STORMWATER MANAGEMENT AND EROSION CONTROL METHODOLOGY AND CALCULATIONS
for
SANDCREEK RANCH, 1ST ADDITION
BONNER COUNTY, IDAHO

Applicant: Mike and Cheryl Seitz

Prepared by: James A. Sewell & Associates, LLC
1319 North Division
Sandpoint, Idaho 83864

Date: February 12, 2026



INTRODUCTION

Mike and Cheryl Seitz are proposing to subdivide approximately 96-acres of undeveloped land into 9 residential lots and common area amenities. As a result, approximately 5,320-lf of private roadway will be constructed, resulting in about 117,000-sf of gravel surface. 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 with slopes ranging from 1% to 2%.

SOILS

The NRCS Soil survey shows on site soils consisting of Selle fine sandy loam and Colburn very fine sandy loam. Depth to water table is generally more than 80-inches below the surface for both soils. The capacity of the most limiting layer transmits water at a rate of 0.57 to 1.98 in/hr for the Colburn soils, and 1.98 to 5.95 in/hr for the Selle soil. The assumed infiltration rate used for design is 2 in/r for the Selle soils, and 1.3 in/hr for the Colburn soil.

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)	= 96 ac
Total Impervious Surface	= 0 ac
Composite Runoff Coefficient (C)	= 0.25

POST-CONSTRUCTION LAND COVER – TOTAL SITE

Undeveloped/Landscaped Area (C = 0.34)	= 96.2 ac
Gravel Roadways (C = 0.5)	= 2.7 ac
Undeveloped (C = 0.25)	= 93.3 ac
Composite Runoff Coefficient (C)	= 0.26

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 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 sandy loam top soil and native sandy soils. Each swale includes a drywell to capture and dispose of runoff subsurface in the event of an emergency overflow condition.

The site has been divided into eleven 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 = 7,651 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.1 cfs

Drainage area No. 1 - Post Development Conditions
Total Impervious Area = 4,208 sf
Green Space = 3,443 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.19 cfs

Vegetated Infiltration Area No. 1
Volume to Retain the First ½-inch of Runoff = 175 cf
Volume to Detain a 24-hour, 25-year Storm = 44 cf (Bowstring Method)
Swale Volume Provided = 181 cf

Drainage Area No. 2 - Predevelopment Conditions
Undeveloped Area = 20,400 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.25 cfs

Drainage area No. 2 - Post Development Conditions
Total Impervious Area = 11,220 sf sf
Green Space = 9,180 sf sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.51 cfs

Vegetated Infiltration Area No. 2
Volume to Retain the First ½-inch of Runoff = 468 cf
Volume to Detain a 24-hour, 25-year Storm = 113 cf (Bowstring Method)
Swale Volume Provided = 469 cf

Drainage Area No. 3 - Predevelopment Conditions
Undeveloped Area = 20,000 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.25 cfs

Drainage area No. 3 - Post Development Conditions
Total Impervious Area = 11,000 sf
Green Space = 9,000 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.5 cfs

Vegetated Infiltration Area No. 3
Volume to Retain the First ½-inch of Runoff = 458 cf
Volume to Detain a 24-hour, 25-year Storm = 109 cf (Bowstring Method)
Swale Volume Provided = 469 cf

Drainage Area No. 4 - Predevelopment Conditions
Undeveloped Area = 11,400 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.14 cfs

Drainage area No. 4 - Post Development Conditions
Total Impervious Area = 6,270 sf
Green Space = 5,130 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.28 cfs

Vegetated Infiltration Area No. 4
Volume to Retain the First ½-inch of Runoff = 261 cf
Volume to Detain a 24-hour, 25-year Storm = 65 cf (Bowstring Method)
Swale Volume Provided = 264 cf

Drainage Area No. 5 - Predevelopment Conditions
Undeveloped Area = 27,600 sf

Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.34 cfs

Drainage area No. 5 - Post Development Conditions
Total Impervious Area = 15,180 sf
Green Space = 12,420 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.69 cfs

Vegetated Infiltration Area No. 5
Volume to Retain the First ½-inch of Runoff = 633 cf
Volume to Detain a 24-hour, 25-year Storm = 149 cf (Bowstring Method)
Swale Volume Provided = 645 cf

Drainage Area No.6 - Predevelopment Conditions
Undeveloped Area = 11,400 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.14 cfs

Drainage area No. 6 - Post Development Conditions
Total Impervious Area = 6,270 sf
Green Space = 5,130 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.28 cfs

Vegetated Infiltration Area No. 6
Volume to Retain the First ½-inch of Runoff = 261 cf
Volume to Detain a 24-hour, 25-year Storm = 65 cf (Bowstring Method)
Swale Volume Provided = 264 cf

Drainage Area No.7 - Predevelopment Conditions
Undeveloped Area = 32,920 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.41 cfs

Drainage area No. 7 - Post Development Conditions
Total Impervious Area = 18,106 sf
Green Space = 14,814 sf
Time of Concentration = 5 min.

Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.82 cfs

Vegetated Infiltration Area No. 7
Volume to Retain the First ½-inch of Runoff = 754 cf
Volume to Detain a 24-hour, 25-year Storm = 178 cf (Bowstring Method)
Swale Volume Provided = 763 cf

Drainage Area No.8 - Predevelopment Conditions
Undeveloped Area = 28,000 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.35 cfs

Drainage area No. 8 - Post Development Conditions
Total Impervious Area = 17,956 sf
Green Space = 10,044 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.74 cfs

Vegetated Infiltration Area No. 8
Volume to Retain the First ½-inch of Runoff = 748 cf
Volume to Detain a 24-hour, 25-year Storm = 222 cf (Bowstring Method)
Swale Volume Provided = 748 cf

Drainage Area No.9 - Predevelopment Conditions
Undeveloped Area = 26,000 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.04 cfs

Drainage area No. 9 - Post Development Conditions
Total Impervious Area = 14,300 sf
Green Space = 11,700 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.65 cfs

Vegetated Infiltration Area No. 9
Volume to Retain the First ½-inch of Runoff = 596 cf
Volume to Detain a 24-hour, 25-year Storm = 177 cf (Bowstring Method)
Swale Volume Provided = 601 cf

Drainage Area No.10 - Predevelopment Conditions
Undeveloped Area = 13,000 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.16 cfs

Drainage area No. 10 - Post Development Conditions
Total Impervious Area = 7,150 sf
Green Space = 5,850 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.39
Post Developed Peak Flow = 0.32 cfs

Vegetated Infiltration Area No. 10
Volume to Retain the First ½-inch of Runoff = 298 cf
Volume to Detain a 24-hour, 25-year Storm = 90 cf (Bowstring Method)
Swale Volume Provided = 300 cf

Drainage Area No.11 - Predevelopment Conditions
Undeveloped Area = 13,920 sf
Time of Concentration = 10 min.
Composite Runoff Coefficient = 0.25
Predeveloped Peak Flow = 0.17 cfs

Drainage area No. 11 - Post Development Conditions
Total Impervious Area = 10,212 sf
Green Space = 3,708 sf
Time of Concentration = 5 min.
Composite Runoff Coefficient = 0.43
Post Developed Peak Flow = 0.39 cfs

Vegetated Infiltration Area No. 11
Volume to Retain the First ½-inch of Runoff = 426 cf
Volume to Detain a 24-hour, 25-year Storm = 126 cf (Bowstring Method)
Swale Volume Provided = 440 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 2026
- Install temporary erosion control
- Perform fill and excavation work for building pad, utilities and drive surfaces

Spring/Summer 2026
- Complete construction
- Check re-vegetated areas for bare spots, washouts, etc.

Late Summer/Fall 2026
- 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

48—Selle fine sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 546n
Landscape: Sand plains
Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 25 to 38 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 80 to 130 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Selle and similar soils: 70 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Selle

Setting

Landscape: Sand plains
Landform: Dunes, Sandy glaciolacustrine deposits on glacial lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and/or loess over sandy glaciolacustrine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: ashy fine sandy loam
Bw - 6 to 21 inches: fine sandy loam
E&Bt - 21 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 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: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F043AY526WA - Warm-Frigid, Udic, Loamy Foothills/Mountainsides, ashy surface (western redcedar, moist herb) Thuja plicata / Clintonia uniflora
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Minor Components

Pywell
Percent of map unit: 5 percent
Landscape: Sand plains
Landform: Depressions on flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hoodoo
Percent of map unit: 5 percent
Landscape: Sand plains
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Bonner County Area, Idaho, Parts of Bonner and Boundary Counties
Survey Area Data: Version 21, Aug 27, 2025

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

9—Colburn very fine sandy loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 547c
Landscape: Hills
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

Colburn and similar soils: 70 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colburn

Setting

Landscape: Hills
Landform: Alluvial fans, Low stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 3 inches: very fine sandy loam
Bwc - 3 to 20 inches: very fine sandy loam
2Btg - 20 to 29 inches: very fine sandy loam
2Cg - 29 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly 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: About 24 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: F043AY526WA - Warm-Frigid, Udic, Loamy Foothills/Mountainsides, ashy surface (western redcedar, moist herb) Thuja plicata / Clintonia uniflora
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Minor Components

Hoodoo
Percent of map unit: 5 percent
Landscape: Hills
Landform: Depressions, Swales
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

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

Pywell
Percent of map unit: 5 percent
Landscape: Hills
Landform: Swales, Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Bonner County Area, Idaho, Parts of Bonner and Boundary Counties
Survey Area Data: Version 21, Aug 27, 2025

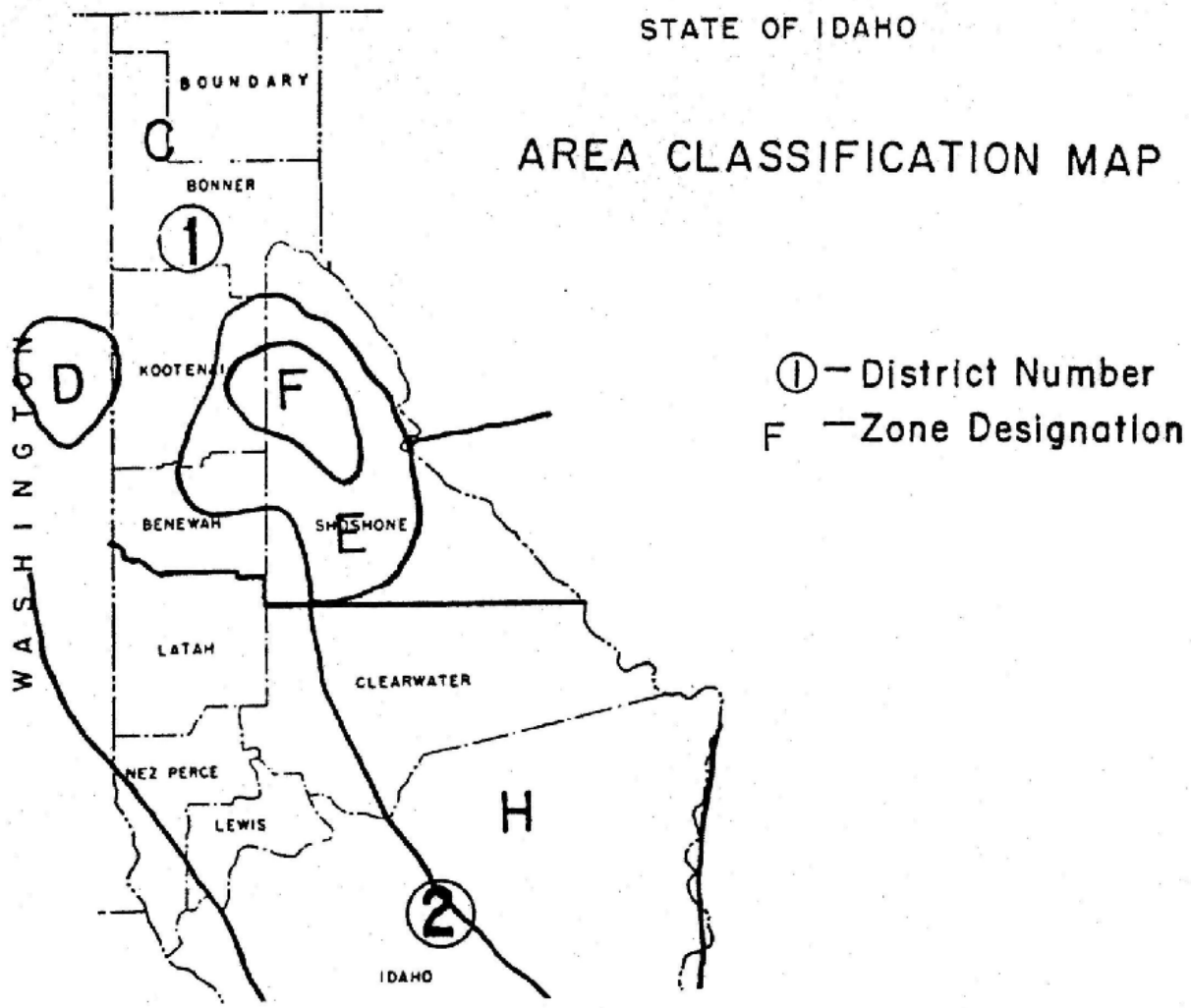


FIGURE 6-3 AREA CLASSIFICATION MAP FOR IDF CURVES - IDAHO
(IDAHO TRANSPORTATION DEPARTMENT)

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

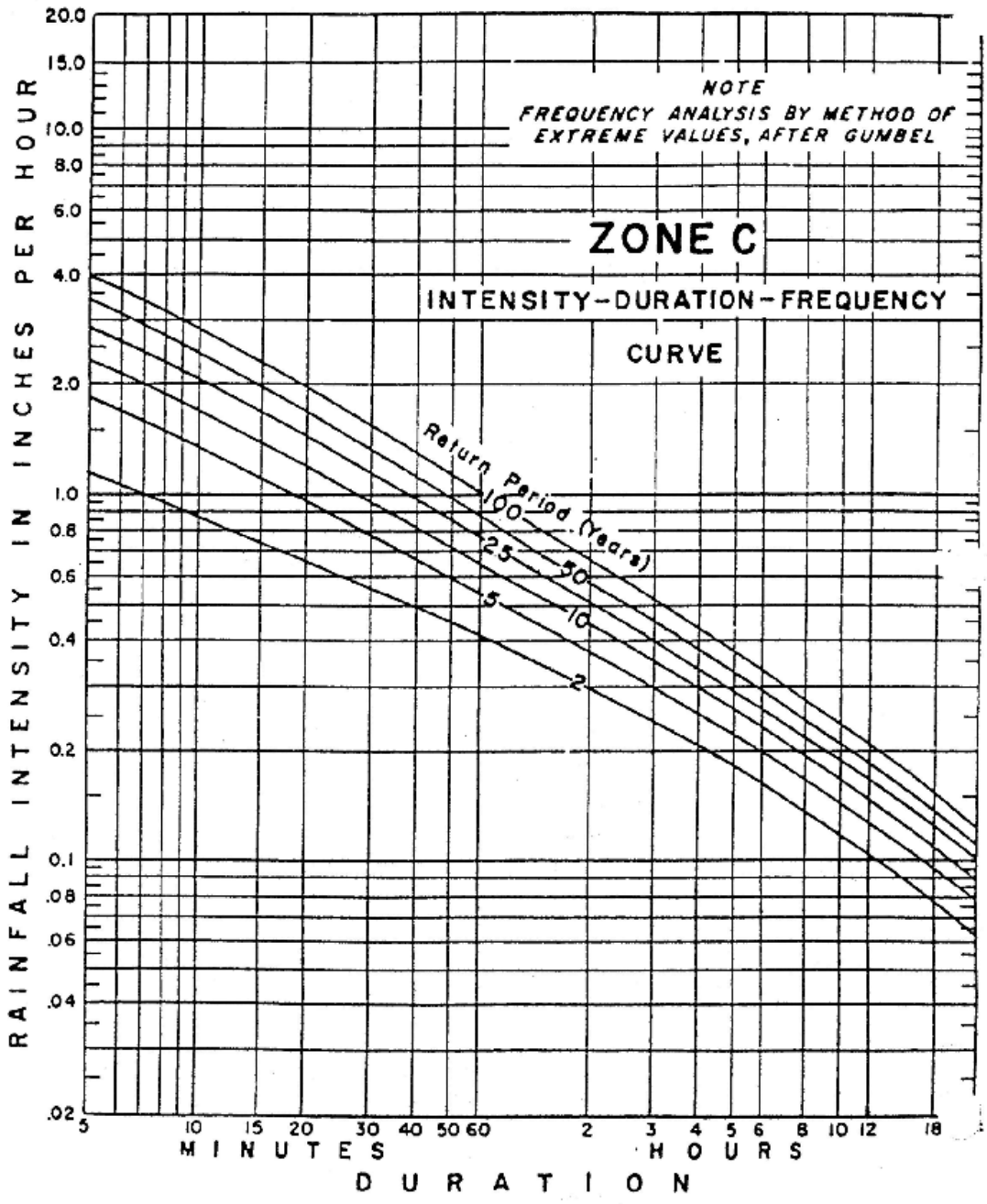


Table 4B.2. Values of Runoff Coefficient (C) for Rational Formula

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 Average lot size (acres): 1/8 1/4 1/3 1/2 1.0	Average % of lot impervious: 65 38 30 25 20	 0.59 0.29 --- --- ---	 0.76 0.55 0.49 0.45 0.41	 0.86 0.70 0.67 0.65 0.63	 0.90 0.80 0.78 0.76 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 0.57	0.99 0.76	0.99 0.84	0.99 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. 1

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 1	7,651	0.18		
Gravel Road and Shoulders	4,208	0.10	0.50	(STA 1+23.73 - 3+15)
Total Impervious Area	4,208	0.10		
Green Space	3,443	0.08	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.00
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	210
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	0.18	acres	First 1/2-Inch Runoff =	175
Composite Runoff Coefficient	0.39			
AxC=	0.07		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.18	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.04			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.10	*(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	0.19	77	0.12	49	24
10	600	2.17	0.15	104	0.10	67	31
15	900	1.83	0.12	125	0.08	81	36
20	1200	1.65	0.11	146	0.07	94	40
25	1500	1.45	0.10	158	0.06	102	42

30	1800	1.27	0.09	164	0.06	106	41
35	2100	1.19	0.08	178	0.05	115	43
40	2400	1.11	0.08	189	0.05	122	44
45	2700	1.04	0.07	198	0.05	128	44
50	3000	0.96	0.07	203	0.04	131	43
55	3300	0.88	0.06	204	0.04	131	40
60	3600	0.8	0.05	202	0.04	130	37
65	3900	0.78	0.05	212	0.03	137	37
70	4200	0.75	0.05	220	0.03	142	37
75	4500	0.72	0.05	226	0.03	145	36
80	4800	0.7	0.05	234	0.03	151	36
85	5100	0.67	0.05	237	0.03	153	35
90	5400	0.65	0.04	243	0.03	157	34
95	5700	0.63	0.04	249	0.03	161	33
100	6000	0.61	0.04	253	0.03	163	32
105	6300	0.59	0.04	257	0.03	166	30
110	6600	0.57	0.04	260	0.03	168	28
115	6900	0.55	0.04	262	0.02	169	26
120	7200	0.53	0.04	263	0.02	170	23
125	7500	0.51	0.03	264	0.02	170	21
130	7800	0.49	0.03	264	0.02	170	18
135	8100	0.47	0.03	262	0.02	169	14
150	9000	0.43	0.03	266	0.02	172	7
165	9900	0.4	0.03	272	0.02	176	0
180	10800	0.38	0.03	282	0.02	182	-5
195	11700	0.37	0.03	297	0.02	192	-8
210	12600	0.36	0.02	311	0.02	201	-12
225	13500	0.34	0.02	315	0.01	203	-20
240	14400	0.33	0.02	326	0.01	210	-24
300	18000	0.29	0.02	357	0.01	231	-48
360	21600	0.25	0.02	369	0.01	238	-79
365	21900	0.25	0.02	374	0.01	242	-80
370	22200	0.25	0.02	379	0.01	245	-81
1080	64800	0.14	0.01	618	0.01	399	-411
1440	86400	0.11	0.01	648	0.00	418	-610

GIA Design Dimensions

GIA Bed Variables:			Resulting Dimensions at Operating Level:				
Length =	15.00	ft	19.00	ft	Bed Area	**210**	sf
Width =	14.00	ft	18.00	ft	Top Area	342	sf
			Resulting Top Dimensions (including free				
Depth =	8.00	in	board):				
Side Slopes =	3	:1	20.00	ft	Height	10.00	in
Free Board =	2.00	in	19.00	ft	Top Area	380	sf
Required Treatment Volume:			Resulting Volume:				
175	cf		**181**	cf			

Vegetated Infiltration Area No. 2

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 2	20,400	0.47		
Gravel Road and Shoulders	11,220	0.26	0.50	(STA 3+15 - 8+25)
Total Impervious Area	11,220	0.26		
Green Space	9,180	0.21	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.00
Bed of GIA Outflow	0.03	cfs	Infiltration Area (sf) =	600
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	0.47	acres	First 1/2-Inch Runoff =	468
Composite Runoff Coefficient	0.39			
AxC=	0.18		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.47	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.12			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.25	*(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	0.51	204	0.33	132	64
10	600	2.17	0.39	276	0.25	178	81
15	900	1.83	0.33	333	0.21	215	93
20	1200	1.65	0.30	390	0.19	252	105
25	1500	1.45	0.26	422	0.17	272	108

30	1800	1.27	0.23	438	0.15	283	106
35	2100	1.19	0.22	476	0.14	307	110
40	2400	1.11	0.20	504	0.13	325	112
45	2700	1.04	0.19	529	0.12	341	113
50	3000	0.96	0.17	540	0.11	349	108
55	3300	0.88	0.16	543	0.10	351	101
60	3600	0.8	0.15	537	0.09	347	91
65	3900	0.78	0.14	566	0.09	365	93
70	4200	0.75	0.14	586	0.09	378	91
75	4500	0.72	0.13	601	0.08	388	88
80	4800	0.7	0.13	623	0.08	402	88
85	5100	0.67	0.12	632	0.08	408	83
90	5400	0.65	0.12	649	0.08	419	80
95	5700	0.63	0.11	663	0.07	428	77
100	6000	0.61	0.11	675	0.07	436	73
105	6300	0.59	0.11	685	0.07	442	68
110	6600	0.57	0.10	693	0.07	447	63
115	6900	0.55	0.10	699	0.06	451	56
120	7200	0.53	0.10	702	0.06	453	49
125	7500	0.51	0.09	704	0.06	454	41
130	7800	0.49	0.09	703	0.06	453	33
135	8100	0.47	0.09	700	0.06	451	23
150	9000	0.43	0.08	710	0.05	458	2
165	9900	0.4	0.07	726	0.05	468	-17
180	10800	0.38	0.07	752	0.04	485	-33
195	11700	0.37	0.07	792	0.04	511	-44
210	12600	0.36	0.07	830	0.04	535	-56
225	13500	0.34	0.06	839	0.04	541	-77
240	14400	0.33	0.06	868	0.04	560	-92
300	18000	0.29	0.05	953	0.03	615	-162
360	21600	0.25	0.05	985	0.03	635	-251
365	21900	0.25	0.05	998	0.03	644	-254
370	22200	0.25	0.05	1,012	0.03	653	-258
1080	64800	0.14	0.03	1,649	0.02	1,064	-1,215
1440	86400	0.11	0.02	1,727	0.01	1,114	-1,787

GIA Design Dimensions

GIA Bed Variables:

Length =	30.00	ft
Width =	20.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	2.00	in

Required Treatment Volume:

468 cf

Resulting Dimensions at Operating Level:

34.00	ft	Bed Area	**600**	sf
24.00	ft	Top Area	816	sf

Resulting Top Dimensions (including free board):

35.00	ft	Height	10.00	in
25.00	ft	Top Area	875	sf

Resulting Volume:

469 cf

Vegetated Infiltration Area No. 3

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 3	20,000	0.46		
Gravel Road and Shoulders	11,000	0.25	0.50	(STA 8+25 - 13+25)
Total Impervious Area	11,000	0.25		
Green Space	9,000	0.21	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.00
Bed of GIA Outflow	0.03	cfs	Infiltration Area (sf) =	600
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	0.46	acres	First 1/2-Inch Runoff =	458
Composite Runoff Coefficient	0.39			
AxC=	0.18		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.46	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.11			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.25	*(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	0.50	200	0.32	129	63
10	600	2.17	0.39	271	0.25	175	80
15	900	1.83	0.33	326	0.21	210	91
20	1200	1.65	0.29	382	0.19	247	102
25	1500	1.45	0.26	413	0.17	267	105

30	1800	1.27	0.23	430	0.15	277	102
35	2100	1.19	0.21	466	0.14	301	107
40	2400	1.11	0.20	494	0.13	319	109
45	2700	1.04	0.19	518	0.12	334	109
50	3000	0.96	0.17	530	0.11	342	105
55	3300	0.88	0.16	533	0.10	344	97
60	3600	0.8	0.14	527	0.09	340	87
65	3900	0.78	0.14	555	0.09	358	89
70	4200	0.75	0.13	574	0.09	370	87
75	4500	0.72	0.13	590	0.08	380	84
80	4800	0.7	0.12	610	0.08	394	83
85	5100	0.67	0.12	620	0.08	400	78
90	5400	0.65	0.12	636	0.07	411	76
95	5700	0.63	0.11	650	0.07	420	72
100	6000	0.61	0.11	662	0.07	427	68
105	6300	0.59	0.10	672	0.07	434	63
110	6600	0.57	0.10	680	0.07	438	58
115	6900	0.55	0.10	685	0.06	442	51
120	7200	0.53	0.09	689	0.06	444	44
125	7500	0.51	0.09	690	0.06	445	36
130	7800	0.49	0.09	689	0.06	444	28
135	8100	0.47	0.08	686	0.05	442	18
150	9000	0.43	0.08	696	0.05	449	-3
165	9900	0.4	0.07	712	0.05	459	-22
180	10800	0.38	0.07	737	0.04	476	-38
195	11700	0.37	0.07	777	0.04	501	-49
210	12600	0.36	0.06	814	0.04	525	-61
225	13500	0.34	0.06	823	0.04	531	-83
240	14400	0.33	0.06	851	0.04	549	-98
300	18000	0.29	0.05	934	0.03	603	-169
360	21600	0.25	0.04	965	0.03	623	-257
365	21900	0.25	0.04	979	0.03	631	-261
370	22200	0.25	0.04	992	0.03	640	-265
1080	64800	0.14	0.02	1,617	0.02	1,043	-1,226
1440	86400	0.11	0.02	1,693	0.01	1,092	-1,799

GIA Design Dimensions

GIA Bed Variables:

Length =	30.00	ft
Width =	20.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	2.00	in

Required Treatment Volume:

458 cf

Resulting Dimensions at Operating Level:

34.00	ft	Bed Area	**600**	sf
24.00	ft	Top Area	816	sf

Resulting Top Dimensions (including free board):

35.00	ft	Height	10.00	in
25.00	ft	Top Area	875	sf

Resulting Volume:

469 cf

Vegetated Infiltration Area No. 4

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 4	11,400	0.26		
Gravel Road and Shoulders	6,270	0.14	0.50	(STA 13+25 - 16+10)
Total Impervious Area	6,270	0.14		
Green Space	5,130	0.12	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.00
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	320
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	0.26	acres	First 1/2-Inch Runoff =	261
Composite Runoff Coefficient	0.39			
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	0.26	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A 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	0.28	114	0.18	74	36
10	600	2.17	0.22	154	0.14	100	46
15	900	1.83	0.19	186	0.12	120	53
20	1200	1.65	0.17	218	0.11	141	60
25	1500	1.45	0.15	236	0.09	152	61

30	1800	1.27	0.13	245	0.08	158	60
35	2100	1.19	0.12	266	0.08	171	63
40	2400	1.11	0.11	282	0.07	182	64
45	2700	1.04	0.11	296	0.07	191	65
50	3000	0.96	0.10	302	0.06	195	63
55	3300	0.88	0.09	304	0.06	196	59
60	3600	0.8	0.08	300	0.05	194	53
65	3900	0.78	0.08	317	0.05	204	55
70	4200	0.75	0.08	327	0.05	211	54
75	4500	0.72	0.07	336	0.05	217	53
80	4800	0.7	0.07	348	0.05	225	52
85	5100	0.67	0.07	353	0.04	228	50
90	5400	0.65	0.07	363	0.04	234	49
95	5700	0.63	0.06	371	0.04	239	47
100	6000	0.61	0.06	377	0.04	244	45
105	6300	0.59	0.06	383	0.04	247	43
110	6600	0.57	0.06	387	0.04	250	40
115	6900	0.55	0.06	391	0.04	252	36
120	7200	0.53	0.05	392	0.03	253	33
125	7500	0.51	0.05	393	0.03	254	28
130	7800	0.49	0.05	393	0.03	253	24
135	8100	0.47	0.05	391	0.03	252	19
150	9000	0.43	0.04	397	0.03	256	8
165	9900	0.4	0.04	406	0.03	262	-3
180	10800	0.38	0.04	420	0.02	271	-11
195	11700	0.37	0.04	443	0.02	286	-16
210	12600	0.36	0.04	464	0.02	299	-22
225	13500	0.34	0.03	469	0.02	303	-34
240	14400	0.33	0.03	485	0.02	313	-41
300	18000	0.29	0.03	532	0.02	343	-78
360	21600	0.25	0.03	550	0.02	355	-125
365	21900	0.25	0.03	558	0.02	360	-127
370	22200	0.25	0.03	565	0.02	365	-128
1080	64800	0.14	0.01	921	0.01	594	-633
1440	86400	0.11	0.01	965	0.01	623	-938

GIA Design Dimensions

GIA Bed Variables:			Resulting Dimensions at Operating Level:				
Length =	20.00	ft	24.00	ft	Bed Area	**320**	sf
Width =	16.00	ft	20.00	ft	Top Area	480	sf
			Resulting Top Dimensions (including free board):				
Depth =	8.00	in					
Side Slopes =	3	:1	25.00	ft	Height	10.00	in
Free Board =	2.00	in	21.00	ft	Top Area	525	sf
Required Treatment Volume:			Resulting Volume:				
261	cf		**264**	cf			

Vegetated Infiltration Area No. 5

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 5	27,600	0.63		
Gravel Road and Shoulders	15,180	0.35	0.50	(STA 16+10 - 23+00)
Total Impervious Area	15,180	0.35		
Green Space	12,420	0.29	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.00
Bed of GIA Outflow	0.04	cfs	Infiltration Area (sf) =	840
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	0.63	acres	First 1/2-Inch Runoff =	633
Composite Runoff Coefficient	0.39			
AxC=	0.25		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.63	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.16			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.34	*(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	0.69	276	0.44	178	86
10	600	2.17	0.53	374	0.34	241	109
15	900	1.83	0.45	450	0.29	290	125
20	1200	1.65	0.41	527	0.26	340	140
25	1500	1.45	0.36	570	0.23	368	144

30	1800	1.27	0.31	593	0.20	383	140
35	2100	1.19	0.29	643	0.19	415	147
40	2400	1.11	0.27	682	0.18	440	149
45	2700	1.04	0.26	715	0.16	462	149
50	3000	0.96	0.24	731	0.15	472	143
55	3300	0.88	0.22	735	0.14	474	132
60	3600	0.8	0.20	727	0.13	469	118
65	3900	0.78	0.19	766	0.12	494	120
70	4200	0.75	0.18	792	0.12	511	118
75	4500	0.72	0.18	814	0.11	525	114
80	4800	0.7	0.17	842	0.11	544	112
85	5100	0.67	0.16	856	0.11	552	105
90	5400	0.65	0.16	878	0.10	566	102
95	5700	0.63	0.15	897	0.10	579	97
100	6000	0.61	0.15	914	0.10	590	91
105	6300	0.59	0.14	927	0.09	598	84
110	6600	0.57	0.14	938	0.09	605	76
115	6900	0.55	0.14	946	0.09	610	67
120	7200	0.53	0.13	950	0.08	613	57
125	7500	0.51	0.13	952	0.08	614	46
130	7800	0.49	0.12	951	0.08	613	34
135	8100	0.47	0.12	946	0.07	611	21
150	9000	0.43	0.11	961	0.07	620	-9
165	9900	0.4	0.10	982	0.06	634	-36
180	10800	0.38	0.09	1,017	0.06	656	-59
195	11700	0.37	0.09	1,072	0.06	692	-75
210	12600	0.36	0.09	1,123	0.06	724	-92
225	13500	0.34	0.08	1,135	0.05	733	-122
240	14400	0.33	0.08	1,175	0.05	758	-143
300	18000	0.29	0.07	1,289	0.05	832	-243
360	21600	0.25	0.06	1,332	0.04	859	-367
365	21900	0.25	0.06	1,351	0.04	871	-372
370	22200	0.25	0.06	1,369	0.04	883	-378
1080	64800	0.14	0.03	2,231	0.02	1,439	-1,728
1440	86400	0.11	0.03	2,336	0.02	1,507	-2,531

GIA Design Dimensions

GIA Bed Variables:

Length =	42.00	ft
Width =	20.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	2.00	in

Required Treatment Volume:

633 cf

Resulting Dimensions at Operating Level:

46.00	ft	Bed Area	**840**	sf
24.00	ft	Top Area	1,104	sf

Resulting Top Dimensions (including free board):

47.00	ft	Height	10.00	in
25.00	ft	Top Area	1,175	sf

Resulting Volume:

645 cf

Vegetated Infiltration Area No. 6

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 6	11,400	0.26		
Gravel Road and Shoulders	6,270	0.14	0.50	(STA 23+00 - 25+85)
Total Impervious Area	6,270	0.14		
Green Space	5,130	0.12	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.00
Bed of GIA Outflow	0.01	cfs	Infiltration Area (sf) =	320
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	0.26	acres	First 1/2-Inch Runoff =	261
Composite Runoff Coefficient	0.39			
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	0.26	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A 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	0.28	114	0.18	74	36
10	600	2.17	0.22	154	0.14	100	46
15	900	1.83	0.19	186	0.12	120	53
20	1200	1.65	0.17	218	0.11	141	60
25	1500	1.45	0.15	236	0.09	152	61

30	1800	1.27	0.13	245	0.08	158	60
35	2100	1.19	0.12	266	0.08	171	63
40	2400	1.11	0.11	282	0.07	182	64
45	2700	1.04	0.11	296	0.07	191	65
50	3000	0.96	0.10	302	0.06	195	63
55	3300	0.88	0.09	304	0.06	196	59
60	3600	0.8	0.08	300	0.05	194	53
65	3900	0.78	0.08	317	0.05	204	55
70	4200	0.75	0.08	327	0.05	211	54
75	4500	0.72	0.07	336	0.05	217	53
80	4800	0.7	0.07	348	0.05	225	52
85	5100	0.67	0.07	353	0.04	228	50
90	5400	0.65	0.07	363	0.04	234	49
95	5700	0.63	0.06	371	0.04	239	47
100	6000	0.61	0.06	377	0.04	244	45
105	6300	0.59	0.06	383	0.04	247	43
110	6600	0.57	0.06	387	0.04	250	40
115	6900	0.55	0.06	391	0.04	252	36
120	7200	0.53	0.05	392	0.03	253	33
125	7500	0.51	0.05	393	0.03	254	28
130	7800	0.49	0.05	393	0.03	253	24
135	8100	0.47	0.05	391	0.03	252	19
150	9000	0.43	0.04	397	0.03	256	8
165	9900	0.4	0.04	406	0.03	262	-3
180	10800	0.38	0.04	420	0.02	271	-11
195	11700	0.37	0.04	443	0.02	286	-16
210	12600	0.36	0.04	464	0.02	299	-22
225	13500	0.34	0.03	469	0.02	303	-34
240	14400	0.33	0.03	485	0.02	313	-41
300	18000	0.29	0.03	532	0.02	343	-78
360	21600	0.25	0.03	550	0.02	355	-125
365	21900	0.25	0.03	558	0.02	360	-127
370	22200	0.25	0.03	565	0.02	365	-128
1080	64800	0.14	0.01	921	0.01	594	-633
1440	86400	0.11	0.01	965	0.01	623	-938

GIA Design Dimensions

GIA Bed Variables:

Length =	20.00	ft
Width =	16.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	2.00	in

Required Treatment Volume:

261 cf

Resulting Dimensions at Operating Level:

24.00	ft	Bed Area	**320**	sf
20.00	ft	Top Area	480	sf

Resulting Top Dimensions (including free board):

25.00	ft	Height	10.00	in
21.00	ft	Top Area	525	sf

Resulting Volume:

264 cf

Vegetated Infiltration Area No. 7

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 7	32,920	0.76		
Gravel Road and Shoulders	18,106	0.42	0.50	(STA 25+85 - 34+08)
Total Impervious Area	18,106	0.42		
Green Space	14,814	0.34	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

BOWSTRING CALCULATIONS

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.00
Bed of GIA Outflow	0.05	cfs	Infiltration Area (sf) =	1,000
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	0.76	acres	First 1/2-Inch Runoff =	754
Composite Runoff Coefficient	0.39			
AxC=	0.29		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.76	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.19			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.41	*(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	0.82	330	0.53	213	103
10	600	2.17	0.64	446	0.41	288	131
15	900	1.83	0.54	537	0.35	346	149
20	1200	1.65	0.48	629	0.31	406	168
25	1500	1.45	0.42	680	0.27	439	172
30	1800	1.27	0.37	707	0.24	456	168
35	2100	1.19	0.35	767	0.22	495	175
40	2400	1.11	0.33	813	0.21	525	177
45	2700	1.04	0.30	853	0.20	551	178

50	3000	0.96	0.28	872	0.18	563	171
55	3300	0.88	0.26	877	0.17	566	158
60	3600	0.8	0.23	867	0.15	560	141
65	3900	0.78	0.23	914	0.15	590	144
70	4200	0.75	0.22	945	0.14	610	141
75	4500	0.72	0.21	970	0.14	626	136
80	4800	0.7	0.20	1,005	0.13	648	134
85	5100	0.67	0.20	1,021	0.13	659	126
90	5400	0.65	0.19	1,047	0.12	676	122
95	5700	0.63	0.18	1,070	0.12	691	116
100	6000	0.61	0.18	1,090	0.12	703	109
105	6300	0.59	0.17	1,106	0.11	714	101
110	6600	0.57	0.17	1,119	0.11	722	91
115	6900	0.55	0.16	1,128	0.10	728	81
120	7200	0.53	0.16	1,133	0.10	731	69
125	7500	0.51	0.15	1,135	0.10	733	56
130	7800	0.49	0.14	1,134	0.09	732	41
135	8100	0.47	0.14	1,129	0.09	728	26
150	9000	0.43	0.13	1,146	0.08	739	-10
165	9900	0.4	0.12	1,172	0.08	756	-43
180	10800	0.38	0.11	1,213	0.07	783	-70
195	11700	0.37	0.11	1,279	0.07	825	-88
210	12600	0.36	0.11	1,339	0.07	864	-108
225	13500	0.34	0.10	1,354	0.06	874	-144
240	14400	0.33	0.10	1,401	0.06	904	-169
300	18000	0.29	0.08	1,537	0.05	992	-288
360	21600	0.25	0.07	1,589	0.05	1,025	-436
365	21900	0.25	0.07	1,611	0.05	1,039	-442
370	22200	0.25	0.07	1,633	0.05	1,053	-448
1080	64800	0.14	0.04	2,661	0.03	1,717	-2,056
1440	86400	0.11	0.03	2,787	0.02	1,798	-3,011

GIA Design Dimensions

GIA Bed Variables:

Length =	50.00	ft
Width =	20.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	2.00	in

Required Treatment Volume:

754 cf

Resulting Dimensions at Operating Level:

54.00	ft	Bed Area	**1,000**	sf
24.00	ft	Top Area	1,296	sf

Resulting Top Dimensions (including free board):

55.00	ft	Height	10.00	in
25.00	ft	Top Area	1,375	sf

Resulting Volume:

763 cf

Vegetated Infiltration Area No. 8

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 8	28,000	0.64		
Gravel Road and Shoulders	17,956	0.41	0.50	(STA 50+50 - 57+50)
Total Impervious Area	17,956	0.41		
Green Space	10,044	0.23	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.41	

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	0.03	cfs	Infiltration Area (sf) =	980
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	0.64	acres	First 1/2-Inch Runoff =	748
Composite Runoff Coefficient	0.41			
AxC=	0.26		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.64	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.16			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.35	*(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	0.74	297	0.45	181	107
10	600	2.17	0.57	402	0.35	245	140
15	900	1.83	0.48	484	0.29	295	163
20	1200	1.65	0.44	567	0.27	345	187
25	1500	1.45	0.38	613	0.23	373	196

30	1800	1.27	0.33	637	0.20	388	197
35	2100	1.19	0.31	691	0.19	421	209
40	2400	1.11	0.29	732	0.18	446	217
45	2700	1.04	0.27	769	0.17	468	222
50	3000	0.96	0.25	785	0.15	479	220
55	3300	0.88	0.23	790	0.14	481	213
60	3600	0.8	0.21	781	0.13	476	201
65	3900	0.78	0.21	823	0.13	502	209
70	4200	0.75	0.20	851	0.12	518	211
75	4500	0.72	0.19	874	0.12	532	211
80	4800	0.7	0.18	905	0.11	551	215
85	5100	0.67	0.18	919	0.11	560	212
90	5400	0.65	0.17	943	0.10	575	212
95	5700	0.63	0.17	964	0.10	587	212
100	6000	0.61	0.16	982	0.10	598	210
105	6300	0.59	0.16	996	0.09	607	207
110	6600	0.57	0.15	1,008	0.09	614	203
115	6900	0.55	0.15	1,016	0.09	619	197
120	7200	0.53	0.14	1,021	0.09	622	191
125	7500	0.51	0.13	1,023	0.08	623	183
130	7800	0.49	0.13	1,021	0.08	622	173
135	8100	0.47	0.12	1,017	0.08	619	163
150	9000	0.43	0.11	1,032	0.07	629	143
165	9900	0.4	0.11	1,055	0.06	643	126
180	10800	0.38	0.10	1,093	0.06	666	115
195	11700	0.37	0.10	1,152	0.06	702	112
210	12600	0.36	0.09	1,206	0.06	735	107
225	13500	0.34	0.09	1,220	0.05	743	86
240	14400	0.33	0.09	1,262	0.05	769	77
300	18000	0.29	0.08	1,385	0.05	844	20
360	21600	0.25	0.07	1,431	0.04	872	-66
365	21900	0.25	0.07	1,451	0.04	884	-67
370	22200	0.25	0.07	1,471	0.04	896	-68
1080	64800	0.14	0.04	2,397	0.02	1,460	-938
1440	86400	0.11	0.03	2,510	0.02	1,529	-1,518

GIA Design Dimensions

GIA Bed Variables:			Resulting Dimensions at Operating Level:				
Length =	49.00	ft	53.00	ft	Bed Area	**980**	sf
Width =	20.00	ft	24.00	ft	Top Area	1,272	sf
			Resulting Top Dimensions (including free board):				
Depth =	8.00	in					
Side Slopes =	3	:1	54.00	ft	Height	10.00	in
Free Board =	2.00	in	25.00	ft	Top Area	1,350	sf
Required Treatment Volume:			Resulting Volume:				
748	cf		**748**	cf			

Vegetated Infiltration Area No. 9

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 9	26,000	0.60		
Gravel Road and Shoulders	14,300	0.33	0.50	(STA 57+50 - 64+00)
Total Impervious Area	14,300	0.33		
Green Space	11,700	0.27	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

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) =	780
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	0.60	acres	First 1/2-Inch Runoff =	596
Composite Runoff Coefficient	0.39			
AxC=	0.23		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.60	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.15			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.32	*(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	0.65	260	0.42	168	85
10	600	2.17	0.50	352	0.32	227	111
15	900	1.83	0.42	424	0.27	274	130
20	1200	1.65	0.38	497	0.25	321	149
25	1500	1.45	0.34	537	0.22	347	156

30	1800	1.27	0.29	559	0.19	360	157
35	2100	1.19	0.28	606	0.18	391	167
40	2400	1.11	0.26	642	0.17	414	173
45	2700	1.04	0.24	674	0.16	435	177
50	3000	0.96	0.22	689	0.14	444	175
55	3300	0.88	0.20	692	0.13	447	170
60	3600	0.8	0.19	685	0.12	442	160
65	3900	0.78	0.18	722	0.12	466	166
70	4200	0.75	0.17	746	0.11	481	168
75	4500	0.72	0.17	766	0.11	494	168
80	4800	0.7	0.16	794	0.10	512	171
85	5100	0.67	0.15	806	0.10	520	169
90	5400	0.65	0.15	827	0.10	534	169
95	5700	0.63	0.15	845	0.09	545	169
100	6000	0.61	0.14	861	0.09	555	167
105	6300	0.59	0.14	874	0.09	564	165
110	6600	0.57	0.13	884	0.09	570	162
115	6900	0.55	0.13	891	0.08	575	157
120	7200	0.53	0.12	895	0.08	577	152
125	7500	0.51	0.12	897	0.08	579	146
130	7800	0.49	0.11	896	0.07	578	138
135	8100	0.47	0.11	892	0.07	575	130
150	9000	0.43	0.10	905	0.06	584	114
165	9900	0.4	0.09	925	0.06	597	100
180	10800	0.38	0.09	958	0.06	618	91
195	11700	0.37	0.09	1,010	0.06	652	89
210	12600	0.36	0.08	1,058	0.05	682	85
225	13500	0.34	0.08	1,070	0.05	690	69
240	14400	0.33	0.08	1,107	0.05	714	61
300	18000	0.29	0.07	1,214	0.04	783	16
360	21600	0.25	0.06	1,255	0.04	810	-52
365	21900	0.25	0.06	1,272	0.04	821	-53
370	22200	0.25	0.06	1,290	0.04	832	-53
1080	64800	0.14	0.03	2,102	0.02	1,356	-746
1440	86400	0.11	0.03	2,201	0.02	1,420	-1,208

GIA Design Dimensions

GIA Bed Variables:			Resulting Dimensions at Operating Level:				
Length =	39.00	ft	43.00	ft	Bed Area	**780**	sf
Width =	20.00	ft	24.00	ft	Top Area	1,032	sf
			Resulting Top Dimensions (including free board):				
Depth =	8.00	in					
Side Slopes =	3	:1	44.00	ft	Height	10.00	in
Free Board =	2.00	in	25.00	ft	Top Area	1,100	sf
Required Treatment Volume:			Resulting Volume:				
596	cf		**601**	cf			

Vegetated Infiltration Area No. 10

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 10	13,000	0.30		
Gravel Road and Shoulders	7,150	0.16	0.50	(STA 64+00 - 67+25)
Total Impervious Area	7,150	0.16		
Green Space	5,850	0.13	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.39	

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) =	368
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 =	298
Composite Runoff Coefficient	0.39			
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	0.30	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.07			
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	0.32	130	0.21	84	43
10	600	2.17	0.25	176	0.16	114	56
15	900	1.83	0.21	212	0.14	137	65
20	1200	1.65	0.19	248	0.12	160	75
25	1500	1.45	0.17	269	0.11	173	79
30	1800	1.27	0.15	279	0.09	180	80
35	2100	1.19	0.14	303	0.09	196	85
40	2400	1.11	0.13	321	0.08	207	88
45	2700	1.04	0.12	337	0.08	217	90

50	3000	0.96	0.11	344	0.07	222	90
55	3300	0.88	0.10	346	0.07	223	87
60	3600	0.8	0.09	342	0.06	221	82
65	3900	0.78	0.09	361	0.06	233	86
70	4200	0.75	0.09	373	0.06	241	87
75	4500	0.72	0.08	383	0.05	247	87
80	4800	0.7	0.08	397	0.05	256	89
85	5100	0.67	0.08	403	0.05	260	88
90	5400	0.65	0.08	414	0.05	267	88
95	5700	0.63	0.07	423	0.05	273	88
100	6000	0.61	0.07	430	0.05	278	88
105	6300	0.59	0.07	437	0.04	282	87
110	6600	0.57	0.07	442	0.04	285	85
115	6900	0.55	0.06	445	0.04	287	83
120	7200	0.53	0.06	448	0.04	289	81
125	7500	0.51	0.06	448	0.04	289	78
130	7800	0.49	0.06	448	0.04	289	74
135	8100	0.47	0.05	446	0.04	288	70
150	9000	0.43	0.05	453	0.03	292	63
165	9900	0.4	0.05	463	0.03	298	57
180	10800	0.38	0.04	479	0.03	309	53
195	11700	0.37	0.04	505	0.03	326	52
210	12600	0.36	0.04	529	0.03	341	51
225	13500	0.34	0.04	535	0.03	345	43
240	14400	0.33	0.04	553	0.02	357	40
300	18000	0.29	0.03	607	0.02	392	20
360	21600	0.25	0.03	627	0.02	405	-12
365	21900	0.25	0.03	636	0.02	410	-12
370	22200	0.25	0.03	645	0.02	416	-12
1080	64800	0.14	0.02	1,051	0.01	678	-331
1440	86400	0.11	0.01	1,100	0.01	710	-548

GIA Design Dimensions

GIA Bed Variables:

Length =	23.00	ft
Width =	16.00	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	2.00	in

Required Treatment Volume:

298 cf

Resulting Dimensions at Operating Level:

27.00	ft	Bed Area	**368**	sf
20.00	ft	Top Area	540	sf

Resulting Top Dimensions (including free board):

28.00	ft	Height	10.00	in
21.00	ft	Top Area	588	sf

Resulting Volume:

300 cf

Vegetated Infiltration Area No. 11

IMPERVIOUS SURFACE CALCULATIONS Date: 2/10/2026

Basin Description	Area (sf)	Area (ac)	C	
Sub Drainage Area 11	13,920	0.32		
Gravel Road and Shoulders	10,212	0.23	0.50	(STA 67+25 - 70+73)
Total Impervious Area	10,212	0.23		
Green Space	3,708	0.09	0.25	Assumed Pasture Group A Soil
Composite Runoff Coeff.			0.43	

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) =	560
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	0.32	acres	First 1/2-Inch Runoff =	426
Composite Runoff Coefficient	0.43			
AxC=	0.14		**Drywell Capacities**	
Time of Concentration	5.00	min	Single Barell (cfs) =	0.30
Pre-Developed:			Double Barell (cfs) =	1.00
Sub Basin Area	0.32	acres		
Composite Runoff Coefficient	0.25	Assumed Pasture Group A Soil		
AxC=	0.08			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	0.17	*(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	0.39	156	0.22	90	61
10	600	2.17	0.30	211	0.17	122	79
15	900	1.83	0.25	254	0.15	146	93
20	1200	1.65	0.23	298	0.13	172	106
25	1500	1.45	0.20	322	0.12	186	111

30	1800	1.27	0.18	335	0.10	193	112
35	2100	1.19	0.16	363	0.10	209	119
40	2400	1.11	0.15	385	0.09	222	123
45	2700	1.04	0.14	404	0.08	233	126
50	3000	0.96	0.13	412	0.08	238	125
55	3300	0.88	0.12	415	0.07	239	121
60	3600	0.8	0.11	410	0.06	237	114
65	3900	0.78	0.11	432	0.06	249	118
70	4200	0.75	0.10	447	0.06	258	120
75	4500	0.72	0.10	459	0.06	265	120
80	4800	0.7	0.10	475	0.06	274	122
85	5100	0.67	0.09	483	0.05	278	120
90	5400	0.65	0.09	495	0.05	286	120
95	5700	0.63	0.09	506	0.05	292	120
100	6000	0.61	0.08	516	0.05	297	119
105	6300	0.59	0.08	523	0.05	302	117
110	6600	0.57	0.08	529	0.05	305	115
115	6900	0.55	0.08	533	0.04	308	112
120	7200	0.53	0.07	536	0.04	309	108
125	7500	0.51	0.07	537	0.04	310	103
130	7800	0.49	0.07	536	0.04	309	98
135	8100	0.47	0.07	534	0.04	308	92
150	9000	0.43	0.06	542	0.03	313	81
165	9900	0.4	0.06	554	0.03	320	71
180	10800	0.38	0.05	574	0.03	331	64
195	11700	0.37	0.05	605	0.03	349	63
210	12600	0.36	0.05	633	0.03	365	60
225	13500	0.34	0.05	641	0.03	369	48
240	14400	0.33	0.05	663	0.03	382	42
300	18000	0.29	0.04	727	0.02	419	10
360	21600	0.25	0.03	751	0.02	433	-39
365	21900	0.25	0.03	762	0.02	439	-40
370	22200	0.25	0.03	772	0.02	445	-40
1080	64800	0.14	0.02	1,258	0.01	726	-538
1440	86400	0.11	0.02	1,318	0.01	760	-870

GIA Design Dimensions

GIA Bed Variables:			Resulting Dimensions at Operating Level:				
Length =	28.00	ft	32.00	ft	Bed Area	**560**	sf
Width =	20.00	ft	24.00	ft	Top Area	768	sf
			Resulting Top Dimensions (including free board):				
Depth =	8.00	in					
Side Slopes =	3	:1	33.00	ft	Height	10.00	in
Free Board =	2.00	in	25.00	ft	Top Area	825	sf
Required Treatment Volume:			Resulting Volume:				
426	cf		**440**	cf			