HARRIS CREEK HEIGHTS
PRELIMINARY STORM DRAINAGE REPORT

Prepared for:

Boise County

January 16, 2023

Prepared By:
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Introduction

This report is the description of the post development stormwater and drainage management plan for proposed Harris Creek Heights subdivision south of Placerville, Idaho. The project lies in the northwest quarter of Section 33, Township 7 North, Range 4 East, Boise Meridian, Boise County, Idaho.

Proposed Development

The proposed development of Harris Creek Heights Subdivision will be 22 buildable lots. There will be roadside swales with check dams to convey water to retention ponds. Any overflow from ponds during a flood event will flow to existing drainage systems along Harris Creek Rd.

Design Criteria

The following design criteria were used in the preparation of this report and corresponding design calculations:

- The Rational Method was used for calculating peak runoff flow.
- No freeboard on the retention ponds is to be used.
- Rainfall intensities are taken from the ITD Hydraulics Design Manual IDF curve – Zone C.
- Runoff Coefficients were taken from Idaho DEQ Catalog of Stormwater Practices.
- A Percolation Rate of 4 inches per hour was estimated based on test pit data in the geotechnical report.

Design Calculations

Drainage Basins

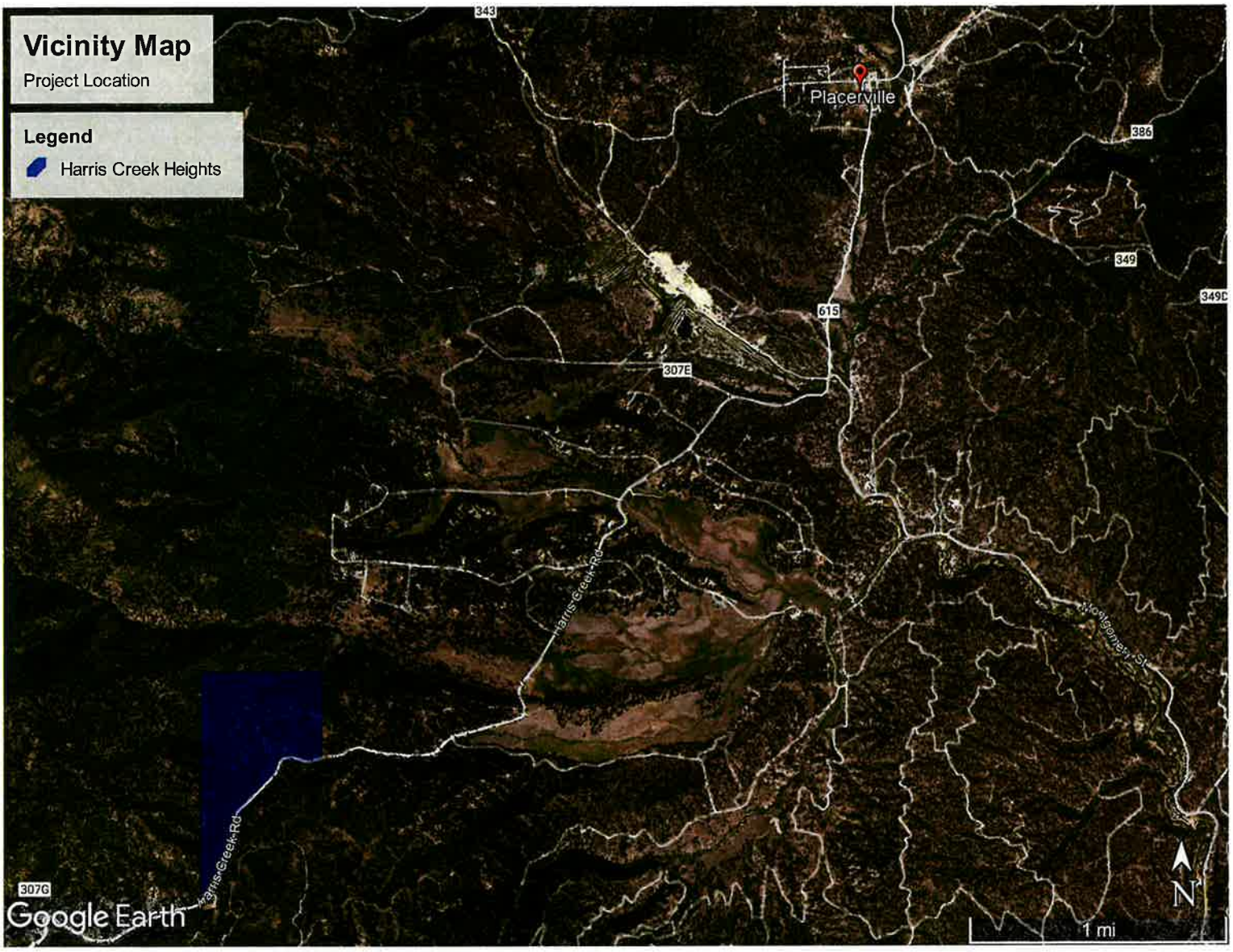
The project is split into 3 drainage basins. All 3 basins will have water sheet flowing to roadside swales with check dams. The swales will then convey the water to culverts, that will flow to retention ponds sized for the 100 year storm. These ponds will retain all storm water caused by improvements to the site. Existing storm water will be handled by existing drainage systems. The ponds were designed such that any overflow will flow to existing drainage systems rather than flooding. See appendix C for Sizing Calculations.

Conclusion

The proposed post development storm water management plan for Harris Creek Heights Subdivision is to convey all storm water to retention ponds through roadside swales and culverts. All storm water not retained in retention ponds will flow into existing drainage ditches per existing drainage patterns.

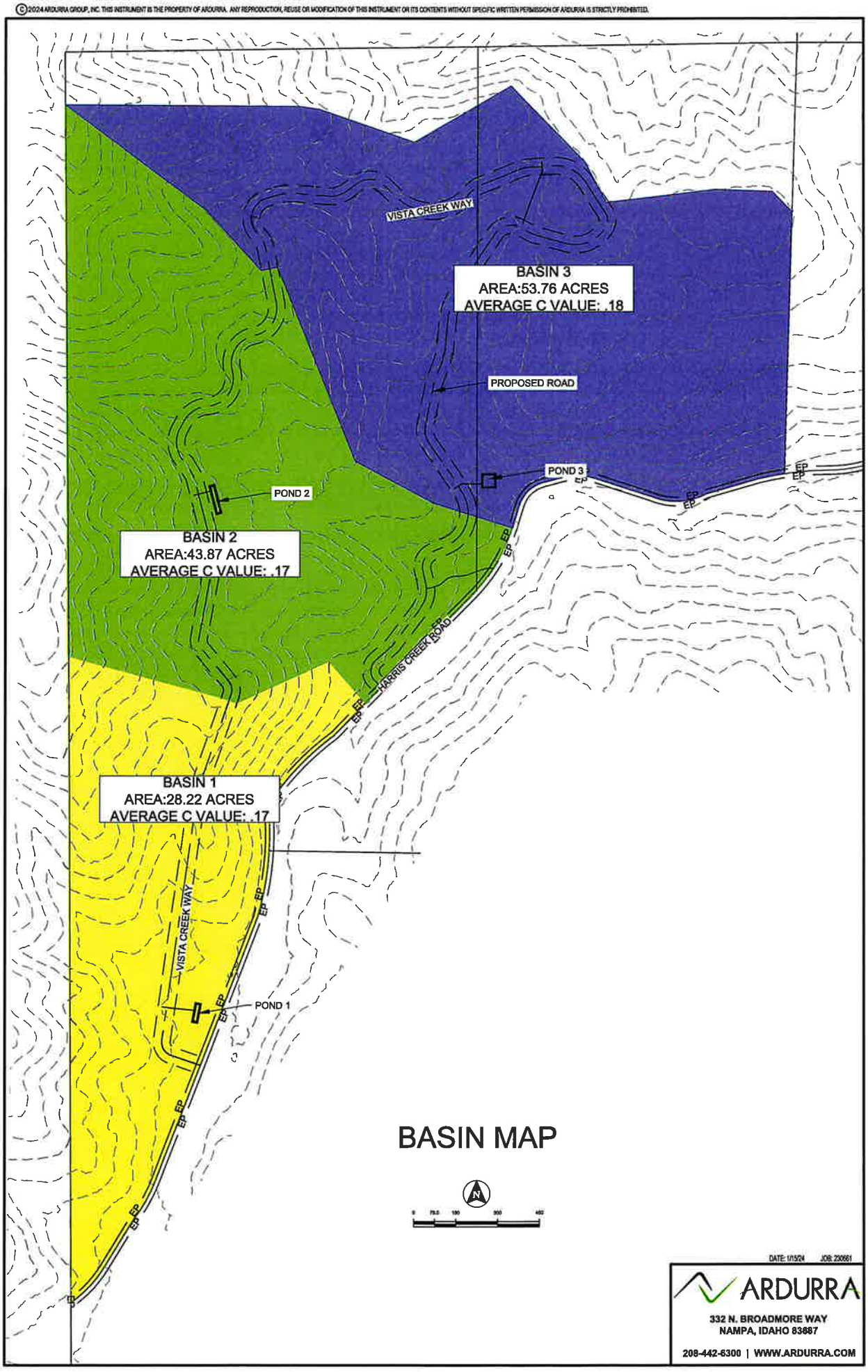
APPENDIX A

VICINITY MAP


Vicinity Map
Project Location
Legend
Harris Creek Heights
343
Placerville
386
349
349D
615
307E
Harris Creek Rd
Montgomery St
Harris Creek Rd
307G
Google Earth
N
1 mi

APPENDIX B

DRAINAGE BASIN MAP



BASIN MAP

DATE: 1/15/24 JOB: 230661

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APPENDIX C

DRAINAGE CALCULATIONS

Design Criteria
$Q = C\,I\,A$
$Q_R = R * A_R$
$Q_P = (1.49 * A_P * R_h^{2/3} * S^{1/2}) / n$
$V_R = Q *$ Duration
$T_P = V_R / Q_R$
$A_T =$ Baffle Dist. * Inside Width
$V_{S\&G} = Q / A_T$
$R_h = D / 4$ (for full flow pipe)
$V_P = Q / A_P$

Abbreviations		
A	=	Drainage Area (acres)
A_R	=	Percolation Area (sf)
C	=	Runoff Coefficient
I	=	Rainfall Intensity (in/hr)
Q	=	Peak Runoff (cfs)
Q_R	=	Percolation Flow Rate (in/hr)
r	=	Percolation Rate (in/hr)
S	=	Slope
T_P	=	Time to Percolate (hr)
V_R	=	Runoff Volume (cf)

Runoff Coefficients	C
General Areas	
Lanscaped	0.2
Asphalt/Concrete	0.9
Gravel	0.45
Gravel driveway	0.45
Roofs	0.95
Downtown	0.95
Urban Neighborhood	
Single-Family	0.5
Multi-Family	0.75
Residential (Rural)	
Apartment Dwelling	0.7
Industrial & Commercial Areas, Light	0.8
Industrial & Commercial Areas, Heavy	0.9
Parks & Cemeteries	0.2
Playgounds	
Railroad yard	0.2
Unimproved	0.15

Storm Frequency Table

Duration (minutes)	2-year Intensity (in/hr)	5-year Intensity (in/hr)	10-year Intensity (in/hr)	25-year Intensity (in/hr)	50-year Intensity (in/hr)	100-year Intensity (in/hr)
10	0.85	1.30	1.80	2.10	2.40	2.70
15	0.72	1.30	1.40	1.70	2.00	2.30
30	0.55	0.76	0.95	1.20	1.30	1.50
60	0.40	0.54	0.65	0.79	0.89	1.00
120	0.30	0.37	0.44	0.51	0.56	0.77
180	0.24	0.30	0.35	0.40	0.45	0.52
360	0.16	0.20	0.23	0.27	0.29	0.34
720	0.11	0.13	0.14	0.17	0.18	0.21
1440	0.07	0.08	0.09	0.10	0.12	0.13

Pond 1

Total Area (A)=	28.22	Acres	Sand Depth=	1.5	ft			
Run-off Coeffecient (C)=	0.17		Pond Depth=	3	ft	Water Depth=	3	ft
Historic Flow Rate=	0	cfs	Pond Bottom Width=	10	ft	Water Top Width=	22	ft
Percolation Rate=	4	in/hr	Pond Bottom Length=	60	ft	Water Top Length=	72	ft
Side Slope (S)=	2	:1	Pond Top Width=	22.0	ft	Percolation Area (Ar)=	600	SF
						Above Ground Storage Volume=	3204	CF
Free Board=	0	ft						

Duration (min)	100-year Intensity (in/hr)	Area (acres)	Flow Rate Q = CIA (cfs)	Historical Flow Rate (cfs)	Perc Rate (r)(in/hr)	Perc Flow Rate (Q_R) (cfs)	Net Flow Rate (cfs)	Existing Runoff Volume (V_R) (cf)	Total Runoff Volume (V_R) (cf)	Improvement Runoff Volume (V_R) (cf)	Available Storage (cf)	Req'd Above Ground Storage (cf)	Time to Percolate (T_P) (hr)
10	2.70	28.22	12.98	0.00	4.00	0.06	12.92	6857	7753	896	3204	-2308	4
15	2.30	28.22	11.05	0.00	4.00	0.06	11.00	8762	9899	1137	3204	-2067	6
30	1.50	28.22	7.21	0.00	4.00	0.06	7.15	11428	12877	1449	3204	-1755	7
60	1.00	28.22	4.81	0.00	4.00	0.06	4.75	15238	17103	1865	3204	-1339	9
120	0.77	28.22	3.70	0.00	4.00	0.06	3.65	23466	26247	2780	3204	-424	14
180	0.52	28.22	2.50	0.00	4.00	0.06	2.44	23771	26393	2622	3204	-582	13
360	0.34	28.22	1.63	0.00	4.00	0.06	1.58	31085	34098	3013	3204	-191	15
720	0.21	28.22	1.01	0.00	4.00	0.06	0.95	38399	41203	2804	3204	-400	14
1440	0.13	28.22	0.62	0.00	4.00	0.06	0.57	47542	49185	1643	3204	-1561	8

Design Criteria
$Q = C\,I\,A$
$Q_R = R * A_R$
$Q_P = (1.49 * A_P * R_h^{2/3} * S^{1/2}) / n$
$V_R = Q *$ Duration
$T_P = V_R / Q_R$
$A_T =$ Baffle Dist. * Inside Width
$V_{S\&G} = Q / A_T$
$R_h = D / 4$ (for full flow pipe)
$V_P = Q / A_P$

Abbreviations		
A	=	Drainage Area (acres)
A_R	=	Percolation Area (sf)
C	=	Runoff Coefficient
I	=	Rainfall Intensity (in/hr)
Q	=	Peak Runoff (cfs)
Q_R	=	Percolation Flow Rate (in/hr)
r	=	Percolation Rate (in/hr)
S	=	Slope
T_P	=	Time to Percolate (hr)
V_R	=	Runoff Volume (cf)

Runoff Coefficients	C
General Areas	
Lanscaped	0.2
Asphalt/Concrete	0.9
Gravel	0.45
Gravel driveway	0.45
Roofs	0.95
Downtown	0.95
Urban Neighborhood	
Single-Family	0.5
Multi-Family	0.75
Residential (Rural)	
Apartment Dwelling	0.7
Industrial & Commercial Areas, Light	0.8
Industrial & Commercial Areas, Heavy	0.9
Parks & Cemeteries	0.2
Playgounds	
Railroad yard	0.2
Unimproved	0.15

Storm Frequency Table

Duration (minutes)	2-year Intensity (in/hr)	5-year Intensity (in/hr)	10-year Intensity (in/hr)	25-year Intensity (in/hr)	50-year Intensity (in/hr)	100-year Intensity (in/hr)
10	0.85	1.30	1.80	2.10	2.40	2.70
15	0.72	1.30	1.40	1.70	2.00	2.30
30	0.55	0.76	0.95	1.20	1.30	1.50
60	0.40	0.54	0.65	0.79	0.89	1.00
120	0.30	0.37	0.44	0.51	0.56	0.77
180	0.24	0.30	0.35	0.40	0.45	0.52
360	0.16	0.20	0.23	0.27	0.29	0.34
720	0.11	0.13	0.14	0.17	0.18	0.21
1440	0.07	0.08	0.09	0.10	0.12	0.13

Pond 2

Total Area (A)=	43.87	Acres	Sand Depth=	1.5	ft		
Run-off Coeffecient (C)=	0.17		Pond Depth=	3	ft	Water Depth=	3 ft
Historic Flow Rate=	0	cfs	Pond Bottom Width=	10	ft	Water Top Width=	22 ft
Percolation Rate=	4	in/hr	Pond Bottom Length=	95	ft	Water Top Length=	107 ft
Side Slope (S)=	2	:1	Pond Top Width=	22.0	ft	Percolation Area (Ar)=	950 SF
						Above Ground Storage Volume=	4884 CF
Free Board=	0	ft					

Duration (min)	100-year Intensity (in/hr)	Area (acres)	Flow Rate Q = CIA (cfs)	Historical Flow Rate (cfs)	Perc Rate (r)(in/hr)	Perc Flow Rate (Q_R) (cfs)	Net Flow Rate (cfs)	Existing Runoff Volume (V_R) (cf)	Total Runoff Volume (V_R) (cf)	Improvement Runoff Volume (V_R) (cf)	Available Storage (cf)	Req'd Above Ground Storage (cf)	Time to Percolate (T_P) (hr)
10	2.70	43.87	20.17	0.00	4.00	0.09	20.09	10660	12052	1392	4884	-3492	4
15	2.30	43.87	17.19	0.00	4.00	0.09	17.10	13621	15388	1767	4884	-3117	6
30	1.50	43.87	11.21	0.00	4.00	0.09	11.12	17767	20016	2249	4884	-2635	7
60	1.00	43.87	7.47	0.00	4.00	0.09	7.38	23689	26583	2894	4884	-1990	9
120	0.77	43.87	5.75	0.00	4.00	0.09	5.67	36481	40792	4311	4884	-573	14
180	0.52	43.87	3.89	0.00	4.00	0.09	3.80	36955	41013	4058	4884	-826	13
360	0.34	43.87	2.54	0.00	4.00	0.09	2.45	48326	52975	4649	4884	-235	15
720	0.21	43.87	1.57	0.00	4.00	0.09	1.48	59696	63987	4290	4884	-594	14
1440	0.13	43.87	0.97	0.00	4.00	0.09	0.88	73910	76326	2416	4884	-2468	8

Design Criteria
$Q = C\,I\,A$
$Q_R = R * A_R$
$Q_P = (1.49 * A_P * R_h^{2/3} * S^{1/2}) / n$
$V_R = Q * Duration$
$T_P = V_R / Q_R$
A_T = Baffle Dist. * Inside Width
$V_{S\&G} = Q / A_T$
$R_h = D / 4$ (for full flow pipe)
$V_P = Q / A_P$

Abbreviations		
A	=	Drainage Area (acres)
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C	=	Runoff Coefficient
I	=	Rainfall Intensity (in/hr)
Q	=	Peak Runoff (cfs)
Q_R	=	Percolation Flow Rate (in/hr)
r	=	Percolation Rate (in/hr)
S	=	Slope
T_P	=	Time to Percolate (hr)
V_R	=	Runoff Volume (cf)

Runoff Coefficients	C
General Areas	
Lanscaped	0.2
Asphalt/Concrete	0.9
Gravel	0.45
Gravel driveway	0.45
Roofs	0.95
Downtown	0.95
Urban Neighborhood	
Single-Family	0.5
Multi-Family	0.75
Residential (Rural)	
Apartment Dwelling	0.7
Industrial & Commercial Areas, Light	0.8
Industrial & Commercial Areas, Heavy	0.9
Parks & Cemeteries	0.2
Playgounds	
Railroad yard	0.2
Unimproved	0.15

Storm Frequency Table

Duration (minutes)	2-year Intensity (in/hr)	5-year Intensity (in/hr)	10-year Intensity (in/hr)	25-year Intensity (in/hr)	50-year Intensity (in/hr)	100-year Intensity (in/hr)
10	0.85	1.30	1.80	2.10	2.40	2.70
15	0.72	1.30	1.40	1.70	2.00	2.30
30	0.55	0.76	0.95	1.20	1.30	1.50
60	0.40	0.54	0.65	0.79	0.89	1.00
120	0.30	0.37	0.44	0.51	0.56	0.77
180	0.24	0.30	0.35	0.40	0.45	0.52
360	0.16	0.20	0.23	0.27	0.29	0.34
720	0.11	0.13	0.14	0.17	0.18	0.21
1440	0.07	0.08	0.09	0.10	0.12	0.13

Pond 3

Total Area (A)=	53.76	Acres	Sand Depth=	1.5	ft			
Run-off Coeffecient (C)=	0.19		Pond Depth=	2	ft	Water Depth=	2	ft
Historic Flow Rate=	0	cfs	Pond Bottom Width=	43	ft	Water Top Width=	51	ft
Percolation Rate=	4	in/hr	Pond Bottom Length=	43	ft	Water Top Length=	51	ft
Side Slope (S)=	2	:1	Pond Top Width=	51.0	ft	Percolation Area (Ar)=	3698	SF
						Above Ground Storage Volume=	8857	CF
Free Board=	0	ft						

Duration (min)	100-year Intensity (in/hr)	Area (acres)	Flow Rate Q = CIA (cfs)	Historical Flow Rate (cfs)	Perc Rate (r)(in/hr)	Perc Flow Rate (Q_R) (cfs)	Net Flow Rate (cfs)	Existing Runoff Volume (V_R) (cf)	Total Runoff Volume (V_R) (cf)	Runoff Volume Increase (V_R) (cf)	Available Storage (cf)	Req'd Above Ground Storage (cf)	Time to Percolate (T_P) (hr)
10	2.70	53.76	27.26	0.00	4.00	0.34	26.92	13063	16152	3088	8857	-5769	3
15	2.30	53.76	23.22	0.00	4.00	0.34	22.88	16692	20592	3901	8857	-4957	3
30	1.50	53.76	15.15	0.00	4.00	0.34	14.80	21772	26645	4874	8857	-3984	4
60	1.00	53.76	10.10	0.00	4.00	0.34	9.75	29029	35116	6087	8857	-2770	5
120	0.77	53.76	7.77	0.00	4.00	0.34	7.43	44705	53512	8807	8857	-50	7
180	0.52	53.76	5.25	0.00	4.00	0.34	4.91	45285	53006	7721	8857	-1136	6
360	0.34	53.76	3.43	0.00	4.00	0.34	3.09	59219	66756	7536	8857	-1321	6
720	0.21	53.76	2.12	0.00	4.00	0.34	1.78	73153	76807	3654	8857	-5203	3
1440	0.13	53.76	1.31	0.00	4.00	0.34	0.97	90570	83824	-6746	8857	-15604	-5