

STRUCTURAL CALCULATIONS

FOR

Aria Retaining Walls Lee's Summit, Missouri

Date:
December 20, 2019



GREGORY L. LINNEMAN - PE
MO LICENSE - 2005001013

PREPARED BY:



3100 W. Nifong Blvd, Bldg #1 • Columbia, Missouri 65203

Geotech Tuto

F. BUILDINGS AND STRUCTURES

F.1. SHALLOW FOUNDATION DESIGN

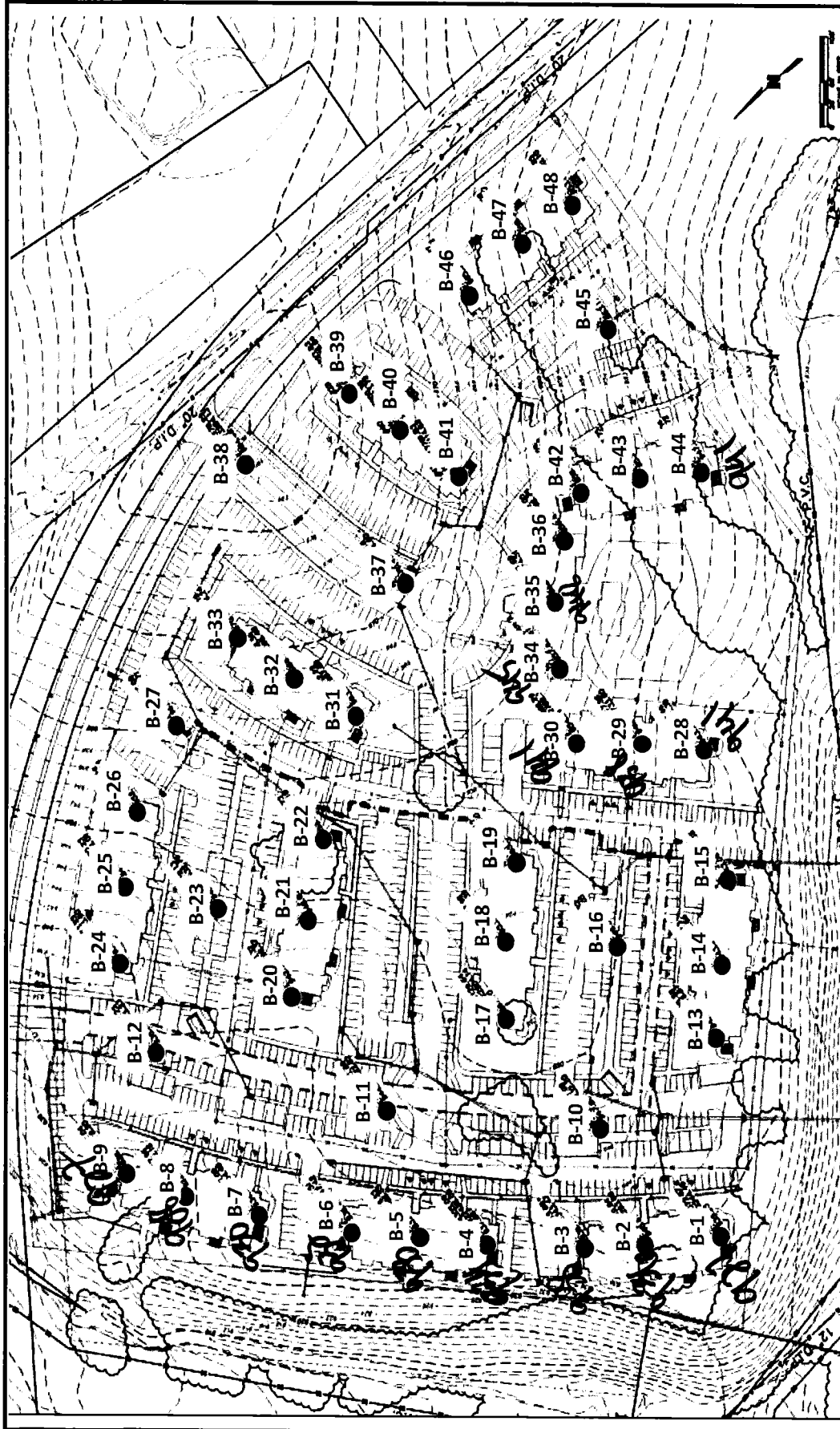
In our opinion, the apartment buildings can be supported on shallow foundations bearing on stiff to very stiff native clay soils, structural fill, or shale bedrock provided the total and differential settlements described in this report are acceptable to the owner. Footings supported on the recommended materials may be proportioned for a maximum allowable net bearing pressure of 2,500 pounds per square foot (psf). The net bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation.

Exterior footings should bear at a minimum depth of 3 feet below the lowest adjacent final ground surface. Footings should have a minimum foundation width of 18 inches for continuous footings and 30 inches for isolated column footings. Earth formed trench footings should have a minimum width of 12 inches.

Lightly loaded interior partition walls (applying less than 0.75 kips per lineal foot (klf)) may be supported directly on the slab-on-grade floor. Depending on the floor slab design and the specific wall loads, it may be necessary to increase the floor slab reinforcement or provide a thickened slab cross-section below interior walls. For interior walls with loads greater than 0.75 klf, we recommend a footing be installed, independent of the floor slab, to properly distribute the wall loads to the underlying soils and reduce the potential for floor slab damage.

The borings encountered occasional softer clay soils that could be present near the bearing elevation of some of the new foundation. **Olsson** should observe and test all foundation bearing materials. If unsuitable bearing materials are encountered in footing excavations, the excavations should be extended deeper to suitable soils. The footings could bear directly on these materials at the lower level or on lean concrete backfill placed in the excavations. The base of all foundation excavations should be free of all water and loose material prior to placing concrete. After foundation subgrades have been observed and evaluated by an **Olsson** representative, concrete should be placed as soon as possible to avoid subjecting the exposed soils to drying, wetting, or freezing conditions. If foundation subgrade soils are subjected to such conditions, **Olsson** should be contacted to reevaluate the foundation bearing materials.

Foundations supported on clay soils (fill or native) could experience total settlements on the order of 1 inch and differential settlements on the order of ½ inch. These estimates do not include consolidation associated with fill placement.



Boring Location Plan

olsson

Scale: n.t.s.

Project No. 019-0012

Approved by: CLW

Date: 8/20/19

Aria Apartments
Lee's Summit, Missouri



BOREHOLE REPORT NO. B-10

Sheet 1 of 1

PROJECT NAME		Aria		CLIENT		Real Equity Management							
PROJECT NUMBER		019-0012		LOCATION		Lee's Summit, Missouri							
ELEVATION (ft)	 Shelby Tube	MATERIAL DESCRIPTION	GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS	
													APPROX. SURFACE ELEV. (ft): 947.0
													0
													5
													10
945		ROOT ZONE	0.5'										
		FAT CLAY											
		Very stiff, moist, brown to dark brown			U 1				29.0	87.2		P. P. = 3.0	
			3.0'										
		Stiff, moist, reddish brown, trace gravel			U 2				26.5	99.7	51/31	P. P. = 1.75	
			5.5'										
940		WEATHERED LIMESTONE											
			9.5'										
		LIMESTONE	10.0'										

REFUSAL AT 10.0 FEET

WATER LEVEL OBSERVATIONS

WD	☒ Not Encountered
IAD	☒ Not Encountered
AD	☒ Not Performed

OLSSON, INC.
1700 E. 123RD STREET
OLATHE, KANSAS 66061

STARTED:	5/29/19	FINISHED:	5/29/19
DRILL CO.:	RC DRILLING	DRILL RIG:	RC-550
DRILLER:	LUKE	LOGGED BY:	DEREK/ALAN
METHOD: CONTINUOUS FLIGHT AUGER			

[illegible]

PROJECT NAME				CLIENT								
Aria				Real Equity Management								
PROJECT NUMBER				LOCATION								
019-0012				Lee's Summit, Missouri								
ELEVATION (ft)	MATERIAL DESCRIPTION		GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS
	APPROX. SURFACE ELEV. (ft): 963.8			0								
	ROOT ZONE		0.5'									
	FAT CLAY											
	Very stiff, moist, dark brown, trace organics				U 1				30.7	90.4		P. P. = 2.0
			3.0'									
960	Very stiff to stiff, moist, brown				U 2				26.2	98.6		P. P. = 2.0
				5								
955					U 3			1.4	26.6	99.1	65/38	
				10								
			13.0'									
950	WEATHERED SHALE				U 4				17.4			P. P. = 4.5
	Moist, brown to gray, trace red											
				15								
945					SS 5		25-30-50/3"		15.8			
			19.8'									

BASE OF BORING AT 19.8 FEET

WATER LEVEL OBSERVATIONS		OLSSON, INC. 1700 E. 123RD STREET OLATHE, KANSAS 66061	STARTED: 5/28/19	FINISHED: 5/28/19
WD	▽ Not Encountered		DRILL CO.: RC DRILLING	DRILL RIG: RC-550
IAD	▼ Not Encountered		DRILLER: LUKE	LOGGED BY: DEREK/ALAN
AD	▽ Not Performed		METHOD: CONTINUOUS FLIGHT AUGER	

Wall Cakes

Cohesion and Friction Angle Correlations with Liquid Limit and Plasticity Index

Input data in yellow cells
Output in green cells

Soil: Fill

Liquid Limit	65
Plastic Limit	27
Plastic Index	38

	Undisturbed							Remolded	
	Das (vs. PI)		T&P (vs. PI)		R&G (vs. LL)		Average	R&G (vs. LL)	
	Mean	95%	Mean	95%	Mean	95%	Mean	Mean	95%
Phi (degrees)	26.2	20.5	27.5	21.8	27.3	23.3	27.0	21.2	17.2
Cohesion (psf)	n/a	n/a	n/a	n/a	230	130	n/a	594	394

Soil: Native

Liquid Limit	51
Plastic Limit	25
Plastic Index	26

	Undisturbed							Remolded	
	Das (vs. PI)		T&P (vs. PI)		R&G (vs. LL)		Average	R&G (vs. LL)	
	Mean	95%	Mean	95%	Mean	95%	Mean	Mean	95%
Phi (degrees)	28.7	23.0	29.5	23.8	30.8	26.8	29.7	25.8	21.8
Cohesion (psf)	n/a	n/a	n/a	n/a	138	38	n/a	443	243

Soil: Bldg 22 Fill

Liquid Limit	60
Plastic Limit	25
Plastic Index	35

	Undisturbed							Remolded	
	Das (vs. PI)		T&P (vs. PI)		R&G (vs. LL)		Average	R&G (vs. LL)	
	Mean	95%	Mean	95%	Mean	95%	Mean	Mean	95%
Phi (degrees)	26.7	21.0	27.9	22.2	28.6	24.6	27.8	22.9	18.9
Cohesion (psf)	n/a	n/a	n/a	n/a	197	97	n/a	540	340

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

Project ID	: Wall 1
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 3.33
Embedment Wall Height(ft)	: 0.50
Exposed Wall Design Height(ft)	: 2.83
Number of Segmental Wall Units	: 5
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 14.00
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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)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	2
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.245
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.236
 Internal Modified Back Slope(Bint) : 14.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 52.923
 Retained Soil(Static)(Ka) : 0.431
 Retained Soil(Static)(Kah Horizontal Component) : 0.415
 External Modified Back Slope(Bext) : 14.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 41.310

Result of External Stability Static Analysis

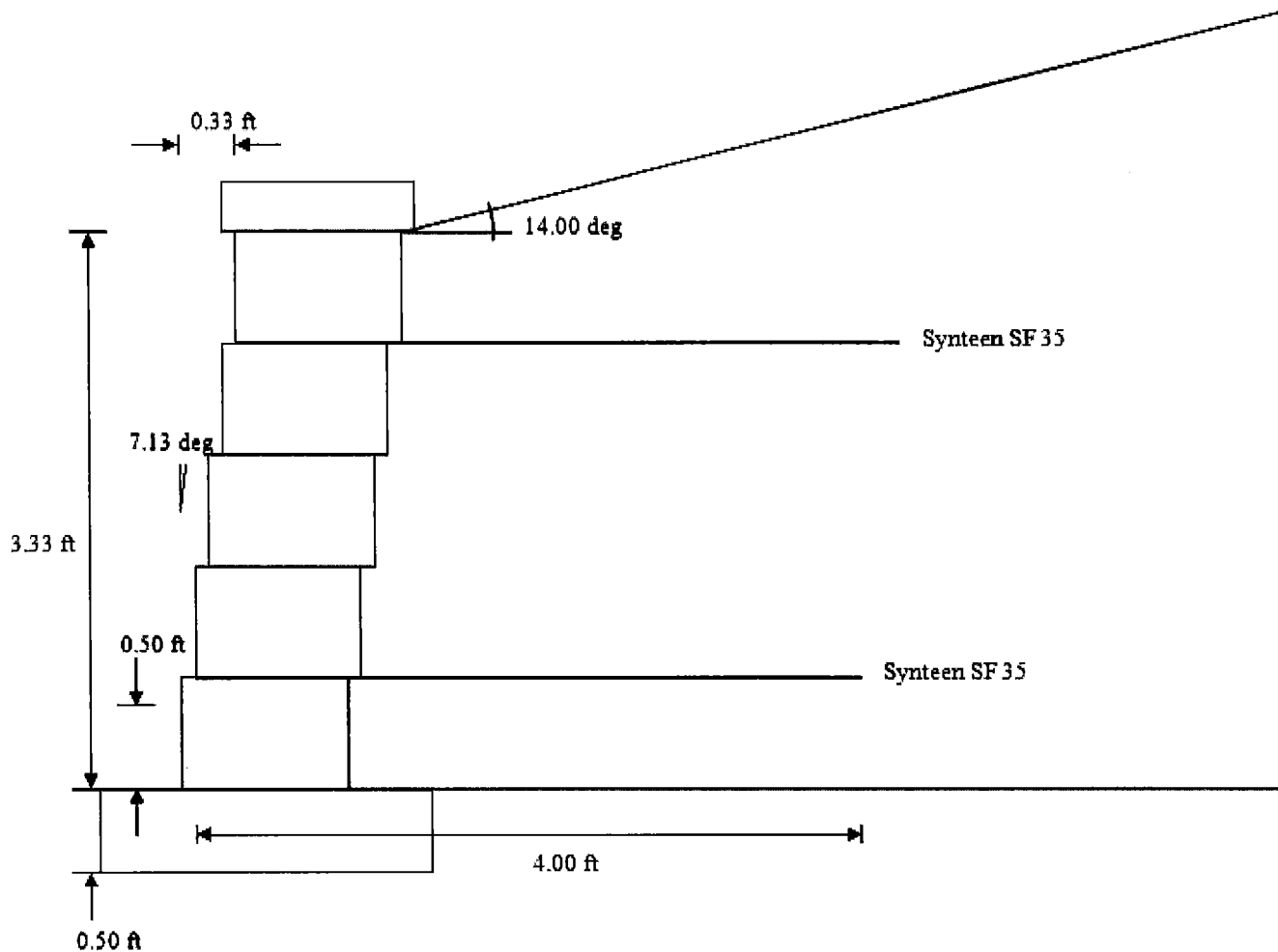
	Calculated	Design Criteria
FOS Sliding	1.84	> 1.50
FOS Overturning	7.16	> 2.00
FOS Bearing Capacity	5.25	> 2.00
Base Reinforcement Length (L)(ft)	4.00	
Base Reinforcement Ratio (L/H)	1.20	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
5	Synteen SF 35	2.67	4.00	1.32	46.11	5.35	26.55	OK
2	Synteen SF 35	0.67	4.00	2.58	15.29	8.51	6.50	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
5	2.67	Synteen SF 35	26.63	22.90
2	0.67	Synteen SF 35		7.82

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 1
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID : ~~Wall 1~~ wall 2
Project Name : Aria Lees Summit
Owner :
Client :
Prepared By :
Company : Crockett Engineering
Address :
Telephone :
Section :
Project File :
Vendor Data File : VERSA-LOK.vdf
Date and Time : 12/20/2019 10:59:02

Type of Structure : Reinforced Wall

Wall Geometry

Design Wall Height(ft) : 2.67
Embedment Wall Height(ft) : 0.50
Exposed Wall Design Height(ft) : 2.17
Number of Segmental Wall Units : 4
Wall Inclination(degrees) : 7.13

Grades

Top Slope(degrees) : 14.00

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)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
 Cap Height (Inches) : 3.62
 Unit Height (Hu)(Inches) : 8.00
 Unit Width (Wu)(Inches) : 12.00
 Unit Length (Inches) : 18.00
 Setback (Inches) : 1.00
 Weight (Infilled)(lb) : 115.00
 Unit Weight (Infilled)(pcf) : 115.00
 Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteon Technical Fabrics	Synteon SF 110	0
Synteon Technical Fabrics	Synteon SF 35	1
Synteon Technical Fabrics	Synteon SF 55	0
Synteon Technical Fabrics	Synteon SF 65	0
Synteon Technical Fabrics	Synteon SF 80	0
Synteon Technical Fabrics	Synteon SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.245
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.236
 Internal Modified Back Slope(Bint) : 14.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 52.923
 Retained Soil(Static)(Ka) : 0.431
 Retained Soil(Static)(Kah Horizontal Component) : 0.415
 External Modified Back Slope(Bext) : 14.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 41.310

Result of External Stability Static Analysis

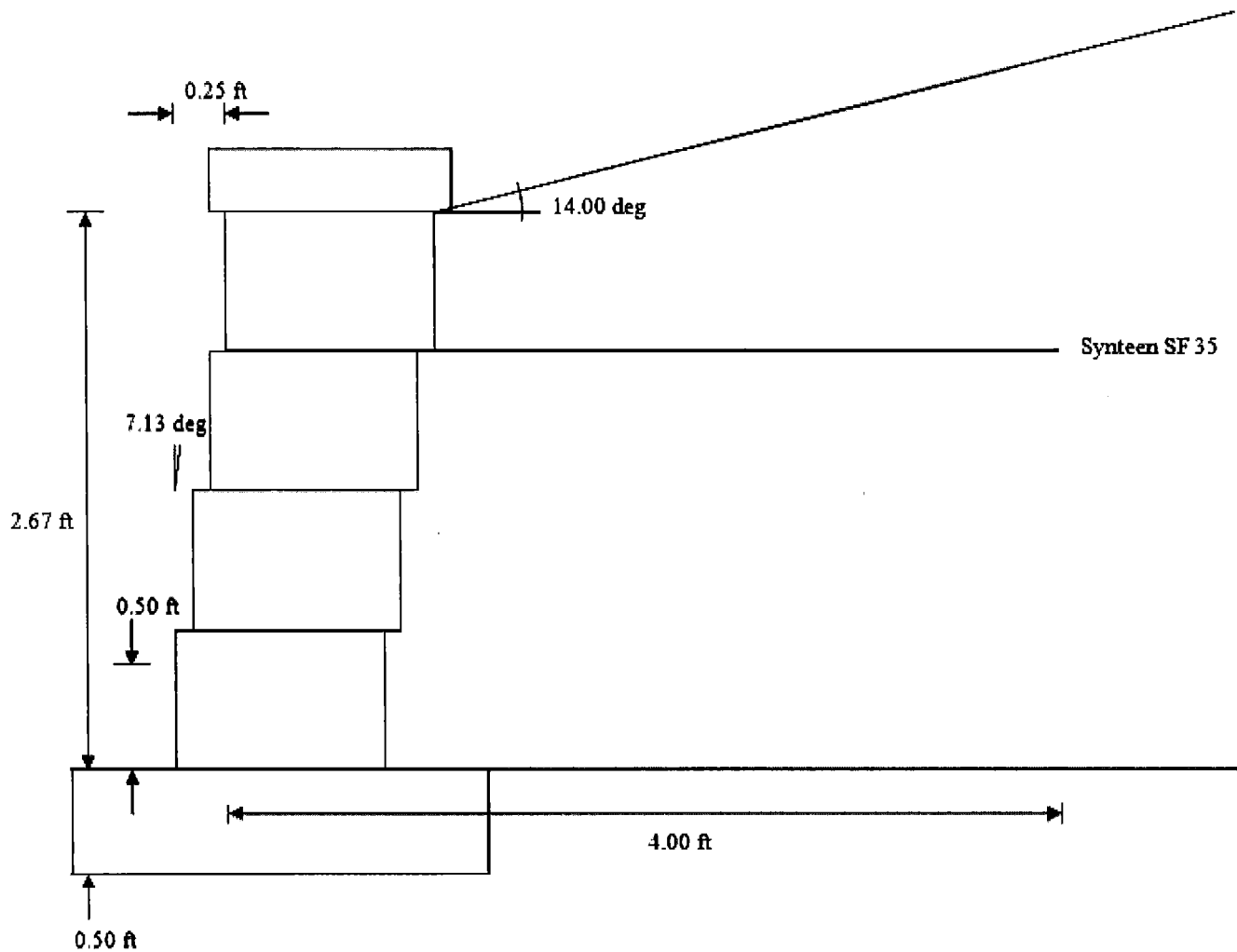
	Calculated	Design Criteria
FOS Sliding	2.13	> 1.50
FOS Overturning	9.84	> 2.00
FOS Bearing Capacity	6.73	> 2.00
Base Reinforcement Length (L)(ft)	4.00	
Base Reinforcement Ratio (L/H)	1.50	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
4	Synteen SF 35	2.00	4.00	1.74	17.94	2.64	26.45	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
4	2.00	Synteen SF 35	26.37	8.91

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 1
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID : Wall 2 3
Project Name : Aria Lees Summit
Owner :
Client :
Prepared By :
Company : Crockett Engineering
Address :
Telephone :
Section :
Project File :
Vendor Data File : VERSA-LOK.vdf
Date and Time : 12/20/2019 10:59:02

Type of Structure : Reinforced Wall

Wall Geometry

Design Wall Height(ft) : 4.67
Embedment Wall Height(ft) : 0.50
Exposed Wall Design Height(ft) : 4.17
Number of Segmental Wall Units : 7
Wall Inclination(degrees) : 7.13

Grades

Top Slope(degrees) : 18.43

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)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	2
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.263
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.253
 Internal Modified Back Slope(Bint) : 18.430
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 51.655
 Retained Soil(Static)(Ka) : 0.500
 Retained Soil(Static)(Kah Horizontal Component) : 0.481
 External Modified Back Slope(Bext) : 18.430
 Orientation of failure plane from horizontal(degrees) for External Stability : 37.225

Result of External Stability Static Analysis

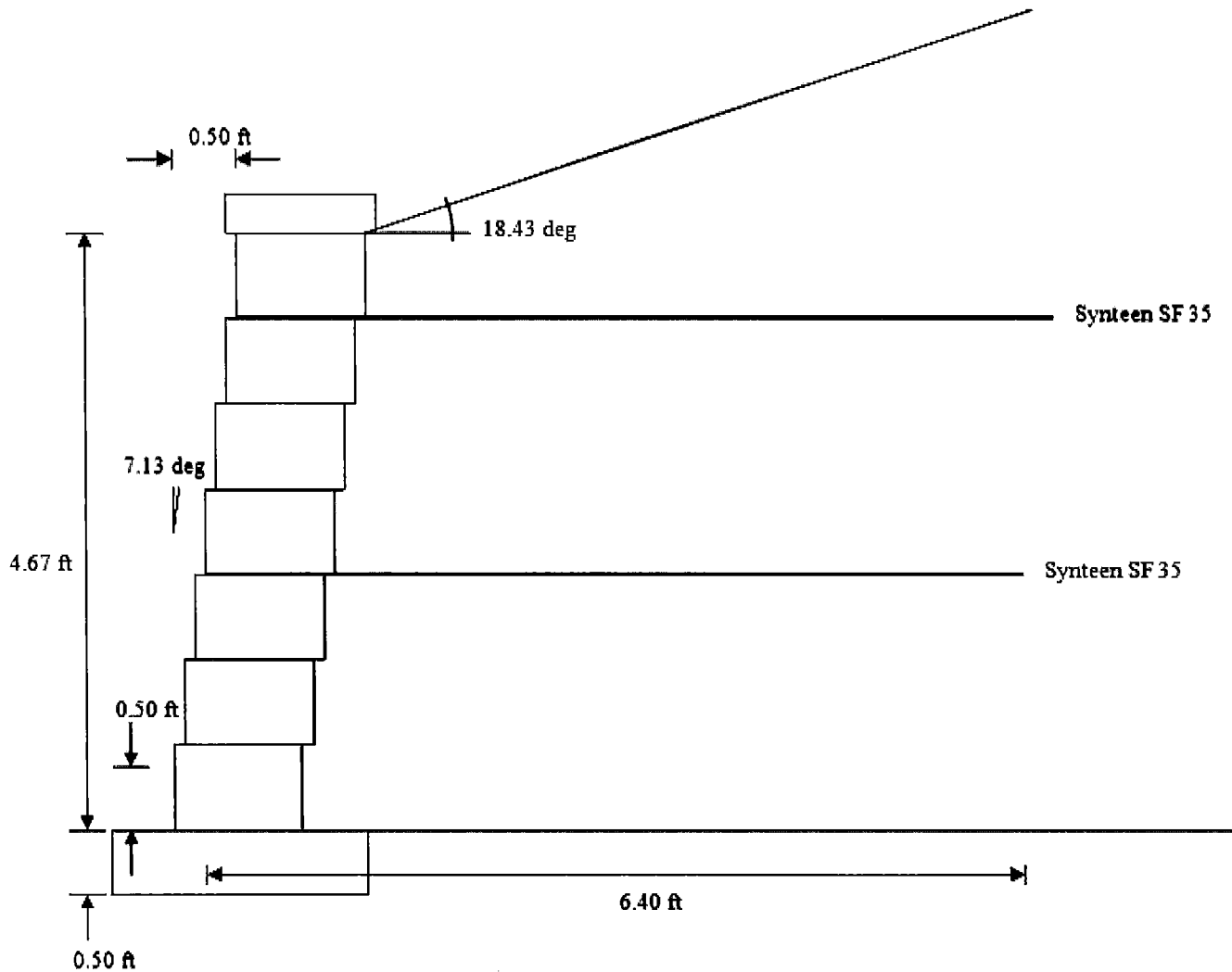
	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	6.00	> 2.00
FOS Bearing Capacity	5.02	> 2.00
Base Reinforcement Length (L)(ft)	6.40	
Base Reinforcement Ratio (L/H)	1.37	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
7	Synteen SF 35	4.00	6.40	2.74	42.70	16.64	9.28	OK
4	Synteen SF 35	2.00	6.40	4.07	6.24	6.71	4.37	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
7	4.00	Synteen SF 35	24.52	21.20
4	2.00	Synteen SF 35		3.19

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 2
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 5
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 6.67
Embedment Wall Height(ft)	: 0.50
Exposed Wall Design Height(ft)	: 6.17
Number of Segmental Wall Units	: 10
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 1.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
 Cap Height (Inches) : 3.62
 Unit Height (Hu)(Inches) : 8.00
 Unit Width (Wu)(Inches) : 12.00
 Unit Length (Inches) : 18.00
 Setback (Inches) : 1.00
 Weight (Infilled)(lb) : 115.00
 Unit Weight (Infilled)(pcf) : 115.00
 Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	3
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Cl	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : **No**

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : **0.207**
 Reinforcement Soil(Static)(Kah Horizontal Component) : **0.199**
 Internal Modified Back Slope(Bint) : **0.000**
 Orientation of failure plane from horizontal(degrees) for Internal Stability : **55.631**
 Retained Soil(Static)(Ka) : **0.332**
 Retained Soil(Static)(Kah Horizontal Component) : **0.319**
 External Modified Back Slope(Bext) : **0.000**
 Orientation of failure plane from horizontal(degrees) for External Stability : **47.704**

Result of External Stability Static Analysis

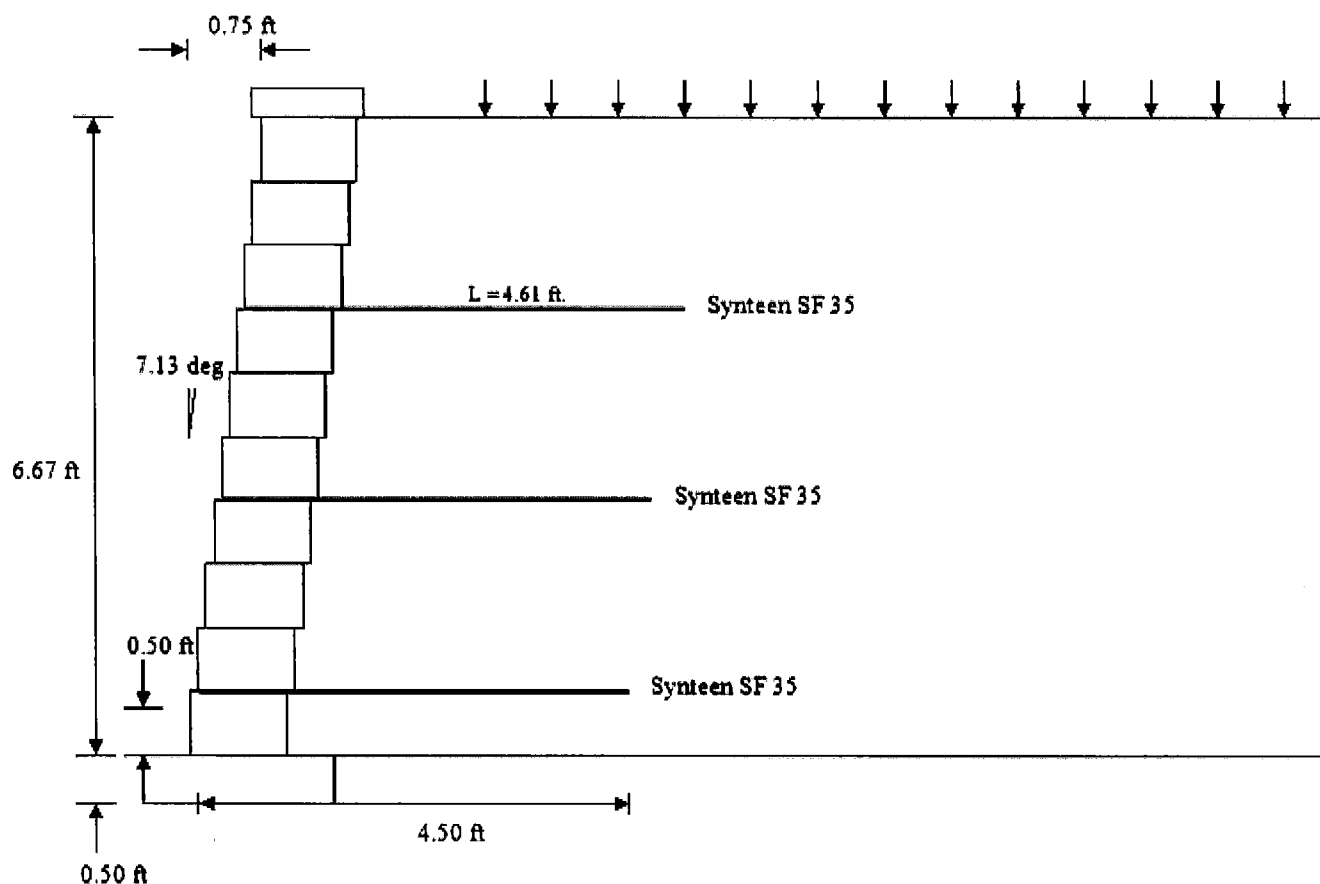
	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	3.78	> 2.00
FOS Bearing Capacity	2.28	> 2.00
Base Reinforcement Length (L)(ft)	4.50	
Base Reinforcement Ratio (L/H)	0.68	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
8	Synteen SF 35	4.67	4.61	1.00	10.93	1.57	12.24	OK
5	Synteen SF 35	2.67	4.50	2.01	7.85	4.53	5.38	OK
2	Synteen SF 35	0.67	4.50	3.13	6.80	9.16	3.35	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
8	4.67	Synteen SF 35	4.05	8.50
5	2.67	Synteen SF 35		4.09
2	0.67	Synteen SF 35		3.65

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 5
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 12.67
Embedment Wall Height(ft)	: 1.15
Exposed Wall Design Height(ft)	: 11.52
Number of Segmental Wall Units	: 19
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 1.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	6
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	CI	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

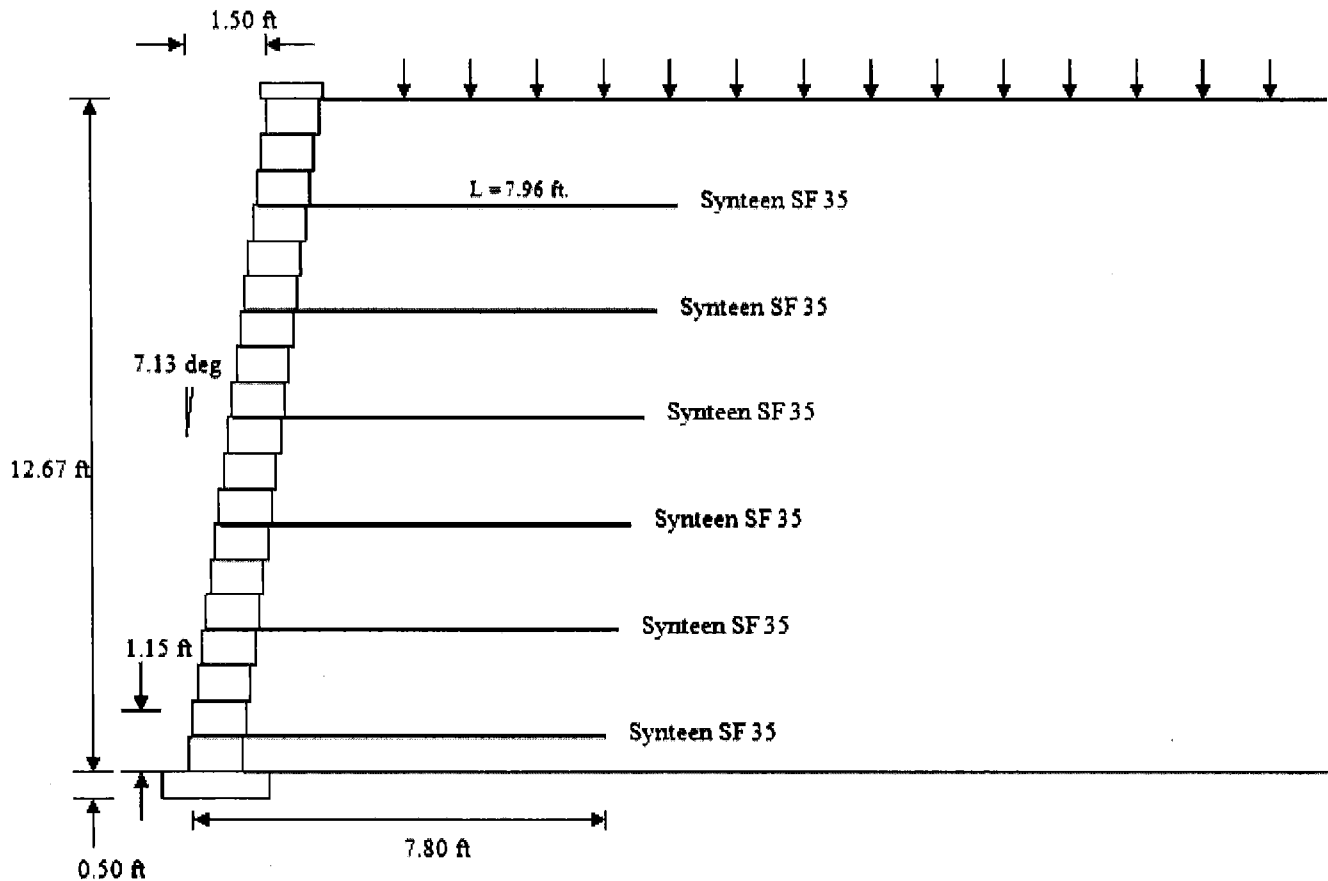
	Calculated	Design Criteria
FOS Sliding	1.51	> 1.50
FOS Overturning	3.70	> 2.00
FOS Bearing Capacity	2.36	> 2.00
Base Reinforcement Length (L)(ft)	7.80	
Base Reinforcement Ratio (L/H)	0.62	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
17	Synteen SF 35	10.67	7.96	1.00	10.93	1.57	15.41	OK
14	Synteen SF 35	8.67	7.80	1.95	7.85	4.41	7.43	OK
11	Synteen SF 35	6.67	7.80	3.07	5.54	7.33	4.86	OK
8	Synteen SF 35	4.67	7.80	4.19	4.28	10.30	3.61	OK
5	Synteen SF 35	2.67	7.80	5.31	3.49	13.29	2.87	OK
2	Synteen SF 35	0.67	7.80	6.43	3.57	19.77	2.38	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
17	10.67	Synteen SF 35	4.05	8.50
14	8.67	Synteen SF 35		4.09
11	6.67	Synteen SF 35		2.97
8	4.67	Synteen SF 35		2.36
5	2.67	Synteen SF 35		1.98
2	0.67	Synteen SF 35		2.08

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 12.00
Embedment Wall Height(ft)	: 1.15
Exposed Wall Design Height(ft)	: 10.85
Number of Segmental Wall Units	: 18
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 1.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	6
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

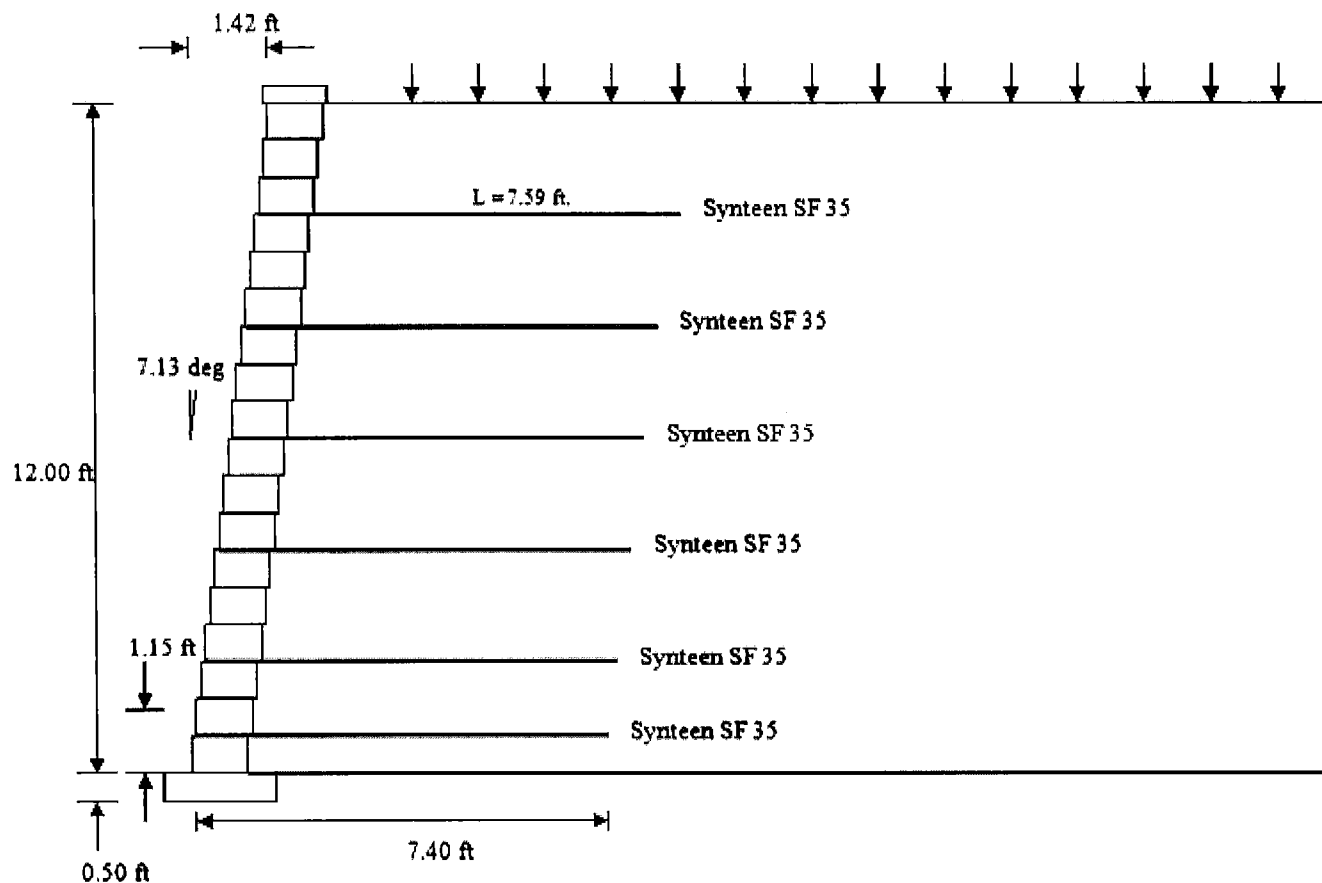
	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	3.67	> 2.00
FOS Bearing Capacity	2.38	> 2.00
Base Reinforcement Length (L)(ft)	7.40	
Base Reinforcement Ratio (L/H)	0.62	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
16	Synteen SF 35	10.00	7.59	1.00	10.91	1.57	15.00	OK
13	Synteen SF 35	8.00	7.40	1.93	7.84	4.35	7.17	OK
10	Synteen SF 35	6.00	7.40	3.05	5.54	7.27	4.68	OK
7	Synteen SF 35	4.00	7.40	4.16	4.28	10.24	3.46	OK
4	Synteen SF 35	2.00	7.40	5.28	4.25	16.14	2.75	OK
2	Synteen SF 35	0.67	7.40	6.03	4.65	22.80	2.41	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
16	10.00	Synteen SF 35	4.04	8.48
13	8.00	Synteen SF 35		4.09
10	6.00	Synteen SF 35		2.97
7	4.00	Synteen SF 35		2.36
4	2.00	Synteen SF 35		2.41
2	0.67	Synteen SF 35		2.68

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 10.00
Embedment Wall Height(ft)	: 1.15
Exposed Wall Design Height(ft)	: 8.85
Number of Segmental Wall Units	: 15
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 1.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	5
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	CI	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

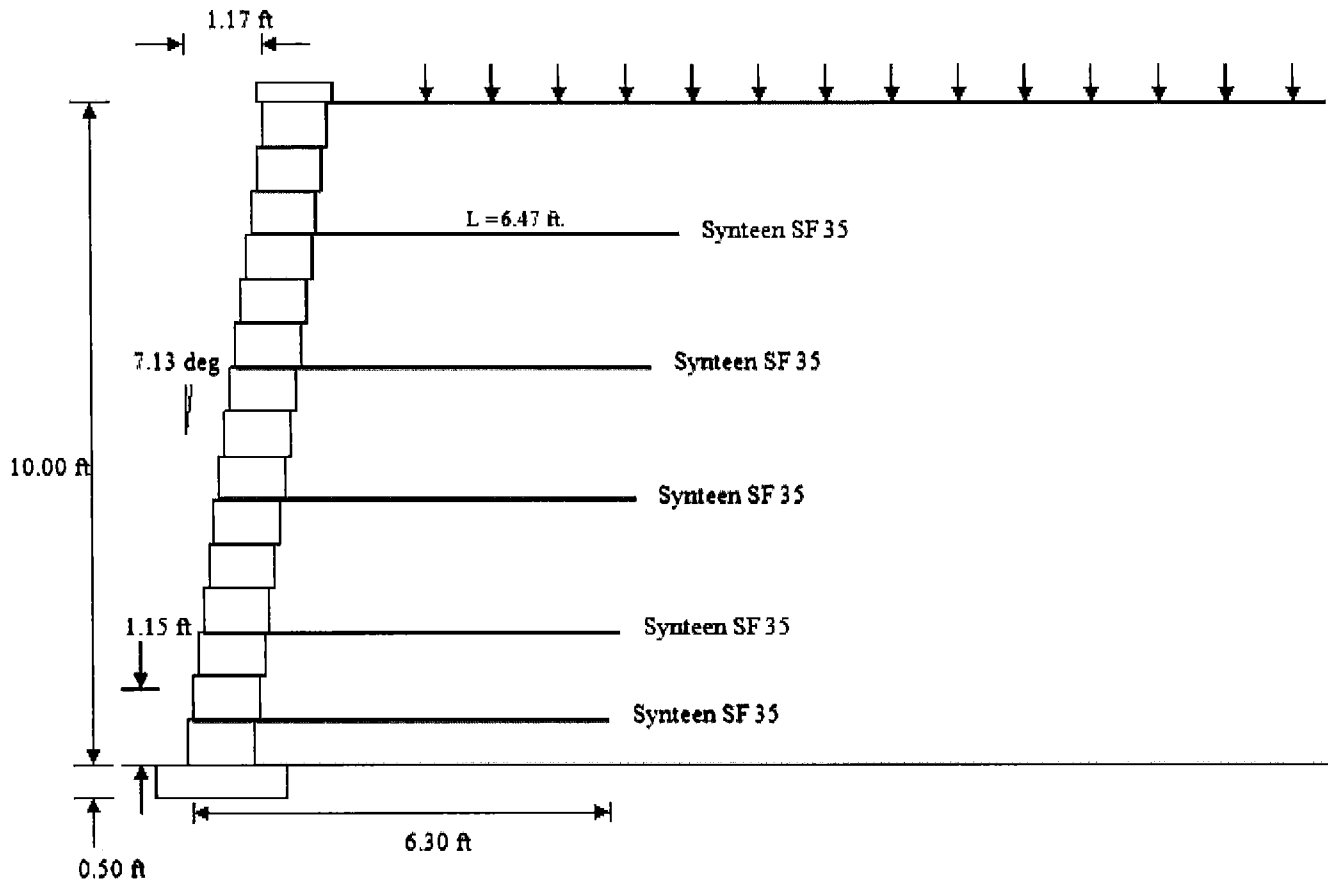
	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	3.68	> 2.00
FOS Bearing Capacity	2.51	> 2.00
Base Reinforcement Length (L)(ft)	6.30	
Base Reinforcement Ratio (L/H)	0.63	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
13	Synteen SF 35	8.00	6.47	1.00	10.91	1.57	13.94	OK
10	Synteen SF 35	6.00	6.30	1.95	7.84	4.39	6.49	OK
7	Synteen SF 35	4.00	6.30	3.06	5.54	7.31	4.17	OK
4	Synteen SF 35	2.00	6.30	4.18	5.24	12.59	3.06	OK
2	Synteen SF 35	0.67	6.30	4.93	5.57	18.38	2.60	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
13	8.00	Synteen SF 35	4.04	8.48
10	6.00	Synteen SF 35		4.09
7	4.00	Synteen SF 35		2.97
4	2.00	Synteen SF 35		2.89
2	0.67	Synteen SF 35		3.13

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 8.00
Embedment Wall Height(ft)	: 1.15
Exposed Wall Design Height(ft)	: 6.85
Number of Segmental Wall Units	: 12
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 1.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
 Cap Height (Inches) : 3.62
 Unit Height (Hu)(Inches) : 8.00
 Unit Width (Wu)(Inches) : 12.00
 Unit Length (Inches) : 18.00
 Setback (Inches) : 1.00
 Weight (Infilled)(lb) : 115.00
 Unit Weight (Infilled)(pcf) : 115.00
 Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	3
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

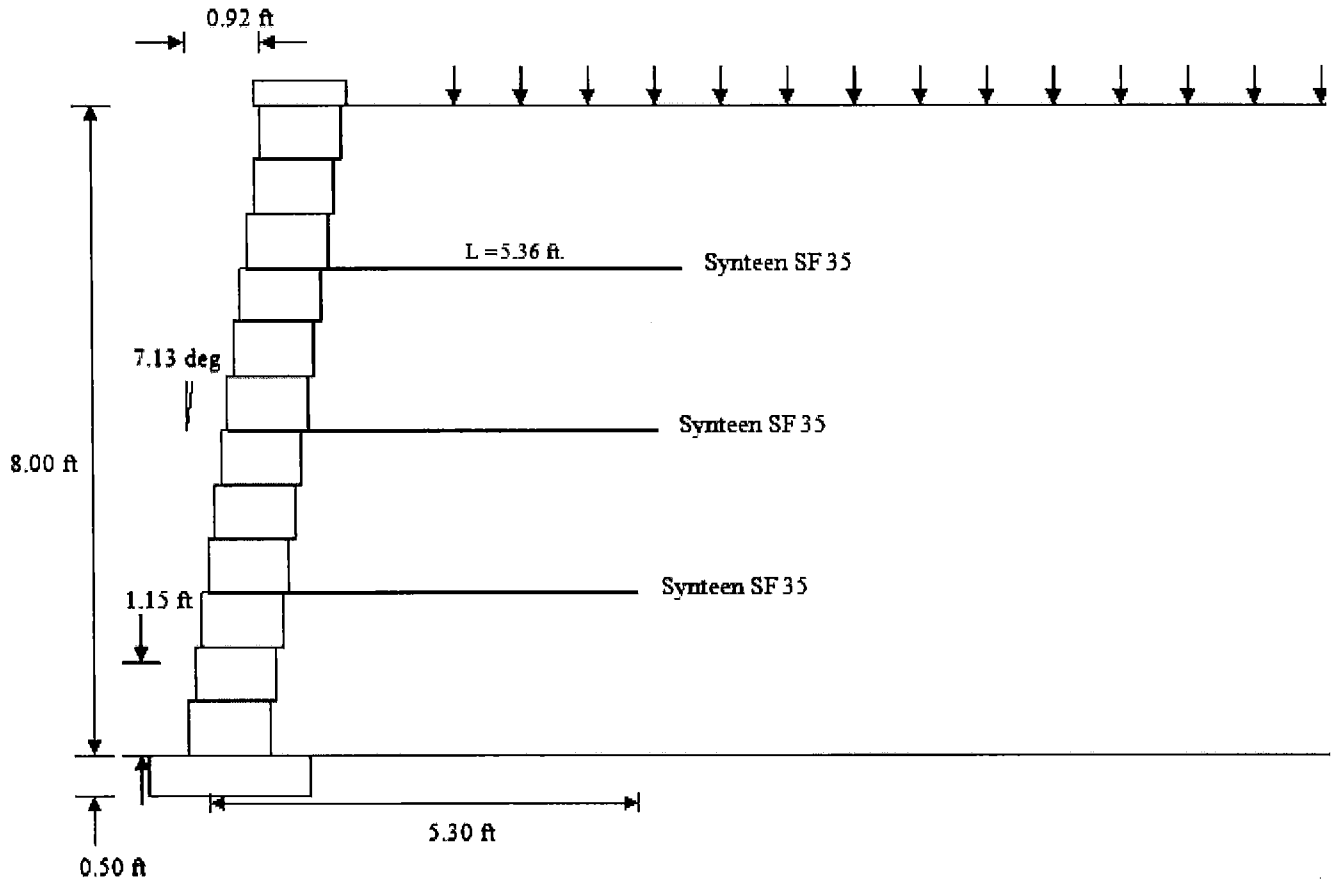
	Calculated	Design Criteria
FOS Sliding	1.52	> 1.50
FOS Overturning	3.84	> 2.00
FOS Bearing Capacity	2.77	> 2.00
Base Reinforcement Length (L)(ft)	5.30	
Base Reinforcement Ratio (L/H)	0.66	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
10	Synteen SF 35	6.00	5.36	1.01	10.91	1.58	12.98	OK
7	Synteen SF 35	4.00	5.30	2.06	7.84	4.65	5.87	OK
4	Synteen SF 35	2.00	5.30	3.18	3.44	4.72	3.71	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
10	6.00	Synteen SF 35	4.04	8.48
7	4.00	Synteen SF 35		4.09
4	2.00	Synteen SF 35		1.85

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 6.00
Embedment Wall Height(ft)	: 1.15
Exposed Wall Design Height(ft)	: 4.85
Number of Segmental Wall Units	: 9
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 1.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
Cap Height (Inches) : 3.62
Unit Height (Hu)(Inches) : 8.00
Unit Width (Wu)(Inches) : 12.00
Unit Length (Inches) : 18.00
Setback (Inches) : 1.00
Weight (Infilled)(lb) : 115.00
Unit Weight (Infilled)(pcf) : 115.00
Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	2
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

	Calculated	Design Criteria
FOS Sliding	1.52	> 1.50
FOS Overturning	3.92	> 2.00
FOS Bearing Capacity	3.11	> 2.00
Base Reinforcement Length (L)(ft)	4.20	
Base Reinforcement Ratio (L/H)	0.70	> 0.60

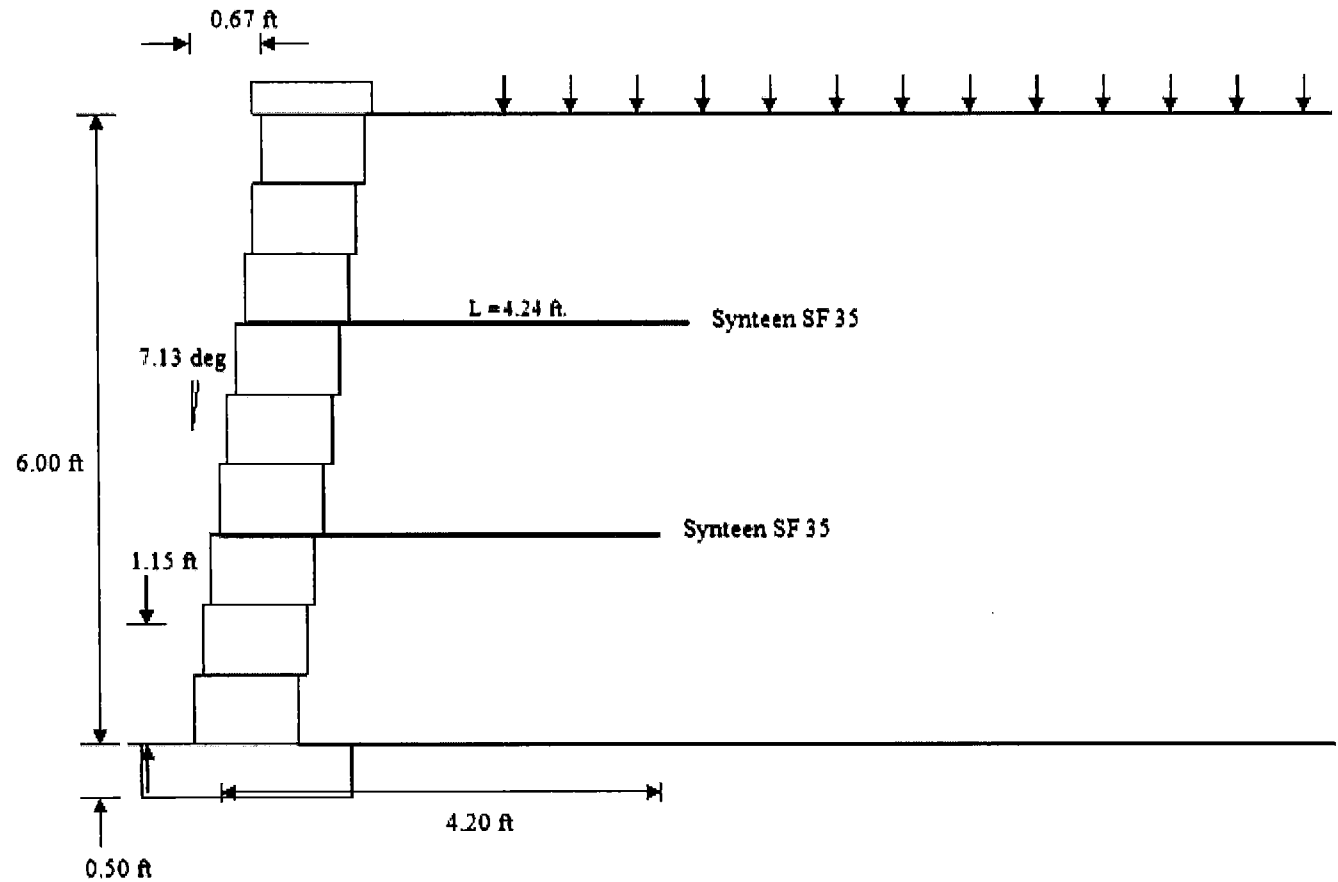
Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
7	Synteen SF 35	4.00	4.24	1.00	10.91	1.58	11.93	OK
4	Synteen SF 35	2.00	4.20	2.08	4.74	2.83	5.18	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
7	4.00	Synteen SF 35	4.04	8.48
4	2.00	Synteen SF 35		2.47

Wall Reinforcement Layout



Project Identification

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 4.00
Embedment Wall Height(ft)	: 1.15
Exposed Wall Design Height(ft)	: 2.85
Number of Segmental Wall Units	: 6
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 1.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
 Cap Height (Inches) : 3.62
 Unit Height (Hu)(Inches) : 8.00
 Unit Width (Wu)(Inches) : 12.00
 Unit Length (Inches) : 18.00
 Setback (Inches) : 1.00
 Weight (Infilled)(lb) : 115.00
 Unit Weight (Infilled)(pcf) : 115.00
 Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	1
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

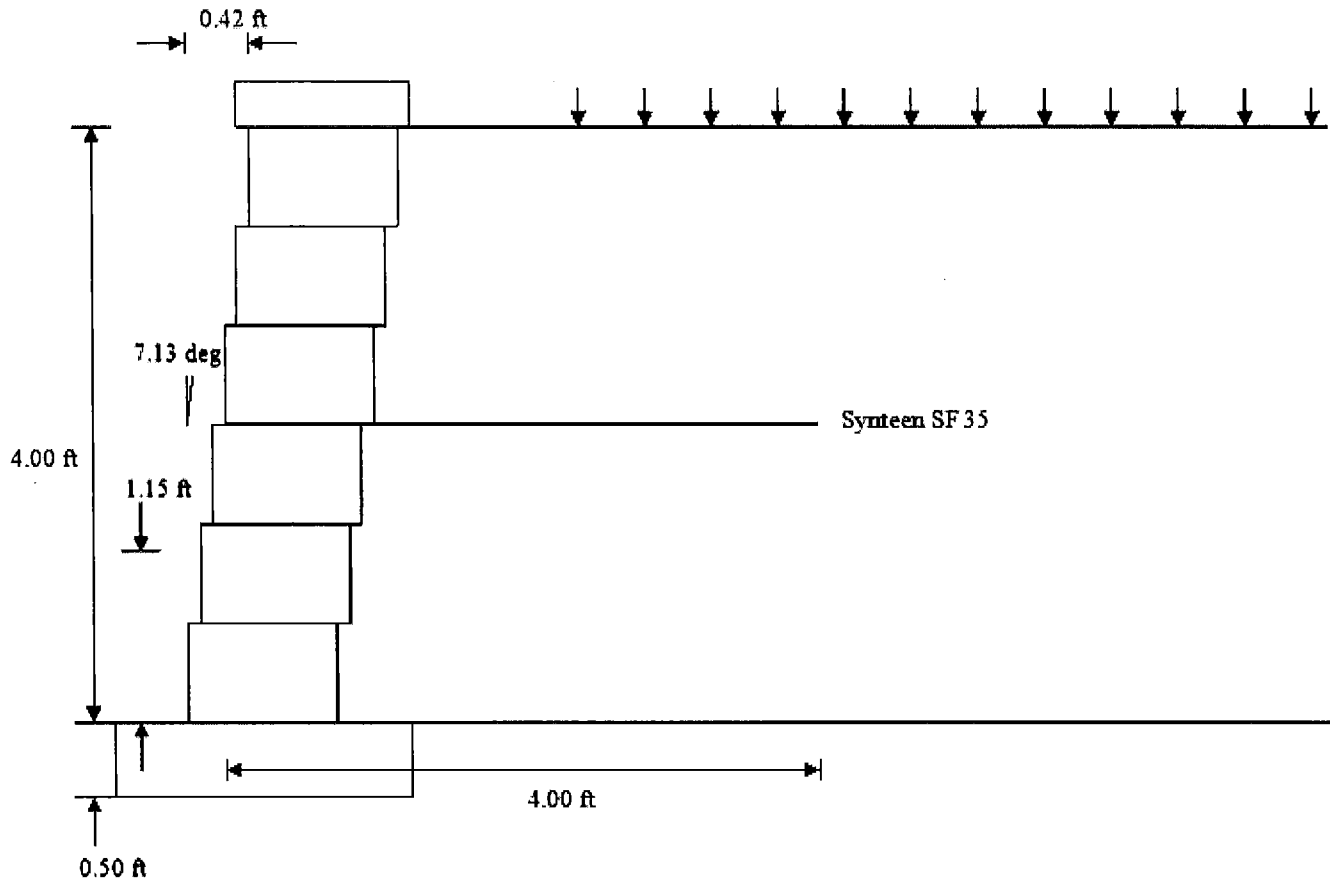
	Calculated	Design Criteria
FOS Sliding	1.96	> 1.50
FOS Overturning	6.65	> 2.00
FOS Bearing Capacity	4.96	> 2.00
Base Reinforcement Length (L)(ft)	4.00	
Base Reinforcement Ratio (L/H)	1.00	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
4	Synteen SF 35	2.00	4.00	1.88	6.72	1.82	11.73	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
4	2.00	Synteen SF 35	4.04	4.77

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 6
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 7
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 7.33
Embedment Wall Height(ft)	: 1.00
Exposed Wall Design Height(ft)	: 6.33
Number of Segmental Wall Units	: 11
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 12.52
Broken Back Distance(ft)	: 20.00

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)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	3
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.239
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.230
 Internal Modified Back Slope(Bint) : 12.520
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 53.286
 Retained Soil(Static)(Ka) : 0.415
 Retained Soil(Static)(Kah Horizontal Component) : 0.399
 External Modified Back Slope(Bext) : 12.520
 Orientation of failure plane from horizontal(degrees) for External Stability : 42.300

Result of External Stability Static Analysis

	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	4.58	> 2.00
FOS Bearing Capacity	3.62	> 2.00
Base Reinforcement Length (L)(ft)	6.30	
Base Reinforcement Ratio (L/H)	0.86	> 0.60

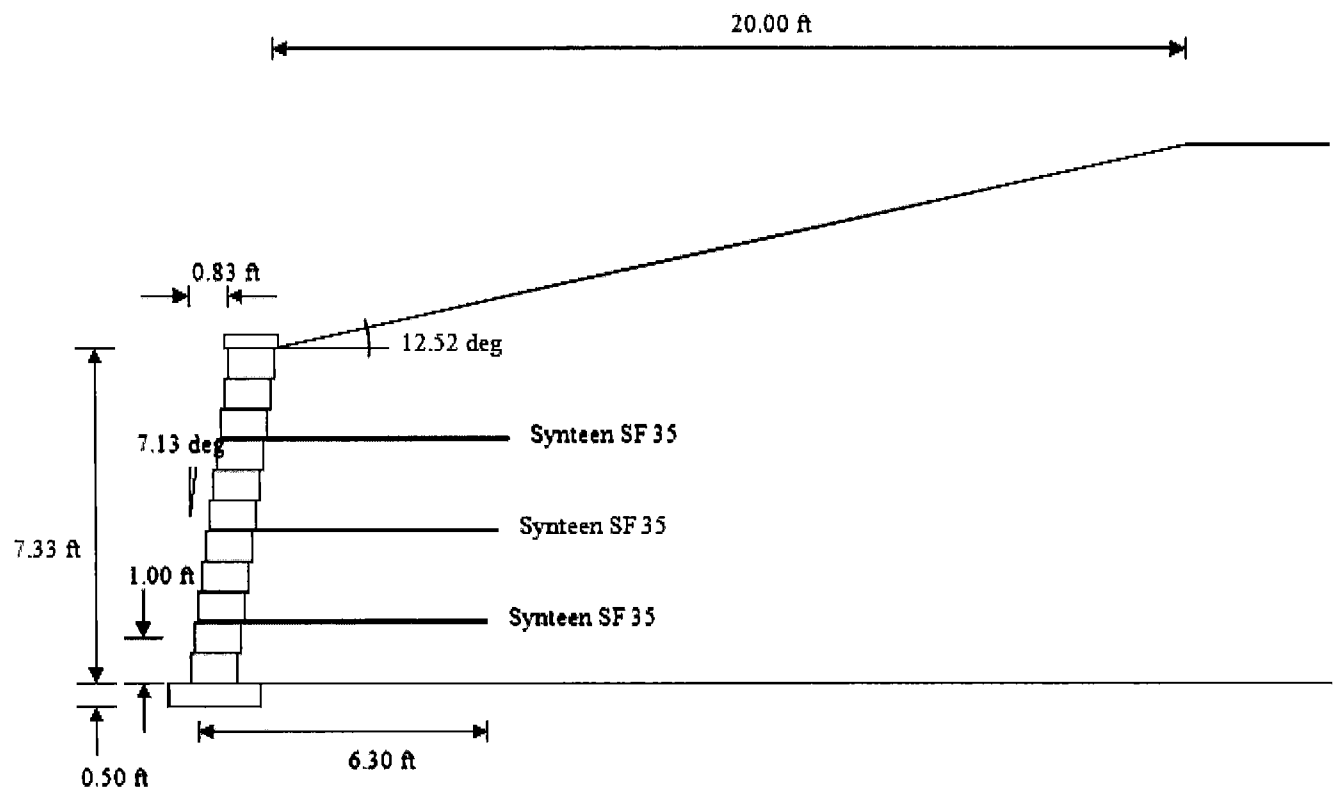
Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
9	Synteen SF 35	5.33	6.30	1.99	14.45	6.00	8.80	OK
6	Synteen SF 35	3.33	6.30	3.23	8.14	8.90	4.66	OK
3	Synteen SF 35	1.33	6.30	4.47	4.53	9.50	3.13	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
9	5.33	Synteen SF 35	3.48	7.32
6	3.33	Synteen SF 35		4.25
3	1.33	Synteen SF 35		2.43

Wall Reinforcement Layout



Project Identification

Project ID	: Wall 7
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 7
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 6.00
Embedment Wall Height(ft)	: 1.00
Exposed Wall Design Height(ft)	: 5.00
Number of Segmental Wall Units	: 9
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 12.52
Broken Back Distance(ft)	: 20.00

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)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	2
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	CI	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.239
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.230
 Internal Modified Back Slope(Bint) : 12.520
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 53.286
 Retained Soil(Static)(Ka) : 0.415
 Retained Soil(Static)(Kah Horizontal Component) : 0.399
 External Modified Back Slope(Bext) : 12.520
 Orientation of failure plane from horizontal(degrees) for External Stability : 42.300

Result of External Stability Static Analysis

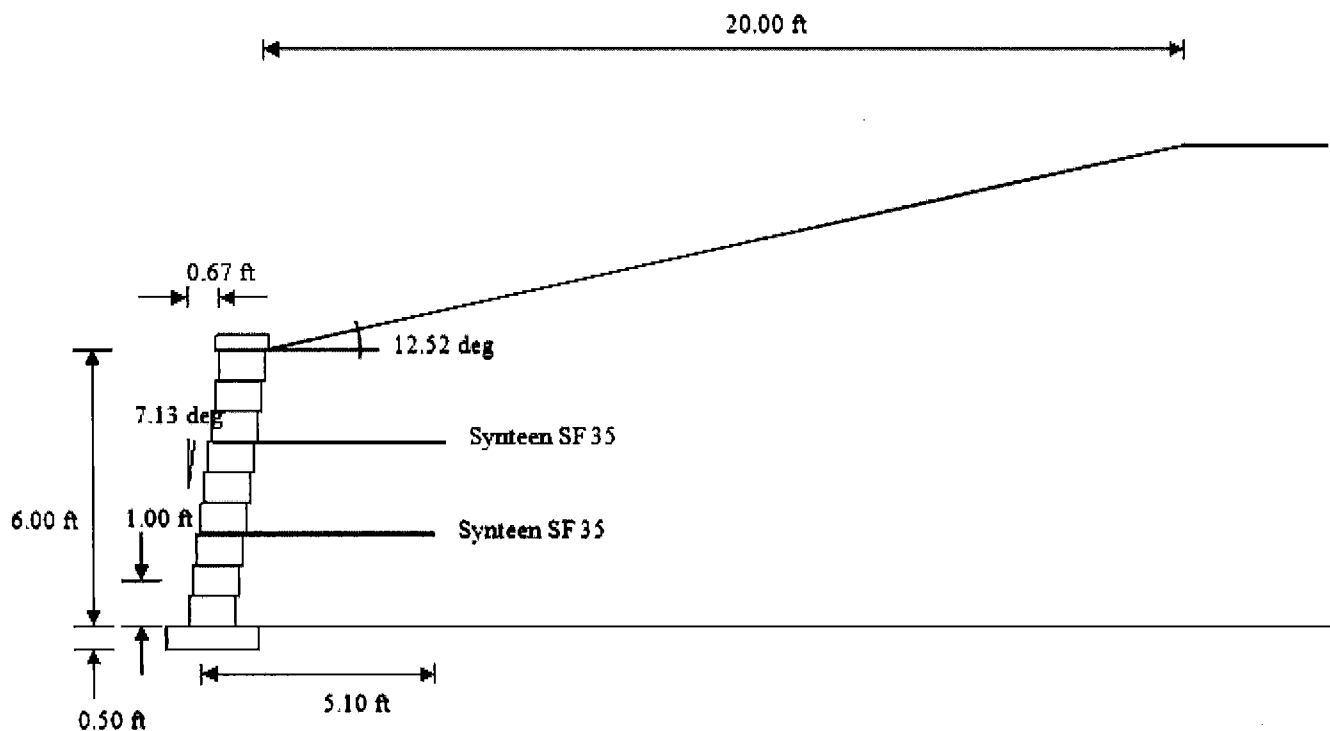
	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	4.55	> 2.00
FOS Bearing Capacity	3.80	> 2.00
Base Reinforcement Length (L)(ft)	5.10	
Base Reinforcement Ratio (L/H)	0.85	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
7	Synteen SF 35	4.00	5.10	1.62	14.48	4.50	9.33	OK
4	Synteen SF 35	2.00	5.10	2.86	4.83	4.44	4.50	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
7	4.00	Synteen SF 35	3.49	7.34
4	2.00	Synteen SF 35		2.52

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 7
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 7
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 4.00
Embedment Wall Height(ft)	: 1.00
Exposed Wall Design Height(ft)	: 3.00
Number of Segmental Wall Units	: 6
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 12.52
Broken Back Distance(ft)	: 20.00

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)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	1
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	CI	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.239
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.230
 Internal Modified Back Slope(Bint) : 12.520
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 53.286
 Retained Soil(Static)(Ka) : 0.415
 Retained Soil(Static)(Kah Horizontal Component) : 0.399
 External Modified Back Slope(Bext) : 12.520
 Orientation of failure plane from horizontal(degrees) for External Stability : 42.300

Result of External Stability Static Analysis

	Calculated	Design Criteria
FOS Sliding	1.72	> 1.50
FOS Overturning	5.93	> 2.00
FOS Bearing Capacity	5.20	> 2.00
Base Reinforcement Length (L)(ft)	4.00	
Base Reinforcement Ratio (L/H)	1.00	> 0.60

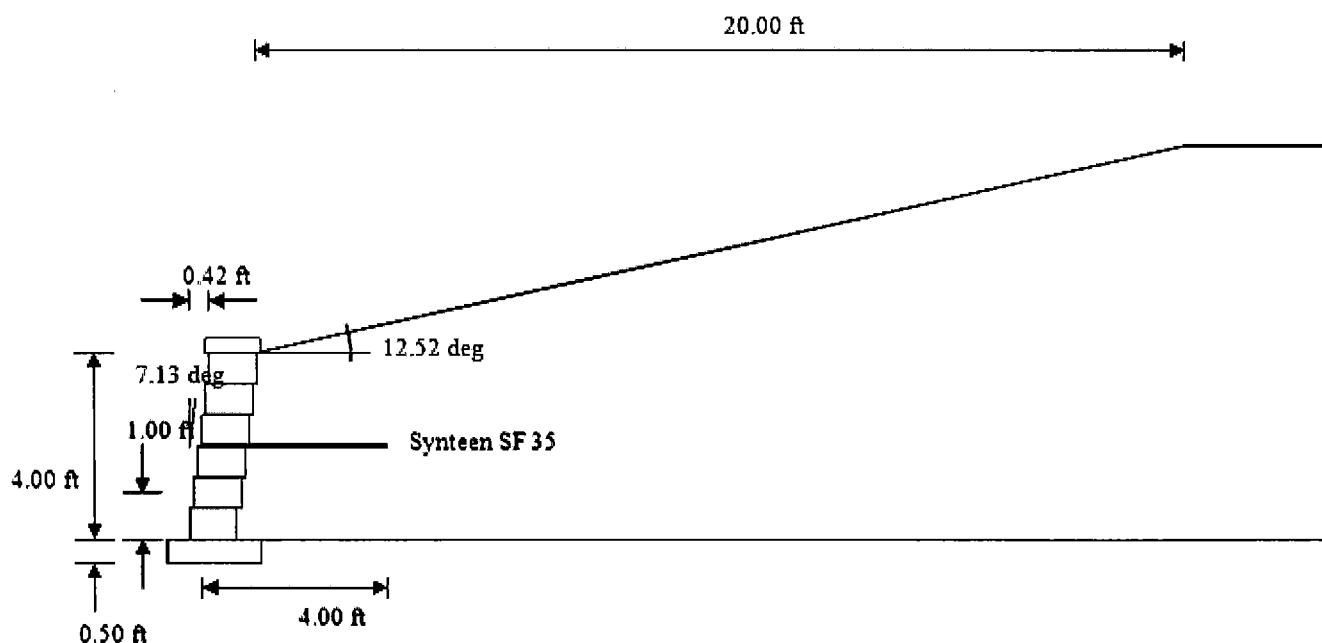
Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
4	Synteen SF 35	2.00	4.00	1.76	8.15	2.49	9.95	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
4	2.00	Synteen SF 35	3.49	4.13

Wall Reinforcement Layout



Project Identification

Project ID	:	Wall 7
Project Name	:	Aria Lees Summit
Owner	:	
Client	:	
Prepared By	:	
Company	:	Crockett Engineering
Address	:	
Telephone	:	
Section	:	
Vendor Data File	:	VERSA-LOK.vdf
Project File	:	
Date and Time	:	12/20/2019 10:59:02

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

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 6.00
Embedment Wall Height(ft)	: 0.55
Exposed Wall Design Height(ft)	: 5.45
Number of Segmental Wall Units	: 9
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 18.43
Broken Back Distance(ft)	: 9.00

Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 9.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	2
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.245
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.236
 Internal Modified Back Slope(Bint) : 14.032
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 52.915
 Retained Soil(Static)(Ka) : 0.368
 Retained Soil(Static)(Kah Horizontal Component) : 0.354
 External Modified Back Slope(Bext) : 6.712
 Orientation of failure plane from horizontal(degrees) for External Stability : 45.279

Result of External Stability Static Analysis

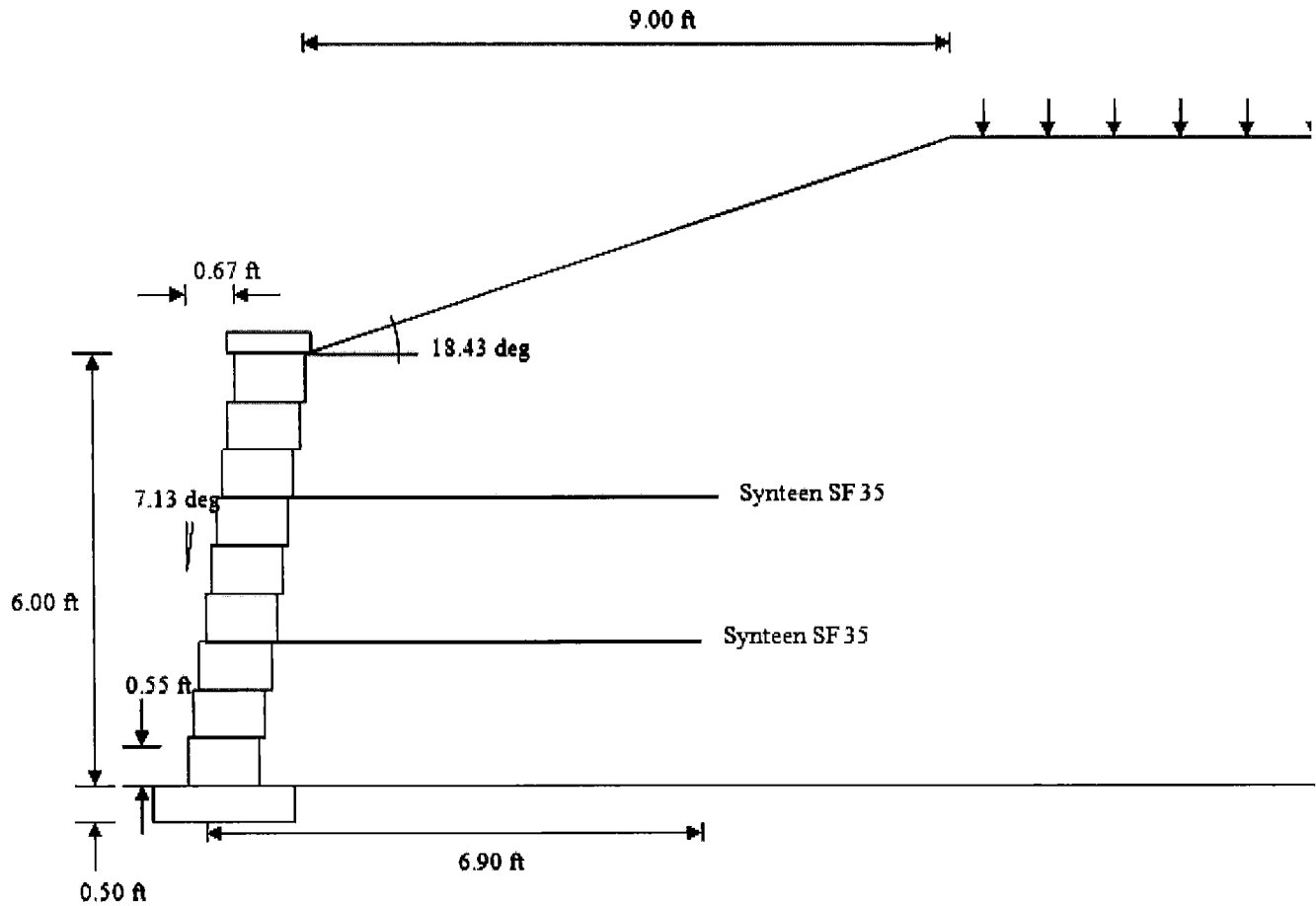
	Calculated	Design Criteria
FOS Sliding	1.51	> 1.50
FOS Overturning	4.93	> 2.00
FOS Bearing Capacity	3.66	> 2.00
Base Reinforcement Length (L)(ft)	6.90	
Base Reinforcement Ratio (L/H)	1.15	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
7	Synteen SF 35	4.00	6.90	3.38	9.24	7.44	4.97	OK
4	Synteen SF 35	2.00	6.90	4.64	4.01	6.72	3.41	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
7	4.00	Synteen SF 35	3.42	7.18
4	2.00	Synteen SF 35		2.46

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 4.00
Embedment Wall Height(ft)	: 0.50
Exposed Wall Design Height(ft)	: 3.50
Number of Segmental Wall Units	: 6
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 18.43
Broken Back Distance(ft)	: 9.00

Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Live Load Surcharge Setback(ft)	: 9.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	1
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.263
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.253
 Internal Modified Back Slope(Bint) : 18.430
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 51.655
 Retained Soil(Static)(Ka) : 0.409
 Retained Soil(Static)(Kah Horizontal Component) : 0.393
 External Modified Back Slope(Bext) : 11.987
 Orientation of failure plane from horizontal(degrees) for External Stability : 42.628

Result of External Stability Static Analysis

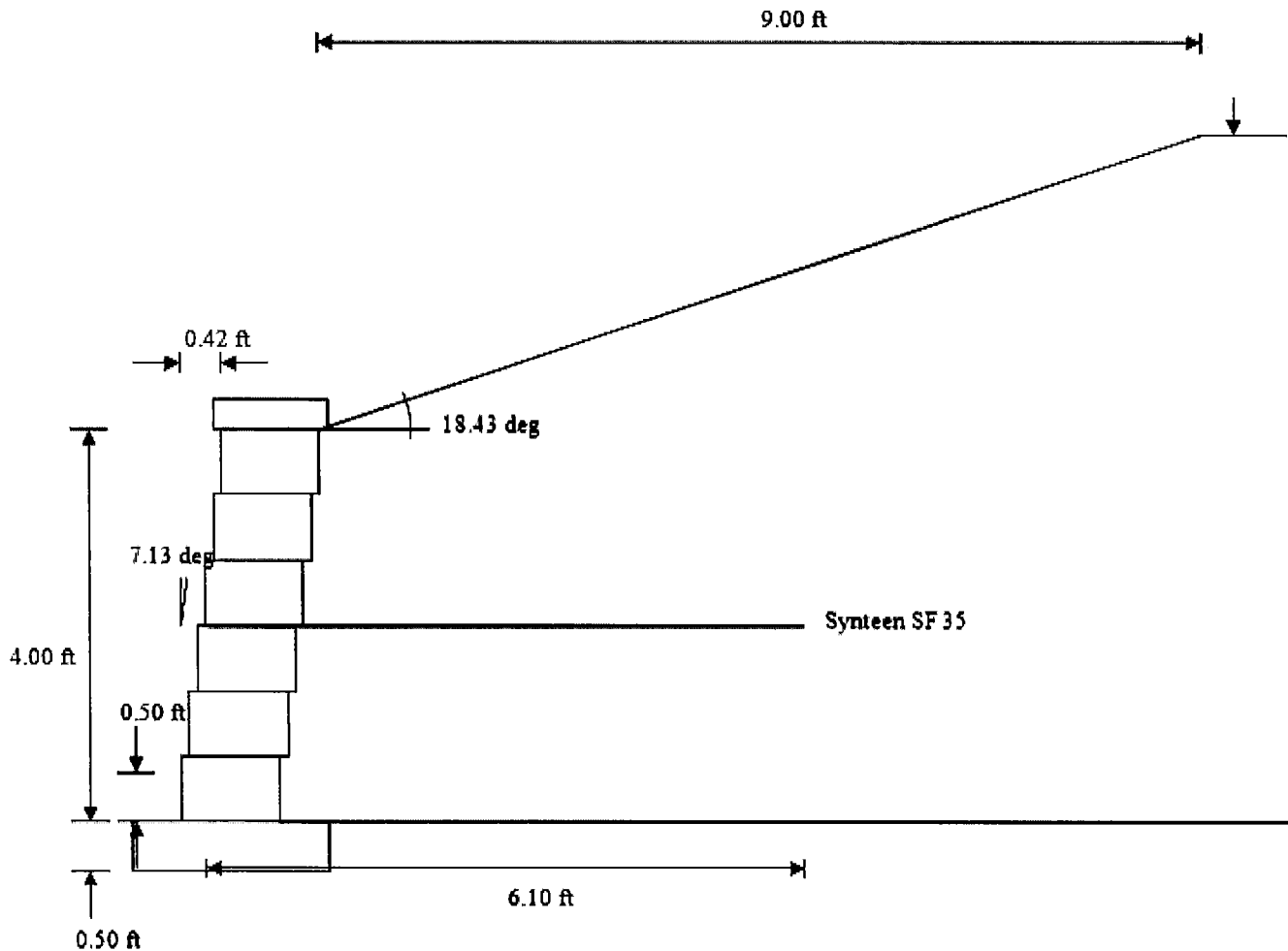
	Calculated	Design Criteria
FOS Sliding	1.51	> 1.50
FOS Overturning	5.85	> 2.00
FOS Bearing Capacity	4.76	> 2.00
Base Reinforcement Length (L)(ft)	6.10	
Base Reinforcement Ratio (L/H)	1.52	> 0.60

Results of Internal Stability Static Analysis

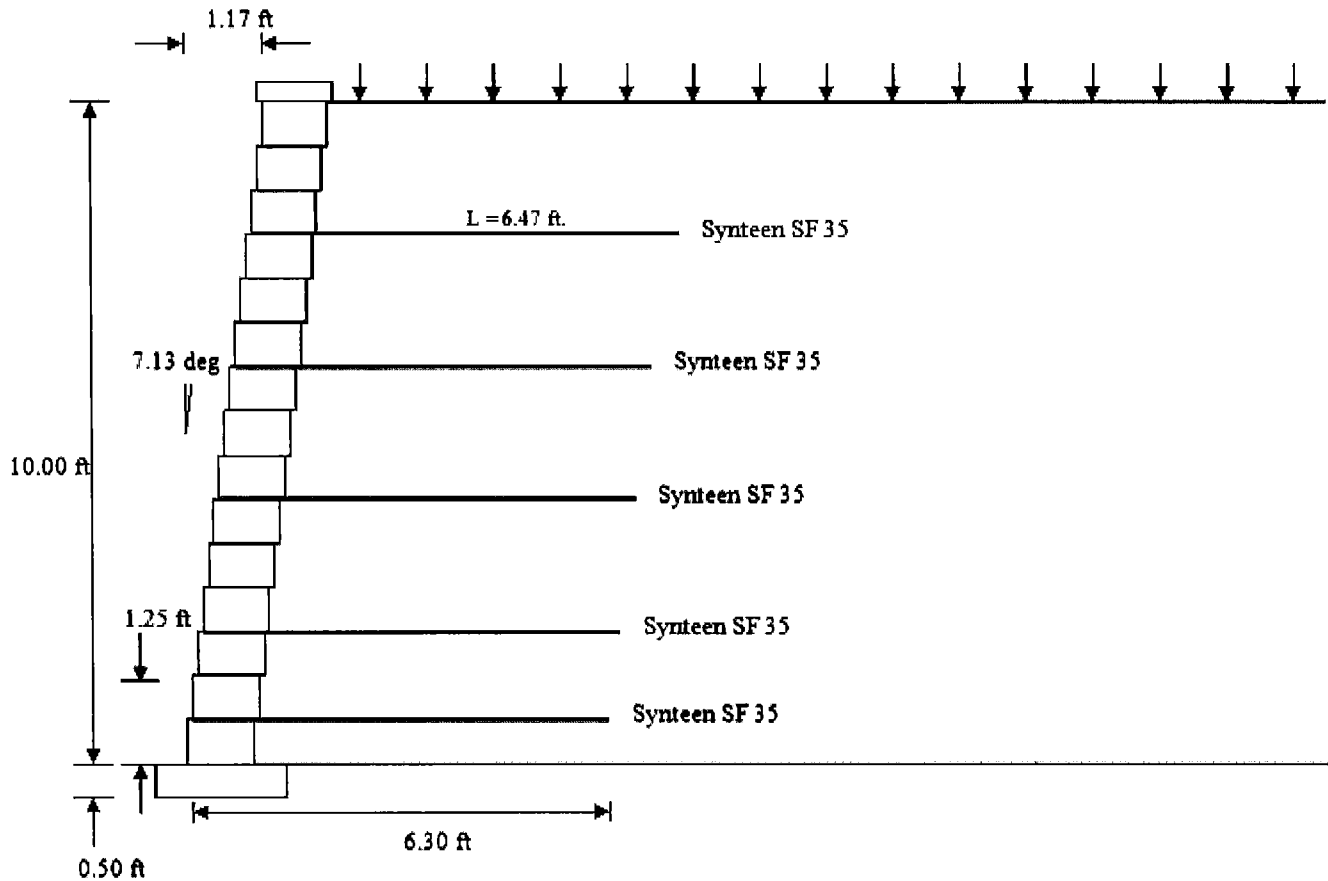
SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
4	Synteen SF 35	2.00	6.10	3.77	5.29	4.28	4.61	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
4	2.00	Synteen SF 35	3.18	3.76

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 8.00
Embedment Wall Height(ft)	: 1.00
Exposed Wall Design Height(ft)	: 7.00
Number of Segmental Wall Units	: 12
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	3
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

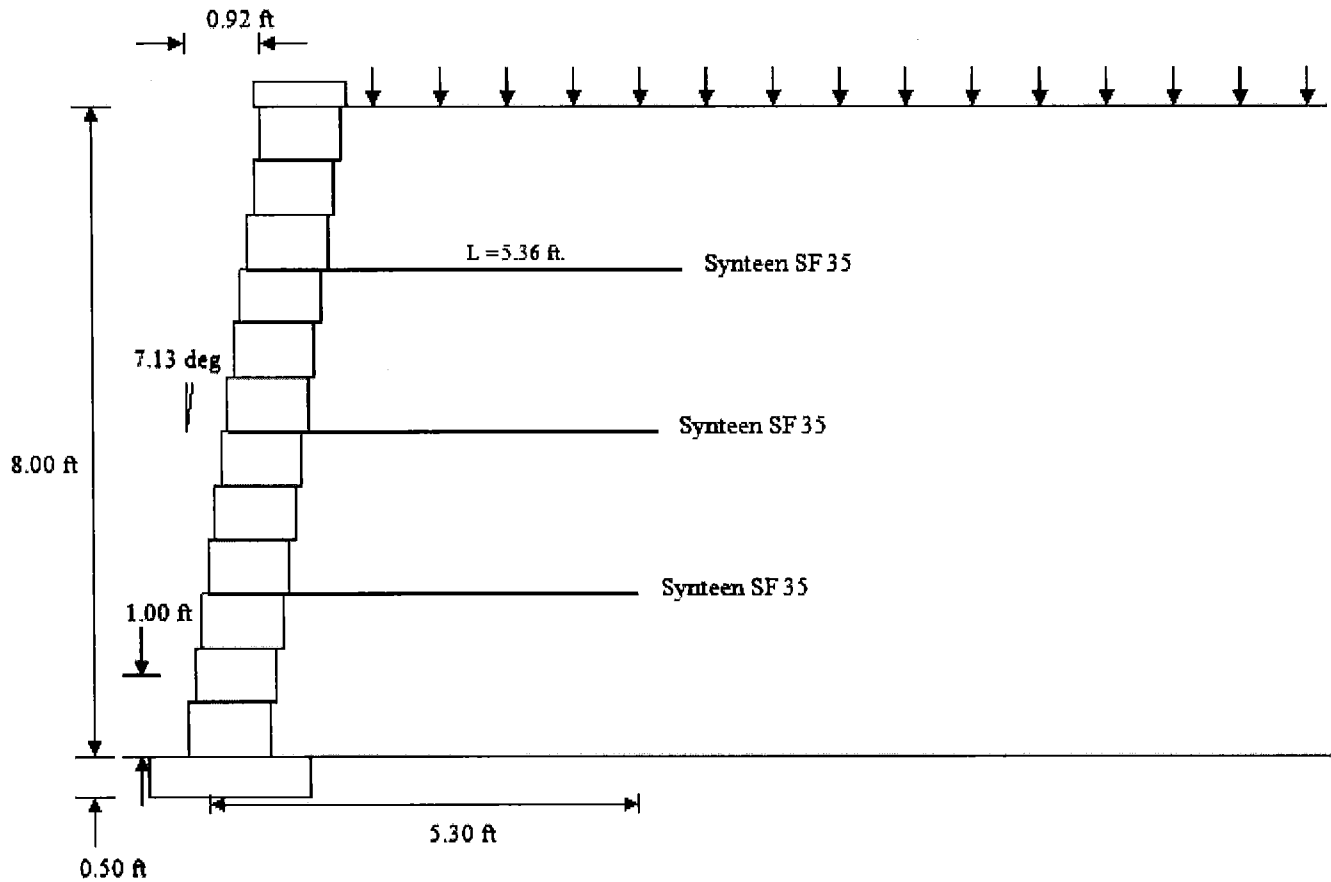
	Calculated	Design Criteria
FOS Sliding	1.52	> 1.50
FOS Overturning	3.84	> 2.00
FOS Bearing Capacity	2.65	> 2.00
Base Reinforcement Length (L)(ft)	5.30	
Base Reinforcement Ratio (L/H)	0.66	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
10	Synteen SF 35	6.00	5.36	1.01	10.91	1.58	12.98	OK
7	Synteen SF 35	4.00	5.30	2.06	7.84	4.65	5.87	OK
4	Synteen SF 35	2.00	5.30	3.18	3.44	4.72	3.71	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
10	6.00	Synteen SF 35	1.83	5.53
7	4.00	Synteen SF 35		4.09
4	2.00	Synteen SF 35		1.85

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 6.00
Embedment Wall Height(ft)	: 0.75
Exposed Wall Design Height(ft)	: 5.25
Number of Segmental Wall Units	: 9
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	2
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	CI	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteon SF 110	1100.00	32.00	4540.00
Synteon SF 35	1100.00	32.00	4540.00
Synteon SF 55	1100.00	32.00	4540.00
Synteon SF 65	1100.00	32.00	4540.00
Synteon SF 80	1100.00	32.00	4540.00
Synteon SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

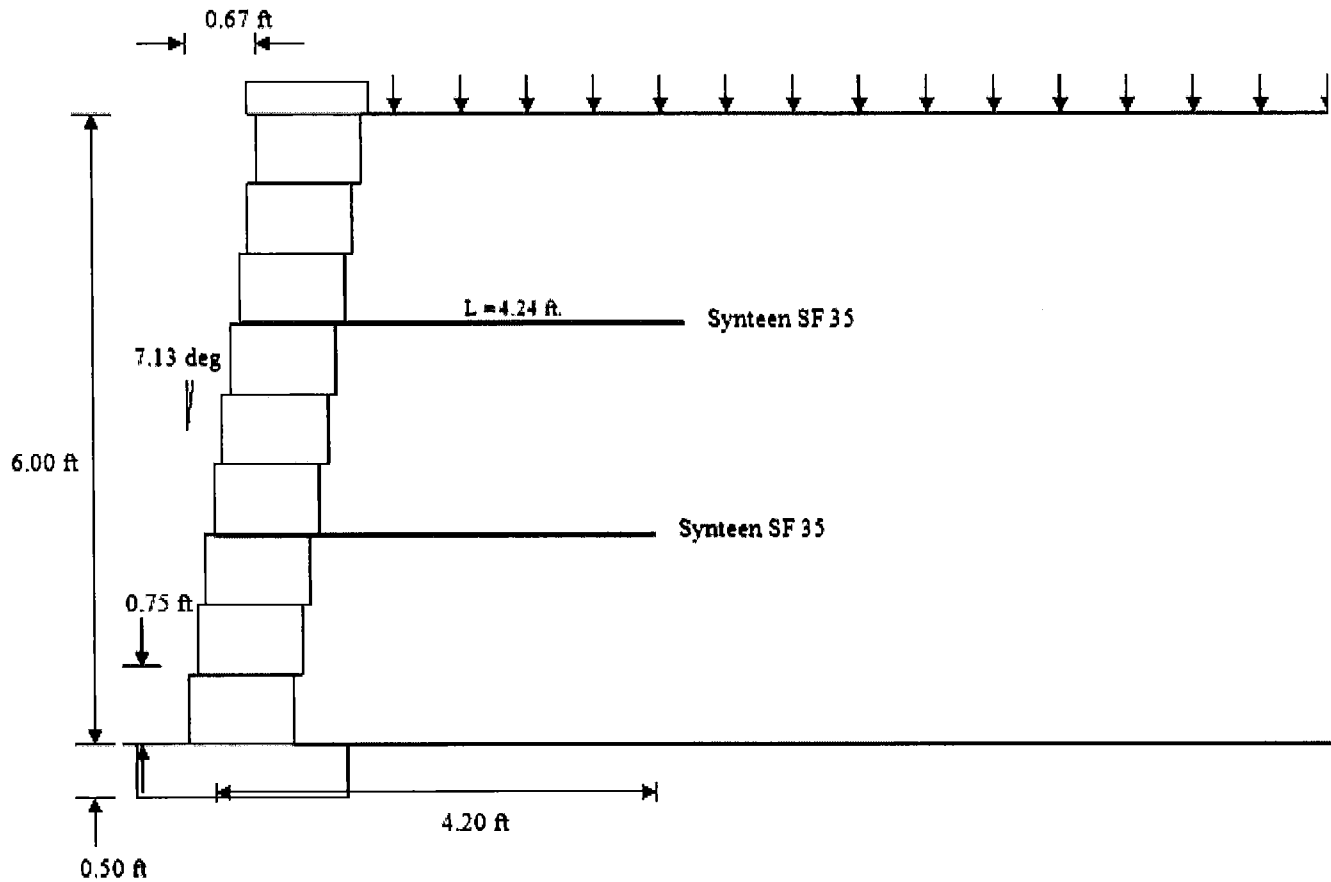
	Calculated	Design Criteria
FOS Sliding	1.52	> 1.50
FOS Overturning	3.92	> 2.00
FOS Bearing Capacity	2.68	> 2.00
Base Reinforcement Length (L)(ft)	4.20	
Base Reinforcement Ratio (L/H)	0.70	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
7	Synteen SF 35	4.00	4.24	1.00	10.91	1.58	11.93	OK
4	Synteen SF 35	2.00	4.20	2.08	4.74	2.83	5.18	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
7	4.00	Synteen SF 35	1.83	5.53
4	2.00	Synteen SF 35		2.47

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 4.00
Embedment Wall Height(ft)	: 0.50
Exposed Wall Design Height(ft)	: 3.50
Number of Segmental Wall Units	: 6
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name	: Square Foot
Cap Height (Inches)	: 3.62
Unit Height (Hu)(Inches)	: 8.00
Unit Width (Wu)(Inches)	: 12.00
Unit Length (Inches)	: 18.00
Setback (Inches)	: 1.00
Weight (Infilled)(lb)	: 115.00
Unit Weight (Infilled)(pcf)	: 115.00
Center of Gravity(Inches)	: 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	1
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

	Calculated	Design Criteria
FOS Sliding	1.96	> 1.50
FOS Overturning	6.65	> 2.00
FOS Bearing Capacity	3.86	> 2.00
Base Reinforcement Length (L)(ft)	4.00	
Base Reinforcement Ratio (L/H)	1.00	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
4	Synteen SF 35	2.00	4.00	1.88	6.72	1.82	11.73	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
4	2.00	Synteen SF 35	1.83	3.41

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

Project ID : Wall 9
Project Name : Aria Lees Summit
Owner :
Client :
Prepared By :
Company : Crockett Engineering
Address :
Telephone :
Section :
Project File :
Vendor Data File : VERSA-LOK.vdf
Date and Time : 12/20/2019 10:59:02

Type of Structure : Reinforced Wall

Wall Geometry

Design Wall Height(ft) : 14.00
Embedment Wall Height(ft) : 1.75
Exposed Wall Design Height(ft) : 12.25
Number of Segmental Wall Units : 21
Wall Inclination(degrees) : 7.13

Grades

Top Slope(degrees) : 0.00

Uniform Distributed Surcharge

Live Load Surcharge(Psf) : 100.00
Dead Load Surcharge(Psf) : 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
 Cap Height (Inches) : 3.62
 Unit Height (Hu)(Inches) : 8.00
 Unit Width (Wu)(Inches) : 12.00
 Unit Length (Inches) : 18.00
 Setback (Inches) : 1.00
 Weight (Infilled)(lb) : 115.00
 Unit Weight (Infilled)(pcf) : 115.00
 Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	7
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	3.66	> 2.00
FOS Bearing Capacity	2.58	> 2.00
Base Reinforcement Length (L)(ft)	8.50	
Base Reinforcement Ratio (L/H)	0.61	> 0.60

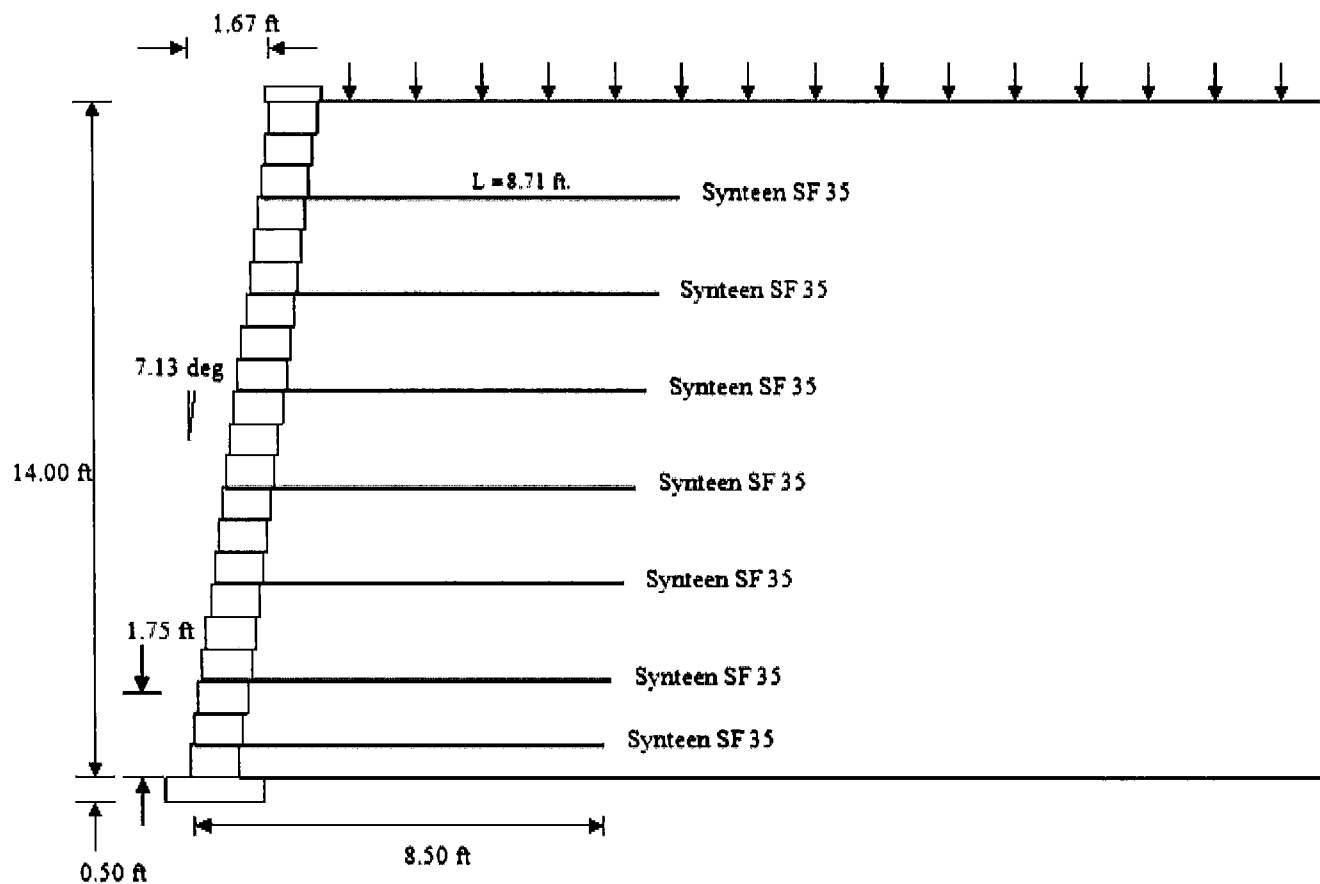
Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
19	Synteen SF 35	12.00	8.71	1.00	10.91	1.57	16.06	OK
16	Synteen SF 35	10.00	8.50	1.91	7.84	4.31	7.86	OK
13	Synteen SF 35	8.00	8.50	3.03	5.54	7.23	5.18	OK
10	Synteen SF 35	6.00	8.50	4.15	4.28	10.20	3.86	OK
7	Synteen SF 35	4.00	8.50	5.26	3.49	13.19	3.08	OK
4	Synteen SF 35	2.00	8.50	6.38	3.58	19.70	2.56	OK
2	Synteen SF 35	0.67	8.50	7.13	3.99	27.24	2.30	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
19	12.00	Synteen SF 35	1.83	5.53
16	10.00	Synteen SF 35		4.09
13	8.00	Synteen SF 35		2.97
10	6.00	Synteen SF 35		2.36
7	4.00	Synteen SF 35		1.98
4	2.00	Synteen SF 35		2.08
2	0.67	Synteen SF 35		2.36

Wall Reinforcement Layout



Project Identification

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 12.00
Embedment Wall Height(ft)	: 1.50
Exposed Wall Design Height(ft)	: 10.50
Number of Segmental Wall Units	: 18
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
 Cap Height (Inches) : 3.62
 Unit Height (Hu)(Inches) : 8.00
 Unit Width (Wu)(Inches) : 12.00
 Unit Length (Inches) : 18.00
 Setback (Inches) : 1.00
 Weight (Infilled)(lb) : 115.00
 Unit Weight (Infilled)(pcf) : 115.00
 Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	6
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	CI	Cds
Synteon SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteon SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteon SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteon SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteon SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteon SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteon SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteon SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteon SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteon SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteon SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteon SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteen SF 110	1100.00	32.00	4540.00
Synteen SF 35	1100.00	32.00	4540.00
Synteen SF 55	1100.00	32.00	4540.00
Synteen SF 65	1100.00	32.00	4540.00
Synteen SF 80	1100.00	32.00	4540.00
Synteen SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

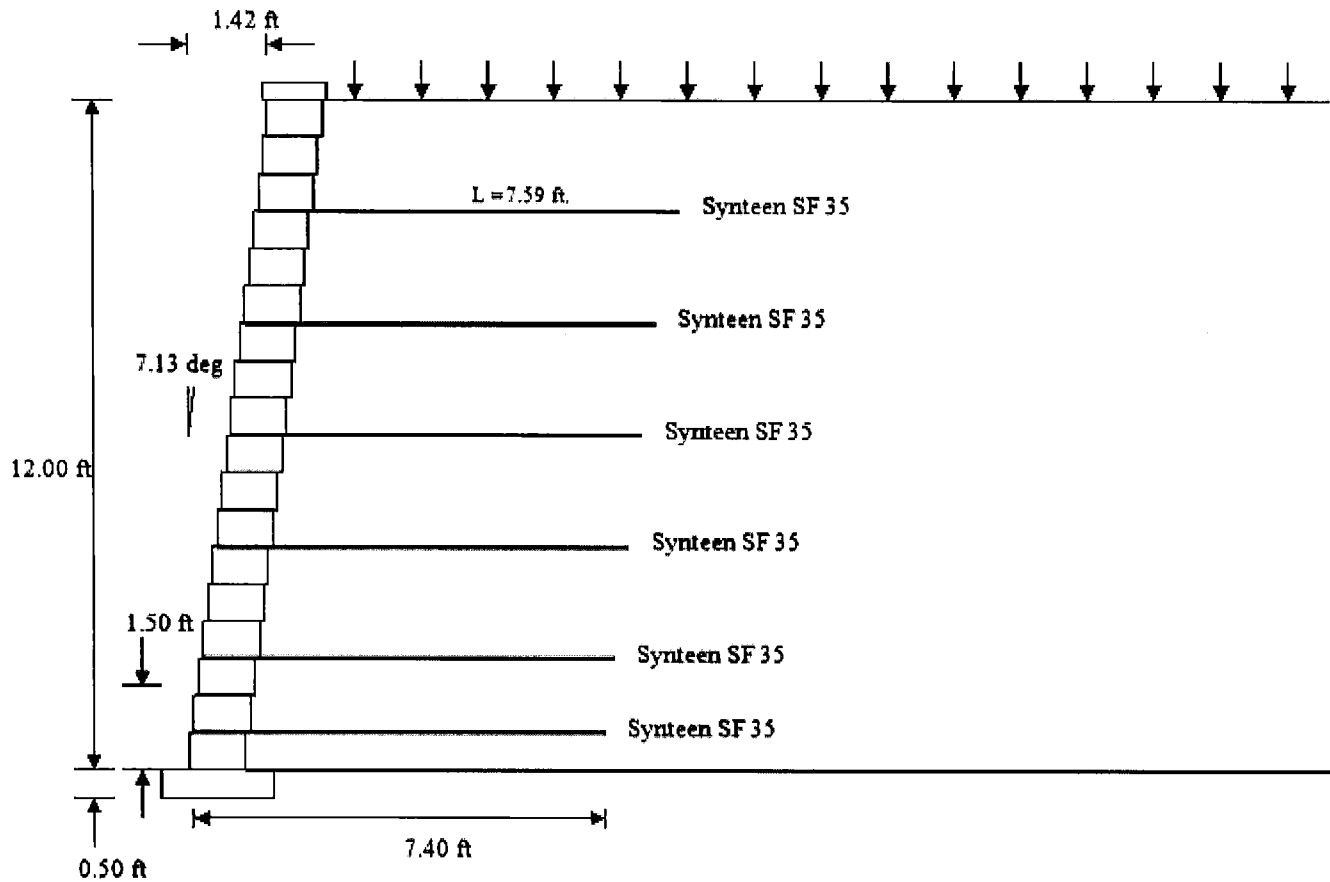
	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	3.67	> 2.00
FOS Bearing Capacity	2.58	> 2.00
Base Reinforcement Length (L)(ft)	7.40	
Base Reinforcement Ratio (L/H)	0.62	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
16	Synteen SF 35	10.00	7.59	1.00	10.91	1.57	15.00	OK
13	Synteen SF 35	8.00	7.40	1.93	7.84	4.35	7.17	OK
10	Synteen SF 35	6.00	7.40	3.05	5.54	7.27	4.68	OK
7	Synteen SF 35	4.00	7.40	4.16	4.28	10.24	3.46	OK
4	Synteen SF 35	2.00	7.40	5.28	4.25	16.14	2.75	OK
2	Synteen SF 35	0.67	7.40	6.03	4.65	22.80	2.41	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
16	10.00	Synteen SF 35	1.83	5.53
13	8.00	Synteen SF 35		4.09
10	6.00	Synteen SF 35		2.97
7	4.00	Synteen SF 35		2.36
4	2.00	Synteen SF 35		2.41
2	0.67	Synteen SF 35		2.68

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02

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

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Project File	:
Vendor Data File	: VERSA-LOK.vdf
Date and Time	: 12/20/2019 10:59:02

Type of Structure	: Reinforced Wall
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Wall Geometry

Design Wall Height(ft)	: 10.00
Embedment Wall Height(ft)	: 1.25
Exposed Wall Design Height(ft)	: 8.75
Number of Segmental Wall Units	: 15
Wall Inclination(degrees)	: 7.13

Grades

Top Slope(degrees)	: 0.00
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Uniform Distributed Surcharge

Live Load Surcharge(Psf)	: 100.00
Dead Load Surcharge(Psf)	: 0.00

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Reinforced Soil		N/A	34.00	125.00
Retained Soil		N/A	23.00	120.00
Leveling Pad Soil		N/A	40.00	135.00
Foundation Soil			23.00	120.00

Segmental Unit Data

Segmental Unit Name : Square Foot
 Cap Height (Inches) : 3.62
 Unit Height (Hu)(Inches) : 8.00
 Unit Width (Wu)(Inches) : 12.00
 Unit Length (Inches) : 18.00
 Setback (Inches) : 1.00
 Weight (Infilled)(lb) : 115.00
 Unit Weight (Infilled)(pcf) : 115.00
 Center of Gravity(Inches) : 6.00

Geosynthetic Reinforcement Type and Number

Supplier	Product Name	Number
Synteen Technical Fabrics	Synteen SF 110	0
Synteen Technical Fabrics	Synteen SF 35	5
Synteen Technical Fabrics	Synteen SF 55	0
Synteen Technical Fabrics	Synteen SF 65	0
Synteen Technical Fabrics	Synteen SF 80	0
Synteen Technical Fabrics	Synteen SF 90	0

Geosynthetic Properties

Geosynthetic Product	Tult (lb/ft)	RFcr	RFd	RFid	LTDS (lb/ft)	Ci	Cds
Synteen SF 110	10205.00	1.57	1.10	1.05	5627.71	0.85	0.90
Synteen SF 35	3435.00	1.54	1.10	1.08	1877.54	0.80	0.80
Synteen SF 55	4200.00	1.54	1.10	1.05	2361.28	0.80	0.85
Synteen SF 65	6000.00	1.55	1.10	1.05	3351.49	0.80	0.85
Synteen SF 80	7400.00	1.55	1.10	1.05	4133.50	0.85	0.90
Synteen SF 90	8500.00	1.55	1.10	1.05	4747.94	0.85	0.90

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1145.00	35.00	5350.00

Geosynthetic-SRW Unit Connection Strength properties

Geosynthetic Product	Minimum Conn. Capacity (lb/ft)	1st Inflection Point (lb/ft)		2nd Inflection Point (lb/ft)	
		Normal Load (lb/ft)	Connection Capacity (lb/ft)	Normal Load (lb/ft)	Max Connection Capacity(lb/ft)
Synteen SF 110	2000.00	667.00	2325.00	5444.00	4655.00
Synteen SF 35	923.00	360.00	967.00	1889.00	1155.00
Synteen SF 55	1437.00	502.00	1572.00	2549.00	2120.00
Synteen SF 65	1845.00	1920.00	2432.00	3565.00	2935.00
Synteen SF 80	1580.00	648.00	1882.00	3238.00	3090.00
Synteen SF 90	1810.00	1920.00	2586.00	3614.00	3270.00

Geosynthetic-SRW Unit Shear Strength properties

Geosynthetic Product	Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
Synteon SF 110	1100.00	32.00	4540.00
Synteon SF 35	1100.00	32.00	4540.00
Synteon SF 55	1100.00	32.00	4540.00
Synteon SF 65	1100.00	32.00	4540.00
Synteon SF 80	1100.00	32.00	4540.00
Synteon SF 90	1100.00	32.00	4540.00

Vertical Components

Vertical Components of Earth Pressures Used : No

Coefficients of Earth Pressure and Failure Plane Orientation

Reinforcement Soil(Static)(Ka) : 0.207
 Reinforcement Soil(Static)(Kah Horizontal Component) : 0.199
 Internal Modified Back Slope(Bint) : 0.000
 Orientation of failure plane from horizontal(degrees) for Internal Stability : 55.631
 Retained Soil(Static)(Ka) : 0.332
 Retained Soil(Static)(Kah Horizontal Component) : 0.319
 External Modified Back Slope(Bext) : 0.000
 Orientation of failure plane from horizontal(degrees) for External Stability : 47.704

Result of External Stability Static Analysis

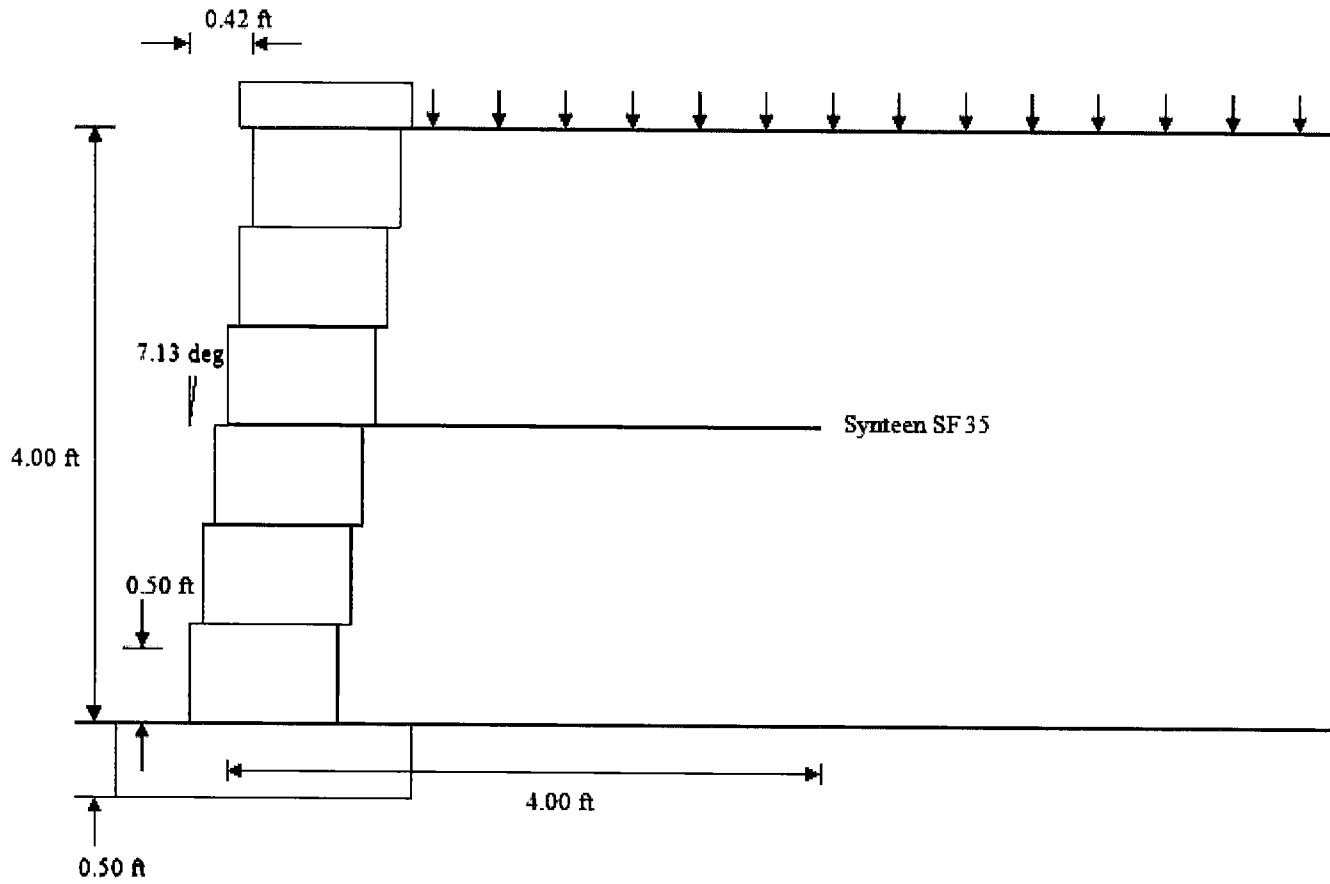
	Calculated	Design Criteria
FOS Sliding	1.50	> 1.50
FOS Overturning	3.68	> 2.00
FOS Bearing Capacity	2.57	> 2.00
Base Reinforcement Length (L)(ft)	6.30	
Base Reinforcement Ratio (L/H)	0.63	> 0.60

Results of Internal Stability Static Analysis

SRW Unit #	Geosynthetic Product	Elevation (ft)	Length (ft)	Anchor Length (ft)	FOS Overstress ≥1.50	FOS Pullout ≥1.50	FOS Slide ≥1.50	Layer Spacing (ft) ≥2.00
13	Synteen SF 35	8.00	6.47	1.00	10.91	1.57	13.94	OK
10	Synteen SF 35	6.00	6.30	1.95	7.84	4.39	6.49	OK
7	Synteen SF 35	4.00	6.30	3.06	5.54	7.31	4.17	OK
4	Synteen SF 35	2.00	6.30	4.18	5.24	12.59	3.06	OK
2	Synteen SF 35	0.67	6.30	4.93	5.57	18.38	2.60	OK

Results of Facing Stability Static Analysis

SRW Unit #	Heel Elev (ft)	Geosynthetic Product	FOS Crest Toppling ≥1.50	FOS Connection ≥1.50
13	8.00	Synteen SF 35	1.83	5.53
10	6.00	Synteen SF 35		4.09
7	4.00	Synteen SF 35		2.97
4	2.00	Synteen SF 35		2.89
2	0.67	Synteen SF 35		3.13

Wall Reinforcement Layout**Project Identification**

Project ID	: Wall 8
Project Name	: Aria Lees Summit
Owner	:
Client	:
Prepared By	:
Company	: Crockett Engineering
Address	:
Telephone	:
Section	:
Vendor Data File	: VERSA-LOK.vdf
Project File	:
Date and Time	: 12/20/2019 10:59:02