

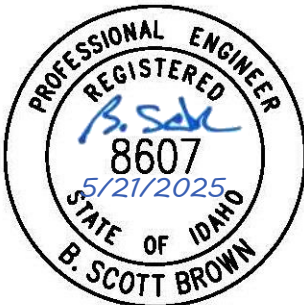


**STORMWATER MANAGEMENT AND EROSION CONTROL
METHODOLOGY AND CALCULATIONS
for
YOMAN BLUFFS PLANNED UNIT DEVELOPMENT
BONNER COUNTY, IDAHO**

Applicant: Yomanone, LLC

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Date: May 20, 2025



INTRODUCTION

Yomanone, LLC is proposing to subdivide approximately 37.6-acres of undeveloped land into 23 residential lots and common area amenities. As a result, approximately 60,640 sf of gravel parking areas and roadway, 12,140 sf of roof top, and 4,650 sf of rock armored ditch will be constructed. The purpose of this report is to recommend facilities to control storm water and prevent erosion and sediment transport, and to describe the analysis used in the selection and design of those facilities. The design and selection of storm water facilities are based on and limited to known topography of the site and soils information obtained from the "Soil Survey of Bonner County Area, Idaho".

During frequent storm events, runoff will be detained onsite in shallow grass lined infiltration swales and landscaped areas prior to regaining predevelopment flow patterns.

EXISTING SITE CONDITIONS

The parcel of land is currently undeveloped and forested with slopes ranging from 2% to 25%.

SOILS

The NRCS Soil survey shows on site soils consisting of Bonner Silt Loam. The soil is considered well drained and depth to water table is generally more than 80-inches below the surface. The capacity of the most limiting layer transmits water at a rate of 0.57 to 1.98 in/hr.

A summary of the typical properties of each soil type found on the site is included in Appendix A, and is taken from the NCRS Soil survey of *Bonner County Area, Idaho, Parts of Bonner and Boundary Counties (Version 14, September 13, 2018)*.

PRE-CONSTRUCTION LAND COVER – TOTAL SITE

Forested, Group B (C = 0.34)	= 37.6 ac
Total Impervious Surface	= 0 ac
Composite Runoff Coefficient (C)	= 0.34

POST-CONSTRUCTION LAND COVER – TOTAL SITE

Undeveloped/Landscaped Area (C = 0.34)	= 35.8 ac
Gravel Parking & Roadways (C = 0.5)	= 1.39 ac
Armored Ditches (C= 0.5)	= 0.11 ac
Rooftop (C = 0.9)	= 0.28 ac
Total Impervious Surface	= 1.78 ac
Composite Runoff Coefficient (C)	= 0.35

STORMWATER MANAGEMENT

Based on site topography and soil characteristics, surface dispersion of storm water and shallow detainment areas are recommended for flow management and treatment. It is

further recommended that site disturbance be minimal and existing, well vegetated areas be retained and protected as much as possible.

The proposed infiltration facilities have been sized to retain and treat the first ½" of runoff from new public roadways. The facilities are also designed to detain the difference between pre-development and post-development runoff flow based on a 25-year storm event, 24-hour period. Post development flows will be detained and released at pre-development rates by infiltration through imported sandy loam top soil. The infiltrated runoff will be captured in perforated pipe surrounded in drain rock, and discharged to a public storm drain system.

The site has been divided into ten drainage areas based on high/low points in the road profiles and grassy infiltration area locations.

Calculation Summary – Grassy Filtration Area Detention Design

Drainage Area No. 1 - Predevelopment Conditions

Undeveloped Area = 10,625 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.18 cfs

Drainage area No. 1 - Post Development Conditions

Total Impervious Area = 5,100 sf sf
Green Space = 5,225 sf sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.42
Post Developed Peak Flow = 0.28 cfs

Vegetated Infiltration Area No. 1

Volume to Retain the First ½-inch of Runoff = 213 cf
Volume to Detain a 24-hour, 25-year Storm = 36 cf (Bowstring Method)
Swale Volume Provided = 213 cf

Drainage Area No. 2 - Predevelopment Conditions

Undeveloped Area = 61,000sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 1.03 cfs

Drainage area No. 2 - Post Development Conditions

Total Impervious Area = 28,200 sf sf
Green Space = 32,800 sf sf
Time of Concentration = 5 min.

Composite Runoff Coefficient = 0.41
Post Developed Peak Flow = 1.62 cfs

Vegetated Infiltration Area No. 2

Volume to Retain the First ½-inch of Runoff = 1,175 cf
Volume to Detain a 24-hour, 25-year Storm = 194 cf (Bowstring Method)
Swale Volume Provided = 1,176 cf

Drainage Area No. 3 - Predevelopment Conditions

Undeveloped Area = 16,625 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.28 cfs

Drainage area No. 3 - Post Development Conditions

Total Impervious Area = 6,650 sf
Green Space = 9,975 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.40
Post Developed Peak Flow = 0.43 cfs

Vegetated Infiltration Area No. 3

Volume to Retain the First ½-inch of Runoff = 277 cf
Volume to Detain a 24-hour, 25-year Storm = 47 cf (Bowstring Method)
Swale Volume Provided = 277 cf

Drainage Area No. 4 - Predevelopment Conditions

Undeveloped Area = 9,625 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.16 cfs

Drainage area No. 4 - Post Development Conditions

Total Impervious Area = 3,850 sf
Green Space = 5,775 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.40
Post Developed Peak Flow = 0.25 cfs

Vegetated Infiltration Area No. 4

Volume to Retain the First ½-inch of Runoff = 160 cf
Volume to Detain a 24-hour, 25-year Storm = 28 cf (Bowstring Method)
Swale Volume Provided = 160 cf

Drainage Area No. 5 - Predevelopment Conditions

Undeveloped Area = 12,500 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.21 cfs

Drainage area No. 5 - Post Development Conditions

Total Impervious Area = 5,000 sf
Green Space = 7,500 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.40
Post Developed Peak Flow = 0.32 cfs

Vegetated Infiltration Area No. 5

Volume to Retain the First ½-inch of Runoff = 208 cf
Volume to Detain a 24-hour, 25-year Storm = 36 cf (Bowstring Method)
Swale Volume Provided = 208 cf

Drainage Area No.6 - Predevelopment Conditions

Undeveloped Area = 13,100 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.22 cfs

Drainage area No. 6 - Post Development Conditions

Total Impervious Area = 12,440 sf
Green Space = 660 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.68
Post Developed Peak Flow = 0.57 cfs

Vegetated Infiltration Area No. 6

Volume to Retain the First ½-inch of Runoff = 518 cf
Volume to Detain a 24-hour, 25-year Storm = 284 cf (Bowstring Method)
Swale Volume Provided = 528 cf

Drainage Area No.7 - Predevelopment Conditions

Undeveloped Area = 7,200 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.12 cfs

Drainage area No. 7 - Post Development Conditions

Total Impervious Area = 6,530 sf

Green Space = 670 sf sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.49
Post Developed Peak Flow = 0.22 cfs

Vegetated Infiltration Area No. 7

Volume to Retain the First ½-inch of Runoff = 272 cf
Volume to Detain a 24-hour, 25-year Storm = 54 cf (Bowstring Method)
Swale Volume Provided = 272 cf

Drainage Area No.8 - Predevelopment Conditions

Undeveloped Area = 8,500 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.14 cfs

Drainage area No. 8 - Post Development Conditions

Total Impervious Area = 6,140 sf sf
Green Space = 2,360 sf sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.74
Post Developed Peak Flow = 0.41 cfs

Vegetated Infiltration Area No. 8

Volume to Retain the First ½-inch of Runoff = 256 cf
Volume to Detain a 24-hour, 25-year Storm = 242 cf (Bowstring Method)
Swale Volume Provided = 267 cf

Drainage Area No.9 - Predevelopment Conditions

Undeveloped Area = 2,300 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.34
Predeveloped Peak Flow = 0.04 cfs

Drainage area No. 9 - Post Development Conditions

Total Impervious Area = 1,870 sf sf
Green Space = 6,630 sf sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.38
Post Developed Peak Flow = 0.20 cfs

Vegetated Infiltration Area No. 9

Volume to Retain the First ½-inch of Runoff = 78 cf
Volume to Detain a 24-hour, 25-year Storm = 14 cf (Bowstring Method)

Swale Volume Provided = 93 cf

Drainage Area No.10 - Predevelopment Conditions

Undeveloped Area = 2,500 sf

Time of Concentration = 10 min.

Composite Runoff Coefficient = 0.34

Predeveloped Peak Flow = 0.04 cfs

Drainage area No. 10 - Post Development Conditions

Total Impervious Area = 1,650 sf sf

Green Space = 6,850 sf sf

Time of Concentration = 5 min.

Composite Runoff Coefficient = 0.37

Post Developed Peak Flow = 0.20 cfs

Vegetated Infiltration Area No. 10

Volume to Retain the First ½-inch of Runoff = 69 cf

Volume to Detain a 24-hour, 25-year Storm = 11 cf (Bowstring Method)

Swale Volume Provided = 93 cf

(See Bowstring Method calculations in Appendix B for detail)

EROSION CONTROL PLAN

Temporary erosion control shall be maintained through the use of existing vegetation and installing a stabilized construction entrance. Permanent facilities that will also serve to control erosion during construction include the vegetated infiltration basins, rock lined ditches, vegetated buffers, and reseeding of disturbed areas. Use the BMP's described in *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties* (Idaho BMP Manual). Silt fence shall be placed downslope of construction areas as shown in the stormwater management plan. Areas where construction activities temporarily cease for more than 21 days shall be stabilized with seeding or straw mulching. All erosion control measures shall be maintained in good working order. The contractor shall be responsible for maintenance of erosion control measures until such time that final stabilization of the site is complete. Once final stabilization is complete, the owner shall be responsible for maintenance of permanent erosion control measures.

Site Re-seeding Recommendation:

Existing areas disturbed during construction shall be reseeded with natural grasses, lawn grasses, or sod as soon as possible after finish grading. Seed mixture recommendations may be obtained from the U.S.D.A. Natural Resource Conservation Service, a licensed landscape architect or a commercially marketed grass mixture may be applied.

Fertilization

It is recommended that a soil analysis be performed prior to fertilization and seeding. The fertilization guidelines should be determined by the soil analysis. The fertilizer type and rate of application should follow the recommendation of the U.S.D.A. Natural Resource Conservation Service or a landscape architect.

OPERATION AND MAINTENANCE PLAN

During Construction

During construction the contractor shall walk the site and inspect storm water and erosion control measures at least once every 7 days and following any storm event of 0.5 inches or greater. Items the contractor shall inspect are:

- Reseeding / Straw Mulching
 - Re-seed add straw mulch to bare spots and washouts, and verify healthy growth
- Grass ditches
 - Periodically inspect ditches and remove any sediment deeper than 6 inches
 - Re-establish vegetation that is damaged during high runoff events.
- Grass filtration basins
 - Periodically inspect basins and remove any sediment deeper than 6 inches
 - Re-establish vegetation that is damaged during high runoff events.

If maintenance of any temporary or final BMP is found to be necessary, the contractor shall begin repairs within 24 hours.

After Final Stabilization

Upon completion of construction and final stabilization, the owners shall take responsibility for operation and maintenance of the stormwater management and erosion control system as well as the funding for the continued maintenance of this system. After final stabilization, the stormwater management and erosion control system shall be inspected at least every six months. The items that shall be inspected are:

- Grass infiltration swales
 - Remove all sediment from the basin and dispose off-site at the end of construction, and during each inspection.
- Grass ditches
 - Remove all sediment from the ditches and dispose off-site at the end of construction, and during each inspection.
- Sloped areas
 - Re-establish grass or vegetation in bare spots found on all sloped areas, or stabilize with another best management practice.

-

IMPLEMENTATION SCHEDULE

The proposed construction schedule is as follows:

Spring 2025

- Install temporary erosion control
- Perform fill and excavation work for building pad, utilities and drive surfaces

Spring/Summer 2025

- Complete construction
- Check re-vegetated areas for bare spots, washouts, etc.

Late Summer/Fall 2025

- Repair and reseed as necessary
- Final stabilization complete

SUMMARY

With the proper implementation of the best management practices listed above, the subject property is capable of supporting the proposed site development without substantial risk of soil erosion or sedimentation of surface waters. The site is capable of treating and conveying stormwater runoff from the proposed pavement using the best management practices described in this report.

APPENDIX A

Drainage Area Sketch, NRCS Soils Classification, IDF Curve Area Classification Map,
Rainfall Intensity Diagram, Runoff Coefficients

Bonner County Area, Idaho, Parts of Bonner and Boundary Counties

4—Bonner silt loam, cool, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 546c

Elevation: 2,000 to 4,200 feet

Mean annual precipitation: 25 to 45 inches

Mean annual air temperature: 41 to 46 degrees F

Frost-free period: 60 to 120 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Bonner, cool, and similar soils: 80 percent

Minor components: 5 percent

*Estimates are based on observations, descriptions, and transects of
the mapunit.*

Description of Bonner, Cool

Setting

Landform: Outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Volcanic ash and loess over outwash derived from
granite and/or schist and/or gneiss

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 6 inches: ashy silt loam

Bw - 6 to 22 inches: gravelly silt loam

2BC - 22 to 30 inches: gravelly loam

3C - 30 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: F043AY524WA - Frigid, Udic, Loamy, Foothills/
Mountainsides, ashy surface (Western Hemlock/Moist Forbes)
Tsuga heterophylla / Clintonia uniflora , Tsuga heterophylla /
Asarum caudatum
Other vegetative classification: western hemlock/queencup beadlily
(CN570)
Hydric soil rating: No

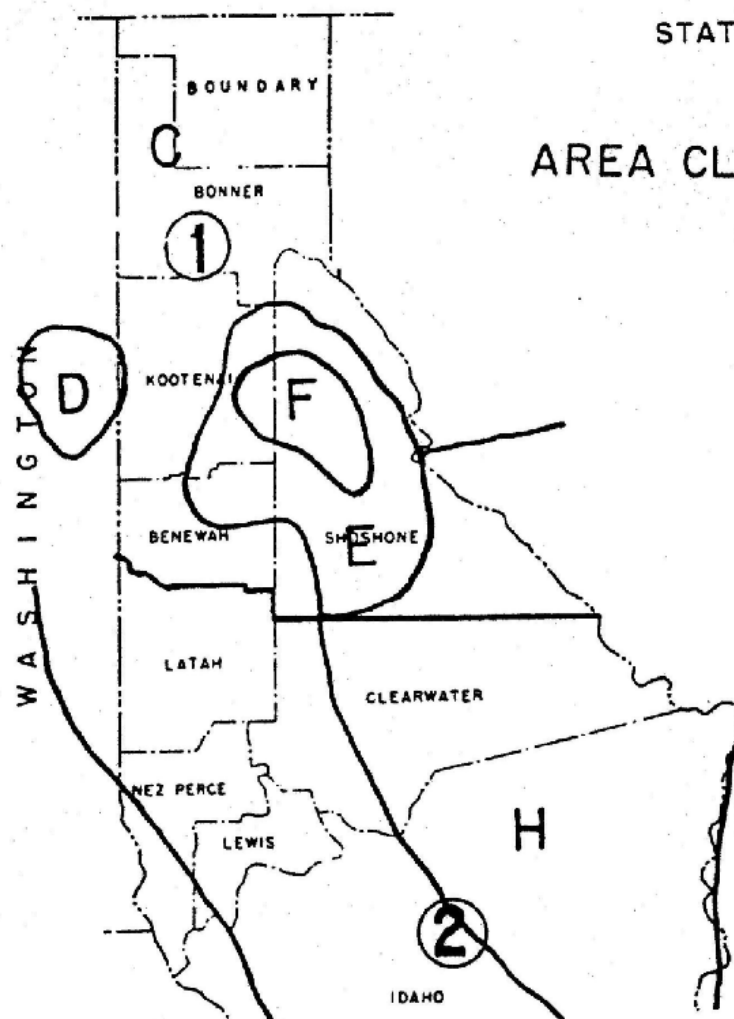
Minor Components

Capehorn

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: western redcedar/ladyfern (CN540)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Bonner County Area, Idaho, Parts of Bonner and Boundary
Counties
Survey Area Data: Version 20, Aug 22, 2024



STATE OF IDAHO

AREA CLASSIFICATION MAP

① - District Number
F - Zone Designation

FIGURE 6-3 AREA CLASSIFICATION MAP FOR IDF CURVES - IDAHO
(IDAHO TRANSPORTATION DEPARTMENT)

FIGURE 6-4 ZONE C, INTENSITY-DURATION-FREQUENCY CURVE
(IDAHO TRANSPORTATION DEPARTMENT)

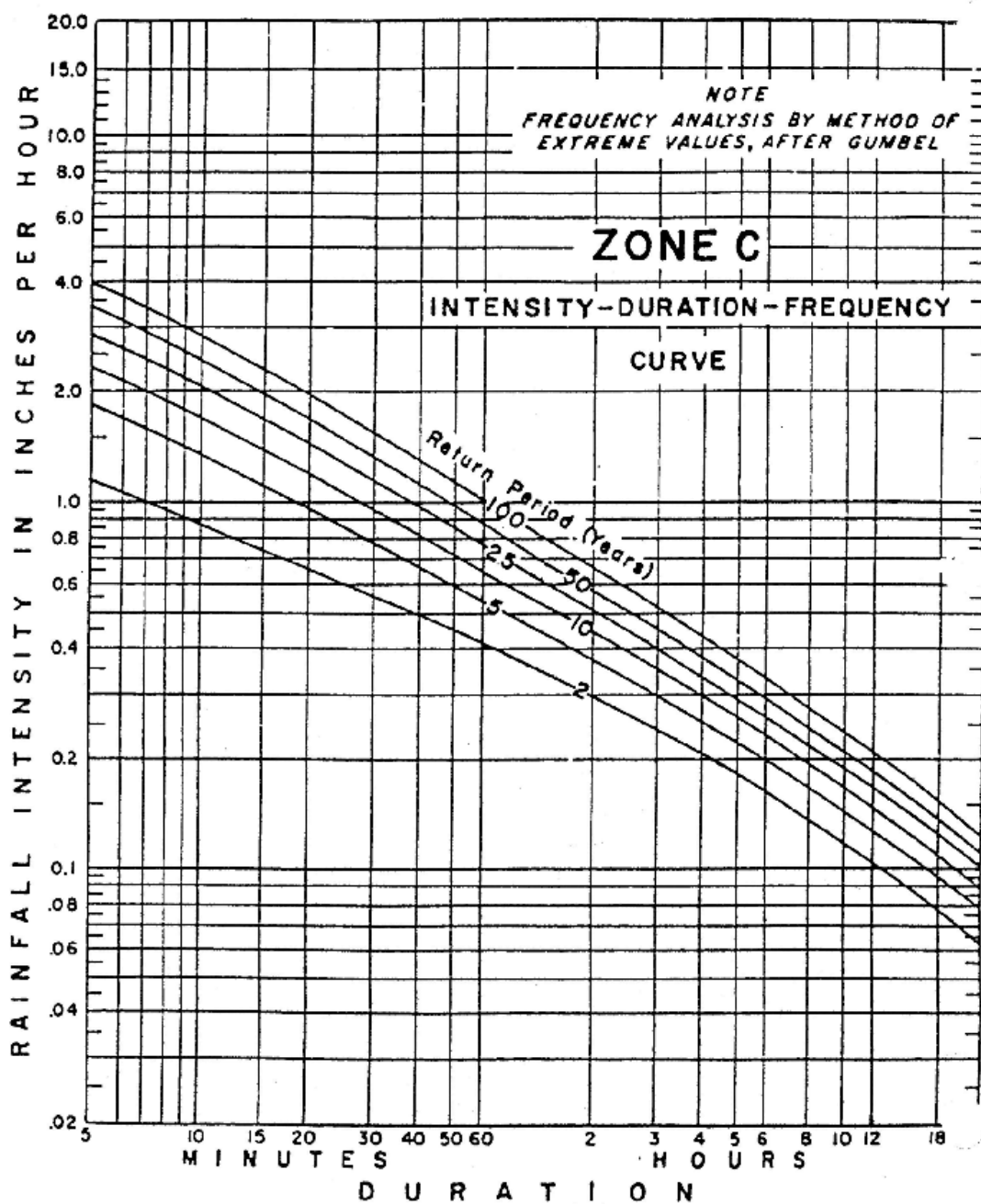


Table 4B.2. Values of Runoff Coefficient (C) for Rational Formula

Land Use	Description	Hydrologic Soils Group			
		A	B	C	D
Cultivated Land	Without conservation treatment	0.49	0.67	0.81	0.88
	With conservation treatment	0.27	0.43	0.67	0.67
Pasture or Range Land	Poor condition	0.38	0.63	0.78	0.84
	Good condition	---	0.25	0.51	0.65
Meadow	Good condition	---	---	0.41	0.61
Wood or Forest Land	Thin stand, poor cover, no mulch	---	0.34	0.59	0.70
	Good cover	---	---	0.45	0.59
Open Space, Lawn, Park, Golf Course, or Cemetery	Good condition (grass cover on 75% or more)	---	0.25	0.51	0.65
	Fair condition (grass cover on 50% to 75%)	---	0.45	0.63	0.74
Commercial and Business Area	85% impervious	0.84	0.90	0.93	0.96
Industrial District	72% impervious	0.67	0.81	0.88	0.92
Residential Lot					
<u>Average lot size (acres):</u>	<u>Average % of lot impervious:</u>				
1/8	65	0.59	0.76	0.86	0.90
1/4	38	0.29	0.55	0.70	0.80
1/3	30	---	0.49	0.67	0.78
1/2	25	---	0.45	0.65	0.76
1.0	20	---	0.41	0.63	0.74
Paved Area	Parking lots, roofs, driveways, etc.	0.99	0.99	0.99	0.99
Street or Road	Paved with curbs and storm sewers	0.99	0.99	0.99	0.99
		0.57	0.76	0.84	0.88
	Gravel	0.49	0.69	0.80	0.84

Note: The designer must use judgment to select the appropriate C value within the range. Generally, larger areas with permeable soils, flat slopes, and dense vegetation should have the lowest C values. Smaller areas with dense soils, moderate to steep slopes, and sparse vegetation should assigned the highest C values.

SOURCE: Panhandle Stormwater Erosion Control and Education Program Training Manual (2007)

APPENDIX B

Storm Water Management Calculations

Vegetated Infiltration Area No. 1A and 1B (Roadway STA 10+25 to 14+50)

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C
Sub Drainage Area 2	10,625	0.24	
ACP Roadway	0	0.00	0.90
Gravel Roadway	4,250	0.10	0.50
Rock Armored Ditch	850	0.02	0.50
Other	0	0.00	0.90
Total Impervious Area	5,100	0.12	
Green Space	5,525	0.13	0.34
Composite Runoff Coeff.			0.42

Assumed Wooded Group B Soil

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	228
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Post Developed			Treatment Storage (cf)	
Area	0.24	acres	First 1/2-Inch Runoff =	213
Composite Runoff Coefficient	0.42			
AxC=	0.10		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.24	acres		
Composite Runoff Coefficient	0.34			
AxC=	0.08			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.18		<i>(flow rate based on 10-min time of concentration)</i>	

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.28	114	0.23	93	19
10	600	2.17	0.22	155	0.18	126	24

15	900	1.83	0.19	186	0.15	152	28
20	1200	1.65	0.17	218	0.14	178	32
25	1500	1.45	0.15	236	0.12	193	33
30	1800	1.27	0.13	246	0.11	200	33
35	2100	1.19	0.12	266	0.10	217	35
40	2400	1.11	0.11	282	0.09	230	36
45	2700	1.04	0.11	296	0.09	242	36
50	3000	0.96	0.10	303	0.08	247	36
55	3300	0.88	0.09	304	0.07	248	34
60	3600	0.8	0.08	301	0.07	246	31
65	3900	0.78	0.08	317	0.06	259	32
70	4200	0.75	0.08	328	0.06	268	32
75	4500	0.72	0.07	337	0.06	275	32
80	4800	0.7	0.07	349	0.06	285	32
85	5100	0.67	0.07	354	0.06	289	31
90	5400	0.65	0.07	364	0.05	297	31
95	5700	0.63	0.06	372	0.05	303	30
100	6000	0.61	0.06	378	0.05	309	29
105	6300	0.59	0.06	384	0.05	313	28
110	6600	0.57	0.06	388	0.05	317	27
115	6900	0.55	0.06	392	0.05	319	26
120	7200	0.53	0.05	393	0.04	321	24
125	7500	0.51	0.05	394	0.04	322	22
130	7800	0.49	0.05	394	0.04	321	20
135	8100	0.47	0.05	392	0.04	320	18
150	9000	0.43	0.04	398	0.04	325	13
165	9900	0.4	0.04	407	0.03	332	8
180	10800	0.38	0.04	421	0.03	344	5
195	11700	0.37	0.04	444	0.03	362	3
210	12600	0.36	0.04	465	0.03	379	1
225	13500	0.34	0.03	470	0.03	384	-4
240	14400	0.33	0.03	487	0.03	397	-7
300	18000	0.29	0.03	534	0.02	435	-23
360	21600	0.25	0.03	552	0.02	450	-44
365	21900	0.25	0.03	559	0.02	456	-44
370	22200	0.25	0.03	567	0.02	462	-45
1080	64800	0.14	0.01	924	0.01	754	-266
1440	86400	0.11	0.01	967	0.01	789	-403

GIA Design Dimensions

GIA Bed Variables:

Length =	38.00	ft
Width =	6.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

213 cf

Resulting Dimensions at Operating Level:

42.00	ft	Bed Area	228	sf
10.00	ft	Top Area	420	sf

Resulting Top Dimensions (including free board):

42.00	ft	Height	8.00	in
10.00	ft	Top Area	420	sf

Resulting Volume:

213 cf

Vegetated Infiltration Area No. 2 (Roadway STA 14+50 to 26+70)

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C
Sub Drainage Area 2	61,000	1.40	
ACP Roadway	0	0.00	0.90
Gravel Roadway	24,400	0.56	0.50
Rock Armored Ditch	3,800	0.09	0.50
Other	0	0.00	0.90
Total Impervious Area	28,200	0.65	
Green Space	32,800	0.75	0.34
Composite Runoff Coeff.			0.41

Assumed Wooded Group B Soil

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Drywell Outflow	0.04	cfs	Infiltration Area (sf) =	1,358
Bed of GIA Outflow	0.000	cfs	Fabric Transmissivity	
Check Dam Outflow (Geotex + Drain Rock)	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Wier Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Orifice Outflow			Treatment Storage (cf)	
Post Developed			First 1/2-Inch Runoff =	1,175
Area	1.40	acres		
Composite Runoff Coefficient	0.41			
AxC=	0.58		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	1.40	acres		
Composite Runoff Coefficient	0.34			
AxC=	0.48			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	1.03	(flow rate based on 10-min time of concentration)		

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	1.62	653	1.33	536	105
10	600	2.17	1.26	883	1.03	725	134
15	900	1.83	1.06	1,063	0.87	873	154
20	1200	1.65	0.96	1,245	0.79	1,023	174
25	1500	1.45	0.84	1,347	0.69	1,106	180
30	1800	1.27	0.74	1,400	0.60	1,150	178
35	2100	1.19	0.69	1,519	0.57	1,248	187
40	2400	1.11	0.64	1,610	0.53	1,322	191

45	2700	1.04	0.60	1,689	0.50	1,387	194
50	3000	0.96	0.56	1,726	0.46	1,418	188
55	3300	0.88	0.51	1,736	0.42	1,425	178
60	3600	0.8	0.46	1,717	0.38	1,410	162
65	3900	0.78	0.45	1,810	0.37	1,486	167
70	4200	0.75	0.43	1,870	0.36	1,536	166
75	4500	0.72	0.42	1,921	0.34	1,578	163
80	4800	0.7	0.41	1,989	0.33	1,634	163
85	5100	0.67	0.39	2,020	0.32	1,659	157
90	5400	0.65	0.38	2,073	0.31	1,703	154
95	5700	0.63	0.37	2,119	0.30	1,740	150
100	6000	0.61	0.35	2,158	0.29	1,772	145
105	6300	0.59	0.34	2,190	0.28	1,798	139
110	6600	0.57	0.33	2,215	0.27	1,819	131
115	6900	0.55	0.32	2,233	0.26	1,834	122
120	7200	0.53	0.31	2,243	0.25	1,843	112
125	7500	0.51	0.30	2,248	0.24	1,846	101
130	7800	0.49	0.28	2,245	0.23	1,844	88
135	8100	0.47	0.27	2,235	0.22	1,835	75
150	9000	0.43	0.25	2,269	0.20	1,863	45
165	9900	0.4	0.23	2,319	0.19	1,905	18
180	10800	0.38	0.22	2,402	0.18	1,972	-4
195	11700	0.37	0.21	2,531	0.18	2,079	-17
210	12600	0.36	0.21	2,651	0.17	2,177	-31
225	13500	0.34	0.20	2,681	0.16	2,202	-62
240	14400	0.33	0.19	2,774	0.16	2,279	-81
300	18000	0.29	0.17	3,043	0.14	2,499	-178
360	21600	0.25	0.14	3,145	0.12	2,583	-304
365	21900	0.25	0.14	3,189	0.12	2,619	-308
370	22200	0.25	0.14	3,232	0.12	2,655	-312
1080	64800	0.14	0.08	5,267	0.07	4,326	-1,656
1440	86400	0.11	0.06	5,516	0.05	4,530	-2,477

GIA Design Dimensions

GIA Bed Variables:

Length =	194.00	ft
Width =	7.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

1,175 cf

Resulting Dimensions at Operating Level:

198.00	ft	Bed Area	1,358	sf
11.00	ft	Top Area	2,178	sf

Resulting Top Dimensions (including free board):

198.00	ft	Height	8.00	in
11.00	ft	Top Area	2,178	sf

Resulting Volume:

1,176 cf

Vegetated Infiltration Area No. 3A and 3B (Roadway STA 26+70 to 33+35)

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C
Sub Drainage Area 2	16,625	0.38	
ACP Roadway	0	0.00	0.90
Gravel Roadway	6,650	0.15	0.50
Rock Armored Ditch	0	0.00	0.50
Other	0	0.00	0.90
Total Impervious Area	6,650	0.15	
Green Space	9,975	0.23	0.34
Composite Runoff Coeff.			0.40

Assumed Wooded Group B Soil

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	300
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Post Developed			Treatment Storage (cf)	
Area	0.38	acres	First 1/2-Inch Runoff =	277
Composite Runoff Coefficient	0.40			
AxC=	0.15		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.38	acres		
Composite Runoff Coefficient	0.34	Assumed Wooded Group B Soil		
AxC=	0.13			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.28	(flow rate based on 10-min time of concentration)		

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.43	174	0.36	146	25
10	600	2.17	0.33	235	0.28	198	32
15	900	1.83	0.28	283	0.24	238	37

20	1200	1.65	0.25	331	0.21	279	42
25	1500	1.45	0.22	358	0.19	301	43
30	1800	1.27	0.20	372	0.16	313	43
35	2100	1.19	0.18	404	0.15	340	45
40	2400	1.11	0.17	428	0.14	360	47
45	2700	1.04	0.16	449	0.13	378	47
50	3000	0.96	0.15	459	0.12	386	46
55	3300	0.88	0.14	462	0.11	388	44
60	3600	0.8	0.12	457	0.10	384	40
65	3900	0.78	0.12	481	0.10	405	42
70	4200	0.75	0.12	497	0.10	419	42
75	4500	0.72	0.11	511	0.09	430	41
80	4800	0.7	0.11	529	0.09	445	41
85	5100	0.67	0.10	537	0.09	452	40
90	5400	0.65	0.10	551	0.08	464	40
95	5700	0.63	0.10	564	0.08	474	39
100	6000	0.61	0.09	574	0.08	483	38
105	6300	0.59	0.09	582	0.08	490	36
110	6600	0.57	0.09	589	0.07	496	35
115	6900	0.55	0.08	594	0.07	500	33
120	7200	0.53	0.08	597	0.07	502	31
125	7500	0.51	0.08	598	0.07	503	28
130	7800	0.49	0.08	597	0.06	502	26
135	8100	0.47	0.07	594	0.06	500	22
150	9000	0.43	0.07	603	0.06	508	16
165	9900	0.4	0.06	617	0.05	519	10
180	10800	0.38	0.06	639	0.05	538	6
195	11700	0.37	0.06	673	0.05	567	3
210	12600	0.36	0.06	705	0.05	593	0
225	13500	0.34	0.05	713	0.04	600	-7
240	14400	0.33	0.05	738	0.04	621	-11
300	18000	0.29	0.04	809	0.04	681	-31
360	21600	0.25	0.04	837	0.03	704	-59
365	21900	0.25	0.04	848	0.03	714	-60
370	22200	0.25	0.04	860	0.03	723	-60
1080	64800	0.14	0.02	1,401	0.02	1,179	-352
1440	86400	0.11	0.02	1,467	0.01	1,235	-533

GIA Design Dimensions

GIA Bed Variables:

Length =	50.00	ft
Width =	6.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

277 cf

Resulting Dimensions at Operating Level:

54.00	ft	Bed Area	300	sf
10.00	ft	Top Area	540	sf

Resulting Top Dimensions (including free board):

54.00	ft	Height	8.00	in
10.00	ft	Top Area	540	sf

Resulting Volume:

277 cf

Vegetated Infiltration Area No. 4A and 4B (Roadway B STA 40+00 to 43+85)

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C
Sub Drainage Area 2	9,625	0.22	
ACP Roadway	0	0.00	0.90
Gravel Roadway	3,850	0.09	0.50
Rock Armored Ditch	0	0.00	0.50
Other	0	0.00	0.90
Total Impervious Area	3,850	0.09	
Green Space	5,775	0.13	0.34
Composite Runoff Coeff.			0.40

Assumed Wooded Group B Soil

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Bed of GIA Outflow	0.00	cfs	Infiltration Area (sf) =	168
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Post Developed			Treatment Storage (cf)	
Area	0.22	acres	First 1/2-Inch Runoff =	160
Composite Runoff Coefficient	0.40			
AxC=	0.09		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.22	acres		
Composite Runoff Coefficient	0.34	Assumed Wooded Group B Soil		
AxC=	0.08			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.16	(flow rate based on 10-min time of concentration)		

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.25	100	0.21	85	14
10	600	2.17	0.19	136	0.16	114	19
15	900	1.83	0.16	164	0.14	138	21

20	1200	1.65	0.15	192	0.12	161	24
25	1500	1.45	0.13	207	0.11	175	25
30	1800	1.27	0.11	216	0.10	181	25
35	2100	1.19	0.11	234	0.09	197	27
40	2400	1.11	0.10	248	0.08	209	27
45	2700	1.04	0.09	260	0.08	219	28
50	3000	0.96	0.09	266	0.07	224	27
55	3300	0.88	0.08	267	0.07	225	26
60	3600	0.8	0.07	264	0.06	222	24
65	3900	0.78	0.07	279	0.06	235	25
70	4200	0.75	0.07	288	0.06	242	25
75	4500	0.72	0.06	296	0.05	249	25
80	4800	0.7	0.06	306	0.05	258	25
85	5100	0.67	0.06	311	0.05	262	24
90	5400	0.65	0.06	319	0.05	269	24
95	5700	0.63	0.06	326	0.05	275	23
100	6000	0.61	0.05	332	0.05	280	23
105	6300	0.59	0.05	337	0.04	284	22
110	6600	0.57	0.05	341	0.04	287	21
115	6900	0.55	0.05	344	0.04	289	20
120	7200	0.53	0.05	345	0.04	291	19
125	7500	0.51	0.05	346	0.04	291	18
130	7800	0.49	0.04	346	0.04	291	16
135	8100	0.47	0.04	344	0.04	290	14
150	9000	0.43	0.04	349	0.03	294	11
165	9900	0.4	0.04	357	0.03	301	7
180	10800	0.38	0.03	370	0.03	311	5
195	11700	0.37	0.03	390	0.03	328	4
210	12600	0.36	0.03	408	0.03	344	2
225	13500	0.34	0.03	413	0.03	347	-2
240	14400	0.33	0.03	427	0.02	360	-4
300	18000	0.29	0.03	469	0.02	394	-15
360	21600	0.25	0.02	484	0.02	408	-30
365	21900	0.25	0.02	491	0.02	413	-31
370	22200	0.25	0.02	498	0.02	419	-31
1080	64800	0.14	0.01	811	0.01	683	-193
1440	86400	0.11	0.01	849	0.01	715	-294

GIA Design Dimensions

GIA Bed Variables:

Length =	28.00	ft
Width =	6.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

160 cf

Resulting Dimensions at Operating Level:

32.00	ft	Bed Area	168	sf
10.00	ft	Top Area	320	sf

Resulting Top Dimensions (including free board):

32.00	ft	Height	8.00	in
10.00	ft	Top Area	320	sf

Resulting Volume:

160 cf

Vegetated Infiltration Area No. 5A and 5B (Roadway C STA 50+00 to 55+00)

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C
Sub Drainage Area 2	12,500	0.29	
ACP Roadway	0	0.00	0.90
Gravel Roadway	5,000	0.11	0.50
Rock Armored Ditch	0	0.00	0.50
Other	0	0.00	0.90
Total Impervious Area	5,000	0.11	
Green Space	7,500	0.17	0.34
Composite Runoff Coeff.			0.40

Assumed Wooded Group B Soil

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	222
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Post Developed			Treatment Storage (cf)	
Area	0.29	acres	First 1/2-Inch Runoff =	208
Composite Runoff Coefficient	0.40			
AxC=	0.12		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.29	acres		
Composite Runoff Coefficient	0.34	Assumed Wooded Group B Soil		
AxC=	0.10			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.21	(flow rate based on 10-min time of concentration)		

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.32	130	0.27	110	19
10	600	2.17	0.25	177	0.21	149	24
15	900	1.83	0.21	213	0.18	179	28

20	1200	1.65	0.19	249	0.16	210	32
25	1500	1.45	0.17	269	0.14	227	33
30	1800	1.27	0.15	280	0.12	236	33
35	2100	1.19	0.14	304	0.12	256	34
40	2400	1.11	0.13	322	0.11	271	35
45	2700	1.04	0.12	338	0.10	284	36
50	3000	0.96	0.11	345	0.09	291	35
55	3300	0.88	0.10	347	0.09	292	33
60	3600	0.8	0.09	343	0.08	289	31
65	3900	0.78	0.09	362	0.08	305	32
70	4200	0.75	0.09	374	0.07	315	32
75	4500	0.72	0.08	384	0.07	323	31
80	4800	0.7	0.08	398	0.07	335	32
85	5100	0.67	0.08	404	0.07	340	31
90	5400	0.65	0.08	415	0.06	349	30
95	5700	0.63	0.07	424	0.06	357	30
100	6000	0.61	0.07	432	0.06	363	29
105	6300	0.59	0.07	438	0.06	369	28
110	6600	0.57	0.07	443	0.06	373	27
115	6900	0.55	0.06	446	0.05	376	26
120	7200	0.53	0.06	449	0.05	378	24
125	7500	0.51	0.06	449	0.05	378	22
130	7800	0.49	0.06	449	0.05	378	20
135	8100	0.47	0.05	447	0.05	376	18
150	9000	0.43	0.05	454	0.04	382	13
165	9900	0.4	0.05	464	0.04	390	9
180	10800	0.38	0.04	480	0.04	404	5
195	11700	0.37	0.04	506	0.04	426	4
210	12600	0.36	0.04	530	0.04	446	1
225	13500	0.34	0.04	536	0.03	451	-4
240	14400	0.33	0.04	555	0.03	467	-6
300	18000	0.29	0.03	609	0.03	512	-22
360	21600	0.25	0.03	629	0.02	529	-42
365	21900	0.25	0.03	638	0.02	537	-42
370	22200	0.25	0.03	646	0.02	544	-43
1080	64800	0.14	0.02	1,053	0.01	887	-258
1440	86400	0.11	0.01	1,103	0.01	928	-391

GIA Design Dimensions

GIA Bed Variables:

Length =	37.00	ft
Width =	6.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

208 cf

Resulting Dimensions at Operating Level:

41.00	ft	Bed Area	222	sf
10.00	ft	Top Area	410	sf

Resulting Top Dimensions (including free board):

41.00	ft	Height	8.00	in
10.00	ft	Top Area	410	sf

Resulting Volume:

208 cf

Vegetated Infiltration Area No. 6

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 2	13,100	0.30		
Roof	6,000	0.14	0.90	(south 1/2 of storage building)
Gravel Parking Area	6,440	0.15	0.50	
Total Impervious Area	12,440	0.29		
Green Space	660	0.02	0.34	Assumed Wooded Group B Soil
Composite Runoff Coeff.			0.68	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Bed of GIA Outflow	0.02	cfs	Infiltration Area (sf) =	520
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Post Developed			Treatment Storage (cf)	
Area	0.30	acres	First 1/2-Inch Runoff =	518
Composite Runoff Coefficient	0.68			
AxC=	0.20		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.30	acres		
Composite Runoff Coefficient	0.34		Assumed Wooded Group B Soil	
AxC=	0.10			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.22		(flow rate based on 10-min time of concentration)	

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.57	229	0.29	115	109
10	600	2.17	0.44	309	0.22	156	144
15	900	1.83	0.37	372	0.19	187	171
20	1200	1.65	0.34	436	0.17	220	198
25	1500	1.45	0.29	472	0.15	238	211
30	1800	1.27	0.26	490	0.13	247	216
35	2100	1.19	0.24	532	0.12	268	232
40	2400	1.11	0.23	564	0.11	284	243
45	2700	1.04	0.21	592	0.11	298	252
50	3000	0.96	0.19	605	0.10	304	254

55	3300	0.88	0.18	608	0.09	306	251
60	3600	0.8	0.16	601	0.08	303	243
65	3900	0.78	0.16	634	0.08	319	255
70	4200	0.75	0.15	655	0.08	330	261
75	4500	0.72	0.15	673	0.07	339	265
80	4800	0.7	0.14	697	0.07	351	272
85	5100	0.67	0.14	708	0.07	356	273
90	5400	0.65	0.13	726	0.07	366	278
95	5700	0.63	0.13	742	0.06	374	281
100	6000	0.61	0.12	756	0.06	381	283
105	6300	0.59	0.12	767	0.06	386	284
110	6600	0.57	0.12	776	0.06	391	284
115	6900	0.55	0.11	782	0.06	394	282
120	7200	0.53	0.11	786	0.05	396	280
125	7500	0.51	0.10	787	0.05	396	276
130	7800	0.49	0.10	786	0.05	396	271
135	8100	0.47	0.10	783	0.05	394	264
150	9000	0.43	0.09	795	0.04	400	256
165	9900	0.4	0.08	812	0.04	409	251
180	10800	0.38	0.08	841	0.04	424	252
195	11700	0.37	0.08	887	0.04	446	261
210	12600	0.36	0.07	928	0.04	468	268
225	13500	0.34	0.07	939	0.03	473	259
240	14400	0.33	0.07	972	0.03	489	261
300	18000	0.29	0.06	1,066	0.03	537	253
360	21600	0.25	0.05	1,102	0.03	555	215
365	21900	0.25	0.05	1,117	0.03	562	218
370	22200	0.25	0.05	1,132	0.03	570	221
1080	64800	0.14	0.03	1,845	0.01	929	-79
1440	86400	0.11	0.02	1,932	0.01	973	-367

GIA Design Dimensions

GIA Bed Variables:

Length =	130.00	ft
Width =	4.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

518 cf

Resulting Dimensions at Operating Level:

134.00	ft	Bed Area	520	sf
8.00	ft	Top Area	1,072	sf

Resulting Top Dimensions (including free board):

134.00	ft	Height	8.00	in
8.00	ft	Top Area	1,072	sf

Resulting Volume:

528 cf

Vegetated Infiltration Area No. 7

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 2	7,200	0.17		
Roof	0	0.00	0.90	(south 1/2 of storage building)
Gravel Parking Area	6,530	0.15	0.50	
Total Impervious Area	6,530	0.15		
Green Space	670	0.02	0.34	Assumed Wooded Group B Soil
Composite Runoff Coeff.			0.49	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	200
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Post Developed			Treatment Storage (cf)	
Area	0.17	acres	First 1/2-Inch Runoff =	272
Composite Runoff Coefficient	0.49			
AxC=	0.08		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.17	acres		
Composite Runoff Coefficient	0.34		Assumed Wooded Group B Soil	
AxC=	0.06			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.12	(flow rate based on 10-min time of concentration)		

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.22	90	0.16	63	25
10	600	2.17	0.17	122	0.12	86	33
15	900	1.83	0.15	147	0.10	103	39
20	1200	1.65	0.13	172	0.09	121	44
25	1500	1.45	0.12	186	0.08	131	47

30	1800	1.27	0.10	194	0.07	136	47
35	2100	1.19	0.10	210	0.07	147	50
40	2400	1.11	0.09	223	0.06	156	52
45	2700	1.04	0.08	234	0.06	164	54
50	3000	0.96	0.08	239	0.05	167	54
55	3300	0.88	0.07	240	0.05	168	52
60	3600	0.8	0.06	237	0.04	166	50
65	3900	0.78	0.06	250	0.04	175	52
70	4200	0.75	0.06	259	0.04	181	53
75	4500	0.72	0.06	266	0.04	186	53
80	4800	0.7	0.06	275	0.04	193	54
85	5100	0.67	0.05	279	0.04	196	53
90	5400	0.65	0.05	287	0.04	201	54
95	5700	0.63	0.05	293	0.04	205	54
100	6000	0.61	0.05	298	0.03	209	54
105	6300	0.59	0.05	303	0.03	212	53
110	6600	0.57	0.05	306	0.03	215	53
115	6900	0.55	0.04	309	0.03	216	52
120	7200	0.53	0.04	310	0.03	217	50
125	7500	0.51	0.04	311	0.03	218	49
130	7800	0.49	0.04	310	0.03	218	47
135	8100	0.47	0.04	309	0.03	217	45
150	9000	0.43	0.03	314	0.02	220	41
165	9900	0.4	0.03	321	0.02	225	38
180	10800	0.38	0.03	332	0.02	233	36
195	11700	0.37	0.03	350	0.02	245	36
210	12600	0.36	0.03	367	0.02	257	35
225	13500	0.34	0.03	371	0.02	260	31
240	14400	0.33	0.03	384	0.02	269	30
300	18000	0.29	0.02	421	0.02	295	20
360	21600	0.25	0.02	435	0.01	305	3
365	21900	0.25	0.02	441	0.01	309	3
370	22200	0.25	0.02	447	0.01	313	3
1080	64800	0.14	0.01	729	0.01	511	-165
1440	86400	0.11	0.01	763	0.01	535	-282

GIA Design Dimensions

GIA Bed Variables:

Length =	100.00	ft
Width =	2.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

272 cf

Resulting Dimensions at Operating Level:

104.00	ft	Bed Area	200	sf
6.00	ft	Top Area	624	sf

Resulting Top Dimensions (including free board):

104.00	ft	Height	8.00	in
6.00	ft	Top Area	624	sf

Resulting Volume:

272 cf

Vegetated Infiltration Area No. 8

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 2	8,500	0.20		
Roof	6,140	0.14	0.90	(south 1/2 of storage building)
Gravel Parking Area	0	0.00	0.50	
Total Impervious Area	6,140	0.14		
Green Space	2,360	0.05	0.34	Assumed Wooded Group B Soil
Composite Runoff Coeff.			0.74	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.28
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	324
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00

Post Developed

Area	0.20	acres	Treatment Storage (cf)	
Composite Runoff Coefficient	0.74		First 1/2-Inch Runoff =	256
AxC=	0.15		Drywell Capacities	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
			Double Barell (cfs) =	1.00

Pre-Developed:

Sub Basin Area	0.20	acres		
Composite Runoff Coefficient	0.34		Assumed Wooded Group B Soil	
AxC=	0.07			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.14		(flow rate based on 10-min time of concentration)	

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.41	164	0.19	75	86
10	600	2.17	0.32	221	0.14	101	115
15	900	1.83	0.27	266	0.12	122	136
20	1200	1.65	0.24	312	0.11	143	158
25	1500	1.45	0.21	337	0.10	154	169

30	1800	1.27	0.18	351	0.08	160	173
35	2100	1.19	0.17	381	0.08	174	187
40	2400	1.11	0.16	403	0.07	184	196
45	2700	1.04	0.15	423	0.07	193	204
50	3000	0.96	0.14	433	0.06	198	206
55	3300	0.88	0.13	435	0.06	199	205
60	3600	0.8	0.12	430	0.05	196	199
65	3900	0.78	0.11	454	0.05	207	209
70	4200	0.75	0.11	469	0.05	214	215
75	4500	0.72	0.10	481	0.05	220	219
80	4800	0.7	0.10	499	0.05	228	225
85	5100	0.67	0.10	506	0.04	231	226
90	5400	0.65	0.09	520	0.04	237	231
95	5700	0.63	0.09	531	0.04	243	234
100	6000	0.61	0.09	541	0.04	247	236
105	6300	0.59	0.09	549	0.04	251	238
110	6600	0.57	0.08	555	0.04	253	238
115	6900	0.55	0.08	559	0.04	256	238
120	7200	0.53	0.08	562	0.04	257	237
125	7500	0.51	0.07	563	0.03	257	234
130	7800	0.49	0.07	563	0.03	257	231
135	8100	0.47	0.07	560	0.03	256	227
150	9000	0.43	0.06	569	0.03	260	223
165	9900	0.4	0.06	581	0.03	265	221
180	10800	0.38	0.06	602	0.03	275	224
195	11700	0.37	0.05	634	0.02	290	233
210	12600	0.36	0.05	664	0.02	303	240
225	13500	0.34	0.05	672	0.02	307	236
240	14400	0.33	0.05	695	0.02	318	240
300	18000	0.29	0.04	763	0.02	348	242
360	21600	0.25	0.04	788	0.02	360	222
365	21900	0.25	0.04	799	0.02	365	225
370	22200	0.25	0.04	810	0.02	370	228
1080	64800	0.14	0.02	1,320	0.01	603	98
1440	86400	0.11	0.02	1,382	0.01	631	-75

GIA Design Dimensions

GIA Bed Variables:

Length =	18.00	ft
Width =	18.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

256 cf

Resulting Dimensions at Operating Level:

22.00	ft	Bed Area	324	sf
22.00	ft	Top Area	484	sf

Resulting Top Dimensions (including free board):

22.00	ft	Height	8.00	in
22.00	ft	Top Area	484	sf

Resulting Volume:

267 cf

Vegetated Infiltration Area No. 9

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C
Sub Drainage Area 2	2,300	0.05	
Roof	0	0.00	0.90
Gravel Road	1,870	0.04	0.50
Total Impervious Area	1,870	0.04	
Green Space	430	0.01	0.34
Composite Runoff Coeff.			0.47

Assumed Wooded Group B Soil

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)= 1.28
Bed of GIA Outflow	0.00	cfs	Infiltration Area (sf) = 78
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)= 0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) = 0.00

Post Developed

Area	0.05	acres	Treatment Storage (cf)
Composite Runoff Coefficient	0.47		First 1/2-Inch Runoff = 78

AxC=	0.02		Drywell Capacities
Time of Concentration	5.00	min	Single Barell (cfs) = 0.30
			Double Barell (cfs) = 1.00

Pre-Developed:

Sub Basin Area	0.05	acres	
Composite Runoff Coefficient	0.34		Assumed Wooded Group B Soil
AxC=	0.02		
Time of Concentration	10	min	
Pre-Developed Flow Rate (cfs)	0.04		(flow rate based on 10-min time of concentration)

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.07	28	0.05	20	7
10	600	2.17	0.05	38	0.04	27	9
15	900	1.83	0.05	46	0.03	33	11
20	1200	1.65	0.04	53	0.03	39	12
25	1500	1.45	0.04	58	0.03	42	13

30	1800	1.27	0.03	60	0.02	43	12
35	2100	1.19	0.03	65	0.02	47	13
40	2400	1.11	0.03	69	0.02	50	14
45	2700	1.04	0.03	72	0.02	52	14
50	3000	0.96	0.02	74	0.02	53	14
55	3300	0.88	0.02	74	0.02	54	13
60	3600	0.8	0.02	74	0.01	53	12
65	3900	0.78	0.02	77	0.01	56	12
70	4200	0.75	0.02	80	0.01	58	12
75	4500	0.72	0.02	82	0.01	59	12
80	4800	0.7	0.02	85	0.01	62	13
85	5100	0.67	0.02	87	0.01	63	12
90	5400	0.65	0.02	89	0.01	64	12
95	5700	0.63	0.02	91	0.01	66	12
100	6000	0.61	0.02	92	0.01	67	12
105	6300	0.59	0.01	94	0.01	68	11
110	6600	0.57	0.01	95	0.01	69	11
115	6900	0.55	0.01	96	0.01	69	11
120	7200	0.53	0.01	96	0.01	69	10
125	7500	0.51	0.01	96	0.01	70	9
130	7800	0.49	0.01	96	0.01	70	9
135	8100	0.47	0.01	96	0.01	69	8
150	9000	0.43	0.01	97	0.01	70	6
165	9900	0.4	0.01	99	0.01	72	5
180	10800	0.38	0.01	103	0.01	74	4
195	11700	0.37	0.01	108	0.01	78	3
210	12600	0.36	0.01	113	0.01	82	2
225	13500	0.34	0.01	115	0.01	83	1
240	14400	0.33	0.01	119	0.01	86	0
300	18000	0.29	0.01	130	0.01	94	-5
360	21600	0.25	0.01	135	0.00	97	-12
365	21900	0.25	0.01	137	0.00	99	-13
370	22200	0.25	0.01	138	0.00	100	-13
1080	64800	0.14	0.00	226	0.00	163	-87
1440	86400	0.11	0.00	236	0.00	171	-134

GIA Design Dimensions

GIA Bed Variables:

Length =	26.00	ft
Width =	3.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

78 cf

Resulting Dimensions at Operating Level:

30.00	ft	Bed Area	78	sf
7.00	ft	Top Area	210	sf

Resulting Top Dimensions (including free board):

30.00	ft	Height	8.00	in
7.00	ft	Top Area	210	sf

Resulting Volume:

93 cf

Vegetated Infiltration Area No. 10

IMPERVIOUS SURFACE CALCULATIONS

Date: 4/1/2025

Basin Description	Area (sf)	Area (ac)	C
Sub Drainage Area 2	2,500	0.06	
Roof	0	0.00	0.90
Gravel Road	1,650	0.04	0.50
Total Impervious Area	1,650	0.04	
Green Space	850	0.02	0.34
Composite Runoff Coeff.			0.45

Assumed Wooded Group B Soil

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	Infiltration (max. 2 in/hr)
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)= 1.28
Bed of GIA Outflow	0.00	cfs	Infiltration Area (sf) = 78
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	Fabric Transmissivity
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)= 0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) = 0.00

Post Developed

Area	0.06	acres	Treatment Storage (cf)
Composite Runoff Coefficient	0.45		First 1/2-Inch Runoff = 69
AxC=	0.03		Drywell Capacities
Time of Concentration	5.00	min	Single Barell (cfs) = 0.30
			Double Barell (cfs) = 1.00

Pre-Developed:

Sub Basin Area	0.06	acres	
Composite Runoff Coefficient	0.34		Assumed Wooded Group B Soil
AxC=	0.02		
Time of Concentration	10	min	
Pre-Developed Flow Rate (cfs)	0.04		(flow rate based on 10-min time of concentration)

25-Year Storm							Operating
Time (min)	Time (sec)	Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Storage (cf)
5	300	2.8	0.07	29	0.05	22	6
10	600	2.17	0.06	39	0.04	30	8
15	900	1.83	0.05	47	0.04	36	9
20	1200	1.65	0.04	55	0.03	42	10
25	1500	1.45	0.04	59	0.03	45	11

30	1800	1.27	0.03	62	0.02	47	10
35	2100	1.19	0.03	67	0.02	51	11
40	2400	1.11	0.03	71	0.02	54	11
45	2700	1.04	0.03	75	0.02	57	11
50	3000	0.96	0.02	76	0.02	58	11
55	3300	0.88	0.02	77	0.02	58	11
60	3600	0.8	0.02	76	0.02	58	10
65	3900	0.78	0.02	80	0.02	61	10
70	4200	0.75	0.02	83	0.01	63	10
75	4500	0.72	0.02	85	0.01	65	10
80	4800	0.7	0.02	88	0.01	67	10
85	5100	0.67	0.02	89	0.01	68	9
90	5400	0.65	0.02	91	0.01	70	9
95	5700	0.63	0.02	93	0.01	71	9
100	6000	0.61	0.02	95	0.01	73	9
105	6300	0.59	0.02	97	0.01	74	8
110	6600	0.57	0.01	98	0.01	75	8
115	6900	0.55	0.01	98	0.01	75	7
120	7200	0.53	0.01	99	0.01	76	7
125	7500	0.51	0.01	99	0.01	76	6
130	7800	0.49	0.01	99	0.01	76	6
135	8100	0.47	0.01	99	0.01	75	5
150	9000	0.43	0.01	100	0.01	76	3
165	9900	0.4	0.01	102	0.01	78	1
180	10800	0.38	0.01	106	0.01	81	0
195	11700	0.37	0.01	112	0.01	85	0
210	12600	0.36	0.01	117	0.01	89	-1
225	13500	0.34	0.01	118	0.01	90	-3
240	14400	0.33	0.01	122	0.01	93	-4
300	18000	0.29	0.01	134	0.01	102	-10
360	21600	0.25	0.01	139	0.00	106	-17
365	21900	0.25	0.01	141	0.00	107	-17
370	22200	0.25	0.01	143	0.00	109	-17
1080	64800	0.14	0.00	232	0.00	177	-94
1440	86400	0.11	0.00	243	0.00	186	-141

GIA Design Dimensions

GIA Bed Variables:

Length =	26.00	ft
Width =	3.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	0.00	in

Required Treatment Volume:

69 cf

Resulting Dimensions at Operating Level:

30.00	ft	Bed Area	78	sf
7.00	ft	Top Area	210	sf

Resulting Top Dimensions (including free board):

30.00	ft	Height	8.00	in
7.00	ft	Top Area	210	sf

Resulting Volume:

93 cf

