STORMWATER MANAGEMENT
and
EROSION CONTROL PLAN
for
PONDERAY HOOTEL
HIGHWAY 95, PONDERAY, ID
RP00000037302A

REVISED

Project:	The applicant is proposing to construct a multi-story hotel on parcel number RP00000037302A which is located in Township 57 North, Range 2 West, Section 03.
Applicant:	Providence Development, LLC
Prepared by:	James A. Sewell & Associates, LLC 1319 North Division Avenue Sandpoint, Idaho 83864
Date:	March 15, 2022

INTRODUCTION

Providence Development, LLC is proposing to construct a 95-unit hotel building on the approximate 3.1-acre parcel of land located on Parcel RP00000037302A, in Ponderay Idaho. The site is located to the north of Schweitzer Cutoff Road and the Best Western Plus on the west side of Highway 95. As a result of this development, approximately 2.15 acres of impervious surfaces will be constructed. This area includes approximately 1.24 acres of pavement, and 0.64 acres of impervious area from the proposed building and sidewalk area. The purpose of this report is to assess the capability of the lot to manage stormwater run-off from impervious surfaces and control erosion attributed to the proposed construction.

The scope of this report is based on and limited to the known general and specific topography of the site, soil types as identified by site inspection, observed surface site features, and soils information obtained from the U.S.D.A. Natural Resources Conservation Service "Web Soil Survey".

EXISTING SITE CONDITIONS

The site is partially developed and contains a gravel access driveway and existing buildingS that will be removed as part of this proposal. In general, runoff currently sheet flows to the west down the steep slopes towards Sand Creek. The majority of the site gently slopes away from the existing building before draining towards the steep slopes on the western edge of the property. The eastern edge of the site abuts Highway 95. There are two existing approaches that provide access to the site where an existing grassed drainage ditch parallels the highway. The existing approaches that serves the site each have an 18-inch corrugated metal pipe (CMP)-culvert beneath it that conveys stormwater along the existing ditch within the Idaho Transportation Department (I.T.D.) Right-of-Way (R.O.W.). The site is covered in trees, grasses and native vegetation.

PROPOSED CONDITIONS

A 90-unit hotel building and parking lot are proposed for the site. The existing building and driveway will be demolished. All disturbed soil areas shall be reseeded with native vegetation. Proposed drainage swales will be constructed to capture runoff from the proposed impervious surfaces.

SOILS

The U.S.D.A. Web Soil Survey indicates that the site is located in an area that contains Bonner Silt Loam, Cool and Haploxeralfs and Xerochrepts. Properties of the soil are found below:

Bonner Silt Loam, Cool, 0 to 4 percent slopes

Setting:

Position on Landscape: Outwash Terraces

Elevation:	2,000 - 4,200 feet
Mean Annual Precipitation:	25 to 45 inches
Mean Annual Temperature:	41° to 46° F
Frost Free Season:	60 to 120 days

Typical Profile:

0-1 inches:	slightly decomposed plant material
1-6 inches:	ashy silt loam
6-22 inches:	gravelly silt loam
22-30 inches:	gravelly loam
30-60 inches:	very gravelly loamy sand

Soil Properties:

Drainage:	Well Drained
Permeability:	Moderately High to High (0.57 to 1.98 in/hr)
Available Water:	Low (about 5.9 inches)
Seasonal Water Table Depth:	More than 80 inches

<u>Haploxeralfs and Xerochrepts, 30 to 55 percent slopes</u>

Setting:

Position on Landscape:	Escarpments
Elevation:	2,000 - 3,000 feet
Mean Annual Precipitation:	25 to 35 inches
Mean Annual Temperature:	41° to 46° F
Frost Free Season:	90 to 120 days

Typical Haploxeralfs Profile:

0-8 inches:	silt loam
8-36 inches:	silty clay loam
36-60 inches:	stratified fine sand to silty clay

Haploxeralfs Soil Properties:

Drainage:	Well Drained
Permeability:	Moderately low to High (0.06 to 1.98 in/hr)
Available Water:	High (about 11.2 inches)
Seasonal Water Table Depth:	More than 80 inches

Typical Xerochrepts Profile:

0-4 inches:	gravelly sandy loam
4-25 inches:	gravelly sandy loam
25-60 inches:	very gravelly loamy sand

Xerochrepts Soil Properties:

Drainage:	Well Drained
Permeability:	Moderately high to High (1.98 to 5.95 in/hr)
Available Water:	Low (about 4.9 inches)
Seasonal Water Table Depth:	More than 80 inches

EXISTING IMPERVIOUS SURFACES

As noted above, existing impervious surface includes a building, paved driveway and a graveled area.

Existing Paved Area	5,210 sf
Existing Gravel Area	24,947 sf
Existing Building	12,941 sf
Total	43,098 sf

CREATED IMPERVIOUS SURFACES REQUIRING TREATMENT

As noted above, construction includes a 90-unit hotel and paved parking lot.

Proposed Building	27,642 sf
Proposed Paved Parking lot	53,992 sf
Total	81,634 sf

STORMWATER MANAGEMENT

Stormwater collection facilities in this report are designed to intercept and treat runoff from impervious surfaces attributed to new building construction. Stormwater collection facilities in this report are designed to capture the first half inch of runoff from the created impervious surface areas and ensure that the post-development site runoff rate from the 25-year design storm not exceed that of the pre-developed site as required by the City of Ponderay. The duration, as determined using the Bowstring method, is the 24-hour event. The following calculations demonstrate these requirements for both storage and treatment structures.

Created Impervious Surfaces

First ½" of Runoff — 3,401 cf (81,634 sf x ½" of runoff)

Existing Conditions:

C = 0.61, Meadow, Soil type D	Area = 2.18 acres
C = 0.69, Gravel Road, Soil type D	Area = 0.57 acres
C = 0.99, Existing Building	Area = 0.30 acres
C = 0.99, Existing Paved Road	Area = 0.12 acres

Total Composite C = 0.701

Time of Concentration = 10 min.
I = 2.17 inches per hour for the 25 year, 10-minute event
A = 3.17 acres
Q = 4.83cfs

Proposed Construction:

C = 0.61, Meadow, Soil type D	Area = 1.30 0acres
C = 0.99, Proposed Building	Area = 0.63 acres
C = 0.99, Proposed Driveway	Area = 1.24 acres

Total Composite C = 0.834
Time of Concentration = 5 min.
I = 2.8 inches per hour for the 5-minute event
A = 3.17 acres
Q = 7.41 cfs

Resulting Infiltration Volume Required:
First ½-inch of Runoff from Impervious Surface = 3,401 cf
24-hour, 20-minute Storm = 572 cf (Bowstring Method)
Swale Volume Provided = 3,519 cf (without freeboard)
(See Bowstring Method calculation in Appendix B for detail)

Grassy Infiltration Areas (GIA)
Infiltration Rate:
The proposed GIAs are designed to detain the increase in runoff due to the addition of the impervious surfaces attributed to building construction. According to the soil survey, the permeability of the existing soil is between 0.06 in/hr and 5.95 in/hr. The GIAs will be undertrained with 4" dia. pipe with and a permeability of 1.98 in/hr has been used for calculation purposes. The combined bottom area of the proposed GIAs shown in the plans is equal to 6,092 sf. The total volume infiltrated over a 24-hour period is:

6,092 sf x 1.98 in/hr x 24hr /12 = 24,142 cubic feet per day

Storage Volume Required
The storage volume required is either the increase in runoff due to the addition of impervious surfaces from the 25-year, 20-minute storm (572 cf) or the first ½" of runoff from created impervious surface areas (3,401 cf), whichever is greater. The storage volumes required is the first ½" of runoff from created impervious surface areas (3,401 cf),

Storage Volume Provided
The total storage volume shown on the plans is 3,519 cf. A total of ten (9) GIAs will be constructed. Two (2) GIAs will be constructed along the proposed building. Six (6) GIAs will be constructed throughout the parking lot area. One GIA will be constructed near the toe of the hill that is located on the west side of the lot. Catch basins will be placed

in the GIAs which will act as overflows. The GIAs will be underdrained with 4” diameter pipe that discharges into each catch basin. The catch basins will all discharge into the lower GIA that is located at the base of the hill. The proposed GIAs are designed to capture stormwater runoff from proposed impervious surfaces.

Calculations Summary

The volume of the proposed GIAs exceeds the requirements set forth by the City of Ponderay. The total volume of the proposed GIAs is greater than the first ½" of runoff from created impervious surface areas and thus there will be no increase in stormwater runoff rate from the site as compared to the pre-development conditions because the increase in runoff volume will be stored on site.

TEMPORARY EROSION CONTROL PLAN

Erosion control shall be maintained through the use of existing vegetation, silt fencing, reseeding of areas denuded of vegetation, and straw mulching. Silt fencing 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-Vegetation

Areas disturbed during construction shall be reseeded as soon as possible after finish grading. All disturbed soil surfaces shall be reseeded and reclaimed with vegetation having soil holding properties.

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.

MAINTENANCE AND CONSTRUCTION

During Construction

During construction the contractor shall walk the site and inspect stormwater and erosion control measures at least once every 7 days and following any storm event of 0.25 inches or greater. Items the contractor shall inspect are:

- Silt Fence
    - Depth of sediment (sediment shall be removed from silt fence when it has reached 1/3 the height of the silt fence)

    - Tears in fabric
    - Fabric secured to fence posts, fence posts firmly in ground

- Reseeding / Straw Mulching
    - Bare spots, washouts, and healthy growth

- Catch Basins/Storm Drain Pipes
    - Sediment build up
    - Clogs

If maintenance is found to be necessary, the contractor shall begin repairs within 24 hours.

<u>After Final Stabilization</u>
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:

- Grassy Infiltration Areas (GIA)
    - Check for sediment build up. If sediment depth exceeds 10% of GIA depth, excavate sediment and re-seed GIA bottom.

- Reseeded Areas
    - Bare spots, washouts, and healthy vegetation growth

In the event that the GIAs become clogged with sediment and cease to function properly, the topsoil should be replaced. A GIA would be considered non-functioning if the runoff from small rain storms fails to infiltrate into the GIA and there is standing water on top of the GIA within 24 hours of a storm event.

IMPLEMENTATION SCHEDULE

The proposed construction schedule is as follows:

Spring/Summer 2022
- Install temporary erosion control prior to site disturbance
- Clear & grub building sites
- Construct GIAs
- Begin building construction

Spring 2023
- Finish building construction
- Finish grade

- Hydroseed or broadcast seed and mulch disturbed areas

Fall 2023
- Check re-vegetated areas for bare spots, washouts, etc.
- Repair and reseed as necessary
- Final stabilization complete

SUMMARY

With the proper implementation of the best management practices listed above and the recommendations listed in this report, the subject property is capable of supporting the proposed building construction without substantial risk of soil erosion or sedimentation of surface waters. The site is capable of retaining and treating storm water runoff in accordance with the City of Ponderay.

APPENDIX A

Area Classification Map, Rainfall Intensity Diagram, Runoff Coefficients

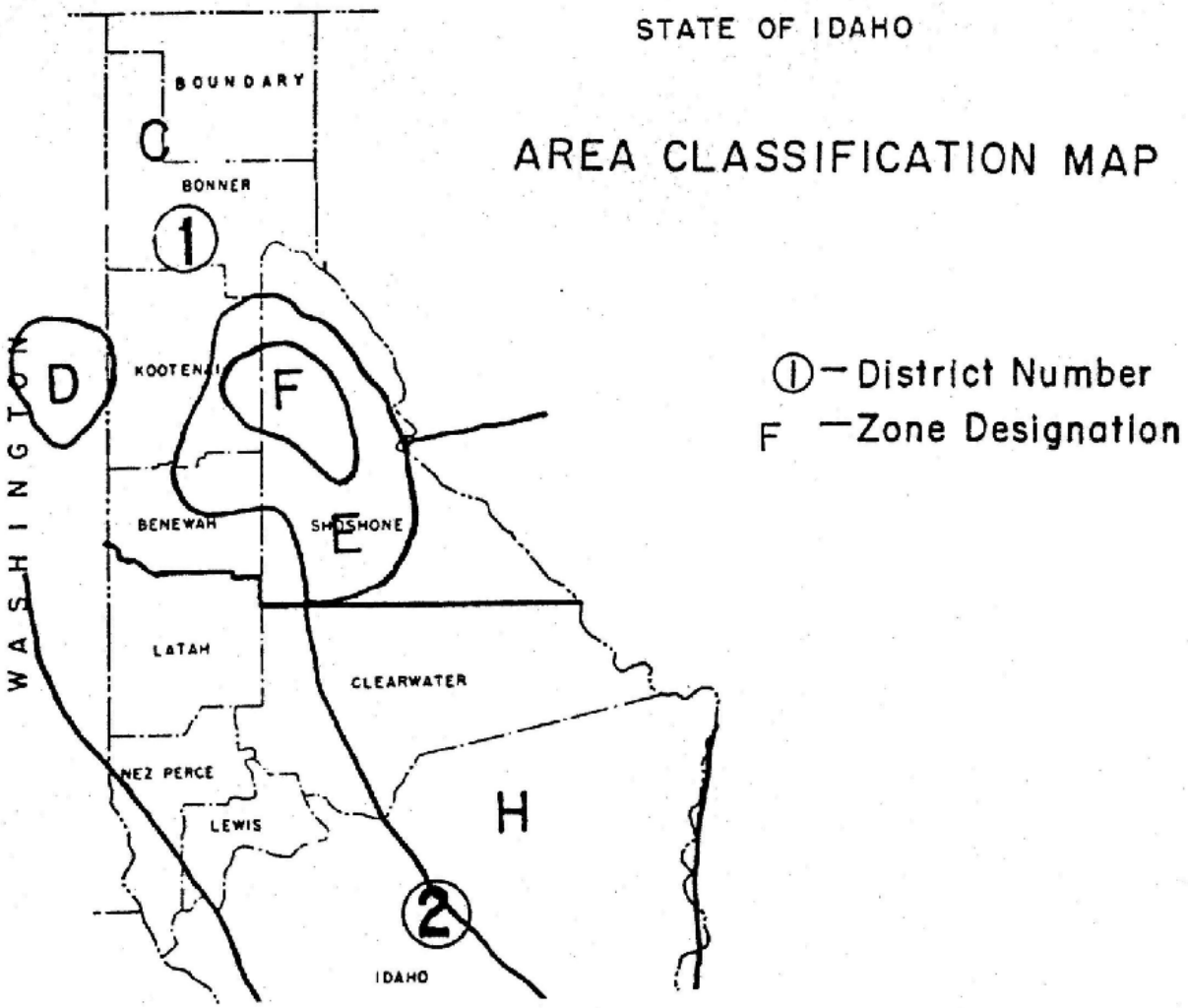

FIGURE 6-3 AREA CLASSIFICATION MAP FOR IDF CURVES - IDAHO
(IDAHO TRANSPORTATION DEPARTMENT)

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

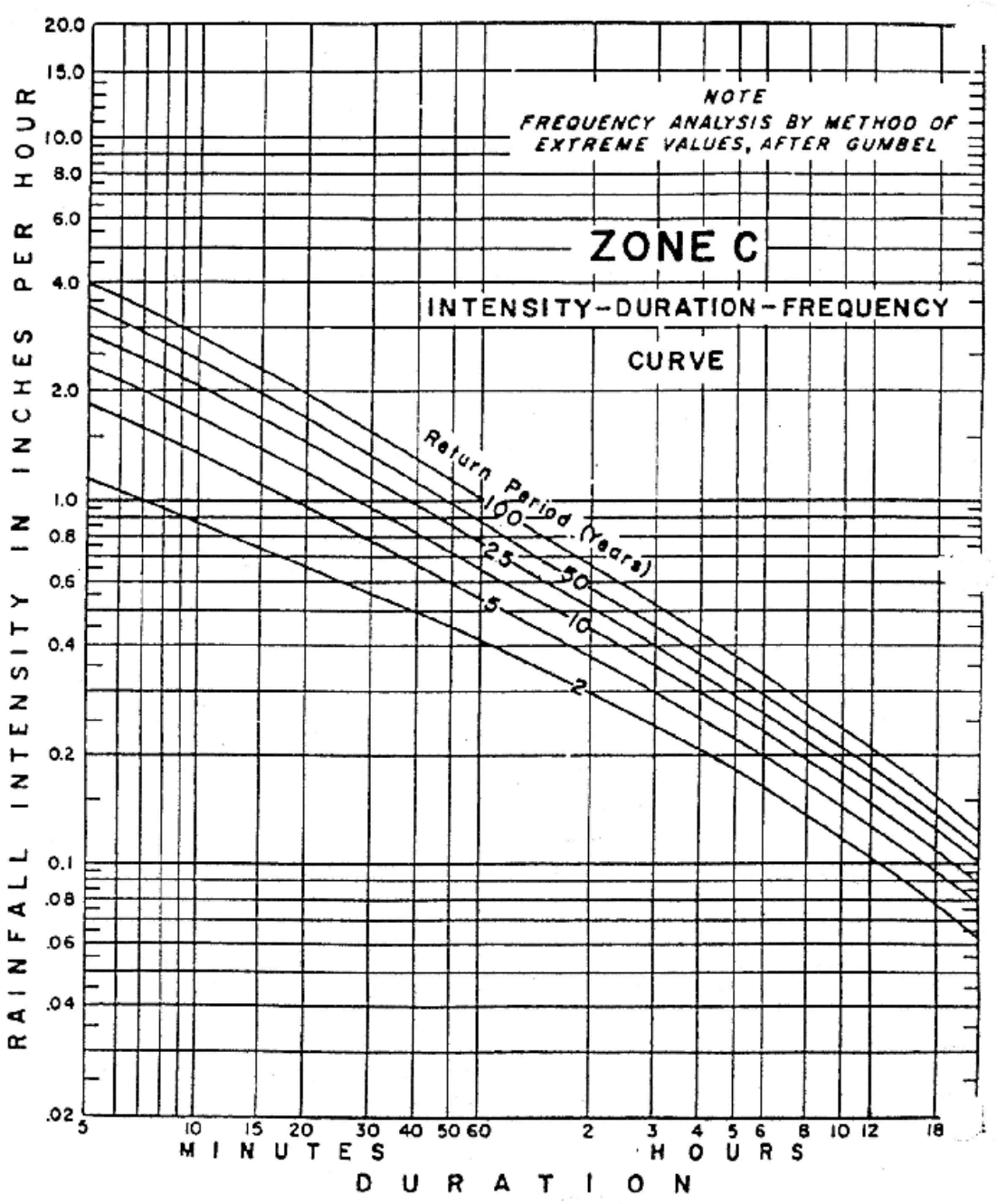

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Table 1A.2. Values of Runoff Coefficient (C) for Rational Formula

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.

APPENDIX B

Stormwater Calculations and BMP Sizing

BOWSTRING METHOD

DATE: 3/9/2022 PJG

Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	1.98
Bed of GIA Outflow	0.28	cfs	GIA Bed Area (sf) =	6,092
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	3.17	acres	First 1/2-Inch Runoff =	3,401
Composite Runoff Coefficient	0.83			
AxC=	2.65			
Time of Concentration	5.00	min		
Pre-Developed:				
Area	3.17	acres		
Composite Runoff Coefficient	0.70			
AxC=	2.23			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	4.83	*(flow rate based on 10-min time of concentration)*		

Time (min)	Time (sec)	25-Year Storm Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Operating Storage (cf)
5	300	2.8	7.42	2,981	6.23	2,506	391
10	600	2.17	5.75	4,034	4.83	3,391	475
15	900	1.83	4.85	4,856	4.07	4,082	523
20	1200	1.65	4.37	5,689	3.67	4,782	572
25	1500	1.45	3.84	6,152	3.23	5,171	562
30	1800	1.27	3.36	6,397	2.83	5,377	517
35	2100	1.19	3.15	6,939	2.65	5,833	520
40	2400	1.11	2.94	7,355	2.47	6,182	502
45	2700	1.04	2.75	7,717	2.32	6,487	476
50	3000	0.96	2.54	7,886	2.14	6,629	419
55	3300	0.88	2.33	7,928	1.96	6,665	342
60	3600	0.8	2.12	7,843	1.78	6,593	245
65	3900	0.78	2.07	8,267	1.74	6,949	229
70	4200	0.75	1.99	8,544	1.67	7,183	189
75	4500	0.72	1.91	8,775	1.60	7,376	142
80	4800	0.7	1.85	9,087	1.56	7,639	108
85	5100	0.67	1.77	9,230	1.49	7,759	47
90	5400	0.65	1.72	9,471	1.45	7,961	2
95	5700	0.63	1.67	9,680	1.40	8,137	-49
100	6000	0.61	1.62	9,857	1.36	8,286	-104
105	6300	0.59	1.56	10,003	1.31	8,409	-165
110	6600	0.57	1.51	10,117	1.27	8,504	-230
115	6900	0.55	1.46	10,199	1.22	8,573	-301
120	7200	0.53	1.40	10,249	1.18	8,615	-377
125	7500	0.51	1.35	10,267	1.14	8,631	-458
130	7800	0.49	1.30	10,254	1.09	8,620	-544
135	8100	0.47	1.24	10,209	1.05	8,582	-635
150	9000	0.43	1.14	10,365	0.96	8,713	-861
165	9900	0.4	1.06	10,595	0.89	8,906	-1,076
180	10800	0.38	1.01	10,971	0.85	9,222	-1,267
195	11700	0.37	0.98	11,564	0.82	9,721	-1,424
210	12600	0.36	0.95	12,110	0.80	10,180	-1,588
225	13500	0.34	0.90	12,247	0.76	10,295	-1,817
240	14400	0.33	0.87	12,673	0.73	10,654	-2,001
300	18000	0.29	0.77	13,902	0.65	11,686	-2,810
360	21600	0.25	0.66	14,368	0.56	12,078	-3,741
365	21900	0.25	0.66	14,567	0.56	12,245	-3,793
370	22200	0.25	0.66	14,765	0.56	12,412	-3,845
1080	64800	0.14	0.37	24,062	0.31	20,227	-14,258
1440	86400	0.11	0.29	25,198	0.24	21,182	-20,108

James A Sewell & Associates, LLC

A New Retail Shell Building - Storm Water Calculations

9-Mar-22 **used only for C-values and as a check for bowstring calcs**
PJG

C Pre-development (meadow, Soil Type D)	0.61
C Pre-development (Gravel access, Soil Type D)	0.84
C Impervious surface:	0.99
I, Rainfall intensity (25-yr/24hr) (in/hr):	0.11
Infiltration Rate (in/hr)	1.98

Existing Condition	Acres	Sq. Ft	
Total Area	3.17	138,255	sf
Paved Area	0.12	5,210	
Gravel Road	0.57	24,947	
Buildings	0.30	12,941	
Meadow	2.18	95,158	sf
	Total	138,255	sf

Proposed Conditions			
Open Space	1.30	56,621	sf
Proposed Building & patio	0.63	27,642	sf
Proposed Paved & Paver area	1.24	53,992	sf
	Total	138,255	sf

25 year Storm Data

Duration (hour)	Intensity (in/hr)
0.083	2.8
0.17	2.1
0.25	1.8
0.33	1.5
0.50	1.2
0.67	0.96
0.83	0.85
1	0.78
2	0.51
3	0.4
4	0.35
5	0.29
6	0.26
8	0.23
10	0.18
12	0.17
18	0.13
24	0.11

25 year, 24 Hour Storm Discharge

Drainage Area#	Contributing Area (sf)	Existing Impervious Area (sf)	Total Impervious Surface (sf)	Created Impervious Area (sf)	***1st 1/2" From Created Impervious Surfaces***	Post Development Composite C	Post Development Run-Off-Rate (cf)	Pre Development Composite C	Pre Development Run-Off-Rate (cf)	Infiltration Rate (cf)	***Pre - Post Less Infiltration (cf)***	**Pre - Post Less Infiltration or 1st 1/2" Whichever is Greater (cf)**	
#1	138,255	0	81,634	81,634	***3,401***	0.834	25,168	0.701	21,157	24124	***-20,113***	**3,401**	1st 1/2"
TOTALS	138,255			81,634	3,401		25,168		21,157	24,124	-20,113.0	3,401	
									Total Required Storage (cf):			**3,401**	

Infiltration Area (sq.ft.)	Treatment Volume (cf)	Storage Volume (cf)	***Post - Develop-ment Discharge (cfs)***	***Pre - Develop-ment Discharge (cfs)***
6,092	3,519	3,519	0.291	0.245

Calculation of GIA Sizes for Specific Areas

GIA	GIA Area (sf)	GIA Per.	Depth (ft)	Vol. (cf)	Runoff From
1	454	135	0.50	261	Parking Lot
2	727	125	0.50	395	Building
3	112	76	0.50	75	Parking Lot
4	156	51	0.50	91	Parking Lot
5	95	72	0.50	66	Parking Lot
6	376	77	0.50	207	Parking Lot
7	148	50	0.50	87	Parking Lot
8	2,942	288	0.50	1543	Building
9	1,082	157	0.67	795	Building
Total:	6,092		***Total***	3,519	