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December 31, 2018
Revised: January 29, 2019

Mr. Dave Buckley
City of Beacon Building Inspector
1 Municipal Center
Beacon, NY 12508

Re: Infiltration and Inflow Investigation
296 Main Street Project
296 Main Street
City of Beacon, New York
Tax ID: 5954-27-869916 (\pm 0.09 acres)

Dear Mr. Buckley,

Hudson Land Design (HLD) has completed an infiltration and inflow investigation at the above referenced parcel as required by the City of Beacon. The investigation was conducted on December 20, 2018, and January 28, 2019 at the existing building located at 296 Main Street, which consists of a two-story wood construction building that fronts on Main Street, and single-story brick building behind it that has frontage on North Cedar Street. Both buildings are currently vacant.

The first phase of the study consisted of an exterior inspection of the building to determine the location of roof leader discharge points. There were two roof leaders observed on the southeast corner of the exterior of the building on the Main Street side that are connected to underground piping. The discharge location of these underground pipes could not be determined by visual inspection (see Figure 1 at the end of this report).

On January 28, 2019, a dye test was conducted with Beacon Sewer Department personnel. In addition, an endoscope was lowered into the ground pipe that the roof leaders discharge into. A blockage was discovered in one of the pipes. The other roof leader discharges into a horizontal cast iron pipe that is directed toward main street. It is believed that this pipe is the sewer lateral pipe from the rear building. There is no storm system in Main Street in the vicinity of this pipe. Dye was administered into the drain

line that discharges from the rear building along the exterior of the east wall of the front building; The results of the dye test confirmed that this pipe discharges to the sewer main within Main Street. It is assumed that since there is no stormwater infrastructure in this location, the two roof leaders located in the southeast corner of the building discharge to this sewer line. Per City of Beacon requirements, these two roof leader pipes will need to be disconnected from the sewer line from the rear building. The Site Plan set currently before the planning board has been updated to show design for re-routing these roof leader pipes to the storm system.

No other exterior roof leader pipes were observed; however, based upon our initial inspection, the building consists of two sections. The front portion of the building is two-story wood-framed construction, and the rear portion is single-story brick construction. It appears that the rear section was added onto the front building. The front building contains a gabled roof that half of which drains toward Main Street and the other half drains toward the rear of the building. The portion of the front building roof that drains toward Main Street is collected by two roof gutters which discharge into the two roof leaders at the southeast corner of the building mentioned earlier in this report.

The rear portion of the gabled roof drains to a lower shed roof that is also pitched toward the rear building. Both of these roofs discharge to the rear building roof which is pitched toward two interior roof leaders located within the rear building. See the attached sketch with Appendix A that shows the locations of the roof leaders and gutters.

The second phase of the investigation consisted of an interior investigation of the front and rear buildings. The rear building is single-story on slab with no basement. There are two roof leaders within the rear building that are piped below the slab – one on the north wall and one on the south wall (Figures 3 & 4). The north roof leader pipe continues below the slab into a 90° elbow where it travels toward the south into a sump with metal cover within the center of the slab floor (Figure 2). The sump has an open bottom to ground where the roof leader discharge is allowed to infiltrate into the subsoils. There is a downward facing 90° elbow overflow outlet on the south side of the sump. It is believed that this overflow pipe is connected to the south roof leader.

Dye was introduced into a sink located adjacent to the south roof leader (Figure 3). The sink drain and the roof leader drain both are directed into a common sewer line. The dye test was conducted to determine where this drain line is directed toward. Manholes were opened on Main Street, and North Cedar Street after the dye was introduced. Dye was observed in a sewer manhole within Main Street; therefore, it has been confirmed that the 4" cast iron sewer line from the rear building discharges toward Main Street along the east exterior wall of the front building into the City sewer system. These roof drains will need to be disconnected from the sewer pipe and re-directed to the storm system. The Site Plan set currently before the planning board has been updated to show design for re-routing these roof leader pipes to the storm system.

The front portion of the building has a basement. The basement was investigated for any interior roof leaders, floor drains or sump pumps that could be connected to the building sewer. A sump pump was observed in the northeast corner of the front building's basement (Figure 5). It was confirmed that the discharge line from the sump pump is connected to the building sewer line. The building sewer line travels along the

westerly wall of the front building and exists the building out of the west wall toward North Cedar Street (Figure 6). There is a sewer manhole within N. Cedar Street that is located just upstream of the sewer lateral coming from the building. The sewer manhole was inspected on January 28, 2019 with the Beacon Sewer Department. It was confirmed that the sewer lateral from the front building is connected to the 8” sewer main within North Cedar Street. The sump pump will need to be disconnected from the sewer pipe and re-routed to the storm system. The Site Plan set currently before the planning board has been updated to show design for re-routing the sump pump to the storm system.

Proposed Mitigation

All roof leaders and the sump pump discharge line will be disconnected from the sewer and re-routed to the City stormwater system. The two roof leaders shown in Figure 1 at the end of this report will be re-routed to storm system by installing a 6” SDR 35 PVC header pipe from this location and directed toward the rear building along the east building wall of the front building. The sump pump discharge line will exit the east building wall and connect directly to this line within an ADS polyethylene catch basin. The 6” SDR 35 PVC continues into the rear building where it will intercept both roof leaders within the rear building below the concrete slab. The sewer line will increase to 8” SDR 35 PVC after intercepting the two roof leader pipes. From there, the 8” pipe is directed toward North Cedar Street.

North Cedar Street does not contain stormwater infrastructure in this area; however, there is a catch basin located approximately 72 feet to the north within North Cedar Street. Therefore, a new catch basin will be installed in this location with a 12” HDPE pipe directed toward the existing catch basin toward the north. The Site Plan set currently before the planning board has been updated to show design for re-routing the sump pump and roof leader pipes to the storm system.

Hydrologic Calculations

A hydrologic model has been developed to determine the amount of stormwater removed from the City sewer system as a result of disconnecting the roof leaders and sump pump. The entire roof area is 3,749 square feet. The hydrologic analysis is summarized within Table I below:

TABLE I
STORMWATER VOLUME REMOVED FROM SANITARY SEWER SYSTEM

Designation	1-Year 2.61 inches	10-Year 4.69 inches	25-Year 5.89 inches	100-Year 8.32 inches
Volume (acre-feet)	0.016	0.030	0.038	0.053
Volume (gallons)	5,214	9,775	12,382	17,270

The hydraulic model can be found within Appendix B.

Based on our observations, HLD believes that there are illicit stormwater connections from the building located at 296 Main Street to the City of Beacon's sanitary sewer collection system. A stormwater utility plan has been developed that shows design for disconnection of roof leaders and sump pump from the sewer system and re-routing to the storm system.

Should you have any questions, please feel free to call me at 845-440-6926.

Sincerely,

A handwritten signature in black ink, appearing to read "Mr. Bodendorf". The signature is fluid and cursive, with the first name "Mr." written in a smaller, more compact script than the last name "Bodendorf".

Michael A. Bodendorf, P.E.

cc:

Aryeh Seigel
Daniel G. Koehler, P.E. (HLD file)

Appendix A

Photographs



Figure 1 – View of Roof Leader Pipes Located in the Southwest Corner of the Front Building



Figure 2 - View of Sump Within Floor of Rear Building



Figure 3 - View of Roof Leader on South Side of Rear Building



Figure 4 - View of Roof Leader on North Side of Rear Building



Figure 5 - View of Sump Pump in Basement of Front Building



Figure 6 - View of Sewer Lateral Leaving Front Building Through the West Wall Toward North Cedar Street

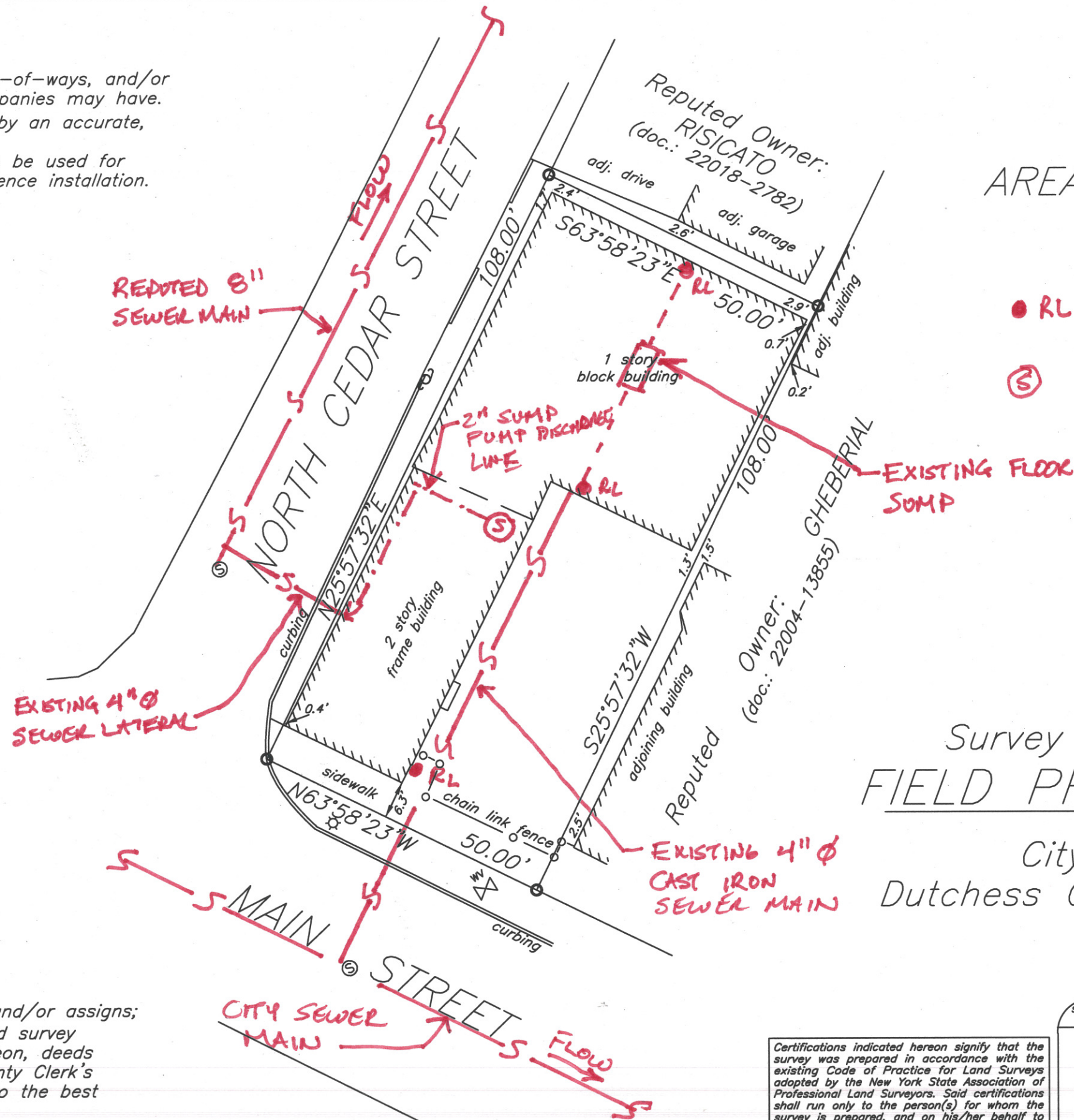
Appendix A
I&I Investigation Sketch

NOTES:

SUBJECT to any easements, rights-of-ways, and/or agreements that the utility companies may have.
 SUBJECT to such facts disclosed by an accurate, up-to-date title search.
 OFFSETS shown hereon are not to be used for construction purposes and/or fence installation.

REFERENCES:

TAX MAP DATA:
 Section: 5954
 Block: 36
 Lot: 933866
 Doc. No.: 22017-9684



AREA = 5,400 S.F.
 = 0.124± acres

● RL - ROOF LEADER LOCATION
 ⊙ S - SUMP PUMP

Survey of Property for
FIELD PROPERTIES, LLC
 located in the
 City of Beacon
 Dutchess County - New York

I hereby certify to:
 -Field Properties, LLC;
 -RG Title Agency (RGD-21747);
 -Walden Savings Bank, its successors and/or assigns;
 that this mapping is based on a field survey performed on the date indicated hereon, deeds and/or maps obtained from the County Clerk's office, and is correct and accurate to the best of my knowledge.

Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of Section 7209, sub-division 2, of the New York State Education Law.

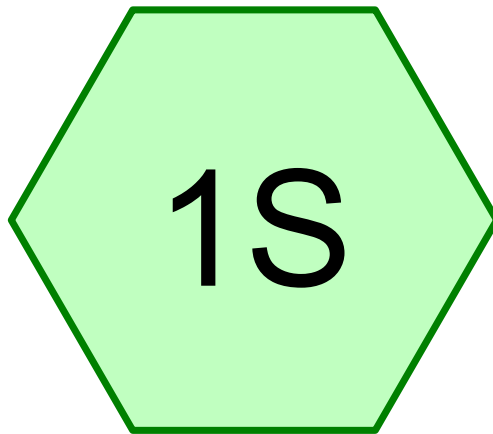
Certifications indicated hereon signify that the survey was prepared in accordance with the existing Code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors. Said certifications shall run only to the person(s) for whom the survey is prepared, and on his/her behalf to the title company, governmental agency and lending institution listed hereon, and to the assignees of the lending institution. Certifications are not transferable to additional institutions or their subsequent owners.

scale: 1" = 20' date: 10 Oct. 2018 file no.: 18-526

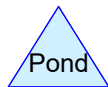
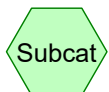
HOWARD W. WEEDEN, PLS, PC
 PROFESSIONAL LAND SURVEYING
 62 Main Street, Walden, N.Y. 12586
 tel.: (845) 778-7643
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Appendix B
Hydrologic Model



ROOF DRAINAGE



DRAINAGE-POST

Prepared by Hudson Land Design

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

296 Main Street

Type III 24-hr 1 Year Storm Rainfall=2.61"

Page 2

Summary for Subcatchment 1S: ROOF DRAINAGE

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Depth> 2.23"

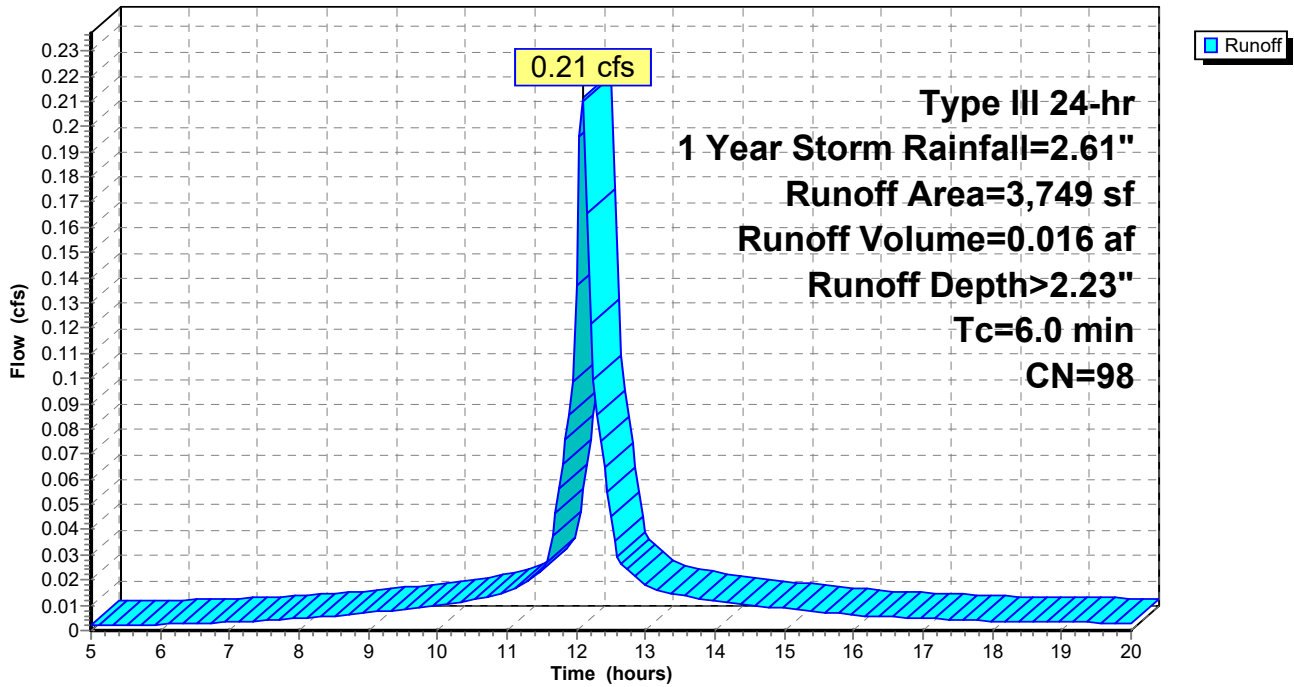
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 Year Storm Rainfall=2.61"

Area (sf)	CN	Description
3,749	98	Roofs, HSG B
3,749		100.00% Impervious Area

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

Subcatchment 1S: ROOF DRAINAGE

Hydrograph



DRAINAGE-POST

Prepared by Hudson Land Design

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

296 Main Street

Type III 24-hr 10 Year Storm Rainfall=4.69"

Page 3

Summary for Subcatchment 1S: ROOF DRAINAGE

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af, Depth> 4.14"

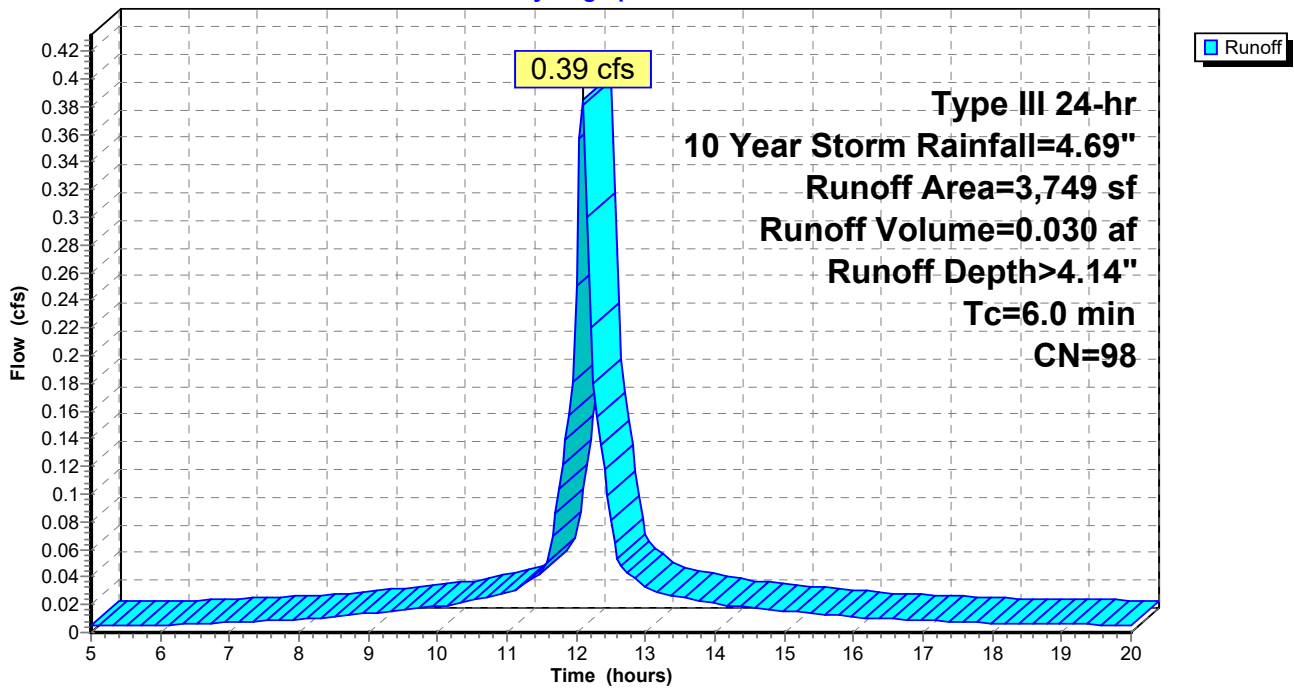
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=4.69"

Area (sf)	CN	Description
3,749	98	Roofs, HSG B
3,749		100.00% Impervious Area

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

Subcatchment 1S: ROOF DRAINAGE

Hydrograph



DRAINAGE-POST

Prepared by Hudson Land Design

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

296 Main Street

Type III 24-hr 25 Year Storm Rainfall=5.89"

Page 4

Summary for Subcatchment 1S: ROOF DRAINAGE

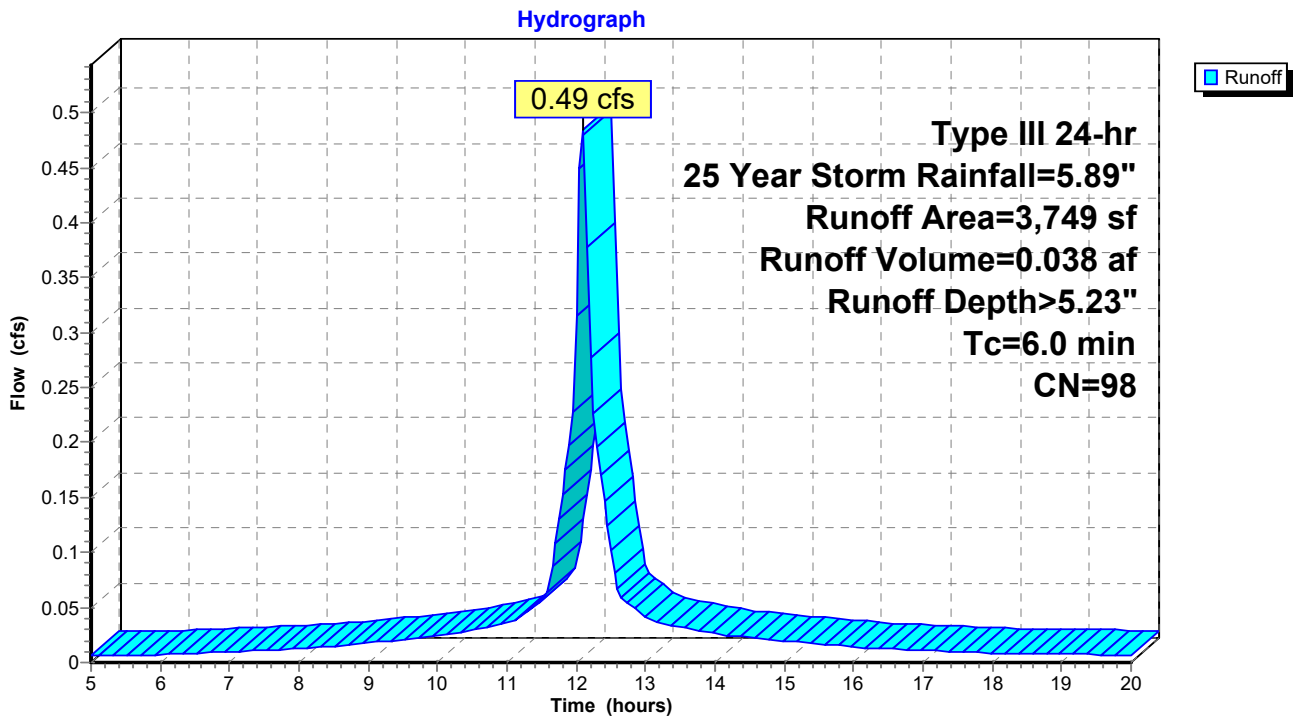
Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.038 af, Depth> 5.23"

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 25 Year Storm Rainfall=5.89"

Area (sf)	CN	Description
3,749	98	Roofs, HSG B
3,749		100.00% Impervious Area

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

Subcatchment 1S: ROOF DRAINAGE



DRAINAGE-POST

Prepared by Hudson Land Design

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296 Main Street

Type III 24-hr 100 Year Storm Rainfall=8.32"

Page 5

Summary for Subcatchment 1S: ROOF DRAINAGE

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.053 af, Depth> 7.43"

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 100 Year Storm Rainfall=8.32"

Area (sf)	CN	Description
3,749	98	Roofs, HSG B
3,749		100.00% Impervious Area

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

Subcatchment 1S: ROOF DRAINAGE

Hydrograph

