5 Railroad Street, Newmarket, NH 03561 • Ph 603-444-4111 • Fax 603-659-4627 • www.horizonsengineering.com

TOWN OF DURHAM
STORMWATER MANAGEMENT PLAN
FOR
CLARK PROPERTIES, LLC

74 MAIN STREET
TAX MAP 106, LOT 59
(FORMERLY TAX MAP 2, LOT 14-1)

SUBMITTED ON
19 JULY 2021

SUBMITTED ON
17 JUNE 2022

Project Number NM18054

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1. PROJECT INFORMATION NARRATIVE

1.1. Project narrative

1.1.1. Project summary

Clark Properties, LLC intends to redevelop the property at 74 Main Street in Durham, New Hampshire (Tax Map 106, Lot 59). The project will demolish the existing 1100 ft^2 building on the property and construct five-story mixed-use building. Additionally, the parking and traffic flow will be modified. This report was prepared by Horizons Engineering to ensure the design of the stormwater management for 74 Main Street complies with the applicable federal, state and local regulations for stormwater.

1.1.2. Existing conditions

The proposed work is located at the corner of Main Street and Pettee Brook Lane. The project site currently consists of an office building and two paved parking areas with a combined 13 spaces. The stormwater runoff from the office building and the larger parking area in the north drain to catch basins on Pettee Brook Lane at the northeast side of the property. The stormwater runoff from the western portion of the site is collected in catch basins along Main Street. All the existing catch basins are part of Durham's municipal separate storm sewer system (MS4). The flow is split between two drainage points. The first point (PA-1) is located at a catch basin on Main Street. This catch basin is routed to the west into UNH property and ultimately outlets to College Brook. The second point (PA-2) is located at a catch basin on the northeast corner of the property along Pettee Brook Lane. The storm sewer ultimately outlets to the Pettee Brook.

1.1.3. Proposed site conditions & disturbances

In the proposed post-developed condition the majority of the lot will be covered by the new building. The majority of the remained of the land will be paved using pervious interlocking concrete pavers (PICP). A small remainder of the land, ca. 300 square feet will be grassed. Due to the negligible impact of this grassed area on the over runoff from the site, and the potential to compact the soils during construction, the entire lot has been modelled as impervious land cover.

The new building will have a roof area of about 6100 square feet. Two-thirds (4000 sq. ft.) of the roof will be routed to permeable paver system to infiltrate some of the runoff and buffer the peak flow. The remainder of the roof will be routed to a new catch basin (1P)

The permeable paver system have been split into three cells. The system is built on a max. 5% grade and two membrane barriers will be installed to create storage space on the slope. Overall the system takes up about 1880 sq. ft. with some of the open-graded reservoir stone extending below the concrete slab under the building overhang.

The runoff from the adjacent property (TM160, L61) will be collected along the property line. The design intent is to have a the concrete pad and concrete edge restraint to be 1/4" proud of the new asphalt to concentrate flow towards a new deep-sump catch basin (2P). The purpose of this to prevent heavily sediment laden runoff from flowing directly into the PICP system. It is expected that during larger storms, the flow depth in this location may exceed 1/2" for very short periods of time, and the PICIP is able to handle these additional flows without ponding.

The remainder of the runoff form the site are the narrow strip between the front of the building and the road which currently flows to the street, and a small 300 sq. ft. area by the proposed transformer pad. These areas will be collected in the existing catch basins located on Pettee Brook Lane (E2) and on the abutting town property (E1).

The flows towards PA-1 have been reduced due to the removal of the paved area on the abutting property.

1.1.4. Hydrologic data and methods

The stormwater model was built in the software program HydroCAD (Version 10.00 25). HydroCAD uses the methods described in the NRCS National Engineering Handbook [2] to create rainfall-runoff relationships, determine time of concentration, generate unit hydrographs for each subcatchment area.

The direct runoff from the site was estimated using the Weighted-Q method. Synthetic design storms used rainfall data and intensity curves from the NOAA (Atlas 14). Soils maps generated by the Natural Resources Conservation Service (NRCS), and land cover data from the field survey were used to determine the soil-complex CN values.

Using SCS TR-20, run under HydroCAD Version 10.0 with 24-hour rainfall events based on Atlas 14 data for Durham, NH, pre- and post-development cover types and drainage paths were modeled to generate peak discharge rates. These data are provided in full in section 1.3 of this report and are summarized below in Table 1.1.

Table 1.1: Project design storm depths from NOAA

Storm	Depth [inches]
1″	1.00
2-YR	3.30
10-YR	5.29
25-YR	6.53
50-YR	7.44
100-YR	8.44

1.1.5. Peak runoff control requirement

Town of Durham Site Design Standards require that measures be taken to control the post-development peak rate runoff so that it does not exceed pre-development runoff for the 1 inch, 2-, 10-, and 17[1]- year, 24-hour storm events. Due to the post-project grading of the site and changes in land cover, stormwater devices were used to attenuate flow in order to meet these Peak Runoff Control requirements. Table 1.2 summarizes the stormwater runoff peak flow rate for the 1 inch, 2-, 10- and 25-year storm events.

Table 1.2: Peak flow from 74 Main Street

Peak flow [ft2/s]				
	PA-1		PA-2	
Storm	Pre	Post	Pre	Post
1″	**0.28**	0.22	**0.19**	0.19
2-YR	**1.07**	0.93	**0.83**	0.77
10-YR	**1.71**	1.53	**1.40**	1.13
25-YR	**2.12**	1.95	**1.76**	1.41
50-YR	**2.43**	2.25	**2.03**	1.62
100-YR	**2.75**	2.57	**2.32**	1.80

The peak flows for all events are decreased in the post-development condition, except the 1” storm which is the same as the pre-development condition.

[1] Understood to be a typo and the 25-year rainfall event is intended

1.1.6. Infiltration volume requirement

A permeable interlocking concrete paver (PICP) systems was selected to store water, and allow for slow infiltration into the existing soils. The existing soils are estimated to have an infiltration rate of 0,5 in/hr. This rate is enough to allow for some infiltration but, in larger storms with long recurrence intervals (>10 year) it is not possible to prevent runoff through infiltration alone. The PICP system does allow more infiltration to the site than in the pre-existing conditions. Therefore, no additional calculations were done to determine if the minimum volume requirement was met. See section 1.1.7 for more information.

1.1.7. Runoff volume control

The runoff volume from each storm event is summarized in table 1.3.

Table 1.3: 74 Main Street storm runoff volumes

Peak flow [ft3]				
	PA-1		PA-2	
Storm	Pre	Post	Pre	Post
1″	**834**	678	**591**	547
2-YR	**3532**	3086	**2747**	2662
10-YR	**6048**	5433	**4873**	4766
25-YR	**7649**	6945	**6247**	6058
50-YR	**8833**	8069	**7269**	7048
100-YR	**10 141**	9314	**8402**	8208

In all events the volume of runoff leaving the site is less in the post-development conditions than the pre-development conditions.

1.2. NRCS soils information


70° 55' 49" W
70° 55' 28" W
43° 8' 11" N
43° 8' 1" N
343020
343070
343120
343170
343220
343270
343320
343370
343420
343470
4777780
4777730
4777680
4777630
4777580
4777530
4777480
HdB
Ballard St
Main St
Sb
HdB
Madbury Rd
HdC
BzB
Jenkins Ct
SfC
SfC
Mill
Soil Map may not be valid at this scale.
Map Scale: 1:2,150 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0
30
60
120
180
Feet
0
100
200
400
600
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 20, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BzB	Buxton silt loam, 3 to 8 percent slopes	6.1	29.8%
HdB	Hollis-Charlton very rocky fine sandy loams, 3 to 8 percent slopes	6.6	32.4%
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	5.4	26.6%
Sb	Saugatuck loamy sand	2.2	10.6%
SfC	Suffield silt loam, 8 to 15 percent slopes	0.1	0.6%
Totals for Area of Interest		**20.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Strafford County, New Hampshire

BzB—Buxton silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d6p
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Buxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buxton

Setting

Parent material: Glaciomarine

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 28 inches: silty clay loam
H3 - 28 to 43 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

Elmwood

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

HdB—Hollis-Charlton very rocky fine sandy loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d7m
Elevation: 0 to 1,000 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 40 percent
Charlton and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: very stony fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: very stony fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

HdC—Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9d7n
Elevation: 0 to 1,200 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 40 percent
Charlton and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: very stony fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: very stony fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 10 percent
Hydric soil rating: No

Woodbridge

Percent of map unit: 5 percent
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Hydric soil rating: No

Sb—Saugatuck loamy sand

Map Unit Setting

National map unit symbol: 9d8r
Elevation: 300 to 1,000 feet
Mean annual precipitation: 27 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 125 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Saugatuck and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saugatuck

Setting

Landform: Outwash terraces
Parent material: Outwash

Typical profile

H1 - 0 to 4 inches: loamy sand
H2 - 4 to 7 inches: sand
H3 - 7 to 26 inches: loamy sand
H4 - 26 to 42 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 16 inches to undefined
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Not named wet

Percent of map unit: 15 percent

Landform: Outwash terraces
Hydric soil rating: Yes

SfC—Suffield silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9d8v
Elevation: 0 to 250 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Suffield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Suffield

Typical profile

H1 - 0 to 19 inches: silt loam
H2 - 19 to 28 inches: silt loam
H3 - 28 to 41 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY017NH - Well Drained Lake Plain
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 9 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: No

1.3. Precipitation tables

NOAA Atlas 14, Volume 10, Version 3
Location name: Durham, New Hampshire, USA*
Latitude: 43.1354°, Longitude: -70.9281°
Elevation: 55.98 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.300** (0.242-0.374)	**0.363** (0.293-0.453)	**0.466** (0.374-0.584)	**0.550** (0.439-0.693)	**0.667** (0.512-0.877)	**0.755** (0.565-1.01)	**0.847** (0.613-1.18)	**0.952** (0.648-1.35)	**1.10** (0.718-1.62)	**1.23** (0.776-1.84)
10-min	**0.425** (0.343-0.531)	**0.514** (0.415-0.642)	**0.659** (0.529-0.825)	**0.779** (0.622-0.982)	**0.945** (0.725-1.24)	**1.07** (0.802-1.44)	**1.20** (0.869-1.67)	**1.35** (0.917-1.92)	**1.56** (1.02-2.30)	**1.74** (1.10-2.61)
15-min	**0.500** (0.404-0.624)	**0.605** (0.488-0.755)	**0.776** (0.624-0.972)	**0.917** (0.731-1.16)	**1.11** (0.853-1.46)	**1.26** (0.943-1.69)	**1.41** (1.02-1.97)	**1.59** (1.08-2.26)	**1.84** (1.20-2.70)	**2.04** (1.29-3.07)
30-min	**0.669** (0.540-0.834)	**0.808** (0.652-1.01)	**1.03** (0.832-1.30)	**1.22** (0.977-1.54)	**1.48** (1.14-1.96)	**1.68** (1.26-2.26)	**1.88** (1.37-2.63)	**2.12** (1.44-3.02)	**2.47** (1.61-3.64)	**2.77** (1.75-4.15)
60-min	**0.837** (0.676-1.04)	**1.01** (0.815-1.26)	**1.30** (1.04-1.62)	**1.53** (1.22-1.93)	**1.86** (1.43-2.45)	**2.10** (1.58-2.83)	**2.36** (1.71-3.30)	**2.66** (1.81-3.79)	**3.11** (2.02-4.58)	**3.49** (2.21-5.24)
2-hr	**1.12** (0.911-1.39)	**1.37** (1.11-1.69)	**1.76** (1.43-2.19)	**2.09** (1.68-2.62)	**2.55** (1.97-3.34)	**2.88** (2.18-3.87)	**3.25** (2.38-4.55)	**3.69** (2.52-5.22)	**4.36** (2.84-6.38)	**4.94** (3.14-7.36)
3-hr	**1.33** (1.08-1.64)	**1.62** (1.32-2.00)	**2.10** (1.70-2.60)	**2.50** (2.01-3.11)	**3.05** (2.37-3.99)	**3.45** (2.62-4.62)	**3.89** (2.87-5.44)	**4.43** (3.03-6.24)	**5.26** (3.44-7.67)	**5.97** (3.80-8.87)
6-hr	**1.74** (1.43-2.14)	**2.14** (1.75-2.63)	**2.78** (2.27-3.43)	**3.32** (2.69-4.11)	**4.06** (3.17-5.28)	**4.60** (3.52-6.13)	**5.20** (3.85-7.22)	**5.93** (4.07-8.30)	**7.05** (4.62-10.2)	**8.03** (5.12-11.8)
12-hr	**2.22** (1.84-2.71)	**2.74** (2.26-3.34)	**3.58** (2.94-4.39)	**4.29** (3.50-5.27)	**5.25** (4.13-6.79)	**5.96** (4.58-7.89)	**6.74** (5.02-9.31)	**7.69** (5.30-10.7)	**9.17** (6.03-13.2)	**10.4** (6.68-15.3)
24-hr	**2.63** (2.19-3.19)	**3.30** (2.74-4.00)	**4.39** (3.63-5.33)	**5.29** (4.34-6.46)	**6.53** (5.17-8.41)	**7.44** (5.76-9.82)	**8.44** (6.34-11.7)	**9.71** (6.71-13.4)	**11.7** (7.72-16.8)	**13.5** (8.64-19.6)
2-day	**2.92** (2.44-3.51)	**3.74** (3.12-4.50)	**5.09** (4.23-6.14)	**6.20** (5.12-7.53)	**7.74** (6.18-9.95)	**8.86** (6.92-11.7)	**10.1** (7.69-14.0)	**11.8** (8.15-16.2)	**14.5** (9.56-20.6)	**16.9** (10.9-24.4)
3-day	**3.14** (2.64-3.76)	**4.03** (3.38-4.83)	**5.47** (4.57-6.58)	**6.67** (5.53-8.06)	**8.32** (6.66-10.7)	**9.52** (7.46-12.5)	**10.9** (8.29-15.0)	**12.7** (8.78-17.3)	**15.6** (10.3-22.1)	**18.2** (11.7-26.3)
4-day	**3.38** (2.84-4.03)	**4.29** (3.61-5.13)	**5.78** (4.84-6.93)	**7.02** (5.83-8.46)	**8.72** (7.00-11.1)	**9.96** (7.83-13.1)	**11.4** (8.68-15.6)	**13.2** (9.18-18.0)	**16.2** (10.8-22.9)	**18.9** (12.2-27.2)
7-day	**4.10** (3.47-4.86)	**5.05** (4.27-6.00)	**6.62** (5.57-7.89)	**7.91** (6.61-9.49)	**9.70** (7.81-12.3)	**11.0** (8.66-14.3)	**12.5** (9.52-16.9)	**14.3** (10.0-19.5)	**17.4** (11.6-24.5)	**20.1** (13.0-28.8)
10-day	**4.79** (4.07-5.66)	**5.78** (4.90-6.84)	**7.40** (6.24-8.79)	**8.74** (7.32-10.4)	**10.6** (8.54-13.3)	**11.9** (9.40-15.4)	**13.4** (10.2-18.1)	**15.3** (10.7-20.7)	**18.3** (12.2-25.7)	**21.0** (13.6-29.9)
20-day	**6.76** (5.78-7.94)	**7.86** (6.71-9.25)	**9.66** (8.21-11.4)	**11.2** (9.41-13.2)	**13.2** (10.7-16.4)	**14.8** (11.6-18.7)	**16.4** (12.4-21.5)	**18.3** (12.9-24.5)	**21.0** (14.1-29.1)	**23.3** (15.1-32.9)
30-day	**8.32** (7.14-9.74)	**9.52** (8.16-11.2)	**11.5** (9.79-13.5)	**13.1** (11.1-15.5)	**15.3** (12.4-18.8)	**17.0** (13.4-21.3)	**18.8** (14.1-24.3)	**20.6** (14.6-27.5)	**23.2** (15.6-32.0)	**25.2** (16.4-35.5)
45-day	**10.2** (8.79-11.9)	**11.5** (9.90-13.4)	**13.7** (11.7-16.0)	**15.4** (13.1-18.2)	**17.9** (14.5-21.8)	**19.8** (15.6-24.6)	**21.7** (16.2-27.7)	**23.5** (16.7-31.2)	**25.9** (17.5-35.6)	**27.6** (18.0-38.8)
60-day	**11.7** (10.1-13.6)	**13.1** (11.3-15.3)	**15.4** (13.3-18.0)	**17.3** (14.8-20.4)	**20.0** (16.2-24.2)	**22.1** (17.4-27.2)	**24.0** (18.0-30.5)	**25.9** (18.4-34.2)	**28.1** (19.0-38.5)	**29.7** (19.4-41.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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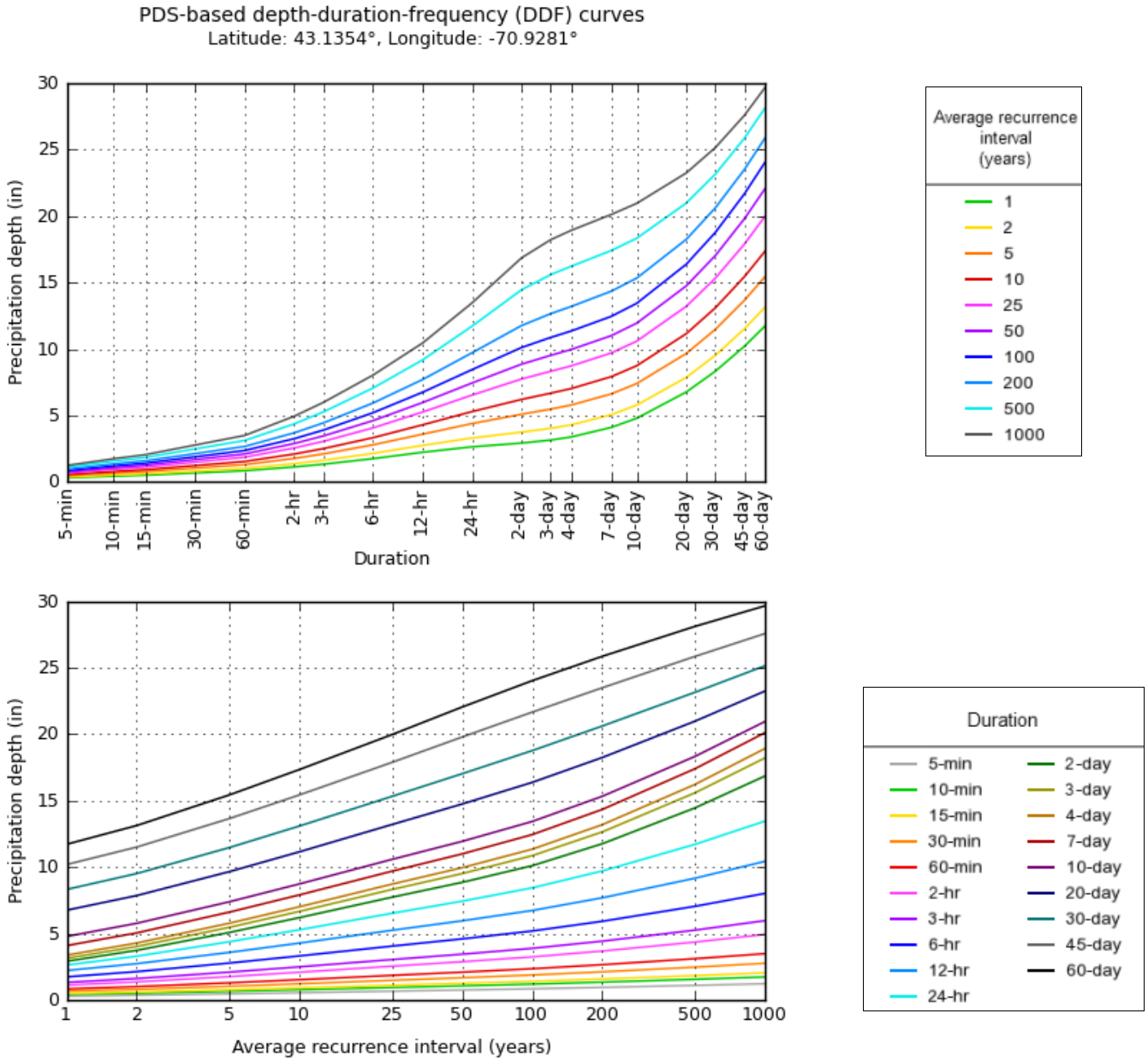
PF graphical



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Created (GMT): Fri Jun 17 05:04:28 2022

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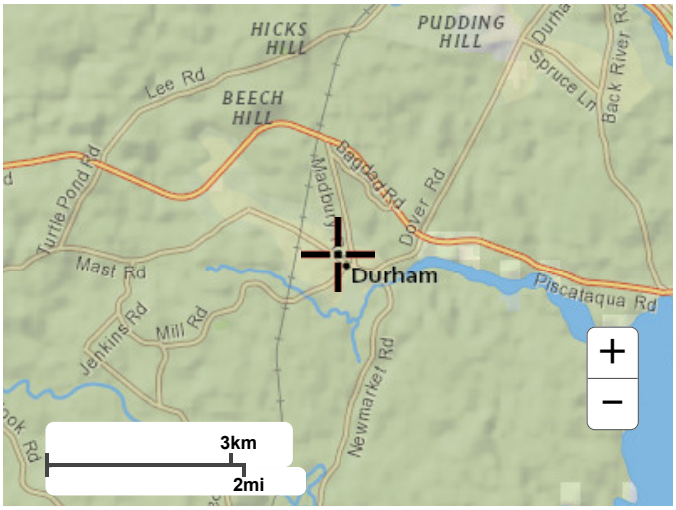
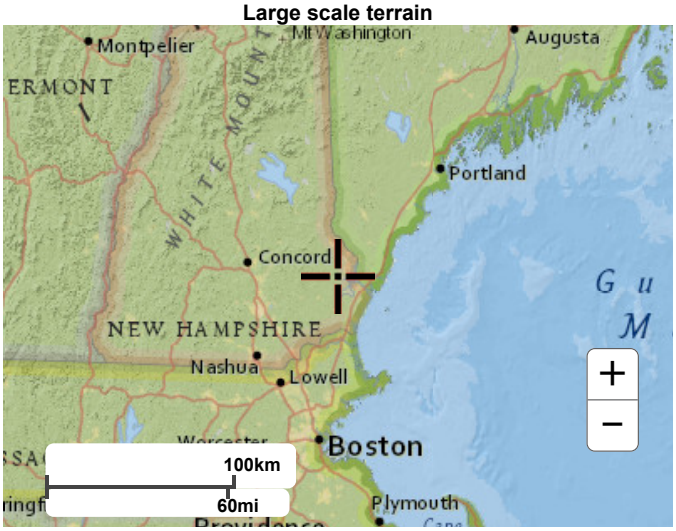
Maps & aerials

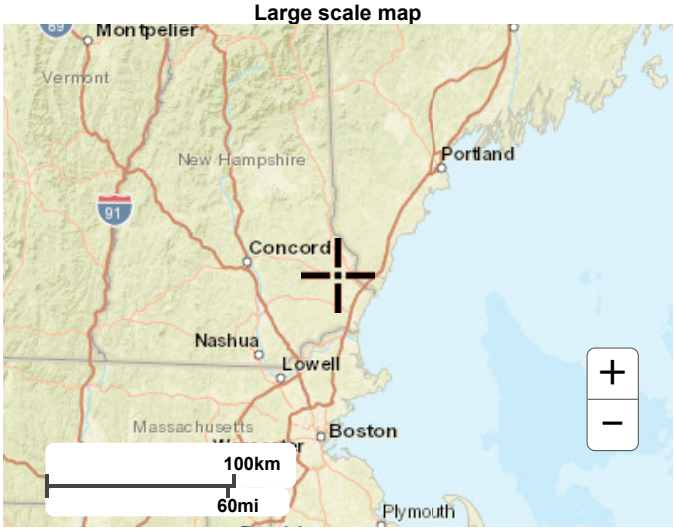
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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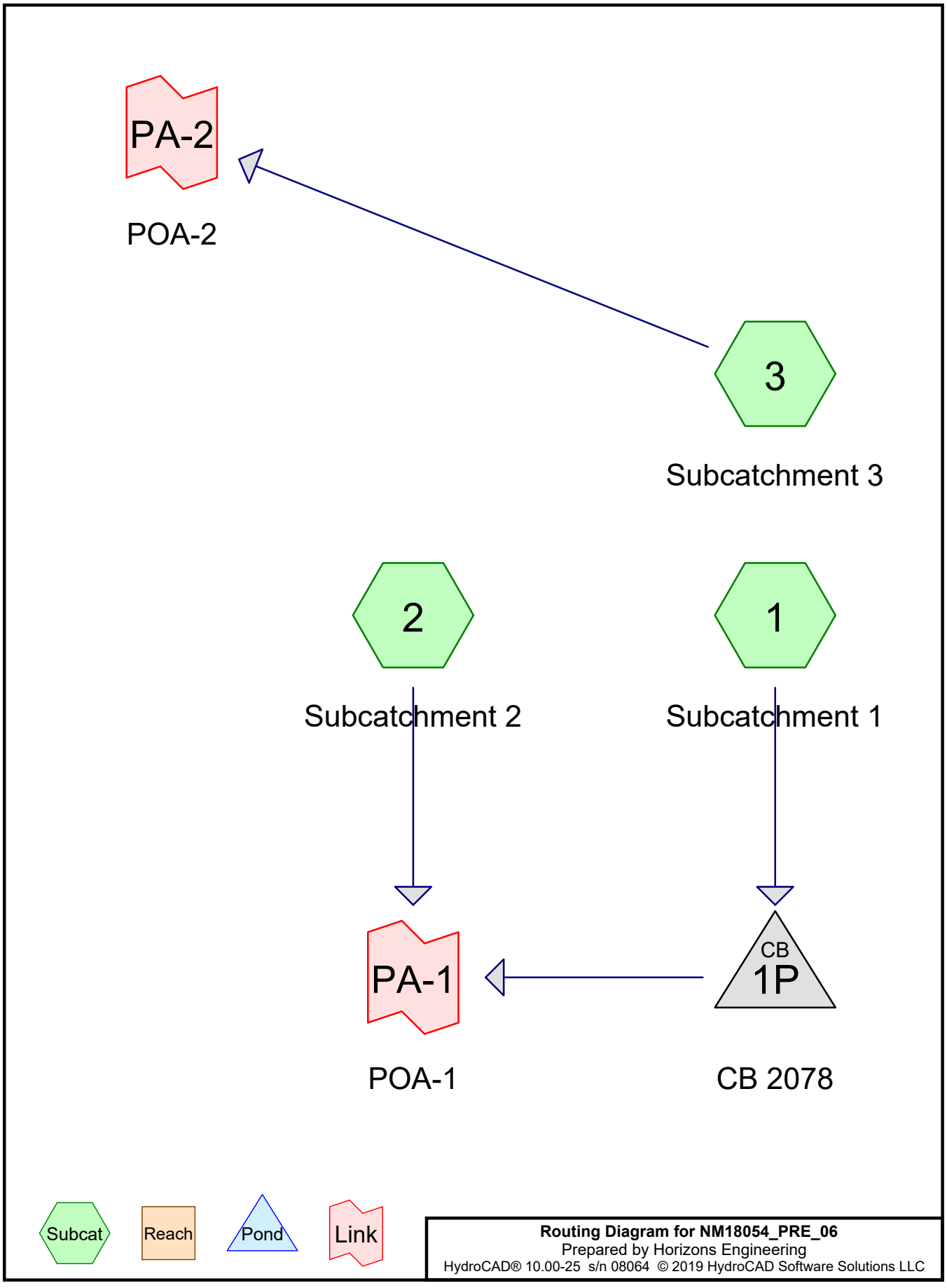
2. DRAINAGE CALCULATIONS

2.1. Pre-development analysis


PA-2
POA-2
3
Subcatchment 3
2
Subcatchment 2
1
Subcatchment 1
PA-1
POA-1
CB
1P
CB 2078
Subcat
Reach
Pond
Link
Routing Diagram for NM18054_PRE_06
Prepared by Horizons Engineering
HydroCAD® 10.00-25 s/n 08064 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
8,902	74	>75% Grass cover, Good, HSG C (1, 2, 3)
18,468	98	Paved parking & roofs, HSG C (1, 2, 3)
2,892	98	Paved parking, HSG C (1, 2, 3)
30,262	**91**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=14,023 sf 82.49% Impervious Runoff Depth=0.66"
Tc=6.0 min CN=WQ Runoff=0.26 cfs 767 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,059 sf 47.50% Impervious Runoff Depth=0.39"
Tc=6.0 min CN=WQ Runoff=0.02 cfs 67 cf

Subcatchment 3: Subcatchment 3 Runoff Area=14,180 sf 62.17% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=WQ Runoff=0.19 cfs 591 cf

Pond 1P: CB 2078 Peak Elev=50.25' Inflow=0.26 cfs 767 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=0.26 cfs 767 cf

Link PA-1: POA-1 Inflow=0.28 cfs 834 cf
Primary=0.28 cfs 834 cf

Link PA-2: POA-2 Inflow=0.19 cfs 591 cf
Primary=0.19 cfs 591 cf

Total Runoff Area = 30,262 sf Runoff Volume = 1,425 cf Average Runoff Depth = 0.57"
29.42% Pervious = 8,902 sf 70.58% Impervious = 21,360 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=14,023 sf 82.49% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=WQ Runoff=0.96 cfs 3,182 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,059 sf 47.50% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=WQ Runoff=0.11 cfs 349 cf

Subcatchment 3: Subcatchment 3 Runoff Area=14,180 sf 62.17% Impervious Runoff Depth=2.32"
Tc=6.0 min CN=WQ Runoff=0.83 cfs 2,747 cf

Pond 1P: CB 2078 Peak Elev=50.50' Inflow=0.96 cfs 3,182 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=0.96 cfs 3,182 cf

Link PA-1: POA-1 Inflow=1.07 cfs 3,532 cf
Primary=1.07 cfs 3,532 cf

Link PA-2: POA-2 Inflow=0.83 cfs 2,747 cf
Primary=0.83 cfs 2,747 cf

Total Runoff Area = 30,262 sf Runoff Volume = 6,278 cf Average Runoff Depth = 2.49"
29.42% Pervious = 8,902 sf 70.58% Impervious = 21,360 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=14,023 sf 82.49% Impervious Runoff Depth=5.83"
Tc=6.0 min CN=WQ Runoff=1.88 cfs 6,808 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,059 sf 47.50% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=WQ Runoff=0.24 cfs 840 cf

Subcatchment 3: Subcatchment 3 Runoff Area=14,180 sf 62.17% Impervious Runoff Depth=5.29"
Tc=6.0 min CN=WQ Runoff=1.76 cfs 6,247 cf

Pond 1P: CB 2078 Peak Elev=50.75' Inflow=1.88 cfs 6,808 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=1.88 cfs 6,808 cf

Link PA-1: POA-1 Inflow=2.12 cfs 7,649 cf
Primary=2.12 cfs 7,649 cf

Link PA-2: POA-2 Inflow=1.76 cfs 6,247 cf
Primary=1.76 cfs 6,247 cf

Total Runoff Area = 30,262 sf Runoff Volume = 13,895 cf Average Runoff Depth = 5.51"
29.42% Pervious = 8,902 sf 70.58% Impervious = 21,360 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=14,023 sf 82.49% Impervious Runoff Depth=6.71"
Tc=6.0 min CN=WQ Runoff=2.15 cfs 7,847 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,059 sf 47.50% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=WQ Runoff=0.28 cfs 986 cf

Subcatchment 3: Subcatchment 3 Runoff Area=14,180 sf 62.17% Impervious Runoff Depth=6.15"
Tc=6.0 min CN=WQ Runoff=2.03 cfs 7,269 cf

Pond 1P: CB 2078 Peak Elev=50.83' Inflow=2.15 cfs 7,847 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=2.15 cfs 7,847 cf

Link PA-1: POA-1 Inflow=2.43 cfs 8,833 cf
Primary=2.43 cfs 8,833 cf

Link PA-2: POA-2 Inflow=2.03 cfs 7,269 cf
Primary=2.03 cfs 7,269 cf

Total Runoff Area = 30,262 sf Runoff Volume = 16,102 cf Average Runoff Depth = 6.39"
29.42% Pervious = 8,902 sf 70.58% Impervious = 21,360 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=14,023 sf 82.49% Impervious Runoff Depth=7.70"
Tc=6.0 min CN=WQ Runoff=2.43 cfs 8,993 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,059 sf 47.50% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=WQ Runoff=0.32 cfs 1,148 cf

Subcatchment 3: Subcatchment 3 Runoff Area=14,180 sf 62.17% Impervious Runoff Depth=7.11"
Tc=6.0 min CN=WQ Runoff=2.32 cfs 8,402 cf

Pond 1P: CB 2078 Peak Elev=50.91' Inflow=2.43 cfs 8,993 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=2.43 cfs 8,993 cf

Link PA-1: POA-1 Inflow=2.75 cfs 10,141 cf
Primary=2.75 cfs 10,141 cf

Link PA-2: POA-2 Inflow=2.32 cfs 8,402 cf
Primary=2.32 cfs 8,402 cf

Total Runoff Area = 30,262 sf Runoff Volume = 18,543 cf Average Runoff Depth = 7.35"
29.42% Pervious = 8,902 sf 70.58% Impervious = 21,360 sf

Summary for Subcatchment 1: Subcatchment 1

Runoff = 1.52 cfs @ 12.04 hrs, Volume= 5,402 cf, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
21	74	>75% Grass cover, Good, HSG C
2,435	74	>75% Grass cover, Good, HSG C
147	98	Paved parking, HSG C
11,420	98	Paved parking & roofs, HSG C
14,023		Weighted Average
2,456		17.51% Pervious Area
11,567		82.49% Impervious Area

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

Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.19 cfs @ 12.04 hrs, Volume= 646 cf, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
123	74	>75% Grass cover, Good, HSG C
958	74	>75% Grass cover, Good, HSG C
310	98	Paved parking, HSG C
668	98	Paved parking & roofs, HSG C
2,059		Weighted Average
1,081		52.50% Pervious Area
978		47.50% Impervious Area

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

Summary for Subcatchment 3: Subcatchment 3

Runoff = 1.40 cfs @ 12.04 hrs, Volume= 4,873 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
658	74	>75% Grass cover, Good, HSG C
4,707	74	>75% Grass cover, Good, HSG C
2,435	98	Paved parking, HSG C
6,380	98	Paved parking & roofs, HSG C
14,180		Weighted Average
5,365		37.83% Pervious Area
8,815		62.17% Impervious Area

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

Summary for Pond 1P: CB 2078

[57] Hint: Peaked at 50.66' (Flood elevation advised)

Inflow Area = 14,023 sf, 82.49% Impervious, Inflow Depth = 4.62" for 10-yr event
Inflow = 1.52 cfs @ 12.04 hrs, Volume= 5,402 cf
Outflow = 1.52 cfs @ 12.04 hrs, Volume= 5,402 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.52 cfs @ 12.04 hrs, Volume= 5,402 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 50.66' @ 12.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**12.0" Round Outlet** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.00' / 49.10' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 12.04 hrs HW=50.66' TW=0.00' (Dynamic Tailwater)
1=Outlet (Inlet Controls 1.52 cfs @ 2.76 fps)

Summary for Link PA-1: POA-1

Inflow Area = 16,082 sf, 78.01% Impervious, Inflow Depth = 4.51" for 10-yr event
Inflow = 1.71 cfs @ 12.04 hrs, Volume= 6,048 cf
Primary = 1.71 cfs @ 12.04 hrs, Volume= 6,048 cf, Atten= 0%, Lag= 0.0 min

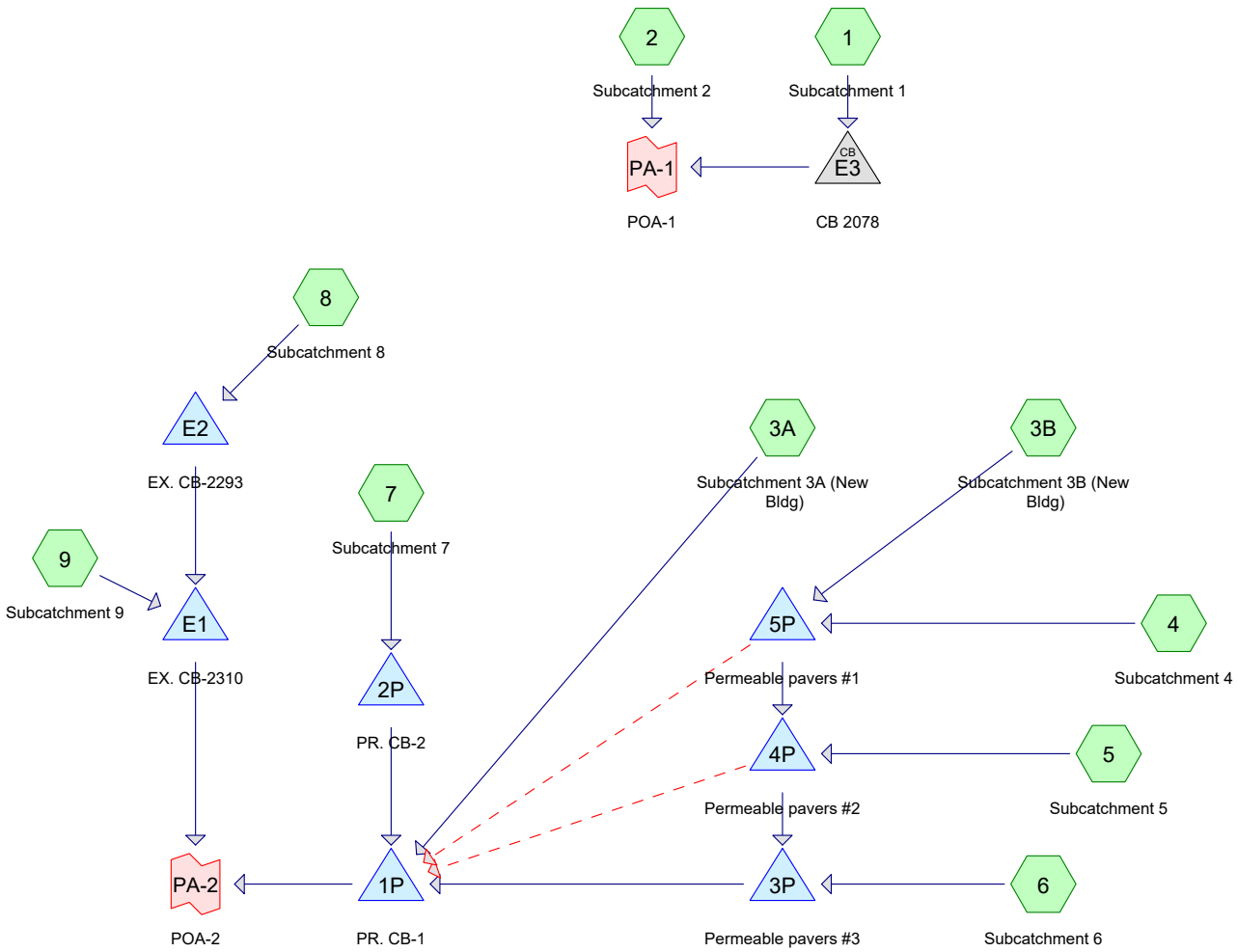
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Link PA-2: POA-2

Inflow Area = 14,180 sf, 62.17% Impervious, Inflow Depth = 4.12" for 10-yr event
Inflow = 1.40 cfs @ 12.04 hrs, Volume= 4,873 cf
Primary = 1.40 cfs @ 12.04 hrs, Volume= 4,873 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

2.2. Post-development analysis



Subcat Reach Pond Link

Routing Diagram for NM18054_POST_10
Prepared by Horizons Engineering
HydroCAD® 10.00-25 s/n 08064 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
5,386	74	>75% Grass cover, Good, HSG C (1, 2)
9,265	98	Paved parking & roofs, HSG C (1, 2)
9,372	98	Paved parking, HSG C (1, 2, 4, 5, 6, 7, 8, 9)
6,301	98	Roofs, HSG C (3A, 3B)
30,324	**94**	**TOTAL AREA**

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=13,022 sf 70.32% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=WQ Runoff=0.20 cfs 611 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,499 sf 39.14% Impervious Runoff Depth=0.32"
Tc=6.0 min CN=WQ Runoff=0.02 cfs 67 cf

Subcatchment 3A: Subcatchment 3A (New Runoff Area=2,301 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.05 cfs 152 cf

Subcatchment 3B: Subcatchment 3B (New Runoff Area=4,000 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.09 cfs 264 cf

Subcatchment 4: Subcatchment 4 Runoff Area=383 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.01 cfs 25 cf

Subcatchment 5: Subcatchment 5 Runoff Area=937 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.02 cfs 62 cf

Subcatchment 6: Subcatchment 6 Runoff Area=803 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.02 cfs 53 cf

Subcatchment 7: Subcatchment 7 Runoff Area=3,476 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.08 cfs 229 cf

Subcatchment 8: Subcatchment 8 Runoff Area=2,572 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.06 cfs 170 cf

Subcatchment 9: Subcatchment 9 Runoff Area=331 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.01 cfs 22 cf

Pond 1P: PR. CB-1 Peak Elev=47.70' Storage=9 cf Inflow=0.13 cfs 374 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.13 cfs 368 cf

Pond 2P: PR. CB-2 Peak Elev=47.76' Storage=10 cf Inflow=0.08 cfs 229 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.08 cfs 223 cf

Pond 3P: Permeable pavers #3 Peak Elev=50.12' Storage=14 cf Inflow=0.02 cfs 53 cf
Discarded=0.00 cfs 53 cf Primary=0.00 cfs 0 cf Outflow=0.00 cfs 53 cf

Pond 4P: Permeable pavers #2 Peak Elev=50.35' Storage=19 cf Inflow=0.02 cfs 62 cf
Discarded=0.00 cfs 62 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 62 cf

Pond 5P: Permeable pavers #1 Peak Elev=52.05' Storage=127 cf Inflow=0.10 cfs 289 cf
Discarded=0.01 cfs 289 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.01 cfs 289 cf

Pond E1: EX. CB-2310 Peak Elev=47.64' Storage=8 cf Inflow=0.06 cfs 185 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.06 cfs 179 cf

Pond E2: EX. CB-2293 Peak Elev=47.72' Storage=9 cf Inflow=0.06 cfs 170 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.06 cfs 163 cf

Pond E3: CB 2078 Peak Elev=50.22' Inflow=0.20 cfs 611 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=0.20 cfs 611 cf

Link PA-1: POA-1 Inflow=0.22 cfs 678 cf
Primary=0.22 cfs 678 cf

Link PA-2: POA-2 Inflow=0.19 cfs 547 cf
Primary=0.19 cfs 547 cf

Total Runoff Area = 30,324 sf Runoff Volume = 1,654 cf Average Runoff Depth = 0.65"
17.76% Pervious = 5,386 sf 82.24% Impervious = 24,938 sf

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=13,022 sf 70.32% Impervious Runoff Depth=2.48"
Tc=6.0 min CN=WQ Runoff=0.81 cfs 2,696 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,499 sf 39.14% Impervious Runoff Depth=1.87"
Tc=6.0 min CN=WQ Runoff=0.12 cfs 390 cf

Subcatchment 3A: Subcatchment 3A (New Runoff Area=2,301 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.18 cfs 588 cf

Subcatchment 3B: Subcatchment 3B (New Runoff Area=4,000 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.31 cfs 1,022 cf

Subcatchment 4: Subcatchment 4 Runoff Area=383 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.03 cfs 98 cf

Subcatchment 5: Subcatchment 5 Runoff Area=937 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.07 cfs 239 cf

Subcatchment 6: Subcatchment 6 Runoff Area=803 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.06 cfs 205 cf

Subcatchment 7: Subcatchment 7 Runoff Area=3,476 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.27 cfs 888 cf

Subcatchment 8: Subcatchment 8 Runoff Area=2,572 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.20 cfs 657 cf

Subcatchment 9: Subcatchment 9 Runoff Area=331 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.03 cfs 85 cf

Pond 1P: PR. CB-1 Peak Elev=47.91' Storage=11 cf Inflow=0.55 cfs 1,939 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.55 cfs 1,932 cf

Pond 2P: PR. CB-2 Peak Elev=47.99' Storage=12 cf Inflow=0.27 cfs 888 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.27 cfs 882 cf

Pond 3P: Permeable pavers #3 Peak Elev=50.33' Storage=62 cf Inflow=0.06 cfs 205 cf
Discarded=0.01 cfs 205 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 205 cf

Pond 4P: Permeable pavers #2 Peak Elev=51.01' Storage=138 cf Inflow=0.27 cfs 288 cf
Discarded=0.01 cfs 288 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.01 cfs 288 cf

Pond 5P: Permeable pavers #1 Peak Elev=52.52' Storage=267 cf Inflow=0.34 cfs 1,120 cf
Discarded=0.01 cfs 604 cf Primary=0.20 cfs 48 cf Secondary=0.11 cfs 468 cf Outflow=0.32 cfs 1,120 cf

Pond E1: EX. CB-2310 Peak Elev=47.76' Storage=10 cf Inflow=0.22 cfs 736 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.22 cfs 729 cf

Pond E2: EX. CB-2293 Peak Elev=47.87' Storage=11 cf Inflow=0.20 cfs 657 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.20 cfs 651 cf

Pond E3: CB 2078 Peak Elev=50.46' Inflow=0.81 cfs 2,696 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=0.81 cfs 2,696 cf

Link PA-1: POA-1 Inflow=0.93 cfs 3,086 cf
Primary=0.93 cfs 3,086 cf

Link PA-2: POA-2 Inflow=0.77 cfs 2,662 cf
Primary=0.77 cfs 2,662 cf

Total Runoff Area = 30,324 sf Runoff Volume = 6,869 cf Average Runoff Depth = 2.72"
17.76% Pervious = 5,386 sf 82.24% Impervious = 24,938 sf

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=13,022 sf 70.32% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=WQ Runoff=1.67 cfs 5,972 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,499 sf 39.14% Impervious Runoff Depth=4.67"
Tc=6.0 min CN=WQ Runoff=0.28 cfs 974 cf

Subcatchment 3A: Subcatchment 3A (New Runoff Area=2,301 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.33 cfs 1,206 cf

Subcatchment 3B: Subcatchment 3B (New Runoff Area=4,000 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.57 cfs 2,097 cf

Subcatchment 4: Subcatchment 4 Runoff Area=383 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.05 cfs 201 cf

Subcatchment 5: Subcatchment 5 Runoff Area=937 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.13 cfs 491 cf

Subcatchment 6: Subcatchment 6 Runoff Area=803 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.11 cfs 421 cf

Subcatchment 7: Subcatchment 7 Runoff Area=3,476 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.50 cfs 1,822 cf

Subcatchment 8: Subcatchment 8 Runoff Area=2,572 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.37 cfs 1,348 cf

Subcatchment 9: Subcatchment 9 Runoff Area=331 sf 100.00% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=98 Runoff=0.05 cfs 174 cf

Pond 1P: PR. CB-1 Peak Elev=48.08' Storage=14 cf Inflow=1.00 cfs 4,555 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=1.00 cfs 4,548 cf

Pond 2P: PR. CB-2 Peak Elev=48.18' Storage=15 cf Inflow=0.50 cfs 1,822 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.49 cfs 1,816 cf

Pond 3P: Permeable pavers #3 Peak Elev=50.87' Storage=235 cf Inflow=0.50 cfs 511 cf
Discarded=0.01 cfs 511 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 511 cf

Pond 4P: Permeable pavers #2 Peak Elev=51.53' Storage=278 cf Inflow=0.64 cfs 759 cf
Discarded=0.01 cfs 473 cf Primary=0.41 cfs 90 cf Secondary=0.11 cfs 196 cf Outflow=0.53 cfs 759 cf

Pond 5P: Permeable pavers #1 Peak Elev=52.53' Storage=272 cf Inflow=0.62 cfs 2,298 cf
Discarded=0.01 cfs 694 cf Primary=0.50 cfs 268 cf Secondary=0.11 cfs 1,336 cf Outflow=0.62 cfs 2,298 cf

Pond E1: EX. CB-2310 Peak Elev=47.86' Storage=11 cf Inflow=0.41 cfs 1,516 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.41 cfs 1,509 cf

Pond E2: EX. CB-2293 Peak Elev=48.00' Storage=13 cf Inflow=0.37 cfs 1,348 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.37 cfs 1,342 cf

Pond E3: CB 2078 Peak Elev=50.70' Inflow=1.67 cfs 5,972 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=1.67 cfs 5,972 cf

Link PA-1: POA-1 Inflow=1.95 cfs 6,945 cf
Primary=1.95 cfs 6,945 cf

Link PA-2: POA-2 Inflow=1.41 cfs 6,058 cf
Primary=1.41 cfs 6,058 cf

Total Runoff Area = 30,324 sf Runoff Volume = 14,706 cf Average Runoff Depth = 5.82"
17.76% Pervious = 5,386 sf 82.24% Impervious = 24,938 sf

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=13,022 sf 70.32% Impervious Runoff Depth=6.38"
Tc=6.0 min CN=WQ Runoff=1.92 cfs 6,921 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,499 sf 39.14% Impervious Runoff Depth=5.51"
Tc=6.0 min CN=WQ Runoff=0.33 cfs 1,148 cf

Subcatchment 3A: Subcatchment 3A (New Runoff Area=2,301 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.37 cfs 1,381 cf

Subcatchment 3B: Subcatchment 3B (New Runoff Area=4,000 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.65 cfs 2,400 cf

Subcatchment 4: Subcatchment 4 Runoff Area=383 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.06 cfs 230 cf

Subcatchment 5: Subcatchment 5 Runoff Area=937 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.15 cfs 562 cf

Subcatchment 6: Subcatchment 6 Runoff Area=803 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.13 cfs 482 cf

Subcatchment 7: Subcatchment 7 Runoff Area=3,476 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.56 cfs 2,086 cf

Subcatchment 8: Subcatchment 8 Runoff Area=2,572 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.42 cfs 1,543 cf

Subcatchment 9: Subcatchment 9 Runoff Area=331 sf 100.00% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=98 Runoff=0.05 cfs 199 cf

Pond 1P: PR. CB-1 Peak Elev=48.13' Storage=14 cf Inflow=1.15 cfs 5,325 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=1.15 cfs 5,318 cf

Pond 2P: PR. CB-2 Peak Elev=48.23' Storage=15 cf Inflow=0.56 cfs 2,086 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.56 cfs 2,079 cf

Pond 3P: Permeable pavers #3 Peak Elev=51.10' Storage=309 cf Inflow=0.83 cfs 657 cf
Discarded=0.01 cfs 603 cf Primary=0.04 cfs 54 cf Outflow=0.05 cfs 657 cf

Pond 4P: Permeable pavers #2 Peak Elev=51.54' Storage=281 cf Inflow=0.74 cfs 904 cf
Discarded=0.01 cfs 501 cf Primary=0.70 cfs 175 cf Secondary=0.11 cfs 228 cf Outflow=0.82 cfs 904 cf

Pond 5P: Permeable pavers #1 Peak Elev=52.53' Storage=273 cf Inflow=0.71 cfs 2,630 cf
Discarded=0.01 cfs 706 cf Primary=0.59 cfs 341 cf Secondary=0.11 cfs 1,583 cf Outflow=0.71 cfs 2,630 cf

Pond E1: EX. CB-2310 Peak Elev=47.88' Storage=11 cf Inflow=0.47 cfs 1,736 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.47 cfs 1,729 cf

Pond E2: EX. CB-2293 Peak Elev=48.03' Storage=13 cf Inflow=0.42 cfs 1,543 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.41 cfs 1,537 cf

Pond E3: CB 2078 Peak Elev=50.76' Inflow=1.92 cfs 6,921 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=1.92 cfs 6,921 cf

Link PA-1: POA-1 Inflow=2.25 cfs 8,069 cf
Primary=2.25 cfs 8,069 cf

Link PA-2: POA-2 Inflow=1.62 cfs 7,048 cf
Primary=1.62 cfs 7,048 cf

Total Runoff Area = 30,324 sf Runoff Volume = 16,951 cf Average Runoff Depth = 6.71"
17.76% Pervious = 5,386 sf 82.24% Impervious = 24,938 sf

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=13,022 sf 70.32% Impervious Runoff Depth=7.35"
Tc=6.0 min CN=WQ Runoff=2.18 cfs 7,971 cf

Subcatchment 2: Subcatchment 2 Runoff Area=2,499 sf 39.14% Impervious Runoff Depth=6.45"
Tc=6.0 min CN=WQ Runoff=0.38 cfs 1,343 cf

Subcatchment 3A: Subcatchment 3A (New Runoff Area=2,301 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.42 cfs 1,572 cf

Subcatchment 3B: Subcatchment 3B (New Runoff Area=4,000 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.73 cfs 2,733 cf

Subcatchment 4: Subcatchment 4 Runoff Area=383 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.07 cfs 262 cf

Subcatchment 5: Subcatchment 5 Runoff Area=937 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.17 cfs 640 cf

Subcatchment 6: Subcatchment 6 Runoff Area=803 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.15 cfs 549 cf

Subcatchment 7: Subcatchment 7 Runoff Area=3,476 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.63 cfs 2,375 cf

Subcatchment 8: Subcatchment 8 Runoff Area=2,572 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.47 cfs 1,758 cf

Subcatchment 9: Subcatchment 9 Runoff Area=331 sf 100.00% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=98 Runoff=0.06 cfs 226 cf

Pond 1P: PR. CB-1 Peak Elev=48.17' Storage=15 cf Inflow=1.27 cfs 6,243 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=1.27 cfs 6,237 cf

Pond 2P: PR. CB-2 Peak Elev=48.27' Storage=16 cf Inflow=0.63 cfs 2,375 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.63 cfs 2,369 cf

Pond 3P: Permeable pavers #3 Peak Elev=51.34' Storage=387 cf Inflow=0.95 cfs 822 cf
Discarded=0.01 cfs 637 cf Primary=0.11 cfs 184 cf Outflow=0.12 cfs 822 cf

Pond 4P: Permeable pavers #2 Peak Elev=51.54' Storage=282 cf Inflow=0.84 cfs 1,066 cf
Discarded=0.01 cfs 528 cf Primary=0.80 cfs 273 cf Secondary=0.11 cfs 265 cf Outflow=0.92 cfs 1,066 cf

Pond 5P: Permeable pavers #1 Peak Elev=52.54' Storage=274 cf Inflow=0.79 cfs 2,995 cf
Discarded=0.01 cfs 717 cf Primary=0.67 cfs 426 cf Secondary=0.11 cfs 1,853 cf Outflow=0.79 cfs 2,995 cf

Pond E1: EX. CB-2310 Peak Elev=47.91' Storage=11 cf Inflow=0.53 cfs 1,977 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.53 cfs 1,971 cf

Pond E2: EX. CB-2293 Peak Elev=48.06' Storage=13 cf Inflow=0.47 cfs 1,758 cf
12.0" Round Culvert n=0.025 L=22.4' S=0.0223 '/' Outflow=0.47 cfs 1,751 cf

Pond E3: CB 2078 Peak Elev=50.84' Inflow=2.18 cfs 7,971 cf
12.0" Round Culvert n=0.012 L=90.0' S=0.0100 '/' Outflow=2.18 cfs 7,971 cf

Link PA-1: POA-1 Inflow=2.57 cfs 9,314 cf
Primary=2.57 cfs 9,314 cf

Link PA-2: POA-2 Inflow=1.80 cfs 8,208 cf
Primary=1.80 cfs 8,208 cf

Total Runoff Area = 30,324 sf Runoff Volume = 19,429 cf Average Runoff Depth = 7.69"
17.76% Pervious = 5,386 sf 82.24% Impervious = 24,938 sf

Summary for Subcatchment 1: Subcatchment 1

Runoff = 1.34 cfs @ 12.04 hrs, Volume= 4,692 cf, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
21	74	>75% Grass cover, Good, HSG C
3,844	74	>75% Grass cover, Good, HSG C
560	98	Paved parking, HSG C
8,597	98	Paved parking & roofs, HSG C
13,022		Weighted Average
3,865		29.68% Pervious Area
9,157		70.32% Impervious Area

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

Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.22 cfs @ 12.04 hrs, Volume= 741 cf, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
123	74	>75% Grass cover, Good, HSG C
1,398	74	>75% Grass cover, Good, HSG C
310	98	Paved parking, HSG C
668	98	Paved parking & roofs, HSG C
2,499		Weighted Average
1,521		60.86% Pervious Area
978		39.14% Impervious Area

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

Summary for Subcatchment 3A: Subcatchment 3A (New Bldg)

Runoff = 0.27 cfs @ 12.04 hrs, Volume= 969 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
2,301	98	Roofs, HSG C
2,301		100.00% Impervious Area

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

Summary for Subcatchment 3B: Subcatchment 3B (New Bldg)

Runoff = 0.47 cfs @ 12.04 hrs, Volume= 1,684 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
4,000	98	Roofs, HSG C
4,000		100.00% Impervious Area

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

Summary for Subcatchment 4: Subcatchment 4

Runoff = 0.04 cfs @ 12.04 hrs, Volume= 161 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
383	98	Paved parking, HSG C
383		100.00% Impervious Area

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

Summary for Subcatchment 5: Subcatchment 5

Runoff = 0.11 cfs @ 12.04 hrs, Volume= 395 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
937	98	Paved parking, HSG C
937		100.00% Impervious Area

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

Summary for Subcatchment 6: Subcatchment 6

Runoff = 0.09 cfs @ 12.04 hrs, Volume= 338 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
803	98	Paved parking, HSG C
803		100.00% Impervious Area

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

Summary for Subcatchment 7: Subcatchment 7

Runoff = 0.41 cfs @ 12.04 hrs, Volume= 1,464 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
3,476	98	Paved parking, HSG C
3,476		100.00% Impervious Area

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

Summary for Subcatchment 8: Subcatchment 8

Runoff = 0.30 cfs @ 12.04 hrs, Volume= 1,083 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
2,572	98	Paved parking, HSG C
2,572		100.00% Impervious Area

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

Summary for Subcatchment 9: Subcatchment 9

Runoff = 0.04 cfs @ 12.04 hrs, Volume= 139 cf, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
NH-Durham(NOAA) 24-hr S1 10-yr Rainfall=5.29"

Area (sf)	CN	Description
331	98	Paved parking, HSG C
331		100.00% Impervious Area

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

Summary for Pond 1P: PR. CB-1

Inflow Area = 11,900 sf,100.00% Impervious, Inflow Depth = 3.59" for 10-yr event
Inflow = 0.79 cfs @ 12.04 hrs, Volume= 3,563 cf
Outflow = 0.79 cfs @ 12.04 hrs, Volume= 3,556 cf, Atten= 0%, Lag= 0.1 min
Primary = 0.79 cfs @ 12.04 hrs, Volume= 3,556 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 48.01' @ 12.04 hrs Surf.Area= 13 sf Storage= 13 cf

Plug-Flow detention time= 3.1 min calculated for 3,556 cf (100% of inflow)
Center-of-Mass det. time= 1.7 min (764.8 - 763.1)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	54 cf	**4.00'D x 4.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**12.0" Round 12" CMP** L= 22.4' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 47.50' / 47.00' S= 0.0223 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.79 cfs @ 12.04 hrs HW=48.01' TW=0.00' (Dynamic Tailwater)
↑**1=12" CMP** (Barrel Controls 0.79 cfs @ 2.88 fps)

Summary for Pond 2P: PR. CB-2

Inflow Area = 3,476 sf,100.00% Impervious, Inflow Depth = 5.05" for 10-yr event
Inflow = 0.41 cfs @ 12.04 hrs, Volume= 1,464 cf
Outflow = 0.41 cfs @ 12.04 hrs, Volume= 1,457 cf, Atten= 0%, Lag= 0.1 min
Primary = 0.41 cfs @ 12.04 hrs, Volume= 1,457 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 48.10' @ 12.04 hrs Surf.Area= 13 sf Storage= 14 cf

Plug-Flow detention time= 7.7 min calculated for 1,457 cf (100% of inflow)
Center-of-Mass det. time= 4.5 min (753.5 - 749.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	54 cf	**4.00'D x 4.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**12.0" Round 12" CMP** L= 22.4' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 47.50' / 47.00' S= 0.0223 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.04 hrs HW=48.10' TW=48.01' (Dynamic Tailwater)
↑└**1=12" CMP** (Outlet Controls 0.41 cfs @ 1.18 fps)

Summary for Pond 3P: Permeable pavers #3

Applied discharge multiplier of 0,8 to account for horizontal infiltration area loss due to geomembrane. Some infiltration under geomembrane that may occur due to geotextile underlaying, which will allow some in-plane water movement below the membrane. Ignoring this addiitonal infiltration was ignored to be conservative as geotextile will not be selected for in-plane transmissivity.

Inflow Area = 6,123 sf,100.00% Impervious, Inflow Depth = 0.66" for 10-yr event
Inflow = 0.09 cfs @ 12.04 hrs, Volume= 338 cf
Outflow = 0.01 cfs @ 12.00 hrs, Volume= 338 cf, Atten= 92%, Lag= 0.0 min
Discarded = 0.01 cfs @ 12.00 hrs, Volume= 338 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 50.48' @ 13.03 hrs Surf.Area= 803 sf Storage= 110 cf

Plug-Flow detention time= 134.6 min calculated for 338 cf (100% of inflow)
Center-of-Mass det. time= 134.6 min (883.6 - 749.0)

Volume	Invert	Avail.Storage	Storage Description
#1	49.80'	481 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 1,202 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
49.80	0	0.0	0	0	0
50.30	803	103.0	134	134	845
51.30	803	103.0	803	937	948
51.63	803	103.0	265	1,202	982

Device	Routing	Invert	Outlet Devices	
#1	Discarded	49.80'	**0.500 in/hr Exfiltration X 0.80 over Horizontal area**	Phase-In= 0.01'
#2	Primary	51.05'	**0.2" Horiz. Orifice/Grate X 200.00** C= 0.600 Limited to weir flow at low heads	

Discarded OutFlow Max=0.01 cfs @ 12.00 hrs HW=50.31' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=49.80' TW=47.00' (Dynamic Tailwater)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 4P: Permeable pavers #2

Applied discharge multiplier of 0,8 to account for horizontal infiltration area loss due to geomembrane. Some infiltration under geomembrane that may occur due to geotextile underlaying, which will allow some in-plane water movement below the membrane. Ignoring this addiitonal infiltration was ignored to be conservative as geotextile will not be selected for in-plane transmissivity.

Storage area is assuming all area are sloped at 5% (1V:20H). Membrane will allow ponding of 1,0 ft in the reservoir layer.

Inflow Area =	5,320 sf,100.00% Impervious,		Inflow Depth =	1.29"	for 10-yr event
Inflow =	0.50 cfs @	12.04 hrs, Volume=	570 cf		
Outflow =	0.11 cfs @	12.18 hrs, Volume=	570 cf,	Atten= 79%,	Lag= 8.7 min
Discarded =	0.01 cfs @	12.18 hrs, Volume=	431 cf		
Primary =	0.00 cfs @	0.00 hrs, Volume=	0 cf		
Secondary =	0.10 cfs @	12.18 hrs, Volume=	139 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 51.47' @ 12.18 hrs Surf.Area= 761 sf Storage= 262 cf

Plug-Flow detention time= 261.0 min calculated for 570 cf (100% of inflow)
Center-of-Mass det. time= 261.0 min (1,002.5 - 741.5)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	251 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 626 cf Overall x 40.0% Voids
#2	50.00'	121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 302 cf Overall x 40.0% Voids
		371 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	0	0	0
51.50	580	435	435
51.83	580	191	626

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	0	0	0
50.50	191	48	48
51.50	191	191	239
51.83	191	63	302

Device	Routing	Invert	Outlet Devices
#1	Discarded	50.00'	**0.500 in/hr Exfiltration X 0.80 over Horizontal area** Phase-In= 0.01'
#2	Secondary	51.25'	**0.2" Horiz. 4" CPP underdrain X 200.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	51.50'	**29.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 12.18 hrs HW=51.47' (Free Discharge)
↑└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=50.00' TW=49.80' (Dynamic Tailwater)
↑└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.10 cfs @ 12.18 hrs HW=51.47' TW=47.87' (Dynamic Tailwater)
↑└**2=4" CPP underdrain** (Orifice Controls 0.10 cfs @ 2.28 fps)

Summary for Pond 5P: Permeable pavers #1

Applied discharge multiplier of 0,8 to account for horizontal infiltration area loss due to geomembrane. Some infiltration under geomembrane that may occur due to geotextile underlaying, which will allow some in-plane water movement below the membrane. Ignoring this addiitonal infiltration was ignored to be conservative as geotextile will not be selected for in-plane transmissivity.

Storage area is assuming all area are sloped at 5% (1V:20H). Membrane will allow ponding of 1,0 ft in the reservoir layer.

Inflow Area = 4,383 sf,100.00% Impervious, Inflow Depth = 5.05" for 10-yr event
Inflow = 0.51 cfs @ 12.04 hrs, Volume= 1,846 cf
Outflow = 0.51 cfs @ 12.04 hrs, Volume= 1,846 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.01 cfs @ 12.00 hrs, Volume= 673 cf
Primary = 0.39 cfs @ 12.04 hrs, Volume= 175 cf
Secondary = 0.11 cfs @ 12.04 hrs, Volume= 997 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 52.53' @ 12.04 hrs Surf.Area= 870 sf Storage= 270 cf

Plug-Flow detention time= 142.8 min calculated for 1,845 cf (100% of inflow)
Center-of-Mass det. time= 142.9 min (891.9 - 749.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	376 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 940 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
51.00	0	0	0
52.50	870	653	653
52.83	870	287	940

Device	Routing	Invert	Outlet Devices
#1	Discarded	51.00'	**0.500 in/hr Exfiltration X 0.80 over Horizontal area** Phase-In= 0.01'
#2	Secondary	52.25'	**0.2" Horiz. 4" CPP underdrain X 200.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	52.50'	**29.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 12.00 hrs HW=52.52' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.39 cfs @ 12.04 hrs HW=52.53' TW=51.08' (Dynamic Tailwater)
3=Sharp-Crested Rectangular Weir (Weir Controls 0.39 cfs @ 0.53 fps)

Secondary OutFlow Max=0.11 cfs @ 12.04 hrs HW=52.53' TW=48.01' (Dynamic Tailwater)
2=4" CPP underdrain (Orifice Controls 0.11 cfs @ 2.53 fps)

Summary for Pond E1: EX. CB-2310

Inflow Area = 2,903 sf,100.00% Impervious, Inflow Depth = 5.03" for 10-yr event
Inflow = 0.34 cfs @ 12.04 hrs, Volume= 1,216 cf
Outflow = 0.34 cfs @ 12.04 hrs, Volume= 1,210 cf, Atten= 0%, Lag= 0.1 min
Primary = 0.34 cfs @ 12.04 hrs, Volume= 1,210 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 47.82' @ 12.04 hrs Surf.Area= 13 sf Storage= 10 cf

Plug-Flow detention time= 8.0 min calculated for 1,210 cf (99% of inflow)
Center-of-Mass det. time= 4.3 min (758.3 - 754.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	54 cf	**4.00'D x 4.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**12.0" Round 12" CMP** L= 22.4' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 47.50' / 47.00' S= 0.0223 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.04 hrs HW=47.82' TW=0.00' (Dynamic Tailwater)
1=12" CMP (Barrel Controls 0.34 cfs @ 2.31 fps)

Summary for Pond E2: EX. CB-2293

Inflow Area = 2,572 sf,100.00% Impervious, Inflow Depth = 5.05" for 10-yr event
Inflow = 0.30 cfs @ 12.04 hrs, Volume= 1,083 cf
Outflow = 0.30 cfs @ 12.04 hrs, Volume= 1,077 cf, Atten= 0%, Lag= 0.1 min
Primary = 0.30 cfs @ 12.04 hrs, Volume= 1,077 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 47.96' @ 12.04 hrs Surf.Area= 13 sf Storage= 12 cf

Plug-Flow detention time= 9.8 min calculated for 1,077 cf (99% of inflow)
Center-of-Mass det. time= 5.7 min (754.7 - 749.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	54 cf	**4.00'D x 4.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**12.0" Round 12" CMP** L= 22.4' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 47.50' / 47.00' S= 0.0223 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.04 hrs HW=47.95' TW=47.82' (Dynamic Tailwater)
↑└**1=12" CMP** (Outlet Controls 0.30 cfs @ 1.27 fps)

Summary for Pond E3: CB 2078

[57] Hint: Peaked at 50.61' (Flood elevation advised)

Inflow Area = 13,022 sf, 70.32% Impervious, Inflow Depth = 4.32" for 10-yr event
Inflow = 1.34 cfs @ 12.04 hrs, Volume= 4,692 cf
Outflow = 1.34 cfs @ 12.04 hrs, Volume= 4,692 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.34 cfs @ 12.04 hrs, Volume= 4,692 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 50.61' @ 12.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**12.0" Round Outlet** L= 90.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.00' / 49.10' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=1.33 cfs @ 12.04 hrs HW=50.61' TW=0.00' (Dynamic Tailwater)
↑└**1=Outlet** (Inlet Controls 1.33 cfs @ 2.66 fps)

Summary for Link PA-1: POA-1

Inflow Area = 15,521 sf, 65.30% Impervious, Inflow Depth = 4.20" for 10-yr event
Inflow = 1.56 cfs @ 12.04 hrs, Volume= 5,433 cf
Primary = 1.56 cfs @ 12.04 hrs, Volume= 5,433 cf, Atten= 0%, Lag= 0.0 min

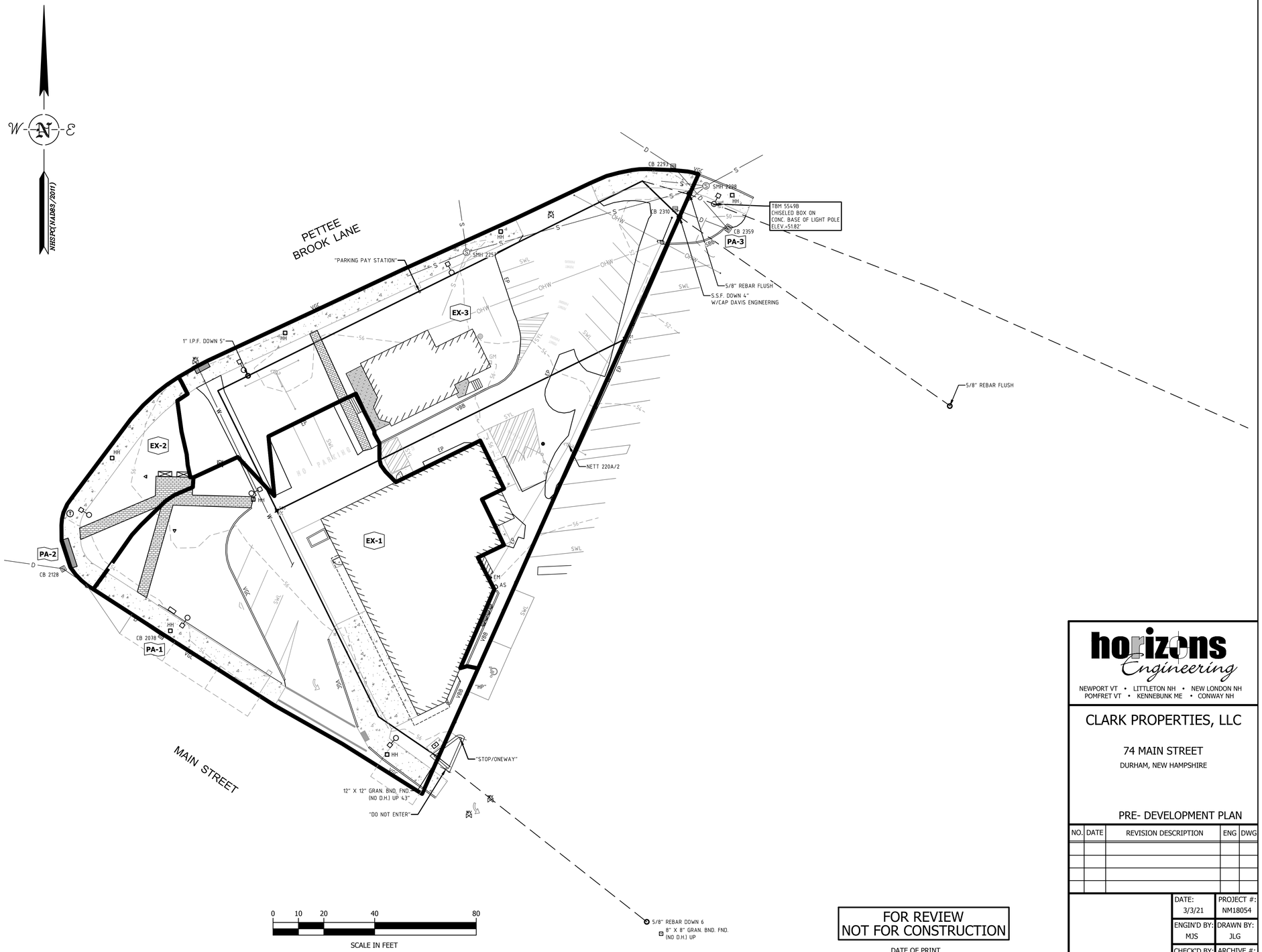
Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link PA-2: POA-2

Inflow Area = 14,803 sf,100.00% Impervious, Inflow Depth = 3.86" for 10-yr event
Inflow = 1.13 cfs @ 12.04 hrs, Volume= 4,766 cf
Primary = 1.13 cfs @ 12.04 hrs, Volume= 4,766 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

3. PLANS



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CLARK PROPERTIES, LLC

74 MAIN STREET
DURHAM, NEW HAMPSHIRE

PRE- DEVELOPMENT PLAN

NO.	DATE	REVISION DESCRIPTION	ENG	DWG

DATE: 3/3/21	PROJECT #: NM18054
ENGIN'D BY: MJS	DRAWN BY: JLG
CHECK'D BY: MJS	ARCHIVE #: H-___

PRE

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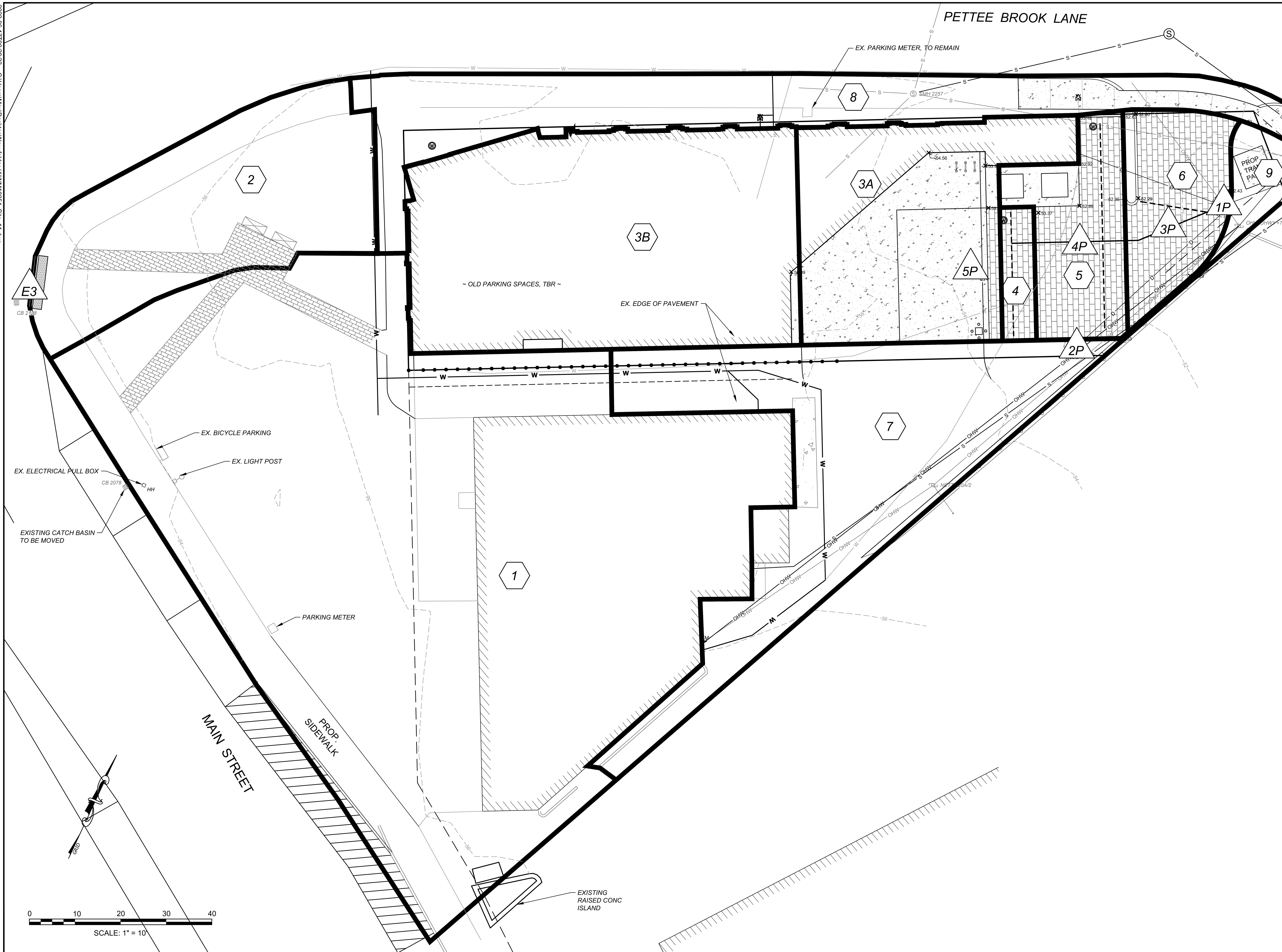

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POST-DEVELOPMENT
STORMWATER MGMT PLAN

PREPARED FOR

CLARK PROPERTIES LLC
74 MAIN STREET
TAX MAP 106, LOT 59
DURHAM, NEW HAMPSHIRE

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
00	2022-06-17	INITIAL SUBMISSION	MCS	MCS

DATE: 2022-06-17	PROJECT #: NM18054
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