

January 26th, 2023

Michael Silveria
Senior Planner
Hingham Planning
Town of Hingham
210 Central street
Hingham, MA 02043

**RE: Minor Modification – Site Plan Approval
392 Main Street
Hingham, MA 02043**

Dear Michael:

The purpose of this correspondence is to follow up the request for a minor modification of the November 29th, 2021 site plan approval with the associated HydroCAD report and sub-catchment area plans.

The applicant/owner would like to construct a sports Court in the rear yard. The stormwater infiltration system has been redesigned to accommodate the additional runoff created by this new impervious surface. Instead of only a portion of the roof runoff being captured, the entire roof runoff is now captured to ensure the post development runoff rates are lower than pre-existing. Peak rates of runoff and volumes are summarized in the table below.



HANOVER OFFICE:
427 Columbia Road
Hanover, MA 02339
781-826-9200

NORWELL OFFICE:
687 Main Street
Norwell, MA 02061
781-659-8187

PLYMOUTH OFFICE:
40 Court Street, Ste 2A
Plymouth, MA 02360
508-746-6060

MARINE DIVISION:
26 Union Street
Plymouth, MA 02360
508-746-6060

merrillinc.com

Storm	Existing Runoff Flow	Existing Volume	Post Development Runoff Flow	Post Development Volume
2-Year-24 Hour (3.2")	0.02 cfs	0.012 af	0.02 cfs	0.010 af
10-Year-24 Hour (4.65")	0.38 cfs	0.054 af	0.34 cfs	0.048 af
100-Year-24 Hour (6.8")	1.91 cfs	0.156 af	1.71 cfs	0.144 af

The combined analysis shows reduction of the flows and volumes for the 2, 10, and 100 year storms compared to the existing conditions.

Please let us know if you have any questions regarding this correspondence.

Sincerely,

Merrill Inc.

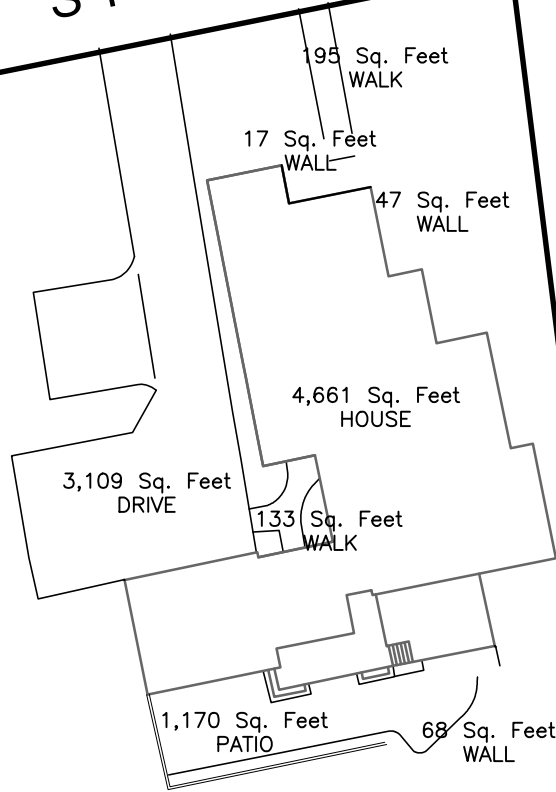
Brendan P. Sullivan, P.E
Senior Project Engineer

Enclosures

cc: S. Giannaros
File 19.022

MAIN STREET

LOT AREA
55,560± SF



46,159 Sq. Feet
LAWN/LANDSCAPE

EXISTING IMPERVIOUS

HOUSE =	4,661
DRIVE =	3,110
WALKS =	328
WALLS =	132
PATIO =	<u>1,170</u>
TOTAL =	9,401

TOTAL AREA:

IMPERVIOUS	=	6,401
LAWN/LANDSCAPE	=	<u>46,159</u>
TOTAL =		55,560

EXISTING SUBCATCHMENT AREA PLAN

DRAWING NO.

CAVANARO CONSULTING
687 MAIN STREET
P.O. BOX 5175
NORWELL, MASSACHUSETTS 02061
PHONE: 781.659.8187
FAX: 781.659.8186



PREPARED FOR:

SPIROS GIANNAROS
392 MAIN STREET
HINGHAM, MA 02043

PROJECT NO. : 19022
DATE : 11/11/21
DRAWN BY : BPS
CHECKED BY : CCH

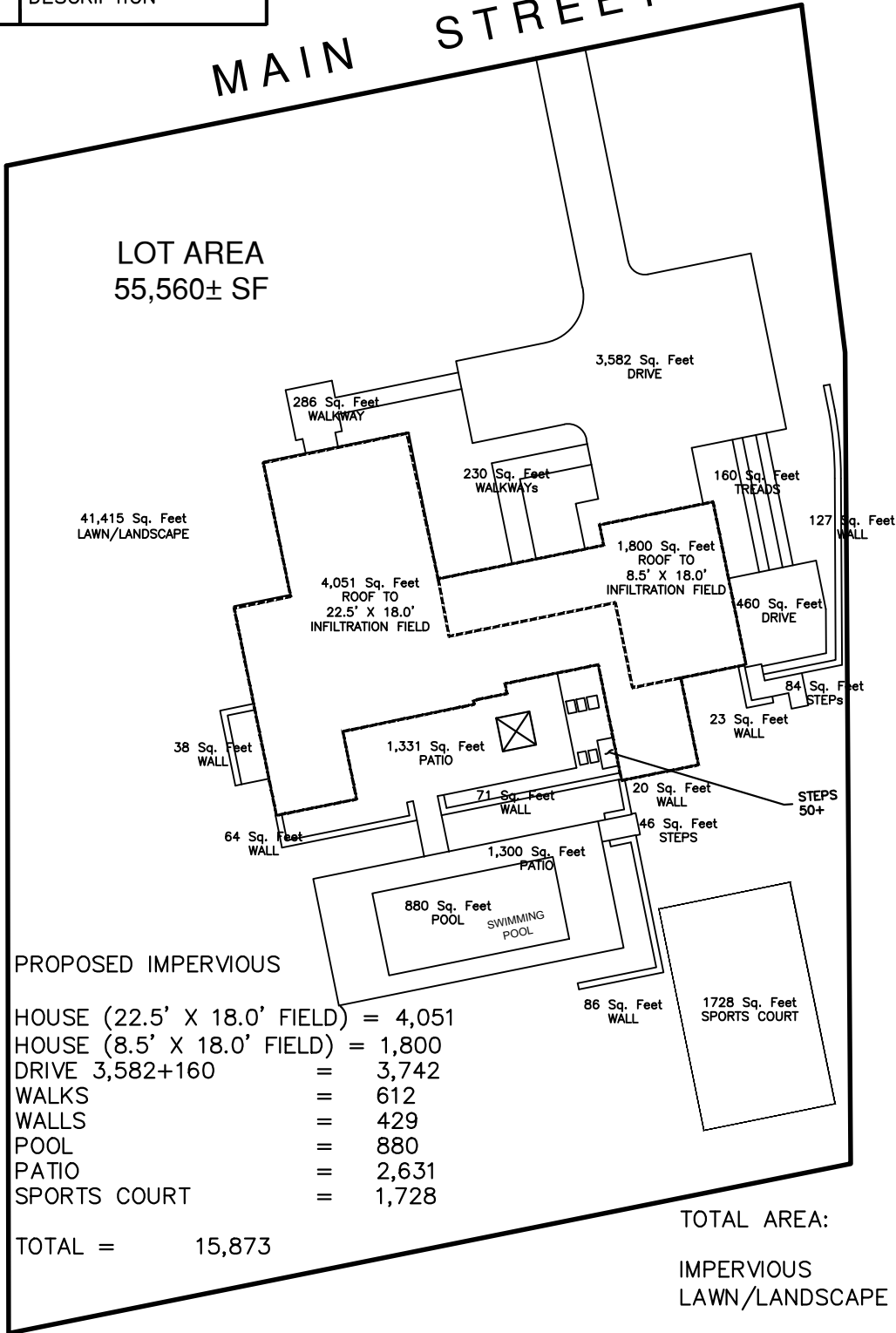
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DRAWING REVISIONS

1	01/26/23	ADDED SPORTS COURT
ACTION	DATE	DESCRIPTION

MAIN STREET

LOT AREA
55,560± SF



PROPOSED IMPERVIOUS

HOUSE (22.5' X 18.0' FIELD)	=	4,051
HOUSE (8.5' X 18.0' FIELD)	=	1,800
DRIVE 3,582+160	=	3,742
WALKS	=	612
WALLS	=	429
POOL	=	880
PATIO	=	2,631
SPORTS COURT	=	1,728

TOTAL = 15,873

TOTAL AREA:

IMPERVIOUS = 15,873
LAWN/LANDSCAPE = 39,687

TOTAL = 55,560

PROPOSED SUBCATCHMENT AREA PLAN

DRAWING NO.

CAVANARO CONSULTING
687 MAIN STREET
P.O. BOX 5175
NORWELL, MASSACHUSETTS 02061
PHONE: 781.659.8187
FAX: 781.659.8186

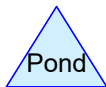
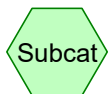
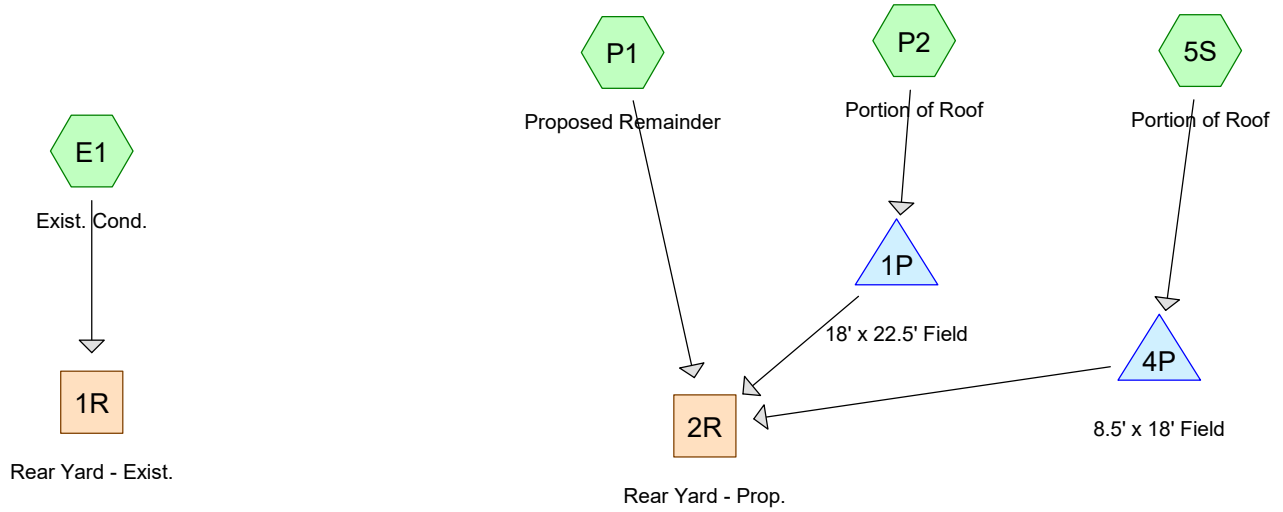


PREPARED FOR:

SIPIROS GIANNAROS
392 MAIN STREET
HINGHAM, MA 02043

PROJECT NO. : 19022
DATE : 11/11/21
DRAWN BY : BPS
CHECKED BY : CCH

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SHEET NO. 1 OF 1
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Routing Diagram for 392 Main St 12.22.22
 Prepared by Merrill Engineers & Land Surveyors, Printed 1/26/2023
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392 Main St 12.22.22

Type III 24-hr 2 Year Event Rainfall=3.20"

Prepared by Merrill Engineers & Land Surveyors

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Page 2

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: Portion of Roof Runoff Area=1,800 sf 100.00% Impervious Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=0.13 cfs 0.010 af

Subcatchment E1: Exist. Cond. Runoff Area=55,560 sf 16.92% Impervious Runoff Depth=0.11"
Tc=5.0 min CN=49 Runoff=0.02 cfs 0.012 af

Subcatchment P1: Proposed Remainder Runoff Area=49,709 sf 18.39% Impervious Runoff Depth=0.11"
Tc=5.0 min CN=49 Runoff=0.02 cfs 0.010 af

Subcatchment P2: Portion of Roof Runoff Area=4,051 sf 100.00% Impervious Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=0.30 cfs 0.023 af

Reach 1R: Rear Yard - Exist. Inflow=0.02 cfs 0.012 af
Outflow=0.02 cfs 0.012 af

Reach 2R: Rear Yard - Prop. Inflow=0.02 cfs 0.010 af
Outflow=0.02 cfs 0.010 af

Pond 1P: 18' x 22.5' Field Peak Elev=108.78' Storage=163 cf Inflow=0.30 cfs 0.023 af
Discarded=0.09 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.023 af

Pond 4P: 8.5' x 18' Field Peak Elev=108.96' Storage=79 cf Inflow=0.13 cfs 0.010 af
Discarded=0.04 cfs 0.010 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.010 af

Total Runoff Area = 2.551 ac Runoff Volume = 0.055 af Average Runoff Depth = 0.26"
78.05% Pervious = 1.991 ac 21.95% Impervious = 0.560 ac

Summary for Subcatchment 5S: Portion of Roof

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	1,800	98	Roof
	1,800		100.00% Impervious Area

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

Summary for Subcatchment E1: Exist. Cond.

Runoff = 0.02 cfs @ 13.65 hrs, Volume= 0.012 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
	3,110	98	Paved parking, HSG C
	4,661	98	Roofs, HSG C
*	1,630	98	other impervious
	46,159	39	>75% Grass cover, Good, HSG A
	55,560	49	Weighted Average
	46,159		83.08% Pervious Area
	9,401		16.92% Impervious Area

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

Summary for Subcatchment P1: Proposed Remainder

Runoff = 0.02 cfs @ 13.65 hrs, Volume= 0.010 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

392 Main St 12.22.22

Type III 24-hr 2 Year Event Rainfall=3.20"

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Page 4

	Area (sf)	CN	Description
*	1,728	98	Sports Court
*	880	1	POOL
	3,742	98	Paved parking, HSG A
*	3,672	98	Other impervious - Patio
	39,687	39	>75% Grass cover, Good, HSG A
	49,709	49	Weighted Average
	40,567		81.61% Pervious Area
	9,142		18.39% Impervious Area

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

Summary for Subcatchment P2: Portion of Roof

Runoff = 0.30 cfs @ 12.07 hrs, Volume= 0.023 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	4,051	98	Roof
	4,051		100.00% Impervious Area

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

Summary for Reach 1R: Rear Yard - Exist.

Inflow Area = 1.275 ac, 16.92% Impervious, Inflow Depth = 0.11" for 2 Year Event event
Inflow = 0.02 cfs @ 13.65 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 13.65 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: Rear Yard - Prop.

Inflow Area = 1.275 ac, 26.99% Impervious, Inflow Depth = 0.10" for 2 Year Event event
Inflow = 0.02 cfs @ 13.65 hrs, Volume= 0.010 af
Outflow = 0.02 cfs @ 13.65 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 18' x 22.5' Field

Inflow Area = 0.093 ac, 100.00% Impervious, Inflow Depth = 2.97" for 2 Year Event event
 Inflow = 0.30 cfs @ 12.07 hrs, Volume= 0.023 af
 Outflow = 0.09 cfs @ 12.37 hrs, Volume= 0.023 af, Atten= 70%, Lag= 18.0 min
 Discarded = 0.09 cfs @ 12.37 hrs, Volume= 0.023 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 108.78' @ 12.37 hrs Surf.Area= 405 sf Storage= 163 cf

Plug-Flow detention time= 8.5 min calculated for 0.023 af (100% of inflow)
 Center-of-Mass det. time= 8.5 min (763.9 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	338 cf	Custom Stage Data (Irregular) Listed below (Recalc) 1,013 cf Overall - 168 cf Embedded = 845 cf x 40.0% Voids
#2	108.50'	168 cf	Cultec C-100 x 12 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		506 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
108.00	405	81.0	0	0	405
110.50	405	81.0	1,013	1,013	608

Device	Routing	Invert	Outlet Devices
#1	Primary	110.40'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	108.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.09 cfs @ 12.37 hrs HW=108.78' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.00' (Free Discharge)
 ↑1=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond 4P: 8.5' x 18' Field

Inflow Area = 0.041 ac, 100.00% Impervious, Inflow Depth = 2.97" for 2 Year Event event
 Inflow = 0.13 cfs @ 12.07 hrs, Volume= 0.010 af
 Outflow = 0.04 cfs @ 12.38 hrs, Volume= 0.010 af, Atten= 71%, Lag= 18.4 min
 Discarded = 0.04 cfs @ 12.38 hrs, Volume= 0.010 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 108.96' @ 12.38 hrs Surf.Area= 153 sf Storage= 79 cf

Plug-Flow detention time= 10.0 min calculated for 0.010 af (100% of inflow)
 Center-of-Mass det. time= 10.0 min (765.4 - 755.5)

392 Main St 12.22.22

Type III 24-hr 2 Year Event Rainfall=3.20"

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Page 6

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	131 cf	Custom Stage Data (Irregular) Listed below (Recalc) 383 cf Overall - 56 cf Embedded = 327 cf x 40.0% Voids
#2	108.50'	56 cf	Cultec C-100 x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		187 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
108.00	153	53.0	0	0	153
110.50	153	53.0	383	383	286

Device	Routing	Invert	Outlet Devices
#1	Primary	110.40'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	108.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.04 cfs @ 12.38 hrs HW=108.96' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.00' (Free Discharge)

↑**1=Orifice/Grate** (Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: Portion of Roof Runoff Area=1,800 sf 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=98 Runoff=0.19 cfs 0.015 af

Subcatchment E1: Exist. Cond. Runoff Area=55,560 sf 16.92% Impervious Runoff Depth=0.51"
Tc=5.0 min CN=49 Runoff=0.38 cfs 0.054 af

Subcatchment P1: Proposed Remainder Runoff Area=49,709 sf 18.39% Impervious Runoff Depth=0.51"
Tc=5.0 min CN=49 Runoff=0.34 cfs 0.048 af

Subcatchment P2: Portion of Roof Runoff Area=4,051 sf 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=98 Runoff=0.44 cfs 0.034 af

Reach 1R: Rear Yard - Exist. Inflow=0.38 cfs 0.054 af
Outflow=0.38 cfs 0.054 af

Reach 2R: Rear Yard - Prop. Inflow=0.34 cfs 0.048 af
Outflow=0.34 cfs 0.048 af

Pond 1P: 18' x 22.5' Field Peak Elev=109.39' Storage=324 cf Inflow=0.44 cfs 0.034 af
Discarded=0.10 cfs 0.034 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.034 af

Pond 4P: 8.5' x 18' Field Peak Elev=109.84' Storage=146 cf Inflow=0.19 cfs 0.015 af
Discarded=0.05 cfs 0.015 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.015 af

Total Runoff Area = 2.551 ac Runoff Volume = 0.152 af Average Runoff Depth = 0.71"
78.05% Pervious = 1.991 ac 21.95% Impervious = 0.560 ac

Summary for Subcatchment 5S: Portion of Roof

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 0.015 af, Depth= 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.65"

Area (sf)	CN	Description
* 1,800	98	Roof
1,800		100.00% Impervious Area

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

Summary for Subcatchment E1: Exist. Cond.

Runoff = 0.38 cfs @ 12.12 hrs, Volume= 0.054 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.65"

Area (sf)	CN	Description
3,110	98	Paved parking, HSG C
4,661	98	Roofs, HSG C
* 1,630	98	other impervious
46,159	39	>75% Grass cover, Good, HSG A
55,560	49	Weighted Average
46,159		83.08% Pervious Area
9,401		16.92% Impervious Area

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

Summary for Subcatchment P1: Proposed Remainder

Runoff = 0.34 cfs @ 12.12 hrs, Volume= 0.048 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.65"

	Area (sf)	CN	Description
*	1,728	98	Sports Court
*	880	1	POOL
	3,742	98	Paved parking, HSG A
*	3,672	98	Other impervious - Patio
	39,687	39	>75% Grass cover, Good, HSG A
	49,709	49	Weighted Average
	40,567		81.61% Pervious Area
	9,142		18.39% Impervious Area

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

Summary for Subcatchment P2: Portion of Roof

Runoff = 0.44 cfs @ 12.07 hrs, Volume= 0.034 af, Depth= 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10 Year Event Rainfall=4.65"

	Area (sf)	CN	Description
*	4,051	98	Roof
	4,051		100.00% Impervious Area

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

Summary for Reach 1R: Rear Yard - Exist.

Inflow Area = 1.275 ac, 16.92% Impervious, Inflow Depth = 0.51" for 10 Year Event event
 Inflow = 0.38 cfs @ 12.12 hrs, Volume= 0.054 af
 Outflow = 0.38 cfs @ 12.12 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: Rear Yard - Prop.

Inflow Area = 1.275 ac, 26.99% Impervious, Inflow Depth = 0.45" for 10 Year Event event
 Inflow = 0.34 cfs @ 12.12 hrs, Volume= 0.048 af
 Outflow = 0.34 cfs @ 12.12 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 18' x 22.5' Field

Inflow Area = 0.093 ac, 100.00% Impervious, Inflow Depth = 4.41" for 10 Year Event event
 Inflow = 0.44 cfs @ 12.07 hrs, Volume= 0.034 af
 Outflow = 0.10 cfs @ 12.45 hrs, Volume= 0.034 af, Atten= 77%, Lag= 23.0 min
 Discarded = 0.10 cfs @ 12.45 hrs, Volume= 0.034 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 109.39' @ 12.45 hrs Surf.Area= 405 sf Storage= 324 cf

Plug-Flow detention time= 17.0 min calculated for 0.034 af (100% of inflow)
 Center-of-Mass det. time= 17.0 min (765.3 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	338 cf	Custom Stage Data (Irregular) Listed below (Recalc) 1,013 cf Overall - 168 cf Embedded = 845 cf x 40.0% Voids
#2	108.50'	168 cf	Cultec C-100 x 12 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		506 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
108.00	405	81.0	0	0	405
110.50	405	81.0	1,013	1,013	608

Device	Routing	Invert	Outlet Devices
#1	Primary	110.40'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	108.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.10 cfs @ 12.45 hrs HW=109.39' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.00' (Free Discharge)
 ↑**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 4P: 8.5' x 18' Field

Inflow Area = 0.041 ac, 100.00% Impervious, Inflow Depth = 4.41" for 10 Year Event event
 Inflow = 0.19 cfs @ 12.07 hrs, Volume= 0.015 af
 Outflow = 0.05 cfs @ 12.43 hrs, Volume= 0.015 af, Atten= 75%, Lag= 21.6 min
 Discarded = 0.05 cfs @ 12.43 hrs, Volume= 0.015 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 109.84' @ 12.43 hrs Surf.Area= 153 sf Storage= 146 cf

Plug-Flow detention time= 17.3 min calculated for 0.015 af (100% of inflow)
 Center-of-Mass det. time= 17.3 min (765.6 - 748.3)

392 Main St 12.22.22

Type III 24-hr 10 Year Event Rainfall=4.65"

Prepared by Merrill Engineers & Land Surveyors

Printed 1/26/2023

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Page 11

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	131 cf	Custom Stage Data (Irregular) Listed below (Recalc) 383 cf Overall - 56 cf Embedded = 327 cf x 40.0% Voids
#2	108.50'	56 cf	Cultec C-100 x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		187 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
108.00	153	53.0	0	0	153
110.50	153	53.0	383	383	286

Device	Routing	Invert	Outlet Devices
#1	Primary	110.40'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	108.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.05 cfs @ 12.43 hrs HW=109.84' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.00' (Free Discharge)

↑**1=Orifice/Grate** (Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: Portion of Roof Runoff Area=1,800 sf 100.00% Impervious Runoff Depth=6.56"
Tc=5.0 min CN=98 Runoff=0.29 cfs 0.023 af

Subcatchment E1: Exist. Cond. Runoff Area=55,560 sf 16.92% Impervious Runoff Depth=1.47"
Tc=5.0 min CN=49 Runoff=1.91 cfs 0.156 af

Subcatchment P1: Proposed Remainder Runoff Area=49,709 sf 18.39% Impervious Runoff Depth=1.47"
Tc=5.0 min CN=49 Runoff=1.71 cfs 0.140 af

Subcatchment P2: Portion of Roof Runoff Area=4,051 sf 100.00% Impervious Runoff Depth=6.56"
Tc=5.0 min CN=98 Runoff=0.64 cfs 0.051 af

Reach 1R: Rear Yard - Exist. Inflow=1.91 cfs 0.156 af
Outflow=1.91 cfs 0.156 af

Reach 2R: Rear Yard - Prop. Inflow=1.71 cfs 0.144 af
Outflow=1.71 cfs 0.144 af

Pond 1P: 18' x 22.5' Field Peak Elev=110.52' Storage=506 cf Inflow=0.64 cfs 0.051 af
Discarded=0.12 cfs 0.049 af Primary=0.14 cfs 0.002 af Outflow=0.26 cfs 0.051 af

Pond 4P: 8.5' x 18' Field Peak Elev=110.54' Storage=187 cf Inflow=0.29 cfs 0.023 af
Discarded=0.05 cfs 0.021 af Primary=0.16 cfs 0.002 af Outflow=0.21 cfs 0.023 af

Total Runoff Area = 2.551 ac Runoff Volume = 0.370 af Average Runoff Depth = 1.74"
78.05% Pervious = 1.991 ac 21.95% Impervious = 0.560 ac

Summary for Subcatchment 5S: Portion of Roof

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af, Depth= 6.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=6.80"

Area (sf)	CN	Description
* 1,800	98	Roof
1,800		100.00% Impervious Area

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

Summary for Subcatchment E1: Exist. Cond.

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.156 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=6.80"

Area (sf)	CN	Description
3,110	98	Paved parking, HSG C
4,661	98	Roofs, HSG C
* 1,630	98	other impervious
46,159	39	>75% Grass cover, Good, HSG A
55,560	49	Weighted Average
46,159		83.08% Pervious Area
9,401		16.92% Impervious Area

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

Summary for Subcatchment P1: Proposed Remainder

Runoff = 1.71 cfs @ 12.09 hrs, Volume= 0.140 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=6.80"

392 Main St 12.22.22

Type III 24-hr 100 Year Event Rainfall=6.80"

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Page 14

	Area (sf)	CN	Description
*	1,728	98	Sports Court
*	880	1	POOL
	3,742	98	Paved parking, HSG A
*	3,672	98	Other impervious - Patio
	39,687	39	>75% Grass cover, Good, HSG A
	49,709	49	Weighted Average
	40,567		81.61% Pervious Area
	9,142		18.39% Impervious Area

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

Summary for Subcatchment P2: Portion of Roof

Runoff = 0.64 cfs @ 12.07 hrs, Volume= 0.051 af, Depth= 6.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=6.80"

	Area (sf)	CN	Description
*	4,051	98	Roof
	4,051		100.00% Impervious Area

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

Summary for Reach 1R: Rear Yard - Exist.

Inflow Area = 1.275 ac, 16.92% Impervious, Inflow Depth = 1.47" for 100 Year Event event
Inflow = 1.91 cfs @ 12.09 hrs, Volume= 0.156 af
Outflow = 1.91 cfs @ 12.09 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: Rear Yard - Prop.

Inflow Area = 1.275 ac, 26.99% Impervious, Inflow Depth = 1.35" for 100 Year Event event
Inflow = 1.71 cfs @ 12.09 hrs, Volume= 0.144 af
Outflow = 1.71 cfs @ 12.09 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 18' x 22.5' Field

Inflow Area = 0.093 ac, 100.00% Impervious, Inflow Depth = 6.56" for 100 Year Event event
 Inflow = 0.64 cfs @ 12.07 hrs, Volume= 0.051 af
 Outflow = 0.26 cfs @ 12.27 hrs, Volume= 0.051 af, Atten= 60%, Lag= 12.1 min
 Discarded = 0.12 cfs @ 12.27 hrs, Volume= 0.049 af
 Primary = 0.14 cfs @ 12.27 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 110.52' @ 12.27 hrs Surf.Area= 405 sf Storage= 506 cf

Plug-Flow detention time= 24.4 min calculated for 0.051 af (100% of inflow)
 Center-of-Mass det. time= 24.4 min (766.8 - 742.4)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	338 cf	Custom Stage Data (Irregular) Listed below (Recalc) 1,013 cf Overall - 168 cf Embedded = 845 cf x 40.0% Voids
#2	108.50'	168 cf	Cultec C-100 x 12 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		506 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
108.00	405	81.0	0	0	405
110.50	405	81.0	1,013	1,013	608

Device	Routing	Invert	Outlet Devices
#1	Primary	110.40'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	108.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.12 cfs @ 12.27 hrs HW=110.52' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.14 cfs @ 12.27 hrs HW=110.52' (Free Discharge)
 ↑**1=Orifice/Grate** (Weir Controls 0.14 cfs @ 1.12 fps)

Summary for Pond 4P: 8.5' x 18' Field

Inflow Area = 0.041 ac, 100.00% Impervious, Inflow Depth = 6.56" for 100 Year Event event
 Inflow = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af
 Outflow = 0.21 cfs @ 12.15 hrs, Volume= 0.023 af, Atten= 25%, Lag= 4.7 min
 Discarded = 0.05 cfs @ 12.14 hrs, Volume= 0.021 af
 Primary = 0.16 cfs @ 12.15 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 110.54' @ 12.15 hrs Surf.Area= 153 sf Storage= 187 cf

Plug-Flow detention time= 18.9 min calculated for 0.023 af (100% of inflow)
 Center-of-Mass det. time= 18.9 min (761.3 - 742.4)

392 Main St 12.22.22

Type III 24-hr 100 Year Event Rainfall=6.80"

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Page 16

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	131 cf	Custom Stage Data (Irregular) Listed below (Recalc) 383 cf Overall - 56 cf Embedded = 327 cf x 40.0% Voids
#2	108.50'	56 cf	Cultec C-100 x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		187 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
108.00	153	53.0	0	0	153
110.50	153	53.0	383	383	286

Device	Routing	Invert	Outlet Devices
#1	Primary	110.40'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	108.00'	8.270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.05 cfs @ 12.14 hrs HW=110.51' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.16 cfs @ 12.15 hrs HW=110.54' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 1.81 fps)