

PART 4: TECHNICAL SPECIFICATIONS AND DRAWINGS

Family Recreational Area at Northview Heights, AMP-09

IFB CONTRACT NO. 600-11-26 Rebid

Contains:

- Geotechnical Exploration Report 09-10-24
- Splashpad Stormwater Water Management Report rev10.22.24
- Distribution Manifold Fabrication
- Aquavator Bollard
- Buckettrio With Acrylic Cut Sheet
- Cast in SS Nozzle Socket
- Controller Manifold Drain
- Reeds Cutsheet
- Ripplerrun Cut Sheet
- Triple Arch Jet SS Nozzle Cutsheet
- Uniflow Cut Sheet
- Vaporarc Acrylic Cut Sheet
- Technical Specifications
- Drawings

Geotechnical Exploration Report 09-10-24

GEOTECHNICAL EXPLORATION REPORT

NORTHVIEW HEIGHTS PLAYGROUND CITY OF PITTSBURGH, ALLEGHENY COUNTY, PENNSYLVANIA

PS&R Project No. 24-441

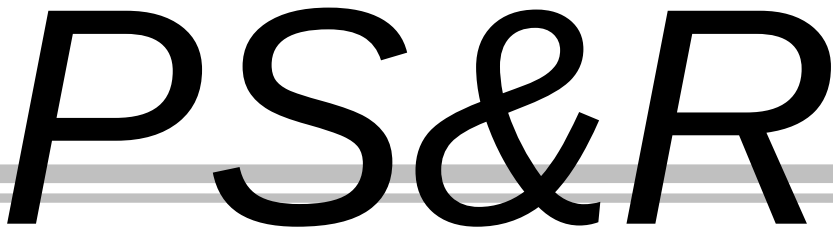
Prepared at the request of:

Leroy E. Mellix, Jr.
Tusick & Associates Architects, Inc.
123 3rd Street
Blawnox, Pennsylvania 15238

Prepared By:



September 9, 2024



Pennsylvania Soil and Rock Incorporated

PS&R Project No. 24-441

September 9, 2024

Leroy E. Mellix, Jr.
Tusick & Associates Architects, Inc.
123 3rd Street
Blawnox, PA 15238

Geotechnical Exploration and Infiltration Study Report
Northview Heights Playground
City of Pittsburgh, Allegheny County, Pennsylvania

1.0 General Summary

This report presents the results of Pennsylvania Soil and Rock, Inc.'s (PS&R) geotechnical exploration for the Northview Heights playground / splash park to be located at the southeast quadrant of the Mt. Pleasant Road and Chicago Street intersection in Pittsburgh, Allegheny County, Pennsylvania. The objectives of this exploration were to determine the nature, character and thickness of the soil, decomposed rock and/or rock within the project area. The information was evaluated and used to develop geotechnical recommendations for foundation design as well as providing general recommendations for the development of the site with respect to the encountered subsurface conditions.

The scope of the exploration included a site reconnaissance, a test pit program to evaluate the existing site conditions, analysis of the data collected and preparation of this Geotechnical Exploration Report. The report was completed in general accordance with our proposal dated August 13th, 2024.

A total of five test pits were completed to characterize the existing subsurface conditions across the proposed project area. Two additional test pits were performed in order to attempt an infiltration study.

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The soils encountered on the property include fill, coal, residual soils, and bedrock. Fill was encountered at all of the test pit locations. Four of the five test pits were terminated in fill. The fill consisted of varying amounts of brown clay to sandy clay, concrete, bricks, and rock fragments. The consistency of the fill was variable. A thin highly weathered coal seam was encountered at TP-5 between 2.5 ft and 3 ft below the surface. Residual soil was encountered at TP-5 and consisted of stiff tan shale with clay. The bedrock encountered below the residual soil at TP-5 consisted of sandstone.

2.0 Site Location and Project Description

The proposed development is located on the southeast quadrant at the Chicago Street and Mount Pleasant Road intersection in the Northview Heights neighborhood of the City of Pittsburgh. The property is currently vacant. Buildings were previously located on the property but were razed. A playground area, splashpad, and restroom building are proposed on the property.

The preceding discussion represents our understanding of the proposed project and is an important part of our engineering interpretation. If this understanding is not correct or if project conditions change, we should be given the opportunity to review our recommendations.

3.0 Site Soils & Geology

Soils. The USDA Websoil Survey as shown in Figure 2, *Site Soils Map* indicates the site soils and lists the limitations for development in these soils in their present state as follows:

- UCB – Urban Land – Culleoka Complex, Gently Sloping
 - No Rating

No rating is provided for urban land due to past earthwork altering the soil conditions. The limitations on site, however, can be mitigated by properly implementing the design developed from this comprehensive geotechnical exploration.

Geology. Map 42, “Greater Pittsburgh Region Geologic Map and Cross Sections” (Wagner, et al., 1975) indicates the near surface rock interval at the site is of the Monongahela Group and of the Casselman Formation of the Conemaugh Group. The near surface bedrock of the Monongahela Group consist of cyclic sequences of shale, sandstone, limestone and coal. The Pittsburgh coal seam is at the base of the Monongahela Group and above the Casselman Formation. The near surface bedrock of the Casselman Formation consists of cyclic sequence of sandstone, shale, red beds, and thin limestone and coal.

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Mining. According to Mineral Resource Report 89 “Coal Resources of Allegheny County, PA” (Dodge, 1985), the base of the Pittsburgh Coal seam is mapped at approximate elevation 1180 ft and is mapped along the edge of a deep mine. Refer to Figure 3, *Mineral Resources Map*, for the relevant coal/mining information.

Landslide Hazards. Figure 4, *Landslide Hazards Map*, Open File Map 78-1057 (D-16) “Landslides and Related Features of the Pittsburgh West, PA Quadrangle” and Open File Map 79-1314 (D-1) “Landslides and Related Features of the Pittsburgh East, PA Quadrangle” indicates that no landslide prone soils are mapped on the property. Soil and rock susceptible to landsliding are mapped to the east of the property.

4.0 Subsurface Exploration

A total of five test pits were excavated by Blaha Excavating to obtain the data necessary to characterize the subsurface conditions across the site. The test pits were completed at those locations depicted on GE500, *Site Plan and Test Pit Locations*.

A CAT 305.5E excavator was used to excavate test pits to depths up to 7 ft below the surface. Each test pit was backfilled with the soil cuttings and the soil was tamped in with the excavator bucket. An engineer of PS&R monitored the test pits on a full-time basis and classified the results. The results are found in Appendix A.

5.0 Test Pit Results

The subsurface profile across the site generally includes fill, residual soils, coal, and bedrock.

Fill was encountered at all of the test pit locations. The fill ranged in depth between 2.5 ft to greater than 7 ft below the surface. Four of the five test pits were terminated in fill. The fill consisted of varying amounts of brown clay to sandy clay, concrete, bricks, and rock fragments. The concrete encountered was typically in a boulder size. The fill ranged between being loose to medium dense.

A thin highly weathered coal seam was encountered at TP-5 between 2.5 ft and 3 ft below the surface. The coal is possibly the Pittsburgh Coal seam that has thinned out near where it outcrops the surface.

Residual soil, which is defined as soil that is weathered from the underlying parent bedrock, was encountered at TP-5. The residual soil consisted of stiff tan shale with clay. The residual soil was between 3 ft to 6 ft below grade before encountering bedrock.

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The bedrock encountered below the residual soil at TP-5 consisted of sandstone encountered at 6 ft below the surface.

Groundwater. Water level measurements were made at the test pit locations upon completion. No groundwater was present at any of the test pits. It should be noted that ground water levels might fluctuate due to variations in rainfall, temperature, site grading and other factors not evident at the times these measurements were made.

6.0 Infiltration Testing

Concurrent with the geotechnical investigation, an infiltration study was attempted for the proposed underground detention facility. Two initial test pits, I-1 and I-2, were excavated. I-1 encountered 3.5 ft of fill before encountering bedrock. I-2 encountered 0.5 ft to 2.0 ft (test pit taken on a slope) before encountering bedrock. There must be a minimum of 2 ft of soil cover between bedrock/decomposed rock and infiltration testing, which did not allow for an infiltration test to be performed at I-2. An infiltration test was attempted at I-1 but the rock quantity in the fill did not allow for the double ring infiltrometer to be properly seated into the soil. Test pit logs are included in Appendix B. In addition, it is not recommended to infiltrate stormwater into fill since it may destabilize the soil.

7.0 Conclusions and Recommendations

Seismicity. Structural calculations which consider seismic effects should assume a Site Class C per the 2012 IBC, Table 1613.5.2 for the overburden soils and underlying bedrock encountered on the site. Considering this site classification and the location of the site, we recommend that an S_{DS} value of 0.078 and an S_{DI} value of 0.045 be used for seismic analyses. Table 1604.5 of the 2015 IBC suggests that the structures on site are best classified as Occupancy Category II. With this understanding, and in conjunction with the recommended S_{DS} and S_{DI} values, it appears that the project will fall under Seismic Design Category (SDC) A. Based on the encountered subsurface conditions and low seismicity of the area, liquefaction is unlikely to occur and was not considered in our analysis.

Mining. As previously stated, the base of the Pittsburgh Coal seam is mapped at approximate elevation 1180 ft and is mapped along the edge of deep mined. Test Pit B-5 encountered a thin coal seam that was likely the Pittsburgh Coal seam and the base of the seam was encountered around elevation 1181 ft. The coal was either stripped from the vicinity or the coal seam thinned out to a negligible thickness where it outcropped the site. Mine subsidence does not appear to be an issue on the site.

Groundwater. Water level measurements were made at the test pit locations upon completion. No groundwater was present at any of the test pits. Although no groundwater was encountered at

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the test locations there is a potential for seeps and springs to form/develop during and after the completion of the development construction. Seeps and springs can negatively impact cut and fill slopes and result in slope instability. All seeps and springs that develop during and after the completion of development construction should be addressed immediately upon observation to maintain the long-term stability of the slopes.

Cut Slope. The proposed 2H:1V cut slope will be stable as designed through the soils provided no groundwater seepage or intact coal seams are encountered. If groundwater seepage or coal is encountered, portions of the slope will need to be reconstructed as depicted on Detail D3/GE502. The bench should slope into the hillside at 10H:1V. The bottom of the bench, parallel to the hillside, should also be shaped to drain to both ends of the reconstruction area. A 4" perforated drain should be installed along the rear of the bench. The drain should be outletted at both ends of the reconstruction area. In addition, a 12" thick blanket drain of #57 stone or a geo-composite drain (Hanes Terradrain 104/2, Marafi G-200N or equivalent) should be extended up the rear of the bench excavation as needed to collect any groundwater seepage.

Subgrade.

The majority of the site subgrade is anticipated to consist of existing fill but the Splash Pad and possibly the Restroom are anticipated to encounter a seam of coal directly below the final subgrade elevation. Based on the encountered conditions we recommend the following steps are taken to address the subgrade.

Playground: Once the playground is brought to final subgrade, if coal is encountered at the surface, it should be removed in its entirety. The undercut is to be backfilled with suitable on-site soils or 2A limestone placed in 8-inch nominal lifts and compacted to 100% of a Standard Proctor. Once any over-excavation and backfill is performed the entire subgrade should be thoroughly compacted and sealed with a large vibratory smooth-drum roller. Proof-roll the compacted subgrade under the observation of the geotechnical engineer or his/her soils technician using a fully loaded tandem axle dump truck to help detect any soft or yield zones. Any isolated unstable areas that cannot be stabilized in-place by additional rolling should be undercut and replaced.

Splash Pad: In the area where the splash pad is proposed we recommend that once the area is brought to final subgrade that test pits are to be performed to ensure that intact coal is greater than 3 ft below final subgrade elevation and that the fill is relatively uniform in nature. If coal or soft soils are encountered an over-excavation should be performed to remove the unsuitable materials. The undercut is to be backfilled with suitable on-site soils or 2A limestone placed in 8-inch nominal lifts and compacted to 100% of standard proctor. Once any over-excavation and backfill is performed the entire subgrade should be thoroughly compacted and

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sealed with a large vibratory smooth-drum roller. Proof-roll the compacted subgrade under the observation of the geotechnical engineer or his/her soils technician using a fully loaded tandem axle dump truck to help detect any soft or yield zones. Any isolated unstable areas that cannot be stabilized in-place by additional rolling should be undercut and replaced prior to subbase placement.

Restrooms: In order to address the footprint for the restroom it is important to not only consider the structure foundations but also the presence of utilities (plumbing) beneath the floor slab. We recommend undercutting the entire building footprint to a depth of 3 feet below the foundation bearing elevation or the base of the fill (the shallower of the two). If the over-excavation is extended below fill onto residual soil, test pits are to verify that no coal is within 3 ft of the foundation. The over-excavation should extend 5 feet outside the building in all directions. The base of the over-excavation should be aggressively compacted with a large ride on vibratory roller. Any soft, unyielding zones are to be removed. The undercut should then be backfilled with suitable on-site soils or 2A limestone placed in 8-inch nominal lifts and compacted to 100% of a Standard Proctor. The backfill should be placed and tested under the observation of the geotechnical engineer or his/her soils technician. The soil encountered is suitable for backfill provided all coal is removed and boulders/concrete are removed or processed to a maximum 8-inch particle size.

Foundations.

Restrooms: Once the over-excavation and backfill is complete the soils anticipated to be directly below the restroom foundation will likely consist of engineered fill. Provided the recommendations in this report are strictly implemented, the proposed restroom structure can be supported on conventional shallow line foundations designed for a net allowable soil bearing pressure not exceeding 2,000 psf.

Park Equipment: The foundations for the play equipment typically consist of shallow auger holes. The playground equipment installer should be prepared to encounter obstructions in the fill and remove them if necessary.

Fill Placement. All fill materials placed as general fill to construct the site should be placed in horizontal layers. Lift thickness should be adjusted based on the size of the compaction equipment. In general, all fill should be placed in maximum 10-inch thick loose lifts and compacted with a vibratory padfoot roller or vibratory smooth drum roller. All fill should be compacted until the in-place density is equal to or greater than 100 percent of the maximum Standard Proctor dry density as determined by ASTM D698 methods. All fill materials should be moisture conditioned to within 3% percent of the optimum moisture content at the time of placement. All efforts should be made to reduce any rock particles to a manageable size (i.e. maximum 8-inch particle) to be incorporated into a 10-inch loose lift. Fill materials are to be free

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of organics, pyrite, coal, and fat clay. Where representative density test cannot be obtained, each lift should be compacted to a visual, non-deflective and stable condition. The moisture content of the fill materials should be maintained as deemed necessary to aid in attaining the required compaction and to maintain overall stability (minimal pumping, yielding and/or rutting).

Underground Utilities. It should be anticipated that obstructions will be encountered during utility installation, and that obstructions in the existing fill will need removed. The soils across the project area classify as OSHA Type B with respect to excavations and sidewall stability. For excavations less than 20 ft deep, this classification requires that excavations to be sloped back to 1H:1V to maintain sidewall stability and to meet OSHA safety requirements. Stable bedrock may be cut vertical where encountered.

Footing excavations, utility trenches and other smaller excavations should be backfilled using either on-site soils or imported fill approved by the geotechnical engineer. Backfill should be spread in horizontal lifts in appropriate thickness for the compaction equipment being used. Generally, lift thickness should be limited to 6 inches for hand operated equipment. Trenches that can accommodate larger rollers may be backfilled in lifts not exceeding 10 inches, provided adequate compaction is attained. Each lift of backfill should be uniformly compacted to at least 98% of its Standard Proctor maximum dry density with moisture content adjusted to within (+/-) 3% of optimum prior to compaction.

8.0 Closure & Design Review

This report has been prepared to aid Tusick & Associates Architects, Inc. in the design and construction of the proposed playground. Its scope is limited to the specific project and location described herein. Our services were provided in general accordance with the standards for such professional services which prevailed among other qualified practitioners within the project area practicing under similar circumstances on projects of comparable scope, size, and complexity during the term of our agreement. Plan and specification review, and monitoring and testing during construction are an extension of these professional services although they may not have been specifically addressed by the original agreement and are subject to the same standard of care. *These extended services should be provided by PS&R to maintain continuity of the original intent of the recommendations and to reduce the possibility of conflicting interpretations or misinterpretations of the data presented in this report.* PS&R accepts no responsibility for uses or interpretations of the data by the client, contractors, or other design professionals for any purpose whatsoever except as expressly described in this report or unless otherwise stated in writing, and then only for the stated purpose.

If you have any questions, or need any additional information regarding this report, please feel free to contact me at (412) 372-4000.

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Very truly yours,



Adam Brozda, P.E.
Project Engineer



Pennsylvania Soil and Rock, Inc.

FIGURES & DRAWINGS

Figure 1 – Site Location Map

Figure 2 – Site Soils Map

Figure 3 – Mineral Resources Map

Figure 4 – Landslide Hazards Map

GE500 – Site Plan and Test Pit Locations

GE501 – Cross Sections A-A, B-B

GE502 – Typical Bench and Drainage Details

APPENDICES

-Appendix A-

Test Pit Logs and Photographs

-Appendix B-

Infiltration Test Pit Logs and Photographs



Reference:
Google Earth

FIGURE 1

Site Location Map

Northview Heights Playground
City of Pittsburgh, Allegheny County,
Pennsylvania
PS&R Project No. 24-441



Mapped Site Soils:

UCB - Urban Land - Culleoka Complex, Gently Sloping



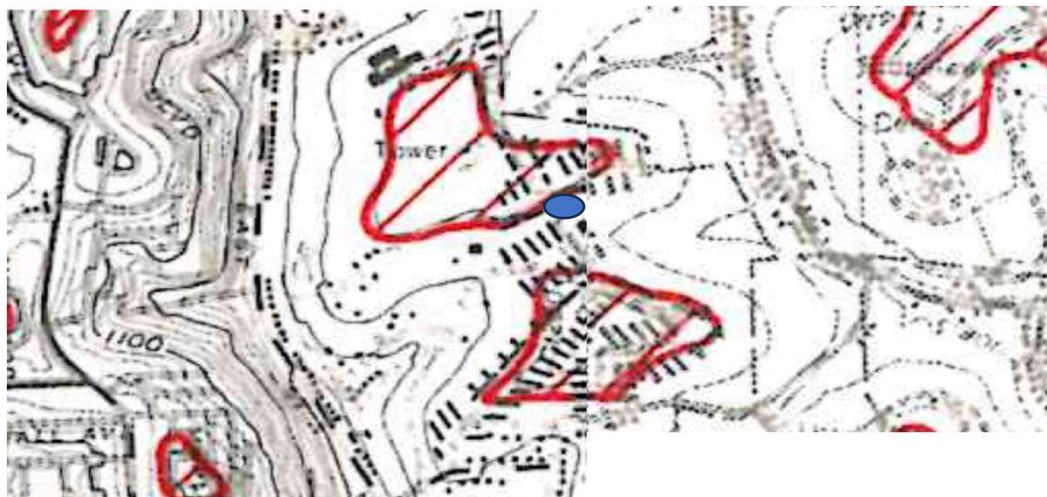
Reference:

USDA WebSoil Survey

FIGURE 2

Site Soils Map

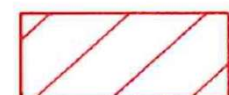
**Northview Heights Playground
City of Pittsburgh, Allegheny County,
Pennsylvania
PS&R Project No. 24-441**



EXPLANATION


Crop line of the
Pittsburgh coal

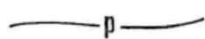

Extent of known
strip mining

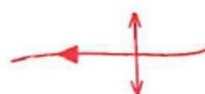

Extent of known
deep mining

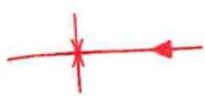
EXPLANATION

CROP LINES


Waynesburg coal

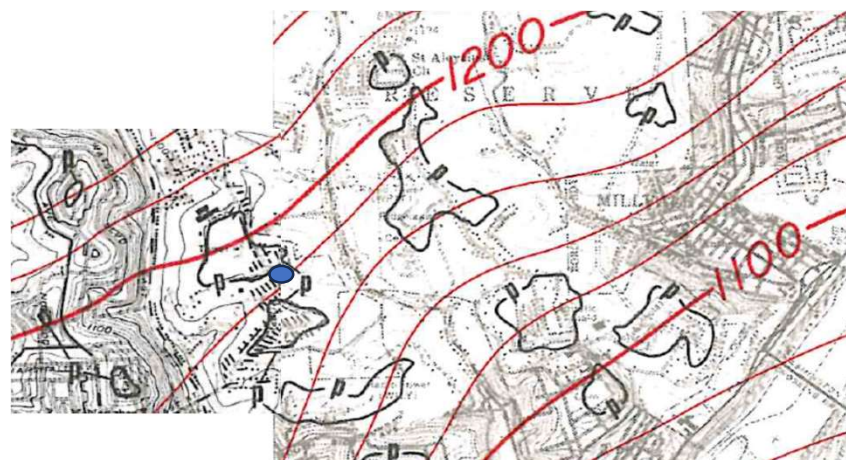

Pittsburgh coal


Anticline
Showing axial-plane trace
and direction of plunge.


Syncline
Showing axial-plane trace
and direction of plunge.



Structure contour
Altitude of the base of the
Pittsburgh coal, in feet
above mean sea level. Con-
tour interval 20 feet.



Reference:
Mineral Resource Report 89
Coal Resources of Allegheny County, PA
Pittsburgh East and Pittsburgh West
Quadrangles, Dodge 1985



FIGURE 3

Mineral Resources Map

Northview Heights Playground
City of Pittsburgh, Allegheny County,
Pennsylvania
PS&R Project No. 24-441



SOIL AND ROCK SUSCEPTIBLE TO LANDSLIDING

Soil and rock similar to that involved in landslides elsewhere in map area; primarily areas underlain by claystone, mudstone and shale associated with other rock types. Rock weathers rapidly on exposure forming clayey soil highly susceptible to sliding. Includes coves (U-shaped, shallow valleys) containing thick layers of clayey soil that are very susceptible to sliding where excavation breaks continuity of slope and where overloaded by artificial fill.



ACTIVE OR RECENTLY ACTIVE LANDSLIDE

Complex landslide composed of earthflow, debris slide, earth and rock slump. Identified from historical records, and from scars, debris and other field evidence. Ground extremely unstable; sliding accelerated by excavation, loading and changes in drainage conditions. May include areas with several active slides too small to be shown separately. Questioned where doubtful.



LANDSLIDE

Area of extensive hummocky ground caused by earthflow and earth and rock slump. Lacks clear evidence of active sliding. Relatively stable in natural, undisturbed state, generally not affected by small structures properly sited in areas away from the edge of the toe; can be reactivated by extensive, rapid excavation, loading, and changes in ground water and surface water conditions. Area of old landslide probably includes recent ones not identified from field evidence or otherwise documented. Upslope boundary of landslide generally defined by modified scarp, but downslope (toe) may be gradational and not well defined. Questioned where doubtful.



Reference:

Landslides and Related Features of the Pittsburgh East and Pittsburgh West, PA Quadrangles

FIGURE 4

Landslide Hazards Map

Northview Heights Playground
City of Pittsburgh, Allegheny County,
Pennsylvania
PS&R Project No. 24-441

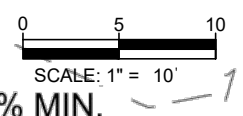
REVISION DESCRIPTION

ALLEGHENY COUNTY, PENNSYLVANIA

1233RD STREET
BLAUNOY PA 15238

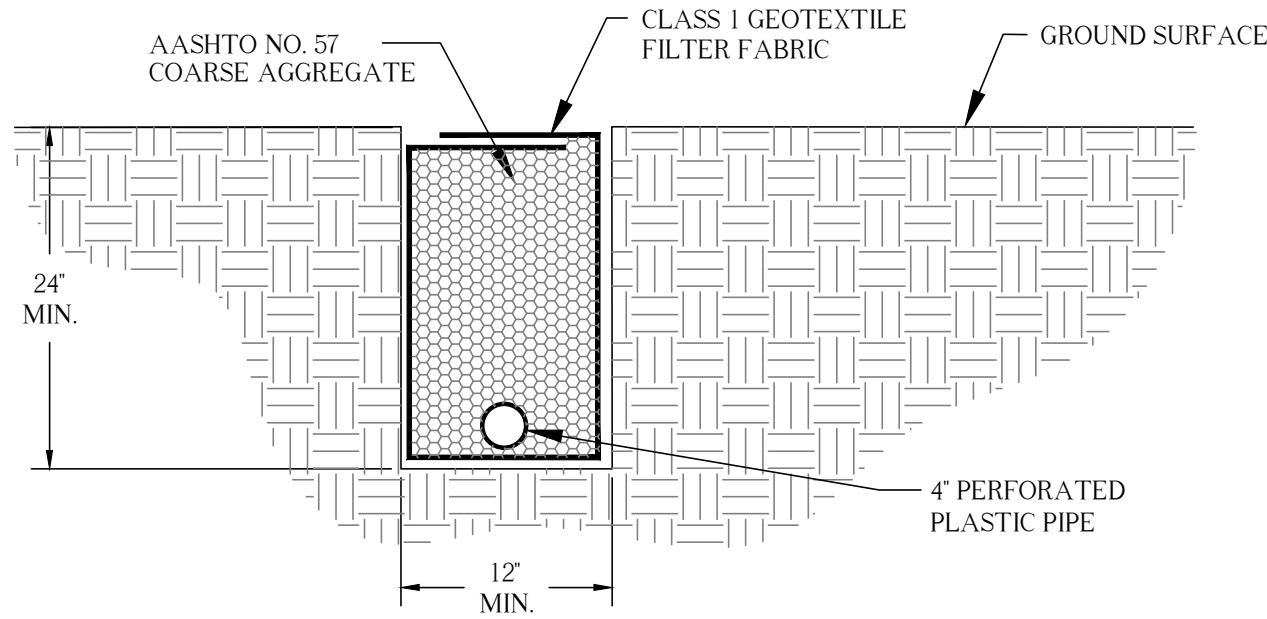
Project Number: 24-441
 Drawing Scale: 1" = 10'
 Date Issued: 09/03/2024
 Drawn By: DDD
 Checked By: AJB
 Project Manager: AJB

GE500



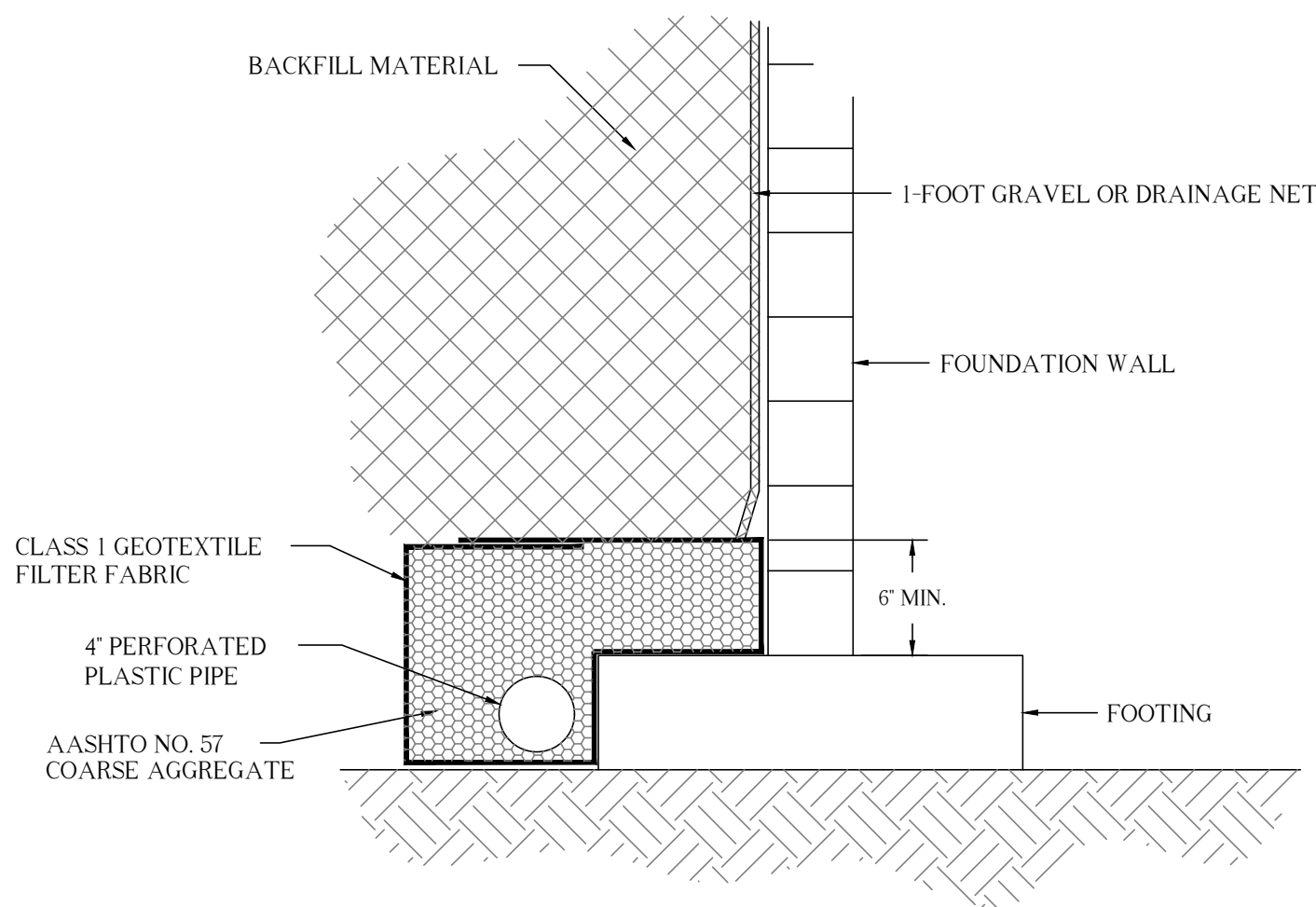
GENERAL SITE EARTHWORK RECOMMENDATIONS

1. ALL FILL AREAS SHOULD BE CLEARED OF TREES, STUMPS, AND VEGETATION AND STRIPPED OF TOPSOIL/ORGANIC SOILS PRIOR TO THE START OF FILL PLACEMENT.
2. THE DISTRIBUTION AND GRADATION OF FILL MATERIALS SHALL BE SUCH THAT THE FILL WILL BE FREE OF LENSES, POCKETS, OR LAYERS OF MATERIALS DIFFERING SUBSTANTIALLY IN GRADATION FROM THE SURROUNDING MATERIALS WITHIN THE DESIGNATED FILL AREAS.
3. FILL SHALL BE PLACED AND SPREAD IN SUCCESSIVE AND APPROXIMATE HORIZONTAL LAYERS OF UNIFORM THICKNESS BASED ON THE NOMINAL PARTICLE SIZE OF MATERIAL AND THE SIZE AND TYPE OF THE AVAILABLE COMPACTION EQUIPMENT. IN GENERAL, SOIL SHOULD BE PLACED IN NO GREATER THAN NOMINAL 10 INCH MAXIMUM LOOSE LIFTS.
4. LARGER ROCK PARTICLES/BOULDERS SHOULD BE PROCESSED DOWN TO A MAXIMUM 8 INCH PARTICLE SIZE TO BE INCORPORATED INTO BULK FILL. OTHERWISE, LARGER ROCK PARTICLES/BOULDERS SHOULD BE PLACED IN NON-STRUCTURAL GREEN AREAS OR HAULED OFF SITE.
5. ADEQUATE COMPACTIVE EFFORT IS APPLIED BY UTILIZING THE PROPER COMPACTION EQUIPMENT FOR THE COMPOSITION OF THE FILL MATERIALS BEING PLACED. SEGMENTED SHEEPSFOOT, AND/OR PADFOOT ROLLERS SHOULD BE USED WHEN PLACING PREDOMINATELY CLAYEY (COHESIVE) FILL MATERIALS. THESE TYPES OF ROLLERS ARE ALSO EFFECTIVE ON CLAYEY SHALES, CLAYSTONE, AND SOFTER SANDSTONE TO BREAK DOWN THE ROCK PARTICLES. SMOOTH DRUM VIBRATORY ROLLERS SHOULD BE UTILIZED ON PREDOMINATELY GRANULAR FILL MATERIALS AND TO SEAL CLAYEY SOILS TO HELP PREVENT SURFACE WATER INFILTRATION AND/OR TO PROMOTE DRAINAGE.
6. ALL FILL MATERIALS SHALL BE COMPACTED BY A SUFFICIENT NUMBER OF COMPLETE TRIPS (I.E. PASSES) OF THE APPROPRIATE COMPACTION EQUIPMENT TO ATTAIN A MINIMUM OF 100% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM TEST DESIGNATION D698 (STANDARD PROCTOR). MAINTAIN THE MOISTURE CONTENT OF THE FILL MATERIALS AS NECESSARY TO ATTAIN THE DESIRED COMPACTION DENSITY, TYPICALLY $\pm 3\%$ OF OPTIMUM MOISTURE.
7. UNDISTURBED AND/OR FILL MATERIALS PLACED WITHIN THE UPPER 12 INCHES OF FINAL GRADE SHOULD BE COMPACTED TO ATTAIN A MINIMUM OF 100% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM TEST DESIGNATION D698 (STANDARD PROCTOR) AT AN IN-PLACE MOISTURE WITHIN $\pm 2\%$ OF THE MATERIAL'S OPTIMUM MOISTURE CONTENT. THE ENTIRE SUBGRADE SURFACE SHOULD BE THOROUGHLY SEALED USING A VIBRATORY SMOOTH DRUM ROLLER.
8. TO VERIFY THE SPECIFIED DEGREE OF COMPACTION AND TO DETERMINE THE IN-PLACE MOISTURE CONTENT AS STATED ABOVE, IN-PLACE FIELD DENSITY TESTS SHOULD BE PERFORMED IN ACCORDANCE TO THE PROCEDURES OF ASTM D6938 (NUCLEAR DENSOMETER).
9. IN ADDITION TO IN-PLACE FIELD DENSITY TESTING, ACCEPTANCE SHOULD ALSO BE PREDICATED ON A VISUAL PERFORMANCE CRITERIA. OBVIOUS SURFACE RUTTING AND/OR DEFLECTION THAT ARE JUDGED TO BE DETRIMENTAL TO THE OVERALL STABILITY OF THE FILL AREA SHOULD BE REMOVED, MOISTURE CONDITIONED AND RECOMPACTED, OR OTHERWISE ADDRESSED PRIOR TO ACCEPTING THE LIFT.
10. WHERE PREDOMINATELY "ROCKY" FILL MATERIALS ARE PLACED OR WHERE REPRESENTATIVE NUCLEAR DENSOMETER TESTS CANNOT BE OBTAINED, A VISUAL NON-DEFLECTION CRITERIA SHOULD BE DEVELOPED IN CONJUNCTION WITH AN ADEQUATE NUMBER OF ROLLER PASSES FOR ACCEPTANCE.



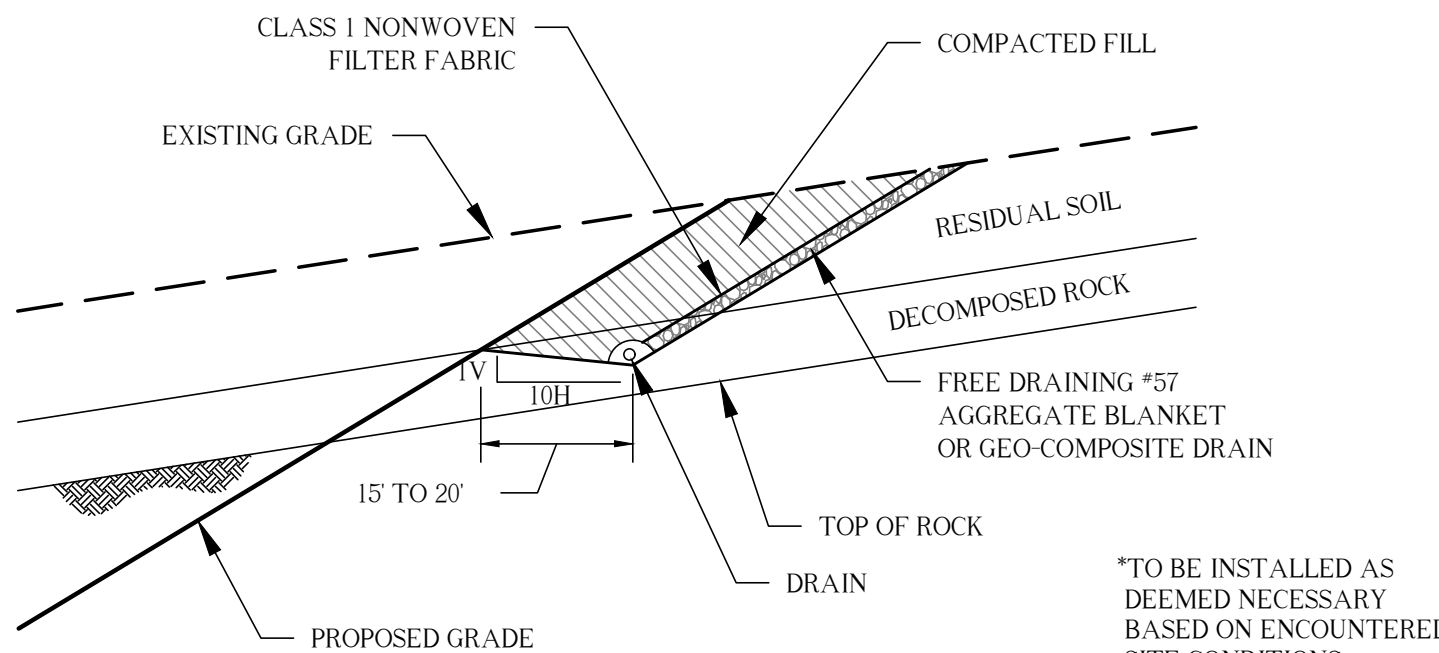
- NOTE:
- 1) 4" PERFORATED PLASTIC PIPE EXTENDED TO DRAIN AWAY FROM SLOPE AND WATER DIVERTED OR COLLECTED IF NECESSARY TO PREVENT EMBANKMENT DAMAGE.
 - 2) PROVIDE DRAINAGE OUTLETS AT 50-FOOT HORIZONTAL INTERVALS.

D1
GE502
TYPICAL SPRING DRAIN DETAIL
NOT TO SCALE

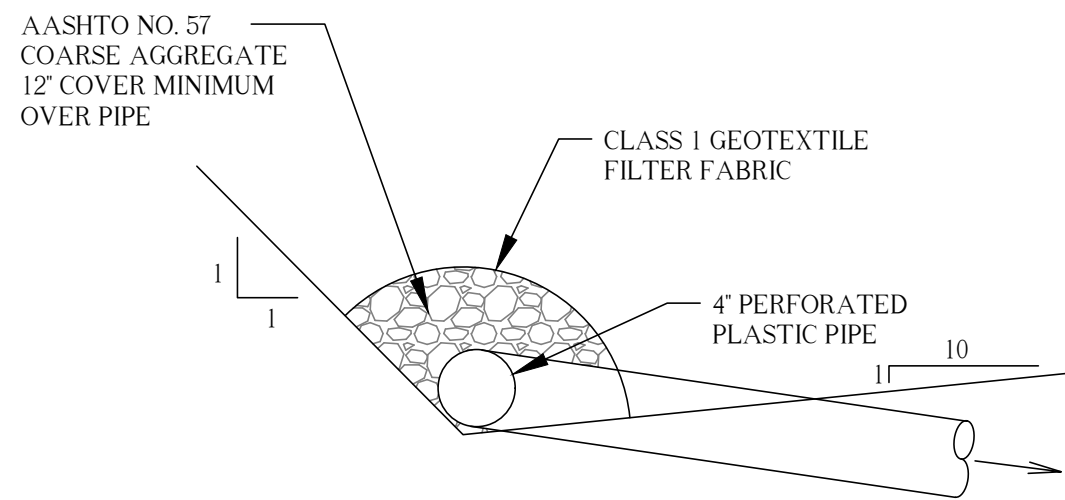


- NOTE:
- 1) 4" PERFORATED PLASTIC PIPE EXTENDED TO DRAIN AWAY FROM HOUSE TO SURFACE OR TO APPROVED COLLECTION POINT.
 - 2) BEGIN DRAINAGE MAT OR GRAVEL NO MORE THAN 6" BELOW GROUND SURFACE.

D2
GE502
TYPICAL FOUNDATION DRAIN DETAIL
NOT TO SCALE



D3
GE502
TYPICAL CUT SLOPE PROTECTION DETAIL
NOT TO SCALE



- *OUTLETS AT APPROXIMATELY 100 FT. CENTERS FOR KEYWAY
*OUTLETS AT APPROXIMATELY 100 FT. CENTERS FOR BENCHES
*ALL OUTLET DRAINS TO BE COVERED WITH 12" MINIMUM NO. 57 AGGREGATE/2B STONE AND WRAPPED IN NON-WOVEN FILTER FABRIC

D4
GE502
KEYWAY/BENCH DRAIN DETAIL
NOT TO SCALE

NORTHVIEW HEIGHTS PLAYGROUND

CITY OF PITTSBURGH
ALLEGHENY COUNTY, PENNSYLVANIA

PREPARED FOR:

TUSICK & ASSOCIATES ARCHITECTS, INC.

123 3RD STREET
BLAUNOX, PA 15238

TYPICAL BENCH
AND DRAINAGE
DETAILS

Project Number: 24-441
Drawing Scale: N.T.S.
Date Issued: 09/03/2024
Drawn By: DDD
Checked By: AJB
Project Manager: AJB

GE502

Pennsylvania Soil and Rock, Inc.

APPENDIX A

Test Pit Logs and Photographs

Test Pit Log

TP-1:

- 0'-7' Brown clay with rock fragments, some brick, trace coal, stiff, moist (FILL)
- River gravel encountered between 5'-7'



Test Pit Log

TP-2:

0'-7' Brown sandy clay with concrete, bricks, and rock fragments, moist, loose (FILL)



Test Pit Log

TP-3:

0'-5' Brown sandy clay, concrete boulders, bricks, and rock fragments, damp, medium dense (FILL)



Test Pit Log

TP-4:

0'-2'	Brown sandy clay with brick and concrete, damp, medium dense (FILL)
2'-	Excavator refusal on obstruction



Test Pit Log

TP-5:

0'-2.5'	Brown sandy clay with rock fragments and concrete, moist, medium dense (FILL)
2.5'-3'	Black highly weathered coal (COAL)
3'-6'	Tan shale with clay, damp, stiff (RESIDUAL)
6'-	Gray sandstone, excavator refusal (BEDROCK)



Pennsylvania Soil and Rock, Inc.

APPENDIX B

Infiltration Test Pit Logs and Photographs

Client Name: Tusick & Associates Architects, Inc.		Project No: 24-441
Project Name: Northview Heights Playground		Test Pit No: I-2
Location: City of Pittsburgh, Allegheny County, Pennsylvania		Elevation: 1175.5' +/-
Date/Time Started: 8/30/2024 - 09:15	Date/Time Complete: 8/30/2024 - 09:30	GWL: Dry at 0 hrs
Geologist/Engr. A. Brozda	Blaha Excavating / **	
		Page: 1 of 1

Depth (ft)	Layer Number	Percent (%) Soil	Percent (%) Rock	Visual Classifications (Matrix Color and Mottling Color/Percent)	Soil Textural Class	Remarks (Depth to Water Table/ Bedrock, Observance of Roots/Pores, Type of Coarse Fragments, Hardpan/Limiting layer)
0.0						
0.5-2.0		60	40	matrix (90%): 10YR 4/3 (brown) matrix (10%): Gley 1 3/5GY (very dark greenish gray)	sandy loam	FILL
				Terminated @ 0.5-2.0' (on bedrock)		BEDROCK
						

Notes: **Excavated using a CAT 305.5E Excavator



Splashpad Stormwater Water Management Report rev10.22.24

STORMWATER MANAGEMENT PLAN DESIGN REPORT

HACP NVH – FAMILY RECREATIONAL AREA

525 MT. PLEASANT ROAD
PITTSBURGH, PA 15214



Prepared by:



Cosmos Technologies, Inc.
700 River Avenue, Suite 100
Pittsburgh, PA 15212

August 2023

Revised October 2024

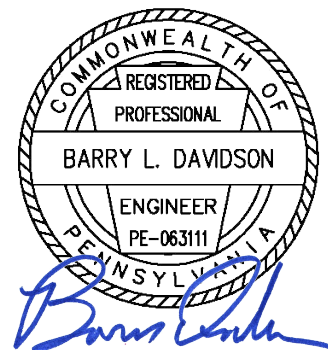


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APPENDIX B – SOILS LOCATION MAP

APPENDIX C – PRE-DEVELOPED STORMWATER RUNOFF CALCULATIONS

APPENDIX D – POST-DEVELOPED STORMWATER RUNOFF CALCULATIONS

APPENDIX E – POST-DEVELOPED STORMWATER CALCULATIONS WITH DETENTION

APPENDIX F – STORMWATER MANAGEMENT PLAN EXHIBITS

APPENDIX G – PADAP PCSM WORKSHEETS

1. INTRODUCTION

This narrative is intended to describe the proposed Stormwater Management (SWM) Plan in support of the Housing Authority of the City of Pittsburgh (HACP) Northview Heights (NVH) Family Recreational Area project, located at 525 Mt. Pleasant Road, Pittsburgh, PA 15214. The proposed project includes the construction of a playground, splash park, restroom building, landscaping, and utilities. The project will result in a minimal increase in impervious area; therefore, stormwater management has been designed in accordance with the City of Pittsburgh (City) Zoning Code, Title 13. The proposed limit of disturbance is less than one (1) acre; therefore, a Pennsylvania Department of Environmental Protection (PADEP) National Pollutant Discharge Elimination System (NPDES) permit is not needed.

2. EXISTING CONDITIONS

The project site is part of the Northview Heights development property, which is owned by HACP. Existing conditions consist of demolished building foundations and grass areas, and two existing parking stalls will be repaved for future use as ADA accessible parking to access the proposed recreational area. The property was previously developed and consists of compacted fill and existing building foundations near the ground surface. Therefore, it has been determined that the site isn't suitable for infiltration of stormwater runoff. The site is not part of an approved Act 167 plan and is not subject to any release rate requirements.

Stormwater currently leaves the site via overland flow and drains to existing off-site catch basins. The overall drainage area and direction of flow will not change as a result of the proposed improvements.

Existing soil at the site, as identified by the United States Department of Agriculture (USDA) Soils Survey, is *Urban land-Culleoka complex, gently sloping (UCB)*. A USDA Natural Resources Conservation Service (NRCS) Web Soil Survey Map has been provided in Appendix B. Culleoka complex soils are associated with hydrologic soil group B per the TR-55 Manual, the corresponding CN values are shown below. Detained and undetained area summaries are included in Appendix D – Post Developed Stormwater Runoff Calculations and shown on plan SWM-03 in Appendix F – Stormwater Management Plan Exhibits.

3. STORMWATER BMP/SCM SUMMARY

Proposed best management practices (BMPs) and stormwater control measures (SCM) were designed to meet or exceed rate, quality, and volume requirements based on current site limitations. These limitations include unknown quality of previous fill activity, property size, and soils not suitable for infiltration. This was accomplished by utilizing a combination of traditional underground detention and storage in the gravel base layer of the proposed playground. The play surface consists of a permeable flexible layer placed on one (1) foot of clean gravel. Void space in the gravel layer will store runoff before draining to the underground detention system via HDPE storm sewers. The detention system consists of two (2) thirty-six (36) inch perforated pipes surrounded by clean gravel. Runoff will be detained and released below pre-developed rates through a six (6) inch HDPE control outlet pipe, which will convey water to an existing downstream inlet. Undetained portions of the overall drainage area to the downstream point of interest consist primarily of off-site/undisturbed areas; therefore, all disturbed areas that will generate increases in stormwater runoff are controlled by the proposed SCMs.

4. STORMWATER ANALYSIS

As the project area involves regulated activities that result in cumulative earth disturbances equal to or greater than ten thousand (10,000) square feet but less than one (1) acre, the Design Storm Method (CG-

1 in the PADEP Stormwater BMP Manual) was applied to establish the level of required stormwater control. For this project, the proposed disturbed area is 42,655 square feet or 0.98 acre. As noted in the City zoning code, Title 13 Stormwater Management, Section 1303.03 – Volume Controls, the following have been incorporated in the stormwater management plan:

- Do not increase the post-development total runoff volume for all storms equal to or less than the 2-year, 24-hour duration precipitation.
- Runoff from at least the annual 95th Percentile Rainfall Event (1.66 inches) using future climate change rainfall projections within the City of Pittsburgh Stormwater Design Manual shall be permanently removed from the runoff flow, i.e., it shall not be released into the sewer system or surface waters of this Commonwealth.
- Removal options include reuse, evaporation, transpiration, and infiltration. Demonstration of technical infeasibility for the removal of runoff shall meet infeasibility criteria thresholds established within the City of Pittsburgh Stormwater Design Manual. If removal of the runoff is deemed infeasible, and the Designated Plan Reviewer agrees, runoff shall be detained and meet water quality release rate requirements as stipulated within the City of Pittsburgh Stormwater Design Manual. Fee-in lieu payments for not meeting the volume requirement within this Chapter are provided in Section 1303.03.F.
- For modeling purposes:
 - Existing (pre-development) non-forested pervious areas shall be calculated using permeability coefficients for meadow in good condition, in efforts to be as conservative as possible in existing conditions modeling.
 - Twenty (20) percent of existing impervious area, when present, shall be calculated using permeability coefficients for meadow in good condition in the model for existing conditions. The intent of this is to start calculations from a baseline that is closer to naturally occurring, pre-urbanization conditions, realizing that impervious cover has detrimental hydrologic impacts.

Pre-development runoff hydrographs were developed using National Weather Service NOAA site specific rainfall data and post-developed runoff hydrographs were developed using Future Climate Change Rainfall Values provided by the City for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year 24-hour storm events.

Stormwater hydrologic models were created using Hydraflow Hydrographs software. Drainage areas were defined for both pre- and post-development conditions with a common Point-of-Interest (POI) was established at an existing downstream stormwater catch basin south of the project site. All drainage areas in both pre- and post-development conditions are tributary to the POI allowing for a direct comparison of existing and proposed runoff conditions. The layout and connectivity of the project hydrologic models are presented in Appendices C, D, and E, plan exhibits of the studied drainage areas are included in Appendix Below are summaries of the rainfall data used for pre- and post-developed conditions.

Pre-Developed: NOAA Rainfall Data

Storm Event (year)	24-hour Rainfall (inches)
1	1.97
2	2.34
5	2.86
10	3.29
25	3.89
50	4.38
100	4.89

Post-Developed: City of Pittsburgh Future Climate Change Rainfall

TABLE 2.3. 24-HOUR DURATION FUTURE CLIMATE CHANGE RAINFALL VALUES FOR THE CITY OF PITTSBURGH

(Table adapted from RAND (2020) – results from Carnegie Mellon University)

Return Period (years)	Rainfall Depth (inches)
1	2.1
2	2.3
5	3.3
10	3.9
25	4.8
50	5.6
100	6.4

If the present-day NOAA Atlas 14 rainfall depth value is higher than the future climate projection rainfall value, the NOAA Atlas 14 value shall apply for modeling analysis purposes.

Drainage Area Summary:

EXISTING	Area (ac.)	Adjusted Area (ac) ⁽¹⁾	CN
Impervious	0.51	0.41	98
Vegetated	1.23	1.33	58 ⁽²⁾
Total	1.74	1.74	67

(1) When the existing project site contains impervious area, 20% of existing impervious area to be disturbed shall be considered meadow in good condition.

(2) Existing non-forested pervious areas must be considered meadow in good condition.

PROPOSED	Area (ac.)	CN
Impervious	0.74	98
Permeable Play Surface	0.22	30 ⁽³⁾
Vegetated	0.78	58
Total	1.74	71

(3) Assumed no runoff, minimum CN Value of 30 used.

Disturbed Area: 42,655 square feet or 0.98 acre

Runoff Volume and Peak Runoff Rate Summary Table:

To manage the increase in post-development runoff rates back to pre-development levels, and to account for the 2-year increase in runoff volume, stormwater detention is being proposed for this project. The gravel subbase beneath the proposed playground surface provides adequate storage to meet volume reduction requirements and an underground detention pipe systems will be installed to reduce post-developed runoff rates to pre-developed. The tables below summarize the pre- and post-developed runoff conditions:

95% Percentile Storm Impervious Area Capture

Post-development Impervious Area (ac.)	95% Percentile Storm Event (in)	Total Required Management Volume (cf)	BMP Storage Volume Provided (9,625 sq. ft. gravel, 1 ft deep, 40% void space) (cf)	Net Volume Difference (cf)
0.74	1.66	2,803	3,850	-1,047

2-Year Storm Runoff Volume Increase

Type II, 24-hr Storm Event	Pre-development Runoff Volume (cf)	Post-development Runoff Volume (cf)	Net Increase in Runoff Volume to Manage (cf)	BMP Storage Volume Provided (9,625 sq. ft. gravel, 1 ft deep, 40% void space) (cf)
2	1,730	2,339	609	3,850

Pre- and Post-development POI Peak Runoff Rate Summary

Type II, 24-hr Storm Event	Pre-development Peak Runoff Rate (cfs)	Post-development Peak Runoff Rate w/o Detention (cfs)	Post-development Peak Runoff Rate w/ Detention (cfs)	Net Peak Runoff Rate Difference (cfs)
1	0.3	0.8	0.3	0.0
2	0.7	1.1	0.4	-0.3
5	1.4	2.8	1.1	-0.3
10	2.1	3.9	2.0	-0.1
25	3.2	5.8	3.1	-0.1
50	4.1	7.6	4.1	-0.0
100	5.1	9.5	5.0	-0.1

Proposed Stormwater Management BMP System:

Project runoff will be collected and conveyed to the stormwater management system via overland flow and trench drains located in the playground and splash pad areas. Runoff to and from the subsurface gravel storage bed below the playground surface will drain via 1" weep holes on the surface and to the trench drain will provide a draw down time of approximately 26 hours, which is less than the required maximum of 72 hours (see Appendix E – Post-Developed Stormwater Calculations with Detention). The subsurface detention system consists of two 36-inch perforated HDPE Pipe and gravel storage, with a 6-inch outlet pipe to reduce peak runoff flow rates.

5. MAINTANANCE PROGRAM

The Contractor will be responsible for the maintenance of the system during construction. After construction, the stormwater management facilities will be owned and maintained by HACP.

Maintenance of the stormwater system after acceptance by the Owner will primarily consist of routine cleaning of accumulated sediment and debris by facility staff or private contractors, with the specific maintenance steps and schedule are listed below:

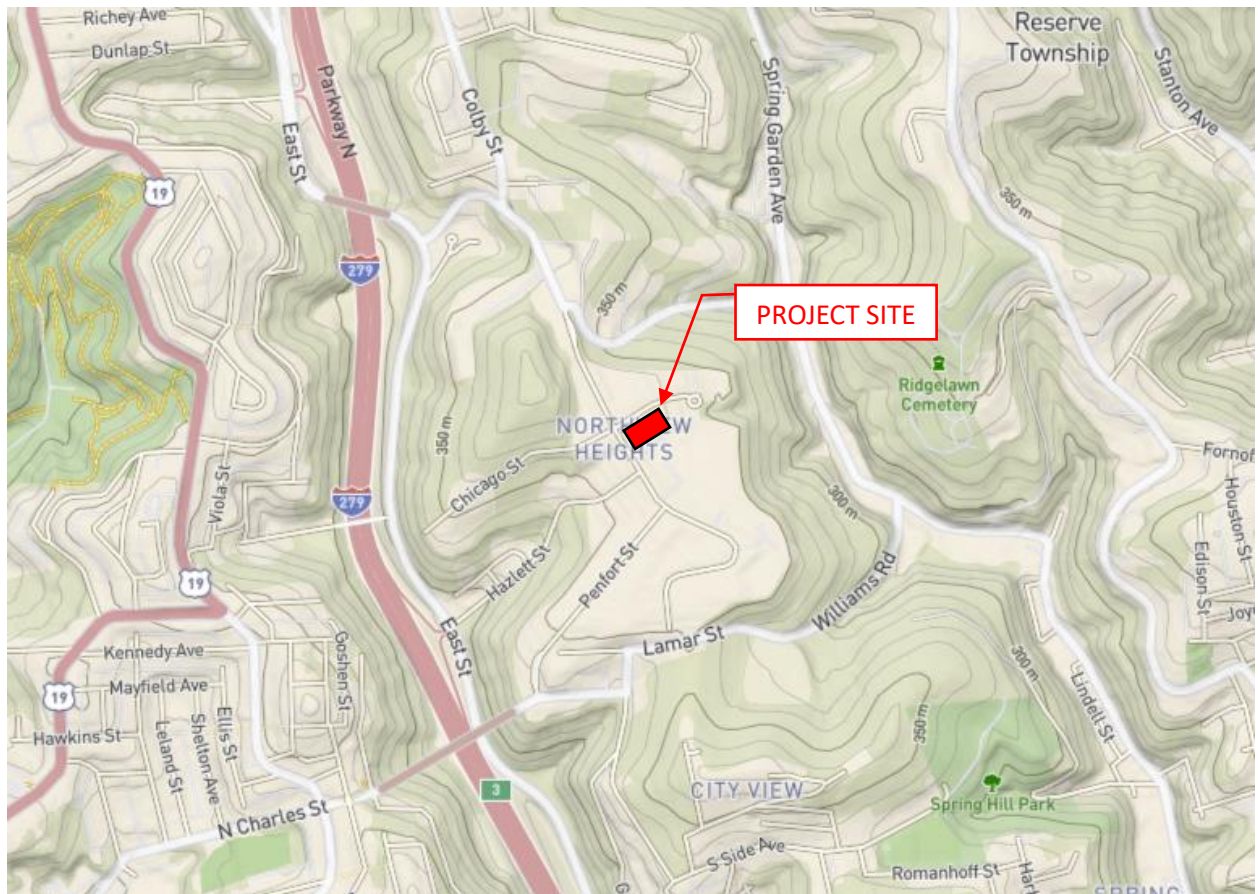
Detention System:

- Inspect pipes annually and after significant rainfall events. Inspect soil, repair eroded areas and remove litter and debris as needed. Inspect twice a year for sediment buildup. Remove debris from surface drains and flush the exfiltration and underdrain piping as needed to remove accumulated sediment.

Storm Sewer and Catch Basins:

- Inspect storm sewer and catch basins annually and after significant rainfall events, and remove sediment and debris as needed.

APPENDIX A
SITE LOCATION MAP



PROJECT LOCATION MAP
SCALE: 1 INCH = 1,000 FEET

HACP NVH – FAMILY RECREATIONAL AREA

525 MT. PLEASANT ROAD
PITTSBURGH, PA 15214

APPENDIX B
SOILS LOCATION MAP

Soil Map—Allegheny County, Pennsylvania



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

8/17/2023
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Allegheny County, Pennsylvania

Survey Area Data: Version 18, Sep 6, 2022

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

Date(s) aerial images were photographed: Sep 11, 2021—Nov 16, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UCB	Urban land-Culleoka complex, gently sloping	1.9	100.0%
Totals for Area of Interest		1.9	100.0%

APPENDIX C

PRE-DEVELOPED STORMWATER RUNOFF CALCULATIONS

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	0.263	0.667	-----	1.400	2.090	3.153	4.088	5.112	Ex POI
Proj. file: Pre-Developed.gpw									Friday, 08 / 18 / 2023		

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.263	2	720	971	-----	-----	-----	Ex POI
Pre-Developed.gpw					Return Period: 1 Year			Friday, 08 / 18 / 2023	

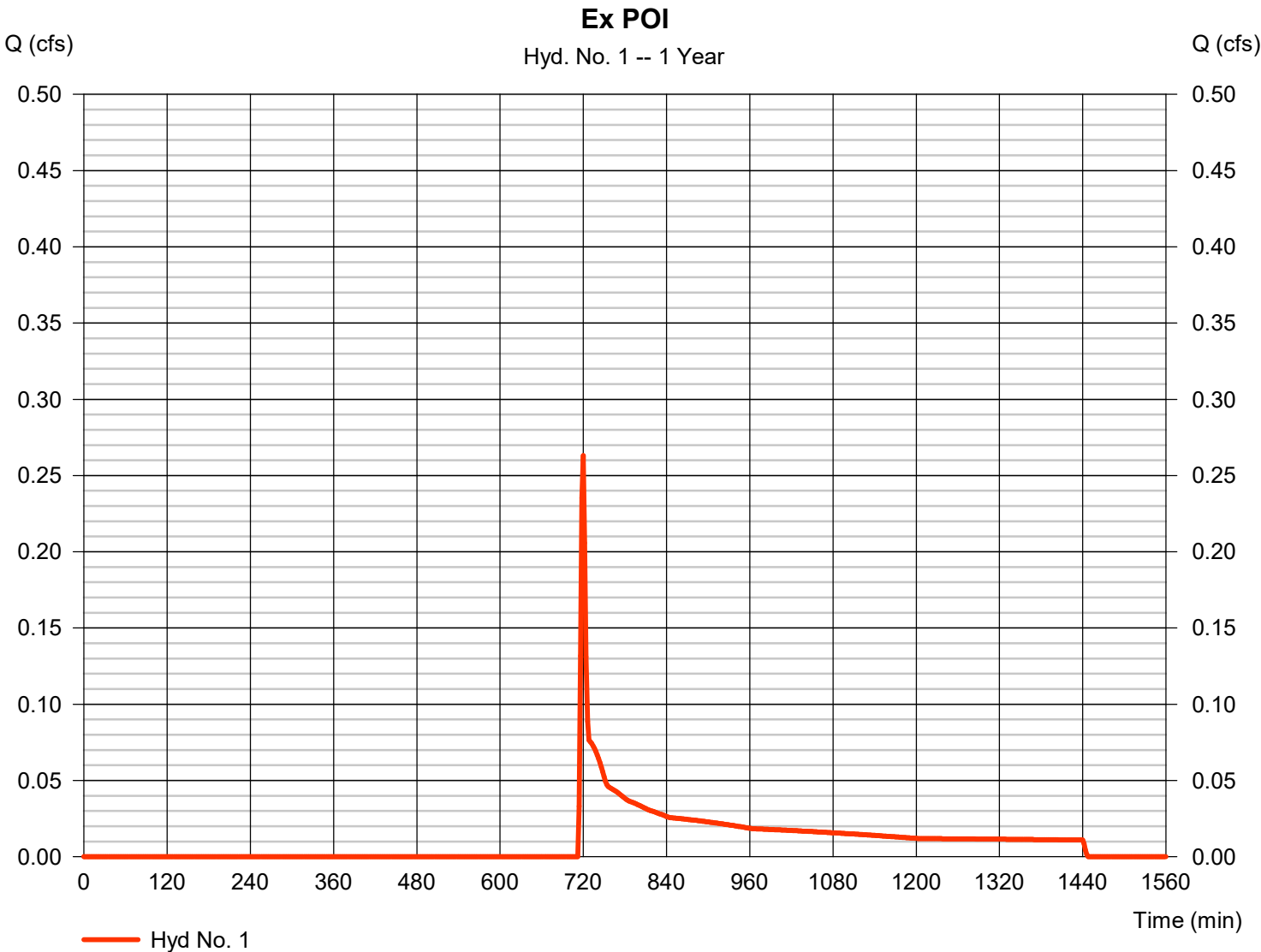
Hydrograph Report

Hyd. No. 1

Ex POI

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.263 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	971 cuft
Drainage area	=	1.740 ac	Curve number	=	67*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.97 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.330 x 58) + (0.410 x 98)] / 1.740



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.667	2	718	1,730	-----	-----	-----	Ex POI
Pre-Developed.gpw					Return Period: 2 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

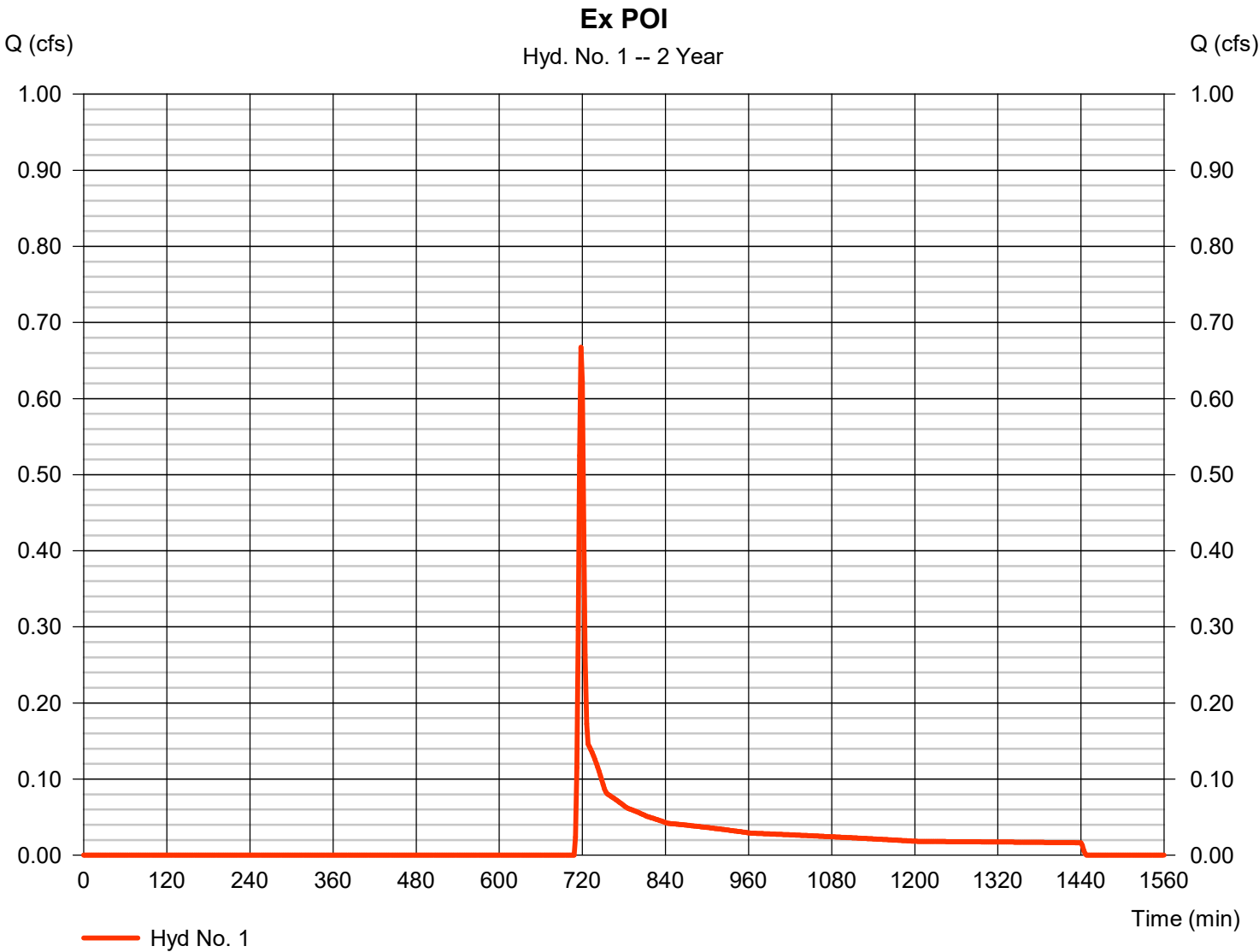
Friday, 08 / 18 / 2023

Hyd. No. 1

Ex POI

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.667 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	1,730 cuft
Drainage area	=	1.740 ac	Curve number	=	67*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.34 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.330 x 58) + (0.410 x 98)] / 1.740



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.400	2	718	3,060	-----	-----	-----	Ex POI
Pre-Developed.gpw					Return Period: 5 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

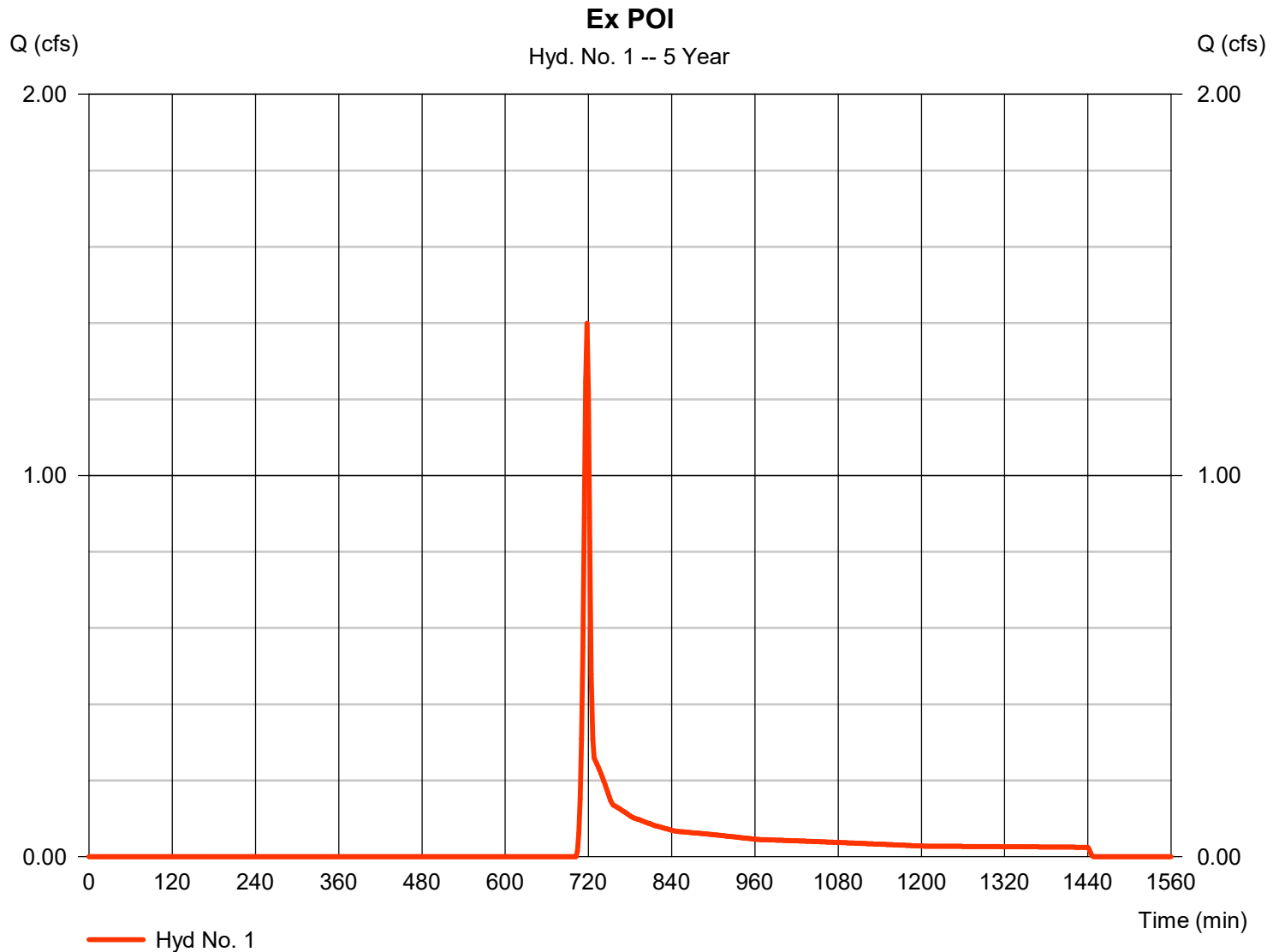
Friday, 08 / 18 / 2023

Hyd. No. 1

Ex POI

Hydrograph type	= SCS Runoff	Peak discharge	= 1.400 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 3,060 cuft
Drainage area	= 1.740 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.330 \times 58) + (0.410 \times 98)] / 1.740$



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.090	2	718	4,351	-----	-----	-----	Ex POI
Pre-Developed.gpw					Return Period: 10 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

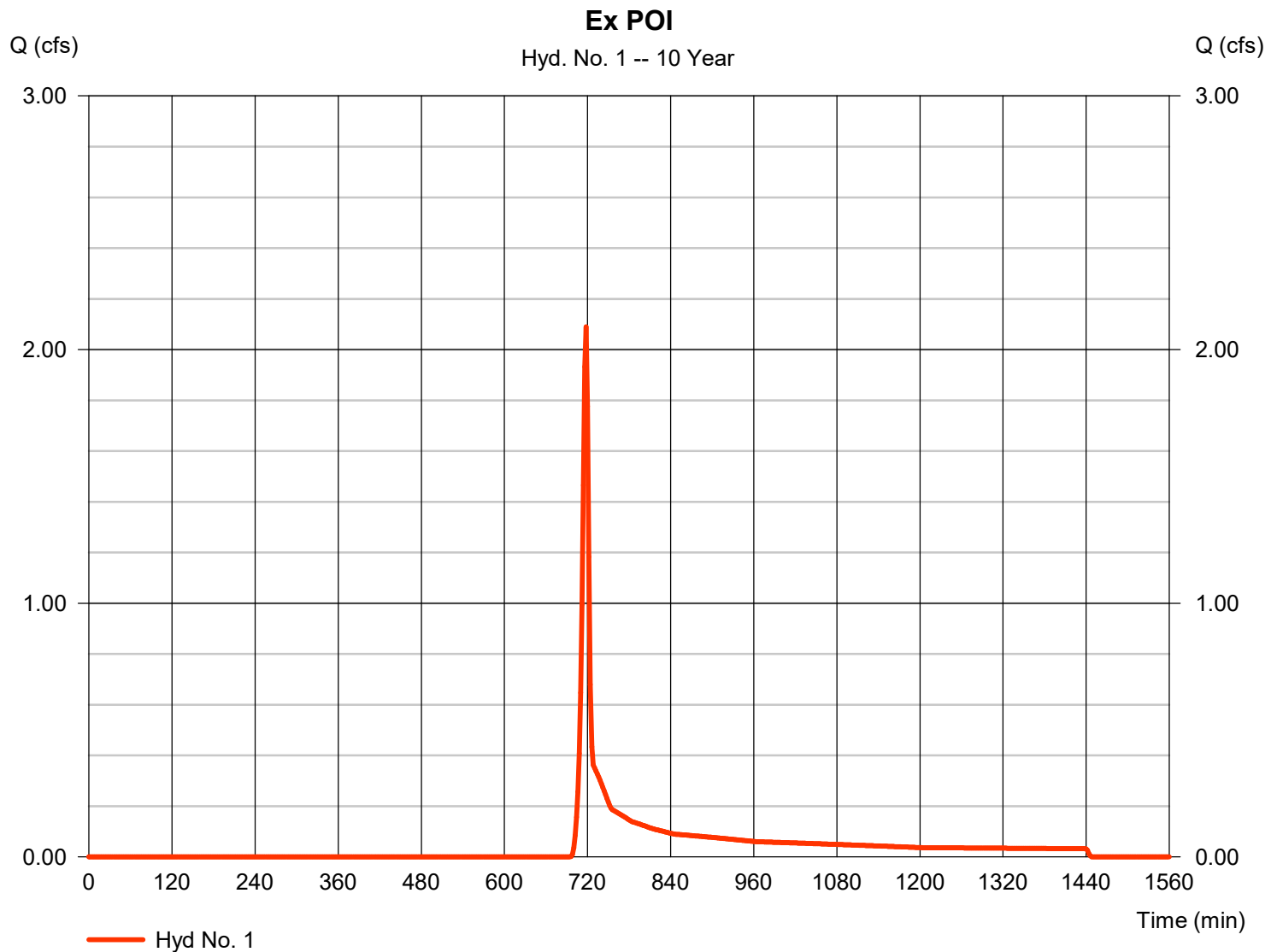
Friday, 08 / 18 / 2023

Hyd. No. 1

Ex POI

Hydrograph type	= SCS Runoff	Peak discharge	= 2.090 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 4,351 cuft
Drainage area	= 1.740 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.29 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.330 \times 58) + (0.410 \times 98)] / 1.740$



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.153	2	718	6,381	-----	-----	-----	Ex POI
Pre-Developed.gpw					Return Period: 25 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

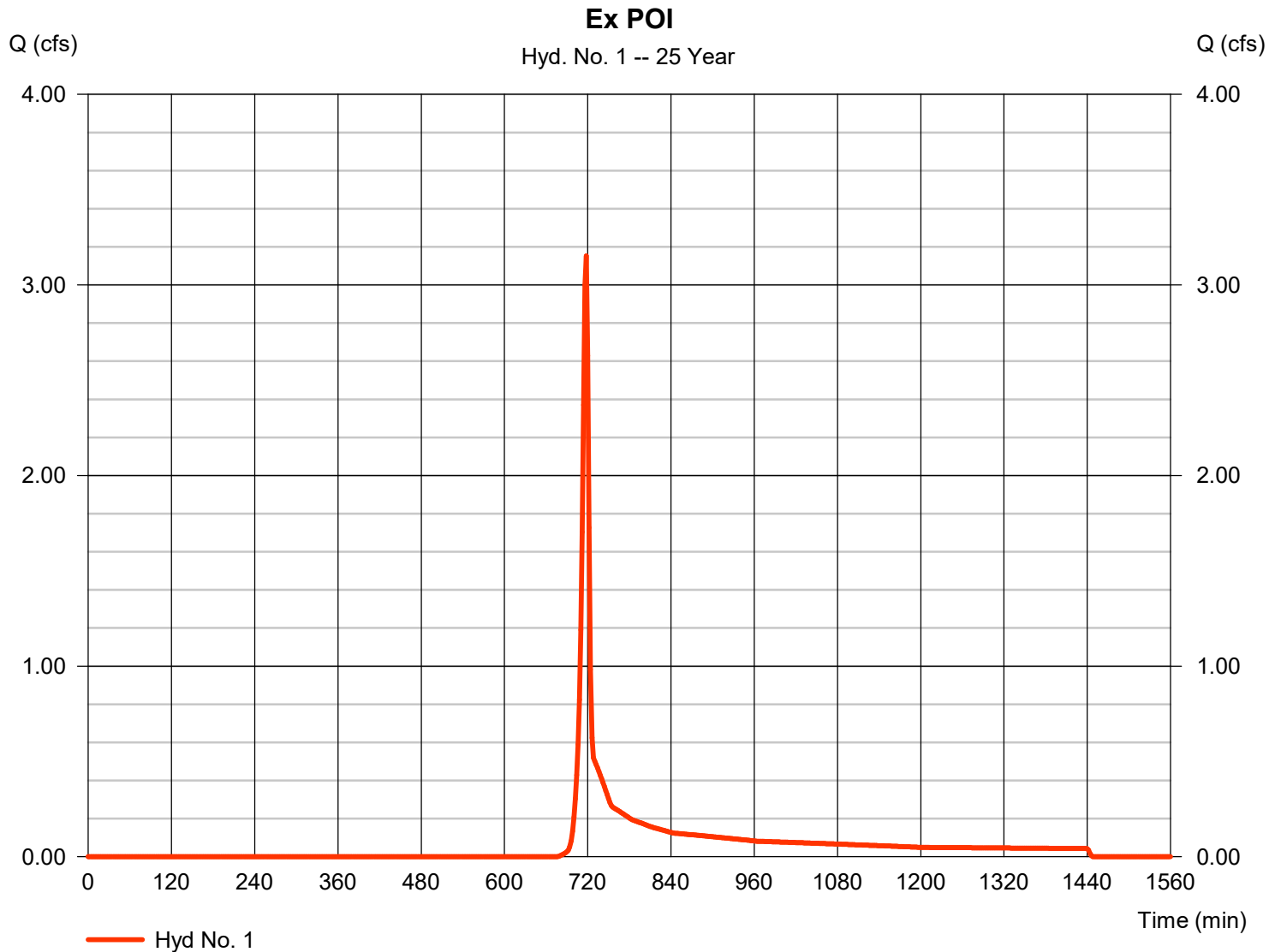
Friday, 08 / 18 / 2023

Hyd. No. 1

Ex POI

Hydrograph type	= SCS Runoff	Peak discharge	= 3.153 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 6,381 cuft
Drainage area	= 1.740 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.89 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.330 \times 58) + (0.410 \times 98)] / 1.740$



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.088	2	718	8,203	-----	-----	-----	Ex POI
Pre-Developed.gpw					Return Period: 50 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

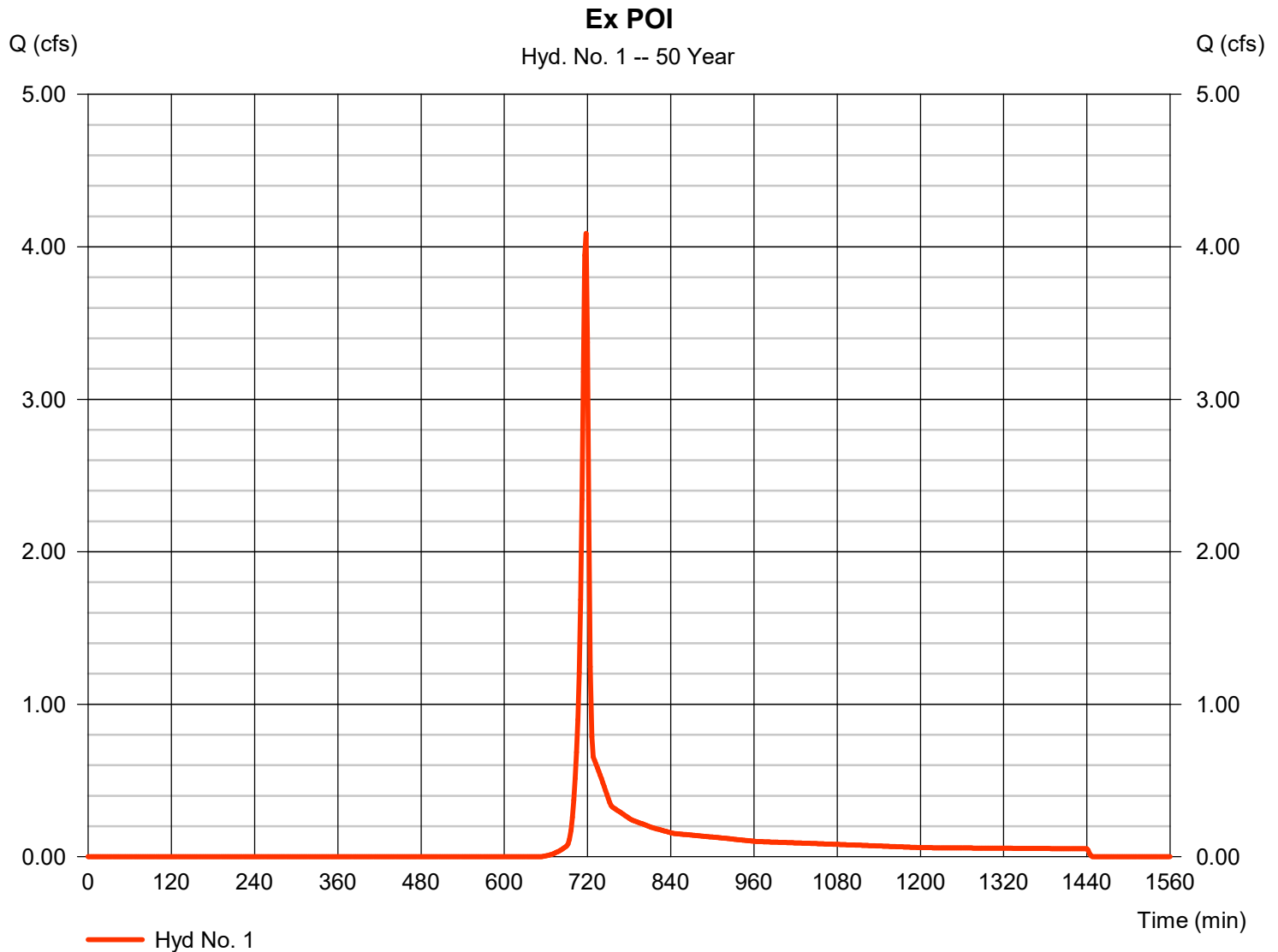
Friday, 08 / 18 / 2023

Hyd. No. 1

Ex POI

Hydrograph type	= SCS Runoff	Peak discharge	= 4.088 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 8,203 cuft
Drainage area	= 1.740 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.330 \times 58) + (0.410 \times 98)] / 1.740$



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.112	2	718	10,225	-----	-----	-----	Ex POI
Pre-Developed.gpw					Return Period: 100 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

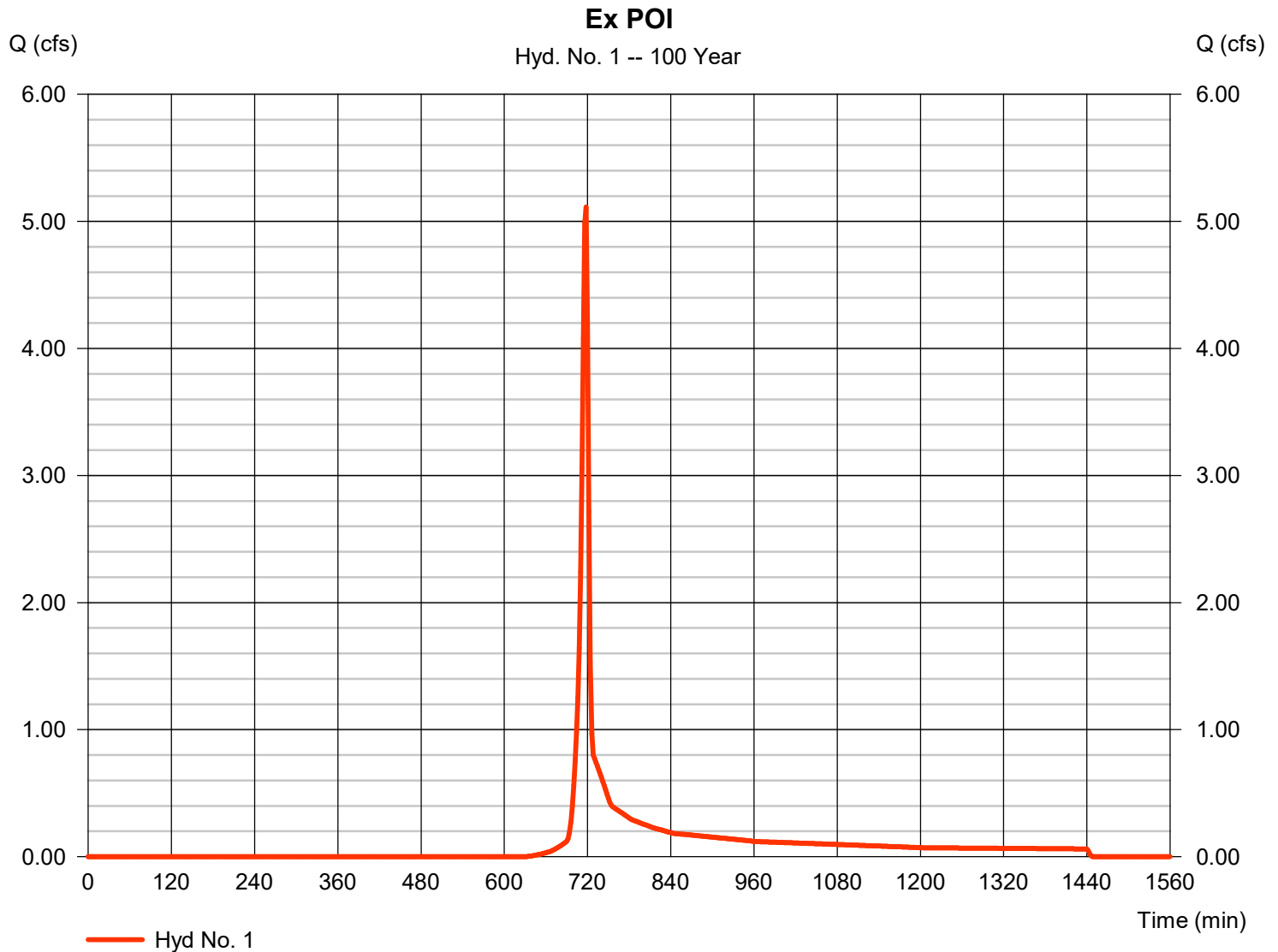
Friday, 08 / 18 / 2023

Hyd. No. 1

Ex POI

Hydrograph type	= SCS Runoff	Peak discharge	= 5.112 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 10,225 cuft
Drainage area	= 1.740 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.89 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.330 \times 58) + (0.410 \times 98)] / 1.740$



APPENDIX D

POST-DEVELOPED STORMWATER RUNOFF CALCULATIONS

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	0.766	1.053	-----	2.752	3.924	5.813	7.583	9.451	Pr POI
Proj. file: Post-Developed.gpw									Friday, 08 / 18 / 2023		

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.766	2	718	1,815	-----	-----	-----	Pr POI
Post-Developed.gpw					Return Period: 1 Year			Friday, 08 / 18 / 2023	

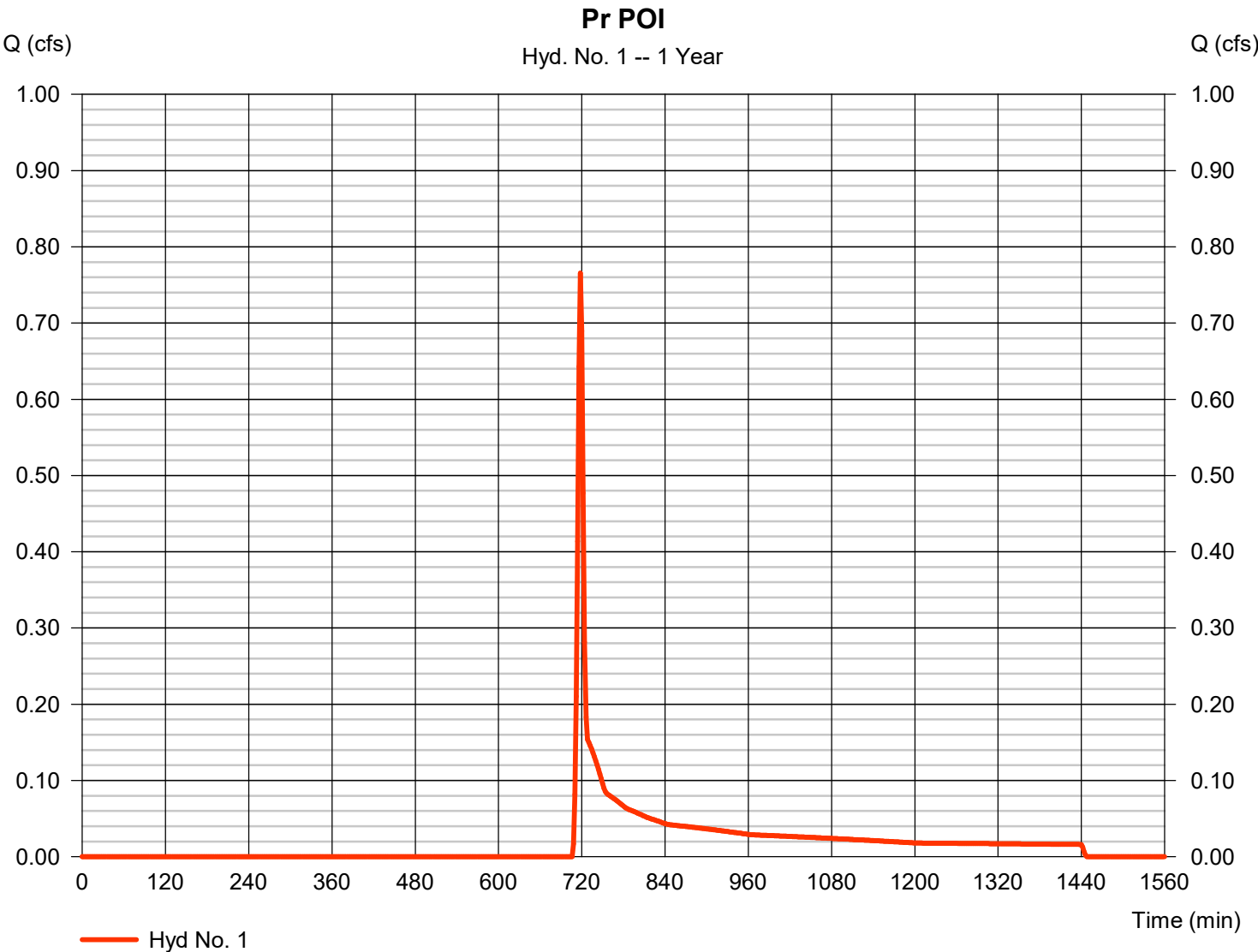
Hydrograph Report

Hyd. No. 1

Pr POI

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.766 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	1,815 cuft
Drainage area	=	1.740 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.740 x 98) + (0.220 x 30) + (0.780 x 58)] / 1.740



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.053	2	718	2,339	-----	-----	-----	Pr POI
Post-Developed.gpw					Return Period: 2 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

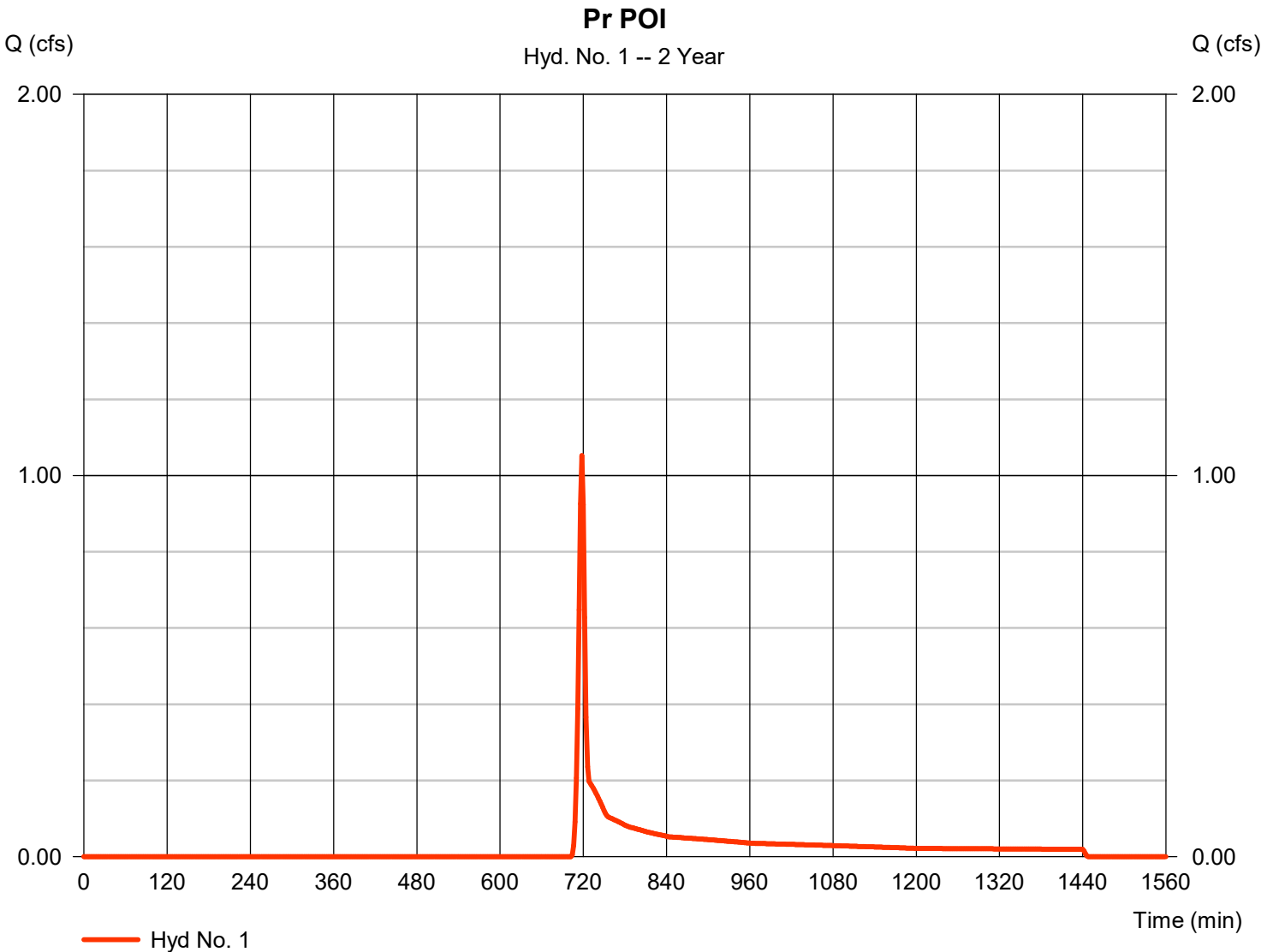
Friday, 08 / 18 / 2023

Hyd. No. 1

Pr POI

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.053 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2,339 cuft
Drainage area	=	1.740 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.740 x 98) + (0.220 x 30) + (0.780 x 58)] / 1.740



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.752	2	718	5,559	-----	-----	-----	Pr POI
Post-Developed.gpw					Return Period: 5 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

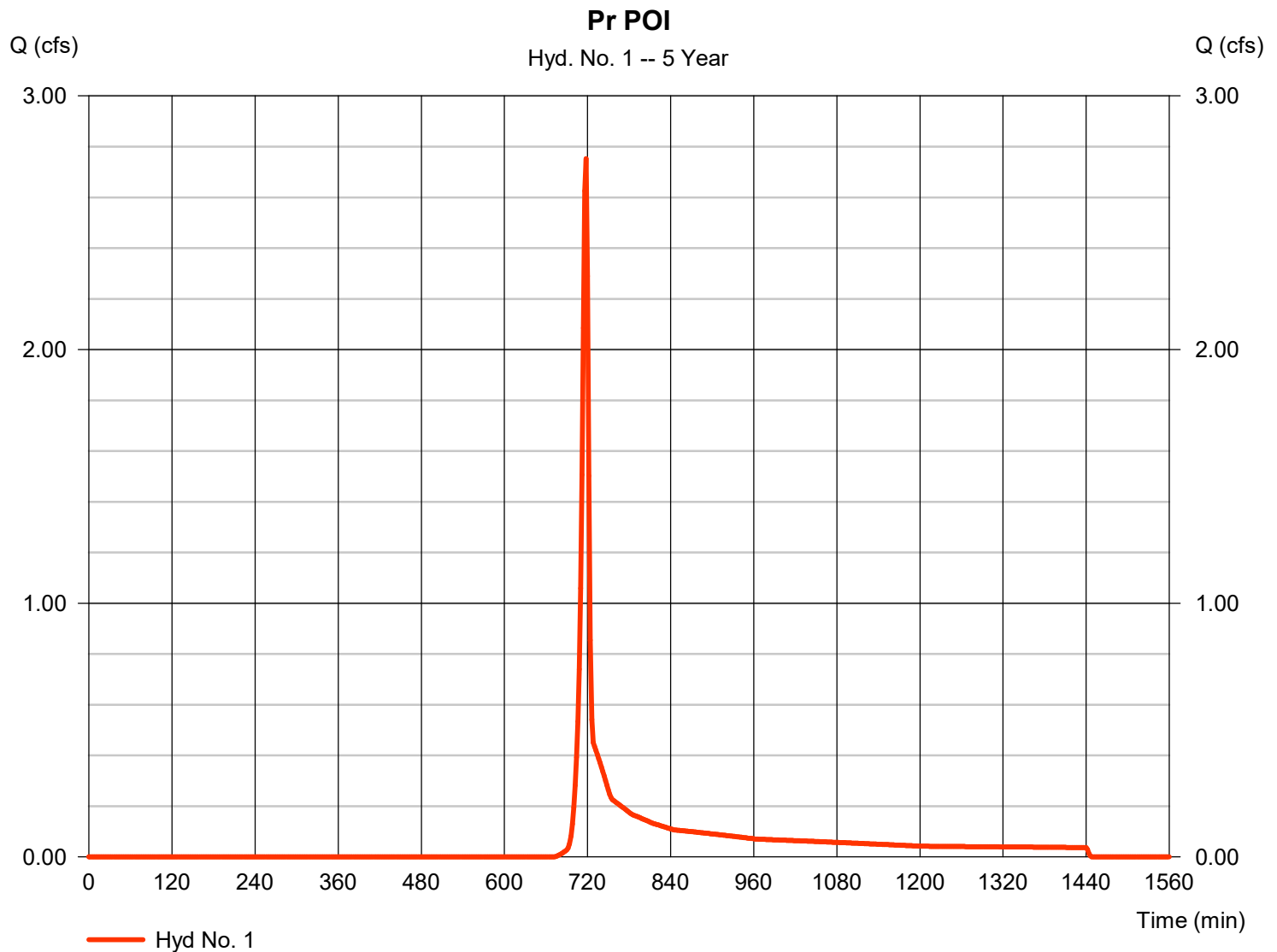
Friday, 08 / 18 / 2023

Hyd. No. 1

Pr POI

Hydrograph type	= SCS Runoff	Peak discharge	= 2.752 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 5,559 cuft
Drainage area	= 1.740 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.740 \times 98) + (0.220 \times 30) + (0.780 \times 58)] / 1.740$



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.924	2	718	7,853	-----	-----	-----	Pr POI
Post-Developed.gpw					Return Period: 10 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

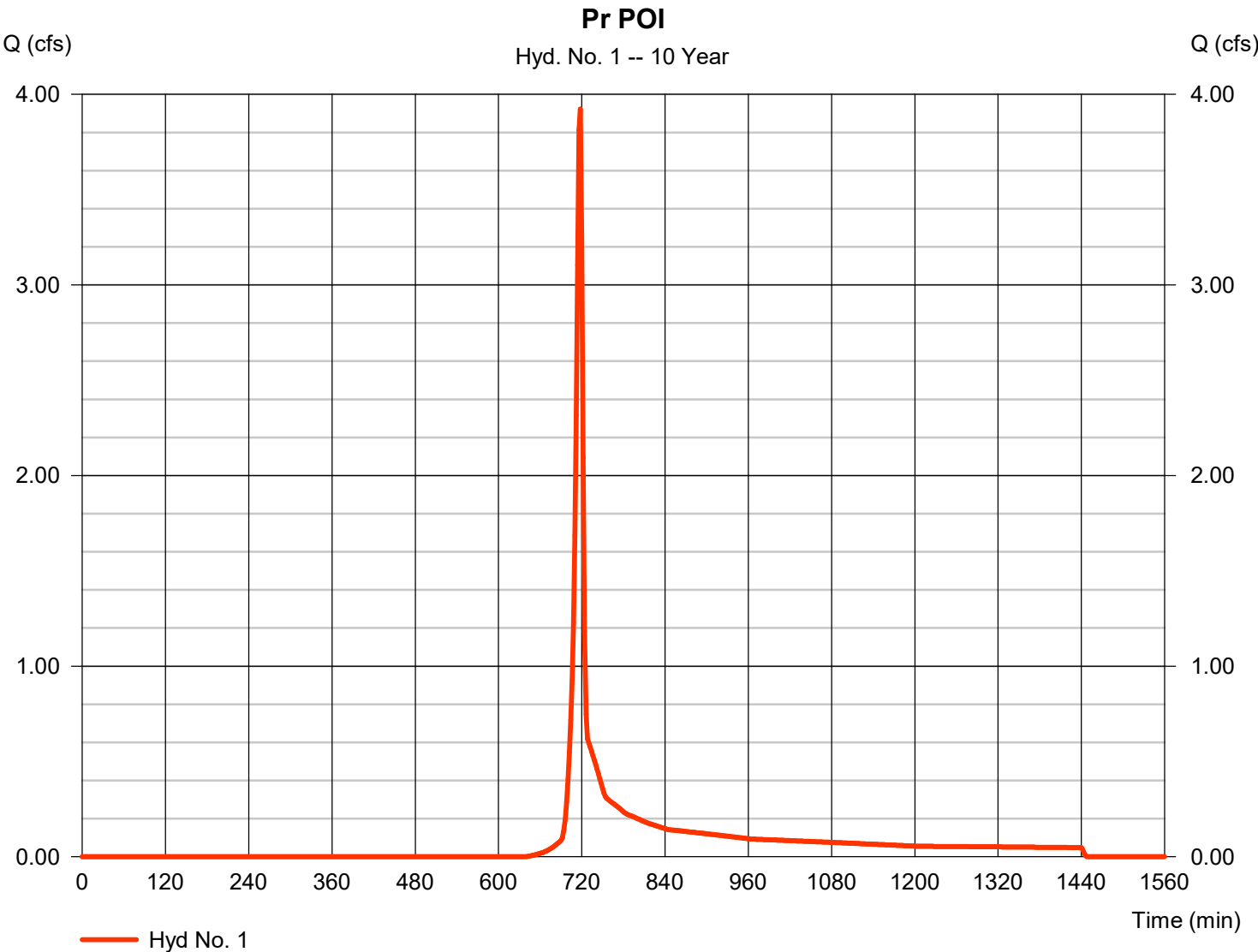
Friday, 08 / 18 / 2023

Hyd. No. 1

Pr POI

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.924 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	7,853 cuft
Drainage area	=	1.740 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.740 x 98) + (0.220 x 30) + (0.780 x 58)] / 1.740



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.813	2	718	11,645	-----	-----	-----	Pr POI
Post-Developed.gpw					Return Period: 25 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

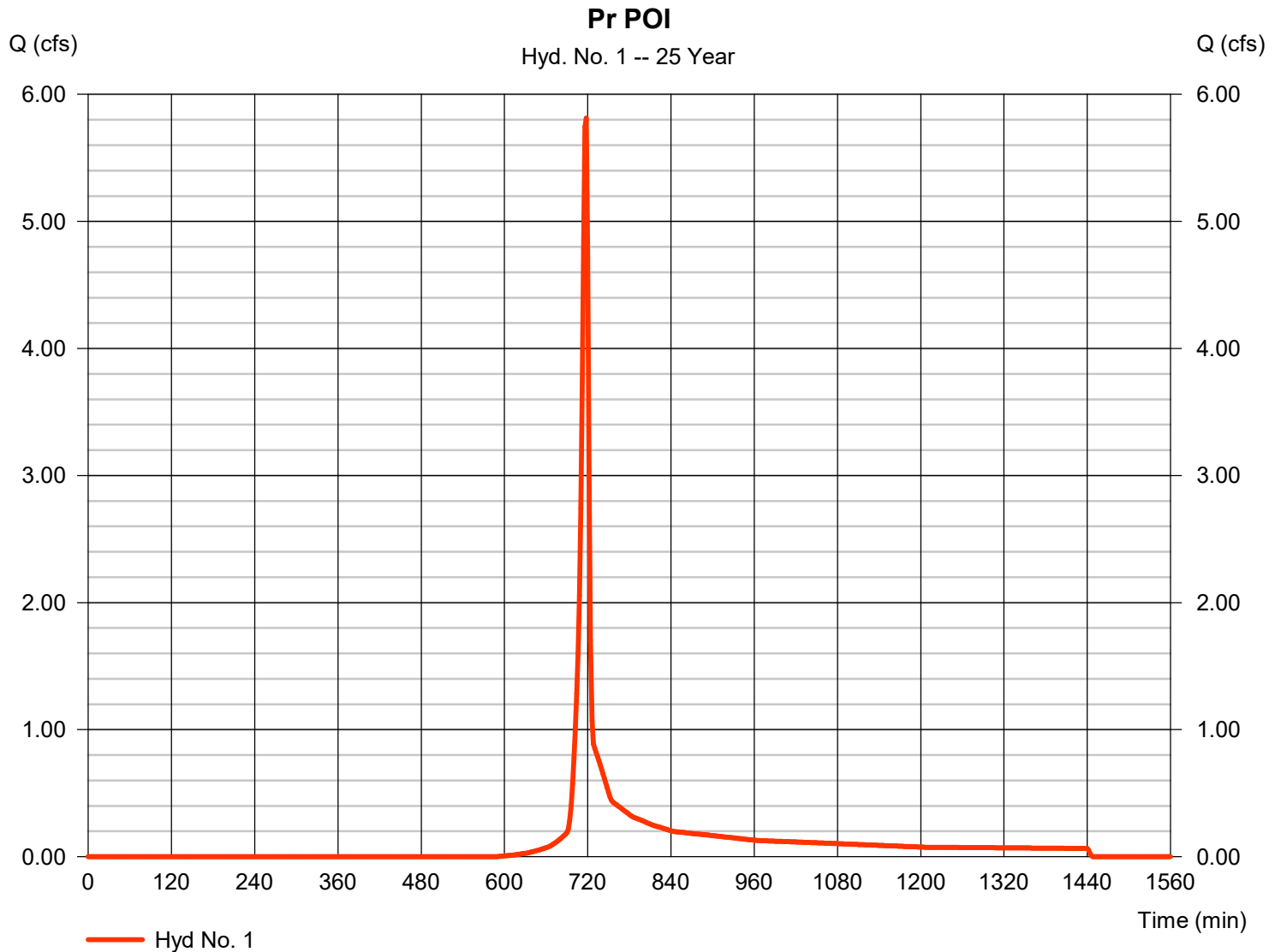
Friday, 08 / 18 / 2023

Hyd. No. 1

Pr POI

Hydrograph type	= SCS Runoff	Peak discharge	= 5.813 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 11,645 cuft
Drainage area	= 1.740 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.740 \times 98) + (0.220 \times 30) + (0.780 \times 58)] / 1.740$



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	7.583	2	718	15,277	-----	-----	-----	Pr POI
Post-Developed.gpw					Return Period: 50 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

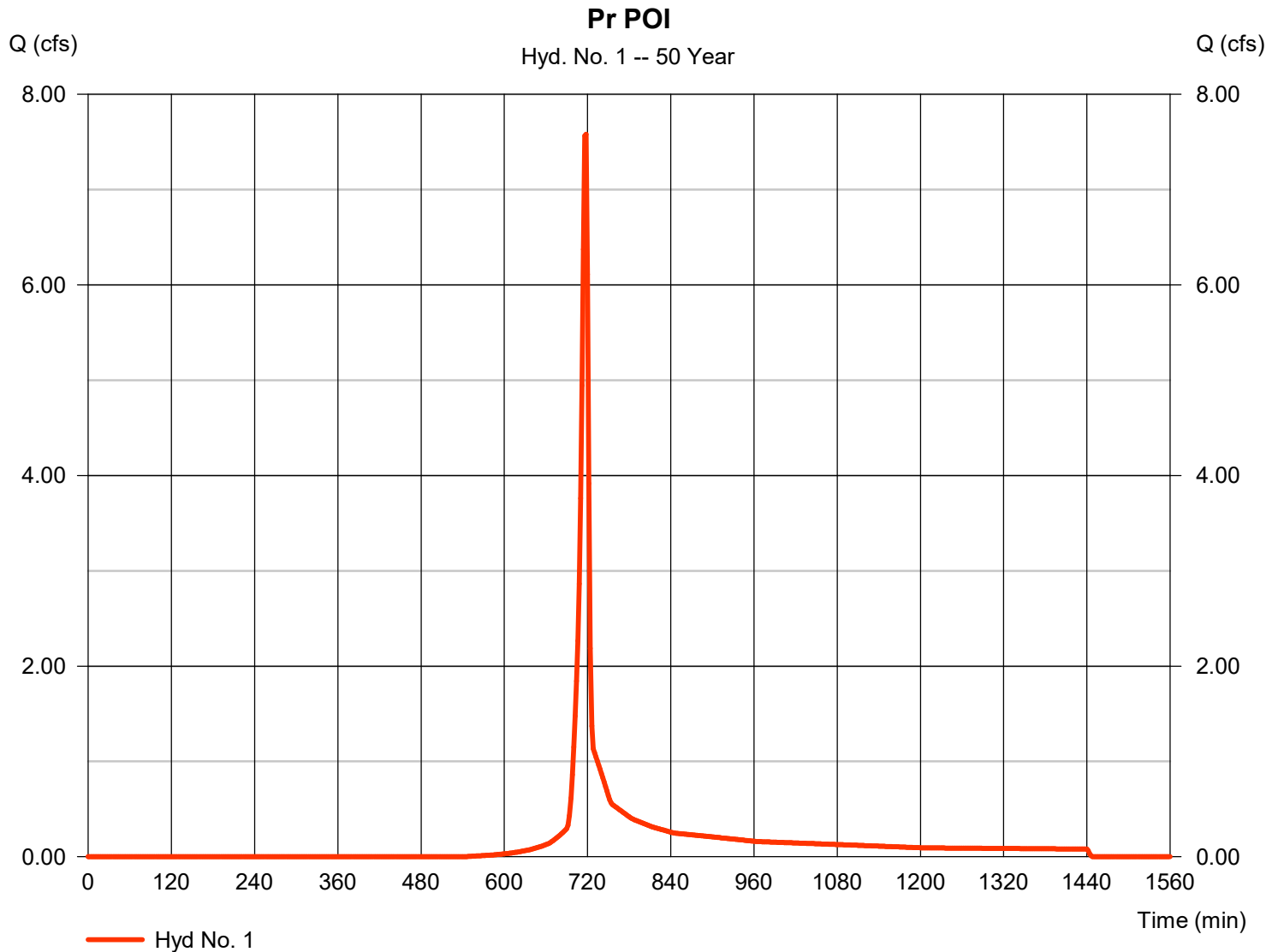
Friday, 08 / 18 / 2023

Hyd. No. 1

Pr POI

Hydrograph type	= SCS Runoff	Peak discharge	= 7.583 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 15,277 cuft
Drainage area	= 1.740 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.740 \times 98) + (0.220 \times 30) + (0.780 \times 58)] / 1.740$



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.451	2	716	19,092	-----	-----	-----	Pr POI
Post-Developed.gpw					Return Period: 100 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

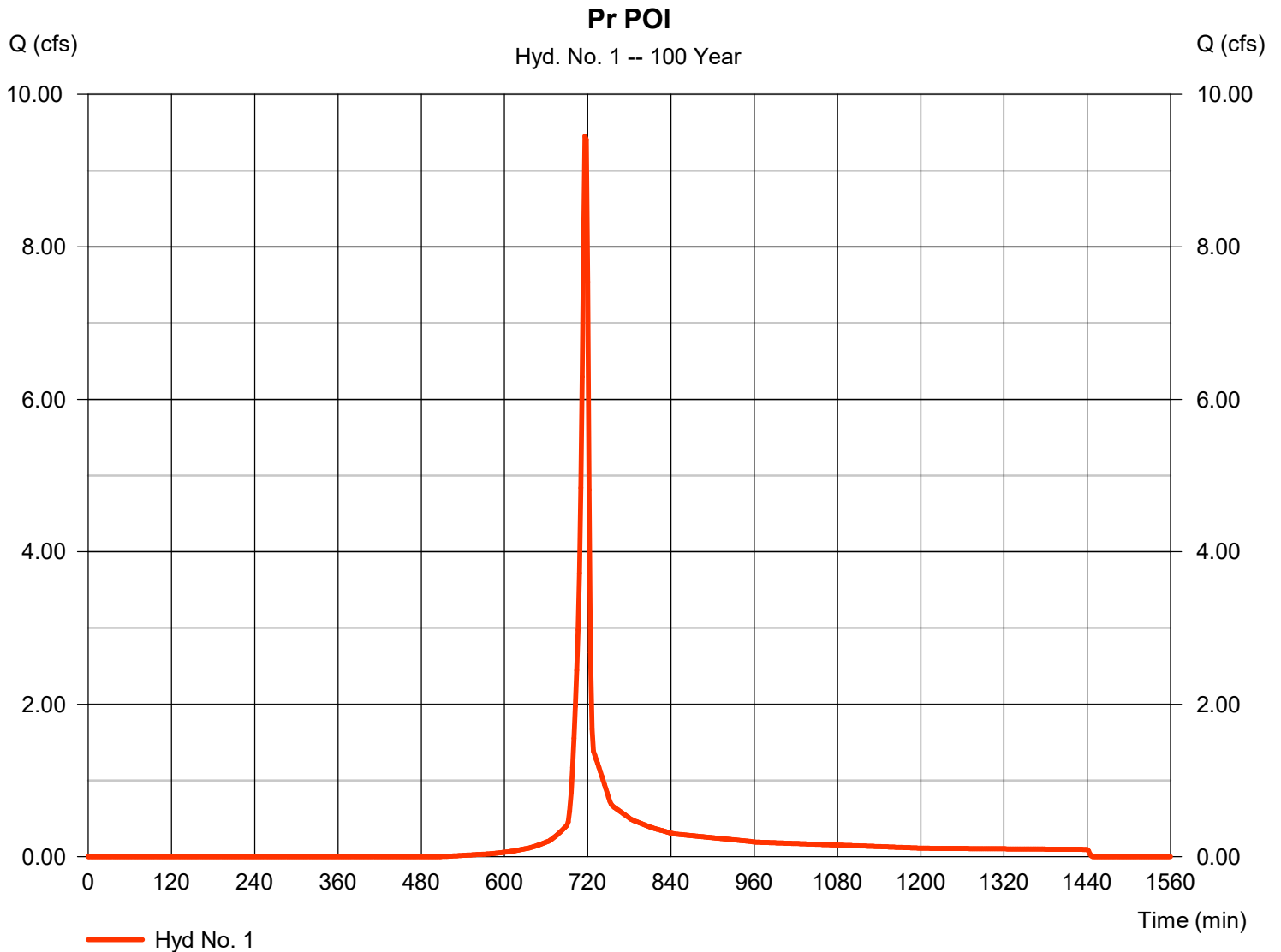
Friday, 08 / 18 / 2023

Hyd. No. 1

Pr POI

Hydrograph type	= SCS Runoff	Peak discharge	= 9.451 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 19,092 cuft
Drainage area	= 1.740 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

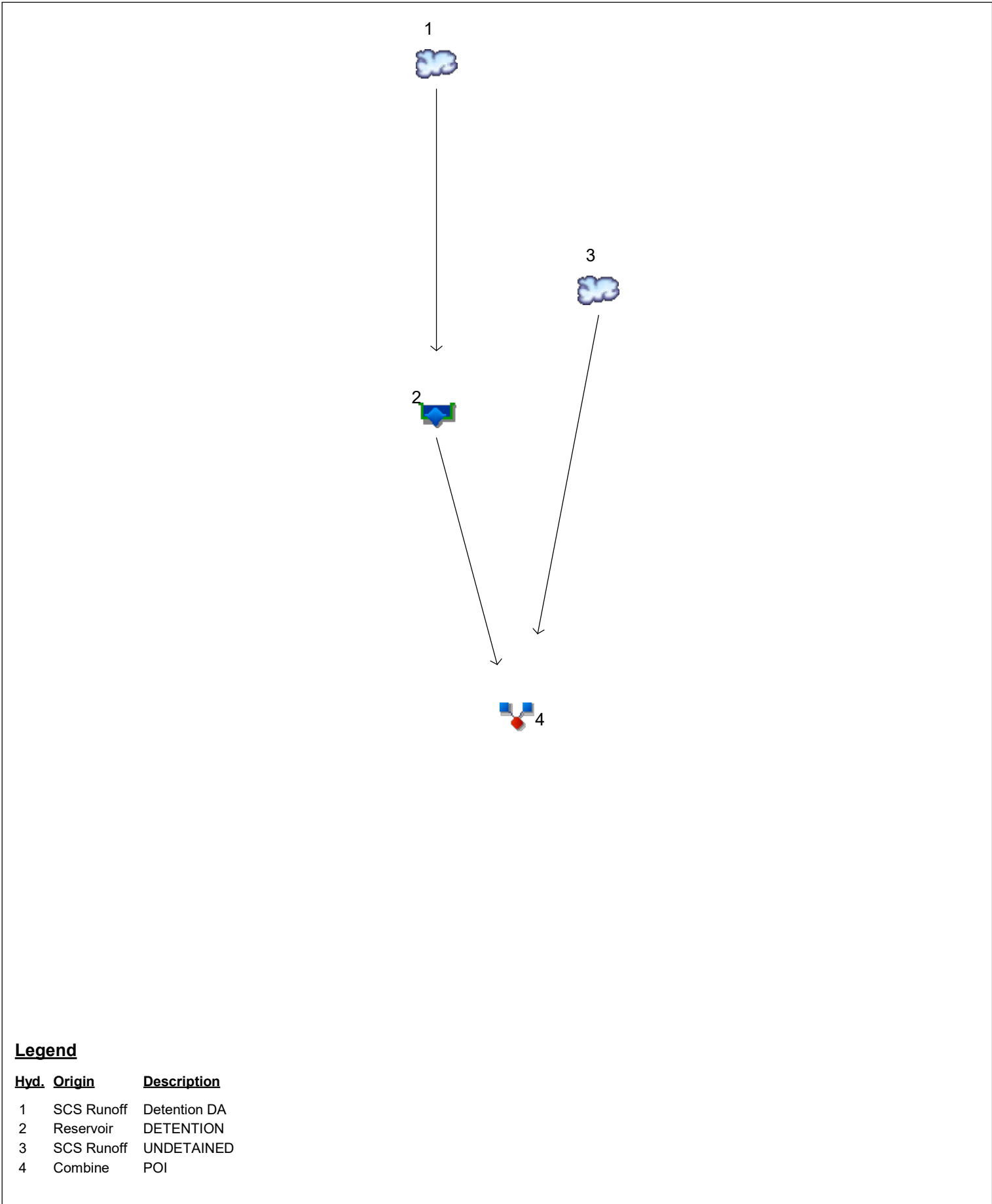
* Composite (Area/CN) = $[(0.740 \times 98) + (0.220 \times 30) + (0.780 \times 58)] / 1.740$



APPENDIX E

**POST-DEVELOPED STORMWATER WITH DETENTION
CALCULATIONS**

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Detention DA
2	Reservoir	DETENTION
3	SCS Runoff	UNDETAINED
4	Combine	POI

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	0.105	0.210	-----	1.005	1.602	2.605	3.576	4.601	Detention DA
2	Reservoir	1	0.008	0.016	-----	0.287	0.635	1.005	1.289	1.575	DETENTION
3	SCS Runoff	-----	0.299	0.411	-----	1.076	1.533	2.272	2.963	3.694	UNDETAINED
4	Combine	2, 3	0.299	0.411	-----	1.095	1.975	3.114	4.071	5.024	POI
Proj. file: Post with Detention.gpw										Friday, 08 / 18 / 2023	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.105	2	720	518	-----	-----	-----	Detention DA
2	Reservoir	0.008	2	1116	227	1	1172.05	324	DETENTION
3	SCS Runoff	0.299	2	718	710	-----	-----	-----	UNDETAINED
4	Combine	0.299	2	718	936	2, 3	-----	-----	POI
Post with Detention.gpw					Return Period: 1 Year			Friday, 08 / 18 / 2023	

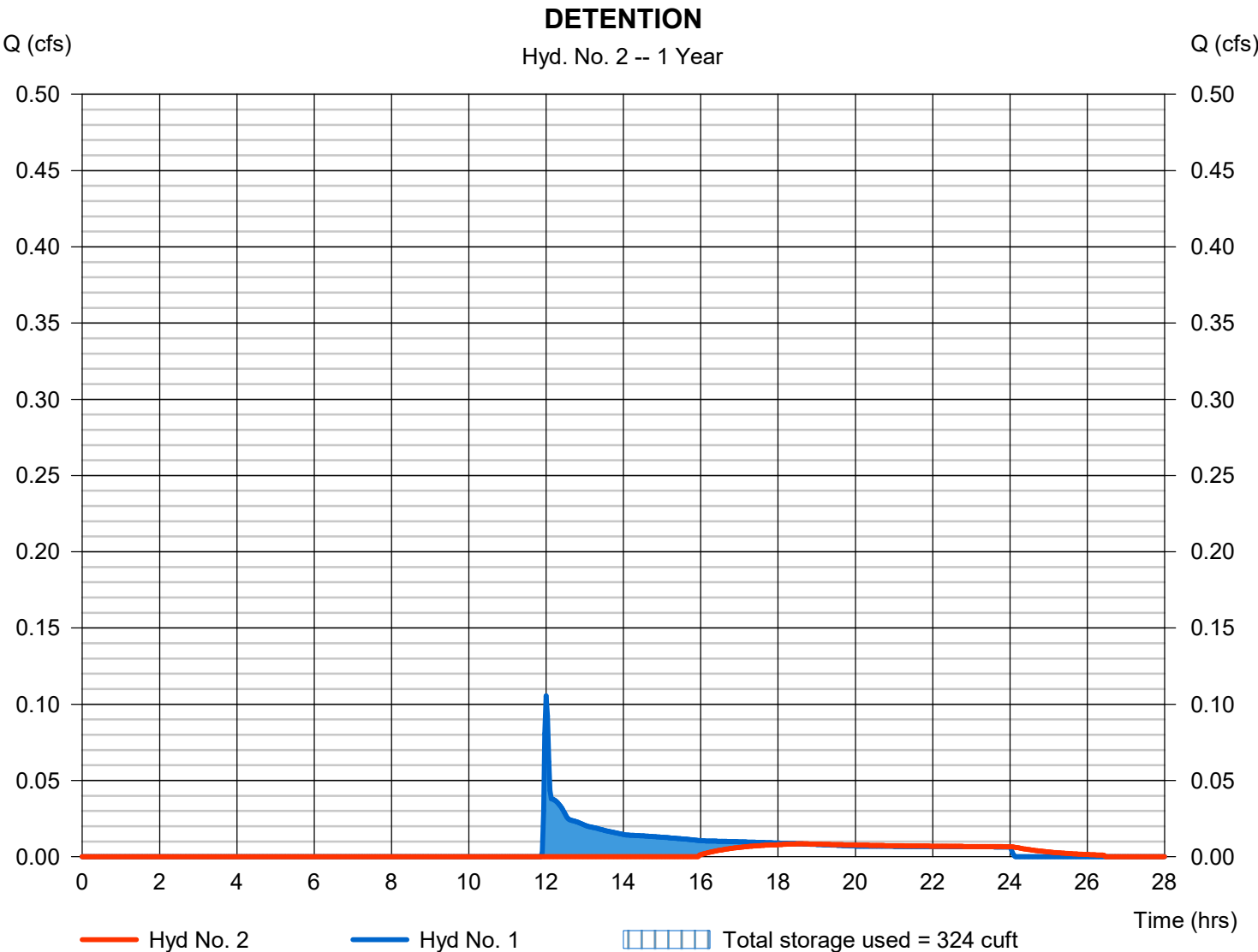
Hydrograph Report

Hyd. No. 2

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.008 cfs
Storm frequency	= 1 yrs	Time to peak	= 18.60 hrs
Time interval	= 2 min	Hyd. volume	= 227 cuft
Inflow hyd. No.	= 1 - Detention DA	Max. Elevation	= 1172.05 ft
Reservoir name	= DETENTION TANK	Max. Storage	= 324 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.210	2	720	731	-----	-----	-----	Detention DA
2	Reservoir	0.016	2	912	439	1	1172.07	337	DETENTION
3	SCS Runoff	0.411	2	718	914	-----	-----	-----	UNDETAINED
4	Combine	0.411	2	718	1,354	2, 3	-----	-----	POI
Post with Detention.gpw					Return Period: 2 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

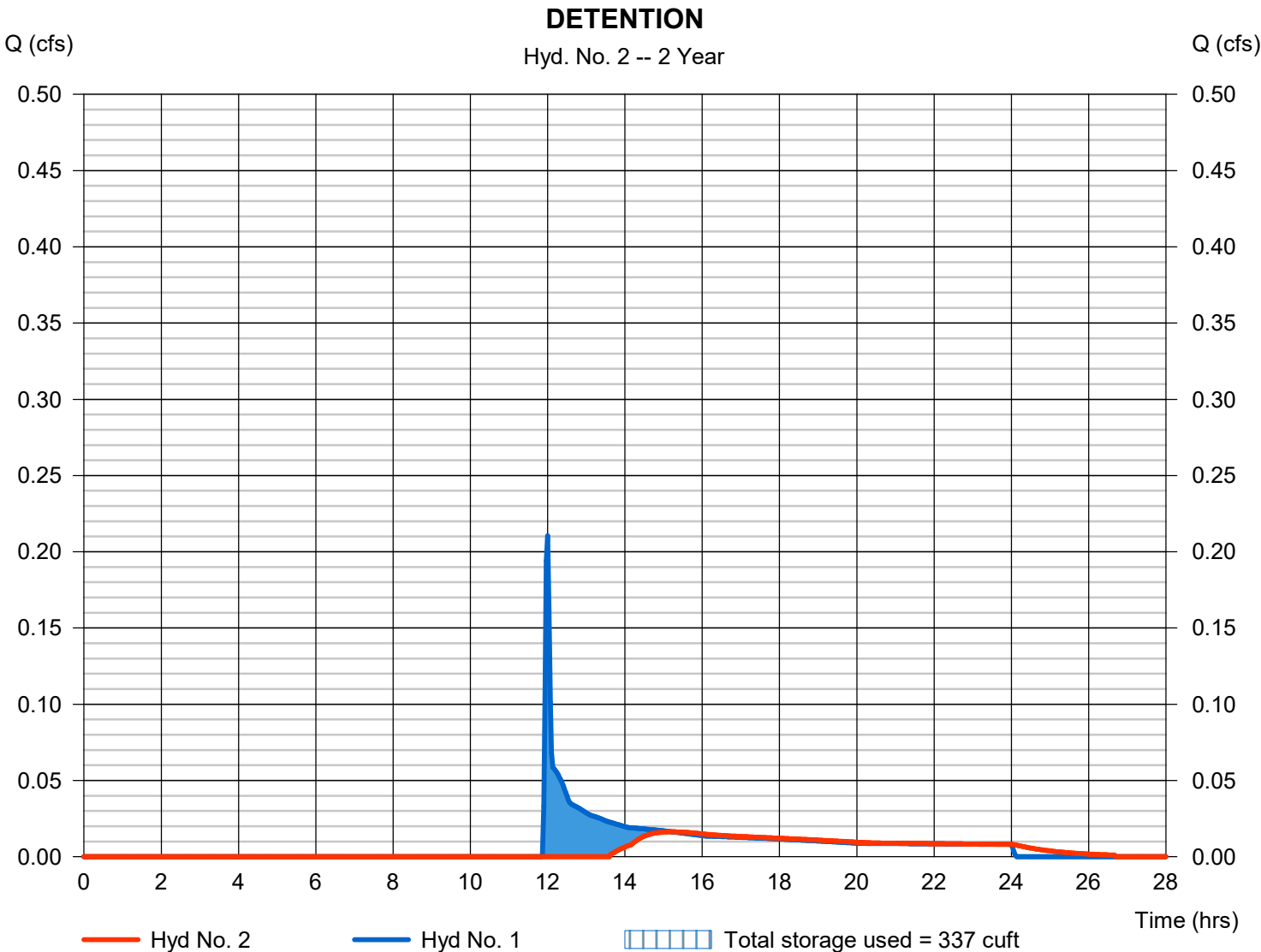
Friday, 08 / 18 / 2023

Hyd. No. 2

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.016 cfs
Storm frequency	= 2 yrs	Time to peak	= 15.20 hrs
Time interval	= 2 min	Hyd. volume	= 439 cuft
Inflow hyd. No.	= 1 - Detention DA	Max. Elevation	= 1172.07 ft
Reservoir name	= DETENTION TANK	Max. Storage	= 337 cuft

Storage Indication method used.



Hydrograph Summary Report

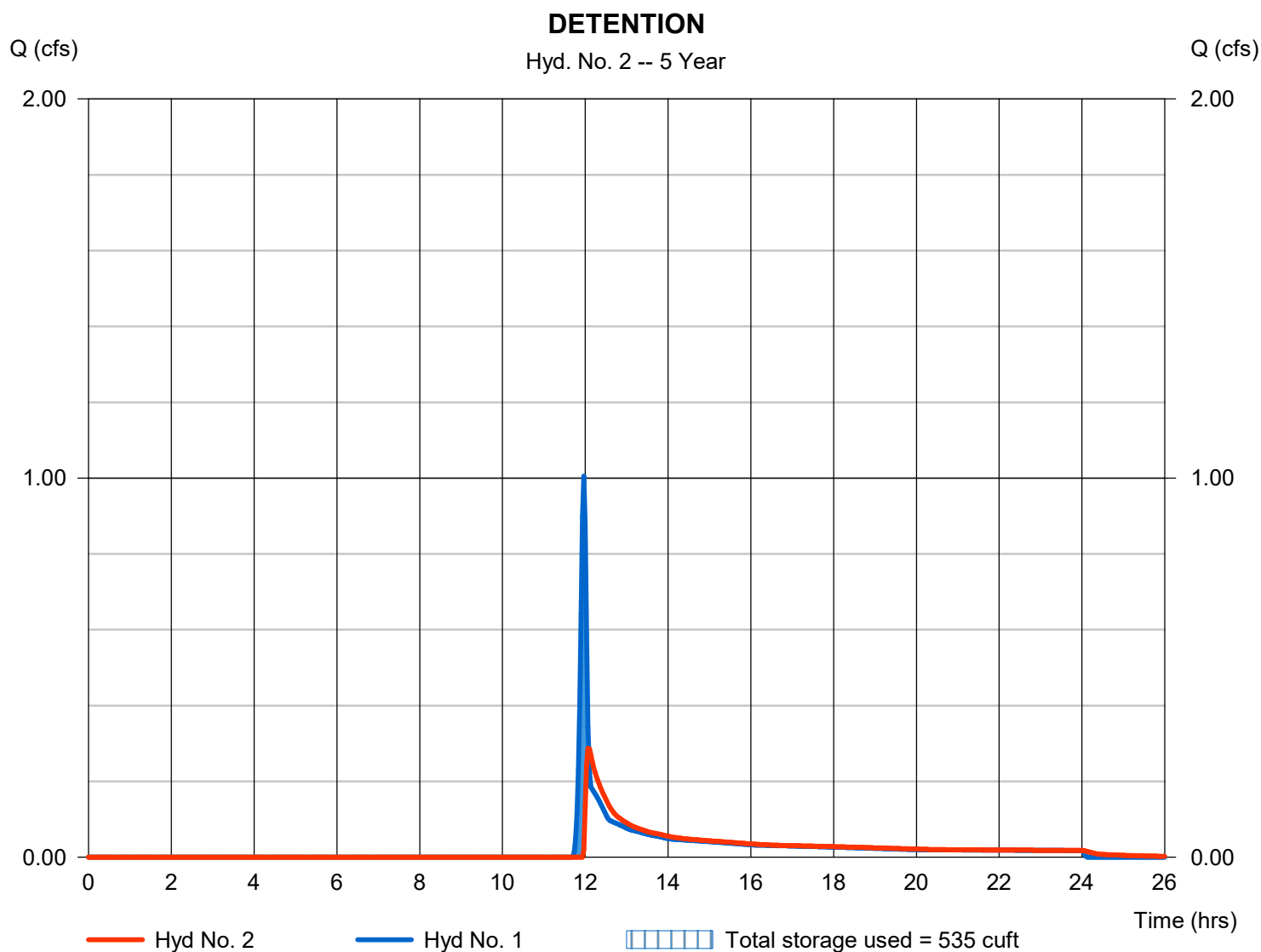
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.005	2	718	2,188	-----	-----	-----	Detention DA
2	Reservoir	0.287	2	724	1,896	1	1172.34	535	DETENTION
3	SCS Runoff	1.076	2	718	2,173	-----	-----	-----	UNDETAINED
4	Combine	1.095	2	718	4,068	2, 3	-----	-----	POI
Post with Detention.gpw					Return Period: 5 Year			Friday, 08 / 18 / 2023	

Hyd. No. 2

Hydrograph type	= Reservoir	Peak discharge	= 0.287 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 1,896 cuft
Inflow hyd. No.	= 1 - Detention DA	Max. Elevation	= 1172.34 ft
Reservoir name	= DETENTION TANK	Max. Storage	= 535 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.602	2	718	3,307	-----	-----	-----	Detention DA
2	Reservoir	0.635	2	724	3,015	1	1172.70	814	DETENTION
3	SCS Runoff	1.533	2	718	3,069	-----	-----	-----	UNDETAINED
4	Combine	1.975	2	718	6,084	2, 3	-----	-----	POI
Post with Detention.gpw					Return Period: 10 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

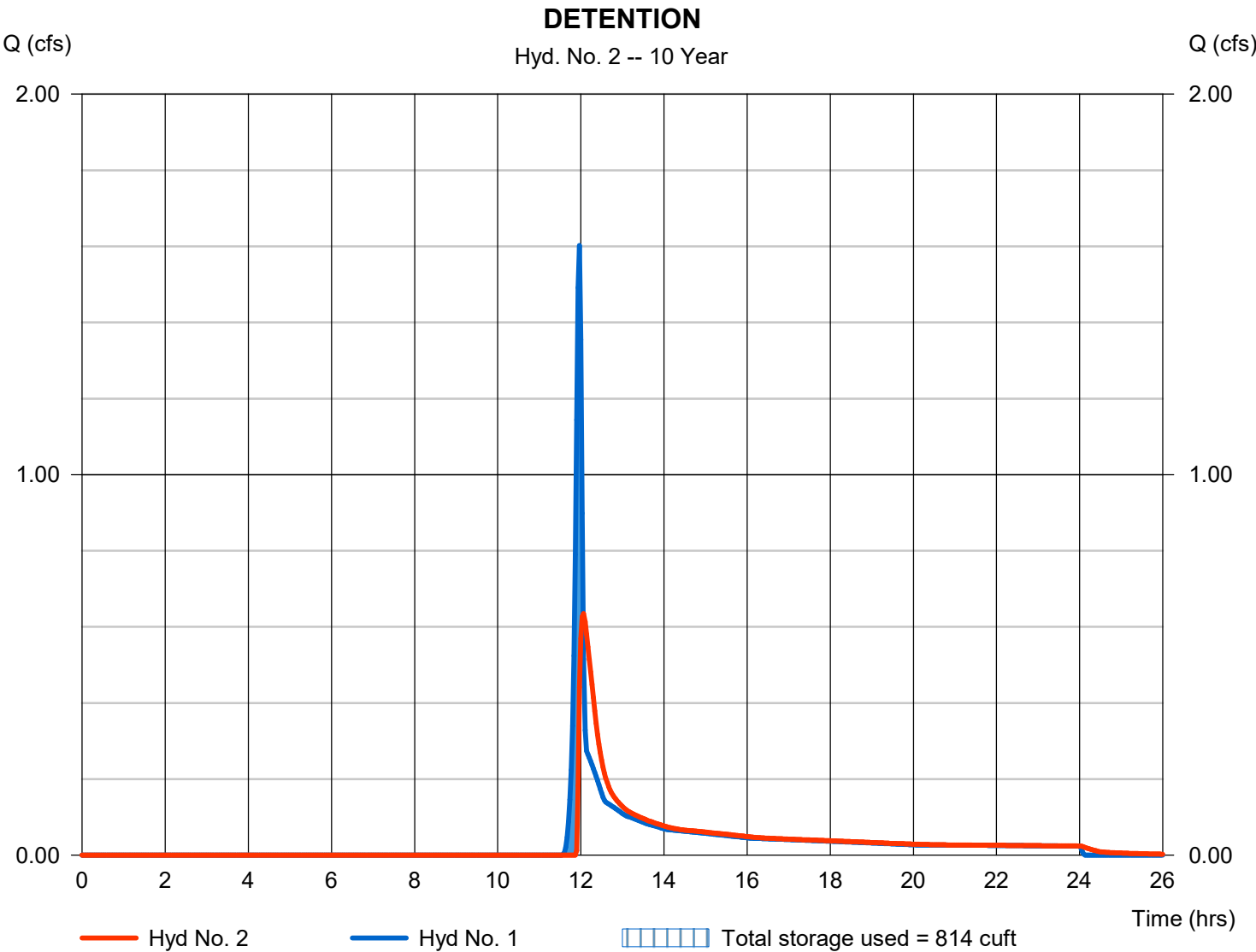
Friday, 08 / 18 / 2023

Hyd. No. 2

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.635 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 3,015 cuft
Inflow hyd. No.	= 1 - Detention DA	Max. Elevation	= 1172.70 ft
Reservoir name	= DETENTION TANK	Max. Storage	= 814 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.605	2	718	5,239	-----	-----	-----	Detention DA
2	Reservoir	1.005	2	724	4,947	1	1173.38	1,387	DETENTION
3	SCS Runoff	2.272	2	718	4,551	-----	-----	-----	UNDETAINED
4	Combine	3.114	2	718	9,498	2, 3	-----	-----	POI
Post with Detention.gpw					Return Period: 25 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

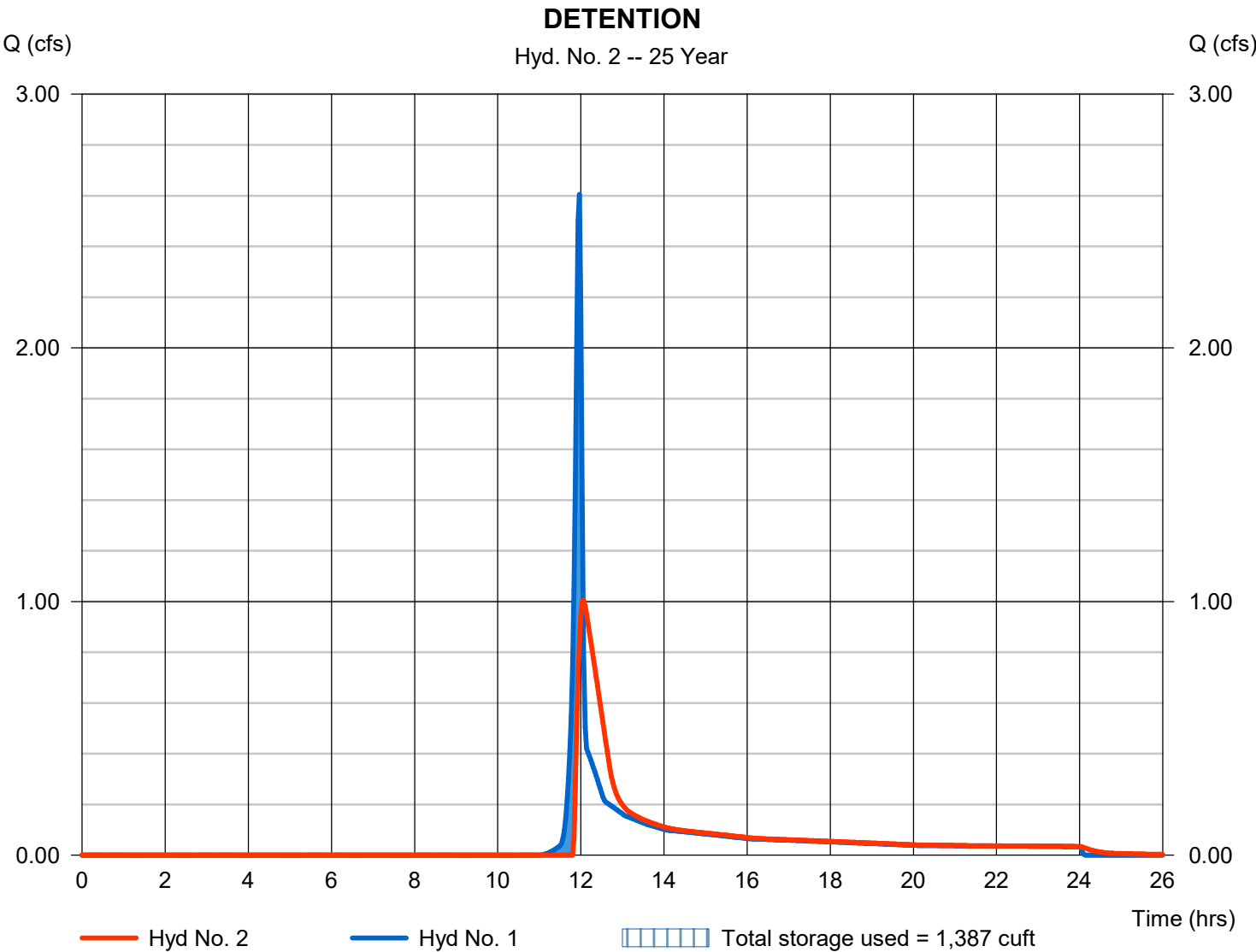
Friday, 08 / 18 / 2023

Hyd. No. 2

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 1.005 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 4,947 cuft
Inflow hyd. No.	= 1 - Detention DA	Max. Elevation	= 1173.38 ft
Reservoir name	= DETENTION TANK	Max. Storage	= 1,387 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.576	2	718	7,152	-----	-----	-----	Detention DA
2	Reservoir	1.289	2	724	6,861	1	1174.11	2,010	DETENTION
3	SCS Runoff	2.963	2	718	5,970	-----	-----	-----	UNDETAINED
4	Combine	4.071	2	718	12,831	2, 3	-----	-----	POI
Post with Detention.gpw					Return Period: 50 Year			Friday, 08 / 18 / 2023	

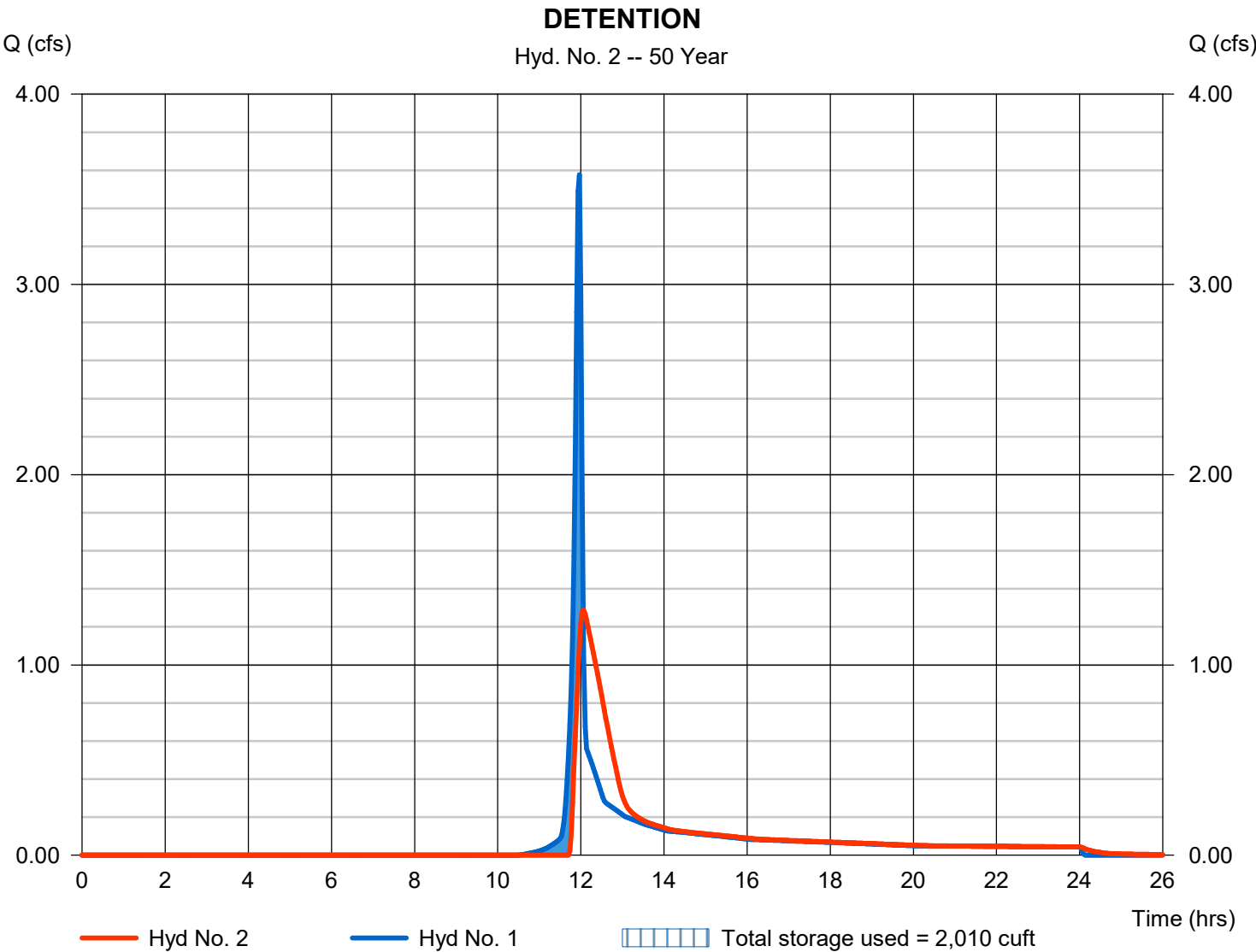
Hydrograph Report

Hyd. No. 2

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 1.289 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 6,861 cuft
Inflow hyd. No.	= 1 - Detention DA	Max. Elevation	= 1174.11 ft
Reservoir name	= DETENTION TANK	Max. Storage	= 2,010 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.601	2	718	9,209	-----	-----	-----	Detention DA
2	Reservoir	1.575	2	724	8,917	1	1175.03	2,708	DETENTION
3	SCS Runoff	3.694	2	716	7,461	-----	-----	-----	UNDETAINED
4	Combine	5.024	2	718	16,378	2, 3	-----	-----	POI
Post with Detention.gpw					Return Period: 100 Year			Friday, 08 / 18 / 2023	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

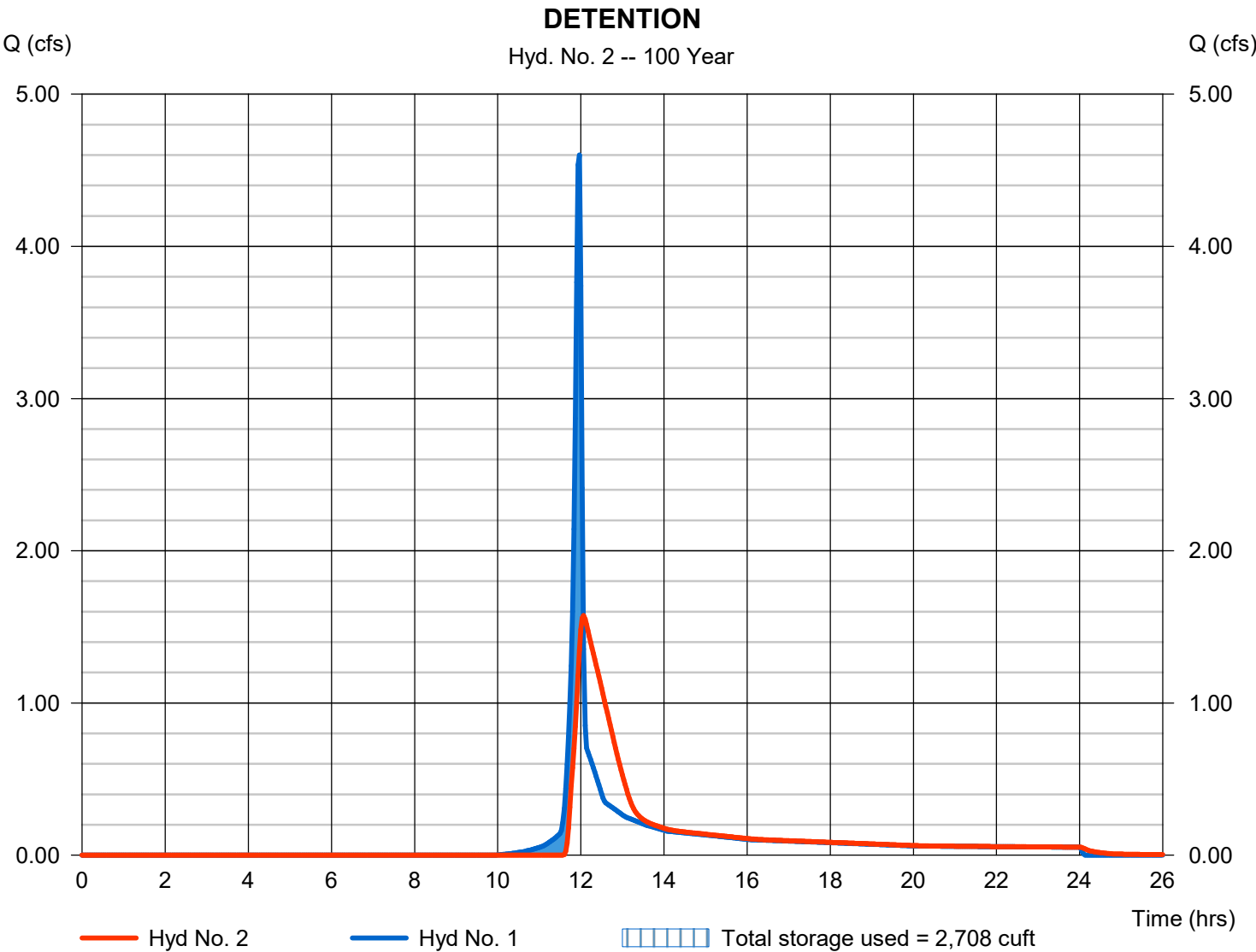
Friday, 08 / 18 / 2023

Hyd. No. 2

DETENTION

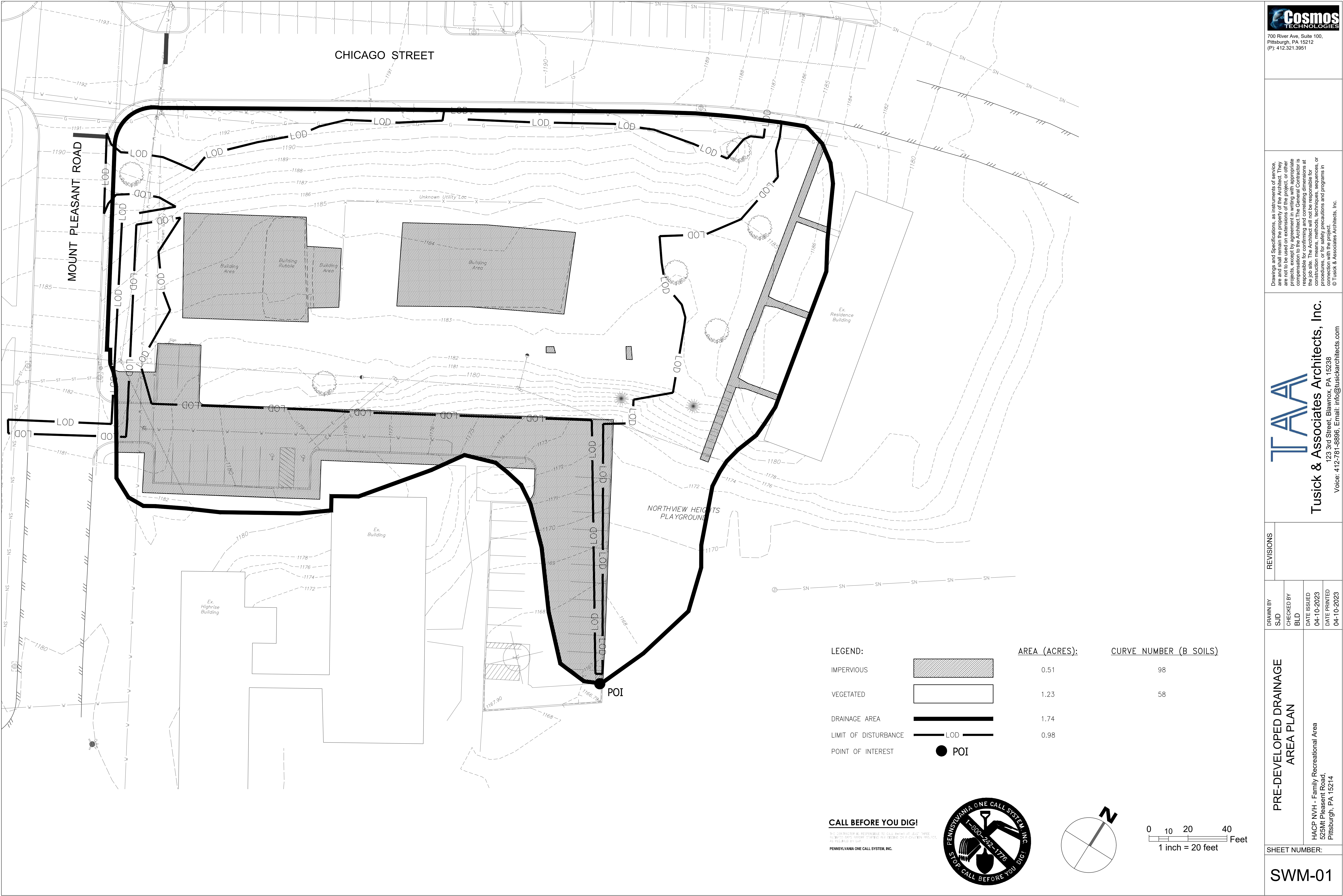
Hydrograph type	= Reservoir	Peak discharge	= 1.575 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 8,917 cuft
Inflow hyd. No.	= 1 - Detention DA	Max. Elevation	= 1175.03 ft
Reservoir name	= DETENTION TANK	Max. Storage	= 2,708 cuft

Storage Indication method used.



APPENDIX F

STORMWATER MANAGEMENT PLAN EXHIBITS



REVISIONS

DRAWN BY
SJD

CHECKED BY
BLD

DATE ISSUED
04-10-2023

DATE PRINTED
04-10-2023

PRE-DEVELOPED DRAINAGE
AREA PLAN

HACP NVH - Family Recreational Area
525Mt Pleasant Road,
Pittsburgh, PA 15214

SWM-01

SHEET NUMBER:

TAAATusick & Associates Architects, Inc.

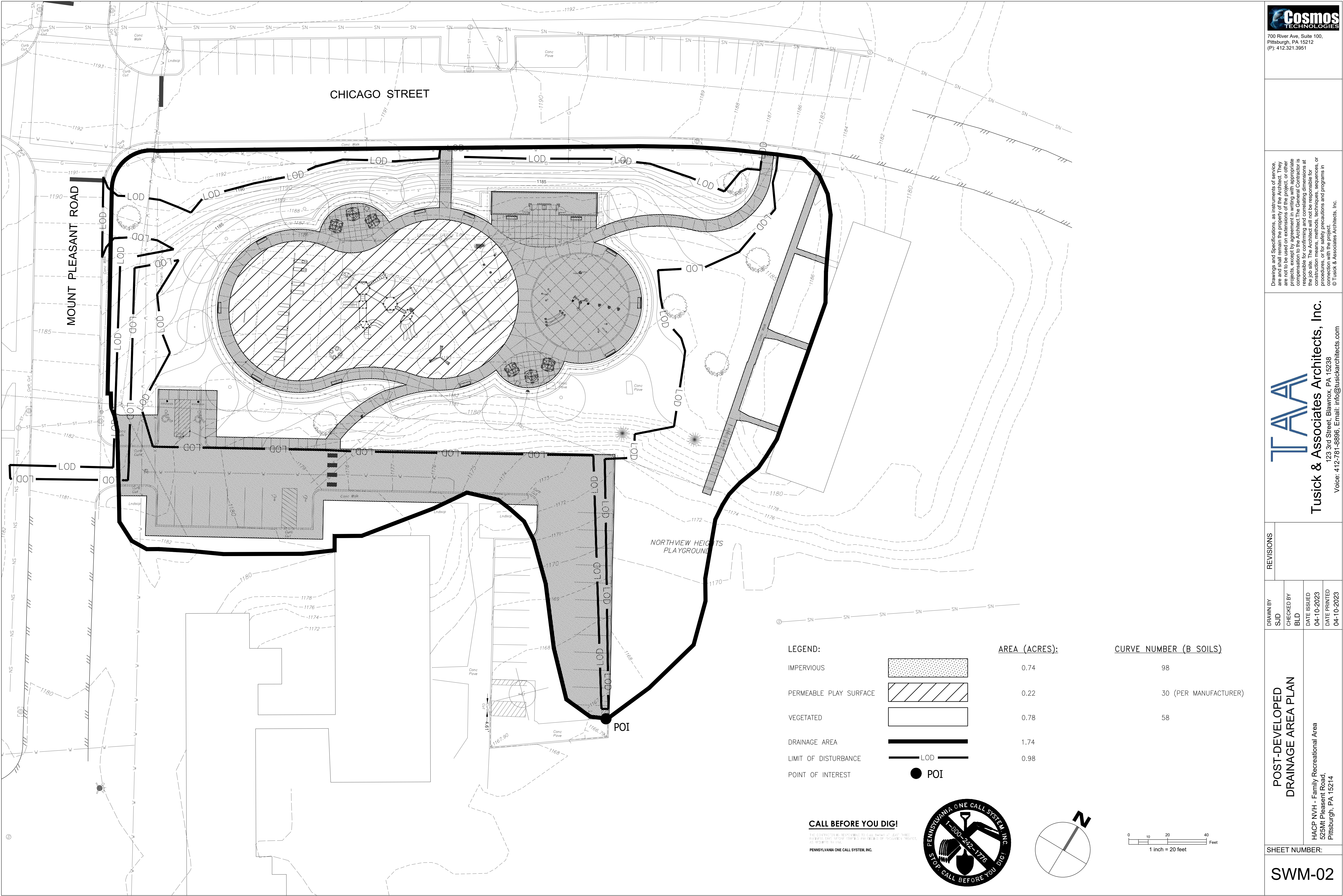
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Pittsburgh, PA 15212
(P): 412.321.3951

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DATE ISSUED
04-10-2023

DATE PRINTED
04-10-2023

POST-DEVELOPED
DRAINAGE AREA PLAN

HACP NVH - Family Recreational Area
525Mt Pleasant Road,
Pittsburgh, PA 15214

SWM-02

SHEET NUMBER:

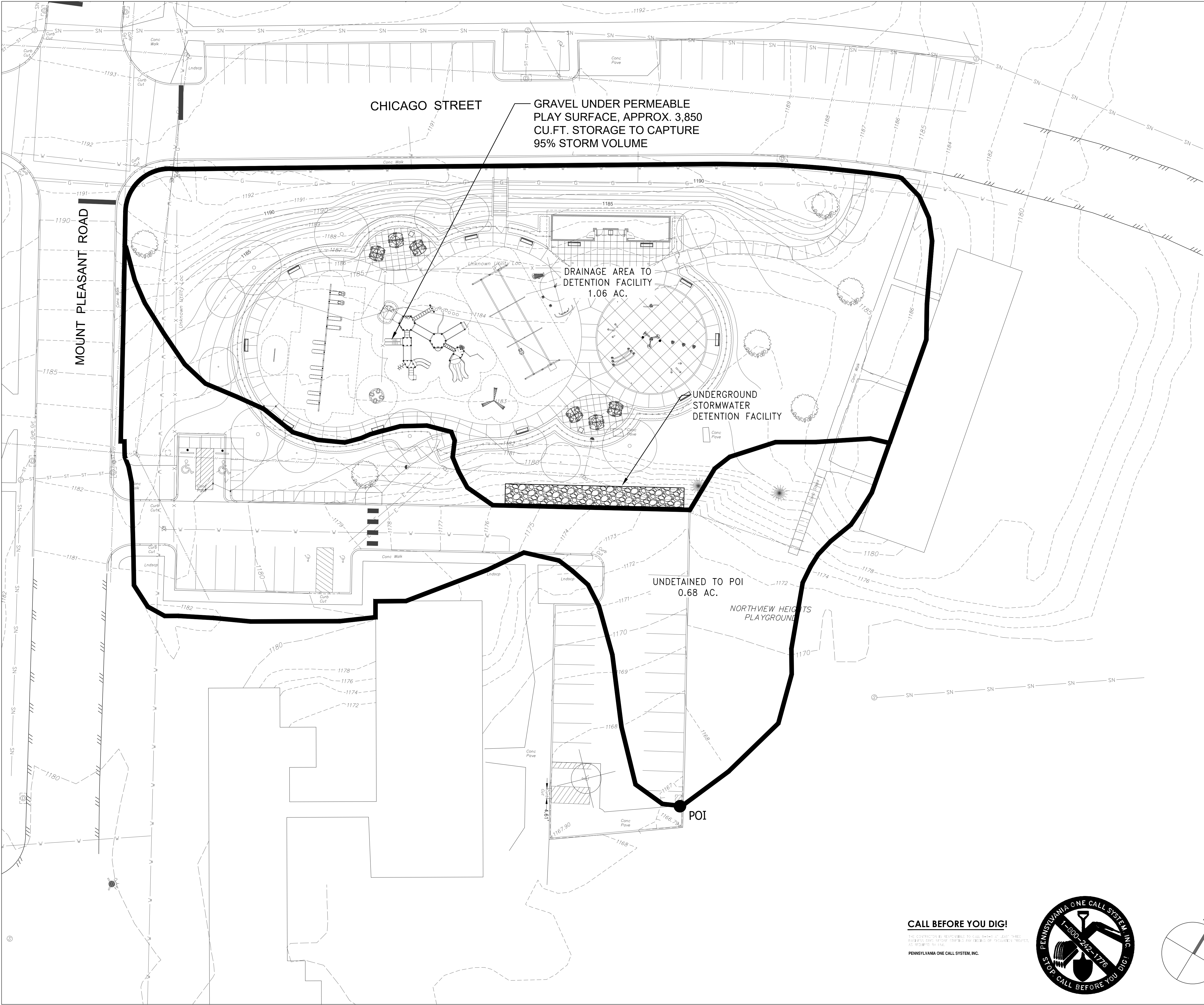
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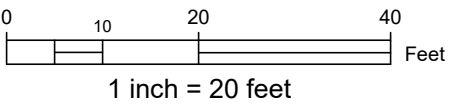
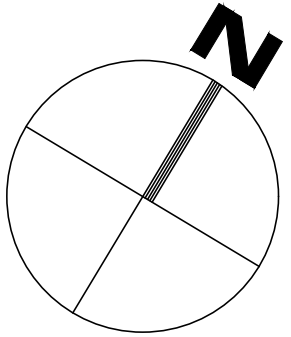
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BLD	04-10-2023

DATE	DATE
04-10-2023	04-10-2023
04-10-2023	04-10-2023

STORMWATER MANAGEMENT PLAN

HACP NVH - Family Recreational Area
525Mt Pleasant Road,
Pittsburgh, PA 15214

SHEET NUMBER:

SWM-03

APPENDIX G
PADEP PCSM WORKSHEETS

General Information

Instructions	General	Volume	Rate	Quality
Project Name:	HACP NVH - Family Recreational Area			Application Type: Other
County:	Allegheny			Municipality: Pittsburgh City
Project Type:	Other			☒ New Project ☐ Minor / Major Amendment
Area: (In Watershed)	1.74	acres		Total Earth Disturbance: (In Watershed) 0.98 acres
No. of Post-Construction Discharge Points:	1			Start DP Numbering at: 001

Volume Management

Project: HACP NVH - Family Recreational Area

Instructions General **Volume** Rate Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): 2.34 inches Alternative 2-Year / 24-Hour Storm Event 2.3 inches

Alternative Source: City of Pittsburgh Future Climate Change Rainfall

Pre-Construction Conditions: No. Rows: 2 ☐ 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)	0.30	B	98	0.041	2.11	2,300
Pervious as Meadow	0.68	B	58	1.448	0.10	241
TOTAL (ACRES):		0.98	TOTAL (CF):			2,541

Post-Construction Conditions: No. Rows: 3

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)	0.60	B	98	0.041	2.11	4,599
Woods (Good Condition)	0.22	A	30	4.667	0.00	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.16	B	58	1.448	0.10	57
TOTAL (ACRES):		0.98	TOTAL (CF):			4,656

NET CHANGE IN VOLUME TO MANAGE (CF): 2,115

Non-Structural BMP Volume Credits:

☒ Other (attach calculations):

Description:

See page 5 of Stormwater Management Plan Design Report

CREDIT (CF):

3,850

Structural BMP Volume Credits: No. Structural BMPs: Start BMP Numbering at:

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)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
			-											

Totals:

INFILTRATION & ET CREDITS (CF):

NET CHANGE IN VOLUME TO MANAGE (CF):

2,115

TOTAL CREDITS (CF):

3,850

VOLUME REQUIREMENT SATISFIED

Rate Control

Project: HACP NVH - Family Recreational Area

Instructions

General

Volume

Rate

Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	2.34
NOAA 10-Year 24-Hour Storm Event (in):	3.29
NOAA 50-Year 24-Hour Storm Event (in):	4.38
NOAA 100-Year 24-Hour Storm Event (in):	4.89

Alternative 2-Year 24-Hour Storm Event (in):	2.3
Alternative 10-Year 24-Hour Storm Event (in):	3.9
Alternative 50-Year 24-Hour Storm Event (in):	5.6
Alternative 100-Year 24-Hour Storm Event (in):	6.4

☒ Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

Peak Discharge Rates (cfs)			
	Pre-Construction	Post-Construction	Net Change
2-Year Storm:	0.70	0.40	-0.30
10-Year Storm:	2.10	2.00	-0.10
50-Year Storm:	4.10	4.10	0.00
100-Year Storm:	5.10	5.00	-0.10

Rate Control Satisfied

Rate Control Satisfied

Rate Control Satisfied

Rate Control Satisfied

Water Quality

Project: HACP NVH - Family Recreational Area

PRINT

Instructions

General

Volume

Rate

Quality

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.30	D	2,300	65.0	0.29	2.05	9.33	0.04	0.29
Pervious as Meadow	Grassland/Herbaceous	0.68	B	241	48.8	0.22	2.30	0.74	0.00	0.03
TOTAL (ACRES):		0.98			TOTALS:			10.07	0.04	0.33

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.60	D	4,599	65.0	0.29	2.05	18.67	0.08	0.59
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.22	A	0	45.0	0.13	1.05	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.16	B	57	48.8	0.22	2.30	0.17	0.00	0.01
TOTAL (ACRES):		0.98			TOTALS:			18.84	0.08	0.60

☒ Characterize Undetained Areas (for Untreated Stormwater)

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%)	0.39	B	61	1.279	0.15	214
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.29	D	98	0.041	2.11	2,223

Non-Structural BMP Water Quality Credits:

☒ Pervious Undetained Area Credit

TSS	TP	TN
0.16	0.00	0.00

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

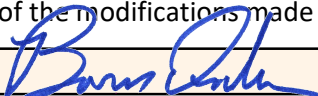
☒ Use default BMP Outflows and Median BMP Outflow Concentrations

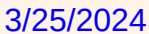
DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
			-											

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	0.00	0.00	0.00
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	10.06	0.04	0.30
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	0.16	0.00	0.00
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	9.90	0.04	0.30
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	10.07	0.04	0.33
WATER QUALITY REQUIREMENT SATISFIED			

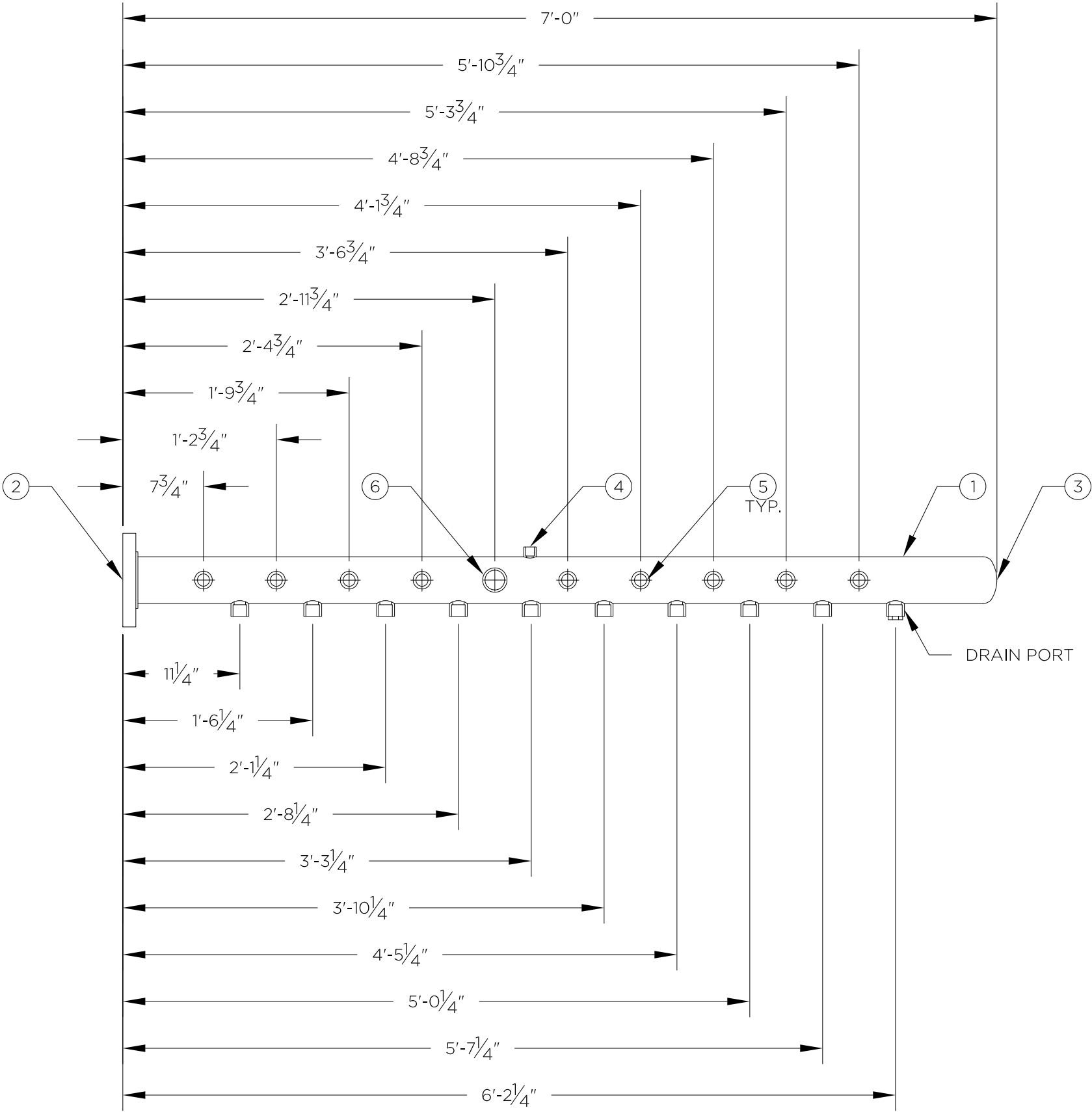
CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

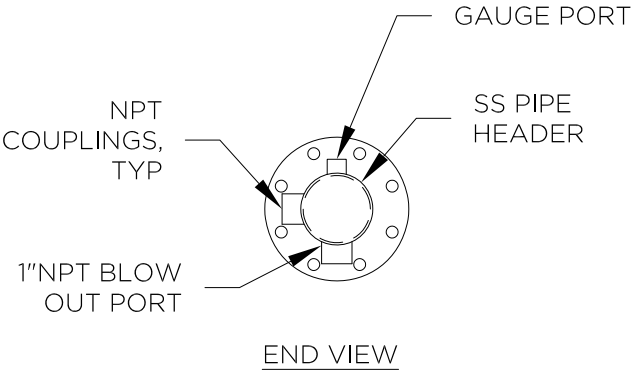

Spreadsheet User Name


Date

Distribution Manifold Fabrication



ITEM	DESCRIPTION	PART #	QTY
1	4" STAINLESS STEEL PIPE	????	1
2	4" STAINLESS STEEL FLANGE	????	1
3	4" STAINLESS STEEL CAP	????	1
4	1/4" NPT STAINLESS STEEL HALF COUPLING	????	1
5	1" NPT STAINLESS STEEL HALF COUPLING	????	19
6	1/2" NPT STAINLESS STEEL HALF COUPLING	????	1



WARNING:
NOT INTENDED FOR USE WITH COMPRESSED
AIR OR GAS. THIS PRODUCT IS ONLY TO BE
USED FOR ITS INTENDED PURPOSE

NOTE:
MANUALLY OPERATED BALL VALVES AND SOLENOID
VALVES FOR FEATURE SUPPLY LINES SHIPPED LOOSE
FOR INSTALLATION IN THE FIELD.

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by landscape structures

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2/10/22

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1154020-HDR

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SHEET TITLE
CHARTERS SPLASH PAD
DISTRIBUTION MANIFOLD FABRICATION

JOB NO.
1154020

NO.
A

REVISION
RELEASE FOR FABRICATION

DATE
2/14/22

1
OF
1

Aquavator Bollard

Structure:

Stainless Steel Fabrication
(see specification for details)

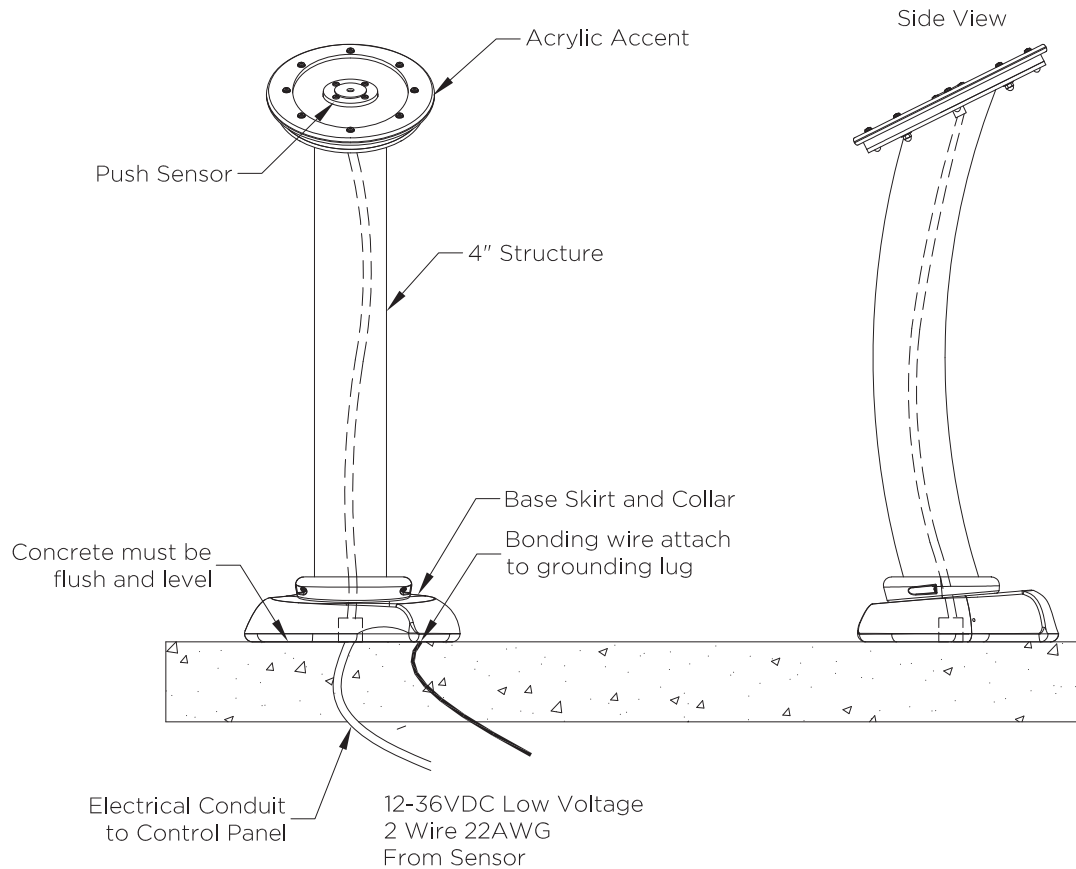
Acrylic Accents
(see specification for details)

Skirt
Fiberglass Fabrication
(see specification for details)

Collar
Urethane
(see specification for details)

Aquavator Data:

Recommended Distance From Aquavator(s) to
Control Panel 50'



Aquavator:

Model No.	Description
300126	Bulldog Aquavator



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AQUAVATOR

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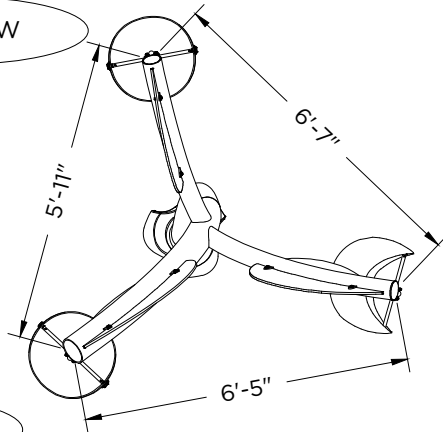
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Buckettrio With Acrylic Cut Sheet

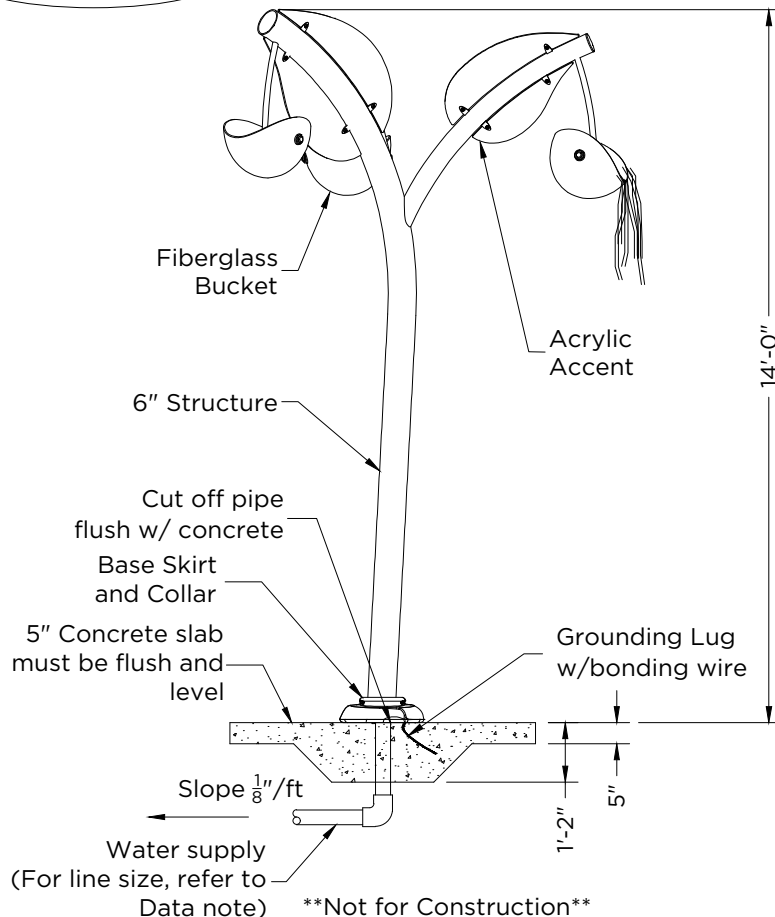
NOTES

1. Valve must be installed on supply line to regulate flow.
2. Shut off valve must be installed on drain line.
3. Concrete mounting surface for structure installation needs to be level and flat.
4. Supply line is based on the designated flow rates for structure.
5. Underground plumbing to be designed for winterization.
6. Consult local electrical inspector for grounding.
7. Concrete will need to be cured a minimum of 7 days before installing structure.
8. Product may require a strainer on the water feed line. consult with manufacturer.
9. Product specifications are subject to change.

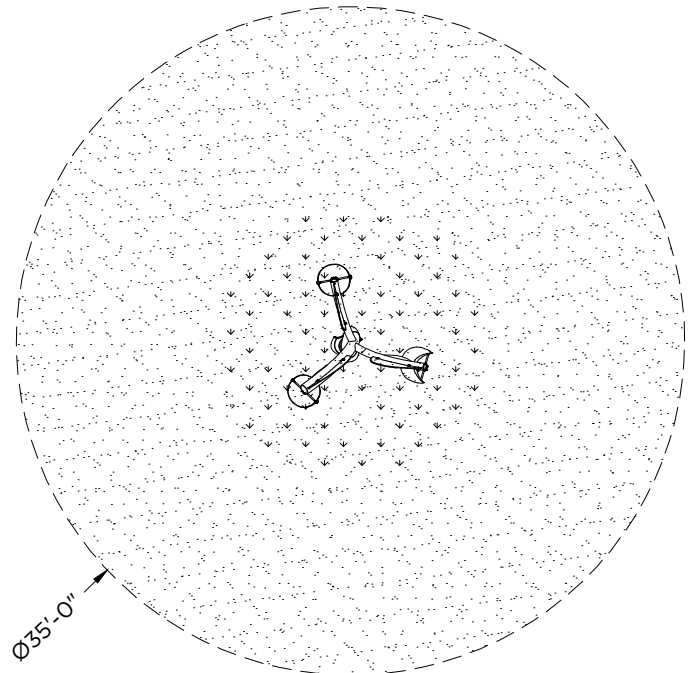
TOP VIEW



FRONT VIEW



SPLASH ZONE



Splash Zone-Not to Scale

Splash Zone Notes:

Splash zones are approximate, actual splash may vary based on various environmental conditions, flow rates, slope of splash pad, submergence depth and wind.

PRODUCT OPTIONS

Structure:

Stainless Steel Fabrication.
(see specification for details)

Fiberglass Bucket Fabrication
(see specification for details)

Acrylic Accent Fabrication
(see specification for details)

Skirt
Fiberglass Fabrication
(see specification for details)

Collar
Urethane
(see specification for details)

DATA

Flow: 15 GPM
Pressure: 8 PSI
Supply Line: 1/2" Pipe
Installation: Flange Mount to Concrete

Cast in SS Nozzle Socket

NOTES

1. Valve must be installed on supply line to regulate flow.
2. Ground spray is designed to be encapsulated in concrete pad.
3. Supply line is based on the designated flow rates for structure.
4. Underground plumbing to be designed for winterization.
5. Consult local electrical inspector for grounding.
6. Product may require a strainer on the water feed line. Consult with manufacturer.
7. Do not exceed 20 feet per second velocity.
8. Product specifications are subject to change.

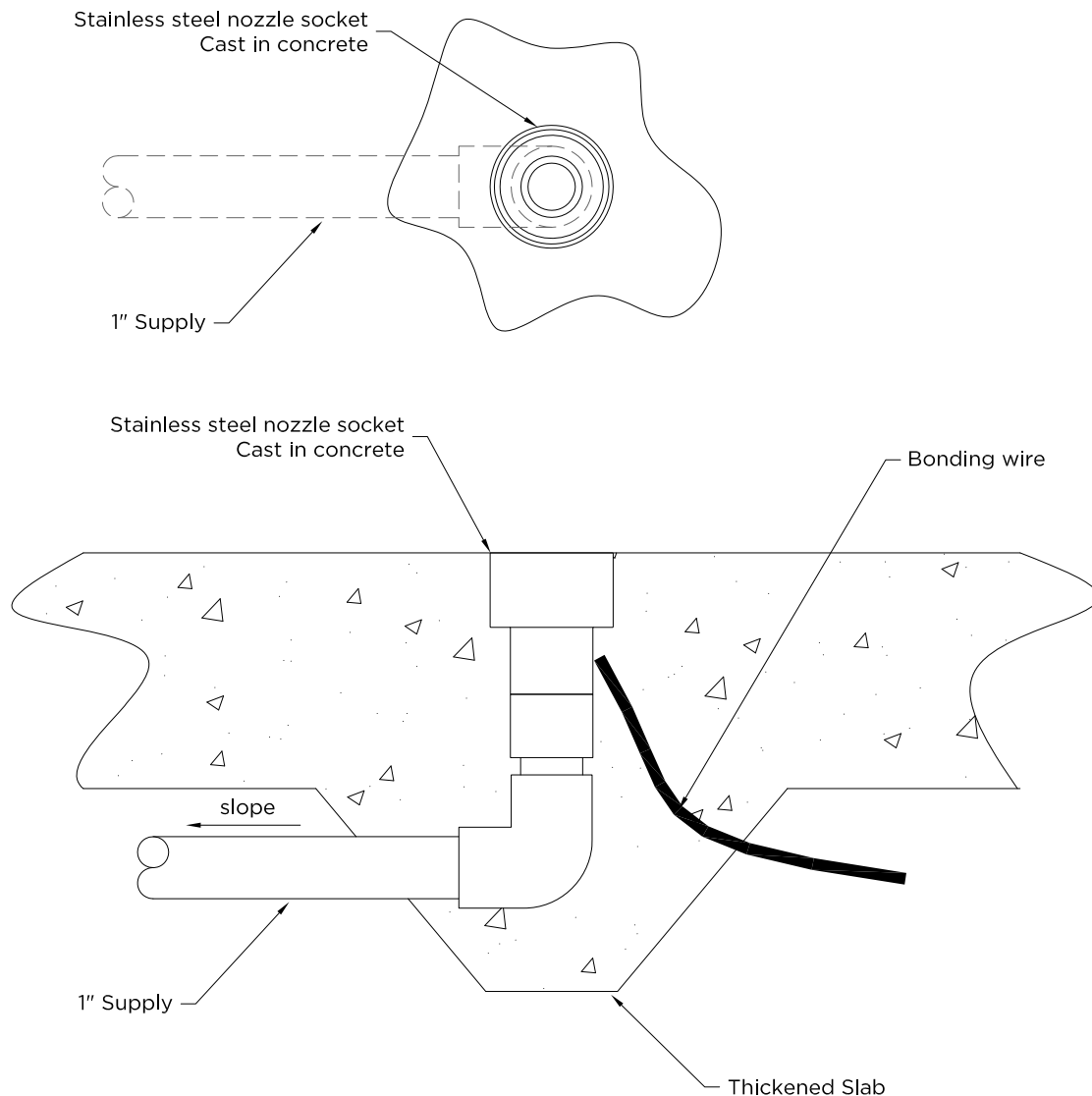
PRODUCT OPTIONS

Structure Pod:

Stainless Steel Fabrication
(see specification for details)

DATA

Installation: Cast In Concrete
Supply Line: 1" Pipe



****Not for Construction****



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CAST IN SS NOZZLE SOCKET

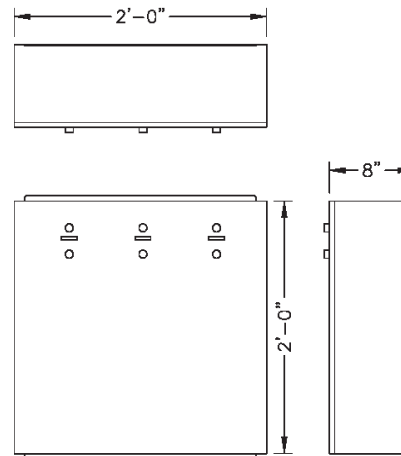
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Controller Manifold Drain



Control Panel

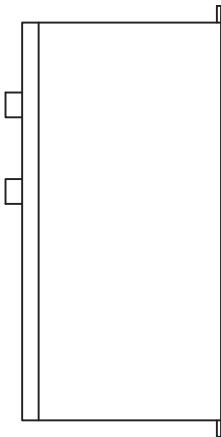
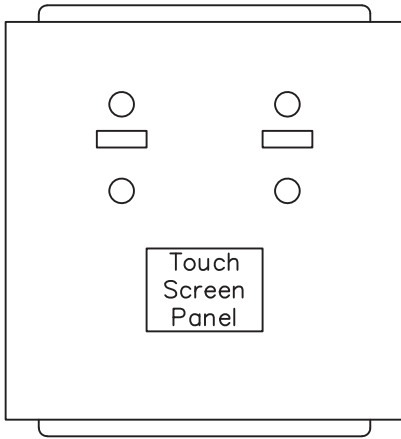
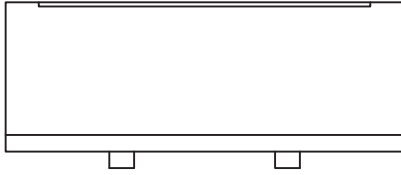
Control Panel to be UL listed and used to control simple on/off operations of water play activities or incorporate operation interface Programmable Logic Controller, (PLC), to create splash pad zoning or sequencing activities.

To be UL listed and may consist of:

- Pump(s) motor starters
- Time clock controls to set hours of operation and set duration time of activated devices
- VFD pump controls
- Flow switch controls
- Pressure transducer controls
- Power feeds to manifold distribution solenoid valves
- Activation Bollard relay switches
- Chemical treatment system power feed
- Vault internal electrical distribution
- Waste valve box relay & power feed
- Water heater relay
- All NEMA rated components
- NEMA 4 enclosure

*All control panels are designed for specific projects

City Water Control Panel (Touch Screen):



Power Feeds to Manifold: _____ (# of Valves)

Activation Relay: _____ (# of Activators)

Location of Touch Screen: Inside / Outside
(Inside of the panel or Visual on Outside Of panel)

Standard Main Power Supply:

120 volts Single phase Project Specific amps

(*Power Supply to be GFI protected.)

Note:

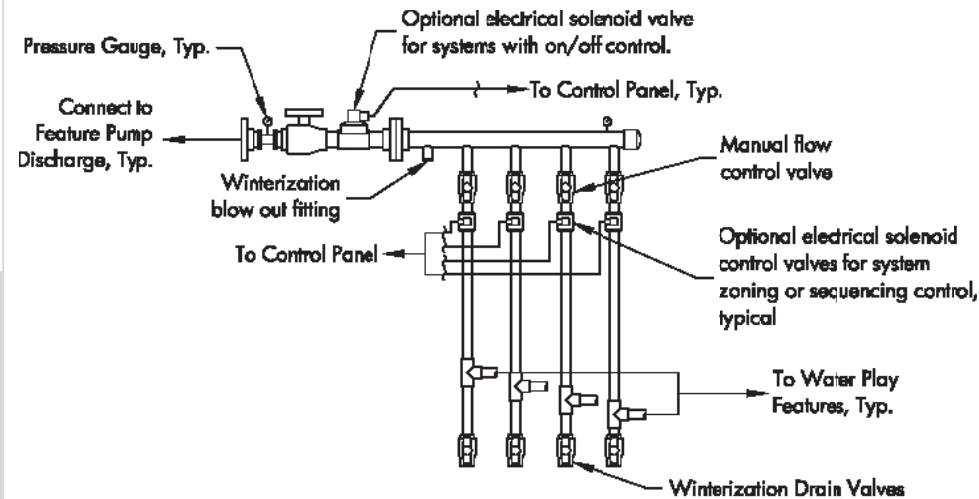
-Information provided is preliminary except the required mainpower supply

NOTE:

-ALL DIMENSIONS ARE APPROXIMATE & WILL NEED TO BE VERIFIED.
-PANEL LOCATION CAN BE EITHER REMOTE OR ADJACENT TO
WATER DISTRIBUTION MANIFOLD.

City Water Control Panel:

<u>Model No.</u>	<u>Description</u>
CP-TSC	Touch Screen Controls



Distribution Manifold- SS

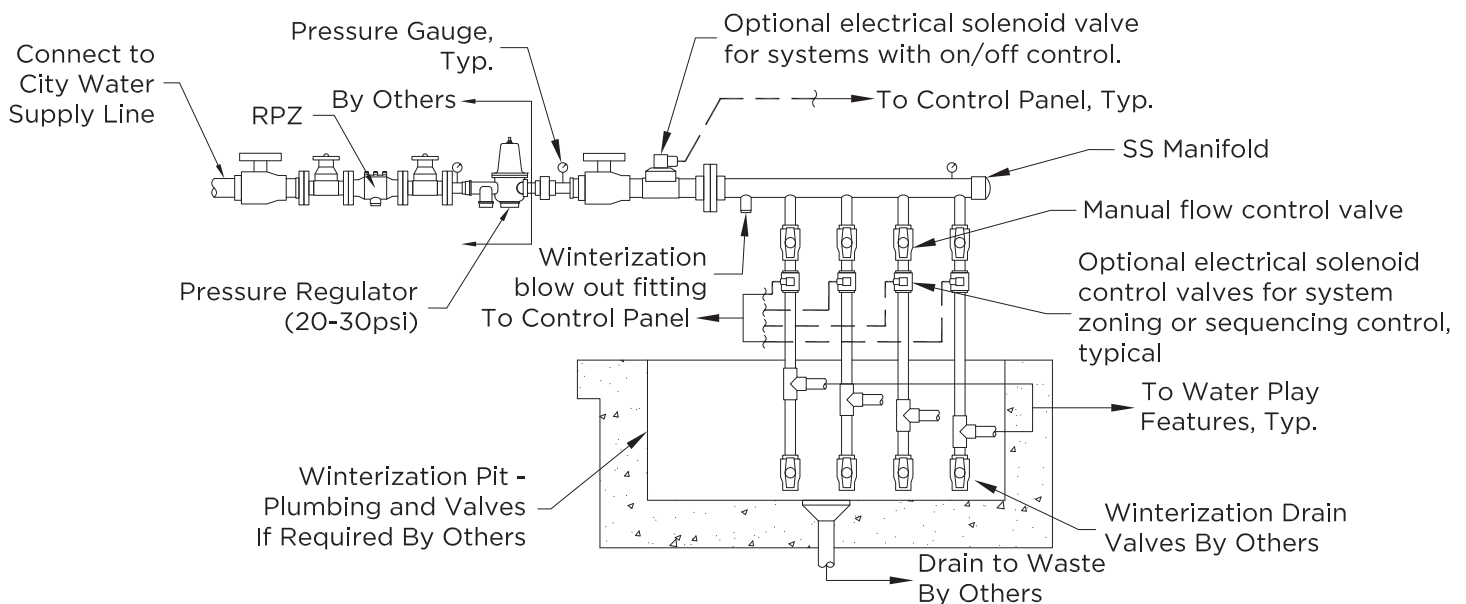
Distribution Manifolds are pre-plumbed water delivery systems from feature pumping system to water play features. Standard distribution manifolds consist of manual flow control valves that regulate water flow levels to each water element for on/off control systems. When creating water play zones or sequencing water play activities, standard distribution manifolds can be upgraded with electric valves or solenoid valves.

May Consist of:

- Available in Stainless Steel or Schedule 80 Gas Welded PVC prefabricated manifold
- Manual flow control valves
- Electrical solenoid valves
- Winterization blow out
- Pressure gauge

City Water Distribution Manifold (S.S.):

Total Feature Flow Rate:	Project Specific
Optional Zoning Electrical Control Valves:	Yes / No
Optional Sequencing Electrical Control Valves:	Yes / No
Number of Manifold Discharge Lines:	_____



Note:

- Configuration of manifold to be project specific.
- All discharge lines are supplied with manual ball valves to regulate flow.
- If system is designed for zone or sequencing, electrical activation valves will be added and controlled by PLC in control panel.
- To avoid erosion of copper supply line pipe, velocities should not exceed 8 feet per second.
- All plumbing lines and valving shall be installed per local codes and regulations

WARNING: NOT INTENDED FOR USE WITH COMPRESSED AIR OR GAS.

THIS PRODUCT IS ONLY TO BE USED FOR ITS INTENDED PURPOSE



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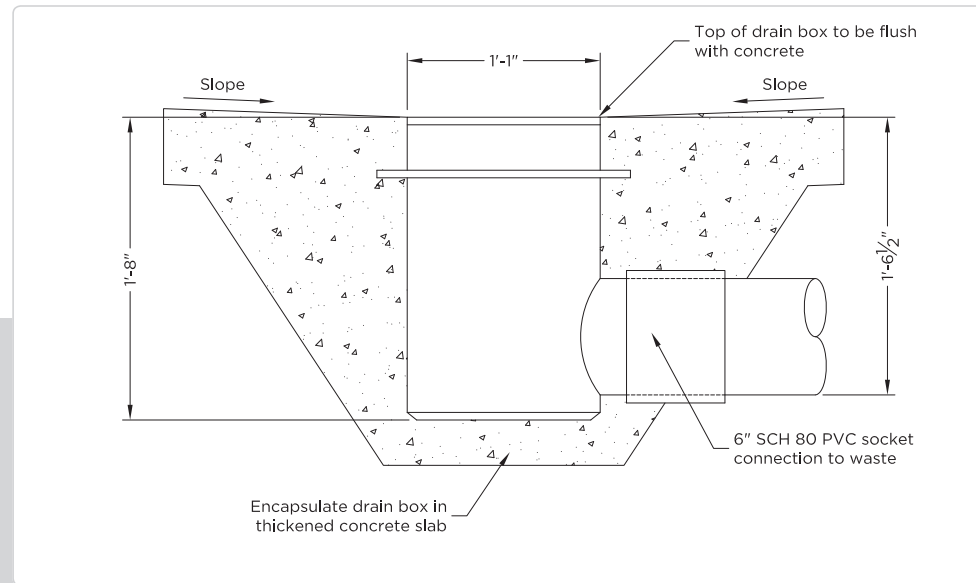
CITY WATER DISTRIBUTION MANIFOLD (S.S.)

JMJ
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SCALE

9/21/16
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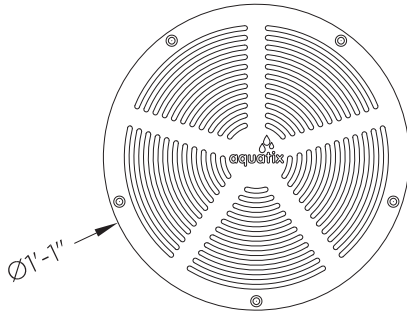
Drain Box

Drain Box to consist of 12 inch fiberglass sump for collection of splash pad water to water to waste or retainage area. Each drainbox is capable of 120 GPM gravity drainage.

May consist of:

- Structural plastic grating
- 12 inch sump
- Removable grate cover
- Foot friendly grate, flush mounted
- Drain is offered in a variety of colors

Top View

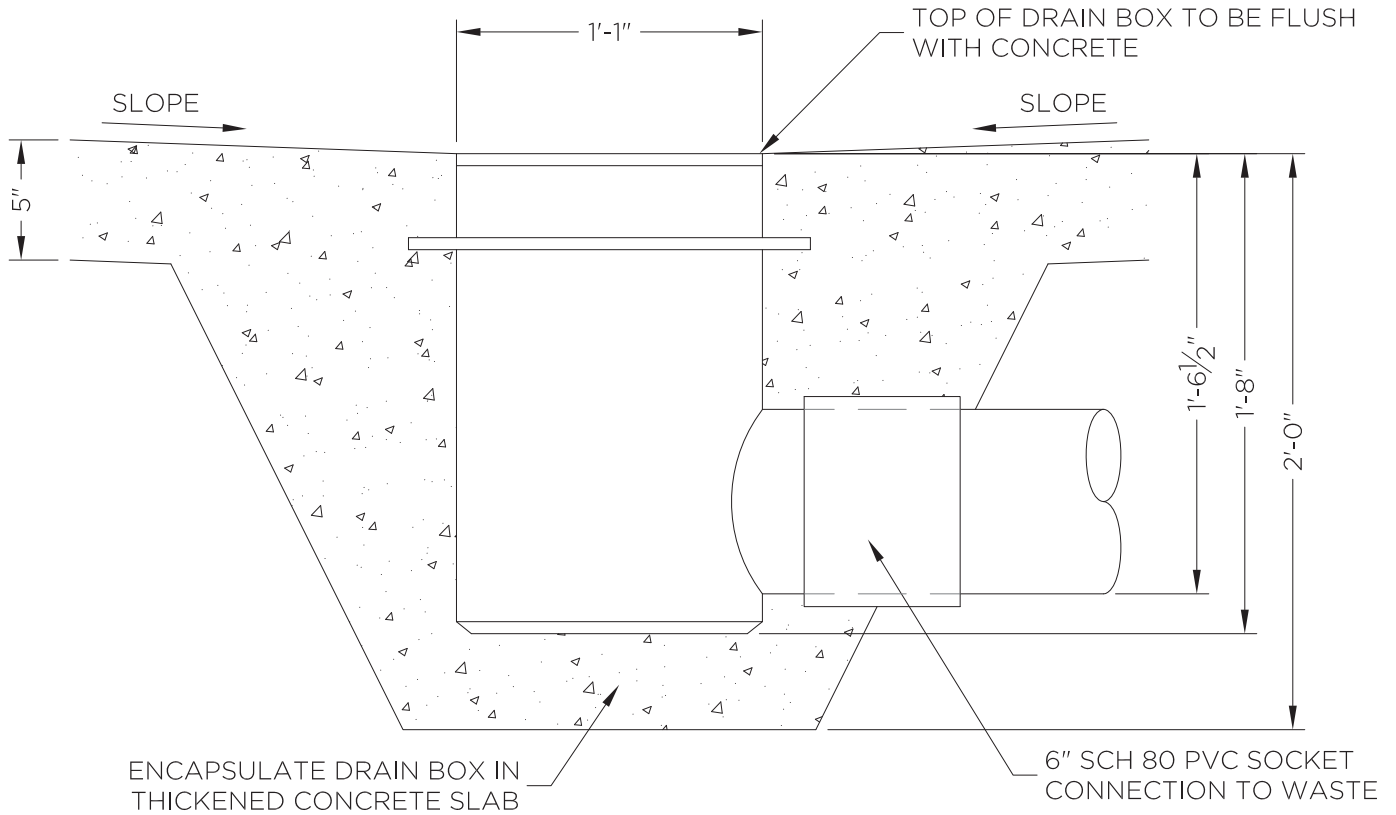


Drain Box Data:

Max 120 gpm Gravity Flow Per Unit

Note:

-Above information is preliminary. Exact number of collector boxes needed for splash pad design based on total feature flow rate, size of splash pad, drainage needs for splash pad layout, and elevation/distance of collector box(s) to waste.



Drain Box:

Model No.	Max. Gravity Flow Rate: (Per Box)
DB-120-6	120 gpm

Note:

-120gpm MAXIMUM drainage is based on a 1/4" per foot slope from 6" collector box drainage line to waste.

DRAIN BOX



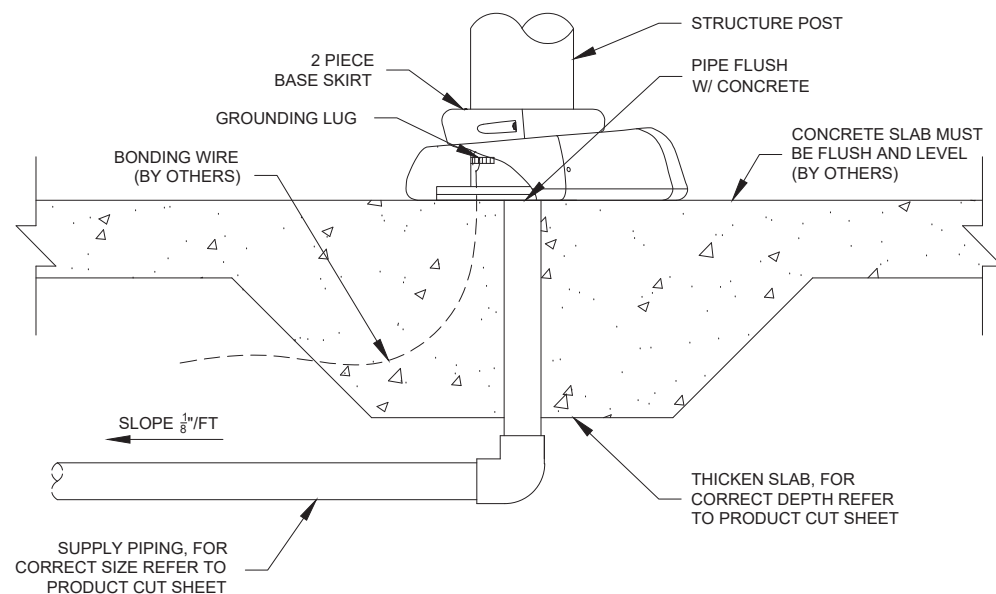
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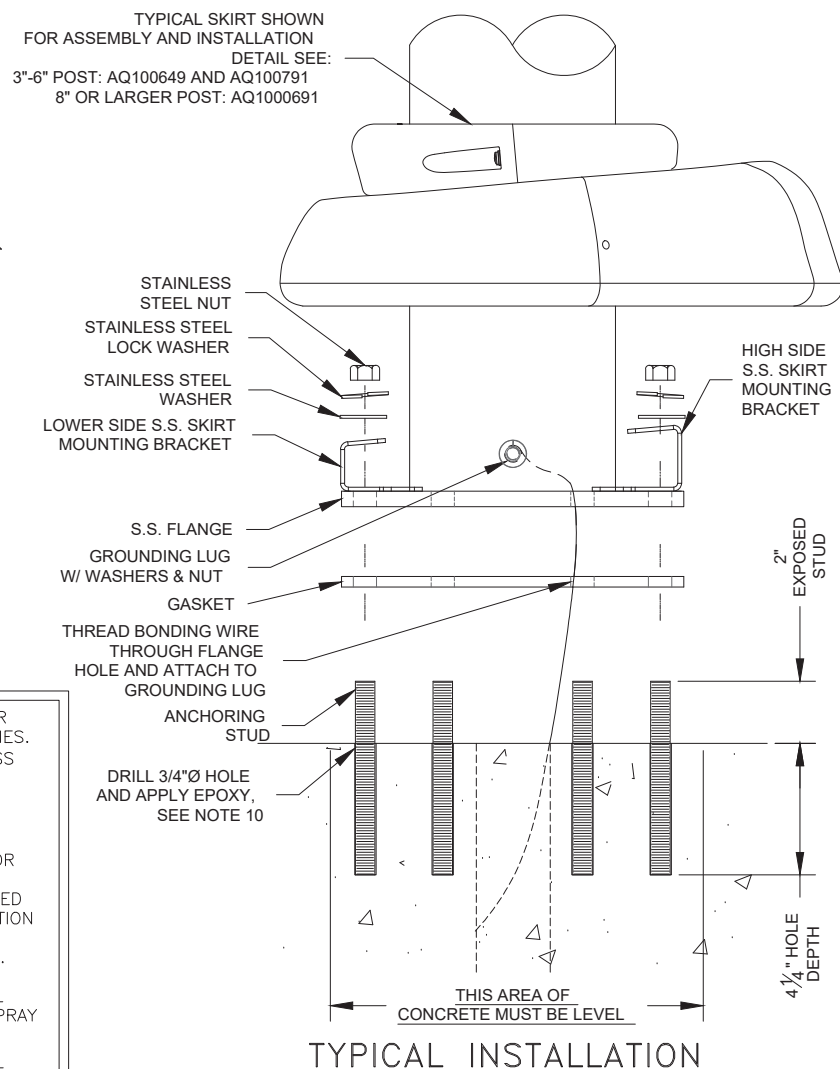
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2/3/21
DATE

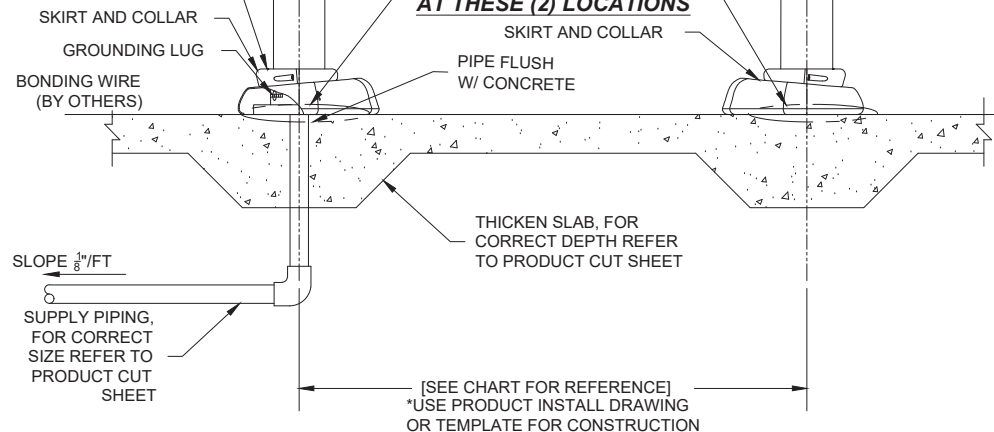
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- NOTES:**
1. THICKEN CONCRETE SLAB UNDER STRUCTURE.
 2. VERIFY LOCAL CODES FOR TYPE, THICKNESS & REINFORCEMENT REQUIREMENTS FOR CONCRETE SLAB. CONCRETE TO BE RATED FOR 4000 PSI MINIMUM.
 3. CONCRETE WILL NEED TO BE CURED A MINIMUM OF 7 DAYS BEFORE INSTALLING STRUCTURE.
 4. CONCRETE MOUNTING SURFACE FOR STRUCTURE INSTALLATION NEEDS TO BE LEVEL AND FLAT.
 5. SUPPLY LINE SIZE TO BE BASED ON DESIGNED FLOW RATE FOR STRUCTURE. SEE STRUCTURE INSTALLATION DRAWING FOR LINE SIZE.
 6. A VALVE MUST BE INSTALLED ON SUPPLY LINE TO REGULATE FLOW.
 7. PRODUCT MAY REQUIRE STRAINER ON SUPPLY LINE. CONSULT WITH MANUFACTURER.
 8. A SHUT OFF VALVE MUST BE INSTALLED ON OPTIONAL DRAIN LINE.
 9. AFTER MARKING HOLE LOCATIONS FOR ANCHOR STUDS, REMOVE STRUCTURE BEFORE DRILLING AND INSTALLING ANCHOR STUDS, AND VACUUM OUT HOLES TO REMOVE DEBRIS.
 10. REFER TO MANUFACTURER'S INSTRUCTIONS FOR EPOXY ANCHOR INSTALLATION AND CURING TIMES.
 11. USE 'ANTI-SEIZE LUBRICANT' ON ALL STAINLESS STEEL THREADED FASTENERS.
 12. USE LOC-TITE ONLY WHEN/WHERE SPECIFIED.
 13. TORQUE SPECS FOR 5/8-11 UNC MOUNTING BOLTS: 65 FT.LB.
 14. UNDERGROUND PLUMBING TO BE DESIGNED FOR WINTERIZATION.
 15. WINTERIZATION TO BE PERFORMED BY A TRAINED TECHNICIAN FAMILIAR WITH PROPER WINTERIZATION PROCEDURES.
 16. BOND IN ACCORDANCE WITH NEC ARTICLE 680.
 17. TO PREVENT DAMAGE OR PERSONAL INJURY, REMOVAL OF THE NOZZLE ASSEMBLIES OF ALL ABOVE GROUND STRUCTURES AND GROUND SPRAY EFFECTS IS REQUIRED DURING START-UP AND WINTERIZATION PROCEDURES.
 18. PRODUCT SPECIFICATIONS SUBJECT TO CHANGE.
 19. SPRAY EFFECT MAY VARY BASED ON VARIOUS ENVIRONMENTAL CONDITIONS, FLOW RATES, SLOPE OF SPLASH PAD, SUBMERGENCE DEPTH, AND WIND.

[illegible]

****PLEASE NOTE WHICH LEG IS THE WATER FEED LEG AND INSTALL THE STRUCTURE ACCORDINGLY**



TYPICAL SS DUAL LEG INSTALLATION ASSEMBLY

3/4" = 1'-0"

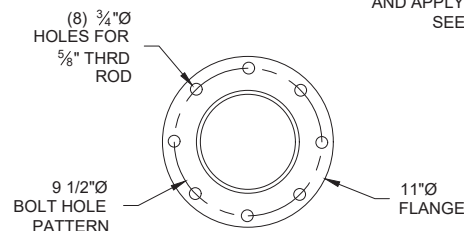
DISTANCE BETWEEN CENTER OF FLANGES FOR REFERENCE ONLY	
WATER BAR	5'-6"
WATER ARCH	5'-7 1/2"
RIPLERUN SMALL (W & W/O ACRYLIC)	8'-7"
RIPLERUN MEDIUM (W & W/O ACRYLIC)	9'-7 1/2"
RIPLERUN LARGE (W & W/O ACRYLIC)	10'-7 3/4"
ALL FULL WATER RAINBOWS	11'-0"
WATERWAY	5'-6"
THEME ARCH (SEVERAL)	11'-0"

*DO NOT USE FOR CONSTRUCTION

NOTES:

- THICKEN CONCRETE SLAB UNDER STRUCTURE.
- VERIFY LOCAL CODES FOR TYPE, THICKNESS, & REINFORCEMENT REQUIREMENTS FOR CONCRETE SLAB. CONCRETE TO BE RATED FOR 4000 PSI MINIMUM.
- A VALVE MUST BE INSTALLED ON SUPPLY LINE TO REGULATE FLOW.
- A SHUT OFF VALVE MUST BE INSTALLED ON DRAIN LINE.
- AFTER MARKING HOLE LOCATIONS, REMOVE STRUCTURE WHEN DRILLING & INSTALLING ANCHORING STUDS.
- REFER TO MANUFACTURERS INSTRUCTIONS FOR EPOXY INSTALLATION AND CURING TIMES.
- USE 'ANTI-SEIZE LUBRICANT' ON ALL S.S. THREADED FASTENERS.
- USE LOC-TITE ONLY WHERE/WHEN SPECIFIED.
- TORQUE SPECS FOR 5/8-11UNC MOUNTING NUTS: 65 FT.LB.
- WINTERIZATION TO BE PERFORMED BY A TRAINED TECHNICIAN FAMILIAR WITH PROPER WINTERIZATION PROCEDURES.
- TO PREVENT DAMAGE OR PERSONAL INJURY, REMOVAL OF THE NOZZLE ASSEMBLIES OF ALL ABOVE GROUND STRUCTURES AND GROUND SPRAY EFFECTS IS REQUIRED DURING STARTUP AND WINTERIZATION PROCEDURES.

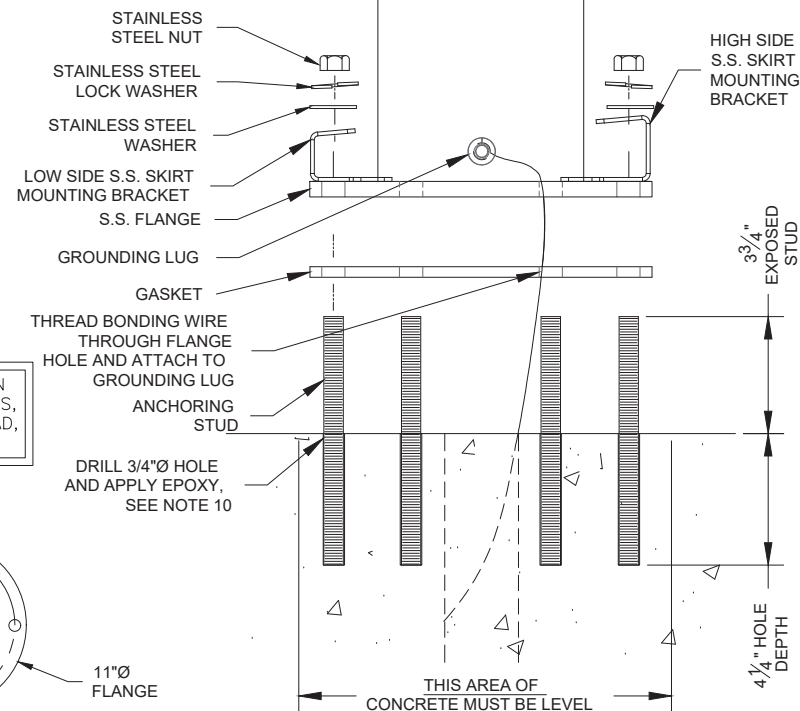
SPRAY EFFECT MAY VARY BASED ON VARIOUS ENVIRONMENTAL CONDITIONS, FLOW RATES, SLOPE OF SPLASH PAD, SUBMERGENCE DEPTH, AND WIND.



BOLT HOLE PATTERN

1 1/2" = 1'-0"

SEE 100649 FOR SKIRT ASSEMBLY AND INSTALLATION



TYPICAL INSTALLATION

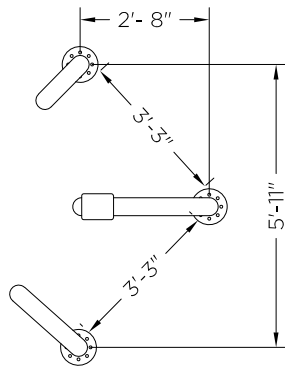
3" = 1'-0"

Reeds Cutsheet

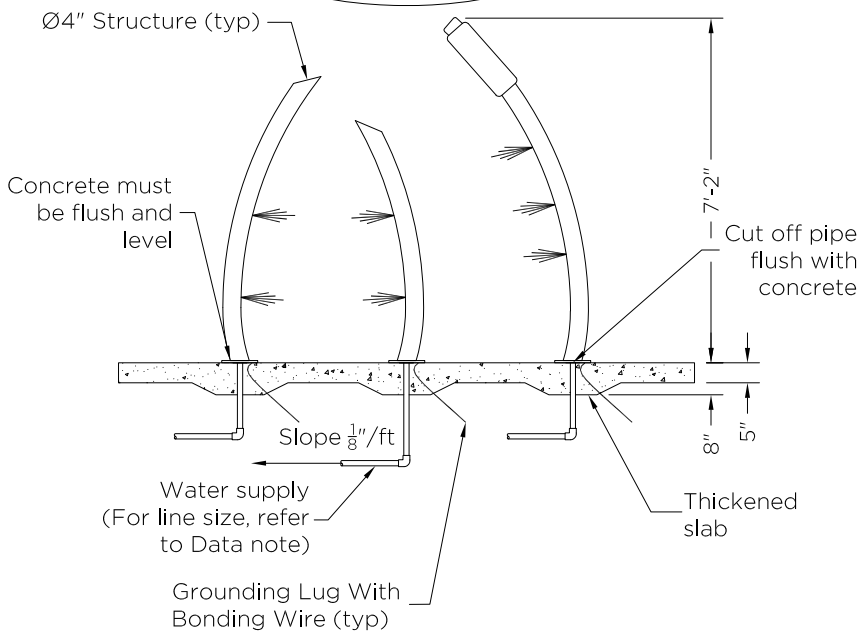
NOTES

1. Valve must be installed on supply line to regulate flow.
2. Concrete mounting surface for structure installation needs to be level and flat.
3. Supply line is based on the designated flow rates for structure.
4. Underground plumbing to be designed for winterization.
5. Consult local electrical inspector for grounding.
6. Concrete will need to be cured a minimum of 7 days before installing structure.
7. Product may require a strainer on the water feed line. consult with manufacturer.
8. Product specifications are subject to change.

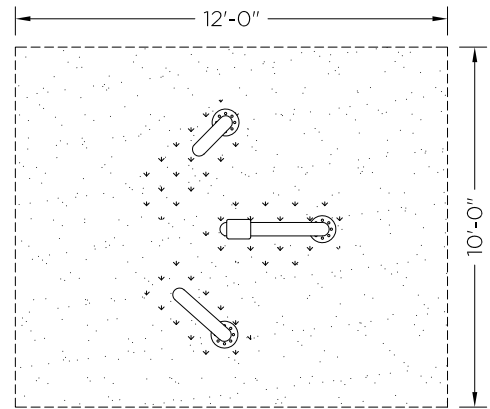
TOP VIEW



FRONT VIEW



SPLASH ZONE



Splash Zone-Not to Scale

Splash Zone Notes:

Splash zones are approximate, actual splash may vary based on various environmental conditions, flow rates, slope of splash pad, submergence depth and wind.

PRODUCT OPTIONS

Structure:

Stainless Steel Fabrication.
(see specification for details)

DATA

Flow: 10 GPM
Pressure: 15 PSI
Supply Line: (3) 1" Pipe
Installation: Flange Mount to Concrete

Not for Construction



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REEDS

JLS
DRAWN BY

1/4"=1'-0"
SCALE

1/2/19
DATE

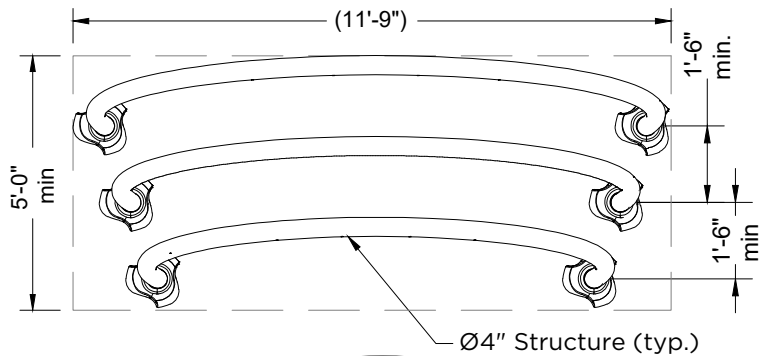
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Ripplerrun Cut Sheet

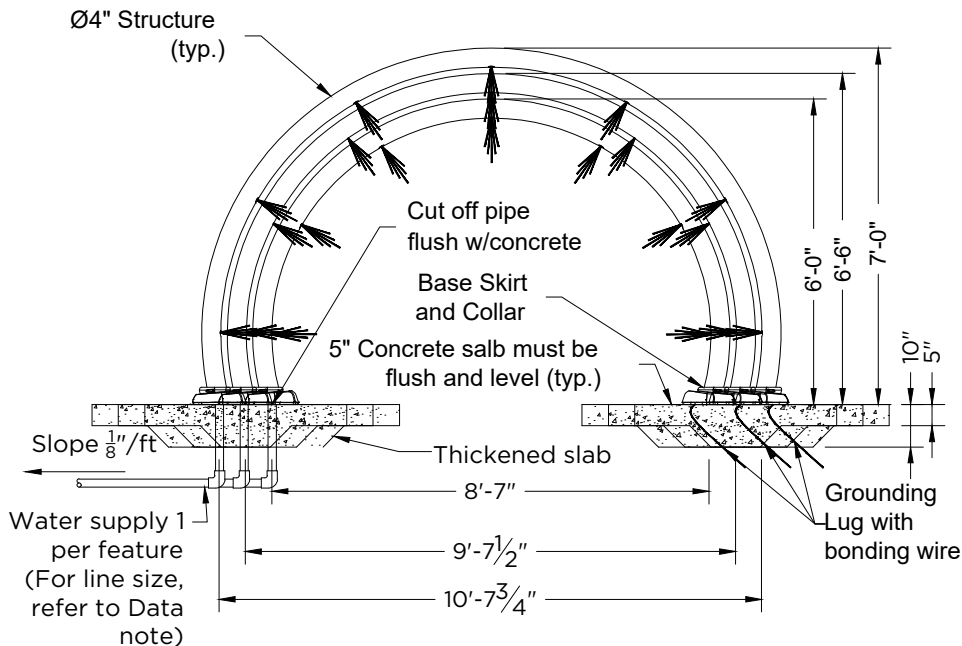
NOTES

1. Valve must be installed on supply line to regulate flow.
2. Shut off valve must be installed on drain line.
3. Concrete mounting surface for structure installation needs to be level and flat.
4. Supply line is based on the designated flow rates for structure.
5. Underground plumbing to be designed for winterization.
6. Consult local electrical inspector for grounding.
7. Concrete will need to be cured a minimum of 7 days before installing structure.
8. Product may require a strainer on the water feed line. consult with manufacturer.
9. Product specifications are subject to change.

TOP VIEW

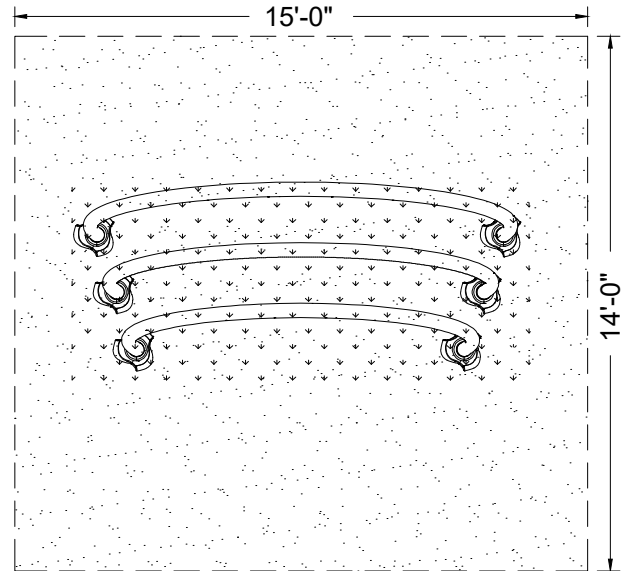


FRONT VIEW



Not for Construction

SPLASH ZONE



Splash Zone-Not to Scale

Splash Zone Notes:

Splash zones are approximate, actual splash may vary based on various environmental conditions, flow rates, slope of splash pad, submergence depth and wind.

PRODUCT OPTIONS

Structure:

Stainless Steel Fabrication.
(see specification for details)

Skirt
Fiberglass Fabrication
(see specification for details)

Collar
Urethane
(see specification for details)

* Water Supply
Both legs are available for water feed
(per rung)

DATA

Flow Range: 30 GPM
Pressure: 15 PSI
Supply Line: (3) 1" Pipes
Installation: Flange Mount to Concrete

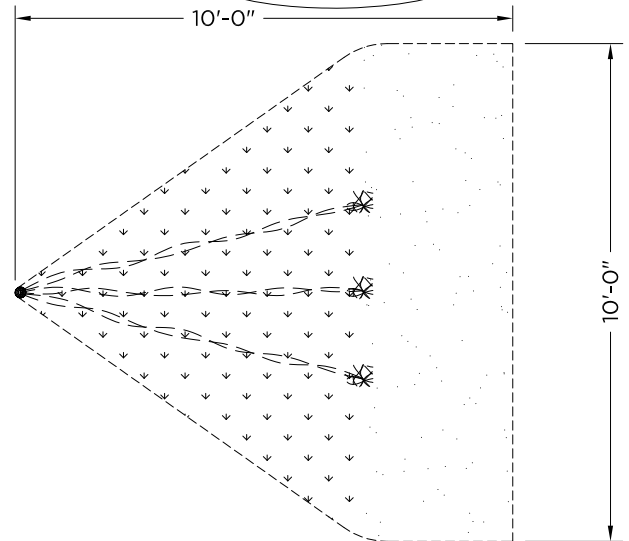
Triple Arch Jet SS Nozzle Cutsheet

NOTES

1. Product may require a strainer on the water feed line.
Consult with manufacturer.
2. Do not exceed 20 feet per second velocity.
3. Product specifications are subject to change.



SPLASH ZONE

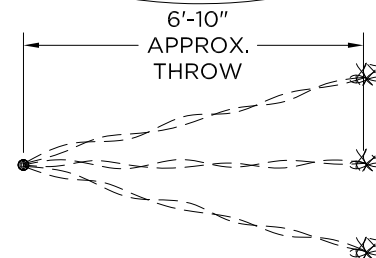


Splash Zone-Not to Scale

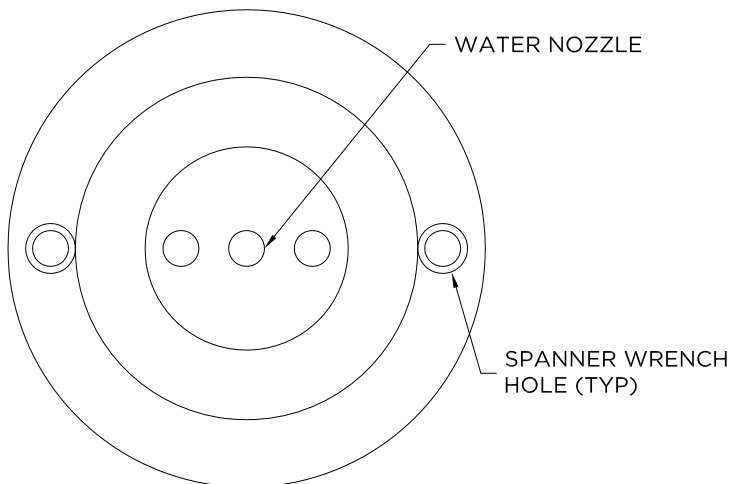
Splash Zone Notes:

Splash zones are approximate, actual splash may vary based on various environmental conditions, flow rates, slope of splash pad, submergence depth and wind.

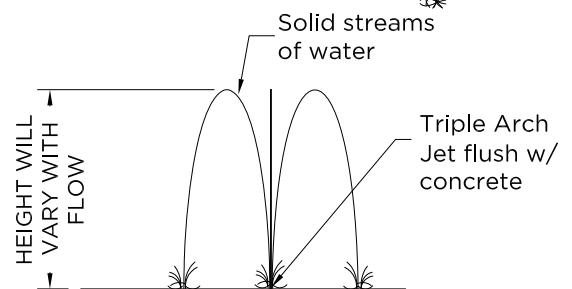
WATER EFFECT



TOP VIEW



SEE MOUNTING OPTIONS



PRODUCT OPTIONS

Structure:

Stainless Steel
(see specification for details)

DATA

High Flow: 5 GPM (4 ft. high)
Low Flow: 2.5 GPM (2 ft. high)
Pressure: 4 PSI

Not for Construction



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STAINLESS STEEL TRIPLE ARCH JET NOZZLE

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SCALE

1/10/19
DATE

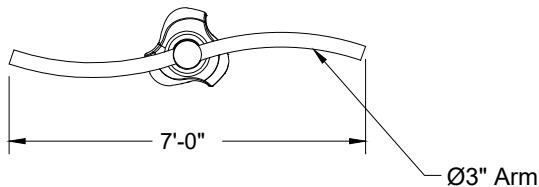
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Uniflow Cut Sheet

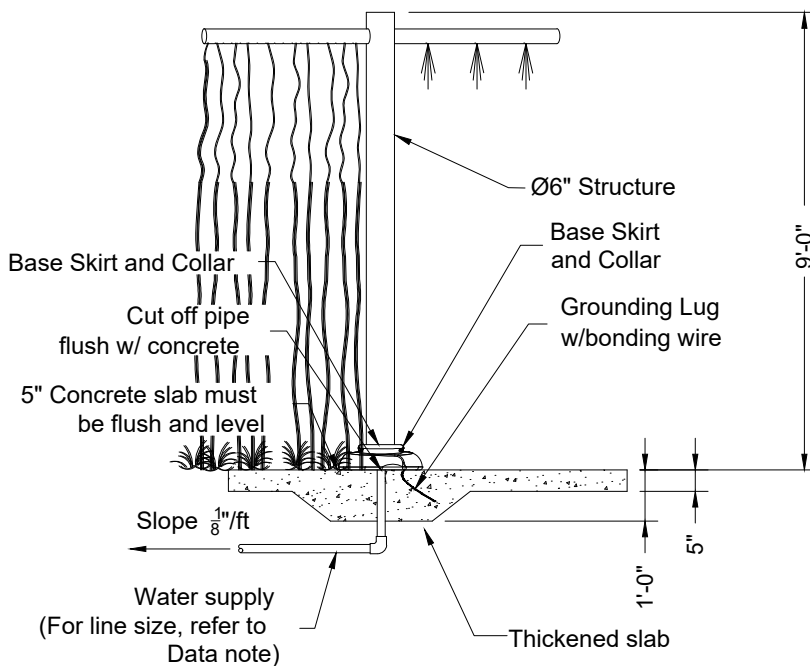
NOTES

1. Valve must be installed on supply line to regulate flow.
2. Shut off valve must be installed on drain line.
3. Concrete mounting surface for structure installation needs to be level and flat.
4. Supply line is based on the designated flow rates for structure.
5. Underground plumbing to be designed for winterization.
6. Consult local electrical inspector for grounding.
7. Concrete will need to be cured a minimum of 7 days before installing structure.
8. Product may require a strainer on the water feed line. consult with manufacturer.
9. Product specifications are subject to change.

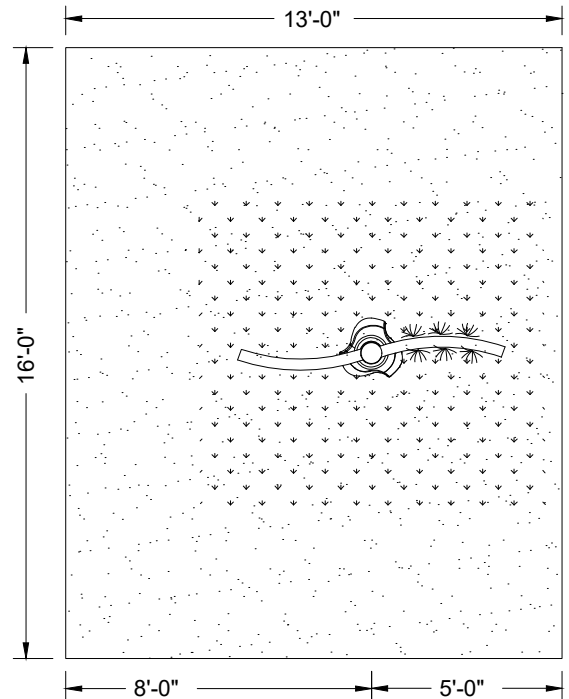
TOP VIEW



FRONT VIEW



SPLASH ZONE



Splash Zone-Not to Scale

Splash Zone Notes:

Splash zones are approximate, actual splash may vary based on various environmental conditions, flow rates, slope of splash pad, submergence depth and wind.

PRODUCT OPTIONS

Structure:

Stainless Steel Fabrication.
(see specification for details)

Skirt
Fiberglass Fabrication
(see specification for details)

Collar
Urethane
(see specification for details)

DATA

Flow Range: 5 TO 20 GPM
Pressure: 15 PSI
Supply Line: 1" TO 1 1/2" Pipe
Installation: Flange Mount to Concrete

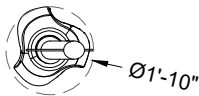
Not for Construction

Vaporarc Acrylic Cut Sheet

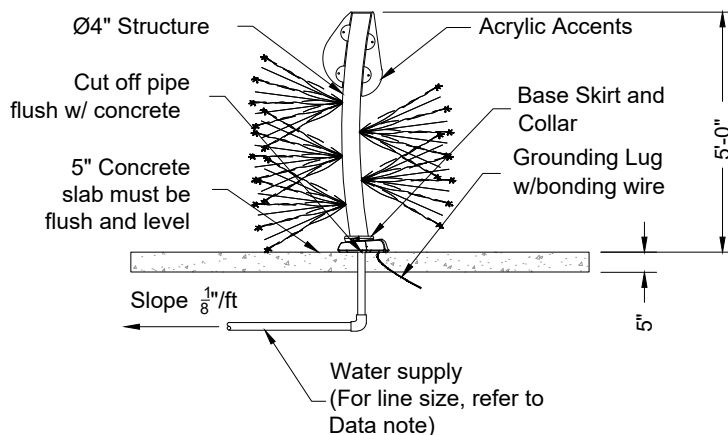
NOTES

1. Valve must be installed on supply line to regulate flow.
2. Shut off valve must be installed on drain line.
3. Concrete mounting surface for structure installation needs to be level and flat.
4. Supply line is based on the designated flow rates for structure.
5. Underground plumbing to be designed for winterization.
6. Consult local electrical inspector for grounding.
7. Concrete will need to be cured a minimum of 7 days before installing structure.
8. Product may require a strainer on the water feed line. consult with manufacturer.
9. Product specifications are subject to change.

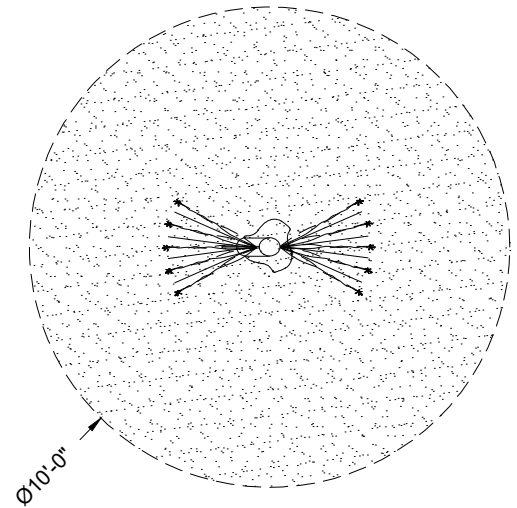
TOP VIEW



FRONT VIEW



SPLASH ZONE



Splash Zone-Not to Scale

Splash Zone Notes:

Splash zones are approximate, actual splash may vary based on various environmental conditions, flow rates, slope of splash pad, submergence depth and wind.

PRODUCT OPTIONS

Structure:

Stainless Steel Fabrication.
(see specification for details)

Acrylic Accents
(see specification for details)

Skirt
Fiberglass Fabrication
(see specification for details)

Collar
Urethane
(see specification for details)

DATA

Flow: 10 TO 20 GPM
Pressure: 15 PSI
Supply Line: 1" TO 1½" Pipe
Installation: Flange Mount to Concrete

Not for Construction



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VAPORARC ACRYLIC

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SCALE

11/12/18
DATE

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