Proposed Racquet Facility
Wellesley Country Club
300 Wellesley Avenue Wellesley, MA 02481

Issued for:

- Project of Significant Impact Review

WELLESLEY COUNTRY CLUB

1910

Applicant/Owner:
Wellesley Country Club
300 Wellesley Avenue
Wellesley, MA 02481

Prepared by:

ALLEN & MAJOR ASSOCIATES, INC.
10 Main Street
Lakeville, MA 02347

Tel: (508) 923-1010
Fax: (508) 923-6309

A&M PROJECT #2749-01
April 28, 2020

PROJECT TEAM

APPLICANT
Wellesley Country Club
300 Wellesley Avenue
Wellesley, MA 02481
Contact: Marty Ryan, General Manager
Contact: Ruth Mallett
Tel: 781-541-5822
E-mail: marty@wellesleycc.com
E-mail: ruthmallett@gmail.com

ATTORNEY
Wilder, Shea & Himmelberger, LLP
One Hollis Street, Suite 400
Wellesley, MA 02482
Contact: David J Himmelberger, Esq.
Tel: 781-237-8180
E-mail: david@wshlawoffice.com

CIVIL ENGINEER
Allen & Major Associates, Inc.
10 Main Street
Lakeville, MA 02347
Contact: Phil Cordeiro, PE
Contact: Paul G. Matos, PE, PLS
Tel: 508-923-1010
E-mail: pcordeiro@allenmajor.com
E-mail: pmatos@allenmajor.com

LAND SURVEYOR
Allen & Major Associates, Inc.
100 Commerce Way
Woburn, MA 01801
Contact: Norman Lipsitz, PLS
Tel: 781-305-9416
E-mail: nlipsitz@allenmajor.com

ARCHITECT
Olson Lewis + Architects
17 Elm Street
Manchester, MA 01944
Contact: Steve Scapicchio, AIA, LEED AP BD+C
Tel: 978-704-6263
E-mail: scapicchio@olsonlewis.com

CONSTRUCTION MANAGER
Stanmar, Inc.
321 Commonwealth Road, Suite 201
Wayland, MA 01778
Contact: Jerry Burke, LEED AP BD+C
Tel: 508-310-7827
E-mail: jburke@stanmar-inc.com

TRAFFIC ENGINEER
Ron Muller & Associates
56 Teresa Road
Hopkinton, MA 01748
Contact: Kirsten Braun, PE
Tel: 508-395-1576
E-mail:

ELECTRICAL ENGINEER
Electrical Systems Engineering, Inc.
22 Manchester Road, Suite 8-A
Derry, NH 03038
Contact: Robert Greene, Principal
Tel: 603-870-9009
E-mail: rgreene@ebsnh.net

The information presented herein this report has been a collaborative effort from the various members/personnel of the Project Team.

TABLE OF CONTENTS

1.0 – Project Summary 1
2.0 – Existing Conditions 1
2.1 – Site Location & Description 1
2.2 – Existing Stormwater Patterns 2
3.0 – Proposed Conditions 3
3.1 – Proposed Overview 3
3.2 – Proposed Stormwater Patterns 3
3.2.1 – Methodology 4
3.2.2 – Erosion and Sediment Control 5
4.0 – Stormwater Management 5
Standard 1 5
Standard 2 5
Standard 3 6
Standard 4 7
Standard 5 7
Standard 6 7
Standard 7 8
Standard 8 8
Standard 9 8
Standard 10 8
5.0 – Stormwater Management System Maintenance 9
6.0 – Long-Term Pollution Prevention 14
7.0 – Water System Impact Analysis 20
8.0 – Sewer System Impact Analysis 20
9.0 – Electrical System Impact Analysis 20
10.0 – Gas System Impact Analysis 20
11.0 – Traffic Impact and Access Analysis 20
12.0 – Refuse Disposal Analysis 21
13.0 – Fire Protection and Life Safety Analysis 21
14.0 – Pedestrian and Bicycle Safety 21
15.0 – Conclusion 21

Appendix A A-1
Hydro-CAD Pre-Development Drainage Analysis A-1
Appendix B B-1
Hydro-CAD Post-Development Drainage Analysis B-1
Appendix C C-1
Stormwater Checklist C-2
TSS Calculation Worksheet C-3
Illicit Discharge Statement C-4
Appendix D D-1
Water & Sewer Analysis by Stanmar, Inc. D-2
Fire Protection/Suppression/Alarm by Stanmar, Inc. D-3
Electrical Analysis by Stanmar, Inc. D-4
Gas Analysis by Stanmar, Inc. D-5
Traffic Analysis by Ron Muller & Associates D-6
Appendix E E-1
EWS-1 Existing Watershed Plan E-1
PWS-1 Proposed Watershed Plan E-1

1.0 – PROJECT SUMMARY

The applicant, Wellesley Country Club is proposing to upgrade the existing tennis building with a new racquet facility located at 300 Wellesley Avenue in the Town of Wellesley, Massachusetts. The project will consist of a complete demolition of the existing tennis building, a portion of the existing outdoor tennis court and some supporting site features and infrastructure. The construction will include a new racquet facility with amenities as well as the required infrastructure to support the development. Amenities will include men and women locker rooms, a family bathroom, tennis viewing lounge, tennis pro-shop, staff offices, golf simulator bays and a golf simulator lounge. The building will be utilized by members only and will not be open to the general public. The club's charter membership will not be increased in conjunction with the new racquet facility.

The purpose of this project narrative and stormwater report is to provide a detailed review of the locus, potential project impacts and stormwater as it pertains to the existing and proposed redevelopment. The report will show by means of narrative, calculations and exhibits that appropriate best management practices have been used to mitigate the impacts from the proposed redevelopment. The report will demonstrate that the proposed site development reduces the peak stormwater discharge rates and the overall site runoff volume during all storm events prior to discharging into the existing drainage system. Further, the report will show that the proposed stormwater management system complies with the ten stormwater standards as presented in the Massachusetts Department of Environmental Protection (MA DEP) Stormwater Management Regulations and MA MS4 General Permit regulations.

2.0 – EXISTING CONDITIONS

2.1 – SITE LOCATION & DESCRIPTION

The project site is located at 300 Wellesley Avenue in Wellesley, MA. The course is bisected by Wellesley Avenue and is bounded to the south by the Wellesley/Needham Town line, Brookside Road to the east, Forest Street to the west, and residential properties to the north. The Town of Wellesley identifies the locus on Assessor Map 40 Lot 1 and Map 32 Lot 2A. The Town of Needham identifies a portion of the locus as Parcel ID 199/113.0-0029-0000.0. The primary area of existing development is the clubhouse building surrounded by amenities including tennis courts and a swimming pool. Clubhouse parking, both vehicle and golf cart is located directly in front of the main building with access to Wellesley Avenue. The site has three access points along Wellesley Avenue. Two are for club patrons while the third is used as a golf cart crossing to access fairways five through nine on the course. An existing maintenance and storage building is located to the west of the main clubhouse. Additional amenities are located on the south side of Wellesley Avenue containing paddle ball courts and club storage facilities. The site is bisected by two administrative boundaries. On the southern portion of the site, below fairway eight is the town line separating the Town of Wellesley from the Town of Needham. The Sudbury transmission Aqueduct runs north to south across the site. The aqueduct is owned and operated by the Massachusetts Water Resources Authority (MWRA). Portions of the Sudbury Trails walking paths traverse the property in parallel with Wellesley Avenue.

The existing tennis courts are located to the west of the existing clubhouse and north of the existing pool house, see figure 1 below. There are currently ten (10) tennis courts of which eight (8) are located outside and two (2) are located inside the existing building, which is approximately 16,180 sf in size.

Figure 1 - Google Earth 2019

The underlying soils have been mapped by the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) and consist of the following:

- 253D Hinckley sandy loam — Hydrologic Soil Group "A"
- 245B Hinckley sandy loam — Hydrologic Soil Group "A"
- 245C Hinckley sandy loam — Hydrologic Soil Group "A"
- 626B Merrimac-Urban land — Hydrologic Soil Group "A"

2.2 – Existing Stormwater Patterns

The Wellesley Country Club has gone through several stormwater analyses on past projects, the current analysis/watershed areas have been concentrated in the vicinity of the tennis courts. In order to compare the difference between pre- and post-development peak flows and run-off volumes, existing and proposed watersheds were developed. The design points for existing watersheds were picked based on the extent of the development and topographic features. The selected design points will be utilized to ensure proper analysis from pre and post-development conditions in accordance with the Massachusetts Stormwater Handbook. The site topography is very well defined for this area. A total of two (2) watersheds have been defined and are as follows:

- Watershed E-1 is located on the south side and is 0.528 acres in size. Watershed E-1 is associated with the south portion of the existing tennis building roof area and portions of the existing parking area and landscape areas. Stormwater currently drains by overland flow to several on-site catch basins in the parking lot and eventually drains to the existing drainage system;
- Watershed E-2 is located on the north side and is 0.828 acres in size. Watershed E-2 is associated with the north portion of the existing tennis building roof area and portions of the existing outdoor tennis courts and landscape areas. Stormwater currently drains by overland flow onto the fairways.

See the rear of this report for a copy of the Existing Watershed Plan (EWS-1).

3.0 – PROPOSED CONDITIONS

3.1 – PROPOSED OVERVIEW

The applicant, Wellesley Country Club is proposing to upgrade the existing indoor tennis facility by expanding the number of indoor courts and provide additional amenities. The new racquet facility will be generally aligned with the existing easterly and southerly wall of the existing building. The new facility footprint will be approximately 35,000 sf in size and will extend westerly into the existing outdoor courts and slightly northerly. Once the construction is completed the new racquet facility will have a total of ten (10) tennis courts of which six (6) will be located outside and four (4) will be located within the building. Inside the building will also include new men and women locker rooms, a family bathroom, tennis viewing lounge, tennis pro-shop, staff offices, two (2) golf simulator bays and a golf simulator lounge.

Since the facility will be used by the existing members and not open to the public, parking and access will not be affected by the proposed racquet facility. Two (2) new ADA accessible parking stalls will be located near the entrance. To accommodate the new ADA accessible parking spaces near the entrance, two (2) parking stalls have to be relocated in the parking lot and are shown on the site plans. Two existing parking stalls displaced by construction of the facility will be replaced within the main parking field ensuring no loss in parking spaces for the site. All points of the site have been designed in compliance with ADA grading tolerances. Other site improvements include landscape areas, underground utilities, municipal water and sewer and a new stormwater management systems. The proposed stormwater management plan calls for the direct recharge of clean roof runoff into one of two (2) subsurface infiltration systems. The subsurface infiltration systems will consist of Stormtech SC-740 chambers. The north system has been designed for 100% infiltration and the southerly system has been designed to infiltrate the first flush and then overflow into the existing drainage system via an outlet control structure. The outlet control structure has been designed to match pre-development conditions and/or reduce the peak discharge rates and runoff volumes. The combination of these BMP's will remove greater than 80% of Total Suspended Solids, from the anticipated stormwater runoff.

3.2 – PROPOSED STORMWATER PATTERNS

The drainage patterns under proposed conditions will maintain the same design points and designations under existing conditions. Some of the existing watershed areas have been modified due to grading of the proposed development. The study concluded that the proposed rates of runoff and runoff volumes at the property line is less than the existing conditions analysis. A total of four (4) watersheds have been defined for the site and are as follows:

- Watershed P-1A is located on the southerly side and is 0.184 acres in size. The area will consist mostly of landscape areas, parking/sidewalk areas that currently drain by overland flow into the existing drainage system;
- Watershed P-1B is approximately 0.429 acres in size and is associated with the southerly portion of the new roof of the racquet facility. Stormwater will be collected by gutters and downspouts into the subsurface infiltration system 1 located in the parking lot. An outlet control structure will allow treated stormwater to overflow into the existing drainage system;
- Water P-2A is located on the northerly side and is 0.320 acres in size. The area will consist mostly of landscape areas, sidewalk, patio areas that currently drain by overland flow onto the

fairways;

- Watershed P-2B is approximately 0.422 acres in size and is associated with the northerly portion of the new roof of the racquet facility. Stormwater will be collected by gutters and downspouts into the subsurface infiltration system 2 located on the northerly side of the building. This system will infiltrate all storm events up to and including the 100-year event.

See the rear of this report for a copy of the Proposed Watershed Plan (PWS-1).

The following tables show comparison of the existing vs proposed peak flow rate of runoff and runoff volume at the three (3) design points.

Table 3.2.A – Design Point 1 Existing vs Proposed peak rate of runoff to Existing Drainage System

Design Storm	Existing (cfs)	Proposed (cfs)	Difference (cfs)
2-year	0.39	0.10	-0.29 (74.3%)
10-year	1.00	0.41	-0.59 (59.0%)
25-year	1.40	0.93	-0.47 (33.5%)
100-year	1.97	1.88	-0.09 (4.5%)

Table 3.2.B – Design Point 1 Existing vs Proposed runoff volume to Existing Drainage System

Design Storm	Existing (ac-ft)	Proposed (ac-ft)	Difference (ac-ft)
2-year	0.032	0.009	-0.023 (71.8%)
10-year	0.074	0.031	-0.043 (58.1%)
25-year	0.101	0.053	-0.048 (47.5%)
100-year	0.140	0.086	-0.054 (38.5%)

Table 3.2.C – Design Point 2 Existing vs Proposed peak rate of runoff to the fairway

Design Storm	Existing (cfs)	Proposed (cfs)	Difference (cfs)
2-year	0.56	0.05	-0.51 (91.0%)
10-year	1.49	0.30	-1.19 (79.8%)
25-year	2.10	0.48	-1.62 (77.1%)
100-year	2.99	0.76	-2.23 (74.5%)

Table 3.2.D – Design Point 2 Existing vs Proposed runoff volume to the fairway

Design Storm	Existing (ac-ft)	Proposed (ac-ft)	Difference (ac-ft)
2-year	0.047	0.008	-0.039 (82.9%)
10-year	0.111	0.026	-0.085 (76.5%)
25-year	0.152	0.038	-0.114 (75.0%)
100-year	0.213	0.057	-0.156 (73.2%)

3.2.1 – METHODOLOGY

The peak rate of runoff was determined using techniques and data found in the following:

1. Urban Hydrology for Small Watersheds – Technical Release 55 by the United States Department of Agriculture Soils Conservation Service, June 1986. Runoff curve numbers and 24-hour precipitation values were obtained from this reference.

2. HydroCAD© Stormwater Modeling System by HydroCAD Software Solutions LLC, version 10.18. The HydroCAD program was used to generate the runoff hydrographs for the watershed

areas, to determine discharge/stage/storage characteristics for the infiltration systems, to perform drainage routing and to combine the results of the runoff hydrographs.

3. Soil Survey of Norfolk County, Massachusetts by United States Department of Agriculture, National Resource Conservation Service. Soil types and boundaries were obtained from this reference.

4. Rainfall Data for each of the storm events was based on the data from the National Weather Service Technical Paper 40 (TP-40) 24-hour rainfall maps as published in the TR-55 book. The total rainfall for each event is shown in the following table:

Table 3.2.1 – Rainfall (TP-40)

2-year	10-year	25-year	100-year
3.10 inches	4.60 inches	5.45 inches	6.60 inches

3.2.2 – Erosion and Sediment Control

The site will be enclosed with a straw wattle and/or fiber roll barrier to prevent incidental conveyance of sediment from disturbed areas off-site or into the existing drainage system during construction. All existing drainage inlets adjacent to the site that are to remain shall have silt sacks installed prior to any construction activities. Stabilized construction entrances shall be installed as part of the construction and will be maintained until site tracking potential has been eliminated. The erosion control measures will remain in place until all construction activities are complete and all disturbed areas have been stabilized. The contractor will be required to inspect all controls regularly to ensure that they are working properly and to see if they need to be cleaned and/or replaced on an as-needed basis. The proposed project will disturb greater than one (1) acre of land, therefore the project will require the filing of a National Pollutant Discharge Elimination System (NPDES) Stormwater Construction General Permit. A stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to any construction activity. The SWPPP will prescribe in detail the performance standards to which the contractor for the project will be responsible for. The SWPPP will be maintained at the construction trailer on-site throughout the duration of the project. The SWPPP shall outline acceptable temporary stabilization measures to prevent incidental transport of sediment to off-site areas.

4.0 – Stormwater Management

Standard 1

No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The proposed project is proposing two (2) subsurface infiltration systems, one with an outlet control structure and another system with 100% infiltration. All stormwater discharges will be treated prior to discharging into the existing drainage system.

Standard 2

Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

Calculations have been provided to show that the proposed development will not cause an increase in peak discharge rates. Refer to the HydroCAD calculations provided within Appendix A and Appendix B of this report for detailed breakdowns.

STANDARD 3

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The USDA Soil Survey of Norfolk County was used to determine soil types on site.

The required recharge rates for each soil classification are as follows:

Table 4.1 – Recharge Volume per Hydrologic Soil Group (HSG)

	HSG A	HSG B	HSG C	HSG D
Required Recharge	0.60 inches	0.35 inches	0.25 inches	0.10 inches

Table 4.2 – Proposed Impervious Surface

Site	Total Area	HSG A	HSG B	HSG C	HSG D
Building Roof	37,106 sf	37,106 sf	-	-	-
Total Impervious Area	37,106 sf	37,106 sf	-	-	-

Under proposed conditions, the project will have 37,106 sf of new roof area which will be directed into a subsurface infiltration system. The required recharge volume is given by the following equation

R_v = F x IA (Equation 1 Stormwater Handbook Volume 3)

where R_v = Required Recharge Volume, ft^3
F = Target Depth factor
IA = Impervious drainage area
R_v = F x IA
= (0.6 inches)(1foot/12 inches)(37,106 sf)
=1,855 cubic feet

The volume within the subsurface infiltration system, below the lowest orifice in the outlet control structure is approximately 5,837 cubic feet which exceeds the required volume of 1,855 cubic feet.

MA MS4 General Permit requires the project to retain and infiltrate the volume of one (1) inch over the post-developed impervious surface, therefore the required V= (1")(1'/12")(37,106 sf) = 3,092 cf.

The volume within the subsurface infiltration system, below the lowest orifice in the outlet control structure is approximately 5,837 cubic feet which exceeds the required volume of 3,092 cubic feet.

The basin drawdown time is defined as:

$Time_{drawdown} = R_v$ / (K)(bottom area)

where R_v = Required Recharge Volume, ft3
K = Saturated Hydraulic Conductivity (from Rawls Table)
Bottom area = Bottom area of recharge structure

Table 4.3 – Drawdown Calculation

System	R_v	K	Bottom Area	$Time_{drawdown}$
System 1	936 cf	8.27 in/hr	1,224 sf	1.1 hrs
System 2	919 cf	8.27 in/hr	2,063 sf	0.6 hrs

STANDARD 4

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. *Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;*
b. *Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook and*
c. *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook*

The proposed project is infiltrating clean roof runoff into two (2) subsurface infiltration systems. No new impervious surfaces are being proposed, except for pedestrian access paths which are not anticipated to generate Total Suspended Solids.

STANDARD 5

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

The proposed project is not a Land Use with Higher Potential Pollutant Loads and therefore Standard 5 does not apply.

STANDARD 6

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices

determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

The project site does not discharge to or near a critical area therefore Standard 6 does not apply.

STANDARD 7

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

The proposed project is considered a mix of new development and redevelopment. The project is required to meet the Stormwater Standards to the maximum extent practicable while also improving over existing conditions. Since the proposed project has a net increase of impervious surface (roof) the proposed stormwater management system has been designed to meet the Stormwater Standards in their entirety.

STANDARD 8

A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

An Erosion Control plan has been incorporated with the design plans. Also, the project requires a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will be prepared and submitted prior to construction. The SWPPP shall also be kept on file as required under the NPDES Construction General Permit program.

STANDARD 9

A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

An operations and maintenance (O&M) plan has been included in this report that outlines the general maintenance for the stormwater systems during and after construction.

STANDARD 10

All illicit discharges to the stormwater management system are prohibited.

No illicit discharges exist on site. The storm water management system proposed shall not be connected to the wastewater management system and shall not be contaminated by contact with

process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease per Massachusetts DEP Storm Water Standard 10. A signed statement shall be provided by the owner in concurrence with issuance of the final site plan.

5.0 – STORMWATER MANAGEMENT SYSTEM MAINTENANCE

In accordance with the standards set forth by the Stormwater Management Policy issued by the Massachusetts Department of Environmental Protection (MassDEP), Allen & Major Associates, Inc. (A&M) has prepared the following Operation and Maintenance plan for the proposed stormwater management system for the proposed project.

This plan focuses on post construction maintenance of the on-site drainage system. Operation and Maintenance (O&M) practices discussed below are recommendations made by the Design Engineer based on available reference material on Best Management Practices (BMP's) and experience. The property owner is responsible for implementation of the plan, and is encouraged to revise / supplement this plan accordingly based on actual site conditions.

This plan is broken into two (2) major sections. The first section describes construction-related erosion and sedimentation controls. The second section is devoted to a post-development operation and maintenance plan.

Basic Information

Proponent:	Wellesley Country Club
Property Address:	300 Wellesley Avenue
City:	Wellesley, MA 02481

Section 1 Construction Activities

1. Schedule a meeting with the various Town Departments, Design Engineer and Owner at least three (3) days prior to start of construction.
2. Install the wattles, silt fence, construction fencing and silt sacks in the catch basins as shown on the Erosion and Sediment Control Plan.
3. All erosion and sedimentation controls shall be in accordance with MassDEP's Erosion and Sedimentation Control guidelines revised through May 2003 and the USDA SCS Erosion and Sedimentation Control in site development dated September 1983.
4. Site access shall be achieved only from the designated construction entrance.
5. All erosion control measures shall be inspected weekly and after any rainfall event greater than 0.5-inches, and shall be maintained, repaired or replaced as required or at the direction of the owner's engineer, or the Town's Engineer.
6. Sediment accumulation up-gradient of the wattles and silt fence greater than 6-inches in depth shall be removed and disposed of in accordance with all applicable regulations.
7. If it appears that sediment is exiting the site, additional silt sacks shall be installed in all catch basins adjacent to the site as directed by the Engineer. Sediment accumulation on all adjacent catch basin inlets shall be removed and the silt sack replaced if torn or damaged.

8. The contractor shall comply with the General and Erosion Notes as shown on the Site Development Plans & National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP).
9. All disturbed areas shall be stabilized with mulch or seed immediately upon completion of the construction activity that disturbed the soil or at 6 months whichever is less.
10. All slopes greater than 3:1 shall be stabilized with an erosion control blanket.
11. The contractor shall keep on site additional silt fence and wattle to mitigate any emergency condition.
12. All proposed drainage structures (catch basins, manholes, etc.) should be cleaned at the end of construction and any time the sediment within the structures equals 12" deep.
13. All newly installed inlets shall be protected during construction by installing silt sacks.
14. The contractor shall be responsible for preventing any silt or sediment from entering the infiltration systems.
15. No overuse, over-compaction, or storage of materials shall occur within any areas defined as stormwater infiltration to prevent the incidental compaction of soils. The areas are to be constructed as soon as possible and protected from construction traffic. NO CONSTRUCTION WATERS are to be emptied into an infiltration system. An allowance may be accommodated for a temporary excavation of soils within the infiltration basin for collection and handling of construction water, but the entirety of the debris is to be removed in order to achieve the grades as shown on the construction drawings.
16. The entire drainage system, including but not limited to catch basin, manholes, piping, water quality structures and infiltration system should be cleaned prior to turnover to the Owner.

<u>Section 2 Post-Development Activities</u>

1. The entire project area shall be stabilized with vegetation upon completion of construction and prior to removal of the erosion control devices.
2. Salt for de-icing on the paved areas during the winter months shall be limited to the minimum amount practicable. Sand containing the minimum amount of calcium chloride (or approved equivalent) needed for handling may be applied as part of the routine winter maintenance activities.
3. The closed drainage system shall be inspected every six (6) months. If more than 18 inches of sediment is found within the drainage structures, manholes or catch basins the structures shall be cleaned and the sediment removed and disposed of.
4. Subsurface Infiltration Structures will be inspected within the first three months after construction and within 72 hours of a half-inch storm event to ensure it is draining properly. Thereafter, the system should be inspected for sediment, trash and debris at least twice per year. Trash, debris, and visible sediment should be removed. The system should also be inspected annually within 72 hours of a half-inch storm event to ensure it is draining properly. Inspection can be accomplished by using the observation well, inspection port, and/or access structure for underground chamber systems. Adjust the inspection interval based on previous observation of sediment accumulation and high water elevations. Conduct jetting and vactoring annually or when inspection shows that maintenance is necessary.
5. Mosquito Control Plan – Both aboveground and underground stormwater BMPs have the potential to serve as mosquito breeding areas. Good design, proper operation and maintenance, and treatment with larvicides can minimize this potential. Reference: Massachusetts Stormwater Handbook Volume 2, Chapter 5 (Copy attached herewith).

Mosquito control shall be performed if visual evidence supports need. Treatment shall include use of accepted pesticides outlined in the Stormwater policy.

6. Work within any drainage structures shall performed in accordance with the latest OSHA regulations, and only by individuals with appropriate OSHA certification.
7. Maintenance Responsibilities **-** All post-construction maintenance activities shall be documented and kept on file and made available upon request.

Referenced from the Massachusetts Stormwater Handbook "Chapter 5"

Miscellaneous Stormwater Topics

Mosquito Control in Stormwater Management Practices

Both aboveground and underground stormwater BMPs have the potential to serve as mosquito breeding areas. Good design, proper operation and maintenance and treatment with larvicides can minimize this potential.

EPA recommends that stormwater treatment practices dewater within three (3) days (72 hours) to reduce the number of mosquitoes that mature to adults, since the aquatic stage of many mosquito species is 7 to 10 days. Massachusetts has had a 72-hour dewatering rule in its Stormwater Management Standards since 1996. The 2008 technical specifications for BMPs set forth in Volume 2, Chapter 2 of the Massachusetts Stormwater Handbook also concur with this practice by requiring that all stormwater practices designed to drain do so within 72 hours.

The proposed site plan does not incorporate any permanent stormwater pooling areas except deep sump catch basins. Any temporary ponding areas are located subsurface. Two temporary stormwater basins are proposed in offsite areas. These areas are anticipated to drain within 72 hours in compliance with the Stormwater Handbook and are discussed further below. Please refer to post-construction prevention below. Recommended oversight includes the application of larvicides to affected areas. The Steen operations team only provides mosquito control if an increased population occurs over baseline conditions.

<u>Construction Period Best Management Practices for Mosquito Control</u>

To minimize mosquito breeding during construction, it is essential that the following actions be taken to minimize the creation of standing pools by taking the actions below. The available options are provided directly from the MassDEP handbook to allow for all contingencies during the construction period.

- **Minimize Land Disturbance:** The existing site is denuded and no further clearing is anticipated. Earthwork activity has the potential to create temporary ponding areas onsite. Stilling basins and temporary forebays will be minimized to the extent feasible. The onsite soils recharge water at an accelerated rate.
- **Catch Basin inlets:** Inspect and refresh filter fabric, hay bales, filter socks or stone dams on a regular basis to ensure that any stormwater ponded at the inlet drains within 8 hours after precipitation stops. Shorter periods may be necessary to avoid hydroplaning in roads caused

by water ponded at the catch basin inlet. Treat catch basin sumps with larvicides such as Bacillus sphaericus (Bs) using a licensed pesticide applicator.

- **Check Dams:** If temporary check dams are used during the construction period to lag peak rate of runoff or pond runoff for exfiltration, inspect and repair the check dams on a regular basis to ensure that any stormwater ponded behind the check dam drains within 72 hours.
- **Design construction period sediment traps** to dewater within 72 hours after precipitation. Because these traps are subject to high silt loads and tend to clog, treat them with the larvicide Bs after it rains from June through October, until the first frost occurs.
- **Construction period open conveyances:** When temporary manmade ditches are used for channelizing construction period runoff, inspect them on a regular basis to remove any accumulated sediment to restore flow capacity to the temporary ditch.
- **Revegetating Disturbed Surfaces:** Revegetating disturbed surfaces reduces sediment in runoff that will cause construction period controls to clog and retain standing pools of water for greater than 72 hours.
- **Sediment fences/hay bale barriers:** When inspections find standing pools of water beyond the 24-hour period after a storm, take action to restore barrier to its normal function.

<u>Post-Construction Stormwater Treatment Practices</u>

- Mosquito control continues with the selection of structural stormwater BMPs that are unlikely to become breeding grounds for mosquitoes, such as:
  - **Bioretention Areas/Rain Gardens/Sand Filter:** Not site applicable.
  - **Infiltration Trenches:** This practice tends not to result in mosquito breeding. If any level spreaders, weirs, or sediment forebays are used as part of the design, inspect them and correct them as necessary to prevent standing pools of water for more than 72 hours.
- Another mosquito control strategy is to select BMPs that can become habitats for mosquito predators, such as:
  - **Constructed Stormwater Wetlands:** Not site applicable.
  - **Wet Basins:** Not site applicable.

Effective mosquito controls require proponents to design structural BMPs to prevent ponding and facilitate maintenance and, if necessary, the application of larvicides. Examples of such design practices include the following:

- **Basins:** Provide perimeter access around wet basins, extended dry detention basins and dry detention basins for both larviciding and routine maintenance. Control vegetation to ensure that access pathways stay open. The open air temporary basins shall be seeded upon completion and allowed to grow naturally. Given the location within the site, rapid growth of vegetation is not anticipated and routine cutting shall be performed on a schedule as determined based on field conditions. Mosquito dunks are an effective treatment device if standing water is encountered.
- **BMPs without a permanent pool of water:** All structural BMPs that do not rely on a permanent pool of water must drain and completely dewater within 72 hours after precipitation. This includes dry detention basins, extended dry detention basins, infiltration basins, and dry water quality swales. Use underdrains at extended dry detention basins to drain the small pools that form due to accumulation of silts. Site development drawings utilize

subsurface handling of stormwater. An emergency overflow basin is proposed that, by design, is not anticipated to receive any stormwater flow up to and including the 100 year event.

- **Energy Dissipators and Flow Spreaders:** Not site applicable.
- **Rain Barrels and Cisterns:** Not site applicable.
- **Subsurface Structures, Deep Sump Catch Basins, Oil Grit Separators, and Leaching Catch Basins:** All manhole covers shall be inspected to ensure they are closed and reduce the likelihood of mosquitoes laying eggs in standing water. Upon routine inspection, if these systems increase the mosquito breeding potential, the covers can be seal and mosquito netting installed over the outlets.
- **Check dams:** Not site applicable.
- **Cisterns:** Not site applicable.
- **Water quality swales:** Not site applicable.
- **Larvicide Treatment: See LTTP for larvicides treatment.**

REFERENCES

California Department of Transportation, 2004, BMP Retrofit Pilot Program, Final Report, Report ID CTSW – RT – 1 – 050,
http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/new_technology/CTSW-RT- 01-050.pdf#xml=http://dap1.dot.ca.gov/cgi-bin/texis/webinator/search/pdfhi.txt?query=mosquito&db=db&pr=www&prox=page&rorder=500&rprox=500&rdfreq=500&rwfreq=500&rlead=500&sufs=0&order=r&cq=&id=4673373b7 Appendix E: Vector Monitoring and Abatement, http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/new_technology/
California Department of Transportation, 2001, Final Vector Report, Caltrans BMP Retrofit Project Sites, Districts 7 and 11, http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/new_technology/CTSW-RT- 01-050/AppendixE/01_FinalVectorReport.pdf
Currier, Brian, and Moeller, 2000, Glenn, Lessons Learned: The CALTRANS Storm Water Best Management Practice Retrofit Pilot Study, prepared by the California State University Sacramento and University of California Davis for the California Department of Transportation, http://www.owp.csus.edu/research/papers/papers/PP015.pdf
Massachusetts Department of Environmental Protection, 2001, West Nile Virus, Application of Pesticides to Wetland Resource Areas and Buffer Zones and Public Water systems, Guideline No. BRPG01-02, http://www.mass.gov/dep/water/wnvpolcy.doc
O'Meara, G.F., 2003, Mosquitoes Associated With Stormwater Detention/Retention Areas, ENY627, University of Florida, Institute of Food and Agricultural Sciences Extension, http://edis.ifas.ufl.edu/mg338
Taylor, Scott M., and Currier, Brian, 1999, A Wet Pond as a Storm Water Runoff BMP – Case Study, presented at Department of Environmental Resources Engineering, Humboldt State University, Arcata, California http://www.owp.csus.edu/research/papers/papers/PP004.pdf
U.S. EPA, 2005, Stormwater Structures and Mosquitoes, EPA 833-F-05-003, http://www.epa.gov/npdes/pubs/sw_wnv.pdf
U.S. EPA, 2003, Do Stormwater Retention Ponds Contribute to Mosquito Problems, Nonpoint source News-Notes, Issue No. 71, http://notes.tetratech-_ffx.com/newsnotes.nsf/0/143f7fa99c3ea25485256d0100618bc9?OpenDocument
Virginia Department of Conservation and Recreation, 2003, Vector Control, Mosquitoes and Stormwater Management, Stormwater Management Technical Bulletin No. 8, http://www.dcr.virginia.gov/soil_&_water/documents/tecbltn8.pdf
Wallace, John R., Stormwater Management and Mosquito Ecology, Stormwater Magazine, March/April 2007, http://www.gradingandexcavation.com/sw_0703_management.html

6.0 – LONG-TERM POLLUTION PREVENTION

As required under stormwater Standard 4, the project requires the "development and implementation of suitable practices for source control and pollution prevention. These measures must be identified in a long term pollution prevention plan. The plan shall include the proper procedures for the following:

- good housekeeping;
- storing materials and waste products inside or under cover;
- vehicle washing;
- routine inspections and maintenance of stormwater BMPs;
- spill prevention and response;
- maintenance of lawns, gardens, and other landscaped areas;
- storage and use of fertilizers, herbicides, and pesticides;
- pet waste management;
- operation and management of septic systems (where applicable); and
- proper management of deicing chemicals and snow.

The proposed project consists of a racquet facility and associated infrastructure to support the development. Upon completion of the projects the maintenance and pollution prevention activities will be the responsibility of the property owner. The Pollution prevention items noted herein shall be followed post construction. Additional constraints shall be followed per the Stormwater Pollution Prevention Plan prepared at the time of construction.

Operator Information

Proponent: Wellesley Country Club
Property Address: 300 Wellesley Avenue
City: Wellesley, MA 02481

Good Housekeeping
The following good housekeeping practices will be followed onsite during the construction project: • An effort will be made to store only the amount of material required to do the job. • All materials stored onsite will be stored in a near, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure. • Products will be kept in their original containers with the original manufacturer's label. • Substances will not be mixed with one another unless recommended by the manufacturer. • Whenever possible, all of a product will be used up before disposing of the container. • Manufacturer's recommendations for proper use and disposal will be followed. • The site superintendent will inspect daily to ensure proper use and disposal of materials onsite.
Hazardous Products
These practices are used to reduce the risks associated with hazardous materials: • Products will be kept in the original containers unless they are not re-sealable. • Original labels and material safety data will be retained; they contain important product information. • If surplus product must be disposed of, manufacturers or local and State recommended methods for proper disposal will be followed.
Product Specific Practices
The following product specific practices will be followed onsite:

Petroleum Products
All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.
Fertilizers
Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
Paints
All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to the manufacturer's instructions or State and local regulations.
Concrete Trucks
Concrete Trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site.
Spill Control Practices
In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and clean-up: • Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies. • Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose. • All spills will be cleaned up immediately upon discovery. • The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance. • Spills of toxic or hazardous substances will be reported to the appropriate State or local government agency, regardless of the size. • The spill prevention plan will be adjusted to include measure to prevent this type of spill from reoccurring and how to clean up the spill if there should be another. A description of the spill, what caused it, and the cleanup measure will also be included. • The Site Superintendent responsible for the day-to-day site operation will be the spill prevention and cleanup coordinator.
Waste Disposal
All trash and construction debris from the site will be deposited in the dumpster. The dumpster will meet all local and State solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. No construction waste materials will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and the individual who manages day-to-day site operations, will be responsible for seeing that these practices are followed.
Hazardous Waste
All hazardous waste materials will be disposed of in the manner specified by local or State regulation or by the manufacturer. Site personnel will be instructed in these practices and the individual whom manages day-to-day site operations, will be responsible for seeing that these practices are followed.
Sanitary Waste
All sanitary waste will be collected from the portable units a minimum of once per week by a licensed sanitary waste management contractor, as required by the local or State regulation.
Pet Waste
The Owner shall implement a cleanup program where pet owners must put the pet waste into bags and dispose of the waste in the trash.
Sanitary Waste (septic)
There is no septic component to this project that will require long term maintenance.
Landscaping
1) **Mulching and Netting** – Mulching will provide immediate protection to exposed soils during the period of short construction delays, or over winter months through the application of plant residues, or other suitable

materials, to exposed soil areas. In areas which have been seeded either for temporary or permanent cover, mulching should immediately follow seeding. On steep slopes, mulch must be supplemented with netting. The preferred mulching material is straw.

Mulch (Hay or Straw) Materials and Installation

a) Straw has been found to be one of the most effective organic mulch materials. The specifications for straw are described below, but other material may be appropriate. The straw should be air-dried; free of undesirable seeds & coarse materials. The application rate per 1,000 sq. ft. is 90-100 lbs. (2-3 bales) and the application rate per acre is 2 tons (100-120 bales). The application should cover about 90% of the surface. The use of straw mulch is appropriate where mulch is maintained for more than three months. Straw mulch is subject to wind blowing unless anchored, is the most commonly used mulching material, and has the best microenvironment for germinating seeds.

Mulch Maintenance

a) Inspect after rainstorms to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, repair surface, reseed, remulch, and install new netting.
b) Straw or grass mulches that blow or wash away should be repaired promptly.
c) If plastic netting is used to anchor mulch, care should be taken during initial mowings to keep the mower height high. Otherwise, the netting can wrap up on the mower blade shafts. After a period of time, the netting degrades and becomes less of a problem.
d) Continue inspections until vegetation is well established.

Vehicle Washing & Construction Access

A stabilized construction entrance has been provided to help reduce vehicle tracking of sediments. Any paved streets adjacent to the site entrance will be swept daily to remove any excess mud, dirt or rock tracked from the site. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

1) **Stabilized Construction Entrance** – An existing stabilized construction entrance shall be used for the duration of construction activity for this project.

Construction Entrance Inspection/Maintenance

a) The entrance should be maintained in a condition that will prevent tracking or flowing of sediment onto adjacent properties. This may require periodic topdressing with additional stone
b) The construction entrance and sediment disposal area shall be inspected weekly and after heavy rains or heavy use.
c) Mud and sediment tracked or washed onto public road shall be immediately removed.
d) Once mud and soil particles clog the voids in the gravel and the effectiveness of the gravel pad is no longer satisfactory, the pad must be topdressed with new stone. Replacement of the entire pad may be necessary when the pad becomes completely clogged.
e) If washing facilities are used, the sediment traps should be cleaned out as often as necessary to assure that adequate trapping efficiency and storage volume is available.
f) The pad shall be reshaped as needed for drainage and runoff control.
g) Broken road pavement on adjacent access roadways shall be repaired immediately.
h) All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved or after the temporary practices are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil areas resulting from removal shall be permanently stabilized.

2) **Construction Road Stabilization** – Existing internal construction roads shall be used for the duration of construction activity for this project. Additional construction road shall be constructed as required with the following requirements:

The proposed stabilization of existing gravel and/or paved roadways will provide a means for construction vehicles to move around the site without causing significant erosion. The road stabilization will significantly speed up on-site work and generally improve site efficiency and working conditions during adverse weather. The construction roads will be stabilized at the beginning of construction and maintained throughout construction. The stabilized construction road will not be located in a cut or fill area until after grading has been performed. Some of the stone used will remain in place for use as part of the final base course of the road. The permanent roadway and cul-de-sac will be paved as soon as possible.

Construction Road Stabilization Design/Construction Requirements

a) A 6-inch course of 2 to 4-inch crushed rock, gravel base, or crushed surfacing base course should be applied immediately after grading or the completion of utility installation. The temporary roads should follow the contour of the natural terrain to the maximum extent possible and/or the existing gravel and/or paved roadways. Slope should not exceed 15 percent. Roadways should be carefully graded to drain to the edge of the road, forcing storm water to travel the shortest route. Provide drainage swales on each side of the roadway in the case of a crowned section, or one side in the case of a super-elevated section.
b) Drain inlets should be protected to prevent sediment-laden water entering.
c) Areas adjacent to culvert crossings and steep slopes should be seeded and mulched.
d) Dust control should be used when necessary. (Please refer to page 15 of 19)

Construction Road Stabilization Inspection/Maintenance

a) Inspect stabilized areas regularly, especially after large storm events. Add 2 to 4-inch crushed rock if necessary and restabilize any areas found to be eroding.
b) All temporary erosion and sediment control measures should be removed with 30 days after final site stabilization is achieved or after the temporary practices are no longer needed.
c) Trapped sediment should be removed or stabilized on site. Disturbed soil areas resulting from removal should be permanently stabilized.

Structural BMP Maintenance

1) **Temporary Diversion** – Temporary Diversion channels will be constructed alongside the proposed roadway until it is paved. The temporary diversion channels will route storm water to temporary sediment basins to remove sediment-laden storm water, before the storm water is allowed to discharge to the permanent detention basin. Check dams need to be utilized along the diversion channels. The maximum spacing of temporary diversion channels should be no greater than the following:

Land Slope (%)	Spacing (feet)
1% or less	300 ft
2%	200 ft
3% to 5%	150 ft
5% or greater	100 ft

Temporary Diversion Design/Construction Requirements

a) The temporary diversion channel cross-section should have a top width between two and four feet, a minimum height of 1.5 ft, and side slopes between 2:1 and 4:1.
b) The grade may be variable depending on the topography and must have a positive grade to the outlet. The maximum channel grade should be limited to 1.0 %.
c) The diverted runoff will outlet through check dams and then to a temporary sediment basin.
d) Diversions that are to serve longer than 30 working days should be seeded and mulched as soon as they are constructed, in order to preserve dike height and reduce maintenance.
e) Once the temporary diversion channels are no longer needed, they should be brought to the design grade and permanently stabilized.

Temporary Diversion Inspection/Maintenance

a) Inspect temporary diversion channels once a week and after every rainfall.
b) Damage caused by construction traffic or other activity should be repaired before the end of each working day.
c) Immediately remove sediment from the flow area and repair the diversion ridge.
d) Check outlets carefully and make timely repairs as needed.
e) When the area protected has been permanently stabilized, remove the ridge and the channel to blend with the natural ground level, and appropriately stabilize it.

2) **Check Dam** – Temporary check dams should be installed along the temporary diversion channels alongside the proposed roadway until it is paved. The check dams will lower the velocities of concentrated flows, thereby reducing erosion in the channel and promoting the settlement of sediments.

Check Dam Design/Construction Requirements

a) Check dams can be constructed of stone, sand bags filled with pea-gravel, or logs. Provide a sump immediately upstream.
b) The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
c) The stone must be placed by hand or mechanical placement (do not dump rock to form dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges. The stone used should be 2 to 4-inch size.
d) Log check dams should be constructed of 4 to 6-inch diameter logs embedded into the soil at least 18 inches.

Check Dam Inspection/Maintenance

a) Inspect after each rainfall event.

Erosion and Sediment Control Inspection and Maintenance Practices

The following are the inspection and maintenance practices that will be used to maintain erosion and sediment controls:

- All control measures will be inspected at least once each week and following any storm event of 0.5 inches or greater.
- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.
- Built up sediment will be removed from hay bales when it has reached a depth of 6-inches.
- Hay bales will be inspected to ensure secured posts, continuous coverage and proper alignment.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts and to ensure healthy growth.
- A maintenance inspection report will be made after each inspection. A copy of the report form to be completed by the inspector is attached.
- The Site Superintendent will be responsible for inspection, maintenance and repair activities and reports.
- Personnel selected to aid the Site Superintendent in the above responsibilities will be knowledgeable in all of the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

Non-Storm Water Discharges

During construction activities at the site, some water from the site will be suitable for discharge to the detention areas and/or temporary sediment basin areas. Non-stormwater discharges will be directed to recharge groundwater and to replenish wetland resource areas as follows:

1) Water from line flushing will be recharged if in compliance with MA Surface and Ground Water Quality Regulations.
2) Uncontaminated groundwater from de-watering excavations will also be recharged.

The construction de-watering and all non-stormwater discharges will be directed into a storm drain inlet equipped with a siltsack (or equivalent) inlet protection or a sediment basin. The developer and site general contractor will comply with the E.P.A.'s Final General Permit for Construction De-watering Discharges, (N.P.D.E.S., Section 402 and 40 C.F.R. 122.26(b)(14)(x).

INVENTORY FOR POLLUTION PREVENTION PLAN

The materials and substances listed below are expected to be present on site during construction:

• Concrete • Detergents • Paints (enamel and latex) • Concrete • Tar	• Fertilizers • Petroleum Based Products • Cleaning Solvents • Wood • Masonry Block • Roofing Shingles

SPILL PREVENTION

Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Paints

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to the manufacturer's instructions or State and local regulations.

Concrete Trucks

Concrete Trucks will be allowed to wash out on-site to a designated area as directed by the Site Superintendent. Concrete waste will be disposed of in accordance with Federal, State and Local regulations.

Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and clean-up:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately upon discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous substances will be reported to the appropriate State or local government agency, regardless of the size.
- The spill prevention plan will be adjusted to include measure to prevent this type of spill from reoccurring and how to clean up the spill if there should be another. A description of the spill, what caused it, and the cleanup measure will also be included.
- The Site Superintendent responsible for the day-to-day site operation will be the spill prevention and cleanup coordinator.

Deicing and Snow Removal
Relative to the agricultural area that surrounds the project, environmentally appropriate deicing tools will be used. Standard snow removal plowing techniques shall be used.

7.0 – Water System Impact Analysis

Review of the water system impact analysis was performed by Stanmar, Inc. A summary statement is being provided herewith, with a detailed analysis included in Appendix D.

It is anticipated that water usage will grow between 50% to 100% from existing use levels when the new building is occupied. This reflects the shifting of two outdoor courts to indoor courts with a longer season as well as the addition of new golf simulator programming that will attract golf members to the tennis facility. The calculation also reflects a higher percentage of daily visitors using the shower facilities which will be new and more appealing than the existing facilities. This increased demand is tempered by the use of low flow plumbing fixtures compared to the existing higher flow fixtures. The existing and the proposed facility will be served from a 6" municipal water main existing on the property and installed within the past 10 years. This main is sufficient to serve the proposed building.

Water usage is estimated at 116,676 gallons per year; an increase of 46,176 gallons above the 2019 usage report of 70,500 gallons

8.0 – Sewer System Impact Analysis

Review of the sewer system impact analysis was performed by Stanmar, Inc. A summary statement is provided above in Section 7.0, with a detailed analysis included in Appendix D. The existing and the proposed facility will continue to be serviced by an existing 8" PVC sanitary main. This main is sufficient to serve the proposed facility.

9.0 – Electrical System Impact Analysis

Review of the electrical system impact analysis was performed by Stanmar, Inc. and Electrical Systems Engineering, Inc. A summary statement is being provided herewith, but for a detail analysis, please refer to Appendix D. *The larger, proposed Racquets Facility will require replacement of the existing, pad mount 500KVA transformer with a larger 750kVA transformer that will feed both the Clubhouse and the proposed Racquets Facility with separate, independent electrical service.*

10.0 – Gas System Impact Analysis

Review of the gas system impact analysis was performed by Stanmar, Inc. A summary statement is being provided herewith, but for a detail analysis, please refer to Appendix D. *An existing gas main originates at the northeast corner of the building at a meter pad. A new gas service will be extended along the northerly side of the building to the ground mounted air handling units.*

11.0 – Traffic Impact and Access Analysis

Review of the traffic conditions and potential impacts was performed by Ron Muller & Associates. A summary statement from their letter is provided herewith:

It is important to note that the expanded tennis facility will not result in an increase in the number of Certificate Owners (members) at the club. The expanded tennis facility will be open to members who currently use the existing facility and usage is not expected to increase with the expansion of the facility. There may be a minor increase in usage of the indoor facility during winter months as the number of indoor courts is increasing. However, since the outdoor courts will likely not be used during this, time, increases in traffic are not expected or will be negligible.

Please refer to Appendix D, for a review and breakdown prepared by Ron Muller & Associates, Inc.

12.0 – Refuse Disposal Analysis

Currently, the club utilizes private haulers to remove solid waste from the club property. The waste is then brought to a licensed disposal facility. This process will not be altered as a result of this project. The club will continue to collect and safely remove solid waste and should not have an impact on the Wellesley Recycling and Disposal Facility (RDF). The club continues to separate recyclables for pick-up.

13.0 – Fire Protection and Life Safety Analysis

The building floor plan has been included in the plan set and demonstrates the egress doors for the facility. An evacuation plan meeting applicable codes will be prepared in advance of the Building Permit submission to the Town. Construction plans shall include appropriate fire protection systems including sprinklers and alarms. Please refer to Appendix D, for a detailed analysis prepared by Stanmar, Inc. A fire flow test was conducted in October 2012, during the pool expansion project. An updated fire flow test will be conducted and coordinated with the Water Department.

The site design allows for vehicle access on two sides of the building along the south side and east side of the building. The north side can be accessed from the fairway and the west side can be accessed from the outdoor tennis courts. Access to all sides of the building are within 250 feet of a parking emergency vehicle in accordance with NFPA requirements. A fire hydrant is located on the south side of the building, approximately 50 feet away.

14.0 – Pedestrian and Bicycle Safety

The tennis replacement project is a club amenity and is focused on pedestrian circulation and safety. Additional sidewalks have been included for connection with the other amenity buildings including the clubhouse and pool area. Where club patrons may cross the proposed driveway a painted crosswalk is proposed to encourage crossing at a consistent location that is visible to oncoming vehicular traffic, adjacent to the main entry door, and well-lit by existing decorative light fixtures. All sidewalks have been designed in accordance with the Americans with Disabilities Act (ADA).

15.0 – Conclusion

As demonstrated throughout this report by means of narrative, calculations and exhibits that appropriate best management practices and strategic site planning have been used to mitigate the impacts from the proposed development on the Town of Wellesley's resources. The proposed project has been designed to minimize and prevent indirect disturbance to neighboring parcels. Strategic site design measures and accepted erosion control practices has been employed to mitigate adverse impacts to the surrounding area both during construction and after. The plan is based on a multi-

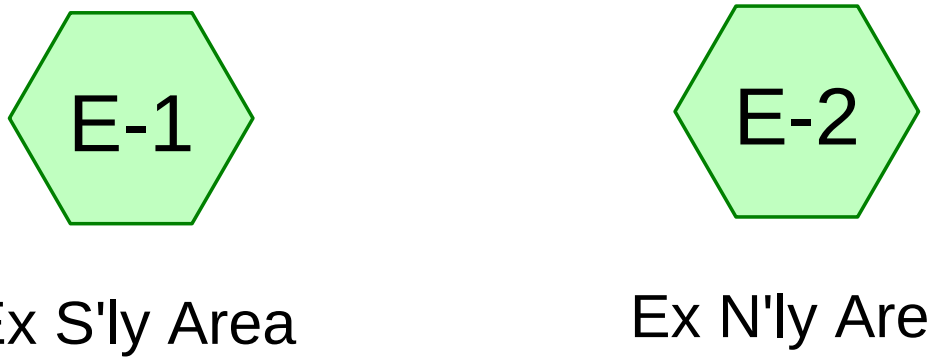
dimensional approach to site layout and stormwater management, which recognizes the need for proper site planning. Source control of potential contaminants and implementation of stormwater runoff treatment methods serve to ensure the protection of the groundwater. The proposed stormwater system includes a number of Best Management Practices to provide improved water quality and stormwater mitigation.

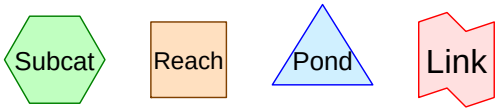
Appendix A

HYDRO-CAD PRE-DEVELOPMENT DRAINAGE ANALYSIS

ALLEN & MAJOR ASSOCIATES, INC.

APPENDIX A





Routing Diagram for 2749-01 - Existing
Prepared by Allen & Major Associates, Inc., Printed 4/23/2020
HydroCAD® 10.00-24 s/n 02881 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.577	39	>75% Grass cover, Good, HSG A (E-1, E-2)
0.129	98	Paved parking, HSG A (E-1, E-2)
0.371	98	Roofs, HSG A (E-1, E-2)
0.279	76	Tennis Court Clay, HSG A (E-2)
1.357	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.357	HSG A	E-1, E-2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.357		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.577	0.000	0.000	0.000	0.000	0.577	>75% Grass cover, Good	E-1, E-2
0.129	0.000	0.000	0.000	0.000	0.129	Paved parking	E-1, E-2
0.371	0.000	0.000	0.000	0.000	0.371	Roofs	E-1, E-2
0.279	0.000	0.000	0.000	0.000	0.279	Tennis Court Clay	E-2
1.357	**0.000**	**0.000**	**0.000**	**0.000**	**1.357**	**TOTAL AREA**	

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 E-1: Ex S'ly Area Runoff Area=23,013 sf 50.70% Impervious Runoff Depth=0.72"
Tc=6.0 min CN=69 Runoff=0.39 cfs 0.032 af

Subcatchment E-2: Ex N'ly Area Runoff Area=36,096 sf 28.04% Impervious Runoff Depth=0.68"
Tc=6.0 min CN=68 Runoff=0.56 cfs 0.047 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.079 af Average Runoff Depth = 0.70"
63.13% Pervious = 0.857 ac 36.87% Impervious = 0.500 ac

Summary for Subcatchment E-1: Ex S'ly Area

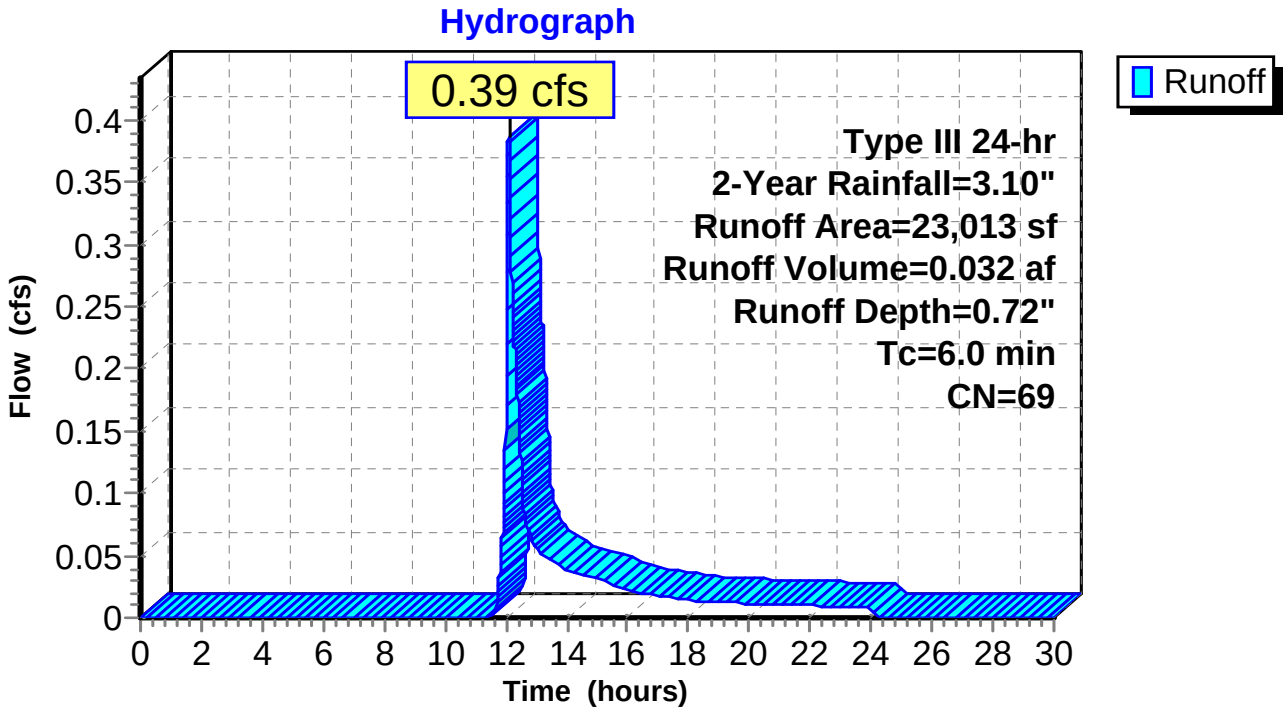
Runoff = 0.39 cfs @ 12.10 hrs, Volume= 0.032 af, Depth= 0.72"

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 Rainfall=3.10"

Area (sf)	CN	Description
11,345	39	>75% Grass cover, Good, HSG A
8,291	98	Roofs, HSG A
3,377	98	Paved parking, HSG A
23,013	69	Weighted Average
11,345		49.30% Pervious Area
11,668		50.70% Impervious Area

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

Subcatchment E-1: Ex S'ly Area



Summary for Subcatchment E-2: Ex N'ly Area

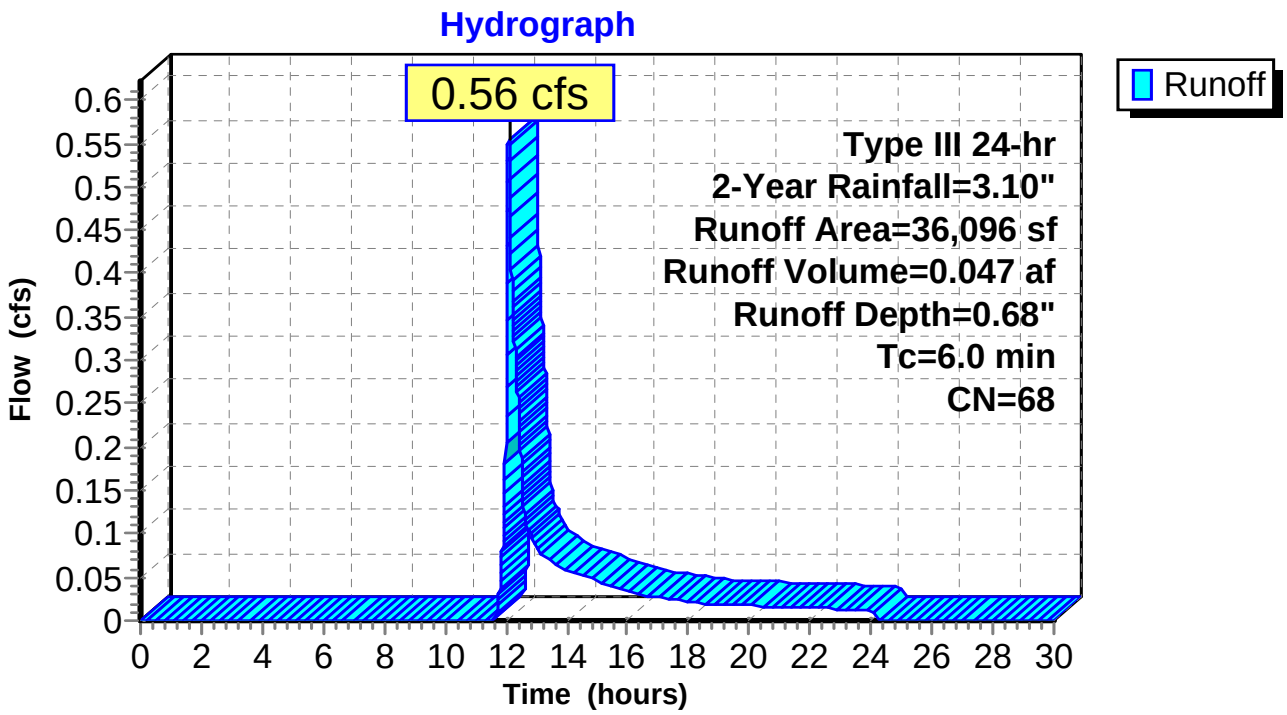
Runoff = 0.56 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 0.68"

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 Rainfall=3.10"

	Area (sf)	CN	Description
	13,808	39	>75% Grass cover, Good, HSG A
*	12,165	76	Tennis Court Clay, HSG A
	7,890	98	Roofs, HSG A
	2,233	98	Paved parking, HSG A
	36,096	68	Weighted Average
	25,973		71.96% Pervious Area
	10,123		28.04% Impervious Area

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

Subcatchment E-2: Ex N'ly Area



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 E-1: Ex S'ly Area Runoff Area=23,013 sf 50.70% Impervious Runoff Depth=1.67"
Tc=6.0 min CN=69 Runoff=1.00 cfs 0.074 af

Subcatchment E-2: Ex N'ly Area Runoff Area=36,096 sf 28.04% Impervious Runoff Depth=1.60"
Tc=6.0 min CN=68 Runoff=1.49 cfs 0.111 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.184 af Average Runoff Depth = 1.63"
63.13% Pervious = 0.857 ac 36.87% Impervious = 0.500 ac

Summary for Subcatchment E-1: Ex S'ly Area

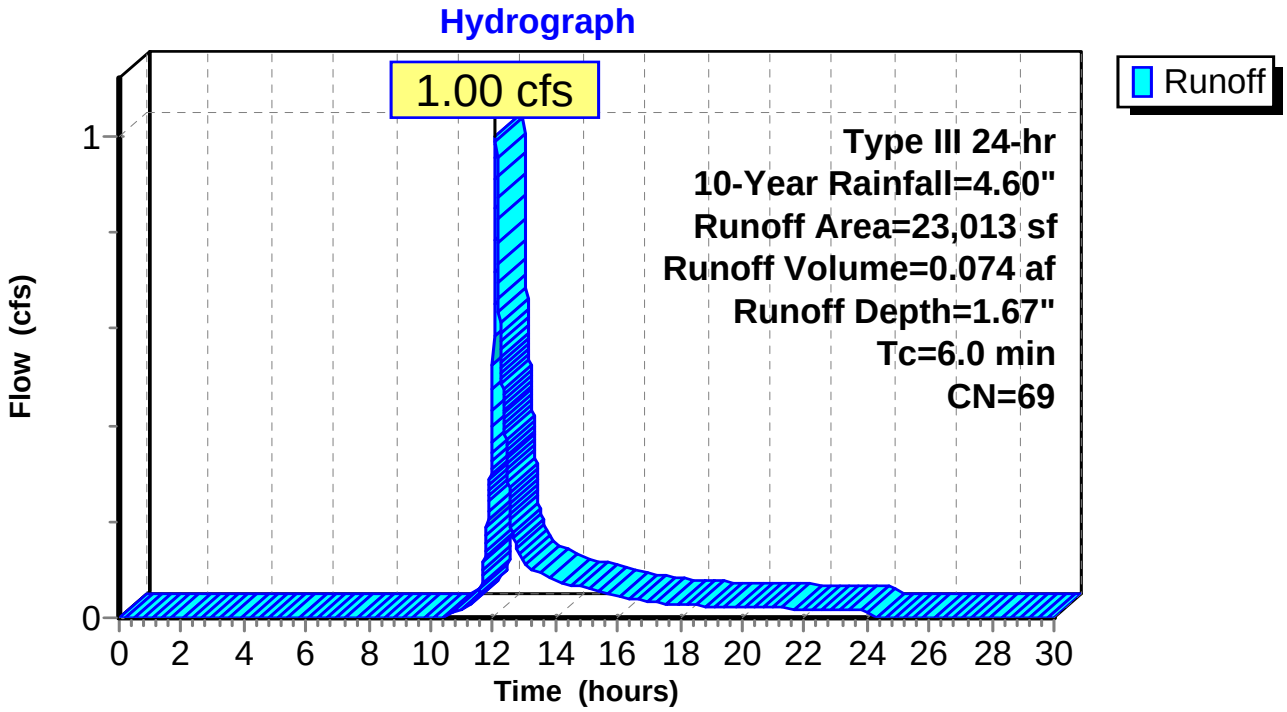
Runoff = 1.00 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 1.67"

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 Rainfall=4.60"

Area (sf)	CN	Description
11,345	39	>75% Grass cover, Good, HSG A
8,291	98	Roofs, HSG A
3,377	98	Paved parking, HSG A
23,013	69	Weighted Average
11,345		49.30% Pervious Area
11,668		50.70% Impervious Area

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

Subcatchment E-1: Ex S'ly Area



Summary for Subcatchment E-2: Ex N'ly Area

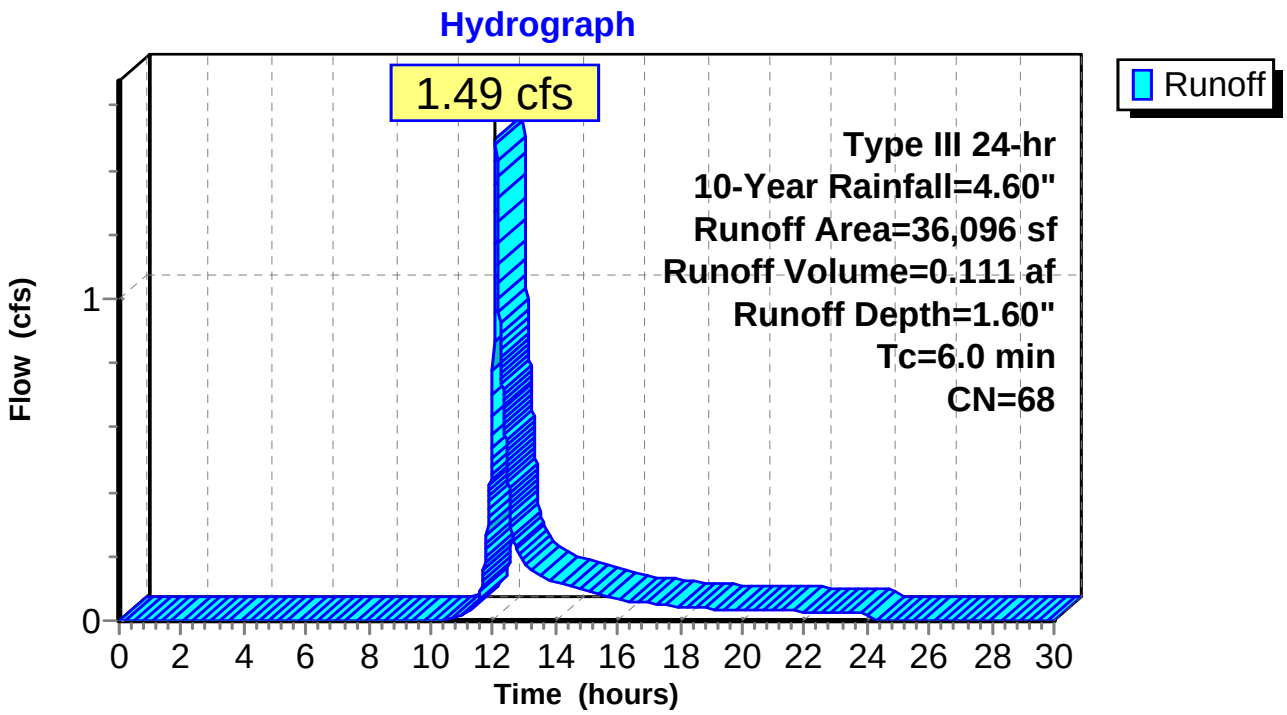
Runoff = 1.49 cfs @ 12.09 hrs, Volume= 0.111 af, Depth= 1.60"

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 Rainfall=4.60"

	Area (sf)	CN	Description
	13,808	39	>75% Grass cover, Good, HSG A
*	12,165	76	Tennis Court Clay, HSG A
	7,890	98	Roofs, HSG A
	2,233	98	Paved parking, HSG A
	36,096	68	Weighted Average
	25,973		71.96% Pervious Area
	10,123		28.04% Impervious Area

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

Subcatchment E-2: Ex N'ly Area



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 E-1: Ex S'ly Area Runoff Area=23,013 sf 50.70% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=69 Runoff=1.40 cfs 0.101 af

Subcatchment E-2: Ex N'ly Area Runoff Area=36,096 sf 28.04% Impervious Runoff Depth=2.21"
Tc=6.0 min CN=68 Runoff=2.10 cfs 0.152 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.253 af Average Runoff Depth = 2.24"
63.13% Pervious = 0.857 ac 36.87% Impervious = 0.500 ac

Summary for Subcatchment E-1: Ex S'ly Area

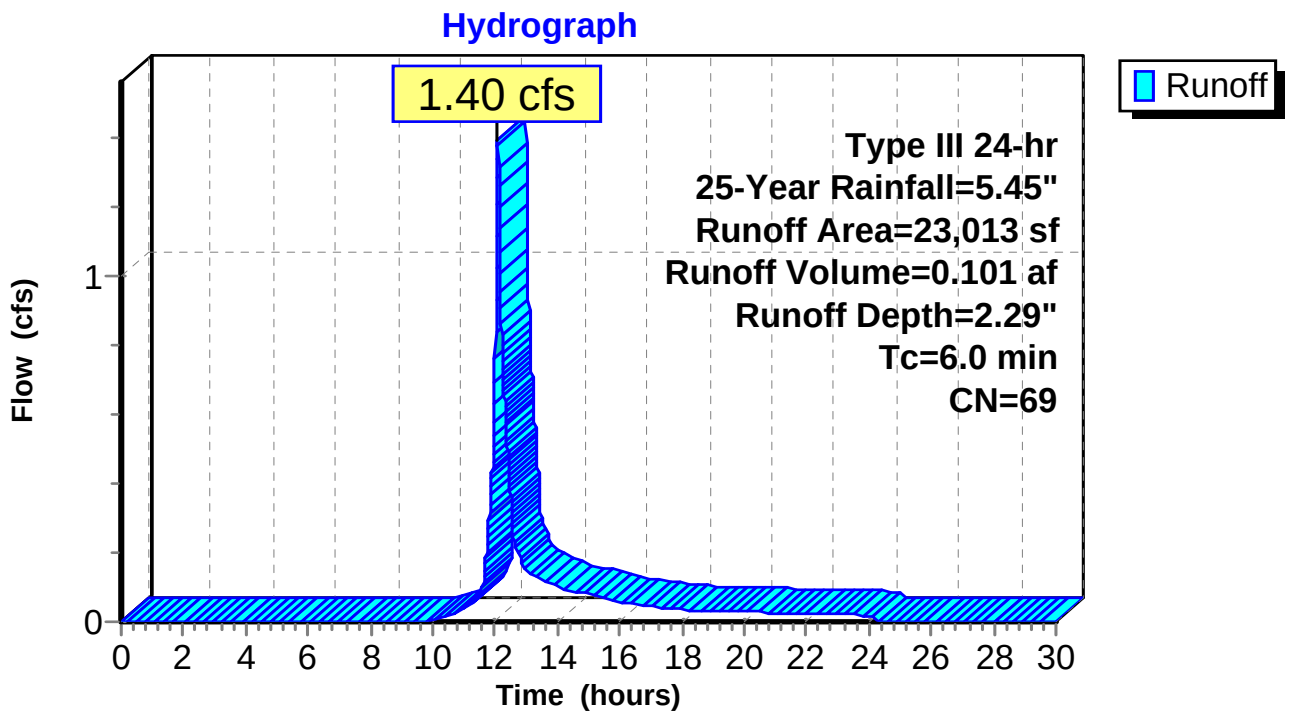
Runoff = 1.40 cfs @ 12.09 hrs, Volume= 0.101 af, Depth= 2.29"

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 25-Year Rainfall=5.45"

Area (sf)	CN	Description
11,345	39	>75% Grass cover, Good, HSG A
8,291	98	Roofs, HSG A
3,377	98	Paved parking, HSG A
23,013	69	Weighted Average
11,345		49.30% Pervious Area
11,668		50.70% Impervious Area

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

Subcatchment E-1: Ex S'ly Area



Summary for Subcatchment E-2: Ex N'ly Area

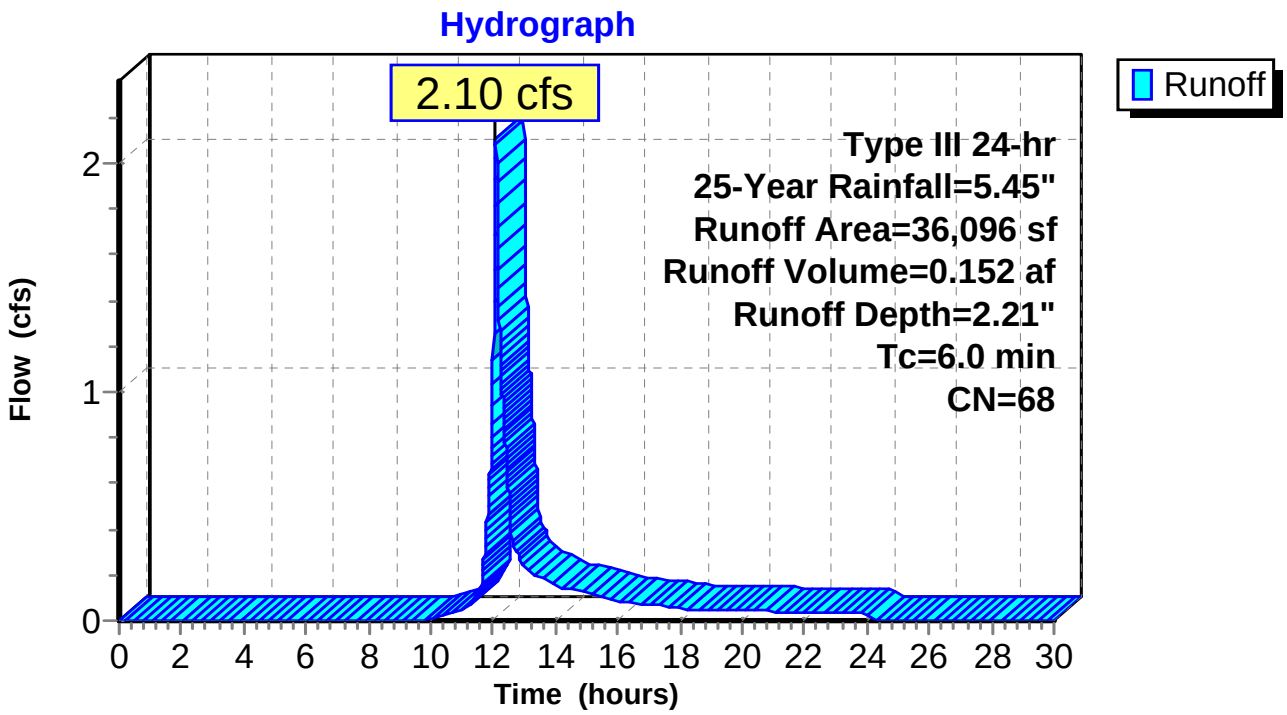
Runoff = 2.10 cfs @ 12.09 hrs, Volume= 0.152 af, Depth= 2.21"

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 25-Year Rainfall=5.45"

	Area (sf)	CN	Description
	13,808	39	>75% Grass cover, Good, HSG A
*	12,165	76	Tennis Court Clay, HSG A
	7,890	98	Roofs, HSG A
	2,233	98	Paved parking, HSG A
	36,096	68	Weighted Average
	25,973		71.96% Pervious Area
	10,123		28.04% Impervious Area

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

Subcatchment E-2: Ex N'ly Area



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 E-1: Ex S'ly Area Runoff Area=23,013 sf 50.70% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=69 Runoff=1.97 cfs 0.140 af

Subcatchment E-2: Ex N'ly Area Runoff Area=36,096 sf 28.04% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=68 Runoff=2.99 cfs 0.213 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.354 af Average Runoff Depth = 3.13"
63.13% Pervious = 0.857 ac 36.87% Impervious = 0.500 ac

Summary for Subcatchment E-1: Ex S'ly Area

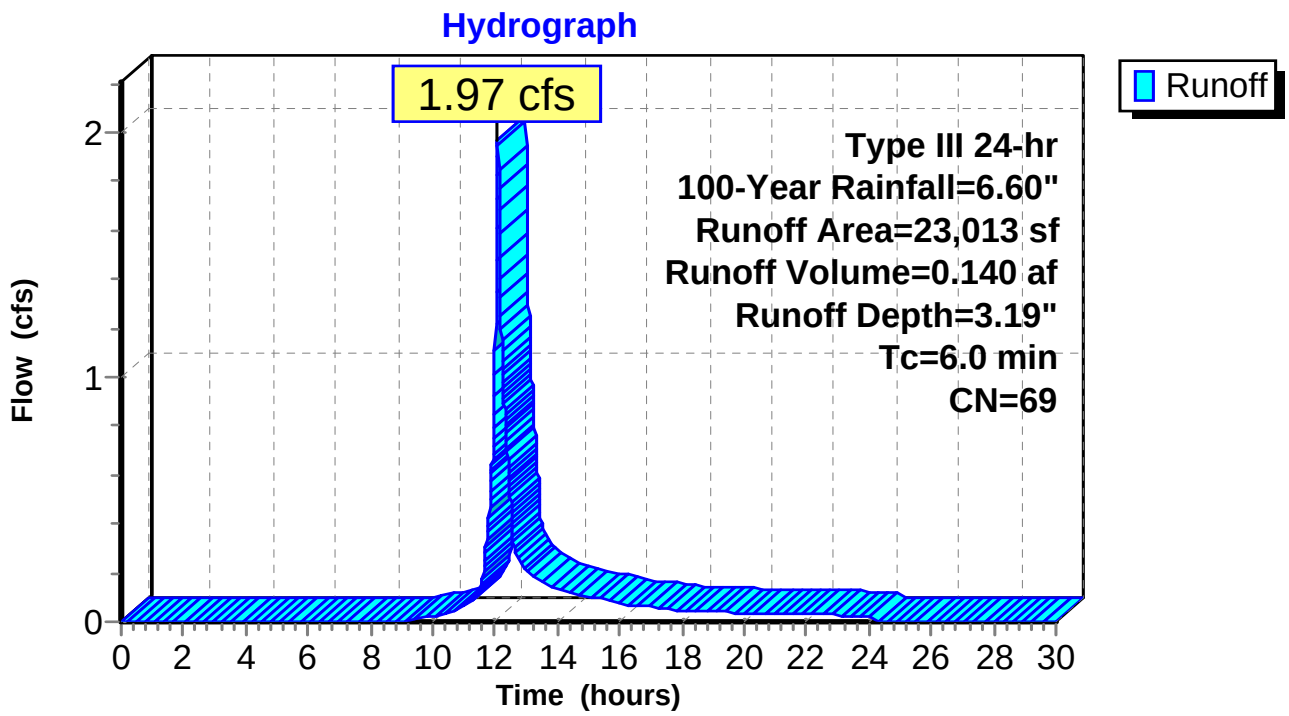
Runoff = 1.97 cfs @ 12.09 hrs, Volume= 0.140 af, Depth= 3.19"

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 Rainfall=6.60"

Area (sf)	CN	Description
11,345	39	>75% Grass cover, Good, HSG A
8,291	98	Roofs, HSG A
3,377	98	Paved parking, HSG A
23,013	69	Weighted Average
11,345		49.30% Pervious Area
11,668		50.70% Impervious Area

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

Subcatchment E-1: Ex S'ly Area



Summary for Subcatchment E-2: Ex N'ly Area

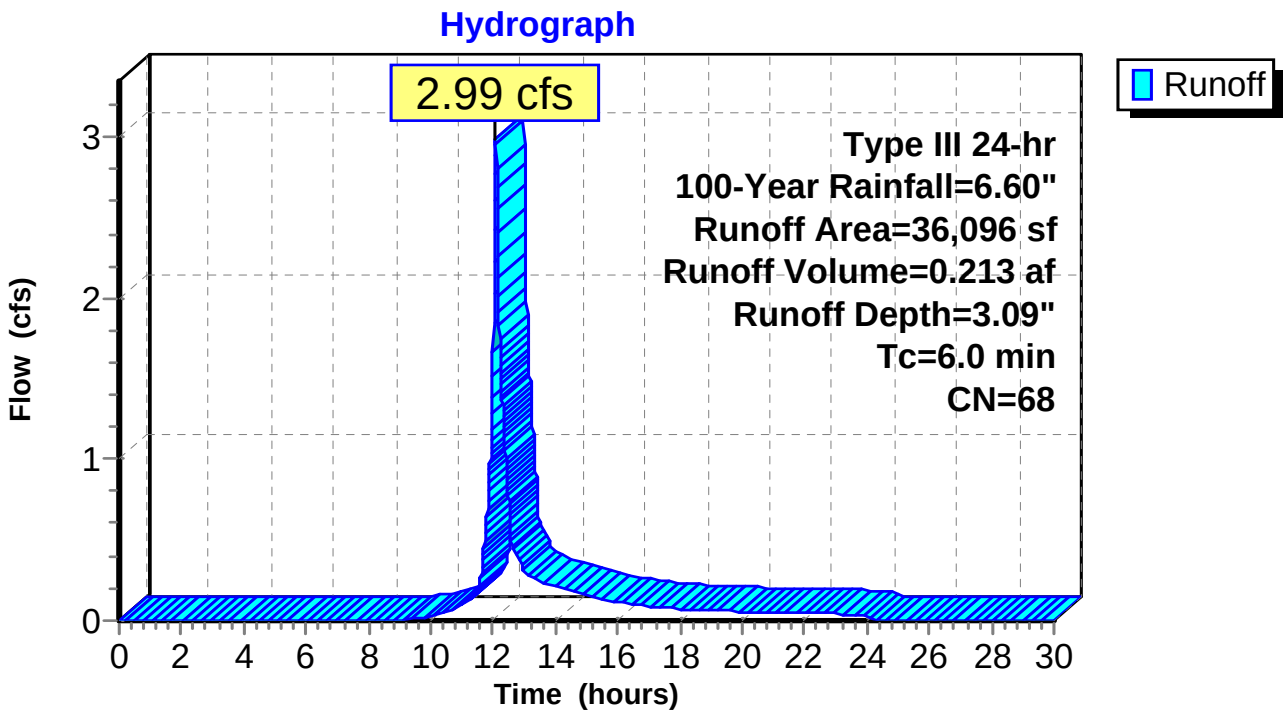
Runoff = 2.99 cfs @ 12.09 hrs, Volume= 0.213 af, Depth= 3.09"

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 Rainfall=6.60"

	Area (sf)	CN	Description
	13,808	39	>75% Grass cover, Good, HSG A
*	12,165	76	Tennis Court Clay, HSG A
	7,890	98	Roofs, HSG A
	2,233	98	Paved parking, HSG A
	36,096	68	Weighted Average
	25,973		71.96% Pervious Area
	10,123		28.04% Impervious Area

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

Subcatchment E-2: Ex N'ly Area

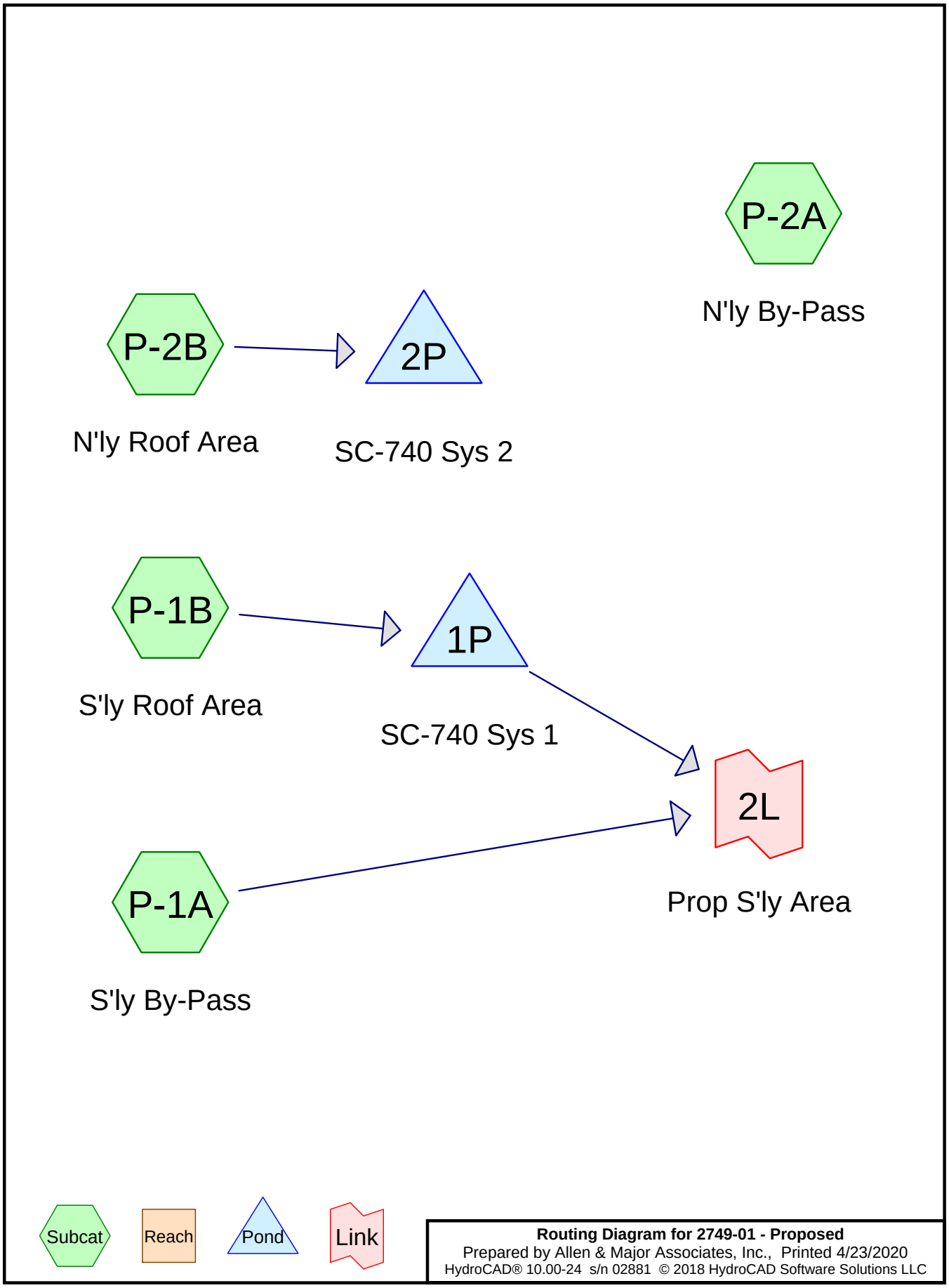


Appendix B

HYDRO-CAD POST-DEVELOPMENT DRAINAGE ANALYSIS

ALLEN & MAJOR ASSOCIATES, INC.

APPENDIX B



Routing Diagram for 2749-01 - Proposed
Prepared by Allen & Major Associates, Inc., Printed 4/23/2020
HydroCAD® 10.00-24 s/n 02881 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.307	39	>75% Grass cover, Good, HSG A (P-1A, P-2A)
0.083	98	Paved parking, HSG A (P-1A)
0.076	98	Paved walk, patio, HSG A (P-2A)
0.852	98	Roofs, HSG A (P-1B, P-2B)
0.039	76	Tennis Court Clay, HSG A (P-2A)
1.357	**84**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.357	HSG A	P-1A, P-1B, P-2A, P-2B
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.357		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.307	0.000	0.000	0.000	0.000	0.307	>75% Grass cover, Good	P-1A, P-2A
0.083	0.000	0.000	0.000	0.000	0.083	Paved parking	P-1A
0.076	0.000	0.000	0.000	0.000	0.076	Paved walk, patio	P-2A
0.852	0.000	0.000	0.000	0.000	0.852	Roofs	P-1B, P-2B
0.039	0.000	0.000	0.000	0.000	0.039	Tennis Court Clay	P-2A
1.357	**0.000**	**0.000**	**0.000**	**0.000**	**1.357**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	149.00	148.60	19.0	0.0211	0.012	12.0	0.0	0.0

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 P-1A: S'ly By-Pass Runoff Area=8,037 sf 45.00% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=66 Runoff=0.10 cfs 0.009 af

Subcatchment P-1B: S'ly Roof Area Runoff Area=18,719 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=1.29 cfs 0.103 af

Subcatchment P-2A: N'ly By-Pass Runoff Area=13,966 sf 23.79% Impervious Runoff Depth=0.31"
Tc=6.0 min CN=58 Runoff=0.05 cfs 0.008 af

Subcatchment P-2B: N'ly Roof Area Runoff Area=18,387 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=1.27 cfs 0.101 af

Pond 1P: SC-740 Sys 1 Peak Elev=148.41' Storage=0.025 af Inflow=1.29 cfs 0.103 af
Discarded=0.23 cfs 0.103 af Primary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.103 af

Pond 2P: SC-740 Sys 2 Peak Elev=154.91' Storage=0.015 af Inflow=1.27 cfs 0.101 af
Outflow=0.39 cfs 0.101 af

Link 2L: Prop S'ly Area Inflow=0.10 cfs 0.009 af
Primary=0.10 cfs 0.009 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.221 af Average Runoff Depth = 1.95"
25.49% Pervious = 0.346 ac 74.51% Impervious = 1.011 ac

Summary for Subcatchment P-1A: S'ly By-Pass

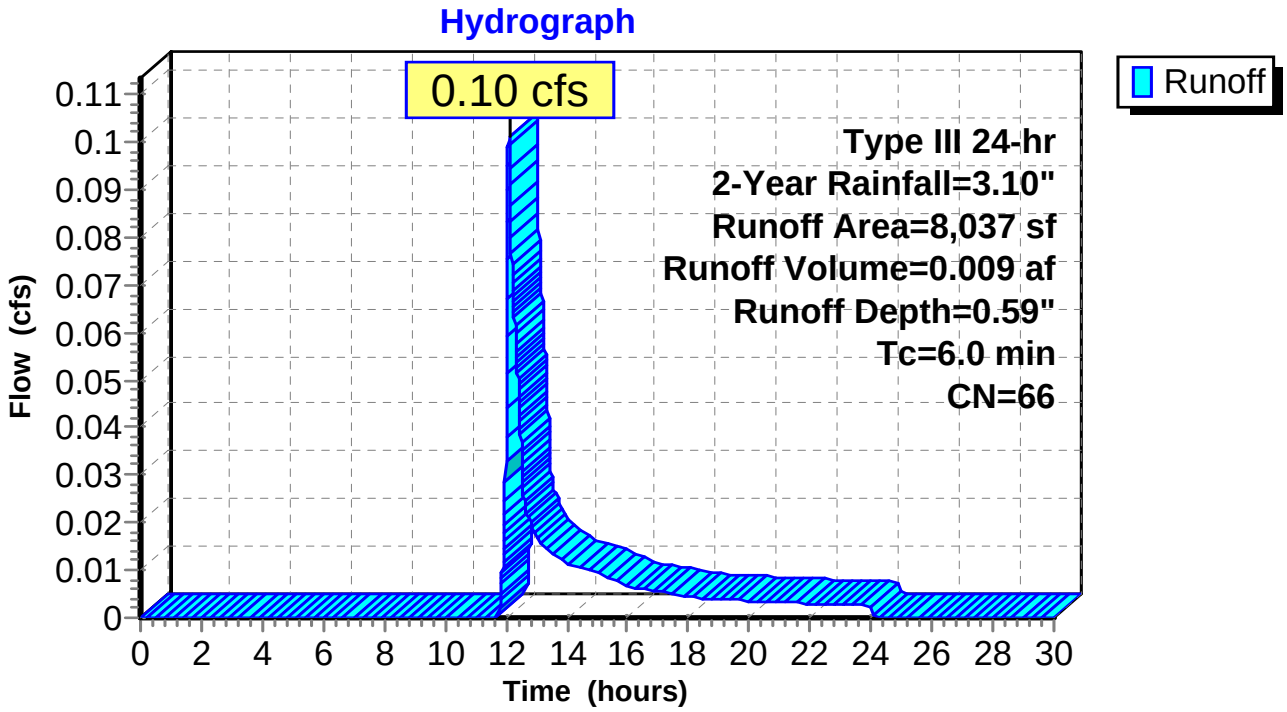
Runoff = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af, Depth= 0.59"

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 Rainfall=3.10"

Area (sf)	CN	Description
4,420	39	>75% Grass cover, Good, HSG A
3,617	98	Paved parking, HSG A
8,037	66	Weighted Average
4,420		55.00% Pervious Area
3,617		45.00% Impervious Area

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

Subcatchment P-1A: S'ly By-Pass



Summary for Subcatchment P-1B: S'ly Roof Area

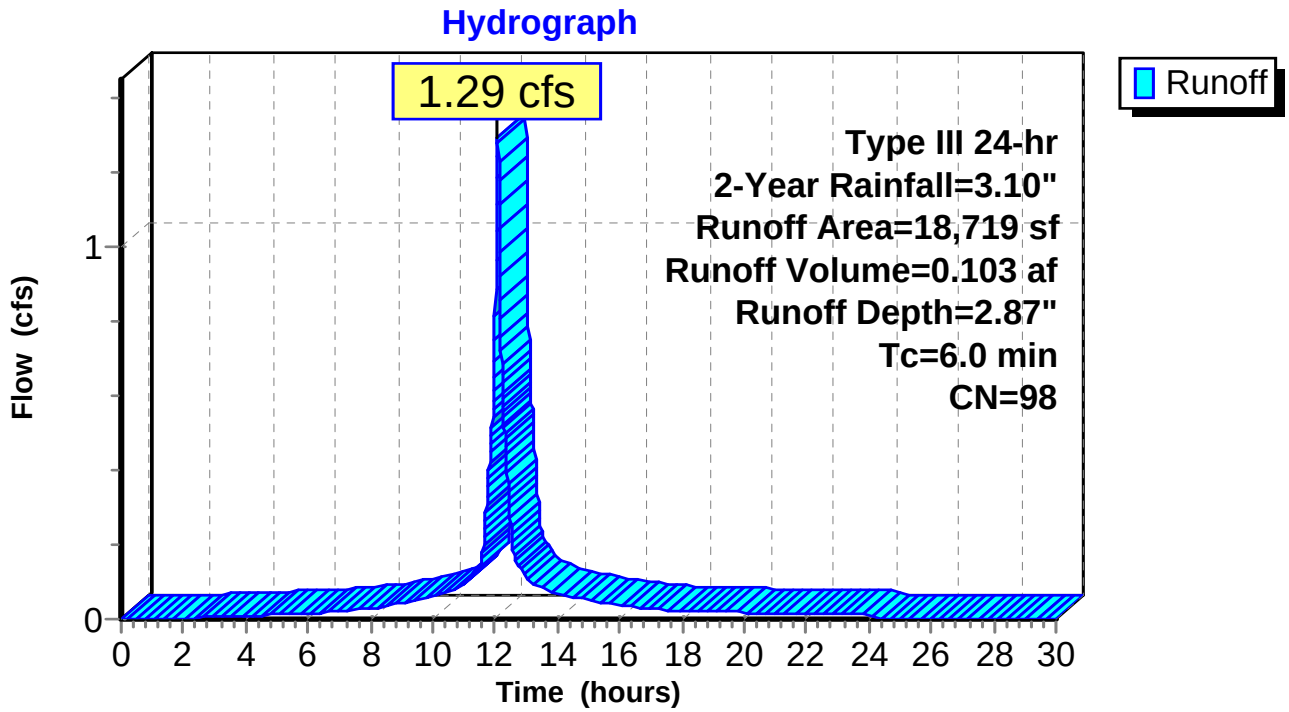
Runoff = 1.29 cfs @ 12.08 hrs, Volume= 0.103 af, Depth= 2.87"

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 Rainfall=3.10"

Area (sf)	CN	Description
18,719	98	Roofs, HSG A
18,719		100.00% Impervious Area

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

Subcatchment P-1B: S'ly Roof Area



Summary for Subcatchment P-2A: N'ly By-Pass

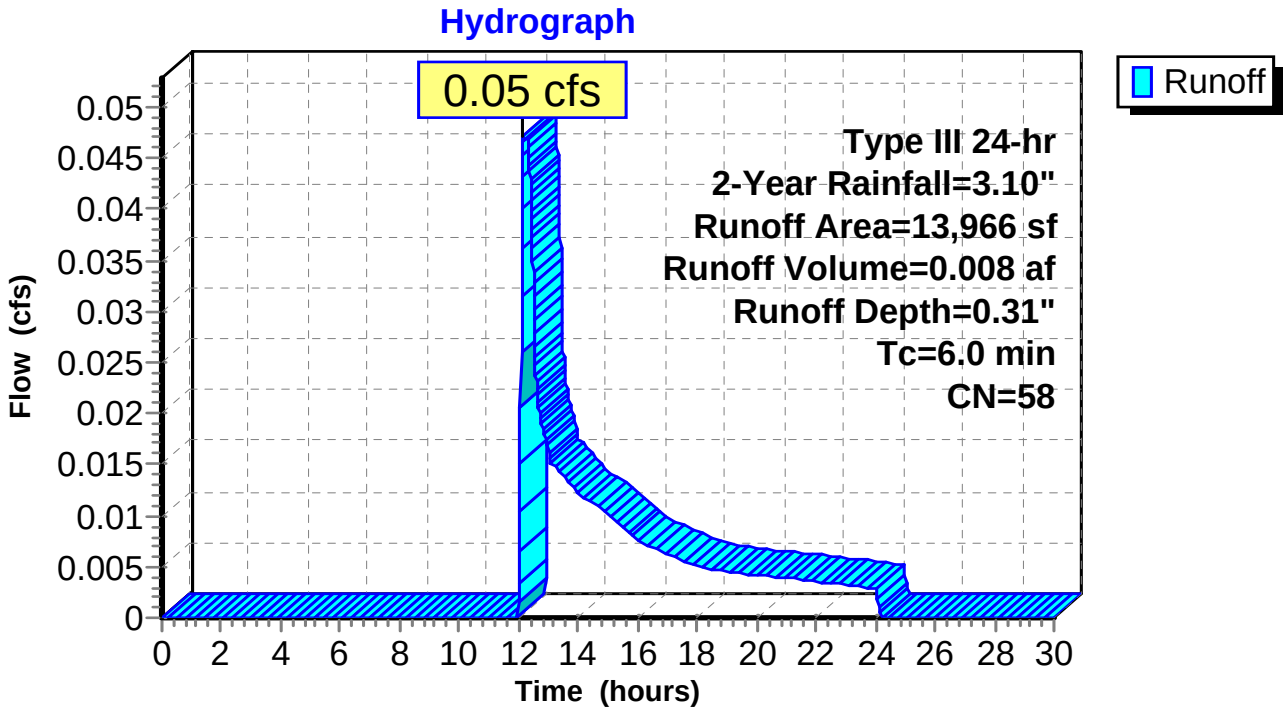
Runoff = 0.05 cfs @ 12.16 hrs, Volume= 0.008 af, Depth= 0.31"

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 Rainfall=3.10"

	Area (sf)	CN	Description
	8,944	39	>75% Grass cover, Good, HSG A
*	1,700	76	Tennis Court Clay, HSG A
*	3,322	98	Paved walk, patio, HSG A
	13,966	58	Weighted Average
	10,644		76.21% Pervious Area
	3,322		23.79% Impervious Area

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

Subcatchment P-2A: N'ly By-Pass



Summary for Subcatchment P-2B: N'ly Roof Area

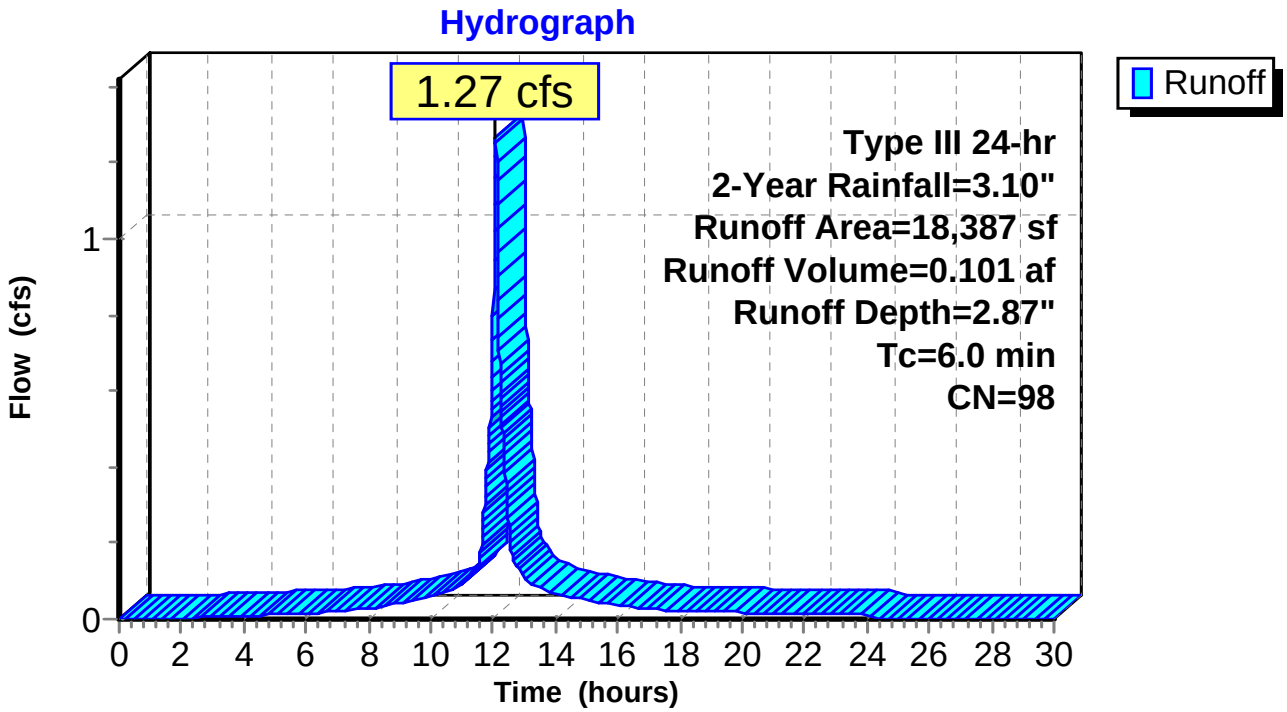
Runoff = 1.27 cfs @ 12.08 hrs, Volume= 0.101 af, Depth= 2.87"

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 Rainfall=3.10"

Area (sf)	CN	Description
18,387	98	Roofs, HSG A
18,387		100.00% Impervious Area

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

Subcatchment P-2B: N'ly Roof Area



Summary for Pond 1P: SC-740 Sys 1

Inflow Area =	0.430 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Year event				
Inflow =	1.29 cfs @	12.08 hrs,	Volume=	0.103 af	
Outflow =	0.23 cfs @	11.68 hrs,	Volume=	0.103 af,	Atten= 82%, Lag= 0.0 min
Discarded =	0.23 cfs @	11.68 hrs,	Volume=	0.103 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= 148.41' @ 12.53 hrs Surf.Area= 0.028 ac Storage= 0.025 af

Plug-Flow detention time= 24.9 min calculated for 0.103 af (100% of inflow)
Center-of-Mass det. time= 24.8 min (781.9 - 757.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	147.00'	0.027 af	**49.00'W x 24.98'L x 3.50'H Field A** 0.098 af Overall - 0.032 af Embedded = 0.067 af x 40.0% Voids
#2A	147.50'	0.032 af	**ADS_StormTech SC-740 +Cap** x 30 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 30 Chambers in 10 Rows
		0.058 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	147.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	149.00'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 149.00' / 148.60' S= 0.0211 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.23 cfs @ 11.68 hrs HW=147.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=147.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Pond 1P: SC-740 Sys 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

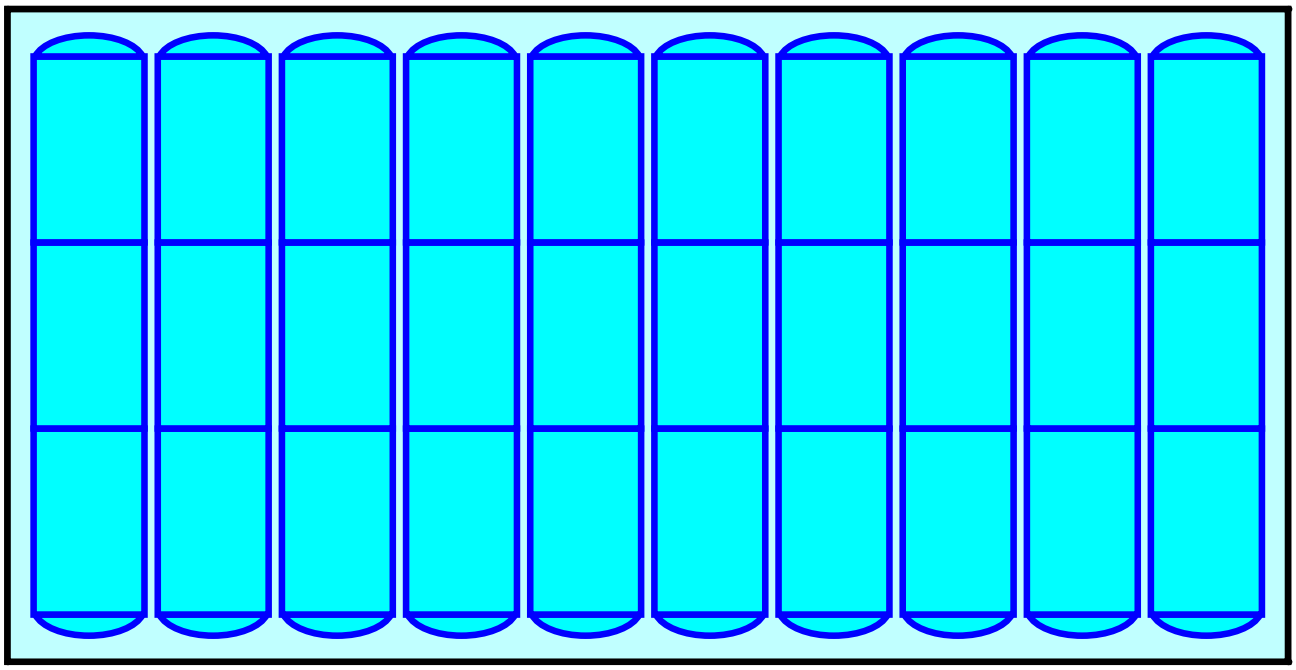
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
10 Rows x 51.0" Wide + 6.0" Spacing x 9 + 12.0" Side Stone x 2 = 49.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

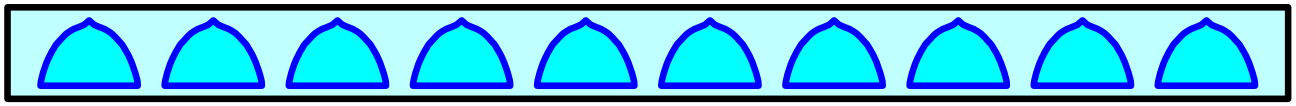
30 Chambers x 45.9 cf = 1,378.2 cf Chamber Storage

4,283.5 cf Field - 1,378.2 cf Chambers = 2,905.3 cf Stone x 40.0% Voids = 1,162.1 cf Stone Storage

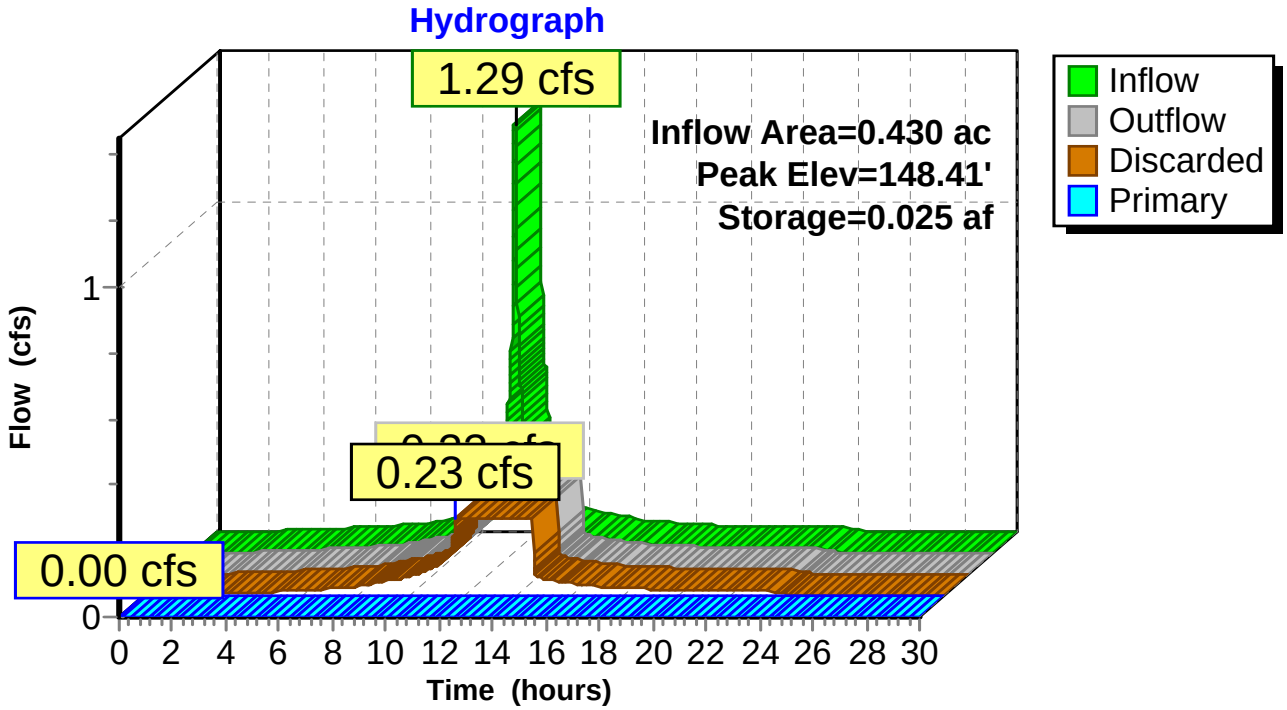
Chamber Storage + Stone Storage = 2,540.3 cf = 0.058 af
Overall Storage Efficiency = 59.3%
Overall System Size = 24.98' x 49.00' x 3.50'

30 Chambers
158.6 cy Field
107.6 cy Stone





Pond 1P: SC-740 Sys 1



Summary for Pond 2P: SC-740 Sys 2

Inflow Area = 0.422 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Year event
Inflow = 1.27 cfs @ 12.08 hrs, Volume= 0.101 af
Outflow = 0.39 cfs @ 11.83 hrs, Volume= 0.101 af, Atten= 69%, Lag= 0.0 min
Discarded = 0.39 cfs @ 11.83 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 154.91' @ 12.39 hrs Surf.Area= 0.047 ac Storage= 0.015 af

Plug-Flow detention time= 7.7 min calculated for 0.101 af (100% of inflow)
Center-of-Mass det. time= 7.7 min (764.8 - 757.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	154.25'	0.046 af	**115.50'W x 17.86'L x 3.50'H Field A** 0.166 af Overall - 0.051 af Embedded = 0.115 af x 40.0% Voids
#2A	154.75'	0.051 af	**ADS_StormTech SC-740 +Cap** x 48 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 24 Rows
		0.097 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	154.25'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.39 cfs @ 11.83 hrs HW=154.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Pond 2P: SC-740 Sys 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

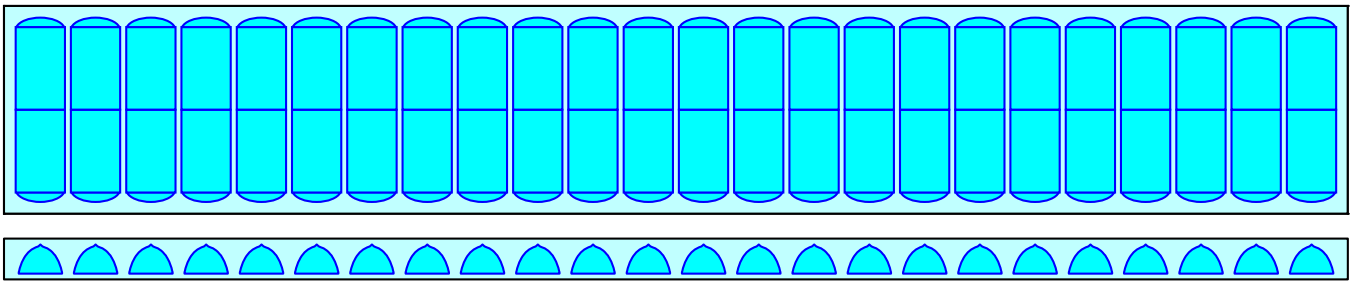
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
24 Rows x 51.0" Wide + 6.0" Spacing x 23 + 12.0" Side Stone x 2 = 115.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

48 Chambers x 45.9 cf = 2,205.1 cf Chamber Storage

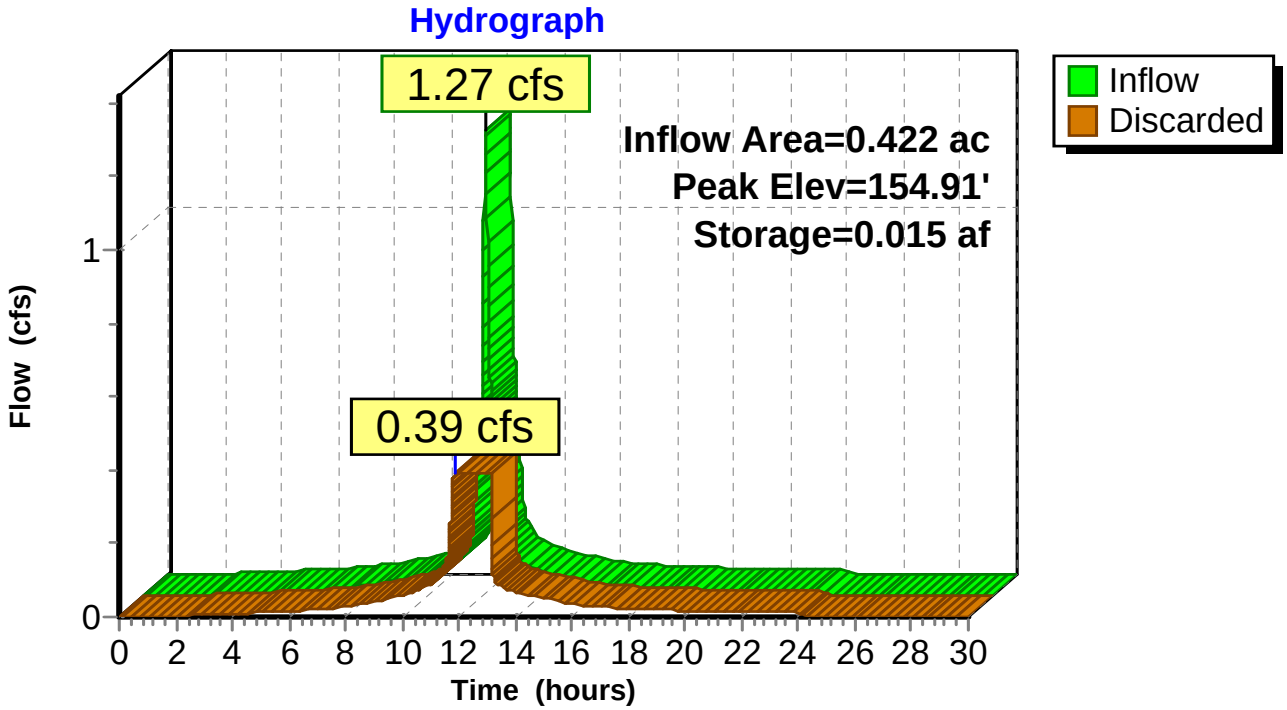
7,218.6 cf Field - 2,205.1 cf Chambers = 5,013.4 cf Stone x 40.0% Voids = 2,005.4 cf Stone Storage

Chamber Storage + Stone Storage = 4,210.5 cf = 0.097 af
Overall Storage Efficiency = 58.3%
Overall System Size = 17.86' x 115.50' x 3.50'

48 Chambers
267.4 cy Field
185.7 cy Stone



Pond 2P: SC-740 Sys 2

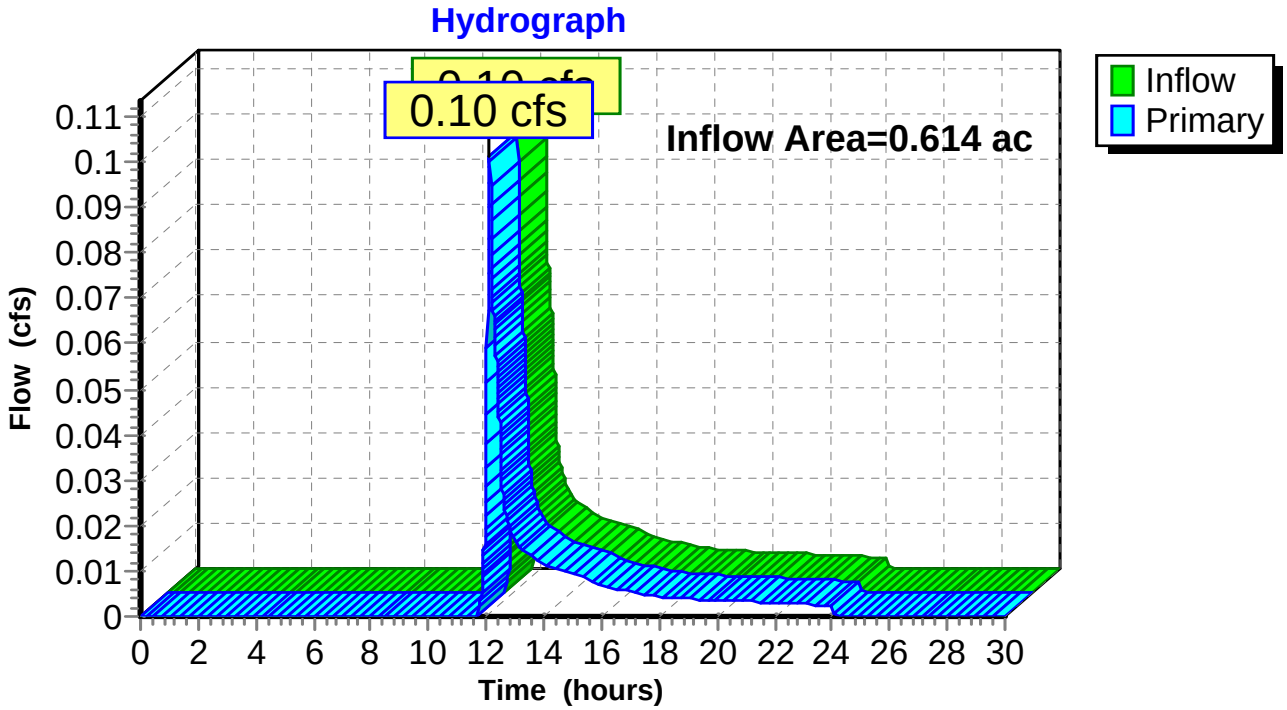


Summary for Link 2L: Prop S'ly Area

Inflow Area = 0.614 ac, 83.48% Impervious, Inflow Depth = 0.18" for 2-Year event
Inflow = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af
Primary = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2L: Prop S'ly Area



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 P-1A: S'ly By-Pass Runoff Area=8,037 sf 45.00% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=66 Runoff=0.30 cfs 0.022 af

Subcatchment P-1B: S'ly Roof Area Runoff Area=18,719 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=1.93 cfs 0.156 af

Subcatchment P-2A: N'ly By-Pass Runoff Area=13,966 sf 23.79% Impervious Runoff Depth=0.96"
Tc=6.0 min CN=58 Runoff=0.30 cfs 0.026 af

Subcatchment P-2B: N'ly Roof Area Runoff Area=18,387 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=1.90 cfs 0.154 af

Pond 1P: SC-740 Sys 1 Peak Elev=149.27' Storage=0.042 af Inflow=1.93 cfs 0.156 af
Discarded=0.23 cfs 0.148 af Primary=0.30 cfs 0.008 af Outflow=0.53 cfs 0.156 af

Pond 2P: SC-740 Sys 2 Peak Elev=155.43' Storage=0.034 af Inflow=1.90 cfs 0.154 af
Outflow=0.39 cfs 0.154 af

Link 2L: Prop S'ly Area Inflow=0.41 cfs 0.031 af
Primary=0.41 cfs 0.031 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.358 af Average Runoff Depth = 3.16"
25.49% Pervious = 0.346 ac 74.51% Impervious = 1.011 ac

Summary for Subcatchment P-1A: S'ly By-Pass

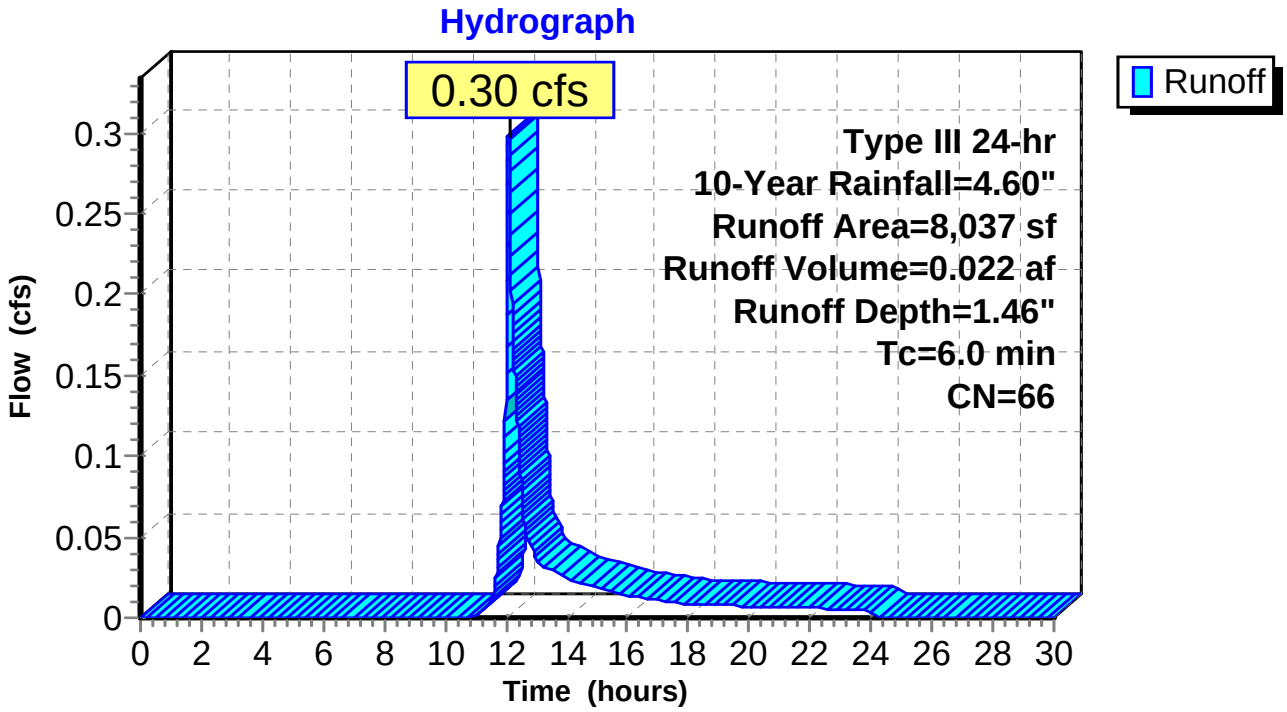
Runoff = 0.30 cfs @ 12.10 hrs, Volume= 0.022 af, Depth= 1.46"

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 Rainfall=4.60"

Area (sf)	CN	Description
4,420	39	>75% Grass cover, Good, HSG A
3,617	98	Paved parking, HSG A
8,037	66	Weighted Average
4,420		55.00% Pervious Area
3,617		45.00% Impervious Area

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

Subcatchment P-1A: S'ly By-Pass



Summary for Subcatchment P-1B: S'ly Roof Area

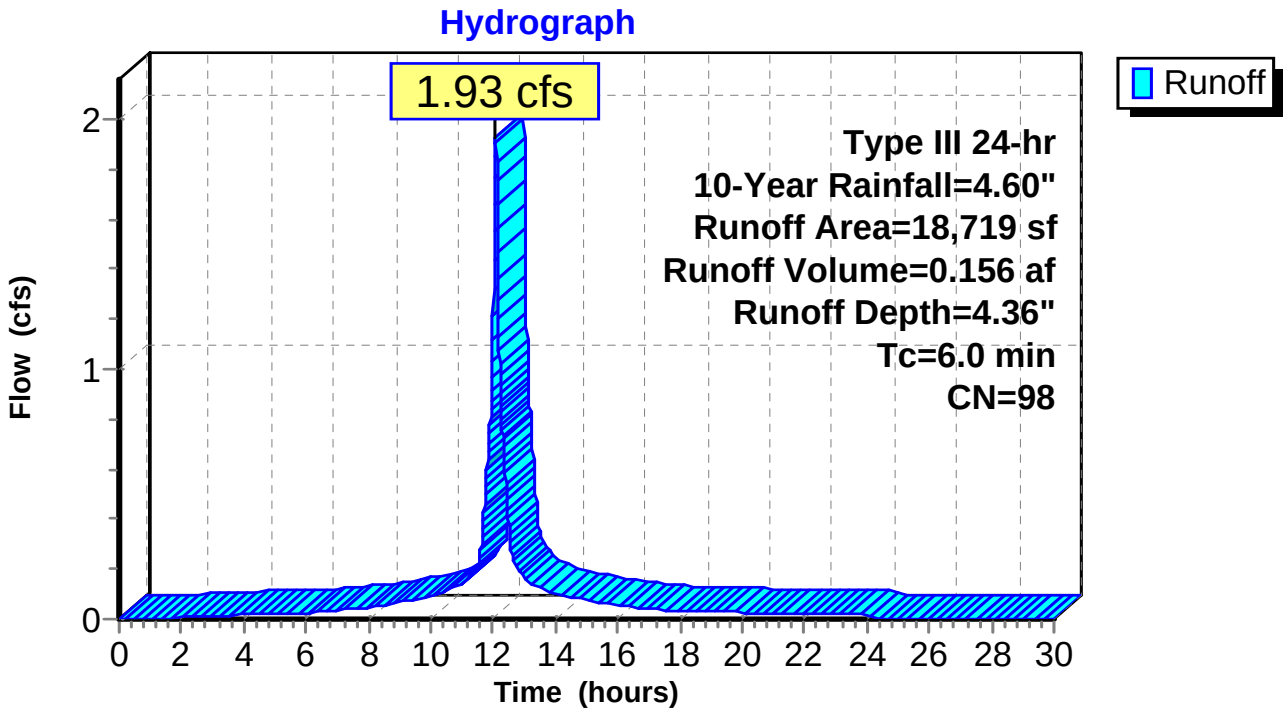
Runoff = 1.93 cfs @ 12.08 hrs, Volume= 0.156 af, Depth= 4.36"

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 Rainfall=4.60"

Area (sf)	CN	Description
18,719	98	Roofs, HSG A
18,719		100.00% Impervious Area

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

Subcatchment P-1B: S'ly Roof Area



Summary for Subcatchment P-2A: N'ly By-Pass

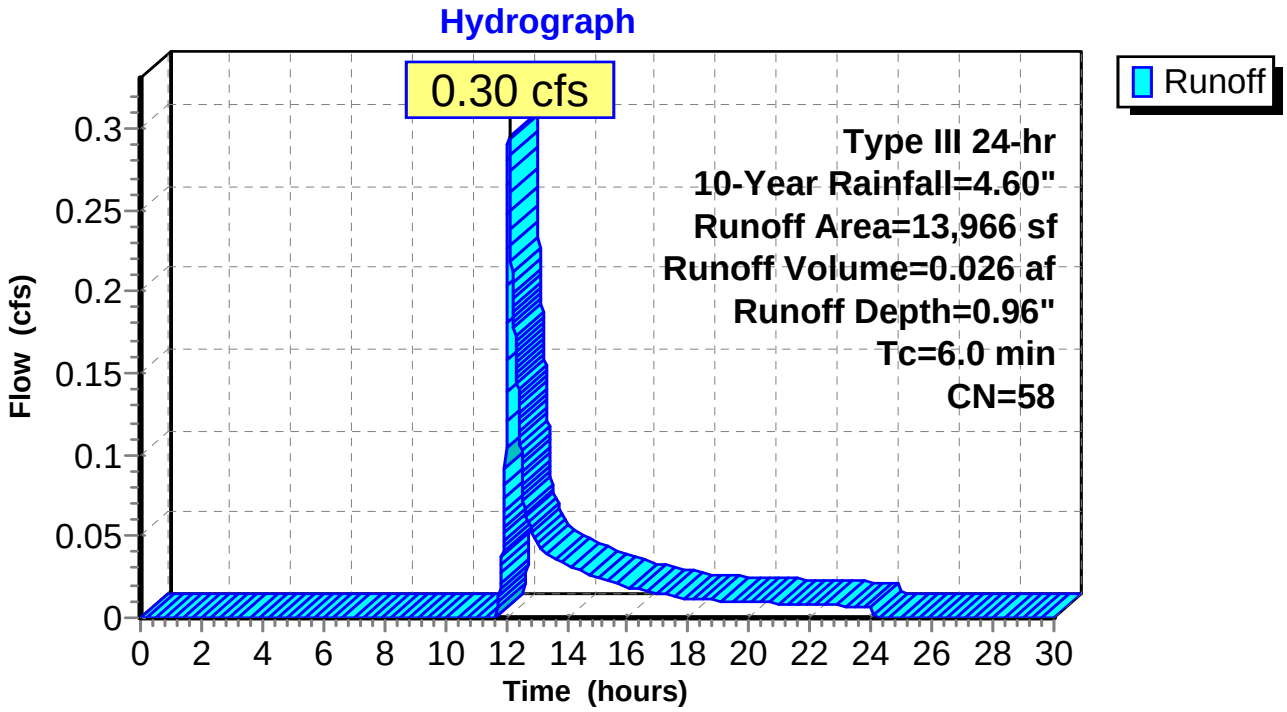
Runoff = 0.30 cfs @ 12.11 hrs, Volume= 0.026 af, Depth= 0.96"

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 Rainfall=4.60"

	Area (sf)	CN	Description
	8,944	39	>75% Grass cover, Good, HSG A
*	1,700	76	Tennis Court Clay, HSG A
*	3,322	98	Paved walk, patio, HSG A
	13,966	58	Weighted Average
	10,644		76.21% Pervious Area
	3,322		23.79% Impervious Area

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

Subcatchment P-2A: N'ly By-Pass



Summary for Subcatchment P-2B: N'ly Roof Area

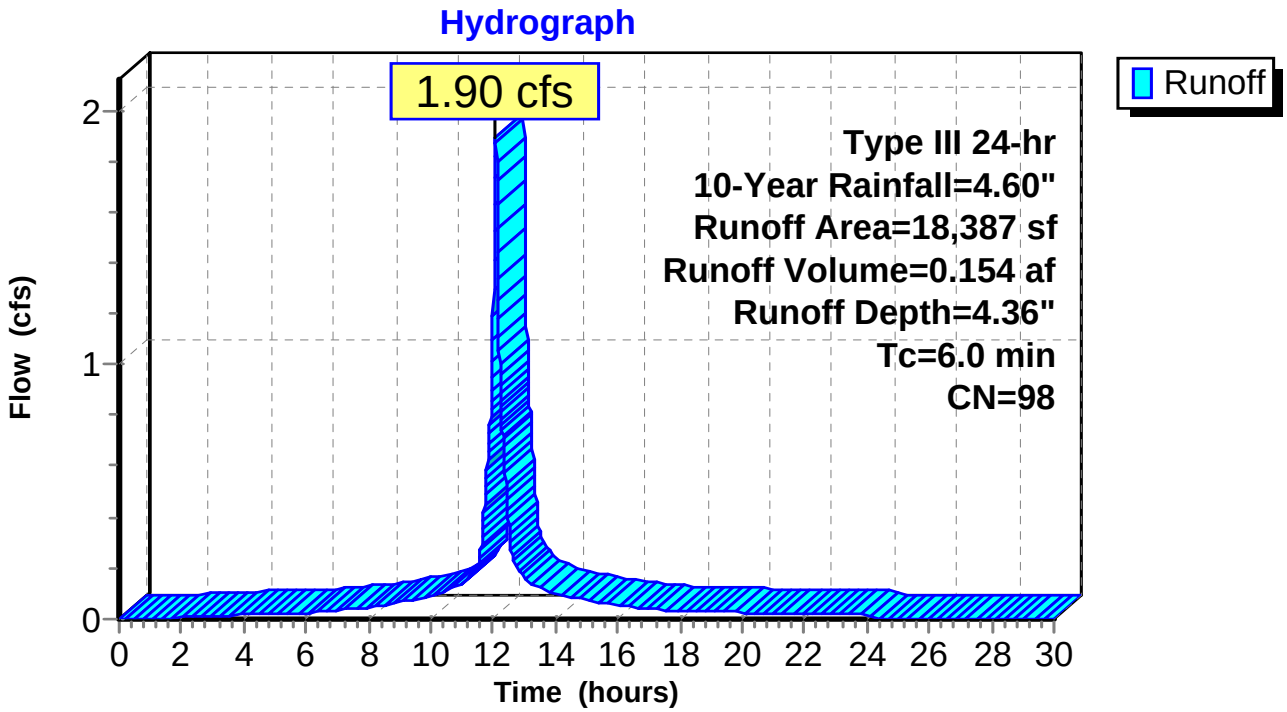
Runoff = 1.90 cfs @ 12.08 hrs, Volume= 0.154 af, Depth= 4.36"

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 Rainfall=4.60"

Area (sf)	CN	Description
18,387	98	Roofs, HSG A
18,387		100.00% Impervious Area

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

Subcatchment P-2B: N'ly Roof Area



Summary for Pond 1P: SC-740 Sys 1

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-Year event
Inflow = 1.93 cfs @ 12.08 hrs, Volume= 0.156 af
Outflow = 0.53 cfs @ 12.42 hrs, Volume= 0.156 af, Atten= 72%, Lag= 20.4 min
Discarded = 0.23 cfs @ 11.58 hrs, Volume= 0.148 af
Primary = 0.30 cfs @ 12.42 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 149.27' @ 12.42 hrs Surf.Area= 0.028 ac Storage= 0.042 af

Plug-Flow detention time= 40.8 min calculated for 0.156 af (100% of inflow)
Center-of-Mass det. time= 40.8 min (790.2 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	147.00'	0.027 af	**49.00'W x 24.98'L x 3.50'H Field A** 0.098 af Overall - 0.032 af Embedded = 0.067 af x 40.0% Voids
#2A	147.50'	0.032 af	**ADS_StormTech SC-740 +Cap** x 30 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 30 Chambers in 10 Rows
		0.058 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	147.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	149.00'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 149.00' / 148.60' S= 0.0211 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.23 cfs @ 11.58 hrs HW=147.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.30 cfs @ 12.42 hrs HW=149.27' (Free Discharge)
└─**2=Culvert** (Inlet Controls 0.30 cfs @ 1.76 fps)

Pond 1P: SC-740 Sys 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

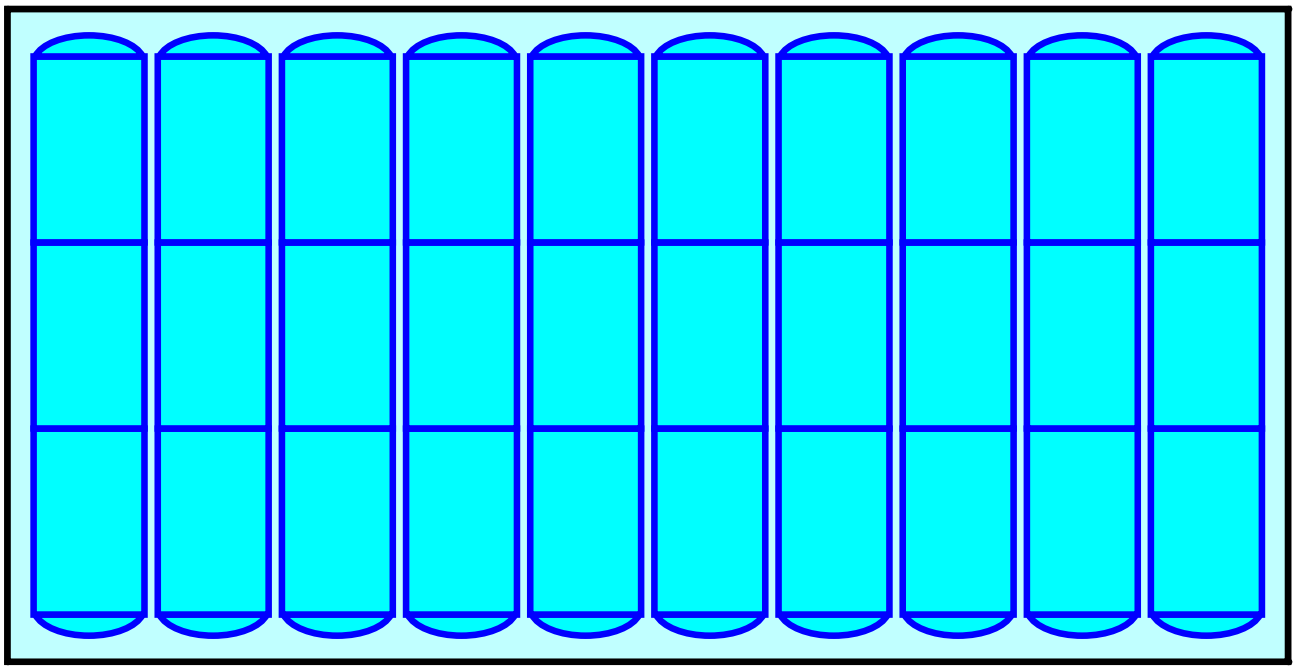
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
10 Rows x 51.0" Wide + 6.0" Spacing x 9 + 12.0" Side Stone x 2 = 49.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

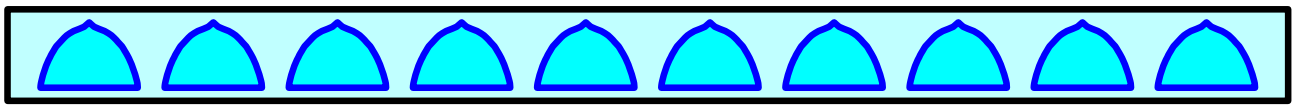
30 Chambers x 45.9 cf = 1,378.2 cf Chamber Storage

4,283.5 cf Field - 1,378.2 cf Chambers = 2,905.3 cf Stone x 40.0% Voids = 1,162.1 cf Stone Storage

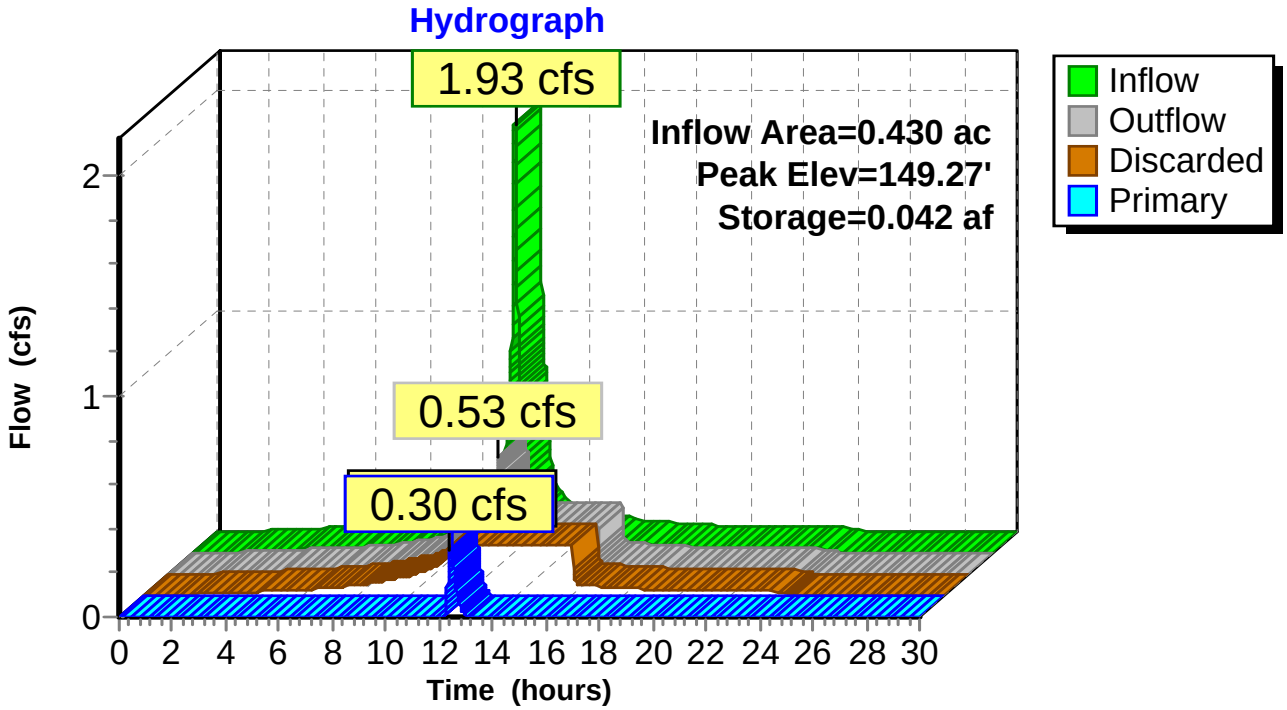
Chamber Storage + Stone Storage = 2,540.3 cf = 0.058 af
Overall Storage Efficiency = 59.3%
Overall System Size = 24.98' x 49.00' x 3.50'

30 Chambers
158.6 cy Field
107.6 cy Stone





Pond 1P: SC-740 Sys 1



Summary for Pond 2P: SC-740 Sys 2

Inflow Area = 0.422 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-Year event
Inflow = 1.90 cfs @ 12.08 hrs, Volume= 0.154 af
Outflow = 0.39 cfs @ 11.71 hrs, Volume= 0.154 af, Atten= 79%, Lag= 0.0 min
Discarded = 0.39 cfs @ 11.71 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 155.43' @ 12.50 hrs Surf.Area= 0.047 ac Storage= 0.034 af

Plug-Flow detention time= 18.4 min calculated for 0.153 af (100% of inflow)
Center-of-Mass det. time= 18.4 min (767.9 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	154.25'	0.046 af	**115.50'W x 17.86'L x 3.50'H Field A** 0.166 af Overall - 0.051 af Embedded = 0.115 af x 40.0% Voids
#2A	154.75'	0.051 af	**ADS_StormTech SC-740 +Cap** x 48 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 24 Rows
		0.097 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	154.25'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.39 cfs @ 11.71 hrs HW=154.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Pond 2P: SC-740 Sys 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

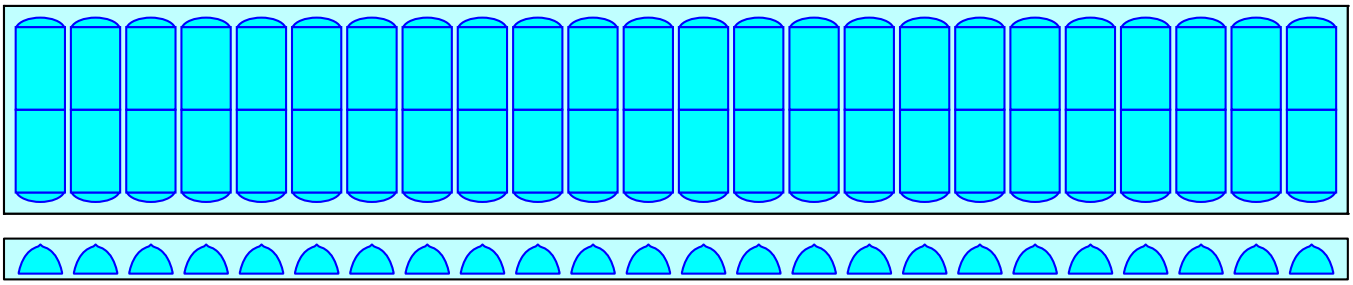
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
24 Rows x 51.0" Wide + 6.0" Spacing x 23 + 12.0" Side Stone x 2 = 115.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

48 Chambers x 45.9 cf = 2,205.1 cf Chamber Storage

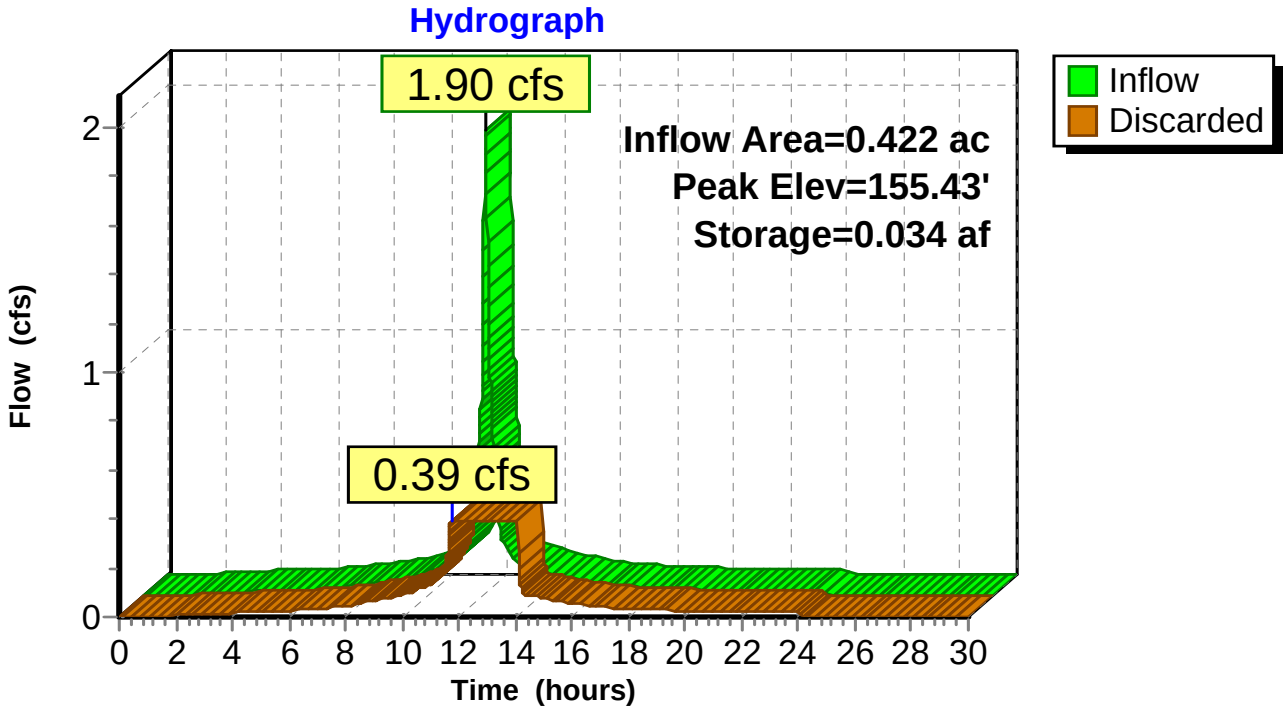
7,218.6 cf Field - 2,205.1 cf Chambers = 5,013.4 cf Stone x 40.0% Voids = 2,005.4 cf Stone Storage

Chamber Storage + Stone Storage = 4,210.5 cf = 0.097 af
Overall Storage Efficiency = 58.3%
Overall System Size = 17.86' x 115.50' x 3.50'

48 Chambers
267.4 cy Field
185.7 cy Stone



Pond 2P: SC-740 Sys 2

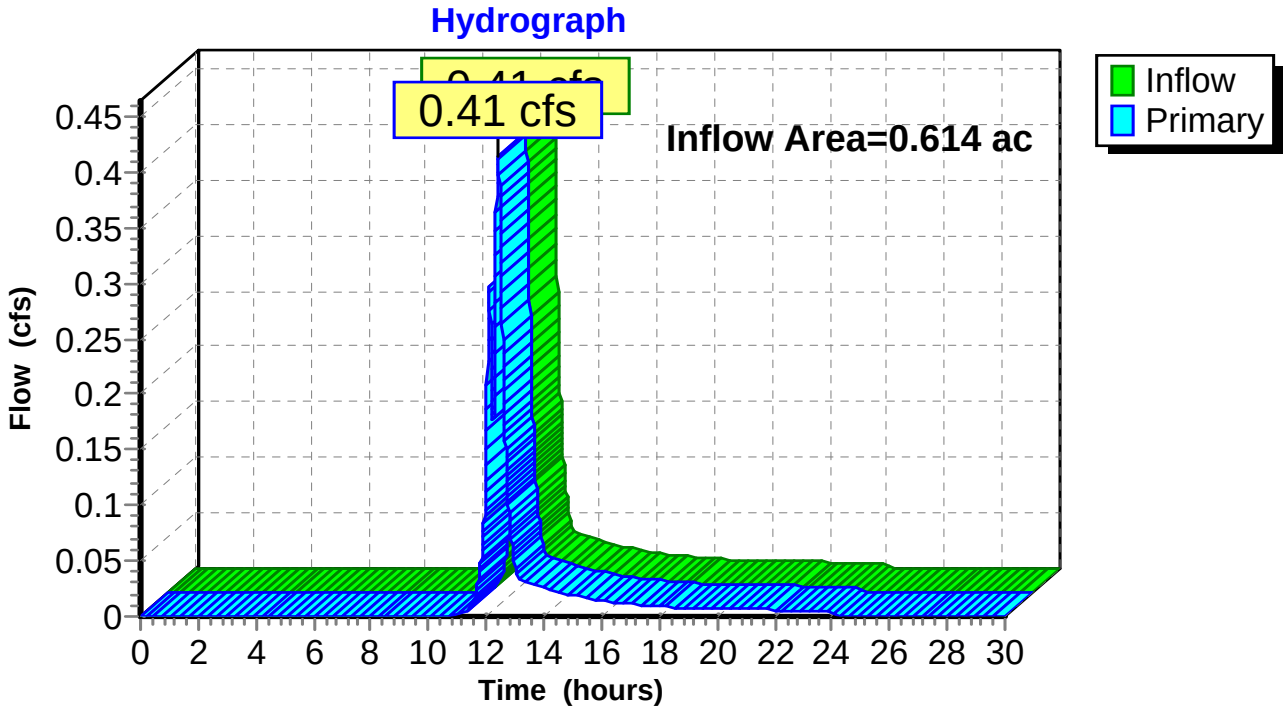


Summary for Link 2L: Prop S'ly Area

Inflow Area = 0.614 ac, 83.48% Impervious, Inflow Depth = 0.60" for 10-Year event
Inflow = 0.41 cfs @ 12.41 hrs, Volume= 0.031 af
Primary = 0.41 cfs @ 12.41 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2L: Prop S'ly Area



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 P-1A: S'ly By-Pass Runoff Area=8,037 sf 45.00% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=66 Runoff=0.43 cfs 0.031 af

Subcatchment P-1B: S'ly Roof Area Runoff Area=18,719 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=2.29 cfs 0.187 af

Subcatchment P-2A: N'ly By-Pass Runoff Area=13,966 sf 23.79% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=58 Runoff=0.48 cfs 0.038 af

Subcatchment P-2B: N'ly Roof Area Runoff Area=18,387 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=2.25 cfs 0.183 af

Pond 1P: SC-740 Sys 1 Peak Elev=149.43' Storage=0.045 af Inflow=2.29 cfs 0.187 af
Discarded=0.23 cfs 0.165 af Primary=0.71 cfs 0.022 af Outflow=0.94 cfs 0.187 af

Pond 2P: SC-740 Sys 2 Peak Elev=155.76' Storage=0.045 af Inflow=2.25 cfs 0.183 af
Outflow=0.39 cfs 0.183 af

Link 2L: Prop S'ly Area Inflow=0.93 cfs 0.053 af
Primary=0.93 cfs 0.053 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.439 af Average Runoff Depth = 3.89"
25.49% Pervious = 0.346 ac 74.51% Impervious = 1.011 ac

Summary for Subcatchment P-1A: S'ly By-Pass

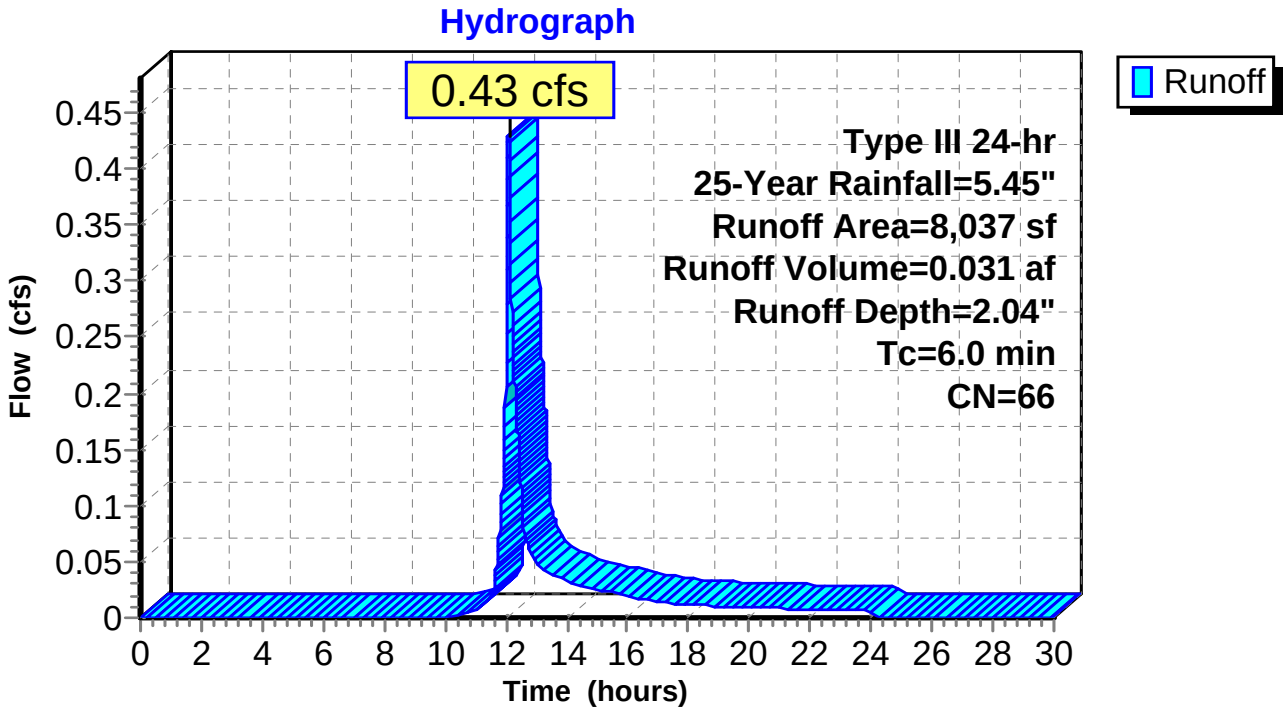
Runoff = 0.43 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 2.04"

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 25-Year Rainfall=5.45"

Area (sf)	CN	Description
4,420	39	>75% Grass cover, Good, HSG A
3,617	98	Paved parking, HSG A
8,037	66	Weighted Average
4,420		55.00% Pervious Area
3,617		45.00% Impervious Area

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

Subcatchment P-1A: S'ly By-Pass



Summary for Subcatchment P-1B: S'ly Roof Area

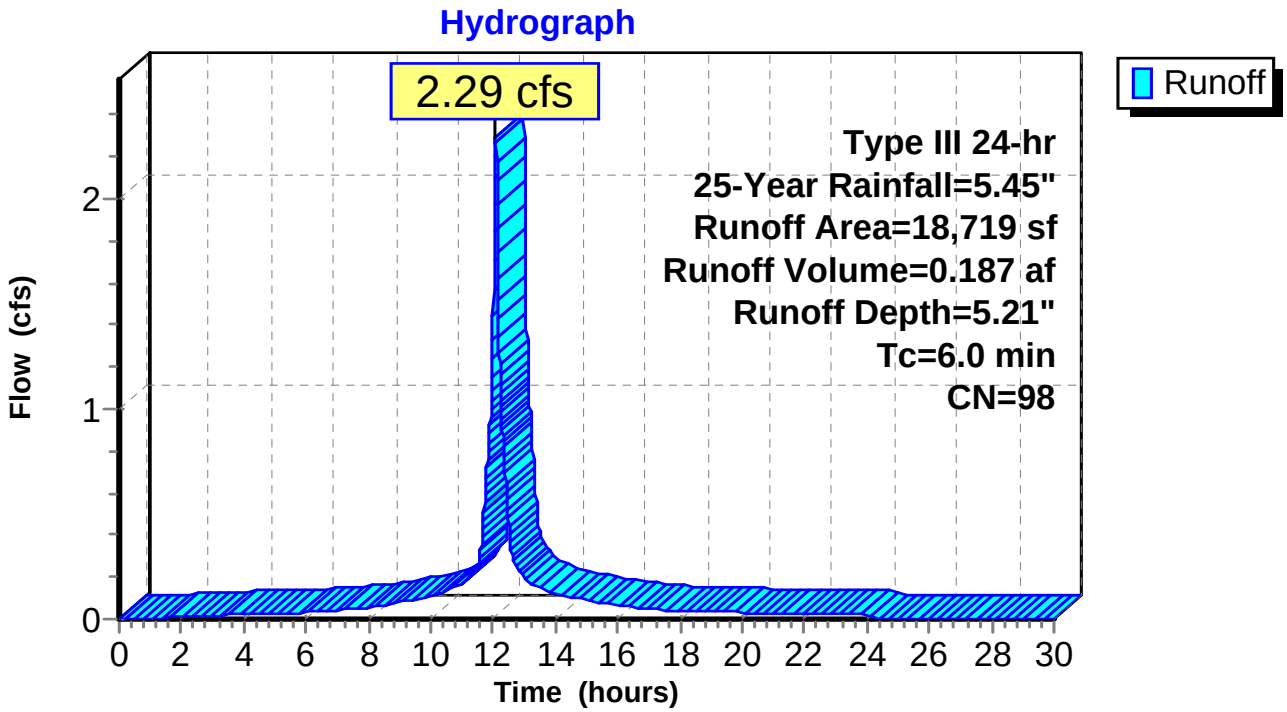
Runoff = 2.29 cfs @ 12.08 hrs, Volume= 0.187 af, Depth= 5.21"

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 25-Year Rainfall=5.45"

Area (sf)	CN	Description
18,719	98	Roofs, HSG A
18,719		100.00% Impervious Area

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

Subcatchment P-1B: S'ly Roof Area



Summary for Subcatchment P-2A: N'ly By-Pass

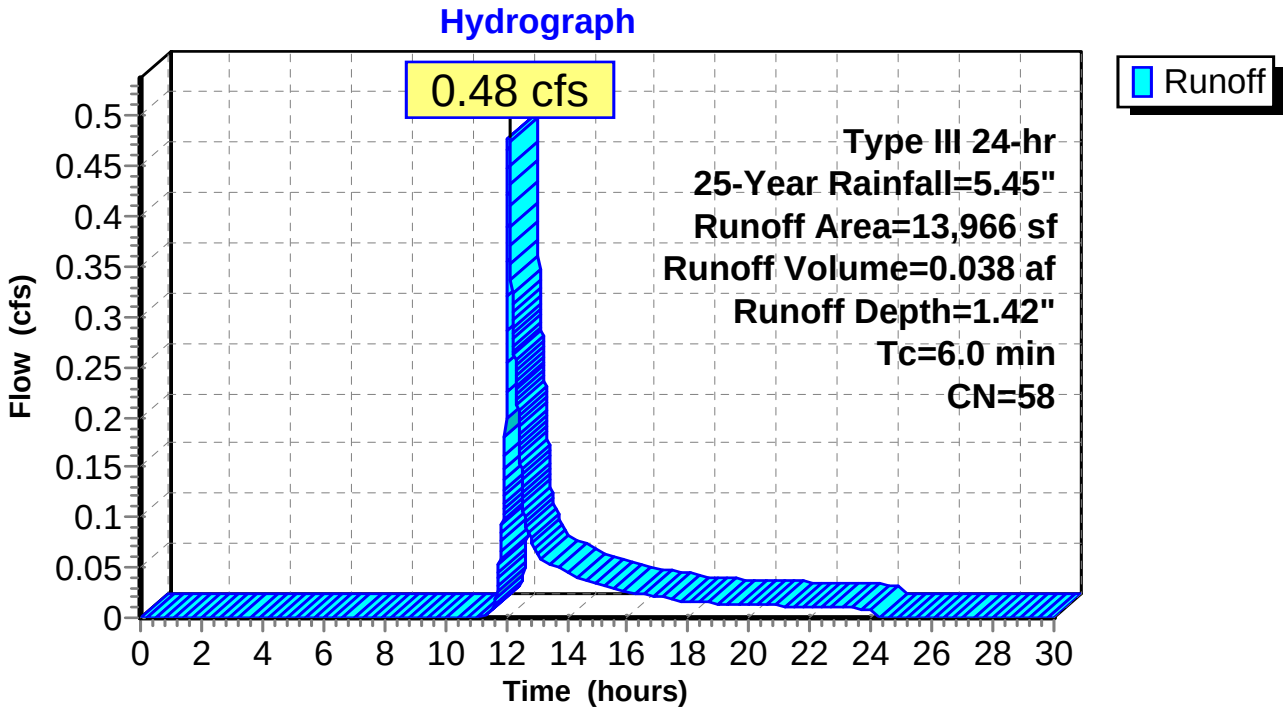
Runoff = 0.48 cfs @ 12.10 hrs, Volume= 0.038 af, Depth= 1.42"

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 25-Year Rainfall=5.45"

	Area (sf)	CN	Description
	8,944	39	>75% Grass cover, Good, HSG A
*	1,700	76	Tennis Court Clay, HSG A
*	3,322	98	Paved walk, patio, HSG A
	13,966	58	Weighted Average
	10,644		76.21% Pervious Area
	3,322		23.79% Impervious Area

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

Subcatchment P-2A: N'ly By-Pass



Summary for Subcatchment P-2B: N'ly Roof Area

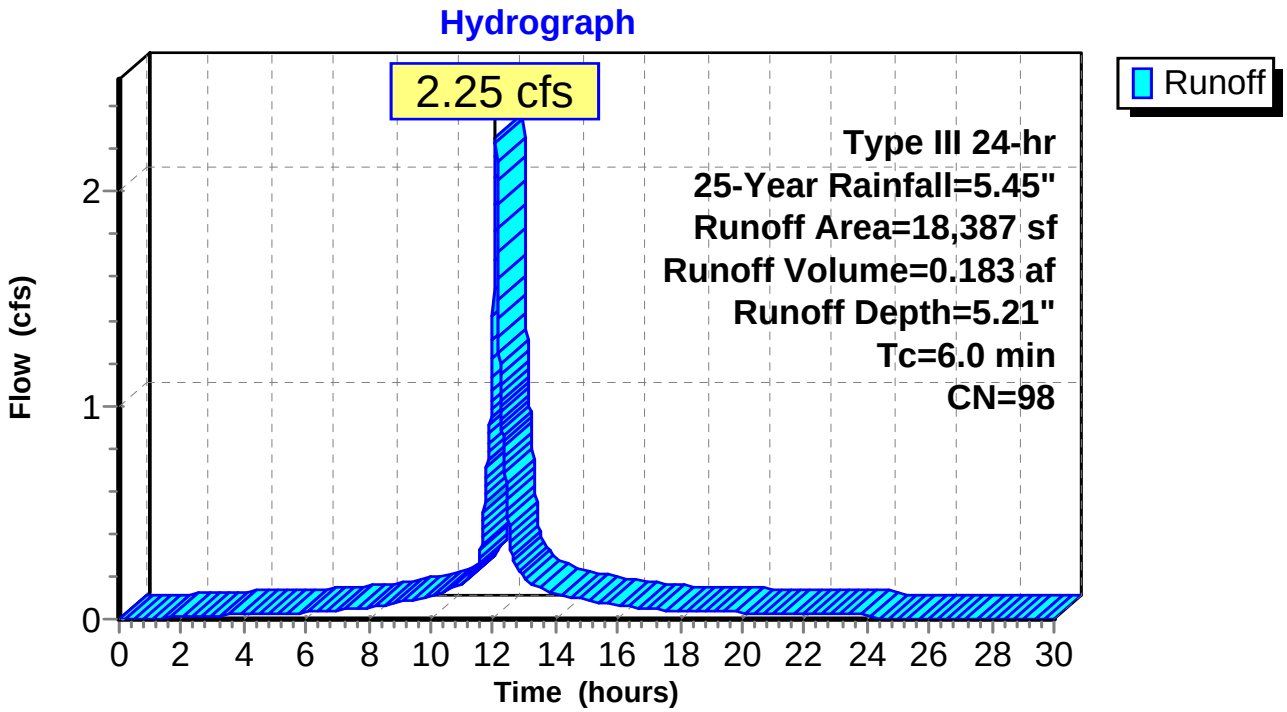
Runoff = 2.25 cfs @ 12.08 hrs, Volume= 0.183 af, Depth= 5.21"

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 25-Year Rainfall=5.45"

Area (sf)	CN	Description
18,387	98	Roofs, HSG A
18,387		100.00% Impervious Area

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

Subcatchment P-2B: N'ly Roof Area



Summary for Pond 1P: SC-740 Sys 1

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth = 5.21" for 25-Year event
Inflow = 2.29 cfs @ 12.08 hrs, Volume= 0.187 af
Outflow = 0.94 cfs @ 12.28 hrs, Volume= 0.187 af, Atten= 59%, Lag= 12.1 min
Discarded = 0.23 cfs @ 11.42 hrs, Volume= 0.165 af
Primary = 0.71 cfs @ 12.28 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 149.43' @ 12.28 hrs Surf.Area= 0.028 ac Storage= 0.045 af

Plug-Flow detention time= 38.9 min calculated for 0.187 af (100% of inflow)
Center-of-Mass det. time= 38.9 min (785.5 - 746.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	147.00'	0.027 af	**49.00'W x 24.98'L x 3.50'H Field A** 0.098 af Overall - 0.032 af Embedded = 0.067 af x 40.0% Voids
#2A	147.50'	0.032 af	**ADS_StormTech SC-740 +Cap** x 30 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 30 Chambers in 10 Rows
		0.058 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	147.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	149.00'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 149.00' / 148.60' S= 0.0211 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.23 cfs @ 11.42 hrs HW=147.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.71 cfs @ 12.28 hrs HW=149.43' (Free Discharge)
└─**2=Culvert** (Inlet Controls 0.71 cfs @ 2.22 fps)

Pond 1P: SC-740 Sys 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

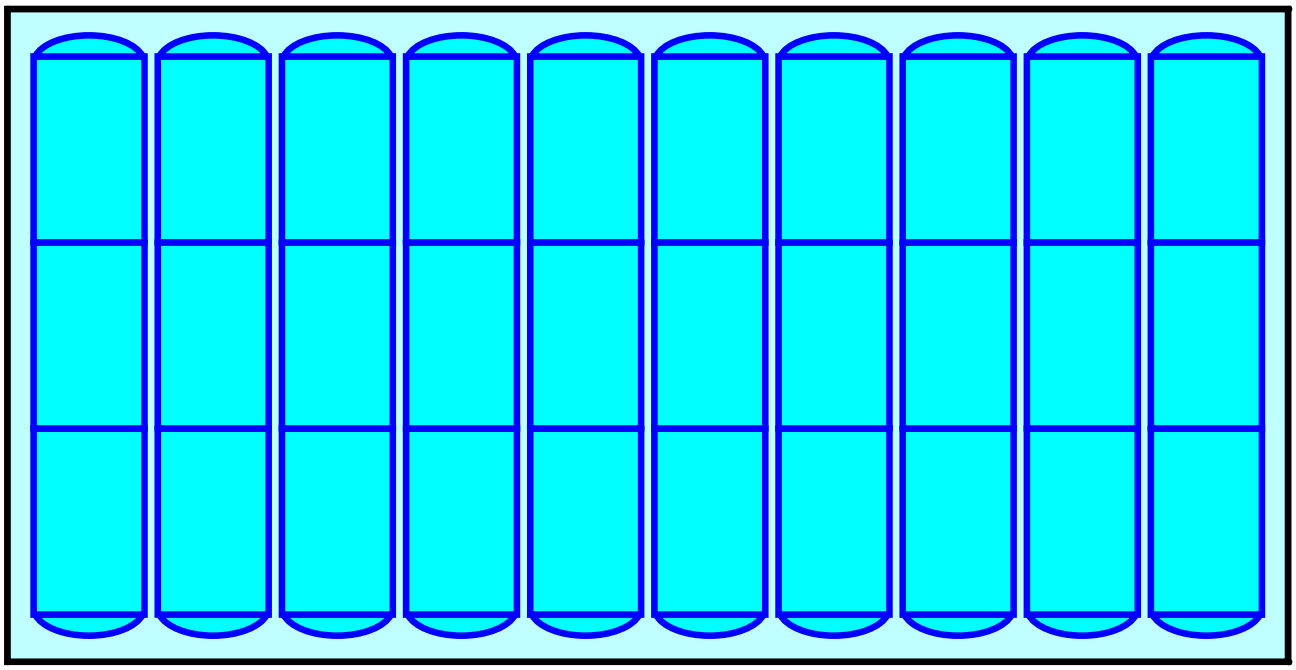
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
10 Rows x 51.0" Wide + 6.0" Spacing x 9 + 12.0" Side Stone x 2 = 49.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

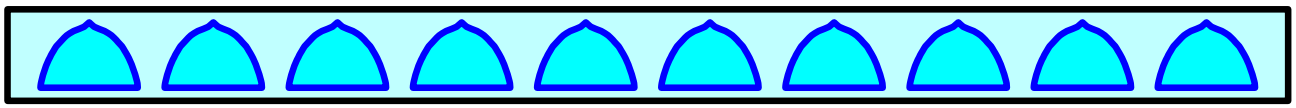
30 Chambers x 45.9 cf = 1,378.2 cf Chamber Storage

4,283.5 cf Field - 1,378.2 cf Chambers = 2,905.3 cf Stone x 40.0% Voids = 1,162.1 cf Stone Storage

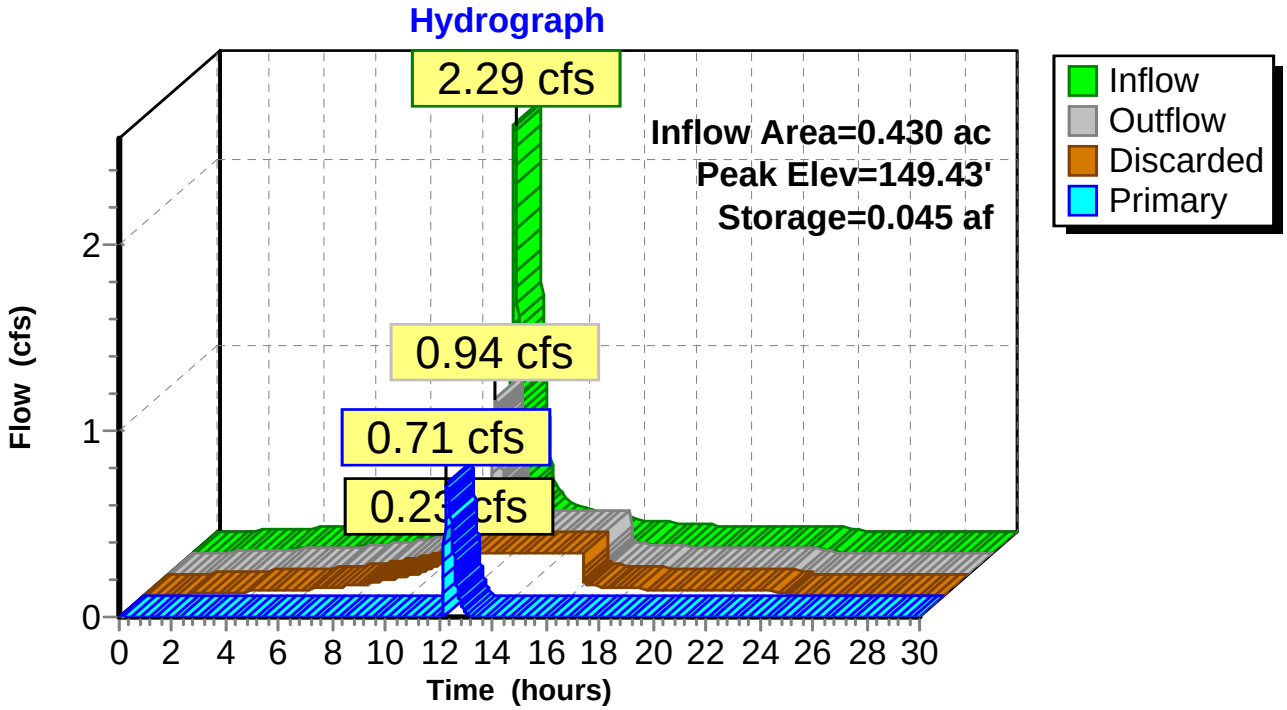
Chamber Storage + Stone Storage = 2,540.3 cf = 0.058 af
Overall Storage Efficiency = 59.3%
Overall System Size = 24.98' x 49.00' x 3.50'

30 Chambers
158.6 cy Field
107.6 cy Stone





Pond 1P: SC-740 Sys 1



Summary for Pond 2P: SC-740 Sys 2

Inflow Area = 0.422 ac,100.00% Impervious, Inflow Depth = 5.21" for 25-Year event
Inflow = 2.25 cfs @ 12.08 hrs, Volume= 0.183 af
Outflow = 0.39 cfs @ 11.67 hrs, Volume= 0.183 af, Atten= 82%, Lag= 0.0 min
Discarded = 0.39 cfs @ 11.67 hrs, Volume= 0.183 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 155.76' @ 12.53 hrs Surf.Area= 0.047 ac Storage= 0.045 af

Plug-Flow detention time= 26.0 min calculated for 0.183 af (100% of inflow)
Center-of-Mass det. time= 26.0 min (772.7 - 746.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	154.25'	0.046 af	**115.50'W x 17.86'L x 3.50'H Field A** 0.166 af Overall - 0.051 af Embedded = 0.115 af x 40.0% Voids
#2A	154.75'	0.051 af	**ADS_StormTech SC-740 +Cap** x 48 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 24 Rows
		0.097 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	154.25'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.39 cfs @ 11.67 hrs HW=154.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Pond 2P: SC-740 Sys 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

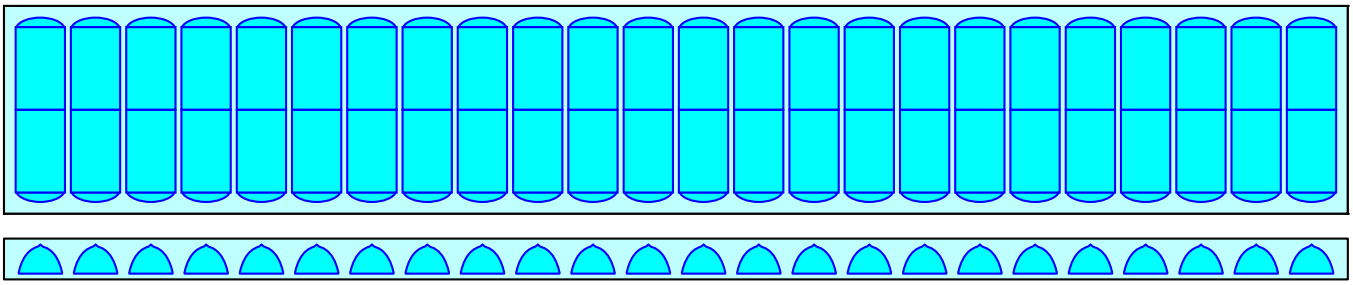
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
24 Rows x 51.0" Wide + 6.0" Spacing x 23 + 12.0" Side Stone x 2 = 115.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

48 Chambers x 45.9 cf = 2,205.1 cf Chamber Storage

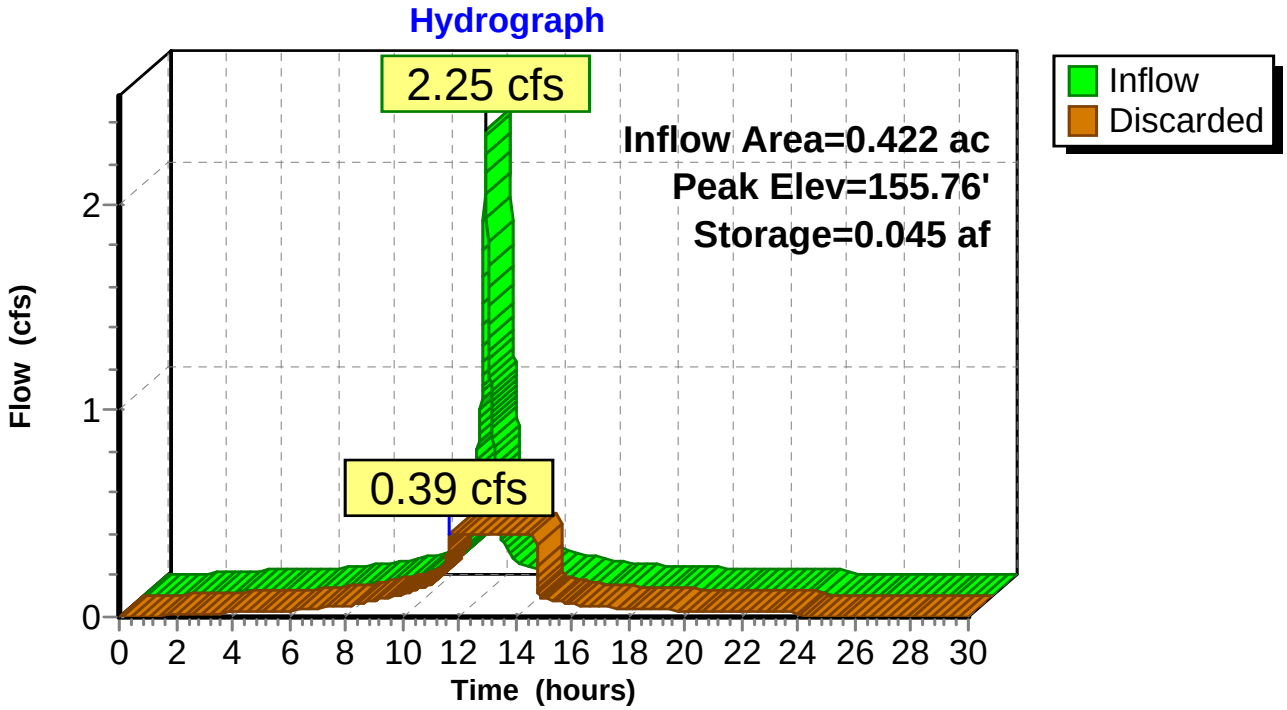
7,218.6 cf Field - 2,205.1 cf Chambers = 5,013.4 cf Stone x 40.0% Voids = 2,005.4 cf Stone Storage

Chamber Storage + Stone Storage = 4,210.5 cf = 0.097 af
Overall Storage Efficiency = 58.3%
Overall System Size = 17.86' x 115.50' x 3.50'

48 Chambers
267.4 cy Field
185.7 cy Stone



Pond 2P: SC-740 Sys 2

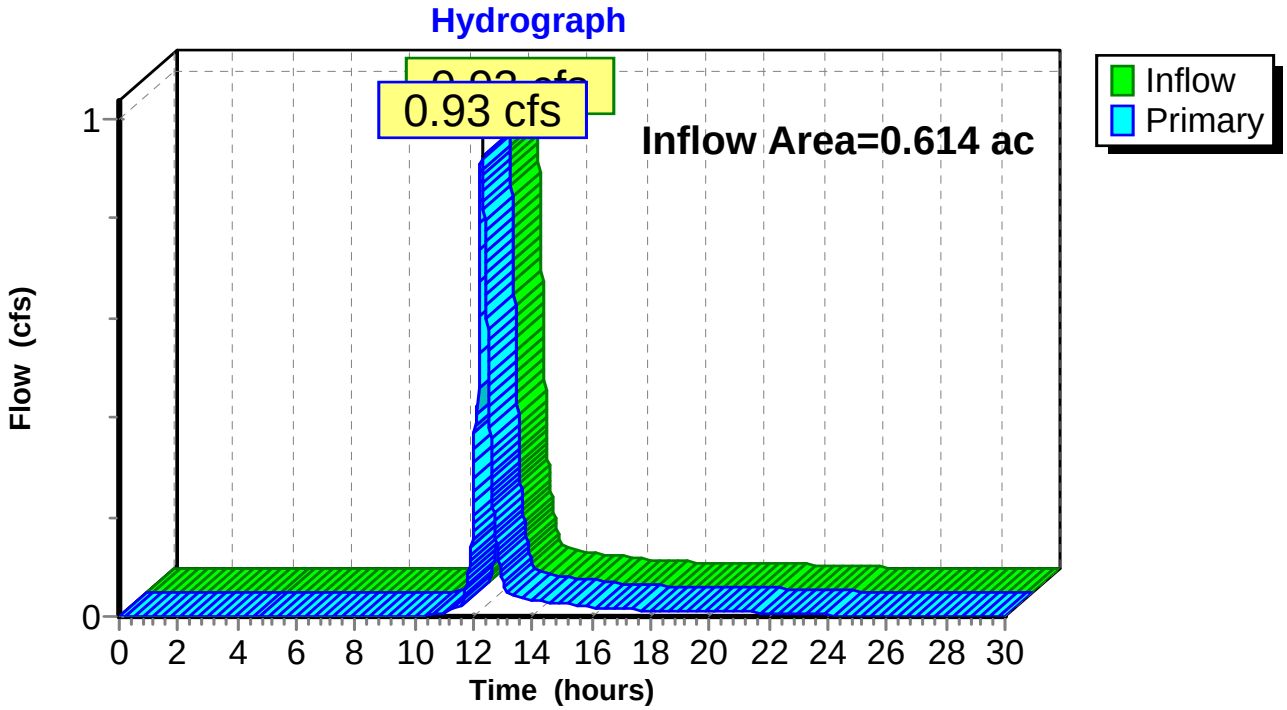


Summary for Link 2L: Prop S'ly Area

Inflow Area = 0.614 ac, 83.48% Impervious, Inflow Depth = 1.03" for 25-Year event
Inflow = 0.93 cfs @ 12.27 hrs, Volume= 0.053 af
Primary = 0.93 cfs @ 12.27 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2L: Prop S'ly Area



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 P-1A: S'ly By-Pass Runoff Area=8,037 sf 45.00% Impervious Runoff Depth=2.89"
Tc=6.0 min CN=66 Runoff=0.62 cfs 0.044 af

Subcatchment P-1B: S'ly Roof Area Runoff Area=18,719 sf 100.00% Impervious Runoff Depth=6.36"
Tc=6.0 min CN=98 Runoff=2.78 cfs 0.228 af

Subcatchment P-2A: N'ly By-Pass Runoff Area=13,966 sf 23.79% Impervious Runoff Depth=2.14"
Tc=6.0 min CN=58 Runoff=0.76 cfs 0.057 af

Subcatchment P-2B: N'ly Roof Area Runoff Area=18,387 sf 100.00% Impervious Runoff Depth=6.36"
Tc=6.0 min CN=98 Runoff=2.73 cfs 0.224 af

Pond 1P: SC-740 Sys 1 Peak Elev=149.64' Storage=0.048 af Inflow=2.78 cfs 0.228 af
Discarded=0.23 cfs 0.187 af Primary=1.45 cfs 0.041 af Outflow=1.69 cfs 0.228 af

Pond 2P: SC-740 Sys 2 Peak Elev=156.25' Storage=0.061 af Inflow=2.73 cfs 0.224 af
Outflow=0.39 cfs 0.224 af

Link 2L: Prop S'ly Area Inflow=1.88 cfs 0.086 af
Primary=1.88 cfs 0.086 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.553 af Average Runoff Depth = 4.89"
25.49% Pervious = 0.346 ac 74.51% Impervious = 1.011 ac

Summary for Subcatchment P-1A: S'ly By-Pass

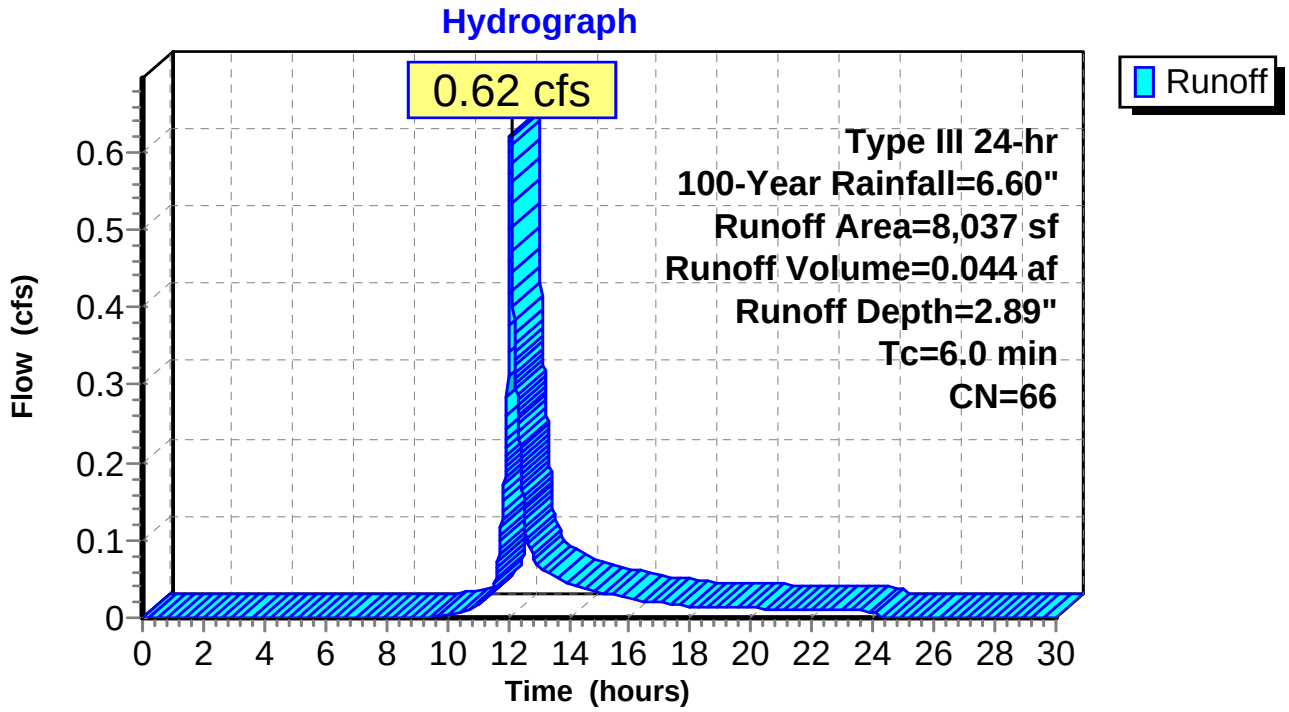
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 2.89"

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 Rainfall=6.60"

Area (sf)	CN	Description
4,420	39	>75% Grass cover, Good, HSG A
3,617	98	Paved parking, HSG A
8,037	66	Weighted Average
4,420		55.00% Pervious Area
3,617		45.00% Impervious Area

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

Subcatchment P-1A: S'ly By-Pass



Summary for Subcatchment P-1B: S'ly Roof Area

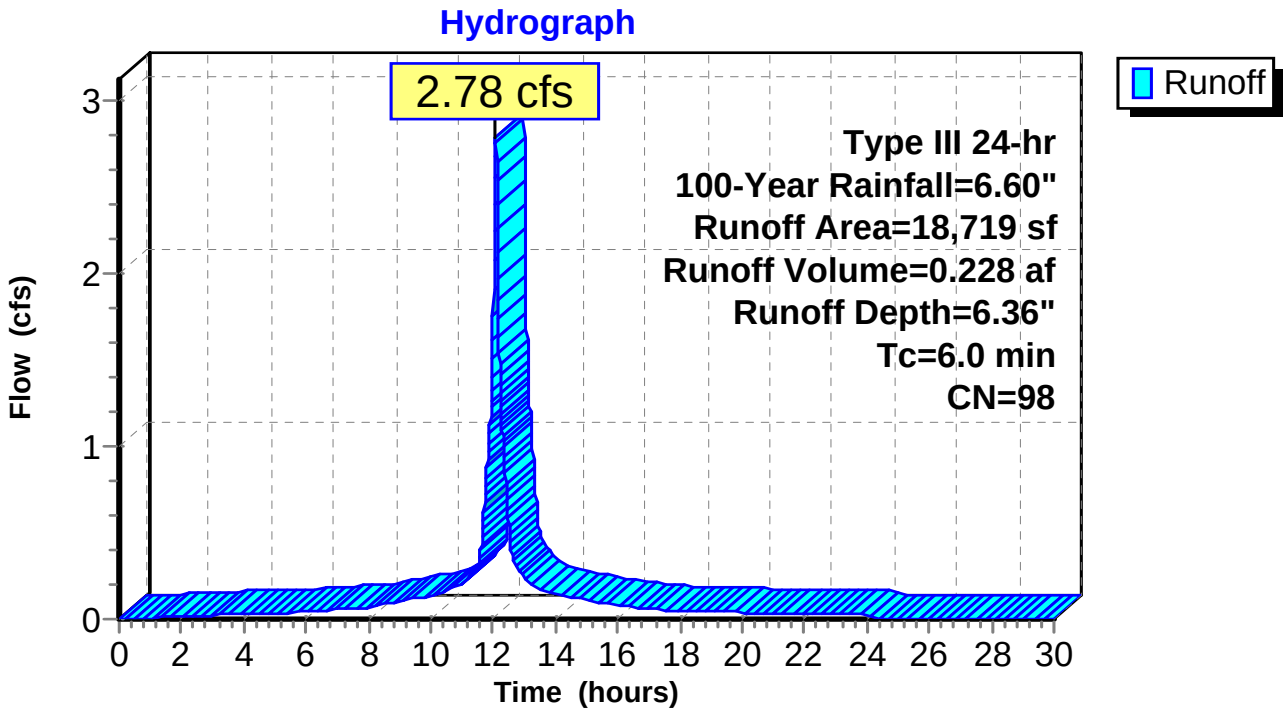
Runoff = 2.78 cfs @ 12.08 hrs, Volume= 0.228 af, Depth= 6.36"

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 Rainfall=6.60"

Area (sf)	CN	Description
18,719	98	Roofs, HSG A
18,719		100.00% Impervious Area

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

Subcatchment P-1B: S'ly Roof Area



Summary for Subcatchment P-2A: N'ly By-Pass

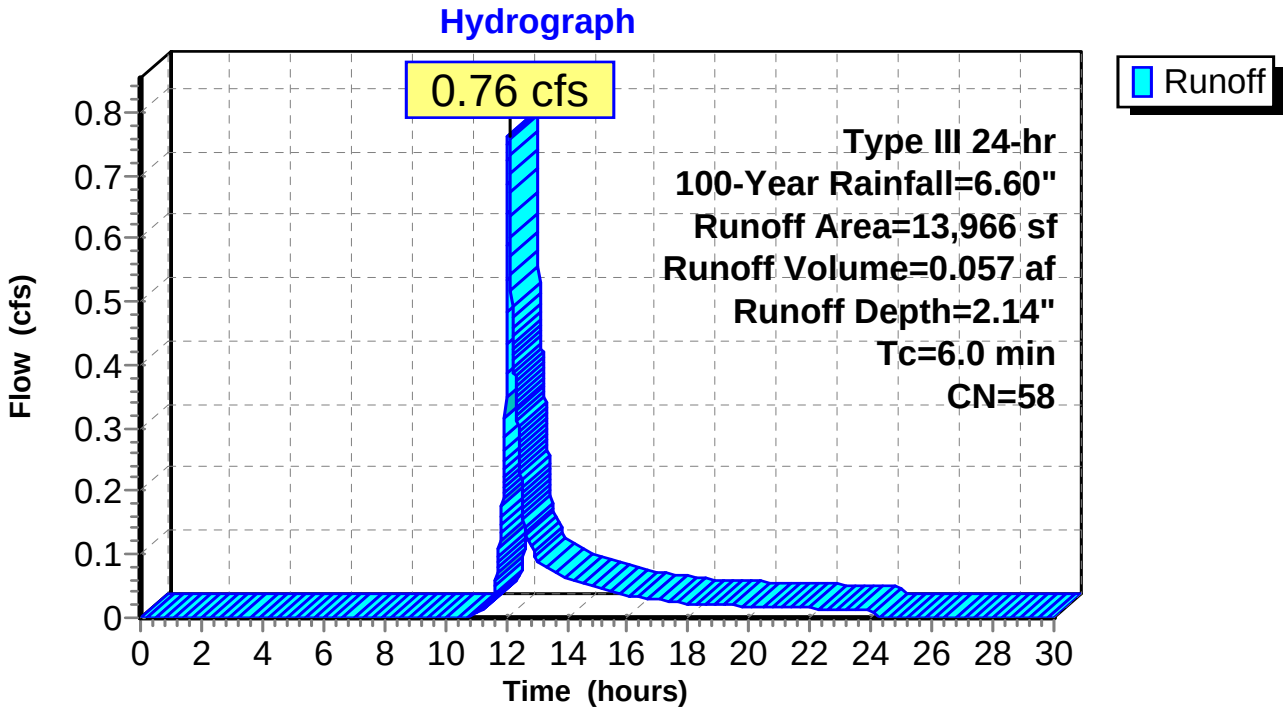
Runoff = 0.76 cfs @ 12.10 hrs, Volume= 0.057 af, Depth= 2.14"

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 Rainfall=6.60"

	Area (sf)	CN	Description
	8,944	39	>75% Grass cover, Good, HSG A
*	1,700	76	Tennis Court Clay, HSG A
*	3,322	98	Paved walk, patio, HSG A
	13,966	58	Weighted Average
	10,644		76.21% Pervious Area
	3,322		23.79% Impervious Area

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

Subcatchment P-2A: N'ly By-Pass



Summary for Subcatchment P-2B: N'ly Roof Area

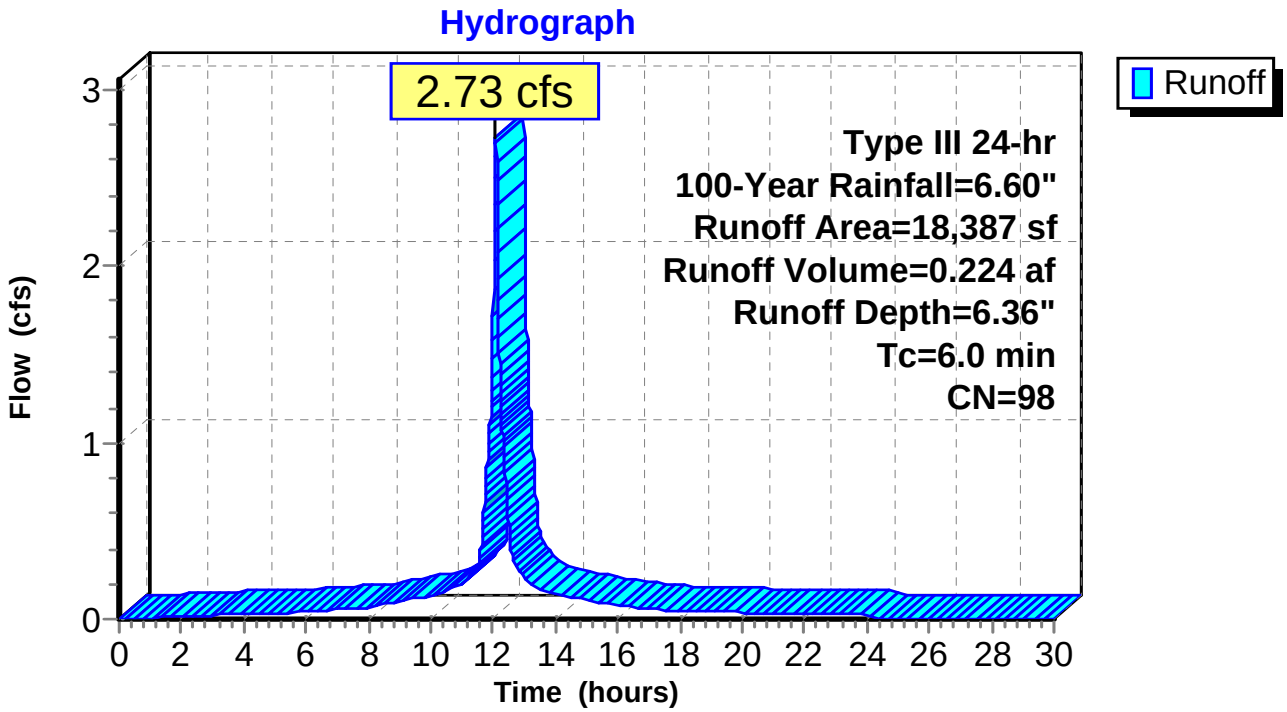
Runoff = 2.73 cfs @ 12.08 hrs, Volume= 0.224 af, Depth= 6.36"

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 Rainfall=6.60"

Area (sf)	CN	Description
18,387	98	Roofs, HSG A
18,387		100.00% Impervious Area

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

Subcatchment P-2B: N'ly Roof Area



Summary for Pond 1P: SC-740 Sys 1

Inflow Area =	0.430 ac,100.00% Impervious, Inflow Depth = 6.36" for 100-Year event				
Inflow =	2.78 cfs @	12.08 hrs,	Volume=	0.228 af	
Outflow =	1.69 cfs @	12.18 hrs,	Volume=	0.228 af,	Atten= 39%, Lag= 6.1 min
Discarded =	0.23 cfs @	11.22 hrs,	Volume=	0.187 af	
Primary =	1.45 cfs @	12.18 hrs,	Volume=	0.041 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 149.64' @ 12.18 hrs Surf.Area= 0.028 ac Storage= 0.048 af

Plug-Flow detention time= 37.1 min calculated for 0.228 af (100% of inflow)
Center-of-Mass det. time= 37.1 min (780.9 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	147.00'	0.027 af	**49.00'W x 24.98'L x 3.50'H Field A** 0.098 af Overall - 0.032 af Embedded = 0.067 af x 40.0% Voids
#2A	147.50'	0.032 af	**ADS_StormTech SC-740 +Cap** x 30 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 30 Chambers in 10 Rows
		0.058 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	147.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	149.00'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 149.00' / 148.60' S= 0.0211 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.23 cfs @ 11.22 hrs HW=147.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=1.45 cfs @ 12.18 hrs HW=149.64' (Free Discharge)
└─**2=Culvert** (Inlet Controls 1.45 cfs @ 2.73 fps)

Pond 1P: SC-740 Sys 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

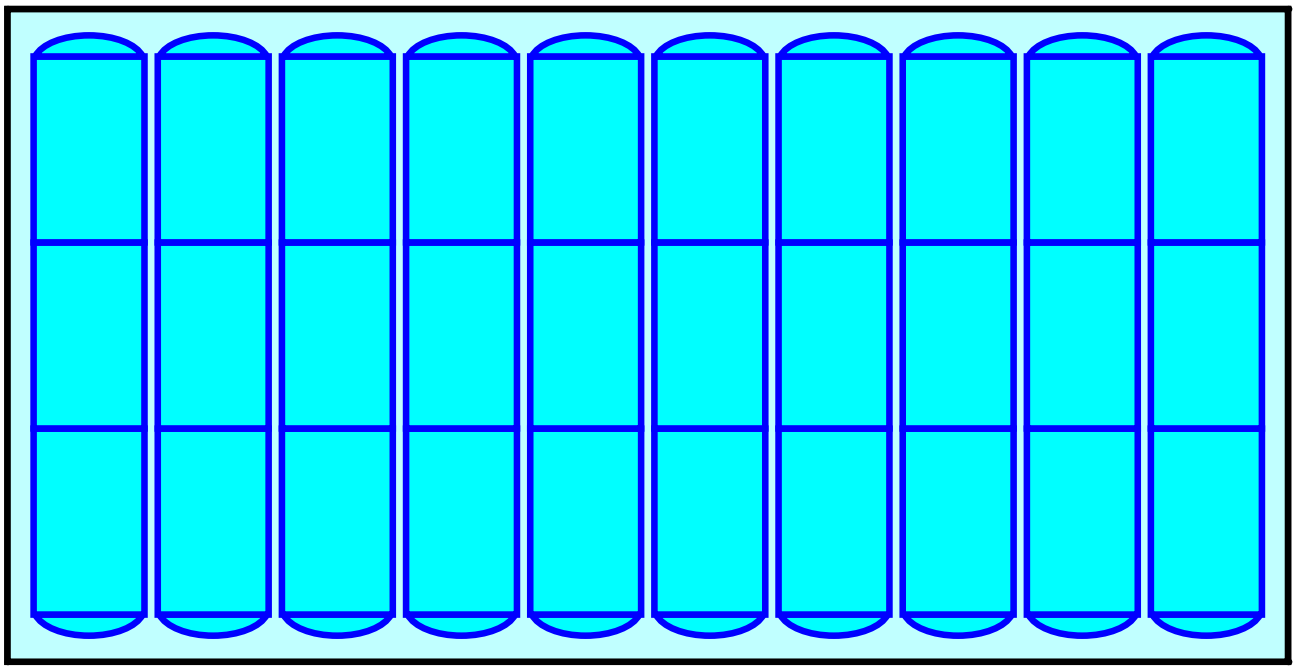
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
10 Rows x 51.0" Wide + 6.0" Spacing x 9 + 12.0" Side Stone x 2 = 49.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

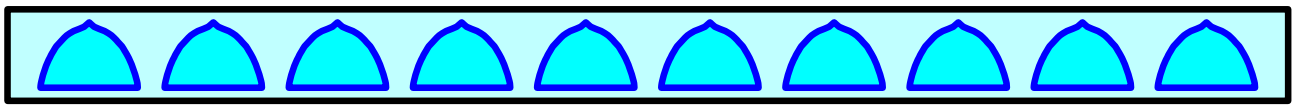
30 Chambers x 45.9 cf = 1,378.2 cf Chamber Storage

4,283.5 cf Field - 1,378.2 cf Chambers = 2,905.3 cf Stone x 40.0% Voids = 1,162.1 cf Stone Storage

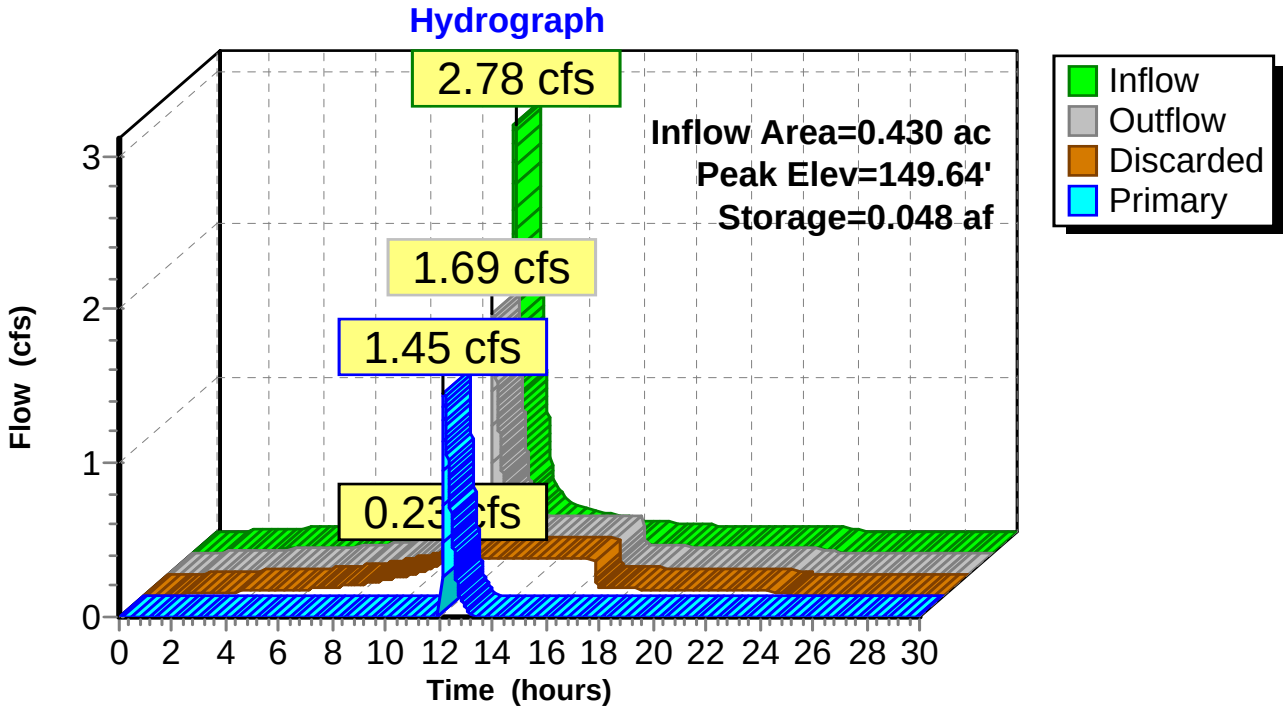
Chamber Storage + Stone Storage = 2,540.3 cf = 0.058 af
Overall Storage Efficiency = 59.3%
Overall System Size = 24.98' x 49.00' x 3.50'

30 Chambers
158.6 cy Field
107.6 cy Stone





Pond 1P: SC-740 Sys 1



Summary for Pond 2P: SC-740 Sys 2

Inflow Area = 0.422 ac,100.00% Impervious, Inflow Depth = 6.36" for 100-Year event
Inflow = 2.73 cfs @ 12.08 hrs, Volume= 0.224 af
Outflow = 0.39 cfs @ 11.63 hrs, Volume= 0.224 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.39 cfs @ 11.63 hrs, Volume= 0.224 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 156.25' @ 12.58 hrs Surf.Area= 0.047 ac Storage= 0.061 af

Plug-Flow detention time= 37.8 min calculated for 0.224 af (100% of inflow)
Center-of-Mass det. time= 37.8 min (781.6 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	154.25'	0.046 af	**115.50'W x 17.86'L x 3.50'H Field A** 0.166 af Overall - 0.051 af Embedded = 0.115 af x 40.0% Voids
#2A	154.75'	0.051 af	**ADS_StormTech SC-740 +Cap** x 48 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 24 Rows
		0.097 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	154.25'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.39 cfs @ 11.63 hrs HW=154.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Pond 2P: SC-740 Sys 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

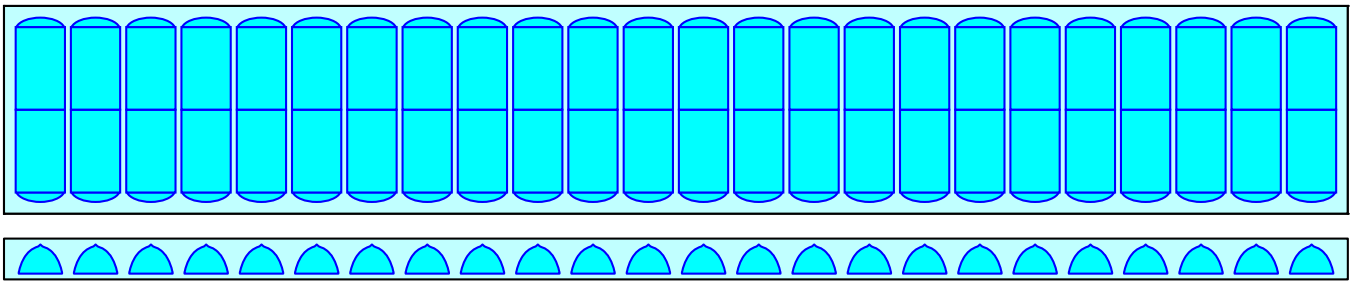
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
24 Rows x 51.0" Wide + 6.0" Spacing x 23 + 12.0" Side Stone x 2 = 115.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

48 Chambers x 45.9 cf = 2,205.1 cf Chamber Storage

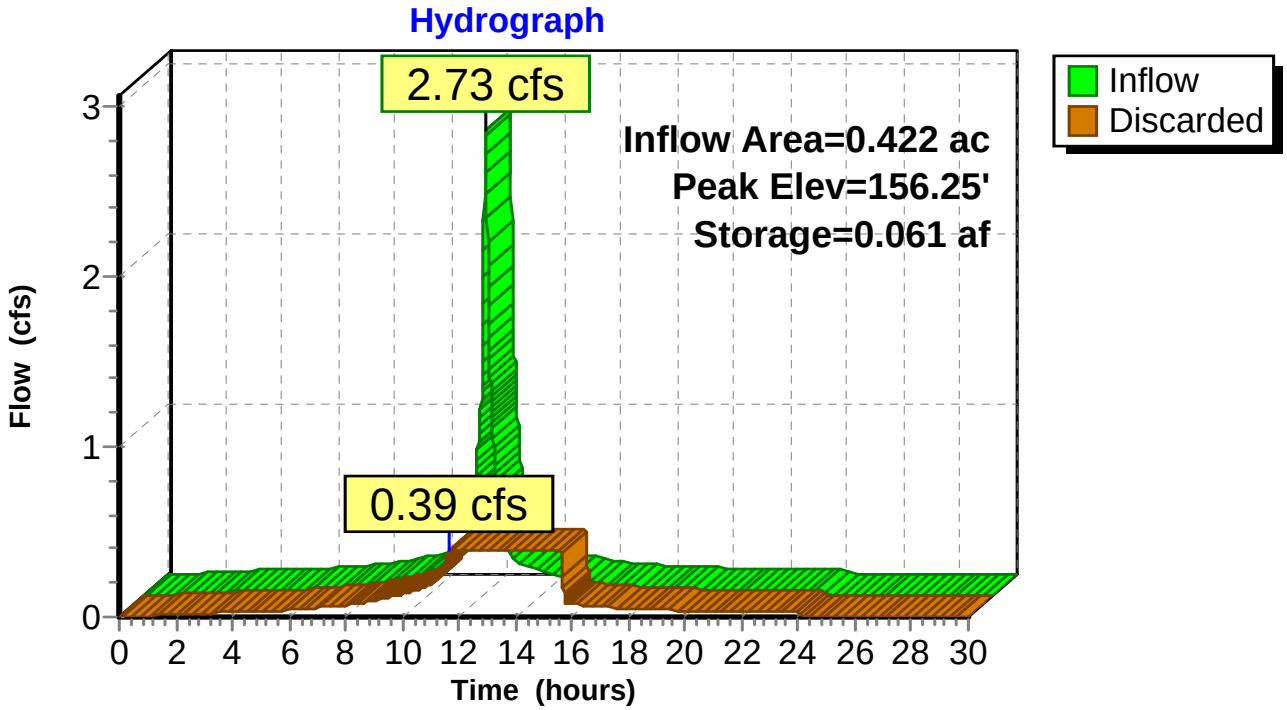
7,218.6 cf Field - 2,205.1 cf Chambers = 5,013.4 cf Stone x 40.0% Voids = 2,005.4 cf Stone Storage

Chamber Storage + Stone Storage = 4,210.5 cf = 0.097 af
Overall Storage Efficiency = 58.3%
Overall System Size = 17.86' x 115.50' x 3.50'

48 Chambers
267.4 cy Field
185.7 cy Stone



Pond 2P: SC-740 Sys 2

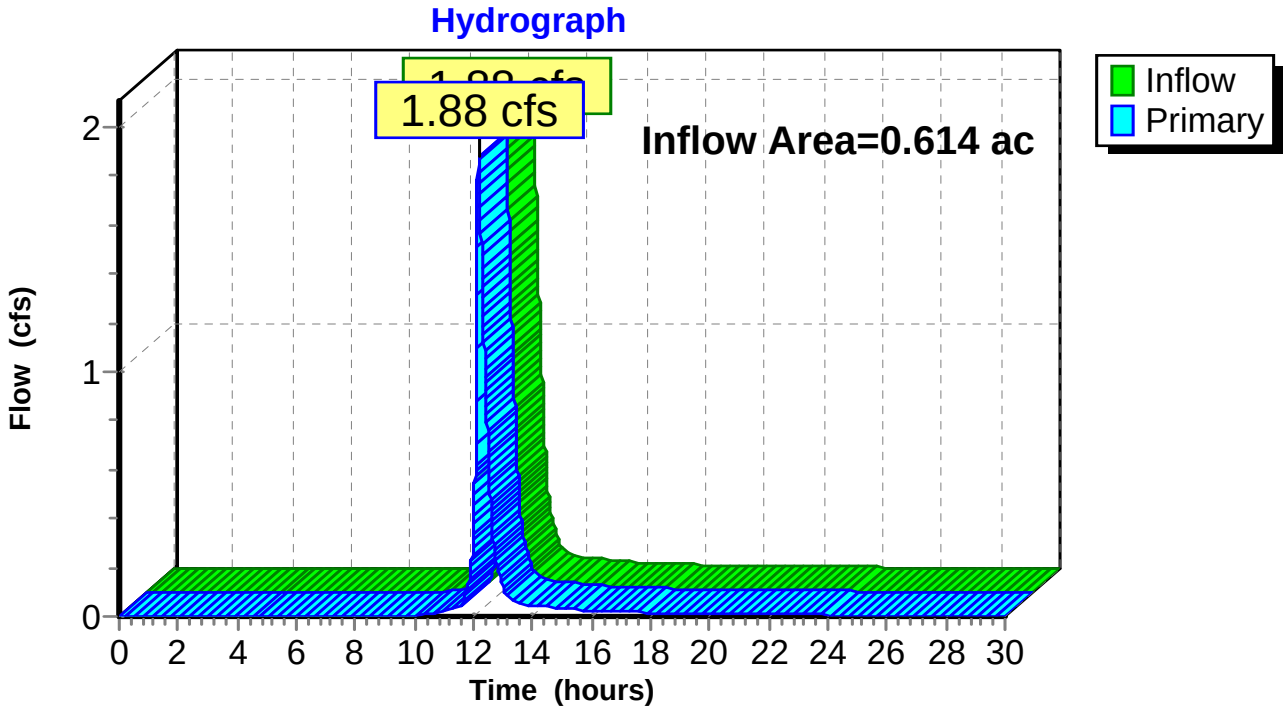


Summary for Link 2L: Prop S'ly Area

Inflow Area = 0.614 ac, 83.48% Impervious, Inflow Depth = 1.67" for 100-Year event
Inflow = 1.88 cfs @ 12.17 hrs, Volume= 0.086 af
Primary = 1.88 cfs @ 12.17 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2L: Prop S'ly Area



Appendix C

Stormwater Checklist
TSS Calculation Worksheet
Illicit Discharge Statement

ALLEN & MAJOR ASSOCIATES, INC.

APPENDIX C

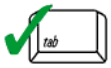
STORMWATER CHECKLIST

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

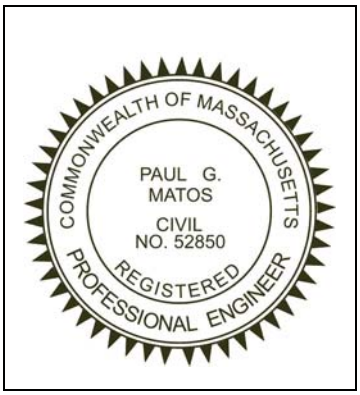
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Paul G Matos 4-30-2020
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☒ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

TSS CALCULATION WORKSHEET

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Infiltration System

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Subsurface Infiltration System (roof runoff)	80%	**1.00**	0.80	0.20
		0.20		

Total TSS Removal = 80%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Wellesley CC
Prepared By: PGM
Date: 4/28/2020

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

ILLICIT DISCHARGE STATEMENT

ILLICIT DISCHARGE STATEMENT

Project: Wellesley Country Club
300 Wellesley Avenue
Wellesley, MA

Date: April 28, 2020

The stormwater management system proposed shall not be connected to the wastewater management system and shall not be contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease per Massachusetts DEP stormwater standard 10.

Engineer:

Allen & Major Associates, Inc.
10 Main Street
Lakeville, MA 02347

Paul G. Matos, PE, PLS
Print Name

Signature

Owner:

Wellesley Country Club
300 Wellesley Avenue
Wellesley, MA

Print Name

Signature

Appendix D

Water & Sewer Analysis by Stanmar, Inc.
Fire Protection/Suppression/Alarm by Stanmar, Inc.
Electrical Analysis by Stanmar, Inc.
Gas Analysis by Stanmar, Inc.
Traffic Analysis by Ron Muller & Associates

ALLEN & MAJOR ASSOCIATES, INC.

APPENDIX D

WATER & SEWER ANALYSIS BY STANMAR, INC.

April 15, 2020

Re: Proposed Racquets Facility - Wellesley County Club, 300 Wellesley Avenue, Wellesley, MA 02481

Evaluation of Water/Sewer Use for Proposed Indoor Racquets Facility

Stanmar, Inc. has evaluated current water use for the existing two court indoor tennis facility and has calculated changes in water use anticipated with the new programming and size of the proposed racquets facility. The existing 2 court facility will be demolished and replaced with a larger 4 court building and support space including the addition of two golf simulators. The eight existing outdoor courts will be reduced to six. Membership will remain unchanged and use for racquets sports is assumed to be fairly constant on a daily basis.

Summary:

It is anticipated that water usage will grow between 50% to 100% from existing use levels when the new building is occupied. This reflects the shifting of two outdoor courts to indoor courts with a longer season as well as the addition of new golf simulator programming that will attract golf members to the tennis facility. The calculation also reflects a higher percentage of daily visitors using the shower facilities which will be new and more appealing than the existing facilities. This increased demand is tempered by the use of low flow plumbing fixtures compared to the existing higher flow fixtures.

The existing and the proposed facility will be served from a 6" municipal water main existing on the property and installed within the past 10 years. This main is sufficient to serve the proposed building.

The existing and proposed facility will be served by an existing 8" PVC sanitary main. This main is sufficient to serve the proposed building.

Existing Building

- Two indoor tennis courts, 12 month use, eight outdoor courts, 6 month use, 3 full time staff

Plumbing Fixtures

- 4 toilet/urinals (3.5 GPM)
- 4 lavatory sinks (2.2 GPM)
- 4 showers (2.2 GPM)
- 1 kitchen sink
- 1 ice machine
- 1 janitor's sink

Water use for 2019 per actual bills = 94 CCF = 70,500 gallons
Breakdown of use:

- 4 players x 12 sessions/day x 360 days/year = 17,280 member visits to indoor courts per year
    - 5% shower rate at 5 minute(11 gallons) = 9,504 gallons
    - 20% toilet/sink use @ 3.0 G = 10,368 gallons
- 16 players x 8 sessions/day x 180 days/year = 23,040 member visits to outdoor courts per year
    - 5% shower rate at 5 minute(11 gallons) = 12,672 gallons
    - 20% toilet/sink use @ 3.0 G = 13,824 gallons
- 3 full time employees at 360 days per year = 1,080 employee days
    - 1,080 employee days at 20 GPD = 21,600 gallons
- Misc use, ice machine, janitor's closet = 2,500 gallons

<u>New Racquets Facility</u>

- Four indoor courts, two golf simulators, 12 month use, 6 outdoor courts, 6 month use, 4 full time staff, new, low flow plumbing fixtures

Plumbing Fixtures

- 6 toilet/urinals (1.28GPF toilets and 0.25 GPF urinal)
- 6 lavatory sinks (0.5 GPM)
- 5 showers (1.5 GPM)
- 1 kitchen sink (2.2 GPM)
- 1 ice machine
- 1 janitor's sink

Anticipated breakdown of water use for new Racquets Facility with new fixtures:

- 8 players x 12 sessions/day x 360 days/year = 34,560 member visits to indoor courts per year
    - 15% shower rate at 5 minute(7.5 gallons) = 38,880 gallons
    - 25% toilet/sink use @ 2.0 G = 17,280 gallons
- 12 players x 8 sessions/day x 180 days/year = 17,280 member visits to outdoor courts per year
    - 5% shower rate at 5 minute(7.5 gallons) = 6,480 gallons
    - 20% toilet/sink use @ 2.0 G = 6,912 gallons
- 4 full time employees at 360 days per year = 1,440 employee days
    - 1,440 employee days at 15 GPD = 28,800 gallons
- 8 players x 8 sessions x 360 days/year = 23,040 member visits to golf simulators per year
    - 30% toilet/sink use @ 2.0 G = 13,824 gallons
- Misc use, ice machine, janitor's closet = 4,500 gallons

Total anticipated annual water use = 116,676 gallons → 325 GPD average, 1,000 GPD peak

FIRE PROTECTION/SUPPRESSION/ALARM BY STANMAR, INC.

April 15, 2020

Re: Proposed Racquets Facility - Wellesley County Club, 300 Wellesley Avenue, Wellesley, MA 02481

Fire Protection – Fire Suppression - Fire Alarm Narrative

Summary:

The proposed project entails the demolition of an existing, unsprinklered, 2 court tennis facility and replacement with a larger 4 court tennis building and associated support programming. The eight existing outdoor courts will be reduced to six. Membership will remain unchanged. The building will be one story with an upper mezzanine. Building occupancy will be primarily Assembly Type 3 and the construction shall be Type 3B, non-combustible.

Fire suppressions systems shall be fed off over the existing 6" water main on the South side of the proposed facility. Fire alarm systems shall communicate with the Wellesley Fire Department as required by current standards approved by the Wellesley Fire Department.

Fire Suppression

The proposed building shall be provided with a wet fire suppression system covering the entire building and meeting the design standards of the Massachusetts State Building Code, 9th Edition. The fire suppression system shall be provided with a double check valve assembly and shall include a fire department connection meeting the Town Of Wellesley Fire Department specifications. The fire department connection shall be located within 100 feet of a fire hydrant.

Protection criteria for the facility shall include Ordinary Hazard Group I at electrical closets, Ordinary Hazard Group II at storage rooms and mechanical rooms and Light Hazard at all other program spaces.

The design of the new sprinkler system will be in conformance with NFPA 12, *Installation of Sprinkler Systems.* The basis of design will be the most current low test data.

Water flow and tamper switches shall be provided on the fire suppression system and tied into the fire alarm system.

The fire suppression system shall be tested in accordance with NFPA 13 and witnessed as required by WFD.

Fire Alarm

A Class A fully addressable fire alarm system shall be designed to monitor the proposed building per NFPA 72. A network of detection and notification devices shall be located throughout the building and tied into a main Fire Alarm Control Panel, located as approved by WFD.

Alarm and Supervisory signals shall be transmitted directly to the Wellesley Fire Department or through a Central Monitoring Station as required by WFD.

The fire alarm system shall include elevator recall, mechanical system shutdown, A/V system interface and sprinkler system interface as required by code.

A Voice Evacuation System is not required for this A3, Assembly Use Group Building as the occupancy load is less than 1,000.

The fire alarm system shall be fully tested in accordance with NFPA 72 and a final test report furnished to WFD.

ELECTRICAL ANALYSIS BY STANMAR, INC.

April 27, 2020

Re: Proposed Racquets Facility - Wellesley County Club, 300 Wellesley Avenue, Wellesley, MA 02481

Evaluation of Electricity Use for Proposed Racquets Facility

Summary:

The larger, proposed Racquets Facility will require replacement of the existing, pad mount 500KVA transformer with a larger 750kVA transformer that will feed both the Clubhouse and the proposed Racquets Facility with separate, independent electrical service.

Existing Racquets Facility Electric Service

The existing Racquets Facility is fed with a 125A, 480V, 3P, 4W circuit that comes out of the Clubhouse switchgear. The 2,000A, 277V/480V, 3P, 4W service in the Clubhouse is fed from a 500kVA pad mount transformer. The peak kW demand for Clubhouse service based on data provided by the Wellesley Municipal Light & Power is roughly 500kW. There are currently six (6) secondary conduit installed between the transformer and the switchgear, four (4) in use and two (2) spare.

New Racquets Facility Electric Service

The recommended changes in the current electrical system configuration are as follows:

1. Disconnect the racquets facility from the Clubhouse electrical switchgear.
2. Replace the current 500kVA transformer with a 750kVA transformer, replacing the pad as needed.
3. Cut back one 4' spare secondary conduit and replace with one 4" secondary conduit and sweep into new Racquets Facility.
4. Provide independent 400A, 277V/48V, 3P, 4W service into new Racquets Facility.
5. Existing, independent 2,000A service into Clubhouse to remain unchanged.

Proposed Racquet Facility
Electrical Load Calculations

	DESCRIPTION	CONNECTED KW	DEMAND FACTOR	DEMAND KW
1)	GENERAL LIGHTING (7.5K) 220.12, 220.42	9.0	100%	9.0
2)	COURT LIGHTING	14.5	125%	18.2
3)	RECEPTACLE LOAD 220.14, 220.44	12.0	100%/50%	11.0
4)	ELECTRIC HEATING 220.51, 220.60	12.0	0%	-0-
5)	A/C SYSTEMS 220.50 120 TONS	180.0	100%	180.0
6)	ELEVATOR LOAD	20.0	100%	20.0
7)	MISC EQUIPMENT LOAD	16.0	65%	10.4
8)	FIRE PUMP LOAD	-0-	0.0%	-0-
9)	VENTILATION SYSTEM	15.0	100%	15.0
	SUBTOTAL LOAD	278.5		263.6
	PEAK DEMAND LOAD OF MAIN BUILDING	489.0		489.0
	TOTAL LOAD	767.5		752.6

Recommended WMLP Transformer Size: 750 kVA @ 277/480 Volts - 3 Phase - 4 Wire

Electrical Systems Engineering, Inc.

New England Headquarters
22 Manchester Road, Suite 8A
Derry, NH 03038

TX Branch Office
343 Drury Lane
Austin, TX 78737

Main Telephone
603.870.9009

Website
www.ESEinc.co

GAS ANALYSIS BY STANMAR, INC.

April 20, 2020

Re: Proposed Racquets Facility - Wellesley County Club, 300 Wellesley Avenue, Wellesley, MA 02481

Evaluation of Natural Gas Use for Proposed Racquets Facility

Summary:
The existing gas service will remain and be configured to service the gas needs of the proposed Racquets Facility.

Existing Racquets Facility Gas Service
An existing gas main originates at the North East corner of the building at a meter pad, extends along the North side and enters the building on the West side of the building. This gas service provides all heating and hot water for the existing facility.

New Racquets Facility Gas Service
Gas fired equipment for the new facility will be limited to the following equipment:

AHU – 1	400 MBH input
AHU – 2	400 MBH input
Misc Allowance	200 MBH input
Total Load	1,000 MBH

The existing gas service to the building at the North East corner will be re-configured as required to meet clearance and access requirements. A new gas main will be run outside the building to serve the two, ground mounted Air Handling Units. Heating of all other portions of the building and hot water shall be electric.

TRAFFIC ANALYSIS BY RON MULLER & ASSOCIATES

Ron Müller & Associates
Traffic Engineering and Consulting Services

56 Teresa Road
Hopkinton, MA 01748
Tel.: (508) 395-1576
Fax: (508) 435-2481
www.RonMullerAssociates.com

Ref.: 20007

March 24, 2020

Mr. Phil Cordeiro
Allen & Major Associates, Inc.
10 Main Street
Lakeville, MA 02347

Reg.: Proposed Tennis Courts
Wellesley Country Club, Wellesley, MA

Dear Phil:

Ron Müller & Associates (RMA) has prepared this letter to document the expected traffic generation of the proposed renovation and expansion of the existing indoor tennis courts located on the Wellesley Country Club property in Wellesley, Massachusetts. The club currently provides 10 tennis courts, including eight outdoor courts and two indoor courts. As proposed, one of the existing outdoor tennis courts will be removed, and the indoor tennis court building will be renovated and expanded to provide four indoor courts. Three of the outdoor courts will be shifted to accommodate the expansion. After the renovation and expansion, the Wellesley Country Club will provide a total of 11 tennis courts with four indoor courts and seven outdoor courts.

The proposed total building footprint will be approximately 34,500 square feet, with 30,000 square feet of tennis court space and 4,500 square feet of programming space. The programming space will include, men's and women's locker rooms, a family bathroom, tennis viewing lounge, tennis pro-shop, staff offices, golf simulator bays and a golf simulator lounge. The building will be utilized by members only and will not be open to the general public.

It is important to note that the expanded tennis facility will not result in an increase in the number of Certificate Owners (members) at the club. The expanded tennis facility will be open to members who currently use the existing facility and usage is not expected to increase with the expansion of the facility. There may be a minor increase in usage of the indoor facility during the winter months as the number of indoor courts is increasing. However, since the outdoor courts will likely not be used during this time, increases in traffic are not expected or will be negligible.

To present an estimate of potential traffic increases at the site independent of the membership at the club, the Institute of Transportation Engineers (ITE) *Trip Generation Manual*[1] was consulted. The ITE manual provides trip-generation rates for a variety of different land uses including Land Use Code 490, Tennis Courts. These trip rates can be applied to the proposed number of tennis courts to estimate the volume of daily and peak hour traffic likely to be generated by the project. Currently, the ITE has no data associated with tennis court traffic generation during the weekday AM peak hour (one hour between 7:00 and 9:00 AM). However, it is unlikely that tennis courts generate any traffic during this time period. As documented in the attached calculations, the expansion from 10 to 11 tennis courts will generate four additional vehicle trips, two entering and two exiting, during the weekday PM peak hour (one hour between 4:00 and 6:00 PM). These additional trips, if actually realized since there will be no increase in club membership, are well within the daily fluctuation of traffic and will not have an impact on adjacent roadways.

Please feel free to contact me should you have any questions regarding these estimates or conclusions.

Sincerely,

Ron Müller & Associates

Kirsten Braun, P.E.
Senior Traffic Engineer

Attachment

[1] *Trip Generation Manual*, *10th Edition;* Institute of Transportation Engineers; Washington, DC; 2017.

Institute of Transportation Engineers (ITE); 10th Edition
Land Use Code (LUC) 490 - Tennis Courts

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area
Independent Variable (X): 1 Tennis Courts

AVERAGE WEEKDAY DAILY (from ITE 9th Edition)

T = 30.32 * (X)
T = 30.32
T = 30 vehicle trips
with 50% (15 vpd) entering and 50% (15 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = Information Not Available
T =
T = 0 vehicle trips
with 50% (0 vph) entering and 50% (0 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

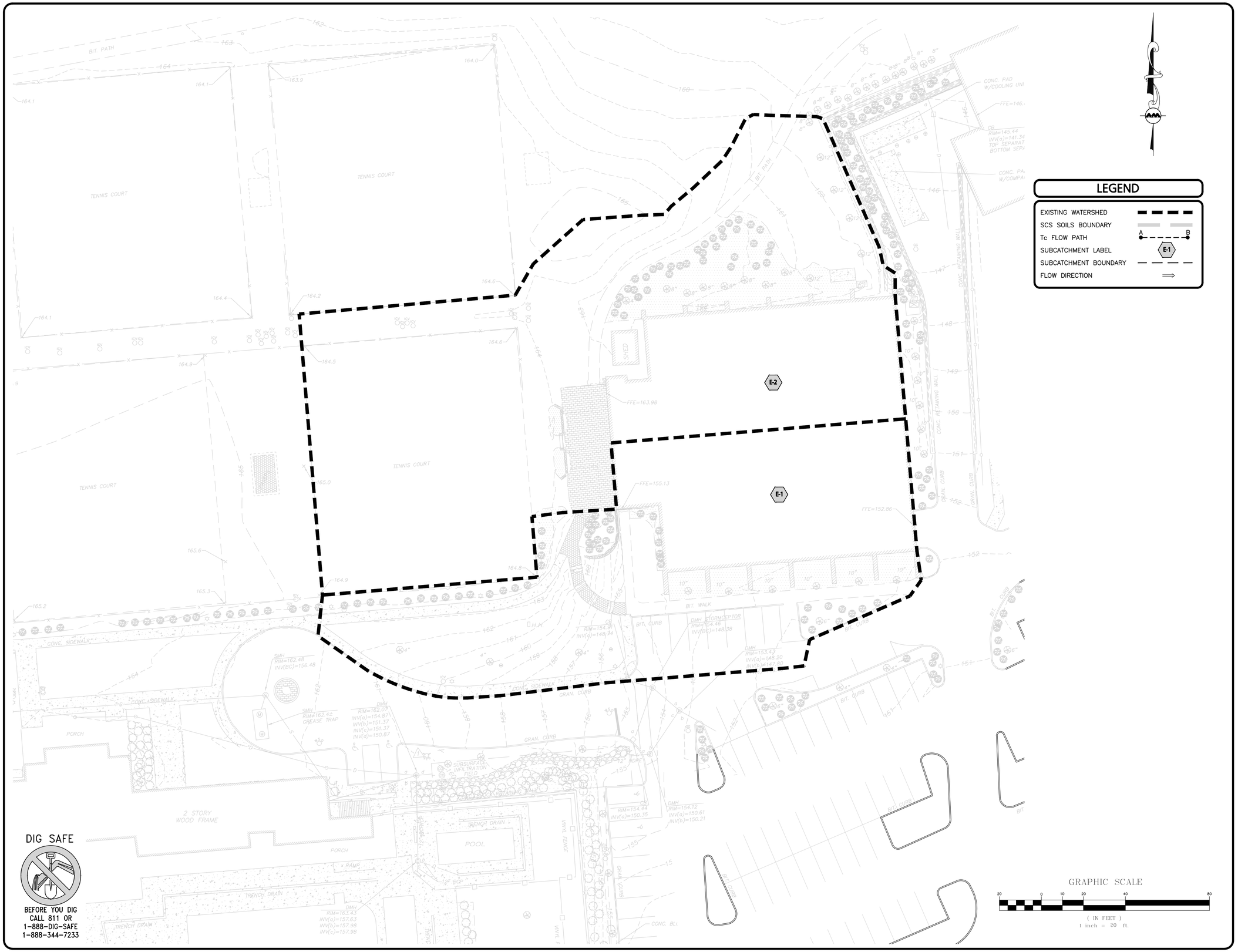
T = 4.21 * (X)
T = 4.21
T = 4 vehicle trips
with 50% (2 vph) entering and 50% (2 vph) exiting.
Note: Directional distribution based on LUC 491 (Racquet/Tennis Club)

Appendix E

EWS-1 Existing Watershed Plan
PWS-1 Proposed Watershed Plan

ALLEN & MAJOR ASSOCIATES, INC.

APPENDIX E



LEGEND

EXISTING WATERSHED	
SCS SOILS BOUNDARY	
Tc FLOW PATH	A — B
SUBCATCHMENT LABEL	E-1
SUBCATCHMENT BOUNDARY	
FLOW DIRECTION	⟹

stanmar inc
DESIGN & CONSTRUCTION

OLSON LEWIS + ARCHITECTS

COMMONWEALTH OF MASSACHUSETTS
PAUL G. MATOS
CIVIL
NO. 52850
REGISTERED PROFESSIONAL ENGINEER

Paul G. Matos 04-30-20
PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

OWNER:
WELLESLEY COUNTRY CLUB
300 WELLESLEY AVE. 1910 WELLESLEY, MA

PROJECT:
RACQUET FACILITY
WELLESLEY COUNTRY CLUB
300 WELLESLEY AVENUE
WELLESLEY, MA 02481

PROJECT NO.	2749-01	DATE:	04-28-20
SCALE:	1" = 20'	DWG. NAME:	C-2749-01_
DESIGNED BY:	PGM	CHECKED BY:	PLC

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
10 MAIN STREET
LAKEVILLE MA 02347
TEL: (508) 923-1010
FAX: (508) 923-6309
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

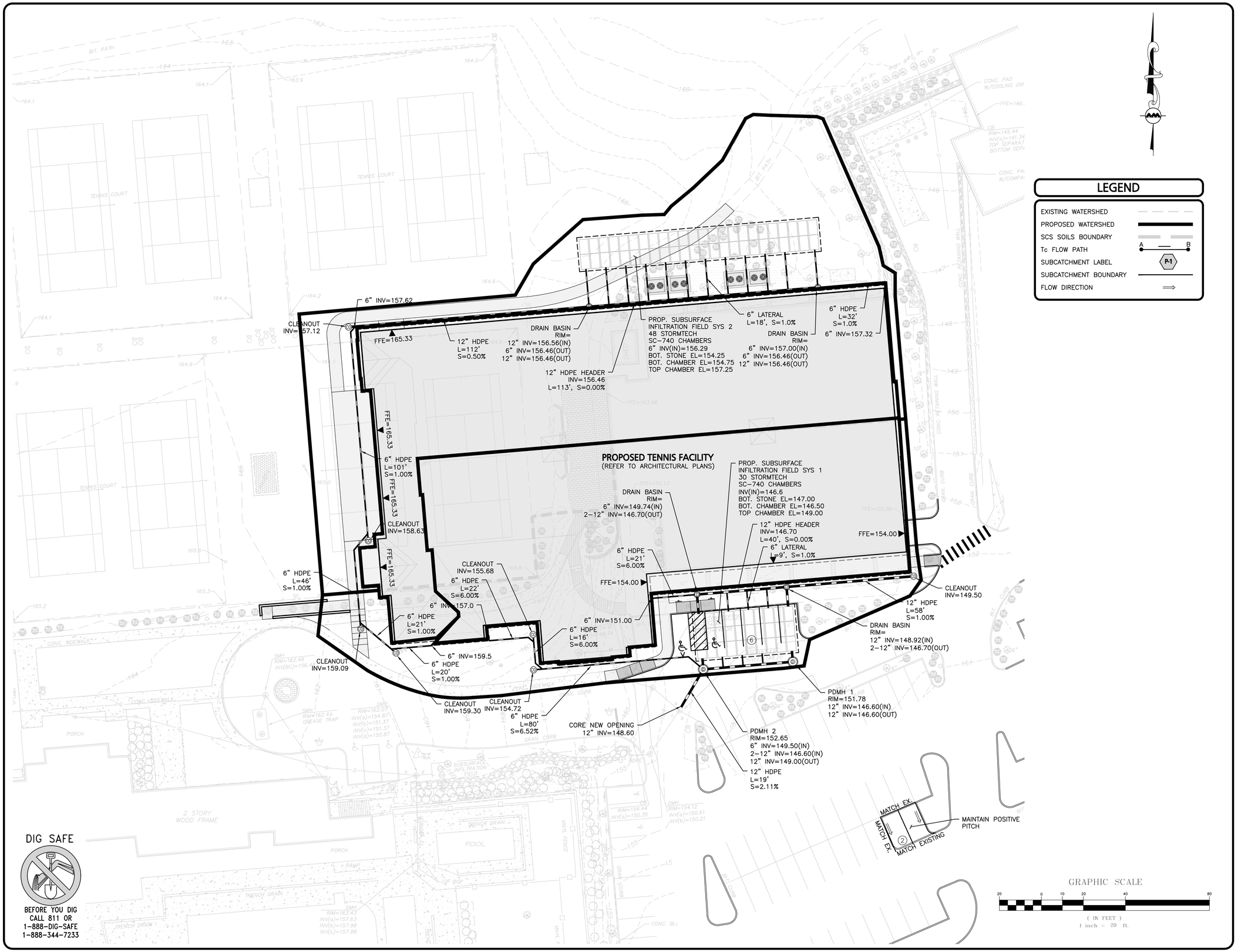
THIS DRAWING HAS BEEN PREPARED IN DIGITAL FORMAT. CLIENT/CLIENT'S REPRESENTATIVE OR CONSULTANTS MAY BE PROVIDED COPIES OF DRAWINGS AND SPECIFICATIONS FOR HIS/HER INFORMATION AND/OR SPECIFIC USE ON THIS PROJECT. DUE TO THE POTENTIAL THAT THE PROVIDED INFORMATION MAY BE MODIFIED UNINTENTIONALLY OR OTHERWISE, ALLEN & MAJOR ASSOCIATES, INC. MAY REMOVE ALL INDICATION OF THE DOCUMENTS' AUTHORSHIP ON THE DIGITAL MEDIA. PRINTED REPRESENTATIONS OR PORTABLE DOCUMENT FORMAT OF THE DRAWINGS AND SPECIFICATIONS ISSUED SHALL BE THE ONLY RECORD COPIES OF ALLEN & MAJOR ASSOCIATES, INC.'S WORK PRODUCT.

DRAWING TITLE: EXISTING WATERSHED PLAN

SHEET No. EWS-1

Copyright©2020 Allen & Major Associates, Inc.
All Rights Reserved

M:\PROJECTS\2749-01\CIVIL\DRAWINGS\CURRENT\C-2749-01_WATERSHED-EXISTING.DWG



M:\PROJECTS\2749-01\CIVIL\DRAWINGS\CURRENT\C-2749-01_WATERSHED-PROPOSED.DWG

stanmar inc
DESIGN & CONSTRUCTION

OLSON LEWIS + ARCHITECTS

COMMONWEALTHOF MASSACHUSETTS
PAUL G. MATOS
CIVIL
NO. 52850
REGISTERED PROFESSIONAL ENGINEER

04-30-20

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

OWNER:
WELLESLEY COUNTRY CLUB
300 WELLESLEY AVE. 1910 WELLESLEY, MA

PROJECT:
RACQUET FACILITY
WELLESLEY COUNTRY CLUB
300 WELLESLEY AVENUE
WELLESLEY, MA 02481

PROJECT NO.	2749-01	DATE:	04-28-20
SCALE:	1" = 20'	DWG. NAME:	C-2749-01_
DESIGNED BY:	PGM	CHECKED BY:	PLC

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
10 MAIN STREET
LAKEVILLE MA 02347
TEL: (508) 923-1010
FAX: (508) 923-6309
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

THIS DRAWING HAS BEEN PREPARED IN DIGITAL FORMAT. CLIENT/CLIENT'S REPRESENTATIVE OR CONSULTANTS MAY BE PROVIDED COPIES OF DRAWINGS AND SPECIFICATIONS FOR HIS/HER INFORMATION AND/OR SPECIFIC USE ON THIS PROJECT. DUE TO THE POTENTIAL THAT THE PROVIDED INFORMATION MAY BE MODIFIED UNINTENTIONALLY OR OTHERWISE, ALLEN & MAJOR ASSOCIATES, INC. MAY REMOVE ALL INDICATION OF THE DOCUMENT'S AUTHORSHIP ON THE DIGITAL MEDIA. PRINTED REPRESENTATIONS OR PORTABLE DOCUMENT FORMAT OF THE DRAWINGS AND SPECIFICATIONS ISSUED SHALL BE THE ONLY RECORD COPIES OF ALLEN & MAJOR ASSOCIATES, INC.'S WORK PRODUCT.

DRAWING TITLE:
PROPOSED WATERSHED PLAN

SHEET No.
PWS-1

Copyright©2020 Allen & Major Associates, Inc.
All Rights Reserved