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Drainage Summary Report
Property of Barak Klarfeld – 1035 Nine Acres Lane, Mamaroneck, NY

The owners propose constructing a pool on their property on Nine Acres Lane. The site presently consists of a residence, deck, walkway and driveway. The proposed improvements to the 17,932 square foot site will increase the impervious area on the site by approximately 1,012 SF. This report will show that the runoff from the proposed pool and patio will be detained in underground storage structures and will not have an adverse impact on downslope properties or drainage facilities.

Presently runoff from the site flows generally from south to north across the property and towards the storm drains in Nine Acres Lane. Runoff from the existing impervious areas flows unabated off the site. The proposed construction will not alter the existing drainage paths onto and off this site.

Our office has analyzed the decrease in runoff rate generated by the 1-, 2-, 5-, 10-, 25-, 50- and 100-Year, 24-Hour Storms. The entire parcel has been identified as “Site” in the enclosed analysis. The proposed pool and patio have been identified as “Pool” in the proposed conditions analysis. Using the Soil Conservation Service TR-20 Method, the decrease in runoff rate was calculated for the pre- and post-development conditions for the site including the new proposals. Table I below summarizes the existing and proposed runoff rates for the design storms.

Table I – Summary of Runoff Rates from Site

Storm Event	Flow/Volume	Existing	Proposed	Δ	$\Delta(\%)$
1-Year	q (cfs)	0.60	0.57	-0.03	-5.00%
	v (CF)	2,211.00	2,084.00	-127.00	-5.74%
2-Year	q (cfs)	0.77	0.73	-0.04	-5.19%
	v (CF)	2,836.00	2,673.00	-163.00	-5.75%
5-Year	q (cfs)	1.09	1.02	-0.07	-6.42%
	v (CF)	4,009.00	3,779.00	-230.00	-5.74%
10-Year	q (cfs)	1.37	1.29	-0.08	-5.84%
	v (CF)	5,087.00	4,795.00	-292.00	-5.74%
25-Year	q (cfs)	1.83	1.73	-0.10	-5.46%
	v (CF)	6,881.00	6,489.00	-392.00	-5.70%
50-Year	q (cfs)	2.26	2.13	-0.13	-5.75%
	v (CF)	8,567.00	8,119.00	-448.00	-5.23%
100-Year	q (cfs)	2.79	2.78	-0.01	-0.36%
	v (CF)	10,701.00	10,185.00	-516.00	-4.82%

The runoff rates for the storms depicted in Table I are the result of storing runoff from the pool and patio in four (4) Cultec Contactor FD C-4 units with a storage volume of 159 CF. These units can also infiltrate the Water Quality Volume (WQV) of 120.2 CF. Once runoff has backed up in the Cultec units it will be metered out via a pop-up emitter that will overflow to the rear yard. The remainder of the site will continue to allow runoff to flow along existing drainage paths. Please refer to the enclosed calculations and maintenance plan for further information.

With the proposed structure in place, it is our professional opinion that there will be no adverse hydrological or hydraulic impacts caused to surrounding or downstream properties or drainage facilities by this development. Under the New York State Department of Environmental Conservation (NYSDEC) regulations, a Notice of Intent (NOI) is not required for this project because the amount of on-site disturbance is less than one acre. To the best of my knowledge, this drainage proposal complies with the NYSDEC and Village of Mamaroneck Stormwater Regulations.



Respectfully submitted,

Frangione Engineering, LLC

A handwritten signature in blue ink, appearing to read "R. Frangione", written over the printed name.

Robert M. Frangione, P.E.
Owner & Chief Engineer
August 11, 2020

Enclosures

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Storm Water Quality Calculations
Klarfeld – 1035 Nine Acres Lane, Mamaroneck, NY
August 11, 2020

Water Quality Volume (WQV) – Proposed Pool and Patio

Total Contributing Area = 0.023 ac. = 1,012 SF

Impervious Area = 1,012 SF = 0.023 ac.

Woods Area = 0 SF = 0.0 ac.

Lawn Area = 0 SF = 0.0 ac.

$$\%I = (0.023/0.023) = 1.0$$

$$RvI = 0.95$$

$$\%T = (0.00/0.023) = 0.0$$

$$RvT = 0.22$$

$$\%F = (0.00/0.023) = 0.0$$

$$RvF = 0.04$$

$$R = (RvI \times \%I) + (RvT \times \%T) + (RvF \times \%F) \\ = (0.95)(1.0) + (0.22)(0.0) + (0.04)(0.0) = 0.95$$

$$WQV = (1.5'' \times R \times A)/12$$

$$= (1.5'' \times 0.95 \times 0.023 \text{ ac.})/12 = 0.0028 \text{ ac.-ft.} = 120.2 \text{ CF}$$

Proposed Detention Facility: (4) Cultec Contactor FD C-4 units with 6'' of stone beneath and 12'' band of stone surrounding.

Volume of Storage Provided = 159 CF > WQV.

Drawdown Time – Cultecs

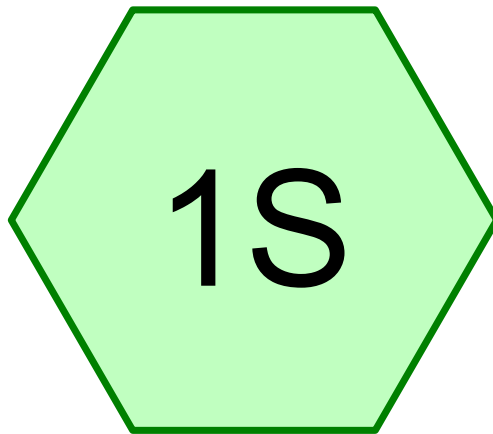
$$T = V/k \times A$$

A = 190 SF (bottom of stone)

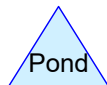
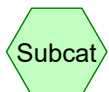
K = 3.37 in./hr.

V = 159 CF (internal storage volume)

$$T = 159 \text{ CF}/([3.37 \text{ in./hr.}/12 \text{ in./ft.}) \times 190 \text{ SF}) = 3 \text{ hours} \ll 72 \text{ hours OK.}$$



Site



Routing Diagram for Klarfeld Existing Drainage

Prepared by Microsoft, Printed 8/10/2020

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Klarfeld Existing Drainage

Prepared by Microsoft

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Type III 24-hr 100-Year Rainfall=9.10"

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Events for Subcatchment 1S: Site

Event	Rainfall (inches)	Runoff (cfs)	Volume (cubic-feet)
1-Year	2.90	0.60	2,211
2-Year	3.40	0.77	2,836
5-Year	4.30	1.09	4,009
10-Year	5.10	1.37	5,087
25-Year	6.40	1.83	6,881
50-Year	7.60	2.26	8,567
100-Year	9.10	2.79	10,701

Klarfeld Existing Drainage

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Type III 24-hr 25-Year Rainfall=6.40"

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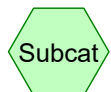
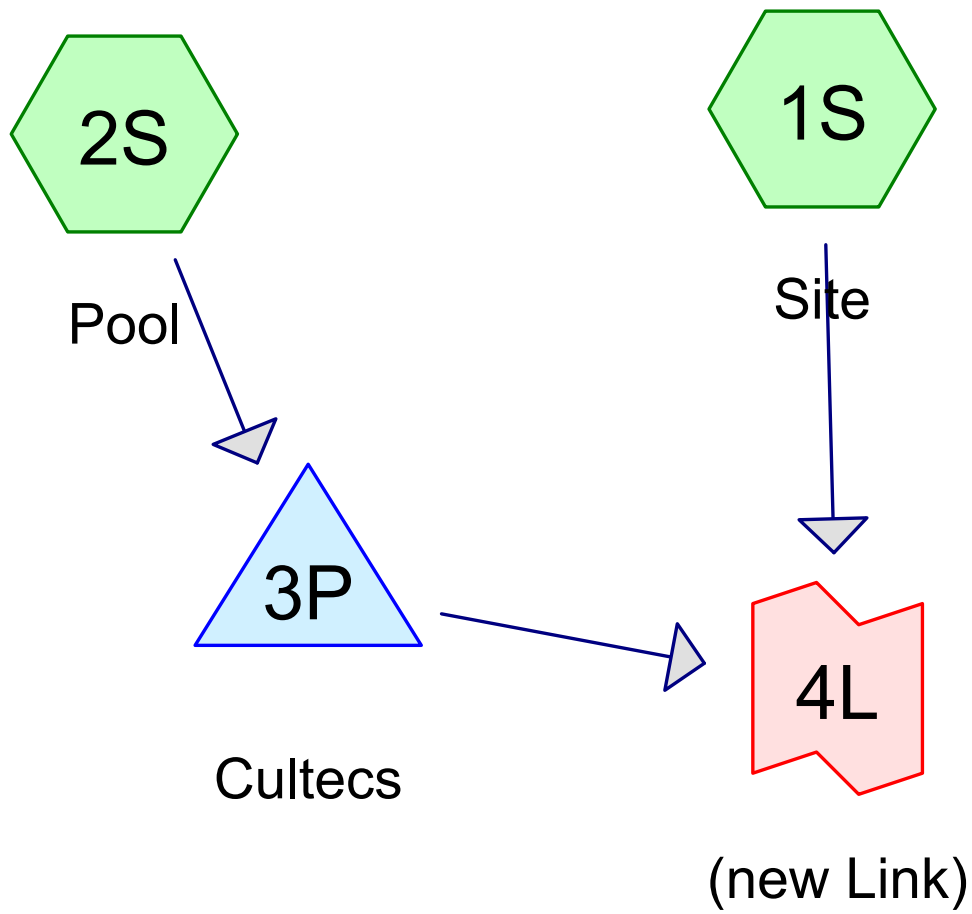
Summary for Subcatchment 1S: Site

Runoff = 1.83 cfs @ 12.15 hrs, Volume= 6,881 cf, Depth> 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	3,209	98	Ex. House
*	909	98	Ex. Drive
*	180	98	Ex. Walk
*	418	98	Ex. Deck
*	30	98	Ex. Pads
	12,925	80	>75% Grass cover, Good, HSG D
	17,671	85	Weighted Average
	12,925		73.14% Pervious Area
	4,746		26.86% Impervious Area

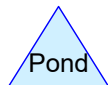
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	82	0.0220	0.12		Sheet Flow, Sheet Grass: Dense n= 0.240 P2= 3.50"



Subcat



Reach



Pond



Link

Routing Diagram for Klarfeld Proposed Drainage

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Klarfeld Proposed Drainage

Prepared by Microsoft

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Type III 24-hr 100-Year Rainfall=9.10"

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Events for Link 4L: (new Link)

Event	Inflow (cfs)	Primary (cfs)	Volume (cubic-feet)
1-Year	0.57	0.57	2,084
2-Year	0.73	0.73	2,673
5-Year	1.02	1.02	3,779
10-Year	1.29	1.29	4,795
25-Year	1.73	1.73	6,489
50-Year	2.13	2.13	8,119
100-Year	2.78	2.78	10,185

Klarfeld Proposed Drainage

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Type III 24-hr 25-Year Rainfall=6.40"

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Summary for Subcatchment 1S: Site

Runoff = 1.73 cfs @ 12.15 hrs, Volume= 6,487 cf, Depth> 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	3,209	98	Ex. House
*	909	98	Ex. Drive
*	180	98	Ex. Walk
*	418	98	Ex. Deck
*	48	98	Ex. & Pr. Pads
	11,895	80	>75% Grass cover, Good, HSG D
	16,659	85	Weighted Average
	11,895		71.40% Pervious Area
	4,764		28.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	82	0.0220	0.12		Sheet Flow, Sheet Grass: Dense n= 0.240 P2= 3.50"

Summary for Subcatchment 2S: Pool

Runoff = 0.14 cfs @ 12.08 hrs, Volume= 519 cf, Depth> 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	792	98	Pr. Pool
*	220	98	Pr. Patio
	1,012	98	Weighted Average
	1,012		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct

Summary for Pond 3P: Cultecs

Inflow Area = 1,012 sf, 100.00% Impervious, Inflow Depth > 6.16" for 25-Year event
 Inflow = 0.14 cfs @ 12.08 hrs, Volume= 519 cf
 Outflow = 0.03 cfs @ 12.49 hrs, Volume= 519 cf, Atten= 78%, Lag= 24.3 min
 Discarded = 0.03 cfs @ 12.49 hrs, Volume= 517 cf
 Primary = 0.01 cfs @ 12.49 hrs, Volume= 2 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Klarfeld Proposed Drainage

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Type III 24-hr 25-Year Rainfall=6.40"

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Peak Elev= 20.01' @ 12.49 hrs Surf.Area= 185 sf Storage= 145 cf

Plug-Flow detention time= 37.8 min calculated for 519 cf (100% of inflow)

Center-of-Mass det. time= 37.6 min (781.3 - 743.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	18.50'	104 cf	10.00'W x 18.50'L x 1.71'H Field A 316 cf Overall - 55 cf Embedded = 261 cf x 40.0% Voids
#2A	19.00'	55 cf	Cultec FD C-4 x 4 Inside #1 Effective Size= 42.0"W x 8.0"H => 1.67 sf x 8.00'L = 13.3 cf Overall Size= 48.0"W x 8.5"H x 8.50'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.67 sf x 2 rows
		159 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.50'	3.370 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 16.50'
#2	Primary	20.00'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.49 hrs HW=20.01' (Free Discharge)

↑**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.01 cfs @ 12.49 hrs HW=20.01' (Free Discharge)

↑**2=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.38 fps)

Summary for Link 4L: (new Link)

Inflow Area = 17,671 sf, 32.69% Impervious, Inflow Depth > 4.41" for 25-Year event
Inflow = 1.73 cfs @ 12.15 hrs, Volume= 6,489 cf
Primary = 1.73 cfs @ 12.15 hrs, Volume= 6,489 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Project Identification:		Klarfeld			Hole 1		
Test Location:		12 Scout Trail			Depth = 34"		
Liquid Used:		Water	pH:	7.0			
Tested By:		RMF					
Depth to water table:		>12"					
Trial #	Start / End	Date MM/DD/YY	Time HR:MIN	Elapsed Time Chg/(Total) Min	Gauge Depth, in.	Inner Infiltration Rate in/Hr.	Remarks
							Weather conditions Etc...
1	Start Test	7/27/2020	12:19	0:15	0.06		
	End Test	"	12:34	0:15	2.50	11.21	95 degrees & sunny
2	Start Test	"	12:35	0:15	0.13		
	End Test	"	12:50	0:30	1.25	4.50	
3	Start Test	"	12:51	0:15	0.13		
	End Test	"	13:06	0:45	1.25	4.50	
					Average	6.74	
					Design rate (50% Clog)	3.37	