Planning and Zoning Department
616 Germantown Pike, Lafayette Hill, PA 19444-1821
484-594-2625
www.whitemarshtwp.org

Subdivision and Land Development Cover Page for SLD # 02-24

Project Name:
Villanova University Boathouse

Address: 601 Washington Street

Date: 7.19.2024

Status: Under Review

Updates:

- Zoning Ordinance Compliance Review Letter- 8.21.24
- Township Engineer Review Letter- 8.30.24
- Fire Marshal Review Letter- 8.30.24
- Montgomery County Planning Commission Review- 9.5.24
- Trip Generation Investigations- 10.7.24
- Township Engineer Review – Traffic Impact Study- 11.22.24
- Revised Shade Tree Commission Material- 11.27.24
- Township's Consulting Arborist Memo – 12.3.24
- Revised SALDO Waiver Request Application- 12.5.24
- Shade Tree Commission Meeting Memo- 12.10.24
- Response to Traffic Impact Study- 12.10.24
- Traffic Impact Study #2- 1.2.25
- Arborist Report on Heritage Trees- 1.7.25

This Checklist and the following items MUST be submitted to the Township, completed in their entirety, at the time of submission for the Township to accept a subdivision/land development application.

This checklist page must be filled out after printing the completed form starting on page 2 where applicable.

Applicant Initials	Required Items of Submission	Township Receipt
_____	Whitemarsh Township Checklist	_____
_____	Whitemarsh Township Application (Signature MUST Be Original)	_____
_____	Whitemarsh Township Request for Modification (Signature MUST Be Original)	_____
_____	Whitemarsh Time Waiver Form (Signature MUST Be Original)	_____
_____	Whitemarsh Township Escrow (Payable to Whitemarsh Township; credit card payment accepted in person)	_____
_____	Montgomery County Planning Commission Municipal Request for Review (County will request fee directly from applicant)	_____
_____	Shade Tree Commission Checklist for Compliance with Chapter 55 (attached)	_____
_____	Transportation Impact Study [§105-21.B.(9)(c)] (if applicable)	_____
_____	Stormwater Management Plan & Supporting Calculations (if applicable)	_____
_____	Supplemental Documents Applicable to a Specific Application	_____
_____	List of Encumbrances (Book & Page Numbers) (if applicable)	_____
_____	Three (3) Complete Sets of All Application Materials	_____
_____	PDF or Link to Digital File of Each Component of the Application	_____

WHITEMARSH TOWNSHIP
SUBDIVISION and/or LAND DEVELOPMENT APPLICATION

The applicant, or applicant's authorized agent, for the Township to accept submission of the application, must complete each Application item and each Application Submission Checklist item.

Application Type: (check one)
☐ Minor Subdivision ☐ Minor Land Development
☐ Major Subdivision ☒ Major Land Development
☐ Land Development Waiver

Plan Type:
☐ Sketch ☒ Preliminary ☐ Final

INSERT "N/A" FOR NOT APPLICABLE WHERE APPROPRIATE

Name of Subdivision/Land Development: Villanova University Boathouse

Location of Subdivision/Land Development: 601 Washington Street
(Primary Access Roadway Name)

Between: Cherry Street (Roadway Name) **and** Lee Street (Roadway Name)

Number of Parcels: 1 **Block Number(s):** _____ **Unit Number(s):** _____

Parcel Number(s): 65-00-12679-00-9

Acreage: 9.8 **Total Lots Proposed:** 1 **Zoning District:** HVY

Water Service Proposed: ☒ Public ☐ Private Sewer Service Proposed: ☒ Public ☐ Private

Applicant Name: Villanova University **Contact Name:** John Camusi

Phone #: 215-783-7314 Fax #: _____ Email: john.camusi@villanova.edu

Address: 800 Lancaster Avenue, Villanova, PA 19085

Owner of Record Name (if Different): _____

Phone #: _____ Fax #: _____ Email: _____

Address: _____

Engineer Name: Michael Roth, PE **Firm Name:** Pennoni

Phone #: 610-422-2486 Fax #: _____ Email: mroth@pennoni.com

Address: 158 W. Gay Street, Suite 300, West Chester, PA 19380

Fees and plans showing all public improvements are submitted with this application. Any additional plan information required by the Township Engineer will be submitted to the Director of Planning and Zoning for distribution. The undersigned applicant agrees to comply with all the provisions of Chapter 105 of the Code of the Township of Whitemarsh, as amended, and agrees to obtain all necessary permits in connection with the proposed subdivision and/or land development.

Whitemarsh Township employees, or township-authorized agents, are hereby granted permission to enter upon the land, if necessary, for site inspections.

Original preliminary and/or original final subdivision and/or land development applications submitted by 4:00pm on the last business day of the month will be reviewed by the Whitemarsh Township Planning Commission at a regular meeting two (2) months following the date of submission or other appropriate meeting date depending upon the results of Township reviews.

I hereby certify, as the undersigned applicant, that I am familiar with the provisions of: [1] Chapter 105, "Subdivision and Land Development", [2] Chapter 58, "Grading, Erosion Control, Stormwater Management and Best Management Practices", and [3] Chapter 55, "Tree Protection Standards" of the Code of the Township of Whitemarsh, as amended, and, to the best of my knowledge and belief, this application and the submitted plans conform to those provisions.

Date of Submission: _____

Signature: _____

(Original Signature must be submitted)

Printed Name: JOHN CAMUSI

I, (name) JOHN CAMUSI **(title)** SENIOR PROJECT MANAGER of

(entity submitting application) VILLANOVA UNIVERSITY do hereby affirm

that I am authorized by the applicant to affix my signature to this application.

Date: 7/19/2024 Signature: _____

(Original Signature must be submitted)

Revised 12.5.24

WHITEMARSH TOWNSHIP
REQUEST FOR MODIFICATION (WAIVER) OF
SUBDIVISION and/or LAND DEVELOPMENT ORDINANCE REQUIREMENTS

Pursuant to § 512.1.(b) of the Pennsylvania Municipalities Planning Code, all requests for a modification shall be in writing and shall accompany and be a part of the application for development. The request shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of the ordinance involved and the minimum modification necessary.

Check the appropriate line:

☐ No modification (or waiver) of the Whitemarsh Township Subdivision and Land Development Ordinance is requested

☒ I/we hereby request the following modification[s] (or waiver[s]) of the Whitemarsh Township Subdivision and Land Development Ordinance. (The request must identify the applicable Section[s] of the Ordinance, modification[s] requested, and facts of unreasonableness or hardship upon which the request is made; attach additional sheets if necessary).

§58-34.B(7)(D) - A waiver to allow a minimum pipe size of 12" and to allow HDPE pipes rather than concrete.

§105-21.B.(1)(n) - A waiver from showing all existing features within 500 feet of the site.

§105-22.A - A waiver from the requirement that plans be drawn at a scale of 1" = 40', plans are drawn at 1" = 30'.

§105-30.A - A waiver is requested to allow Washington Ave to have a cartway of 30 feet rather than 36 feet as required for local roads.

§105-36.B - A waiver from the requirement of a minimum of 200 feet between access points to parking areas.

§105-47.K(3) - A waiver is requested to allow river access paths to be more than 500 feet apart, only one access path is provided with this development.

§105-52 - A partial waiver is requested to allow a buffer of less than 50 feet in the area of trailer parking.

A waiver of resolution 2004-8 I.B.4.K to allow grading within 5 feet of the property line.

§105-12.D - A waiver is requested to allow for a combined preliminary/final land development submission.

Name of Subdivision and/or Land Development: Villanova University Boathouse

Date: 12/5/24

Signature: JOHN CAMUSI

(Original Signature must be submitted)

WHITEMARSH TOWNSHIP
SUBDIVISION and/or LAND DEVELOPMENT
TIME WAIVER FORM

Date: 7/19/2024

Granted to: Whitemarsh Township Board of Supervisors

Name of Subdivision and/or Land Development: Villanova University Boathouse

On or about 7/19/2024, I/we submitted for official filing the above-reference application.

Notwithstanding any contrary provision of the Pennsylvania Municipalities Planning Code or the Code of the Township of Whitemarsh, this letter will serve as notice to Whitemarsh Township that the requirement that action be taken on this application within ninety (90) days is hereby waived, without limitation as to time. This waiver is granted to permit us to make revisions to the application during the application review process.

Further, with the understanding that this waiver is voluntarily given and will be relied upon by Whitemarsh Township, I/we will give Whitemarsh Township written notice (by certified mail or recognized overnight carrier) should we determine that limiting the time of the review process becomes necessary. Whitemarsh Township shall then have ninety (90) days from receipt of such written notice in which to act upon the application.

This waver is not transferable or assignable by the Applicants and shall apply to any and all revised submissions made in relation to the above-referenced application.

I/we represent that I/we have been duly authorized to execute this waiver on behalf of the Applicant.

Date: 6/17/24

Signature: _____
(Original Signature must be submitted)

Printed Name: JOHN CAMUSI

Firm Name: VILLANOVA UNIVERSITY.
(if applicable)

Title: SENIOR PROJECT MANAGER.
(if applicable)

VILLANOVA BOATHOUSE

PRELIMINARY LAND DEVELOPMENT

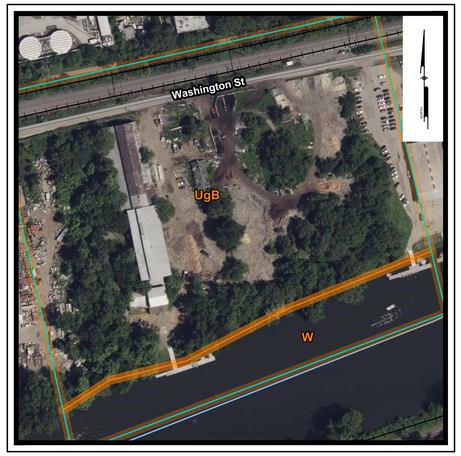
MONTGOMERY COUNTY, PENNSYLVANIA
JULY 12, 2024

PREPARED FOR:
OWNER/DEVELOPER

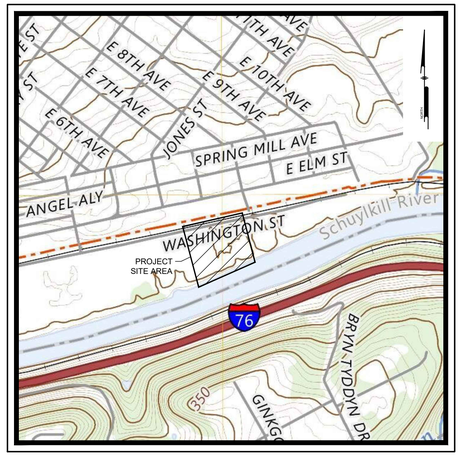
VILLANOVA UNIVERSITY

800 LANCASTER AVE
VILLANOVA, PA 19085

SHEET LIST TABLE		
PAGE	SHEET NUMBER	SHEET TITLE
1	CS0001	COVER SHEET
2	CS0002	GENERAL NOTES
3	CS0200	EXISTING RESOURCE AND SITE ANALYSIS PLAN
4	CS0201	EXISTING CONDITIONS PLAN
5	CS0501	DEMOLITION PLAN
6	CS0502	TREE SURVEY PLAN
7	CS1001	SITE PLAN
8	CS1501	GRADING PLAN
9	CS1701	UTILITY PLAN
10	CS2001	LANDSCAPING PLAN
11	CS2201	LIGHTING PLAN
12	CS4001	STORM SEWER PROFILES
13	CS4501	SANITARY SEWER PROFILES
14	CS6001	SITE DETAILS
15	CS6002	SITE DETAILS
16	CS8001	EROSION AND SEDIMENTATION CONTROL PLAN
17	CS8501	EROSION AND SEDIMENTATION CONTROL NOTES
18	CS8502	EROSION AND SEDIMENTATION CONTROL DETAILS
19	CS8503	EROSION AND SEDIMENTATION CONTROL DETAILS
20	CS9001	POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
21	CS9501	POST CONSTRUCTION STORMWATER MANAGEMENT NOTES
22	CS9502	POST CONSTRUCTION STORMWATER MANAGEMENT DETAILS
23	CS9801	TRUCK TURNING PLAN



SOILS MAP
Scale: 1" = 150'



USGS MAP
Scale: 1" = 800'

PREPARED BY:

PENNONI ASSOCIATES INC.

158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907
F 610.429.8918

CALL BEFORE YOU DIG
BEFORE YOU DIG ANYWHERE IN PENNSYLVANIA
CALL 1-800-242-1776
PA. ACT 287 OF 1974 REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL OR BLAST PENNSYLVANIA ONE-CALL SYSTEM, INC.
SERIAL NUMBER(S): 20231644446

NOT FOR CONSTRUCTION

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

COVER SHEET

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON THE EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM

PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	AS NOTED
DRAWN BY	CW
APPROVED BY	MR

CS0001

SHEET 1 OF 23

PLOTTED: 7/19/2024 9:27 AM, BY: Cameron Williams PLOTSTYLE: Pennoni NCS.ctb
u:\Accounts\BLAM\Villa\23005 – villanova boathouse – HIDE\BKRN_SHEETS\CS0001.dwg

GENERAL NOTES:

1. SITE ADDRESS: 601 WASHINGTON STREET
CONSHOHOCKEN, PA, 19428

OWNER/APPLICANT: VILLANOVA UNIVERSITY
800 LANCASTER AVENUE,
VILLANOVA, PA, 19085

ARCHITECT: BLACKNEY HAYES ARCHITECTS
600 CHESTNUT STREET, SUITE 1200
PHILADELPHIA, PA, 19106

ENGINEER: PENNONI ASSOCIATES INC.
157 WEST GAY STREET, SUITE 300
WEST CHESTER, PA 19380

2. THE PURPOSE OF THIS PLAN IS TO SHOW THE CONSTRUCTION OF A BOATHOUSE THROUGH THE PARTIAL DEMOLITION OF AN EXISTING BUILDING ON THE SITE, ALONG WITH ASSOCIATED PARKING AND RIVERFRONT AND RIVER ACCESS TRAILS.

3. **MUNICIPAL ZONING INFORMATION:**

THIS SITE IS LOCATED IN THE FOLLOWING ZONE IN THE TOWNSHIP OF WHITEMARSH:

HVY - HEAVY INDUSTRIAL DISTRICT
FLOODPLAIN CORRIDOR CONSERVATION OVERLAY DISTRICT
RCCD - RIPARIAN CORRIDOR CONSERVATION DISTRICT
RDD-1 - RIVERFRONT DEVELOPMENT DISTRICT SUBDISTRICT 1

FOR COMPLETE ZONING INFORMATION PLEASE REFER TO THE ZONING CODE OF THE TOWNSHIP OF WHITEMARSH AS CURRENTLY AMENDED.

4. **FLOOD ZONE INFORMATION:**

BY GRAPHIC PLOTTING ONLY, BASED UPON THE FLOOD INSURANCE RATE MAP, PANEL NO. 0358, COMMUNITY MAP NO. 42091C0358G WITH AN EFFECTIVE DATE OF MARCH, 2, 2016, THE SITE IS LOCATED IN THE FOLLOWING AREA:

ZONE AE AREA DETERMINED WITHIN THE BASE FLOOD ELEVATION

NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THE DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

5. UNLESS SPECIFICALLY STATED OR SHOWN HEREON TO THE CONTRARY, THIS SURVEY IS MADE SUBJECT TO AND DOES NOT LOCATE OR DELINEATE:

A. RIGHTS OR INTERESTS OF THE UNITED STATES OF AMERICA OR COMMONWEALTH OF PENNSYLVANIA OVER LANDS NOW OR FORMERLY FLOWED BY TIDEWATER, BUT NO LONGER VISIBLE OR PHYSICALLY EVIDENT, OR LANDS CONTAINING ANY ANIMAL, MARINE, OR BOTANICAL SPECIES REGULATED BY OR UNDER THE JURISDICTION OF ANY FEDERAL, STATE, OR LOCAL AGENCY.

B. BUILDING SETBACK LINES, ZONING REGULATIONS OR LINES ESTABLISHED BY ANY FEDERAL, STATE OR LOCAL AGENCY WHICH MAY AFFECT THE BUILDING OR DEVELOPMENT POTENTIAL OF THE SUBJECT PROPERTY.

C. ANY SUBSURFACE OR SUBTERRANEAN CONDITION, EASEMENTS OR RIGHTS, INCLUDING, BUT NOT LIMITED TO MINERAL OR MINING RIGHTS, OR THE LOCATION OF OR RIGHTS TO ANY SUBSURFACE STRUCTURES, CONTAINERS OR FACILITIES OR ANY OTHER NATURAL OR MAN-MADE SUBSURFACE CONDITION WHICH MAY OR MAY NOT AFFECT THE USE OR DEVELOPMENT POTENTIAL OF THE SUBJECT PROPERTY.

6. THE LOCATION OF THE EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN TAKEN FROM EXISTING UTILITY RECORDS AVAILABLE AT THE TIME THESE PLANS WERE PREPARED AND FROM SURFACE OBSERVATION OF THE SITE.

7. COMPLETENESS OR ACCURACY OF LOCATION AND DEPTH OF UNDERGROUND UTILITIES AND STRUCTURES IS NOT GUARANTEED.

8. THE CONTRACTOR SHALL VERIFY LOCATIONS AND DEPTHS OF ALL UNDERGROUND UTILITIES AND STRUCTURES BEFORE THE START OF WORK.

9. REFERENCE IS MADE TO PENNSYLVANIA ONE CALL SYSTEM, ASSIGNED SERIAL NUMBER 20231644446 IN ACCORDANCE WITH PA ACT 287 OF 1974 AS AMENDED BY PA ACT 121 OF 2008 ENTITLED "UNDERGROUND UTILITY LINE PROTECTION LAW". (800-242-1776)

10. IN ACCORDANCE WITH PA ACT 287 OF 1974 AS AMENDED BY PA ACT 187 OF 1996, THE CONTRACTOR SHALL NOTIFY ALL UTILITIES WITHIN THE WORK AREA VIA THE PENNSYLVANIA ONE CALL SYSTEM, INC. (800-242-1776) A MINIMUM OF 3 WORKING DAYS BEFORE THE START OF EXCAVATION.

11. THE SITE IS TO BE SERVED BY PUBLIC SEWER AND WATER SERVICE.

12. ALL RADII SHOWN ARE 5 FT UNLESS OTHERWISE SPECIFIED.

13. THE PROJECT SITE BOUNDARY IS LOCATED WITHIN THE LOWER SCHUYLKILL WATERSHED AND THE RECEIVING STREAM IS THE SCHUYLKILL RIVER, WHICH IS CLASSIFIED AS WARM WATER FISHES, MIGRATORY FISHES (WWF-MF) BY TITLE 25, CHAPTER 93 OF THE PENNSYLVANIA CODE.

14. A PRE-CONSTRUCTION MEETING SET UP WITH THE TOWNSHIP WILL BE REQUIRED BEFORE ANY CONSTRUCTION COMMENCES.

GENERAL UTILITY NOTES:

1. IN ACCORDANCE WITH PA ACT 287 (1974), AS AMENDED, THE CONTRACTOR SHALL NOTIFY ALL UTILITIES WITHIN THE WORK AREA VIA THE PENNSYLVANIA ONE CALL SYSTEM, INC. (800-242-1776) A MINIMUM OF 3 WORKING DAYS BEFORE THE START OF EXCAVATION.

2. UTILITY COORDINATION SHALL BE INCLUDED IN THE PROJECT SCHEDULE AND IT IS THE EXPLICIT RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT THE PROJECT SCHEDULE INCLUDES THE NECESSARY RELOCATIONS. THE CONTRACTOR WILL NOT BE PAID ADDITIONALLY FOR THIS COORDINATION.

3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE LOCATIONS AND DEPTHS OF ALL EXISTING UNDERGROUND UTILITIES AND STRUCTURES BEFORE THE START OF WORK AND TO TAKE WHATEVER STEPS NECESSARY TO PROVIDE FOR THEIR PROTECTION. THE ENGINEER HAS DILIGENTLY ATTEMPTED TO LOCATE AND INDICATE ALL EXISTING FACILITIES ON THESE PLANS; HOWEVER, THIS INFORMATION IS SHOWN FOR THE CONTRACTOR'S CONVENIENCE ONLY. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF UTILITIES SHOWN OR NOT SHOWN. COMPLETENESS OR ACCURACY OF LOCATION AND DEPTH OF UNDERGROUND UTILITIES AND STRUCTURES IS NOT GUARANTEED.

4. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES FOR EXACT LOCATION AND PROTECTION OF THEIR UTILITIES PRIOR TO STARTING CONSTRUCTION. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AND REPLACE ANY AND ALL DAMAGE MADE TO UTILITIES BY THE CONTRACTOR.

5. CONTRACTOR MUST APPLY FOR ALL UTILITY CONNECTION APPLICATIONS. CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY CONNECTION FEES FOR CONSTRUCTION. REFER TO THIS SHEET FOR AVAILABLE UTILITY COMPANY LIST.

6. CONTRACTOR MUST OBTAIN ANY REQUIRED UTILITY DETAILS FOR RECONNECTION OF EXISTING SERVICES OR NEW SERVICE AND IS RESPONSIBLE FOR THE CONSTRUCTION OF EACH NEW SERVICE PER THE APPROPRIATE UTILITY COMPANY'S SPECIFICATIONS.

7. THE LOCATION OF THE EXISTING OVERHEAD UTILITIES SHOWN ON THIS PLAN HAVE BEEN TAKEN FROM FIELD OBSERVATION.

8. ALL NEW UTILITIES SHALL BE INSTALLED UNDERGROUND.

9. THE CONTRACTOR SHALL COORDINATE LOCATION AND INSTALLATION OF ALL UNDERGROUND UTILITIES AND APPURTENANCES TO MINIMIZE DISTURBANCE TO CURBING, PAVING, AND COMPACTED SUB-GRADE.

10. IF CONFLICTS ARE FOUND, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND DESIGN ENGINEER FOR INSTRUCTION BEFORE PROCEEDING WITH WORK.

11. CONTRACTOR SHALL EXCAVATE ONLY ENOUGH TRENCH FOR WHICH PIPE CAN BE INSTALLED AND TRENCH BACKFILLED BY THE END OF EACH WORK DAY.

12. BEDDING REQUIREMENTS SPECIFIED HEREIN ARE TO BE CONSIDERED AS MINIMUMS FOR RELATIVELY DRY, STABLE EARTH CONDITIONS. ADDITIONAL BEDDING SHALL BE REQUIRED FOR ROCK TRENCHES AND WET AREAS. CONTRACTOR SHALL HAVE THE RESPONSIBILITY TO PROVIDE SUCH ADDITIONAL BEDDING AS MAY BE REQUIRED TO PROPERLY CONSTRUCT THE WORK.

13. COMPACTION OF THE BACKFILL OF ALL TRENCHES SHALL BE COMPACTED TO THE DENSITY OF 95% OF THEORETICAL MAXIMUM DRY DENSITY (ASTM D698). BACKFILL MATERIAL SHALL BE FREE FROM ROOTS, STUMPS, OR OTHER FOREIGN DEBRIS AND SHALL BE PLACED IN LIFTS NOT TO EXCEED 6 INCHES IN COMPACTED FILL THICKNESS. A REPORT FROM A GEOTECHNICAL ENGINEER MAY BE REQUIRED BY THE PUBLIC WORKS INSPECTOR. CORRECTION OF ANY TRENCH SETTLEMENT WITHIN A YEAR FROM THE DATE OF APPROVAL WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

14. AN AS-BUILT SURVEY OF ALL STORMWATER BMPS IS TO BE SUBMITTED TO THE TOWNSHIP IN BOTH PAPER AND DIGITAL (.DWG) FORMATS.

15. THE SITE WILL BE SERVED BY PUBLIC WATER AND SEWER.

WATER NOTES:

1. EXISTING WATER LINES WITHIN THE PROJECT AREA ARE PRIVATE LINES. PROPOSED CHANGES TO WATER LINES ARE TO BE COORDINATED WITH THE ENGINEER IN ORDER TO CONTINUE TO PROVIDE SERVICE TO CAMPUS SYSTEMS.

2. WATER LINE CONSTRUCTION SHALL BE SEQUENCED IN SUCH A MANNER AS TO MINIMIZE LOSS OF SERVICE TO ANY OTHER CAMPUS SYSTEMS. CONTRACTOR SHALL COORDINATE WITH ENGINEER. DEPENDING UPON THE NATURE OF THE LOSS OF SERVICE, IT MAY BE REQUIRED THAT WORK BE COMPLETED IN THE EVENING AFTER NORMAL BUSINESS. ALL VALVES NEEDED FOR SHUT-DOWN SHALL BE COORDINATED WITH ENGINEER.

3. A MINIMUM VERTICAL CLEARANCE OF EIGHTEEN (18) INCHES BETWEEN ANY UTILITY AND THE WATER MAIN AND OTHER APPURTENANCES.

4. WATER MAINS SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE, DOUBLE CEMENT LINED AND TAR COATED WITH PUSH-ON JOINTS, CLASS 52.

5. ALL FITTINGS SHALL BE DUCTILE IRON CLASS 350 ANSI A21.10 OR ANSI A21.53, EPOXY COATED MECHANICAL OR PUSH-ON JOINTS. NOTE: FITTINGS NOT FURNISHED WITH AN EPOXY COATING CAN BE FURNISHED WITH A DOUBLE CEMENT LINING AND TAR COATING.

6. THE WATER LINES WITHIN THE PROJECT AREA ARE PRIVATE. WATER LINE REVISIONS SHOULD BE COORDINATED WITH THE CAMPUS SYSTEM.

SANITARY SEWER NOTES:

1. ALL SANITARY SEWER MANHOLES NOT LOCATED IN PAVED AREAS MUST BE EQUIPPED WITH WATERTIGHT FRAMES AND COVERS TO PREVENT THE INFLOW OF SURFACE WATER INTO THE SANITARY SEWER.

2. ALL SANITARY SEWER CONSTRUCTION MUST CONFORM TO RADNOR TOWNSHIP'S STANDARDS AND SPECIFICATIONS (LATEST EDITION).

3. CONTRACTOR TO FIELD VERIFY LOCATION AND INVERT OF EXISTING SANITARY SEWER MAINS AND EXISTING LATERALS FOR CONNECTION TO EXISTING SEWER SYSTEM.

4. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CUT SHEETS FOR ALL SANITARY SYSTEM CONSTRUCTION FOR REVIEW AND APPROVAL BY RADNOR TOWNSHIP PRIOR TO CONSTRUCTION.

5. TYPICAL COVER OF THE SANITARY SEWER MAIN SHALL BE A MINIMUM OF FIVE FEET (5').

6. THE SANITARY MAIN PIPE AND FITTINGS SHALL BE GASKETED SDR-26 SEWER PIPE.

7. MANHOLE STRUCTURES SHALL CONFORM TO ASTM C-478 AND PENNDOT PUB. 408, TO SUPPORT HS20-44 LOADING.

8. UNLESS OTHERWISE NOTED, SANITARY LATERALS SHALL CONSIST OF SIX (6") INCH DIAMETER SDR-26 SEWER PIPE AT A MINIMUM SLOPE OF 1/4" PER FOOT.

9. THERE SHALL BE NO LATERAL CONNECTIONS INTO SANITARY SEWER MANHOLES.

DEMOLITION NOTES:

1. DEMOLITION WILL BEGIN UPON RECEIPT OF ALL NECESSARY APPROVALS AND PERMITS FROM ALL APPLICABLE GOVERNMENTAL AGENCIES. ALL WORK SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES.

2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT THE AREAS FOR BOTH VEHICULAR AND PEDESTRIAN TRAFFIC BE SAFE, CLEAN, AND ACCESSIBLE AT ALL TIMES DURING CONSTRUCTION.

3. CONTRACTOR SHALL CONTACT THE PA ONE CALL SYSTEM (1-800-242-1776) PER ACT 287, AS AMENDED, NOT LESS THAN THREE DAYS NOR MORE THAN TEN WORKING DAYS BEFORE COMMENCING WITH DEMOLITION.

4. CONTRACTOR IS RESPONSIBLE FOR UTILIZING APPLICABLE EROSION CONTROL MEASURES PRIOR TO AND DURING DEMOLITION. REFER TO EROSION AND SEDIMENTATION CONTROL PLANS, NOTES AND DETAILS FOR EROSION AND SEDIMENT CONTROL PROCEDURES.

5. THE CONTRACTOR SHALL ENSURE THAT PROPER MECHANISMS ARE IN PLACE TO CONTROL WASTE MATERIALS THAT COULD ADVERSELY IMPACT WATER QUALITY. DEMOLITION WASTES INCLUDE, BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, BUILDING MATERIAL, CONCRETE WASTE WATER, SANITARY WASTES, ETC. MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSE KEEPING, MATERIAL MANAGEMENT AND LITTER CONTROL. WHEREVER POSSIBLE, RECYCLING OF EXCESS MATERIALS IS PREFERRED. RATHER THAN DISPOSAL, DIRECT ALL PUMP DISCHARGES RESULTING FROM DEWATERING OPERATIONS TO A SUITABLE FILTERING DEVICE IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN.

6. SAFETY DEVICES (I.E. BARRICADES, WARNING TAPE, CHAIN LINK FENCING, ETC.) SHALL BE USED DURING DEMOLITION PROCEDURE TO INSURE THE SAFETY OF THE SURROUNDING PUBLIC.

7. THE CONTRACTOR SHALL IMMEDIATELY REMOVE ANY AND ALL DEBRIS THAT MAY FALL ON THE ROADWAY AND/OR MAY BE TRACKED ONTO THE ROADWAY.

8. UTILITY REMOVALS/ABANDONMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING ADDITIONAL SPECIFICATIONS:

A. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES AND TO TAKE WHATEVER STEPS NECESSARY TO PROVIDE FOR THEIR PROTECTION. THE ENGINEER HAS DILIGENTLY ATTEMPTED TO LOCATE AND INDICATE ALL EXISTING FACILITIES ON THESE PLANS; HOWEVER, THIS INFORMATION IS SHOWN FOR THE CONTRACTOR'S CONVENIENCE ONLY. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF UTILITIES SHOWN OR NOT SHOWN. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES FOR EXACT LOCATION OF THEIR UTILITIES PRIOR TO STARTING CONSTRUCTION. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AND REPLACE ANY AND ALL DAMAGE MADE TO UTILITIES BY THE CONTRACTOR.

B. CONTRACTOR TO NOTIFY APPROPRIATE UTILITY COMPANY PRIOR REMOVAL/ABANDONMENT OF SUCH UTILITY.

C. REMOVAL/ABANDONMENT OF PRIVATE UTILITY COMPANY SERVICES TO BE IN ACCORDANCE WITH EACH RESPECTIVE UTILITY COMPANY STANDARD SPECIFICATIONS OR THE FOLLOWING PROCEDURE, WHICH EVER IS MORE RESTRICTIVE:
- ALL PIPES TO BE ABANDON SHALL BE EITHER EXCAVATED, REMOVED AND THE TRENCH BACKFILLED WITH COURSE AGGREGATE MATERIAL OR ALTERNATE MATERIAL APPROVED BY THE ENVIRONMENTAL ENGINEER OF RECORD OR THE PIPE SHALL BE COMPLETED FILLED WITH FLOWABLE FILL/SAND AND THE ENDS SEALED WITH WATERTIGHT GROUT.
- ALL STRUCTURES TO BE ABANDONED IN-PLACE SHALL HAVE AT MINIMUM THE FIRST 5 FEET BELOW PROPOSED GRADE REMOVED. THE REMAINING STRUCTURE SHALL BE COMPLETELY FILLED WITH FLOWABLE FILL, CAPPED WITH A WATERTIGHT CONCRETE COVER AND SEALED WITH WATERTIGHT GROUT. WHERE SITE GRADING NECESSITATES STRUCTURE REMOVAL, THE ASSOCIATED PIPES SHALL BE FILLED WITH FLOWABLE FILL AND THE ENDS SEALED WITH WATERTIGHT GROUT. THE CONTRACTOR SHALL FIELD VERIFY THE FLOW PATH OF ALL PIPES TO ENSURE THAT PLUGGING PIPES WILL NOT ADVERSELY AFFECT DRAINAGE ON ANY ADJACENT ROADWAY OR PROPERTY.

12. REMOVAL AND DISPOSAL OF BITUMINOUS MATERIAL SHALL BE IN COMPLETED IN ACCORDANCE WITH DETAILS AND REGULATIONS OF THE TOWNSHIP, PADEP AND PENNDOT, AS APPLICABLE AND IS SUBJECT TO INSPECTION AND APPROVAL AS APPROPRIATE.

PA ONECALL UTILITIES LIST

ALL DESIGNERS AND CONTRACTORS UTILIZING THIS PLAN AND THE INFORMATION CONTAINED THEREON ARE CAUTIONED TO COMPLY WITH THE REQUIREMENTS OF PENNSYLVANIA ACT 287, AS AMENDED, ENTITLED "UNDERGROUND UTILITY LINE PROTECTION."
SERIAL NO: 20231644446

COMPANY: WHITEMARSH TOWNSHIP AUTHORITY
ADDRESS: 2015 JOSHUA RD BLDG 100
LAFAYETTE HILL, PA. 19444
CONTACT: TOM BONJO
EMAIL: TBONJO@WHITEMARSHAUTHORITY.ORG
PHONE: 610-825-1412

COMPANY: COMCAST
ADDRESS: 1250 HADDONFIELD-BERLIN RD
CHERRY HILL, NJ. 08034
CONTACT: WYATT PARRISH
EMAIL: WYATT_PARRISH@CABLE.COMCAST.COM
PHONE: 484-368-4391

COMPANY: CONSHOHOCKEN BOROUGH AUTHORITY
ADDRESS: 601 E ELM ST
CONSHOHOCKEN, PA. 19428
CONTACT: VINNY COLON
EMAIL: VCOLON@CONSHOHOCKENSA.COM
PHONE: 610-828-0979 EXT. 106

COMPANY: AQUA PENNSYLVANIA
ADDRESS: 762 LANCASTER AVE
BRYN MAWR, PA. 19010
CONTACT: THOMAS WADDY
EMAIL: TBWADDY@AQUAAMERICA.COM
PHONE: 610-525-1400 EXT. 52105

COMPANY: PECO AN EXELON COMPANY C/O USIC
ADDRESS: 450 S HENDERSON ROAD SUITE B
KING OF PRUSSIA, PA. 19406
CONTACT: NIKKIA SIMPKINS
EMAIL: NIKKIASIMPKINS@USICLLC.COM
PHONE: 484-681-5720

COMPANY: VERIZON BUSINESS FORMERLY MCI
ADDRESS: 400 INTERNATIONAL PARKWAY
RICHARDSON, TX. 75081
CONTACT: DEAN BOYERS
EMAIL: INVESTIGATIONS@VERIZON.COM
PHONE: 469-886-4238

COMPANY: SOUTHEASTERN PA TRANSPORTATION AUTHORITY
ADDRESS: 1234 MARKET ST 12TH FLOOR
PHILADELPHIA, PA. 19107
CONTACT: TYLER LADD
EMAIL: TLADD@SEPTA.ORG
PHONE: 215-580-8015

COMPANY: VERIZON BUSINESS FORMERLY MCI
ADDRESS: 7001 WESTON PKWY
CARY, NC. 27513
CONTACT: VICTOR WOOD
EMAIL: VICTOR.S.WOOD@VERIZON.COM
PHONE: 919-414-2782

COMPANY: WHITEMARSH TOWNSHIP PUBLIC WORKS
ADDRESS: 616 GERMANTOWN PIKE
LAFAYETTE HILLS, PA. 19444
CONTACT: JOHN FIELDS
EMAIL: JFIELDS@WHITEMARSHTWP.ORG
PHONE: 215-783-1617

GENERAL CONSTRUCTION AND GRADING NOTES:

1. ALL WORK SHALL COMPLY WITH APPLICABLE STATE, FEDERAL AND LOCAL CODES AND ALL NECESSARY LICENSES AND PERMITS SHALL BE OBTAINED BY THE CONTRACTOR AT HIS EXPENSE UNLESS PREVIOUSLY OBTAINED BY THE OWNER/DEVELOPER.

2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOWING STANDARDS, AS APPLICABLE:
A. PENNDOT SPECIFICATION, PUB 408/2007 OR LATEST REVISION.
B. PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, PUBLICATION 72, LAST REVISED 9/19/08 OR LATEST REVISION.
C. PENNDOT HANDBOOK OF APPROVED SIGNS, PUB 236/2006 OR LATEST REVISION.
D. AMERICANS WITH DISABILITIES ACT OF JULY 1991 AS AMENDED.
E. THE PENNSYLVANIA CLEAN STREAM LAW (35 P.S. SECTION 691.1 ET. SEQ.).
F. REGULATIONS OF PA CODE TITLE 25, CHAPTER 102.
G. TOWNSHIP STANDARDS AND SPECIFICATIONS (LATEST EDITION).

IN EVENT OF A CONFLICT AMONG THESE REQUIREMENTS AND/OR PLANS, THE MORE RESTRICTIVE REGULATION SHALL APPLY OR A CLARIFICATION SHALL BE OBTAINED FROM THE ENGINEER.

3. THE CONTRACTOR SHALL BE REQUIRED TO REVIEW AND ABIDE BY SPECIFICATIONS OF THE PLAN AND ALL SUPPORTING DOCUMENTS, PERMITS, AND REPORTS FOR THIS SITE, INCLUDING NOT BUT NOT LIMITED TO:
- EROSION AND SEDIMENTATION CONTROL PLAN

4. THE CONTRACTOR SHALL IMMEDIATELY INFORM THE ENGINEER OF ANY DISCREPANCIES OR ERROR THEY DISCOVER IN THE PLANS.

5. DEVIATION FROM THESE PLANS AND NOTES WITHOUT THE PRIOR CONSENT OF THE OWNER OR HIS REPRESENTATIVE OR THE ENGINEER MAY BE CAUSE OF THE WORK TO BE UNACCEPTABLE.

6. UTILITY COORDINATION SHALL BE INCLUDED IN THE PROJECT SCHEDULE AND IT IS THE EXPLICIT RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT THE PROJECT SCHEDULE INCLUDES THE NECESSARY RELOCATIONS. THE CONTRACTOR WILL NOT BE PAID ADDITIONALLY FOR THIS COORDINATION. THE CONTRACTOR SHOULD SEEK ASSISTANCE FROM ALL UTILITY COMPANIES TO LOCATE AND PROTECT THEIR FACILITIES. IF CONFLICTS ARE FOUND, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND DESIGN ENGINEER FOR INSTRUCTION BEFORE PROCEEDING WITH WORK.

7. ALL MATERIALS SHALL BE NEW UNLESS USED OR SALVAGED MATERIALS ARE AUTHORIZED BY THE OWNER.

8. TRAFFIC CONTROL METHODS, SUCH AS BARRICADES, SUFFICIENT LIGHTS, SIGNS, ETC., THAT MAY BE NECESSARY FOR THE PROTECTION AND SAFETY OF THE PUBLIC SHALL BE PROVIDED AND MAINTAINED THROUGHOUT THE CONSTRUCTION.

9. CONTRACTOR SHALL FURNISH AND MAINTAIN ALL NECESSARY BARRICADES AROUND THE WORK AREA.

10. HIGH INTENSITY LIGHTING FACILITIES SHALL BE SO ARRANGED THAT THE SOURCE OF ANY LIGHT IS CONCEALED FROM PUBLIC VIEW AND FROM ADJACENT RESIDENTIAL PROPERTY AND DOES NOT INTERFERE WITH TRAFFIC.

11. THE CONTRACTOR SHALL MAINTAIN ACCESS FOR EMERGENCY VEHICLES AROUND AND TO ALL BUILDINGS NEAR CONSTRUCTION. IN TIME OF RAIN OR MUD, ROADS SHALL BE ABLE TO CARRY A FIRE TRUCK BY BEING PAVED OR HAVING A CRUSHED STONE BASE, ETC., WITH A MINIMUM WIDTH OF 20 FEET. ACCESS TO BUILDINGS THAT HAVE SPRINKLER OR STANDPIPE SYSTEMS SHALL BE WITHIN 40 FEET OF THE FIRE DEPARTMENT CONNECTOR. (NFPA 1141 3-1)

12. THE CONTRACTOR WILL ENSURE THAT POSITIVE AND ADEQUATE DRAINAGE IS MAINTAINED AT ALL TIMES WITHIN THE PROJECT LIMITS. THIS MAY INCLUDE, BUT NOT BE LIMITED TO REPLACEMENT OR RECONSTRUCTION OF EXISTING DRAINAGE STRUCTURES THAT HAVE BEEN DAMAGED OR REMOVED OR REGRADING AS REQUIRED BY THE ENGINEER, EXCEPT FOR THOSE DRAINAGE ITEMS SHOWN AT SPECIFIC LOCATIONS AND HAVING SPECIFIC PAY ITEMS IN THE DETAILED ESTIMATE. NO SEPARATE PAYMENT WILL BE MADE FOR ANY COSTS INCURRED TO COMPLY WITH THIS REQUIREMENT.

13. THE CONTRACTOR SHALL PROVIDE ANY AND ALL EXCAVATION AND MATERIAL SAMPLES NECESSARY TO CONDUCT REQUIRED SOIL TESTS. ALL ARRANGEMENTS AND SCHEDULING FOR THE TESTING SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

14. ALL PERMITS MUST BE OBTAINED PRIOR TO THE START OF CONSTRUCTION.

UTILITY TRENCH NOTES

1. LIMIT ADVANCED CLEARING AND GRUBBING OPERATIONS TO A DISTANCE EQUAL TO TWO TIMES THE LENGTH OF PIPE INSTALLATION THAT CAN BE COMPLETED IN ONE DAY.

2. WORK CREWS AND EQUIPMENT FOR TRENCHING, PLACEMENT OF PIPE, PLUG CONSTRUCTION AND BACKFILLING WILL BE SELF CONTAINED AND SEPARATE FROM CLEARING AND GRUBBING AND SITE RESTORATION AND STABILIZATION OPERATIONS.

3. ALL SOIL EXCAVATED FROM THE TRENCH WILL BE PLACED ON THE UPHILL SIDE OF THE TRENCH.

4. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT, PLUG INSTALLATION AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY.

5. WATER WHICH ACCUMULATES IN THE OPEN TRENCH WILL BE COMPLETELY REMOVED BY PUMPING BEFORE PIPE PLACEMENT AND/OR BACKFILLING BEGINS. WATER REMOVED FROM THE TRENCH SHALL BE PUMPED THROUGH A FILTRATION DEVICE.

6. ON THE DAY FOLLOWING PIPE PLACEMENT AND TRENCH BACKFILLING, THE DISTURBED AREA WILL BE GRADED TO FINAL CONTOURS AND IMMEDIATELY STABILIZED.

SIGN TABLE:

SYMBOL	SIGN CHARACTERISTICS	PENNDOT #	SIZE
A	STOP	R1-1	30" X 30"
B	DO NOT ENTER	R5-1	30" X 30"
C	NO PARKING FIRE LANE		12" X 18"
D	RESERVED PARKING	R7-8	12" X 18"
E	VAN ACCESSIBLE	R7-8P	12" X 6"

SOIL CHART

OBTAINED FROM NRCS SOIL MART ON 1/9/2024

SYMBOL	NAME	HYDROLOGIC GROUP	SLOPES	HYDRIC	DEPTH TO		LIMITATIONS		RESOLUTION NOTES
					WATER TABLE (IN)	BEDROCK (IN)	FROST ACTION	SMALL COMMERCIAL BUILDINGS	
UgB	URBAN LAND	-	0 TO 8%	NO	-	-	NONE	NOT RATED	-

CONESTOGA FORMATION

STATE: PENNSYLVANIA
NAME: CONESTOGA FORMATION
GEOLOGIC AGE: ORDOVICIAN AND CAMBRIAN
ORIGINAL MAP LABEL: OCc
PRIMARY ROCK TYPE: LIMESTONE
SECONDARY ROCK TYPE: SHALE, CONGLOMERATIC LIMESTONE, PHYLLITE

GLENARM WISSAHICKON FORMATION

STATE: PENNSYLVANIA
NAME: GKENARM WISSAHICKON FORMATION
GEOLOGIC AGE: PROBABLY LOWER PALEOZOIC
ORIGINAL MAP LABEL: Xgw
PRIMARY ROCK TYPE: OLIGOCLASE-MICA SCHIST
SECONDARY ROCK TYPE: HORNBLENDE GNEISS, GNEISS, AMPHIBOLITE

FELSIC GNEISS

STATE: PENNSYLVANIA
NAME: FELSIC GNEISS
GEOLOGIC AGE: PRECAMBRIAN
ORIGINAL MAP LABEL: fgp
PRIMARY ROCK TYPE: FELSIC GNEISS
SECONDARY ROCK TYPE: N/A

SITE LEGEND

- PROPERTY LINE
- LEGAL RIGHT-OF-WAY
- EX PROPERTY CORNER FOUND
- EX CONCRETE MONUMENT
- ADJOINING PROPERTY LINE
- EX BUILDING
- EX CURB
- EX EDGE OF PAVEMENT
- EX EDGE OF GRAVEL
- EX WALL
- EX FENCE LINE
- EX SIGN
- EX LANDSCAPING
- EX TREE ROW
- 361 EX MINOR CONTOUR
- 360 EX MAJOR CONTOUR
- D D EX STORM SEWER LINES
- EX UTILITY MANHOLE
- EX STORM SEWER INLET
- EX STORMWATER MANHOLE
- OE OE EX OVERHEAD ELECTRICAL LINES
- UE UE EX ELECTRICAL LINES
- EX UTILITY POLE
- W W EX WATER LINES
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- EX WATER VALVE
- S S EX SANITARY SEWER LINES
- EX SANITARY MANHOLE
- EX SANITARY CLEAN OUT
- G G EX NATURAL GAS LINES
- UT UT EX PHONE LINES
- EX SOIL BOUNDARY
- EX FENCE
- EXISTING TREE (TBR)
- PROPOSED PROPERTY LINE
- PROPOSED RIGHT-OF-WAY
- BUILDING SETBACK LINE
- PROPOSED EASEMENT
- PROPOSED BUILDING
- PROPOSED CURB
- PROPOSED SIDEWALK
- PROPOSED SIGN
- FFE 360 PROPOSED FINISHED FLOOR ELEVATION
- 360 PROPOSED MAJOR CONTOUR
- 361 PROPOSED MINOR CONTOUR
- PROPOSED BUILDING
- PROPOSED STORM LINE
- PROPOSED STORM MANHOLE
- PROPOSED INLET
- S S PROPOSED SANITARY SEWER LINES
- PROPOSED SANITARY SEWER MANHOLE
- E E PROPOSED ELECTRICAL
- PROPOSED ELECTRIC MANHOLE
- W W PROPOSED WATER LINES
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- F F PROPOSED FIRE PROTECTION
- PROPOSED LIGHT POLE

NOT FOR CONSTRUCTION

PLOTTED: 7/19/2024 9:28 AM BY: Cameron Williams PLOTSTYLE: Pennoni NCS.ctb
u:\Accounts\BLMA\Villa\23005 - villanova boathouse - HISTORIC\PLSHEETS\CS0002.dwg

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

GENERAL NOTES

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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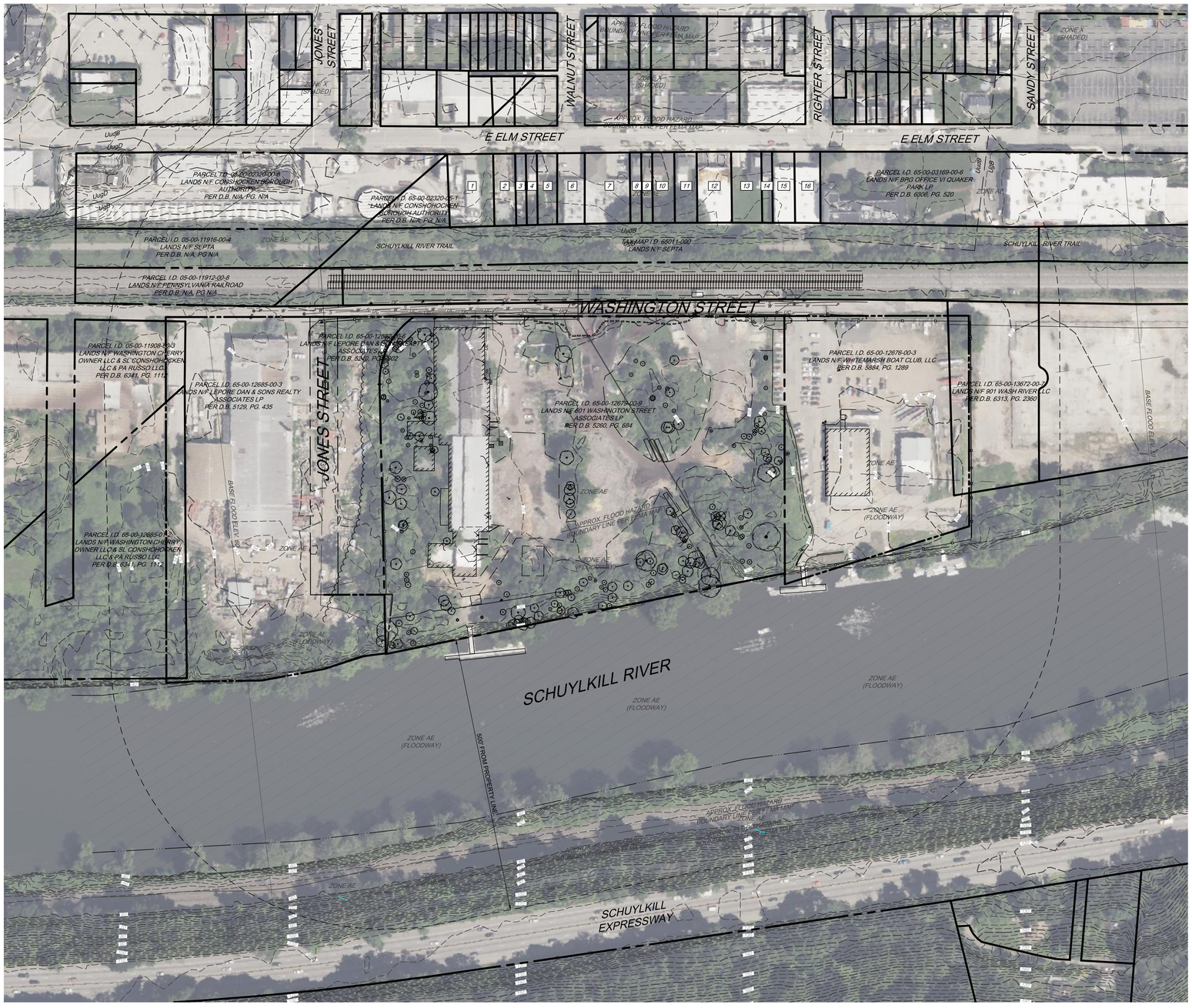

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- EX SANITARY MANHOLE
- EX SANITARY CLEAN OUT
- G G EX NATURAL GAS LINES
- UT UT EX PHONE LINES
- EX SOIL BOUNDARY
- EX FENCE

NORTH

0 100' 200'

NOTE: THE ENTIRE SITE IS LOCATED WITHIN THE RIPARIAN CORRIDOR, WHICH IS COTERMINOUS WITH TH E100 YEAR FLOODPLAIN.

SOIL CHART

OBTAINED FROM NRCS SOIL MART ON 6/13/2024

SYMBOL	NAME	HYDROLOGIC GROUP	SLOPES	HYDRIC	DEPTH TO		LIMITATIONS		RESOLUTION NOTES
					WATER TABLE (IN)	BEDROCK (IN)	FROST ACTION	SMALL COMMERCIAL BUILDINGS	
UgB	URBAN LAND	-	0 TO 8%	NO	-	-	NONE	NOT RATED	-
UudB	URBAN LAND - UDORTHENTS, LIMESTONE COMPLEX	C/D	0 TO 8%	NO	6-24	20-99	NONE	NOT LIMITED	
UugD	URBAN LAND - UDORTHENTS, LIMESTONE COMPLEX	C	8 TO 25%	NO	60	20-70	NONE	VERY LIMITED	

NOT FOR CONSTRUCTION

CONESTOGA FORMATION

STATE: PENNSYLVANIA
NAME: CONESTOGA FORMATION
GEOLOGIC AGE: ORDOVICIAN AND CAMBRIAN
ORIGINAL MAP LABEL: OCc
PRIMARY ROCK TYPE: LIMESTONE
SECONDARY ROCK TYPE: SHALE, CONGLOMERATIC LIMESTONE, PHYLLITE

GLENARM WISSAHICKON FORMATION

STATE: PENNSYLVANIA
NAME: GKENARM WISSAHICKON FORMATION
GEOLOGIC AGE: PROBABLY LOWER PALEOZOIC
ORIGINAL MAP LABEL: Xgw
PRIMARY ROCK TYPE: OLIGOCLASE-MICA SCHIST
SECONDARY ROCK TYPE: HORNBLENDE GNEISS, GNEISS, AMPHIBOLITE

FELSIC GNEISS

STATE: PENNSYLVANIA
NAME: FELSIC GNEISS
GEOLOGIC AGE: PRECAMBRIAN
ORIGINAL MAP LABEL: fgp
PRIMARY ROCK TYPE: FELSIC GNEISS
SECONDARY ROCK TYPE: N/A

PROPERTY OWNERS TABLE

PROPERTY #	PARCEL ID	OWNER	DEED BOOK (BOOK-PAGE)
1	65-00-03280-00-3	CONSHOHOCKEN BOROUGH AUTHORITY	4778-125
2	65-00-03277-00-6	JOSEPH GRASSO	5590-14
3	65-00-03274-00-9	JOSEPH GRASSO	5590-10
4	65-00-03271-00-3	ALLISON & DANE WOZNIAK	6162-698
5	65-00-03268-00-6	JOSE R ORTIZ & ELIZABETH H	5552-1110
6	65-00-03265-01-8	KENNEDY PROPERTIES LP	-
7	65-00-03265-00-9	KENNEDY PROPERTIES LP	5461-1879
8	65-00-03262-00-3	PALMER PROPERTY ACQUISITIONS LLC	5927-2043
9	65-00-03259-00-6	JOSEPH R FERRIER & KAREN T	5598-994
10	65-00-03256-00-9	RACHEL C TSIOURIS-GABRIELE & NICHOLAS LOUIS GABRIELE	6147-1930
11	65-00-03263-00-3	JOSEPH A SUGLASKI & BARBARA L	-
12	65-00-03250-00-6	CONNAUGHTOWN PARTNERS LLC	6199-1799
13	65-00-03247-00-9	CONNAUGHTOWN PARTNERS LLC	6199-1799
14	65-00-03244-00-3	CONNAUGHTOWN PARTNERS LLC	6199-1799
15	65011-043	-	-
16	65-00-03241-00-6	ELM STREET PARTNERS	5104-1918

Pennoni
PENNONI ASSOCIATES INC.
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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

EXISTING RESOURCE AND SITE ANALYSIS PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1" = 100'
DRAWN BY	CW
APPROVED BY	MR

CS0200

SHEET 3 OF 23

PLOTTED: 7/19/2024 9:28 AM, BY: Cameron Williams PLOTSTYLE: Pennoni NCS.ctb
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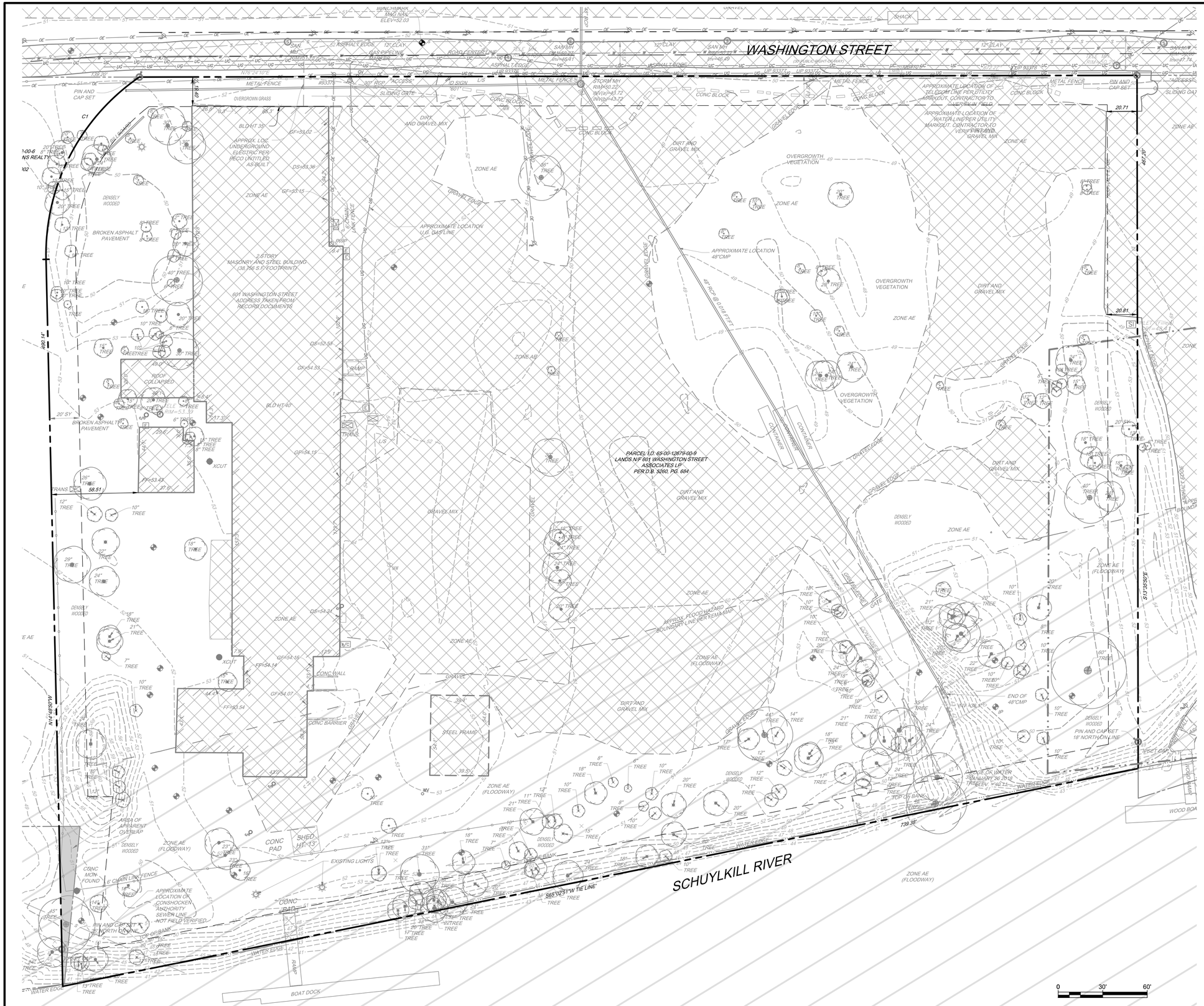

SITE LEGEND

- PROPERTY LINE
- LEGAL RIGHT-OF-WAY
- EX PROPERTY CORNER FOUND
- EX CONCRETE MONUMENT
- ADJOINING PROPERTY LINE
- EX BUILDING
- EX CURB
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- EX EDGE OF GRAVEL
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- EX SANITARY MANHOLE
- EX SANITARY CLEAN OUT
- G G EX NATURAL GAS LINES
- UT UT EX PHONE LINES
- EX SOIL BOUNDARY
- EX FENCE
- EX IMPERVIOUS

NOTE: THE ENTIRETY OF THE PROJECT SITE AREA IS LOCATED IN THE 100 - YR FLOODPLAIN

NOT FOR CONSTRUCTION

Pennoni

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601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

EXISTING CONDITIONS PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS0201

SHEET 4 OF 23

PLOTTED: 7/19/2024 9:28 AM, BY: Cameron Williams PLOTSTYLE: Pennoni MCS.stb
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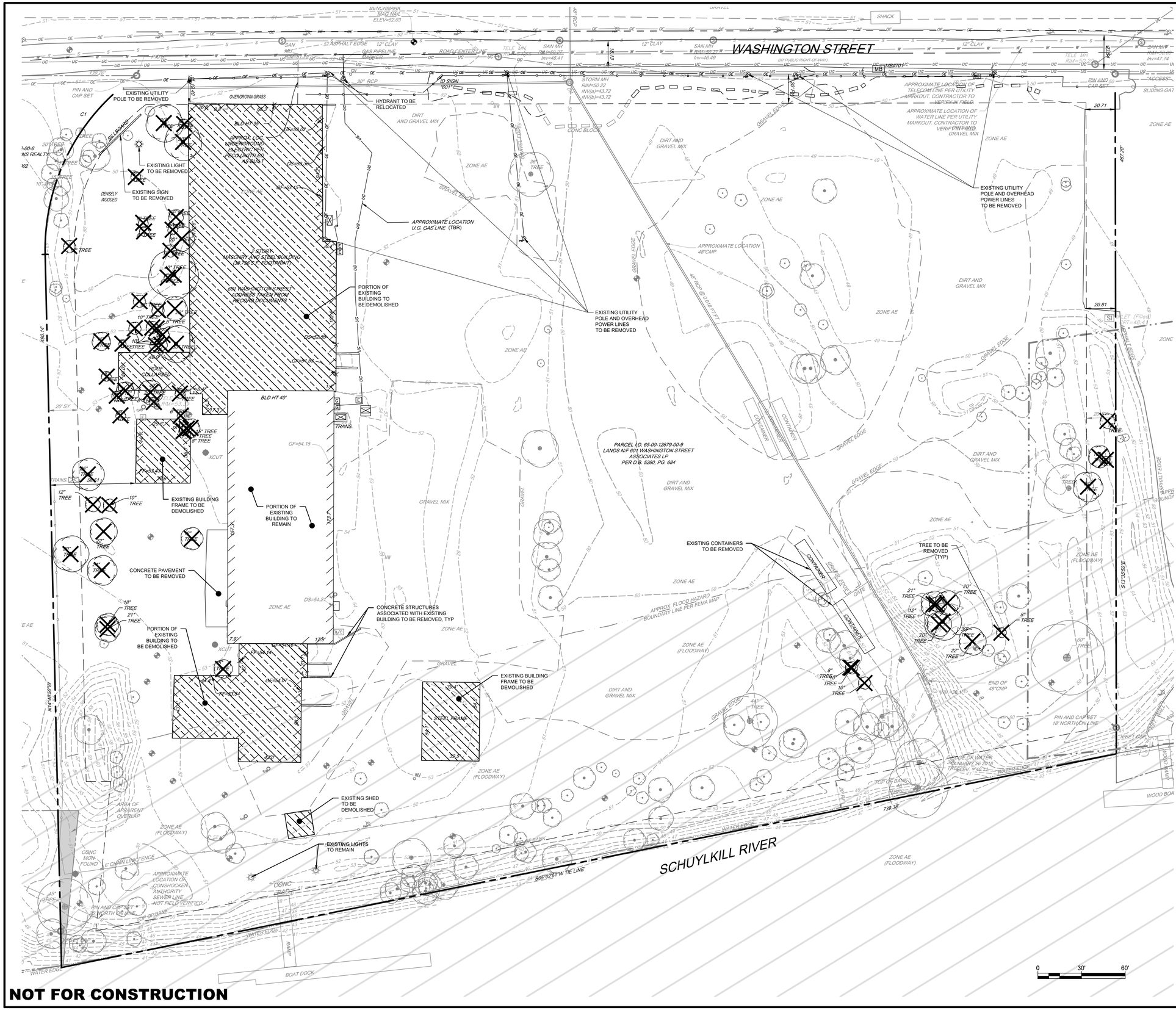

SITE LEGEND

- PROPERTY LINE
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- EX PROPERTY CORNER FOUND
- EX CONCRETE MONUMENT
- ADJOINING PROPERTY LINE
- EX BUILDING
- EX CURB
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- EX EDGE OF GRAVEL
- EX WALL
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- EX LANDSCAPING
- EX TREE ROW
- EX MINOR CONTOUR
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- EX STORM SEWER LINES
- EX UTILITY MANHOLE
- EX STORM SEWER INLET
- EX STORMWATER MANHOLE
- EX OVERHEAD ELECTRICAL LINES
- EX ELECTRICAL LINES
- EX UTILITY POLE
- EX WATER LINES
- EX FIRE HYDRANT
- EX WATER VALVE
- EX SANITARY SEWER LINES
- EX SANITARY MANHOLE
- EX SANITARY CLEAN OUT
- EX NATURAL GAS LINES
- EX PHONE LINES
- EX SOIL BOUNDARY
- EX FENCE
- EXISTING TREE (TBR)

NOTE: THE ENTIRETY OF THE PROJECT SITE AREA IS LOCATED IN THE 100 - YR FLOODPLAIN

NOT FOR CONSTRUCTION

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DEMOLITION PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

BY	REVISIONS	NO.	DATE
CW	PLD SUBMISSION	1	2024-07-19
CW	90% CDS	0	2024-07-12

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS0501

SHEET 5 OF 23

PLOTTED: 7/19/2024 9:29 AM BY: Cameron Williams PLOTSTYLE: Pennoni WCS.ctb
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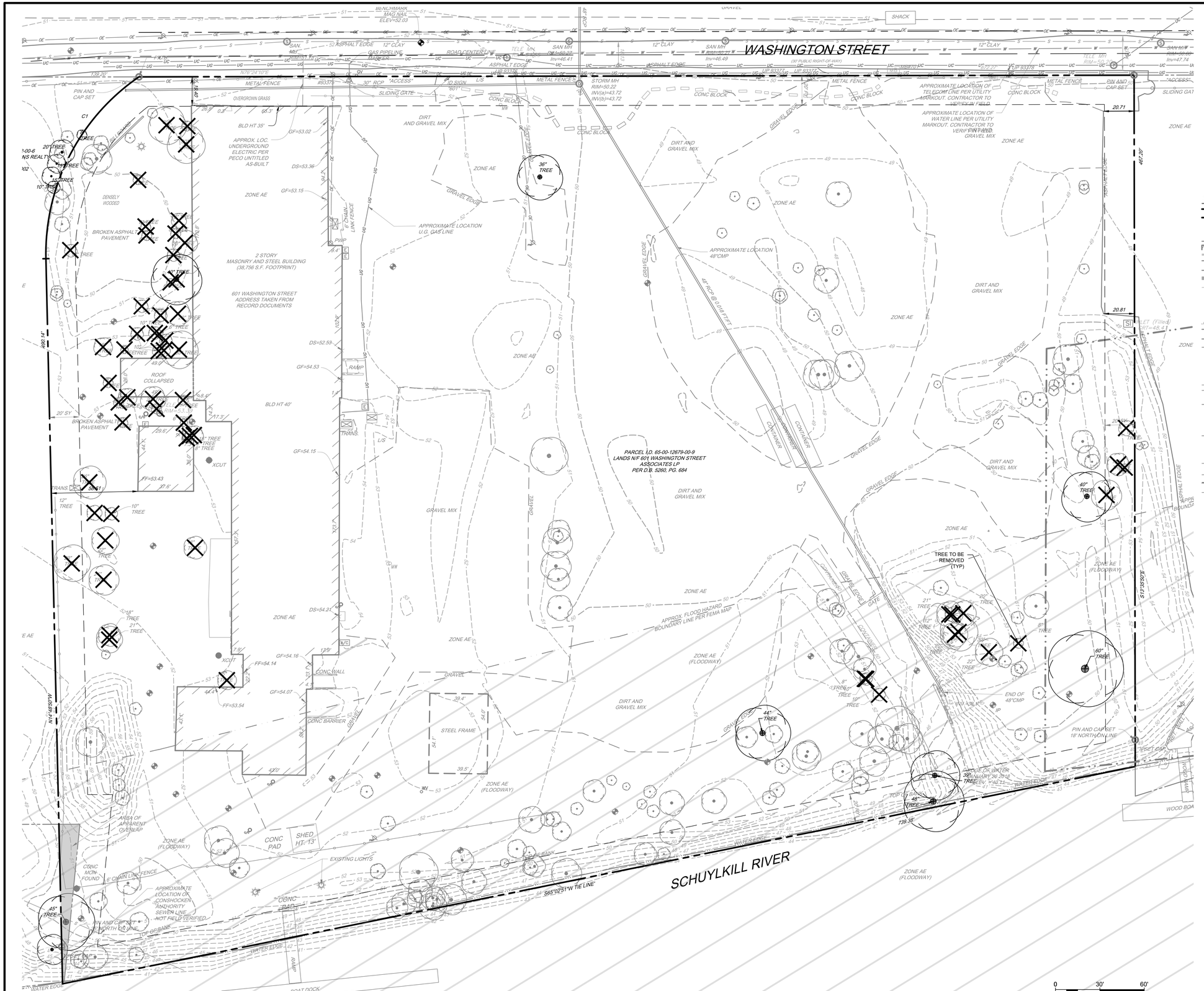

SITE LEGEND

- PROPERTY LINE
- LEGAL RIGHT-OF-WAY
- EX PROPERTY CORNER FOUND
- EX CONCRETE MONUMENT
- ADJOINING PROPERTY LINE
- EX BUILDING
- EX CURB
- EX EDGE OF PAVEMENT
- EX EDGE OF GRAVEL
- EX WALL
- EX FENCE LINE
- EX SIGN
- EX LANDSCAPING
- EX TREE ROW
- EX MINOR CONTOUR
- EX MAJOR CONTOUR
- EX STORM SEWER LINES
- EX UTILITY MANHOLE
- EX STORM SEWER INLET
- EX STORMWATER MANHOLE
- EX OVERHEAD ELECTRICAL LINES
- EX ELECTRICAL LINES
- EX UTILITY POLE
- EX WATER LINES
- EX FIRE HYDRANT
- EX WATER VALVE
- EX SANITARY SEWER LINES
- EX SANITARY MANHOLE
- EX SANITARY CLEAN OUT
- EX NATURAL GAS LINES
- EX PHONE LINES
- EX SOIL BOUNDARY
- EX FENCE
- EXISTING TREE (TBR)

NOTE: HERITAGE AND BOUNDARY TREES ARE SHOWN IN BLACK.

NOT FOR CONSTRUCTION

Pennoni

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
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T 610.429.8907 F 610.429.8918

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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

TREE SURVEY PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

DATE	NO.	REVISIONS	BY
2024-07-19	1	PLD SUBMISSION	CW
2024-07-12	0	90% CDS	CW

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS0502

SHEET 6 OF 23

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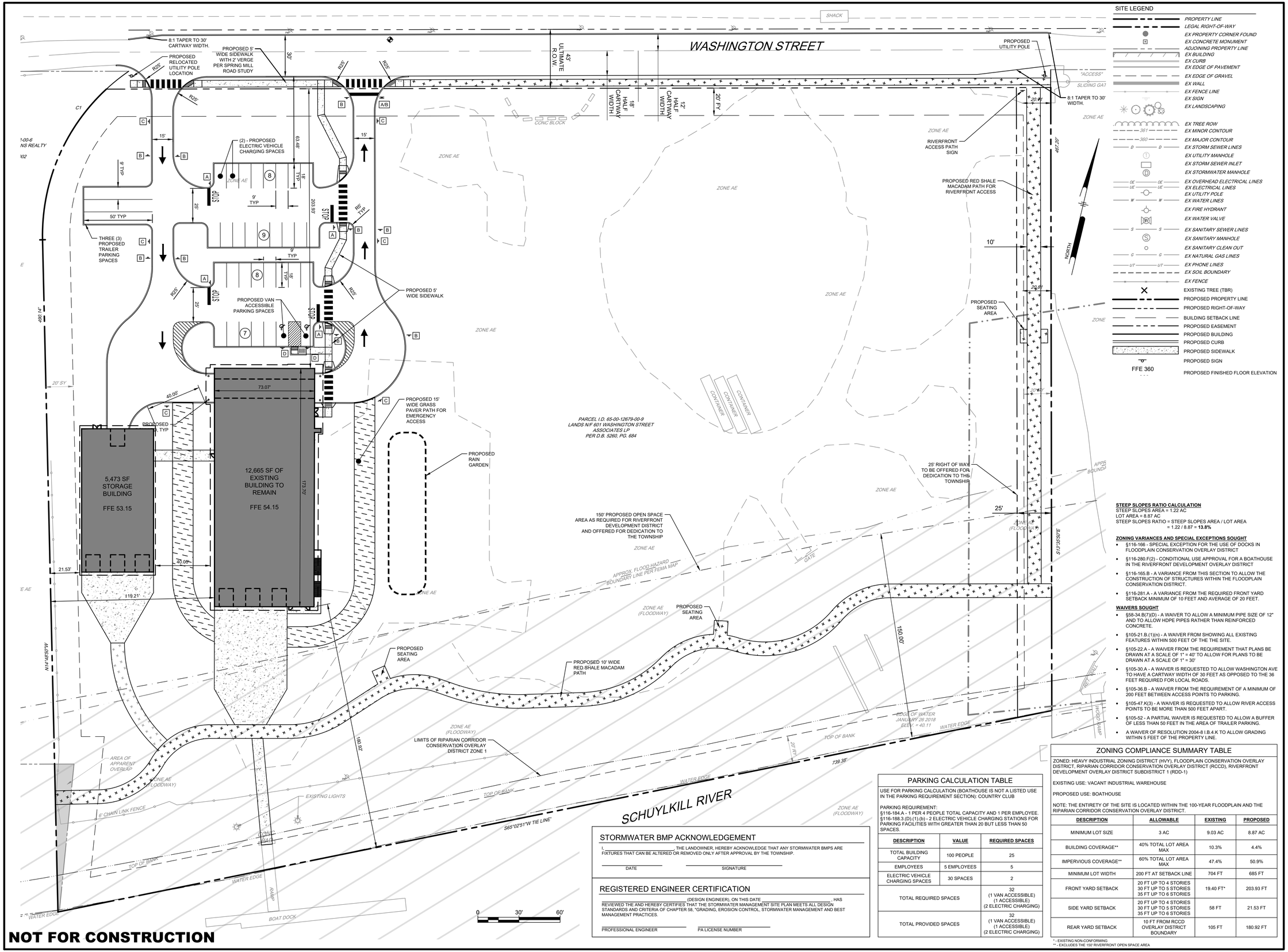

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- EX NATURAL GAS LINES
- EX PHONE LINES
- EX SOIL BOUNDARY
- EX FENCE
- EXISTING TREE (TBR)
- PROPOSED PROPERTY LINE
- PROPOSED RIGHT-OF-WAY
- BUILDING SETBACK LINE
- PROPOSED EASEMENT
- PROPOSED BUILDING
- PROPOSED CURB
- PROPOSED SIDEWALK
- PROPOSED SIGN
- FFE 360 — PROPOSED FINISHED FLOOR ELEVATION

STEEP SLOPES RATIO CALCULATION
STEEP SLOPES AREA = 1.22 AC
LOT AREA = 8.87 AC
STEEP SLOPES RATIO = STEEP SLOPES AREA / LOT AREA
= 1.22 / 8.87 = **13.8%**

ZONING VARIANCES AND SPECIAL EXCEPTIONS SOUGHT

- §116-166 - SPECIAL EXCEPTION FOR THE USE OF DOCKS IN FLOODPLAIN CONSERVATION OVERLAY DISTRICT
- §116-280.F(2) - CONDITIONAL USE APPROVAL FOR A BOATHOUSE IN THE RIVERFRONT DEVELOPMENT OVERLAY DISTRICT
- §116-165.B - A VARIANCE FROM THIS SECTION TO ALLOW THE CONSTRUCTION OF STRUCTURES WITHIN THE FLOODPLAIN CONSERVATION DISTRICT.
- §116-281.A - A VARIANCE FROM THE REQUIRED FRONT YARD SETBACK MINIMUM OF 10 FEET AND AVERAGE OF 20 FEET.

WAIVERS SOUGHT

- §58-34.B(7)(D) - A WAIVER TO ALLOW A MINIMUM PIPE SIZE OF 12" AND TO ALLOW HDPE PIPES RATHER THAN REINFORCED CONCRETE.
- §105-21.B.(1)(n) - A WAIVER FROM SHOWING ALL EXISTING FEATURES WITHIN 500 FEET OF THE THE SITE.
- §105-22.A - A WAIVER FROM THE REQUIREMENT THAT PLANS BE DRAWN AT A SCALE OF 1" = 40' TO ALLOW FOR PLANS TO BE DRAWN AT A SCALE OF 1" = 30'
- §105-30.A - A WAIVER IS REQUESTED TO ALLOW WASHINGTON AVE TO HAVE A CARTWAY WIDTH OF 30 FEET AS OPPOSED TO THE 36 FEET REQUIRED FOR LOCAL ROADS.
- §105-36.B - A WAIVER FROM THE REQUIREMENT OF A MINIMUM OF 200 FEET BETWEEN ACCESS POINTS TO PARKING.
- §105-47.K(3) - A WAIVER IS REQUESTED TO ALLOW RIVER ACCESS POINTS TO BE MORE THAN 500 FEET APART.
- §105-52 - A PARTIAL WAIVER IS REQUESTED TO ALLOW A BUFFER OF LESS THAN 50 FEET IN THE AREA OF TRAILER PARKING.
- A WAIVER OF RESOLUTION 2004-8 I.B.4.K TO ALLOW GRADING WITHIN 5 FEET OF THE PROPERTY LINE.

STORMWATER BMP ACKNOWLEDGEMENT

I, _____, THE LANDOWNER, HEREBY ACKNOWLEDGE THAT ANY STORMWATER BMPS ARE FIXTURES THAT CAN BE ALTERED OR REMOVED ONLY AFTER APPROVAL BY THE TOWNSHIP.

_____ DATE

_____ SIGNATURE

REGISTERED ENGINEER CERTIFICATION

_____ (DESIGN ENGINEER), ON THIS DATE _____, HAS REVIEWED THE AND HEREBY CERTIFIES THAT THE STORMWATER MANAGEMENT SITE PLAN MEETS ALL DESIGN STANDARDS AND CRITERIA OF CHAPTER 58, "GRADING, EROSION CONTROL, STORMWATER MANAGEMENT AND BEST MANAGEMENT PRACTICES.

_____ PROFESSIONAL ENGINEER

_____ PA LICENSE NUMBER

PARKING CALCULATION TABLE

USE FOR PARKING CALCULATION (BOATHOUSE IS NOT A LISTED USE IN THE PARKING REQUIREMENT SECTION): COUNTRY CLUB

PARKING REQUIREMENT:
§116-184.A - 1 PER 4 PEOPLE TOTAL CAPACITY AND 1 PER EMPLOYEE.
§116-188.3.(D).(1).(b) - 2 ELECTRIC VEHICLE CHARGING STATIONS FOR PARKING FACILITIES WITH GREATER THAN 20 BUT LESS THAN 50 SPACES.

DESCRIPTION	VALUE	REQUIRED SPACES
TOTAL BUILDING CAPACITY	100 PEOPLE	25
EMPLOYEES	5 EMPLOYEES	5
ELECTRIC VEHICLE CHARGING SPACES	30 SPACES	2
TOTAL REQUIRED SPACES		32 (1 VAN ACCESSIBLE) (1 ACCESSIBLE) (2 ELECTRIC CHARGING)
TOTAL PROVIDED SPACES		32 (1 VAN ACCESSIBLE) (1 ACCESSIBLE) (2 ELECTRIC CHARGING)

ZONING COMPLIANCE SUMMARY TABLE

ZONED: HEAVY INDUSTRIAL ZONING DISTRICT (HVY), FLOODPLAIN CONSERVATION OVERLAY DISTRICT, RIPARIAN CORRIDOR CONSERVATION OVERLAY DISTRICT (RCCD), RIVERFRONT DEVELOPMENT OVERLAY DISTRICT SUBDISTRICT 1 (RDD-1)

EXISTING USE: VACANT INDUSTRIAL WAREHOUSE

PROPOSED USE: BOATHOUSE

NOTE: THE ENTIRETY OF THE SITE IS LOCATED WITHIN THE 100-YEAR FLOODPLAIN AND THE RIPARIAN CORRIDOR CONSERVATION OVERLAY DISTRICT.

DESCRIPTION	ALLOWABLE	EXISTING	PROPOSED
MINIMUM LOT SIZE	3 AC	9.03 AC	8.87 AC
BUILDING COVERAGE**	40% TOTAL LOT AREA MAX	10.3%	4.4%
IMPERVIOUS COVERAGE**	60% TOTAL LOT AREA MAX	47.4%	50.9%
MINIMUM LOT WIDTH	200 FT AT SETBACK LINE	704 FT	685 FT
FRONT YARD SETBACK	20 FT UP TO 4 STORIES 30 FT UP TO 5 STORIES 35 FT UP TO 6 STORIES	19.40 FT*	203.93 FT
SIDE YARD SETBACK	20 FT UP TO 4 STORIES 30 FT UP TO 5 STORIES 35 FT UP TO 6 STORIES	58 FT	21.53 FT
REAR YARD SETBACK	10 FT FROM RCCD OVERLAY DISTRICT BOUNDARY	105 FT	180.92 FT

* - EXISTING NON-CONFORMING
** - EXCLUDES THE 150' RIVERFRONT OPEN SPACE AREA

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SITE PLAN

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS1001

SHEET 7 OF 23

PLOTTED: 7/19/2024 9:32 AM, BY: Cameron Williams PLOTSTYLE: Pennoni MCS.stb
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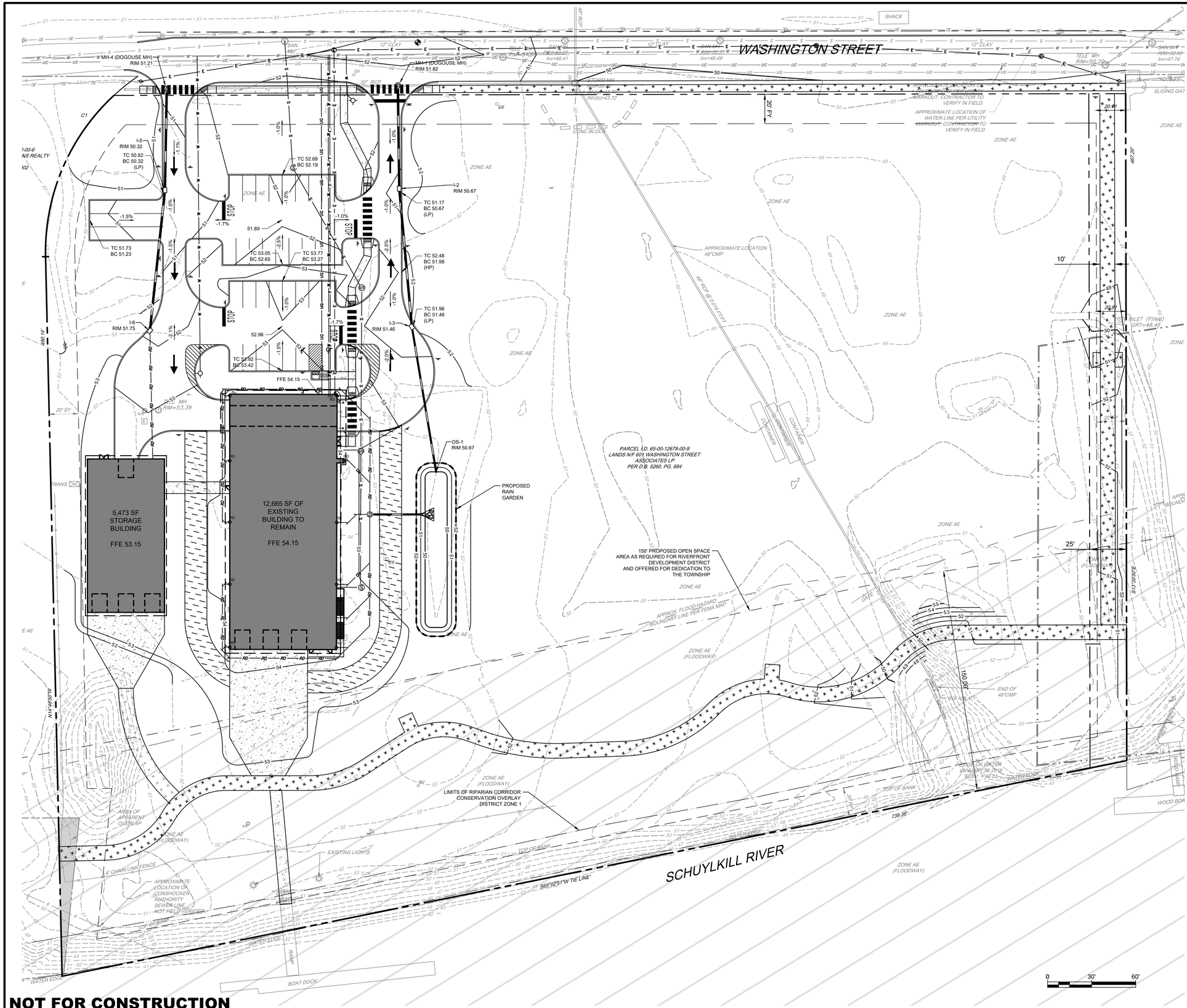

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- PROPOSED SIDEWALK
- PROPOSED SIGN
- FFE 360 — PROPOSED FINISHED FLOOR ELEVATION
- 360 — PROPOSED MAJOR CONTOUR
- 361 — PROPOSED MINOR CONTOUR
- PROPOSED BUILDING
- PROPOSED STORM LINE
- PROPOSED STORM MANHOLE
- PROPOSED INLET
- PROPOSED SANITARY SEWER LINES
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED ELECTRICAL
- PROPOSED ELECTRIC MANHOLE
- PROPOSED WATER LINES
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED FIRE PROTECTION
- PROPOSED LIGHT POLE

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GRADING PLAN

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CS1501

SHEET 8 OF 23

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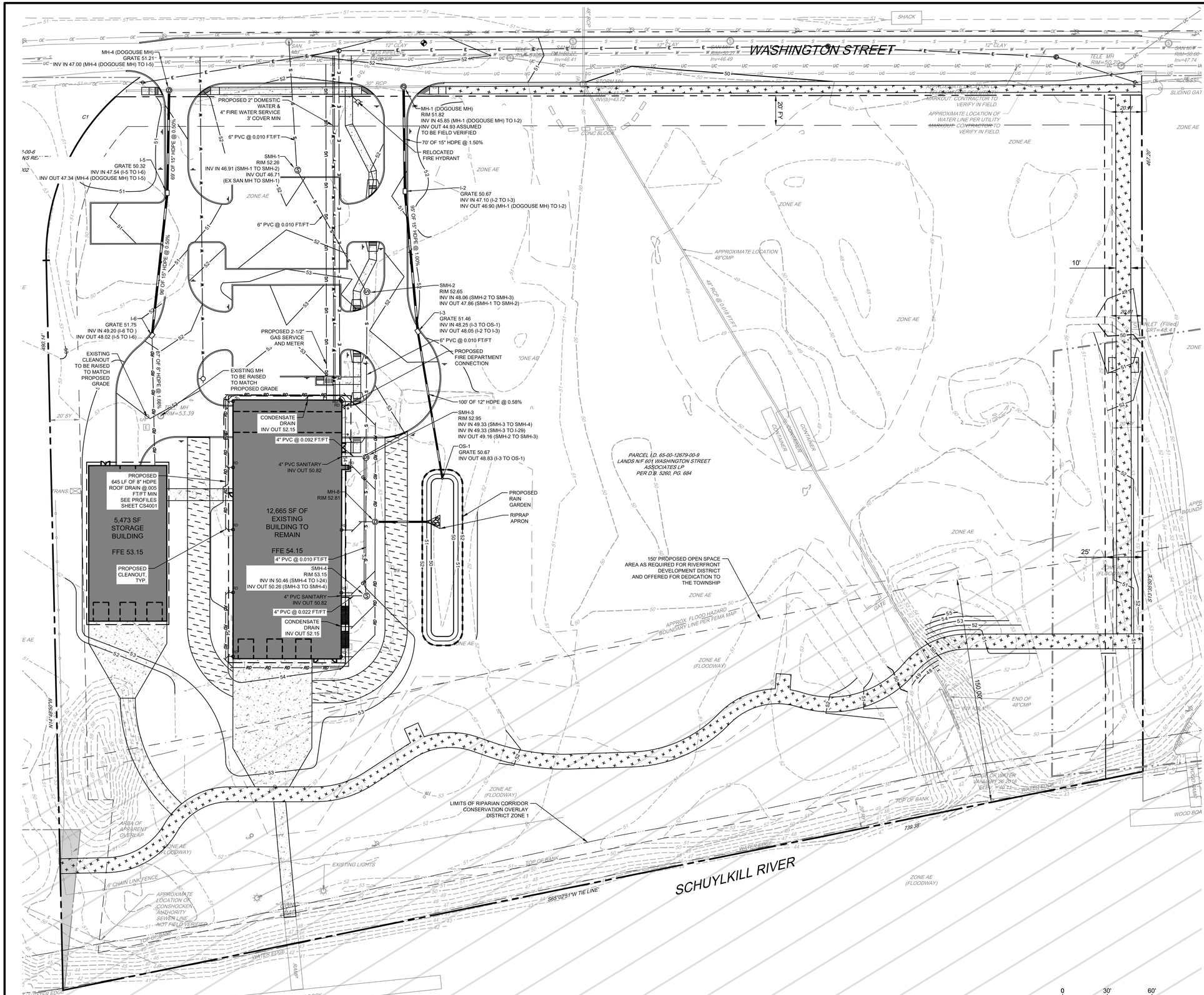
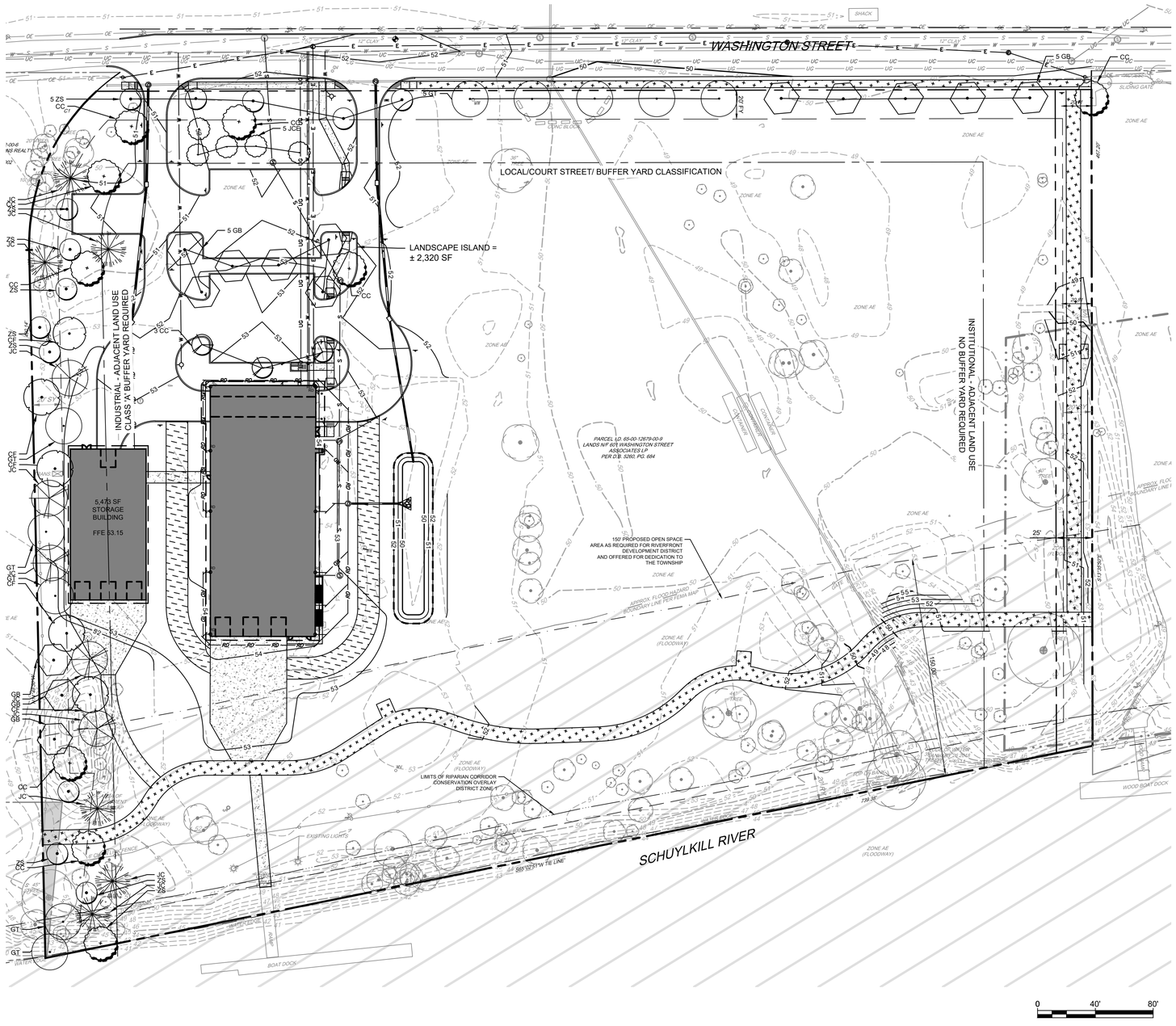

WASHINGTON STREET
SHACK
MH-4 (DOGOUSE MH)
GRATE 51.21
INV IN 47.00 (MH-4 (DOGOUSE MH) TO I-5)
PROPOSED 2" DOMESTIC WATER & 4" FIRE WATER SERVICE 3' COVER MIN
6" PVC @ 0.010 FT/FT
I-5
GRATE 50.32
INV IN 47.54 (I-5 TO I-6)
INV OUT 47.34 (MH-4 (DOGOUSE MH) TO I-5)
69' OF 15" HDPE @ 0.58%
SMH-1
RIM 52.26
INV IN 46.91 (SMH-1 TO SMH-2)
INV OUT 46.71
(EX SAN MH TO SMH-1)
MH-1 (DOGOUSE MH)
RIM 51.82
INV IN 45.85 (MH-1 (DOGOUSE MH) TO I-2)
INV OUT 44.93 ASSUMED
TO BE FIELD VERIFIED
70' OF 15" HDPE @ 1.50%
RELOCATED FIRE HYDRANT
I-2
GRATE 50.67
INV IN 47.10 (I-2 TO I-3)
INV OUT 46.90 (MH-1 (DOGOUSE MH) TO I-2)
95' OF 15" HDPE @ 1.00%
6" PVC @ 0.010 FT/FT
SMH-2
RIM 52.65
INV IN 48.06 (SMH-2 TO SMH-3)
INV OUT 47.86 (SMH-1 TO SMH-2)
I-3
GRATE 51.46
INV IN 48.25 (I-3 TO OS-1)
INV OUT 48.05 (I-2 TO I-3)
6" PVC @ 0.010 FT/FT
PROPOSED FIRE DEPARTMENT CONNECTION
I-6
GRATE 51.75
INV IN 49.20 (I-6 TO)
INV OUT 48.02 (I-5 TO I-6)
98' OF 15" HDPE @ 0.50%
PROPOSED 2-1/2" GAS SERVICE AND METER
EXISTING CLEANOUT TO BE RAISED TO MATCH PROPOSED GRADE
EXISTING MH TO BE RAISED TO MATCH PROPOSED GRADE
87' OF 8" HDPE @ 1.60%
MH RIM=53.39
100' OF 12" HDPE @ 0.58%
SMH-3
RIM 52.95
INV IN 49.33 (SMH-3 TO SMH-4)
INV IN 49.33 (SMH-3 TO I-29)
INV OUT 49.16 (SMH-2 TO SMH-3)
OS-1
GRATE 50.67
INV OUT 48.83 (I-3 TO OS-1)
CONDENSATE DRAIN
INV OUT 52.15
4" PVC @ 0.092 FT/FT
4" PVC SANITARY
INV OUT 50.82
PROPOSED 645 LF OF 8" HDPE ROOF DRAIN @ .005 FT/FT MIN SEE PROFILES SHEET CS4001
5,473 SF STORAGE BUILDING
FFE 53.15
PROPOSED CLEANOUT, TYP.
12,665 SF OF EXISTING BUILDING TO REMAIN
FFE 54.15
MH-8
RIM 52.81
4" PVC @ 0.010 FT/FT
SMH-4
RIM 53.15
INV IN 50.46 (SMH-4 TO I-24)
INV OUT 50.26 (SMH-3 TO SMH-4)
4" PVC SANITARY
INV OUT 50.82
4" PVC @ 0.022 FT/FT
CONDENSATE DRAIN
INV OUT 52.15
PROPOSED RAIN GARDEN
RIPRAP APRON
150' PROPOSED OPEN SPACE AREA AS REQUIRED FOR RIVERFRONT DEVELOPMENT DISTRICT AND OFFERED FOR DEDICATION TO THE TOWNSHIP
LIMITS OF RIPARIAN CORRIDOR CONSERVATION OVERLAY DISTRICT ZONE 1
PARCEL I.D. 65-00-12679-00-9
LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP
PER D.B. 5260, PG. 684
SAN MH RIM=46.22 Inv=46.41
SAN MH RIM=46.49
STORM MH RIM=51.72 INV(s)=43.72
TELE MH RIM=50.22
SAN MH RIM=50.60 Inv=47.74
12" CLAY
GAS PIPELINE MARKER
APPROXIMATE LOCATION OF WATER LINE PER UTILITY MARKOUT. CONTRACTOR TO VERIFY IN FIELD.
APPROXIMATE LOCATION OF WATER LINE PER UTILITY MARKOUT. CONTRACTOR TO VERIFY IN FIELD.
SLIDING GATE
CONC BLOCK
APPROXIMATE LOCATION 48"CMP
48" RCP @ 0.04% FT/FT
INLET (Filled) RIM=48.41
CONTAINER
COMPRESSOR
CONTAINER
END OF 48"CMP
150.00'
WIDTH VARIES
APPROX. OK WATER MAINLINE 28.2018 ELEV. =40.1
WATER EDGE
TOP OF BANK
739.38'
SCHUYLKILL RIVER
S65°02'51"W TIE LINE
N14°58'50"W
AREA OF APPARENT OVERLAP
EXISTING LIGHTS
6' CHAIN LINK FENCE
APPROXIMATE LOCATION OF CONSHOCKEN AUTHORITY SEWER LINE - NOT FIELD VERIFIED
RAMP
BOAT DOCK
WOOD BOA
APPROX. FLOOD HAZARD BOUNDARY LINE PER FEMA MAP
ZONE AE
ZONE AE (FLOODWAY)
ZONE AE (FLOODWAY)
ZONE AE (FLOODWAY)
ZONE AE (FLOODWAY)
ZONE AE
ZONE AE
ZONE AE



PROPOSED LANDSCAPING

DECIDUOUS TREES

SYM	KEY	QTY	BOTANICAL NAME	COMMON NAME	INITIAL SIZE	ROOT
	JCE	5	ACER CAMPESTRE 'EVELYN'	QUEEN ELIZABETH MAPLE	3" CALIPER	
	ARC	3	ACER RUNBRUM 'COLUMNARE'	COLUMNAR RED MAPLE	3" CALIPER	
	CC	9	CERCIS CANADENSIS 'FOREST PANSY'	FOREST PANSY EASTERN REDBUD	3" CALIPER	
	CF	5	CORNUS FLORIDA 'CLOUD NINE'	CLOUD NINE DOGWOOD		
	GB	14	GINKO BILOBA 'GOLDSPIRE'	GINKO 'GOLDSPIRE'	3" CALIPER	
	GT	10	GLEDITSIA TRIACANTHOS VAR INERMIS 'SKYCOLE' SKYLINE	SKYLINE HONEYLOCUST	3" CALIPER	
	ZS	13	ZELKOVA SERRATA 'MUSASHINO'	MUSASHINO ZELKOVA	3" CALIPER	

EVERGREEN TREES

	JC	6	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS'	HETZI COLUMNAR JUNIPER		
	TO	5	THUJA OCCIDENTALIS 'SMARAGD'	EMERALD GREEN ARBORBITAE		

LANDSCAPE COMPLIANCE SUMMARY

CODE REFERENCE	SUMMARY	REQUIRED	PROVIDED
105-48.B	SHADE STREET TREES SHALL BE PLANTED AT INTERVALS OF NOT MORE THAN 45 FEET, AND FLOWERING STREET TREES AT INTERVALS OF NOT MORE THAN 30 FEET ALONG ONE OR BOTH SIDES OF AN EXISTING STREET WITHIN THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.	EXISTING STREET FRONTAGE 688.5/45 = 15.3 = 16 TREES	16 TREES
105-52.B(2)	BUFFER YARD - CLASS A	1 FLOWERING TREE PER 60 FEET 613.07/40 = 10.22 = 11 TREES	11 TREES
		1 EVERGREEN TREE PER 60 FEET 613.07/60 = 10.22 = 11 TREES	11 TREES
		1 CANOPY TREE PER 40 FEET 613.07/40 = 15.32 = 16 TREES	16 TREES
105-39(A)	ALL PARKING AREAS SHALL HAVE AT LEAST ONE, THREE-INCH-CALIPER TREE FOR EVERY TWO PARKING SPACES PROVIDED.	32 PARKING SPACES = 16 TREES	16 TREES
105-39(C)	A MINIMUM OF 10% OF ANY PARKING LOT FACILITY OVER 2,000 SQUARE FEET IN GROSS AREA SHALL BE DEVOTED TO LANDSCAPING.	± 9,170 SF OF PARKING LOT AREA 9,170/10 = 917 SF	>917 SF

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0	2024-07-12	90% CDS	CW

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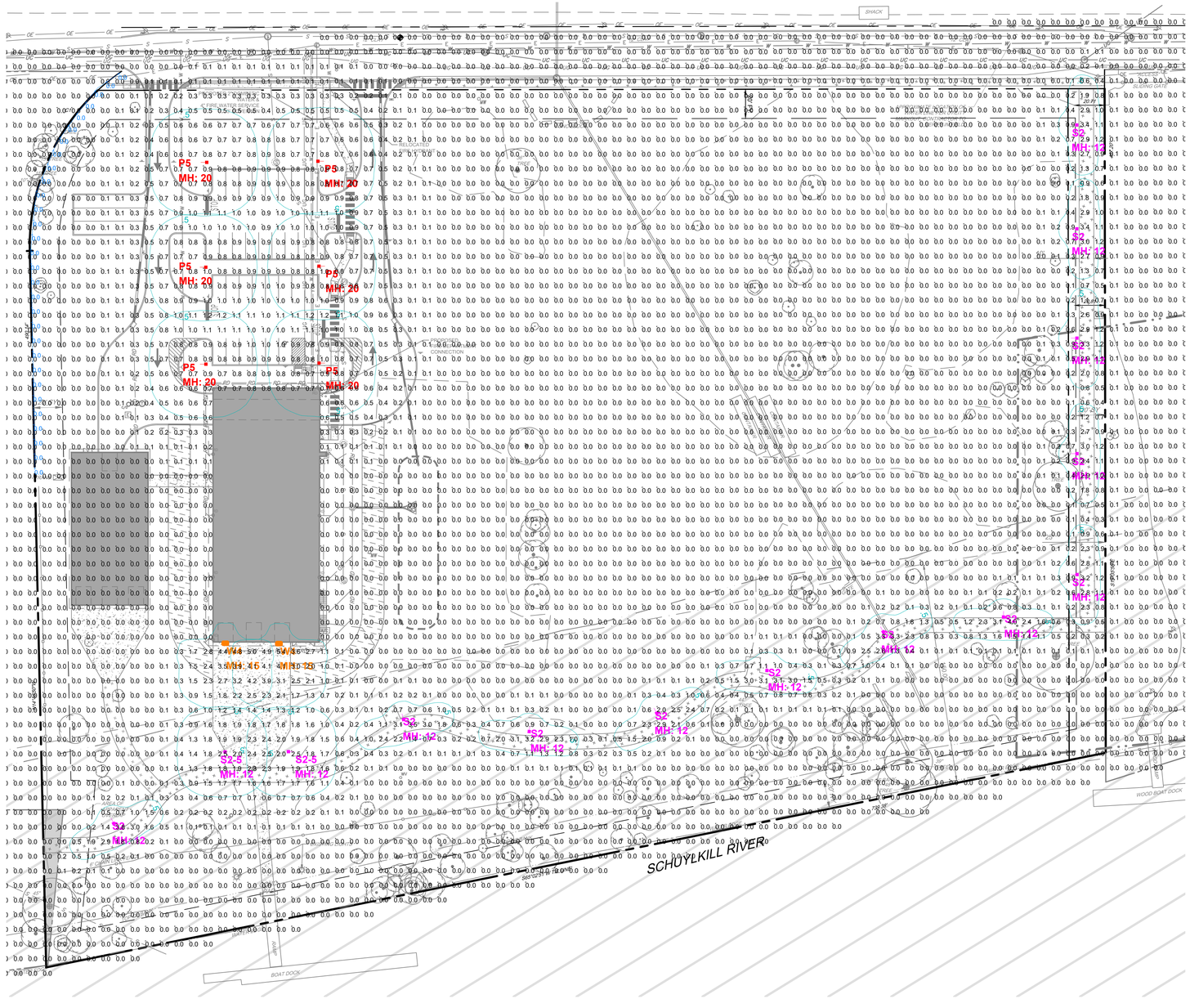
PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 40'
DRAWN BY	CW
APPROVED BY	MR

CS2001

SHEET 10 OF 23

U:\Accounts\BUHAV\VILUX23005 - Villanova Boathouse - LD\DESIGN_SHEETS\CS2001.dwg PLOTTED: 7/19/2024 11:29 AM BY: Sushi Moore PLOTSTYLE: Pennoni NCS.stb



CALCULATION SUMMARY

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	PtSpcLr	PtSpcTb
CALC PTS TO ZERO	Illuminance	Fc	0.2	5.4	0.0	N.A.	N.A.	10	10
PROPERTY LINE WEST	Illuminance	Fc	0.0	0.0	0.0	N.A.	N.A.	10	N.A.
BOAT PREP AREA	Illuminance	Fc	2.5	5.4	0.6	4.1	9.0		
DRIVEWAY EAST	Illuminance	Fc	0.6	1.1	0.2	3.0	5.5		
DRIVEWAY WEST	Illuminance	Fc	0.7	1.2	0.3	2.4	4.0		
PARKING AREA	Illuminance	Fc	0.9	1.2	0.8	1.2	1.5		
RIVER WALKWAY	Illuminance	Fc	1.7	4.0	0.1	17.0	40.0		
RIVERFRONT ACCESS PATH	Illuminance	Fc	2.1	3.4	0.4	5.4	8.5		

LUMINAIRE SCHEDULE **REFER TO LIGHTING FIXTURE CUTSHEETS FOR COMPLETE CATALOG NUMBERS**

Symbol	Qty	Fixture Type	Description	Manufacturer	Catalog No.	CCT	LLF	Total Watts	Delivered Lumens	Mounting Height	* Pole Spec	Filename
	6	P5	LED SINGLE AREA POLE LIGHT, TYPE 5 DISTRIBUTION, NOM 6000 LUMENS	BEACON PRODUCTS	RAR-1-80L-50-3K7-5QW-U	3000K	0.900	49.7	6009	20	SSS-20FT	RAR1-80L-50-3K7-5QW.ies
	12	S2	LED SINGLE AREA POLE LIGHT, TYPE 2 DISTRIBUTION, NOM 3200 LUMENS	BEACON PRODUCTS	RAR1-80L-25-3K7-T2-U	3000K	0.900	25.4	3223	12	SSS-12FT	RAR1-80L-25-3K7-2.ies
	2	S2-5	LED SINGLE AREA POLE LIGHT, TYPE 2 DISTRIBUTION, NOM 3200 LUMENS	BEACON PRODUCTS	RAR-1-80L-50-3K7-5QW-U	3000K	0.900	49.7	6009	12	SSS-12FT	RAR1-80L-50-3K7-5QW.ies
	2	W4	LED WALL MOUNT CUT-OFF, TYPE 4F DISTRIBUTION, NOM 7000 LUMENS	BEACON	RWL2-36L-55-3K7-4F	3000K	0.900	63.1	7081	15		RWL2-36L-55-3K7-4F.ies

* NOTE: CONTRACTOR TO COORD LUMINAIRE MH WITH POLE HEIGHT AND CONCRETE BASE

NOT FOR CONSTRUCTION

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

LIGHTING PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 40'
DRAWN BY	CW
APPROVED BY	MR

CS2201

SHEET 11 OF 23

PLOTTED: 7/19/2024 9:34 AM, BY: Cameron Williams PLOTSTYLE: Pennoni NCS.stb
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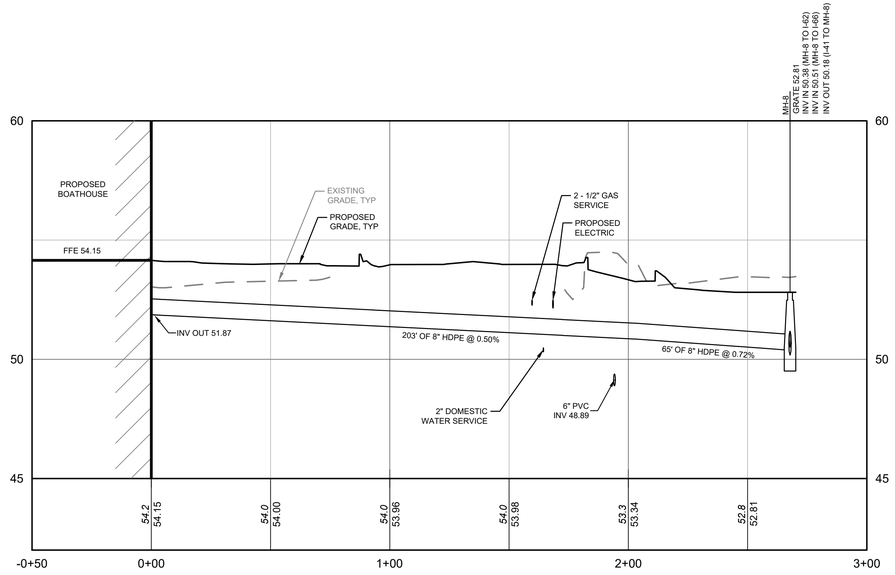
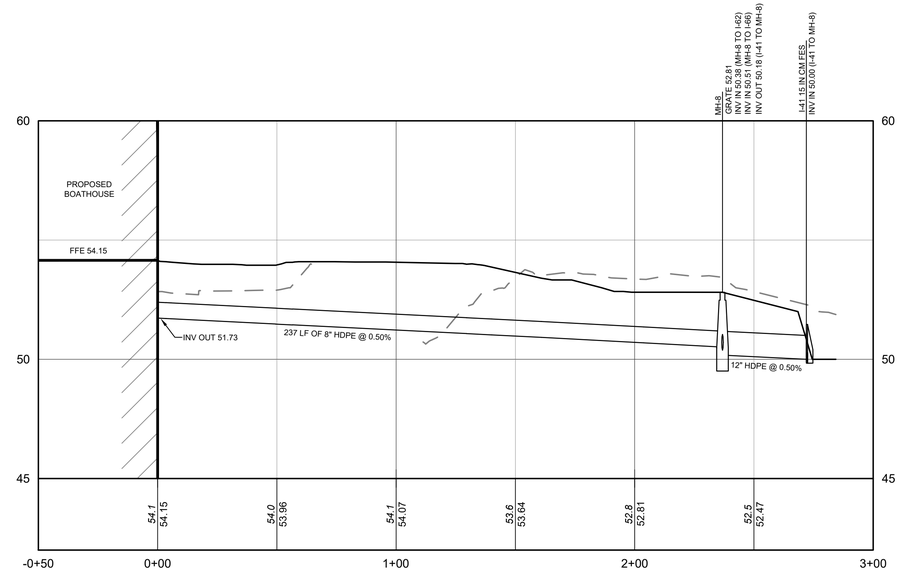
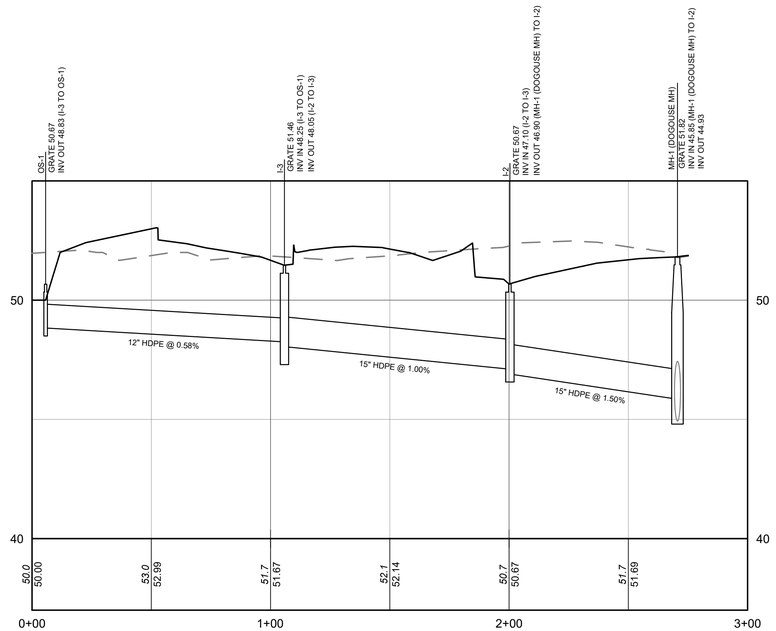


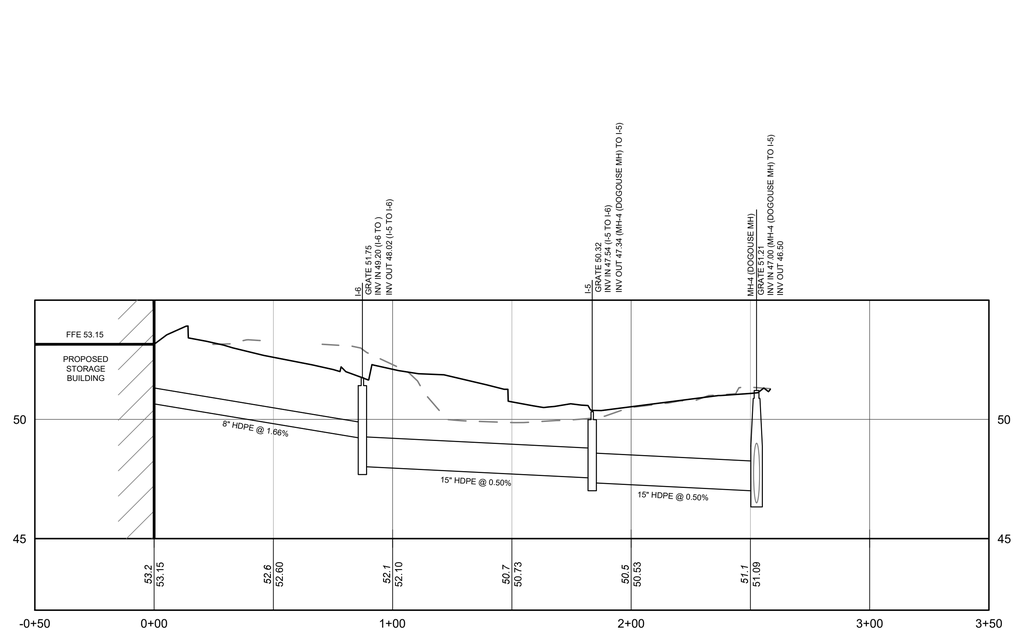
PROPOSED BOATHOUSE NORTH ROOF DRAINS TO MH-8
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'



PROPOSED BOATHOUSE SOUTH ROOF DRAINS TO RAIN GARDEN
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'



OS-1 TO MH-1
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'



PROPOSED STORAGE BUILDING TO MH-4
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'

NOT FOR CONSTRUCTION

u:\Accounts\BLHA\Vilux23005 - villanova boathouse - MEP\ESIGN_SHEETS\CS4001.dwg PLOTTED: 7/19/2024 9:35 AM By: Cameron Williams PLOTSTYLE: Pennoni-NCS.ctb

Pennoni
PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

STORM SEWER PROFILES

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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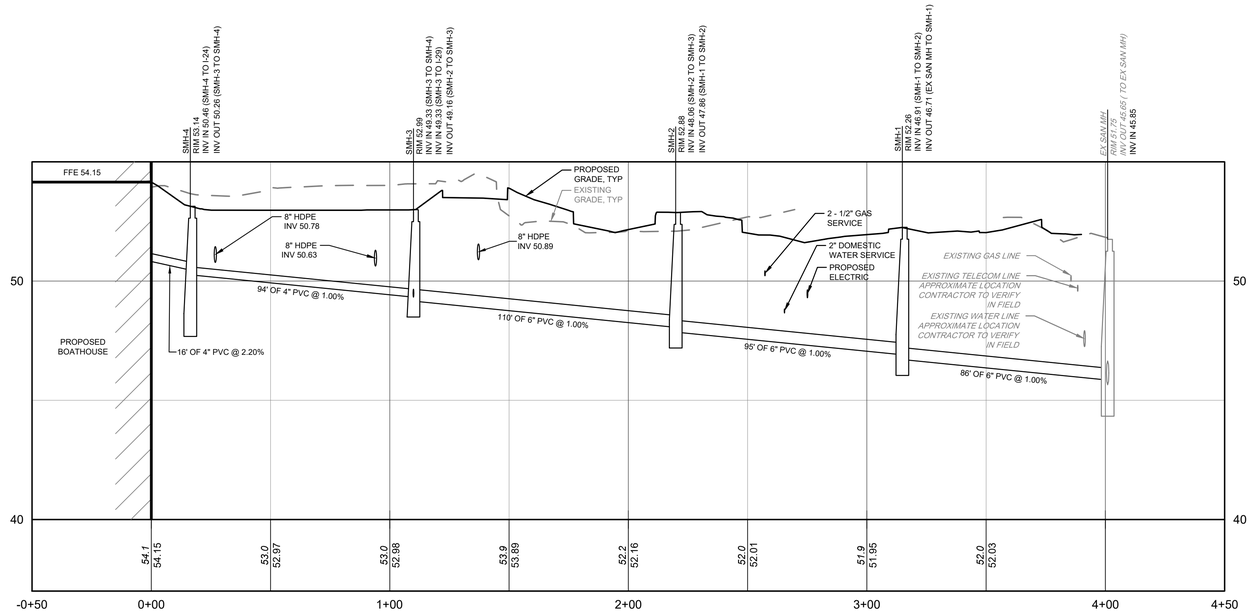
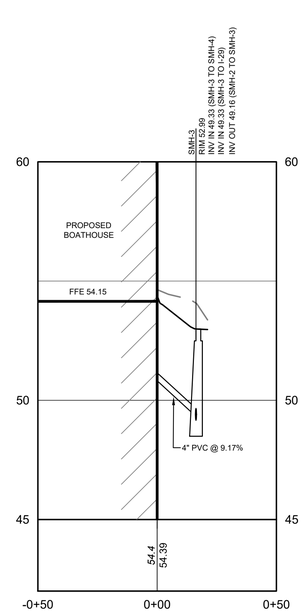
PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	AS NOTED
DRAWN BY	CW
APPROVED BY	MR

CS4001

SHEET 12 OF 23



PROPOSED BOATHOUSE TO EXISTING MANHOLE
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'



PROPOSED BOATHOUSE TO SMH-3
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'

NOT FOR CONSTRUCTION

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158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
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SANITARY SEWER PROFILES

VILLANOVA UNIVERSITY
800 LANCASTER AVE
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NO.	DATE	REVISIONS	BY
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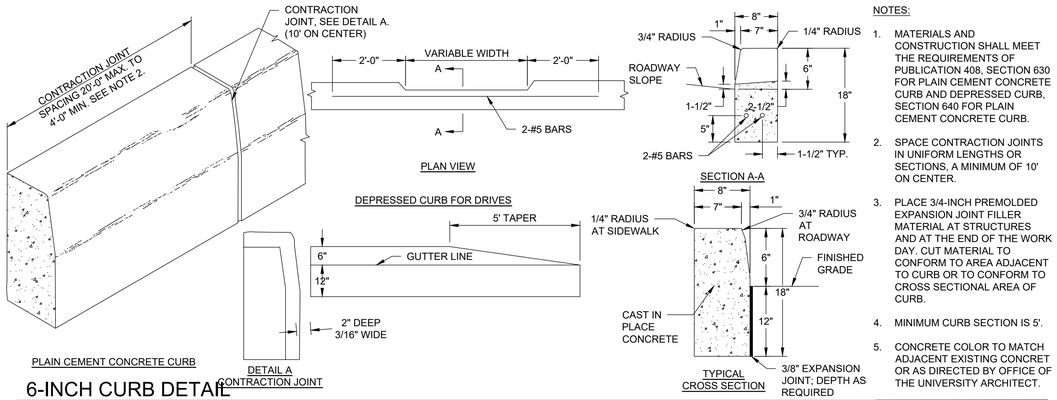
PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	AS NOTED
DRAWN BY	CW
APPROVED BY	MR

CS4501

SHEET 13 OF 23

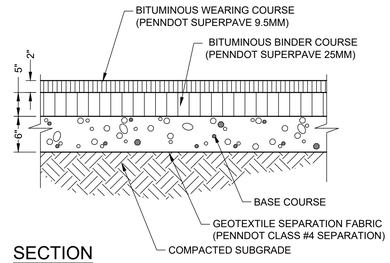
u:\Accounts\BLAM\villa-220205 - villanova boathouse + MD\DESIGN_SHEETS\CS4501.dwg PLOTTED: 7/19/2024 8:35 AM BY: Cameron Williams PLOTSTYLE: Pennoni MCS.ctb



NOTES:

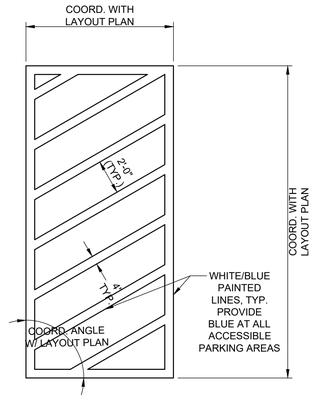
1. MATERIALS AND CONSTRUCTION SHALL MEET THE REQUIREMENTS OF PUBLICATION 408, SECTION 630 FOR PLAIN CEMENT CONCRETE CURB AND DEPRESSED CURB, SECTION 640 FOR PLAIN CEMENT CONCRETE CURB.
2. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS, A MINIMUM OF 10' ON CENTER.
3. PLACE 3/4-INCH PREMOLDED EXPANSION JOINT FILLER MATERIAL AT STRUCTURES AND AT THE END OF THE WORK DAY. CUT MATERIAL TO CONFORM TO AREA ADJACENT TO CURB OR TO CONFORM TO CROSS SECTIONAL AREA OF CURB.
4. MINIMUM CURB SECTION IS 5'.
5. CONCRETE COLOR TO MATCH ADJACENT EXISTING CONCRET OR AS DIRECTED BY OFFICE OF THE UNIVERSITY ARCHITECT.

6-INCH CURB DETAIL
NOT TO SCALE



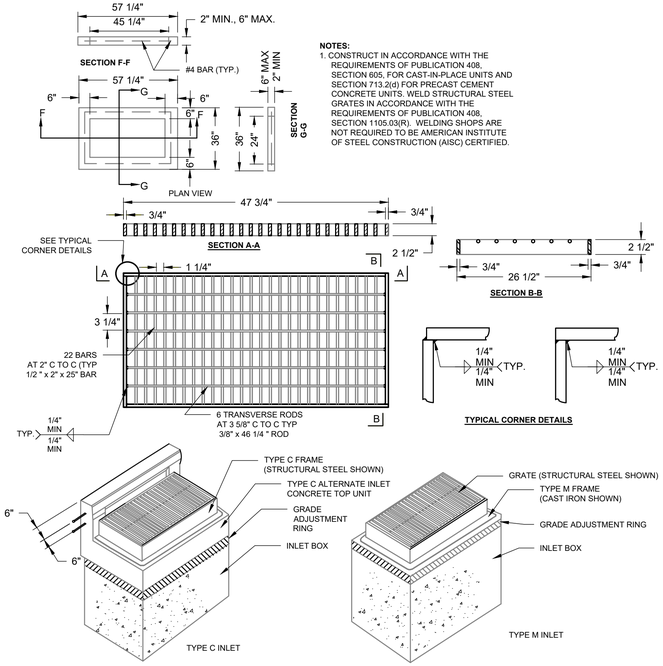
SECTION

WHITEMARSH TWP ROADWAY RESTORATION PAVING
NOT TO SCALE



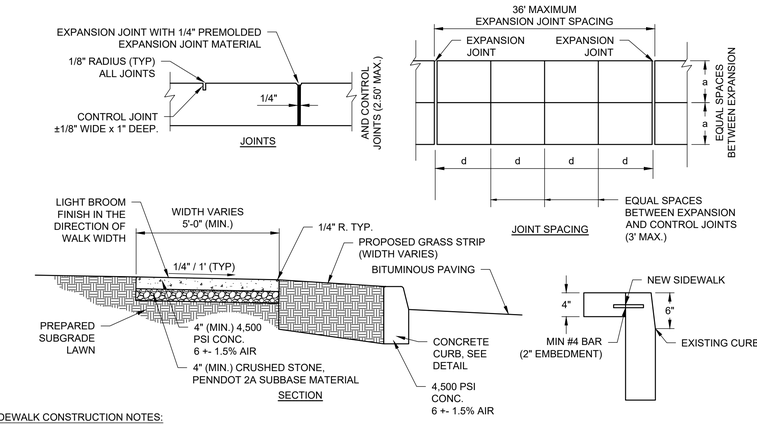
PLAN

PAVEMENT LINE STRIPING
NTS



NOTES:
1. CONSTRUCT IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 605, FOR CAST-IN-PLACE UNITS AND SECTION 713.2(d) FOR PRECAST CEMENT CONCRETE UNITS. WELD STRUCTURAL STEEL GRATES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105.03(R). WELDING SHOPS ARE NOT REQUIRED TO BE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) CERTIFIED.

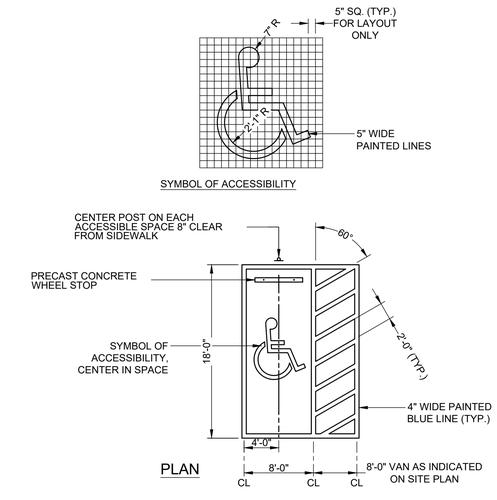
INLET BOXES, FRAME, AND GRATE (REFER TO PENNDOT PUB. 72M)
NOT TO SCALE



SIDEWALK CONSTRUCTION NOTES:

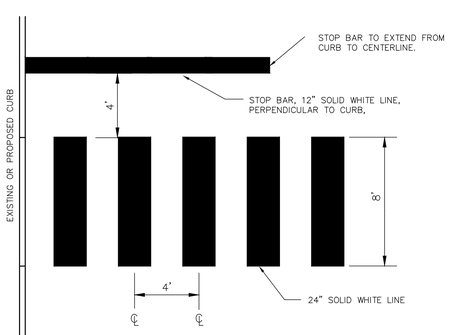
1. PROVIDE MATERIALS AND CONSTRUCTION METHODS MEETING THE REQUIREMENTS OF PADOT PUB. 408.
2. COORDINATE JOINT LOCATIONS TO MATCH EXISTING BLOCKS.
3. THE PRIMARY SURFACE OF THE CONCRETE SIDEWALK SHALL HAVE A BROOM FINISH AND AN AREA TWO (2) INCHES IN WIDTH, PARALLEL TO THE CONTROL JOINTS, SHALL HAVE A SMOOTH-TROWLED FINISH.
4. WHERE SIDEWALK IS BEING REPLACED ALONG A CURB, CONTRACTOR TO DOWEL INTO ADJACENT CURB TO STABILIZE THE NEW SIDEWALK.
5. AREAS OF SPALLING CONCRETE THAT ARE LESS THAT 1" DEEP SHALL BE SCARIFIED, FILLED AND SEALED. CONTRACTOR TO PROVIDE SUBMITTAL FOR PRODUCT AND COLOR TO BE USED. COLOR SHALL MATCH EXISTING SIDEWALK
6. DEEPER SPALLING CONCRETE SHALL BE EVALUATED BY DRISCOLL AND/OR PENNONI ON A CASE BY CASE BASIS.
7. SUBMIT A CURING COMPOUND FOR ENGINEER'S REVIEW.

CONCRETE SIDEWALK
NOT TO SCALE



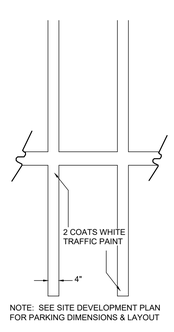
PLAN

ACCESSIBLE PARKING
NTS



NOTES: 1. CROSSWALK STRIPING TO BE ALIGNED WITH THE DIRECTION OF TRAFFIC FLOW.
2. LOCATION OF STREET MARKINGS TO BE APPROVED BY THE PHILADELPHIA STREETS DEPARTMENT PRIOR TO INSTALLATION.

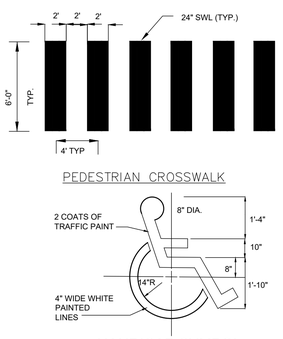
CROSSWALK MARKINGS AND STOP BAR
NOT TO SCALE



NOTE: SEE SITE DEVELOPMENT PLAN FOR PARKING DIMENSIONS & LAYOUT

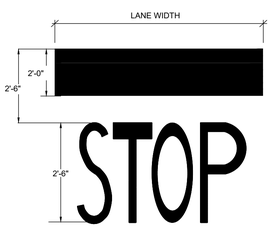
PARKING STALL STRIPING

PAVEMENT MARKINGS
NOT TO SCALE

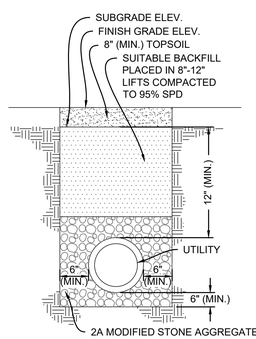


HANDICAP SYMBOL

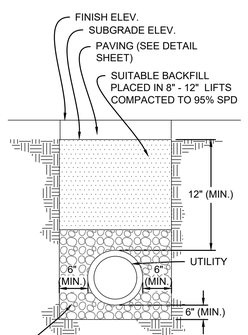
NOTES:
1. PAINT COLOR TO BE "WHITE" FOR ARROW AND LETTERS. "DRIVE THRU" AND "STOP" LETTERS TO BE ELONGATED HELEVETICA MEDIUM - 4" WIDE STROKES
2. PAINT 2" BLACK OUTLINE AROUND ARROW AND LETTERS FOR PROJECTS WITH CONCRETE PARKING LOTS.



STOP BAR



TYPICAL UTILITY TRENCH - GRASS AREAS
NOT TO SCALE



TYPICAL UTILITY TRENCH - PAVED AREAS
NOT TO SCALE

NOT FOR CONSTRUCTION

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

SITE DETAILS

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	AS NOTED
DRAWN BY	CW
APPROVED BY	MR

CS6001

SHEET 14 OF 23

PLOTTED: 7/19/2024 9:55 AM, BY: Cameron Williams PLOTSTYLE: Pennoni MCS.stb
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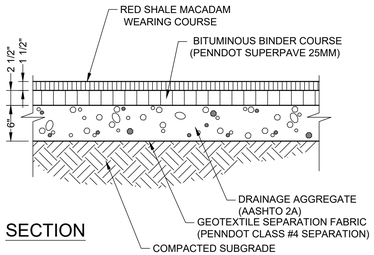
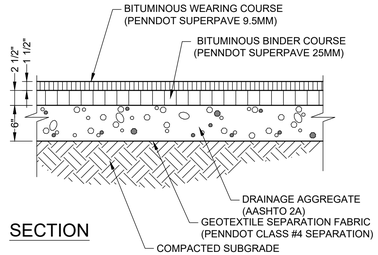


SECTION

ASPHALT TRAIL/SIDEWALK PAVING

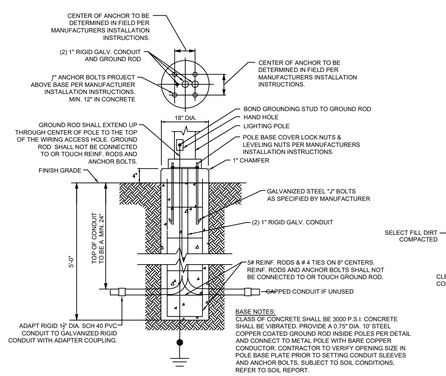
NTS

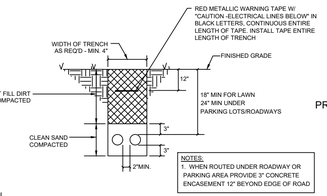


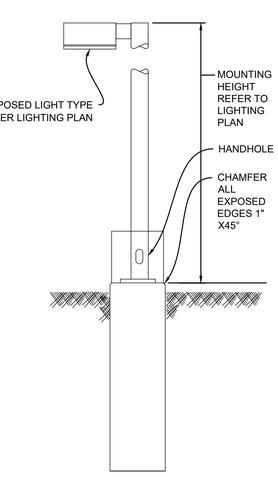
SECTION

ONSITE ASPHALT PAVING

NTS





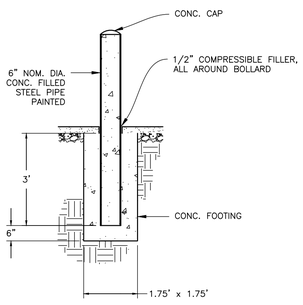


LIGHTING NOTES

1. ALL POLE BASES SHALL BE FLUSH STYLE UNLESS RAISED BASE IS REQUIRED PER NOTE 2 BELOW.
2. ALL POLES SUPPORTING LIGHT FIXTURES FOR THE ILLUMINATION OF PARKING AREAS AND LOCATED DIRECTLY BEHIND PARKING SPACES. OR WHERE THEY COULD BE HIT BY SNOW PLOWS, SHALL BE PLACED A MINIMUM OF FIVE (5) FEET OUTSIDE PAVED AREA, FACE OF CURB OR WHEEL STOPS, OR PLACED ON CONCRETE PEDESTALS AT LEAST THIRTY (30) INCHES HIGH ABOVE THE PAVEMENT, OR ADEQUATELY PROTECTED BY OTHER MEANS.
3. SITE CONTRACTOR SHALL PROVIDE ELECTRICAL POWER SERVICE TO THE PROPOSED LIGHT LOCATIONS, SERVICE LINES TO BE LOCATED WITHIN CONDUIT, SERVICE LINE LOCATIONS TO BE DETERMINED BY THE SITE CONTRACTOR AND SHOWN ON THE FINAL AS-BUILT PLANS.
4. LIGHTING SHALL BE CONTROLLED BY AUTOMATIC SWITCHING DEVICES, SUCH AS TIME CLOCKS OR COMBINATION MOTION DETECTORS AND PHOTOCELLS, TO PERMIT EXTINGUISHING OFFENDING SOURCES BETWEEN 11:00 P.M. AND DAWN TO MITIGATE NUISANCE GLARE AND SKY-LIGHTING CONSEQUENCES.
5. ALL NONESSENTIAL LIGHTING, INCLUDING DISPLAY, AESTHETIC, PARKING AND SIGH LIGHTING SHALL BE REQUIRED TO BE TURNED OFF OR REDUCED BY 75 PERCENT AFTER BUSINESS HOURS OR 11:00 P.M. FOR A SPECIFIC SAFETY PURPOSE SHALL BE APPROVED BY THE TOWNSHIP.
6. MAINTENANCE - LIGHTING FIXTURES AND ANCILLARY EQUIPMENT SHALL BE MAINTAINED SO AS TO CONTINUOUSLY MEET THE REQUIREMENTS AS SHOWN ON THIS PLAN.

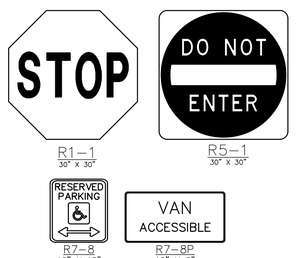
LIGHT DETAIL

N.T.S.



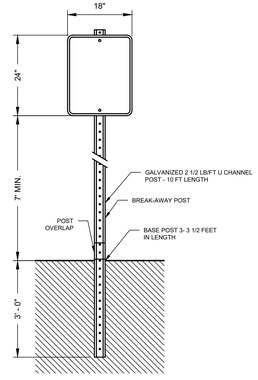
BOLLARD DETAIL

N.T.S.



SIGN DETAILS

N.T.S.

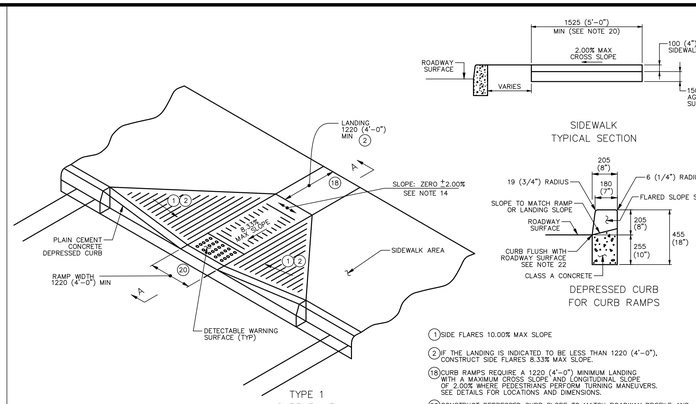


NOTES:
1. MINIMUM HEIGHT FOR ALL TRAFFIC CONTROL SIGNS PER REQUIREMENTS OF THE MUNICIPALITY, PENNDOT, ADA, AND MUTCD STANDARDS.
2. ALL TRAFFIC CONTROL SIGNS SHALL BE MOUNTED TO BREAK-AWAY POSTS.
3. ALL TRAFFIC CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE MANUAL OR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

SIGN POST DETAIL

N.T.S.

NOT FOR CONSTRUCTION

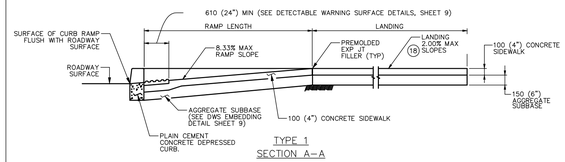


(1) SIDE FLARES 10.00% MAX SLOPE

(2) IF THE LANDING IS INDICATED TO BE LESS THAN 1220 (4'-0"), CONSTRUCT SIDE FLARES @ 8.33% MAX SLOPE.

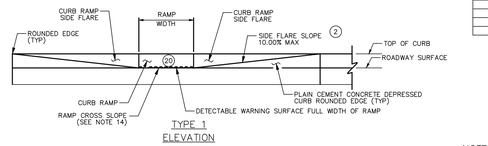
(18) CURB RAMPS REQUIRE A 1220 (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE DETAILS FOR LOCATIONS AND DIMENSIONS.

(20) CONSTRUCT DEPRESSED CURB SLOPE TO MATCH ROADWAY PROFILE AND HAVE A FLUSH CONNECTION. DO NOT EXCEED 5.00% PER 305 (1'-0") CROSS SLOPE RATE OF CHANGE WHEN TRANSITIONING FROM LEVEL LANDING TO ROADWAY PROFILE. A TECHNICALLY INFEASIBLE FORM IS REQUIRED WHEN RAMP CROSS SLOPE EXCEEDS 2.00%

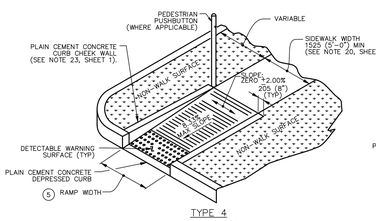


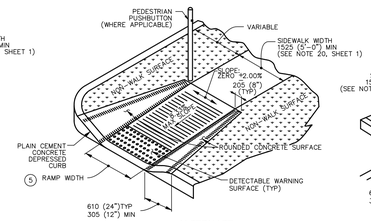
PERCENT SLOPE	EQUIVALENT SLOPE
10.00%	10:1 (1:10)
8.33%	12:1 (1:12)
7.14%	14:1 (1:14)
5.00%	20:1 (1:20)
2.00%	50:1 (1:50)
1.00%	100:1 (1:100)

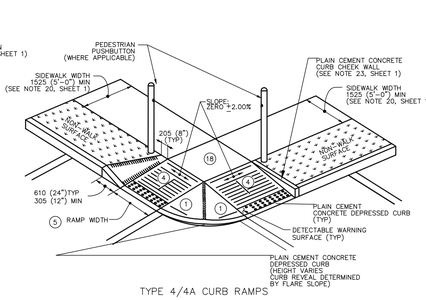
EQUIVALENT SLOPES

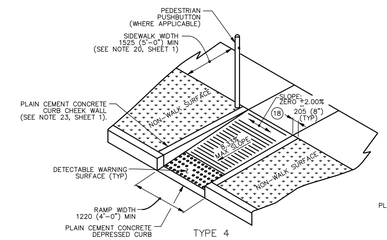


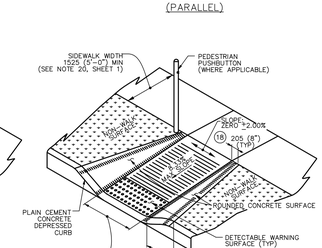
NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

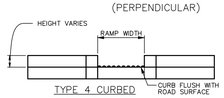


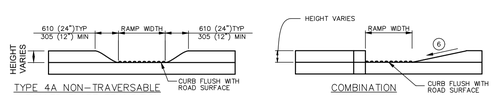












TYPICAL ELEVATIONS FOR DEPRESSED CURBS

1 SIDE FLARES 10.00% MAX SLOPE

4 8.33% MAX RAMP SLOPE

5 CURB RAMP WIDTH IS EQUAL TO SIDEWALK WIDTH WHEN THE SIDEWALK WIDTH IS GREATER THAN OR EQUAL TO THE MINIMUM 1220 (4'-0").

6 SLOPE VARIES SEE RAMP DETAILS

18 CURB RAMPS REQUIRE A 1220 (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE DETAILS FOR LOCATIONS AND DIMENSIONS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 350, 409, 630, 676 AND 694.
2. PROVIDE EXPANSION JOINT MATERIAL 13 (1/2") THICK WHERE CURB RAMP ADJOINS ANY RIGID PAVEMENT, SIDEWALK OR STRUCTURE WITH THE TOP OF
3. CONSTRUCT CURB RAMPS WITH A MINIMUM 1220 X 1220 (4'-0" X 4'-0") CLEAR SPACE BEYOND THE CURB FACE, WITHIN THE WIDTH OF THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE. SEE SHEET 7 FOR CROSSWALK DETAILS.
4. SEAL JOINTS WITH AN APPROVED SEALING MATERIAL.
5. PROVIDE SLIP RESISTANT TEXTURE ON CURB RAMP BY COARSE BROOMING TRANSVERSE TO THE SLOPE OF THE RAMP. EXTEND TEXTURE THE FULL WIDTH AND LENGTH OF THE CURB RAMP INCLUDING FLARED SIDE RAMPS.
6. MODIFY CONSTRUCTION DETAILS TO ADAPT DIMENSIONS TO EXISTING CURB HEIGHTS WHERE THE CURB IS LESS THAN THE STANDARD 205 (8") HEIGHT.
7. CURB RAMP AND SIDE FLARE LENGTHS ARE VARIABLE AND BASED ON
8. TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 4500 (15'-0"). ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
9. NON-WALK AREA IS AN OBSTRUCTED OR GRASS/NON-PAVED AREA ADJACENT TO THE PEDESTRIAN ACCESS ROUTE THAT IS NOT USED BY THE PEDESTRIAN FOR ACCESS.
10. THE DETAILS DEPICT PEDESTRIAN PUSHBUTTON POLES TO ILLUSTRATE THE RECOMMENDED PLACEMENT OF PEDESTRIAN PUSHBUTTONS. FOR ALTERATION PROJECTS, PROVIDE ACCESS TO EXISTING PEDESTRIAN PUSHBUTTONS TO THE MAXIMUM EXTENT FEASIBLE. INSTALL PEDESTRIAN PUSHBUTTON STUB POLES, WHERE APPLICABLE, SO AS NOT TO CREATE PEDESTRIAN OBSTRUCTIONS.
11. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. US CUSTOMARY UNITS IN ( ) PARENTHESIS.
12. ALIGN DETECTABLE WARNING SURFACE TRUNCATED DOMES ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF THE RAMP AND PERPENDICULAR TO CURB.
13. PROVIDE DETECTABLE WARNING SURFACES (DWS) 610 (24") MINIMUM (IN THE DIRECTION OF PEDESTRIAN TRAVEL) ACROSS FULL WIDTH OF RAMP AT THE GRADE BREAK NEAR STREET EDGE. PROVIDE DWS THAT CONTRAST VISUALLY WITH ADJACENT WALKWAY SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT FOR THE FULL WIDTH OF RAMP.
14. FOR NEW CONSTRUCTION, DO NOT EXCEED 2.00% CROSS SLOPE ON THE CURB RAMP OR PEDESTRIAN ACCESSIBLE ROUTE.
15. FOR NEW CONSTRUCTION AND ALTERATIONS, CONSTRUCT CURB RAMP AND FLARE SLOPES WITH THE FLATTEST SLOPE POSSIBLE. THE SLOPES INDICATED IN THE DETAILS SHOW THE MAX SLOPE ALLOWABLE. SLOPES THAT EXCEED THOSE INDICATED IN THE DETAILS, OR CONTRACT DOCUMENTS AS APPLICABLE, WILL NOT BE ACCEPTED AND WILL BE RECONSTRUCTED.
16. CONSTRUCT SIDEWALKS AT A LONGITUDINAL SLOPE NOT TO EXCEED 5.00% FOR ROADWAY PROFILE SLOPES THAT EXCEED 5.00%, CONSTRUCT PARALLEL SIDEWALKS ADJACENT TO ROADWAY AT A LONGITUDINAL SLOPE NOT TO EXCEED ROADWAY PROFILE SLOPE.
17. THE CHANGE IN GRADE AT THE BOTTOM OF THE CURB RAMP AND ADJOINING ROAD SURFACE IS NOT TO EXCEED AN ALGEBRAIC DIFFERENCE OF 11.00%. THE COUNTER SLOPE OF THE GUTTER OR ROAD AT THE FOOT OF A CURB RAMP, LANDING OR BLENDED TRANSITION IS NOT TO EXCEED 5.00%. SEE SHEET 8 FOR DETAILS.
18. THE CONSTRUCTION STANDARDS DEPICTED ARE MOST APPROPRIATE FOR NEW CONSTRUCTION. ALL CONSTRUCTION MUST MEET THE STANDARDS CONTAINED HEREIN UNLESS OTHERWISE NOTED OR DIRECTED.
19. ALL SLOPES ARE MEASURED WITH RESPECT TO A LEVEL PLANE. THEREFORE, THE LENGTH OF RAMP OR FLARE MEASURED ALONG THE SLOPE (SEE EXAMPLE) A 150 (6") CURB DOES NOT NECESSARILY MEAN A RAMP LENGTH OF 1830 (6'-0") FOR A 12:1 (1:12) SLOPE.
20. SIDEWALK WIDTH MAY BE REDUCED TO 1220 (4'-0"), WHEN PASSING AREAS 1525 X 1525 (5'-0" X 5'-0") ARE PROVIDED EVERY 61 METERS (200').
21. THE TRAVEL LANE IS DEFINED BY THE OUTSIDE EDGE OF THE WHITE PAVEMENT MARKING LINE. IF A WHITE PAVEMENT MARKING LINE DOES NOT EXIST, THE TRAVEL LANE IS DEFINED BY THE CONTRACT DOCUMENTS.
22. CONSTRUCT DEPRESSED CURB FOR CURB RAMPS FLUSH TO ADJACENT ROADWAY. GRADE EDGE OF ROAD ELEVATIONS AT THE FLOW LINE TO ENSURE POSITIVE DRAINAGE AND PREVENT PONDING. FOR FILL MADE BEHIND DEPRESSED CURB, ADJUST SLOPES TO PROVIDE POSITIVE DRAINAGE.
23. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 (1:3) MAXIMUM. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN ACCESS ROUTE.
24. CONSTRUCT TOP OF PLAIN CEMENT CONCRETE DEPRESSED CURB TO BE FLUSH WITH ADJACENT SURFACES (RAMPS, SIDEWALKS, FLARES).
25. FOR CURB RAMPS THAT LEAD TO A SINGLE CROSSWALK, THE RAMP (EXCLUDING FLARES) TO BE FULLY INSIDE OF MARKED CROSSWALK LINES. SEE SHEET 7 FOR DETAILS.
26. A 1220 (4'-0") MAXIMUM DIGITAL DISPLAY LEVEL WILL BE USED TO VERIFY THE SLOPES OF CURB RAMPS AND SIDEWALKS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CURB RAMPS AND SIDEWALKS

NEW CONSTRUCTION OR ALTERATION DETAILS
TYPE 1 TYPICAL SECTIONS

RECOMMENDED JUN. 1, 2010	RECOMMENDED JUN. 1, 2010	SHT 1 OF 13
CHIEF, HWY. QA DIVISION	DIRECTOR, BUREAU OF DESIGN	RC-67M

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CURB RAMPS AND SIDEWALKS

NEW CONSTRUCTION OR ALTERATION DETAILS
TYPE 4 CURB RAMPS

RECOMMENDED JUN. 1, 2010	RECOMMENDED JUN. 1, 2010	SHT 4 OF 13
CHIEF, HWY. QA DIVISION	DIRECTOR, BUREAU OF DESIGN	RC-67M

Pennoni
PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

SITE DETAILS

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON THE EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS6002

SHEET 15 OF 23

PLOTTED: 7/19/2024 9:35 AM, BY: Cameron Williams PLOTSTYLE: Pennoni MCS.ctb
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WASHINGTON STREET

SCHUYLKILL RIVER

NOT FOR CONSTRUCTION

EROSION AND SEDIMENT CONTROL LEGEND

- LOD — PROPOSED LIMIT OF DISTURBANCE
- PROPOSED SITE BOUNDARY
- CFS — PROPOSED COMPOST FILTER SOCK
- PROPOSED TOPSOIL STOCK PILE
- PROPOSED SLOPE MATTING
- PROPOSED ROCK CONSTRUCTION ENTRANCE

NORTH

0 30' 60'

CONCRETE WASHOUT

TEMPORARY ROCK CONSTRUCTION ENTRANCE

TEMPORARY INLET PROTECTION, TYP.

LIMIT OF DISTURBANCE 193,557 SF (4.44 AC)

TEMPORARY SOIL STOCKPILE

PROPOSED RAIN GARDEN

TEMPORARY EROSION MATTING TYP.

TREE PROTECTION FENCING, TYP.

CFS-1 thru CFS-6 18-IN

I-2 RIM 50.67

I-3 RIM 51.46

I-6 RIM 51.75

OS-1 RIM 50.67

MH-1 (DOGOUSE MH) RIM 51.82

MH-4 (DOGOUSE MH) RIM 51.21

5,473 SF STORAGE BUILDING FFE 53.15

12,665 SF OF EXISTING BUILDING TO REMAIN FFE 54.15

PARCEL I.D. 65-00-12679-00-9 LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP PER D.B. 5260, PG. 684

ZONE AE

ZONE AE (FLOODWAY)

APPROX. FLOOD HAZARD BOUNDARY LINE PER FEMA MAP

APPROXIMATE LOCATION 48"CMP

48" RCP @ 0.00% FITF

WATER LINE PER UTILITY MARKOUT. CONTRACTOR TO VERIFY IN FIELD.

S65°02'51"W TIE LINE

S13°33'50"E

N14°58'50"W

739.39'

150.00'

467.28'

20' R

10'

25'

AREA OF APPARENT OVERLAP

EXISTING LIGHTS

BOAT DOCK

WOOD BOAT DOCK

SLIDING GATE

CONTAINER

CONTAINER

CONTAINER

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

EROSION AND SEDIMENTATION CONTROL PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON THE EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1" = 30'
DRAWN BY	CW
APPROVED BY	MR

CS8001

SHEET 16 OF 23

PLOTTED: 7/19/2024 9:52 AM, BY: Cameron Williams PLOTSTYLE: Pennoni MCS.stb
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EROSION AND SEDIMENTATION CONTROL NOTES

1. ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.

2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRECONSTRUCTION MEETING.

3. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.

4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

5. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.

6. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

7. DURING GRADING OPERATIONS, NECESSARY MEASURES FOR DUST CONTROL MUST BE EXERCISED.

8. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.

9. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED, IF NECESSARY, AT THE LOCATION(S) SHOWN ON THE PLAN MAP(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.

10. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.

11. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THIS SITE.

12. ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

13. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL FROM THE SITE, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.

14. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.

15. VEHICLES AND EQUIPMENT MAY NEITHER ENTER DIRECTLY NOR EXIT DIRECTLY FROM LOTS. VEHICLES AND EQUIPMENT MAY ONLY ENTER AND EXIT THE CONSTRUCTION SITE VIA A STABILIZED ROCK CONSTRUCTION ENTRANCE FROM THE LOCAL DRIVE.

16. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. THE OPERATOR WILL MAINTAIN AND MAKE AVAILABLE TO LOCAL COUNTY CONSERVATION DISTRICT COMPLETE, WRITTEN INSPECTION LOGS OF ALL THOSE INSPECTIONS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.

17. A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.

18. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.

19. ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

20. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES - 6 TO 12 INCHES ON COMPACTED SOILS - PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.

21. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.

22. ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.

23. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.

24. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.

25. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.

26. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.

27. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.

28. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON-GERMINATING MONTHS, MULCH OR OTHER PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.

29. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR MOTHER MOVEMENTS.

30. EROSION AND SEDIMENT BMPS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMPS. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.

31. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.

32. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.

33. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.

34. FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

35. CONCRETE WASH WATER SHALL BE HANDLED IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. IN NO CASE SHALL IT BE ALLOWED TO ENTER ANY SURFACE WATERS OR GROUNDWATER SYSTEMS.

36. EROSION CONTROL BLANKETING SHALL BE INSTALLED ON ALL SLOPES 3H:1V OR STEEPER WITHIN 50 FEET OF A SURFACE WATER AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS.

37. IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER WILL BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE LOCAL COUNTY CONSERVATION DISTRICT WILL BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY.

38. THE OPERATOR SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.

39. THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF THE APPENDIX 64, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART 1, DEPARTMENT OF ENVIRONMENTAL PROTECTION, SUBPART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.

40. THE E&S CONTROL PLAN MAPPING MUST DISPLAY A PA ONE CALL SYSTEM INCORPORATED SYMBOL INCLUDING THE SITE IDENTIFICATION NUMBER. (THIS IS A NUMBERED SYMBOL NOT A NOTE.)

41. STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN

CLEAN FILL & ENVIRONMENTAL DUE DILIGENCE

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL FROM THE SITE, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.

2. CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON-WATER SOLUBLE, NON-DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK, OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE-USE).

3. CLEAN FILL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE: FILL MATERIALS AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE STILL QUALIFIES AS CLEAN FILL PROVIDED THE TESTING REVEALS THAT THE FILL MATERIAL CONTAINS CONCENTRATIONS OF REGULATED SUBSTANCES THAT ARE BELOW THE RESIDENTIAL LIMITS IN TABLES FP-1A AND FP-1B FOUND IN THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".

4. ANY PERSON PLACING CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FP-001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL. A COPY OF FORM FP-001 CAN BE FOUND AT THE END OF THESE INSTRUCTIONS.

5. ENVIRONMENTAL DUE DILIGENCE: THE APPLICANT MUST PERFORM ENVIRONMENTAL DUE DILIGENCE TO DETERMINE IF THE FILL MATERIALS ASSOCIATED WITH THE PROJECT QUALIFY AS CLEAN FILL. ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".

6. FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA. CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE. THESE REGULATIONS ARE AVAILABLE ON-LINE AT WWW.PACODE.COM.

TOPSOIL DEFINITION & APPLICATION

TOPSOIL IS DEFINED AS FRIABLE CLAY LOAM SURFACE SOIL FOUND IN A DEPTH OF NOT LESS THAN FOUR (4") INCHES. TO BE SATISFACTORY, TOPSOIL SHALL BE FREE OF SUBSOIL, CLAY LUMPS, STONES, AND OTHER OBJECTS OVER THREE QUARTER (3/4") INCHES IN DIAMETER, AND WITHOUT WEEDS, ROOTS, AND OTHER OBJECTIONABLE MATERIALS. TOPSOIL SHALL CONTAIN AT LEAST FIVE (5%) PERCENT ORGANIC MATTER DETERMINED BY LOSS ON IGNITION OF MOISTURE FREE SAMPLES DRIED IN ACCORDANCE WITH THE CURRENT METHOD OF THE ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS. THE ACIDITY RANGE SHALL BE PH 5-0 TO PH 7.0 INCLUSIVE. TOPSOIL SHALL ALSO MEET THE REQUIREMENTS OF PENNDOT PUBLICATION 408 SPECIFICATIONS, SECTION 800, INCLUDING ALL SUBSECTIONS, LATEST EDITION.

GRADED AREAS SHOULD BE SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES TO PERMIT BONDING OF THE TOPSOIL TO THE SURFACE AREAS AND TO PROVIDE A ROUGHENED SURFACE TO PREVENT TOPSOIL FROM SLIDING DOWN SLOPE. TOPSOIL SHOULD BE UNIFORMLY DISTRIBUTED ACROSS THE DISTURBED AREA TO A DEPTH OF 4 TO 8 INCHES MINIMUM - 2 INCHES ON FILL OUTSLOPES. SPREADING SHOULD BE DONE IN SUCH A MANNER THAT GRADING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL PREPARATION OR TILLAGE. IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOIL PLACEMENT SHOULD BE CORRECTED IN ORDER TO PREVENT FORMATION OF DEPRESSIONS UNLESS SUCH DEPRESSIONS ARE PART OF THE PCSM PLAN. TOPSOIL SHOULD NOT BE PLACED WHILE THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL IS EXCESSIVELY WET, OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDED PREPARATION. AREAS WHICH ARE TO BE TOP-SOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES. COMPACTED SOILS SHOULD BE SCARIFIED 6 TO 12 INCHES ALONG CONTOUR WHEREVER POSSIBLE PRIOR TO SEEDING. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING.

CUBIC YARDS OF TOPSOIL REQUIRED FOR APPLICATION TO VARIOUS DEPTHS

DEPTH (IN)	PER 1,000 SQUARE FEET	PER ACRE
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	537
5	15.5	672
6	18.6	806
7	21.7	940
8	24.8	1,074

COMPLETION CERTIFICATE AND FINAL PLANS

WITHIN 30 DAYS AFTER THE COMPLETION OF EARTH DISTURBANCE ACTIVITIES AUTHORIZED BY THIS PERMIT, INCLUDING THE PERMANENT STABILIZATION OF THE SITE AND PROPER INSTALLATION OF PCSM BMPS IN ACCORDANCE WITH THE APPROVED PCSM PLAN, OR UPON SUBMISSION OF THE NOT IF SOONER, THE PERMITTEE SHALL FILE WITH THE DEPARTMENT OR LOCAL COUNTY CONSERVATION DISTRICT A STATEMENT SIGNED BY A LICENSED PROFESSIONAL AND BY THE PERMITTEE CERTIFYING THAT WORK HAS BEEN PERFORMED IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THIS PERMIT AND THE APPROVED E&S AND PCSM PLANS.

RECYCLE & DISPOSAL OF MATERIALS

1. THE OPERATOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTE IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1 ET DEQ., AND 287.1 ET SEQ. THE CONTRACTOR SHALL NOT ILLEGALLY BURY, DUMP, OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.

2. CONSTRUCTION WASTES INCLUDE, BUT NOT LIMITED TO:
   - INLET PROTECTION
   - PUMPED WATER FILTER BAGS

3. ANY WASTE OR BORROW AREA MUST HAVE AN E&S PLAN REVIEWED AND APPROVED BY MONTGOMERY COUNTY CONSERVATION DISTRICT PRIOR TO BEING ACTIVATED.

UNFORSEEN EROSIVE CONDITIONS

1. SHOULD UNFORESEEN EROSIVE CONDITIONS DEVELOP DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE ACTION TO REMEDY SUCH CONDITIONS AND TO PREVENT DAMAGE TO ADJACENT PROPERTIES AS A RESULT OF INCREASED RUNOFF AND/OR SEDIMENT DISPLACEMENT. STOCKPILES OF WOOD CHIPS, HAY BALES, CRUSHED STONE AND OTHER MULCHES SHALL BE HELD IN READINESS TO DEAL IMMEDIATELY WITH EMERGENCY PROBLEMS OF EROSION.

2. THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF APPENDIX 64, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART 1, D.E.P., SUB-PART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.

3. CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO PROTECT EXISTING TREES AND SHRUBS WHICH ARE TO REMAIN IN PLACE. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGES, INCLUDING REPLACING TREES OR SHRUBS IN KIND IF NECESSARY.

4. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING REGULARLY TRACKED ONTO PUBLIC STREETS, THE CONTRACTOR SHALL BE PREPARED, UPON WRITTEN NOTICE GIVEN BY THE MUNICIPALITY OR THE CONSERVATION DISTRICT, TO PROVIDE TIRE WASHING FACILITIES AT ALL ROCK CONSTRUCTION ENTRANCES.

CLEAN FILL AND ENVIRONMENTAL DUE DILIGENCE

THE OPERATOR IS RESPONSIBLE FOR ENSURING THAT ALL MATERIAL PLACED ON THE SITE QUALIFIES AS CLEAN FILL. CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON-WATER SOLUBLE, NON-DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK, OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIAL PLACED IN OR ON WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. ALL FILL MATERIAL MUST BE USED IN ACCORDANCE WITH THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S POLICY "MANAGEMENT OF FILL" DOCUMENT NUMBER 258-2182-773. A COPY OF THIS DOCUMENT IS AVAILABLE THROUGH THE DEP WEBSITE AT www.depweb.state.pa.us

ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS INVESTIGATIVE TECHNIQUES, INCLUDING BY NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS.

EROSION & SEDIMENTATION MAINTENANCE:

1. DURING THE LIFE OF THE PROJECT, ALL EROSION AND SEDIMENTATION CONTROL DEVICES MUST BE PROPERLY MAINTAINED. MAINTENANCE SHALL INCLUDE THE INSPECTION OF EROSION CONTROL FACILITIES AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS, UNLESS MORE FREQUENT INSPECTION IS REQUIRED. IMMEDIATELY PERFORM CLEANOUT, REPAIR AND REPLACEMENT OF THE FACILITIES AS NEEDED. (REGRADE, RESEED AND MULCH WASHED OUT AREAS AS NEEDED.)

2. UNTIL THE SITE IS STABILIZED ALL EROSION AND SEDIMENTATION BMP'S MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENTATION BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL SITE INSPECTIONS WILL BE DOCUMENTED IN AN INSPECTION LOG KEPT FOR THIS PURPOSE. THE COMPLIANCE ACTIONS AND THE DATE, TIME AND NAME OF THE PERSON CONDUCTING THE INSPECTION. THE INSPECTION LOG WILL BE KEPT ON SITE AT ALL TIMES AND MADE AVAILABLE TO DEP UPON REQUEST.

3. WHERE BMP'S ARE FOUND TO FAIL TO ALLEVIATE EROSION OR SEDIMENT POLLUTION THE PERMITTEE OR CO-PERMITTEE NOTIFY THE BERKS COUNTY CONSERVATION DISTRICT OF THE FAILURE AND SHALL INCLUDE THE FOLLOWING INFORMATION:

   3.1. THE LOCATION AND SEVERITY OF THE BMP'S FAILURE AND ANY POLLUTION EVENTS.

   3.2. ALL STEPS TAKEN TO, REDUCE, ELIMINATE AND PREVENT THE RECURRENCE OF THE NON-COMPLIANCE.

   3.3. THE TIME FRAME TO CORRECT THE NONCOMPLIANCE, INCLUDING THE EXACT DATES WHEN THE ACTIVITY WILL RETURN TO COMPLIANCE.

4. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF EROSION AND SEDIMENTATION BMP'S FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMP'S OR MODIFICATIONS OF THOSE INSTALLED WILL BE NEEDED.

5. SEEDED AREAS THAT HAVE WASHED AWAY SHALL BE FILLED AND GRADED, AS NECESSARY, AND THEN RESEEDED. A STRAW COVER SHALL BE APPLIED TO RETAIN THE SEED ALONG WITH AN ANCHORING METHOD DESCRIBED ON THE ATTACHED MULCH ANCHORING GUIDE, UNTIL IT HAS A CHANCE TO ROOT PROPERLY.

6. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE, THE OPERATOR SHALL STABILIZE ANY AREAS DISTURBED BY THE ACTIVITIES. DURING NON-GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE SPECIFIED RATES. DISTURBED AREAS WHICH ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN 1 YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE PERMANENT VEGETATIVE STABILIZATION SPECIFICATIONS.

7. SEDIMENT REMOVED FROM BMPs SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

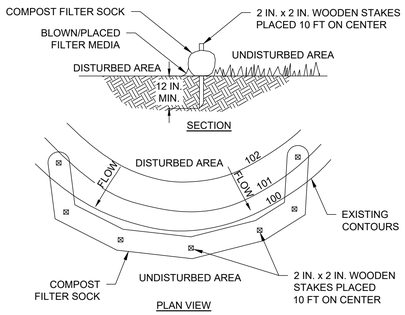
8. INLET FILTER BAGS SHALL BE CLEANED OUT OR REPLACED WHEN BAG IS HALF FULL.

9. SEDIMENT SHALL BE REMOVED FROM COMPOST FILTER SOCKS WHEN REACHING ONE HALF THE HEIGHT OF THE SOCK, IF USED.

10. THE CONTRACTOR SHALL INSPECT ALL ROCK CONSTRUCTION ENTRANCES ON A DAILY BASIS AND SHALL ENSURE THAT SEDIMENT IS NOT BEING TRACKED ONTO PUBLIC STREETS. SEDIMENT THAT IS TRACKED ONTO PUBLIC STREETS SHALL BE COLLECTED AND RETURNED TO THE SITE OR OTHERWISE PROPERLY REMOVED BY A STREET SWEEPER.

11. EROSION CONTROL BLANKETING SHALL BE INSTALLED ON ALL SLOPES 3H:1V OR STEEPER WITHIN 50 FEET OF SURFACE WATER AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS, IF USED.

12. FILL MATERIAL FOR EMBANKMENTS SHALL BE FREE OF ROOTS, OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIALS. THE EMBANKMENT SHALL BE COMP



NOTES:

SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.

ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

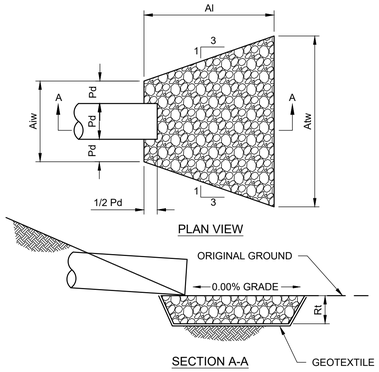
COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST FILTER SOCK

NTS STANDARD CONSTRUCTION DETAIL #4-1



OUTLET NO.	PIPE DIA Pd (IN)	RIPRAP SIZE R-__	RIPRAP THICK. Rt (IN)	APRON LENGTH Al (FT)	APRON INITIAL WIDTH Aiw (FT)	APRON TERMINAL WIDTH Atw (FT)
1	12	3	9	6	3	9

NOTES:

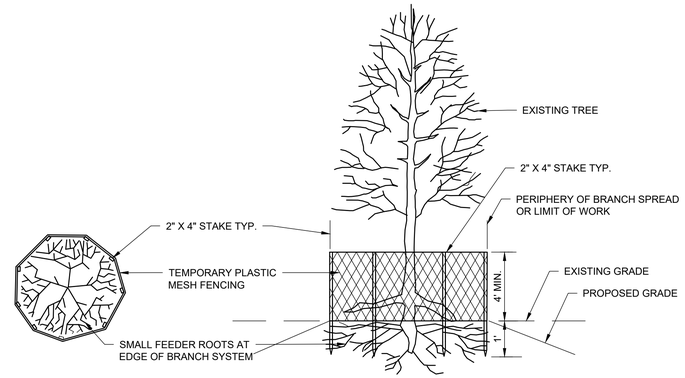
ALL APRONS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN. TERMINAL WIDTHS SHALL BE ADJUSTED AS NECESSARY TO MATCH RECEIVING CHANNELS.

ALL APRONS SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RUNOFF EVENT. DISPLACED RIPRAP WITHIN THE APRON SHALL BE REPLACED IMMEDIATELY.

EXTEND RIPRAP ON BACK SIDE OF APRON TO AT LEAST 1/2 DEPTH OF PIPE ON BOTH SIDES TO PREVENT SCOUR AROUND THE PIPE.

RIPRAP APRON AT PIPE OULET NO FLARED ENDWALL

NTS STANDARD CONSTRUCTION DETAIL #9-2



NOTES:

1. THOSE TREES WHICH ARE WITHIN TWENTY-FIVE (25) FEET OF ANY PROPOSED EXCAVATION OR GRADING OPERATION, OR IN ANY OTHER LOCATION DEEMED APPROPRIATE BY THE ENGINEER, SHALL BE PROTECTED BY INSTALLING AND MAINTAINING A FENCE AT THE DRIP LINE.

2. NO BOARDS OR OTHER MATERIAL SHALL BE NAILED TO TREES DURING CONSTRUCTION.

3. HEAVY EQUIPMENT OPERATORS SHALL AVOID DAMAGING EXISTING TREE TRUNKS AND ROOTS. FEEDER ROOTS SHALL NOT BE CUT CLOSER THAN TWENTY-FIVE (25) FEE FROM TREE TRUNKS.

4. TREE TRUNKS AND EXPOSED ROOTS DAMAGED DURING CONSTRUCTION SHALL BE PROTECTED FROM FURTHER DAMAGE BY BEING TREATED IMMEDIATELY.

5. TREE LIMBS DAMAGED DURING CONSTRUCTION SHALL BE PROPERLY PRUNED ANDTREATED IMMEDIATELY.

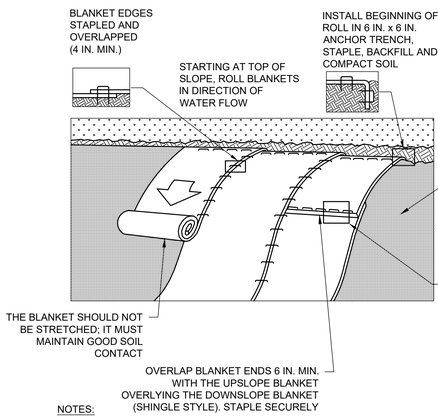
6. THE OPERATION OF HEAVY EQUIPMENT OVER ROOT SYSTEMS OF SUCH TREES SHALLBE MINIMIZED IN ORDER TO PREVENT SOIL COMPACTION.

7. DAMAGED TREES SHALL BE FERTILIZED TO AID IN THEIR RECOVERY.

8. CONSTRUCTION DEBRIS SHALL NOT BE DISPOSED OF NEAR OR AROUND TREES.

TREE PROTECTION FENCE

NTS



NOTES:

SEED AND SOIL AMENDMENTS SHALL BE APPLIED ACCORDING TO THE RATES IN THE PLAN DRAWINGS PRIOR TO INSTALLING THE BLANKET.

PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.

SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.

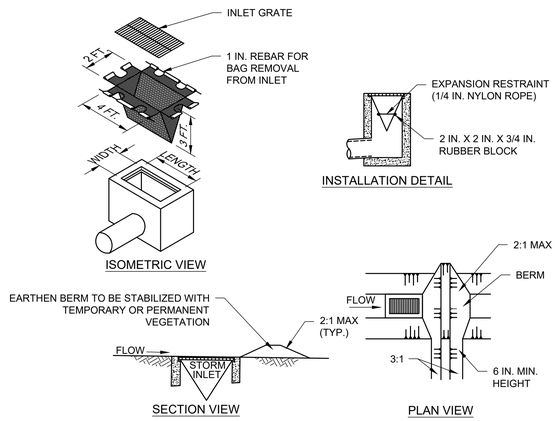
BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.

THE BLANKET SHALL BE STAPLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.

EROSION CONTROL BLANKET INSTALLATION

NTS STANDARD CONSTRUCTION DETAIL #11-1



NOTES:

MAXIMUM DRAINAGE AREA = 1/2 ACRE.

INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.

ROLLED EARTHEN BERM IN ROADWAY SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM ON ROADWAY SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. EARTHEN BERM IN CHANNEL SHALL BE MAINTAINED UNTIL PERMANENT STABILIZATION IS COMPLETED OR REMAIN PERMANENTLY.

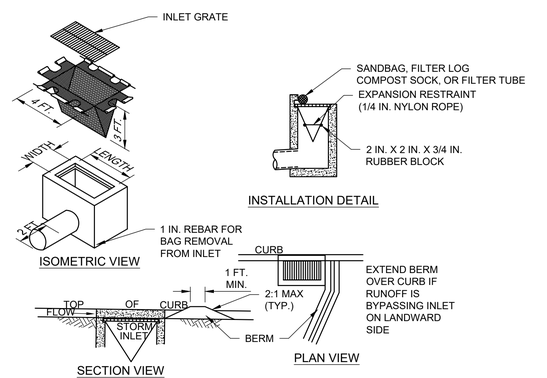
AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS., A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE.

INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.

DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

FILTER INLET PROTECTION - TYPE M INLET

NTS STANDARD CONSTRUCTION DETAIL #4-16



NOTES:

MAXIMUM DRAINAGE AREA = 1/2 ACRE.

INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.

ROLLED EARTHEN BERM SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS, A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE.

INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.

DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

FILTER BAG INLET PROTECTION- TYPE C INLET

NTS STANDARD CONSTRUCTION #4-15

NOT FOR CONSTRUCTION

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

EROSION AND SEDIMENTATION CONTROL DETAILS

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

BY	REVISIONS	NO.	DATE
CW	PLD SUBMISSION	1	2024-07-19
CW	90% CDS	0	2024-07-12

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON THE EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM

PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	AS NOTED
DRAWN BY	CW
APPROVED BY	MR

CS8502

SHEET 18 OF 23

PLOTTED: 7/19/2024 9:52 AM, BY: Cameron Williams PLOTSTYLE: Pennoni WCS.ctb
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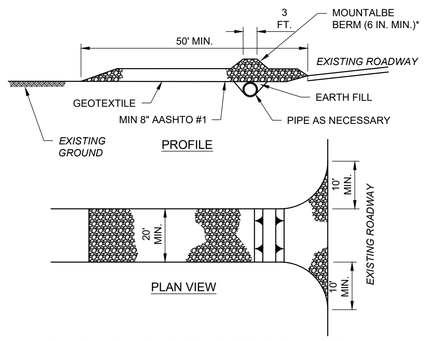


* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:

REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.

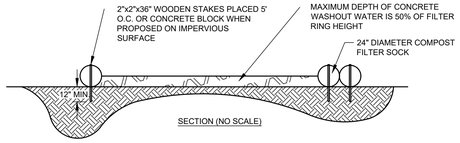
RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.

MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.

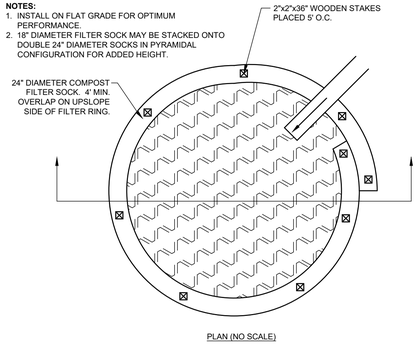
MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

ROCK CONSTRUCTION ENTRANCE

NTS STANDARD CONSTRUCTION DETAIL #3-1



NOTES:
1. INSTALL ON FLAT GRADE FOR OPTIMUM PERFORMANCE.
2. 18" DIAMETER FILTER SOCK MAY BE STACKED ONTO DOUBLE 24" DIAMETER SOCKS IN PYRAMIDAL CONFIGURATION FOR ADDED HEIGHT.

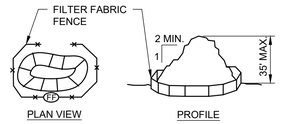


NOTES:

1. A SUITABLE IMPERVIOUS GEOMEMBRANE SHALL BE PLACED AT THE LOCATION OF THE WASHOUT PRIOR TO INSTALLING THE SOCKS.
2. WHENEVER COMPOST SOCK WASHOUTS ARE USED, A SUITABLE IMPERVIOUS GEOMEMBRANE SHOULD BE PLACED AT THE LOCATION OF THE WASHOUT. COMPOST SOCKS SHOULD BE STAKED IN THE MANNER RECOMMENDED BY THE MANUFACTURER AROUND THE PERIMETER OF THE GEOMEMBRANE SO AS TO FORM A RING WITH THE ENDS OF THE SOCK LOCATED AT THE UPSLOPE CORNER (AS SHOWN ABOVE). CARE SHOULD BE TAKEN TO ENSURE CONTINUOUS CONTACT OF THE SOCK WITH THE GEOMEMBRANE AT ALL LOCATIONS. WHERE NECESSARY, SOCKS MAY BE STACKED AND STAKED SO AS TO FORM A TRIANGULAR CROSS SECTION.
3. ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY. DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATLY. ACCUMULATED MATERIALS SHOULD BE REMOVED WHEN THEY REACH 75% CAPACITY. PLASTIC LINERS SHOULD BE REPLACED WITH EACH CLEANING OF THE WASHOUT FACILITY.

TYPICAL COMPOST SOCK CONCRETE WASHOUT

NTS



NOTES:

1. SILT FENCE MUST BE PLACED AROUND THE PERIMETER OF ALL STOCKPILES.
2. IMMEDIATELY APPLY TEMPORARY SEEDING TO ALL STOCKPILES WHICH WILL REMAIN IN PLACE 20 DAYS OR MORE.

TOPSOIL STOCKPILE

NTS

NOT FOR CONSTRUCTION

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

EROSION AND SEDIMENTATION CONTROL DETAILS

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS8503

SHEET 19 OF 23

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WASHINGTON STREET

SCHUYLKILL RIVER

5,473 SF STORAGE BUILDING

FFE 53.15

12,665 SF OF EXISTING BUILDING TO REMAIN

FFE 54.15

CONDENSATE DRAIN INV OUT 52.15

CONDENSATE DRAIN INV OUT 52.15

MH-4 (DOGHOUSE MH) RIM 51.21

MH-1 (DOGHOUSE MH) RIM 51.82

I-5 RIM 50.32

I-2 RIM 50.67

I-3 RIM 51.46

I-6 RIM 51.75

OS-1 RIM 50.67

LIMIT OF DISTURBANCE OFFSET 3' FOR VISUAL PURPOSES 193,556 SF (4.44 AC)

PDRA-2 (BYPASS) IMPERVIOUS: 1.71 AC LAWN: 2.10 AC TOTAL: 3.81 AC

PDRA-1 IMPERVIOUS: 0.34 AC LAWN: 0.29 AC TOTAL: 0.63 AC

PROPOSED RAIN GARDEN

RIPRAP APRON

150' PROPOSED OPEN SPACE AREA AS REQUIRED FOR RIVERFRONT DEVELOPMENT DISTRICT AND OFFERED FOR DEDICATION TO THE TOWNSHIP

LIMITS OF RIPARIAN CORRIDOR CONSERVATION OVERLAY DISTRICT ZONE 1

PARCEL I.D. 65-00-12679-00-9 LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP PER D.B. 5260, PG. 684

APPROXIMATE LOCATION 48"CMP

48" RCP @ 0.04% FTF

APPROX. FLOOD HAZARD BOUNDARY LINE PER FEMA MAP

APPROXIMATE LOCATION OF CONSHOHOCKEN AUTHORITY SEWER LINE - NOT FIELD VERIFIED

MARKOUT: CONTRACTOR TO VERIFY IN FIELD.

DP-001 TOP OF BANK ELEV. = 40.11 JANUARY 26 2018

739.38'

S65°02'51"W TIE LINE

ZONE AE

ZONE AE (FLOODWAY)

WATER EDGE

TOP OF BANK

BOAT DOCK

RAMP

WOOD BOARDWALK

CONTAINER

COMPRESSOR

SHACK

SLIDING GATE

GATE

TELE. MH RIM=50.22 INV=47.74

SAN MH RIM=50.00 Inv=47.74

SAN MH RIM=50.27 Inv=46.49

SAN MH RIM=50.22 Inv=46.41

STORM MH RIM=51.13 INV(b)=43.72

TELET. (Filled) INV=48.41

POST-DEVELOPMENT DRAINAGE AREA LEGEND

- LOD — LIMIT OF DISTURBANCE
- PDRA-1
- PDRA-2 (BYPASS)

NORTH

0 30' 60'

NOT FOR CONSTRUCTION

PLOTTED: 7/19/2024 10:20 AM BY: Cameron Williams PLOTSTYLE: Pennoni MCS.ctb

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VILLANOVA BOATHOUSE

601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS9001

SHEET 20 OF 23

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN NOTES:

1. THE PROJECT'S RECEIVING WATERCOURSE IS THE SCHUYLKILL RIVER, WHICH IS CLASSIFIED AS WARM WATER FISHES, MIGRATORY FISHES (WWF-MF) BY TITLE 25, CHAPTER 93 OF THE PENNSYLVANIA CODE.

2. A NOTICE OF TERMINATION (NOT) WILL BE REQUIRED TO BE SUBMITTED FOLLOWING APPROVAL OF THE FINAL AS-BUILT PLANS. PRIOR TO ACCEPTING THE NOTICE OF TERMINATION, THE DEPARTMENT AND/OR CONSERVATION DISTRICT STAFF WILL PERFORM A FINAL INSPECTION TO ENSURE SITE STABILIZATION AND VERIFY ADEQUATE INSTALLATION AND FUNCTION OF STORMWATER BMP'S.

3. UPON PERMANENT STABILIZATION OF THE EARTH DISTURBANCE ACTIVITY UNDER §102.22(A)(2) (RELATING TO PERMANENT STABILIZATION), AND INSTALLATION OF BMPS IN ACCORDANCE WITH AN APPROVED PLAN PREPARED AND IMPLEMENTED IN ACCORDANCE WITH §102.4 AND §102.8 (RELATING TO EROSION AND SEDIMENT CONTROL REQUIREMENTS; AND PCSM REQUIREMENTS), THE PERMITTEE OR CO-PERMITTEE SHALL SUBMIT A NOTICE OF TERMINATION TO THE DEPARTMENT OR CONSERVATION DISTRICT.

   THE NOTICE OF TERMINATION MUST INCLUDE:

   (1) THE FACILITY NAME, ADDRESS AND LOCATION.
   (2) THE OPERATOR NAME AND ADDRESS.
   (3) THE PERMIT NUMBER.
   (4) THE REASON FOR PERMIT TERMINATION.
   (5) IDENTIFICATION OF THE PERSONS WHO HAVE AGREED TO AND WILL BE RESPONSIBLE FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS IN ACCORDANCE WITH §102.8(M) AND PROOF OF COMPLIANCE WITH §102.8(M)(2).

   PRIOR TO ACCEPTING THE NOT, THE DEPARTMENT AND/OR CONSERVATION DISTRICT STAFF WILL PERFORM A FINAL INSPECTION AND APPROVE OR DENY THE NOTICE OF TERMINATION.

4. THE PERMITTEE SHALL INCLUDE WITH A NOTICE OF TERMINATION "RECORD DRAWINGS" WITH A FINAL CERTIFICATION STATEMENT FROM A LICENSED PROFESSIONAL, WHICH READS AS FOLLOWS:

   "I, OWNER, DO HEREBY CERTIFY PURSUANT TO THE PENALTIES OF 18 PA. C. S. A. §4904 TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THAT THE ACCOMPANYING RECORD DRAWINGS ACCURATELY REFLECT THE AS-BUILT CONDITIONS, ARE TRUE AND CORRECT, AND ARE IN CONFORMANCE WITH CHAPTER 102 OF THE RULES AND REGULATIONS OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION AND THAT THE PROJECT SITE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PCSM PLAN, ALL APPROVED PLAN CHANGES AND ACCEPTED CONSTRUCTION PRACTICES."

   (1) THE PERMITTEE SHALL RETAIN A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN.
   (2) THE PERMITTEE SHALL PROVIDE A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN TO THE PERSON IDENTIFIED IN THIS SECTION AS BEING RESPONSIBLE FOR THE LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS.

5. ALL STORMWATER CONVEYANCE AND MANAGEMENT FACILITIES SHOWN ON THIS PLAN ARE PERMANENT AND ARE NOT TO BE REMOVED OR ALTERED WITHOUT THE APPROVAL OF TREDYFFRIN TOWNSHIP. THE INDIVIDUAL LOT OWNER, HIS/HER HEIRS, ASSIGNS OR SUCCESSORS SHALL BE RESPONSIBLE FOR THE PERPETUAL MAINTENANCE OF THE SAID FACILITIES.

6. "THE OWNER HEREBY GRANTS PERMISSION TO THE TOWNSHIP, ITS AUTHORIZED AGENTS AND EMPLOYEES, TO ENTER UPON THE PROPERTY, AT REASONABLE TIMES AND UPON PRESENTATION OF PROPER IDENTIFICATION, TO INSPECT THE BMP'S WHENEVER IT DEEMS NECESSARY, WHENEVER POSSIBLE, THE TOWNSHIP SHALL NOTIFY THE OWNER PRIOR TO ENTERING THE PROPERTY."

7. CONTRACTOR WILL EXCAVATE IN THE AREA OF THE TEST PIT LOCATION TP-2/1-2, IN ORDER TO DETERMINE IF THE INFILTRATION RATE IS CAUSED BY A SOLUTION ACTIVITY. THIS EXCAVATION WILL BE MONITORED BY A GEOTECHNICAL ENGINEER. ANY REQUIRED BASINS MODIFICATIONS WILL BE BROUGHT TO THE TOWNSHIP PRIOR TO INSTALLATION.

PCSM LONGTERM OPERATION & MAINTENANCE NOTES

UNTIL THE PERMITTEE OR CO-PERMITTEE HAS RECEIVED WRITTEN APPROVAL OF A NOTICE OF TERMINATION, THE PERMITTEE OR CO-PERMITTEE WILL REMAIN RESPONSIBLE FOR COMPLIANCE WITH THE PERMIT TERMS AND CONDITIONS INCLUDING LONG-TERM OPERATION AND MAINTENANCE OF ALL PCSM BMPS ON THE PROJECT SITE AND IS RESPONSIBLE FOR VIOLATIONS OCCURRING ON THE PROJECT SITE THE DEPARTMENT OR CONSERVATION DISTRICT WILL CONDUCT A FINAL INSPECTION AND APPROVE OR DENY THE NOTICE OF TERMINATION WITHIN 30 DAYS.

FOR ANY PROPERTY CONTAINING A PCSM BMP, THE PERMITTEE OR CO-PERMITTEE SHALL RECORD AN INSTRUMENT WITH THE RECORDER OF DEEDS WHICH WILL ASSURE DISCLOSURE OF THE PCSM BMP AND THE RELATED OBLIGATIONS IN THE ORDINARY COURSE OF A TITLE SEARCH OF THE SUBJECT PROPERTY. THE RECORDED INSTRUMENT MUST IDENTIFY THE PCSM BMP, PROVIDE FOR NECESSARY ACCESS RELATED TO LONG-TERM OPERATION AND MAINTENANCE FOR PCSM BMPS AND PROVIDE NOTICE THAT THE RESPONSIBILITY FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS IS A COVENANT THAT RUNS WITH THE LAND THAT IS BINDING UPON AND ENFORCEABLE BY SUBSEQUENT GRANTEES, AND PROVIDE PROOF OF FILING WITH THE NOTICE OF TERMINATION UNDER § 102.7(B)(5) (RELATING TO PERMIT TERMINATION)

THE PERSON RESPONSIBLE FOR PERFORMING LONG-TERM OPERATION AND MAINTENANCE MAY ENTER INTO AN AGREEMENT WITH ANOTHER PERSON INCLUDING A CONSERVATION DISTRICT, NONPROFIT ORGANIZATION, MUNICIPALITY, AUTHORITY, PRIVATE CORPORATION OR OTHER PERSON, TO TRANSFER THE RESPONSIBILITY FOR PCSM BMPS OR TO PERFORM LONG-TERM OPERATION AND MAINTENANCE AND PROVIDE NOTICE THEREOF TO THE DEPARTMENT.

INSPECTIONS SHALL BE PERFORMED AS NOTED FOR EACH BMP AND ANNUALLY. A WRITTEN REPORT DOCUMENTING EACH INSPECTION AND ALL BMP REPAIR AND MAINTENANCE ACTIVITIES SHALL BE PROVIDED ANNUALLY.

A PERMITTEE OR CO-PERMITTEE THAT FAILS TO TRANSFER LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMP OR OTHERWISE FAILS TO COMPLY WITH THIS REQUIREMENT SHALL REMAIN JOINTLY AND SEVERALLY RESPONSIBLE WITH THE LANDOWNER FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS LOCATED ON THE PROPERTY.

LONGTERM OPERATION AND MAINTENANCE RESPONSIBLE PARTY:

VILLANOVA UNIVERSITY
800 LANCASTER AVENUE
VILLANOVA, PA, 19085

STORMWATER BMP FAILURE

A STORMWATER BMP FAILURE FOR THIS SITE IS DEFINED AS:

1. THE BIO-RETENTION BASIN NOT DEWATERING WITHIN 72-HOURS. IN THE EVENT THAT THIS OCCURS, THE DESIGN ENGINEER SHOULD BE CONTACTED TO INVESTIGATE THE CAUSE OF THE FAILURE. IF THE BMP HAS NOT DEWATERED WITHIN 72-HOURS AND A PRECIPITATION EVENT IS FORECASTED THE FACILITY SHOULD BE DEWATERED PRIOR TO THE PRECIPITATION EVENT.
2. THE BIO-RETENTION BASIN VEGETATION DIES OR FAILS TO ESTABLISH. IN THE EVENT THAT THIS OCCURS THE LANDSCAPING SHALL BE REPLACED IN KIND.

STORM SEWERS

A STORM SEWER SYSTEM HAS BEEN DESIGNED TO CONVEY RUNOFF TO THE VARIOUS STORMWATER BASINS THROUGHOUT THE SITE. STORM SEWER PIPES ARE ALSO PROPOSED TO CONVEY WATER FROM THE VARIOUS BIO-RETENTION BASINS TO STABLE OUTLETS AND ALSO TO DIVERT WATER FROM OFF-SITE AROUND THE SITE.

OPERATION & MAINTENANCE:

1. THE LOT OWNER OF RECORD IS RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE STORM SEWER SYSTEM AND PROVIDING A WRITTEN REPORT DOCUMENTING EACH INSPECTION AND ALL BMP REPAIR AND MAINTENANCE ACTIVITIES.
2. THE STORM SEWER SYSTEM SHALL BE INSPECTED AT LEAST FOUR (4) TIMES A YEAR.
3. REMOVE SEDIMENT FROM ALL STRUCTURES AT LEAST ONCE PER YEAR.
4. DISPOSE OF SEDIMENT, DEBRIS/TRASH, AND ANY OTHER WASTE MATERIAL REMOVED FROM THE STORM SEWER SYSTEM AT A SUITABLE DISPOSAL/RECYCLING SITE AND IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL WASTE REGULATIONS.

STRUCTURAL BMP 6.4.5 - RAIN GARDEN (BMP ID 1)

INSPECTION SCHEDULE:

PERIODIC INSPECTION OF THE RAIN GARDEN FACILITIES IS NECESSARY TO ENSURE ITS PROPER FUNCTIONING. THESE FACILITIES SHALL BE INSPECTED AS FOLLOWS:

1. DURING THE FIRST GROWING SEASON FOLLOWING CONSTRUCTION OF THE RAIN GARDEN FACILITY OR UNTIL ESTABLISHED, THE NEWLY-PLANTED VEGETATION SHOULD BE INSPECTED EVERY TWO (2) TO THREE (3) WEEKS.
2. THE RAIN GARDEN FACILITIES SHOULD BE INSPECTED WITHIN 48 HOURS AFTER EVERY MAJOR STORM EVENT (>1 INCH RAINFALL DEPTH) TO EVALUATE THE DEWATERING AND INSPECT FOR EROSION. AS PART OF THIS EVALUATION, THE INSPECTOR SHALL OPEN THE MONITORING WELL OF THE RAIN GARDEN FACILITY TO CONFIRM THAT THE WATER ELEVATION IS NOT ABOVE THE BASIN BOTTOM.
3. THE RAIN GARDEN FACILITY SHOULD HAVE A GENERAL INSPECTION AT LEAST TWO (2) TIMES PER YEAR. THE GENERAL INSPECTION SHOULD ASSESS THE HEALTH OF VEGETATION, SOIL EROSION, FLOW CHANNELIZATION, BANK STABILITY, CLOGGING OF INLETS OR OUTLETS, AND SEDIMENT/DEBRIS ACCUMULATION.
4. A WRITTEN INSPECTION REPORT SHOULD BE FILED IN THE INSPECTION AND MAINTENANCE LOG OF THE OWNER OF RECORD OR AND MADE AVAILABLE UPON REQUEST TO GOVERNMENTAL AUTHORITIES.

OPERATION & MAINTENANCE:

MAINTENANCE OF THE RAIN GARDEN FACILITIES IS NECESSARY TO ENSURE THE PROPER FUNCTIONALITY OF THE FACILITY. THESE FACILITIES SHALL BE MAINTAINED ON AN ANNUAL BASIS AS FOLLOWS:

1. THE OWNER OF RECORD IS RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE RAIN GARDEN FACILITIES AND MAINTAINING A LOG OF ALL WRITTEN REPORTS DOCUMENTING EACH INSPECTION AND ALL BMP REPAIR AND MAINTENANCE ACTIVITIES.
2. THE RAIN GARDEN FACILITIES VEGETATION MAY NEED ADDITIONAL SUPPORT (E.G., WATERING, WEEDING, MULCHING, REPLANTING,) DURING THE FIRST YEAR.
3. VEHICLES SHOULD NOT BE PARKED ON OR DRIVEN OVER THE RAIN GARDEN FACILITY BOTTOM AND CARE SHOULD BE TAKEN TO AVOID EXCESSIVE COMPACTION BY MOWERS.
4. MAINTENANCE ACTIVITIES TO BE DONE WITHIN 48 HOURS AFTER EVERY MAJOR STORM EVENT (> 1 INCH RAINFALL DEPTH):
   a. VEGETATED AREAS SHOULD BE INSPECTED FOR EROSION.
   b. EVALUATE THE DRAIN-DOWN TIME OF THE RAIN GARDEN FACILITIES TO ENSURE THE MAXIMUM TIME OF 48-HOURS AFTER THE STORM EVENT HAS ENDED IS NOT BEING EXCEEDED.
5. MAINTENANCE ACTIVITIES TO BE DONE ANNUALLY:
   a. MOWING AND/OR TRIMMING OF VEGETATION SHOULD BE PERFORMED AS NECESSARY TO SUSTAIN THE SYSTEM. MEADOW GRASSES SHOULD BE MOWED ANNUALLY. MOWING SHOULD BE DONE DURING THE SUMMER TO ENSURE ADEQUATE REGROWTH OF VEGETATION PRIOR TO WINTER. SPECIAL CARE SHOULD BE TAKEN TO MINIMIZE DISTURBANCE ASSOCIATED WITH THE MOWING OF THE MEADOW GRASSES.
   b. DETRITUS SHOULD BE REMOVED EVERY YEAR. PERENNIAL PLANTINGS MAY BE CUT DOWN AT THE END OF THE GROWING SEASON.
   c. VEGETATED AREAS SHOULD BE INSPECTED ANNUALLY FOR EROSION AND UNWANTED GROWTH OF EXOTIC/INVASIVE SPECIES. VEGETATION SHOULD BE MAINTAINED TO AT LEAST 85% COVER. BARE SPOTS SHALL BE RE-SEEDED IMMEDIATELY UPON DISCOVERY.
   d. EXCESSIVE BUILD-UP OF SEDIMENT SHALL BE REMOVED. SEDIMENT REMOVAL SHOULD BE CONDUCTED WHEN THE MANAGER/RELEASE CONCEPT RAIN GARDEN FACILITIES IS COMPLETELY DRY. SEDIMENT SHOULD BE DISPOSED OF PROPERLY AND ONCE SEDIMENT IS REMOVED, DISTURBED AREAS NEED TO BE IMMEDIATELY STABILIZED AND VEGETATED.
6. MAINTENANCE ACTIVITIES AS NEEDED:
   a. INLETS UPSTREAM OF THE RAIN GARDEN FACILITIES SHOULD BE INSPECTED AND CLEANED AT LEAST TWO (2) TIMES PER YEAR AND AFTER RUNOFF EVENTS GREATER THAN 1-INCH.
   b. TREES AND SHRUBS SHOULD BE INSPECTED TWICE PER YEAR TO EVALUATE HEALTH.
   c. MULCH SHOULD BE RE-SPREAD WHEN EROSION IS EVIDENT AND BE REPLENISHED AS NEEDED. ONCE EVERY TWO (2) TO THREE (3) YEARS THE ENTIRE AREA MAY REQUIRE MULCH REPLACEMENT.
   d. DURING PERIODS OF EXTENDED DROUGHT, THE RAIN GARDEN FACILITIES MAY REQUIRE WATERING.
7. WINTER MAINTENANCE:
   a. ABRASIVES SUCH AS SAND OR CINDERS SHOULD NOT BE APPLIED ON OR ADJACENT TO THE PERMEABLE PAVEMENT AREAS.

SALT IS AN ACCEPTABLE DEICER AND CAN BE USED ON PERMEABLE PAVEMENT AREAS.

STRUCTURAL BMP - STORM SEWERS

A STORM SEWER SYSTEM HAS BEEN DESIGNED TO CONVEY RUNOFF FROM THE PAVED AREA TO THE SUBSURFACE BASIN. STORM SEWER PIPES ARE ALSO PROPOSED TO CONVEY WATER FROM THE SUBSURFACE DETENTION BASIN TO AN EXISTING STORM SEWER SYSTEM, THAT DISCHARGES OFF-SITE.

OPERATION & MAINTENANCE:

1. THE LOT OWNER OF RECORD IS RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE STORM SEWER SYSTEM AND PROVIDING A WRITTEN REPORT DOCUMENTING EACH INSPECTION AND ALL BMP REPAIR AND MAINTENANCE ACTIVITIES.
2. THE STORM SEWER SYSTEM SHALL BE INSPECTED AT LEAST FOUR (4) TIMES A YEAR.
3. REMOVE SEDIMENT FROM ALL STRUCTURES AT LEAST ONCE PER YEAR.
4. DISPOSE OF SEDIMENT, DEBRIS/TRASH, AND ANY OTHER WASTE MATERIAL REMOVED FROM THE STORM SEWER SYSTEM AT A SUITABLE DISPOSAL/RECYCLING SITE AND IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL WASTE REGULATIONS.

INSPECTION SCHEDULE:

STORM SEWER SYSTEM SHOULD BE INSPECTED AT LEAST TWO (2) TIMES PER YEAR, AS WELL AS AFTER EVERY STORM GREATER THAN 1-INCH.

UNFORSEEN EROSIVE CONDITIONS

1. SHOULD UNFORSEEN EROSIVE CONDITIONS DEVELOP DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE ACTION TO REMEDY SUCH CONDITIONS AND TO PREVENT DAMAGE TO ADJACENT PROPERTIES AS A RESULT OF INCREASED RUNOFF AND/OR SEDIMENT DISPLACEMENT. STOCKPILES OF WOOD CHIPS, HAY BALES, CRUSHED STONE, AND OTHER MULCHES SHALL BE HELD IN READINESS TO DEAL IMMEDIATELY WITH EMERGENCY PROBLEMS OF EROSION.

CLEAN FILL & ENVIRONMENTAL DUE DILIGENCE

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL FROM THE SITE, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.

2. CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON-WATER SOLUBLE, NON-DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIAL PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE-USE).

3. CLEAN FILL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE: FILL MATERIALS AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE STILL QUALIFIES AS CLEAN FILL PROVIDED THE TESTING REVEALS THAT THE FILL MATERIAL CONTAINS CONCENTRATIONS OF REGULATED SUBSTANCES THAT ARE BELOW THE RESIDENTIAL LIMITS IN TABLES FP-1A AND FP-1B FOUND IN THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".

4. ANY PERSON PLACING CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FP-001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL. A COPY OF FORM FP-001 CAN BE FOUND AT THE END OF THESE INSTRUCTIONS.

5. ENVIRONMENTAL DUE DILIGENCE: THE APPLICANT MUST PERFORM ENVIRONMENTAL DUE DILIGENCE TO DETERMINE IF THE FILL MATERIALS ASSOCIATED WITH THE PROJECT QUALIFY AS CLEAN FILL. ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".

6. FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA. CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE. THESE REGULATIONS ARE AVAILABLE ON-LINE AT WWW.PACODE.COM.

TEMPORARY SEEDING NOTE

TEMPORARY STABILIZATION OF ALL EXPOSED EARTH SURFACES WHERE CONSTRUCTION ACTIVITY HAS CEASED, INCLUDING TOPSOIL STOCKPILES SHALL BE STABILIZED IMMEDIATELY BY THE FOLLOWING METHODS AND MATERIALS.

1. APPLY ONE (1) TON OF AGRICULTURAL GRADE LIMESTONE PER ACRE PLUS FERTILIZER (10-10-10) AT THE RATE OF 500 LBS PER ACRE AND WORK INTO SOIL WHEREVER POSSIBLE.

2. APPLY 100% ANNUAL RYEGRASS SEED AT A RATE OF 227 LBS PER 1000 SQUARE FEET.

3. AFTER SEEDING MULCH WITH HAY OR STRAW AT A RATE OF THREE (3) TONS PER ACRE.

SOIL CHART

OBTAINED FROM NRCS SOIL MART ON 1/9/2024

SYMBOL	NAME	HYDROLOGIC GROUP	SLOPES	HYDRIC	DEPTH TO		LIMITATIONS		RESOLUTION NOTES
					WATER TABLE (IN)	BEDROCK (IN)	FROST ACTION	SMALL COMMERCIAL BUILDINGS	
UgB	URBAN LAND	-	0 TO 8%	NO	-	-	NONE	NOT RATED	-

CONESTOGA FORMATION

STATE: PENNSYLVANIA
NAME: CONESTOGA FORMATION
GEOLOGIC AGE: ORDOVICIAN AND CAMBRIAN
ORIGINAL MAP LABEL: OCc
PRIMARY ROCK TYPE: LIMESTONE
SECONDARY ROCK TYPE: SHALE, CONGLOMERATIC LIMESTONE, PHYLLITE

GLENARM WISSAHICKON FORMATION

STATE: PENNSYLVANIA
NAME: GKENARM WISSAHICKON FORMATION
GEOLOGIC AGE: PROBABLY LOWER PALEOZOIC
ORIGINAL MAP LABEL: Xgw
PRIMARY ROCK TYPE: OLIGOCLASE-MICA SCHIST
SECONDARY ROCK TYPE: HORNBLENDE GNEISS, GNEISS, AMPHIBOLITE

FELSIC GNEISS

STATE: PENNSYLVANIA
NAME: FELSIC GNEISS
GEOLOGIC AGE: PRECAMBRIAN
ORIGINAL MAP LABEL: fgp
PRIMARY ROCK TYPE: FELSIC GNEISS
SECONDARY ROCK TYPE: N/A

PERMANENT SEEDING SITE PREPARATION

PERMANENT STABILIZATION OF THE ALL EXPOSED EARTH SURFACES AFTER THE COMPLETION OF THE SITE GRADING AND IMPROVEMENTS SHALL BE ACCOMPLISHED BY THE FOLLOWING METHODS AND MATERIALS:

1. AFTER INSTALLATION OF THE NEEDED SURFACE WATER CONTROL MEASURES, PERFORM ALL CULTURAL OPERATIONS AT RIGHT ANGLES TO THE SLOPE.
2. OBTAIN SOILS TESTING FROM AN INDEPENDENT LABORATORY TO DETERMINE NECESSARY SOILS MODIFICATIONS.
3. IN THE ABSENCE OF SOILS TESTING, APPLY AGRICULTURAL GRADE LIMESTONE AT THE MINIMUM RATE OF SIX TONS LIMESTONE PER ACRE (277 LBS. PER 1,000 SQUARE FEET).
4. IN THE ABSENCE OF SOILS TESTING, WORK IN FERTILIZER AT THE RATE OF 1000 LBS. OF 10-20-20 OR EQUIVALENT PER ACRE.
5. SMOOTH AND FIRM SEEDED AREAS WITH CULTIPACKER, OR OTHER SIMILAR EQUIPMENT, PRIOR TO SEEDING.
6. APPLY SEED.
7. COVER GRASS SEEDS WITH 1/4 INCH OF TOPSOIL WITH SUITABLE EQUIPMENT.
8. APPLY STRAW MULCH AT A RATE OF 3.0 TON PER ACRE IMMEDIATELY AFTER SEEDING.
9. USE SOD WHERE THERE IS A HEAVY CONCENTRATION OF WATER AND IT IS IMPORTANT TO GET A QUICK VEGETATIVE COVER IN ORDER TO PREVENT GULLYING. USE SOD AT THE DIRECTION OF THE TOWNSHIP ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.
10. HYDROSEEDING SHALL BE AN ACCEPTABLE ALTERNATIVE TO THE ABOVE SEEDING WHEN PERFORMED IN ACCORDANCE WITH PENNDOT PUB. 408 SECTIONS 804 AND 805 AND APPROVED BY THE SITE ENGINEER.

PERMANENT SEEDING NOTE

1. SPREAD AND FINE GRADE 12" TOPSOIL ON ALL AREAS TO BE PERMANENTLY SEEDED.
2. BEFORE SEEDING, APPLY APPROPRIATE SOIL MODIFICATIONS.
3. INSTALL EROSION/SEED BLANKET WHERE NEEDED.
4. WATER AND MAINTAIN ALL LAWN AREAS.
5. RESEED BARE OR THIN AREAS AS DIRECTED BY THE ENGINEER.
6. IF GROUND COVER IS NOT OTHERWISE SPECIFIED ON THE APPROVED LANDSCAPING PLANS, USE SEED MIXTURE 2, AS SHOWN IN TABLE 11.4.
7. APPLY STRAW MULCH AT 3.0 TON/ACRE IMMEDIATELY AFTER SEEDING.
8. APPLY STRAW AND MULCH DURING NON-GROWING SEASONS (NOVEMBER - MARCH)

RECYCLE & DISPOSAL OF MATERIALS

1. POST CONSTRUCTION WASTE INCLUDES, BUT IS NOT LIMITED TO ANYTHING FROM GARAGE SUCH AS PLASTIC DRINK CUP, LUNCH LEFTOVERS, ANIMAL FECES, LEAVES AND ROAD DEBRIS, TYPICAL OFFICE TRASH, LITTER AND SEDIMENT.
2. EXCESSIVE BUILD UP OF SEDIMENT SHALL BE REMOVED. SEDIMENT REMOVAL SHOULD BE CONDUCTED WHEN THE BMP FACILITY IS COMPLETELY DRY. SEDIMENT SHOULD BE DISPOSED OF PROPERLY AND ONCE SEDIMENT IS REMOVED, DISTURBED AREAS NEED TO BE IMMEDIATELY STABILIZED AND VEGETATED.
3. DISPOSE OF SEDIMENT, DEBRIS/TRASH AND OTHER WASTE MATERIAL REMOVED FROM THE STORM SEWER SYSTEM AT A SUITABLE DISPOSAL/RECYCLING SITE AND IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL WASTE REGULATIONS.

PCSM SEDIMENT REMOVAL

1. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

2. THE CONTRACTOR SHALL ENSURE THAT SEDIMENT IS NOT BEING TRACKED ONTO PUBLIC STREETS. SEDIMENT THAT IS TRACKED ONTO PUBLIC STREETS SHALL BE COLLECTED AND RETURNED TO THE SITE OR OTHERWISE PROPERLY REMOVED BY A STREET SWEEPER.

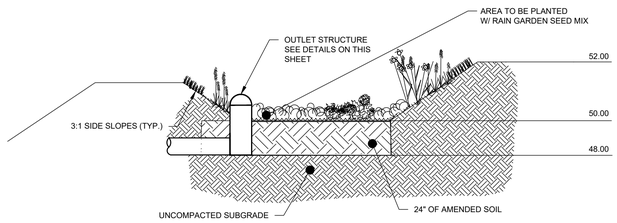
RAIN GARDEN SEED MIX (ERNMX-180) OR APPROVED EQUAL

	38% ·	RIVER OATS, PA/VA ECOTYPE BLEND (CHASMANTHIUM LATIFOLIUM (UNIOLA LATIFOLIA), PA/VA COTYPE BLEND)
	20% ·	VIRGINIA WILDRYE, PA ECOTYPE (ELYMUS VIRGINICUS, PA ECOTYPE)
	10% ·	FOX SEDGE, PA ECOTYPE (CAREX VULPINOIDEA, PA ECOTYPE)
	4% ·	PURPLE CONEFLOWER (ECHINACEA PURPUREA)
	3% ·	TALL WHITE BEARDTONGUE, PA ECOTYPE (PENSTEMON DIGITALIS, PA ECOTYPE)
	3% ·	BLACKEYED SUSAN, COASTAL PLAIN NC ECOTYPE (RUDBECKIA HIRTA, COASTAL PLAIN NC ECOTYPE)
	3% ·	LANCELEAF COREOPSIS, COASTAL PLAIN NC ECOTYPE (COREOPSIS LANCEOLATA COASTAL PLAIN NC ECOTYPE)
	2% ·	OHIO SPIDERWORT, PA ECOTYPE (TRADESCANTIA OHIENSIS, PA ECOTYPE)
	2% ·	OXEYE SUNFLOWER, PA ECOTYPE (HELIOPSIS HELIANTHOIDES, PA ECOTYPE)
	2% ·	AUTUMN BENTGRASS, PA ECOTYPE (AGROSTIS PERENNANS, PA ECOTYPE)
	2% ·	PARTRIDGE PEA, PA ECOTYPE (CHAMAECRISTA FASCICULATA (CASSIA F.), PA ECOTYPE)
	2% ·	MARSH (DENSE) BLAZING STAR (SPIKED GAYFEATHER), PA ECOTYPE (LIATRIS SPICATA, PA ECOTYPE)
	1.5% ·	SMOOTH BLUE ASTER, NY ECOTYPE (ASTER LAEVIS (SYMPHYOTRICHUM LAEVE), NY ECOTYPE)
	1% ·	WILD SENNA, VA & WV ECOTYPE (SENNA HEBECARPA (CASSIA H.), VA & WV ECOTYPE)
	1% ·	NEW ENGLAND ASTER, PA ECOTYPE (ASTER NOVAE-ANGLIAE (SYMPHYOTRICHUM N.), PA ECOTYPE)
	1% ·	SWAMP MILKWEED, PA ECOTYPE (ASCLEPIAS INCARNATA, PA ECOTYPE)
	1% ·	PATH RUSH, PA ECOTYPE (JUNCUS TENUIS, PA ECOTYPE)
	1% ·	SOFT RUSH (JUNCUS EFFUSUS)
	0.8% ·	WILD BERGAMOT, FORT INDIANTOWN GAP-PA ECOTYPE (MONARDA FISTULOSA, FORT INDIANTOWN GAP-PA ECOTYPE)
	0.5% ·	MISTFLOWER, VA ECOTYPE (EUPATORIUM COELESTINUM (CONOCLINIUM C.), VA ECOTYPE)
	0.5% ·	BLUE FALSE INDIGO, SOUTHERN WV ECOTYPE (BAPTISIA AUSTRALIS, SOUTHERN WV ECOTYPE)
	0.5% ·	EARLY GOLDENROD, VA ECOTYPE (SOLIDAGO JUNCEA, VA ECOTYPE)
	0.2% ·	SLENDER MOUNTAINMINT (PYCNANTHEMUM TENUIFOLIUM)
	100%	TOTAL: APPLIED 20 LB PER ACRE WITH A COVER CROP OF GRAIN RYE AT 30 LB PER ACRE

MEADOW SEED MIX:

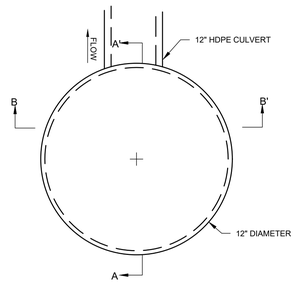
SEED MIX 'B' UPL MEADOW MIX (ERNMX-250-1) - **MODIFIED TO ELIMINATE BIG BLUESTEM** OR APPROVED EQUAL

20%	ELYMUS VIRGINICUS, PA ECOTYPE (VIRGINIA WILDRYE, PA ECOTYPE)
19%	SORGHASTRUM NUTANS, PA ECOTYPE (INDIANGRASS, PA ECOTYPE)
18%	SCHIZACHYRIUM SCOPARIUM, FORT INDIANTOWN GAP-PA ECOTYPE (LITTLE BLUESTEM, FORT INDIANTOWN GAP-PA ECOTYPE)
9%	TRIDENS FLAVUS (PURPLETOP)
5%	ANDROPOGON GERARDII, 'NIAGARA' (BIG BLUESTEM, 'NIAGARA')
5%	PENSTEMON DIGITALIS, PA ECOTYPE (TALL WHITE BEARDTONGUE, PA ECOTYPE)
4%	CHAMAECRISTA FASCICULATA (CASSIA F.), PA ECOTYPE (PARTRIDGE PEA, PA ECOTYPE)
3%	RUDBECKIA HIRTA (BLACKEYED SUSAN)
2%	ASTER NOVAE-ANGLIAE (SYMPHYOTRICHUM N.) (NEW ENGLAND ASTER)
2%	HELIOPSIS HELIANTHOIDES, PA ECOTYPE (OXEYE SUNFLOWER, PA ECOTYPE)
2%	LIATRIS SPICATA, PA ECOTYPE (MARSH (DENSE) BLAZING STAR (SPIKED GAYFEATHER), PA ECOTYPE)
2%	MONARDA FISTULOSA, PA ECOTYPE (WILD BER



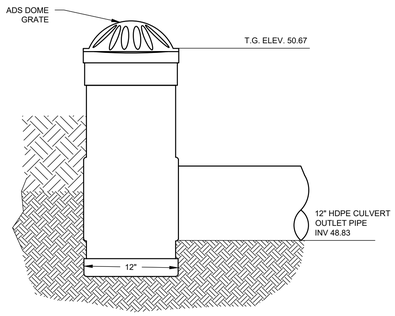
CROSS SECTION

N.T.S.



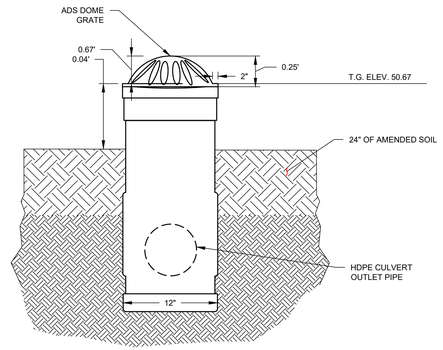
PLAN VIEW

N.T.S.



OUTLET STRUCTURE B–B'

N.T.S.



OUTLET STRUCTURE A–A'

N.T.S.

NYLOPLAST RAIN GARDEN OUTLET STRUCTURE DETAIL (OS-1)

N.T.S.

RAIN GARDEN NOTES:

1. ALL CONSTRUCTION ACTIVITIES FOR THE RAIN GARDEN SHOULD OCCUR WITHIN A SHORT TIME PERIOD TO ENSURE THAT SILT AND SEDIMENT DO NOT ENTER THE RAIN GARDEN.
2. THE RAIN GARDEN SHALL BE PROTECTED FROM COMPACTION DUE TO HEAVY EQUIPMENT OPERATION OR STORAGE OF FILL OR CONSTRUCTION MATERIAL. EXCAVATION FOR THE RAIN GARDEN SHALL BE PERFORMED WITH EQUIPMENT THAT WILL NOT COMPACT THE BOTTOM OF THE BASIN.
3. APPROPRIATE MEASURES ARE TO BE TAKEN IN THE EVENT OF SEDIMENT ENTERING AND CLOGGING THE RAIN GARDEN. SHOULD UNFAVORABLE CONDITIONS (I.E. GROUNDWATER AND/OR BEDROCK, ETC.) BE ENCOUNTERED DURING THE CONSTRUCTION PROCESS OF THE RAIN GARDEN, THE DESIGN ENGINEER SHOULD BE CONTACTED TO ADDRESS SUCH ISSUES.
4. IF INSPECTION INDICATES THAT SOIL OR SEDIMENT HAS ENTERED ANY OF THE RAIN GARDEN, APPROPRIATE MEASURES (I.E. CLEARING THE SOIL SEDIMENT FROMRAIN GARDEN) SHOULD BE ADDRESSED.
5. THE TOP, BOTTOM AND SIDES OF STONE TRENCH SHALL BE LINED WITH NON-WOVEN PERVIOUS GEO-TEXTILE MEETING THE SPECIFICATIONS OF PENN DOT PUBLICATION 408, SECTION 735, CONSTRUCTION CLASS 1.
6. SOIL MIX SPECIFICATIONS:
   a. CLAY CONTENT: LESS THAN 5%
   b. SAND CONTENT: 50-60%
   c. LEAF COMPORT OF AGED LEAF MULCH: 20-30%
   d. HIGH QUALITY TOPSOIL: 20-30
   e. BIORETENTION SOIL CAN BE CREATED BY AMENDING EXISTING SOIL, DEPENDING ON THE QUALITY OF THE SOIL, COMBINE 20-30% NATIVE SOIL WITH 20-30% COMPOST AND 50% SAND.
   f. HAVE A PERMEABILITY OF AT LEAST 1.0 FEET PER DAY (0.5 INCHES PER HOUR).
   g. BE FREE OF STONES, STUMPS, ROOTS, OR OTHER WOODY MATERIAL OVER 1.0 INCH IN DIAMETER. IT SHOULD ALSO BE FREE OF BRUSH OR SEEDS FROM NOXIOUS WEEDS. PLACEMENT OF THE PLANTING SOIL SHOULD BE IN LIFTS OF 12-18 INCHES, LOOSELY COMPACTED (TAMPED LIGHTLY WITH A DOZER OR BACKHOE BUCKET).

RAIN GARDEN SEED MIX:

ERNMX-180 OR APPROVED EQUAL

20.0%	PANICUM RIGIDULUM (PA ECOTYPEREDTOP PANIC GRASS, PA ECOTYPE)
20.0%	SCHIZACHYRIUM SCOPARIUM (EASTERN ECOTYPELITTLE BLUESTEM, EASTERN ECOTYPE)
10.0%	ELYMUS VIRGINICUS (VIRGINIA WILD RYE)
5.00%	CAREX VULPINOIDEA (FOX SEDGE)
5.00%	CHASMANTHIUM LATIFOLIUM (RIVER OATS)
5.00%	ECHINACEA PURPUREA, PURPLE CONEFLOWER
5.00%	LIATRIS SPICATA (MARSH (DENSE) BLAZING STAR, SPIKED GAYFEATHER)
5.00%	RUDBECKIA HIRTA (BLACK EYED SUSAN)
3.00%	MONARDA FISTULOSA (WILD BERGAMOT)
3.00%	PENSTEMON DIGITALIS (TALL WHITE BEARD TONGUE)
2.00%	ANDROPOGON GERARDII ('WI ECOTYPE'-WI ECOTYPE' BIG BLUESTEM)
2.00%	ASCLEPIAS INCARNATA (SWAMP MILKWEED)
2.00%	ASTER NOVAE-ANGLIAE (NEW ENGLAND ASTER)
2.00%	BAPTISIA AUSTRALIS (BLUE FALSE INDIGO)
2.00%	GEUM LACINIATUM (ROUGH AVENS)
2.00%	SENNA HEBECARPA (WILD SENNA)
2.00%	TRADESCANTIA OHIENSIS (OHIO SPIDERWORT)
2.00%	VERBENA HASTATA (BLUE VERVAIN)
2.00%	ZIZIA AUREA (GOLDEN ALEXANDERS)
1.00%	AGROSTIS PERENNANS (AUTUMN BENTGRASS)
100.00%	(SEEDING RATE: 15 LB PER ACRE OR 1/2 LB PER 1,000 SQ FT)

*DO NOT USE FERTILIZER WHERE 'RAIN GARDEN' SEED MIX IS PLANTED.

RAIN GARDEN 1 DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION

u:\Accounts\BUHA\vilux23005 - villanova boathouse - kit\DESIGN_SHEETS\CS9502.dwg PLOTTED: 7/19/2024 10:20 AM, BY: Cameron Williams PLOTSTYLE: Pennoni NCS.ctb

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

POST CONSTRUCTION STORMWATER MANAGEMENT DETAILS

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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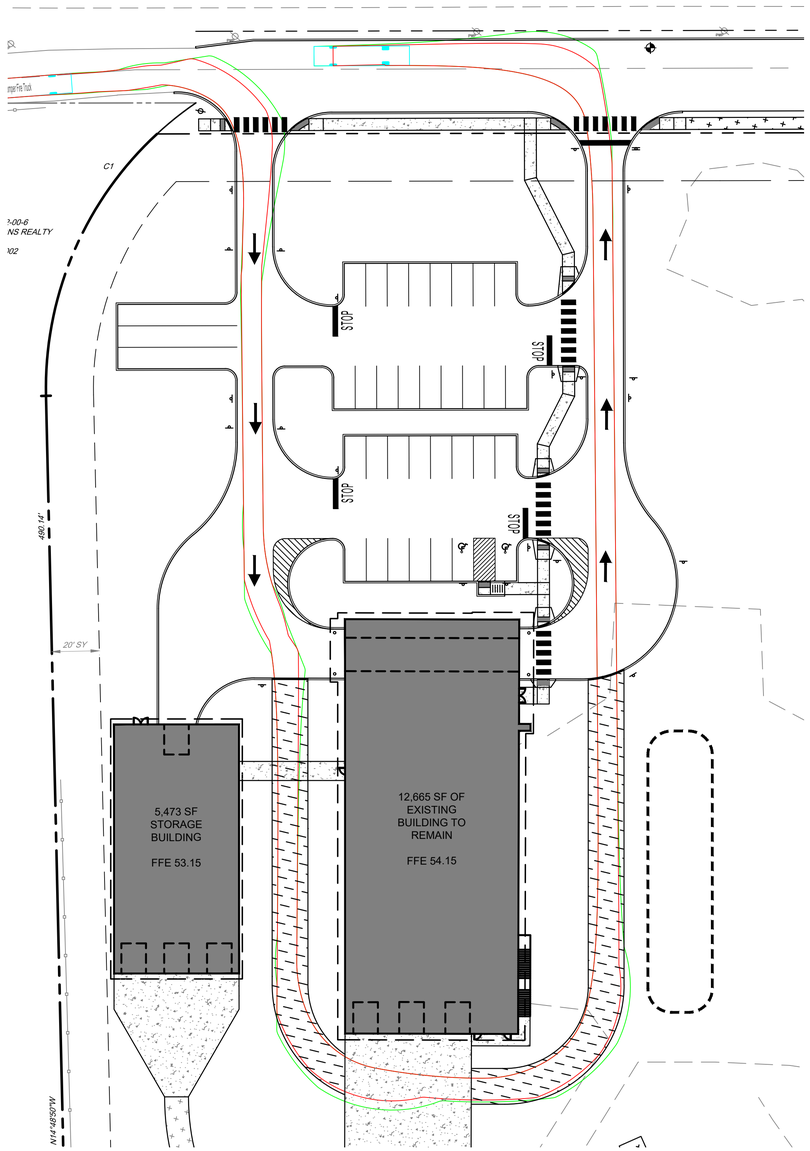
PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	AS NOTED
DRAWN BY	CW
APPROVED BY	MR

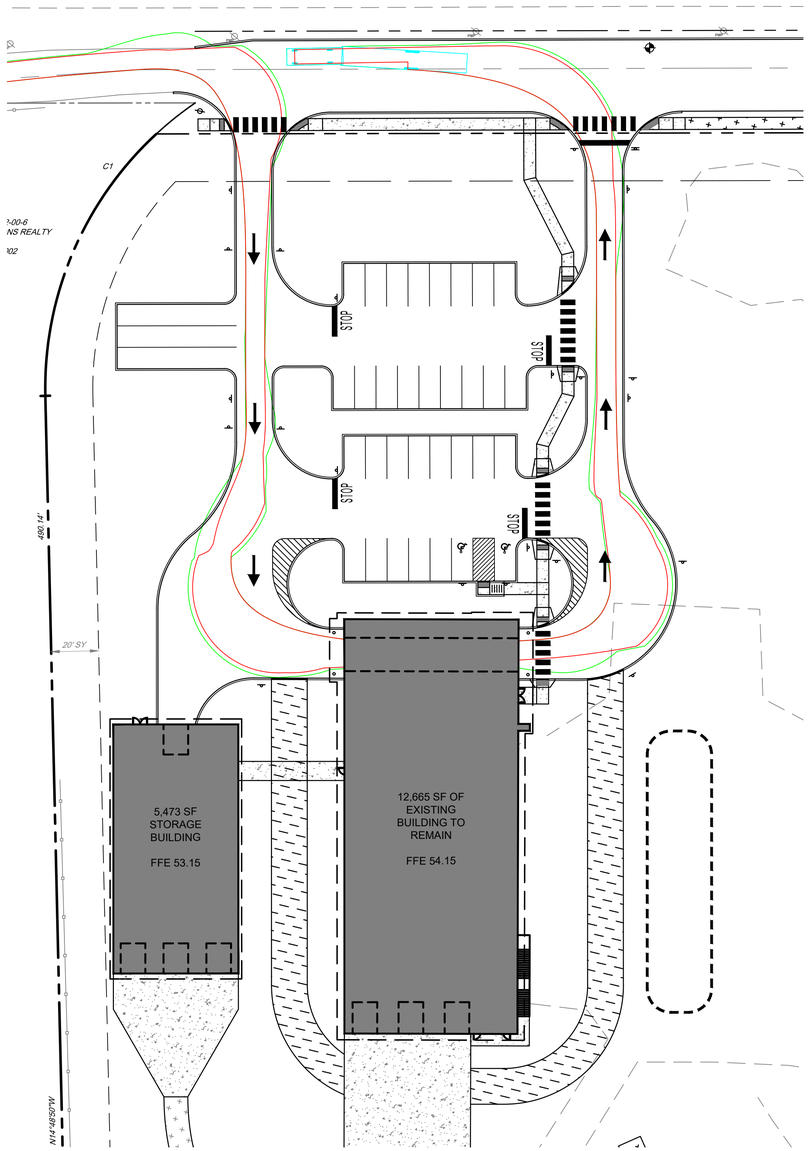
CS9502

SHEET 22 OF 23



FIRE ACCESS TURNING ANALYSIS
SCALE 1" = 30'

0 30' 60'



VILLANOVA BOAT TRAILER TURNING ANALYSIS
SCALE 1" = 30'

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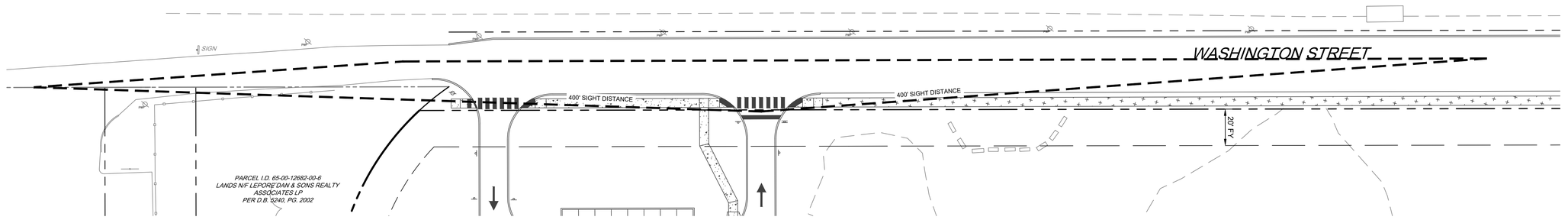

EXITING SIGHT DISTANCES
SCALE 1" = 30'

0 30' 60'

NOT FOR CONSTRUCTION

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West Chester, PA 19380
T 610.429.8907 F 610.429.8918

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VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

TRUCK TURNING PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

NO.	DATE	REVISIONS	BY
1	2024-07-19	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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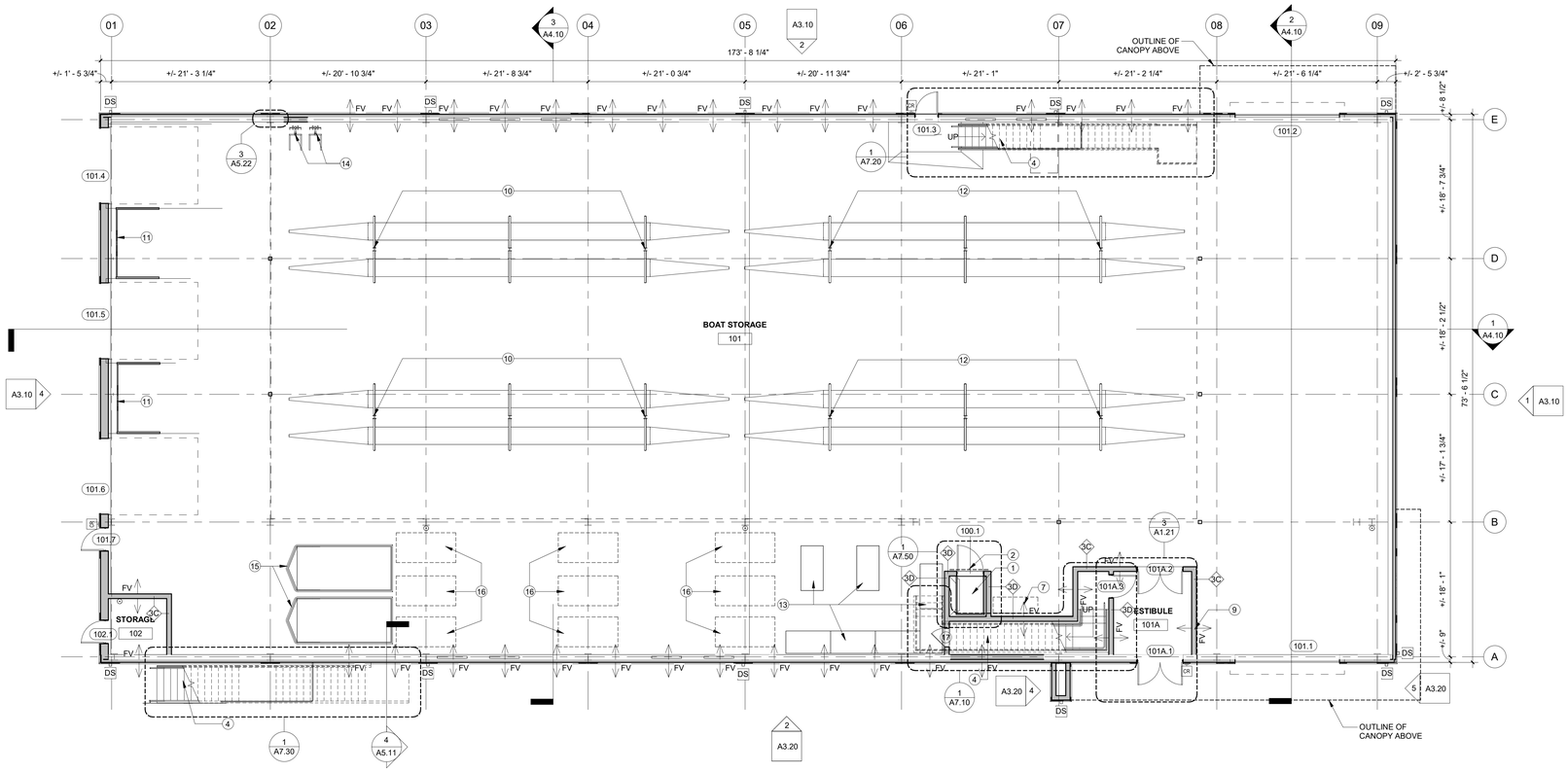
PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

CS9801

SHEET 23 OF 23

PLOTTED: 7/19/2024 10:21 AM, BY: Cameron Williams PLOTSTYLE: Pennoni NCS.ctb
u:\Accounts\BUHA\vilux23005 - villanova boathouse - ed\DESIGN_SHEETS\CS9801.dwg



1 **FIRST FLOOR**
1/8" = 1'-0"

FLOOR PLAN LEGEND

- EXISTING WALL TO REMAIN
- NEW WALL, SEE PARTITION SCHED. & WALL DETAILS (X)
- EXISTING DOOR TO REMAIN
- NEW DOOR, SEE SCHED. (202A.1)
- NEW MILLWORK
- AREA NOT IN SCOPE
- FV — AUTOMATIC INSULATED FLOOD VENT, 200 SF PROTECTION PER VENT MIN.

FLOOR PLAN KEYED NOTES

1. NEW ELECTRIC 2 STOP LIFT WITH INTEGRATED CONTROLLER
2. DRY FLOOD PROOFING SYSTEM FROM TOP OF GROUND FLOOR SLAB TO DESIGN FLOOD ELEVATION
3. WET FLOOD PROOFING THROUGH WALL AUTOMATIC ENGINEERED FLOOD VENT, 200 SF OF PROTECTION PER VENT
4. NEW STAIR WITH HANDRAIL & GUARDRAIL
5. NEW THERMAL STOREFRONT SYSTEM W/ IGU
6. PROVIDE MIN. R-13 BATT INSULATION AND EXTERIOR GYP BD SHEATHING ON FACE OF WALL EXPOSED TO BOAT STORAGE. PROVIDE GYP BD ON INTERIOR FACE.
7. WALL MOUNTED DRY FLOOD PROOFING SYSTEM STORAGE
8. NEW PERMANENT METAL LADDER TO ROOF DECK ABOVE W/ INSULATED ROOF HATCH
9. PROVIDE FIRE DAMPER BY FLOOD VENT MANUFACTURER AT RATED WALL PENETRATIONS
10. BOAT STORAGE RACKS BY OWNER
11. OAR STORAGE BY OWNER
12. NEW BOAT RACK BY CONTRACTOR, COORDINATE W/ OWNER FOR PRODUCT INFORMATION
13. METAL CABINET AND SHELVING SYSTEM WITH WORK BENCH TOPS BY CONTRACTOR PROVIDE FACTORY PAINTED FINISH (SHURE MANUFACTURING CORP., HEAVY DUTY WORKBENCH SYSTEM MODEL 800330, FULLY WELDED STEEL CONSTRUCTION, 70.5 INCHES WIDE BY 30.675 INCHES DEEP BY 34 INCHES HIGH).
14. BOAT LIFT BY OWNER.
15. LAUNCHES BY OWNER.
16. 4'-0" x 8'-0" OVERHEAD MOTORIZED STORAGE PLATFORM SYSTEM
17. 30" X 30" FIRE RATED ACCESS PANEL
18. NEW THERMALLY BROKEN WINDOW, SEE INTERIOR ELEVATIONS AND WINDOW SCHEDULE, TYP.

BLACKNEY HAYES ARCHITECTS

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Project:
Boathouse - 601 Washington St.

Project Address:
601 Washington Street
Conshohocken, PA 19428

Sheet Title:
1ST FLOOR PLAN

Seal

DUTY TO INSPECT CONTRACT DOCUMENTS PRIOR TO STARTING WORK
Any party who relies in part or whole on the content of these Construction Documents shall, before beginning any work, be responsible for fully inspecting the complete set of Contract Documents, including all Drawings, Specifications, and Addenda, for completeness, conflicts, scope of work, and suitability for constructing the building. All parties relying on these documents represent that they have expertise in the area of their responsibility and are knowledgeable regarding industry standards, product requirements and code requirements and therefore are qualified to fully evaluate and interpret the contract documents. All parties relying on these documents must, prior to beginning work, submit all requests for clarifications and additional information to the Architect in writing. **All parties who begin work hereby certify that the documents are suitable for their intended purposes unless noted in specific written exception beforehand.**

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Release

Date	Comments	△
03.04.2024	SCHEMATIC DESIGN	
04.26.2024	DESIGN DEVELOPMENT	
07.12.2024	90% CD ISSUE	

BHA Job Number:	24-008
Scale:	As indicated
Drawn By:	BH
Checked By:	BJ
Approved By:	Approver

Sheet No.
A1.01

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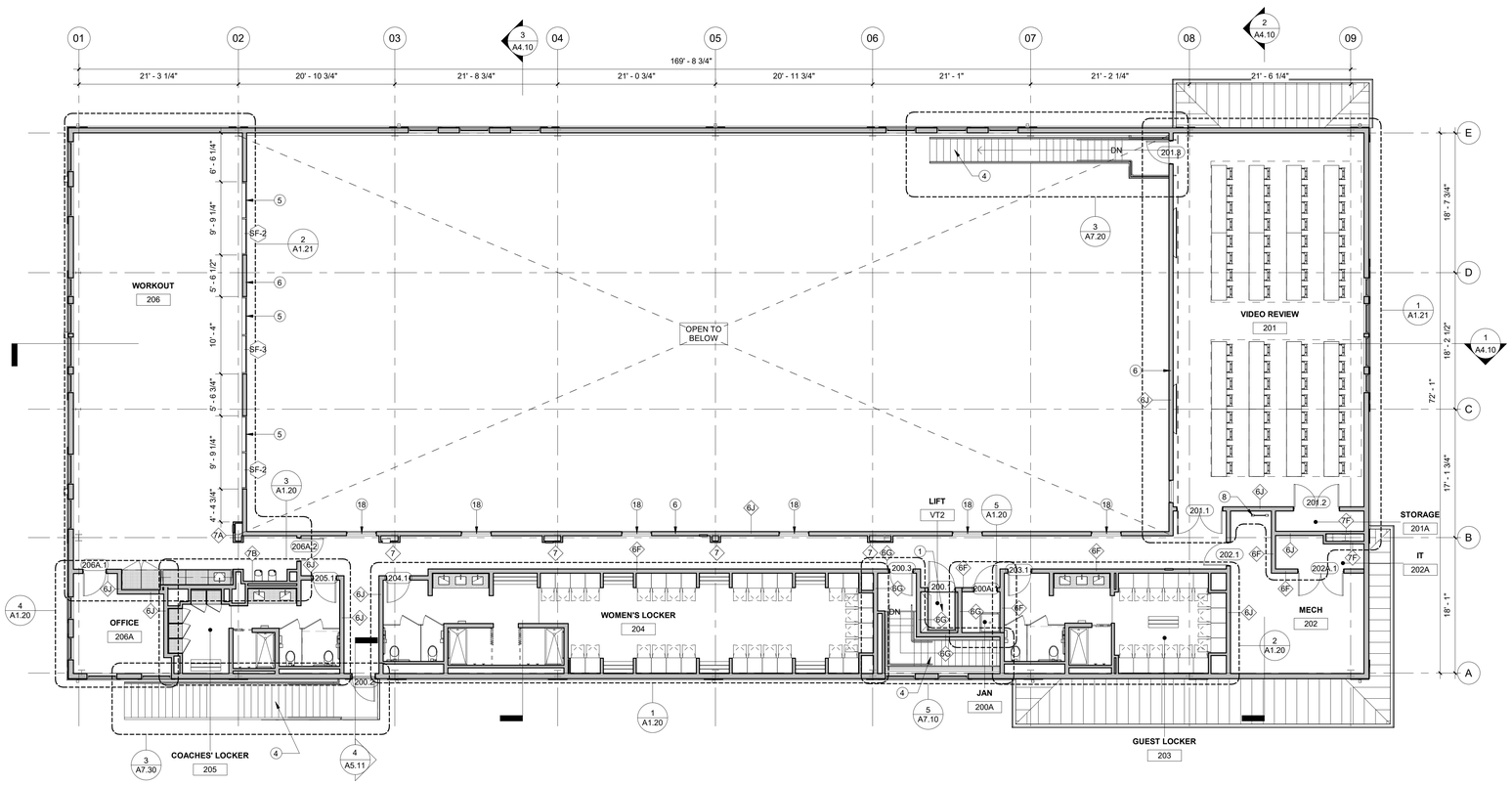

1 **SECOND FLOOR PLAN**
1/8" = 1'-0"

FLOOR PLAN LEGEND

- EXISTING WALL TO REMAIN
- NEW WALL, SEE PARTITION SCHED. & WALL DETAILS (X)
- EXISTING DOOR TO REMAIN
- NEW DOOR, SEE SCHED. (202A.1)
- NEW MILLWORK
- AREA NOT IN SCOPE
- FV — AUTOMATIC INSULATED FLOOD VENT, 200 SF PROTECTION PER VENT MIN.

FLOOR PLAN KEYED NOTES

1. NEW ELECTRIC 2 STOP LIFT WITH INTEGRATED CONTROLLER.
2. DRY FLOOD PROOFING SYSTEM FROM TOP OF GROUND FLOOR SLAB TO DESIGN FLOOD ELEVATION
3. WET FLOOD PROOFING THROUGH WALL AUTOMATIC ENGINEERED FLOOD VENT, 200 SF OF PROTECTION PER VENT
4. NEW STAIR WITH HANDRAIL & GUARDRAIL
5. NEW THERMAL STOREFRONT SYSTEM W/ IGU
6. PROVIDE MIN. R-13 BATT INSULATION AND EXTERIOR GYP BD SHEATHING ON FACE OF WALL EXPOSED TO BOAT STORAGE. PROVIDE GYP BD ON INTERIOR FACE.
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14. BOAT LIFT BY OWNER.
15. LAUNCHES BY OWNER.
16. 4'-0" x 8'-0" OVERHEAD MOTORIZED STORAGE PLATFORM SYSTEM
17. 30" X 30" FIRE RATED ACCESS PANEL
18. NEW THERMALLY BROKEN WINDOW, SEE INTERIOR ELEVATIONS AND WINDOW SCHEDULE, TYP.

BLACKNEY HAYES ARCHITECTS

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Project Address:
601 Washington Street
Conshohocken, PA 19428

Sheet Title:
2ND FLOOR PLAN

Seal

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Release

Date	Comments	△
03.04.2024	SCHEMATIC DESIGN	
04.26.2024	DESIGN DEVELOPMENT	
07.12.2024	90% CD ISSUE	

BHA Job Number:	24-008
Scale:	As indicated
Drawn By:	BH
Checked By:	BJ
Approved By:	Approver

Sheet No.
A1.02

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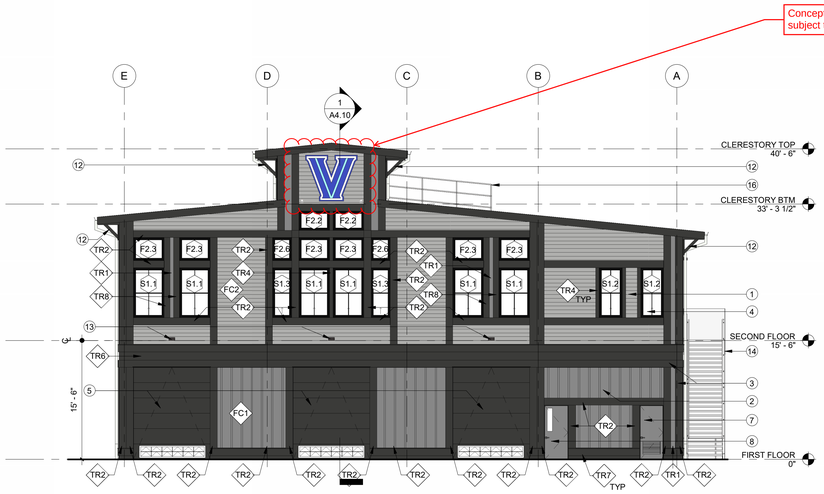
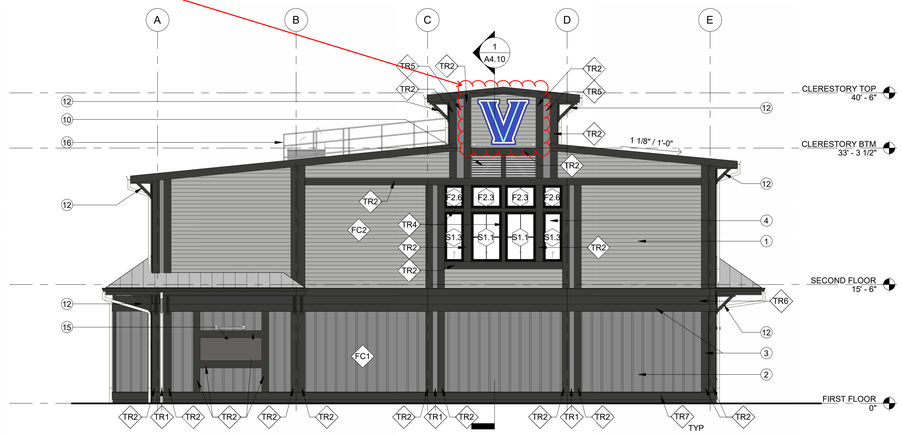


4 **SOUTH BUILDING ELEVATION**
1/8" = 1'-0"



3 **NORTH BUILDING ELEVATION**
1/8" = 1'-0"

2 **WEST BUILDING ELEVATION**
1/8" = 1'-0"

1 **EAST BUILDING ELEVATION**
1/8" = 1'-0"

ELEVATION KEYED NOTES

1. FIBER CEMENT SIDING
2. FIBER CEMENT PANEL IN BOARD AND BATTEN STYLE
3. FIBER CEMENT TRIM BOARD
4. NEW WINDOW W/ IGU
5. POWERED OVERHEAD INSULATED SECTIONAL DOOR W/ INTEGRATED INSULATED AUTOMATIC ENGINEERED FLOOD VENT PROVIDING 2,400 SF MIN. OF PROTECTION PER OVERHEAD DOOR, REFER TO PLANS FOR SIZE AND TYPE
6. POWERED OVERHEAD INSULATED COILING DOOR, REFER TO PLANS FOR SIZE AND TYPE
7. INSULATED HOLLOW METAL DOOR W/ INSULATED HOLLOW METAL FRAME
8. INSULATED HOLLOW METAL DOOR W/ IGU, SAFETY GLAZED VISION PANEL & INSULATED HOLLOW METAL FRAME
9. ALUMINUM FRAMED DOOR W/ IGU & SAFETY GLAZING
10. FIXED SIGHT-PROOF ALUMINUM LOUVER. PROVIDED INSULATED BLANK-OFF PANELS.
11. INSULATED AUTOMATIC ENGINEERED FLOOD VENT, 200 SF PROTECTION PER VENT MIN.
12. ROOF OUTLOOKER (BRACKET), COLOR TO MATCH FIBER CEMENT TRIM
13. NOT USED
14. PERFORATED METAL PANEL GUARDRAIL
15. PROPOSED DONOR PLAQUE LOCATION
16. 42" HIGH PIPE GUARD RAIL W/ 21" HIGH MID RAIL AND 4" HIGH CURB RAIL

EXTERIOR WALL ASSEMBLY LEGEND

	ASSEMBLY NO.	DESCRIPTION	GRAPHIC DESCRIPTION
FIBER CEMENT	FC1	FIBER CEMENT WALL: - FIBER CEMENT VERT. BOARD AND BATTEN, COLOR GRAY SLATE - METAL Z-FURRING - R-17.5 MIN c.i. XPS INSULATION BOARD - WEATHER BARRIER - EXISTING CMU (NEW CMU WHERE REQUIRED)	
	FC2	FIBER CEMENT WALL: - FIBER CEMENT SIDING, COLOR LIGHT MIST - 1X4 FURRING - WEATHER BARRIER - 5/8" EXTERIOR SHEATHING - WOOD STUD FRAMING, REFER TO STRUCT. DWGS - R-20 MIN. BATT INSULATION FILLING STUD CAVITY - 5/8" GYPSUM WALLBOARD*	
	FC3	FIBER CEMENT WALL: - VERTICAL BOARD AND BATTEN, COLOR GRAY SLATE - METAL Z-FURRING - WEATHER BARRIER - 6" MIN. CMU	
		ALL FIBER CEMENT TO BE SMOOTH FINISH U.O.N. * PROVIDE 5/8" EXTERIOR SHEATHING FACING BOAT STORAGE (ROOM 101) LOCATIONS	

TRIM	TR1: 5 1/2" W x 4/4 THICK FIBER CEMENT TRIM, COLOR GRAY SLATE	TR2: 11 1/4" W x 5/4 THICK FIBER CEMENT TRIM, COLOR IRON GRAY	TR3: 7 1/4" W x 4/4 THICK FIBER CEMENT TRIM, COLOR GRAY SLATE
	TR4: 5 1/2" W x 4/4 THICK FIBER CEMENT TRIM, COLOR IRON GRAY	TR5: 11 1/4" W x 4/4 THICK FIBER CEMENT TRIM, COLOR GRAY SLATE	TR6: BUILT UP FIBER CEMENT TRIM, COLOR IRON GRAY SEE 5 / A5.20
	TR7: BUILT UP FIBER CEMENT TRIM, COLOR IRON GRAY SEE 1 / A5.20	TR8: 9 1/4" W x 5/4 THICK FIBER CEMENT TRIM, COLOR IRON GRAY	
	ALL TRIM TO BE SMOOTH FINISH U.O.N.		

BLACKNEY HAYES ARCHITECTS

phone: 215.829.0922 x118
CONTACT PERSON: Carmen Bushong

OWNER
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CIVIL
PENNONI
phone: 610.422.2486
CONTACT PERSON: Michael Roth

Project:
Boathouse - 601 Washington St.

Project Address:
601 Washington Street
Conshohocken, PA 19428

Sheet Title:
BUILDING ELEVATIONS

Seal

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Release

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03.04.2024	SCHEMATIC DESIGN	
04.26.2024	DESIGN DEVELOPMENT	
07.12.2024	90% CD ISSUE	

BHA Job Number:	24-008
Scale:	As indicated
Drawn By:	BJ
Checked By:	CB
Approved By:	Approver

Sheet No.
A3.10

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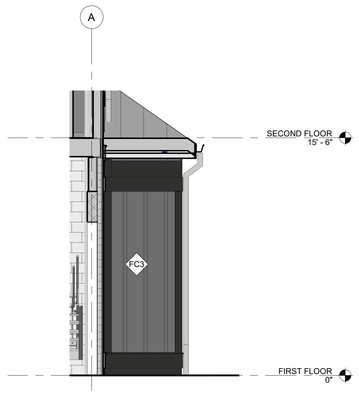
EXTERIOR WALL ASSEMBLY LEGEND

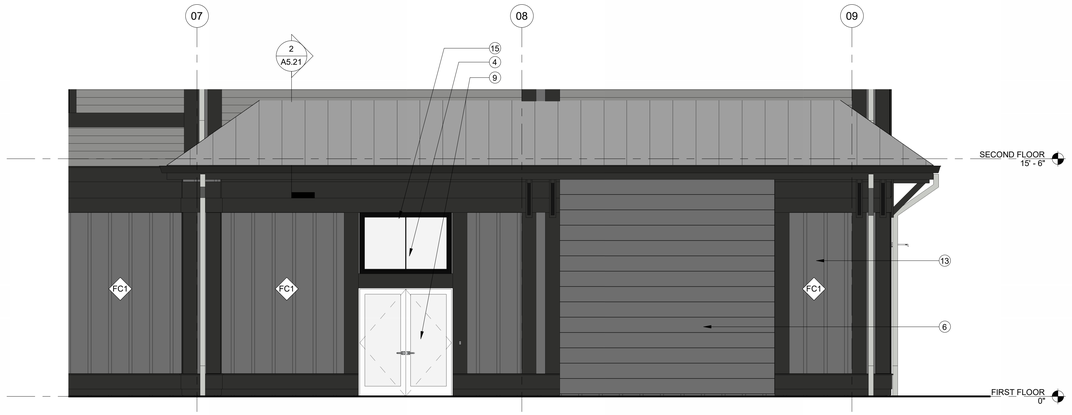
	ASSEMBLY NO.	DESCRIPTION	GRAPHIC DESCRIPTION
FIBER CEMENT	FC1	FIBER CEMENT WALL: - FIBER CEMENT VERT. BOARD AND BATTEN, COLOR GRAY SLATE - METAL Z-FURRING - R-17.5 MIN c.i. XPS INSULATION BOARD - WEATHER BARRIER - EXISTING CMU (NEW CMU WHERE REQUIRED)	
	FC2	FIBER CEMENT WALL: - FIBER CEMENT SIDING, COLOR LIGHT MIST - 1X4 FURRING - WEATHER BARRIER - 5/8" EXTERIOR SHEATHING - WOOD STUD FRAMING, REFER TO STRUCT. DWGS - R-20 MIN. BATT INSULATION FILLING STUD CAVITY - 5/8" GYPSUM WALLBOARD*	
	FC3	FIBER CEMENT WALL: - VERTICAL BOARD AND BATTEN, COLOR GRAY SLATE - METAL Z-FURRING - WEATHER BARRIER - 6" MIN. CMU	
		ALL FIBER CEMENT TO BE SMOOTH FINISH U.O.N. * PROVIDE 5/8" EXTERIOR SHEATHING FACING BOAT STORAGE (ROOM 101) LOCATIONS	
TRIM	TR1	5 1/2" W x 4/4 THICK FIBER CEMENT TRIM, COLOR GRAY SLATE	
	TR2	11 1/4" W x 5/4 THICK FIBER CEMENT TRIM, COLOR IRON GRAY	
	TR3	7 1/4" W x 4/4 THICK FIBER CEMENT TRIM, COLOR GRAY SLATE	
	TR4	5 1/2" W x 4/4 THICK FIBER CEMENT TRIM, COLOR IRON GRAY	
	TR5	11 1/4" W x 4/4 THICK FIBER CEMENT TRIM, COLOR GRAY SLATE	
	TR6	BUILT UP FIBER CEMENT TRIM, COLOR IRON GRAY SEE 5 / A5.20	
	TR7	BUILT UP FIBER CEMENT TRIM, COLOR IRON GRAY SEE 1 / A5.20	
	TR8	9 1/4" W x 5/4 THICK FIBER CEMENT TRIM, COLOR IRON GRAY	
		ALL TRIM TO BE SMOOTH FINISH U.O.N.	

ELEVATION KEYED NOTES

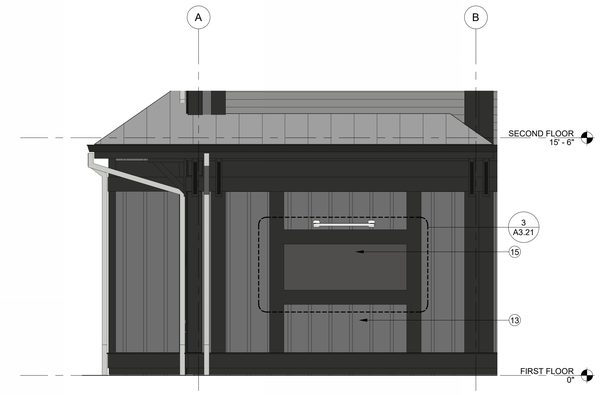
1. FIBER CEMENT SIDING
2. FIBER CEMENT PANEL IN BOARD AND BATTEN STYLE
3. FIBER CEMENT TRIM BOARD
4. NEW WINDOW W/ IGU
5. POWERED OVERHEAD INSULATED SECTIONAL DOOR W/ INTEGRATED INSULATED AUTOMATIC ENGINEERED FLOOD VENT PROVIDING 2.400 SF MIN. OF PROTECTION PER OVERHEAD DOOR, REFER TO PLANS FOR SIZE AND TYPE
6. POWERED OVERHEAD INSULATED COILING DOOR, REFER TO PLANS FOR SIZE AND TYPE
7. INSULATED HOLLOW METAL DOOR W/ INSULATED HOLLOW METAL FRAME
8. INSULATED HOLLOW METAL DOOR W/ IGU, SAFETY GLAZED VISION PANEL & INSULATED HOLLOW METAL FRAME
9. ALUMINUM FRAMED DOOR W/ IGU & SAFETY GLAZING
10. FIXED SIGHT-PROOF ALUMINUM LOUVER. PROVIDED INSULATED BLANK-OFF PANELS.
11. INSULATED AUTOMATIC ENGINEERED FLOOD VENT, 200 SF PROTECTION PER VENT MIN.
12. ROOF OUTLOOKER (BRACKET), COLOR TO MATCH FIBER CEMENT TRIM
13. NOT USED
14. PERFORATED METAL PANEL GUARDRAIL
15. PROPOSED DONOR PLAQUE LOCATION
16. 42" HIGH PIPE GUARD RAIL W/ 21" HIGH MID RAIL AND 4" HIGH CURB RAIL



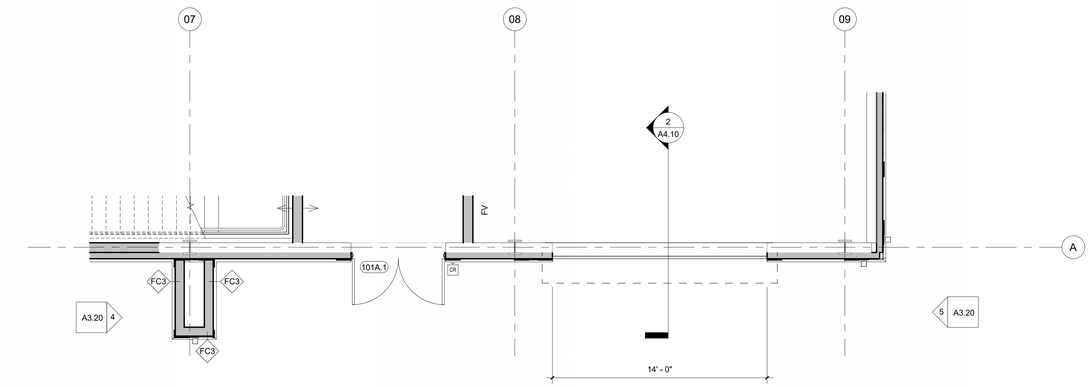
4 **ENLARGED NORTH ELEVATION - MAIN ENTRANCE**
1/4" = 1'-0"



2 **ENLARGED ELEVATION - OVERHEAD COILING DOOR**
1/4" = 1'-0"



5 **ENLARGED NORTH ELEVATION - OVERHEAD COILING DOOR**
1/4" = 1'-0"



1 **ENLARGED PLAN - ENTRANCES**
1/4" = 1'-0"

BLACKNEY HAYES ARCHITECTS

phone: 215.829.0922 x118
CONTACT PERSON: Carmen Bushong

OWNER
Villanova University
phone: Client Phone
CONTACT PERSON: John Camusi

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PSQUARED
phone: 484.539.9458
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CIVIL
PENNONI
phone: 610.422.2486
CONTACT PERSON: Michael Roth

Project:
Boathouse - 601 Washington St.

Project Address:
601 Washington Street
Conshohocken, PA 19428

Sheet Title:
ENLARGED PARTIAL BUILDING ELEVATIONS

Seal

DUTY TO INSPECT CONTRACT DOCUMENTS PRIOR TO STARTING WORK:
Any party who relies in part or whole on the content of these Construction Documents shall, before beginning any work, be responsible for fully inspecting the complete set of Contract Documents, including all Drawings, Specifications, and Addenda, for completeness, conflicts, scope of work, and suitability for constructing the building. All parties relying on these documents represent that they have expertise in the area of their responsibility and are knowledgeable regarding industry standards, product requirements and code requirements and therefore are qualified to fully evaluate and interpret the contract documents. All parties relying on these documents must, prior to beginning work, submit all requests for clarifications and additional information to the Architect in writing. **All parties who begin work hereby certify that the documents are suitable for their intended purposes unless noted in specific written exception beforehand.**

Warning: Actual conditions may vary from conditions shown on this drawing. Confirm all information in the field before proceeding with any work and notify the Architect in writing if a variation is discovered.

This drawing is not to be copied or transmitted in any form without the express written authorization of Blackney Hayes Architects. All ideas and concepts depicted or suggested in this drawing are the property of Blackney Hayes Architects.

Release

Date	Comments	△
03.04.2024	SCHEMATIC DESIGN	
04.26.2024	DESIGN DEVELOPMENT	
07.12.2024	90% CD ISSUE	

BHA Job Number:	24-008
Scale:	As indicated
Drawn By:	Author
Checked By:	Checker
Approved By:	Approver

Sheet No.
A3.20

NOT FOR CONSTRUCTION

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7/12/2024 4:21:09 PM

June 21, 2024

Pennoni
158 W Gay St
West Chester, Pa

Re: Water Availability
601 Washington St
Whitemarsh Twp, Montgomery County

In response to your request, this letter will serve as confirmation that the above referenced property is situated within Aqua Pennsylvania Inc. service territory.

Domestic and fire water service is available to this property and will be provided in accordance with Aqua Pennsylvania, Inc. Rules and Regulations. For further details, visit www.aquaamerica.com.

Regarding capacity for domestic and fire service for this area, flow data information can be obtained upon written request to our Control Center at SEPAflowrequest@aquaamerica.com. Include the address with town or township and the nearest intersecting street.

This letter expires one year from the date of issue.

Should you have any further questions or need to request an application for service, contact me at (610) 541-4160 or dlciotti@aquaamerica.com.

Regards,

Deanna L. Ciotti
New Business Administrator - Services
Aqua Pennsylvania, Inc
762 W. Lancaster Ave
Bryn Mawr, PA 19010
O: 610.541.4160

POST-CONSTRUCTION STORMWATER MANAGEMENT REPORT

Villanova Boathouse

601 Washington Street, Conshohocken, PA 19428

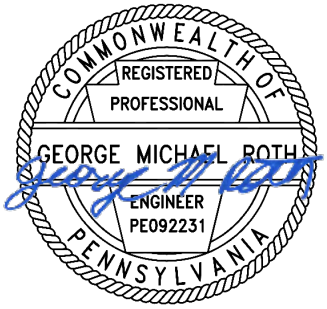
Whitemarsh Township, PA

Prepared For:

Villanova University
800 E. Lancaster
Villanova, Pennsylvania 19085

Submitted By:

Pennoni
158 West Gay St, Suite 300
West Chester, Pennsylvania 19380



Michael Roth, PE
Project Engineer
Professional Engineer: Pennsylvania – No. PE092231

VILUX23005
July 15, 2024

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APPENDICES

A. Pre-Development Hydrology
B. Post Development Hydrology
C. Runoff Volume Calculations
D. Additional Calculations
E. Drainage Area Maps
F. Geotechincal Report

Executive Summary

Villanova University is proposing to demolish a portion of the existing building located at 601 Washington Street, and renovate the remaining portion for use as a proposed boathouse for their rowing team. In addition to the building renovation, site improvements are also being proposed such as new parking areas, stormwater management, landscaping, lighting, etc. The proposed stormwater facilities have been designed to address the impacts of the proposed development on stormwater runoff in accordance with Whitemarsh Township Requirements.

The Schuylkill River borders the site to the south and all stormwater on-site currently flows directly to the river. There are no existing stormwater management facilities on-site. The portion of the Schuylkill River that borders the site has a stream classification of Warm Water Fishes, Migratory Fish (WWF, MF) according to title 25, Chapter 93 of the Pennsylvania Code.

The overall goal of the Stormwater Management Plan is to provide water quality, water quantity infiltration, and rate control at the source of runoff, while maintaining the drainage areas and hydrology of the site. One (1) Rain is proposed to meet the stormwater water quality, water quantity infiltration and rate control requirements as required by Whitemarsh Township.

Conclusions

This proposed project meets Whitemarsh Township's Stormwater Management Requirements for *runoff rate control* by reducing the peak runoff rates associated with post-development to below the required pre-development rates as required in §58-15, as outlined in this report.

This proposed project meets Whitemarsh Township's Stormwater Management Requirements for *volume controls* by infiltration, evaporation, or transpiration of the increased volume associated calculations as required in §58-14, as outlined in this report.

Introduction

Proposed Construction

The following sections provide a description of the proposed project as well as the design criteria for the Post-Construction Stormwater Management Plan.

Project Background

Villanova University is proposing to demolish a portion of the existing building located at 601 Washington Street, and renovate the remaining portion for use as a proposed boathouse for their rowing team. In addition to the building renovation, site improvements are also being proposed such as new parking areas, stormwater management, landscaping, lighting, etc. Stormwater Design Criteria

The following paragraphs describe the stormwater management requirements of Franconia Township as they relate to runoff rate and runoff quantity and quality.

Stormwater Runoff Rate Control

§58-15.A(1) of the Whitemarsh Township Stormwater Ordinance specifies the runoff rate control requirements for the site. These requirements are that the peak runoff rate for the post-development 1-, 2-, 5-, 10-, 25-, 50-, and 100-year twenty-four hour storm events shall not exceed the pre-development peak rate for each respective storm event. Table 1 below summarizes the peak runoff rate control requirements.

Table 1: Peak Runoff Rate Requirements

Section 58-15.A.1 Requirements		
Post-Development Condition	**Reduce to**	**Pre-Development Condition**
2-year		2-year
5-year		5-year
10-year		10-year
25-year		25-year
50-year		50-year
100-year		100-year

Volume Controls

§58-14.A of the Whitemarsh Township Stormwater Ordinance specifies that the Design Storm Method shall be implemented. This requires that the total runoff volume for all storms equal to or less than the 2-year, twenty-four-hour storm event is equal to or less than pre-development conditions. Additionally, existing non-forested pervious areas shall be considered meadow in good condition and 20% of existing impervious areas shall be considered meadow in good condition.

Rainfall Input Data

The following table has been provided to summarize the associated rainfall depths for the applicable recurrence storm events in Conshohocken, PA as determined by NOAA Atlas 14:

Table 2: Design Storm Data

DESIGN STORM DATA	
Recurrence Storm Event	**Rainfall Depth (in.)**
One (1)-Year	2.73
Two (2)-Year	3.28
Five (5)-Year	4.12
Ten (10)-Year	4.82
Twenty-five (25)-Year	5.83
Fifty (50)-Year	6.68
One hundred (100)-Year	7.60

Existing Site Evaluation

The following paragraphs provide a description of the subject property including its location, general characteristics, and current use. Current uses of adjoining properties and properties in the surrounding area are also described below.

Property Location and Legal Description

The subject property is in Whitemarsh Township, Montgomery County, Pennsylvania. The property can be found on the United States Geological Survey (USGS) 7.5- minute topographic quadrangle for Norristown, Pennsylvania. A copy of a topographic map is provided in Figure 1.

The subject property is identified as Parcel I.D. 65-00-12679-00-9.

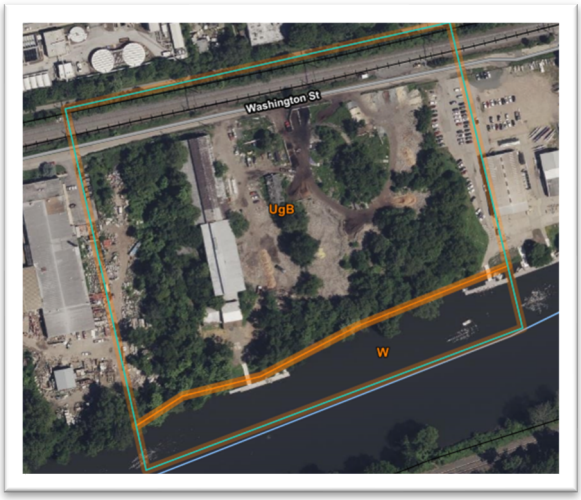
Figure 1: USGS Location Map

USGS Quadrangle: Norristown, PA

Site Soils

The following table and figure have been provided to summarize the soils onsite. The information provided below is also included within the plan set.

Figure 2: Soils Map



Shown per the US Natural Resources Conservation Service, Web Soil Survey

Table 3: Site Soils

SOIL CHART

OBTAINED FROM NRCS SOIL MART ON 1/9/2024

SYMBOL	NAME	HYDROLOGIC GROUP	SLOPES	HYDRIC	DEPTH TO		LIMITATIONS		RESOLUTION NOTES
					WATER TABLE (IN)	BEDROCK (IN)	FROST ACTION	SMALL COMMERCIAL BUILDINGS	
UgB	URBAN LAND	-	0 TO 8%	NO	-	-	NONE	NOT RATED	-

Site Geology

The underlying bedrock within the site consists of Conestoga and Glenarm Wissahickon Formations and Felic Gneiss.

Surface Waters

The Schuylkill River borders the site to the south and all stormwater on-site currently flows directly to the river. There are no existing stormwater management facilities on-site. The portion of the Schuylkill River that borders the site has a stream classification of Warm Water Fishes, Migratory Fish (WWF, MF) according to title 25, Chapter 93 of the Pennsylvania Code.

Stormwater Runoff Rate Control

Techniques of Analysis

The SCS Method was used to calculate the pre- and post-development runoff rates associated with the project site for the applicable design storm events. The “CN” value used was calculated for the delineated pre- and post-development drainage areas based on the hydrologic soil group and land use. Drainage area maps have been added as an appendix of this report. Six (6) minute Time of Concentration (“Tc”) values were utilized for the pre- and post-development conditions due to impervious coverages and small TC paths within the disturbed areas for both conditions.

Using the calculated drainage areas, Tc values, and “CN” values as input data, HydroCAD software was used to calculate site runoff rates at the pre- and post-development Discharge Point condition for the applicable design storm events.

Pre-Development Conditions

The project site consists of impervious surfaces and overgrown vegetative areas in the pre-development condition. Drainage on site is a part of the Schuylkill River Watershed. A Drainage Area Plan is included in Appendix E of this report which shows the existing drainage conditions.

For the purpose of modeling pre-development hydrology one (1) Discharge Point was established southeast of the proposed improvements. The existing topography directs water to the south towards the Schuylkill River.

Ground cover assumptions within discharge point DP-001 are consistent with the design requirements listed in §58-14.A(2) of the Whitemarsh Township Stormwater Management Ordinance. Table 4 has been provided below to summarize the existing ground cover conditions for these drainage areas.

Table 4: Pre-Development Drainage Area Summary

EXISTING DRAINAGE AREA SUMMARY – DP-001			
Surface	**Soil Type**	**CN**	**Area (Ac.)**
Meadow, good condition	D soils	78	1.99
Return to Meadow, good condition	D soils	78	0.49
Impervious	D soils	98	1.96
Total Area			***4.44***

For additional calculation information refer to Appendix A.

Using the SCS Method and appropriate CN values and times-of-concentration, peak runoff rates were calculated for the 1-,2-, 5-, 10-, 25-, 50-, and 100-yr storm events. In addition, detailed computations of pre-development conditions can be found in Appendix A of this report.

Table 5: Pre-Development Peak Runoff Rate

Runoff Rate Summary for DP-001							
	STORM EVENT						
	PEAK RUNOFF RATE (CFS)						
DESCRIPTION	**1**	**2**	**5**	**10**	**25**	**50**	**100**
Pre-Development POI #1 (Node 1L)	11.47	14.75	19.93	24.35	30.81	36.29	42.24

For additional calculation information refer to Appendix A.

Post-Development Conditions

In order to compare post-development rates to pre-development rates, the same drainage area was delineated to discharge point DP-001 for post-development. The post-development drainage area was broken down into the areas that flow to the proposed rain garden and bypass areas. These areas were routed and combined to analyze the post-development rates at DP-001.

The post-development cover conditions within the limit of disturbance consist of lawn and impervious areas. See Appendix E for drainage maps.

Table 6: Post-Development Drainage Area Summary

POST DEVELOPMENT DRAINAGE AREA SUMMARY - DP-001					
Surface	Soil Type	CN	Area (Ac.)		
			PDRA (TOTAL)	PDRA-1 (To RG 1)	PDRA-2 (Bypass)
Lawn, good condition	D soils	80	2.39	0.29	2.10
Impervious	D soils	98	2.05	0.34	1.71
Total Area			***4.44***	***0.63***	***3.81***

For additional calculation information refer to Appendix B.

Table 7 summarizes the post-development peak runoff rates for the drainage areas described above for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-yr frequency storm events.

Table 7: Peak Rate Summary Table

Runoff Rate Summary for DP-001							
	STORM EVENT						
	PEAK RUNOFF RATE (CFS)						
DESCRIPTION	1	2	5	10	25	50	100
Pre-Development POI #1 (Node 1L)	11.47	14.75	19.93	24.35	30.81	36.29	42.24
Post-Development POI #1 (Node 2L)	10.37	14.06	19.81	24.05	29.92	34.88	40.25
Allowable Rates	11.47	14.75	19.93	24.35	30.81	36.29	42.24
Difference	**-1.10**	**-0.69**	**-0.12**	**-0.30**	**-0.89**	**-1.41**	**-1.99**

For additional calculation information refer to Appendix B.

Summary

By providing the proposed rain garden, the peak runoff rate in the post-development condition is reduced in accordance with the Whitemarsh Township Stormwater Management Requirements as shown in Table 7. Therefore, this project is in compliance with the Whitemarsh Township Stormwater Management ordinance as it relates to *peak runoff rate control.*

Volume Controls

Techniques of Analysis

The Whitemarsh Township Stormwater Management Ordinance requires the infiltration volume to be greater than or equal to the increase in volume associated with the 2-year twenty-four-hour storm event. Existing non-forested pervious areas must be considered meadow in good condition and twenty (20) percent of existing impervious area shall be considered meadow in good condition.

To meet the Whitemarsh Township requirements for stormwater water quality volume, the PADEP PCSM Spreadsheet was utilized. The PCSM Spreadsheet utilizes the SCS Curve Number Method to calculate the runoff volume associated with the 2-year twenty-four-hour storm event for the pre- and post-development conditions. The CN values used in the worksheet are based on the Hydrologic Soil Group and cover conditions for the soils within the site.

Pre-Development Conditions

As previously described, conditions onsite in the pre-development conditions are mostly developed impervious surfaced and overgrown vegetative areas tributary to Discharge Point 001. Meadow in good condition ground cover conditions were used in the PCSM Spreadsheet in the pre-development condition as required by §51-14.A(2)(a) of the Whitemarsh Township Stormwater Management Ordinance. Twenty (20) percent of the existing impervious areas are also considered Meadow in good condition as required §51-14.A(2)(b).

Post-Development Conditions

For the post-Development conditions, lawn in good condition and impervious cover CN values were used in the PCSM Spreadsheet to calculate the total runoff volume for the 2-year storm event. Table 8 below summarizes the calculated pre- and post-development 2-year runoff volume and displays the required 2-year storage volume. These values are taken from the PCSM Spreadsheet which is included in Appendix C

Table 8: 2-year Runoff Volume Control Summary – DP-001

DP-001 2-YEAR RUNOFF VOLUME SUMMARY (cf)			
	Existing Conditions	**Proposed Conditions**	**2-Year Treatment Volume**
On-site stormwater management area (Required Volume)	33,674	35,374	1,700

For additional calculation information refer to Appendix C.

In order to manage the increase in runoff volume from the proposed improvements, the storage volume was calculated for the proposed rain garden. The rain garden has been designed to provide storage volume through voids within the layer of amended soil and through surface storage above the amended soil and below the outlet structure. The outlet structure has been designed to provide a means for conveyance of higher storm events. Storage volume values are taken from the post-development HydroCAD model included in Appendix B of this report. The storage volume was calculated as the 2-year outflow volume for the rain garden subtracted from the 2-year inflow volume. This calculation does not take infiltration into account, which would increase the amount of volume removed. Infiltration has only been added to the model to calculate the proposed dewatering time. Table 9 below shows the storage volume provided by the proposed stormwater facilities and compares it with the required treatment volume. These values can be seen in the PCSM Spreadsheet provided in Appendix C.

Table 9: 2-year Storage Volume Summary

DP-001 2-YEAR STORAGE VOLUME SUMMARY (cf)			
Basin #	**2-Year volume Inflow (CF)**	**2-Year volume Outflow (CF)**	**Retained Volume (CF)**
Rain Garden 1	5,302	3,451	**1,851**
		Required 2-Year Treatment Volume =	1,700
		Total Storage Volume Provided =	**1,851**
		Excess Runoff Volume Provided =	*151*

For additional calculation information refer to Appendix B.

Summary

As shown in the table above, the designed storage volume of the proposed rain garden exceeds the required net increase in runoff volume for the 2-year storm event. Therefore, this project is in compliance with the Whitemarsh Township Stormwater management ordinance as it relates to *volume controls*.

Downstream Analysis

As previously discussed, this Stormwater Management Plan has been designed to reduce the post development peak runoff rates, to manage the required runoff volume and to store the required infiltration volume in accordance with the Whitemarsh Township Stormwater Management Ordinance. By providing the rain garden, the stormwater design meets the requirements of the aforementioned stormwater management ordinances. The proposed stormwater management BMP's will decrease the post-development runoff rate and volume at the established discharge point, therefore there will be no impact to the downstream waterways. As previously mentioned, the Schuylkill River borders the site to the south so the flow path to the receiving waters are shown on the plan drawings.

Thermal Impact Analysis

Pre-Development Conditions

The existing site consists of an existing former warehouse building and associated impervious surfaces. No existing stormwater management controls exist on-site. Stormwater runoff sheet flows off of the site directly into the Schuylkill River with little chance for mitigation of thermal impacts.

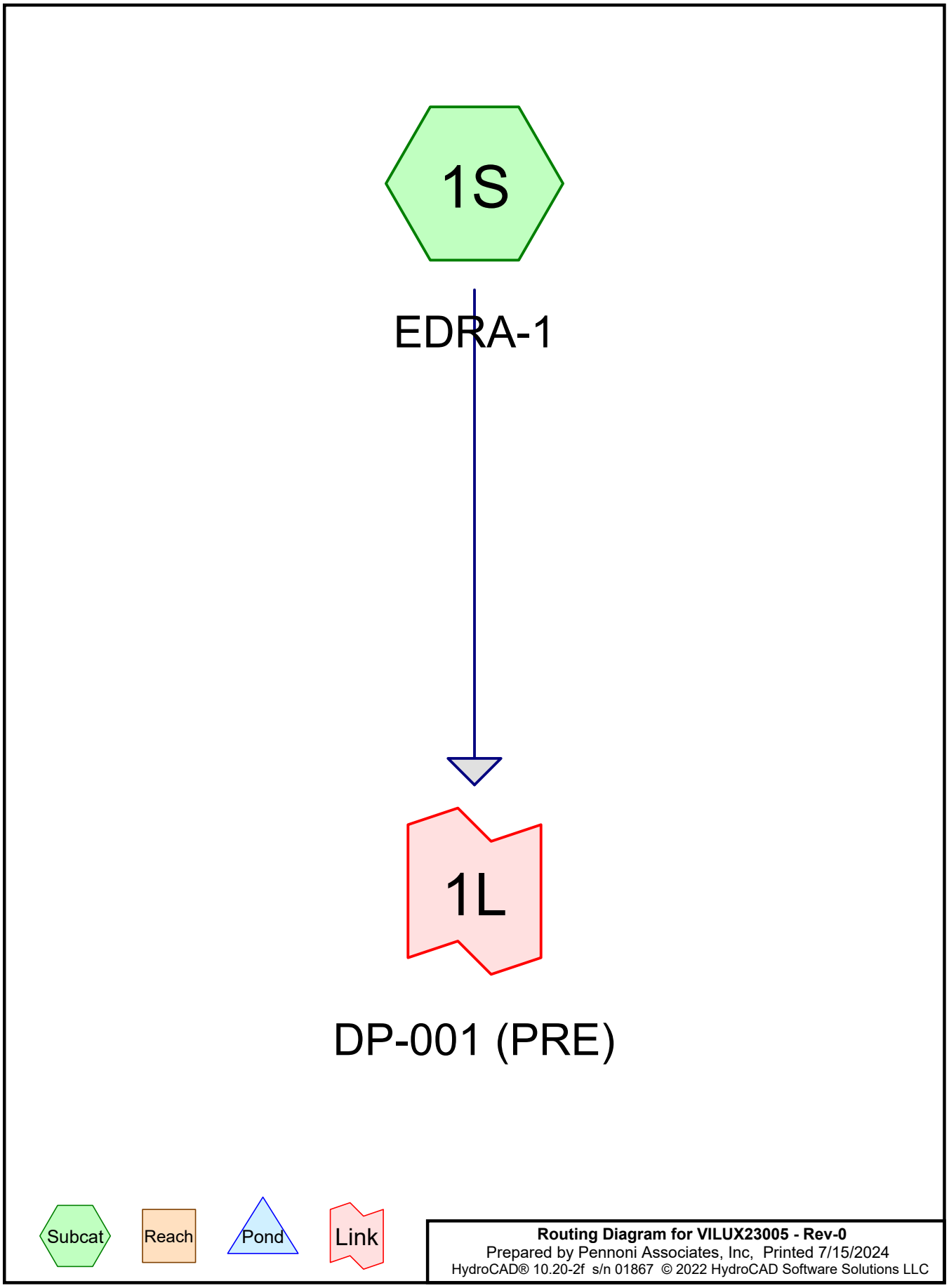
Post-Development Conditions

The proposed development has been designed to mitigate any potential thermal impacts to the waters of the commonwealth. Potential sources for thermal pollution include runoff from new impervious surfaces. Runoff from impervious surfaces will be captured locally and routed to the proposed BMP, allowing time for cooling. The BMP's promote infiltration and/or evapotranspiration which further limits the temperature of water which will ultimately be discharged to the existing receiving waterway. Additionally, impervious coverage will be reduced compared to the pre-development conditions.

Summary

By reducing impervious compared to the pre-development conditions and post-development runoff to the proposed BMP, effects of thermal pollution from stormwater runoff will be mitigated.

Appendix A:
Pre-Development Hydrology



Routing Diagram for VILUX23005 - Rev-0
Prepared by Pennoni Associates, Inc, Printed 7/15/2024
HydroCAD® 10.20-2f s/n 01867 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EDRA-1 Runoff Area=4.440 ac 44.14% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=WQ Runoff=11.47 cfs 26,253 cf

Link 1L: DP-001 (PRE) Inflow=11.47 cfs 26,253 cf
Primary=11.47 cfs 26,253 cf

Total Runoff Area = 193,406 sf Runoff Volume = 26,253 cf Average Runoff Depth = 1.63"
55.86% Pervious = 108,029 sf 44.14% Impervious = 85,378 sf

Summary for Subcatchment 1S: EDRA-1

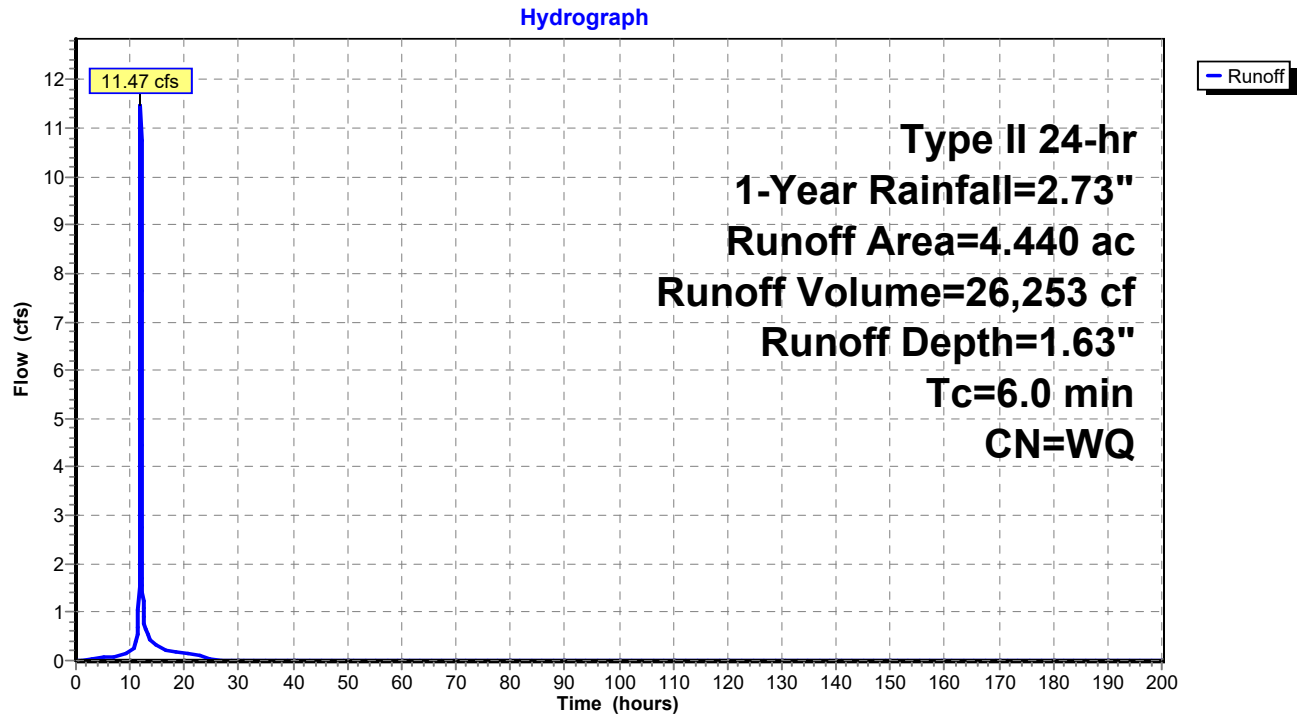
Runoff = 11.47 cfs @ 11.97 hrs, Volume= 26,253 cf, Depth= 1.63"
Routed to Link 1L : DP-001 (PRE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.73"

	Area (ac)	CN	Description
	1.960	98	Paved parking, HSG D
	1.990	78	Meadow, non-grazed, HSG D
*	0.490	78	Impervious as Meadow, non-grazed, HSG D
	4.440		Weighted Average
	2.480		55.86% Pervious Area
	1.960		44.14% Impervious Area

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

Subcatchment 1S: EDRA-1

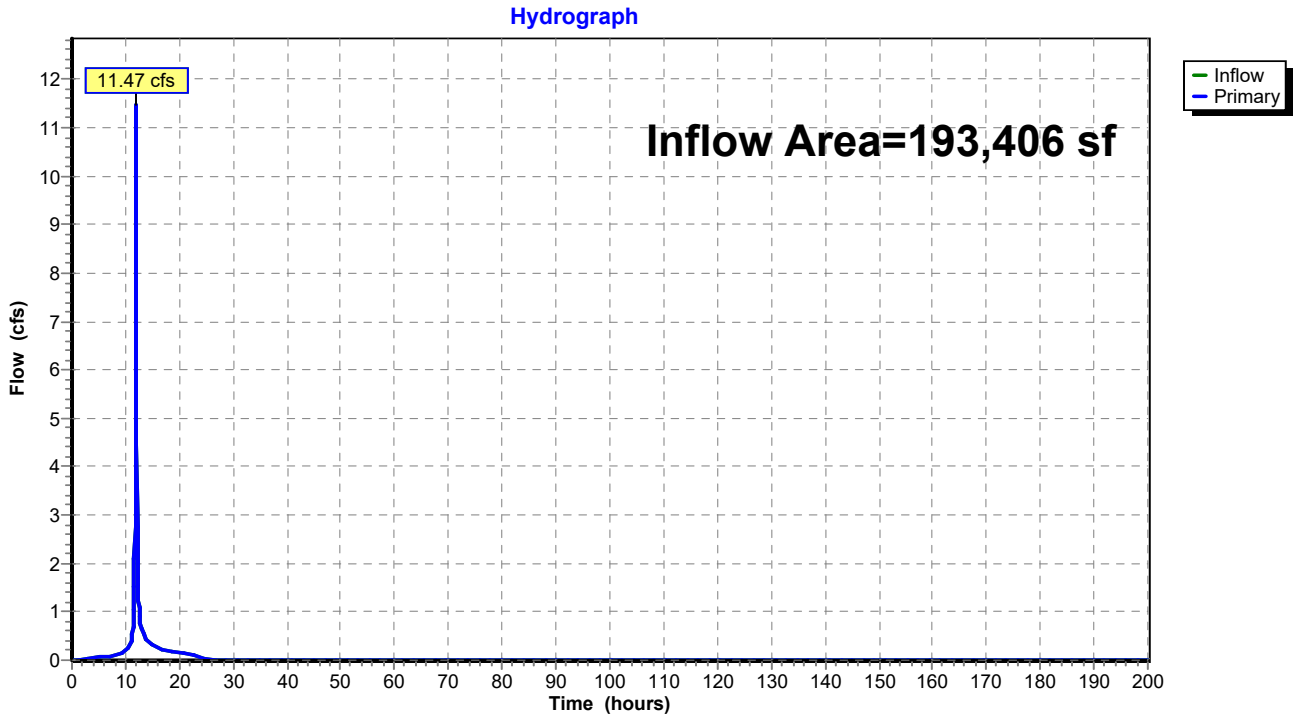


Summary for Link 1L: DP-001 (PRE)

Inflow Area = 193,406 sf, 44.14% Impervious, Inflow Depth = 1.63" for 1-Year event
Inflow = 11.47 cfs @ 11.97 hrs, Volume= 26,253 cf
Primary = 11.47 cfs @ 11.97 hrs, Volume= 26,253 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 1L: DP-001 (PRE)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EDRA-1 Runoff Area=4.440 ac 44.14% Impervious Runoff Depth=2.09"
Tc=6.0 min CN=WQ Runoff=14.75 cfs 33,674 cf

Link 1L: DP-001 (PRE) Inflow=14.75 cfs 33,674 cf
Primary=14.75 cfs 33,674 cf

Total Runoff Area = 193,406 sf Runoff Volume = 33,674 cf Average Runoff Depth = 2.09"
55.86% Pervious = 108,029 sf 44.14% Impervious = 85,378 sf

Summary for Subcatchment 1S: EDRA-1

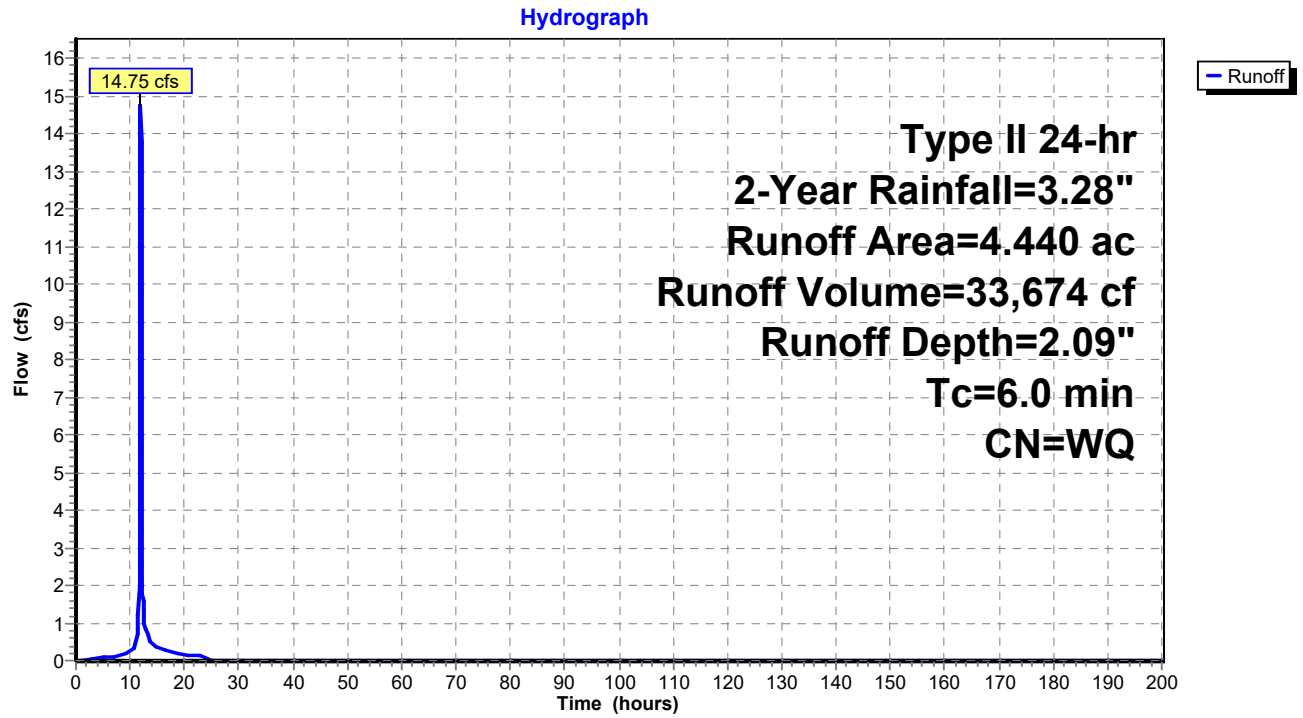
Runoff = 14.75 cfs @ 11.97 hrs, Volume= 33,674 cf, Depth= 2.09"
Routed to Link 1L : DP-001 (PRE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 2-Year Rainfall=3.28"

	Area (ac)	CN	Description
	1.960	98	Paved parking, HSG D
	1.990	78	Meadow, non-grazed, HSG D
*	0.490	78	Impervious as Meadow, non-grazed, HSG D
	4.440		Weighted Average
	2.480		55.86% Pervious Area
	1.960		44.14% Impervious Area

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

Subcatchment 1S: EDRA-1

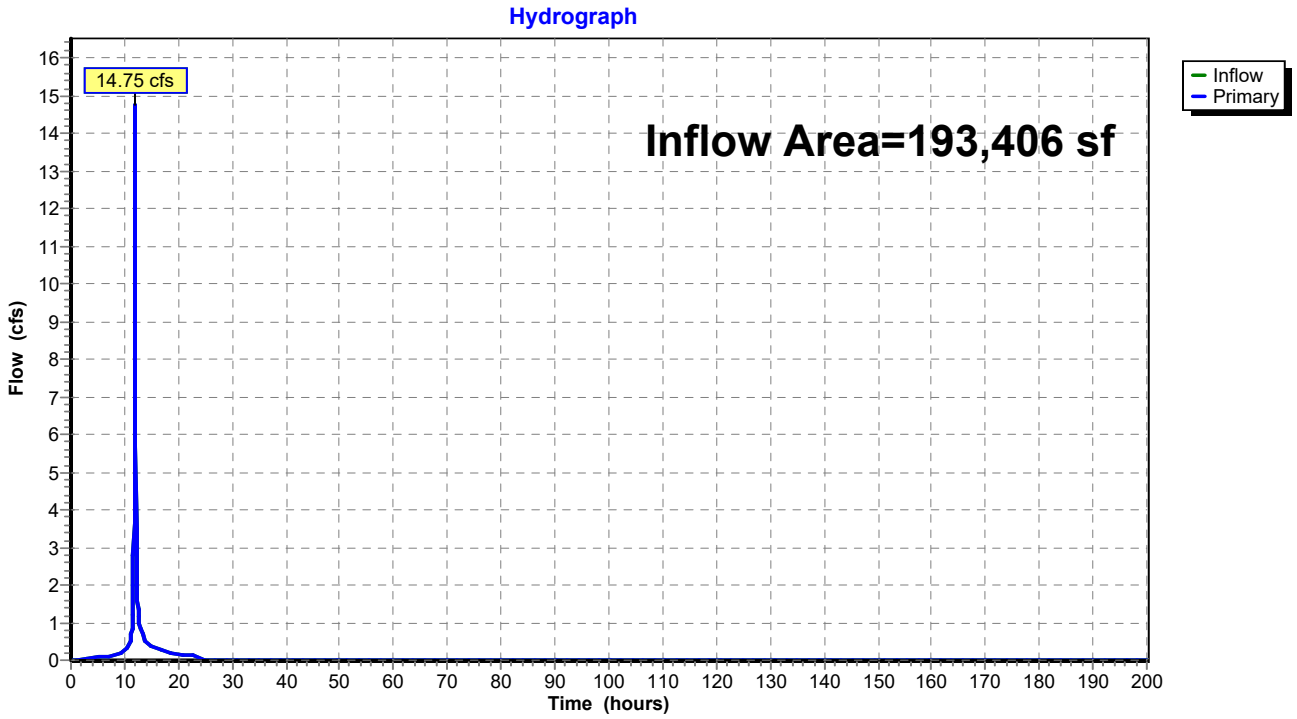


Summary for Link 1L: DP-001 (PRE)

Inflow Area = 193,406 sf, 44.14% Impervious, Inflow Depth = 2.09" for 2-Year event
Inflow = 14.75 cfs @ 11.97 hrs, Volume= 33,674 cf
Primary = 14.75 cfs @ 11.97 hrs, Volume= 33,674 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 1L: DP-001 (PRE)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EDRA-1 Runoff Area=4.440 ac 44.14% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=WQ Runoff=19.93 cfs 45,491 cf

Link 1L: DP-001 (PRE) Inflow=19.93 cfs 45,491 cf
Primary=19.93 cfs 45,491 cf

Total Runoff Area = 193,406 sf Runoff Volume = 45,491 cf Average Runoff Depth = 2.82"
55.86% Pervious = 108,029 sf 44.14% Impervious = 85,378 sf

Summary for Subcatchment 1S: EDRA-1

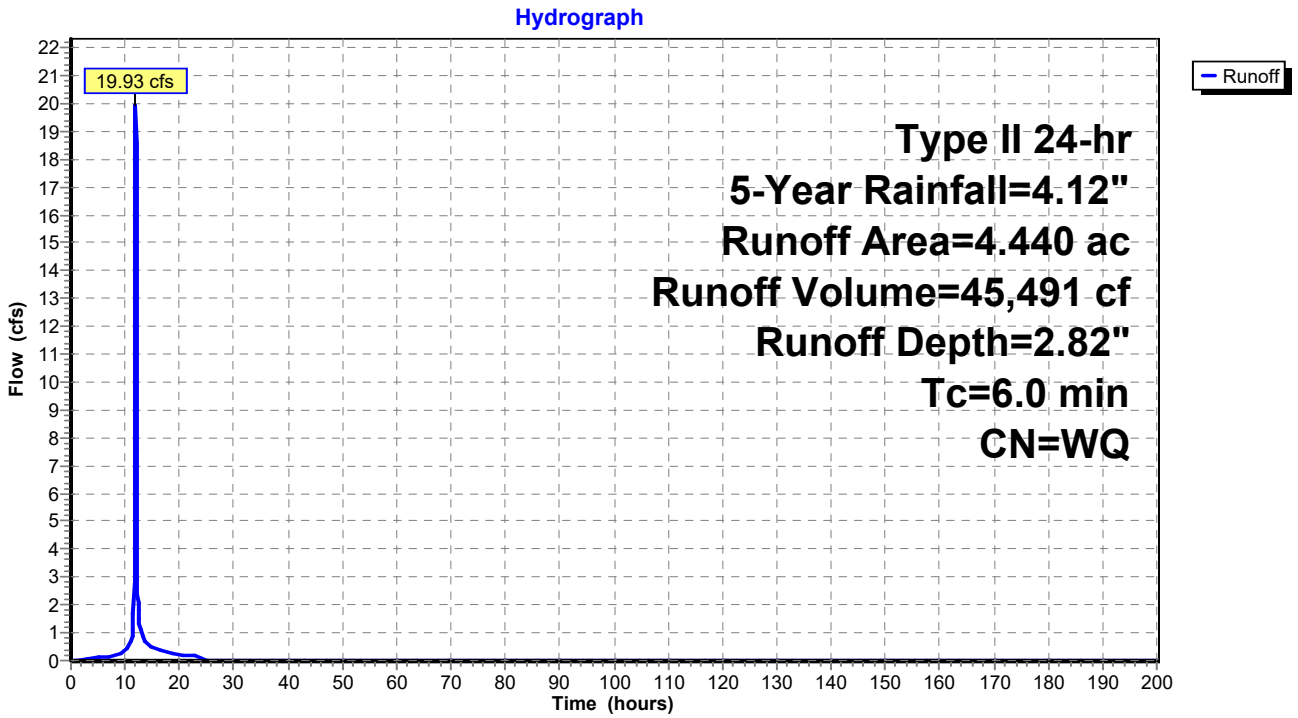
Runoff = 19.93 cfs @ 11.97 hrs, Volume= 45,491 cf, Depth= 2.82"
Routed to Link 1L : DP-001 (PRE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 5-Year Rainfall=4.12"

	Area (ac)	CN	Description
	1.960	98	Paved parking, HSG D
	1.990	78	Meadow, non-grazed, HSG D
*	0.490	78	Impervious as Meadow, non-grazed, HSG D
	4.440		Weighted Average
	2.480		55.86% Pervious Area
	1.960		44.14% Impervious Area

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

Subcatchment 1S: EDRA-1

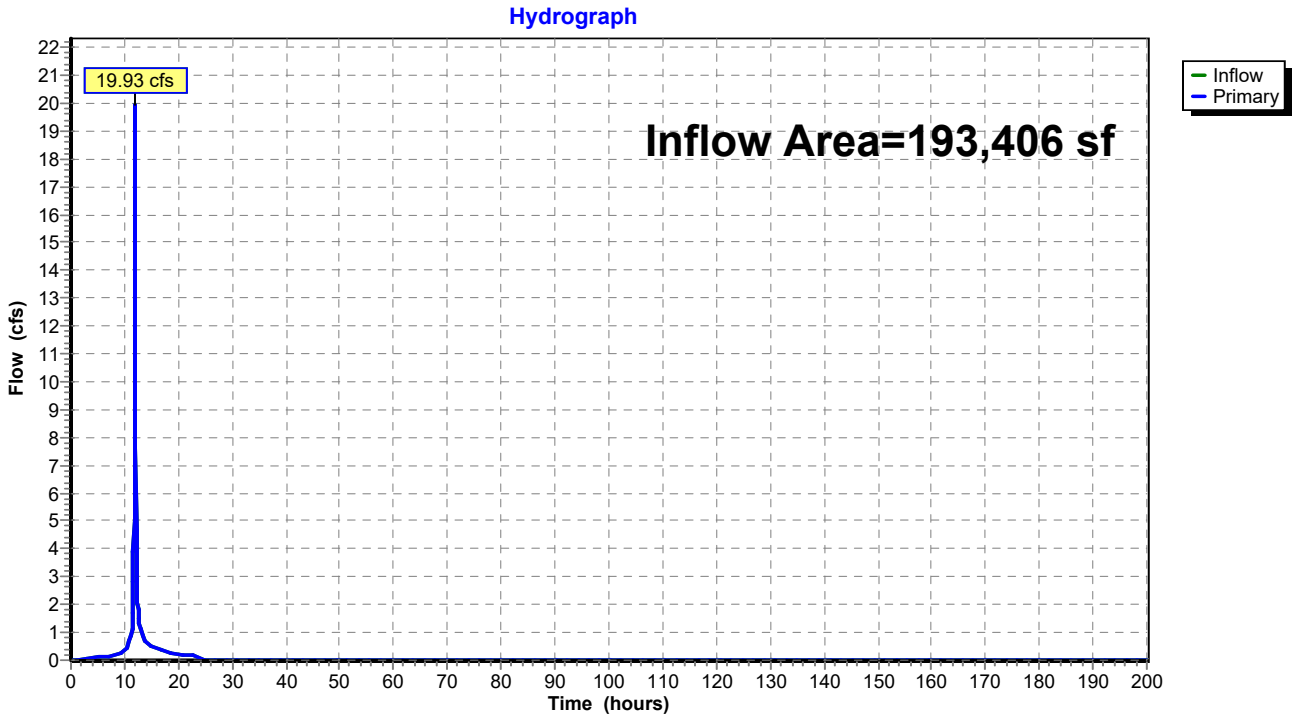


Summary for Link 1L: DP-001 (PRE)

Inflow Area = 193,406 sf, 44.14% Impervious, Inflow Depth = 2.82" for 5-Year event
Inflow = 19.93 cfs @ 11.97 hrs, Volume= 45,491 cf
Primary = 19.93 cfs @ 11.97 hrs, Volume= 45,491 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 1L: DP-001 (PRE)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EDRA-1 Runoff Area=4.440 ac 44.14% Impervious Runoff Depth=3.45"
Tc=6.0 min CN=WQ Runoff=24.35 cfs 55,653 cf

Link 1L: DP-001 (PRE) Inflow=24.35 cfs 55,653 cf
Primary=24.35 cfs 55,653 cf

Total Runoff Area = 193,406 sf Runoff Volume = 55,653 cf Average Runoff Depth = 3.45"
55.86% Pervious = 108,029 sf 44.14% Impervious = 85,378 sf

Summary for Subcatchment 1S: EDRA-1

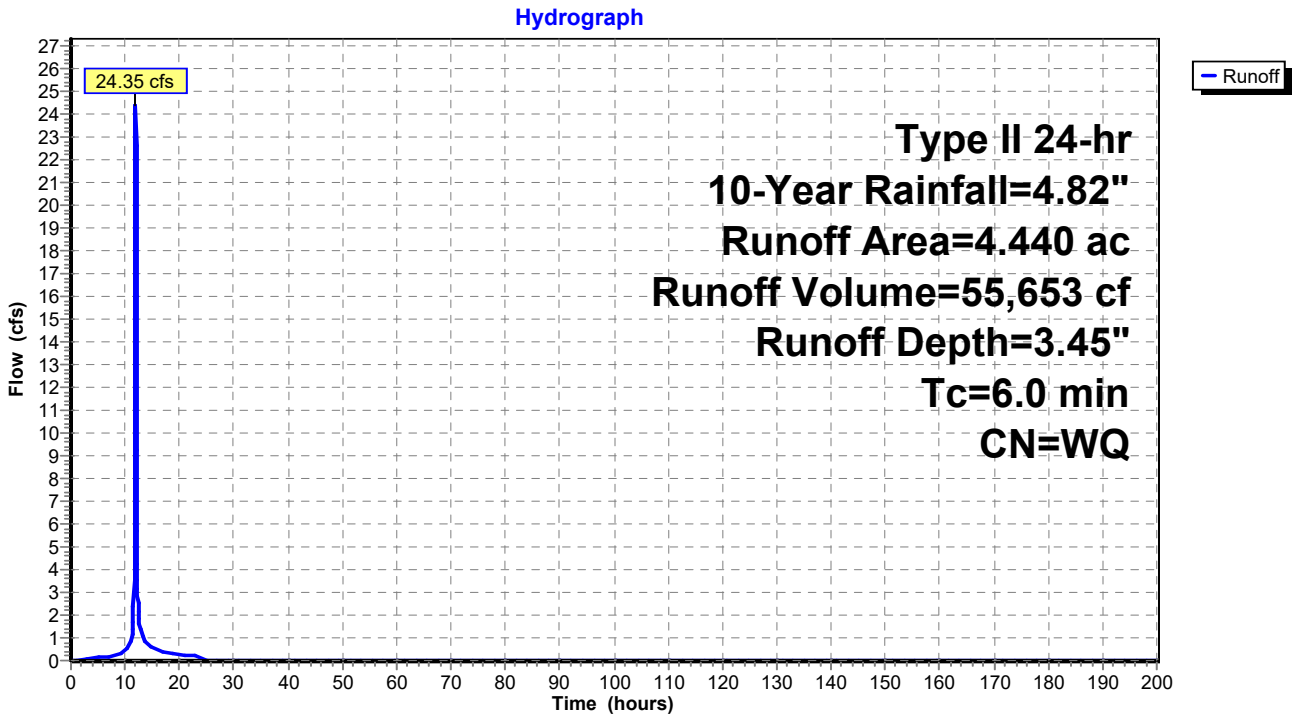
Runoff = 24.35 cfs @ 11.97 hrs, Volume= 55,653 cf, Depth= 3.45"
Routed to Link 1L : DP-001 (PRE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.82"

	Area (ac)	CN	Description
	1.960	98	Paved parking, HSG D
	1.990	78	Meadow, non-grazed, HSG D
*	0.490	78	Impervious as Meadow, non-grazed, HSG D
	4.440		Weighted Average
	2.480		55.86% Pervious Area
	1.960		44.14% Impervious Area

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

Subcatchment 1S: EDRA-1

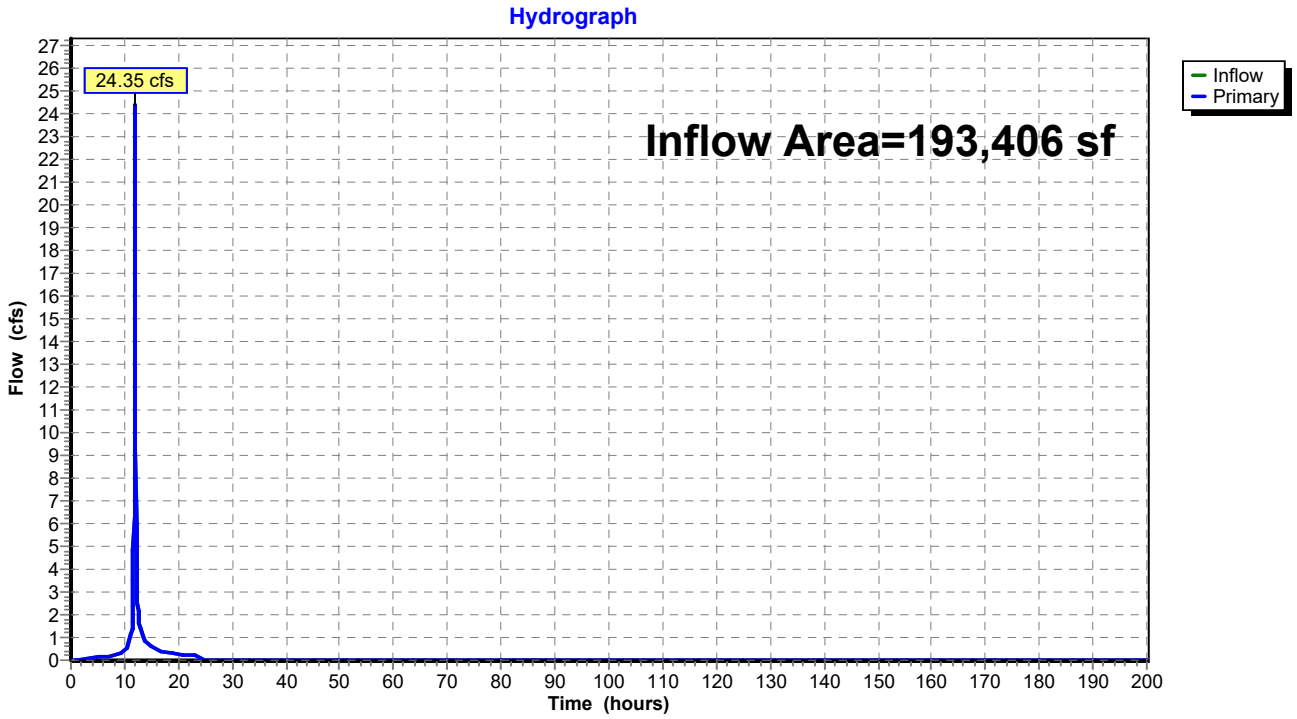


Summary for Link 1L: DP-001 (PRE)

Inflow Area = 193,406 sf, 44.14% Impervious, Inflow Depth = 3.45" for 10-Year event
Inflow = 24.35 cfs @ 11.97 hrs, Volume= 55,653 cf
Primary = 24.35 cfs @ 11.97 hrs, Volume= 55,653 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 1L: DP-001 (PRE)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EDRA-1 Runoff Area=4.440 ac 44.14% Impervious Runoff Depth=4.38"
Tc=6.0 min CN=WQ Runoff=30.81 cfs 70,657 cf

Link 1L: DP-001 (PRE) Inflow=30.81 cfs 70,657 cf
Primary=30.81 cfs 70,657 cf

Total Runoff Area = 193,406 sf Runoff Volume = 70,657 cf Average Runoff Depth = 4.38"
55.86% Pervious = 108,029 sf 44.14% Impervious = 85,378 sf

Summary for Subcatchment 1S: EDRA-1

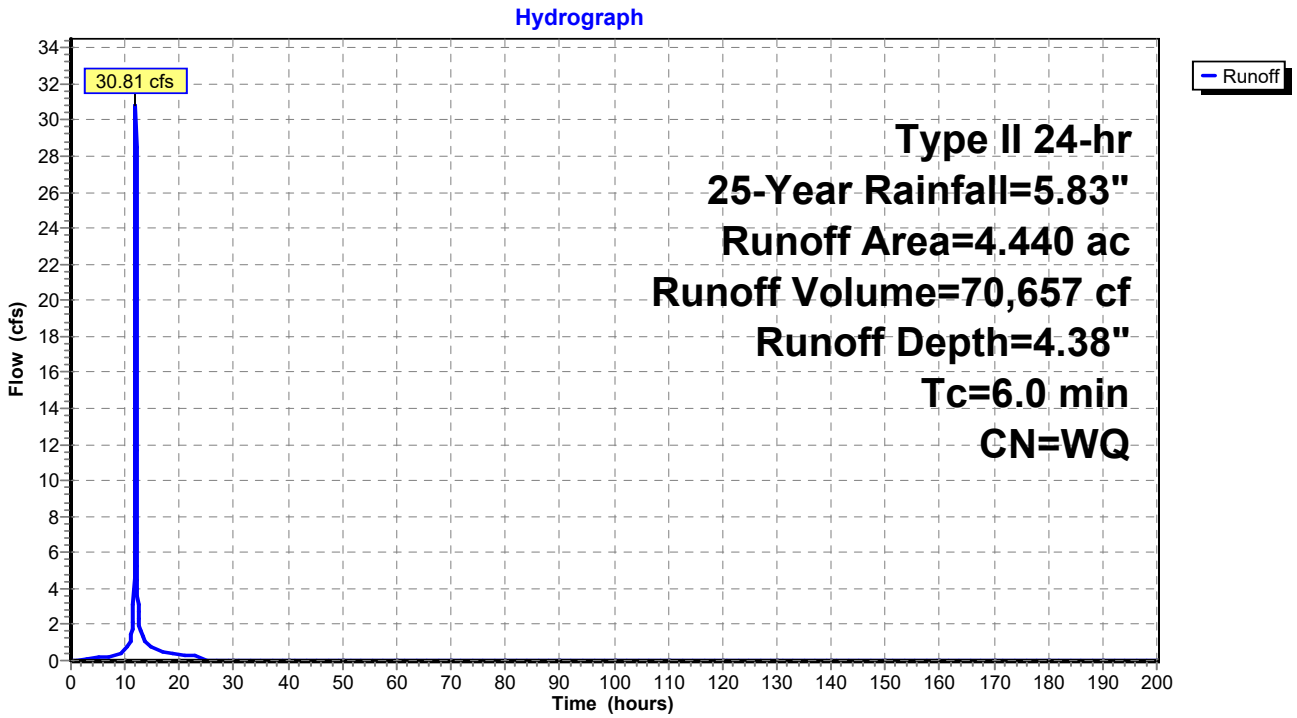
Runoff = 30.81 cfs @ 11.97 hrs, Volume= 70,657 cf, Depth= 4.38"
Routed to Link 1L : DP-001 (PRE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=5.83"

	Area (ac)	CN	Description
	1.960	98	Paved parking, HSG D
	1.990	78	Meadow, non-grazed, HSG D
*	0.490	78	Impervious as Meadow, non-grazed, HSG D
	4.440		Weighted Average
	2.480		55.86% Pervious Area
	1.960		44.14% Impervious Area

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

Subcatchment 1S: EDRA-1

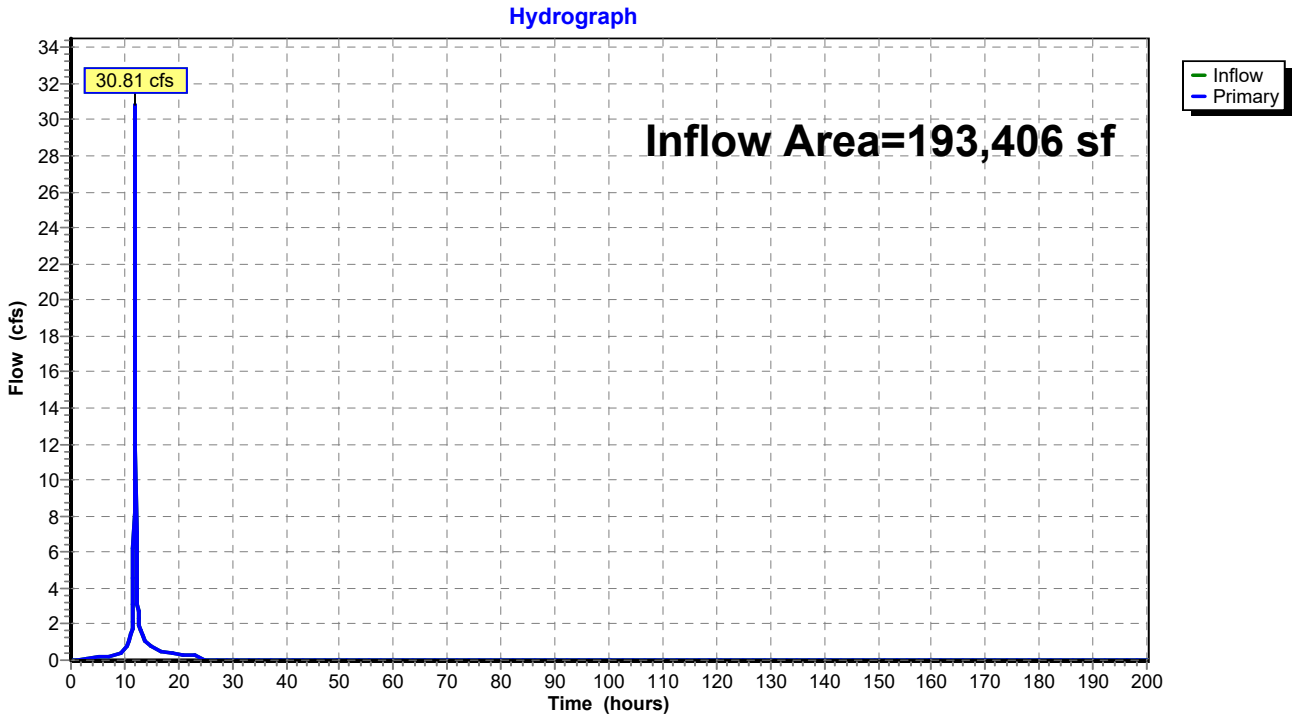


Summary for Link 1L: DP-001 (PRE)

Inflow Area = 193,406 sf, 44.14% Impervious, Inflow Depth = 4.38" for 25-Year event
Inflow = 30.81 cfs @ 11.97 hrs, Volume= 70,657 cf
Primary = 30.81 cfs @ 11.97 hrs, Volume= 70,657 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 1L: DP-001 (PRE)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EDRA-1 Runoff Area=4.440 ac 44.14% Impervious Runoff Depth=5.18"
Tc=6.0 min CN=WQ Runoff=36.29 cfs 83,508 cf

Link 1L: DP-001 (PRE) Inflow=36.29 cfs 83,508 cf
Primary=36.29 cfs 83,508 cf

Total Runoff Area = 193,406 sf Runoff Volume = 83,508 cf Average Runoff Depth = 5.18"
55.86% Pervious = 108,029 sf 44.14% Impervious = 85,378 sf

Summary for Subcatchment 1S: EDRA-1

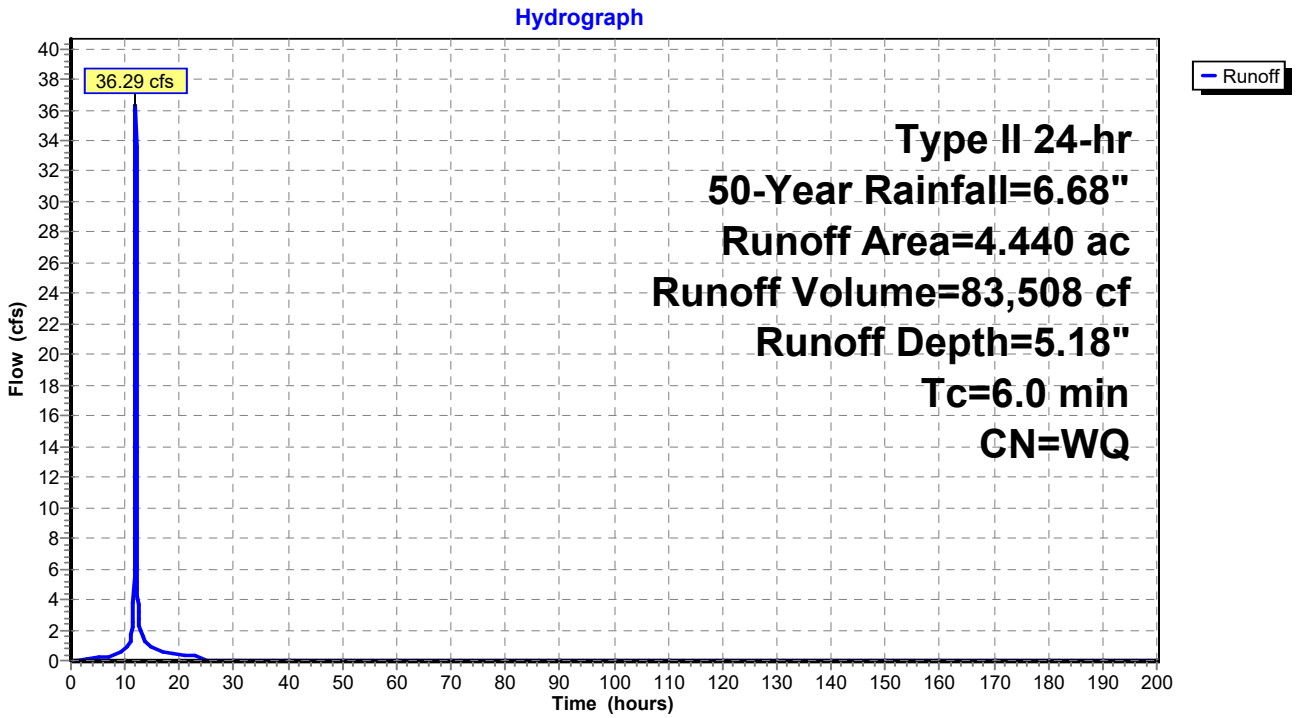
Runoff = 36.29 cfs @ 11.97 hrs, Volume= 83,508 cf, Depth= 5.18"
Routed to Link 1L : DP-001 (PRE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 50-Year Rainfall=6.68"

	Area (ac)	CN	Description
	1.960	98	Paved parking, HSG D
	1.990	78	Meadow, non-grazed, HSG D
*	0.490	78	Impervious as Meadow, non-grazed, HSG D
	4.440		Weighted Average
	2.480		55.86% Pervious Area
	1.960		44.14% Impervious Area

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

Subcatchment 1S: EDRA-1

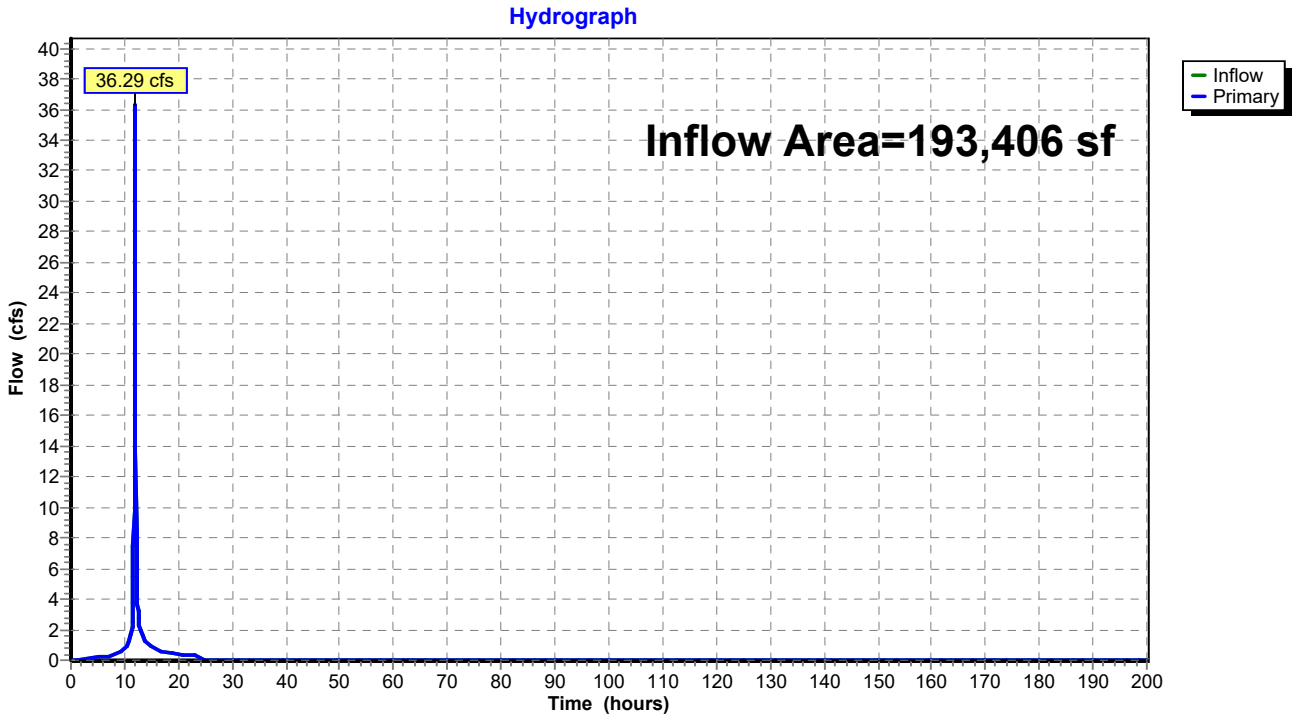


Summary for Link 1L: DP-001 (PRE)

Inflow Area = 193,406 sf, 44.14% Impervious, Inflow Depth = 5.18" for 50-Year event
Inflow = 36.29 cfs @ 11.97 hrs, Volume= 83,508 cf
Primary = 36.29 cfs @ 11.97 hrs, Volume= 83,508 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 1L: DP-001 (PRE)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EDRA-1 Runoff Area=4.440 ac 44.14% Impervious Runoff Depth=6.05"
Tc=6.0 min CN=WQ Runoff=42.24 cfs 97,583 cf

Link 1L: DP-001 (PRE) Inflow=42.24 cfs 97,583 cf
Primary=42.24 cfs 97,583 cf

Total Runoff Area = 193,406 sf Runoff Volume = 97,583 cf Average Runoff Depth = 6.05"
55.86% Pervious = 108,029 sf 44.14% Impervious = 85,378 sf

Summary for Subcatchment 1S: EDRA-1

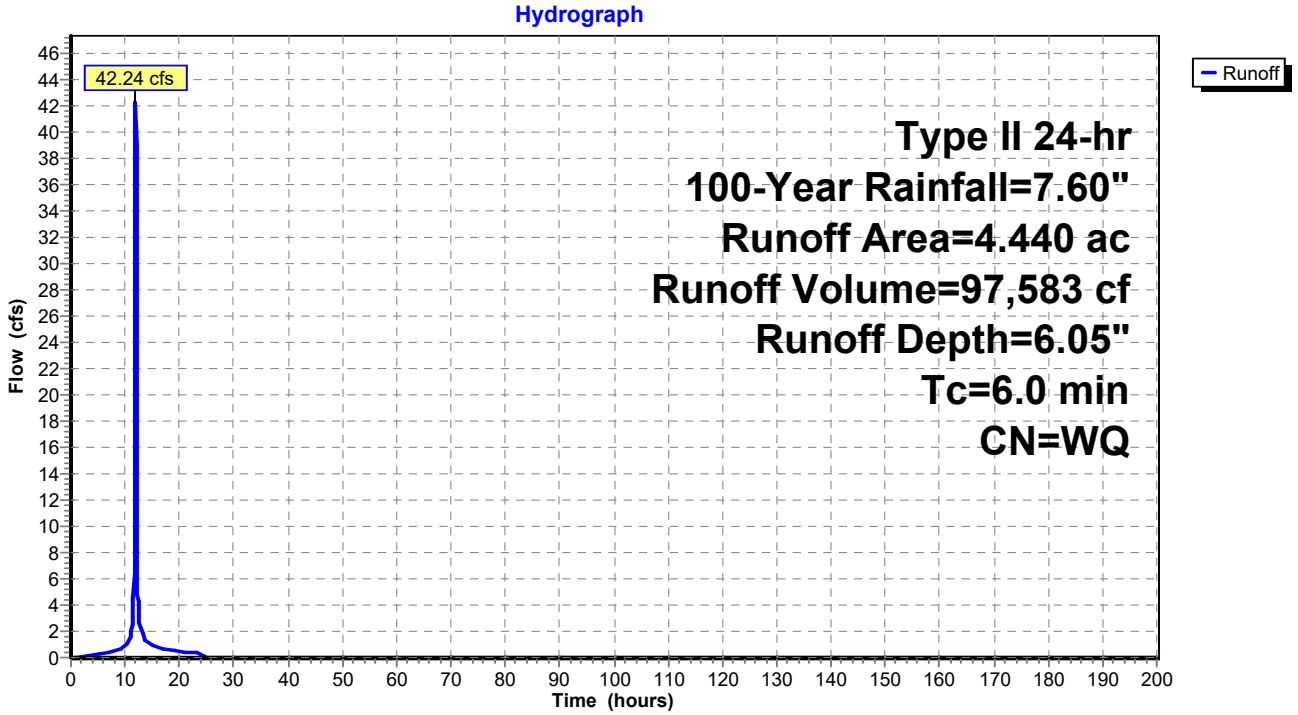
Runoff = 42.24 cfs @ 11.97 hrs, Volume= 97,583 cf, Depth= 6.05"
Routed to Link 1L : DP-001 (PRE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=7.60"

	Area (ac)	CN	Description
	1.960	98	Paved parking, HSG D
	1.990	78	Meadow, non-grazed, HSG D
*	0.490	78	Impervious as Meadow, non-grazed, HSG D
	4.440		Weighted Average
	2.480		55.86% Pervious Area
	1.960		44.14% Impervious Area

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

Subcatchment 1S: EDRA-1

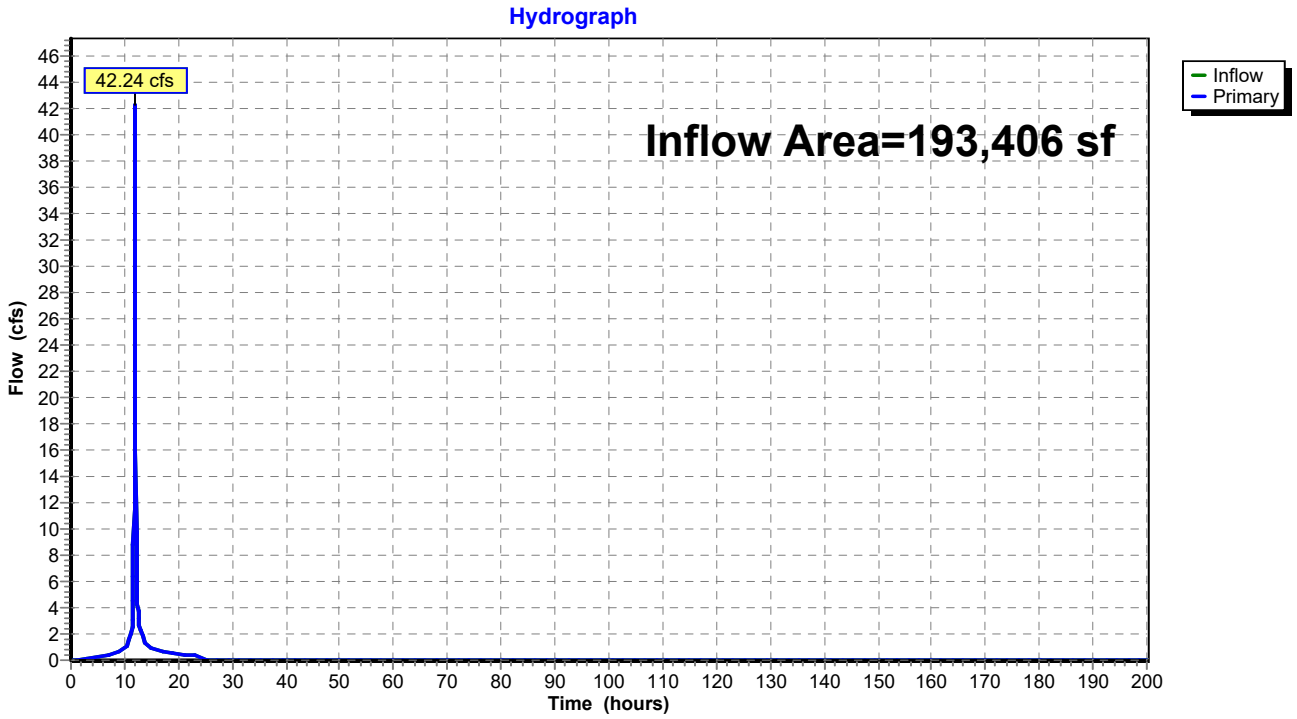


Summary for Link 1L: DP-001 (PRE)

Inflow Area = 193,406 sf, 44.14% Impervious, Inflow Depth = 6.05" for 100-Year event
Inflow = 42.24 cfs @ 11.97 hrs, Volume= 97,583 cf
Primary = 42.24 cfs @ 11.97 hrs, Volume= 97,583 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 1L: DP-001 (PRE)



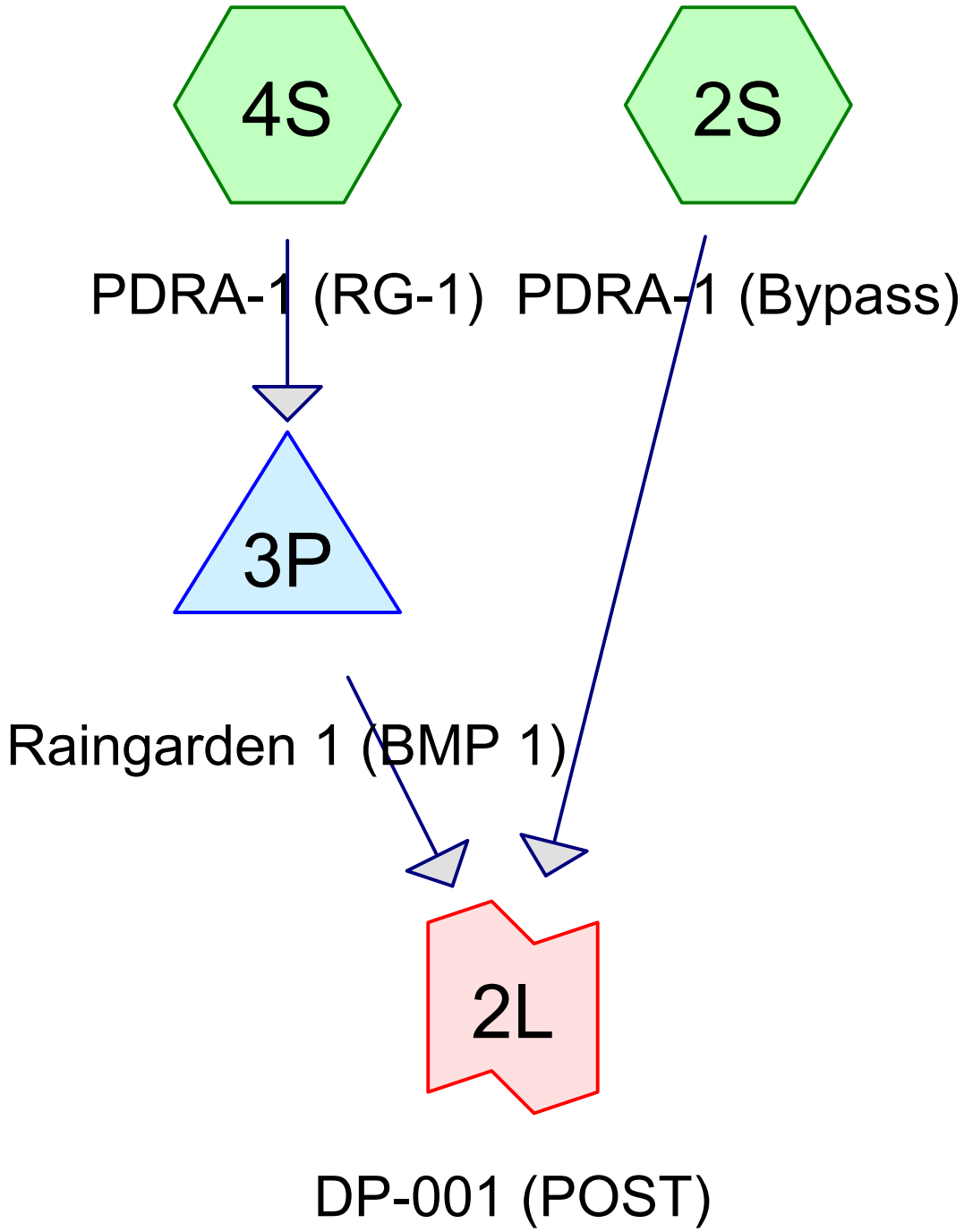
Events for Subcatchment 1S: EDRA-1

Event	Rainfall (inches)	Runoff (cfs)	Volume (cubic-feet)	Depth (inches)
1-Year	2.73	11.47	26,253	1.63
2-Year	3.28	14.75	33,674	2.09
5-Year	4.12	19.93	45,491	2.82
10-Year	4.82	24.35	55,653	3.45
25-Year	5.83	30.81	70,657	4.38
50-Year	6.68	36.29	83,508	5.18
100-Year	**7.60**	**42.24**	**97,583**	**6.05**

Events for Link 1L: DP-001 (PRE)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1-Year	11.47	11.47	**0.00**
2-Year	14.75	14.75	0.00
5-Year	19.93	19.93	0.00
10-Year	24.35	24.35	0.00
25-Year	30.81	30.81	0.00
50-Year	36.29	36.29	0.00
100-Year	**42.24**	**42.24**	0.00

Appendix B:
Post-Development Hydrology



Subcat Reach Pond Link

Routing Diagram for VILUX23005 - Rev-0
Prepared by Pennoni Associates, Inc, Printed 7/15/2024
HydroCAD® 10.20-2f s/n 01867 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: PDRA-1 (Bypass) Runoff Area=3.810 ac 44.88% Impervious Runoff Depth=1.70"
Tc=6.0 min CN=WQ Runoff=10.34 cfs 23,530 cf

Subcatchment4S: PDRA-1 (RG-1) Runoff Area=0.630 ac 53.97% Impervious Runoff Depth=1.83"
Tc=6.0 min CN=WQ Runoff=1.82 cfs 4,192 cf

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=50.83' Storage=2,201 cf Inflow=1.82 cfs 4,192 cf
Outflow=0.68 cfs 2,341 cf

Link 2L: DP-001 (POST) Inflow=10.37 cfs 25,870 cf
Primary=10.37 cfs 25,870 cf

Total Runoff Area = 193,406 sf Runoff Volume = 27,721 cf Average Runoff Depth = 1.72"
53.83% Pervious = 104,108 sf 46.17% Impervious = 89,298 sf

Summary for Subcatchment 2S: PDRA-1 (Bypass)

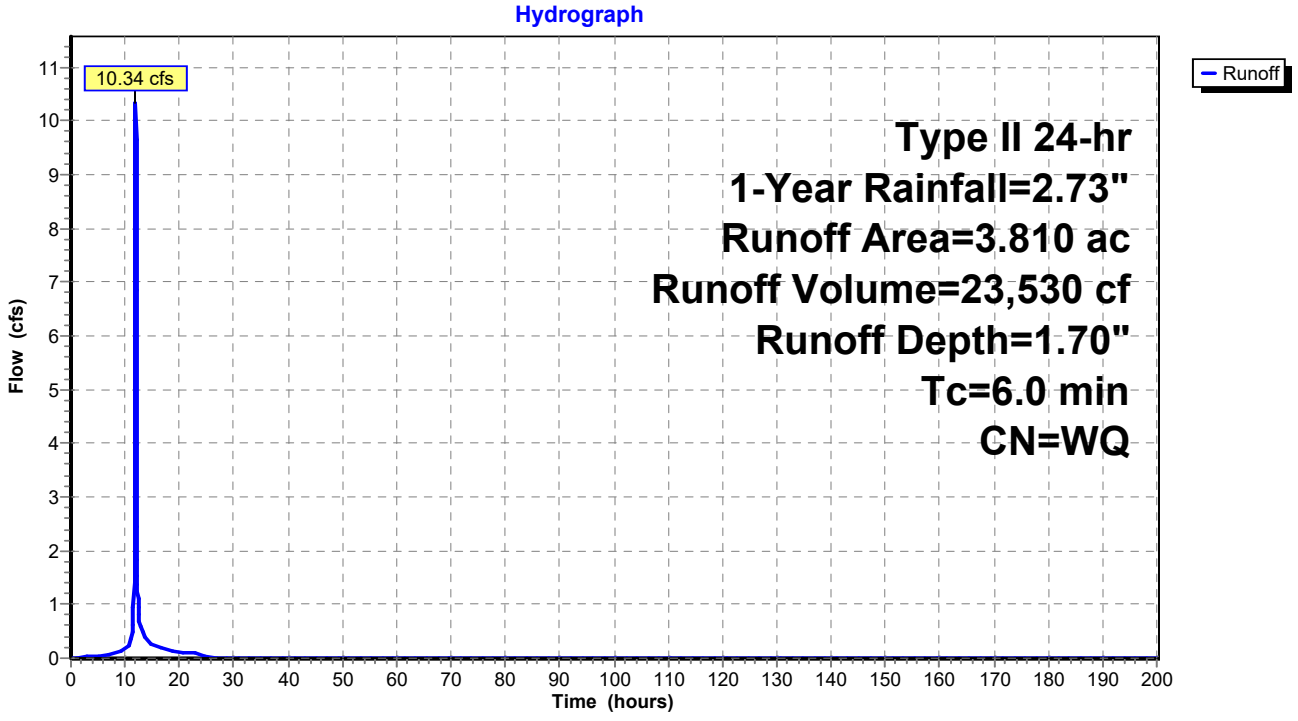
Runoff = 10.34 cfs @ 11.97 hrs, Volume= 23,530 cf, Depth= 1.70"
Routed to Link 2L : DP-001 (POST)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.73"

Area (ac)	CN	Description
2.100	80	>75% Grass cover, Good, HSG D
1.710	98	Paved parking, HSG D
3.810		Weighted Average
2.100		55.12% Pervious Area
1.710		44.88% Impervious Area

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

Subcatchment 2S: PDRA-1 (Bypass)



Summary for Subcatchment 4S: PDRA-1 (RG-1)

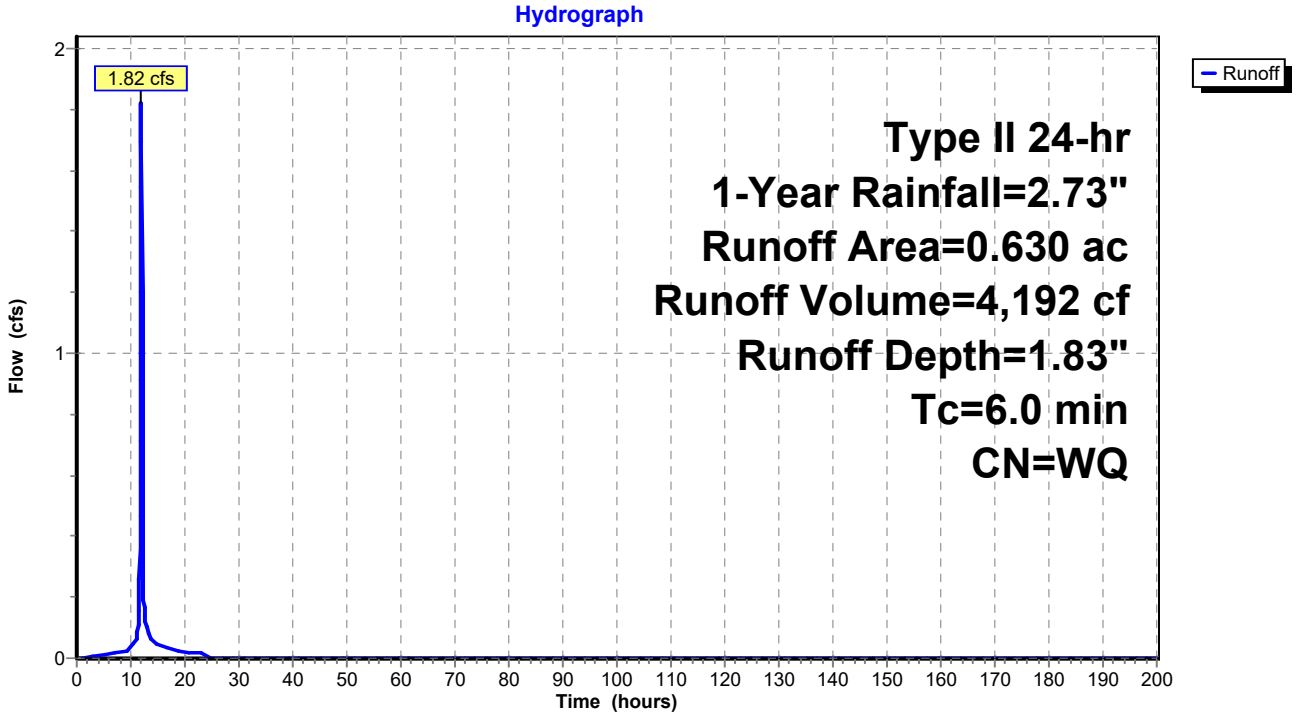
Runoff = 1.82 cfs @ 11.97 hrs, Volume= 4,192 cf, Depth= 1.83"
Routed to Pond 3P : Raingarden 1 (BMP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.73"

Area (ac)	CN	Description
0.290	80	>75% Grass cover, Good, HSG D
0.340	98	Paved parking, HSG D
0.630		Weighted Average
0.290		46.03% Pervious Area
0.340		53.97% Impervious Area

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

Subcatchment 4S: PDRA-1 (RG-1)



Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 1.83" for 1-Year event
Inflow = 1.82 cfs @ 11.97 hrs, Volume= 4,192 cf
Outflow = 0.68 cfs @ 12.09 hrs, Volume= 2,341 cf, Atten= 62%, Lag= 7.4 min
Primary = 0.68 cfs @ 12.09 hrs, Volume= 2,341 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 50.83' @ 12.09 hrs Surf.Area= 3,765 sf Storage= 2,201 cf

Plug-Flow detention time= 243.3 min calculated for 2,341 cf (56% of inflow)
Center-of-Mass det. time= 124.2 min (904.5 - 780.3)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

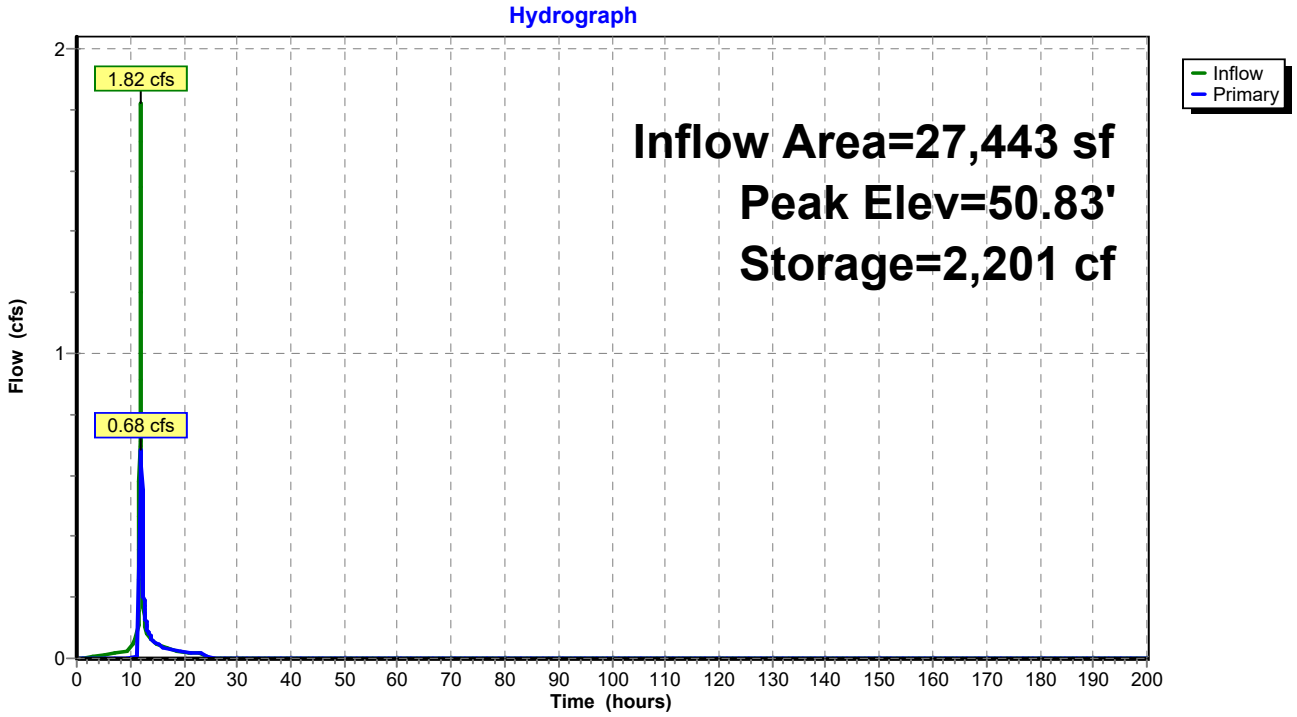
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

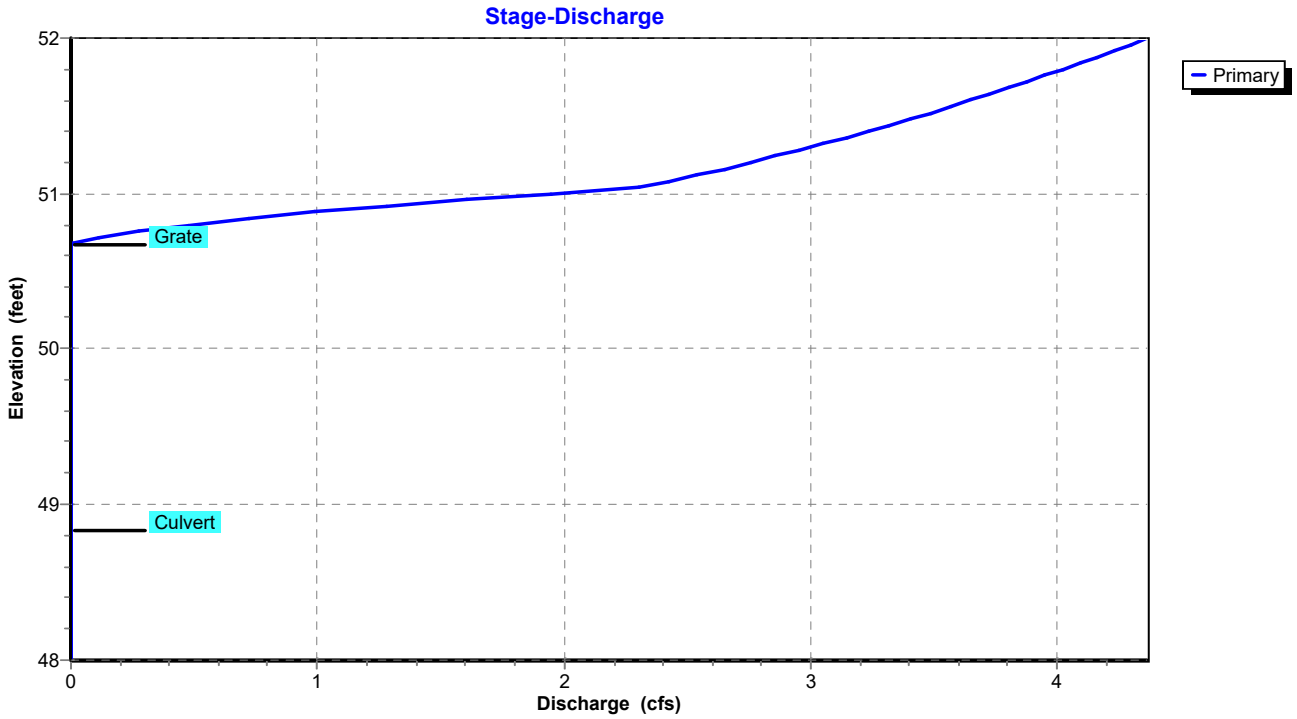
Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.67 cfs @ 12.09 hrs HW=50.83' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.67 cfs of 3.68 cfs potential flow)
↑—**2=Grate** (Weir Controls 0.67 cfs @ 1.31 fps)

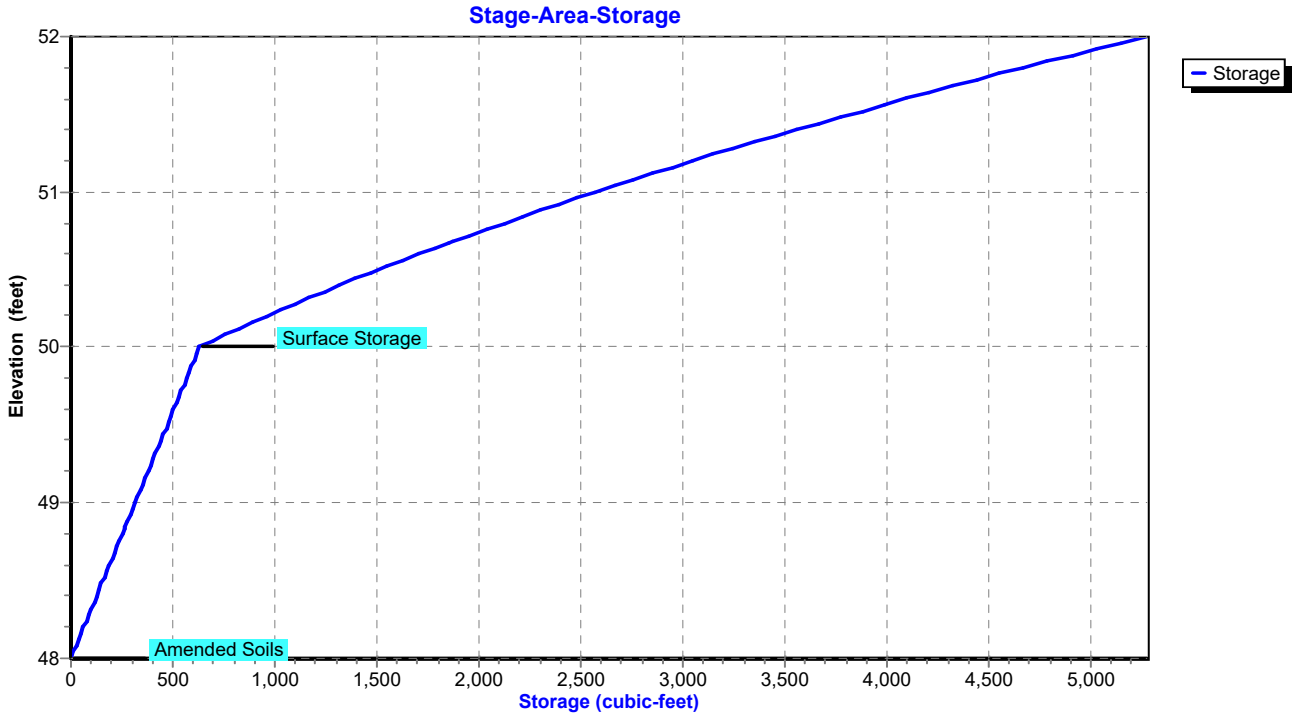
Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)

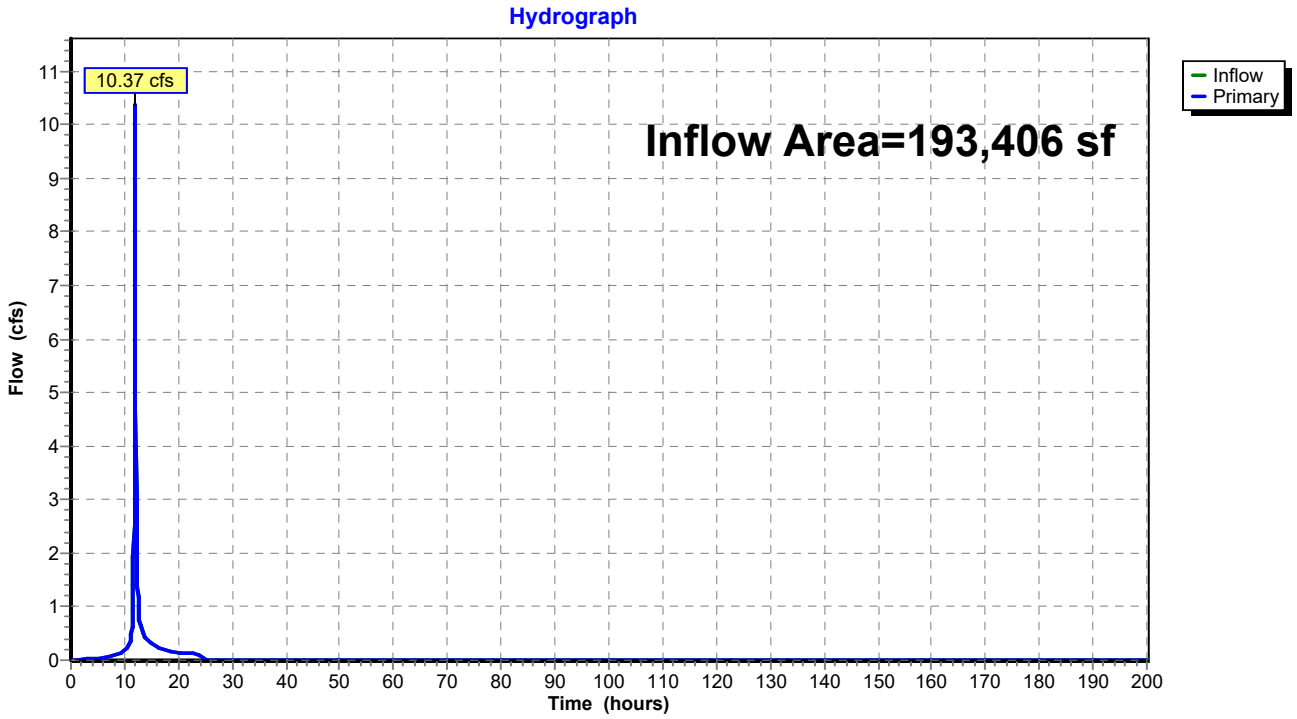


Summary for Link 2L: DP-001 (POST)

Inflow Area = 193,406 sf, 46.17% Impervious, Inflow Depth = 1.61" for 1-Year event
Inflow = 10.37 cfs @ 11.97 hrs, Volume= 25,870 cf
Primary = 10.37 cfs @ 11.97 hrs, Volume= 25,870 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 2L: DP-001 (POST)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: PDRA-1 (Bypass) Runoff Area=3.810 ac 44.88% Impervious Runoff Depth=2.17"
Tc=6.0 min CN=WQ Runoff=13.22 cfs 30,073 cf

Subcatchment4S: PDRA-1 (RG-1) Runoff Area=0.630 ac 53.97% Impervious Runoff Depth=2.32"
Tc=6.0 min CN=WQ Runoff=2.30 cfs 5,302 cf

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=50.94' Storage=2,446 cf Inflow=2.30 cfs 5,302 cf
Outflow=1.48 cfs 3,451 cf

Link 2L: DP-001 (POST) Inflow=14.06 cfs 33,523 cf
Primary=14.06 cfs 33,523 cf

Total Runoff Area = 193,406 sf Runoff Volume = 35,374 cf Average Runoff Depth = 2.19"
53.83% Pervious = 104,108 sf 46.17% Impervious = 89,298 sf

Summary for Subcatchment 2S: PDRA-1 (Bypass)

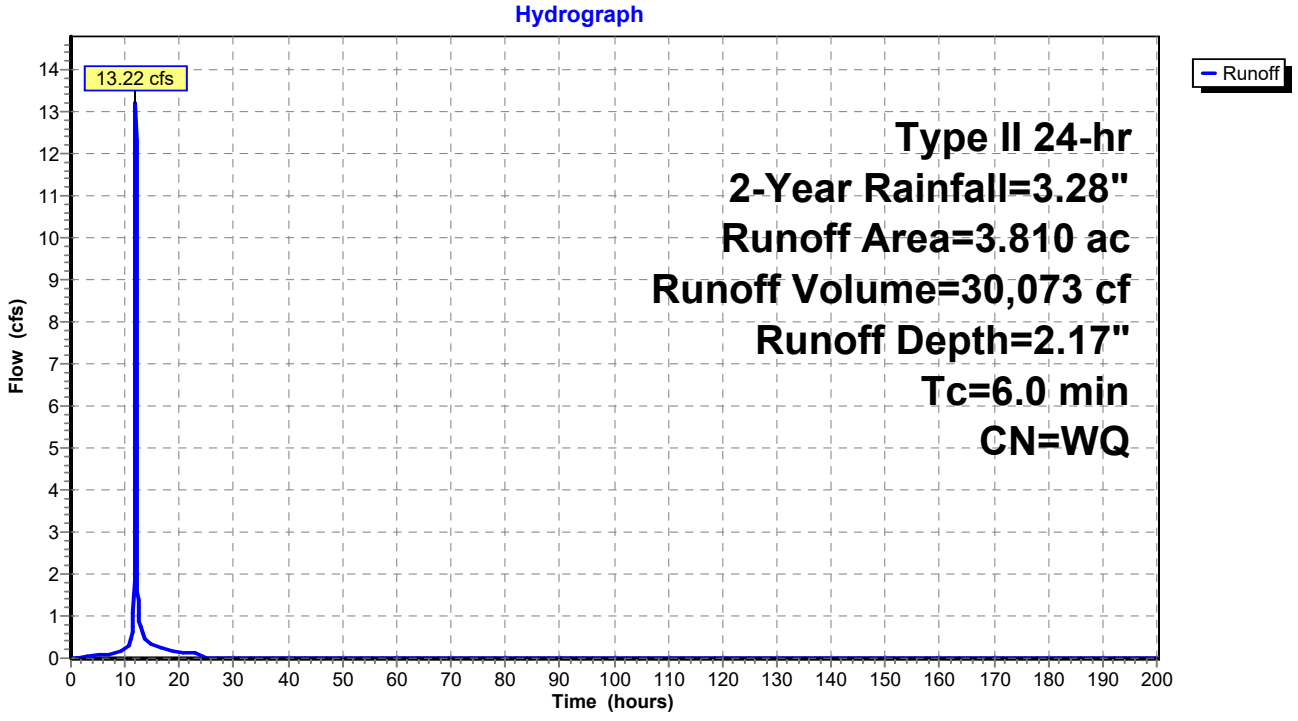
Runoff = 13.22 cfs @ 11.97 hrs, Volume= 30,073 cf, Depth= 2.17"
Routed to Link 2L : DP-001 (POST)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 2-Year Rainfall=3.28"

Area (ac)	CN	Description
2.100	80	>75% Grass cover, Good, HSG D
1.710	98	Paved parking, HSG D
3.810		Weighted Average
2.100		55.12% Pervious Area
1.710		44.88% Impervious Area

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

Subcatchment 2S: PDRA-1 (Bypass)



Summary for Subcatchment 4S: PDRA-1 (RG-1)

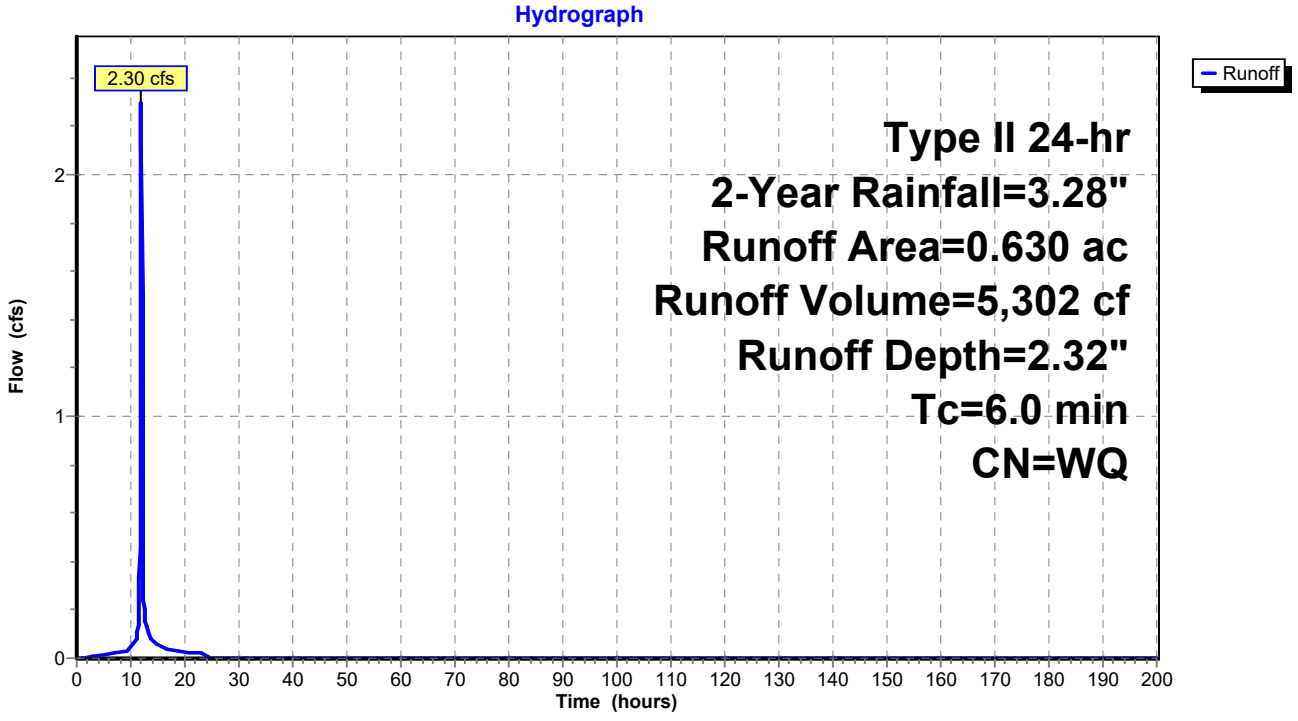
Runoff = 2.30 cfs @ 11.97 hrs, Volume= 5,302 cf, Depth= 2.32"
Routed to Pond 3P : Raingarden 1 (BMP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 2-Year Rainfall=3.28"

Area (ac)	CN	Description
0.290	80	>75% Grass cover, Good, HSG D
0.340	98	Paved parking, HSG D
0.630		Weighted Average
0.290		46.03% Pervious Area
0.340		53.97% Impervious Area

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

Subcatchment 4S: PDRA-1 (RG-1)



Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 2.32" for 2-Year event
Inflow = 2.30 cfs @ 11.97 hrs, Volume= 5,302 cf
Outflow = 1.48 cfs @ 12.05 hrs, Volume= 3,451 cf, Atten= 36%, Lag= 4.8 min
Primary = 1.48 cfs @ 12.05 hrs, Volume= 3,451 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 50.94' @ 12.05 hrs Surf.Area= 3,845 sf Storage= 2,446 cf

Plug-Flow detention time= 205.6 min calculated for 3,451 cf (65% of inflow)
Center-of-Mass det. time= 97.6 min (874.7 - 777.0)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

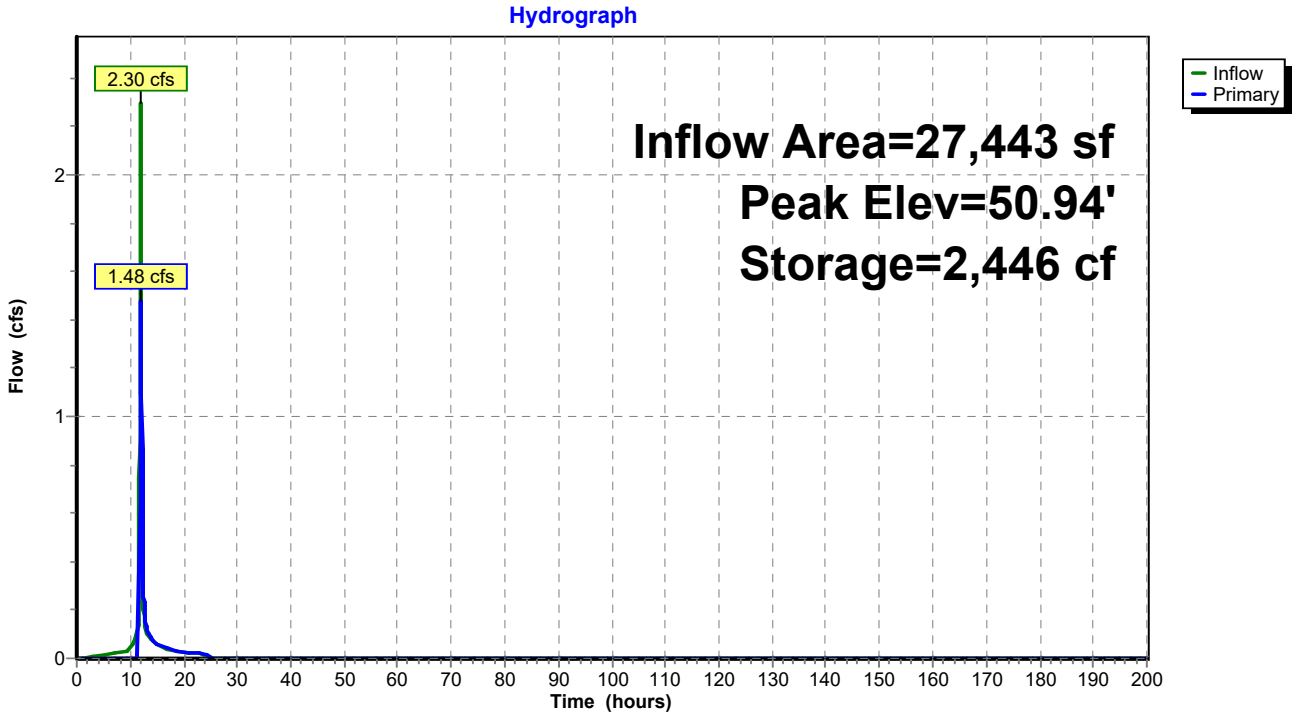
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

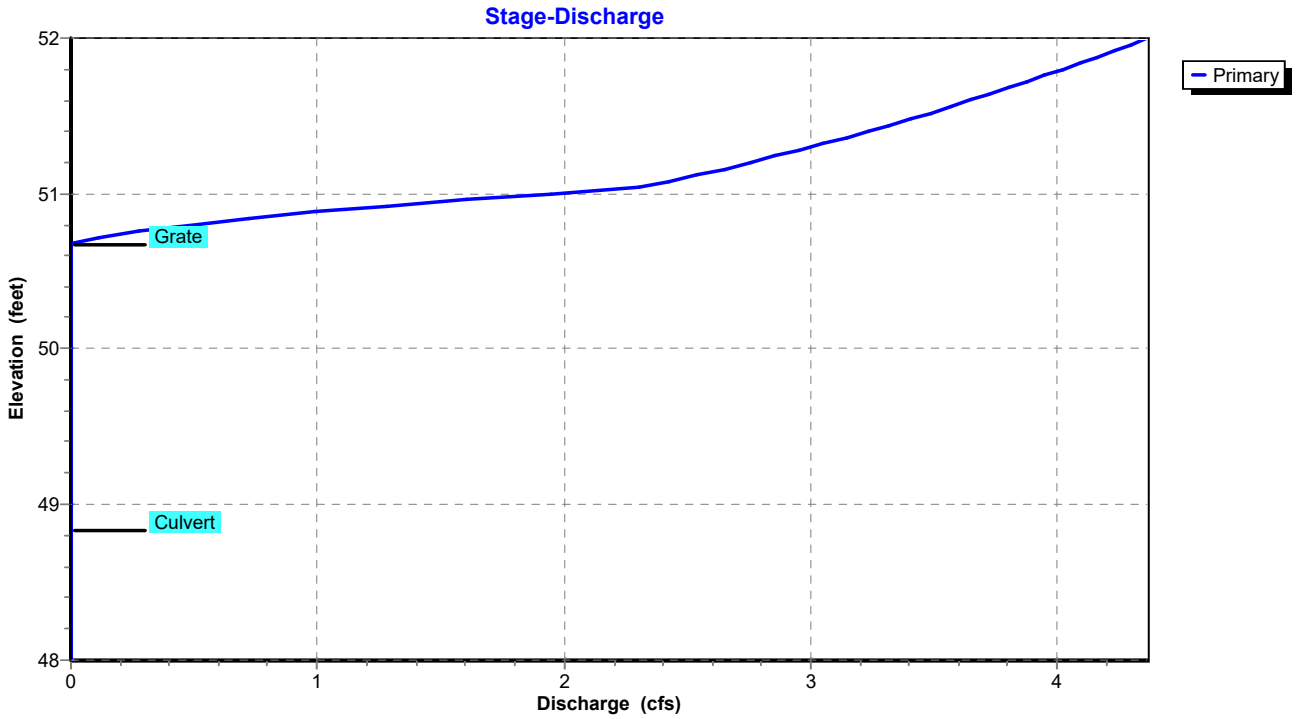
Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.45 cfs @ 12.05 hrs HW=50.94' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 1.45 cfs of 3.81 cfs potential flow)
↑—**2=Grate** (Weir Controls 1.45 cfs @ 1.70 fps)

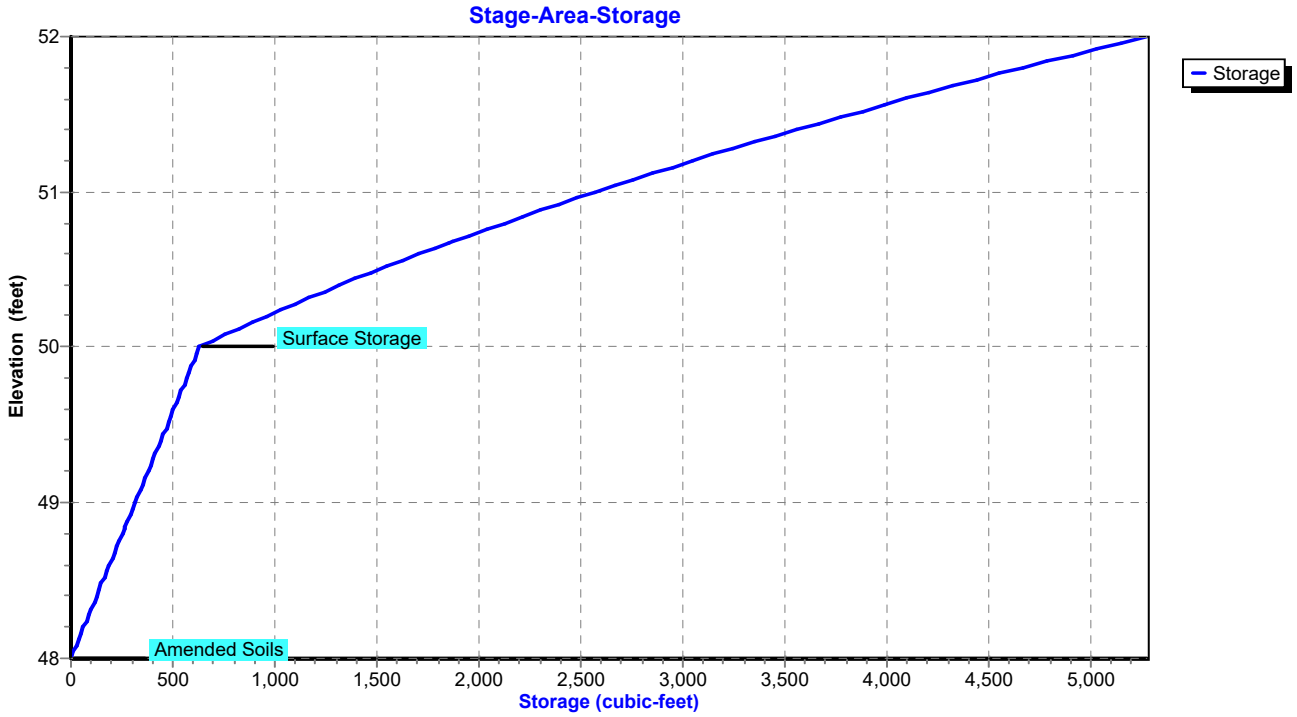
Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)

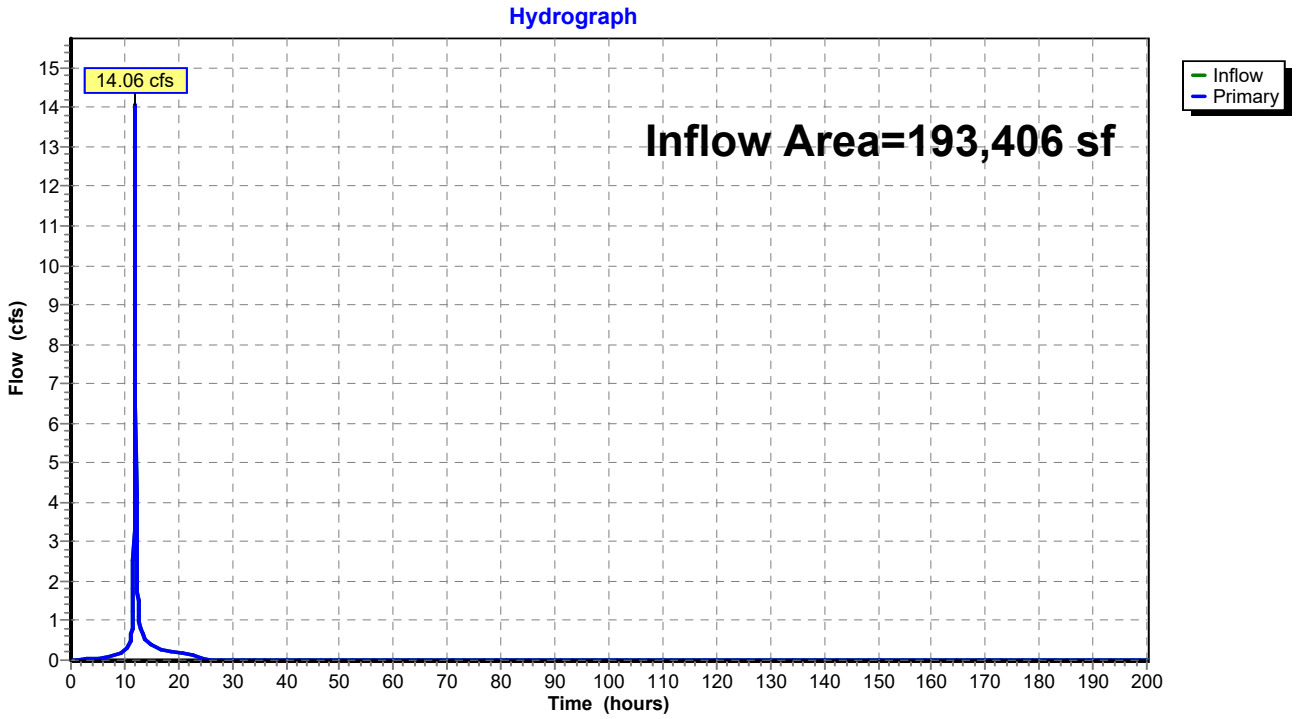


Summary for Link 2L: DP-001 (POST)

Inflow Area = 193,406 sf, 46.17% Impervious, Inflow Depth = 2.08" for 2-Year event
Inflow = 14.06 cfs @ 11.98 hrs, Volume= 33,523 cf
Primary = 14.06 cfs @ 11.98 hrs, Volume= 33,523 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 2L: DP-001 (POST)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: PDRA-1 (Bypass) Runoff Area=3.810 ac 44.88% Impervious Runoff Depth=2.92"
Tc=6.0 min CN=WQ Runoff=17.73 cfs 40,437 cf

Subcatchment4S: PDRA-1 (RG-1) Runoff Area=0.630 ac 53.97% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=WQ Runoff=3.05 cfs 7,049 cf

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.06' Storage=2,709 cf Inflow=3.05 cfs 7,049 cf
Outflow=2.37 cfs 5,198 cf

Link 2L: DP-001 (POST) Inflow=19.81 cfs 45,635 cf
Primary=19.81 cfs 45,635 cf

Total Runoff Area = 193,406 sf Runoff Volume = 47,486 cf Average Runoff Depth = 2.95"
53.83% Pervious = 104,108 sf 46.17% Impervious = 89,298 sf

Summary for Subcatchment 2S: PDRA-1 (Bypass)

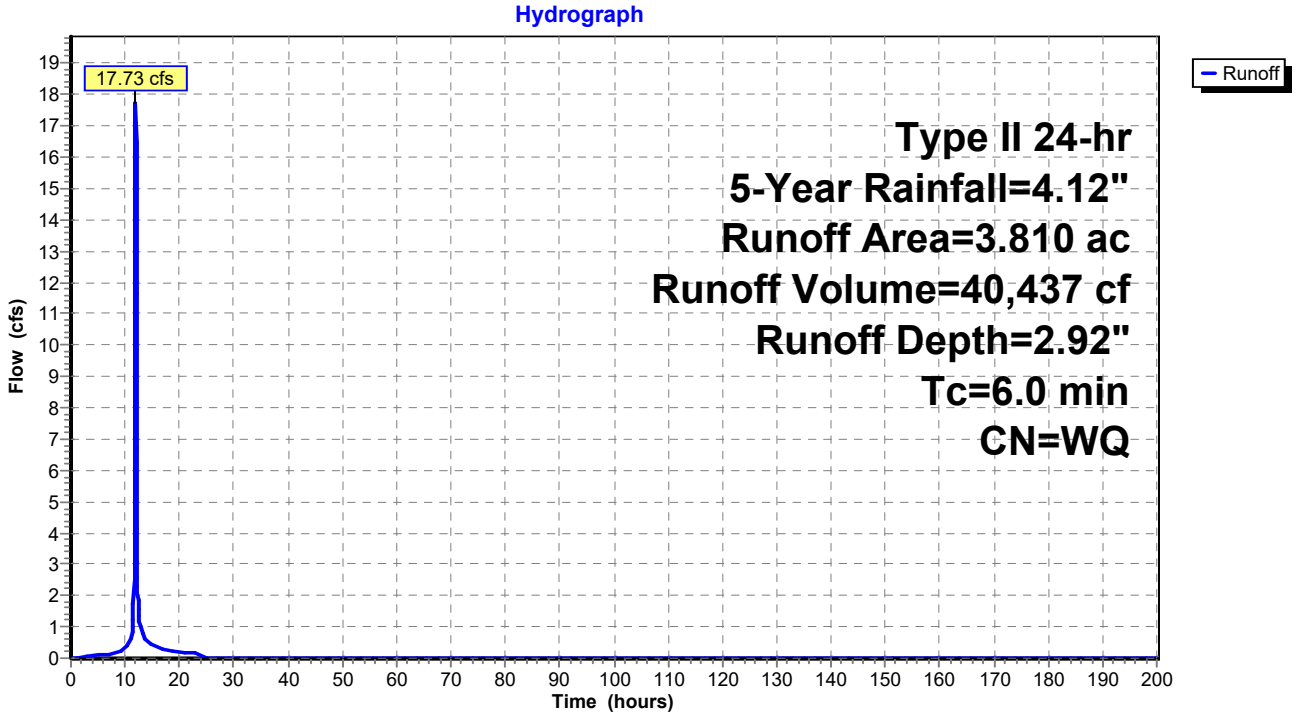
Runoff = 17.73 cfs @ 11.97 hrs, Volume= 40,437 cf, Depth= 2.92"
Routed to Link 2L : DP-001 (POST)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 5-Year Rainfall=4.12"

Area (ac)	CN	Description
2.100	80	>75% Grass cover, Good, HSG D
1.710	98	Paved parking, HSG D
3.810		Weighted Average
2.100		55.12% Pervious Area
1.710		44.88% Impervious Area

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

Subcatchment 2S: PDRA-1 (Bypass)



Summary for Subcatchment 4S: PDRA-1 (RG-1)

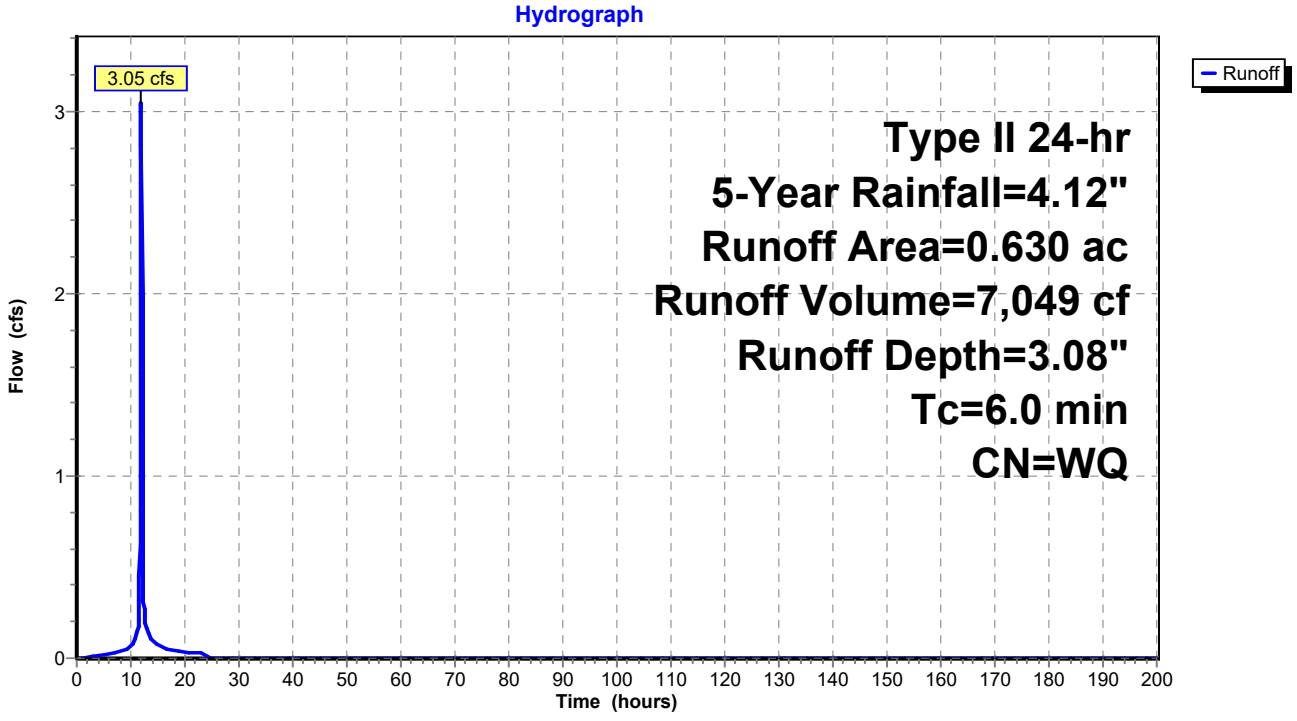
Runoff = 3.05 cfs @ 11.97 hrs, Volume= 7,049 cf, Depth= 3.08"
Routed to Pond 3P : Raingarden 1 (BMP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 5-Year Rainfall=4.12"

Area (ac)	CN	Description
0.290	80	>75% Grass cover, Good, HSG D
0.340	98	Paved parking, HSG D
0.630		Weighted Average
0.290		46.03% Pervious Area
0.340		53.97% Impervious Area

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

Subcatchment 4S: PDRA-1 (RG-1)



Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 3.08" for 5-Year event
Inflow = 3.05 cfs @ 11.97 hrs, Volume= 7,049 cf
Outflow = 2.37 cfs @ 12.02 hrs, Volume= 5,198 cf, Atten= 22%, Lag= 3.3 min
Primary = 2.37 cfs @ 12.02 hrs, Volume= 5,198 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.06' @ 12.02 hrs Surf.Area= 3,932 sf Storage= 2,709 cf

Plug-Flow detention time= 174.3 min calculated for 5,198 cf (74% of inflow)
Center-of-Mass det. time= 79.0 min (851.9 - 772.9)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

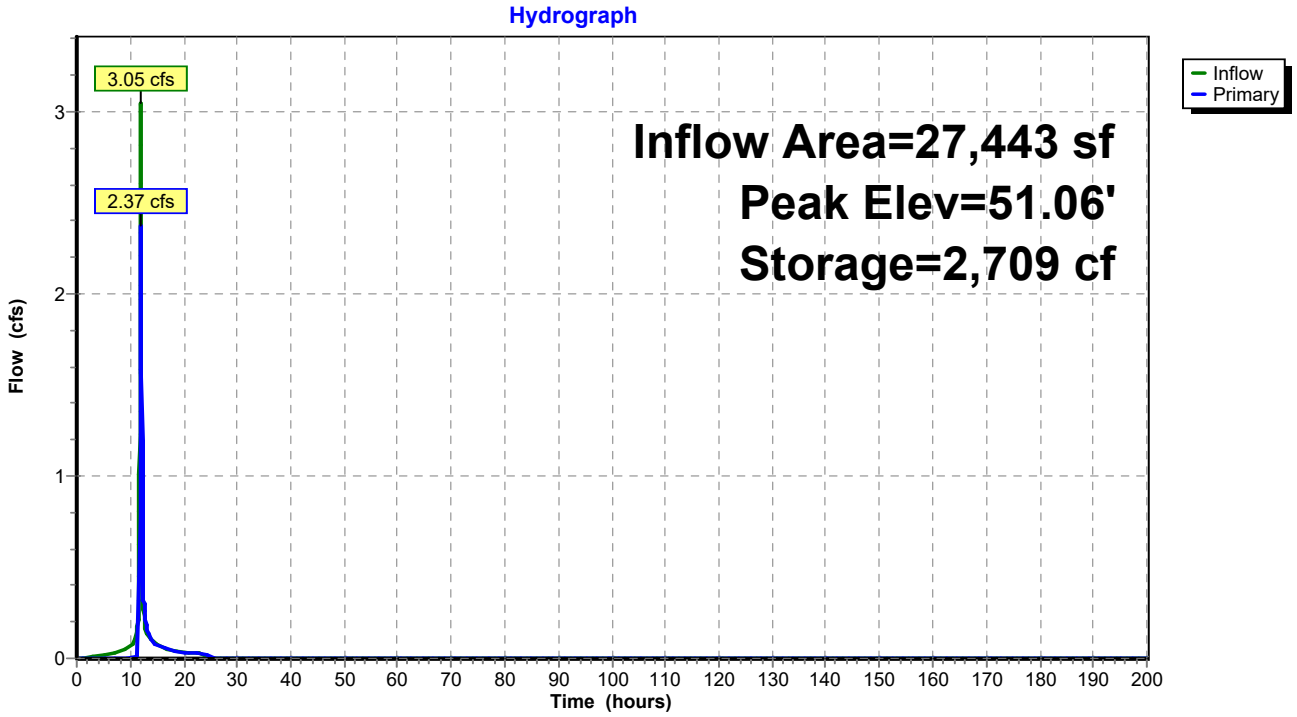
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

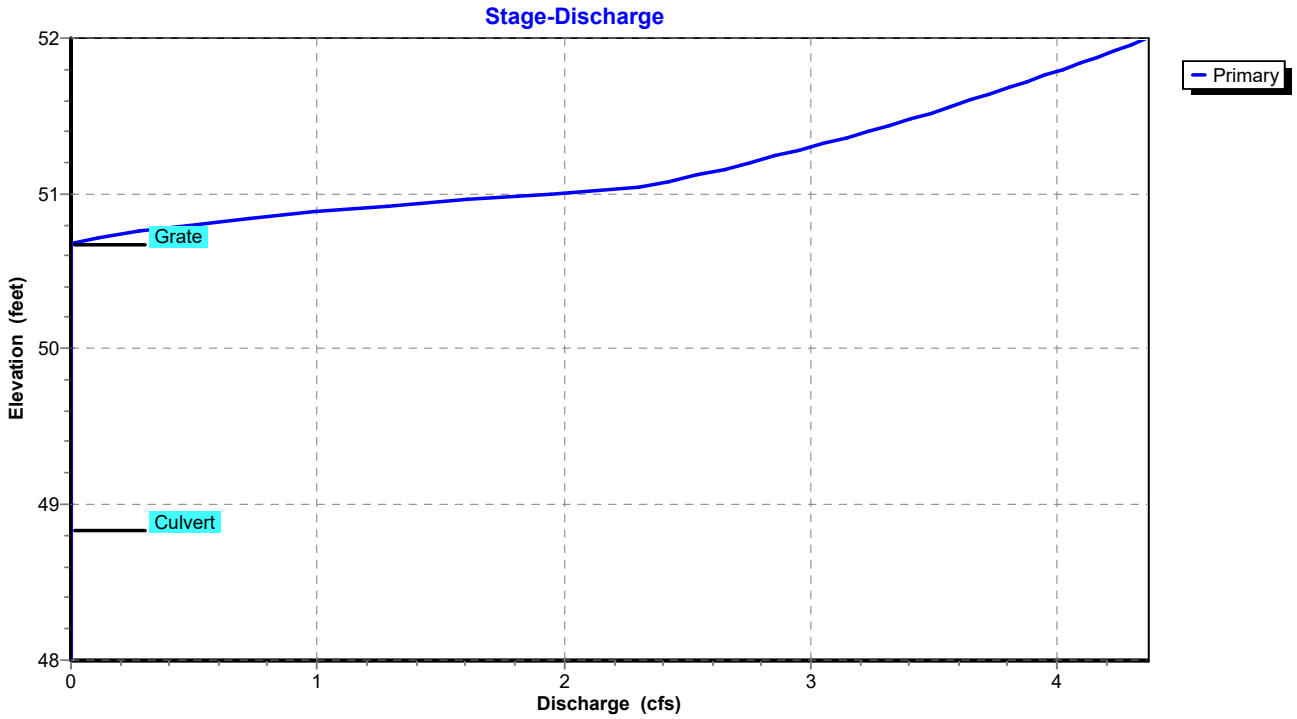
Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.34 cfs @ 12.02 hrs HW=51.05' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 2.34 cfs of 3.93 cfs potential flow)
↑—**2=Grate** (Orifice Controls 2.34 cfs @ 2.98 fps)

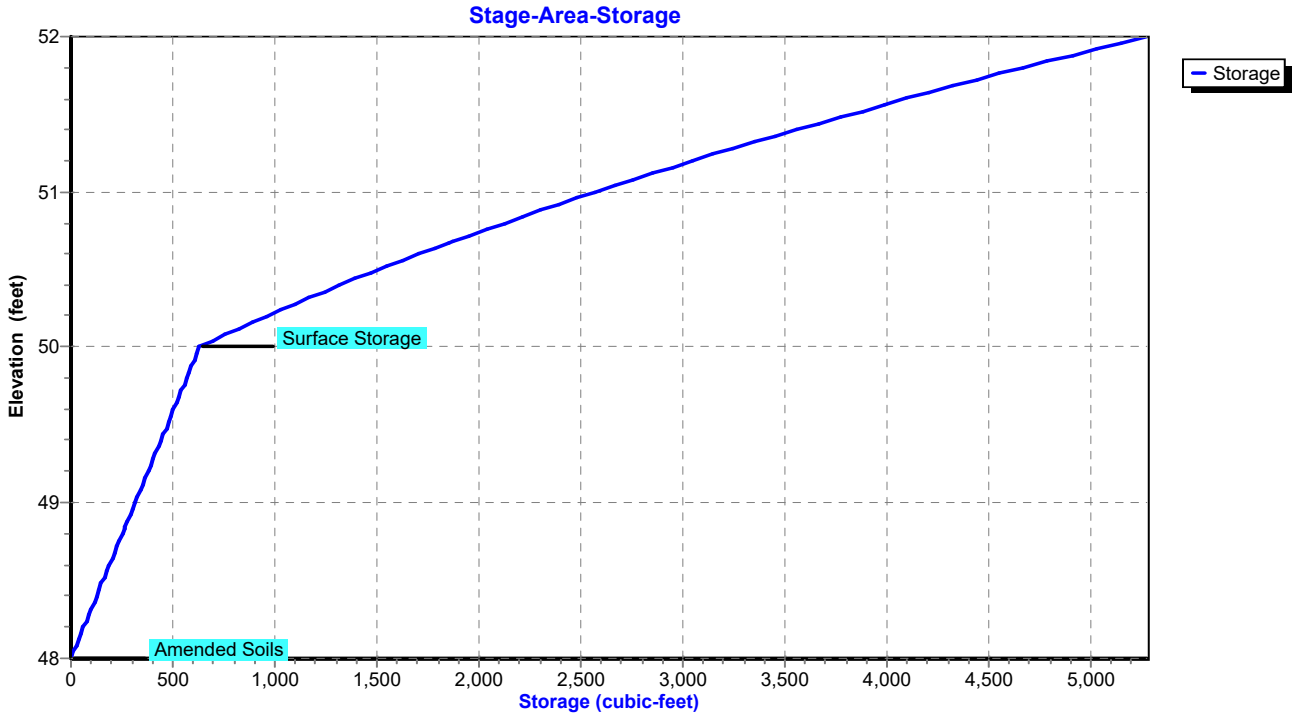
Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)

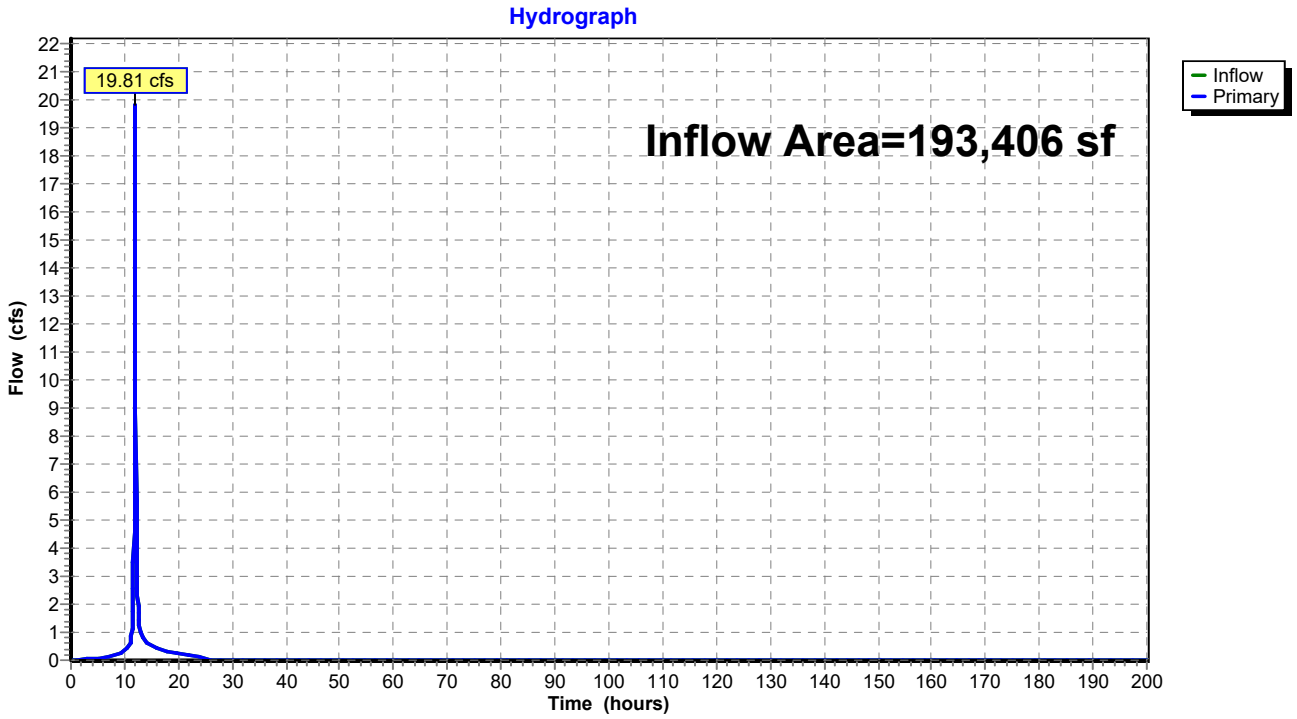


Summary for Link 2L: DP-001 (POST)

Inflow Area = 193,406 sf, 46.17% Impervious, Inflow Depth = 2.83" for 5-Year event
Inflow = 19.81 cfs @ 11.97 hrs, Volume= 45,635 cf
Primary = 19.81 cfs @ 11.97 hrs, Volume= 45,635 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 2L: DP-001 (POST)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: PDRA-1 (Bypass) Runoff Area=3.810 ac 44.88% Impervious Runoff Depth=3.57"
Tc=6.0 min CN=WQ Runoff=21.56 cfs 49,311 cf

Subcatchment4S: PDRA-1 (RG-1) Runoff Area=0.630 ac 53.97% Impervious Runoff Depth=3.73"
Tc=6.0 min CN=WQ Runoff=3.68 cfs 8,538 cf

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.16' Storage=2,959 cf Inflow=3.68 cfs 8,538 cf
Outflow=2.65 cfs 6,686 cf

Link 2L: DP-001 (POST) Inflow=24.05 cfs 55,997 cf
Primary=24.05 cfs 55,997 cf

Total Runoff Area = 193,406 sf Runoff Volume = 57,848 cf Average Runoff Depth = 3.59"
53.83% Pervious = 104,108 sf 46.17% Impervious = 89,298 sf

Summary for Subcatchment 2S: PDRA-1 (Bypass)

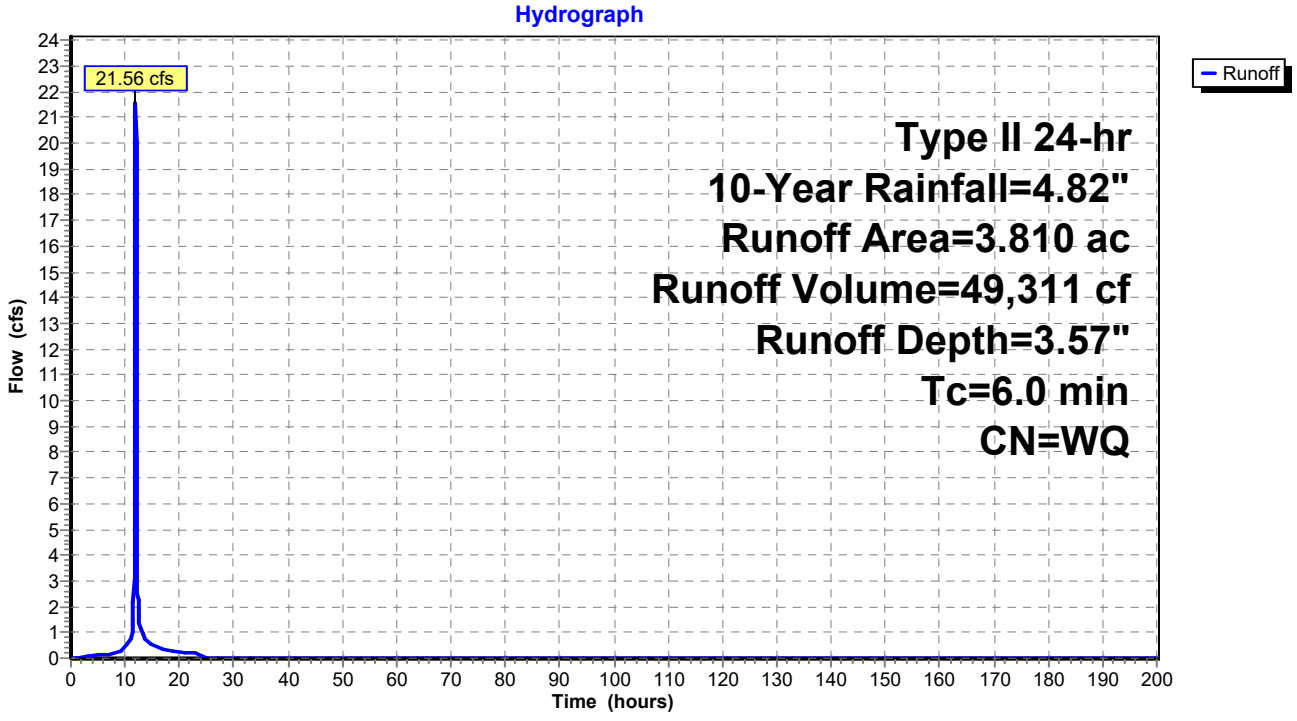
Runoff = 21.56 cfs @ 11.97 hrs, Volume= 49,311 cf, Depth= 3.57"
Routed to Link 2L : DP-001 (POST)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.82"

Area (ac)	CN	Description
2.100	80	>75% Grass cover, Good, HSG D
1.710	98	Paved parking, HSG D
3.810		Weighted Average
2.100		55.12% Pervious Area
1.710		44.88% Impervious Area

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

Subcatchment 2S: PDRA-1 (Bypass)



Summary for Subcatchment 4S: PDRA-1 (RG-1)

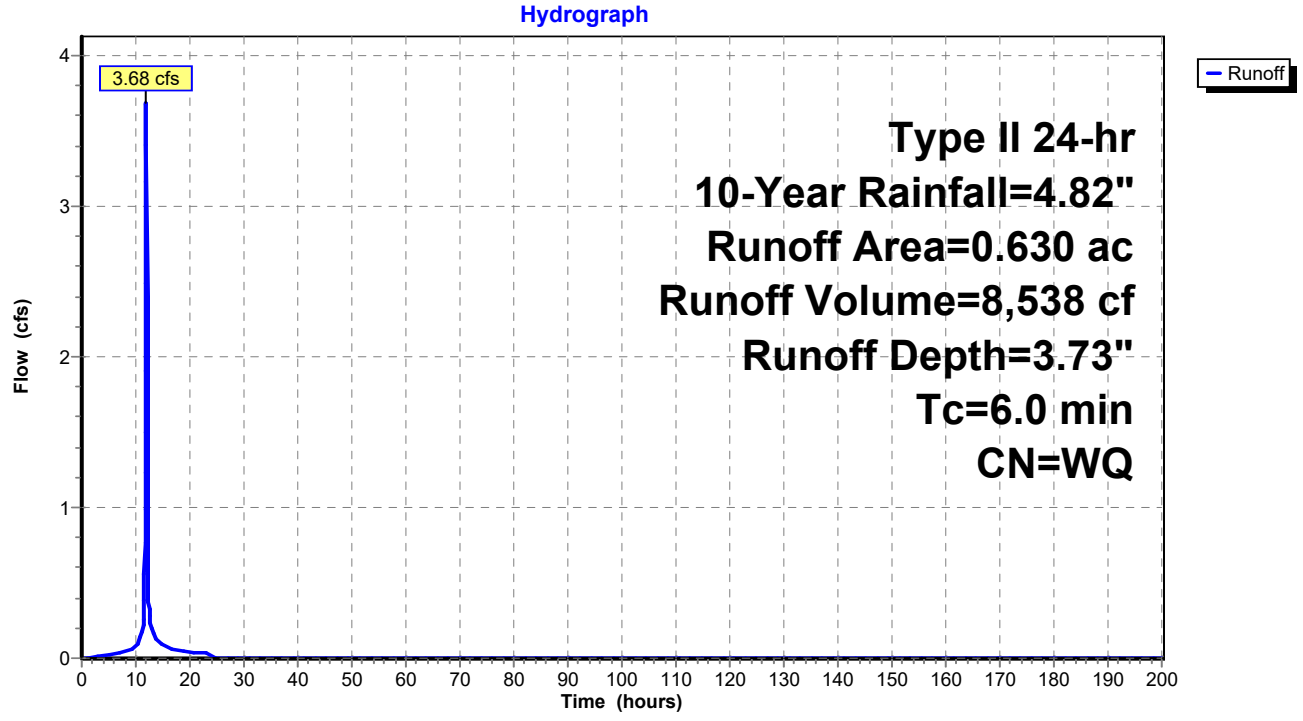
Runoff = 3.68 cfs @ 11.97 hrs, Volume= 8,538 cf, Depth= 3.73"
Routed to Pond 3P : Raingarden 1 (BMP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.82"

Area (ac)	CN	Description
0.290	80	>75% Grass cover, Good, HSG D
0.340	98	Paved parking, HSG D
0.630		Weighted Average
0.290		46.03% Pervious Area
0.340		53.97% Impervious Area

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

Subcatchment 4S: PDRA-1 (RG-1)



Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 3.73" for 10-Year event
Inflow = 3.68 cfs @ 11.97 hrs, Volume= 8,538 cf
Outflow = 2.65 cfs @ 12.03 hrs, Volume= 6,686 cf, Atten= 28%, Lag= 3.9 min
Primary = 2.65 cfs @ 12.03 hrs, Volume= 6,686 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.16' @ 12.03 hrs Surf.Area= 4,014 sf Storage= 2,959 cf

Plug-Flow detention time= 157.3 min calculated for 6,685 cf (78% of inflow)
Center-of-Mass det. time= 71.1 min (841.2 - 770.1)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

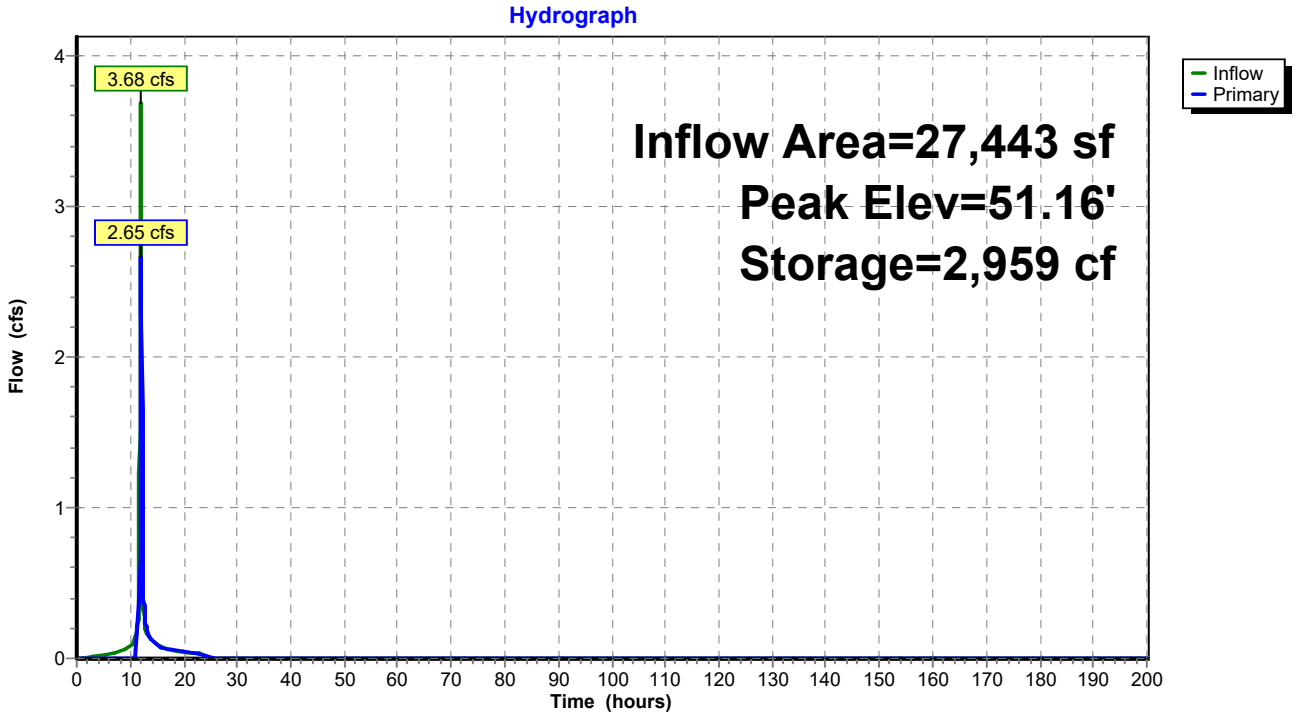
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

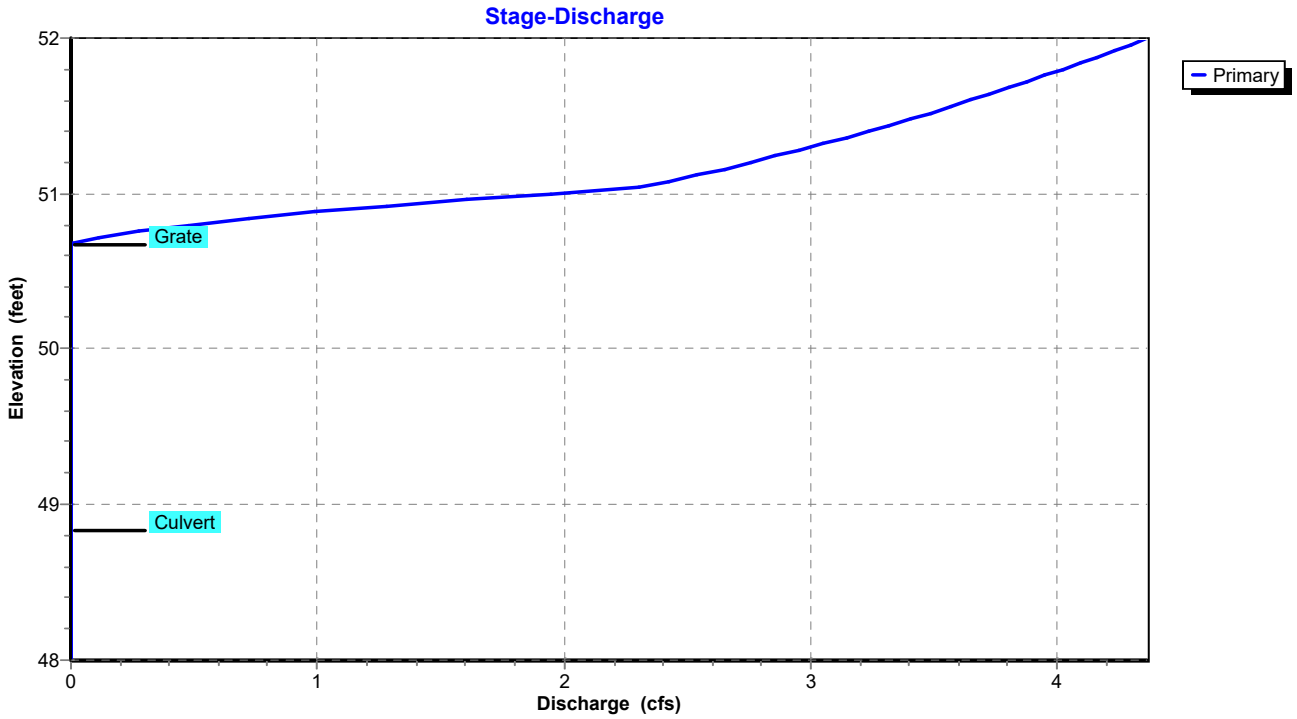
Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.64 cfs @ 12.03 hrs HW=51.16' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 2.64 cfs of 4.04 cfs potential flow)
↑**2=Grate** (Orifice Controls 2.64 cfs @ 3.36 fps)

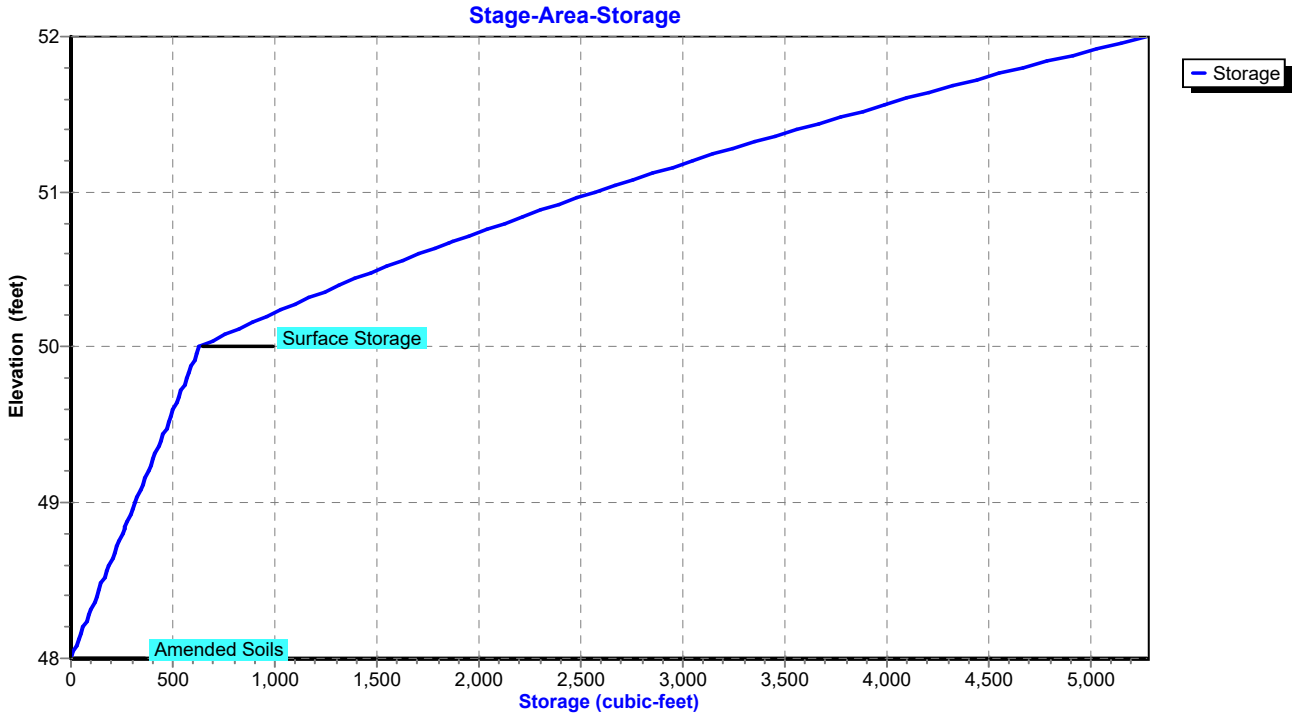
Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)

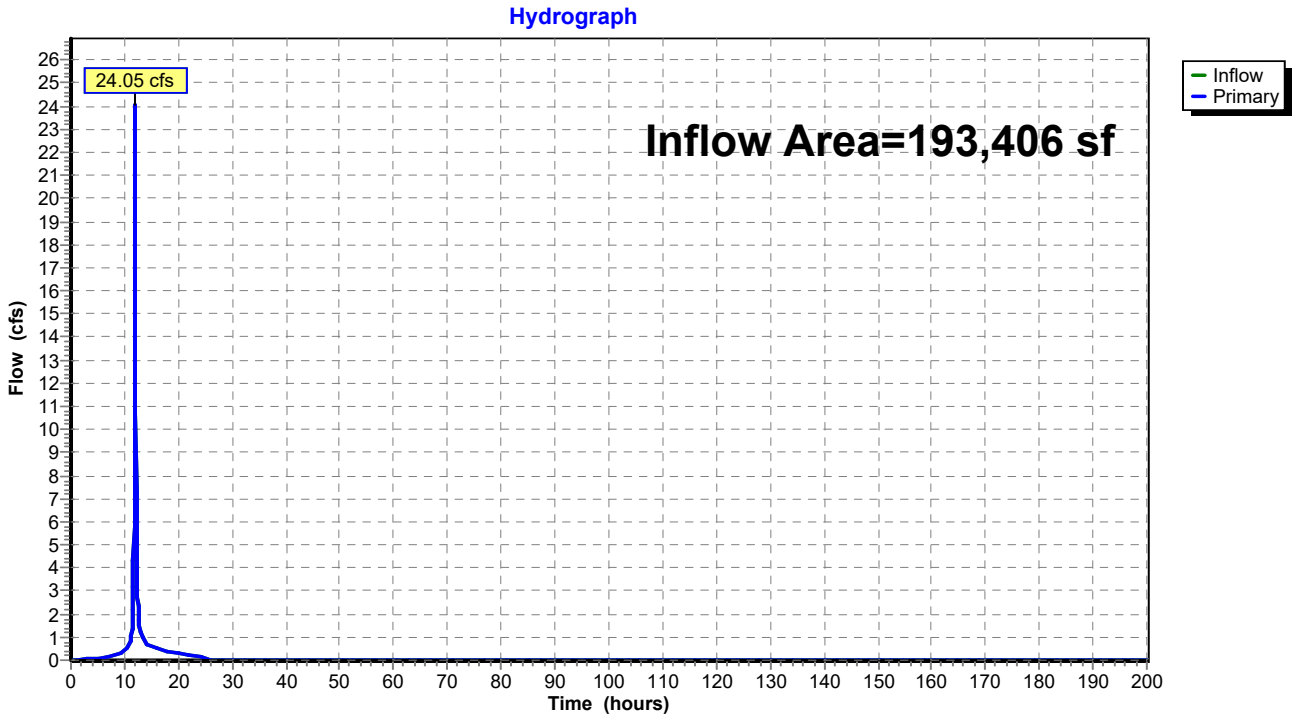


Summary for Link 2L: DP-001 (POST)

Inflow Area = 193,406 sf, 46.17% Impervious, Inflow Depth = 3.47" for 10-Year event
Inflow = 24.05 cfs @ 11.97 hrs, Volume= 55,997 cf
Primary = 24.05 cfs @ 11.97 hrs, Volume= 55,997 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 2L: DP-001 (POST)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: PDRA-1 (Bypass) Runoff Area=3.810 ac 44.88% Impervious Runoff Depth=4.51"
Tc=6.0 min CN=WQ Runoff=27.14 cfs 62,369 cf

Subcatchment4S: PDRA-1 (RG-1) Runoff Area=0.630 ac 53.97% Impervious Runoff Depth=4.69"
Tc=6.0 min CN=WQ Runoff=4.60 cfs 10,721 cf

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.32' Storage=3,350 cf Inflow=4.60 cfs 10,721 cf
Outflow=3.05 cfs 8,870 cf

Link 2L: DP-001 (POST) Inflow=29.92 cfs 71,239 cf
Primary=29.92 cfs 71,239 cf

Total Runoff Area = 193,406 sf Runoff Volume = 73,091 cf Average Runoff Depth = 4.53"
53.83% Pervious = 104,108 sf 46.17% Impervious = 89,298 sf

Summary for Subcatchment 2S: PDRA-1 (Bypass)

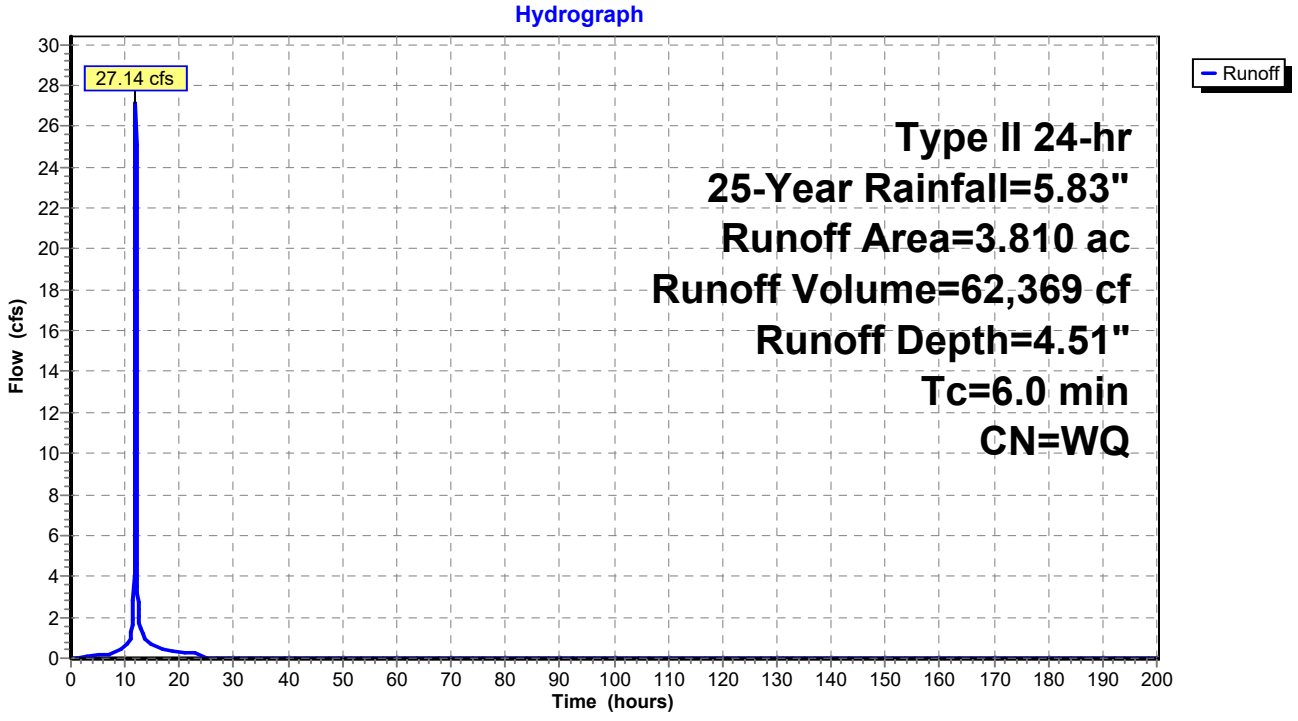
Runoff = 27.14 cfs @ 11.97 hrs, Volume= 62,369 cf, Depth= 4.51"
Routed to Link 2L : DP-001 (POST)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=5.83"

Area (ac)	CN	Description
2.100	80	>75% Grass cover, Good, HSG D
1.710	98	Paved parking, HSG D
3.810		Weighted Average
2.100		55.12% Pervious Area
1.710		44.88% Impervious Area

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

Subcatchment 2S: PDRA-1 (Bypass)



Summary for Subcatchment 4S: PDRA-1 (RG-1)

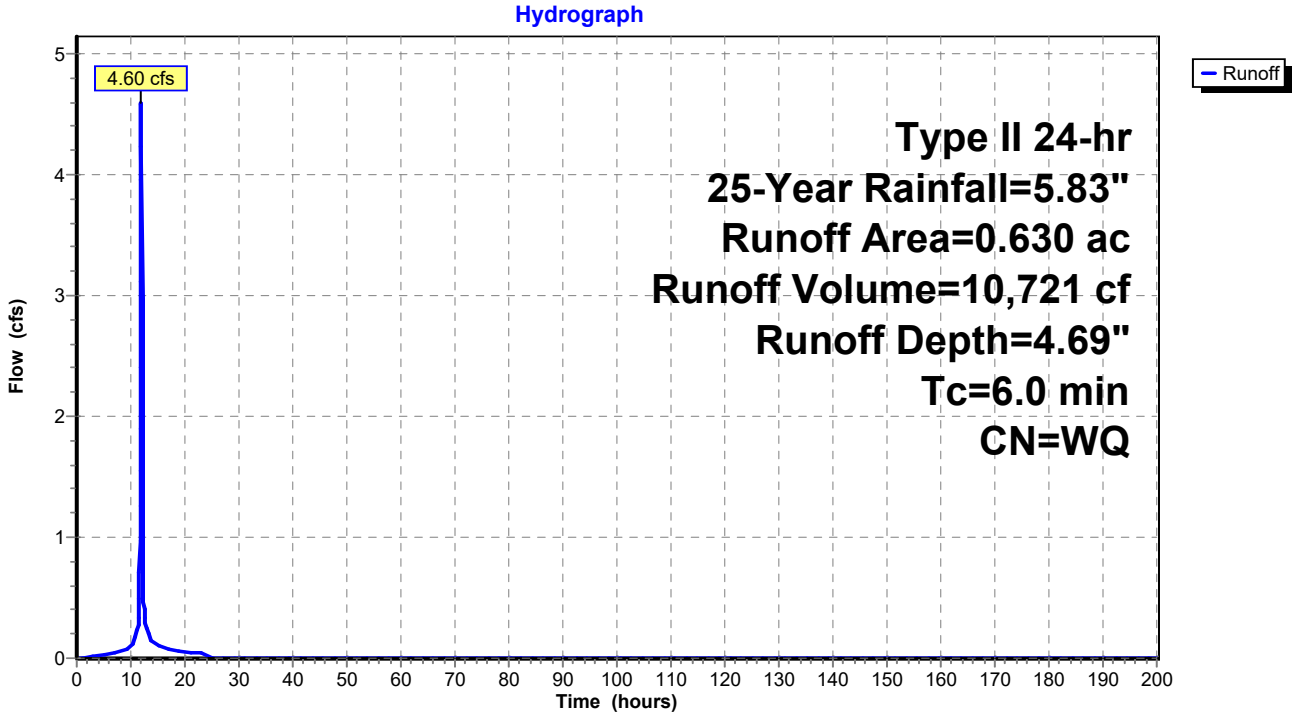
Runoff = 4.60 cfs @ 11.97 hrs, Volume= 10,721 cf, Depth= 4.69"
Routed to Pond 3P : Raingarden 1 (BMP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=5.83"

Area (ac)	CN	Description
0.290	80	>75% Grass cover, Good, HSG D
0.340	98	Paved parking, HSG D
0.630		Weighted Average
0.290		46.03% Pervious Area
0.340		53.97% Impervious Area

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

Subcatchment 4S: PDRA-1 (RG-1)



Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 4.69" for 25-Year event
Inflow = 4.60 cfs @ 11.97 hrs, Volume= 10,721 cf
Outflow = 3.05 cfs @ 12.04 hrs, Volume= 8,870 cf, Atten= 34%, Lag= 4.4 min
Primary = 3.05 cfs @ 12.04 hrs, Volume= 8,870 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.32' @ 12.04 hrs Surf.Area= 4,138 sf Storage= 3,350 cf

Plug-Flow detention time= 140.4 min calculated for 8,870 cf (83% of inflow)
Center-of-Mass det. time= 64.4 min (831.0 - 766.7)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

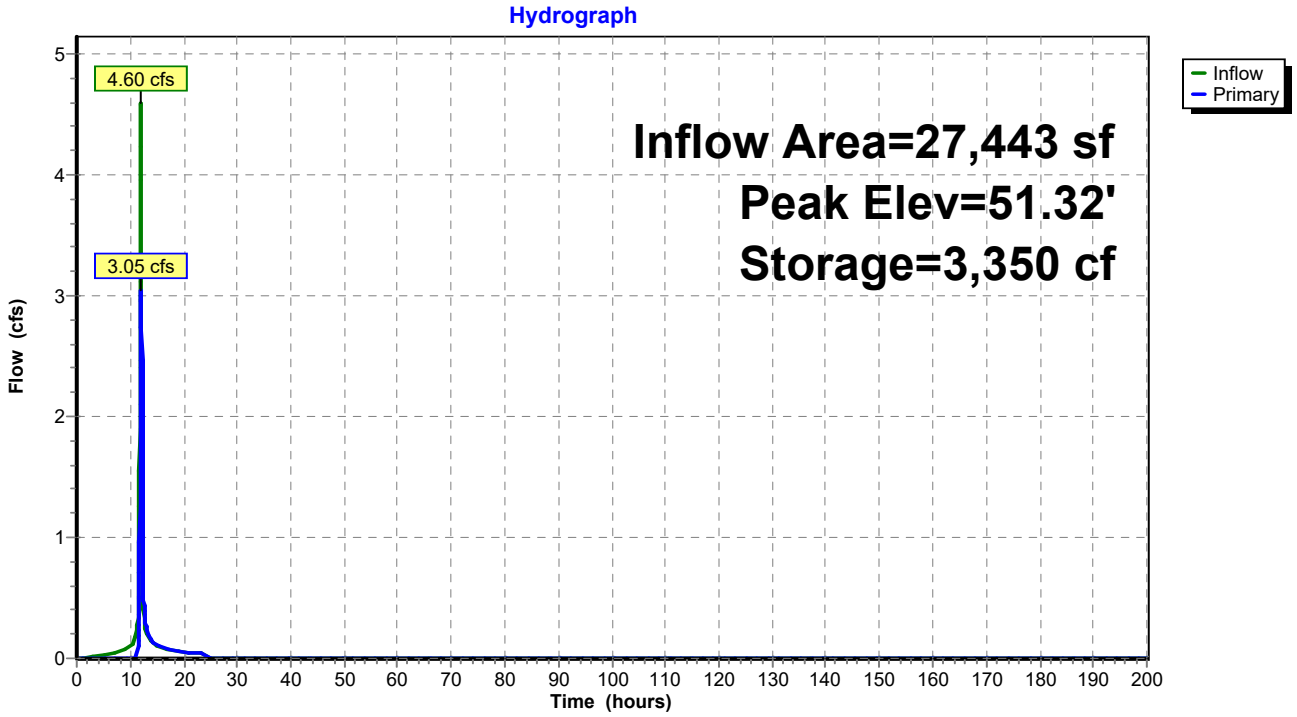
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

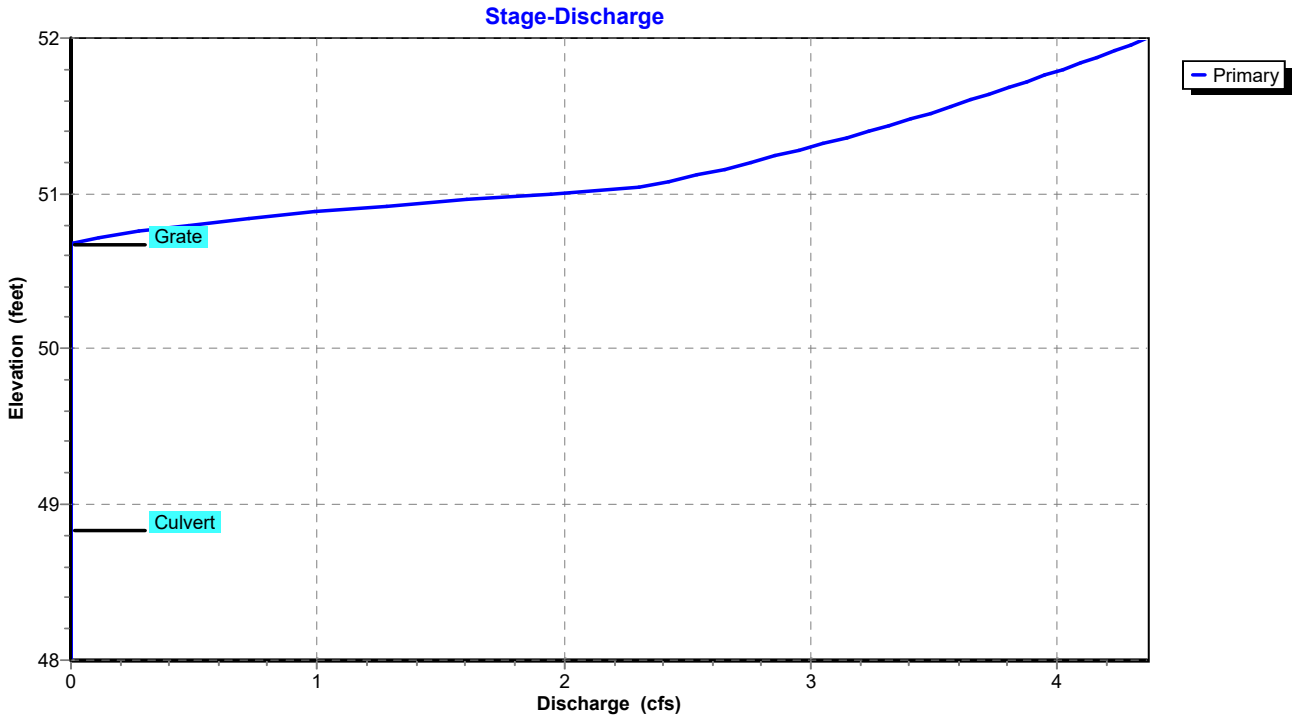
Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.04 cfs @ 12.04 hrs HW=51.32' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 3.04 cfs of 4.21 cfs potential flow)
↑**2=Grate** (Orifice Controls 3.04 cfs @ 3.88 fps)

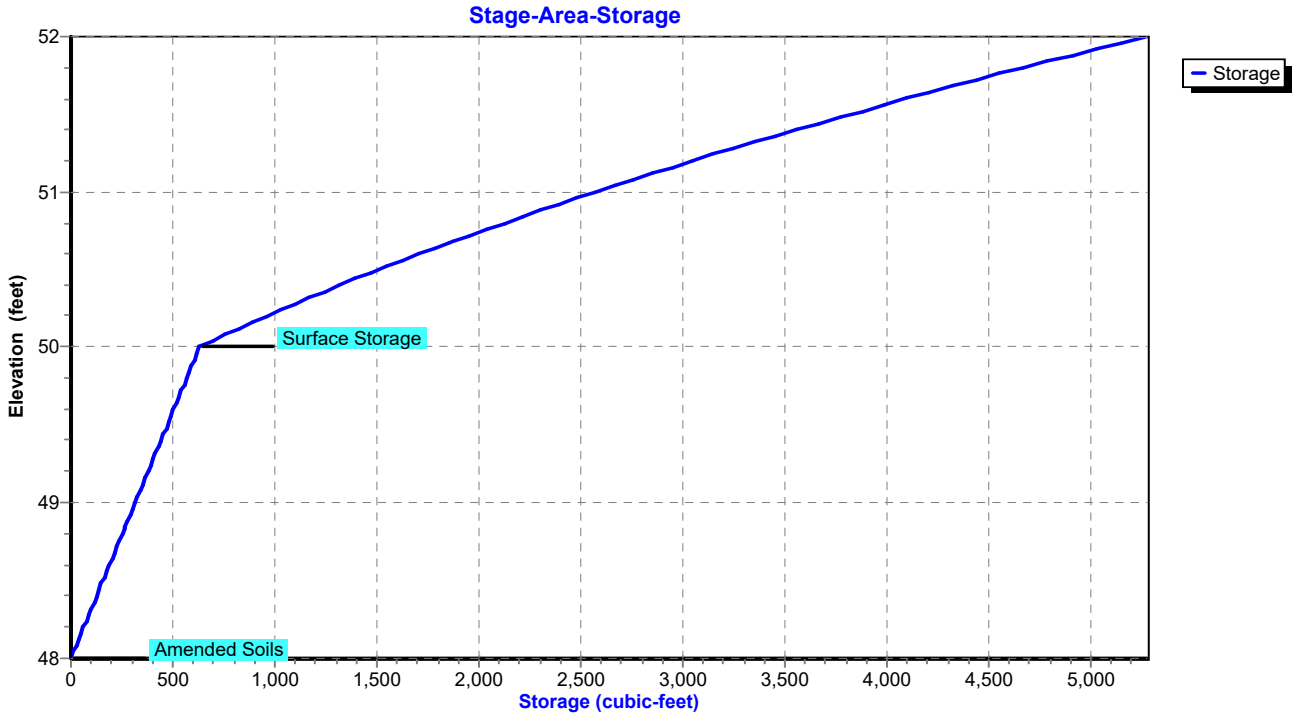
Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)

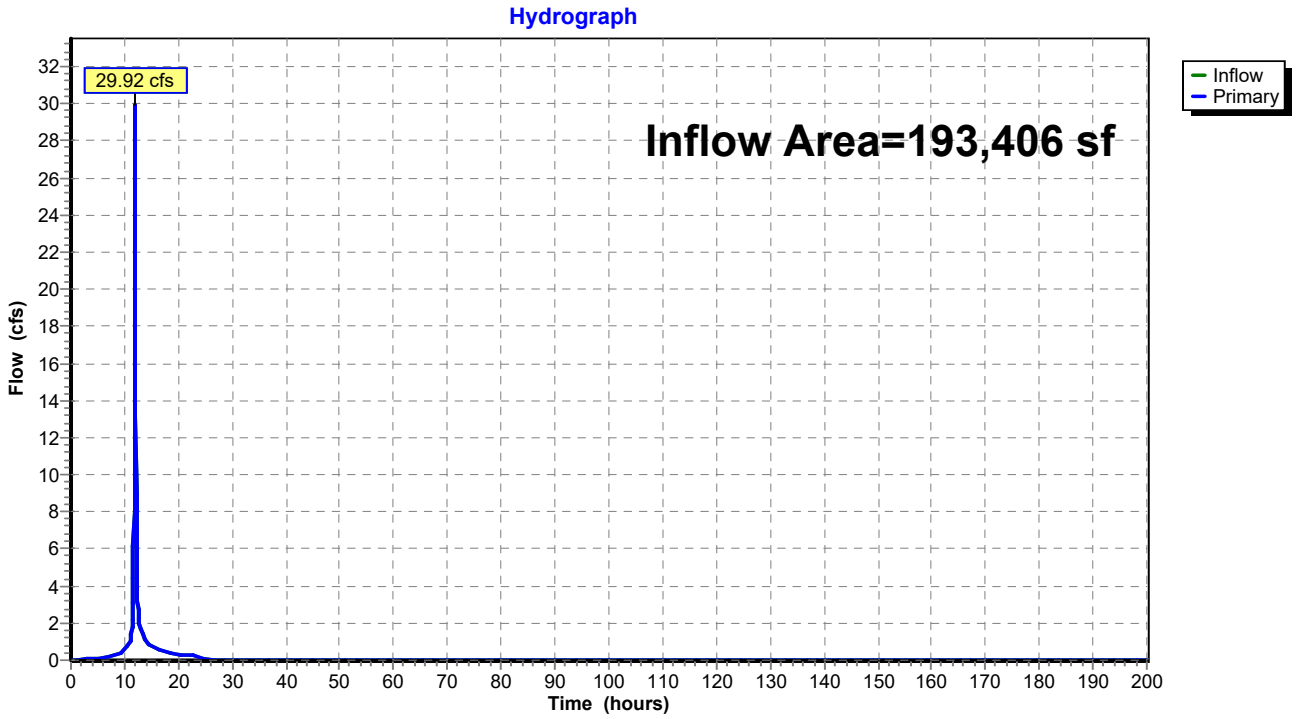


Summary for Link 2L: DP-001 (POST)

Inflow Area = 193,406 sf, 46.17% Impervious, Inflow Depth = 4.42" for 25-Year event
Inflow = 29.92 cfs @ 11.97 hrs, Volume= 71,239 cf
Primary = 29.92 cfs @ 11.97 hrs, Volume= 71,239 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 2L: DP-001 (POST)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: PDRA-1 (Bypass) Runoff Area=3.810 ac 44.88% Impervious Runoff Depth=5.32"
Tc=6.0 min CN=WQ Runoff=31.85 cfs 73,524 cf

Subcatchment4S: PDRA-1 (RG-1) Runoff Area=0.630 ac 53.97% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=WQ Runoff=5.38 cfs 12,582 cf

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.46' Storage=3,708 cf Inflow=5.38 cfs 12,582 cf
Outflow=3.35 cfs 10,731 cf

Link 2L: DP-001 (POST) Inflow=34.88 cfs 84,255 cf
Primary=34.88 cfs 84,255 cf

Total Runoff Area = 193,406 sf Runoff Volume = 86,106 cf Average Runoff Depth = 5.34"
53.83% Pervious = 104,108 sf 46.17% Impervious = 89,298 sf

Summary for Subcatchment 2S: PDRA-1 (Bypass)

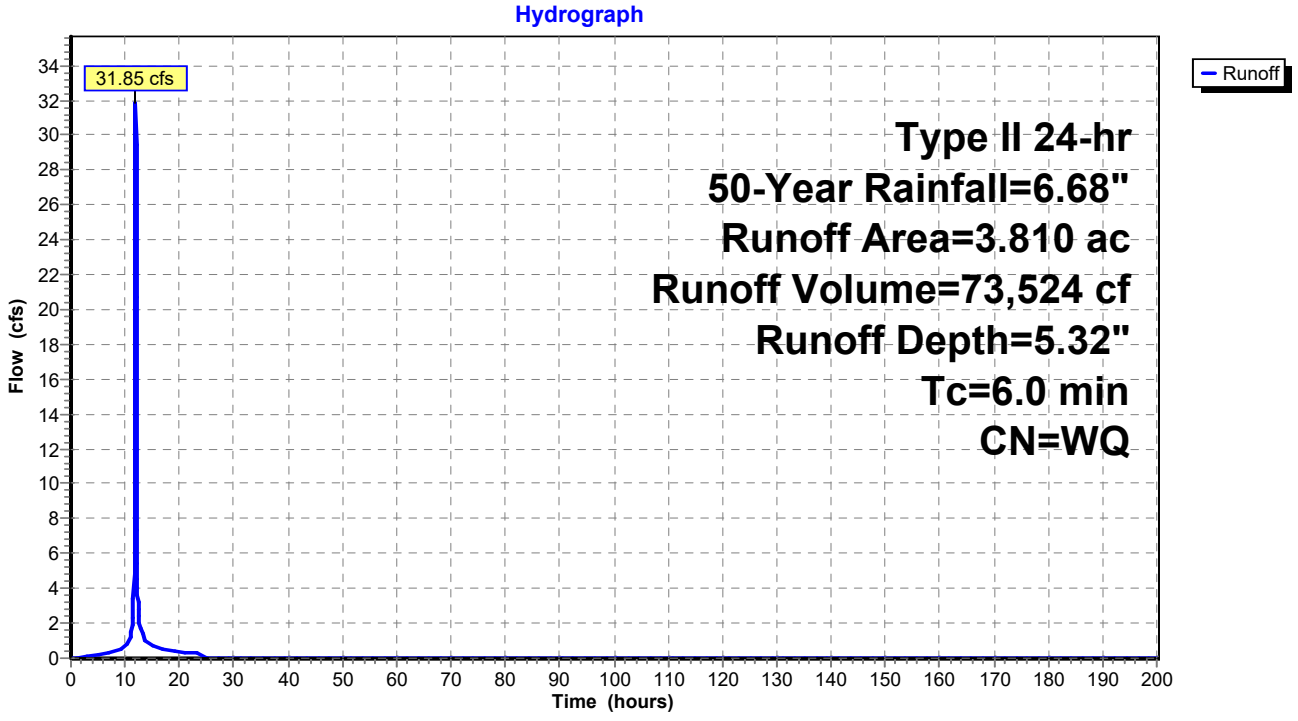
Runoff = 31.85 cfs @ 11.97 hrs, Volume= 73,524 cf, Depth= 5.32"
Routed to Link 2L : DP-001 (POST)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 50-Year Rainfall=6.68"

Area (ac)	CN	Description
2.100	80	>75% Grass cover, Good, HSG D
1.710	98	Paved parking, HSG D
3.810		Weighted Average
2.100		55.12% Pervious Area
1.710		44.88% Impervious Area

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

Subcatchment 2S: PDRA-1 (Bypass)



Summary for Subcatchment 4S: PDRA-1 (RG-1)

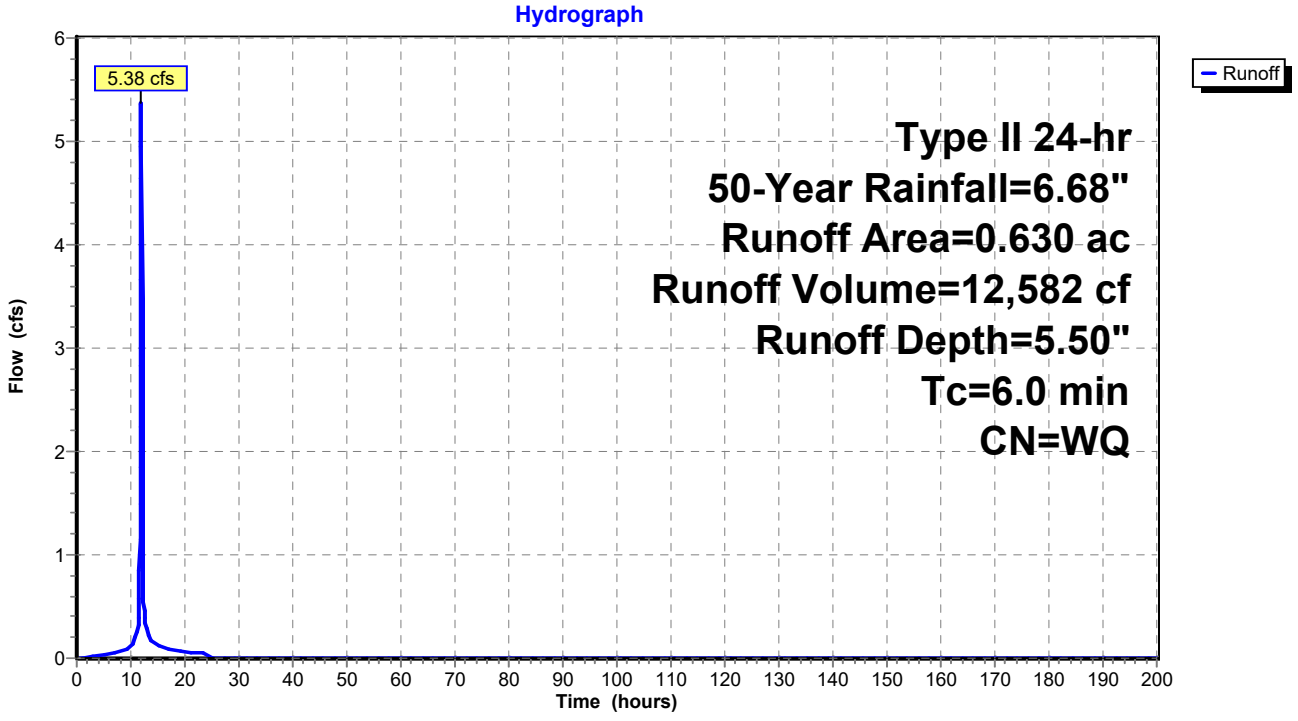
Runoff = 5.38 cfs @ 11.97 hrs, Volume= 12,582 cf, Depth= 5.50"
Routed to Pond 3P : Raingarden 1 (BMP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 50-Year Rainfall=6.68"

Area (ac)	CN	Description
0.290	80	>75% Grass cover, Good, HSG D
0.340	98	Paved parking, HSG D
0.630		Weighted Average
0.290		46.03% Pervious Area
0.340		53.97% Impervious Area

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

Subcatchment 4S: PDRA-1 (RG-1)



Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 5.50" for 50-Year event
Inflow = 5.38 cfs @ 11.97 hrs, Volume= 12,582 cf
Outflow = 3.35 cfs @ 12.04 hrs, Volume= 10,731 cf, Atten= 38%, Lag= 4.8 min
Primary = 3.35 cfs @ 12.04 hrs, Volume= 10,731 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.46' @ 12.04 hrs Surf.Area= 4,246 sf Storage= 3,708 cf

Plug-Flow detention time= 129.0 min calculated for 10,728 cf (85% of inflow)
Center-of-Mass det. time= 60.4 min (824.6 - 764.2)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

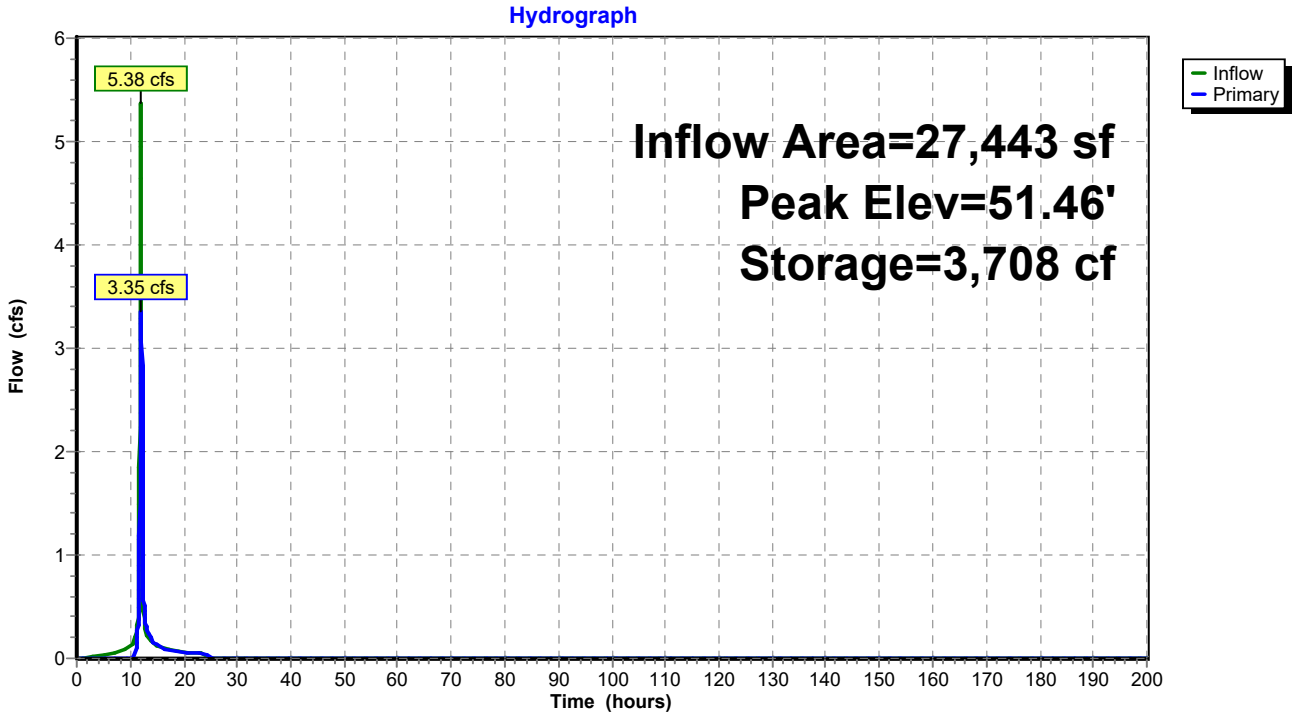
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

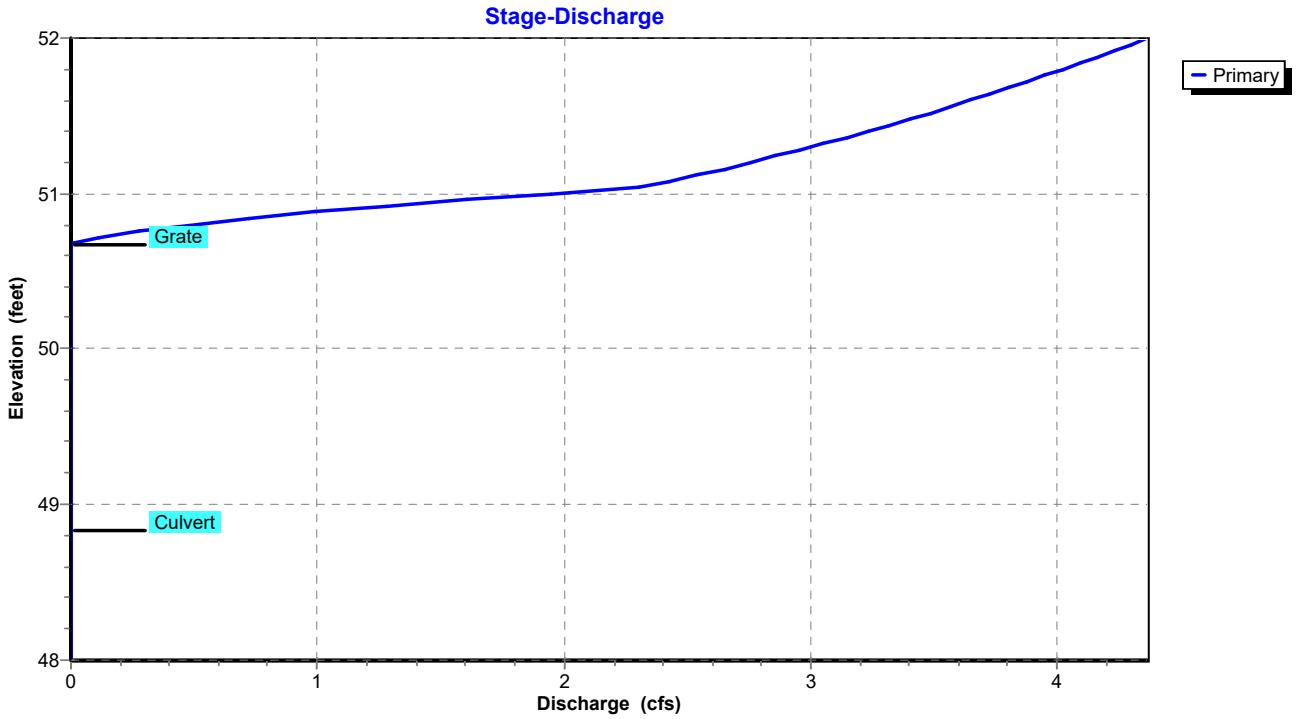
Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.34 cfs @ 12.04 hrs HW=51.45' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 3.34 cfs of 4.34 cfs potential flow)
↑—**2=Grate** (Orifice Controls 3.34 cfs @ 4.26 fps)

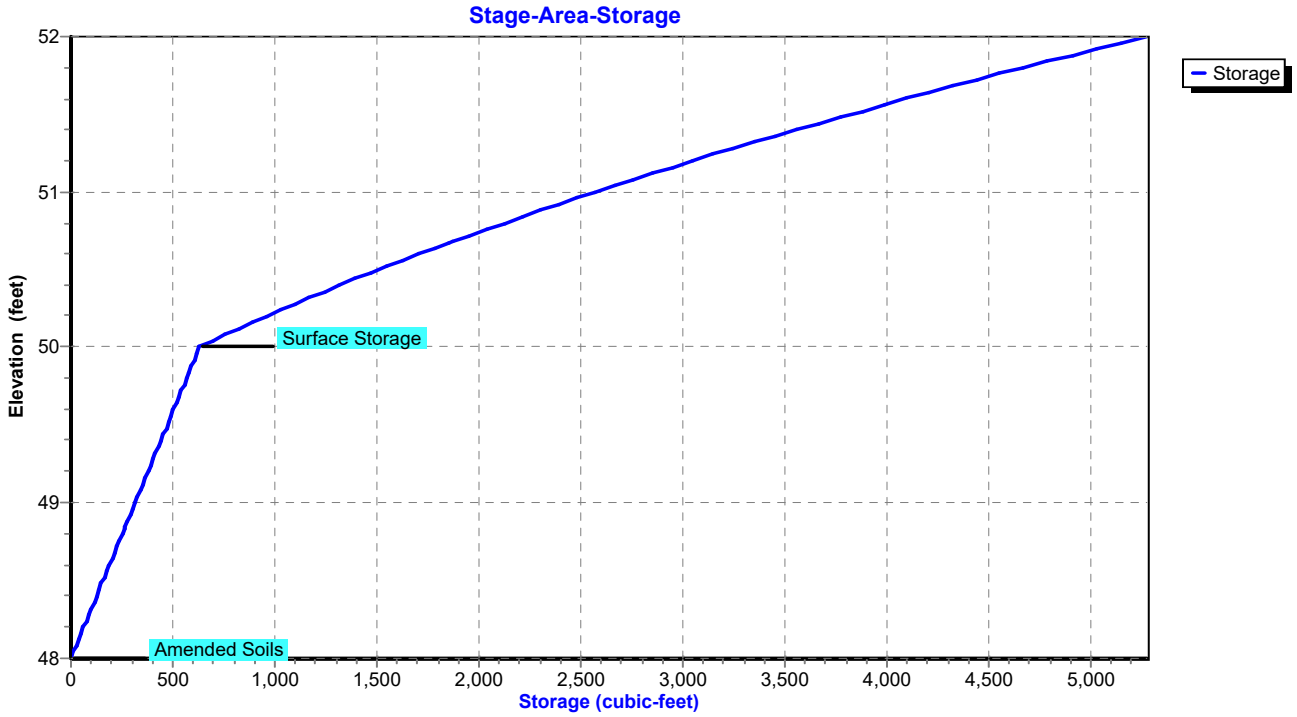
Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)

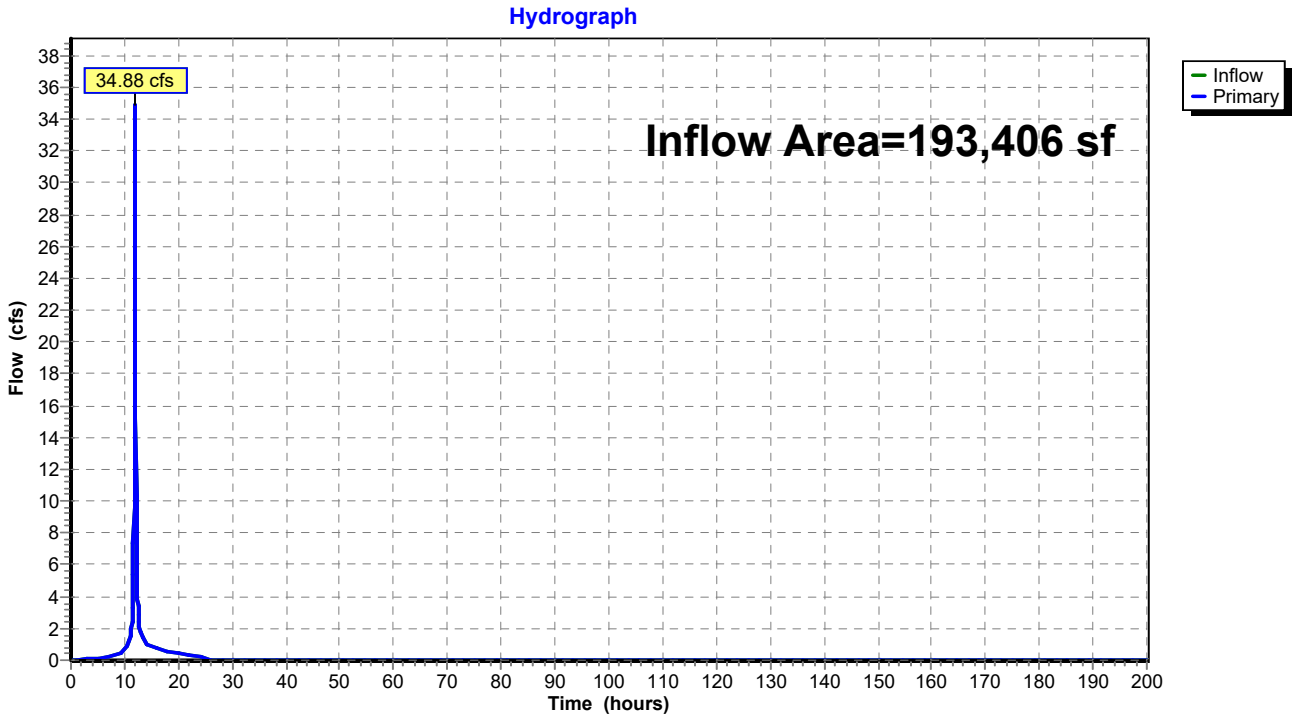


Summary for Link 2L: DP-001 (POST)

Inflow Area = 193,406 sf, 46.17% Impervious, Inflow Depth = 5.23" for 50-Year event
Inflow = 34.88 cfs @ 11.97 hrs, Volume= 84,255 cf
Primary = 34.88 cfs @ 11.97 hrs, Volume= 84,255 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 2L: DP-001 (POST)



Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: PDRA-1 (Bypass) Runoff Area=3.810 ac 44.88% Impervious Runoff Depth=6.20"
Tc=6.0 min CN=WQ Runoff=36.97 cfs 85,717 cf

Subcatchment4S: PDRA-1 (RG-1) Runoff Area=0.630 ac 53.97% Impervious Runoff Depth=6.39"
Tc=6.0 min CN=WQ Runoff=6.22 cfs 14,612 cf

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.61' Storage=4,123 cf Inflow=6.22 cfs 14,612 cf
Outflow=3.66 cfs 12,761 cf

Link 2L: DP-001 (POST) Inflow=40.25 cfs 98,478 cf
Primary=40.25 cfs 98,478 cf

Total Runoff Area = 193,406 sf Runoff Volume = 100,329 cf Average Runoff Depth = 6.22"
53.83% Pervious = 104,108 sf 46.17% Impervious = 89,298 sf

Summary for Subcatchment 2S: PDRA-1 (Bypass)

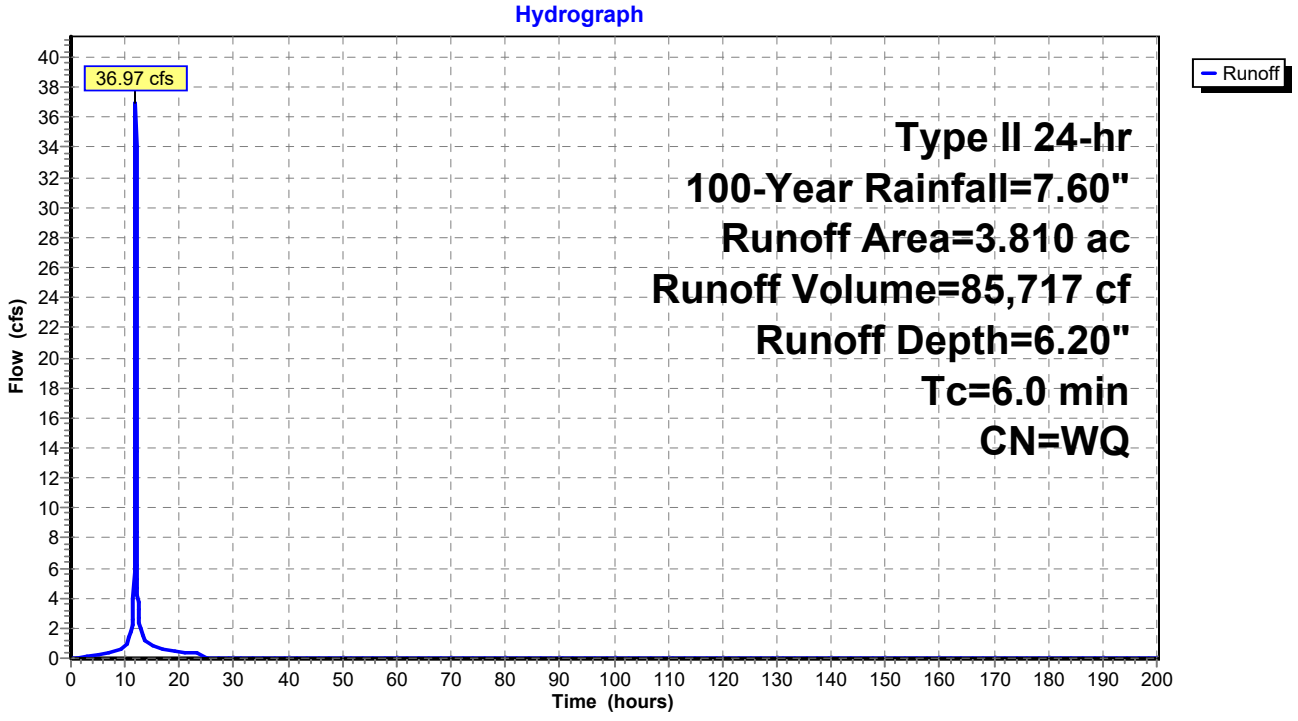
Runoff = 36.97 cfs @ 11.97 hrs, Volume= 85,717 cf, Depth= 6.20"
Routed to Link 2L : DP-001 (POST)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=7.60"

Area (ac)	CN	Description
2.100	80	>75% Grass cover, Good, HSG D
1.710	98	Paved parking, HSG D
3.810		Weighted Average
2.100		55.12% Pervious Area
1.710		44.88% Impervious Area

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

Subcatchment 2S: PDRA-1 (Bypass)



Summary for Subcatchment 4S: PDRA-1 (RG-1)

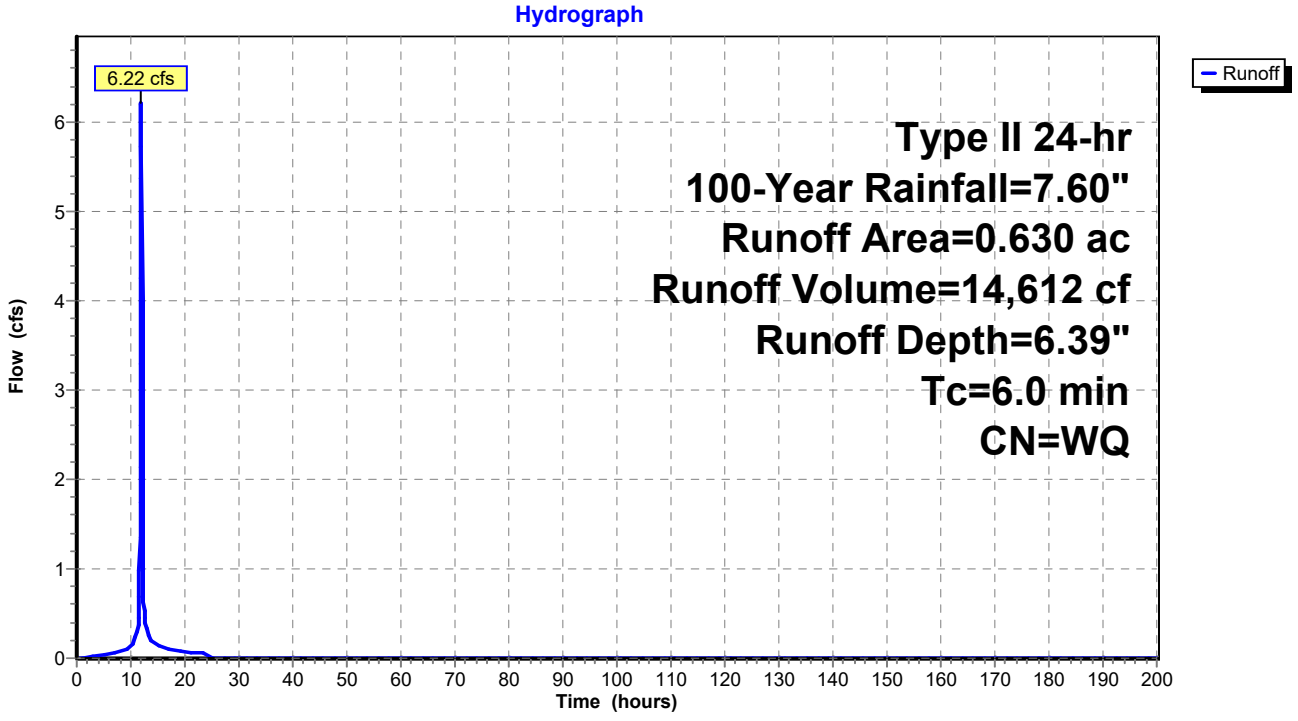
Runoff = 6.22 cfs @ 11.97 hrs, Volume= 14,612 cf, Depth= 6.39"
Routed to Pond 3P : Raingarden 1 (BMP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=7.60"

Area (ac)	CN	Description
0.290	80	>75% Grass cover, Good, HSG D
0.340	98	Paved parking, HSG D
0.630		Weighted Average
0.290		46.03% Pervious Area
0.340		53.97% Impervious Area

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

Subcatchment 4S: PDRA-1 (RG-1)



Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 6.39" for 100-Year event
Inflow = 6.22 cfs @ 11.97 hrs, Volume= 14,612 cf
Outflow = 3.66 cfs @ 12.05 hrs, Volume= 12,761 cf, Atten= 41%, Lag= 5.1 min
Primary = 3.66 cfs @ 12.05 hrs, Volume= 12,761 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.61' @ 12.05 hrs Surf.Area= 4,366 sf Storage= 4,123 cf

Plug-Flow detention time= 119.7 min calculated for 12,761 cf (87% of inflow)
Center-of-Mass det. time= 57.1 min (818.9 - 761.9)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

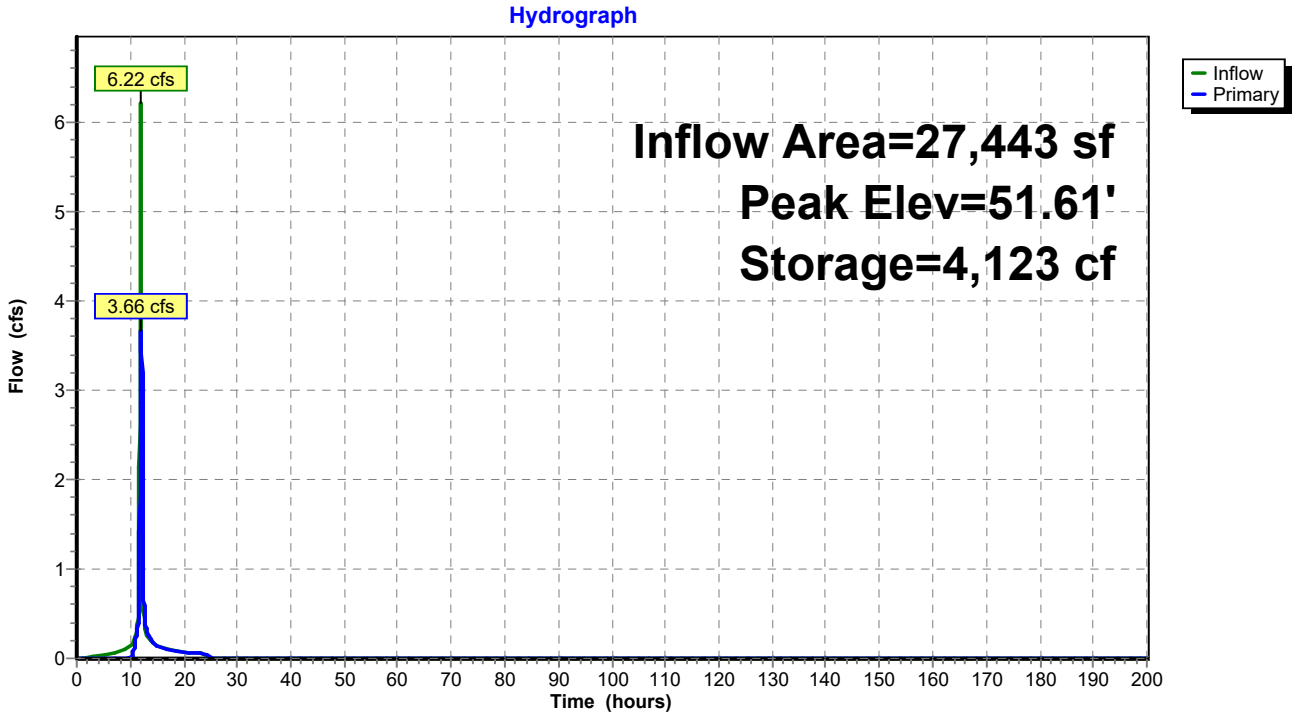
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

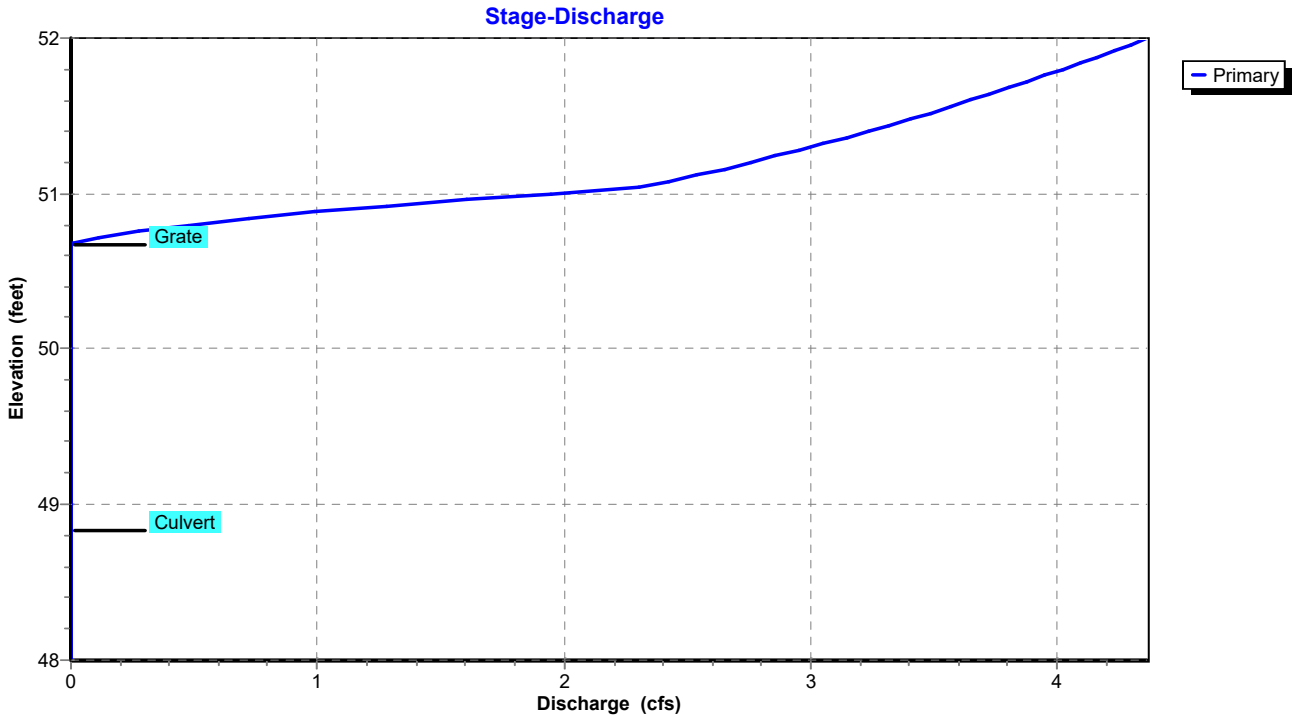
Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.65 cfs @ 12.05 hrs HW=51.60' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 3.65 cfs of 4.49 cfs potential flow)
↑**2=Grate** (Orifice Controls 3.65 cfs @ 4.64 fps)

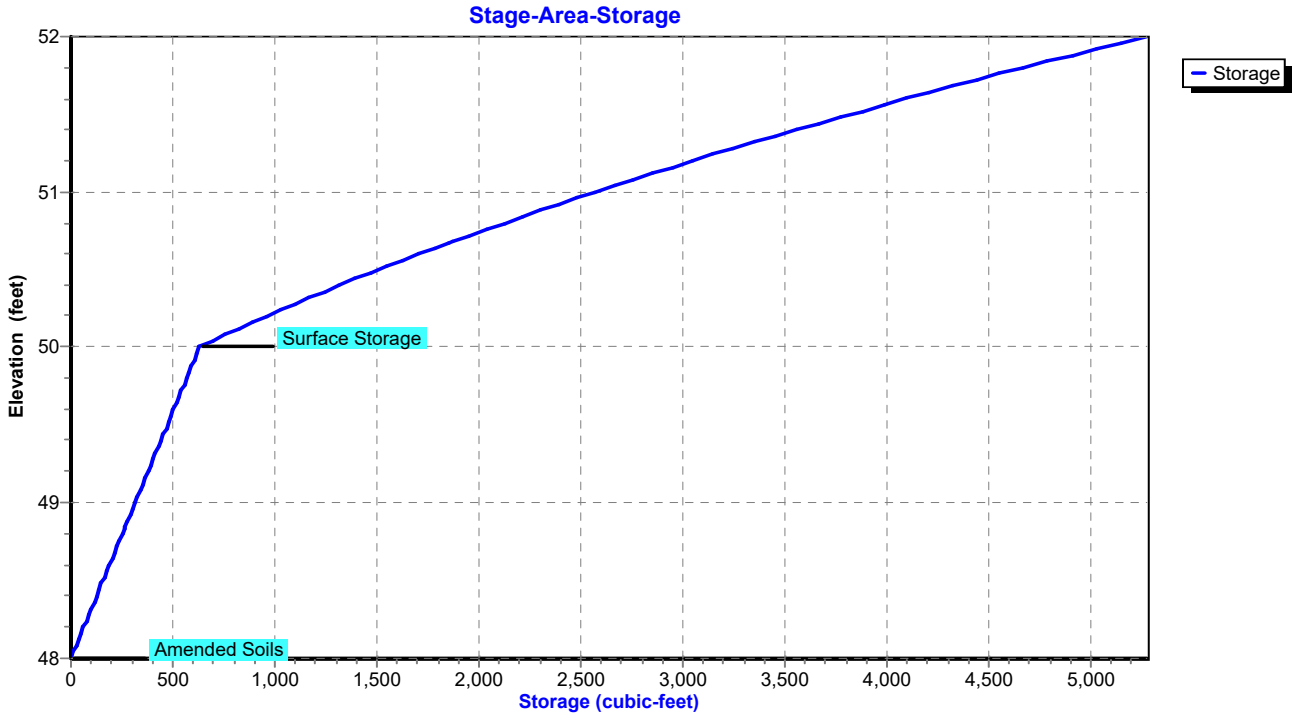
Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)



Pond 3P: Raingarden 1 (BMP 1)

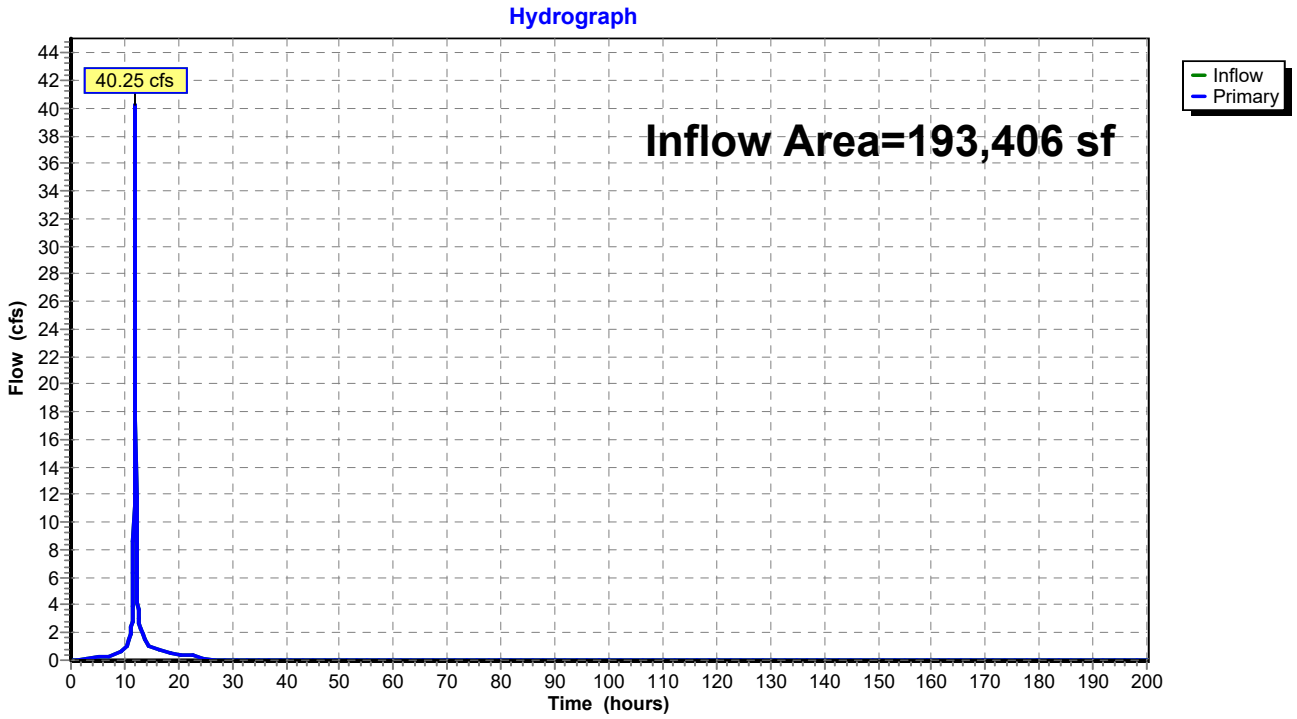


Summary for Link 2L: DP-001 (POST)

Inflow Area = 193,406 sf, 46.17% Impervious, Inflow Depth = 6.11" for 100-Year event
Inflow = 40.25 cfs @ 11.97 hrs, Volume= 98,478 cf
Primary = 40.25 cfs @ 11.97 hrs, Volume= 98,478 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs

Link 2L: DP-001 (POST)



Events for Subcatchment 2S: PDRA-1 (Bypass)

Event	Rainfall (inches)	Runoff (cfs)	Volume (cubic-feet)	Depth (inches)
1-Year	2.73	10.34	23,530	1.70
2-Year	3.28	13.22	30,073	2.17
5-Year	4.12	17.73	40,437	2.92
10-Year	4.82	21.56	49,311	3.57
25-Year	5.83	27.14	62,369	4.51
50-Year	6.68	31.85	73,524	5.32
100-Year	**7.60**	**36.97**	**85,717**	**6.20**

Events for Subcatchment 4S: PDRA-1 (RG-1)

Event	Rainfall (inches)	Runoff (cfs)	Volume (cubic-feet)	Depth (inches)
1-Year	2.73	1.82	4,192	1.83
2-Year	3.28	2.30	5,302	2.32
5-Year	4.12	3.05	7,049	3.08
10-Year	4.82	3.68	8,538	3.73
25-Year	5.83	4.60	10,721	4.69
50-Year	6.68	5.38	12,582	5.50
100-Year	**7.60**	**6.22**	**14,612**	**6.39**

Events for Pond 3P: Raingarden 1 (BMP 1)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-Year	1.82	0.68	50.83	2,201
2-Year	2.30	1.48	50.94	2,446
5-Year	3.05	2.37	51.06	2,709
10-Year	3.68	2.65	51.16	2,959
25-Year	4.60	3.05	51.32	3,350
50-Year	5.38	3.35	51.46	3,708
100-Year	**6.22**	**3.66**	**51.61**	**4,123**

Events for Link 2L: DP-001 (POST)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1-Year	10.37	10.37	**0.00**
2-Year	14.06	14.06	0.00
5-Year	19.81	19.81	0.00
10-Year	24.05	24.05	0.00
25-Year	29.92	29.92	0.00
50-Year	34.88	34.88	0.00
100-Year	**40.25**	**40.25**	0.00

Appendix C:
Runoff Volume Calculations

Volume Management

Project: Villanova Boathouse

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.28** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **3**

☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	1.96	D	98	0.041	3.05	21,680
Pervious as Meadow	1.99	D	78	0.564	1.33	9,624
Impervious as Meadow	0.49	D	78	0.564	1.33	2,370
TOTAL (ACRES):	**4.44**				**TOTAL (CF):**	**33,674**

Post-Construction Conditions: *No. Rows:* **2**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.39	D	80	0.500	1.46	12,699
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	2.05	D	98	0.041	3.05	22,676
TOTAL (ACRES):	**4.44**				**TOTAL (CF):**	**35,374**

NET CHANGE IN VOLUME TO MANAGE (CF): **1,700**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **1** *Start BMP Numbering at:* **1**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Rain Garden / Bioretention	-	Off-Site	0.63	5,302	1,576	4.00	12	Yes	2.0	1,851	**5,302**	**0**
												Totals:	**5,302**	

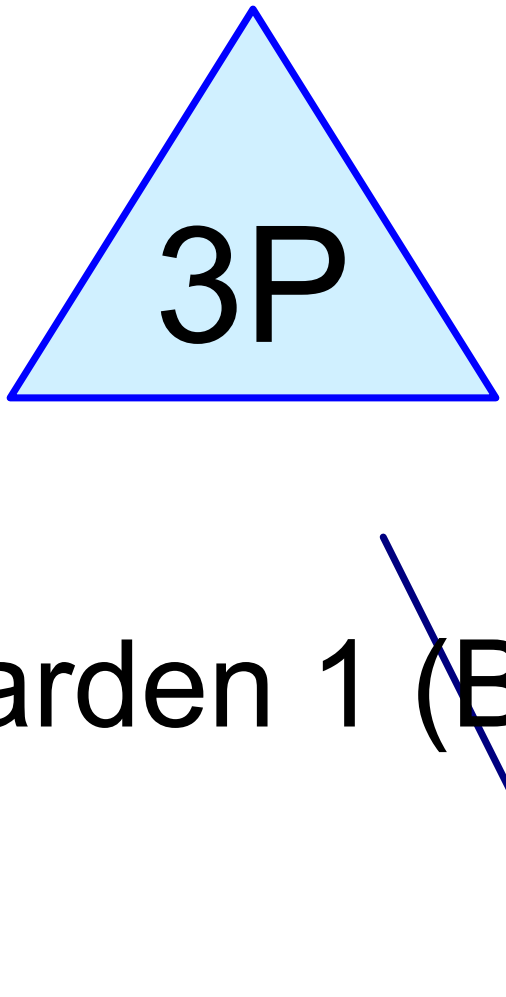
INFILTRATION & ET CREDITS (CF): **5,302**

NET CHANGE IN VOLUME TO MANAGE (CF): **1,700**

TOTAL CREDITS (CF): **5,302**

VOLUME REQUIREMENT SATISFIED

Appendix D:
Additional Calculations



Subcat Reach Pond Link

Routing Diagram for VILUX23005 - Rev-0
Prepared by Pennoni Associates, Inc, Printed 7/15/2024
HydroCAD® 10.20-2f s/n 01867 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=50.40' Storage=1,320 cf Inflow=1.82 cfs 4,192 cf
Discarded=0.32 cfs 4,197 cf Primary=0.00 cfs 0 cf Outflow=0.32 cfs 4,197 cf

Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 1.83" for 1-Year event
Inflow = 1.82 cfs @ 11.97 hrs, Volume= 4,192 cf
Outflow = 0.32 cfs @ 12.17 hrs, Volume= 4,197 cf, Atten= 82%, Lag= 11.9 min
Discarded = 0.32 cfs @ 12.17 hrs, Volume= 4,197 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 50.40' @ 12.17 hrs Surf.Area= 3,446 sf Storage= 1,320 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 30.5 min (810.8 - 780.3)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	48.00'	**4.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.32 cfs @ 12.17 hrs HW=50.40' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.00' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)
└**2=Grate** (Controls 0.00 cfs)

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=50.63' Storage=1,768 cf Inflow=2.30 cfs 5,302 cf
Discarded=0.33 cfs 5,306 cf Primary=0.00 cfs 0 cf Outflow=0.33 cfs 5,306 cf

Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 2.32" for 2-Year event
Inflow = 2.30 cfs @ 11.97 hrs, Volume= 5,302 cf
Outflow = 0.33 cfs @ 12.21 hrs, Volume= 5,306 cf, Atten= 85%, Lag= 14.3 min
Discarded = 0.33 cfs @ 12.21 hrs, Volume= 5,306 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 50.63' @ 12.21 hrs Surf.Area= 3,614 sf Storage= 1,768 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 38.3 min (815.3 - 777.0)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	48.00'	**4.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.33 cfs @ 12.21 hrs HW=50.63' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.00' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)
└**2=Grate** (Controls 0.00 cfs)

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=50.85' Storage=2,235 cf Inflow=3.05 cfs 7,049 cf
Discarded=0.35 cfs 6,450 cf Primary=0.78 cfs 603 cf Outflow=1.13 cfs 7,053 cf

Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 3.08" for 5-Year event
Inflow = 3.05 cfs @ 11.97 hrs, Volume= 7,049 cf
Outflow = 1.13 cfs @ 12.09 hrs, Volume= 7,053 cf, Atten= 63%, Lag= 7.5 min
Discarded = 0.35 cfs @ 12.09 hrs, Volume= 6,450 cf
Primary = 0.78 cfs @ 12.09 hrs, Volume= 603 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 50.85' @ 12.09 hrs Surf.Area= 3,776 sf Storage= 2,235 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 38.3 min (811.2 - 772.9)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	48.00'	**4.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.35 cfs @ 12.09 hrs HW=50.85' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.35 cfs)

Primary OutFlow Max=0.75 cfs @ 12.09 hrs HW=50.85' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.75 cfs of 3.70 cfs potential flow)
└**2=Grate** (Weir Controls 0.75 cfs @ 1.37 fps)

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=50.97' Storage=2,507 cf Inflow=3.68 cfs 8,538 cf
Discarded=0.36 cfs 7,211 cf Primary=1.69 cfs 1,328 cf Outflow=2.05 cfs 8,539 cf

Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 3.73" for 10-Year event
Inflow = 3.68 cfs @ 11.97 hrs, Volume= 8,538 cf
Outflow = 2.05 cfs @ 12.06 hrs, Volume= 8,539 cf, Atten= 44%, Lag= 5.5 min
Discarded = 0.36 cfs @ 12.06 hrs, Volume= 7,211 cf
Primary = 1.69 cfs @ 12.06 hrs, Volume= 1,328 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 50.97' @ 12.06 hrs Surf.Area= 3,865 sf Storage= 2,507 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.8 min (805.9 - 770.1)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	48.00'	**4.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.36 cfs @ 12.06 hrs HW=50.96' (Free Discharge)
↑└**3=Exfiltration** (Exfiltration Controls 0.36 cfs)

Primary OutFlow Max=1.61 cfs @ 12.06 hrs HW=50.96' TW=0.00' (Dynamic Tailwater)
↑└**1=Culvert** (Passes 1.61 cfs of 3.83 cfs potential flow)
↑└**2=Grate** (Weir Controls 1.61 cfs @ 1.76 fps)

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.13' Storage=2,871 cf Inflow=4.60 cfs 10,721 cf
Discarded=0.37 cfs 8,254 cf Primary=2.55 cfs 2,470 cf Outflow=2.92 cfs 10,724 cf

Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 4.69" for 25-Year event
Inflow = 4.60 cfs @ 11.97 hrs, Volume= 10,721 cf
Outflow = 2.92 cfs @ 12.04 hrs, Volume= 10,724 cf, Atten= 36%, Lag= 4.7 min
Discarded = 0.37 cfs @ 12.04 hrs, Volume= 8,254 cf
Primary = 2.55 cfs @ 12.04 hrs, Volume= 2,470 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.13' @ 12.04 hrs Surf.Area= 3,986 sf Storage= 2,871 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.9 min (800.5 - 766.7)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	48.00'	**4.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.37 cfs @ 12.04 hrs HW=51.12' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=2.54 cfs @ 12.04 hrs HW=51.12' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 2.54 cfs of 4.00 cfs potential flow)
└**2=Grate** (Orifice Controls 2.54 cfs @ 3.24 fps)

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.28' Storage=3,246 cf Inflow=5.38 cfs 12,582 cf
Discarded=0.38 cfs 9,118 cf Primary=2.95 cfs 3,467 cf Outflow=3.33 cfs 12,585 cf

Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 5.50" for 50-Year event
Inflow = 5.38 cfs @ 11.97 hrs, Volume= 12,582 cf
Outflow = 3.33 cfs @ 12.05 hrs, Volume= 12,585 cf, Atten= 38%, Lag= 4.8 min
Discarded = 0.38 cfs @ 12.05 hrs, Volume= 9,118 cf
Primary = 2.95 cfs @ 12.05 hrs, Volume= 3,467 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.28' @ 12.05 hrs Surf.Area= 4,106 sf Storage= 3,246 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.1 min (797.3 - 764.2)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	48.00'	**4.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.38 cfs @ 12.05 hrs HW=51.27' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=2.94 cfs @ 12.05 hrs HW=51.27' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 2.94 cfs of 4.16 cfs potential flow)
└**2=Grate** (Orifice Controls 2.94 cfs @ 3.74 fps)

Time span=0.00-200.00 hrs, dt=0.04 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 3P: Raingarden 1 (BMP 1) Peak Elev=51.45' Storage=3,680 cf Inflow=6.22 cfs 14,612 cf
Discarded=0.39 cfs 10,007 cf Primary=3.33 cfs 4,605 cf Outflow=3.72 cfs 14,612 cf

Summary for Pond 3P: Raingarden 1 (BMP 1)

Inflow Area = 27,443 sf, 53.97% Impervious, Inflow Depth = 6.39" for 100-Year event
Inflow = 6.22 cfs @ 11.97 hrs, Volume= 14,612 cf
Outflow = 3.72 cfs @ 12.05 hrs, Volume= 14,612 cf, Atten= 40%, Lag= 5.0 min
Discarded = 0.39 cfs @ 12.05 hrs, Volume= 10,007 cf
Primary = 3.33 cfs @ 12.05 hrs, Volume= 4,605 cf
Routed to Link 2L : DP-001 (POST)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.04 hrs
Peak Elev= 51.45' @ 12.05 hrs Surf.Area= 4,238 sf Storage= 3,680 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 32.5 min (794.4 - 761.9)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	4,648 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
#2	48.00'	630 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 3,152 cf Overall x 20.0% Voids
		5,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.00	1,576	0	0
51.00	2,310	1,943	1,943
52.00	3,100	2,705	4,648

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,576	0	0
50.00	1,576	3,152	3,152

Device	Routing	Invert	Outlet Devices
#1	Primary	48.83'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.83' / 48.25' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	50.67'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	48.00'	**4.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.39 cfs @ 12.05 hrs HW=51.44' (Free Discharge)
↑└**3=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=3.31 cfs @ 12.05 hrs HW=51.44' TW=0.00' (Dynamic Tailwater)
↑└**1=Culvert** (Passes 3.31 cfs of 4.33 cfs potential flow)
↑└**2=Grate** (Orifice Controls 3.31 cfs @ 4.22 fps)

Events for Pond 3P: Raingarden 1 (BMP 1)

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-Year	1.82	0.32	0.32	0.00	50.40	1,320
2-Year	2.30	0.33	0.33	0.00	50.63	1,768
5-Year	3.05	1.13	0.35	0.78	50.85	2,235
10-Year	3.68	2.05	0.36	1.69	50.97	2,507
25-Year	4.60	2.92	0.37	2.55	51.13	2,871
50-Year	5.38	3.33	0.38	2.95	51.28	3,246
100-Year	**6.22**	**3.72**	**0.39**	**3.33**	**51.45**	**3,680**

Hydrograph for Pond 3P: Raingarden 1 (BMP 1)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	**0.00**
4.00	0.01	0	48.00	0.01	0.01	0.00
8.00	**0.02**	0	48.00	0.02	0.02	0.00
12.00	**1.69**	**1,023**	**50.24**	**0.31**	**0.31**	0.00
16.00	0.03	**0**	**48.00**	**0.07**	**0.07**	0.00
20.00	0.02	0	48.00	0.04	0.04	0.00
24.00	0.02	0	48.00	0.03	0.03	0.00
28.00	0.00	0	48.00	0.00	0.00	0.00
32.00	0.00	0	48.00	0.00	0.00	0.00
36.00	0.00	0	48.00	0.00	0.00	0.00
40.00	0.00	0	48.00	0.00	0.00	0.00
44.00	0.00	0	48.00	0.00	0.00	0.00
48.00	0.00	0	48.00	0.00	0.00	0.00
52.00	0.00	0	48.00	0.00	0.00	0.00
56.00	0.00	0	48.00	0.00	0.00	0.00
60.00	0.00	0	48.00	0.00	0.00	0.00
64.00	0.00	0	48.00	0.00	0.00	0.00
68.00	0.00	0	48.00	0.00	0.00	0.00
72.00	0.00	0	48.00	0.00	0.00	0.00
76.00	0.00	0	48.00	0.00	0.00	0.00
80.00	0.00	0	48.00	0.00	0.00	0.00
84.00	0.00	0	48.00	0.00	0.00	0.00
88.00	0.00	0	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00
100.00	0.00	0	48.00	0.00	0.00	0.00
104.00	0.00	0	48.00	0.00	0.00	0.00
108.00	0.00	0	48.00	0.00	0.00	0.00
112.00	0.00	0	48.00	0.00	0.00	0.00
116.00	0.00	0	48.00	0.00	0.00	0.00
120.00	0.00	0	48.00	0.00	0.00	0.00
124.00	0.00	0	48.00	0.00	0.00	0.00
128.00	0.00	0	48.00	0.00	0.00	0.00
132.00	0.00	0	48.00	0.00	0.00	0.00
136.00	0.00	0	48.00	0.00	0.00	0.00
140.00	0.00	0	48.00	0.00	0.00	0.00
144.00	0.00	0	48.00	0.00	0.00	0.00
148.00	0.00	0	48.00	0.00	0.00	0.00
152.00	0.00	0	48.00	0.00	0.00	0.00
156.00	0.00	0	48.00	0.00	0.00	0.00
160.00	0.00	0	48.00	0.00	0.00	0.00
164.00	0.00	0	48.00	0.00	0.00	0.00
168.00	0.00	0	48.00	0.00	0.00	0.00
172.00	0.00	0	48.00	0.00	0.00	0.00
176.00	0.00	0	48.00	0.00	0.00	0.00
180.00	0.00	0	48.00	0.00	0.00	0.00
184.00	0.00	0	48.00	0.00	0.00	0.00
188.00	0.00	0	48.00	0.00	0.00	0.00
192.00	0.00	0	48.00	0.00	0.00	0.00
196.00	0.00	0	48.00	0.00	0.00	0.00
200.00	0.00	0	48.00	0.00	0.00	0.00

Hydrograph for Pond 3P: Raingarden 1 (BMP 1)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	**0.00**
4.00	0.01	0	48.00	0.01	0.01	0.00
8.00	**0.02**	0	48.00	0.02	0.02	0.00
12.00	**2.14**	**1,352**	**50.42**	**0.32**	**0.32**	0.00
16.00	0.04	**0**	**48.00**	**0.00**	**0.00**	0.00
20.00	0.02	0	48.00	0.00	0.00	0.00
24.00	0.02	0	48.00	0.00	0.00	0.00
28.00	0.00	0	48.00	0.00	0.00	0.00
32.00	0.00	0	48.00	0.00	0.00	0.00
36.00	0.00	0	48.00	0.00	0.00	0.00
40.00	0.00	0	48.00	0.00	0.00	0.00
44.00	0.00	0	48.00	0.00	0.00	0.00
48.00	0.00	0	48.00	0.00	0.00	0.00
52.00	0.00	0	48.00	0.00	0.00	0.00
56.00	0.00	0	48.00	0.00	0.00	0.00
60.00	0.00	0	48.00	0.00	0.00	0.00
64.00	0.00	0	48.00	0.00	0.00	0.00
68.00	0.00	0	48.00	0.00	0.00	0.00
72.00	0.00	0	48.00	0.00	0.00	0.00
76.00	0.00	0	48.00	0.00	0.00	0.00
80.00	0.00	0	48.00	0.00	0.00	0.00
84.00	0.00	0	48.00	0.00	0.00	0.00
88.00	0.00	0	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00
100.00	0.00	0	48.00	0.00	0.00	0.00
104.00	0.00	0	48.00	0.00	0.00	0.00
108.00	0.00	0	48.00	0.00	0.00	0.00
112.00	0.00	0	48.00	0.00	0.00	0.00
116.00	0.00	0	48.00	0.00	0.00	0.00
120.00	0.00	0	48.00	0.00	0.00	0.00
124.00	0.00	0	48.00	0.00	0.00	0.00
128.00	0.00	0	48.00	0.00	0.00	0.00
132.00	0.00	0	48.00	0.00	0.00	0.00
136.00	0.00	0	48.00	0.00	0.00	0.00
140.00	0.00	0	48.00	0.00	0.00	0.00
144.00	0.00	0	48.00	0.00	0.00	0.00
148.00	0.00	0	48.00	0.00	0.00	0.00
152.00	0.00	0	48.00	0.00	0.00	0.00
156.00	0.00	0	48.00	0.00	0.00	0.00
160.00	0.00	0	48.00	0.00	0.00	0.00
164.00	0.00	0	48.00	0.00	0.00	0.00
168.00	0.00	0	48.00	0.00	0.00	0.00
172.00	0.00	0	48.00	0.00	0.00	0.00
176.00	0.00	0	48.00	0.00	0.00	0.00
180.00	0.00	0	48.00	0.00	0.00	0.00
184.00	0.00	0	48.00	0.00	0.00	0.00
188.00	0.00	0	48.00	0.00	0.00	0.00
192.00	0.00	0	48.00	0.00	0.00	0.00
196.00	0.00	0	48.00	0.00	0.00	0.00
200.00	0.00	0	48.00	0.00	0.00	0.00

Hydrograph for Pond 3P: Raingarden 1 (BMP 1)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	0.00
4.00	0.01	0	48.00	0.01	0.01	0.00
8.00	**0.03**	0	48.00	0.03	0.03	0.00
12.00	**2.82**	**1,894**	**50.69**	**0.37**	**0.34**	**0.03**
16.00	0.06	**175**	**48.55**	**0.15**	**0.15**	**0.00**
20.00	0.03	0	48.00	0.00	0.00	0.00
24.00	0.03	0	48.00	0.00	0.00	0.00
28.00	0.00	0	48.00	0.00	0.00	0.00
32.00	0.00	0	48.00	0.00	0.00	0.00
36.00	0.00	0	48.00	0.00	0.00	0.00
40.00	0.00	0	48.00	0.00	0.00	0.00
44.00	0.00	0	48.00	0.00	0.00	0.00
48.00	0.00	0	48.00	0.00	0.00	0.00
52.00	0.00	0	48.00	0.00	0.00	0.00
56.00	0.00	0	48.00	0.00	0.00	0.00
60.00	0.00	0	48.00	0.00	0.00	0.00
64.00	0.00	0	48.00	0.00	0.00	0.00
68.00	0.00	0	48.00	0.00	0.00	0.00
72.00	0.00	0	48.00	0.00	0.00	0.00
76.00	0.00	0	48.00	0.00	0.00	0.00
80.00	0.00	0	48.00	0.00	0.00	0.00
84.00	0.00	0	48.00	0.00	0.00	0.00
88.00	0.00	0	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00
100.00	0.00	0	48.00	0.00	0.00	0.00
104.00	0.00	0	48.00	0.00	0.00	0.00
108.00	0.00	0	48.00	0.00	0.00	0.00
112.00	0.00	0	48.00	0.00	0.00	0.00
116.00	0.00	0	48.00	0.00	0.00	0.00
120.00	0.00	0	48.00	0.00	0.00	0.00
124.00	0.00	0	48.00	0.00	0.00	0.00
128.00	0.00	0	48.00	0.00	0.00	0.00
132.00	0.00	0	48.00	0.00	0.00	0.00
136.00	0.00	0	48.00	0.00	0.00	0.00
140.00	0.00	0	48.00	0.00	0.00	0.00
144.00	0.00	0	48.00	0.00	0.00	0.00
148.00	0.00	0	48.00	0.00	0.00	0.00
152.00	0.00	0	48.00	0.00	0.00	0.00
156.00	0.00	0	48.00	0.00	0.00	0.00
160.00	0.00	0	48.00	0.00	0.00	0.00
164.00	0.00	0	48.00	0.00	0.00	0.00
168.00	0.00	0	48.00	0.00	0.00	0.00
172.00	0.00	0	48.00	0.00	0.00	0.00
176.00	0.00	0	48.00	0.00	0.00	0.00
180.00	0.00	0	48.00	0.00	0.00	0.00
184.00	0.00	0	48.00	0.00	0.00	0.00
188.00	0.00	0	48.00	0.00	0.00	0.00
192.00	0.00	0	48.00	0.00	0.00	0.00
196.00	0.00	0	48.00	0.00	0.00	0.00
200.00	0.00	0	48.00	0.00	0.00	0.00

Hydrograph for Pond 3P: Raingarden 1 (BMP 1)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	0.00
4.00	0.02	0	48.00	0.02	0.02	0.00
8.00	**0.03**	0	48.00	0.03	0.03	0.00
12.00	**3.40**	**2,315**	**50.89**	**1.38**	**0.35**	**1.03**
16.00	0.07	**293**	**48.93**	**0.15**	**0.15**	**0.00**
20.00	0.04	0	48.00	0.06	0.06	0.00
24.00	0.03	0	48.00	0.05	0.05	0.00
28.00	0.00	0	48.00	0.00	0.00	0.00
32.00	0.00	0	48.00	0.00	0.00	0.00
36.00	0.00	0	48.00	0.00	0.00	0.00
40.00	0.00	0	48.00	0.00	0.00	0.00
44.00	0.00	0	48.00	0.00	0.00	0.00
48.00	0.00	0	48.00	0.00	0.00	0.00
52.00	0.00	0	48.00	0.00	0.00	0.00
56.00	0.00	0	48.00	0.00	0.00	0.00
60.00	0.00	0	48.00	0.00	0.00	0.00
64.00	0.00	0	48.00	0.00	0.00	0.00
68.00	0.00	0	48.00	0.00	0.00	0.00
72.00	0.00	0	48.00	0.00	0.00	0.00
76.00	0.00	0	48.00	0.00	0.00	0.00
80.00	0.00	0	48.00	0.00	0.00	0.00
84.00	0.00	0	48.00	0.00	0.00	0.00
88.00	0.00	0	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00
100.00	0.00	0	48.00	0.00	0.00	0.00
104.00	0.00	0	48.00	0.00	0.00	0.00
108.00	0.00	0	48.00	0.00	0.00	0.00
112.00	0.00	0	48.00	0.00	0.00	0.00
116.00	0.00	0	48.00	0.00	0.00	0.00
120.00	0.00	0	48.00	0.00	0.00	0.00
124.00	0.00	0	48.00	0.00	0.00	0.00
128.00	0.00	0	48.00	0.00	0.00	0.00
132.00	0.00	0	48.00	0.00	0.00	0.00
136.00	0.00	0	48.00	0.00	0.00	0.00
140.00	0.00	0	48.00	0.00	0.00	0.00
144.00	0.00	0	48.00	0.00	0.00	0.00
148.00	0.00	0	48.00	0.00	0.00	0.00
152.00	0.00	0	48.00	0.00	0.00	0.00
156.00	0.00	0	48.00	0.00	0.00	0.00
160.00	0.00	0	48.00	0.00	0.00	0.00
164.00	0.00	0	48.00	0.00	0.00	0.00
168.00	0.00	0	48.00	0.00	0.00	0.00
172.00	0.00	0	48.00	0.00	0.00	0.00
176.00	0.00	0	48.00	0.00	0.00	0.00
180.00	0.00	0	48.00	0.00	0.00	0.00
184.00	0.00	0	48.00	0.00	0.00	0.00
188.00	0.00	0	48.00	0.00	0.00	0.00
192.00	0.00	0	48.00	0.00	0.00	0.00
196.00	0.00	0	48.00	0.00	0.00	0.00
200.00	0.00	0	48.00	0.00	0.00	0.00

Hydrograph for Pond 3P: Raingarden 1 (BMP 1)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	0.00
4.00	0.02	0	48.00	0.02	0.02	0.00
8.00	**0.05**	0	48.00	0.05	0.05	0.00
12.00	**4.24**	**2,761**	**51.08**	**2.79**	**0.37**	**2.42**
16.00	0.08	**432**	**49.37**	**0.15**	**0.15**	**0.00**
20.00	0.05	0	48.00	0.08	0.08	0.00
24.00	0.04	0	48.00	0.08	0.08	0.00
28.00	0.00	0	48.00	0.00	0.00	0.00
32.00	0.00	0	48.00	0.00	0.00	0.00
36.00	0.00	0	48.00	0.00	0.00	0.00
40.00	0.00	0	48.00	0.00	0.00	0.00
44.00	0.00	0	48.00	0.00	0.00	0.00
48.00	0.00	0	48.00	0.00	0.00	0.00
52.00	0.00	0	48.00	0.00	0.00	0.00
56.00	0.00	0	48.00	0.00	0.00	0.00
60.00	0.00	0	48.00	0.00	0.00	0.00
64.00	0.00	0	48.00	0.00	0.00	0.00
68.00	0.00	0	48.00	0.00	0.00	0.00
72.00	0.00	0	48.00	0.00	0.00	0.00
76.00	0.00	0	48.00	0.00	0.00	0.00
80.00	0.00	0	48.00	0.00	0.00	0.00
84.00	0.00	0	48.00	0.00	0.00	0.00
88.00	0.00	0	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00
100.00	0.00	0	48.00	0.00	0.00	0.00
104.00	0.00	0	48.00	0.00	0.00	0.00
108.00	0.00	0	48.00	0.00	0.00	0.00
112.00	0.00	0	48.00	0.00	0.00	0.00
116.00	0.00	0	48.00	0.00	0.00	0.00
120.00	0.00	0	48.00	0.00	0.00	0.00
124.00	0.00	0	48.00	0.00	0.00	0.00
128.00	0.00	0	48.00	0.00	0.00	0.00
132.00	0.00	0	48.00	0.00	0.00	0.00
136.00	0.00	0	48.00	0.00	0.00	0.00
140.00	0.00	0	48.00	0.00	0.00	0.00
144.00	0.00	0	48.00	0.00	0.00	0.00
148.00	0.00	0	48.00	0.00	0.00	0.00
152.00	0.00	0	48.00	0.00	0.00	0.00
156.00	0.00	0	48.00	0.00	0.00	0.00
160.00	0.00	0	48.00	0.00	0.00	0.00
164.00	0.00	0	48.00	0.00	0.00	0.00
168.00	0.00	0	48.00	0.00	0.00	0.00
172.00	0.00	0	48.00	0.00	0.00	0.00
176.00	0.00	0	48.00	0.00	0.00	0.00
180.00	0.00	0	48.00	0.00	0.00	0.00
184.00	0.00	0	48.00	0.00	0.00	0.00
188.00	0.00	0	48.00	0.00	0.00	0.00
192.00	0.00	0	48.00	0.00	0.00	0.00
196.00	0.00	0	48.00	0.00	0.00	0.00
200.00	0.00	0	48.00	0.00	0.00	0.00

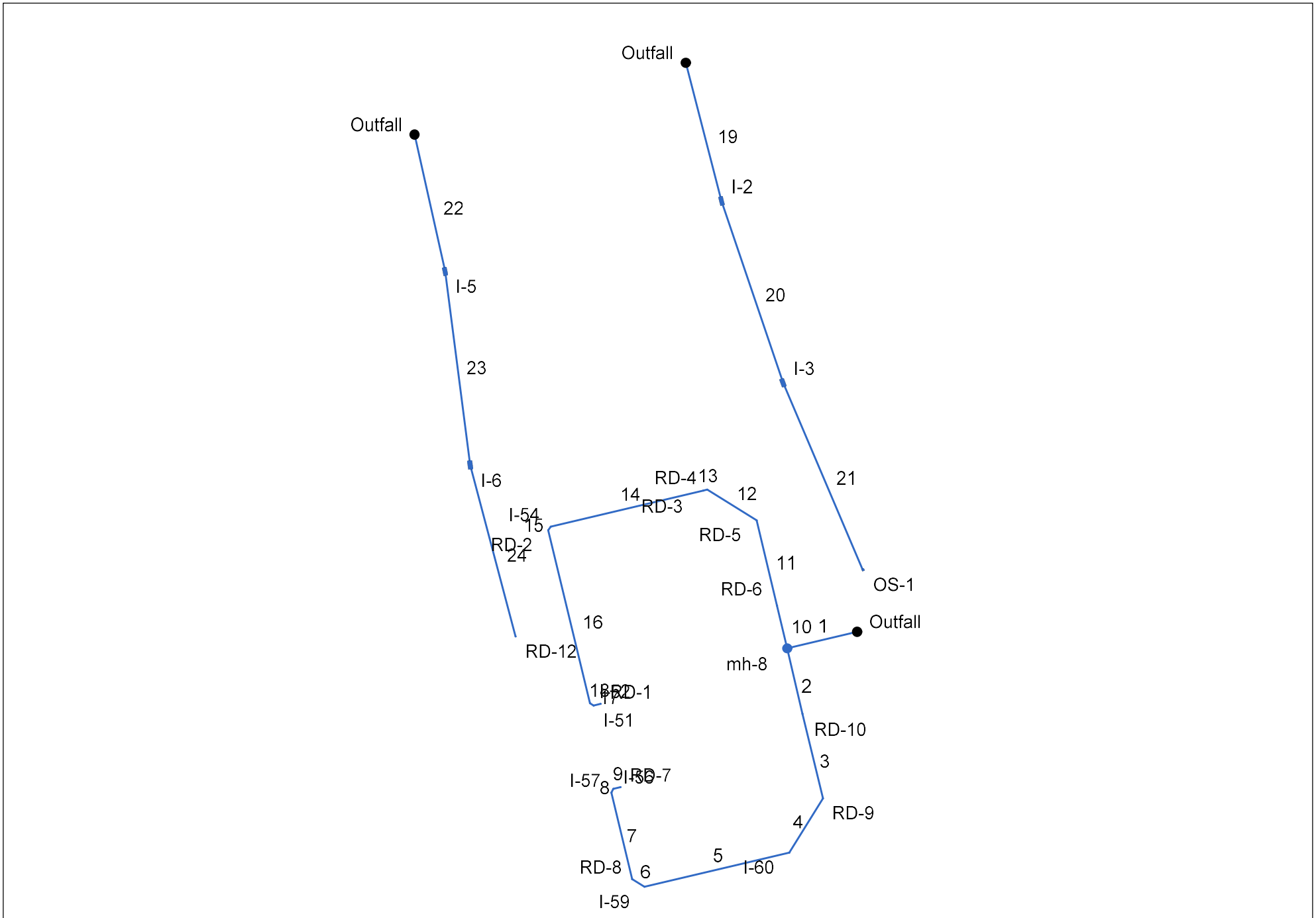
Hydrograph for Pond 3P: Raingarden 1 (BMP 1)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	0.00
4.00	0.03	0	48.00	0.03	0.03	0.00
8.00	**0.06**	0	48.00	0.06	0.06	0.00
12.00	**4.95**	**3,106**	**51.22**	**3.19**	**0.38**	**2.81**
16.00	0.10	**521**	**49.65**	**0.15**	**0.15**	**0.00**
20.00	0.05	0	48.00	0.00	0.00	0.00
24.00	0.05	0	48.00	0.00	0.00	0.00
28.00	0.00	0	48.00	0.00	0.00	0.00
32.00	0.00	0	48.00	0.00	0.00	0.00
36.00	0.00	0	48.00	0.00	0.00	0.00
40.00	0.00	0	48.00	0.00	0.00	0.00
44.00	0.00	0	48.00	0.00	0.00	0.00
48.00	0.00	0	48.00	0.00	0.00	0.00
52.00	0.00	0	48.00	0.00	0.00	0.00
56.00	0.00	0	48.00	0.00	0.00	0.00
60.00	0.00	0	48.00	0.00	0.00	0.00
64.00	0.00	0	48.00	0.00	0.00	0.00
68.00	0.00	0	48.00	0.00	0.00	0.00
72.00	0.00	0	48.00	0.00	0.00	0.00
76.00	0.00	0	48.00	0.00	0.00	0.00
80.00	0.00	0	48.00	0.00	0.00	0.00
84.00	0.00	0	48.00	0.00	0.00	0.00
88.00	0.00	0	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00
100.00	0.00	0	48.00	0.00	0.00	0.00
104.00	0.00	0	48.00	0.00	0.00	0.00
108.00	0.00	0	48.00	0.00	0.00	0.00
112.00	0.00	0	48.00	0.00	0.00	0.00
116.00	0.00	0	48.00	0.00	0.00	0.00
120.00	0.00	0	48.00	0.00	0.00	0.00
124.00	0.00	0	48.00	0.00	0.00	0.00
128.00	0.00	0	48.00	0.00	0.00	0.00
132.00	0.00	0	48.00	0.00	0.00	0.00
136.00	0.00	0	48.00	0.00	0.00	0.00
140.00	0.00	0	48.00	0.00	0.00	0.00
144.00	0.00	0	48.00	0.00	0.00	0.00
148.00	0.00	0	48.00	0.00	0.00	0.00
152.00	0.00	0	48.00	0.00	0.00	0.00
156.00	0.00	0	48.00	0.00	0.00	0.00
160.00	0.00	0	48.00	0.00	0.00	0.00
164.00	0.00	0	48.00	0.00	0.00	0.00
168.00	0.00	0	48.00	0.00	0.00	0.00
172.00	0.00	0	48.00	0.00	0.00	0.00
176.00	0.00	0	48.00	0.00	0.00	0.00
180.00	0.00	0	48.00	0.00	0.00	0.00
184.00	0.00	0	48.00	0.00	0.00	0.00
188.00	0.00	0	48.00	0.00	0.00	0.00
192.00	0.00	0	48.00	0.00	0.00	0.00
196.00	0.00	0	48.00	0.00	0.00	0.00
200.00	0.00	0	48.00	0.00	0.00	0.00

Hydrograph for Pond 3P: Raingarden 1 (BMP 1)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	0.00
4.00	0.03	0	48.00	0.03	0.03	0.00
8.00	**0.07**	0	48.00	0.07	0.07	0.00
12.00	**5.72**	**3,499**	**51.38**	**3.57**	**0.39**	**3.18**
16.00	0.11	**582**	**49.85**	**0.15**	**0.15**	**0.00**
20.00	0.06	0	48.00	0.06	0.06	0.00
24.00	0.05	0	48.00	0.05	0.05	0.00
28.00	0.00	0	48.00	0.00	0.00	0.00
32.00	0.00	0	48.00	0.00	0.00	0.00
36.00	0.00	0	48.00	0.00	0.00	0.00
40.00	0.00	0	48.00	0.00	0.00	0.00
44.00	0.00	0	48.00	0.00	0.00	0.00
48.00	0.00	0	48.00	0.00	0.00	0.00
52.00	0.00	0	48.00	0.00	0.00	0.00
56.00	0.00	0	48.00	0.00	0.00	0.00
60.00	0.00	0	48.00	0.00	0.00	0.00
64.00	0.00	0	48.00	0.00	0.00	0.00
68.00	0.00	0	48.00	0.00	0.00	0.00
72.00	0.00	0	48.00	0.00	0.00	0.00
76.00	0.00	0	48.00	0.00	0.00	0.00
80.00	0.00	0	48.00	0.00	0.00	0.00
84.00	0.00	0	48.00	0.00	0.00	0.00
88.00	0.00	0	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00
100.00	0.00	0	48.00	0.00	0.00	0.00
104.00	0.00	0	48.00	0.00	0.00	0.00
108.00	0.00	0	48.00	0.00	0.00	0.00
112.00	0.00	0	48.00	0.00	0.00	0.00
116.00	0.00	0	48.00	0.00	0.00	0.00
120.00	0.00	0	48.00	0.00	0.00	0.00
124.00	0.00	0	48.00	0.00	0.00	0.00
128.00	0.00	0	48.00	0.00	0.00	0.00
132.00	0.00	0	48.00	0.00	0.00	0.00
136.00	0.00	0	48.00	0.00	0.00	0.00
140.00	0.00	0	48.00	0.00	0.00	0.00
144.00	0.00	0	48.00	0.00	0.00	0.00
148.00	0.00	0	48.00	0.00	0.00	0.00
152.00	0.00	0	48.00	0.00	0.00	0.00
156.00	0.00	0	48.00	0.00	0.00	0.00
160.00	0.00	0	48.00	0.00	0.00	0.00
164.00	0.00	0	48.00	0.00	0.00	0.00
168.00	0.00	0	48.00	0.00	0.00	0.00
172.00	0.00	0	48.00	0.00	0.00	0.00
176.00	0.00	0	48.00	0.00	0.00	0.00
180.00	0.00	0	48.00	0.00	0.00	0.00
184.00	0.00	0	48.00	0.00	0.00	0.00
188.00	0.00	0	48.00	0.00	0.00	0.00
192.00	0.00	0	48.00	0.00	0.00	0.00
196.00	0.00	0	48.00	0.00	0.00	0.00
200.00	0.00	0	48.00	0.00	0.00	0.00

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan 25-Yr Storm



Project File: VILUX23005 - PIPE CALCS_2.stm	Number of lines: 24	Date: 7/17/2024

Storm Sewer Inventory Report

25-Yr Storm

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	35.150	166.500	MH	0.00	0.03	0.95	0.0	50.00	0.51	50.18	12	Cir	0.012	1.00	53.69	SD-30
2	1	33.060	-89.840	None	0.00	0.00	0.00	0.0	50.51	0.54	50.69	8	Cir	0.012	0.15	53.00	SD-23(2)
3	2	42.870	0.000	None	0.00	0.03	0.95	5.0	50.69	0.54	50.92	8	Cir	0.012	0.75	52.30	SD-23(2)
4	3	31.410	45.042	None	0.00	0.00	0.00	5.0	50.92	0.51	51.08	8	Cir	0.012	0.75	54.37	SD-45
5	4	72.905	44.964	None	0.00	0.00	0.00	5.0	51.08	0.49	51.44	8	Cir	0.012	0.75	54.77	SD-44
6	5	7.067	45.000	None	0.00	0.03	0.95	5.0	51.44	0.57	51.48	8	Cir	0.012	0.75	54.81	SD-43
7	6	43.898	44.826	None	0.00	0.00	0.00	5.0	51.48	0.50	51.70	8	Cir	0.012	0.75	52.44	SD-42
8	7	2.121	45.000	None	0.00	0.00	0.00	5.0	51.70	0.47	51.71	8	Cir	0.012	0.75	52.45	SD-41
9	8	3.500	45.000	None	0.00	0.03	0.95	5.0	51.71	0.57	51.73	8	Cir	0.012	1.00	54.15	SD-40
10	1	21.640	90.174	None	0.00	0.03	0.95	5.0	50.38	0.74	50.54	8	Cir	0.012	0.15	52.67	SD-28
11	10	43.210	0.000	None	0.00	0.03	0.95	5.0	50.54	0.72	50.85	8	Cir	0.012	0.75	51.66	SD-28(2)
12	11	28.490	-44.695	None	0.00	0.03	0.95	5.0	50.85	0.49	50.99	8	Cir	0.012	0.75	51.64	SD-27
13	12	2.030	-45.313	None	0.00	0.03	0.95	5.0	50.99	0.49	51.00	8	Cir	0.012	0.15	53.10	RD-3
14	13	77.040	0.000	None	0.00	0.00	0.00	5.0	51.00	0.51	51.39	8	Cir	0.012	0.75	54.57	SD-26(2)
15	14	2.096	-45.174	None	0.00	0.03	0.95	5.0	51.39	0.48	51.40	8	Cir	0.012	0.75	54.59	SD-39
16	15	87.661	-45.000	None	0.00	0.00	0.00	5.0	51.40	0.50	51.84	8	Cir	0.012	0.75	52.44	SD-38
17	16	2.121	-45.000	None	0.00	0.00	0.00	5.0	51.84	0.47	51.85	8	Cir	0.012	0.75	52.46	SD-37
18	17	3.500	-45.000	None	0.00	0.03	0.95	5.0	51.85	0.57	51.87	8	Cir	0.012	1.00	52.46	SD-36
19	End	70.235	75.715	Comb	0.00	0.36	0.74	5.0	45.85	1.49	46.90	15	Cir	0.012	0.50	49.65	SD-32
20	19	94.530	-4.433	Grate	0.00	0.07	0.93	5.0	47.10	1.00	48.05	15	Cir	0.012	0.50	51.46	SD-13
21	20	100.123	-4.280	MH	2.92	0.00	0.00	5.0	48.25	0.58	48.83	12	Cir	0.012	1.00	50.67	SD-16
22	End	68.930	77.500	Comb	0.00	0.48	0.68	5.0	47.00	0.49	47.34	15	Cir	0.012	0.50	50.32	SD-14
23	22	96.357	5.100	Grate	0.00	0.16	0.72	5.0	47.54	0.50	48.02	15	Cir	0.012	0.50	52.79	SD-12

Project File: VILUX23005 - PIPE CALCS_2.stm

Number of lines: 24

Date: 7/17/2024

Storm Sewer Inventory Report

25-Yr Storm

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	87.320	-7.370	None	0.00	0.14	0.95	5.0	49.20	1.66	50.65	8	Cir	0.012	1.00	0.00	SD-34

Structure Report

25-Yr Storm

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	mh-8	Manhole	53.69	Cir	4.00	4.00	12	Cir	50.18	8 8	Cir Cir	50.51 50.38
2	RD-10	None	53.00	n/a	n/a	n/a	8	Cir	50.69	8	Cir	50.69
3	RD-9	None	52.30	n/a	n/a	n/a	8	Cir	50.92	8	Cir	50.92
4	I-60	None	54.37	n/a	n/a	n/a	8	Cir	51.08	8	Cir	51.08
5	I-59	None	54.77	n/a	n/a	n/a	8	Cir	51.44	8	Cir	51.44
6	RD-8	None	54.81	n/a	n/a	n/a	8	Cir	51.48	8	Cir	51.48
7	I-57	None	52.44	n/a	n/a	n/a	8	Cir	51.70	8	Cir	51.70
8	I-56	None	52.45	n/a	n/a	n/a	8	Cir	51.71	8	Cir	51.71
9	RD-7	None	54.15	n/a	n/a	n/a	8	Cir	51.73			
10	RD-6	None	52.67	n/a	n/a	n/a	8	Cir	50.54	8	Cir	50.54
11	RD-5	None	51.66	n/a	n/a	n/a	8	Cir	50.85	8	Cir	50.85
12	RD-4	None	51.64	n/a	n/a	n/a	8	Cir	50.99	8	Cir	50.99
13	RD-3	None	53.10	n/a	n/a	n/a	8	Cir	51.00	8	Cir	51.00
14	I-54	None	54.57	n/a	n/a	n/a	8	Cir	51.39	8	Cir	51.39
15	RD-2	None	54.59	n/a	n/a	n/a	8	Cir	51.40	8	Cir	51.40
16	I-52	None	52.44	n/a	n/a	n/a	8	Cir	51.84	8	Cir	51.84
17	I-51	None	52.46	n/a	n/a	n/a	8	Cir	51.85	8	Cir	51.85
18	RD-1	None	52.46	n/a	n/a	n/a	8	Cir	51.87			
19	I-2	Combination	49.65	Rect	4.00	2.00	15	Cir	46.90	15	Cir	47.10
20	I-3	Grate	51.46	Rect	4.00	2.00	15	Cir	48.05	12	Cir	48.25
21	OS-1	Manhole	50.67	Rect	1.00	1.00	12	Cir	48.83			
22	I-5	Combination	50.32	Rect	4.00	2.00	15	Cir	47.34	15	Cir	47.54

Project File: VILUX23005 - PIPE CALCS_2.stm | Number of Structures: 24 | Run Date: 7/17/2024

Structure Report

25-Yr Storm

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
23	I-6	Grate	52.79	Rect	4.00	2.00	15	Cir	48.02	8	Cir	49.20
24	RD-12	None	0.00	n/a	n/a	n/a	8	Cir	50.65			

Project File: VILUX23005 - PIPE CALCS_2.stm | Number of Structures: 24 | Run Date: 7/17/2024

Storm Sewer Tabulation

25-Yr Storm

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	35.150	0.03	0.30	0.95	0.03	0.29	0.0	9.4	6.0	1.70	2.76	2.25	12	0.51	50.00	50.18	51.00	51.05	50.63	53.69	SD-30
2	1	33.060	0.00	0.09	0.00	0.00	0.09	0.0	8.5	6.2	0.53	0.97	1.75	8	0.54	50.51	50.69	51.14	51.17	53.69	53.00	SD-23(2)
3	2	42.870	0.03	0.09	0.95	0.03	0.09	5.0	8.0	6.3	0.54	0.96	2.38	8	0.54	50.69	50.92	51.18	51.28	53.00	52.30	SD-23(2)
4	3	31.410	0.00	0.06	0.00	0.00	0.06	5.0	7.6	6.4	0.36	0.93	1.81	8	0.51	50.92	51.08	51.37	51.40	52.30	54.37	SD-45
5	4	72.905	0.00	0.06	0.00	0.00	0.06	5.0	6.5	6.7	0.38	0.92	2.25	8	0.49	51.08	51.44	51.46	51.73	54.37	54.77	SD-44
6	5	7.067	0.03	0.06	0.95	0.03	0.06	5.0	6.4	6.7	0.38	0.98	2.06	8	0.57	51.44	51.48	51.81	51.81	54.77	54.81	SD-43
7	6	43.898	0.00	0.03	0.00	0.00	0.03	5.0	5.2	7.1	0.20	0.93	1.46	8	0.50	51.48	51.70	51.87	51.92	54.81	52.44	SD-42
8	7	2.121	0.00	0.03	0.00	0.00	0.03	5.0	5.1	7.1	0.20	0.90	1.57	8	0.47	51.70	51.71	51.97	51.97	52.44	52.45	SD-41
9	8	3.500	0.03	0.03	0.95	0.03	0.03	5.0	5.0	7.1	0.20	0.99	1.80	8	0.57	51.71	51.73	52.00	51.94	52.45	54.15	SD-40
10	1	21.640	0.03	0.18	0.95	0.03	0.17	5.0	9.3	6.0	1.03	1.13	2.94	8	0.74	50.38	50.54	51.14	51.27	53.69	52.67	SD-28
11	10	43.210	0.03	0.15	0.95	0.03	0.14	5.0	9.1	6.1	0.86	1.11	2.53	8	0.72	50.54	50.85	51.29	51.46	52.67	51.66	SD-28(2)
12	11	28.490	0.03	0.12	0.95	0.03	0.11	5.0	8.8	6.1	0.70	0.92	2.03	8	0.49	50.85	50.99	51.54	51.61	51.66	51.64	SD-27
13	12	2.030	0.03	0.09	0.95	0.03	0.09	5.0	8.8	6.1	0.52	0.92	1.50	8	0.49	50.99	51.00	51.66	51.66	51.64	53.10	RD-3
14	13	77.040	0.00	0.06	0.00	0.00	0.06	5.0	7.7	6.4	0.36	0.93	1.47	8	0.51	51.00	51.39	51.67	51.75	53.10	54.57	SD-26(2)
15	14	2.096	0.03	0.06	0.95	0.03	0.06	5.0	7.7	6.4	0.36	0.90	1.68	8	0.48	51.39	51.40	51.79	51.79	54.57	54.59	SD-39
16	15	87.661	0.00	0.03	0.00	0.00	0.03	5.0	5.2	7.1	0.20	0.93	1.52	8	0.50	51.40	51.84	51.83	52.05	54.59	52.44	SD-38
17	16	2.121	0.00	0.03	0.00	0.00	0.03	5.0	5.1	7.1	0.20	0.90	1.62	8	0.47	51.84	51.85	52.10	52.10	52.44	52.46	SD-37
18	17	3.500	0.03	0.03	0.95	0.03	0.03	5.0	5.0	7.1	0.20	0.99	1.81	8	0.57	51.85	51.87	52.14	52.08	52.46	52.46	SD-36
19	End	70.235	0.36	0.43	0.74	0.27	0.33	5.0	6.0	6.8	5.18	8.55	5.41	15	1.49	45.85	46.90	46.75	47.82	51.82	49.65	SD-32
20	19	94.530	0.07	0.07	0.93	0.07	0.07	5.0	5.4	7.0	3.38	7.01	4.53	15	1.00	47.10	48.05	47.82	48.79	49.65	51.46	SD-13
21	20	100.123	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	2.92	2.94	4.26	12	0.58	48.25	48.83	49.06	49.65	51.46	50.67	SD-16
22	End	68.930	0.48	0.78	0.68	0.33	0.57	5.0	6.7	6.6	3.82	4.91	3.72	15	0.49	47.00	47.34	48.08	48.23	52.27	50.32	SD-14

Project File: VILUX23005 - PIPE CALCS_2.stm | Number of lines: 24 | Run Date: 7/17/2024

NOTES:Intensity = 59.46 / (Inlet time + 11.60) ^ 0.75; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

25-Yr Storm

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	96.357	0.16	0.30	0.72	0.12	0.25	5.0	5.5	7.0	1.73	4.94	2.79	15	0.50	47.54	48.02	48.36	48.54	50.32	52.79	SD-12
24	23	87.320	0.14	0.14	0.95	0.13	0.13	5.0	5.0	7.1	0.95	1.69	4.33	8	1.66	49.20	50.65	49.56	51.11	52.79	0.00	SD-34

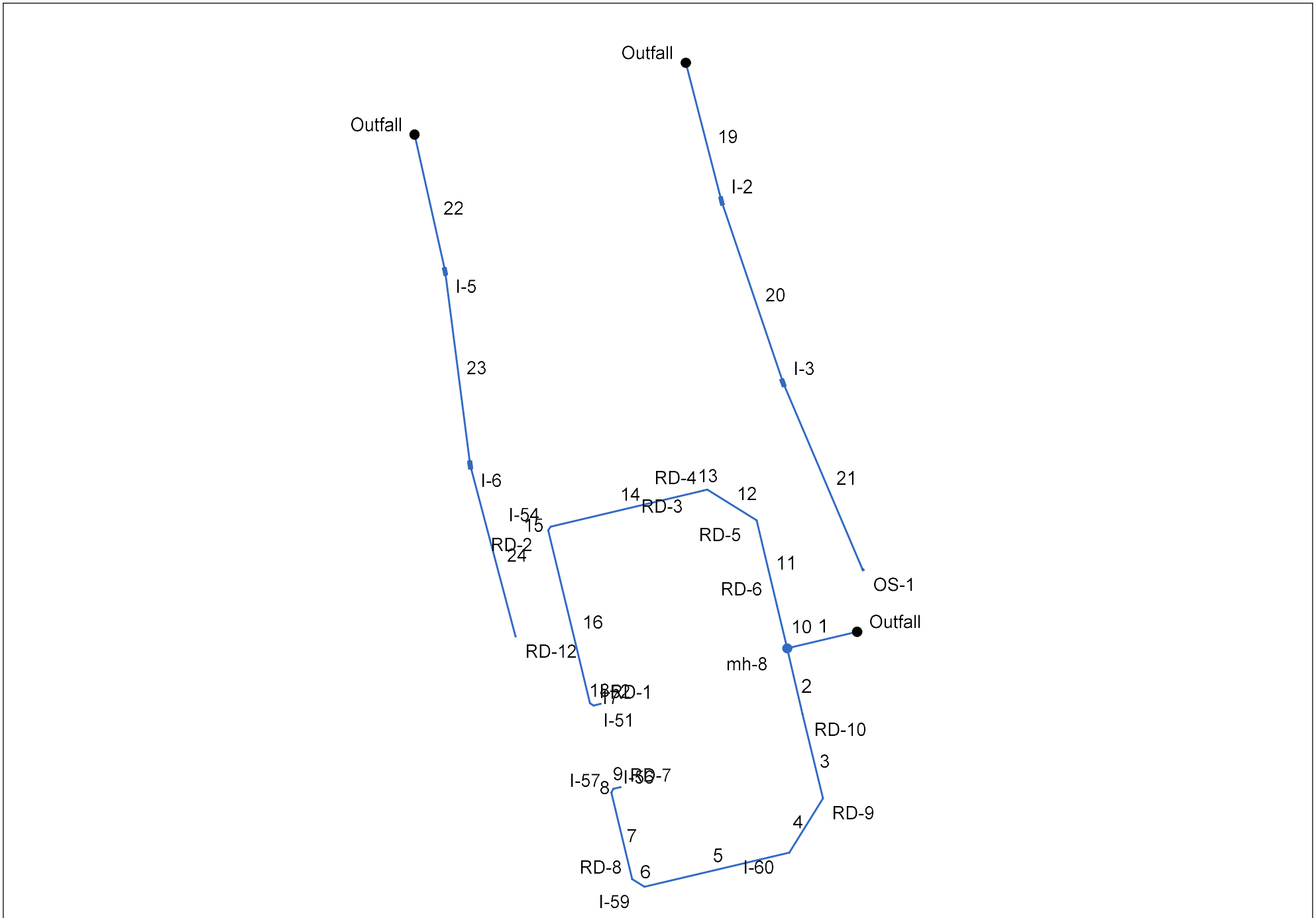
Project File: VILUX23005 - PIPE CALCS_2.stm

Number of lines: 24

Run Date: 7/17/2024

NOTES:Intensity = 59.46 / (Inlet time + 11.60) ^ 0.75; Return period =Yrs. 25 ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan 100-Yr Storm



Project File: VILUX23005 - PIPE CALCS_2.stm	Number of lines: 24	Date: 7/17/2024

Storm Sewer Inventory Report

100-Yr Storm

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	35.150	166.500	MH	0.00	0.03	0.95	0.0	50.00	0.51	50.18	12	Cir	0.012	1.00	53.69	SD-30
2	1	33.060	-89.840	None	0.00	0.00	0.00	0.0	50.51	0.54	50.69	8	Cir	0.012	0.15	53.00	SD-23(2)
3	2	42.870	0.000	None	0.00	0.03	0.95	5.0	50.69	0.54	50.92	8	Cir	0.012	0.75	52.30	SD-23(2)
4	3	31.410	45.042	None	0.00	0.00	0.00	5.0	50.92	0.51	51.08	8	Cir	0.012	0.75	54.37	SD-45
5	4	72.905	44.964	None	0.00	0.00	0.00	5.0	51.08	0.49	51.44	8	Cir	0.012	0.75	54.77	SD-44
6	5	7.067	45.000	None	0.00	0.03	0.95	5.0	51.44	0.57	51.48	8	Cir	0.012	0.75	54.81	SD-43
7	6	43.898	44.826	None	0.00	0.00	0.00	5.0	51.48	0.50	51.70	8	Cir	0.012	0.75	52.44	SD-42
8	7	2.121	45.000	None	0.00	0.00	0.00	5.0	51.70	0.47	51.71	8	Cir	0.012	0.75	52.45	SD-41
9	8	3.500	45.000	None	0.00	0.03	0.95	5.0	51.71	0.57	51.73	8	Cir	0.012	1.00	54.15	SD-40
10	1	21.640	90.174	None	0.00	0.03	0.95	5.0	50.38	0.74	50.54	8	Cir	0.012	0.15	52.67	SD-28
11	10	43.210	0.000	None	0.00	0.03	0.95	5.0	50.54	0.72	50.85	8	Cir	0.012	0.75	51.66	SD-28(2)
12	11	28.490	-44.695	None	0.00	0.03	0.95	5.0	50.85	0.49	50.99	8	Cir	0.012	0.75	51.64	SD-27
13	12	2.030	-45.313	None	0.00	0.03	0.95	5.0	50.99	0.49	51.00	8	Cir	0.012	0.15	53.10	RD-3
14	13	77.040	0.000	None	0.00	0.00	0.00	5.0	51.00	0.51	51.39	8	Cir	0.012	0.75	54.57	SD-26(2)
15	14	2.096	-45.174	None	0.00	0.03	0.95	5.0	51.39	0.48	51.40	8	Cir	0.012	0.75	54.59	SD-39
16	15	87.661	-45.000	None	0.00	0.00	0.00	5.0	51.40	0.50	51.84	8	Cir	0.012	0.75	52.44	SD-38
17	16	2.121	-45.000	None	0.00	0.00	0.00	5.0	51.84	0.47	51.85	8	Cir	0.012	0.75	52.46	SD-37
18	17	3.500	-45.000	None	0.00	0.03	0.95	5.0	51.85	0.57	51.87	8	Cir	0.012	1.00	52.46	SD-36
19	End	70.235	75.715	Comb	0.00	0.36	0.74	5.0	45.85	1.49	46.90	15	Cir	0.012	0.50	49.65	SD-32
20	19	94.530	-4.433	Grate	0.00	0.07	0.93	5.0	47.10	1.00	48.05	15	Cir	0.012	0.50	51.46	SD-13
21	20	100.123	-4.280	MH	3.72	0.00	0.00	5.0	48.25	0.58	48.83	12	Cir	0.012	1.00	50.67	SD-16
22	End	68.930	77.500	Comb	0.00	0.48	0.68	5.0	47.00	0.49	47.34	15	Cir	0.012	0.50	50.32	SD-14
23	22	96.357	5.100	Grate	0.00	0.16	0.72	5.0	47.54	0.50	48.02	15	Cir	0.012	0.50	52.79	SD-12

Project File: VILUX23005 - PIPE CALCS_2.stm

Number of lines: 24

Date: 7/17/2024

Storm Sewer Inventory Report

100-Yr Storm

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	87.320	-7.370	None	0.00	0.14	0.95	5.0	49.20	1.66	50.65	8	Cir	0.012	1.00	0.00	SD-34

Structure Report

100-Yr Storm

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	mh-8	Manhole	53.69	Cir	4.00	4.00	12	Cir	50.18	8 8	Cir Cir	50.51 50.38
2	RD-10	None	53.00	n/a	n/a	n/a	8	Cir	50.69	8	Cir	50.69
3	RD-9	None	52.30	n/a	n/a	n/a	8	Cir	50.92	8	Cir	50.92
4	I-60	None	54.37	n/a	n/a	n/a	8	Cir	51.08	8	Cir	51.08
5	I-59	None	54.77	n/a	n/a	n/a	8	Cir	51.44	8	Cir	51.44
6	RD-8	None	54.81	n/a	n/a	n/a	8	Cir	51.48	8	Cir	51.48
7	I-57	None	52.44	n/a	n/a	n/a	8	Cir	51.70	8	Cir	51.70
8	I-56	None	52.45	n/a	n/a	n/a	8	Cir	51.71	8	Cir	51.71
9	RD-7	None	54.15	n/a	n/a	n/a	8	Cir	51.73			
10	RD-6	None	52.67	n/a	n/a	n/a	8	Cir	50.54	8	Cir	50.54
11	RD-5	None	51.66	n/a	n/a	n/a	8	Cir	50.85	8	Cir	50.85
12	RD-4	None	51.64	n/a	n/a	n/a	8	Cir	50.99	8	Cir	50.99
13	RD-3	None	53.10	n/a	n/a	n/a	8	Cir	51.00	8	Cir	51.00
14	I-54	None	54.57	n/a	n/a	n/a	8	Cir	51.39	8	Cir	51.39
15	RD-2	None	54.59	n/a	n/a	n/a	8	Cir	51.40	8	Cir	51.40
16	I-52	None	52.44	n/a	n/a	n/a	8	Cir	51.84	8	Cir	51.84
17	I-51	None	52.46	n/a	n/a	n/a	8	Cir	51.85	8	Cir	51.85
18	RD-1	None	52.46	n/a	n/a	n/a	8	Cir	51.87			
19	I-2	Combination	49.65	Rect	4.00	2.00	15	Cir	46.90	15	Cir	47.10
20	I-3	Grate	51.46	Rect	4.00	2.00	15	Cir	48.05	12	Cir	48.25
21	OS-1	Manhole	50.67	Rect	1.00	1.00	12	Cir	48.83			
22	I-5	Combination	50.32	Rect	4.00	2.00	15	Cir	47.34	15	Cir	47.54

Structure Report

100-Yr Storm

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
23	I-6	Grate	52.79	Rect	4.00	2.00	15	Cir	48.02	8	Cir	49.20
24	RD-12	None	0.00	n/a	n/a	n/a	8	Cir	50.65			

Storm Sewer Tabulation

100-Yr Storm

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	35.150	0.03	0.30	0.95	0.03	0.29	0.0	8.9	6.9	1.98	2.76	2.59	12	0.51	50.00	50.18	51.00	51.07	50.63	53.69	SD-30
2	1	33.060	0.00	0.09	0.00	0.00	0.09	0.0	8.0	7.2	0.61	0.97	1.86	8	0.54	50.51	50.69	51.19	51.24	53.69	53.00	SD-23(2)
3	2	42.870	0.03	0.09	0.95	0.03	0.09	5.0	7.7	7.3	0.62	0.96	2.33	8	0.54	50.69	50.92	51.25	51.34	53.00	52.30	SD-23(2)
4	3	31.410	0.00	0.06	0.00	0.00	0.06	5.0	7.3	7.4	0.42	0.93	1.79	8	0.51	50.92	51.08	51.42	51.45	52.30	54.37	SD-45
5	4	72.905	0.00	0.06	0.00	0.00	0.06	5.0	6.3	7.7	0.44	0.92	2.31	8	0.49	51.08	51.44	51.50	51.75	54.37	54.77	SD-44
6	5	7.067	0.03	0.06	0.95	0.03	0.06	5.0	6.2	7.7	0.44	0.98	2.13	8	0.57	51.44	51.48	51.84	51.84	54.77	54.81	SD-43
7	6	43.898	0.00	0.03	0.00	0.00	0.03	5.0	5.1	8.1	0.23	0.93	1.46	8	0.50	51.48	51.70	51.90	51.95	54.81	52.44	SD-42
8	7	2.121	0.00	0.03	0.00	0.00	0.03	5.0	5.1	8.1	0.23	0.90	1.59	8	0.47	51.70	51.71	51.99	51.99	52.44	52.45	SD-41
9	8	3.500	0.03	0.03	0.95	0.03	0.03	5.0	5.0	8.1	0.23	0.99	1.86	8	0.57	51.71	51.73	52.02	51.95	52.45	54.15	SD-40
10	1	21.640	0.03	0.18	0.95	0.03	0.17	5.0	8.8	7.0	1.19	1.13	3.41	8	0.74	50.38	50.54	51.19	51.36	53.69	52.67	SD-28
11	10	43.210	0.03	0.15	0.95	0.03	0.14	5.0	8.6	7.0	1.00	1.11	2.86	8	0.72	50.54	50.85	51.39	51.64	52.67	51.66	SD-28(2)
12	11	28.490	0.03	0.12	0.95	0.03	0.11	5.0	8.4	7.1	0.81	0.92	2.31	8	0.49	50.85	50.99	51.74	51.85	51.66	51.64	SD-27
13	12	2.030	0.03	0.09	0.95	0.03	0.09	5.0	8.4	7.1	0.60	0.92	1.73	8	0.49	50.99	51.00	51.91	51.91	51.64	53.10	RD-3
14	13	77.040	0.00	0.06	0.00	0.00	0.06	5.0	7.4	7.3	0.42	0.93	1.23	8	0.51	51.00	51.39	51.92	51.99	53.10	54.57	SD-26(2)
15	14	2.096	0.03	0.06	0.95	0.03	0.06	5.0	7.3	7.4	0.42	0.90	1.24	8	0.48	51.39	51.40	52.01	52.01	54.57	54.59	SD-39
16	15	87.661	0.00	0.03	0.00	0.00	0.03	5.0	5.1	8.1	0.23	0.93	1.20	8	0.50	51.40	51.84	52.03	52.11	54.59	52.44	SD-38
17	16	2.121	0.00	0.03	0.00	0.00	0.03	5.0	5.1	8.1	0.23	0.90	1.50	8	0.47	51.84	51.85	52.15	52.15	52.44	52.46	SD-37
18	17	3.500	0.03	0.03	0.95	0.03	0.03	5.0	5.0	8.1	0.23	0.99	1.83	8	0.57	51.85	51.87	52.17	52.09	52.46	52.46	SD-36
19	End	70.235	0.36	0.43	0.74	0.27	0.33	5.0	5.8	7.8	6.32	8.55	6.30	15	1.49	45.85	46.90	46.75	47.91	51.82	49.65	SD-32
20	19	94.530	0.07	0.07	0.93	0.07	0.07	5.0	5.4	8.0	4.24	7.01	4.95	15	1.00	47.10	48.05	47.91	48.88	49.65	51.46	SD-13
21	20	100.123	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	3.72	2.94	4.74	12	0.58	48.25	48.83	49.25	50.18	51.46	50.67	SD-16
22	End	68.930	0.48	0.78	0.68	0.33	0.57	5.0	6.5	7.6	4.38	4.91	4.10	15	0.49	47.00	47.34	48.08	48.30	52.27	50.32	SD-14

Project File: VILUX23005 - PIPE CALCS_2.stm

Number of lines: 24

Run Date: 7/17/2024

NOTES:Intensity = 46.51 / (Inlet time + 9.20) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

100-Yr Storm

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	96.357	0.16	0.30	0.72	0.12	0.25	5.0	5.5	8.0	1.97	4.94	2.89	15	0.50	47.54	48.02	48.45	48.58	50.32	52.79	SD-12
24	23	87.320	0.14	0.14	0.95	0.13	0.13	5.0	5.0	8.1	1.08	1.69	4.52	8	1.66	49.20	50.65	49.59	51.14	52.79	0.00	SD-34

Project File: VILUX23005 - PIPE CALCS_2.stm

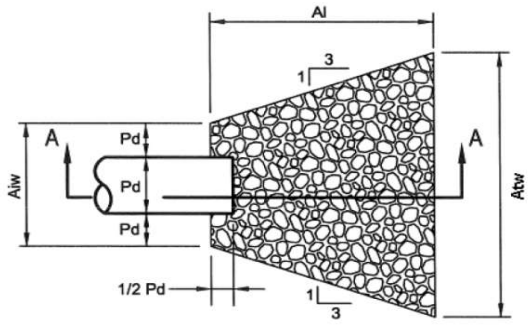
Number of lines: 24

Run Date: 7/17/2024

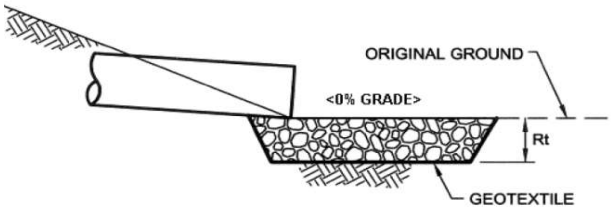
NOTES:Intensity = 46.51 / (Inlet time + 9.20) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

STANDARD E&S WORKSHEET #20
Riprap Apron Outlet Protection

PROJECT NAME: Villanova Boathouse
LOCATION: 601 Washington Ave, Conshohocken, PA
PREPARED BY: CW Date: 2024.07.17
CHECKED BY: Date:



PLAN VIEW



SECTION A - A

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
1-0	12	Min.	0.013	0.005	1.98	3.56	R-3	9	6	3	9

***:The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Mannings equation to calculate velocity for pipe slopes greater than or equal to 0.05 ft/ft**

Appendix E:
Drainage Area Maps

WASHINGTON STREET

SCHUYLKILL RIVER

LIMIT OF DISTURBANCE OFFSET 3' FOR VISUAL PURPOSES
193,556 SF (4.44 AC)

EDRA-1
IMPERVIOUS: 1.96 AC
MEADOW: 1.99 AC
IMPERVIOUS AS MEADOW: 0.49
TOTAL: 4.44 AC

PARCEL I.D. 65-00-12679-00-9
LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP
PER D.B. 5260, PG. 684

2 STORY MASONRY AND STEEL BUILDING (38,756 S.F. FOOTPRINT)

601 WASHINGTON STREET ADDRESS TAKEN FROM RECORD DOCUMENTS

ROOF COLLAPSED

BLD HT 35'

BLD HT 40'

SHED HT. 13'

BROKEN ASPHALT PAVEMENT

DIRT AND GRAVEL MIX

GRAVEL MIX

ZONE AE

ZONE AE (FLOODWAY)

APPROX. LOC. UNDERGROUND ELECTRIC PER PECO UNTITLED AS-BUILT

APPROXIMATE LOCATION OF TELECOMM LINE PER UTILITY MARKOUT. CONTRACTOR TO VERIFY IN FIELD.

APPROXIMATE LOCATION 48"CMP

48" RCP @ 0.0% FFE

APPROX. FLOOD HAZARD BOUNDARY LINE PER FEMA MAP

AREA OF APPARENT OVERLAP

APPROXIMATE LOCATION OF CONSHOCKEN AUTHORITY SEWER LINE - NOT FIELD VERIFIED

PIN AND CAP SET

PIN AND CAP SET 18' NORTH ON LINE

END OF 48"CMP

TOP OF BANK

WATER EDGE

739.38'

S65°02'51"W TIE LINE

DP-001

BOAT DOCK

WOOD BOAT DOCK

CONTAINER

COMPRESSOR

GRAVEL EDGE

ASPHALT EDGE

METAL FENCE

CONC BLOCK

SLIDING GATE

"ACCESS"

RACK

SHED

0 30' 60'

NORTH

NOT FOR CONSTRUCTION

PLOTTED: 7/17/2024 5:41 PM BY: Cameron Williams PLOTSTYLE: Pennoni NCS.ctb

U:\Accounts\BU\HAV\VILUX23005 - Villanova Boathouse - LDVDESIGN_SHEETS\Drainage Area Plans\DA-1.dwg

Pennoni

PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE

601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

PRE-DEVELOPMENT DRAINAGE AREA MAP

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

BY	REVISIONS	NO.	DATE
CW	PLD SUBMISSION	1	07/17/2024
CW	90% CDS	0	2024-07-12

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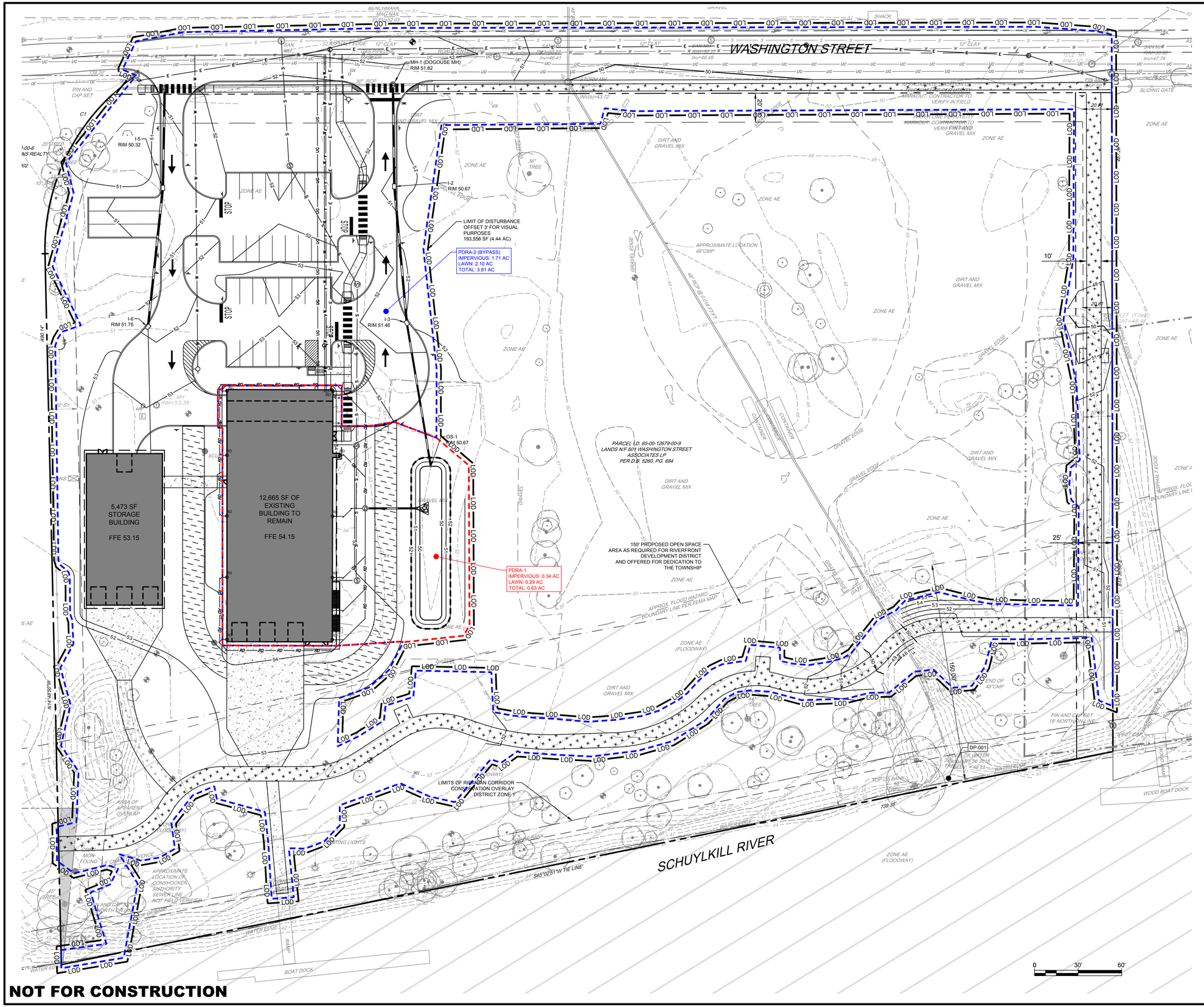
PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

DA-1

SHEET 1 OF 2



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VILLANOVA BOATHOUSE

601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

800 LANCASTER AVE
VILLANOVA, PA 19085

POST-DEVELOPMENT DRAINAGE AREA MAP

VILLANOVA UNIVERSITY

NO.	DATE	REVISIONS	BY
1	07/17/2024	PLD SUBMISSION	CW
0	2024-07-12	90% CDS	CW

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PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 30'
DRAWN BY	CW
APPROVED BY	MR

DA-2

SHEET 2 OF 2

PLOTTED: 7/17/2024 5:38 PM, BY: Cameron Williams PLOTSTYLE: Pennoni MCS.stb
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Appendix F:
Geotechnical Report

April 2, 2024

VILUX23005

Blackney Hayes Architects
Attn: Kevin Blackney, AIA, LEED AP
Public Ledger Building
600 Chestnut Street, Suite 1200
Philadelphia, PA 19106

RE: Infiltration Testing Summary Report
Villanova Boathouse
601 Washington Street
Conshohocken, PA

Dear Mr. Blackney,

Pennoni is pleased to submit this report summarizing the infiltration tests performed as part of the above referenced project. The purpose of the study was to determine the soil profile, depth to potential limiting zones or confining strata, and to estimate the infiltration rates in the general areas of potential Stormwater Management (SWM) facilities.

Field Work

On March 14, 2024, four test pits were excavated by Ambient Group, LLC using a rubber tire backhoe. Testing locations were selected within the proposed stormwater management facility and established in the field by Pennoni personnel. Approximate testing locations are presented on the Test Location Plan, Drawing LP-1. Generally, the test pits were extended 2 ft beyond the proposed testing elevation, which required by the Pennsylvania Stormwater BMP Manual, Appendix C (PABMP). The test pits were performed to evaluate the soil horizons and depth to groundwater and/or limiting zones, prior to infiltration testing (described below). Following the conclusion of the excavations and testing, the test pits were backfilled with the excavated soil in 10 to 12 in. lifts and tamped with the excavator bucket.

Our D. Marano, PE directed the field work, and our T. Hall, EIT observed the test pits and performed the infiltration testing. The test pit and infiltration logs are attached.

Subsurface Stratigraphy

Test Pits INF-1 and INF-2 disclosed a surficial topsoil layer approximately 4 in. thick. A 6 to 7 ft thick manmade fill layer was encountered in the test pits. The underlying subsoils, including the fill, have been grouped into two principal strata based on their engineering properties and our interpretation of their origin. Table 1 presents the strata descriptions.

Table 1: Soil Stratum Descriptions

STRATUM	THICKNESS (FT)	DESCRIPTION
F	6 – 7	FILL: Black to brown coarse to medium to fine SAND, some Brick, Cinders, Rock Fragments, little to some Silt
1	--	Brown to gray SILTY CLAY to SILT, with varying amounts of fine to medium Sand, trace Gravel
Notes: All test pits terminated in Stratum 1.		

Observations for groundwater were made during and shortly after the completion of the test pit excavations. Evidence of groundwater was encountered at depths varying between 6 and 7 ft below ground surface (bgs) (Elev. 46.0 to Elev. 46.5). These observations are for the time and locations noted and may not be indicative of seasonal or daily fluctuations. Seasonal variations on the order of several feet should be anticipated.

Available geological data indicates that the subject site is partially underlain by the Conestoga Formation, consisting of medium gray, impure limestone with a conglomeratic base. Disappearing streams, sinkholes, and caves are typical karst topographic features in this formation. In carbonate soils, excessively rapid drainage may increase the risk of sinkhole formation, and some compaction or additional soil may be appropriate.

Infiltration Testing Summary

Pennoni performed four double ring infiltration tests within potential SWM facility footprints. Testing was performed in general accordance with the PABMP.

A pre-soak was performed prior to testing, where the double rings were filled with approximately 3 in. of water and allowed to drain completely. The rings were refilled and the time to drop 3 in. measured until stabilized infiltration rates were observed (two testing measurements of time within 0.5 second). The following table presents a summary of the field results for the infiltration tests performed.

Table 2: Testing Results

Test #	Ground Surface Elev.	Groundwater Depth, ft (Elev.)	Testing Depth, ft (Elev.)	Tested Stratum	Field Infiltration Rate (in/hr)
INF-1	52.5	6.0 (46.5)	4.0 (52.5)	F	17.6
INF-2	52.5	6.0 (46.5)	4.0 (48.5)	F	10.0
INF-3	53.0	7.0 (46.0)	5.0 (48.0)	F	8.0
INF-4	53.0	6.5 (46.5)	4.5 (48.5)	F	35.5

Field infiltration rates were observed to be between 8.0 and 35.5 in/hr within Stratum F, with a mean value of 17.8 in/hr. These rates generally fall outside the acceptable range of 0.1 in./hr. to 10 in./hr. according to the BMP Manual, Appendix C, and are not suitable for infiltration. A soil buffer (i.e., an organic layer over the bed bottom) may be required if pollutant loading is expected to be significant.

Limitations

This work has been performed in accordance with generally accepted professional practice in the field of geotechnical engineering. Our conclusions and recommendations are based on the data revealed by this exploration. We are not responsible for any conclusions or opinions drawn from the data included herein, other than those specifically stated, nor are the recommendations presented in this report intended for direct use as construction specifications. This report is intended for use with regard to the specific project described herein; any changes in loads, structures, or locations should be brought to our attention so that we may determine how they may affect our conclusions. An attempt has been made to provide for normal contingencies, but the possibility remains that unexpected conditions may be present which we are not aware of. If additional or contradictory data are revealed in the future, we should be notified so that modifications to this report can be made, if necessary. If we do not review relevant construction documents and witness the relevant construction operations, then we cannot be responsible for any problems that may result from misinterpretation or misunderstanding of this report or failure to comply with our recommendations.

We trust that the information presented in this report is what you require at this time and we thank you for the opportunity to assist you with this project. If you have any questions, or if you need any further assistance with this project, please contact this office at your earliest convenience.

Respectfully,

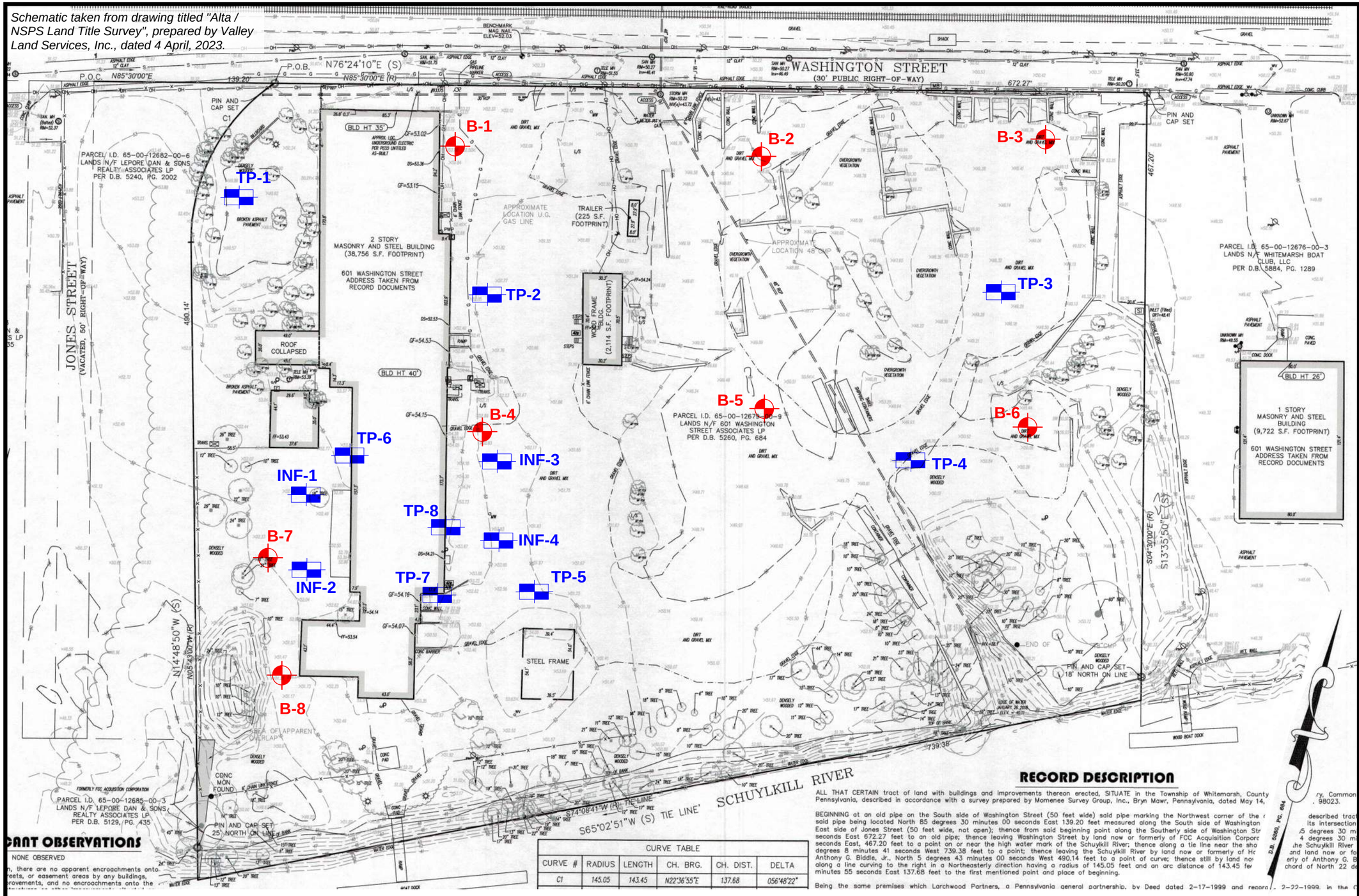
PENNONI ASSOCIATES INC.

Tristan Hall, EIT
Graduate Geotechnical Engineer

Daniel P. Marano, PE
Senior Geotechnical Engineer

Enclosures: Test Location Plan (LP-1)
Test Pit Logs (INF-1 through INF-4)
Infiltration Testing Logs (INF-1 through INF-4)

Schematic taken from drawing titled "Alta / NSPS Land Title Survey", prepared by Valley Land Services, Inc., dated 4 April, 2023.



CURVE TABLE					
CURVE #	RADIUS	LENGTH	CH. BRG.	CH. DIST.	DELTA
C1	145.05	143.45	N22°36'55"E	137.68	056°48'22"

SIGNIFICANT OBSERVATIONS

NONE OBSERVED

..., there are no apparent encroachments onto ... roots, or easement areas by any buildings, ... improvements, and no encroachments onto the ...

RECORD DESCRIPTION

ALL THAT CERTAIN tract of land with buildings and improvements thereon erected, SITUATE in the Township of Whitemarsh, County ... Pennsylvania, described in accordance with a survey prepared by Momenee Survey Group, Inc., Bryn Mawr, Pennsylvania, dated May 14, ...

BEGINNING at an old pipe on the South side of Washington Street (50 feet wide) said pipe marking the Northwest corner of the ... said pipe being located North 85 degrees 30 minutes 00 seconds East 139.20 feet measured along the South side of Washington ... East side of Jones Street (50 feet wide, not open); thence from said beginning point along the Southerly side of Washington Str... seconds East 672.27 feet to an old pipe; thence leaving Washington Street by land now or formerly of FCC Acquisition Corpora... seconds East, 467.20 feet to a point on or near the high water mark of the Schuylkill River; thence along a tie line near the sho... degrees 8 minutes 41 seconds West 739.38 feet to a point; thence leaving the Schuylkill River by land now or formerly of Ho... Anthony G. Biddle, Jr., North 5 degrees 43 minutes 00 seconds West 490.14 feet to a point of curve; thence still by land no... along a line curving to the right in a Northeasterly direction having a radius of 145.05 feet and an arc distance of 143.45 fe... minutes 55 seconds East 137.68 feet to the first mentioned point and place of beginning.

Being the same premises which Larchwood Partners, a Pennsylvania general partnership, by Deed dated 2-17-1999 and record... 2-22-1999, in the ... ry, Common ... 98023.

described tract ... its intersection ... .5 degrees 30 m... 4 degrees 30 m... the Schuylkill River ... and land now or fo... erly of Anthony G. B... chord of North 22 d...

D.B. 5260, PG. 684

LEGEND

B - TEST BORING LOCATION AND IDENTIFYING NUMBER

TP - / INF - TEST PIT / INFILTRATION TEST LOCATION AND IDENTIFYING NUMBER

PENNONI ASSOCIATES INC.
1900 Market Street, Suite 300
Philadelphia, PA 19103
T 215.222.3000 **F** 215.222.3588

VILLANOVA BOATHOUSE

601 Washington Street
Conshohocken, PA 19428

TEST LOCATION PLAN

Blackney Hayes Architects
600 Chestnut Street, Suite 1200
Philadelphia, PA 19106

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PROJECT	VILUX23005
DATE	14 MARCH, 2024
DRAWING SCALE	NTS
DRAWN BY	TH
APPROVED BY	DM

LP - 1

SHEET 1 OF # 1

TEST PIT LOG

Test Pit INF-1

CLIENT Villanova University
PROJECT NAME 601 Washington Street
PROJECT NUMBER VILUX22001
PROJECT LOCATION 601 Washington St., Whitemarsh Twp, PA
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
GROUND ELEVATION 52.5'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION 6.0' / Elev 46.5'
OPERATOR / HELPER Danny / Mike
AT END OF EXCAVATION 6.0' / Elev 46.5'
LOGGED BY T. Hall **CHECKED BY** D. Marano
AFTER EXCAVATION 6.0' / Elev 46.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0.0			T	Depth 0.3 — 4" TOPSOIL — Elev. 52.2	
				FILL: Black C/M/F SAND, some Silt, some Rock Fragments	
2.5				FILL: Black C/M/F SAND, some Brick and Rock Fragments, little Silt	
			F	FILL: Brown to black C/M/F SAND, some Bricks, Cinders, and Rock Fragments, little Silt	
5.0					
				6.0 — 46.5	
			1	Brown SILTY CLAY, trace F/M Sand, trace Gravel	
				7.0 — 45.5	
				Test Pit terminated at 7.0 feet.	

NOTES:

Test Pit INF-2
PAGE 1 OF 1

TEST PIT LOG

CLIENT Villanova University
PROJECT NAME 601 Washington Street
PROJECT NUMBER VILUX22001
PROJECT LOCATION 601 Washington St., Whitemarsh Twp, PA
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
GROUND ELEVATION 52.5'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION 6.0' / Elev 46.5'
OPERATOR / HELPER Danny / Mike
AT END OF EXCAVATION 6.0' / Elev 46.5'
LOGGED BY T. Hall **CHECKED BY** D. Marano
AFTER EXCAVATION 6.0' / Elev 46.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0.0				Depth / Elev.	
			T	0.3 / 52.2 — 4" TOPSOIL	
			F	FILL: Brown to black C/M/F SAND, some Bricks, Cinders, and Rock Fragments, little Silt	
2.5					
5.0					
				6.0 / 46.5	
			1	Brown SILTY CLAY, little F/M Sand	
				7.0 / 45.5	
				Test Pit terminated at 7.0 feet.	

NOTES:

TEST PIT LOG

Test Pit INF-3
PAGE 1 OF 1

CLIENT Villanova University
PROJECT NAME 601 Washington Street
PROJECT NUMBER VILUX22001
PROJECT LOCATION 601 Washington St., Whitemarsh Twp, PA
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
GROUND ELEVATION 53.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION 7.0' / Elev 46.0'
OPERATOR / HELPER Danny / Mike
AT END OF EXCAVATION 7.0' / Elev 46.0'
LOGGED BY T. Hall **CHECKED BY** D. Marano
AFTER EXCAVATION 7.0' / Elev 46.0'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0.0				Depth Elev.	
			F	FILL: Black to gray GRAVEL COURSE FILL: Brown to black C/M/F SAND, some Bricks, Cinders, and Rock Fragments, little Silt	
2.5					
5.0					
				6.0 47.0	
			1	Gray to brown SILTY CLAY, little F/M Sand	
				7.0 46.0	
				Test Pit terminated at 7.0 feet.	

NOTES:

TEST PIT LOG

Test Pit INF-4

CLIENT Villanova University
PROJECT NAME 601 Washington Street
PROJECT NUMBER VILUX22001
PROJECT LOCATION 601 Washington St., Whitemarsh Twp, PA
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
GROUND ELEVATION 53.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION 6.5' / Elev 46.5'
OPERATOR / HELPER Danny / Mike
AT END OF EXCAVATION 6.5' / Elev 46.5'
LOGGED BY T. Hall **CHECKED BY** D. Marano
AFTER EXCAVATION 6.5' / Elev 46.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0.0				Depth / Elev.	
				FILL: Black to gray GRAVEL COURSE	
				FILL: Gray C/M/F SAND and C/F GRAVEL, little Silt	
				FILL: Brown SILT, some F/M/C Sand	
				FILL: Black C/M/F SAND, some Rock Fragments, some Silt	
2.5					
				FILL: BRICK and CINDERS, some black C/M/F Sand	
			F	FILL: Black to dark brown C/M/F SAND and SILT, some Rock Fragments	
5.0					
				FILL: BRICK and CINDERS, some black C/M/F Sand	
				FILL: Black C/M/F SAND and C/F gravel size ROCK FRAGMENTS, some Brick and Cobbles	
7.0					46.0
			1	Gray SILT, some fine Sand	
7.5					
8.0					45.0
				Test Pit terminated at 8.0 feet.	

NOTES:

Pennoni

DOUBLE RING FIELD DATA SHEET

Date: 03/14/2024
Test Performed By: T. Hall
Project Number: VILUX23005
Test Number: INF-1

Diameter of Inner Ring: 6 in.
Diameter of Outer Ring: 12 in.
Seating Depth of Rings: 4 in.

Trial #	Start Time	End Time	ΔT (min)	H1 (in.)	H2 (in.)	ΔH (in.)	Rate (in/hr)
P1	0940	1010	30.0	3	0.00	3.00	6.00
P2	1010	1018	8.0	3	0.00	3.00	22.50
T1	1018	1028	10.5	3	0.00	3.00	17.14
T2	1030	1040	10.3	3	0.00	3.00	17.56
T3	1041	1051	10.3	3	0.00	3.00	17.56
T4	1052	1102	10.3	3	0.00	3.00	17.56
					Average		**17.56**

Notes: Approximate Ground Surface Elevation (ft): ELEV. 52.5
Approximate Test Elevation (ft): ELEV. 48.5
Test Depth: 4.0ft (TP-1)

DOUBLE RING FIELD DATA SHEET

Date: 03/14/2024
Test Performed By: T. Hall
Project Number: VILUX23005
Test Number: INF-2

Diameter of Inner Ring: 6 in.
Diameter of Outer Ring: 12 in.
Seating Depth of Rings: 4 in.

Trial #	Start Time	End Time	ΔT (min)	H1 (in.)	H2 (in.)	ΔH (in.)	Rate (in/hr)
P1	0945	1015	30.0	3	0.00	3.00	6.00
P2	1015	1027	12.5	3	0.00	3.00	14.40
T1	1028	1040	18.0	3	0.00	3.00	10.00
T2	1041	1058	17.5	3	0.00	3.00	10.29
T3	1059	1117	18.0	3	0.00	3.00	10.00
T4	1117	1135	18.0	3	0.00	3.00	10.00
					Average		**10.00**

Notes: Approximate Ground Surface Elevation (ft): ELEV. 52.5
Approximate Test Elevation (ft): ELEV. 48.5
Test Depth: 4.0ft (TP-2)

DOUBLE RING FIELD DATA SHEET

Date: 03/14/2024
Test Performed By: T. Hall
Project Number: VILUX23005
Test Number: INF-3

Diameter of Inner Ring: 6 in.
Diameter of Outer Ring: 12 in.
Seating Depth of Rings: 4 in.

Trial #	Start Time	End Time	ΔT (min)	H1 (in.)	H2 (in.)	ΔH (in.)	Rate (in/hr)
P1	1251	1309	18.5	3	0.00	3.00	9.73
P2	1310	1331	21.0	3	0.00	3.00	8.57
T1	1332	1354	22.3	3	0.00	3.00	8.09
T2	1355	1417	22.4	3	0.00	3.00	8.04
T3	1420	1442	22.4	3	0.00	3.00	8.04
T4	1443	1505	22.4	3	0.00	3.00	8.04
					Average		**8.04**

Notes: Approximate Ground Surface Elevation (ft): ELEV. 53.0
Approximate Test Elevation (ft): ELEV. 48.0
Test Depth: 5.0ft (TP-3)

Pennoni

DOUBLE RING FIELD DATA SHEET

Date: 03/14/2024
Test Performed By: T. Hall
Project Number: VILUX23005
Test Number: INF-4

Diameter of Inner Ring: 6 in.
Diameter of Outer Ring: 12 in.
Seating Depth of Rings: 4 in.

Trial #	Start Time	End Time	ΔT (min)	H1 (in.)	H2 (in.)	ΔH (in.)	Rate (in/hr)
P1	1205	1208	3.0	3	0.00	3.00	60.00
P2	1209	1213	4.5	3	0.00	3.00	40.00
T1	1214	1219	4.9	3	0.00	3.00	36.73
T2	1220	1225	5.3	3	0.00	3.00	34.29
T3	1226	1231	5.1	3	0.00	3.00	35.41
T4	1232	1237	5.1	3	0.00	3.00	35.64
					Average		**35.53**

Notes: Approximate Ground Surface Elevation (ft): ELEV. 53.0
Approximate Test Elevation (ft): ELEV. 48.5
Test Depth: 4.5 ft (TP-4)

July 19, 2024

VILUX23005

Charles L. Guttenplan AICP
Director of Planning and Zoning / Zoning Officer
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: SLD#02-24: Villanova Boathouse at 601 Washington Street
Sketch Plan / Land Development of Boathouse Modification and Parking Improvements
Zoning Ordinance Compliance Review Letter

Dear Charles Guttenplan:

We are in receipt of the Whitemarsh Township Fire Marshal comments review letter dated March 22, 2024. We have revised the plans based on the comments provided. Below is a summary of the Fire Marshal's comments in italics with our responses in **bold**.

Comments:

1. *Fire department connections shall be installed within 100' of the approved hydrants in approved locations. (This is if the building is being sprinklered.*

   Pennoni Response: The fire department connection location will be coordinated with the Fire Department. A hydrant has been proposed on-site that is within 100' of the building, and location can be adjusted per coordination with the Fire Department.

2. *The building will need an NFPA 72 compliant fire alarm system.*

   Pennoni Response: Acknowledged.

3. *An emergency entry key box will be needed for the facility in accordance with Whitemarsh Township Ordinance 1036 accepted on March 14, 2024*

   Pennoni Response: An emergency entry key box will be provided.

4. *The plan must be in accordance with Whitemarsh Township Ordinance 1012 accepted on April 14, 2022, Section 503.2.1 Dimensions and International Fire Code Section 5031.1 Buildings and Facilities.*

   a. *Dimension. Fire Apparatus access roads shall have an unobstructed width of 24 feet, exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of 14 feet. No access drive shall be located closer than five feet to a structure.*

      Pennoni Response: Per conversations with the Fire Marshal, it was determined that the 15' cartway width shown on the plans is acceptable as they are one-way drives.

b. *503.1.1 Buildings and Facilities. Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or withing the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45,720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility.*

Pennoni Response: Grass pavers have been added to the plans to provide emergency access to all sides of the building. See Site Plan (CS1001) and Truck Turning Plan (CS9801).

5. *There must be an Emergency Action Plan in place since the building is in a known flooding area and shall be updated annually.*

a. *Emergency contacts shall be updated annually.*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department.

b. *The facility will register with ReadyMontCo.*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department..

c. *Provide Emergency Evacuation Routes/Shelter in place plans.*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department.

d. *Provide procedures for accounting for coaches, staff, and students/athletes after evacuation.*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department.

e. *Provide means of notifying occupants during an emergency*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department.

f. *Provide site plans with evacuation points, hydrants, and fire department access.*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department.

g. *Provide Floor Plans.*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department.

h. *Provide locations for coaches, staff, and students/athletes to move their cars in the event of a potential flood.*

Pennoni Response: Will comply, the Applicant will coordinate the Emergency Action Plan with the Fire Department.

ADDITIONAL COMMENTS

6. *Will the fire hydrant be moved? It is noted that utility relocation will be done with the movement of the telephone poles for the driveway.*

   Pennoni Response: The existing hydrant will be relocated as part of the proposed road widening.

7. *Will the proposed trail be able to support emergency vehicles in the event of an incident?*

   Pennoni Response: The proposed asphalt trail will be able to support an emergency vehicle in the event of an incident.

8. *Will the current containers shown on the sketch plan remain on site or are they being removed with the project?*

   Pennoni Response: It is our understanding that these containers will be removed, if not done so already.

9. *Will the other boat access by the containers remain or is that being removed? If the other boat access is staying, will it be made accessible to first responders?*

   Pennoni Response: There are not plans for the other boat access at this time. The applicant will coordinate with the Fire Department regarding the use of the site for boat access.

10. *Can impervious surface be added to access the above-mentioned boat access so emergency first responders can maneuver vehicles to that point?*

    Pennoni Response: As noted in the previous response the applicant will coordinate with the Fire Department regarding the use of the site for boat access. The proposed asphalt trails are adjacent to this area.

11. *Access will be needed from the front driveway to the back of the boathouse for emergency responders in the event of a fire, medical, or police incident.*

    Pennoni Response: Access has been provided through the use of grass pavers. See Site Plan (CS1001) and Truck Turning Plan (CS9801).

12. *No Parking Fire Lane signage will need to be provided along the driveways.*

    Pennoni Response: Signage has been added accordingly. See site plan.

Thank you and your staff for your assistance and attention on this project. Should you have any questions or need additional information, please do not hesitate to contact me at 610-422-2486 for MRoth@Pennoni.com.
PENNONI ASSOCIATES INC.

Mike Roth

Michael Roth, P.E.
Project Engineer

cc:

July 19, 2024

VILUX23005

Craig T. McAnally
Township Manager
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: Sketch Plan Review
601 Washington Street
Whitemarsh Township, Montgomery County, PA
S/LD # 02-24
Project Number 2024-00243

Dear Mr. McAnally:

We are in receipt of the Gilmore & Associates, Inc. (Gilmore) comments review letter dated April 26, 2024. We have revised the plans based on the comments provided. Below is a summary of Gilmore's comments in italics with our responses in **bold**.

Comments:

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE

1. *105-20(A)(4) The Zoning Compliance Summary Table must be revised to indicate that the site is located within the RDD-1 (instead of RDD) Overlay District.*

   Pennoni Response: The Zoning Compliance Summary Table has been revised accordingly.

2. *105-20(A)(10) The plans must be revised to show the boundaries of all adjoining properties with names of landowners, including those across Washington Street.*

   Pennoni Response: Pennoni Response: The boundaries of adjoining properties and the names of landowners have been added to the Existing Resource and Site Analysis Plan, see sheet CS0200.

3. *105-20(A)(12) The plans must be revised to show existing principal buildings (and their respective uses) and driveways on the peripheral strip. Sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads, and other significant man-made features within 500 feet of and within the site, including properties across streets.*

   Pennoni Response: The existing site features within 500 feet of the site have been shown with aerial imagery on the Existing Resource and Site Analysis Plan, see sheet CS0200.

4. *105-20(A)(21), 105-21(B)(1)(n) The plans must be revised to show topographic, physical, and cultural features including but not limited to fields, pastures, meadows, woodland, trees with a dbh of six inches or more, hedgerows and other significant vegetation, steep slopes, rock outcrops, soil types, ponds, ditches, drains, storage tanks, streams within 200 feet of the tract, and existing rights-of-way and easements, and historical and cultural features such as all structures, foundations, walls, wells, trails, and abandoned roads.*

   Pennoni Response: The existing site features within 500 feet of the site have been shown with aerial imagery on the Existing Resource and Site Analysis Plan, see sheet CS0200.

5. *105-20(A)(22), 105-21(B)(6) The plans must be revised to include a general description of proposed method of water supply, and sewage disposal.*

   Pennoni Response: The site will be served with public sewer and water. Connections to these utilities have been added to the Utility Plan, see sheet CS1701. A note has also been added on the General Notes Sheet, sheet CS0002.

6. *105-20(B)(1) The plans must be revised to show proposed finished grades.*

   Pennoni Response: Proposed grading has been added to the Grading Plan (sheet CS1501).

7. *105-21(B)(1)(l) The plans indicate an "area of apparent overlap" at the Southwestern Corner of the site. Property Boundaries must be resolved and properly monumented prior to final plan approval.*

   Pennoni Response: The applicant will review with the surveyor. Boundaries will be resolved prior to final plan approval.

8. *105-20(B)(2) The plans must be revised to note the base flood elevation (BFE) consistent with FEMA Flood Insurance Maps and Surveys, which designate the base flood elevation as being at approximately elevation of 59.5.*

   Pennoni Response: The base flood elevation has been added to the Existing Resource and Site Analysis Plan, see sheet CS0200.

9. *105-21(B)(2)(e) The plans must indicate the lowest floor elevation and/or the elevation to which the structure would be floodproofed.*

   Pennoni Response: The floor elevation of the building has been added to the plans.

10. *105-21(B)(7) The applicant must submit a Landscaping and grading plan, showing existing and proposed grades for the entire site, existing vegetation to be removed, existing vegetation to be preserved, and a proposed planting schedule indicating the locations, species and sizes of plantings as required by § 105-39, 105-48 and 105-52.*

    Pennoni Response: The proposed Landscaping Plans are in accordance with sections 105-39, 105-48 and 105-52. Please see sheet CS2001 for Landscape Plans and corresponding schedule and compliance chart.

11. *105-21(B)(9)(c)[1] The applicant is advised that the Township Planning Commission, at its discretion, may request the preparation of a traffic impact study for any land development.*

    Pennoni Response: A traffic impact study is required for this development as part of the requirements of the Riverfront Development District Subdistrict 1 and will be provided under separate cover.

12. *105-21(B)(10)(a), 105-78 The applicant shall submit a letter from the appropriate municipal authority indicating the availability of public sanitary sewer facilities.*

    Pennoni Response: Pennoni is currently coordinating with the municipal authority to get a will-serve letter for the site. A copy will be provided to the township when it is received.

13. *105-21(B)(10)(b) The applicant shall submit a letter from the appropriate municipal authority indicating the availability of central water supply.*

    Pennoni Response: A Will-Serve letter from Aqua Pennsylvania is included with this submission.

14. *105-21(B)(12) The applicant is advised that a Site context map showing the location of the proposed subdivision within its neighborhood context will be required as part of any Preliminary Plan submission.*

    Pennoni Response: The features of the Site Context Map can be found on the Existing Resource and Site Analysis Plan. See sheet CS0200.

15. *105-21(B)(13) The applicant is advised that an Existing Resources and Site Analysis Plan (ERSAP) will be required as part of any Preliminary Plan submission and shall provide a comprehensive analysis of existing conditions, both on the proposed development tract and within 500 feet of the tract boundaries. Conditions beyond the tract boundaries may be described on the basis of existing published data available from governmental agencies and from aerial photographs.*

    Pennoni Response: An Existing Resources and Site Analysis Plan has been added to the plans, see sheet CS0200.

16. *105-21(B)(13)[10] There is an existing sign located at the front corner of the site, along Washington Street, for a former historic use of the site. The applicant should consider possible reuse/repurposing of the sign, if feasible.*

    Pennoni Response: The applicant will consider potential reuse/repurposing of the sign.

17. *105-21(B)(15) The applicant is advised that a Preliminary Resource Impact and Conservation Plan (the "Preliminary Impact Plan") will be required as part of any Preliminary Plan submission to categorize the impacts of the proposed activities and physical alterations on those resources shown on the ERSAP. All proposed improvements, including but not necessarily limited to grading, fill, streets, buildings, utilities and stormwater management facilities, as proposed in the other Preliminary Plan documents, shall be taken into account in preparing the Preliminary Impact Plan, which shall clearly demonstrate that the applicant has minimized site disturbance to the greatest extent practicable.*

    Pennoni Response: These details are provided on the various Preliminary Plan sheets. Disturbance has been minimized by reusing a portion of the existing building, and clustering site improvements in the western portion of the property.

18. *105-21.1(K)(2) Within the South Transportation Service Area an impact fee in the amount of Two Thousand Five Hundred and Twenty-Nine Dollars ($2,529.00) per anticipated peak hour trip must be provided by the applicant.*

    Pennoni Response: Comment acknowledged.

19. *105-26(E) The applicant must provide evidence in sufficient detail to demonstrate that there are no environmental concerns related to previous uses of the site. Additional information must be provided related to the site's participation in the PADEP Act 2 Program, related to the former industrial uses.*

    Pennoni Response: Environmental studies have occurred on-site and a summary of the findings is being prepared. This summary will be provided to the Township.

20. *105-27, 105-84 Where a proposed park, playground, school or other public use shown in the Comprehensive Plan is located in whole or in part in a subdivision or land development, the Board of Supervisors may require the dedication or reservation of such area within the subdivision or land development, in those cases in which the Board of Supervisors deems such requirements to be necessary. Please note that both the Comprehensive Plan and the 'Spring Mill Area Study' call for amenities along the River in this location such as restrooms, fishing piers, non-motorized boat launches, and facilities for bike and boat rentals.*

    Pennoni Response: Acknowledged, amenities will be provided in accordance with the Spring Mill Study if deemed necessary by the Board of Supervisors.

21. *105-28(A) The plans should be revised to provide a roadway cross section consistent with the recommendations on Page 49 of the 'Spring Mill Area Study'.*

    Pennoni Response: The plans have been revised to provide a roadway cross section consistent with the Spring Mill Area Study.

22. *105-30(A) As defined by Section 105-29(C) and 105-30(A), streets adjacent to the site are subject to the following requirements: The plans must be revised in order to demonstrate compliance with the requirements of this section of the ordinance. It appears that the applicant is proposing to provide 28 feet of ultimate right-of-way width from the road centerline along the property frontage. This dimension should be labeled. The plans must also be revised to provide the required cartway width, curbing, sidewalks and tree zone or a waiver must be obtained to not require those features.*

    Pennoni Response: The required half width for the cartway and ultimate right-of-way have been provided. Curbing and sidewalks have been added along the frontage of the developed portion of the property, and an asphalt sidewalk has been provided to the eastern property line.

23. *105-34, 105-35(A) Proposed street grades must be shown in order to demonstrate compliance with the requirements of these sections of the ordinance.*

    Pennoni Response: Proposed street grades are shown on the Grading Plan, see sheet CS1501.

24. *105-36(B) This section of the ordinance states that access to parking areas shall be controlled and shall be so located as to provide a minimum of 200 feet between points of access. The plans must be revised, or a waiver must be obtained.*

    Pennoni Response: A waiver will be requested from this section.

25. *105-37 The plans must be revised to demonstrate compliance with the sight distance requirements of this section of the ordinance and/or the required sight distances contained in the most current revision of Pennsylvania Code Title 67 Chapter 441, whichever is more restrictive. Available sight distance at intersections must be indicated.*

    Pennoni Response: The proposed sight distance triangles have been added to the Truck Turning Plan, see sheet CS9801.

26. *105-38(C) The applicant must obtain the approval of the Fire Marshal with regard to access for fire protection equipment.*

    Pennoni Response: Acknowledged, the applicant will coordinate with the Fire Marshal. A copy of a response letter to their Sketch Plan review is included as part of the Preliminary Land Development submission.

27. *105-38(C) This section of the ordinance requires curves/turns in entrance and exit drives and all internal parking lot aisles necessary for providing access for fire protection equipment to have a minimum inside turning radius of 25 feet and a minimum outside turning radius of 50 feet. The applicant shall submit plans using truck turning templates showing the required turning radii are provided for access to each building.*

    Pennoni Response: The route provided for fire access is 15 feet in width. Interior radii along the route are 25' (corresponding to an outer radius of 40') with the exception for curbing near the building. Truck turning showing emergency access to the building has been added to the Truck Turning Plans (sheet CS9801) and shows that a Fire Truck will be able to maneuver through the site.

28. *105-38(K) This section of the ordinance requires that parking lots with less than 30 spaces not have a grade exceeding 5% and that parking lots with more than 30 spaces not have grades that exceed 3%. The plans must be revised to provide parking area grades in compliance with the requirements of this section of the ordinance.*

    Pennoni Response: The proposed grading for the parking area is shown on the Grading Plan (sheet CS1501).

29. *105-38(M), 105-70 Appropriate signage and paving markings must be provided at the driveway access points, in order to regulate the one-way traffic pattern.*

    Pennoni Response: Pavement markings and signs have been added to the site to regulate the direction of traffic. See Site Plan, sheet CS1001.

30. *105-38(U) All common parking areas shall be adequately lighted during after-dark operating hours and all lights shall be located on raised parking islands, not on the parking surface. A Lighting Plan which indicates an adequate level of illumination in all parking areas must be submitted to the Township.*

    Pennoni Response: A lighting plan has been added to the plans. See sheet CS2201.

31. *105-38(V) All artificial lighting used to illuminate any parking space or spaces shall be so arranged that no direct rays from such lighting shall fall upon any neighboring property or streets, nor shall any high brightness surface of the luminaries be visible from neighboring residential property or from a public street. The required Lighting Plan must also demonstrate compliance with the requirements of this section of the ordinance.*

    Pennoni Response: The lighting plan included with this submission does not show any light encroaching on neighboring properties. See sheet CS2201.

32. *105-39(A) This section of the ordinance requires that all parking areas shall have at least one tree of three inches minimum caliper for every two parking spaces provided. Calculations that demonstrate compliance with the shade tree requirements contained in this section of the ordinance must be added to the plans.*

    Pennoni Response: Proposed parking plantings in Landscape Plans CS2001 are per section 105-39(A). The compliance chart included in the Landscape Plans contain compliance calculations.

33. *105-39(C) A minimum of 10% of any parking lot facility over 2,000 square feet in gross area shall be devoted to landscaping, inclusive of required trees. The plans must be revised to meet the requirements of this section of the ordinance and the percentage of the parking lot which is devoted to landscaping must be calculated and listed on the plans.*

    Pennoni Response: Plans have been revised to include this code section on the compliance calculations on sheet CS2001. It should be noted that the landscape area provided greatly exceeds the 10% required.

34. *105-40(A) Required off street loading facilities, if necessary, must be designed so that each space shall be no less than 14 feet wide, 50 feet long, and 17 feet high, exclusive of drives and maneuvering space and located entirely on the lot being served. The plans must be revised to demonstrate compliance with this section of the ordinance.*

    Pennoni Response: Off-street loading areas are not necessary for this project.

35. *105-40(D) The plans must be revised in order to demonstrate that driveways and entranceways shall be graded, have a bituminous surface, and be drained to the satisfaction of the Township Engineer to the extent necessary to prevent nuisances of dust, erosion or excessive water flow across public streets or sidewalks.*

    Pennoni Response: The proposed site grading is shown on the Grading Plan (sheet CS1501).

36. *105-41(A) This section of the ordinance requires that the proposed Stormwater Management Plan be reviewed for compliance with Chapter 58 of the Whitemarsh Township Code, entitled 'Grading, Erosion Control, Stormwater Management and Best Management Practices'.*

    Pennoni Response: The stormwater management design of the site has been designed to comply with the requirements of Chapter 58 of the Whitemarsh Township Code.

37. *105-42(A), 105-21(B)(5) No subdivision or land development plan shall be approved unless there has been an erosion and sedimentation control plan approved by the Township Engineer consistent with the requirements of Chapter 58 of the Whitemarsh Township Code, entitled 'Grading, Erosion Control, Stormwater Management and Best Management Practices'.*

    Pennoni Response: An erosion and sedimentation control plan has been added to the plans, see sheet CS8001.

38. *105-45 The plans must be revised to show all existing and proposed easements, in accordance with this section of the ordinance.*

    Pennoni Response: Will comply.

39. *105-46 Curbs shall be provided in all subdivisions and land developments in accordance with Sections 105-30, and 105-74.*

    Pennoni Response: Curbs are provided as part of this project.

40. *105-47, 105-49 The plans must be revised to provide internal sidewalks, pedestrian paths and crosswalks to provide safe access around the site. A pedestrian walkway should be provided from the front door to Washington Street sidewalk.*

    Pennoni Response: Internal sidewalks, pedestrian paths, and crosswalks have been added to the site, an ADA accessible path has been added from Washington Street to the front entrance of the building.

41. *105-47(A) Sidewalks shall be provided along Washington Street in accordance with sections 105-30, 105-47 and 105-73 of the Whitemarsh Township Code.*

    Pennoni Response: Sidewalks have been added north of the development fronting Washington Street. The remainder of the site frontage will have an asphalt path that will be removed and converted into sidewalk upon future development of the site.

42. *105-47(B) The minimum width of all sidewalks and pedestrian paths shall be five feet; in areas of higher pedestrian density, the minimum width of all sidewalks shall be eight feet.*

    Pennoni Response: All sidewalks on site are a minimum of five feet wide.

43. *105-47(D) Curb cuts shall be provided at all street crossings. The plans must be revised to provide curb cuts and ADA accessible ramps at all access drives.*

    Pennoni Response: Curb cuts and accessible ramps at crossings have been added to the plans, see Site Plan (sheet CS1001).

44. *105-47(K) In areas zoned Riverfront Development District, in the RDD-1 subdistrict, public riverfront access, perpendicular to the river, is required for all properties that have access to the river, and shall be subject to the following:*

    4) At least one seating area shall be provided along each access.

    Pennoni Response: A seating area has been added to the riverfront access path. See Site Plan, sheet CS1001.

    5) Lighting fixtures shall be installed along the pathway and shall be of a style as approved by the Board of Supervisors.

    Pennoni Response: Lighting fixtures have been added to the riverfront access path. Refer to Lighting Plan and Lighting Details.

    6) The access shall contain appropriate signage to direct pedestrians to the river in accordance with Chapter 116, Zoning, § 116-286(B)(5).

    Pennoni Response: An access sign has been added to the beginning of the riverfront access path near Washington Street, see Site Plan (sheet CS1001).

45. *105-48 This section of the ordinance requires the installation of street trees along all streets where suitable trees do not exist. Large street trees shall be planted at intervals of not more than 45 feet, and/or small street trees at intervals of not more than 30 feet along one or both sides of any existing street within the proposed land development. The plans must be revised to include a table detailing the number of street trees required and provided.*

    Pennoni Response: Proposed street trees have been provided per section 105-48. See sheet CS2001 for locations and compliance chart.

46. *105-51(G) Parking areas shall be located and designed in such a manner that they are visibly secluded from eye level in the surrounding area. Grading to depress the parking area, raised berms, landscaping or fencing are satisfactory methods to create such seclusion.*

    Pennoni Response: The parking area is set back over 60’ from the road, and the landscape area between the parking and road will be planted to visually screen the parking lot.

47. *105-51(H) Outdoor collection stations shall be provided for garbage and trash removal when indoor collection is not provided. Collection stations shall be screened from view and landscaped. The plans must be revised to indicate the location of any outdoor collection stations, and adequate screening must be provided.*

    Pennoni Response: It is not anticipated that any outdoor collection stations will be required.

48. *105-52 Buffer yards are required between land developments and along existing streets to soften visual impact, to screen glare, and to create a visual barrier between conflicting land uses. The plans must be revised to provide a table detailing the buffer yard requirements, in accordance with Section 105-52.B as well as the actual buffers provided. All landscaping plans are subject to the review and approval of the Shade Tree Commission.*

    Pennoni Response: Buffer yards have been provided. See sheet CS2001 for locations and compliance chart.

49. *105-52(B)(2) This section of the ordinance requires that all buffers shall have a minimum width of 50 feet. The Board of Supervisors may permit an alternative planting option which shall have a screening capability equal to or greater than any of the available options. The applicant should provide evidence in sufficient detail to the Board of Supervisors in order to demonstrate that sufficient screening will be provided.*

    Pennoni Response: A 50' planting buffer has been added to the plans. A partial waiver is required, because the buffer is less than 50' in some locations, however, the required plantings are still being provided.

50. *105-52 The plans should be revised to provide a buffer between Washington Street and the SEPTA train tracks. Consideration must be given to restricting pedestrian access to the tracks by means of plantings, fencing, low walls or other safety measures. We recommend coordination with SEPTA with regard to safety along the tracks.*

    Pennoni Response: The applicant will coordinate with SEPTA.

51. *105-52, 105-83 All landscaping plans are subject to the review and approval of the Shade Tree Commission.*

    Pennoni Response: Acknowledged, will comply.

52. *105-53(D) This section of the ordinance requires the dedication of land in the amount of 10% of the total Site Area for Park and/or Recreational use. The applicant has the option of offering a fee in lieu of dedicating actual land area and can also provide a combination of a fee in lieu and dedication of land. All offers of land and/or fees in lieu of dedication must meet the requirements of this section of the ordinance.*

    Pennoni Response: The applicant will coordinate with the township regarding the open space requirements and would like to discuss potential credits for some of the public site amenities, such as the trails.

53. *105-69(C) Along the existing street on which a subdivision or land development abuts, improvements shall be made to the street. The improvements to the boundary street shall be determined by the width of the required cartway and built to the specifications established by the Township. The applicant is advised that the standard pavement restoration cross section for Township roads is 6" Base Course, 5" 25mm Superpave Binder Course, 2" 9.5mm Superpave wearing course.*

    Pennoni Response: The pavement restoration cross section specifications have been added to a detail on the plans. See sheet CS6001.

54. *105-71 This section of the ordinance requires that, when appropriate, the developer shall install or cause to be installed at the developer's expense metal or fiberglass pole streetlights serviced by underground conduit. The Board of Supervisors may consider requiring the installation of streetlights along the property frontages.*

    Pennoni Response: Acknowledged.

55. *105-73 This section of the ordinance requires sidewalks to be constructed as required by 105-30 and 105-47. The plans must be revised to indicate the installation of sidewalks where required.*

    Pennoni Response: Sidewalks have been added to the plans accordingly.

56. *105-74 This section of the ordinance requires Curbs to be constructed as required by section 105-30. The plans must be revised to indicate the installation of curbing where required.*

    Pennoni Response: Curbs have been added as part of this development.

57. *105-75 The developer shall construct stormwater drainage facilities, including curbs, inlets, storm sewers, road swales, and other structures in order to prevent erosion, flooding and other hazards.*

    Pennoni Response: Stormwater management design has been designed to prevent erosion, flooding, and other hazards. See Utility Plan (sheet CS1701).

58. *105-76 The applicant must obtain a letter of approval from the Township Fire Marshal in order to ensure that adequate fire protection is provided.*

    Pennoni Response: The Applicant is coordinating with the Fire Marshal, and a copy of a response to their Sketch Plan review letter is included with the Preliminary Land Development submission.

59. *105-81 All electric, telephone and communication service facilities, both main and service lines, shall be provided by underground cables, installed in accordance with the prevailing standards and practices of the utility and other companies providing such service. Final plans shall show locations of all utilities and shall be coordinated with landscaping.*

    Pennoni Response: Proposed electric lines have been revised to be underground. Locations of all proposed utilities can be found on the Utility Plan, see sheet CS1701.

60. *105-89 The developer shall enter into a written agreement with the Township in the manner and form approved by the Solicitor wherein the developer shall agree, to construct or cause to be constructed at his own expense all proposed improvements shown on the approved land development plan, all in strict accordance with the standards and specifications of the Township and within the time specified in said agreement, and to deposit with the Township financial security in an amount sufficient to cover the cost of all subdivision or land development improvements, including both public and private improvements.*

    Pennoni Response: Acknowledged.

FLOODPLAIN MANAGEMENT

61. *101-9(C)(3) The plans must be revised to note the base flood elevation.*

    Pennoni Response: The base flood elevation has been added to the Existing Resource and Site Analysis Plan, see sheet CS0200.

62. *101-9(B)(2), 101-23(C) The plans must be revised in order to demonstrate that all utilities and facilities, such as sewer, gas, electrical and water systems are located and constructed to minimize or eliminate flood damage.*

    Pennoni Response: Will comply.

63. *101-9(C)(4)(e) The applicant must provide documentation, certified by a registered professional engineer, to show that the cumulative effect of any proposed development, when combined with all other existing and anticipated development, will not increase the base flood elevation at any point within the community.*

    Pennoni Response: Will comply.

64. *101-9(C)(4)(f), 101-22(B), 101-22(C) The applicant must provide a document, certified by a registered professional engineer or architect, which states that the proposed construction or development has been adequately designed to withstand the pressures, velocities, impact and uplift forces associated with the base flood. Such statement shall include a description of the type and extent of flood proofing measures which have been incorporated into the design of the structure and/or the development.*

    Pennoni Response: Will comply.

65. *101-9(C)(4)(g) The applicant must indicate whether any materials or substances referred to in § 101-23F and §101-24 are intended to be used, produced, stored or otherwise maintained on site.*

    Pennoni Response: Gasoline will be stored on-site for the boats. It will be stored in accordance with any applicable requirements.

66. *101-17(A)(1) The plans show proposed pathways within the floodway. This section of the ordinance states that no encroachments, including fill, new construction, substantial improvements, or other development shall be permitted within the floodway area unless it has been demonstrated through hydrologic and hydraulic analysis performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.*

    Pennoni Response: Will comply.

67. *101-17(A)(1) In the Floodplain Conservation District, no development shall be permitted except where the effect of such development on flood heights is fully offset by accompanying improvements which have been approved by all appropriate local, state, and federal authorities as required. The applicant must provide evidence in sufficient detail to demonstrate compliance with the requirements of this section of the ordinance, such as the inclusion of a cut/fill analysis plan demonstrating there will be no net fill.*

    Pennoni Response: Comment acknowledged, cut fill information will be provided. It shall also be noted that portions of existing buildings within the floodplain will be removed which will help offset any minor proposed grading on-site.

68. *101-17(A)(2) The plans show proposed pathways within the floodway. This section of the ordinance states that no new construction or development shall be allowed within the floodway area unless the appropriate approvals are obtained from the Army Corps of Engineers, Federal Emergency Management Agency, Pennsylvania Department of Environmental Protection and approved by the Township.*

    Pennoni Response: Will comply.

69. *101-23(H) The plans must be revised to demonstrate that any structures, including fencing and trash enclosures, shall be adequately anchored to prevent flotation, collapse, or lateral movement.*

    Pennoni Response: Will comply.

CHAPTER 55 - TREE PROTECTION STANDARDS

70. *55-4(A) A Tree Survey Plan prepared in accordance with the requirements contained in this section of the ordinance must be submitted to the Township. The tree survey plan shall be reviewed by the Shade Tree Commission in a public meeting.*

    Pennoni Response: A Tree Survey Plan has been added to the plans, see sheet CS0502.

71. *55-4(A)(6) Any tree lost or destroyed within the past five years must be shown on the Tree Survey Plan as a "Removed Tree" and must be replaced as part of the proposed project.*

    Pennoni Response: As we understand the survey for the existing conditions of the site shows the current trees on site as well as previously removed trees.

72. *55-4(B)(1) The plans must be revised to include provisions for tree protection to preserve healthy trees and shrubs on site in accordance with this section of the ordinance. A note must be added to the plans requiring protective fencing to be placed around trees on the property prior to construction. Protective fencing must be shown on the plans in the areas where it will be required, and a tree protection fence detail must be provided. Street trees and other required plant material shall not be planted until the finished grading of the land development has been completed.*

    Pennoni Response: Tree protection fencing is shown on the Erosion and Sedimentation control plan, see sheet CS8001. The note has been added to the Construction Sequence on the Erosion and Sedimentation Control Notes, see sheet CS8501.

73. *55-4(B)(2) A note must be added to the plans requiring a pre-construction conference with the Township Shade Tree Commission prior to start of construction.*

    Pennoni Response: A note has been added to the Construction Sequence on the Erosion and Sedimentation Control Notes, see sheet CS8501.

74. *(55-4B)(6)(a) This section of the ordinance requires that every tree determined to be living and healthy, with a DBH of 6 inches or greater and which is designated to be removed or which is destroyed, shall be replaced with one or more new shade trees of a type approved by the Township with a trunk diameter of not less than 3 inches in caliper. The total caliper of replacement trees, measured at 6 inches above the ground line, shall equal or exceed the DBH of the tree removed. Calculations that indicate compliance with the tree replacement requirements contained in this section of the ordinance must be added to the plans.*

    Pennoni Response: Refer to Shade Tree Application worksheet.

75. *55-4(B)(6)(c) Replacement trees shall be planted in addition to the trees required by planting requirements otherwise set forth in the Subdivision and Land Development Code.*

    Pennoni Response: Refer to Shade Tree Application worksheet.

76. *55-4(A)(7) Heritage trees and boundary trees shall be individually noted on the tree survey plan.*

    Pennoni Response: Heritage and boundary trees have been noted on the tree survey plan.

77. *55-4(B)(6)(b) This section of the ordinance requires specific approval from the Board of Supervisors prior to removal of any trees identified as Heritage Trees. The plans must be revised to clearly indicate the presence or absence of any Heritage Trees.*

    Pennoni Response: Heritage Trees have been Identified on the tree survey plan. One heritage tree is planned to be removed.

GRADING, EROSION CONTROL, STORMWATER MANAGEMENT AND BEST MANAGEMENT PRACTICES ORDINANCE:

78. *58-14 Water volume controls shall be implemented using the Design Storm Methods described in this section of the ordinance.*

    Pennoni Response: Project complies with the Township Water Volume control requirements. Please refer to the Post Construction Stormwater Management Report.

79. *58-15(A)(1) All earth disturbance activities shall limit the rate of stormwater runoff so that no greater runoff is permitted from any point on the site than that of the site at its maximum development potential in its natural condition of the same frequency storm.*

    Pennoni Response: Project complies with the Township Rate control requirements. Please refer to the Post Construction Stormwater Management Report.

80. *58-17(A)(2)(k) The plans must be revised to show proposed finished grades.*

    Pennoni Response: The plans have been revised to show the proposed grades.

81. *58-17(A)(2)(l) The plan must be revised to include a delineation of the limits of disturbance, along with a statement, in square feet, of the total site area and the disturbed area.*

    Pennoni Response: The limit of disturbance has been added to the Erosion and Sedimentation Control Plan (sheet CS8001) as well as the Post Construction Stormwater Management Plan (sheet CS9001).

82. *58-17(A)(2)(o) The plans must be revised to show the size, location and construction details of all existing and proposed impervious ground cover.*

    Pennoni Response: Existing impervious has been hatched on the Existing Conditions Plan, see sheet CS0201. Details for the proposed impervious ground cover are located on the Site Details sheet, see sheet CS6002.

83. *58-17(A)(2)(p) The plan must be revised to show the size, location and construction details of all existing and proposed storm drainage facilities. At a minimum, both existing and proposed pipe sizes, lengths, slopes and materials should be shown. Invert data, pipe slopes and related structure information must be provided for existing structures. The condition of any existing stormwater piping traversing the property must be assessed, and any deficiencies must be corrected.*

    Pennoni Response: Existing utilities and associated elevations have been added to the plans, see Existing Conditions Plan (sheet CS0201).

84. *58-17(A)(2)(q) The plan must be revised to include an estimated development schedule and construction sequence for the site.*

    Pennoni Response: A construction sequence has been added to the Erosion and Sedimentation Control Notes, see sheet CS8501.

85. *58-17(A)(2)(t) A statement, signed by the landowner, acknowledging that any stormwater BMPs are fixtures that can be altered or removed only after approval by the Township shall be added to the plans.*

    Pennoni Response: A signature block has been added to the site plan with the note above. See sheet CS1001.

86. *58-17(A)(2)(s) The following signature block must be added to the plans: "(Design Engineer)", on this date (Signature, date), has reviewed and hereby certifies that the Stormwater Management Site Plan meets all design standards and criteria of Chapter 58, " Grading, Erosion Control, Stormwater Management and Best Management Practices"."*

    Pennoni Response: The signature block has been added to the site plan. See sheet CS1001.

87. *58-17(A)(4) The applicant must submit plans and supporting calculations detailing proposed stormwater drainage and stormwater management systems required by regulations adopted pursuant to this chapter.*

    Pennoni Response: Project complies, the plans and stormwater management report provide the applicable calculations and details for the stormwater drainage and stormwater management systems.

88. *58-17(A)(4), 58-28(D)(7) This section of the ordinance requires provisions be made to effectively accommodate the increased runoff caused by changed soil and surface conditions during and after development of the site. The applicant must submit plans and supporting calculations detailing proposed stormwater drainage and stormwater management systems required by regulations adopted pursuant to this chapter.*

    Pennoni Response: Project complies with the Township Water Volume and Rate control requirements. Please refer to the Post Construction Stormwater Management Report, and details on the plan drawings.

89. *58-17(A)(5) The applicant must submit plans and written procedures for minimizing erosion and sedimentation.*

    Pennoni Response: Erosion and sedimentation control is detailed on the Erosion and Sedimentation Control Plans, notes, and details. See CS8000's and CS8500's sheets.

90. *58-17(A)(12) The applicant must submit plans and supporting documentation verifying compliance with the tree preservation, protection and replacement requirements of the Whitemarsh Township Code.*

    Pennoni Response: Refer to Shade Tree Application worksheet.

91. *58-18(2) Since the limit of disturbance appears to be greater than one acre, the applicant must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Pennsylvania Department of Environmental Protection. Once obtained, a copy must be submitted to the Township.*

    Pennoni Response: Acknowledged, an NPDES permit will be obtained from the PADEP and a copy will be provided to the Township.

92. *58-23(A) An as-built survey of all stormwater BMPs must be submitted to the Township in paper and digital (dwg) formats. A note must be added to the plans stating an as-built survey will be completed and submitted in both formats to the Township.*

    Pennoni Response: The note was added as #14 under the General Utility Notes, see sheet CS0002.

93. *58-24(K)(2) Stormwater facilities shall be accessible to permit periodic maintenance and an access easement shall be provided to permit such access. The following blanket stormwater easement note, must be added to the plan: 'Stormwater facilities shall be owned and maintained by the property owner in perpetuity. The property owner shall provide a blanket stormwater access easement to the Township for the purpose of access to the stormwater facilities. If, in the judgment of the Township Engineer, the owner has failed to maintain the stormwater facilities in such a manner as to ensure their proper functioning, the Township after providing a written notice, shall have the right to enter upon the lands of the owner and to make any repairs as may be necessary to the stormwater facilities to ensure that such facilities function and perform in accordance with the design specifications. Any and all costs incurred by the Township for such repairs and/or maintenance shall be paid in full by the owner. A lien or liens may be placed against the property if the owner fails to remit payment within sixty (60) days.'*

    Pennoni Response: Will comply.

94. *58-28(D)(14) A note must be added to the plans to address measures for dust control during grading.*

    Pennoni Response: A note has been added to the Erosion and Sedimentation Control Notes as #7, see sheet CS8501.

95. *58-29(E) Fills shall not encroach on natural watercourses, floodways, floodway fringes, constructed channels, or on wetlands unless permitted by the Army Corps of Engineers, Pennsylvania Department of Environmental Protection (PADEP) and approved by the Township.*

    Pennoni Response: Will comply.

96. *58-30(A)(8) If in the course of reviewing the stormwater management plan, the Township Engineer determines that off-site improvements are necessary to satisfactorily control the stormwater from the site, the applicant shall be responsible for such off-site improvements.*

    Pennoni Response: Acknowledged.

97. *58-30(A)(13) All Regulated Earth Disturbance Activities are required to have water quality protection measures after completion of the earth disturbance activities, and include operation and maintenance of the BMP.*

    Pennoni Response: The proposed rain garden provides water quality for the site.

98. *58-31(A)(16) The applicant must submit legal descriptions for any proposed rights-of-way, easements, or lands to be offered for dedication.*

    Pennoni Response: Will comply.

99. *58-32(A)(2) The increased runoff from the proposed development must be controlled by permanent runoff control measures. All runoff control measures shall be evaluated for their effectiveness during the one hundred year storm. The required stormwater management calculations must demonstrate compliance with the requirements of this section of the ordinance.*

    Pennoni Response: Project complies, the Post Construction Stormwater Management report includes stormwater calculations up to and including the 100-year storm event.

100. *58-32(A)(3) All plans and designs for stormwater management systems and facilities submitted to the Township for approval shall determine stormwater peak discharge and runoff by use of the Soil Cover Complex Method as set forth in the U.S. Department of Agriculture, Soil Conservation Service Publication entitled, "Urban Hydrology for Small Watersheds," Technical Release #55 or latest edition thereof.*

    Pennoni Response: Project complies, the SCS methodology was utilized for the stormwater calculations. Refer to the Post Construction Stormwater Management Report.

101. *58-34(B)(7)(d) This section of the ordinance requires that the minimum diameter of all storm drainage pipes is eighteen inches or equivalent thereto. Additionally, all storm pipes shall be reinforced concrete pipe.*

    Pennoni Response: A waiver has been requested from this section to allow for HDPE pipes with a minimum pipe diameter of 12".

102. *58-35(C)(3)(e) A detailed soils evaluation of the project site shall be performed to determine the suitability of infiltration BMPs, if any. The evaluation shall be performed by a Registered Professional Engineer experienced in geotechnical engineering or a Certified Professional Soil Scientist and at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, and subgrade stability. A copy of the results of the soils evaluation must be submitted to the Township.*

    Pennoni Response: The Soil Report associated with the site has been included in the Post Construction Stormwater Management Report.

ADDITIONAL COMMENTS

103. *The proposed improvements may require the applicant to obtain a Chapter 105 General Permit, administered by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Waterways Engineering and Wetlands.*

    Pennoni Response: Will comply.

Thank you and your staff for your assistance and attention on this project. Should you have any questions or need additional information, please do not hesitate to contact me at 610-422-2486 for MRoth@Pennoni.com.
PENNONI ASSOCIATES INC.

Michael Roth, P.E.
Project Engineer

cc:

July 19, 2024

VILUX23005

Charles L. Guttenplan AICP
Director of Planning and Zoning / Zoning Officer
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: SLD#02-24: Villanova Boathouse at 601 Washington Street
Sketch Plan / Land Development of Boathouse Modification and Parking Improvements
Zoning Ordinance Compliance Review Letter

Dear Charles Guttenplan:

We are in receipt of the Whitemarsh Township comments review letter dated April 26, 2024. We have revised the plans based on the comments provided. Below is a summary of the Township's comments in italics with our responses in **bold**.

Comments:

1. *§116-11 Building setback lines must be measure from the ultimate rights-of-way of streets. As defined by Section 105-30 of the Township Code (Subdivision and Land Development), Washington Street is a local street with a required ultimate right-of-way of 56 feet. We note a 'Proposed ROW' of 47.8 feet; the derivation of this dimension must be provided. Based upon the 56-foot ultimate right-of-way, the ultimate right-of-way on this side of Washington Street along this property's frontage, would be 28 feet from centerline.*

   Pennoni Response: The ultimate right-of-way and the proposed cartway width for Washington Street have been revised accordingly.

2. *§116-28.A.(2) For any future Preliminary Plan, the applicant shall furnish a letter from the appropriate authority indicating the availability and supply of water for the proposed project to the Zoning Officer.*

   Pennoni Response: A Will-Serve letter from Aqua Pennsylvania has been included with this submission.

3. *§116-29 For any future Preliminary Plan, the applicant must obtain the approval of the Whitemarsh Township Authority with regard to any proposed sanitary sewer facilities.*

   Pennoni Response: Pennoni is currently coordinating with the municipal authority to get a will-serve letter for the site. A copy will be provided to the township when it is received.

4. *§116-33.2, §116-258.D, §116-279 In those areas of Whitemarsh Township where an overlay district applies, should the use of an underlying district be utilized, underlaying requirements shall apply. For overlay uses, the requirements of the overlay district shall apply, and in the event of a conflict, the overlay district requirements take precedence over those of the underlying zoning district(s). In the case of multiple overlay districts, unless otherwise stated, the most restrictive overlay district requirements apply.*

   In those areas of Whitemarsh township where the RDD applies, the requirements of the RDD shall be additive to the requirements of the underlying zoning district(s) and in the event of conflict, it takes precedence over the underlying district(s).

Where a conflict between the Riverfront Development District regulations, Riparian Corridor Conservation District regulations, and the Floodplain Conservation District regulations (Article XXII), the stricter regulation shall apply. Also, please see related comment #17.

For the purposes of this review, the requirements of the Riverfront Development Overlay District Subdistrict 1 (RDD-1) were utilized, as well as the Floodplain and Riparian Corridor Conservation Overlay Districts.

Pennoni Response: Acknowledged.

5. *§116-161.A A note must be added to the plans which indicates that the entire property is located within the Floodplain Conservation Overlay District.*

   Pennoni Response: The note has been added to the Zoning Compliance Summary Table on the Site Plan (CS1001).

6. *§116-164.C In the Floodplain Conservation District, no development shall be permitted except where the effect of such development on flood heights is fully offset by accompanying improvements which have been approved by all appropriate local, state, and federal authorities as required. Additionally, compliance is required with Chapter 101 of the Whitemarsh Township Code, 'Floodplain Management'.*

   Pennoni Response: Will comply.

7. *§116-165.B This section allows certain uses in the Floodplain Conservation District [including public and private recreational uses and activities in §116-165.B.(2)] provided they are in compliance with the provisions of the underlying district and not prohibited by another ordinance and provided they do not require structures. Since the boathouse and other proposed improvements are structures, a variance from this section is required.*

   Pennoni Response: A variance from this section will be requested.

8. *§116-166.A.(1) Special exceptions may be granted for water-related uses and activities in the floodway, such as marinas, docks, wharves, and piers. A portion of the paved access from the boathouse to the boat ramp, the boat ramp, and dock are all in the floodway and would require a special exception. In addition, portions of the boat ramp and the entire dock appear to be off the property and in the river. Allowance for these would require coordination with the PA Dept. of Environmental Protection Southeast Regional Office, Bureau of Waterways Engineering and Wetlands. They could advise if they have sole jurisdiction or if the U.S. Army Corps of Engineers would also be involved for the structures within the river.*

   Pennoni Response: Acknowledged, will comply.

9. *§116-166.B This section allows special exceptions to be granted for certain uses and activities within the floodway fringe. It appears that the special exceptions under several of the subsections of this section would be required: for the portion of the paved area leading from the boathouse to the boat ramp [under §116-166.B.(1)]; utilities and public facilities and improvements, which would include, parking areas and accessways, curbs, sidewalks, or other structural improvements [under §116-166.B.(3)]; and storage of boats and other required equipment [meeting the requirements under §116-166.B.(5)].*

   Pennoni Response: Acknowledged special exception will be sought for the activities that are located in the floodway fringe.

10. *§116-166.C Any new construction, development, or substantial improvements should be in full compliance with 44 CFR 60.3(a) through (d) of the National Flood Insurance Program regulations.*

    Pennoni Response: Will comply.

11. *§116-184.A The applicant must indicate what specific use in the list within this section was used as the basis to determine the required number of parking spaces. Based on said use, the number of spaces required, and the number proposed, must both be indicated on the plan.*

    Pennoni Response: A parking calculation table containing the requested information has been added to the site plan (sheet CS1001).

12. *§116-184.F all parking shall conform to the requirements of the Whitemarsh Township Fire Prevention Code as enacted and amended. The applicant must obtain approval from the Whitemarsh Township Fire Marshal. (A separate review will be provided.)*

    Pennoni Response: Acknowledged, a copy of a response letter to the Fire Marshal's review is included as part of the Preliminary Land Development submission.

13. *§116-187 Any future preliminary plan shall include adequate space, if required, for off-street loading.*

    Pennoni Response: No off-street loading is required by the applicant, sufficient space is provided on-site for maneuverability and loading/unloading of boats.

14. *§116-188.1.B The plan shall include electric vehicle charging stations as required by this section. The Township requires the installation of electric vehicle charging stations, as regulated in §116-188.3. within all new, expanded, or reconstructed parking areas. The specific number require is based upon §116-188.3.D.(1)(b), which in this case would be two; note that these spaces are in addition to the number of otherwise required spaces.*

    Pennoni Response: Electric vehicle charging spaces have been added to the parking lot and parking calculation table. See Site Plan (sheet CS1001).

15. *§116-204.B The modification, alteration, repair, reconstruction, or improvements of any kind to a structure and/or use within the Floodplain Conservation District to an extent or amount of 50% or more of its market value shall be undertaken only in full compliance with the provisions of this chapter and any other applicable ordinance, which shall include Chapter 110, Floodplain Management.*

    Pennoni Response: Acknowledged, will comply.

16. *§116-258 Any future preliminary plans shall indicate that the entire site is located within the Riparian Corridor Conservation District. As such, the Riparian Corridor Conservation District shall serve as a supplement to the underlying district provisions. Also, see related comment #17.*

    Pennoni Response: A note has been added to the Zoning Compliance Summary Table on the Site Plan (sheet CS1001) indicating the entirety of the site is located within the Riparian Corridor Conservation District.

17. *§116-259, §116-260, §116-279.B.(3) The proposed use(s) of the subject property are not permitted within the Riparian Corridor Conservation District as defined in these sections of the ordinance. For structures that are otherwise permitted by virtue of the requirements of the Riverfront Development District, relief from the Zoning Hearing Board from the provisions of Article XXXV-Riparian Corridor Conservation District shall not be required, provided approval is recommended to the Board of Supervisors by the Township Engineer. Note that on this site, the Riparian Corridor is coterminous with the 100-year Floodplain boundary.*

    Pennoni Response: "Boathouse" is a use allowed by conditional use in the RDD-1 overlay district. A Conditional Use application will be submitted for this project.

18. *§116-264.A Re-establishment of forest cover and woodland habitat within the Riparian Corridor shall be consistent with the requirements of the landscape regulation within the Township Subdivision and Land Development Ordinance. Also, see related Comment #17.*

    Pennoni Response: Landscaping and screening requirements have been provided in accordance with the requirements of the Township Subdivision and Land Development Ordinance.

19. *§116-280.F.(2) The boathouse and river-oriented recreation require conditional use approval from the Board of Supervisors. It should be noted that for any conditional use, testimony must be provided to allow the Board of Supervisors to make determinations and required in §116-37.F.(1)-(8) of the ordinance.*

    Pennoni Response: Acknowledged, a Conditional Use application will be submitted.

20. *§116-281.A.(3)(a) This section requires that the minimum building setback from the ultimate right-of-way (of Washington Street) to be 10 feet with an average of 20 feet. As proposed, the location of the reduced scale boathouse will not meet these requirements, thereby requiring a variance from this section. Also as noted in Comment #1, the proposed (ultimate?) right-of-way dimension of 47.8 feet is unclear.*

    Pennoni Response: A variance will be requested from this section. The proposed ultimate right-of-way has been revised per comment 1.

21. *§116-281.A.(9) This section requires the building and impervious coverage calculations to exclude the riverfront open space (of 150 feet). It is unclear if the calculations in the Zoning Compliance Summary Table are done on this basis or on the entire tract area. Clarification must be provided.*

    Pennoni Response: The coverage calculations for the site have been revised to exclude the riverfront open space area.

22. *§116-283.A.(2) This section contains permitted dominant building materials which are applicable to the new front facade of the boathouse, (once the existing front portion is removed) and to all other facades whose exterior appearance will be modified.*

    Pennoni Response: Acknowledged. Will comply.

23. *§116-283.B Public amenities, if provided, must be in accordance with the requirements of this section of the ordinance.*

    Pennoni Response: Acknowledged.

24. *§116-283.C The preliminary plans must demonstrate compliance with the landscaping and screening requirements described in this section of the ordinance.*

    Pennoni Response: Landscaping and screening requirements have been provided in accordance with the requirements of the Township Subdivision and Land Development Ordinance.

25. *§116-283.D For all developments in RDD, the following elements shall be included to create a pedestrian oriented development:*
    a. *Lighting along all street frontages with lighting fixtures to be of a style as approved by the Board of Supervisors.*

       Pennoni Response: The Applicant will coordinate with the Township regarding the style of lighting fixtures proposed along the street.

b. *Benches, trash receptacles, bicycle racks, and other street furniture in a style approved by the Board of Supervisors.*

Pennoni Response: The Applicant will coordinate with the Township regarding the style of these site furnishings.

c. *Wide sidewalks and other pedestrian amenities, landscaping, shade trees.*

Pennoni Response: Landscaping and sidewalks are proposed throughout the site.

d. *A variety of pavement materials for street surfaces and sidewalks.*

Pennoni Response: The project utilizes a combination of pavement materials, including; asphalt parking areas, concrete sidewalks, and red shale macadam paths and trails.

e. *Planting Strips, located between the curb and sidewalk.*

Pennoni Response: A 2' wide grass verge has been added between the curb and the sidewalk consistent with the cross section shown on page 49 of the Spring Mill Area Study.

26. *§116-284.A While the 150-foot open space area along the riverfront required by this section is shown on the plan, it appears to be measure from the property line along the river. It is required to be measured from "the mean water elevation of the Rivers of the United States/Pennsylvania". This area must be offered for dedication to the Township and if not accepted, an easement for public use along with maintenance agreements must be provided, in forms acceptable to the Township.*

Pennoni Response: The 150-foot open space area is measured from the water elevation recorded during a site survey. The area will be offered for dedication to the Township. Notes have been added to the plans accordingly.

27. *§116-284.A.(1)-(5) These sections detail required improvements in the 150-foot open space area along the riverfront. While the red shale macadam trail is shown [§116-284.A.(1)], the other improvements [§116-284.A.(2)-(5)] must also be shown on any preliminary plan.*

Pennoni Response: Proposed seating areas are called out on the Site Plan, sheet CS1001, proposed path landscaping and lighting can be found on the Landscaping Plan and Lighting Plan respectively.

28. *§116-284.D Public Waterfront Access is required in accordance with Chapter 105, Subdivision and Land Development, Section 105-47(K).*

Pennoni Response: A public waterfront access path has been added to the eastern side of the property.

29. *§116-286 Any proposed signage shall be included on any future preliminary plan and shall be consistent with this section of the ordinance.*

Pennoni Response: Acknowledged.

30. *§116-287.B.(1)-(4) Any future preliminary plan shall include all applicable information as required by these sections.*

Pennoni Response: Landscaping plans and Architectural floor plans and elevations are provided as part of this submission.

31. *§116-287.B.(5) This section requires the submission of a Traffic Impact Study (TIS) for all developments in the RDD-1 subdistrict. The TIS must be submitted with the preliminary plan.*

    Pennoni Response: Comment acknowledged, a TIS will be provided under separate cover.

32. *There are a few notes along the river that require some clarification. We are not certain what is meant by "Schuylkill River Right of Way" and don't understand why the "Red Shale Macadam Area Right of Way" is down along the river when the red shale macadam trail is located further inland. Finally, the "10' Setback from RCCD District" seems misplaced since the entire site is located within the Riparian Corridor Conservation district.*

    Pennoni Response: The notes along the river have been revised.

Thank you and your staff for your assistance and attention on this project. Should you have any questions or need additional information, please do not hesitate to contact me at 610-422-2486 for MRoth@Pennoni.com.
PENNONI ASSOCIATES INC.

Mike Roth

Michael Roth, P.E.
Project Engineer

cc:

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Township Manager

August 21, 2024

John Camusi, Senior Project Manager
Villanova University
800 Lancaster Avenue
Villanova, PA 19085

RE: SLD#02-24: Villanova Boathouse at 601 Washington Street
Preliminary Plan / Land Development of Boathouse Modification and Parking Improvements
Zoning Ordinance Compliance Review Letter

Dear Mr. Camusi:

Please accept this as a review of the Zoning Ordinance Compliance issues for your above referenced Preliminary Land Development Plan, based on two plan sets-- a twenty-three-sheet plan set prepared by Pennoni Associates, Inc., dated July 12, 2024, with the last revision date of July 19, 2024 and a four-sheet plan set prepared by Blackney Hayes Architects, dated March 4, 2024, with the last revision date of July 12, 2024. This Preliminary Plan follows a Sketch Plan for this project that the Township reviewed in a letter dated March 6, 2024, to which Pennoni Associates responded via letter of July 19, 2024.

The following are the Zoning Ordinance compliance issues noted concerning the Preliminary Plan. If compliance cannot be shown for any of these provisions, a modification to the plan must be made or a variance from the Zoning Hearing Board would have to be secured.

1. §116-29. The applicant must obtain the approval of the Whitemarsh Township Authority with regard to any proposed sanitary sewer facilities. We understand the applicant is currently coordinating with the Authority and will provide a will-serve letter to the Township.

2. §116-164.C. In the Floodplain Conservation District, no development shall be permitted except where the effect of such development on flood heights is fully offset by accompanying improvements which have been approved by all appropriate local, state and federal authorities as required. Additionally, compliance is required with Chapter 101 of the Whitemarsh Township Code, 'Floodplain Management'. We understand the applicant is aware of these requirements.

3. §116-165.B. This section allows certain uses in the Floodplain Conservation District provided they do not require structures. We understand that the applicant will seek a variance to allow the construction of structures within the Floodplain Conservation District.

4. §116-166.A.(1) Special exceptions may be granted for water-related uses and activities in the floodway, such as marinas, docks, wharves and piers. Portions of the boat ramp and the entire dock appear to be off the property and in the river. Allowance for these would require coordination with the PA Dept. of Environmental Protection Southeast Regional Office, Bureau of Waterways Engineering and Wetlands. They could

advise if they have sole jurisdiction or if the U.S. Army Corps of Engineers would also be involved for the structures within the river. We understand a special exception will be sought for the use of docks in the Floodplain Conservation Overlay District.

5. §116-166.B. This section allows special exceptions to be granted for certain uses and activities within the floodway fringe. We understand a special exception will be sought for the use of docks in the Floodplain Conservation Overlay District.

6. §116-166.C. Any new construction, development or substantial improvements should be in full compliance with 44 CFR 60.3(a) through (d) of the National Flood Insurance Program regulations. We understand the applicant is aware of this requirement.

7. §116-184.F. All parking shall conform to the requirements of the Whitemarsh Township Fire Prevention Code as enacted and amended. The applicant must obtain approval from the Whitemarsh Township Fire Marshal. We understand the applicant is in communication with the Fire Marshal; he will be issuing a separate review of this proposal.

8. §116-204.B. The modification, alteration, repair, reconstruction or improvements of any kind to a structure and/or use within the Floodplain Conservation District to an extent or amount of 50% or more of its market value shall be undertaken only in full compliance with the provisions of this chapter and any other applicable ordinance, which shall include Chapter 101, Floodplain Management. We understand that the applicant is aware of these requirements. Details about compliance with this section will be included in the Township Engineer Review.

9. §116-259. §116-260. §116-279.B.(3) The proposed use(s) of the subject property are not permitted within the Riparian Corridor Conservation District as defined in these sections of the ordinance. For structures that are otherwise permitted by virtue of the requirements of the Riverfront Development District, relief from the Zoning Hearing Board from the provisions of Article XXXV-Riparian Corridor Conservation District shall not be required, provided approval is recommended to the Board of Supervisors by the Township Engineer. Note that on this site, the Riparian Corridor is coterminous with the 100-year Floodplain boundary. Specifically related to the boathouse, should the use be recommended by the Township Engineer, it will require conditional use approval under the RDD-1 requirements; we understand the applicant is aware of this. (See related Comment #11.)

10. §116-264.A. Re-establishment of forest cover and woodland habitat within the Riparian Corridor shall be required consistent with the requirements of the landscape regulations within the Township Subdivision and Land Development Ordinance. Also, see related Comment #9.

11. §116-280.F.(2) The boathouse and river-oriented recreation require conditional use approval from the Board of Supervisors. It should be noted that for any conditional use, testimony must be provided to allow the Board of Supervisors to make determinations as required in §116-37.F.(1)-(8) of the ordinance as well as any specific requirements in the RDD District.

12. §116-281.A.(3)(a) This section requires that the minimum building setback from the ultimate right-of-way (of Washington Street) be 10 feet with an average of 20 feet. We understand a variance will be sought for the renovated boathouse.

13. §116-281.A.(8) & (9) The impervious coverage is listed as 50.9% which is well below the maximum of 75%, excluding the 150' area to be preserved along the river. Given the extent of the underdeveloped area on the tract, the provided percentage seems high. This number shall be verified.

14. §116.283.A.(2) This section contains permitted dominant building materials which are applicable to the new front façade of the boathouse (once the existing front portion is removed) and to all other façades whose exterior appearance will be modified. While we note the main building is in compliance, plans for the storage structure must be provided.

15. §116-283.C. The preliminary plans must demonstrate compliance with the landscaping and screening requirements described in this section of the ordinance.

    We note that the Landscape Chart on Landscape Plan does not include Chapter 55 tree replacements. Details about Chapter 55 compliance will be included in the Township Engineer Review Letter. However, the Shade Tree Commission will be required to review the Landscape Plan and must recommend its approval to the Board of Supervisors.

16. §116-283.D.(1)(a) & (b) Lighting along all street frontages is required with lighting fixtures to be of a style as approved by the Board of Supervisors. We understand the applicant will coordinate with the Township regarding the style of lighting fixtures proposed along the street.

    Benches, trash receptacles, bicycle racks and other street furniture in a style approved by the Board of Supervisors, are also required for all developments in the Riverfront Development District. We understand the applicant will coordinate with the Township as well, with regard to the style of these site furnishings.

17. §116-284.A.(1)-(5) These sections detail required improvements in the 150-foot open space area along the riverfront. While the improvements are shown, we recommend an additional seating area where the red shale macadam trail intersects with the perpendicular trail which extends to Washington Street.

18. §116-287.B.(5) This section requires the submission of a Traffic Impact Study (TIS) for all developments in the RDD-1 subdistrict. We understand a TIS will be provided under separate cover. The Township Engineer will provide a separate review of the TIS.

Should you have any questions, please do not hesitate to contact me.

Very truly yours,

Charles L. Guttenplan, AICP
Director of Planning and Zoning/Zoning Officer

cc: Craig T. McAnally, Township Manager
Robert A. Sztubinski, B.C.O., Director of Building and Codes
Andrew Thomas, Fire Marshal
Sean P. Kilkenny, Esq., Township Solicitor
Krista Heinrich, P.E., Township Engineer
Michael Roth, P.E., Applicant's Engineer
John J. Iannozzi, Esq., Applicant's Attorney

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

August 30, 2024

Craig T. McAnally - Township Manager
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: Preliminary Plan Review
601 Washington Street
Whitemarsh Township, Montgomery County, PA
S/LD # 02-24
Our Project Number 2024-00243

Dear Mr. McAnally:

As requested, we have reviewed plans for the above referenced Preliminary Plan Submission consisting of a 23-Sheet Plan prepared by Pennoni Associates, Inc. and dated July 12, 2024, and last revised July 19, 2024. The following comments are offered for your consideration:

The applicant is requesting or requires waivers and/or relief from the requirements of the following sections of the ordinance:

	Section	Description
1.	105-21(B)(A)(1) 105-22(A)	The applicant is requesting a waiver from the requirements of this section of the ordinance, which requires the plans to be drawn at a scale of one-inch equals 40 feet, in order to allow the plans to be drawn at a scale of one inch equals 30 feet.
2.	105-21(B)(1)(n)	The applicant is requesting a waiver from the requirements of this section of the ordinance, which requires the plans to show existing principal buildings (and their respective uses), and driveways on the adjacent peripheral strip: sewers lines, storm drains, culverts, bridges, utility easements, quarries, railroads, and other significant man-made features within 500 feet of and within the site, including properties across streets. An aerial photo has been included in the plan set which shows the required features.
3.	105-30(A)	The applicant is requesting a waiver from the requirements of this section in order to allow Washington Street to have a cartway width of 30 feet, where 36 feet is required.

	Section	Description

4. 105-30(A) As defined by Section 105-29(C) and 105-30(A), streets on and adjacent to the site are subject to the following requirements:

Street Name	Classification	Required Ultimate R.O.W	Required Cartway Width	Curbs	Sidewalks	Tree Zone
Washington Street	Local Street	56 feet	36 feet	Required	Required	Required

The following comments must be addressed:

- The plans must be revised to provide the required right-of-way half-width of 28 feet along the site frontage, where 27 feet appears to be currently shown. This dimension must be labeled.
- All cartway, right-of-way and lane widths must be labeled.
- Curbing must be provided along the entire frontage along Washington Street, or a waiver must be requested.

5. 105-36(B) The applicant is requesting a waiver from the requirements of this section of the ordinance which states that access to parking areas shall be controlled and shall be so located as to provide a minimum of 200 feet between points of access. The plans show two access points, with centerlines spaced approximately 145 feet apart.

6. 105-46 Curbs shall be provided in all subdivisions and land developments in accordance with Sections 105-30, and 105-74. The plans must be revised to provide curbing along both sides of Washington Street, along the entire property frontage, or a waiver must be requested.

7. 105-47(K)(3) The applicant is requesting a waiver from the requirements of this section of the ordinance in order to not require that Riverfront access points must be located no more than 500 feet apart. The plans show one access point along the Eastern property line, with no additional access points through the property which is approximately 685 feet wide.

8. 105-48(E) Street trees shall be planted within a tree planting zone of lawn area situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk. The plans currently show street trees being located behind the sidewalk and must be revised in order to demonstrate compliance with the requirements of this section of the ordinance or a waiver must be requested.

9. 105-52(B)(2) The applicant is requesting a waiver from the requirements of this section of the ordinance in order to not require buffers to have a minimum width of 50 feet.

10. 105-74 This section of the ordinance requires curbs to be constructed as required by section 105-30. The plans must be revised to indicate the installation of curbing along the entire frontage along Washington street, or a waiver must be requested.

11. 55-4(B)(6)(c) The plans must be revised to provide replacement trees, which shall be planted in addition to the trees required by planting requirements otherwise set forth in the Subdivision and Land Development Code. The plans must be revised to include a tabulation of the total caliper inches of trees to be removed, and proposed replacement trees. The plans must also be revised to provide the required replacement trees, or relief from the requirements of this section of the ordinance must be obtained.

	Section	Description
12.	58-28(D)(11)	The applicant is requesting relief from the requirements of this section of the ordinance to allow edges of slopes to be less than five feet from property lines or right of way lines. The List of Waivers requested on Sheet 7 must be revised to reference section 58-28(D)(11), instead of Section I.B.4.K of Resolution 2004-8.
13.	58-34(B)(7)(d)	The applicant is requesting relief from the requirements of this section of the ordinance which requires that the minimum diameter of all storm drainage pipes is eighteen inches or equivalent thereto, in order to allow the use of 12" diameter High Density Polyethylene (HDPE) pipe.

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE

	Section	Description
14.	105-21(B)(1)(l)	The plans indicate an "area of apparent overlap" at the Southwestern Corner of the site. Property Boundaries must be resolved and properly monumented prior to final plan approval.
15.	105-20(B)(2)	The Record plan must be revised to note the base flood elevation (BFE) consistent with FEMA Flood Insurance Maps and Surveys, which designate the base flood elevation as being at approximately elevation of 59.5.
16.	105-21(B)(2)(e)	The plans must indicate the elevation to which the existing and proposed structures are to be floodproofed.
17.	105-21(B)(9)(c)[1]	The applicant is advised that the Township Planning Commission, at its discretion, may request the preparation of a traffic impact study for any land development.
18.	105-21(B)(10)(a), 105-78	The applicant shall submit a letter from the appropriate municipal authority indicating the availability of public sanitary sewer facilities.
19.	105-21(B)(13)[10]	There is an existing sign located at the front corner of the site, along Washington Street, for a former use of the site. The applicant should consider possible reuse/repurposing of the sign, if feasible.
20.	105-21.1(K)(2)	Within the South Transportation Service Area an impact fee in the amount of Two Thousand Five Hundred and Twenty-Nine Dollars ($2,529.00) per anticipated peak hour trip must be provided by the applicant.
21.	105-26(E)	The applicant must provide evidence in sufficient detail to demonstrate that there are no environmental concerns related to previous uses of the site. Additional information must be provided related to the site's participation in the PADEP Act 2 Program, related to the former industrial uses.

	Section	Description
22.	105-27, 105-84	Where a proposed park, playground, school or other public use shown in the Comprehensive Plan is located in whole or in part in a subdivision or land development, the Board of Supervisors may require the dedication or reservation of such area within the subdivision or land development, in those cases in which the Board of Supervisors deems such requirements to be necessary. Please note that both the Comprehensive Plan and the 'Spring Mill Area Study'[1] call for amenities along the River in this area such as restrooms, fishing piers, non-motorized boat launches, and facilities for bike and boat rentals.
23.	105-28(A), 105-69(C)	The "Whitemarsh Twp Roadway Restoration Paving" Detail on Sheet 14 must be revised to call for 6" (min.) PennDOT 2a Stone for the Base Course.
24.	105-37	The existing site distances layout on Sheet CS9801 must be revised to show existing and proposed vegetation.
25.	105-38(C)	The applicant must obtain the approval of the Fire Marshal with regard to access for fire protection equipment.
26.	105-38(M), 105-70	Appropriate signage and paving markings must be provided at the internal parking areas, in order to regulate the one-way traffic pattern, including "One-way" and "No Right Turns" signage.
27.	105-45	The plans must be revised to show all existing and proposed easements, in accordance with this section of the ordinance.
28.	105-47, 105-73(D)	The plans show proposed sidewalks to be constructed of varying materials along Washington Street. Concrete sidewalks are proposed in front of the proposed building, and the remainder is proposed to be red shale macadam, which does not provide for continuity of street improvements in the area. The applicant must provide testimony in sufficient detail to demonstrate that the change in materials is appropriate.
29.	105-47(H), 105-47(G)	The proposed grade of the landing area and path from the 5,473 sf storage building appears to be in excess of 7% and must be revised.
30.	105-47(K)(4)	The plans must be revised to include constructible details for the proposed seating within the Riverfront access.
31.	105-47(K)	The plans must be revised to include the following notes: • "The 150-foot-wide Riverfront Access and Open Space area shall be offered for dedication to the Township. If the area is not accepted for dedication, an easement for public use must be provided along with maintenance agreements acceptable to the Township. Whether or not the Township accepts dedication, the applicant shall construct, and the property owner shall maintain in perpetuity, the public trail, the access paths leading to such trail, landscaping, lighting and public amenities." • "The cost and responsibility of maintaining all areas noted as Open Space shall be borne by the property owner."

[1] http://www.whitemarshtwp.org/DocumentCenter/View/3323/Whitemarsh-Spring-Mill-Multi-Modal-and-Land-Use-Study---Final-Report

	Section	Description
32.	105-47(K)(6)	The plans must be revised to include a constructible detail for the Riverfront Access Path Sign.
33.	105-52	The plans should be revised to provide a buffer between Washington Street and the SEPTA train tracks. Consideration must be given to restricting pedestrian access to the tracks by means of plantings, fencing, low walls or other safety measures. We recommend coordination with SEPTA with regard to safety along the tracks.
34.	105-52, 105-83	All landscaping plans are subject to the review and approval of the Shade Tree Commission.
35.	105-53(D)	This section of the ordinance requires the dedication of land in the amount of 10% of the total Site Area for Park and/or Recreational use. The applicant has the option of offering a fee in lieu of dedicating actual land area and can also provide a combination of a fee in lieu and dedication of land. All offers of land and/or fees in lieu of dedication must meet the requirements of this section of the ordinance.
36.	105-69	Cartway width and curbing should not taper at the boundaries with adjacent properties, in order to facilitate future widening and road improvements. Signage, striping and/or other treatments may be used to indicate any transition.
37.	105-69(C)	The plans must be revised to indicate the limits of saw cuts for road restoration along Washington Street.
38.	105-71	This section of the ordinance requires that, when appropriate, the developer shall install or cause to be installed at the developer's expense metal or fiberglass pole streetlights serviced by underground conduit. The Board of Supervisors may consider requiring the installation of streetlights along the property frontages.
39.	105-76	The applicant must obtain a letter of approval from the Township Fire Marshal in order to ensure that adequate fire protection is provided.
40.	105-81	Proposed and/or relocated utility poles must be located further from the edge of cartway, to allow for future widening and installation of sidewalks along Washington Street.
41.	105-89	The developer shall enter into a written agreement with the Township in the manner and form approved by the Solicitor wherein the developer shall agree, to construct or cause to be constructed at his own expense all proposed improvements shown on the approved land development plan, all in strict accordance with the standards and specifications of the Township and within the time specified in said agreement, and to deposit with the Township financial security in an amount sufficient to cover the cost of all subdivision or land development improvements, including both public and private improvements.

FLOODPLAIN MANAGEMENT

	Section	Description
42.	101-9(B)(2), 101-23(C)	The plans must be revised in order to demonstrate that all utilities and facilities, such as sewer, gas, electrical and water systems are located and constructed to minimize or eliminate flood damage.
43.	101-9(C)(4)(e)	The applicant must provide documentation, certified by a registered professional engineer, to show that the cumulative effect of any proposed development, when combined with all other existing and anticipated development, will not increase the base flood elevation at any point within the community.
44.	101-9(C)(4)(f), 101-22(B), 101-22(C)	The applicant must provide a document, certified by a registered professional engineer or architect, which states that the proposed construction or development has been adequately designed to withstand the pressures, velocities, impact and uplift forces associated with the base flood. Such statement shall include a description of the type and extent of flood proofing measures which have been incorporated into the design of the structure and/or the development.
45.	101-9(C)(4)(g)	The plans must be revised to indicate the amount, and location of gasoline to be stored on site for boats, and a description of the safeguards incorporated into the design of the proposed structure to prevent leaks or spills during a base flood.
46.	101-17(A)(2), 101-21(D)	The applicant must obtain the appropriate permit from the Department of Environmental Protection regional office for the construction of trails and seating areas within the floodway area.
47.	101-22(B)(1)	In Zone AE, any new construction or substantial improvement of a nonresidential structure shall have the lowest floor (including basement) elevated up to, or above, the regulatory flood elevation, or be designed and constructed so that the space enclosed below the regulatory flood elevation is floodproofed so that the structure is watertight with walls substantially impermeable to the passage of water; and has structural components with the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.
48.	101-17(A)(1)	The plans show proposed pathways within the floodway. This section of the ordinance states that no encroachments, including fill, new construction, substantial improvements, or other development shall be permitted within the floodway area unless it has been demonstrated through hydrologic and hydraulic analysis performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.
49.	101-17(A)(1)	In the Floodplain Conservation District, no development shall be permitted except where the effect of such development on flood heights is fully offset by accompanying improvements which have been approved by all appropriate local, state, and federal authorities as required. The applicant must provide evidence in sufficient detail to demonstrate compliance with the requirements of this section of the ordinance, such as the inclusion of a cut/fill analysis plan demonstrating there will be no net fill.

	Section	Description
50.	101-17(A)(2)	The plans show proposed pathways within the floodway. This section of the ordinance states that no new construction or development shall be allowed within the floodway area unless the appropriate approvals are obtained from the Army Corps of Engineers, Federal Emergency Management Agency, Pennsylvania Department of Environmental Protection and approved by the Township.
51.	101-23(H)	The plans must be revised to demonstrate that any structures, including fencing and trash enclosures, shall be adequately anchored to prevent flotation, collapse, or lateral movement.

CHAPTER 55 - TREE PROTECTION STANDARDS

	Section	Description
52.	55-4(A)	The Landscaping Plan must be revised in order to eliminate the following discrepancies: • 1 'ZS' in lower SW corner should be labeled 'CC'. • 3 'CC in front of the main building should be labeled 'ARC'. • At the center parking island, 5-GB are listed in the proposed landscaping schedule, and 6 shown in plan view. • All 5 'TO' appear to be mislabeled as 'JC'.
53.	55-4(A)	The tree survey plan shall be reviewed by the Shade Tree Commission in a public meeting.
54.	55-4(B)(6)(a)	This section of the ordinance requires that every tree determined to be living and healthy, with a DBH of 6 inches or greater and which is designated to be removed or which is destroyed, shall be replaced with one or more new shade trees of a type approved by the Township with a trunk diameter of not less than 3 inches in caliper. The total caliper of replacement trees, measured at 6 inches above the ground line, shall equal or exceed the DBH of the tree removed. Calculations that indicate compliance with the tree replacement requirements contained in this section of the ordinance must be added to the plans.
55.	55-4(A)(7)	Please review Sheet CS0501 to ensure all Heritage trees have been individually noted.
56.	55-4(B)(6)(b)	This section of the ordinance requires specific approval from the Board of Supervisors prior to removal of any trees identified as Heritage Trees. The plans appear to show the removal of one (1) 40" Tree in the Northwestern corner of the site.

GRADING, EROSION CONTROL, STORMWATER MANAGEMENT AND BEST MANAGEMENT PRACTICES ORDINANCE:

	Section	Description
57.	58-17(A)(2)(k)	The plans must be revised to show proposed finished grades in the area of the landing area and path from the 5,473 sf storage building.
58.	58-17(A)(2)(l)	The limits of disturbance must be revised to include the following: • The area bound by the contour line representing an elevation of 50 in the Southeastern corner of the side, at the intersection of the trails. • The area around proposed contour line representing an elevation of 52, near the rain garden.
59.	58-18(2)	Since the limit of disturbance is greater than one acre, the applicant must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Pennsylvania Department of Environmental Protection. Once obtained, a copy must be submitted to the Township.
60.	58-24(K)(2)	Stormwater facilities shall be accessible to permit periodic maintenance and an access easement shall be provided to permit such access. The following blanket stormwater easement note, must be added to the plan: *'Stormwater facilities shall be owned and maintained by the property owner in perpetuity. The property owner shall provide a blanket stormwater access easement to the Township for the purpose of access to the stormwater facilities. If, in the judgment of the Township Engineer, the owner has failed to maintain the stormwater facilities in such a manner as to ensure their proper functioning, the Township after providing a written notice, shall have the right to enter upon the lands of the owner and to make any repairs as may be necessary to the stormwater facilities to ensure that such facilities function and perform in accordance with the design specifications. Any and all costs incurred by the Township for such repairs and/or maintenance shall be paid in full by the owner. A lien or liens may be placed against the property if the owner fails to remit payment within sixty (60) days.'*
61.	58-28(D)(8)	The plans must be revised to provide a sediment barrier, such as compost filter sock, downslope of any disturbed earth.
62.	58-29(E)	Fills shall not encroach on natural watercourses, floodways, floodway fringes, constructed channels, or on wetlands unless permitted by the Army Corps of Engineers, Pennsylvania Department of Environmental Protection (PADEP) and approved by the Township.
63.	58-30(A)(8)	If in the course of reviewing the stormwater management plan, the Township Engineer determines that off-site improvements are necessary to satisfactorily control the stormwater from the site, the applicant shall be responsible for such off-site improvements.
64.	58-31(A)(3)	The stormwater calculations must be revised to include the numeric weighted Curve Number for the all hydrographs; which are currently listed as "WQ".
65.	58-31(A)(16)	The applicant must submit legal descriptions for any proposed rights-of-way, easements, or lands to be offered for dedication.

ADDITIONAL COMMENTS

66. The proposed improvements may require the applicant to obtain a Chapter 105 General Permit, administered by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Waterways Engineering and Wetlands.

67. Please review the plans to ensure all notes reference Whitemarsh Township.

68. The plans must be revised to indicate the existing and proposed use of three large containers at the center of the site.

Any future submission of the design plans for this project must be accompanied by a letter, prepared by the applicant's engineer, which addresses each of the comments contained in this report. Should you have any questions regarding this matter, please do not hesitate to contact me at this office.

Sincerely,

Krista Heinrich, PE
Township Engineer

c: Charles L. Guttenplan, AICP – Director of Planning and Zoning
Sean Kilkenny, Esq.; The Law Offices of Sean Kilkenny, LLC – Township Solicitor
John Camusi, Villanova University – Applicant
Michael Roth, PE– Applicant's Engineer
John J. Iannozzi, Esq. – Applicant's Attorney

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WHITEMARSH TOWNSHIP

To: Charlie L. Guttenplan, Director of Planning & Zoning/Zoning Officer.

From: **Andrew G. Thomas, Fire Marshal** AG 8/30/24

Subject: SLD#02-24 VILLANOVA BOATHOUSE
(PRELIMINARY PLAN)
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

Date: 8/30/2024

After reviewing the Preliminary Plan for the Villanova Boathouse, the following items must be addressed.

1. The plan must be in accordance with Whitemarsh Township Ordinance 1012 accepted on April 14, 2022, Section 503.2.1 Dimensions and International Fire Code Section 5031.1 Buildings and facilities. **(Truck Turning Plan CS9801 apparatus dimensions are 10 feet off, correct dimensions are attached to this review please use Tower 29 for your truck turn plan.)**

    a. Dimensions. Fire Apparatus access roads shall have an unobstructed width of 24 feet, exclusive of shoulders, except for *approved* security gates in accordance with Section 503.6, and an unobstructed vertical clearance of 14 feet. No access driveway shall be located closer than five feet to a structure.
    b. 503.1.1 Buildings and facilities. *Approved* fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the *exterior walls* of the first story of the building as measured by an *approved* route around the exterior of the building or facility.

2. No parking fire lane signage, either physical signs or roadway striping is acceptable. **This will need to be provided along both sides of the driveways to prevent vehicles from obstructing access to the building (Additional signage or markings will be needed).**

Andrew G. Thomas
Fire Marshal, Emergency Management Coordinator
616 Germantown Pike
Lafayette Hill, PA 19444
Phone: 610-825-3535 ext. 2614
Email: athomas@whitemarshtwp.org

Aerial Apparatus Dimensions

Tower 29

Overall Length: 49' 4"

Wheelbase: 23'

Ladder 45

Overall Length: 44' 7"

Wheelbase: 245"

MONTGOMERY COUNTY
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PLANNING COMMISSION

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SCOTT FRANCE, AICP
EXECUTIVE DIRECTOR

September 5, 2024

Mr. Charles L. Guttenplan, AICP
Director of Planning & Zoning Officer
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, Pennsylvania 19444

Re: MCPC # 19-0018-004
Plan Name: Villanova University Boathouse
1 lot /18.138 sq. ft. comprising +/- 9.02 acres
Whitemarsh Township

Dear Mr. Guttenplan:

We have reviewed the above-referenced subdivision and land development in accordance with Section 502 of Act 247, "The Pennsylvania Municipalities Planning Code," as you requested on July 19, 2024 in an electronic submission to this office. We forward this letter as a report of our review.

BACKGROUND

The applicant, Villanova University, has submitted a preliminary plan for the redevelopment of a former industrial site as a recreational boating facility utilizing the Schuylkill River for boating. The Planning Commission reviewed a sketch plan of this development proposal in a letter to the township dated March 25, 2024. This submission revises the earlier plan with the addition of a 5,473 sq. ft. storage building situated immediately west of the principal building. The applicant proposes the demolition of the majority of a 42,484 sq. ft. industrial building and plans to use +/- 12,665 sq. ft. of an existing building's footprint to construct a two-story recreational building. The first floor is designed to store boats while the second floor is a large area open to the first floor with overlooking support rooms. Adjacent to the two buildings are wide concrete pads leading to a boat ramp and dock at the river's edge.

The application states that approximately 3.0 acres of the 9.8 acre tract will be impacted by the development. The property at 601 Washington Street is Tax Parcel # #65-00-12679-00-9, which lies in the township's Heavy Industrial District (HVY), the Riverfront Development District (RDD-1), and the Floodplain Conservation Overlay District. As pertains to the site's zoning, the township regulations for

the Riverfront Development Overlay District are additive to the requirements of the underlying district(s), and in the event of a conflict, take precedence over the underlying zoning district(s). The plan notes indicate that the "entirety of the project site area is located in the 100-year floodplain".

The submitted application indicates that various variances and waivers from the township's Zoning Code and Land Development Code will be sought. The application indicates that other types of relief are required, including:

- A Special Exception-Required for the use of a boating dock in the Floodplain Conservation Overlay District. Section 116-166. Special Exception.
- Conditional Use Approval-Needed for a Boathouse in the Riverfront Development Overlay District. Sec. 116-280.F.(2.)

The history of this site includes a land development proposal reviewed by the Montgomery County Planning Commission (MCPC) in a letter dated April 20, 2022. The land development plan was submitted by 601 Washington St. Associates, LP; the developer proposed the construction of a 4-story, 227 unit apartment building for this site.

The property has an Environmental Covenant recorded with the Montgomery County Recorder of Deeds on April 3, 2023. The Covenant states that the site has a history of industrial operations, which consisted of the manufacture of pressure and storage tanks for water, oil and gas. As part of these activities, welding and metal fabrication took place between 1926 and 1967. Currently the site is primarily vacant, with a portion of it being used for storage and sale of landscape materials, as well as the storage of boats used by local rowing teams.

COMPREHENSIVE PLAN COMPLIANCE

Consistency with *Montco 2040*- A Shared Vision

The plans for the redevelopment of this site as a recreational use is consistent with the future land use vision and stated goals of *Montco 2040: A Shared Vison*, the comprehensive plan and future land use vision for the county. The Future Land Use Map of the plan designates the land use vision for the site as part of a larger 'Regional Mixed-Use Center' (RMUC) extending from the Schuylkill Riverfront to Spring Mill East Elm Street.
"https://www.montcopa.org/1579/Montco-2040-Comprehensive-Plan).

Consistency with the *Whitemarsh Township Selective Comprehensive Plan Update, 2020* & The *Spring Mill Multi-Modal and land Use Study, March 2022.*

The redevelopment proposal for this property appears compatible with the township's future land use vision for this area envisioned as a 'Waterfront District Character Area', as recommended by the *Whitemarsh Township Selective Comprehensive Plan Update, 2020* and specifically in the plan's Chapter Four- Future Land Use Plan. The future land use goal for this character area is to support high-density development and quality public spaces along the riverfront. The redevelopment proposal supports the goals of creating green space along the Schuylkill River and ensuring recreational access and enjoyment of the river.

RECOMMENDATION

The Montgomery County Planning Commission (MCPC) generally supports the applicant's preliminary plan submission. Many of the issues we raised in our review of the sketch plan appear to be addressed. There are several issues that remain pertinent and bear emphasizing including: the potential future subdivision of the 9.0 property, the resiliency of the site development to flooding with the increasing frequency of the Schuylkill River flooding this areas, and applicant's proposed Washington Street improvements. We recommend the applicant and the township consider these issues and our comments.

COMMENTS

1. Future Site Development & Environmental Issues-

The applicant is developing only approximately 1/3rd or 3 acres of the 9.8 acre site. The applicant should provide additional information to the township on their vision for how the remaining vacant 6.0 acres may be redeveloped. As noted the property has a history of industrial activity, and environmental investigations were conducted at the property as documented by the recorded Environmental Covenant of April 2023. The Covenant states that a determination was made on the presence of hazardous contaminants in the soil and groundwater. As a result, activity and uses are limited at the site, as outlined in that environmental covenant. Approval of any development/activity for the site requires consideration as to the limitations and restrictions outlined in the environmental covenant.

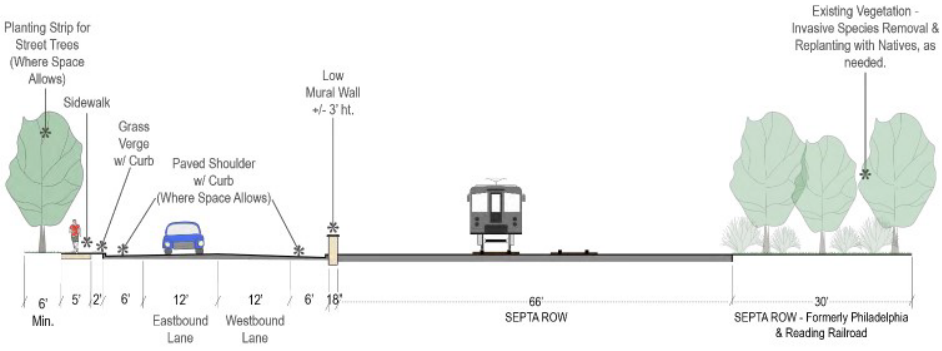
2. Washington Street Streetscape-Improvements

a. RDD-1 Streetscape requirements and the right-of-way width

The township should ensure that the applicant's plan addresses the goal of a pedestrian-friendly, unified streetscape along Washington Street. The recommended improvements and amenities should be established along the entire frontage of the applicant's parcel and meet the township's district requirements and recommendations from the Spring Mill Multi-Modal Study.

The Township's requirement for pedestrian-oriented development, §116-283 D.1-

requires a number of pedestrian-oriented elements, including: pedestrian lighting, benches, wide sidewalks, and pavement variety, with the strip between the curb and sidewalk. While the plan shows many of these elements, there are some discrepancies. The applicant's plan proposes a 43 ft. ultimate right-of-way and a 30 ft. wide roadway. A waiver is requested for the requirement of a 36 ft. wide roadway width. It is not clear how the recommended amenities as shown below from the SMMM Study can be constructed within the proposed right-of-way and roadway width. We recommend the township assess the proposal to ensure that it is consistent with the Spring Mill Multi-Modal and Land Use Study. We believe the recommendation for a 3 ft. high mural wall is both useful and a needed improvement to screen the railroad corridor along Washington Street.



Washington Street – Typical Cross Section

The widening of Washington Street west of the David's Bridal property would provide for a dedicated pedestrian path on the south side of the road, two travel lanes with dedicated shoulders and a low wall that separates the traveled way from the adjacent SEPTA right-of-way. Where space allows, street trees and pedestrian-scale lighting could also be included to provide a more inviting path for pedestrians. The inclusion of the low wall on the north side of the street provides an opportunity for collaboration between the Township and local artists and/or school art departments to prepare a decorative design for the wall that can incorporate local historical context into the proposed improvements.

Recommended Cross-section of Washington Street- Spring Mill Study

b. Washington Street sidewalk material

The applicant should address the discrepancy on the plan for the material composition of the sidewalk along Washington Street. The symbol representing the sidewalk is the same symbol for the 10 ft. wide 'red-shale' macadam pathway along the riverfront. The symbol in the plan's legend for sidewalks shows concrete, however the concrete symbol is not used in the plan's depiction of sidewalks along Washington Street. The plan should be corrected and a concrete sidewalk should be constructed along Washington Street.

c. Pedestrian-scale lighting – Section105-47.K.(6.)

The site plan does not provide the required pedestrian-scale lighting along Washington Street. This is a required improvement in the Riverfront Development District as stated in Section 105-47.K.(6.). We recommend the applicant work with the township to determine the appropriate type of lighting fixture planned for Washington Street, to ensure a consistent design along the street corridor.

3. Schuylkill Riverfront Access – Pathway Landscape Improvements

The plan shows the required perpendicular public access to the riverfront, the dedicated riverfront trail with seating areas, and the dedicated open space areas as required by Section 116-284. The applicant should ensure that the other required riverfront amenities, including lighting the riverfront pathway are provided. We recommend the plan include a native shade planting along the perpendicular pathway. Trees could be planted 30-35 ft. on-center, along the 350 ft. long perpendicular pathway to the river and, over time, establish a shaded corridor to the river. Species could include the same native floodplain species recommended below. [Comment #6.a.2.]. This improvement would be a valuable 'green-investment' to restore the river's floodplain environment and provide a visual boundary line for the property owner.

4. Base Flood Elevation and 116-204. Alteration of a Structure in the Floodplain Conservation District

The applicant's plan does not document the Base Flood Elevation of the proposed structure as required by Floodplain Conservation District regulations. According to Note #4 on Sheet # 2/ 23 of the plan, the Base Flood Elevation will be determined for a variance from FEMA – Federal Emergency Management Agency. The township's requirements for an alteration of a structure in the Floodplain Conservation District [Section 116-204.A.] requires that, to the greatest extent feasible, the applicant should elevate or flood-proof the proposed buildings. The architectural elevations of the building do not show the building's flood-proofing measures or the proposed building's elevation above the Base Flood Elevation. The applicant should address the requirements and provide the township with the required documentation and related building improvements to ensure the building's resiliency to the river's floods.

5. Emergency Preparedness and the Proposed Development Within the Schuylkill River's 100-Year Floodplain

Emergency preparedness is an important consideration in the assessment of the proposed development. The site lies within the Schuylkill River's 100-year floodplain and floodway fringe, and developments along Washington Street are experiencing increasingly frequent and sometimes disastrous impacts. The street was partially inundated by flood waters on January 10, 2024 and experienced a disastrous event with Hurricane Ida on September 1-2, 2021. Several hundred cars were damaged and many were a total loss from the impacts of the hurricane.

Our concern is that redevelopment as a recreational center may place additional burdens on local and county emergency services responding to Schuylkill River flooding events and rescues at this site and on neighboring properties. The applicant should coordinate with the township's emergency services and fire departments to develop a flood and emergency preparedness plan. The applicant should provide the township with details of its emergency preparedness plan and how its ramp and dock will be secured during flooding events.

6. Site Improvements

a. Landscape Plan

1. *Landscape Restoration*

As a significant portion of the applicant's parcel will not be developed, we believe the tract's undeveloped areas should receive greater attention. We recommend the applicant provide a robust landscape restoration plan for the areas which were previously used for outdoor storage of various materials. Restoration could include more extensive riparian forest plantings using bare-root plantings of smaller caliper, the removal of invasive vegetation, and the establishment of meadow areas with native shrubs and grasses. We recommend the applicant consider these measures and submit a restoration plan for these areas.

2. *Selected Tree Species for Washington Street and the Parking Lot*

The proposed street tree species and parking lot trees are 'Goldspire' Gingko, 'Musashino' Zelkova and 'Skyline' Honeylocust, which are not considered part of Piedmont floodplain tree community. We recommend that native, well-adapted floodplain tree species be selected, including: Princeton American elm (*Ulmus americana* 'Princeton', Sycamore (*Platanus occidentalis*) and Hackberry *(Celtis occidentalis*).

Section 105-48.1.A. Landscaping of the township's code recommends, "the applicant is encouraged to select native plant species and water-conserving plants." . . . and " to choose those species which may be expected to be found together under more or less natural conditions on tracts of land comparable to those where the trees and shrubs are to be planted." We recommend the applicant consider substituting native floodplain tree species for the introduced tree species that have been selected -- Ginkgo, Zelkova, and 'Emerald Green' Arborvitae. We recommend that consideration be given to native tree species including: *Betula nigra* (River birch), *Platanus occidentalis* (Sycamore), and *Celtis occidentalis* (Hackberry).

b. Debris and Industrial Storage Containers

Recent aerial photographs indicate that the site has various areas of debris scattered, along with other objects and what appears to be metal containers and concrete barriers along the perimeter. We recommend that as a condition of approval for the site's redevelopment the township require the clean-up of the remnants of the previous activities and the removal of any debris from previous industrial activities.

CONCLUSION

We wish to reiterate that MCPC generally supports the applicant's proposal but we believe that our suggested revisions will better achieve the township's vision of riverfront redevelopment. We recommend the township consider and address these review comments to your satisfaction.

Please note that the review comments and recommendations contained in this report are advisory to the municipality and final disposition for the approval of any proposal will be made by the municipality.

Should the governing body approve a final plat of this proposal, the applicant must present the plan to our office for seal and signature prior to recording with the Recorder of Deeds office. A paper copy bearing the municipal seal and signature of approval must be supplied for our files. Please print the assigned MCPC number # 19-0018-004.

Sincerely,

Barry W. Jeffries

Barry W. Jeffries, ASLA , Senior Design Planner

Barry.Jeffries@montgomerycountypa.gov , 610.278.3444

c: Villanova University, Applicant
Mike Roth, P.E., Pennoni, Applicant's Representative
Aaron Kostyk, Chair, Whitemarsh Township Planning Commission

Attachment A: Aerial Image of Site
Attachment B: Reduced Copy of Applicant's Proposed Site Plan

ATTACHMENT A & B

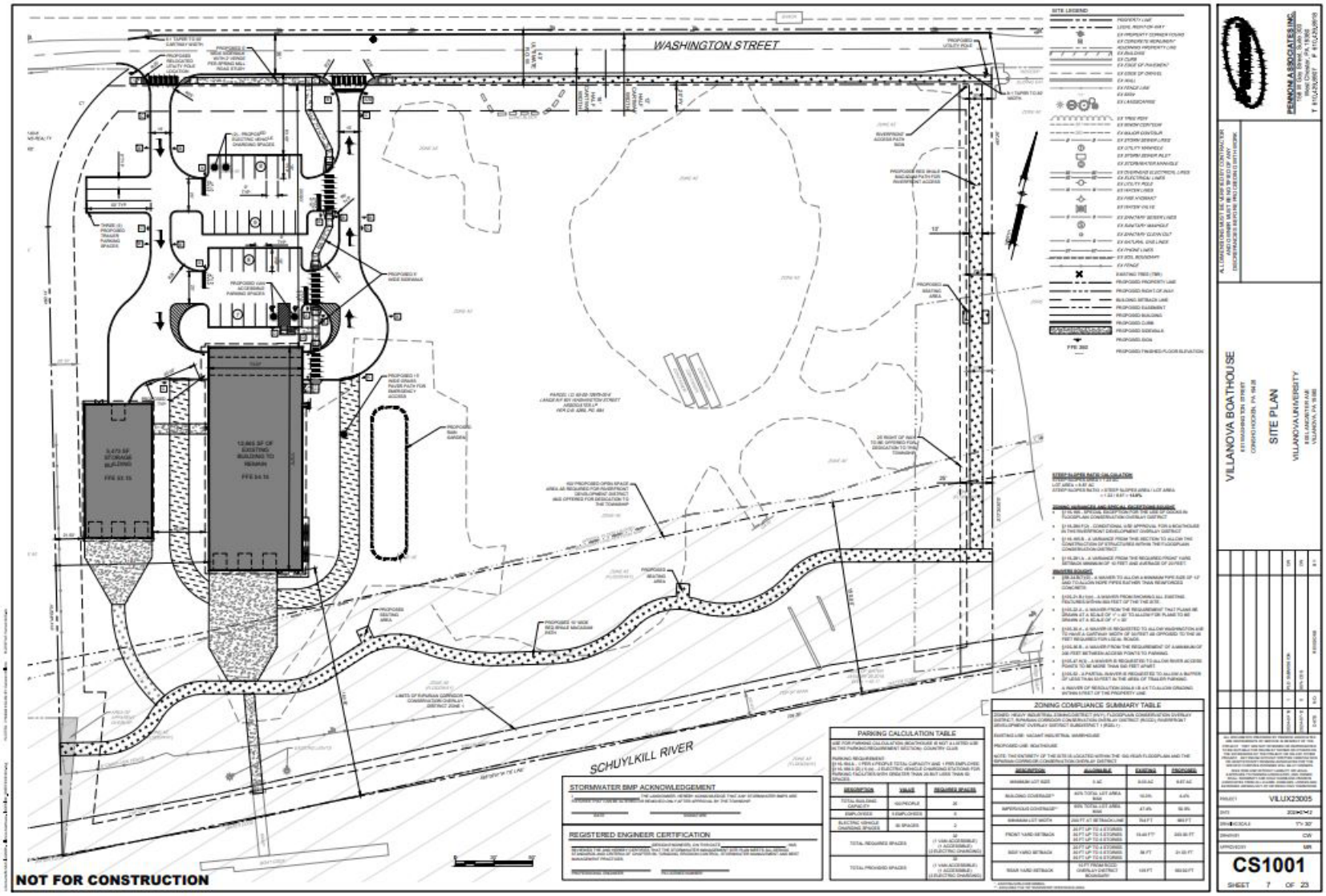
Villanova University Boathouse
MCPC#190018004

Montgomery County Planning Commission

0 50 100 200 Feet

N

Montgomery County Courthouse - Planning Commission
PO Box 311 Norristown PA 19404-0311
(p) 610 278-3722 (f) 610 278-3941
www.montcopa.org/plancom
Aerial photography provided by Nearmap


WASHINGTON STREET
SCHUYLKILL RIVER
NOT FOR CONSTRUCTION
VILLANOVA BOATHOUSE
SITE PLAN
CS1001

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

248 Beech Hill Road • Wynnewood • PA • 19096 • (215) 625-3821 Phone • (484) 792-9495 Fax
www.FTAVANIASSOCIATES.com

2 October 2024

Krista Heinrich, P.E.
Gilmore & Associates, Inc.
65 East Butler Street, SU 100
New Britain, PA 18901

VIA EMAIL ONLY

RE: Villanova University,
601 Washington Street
Proposed Boathouse Site Renovations
Trip Generation Investigations,
Whitemarsh Township, Montgomery County
FTA Job # 224-017

Ms. Heinrich:

F. Tavani and Associates, Inc. (FTA) has completed trip generation investigations relative to proposed site renovations at 601 Washington Street. The renovations will include a new building and parking lot to better host Villanova University's (Villanova's) crew / rowing activities as shown in **Figures 1** and **2** which are attached to the end of this report. The site is in fact presently used by Villanova in this manner, but the site is currently lacking appropriate facilities to support its use. The future use (i.e., following the mentioned renovations) of the site will be substantially similar to its current use, and future traffic conditions will be substantially similar to current traffic conditions.

Earlier this year, FTA traded emails with both you and D. Drummond regarding the project, and the need for a traffic study. As mentioned in those emails, FTA believed there was clear circumstantial evidence that traffic leading to and from the site is not only minimal, but likely does not even pass through any existing intersection in the township, given the site's placement so close to the SW corner of the township's borders. The path of traffic to and from the west is also essentially assured by virtue of the relatively few Schuylkill River crossings as well as the location of Villanova relative to said crossings and the site. Mr. Drummond's email of 15 August 2024 appeared to agree with this conclusion, and added that the applicant should consider conducting counts at the existing site as an offer of proof relative to FTA's claims (which were based on conversations with Villanova coaches and others on the project team). FTA conducted the requested traffic counts a few weeks later, after the fall season was well underway. This report presents the findings of those counts.

PROJECT SUMMARY

As mentioned in the attached emails as well as above, the site is essentially a renovation and repurposing of an existing industrial use. To wit, as shown in **Figure 3**, which is a site plan excerpt, the industrial building currently found on site is being reduced in size and renovated to accommodate Villanova's needs. That building currently runs essentially the entire depth of the site, from Washington Street nearly to the river, and Villanova plans to remove a portion of both

the 'front' and 'rear' of the building as inspection of **Figure 3** and comparison of same to **Figure 2** will reveal. A small auxiliary building is also proposed to be constructed to the west of the main building. All told, the total square footage of both buildings will be a little over 18,000 SF, which is less half of the existing 44,000 SF found on the site today.

Other changes include circulation and parking revisions. There is no paved parking on the site today. The site plan shows 35 total parking spaces are proposed, 3 of which will be for trailers, but could also be used by automobiles or vans if needed. In terms of access, there is one unsignalized gated driveway immediately east of the existing building which is in current, active use. There is also a former unsignalized driveway immediately west of the existing building which has not been used in some time. As **Figure 3** shows, the plan is to use both driveways as a split pair – one being designated as entrance-only and the other as exit-only.

DATA COLLECTION

As mentioned in the attached emails, the site is currently used in substantially the same way it is proposed to continue to be used. The attached scoping emails contain an explanation of the days of week when the site is used, along with approximate hours of each day the site is typically used each day and estimates of the number of athletes / coaches who visit the site. The applicant was asked to bolster these estimates with actual traffic counts at the existing site. Even though the site is only used for a limited number of hours, *MioVision Scout* cameras were deployed and programmed to collect approximately 15 hours of count data each day – a total of 45 hours – to confirm not only the 'peak' usage of the site but also when the site is <u>not</u> being used. Count data was collected on Wednesday, 11 September; Thursday, 12 September, and Saturday, 14 September 2024. The counts were conducted as turning movement counts and included through traffic along Washington Street. Count summary pages are attached following the figures and scoping emails.

The first few pages of the count summary pages include only the turning movements in and out of the site, to focus attention on the trip distribution and trip generation aspects of the site. There are a few immediate conclusions that can be drawn after an inspection of the data:

- there was, on average, only about 1 car <u>per day</u> that entered the site via left turn (from the east);
- there was, on average, only about 1 car <u>per day</u> that exited the site via right turn (to the east);
- approximately half (22 of 45) of the hours counted had <u>zero activity</u> entering or exiting;
- another 4 of the hours counted had <u>only 1 or 2 vehicles</u> entering or exiting during the entire hour;
- there was an average of 3 to 4 vehicles per hour entering or exiting during the entire study; and
- the busiest 1 hour (of the 45 hours) had 25 vehicles entering and 10 vehicles exiting (Sat, 7-8 AM).

Following the pages of "trip generation only" turning movement summaries there are summaries which also include through movements along Washington Street. As shown in those pages, hourly through volumes along Washington Street are generally light and on average amounted to approximately 25 vehicles per hour (vph) per direction during the 45 hours counted. Many hours featured single-digit hourly directional through volumes. Out of 90 data points, 86 were less than 99 vph. All things considered, through volumes along Washington Street can be described as very low.

CONCLUSIONS

The site is currently used as a boathouse for crew / rowing activities. It is proposed to continue to be used as it is today, but with site improvements to include new and renovated buildings which will result in a square footage reduction greater than half of what currently exists, as well as the addition

of 35 paved parking spaces. Traffic counts were conducted as directed by the township, the results of which confirm the details of the scoping emails which had been previously exchanged. Namely, the use of the site is limited in nature and results in minimal traffic. Additionally, for essentially the entirety of the data collection, neither entering nor exiting traffic travels through any public intersection in Whitemarsh Township. Through volumes along Washington Street are also low and it appears that no road improvements are needed to support the proposed changes to the existing abandoned industrial site.

Finally, with very specific regard to Mr. Drummond's email dated 15 August 2024, here are 4 specific responses to the 4 issues raised:

1. The proposed land use is a boathouse.
2. The anticipated number of trips during during hours of peak site utilization (site peak hours) is approximately 40 vph (total in and out); see for example the existing Saturday 7:00 to 8:00 AM hour.
3. Anticipated trip generation was derived through a combination of team discussion and actual count data as previously presented.
4. Done, as requested.

Please call or email with any questions. Thank you.

Very truly yours,
F. TAVANI AND ASSOCIATES, INC.

FRANK TAVANI, P.E., PTOE
Principal

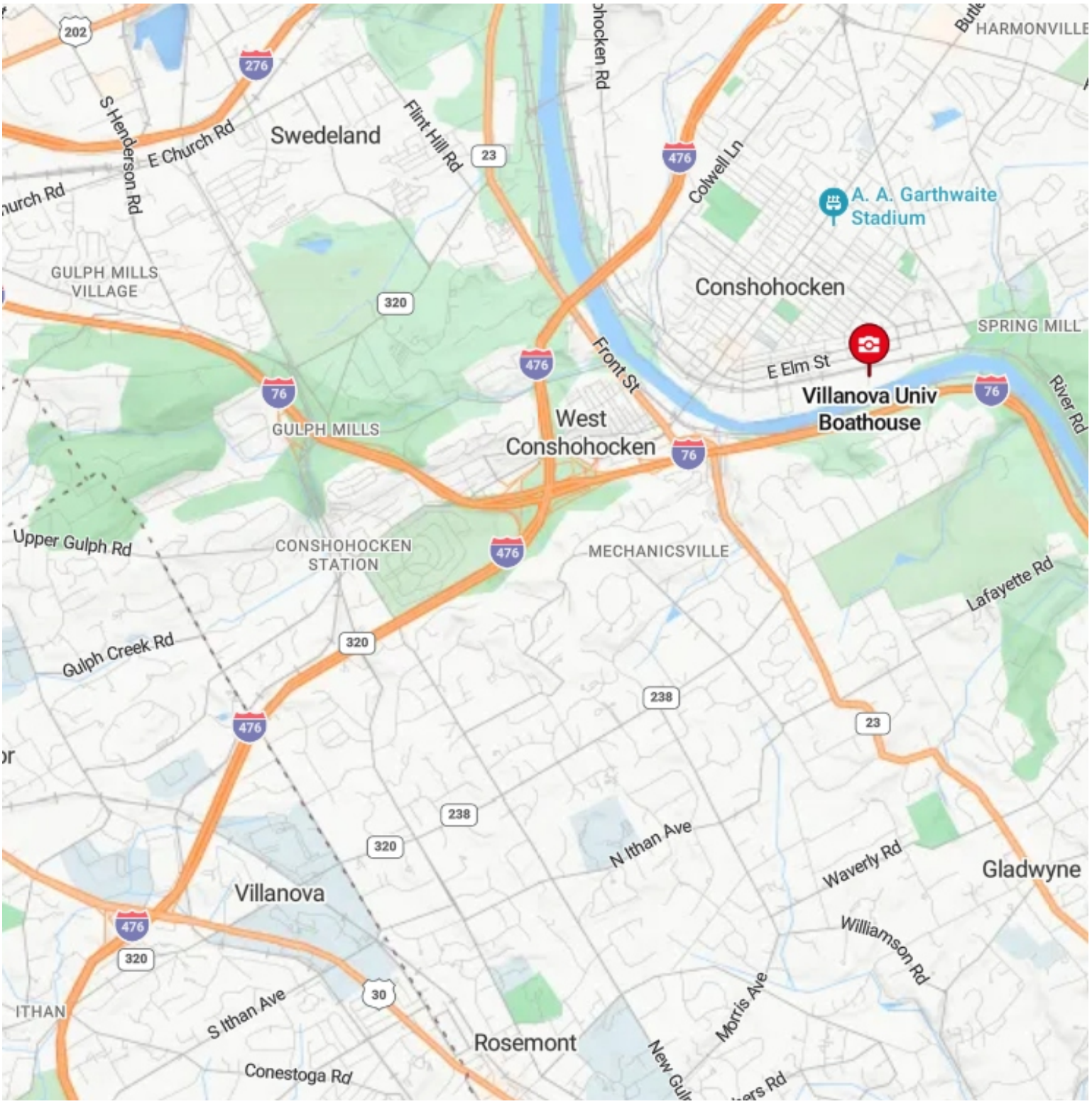
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
FRANK TAVANI
ENGINEER
PE-052846-E

attachments

Site & University Locales and Roadway Connectivities

Villanova University Washington Street Boathouse Trip Generation
Whitemarsh Township, Montgomery County, Pennsylvania

September 2024*

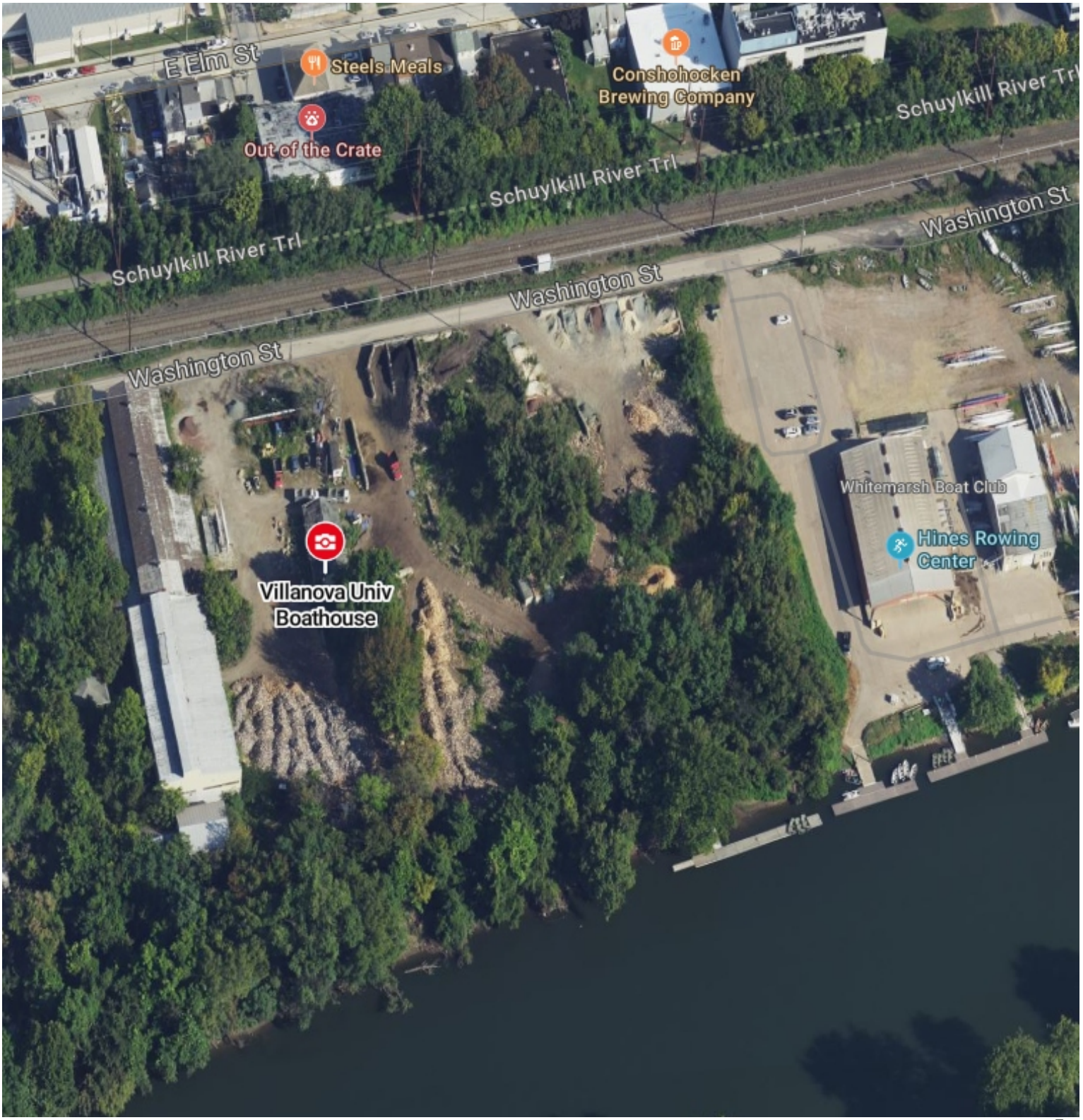


* figure preparation date

Existing Conditions Satellite View

Villanova University Washington Street Boathouse Trip Generation
Whitemarsh Township, Montgomery County, Pennsylvania

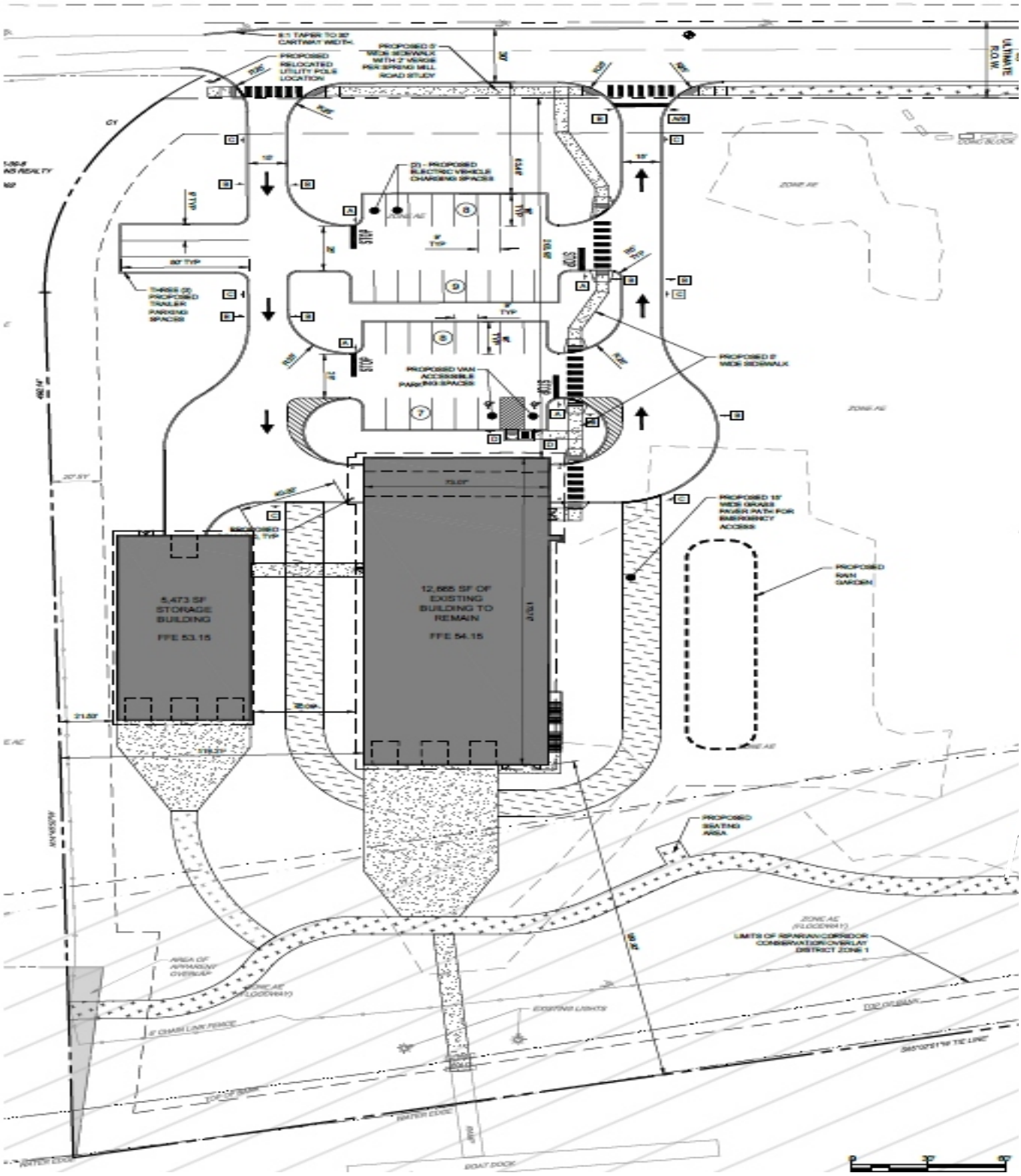
September 2024



Site Plan Excerpt

Villanova University Washington Street Boathouse Trip Generation
Whitemarsh Township, Montgomery County, Pennsylvania

September 2024



Re: proposed Villanova Boathouse - Traffic Study?

From: Damon Drummond (ddrummond@gilmore-assoc.com)

To: frank@ftavaniassociates.com

Cc: kheinrich@gilmore-assoc.com

Date: Thursday, August 15, 2024 at 02:17 PM EDT

Frank,

Based on the info below, please prepare a brief traffic generation letter study for submission to the Township. It should include the following (some you have already noted below):

1. Proposed Land Use
2. Number of trips in/out during an AM/PM/Saturday peak hours on a typical in-season day.
3. Background on how the trip generation was derived for this particular use.
4. Consider counting the site to determine the trip generation. As you noted, the site is already being utilized in the manner noted below.

Based on the trip generation letter, we can than determine if any other traffic impact analysis is required as per SALDO 105-21 (B)(9). Give me a call with any questions.

Thanks,
Damon

Damon Drummond, P.E.,PTOE Senior Transportation Engineer
Gilmore & Associates, Inc.
65 E. Butler Avenue, Suite 100, New Britain, PA 18901
Main: 215-345-4330 | Direct: 267-914-7799 | Cell: 215-896-2746

www.gilmore-assoc.com | BUILDING ON A FOUNDATION OF EXCELLENCE

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From: Krista Heinrich <kheinrich@gilmore-assoc.com>
Sent: Wednesday, August 14, 2024 4:49 PM
To: Damon Drummond <ddrummond@gilmore-assoc.com>
Subject: FW: proposed Villanova Boathouse - Traffic Study?

From: Frank Tavani <frank@ftavaniassociates.com>
Sent: Wednesday, August 14, 2024 4:26 PM
To: Charlie Guttenplan <cguttenplan@whitemarshtwp.org>

Cc: Kevin Blackney <kblackney@blackneyhayes.com>; John Camusi <john.camusi@villanova.edu>; Carmen Bushong <cbushong@blackneyhayes.com>; Michael Roth <mroth@pennoni.com>; Michael Kissinger <mkissinger@pennoni.com>
Subject: proposed Villanova Boathouse - Traffic Study?

Hello Mr. Guttenplan.

I have been asked to explore the need for a traffic study for Villanova University's proposed new boathouse at 601 Washington Street in Whitemarsh Township

The site is currently used for a similar use, but some changes are proposed. More specifically, the project is really nothing more than a renovation of only a portion of an existing building on the site. Additionally, the site was also previously used by a landscape contractor for firewood storage and temporary storage. That use has ceased.

This location is at the very edge of the southwestern corner of the township. The following google link will take you to its location:

https://link.edgepilot.com/s/185c1beb/Exo_GiqbDkmynRGTuioXKQ?u=https://www.google.com/maps/place/601%2BWashington%2BSt%2C%2BConshohocken%2C%2BPA%2B19428/@40.0723749%2C-75.2986208%2C16z/data=!4m6!3m5!1s0x89c6bef5ee4125af:0xa8535095a2ece86a!8m2!3d40.072375!4d-75.2937499!16s%252Fg%252F11cpkfstjn?entry=ttu

The next google link shows the township borders; you can see how close it is:

https://link.edgepilot.com/s/f52caa32/dm5Qu0qVV0yxqzKMqOeUZQ?u=https://www.google.com/maps/place/Whitemarsh%2BTownship%2C%2BPA/@40.0724847%2C-75.2967846%2C16.47z/data=!4m6!3m5!1s0x89c6bc0869feae13:0x96edc28a27e6c474!8m2!3d40.1192546!4d-75.2362381!16zL20vMF83bV8?entry=ttu

I am told that this site is located in a zoning district which requires a traffic study (in all cases). The complication here is that it appears that no site traffic (at all) will travel through Whitemarsh Township. Even if it did, it would be relatively low in number and also mainly during off-peak hours.

I will explain further.

First, there is no ITE LUC for Boathouses and so I inquired about how, when, and how often a university boathouse is used. Here is what I learned from one of the rowing coaches:

The season starts at the end of August and finishes the middle of May. Actual site usage does not take place during all of those months, and – after accounting for school breaks and winter weather – can actually be only a fraction of those months. If the winter is not cooperative there may be very little, if any, river activity during various times January through March, for example. This could leave just a few months of actual consistent usage.

In terms of timing, the women's team is generally at the boathouse from 5 AM to 9 AM weekdays and 7 to 11 AM Saturdays. The men's team is at the boathouse during the evenings from around 5 to about 8 PM (depending daylight / time of year) during the weekdays and roughly the same time on Saturdays. Villanova also has some limited high school programs and they generally run

from 3 PM to 5 PM on weekdays. During the off-season there is really no student activity and only occasional coach visits at random times.

In terms of volumes, the Women's team consists of about 40-50 athletes and the Men's team is about the same. There are 4 coaches for each team. Women student-athletes take vans, men's team uses personal vehicles. The women players' van count is usually about 7. The men player carpool in personal vehicle and the number of cars is usually in the 8-10 range. Most athletes participate at every practice.

Regarding transport to and from the University, the normal (and really only) vehicular path between Villanova the site includes:

- crossing the Fayette Street bridge to
- Elm Street to
- Ash Street to
- Washington Street (site).

Return trips are the reverse. This is the path always taken due to limited number of river crossings in the immediate area. Most of the streets just mentioned are not in Whitemarsh Township. In fact, not a single Whitemarsh Township intersection is traversed by any traffic going to or from the site when using this path.

In summary, I cannot think of any justification to perform a traffic study since:

– no intersection in the township is affected;
– even if some were, the volumes under consideration are low and during mainly off-peak times; &
– the site is currently used by Villanova in the exact manner which they propose to continue using it.

Can you please advise if you agree and if so how the applicant should proceed?

Thank you,
Frank

Frank Tavani, P.E., PTOE
Principal

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood, PA 19096

(215) 625-3821 phone
(484) 792-9495 fax
(267) 250-4858 cell

www.FTAVANIASSOCIATES.com

Links contained in this email have been replaced. If you click on a link in the email above, the link

will be analyzed for known threats. If a known threat is found, you will not be able to proceed to the destination. If suspicious content is detected, you will see a warning.

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

WEDNESDAY

File Name : 224-017_Villanova_Boat_1224325_09-11-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/11/2024
Page No : 1

Groups Printed- Lights - Buses - Trucks

	Washington -- INBOUND From East	Site -- OUTBOUND From South		Washington -- INBOUND From West	
Start Time	Left	Left	Right	Right	Int. Total
05:00 AM	0	0	0	0	0
05:15 AM	0	0	0	0	0
05:30 AM	0	0	0	0	0
05:45 AM	0	0	0	2	2
Total	0	0	0	2	2
06:00 AM	0	0	0	6	6
06:15 AM	0	1	0	0	1
06:30 AM	0	0	0	0	0
06:45 AM	0	0	0	0	0
Total	0	1	0	6	7
07:00 AM	0	0	0	0	0
07:15 AM	0	1	0	0	1
07:30 AM	0	0	0	0	0
07:45 AM	0	0	0	0	0
Total	0	1	0	0	1
08:00 AM	0	0	0	0	0
08:15 AM	0	0	0	1	1
08:30 AM	0	3	0	1	4
08:45 AM	0	2	0	0	2
Total	0	5	0	2	7
09:00 AM	0	0	0	0	0
09:15 AM	0	1	0	2	3
09:30 AM	0	0	0	1	1
09:45 AM	0	1	0	2	3
Total	0	2	0	5	7
10:00 AM	0	0	0	1	1
10:15 AM	0	0	0	0	0
10:30 AM	0	1	0	0	1
10:45 AM	0	4	0	0	4
Total	0	5	0	1	6
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
Total	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
Total	0	0	0	0	0
01:00 PM	0	0	0	0	0
01:15 PM	0	0	0	0	0
01:30 PM	0	0	0	0	0
01:45 PM	0	0	0	0	0
Total	0	0	0	0	0

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

File Name : 224-017_Villanova_Boat_1224325_09-11-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/11/2024
Page No : 2

Groups Printed- Lights - Buses - Trucks

	Washington -- INBOUND From East	Site -- OUTBOUND From South		Washington -- INBOUND From West	
Start Time	Left	Left	Right	Right	Int. Total
02:00 PM	0	0	0	0	0
02:15 PM	0	0	0	0	0
02:30 PM	0	0	0	0	0
02:45 PM	0	0	0	0	0
Total	0	0	0	0	0
03:00 PM	0	0	0	0	0
03:15 PM	1	0	0	4	5
03:30 PM	0	3	0	8	11
03:45 PM	0	2	0	4	6
Total	1	5	0	16	22
04:00 PM	0	0	0	5	5
04:15 PM	0	0	0	0	0
04:30 PM	0	0	0	0	0
04:45 PM	0	0	0	0	0
Total	0	0	0	5	5
05:00 PM	0	0	0	0	0
05:15 PM	0	0	0	0	0
05:30 PM	0	4	0	2	6
05:45 PM	0	10	0	6	16
Total	0	14	0	8	22
06:00 PM	0	8	1	9	18
06:15 PM	0	2	0	1	3
06:30 PM	0	0	0	0	0
06:45 PM	0	0	0	0	0
Total	0	10	1	10	21
07:00 PM	0	0	0	0	0
07:15 PM	0	0	0	0	0
07:30 PM	0	0	0	0	0
07:45 PM	0	0	0	0	0
Total	0	0	0	0	0
08:00 PM	0	7	0	0	7
08:15 PM	0	1	0	0	1
08:30 PM	0	0	0	0	0
08:45 PM	0	0	0	0	0
Total	0	8	0	0	8
Grand Total	1	51	1	55	108
Apprch %	100	98.1	1.9	100	
Total %	0.9	47.2	0.9	50.9	
Lights	1	51	1	55	108
% Lights	100	100	100	100	100
Buses	0	0	0	0	0
% Buses	0	0	0	0	0
Trucks	0	0	0	0	0
% Trucks	0	0	0	0	0

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

THURSDAY

File Name : 224-017_Villanova_Boat2_1224327_09-12-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/12/2024
Page No : 1

Groups Printed- Lights - Buses - Trucks

	Washington -- INBOUND From East	Site -- OUTBOUND From South		Washington -- INBOUND From West	
Start Time	Left	Left	Right	Right	Int. Total
05:00 AM	0	0	0	1	1
05:15 AM	0	0	0	5	5
05:30 AM	0	1	0	0	1
05:45 AM	0	0	0	0	0
Total	0	1	0	6	7
06:00 AM	0	0	0	0	0
06:15 AM	0	0	0	0	0
06:30 AM	0	0	0	0	0
06:45 AM	0	0	0	0	0
Total	0	0	0	0	0
07:00 AM	1	1	0	0	2
07:15 AM	0	0	0	0	0
07:30 AM	0	0	0	1	1
07:45 AM	0	7	0	0	7
Total	1	8	0	1	10
08:00 AM	0	0	0	0	0
08:15 AM	0	0	0	0	0
08:30 AM	0	0	0	0	0
08:45 AM	0	0	0	0	0
Total	0	0	0	0	0
09:00 AM	0	1	0	0	1
09:15 AM	0	0	0	0	0
09:30 AM	0	0	0	0	0
09:45 AM	0	0	0	0	0
Total	0	1	0	0	1
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	0	0
10:45 AM	0	0	0	0	0
Total	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
Total	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
Total	0	0	0	0	0
01:00 PM	0	0	0	0	0
01:15 PM	0	0	0	0	0
01:30 PM	0	0	0	0	0
01:45 PM	0	0	0	0	0
Total	0	0	0	0	0

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

File Name : 224-017_Villanova_Boat2_1224327_09-12-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/12/2024
Page No : 2

Groups Printed- Lights - Buses - Trucks

	Washington -- INBOUND From East	Site -- OUTBOUND From South		Washington -- INBOUND From West	
Start Time	Left	Left	Right	Right	Int. Total
02:00 PM	0	0	0	0	0
02:15 PM	0	0	0	0	0
02:30 PM	0	0	0	0	0
02:45 PM	0	0	0	0	0
Total	0	0	0	0	0
03:00 PM	0	0	0	0	0
03:15 PM	0	0	0	6	6
03:30 PM	0	1	0	5	6
03:45 PM	0	2	0	8	10
Total	0	3	0	19	22
04:00 PM	0	0	0	0	0
04:15 PM	0	0	0	0	0
04:30 PM	0	0	0	2	2
04:45 PM	0	0	0	0	0
Total	0	0	0	2	2
05:00 PM	0	1	0	0	1
05:15 PM	0	2	0	2	4
05:30 PM	0	7	0	2	9
05:45 PM	0	4	0	6	10
Total	0	14	0	10	24
06:00 PM	0	6	0	5	11
06:15 PM	0	2	0	0	2
06:30 PM	0	0	0	0	0
06:45 PM	0	2	1	1	4
Total	0	10	1	6	17
07:00 PM	0	0	0	0	0
07:15 PM	0	0	0	0	0
07:30 PM	0	0	0	0	0
07:45 PM	0	0	0	0	0
Total	0	0	0	0	0
Grand Total	1	37	1	44	83
Apprch %	100	97.4	2.6	100	
Total %	1.2	44.6	1.2	53	
Lights	1	37	1	44	83
% Lights	100	100	100	100	100
Buses	0	0	0	0	0
% Buses	0	0	0	0	0
Trucks	0	0	0	0	0
% Trucks	0	0	0	0	0

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

SATURDAY

File Name : 224-017_Villanova_Boat3_1224329_09-14-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/14/2024
Page No : 1

Groups Printed- Lights - Buses - Trucks

	Washington -- INBOUND From East	Site -- OUTBOUND From South		Washington -- INBOUND From West	
Start Time	Left	Left	Right	Right	Int. Total
06:00 AM	0	0	0	0	0
06:15 AM	0	0	0	0	0
06:30 AM	0	0	0	0	0
06:45 AM	0	0	0	0	0
Total	0	0	0	0	0
07:00 AM	0	1	0	6	7
07:15 AM	0	0	0	1	1
07:30 AM	0	1	0	7	8
07:45 AM	0	8	0	11	19
Total	0	10	0	25	35
08:00 AM	0	2	0	1	3
08:15 AM	0	0	0	0	0
08:30 AM	1	1	0	0	2
08:45 AM	0	0	0	2	2
Total	1	3	0	3	7
09:00 AM	0	0	0	2	2
09:15 AM	0	0	0	6	6
09:30 AM	0	2	0	3	5
09:45 AM	0	2	0	4	6
Total	0	4	0	15	19
10:00 AM	0	2	0	3	5
10:15 AM	0	7	0	4	11
10:30 AM	2	14	0	0	16
10:45 AM	0	1	0	0	1
Total	2	24	0	7	33
11:00 AM	0	3	0	0	3
11:15 AM	0	1	0	0	1
11:30 AM	0	7	0	0	7
11:45 AM	0	0	0	0	0
Total	0	11	0	0	11
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
Total	0	0	0	0	0
01:00 PM	0	0	0	0	0
01:15 PM	0	0	0	0	0
01:30 PM	0	0	0	0	0
01:45 PM	0	0	0	0	0
Total	0	0	0	0	0
02:00 PM	0	0	0	0	0
02:15 PM	0	0	0	0	0
02:30 PM	0	0	0	0	0
02:45 PM	0	0	0	0	0
Total	0	0	0	0	0

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

File Name : 224-017_Villanova_Boat3_1224329_09-14-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/14/2024
Page No : 2

Groups Printed- Lights - Buses - Trucks

	Washington -- INBOUND From East	Site -- OUTBOUND From South		Washington -- INBOUND From West	
Start Time	Left	Left	Right	Right	Int. Total
03:00 PM	0	0	0	0	0
03:15 PM	0	0	0	0	0
03:30 PM	0	0	0	0	0
03:45 PM	0	0	0	0	0
Total	0	0	0	0	0
04:00 PM	0	0	0	0	0
04:15 PM	0	0	0	0	0
04:30 PM	0	0	0	0	0
04:45 PM	0	0	0	0	0
Total	0	0	0	0	0
05:00 PM	0	0	0	0	0
05:15 PM	0	0	0	0	0
05:30 PM	0	0	0	0	0
05:45 PM	0	0	0	0	0
Total	0	0	0	0	0
06:00 PM	0	0	0	0	0
06:15 PM	0	0	0	0	0
06:30 PM	0	0	0	0	0
06:45 PM	0	0	0	0	0
Total	0	0	0	0	0
07:00 PM	0	0	0	0	0
07:15 PM	0	0	0	0	0
07:30 PM	0	0	0	0	0
07:45 PM	0	0	0	0	0
Total	0	0	0	0	0
Grand Total	3	52	0	50	105
Apprch %	100	100	0	100	
Total %	2.9	49.5	0	47.6	
Lights	3	52	0	50	105
% Lights	100	100	0	100	100
Buses	0	0	0	0	0
% Buses	0	0	0	0	0
Trucks	0	0	0	0	0
% Trucks	0	0	0	0	0

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

WEDNESDAY
with THRUS

File Name : 224-017_Villanova_Boat_1224325_09-11-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/11/2024
Page No : 1

Groups Printed- Lights - Buses - Trucks

	Washington From East		Site From South		Washington From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
05:00 AM	0	0	0	0	0	0	0
05:15 AM	0	0	0	0	0	0	0
05:30 AM	0	0	0	0	3	0	3
05:45 AM	0	1	0	0	0	2	3
Total	0	1	0	0	3	2	6
06:00 AM	0	1	0	0	0	6	7
06:15 AM	0	0	1	0	1	0	2
06:30 AM	0	0	0	0	6	0	6
06:45 AM	0	1	0	0	4	0	5
Total	0	2	1	0	11	6	20
07:00 AM	0	3	0	0	2	0	5
07:15 AM	0	2	1	0	6	0	9
07:30 AM	0	2	0	0	0	0	2
07:45 AM	0	0	0	0	5	0	5
Total	0	7	1	0	13	0	21
08:00 AM	0	3	0	0	4	0	7
08:15 AM	0	3	0	0	4	1	8
08:30 AM	0	2	3	0	1	1	7
08:45 AM	0	0	2	0	4	0	6
Total	0	8	5	0	13	2	28
09:00 AM	0	3	0	0	4	0	7
09:15 AM	0	2	1	0	1	2	6
09:30 AM	0	4	0	0	3	1	8
09:45 AM	0	2	1	0	3	2	8
Total	0	11	2	0	11	5	29
10:00 AM	0	5	0	0	2	1	8
10:15 AM	0	1	0	0	2	0	3
10:30 AM	0	3	1	0	2	0	6
10:45 AM	0	4	4	0	4	0	12
Total	0	13	5	0	10	1	29
11:00 AM	0	2	0	0	2	0	4
11:15 AM	0	2	0	0	2	0	4
11:30 AM	0	6	0	0	1	0	7
11:45 AM	0	3	0	0	3	0	6
Total	0	13	0	0	8	0	21
12:00 PM	0	6	0	0	2	0	8
12:15 PM	0	4	0	0	0	0	4
12:30 PM	0	0	0	0	1	0	1
12:45 PM	0	2	0	0	2	0	4
Total	0	12	0	0	5	0	17
01:00 PM	0	2	0	0	5	0	7
01:15 PM	0	1	0	0	2	0	3
01:30 PM	0	4	0	0	1	0	5
01:45 PM	0	4	0	0	0	0	4
Total	0	11	0	0	8	0	19

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

File Name : 224-017_Villanova_Boat_1224325_09-11-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/11/2024
Page No : 2

Groups Printed- Lights - Buses - Trucks

	Washington From East		Site From South		Washington From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
02:00 PM	0	1	0	0	2	0	3
02:15 PM	0	3	0	0	0	0	3
02:30 PM	0	2	0	0	0	0	2
02:45 PM	0	4	0	0	3	0	7
Total	0	10	0	0	5	0	15
03:00 PM	0	6	0	0	11	0	17
03:15 PM	1	2	0	0	17	4	24
03:30 PM	0	8	3	0	33	8	52
03:45 PM	0	24	2	0	45	4	75
Total	1	40	5	0	106	16	168
04:00 PM	0	3	0	0	12	5	20
04:15 PM	0	3	0	0	4	0	7
04:30 PM	0	1	0	0	5	0	6
04:45 PM	0	2	0	0	6	0	8
Total	0	9	0	0	27	5	41
05:00 PM	0	2	0	0	4	0	6
05:15 PM	0	2	0	0	11	0	13
05:30 PM	0	8	4	0	14	2	28
05:45 PM	0	15	10	0	24	6	55
Total	0	27	14	0	53	8	102
06:00 PM	0	37	8	1	21	9	76
06:15 PM	0	18	2	0	18	1	39
06:30 PM	0	48	0	0	8	0	56
06:45 PM	0	5	0	0	6	0	11
Total	0	108	10	1	53	10	182
07:00 PM	0	7	0	0	2	0	9
07:15 PM	0	8	0	0	7	0	15
07:30 PM	0	17	0	0	2	0	19
07:45 PM	0	2	0	0	0	0	2
Total	0	34	0	0	11	0	45
08:00 PM	0	13	7	0	0	0	20
08:15 PM	0	7	1	0	2	0	10
08:30 PM	0	10	0	0	0	0	10
08:45 PM	0	7	0	0	0	0	7
Total	0	37	8	0	2	0	47
Grand Total	1	343	51	1	339	55	790
Apprch %	0.3	99.7	98.1	1.9	86	14	
Total %	0.1	43.4	6.5	0.1	42.9	7	
Lights	1	331	51	1	331	55	770
% Lights	100	96.5	100	100	97.6	100	97.5
Buses	0	2	0	0	2	0	4
% Buses	0	0.6	0	0	0.6	0	0.5
Trucks	0	10	0	0	6	0	16
% Trucks	0	2.9	0	0	1.8	0	2

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

THURSDAY
with THRUS

File Name : 224-017_villanova_boat2_1224327_09-12-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/12/2024
Page No : 1

Groups Printed- Lights - Buses - Trucks

	Washington From East		Site From South		Washington From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
05:00 AM	0	0	0	0	0	1	1
05:15 AM	0	0	0	0	1	5	6
05:30 AM	0	0	1	0	0	0	1
05:45 AM	0	1	0	0	1	0	2
Total	0	1	1	0	2	6	10
06:00 AM	0	1	0	0	2	0	3
06:15 AM	0	2	0	0	6	0	8
06:30 AM	0	1	0	0	1	0	2
06:45 AM	0	1	0	0	6	0	7
Total	0	5	0	0	15	0	20
07:00 AM	1	0	1	0	8	0	10
07:15 AM	0	1	0	0	8	0	9
07:30 AM	0	0	0	0	3	1	4
07:45 AM	0	3	7	0	1	0	11
Total	1	4	8	0	20	1	34
08:00 AM	0	8	0	0	1	0	9
08:15 AM	0	2	0	0	3	0	5
08:30 AM	0	2	0	0	5	0	7
08:45 AM	0	0	0	0	3	0	3
Total	0	12	0	0	12	0	24
09:00 AM	0	3	1	0	3	0	7
09:15 AM	0	2	0	0	0	0	2
09:30 AM	0	2	0	0	2	0	4
09:45 AM	0	2	0	0	2	0	4
Total	0	9	1	0	7	0	17
10:00 AM	0	4	0	0	1	0	5
10:15 AM	0	2	0	0	0	0	2
10:30 AM	0	3	0	0	3	0	6
10:45 AM	0	1	0	0	1	0	2
Total	0	10	0	0	5	0	15
11:00 AM	0	4	0	0	0	0	4
11:15 AM	0	0	0	0	0	0	0
11:30 AM	0	3	0	0	1	0	4
11:45 AM	0	3	0	0	4	0	7
Total	0	10	0	0	5	0	15
12:00 PM	0	2	0	0	0	0	2
12:15 PM	0	2	0	0	3	0	5
12:30 PM	0	1	0	0	3	0	4
12:45 PM	0	1	0	0	2	0	3
Total	0	6	0	0	8	0	14
01:00 PM	0	1	0	0	0	0	1
01:15 PM	0	1	0	0	1	0	2
01:30 PM	0	0	0	0	1	0	1
01:45 PM	0	0	0	0	2	0	2
Total	0	2	0	0	4	0	6

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

File Name : 224-017_villanova_boat2_1224327_09-12-2024
Site Code : 224-017 Villanova Boat
Start Date : 9/12/2024
Page No : 2

Groups Printed- Lights - Buses - Trucks

	Washington From East		Site From South		Washington From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
02:00 PM	0	3	0	0	1	0	4
02:15 PM	0	3	0	0	1	0	4
02:30 PM	0	4	0	0	7	0	11
02:45 PM	0	12	0	0	6	0	18
Total	0	22	0	0	15	0	37
03:00 PM	0	2	0	0	13	0	15
03:15 PM	0	3	0	0	21	6	30
03:30 PM	0	9	1	0	34	5	49
03:45 PM	0	23	2	0	54	8	87
Total	0	37	3	0	122	19	181
04:00 PM	0	8	0	0	10	0	18
04:15 PM	0	2	0	0	0	0	2
04:30 PM	0	1	0	0	4	2	7
04:45 PM	0	1	0	0	7	0	8
Total	0	12	0	0	21	2	35
05:00 PM	0	2	1	0	5	0	8
05:15 PM	0	3	2	0	15	2	22
05:30 PM	0	29	7	0	18	2	56
05:45 PM	0	27	4	0	15	6	52
Total	0	61	14	0	53	10	138
06:00 PM	0	23	6	0	18	5	52
06:15 PM	0	33	2	0	29	0	64
06:30 PM	0	36	0	0	11	0	47
06:45 PM	0	23	2	1	7	1	34
Total	0	115	10	1	65	6	197
07:00 PM	0	11	0	0	4	0	15
07:15 PM	0	5	0	0	4	0	9
07:30 PM	0	7	0	0	3	0	10
07:45 PM	0	3	0	0	0	0	3
Total	0	26	0	0	11	0	37
Grand Total	1	332	37	1	365	44	780
Apprch %	0.3	99.7	97.4	2.6	89.2	10.8	
Total %	0.1	42.6	4.7	0.1	46.8	5.6	
Lights	1	322	37	1	354	44	759
% Lights	100	97	100	100	97	100	97.3
Buses	0	1	0	0	1	0	2
% Buses	0	0.3	0	0	0.3	0	0.3
Trucks	0	9	0	0	10	0	19
% Trucks	0	2.7	0	0	2.7	0	2.4

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

SATURDAY
with THRUS

File Name : 224-017_villanova_boat3_1224329_09-14-2024withthrus
Site Code : 224-017 Villanova Boat
Start Date : 9/14/2024
Page No : 1

Groups Printed- Lights - Buses - Trucks

	Washington From East		Site From South		Washington From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
06:00 AM	0	0	0	0	1	0	1
06:15 AM	0	1	0	0	13	0	14
06:30 AM	0	1	0	0	19	0	20
06:45 AM	0	6	0	0	11	0	17
Total	0	8	0	0	44	0	52
07:00 AM	0	2	1	0	3	6	12
07:15 AM	0	11	0	0	20	1	32
07:30 AM	0	1	1	0	4	7	13
07:45 AM	0	4	8	0	11	11	34
Total	0	18	10	0	38	25	91
08:00 AM	0	4	2	0	5	1	12
08:15 AM	0	3	0	0	15	0	18
08:30 AM	1	3	1	0	27	0	32
08:45 AM	0	16	0	0	36	2	54
Total	1	26	3	0	83	3	116
09:00 AM	0	20	0	0	9	2	31
09:15 AM	0	22	0	0	9	6	37
09:30 AM	0	4	2	0	5	3	14
09:45 AM	0	8	2	0	13	4	27
Total	0	54	4	0	36	15	109
10:00 AM	0	4	2	0	4	3	13
10:15 AM	0	17	7	0	7	4	35
10:30 AM	2	20	14	0	23	0	59
10:45 AM	0	35	1	0	46	0	82
Total	2	76	24	0	80	7	189
11:00 AM	0	55	3	0	19	0	77
11:15 AM	0	13	1	0	9	0	23
11:30 AM	0	8	7	0	3	0	18
11:45 AM	0	7	0	0	4	0	11
Total	0	83	11	0	35	0	129
12:00 PM	0	5	0	0	6	0	11
12:15 PM	0	7	0	0	2	0	9
12:30 PM	0	18	0	0	5	0	23
12:45 PM	0	2	0	0	2	0	4
Total	0	32	0	0	15	0	47
01:00 PM	0	4	0	0	7	0	11
01:15 PM	0	6	0	0	17	0	23
01:30 PM	0	21	0	0	14	0	35
01:45 PM	0	30	0	0	20	0	50
Total	0	61	0	0	58	0	119
02:00 PM	0	13	0	0	8	0	21
02:15 PM	0	3	0	0	2	0	5
02:30 PM	0	2	0	0	1	0	3
02:45 PM	0	5	0	0	4	0	9
Total	0	23	0	0	15	0	38

F. Tavani and Associates, Inc.
248 Beech Hill Road
Wynnewood PA 19096
"established 2004"

File Name : 224-017_villanova_boat3_1224329_09-14-2024withthrus
Site Code : 224-017 Villanova Boat
Start Date : 9/14/2024
Page No : 2

Groups Printed- Lights - Buses - Trucks

	Washington From East		Site From South		Washington From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
03:00 PM	0	1	0	0	0	0	1
03:15 PM	0	1	0	0	2	0	3
03:30 PM	0	3	0	0	3	0	6
03:45 PM	0	4	0	0	13	0	17
Total	0	9	0	0	18	0	27
04:00 PM	0	21	0	0	2	0	23
04:15 PM	0	4	0	0	3	0	7
04:30 PM	0	2	0	0	1	0	3
04:45 PM	0	2	0	0	2	0	4
Total	0	29	0	0	8	0	37
05:00 PM	0	1	0	0	2	0	3
05:15 PM	0	0	0	0	1	0	1
05:30 PM	0	1	0	0	2	0	3
05:45 PM	0	3	0	0	0	0	3
Total	0	5	0	0	5	0	10
06:00 PM	0	1	0	0	1	0	2
06:15 PM	0	3	0	0	1	0	4
06:30 PM	0	1	0	0	2	0	3
06:45 PM	0	0	0	0	0	0	0
Total	0	5	0	0	4	0	9
07:00 PM	0	3	0	0	0	0	3
07:15 PM	0	0	0	0	0	0	0
07:30 PM	0	0	0	0	0	0	0
07:45 PM	0	0	0	0	0	0	0
Total	0	3	0	0	0	0	3
Grand Total	3	432	52	0	439	50	976
Apprch %	0.7	99.3	100	0	89.8	10.2	
Total %	0.3	44.3	5.3	0	45	5.1	
Lights	3	430	52	0	436	50	971
% Lights	100	99.5	100	0	99.3	100	99.5
Buses	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0
Trucks	0	2	0	0	3	0	5
% Trucks	0	0.5	0	0	0.7	0	0.5

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

November 22, 2024

Craig T. McAnally - Township Manager
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: Traffic Study Review
601 Washington Street
Whitemarsh Township, Montgomery County, PA
S/LD # 02-24
Our Project Number 2024-00243

Dear Mr. McAnally:

As requested, we have reviewed the traffic impact study for the above noted Subdivision/Land Development application. The following comments are offered for your consideration:

A. PROJECT DESCRIPTION

The project includes the renovation of the existing 44,000 sf industrial building to reduce the overall size and construction of a small auxiliary storage building to the west of the main building, with the final total square footage of both buildings approximately 18,000 sf. Proposed access to the site will utilize a split pair of one-way driveways and the parking area will be paved to accommodate 35 parking spaces, 3 spaces of which can be used for trailers.

B. DOCUMENTS REVIEWED

1. Trip Generation Investigations prepared by F. Tavani and Associates, Inc., dated October 2, 2024.

C. COMMENTS

1. The study notes that no road improvements are needed for the project; however, Section 105-30 of the Township Code and the “Spring Mill Multi-Modal and Land Use Study” detail necessary sidewalk, cartway, and right-of-way requirements. These should be discussed in the study.

2. The proposed sidewalk should extend along the entire frontage to the property lines to connect with future pedestrian facilities.

3. The study includes counts and trip generation assumptions for the purpose of team training. Clarify whether this site would also be used for tournaments/regattas that might increase the traffic needs for the site, or whether it will continue to be used strictly for team training.

4. During the PM peak hour, there are a total of 43 site trips and the site is located in TSA South. The traffic impact fee is $2,529.00 per PM peak hour trip. The total Traffic Impact Fee is $108,747.00 for the proposed development.

5. We note that the site plan was difficult to read in the PDF of the report. Additional comments regarding the site plan may be provided upon formal submission of the land development plan.

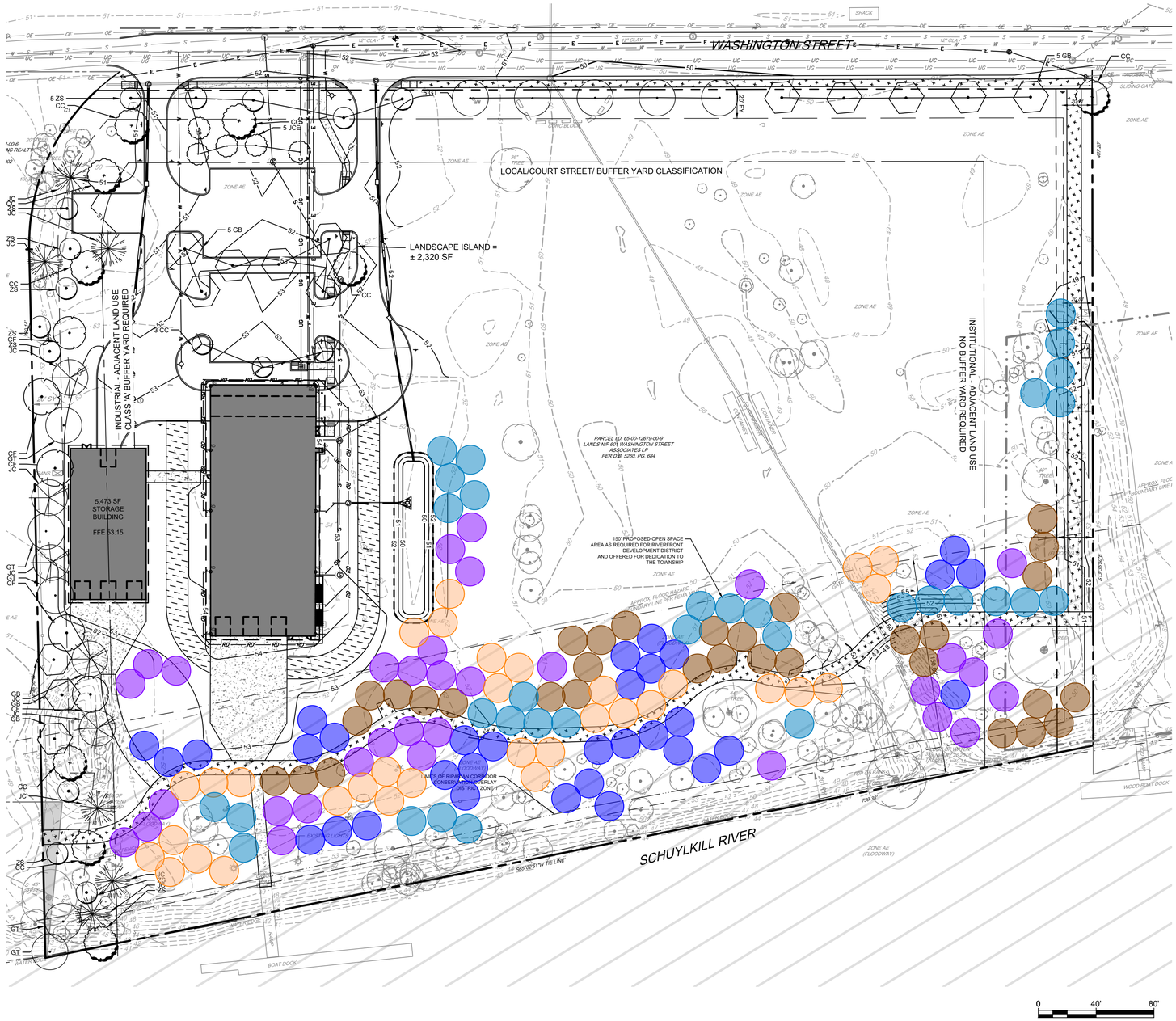
Any future submission of the design plans for this project must be accompanied by a letter prepared by the applicant's engineer, which addresses each of the comments contained in this report. Should you have any questions regarding this matter, please do not hesitate to contact me at this office.

Sincerely,

Krista Heinrich, PE
Township Engineer

c: Charles L. Guttenplan, AICP – Director of Planning and Zoning
Sean Kilkenny, Esq.; The Law Offices of Sean Kilkenny, LLC – Township Solicitor
John Camusi, Villanova University – Applicant
Michael Roth, PE– Applicant's Engineer
John J. Iannozzi, Esq. – Applicant's Attorney
Frank Tavani, P.E., PTOE - F. Tavani and Associates, Inc.

O:\MUNICIPL\2024\2400243-WshT_601 Washington Street-Villanova-SLD 02-24\correspondence\TIS Review #1.doc



PROPOSED LANDSCAPING

DECIDUOUS TREES

SYM	KEY	QTY	BOTANICAL NAME	COMMON NAME	INITIAL SIZE	ROOT
	JCE	5	ACER CAMPESTRE 'EVELYN'	QUEEN ELIZABETH MAPLE	3" CALIPER	
	ARC	3	ACER RUNBRUM 'COLUMNARE'	COLUMNAR RED MAPLE	3" CALIPER	
	CC	9	CERCIS CANADENSIS 'FOREST PANSY'	FOREST PANSY EASTERN REDBUD	3" CALIPER	
	CF	5	CORNUS FLORIDA 'CLOUD NINE'	CLOUD NINE DOGWOOD		
	GB	14	GINKO BILOBA 'GOLDSPIRE'	GINKO 'GOLDSPIRE'	3" CALIPER	
	GT	10	GLEDITSIA TRIACANTHOS VAR INERMIS 'SKYCOLE' SKYLINE	SKYLINE HONEYLOCUST	3" CALIPER	
	ZS	13	ZELKOVA SERRATA 'MUSASHINO'	MUSASHINO ZELKOVA	3" CALIPER	

EVERGREEN TREES

SYM	KEY	QTY	BOTANICAL NAME	COMMON NAME	INITIAL SIZE	ROOT
	JC	6	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS'	HETZI COLUMNAR JUNIPER		
	TO	5	THUJA OCCIDENTALIS 'SMARAGD'	EMERALD GREEN ARBORBITAE		

LANDSCAPE COMPLIANCE SUMMARY

CODE REFERENCE	SUMMARY	REQUIRED	PROVIDED
105-48.B	SHADE STREET TREES SHALL BE PLANTED AT INTERVALS OF NOT MORE THAN 45 FEET, AND FLOWERING STREET TREES AT INTERVALS OF NOT MORE THAN 30 FEET ALONG ONE OR BOTH SIDES OF AN EXISTING STREET WITHIN THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.	EXISTING STREET FRONTAGE 688.5/45 = 15.3 = 16 TREES	16 TREES
105-52.B(2)	BUFFER YARD - CLASS A	1 FLOWERING TREE PER 60 FEET 613.07/40 = 10.22 = 11 TREES	11 TREES
		1 EVERGREEN TREE PER 60 FEET 613.07/60 = 10.22 = 11 TREES	11 TREES
		1 CANOPY TREE PER 40 FEET 613.07/40 = 15.32 = 16 TREES	16 TREES
105-39(A)	ALL PARKING AREAS SHALL HAVE AT LEAST ONE, THREE-INCH-CALIPER TREE FOR EVERY TWO PARKING SPACES PROVIDED.	32 PARKING SPACES = 16 TREES	16 TREES
105-39(C)	A MINIMUM OF 10% OF ANY PARKING LOT FACILITY OVER 2,000 SQUARE FEET IN GROSS AREA SHALL BE DEVOTED TO LANDSCAPING.	± 9,170 SF OF PARKING LOT AREA 9,170/10 = 917 SF	>917 SF

REPLACEMENT TREE SCHEDULE

DECIDUOUS TREES

SYM	KEY	QTY	BOTANICAL NAME	COMMON NAME	HT	SPREAD
		32	ACER X FREEMANII 'AUTUMN BLAZE'	AUTUMN BLAZE FREEMAN MAPLE	50'	30'
		33	GLEDITSIA TRIACANTHOS 'JFS GMORGENSON1'	NORTHERN SENTINEL HONEYLOCUST	45'	25'
		32	NYSSA SYLVATICA 'WILDFIRE'	WILDFIRE BLACKGUM	50'	25'
		33	TILIA AMERICANA 'MCKSENTRY'	AMERICAN SENTRY LINDEN	45'	25'
		33	QUERCUS PALUSTRIS 'PWJR08'	PACIFIC BRILLIANCE PIN OAK	50'	25'

REPLACEMENT TREE COMPLIANCE SUMMARY

CODE REFERENCE	SUMMARY	REQUIRED	PROVIDED
54-D(6)a	THE TOTAL CALIPER OF REPLACEMENT TREES, MEASURED AT SIX INCHES ABOVE THE GROUND LINE, SHALL EQUAL OR EXCEED THE DBH OF THE REMOVED TREES.	77 TREES TO REMOVED (489 CALIPER INCHES REMOVED)	163 TREES (489 / 3 = 163)

1. THIS EXHIBIT ASSUMES TREES #209-286 ALL ARE TO BE REMOVED AND NO CREDIT IS TAKEN FOR TREES THAT WILL REMAIN.
2. AT THE TIME OF SUBMISSION OF THIS PLAN, THE PHYSICAL FIELD LOCATION OF EACH NUMBERED TREE IS NOT KNOWN.
3. A FIELD SURVEY TO DATA COLLECT EACH TREE WILL OCCUR 30 DAYS OF THE SUBMISSION OF THIS PLAN.
4. ONCE THE LOCATION OF ALL SURVEYED TREES ARE KNOWN, THE PLANTING PLAN WILL BE ADJUSTED TO AVOID CONFLICTS WITH TREES TO REMAIN AND THE REPLACEMENT TREE CALCULATIONS WILL BE REVISED ACCORDINGLY.

SHADE TREE MEETING EXHIBIT
11/27/2024

NOT FOR CONSTRUCTION

Pennoni
PENNONI ASSOCIATES INC.
158 W Gay Street, Suite 300
West Chester, PA 19380
T 610.429.8907 F 610.429.8918

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

VILLANOVA BOATHOUSE
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428

LANDSCAPING PLAN

VILLANOVA UNIVERSITY
800 LANCASTER AVE
VILLANOVA, PA 19085

BY	REVISIONS	NO.	DATE
CW	PLD SUBMISSION	1	2024-07-19
CW	90% CDS	0	2024-07-12

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON THE EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

PROJECT	VILUX23005
DATE	2024-07-12
DRAWING SCALE	1"= 40'
DRAWN BY	CW
APPROVED BY	MR

CS2001

SHEET 10 OF 23

U:\Accounts\BU\HAV\VILUX23005 - Villanova Boathouse - LD\DESIGN_SHEETS\CS2001.dwg PLOTTED: 7/19/2024 11:29 AM BY: Scott Moore PLOTSTYLE: Pennoni MCS.ctb

Villanova University

Applicant Name: Villanova University

Development Name: Villanova Boathouse

Location of Property: 601 Washington St, Conshohocken, PA 19428

Date: 11/27/2024

PROJECT COVER SHEET – *Approved at June 6, 2023 Shade Tree Commission Meeting*

To verify fulfillment of Chapter 55 Ordinance requirements for:

1. *Maximum Tree Removal – 55-4B*
2. *Tree Replacement – 55-4D(6)(a)*
3. *Substitutions for Replacements – 55-4F*
4. *Replacement Tree Species – 55-4E*
5. *Tree and Shrub requirements for Chapters other than Chapter 55*

Complete the following tables, filling in data for each lettered item, and resolving each Compliance Test. In accordance with 55-4C(4)(e), provide this completed Cover Sheet together with the Landscape Plan.

Citations to Sections of Chapter 55 are provided for the convenience of the Applicant. Other Chapters of the Whitemarsh Township Code and other sections of Chapter 55, such as 55-2 Definitions, may be relevant. In the event of an inconsistency between this Cover Sheet and any provision of the Code, the language of the Code shall be controlling.

1) Calculation of Requirement for Maximum Tree Removal – 55-4B:

A.	***Total of all existing Trees on the lot with DBH of 6" or greater**, per 55-4C(3)(a).*	301
B.	*33% of line (A) = **maximum existing Trees which may be Removed.***	99
C.	*Provide **number of existing Trees proposed to be Removed by the Applicant,** per 55-4C(3)(a).*	77
	***COMPLIANCE TEST:** If Line (C) is greater than Line (B), the Applicant's proposal is not in compliance with the requirement that no more than 33% of trees having a DBH of six inches or greater may be removed.*	IN COMPLIANCE

2) *Calculation of Replacement Requirement for Removed Trees having a DBH of Six Inches or Greater 55-4D(6)(a):*

D.	***Total DBH of all existing Living and Healthy Trees*** *(as determined per 55-4A) having a DBH of 6" or greater* ***that are proposed to be Removed****, per 55-4C(3)(a).*	489
E.	***Total DBH of all Living and Healthy Trees*** *(as determined per 55-4A) having a DBH of 6" or greater,* ***removed within five years prior to the submission of application****, per 55-4C(3)(b).*	0
F.	*Sum of line (D) and line (E) =* ***Total DBH that must be replaced for all Removed Living and Healthy Trees.***	489
G.	***Total Caliper inches of Canopy Replacement Trees proposed to be planted*** *by the Applicant (as shown on the Landscape Plan) per 55-4D(6)(a). Each Canopy Replacement Tree shall have a minimum Caliper of three inches.*	489 489/3=163 trees
	COMPLIANCE TEST: *If Line (G) is less than Line (F), the Applicant's proposal is not in compliance with the minimum Canopy Tree Replacement Requirement.* *To comply with this requirement, the Applicant may request a waiver from the Shade Tree Commission to permit limited substitutions per 55-4F. If so, proceed to Substitution calculation (3) below.*	IN COMPLIANCE

3) *Calculation of maximum Proposed Substitutions for Replacement Canopy Trees – 554F, subject to certain limitations and approval by the Shade Tree Commission.*

H.	*40% of line (F) (round fractions down to a whole number) =* ***maximum Caliper of required Replacement Canopy Trees that may be substituted*** *with Understory Trees and/or FIL, upon STC approval, per 55-4F.*	195
I.	*Line (F) less Line (G) =* ***Shortfall in DBH compliance with the minimum Canopy Tree Replacement Requirement,*** *per 55-4D(6)(a).*	0
	COMPLIANCE TEST: *If line (H) is less than line (I), the deficit of minimum Canopy Tree Replacement requirement, per 55-4D(6) cannot be fully compensated with Substitutions, per 55-4F.*	IN COMPLIANCE

J.	*Line (I) divided by 3" (round fractions <u>up</u> to a whole number) =* ***Shortfall in the <u>number</u> of required 3" Canopy Replacement Trees.***	0
K.	*Provide the* ***total number of substitution Understory Trees proposed to be planted*** *by the Applicant, per 55-4F(1).*	195/3=65
L.	*Line (K) divided by two =* ***Number of required 3"-cal. Replacement Canopy Trees being substituted with Understory Trees*** *per 55-4F(1).*	65/2=33
M.	*Line (J) less Line (L) =* ***Number of required 3"-cal. Replacement Canopy Trees proposed by the Applicant to be substituted with payment of in-lieu fees****, per 55-4F(2).* ***NOTE:*** *Review proposed Landscape Plan to ensure that the use of Replacement Understory Tree substitutes has been maximized prior to calculating the number of substitutes via in-lieu fees, per 55-4F(4).*	-33 (in-lieu fee not proposed)
N.	*Sum of Line (L) and Line (M) =* ***Total proposed number of Replacement Canopy Trees being substituted per 55-4F.***	0
O.	*Line (N) multiplied by 3" =* ***Total shortfall of DBH to be fulfilled with substitutions*** *as proposed by this Landscape Plan.*	0
	COMPLIANCE TEST: *If (O) is greater than (H), the Applicant's proposal has exceeded the 40% maximum eligible for consideration for Replacement substitutions, per 55-4F, and is not in compliance.*	IN COMPLIANCE
P.	*Sum of Line (O) and (G) =* ***Total Caliper compensation for Removed Trees*** *as provided by this proposed Landscape Plan.*	489
	COMPLIANCE TEST: *If (P) is less than (F), the Applicant's proposal is not in compliance with the Tree Replacement Requirement.*	IN COMPLIANCE

4) <u>Compliance with Species Requirement of Replacement Trees – 55-4E</u>:

Q.	***Total number of proposed Canopy Replacement Trees,*** *per 55-4C(4)(c).*	163

R.	*75% of line (Q) (round fractions up to the next whole number) =* ***Minimum required number of Native Species Replacement Canopy Trees****, per 55-4E.*	123
S.	*Provide the* ***number of proposed Native Species Canopy Replacement Trees,*** *per 55-4C(4)(c).*	163
	COMPLIANCE TEST: *If Line (S) is less than Line (R), the Applicant's proposal is not in compliance with the 75% Native Species requirement for Replacement Canopy Trees, per 55-4E.*	IN COMPLIANCE
T.	*Provide the* ***number of proposed Native Species Understory Trees****.*	0
	COMPLIANCE TEST: *If Line (T) is less than line (K), he Applicant's proposal is not in compliance with the 100% Native Species requirement for Replacement Understory Trees.*	IN COMPLIANCE

5) Compliance with Landscaping Requirements of Other Code Chapters. Complete the following Tables for each applicable requirement.

REQUIRED TREES:

A	B	C	D*	E	F**
Full Code Citation: Chapter; sub-chapter, etc.	Subject matter as indicated in Code caption	Required # of Trees	Credits for Preserved Trees per 55-4D(5)	Proposed # of Trees	Column (C) less Columns (D) and (E)
	Refer to Landscape Plans				

NOTE: Column (D) Credits are strictly limited to calculating Chapter 105-52 Buffer yards, in accordance with 55-4D(5).
****NOTE: When the result in Column (F) is greater than zero, the Applicant's proposal is not in compliance with the applicable Code requirement.***

REQUIRED SHRUBS:

A	B	C	D	E*
Full Code Citation: Chapter; sub-chapter, etc.	Subject matter as indicated in Code caption	Required # of Shrubs	Proposed # of Shrubs	Column (C) less Column (D)
	Refer to Landscape Plans			

NOTE: When the result in Column (E) is greater than zero, the Applicant's proposal is not in compliance with the applicable Code requirement.

JOHN B. WARD & CO.
EST 1957
ARBORISTS
Bryn Mawr, PA

November 26, 2024

Villanova University
Mr. John Camusi
800 Lancaster Avenue
Villanova, PA 19085

RE: 600 Washington Street
Conshohocken, PA 19428

Dear John,
Following my inspection, outlined below is the tree inventory information:

	DBH	Genus & Species	Condition
1.	6.5”	Chinese elm	
2.	10”	Sycamore	
3.	43”	Horse chestnut	
4.	6.5”	Chinese elm	
5.	22”	Paulownia	
6.	8.5”	Boxelder	
7.	10”	Boxelder	
8.	10”	Boxelder	
9.	8”	Boxelder	
10.	11”	Boxelder	
11.	12”	Boxelder	
12.	8”	Ash	Dying
13.	24”	Red maple	
14.	12”	Boxelder	

JOHN B. WARD & CO.
EST 1957
ARBORISTS
Bryn Mawr, PA

60 YEARS OF SERVICE

DBH	Genus & Species	Condition
15. 10”	Boxelder	Dead
16. 9.5”	Boxelder	
17. 15”	Black locust	
18. 6”	Black locust	
19. 9”	Black locust	
20. 7”	Black locust	
21. 7”	Black locust	
22. 21”	Black locust	
23. 18”	Boxelder	
24. 13”	Ailanthus	Declining
25. 8”	Ailanthus	Dead
26. 13”	Ailanthus	Declining
27. 15”	Boxelder	
28. 14”	Boxelder	
29. 12”	Boxelder	
30. 12”	Boxelder	
31. 10.5”	Ailanthus	Dead
32. 28”	Boxelder	
33. 9”	Silver maple	
34. 20”	Silver maple	
35. 48”	Silver maple	Diseased
36. 6.5”	Black walnut	
37. 17”	Boxelder	
38. 10.5”	Boxelder	

JOHN B. WARD & CO.
EST 1957
ARBORISTS
Bryn Mawr, PA

DBH	Genus & Species	Condition
39. 16”	Boxelder	
40. 9.5”	Ailanthus	Dead
41. 9.5”	Boxelder	Dead
42. 7”	Mulberry	
43. 7”	Elm	
44. 7.5”	Ailanthus	Diseased
45. 11.5”	Ailanthus	Diseased
46. 8.5”	Boxelder	
47. 8”	Boxelder	
48. 12.5”	Elm	
49. 6”	Boxelder	
50. 7”	Silver maple	
51. 9.5”	Boxelder	
52. 9”	Boxelder	
53. 8.5”	Silver maple	
54. 20.5”	Paulownia	
55. 9”	Boxelder	
56. 7”	Silver maple	
57. 7.5”	Red maple	
58. 20”	Black locust	
59. 9”	Paulownia	
60. 6”	Red maple	
61. 16”	Red maple	
62. 8.5”	Elm	

	DBH	Genus & Species	Condition
63.	14.5”	Silver maple	
64.	11”	Silver maple	
65.	15.5”	Black locust	
66.	21.5”	Black locust	
67.	8.5”	Boxelder	
68.	14.5”	Aspen	
69.	11”	Aspen	
70.	12.5”	Aspen	
71.	11”	Boxelder	
72.	6”	Honey locust	
73.	12”	Honey locust	
74.	15.5”	Paulownia	
75.	16”	Black locust	
76.	8”	Black locust	
77.	23”	Black locust	
78.	26”	Paulownia	
79.	7.5”	Red maple	
80.	14”	Black locust	
81.	9”	Black walnut	
82.	20”	Ailanthus	
83.	12”	Ailanthus	Diseased
84.	9”	Walnut	Diseased
85.	7”	Locust	
86.	16”	Mulberry	Dead

JOHN B. WARD & CO.
EST 1957
ARBORISTS
Bryn Mawr, PA

60 YEARS OF SERVICE

DBH	Genus & Species	Condition
87. 10”	Mulberry	Declining
88. 24”	Elm	Diseased
89. 12”	Maple	Declining
90. 6”	Red maple	
91. 10.5”	Ailanthus	Declining
92. 18.5”	Boxelder	Declining
93. 6.8”	Silver maple	Declining
94. 8.5”	Elm	
95. 28”	Maple	
96. 12”	Ailanthus	
97. 8”	Mimose	
98. 10”	Boxelder	
99. 10”	Boxelder	
100. 20”	Boxelder	Declining
101. 24”	Boxelder	Diseased
102. 7”	Mimosa	Dead
103. 7”	Mulberry	
104. 6.5”	Red maple	
105. 19”	Siberian elm	
106. 10.5”	Paulownia	
107. 11”	Silver maple	
108. 19”	Silver maple	
109. 24”	Sycamore	
110. 18”	Paulownia	Declining

DBH	Genus & Species	Condition
111. 10”	Elm	
112. 8.5”	Silver maple	
113. 27”	Sycamore	
114. 39”	Silver maple	
115. 42”	Sycamore	
116. 12”	Boxelder	
117. 8”	Boxelder	Dead
118. 10.5”	Boxelder	Dead
119. 15”	Paulownia	
120. 10.5”	Boxelder	
121. 6”	Hackberry	
122. 7”	Hackberry	
123. 18”	Paulownia	
124. 12”	Boxelder	
125. 12”	Ailanthus	Dead
126. 23”	Paulownia	
127. 12.5”	Paulownia	
128. 9.5”	Boxelder	
129. 18”	Silver maple	Declining
130. 28”	Silver maple	Declining
131. 7”	Hackberry	Dead
132. 9.5”	Boxelder	
133. 10”	Boxelder	Declining
134. 11”	Boxelder	

	DBH	Genus & Species	Condition
135.	48”	Silver maple	Diseased
136.	16”	Boxelder	
137.	7”	Paulownia	
138.	24”	Paulownia	Diseased
139.	11”	Elm	
140.	29”	Paulownia	Diseased
141.	15.5”	Elm	Declining
142.	18”	Silver maple	Declining
143.	8.5”	Boxelder	Declining
144.	8”	Ailanthus	Dead
145.	10.5”	Silver maple	Declining
146.	23”	Paulownia	Declining
147.	9.5”	Black locust	Diseased
148.	6.5”	Paulownia	Diseased
149.	48”	Sycamore	
150.	23”	Sycamore	
151.	26”	Sycamore	
152.	12”	Paulownia	
153.	20”	Silver maple	Diseased
154.	18”	Boxelder	Declining
155.	19”	Paulownia	
156.	9”	Boxelder	Diseased
157.	8.5”	Boxelder	
158.	12.5”	Ailanthus	Dead

DBH	Genus & Species	Condition
159. 18”	Silver maple	Diseased
160. 9”	Boxelder	
161. 18”	Catalpa	
162. 9”	Boxelder	
163. 9”	Elm	Declining
164. 9”	Boxelder	Diseased
165. 6.5”	Boxelder	
166. 8”	Elm	
167. 14”	Ailanthus	Dead
168. 7.5”	Elm	
169. 12”	Maple	Dead
170. 20”	Hackberry	Diseased
171. 18”	Hackberry	Diseased
172. 10”	Hackberry	Diseased
173. 14”	Silver maple	Diseased
174. 12”	Ailanthus	Dead
175. 12”	Ailanthus	Dead
176. 6.5”	Elm	
177. 21.5”	Sycamore	
178. 18”	Silver maple	Diseased
179. 50”	Silver maple	Diseased
180. 12”	Silver maple	Diseased
181. 20”	Silver maple	Diseased
182. 12”	Paulownia	Dead

	DBH	Genus & Species	Condition
183.	18”	Black locust	Diseased
184.	12.5”	Paulownia	Diseased
185.	10”	Paulownia	Diseased
186.	12”	Paulownia	Diseased
187.	12”	Red maple	Diseased
188.	8”	Boxelder	Diseased
189.	22”	Sycamore	
190.	12”	Boxelder	
191.	14”	Boxelder	Dead
192.	12.5”	Elm	Diseased
193.	8”	Elm	
194.	12”	Paulownia	Declining
195.	8”	Paulownia	Dead
196.	12”	Paulownia	Dead
197.	8”	Elm	Dead
198.	12”	Elm	
199.	8”	Black locust	
200.	9”	Black locust	
201.	10”	Black locust	
202.	9”	Paulownia	Declining
203.	10”	Paulownia	Dead
204.	37”	Catalpa	Diseased
205.	8”	Norway maple	
206.	10”	Catalpa	

	DBH	Genus & Species	Condition
207.	8”	Catalpa	
208.	17”	Catalpa	
209.	11.5”	Catalpa	Diseased
210.	14.5”	Catalpa	Diseased
211.	10.5”	Catalpa	
212.	12”	Catalpa	Declining
213.	12”	Catalpa	Diseased
214.	9”	Elm	Diseased
215.	11”	Cherry	
216.	14”	Catalpa	Declining
217.	10”	Catalpa	Dead
218.	16”	Black locust	
219.	16”	Black locust	
220.	10.5”	Boxelder	
221.	11”	Elm	
222.	13.5”	Catalpa	Dead
223.	18”	Paulownia	
224.	24.5”	Paulownia	
225.	10”	Catalpa	Diseased
226.	7.5”	Elm	
227.	12.5”	Catalpa	Diseased
228.	9”	Boxelder	Dead
229.	9”	Boxelder	Diseased
230.	24”	Paulownia	Diseased
231.	10”	Mulberry	

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EST 1957
ARBORISTS
Bryn Mawr, PA

DBH	Genus & Species	Condition
232. 11.5”	Mulberry	
233. 16”	Elm	
234. 20”	Sycamore	
235. 24”	Sycamore	
236. 13”	Elm	Diseased
237. 8”	Elm	Diseased
238. 12”	Elm	Dead
239. 14”	Ailanthus	Dead
240. 14”	Black locust	Diseased
241. 9”	Black locust	Diseased
242. 12”	Black locust	Diseased
243. 18”	Elm	Diseased
244. 20”	Locust	Declining
245. 11.5”	Boxelder	
246. 10”	Mulberry	Declining
247. 11”	Boxelder	Dead
248. 31”	Paulownia	
249. 16”	Sycamore	Diseased
250. 40”	Black locust	Dead
251. 12”	Ailanthus	Dead
252. 18”	Sycamore	Diseased
253. 9”	Sycamore	
254. 34”	Sycamore	Dead
255. 24”	Mulberry	Diseased

DBH	Genus & Species	Condition
256. 24”	Norway maple	Declining
257. 7.5”	Boxelder	
258. 10”	Mulberry	Dead
259. 12”	Paulownia	Dead
260. 22”	Boxelder	Dead
261. 12”	Aspen	
262. 8”	Elm	Dead
263. 11.5”	Elm	Diseased
264. 7.5”	Elm	Dead
265. 8.5”	Elm	Dead
266. 7”	Elm	Dead
267. 8”	Elm	
268. 18”	Elm	
269. 18”	Sycamore	Diseased
270. 16”	Elm	
271. 7”	Elm	
272. 8.5”	Elm	
273. 11”	Black locust	
274. 11”	Elm	
275. 8”	Elm	Dead
276. 9”	Elm	Dead
277. 11”	Ailanthus	Dead
278. 9”	Ailanthus	dead
279. 7”	7”	Elm

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EST 1957
ARBORISTS
Bryn Mawr, PA

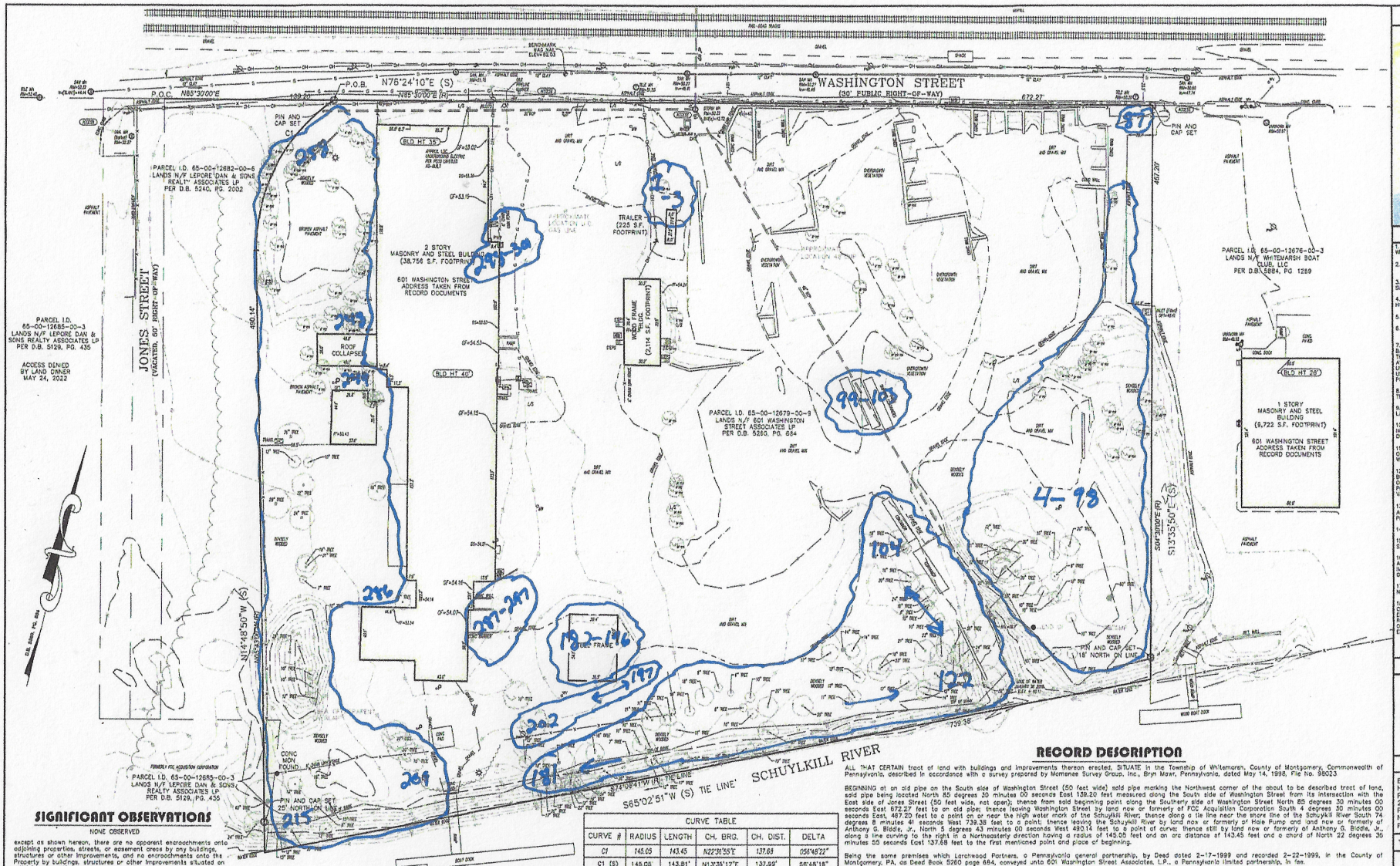
	DBH	Genus & Species	Condition
280.	7.5”	Elm	
281.	7”	Elm	
282.	10”	Boxelder	
283.	8”	Ailanthus	
284.	8.5”	Elm	
285.	6.5”	Sycamore	
286.	8”	Ailanthus	Dead
287.	7.5”	Elm	Diseased
288.	6.5”	Elm	
289.	9.5”	Ailanthus	Dead
290.	8”	Black locust	
291.	10”	Ailanthus	Dead
292.	6.5”	Ailanthus	Dead
293.	12”	Paulownia	
294.	14”	Paulownia	
295.	15”	Paulonia	
296.	11”	Paulownia	
297.	18”	Paulownia	
298.	20”	Ailanthus	Dead
299.	12”	Ailanthus	Dead
300.	6”	Ailanthus	Dead
301.	10”	Ailanthus	Dead

JOHN B. WARD & CO.
EST 1957
ARBORISTS
Bryn Mawr, PA

The above inventory was completed on November 25th, 2024. All of the trees are pioneer or invasive species. Several trees are significantly leaning near the waters edge or are covered in vines.

Sincerely,

John Verbrugge
ISA Certified Arborist



SIGNIFICANT OBSERVATIONS

NONE OBSERVED

except as shown hereon, there are no apparent encroachments onto adjoining properties, streets, or easement areas by any buildings, structures or other improvements, and no encroachments onto this Property by buildings, structures or other improvements situated on adjoining properties.

SYMBOLS

(THIS IS A STANDARD LEGEND. NOT ALL ITEMS ARE ON THE SURVEY.)

- MONUMENT FOUND
- MONUMENT TO BE SET
- BENCHMARK TOPO
- (R) RECORD DATA
- (S) SURVEYED DATA
- R/W RIGHT OF WAY
- SBL SET BACK LINE
- RCP REINFORCED CONC PIPE
- CMP CORRUGATED METAL PIPE
- PVC PLASTIC PIPE
- HDPE HIGH DENSITY POLYETHYLENE PIPE
- DIP CAST IRON PIPE
- DIP DUCTILE IRON PIPE
- L/S LANDSCAPING
- DECIDUOUS TREE
- EVERGREEN TREE
- U.G. UNDER GROUND
- C — CABLE TELEVISION LINE
- E — ELECTRICAL LINE
- G — GAS LINE
- T — TELEPHONE LINE
- W — WATER LINE
- OH — OVERHEAD ELECTRIC WIRE
- SPOT LIGHT
- POWERPOLE
- GUY WIRE
- LIGHT POLE
- STREET LIGHT POLE
- ELEC. TRANSFORMER
- AIR CONDITIONER
- ELEC. MANHOLE
- ELECTRIC METER
- CABLE BOX
- UNDERGROUND CABLE MARKER
- TRAFFIC POLES
- TRAFFIC SIGNAL
- TRAFFIC MANHOLE
- TRAFFIC SIGNAL BOX
- SEWER MANHOLE
- CLEAN OUT
- STORM DRAIN MANHOLE
- STORM INLET
- CURB INLET
- ROUND STORM INLET
- UNKNOWN MANHOLE
- WATER MANHOLE
- WATER VALVE
- WATER METER
- HYDRANT / FDC
- GAS MANHOLE
- GAS VALVE
- GAS METER
- UNDERGROUND GAS MARKER
- TELEPHONE MANHOLE
- PAY PHONE
- TELEPHONE BOX
- UNDERGROUND TELEPHONE MARKER
- FLAG POLE
- BOLLARD
- BORE HOLE
- MONITORING WELL
- MAIL BOX
- SIGN
- METAL TANK COVER
- AIR COMPRESSOR

ITEMS CORRESPONDING TO SCHEDULE B-II

COMMONWEALTH LAND TITLE INSURANCE COMPANY, COMMITMENT NO. PHI223099, COMMITMENT DATE: OCTOBER 12, 2022.

(11) Deed of Dedication between Philadelphia Steel and Iron Company and Whitemarsh Township, dated 10/5/1937 and recorded 10/6/1937 as in Deed Book 1247 page 291. NOT PLOTTED ON SURVEY, ITS LOCATION CANNOT BE DETERMINED FORM RECORD DOCUMENT.

(12) Rights granted to The Bell Telephone Company of Pennsylvania in Deed Book 1293 page 528. NOT PLOTTED ON SURVEY, ITS LOCATION CANNOT BE DETERMINED FORM RECORD DOCUMENT.

(13) Right of Way between John J. Regan and Wilmer C. Swartley co-partners trading as Philadelphia Steel and Iron Company and Philadelphia Suburban Water Company, dated 8/23/1948 and recorded 10/27/1948 as in Deed Book 1957 page 560. NOT PLOTTED ON SURVEY, ITS LOCATION CANNOT BE DETERMINED FORM RECORD DOCUMENT.

(14) Deed of Dedication between Wilmer C. Swartley and John J. Regan co-partners trading as Philadelphia Steel and Iron Company and Township of Whitemarsh, dated 8/23/1948 and recorded 1/31/1949 as in Deed Book 1978 page 1. NOT PLOTTED ON SURVEY, LIES IN BED OF WASHINGTON STREET.

(15) Rights granted to Philadelphia Electric Company in Deed Book 3632 page 77. NOT PLOTTED ON SURVEY, IT IS A BLANKET EASEMENT.

(16) Terms and conditions of Lease dated 6/1/1955, of which a Memorandum of Lease (which contains Lessee option to purchase and Lessor right of first refusal) between Larchwood Partners and Anthony G. Biddle Jr., recorded 7/15/1985 as in Deed Book 4772 page 784. NOT PLOTTED ON SURVEY, THE DOCUMENTS ARE ILLEGIBLE..

(17) Rights granted to Philadelphia Electric Company, for electric and gas in Deed Book 5025 page 2495. NOT PLOTTED ON SURVEY, IT IS A BLANKET EASEMENT.

(18) Rights granted to PECO Energy Company as in Deed Book 5205 page 13. NOT PLOTTED ON SURVEY, IT IS A BLANKET EASEMENT.

(19) Hazardous Substances Certificate and Indemnity Agreement, which includes provisions, rights and access in Deed Book 5659 page 2243. NOT PLOTTED ON SURVEY, BLANKET IN NATURE.

CURVE TABLE					
CURVE #	RADIUS	LENGTH	CH. BRG.	CH. DIST.	DELTA
C1	145.05	143.45	N22°31'25"E	137.68	056°38'22"
C1 (S)	145.05	143.81'	N13°35'17"E	137.99'	56°48'18"

RECORD DESCRIPTION

ALL THAT CERTAIN tract of land with buildings and improvements thereon erected, SITUATE in the Township of Whitemarsh, County of Montgomery, Commonwealth of Pennsylvania, described in accordance with a survey prepared by Momenee Survey Group, Inc., Bryn Mawr, Pennsylvania, dated May 14, 1998, File No. 98023

BEGINNING at an old pipe on the South side of Washington Street (50 feet wide) said pipe marking the Northwest corner of the about to be described tract of land, said pipe being located North 85 degrees 30 minutes 00 seconds East 139.20 feet measured along the South side of Washington Street from its intersection with the East side of Jones Street (50 feet wide, not open); thence from said beginning point along the Southerly side of Washington Street North 85 degrees 30 minutes 00 seconds East 672.27 feet to an old pipe; thence leaving Washington Street by land now or formerly of FDC Acquisition Corporation South 4 degrees 30 minutes 00 seconds East, 467.20 feet to a point on or near the high water mark of the Schuylkill River; thence along a tie line near the shore line of the Schuylkill River South 74 degrees 8 minutes 41 seconds West 739.38 feet to a point; thence leaving the Schuylkill River by land now or formerly of Hale Pump and land now or formerly of Anthony G. Biddle, Jr., North 5 degrees 43 minutes 00 seconds West 480.14 feet to a point of curve; thence still by land now or formerly of Anthony G. Biddle, Jr., along a line curving to the right in a Northeasterly direction having a radius of 145.05 feet and an arc distance of 143.45 feet and a chord of North 22 degrees 36 minutes 55 seconds East 137.68 feet to the first mentioned point and place of beginning.

Being the same premises which Larchwood Partners, a Pennsylvania general partnership, by Deed dated 2-17-1999 and recorded 2-22-1999, in the County of Montgomery, PA, as Deed Book 5260 page 684, conveyed unto 601 Washington Street Associates, L.P., a Pennsylvania limited partnership, in fee.

BEING KNOWN AS 601 WASHINGTON STREET.
BEING TAX PARCEL NO. 65-00-12679-00-9.

THE LANDS SURVEYED, SHOWN AND DESCRIBED HEREON ARE THE SAME LANDS AS DESCRIBED IN THE TITLE COMMITMENT PROVIDED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY, COMMITMENT NO. PHI223099, COMMITMENT DATE: OCTOBER 12, 2022,AND ALL EASEMENTS, COVENANTS AND RESTRICTIONS REFERENCED IN SET FORTH IN THE TITLE COMMITMENT OR APPARENT FROM A PHYSICAL INSPECTION OF THE SITE OR OTHERWISE KNOWN TO ME HAVE BEEN PLOTTED HEREON AND NOTED AS TO THEIR EFFECT ON THE PROPERTY.

SURVEY DESCRIPTION

Beginning at a Pin and Cap set along the southerly right of way line of Washington Street, at the northeasterly corner of the lands n/f Dan Lepore & Sons Thence,

1) along said right of way of Washington Street North 76°24'10" East a distance of 672.27 feet to a pin and cap set at the northwesterly corner of the lands n/f Whitemarsh Boat Club, LLC. Thence

2) along the westerly line of said Whitemarsh Boat Club, LLC, South 13°35'50" East passing through a Pin and Cap set at 449.19 feet, for a total a distance of 467.20 feet to a point along the northerly edge of the Schuylkill River Thence,

3) along the said northerly line of the Schuylkill River, subtended by a tie line at South 65°02'51" West a distance of 739.38 feet to a point at the southeasterly corner of the aforementioned lands of Dan Lepore & Sons Thence,

4) along the easterly line of said Dan Lepore & Sons, North 14°48'50" West passing over a Pin and Cap set at 24.95 feet, for a total distance of 480.14 feet to a point Thence,

5) with a curve turning to the right, having a radius of 145.05 feet, an arc length of 143.81 feet, with a delta angle of 56°48'18", with a chord bearing of North 13°35'17" East, with a chord length of 137.99 feet to the point of beginning.

Containing 393,026 square feet or 9.0229 acres of land

SURVEYOR'S CERTIFICATION

TO: COMMONWEALTH LAND TITLE INSURANCE COMPANY; 601 WASHINGTON STREET ASSOCIATES LP

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 1, 2, 3, 4, 5, 7a, 8, 9, 11a, 13 of Table A thereof.

The fieldwork was completed on NOVEMBER 09, 2022.

GREGORY C. NOLL
PENNSYLVANIA PROFESSIONAL LAND SURVEYOR SU070045

DATE

THIS CERTIFICATION IS MADE TO ONLY NAMED PARTIES FOR PURCHASE AND/OR MORTGAGE OF HEREIN DELINEATED PROPERTY BY THE NAMED PURCHASERS. NO RESPONSIBILITY OR LIABILITY IS ASSUMED BY SURVEYOR FOR THE USE OF SURVEY FOR ANY OTHER PURPOSE, INCLUDING, BUT NOT LIMITED TO, USE OF SURVEY MYSELF, RESALE OF PROPERTY, OR TO ANY OTHER PERSON NOT LISTED IN CERTIFICATION, EITHER DIRECTLY OR INDIRECTLY.

VICINITY M

1. PROPERTY IS KNOWN AS TAX PAR WHITEMARSH, COUNTY OF MONTGOMERY,
2. LOT AREA (TO TIE LINE) = 393,02 LOT AREA (TO TOP OF BANK) = :
3. NO CHANGES IN STREET RIGHT OF SURVEYOR. NO OBSERVABLE EVIDENCE
4. THE PROPERTY HAS DIRECT ACCES HIGHWAY.
5. HORIZONTAL DATUM = PENNSYLVA
6. VERTICAL DATUM = NAVD 88. BEN BASE FLOOD ELEVATION = 50 FEE
7. LOCATION OF ALL UNDERGROUND I BASED ON UTILITY MARK-OUTS, ABOVE THE FIELD, AND THE MAPS LISTED IN T AVAILABLE AS-BUILT PLANS AND UTILI UNDERGROUND UTILITIES AND STRUCTU UNDERGROUND UTILITIES SHOULD BE VE PROPER UTILITY COMPANIES.
8. THE EXISTENCE OF UNDERGROUND THIS SURVEY.
9. LOCATION INFORMATION SHOWN HE LAND SERVICES, LLC., DATE OF FIELD S
13. THIS PLAN IS VALID ONLY WHEN S IMPRESSION SEAL AND WAS PREPARED OF THE STATE IN WHICH THE PROJECT
11. THE WORD "CERTIFY" OR "CERTIFIC OF PROFESSIONAL OPINION REGARDING WARRANTY OR GUARANTEE, EXPRESSED
12. COPYRIGHT © 2022, FIRST ORDER, BE REPRODUCED BY PHOTOCOPYING, RE OR TRANSMITTED IN OR BY ANY COMPU PERMISSION OF THE SURVEYOR. COPIES VALID.
13. IN RESPONSE TO ALTA/NSPS TABL ARE FROM OBSERVED EVIDENCE OF ABO PROVIDED BY THE CLIENT.
14. THERE WAS NO OBSERVABLE EVIDE
15. THERE WAS NO OBSERVABLE EVIDE SANITARY LANDFILL.
16. EXCEPT AS PLOTTED AND LABELED ADJOINING PROPERTIES, STREETS, OR E IMPROVEMENTS, AND NO ENCROACHMEN OTHER IMPROVEMENTS SITUATED ON AD
17. THE SUBJECT PARCEL CREATES A NO GAPS, GORES, OR STRIPS ALONG O
18. THE PROPERTY DESCRIBED HEREON COMMONWEALTH LAND TITLE INSURANCE EFFECTIVE DATE OF OCTOBER 12, 2022. REFERENCED IN SET FORTH IN THE TITL OF THE SITE OR OTHERWISE KNOWN TO EFFECT ON THE PROPERTY.

UTILITIES SHOWN ARE BASED TO THEIR LOCATION OR SIZE. PRIOR TO CONSTRUCTION, PO

AQUA PENNSYLVANIA
COMCAST CABLE
PECO ENERGY
SOUTHEASTERN PA TRANSPOR
VERIZON
WHITEMARSH TOWNSHIP
WHITEMARSH TOWNSHIP SEWE

BY GRAPHICAL REPRESENTATIO HAZARD ZONE AE AS SHOWN PANEL No. 42091C0356G WHIC 2016 AND IS IN A SPECIAL FL PERFORMED TO DETERMINE TH NEEDED TO VERIFY THIS DETER FROM THE FEDERAL EMERGENC

TYPE OF SURVEY: ALTA / NSP

VALLEY LAND SERVICES, LLC

SITE ADDRESS: 601 WASHINGTO TOWNSHIP OF W MONTGOMERY CO

CLIENT: VILLANOVA UNIVERSITY

JOB NO: V220349

DATE: NOVEMBER 9, 2022.

REVISIONS:	
No.	DATE
1	02/08/23
2	03/21/23

0 40'

SCALE

ROCKWELL ASSOCIATES

URBAN FORESTRY, NATURAL RESOURCE & LANDSCAPE CONSULTANTS

600 Washington Street – Villanova

610-731-7969 | www.rockwellurbanforestry.com | John@Rockwellurbanforestry.com

ROCKWELL ASSOCIATES

Date: December 3, 2024
To: Ms. Samantha Zrillo - Whitemarsh Township Planner
From: John Hosbach, Jr. RCA
Re: 600 Washington Street
File#: 837VIL

Dear Sam,

Pursuant to the plan review and site visit, the following are my notes.

The applicant is proposing the renovation and improvements of the said property that will house the subject Crew equipment and meeting area for the team.

During our inspection, as you may recall, the site inhabits a very degrading and failing woodland structure. Understanding that I received this prior to going away for the holiday and returning on the day of the meeting, I am only providing notes to be discussed this evening.

I. The applicant has provided a map of the subject trees which shows groupings of trees. At our meeting we concluded that trees shall be shown with an X that are to be removed. However, since the trees are growing in groupings of the same species, I am fine with this method. The applicant notes on the plan that a field survey will be conducted within 30 days to pick up the subject tree locations.
II. A total of 77 trees are proposed for removal. This includes one risk related silver maple that was observed at the site meeting.
III. The applicant is proposing the utilization of 33 understory trees.
IV. No tree protection is shown on the plan. This will be required.
V. 489 caliper inches are to be replaced. The applicant is complying.
VI. The species palate for the replacement schedule only meets our native species requirement.
VII. I would like to see a broader palate of species for plant diversity. No more than 10% of any species.
VIII. The subject planting plan shows an extensive quantity of the trees to be planted closer to the subject trail/river. This is helpful as it will increase stabilization of the river buffer.

The subject mitigation will most certainly provide a healthier and sustainable landscape. The subject canopy is primarily a pioneer palate will no regeneration of long-term species.

John Rockwell Hosbach jr. CONSULTANT

Notes

WHITEMARSH TOWNSHIP

To:	**Krista Heinrich, PE, Township Engineer, Gilmore Associates**
From:	**Samantha Zrillo, Planner**
CC:	**John Hosbach, Township's Consulting Arborist** **Christian Fassbender, Shade Tree Commission Chair** **John J. Iannozzi, Esquire, Applicant's Attorney** **John Camusi, Applicant's Contact** **Michael Roth, P.E., Applicant's Engineer** **Ken Hoffman, RLA, Applicant's Landscape Architect**
Subject:	**STC Meeting: SLD#02-24 Villanova University Boat House (601 Washington St)**
Date:	**December 10, 2024**

Plans Reviewed: *Pennoni Associates, Inc., Preliminary Land Development, Plan Set (23 pages) Dated July 12, 2024 with a revision date of July 19, 2024. Revised Landscape Plan marked "Shade Tree Meeting Exhibit 11/27/2024"*

Ken Hoffman, the Applicant's Landscape Architect, and Michael Roth, the Applicant's Engineer, appeared before the Shade Tree Commission on December 3, 2024. Mr. Hoffman provided an overview of the plan that included the existing conditions, proposed scope of work, and the tree plan. At the time of plan submission to the Township, a detailed tree survey was not completed. Prior to this meeting, a survey tree was done, but is not yet reflected on the plans. The exact location of each surveyed tree is not known, so tree protection does not appear on the plans and the exact tree removal and replacement calculations is not known. The Landscape Plan assumes that the 77 trees in the vicinity of the work will all be removed, and the healthy trees (total of 489") have compensation along the river and proposed walking trail. These calculations will change once the exact location of the trees is known, but there will be proper tree replacement compensation. The Landscape Plan also depicts the Chapter 105, SALDO, requirements.

There was concern over tree protection fencing placement, tree protection fencing details, heritage trees, tree species, and discrepancies on plans. There was a discussion about these topics.

Ms. Kelly made a motion to recommend approval of the plans with the following conditions:

- **Plans will show a tree inventory denoting every tree on site and trees being removed have an "x" or number that correlates with tree inventory sheet**
- **Proper tree protection fencing is shown on the plan with required tree protection detail**
- **Proper calculations for replacement compensation will be shown on the plans**
- **No more than 10% of any one species will be planted. All species for Chapter 55 replacement will be native. Proposed Zelkova for SALDO will be replaced with American Elm.**
- **Trees near stormwater management improvements will be considered for protection. Those that cannot be protected will be replaced in accordance with Chapter 55.**
- **The Demolition Plan needs to be revised to reflect tree plan changes.**
- **Heritage trees shall be noted on the plans and require Board of Supervisors approval.**
- **Comments in Township Engineer Letter, dated 8.30.24, will be addressed.**

Ms. Kosabutski seconded the motion. Motion passed 3-0.

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

248 Beech Hill Road • Wynnewood • PA • 19096 • (215) 625-3821 Phone • (484) 792-9495 Fax
www.FTAVANIASSOCIATES.com

10 December 2024

Craig McAnally
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, PA 19444

VIA EMAIL ONLY

RE: Villanova University,
601 Washington Street
Proposed Boathouse Site Renovations
Trip Generation Investigations,
Whitemarsh Township, Montgomery County
S/LD # 02-024
G/A Job # 2024-00243
FTA Job # 224-017

Mr. McAnally:

F. Tavani and Associates, Inc. (FTA) is in receipt of a letter from Gilmore & Associates, Inc. addressed to you dated 22 November 2024 regarding the above-referenced project. Said letter contained 5 comments. FTA writes to you today to offer responses to those comments.

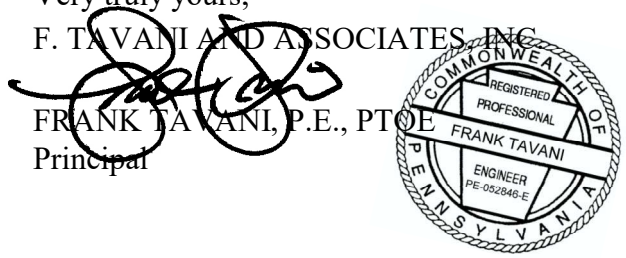
1. The referenced code section and study were reviewed. The project provides road improvements to include road widening, new pedestrian facilities, new curbs, and new tree zones – as well as a new shoulder along the site side of the cartway – all in compliance with referenced township guidelines. When the traffic study referenced that "no road improvements are needed" it was a reference to new additional *capacity-adding* road improvements, such as new auxiliary turn lanes, etc. not being needed.
2. The project's focus includes building improvements and adding paved parking to the existing site along the western 1/3rd of the site. The remaining 2/3 ^{rds} of the site to the east is presently vacant and there are no development plans at present. However, some improvements may take place there at some later date, and to continue the proposed concrete pavement for the full length of the site will complicate future plans. Further, I understand that during an informal Township meeting in the spring of this year the site civil engineer indicated an asphalt trail along the eastern 2/3rds of the site would provide an adequate pedestrian facility in the context of the site's location and so is made part of the plans.
3. There are no plans for regattas or tournaments at the site.
4. Page 24 of PennDOT Publication 639 (see attached) states the busiest hour during the weekday peak period beginning at 4:00 PM and ending at 6:00 PM should be the basis for a traffic impact fee. FTA reviewed the traffic count data and found that, of the two weekdays which were counted, the first weekday had a maximum PM peak hour activity of 22 trips (in and out) and the second weekday had a maximum PM peak hour

activity of 24 trips (in and out). The simple average of these (23) should be applied to the fee of $2,529 per trip, or a total fee of $58,167.

5. The plan contained in the traffic report was for essentially for orientation purposes; future submittals will contain full-size plans and will be supplied directly by the site civil engineer.

Please call or email with any questions. Thank you.

Very truly yours,
F. TAVANI AND ASSOCIATES, INC.



FRANK TAVANI, P.E., PTOE
Principal

attachments

cc: Damon Drummond, P.E., PTOE
Krista Heinrich, P.E.

Pennsylvania Department of Transportation

Transportation Impact Fees

A Handbook for Pennsylvania's Municipalities

Updated
March 2009

PUB 639

Identifying Intersections and Roadways to be Studied

The identification of study intersections and roadways is the first step in completing the Roadway Sufficiency Analysis. The municipality should refer to resources such as recently completed traffic studies for land development projects, PennDOT capital projects, roadway functional classification systems defined by PennDOT or the municipal comprehensive plan, and MPO/RPO planning studies. These resources may contain peak hour traffic volume data and LOS analysis that will be helpful in making selections.

Because of the expenses associated with preparing the Roadway Sufficiency Analysis, only the intersections and roadways that will be negatively impacted by new development should be studied. The Roadway Sufficiency Analysis should not include study intersections or roadways that will not have a significant amount of traffic added from new development. Most locations that currently have highly acceptable LOS (i.e., LOS A or B) and will not have significant traffic added from new development should not be added, because moderate or even significant new development traffic may not result in unacceptable LOS. Study locations with existing perceived safety problems and no expected capacity deficiencies resulting from new development should not be included in the Roadway Sufficiency Analysis because they are not eligible to be funded with impact fees. Safety improvements needed to correct design deficiencies within the limits of work for capacity improvements are eligible to be funded with impact fees. The municipality should rely largely on the judgment of the municipal engineer and/or traffic engineer contracted to complete the transportation impact fee study for the selection of study locations. The identification of study intersections and roadways should not be finalized until the completion of preliminary land use projections for the Land Use Assumptions Report so that the impacts of new development are better understood.

Identification of Traffic Volume Peak Hour for Analysis

After the selection of study intersections and roadway segments, a peak hour of traffic must be selected for the development of traffic volumes and capacity analysis. The peak hour of traffic is the four consecutive 15-minute intervals during a peak period that result in the highest traffic volumes.

The majority of land uses generate the highest number of trips during the afternoon (4:00 to 6:00 p.m.) peak period. Therefore, in most cases the afternoon peak hour should be selected for the basis of the impact fee. The selection of the afternoon peak hour will enable the municipality to evaluate the greatest traffic impact resulting from new development and maximize the amount of revenue generated by the impact fee. In some cases,

In order to reduce costs of the Roadway Sufficiency Analysis to the municipality, the intersections and roadways studied should consist of only those that will be negatively impacted by new development.

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

January 2, 2025

Craig T. McAnally - Township Manager
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: Traffic Study Review #2
601 Washington Street
Whitemarsh Township, Montgomery County, PA
S/LD # 02-24
Our Project Number 2024-00243

Dear Mr. McAnally:

As requested, we have reviewed the traffic impact study for the above noted Subdivision/Land Development application. The following comments are offered for your consideration:

A. PROJECT DESCRIPTION

The project includes the renovation of the existing 44,000 sf industrial building to reduce the overall size and construction of a small auxiliary storage building to the west of the main building, with the final total square footage of both buildings approximately 18,000 sf. Proposed access to the site will utilize a split pair of one-way driveways and the parking area will be paved to accommodate 35 parking spaces, 3 spaces of which can be used for trailers.

B. DOCUMENTS REVIEWED

1. Trip Generation Investigations Comment Response Letter prepared by F. Tavani and Associates, Inc., dated December 10, 2024.

C. COMMENTS

1. As mentioned previously, the proposed sidewalk should extend along the entire frontage to the property lines to connect with future pedestrian facilities. The applicant's engineer indicates that the current project is for only a portion of the site and that the remaining portion will be available for future development and the sidewalk will be installed at that time. However, the applicant's engineer indicates there are no current development plans and that future improvements may take place at some later date. If there was an imminent plan for the property, we could recommend deferring the installation of sidewalk. However, since there is no current plan and no timeline for development, sidewalk should be provided with the proposed development.

2. We note that the applicant's engineer indicates 23 peak hour trips during the PM peak hour. The traffic impact fee is $2,529.00 per PM peak hour trip for TSA South. Therefore, the total Traffic Impact Fee is $58,167.00 for the proposed development.

3. We note that the site plan was difficult to read in the PDF of the report. Additional comments regarding the site plan may be provided upon formal submission of the land development plan.

Any future submission of the design plans for this project must be accompanied by a letter prepared by the applicant's engineer, which addresses each of the comments contained in this report. Should you have any questions regarding this matter, please do not hesitate to contact me at this office.

Sincerely,

Krista Heinrich, PE
Township Engineer

c: Charles L. Guttenplan, AICP – Director of Planning and Zoning
Sean Kilkenny, Esq.; The Law Offices of Sean Kilkenny, LLC – Township Solicitor
John Camusi, Villanova University – Applicant
Michael Roth, PE– Applicant's Engineer
John J. Iannozzi, Esq. – Applicant's Attorney
Frank Tavani, P.E., PTOE - F. Tavani and Associates, Inc.

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ROCKWELL ASSOCIATES

Urban Foresters - Natural Resource Consultants Planners - Forensic Arborists

Villanova University - 600 Washington Street - Boat House Operations

January 7, 2025
To: Samantha Zrillo
Cc: Charlie Guttenplan, Craig T. McAnally
Whitemarsh Township - Planner
616 Germantown Pike Lafayette Hill, PA 19444-1821
From: John Hosbach
Applicant: Villanova University

Dear Sam,

Pursuant to my site inspection today and the review of sheet CS0502 of the plan set, the following are my field notes.

[1] The heritage trees and their condition have been reported accurately and consistent with the field observations of these said trees.

[2] Trees noted as diseased were observed as being risk related and hazardous. The subject black locust should be removed prior to the start of any work product to avoid worker(s) accident.

[3] It was great to see that numerous heritage trees, specifically the sycamore's, will be preserved. It would be in the best interest of the university to have these trees pruned, mulched and fertilized to increase longevity.

In closing, the plan set provides factual and a true representation of the actual position of these heritage status trees.

John Rockwell Hosbach jr. CONSULTANT