RALPH G. MASTROMONACO, P.E., P.C. Consulting Engineers 13 Dove Court, Croton-on-Hudson, New York 10520 Tel: (914) 271-4762 Fax: (914) 271-2820

Project: Picucci Subdivision Croton Dam Road, Ossining, NY

Scope: Preliminary Drainage Assessment

**Date:** June 7, 2022

### Introduction:

The proposed subdivision and potential new house, analyzed schematically here in advance of the building permit, requires an assessment of the impact on stormwater runoff. The runoff from the new impervious areas of the house and driveway will be controlled by capturing the runoff in a Detention Basin / Rain Garden. The NYS DEC 90% storm is fully captured in the system through exfiltration. A conservative exfiltration rate of 20 minute per inch is used for this preliminary report. Final soil testing will be conducted prior to building permit to confirm the estimates made herein.

The flow analysis is made using the Hydrocad software. The hydrologic group is taken from the Web Soil Survey and is noted as: Paxton fine sandy loam, 15 to 25 percent slopes. The model and parameters are enclosed in the computer printout.

Storm Frequency Year	Existing Flow (cfs)	Proposed Flow (cfs)
100	2.725	2.638
10	1.102	1.058
2	0.503	0.336

### **Results:**

### **Discussion:**

Given the capture of stormwater the proposed new house would little or no impact on neighboring properties due to stormwater. The computations indicate a reduction in all peak flows studied as a result of the installed stormwater controls.

### Submitted by:





### Figure: Stormwater Site Plan showing Drainage Areas

Figure: Soil and Hydrologic Groups



Ralph G. Mastromonaco, PE PC Consulting Engineers





Flow (cfs)

Runoff

Picucci III 24-hr 2 yr Rainfall=3.41" PIC_1_USE Type III 24-hr 2 yr Rainfall: Printed 6/7/2022 Prepared by RGMPEPC Printed 6/7 Printed 6/7 Printe 7 Printed 6/7 Printed 6/7 Pr	IN Summary for Subcatchment HSE: House+Driveway	<ul> <li>h&gt; 1.07"</li> <li>Runoff = 0.315 cfs @ 12.14 hrs, Volume= 0.027 af, Depth&gt; 2.97"</li> <li>hrs, dt= 0.05 hrs</li> <li>no hrs, dt= 0.05 hrs</li> </ul>	Type III 24-hr 2 yr Rainfall=3.41"           Area (sf)         CN         Description           4,786         38.00         House+Drive Impervious           4,786         100.00% Impervious	Tc     Length     Slope     Velocity     Capacity     Description       (min)     (feet)     (ft/ft)     (ft/sec)     (cfs)       10.00     Direct Entry,	Subcatchment HSE: House+Driveway	16       0.35       0.315 cfs @ 12.14 hrs       1.315 cfs @ 12.14 hrs         0.315 cfs @ 12.14 hrs       1.124 hrs       1.124 hrs         11.24 hr       0.25       0.315 cfs @ 12.14 hrs       1.7pe III 24 hr         11.24 hr       0.25       0.015       0.215 cfs @ 12.14 hrs       1.7pe III 24 hr         11.24 hr       0.25       0.015       1.10 hrs       1.7pe III 24 hr         0.041 af       0.015       0.15       1.10 hrs       1.10 hrs         0.00 min       0.15       0.15       1.10 hrs       1.10 hrs         0.00 min       0.15       0.15       1.10 hrs       1.10 hrs         0.00 min       0.15       0.15       1.10 hrs       1.10 hrs         0.15       0.15       0.15       1.10 hrs       1.10 hrs         0.16       0.15       0.15       1.10 hrs       1.10 hrs         1.1       1.1       1.1       1.10 hrs       1.11 hrs         1.1       1.1       1.1       1.1       1.1       1.1
Type III 24 oCAD Software Solutions LLC	mary for Subcatchment LWN: LAWN	hrs, Volume= 0.041 af, Depth> 1. S, Weighted-CN, Time Span= 5.00-20.00 hr	n ss cover, Good, HSG C Pervious Area	r Capacity Description (cfs) Direct Entry,	Subcatchment LWN: LAWN	Hydrograph cfs @ 12.30 hrs Runoff=0.406 cfs @ 12.30 Type III 2 2 yr Rainfall=3 Runoff Area=19.37 Runoff Volume=0.04 Tc=20.00 12=20.00 12=20.00 12=20.00

	D® 10 10-4:					
HydroCP		a s/n M16359 (	© 2020 HydroCAL	<b>O Software Soluti</b>	ons LLC	Pag
		S	ummarv for P	ond 1P: Rair	n Garden	
Inflow A	rea =	0.568 ac, 19.	33% Impervious	, Inflow Depth :	1.44" for 2 yr eve	ent
Outflow		0.621 cfs @ 0.449 cfs @	12.21 nrs, volur 12.46 hrs, Volur	ne= 0.0 ne= 0.0	oo ar 68 af. Atten= 28%. L	.aq= 14.78 min
Discard	= pe	0.113 cfs @	12.20 hrs, Volur	ne= 0.0	57 af	)
Primary	ш	0.336 cfs @	12.46 hrs, Volur	ne= 0.0	11 af	
Routing Peak El	by Stor-Ind ev= 384.39'	l method, Time @ 12.46 hrs	Span= 5.00-20. Surf.Area= 1,62	.00 hrs, dt= 0.05 4 sf Storage=	hrs / 2 722 cf	
Plug-Flo Center-o	w detentior of-Mass det	n time= 56.41 r time= 55.88 r	min calculated fo min ( 847.99 - 79	r 0.068 af (100% 12.11)	6 of inflow)	
Volume	Inver	t Avail.Sto	rage Storage L	Jescription		
#	383.00	), 4(	06 cf <b>Custom</b> ; 812 cf Ov	Stage Data (Pri erall × 50.0% \	<b>smatic)</b> Listed below ( oids	Recalc)
#2	384.00	1,62	24 cf Custom	Stage Data (Pri	smatic)Listed below (	Recalc)
		2,03	30 cf Total Ava	iilable Storage		
Elevatio	S	surf.Area	Inc.Store	Cum.Store		
(tee	et)	(sq-ft)	(cubic-feet)	(cubic-feet)		
383.(	89	812 812	0 812	0		
	S	40	10	1		
Elevatio	S III	Surf.Area	Inc.Store	Cum.Store		
(Tee	3()	(11-ps)	(cnpic-reet)	(cubic-reet)		
384.( 386.(	00	812 812	0 1.624	0 1.624		
		1		- 		
Device	Routing	INVer	Outlet Devices			
#1 #2	Primary Discarded	384.25' 383.00'	2.0' long Shar 3.000 in/hr Ext	p-Crested Rec	angular Weir 2 End	Contraction(s)

Primary OutFlow Max=0.332 cfs @ 12.46 hrs HW=384.39' (Free Discharge) -1=Sharp-Crested Rectangular Weir (Weir Controls 0.332 cfs @ 1.22 fps)





Picucci PIC_1_USE Prepared by RGMPEPC HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC Printed 6/7/2022	Summary for Subcatchment HSE: House+Driveway	Runoff = 0.478 cfs @ 12.14 hrs, Volume= 0.042 af, Depth> 4.55"	Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10 yr Rainfall=5.14"	Area (sf)         CN         Description           *         4,786         98.00         House+Drive Impervious           4,786         100.00% Impervious Area	Tc         Length         Slope         Velocity         Capacity         Description           (min)         (feet)         (ft/ft)         (ft/sec)         (cfs)           10.00         Direct Entry,	Subcatchment HSE: House+Driveway	Hydrograph 0.5 0.45 0.45 0.45 0.45 0.45 0.32 0.32 0	0 <sup>1</sup>
Pic_1_USE Type III 24-hr 10 yr Rainfall=5.14" Prepared by RGMPEPC Printed 6/7/2022 Printed 6/7/2022 Printed 6/7/2022 Printed 6/7/2022 Printed 6/7/2022 Page 10	Summary for Subcatchment LWN: LAWN	Runoff = 0.889 cfs @ 12.28 hrs, Volume= 0.087 af, Depth> 2.28"	Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10 yr Rainfall=5.14"	Area (sf)         CN         Description           19,977         74.00         >75% Grass cover, Good, HSG C           19,977         100.00% Pervious Area	Tc         Length         Slope         Velocity         Capacity         Description           (min)         (feet)         (ft/ft)         (ft/sec)         (cfs)         20.00           20.00         Direct Entry,         Direct Entry,         Direct Entry,	Subcatchment LWN: LAWN	Hydrograph Hydrograph 0.9 0.8 0.7 0.7 0.6 0.7 0.6 0.5 10 yr Rainfall=5.14" Runoff Area=19,977 sf Runoff Volume=0.087 af Runoff Colume=0.087 af Runoff Depth>2.28" Tc=20.00 min 0.7 0.7 0.7 0.6 0.7 0.6 0.7 0.7 0.6 0.7 0.7 0.7 0.7 0.6 0.7 0.7 0.6 0.7 0.6 0.7 0.7 0.7 0.7 0.6 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	0 + · · · · · · · · · · · · · · · · · ·

Picucci Type III 24-hr 10 yr Rainfall=5.14" Printed 6/7/2022 Software Solutions LLC Page 12	PIC_1_USE Prepared by I HydroCAD® 10	RGMPEPC .10-4a s/n M16359	© 2020 HydroCAD (	Pic Type III 24-hr 10 yr Rainfall=6 Printed 6/7/2 Software Solutions LLC Pag	ucci 14' 022
: Rain Garden		S	ummary for Po	ond 1P: Rain Garden	
rs Inflow Area=0.568 ac □ Outflow □ Discarded	Inflow Area = Inflow = Outflow = Discarded = Primary =	0.568 ac, 19 1.217 cfs @ 1.171 cfs @ 0.113 cfs @ 0.113 cfs @		Inflow Depth > 2.72" for 10 yr event e= 0.129 af e= 0.124 af, Atten= 4%, Lag= 4.10 min e= 0.073 af e= 0.051 af	
Discarded=0.113 cfs @ 12.09 hrs Primary=1.058 cfs @ 12.20 hrs Primary=1.058 cfs @ 12.29 hrs	Routing by Sto Peak Elev= 38	br-Ind method, Time 34.55' @ 12.29 hrs	e Span= 5.00-20.0 Surf.Area= 1,624	00 hrs, dt= 0.05 hrs / 2 t sf Storage= 855 cf	
rear Liv-Joy.Jo	Plug-Flow det Center-of-Mas	ention time= 44.03 is det. time= 28.69	min calculated for ( min ( 815.01 - 786	0.124 af (96% of inflow) 3.32 )	
	Volume	Invert Avail.Sto	orage Storage De	escription	
	#1 3	83.00' 4	06 cf <b>Custom St</b> 812 cf Ove	tage Data (Prismatic)Listed below (Recalc) arall × 50.0% Vioids	
	#2 3	84.00' 1,6 2.0	24 cf Custom St 20 of Total Avails	tage Data (Prismatic) isted below (Recalc) able Storage	
		<b>A</b> , <b>O</b>			
14 15 16	Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
urs)	383.00 384.00	812 812	0 812	812	
	Elevation	Surf.Area	Inc.Store	Cum.Store	
	384.00	(sy-it) 812			
	386.00	812	1,624	1,624	
	Device Rout	ing Invert	Outlet Devices		
	#1 Prim #2 Disc	ary 384.25' arded 383.00'	2.0' long Sharp 3.000 in/hr Exfil	<ul> <li>Crested Rectangular Weir 2 End Contraction(s) litration over Surface area</li> </ul>	
	Discarded Ou	itFlow Max=0.113	cfs @ 12.00 hrs H ntrols 0 113 cfs)	+W=384.07' (Free Discharge)	

13 Time (hours)

2

÷

9 0

12.00 hrs

0.113 cfs @

Primary OutFlow Max=1.054 cfs @ 12.29 hrs HW=384.55' (Free Discharge) -1=Sharp-Crested Rectangular Weir(Weir Controls 1.054 cfs @ 1.80 fps)

Type III 24-PIC\_1 USE Typ Prepared by RGMPEPC HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC Pond 1P: Rain Garden

Hydrograph

1.171 cfs @ 12.29 hrs 1.058 cfs @ 12.29 hrs

-

Flow (cfs)



Picucci PIC_1_USE Type III 24-hr 100 yr Rainfall=9.30" Prepared by RGMPEPC Printed 6/7/2022 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC Page 15	Summary for Subcatchment HSE: House+Driveway	Runoff = 0.869 cfs @ 12.14 hrs, Volume= 0.076 af, Depth> 8.32" Duroff by SCS TD-20 method 11H-SCS Weichted CN Time Science 5.00.20 mb her dt= 0.05 hrs	Type III 24-hr 100 yr Rainfall=9.30" Type III 24-hr 100 yr Rainfall=9.30" Area (sf) CN Description	* 4,786 98.00 House+Drive Impervious 4,786 100.00% Impervious Area	Tc         Length         Slope         Velocity         Capacity         Description           (min)         (feet)         (ft/ft)         (ft/sec)         (cfs)           10.00         Direct Entry,	Subcatchment HSE: House+Driveway	Hydrograph	Plow (cfs) 0.9 0.9 0.9 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.6 0.7 0.7 0.7 0.6 0.7 0.6 0.7 0.0 0.0 0.0 0.0 0.0 Runoff=0.889 cfs @ 12.14 hrs 100 yr Rainfall=9.30" Runoff Area-4.786 sf Runoff Area-4.786 sf Runoff Area-4.786 sf Runoff Carea-3.786 sf 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1	iiue (uons)
Picucci Picucci Type III 24-hr 100 yr Rainfall=9.30" Prepared by RGMPEPC Printed 6/7/2022 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC Page 16	Summary for Subcatchment LWN: LAWN	Runoff = 2.199 cfs @ 12.27 hrs, Volume= 0.218 af, Depth> 5.71" Dunoff by SCS TD-20 method 11H-SCS Weinthed CN Time Share 5.00.20 m hrs. 4H= 0.05 hrs	runul by SCS IR-20 metriou, on-SCS, weignieu-Civ, mile Span- 3.00-20.00 ms, ur- 0.03 ms Type III 24-hr 100 yr Rainfall=9.30" Area (sf) CN Description	19,977 74.00 >75% Grass cover, Good, HSG C 19,977 100.00% Pervious Area	Tc         Length         Slope         Velocity         Capacity         Description           (min)         (feet)         (ft/ft)         (ft/sec)         (cfs)         20.00           20.00         Direct Entry,         Direct Entry,         Direct Entry,         Direct Entry,	Subcatchment LWN: LAWN	Hydrograph	Elow (cfs) Plots (cfs) Flow	iime (nours)

Picucci Type III 24-hr 100 yr Rainfall=9.30" Printed 6/7/2022 AD Software Solutions LLC Page 17	r Pond 1P: Rain Garden	us, Inflow Depth > 6.21" for 100 yr event lume= 0.294 af ume= 0.285 af, Atten= 1%, Lag= 2.31 min lume= 0.101 af lume= 0.184 af	620.00 hrs, dt= 0.05 hrs / 2 ,624 sf Storage= 1,070 cf	for 0.284 af (97% of inflow) 774.83 )	e Description <b>m Stage Data (Prismatic)</b> Listed below (Recalc)	Overall × 50.0% Voids <b>m Stage Data (Prismatic)L</b> isted below (Recalc) wailable Storage	Cum.Store (cubic-feet) 0	Cum.Store (cubic-feet)	0 1,624	es arp-Crested Rectangular Weir 2 End Contraction(s) Exfiltration over Surface area	rs HW=384.01' (Free Discharge) s)
2020 HydroC	immary foi	33% Impervio 2.23 hrs, Vo 2.27 hrs, Vo 0.75 hrs, Vo 2.27 hrs, Vo	Span= 5.00-; Surf.Area= 1,	iin calculated iin ( 790.74 -	age Storag 6 cf <b>Custo</b> l	812 cf <u>4 cf <b>Custo</b></u> 0 cf Total <i>P</i>	Inc.Store (cubic-feet) 0	Inc.Store (cubic-feet)	0 1,624	Outlet Devic 2.0' long Sh 3.000 in/hr	fs @ 10.75 h trols 0.113 cf
<b>jE</b> y RGMPEPC 10.10-4a s/n M16359 ©	Su	<ul> <li>0.568 ac, 19.3</li> <li>2.792 cfs @ 1</li> <li>2.751 cfs @ 1</li> <li>0.113 cfs @ 1</li> <li>2.638 cfs @ 1</li> </ul>	Stor-Ind method, Time 384.82' @ 12.27 hrs	etention time= 28.02 m lass det. time= 15.91 m	Invert Avail.Stora 383.00' 406	384.00' 1,62 <sup>,</sup> 2,03	Surf.Area (sq-ft) ( 812	Surf.Area (sq-ft) (	812 812	uting Invert imary 384.25' scarded 383.00'	<b>OutFlow</b> Max=0.113 ct ation (Exfiltration Cont
PIC_1_US Prepared b HydroCAD®		Inflow Area Inflow = Outflow = Discarded = Primary =	Routing by Peak Elev=	Plug-Flow d Center-of-M	Volume #1	#2	Elevation (feet) 383.00	Elevation (feet)	384.00 386.00	Device Ro #1 Pri #2 Dia	Discarded
itucci =9.30" 12022		<u> </u>	7								

Primary OutFlow Max=2.619 cfs @ 12.27 hrs HW=384.81' (Free Discharge) -1=Sharp-Crested Rectangular Weir(Weir Controls 2.619 cfs @ 2.46 fps)



Flow (cfs)



		© 2020 HydroCAD Software Solutions LLC	
PIC 1 USE	Prepared by RGMPEPC	HydroCAD® 10.10-4a s/n M16359 @	

Picucci Multi-Event Tables Printed 6/7/2022 Page 20

**Events for Subcatchment EX: Existing** 

Depth	(inches)	1.07	2.28	5.71
Volume	(acre-feet)	0.051	0.108	0.270
Runoff	(cfs)	0.503	1.102	2.725
Rainfall	(inches)	3.41	5.14	9.30
Event		2 yr	10 yr	100 yr

1_USE Multi-Eve	ared by RGMPEPC Printed	CAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC
PIC_1_USE	Prepared by RC	HydroCAD® 10.10

Events for Subcatchment LWN: LAWN

Depth	(inches)	1.07	2.28	5.71
Volume	(acre-feet)	0.041	0.087	0.218
Runoff	(cfs)	0.406	0.889	2.199
Rainfall	(inches)	3.41	5.14	9.30
Event		2 yr	10 yr	100 yr

### Picucci ent Tables 1 6/7/2022 Page 22

PIC\_1\_USE Prepared by RGMPEPC HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

# Events for Subcatchment HSE: House+Driveway

Depth (inches)	2.97	4.55	8.32
Volume (acre-feet)	0.027	0.042	0.076
Runoff (cfs)	0.315	0.478	0.869
Rainfall (inches)	3.41	5.14	9.30
Event	2 yr	10 yr	100 yr

Picucci	nt Tables	6/7/2022	Page 23
	Aulti-Evei	Printed	

### PIC\_1\_USE Prepared by RGMPEPC HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

Events for Pond 1P: Rain Garden

Storage	(cubic-feet)	722	855	1,070
Elevation	(feet)	384.39	384.55	384.82
Primary	(cfs)	0.336	1.058	2.638
Discarded	(cfs)	0.113	0.113	0.113
Outflow	(cfs)	0.449	1.171	2.751
Inflow	(cfs)	0.621	1.217	2.792
Event		2 yr	10 yr	100 yr

USE ed by RGMPEPC D® 10.10-4a s/n M16359 © 2020 Hydro			CAD Software Solutions LLC	
I @ ∢I	_USE	ed by RGMPEPC	AD® 10.10-4a s/n M16359 © 2020 HydroC	

Picucci Multi-Event Tables Printed 6/7/2022 Page 24

## **Events for Link FINAL: FINAL**

Elevation (feet)	0.00	0.00	0.00
Primary (cfs)	0.336	1.058	2.638
Inflow (cfs)	0.336	1.058	2.638
Event	2 yr	10 yr	100 yr