CIVIL ENGINEERING
ENVIRONMENTAL
SURVEYING
LANDSCAPE ARCHITECTURE
GEOTECHNICAL

STORMWATER MANAGEMENT REPORT

248 Stickles Pond Road
Block 151 Lot 21
Andover Township
Sussex County, New Jersey

Prepared For:
BHT Properties Group
5081 SW 48th Street, 1023
Davie, Florida 33314

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1. PROJECT DESCRIPTION

1.1 Existing Conditions

The site is identified as 248 Stickles Pond Road and is located in the Township of Andover, County of Sussex, New Jersey. The tax parcel designation is Block 151, Lot 21. This project's overall property is the former Newton Airport. It is bordered by Stickles Pond to the Northeast and the Pequest River to the Northwest along the property lines. The total parcel area is 4,393,962 ft^2 (± 100.87 acres). The existing development features consist of 3 unoccupied buildings, multiple barns, multiple trailers and detached garages, paved driveways and an asphalt runaway. Currently, the site land cover consists of grassland and wooded areas. Field investigation for wetlands discovered the presence of freshwater wetlands on the property. The topographic relief of the property ranges from 588 to 645 feet about MSL. The surface topography fluctuates from moderately flat land along Stickles Pond Road, the southern part of the property, to various steep sections scattered throughout the property. There are no existing stormwater conveyance on the site that collects the generated stormwater runoff. Therefore, the stormwater runoff generated within the site is in its majority contained within the site boundaries and the remaining runoff it discharges toward the adjacent properties and Stickles Pond.

1.2 Proposed Conditions

The project proposes the construction of a ±12,860 square feet construction office building with storage areas designated to store construction equipment and construction materials such as aggregate, stones and other typical construction materials. The surface cover for the storage areas is asphalt millings. Access and parking on the site will include a two-way driveway from Stickles Pond Road and surface paved parking along the frontage of the office building. Amenities proposed for the site include a proposed concrete sidewalk along the front, side, and rear of the proposed building. The total limit of disturbance created by the proposed development is ±61.65 acres (±62% of the total area of the site) and the net increase in impervious coverage is ±43.17 acres. The project is considered a major project in accordance with the NJDEP Phase II Stormwater Regulations, as it will include greater than 1.0 acre of disturbance and creates greater than 1/4 acre of new impervious surface. Stormwater on the proposed site will be controlled with:

- Six above-ground infiltration basins designed to capture, treat and infiltrate the stormwater runoff.

Due to the existing drainage characteristics of the site, the proposed stormwater management systems have been designed to capture, treat and infiltrate the water quality storm event and the 2, 10, and 100-year storm events in order to meet the water quantity peak reduction requirements, water quality requirements, and the ground water requirements specified on N.J.A.C. 7:8-5.4 and N.J.A.C. 7:8-5.5. Therefore, an exception waiver is requested for the use of infiltration as part of the routing for the 2, 10 and 100-year storm events.

1.3 Soil Conditions

Per the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey of Sussex County, the site is underlain by four soil types:

- FaxC - Farmington-Rock Outcrop Complex (0 to 15 percent slopes). The Farmington series consists of shallow, well drained and somewhat excessively drained soils formed in till. They are nearly level to very steep soils on glaciated uplands. It is not on the hydric soils list;

- HdxpAb – Hazen-Paulins Kill Complex (0 to 3 percent slopes); Hazen Hero Fredon soils are present surrounding the Paulins Kill and surrounding floodplains. This general soil unit consists of nearly level to very steep, deep, well drained and poorly drained soils, on river terraces, outwash terraces and kames. It is not on the hydric soils list;

- USFARC – Urban Land-Farmington-Rock Outcrop Complex (0 to 15 percent slopes). Urban Land consists of nearly level to moderately steep areas where the soils have been altered or obscured by urban works and structures;

- RnfD – Rock Outcrop – Farmington-Galway Complex (15 to 35 percent slopes). Rock Outcrop consists of steep, well-drained soil. It is not on the hydric soil list.

Farmington-Rock Outcrop (FaxC) comprises 33% of the total disturbed area, Hazen-Paulins Kill (HdxpAb) comprises 59%, Urban Land-Farmington-Rock Outcrop (USFARC) comprises 5% and the remaining 3% of the total disturbed area is comprised by Rock Outcrop – Farmington-Galway (RnfD). Both FaxC, USFARC and RnfD are classified as Hydrologic Soil Group (HSG) 'D', and HdxpAb is classified as Hydrologic Soil Group (HSG) 'A'. A USDA NRCS Web Soil Survey map is included in Appendix A.

In situ soil testing was performed onsite in the location of the proposed stormwater management systems and along the areas with different USDA NRCS soil group classifications to obtain physical data regarding the infiltration rates of the site. The lab data results are included in Appendix H. The results obtained indicate that the site is well-drained within the proposed limit of disturbance. The obtained soil permeability rates were greater than 5.67 inches per hour; therefore, in accordance with NJ Stormwater BMP Manual Appendix E, the soil hydrologic groups can be classified as Hydrologic Soil Group 'A'.

2. METHODOLOGY

2.1 Stormwater Runoff Calculation Methodology

The stormwater quantity runoff analysis has been performed utilizing the Soil Conservation Service (SCS) Technical Release 55 (TR-55) "Urban Hydrology for Small Watersheds," revised June 1986. The site runoff has been calculated for the 2-, 10-, and 100-year storm frequencies in accordance with NJDEP's stormwater regulations for water quantity control (N.J.A.C. 7:8-5.4).

The analysis utilized the New Jersey 24-hour rainfall frequency data per NOAA precipitation frequency estimates with New Jersey region C rainfall distribution. The time of concentration (Tc) calculations were calculated based on the TR-55 methodology. Several potential Tc flow paths were analyzed in order to determine the most appropriate flow path. CN values were calculated for each drainage area. The summary of results and supporting calculations for the existing and proposed stormwater quantity runoff analysis can be found in Appendices B, C and D of this report.

2.2 Stormwater Runoff Quality

The stormwater runoff quality analysis has been performed in accordance with NJDEP's Stormwater Management Regulations (N.J.A.C. 7:8-5.5). This stormwater management plan serves to reduce the post-construction load of Total Suspended Solids (TSS) generated from the water quality design storm by 80 percent, as an annual average. This reduction has been applied to all areas of new development on the site. The water quality design storm consists of 1.25 inches of rain falling in 2 hours with the NJDEP distribution as illustrated in N.J.A.C. 7:8-5.5 "Table 1 - Water Quality Design Storm Distribution" (refer to Appendix H).

Six above-ground infiltration basins to obtain the required 80% TSS removal from the total proposed impervious area (refer to Appendix G).

2.3 Groundwater Recharge

A groundwater recharge analysis has been performed in accordance with NJDEP's Stormwater Management Rules (N.J.A.C. 7:8-5.4). The New Jersey Groundwater Recharge Spreadsheet (NJGRS) Version 2.0 (Updated November 2003) was utilized to determine the groundwater recharge associated with the site. Computations of the pre-development and post-development annual groundwater recharge rates and the annual recharge deficit was prepared based on the New Jersey Geological Survey Report GSR-32" A Method for Evaluating Ground-Water Recharge Areas in New Jersey", which is incorporated into the NJGSR spreadsheet (refer to Appendix G of this report).

2.4 Non-Structural Stormwater Management Strategies

As per N.J.A.C. 7:8-5.3 requirements non-structural stormwater strategies have been incorporated into the design to the maximum extent practicable:

- The impervious surfaces are minimized on the project site to meet current codes and the runoff over the impervious surfaces flow into the proposed stormwater systems.
- The Time of Concentration decrease is minimized to the extent practicable.
- Land disturbance is being minimized to the extent practicable.
- Soil compaction will be minimized and any areas of over compaction will be mediated.
- Low maintenance trees and native grasses are proposed to encourage retention of all plantings.
- The use of natural open channel swales is utilized to convey the stormwater runoff through portions of the site where it is feasible.

2.5 Stormwater Conveyance

The storm sewer hydraulics is based upon the Manning Equation as defined in the "Handbook of Hydraulics," by Brater and King, Sixth Edition. Storm sewer capacity is based on full depth gravity flow. Two stormwater conveyance pipes are proposed to convey the water to each of the two infiltration basins. Refer to Appendix E for calculations.

3. STORMWATER ANALYSIS

3.1 Existing Conditions Stormwater Runoff Quantity

The Pre-Development Drainage Area Plan (Appendix B) illustrates the existing drainage areas on site. The pre-development drainage areas have been delineated only within the proposed limit of disturbance anticipated by the proposed development. The site has been analyzed as nine distinct drainage areas: EDA-A, EDA-B, EDA-C, EDA-D, EDA-E, EDA-F, EDA-G, EDA-H, and EDA-I.

EDA-A is defined as 14.94 acres of site area that drains from the southern section of Stickles Pond Road and the middle-south section of the site toward a low point located east from the common property line with Block 151, Lot 20. The drainage area contains multiple land covers as follows: 8.88 acres of grassland, 4.61 acres of woods, and 1.46 acres of impervious area. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-B is defined as 17.97 acres of site area that drains from the north section of Stickles Pond Road and the middle-north section of the site toward the existing wetlands. The drainage area contains multiple land covers as follows: 12.21 acres of grassland, 3.40 acres of woods, and 2.36 acres of impervious area. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-C is comprised of 4.29 acres of site area that drains from the north section of Stickles Pond Road and east section of the site toward the Stickles pond. The drainage area contains multiple land covers as follows: 2.2 acres of grassland, 0.97 acres of woods, and 1.12 acres of impervious area.

EDA-D is comprised of 3.76 acres of site area that drains from the middle-north west section of the site and west section of the site toward a low point located east from the common property line with Block 151, Lot 20. The drainage area contains multiple land covers as follows: 0.43 acres of grassland, and 3.20 acres of woods. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-E is comprised 4.69 acres of site area that drains from the middle-north west section of the site toward the north section of the site, to a point located along the common property line with Block 151, Lot 22. The drainage area contains 4.69 acres of woods.

EDA-F is comprised 0.97 acres of site area that drains from the west section of the site toward the adjacent property, Block 151, Lot 17. The drainage area contains 0.97 acres of woods.

EDA-G is comprised of 5.08 acres of site area that drains from the northwest section of the site toward the adjacent property, Block 151, Lot 22. The drainage area contains multiple land covers as follows: 2.01 acres of grassland, and 3.06 acres of woods.

EDA-H is comprised of 12.92 acres of site area that drains from the upper north section of the site toward a low point. The drainage area contains multiple land covers as follows: 8.92 acres of grassland and 4.0 acres of woods. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-I is comprised of 1.10 acres of site area that drains from the upper northeast section of the site toward Stickles pond. The drainage area contains 1.10 acres of woods.

The curve numbers (CN) and time of concentration (Tc) for the existing drainage areas have been calculated utilizing the TR-55 method for each drainage. Runoff hydrographs have been calculated for the 2, 10, and 100 years storm.

The pre-development runoff from the drainage areas is listed in the following table:

Drainage Area	2-year Storm	10-year Storm	100-year Storm
EDA-A	4.381 CFS	13.26 CFS	37.09 CFS
EDA-B	4.623 CFS	8.550 CFS	26.18 CFS
EDA-C	5.163 CFS	9.692 CFS	19.47 CFS
EDA-D	5.388 CFS	10.55 CFS	20.91 CFS
EDA-E	6.409 CFS	12.58 CFS	25.00 CFS

EDA-F	1.543 CFS	2.911 CFS	5.610 CFS
EDA-G	2.996 CFS	7.883 CFS	19.07 CFS
EDA-H	0.000 CFS	0.097 CFS	3.352 CFS
EDA-I	0.000 CFS	0.000 CFS	0.064 CFS

Refer to Appendices B through D for a summary of the composite curve numbers (CN), pre-development peak discharge rates for the 2-, 10-, and 100-year storms, and the associated runoff hydrographs.

3.2 Proposed Conditions Stormwater Runoff Quantity

The Post-Development Drainage Area Plan (Appendix B), illustrates the proposed drainage areas for the post-development condition. The post-development drainage areas have been delineated only within the proposed limit of disturbance anticipated by the proposed development. To accommodate the proposed site development, the site has been analyzed as nine distinct drainage areas: PDA-A, PDA-B, PDA-C, PDA-D, PDA-E, PDA-F, PDA-G, PDA-H, and PDA-I.

PDA-A is comprised of 5.13 acres of site area along the lower south section of Stickles Pond Road and the lower south section of the site. PDA A is comprised of the proposed building, paved areas and lawn areas located along the lower south section of the site and the lower south section of the Stickles Pond Road. The stormwater runoff generated from PDA-A is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-A. Since in existing conditions the stormwater runoff generated by EDA-A is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed above-ground infiltration basin SWM-A. SWM-A has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-B is comprised of 25.62 acres of site area along the north section of Stickles Pond Road and the middle-north section of the site. For the purpose of analysis, PDA-B has been divided into three sub-drainage areas: PDA-B1, PDA-B2 and PDA-B3. PDA-B1 is a 20.58 acres site area comprised of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the upper middle-north section of the site and the north section of Stickles Pond Road. The stormwater runoff generated from PDA-B1 is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-B1. Since in the existing conditions the stormwater runoff generated by EDA-B is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed pervious pavement system SWM-B1. SWM-B1 has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-B2 is a 4.53 acres site area comprised of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the south section of the site. The stormwater runoff generated from PDA-B2 is captured, treated and infiltrated by the proposed pervious pavement system: SWM-B2. Since in the existing conditions the stormwater runoff generated by EDA-B is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed above-ground infiltration basin SWM-B2. SWM-B2 has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-B3 is a 0.50 acres site area comprised of lawn areas located along the south section of the site. The stormwater runoff generated from PDA-B3 bypasses the proposed above-ground basins for PDA-B, and it discharges to an existing wetland on site.

PDA-C is a 0.94 acres site area along the upper north section of Stickles Pond Road. It is comprised of lawn areas and the upper north section of the Stickles Pond Road. The stormwater runoff generated from PDA-C bypasses the proposed stormwater management systems and it drains to the existing Stickles pond.

PDA-D is a 12.66 acres site area along the middle-north west section of the site and the lower west section of the site. It is comprised of a portion of the proposed construction equipment and construction material storage area and lawn area. The stormwater runoff generated from PDA-D is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-D. Since in the existing conditions the stormwater runoff generated by EDA-D is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed above-ground infiltration basin SWM-D. SWM-D has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-E is a 0.36 acres site area comprised of lawn area. The stormwater runoff generated by PDA-E bypasses the proposed stormwater management systems and discharges to the adjacent property, Block 151, Lot 22. Since the size of PDA-e has been reduced to produce a stormwater runoff less than or equal to the stormwater runoff produced by EDA-E, no increase in peak discharge toward Block 151, Lot 22 is expected to occur.

PDA-F is a 0.85 acres site area along the west section of the site. It Is comprised of grass areas and it drains toward the adjacent property, Block 151, Lot 17. Since the size of PDA-F has been reduced to produce a stormwater runoff less than or equal to the stormwater runoff produced by EDA-F, no increase in peak discharge toward Block 151, Lot 22 is expected to occur.

PDA-G is comprised of 6.39 acres of site area along the northwest section of the site. For the purpose of analysis, PDA-G has been divided into two sub-drainage areas: PDA-G1 and PDA-G2. PDA-G1 is a 5.83 acres site area comprised

of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the northwest section of the site. The stormwater runoff generated by PDA-G1 is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-G1. The proposed above-ground infiltration basin has been designed to capture, treat and infiltrate the water quality storm, and the 2, 10, and 100-year storms. PDA-G2 is a 0.30 acres site area comprised of lawn located areas along the northwest section of the site. The stormwater runoff generated by PDA-G2 bypasses the proposed stormwater management systems and it drains to the adjacent property, Block 151, Lot 22. By designing the proposed above-ground infiltration basin to capture, treat and infiltrate the water quality storms, and the 2,10, and 100-year storms, no increase in peak discharge toward Block 151, Lot 22 is expected to occur.

PDA-H is comprised of 13.53 acres of site area along the upper north section of the site. It is comprised of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the upper north section of the site. The stormwater runoff generated by PDA-H is captured, treated and infiltrated by a proposed above-ground infiltration basin: SWM-H. The proposed above-ground infiltration basin SWM-H1 has been designed to capture, treat and infiltrate the water quality storm and the 2, 10 and 100-year storms.

PDA-I is a 0.26 acres of site area located along the upper northeast section of the site. It is comprised of lawn areas and wooded areas. The stormwater runoff generated by PDA-I bypasses the proposed stormwater management systems and it drains to the existing Stickles pond.

The post-development drainage area discharges, and the performance of the stormwater management systems are summarized in the tables below:

Table-2: Post-Development Drainage Areas Peak Discharge Summary

Drainage Area	2-year Storm	10-year Storm	100-year Storm
PDA-A	0.000 CFS	0.000 CFS	0.000 CFS
PDA-B	0.663 CFS	1.405 CFS	2.951 CFS
PDA-C	2.481 CFS	4.043 CFS	7.016 CFS
PDA-D	0.000 CFS	0.000 CFS	0.000 CFS
PDA-E	0.908 CFS	1.529 CFS	2.691 CFS
PDA-F	0.919 CFS	1.781 CFS	3.503 CFS
PDA-G	0.528 CFS	1.011 CFS	1.969 CFS
PDA-H	0.000 CFS	0.000 CFS	0.000 CFS
PDA-I	0.000 CFS	0.001 CFS	0.064 CFS

Table-3: Stormwater Management System Performance: SWM-A

Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	593.28 FT	15,242 CF
10-Yr	0.000 CFS	593.92 FT	23,853 CF
100-Yr	0.000 CFS	595.05 FT	41,143 CF

Table-5: Stormwater Management System Performance: SWM B1-B2			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	599.19 FT, 598.84 FT	97,924 CF
10-Yr	0.000 CFS	599.93 FT, 599.29 FT	163,505 CF
100-Yr	0.000 CFS	601.29 FT, 600.29 FT	302,733 CF

Table-8: Stormwater Management System Performance: SWM-D			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	600.54 FT	68,027 CF
10-Yr	0.000 CFS	601.84 FT	108,547 CF
100-Yr	0.000 CFS	604.11 FT	189,497 CF

Table-10: Stormwater Management System Performance: SWM-G1			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	598.13 FT	29,169 CF
10-Yr	0.000 CFS	599.14 FT	47,342 CF
100-Yr	0.000 CFS	600.64 FT	82,656 CF

Table-11: Stormwater Management System Performance: SWM-H			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	597.36 FT	53,610 CF
10-Yr	0.000 CFS	598.16 FT	89,289 CF
100-Yr	0.000 CFS	599.63 FT	164,586 CF

The proposed Stormwater Management Systems provide the necessary detention time and storage to achieve the reduction factors required by N.J.A.C.7:8. A summary table has been provided below documenting the overall performance of the systems.

Table-12: Pre-Development and Post Development Peak Discharge Runoff Comparison Table

Drainage Areas	Storm	Existing Peak Discharge	Reduction Required	Target Runoff	Proposed Peak Discharge
EDA-A/PDA-A	2-Year	4.381 CFS	50%	2.19 CFS	0.000 CFS
	10-Year	13.26 CFS	75%	9.945 CFS	0.000 CFS
	100-Year	37.09 CFS	80%	29.67 CFS	0.000 CFS
EDA-B/PDA-B	2-Year	4.623 CFS	50%	2.3115 CFS	0.663 CFS
	10-Year	8.537 CFS	75%	6.402 CFS	1.405 CFS
	100-Year	26.07 CFS	80%	20.856 CFS	2.951 CFS
EDA-C/PDA-C	2-Year	5.163 CFS	>=	5.163 CFS	2.481 CFS
	10-Year	9.692 CFS	>=	9.692 CFS	4.043 CFS
	100-Year	19.47 CFS	>=	19.47 CFS	7.016 CFS
EDA-D/PDA-D	2-Year	5.388 CFS	50%	2.694 CFS	0.000 CFS
	10-Year	10.55 CFS	75%	7.912 CFS	0.000 CFS
	100-Year	20.91 CFS	80%	16.728 CFS	0.000 CFS
EDA-E/PDA-E	2-Year	6.409 CFS	>=	6.409 CFS	0.908CFS
	10-Year	12.58 CFS	>=	12.58 CFS	1.529 CFS
	100-Year	25.00 CFS	>=	25.00 CFS	2.691 CFS
EDA-F/PDA-F	2-Year	1.543 CFS	>=	1.543 CFS	0.919 CFS
	10-Year	2.911 CFS	>=	2.911 CFS	1.781 CFS
	100-Year	5.610 CFS	>=	5.610 CFS	3.503 CFS
EDA-G/PDA-G	2-Year	2.996 CFS	50%	1.498 CFS	0.528 CFS
	10-Year	7.883 CFS	75%	5.912 CFS	1.011 CFS

	100-Year	19.07 CFS	80%	15.256 CFS	1.969 CFS
EDA-E/PDA-H	2-Year	0.000 CFS	50%	0.000 CFS	0.000 CFS
	10-Year	0.097 CFS	75%	0.0727 CFS	0.000 CFS
	100-Year	3.352 CFS	80%	2.68 CFS	0.000 CFS
EDA-E/PDA-I	2-Year	0.000 CFS	>=	0.000 CFS	0.000 CFS
	10-Year	0.000 CFS	>=	0.000 CFS	0.001 CFS
	100-Year	0.064 CFS	>=	0.062 CFS	0.064CFS

3.3 Stormwater Runoff Quality

Proposed runoff quality has achieved the required TSS removal, in accordance with NJDEP standards. The water quality storm calculations are contained in Appendix F. Quality treatment has been provided for PDA-A, PDA-B, PDA-D, PDA-G, and PDA-H through the use of six above-ground infiltration basins designed to treat the entire water quality storm volume without overflow. Consequently, the proposed above-ground infiltration basins qualify for an 80% TSS removal rate in accordance with NJDEP Phase II standards.

3.4 Groundwater Recharge

For the groundwater recharge calculations, the soil type chosen to model the site recharge capacity were based: Hazen, Sandy Land, and Urban Land. The web soil survey soil groups Farmington-Rock Outcrop and Rock Outcrop-Farmington-Galway are not in the available list of soils offered by The New Jersey Groundwater Recharge Spreadsheet (NJGRS) Version 2.0 (Updated November 2003). The soil type Sandy Land was chosen base on the results obtained from the on-site in situ soil investigations conducted at the site (refer to Appendix H).

The existing site has a total annual recharge of 3,733,11 C.F. The proposed development creates a groundwater recharge deficit of 2,666,400 C.F. Sic above-ground infiltration basins have been proposed to infiltrate the groundwater recharge deficit. Table-13: Proposed Ground Water Recharge, shows the recharged volume obtained by each proposed stormwater management system.

Table-13: Proposed Groundwater Recharge

SWM Name	Annual BMP Recharge Volume (CF)
SWM-A	383,047 CF
SWM-B1	992,821 CF
SWM-B2	444,829 CF
SWM-D	992,821 CF
SWM-G1	648,709 CF
SWM-H	992,821 CF

Total Proposed Annual Recharge	4,455,048 CF
Net Annual Increase	1,788,648 CF

An annual recharge volume of 4,455,048 C.F. is observed in the post development conditions. A net increase in the annual recharge of 1,788,648 C.F. is observed. The analysis has been performed based upon the approved NJDEP Recharge Spreadsheet and can be found in Appendix G

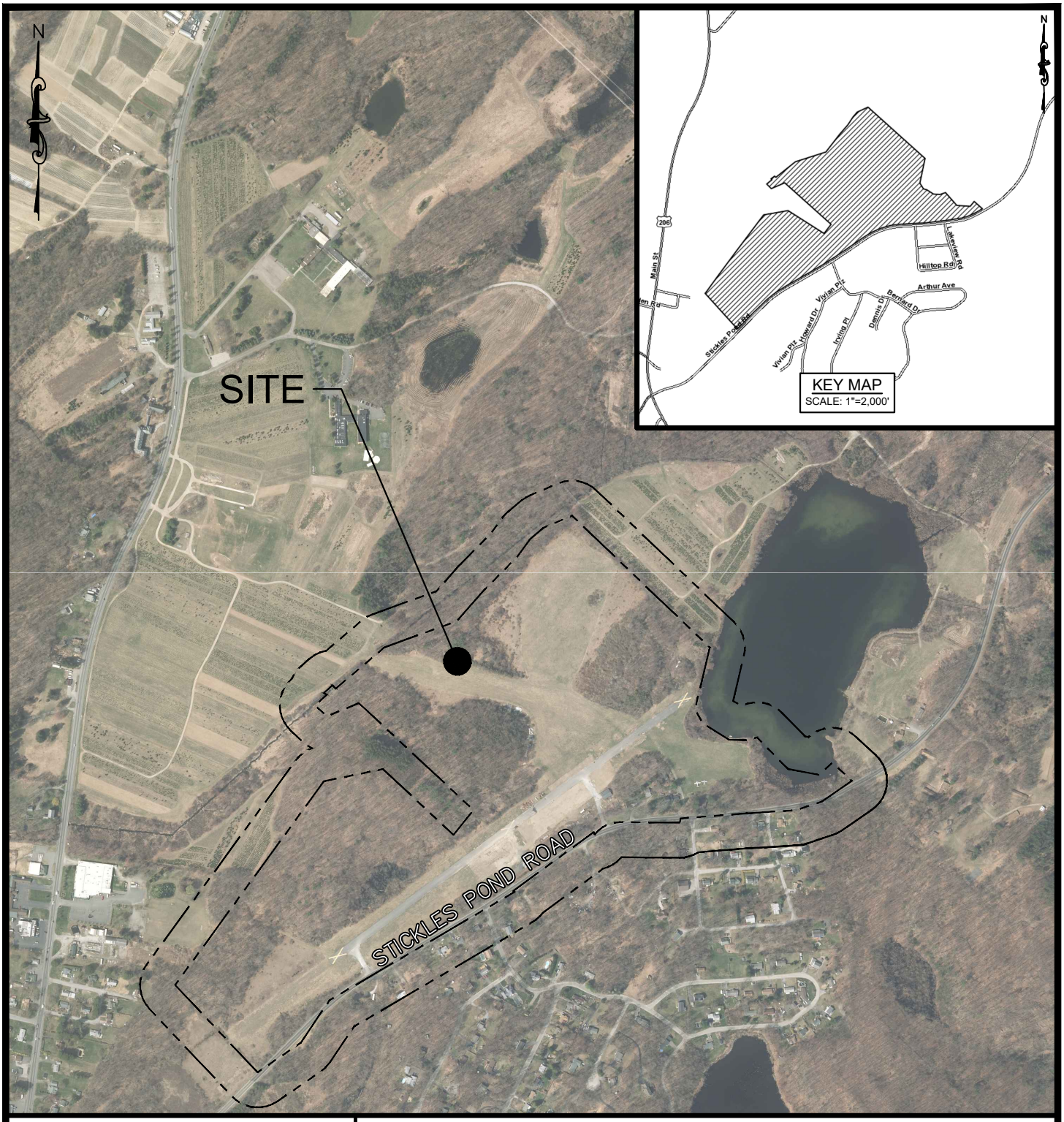
3.5 Soil Erosion and Sediment Control

Soil Erosion and Sediment Control measures have been designed for the stormwater management system to ensure that water quality is maintained and that the system can safely and adequately control runoff from the property. Design calculations for the conduit outlet protections for the proposed above-ground infiltration basins can be found in Appendix I

4. CONCLUSIONS

In conclusion, the proposed design includes a proposed stormwater management system for the property that meets all of the quantity, quality and recharge requirements outlined in the Stormwater Management Rules of N.J.A.C. 7:8. A waiver is requested for the use of infiltration in the routing of the 2, 10 and 100-year storm events. There is no existing stormwater conveyance system to which the proposed peak runoff rates can be discharged to.

APPENDIX A –
DRAWING EXHIBITS



800 0 800

SCALE 1" = 800 FT

IMAGERY SOURCE: NEW JERSEY GEOGRAPHIC INFORMATION NETWORK

TITLE:

AERIAL MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

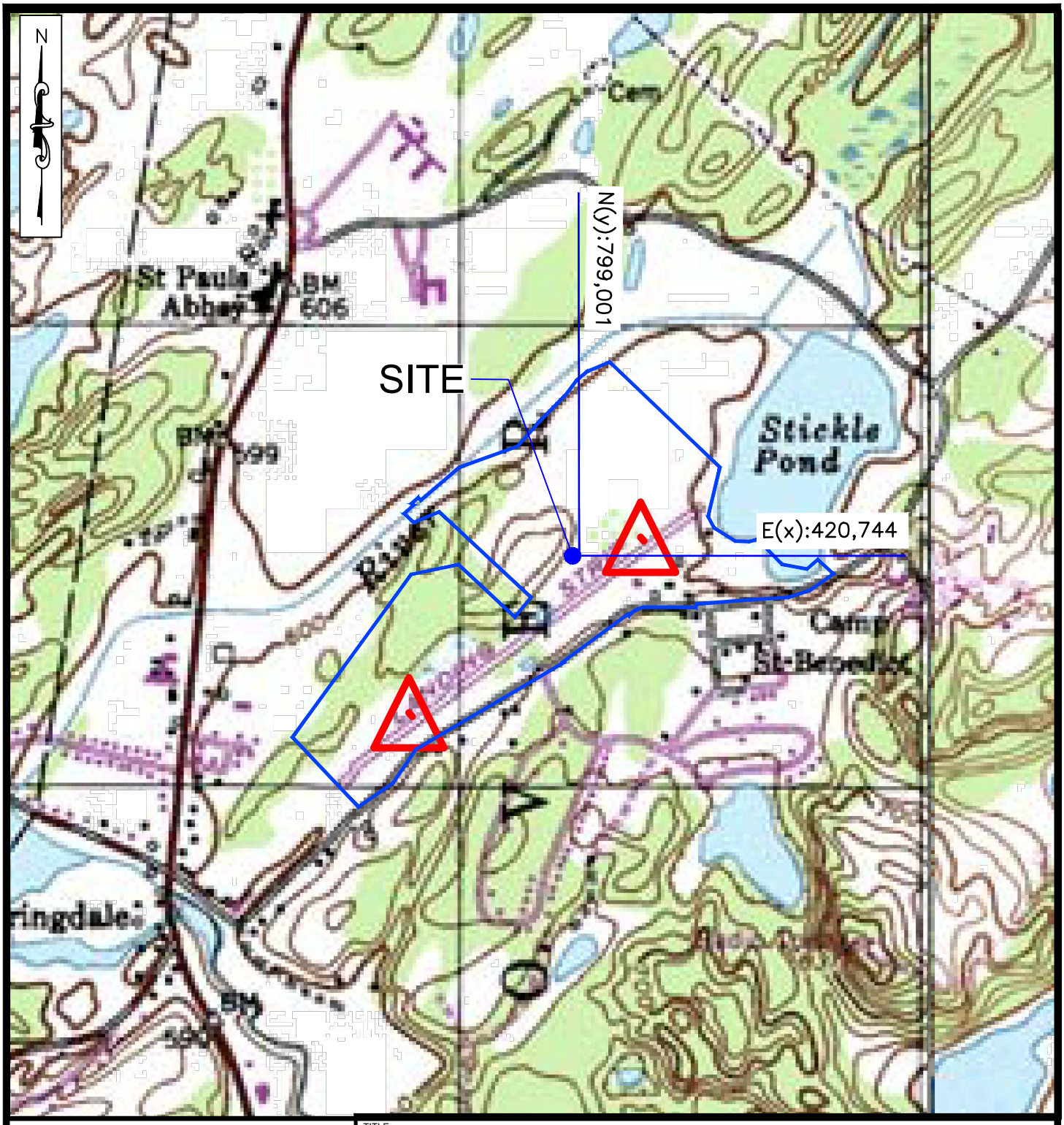
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 01_AERIAL.DWG

FIGURE No.

A1



1000 0 1000

SCALE 1" = 1000 FT

REFERENCES: USGS NEWTON WEST QUAD

TITLE:

USGS MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

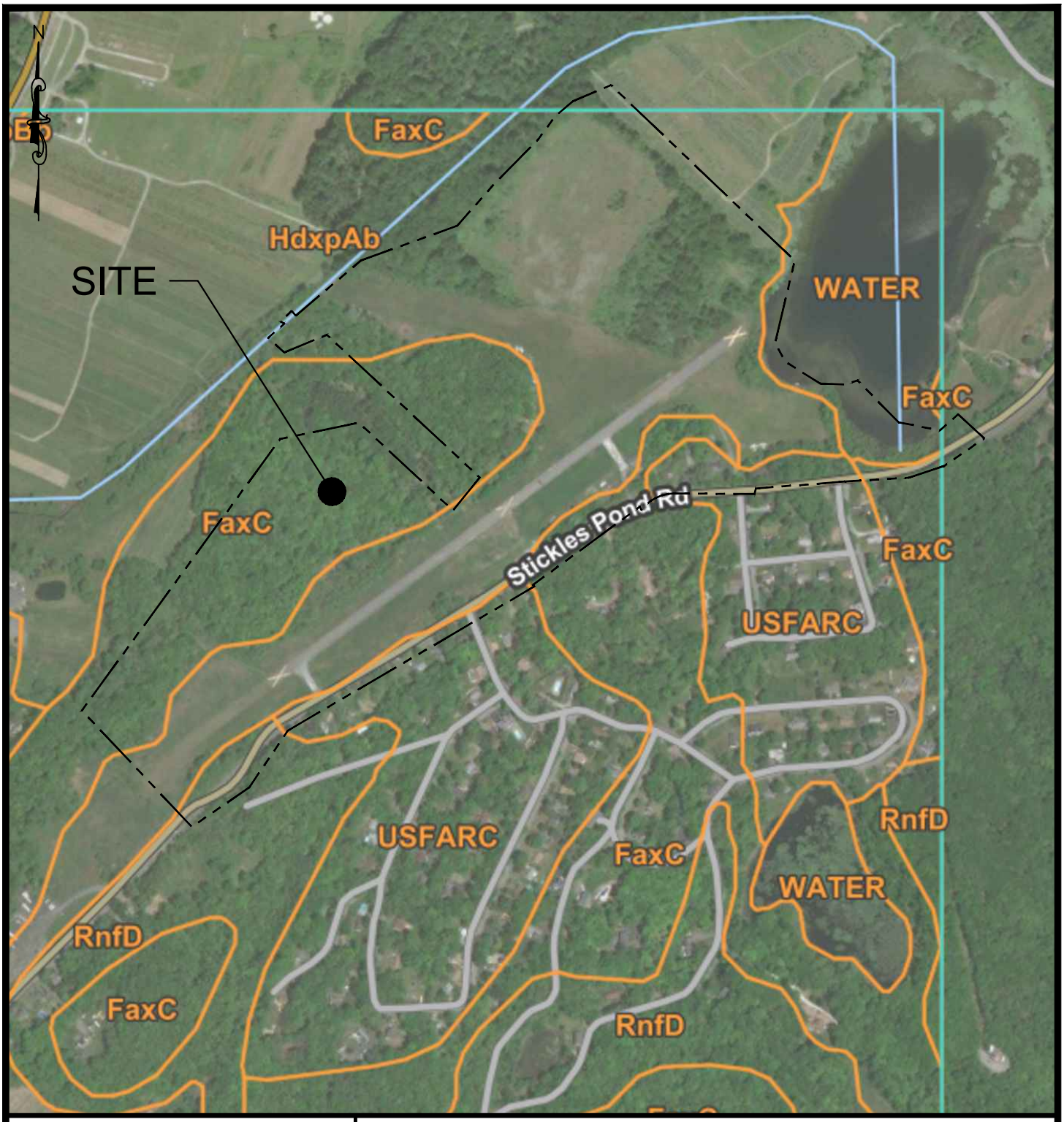
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 02_USGS.DWG

FIGURE No.

A2



600 0 600

SCALE 1" = 600 FT

IMAGERY SOURCE: NEW JERSEY GEOGRAPHIC INFORMATION NETWORK

TITLE:

SOIL MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

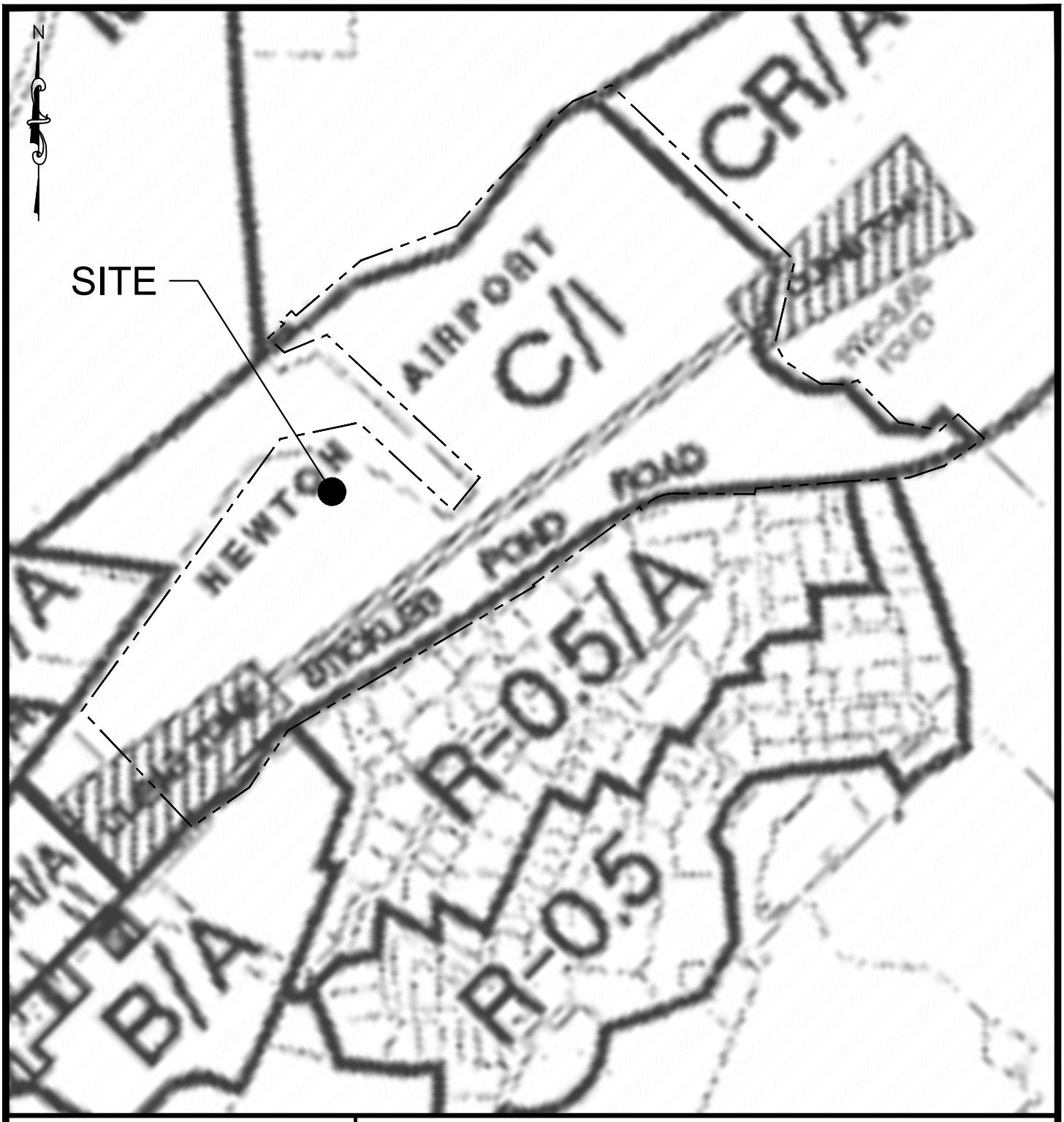
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 03_SOILS.DWG

FIGURE No.

A3



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SCALE 1" = 600 FT

IMAGERY SOURCE: ANDOVER TOWNSHIP ZONING MAP

TITLE:

ZONING MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

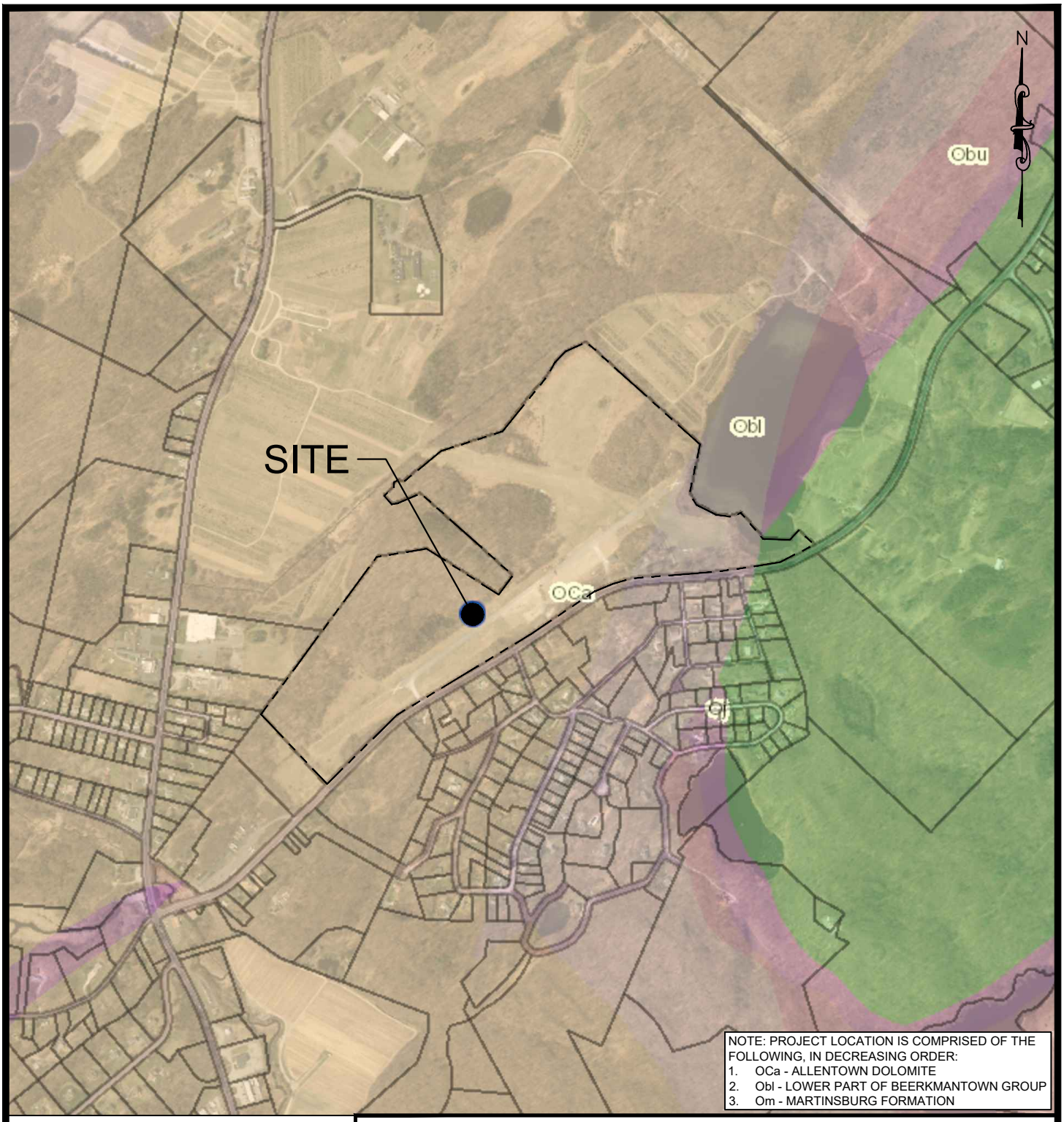
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 04_ZONING.DWG

FIGURE No.

A4



1000 0 1000

SCALE 1" = 1000 FT

REFERENCES: NJ GEOWEB

TITLE:

GEOLOGIC MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

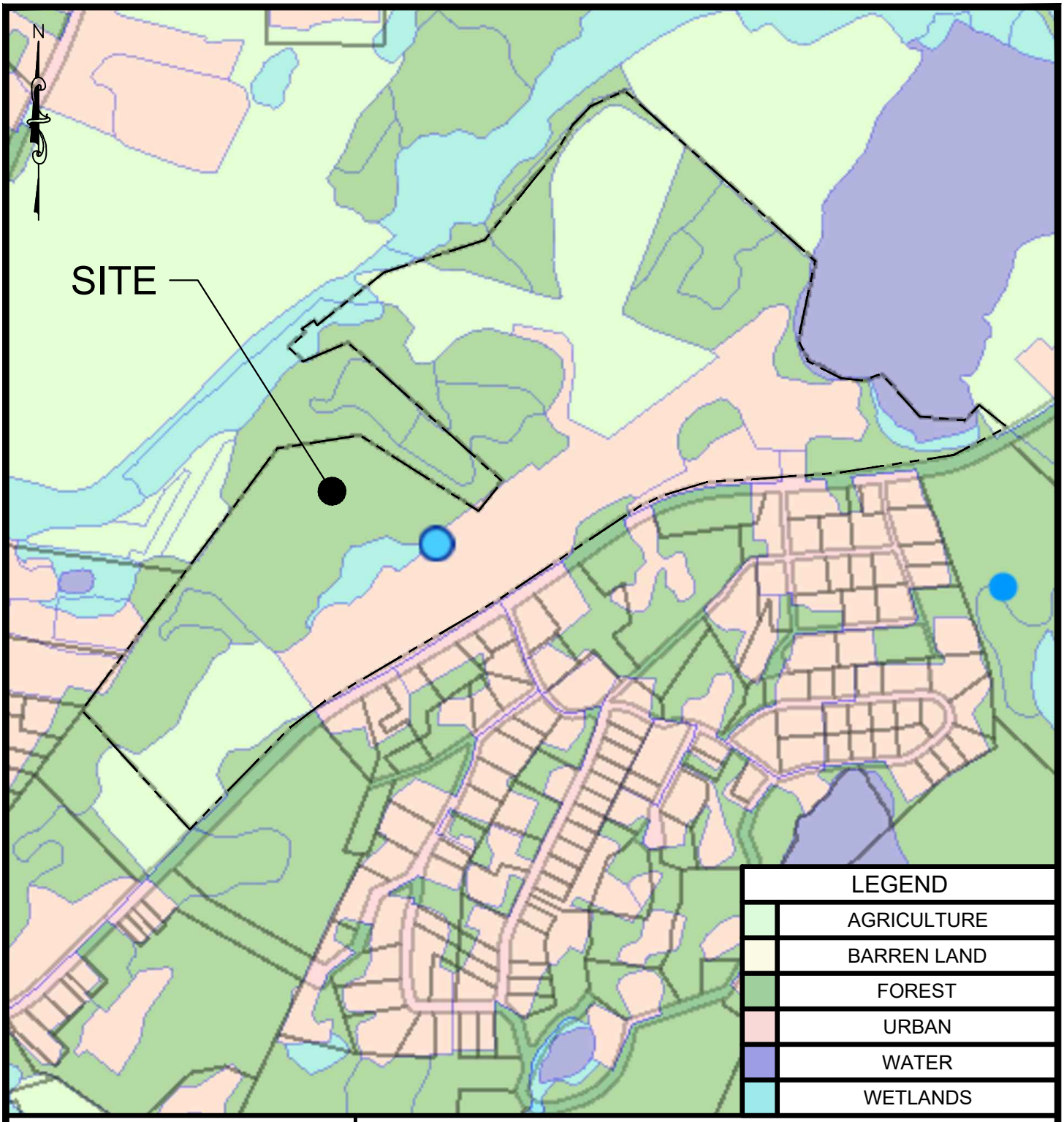
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 0119134 GEOLOGY.DWG
SOIL.DWG

FIGURE No.

A5



600 0 600

SCALE 1" = 600 FT

IMAGERY SOURCE: ANDOVER TOWNSHIP ZONING MAP

TITLE:

LAND USE MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 06_LAND USE.DWG

FIGURE No.

A6

NOAA Atlas 14, Volume 2, Version 3
Location name: Andover Twp, New Jersey, USA*
Latitude: 41.026°, Longitude: -74.7583°
Elevation: 602.81 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.327 (0.295-0.365)	0.391 (0.352-0.435)	0.468 (0.420-0.520)	0.527 (0.472-0.586)	0.605 (0.538-0.671)	0.667 (0.590-0.740)	0.730 (0.640-0.810)	0.798 (0.693-0.887)	0.896 (0.769-1.00)	0.973 (0.825-1.09)
10-min	0.514 (0.463-0.573)	0.616 (0.554-0.685)	0.737 (0.661-0.819)	0.825 (0.739-0.917)	0.942 (0.838-1.05)	1.03 (0.914-1.15)	1.13 (0.989-1.25)	1.22 (1.06-1.36)	1.36 (1.17-1.52)	1.47 (1.24-1.65)
15-min	0.637 (0.573-0.710)	0.763 (0.687-0.850)	0.916 (0.822-1.02)	1.03 (0.922-1.14)	1.18 (1.05-1.31)	1.29 (1.14-1.43)	1.41 (1.24-1.57)	1.53 (1.33-1.70)	1.70 (1.46-1.91)	1.84 (1.56-2.07)
30-min	0.856 (0.771-0.955)	1.04 (0.933-1.15)	1.28 (1.15-1.42)	1.46 (1.31-1.62)	1.70 (1.51-1.89)	1.89 (1.67-2.10)	2.09 (1.84-2.32)	2.30 (2.00-2.56)	2.61 (2.24-2.92)	2.86 (2.42-3.21)
60-min	1.06 (0.951-1.18)	1.29 (1.16-1.43)	1.62 (1.45-1.80)	1.88 (1.68-2.08)	2.23 (1.99-2.48)	2.53 (2.23-2.80)	2.84 (2.49-3.15)	3.18 (2.76-3.54)	3.67 (3.15-4.11)	4.09 (3.47-4.59)
2-hr	1.29 (1.16-1.42)	1.56 (1.42-1.73)	1.98 (1.78-2.19)	2.31 (2.07-2.55)	2.79 (2.49-3.07)	3.19 (2.83-3.52)	3.64 (3.20-4.01)	4.13 (3.60-4.57)	4.87 (4.18-5.41)	5.50 (4.66-6.14)
3-hr	1.44 (1.31-1.60)	1.74 (1.58-1.93)	2.19 (1.98-2.43)	2.55 (2.30-2.82)	3.07 (2.75-3.39)	3.51 (3.12-3.88)	3.99 (3.51-4.41)	4.51 (3.94-5.01)	5.31 (4.56-5.91)	5.98 (5.08-6.70)
6-hr	1.87 (1.70-2.06)	2.25 (2.05-2.48)	2.80 (2.55-3.09)	3.26 (2.96-3.59)	3.94 (3.55-4.33)	4.54 (4.05-4.99)	5.20 (4.59-5.72)	5.94 (5.18-6.54)	7.06 (6.05-7.81)	8.05 (6.80-8.93)
12-hr	2.33 (2.11-2.59)	2.81 (2.55-3.13)	3.52 (3.18-3.91)	4.13 (3.72-4.57)	5.05 (4.50-5.57)	5.86 (5.17-6.45)	6.77 (5.91-7.46)	7.80 (6.73-8.62)	9.40 (7.95-10.4)	10.8 (8.98-12.0)
24-hr	2.69 (2.50-2.93)	3.24 (3.01-3.52)	4.05 (3.75-4.39)	4.72 (4.36-5.11)	5.72 (5.25-6.18)	6.57 (6.00-7.09)	7.51 (6.81-8.09)	8.54 (7.69-9.19)	10.1 (8.96-10.8)	11.4 (10.0-12.2)
2-day	3.17 (2.95-3.43)	3.82 (3.55-4.13)	4.77 (4.43-5.15)	5.56 (5.14-5.99)	6.69 (6.16-7.20)	7.65 (7.01-8.23)	8.70 (7.92-9.34)	9.83 (8.89-10.6)	11.5 (10.3-12.3)	12.9 (11.4-13.8)
3-day	3.33 (3.10-3.58)	4.00 (3.73-4.32)	4.99 (4.64-5.37)	5.80 (5.38-6.24)	6.97 (6.44-7.48)	7.97 (7.32-8.53)	9.04 (8.25-9.67)	10.2 (9.24-10.9)	11.9 (10.7-12.7)	13.3 (11.8-14.2)
4-day	3.48 (3.25-3.74)	4.18 (3.91-4.50)	5.21 (4.85-5.59)	6.05 (5.62-6.48)	7.26 (6.71-7.76)	8.28 (7.62-8.84)	9.38 (8.58-10.0)	10.6 (9.60-11.3)	12.3 (11.1-13.1)	13.7 (12.3-14.7)
7-day	4.10 (3.84-4.41)	4.91 (4.59-5.27)	6.04 (5.65-6.48)	6.99 (6.51-7.49)	8.36 (7.75-8.93)	9.50 (8.78-10.1)	10.7 (9.86-11.5)	12.1 (11.0-12.9)	14.0 (12.7-15.0)	15.7 (14.0-16.7)
10-day	4.73 (4.44-5.05)	5.65 (5.30-6.03)	6.86 (6.43-7.32)	7.85 (7.34-8.37)	9.24 (8.62-9.85)	10.4 (9.65-11.1)	11.6 (10.7-12.3)	12.9 (11.8-13.7)	14.7 (13.4-15.7)	16.2 (14.7-17.3)
20-day	6.35 (5.98-6.74)	7.53 (7.09-7.99)	8.94 (8.42-9.49)	10.1 (9.47-10.7)	11.6 (10.9-12.3)	12.9 (12.0-13.6)	14.1 (13.2-15.0)	15.5 (14.4-16.4)	17.3 (15.9-18.3)	18.7 (17.2-19.9)
30-day	7.94 (7.51-8.40)	9.36 (8.85-9.89)	10.9 (10.3-11.5)	12.1 (11.4-12.8)	13.7 (12.9-14.4)	14.9 (14.0-15.8)	16.2 (15.2-17.1)	17.5 (16.3-18.4)	19.1 (17.8-20.2)	20.4 (18.9-21.6)
45-day	10.1 (9.62-10.7)	11.9 (11.3-12.5)	13.6 (12.9-14.3)	14.9 (14.2-15.7)	16.6 (15.8-17.5)	17.9 (17.0-18.9)	19.2 (18.2-20.2)	20.4 (19.3-21.5)	22.0 (20.7-23.2)	23.2 (21.8-24.5)
60-day	12.2 (11.5-12.8)	14.2 (13.5-15.0)	16.2 (15.4-17.0)	17.7 (16.8-18.6)	19.5 (18.6-20.6)	21.0 (19.9-22.1)	22.3 (21.1-23.5)	23.7 (22.4-24.9)	25.3 (23.9-26.7)	26.6 (25.0-28.0)

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

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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

IMAGERY SOURCE: NOAA ATLAS 14, VOLUME 2, VERSION 3 FOR ANDOVER TOWNSHIP.

TITLE: NOAA ATLAS 14 - POINT PRECIPITATION FREQUENCY ESTIMATES

E&LP
140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500
A PROFESSIONAL ASSOCIATION

LOCATION:
BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: NOAA FREQUENCY.DWG

FIGURE No.
A7

Figure 5-9: NJ Locations of Regions C and D

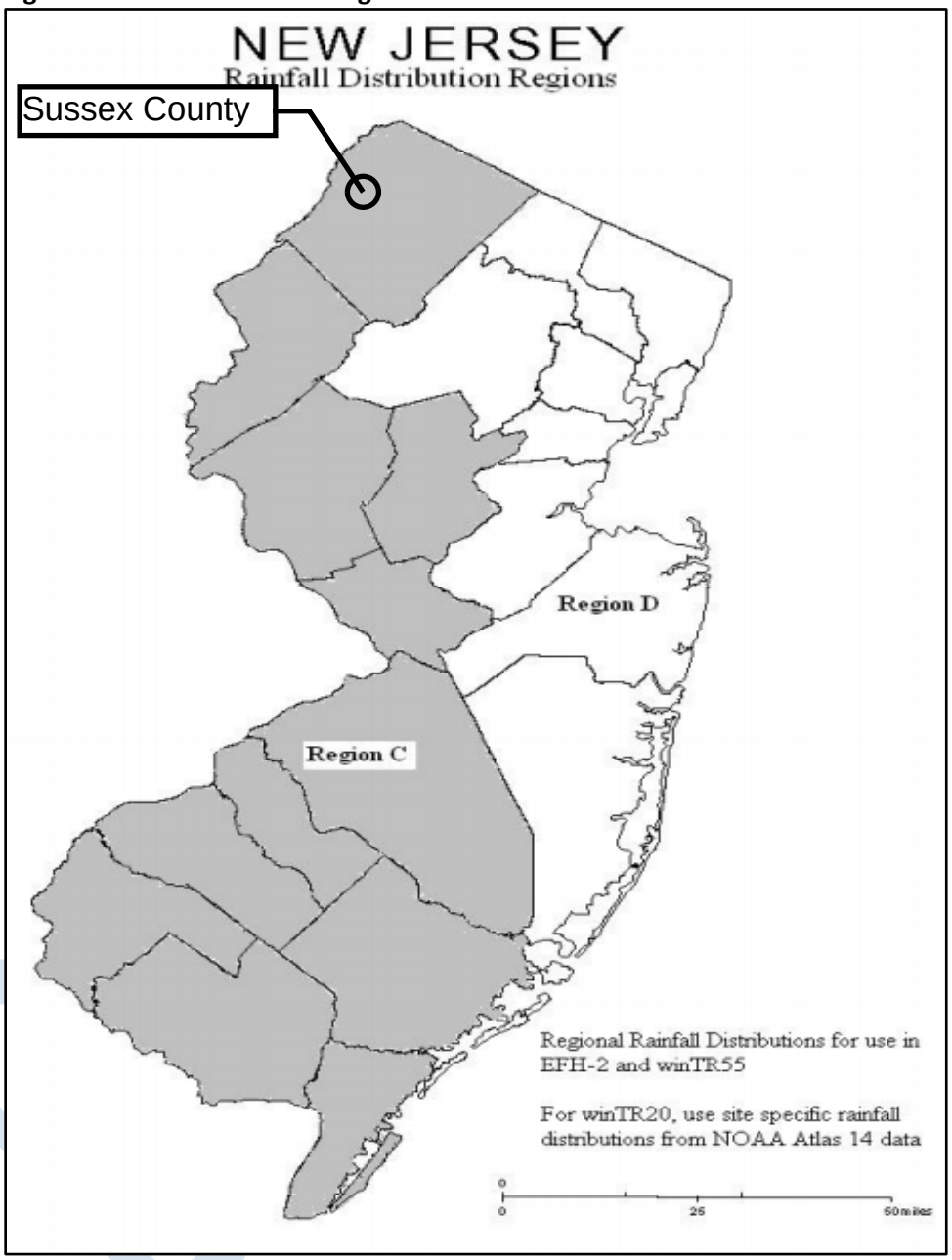


TABLE 7.1

TYPICAL RUNOFF COEFFICIENTS (C VALUES) FOR 100 YEAR FREQUENCY STORM

TABLE 7.1

TYPICAL RUNOFF COEFFICIENTS (C VALUES) FOR 100 YEAR FREQUENCY STORM

Land Use Description			Hydrologic Soil Group A	B	C	D
Cultivated land:						
without conservation treatment			0.49	0.67	0.81	0.88
with conservation treatment			0.27	0.43	0.61	0.67
Pasture or range land:						
poor condition			0.38	0.63	0.78	0.84
good condition			NA	0.25	0.51	0.65
Meadow: good condition			NA	NA	0.44	0.61
Wood or forest land:						
thin stand, poor cover, no mulch			NA	NA	0.59	0.79
good cover			NA	NA	0.45	0.59
Open spaces, lawns, parks, golf courses, cemeteries:						
good condition, grass cover on 75% or more of area			NA	0.25	0.51	0.65
fair condition, grass cover on 50–75% of area			NA	0.45	0.63	0.74
Commercial and business areas (85% impervious)			0.84	0.90	0.93	0.96
Industrial districts (72% impervious)			0.67	0.81	0.88	0.92
Residential:						
	Average lot size	Average impervious				
	⅛ acre	65%	0.59	0.76	0.86	0.90
	¼ acre	38%	0.25	0.55	0.70	0.80
	⅓ acre	30%	NA	0.49	0.67	0.78
	½ acre	25%	NA	0.45	0.65	0.76
	1 acre	20%	NA	0.41	0.63	0.74
Paved parking lots, roofs, driveways, etc.			0.99	0.99	0.99	0.99
Streets and roads:						
paved with curbs and storm sewers			0.99	0.99	0.99	0.99
gravel			0.57	0.76	0.84	0.88
dirt			0.49	0.69	0.80	0.84

Note: NA denotes information is not available; design engineers should rely on another authoritative source.

Source: New Jersey Department of Environmental Protection, Technical Manual for Land Use Regulation Program, Bureaus of Inland and Coastal Regulations, Stream Encroachment Permits (Trenton, New Jersey: Department of Environmental Protection, Revised September 1995) p. 12.

TITLE:

NJRSIS TABLE 7.1: TYPICAL RUNOFF COEFFICIENTS

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C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: RUNOFF COEFFICIENTS.DWG

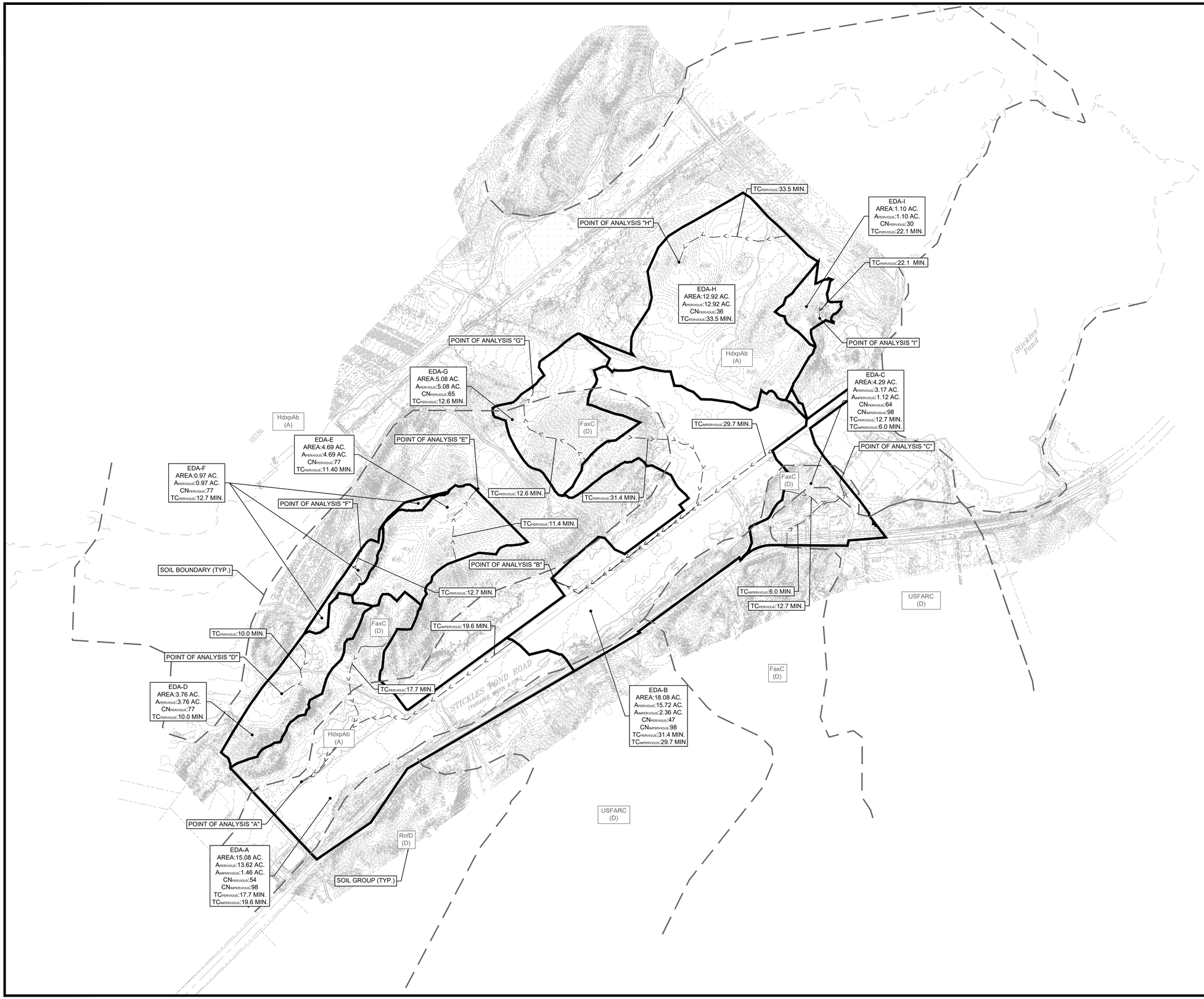
FIGURE No.

A8

IMAGERY SOURCE: NOAA ATLAS 14, VOLUME 2, VERSION 3 FOR ANDOVER TOWNSHIP.

APPENDIX B –

PRE AND POST DEVELOPMENT DRAINAGE AREA MAPS



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140 WEST MAIN STREET HIGH BRIDGE, NJ 08829
PH. 908-238-0544 FAX. 908-238-9572
A PROFESSIONAL ASSOCIATION
CERTIFICATE OF AUTHORIZATION NO.: 24GA28021500 EXP. 8/31/2022

NO.	REVISION	BY	DATE
3.	PER TWP ENGINEER COMMENTS	EAJ	1/26/2021
2.	PER TWP ENGINEER COMMENTS	EAJ	11/1/2020
1.	PER TWP ENGINEER COMMENTS	EAJ	2/6/2020

01/26/2021
DATE

WAYNE J. INGRAM
PROFESSIONAL ENGINEER
N.J. P.E. NO. 24GB04258200

PROJECT:

248 STICKLES POND ROAD
BLOCK 151, LOT 21
ANDOVER TOWNSHIP

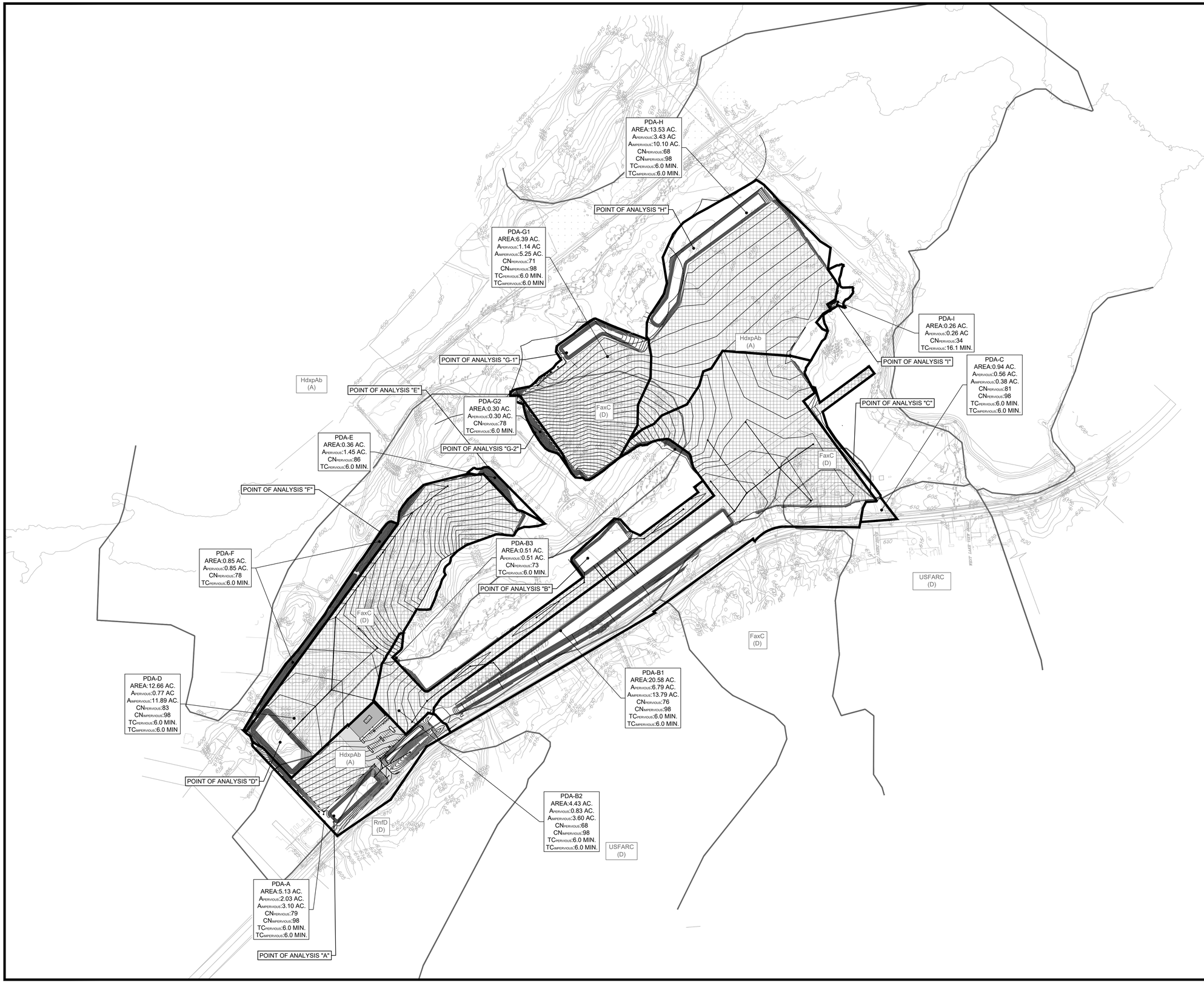
SUSSEX COUNTY NEW JERSEY

TITLE:

PRE-DEVELOPMENT DRAINAGE AREA

JOB NO.:	19134
SCALE:	1" = 200'
DESIGNED:	CBR
CHECKED:	JAH
FILENAME:	00_EX-WSHD.DWG
DATE:	12/12/2019

DRAWING NO.: 1 / 2



N.S.P.C.S.

200 0 200

Scale 1" = 200'

E&LP

140 WEST MAIN STREET HIGH BRIDGE, NJ 08829
PH. 908-238-0544 FAX. 908-238-9572
A PROFESSIONAL ASSOCIATION
CERTIFICATE OF AUTHORIZATION NO.: 24GA28021500 EXP. 8/31/2022

NO.	REVISION	BY	DATE
3.	PER TWP ENGINEER COMMENTS	EAJ	1/26/2021
2.	PER TWP ENGINEER COMMENTS	EAJ	11/1/2020
1.	PER TWP ENGINEER COMMENTS	EAJ	2/6/2020

01/26/2021
DATE

WAYNE J. INGRAM
PROFESSIONAL ENGINEER
N.J. P.E. NO. 24GB04258200

PROJECT:

248 STICKLES POND ROAD
BLOCK 151, LOT 21
ANDOVER TOWNSHIP

SUSSEX COUNTY NEW JERSEY

TITLE:

POST-DEVELOPMENT DRAINAGE AREA

JOB NO.:	19134
SCALE:	1" = 200'
DESIGNED:	CBR
CHECKED:	JAH
FILENAME:	00_PR-WSHD.DWG
DATE:	09/30/2019

DRAWING NO.: 2 / 2

APPENDIX C –
CURVE NUMBER WORKSHEETS

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA A - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	332,648	7.64	297.82
Grassland (D)	80	59,725	1.37	109.69
Wood (A)	30	19,124	0.44	13.17
Wood (D)	77	181,596	4.17	321.00
Totals =			13.62	741.69

Composite Cn = $\frac{741.69}{13.62}$ = 54.47

USE Cn = 54

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA A - Pre-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	63,746	1.46	143.41

Totals =	1.46	143.41

Composite Cn = $\frac{143.41}{1.46}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA B - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	492,568	11.31	441.00
Grassland (D)	80	44,048	1.01	80.90
Wood (A)	30	37,480	0.86	25.81
Wood (D)	77	110,833	2.54	195.92
Totals =			15.72	743.63

Composite Cn = $\frac{743.63}{15.72}$ = 47.29

USE Cn = 47

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA B - Pre-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	102,727	2.36	231.11

Totals = 2.36 231.11

Composite Cn = $\frac{231.11}{2.36}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA C - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	46,284	1.06	41.44
Grassland (D)	80	49,557	1.14	91.01
Wood (A)	30	3,296	0.08	2.27
Wood (D)	77	38,897	0.89	68.76
Totals =			3.17	203.48

Composite Cn = $\frac{203.48}{3.17}$ = 64.21

USE Cn = 64

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA C - Pre-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	48,787	1.12	109.76

Totals = 1.12 109.76

Composite Cn = $\frac{109.76}{1.12}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA D - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (D)	80	18,911	0.43	34.73
Wood (D)	77	144,703	3.32	255.79
Totals =			3.76	290.52

Composite Cn = $\frac{290.52}{3.76}$ = 77.35

USE Cn = 77

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA E - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Wood (D)	77	204,296	4.69	361.13

Totals =	4.69	361.13

Composite Cn = $\frac{361.13}{4.69}$ = 77.00

USE Cn = 77.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA F - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Wood (D)	77	42,253	0.97	74.69
Totals =			0.97	74.69

Composite Cn = $\frac{74.69}{0.97}$ = 77.00

USE Cn = 77.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA G - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	56,368	1.29	50.47
Grassland (D)	80	31,324	0.72	57.53
Wood (A)	30	11,763	0.27	8.10
Wood (D)	77	121,640	2.79	215.02
Totals =			5.08	331.12

Composite Cn = $\frac{331.12}{5.08}$ = 65.24

USE Cn = 65

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA H - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	388,727	8.92	348.03
Wood (A)	30	174,178	4.00	119.96
Totals =			12.92	467.99

Composite Cn = $\frac{467.99}{12.92}$ = 36.22

USE Cn = 36

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA I - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Wood (A)	30	48,079	1.10	33.11
Totals =			1.10	33.11

Composite Cn = $\frac{33.11}{1.10}$ = 30.00

USE Cn = 30

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA A - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	41,124	0.94	64.20
Lawn (D)	89	47,331	1.09	96.71
Totals =			2.03	160.90

Composite Cn = $\frac{160.90}{2.03}$ = 79.24

USE Cn = 79

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA A - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	135,036	3.10	303.80

Totals =	3.10	303.80

Composite Cn = $\frac{303.80}{3.10}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	189,095	4.34	295.19
Lawn (D)	89	106,611	2.45	217.82
Totals =			6.79	513.01

Composite Cn = $\frac{513.01}{6.79}$ = 75.57

USE Cn = 76

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B1 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	600,692	13.79	1351.42

Totals =	13.79	1351.42

Composite Cn = $\frac{1351.42}{13.79}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B2 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	35,955	0.83	56.13
Totals =			0.83	56.13

Composite Cn = $\frac{56.13}{0.83}$ = 68.00

USE Cn = 68

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B2 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	156,816	3.60	352.80
Totals =			3.60	352.80

Composite Cn = $\frac{352.80}{3.60}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B3 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	16,494	0.38	25.75
Lawn (D)	89	5,294	0.12	10.82
Totals =			0.50	36.57

Composite Cn = 36.57 / 0.50 = 73.10

USE Cn = 73

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA C - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	9,494	0.22	14.82
Lawn (D)	89	14,999	0.34	30.64
Totals =			0.56	45.46

Composite Cn = $\frac{45.46}{0.56}$ = 80.86

USE Cn = 81

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA-C - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	16,397	0.38	36.89

Totals = 0.38 36.89

Composite Cn = $\frac{36.89}{0.38}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA D - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	9,585	0.22	14.96
Lawn (D	89	24,052	0.55	49.14
Totals =			0.77	64.10

Composite Cn = $\frac{64.10}{0.77}$ = 83.02

USE Cn = 83

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA D - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	517,928	11.89	1165.22

Totals =	11.89	1165.22

Composite Cn = $\frac{1165.22}{11.89}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA E1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (D)	86	15,682	0.36	30.96
Totals =			0.36	30.96

Composite Cn = $\frac{30.96}{0.36}$ = 86.00

USE Cn = 86

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA F - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Meadow (D)	78	37,026	0.85	66.30
Totals =			0.85	66.30

Composite Cn = $\frac{66.30}{0.85}$ = 78.00

USE Cn = 78

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA G1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	42,430	0.97	66.24
Lawn (D)	89	7,214	0.17	14.74
Totals =			1.14	80.98

Composite Cn = $\frac{80.98}{1.14}$ = 71.05

USE Cn = 71

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA G1 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	228,690	5.25	514.50

Totals =	5.25	514.50

Composite Cn = $\frac{514.50}{5.25}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA G2 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Meadow (D)	78	13268.9	0.30	23.76
Totals =			0.30	23.76

Composite Cn = $\frac{23.76}{0.30}$ = 78.00

USE Cn = 78

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA H1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	149,194	3.43	232.90
Totals =			3.43	232.90

Composite Cn = $\frac{232.90}{3.43}$ = 68.00

USE Cn = 68

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA H1 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
*Impervious	98	439,956	10.10	989.80

Totals =	10.10	989.80

Composite Cn = $\frac{989.80}{10.10}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA I - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	1,307	0.03	2.04
Wood (A)	30	10200.26	0.23	7.02
Totals =			0.26	9.06

Composite Cn = $\frac{9.06}{0.26}$ = 34.32

USE Cn = 34

APPENDIX D -

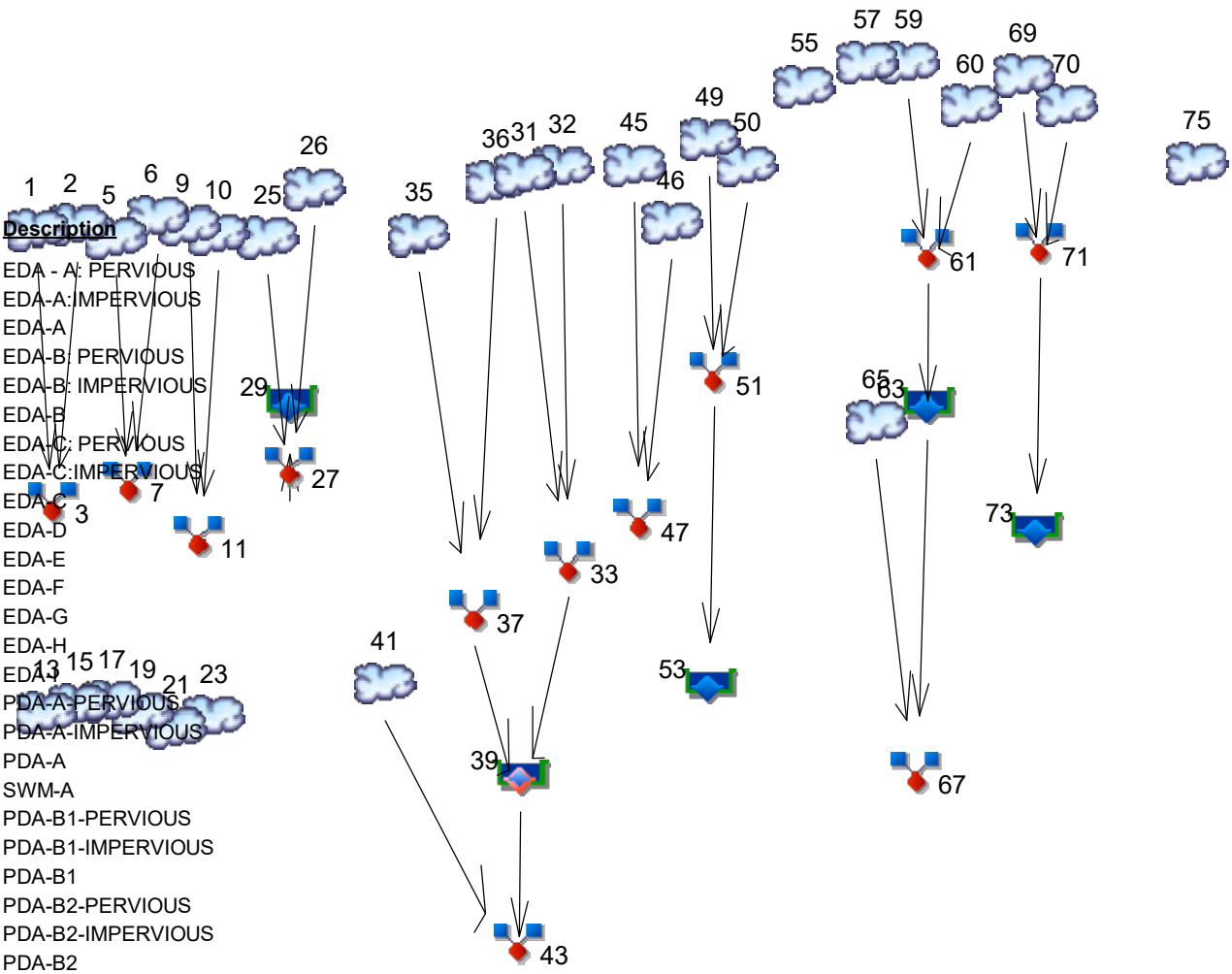
HYDROLOGIC ANALYSIS AND RUNOFF QUANTITY CALCULATIONS

Hydraflow Table of Contents

10 - Year

100 - Year

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	EDA - A: PERVIOUS
2	SCS Runoff	EDA-A:IMPERVIOUS
3	Combine	EDA-A
5	SCS Runoff	EDA-B: PERVIOUS
6	SCS Runoff	EDA-B: IMPERVIOUS
7	Combine	EDA-B
9	SCS Runoff	EDA-C: PERVIOUS
10	SCS Runoff	EDA-C:IMPERVIOUS
11	Combine	EDA-C
13	SCS Runoff	EDA-D
15	SCS Runoff	EDA-E
17	SCS Runoff	EDA-F
19	SCS Runoff	EDA-G
21	SCS Runoff	EDA-H
23	SCS Runoff	EDA-I
25	SCS Runoff	PDA-A-PERVIOUS
26	SCS Runoff	PDA-A-IMPERVIOUS
27	Combine	PDA-A
29	Reservoir	SWM-A
31	SCS Runoff	PDA-B1-PERVIOUS
32	SCS Runoff	PDA-B1-IMPERVIOUS
33	Combine	PDA-B1
35	SCS Runoff	PDA-B2-PERVIOUS
36	SCS Runoff	PDA-B2-IMPERVIOUS
37	Combine	PDA-B2
39	Reservoir(i)	INT. POND B1-B2
41	SCS Runoff	PDA-B3
43	Combine	PDA-B
45	SCS Runoff	PDA-C-PERVIOUS
46	SCS Runoff	PDA-C-IMPERVIOUS
47	Combine	PDA-C
49	SCS Runoff	PDA-D-PERVIOUS
50	SCS Runoff	PDA-D-IMPERVIOUS
51	Combine	PDA-D
53	Reservoir	SWM-D
55	SCS Runoff	PDA-E
57	SCS Runoff	PDA-F
59	SCS Runoff	PDA-G1-PERVIOUS
60	SCS Runoff	PDA-G1-IMPERVIOUS
61	Combine	PDA-G1
63	Reservoir	SWM-G1
65	SCS Runoff	PDA-G2
67	Combine	PDA-G
69	SCS Runoff	PDA-H-PERVIOUS
70	SCS Runoff	PDA-H-IMPERVIOUS
71	Combine	PDA-H
73	Reservoir	SWM-H
75	SCS Runoff	PDA-I

Hydrograph Return Period Recap

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	------	-------	1.078	-------	-------	7.491	-------	-------	27.91	EDA - A: PERVIOUS
2	SCS Runoff	------	-------	3.447	-------	-------	5.067	-------	-------	8.078	EDA-A:IMPERVIOUS
3	Combine	1, 2	-------	4.075	-------	-------	12.50	-------	-------	35.98	EDA-A
5	SCS Runoff	------	-------	0.157	-------	-------	2.561	-------	-------	15.76	EDA-B: PERVIOUS
6	SCS Runoff	------	-------	4.623	-------	-------	6.797	-------	-------	10.84	EDA-B: IMPERVIOUS
7	Combine	5, 6	-------	4.623	-------	-------	8.550	-------	-------	26.18	EDA-B
9	SCS Runoff	------	-------	1.529	-------	-------	4.412	-------	-------	11.16	EDA-C: PERVIOUS
10	SCS Runoff	------	-------	4.090	-------	-------	6.007	-------	-------	9.571	EDA-C:IMPERVIOUS
11	Combine	9, 10	-------	5.163	-------	-------	9.692	-------	-------	19.47	EDA-C
13	SCS Runoff	------	-------	5.388	-------	-------	10.55	-------	-------	20.91	EDA-D
15	SCS Runoff	------	-------	6.409	-------	-------	12.58	-------	-------	25.00	EDA-E
17	SCS Runoff	------	-------	1.543	-------	-------	2.911	-------	-------	5.610	EDA-F
19	SCS Runoff	------	-------	2.996	-------	-------	7.883	-------	-------	19.07	EDA-G
21	SCS Runoff	------	-------	0.000	-------	-------	0.097	-------	-------	3.352	EDA-H
23	SCS Runoff	------	-------	0.000	-------	-------	0.000	-------	-------	0.064	EDA-I
25	SCS Runoff	------	-------	0.000	-------	-------	0.000	-------	-------	0.000	PDA-A-PERVIOUS
26	SCS Runoff	------	-------	10.93	-------	-------	16.05	-------	-------	25.58	PDA-A-IMPERVIOUS
27	Combine	25, 26	-------	10.93	-------	-------	16.05	-------	-------	25.58	PDA-A
29	Reservoir	27	-------	0.000	-------	-------	0.000	-------	-------	0.000	SWM-A
31	SCS Runoff	------	-------	10.75	-------	-------	21.35	-------	-------	42.81	PDA-B1-PERVIOUS
32	SCS Runoff	------	-------	48.62	-------	-------	71.41	-------	-------	113.78	PDA-B1-IMPERVIOUS
33	Combine	31, 32	-------	59.36	-------	-------	92.76	-------	-------	156.59	PDA-B1
35	SCS Runoff	------	-------	0.779	-------	-------	1.878	-------	-------	4.313	PDA-B2-PERVIOUS
36	SCS Runoff	------	-------	12.69	-------	-------	18.64	-------	-------	29.70	PDA-B2-IMPERVIOUS
37	Combine	35, 36	-------	13.46	-------	-------	20.52	-------	-------	34.02	PDA-B2
39	Reservoir(i)	33, 37	-------	0.000	-------	-------	0.000	-------	-------	0.000	INT. POND B1-B2
41	SCS Runoff	------	-------	0.663	-------	-------	1.405	-------	-------	2.951	PDA-B3

Hydrograph Return Period Recap

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	
43	Combine	39, 41,	-------	0.663	-------	-------	1.405	-------	-------	2.951	PDA-B
45	SCS Runoff	------	-------	1.142	-------	-------	2.075	-------	-------	3.881	PDA-C-PERVIOUS
46	SCS Runoff	------	-------	1.340	-------	-------	1.968	-------	-------	3.135	PDA-C-IMPERVIOUS
47	Combine	45, 46	-------	2.481	-------	-------	4.043	-------	-------	7.016	PDA-C
49	SCS Runoff	------	-------	1.717	-------	-------	3.023	-------	-------	5.512	PDA-D-PERVIOUS
50	SCS Runoff	------	-------	41.92	-------	-------	61.57	-------	-------	98.10	PDA-D-IMPERVIOUS
51	Combine	49, 50	-------	43.64	-------	-------	64.59	-------	-------	103.61	PDA-D
53	Reservoir	51	-------	0.000	-------	-------	0.000	-------	-------	0.000	SWM-D
55	SCS Runoff	------	-------	0.908	-------	-------	1.529	-------	-------	2.691	PDA-E
57	SCS Runoff	------	-------	1.497	-------	-------	2.864	-------	-------	5.578	PDA-F
59	SCS Runoff	------	-------	1.328	-------	-------	2.951	-------	-------	6.411	PDA-G1-PERVIOUS
60	SCS Runoff	------	-------	18.51	-------	-------	27.19	-------	-------	43.32	PDA-G1-IMPERVIOUS
61	Combine	59, 60	-------	19.84	-------	-------	30.14	-------	-------	49.73	PDA-G1
63	Reservoir	61	-------	0.000	-------	-------	0.000	-------	-------	0.000	SWM-G1
65	SCS Runoff	------	-------	0.528	-------	-------	1.011	-------	-------	1.969	PDA-G2
67	Combine	63, 65,	-------	0.528	-------	-------	1.011	-------	-------	1.969	PDA-G
69	SCS Runoff	------	-------	3.219	-------	-------	7.759	-------	-------	17.82	PDA-H-PERVIOUS
70	SCS Runoff	------	-------	35.61	-------	-------	52.30	-------	-------	83.33	PDA-H-IMPERVIOUS
71	Combine	69, 70	-------	38.80	-------	-------	60.06	-------	-------	101.15	PDA-H
73	Reservoir	71	-------	0.000	-------	-------	0.000	-------	-------	0.000	SWM-H
75	SCS Runoff	------	-------	0.000	-------	-------	0.001	-------	-------	0.064	PDA-I

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	1.078	1	749	11,468	------	------	------	EDA - A: PERVIOUS
2	SCS Runoff	3.447	1	734	15,938	------	------	------	EDA-A:IMPERVIOUS
3	Combine	4.075	1	736	27,407	1, 2	------	------	EDA-A
5	SCS Runoff	0.157	1	815	4,542	------	------	------	EDA-B: PERVIOUS
6	SCS Runoff	4.623	1	741	25,763	------	------	------	EDA-B: IMPERVIOUS
7	Combine	4.623	1	741	30,305	5, 6	------	------	EDA-B
9	SCS Runoff	1.529	1	733	6,546	------	------	------	EDA-C: PERVIOUS
10	SCS Runoff	4.090	1	727	13,059	------	------	------	EDA-C:IMPERVIOUS
11	Combine	5.163	1	728	19,605	9, 10	------	------	EDA-C
13	SCS Runoff	5.388	1	729	16,931	------	------	------	EDA-D
15	SCS Runoff	6.409	1	730	21,496	------	------	------	EDA-E
17	SCS Runoff	1.543	1	729	4,813	------	------	------	EDA-F
19	SCS Runoff	2.996	1	732	12,041	------	------	------	EDA-G
21	SCS Runoff	0.000	1	n/a	0	------	------	------	EDA-H
23	SCS Runoff	0.000	1	n/a	0	------	------	------	EDA-I
25	SCS Runoff	0.000	1	n/a	0	------	------	------	PDA-A-PERVIOUS
26	SCS Runoff	10.93	1	727	34,899	------	------	------	PDA-A-IMPERVIOUS
27	Combine	10.93	1	727	34,899	25, 26	------	------	PDA-A
29	Reservoir	0.000	1	711	0	27	593.28	15,242	SWM-A
31	SCS Runoff	10.75	1	727	29,991	------	------	------	PDA-B1-PERVIOUS
32	SCS Runoff	48.62	1	727	155,245	------	------	------	PDA-B1-IMPERVIOUS
33	Combine	59.36	1	727	185,236	31, 32	------	------	PDA-B1
35	SCS Runoff	0.779	1	728	2,344	------	------	------	PDA-B2-PERVIOUS
36	SCS Runoff	12.69	1	727	40,528	------	------	------	PDA-B2-IMPERVIOUS
37	Combine	13.46	1	727	42,872	35, 36	------	------	PDA-B2
39	Reservoir(i)	0.000	1	798	0	33, 37	599.19	97,442	INT. POND B1-B2
41	SCS Runoff	0.663	1	727	1,888	------	------	------	PDA-B3

Hydrograph Summary Report

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

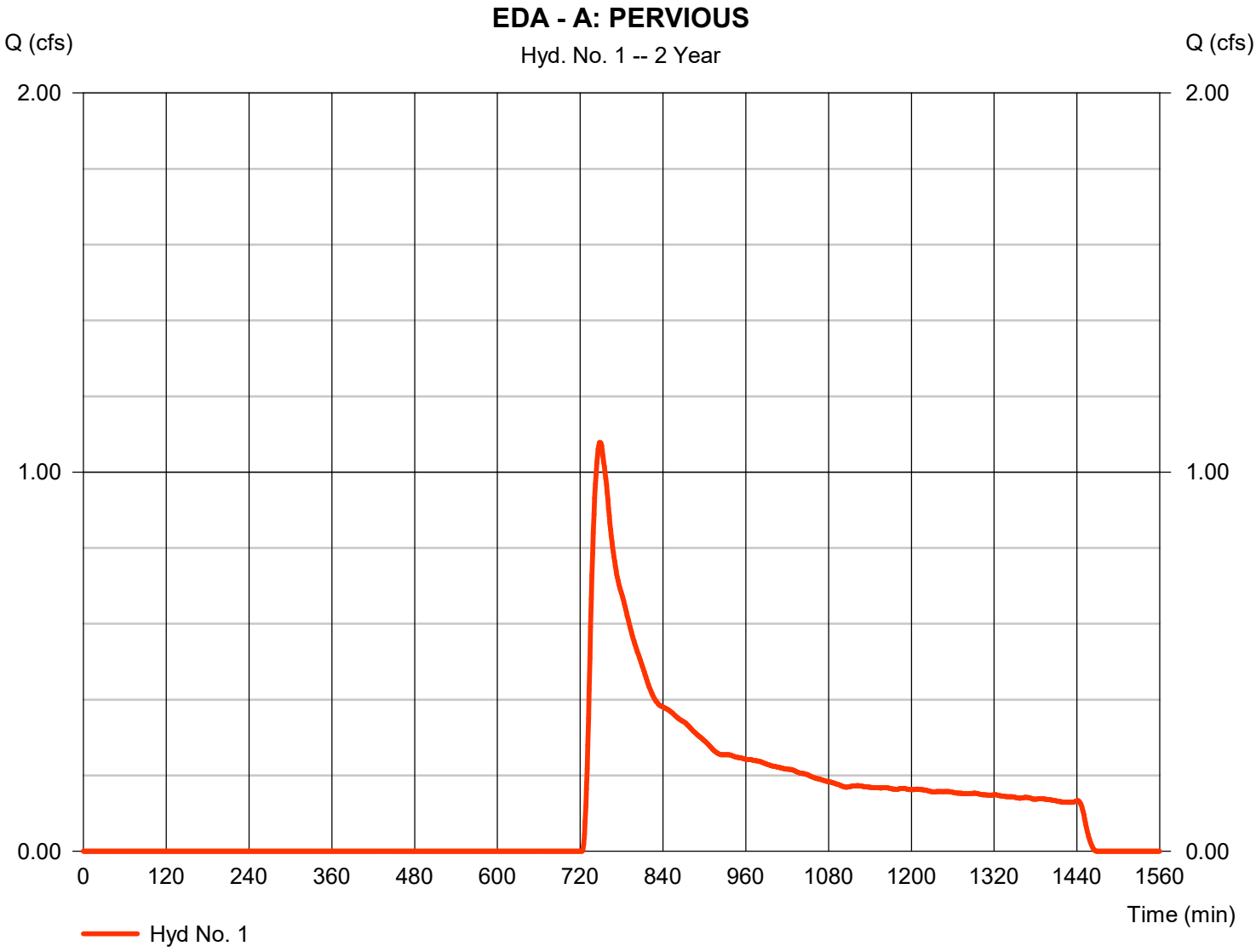
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
43	Combine	0.663	1	727	1,888	39, 41,	------	------	PDA-B
45	SCS Runoff	1.142	1	727	3,146	------	------	------	PDA-C-PERVIOUS
46	SCS Runoff	1.340	1	727	4,278	------	------	------	PDA-C-IMPERVIOUS
47	Combine	2.481	1	727	7,424	45, 46	------	------	PDA-C
49	SCS Runoff	1.717	1	727	4,733	------	------	------	PDA-D-PERVIOUS
50	SCS Runoff	41.92	1	727	133,855	------	------	------	PDA-D-IMPERVIOUS
51	Combine	43.64	1	727	138,588	49, 50	------	------	PDA-D
53	Reservoir	0.000	1	677	0	51	600.54	68,027	SWM-D
55	SCS Runoff	0.908	1	727	2,520	------	------	------	PDA-E
57	SCS Runoff	1.497	1	727	4,145	------	------	------	PDA-F
59	SCS Runoff	1.328	1	728	3,850	------	------	------	PDA-G1-PERVIOUS
60	SCS Runoff	18.51	1	727	59,103	------	------	------	PDA-G1-IMPERVIOUS
61	Combine	19.84	1	727	62,954	59, 60	------	------	PDA-G1
63	Reservoir	0.000	1	687	0	61	598.13	29,169	SWM-G1
65	SCS Runoff	0.528	1	727	1,463	------	------	------	PDA-G2
67	Combine	0.528	1	727	1,463	63, 65,	------	------	PDA-G
69	SCS Runoff	3.219	1	728	9,687	------	------	------	PDA-H-PERVIOUS
70	SCS Runoff	35.61	1	727	113,704	------	------	------	PDA-H-IMPERVIOUS
71	Combine	38.80	1	727	123,391	69, 70	------	------	PDA-H
73	Reservoir	0.000	1	909	0	71	597.36	53,610	SWM-H
75	SCS Runoff	0.000	1	n/a	0	------	------	------	PDA-I

Hydrograph Report

Hyd. No. 1

EDA - A: PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.078 cfs
Storm frequency	=	2 yrs	Time to peak	=	749 min
Time interval	=	1 min	Hyd. volume	=	11,468 cuft
Drainage area	=	13.620 ac	Curve number	=	54
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	17.70 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 1

EDA - A: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 16.00		0.00		0.00		
Travel Time (min)	**= 9.29**	**+**	**0.00**	**+**	**0.00**	**=**	**9.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		274.00		479.00		
Watercourse slope (%)	= 0.00		4.20		0.50		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		3.31		1.14		
Travel Time (min)	**= 0.00**	**+**	**1.38**	**+**	**7.00**	**=**	**8.38**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

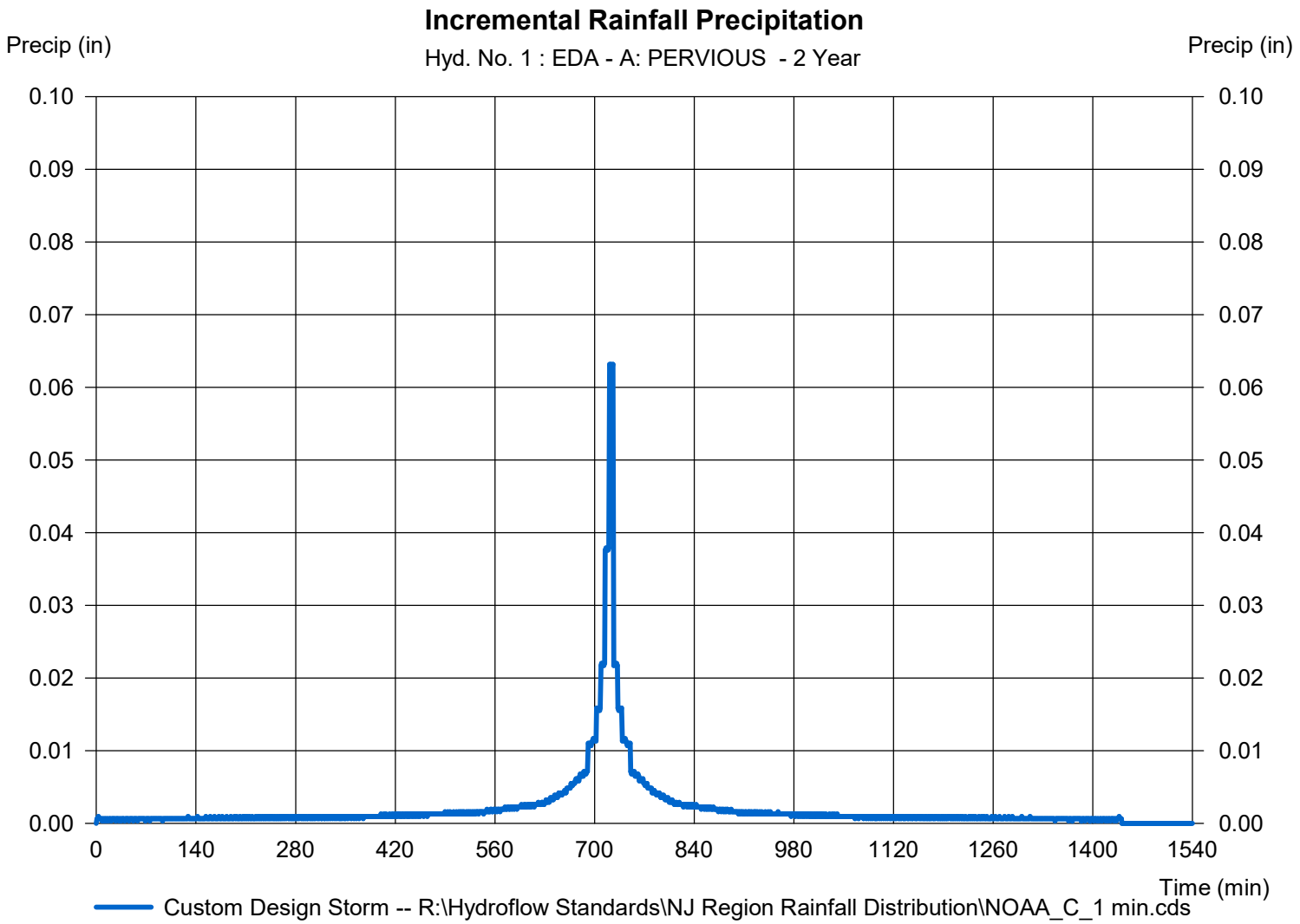
Total Travel Time, Tc ..... 17.70 min

Precipitation Report

Hyd. No. 1

EDA - A: PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

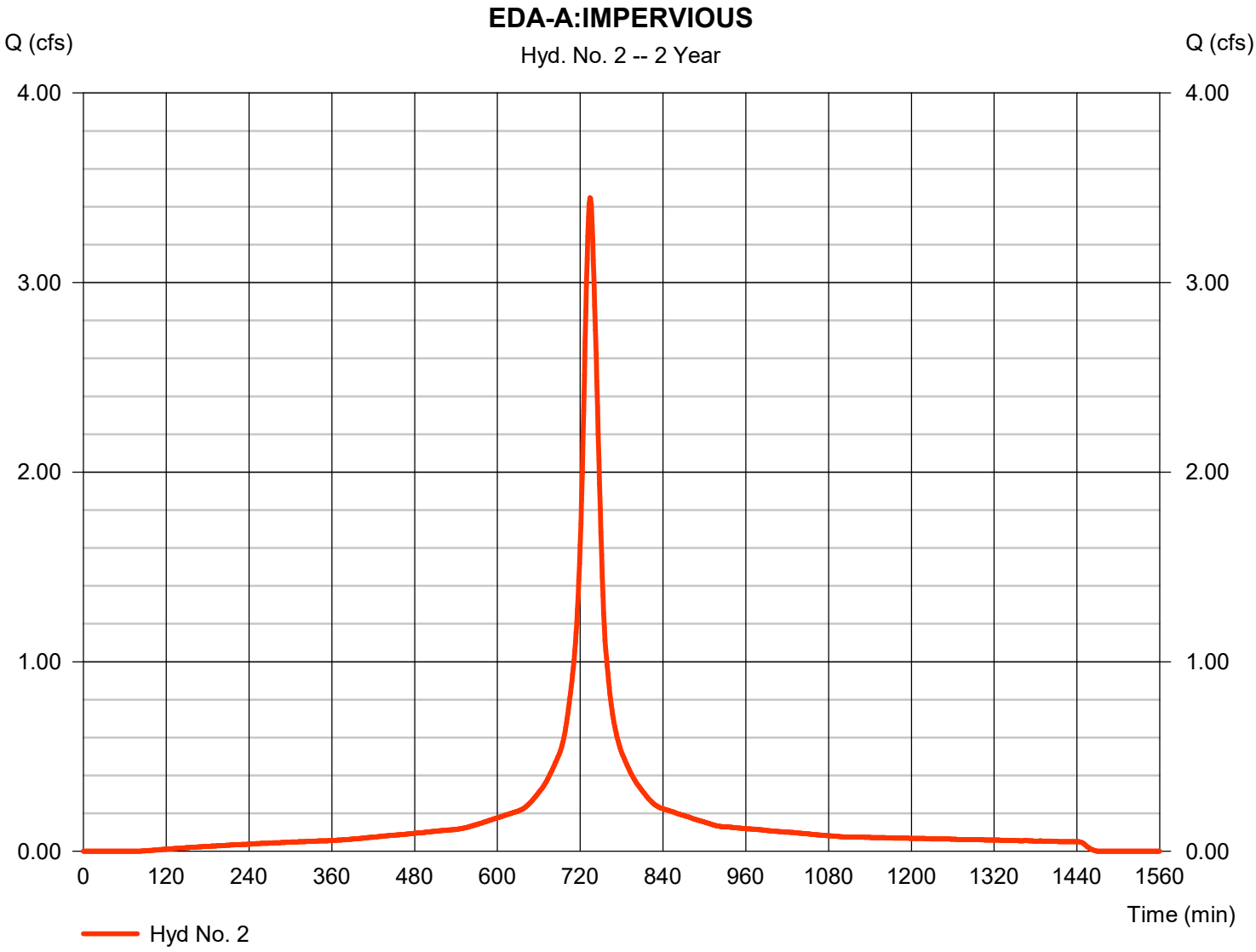


Hydrograph Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.447 cfs
Storm frequency	=	2 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	15,938 cuft
Drainage area	=	1.460 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.60 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 2

EDA-A:IMPERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 0.40		0.00		0.00		
Travel Time (min)	**= 2.29**	**+**	**0.00**	**+**	**0.00**	**=**	**2.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		509.00		600.00		
Watercourse slope (%)	= 0.00		0.20		0.60		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.91		1.25		
Travel Time (min)	**= 0.00**	**+**	**9.33**	**+**	**8.00**	**=**	**17.33**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

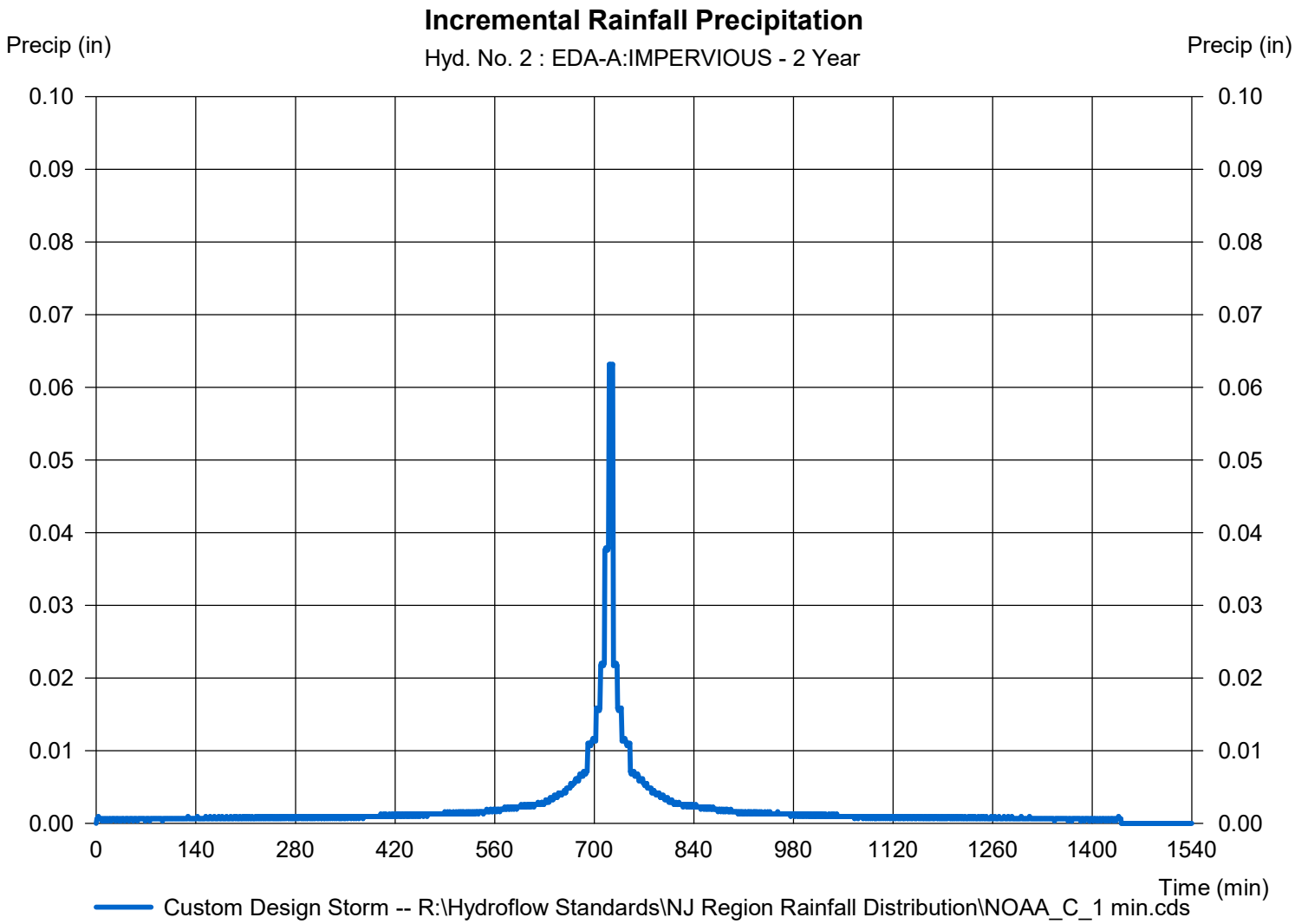
Total Travel Time, Tc ..... 19.60 min

Precipitation Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

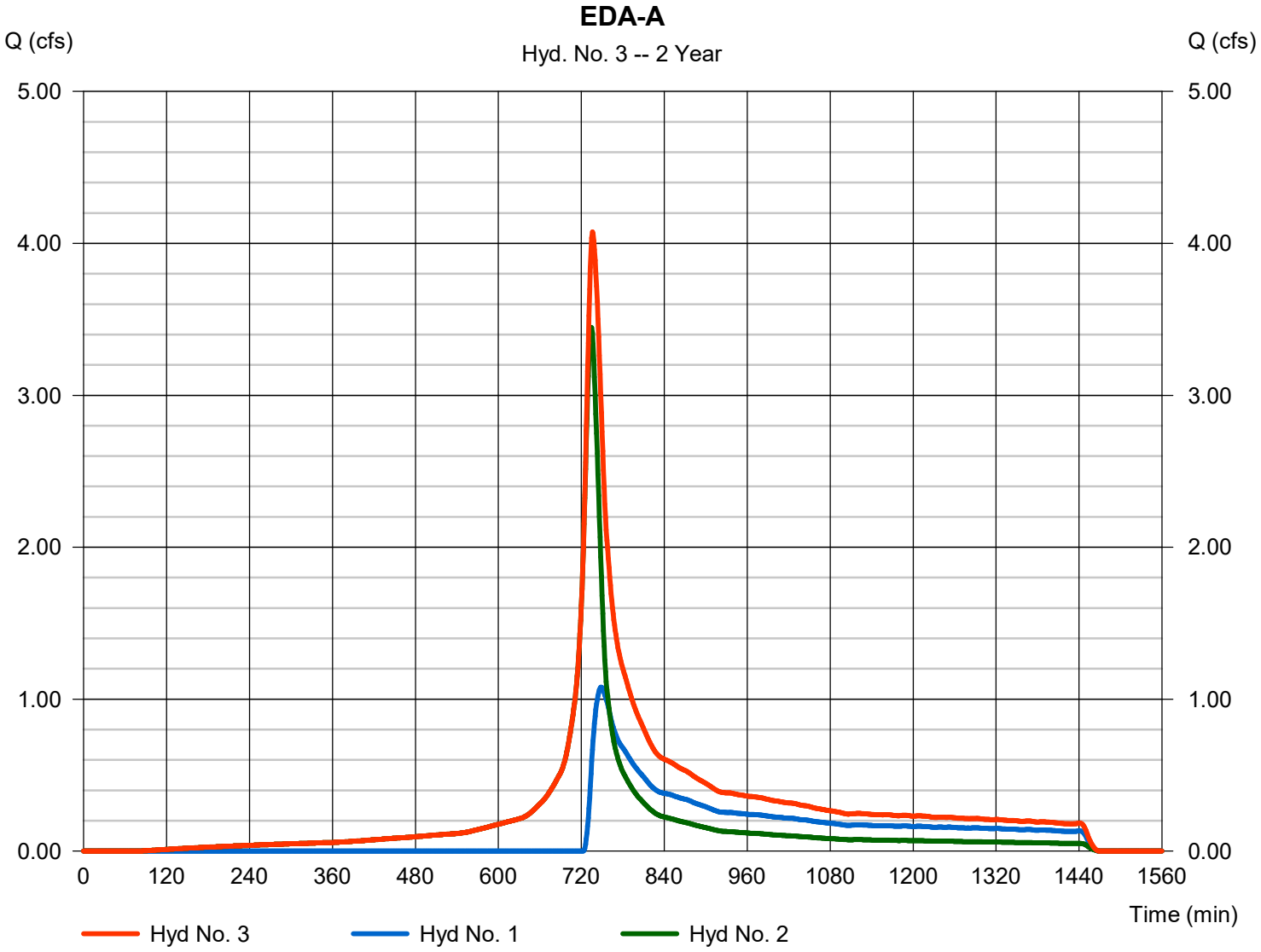


Hydrograph Report

Hyd. No. 3

EDA-A

Hydrograph type	= Combine	Peak discharge	= 4.075 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 27,407 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 15.080 ac

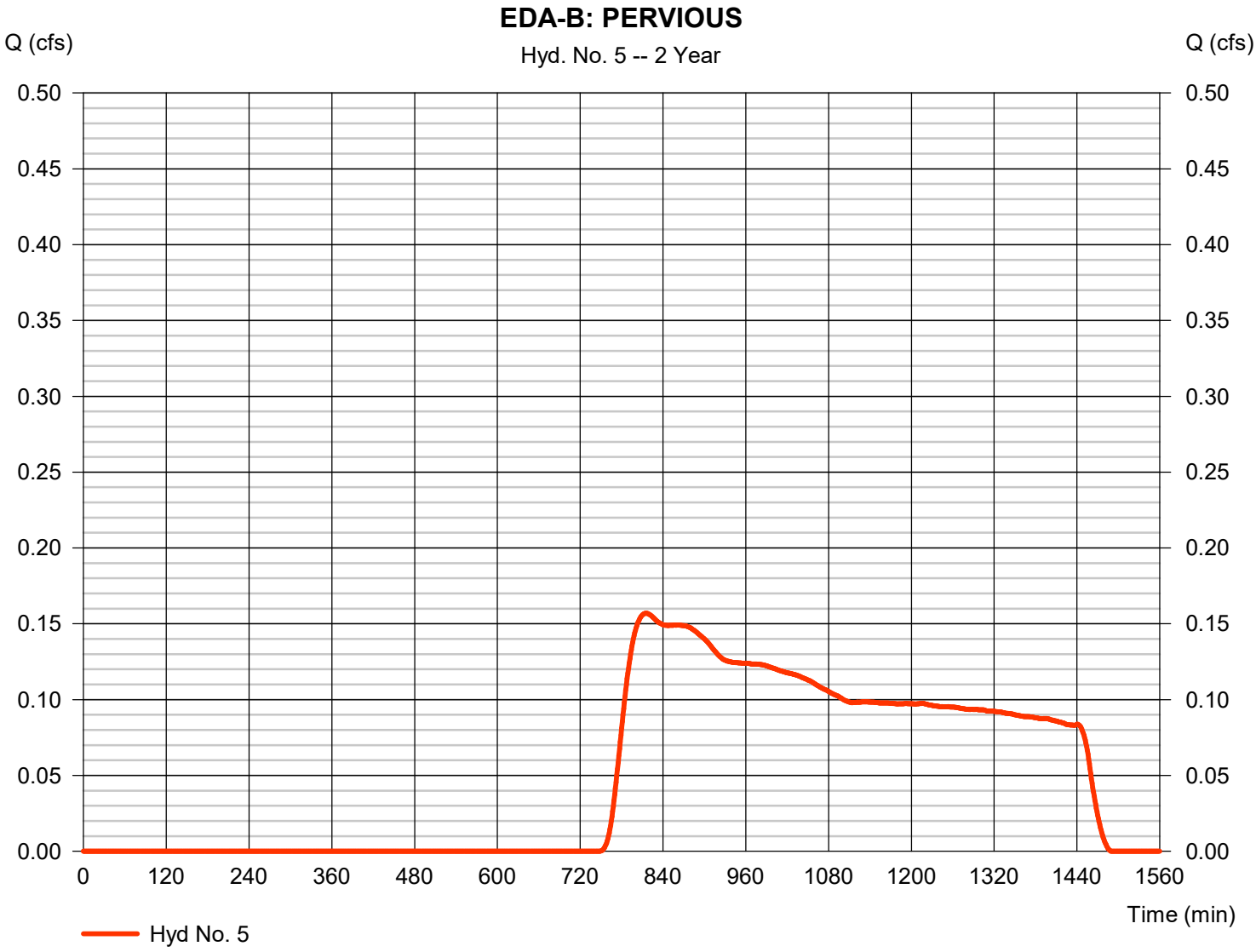


Hydrograph Report

Hyd. No. 5

EDA-B: PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.157 cfs
Storm frequency	=	2 yrs	Time to peak	=	815 min
Time interval	=	1 min	Hyd. volume	=	4,542 cuft
Drainage area	=	15.720 ac	Curve number	=	47
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.40 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 5

EDA-B: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 7.30		0.00		0.00		
Travel Time (min)	**= 12.71**	**+**	**0.00**	**+**	**0.00**	**=**	**12.71**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		704.00		818.00		
Watercourse slope (%)	= 0.00		4.90		0.30		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		3.57		0.88		
Travel Time (min)	**= 0.00**	**+**	**3.29**	**+**	**15.43**	**=**	**18.71**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

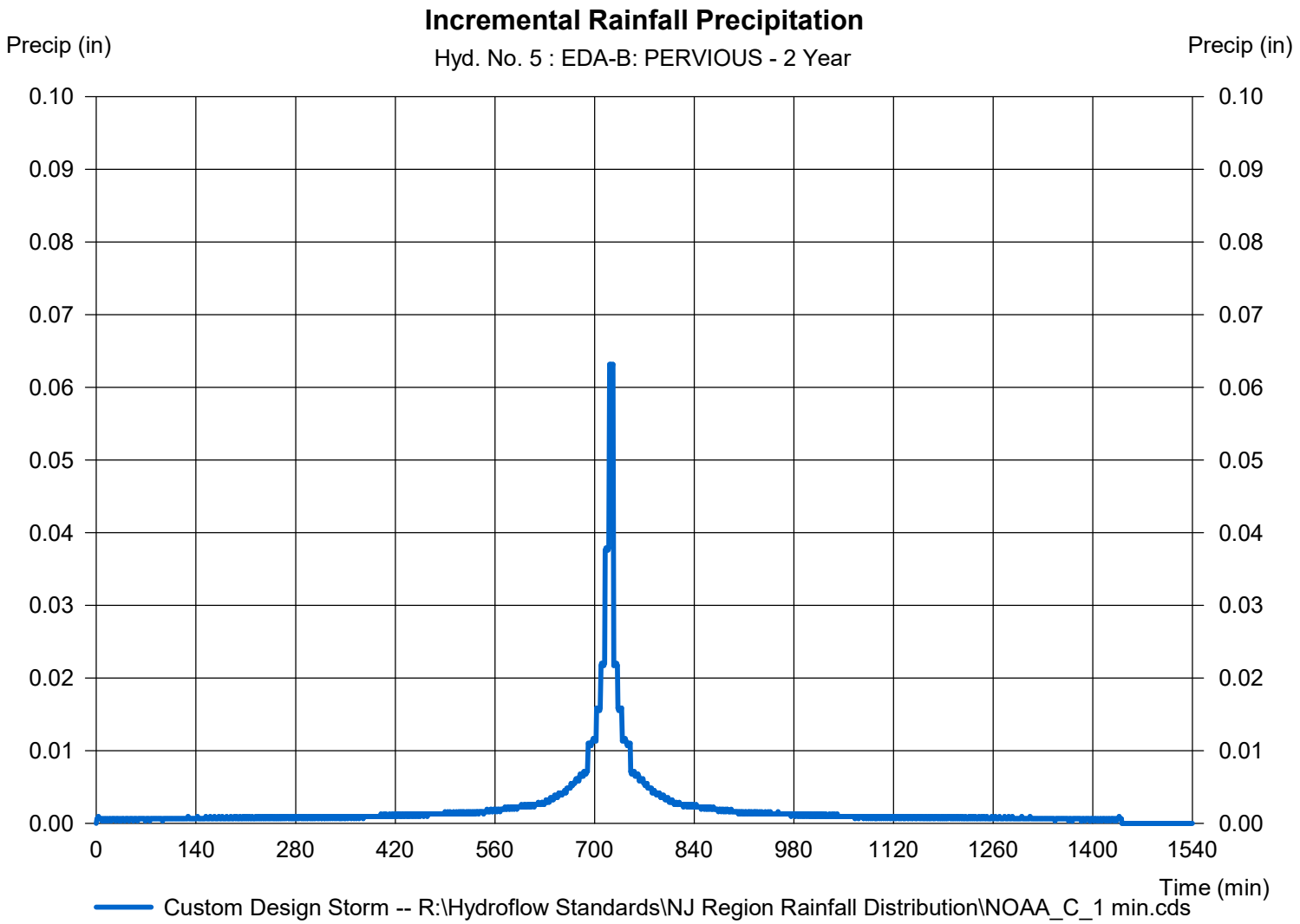
Total Travel Time, Tc ..... 31.40 min

Precipitation Report

Hyd. No. 5

EDA-B: PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

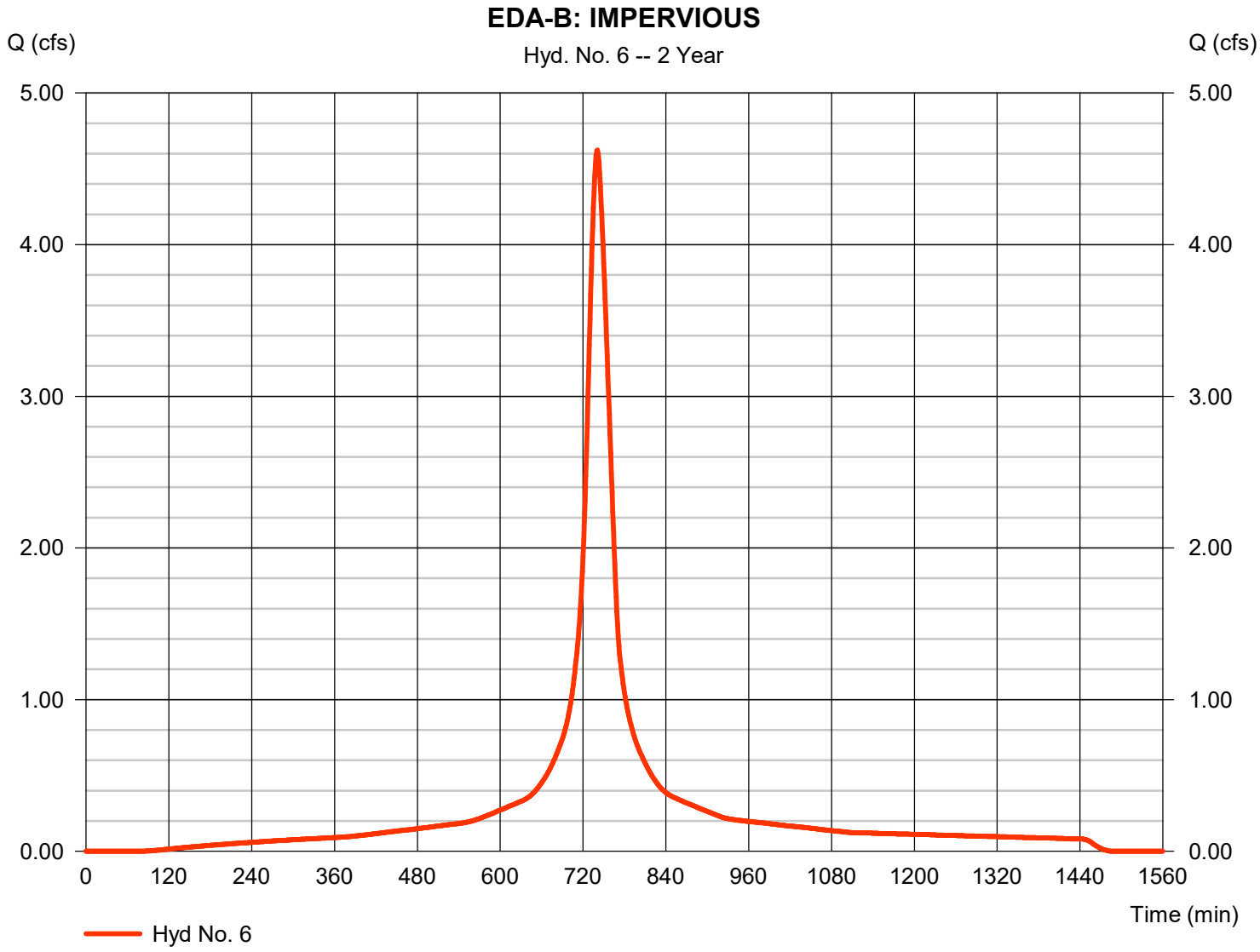


Hydrograph Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.623 cfs
Storm frequency	=	2 yrs	Time to peak	=	741 min
Time interval	=	1 min	Hyd. volume	=	25,763 cuft
Drainage area	=	2.360 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	29.70 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 6

EDA-B: IMPERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 0.10		0.00		0.00		
Travel Time (min)	**= 3.99**	**+**	**0.00**	**+**	**0.00**	**=**	**3.99**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		1303.00		98.00		
Watercourse slope (%)	= 0.00		0.20		0.30		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.91		0.88		
Travel Time (min)	**= 0.00**	**+**	**23.89**	**+**	**1.85**	**=**	**25.74**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

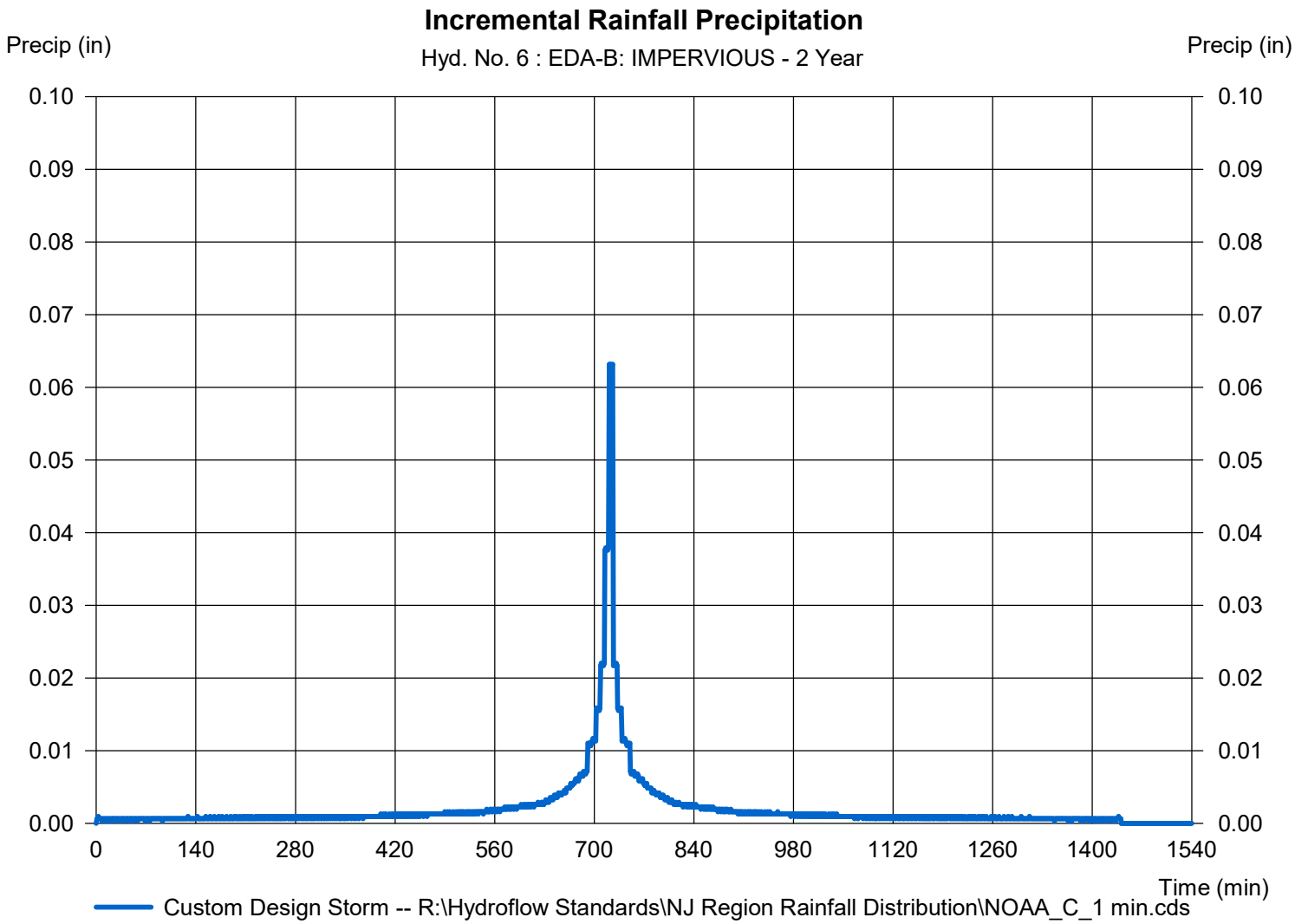
Total Travel Time, Tc ..... 29.70 min

Precipitation Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

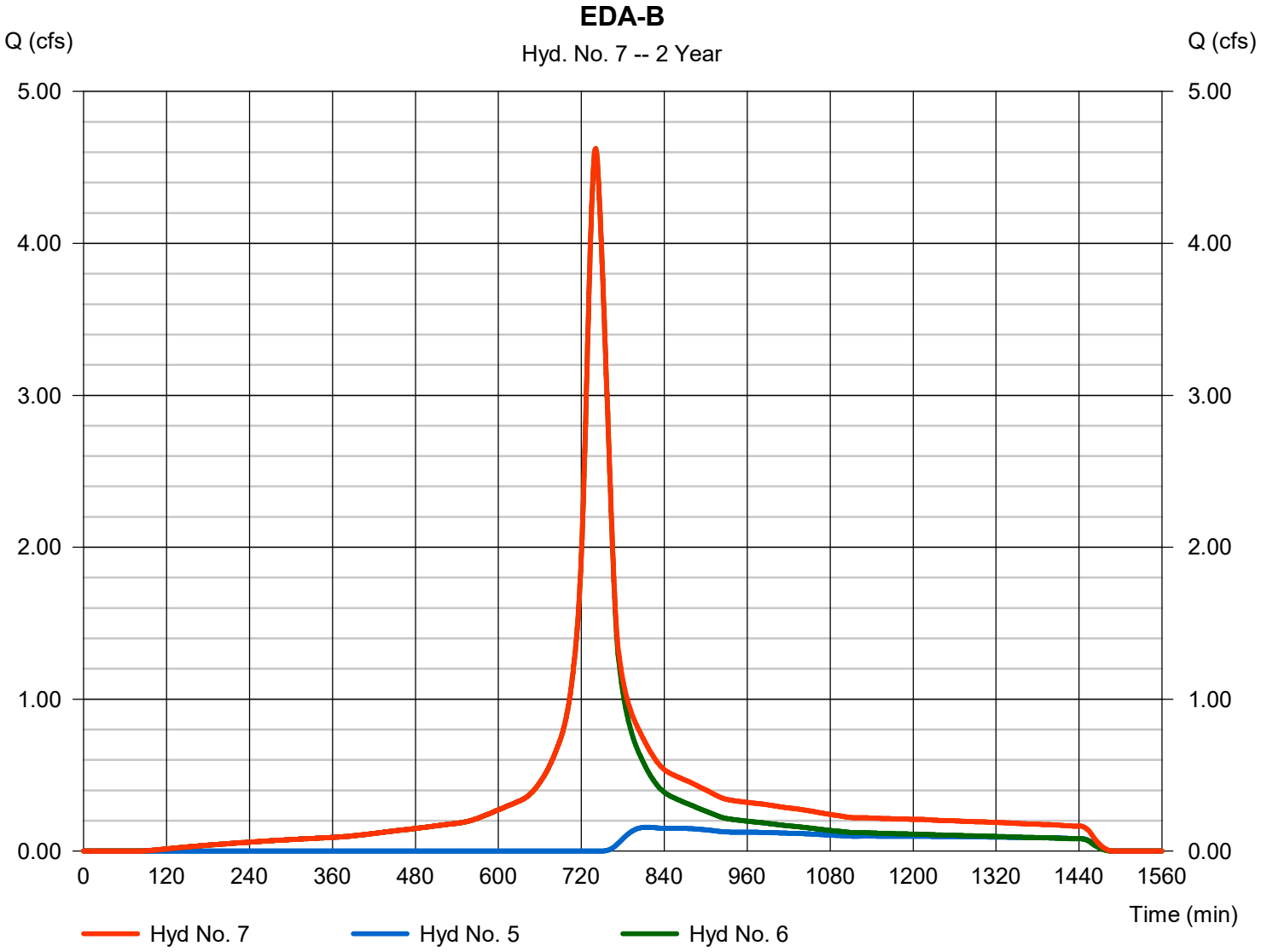


Hydrograph Report

Hyd. No. 7

EDA-B

Hydrograph type	= Combine	Peak discharge	= 4.623 cfs
Storm frequency	= 2 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 30,305 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 18.080 ac

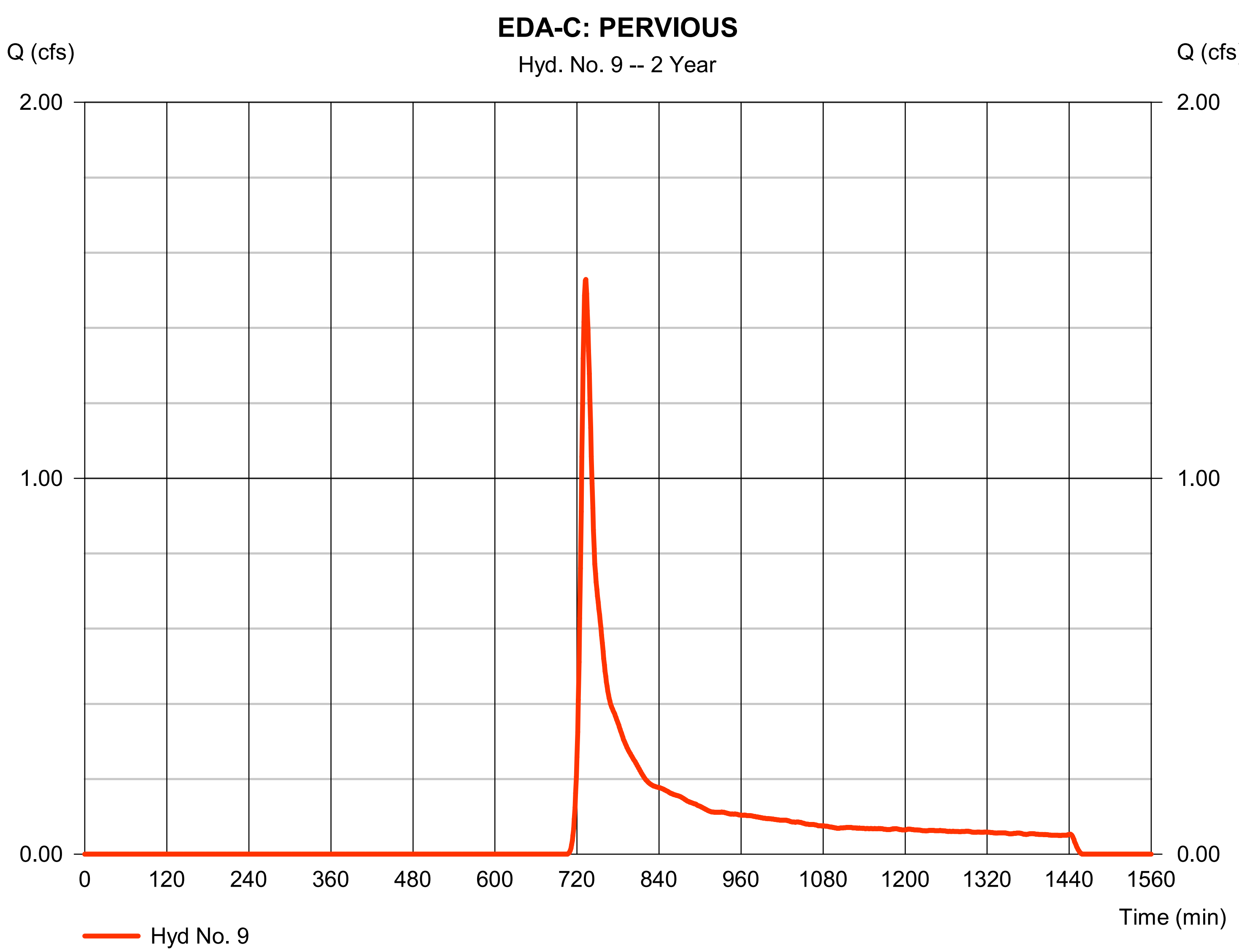


Hydrograph Report

Hyd. No. 9

EDA-C: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.529 cfs
Storm frequency	= 2 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 6,546 cuft
Drainage area	= 3.170 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.70 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 9

EDA-C: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 12.10		0.00		0.00		
Travel Time (min)	**= 10.39**	**+**	**0.00**	**+**	**0.00**	**=**	**10.39**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		73.00		265.00		
Watercourse slope (%)	= 0.00		12.00		1.70		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		5.59		2.10		
Travel Time (min)	**= 0.00**	**+**	**0.22**	**+**	**2.10**	**=**	**2.32**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

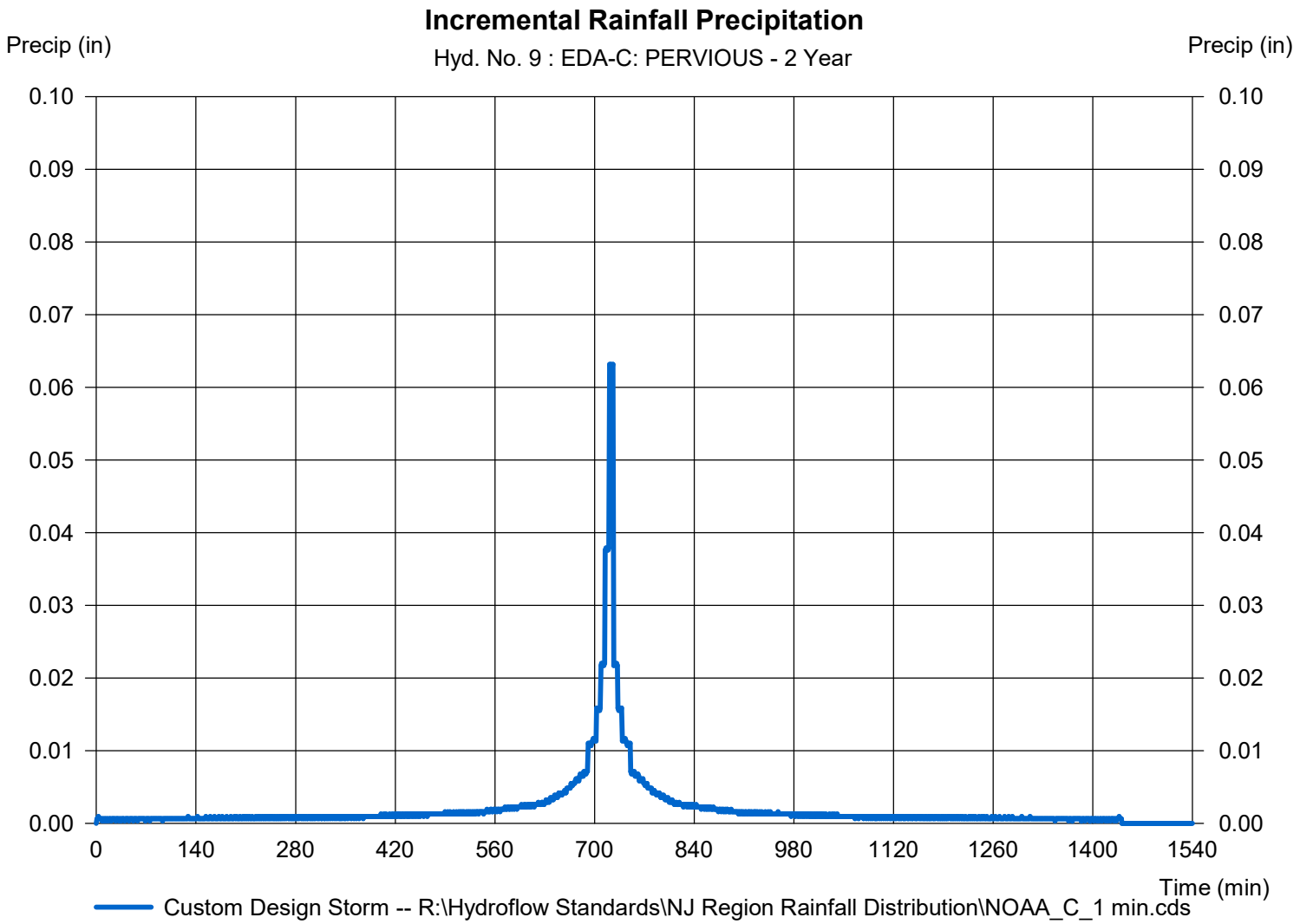
Total Travel Time, Tc ..... 12.70 min

Precipitation Report

Hyd. No. 9

EDA-C: PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

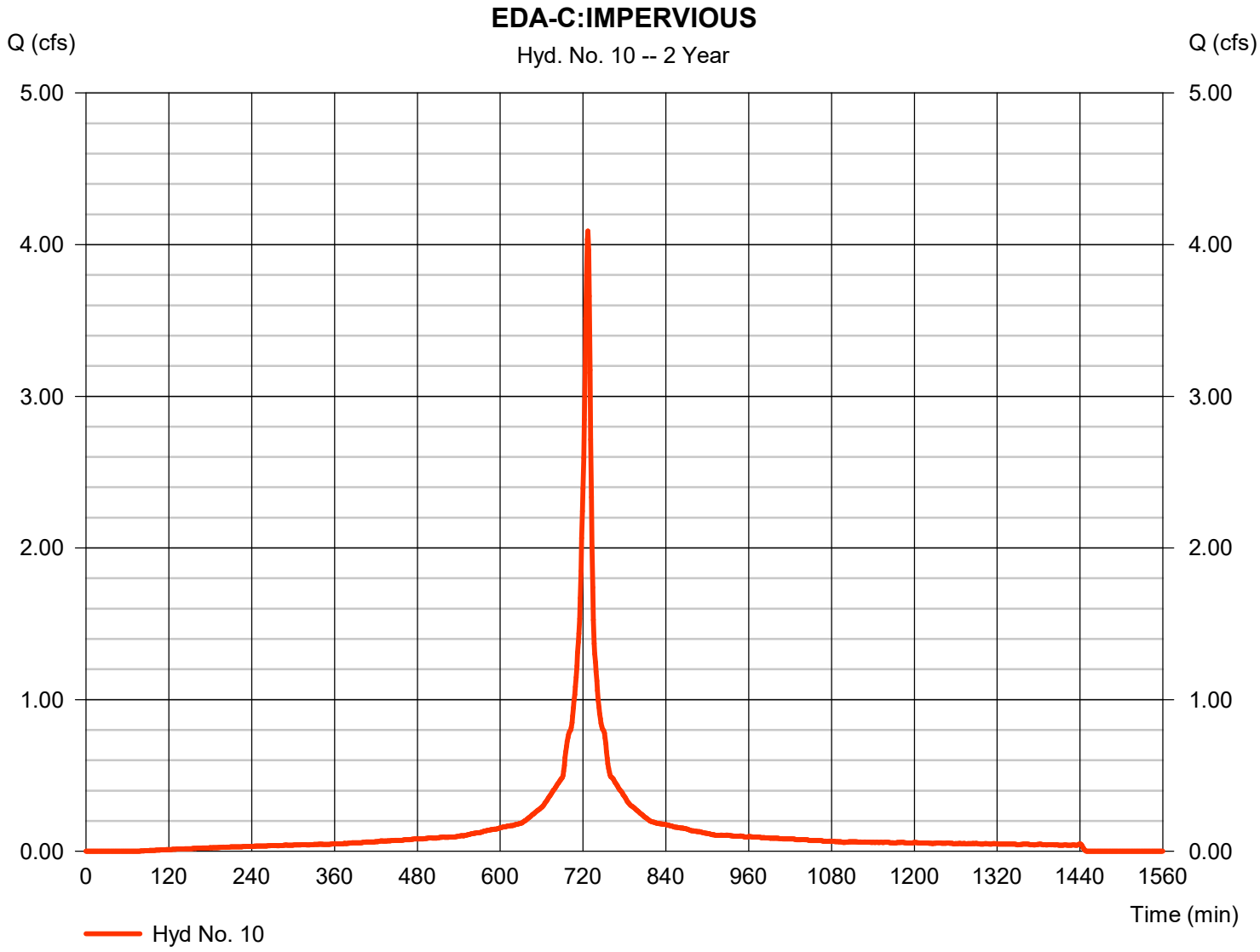


Hydrograph Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.090 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	13,059 cuft
Drainage area	=	1.160 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

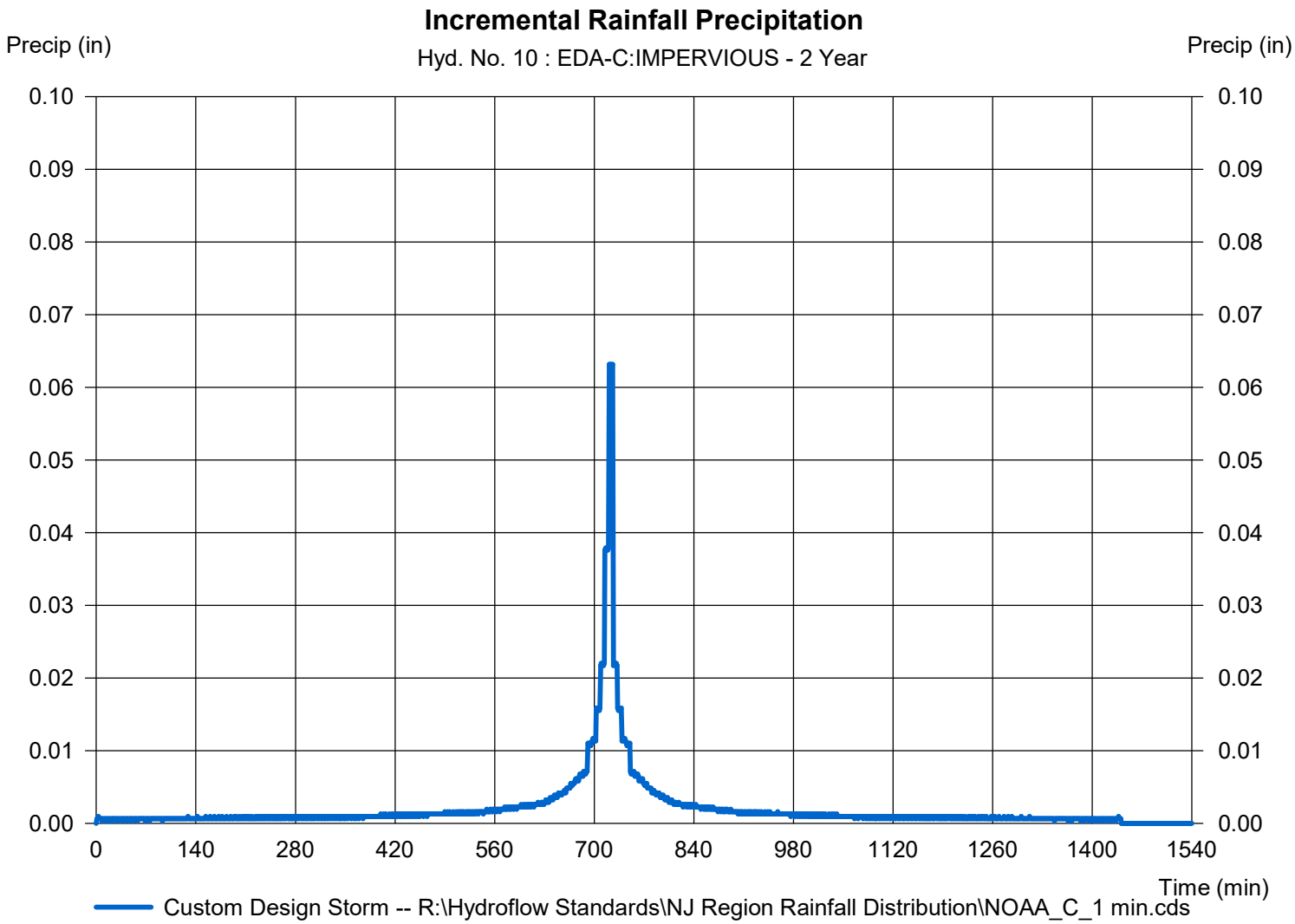


Precipitation Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

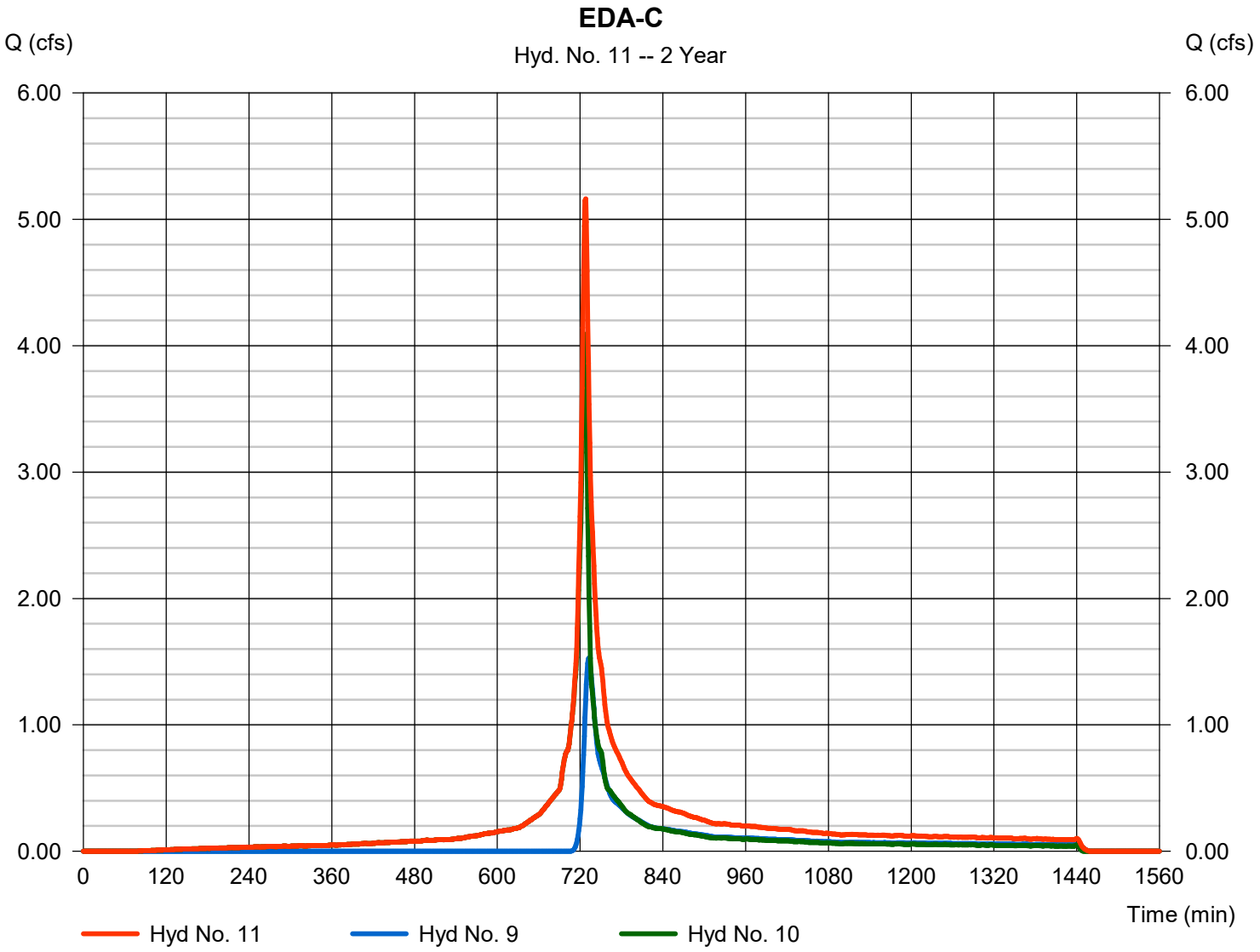


Hydrograph Report

Hyd. No. 11

EDA-C

Hydrograph type	= Combine	Peak discharge	= 5.163 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 19,605 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 4.330 ac

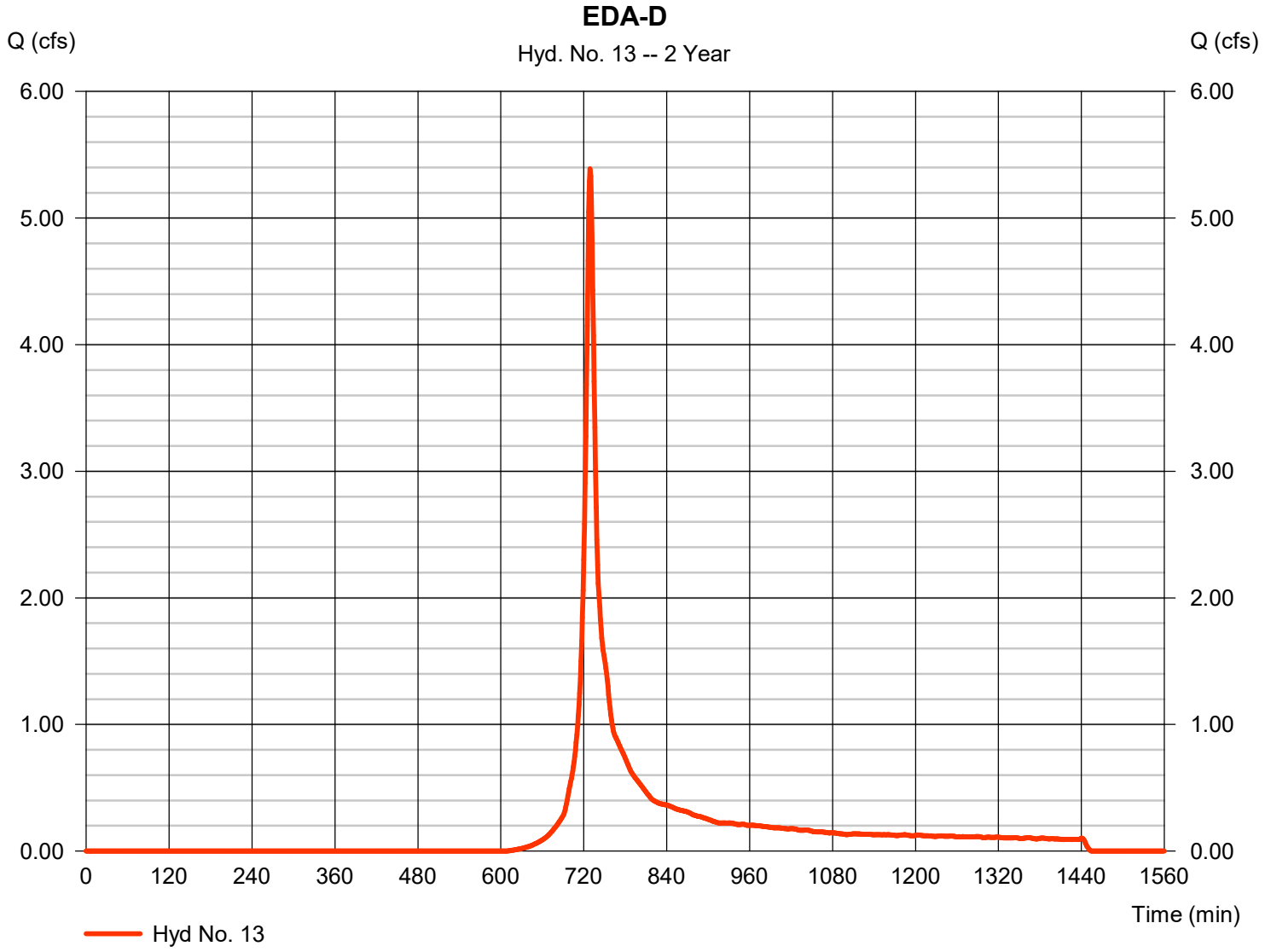


Hydrograph Report

Hyd. No. 13

EDA-D

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.388 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	16,931 cuft
Drainage area	=	3.760 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds



TR55 Tc Worksheet

Hyd. No. 13

EDA-D

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.000		0.000		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 21.20		0.00		0.00		
Travel Time (min)	**= 8.30**	**+**	**0.00**	**+**	**0.00**	**=**	**8.30**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		288.00		0.00		
Watercourse slope (%)	= 0.00		3.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		2.79		0.00		
Travel Time (min)	**= 0.00**	**+**	**1.72**	**+**	**0.00**	**=**	**1.72**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

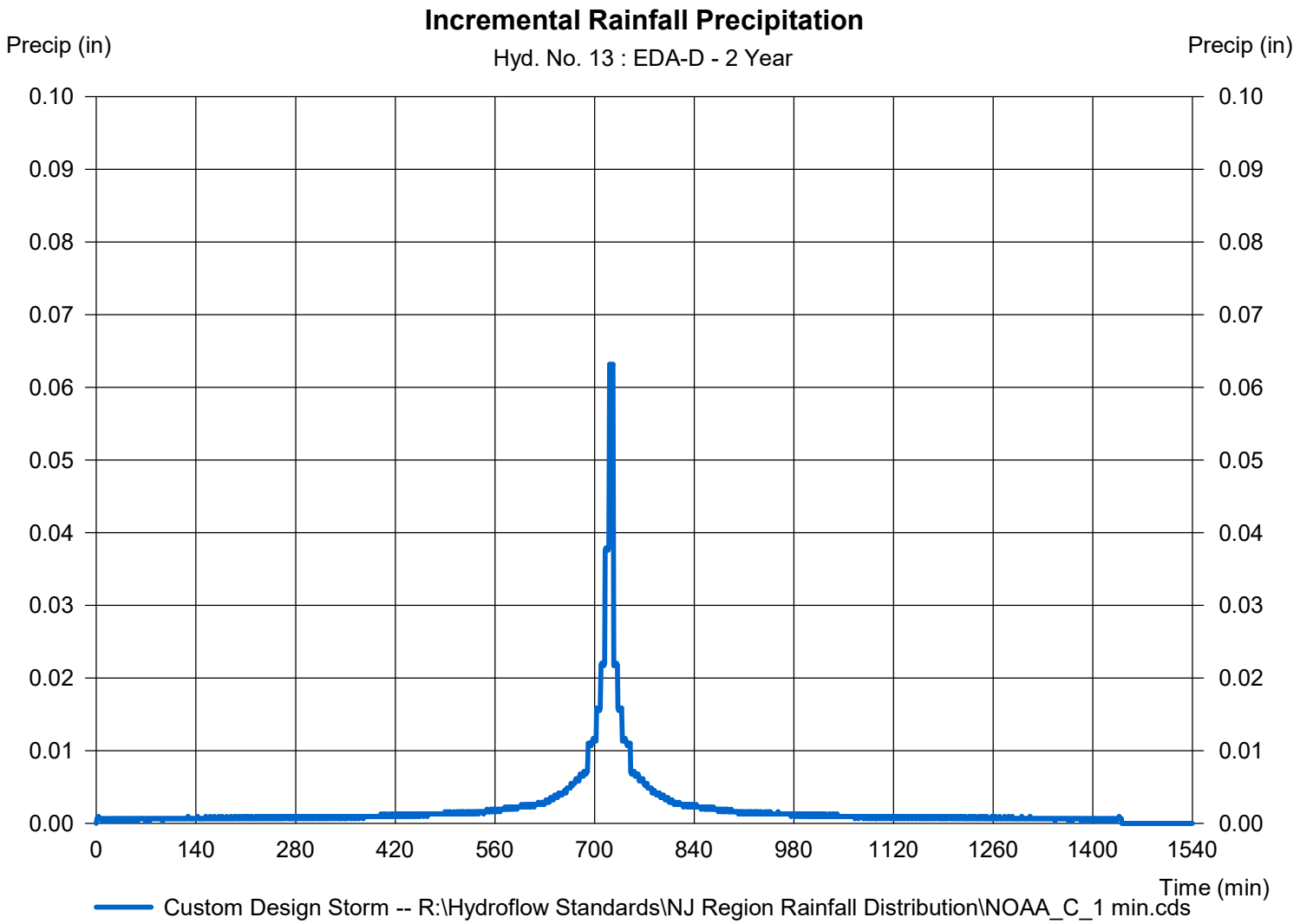
Total Travel Time, Tc ..... 10.00 min

Precipitation Report

Hyd. No. 13

EDA-D

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

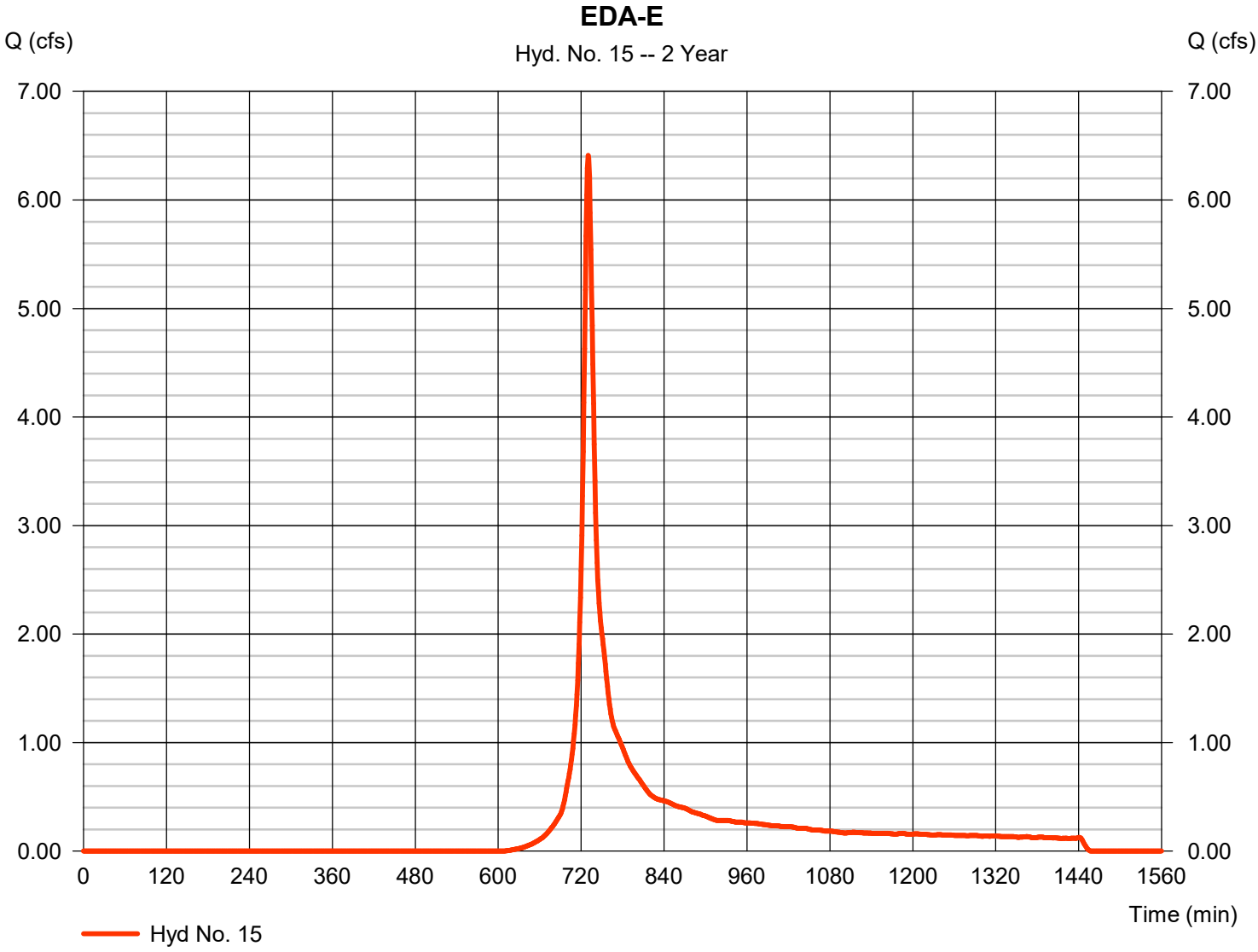


Hydrograph Report

Hyd. No. 15

EDA-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.409 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	21,496 cuft
Drainage area	=	4.690 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.40 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 15

EDA-E

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 12.40		0.00		0.00		
Travel Time (min)	**= 10.29**	**+**	**0.00**	**+**	**0.00**	**=**	**10.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		257.00		0.00		
Watercourse slope (%)	= 0.00		5.30		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		3.71		0.00		
Travel Time (min)	**= 0.00**	**+**	**1.15**	**+**	**0.00**	**=**	**1.15**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

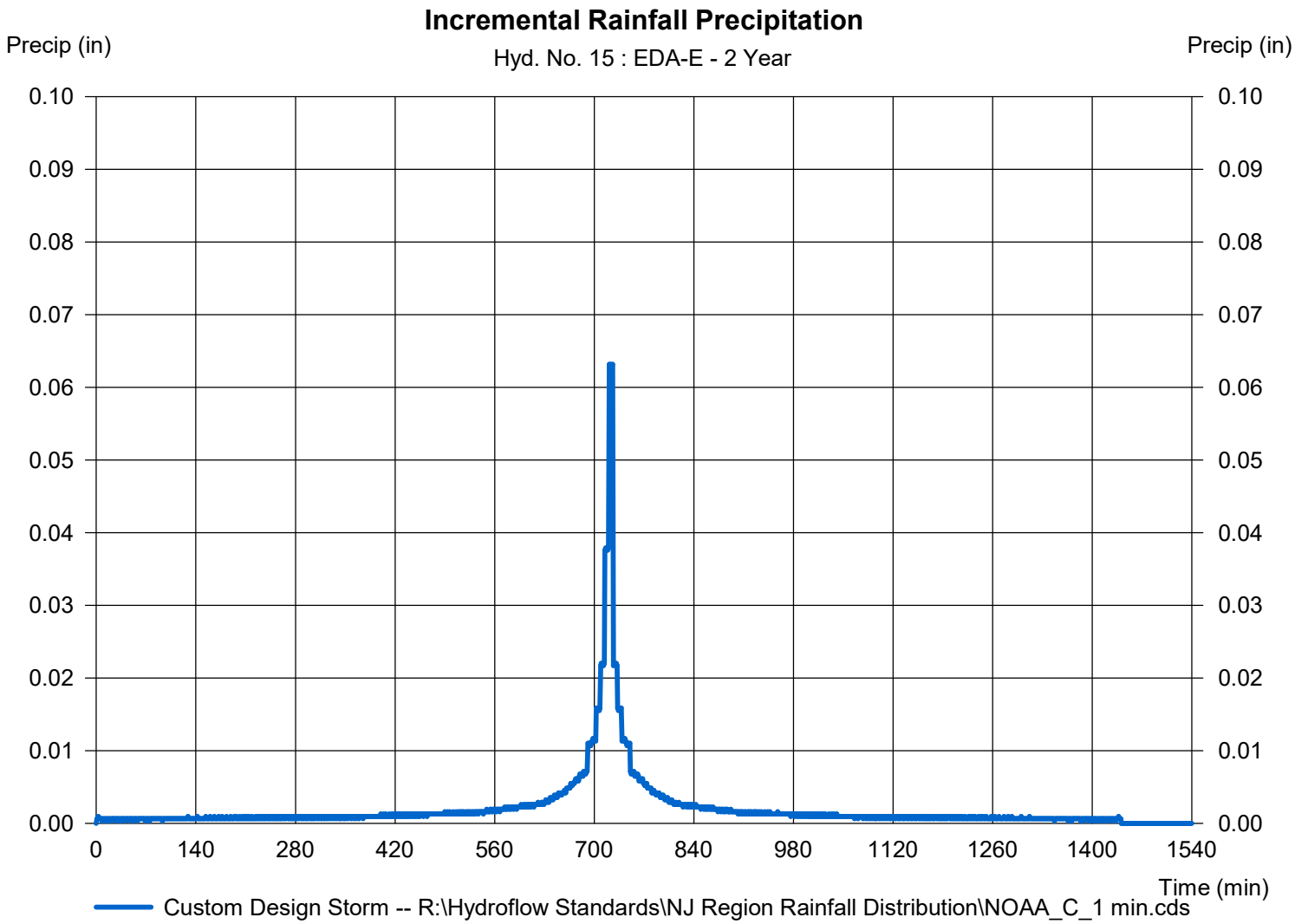
Total Travel Time, Tc ..... 11.40 min

Precipitation Report

Hyd. No. 15

EDA-E

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

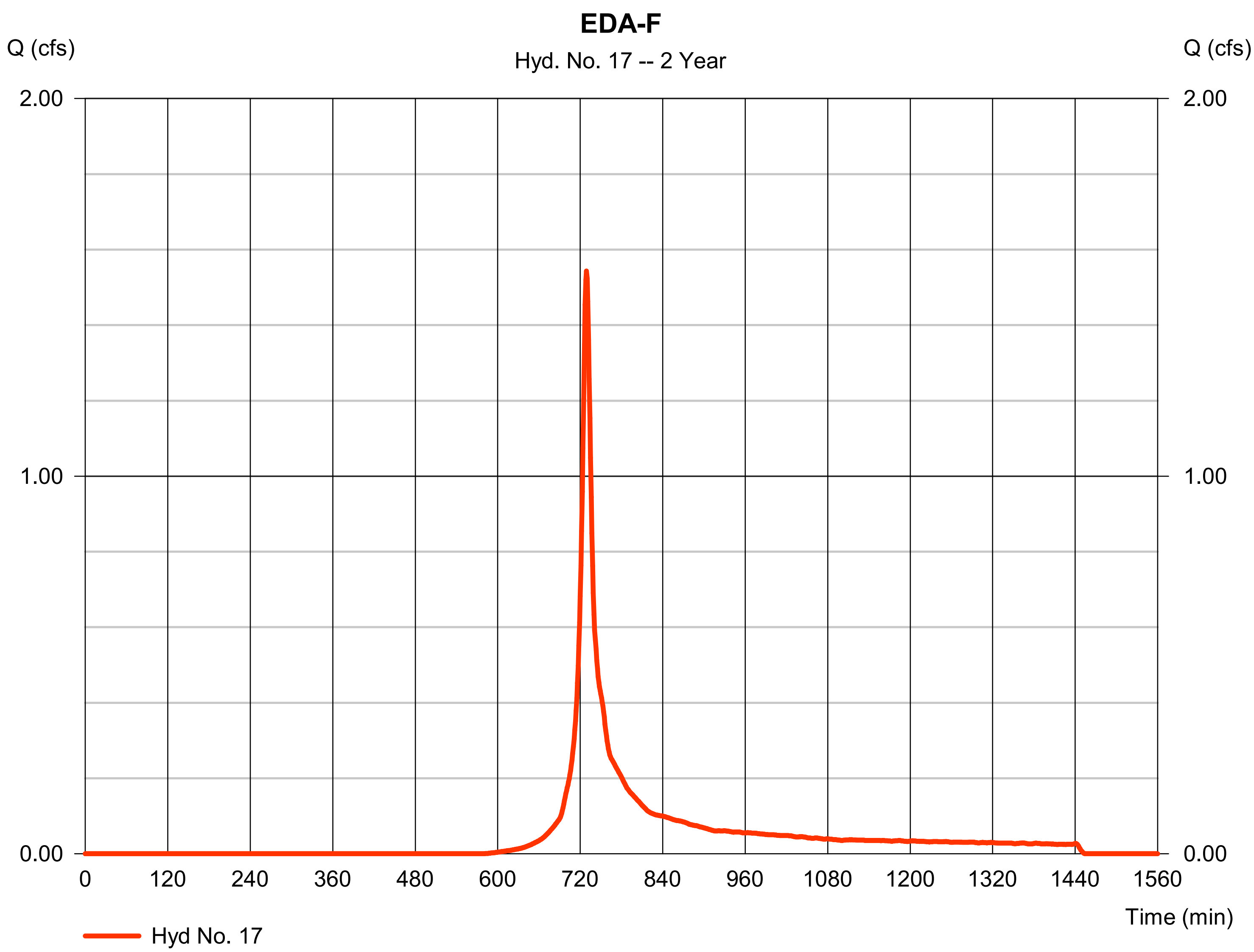


Hydrograph Report

Hyd. No. 17

EDA-F

Hydrograph type	= SCS Runoff	Peak discharge	= 1.543 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,813 cuft
Drainage area	= 0.970 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 17

EDA-F

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.240		0.011		
Flow length (ft)	= 40.0		35.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 16.30		3.50		0.00		
Travel Time (min)	**= 4.43**	**+**	**4.90**	**+**	**0.00**	**=**	**9.33**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		62.00		0.00		
Watercourse slope (%)	= 0.00		1.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		1.61		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.64**	**+**	**0.00**	**=**	**0.64**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

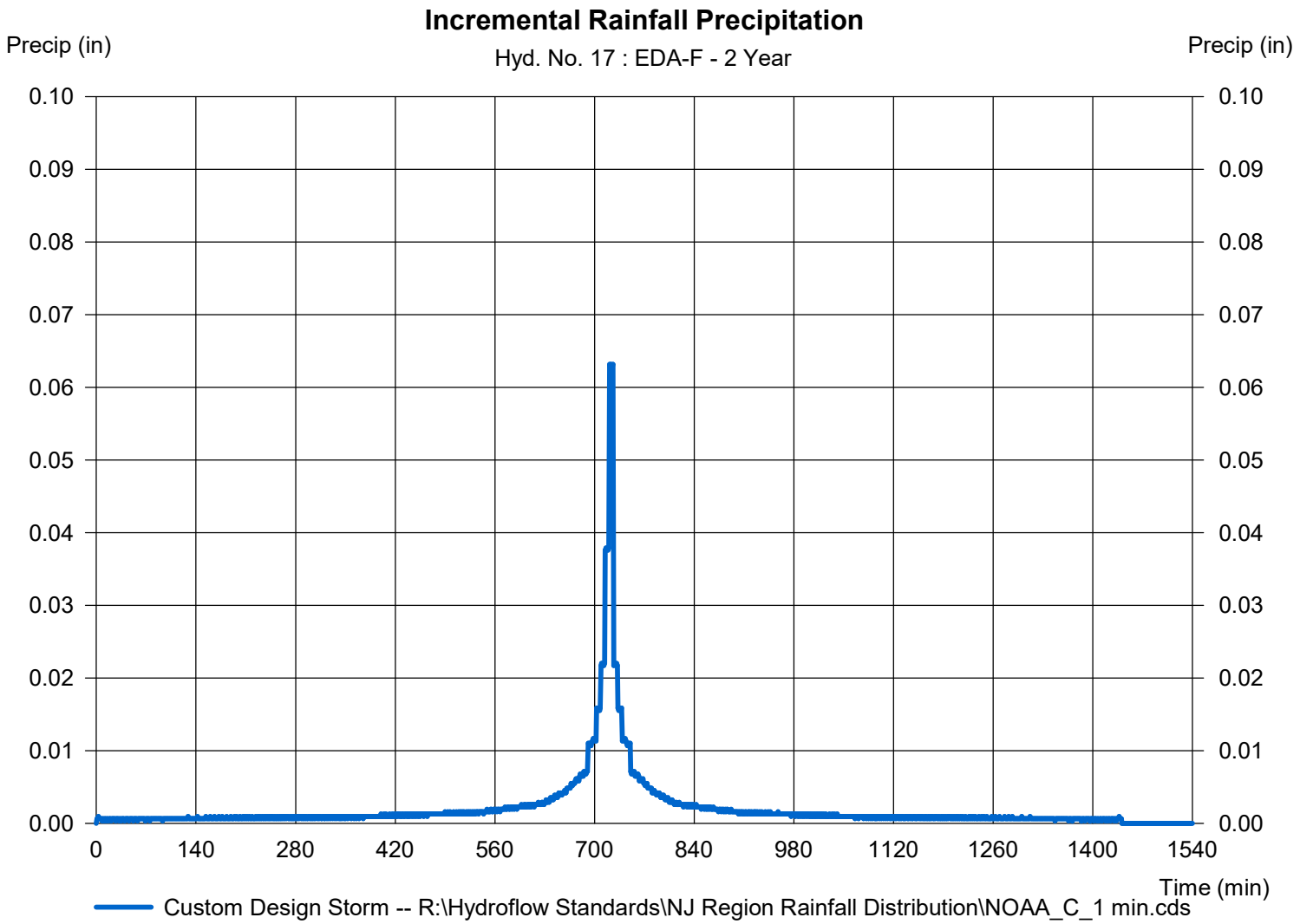
Total Travel Time, Tc ..... 10.00 min

Precipitation Report

Hyd. No. 17

EDA-F

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

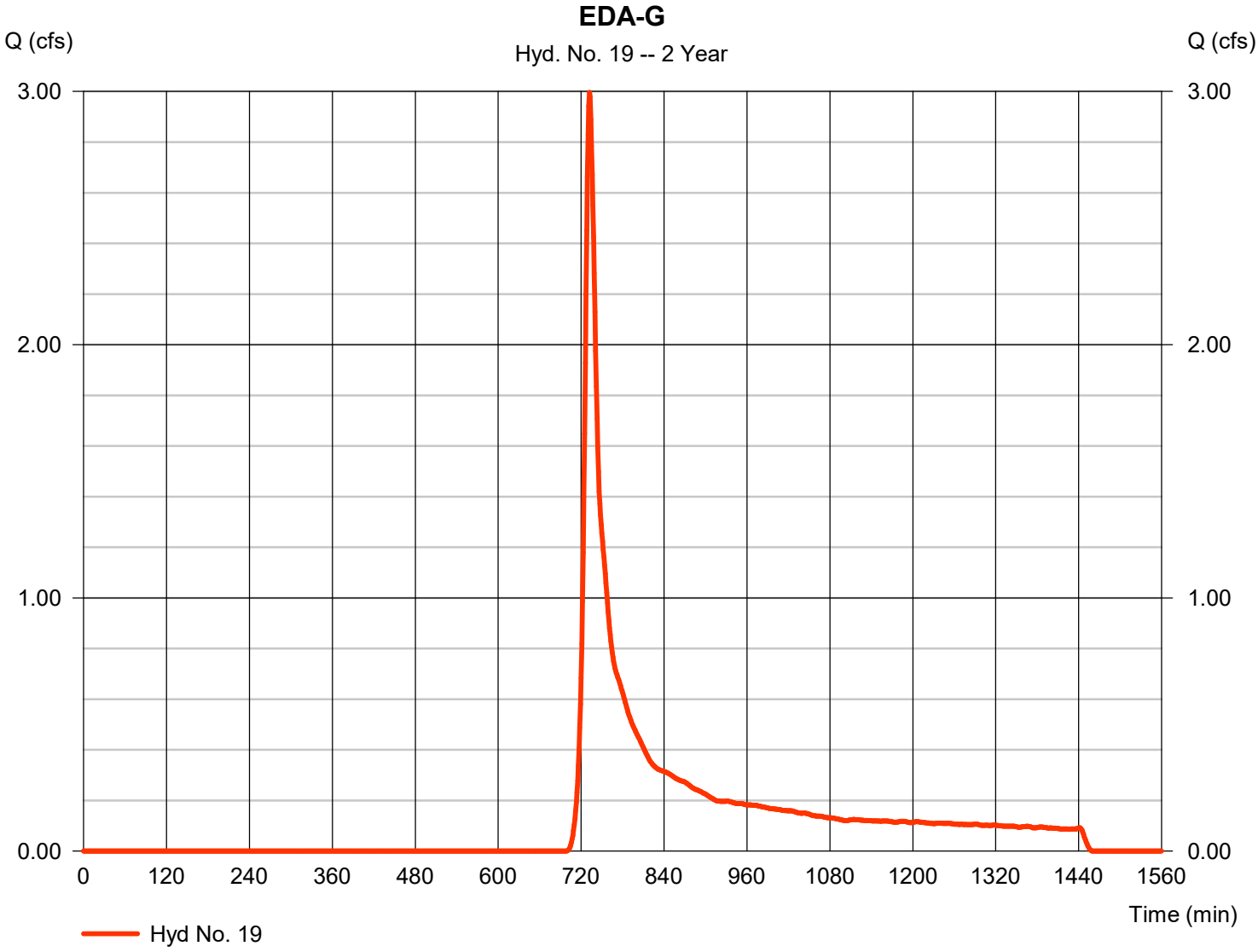


Hydrograph Report

Hyd. No. 19

EDA-G

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.996 cfs
Storm frequency	=	2 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	12,041 cuft
Drainage area	=	5.080 ac	Curve number	=	66
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.60 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Storm Rainfall	=	484



TR55 Tc Worksheet

Hyd. No. 19

EDA-G

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 10.50		0.00		0.00		
Travel Time (min)	**= 10.99**	**+**	**0.00**	**+**	**0.00**	**=**	**10.99**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		159.00		276.00		
Watercourse slope (%)	= 0.00		12.20		6.70		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		5.64		4.18		
Travel Time (min)	**= 0.00**	**+**	**0.47**	**+**	**1.10**	**=**	**1.57**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

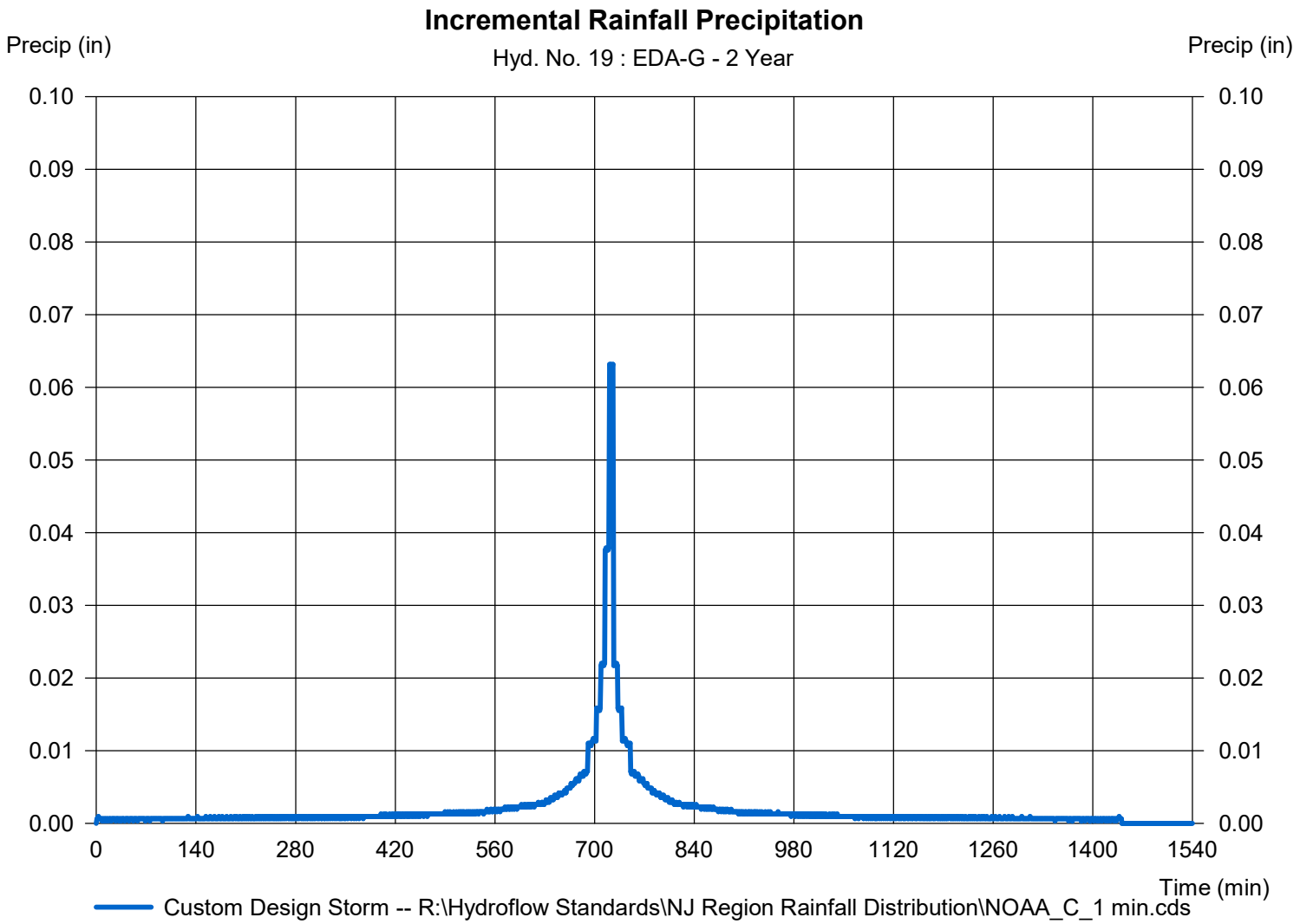
Total Travel Time, Tc ..... 12.60 min

Precipitation Report

Hyd. No. 19

EDA-G

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

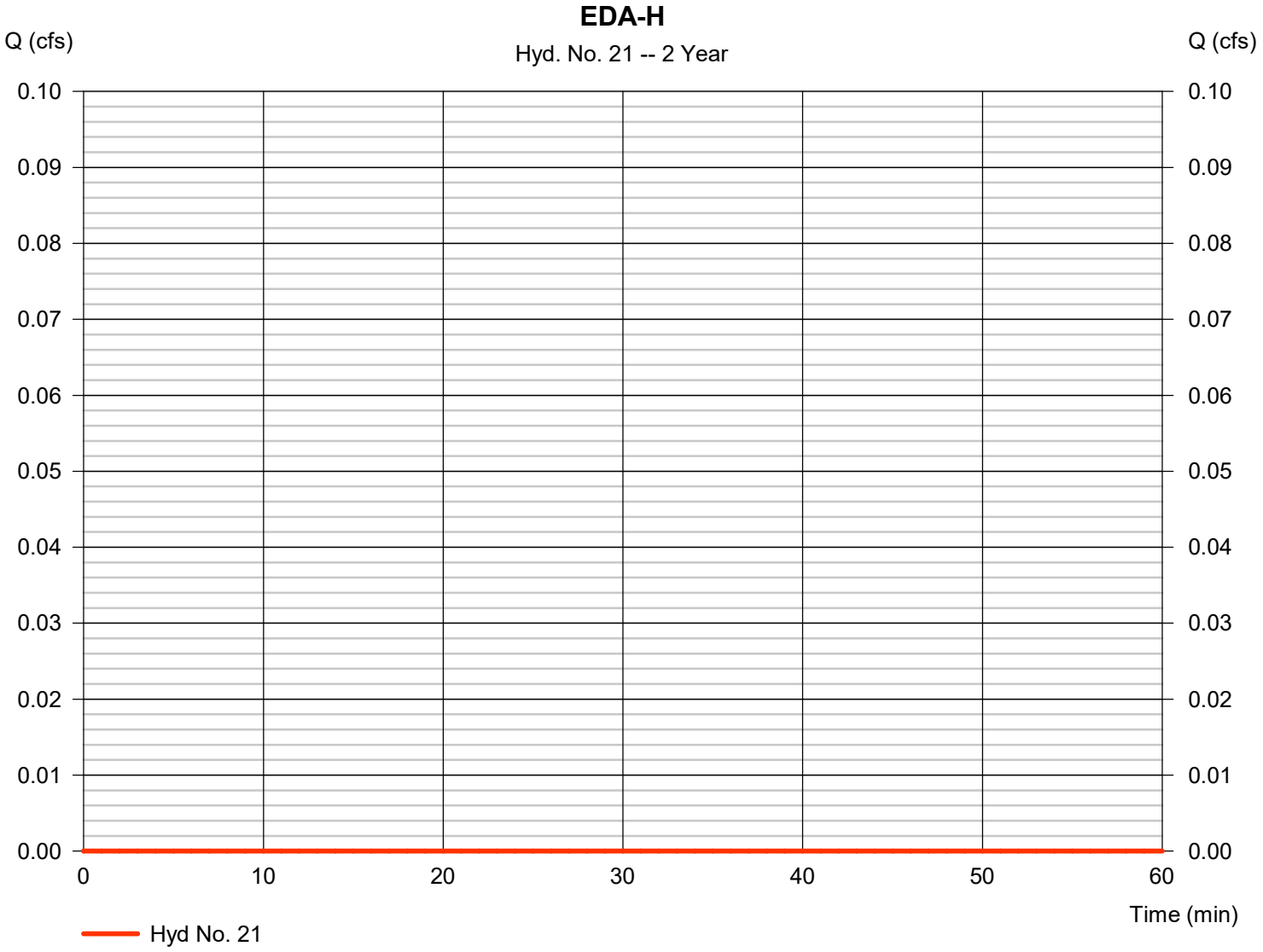


Hydrograph Report

Hyd. No. 21

EDA-H

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Drainage area	=	12.920 ac	Curve number	=	36
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	33.50 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 21

EDA-H

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.150		0.011		
Flow length (ft)	= 32.0		68.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 3.00		0.10		0.00		
Travel Time (min)	**= 7.29**	**+**	**23.71**	**+**	**0.00**	**=**	**31.00**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		452.00		
Watercourse slope (%)	= 0.00		0.00		3.40		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.00		2.98		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**2.53**	**=**	**2.53**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

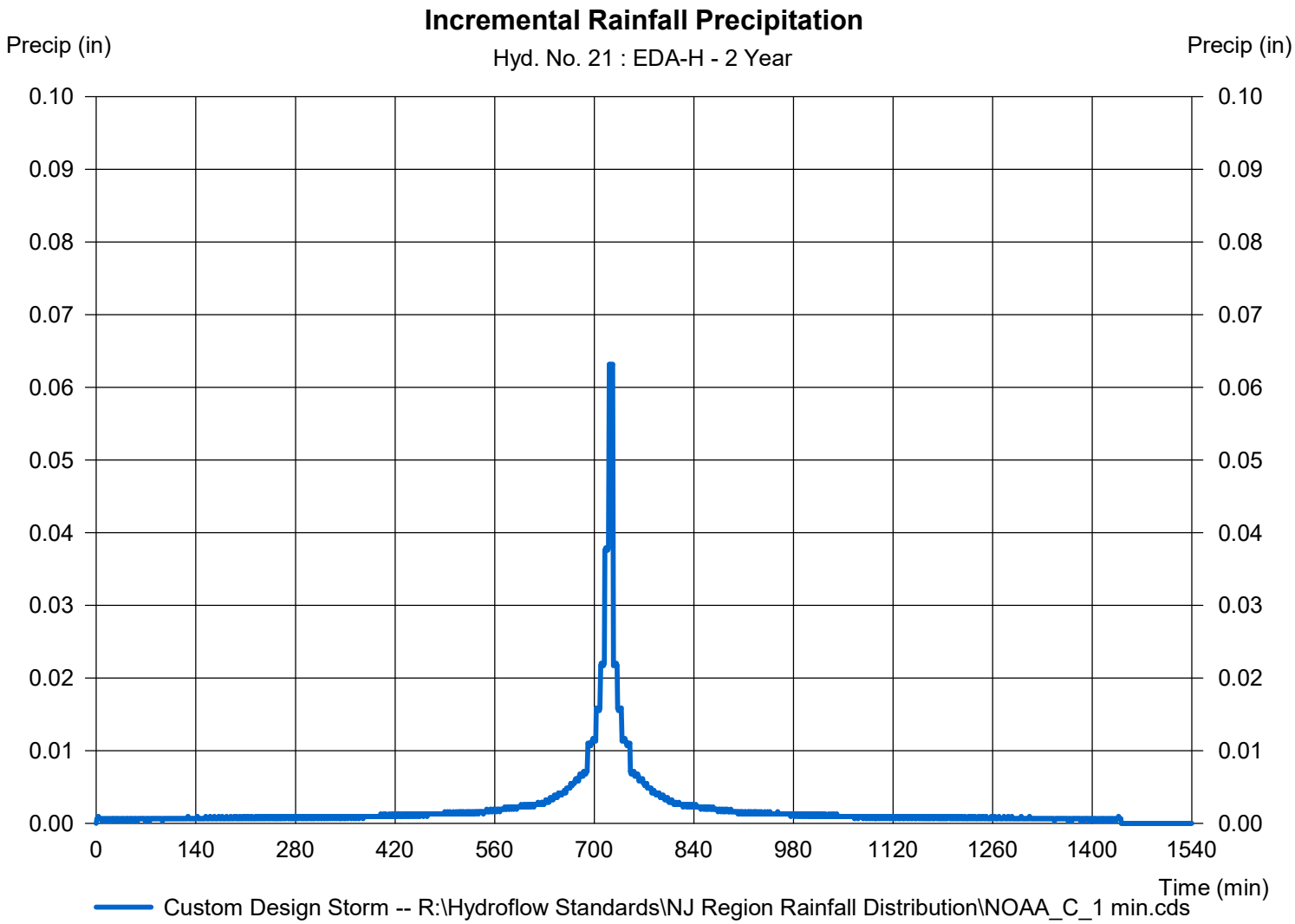
Total Travel Time, Tc ..... 33.50 min

Precipitation Report

Hyd. No. 21

EDA-H

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

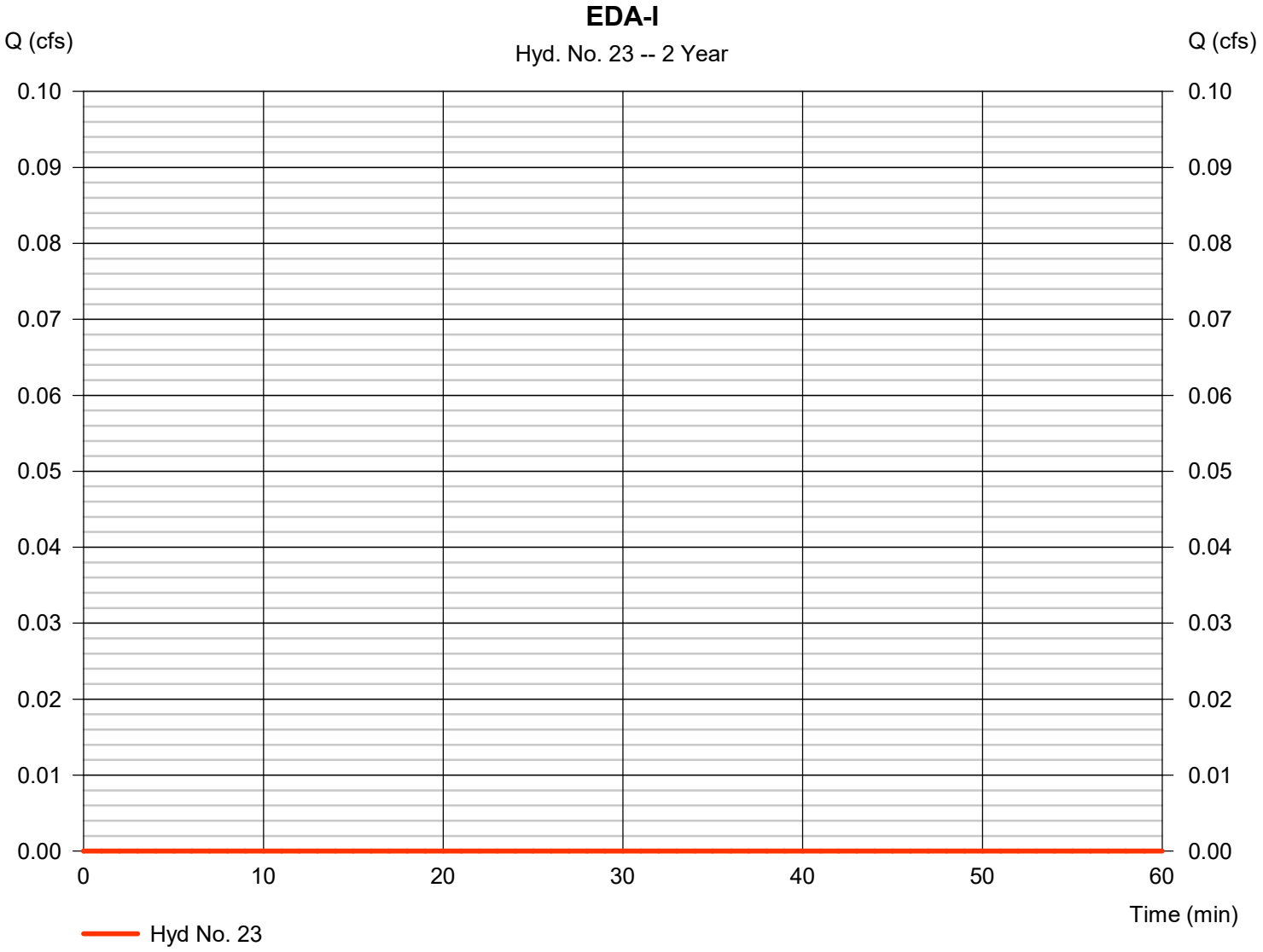


Hydrograph Report

Hyd. No. 23

EDA-I

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Drainage area	=	1.100 ac	Curve number	=	30
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	22.10 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 23

EDA-I

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 1.90		0.00		0.00		
Travel Time (min)	**= 21.78**	**+**	**0.00**	**+**	**0.00**	**=**	**21.78**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		97.00		0.00		
Watercourse slope (%)	= 0.00		13.80		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		5.99		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.27**	**+**	**0.00**	**=**	**0.27**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

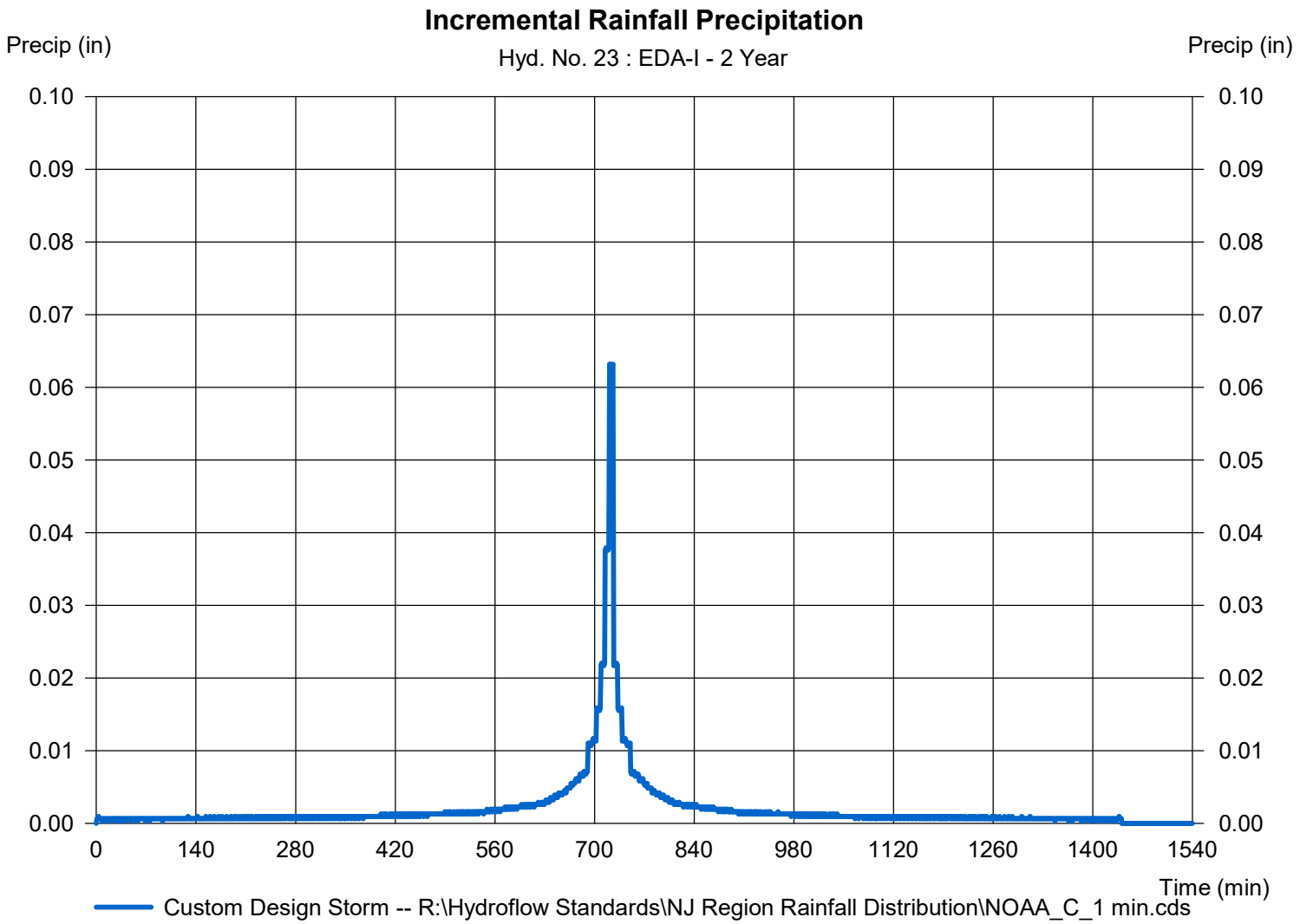
Total Travel Time, Tc ..... 22.10 min

Precipitation Report

Hyd. No. 23

EDA-I

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

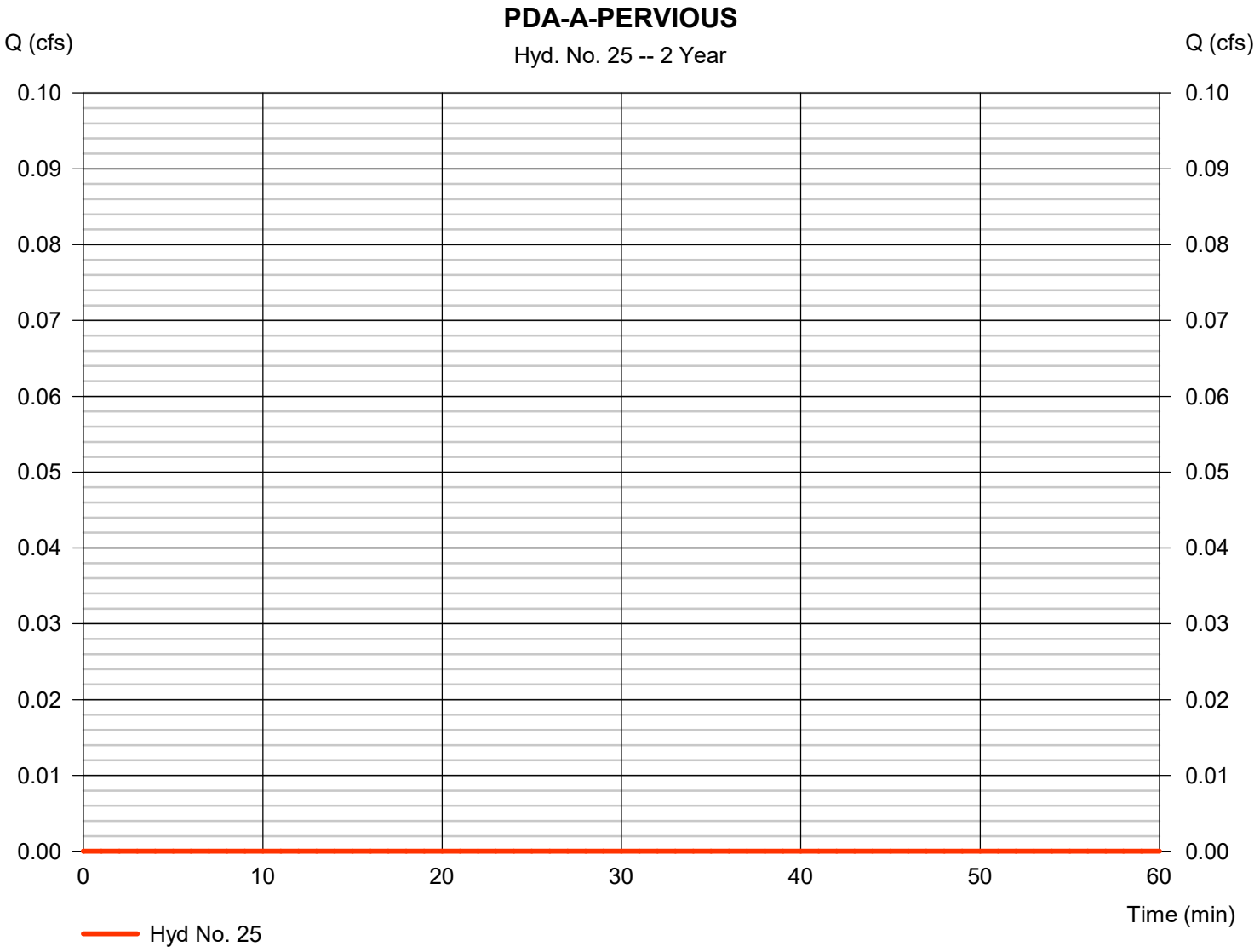


Hydrograph Report

Hyd. No. 25

PDA-A-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Drainage area	=	2.030 ac	Curve number	=	9
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

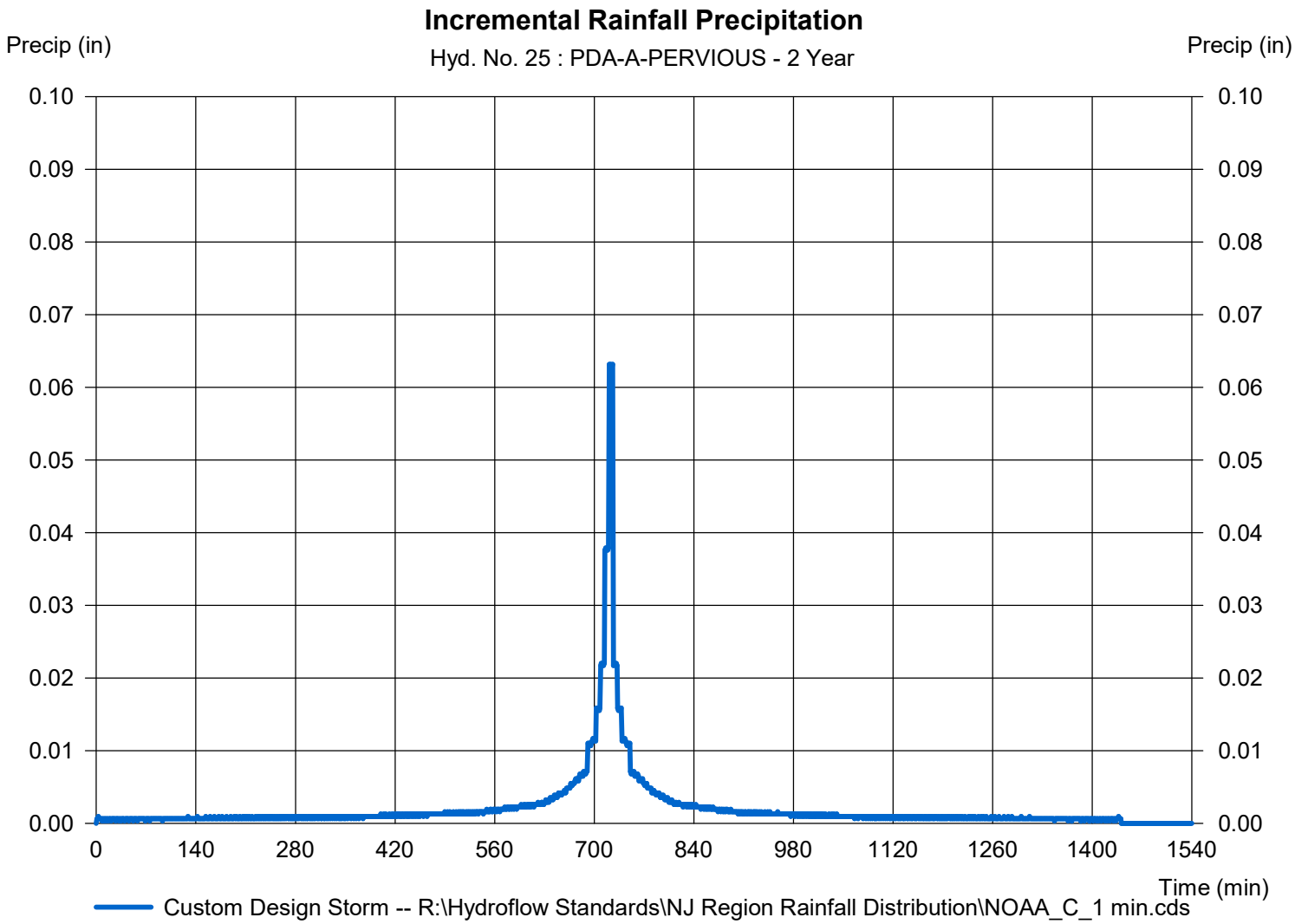


Precipitation Report

Hyd. No. 25

PDA-A-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

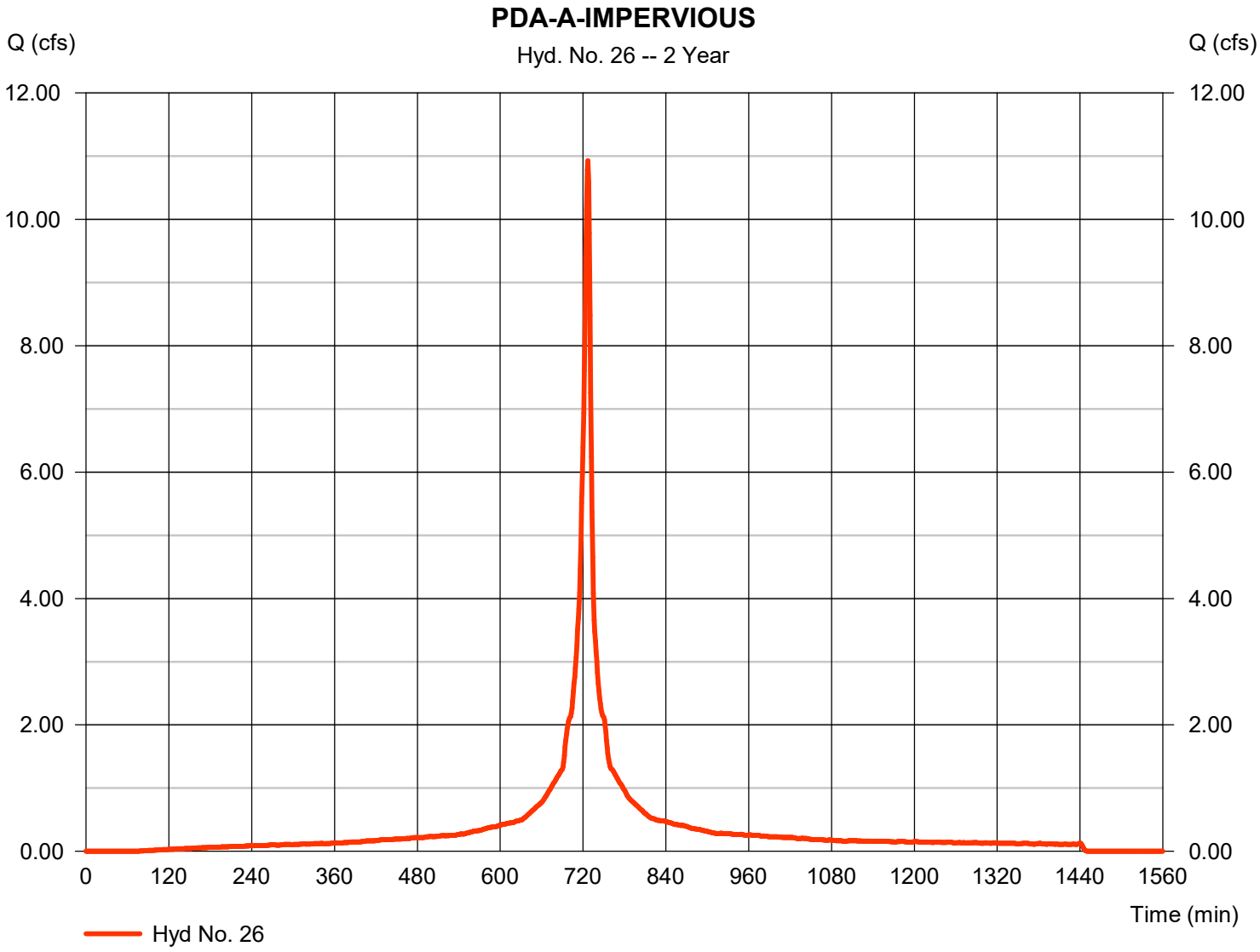


Hydrograph Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.93 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	34,899 cuft
Drainage area	=	3.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Storm Distribution	=	Type II

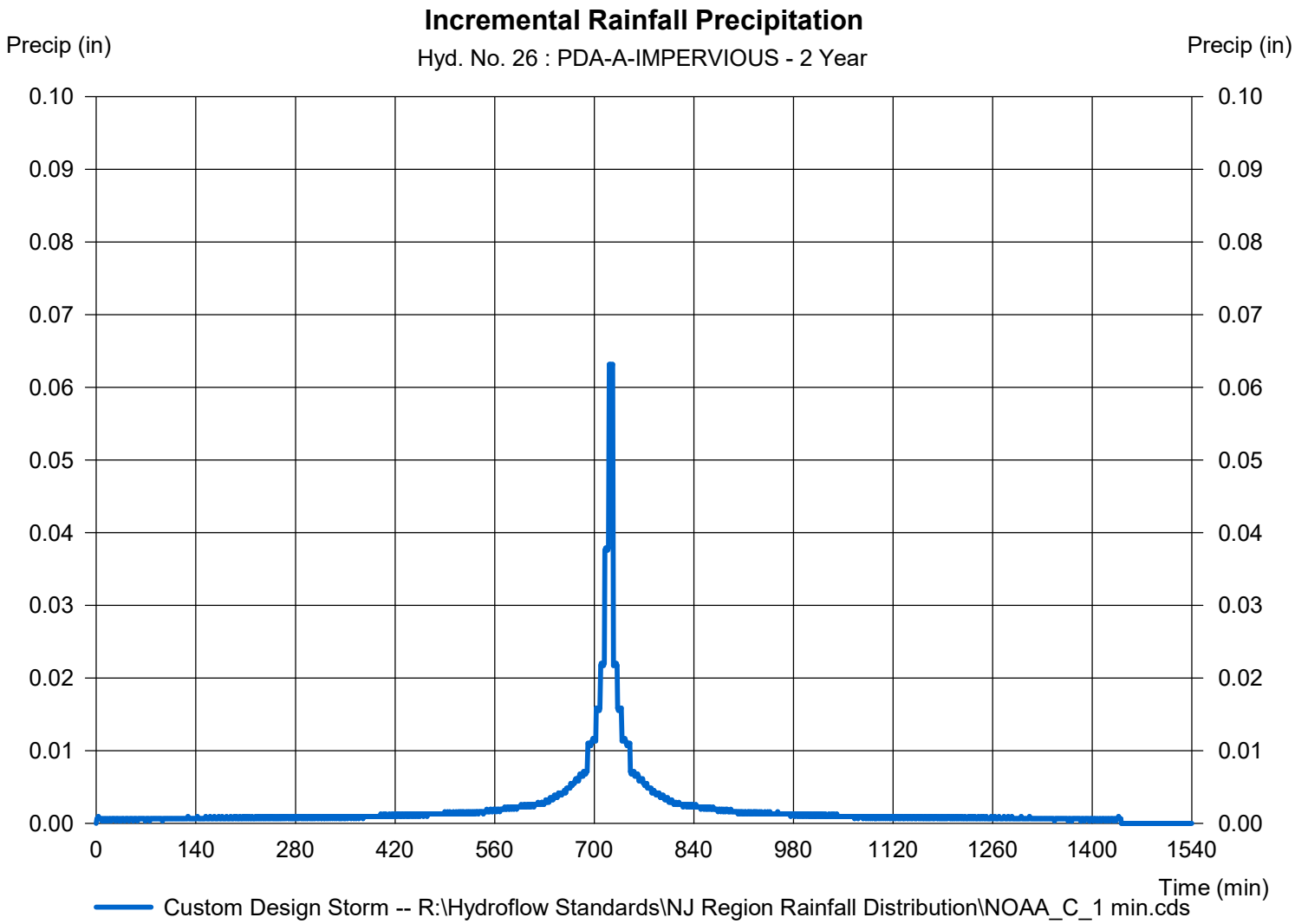


Precipitation Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

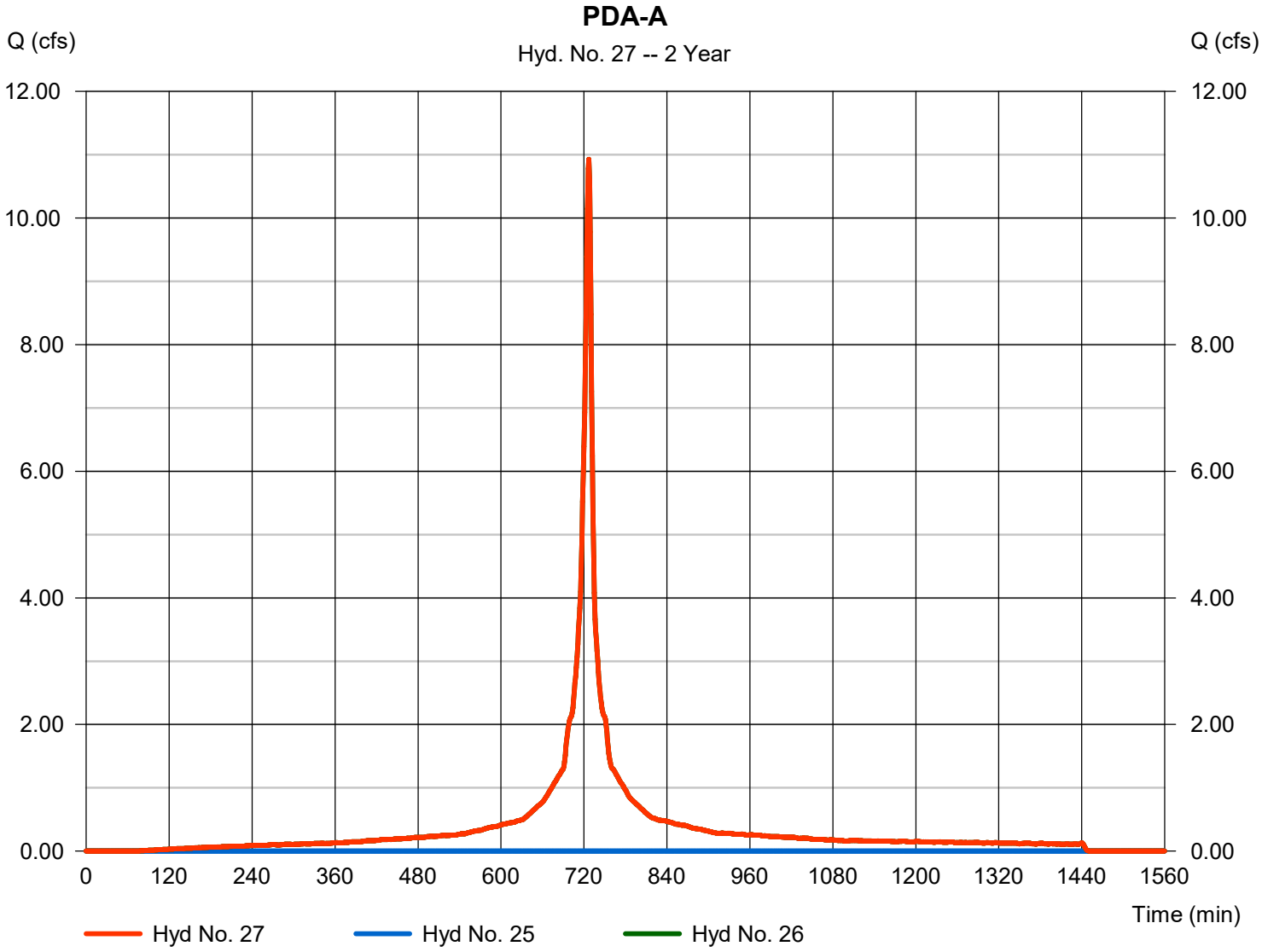


Hydrograph Report

Hyd. No. 27

PDA-A

Hydrograph type	= Combine	Peak discharge	= 10.93 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 34,899 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 5.130 ac



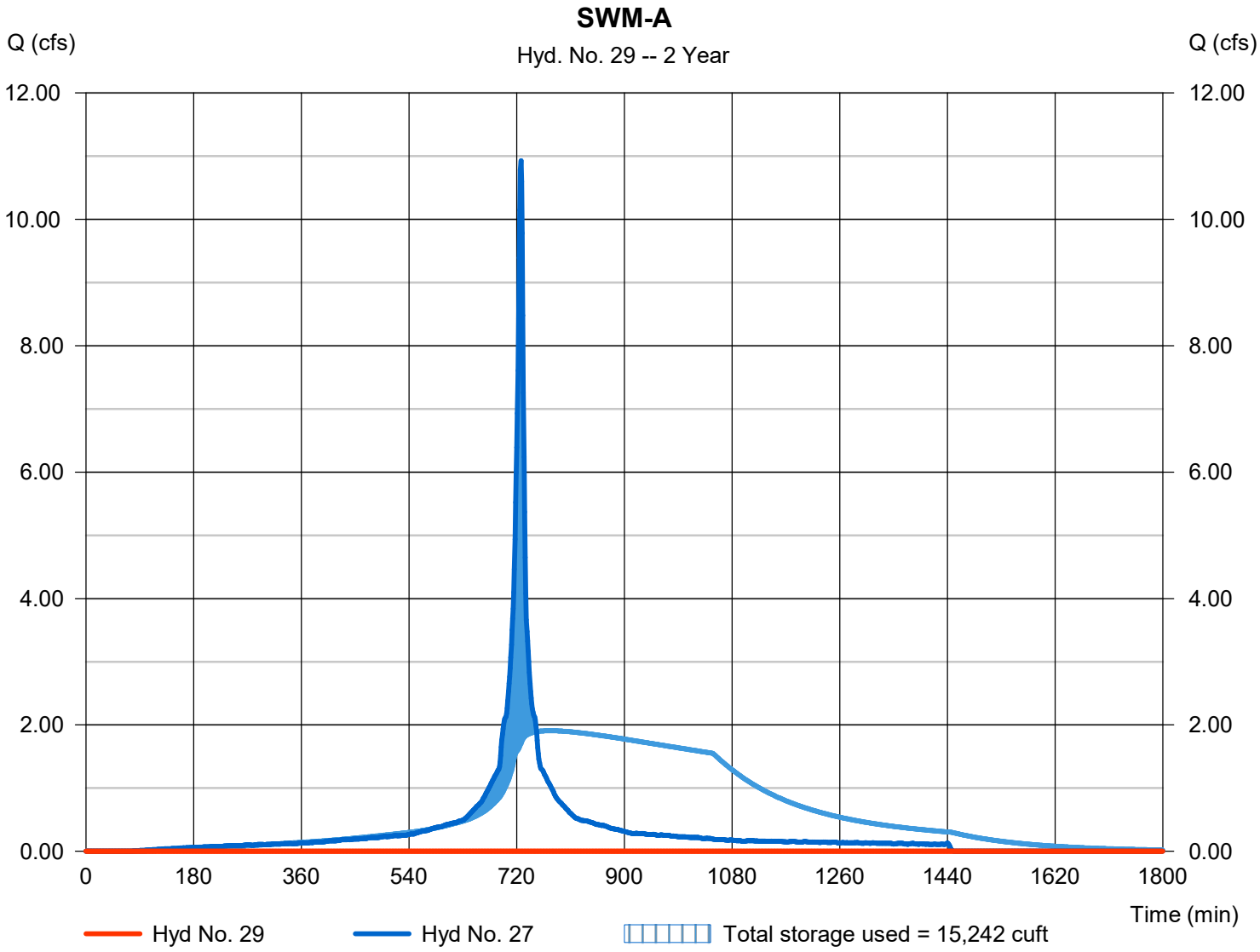
Hydrograph Report

Hyd. No. 29

SWM-A

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 711 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 27 - PDA-A	Max. Elevation	= 593.28 ft
Reservoir name	= SWM-A	Max. Storage	= 15,242 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 1 - SWM-A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 592.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	592.00	10,637	0	0
1.00	593.00	12,473	11,542	11,542
2.00	594.00	14,370	13,409	24,951
3.00	595.00	16,330	15,338	40,289
4.00	596.00	18,354	17,330	57,619
5.00	597.00	20,441	19,386	77,006

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

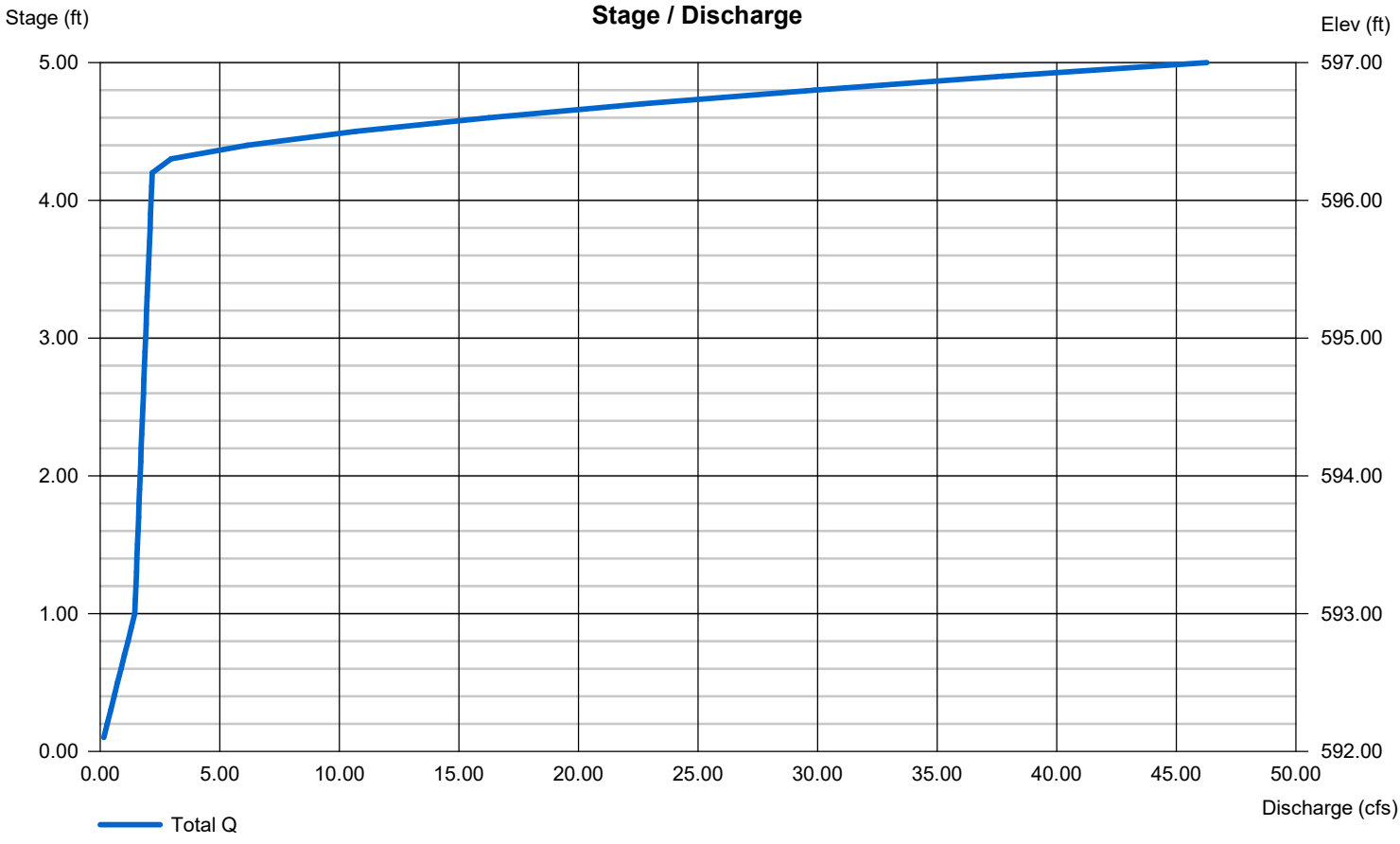
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 26.00	0.00	0.00	0.00
Crest El. (ft)	= 596.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

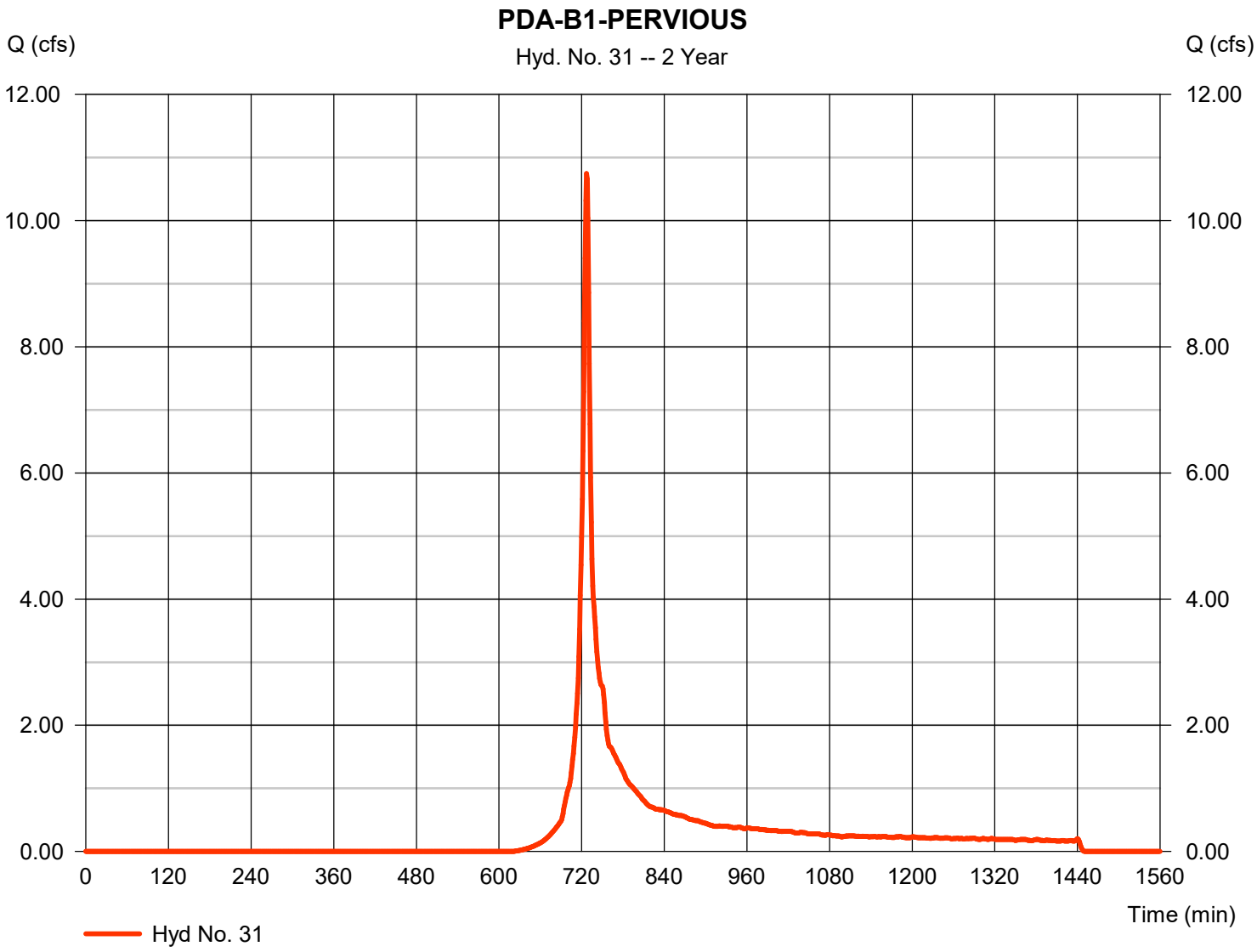


Hydrograph Report

Hyd. No. 31

PDA-B1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.75 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	29,991 cuft
Drainage area	=	6.790 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

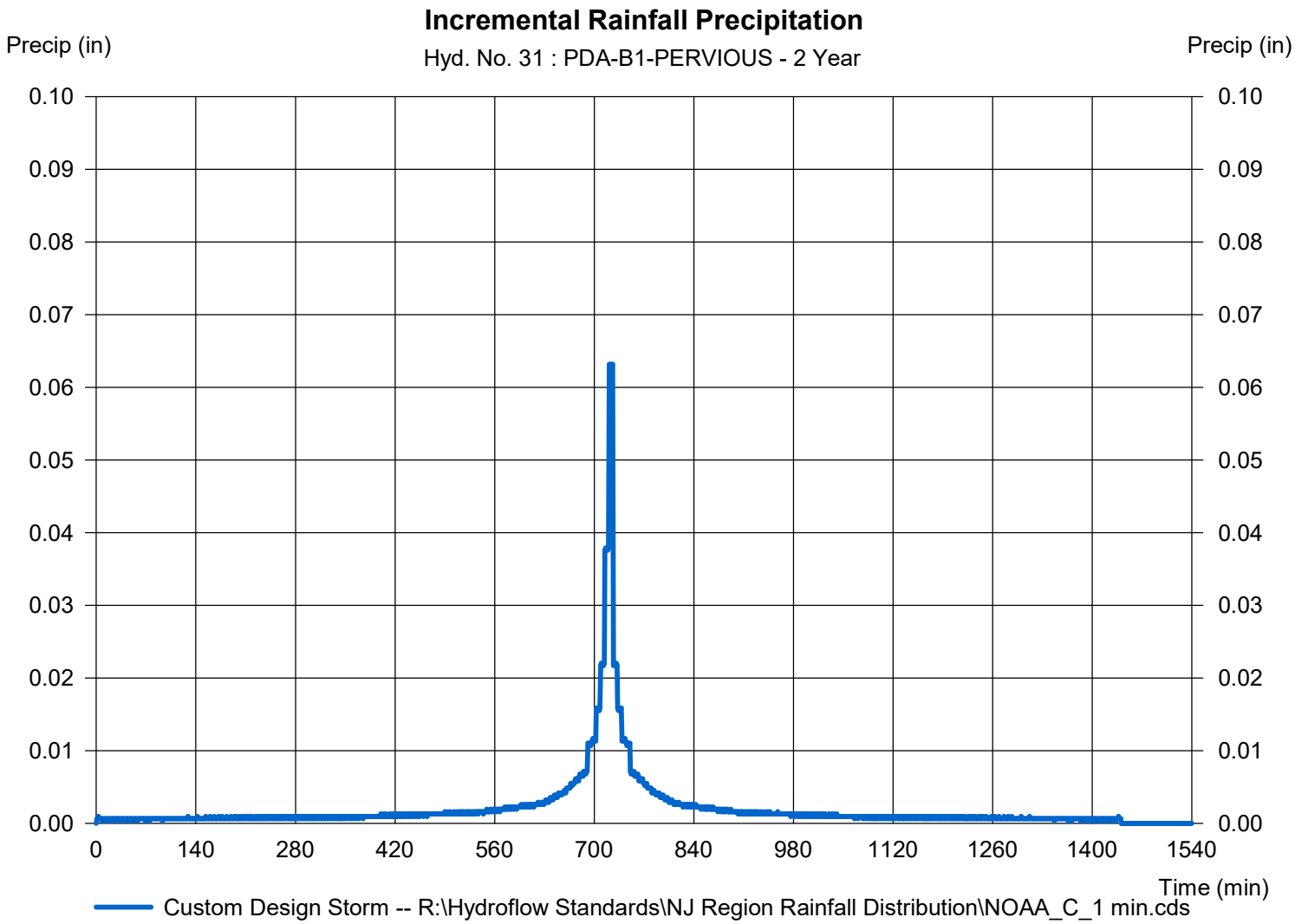


Precipitation Report

Hyd. No. 31

PDA-B1-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

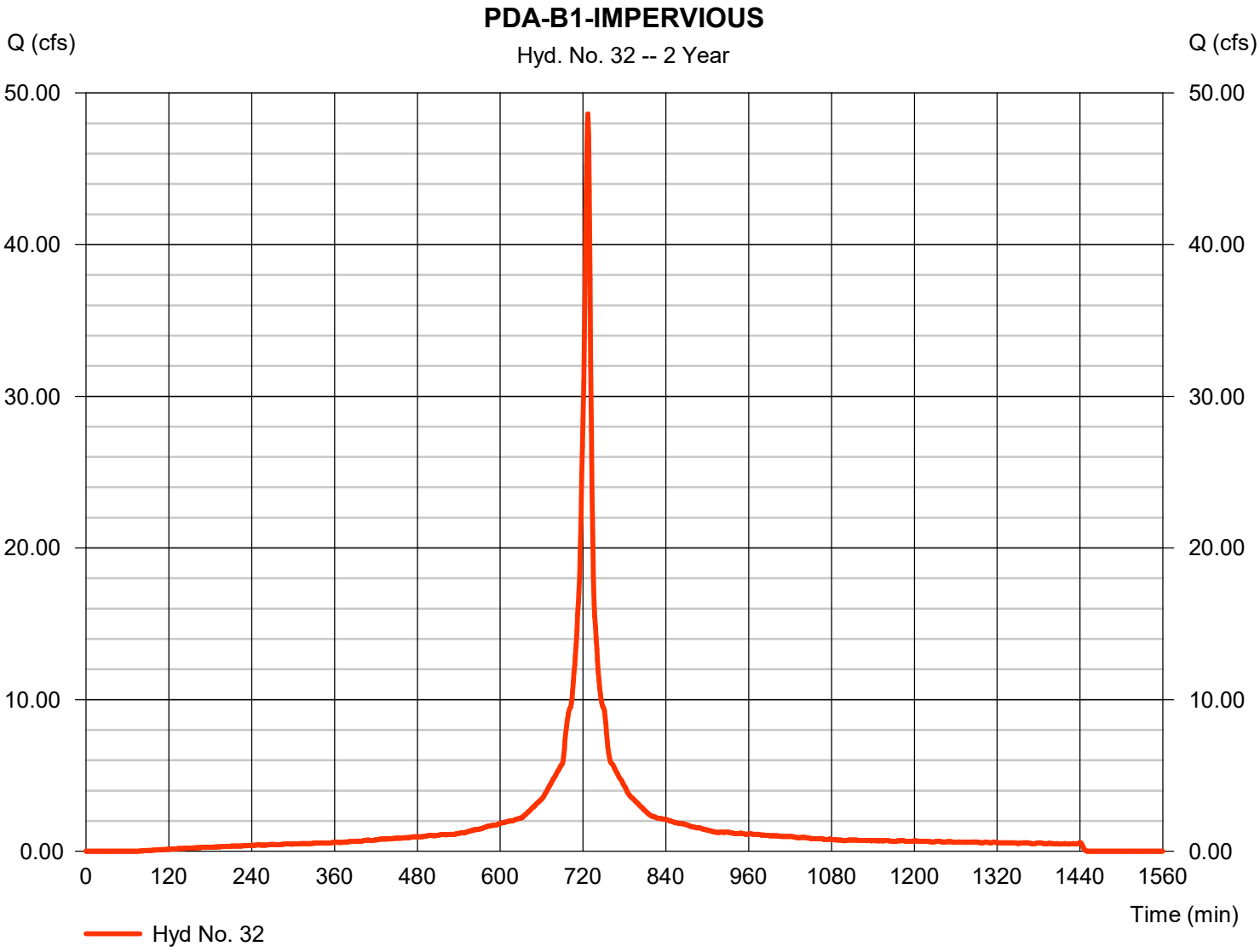


Hydrograph Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	48.62 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	155,245 cuft
Drainage area	=	13.790 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

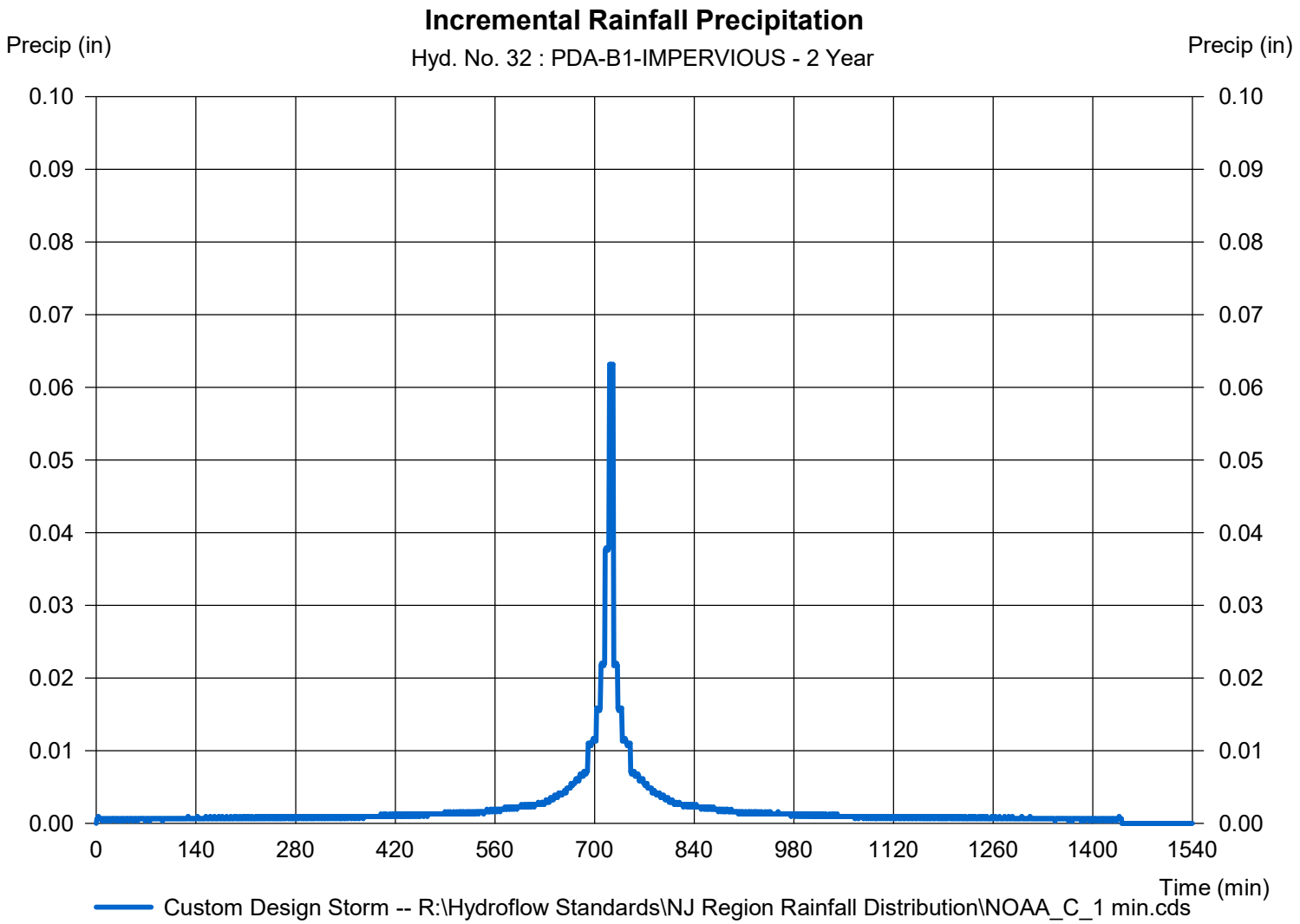


Precipitation Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

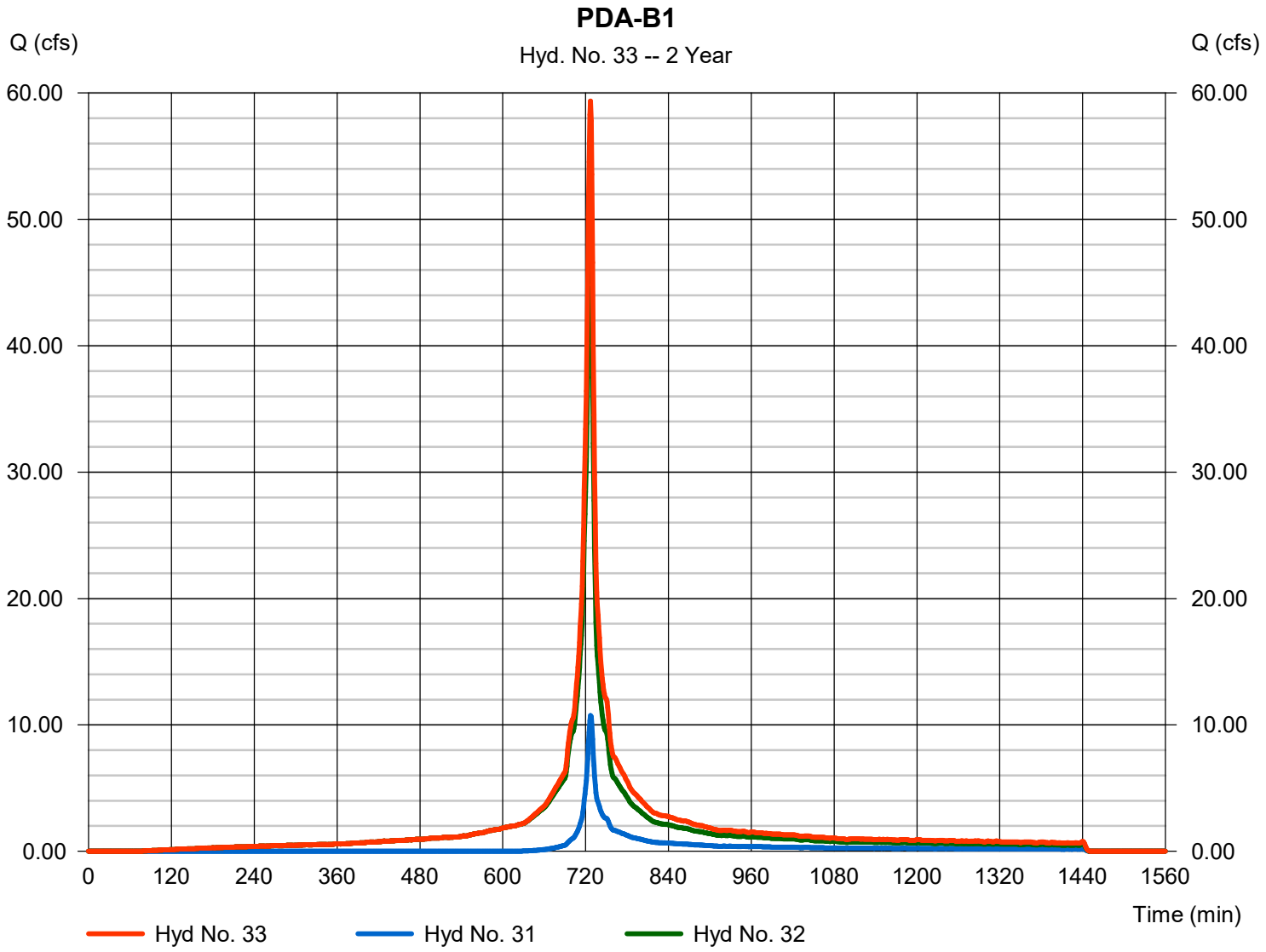


Hydrograph Report

Hyd. No. 33

PDA-B1

Hydrograph type	=	Combine	Peak discharge	=	59.36 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	185,236 cuft
Inflow hyds.	=	31, 32	Contrib. drain. area	=	20.580 ac

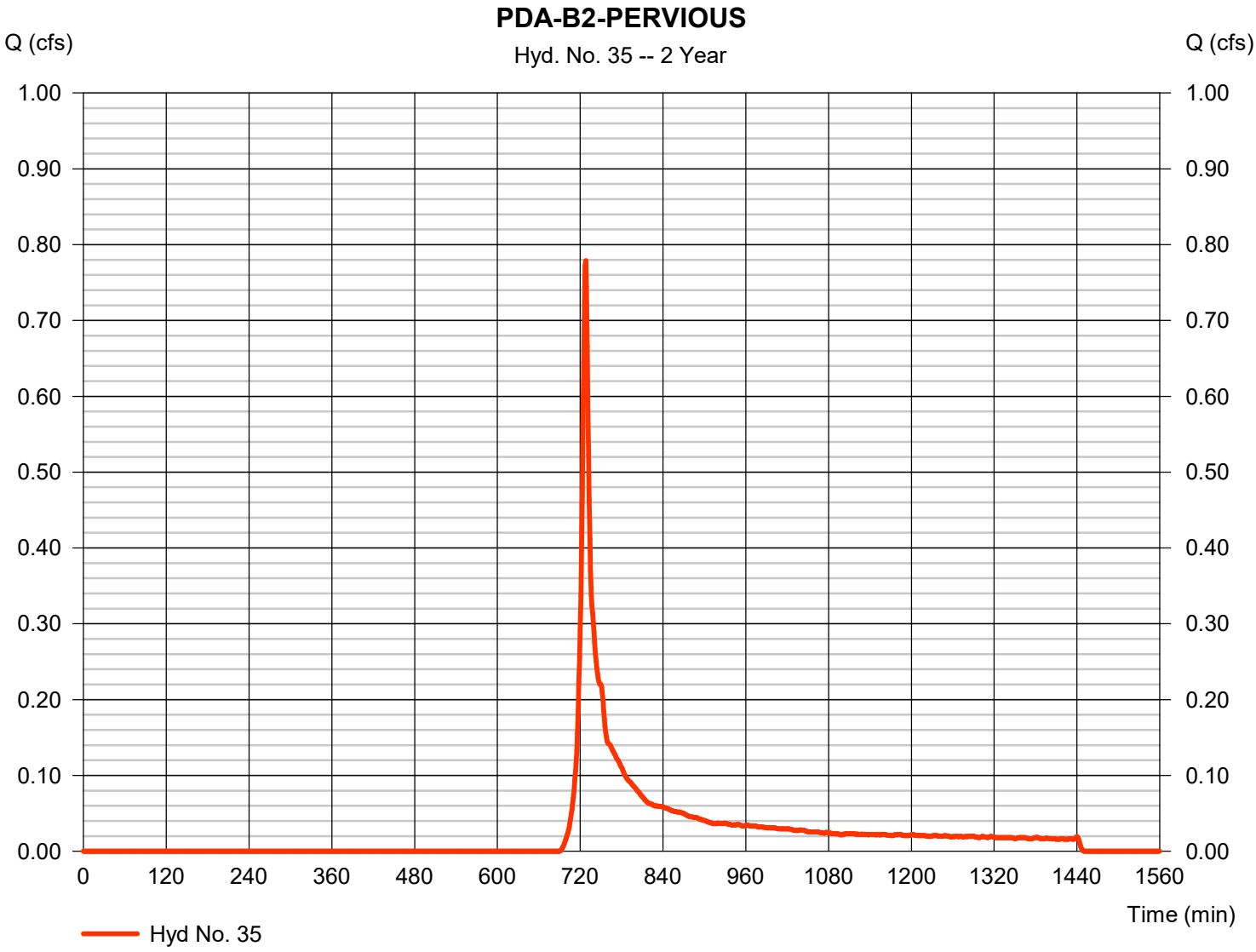


Hydrograph Report

Hyd. No. 35

PDA-B2-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.779 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	2,344 cuft
Drainage area	=	0.830 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

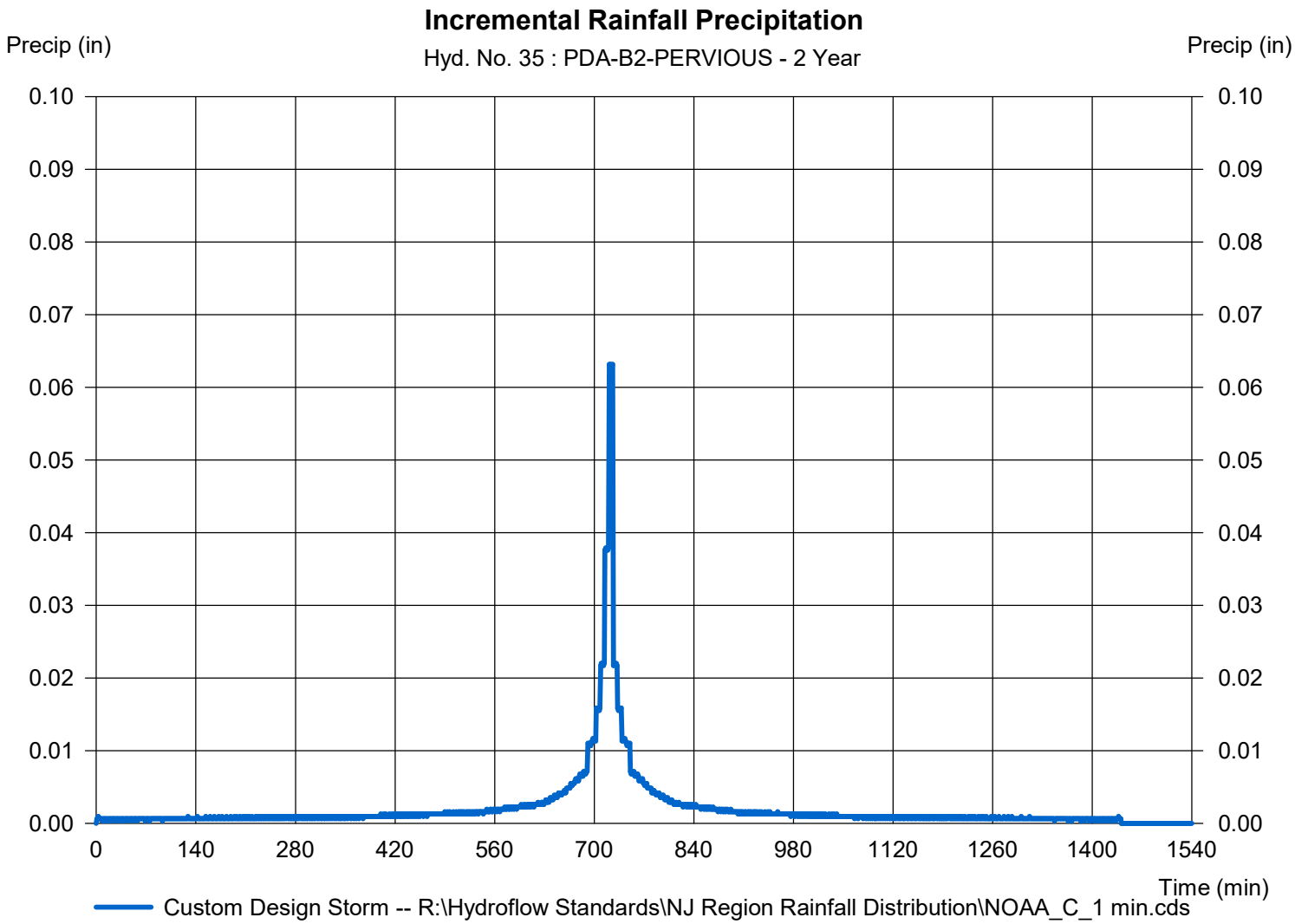


Precipitation Report

Hyd. No. 35

PDA-B2-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

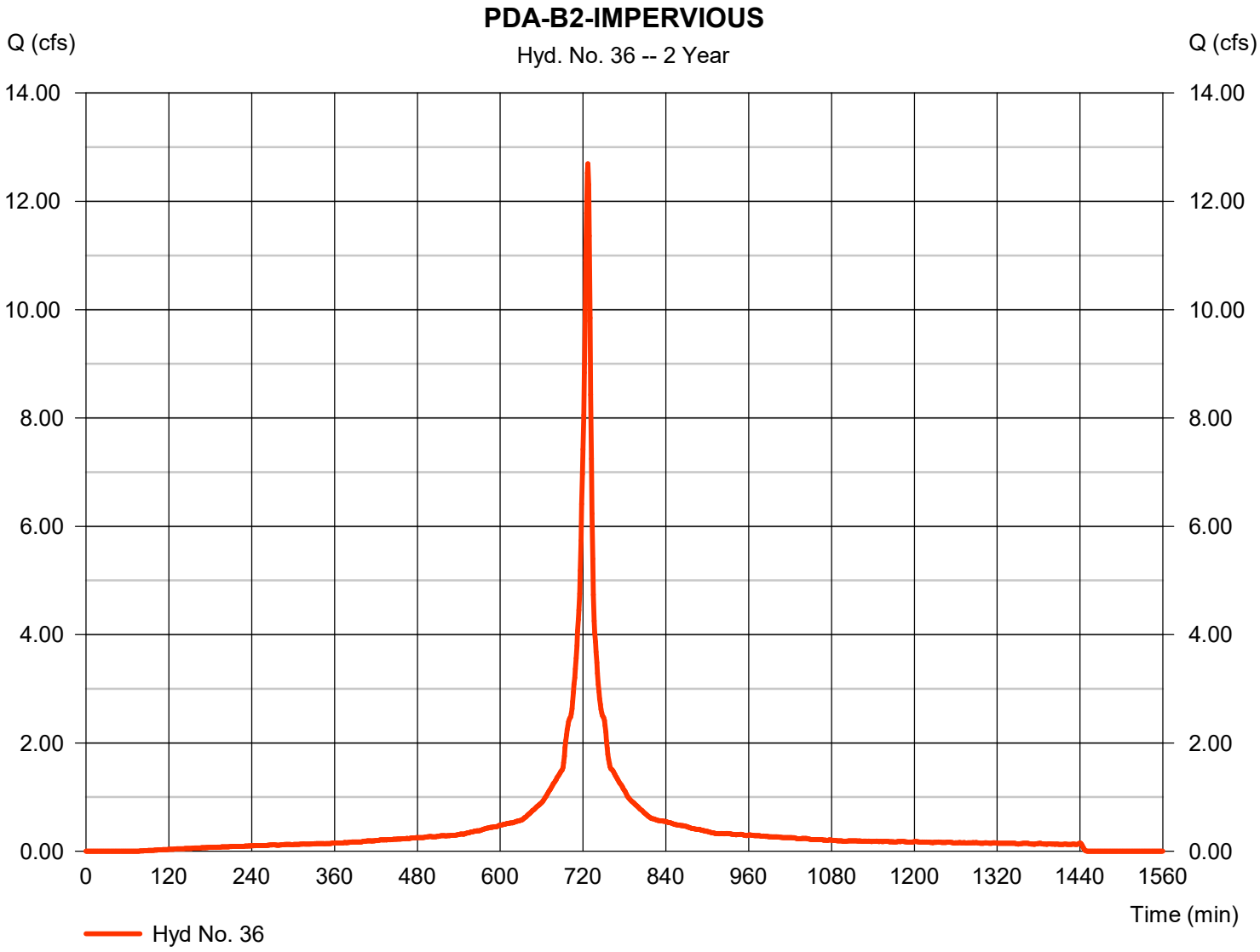


Hydrograph Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.69 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	40,528 cuft
Drainage area	=	3.600 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

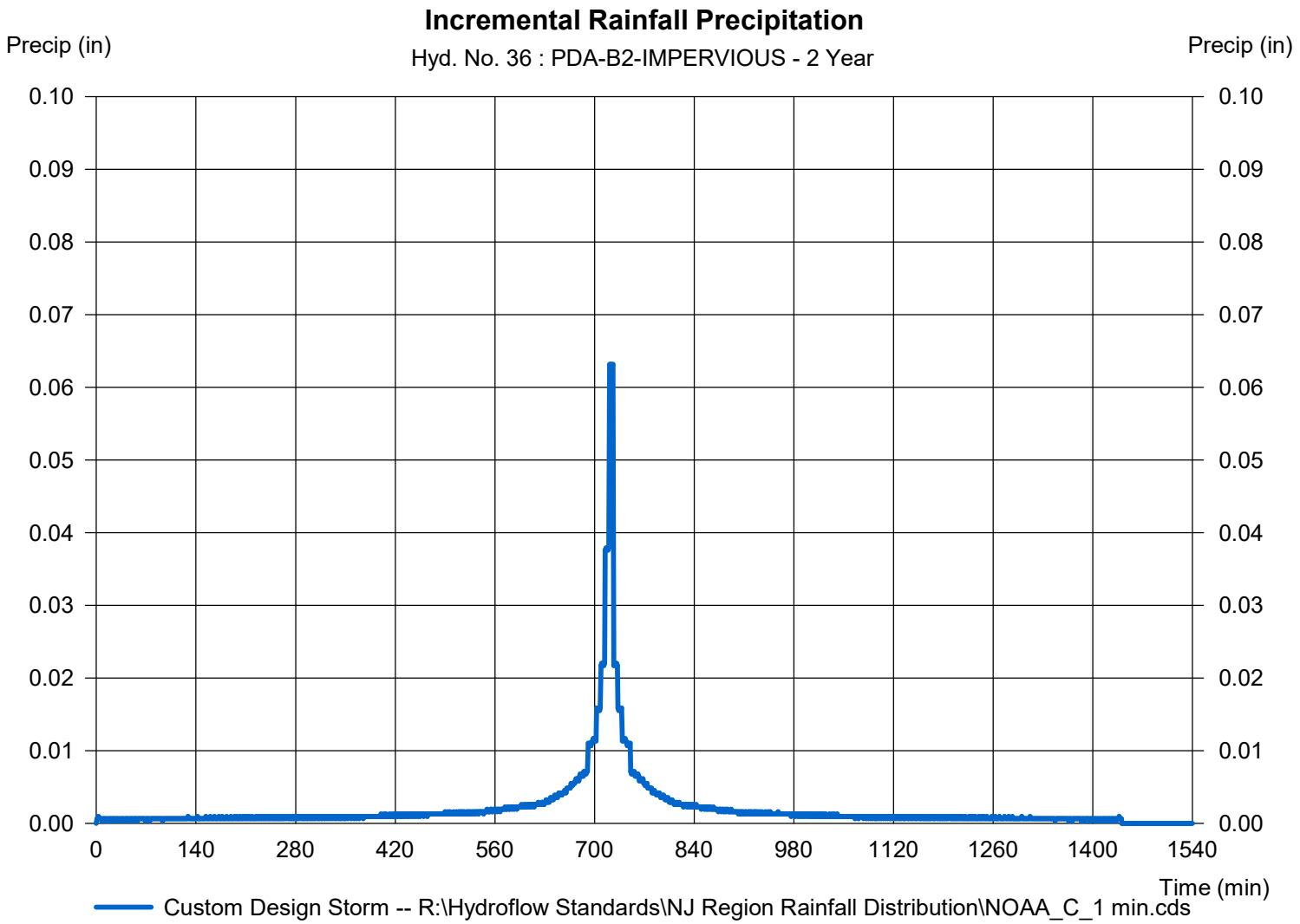


Precipitation Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

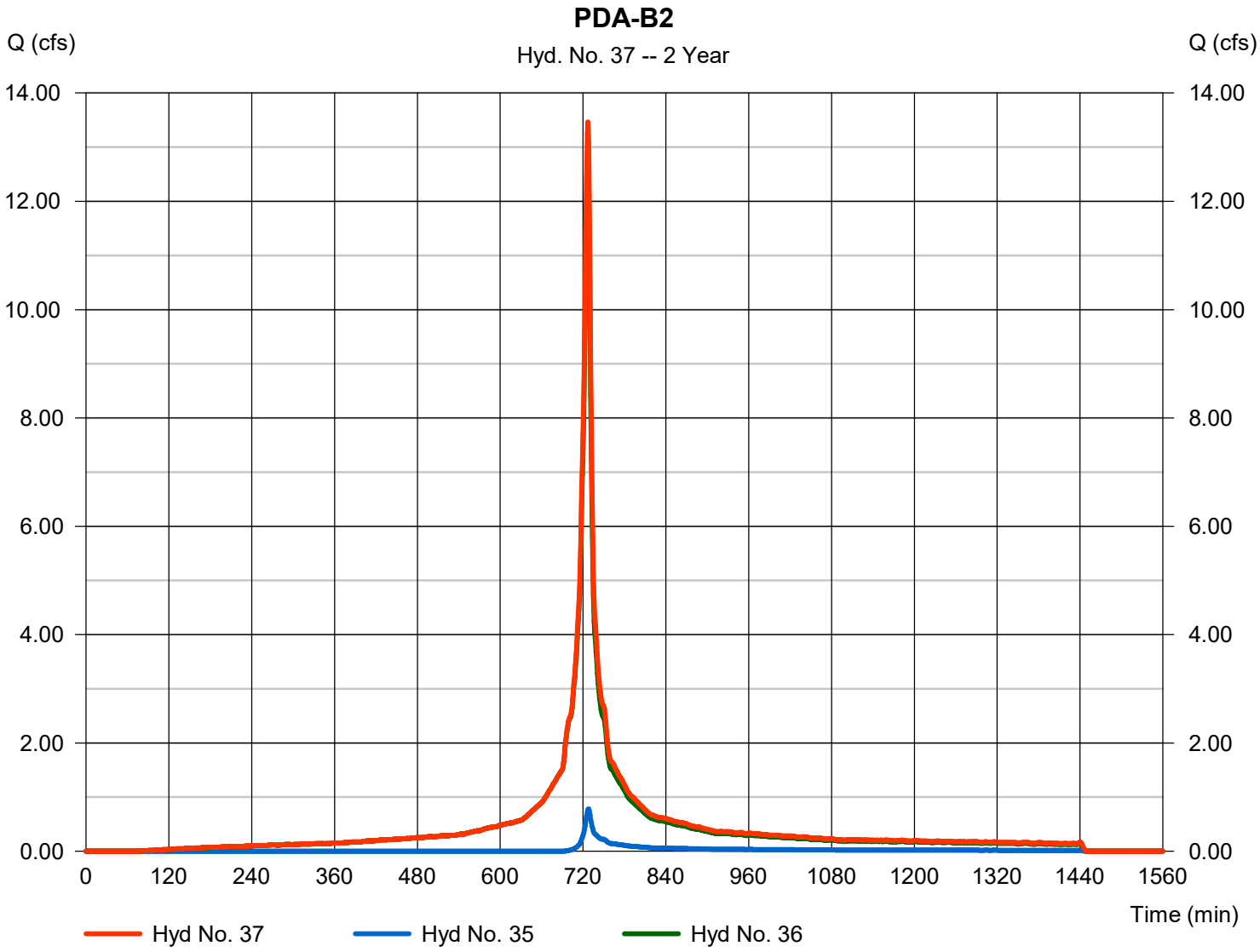


Hydrograph Report

Hyd. No. 37

PDA-B2

Hydrograph type	=	Combine	Peak discharge	=	13.46 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	42,872 cuft
Inflow hyds.	=	35, 36	Contrib. drain. area	=	4.430 ac



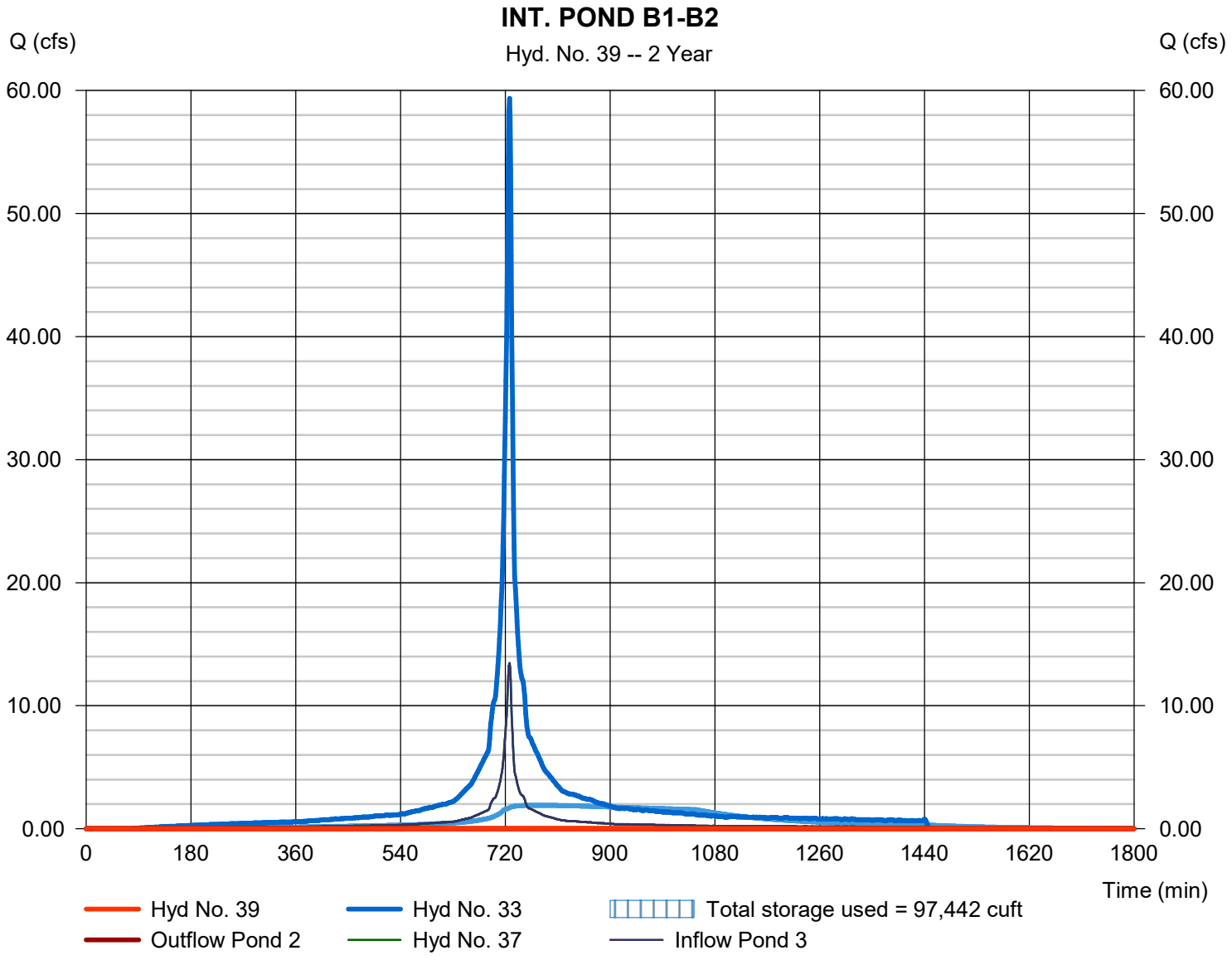
Hydrograph Report

Hyd. No. 39

INT. POND B1-B2

Hydrograph type	=	Reservoir (Interconnected)	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	798 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Upper Pond	=	SWM-B1	Lower Pond	=	SWM-B2
Inflow hyd.	=	33 - PDA-B1	Other Inflow hyd.	=	37 - PDA-B2
Max. Elevation	=	599.19 ft	Max. Elevation	=	598.82 ft
Max. Storage	=	79,308 cuft	Max. Storage	=	18,134 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 2 - SWM-B1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	61,258	0	0
1.00	599.00	69,679	65,417	65,417
2.00	600.00	78,515	74,046	139,463
3.00	601.00	87,768	83,090	222,553
4.00	602.00	97,511	92,588	315,140

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 598.00	0.00	0.00	0.00
Length (ft)	= 164.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

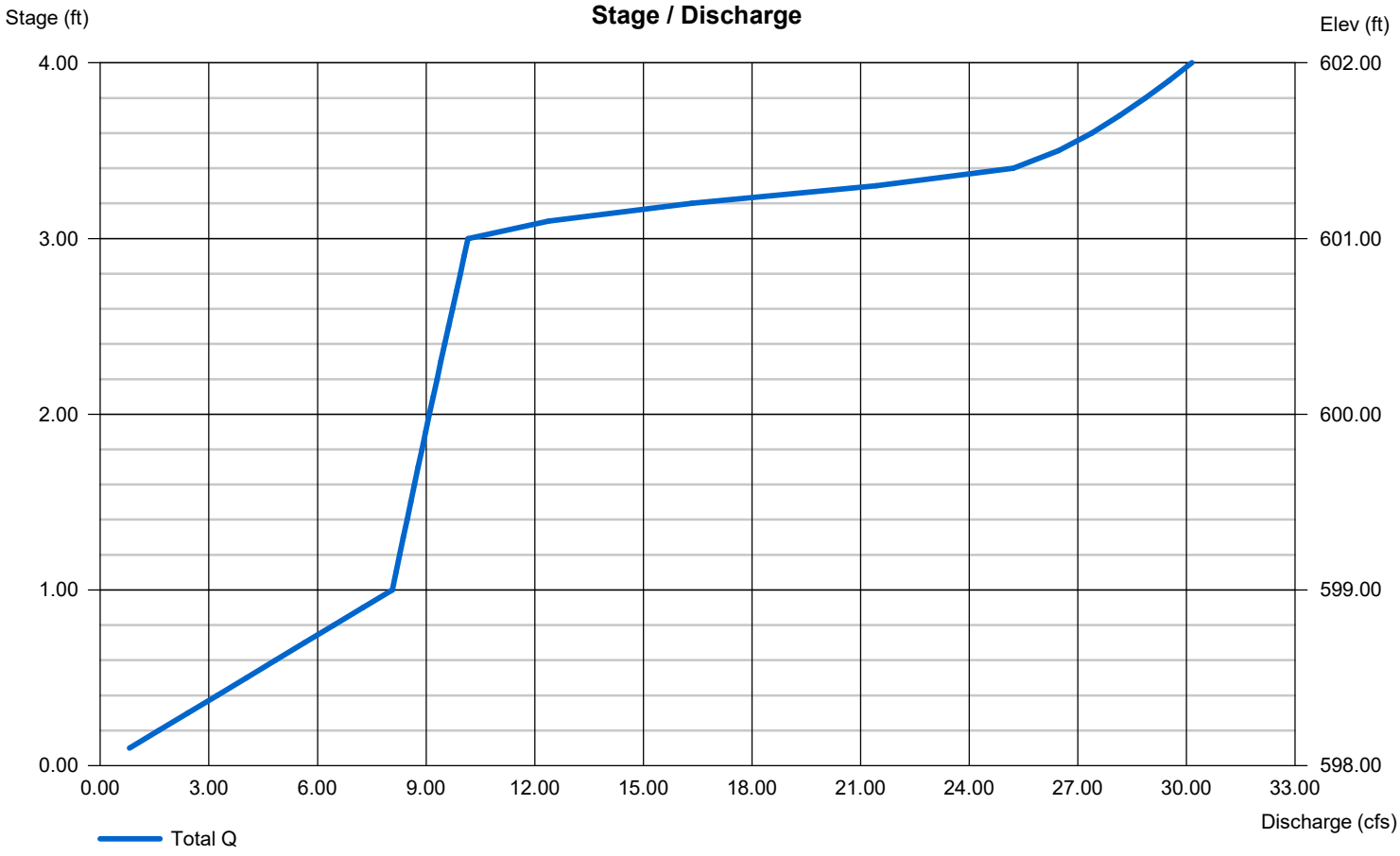
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	0.00	0.00	0.00
Crest El. (ft)	= 601.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Pond No. 3 - SWM-B2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	21,184	0	0
1.00	599.00	23,256	22,210	22,210
2.00	600.00	25,384	24,310	46,520
3.00	601.00	27,569	26,466	72,986
4.00	602.00	29,810	28,679	101,665

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

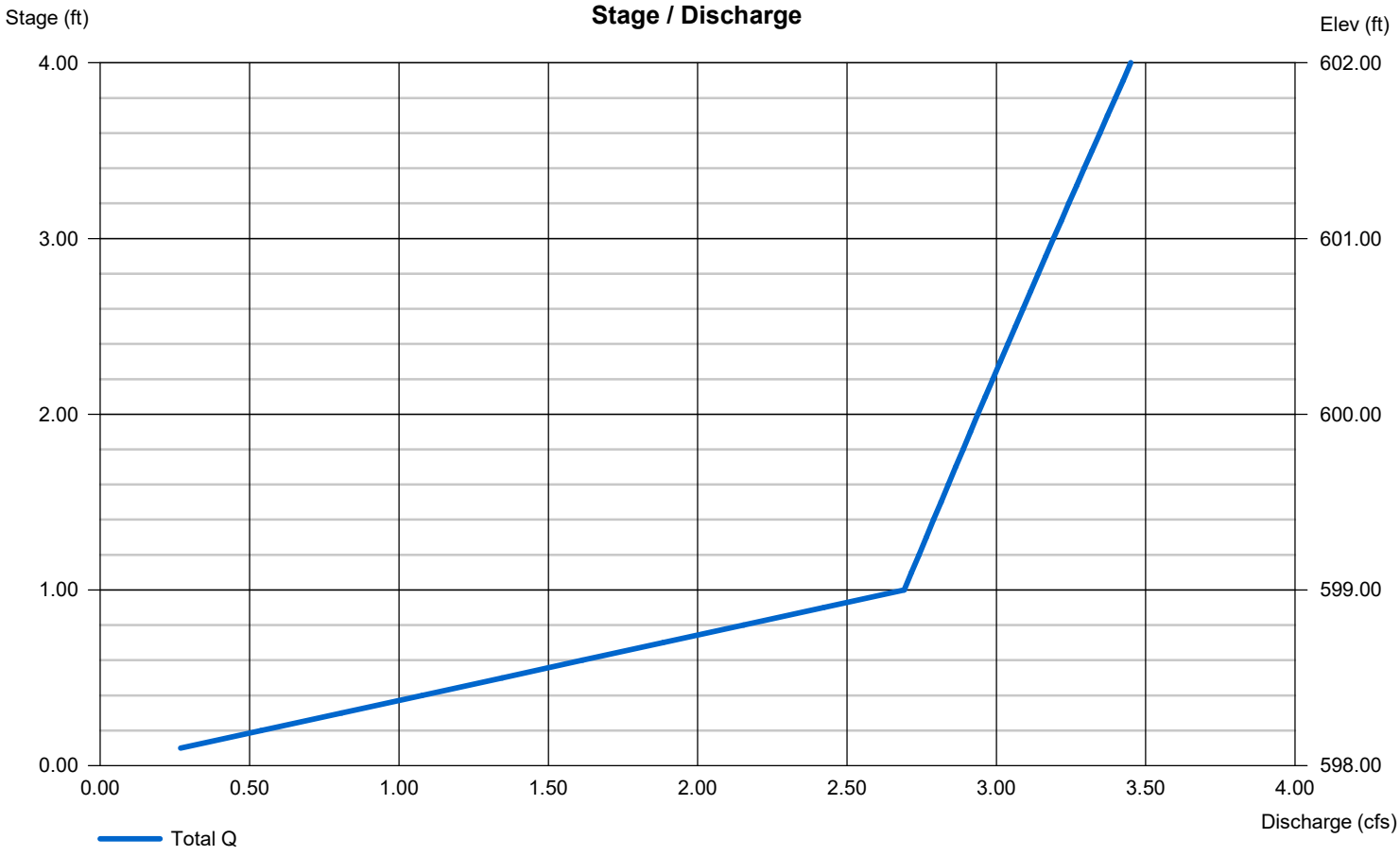
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

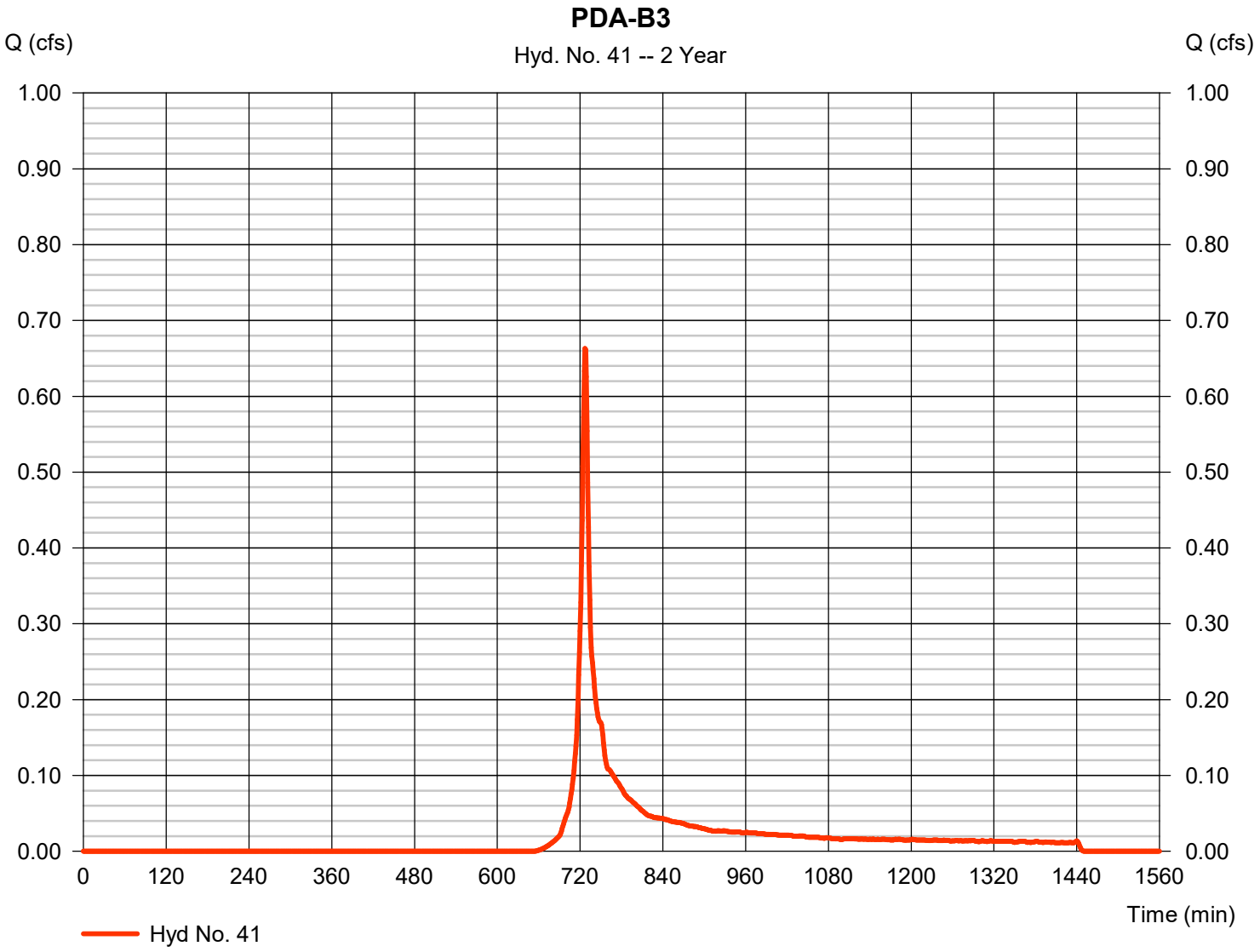


Hydrograph Report

Hyd. No. 41

PDA-B3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.663 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,888 cuft
Drainage area	=	0.500 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

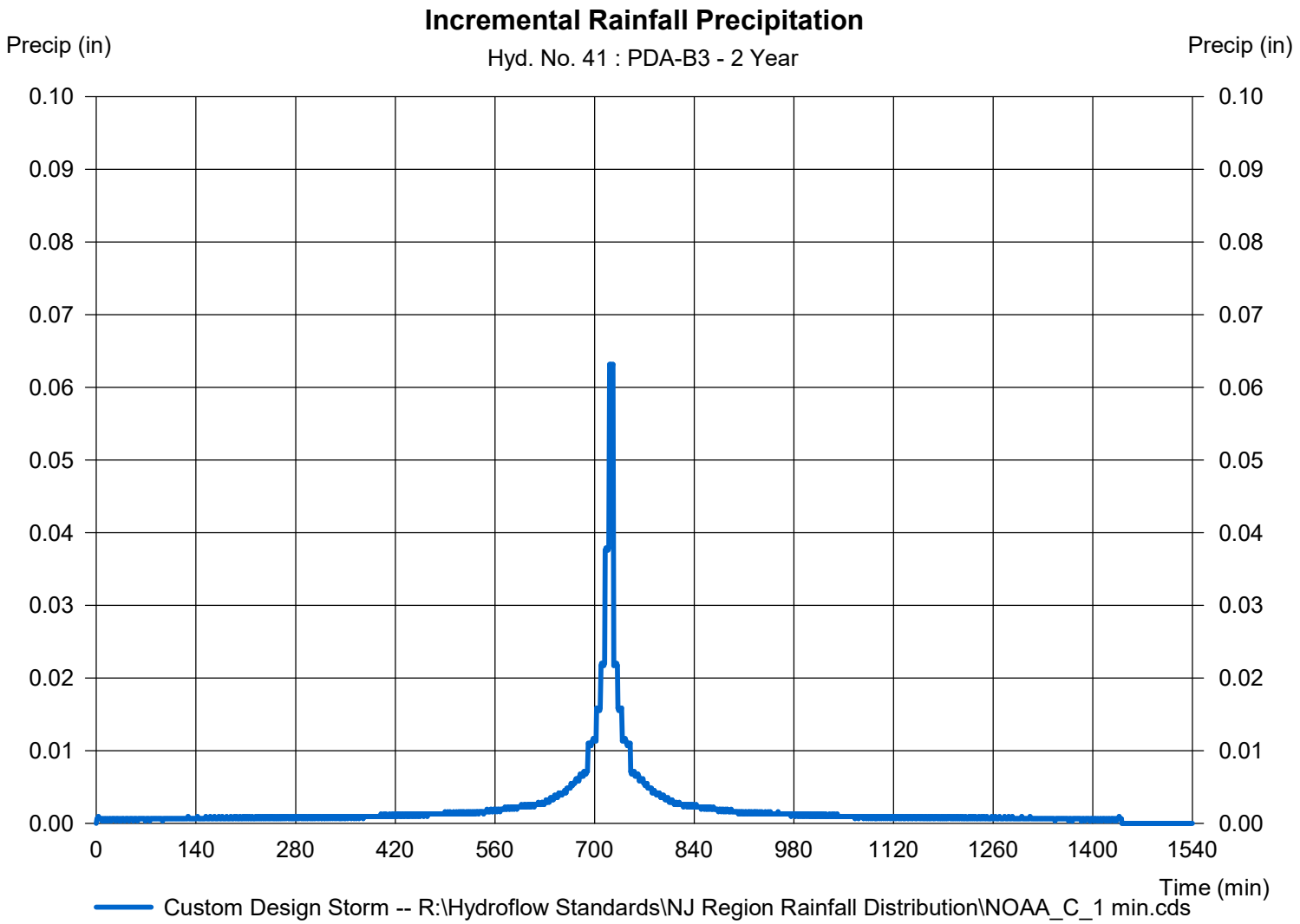


Precipitation Report

Hyd. No. 41

PDA-B3

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

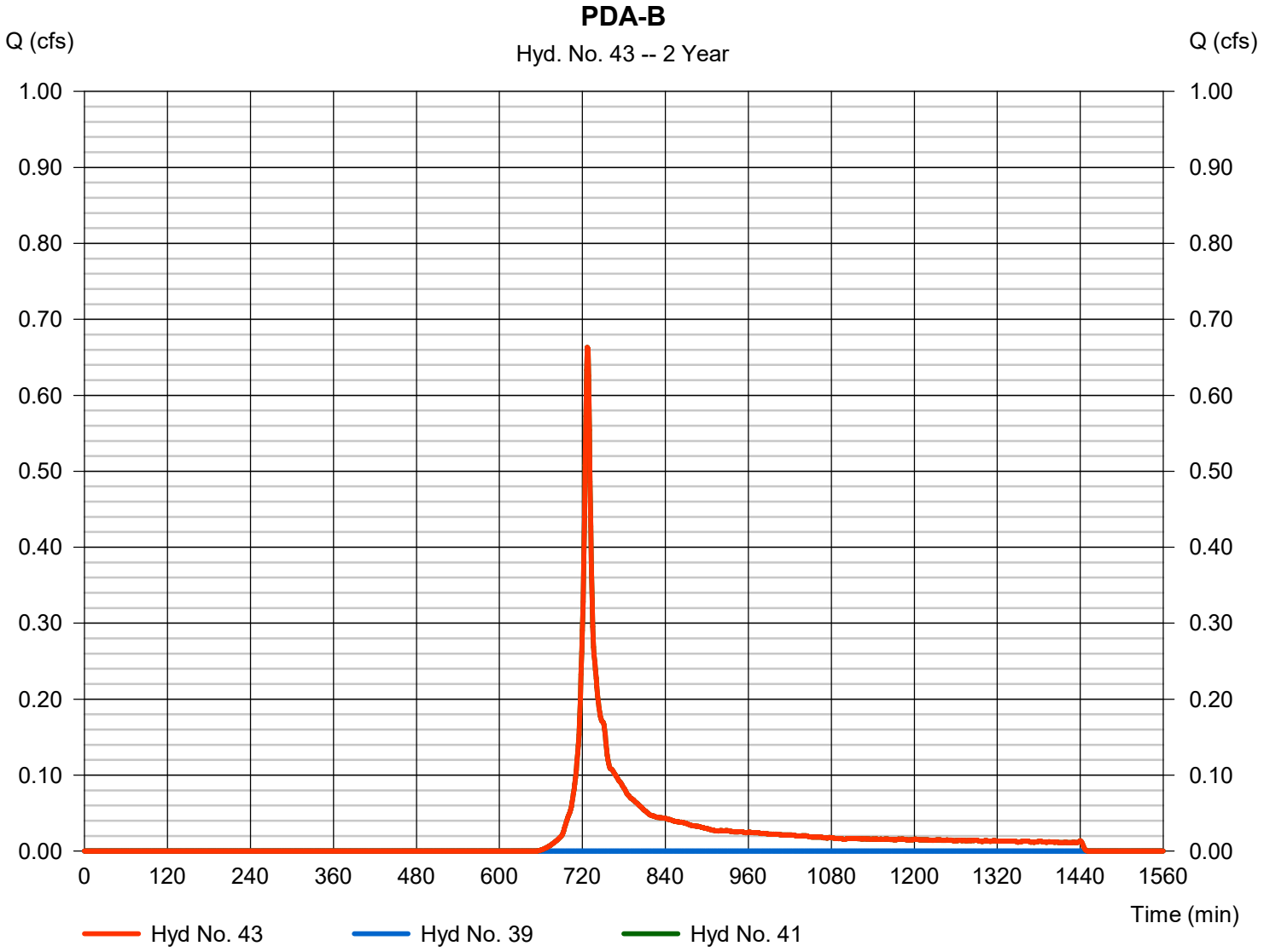


Hydrograph Report

Hyd. No. 43

PDA-B

Hydrograph type	=	Combine	Peak discharge	=	0.663 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,888 cuft
Inflow hyds.	=	39, 41	Contrib. drain. area	=	0.500 ac

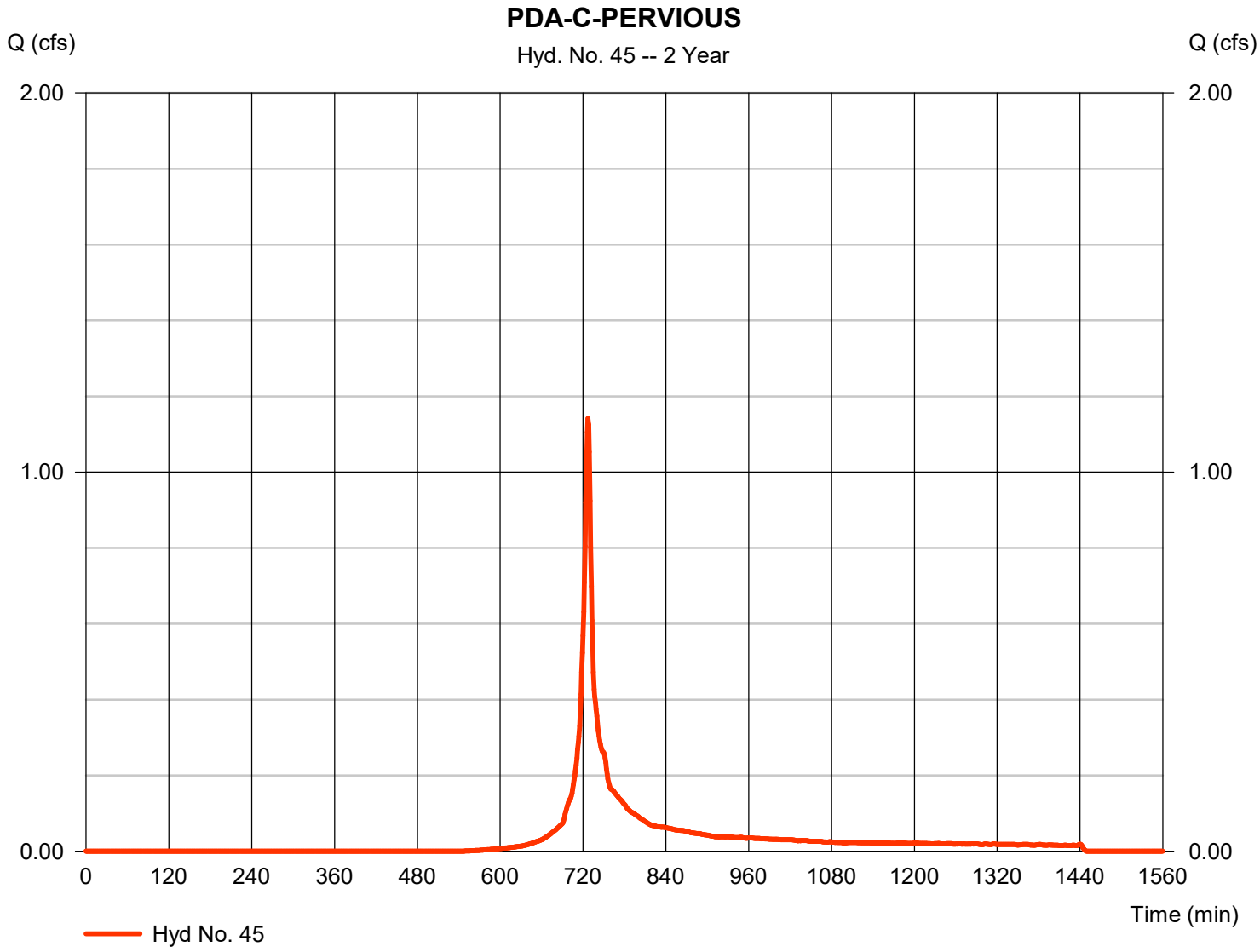


Hydrograph Report

Hyd. No. 45

PDA-C-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.142 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	3,146 cuft
Drainage area	=	0.560 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

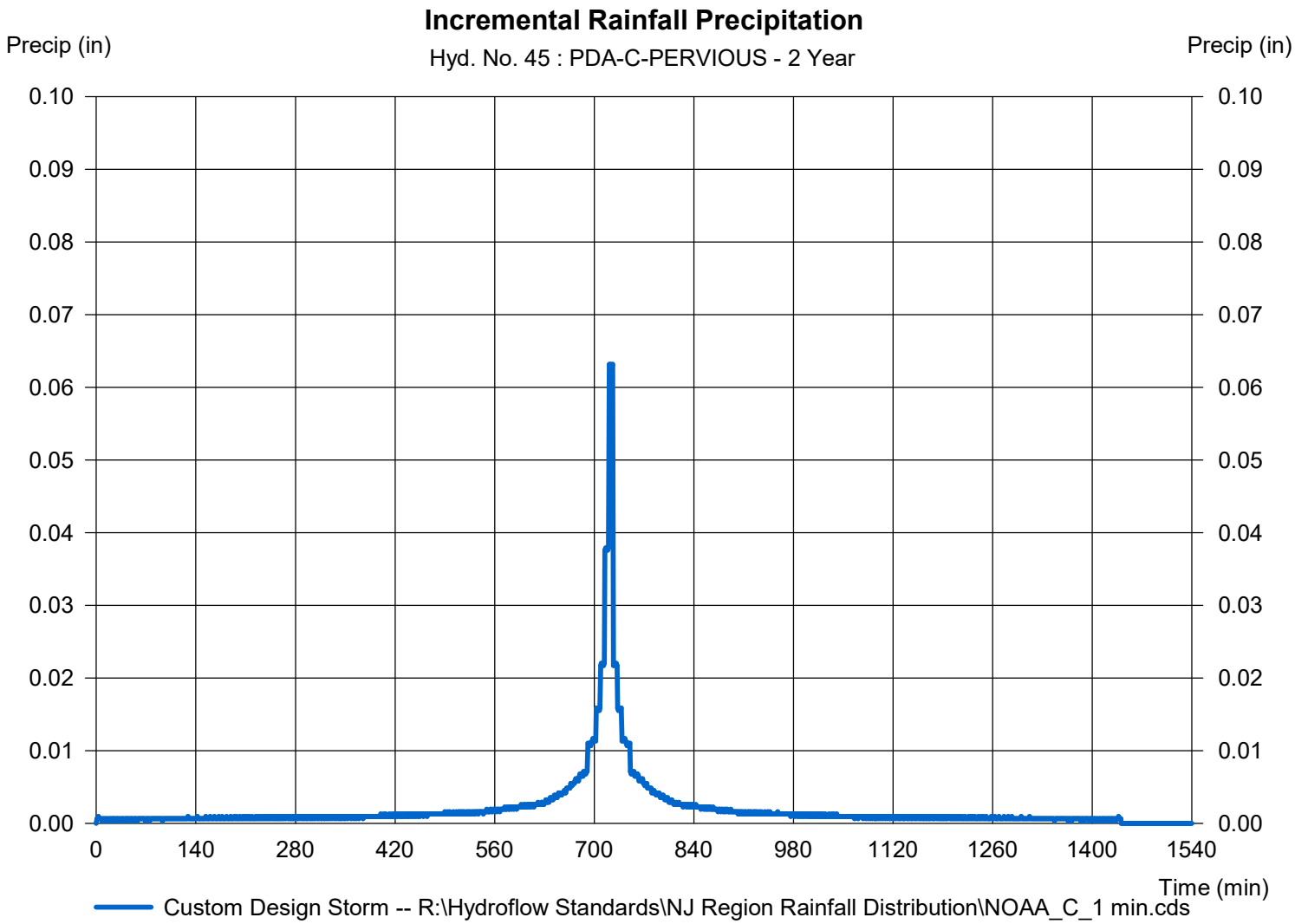


Precipitation Report

Hyd. No. 45

PDA-C-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

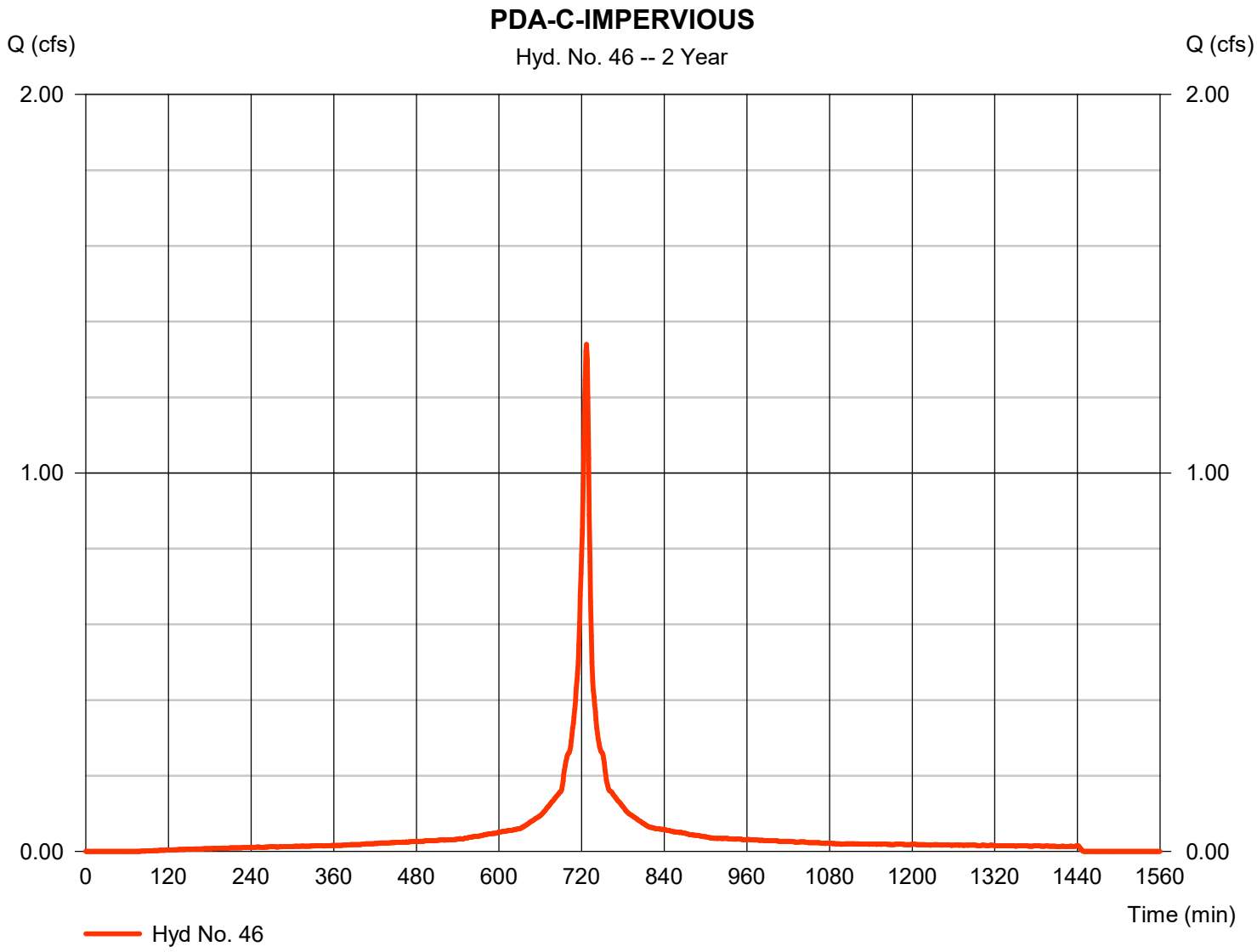


Hydrograph Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.340 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	4,278 cuft
Drainage area	=	0.380 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.50 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

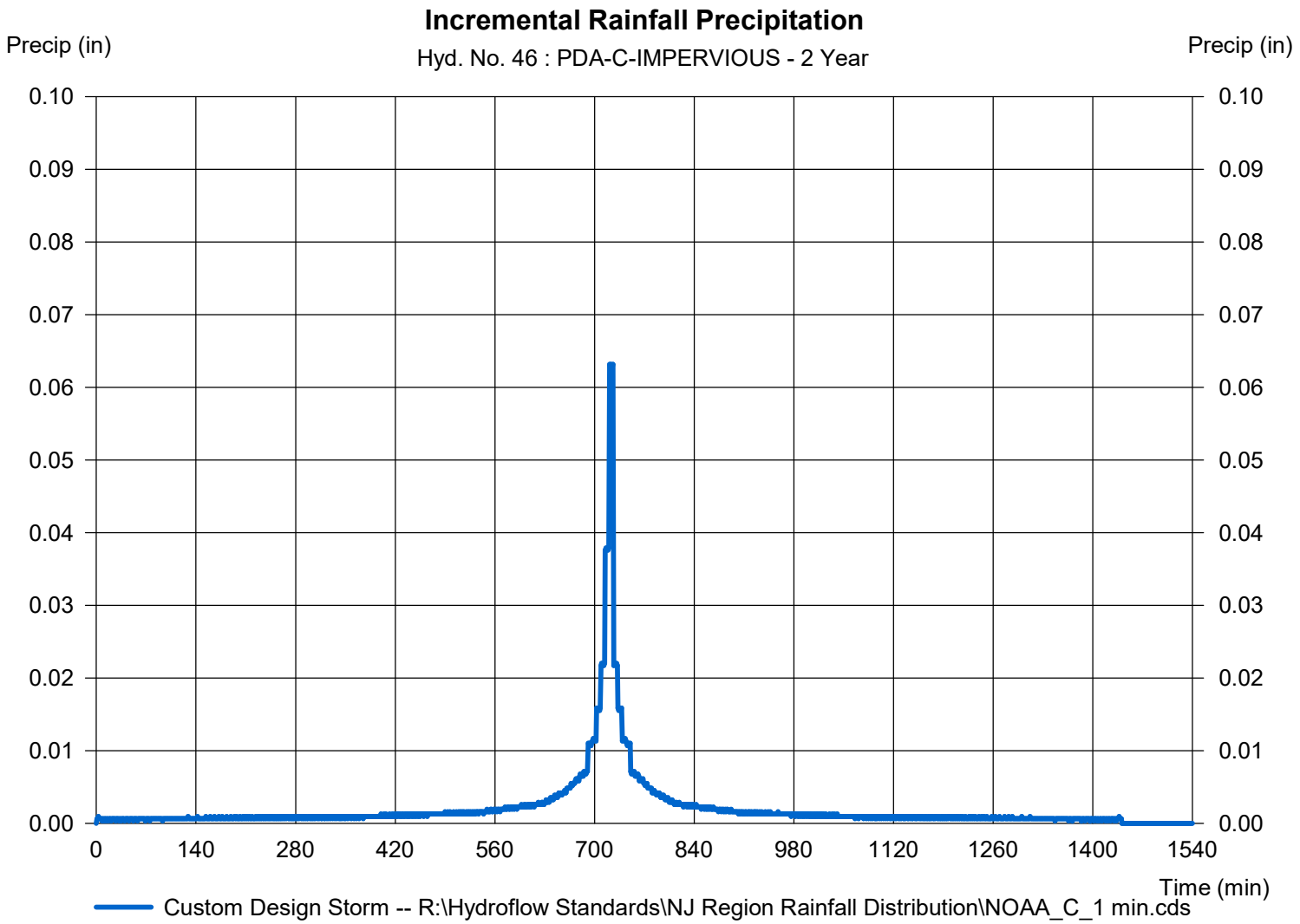


Precipitation Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

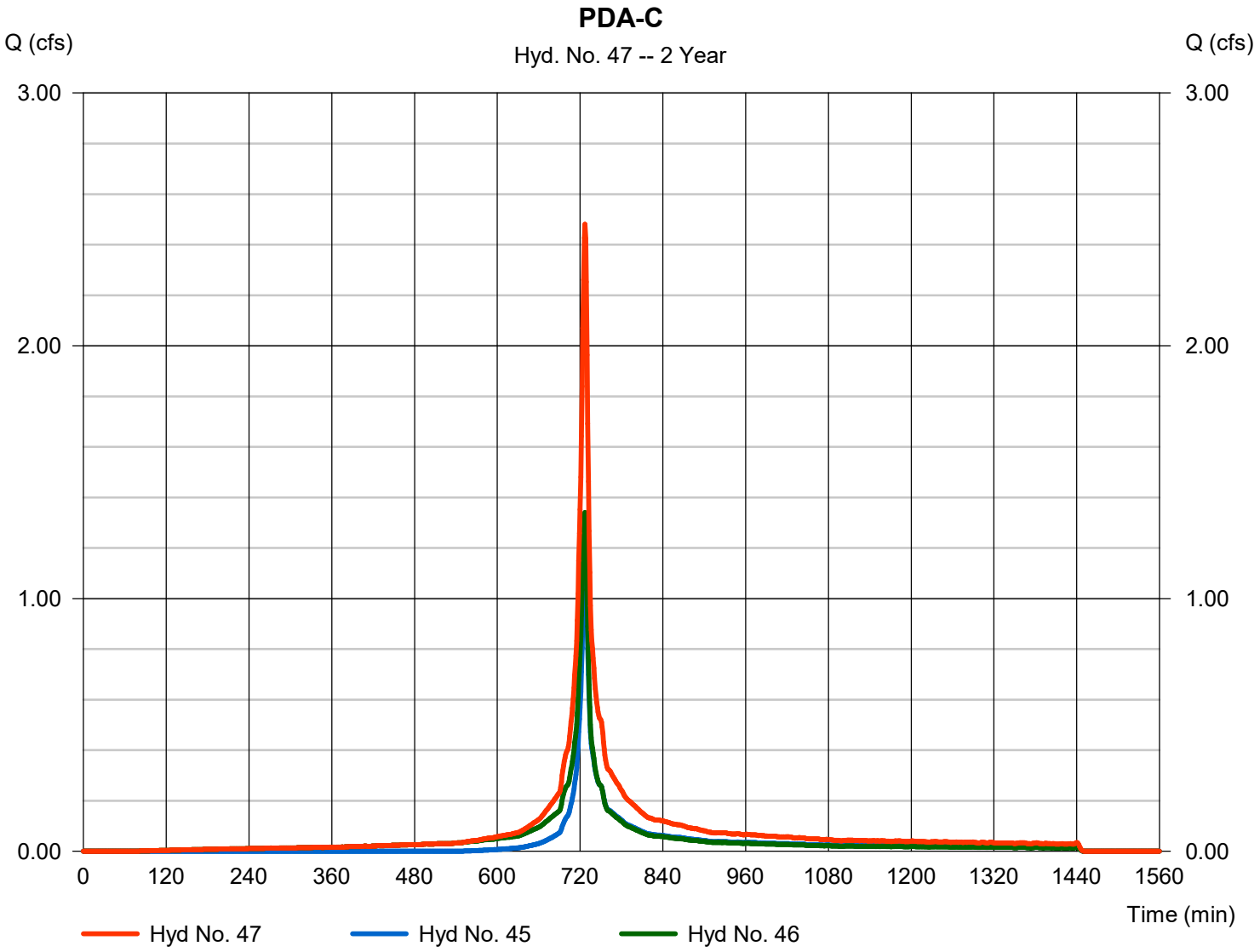


Hydrograph Report

Hyd. No. 47

PDA-C

Hydrograph type	= Combine	Peak discharge	= 2.481 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 7,424 cuft
Inflow hyds.	= 45, 46	Contrib. drain. area	= 0.940 ac

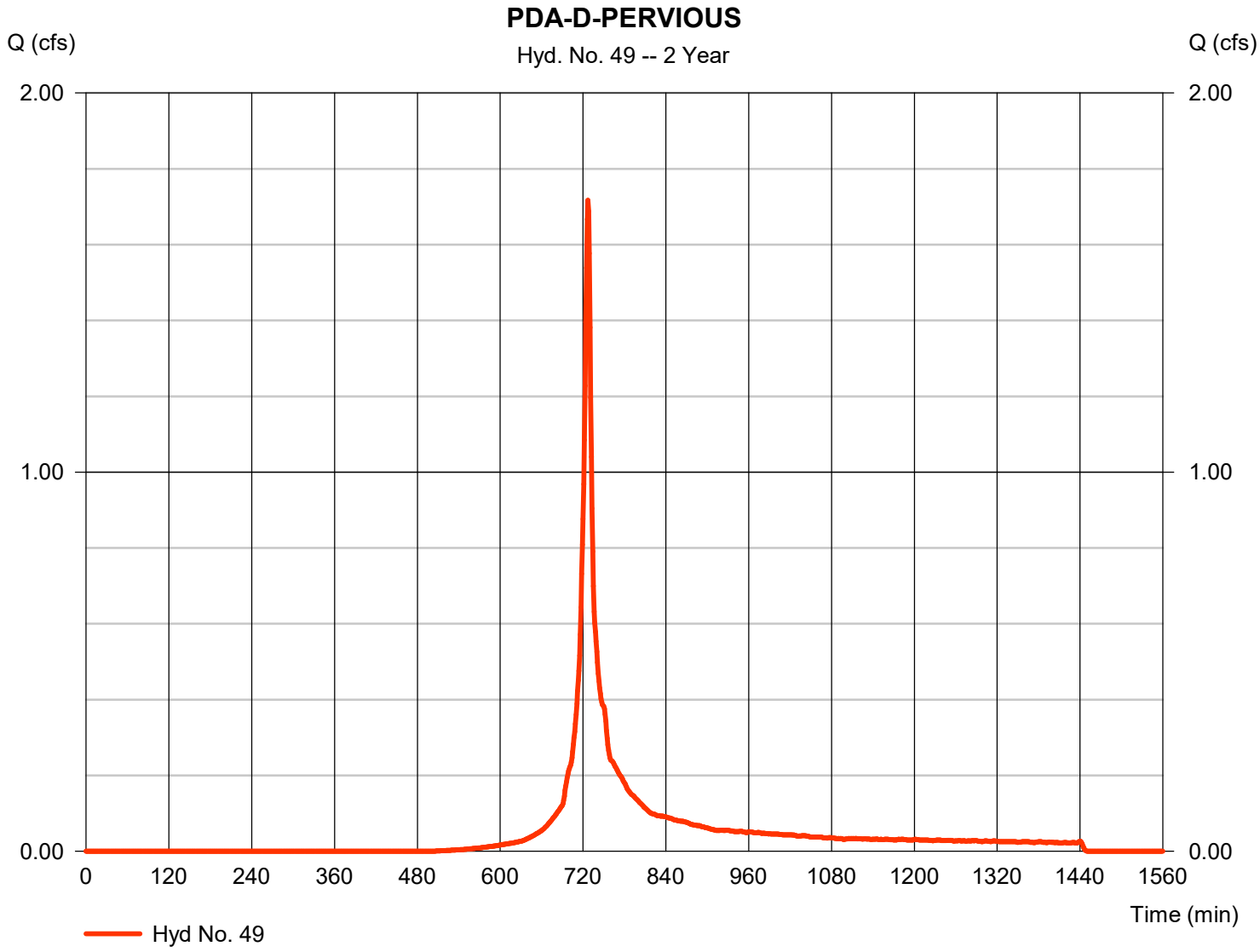


Hydrograph Report

Hyd. No. 49

PDA-D-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.717 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	4,733 cuft
Drainage area	=	0.770 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

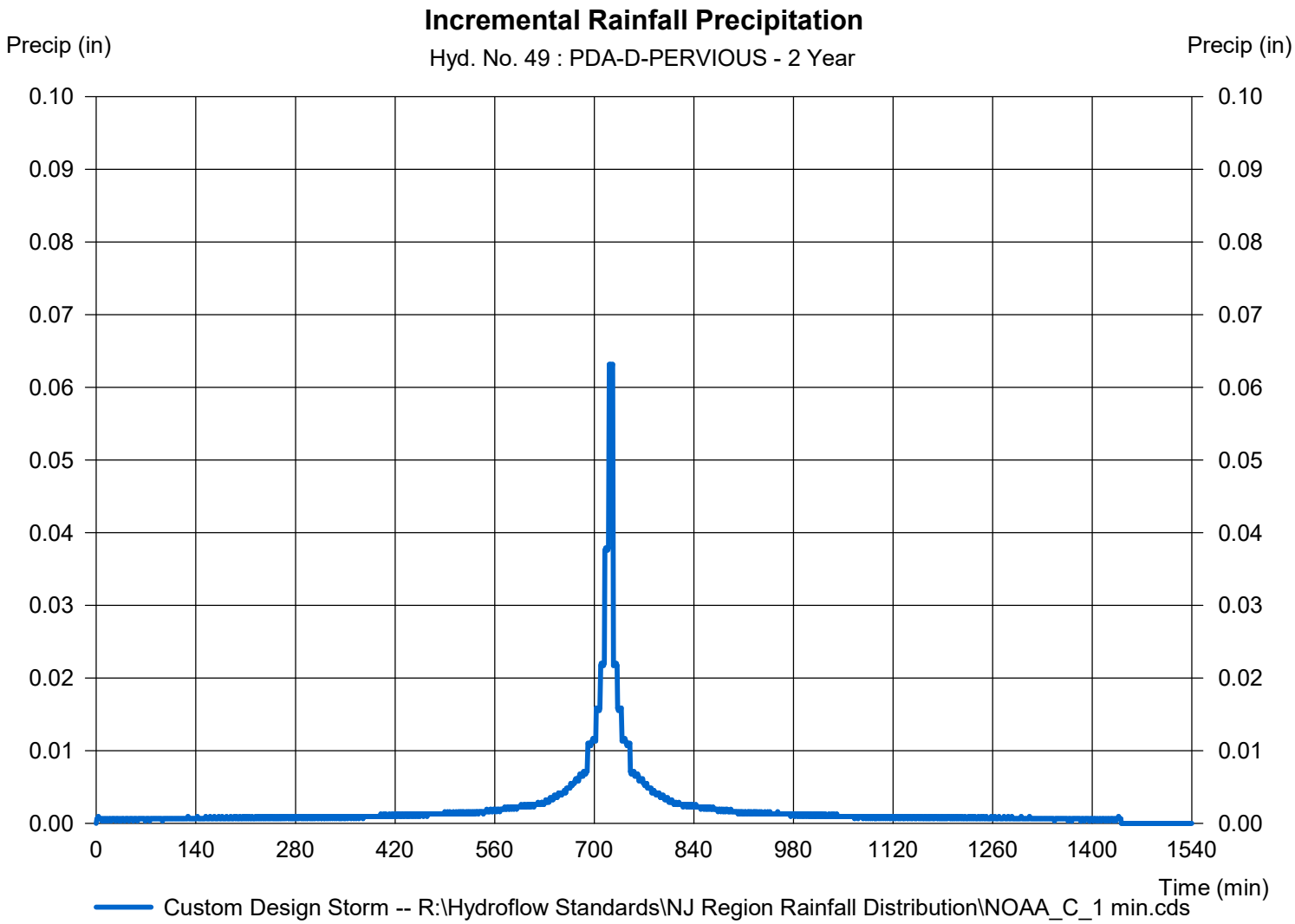


Precipitation Report

Hyd. No. 49

PDA-D-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

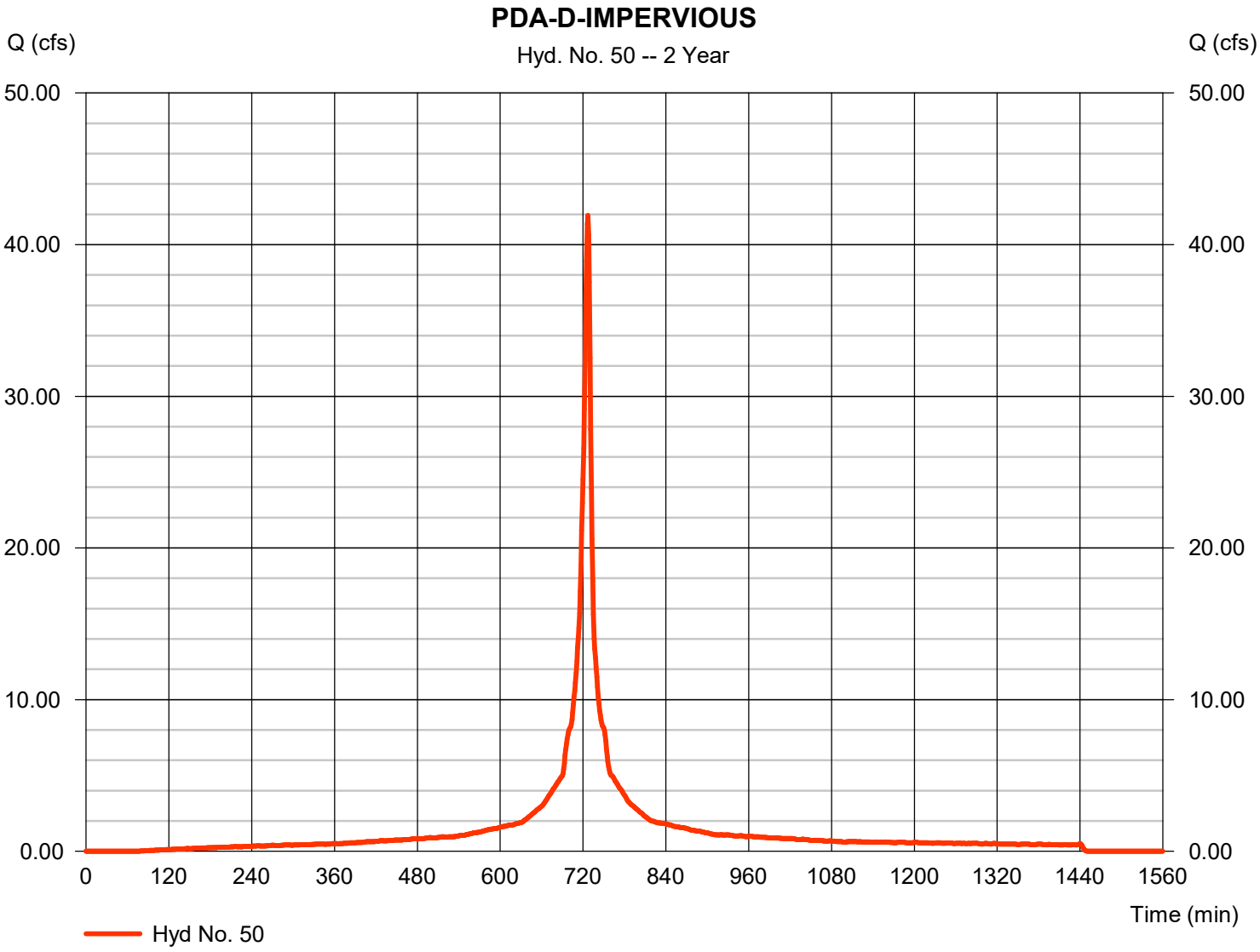


Hydrograph Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.92 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	133,855 cuft
Drainage area	=	11.890 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

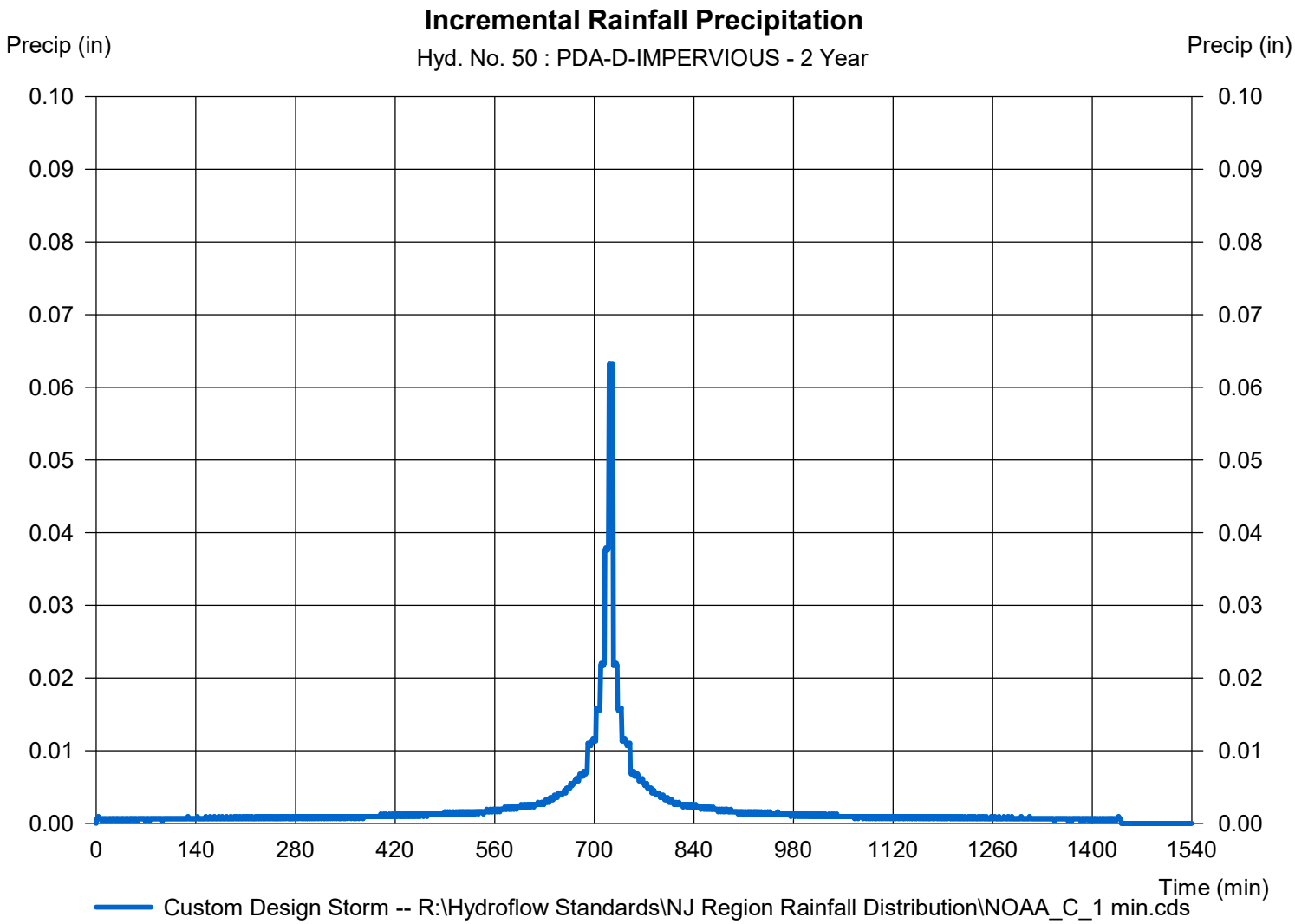


Precipitation Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

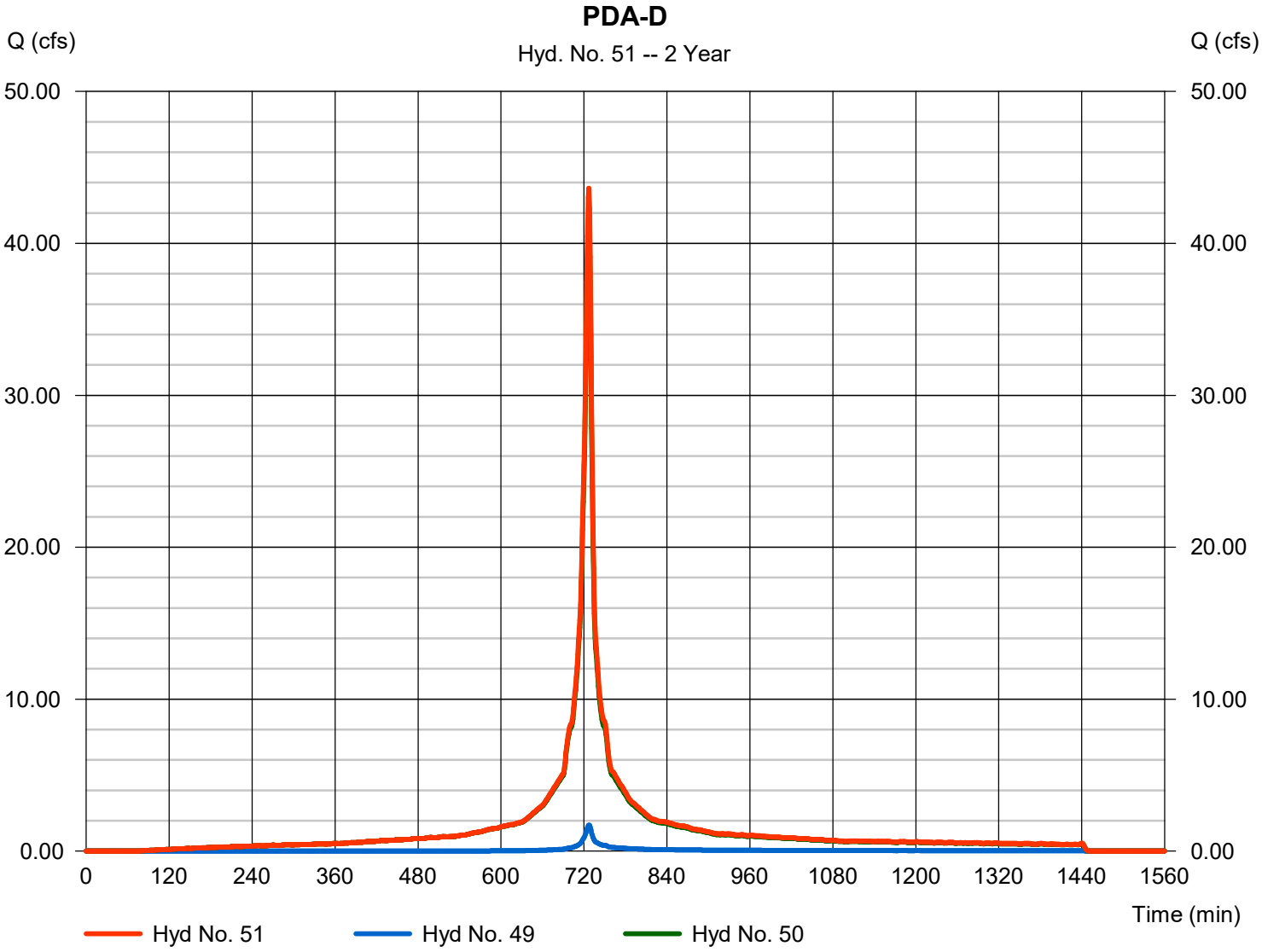


Hydrograph Report

Hyd. No. 51

PDA-D

Hydrograph type	= Combine	Peak discharge	= 43.64 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 138,588 cuft
Inflow hyds.	= 49, 50	Contrib. drain. area	= 12.660 ac



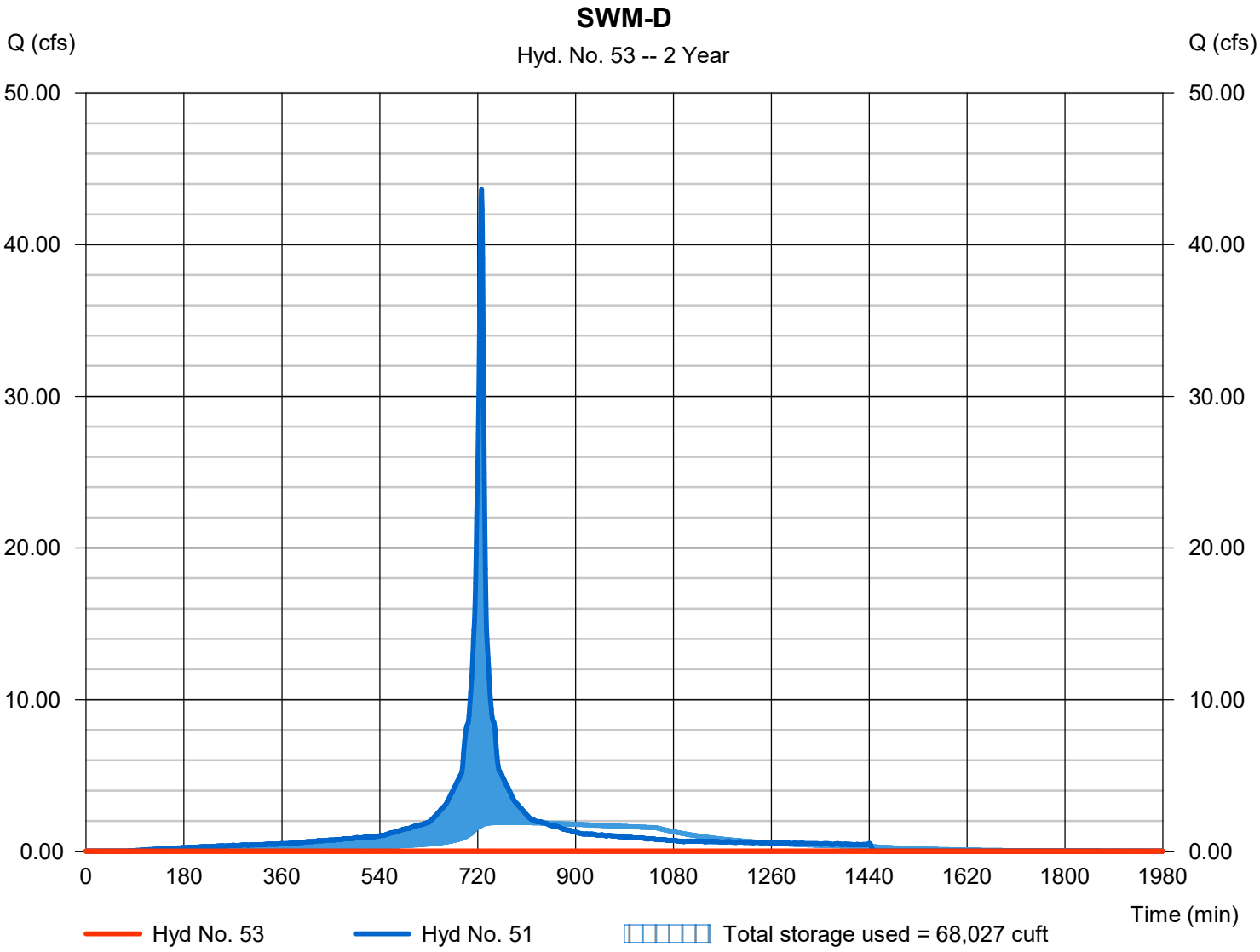
Hydrograph Report

Hyd. No. 53

SWM-D

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	677 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	51 - PDA-D	Max. Elevation	=	600.54 ft
Reservoir name	=	SWM-D	Max. Storage	=	68,027 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 4 - SWM-D

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	23,768	0	0
1.00	599.00	26,054	24,900	24,900
2.00	600.00	28,387	27,209	52,109
3.00	601.00	30,767	29,566	81,675
4.00	602.00	33,193	31,969	113,644
5.00	603.00	35,667	34,419	148,064
6.00	604.00	38,187	36,916	184,980
7.00	605.00	40,754	39,460	224,439

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

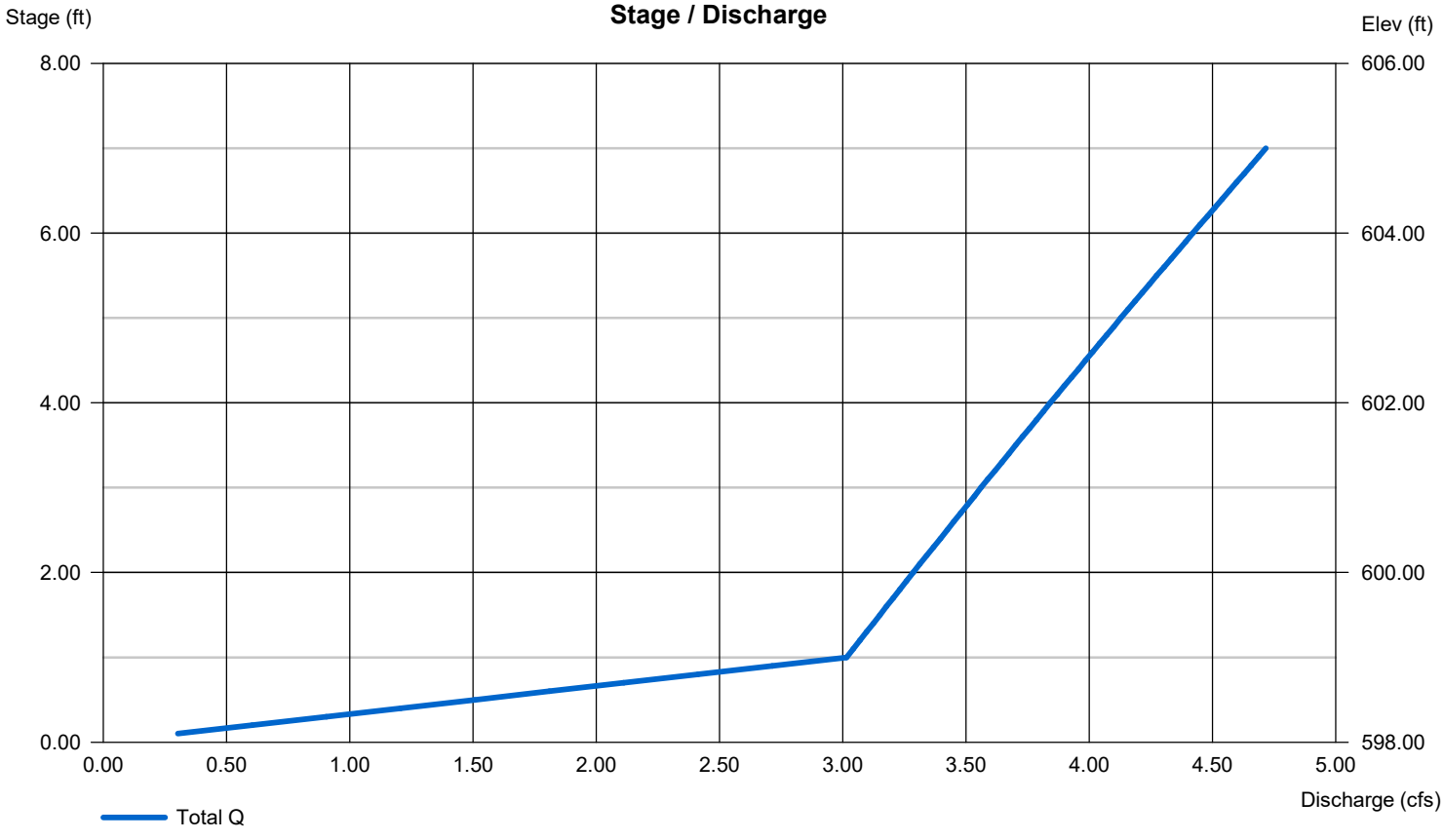
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

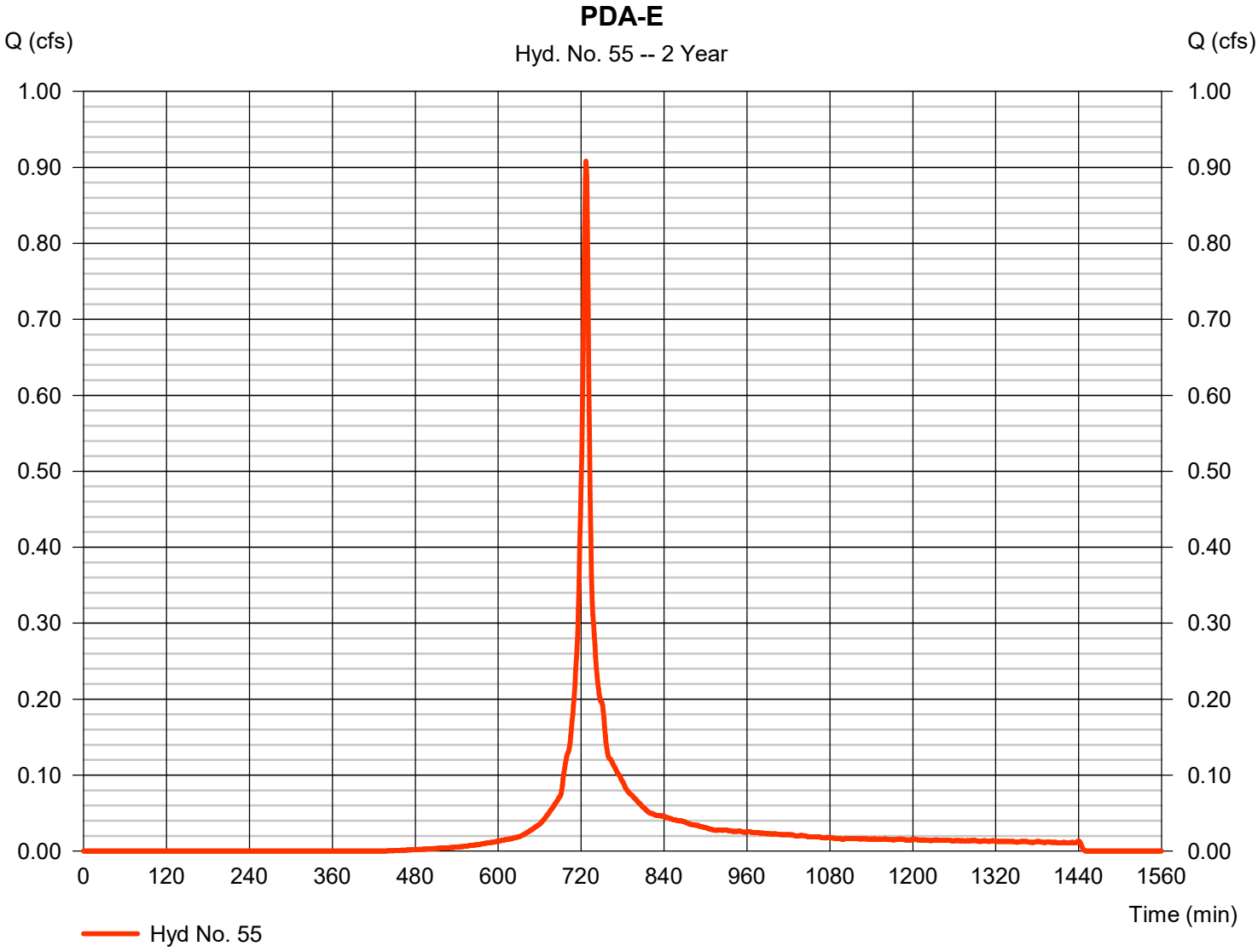


Hydrograph Report

Hyd. No. 55

PDA-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.908 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,520 cuft
Drainage area	=	0.360 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

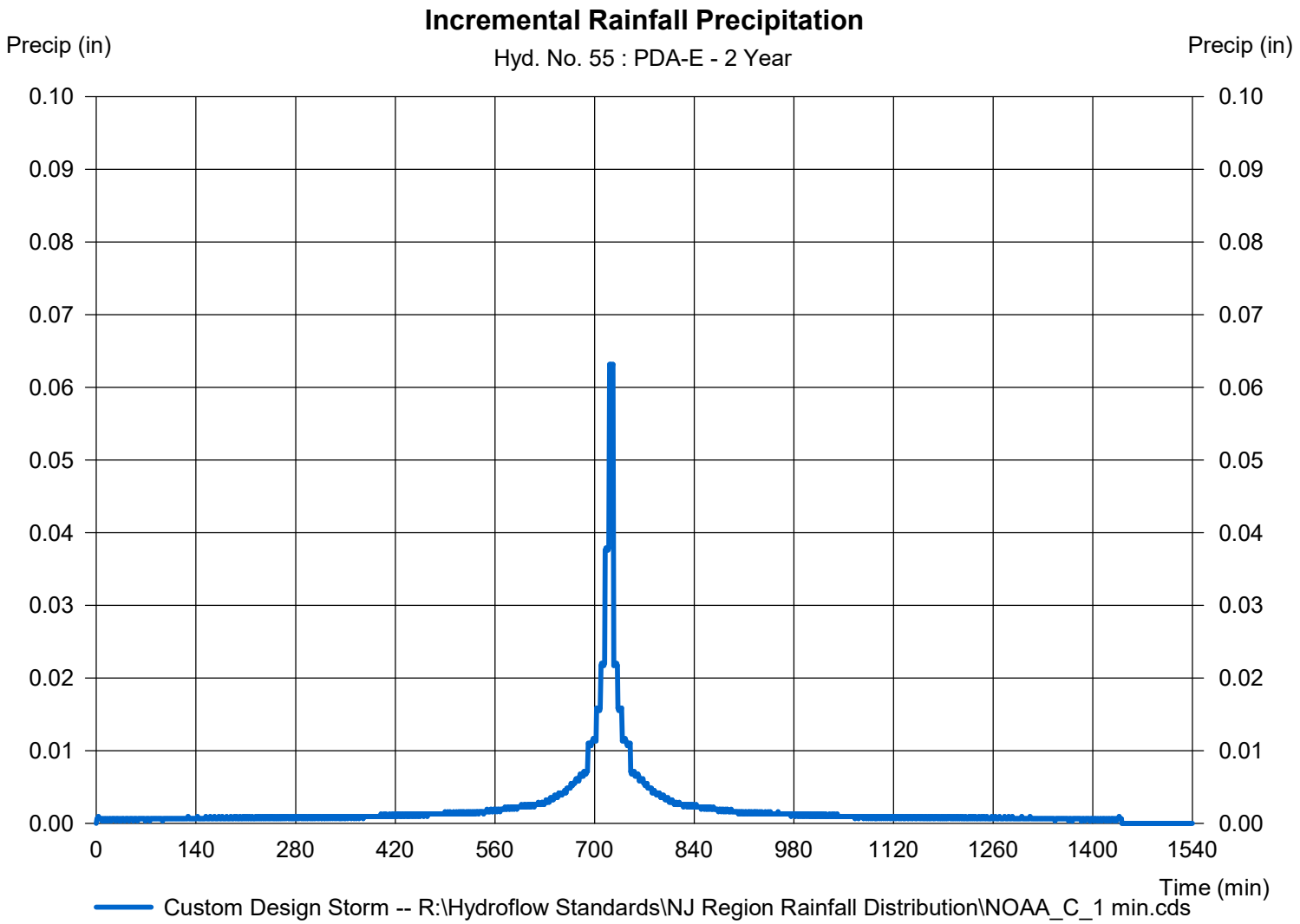


Precipitation Report

Hyd. No. 55

PDA-E

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

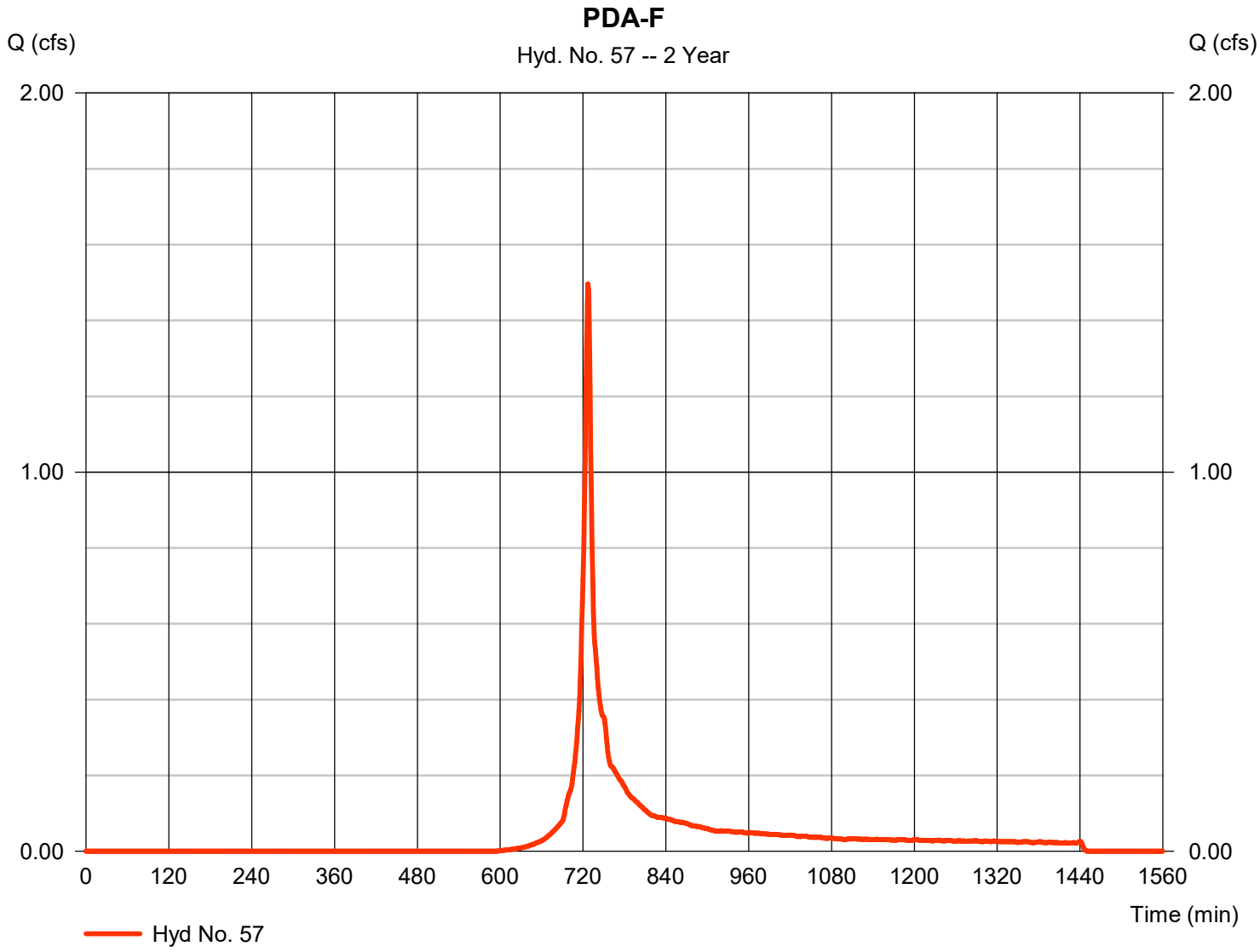


Hydrograph Report

Hyd. No. 57

PDA-F

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.497 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	4,145 cuft
Drainage area	=	0.850 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

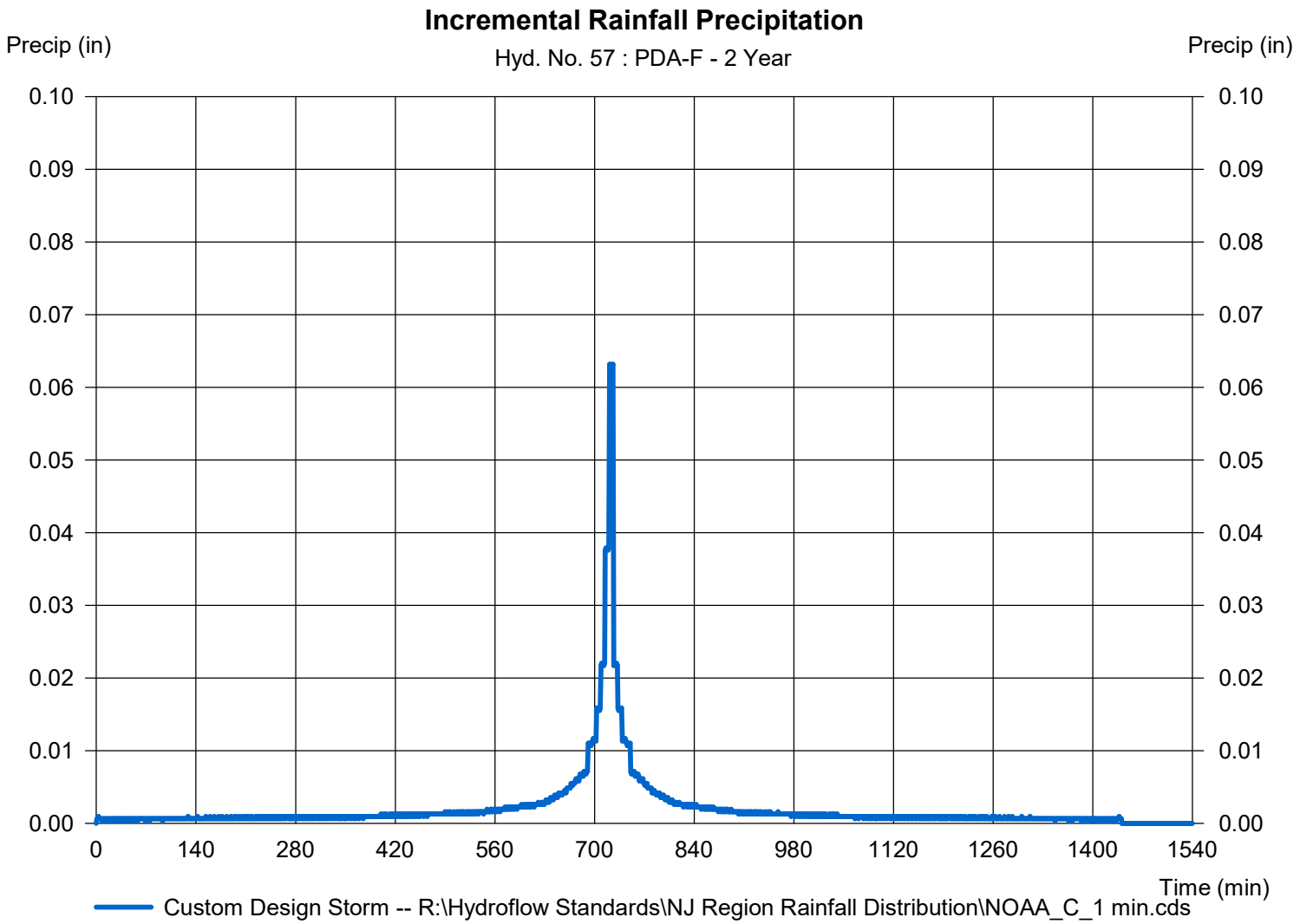


Precipitation Report

Hyd. No. 57

PDA-F

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

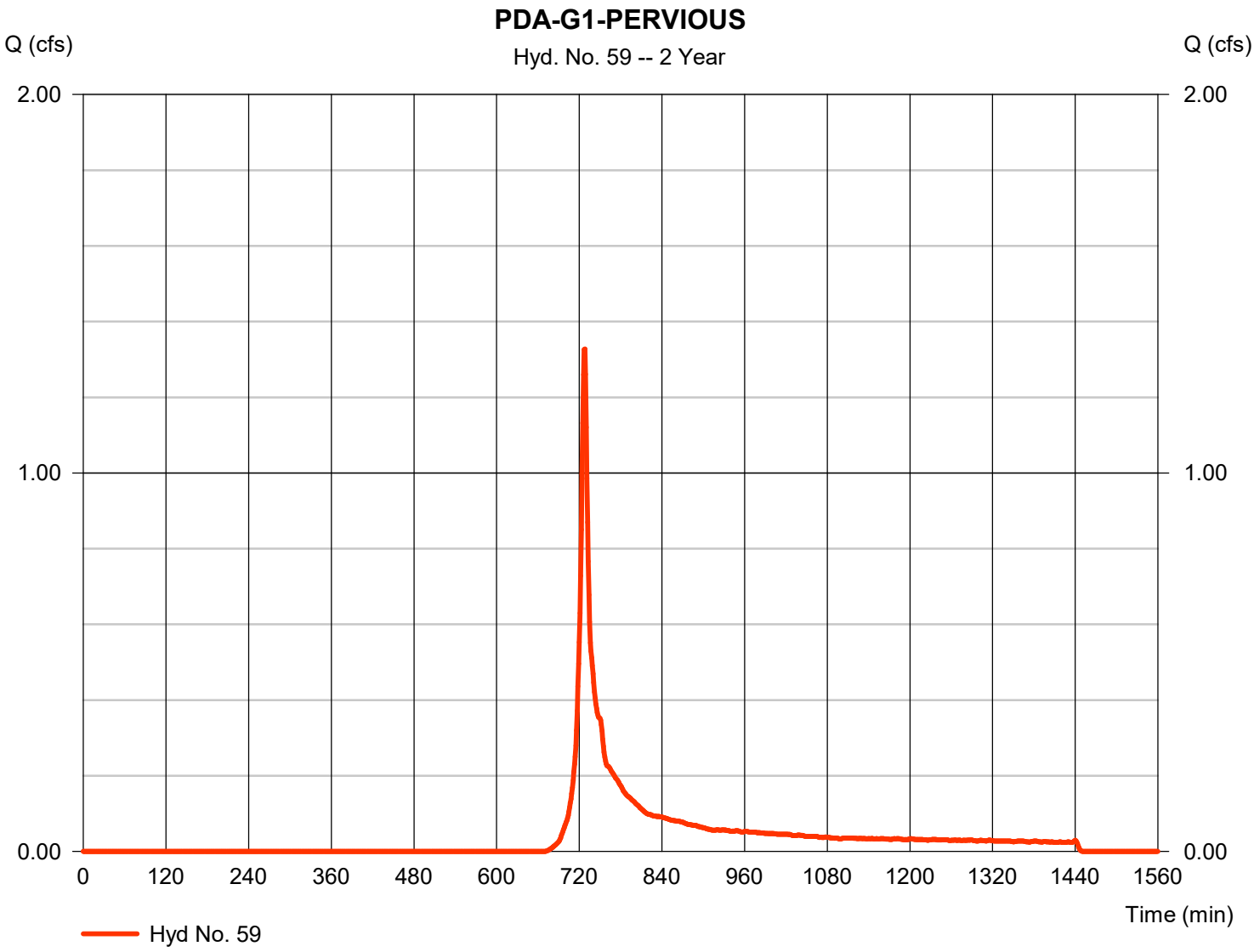


Hydrograph Report

Hyd. No. 59

PDA-G1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.328 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	3,850 cuft
Drainage area	=	1.140 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

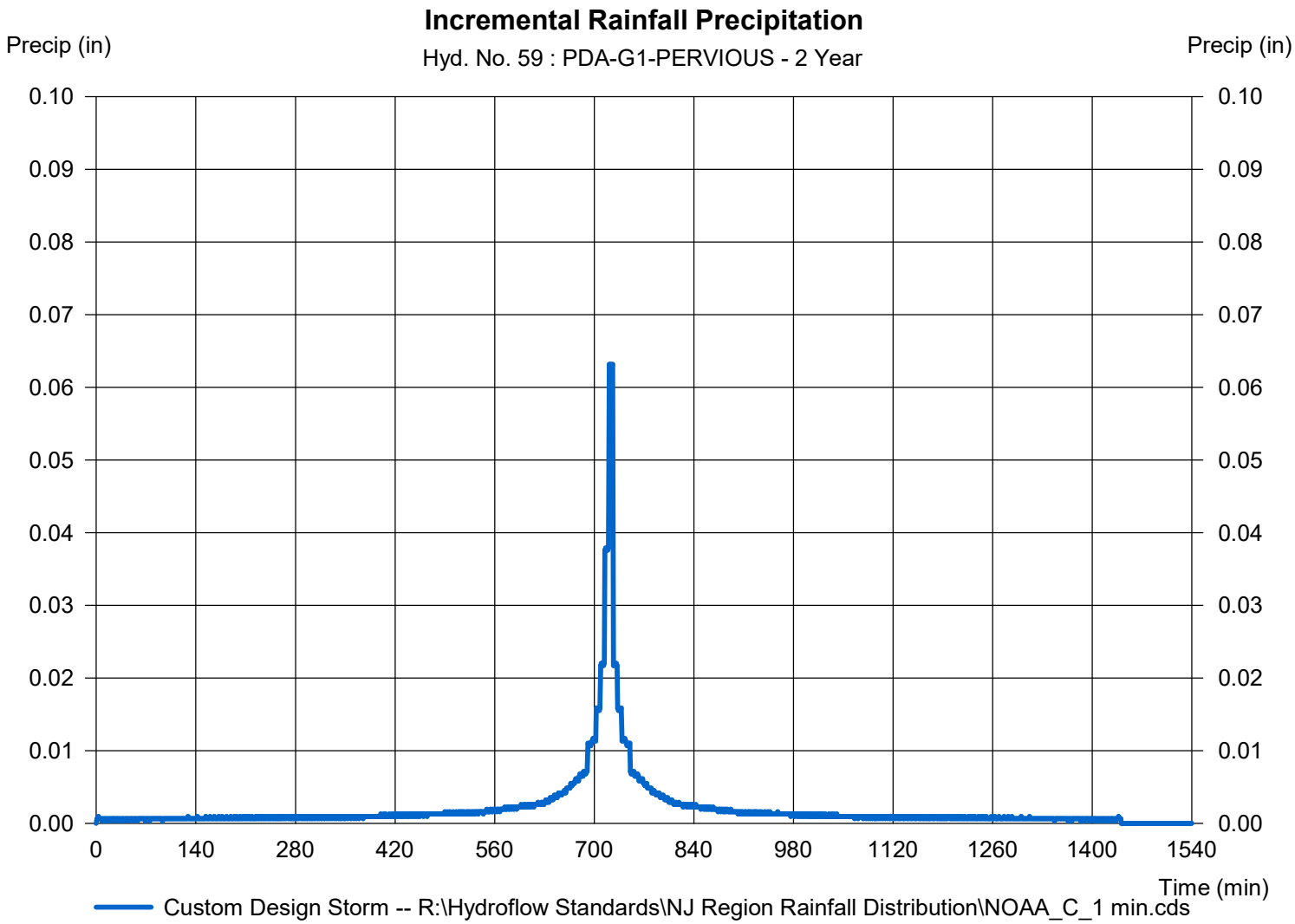


Precipitation Report

Hyd. No. 59

PDA-G1-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

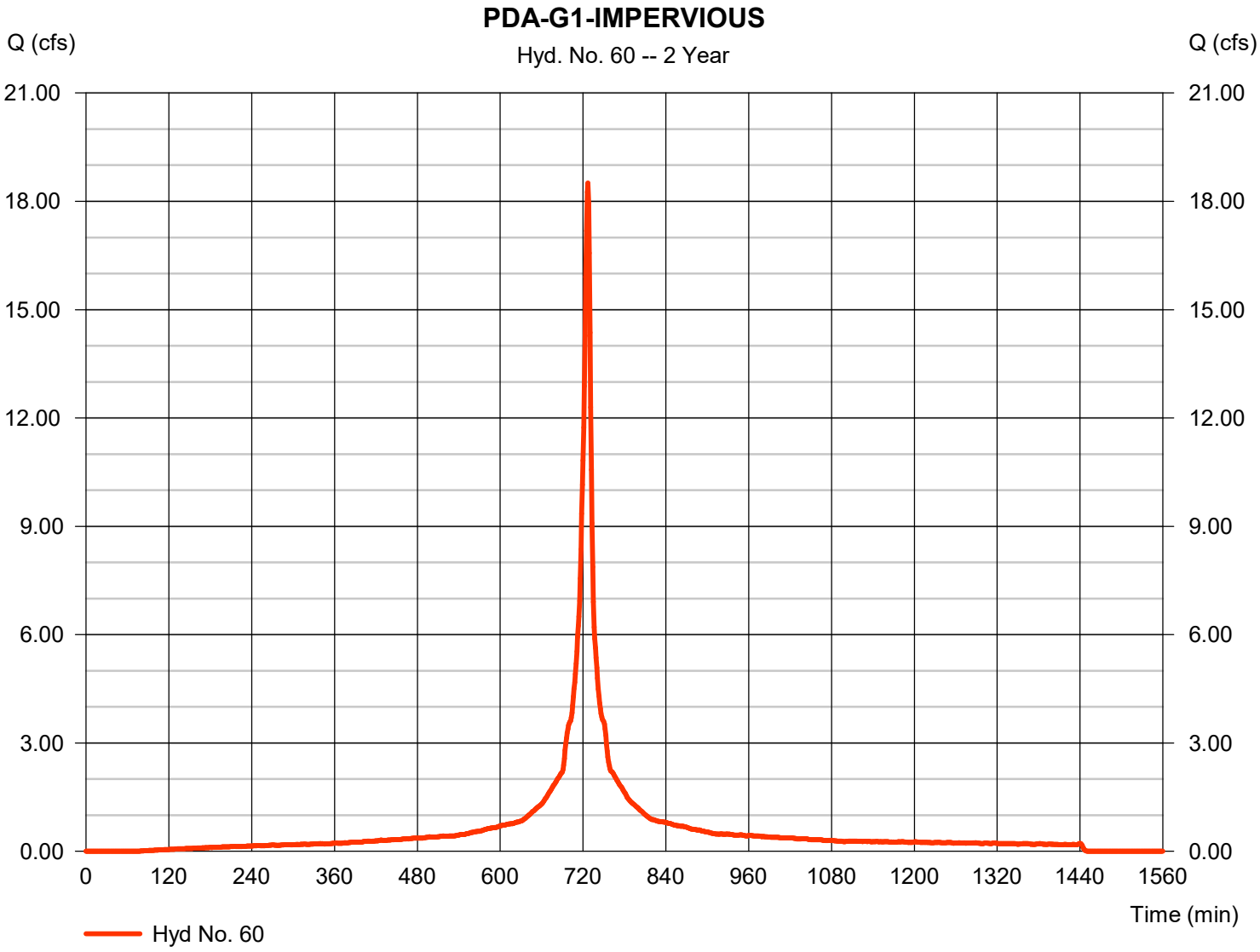


Hydrograph Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.51 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	59,103 cuft
Drainage area	=	5.250 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Storm Distribution	=	NJ484

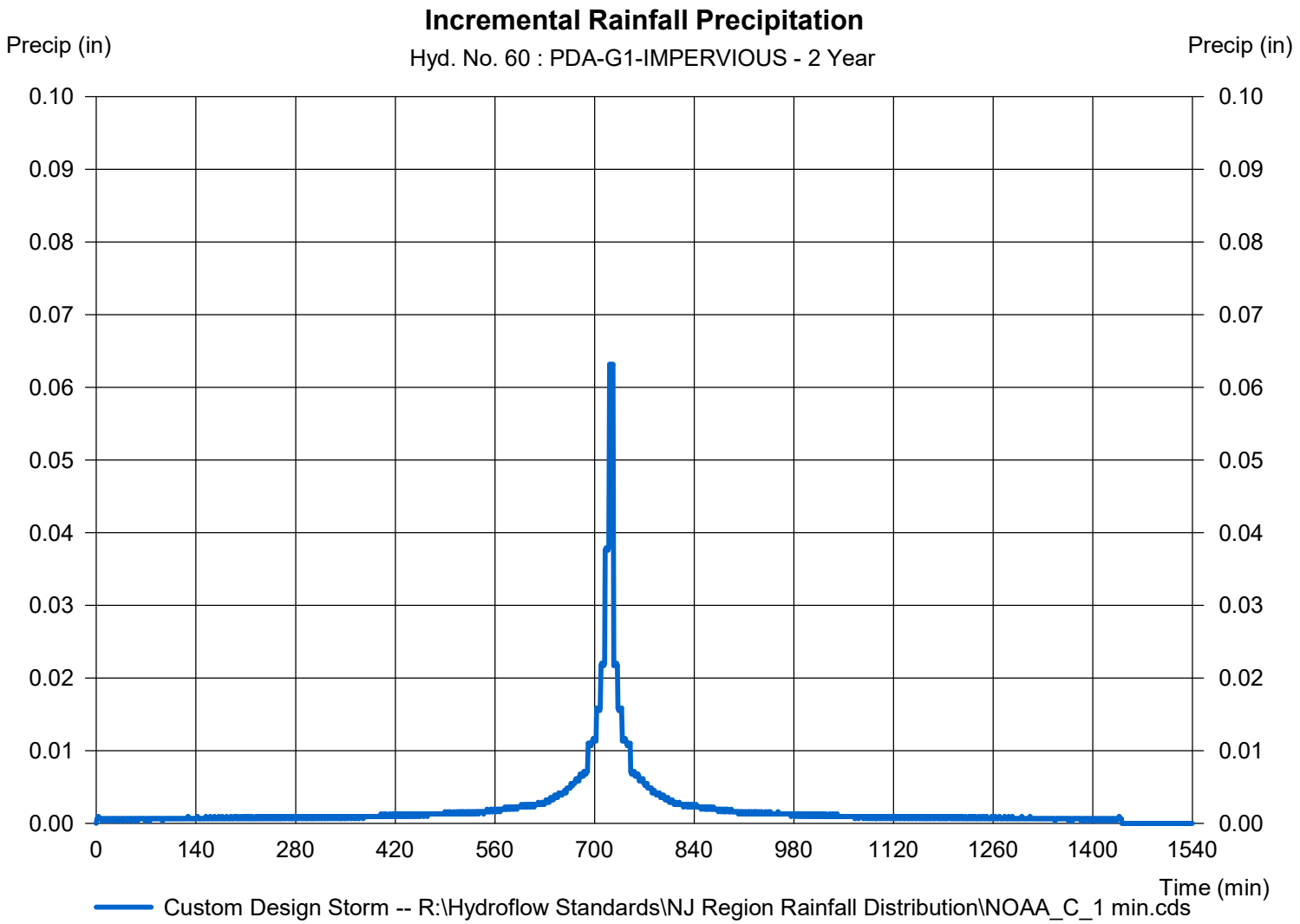


Precipitation Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

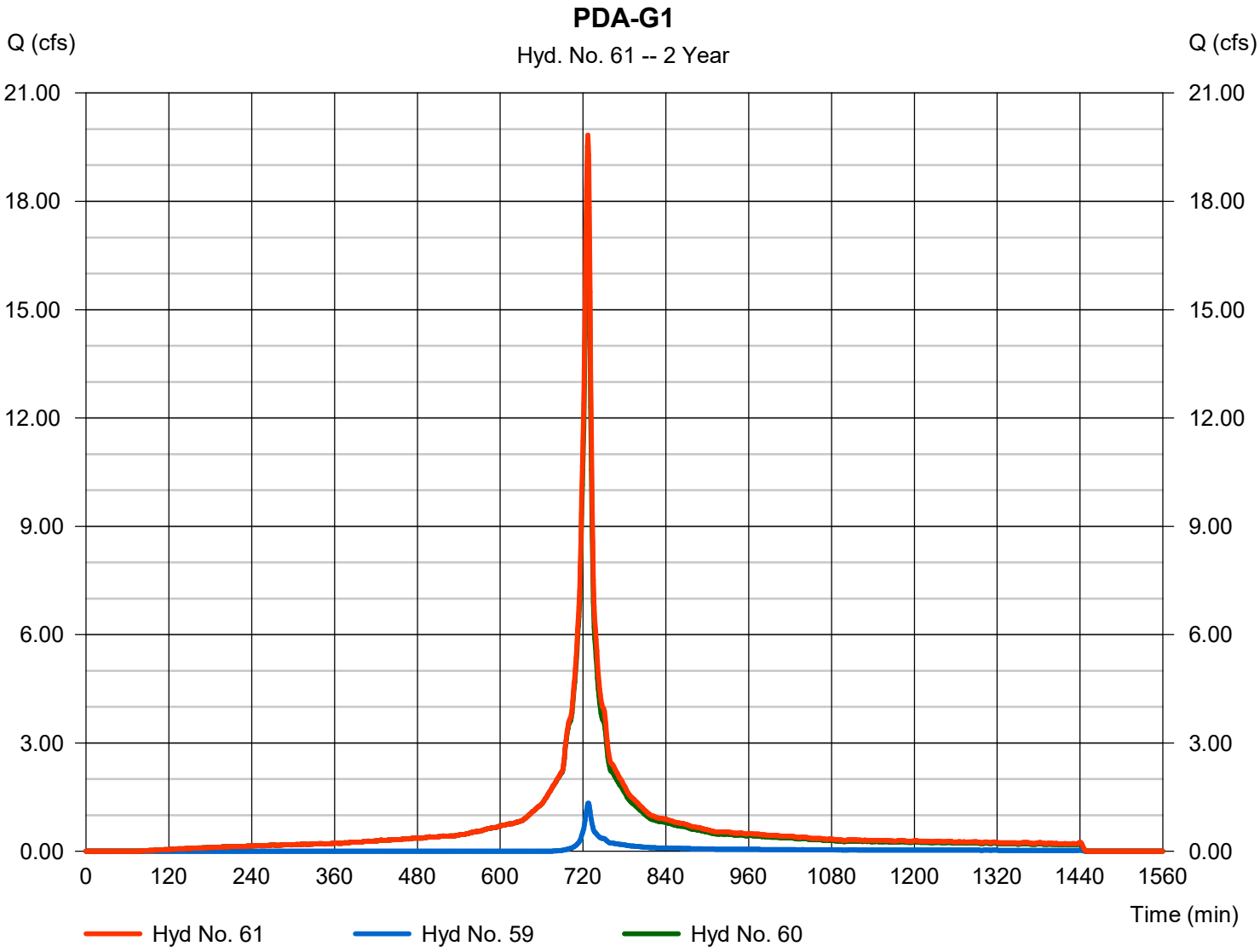


Hydrograph Report

Hyd. No. 61

PDA-G1

Hydrograph type	=	Combine	Peak discharge	=	19.84 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	62,954 cuft
Inflow hyds.	=	59, 60	Contrib. drain. area	=	6.390 ac



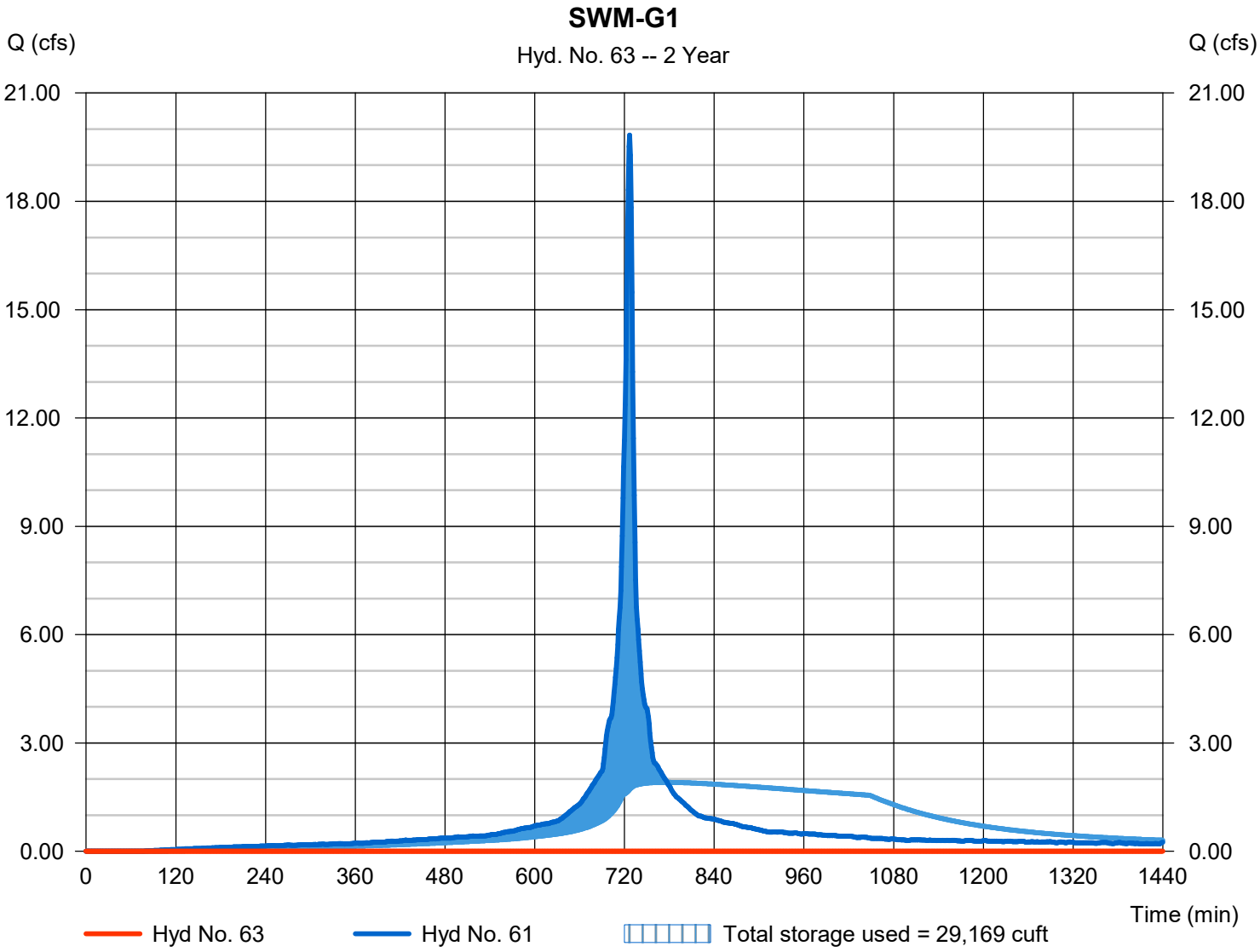
Hydrograph Report

Hyd. No. 63

SWM-G1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 687 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 61 - PDA-G1	Max. Elevation	= 598.13 ft
Reservoir name	= SWM-G1	Max. Storage	= 29,169 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 5 - SWM-G1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 596.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	596.00	10,939	0	0
1.00	597.00	13,385	12,140	12,140
2.00	598.00	16,090	14,716	26,856
3.00	599.00	19,035	17,540	44,396
4.00	600.00	22,232	20,611	65,007
5.00	601.00	32,957	27,416	92,423

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

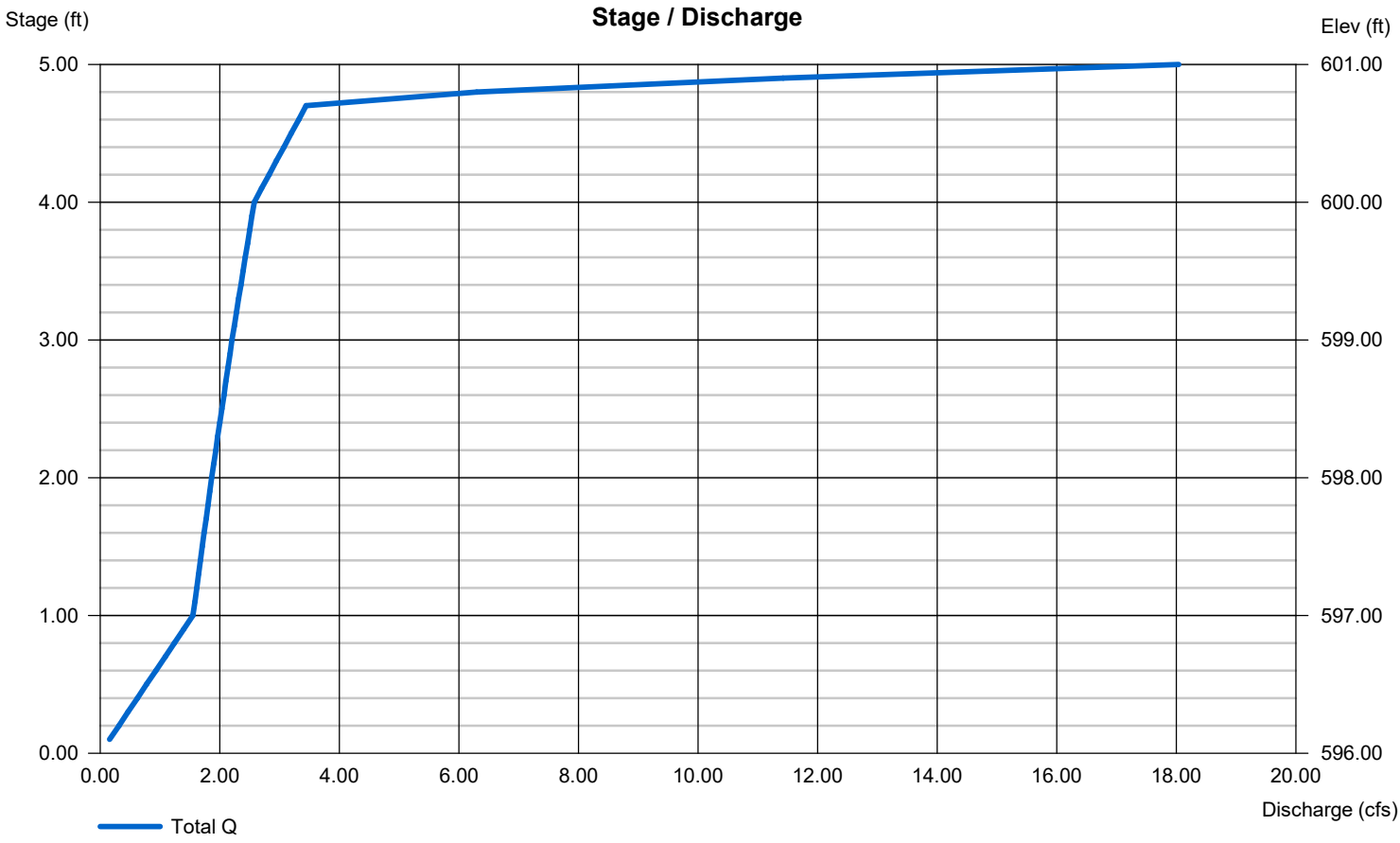
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 26.00	0.00	0.00	0.00
Crest El. (ft)	= 600.70	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

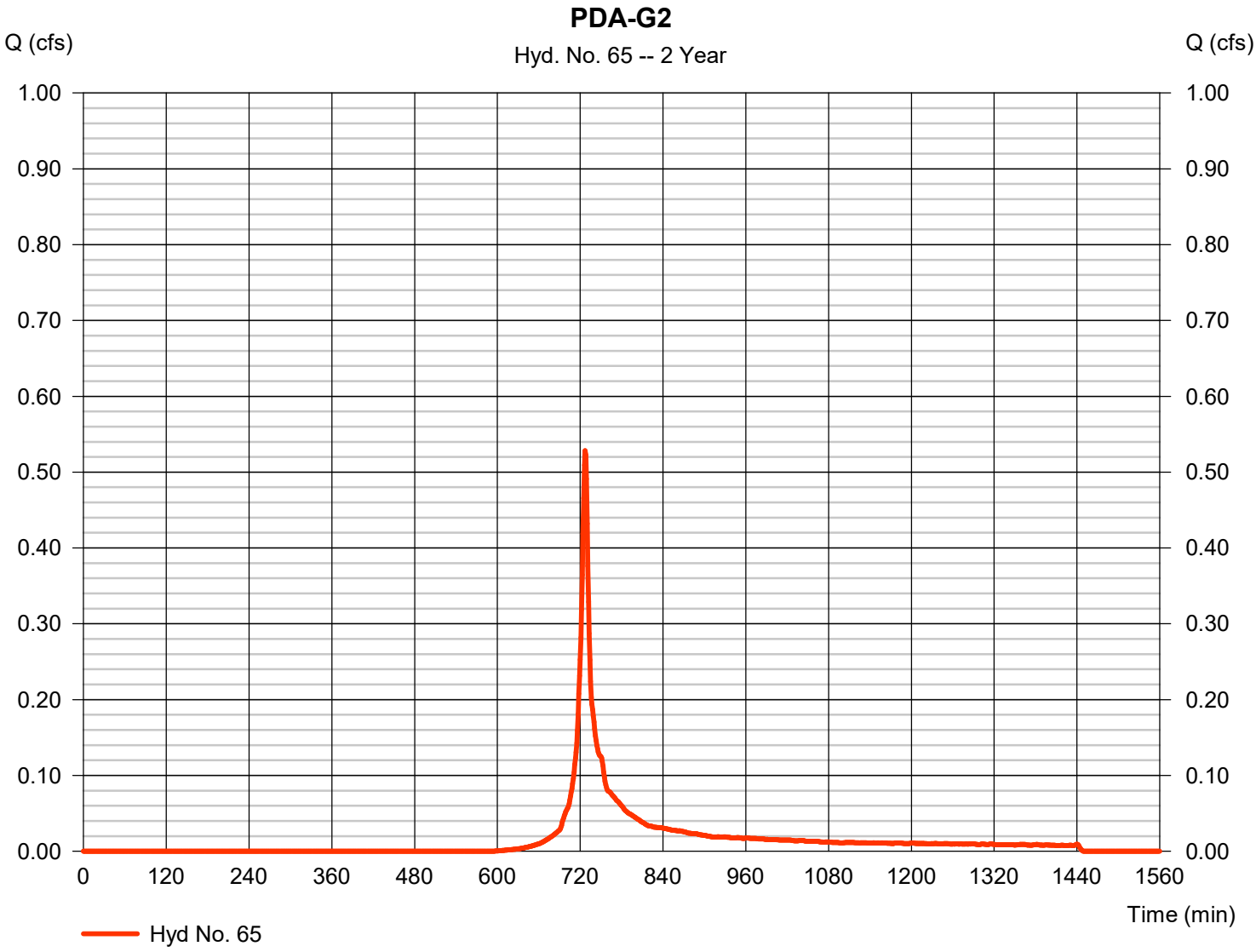


Hydrograph Report

Hyd. No. 65

PDA-G2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.528 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,463 cuft
Drainage area	=	0.300 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

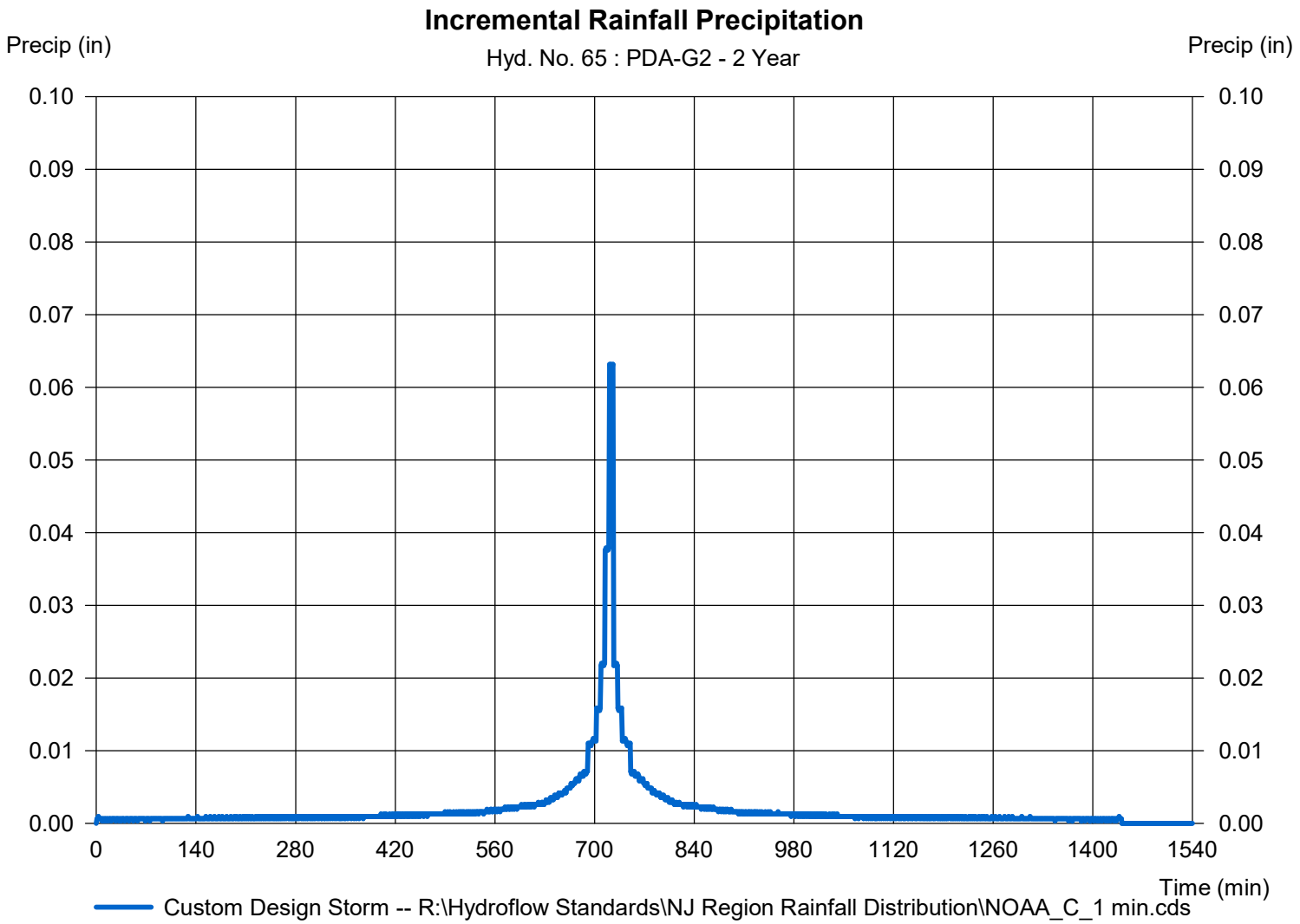


Precipitation Report

Hyd. No. 65

PDA-G2

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

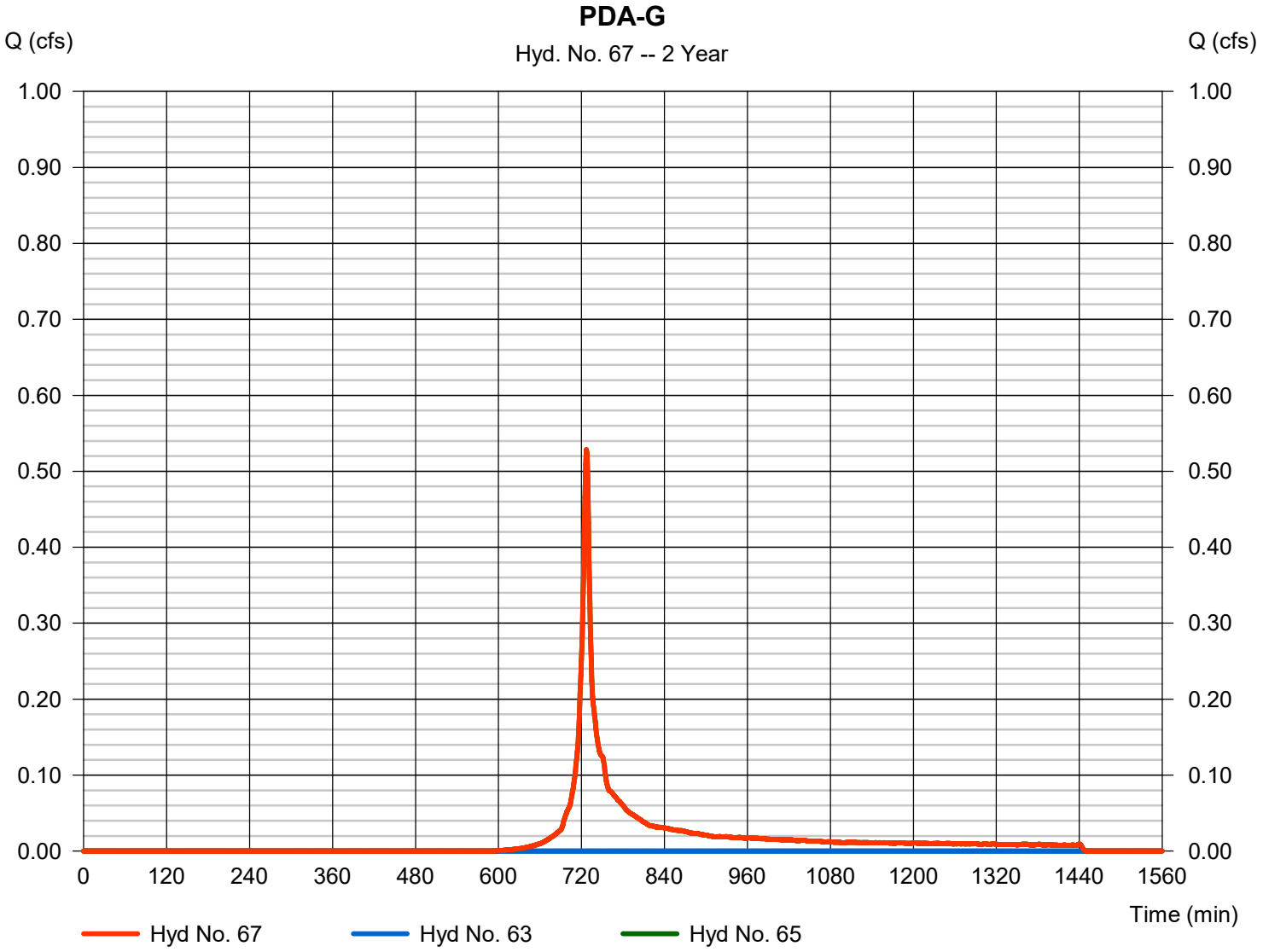


Hydrograph Report

Hyd. No. 67

PDA-G

Hydrograph type	=	Combine	Peak discharge	=	0.528 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,463 cuft
Inflow hyds.	=	63, 65	Contrib. drain. area	=	0.300 ac

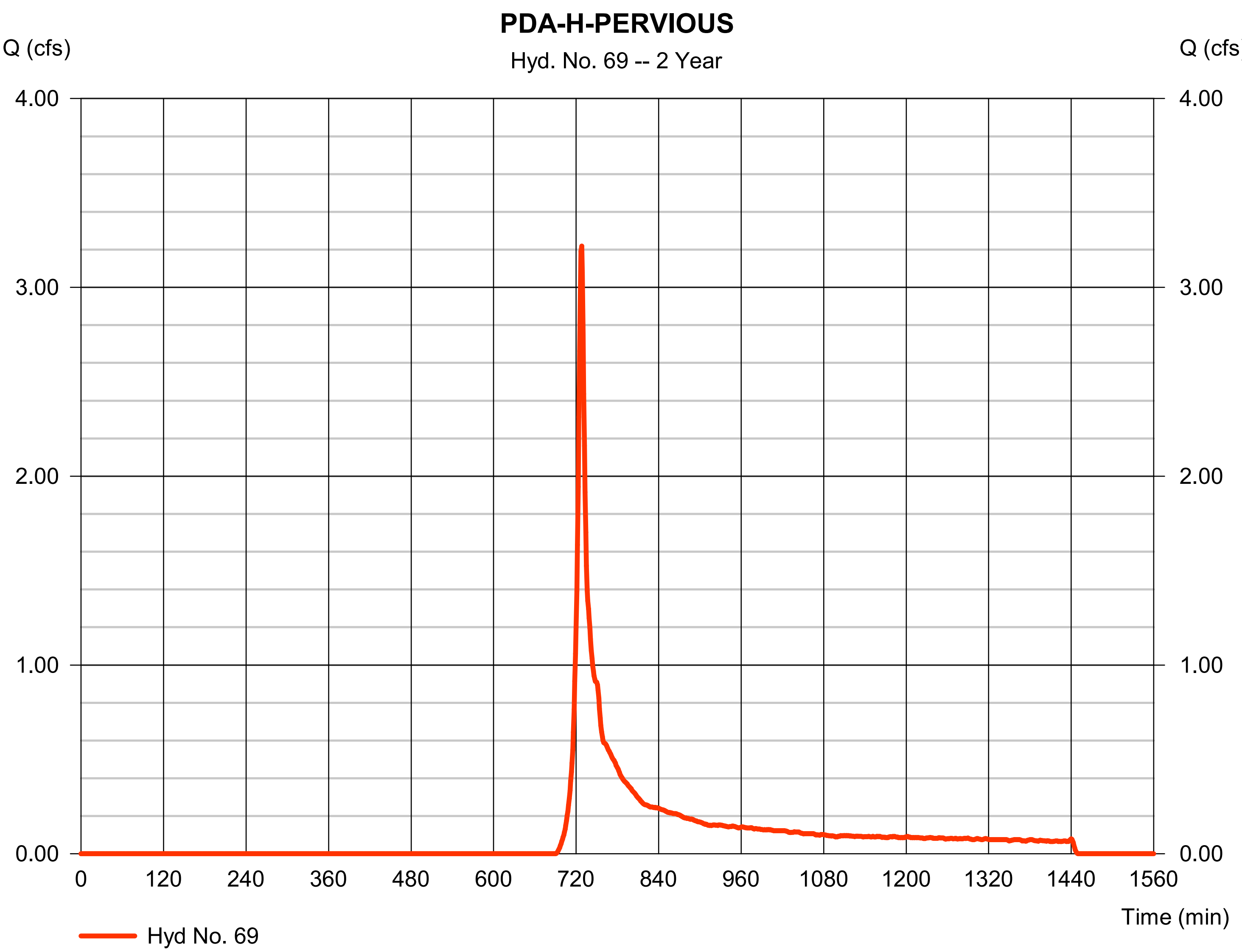


Hydrograph Report

Hyd. No. 69

PDA-H-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 3.219 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 9,687 cuft
Drainage area	= 3.430 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

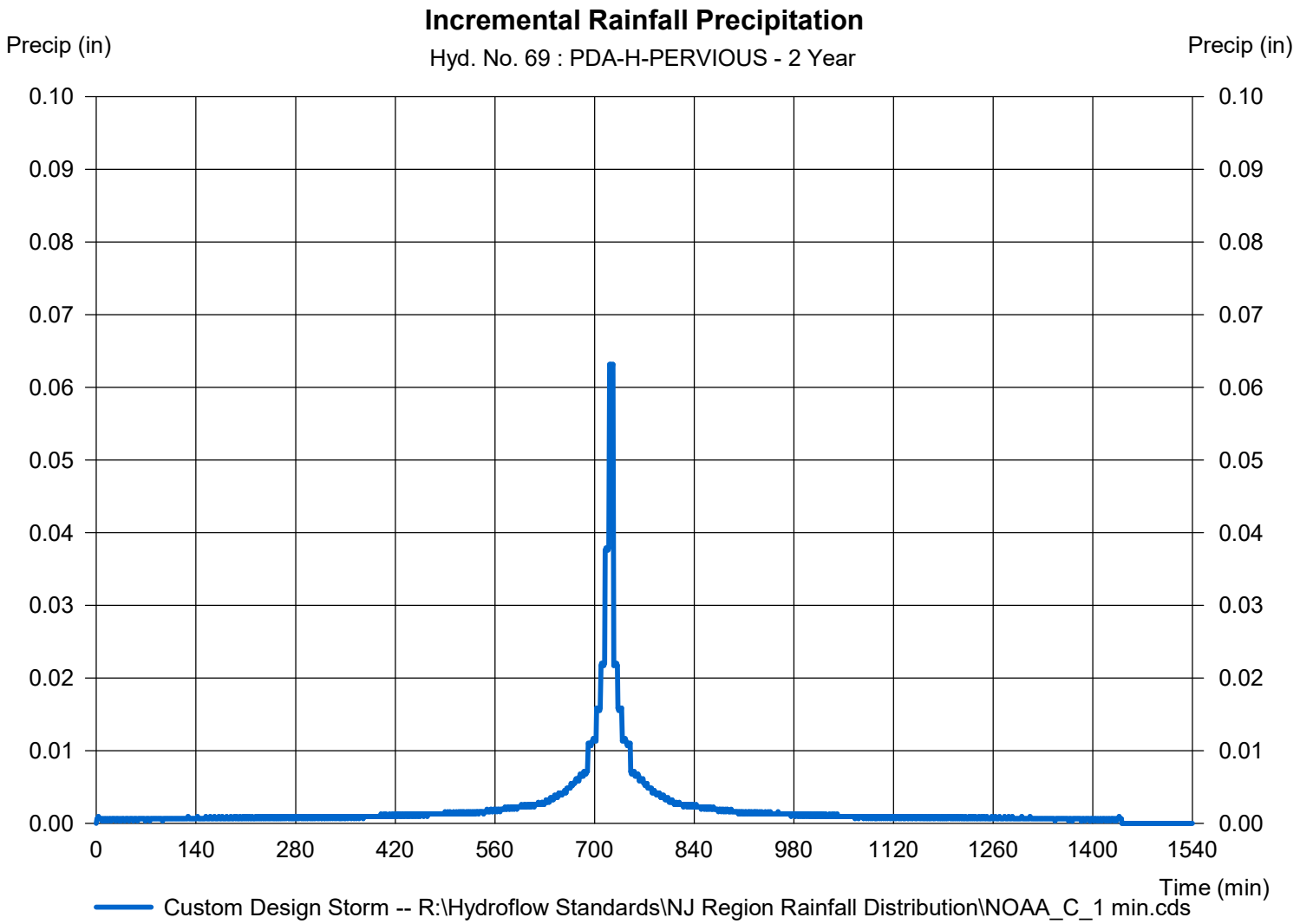


Precipitation Report

Hyd. No. 69

PDA-H-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

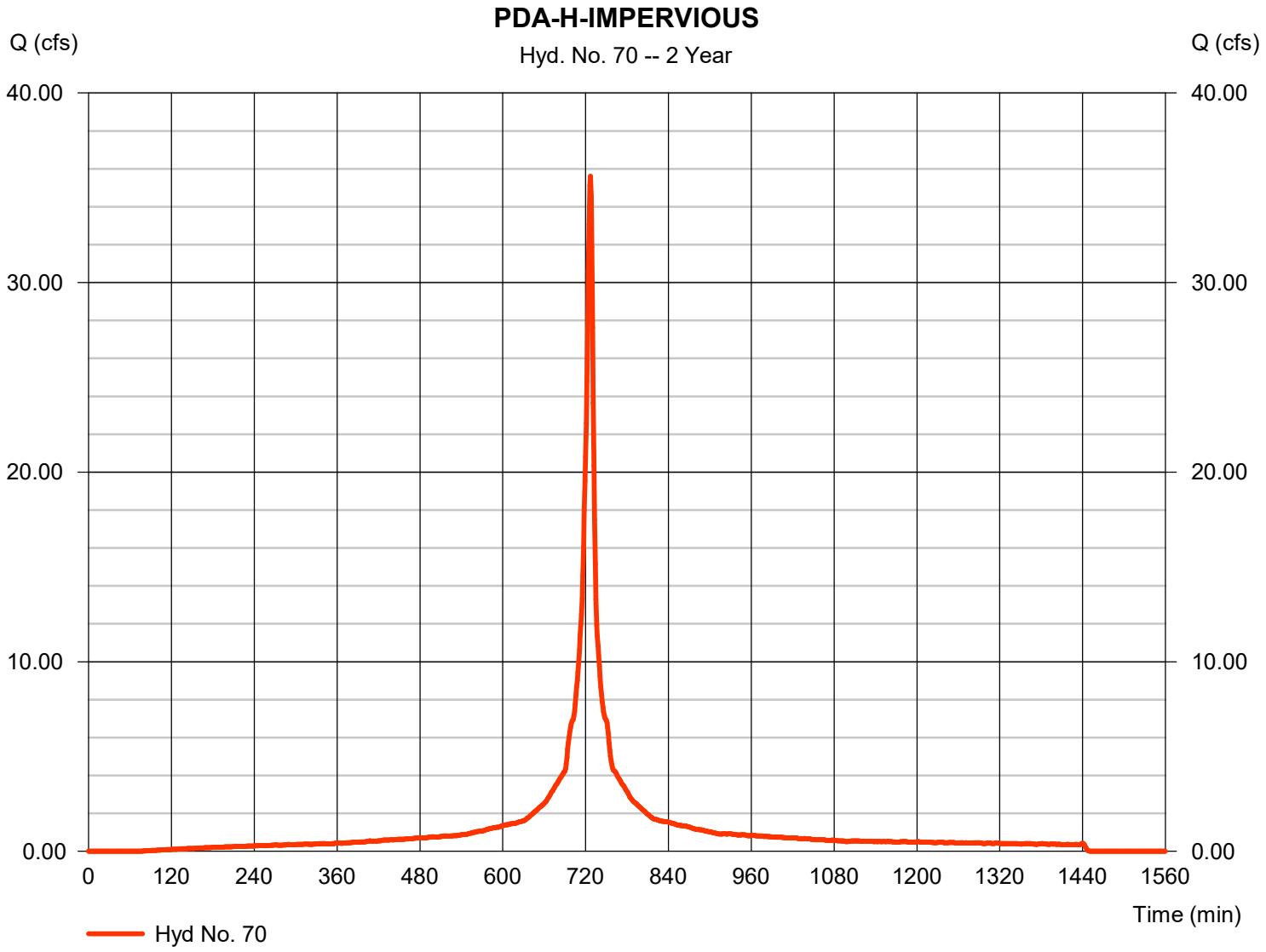


Hydrograph Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.61 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	113,704 cuft
Drainage area	=	10.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

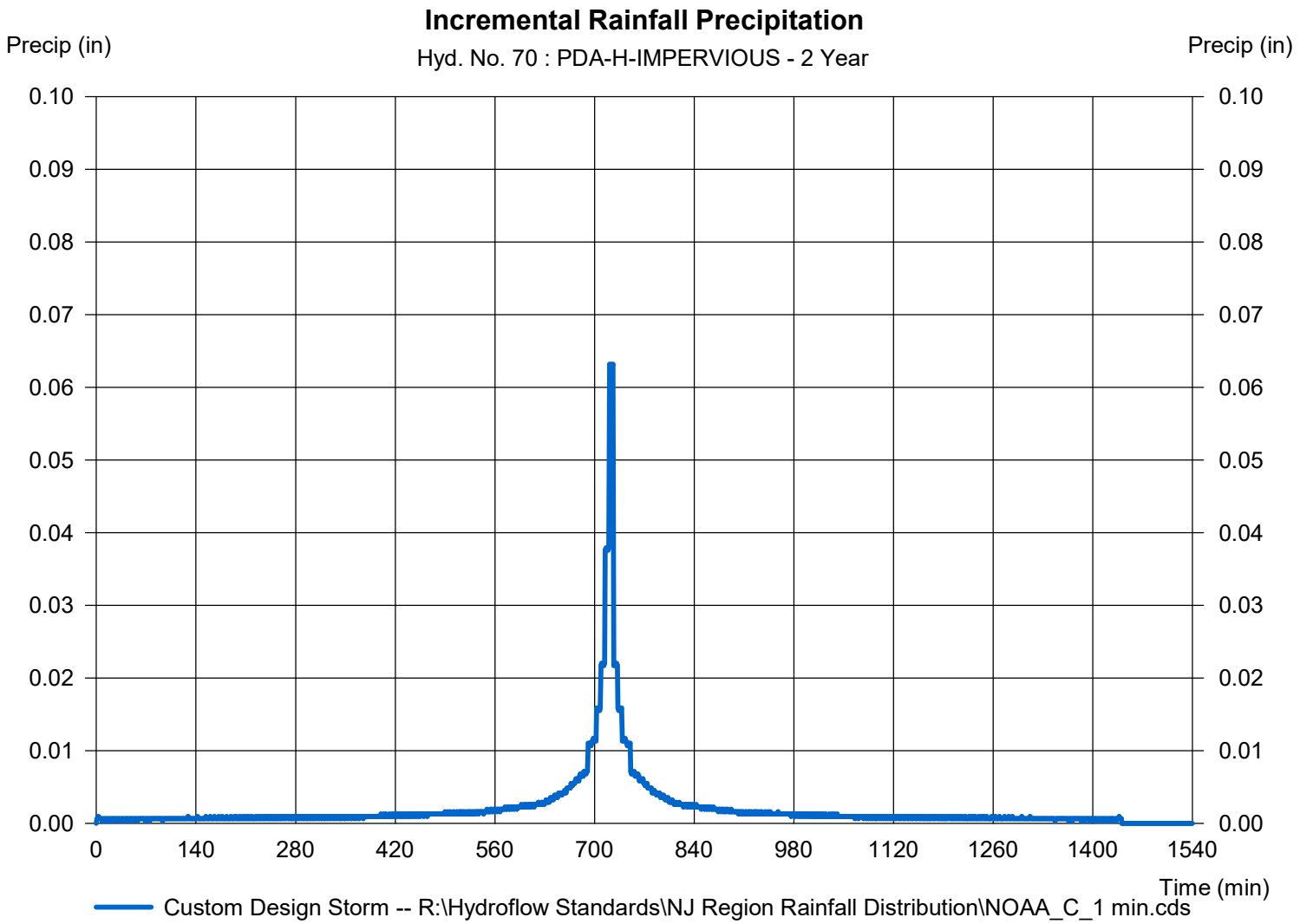


Precipitation Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

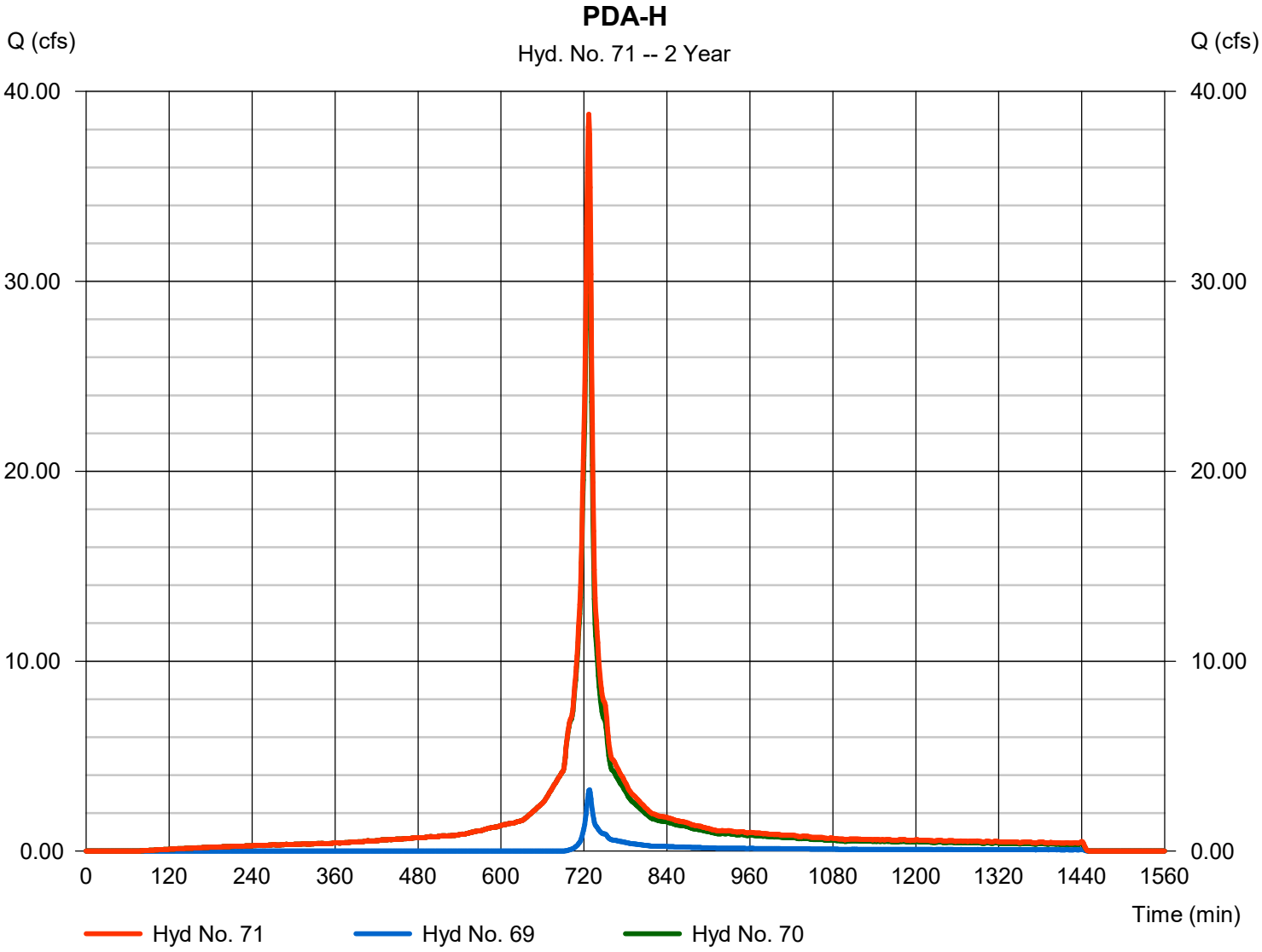


Hydrograph Report

Hyd. No. 71

PDA-H

Hydrograph type	=	Combine	Peak discharge	=	38.80 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	123,391 cuft
Inflow hyds.	=	69, 70	Contrib. drain. area	=	13.530 ac



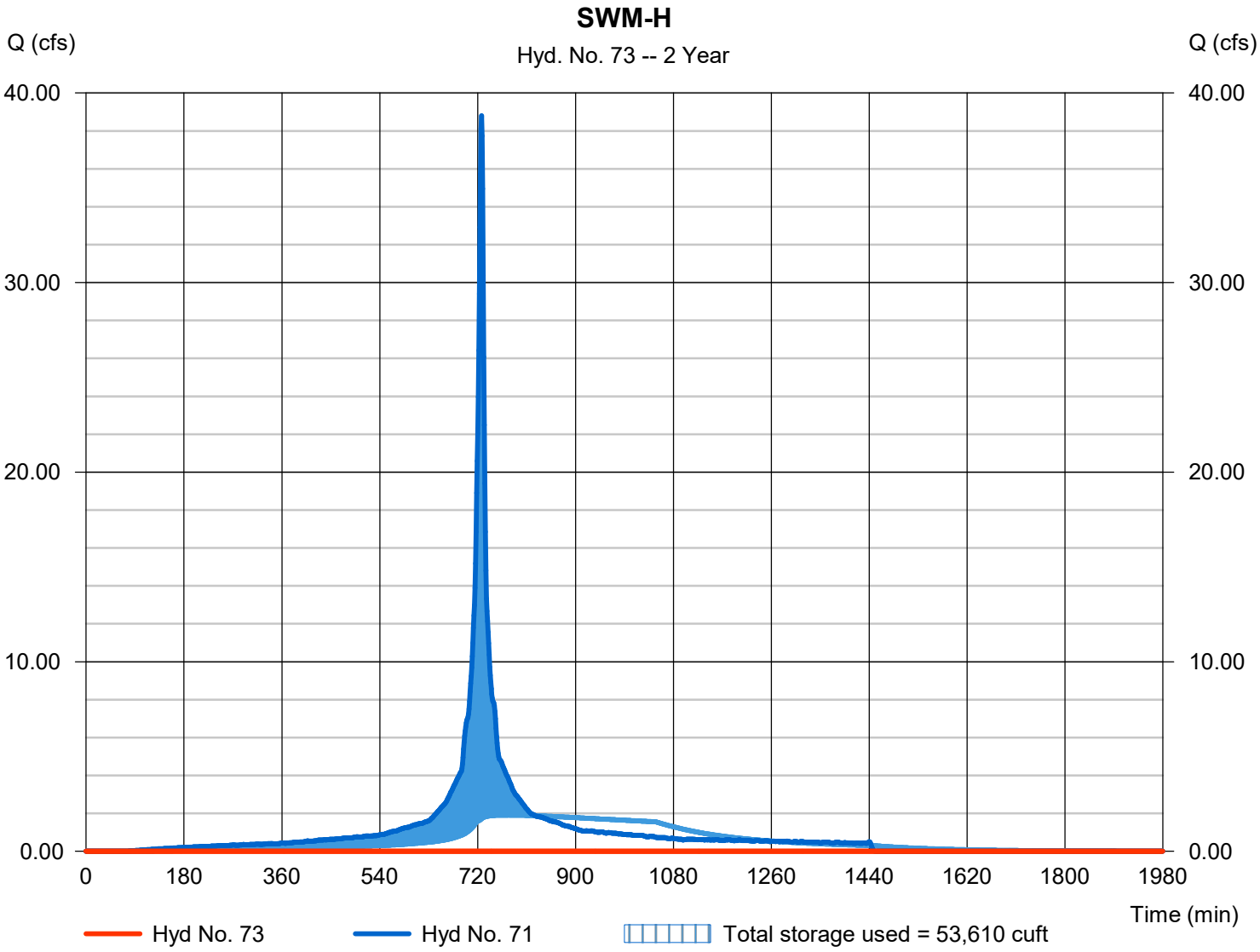
Hydrograph Report

Hyd. No. 73

SWM-H

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	909 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	71 - PDA-H	Max. Elevation	=	597.36 ft
Reservoir name	=	SWM-H	Max. Storage	=	53,610 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 6 - SWM-H

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 596.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	596.00	35,726	0	0
1.00	597.00	40,735	38,199	38,199
2.00	598.00	46,050	43,361	81,560
3.00	599.00	51,472	48,731	130,290
4.00	600.00	57,000	54,207	184,497

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

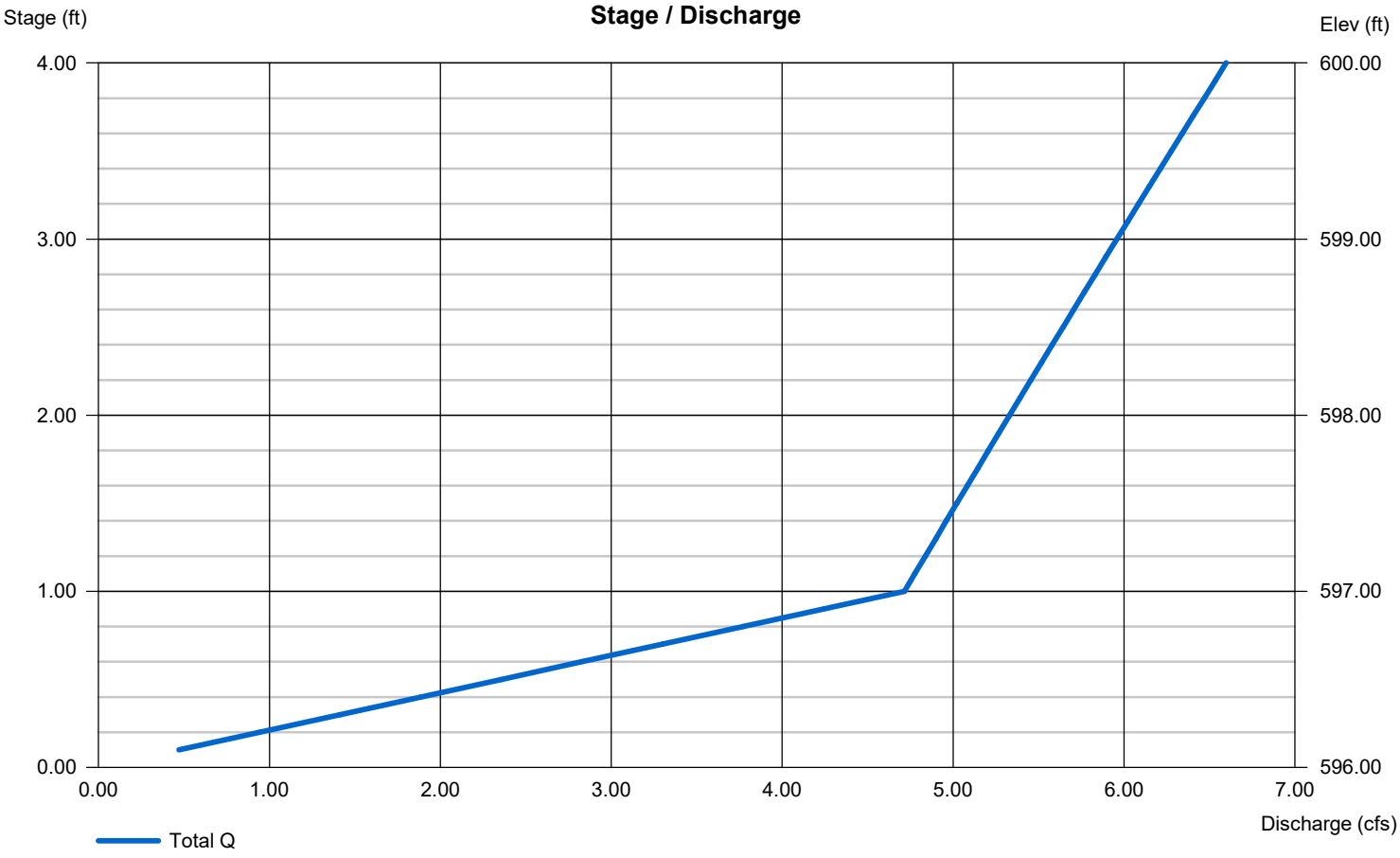
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

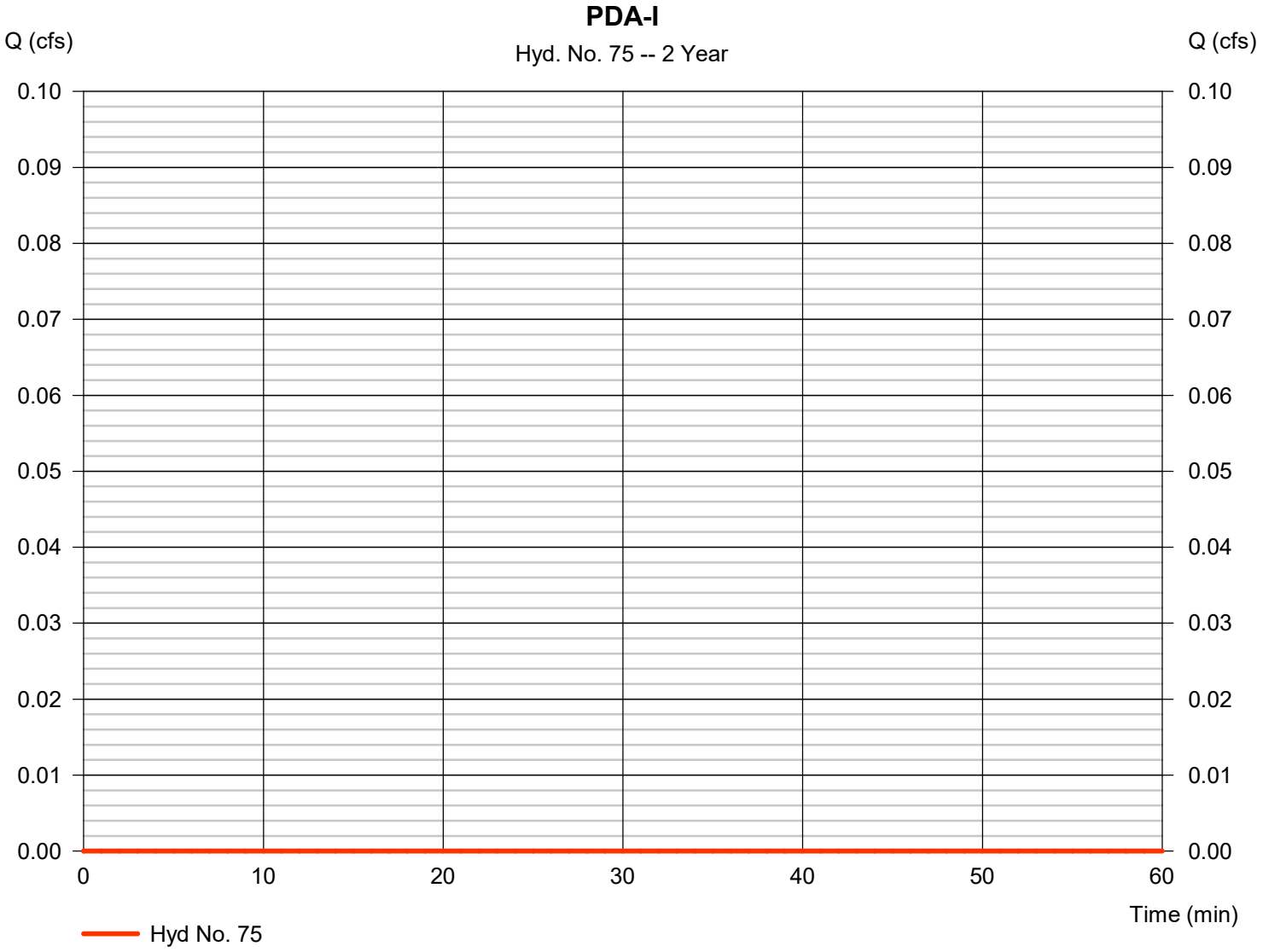


Hydrograph Report

Hyd. No. 75

PDA-I

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Drainage area	=	0.260 ac	Curve number	=	34
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.24 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NJA_C_1 min.cds	Shape factor	=	484

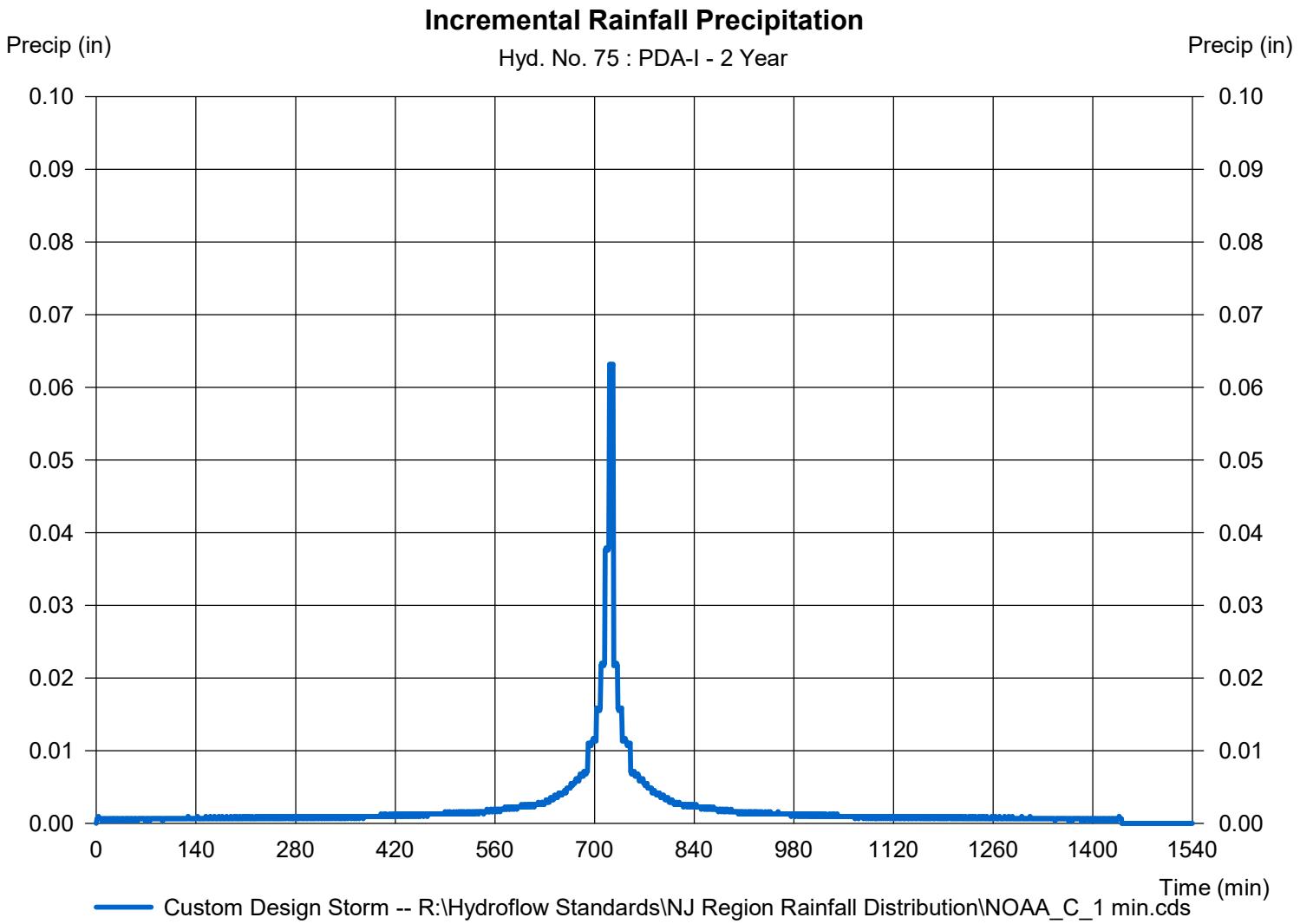


Precipitation Report

Hyd. No. 75

PDA-I

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



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	7.491	1	736	38,775	------	------	------	EDA - A: PERVIOUS
2	SCS Runoff	5.067	1	734	23,815	------	------	------	EDA-A:IMPERVIOUS
3	Combine	12.50	1	736	62,590	1, 2	------	------	EDA-A
5	SCS Runoff	2.561	1	759	25,580	------	------	------	EDA-B: PERVIOUS
6	SCS Runoff	6.797	1	741	38,496	------	------	------	EDA-B: IMPERVIOUS
7	Combine	8.550	1	743	64,076	5, 6	------	------	EDA-B
9	SCS Runoff	4.412	1	732	15,949	------	------	------	EDA-C: PERVIOUS
10	SCS Runoff	6.007	1	727	19,513	------	------	------	EDA-C:IMPERVIOUS
11	Combine	9.692	1	728	35,462	9, 10	------	------	EDA-C
13	SCS Runoff	10.55	1	729	32,740	------	------	------	EDA-D
15	SCS Runoff	12.58	1	730	41,568	------	------	------	EDA-E
17	SCS Runoff	2.911	1	729	9,052	------	------	------	EDA-F
19	SCS Runoff	7.883	1	732	28,071	------	------	------	EDA-G
21	SCS Runoff	0.097	1	896	3,392	------	------	------	EDA-H
23	SCS Runoff	0.000	1	1444	1	------	------	------	EDA-I
25	SCS Runoff	0.000	1	n/a	0	------	------	------	PDA-A-PERVIOUS
26	SCS Runoff	16.05	1	727	52,147	------	------	------	PDA-A-IMPERVIOUS
27	Combine	16.05	1	727	52,147	25, 26	------	------	PDA-A
29	Reservoir	0.000	1	689	0	27	593.92	23,853	SWM-A
31	SCS Runoff	21.35	1	727	58,838	------	------	------	PDA-B1-PERVIOUS
32	SCS Runoff	71.41	1	727	231,969	------	------	------	PDA-B1-IMPERVIOUS
33	Combine	92.76	1	727	290,807	31, 32	------	------	PDA-B1
35	SCS Runoff	1.878	1	727	5,251	------	------	------	PDA-B2-PERVIOUS
36	SCS Runoff	18.64	1	727	60,558	------	------	------	PDA-B2-IMPERVIOUS
37	Combine	20.52	1	727	65,808	35, 36	------	------	PDA-B2
39	Reservoir(i)	0.000	1	715	0	33, 37	599.93	162,662	INT. POND B1-B2
41	SCS Runoff	1.405	1	727	3,876	------	------	------	PDA-B3

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
43	Combine	1.405	1	727	3,876	39, 41,	------	------	PDA-B
45	SCS Runoff	2.075	1	727	5,761	------	------	------	PDA-C-PERVIOUS
46	SCS Runoff	1.968	1	727	6,392	------	------	------	PDA-C-IMPERVIOUS
47	Combine	4.043	1	727	12,153	45, 46	------	------	PDA-C
49	SCS Runoff	3.023	1	727	8,448	------	------	------	PDA-D-PERVIOUS
50	SCS Runoff	61.57	1	727	200,008	------	------	------	PDA-D-IMPERVIOUS
51	Combine	64.59	1	727	208,457	49, 50	------	------	PDA-D
53	Reservoir	0.000	1	615	0	51	601.84	108,547	SWM-D
55	SCS Runoff	1.529	1	727	4,334	------	------	------	PDA-E
57	SCS Runoff	2.864	1	727	7,904	------	------	------	PDA-F
59	SCS Runoff	2.951	1	727	8,171	------	------	------	PDA-G1-PERVIOUS
60	SCS Runoff	27.19	1	727	88,313	------	------	------	PDA-G1-IMPERVIOUS
61	Combine	30.14	1	727	96,484	59, 60	------	------	PDA-G1
63	Reservoir	0.000	1	650	0	61	599.14	47,342	SWM-G1
65	SCS Runoff	1.011	1	727	2,790	------	------	------	PDA-G2
67	Combine	1.011	1	727	2,790	63, 65,	------	------	PDA-G
69	SCS Runoff	7.759	1	727	21,698	------	------	------	PDA-H-PERVIOUS
70	SCS Runoff	52.30	1	727	169,898	------	------	------	PDA-H-IMPERVIOUS
71	Combine	60.06	1	727	191,596	69, 70	------	------	PDA-H
73	Reservoir	0.000	1	1098	0	71	598.16	89,289	SWM-H
75	SCS Runoff	0.001	1	1440	35	------	------	------	PDA-I

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

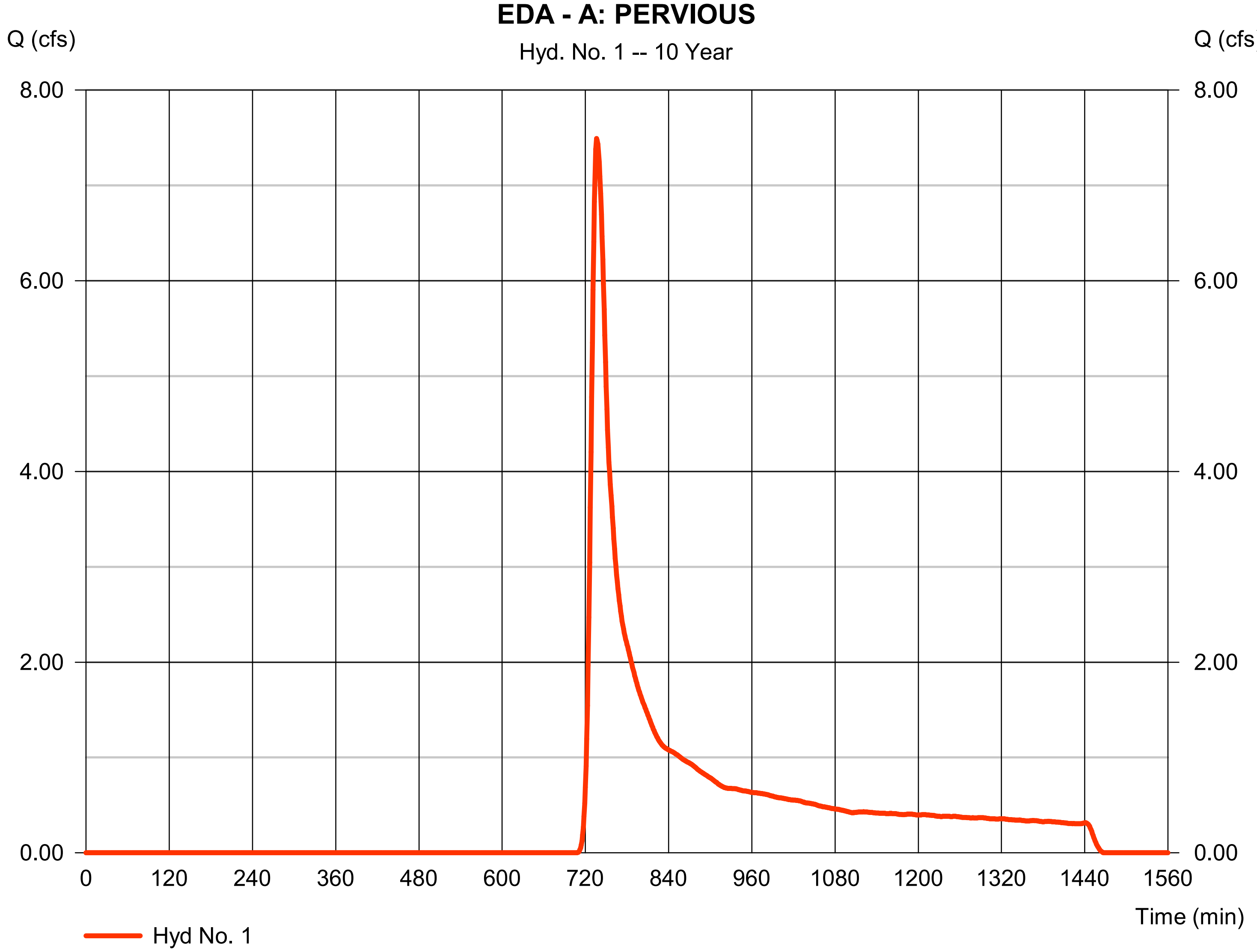
Hyd. No. 1

EDA - A: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 7.491 cfs
Storm frequency	= 10 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 38,775 cuft
Drainage area	= 13.620 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.70 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

EDA - A: PERVIOUS

Hyd. No. 1 -- 10 Year

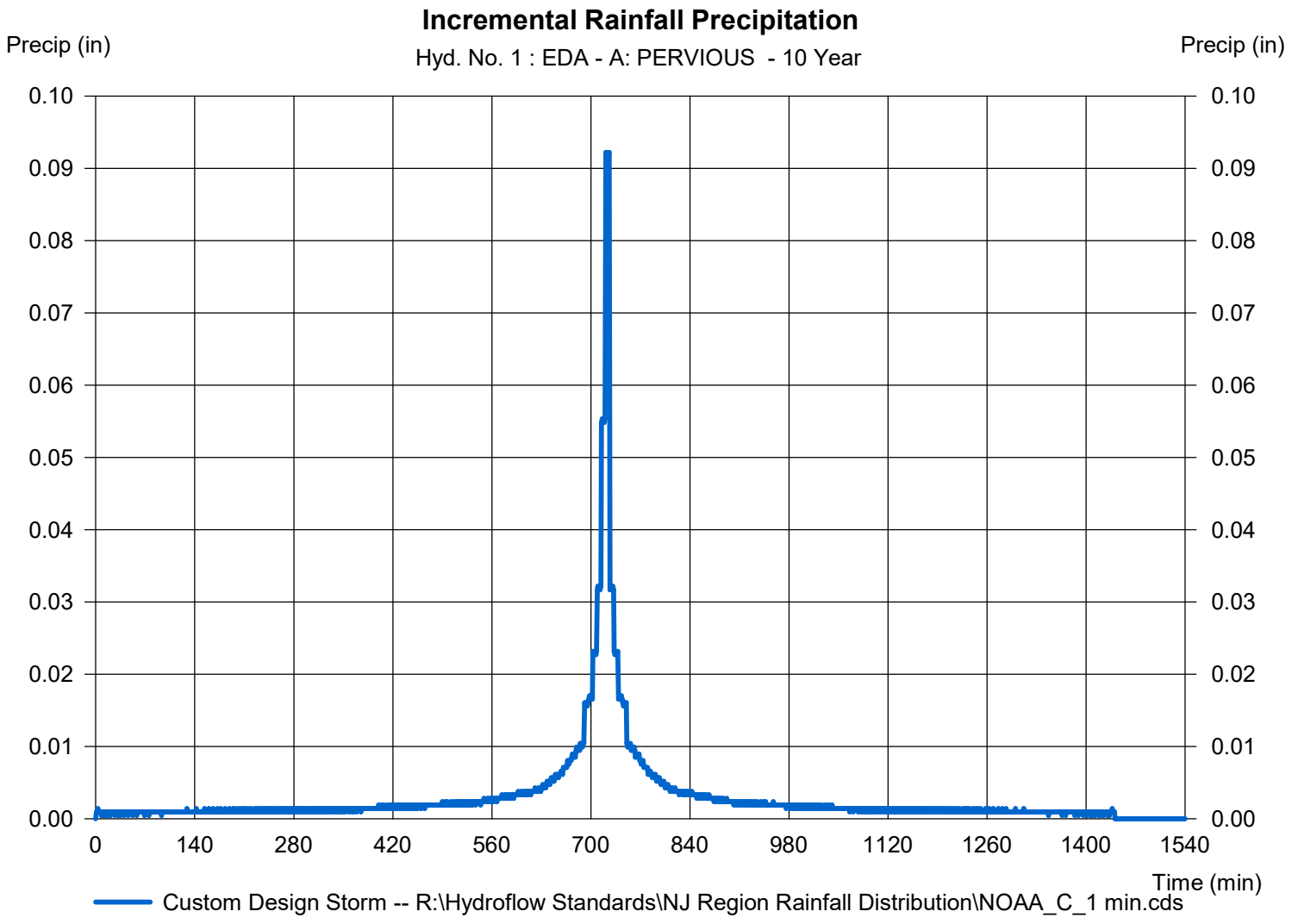


Precipitation Report

Hyd. No. 1

EDA - A: PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



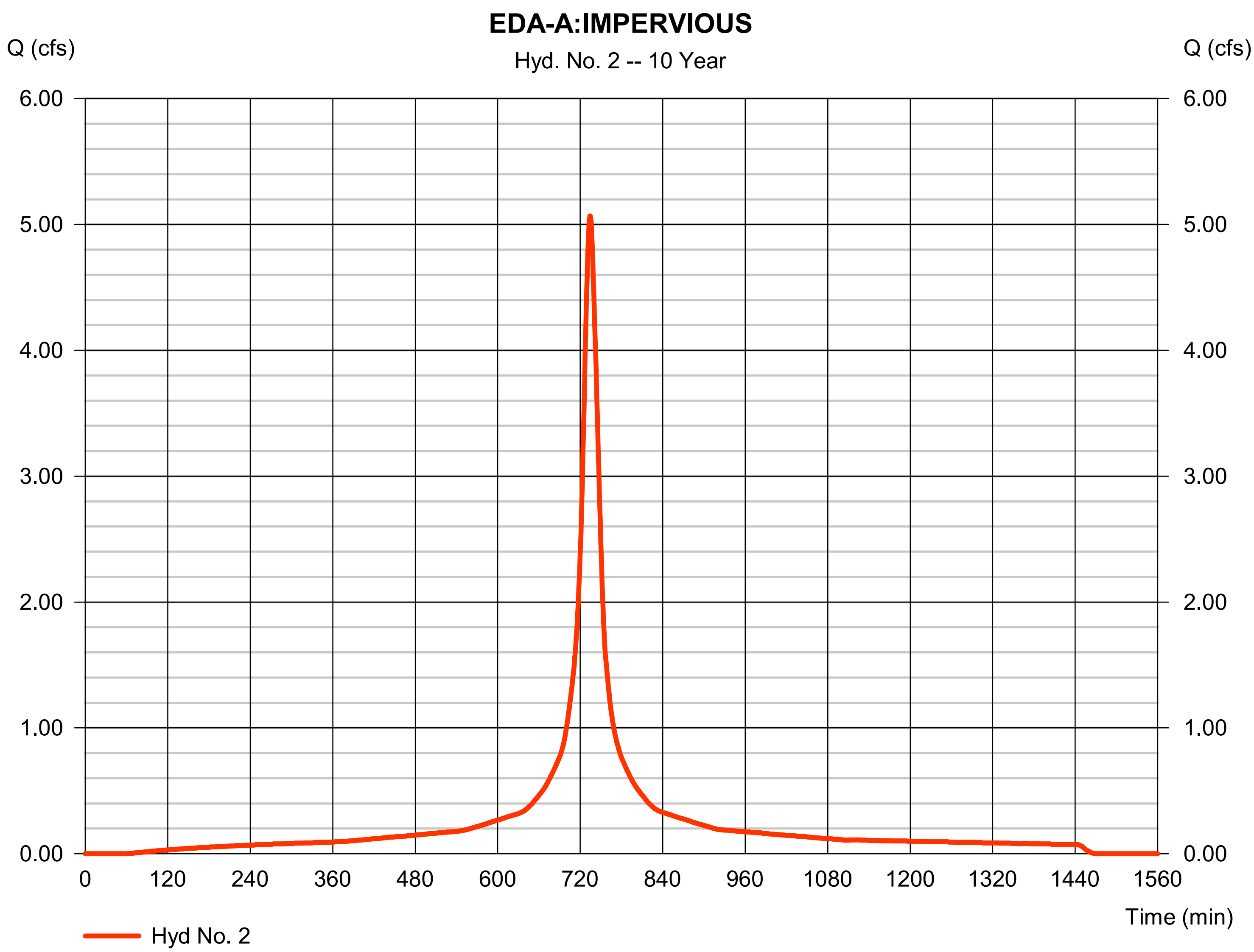
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 2

EDA-A:IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 5.067 cfs
Storm frequency	= 10 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 23,815 cuft
Drainage area	= 1.460 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.60 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

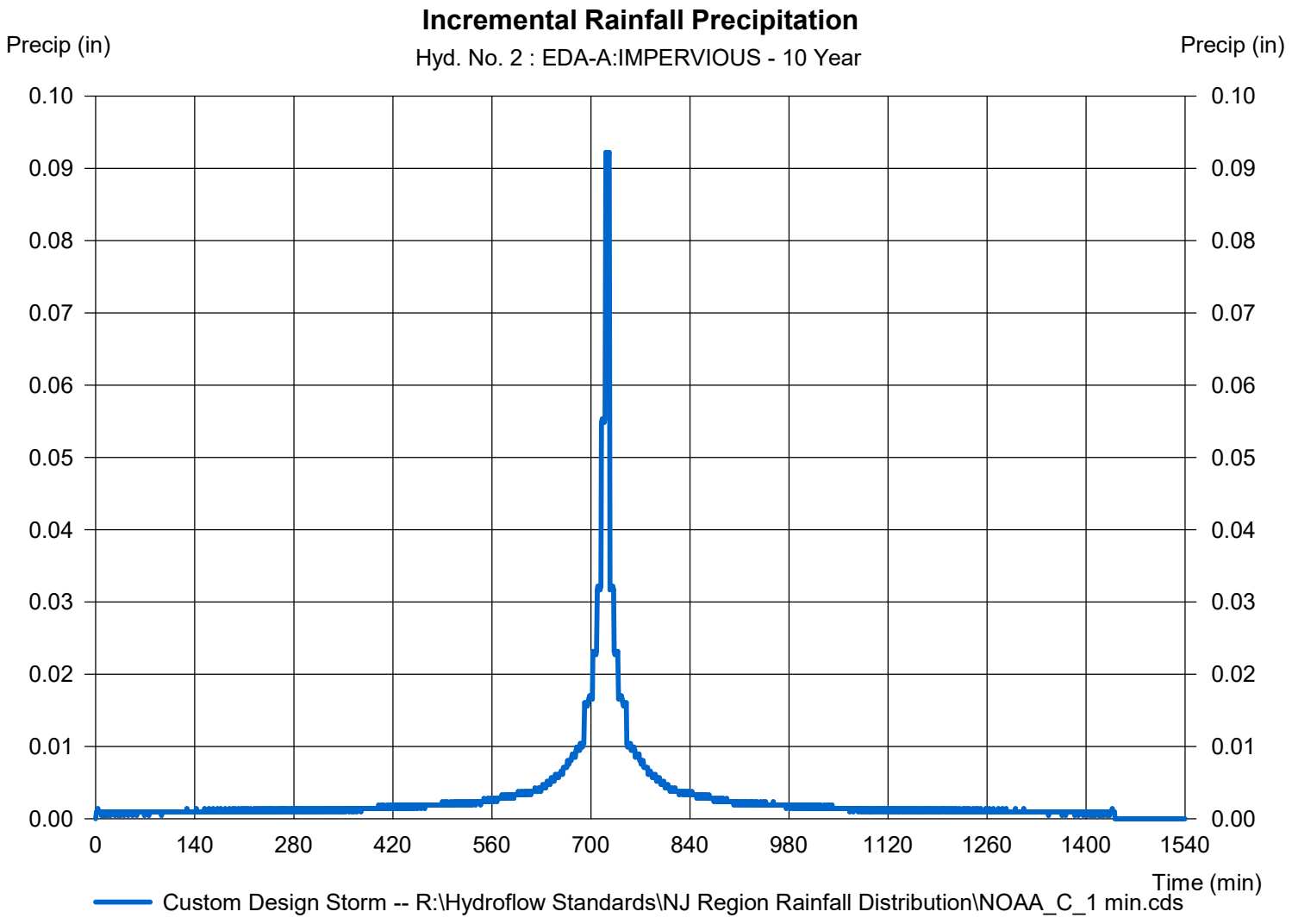


Precipitation Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

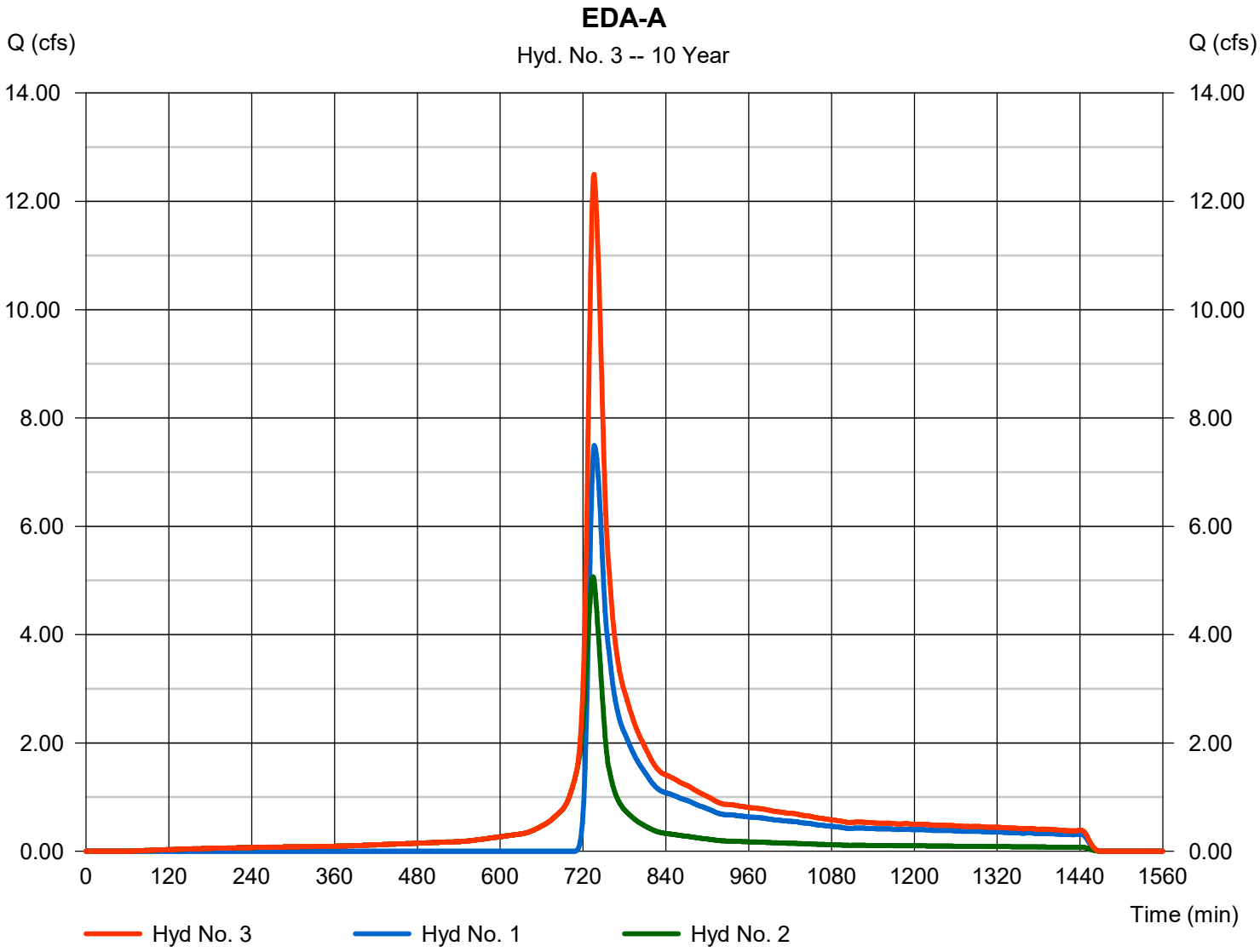


Hydrograph Report

Hyd. No. 3

EDA-A

Hydrograph type	= Combine	Peak discharge	= 12.50 cfs
Storm frequency	= 10 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 62,590 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 15.080 ac



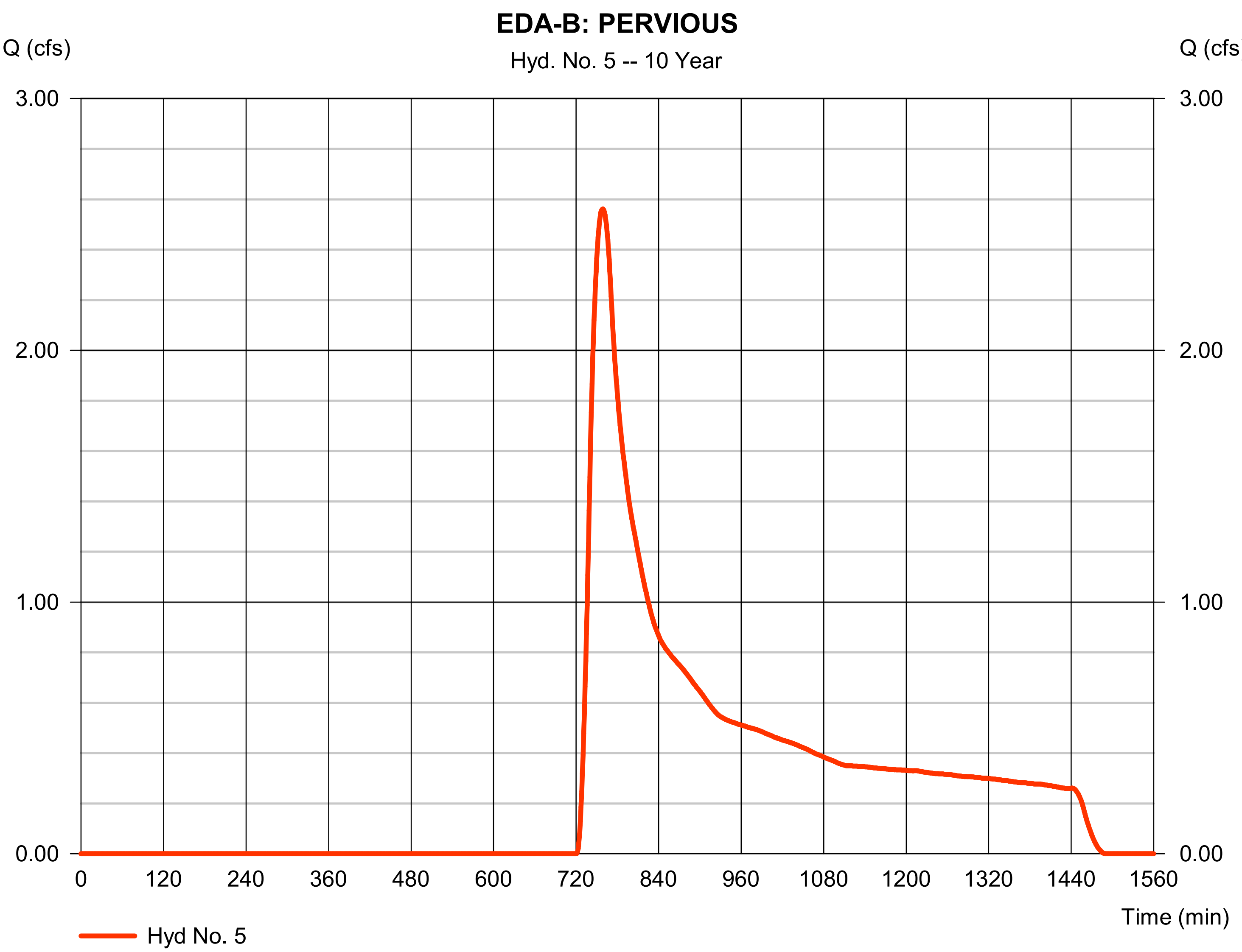
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 5

EDA-B: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 2.561 cfs
Storm frequency	= 10 yrs	Time to peak	= 759 min
Time interval	= 1 min	Hyd. volume	= 25,580 cuft
Drainage area	= 15.720 ac	Curve number	= 47
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.40 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

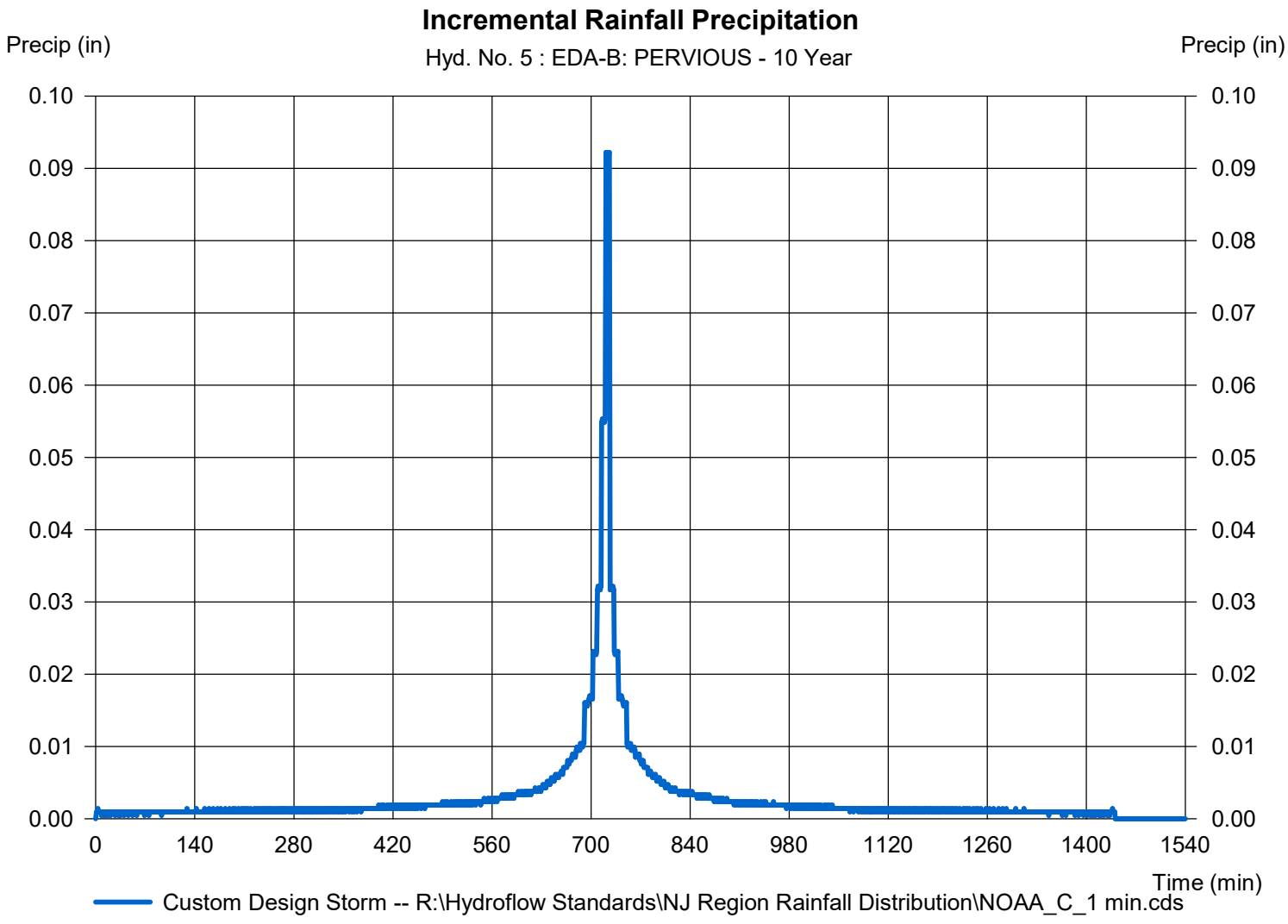


Precipitation Report

Hyd. No. 5

EDA-B: PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

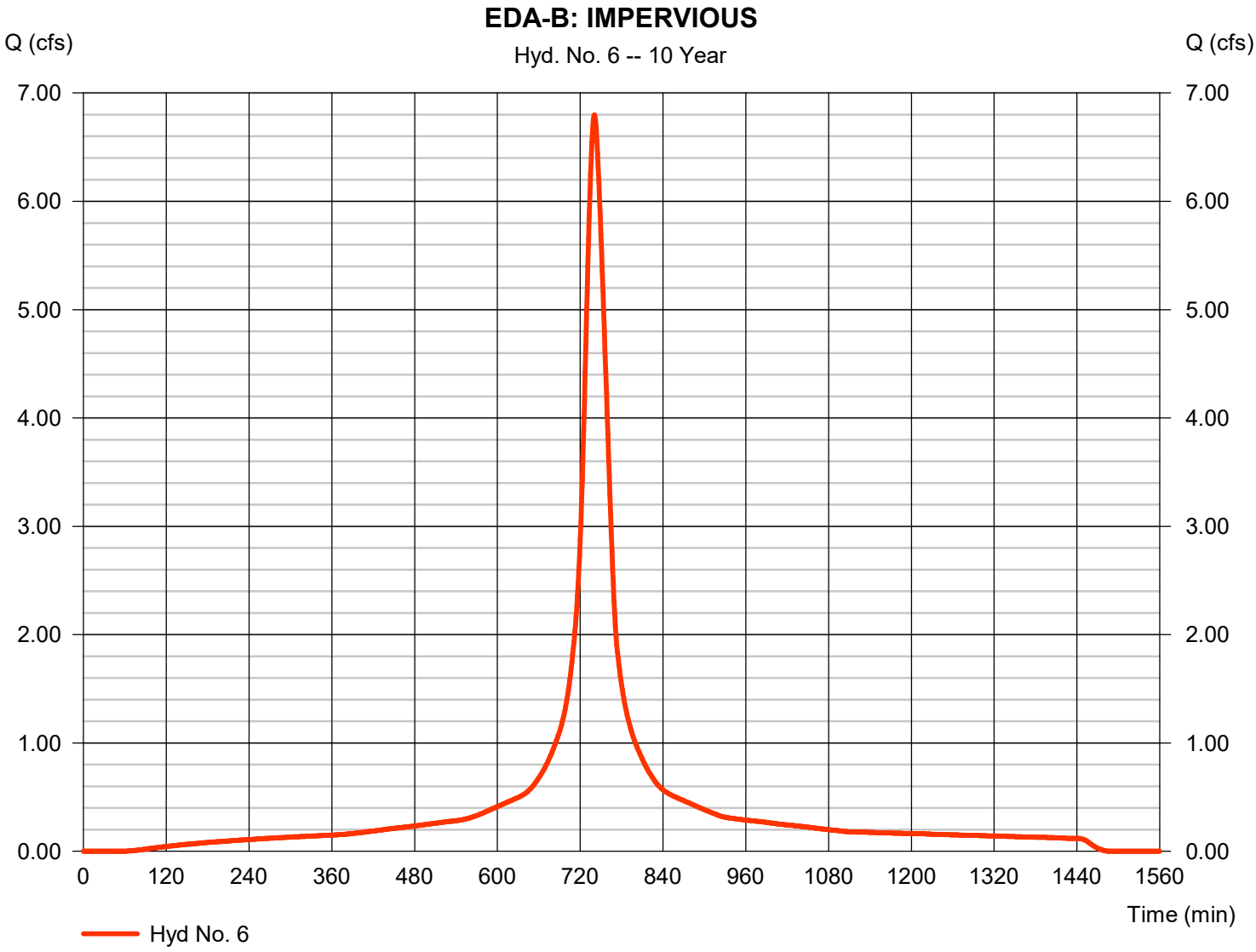


Hydrograph Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.797 cfs
Storm frequency	=	10 yrs	Time to peak	=	741 min
Time interval	=	1 min	Hyd. volume	=	38,496 cuft
Drainage area	=	2.360 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	29.70 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Shape factor	=	484

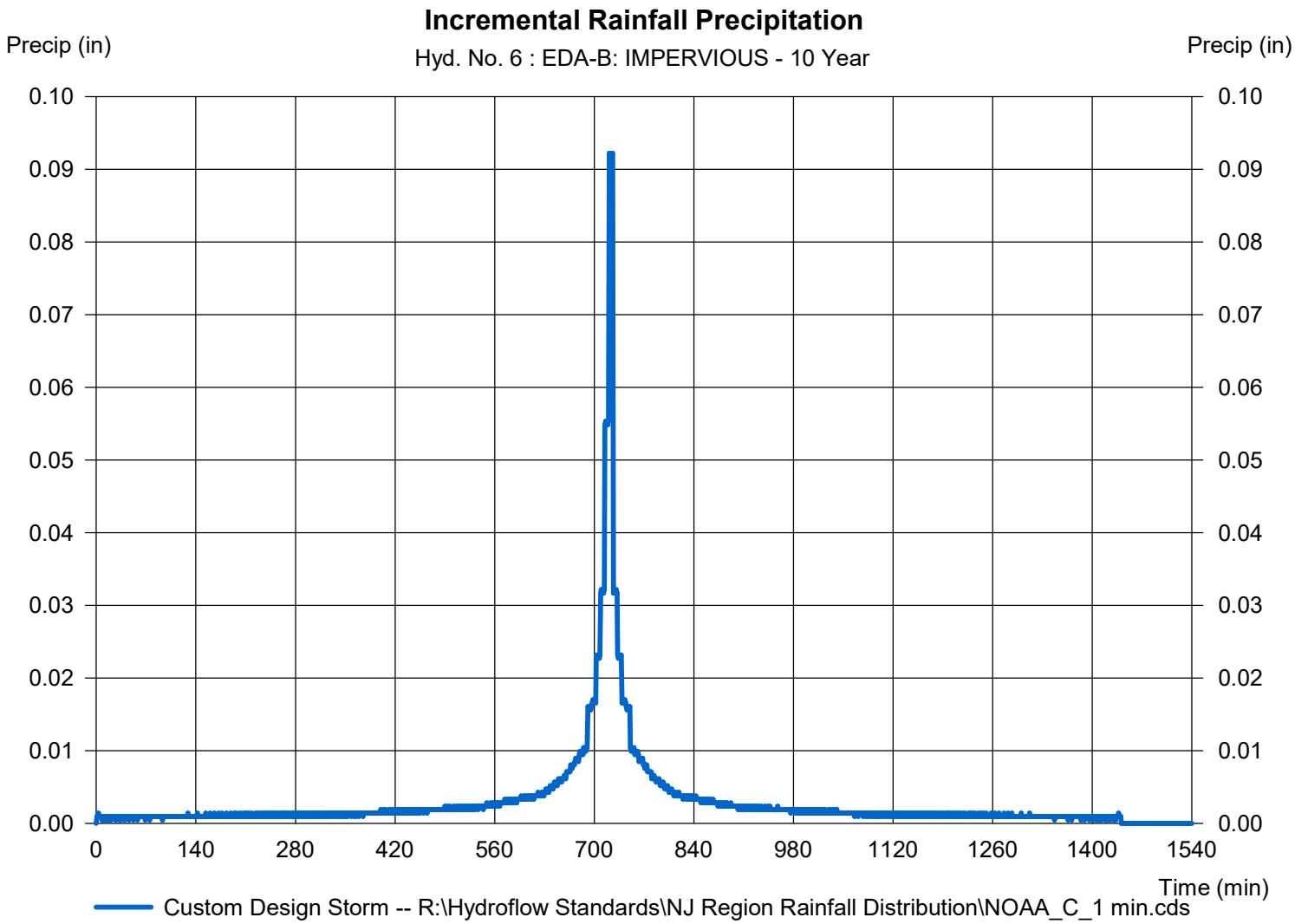


Precipitation Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

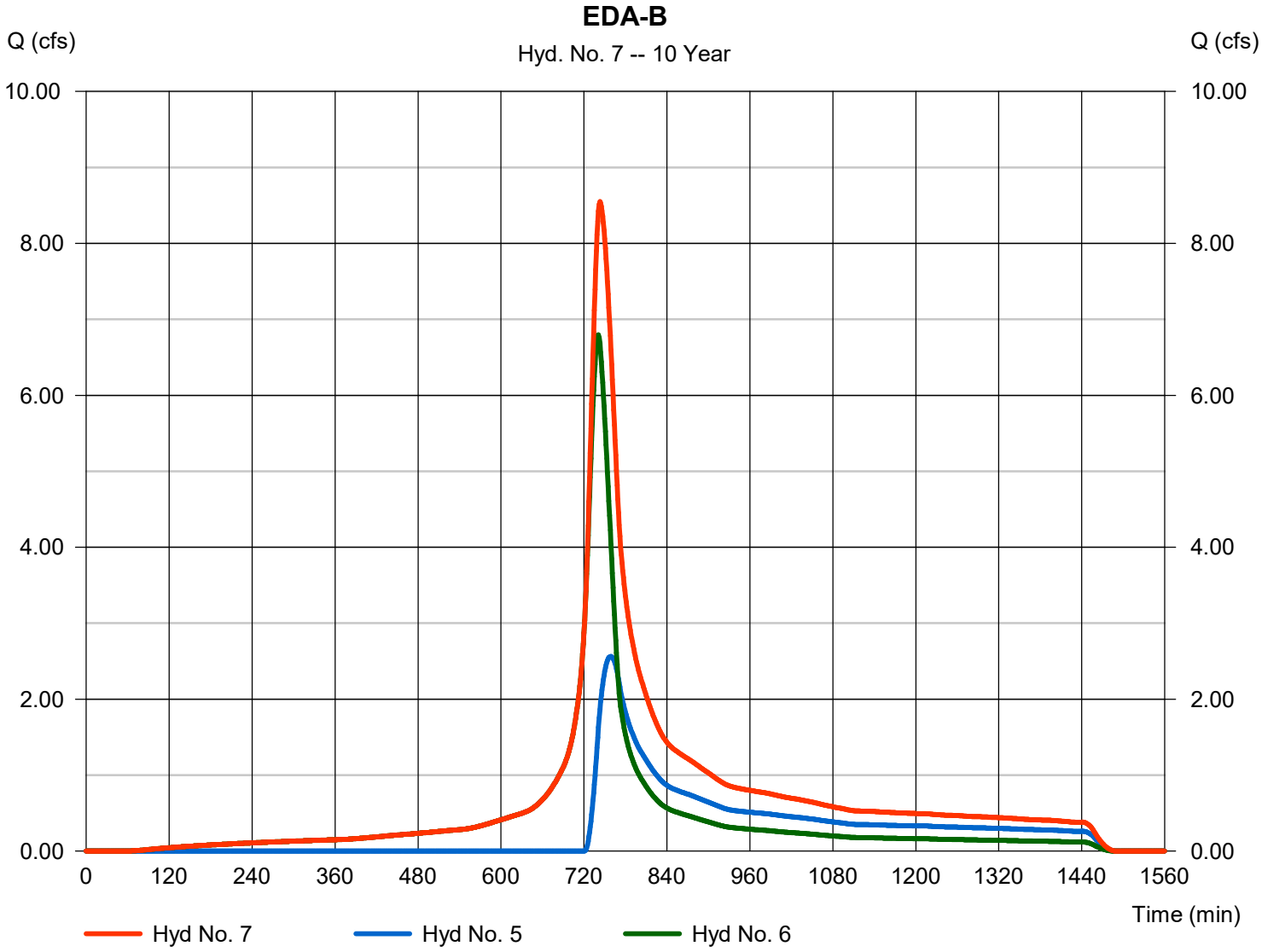


Hydrograph Report

Hyd. No. 7

EDA-B

Hydrograph type	= Combine	Peak discharge	= 8.550 cfs
Storm frequency	= 10 yrs	Time to peak	= 743 min
Time interval	= 1 min	Hyd. volume	= 64,076 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 18.080 ac

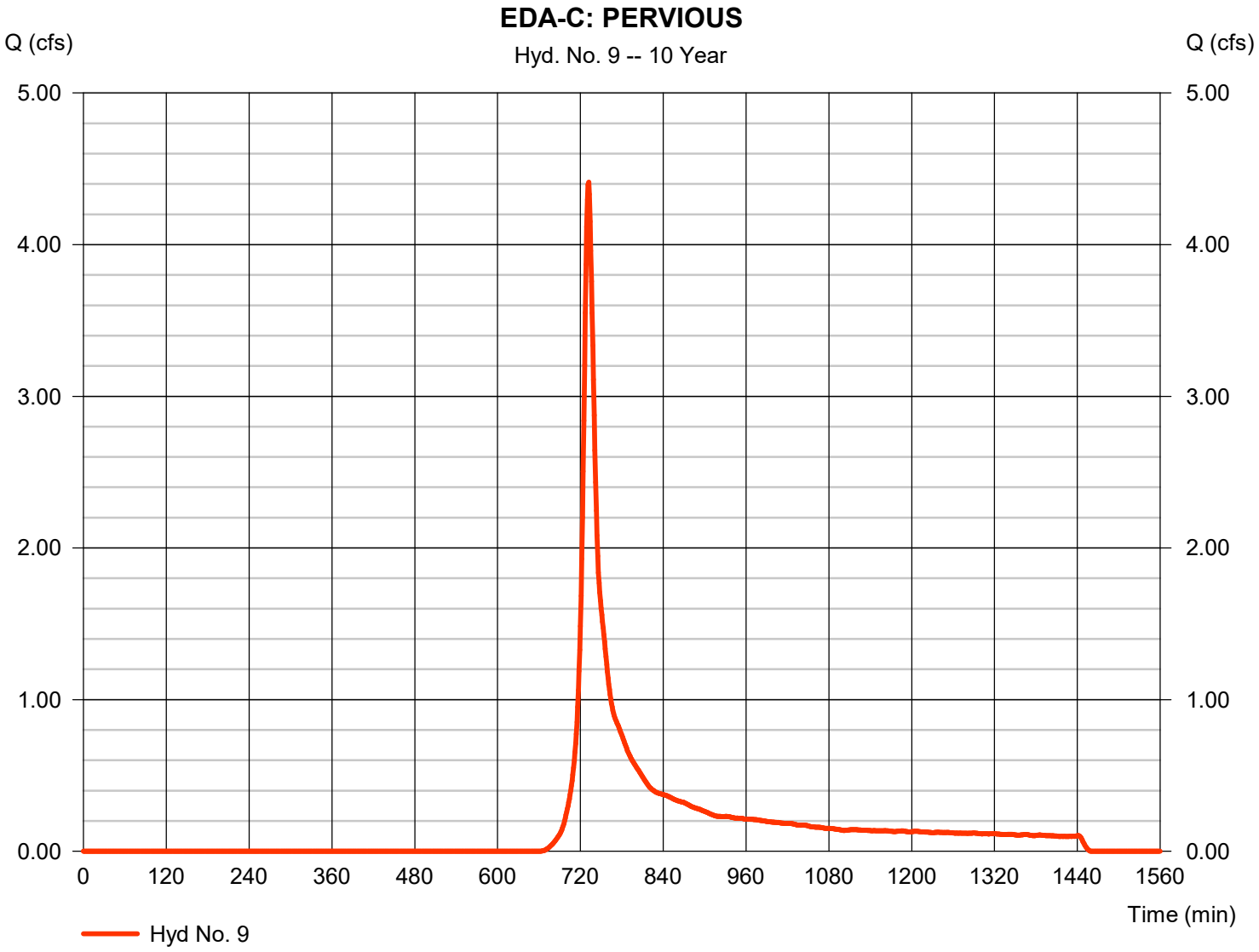


Hydrograph Report

Hyd. No. 9

EDA-C: PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.412 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	15,949 cuft
Drainage area	=	3.170 ac	Curve number	=	64
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

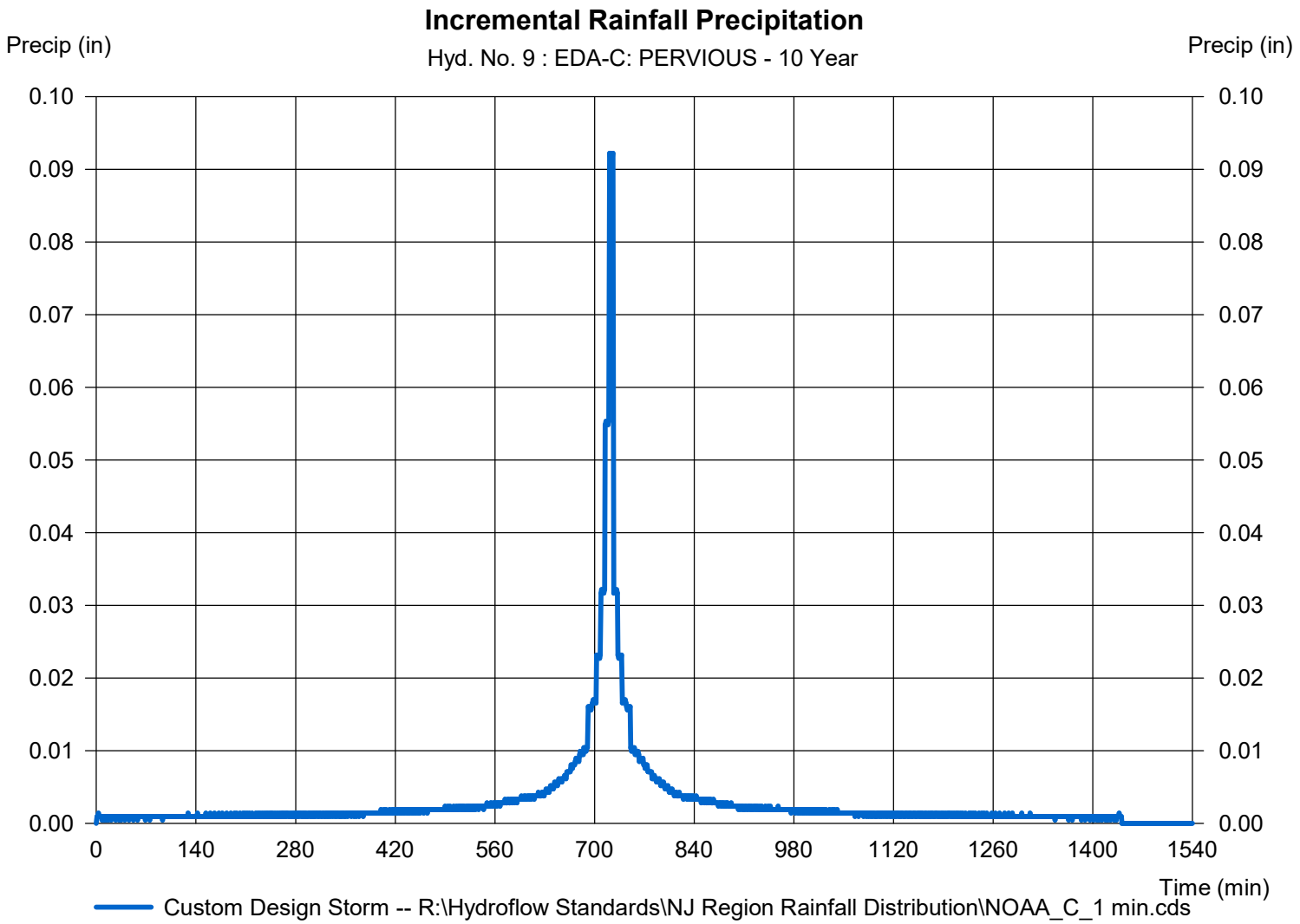


Precipitation Report

Hyd. No. 9

EDA-C: PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



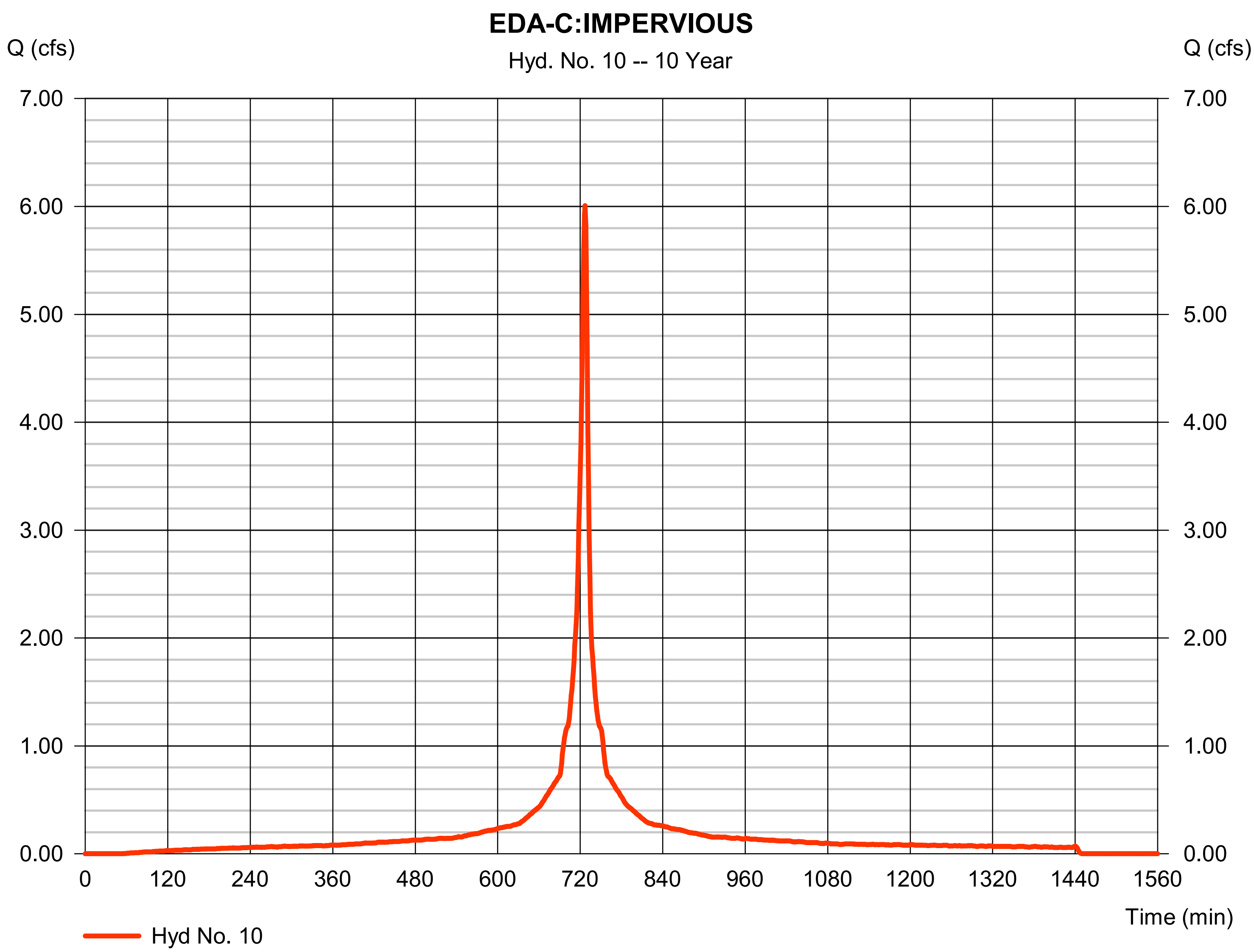
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 10

EDA-C:IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.007 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	19,513 cuft
Drainage area	=	1.160 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	=	484

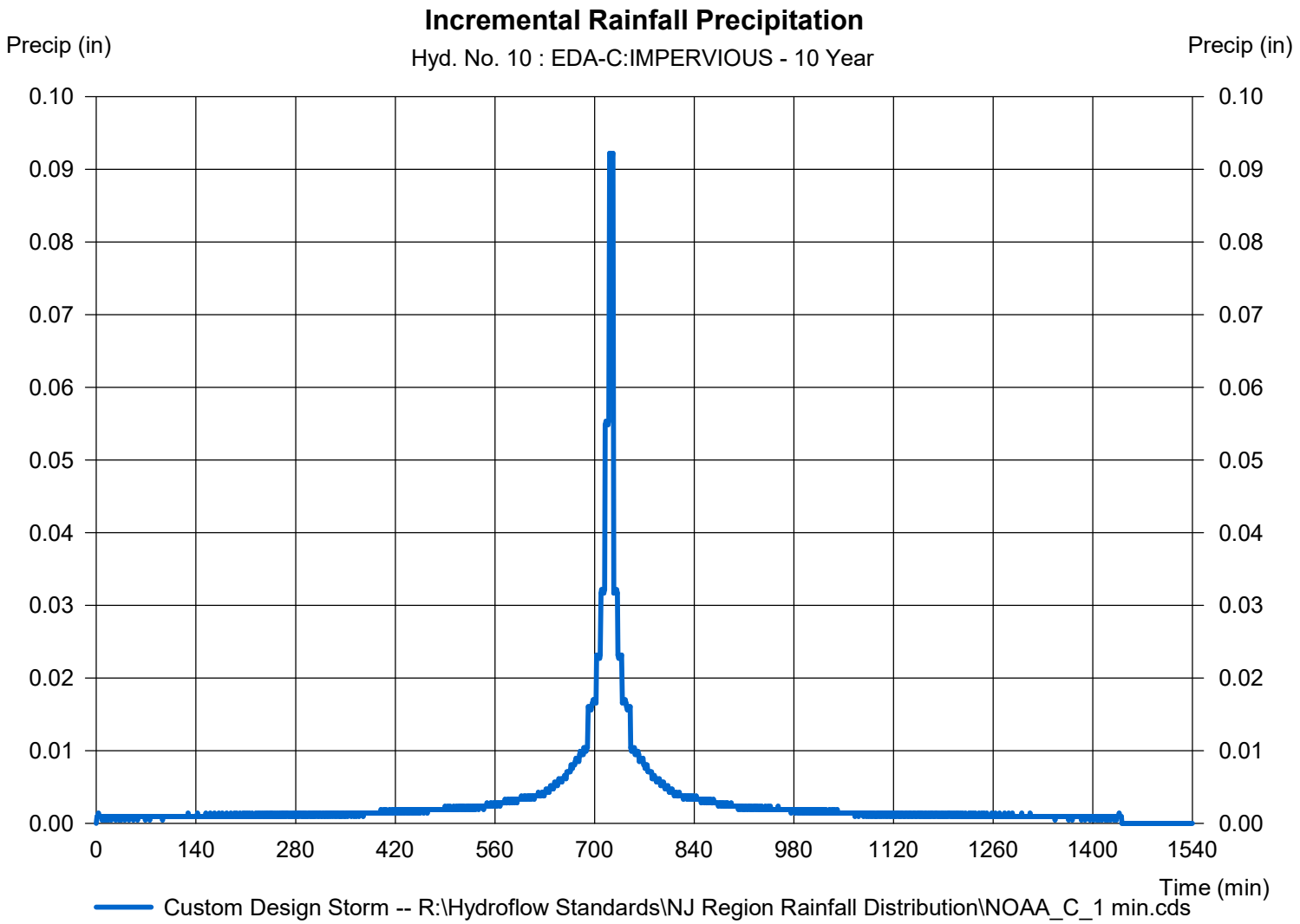


Precipitation Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

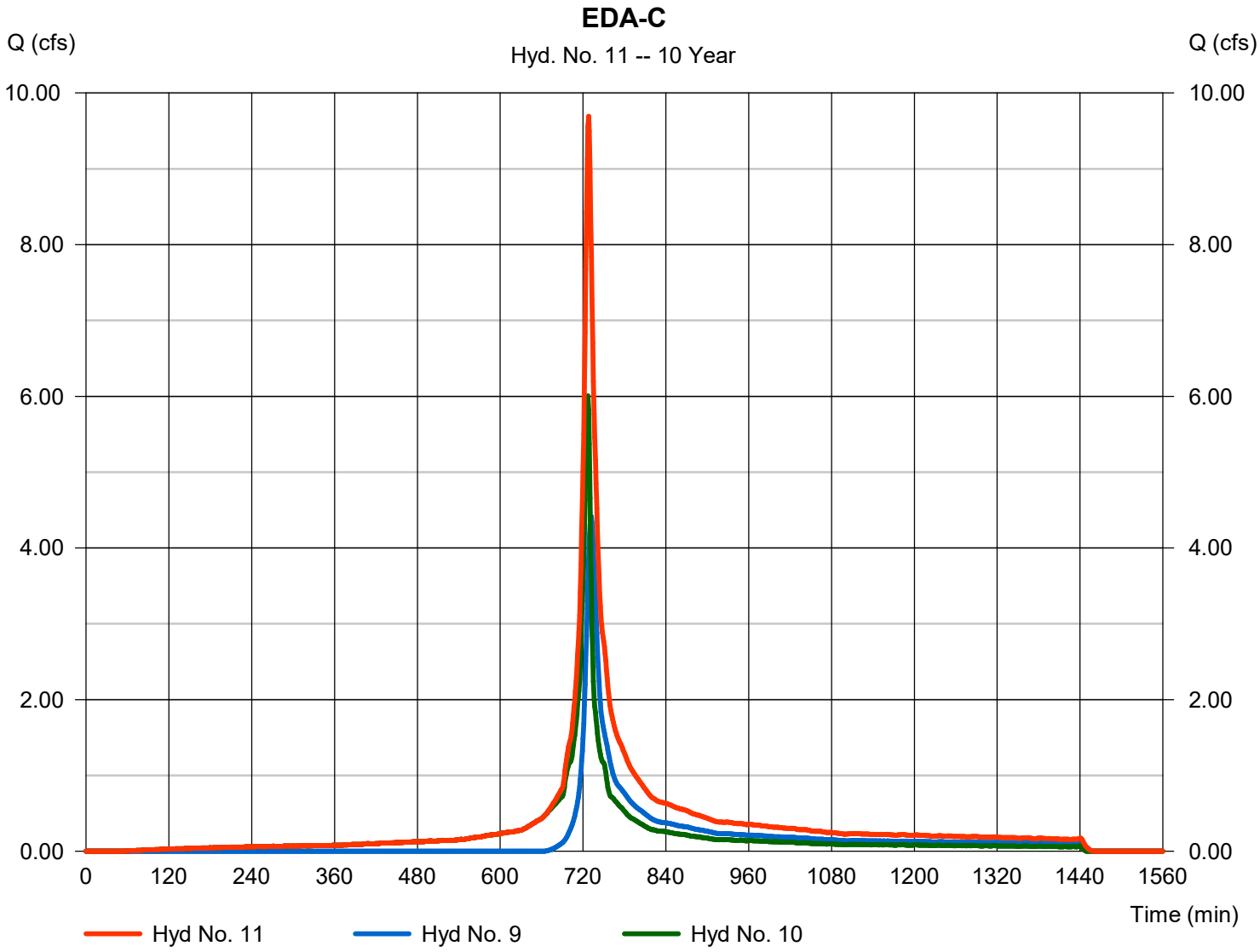


Hydrograph Report

Hyd. No. 11

EDA-C

Hydrograph type	=	Combine	Peak discharge	=	9.692 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	35,462 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	4.330 ac

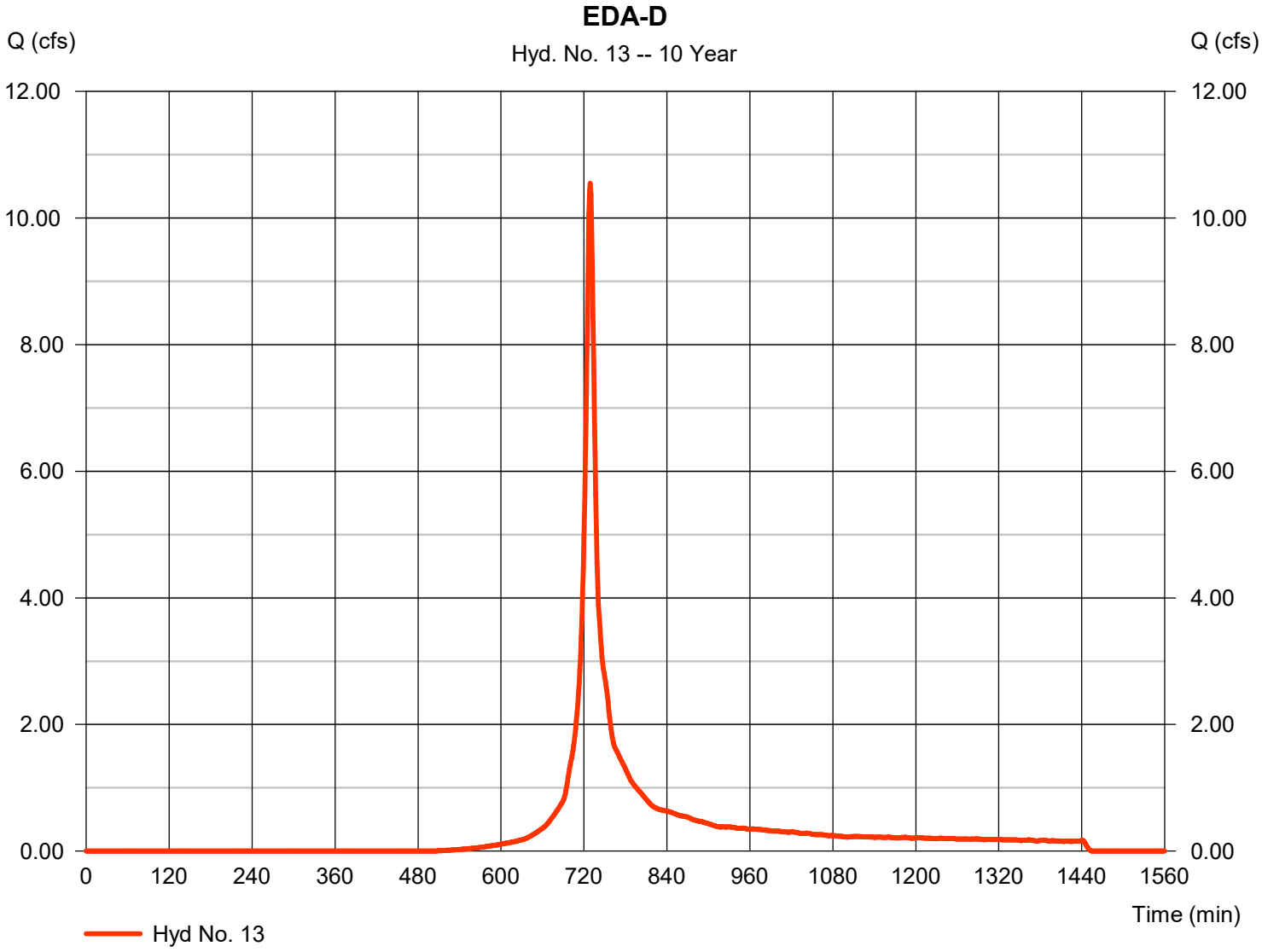


Hydrograph Report

Hyd. No. 13

EDA-D

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.55 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	32,740 cuft
Drainage area	=	3.760 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region Rainfall	Storm Distribution	=	NJA_C_1 min.cds

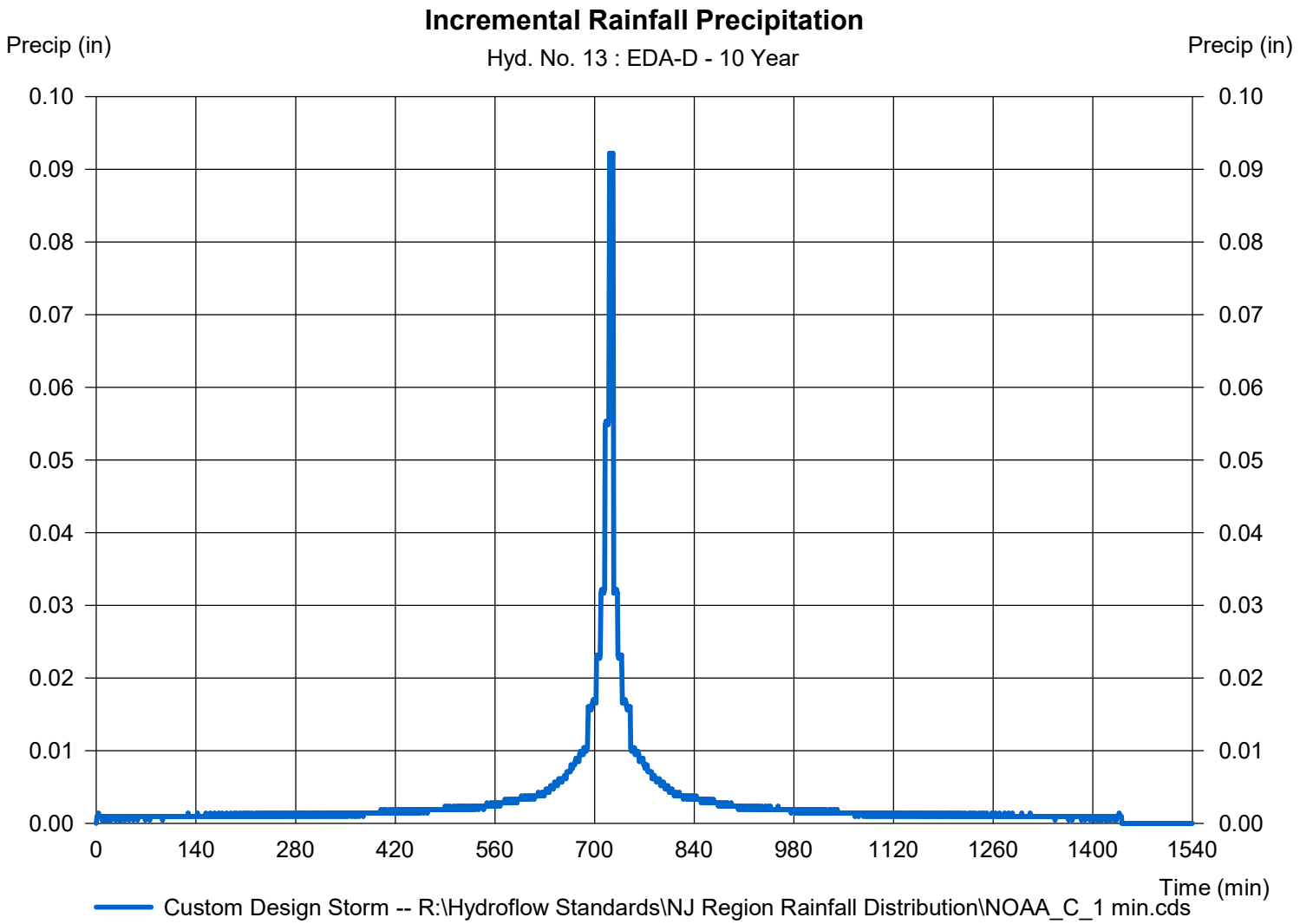


Precipitation Report

Hyd. No. 13

EDA-D

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

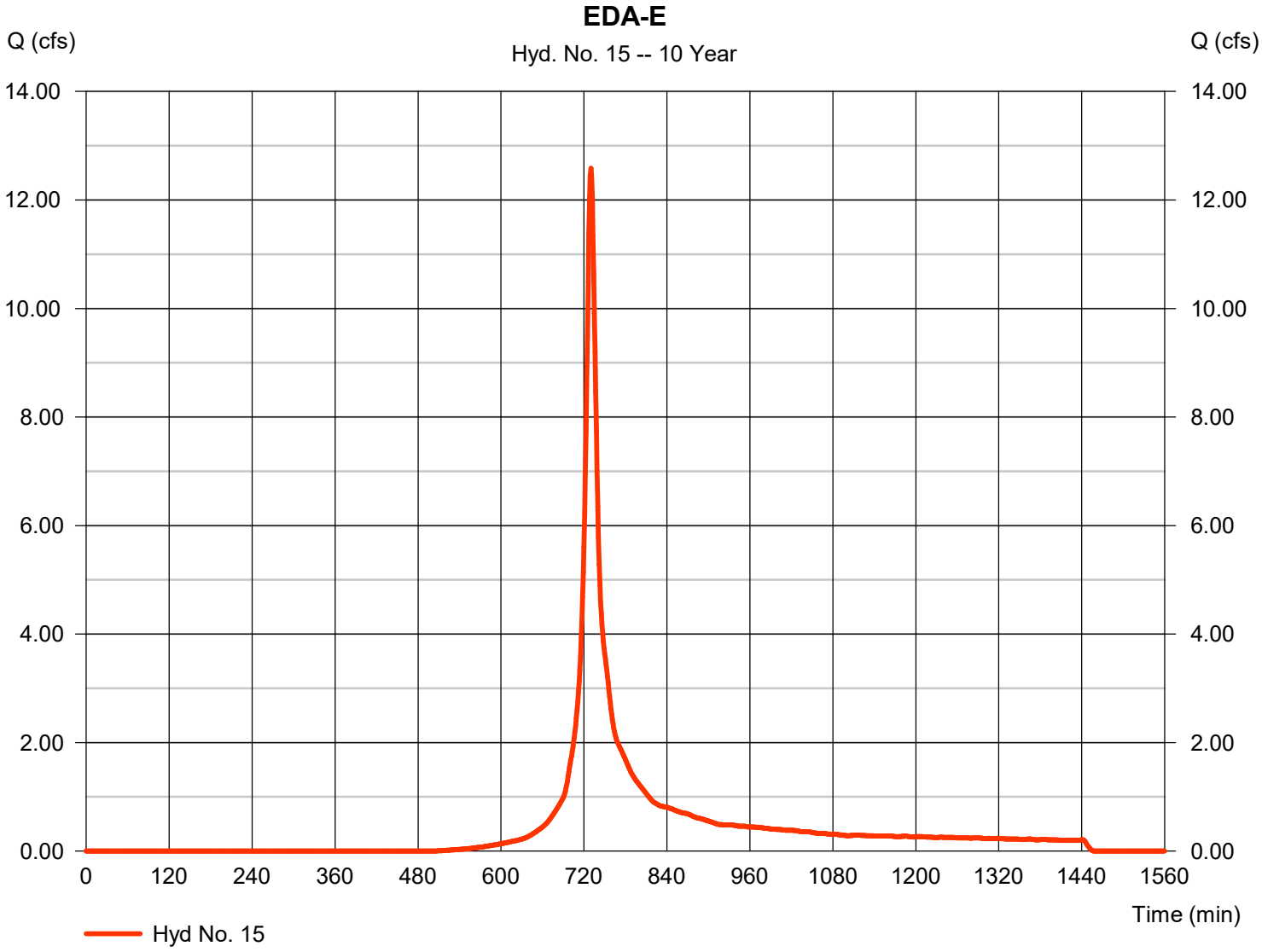


Hydrograph Report

Hyd. No. 15

EDA-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.58 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	41,568 cuft
Drainage area	=	4.690 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.40 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

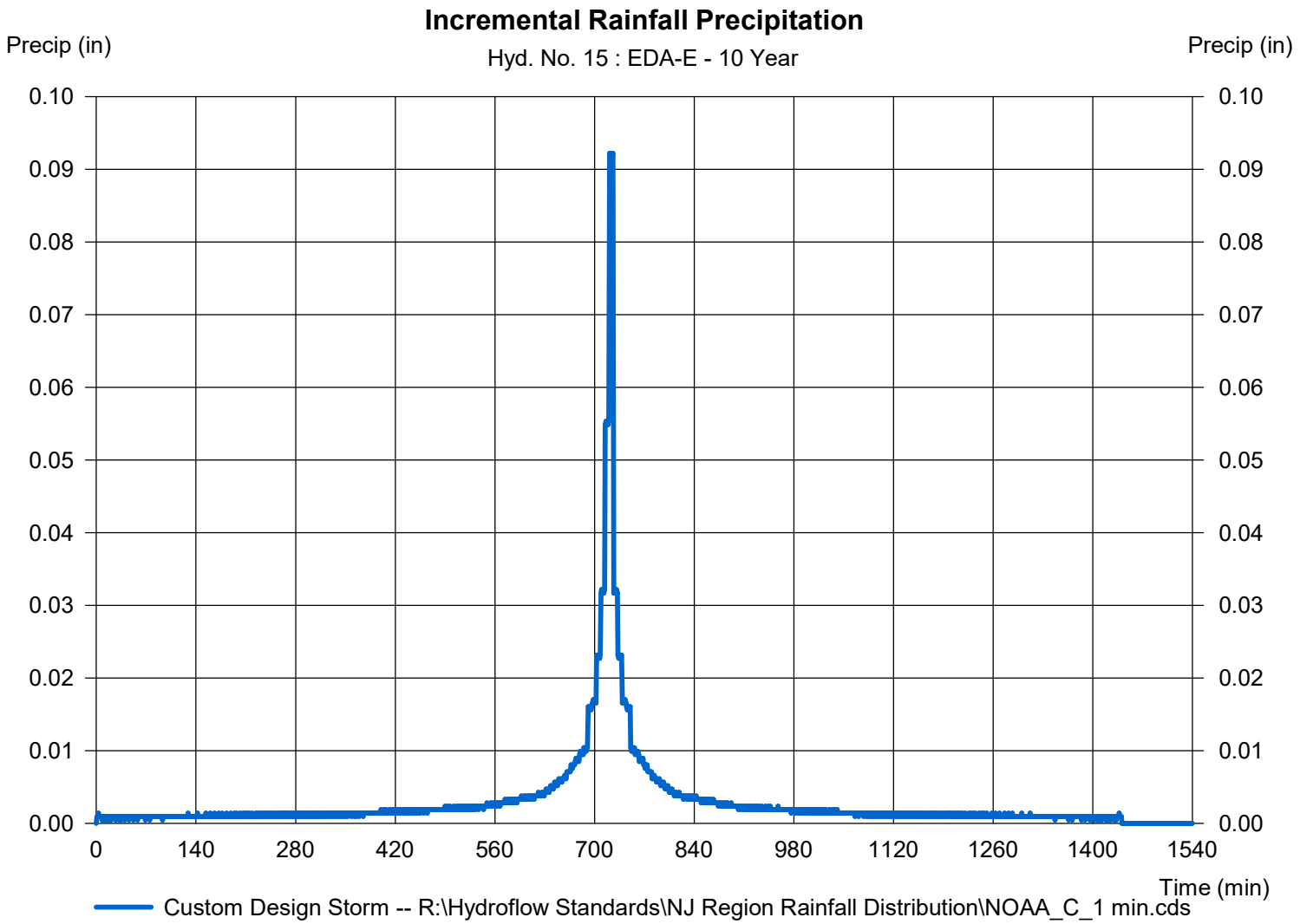


Precipitation Report

Hyd. No. 15

EDA-E

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

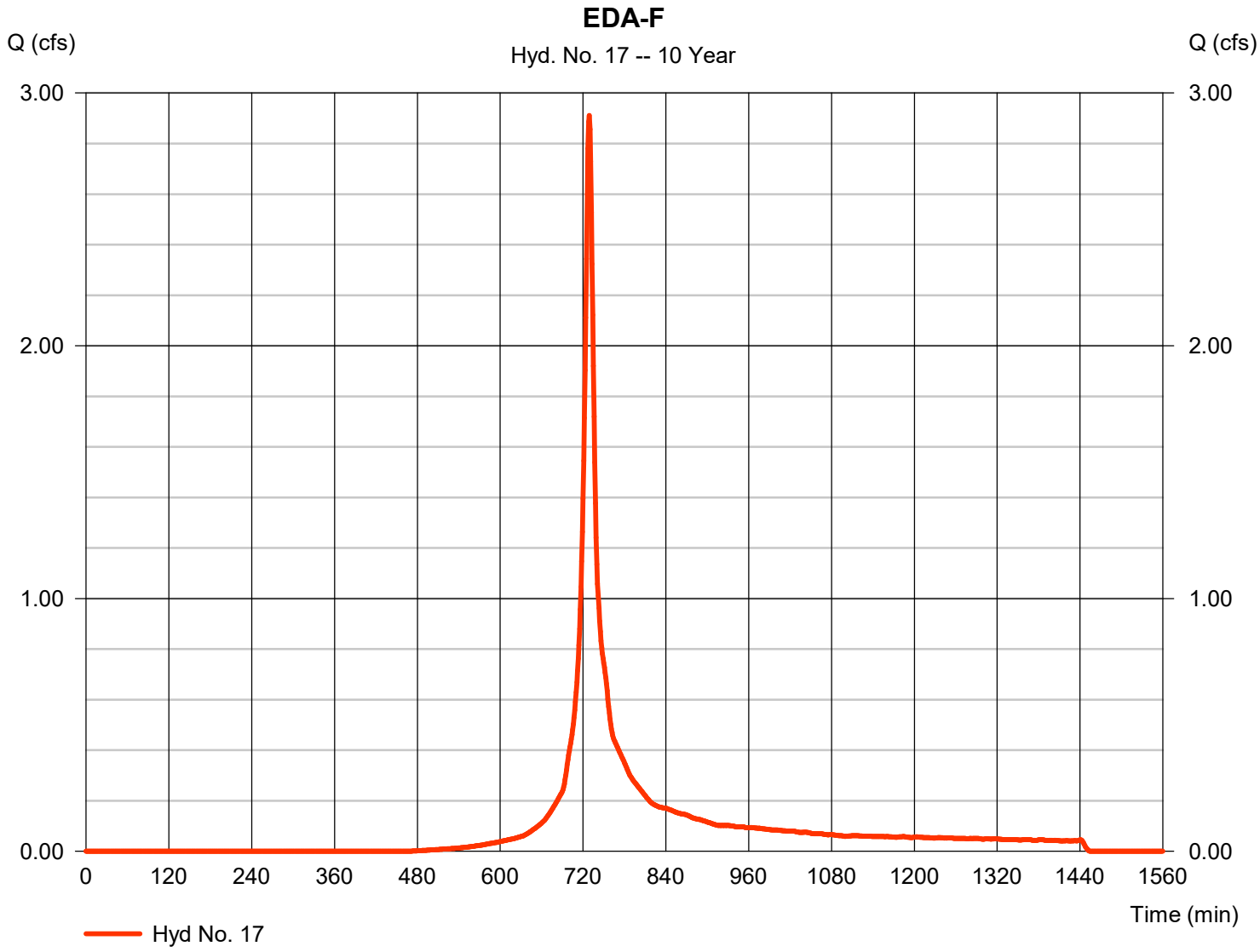


Hydrograph Report

Hyd. No. 17

EDA-F

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.911 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	9,052 cuft
Drainage area	=	0.970 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Storm frequency	=	484

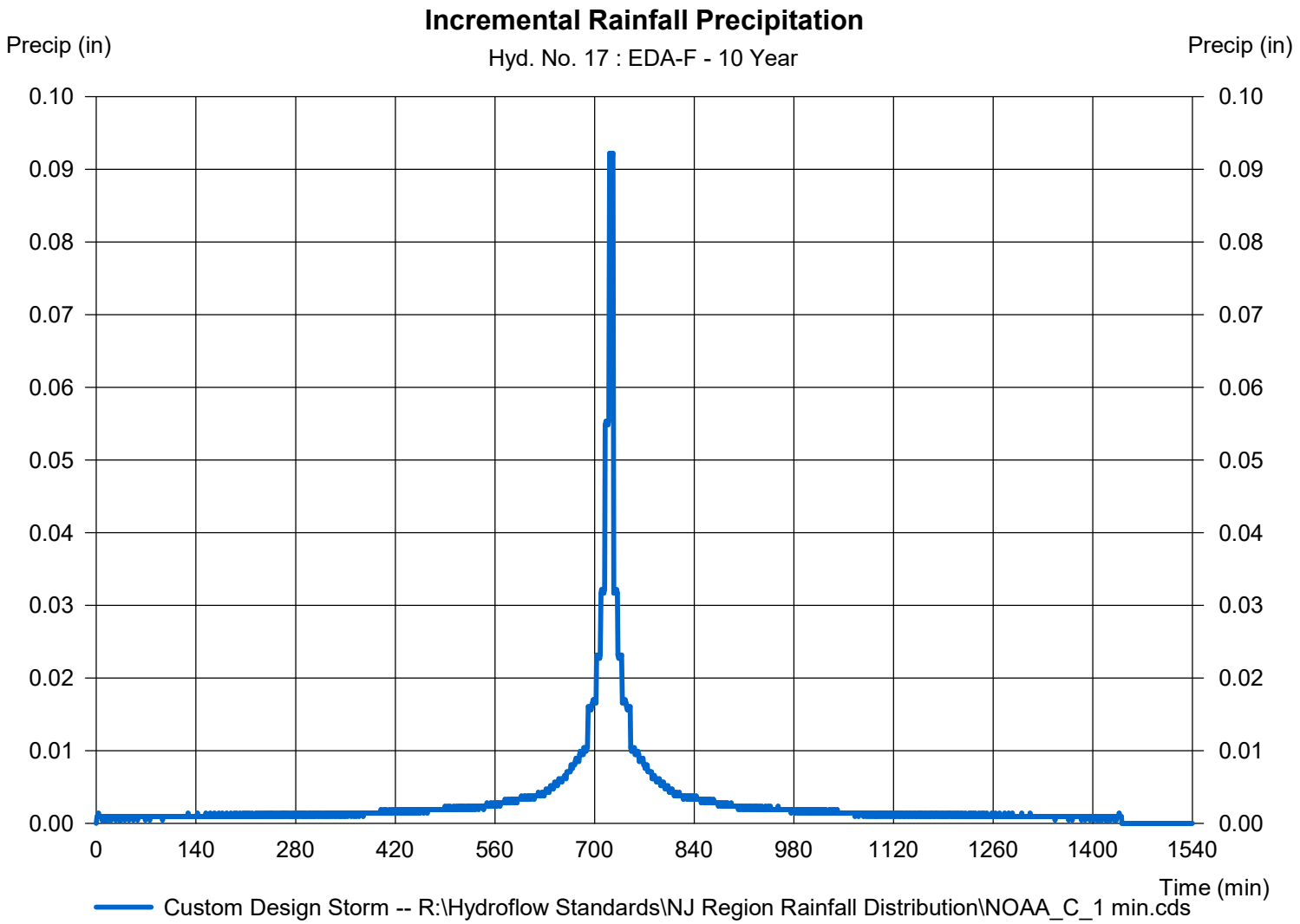


Precipitation Report

Hyd. No. 17

EDA-F

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

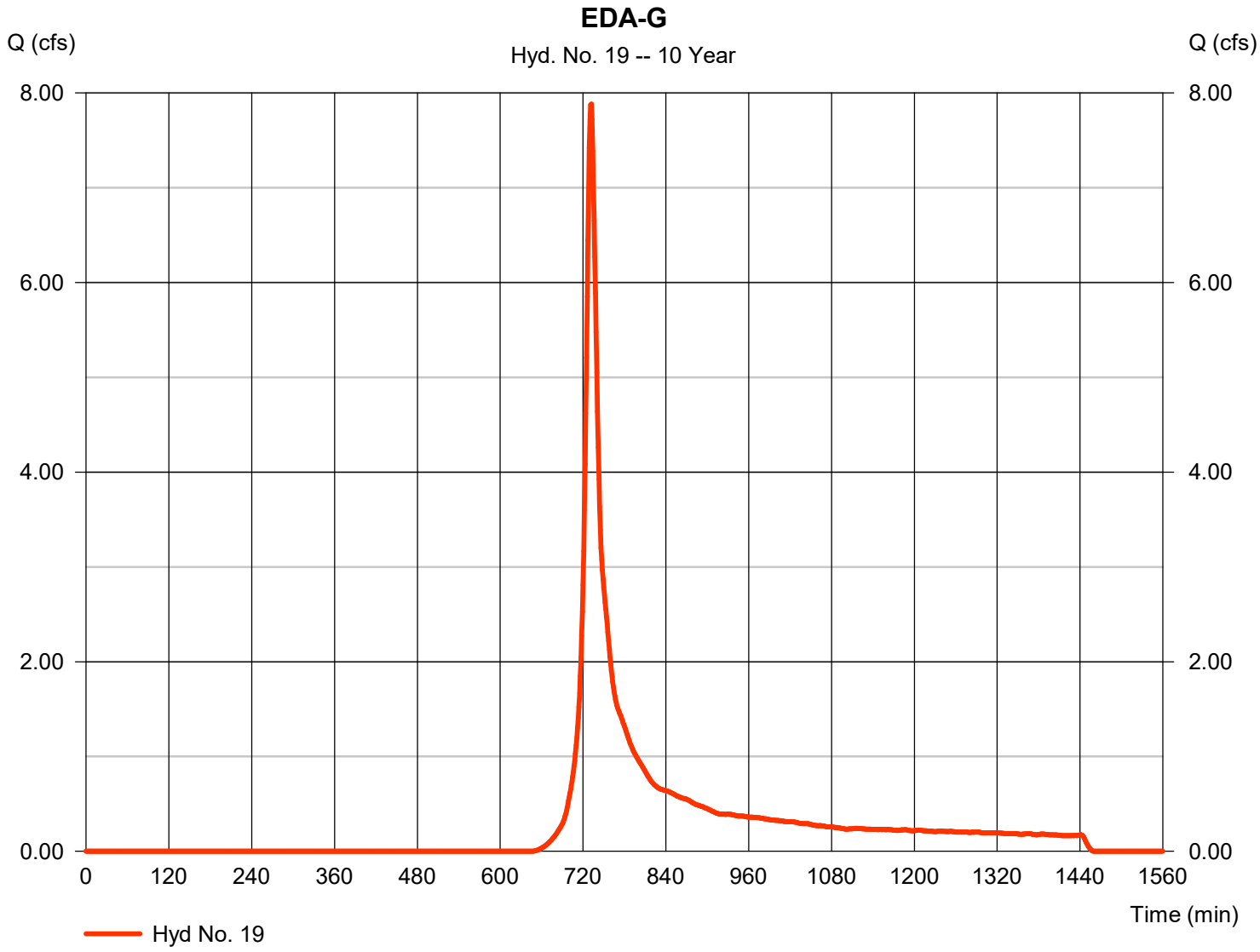


Hydrograph Report

Hyd. No. 19

EDA-G

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.883 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	28,071 cuft
Drainage area	=	5.080 ac	Curve number	=	66
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.60 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

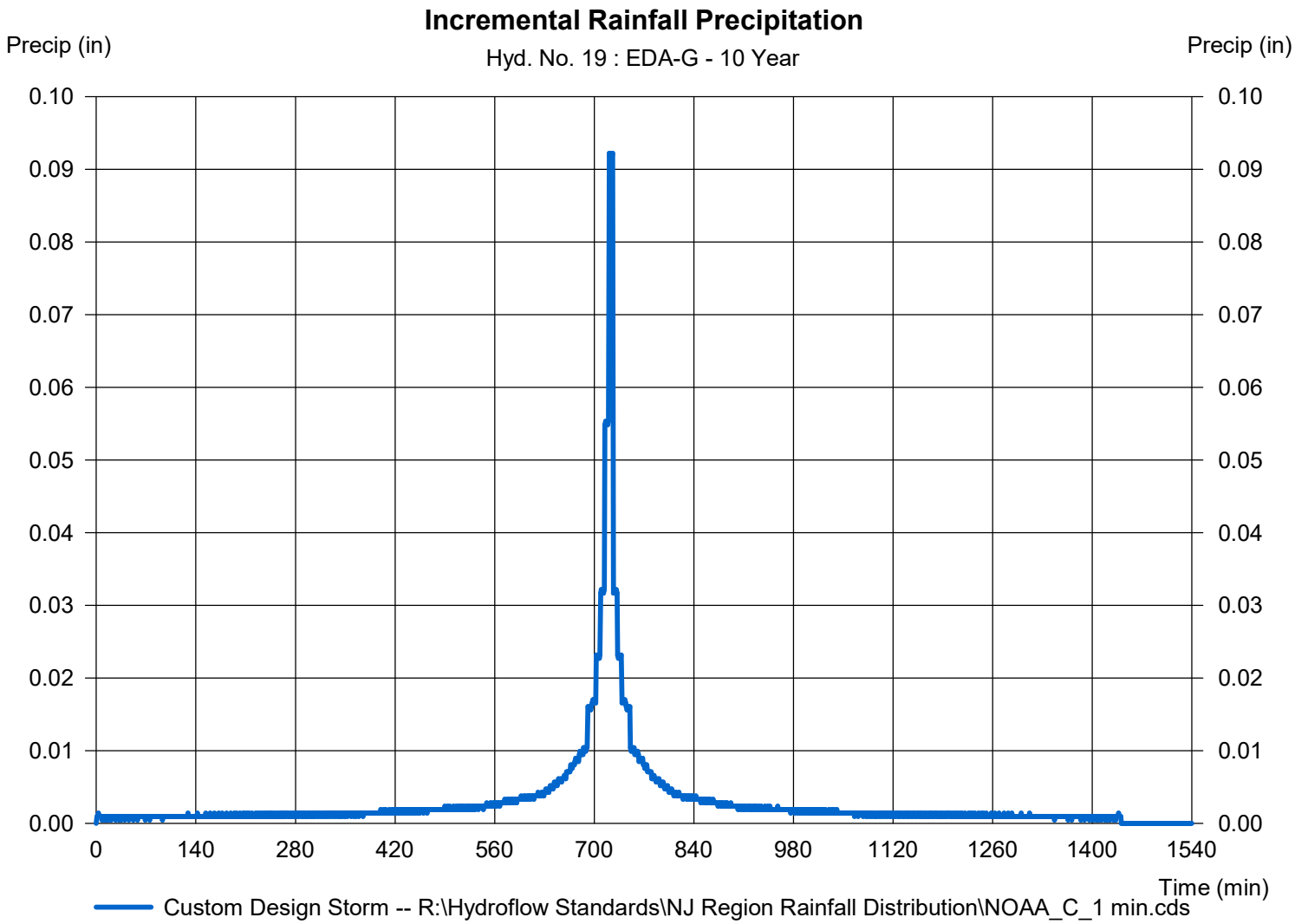


Precipitation Report

Hyd. No. 19

EDA-G

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

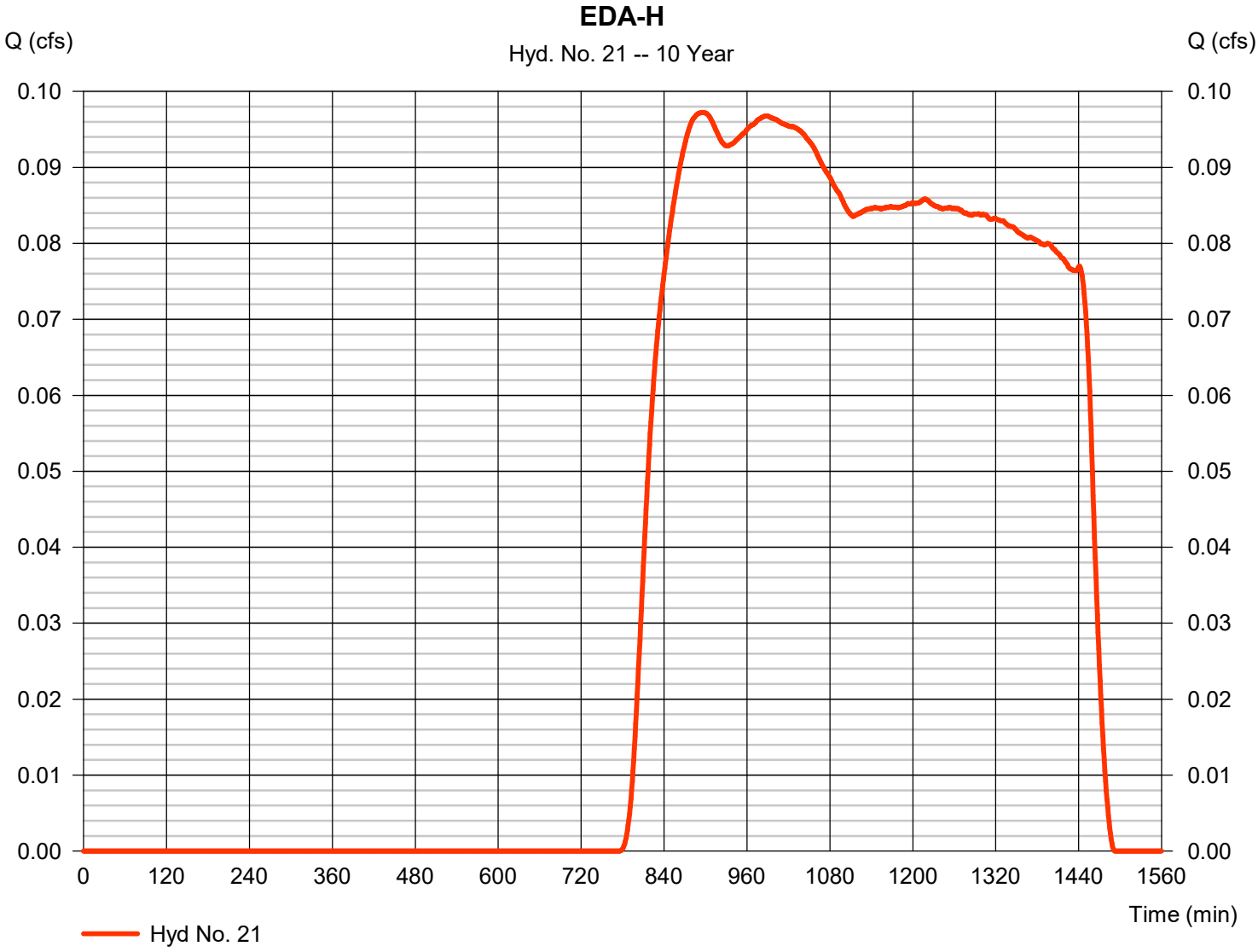


Hydrograph Report

Hyd. No. 21

EDA-H

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.097 cfs
Storm frequency	=	10 yrs	Time to peak	=	896 min
Time interval	=	1 min	Hyd. volume	=	3,392 cuft
Drainage area	=	12.920 ac	Curve number	=	36
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	33.50 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

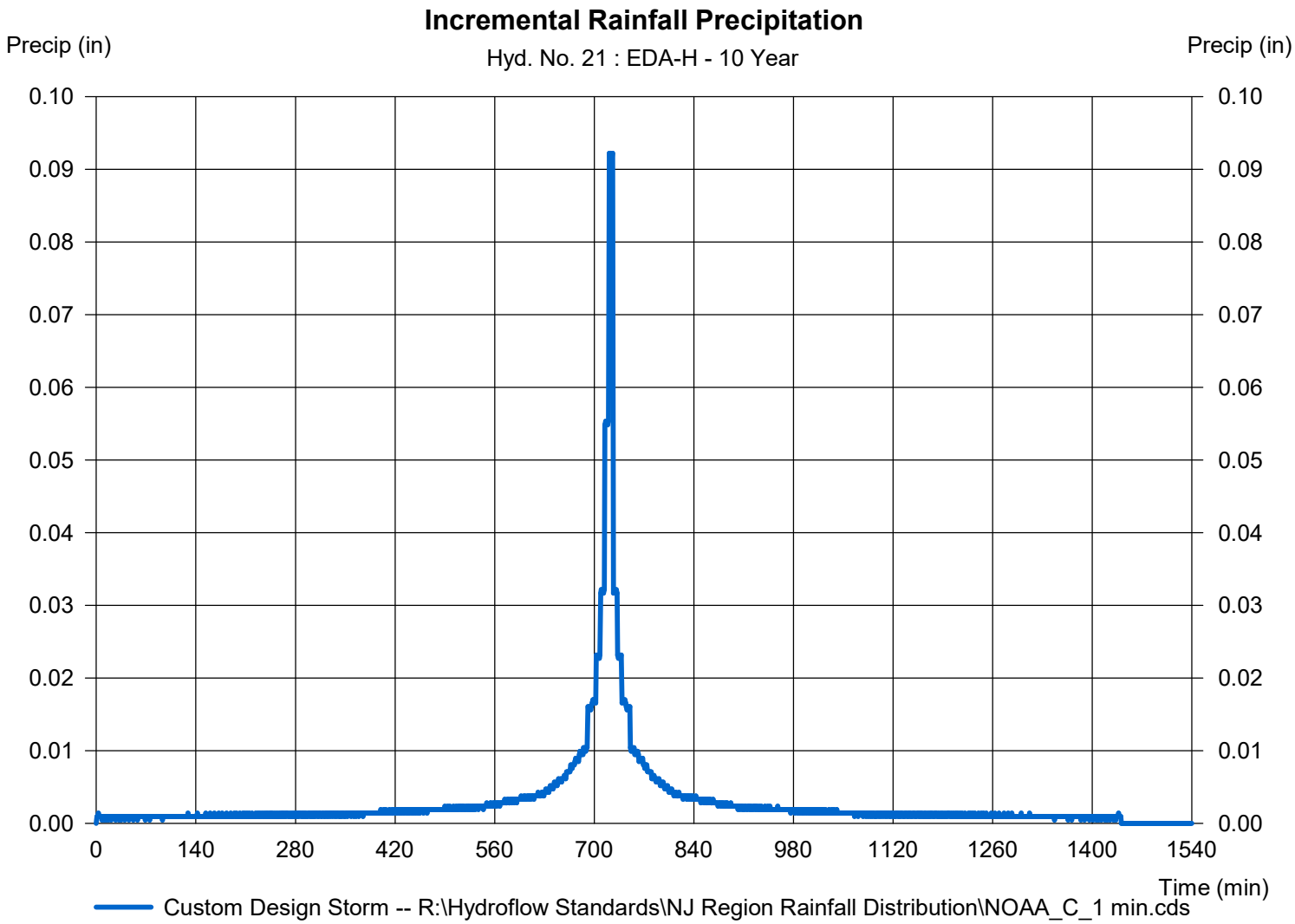


Precipitation Report

Hyd. No. 21

EDA-H

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

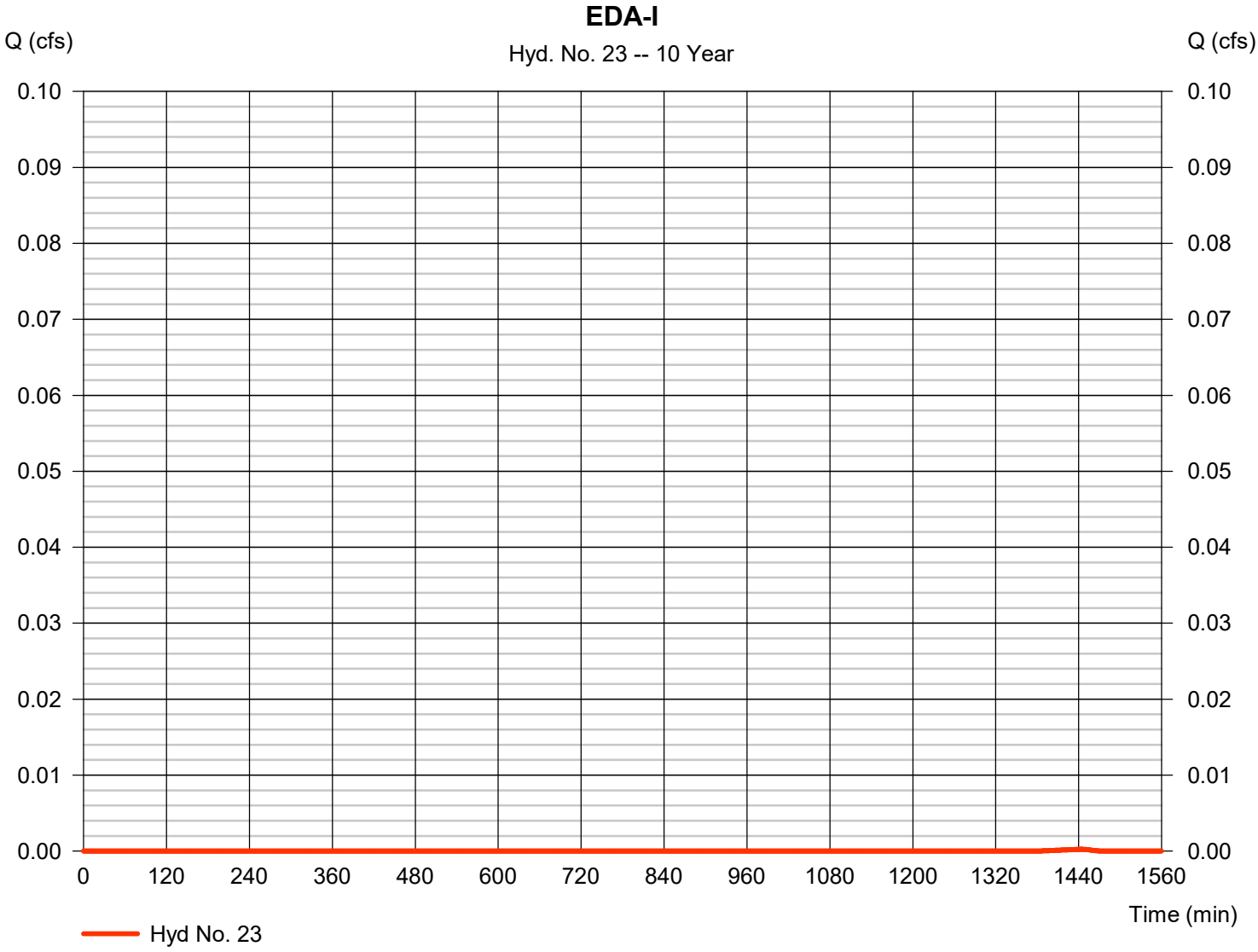


Hydrograph Report

Hyd. No. 23

EDA-I

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	1444 min
Time interval	=	1 min	Hyd. volume	=	1 cuft
Drainage area	=	1.100 ac	Curve number	=	30
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	22.10 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

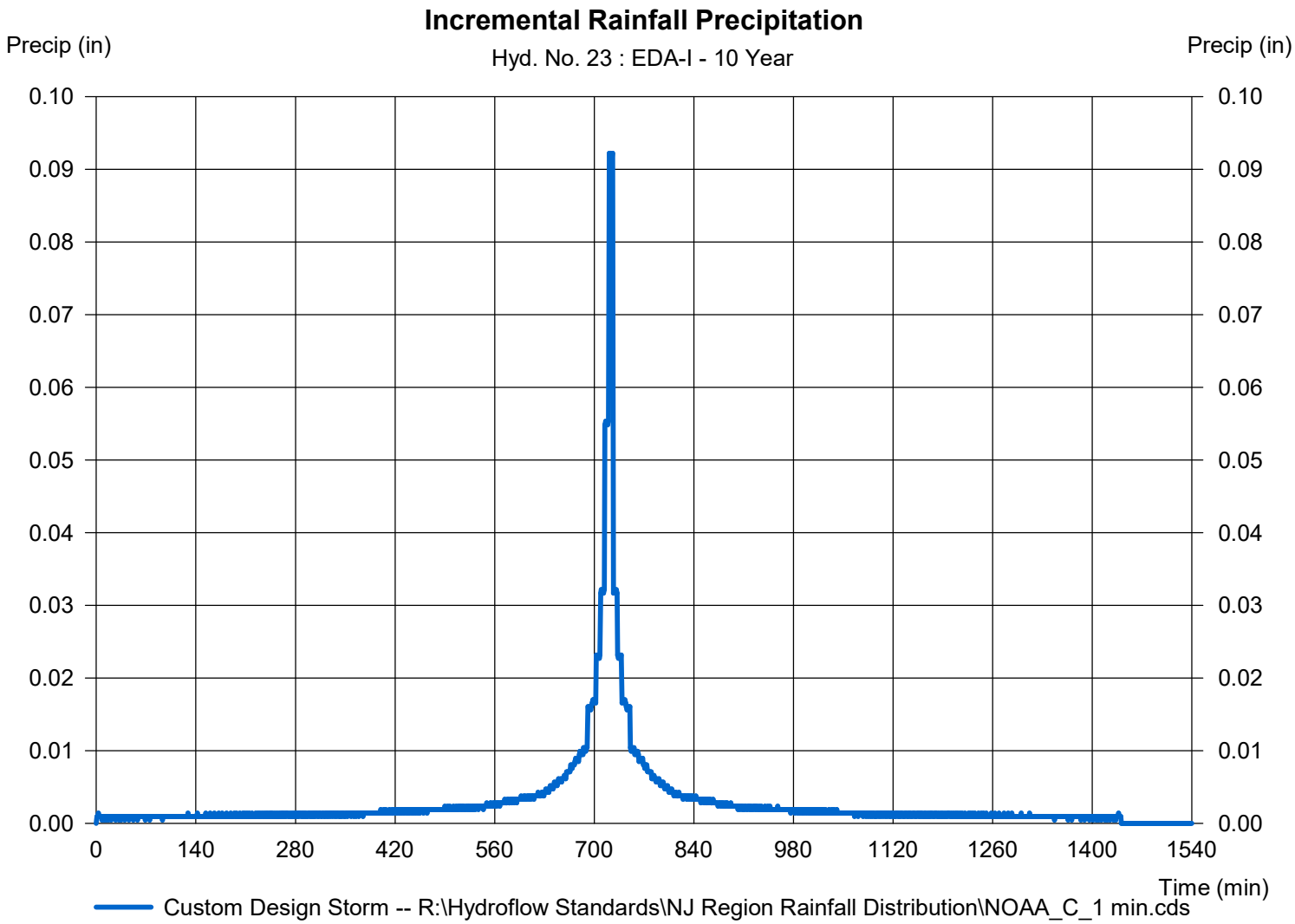


Precipitation Report

Hyd. No. 23

EDA-I

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



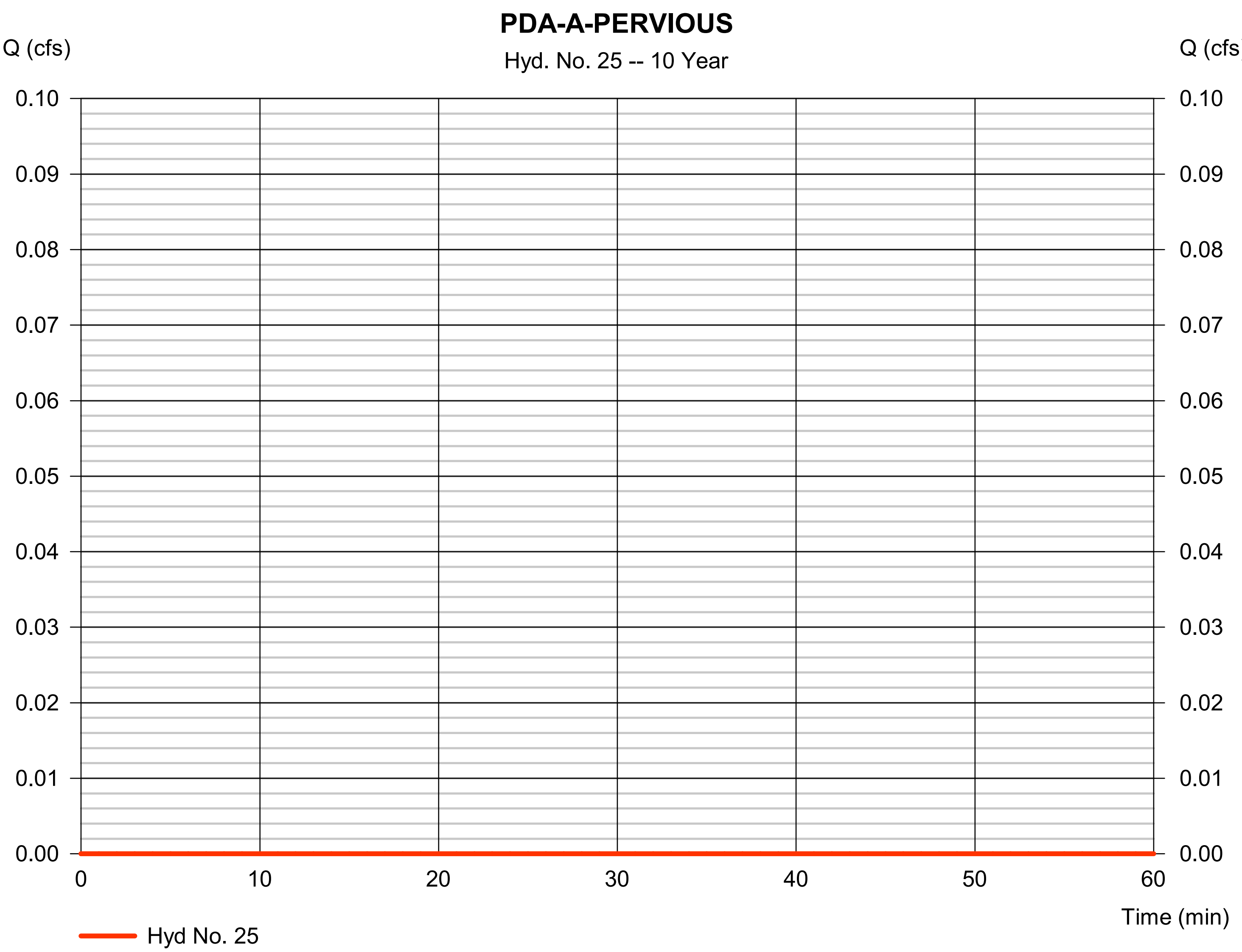
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 25

PDA-A-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 2.030 ac	Curve number	= 9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

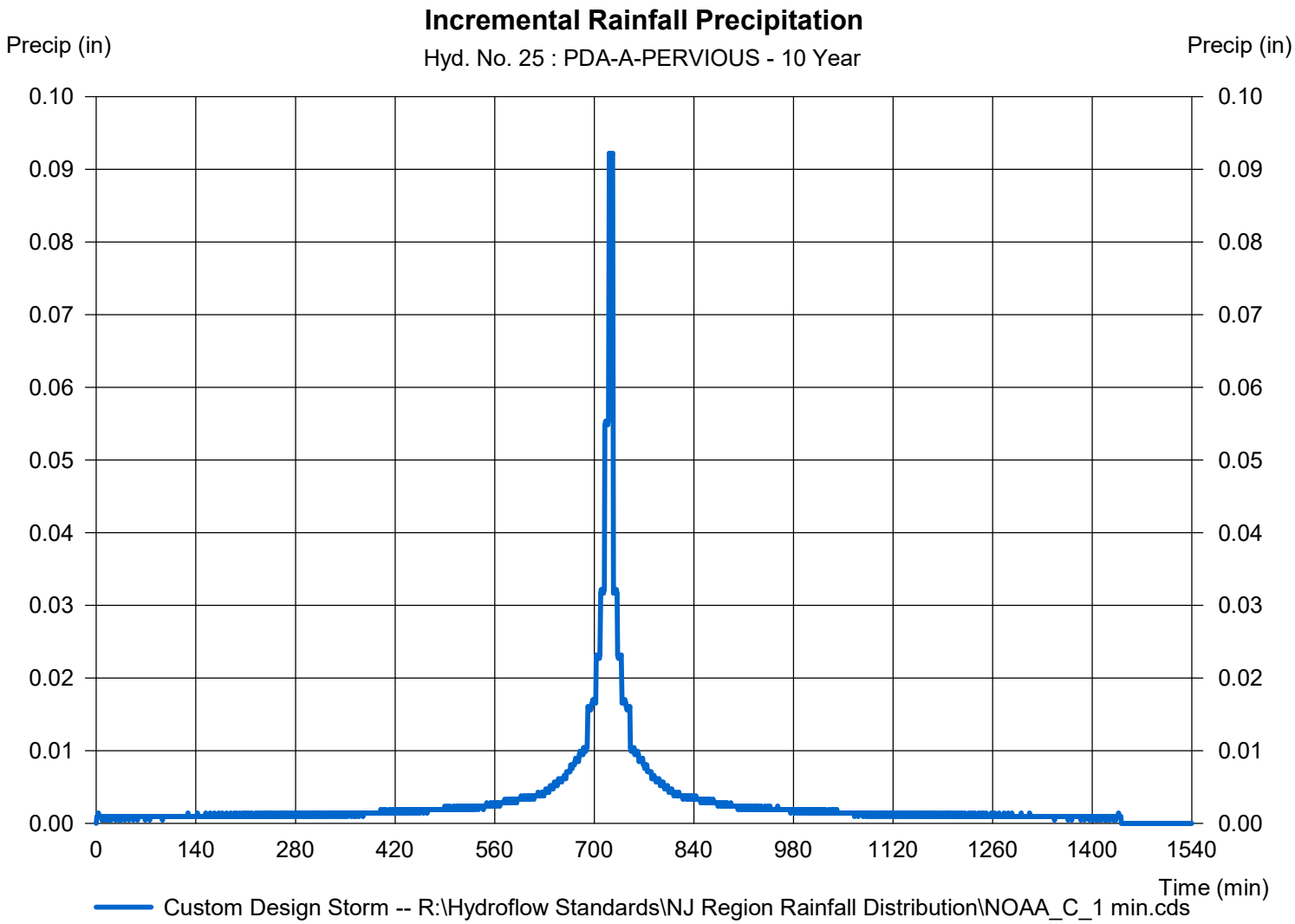


Precipitation Report

Hyd. No. 25

PDA-A-PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

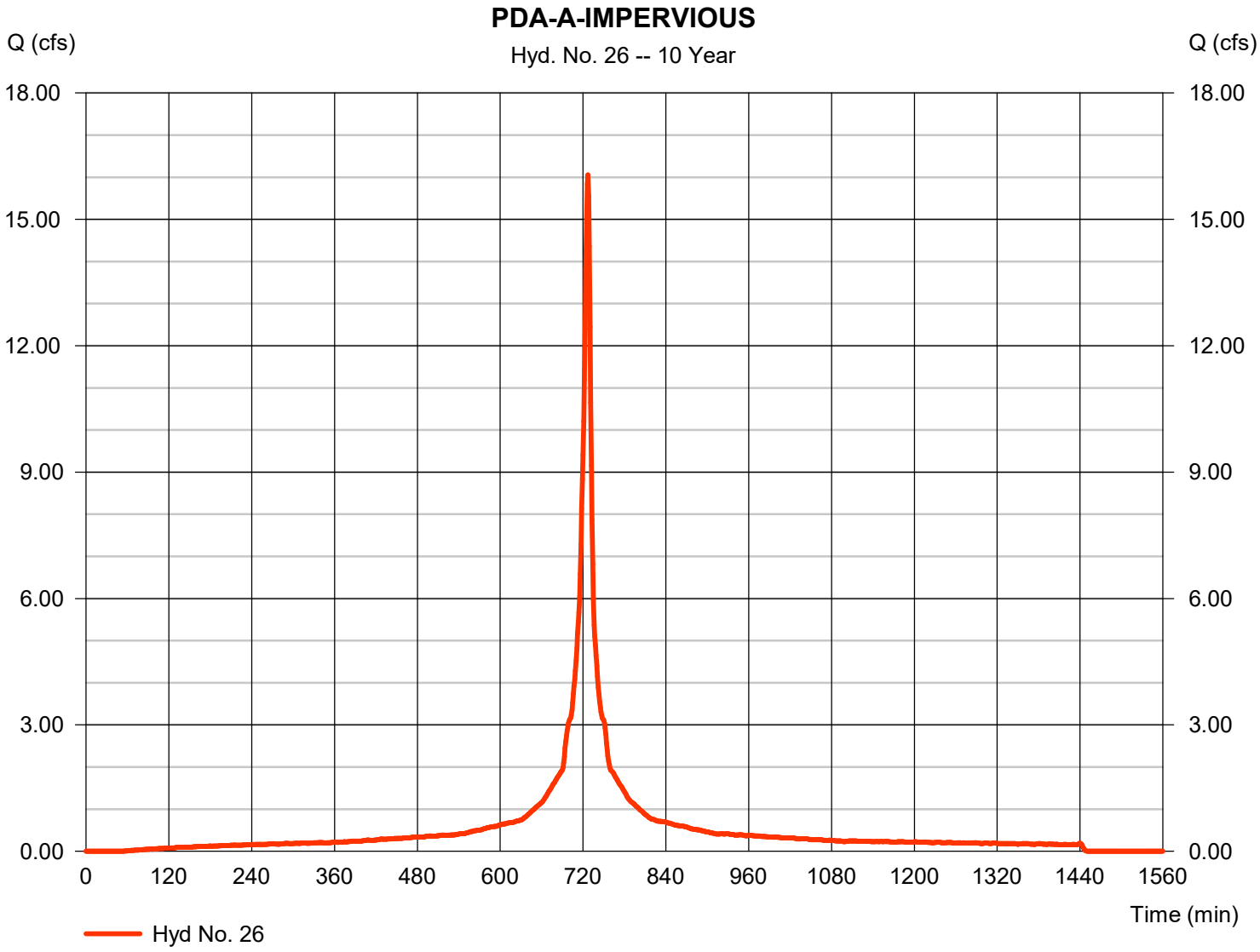


Hydrograph Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.05 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	52,147 cuft
Drainage area	=	3.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

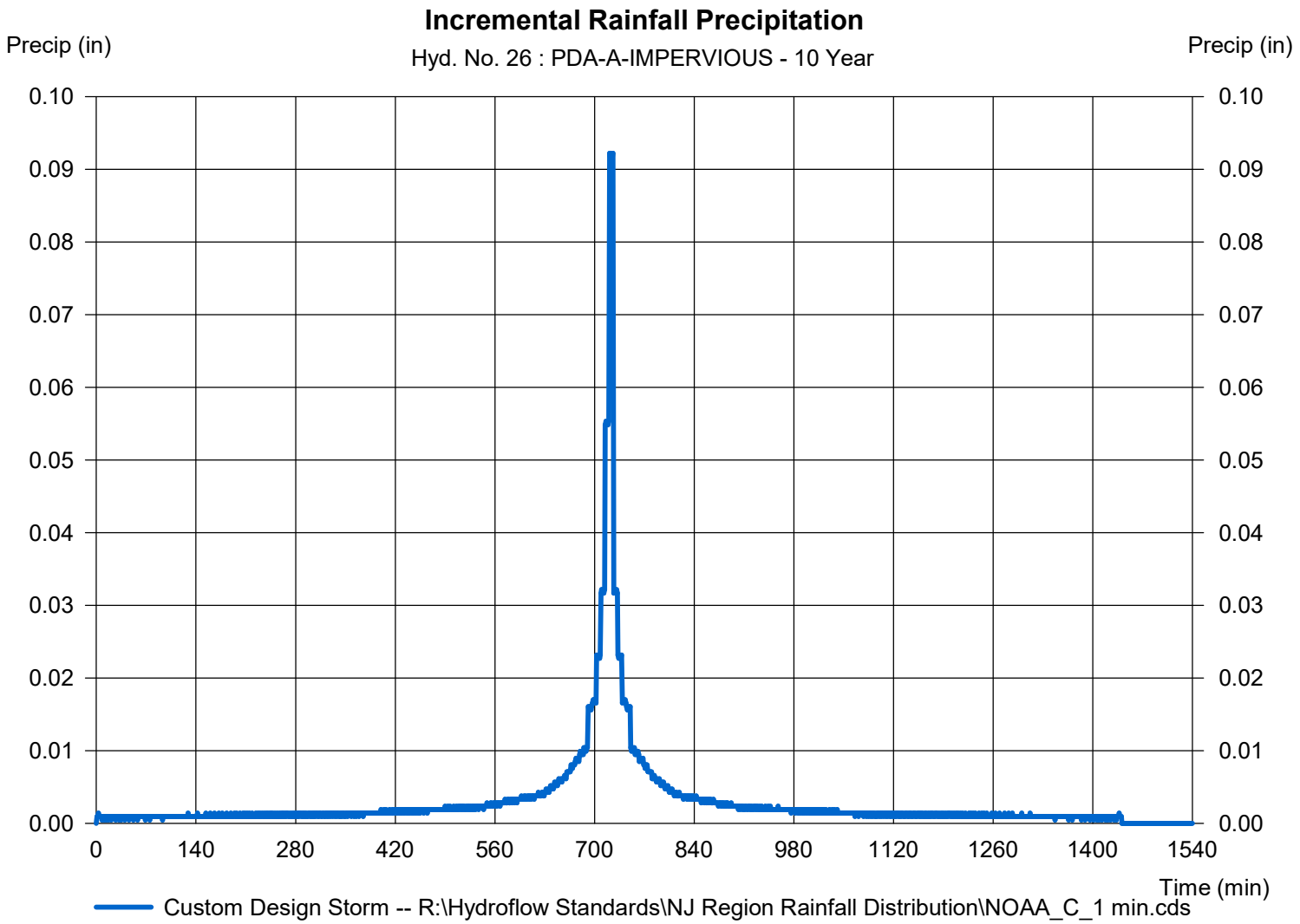


Precipitation Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

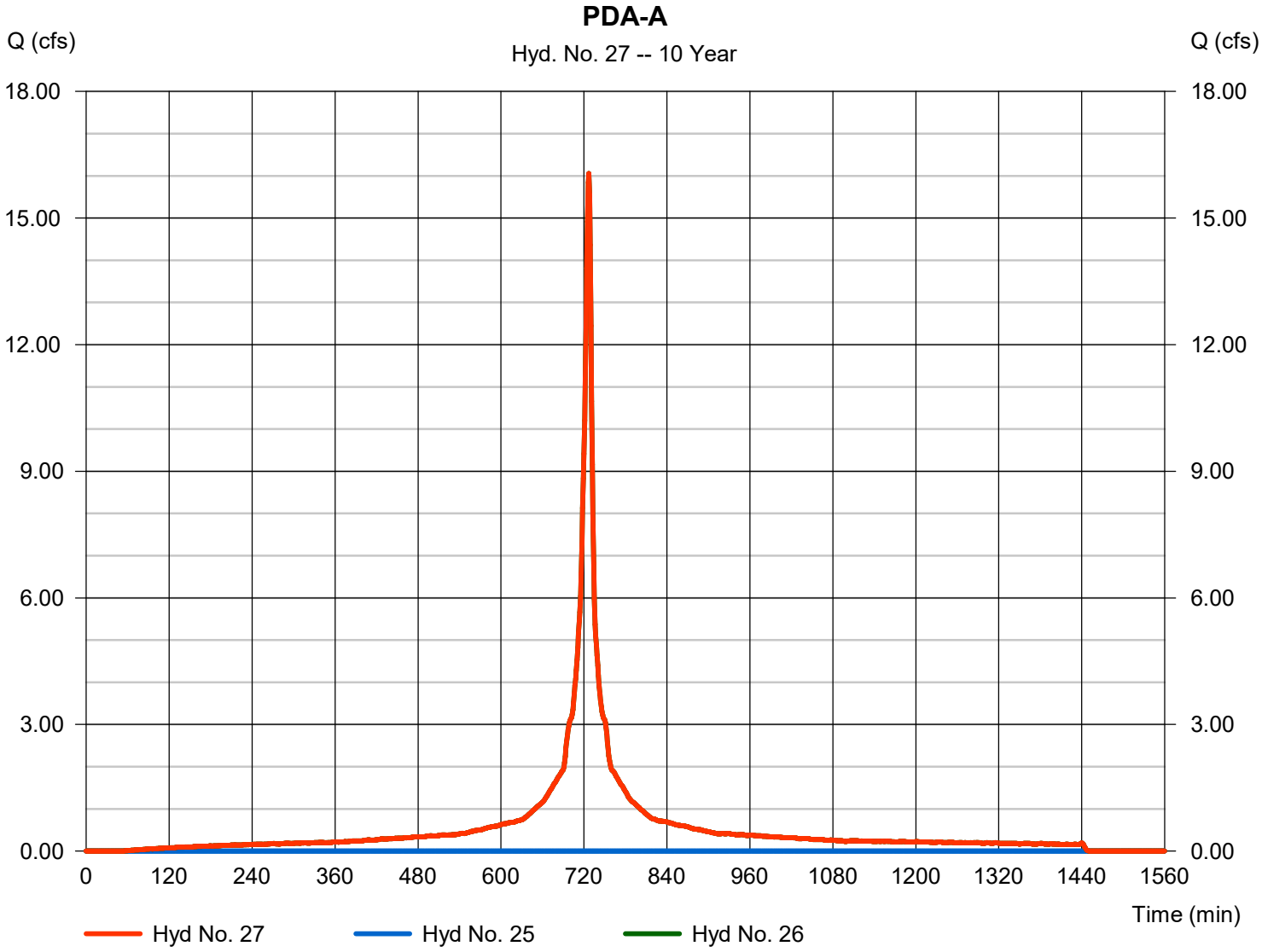


Hydrograph Report

Hyd. No. 27

PDA-A

Hydrograph type	=	Combine	Peak discharge	=	16.05 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	52,147 cuft
Inflow hyds.	=	25, 26	Contrib. drain. area	=	5.130 ac



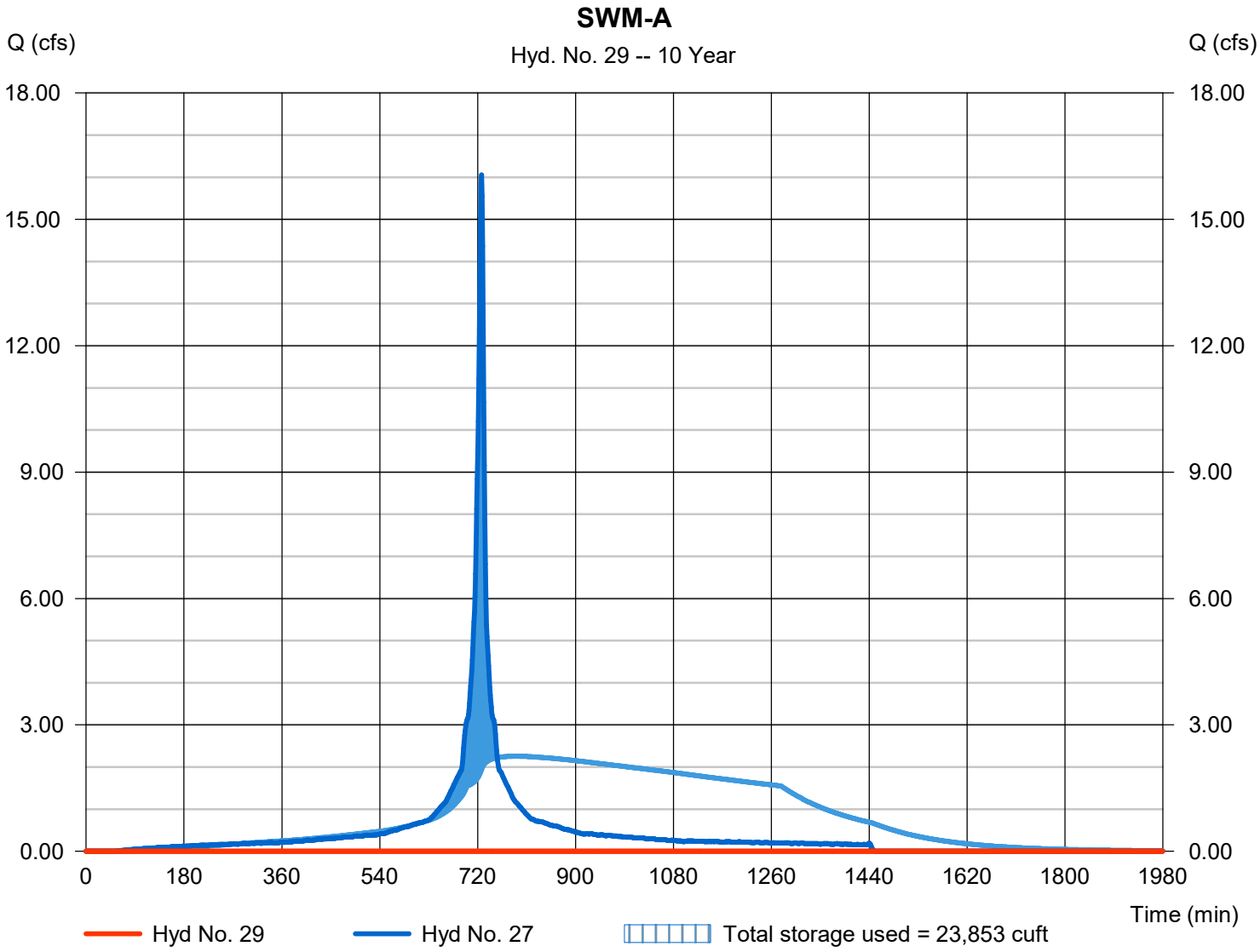
Hydrograph Report

Hyd. No. 29

SWM-A

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	689 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	27 - PDA-A	Max. Elevation	=	593.92 ft
Reservoir name	=	SWM-A	Max. Storage	=	23,853 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

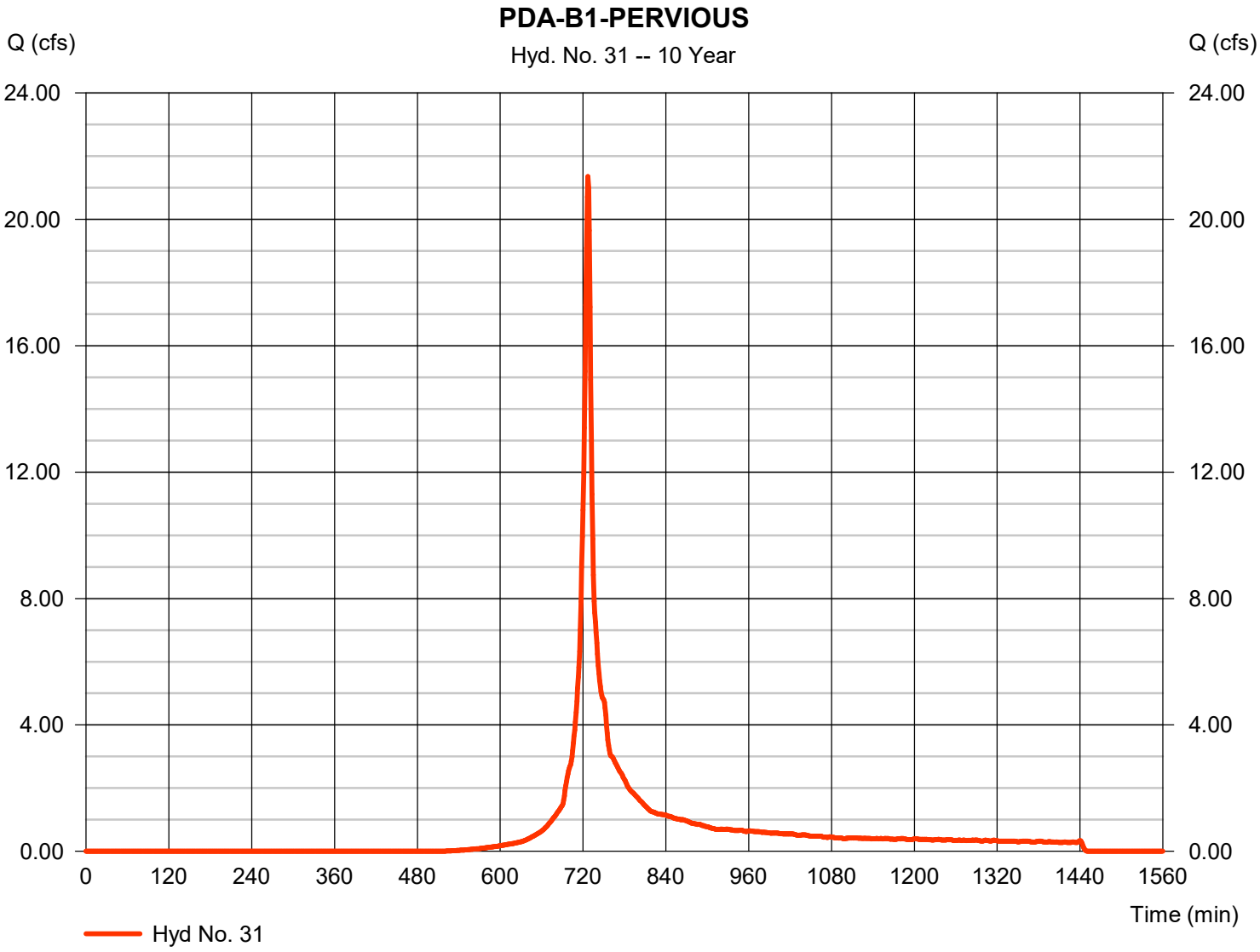


Hydrograph Report

Hyd. No. 31

PDA-B1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.35 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	58,838 cuft
Drainage area	=	6.790 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Storm Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

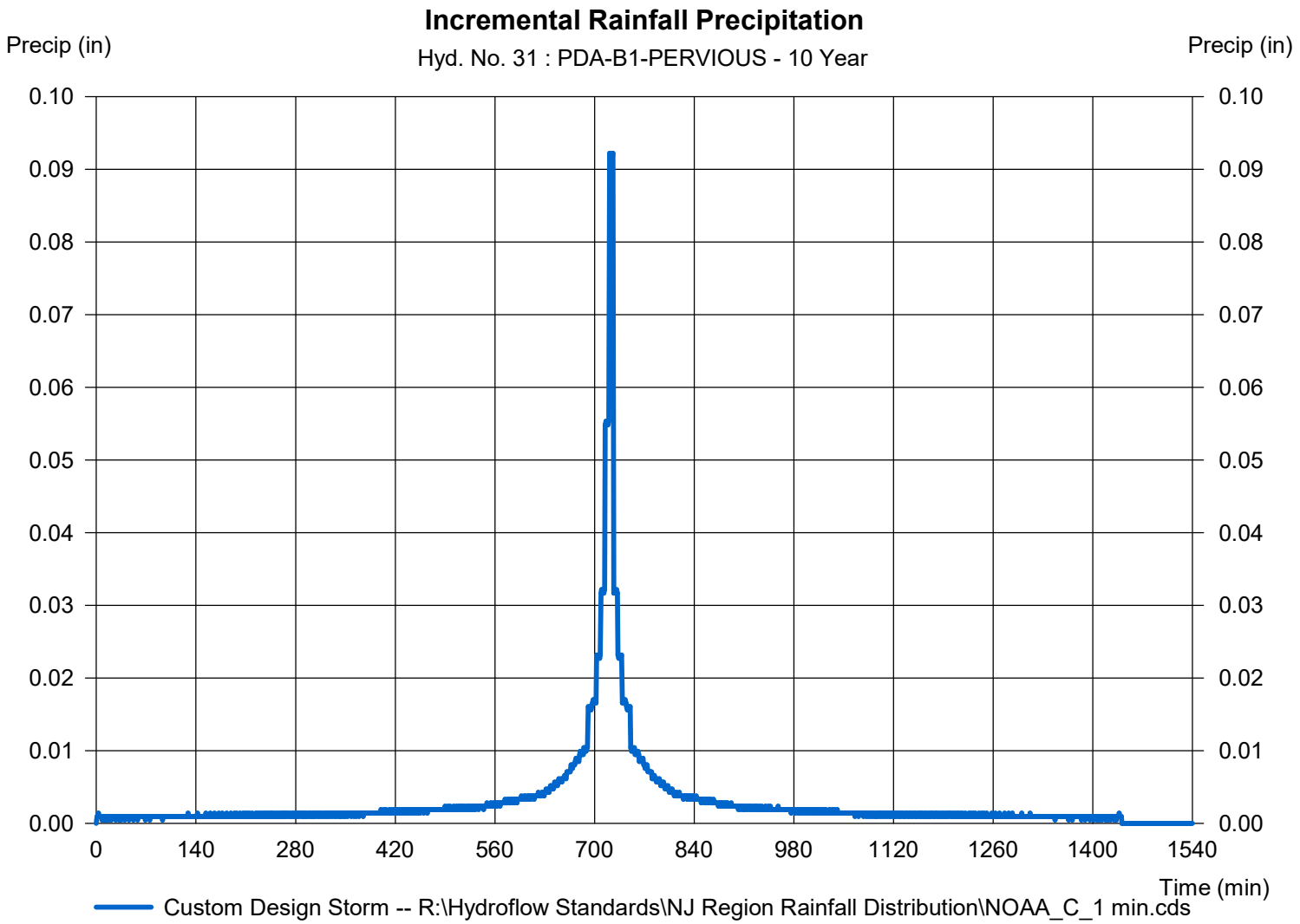


Precipitation Report

Hyd. No. 31

PDA-B1-PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



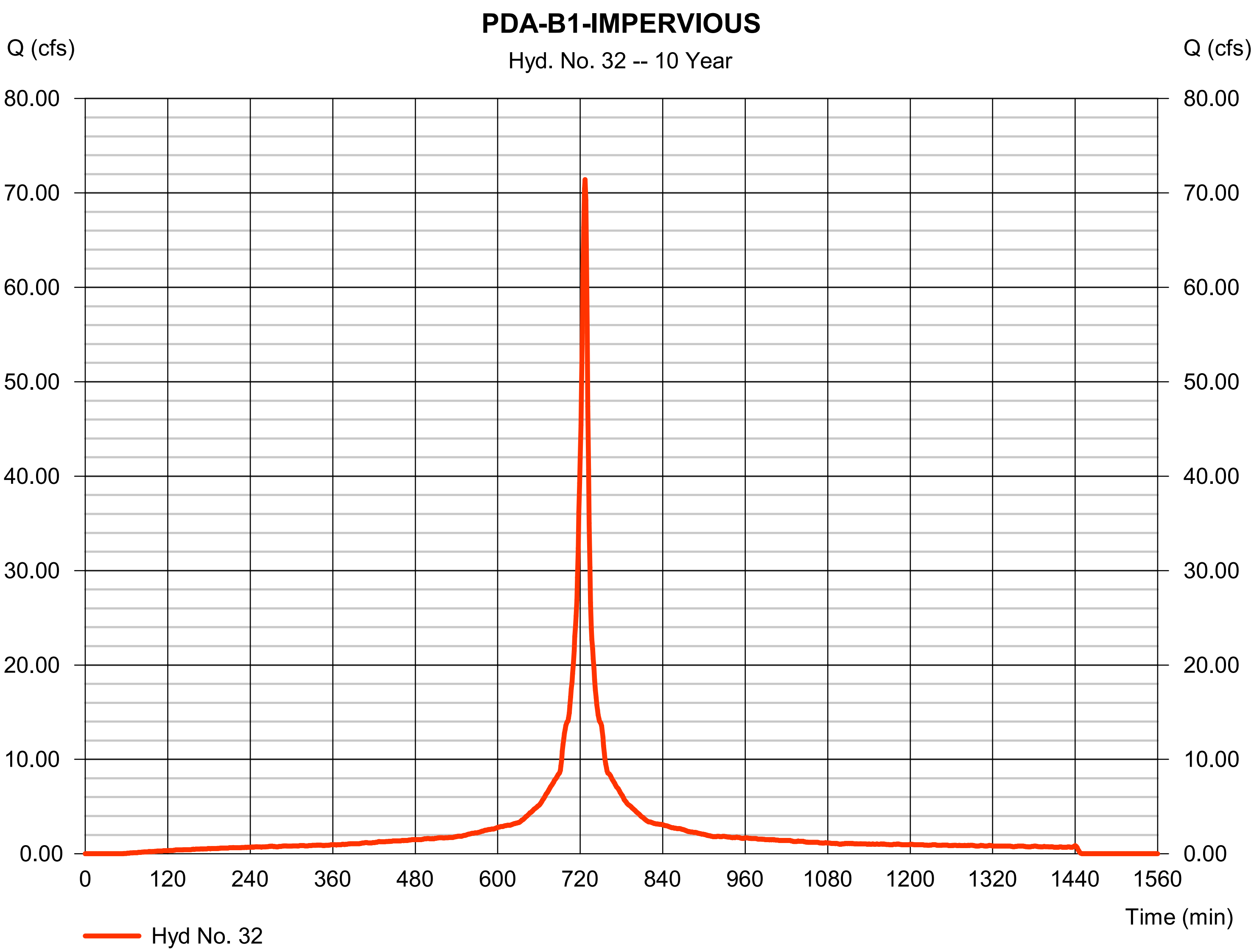
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 32

PDA-B1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 71.41 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 231,969 cuft
Drainage area	= 13.790 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

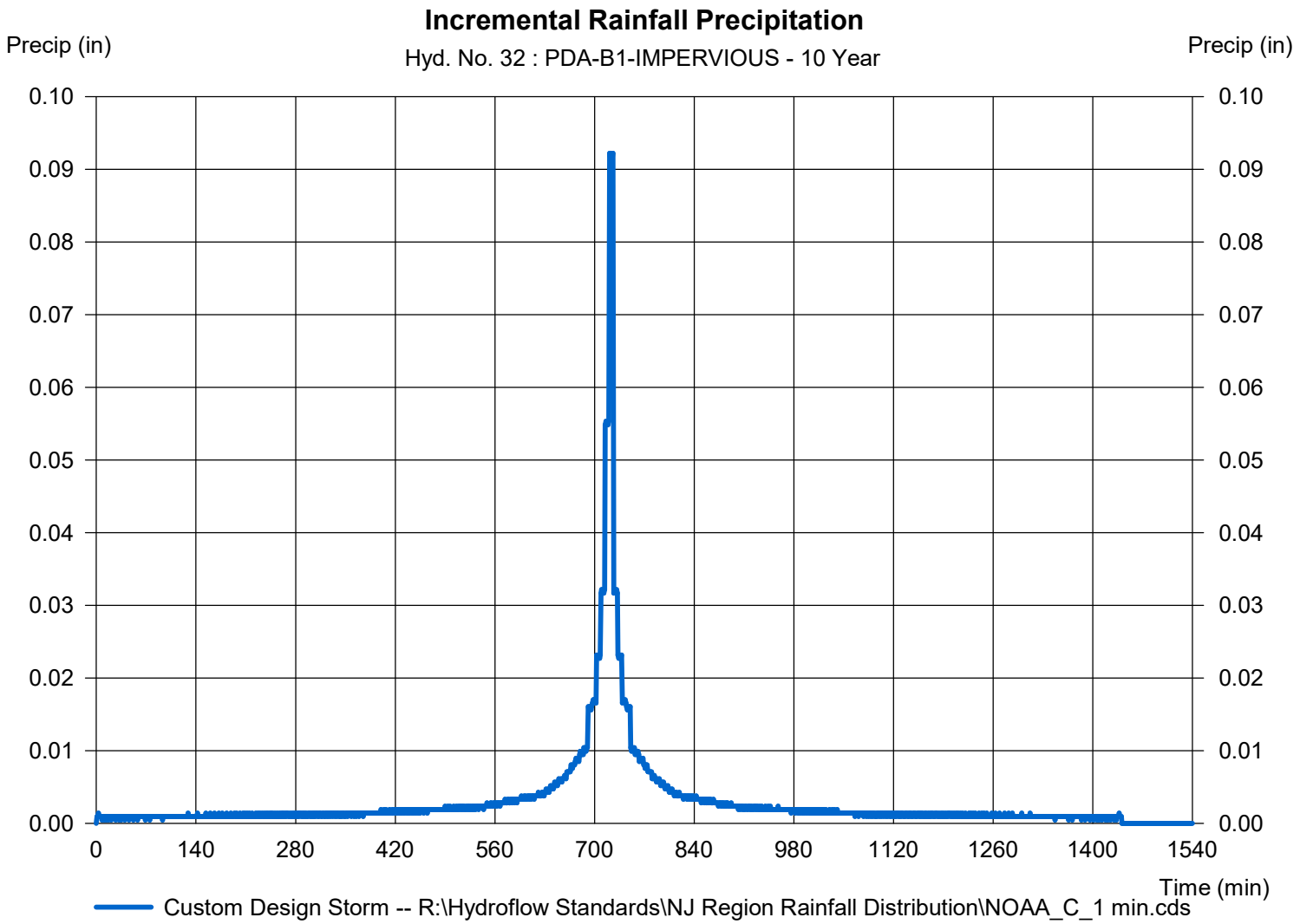


Precipitation Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

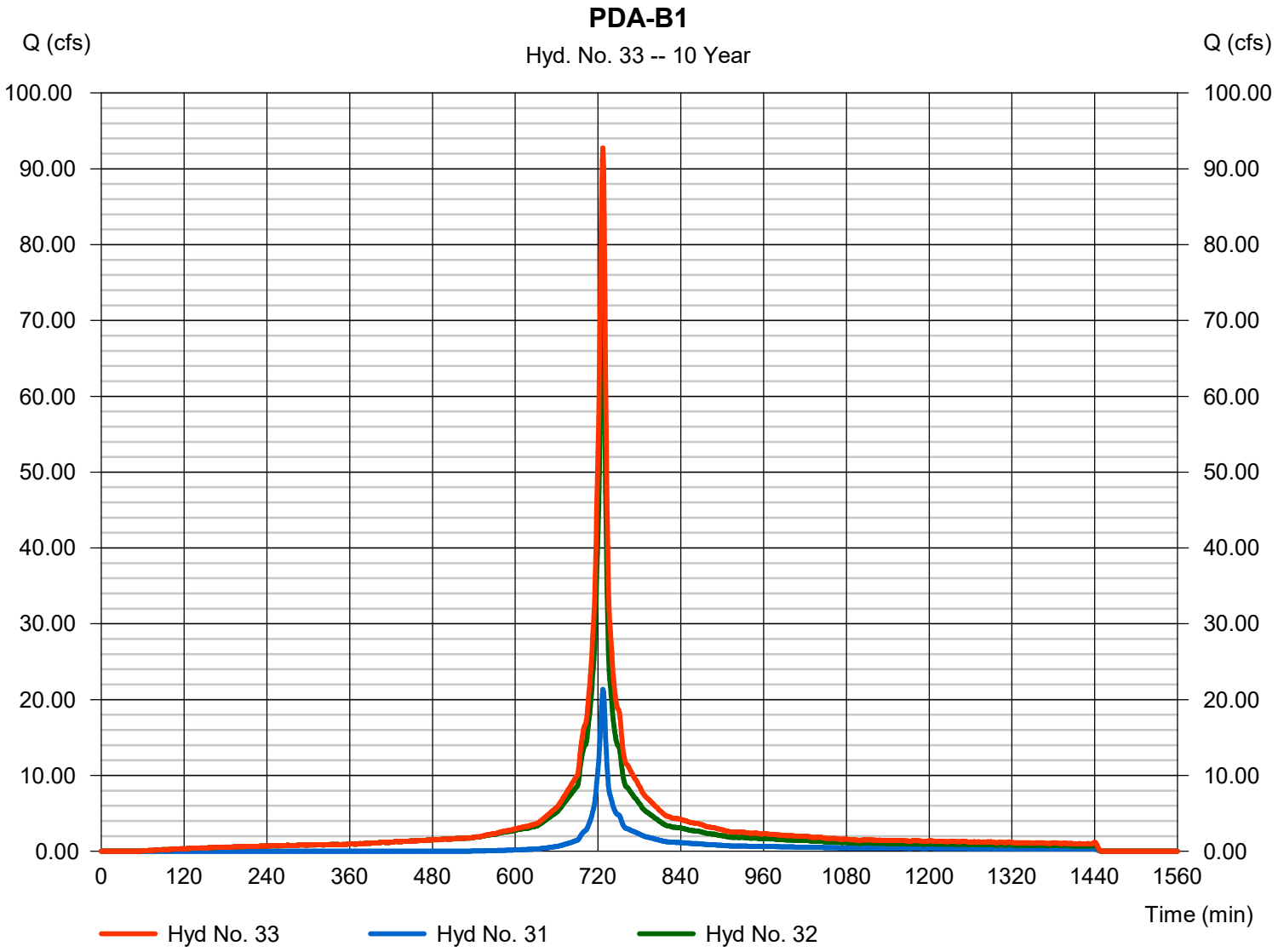


Hydrograph Report

Hyd. No. 33

PDA-B1

Hydrograph type	=	Combine	Peak discharge	=	92.76 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	290,807 cuft
Inflow hyds.	=	31, 32	Contrib. drain. area	=	20.580 ac



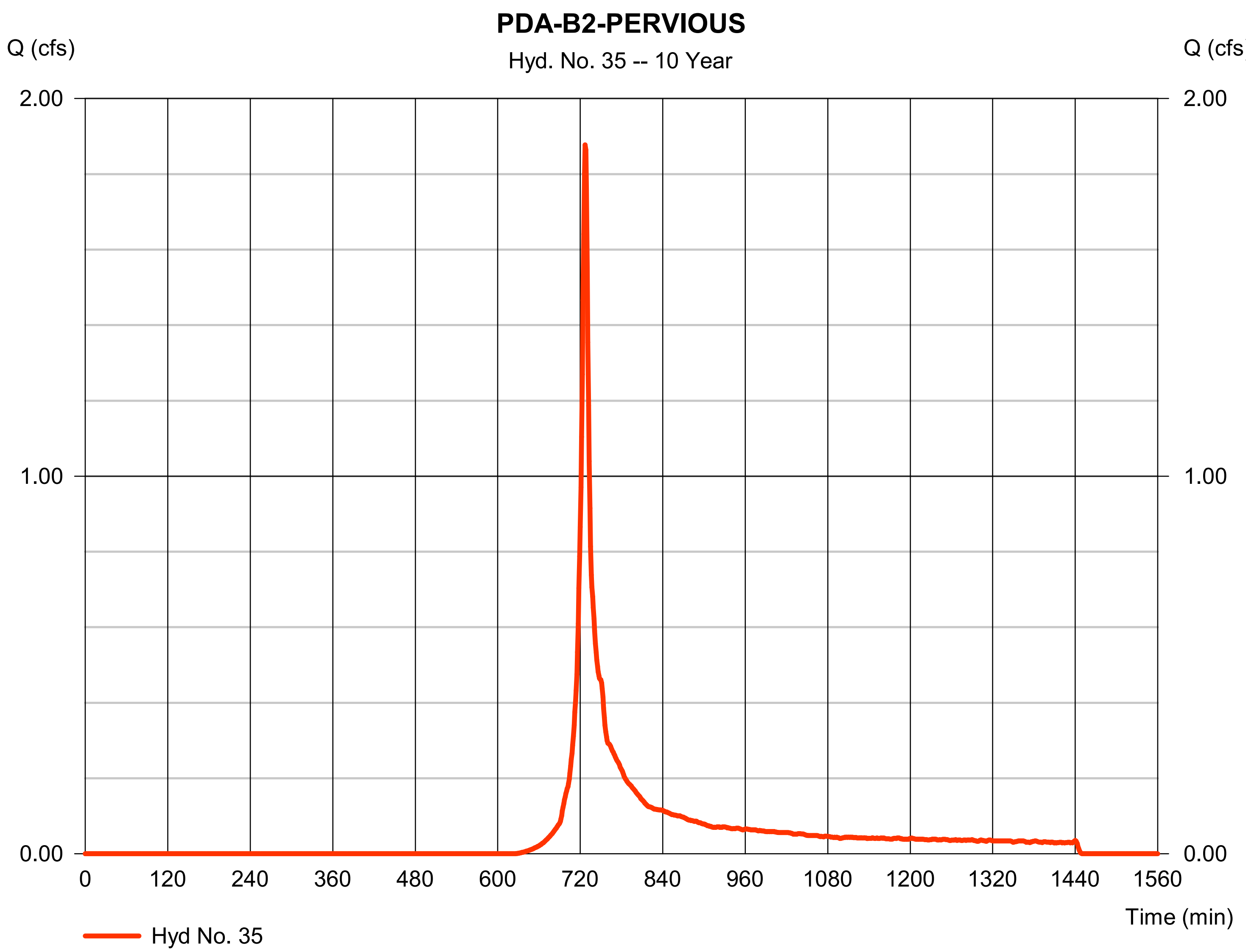
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 35

PDA-B2-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.878 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	5,251 cuft
Drainage area	=	0.830 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	=	484

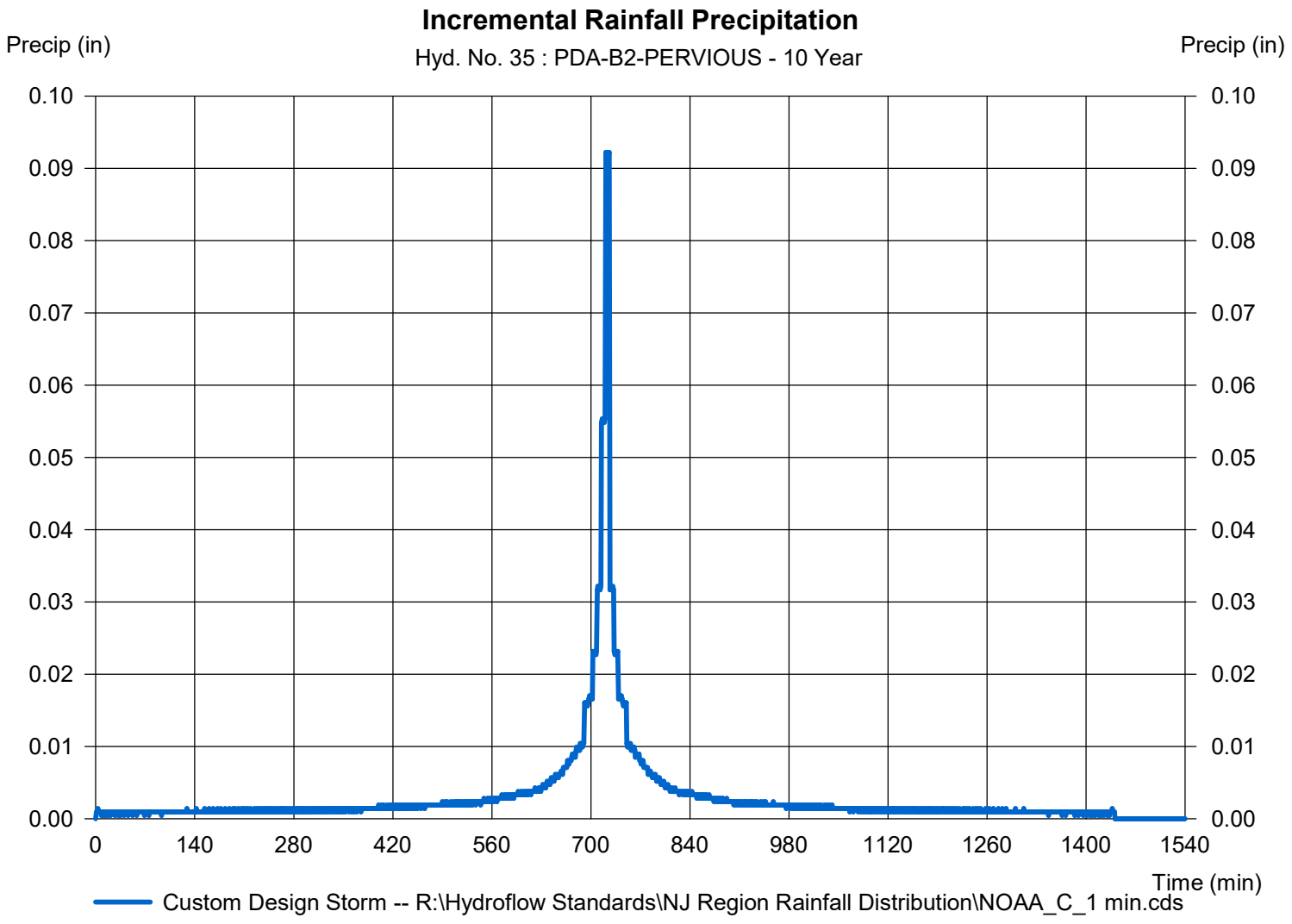


Precipitation Report

Hyd. No. 35

PDA-B2-PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

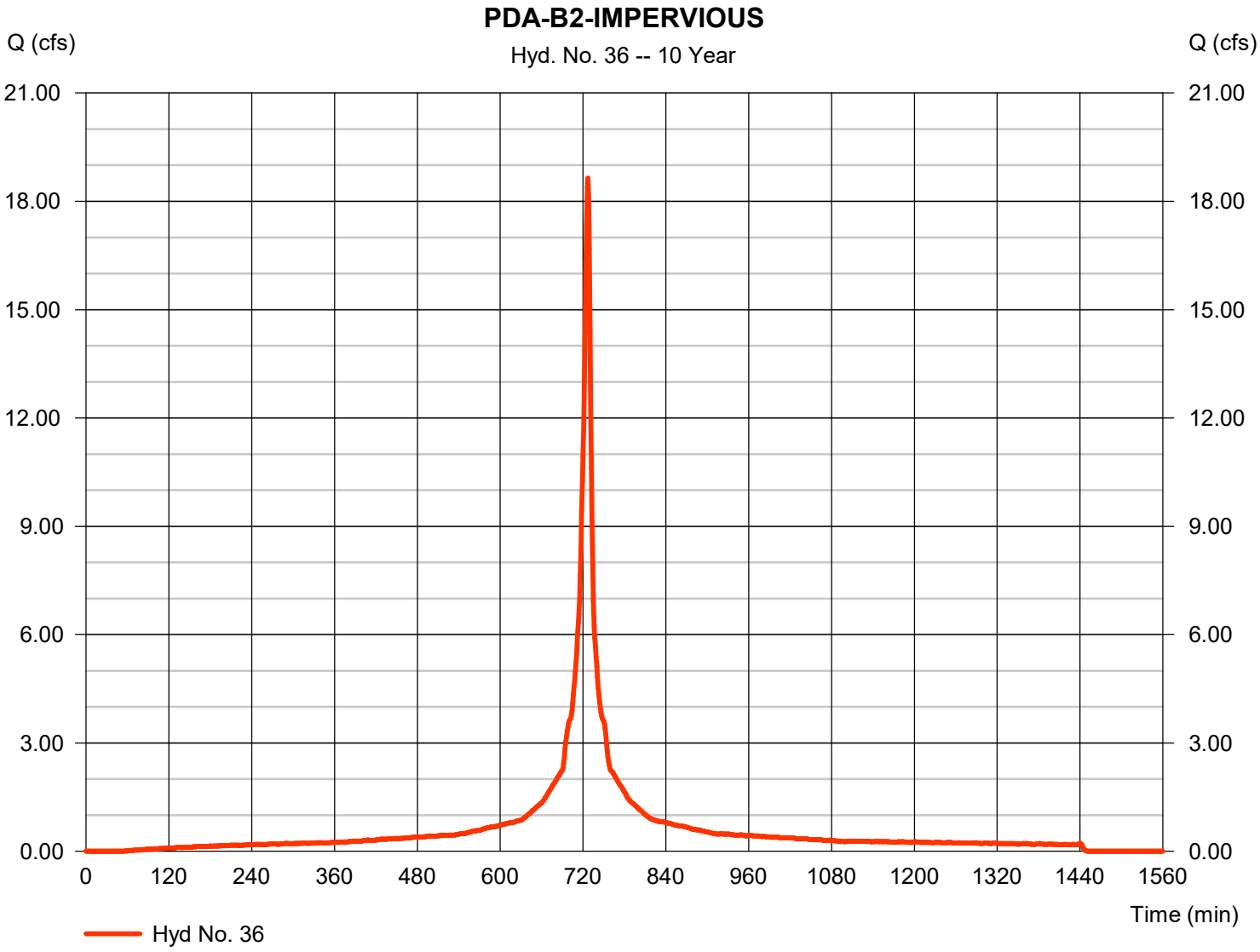


Hydrograph Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.64 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	60,558 cuft
Drainage area	=	3.600 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

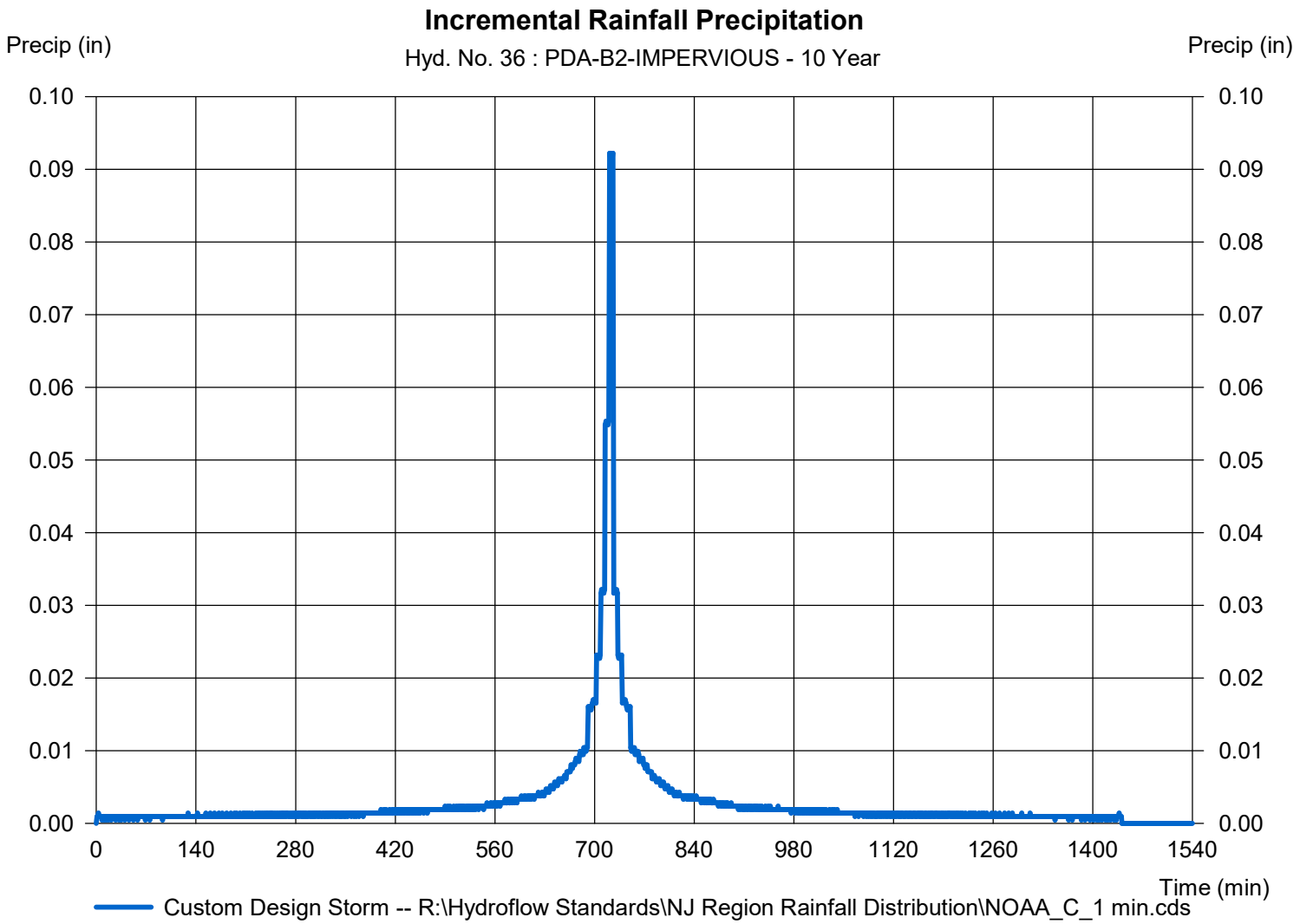


Precipitation Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

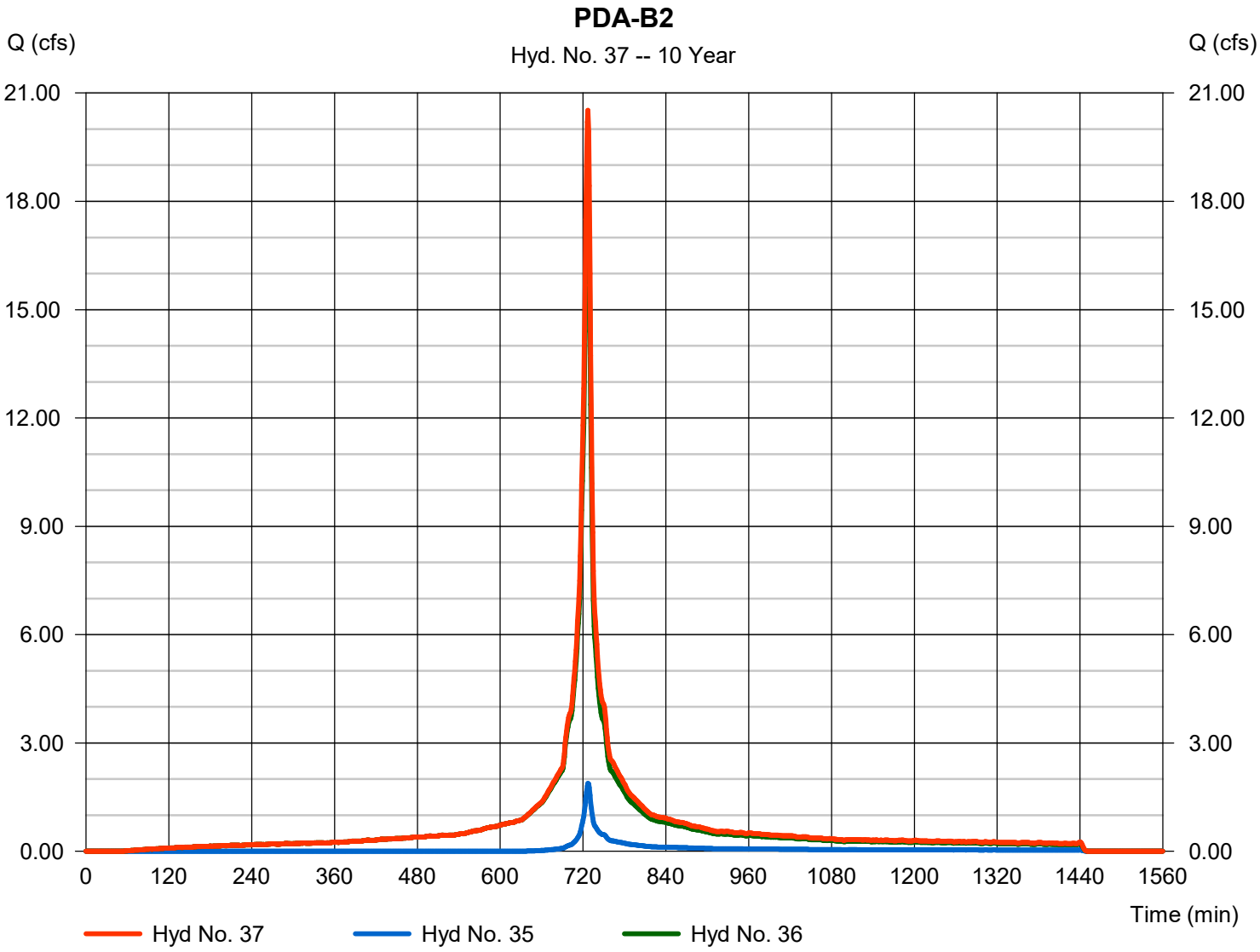


Hydrograph Report

Hyd. No. 37

PDA-B2

Hydrograph type	=	Combine	Peak discharge	=	20.52 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	65,808 cuft
Inflow hyds.	=	35, 36	Contrib. drain. area	=	4.430 ac



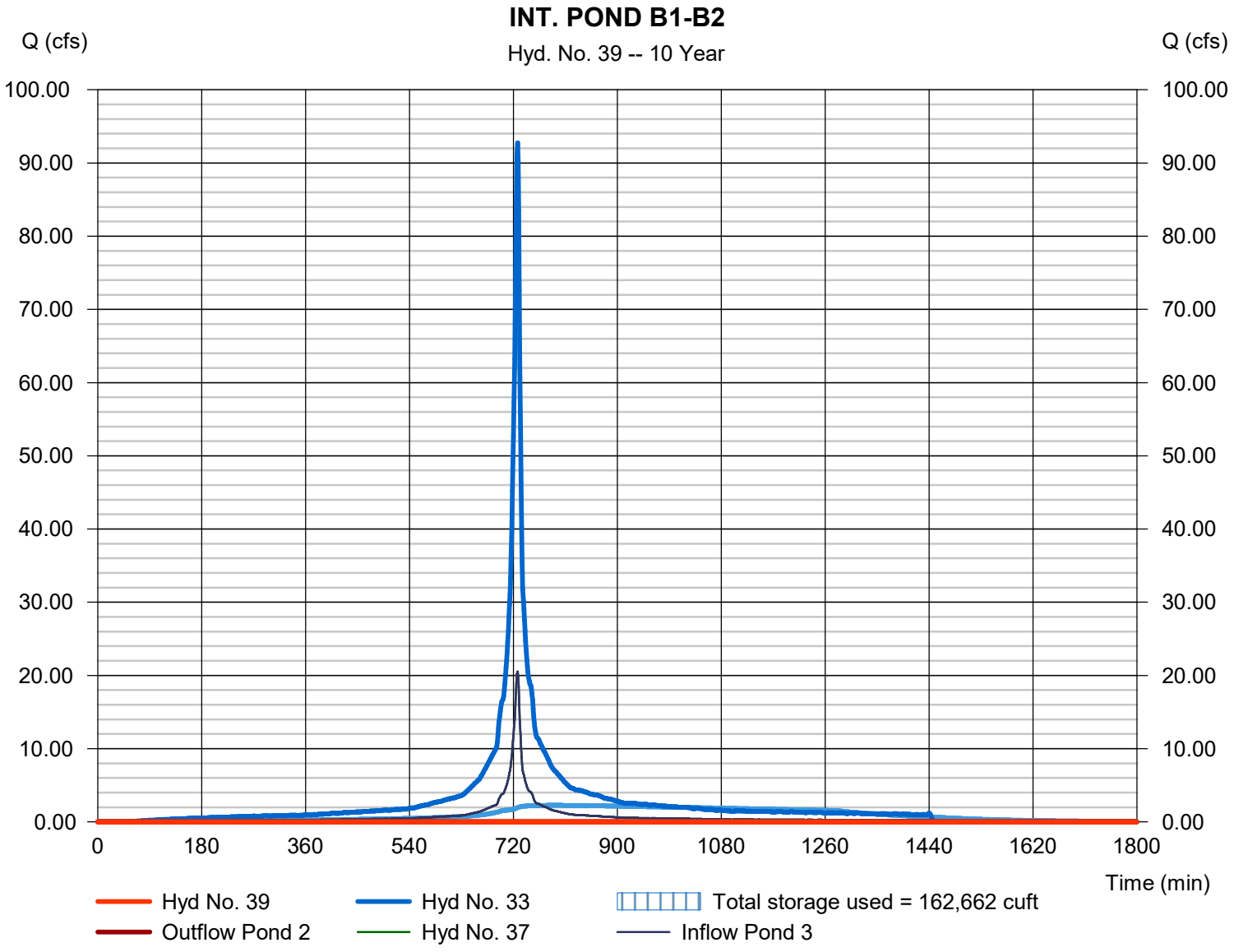
Hydrograph Report

Hyd. No. 39

INT. POND B1-B2

Hydrograph type	=	Reservoir (Interconnected)	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	715 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Upper Pond	=	SWM-B1	Lower Pond	=	SWM-B2
Inflow hyd.	=	33 - PDA-B1	Other Inflow hyd.	=	37 - PDA-B2
Max. Elevation	=	599.93 ft	Max. Elevation	=	599.26 ft
Max. Storage	=	134,220 cuft	Max. Storage	=	28,442 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.



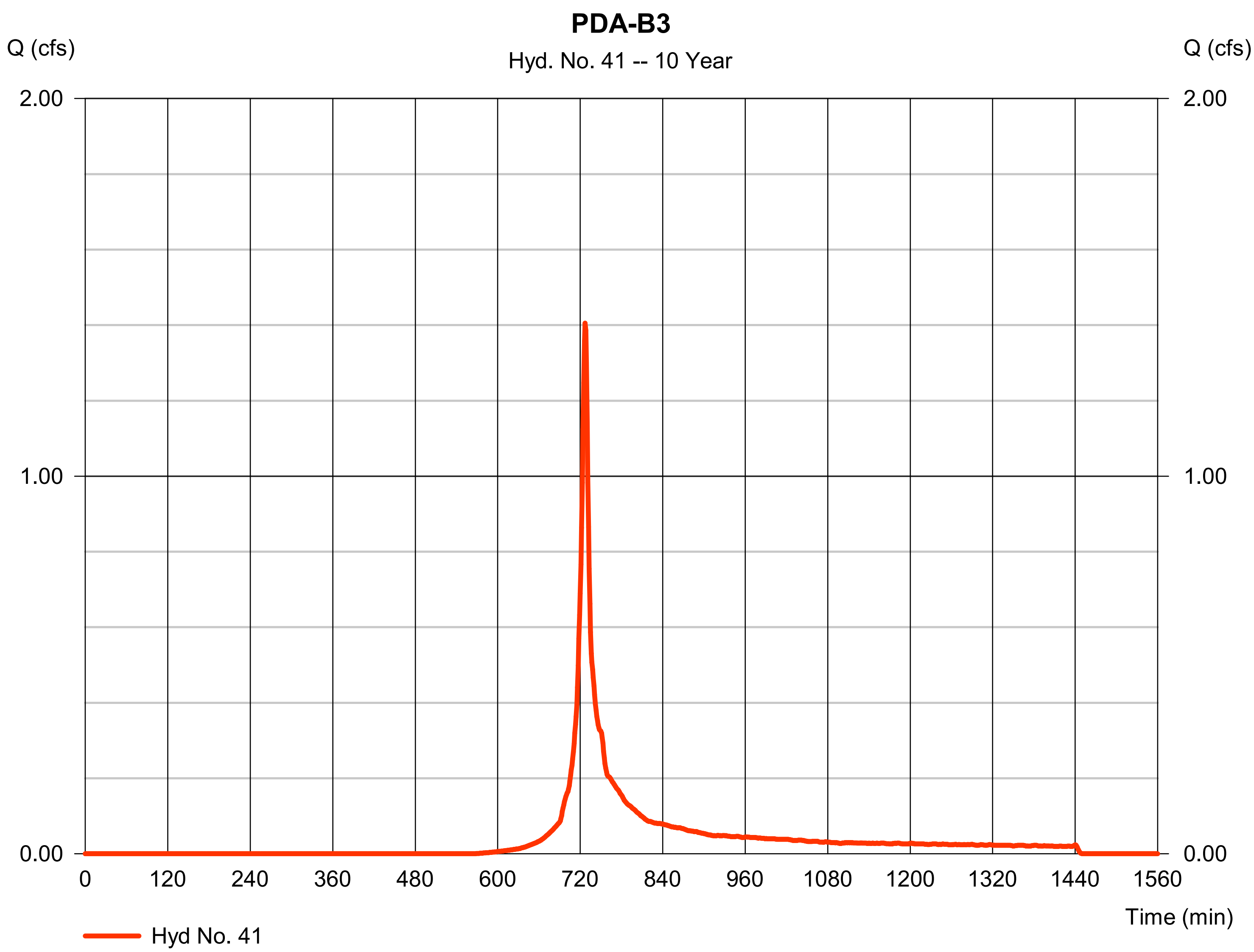
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 41

PDA-B3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.405 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 3,876 cuft
Drainage area	= 0.500 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

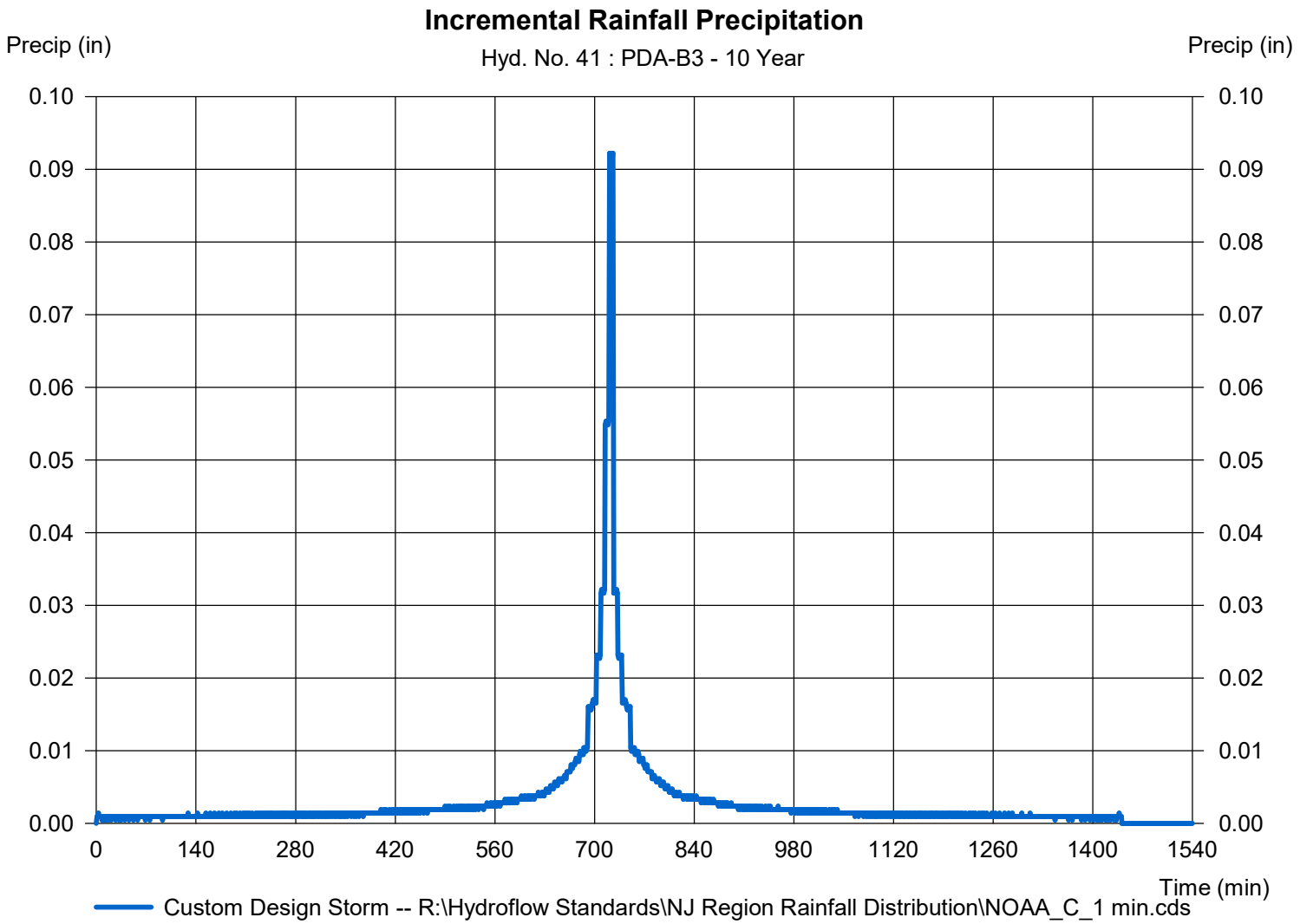


Precipitation Report

Hyd. No. 41

PDA-B3

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

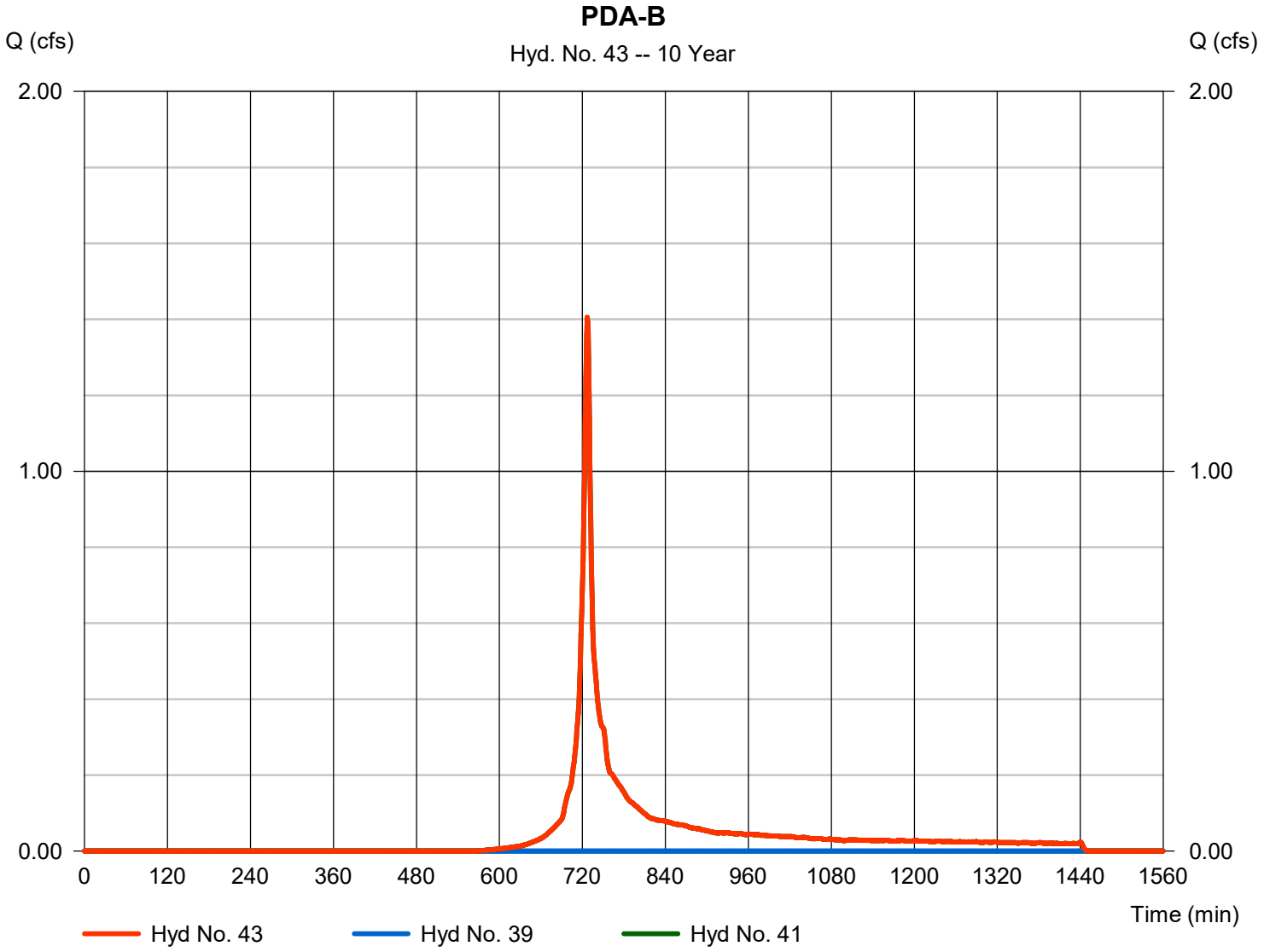


Hydrograph Report

Hyd. No. 43

PDA-B

Hydrograph type	=	Combine	Peak discharge	=	1.405 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	3,876 cuft
Inflow hyds.	=	39, 41	Contrib. drain. area	=	0.500 ac

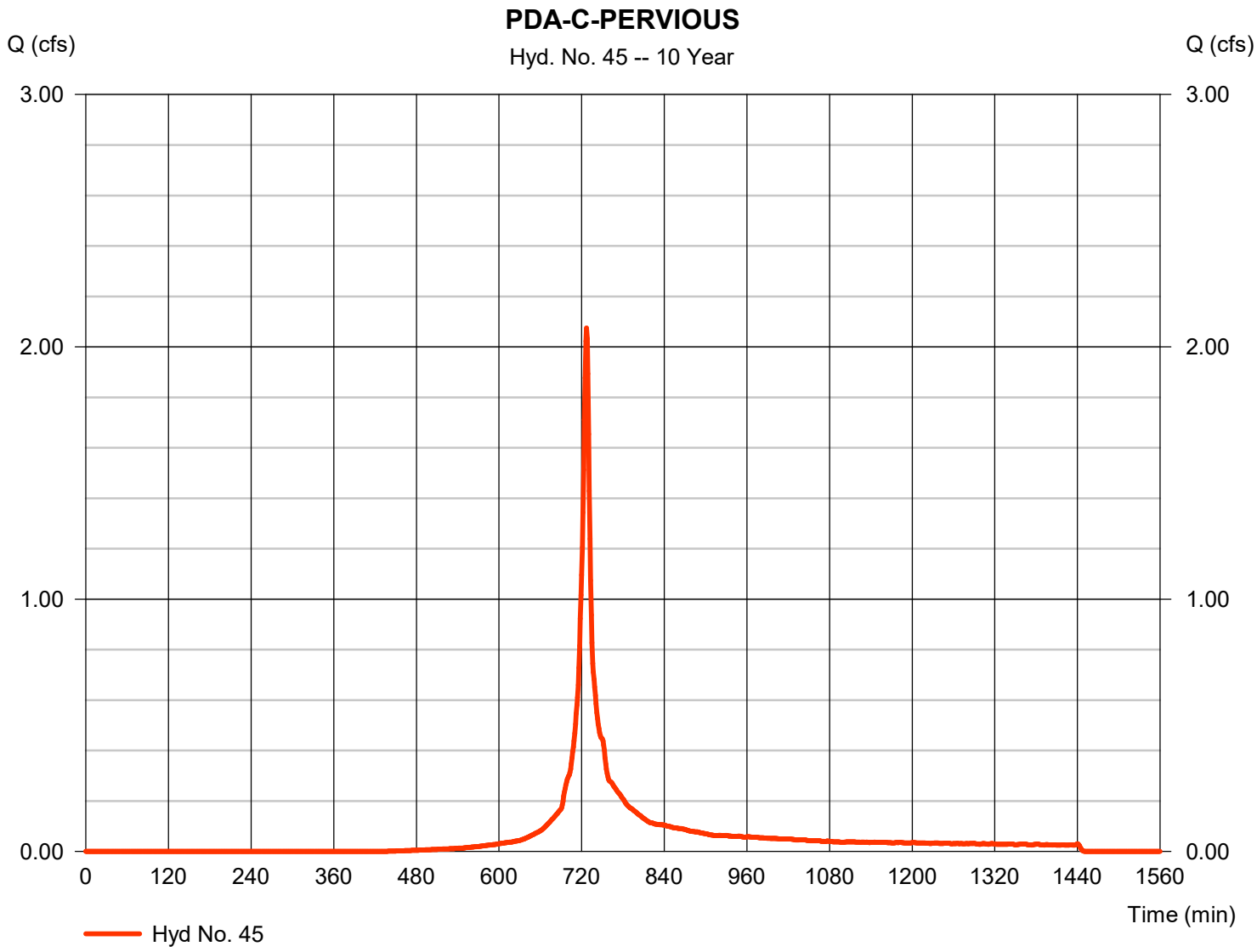


Hydrograph Report

Hyd. No. 45

PDA-C-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.075 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	5,761 cuft
Drainage area	=	0.560 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

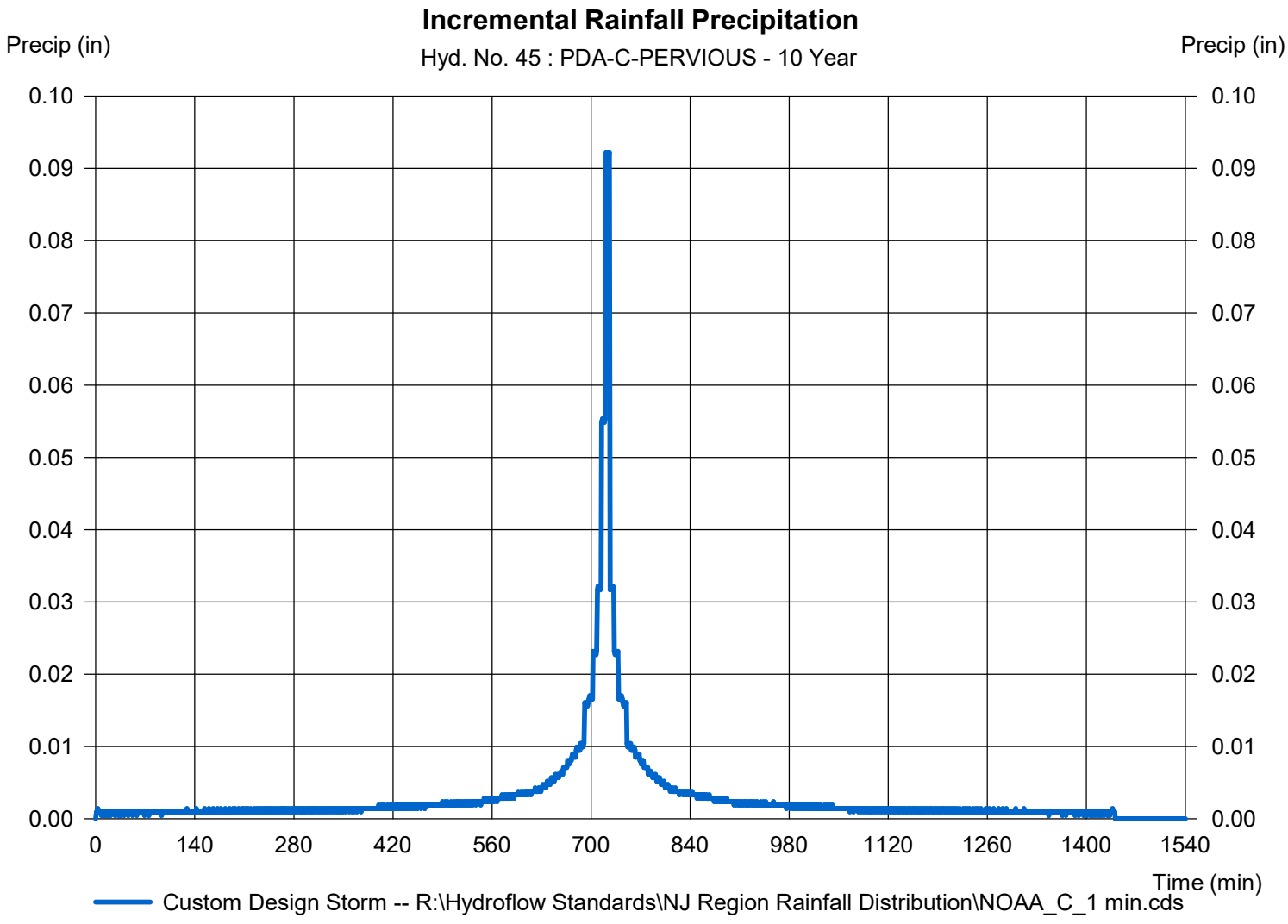


Precipitation Report

Hyd. No. 45

PDA-C-PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

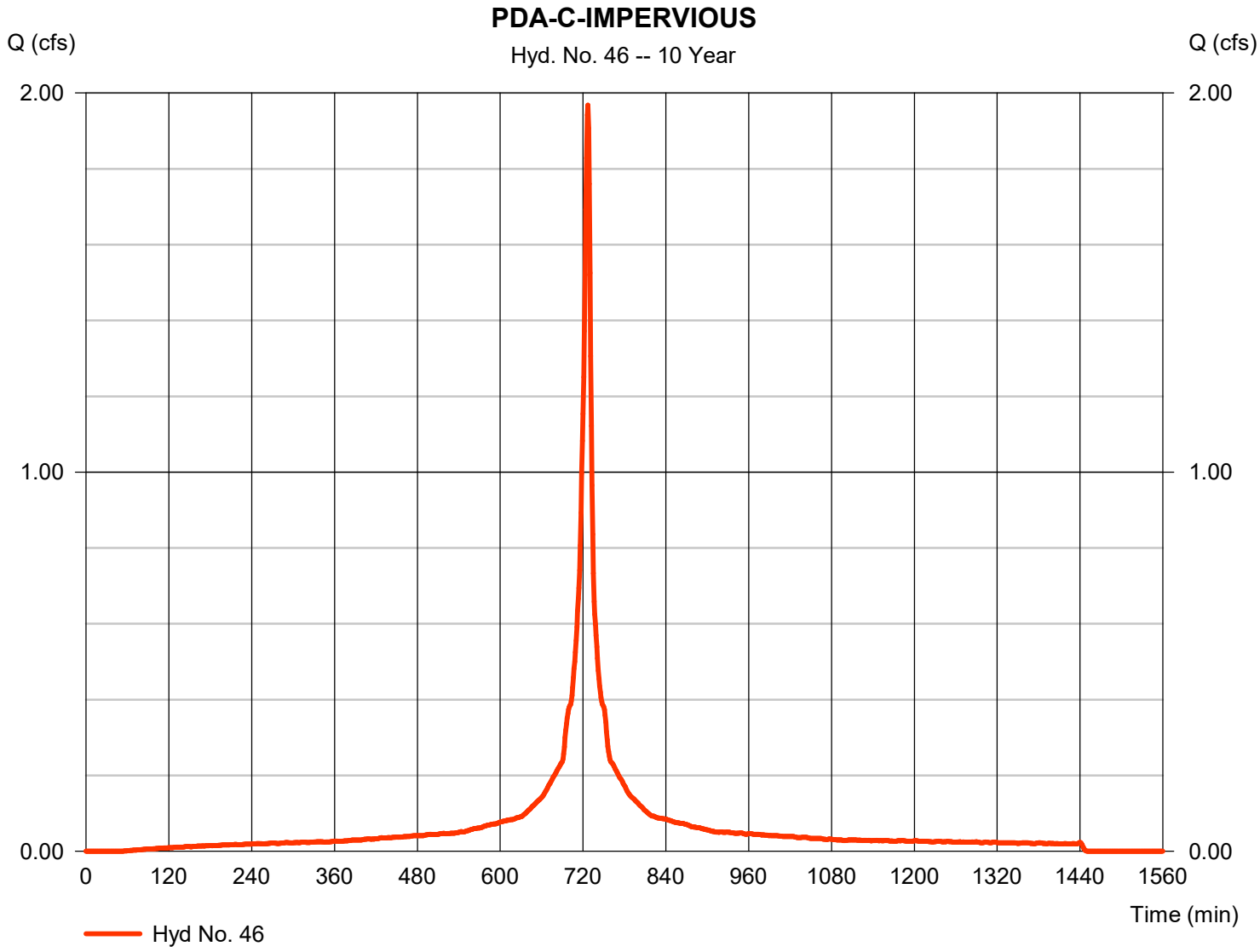


Hydrograph Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.968 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	6,392 cuft
Drainage area	=	0.380 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.50 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

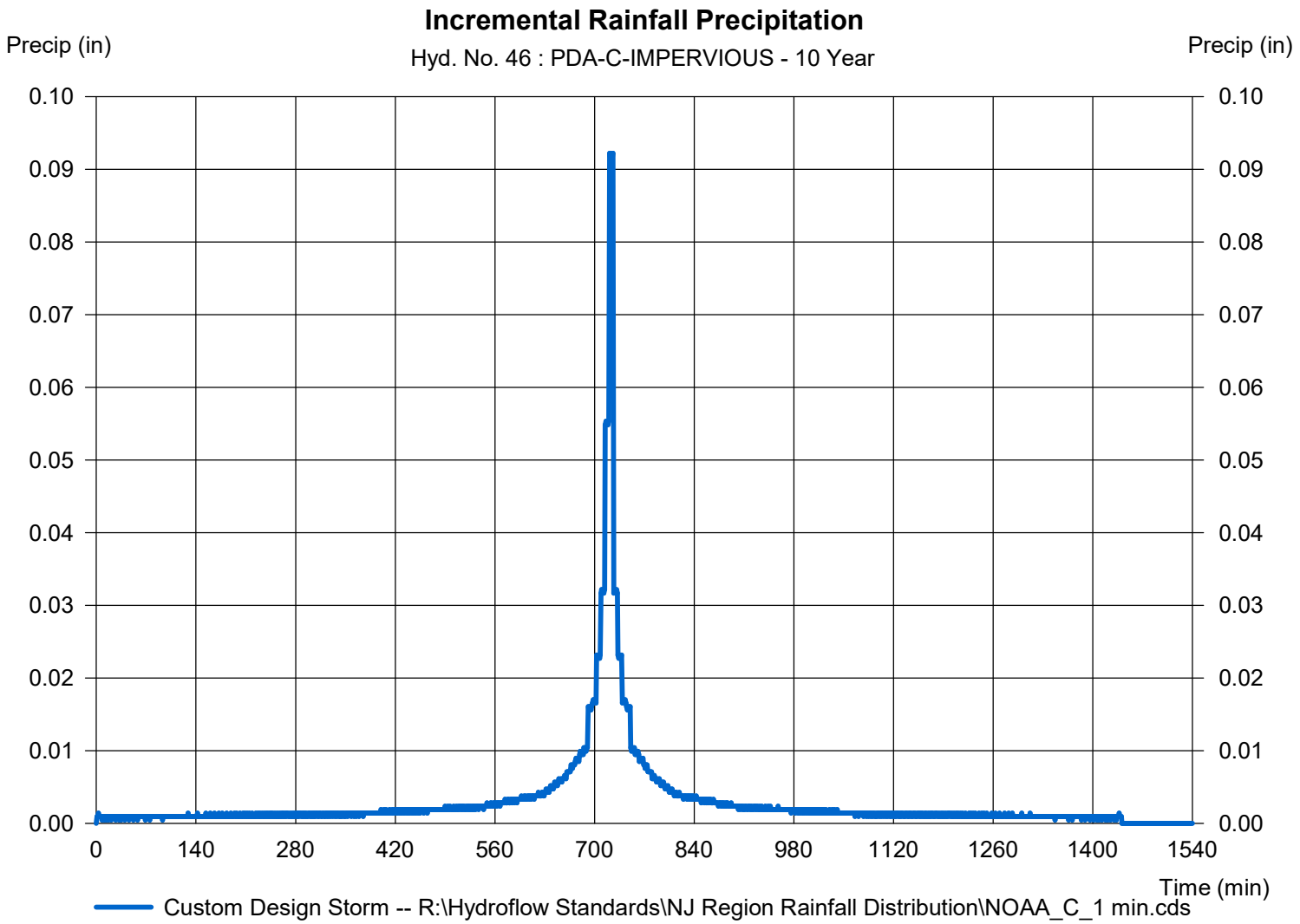


Precipitation Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

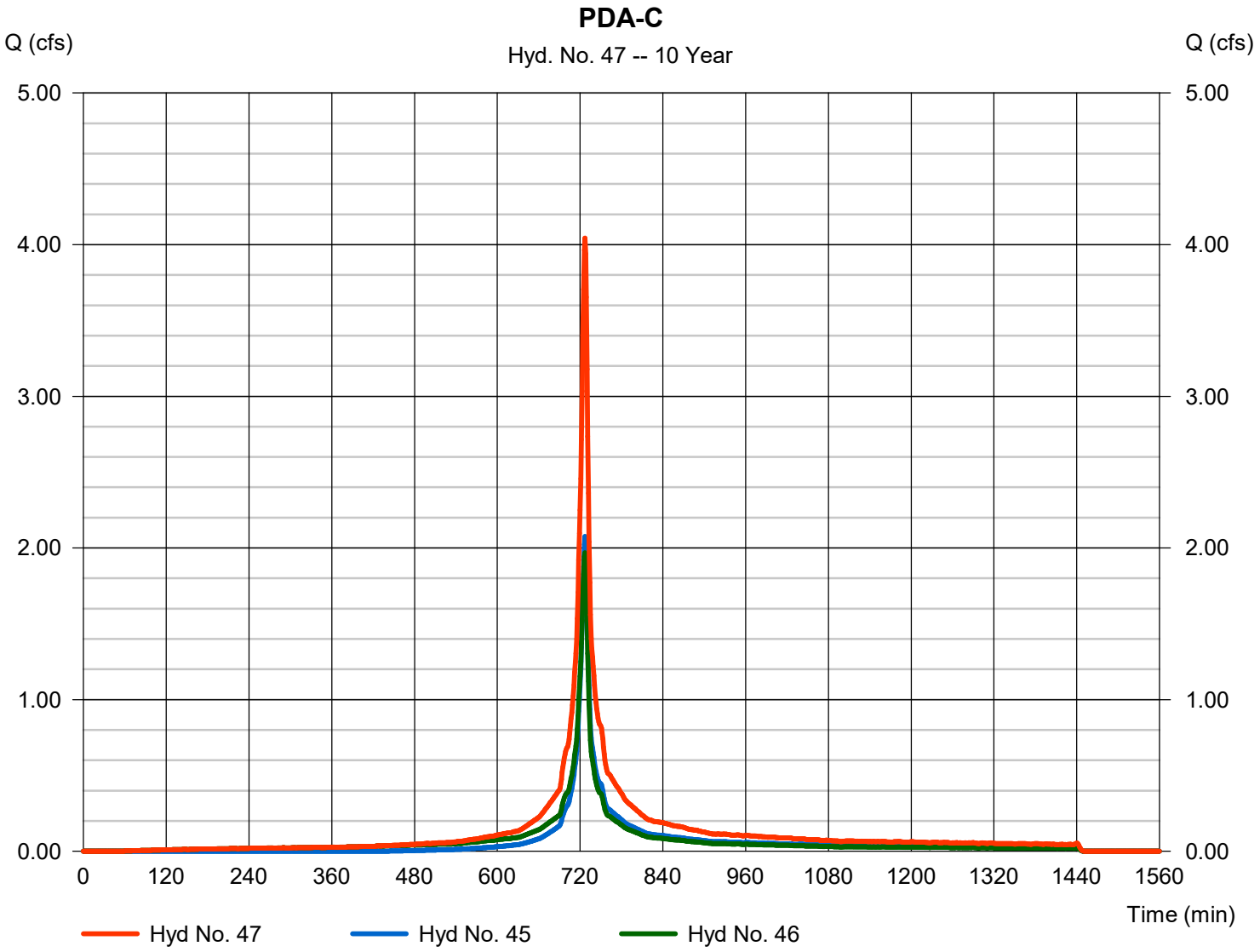


Hydrograph Report

Hyd. No. 47

PDA-C

Hydrograph type	= Combine	Peak discharge	= 4.043 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 12,153 cuft
Inflow hyds.	= 45, 46	Contrib. drain. area	= 0.940 ac



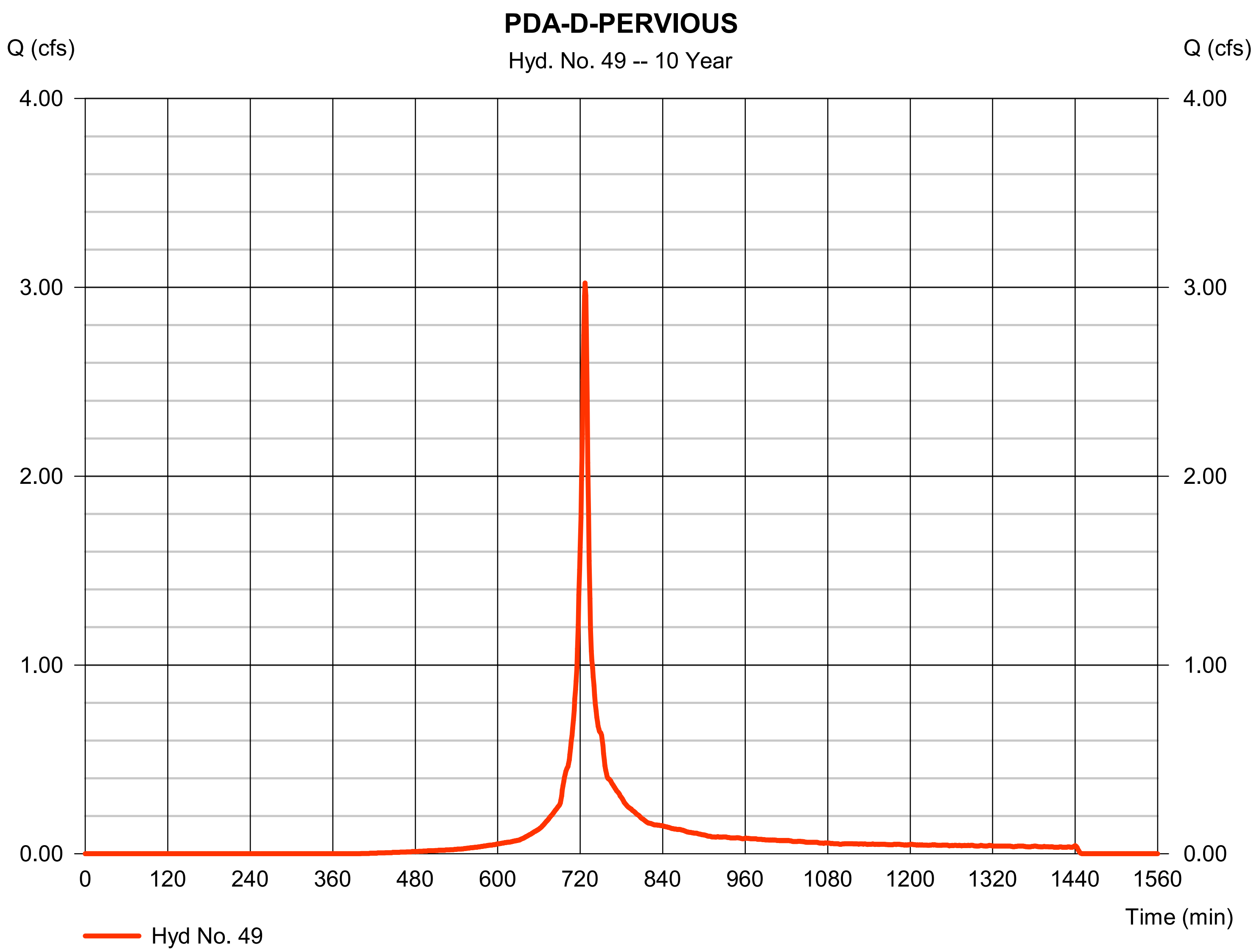
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 49

PDA-D-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 3.023 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 8,448 cuft
Drainage area	= 0.770 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

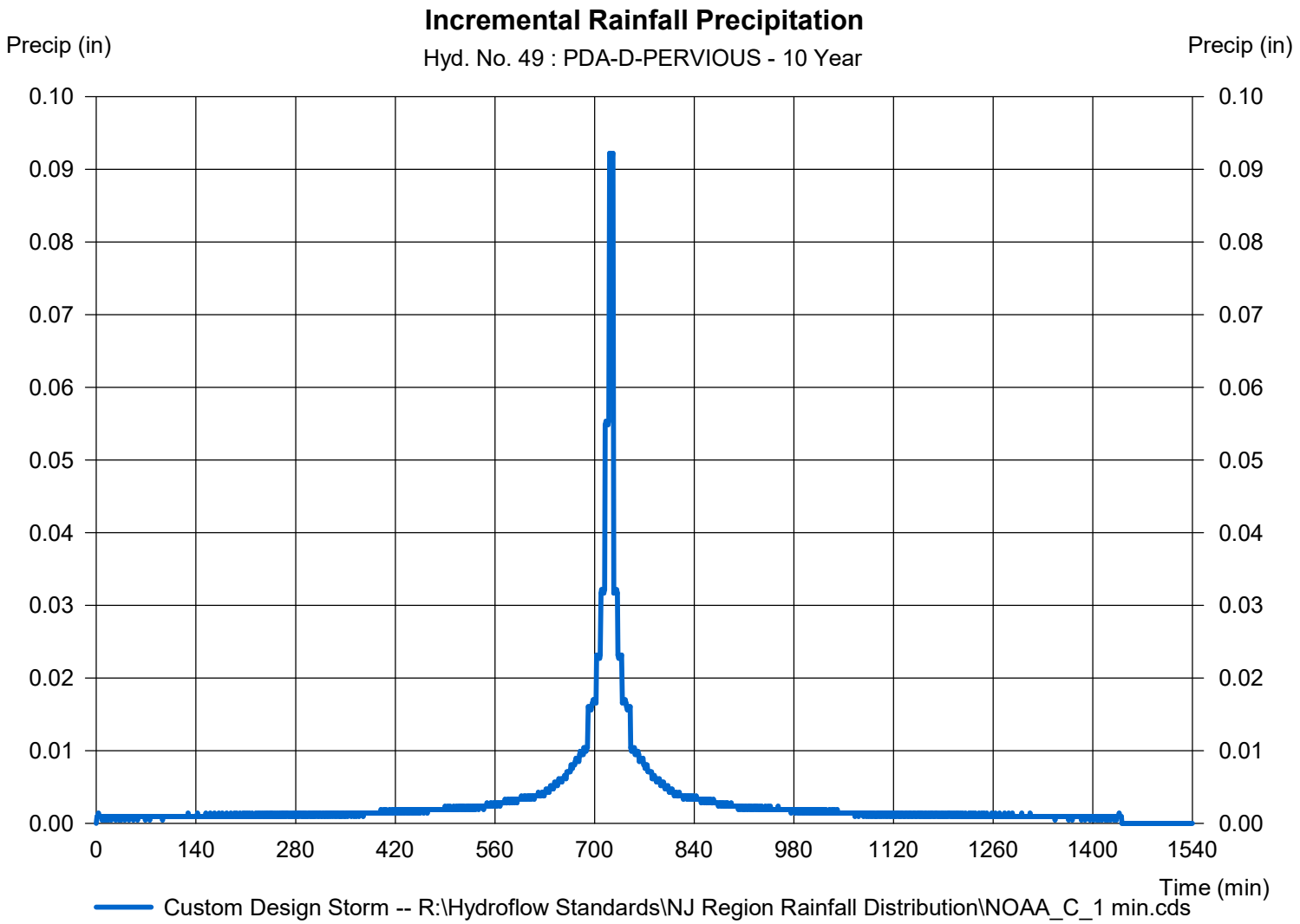


Precipitation Report

Hyd. No. 49

PDA-D-PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

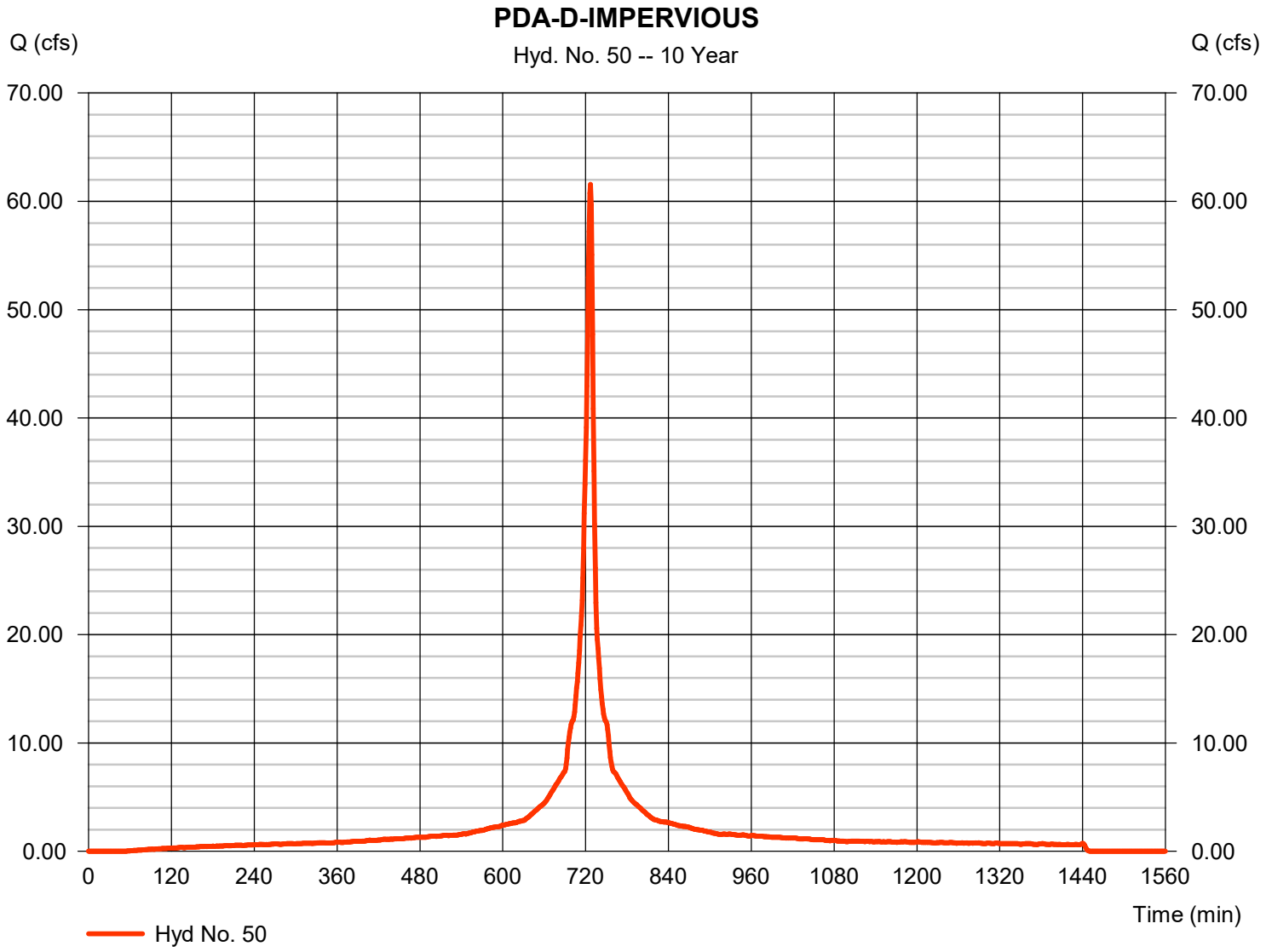


Hydrograph Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	61.57 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	200,008 cuft
Drainage area	=	11.890 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

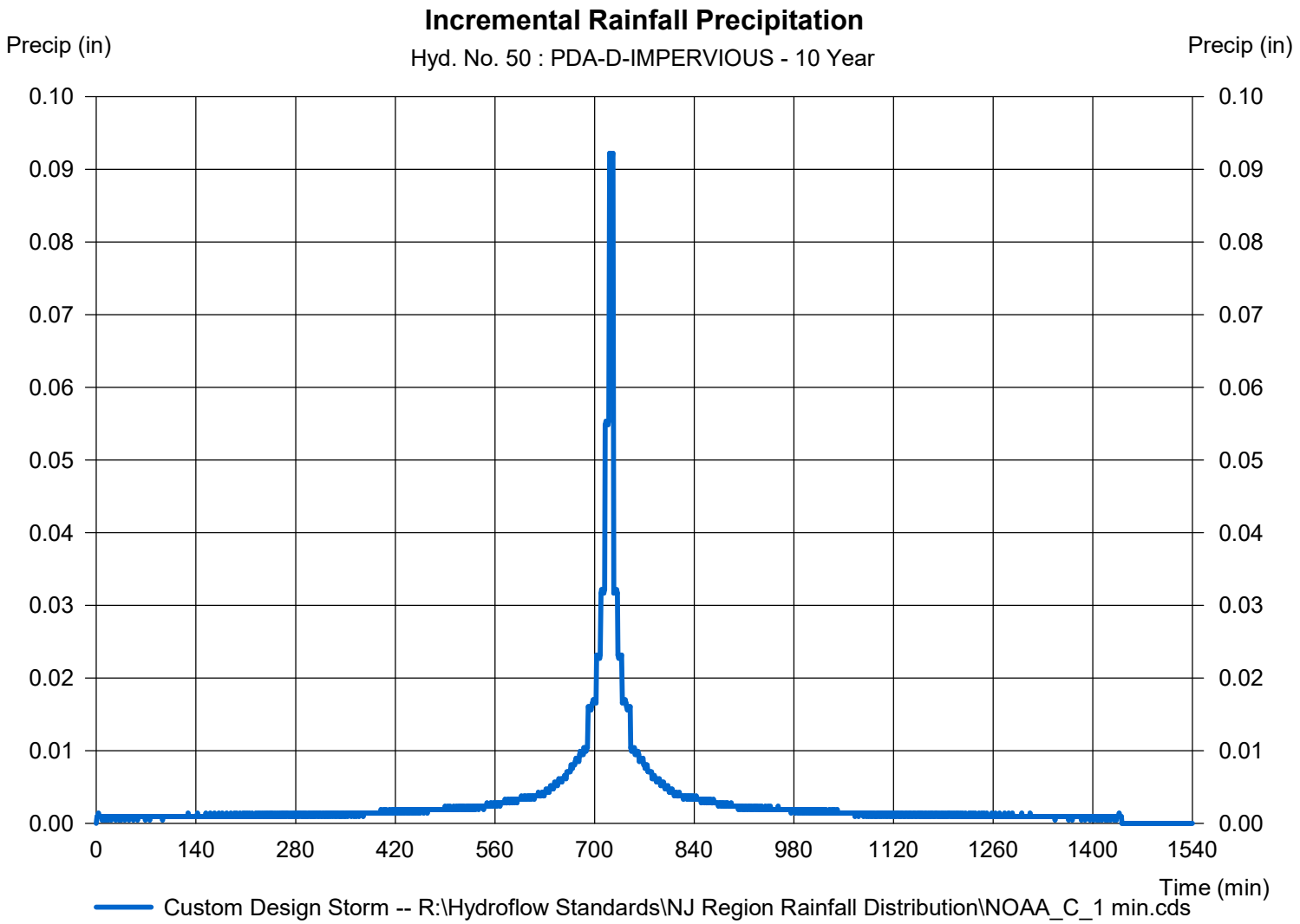


Precipitation Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

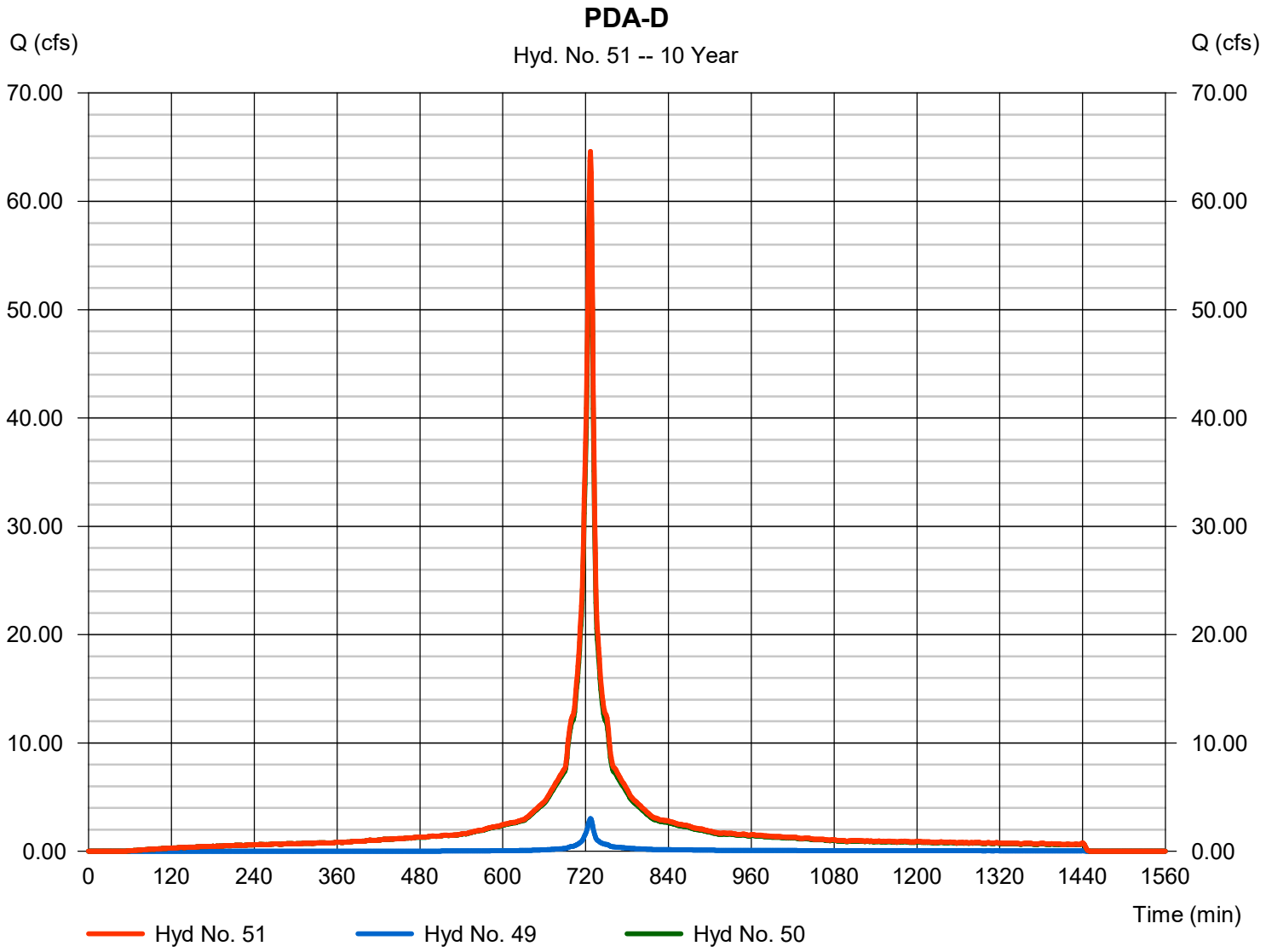


Hydrograph Report

Hyd. No. 51

PDA-D

Hydrograph type	= Combine	Peak discharge	= 64.59 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 208,457 cuft
Inflow hyds.	= 49, 50	Contrib. drain. area	= 12.660 ac



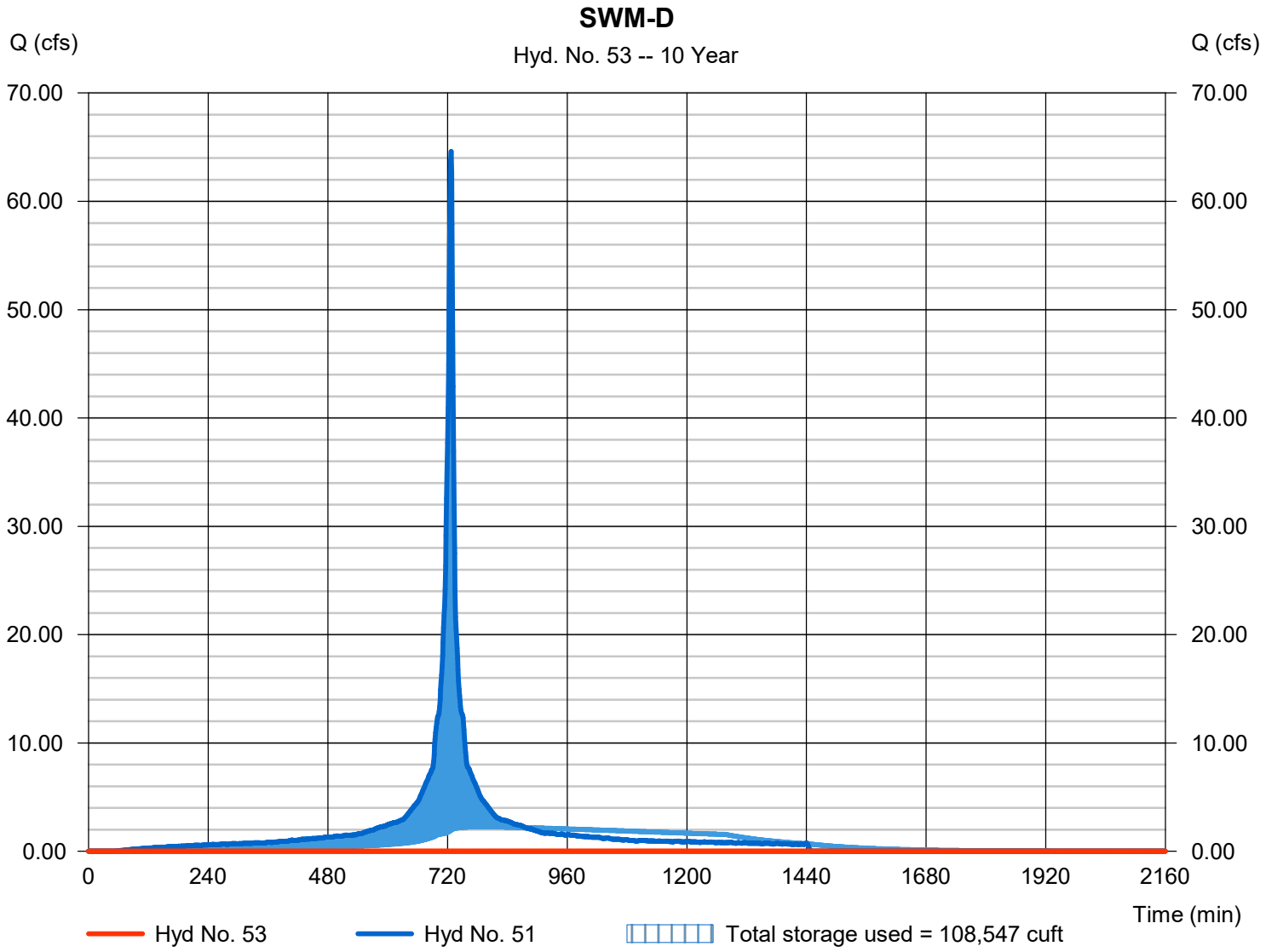
Hydrograph Report

Hyd. No. 53

SWM-D

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	615 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	51 - PDA-D	Max. Elevation	=	601.84 ft
Reservoir name	=	SWM-D	Max. Storage	=	108,547 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

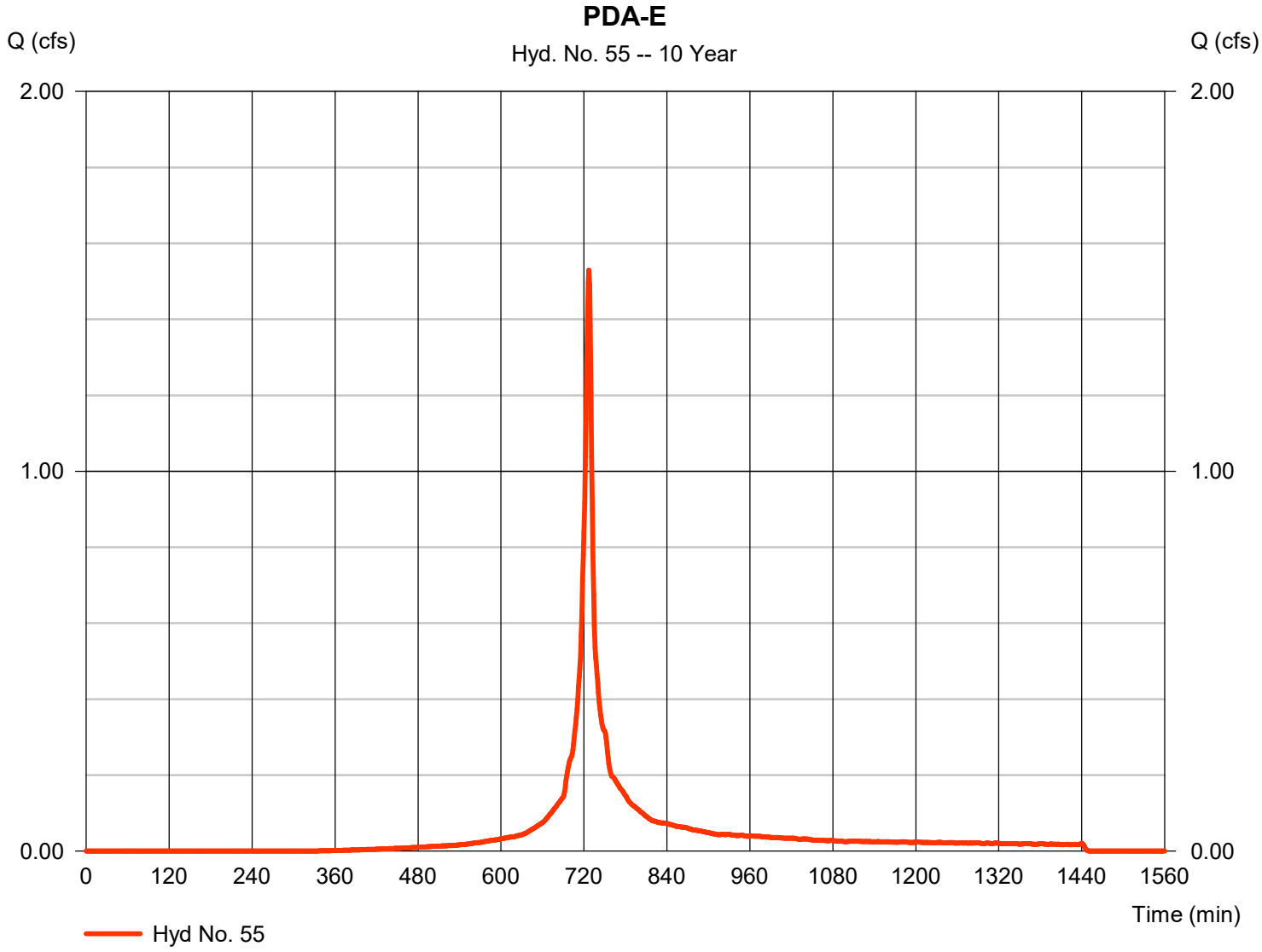


Hydrograph Report

Hyd. No. 55

PDA-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.529 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	4,334 cuft
Drainage area	=	0.360 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

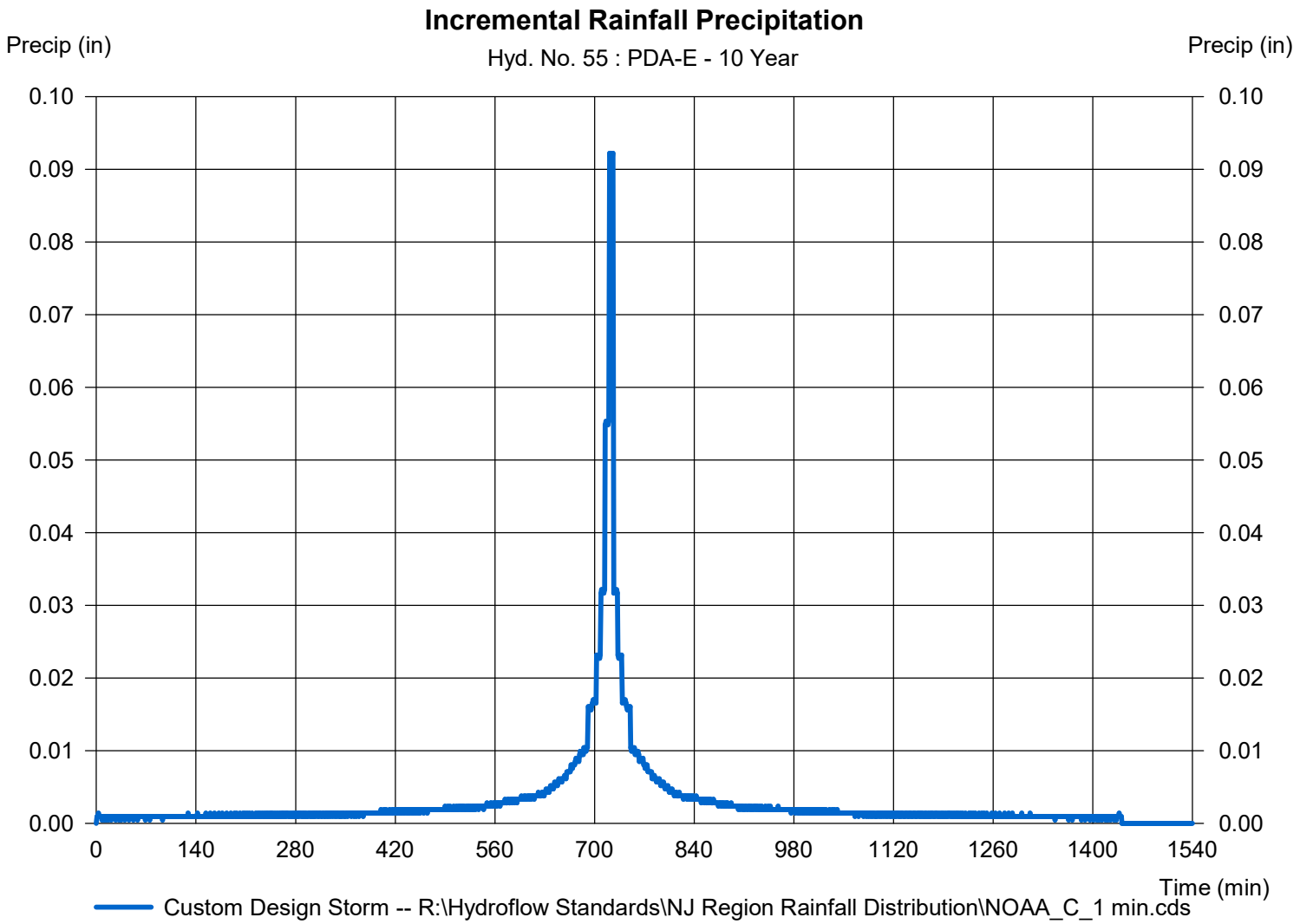


Precipitation Report

Hyd. No. 55

PDA-E

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

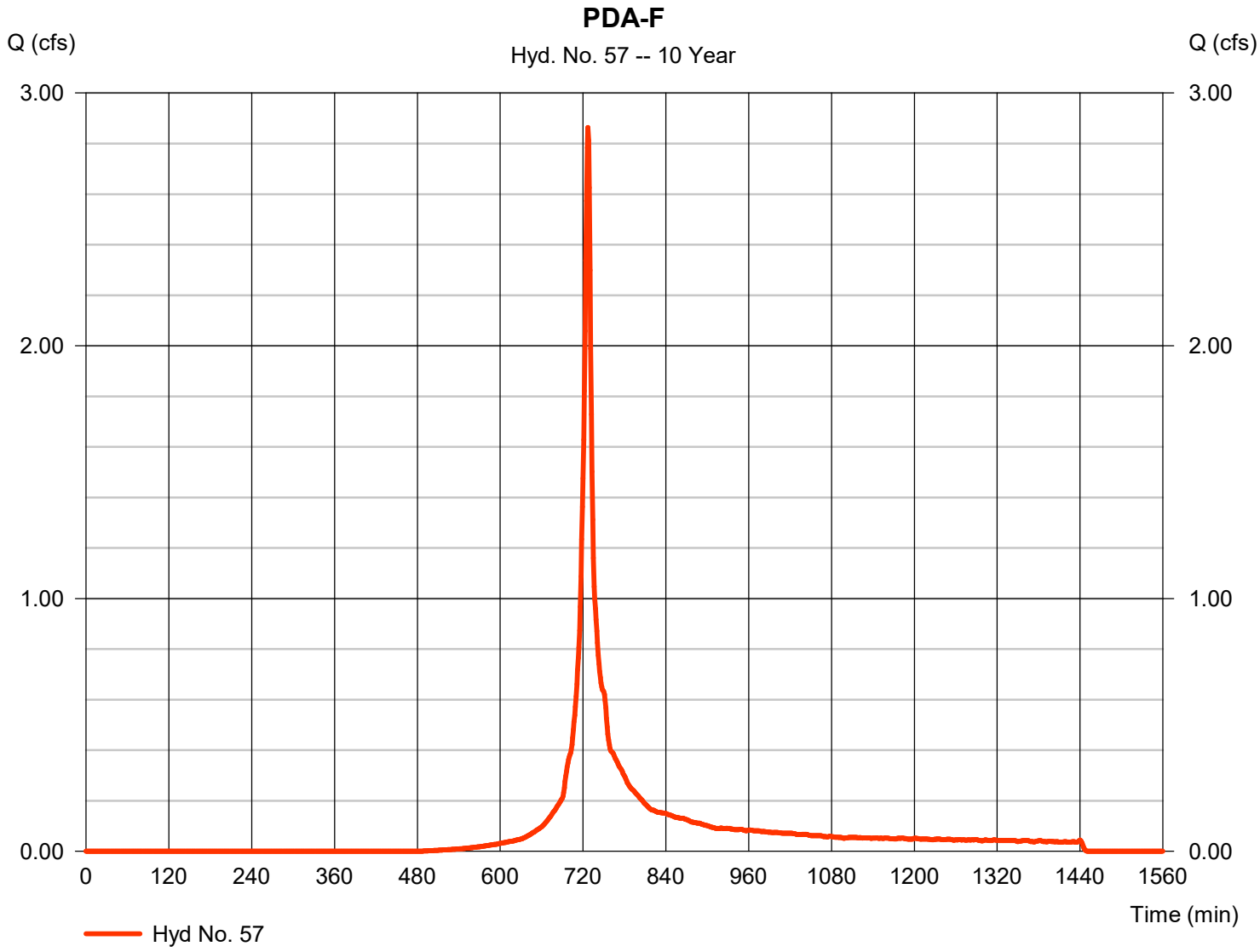


Hydrograph Report

Hyd. No. 57

PDA-F

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.864 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	7,904 cuft
Drainage area	=	0.850 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

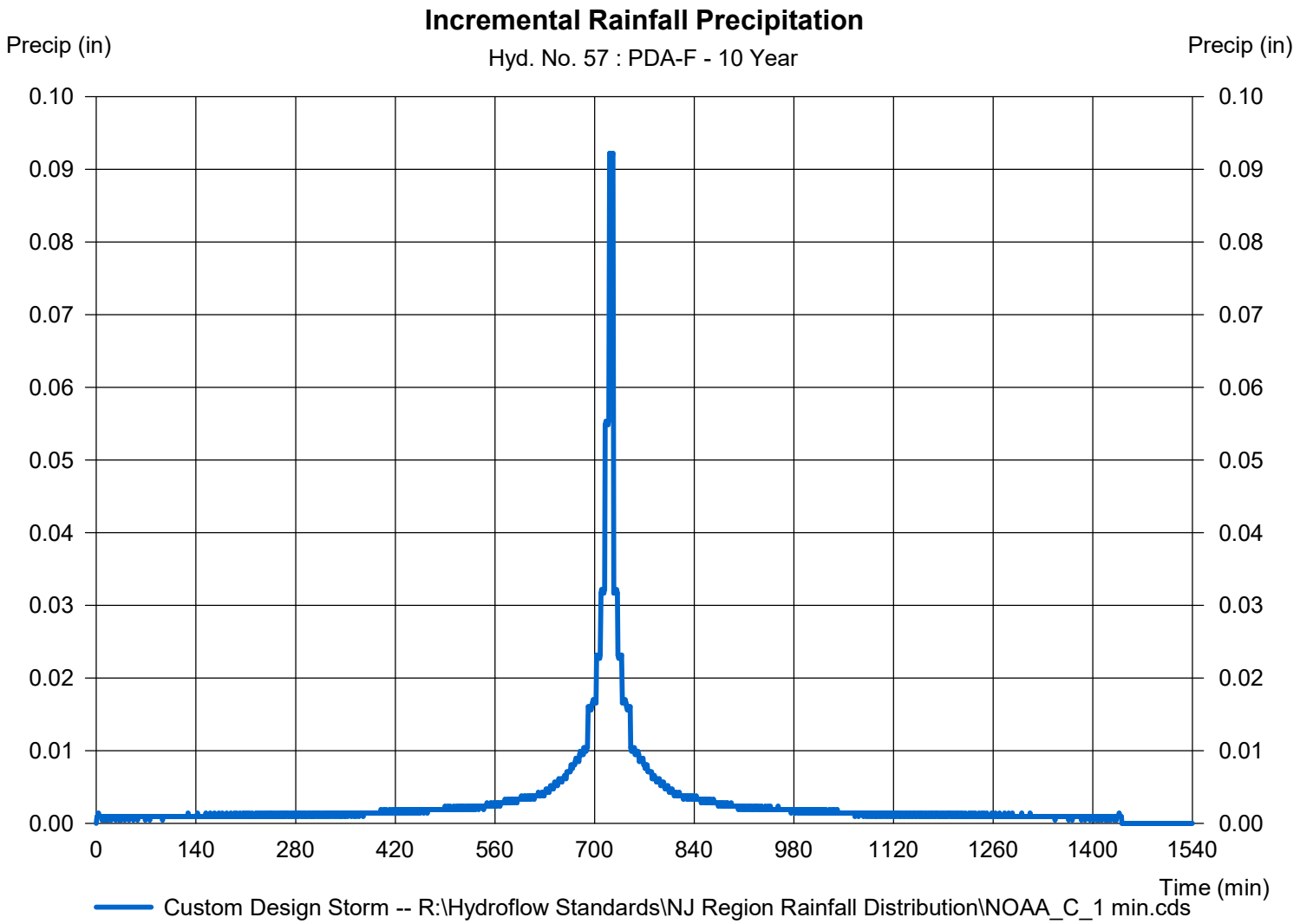


Precipitation Report

Hyd. No. 57

PDA-F

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

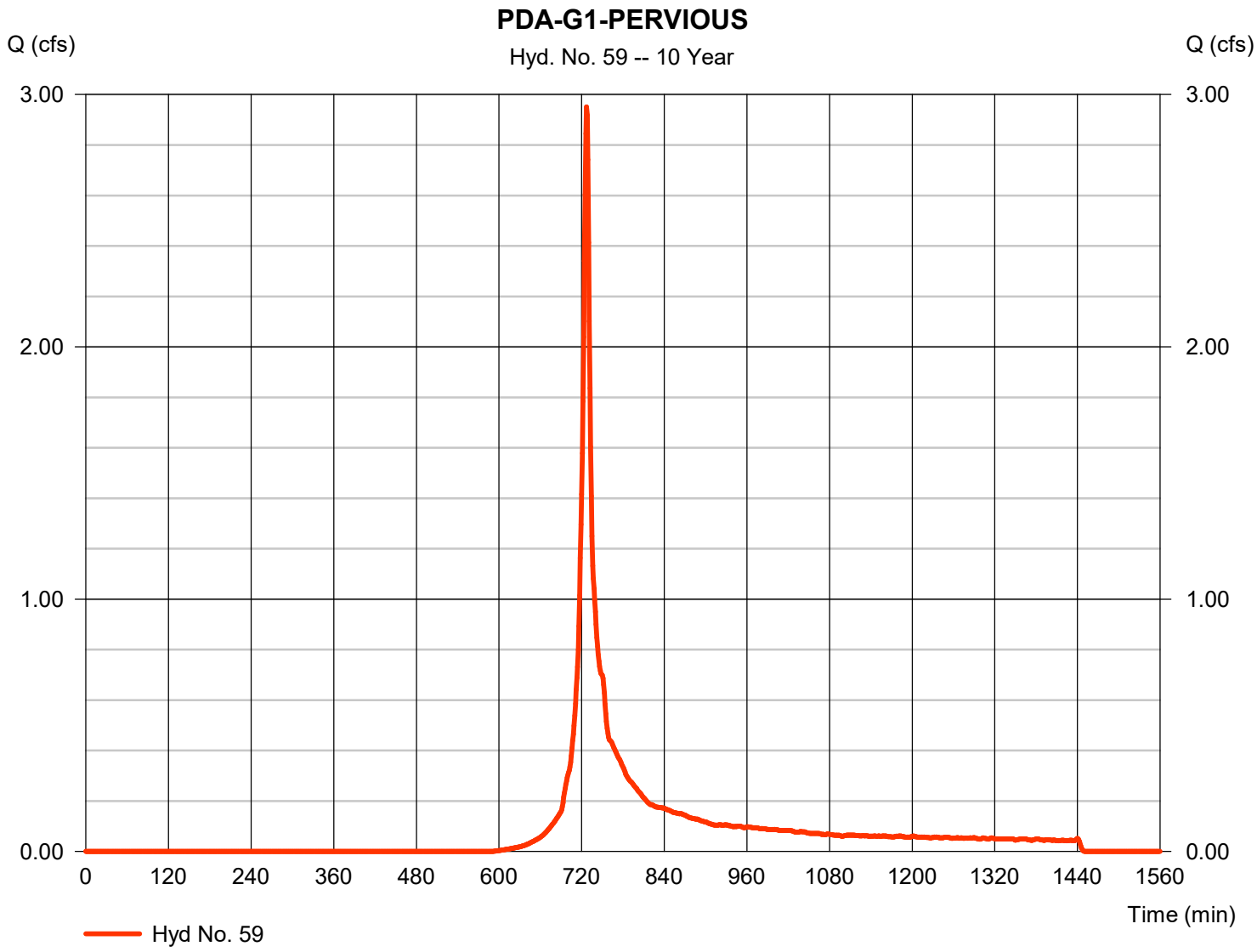


Hydrograph Report

Hyd. No. 59

PDA-G1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.951 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	8,171 cuft
Drainage area	=	1.140 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

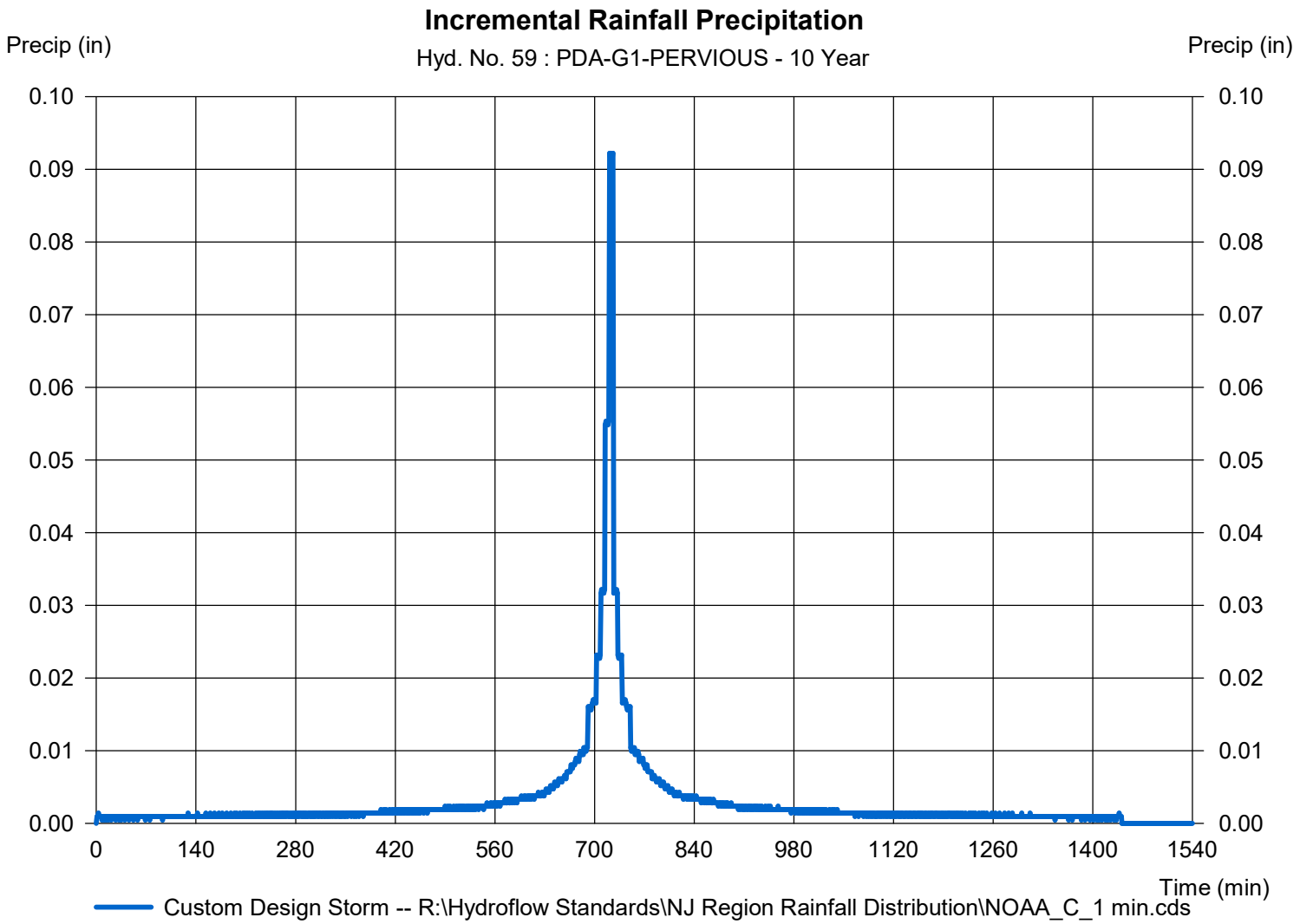


Precipitation Report

Hyd. No. 59

PDA-G1-PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

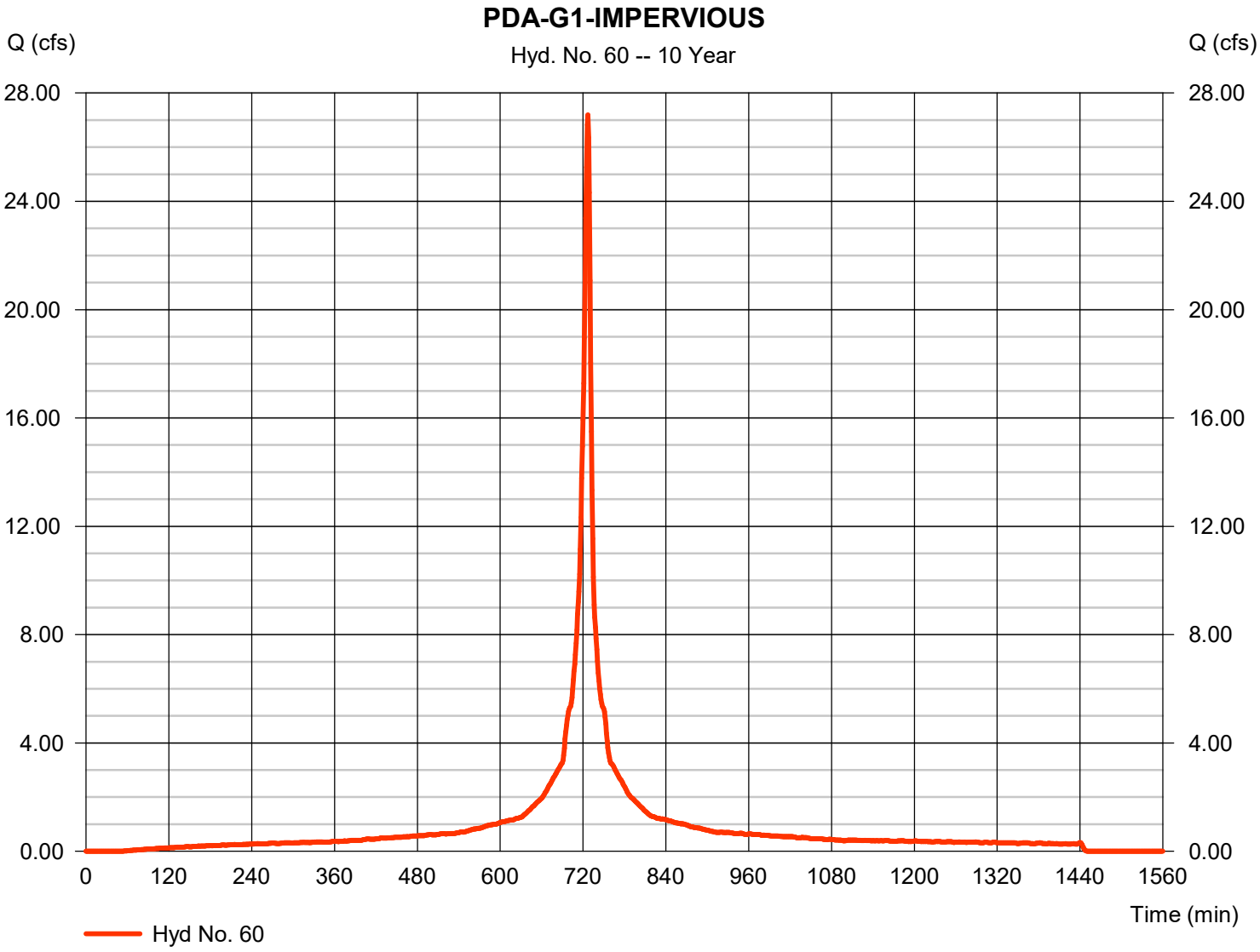


Hydrograph Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.19 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	88,313 cuft
Drainage area	=	5.250 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

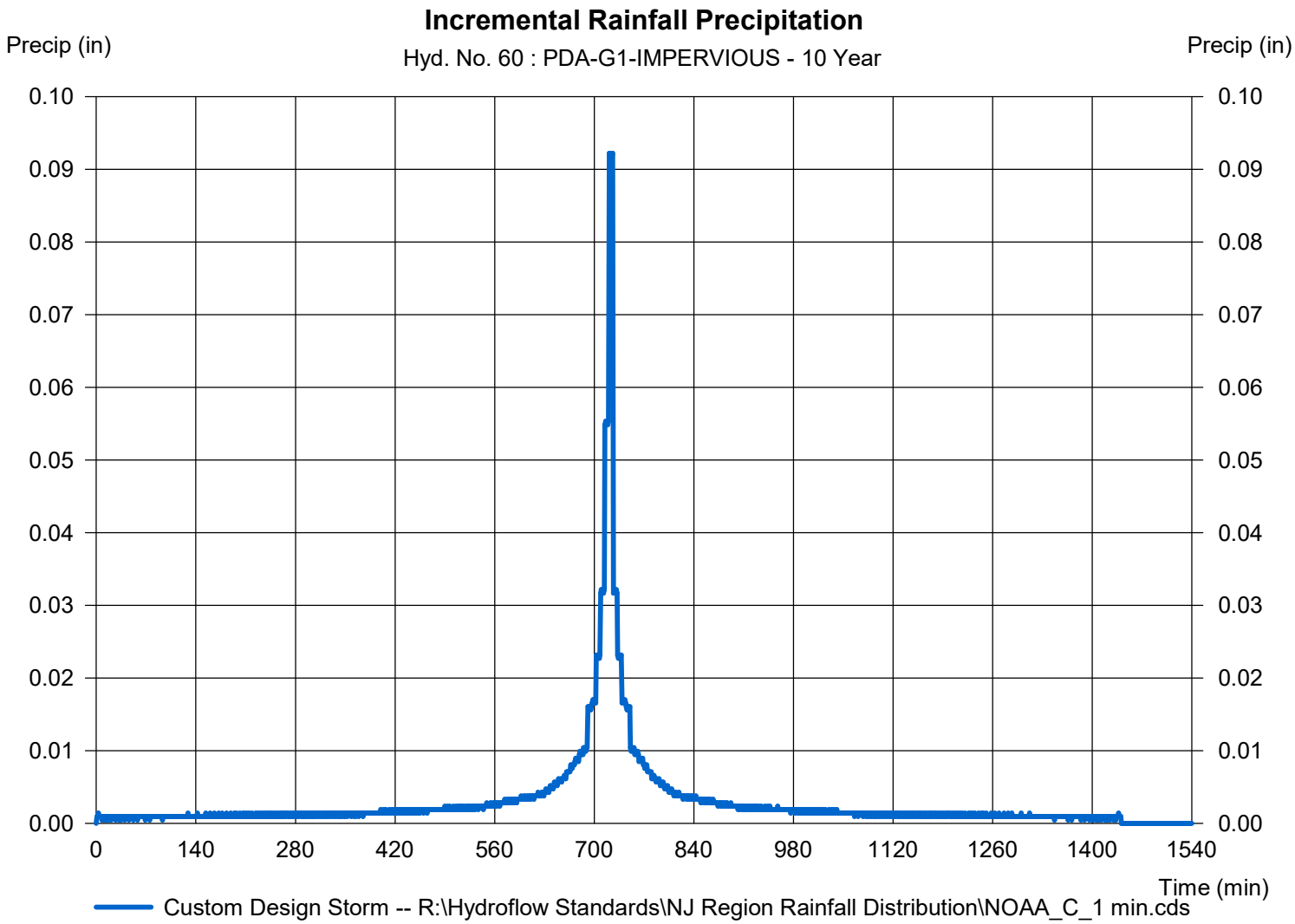


Precipitation Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

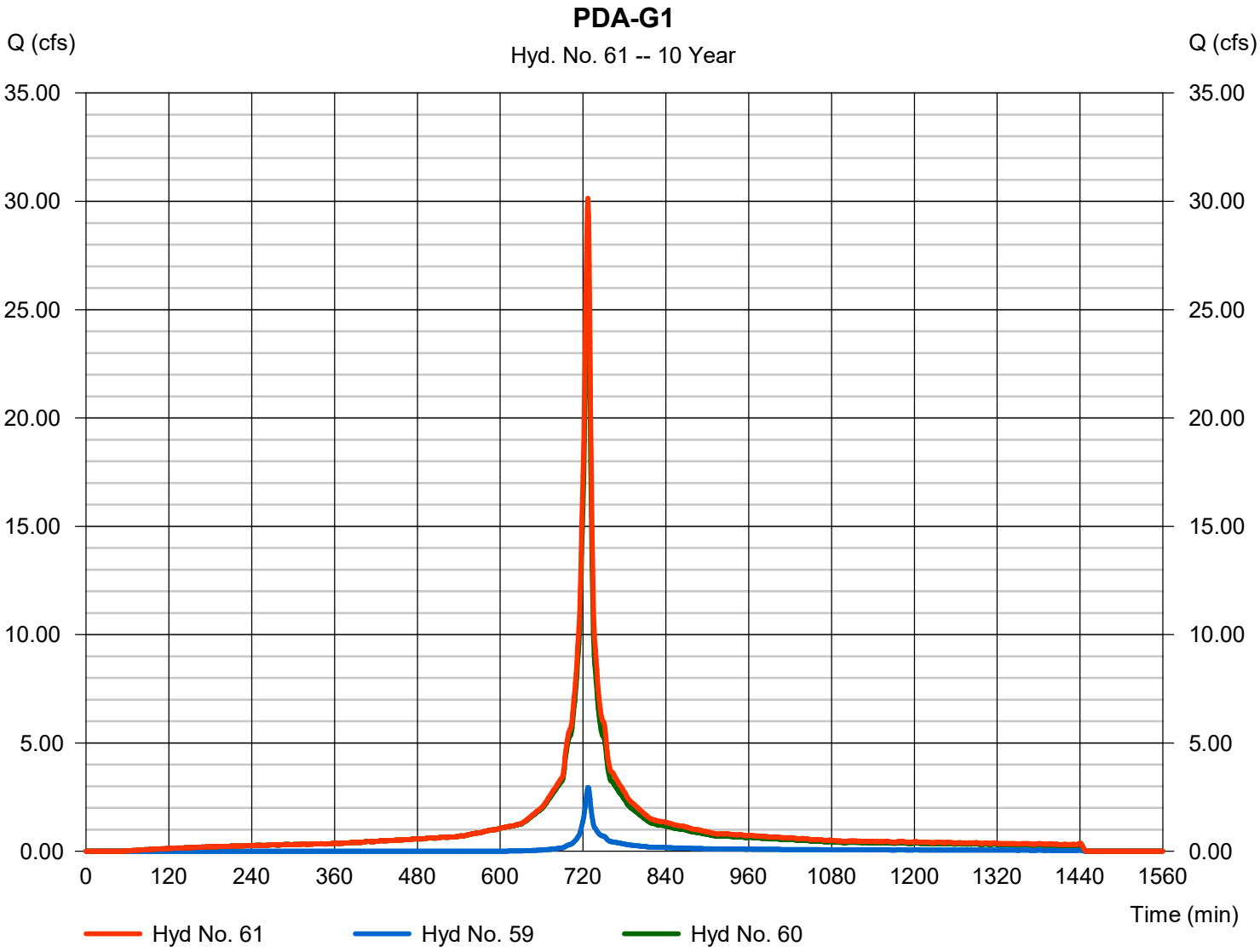


Hydrograph Report

Hyd. No. 61

PDA-G1

Hydrograph type	=	Combine	Peak discharge	=	30.14 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	96,484 cuft
Inflow hyds.	=	59, 60	Contrib. drain. area	=	6.390 ac



Hydrograph Report

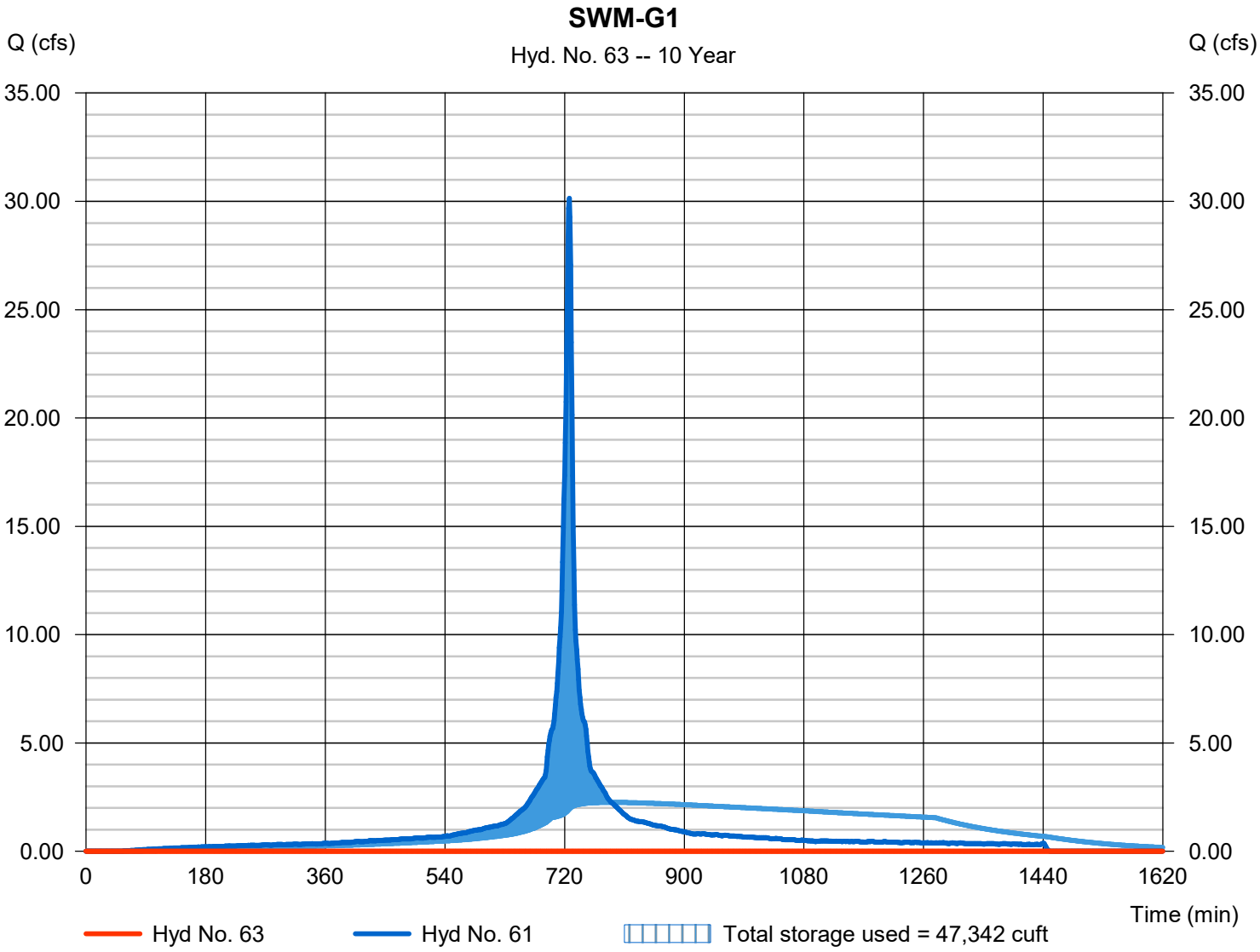
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 63

SWM-G1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 650 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 61 - PDA-G1	Max. Elevation	= 599.14 ft
Reservoir name	= SWM-G1	Max. Storage	= 47,342 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



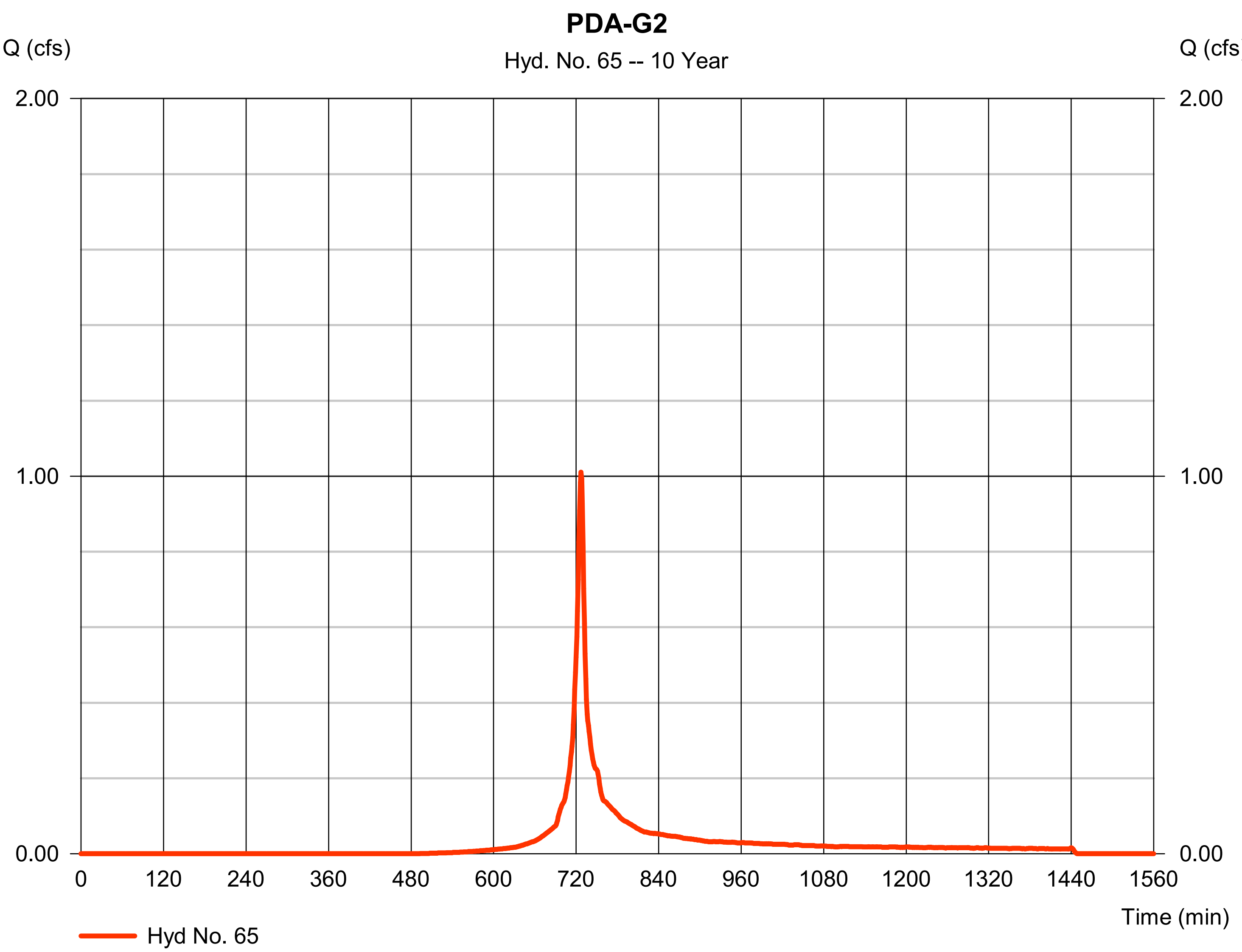
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 65

PDA-G2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.011 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 2,790 cuft
Drainage area	= 0.300 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

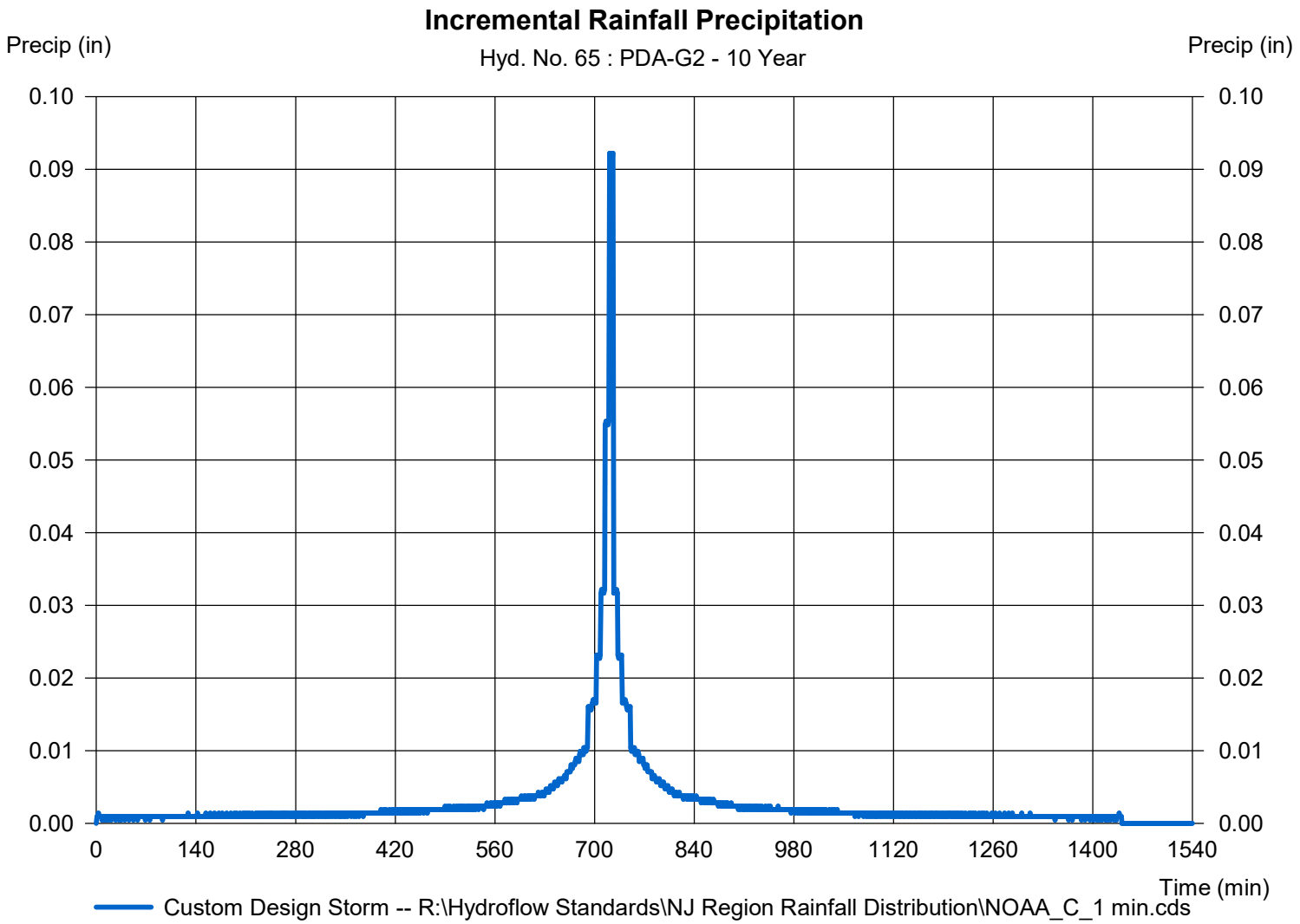


Precipitation Report

Hyd. No. 65

PDA-G2

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

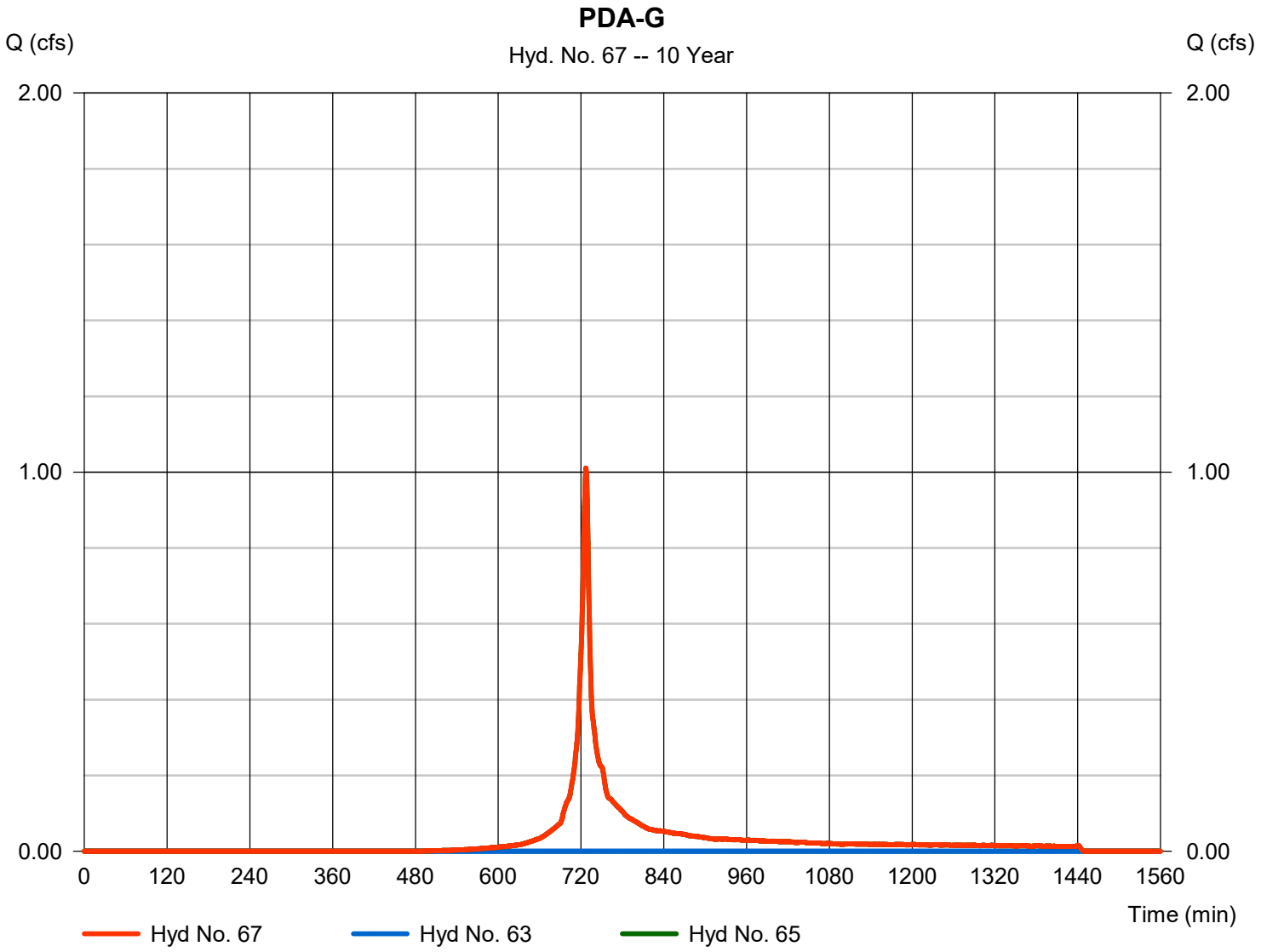


Hydrograph Report

Hyd. No. 67

PDA-G

Hydrograph type	=	Combine	Peak discharge	=	1.011 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,790 cuft
Inflow hyds.	=	63, 65	Contrib. drain. area	=	0.300 ac



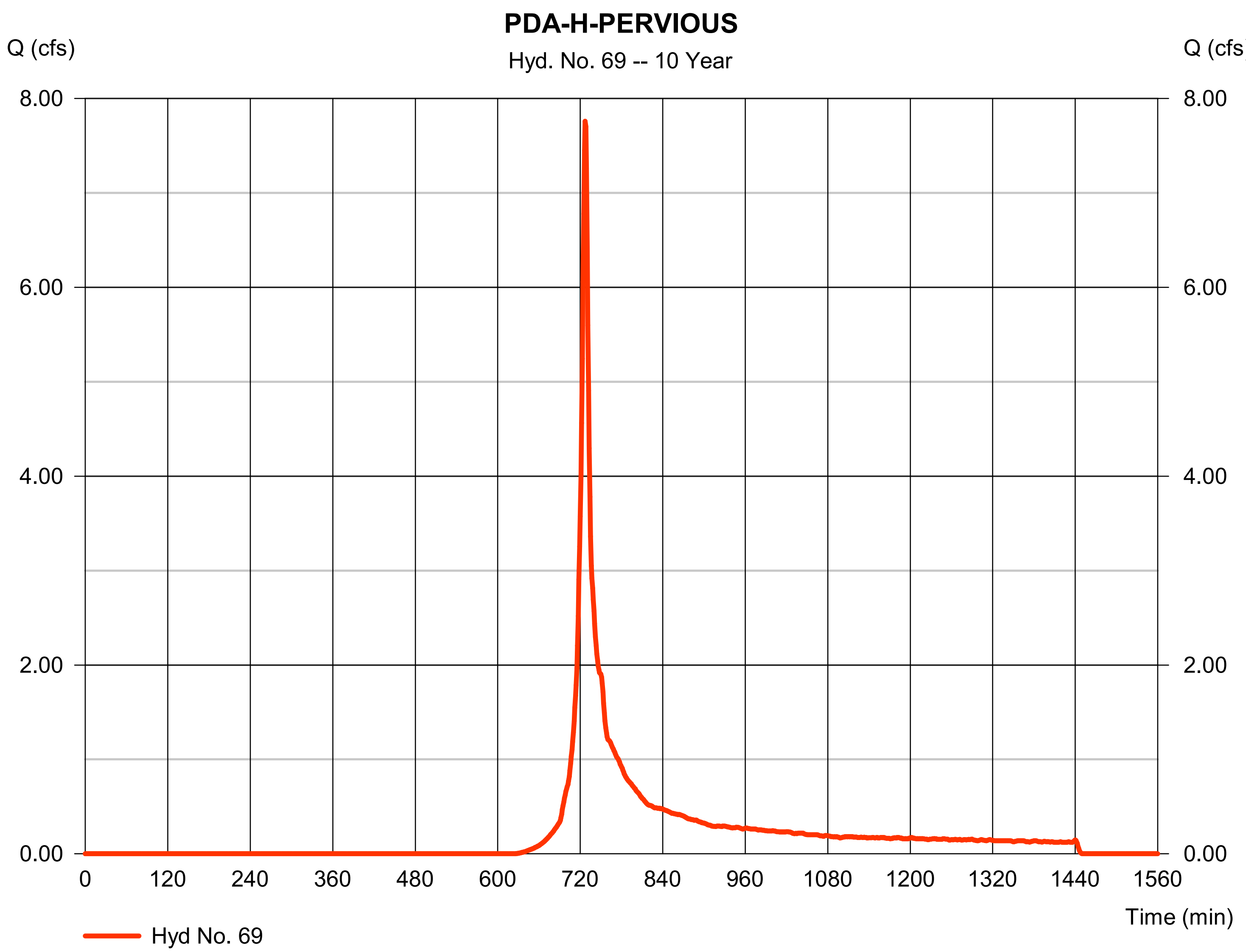
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Monday, 11 / 2 / 2020

Hyd. No. 69

PDA-H-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 7.759 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 21,698 cuft
Drainage area	= 3.430 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.73 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

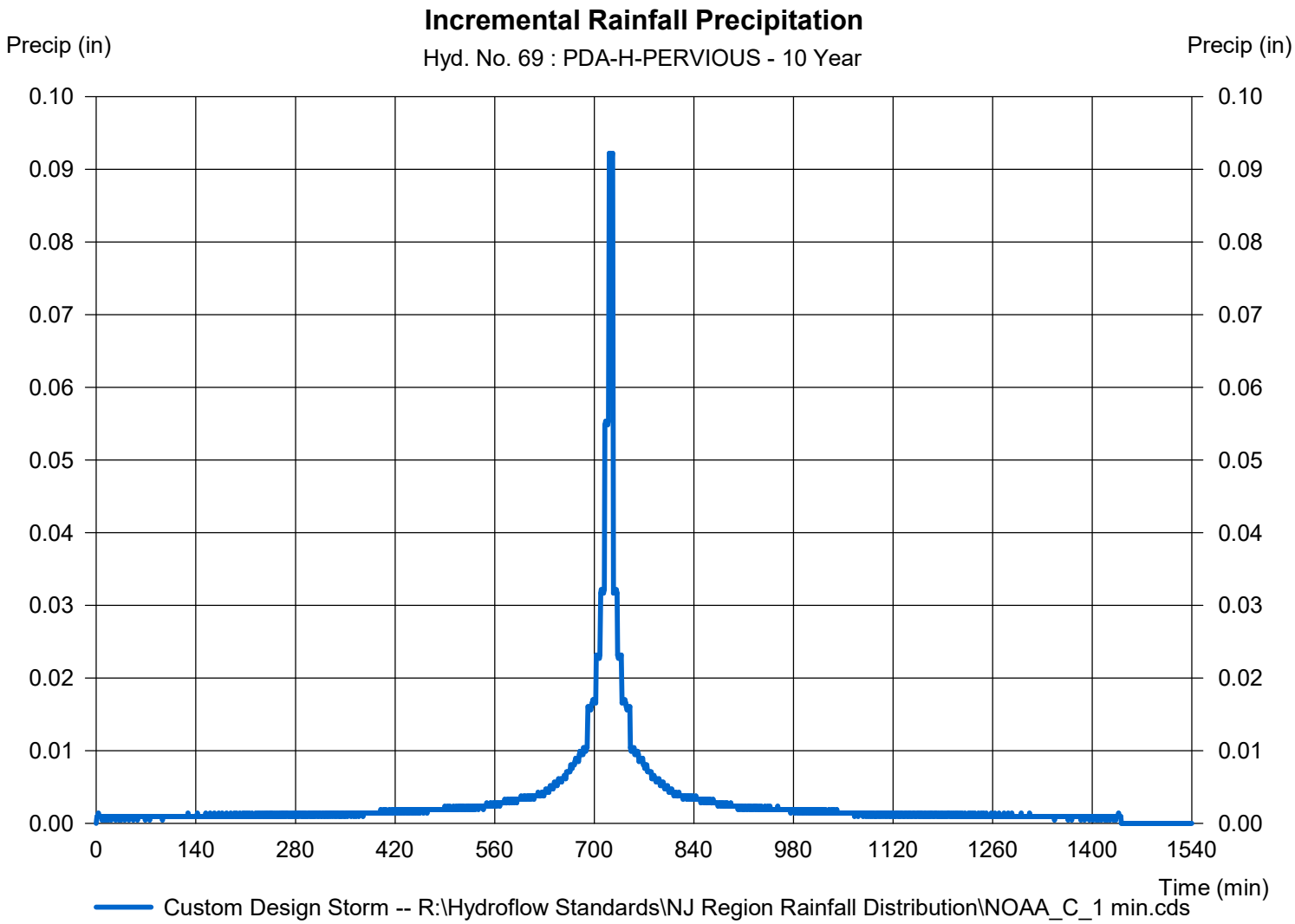


Precipitation Report

Hyd. No. 69

PDA-H-PERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

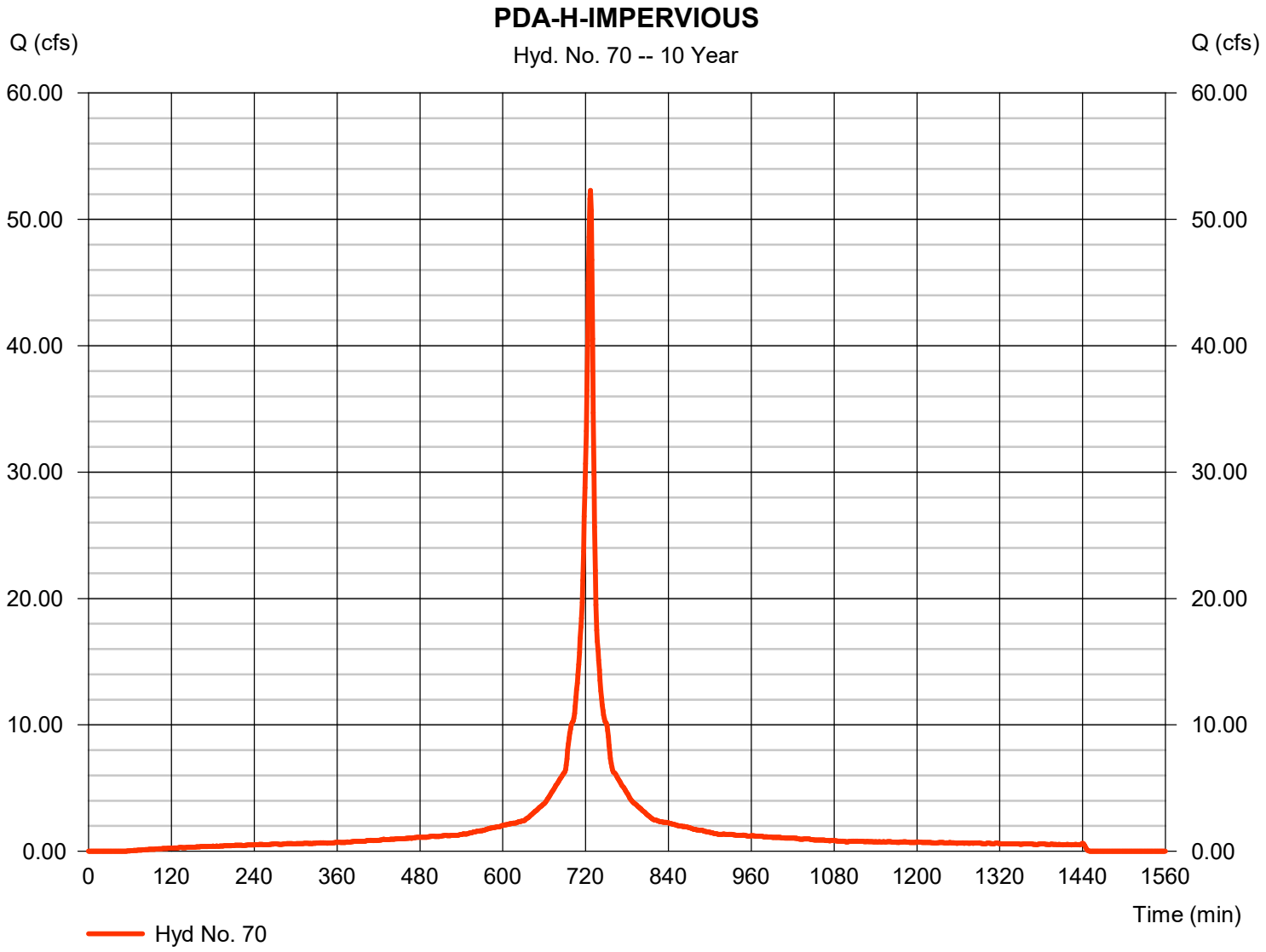


Hydrograph Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	52.30 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	169,898 cuft
Drainage area	=	10.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

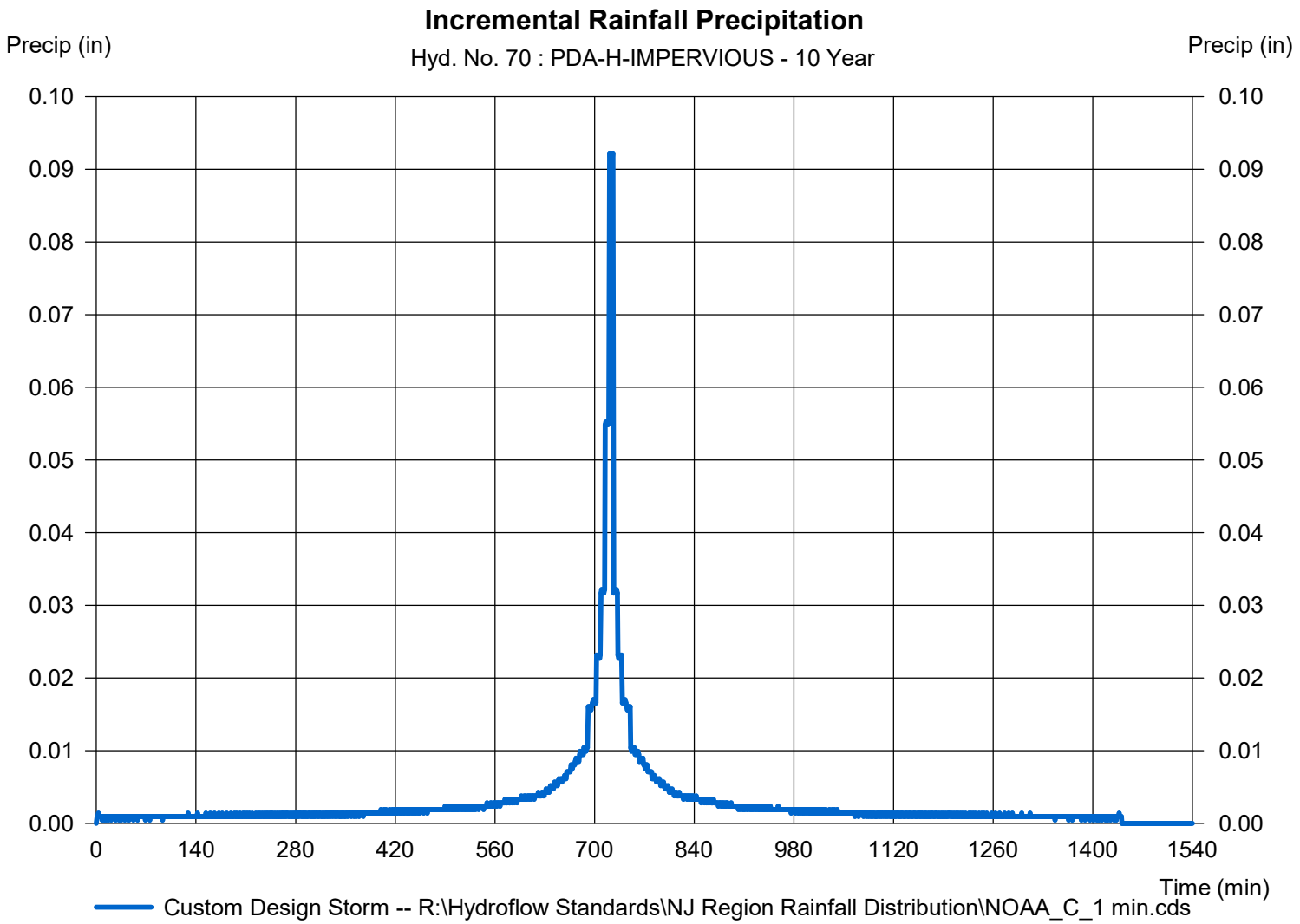


Precipitation Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

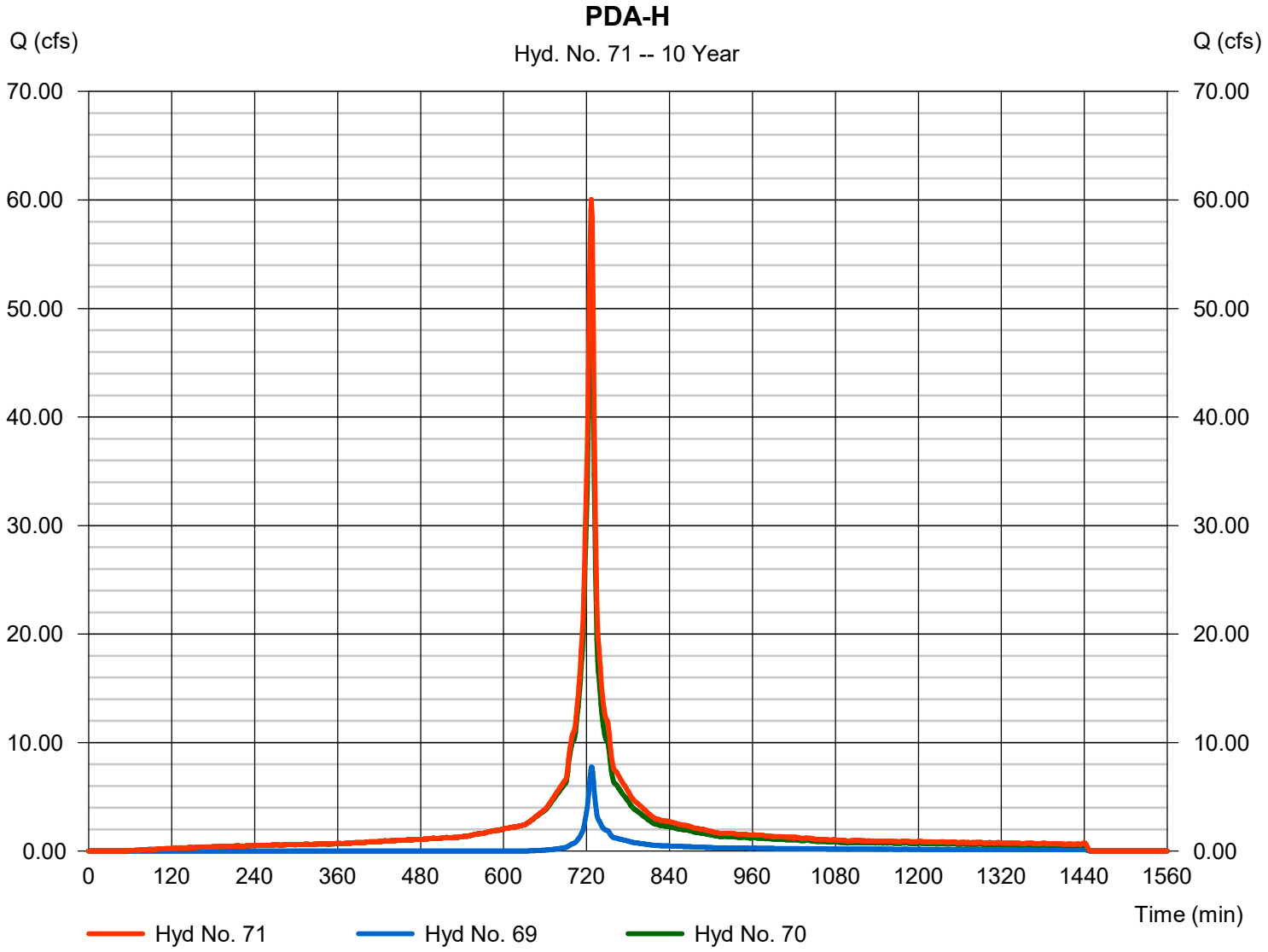


Hydrograph Report

Hyd. No. 71

PDA-H

Hydrograph type	= Combine	Peak discharge	= 60.06 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 191,596 cuft
Inflow hyds.	= 69, 70	Contrib. drain. area	= 13.530 ac



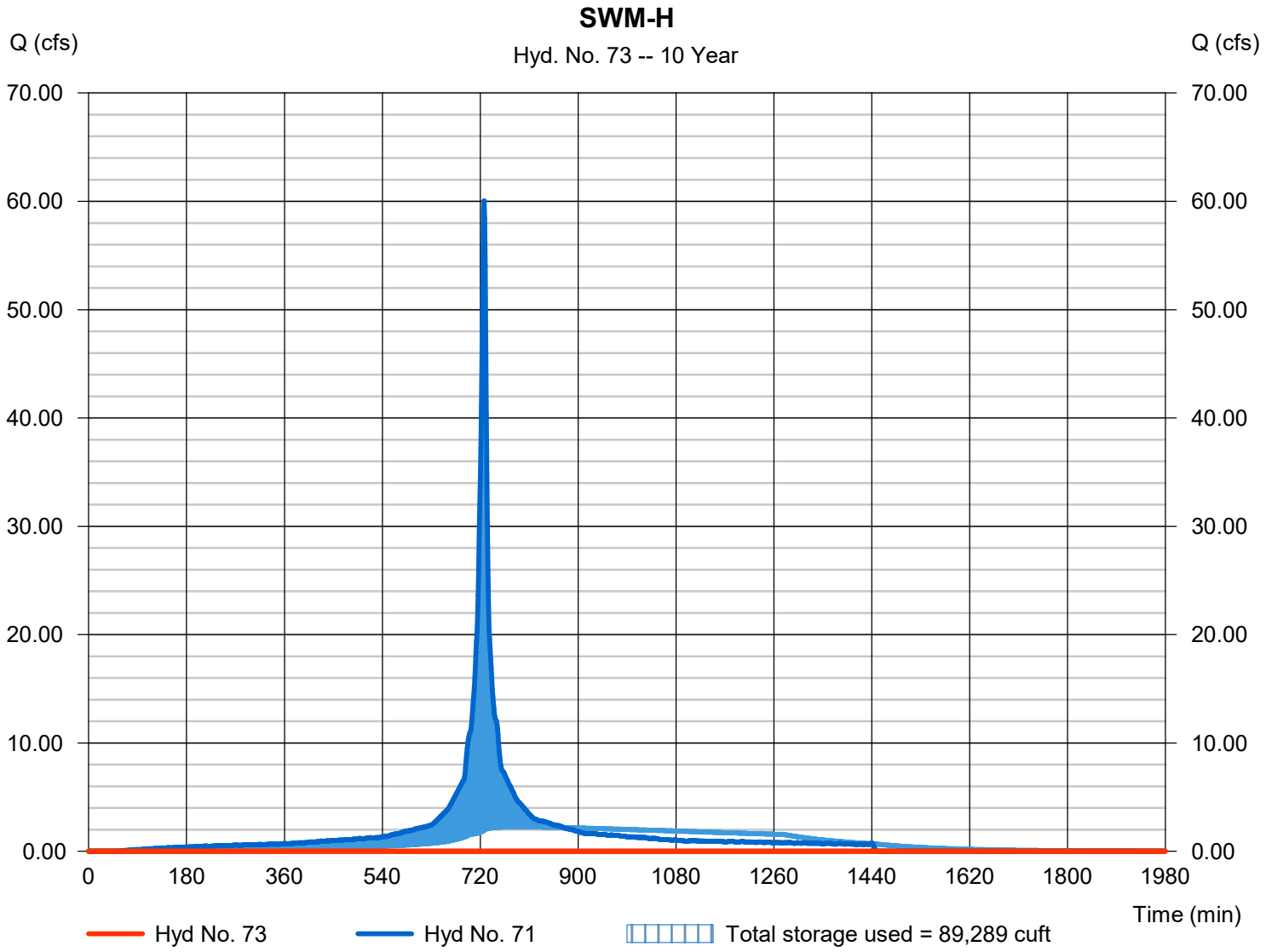
Hydrograph Report

Hyd. No. 73

SWM-H

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 1098 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 71 - PDA-H	Max. Elevation	= 598.16 ft
Reservoir name	= SWM-H	Max. Storage	= 89,289 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

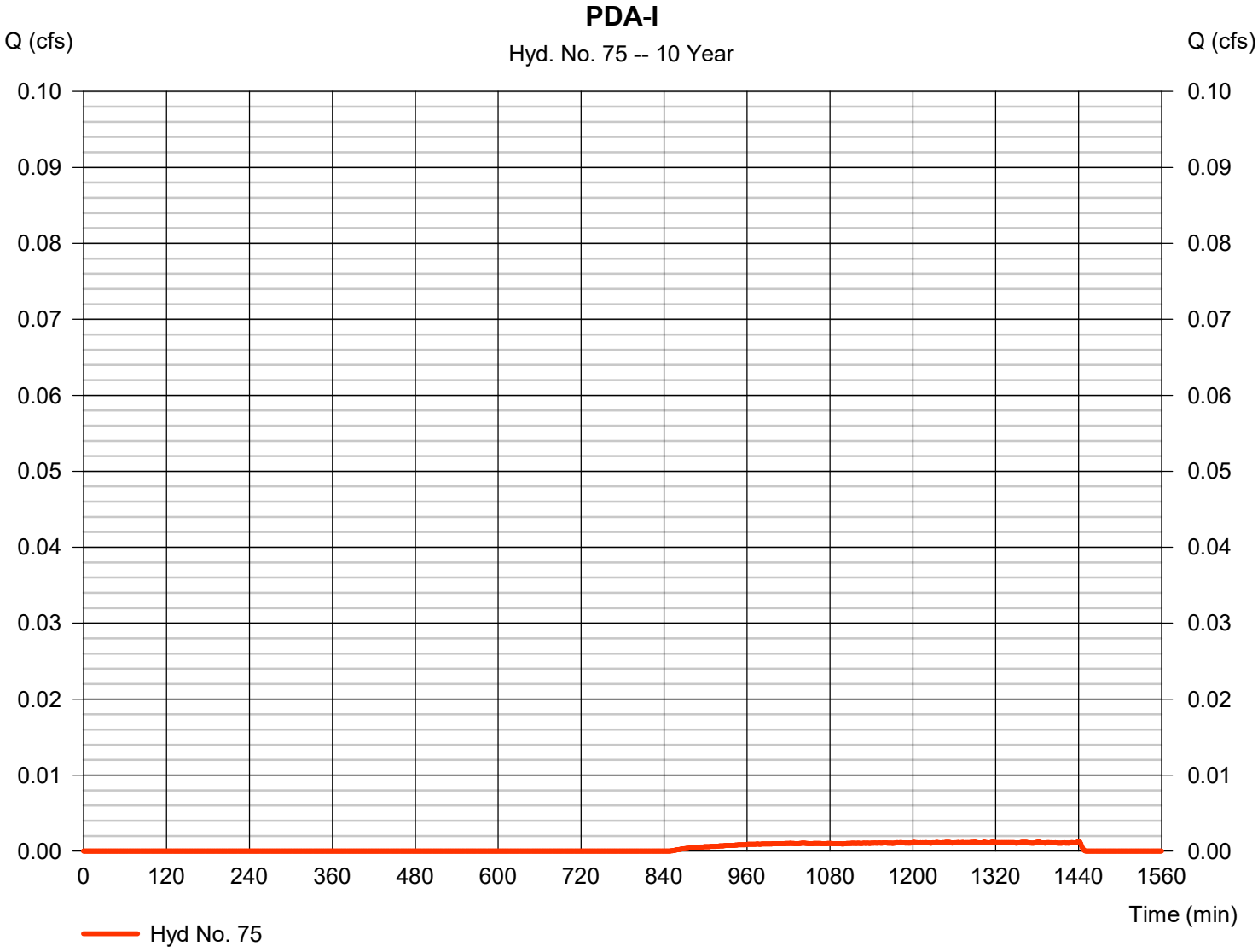


Hydrograph Report

Hyd. No. 75

PDA-I

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.001 cfs
Storm frequency	=	10 yrs	Time to peak	=	1440 min
Time interval	=	1 min	Hyd. volume	=	35 cuft
Drainage area	=	0.260 ac	Curve number	=	34
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.73 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

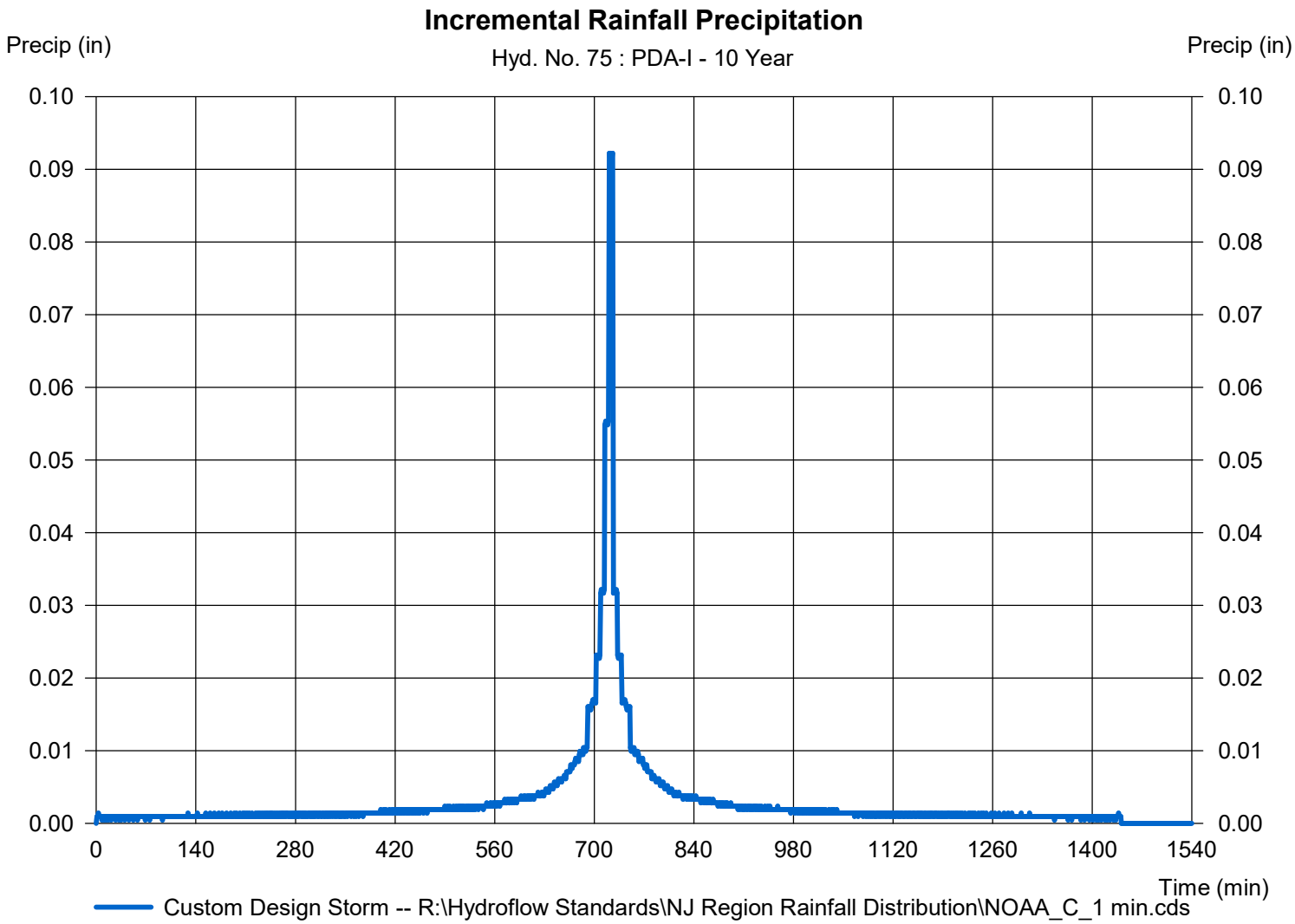


Precipitation Report

Hyd. No. 75

PDA-I

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 4.7300 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



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	27.91	1	735	115,035	------	------	------	EDA - A: PERVIOUS
2	SCS Runoff	8.078	1	734	38,532	------	------	------	EDA-A:IMPERVIOUS
3	Combine	35.98	1	735	153,567	1, 2	------	------	EDA-A
5	SCS Runoff	15.76	1	746	95,938	------	------	------	EDA-B: PERVIOUS
6	SCS Runoff	10.84	1	741	62,285	------	------	------	EDA-B: IMPERVIOUS
7	Combine	26.18	1	743	158,223	5, 6	------	------	EDA-B
9	SCS Runoff	11.16	1	731	38,451	------	------	------	EDA-C: PERVIOUS
10	SCS Runoff	9.571	1	727	31,571	------	------	------	EDA-C:IMPERVIOUS
11	Combine	19.47	1	728	70,022	9, 10	------	------	EDA-C
13	SCS Runoff	20.91	1	729	65,881	------	------	------	EDA-D
15	SCS Runoff	25.00	1	730	83,643	------	------	------	EDA-E
17	SCS Runoff	5.610	1	729	17,793	------	------	------	EDA-F
19	SCS Runoff	19.07	1	731	65,526	------	------	------	EDA-G
21	SCS Runoff	3.352	1	760	33,535	------	------	------	EDA-H
23	SCS Runoff	0.064	1	774	1,222	------	------	------	EDA-I
25	SCS Runoff	0.000	1	n/a	0	------	------	------	PDA-A-PERVIOUS
26	SCS Runoff	25.58	1	727	84,372	------	------	------	PDA-A-IMPERVIOUS
27	Combine	25.58	1	727	84,372	25, 26	------	------	PDA-A
29	Reservoir	0.000	1	641	0	27	595.05	41,143	SWM-A
31	SCS Runoff	42.81	1	727	119,824	------	------	------	PDA-B1-PERVIOUS
32	SCS Runoff	113.78	1	727	375,319	------	------	------	PDA-B1-IMPERVIOUS
33	Combine	156.59	1	727	495,143	31, 32	------	------	PDA-B1
35	SCS Runoff	4.313	1	727	11,891	------	------	------	PDA-B2-PERVIOUS
36	SCS Runoff	29.70	1	727	97,980	------	------	------	PDA-B2-IMPERVIOUS
37	Combine	34.02	1	727	109,871	35, 36	------	------	PDA-B2
39	Reservoir(i)	0.000	1	685	0	33, 37	601.18	306,480	INT. POND B1-B2
41	SCS Runoff	2.951	1	727	8,195	------	------	------	PDA-B3

Hydrograph Summary Report

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

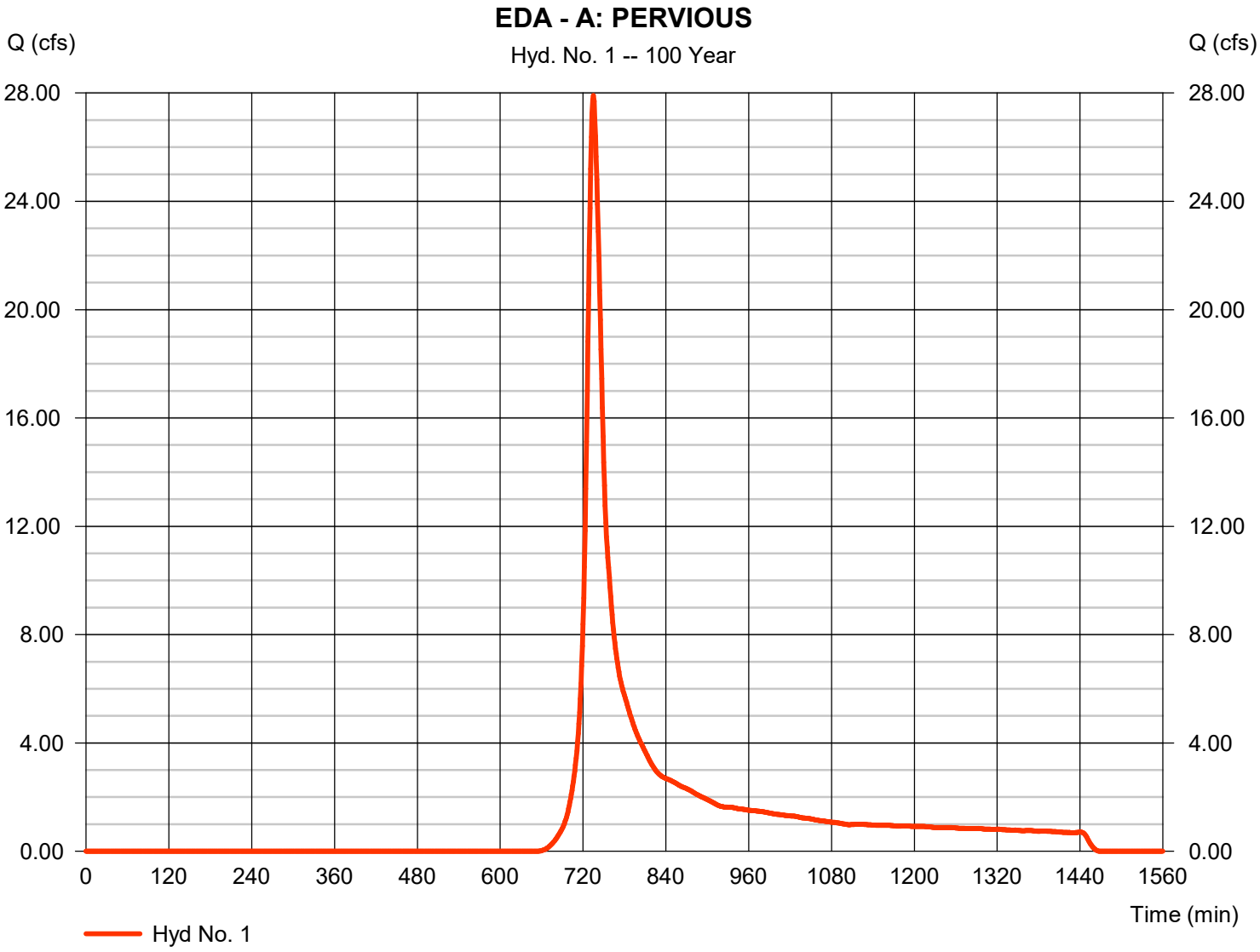
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
43	Combine	2.951	1	727	8,195	39, 41,	------	------	PDA-B
45	SCS Runoff	3.881	1	727	11,071	------	------	------	PDA-C-PERVIOUS
46	SCS Runoff	3.135	1	727	10,342	------	------	------	PDA-C-IMPERVIOUS
47	Combine	7.016	1	727	21,414	45, 46	------	------	PDA-C
49	SCS Runoff	5.512	1	727	15,884	------	------	------	PDA-D-PERVIOUS
50	SCS Runoff	98.10	1	727	323,608	------	------	------	PDA-D-IMPERVIOUS
51	Combine	103.61	1	727	339,491	49, 50	------	------	PDA-D
53	Reservoir	0.000	1	485	0	51	604.11	189,497	SWM-D
55	SCS Runoff	2.691	1	727	7,893	------	------	------	PDA-E
57	SCS Runoff	5.578	1	727	15,719	------	------	------	PDA-F
59	SCS Runoff	6.411	1	727	17,738	------	------	------	PDA-G1-PERVIOUS
60	SCS Runoff	43.32	1	727	142,888	------	------	------	PDA-G1-IMPERVIOUS
61	Combine	49.73	1	727	160,626	59, 60	------	------	PDA-G1
63	Reservoir	0.000	1	735	0	61	600.64	82,656	SWM-G1
65	SCS Runoff	1.969	1	727	5,548	------	------	------	PDA-G2
67	Combine	1.969	1	727	5,548	63, 65,	------	------	PDA-G
69	SCS Runoff	17.82	1	727	49,140	------	------	------	PDA-H-PERVIOUS
70	SCS Runoff	83.33	1	727	274,889	------	------	------	PDA-H-IMPERVIOUS
71	Combine	101.15	1	727	324,029	69, 70	------	------	PDA-H
73	Reservoir	0.000	1	1459	0	71	599.63	164,586	SWM-H
75	SCS Runoff	0.064	1	733	556	------	------	------	PDA-I

Hydrograph Report

Hyd. No. 1

EDA - A: PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.91 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	115,035 cuft
Drainage area	=	13.620 ac	Curve number	=	54
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	17.70 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

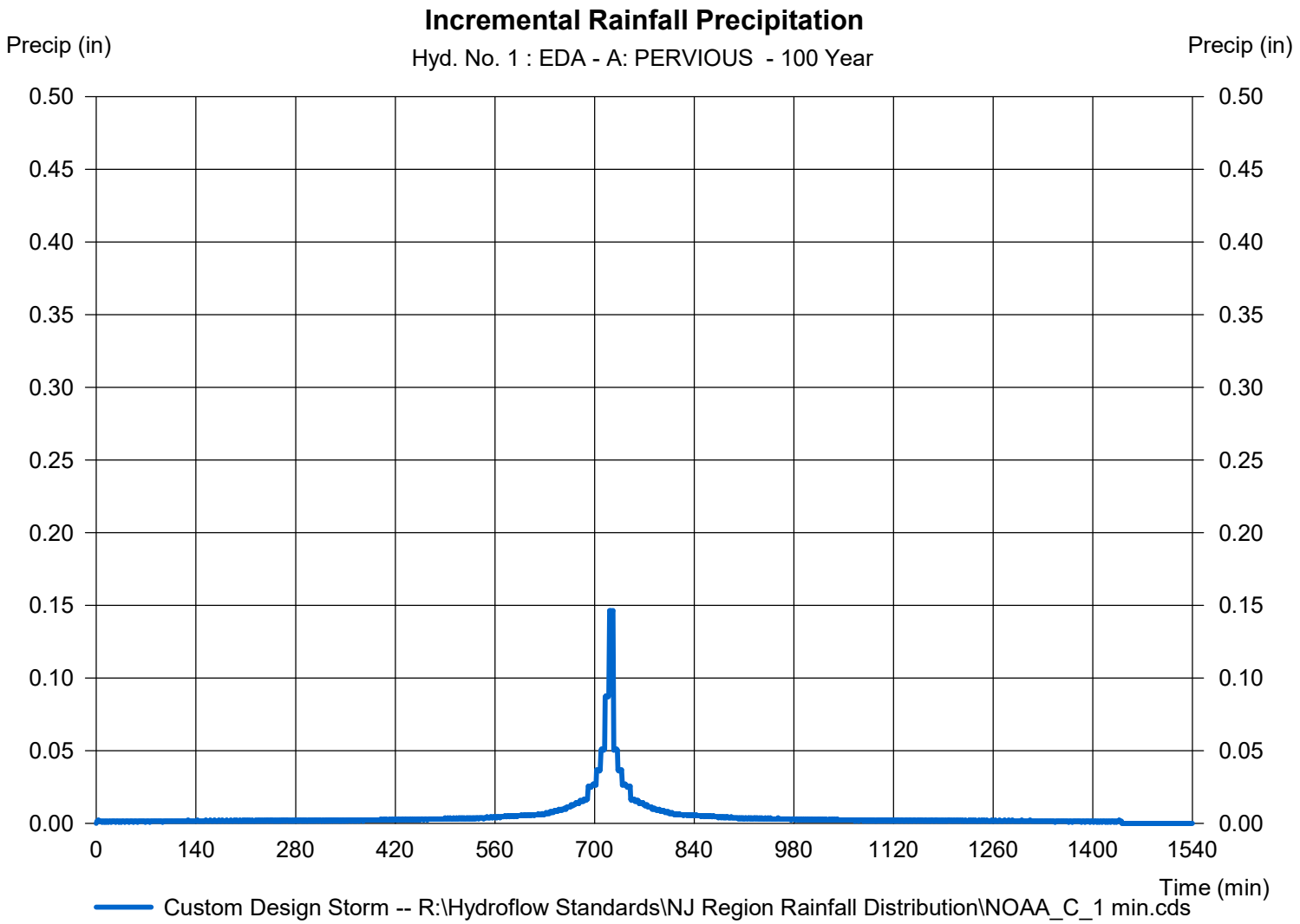


Precipitation Report

Hyd. No. 1

EDA - A: PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



Hydrograph Report

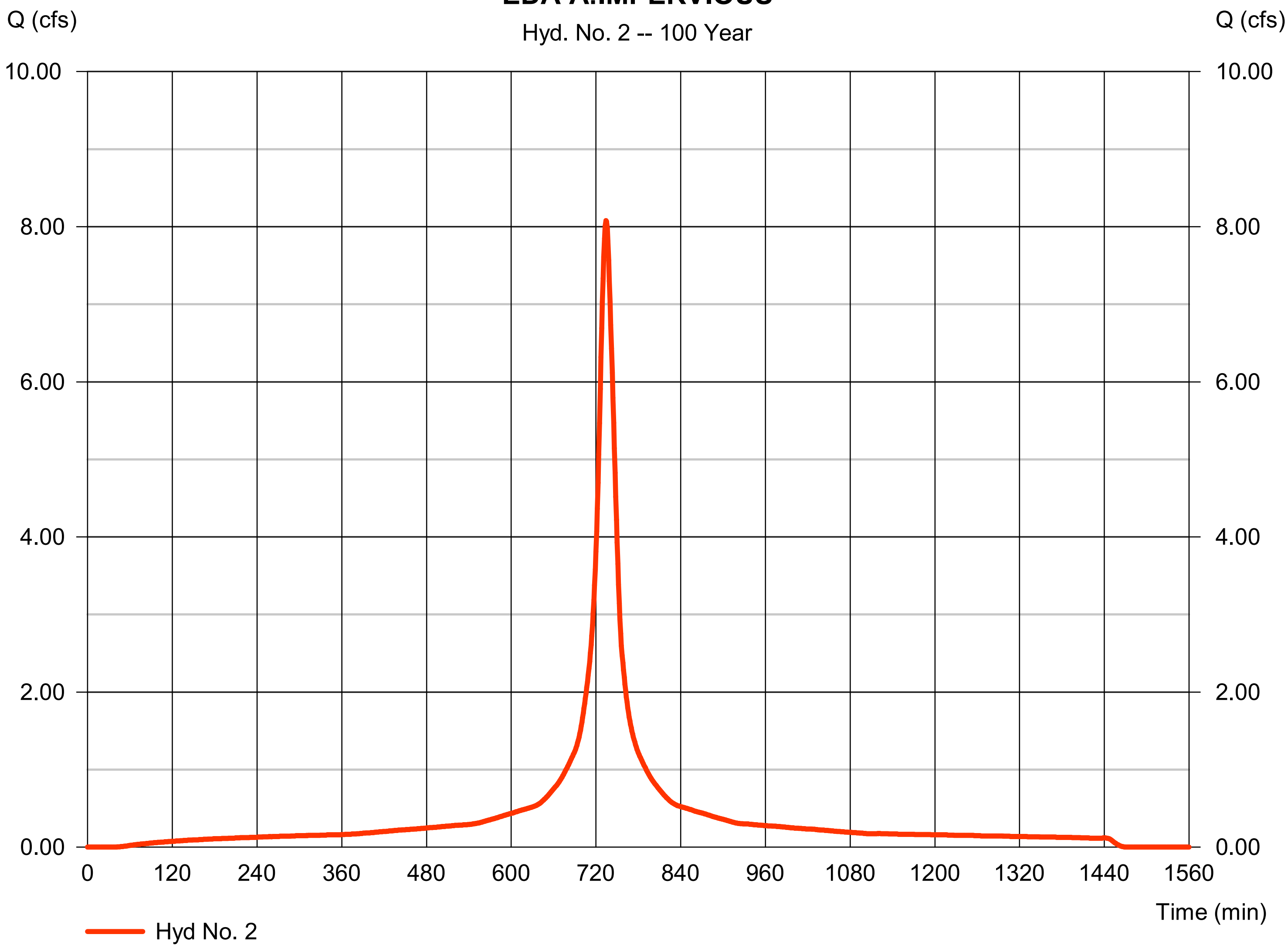
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 2

EDA-A:IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 8.078 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 38,532 cuft
Drainage area	= 1.460 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.60 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

EDA-A:IMPERVIOUS

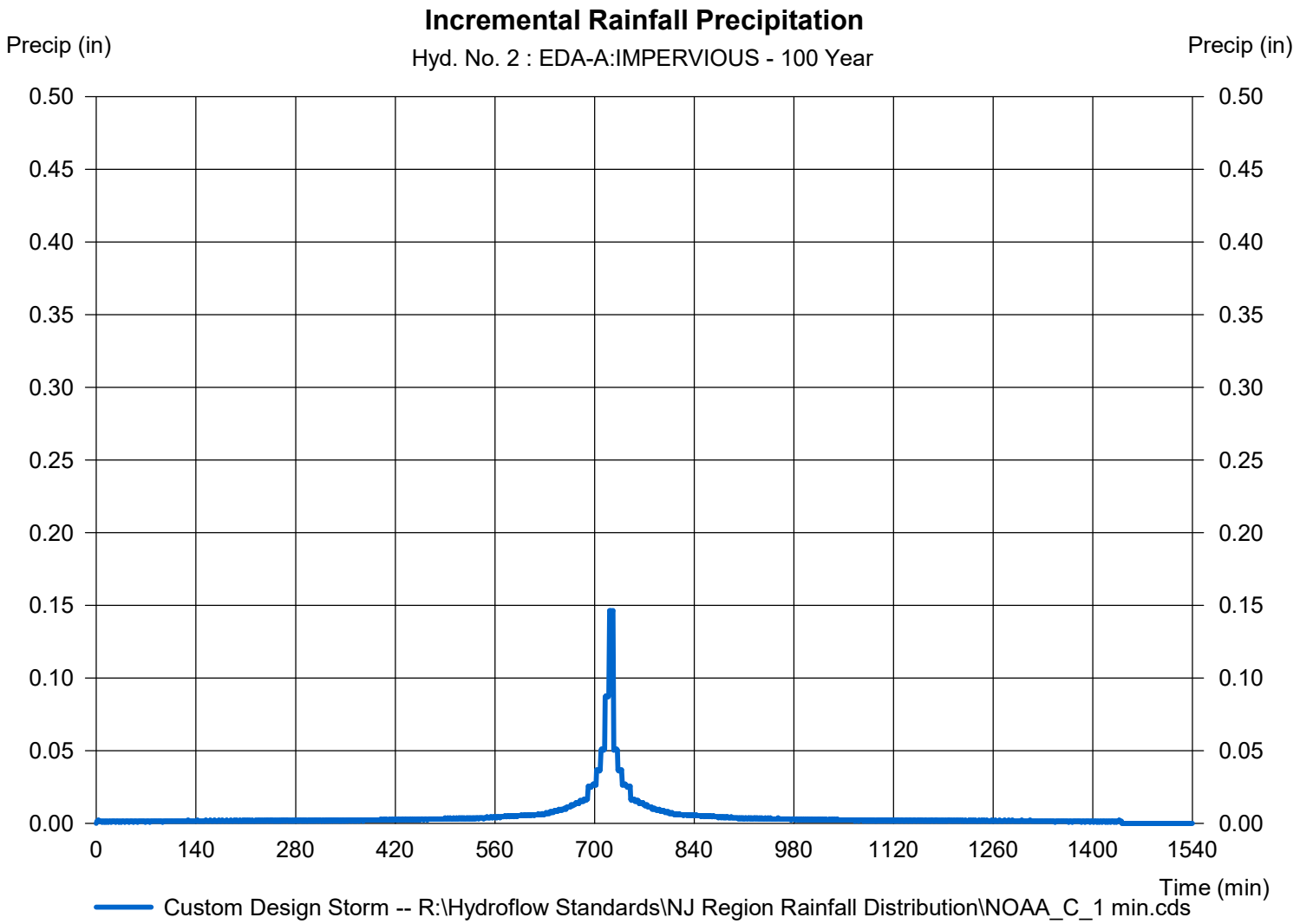


Precipitation Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

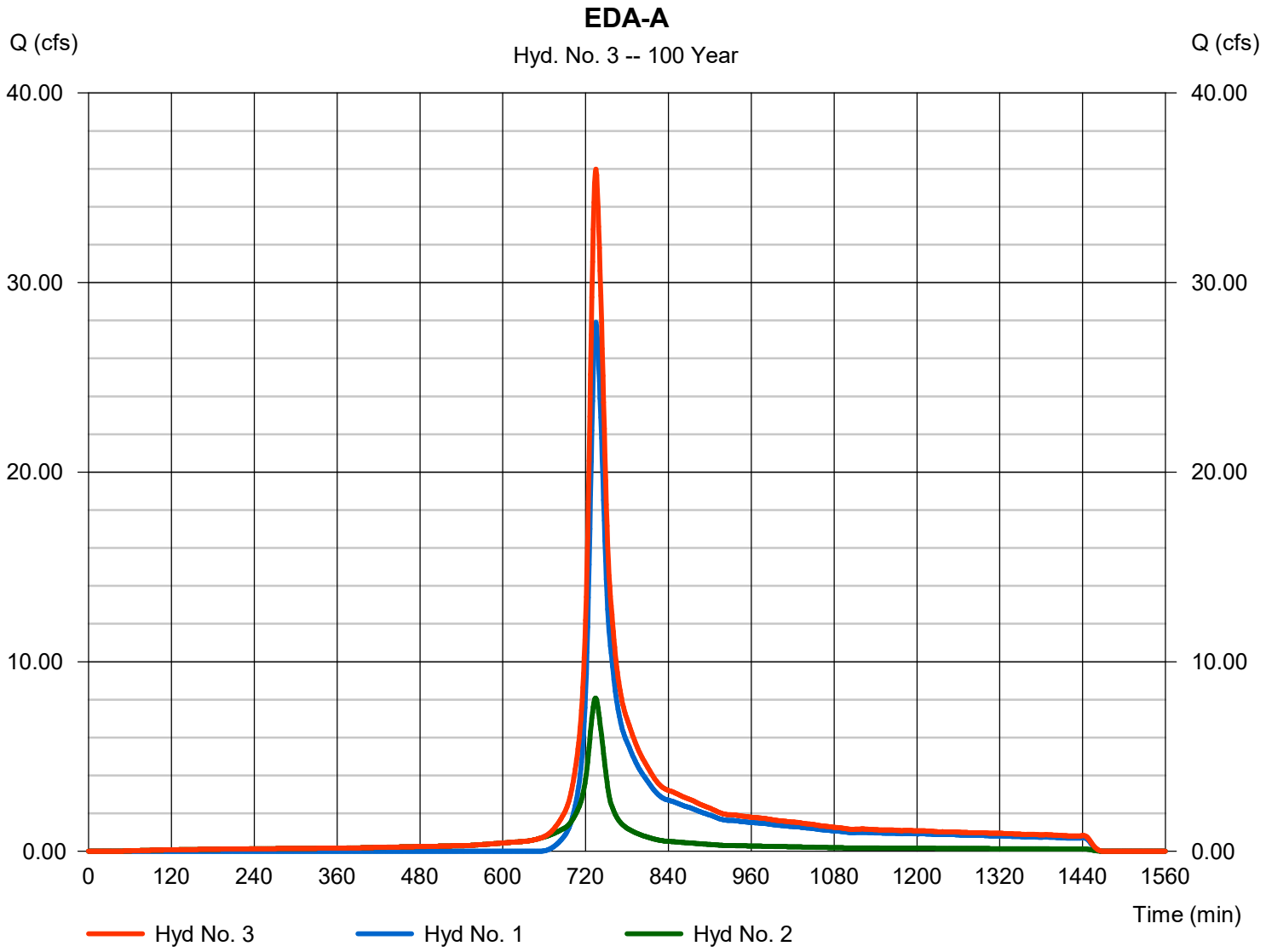


Hydrograph Report

Hyd. No. 3

EDA-A

Hydrograph type	=	Combine	Peak discharge	=	35.98 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	153,567 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	15.080 ac

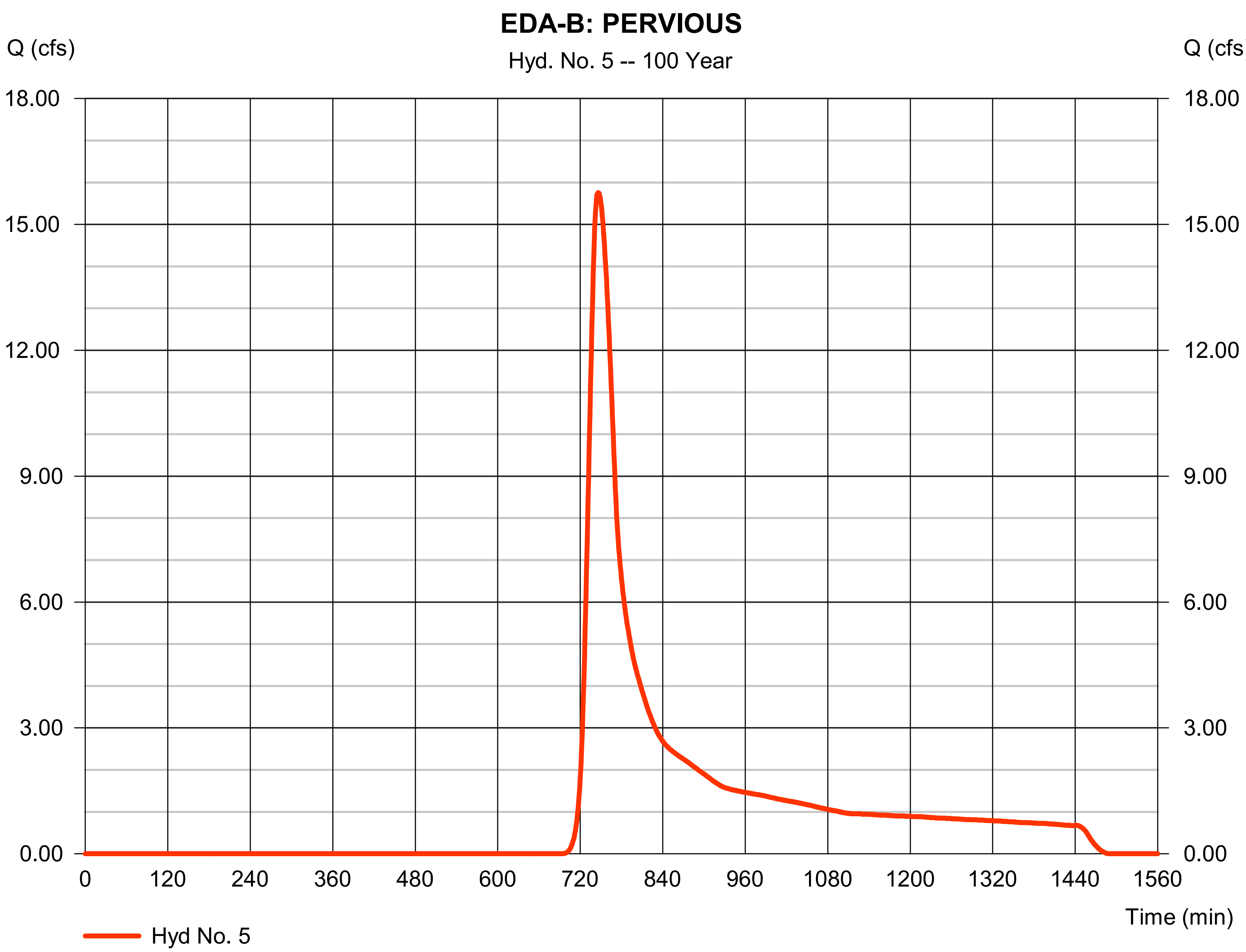


Hydrograph Report

Hyd. No. 5

EDA-B: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 15.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 746 min
Time interval	= 1 min	Hyd. volume	= 95,938 cuft
Drainage area	= 15.720 ac	Curve number	= 47
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.40 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

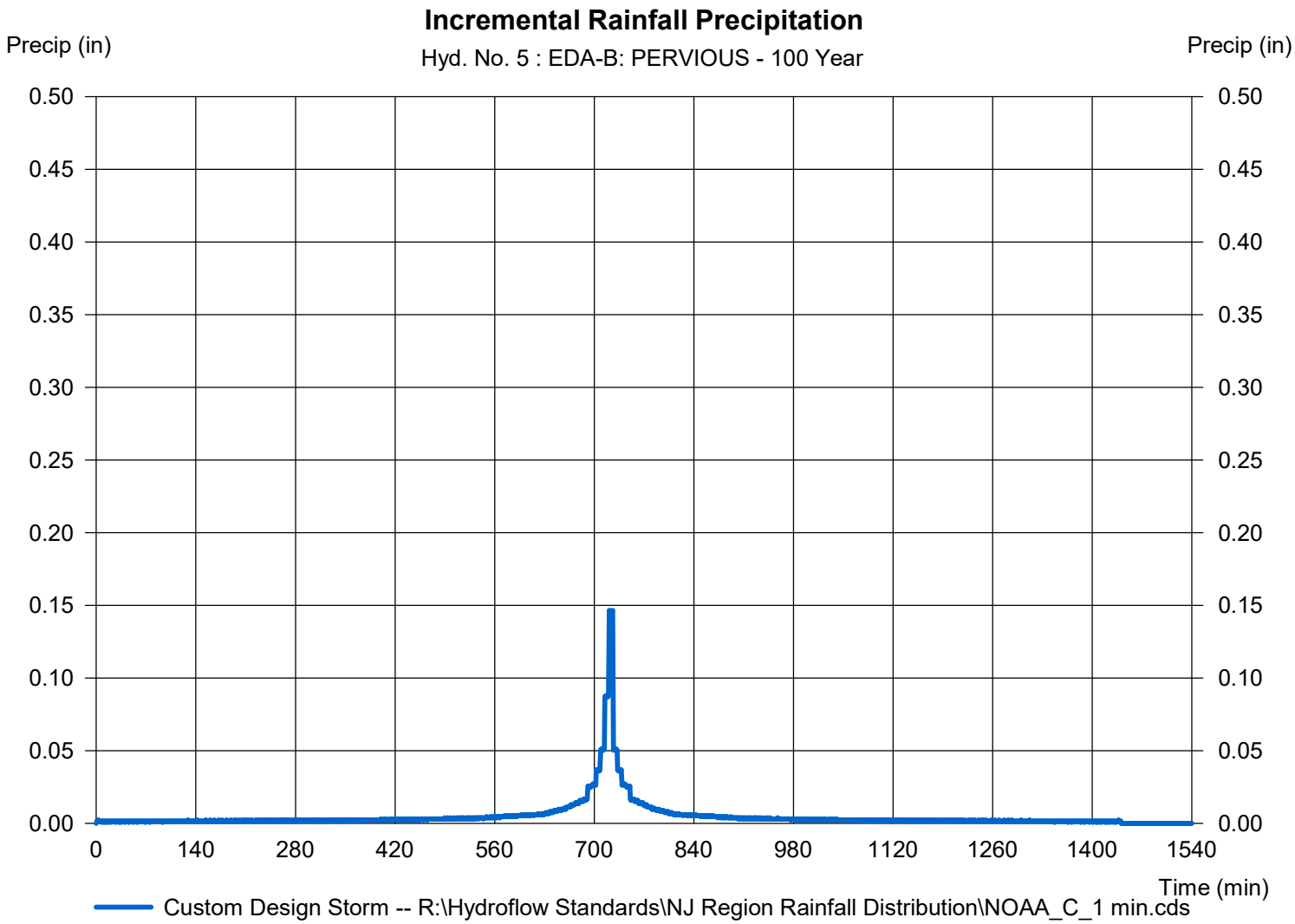


Precipitation Report

Hyd. No. 5

EDA-B: PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

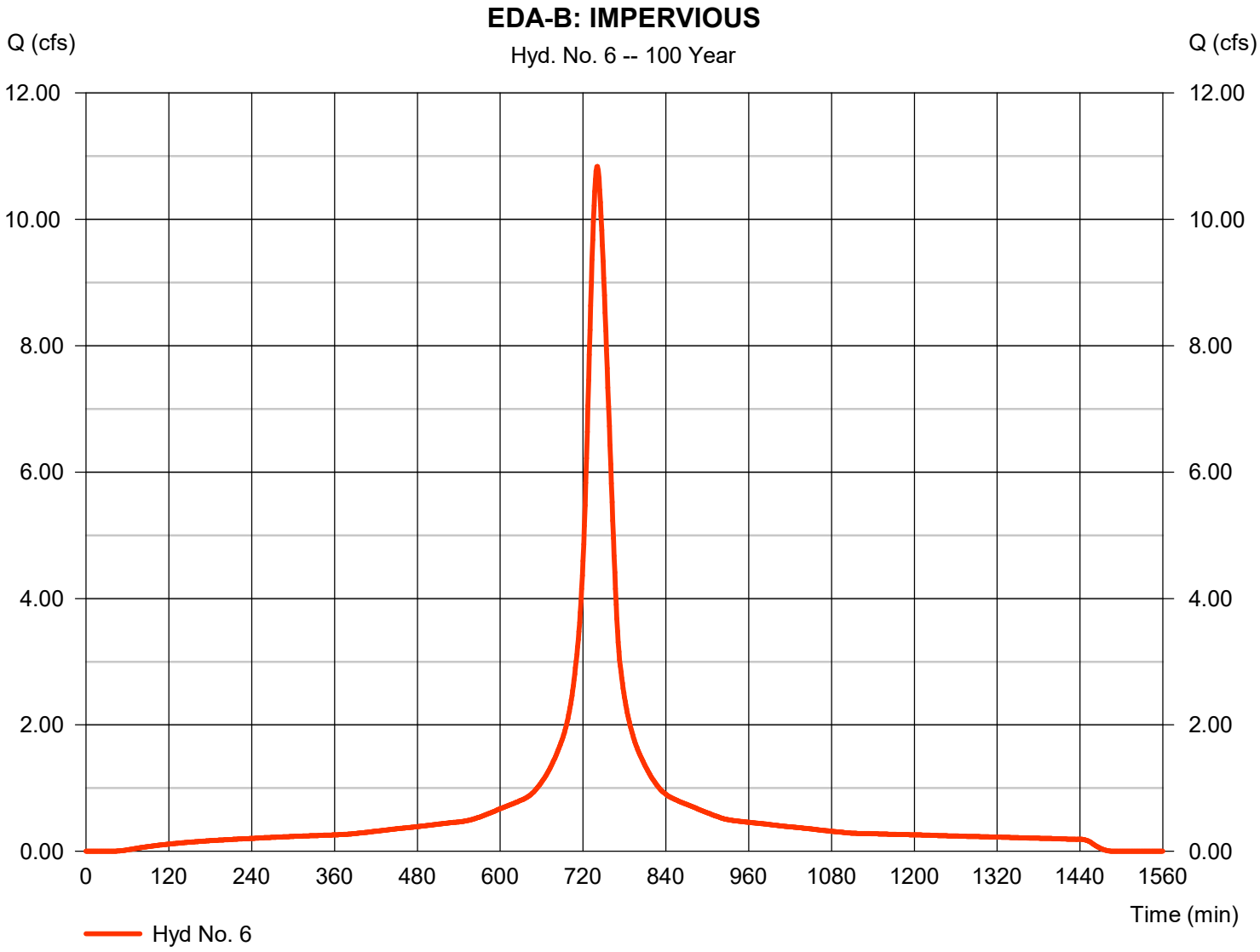


Hydrograph Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.84 cfs
Storm frequency	=	100 yrs	Time to peak	=	741 min
Time interval	=	1 min	Hyd. volume	=	62,285 cuft
Drainage area	=	2.360 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	29.70 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

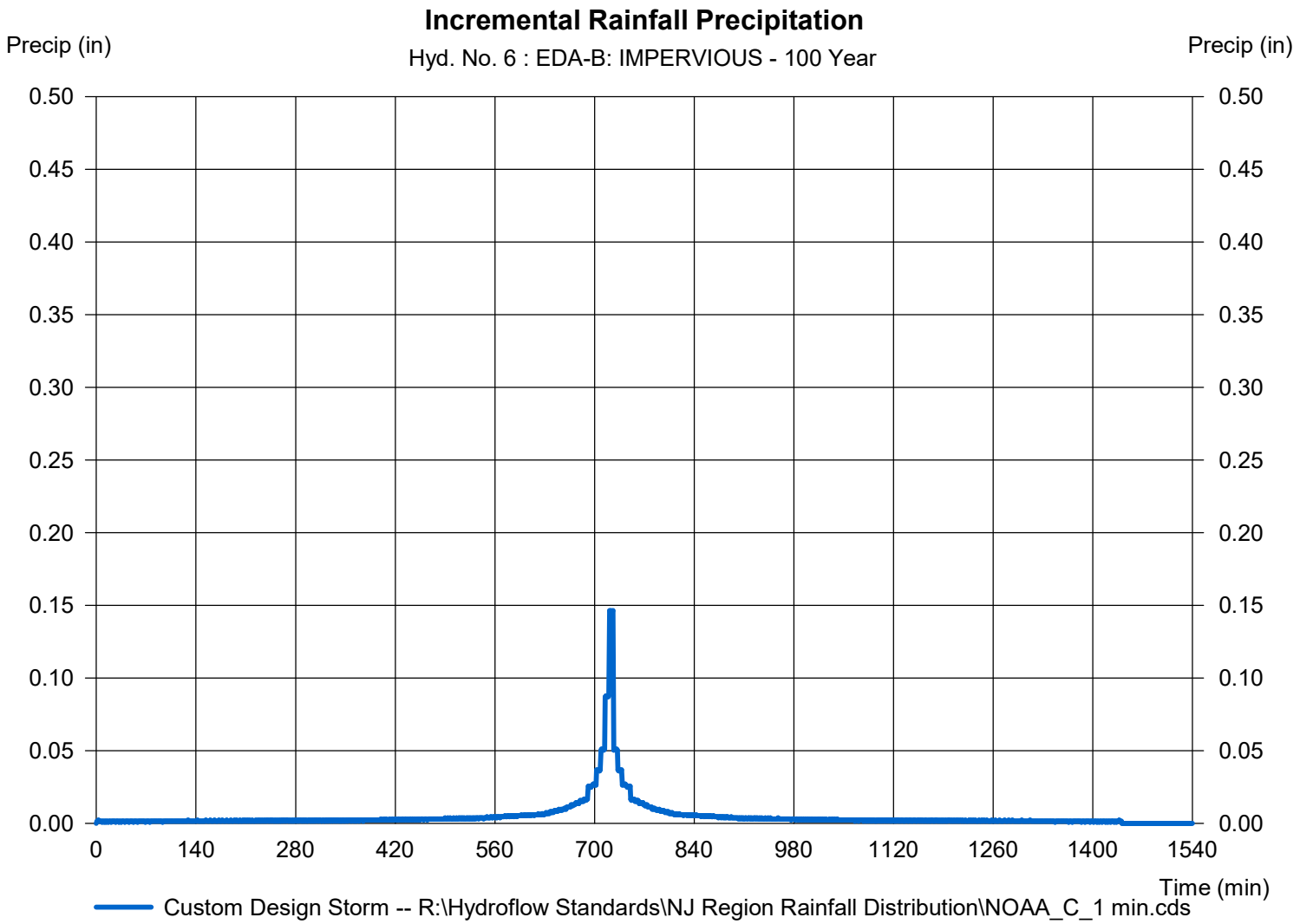


Precipitation Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

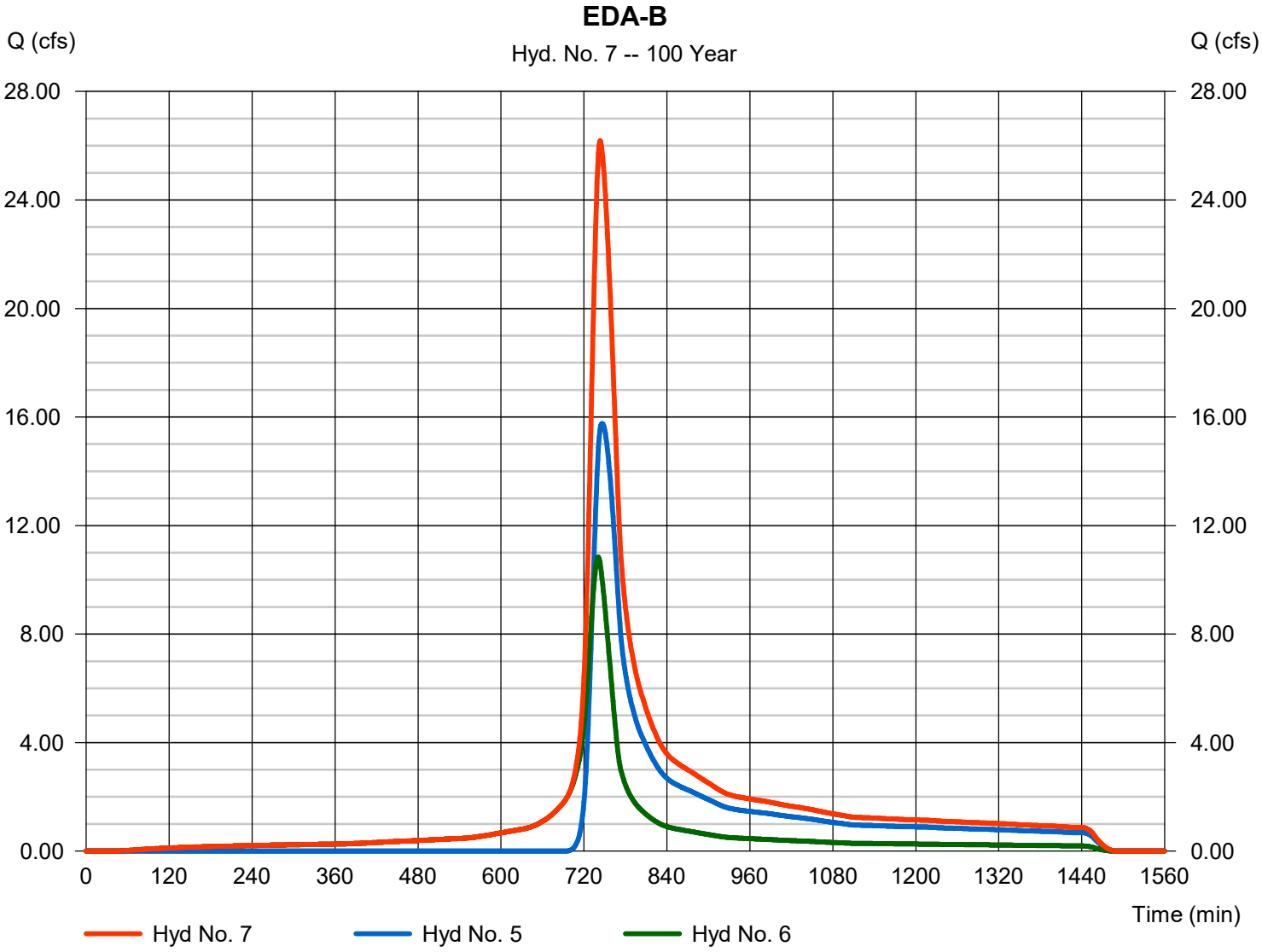


Hydrograph Report

Hyd. No. 7

EDA-B

Hydrograph type	=	Combine	Peak discharge	=	26.18 cfs
Storm frequency	=	100 yrs	Time to peak	=	743 min
Time interval	=	1 min	Hyd. volume	=	158,223 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	18.080 ac



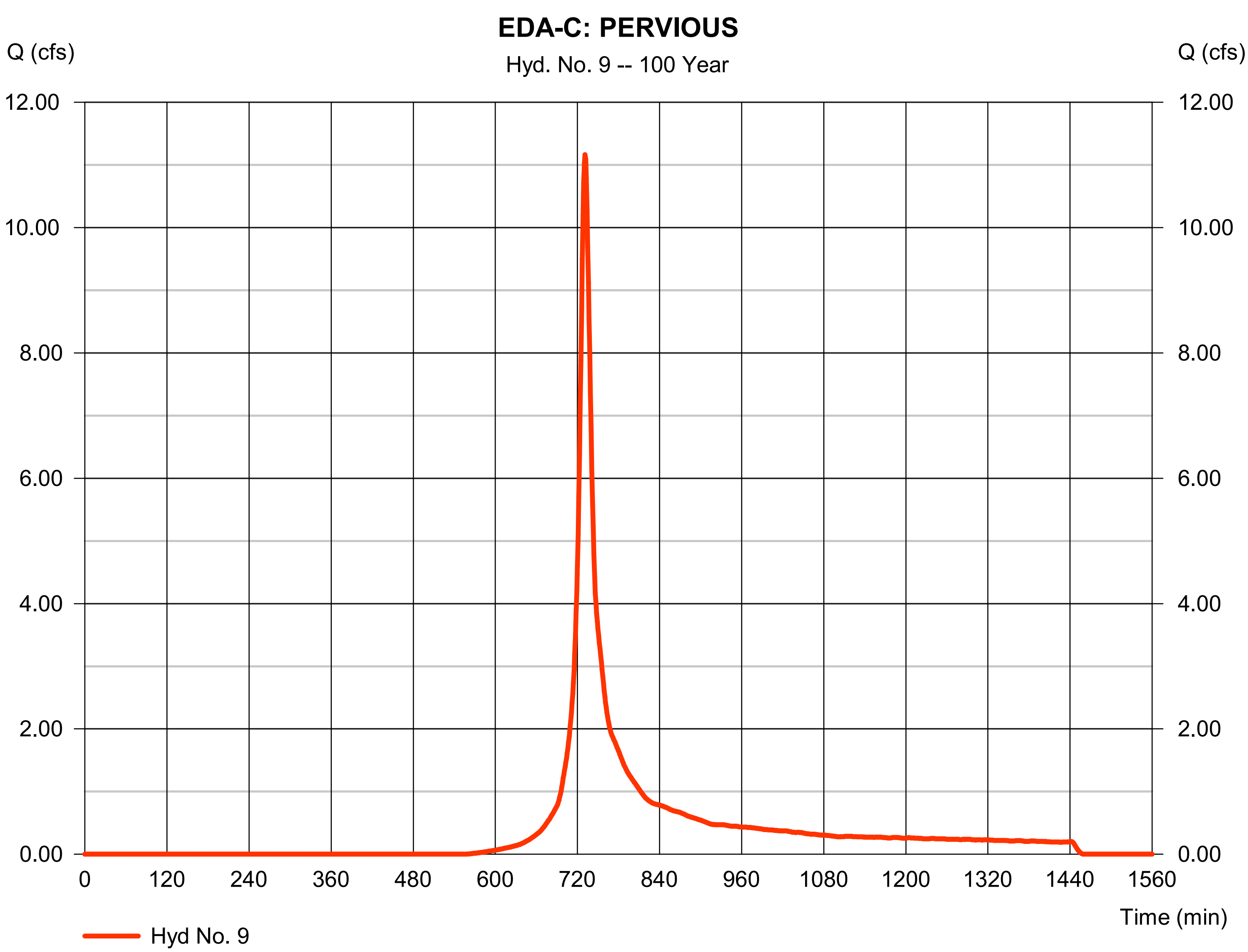
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 9

EDA-C: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 11.16 cfs
Storm frequency	= 100 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 38,451 cuft
Drainage area	= 3.170 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.70 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

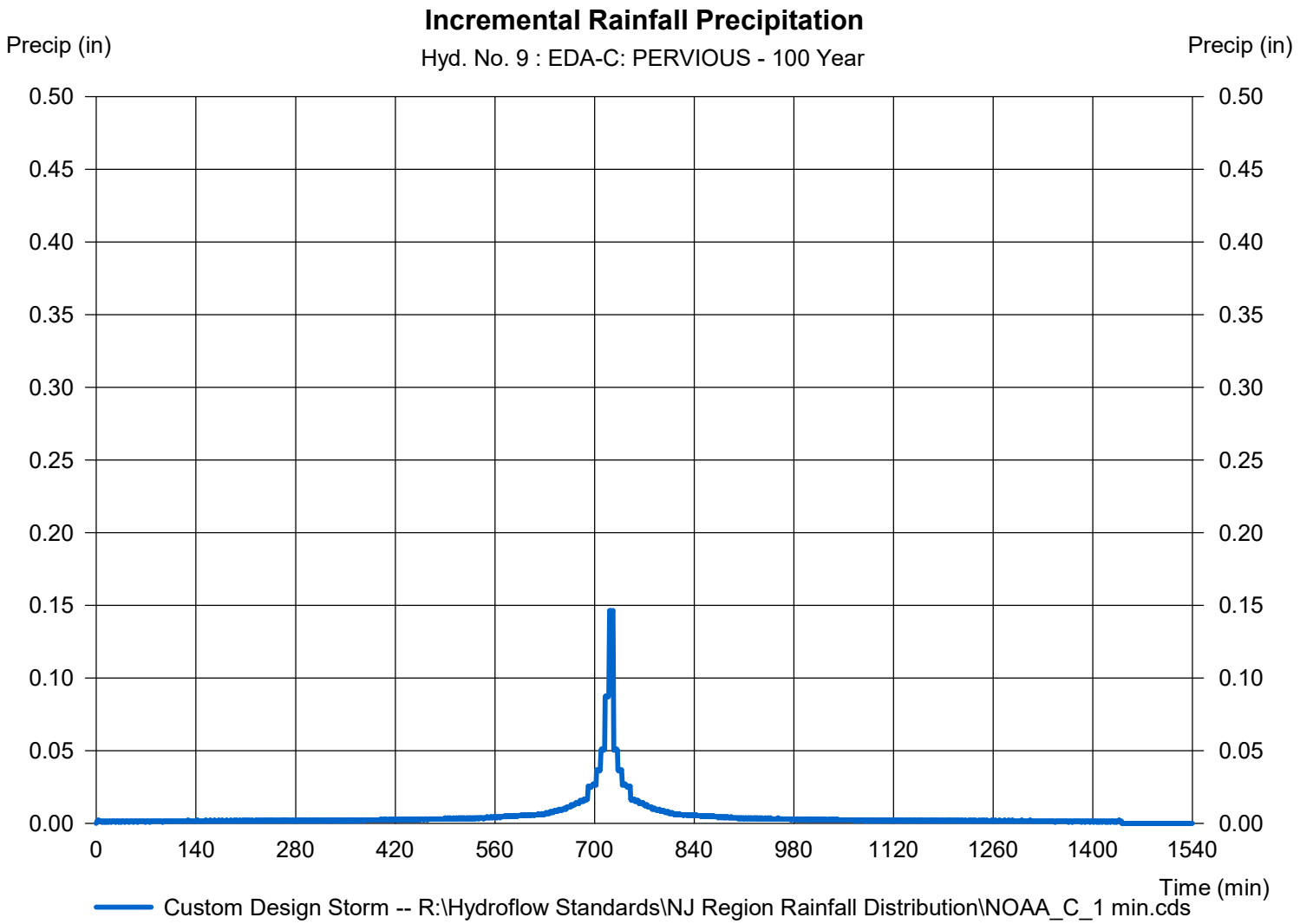


Precipitation Report

Hyd. No. 9

EDA-C: PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



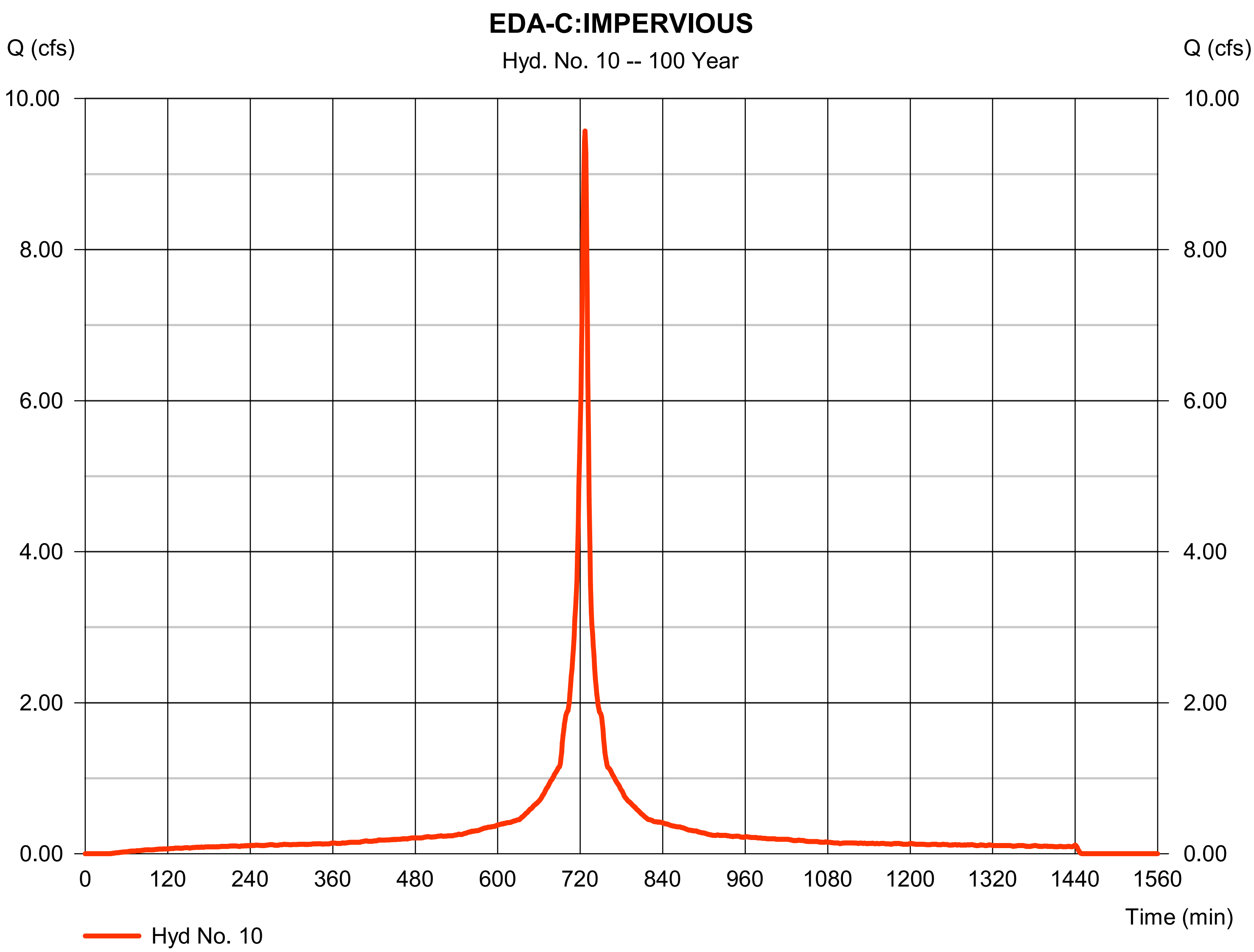
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 10

EDA-C:IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 9.571 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 31,571 cuft
Drainage area	= 1.160 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

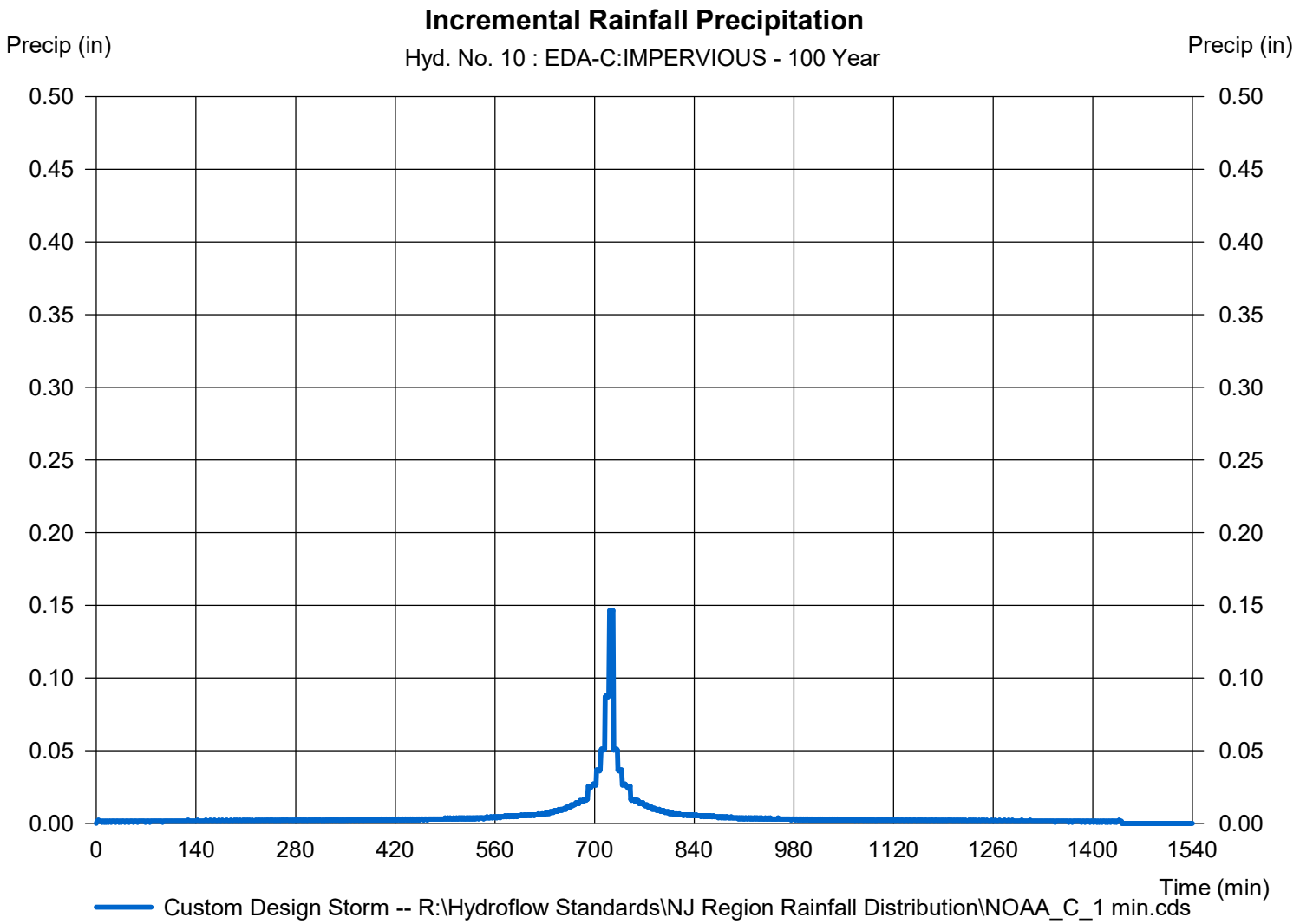


Precipitation Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

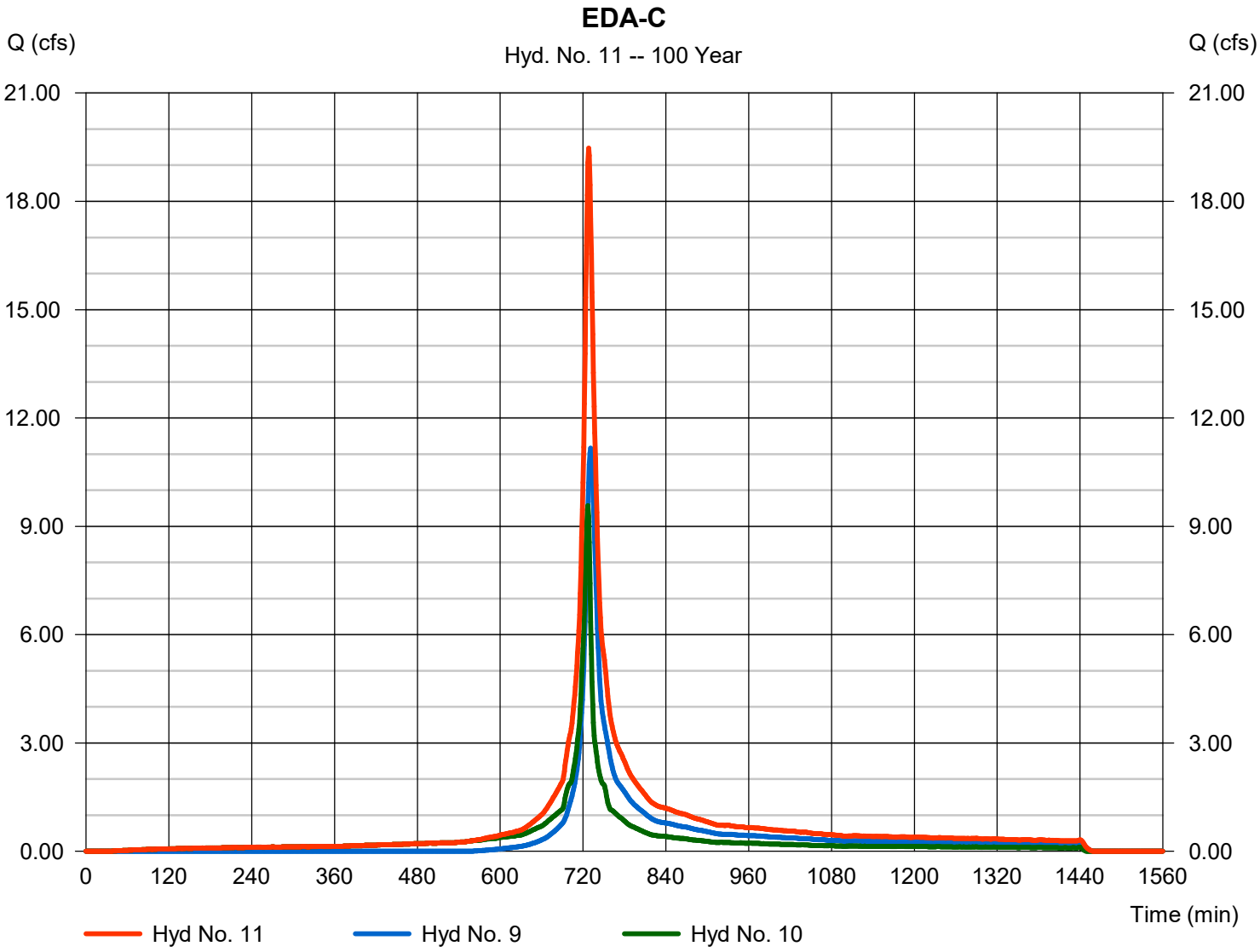


Hydrograph Report

Hyd. No. 11

EDA-C

Hydrograph type	= Combine	Peak discharge	= 19.47 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 70,022 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 4.330 ac

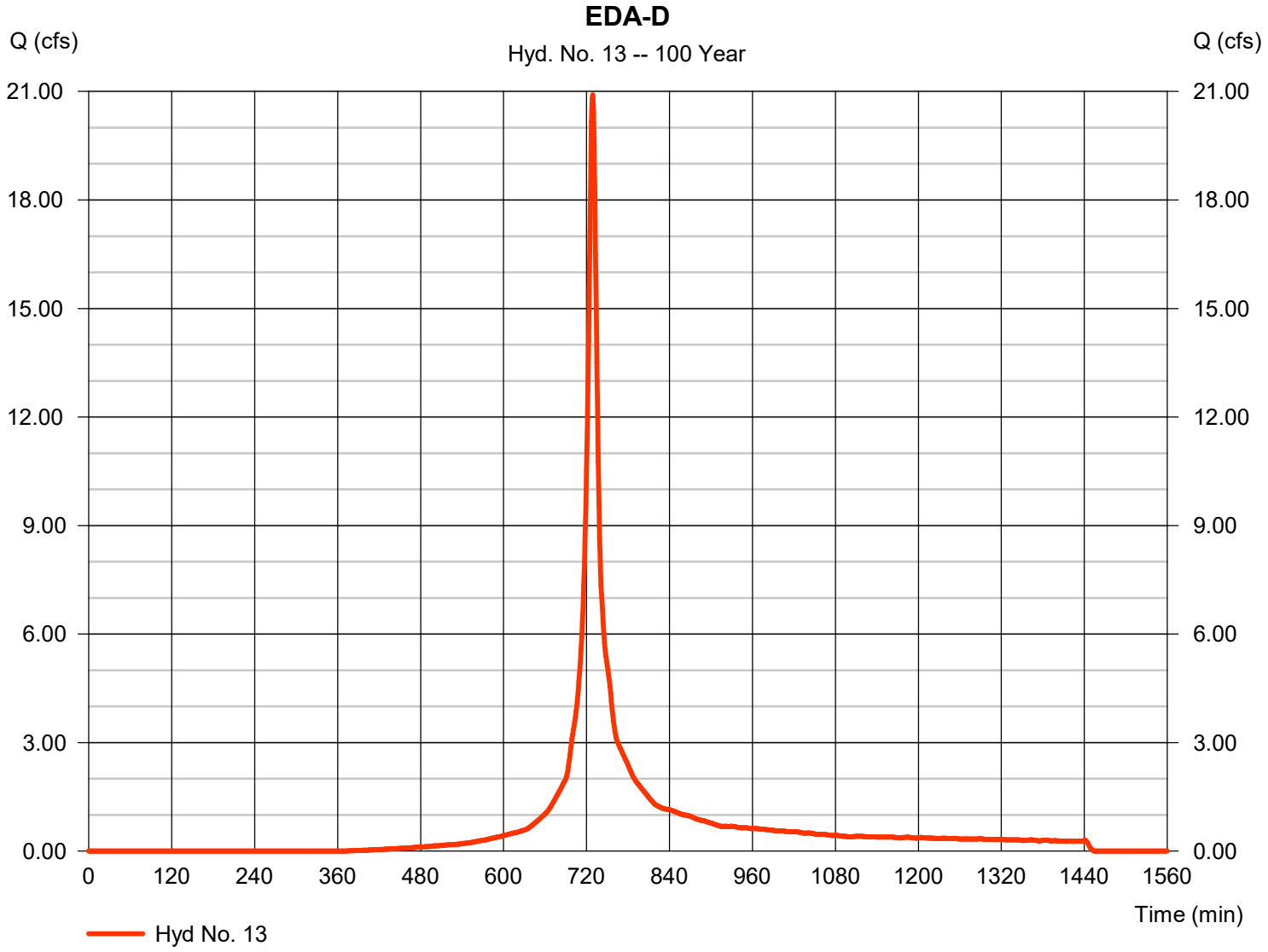


Hydrograph Report

Hyd. No. 13

EDA-D

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.91 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	65,881 cuft
Drainage area	=	3.760 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

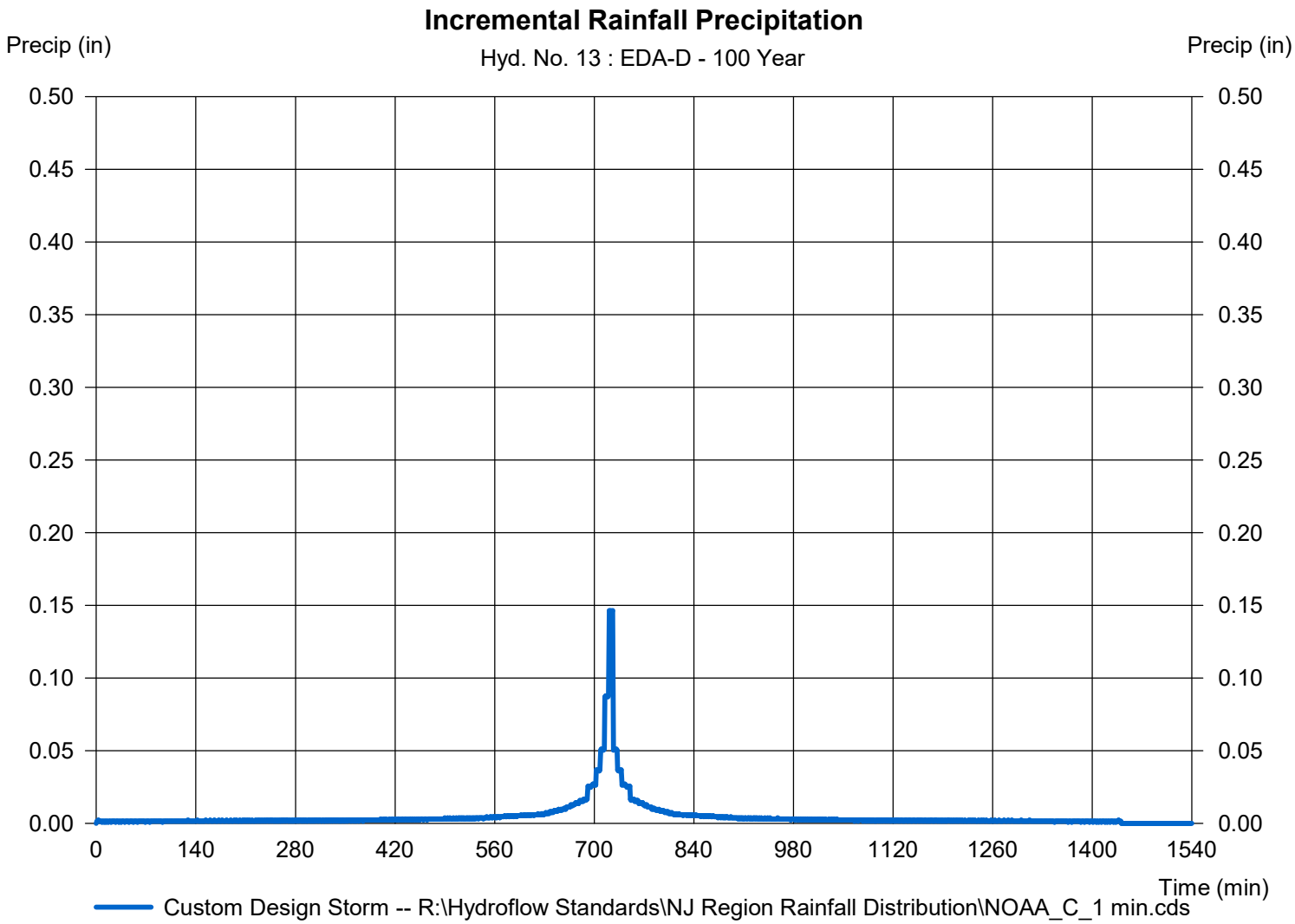


Precipitation Report

Hyd. No. 13

EDA-D

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

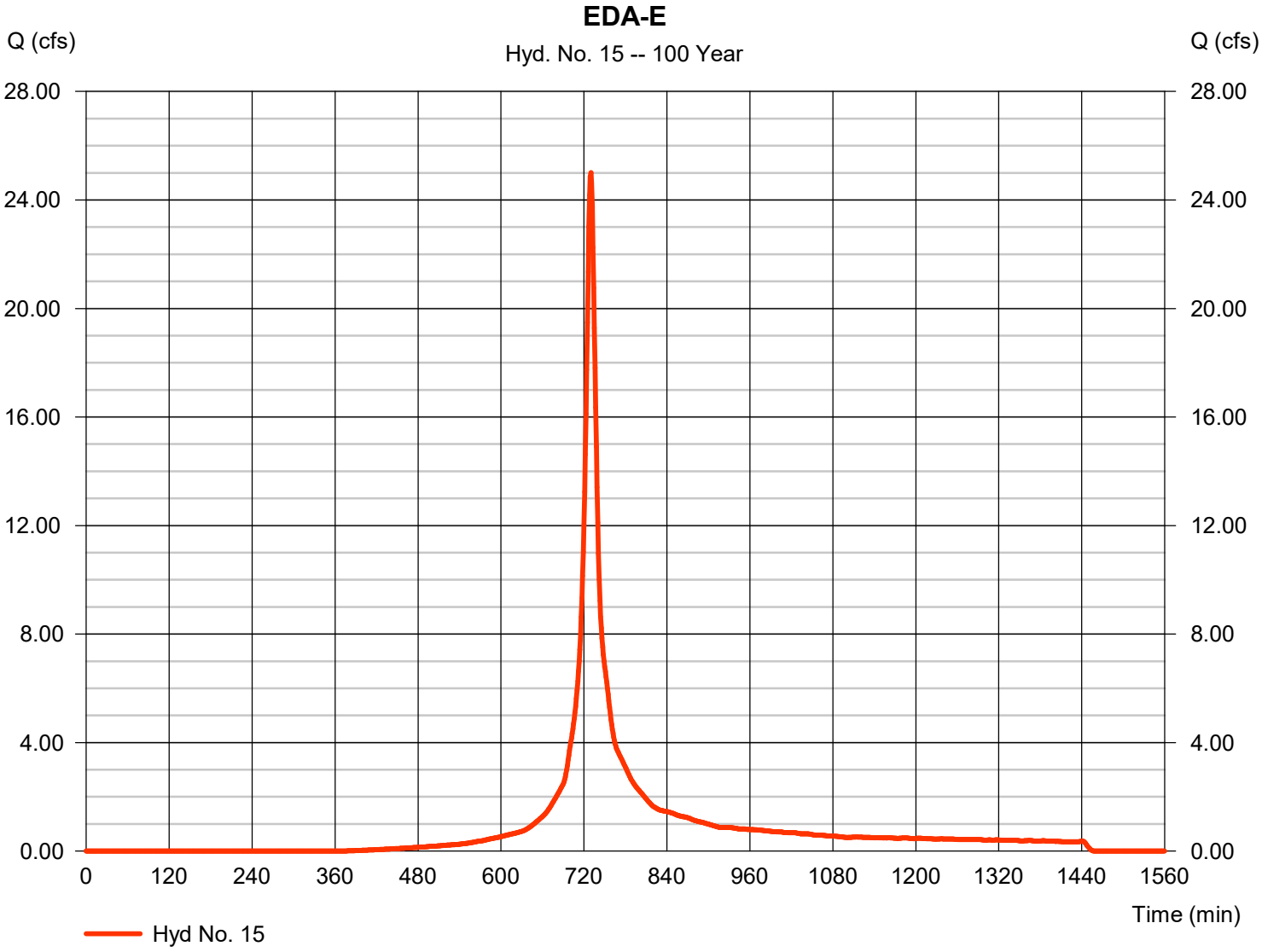


Hydrograph Report

Hyd. No. 15

EDA-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	83,643 cuft
Drainage area	=	4.690 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.40 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

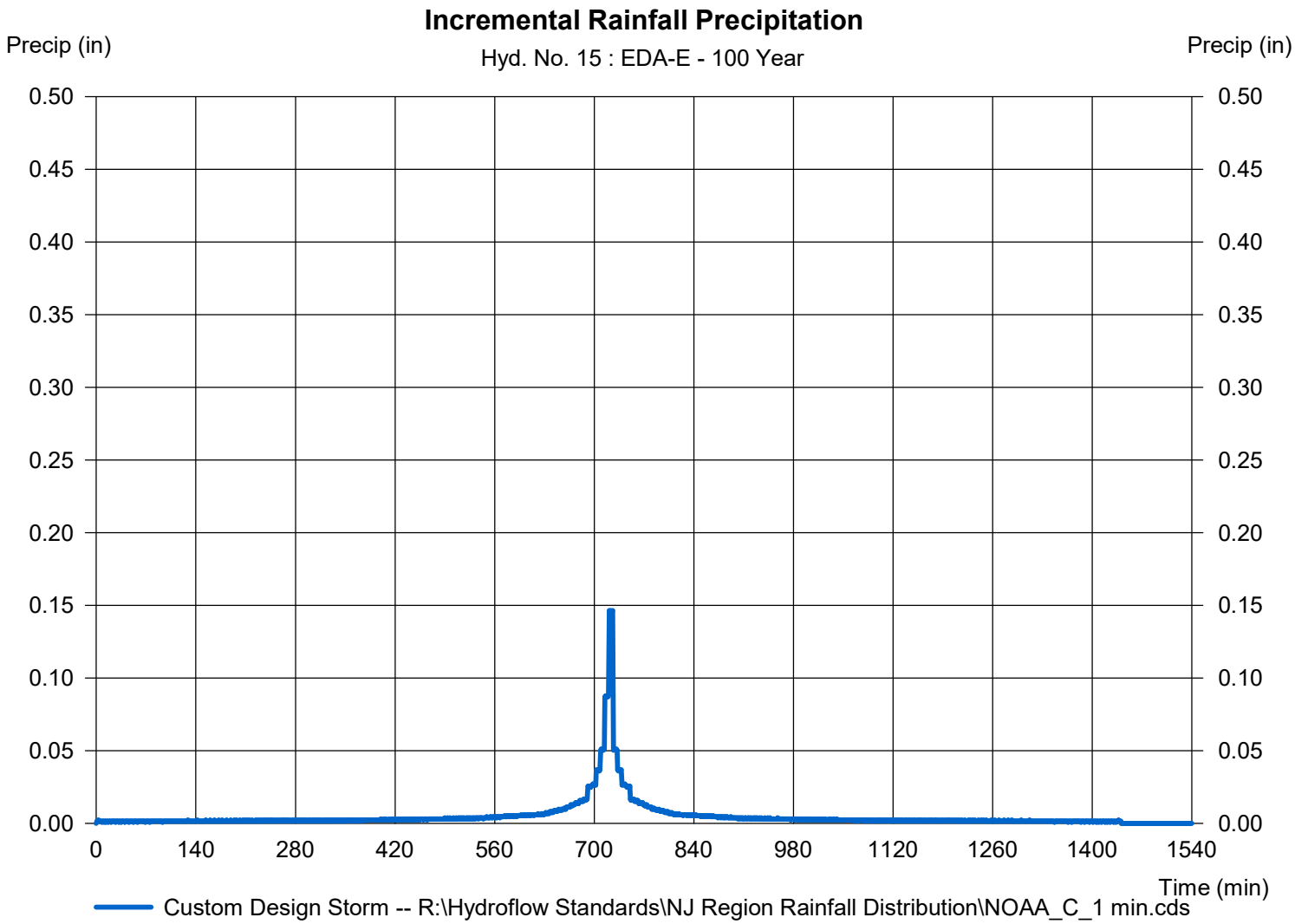


Precipitation Report

Hyd. No. 15

EDA-E

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

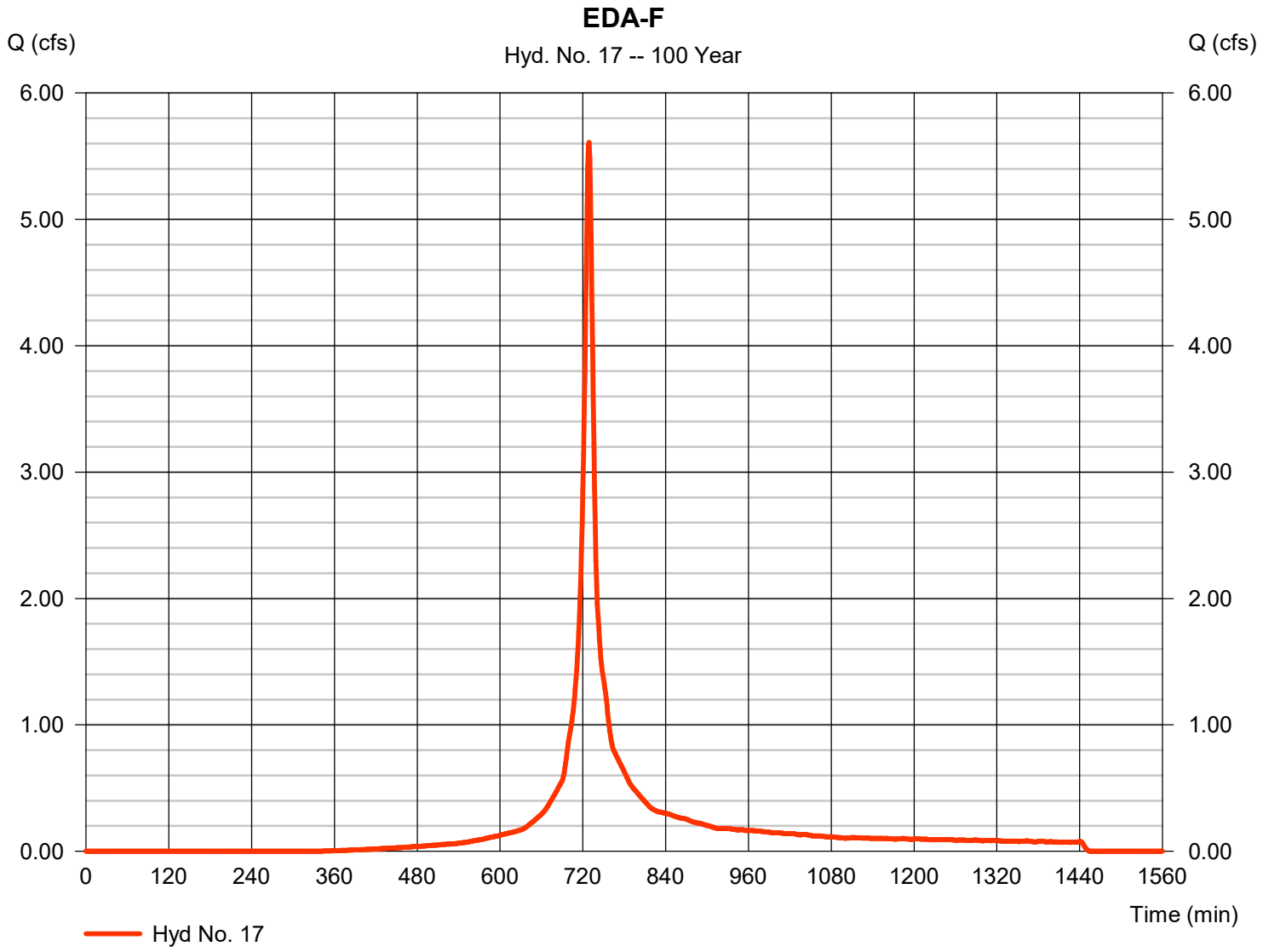


Hydrograph Report

Hyd. No. 17

EDA-F

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.610 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	17,793 cuft
Drainage area	=	0.970 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall	Storm Distribution	=	NJAA_C_1 min.cds

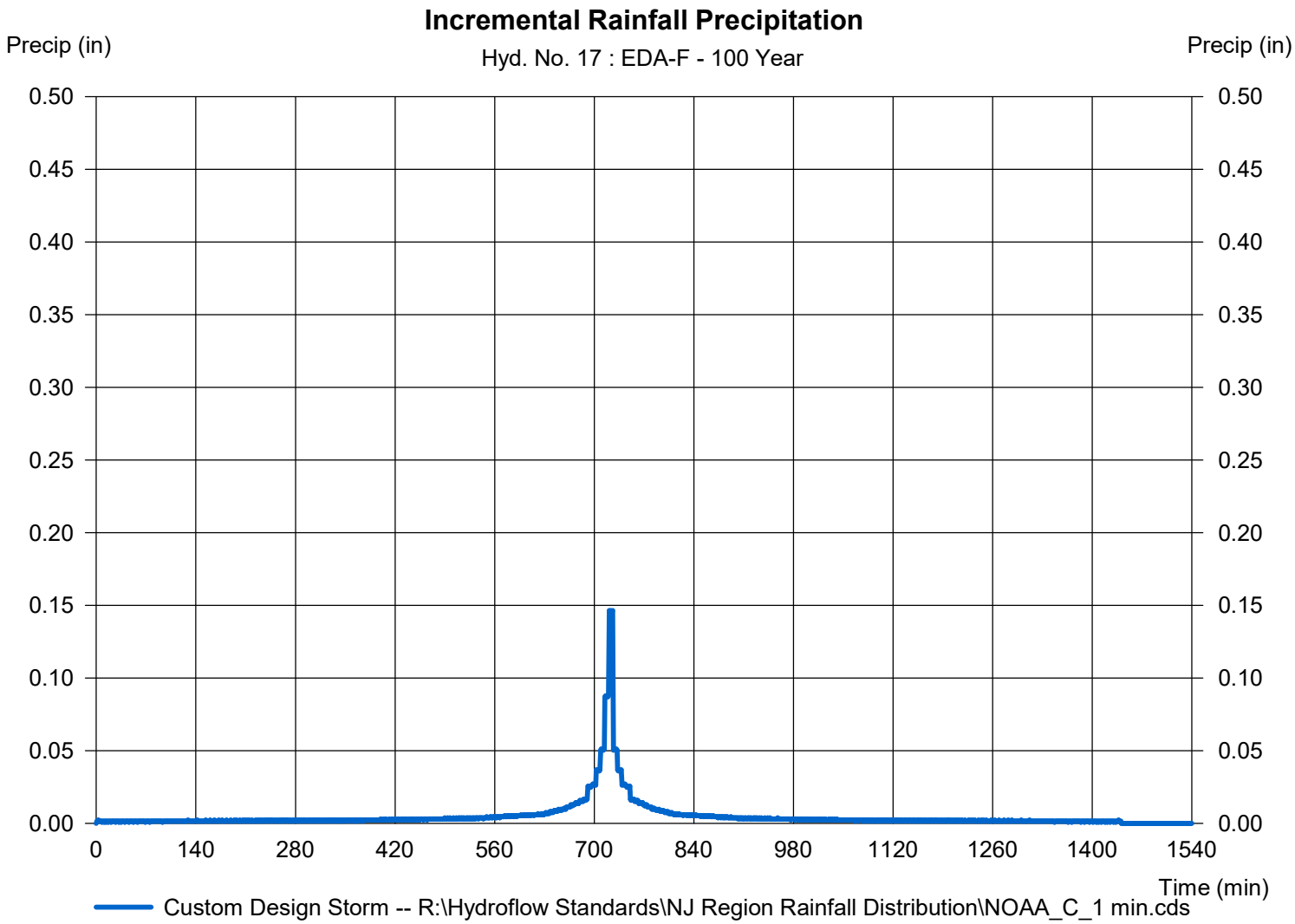


Precipitation Report

Hyd. No. 17

EDA-F

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

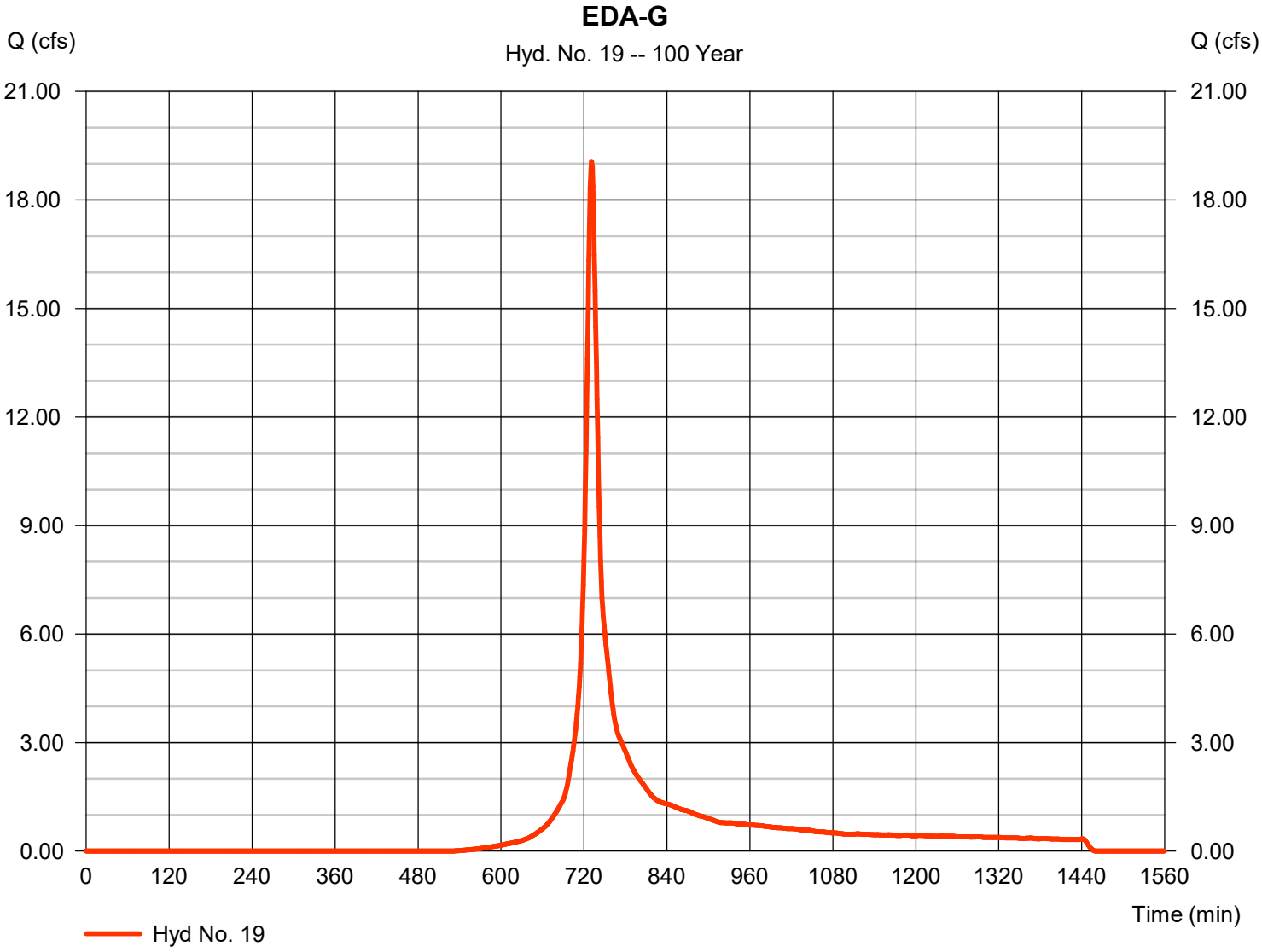


Hydrograph Report

Hyd. No. 19

EDA-G

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.07 cfs
Storm frequency	=	100 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	65,526 cuft
Drainage area	=	5.080 ac	Curve number	=	66
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.60 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

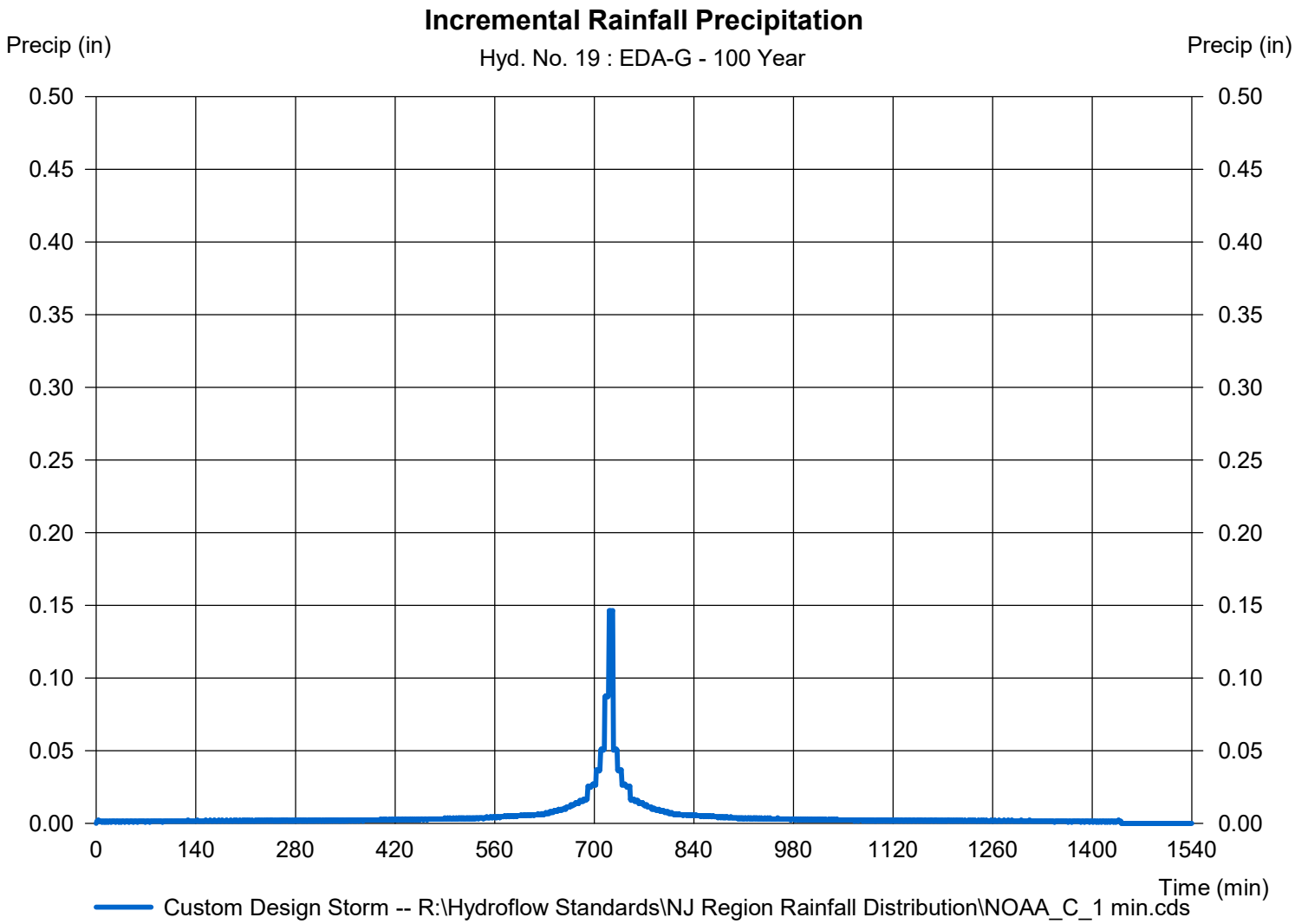


Precipitation Report

Hyd. No. 19

EDA-G

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



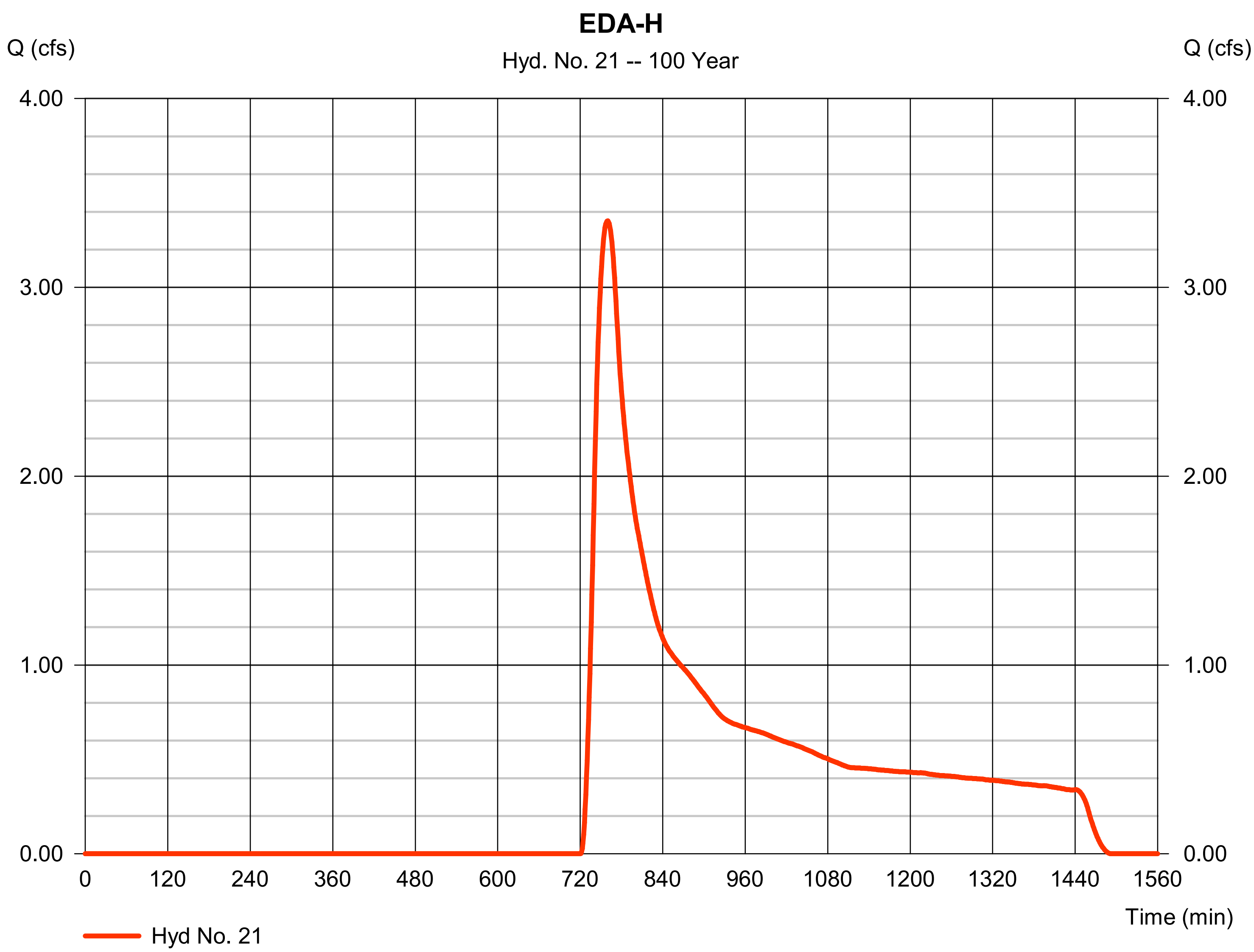
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Monday, 11 / 2 / 2020

Hyd. No. 21

EDA-H

Hydrograph type	= SCS Runoff	Peak discharge	= 3.352 cfs
Storm frequency	= 100 yrs	Time to peak	= 760 min
Time interval	= 1 min	Hyd. volume	= 33,535 cuft
Drainage area	= 12.920 ac	Curve number	= 36
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 33.50 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

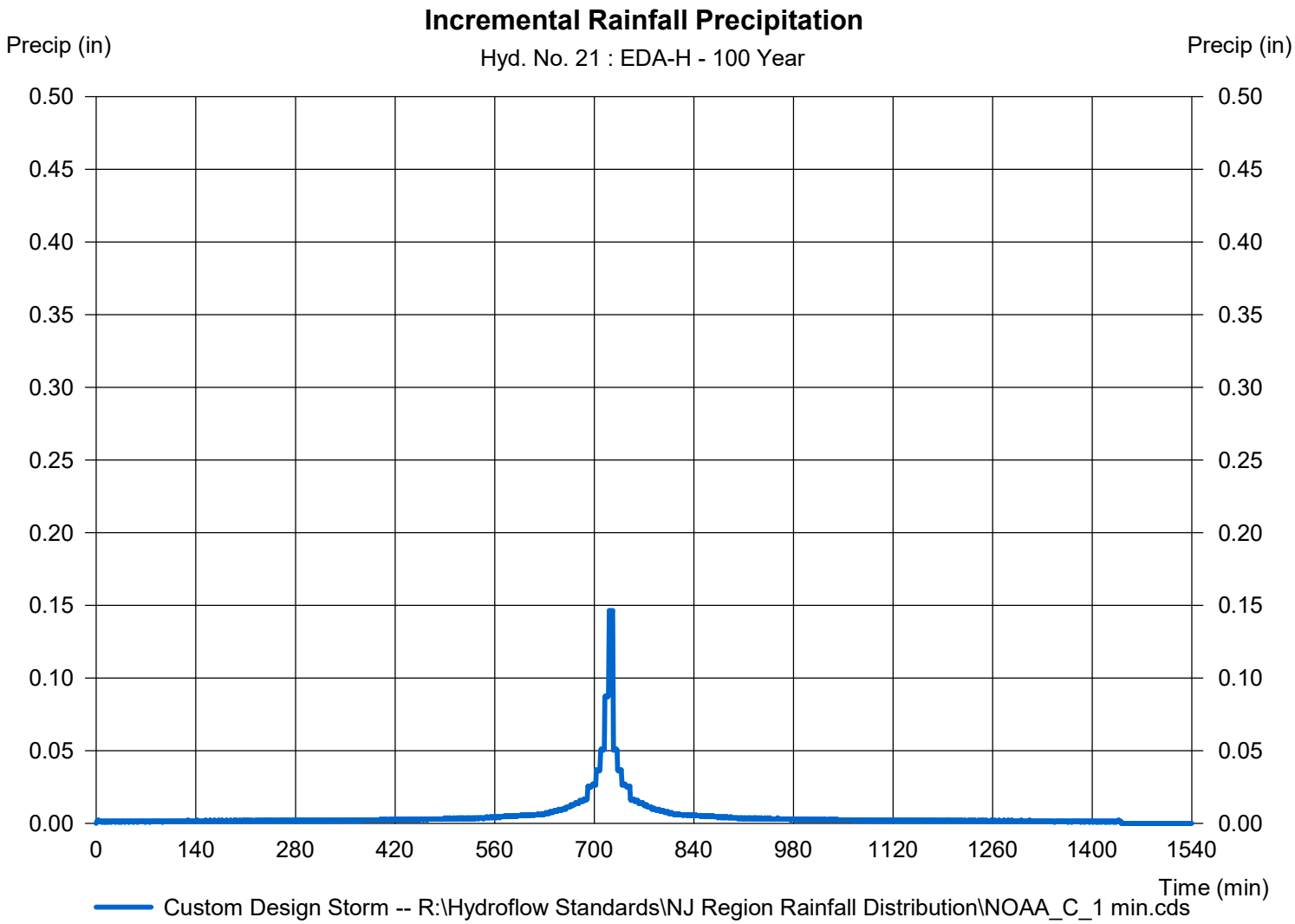


Precipitation Report

Hyd. No. 21

EDA-H

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

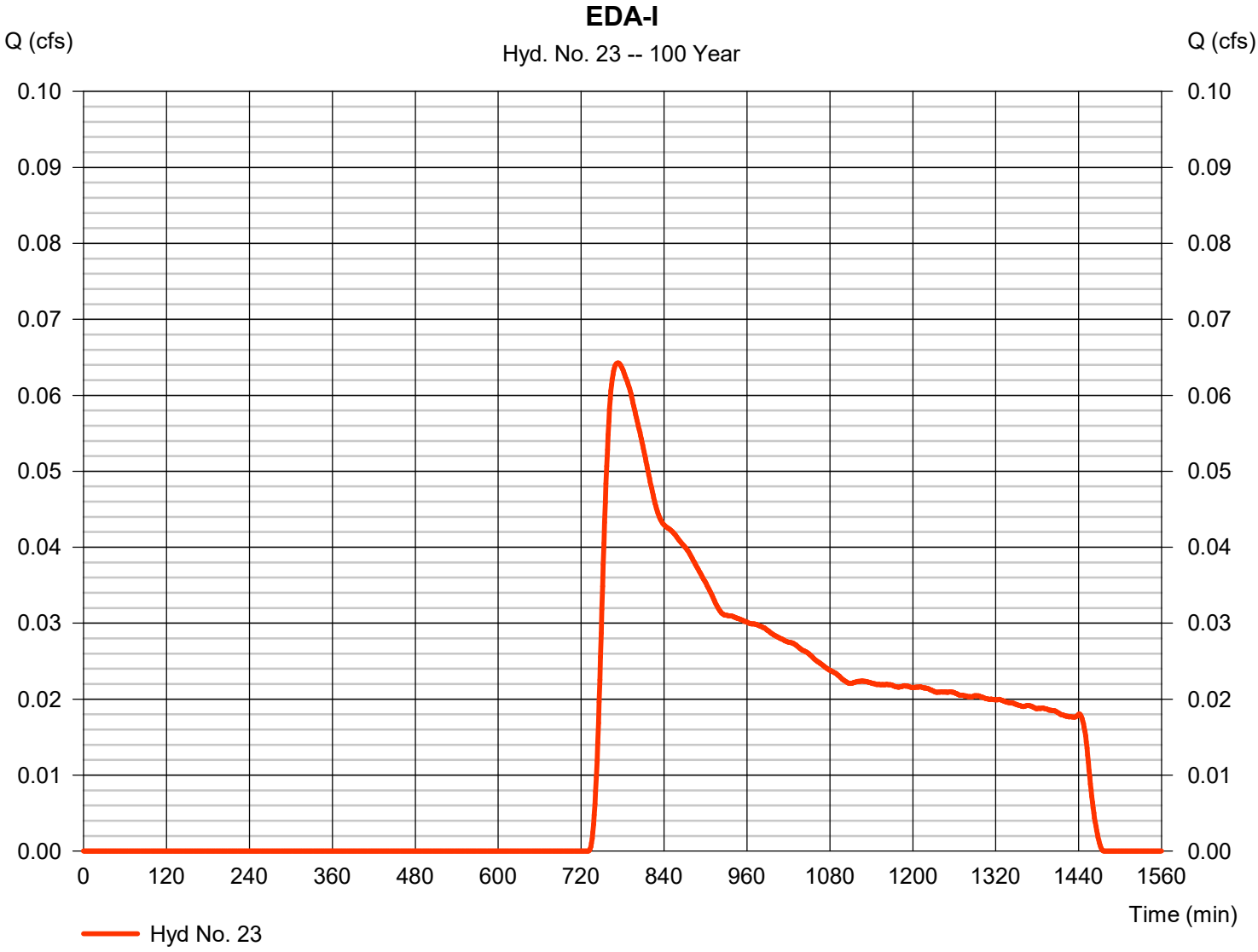


Hydrograph Report

Hyd. No. 23

EDA-I

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.064 cfs
Storm frequency	=	100 yrs	Time to peak	=	774 min
Time interval	=	1 min	Hyd. volume	=	1,222 cuft
Drainage area	=	1.100 ac	Curve number	=	30
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	22.10 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

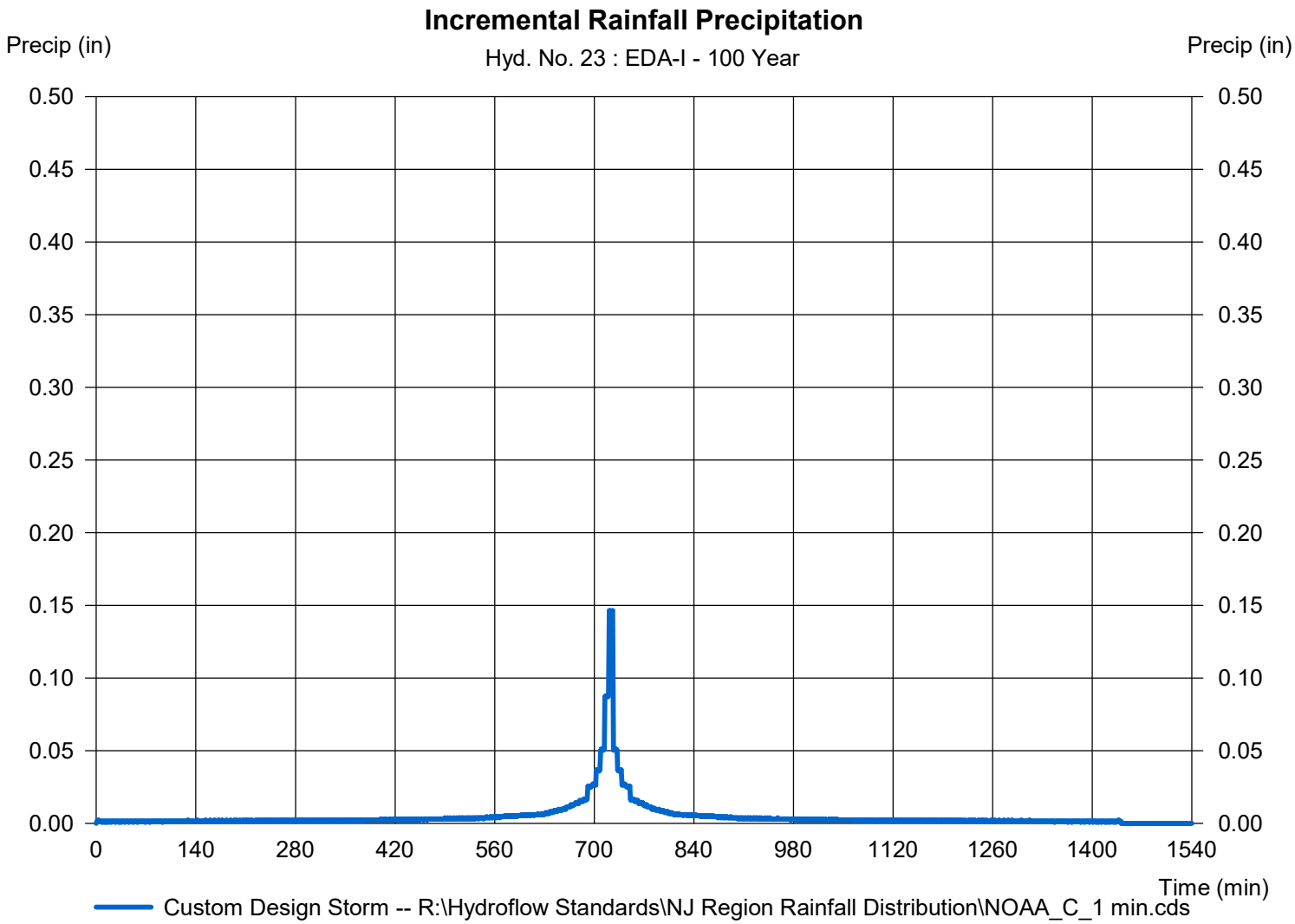


Precipitation Report

Hyd. No. 23

EDA-I

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



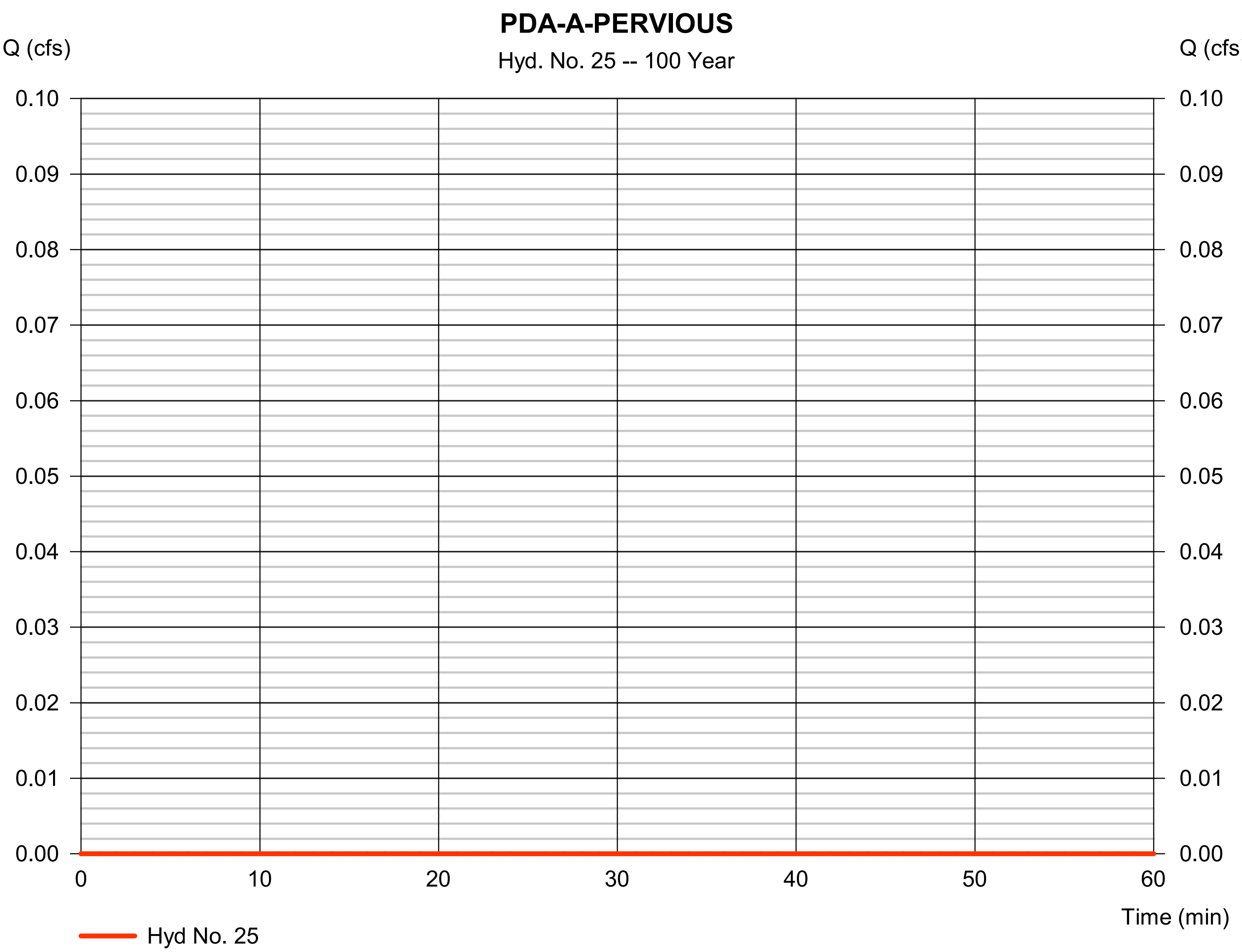
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 25

PDA-A-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 2.030 ac	Curve number	= 9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

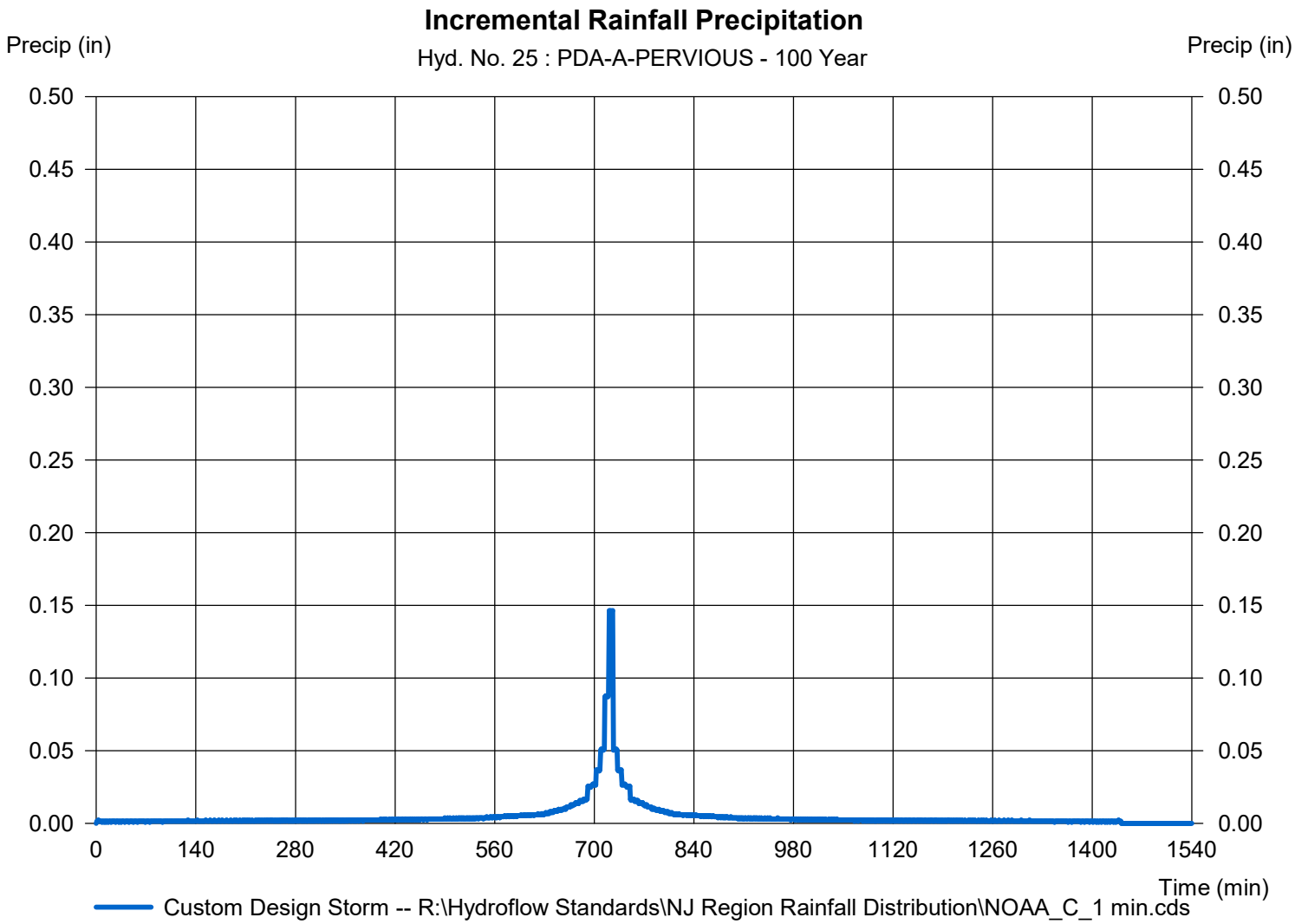


Precipitation Report

Hyd. No. 25

PDA-A-PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

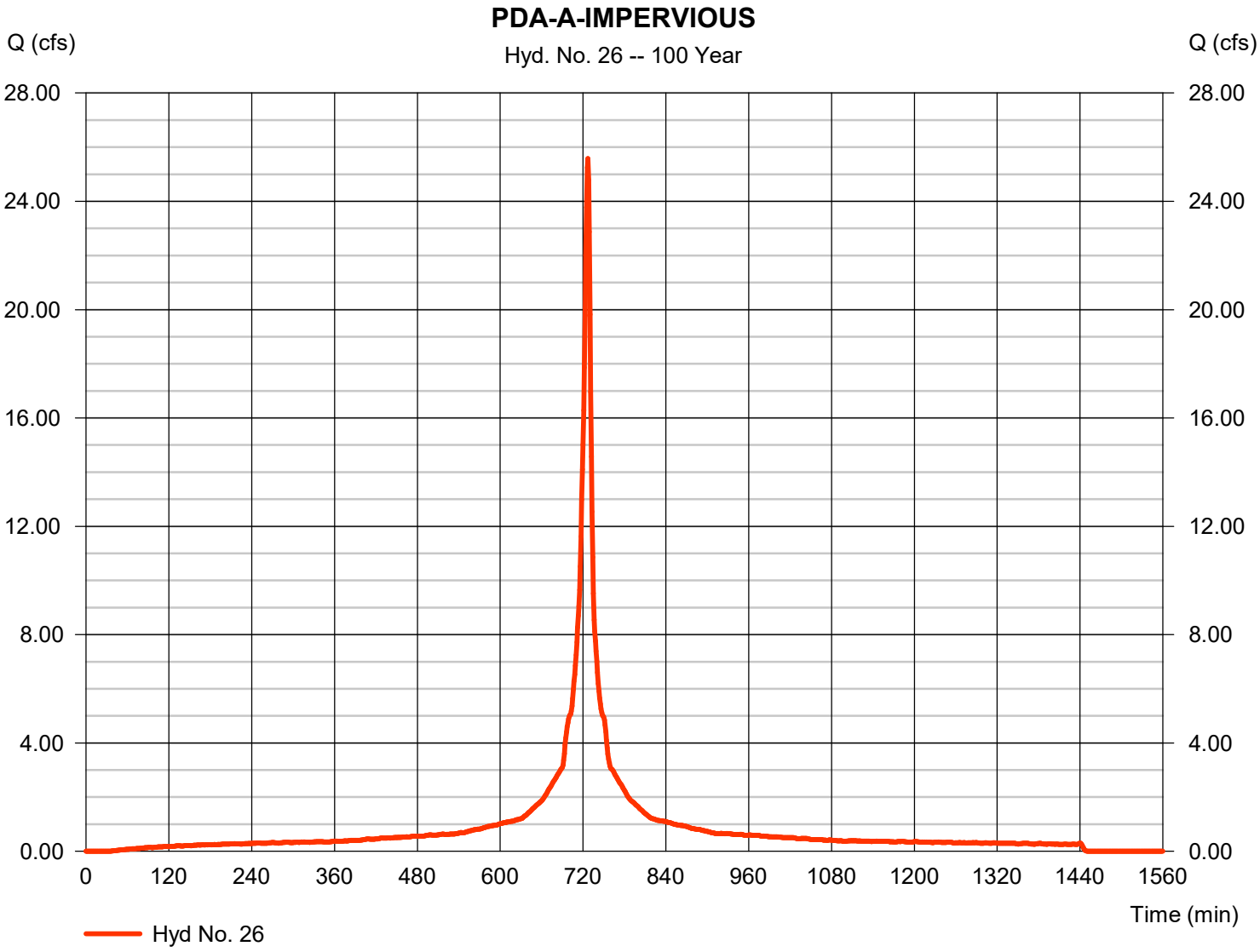


Hydrograph Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.58 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	84,372 cuft
Drainage area	=	3.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

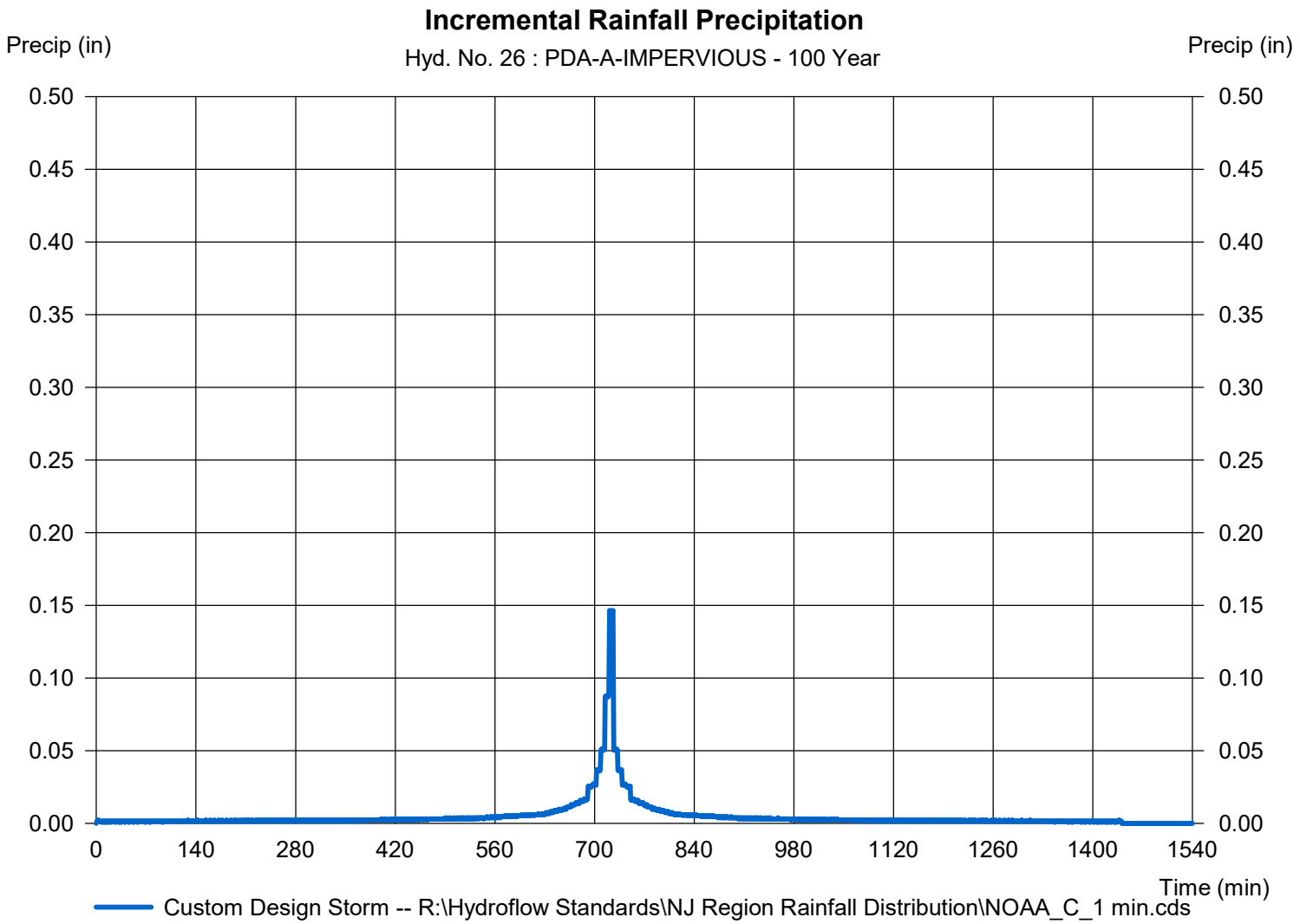


Precipitation Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

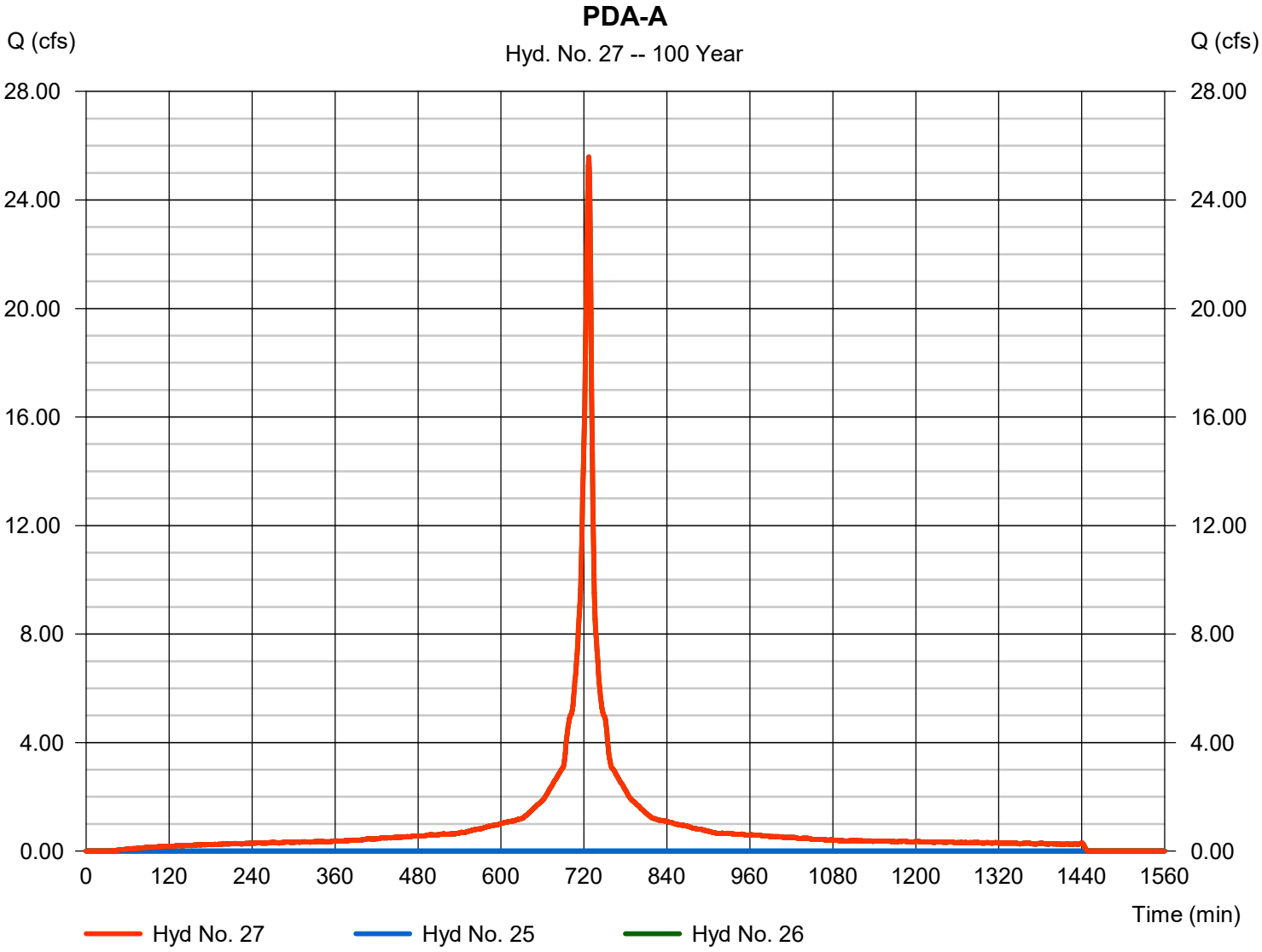


Hydrograph Report

Hyd. No. 27

PDA-A

Hydrograph type	=	Combine	Peak discharge	=	25.58 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	84,372 cuft
Inflow hyds.	=	25, 26	Contrib. drain. area	=	5.130 ac



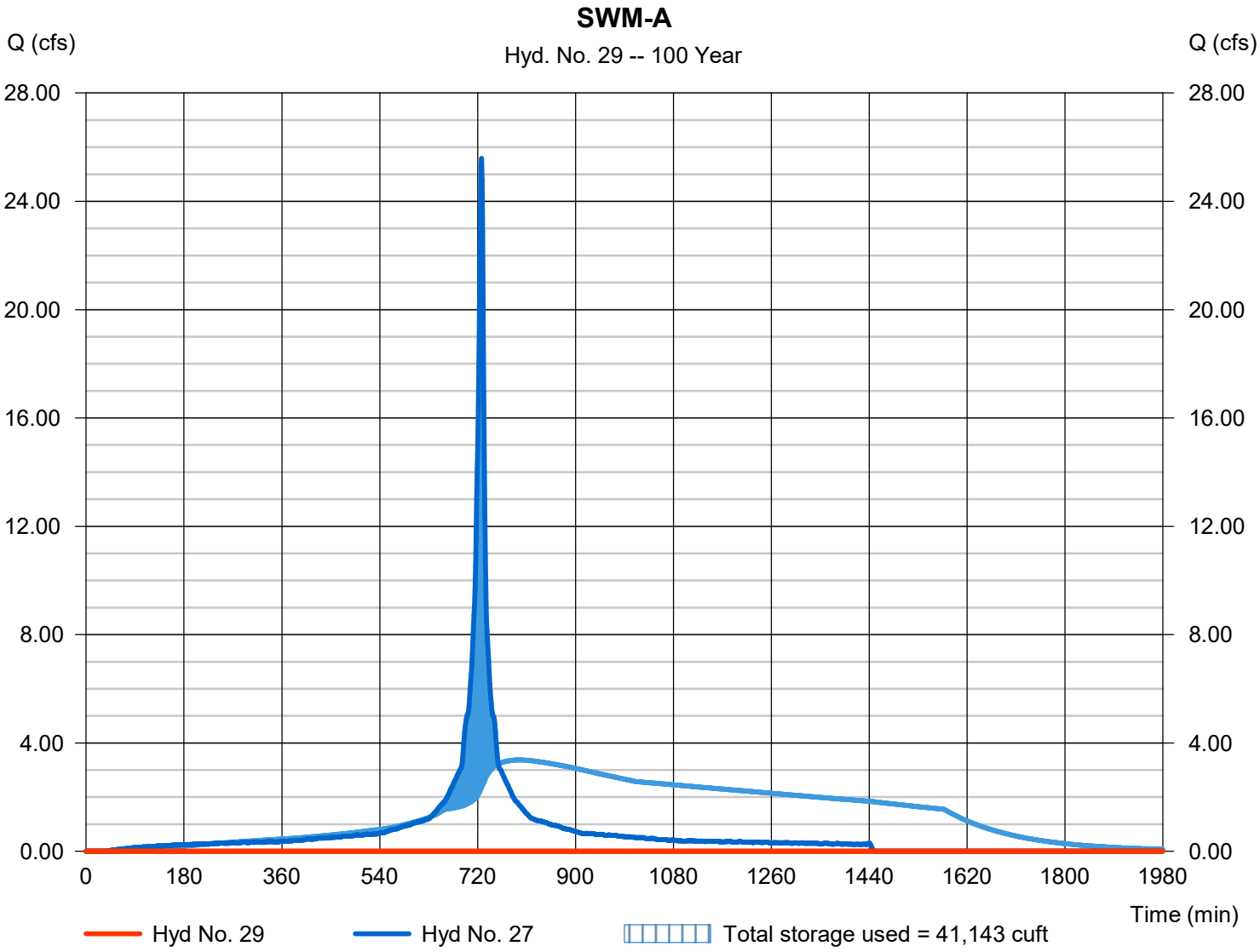
Hydrograph Report

Hyd. No. 29

SWM-A

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	641 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	27 - PDA-A	Max. Elevation	=	595.05 ft
Reservoir name	=	SWM-A	Max. Storage	=	41,143 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

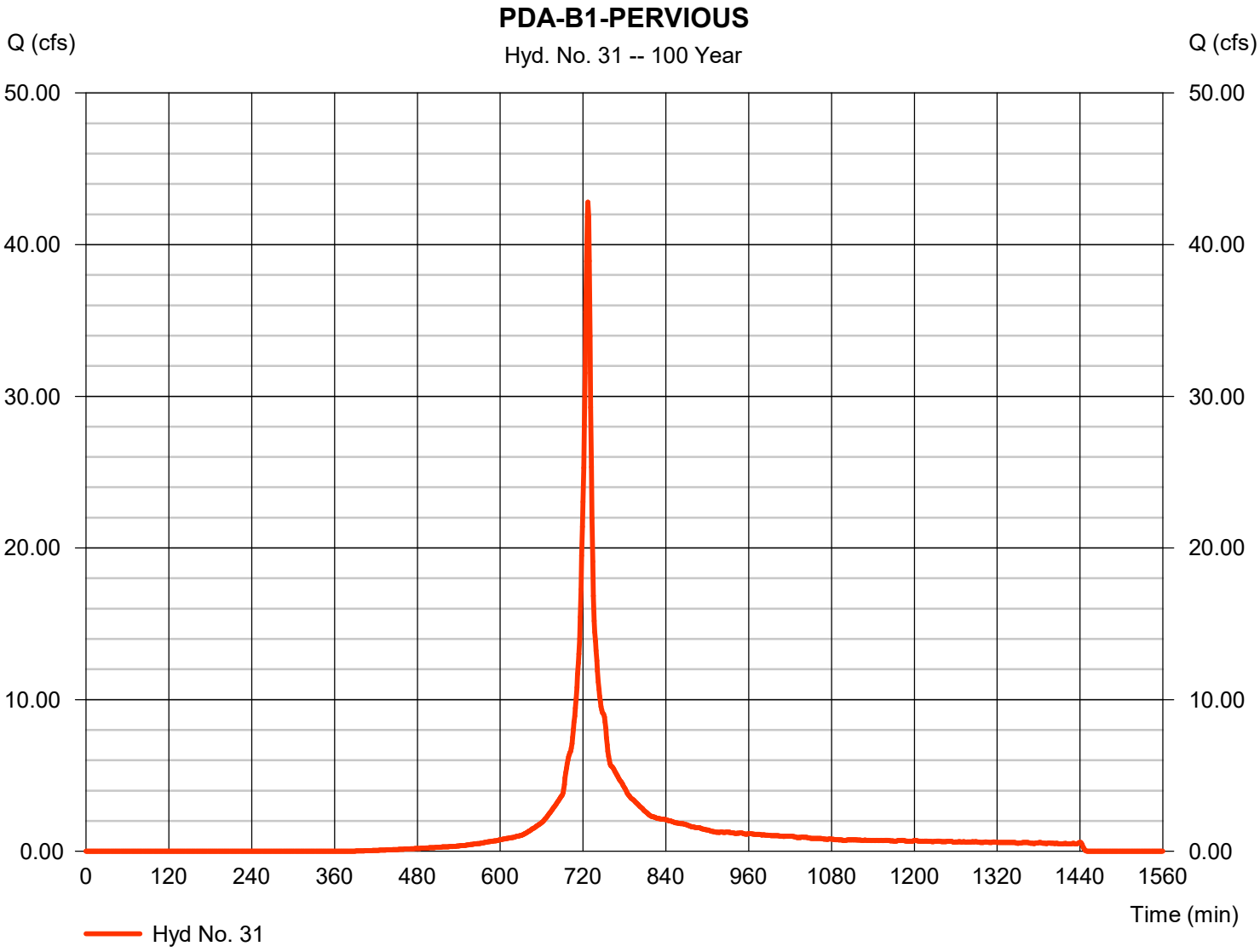


Hydrograph Report

Hyd. No. 31

PDA-B1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	42.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	119,824 cuft
Drainage area	=	6.790 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

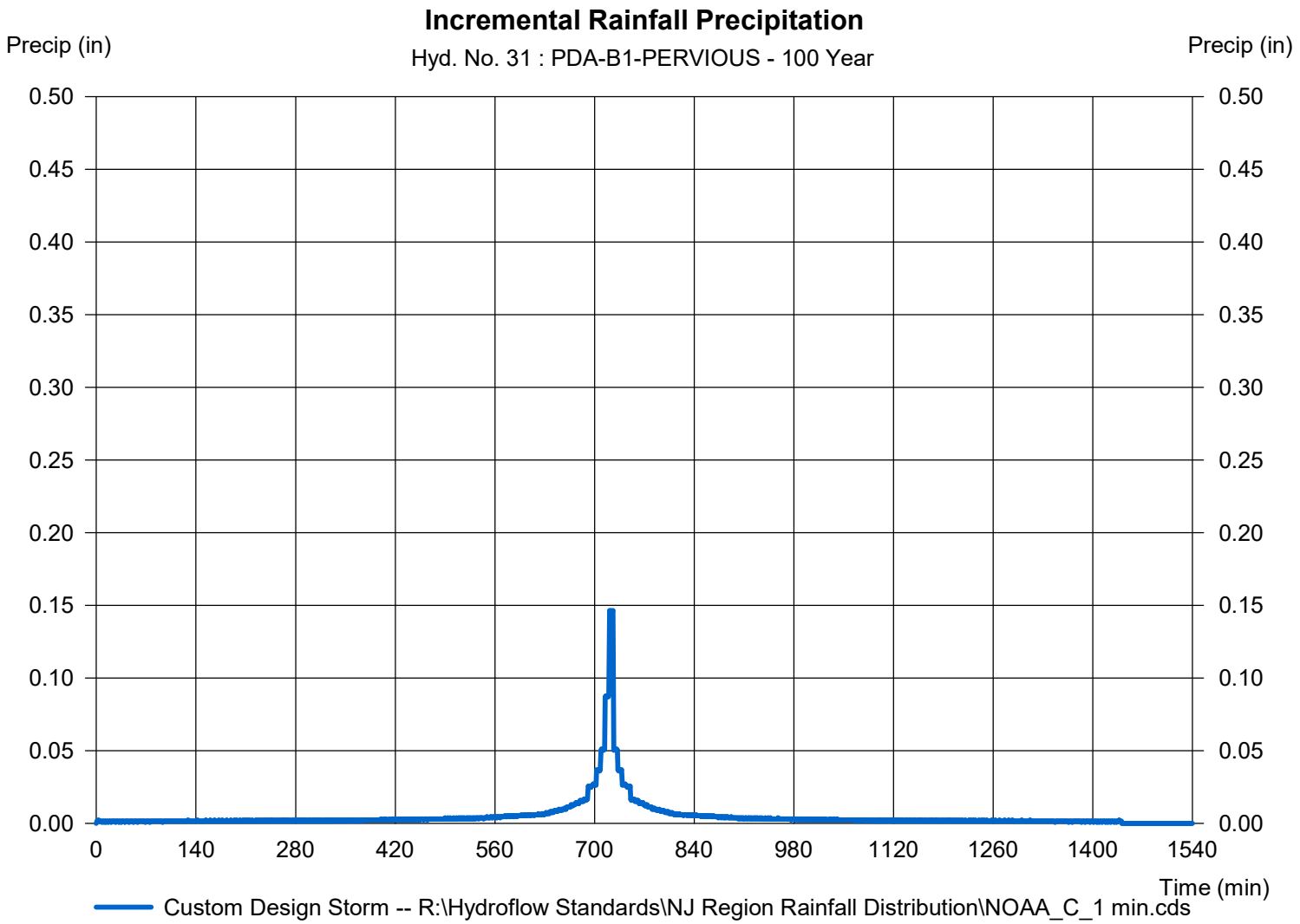


Precipitation Report

Hyd. No. 31

PDA-B1-PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



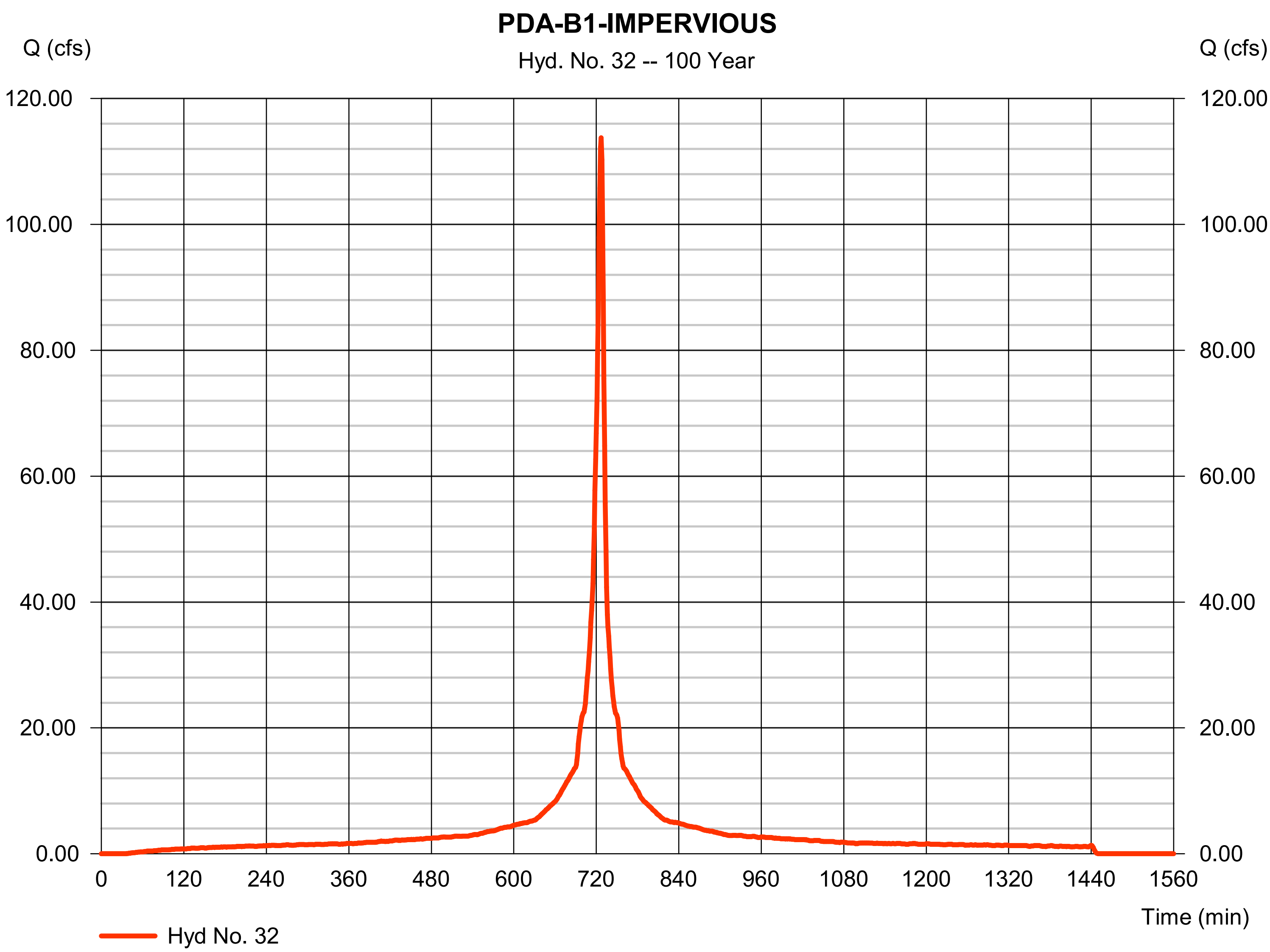
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 32

PDA-B1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 113.78 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 375,319 cuft
Drainage area	= 13.790 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

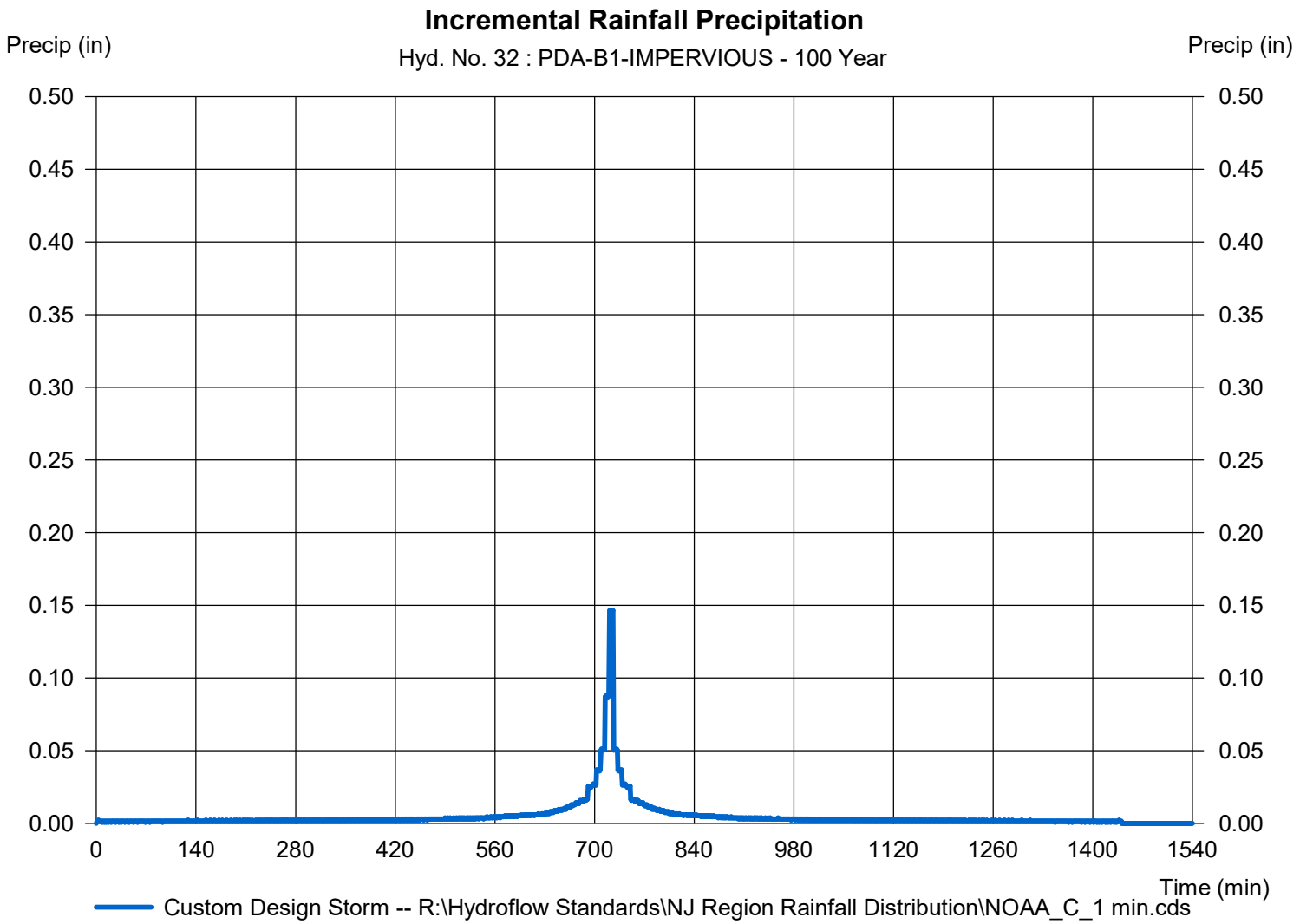


Precipitation Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

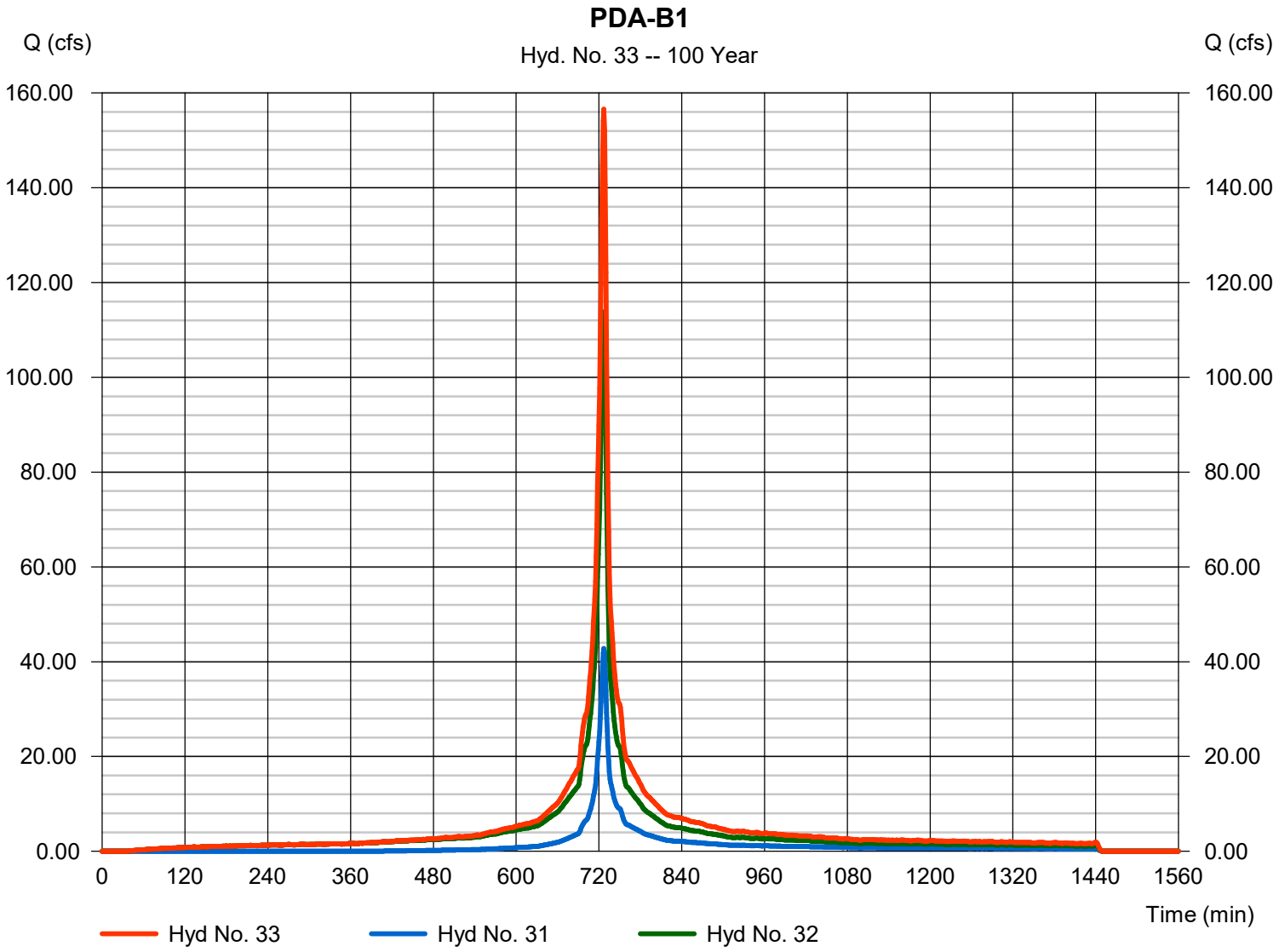


Hydrograph Report

Hyd. No. 33

PDA-B1

Hydrograph type	=	Combine	Peak discharge	=	156.59 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	495,143 cuft
Inflow hyds.	=	31, 32	Contrib. drain. area	=	20.580 ac



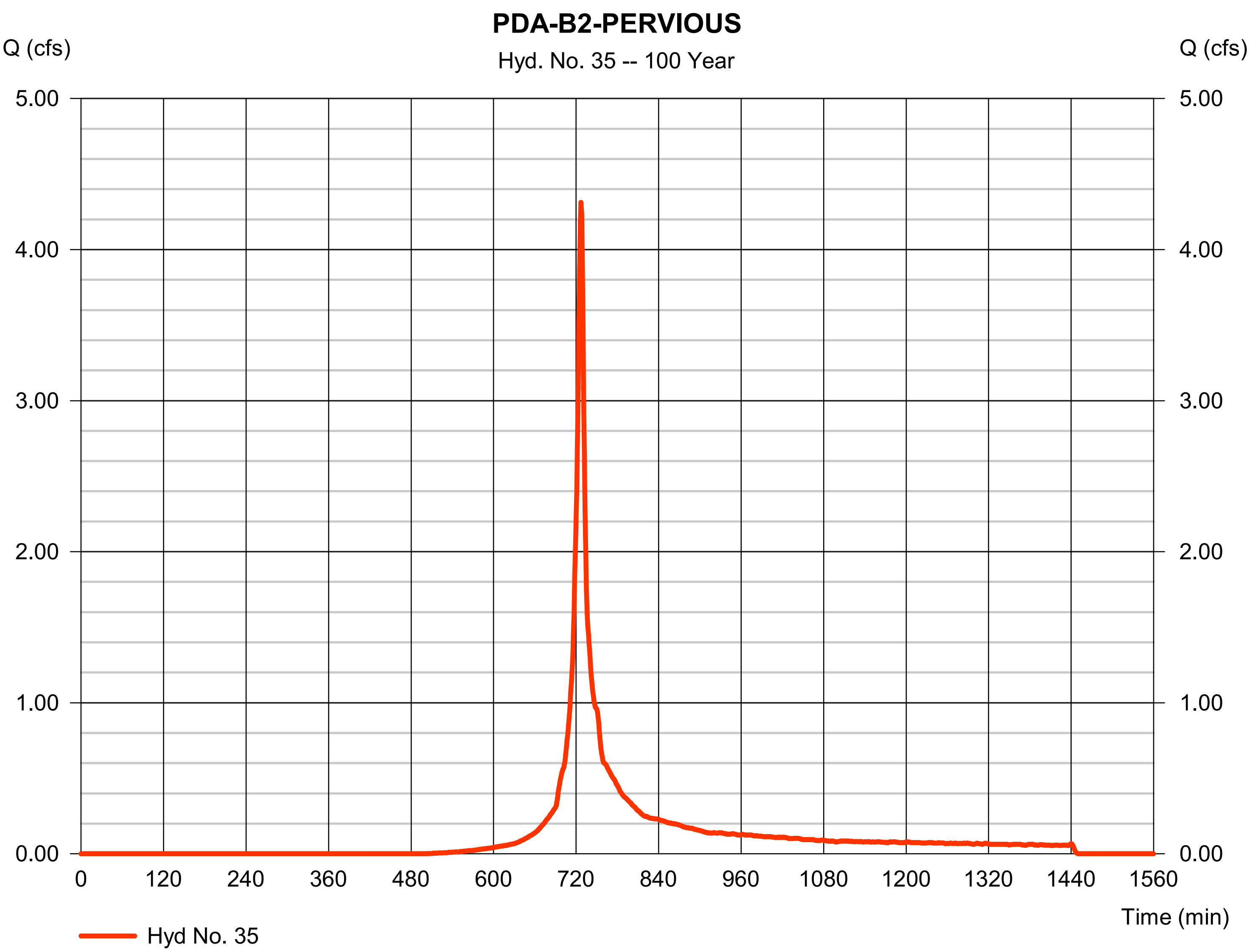
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 35

PDA-B2-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 4.313 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 11,891 cuft
Drainage area	= 0.830 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

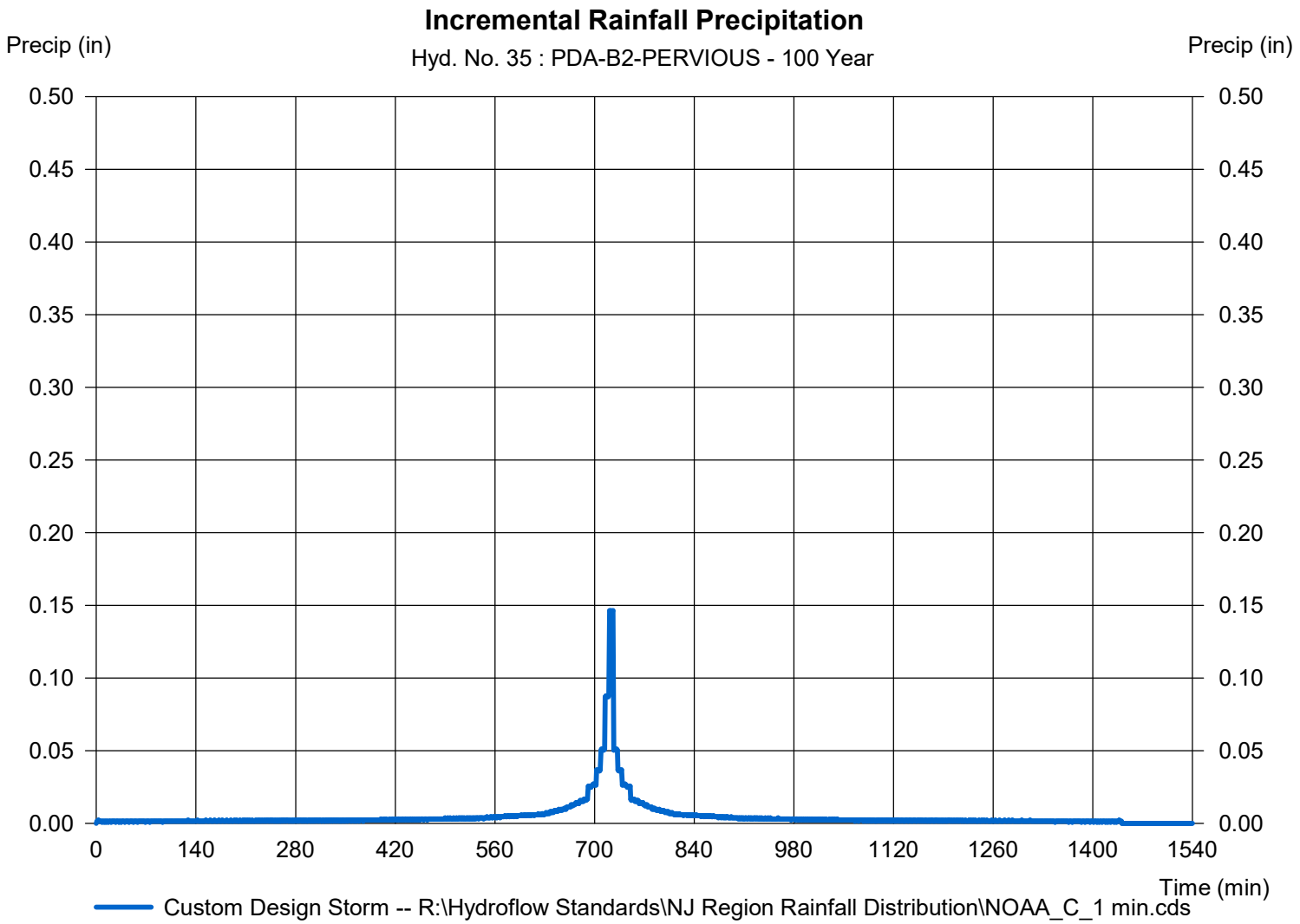


Precipitation Report

Hyd. No. 35

PDA-B2-PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

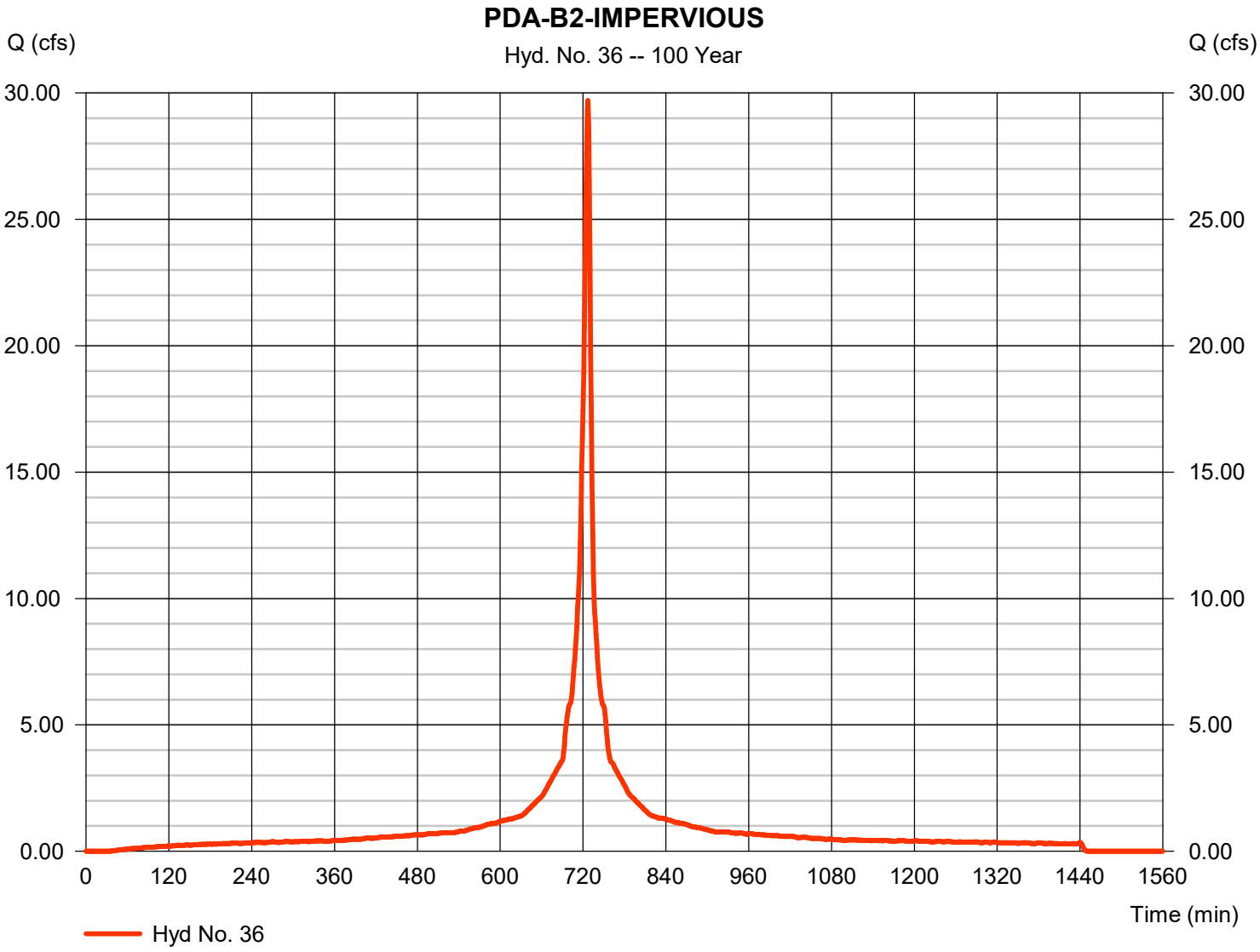


Hydrograph Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.70 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	97,980 cuft
Drainage area	=	3.600 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

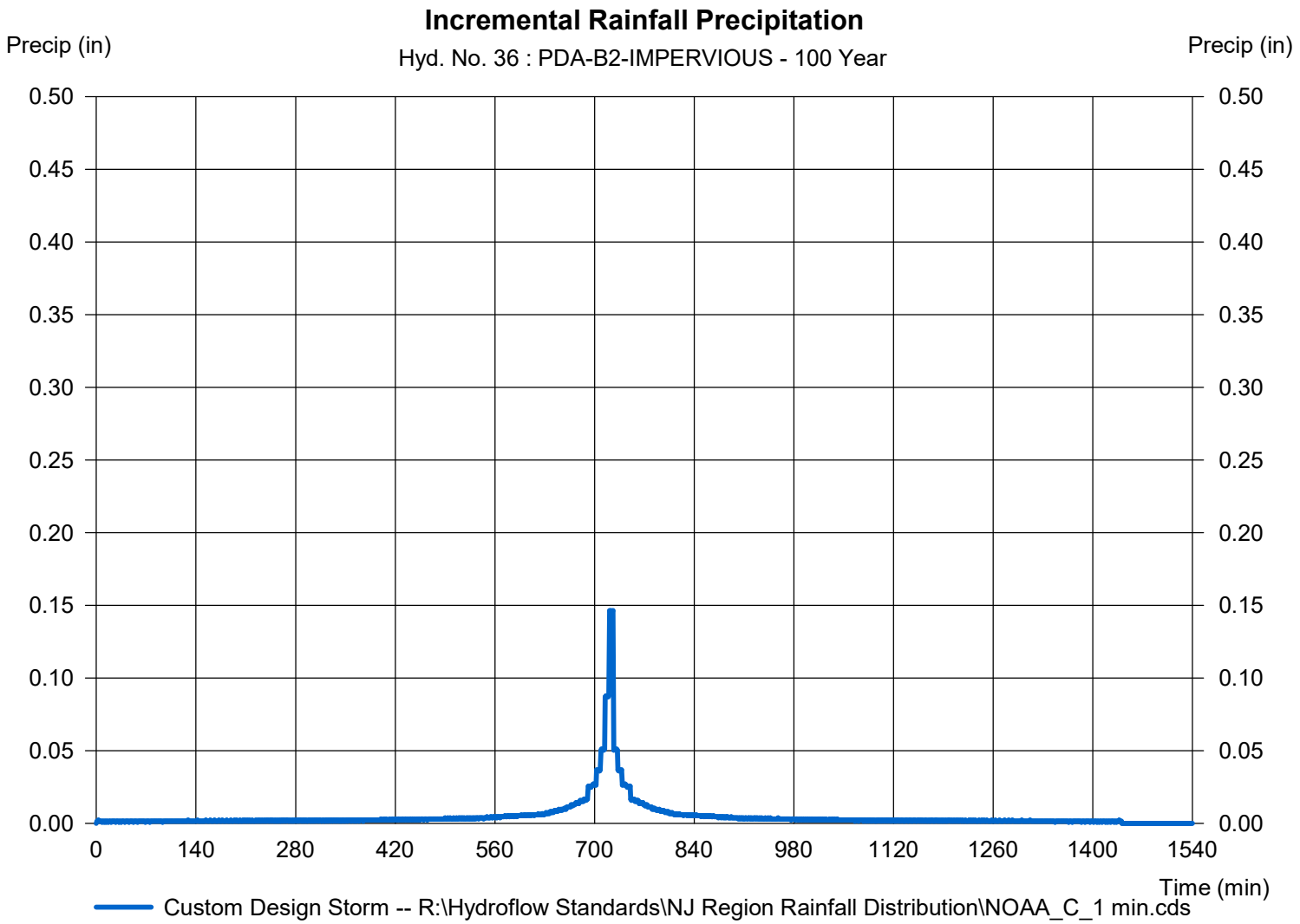


Precipitation Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

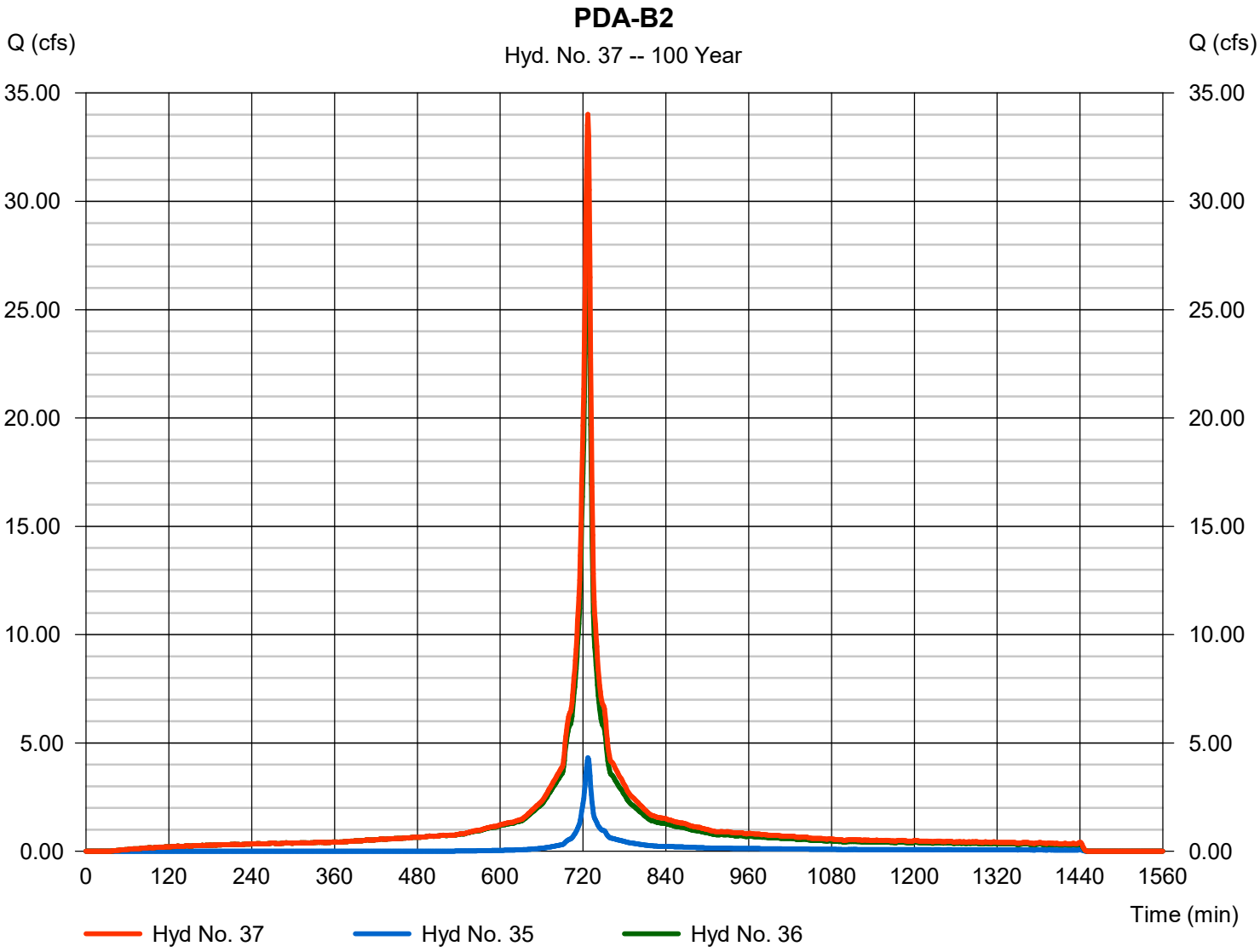


Hydrograph Report

Hyd. No. 37

PDA-B2

Hydrograph type	=	Combine	Peak discharge	=	34.02 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	109,871 cuft
Inflow hyds.	=	35, 36	Contrib. drain. area	=	4.430 ac



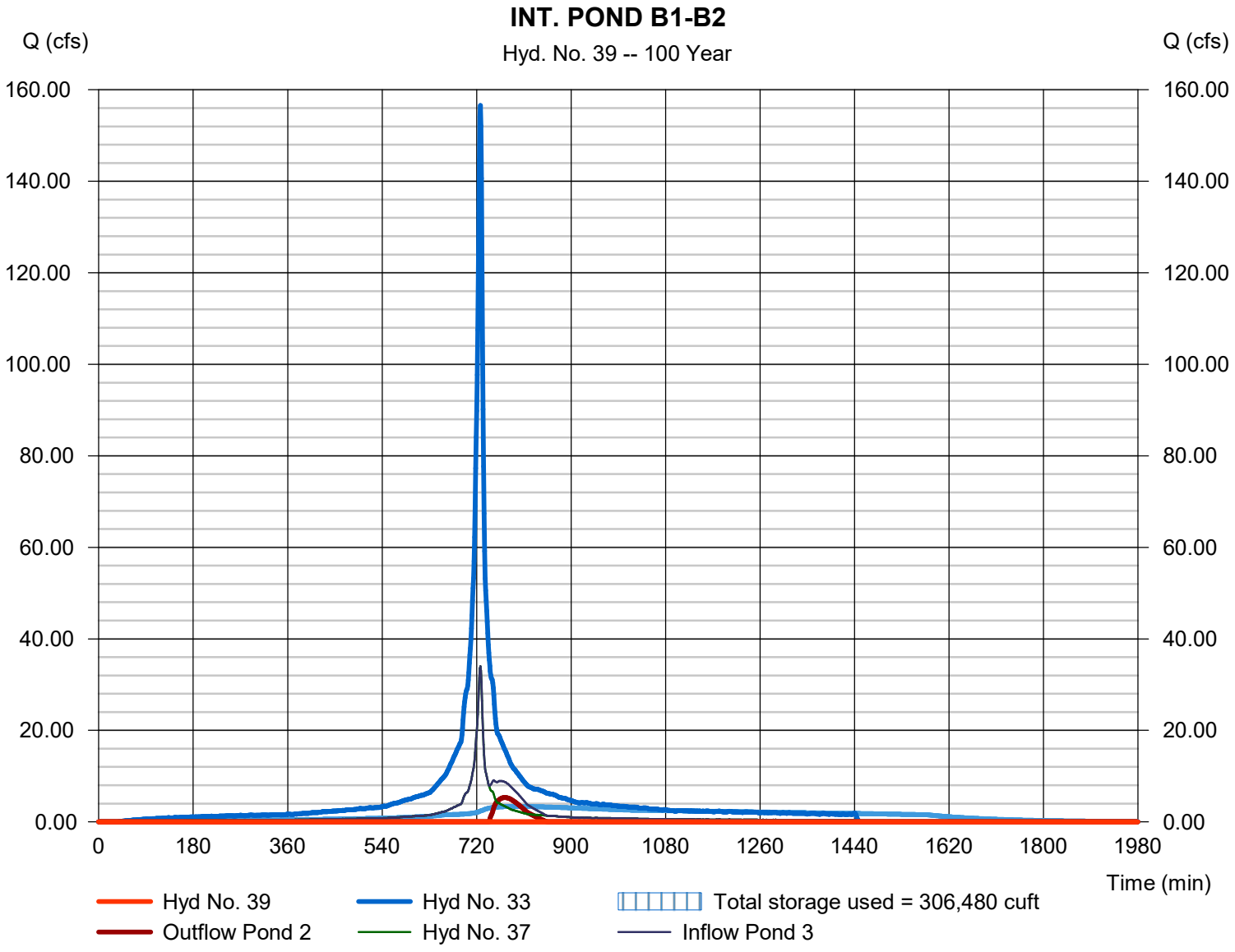
Hydrograph Report

Hyd. No. 39

INT. POND B1-B2

Hydrograph type	=	Reservoir (Interconnected)	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	685 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Upper Pond	=	SWM-B1	Lower Pond	=	SWM-B2
Inflow hyd.	=	33 - PDA-B1	Other Inflow hyd.	=	37 - PDA-B2
Max. Elevation	=	601.18 ft	Max. Elevation	=	600.77 ft
Max. Storage	=	239,528 cuft	Max. Storage	=	66,952 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.

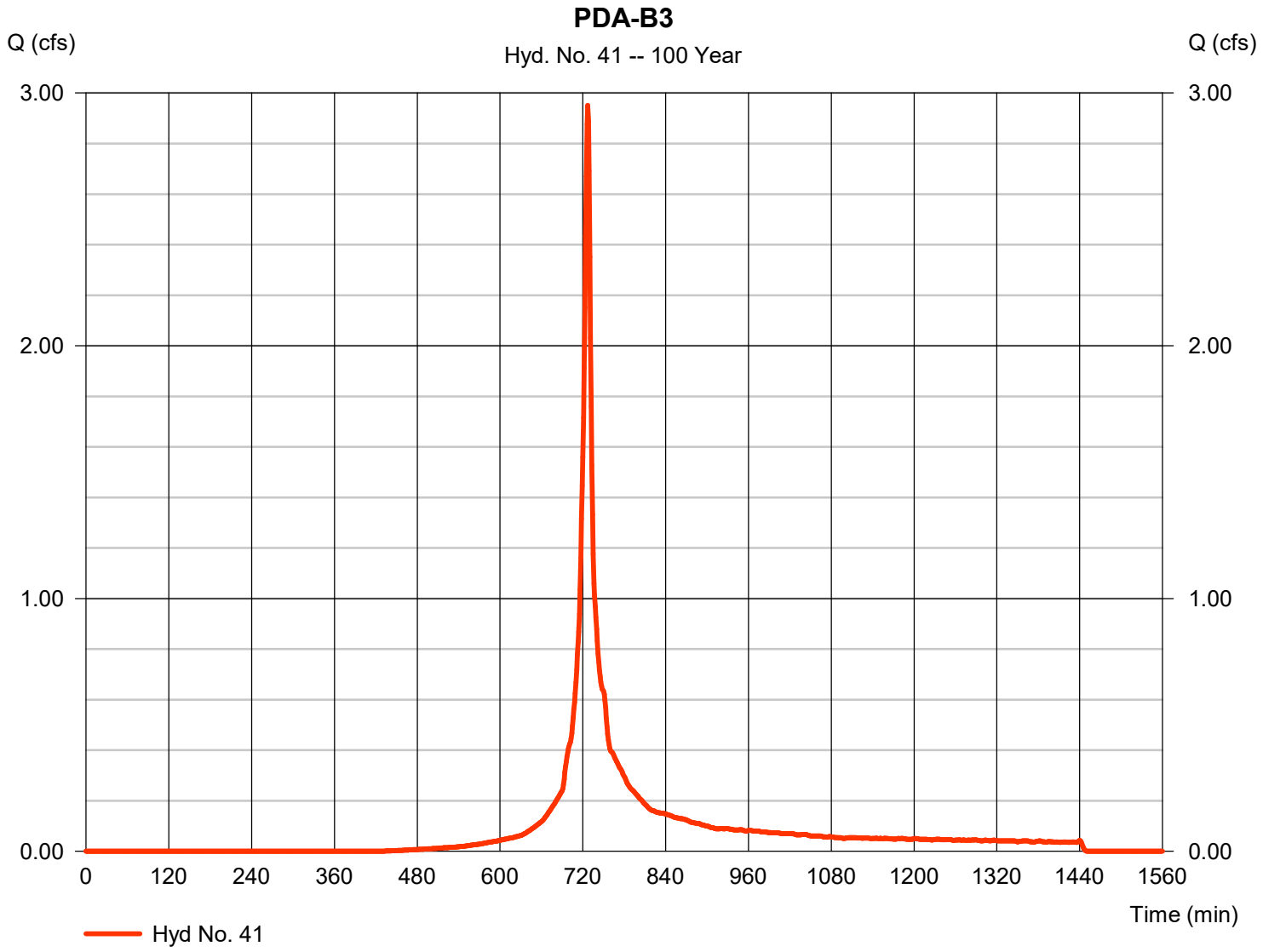


Hydrograph Report

Hyd. No. 41

PDA-B3

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.951 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	8,195 cuft
Drainage area	=	0.500 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

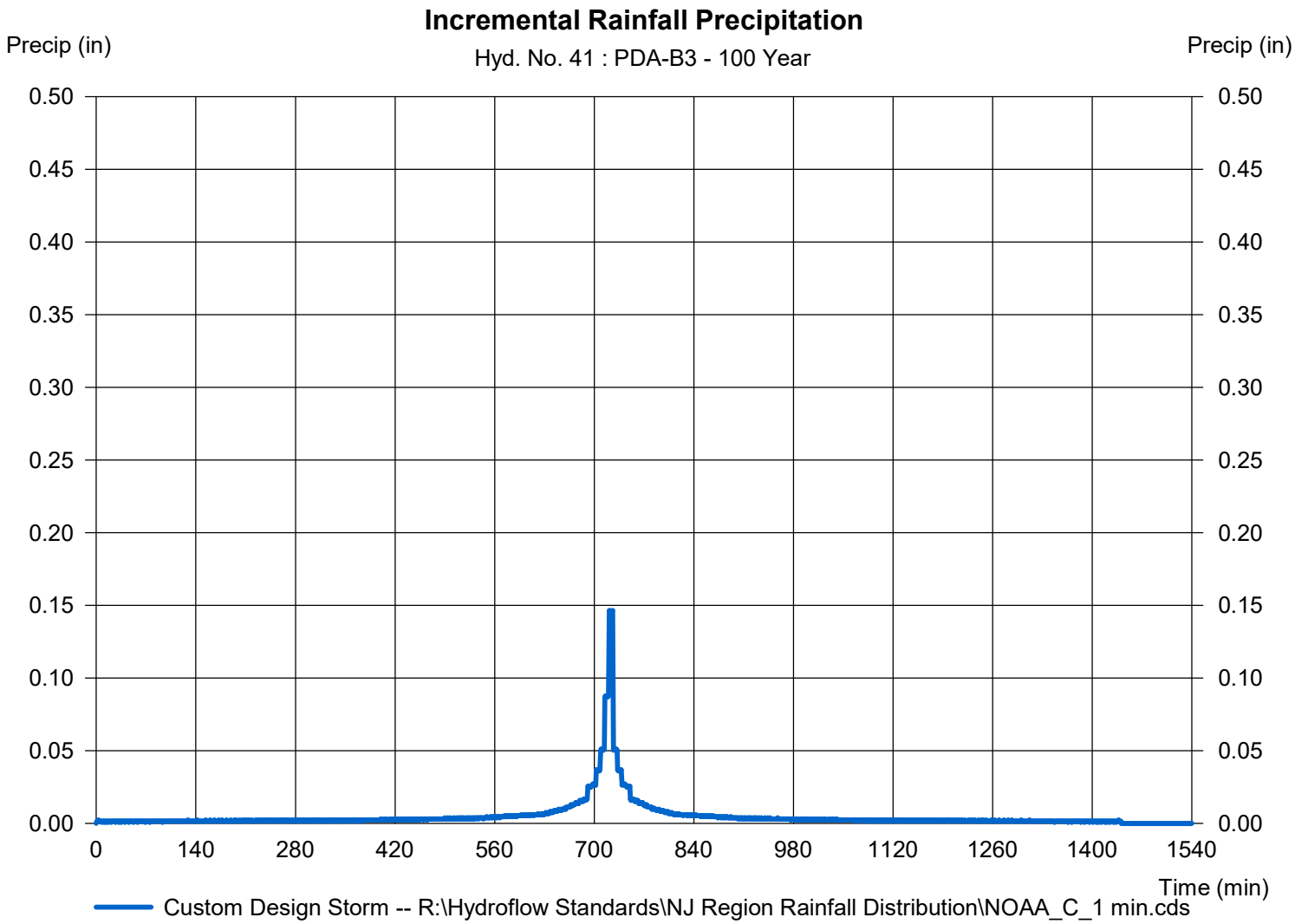


Precipitation Report

Hyd. No. 41

PDA-B3

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

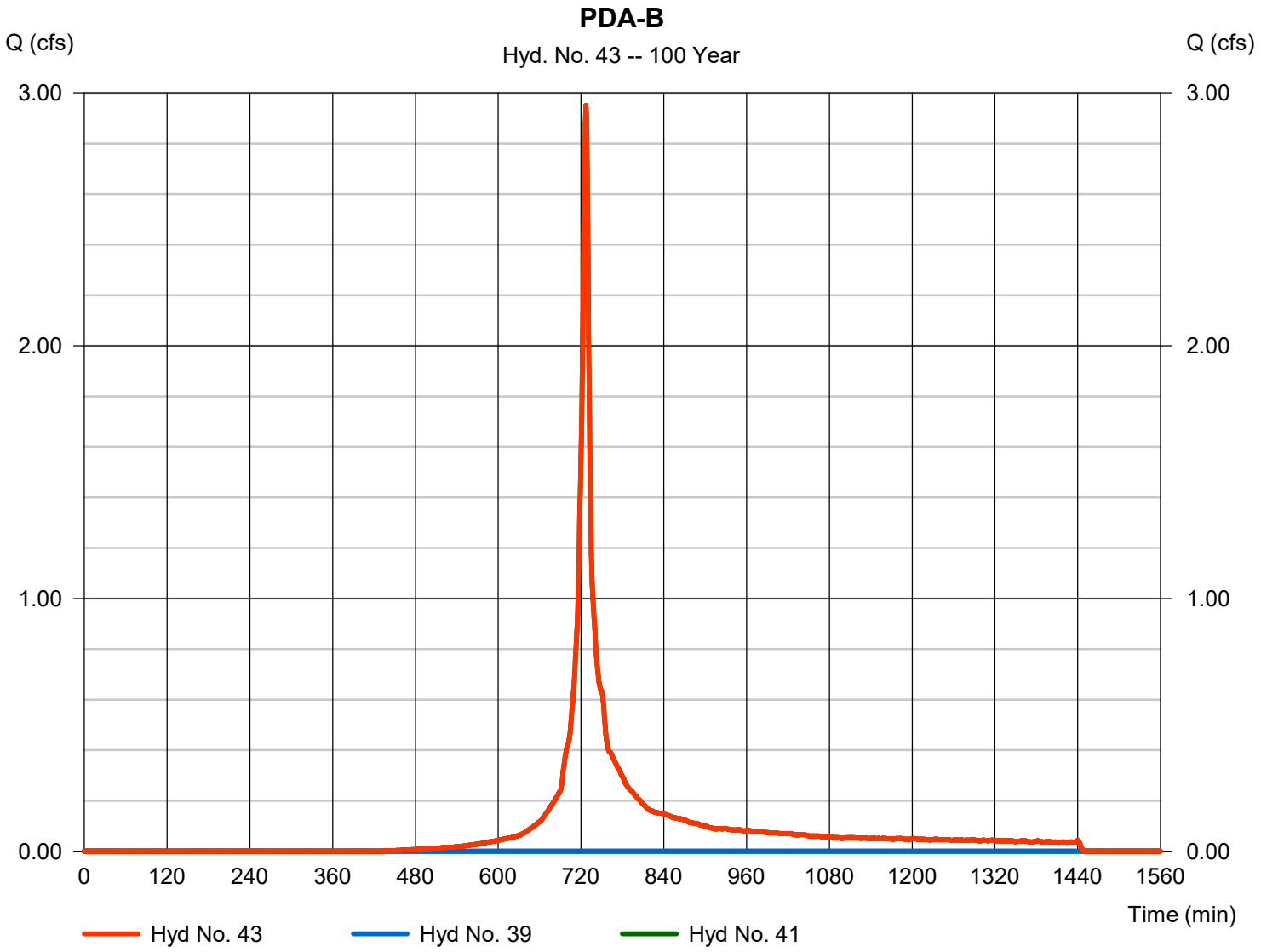


Hydrograph Report

Hyd. No. 43

PDA-B

Hydrograph type	=	Combine	Peak discharge	=	2.951 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	8,195 cuft
Inflow hyds.	=	39, 41	Contrib. drain. area	=	0.500 ac



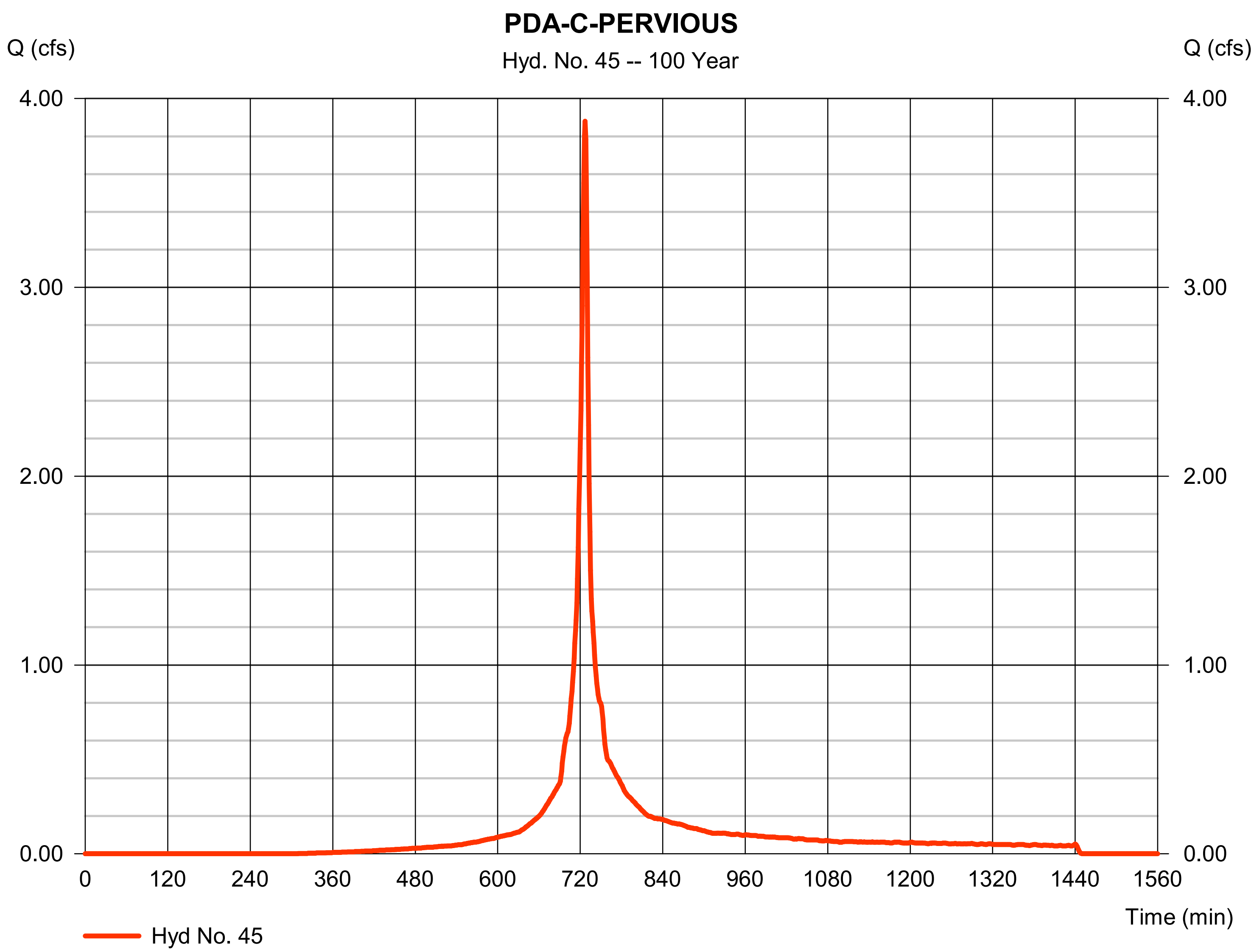
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 45

PDA-C-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 3.881 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 11,071 cuft
Drainage area	= 0.560 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

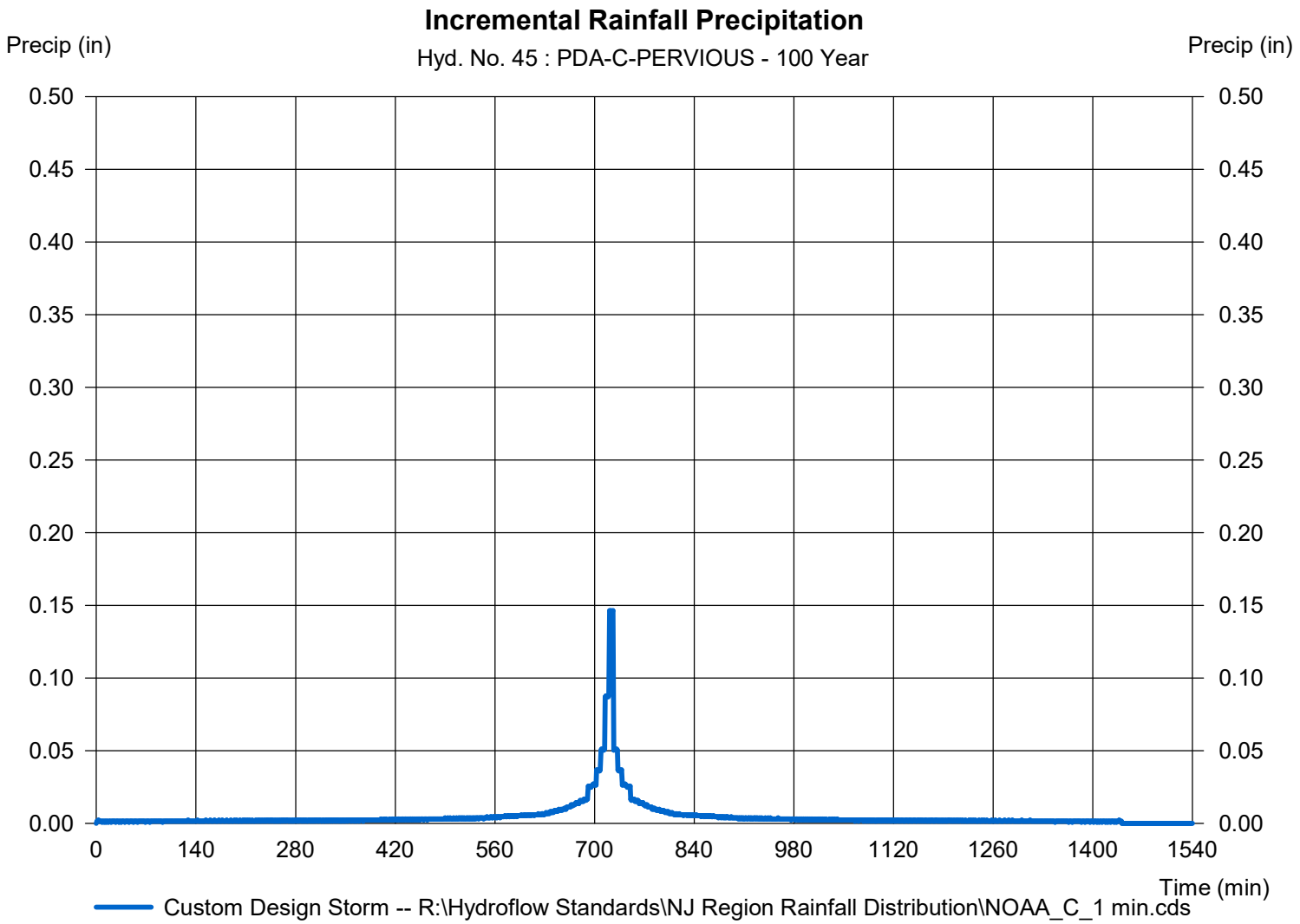


Precipitation Report

Hyd. No. 45

PDA-C-PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



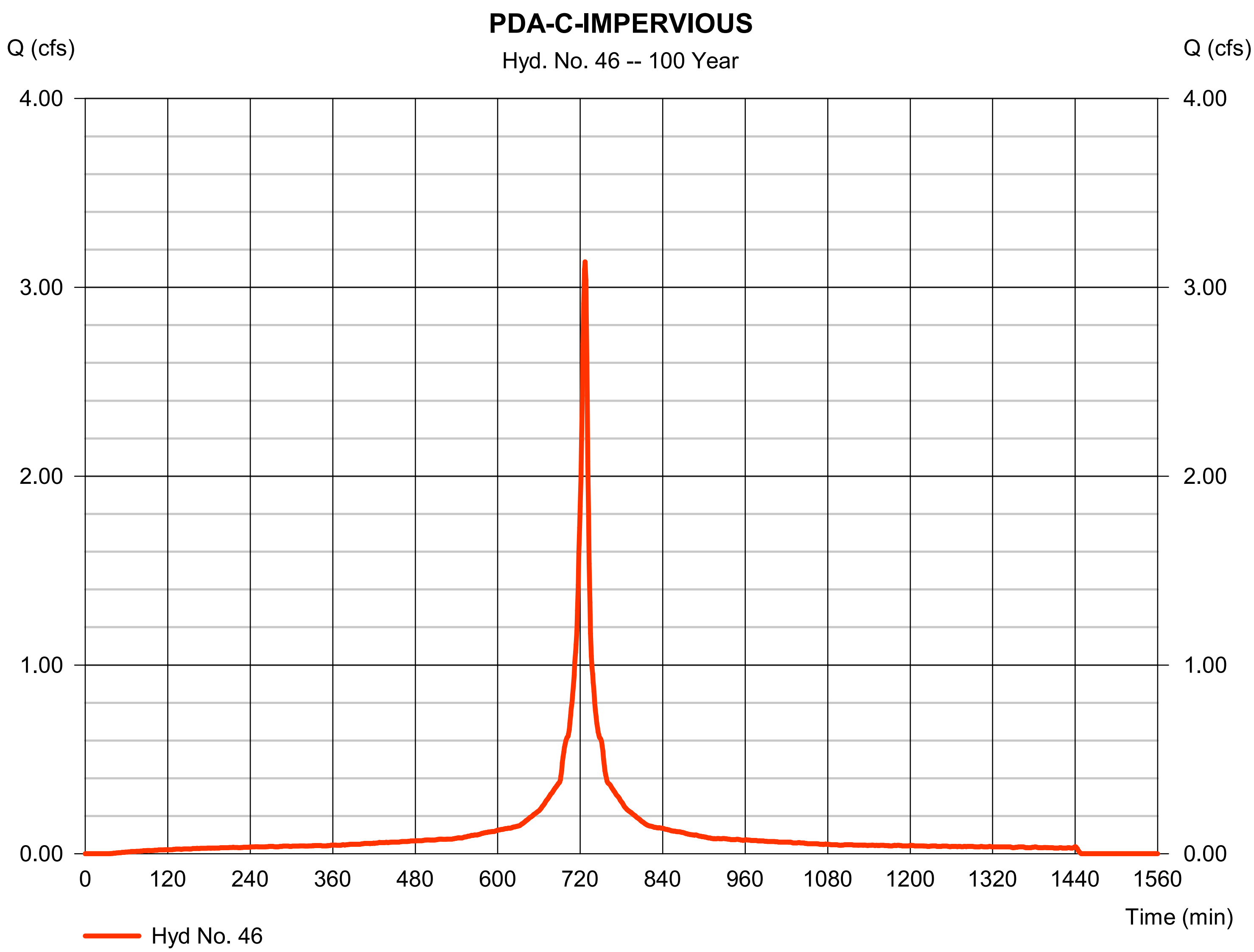
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 46

PDA-C-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 3.135 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 10,342 cuft
Drainage area	= 0.380 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.50 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

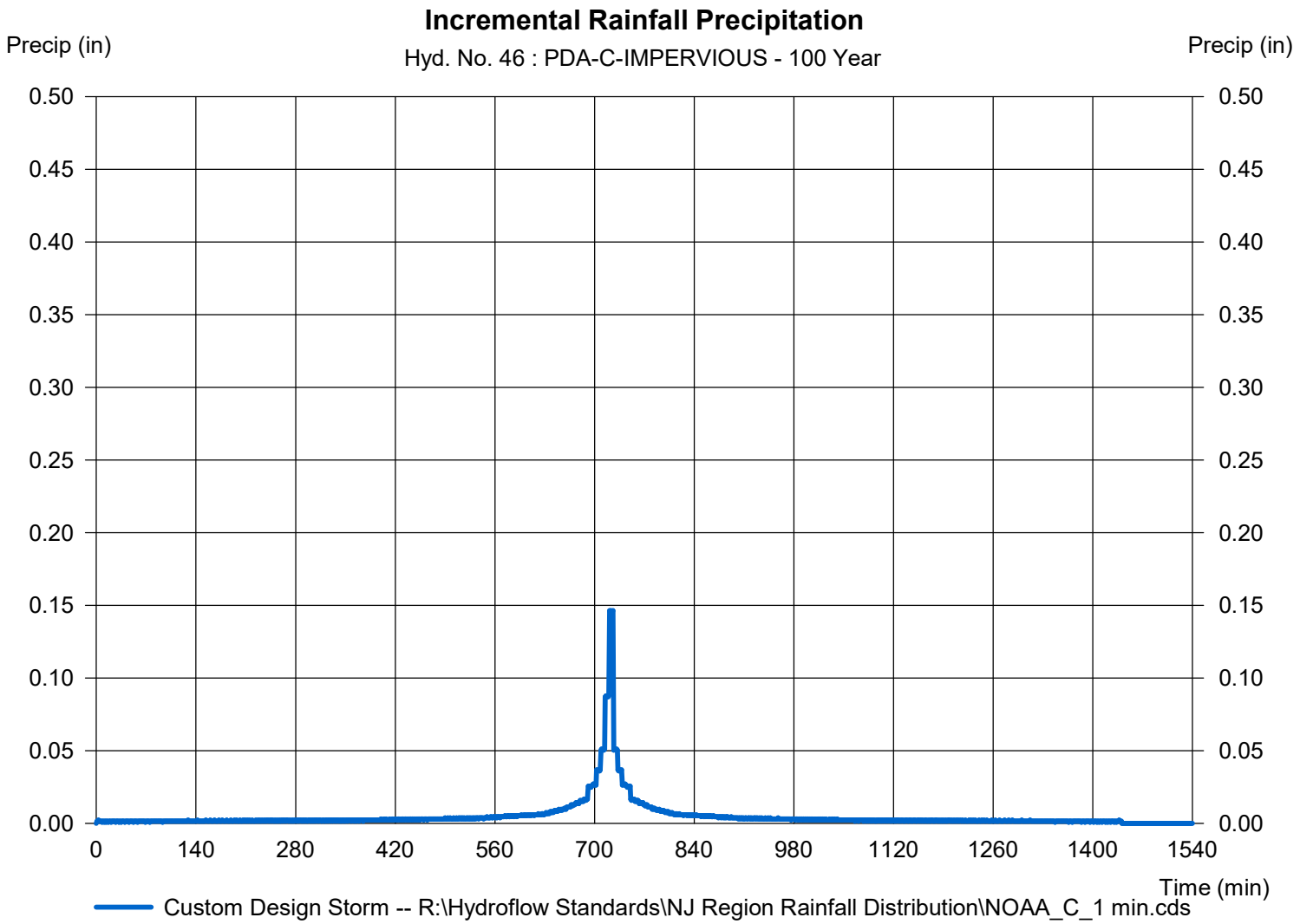


Precipitation Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

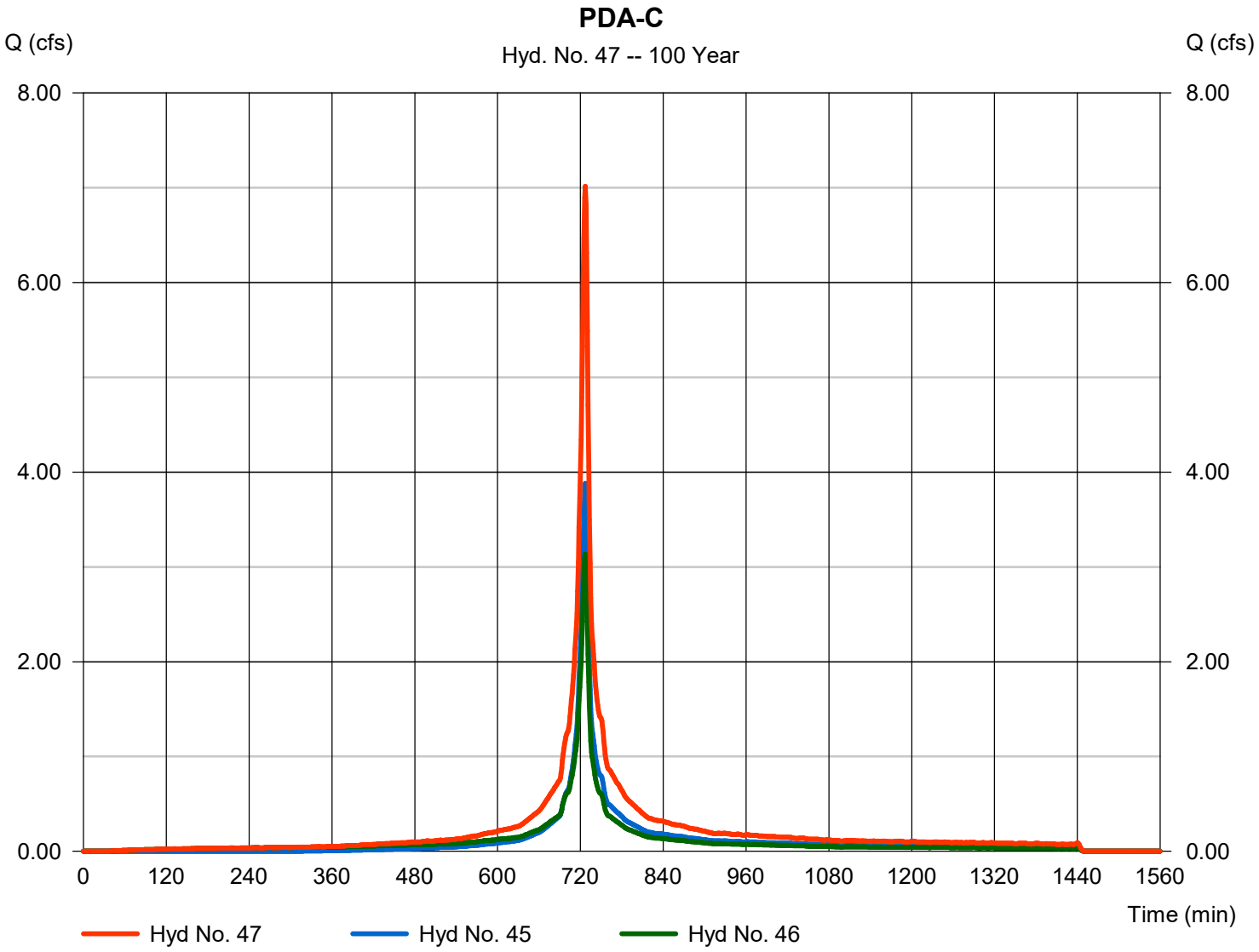


Hydrograph Report

Hyd. No. 47

PDA-C

Hydrograph type	= Combine	Peak discharge	= 7.016 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 21,414 cuft
Inflow hyds.	= 45, 46	Contrib. drain. area	= 0.940 ac

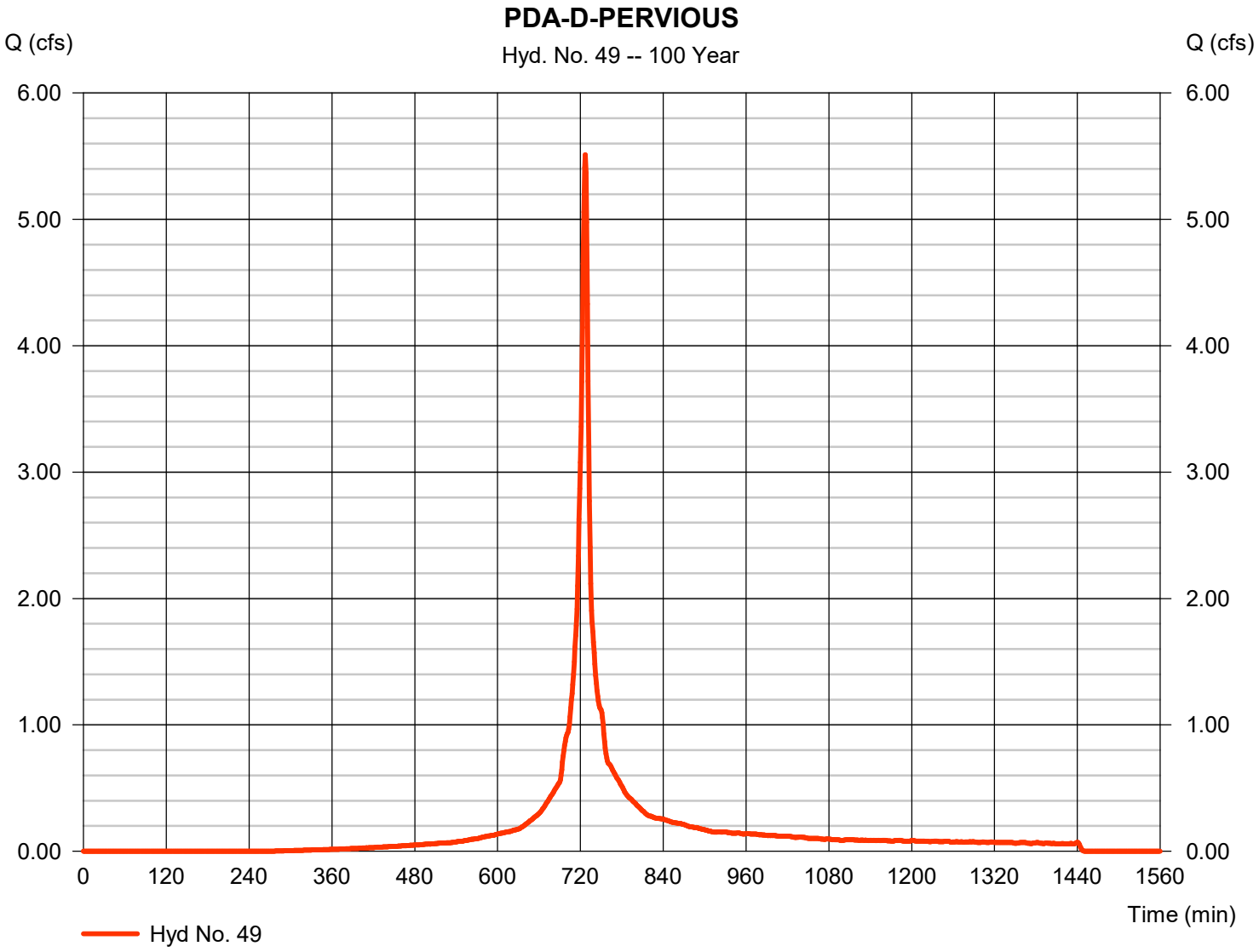


Hydrograph Report

Hyd. No. 49

PDA-D-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.512 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	15,884 cuft
Drainage area	=	0.770 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

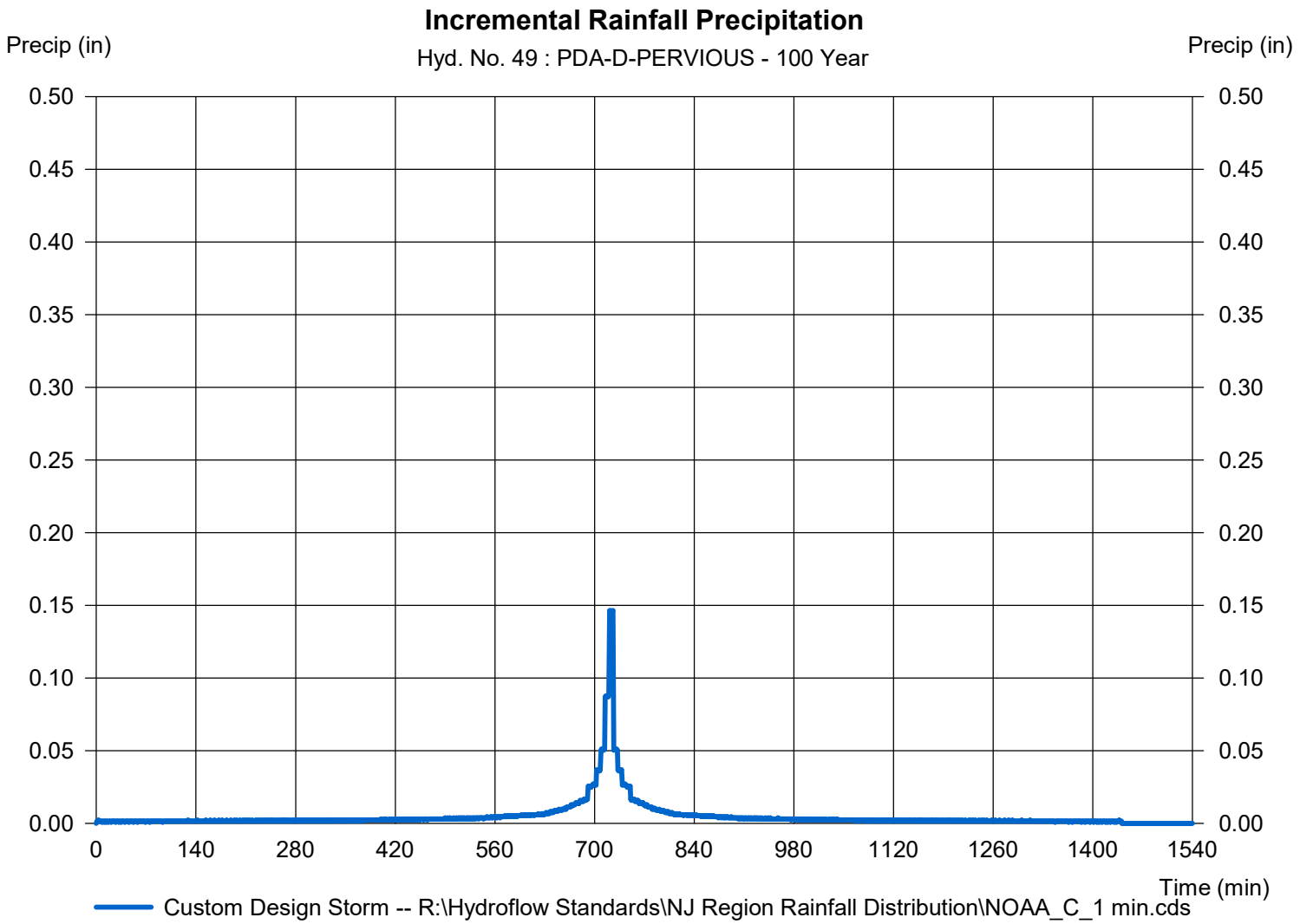


Precipitation Report

Hyd. No. 49

PDA-D-PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

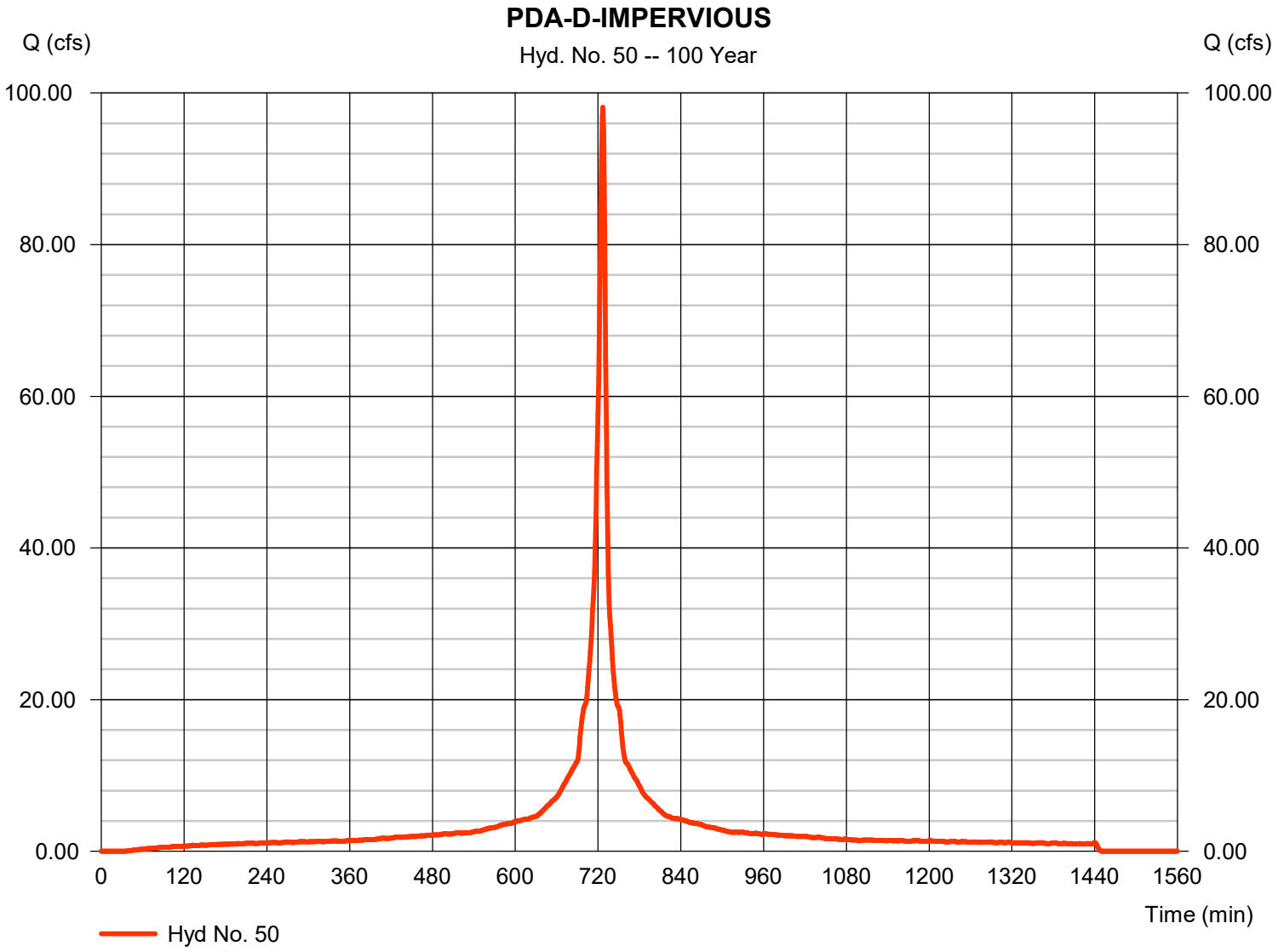


Hydrograph Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	98.10 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	323,608 cuft
Drainage area	=	11.890 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

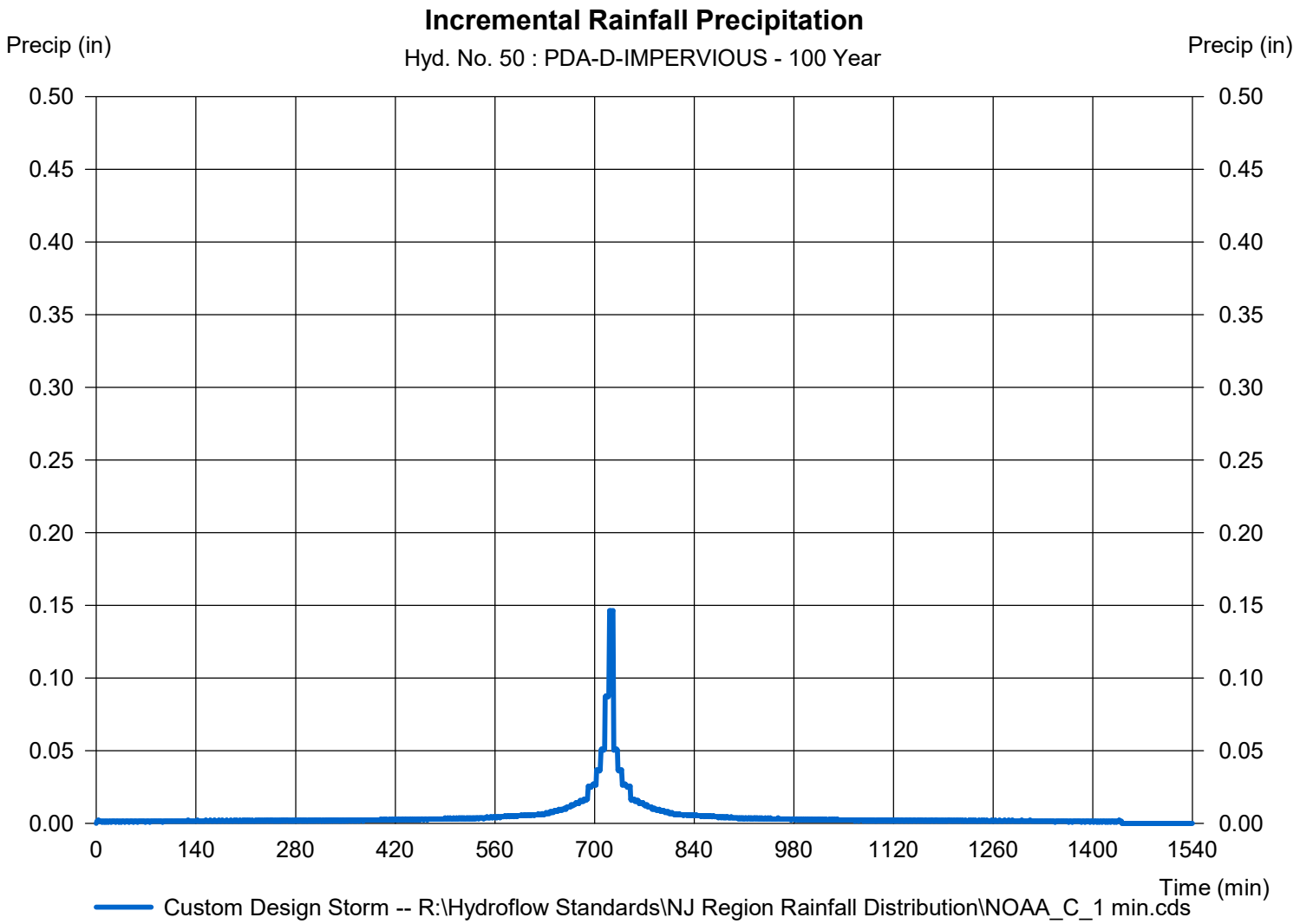


Precipitation Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

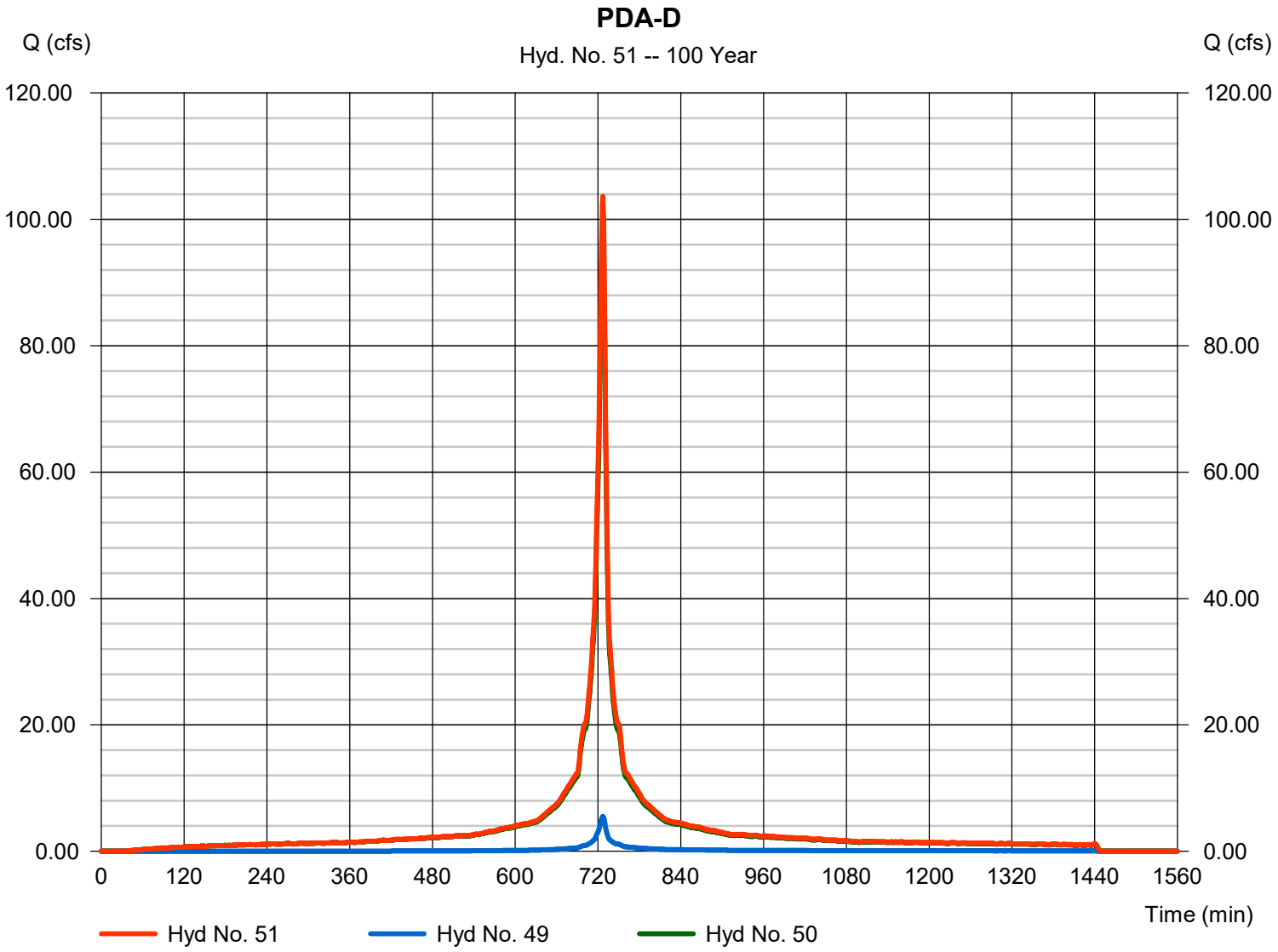


Hydrograph Report

Hyd. No. 51

PDA-D

Hydrograph type	= Combine	Peak discharge	= 103.61 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 339,491 cuft
Inflow hyds.	= 49, 50	Contrib. drain. area	= 12.660 ac



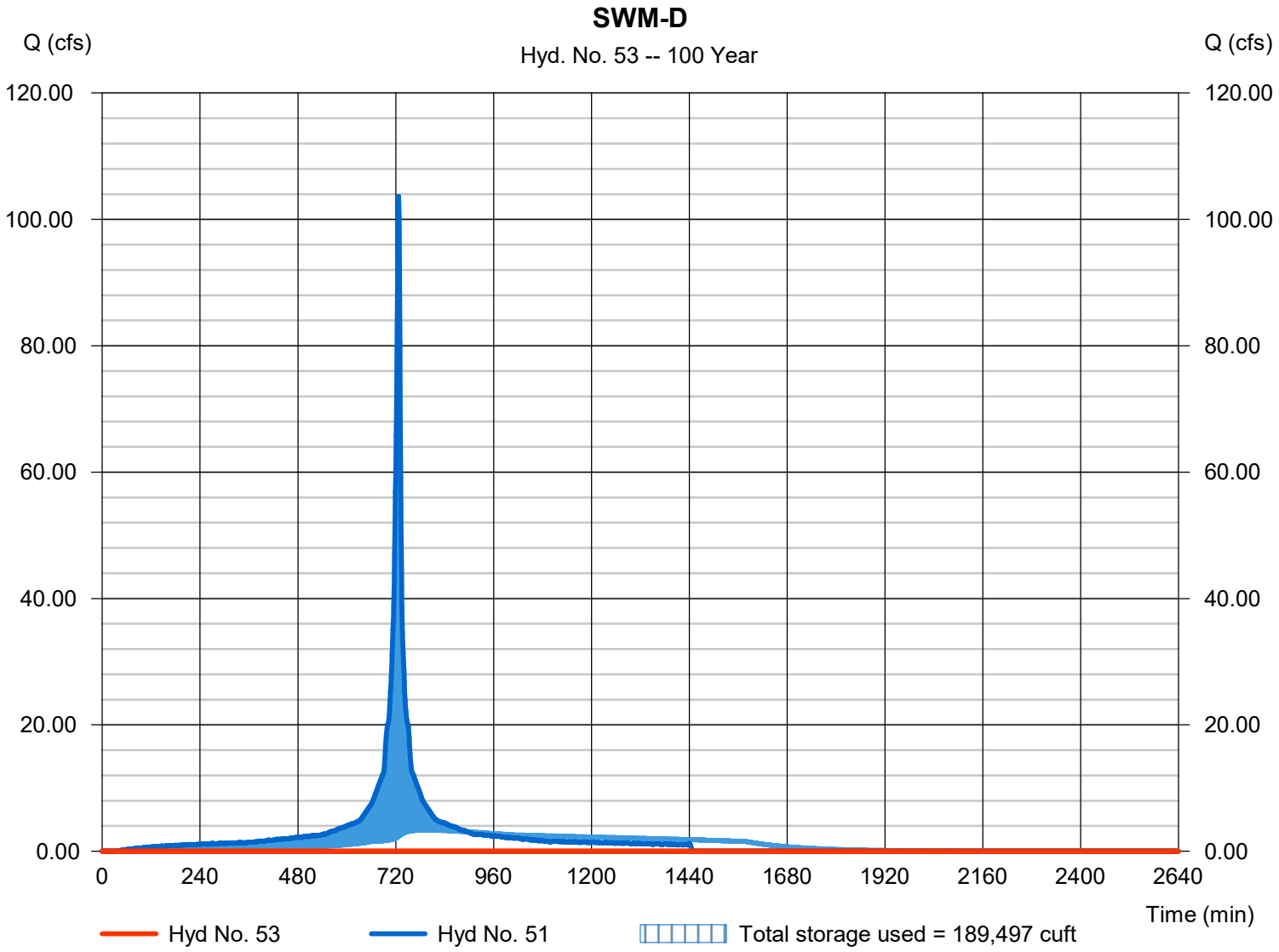
Hydrograph Report

Hyd. No. 53

SWM-D

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	485 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	51 - PDA-D	Max. Elevation	=	604.11 ft
Reservoir name	=	SWM-D	Max. Storage	=	189,497 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



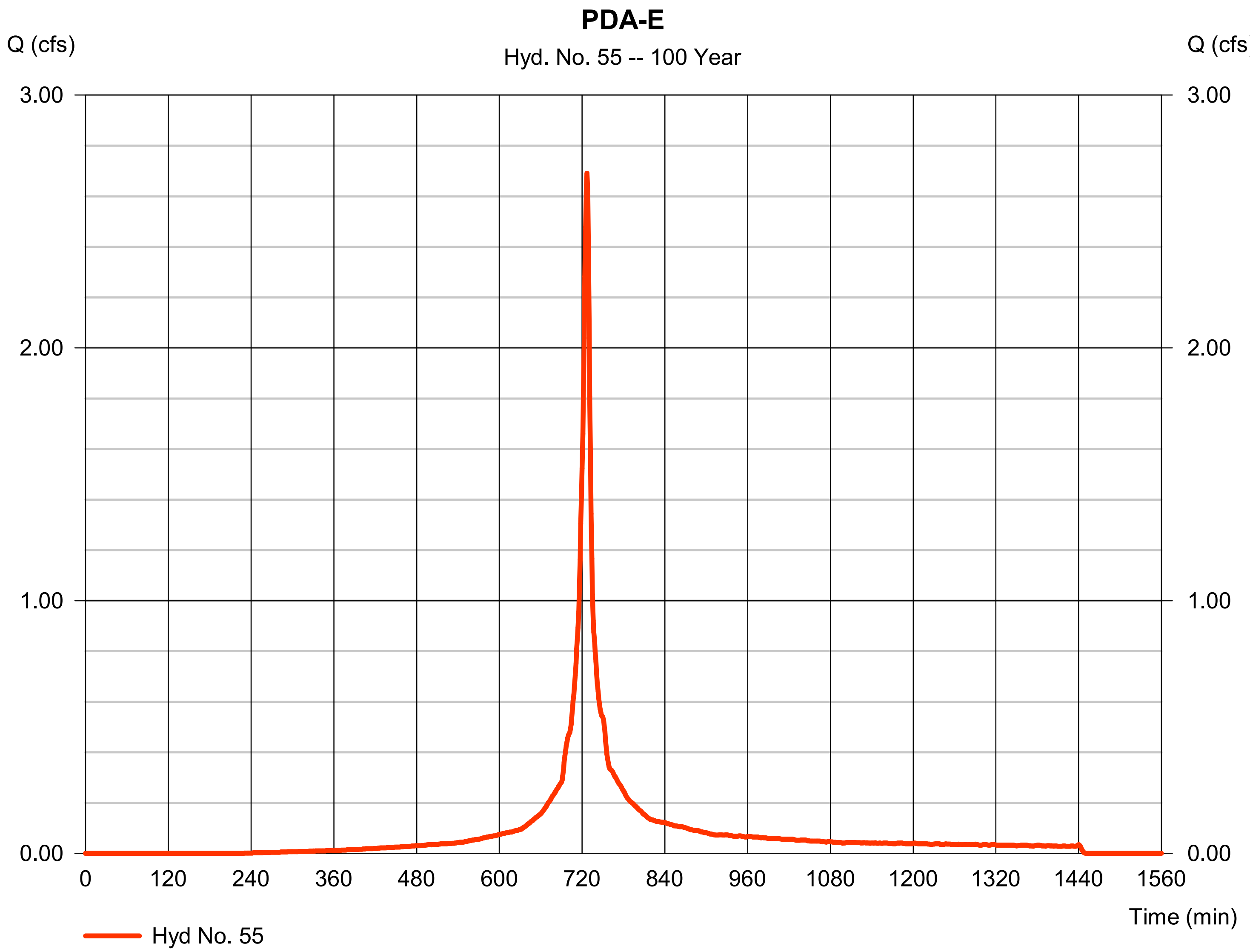
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 55

PDA-E

Hydrograph type	= SCS Runoff	Peak discharge	= 2.691 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 7,893 cuft
Drainage area	= 0.360 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

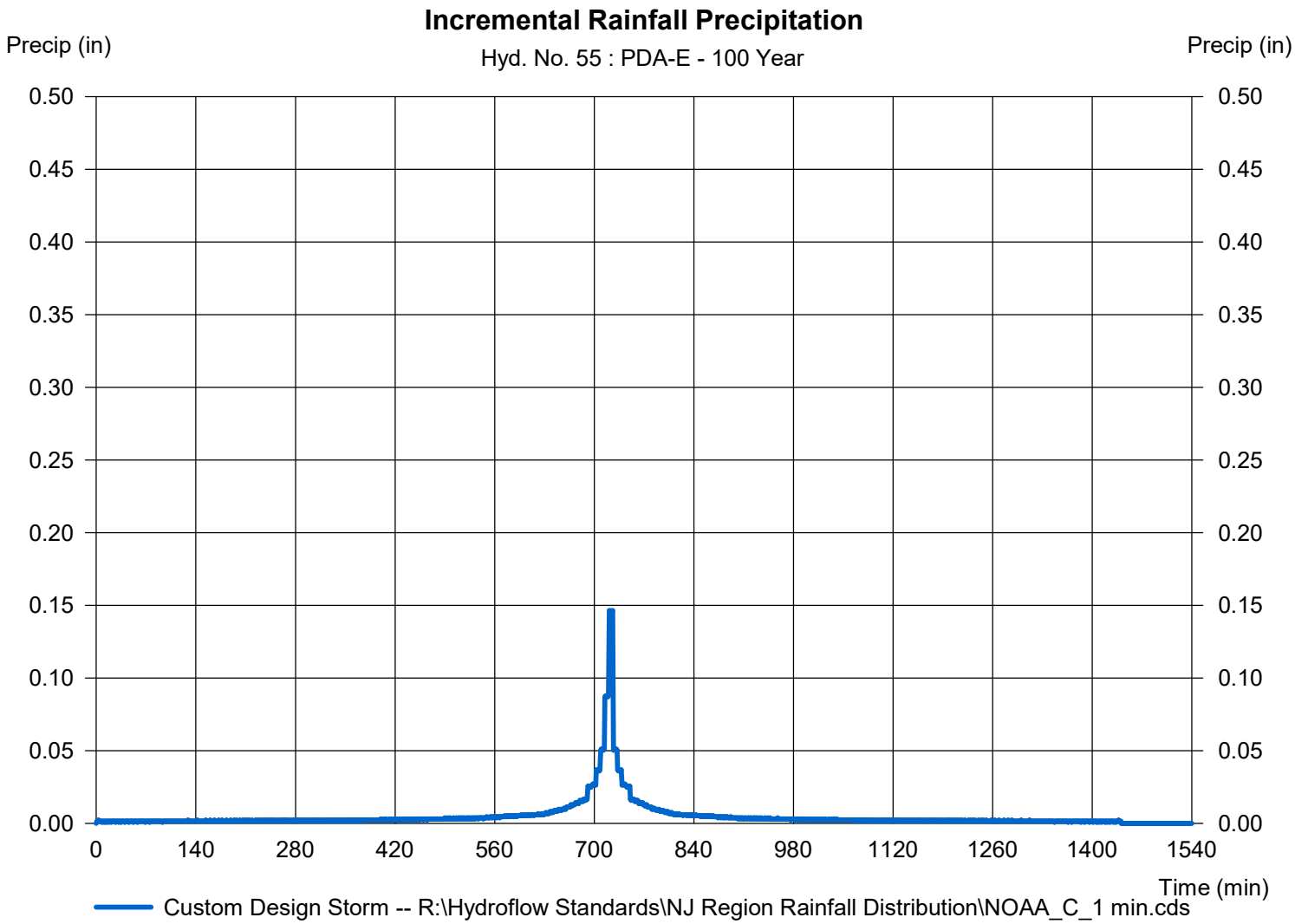


Precipitation Report

Hyd. No. 55

PDA-E

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



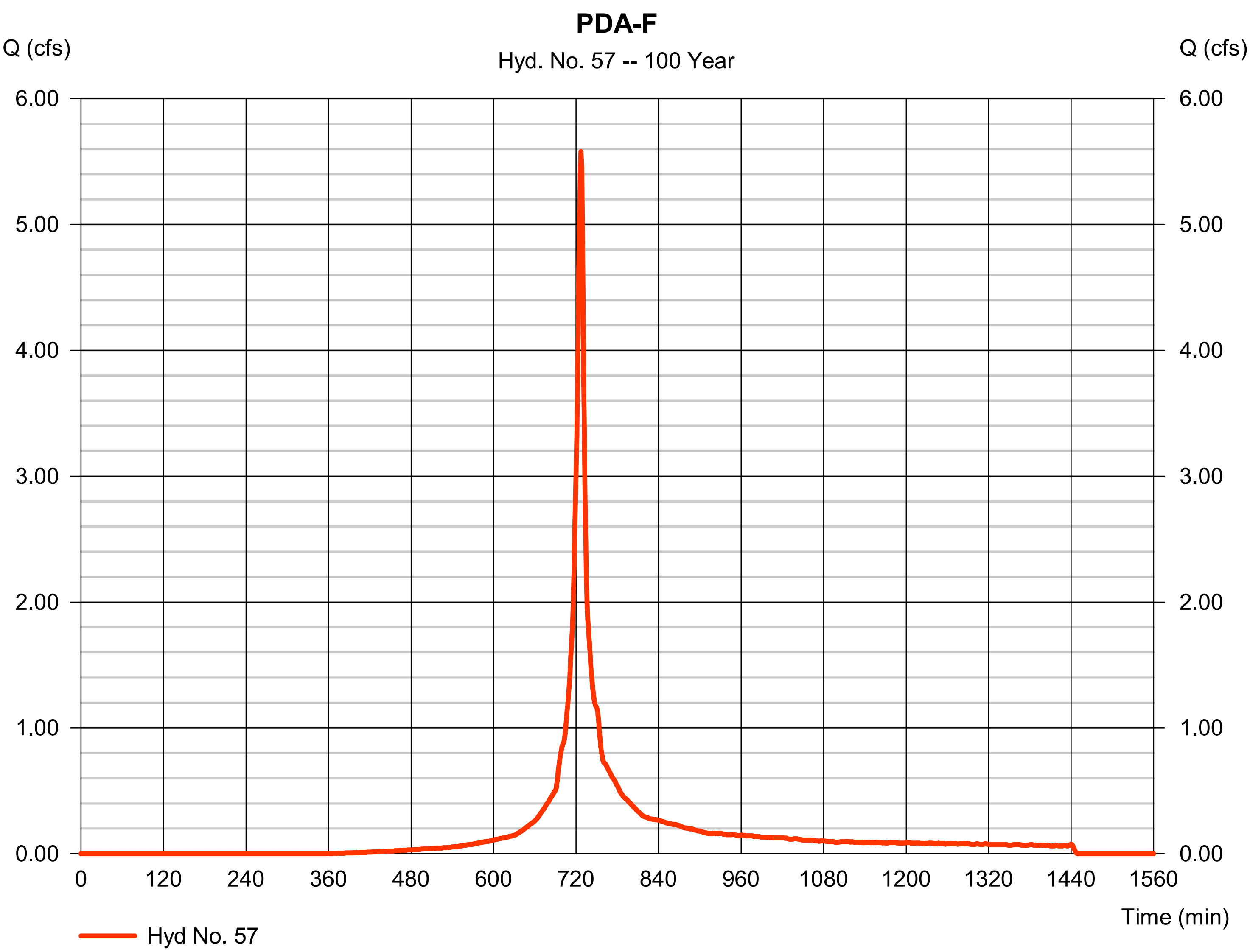
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

Hyd. No. 57

PDA-F

Hydrograph type	= SCS Runoff	Peak discharge	= 5.578 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 15,719 cuft
Drainage area	= 0.850 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.51 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NOAA_C_1 min.cds	Shape factor	= 484

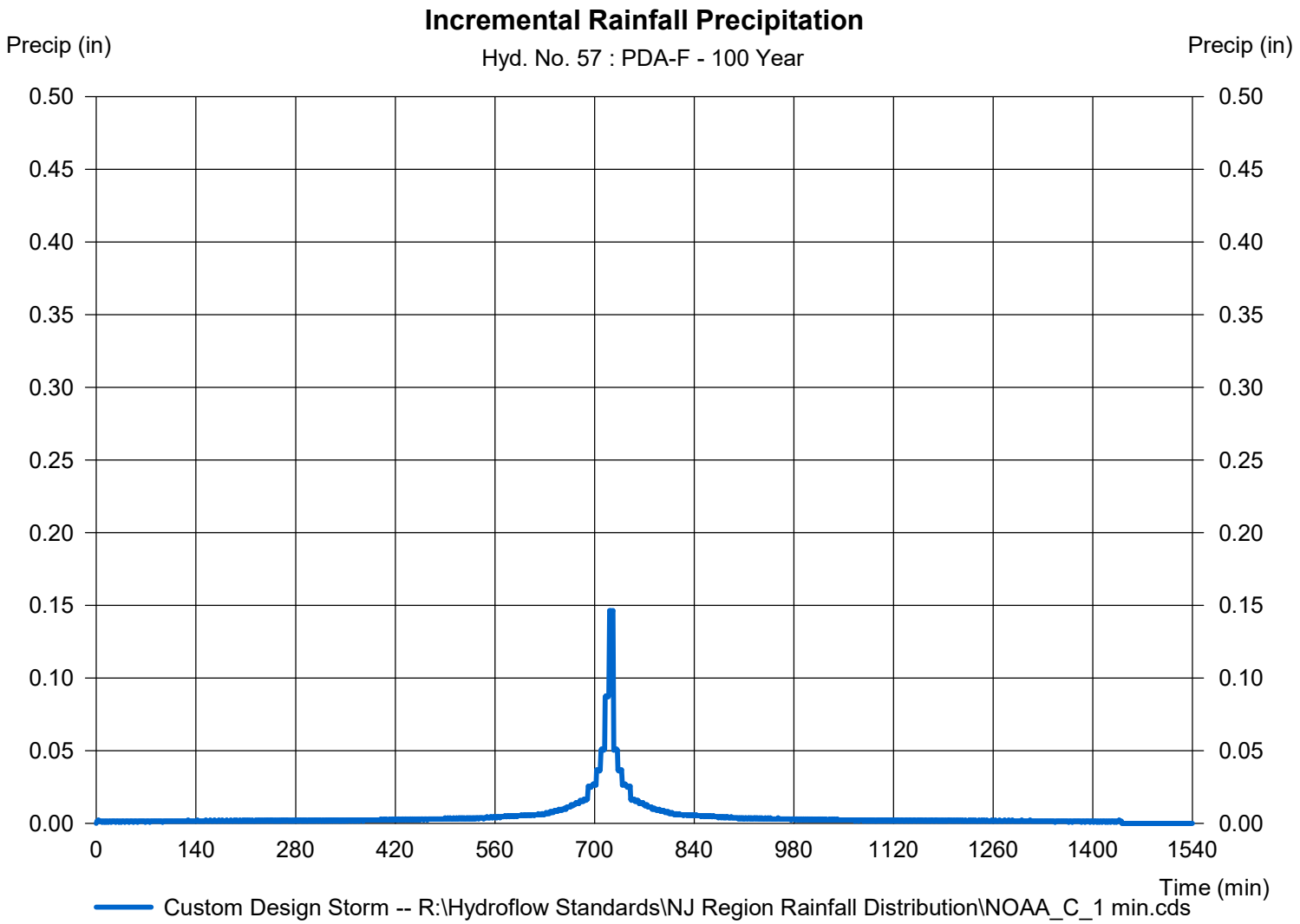


Precipitation Report

Hyd. No. 57

PDA-F

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

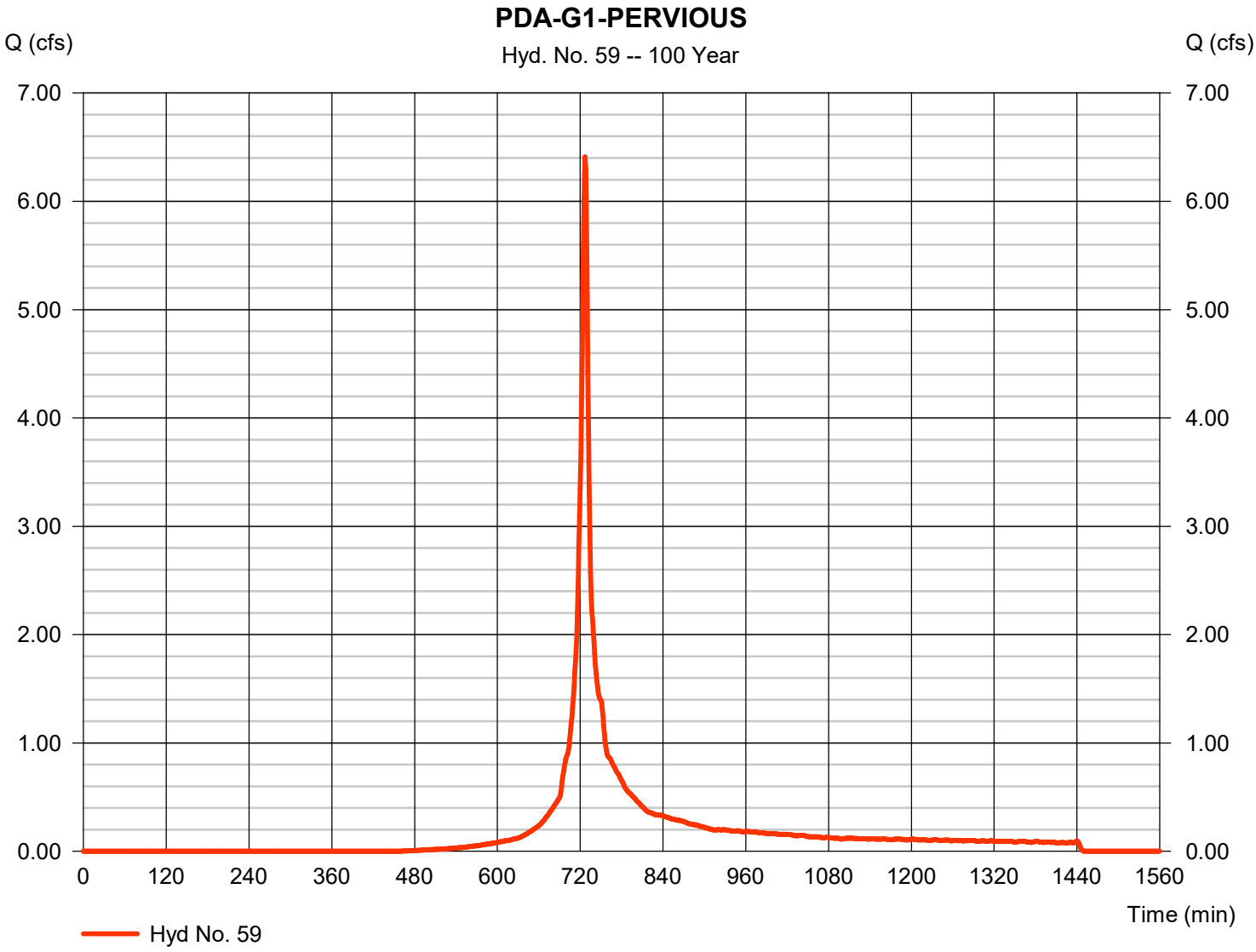


Hydrograph Report

Hyd. No. 59

PDA-G1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.411 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	17,738 cuft
Drainage area	=	1.140 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

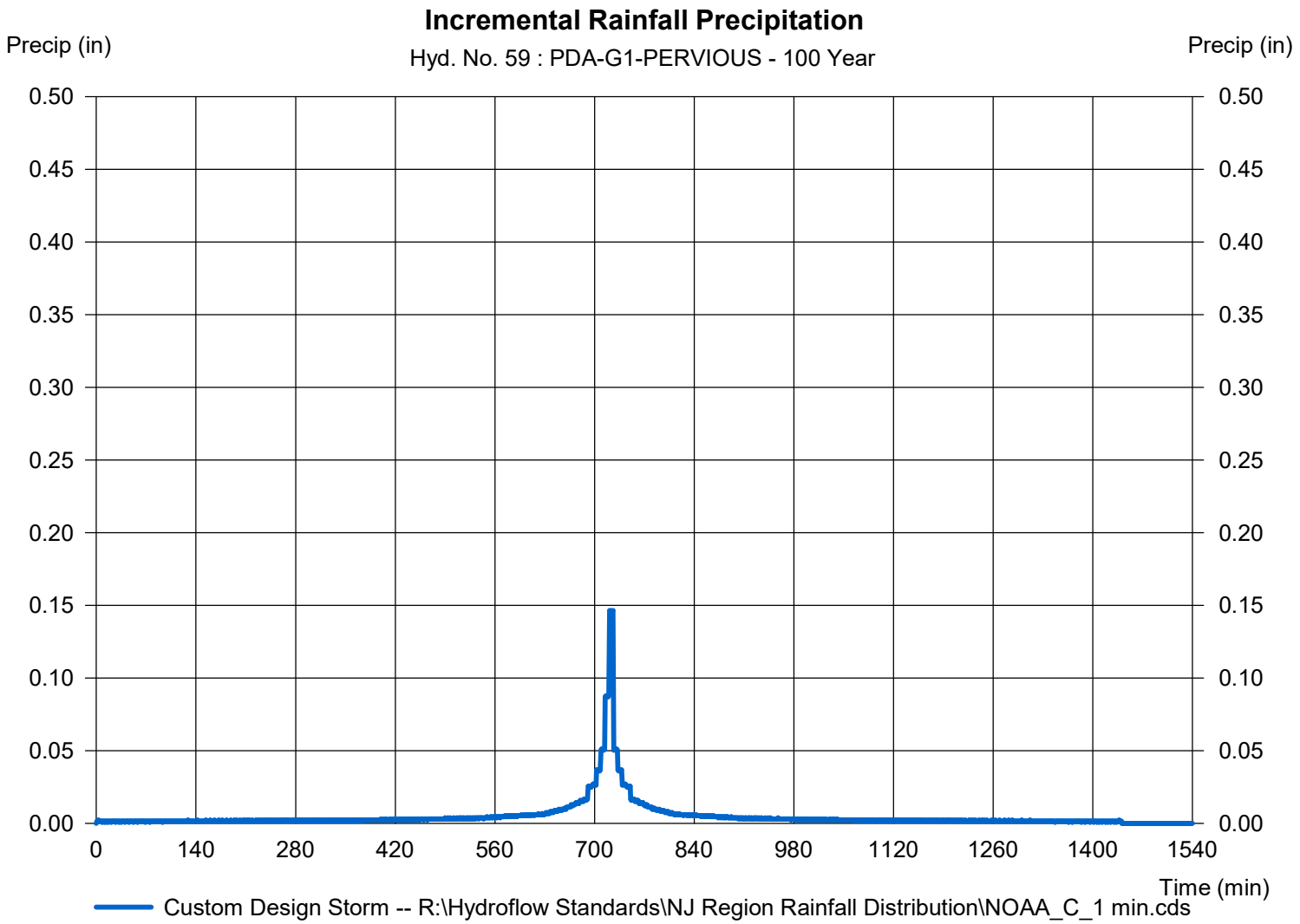


Precipitation Report

Hyd. No. 59

PDA-G1-PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

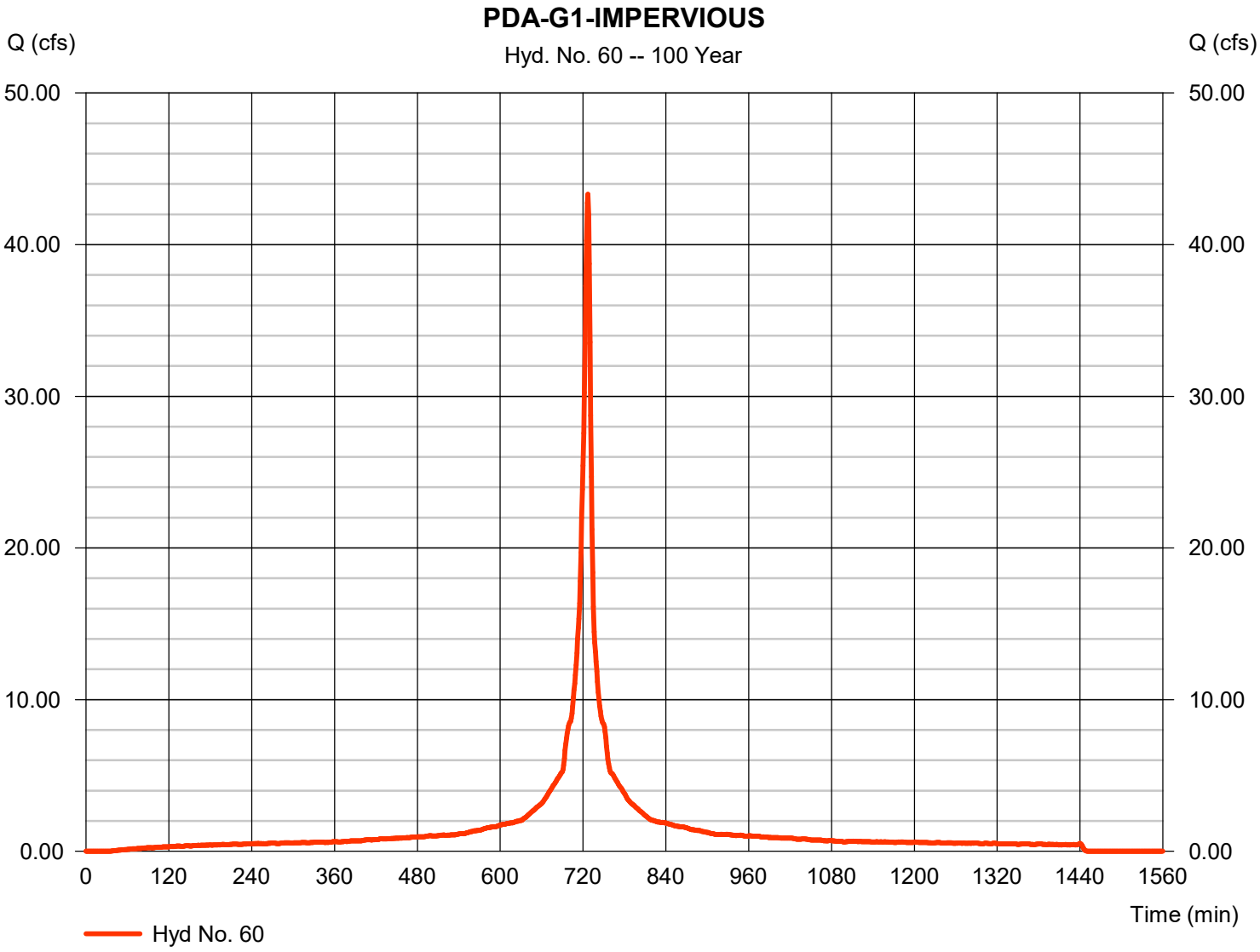


Hydrograph Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	43.32 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	142,888 cuft
Drainage area	=	5.250 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

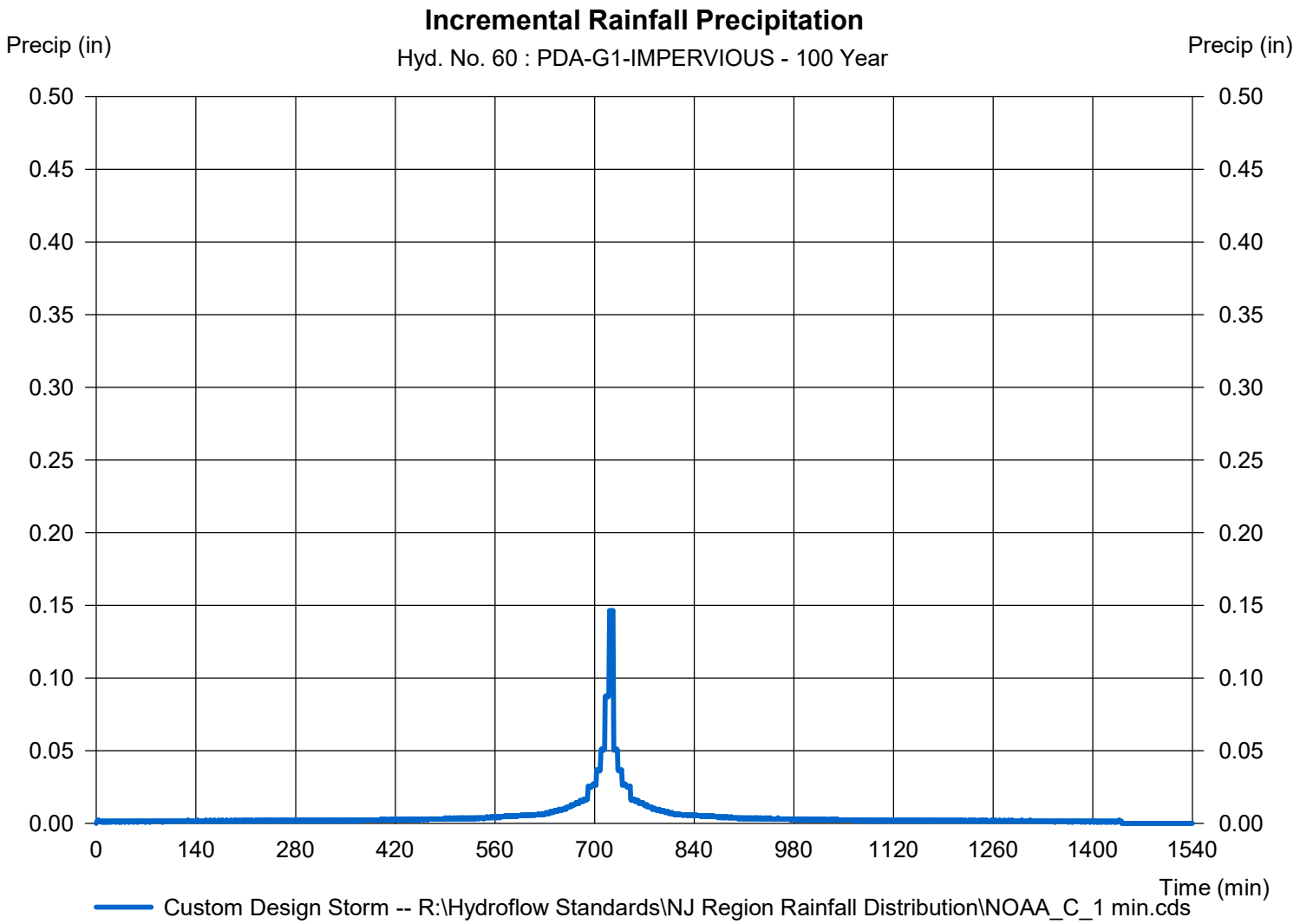


Precipitation Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

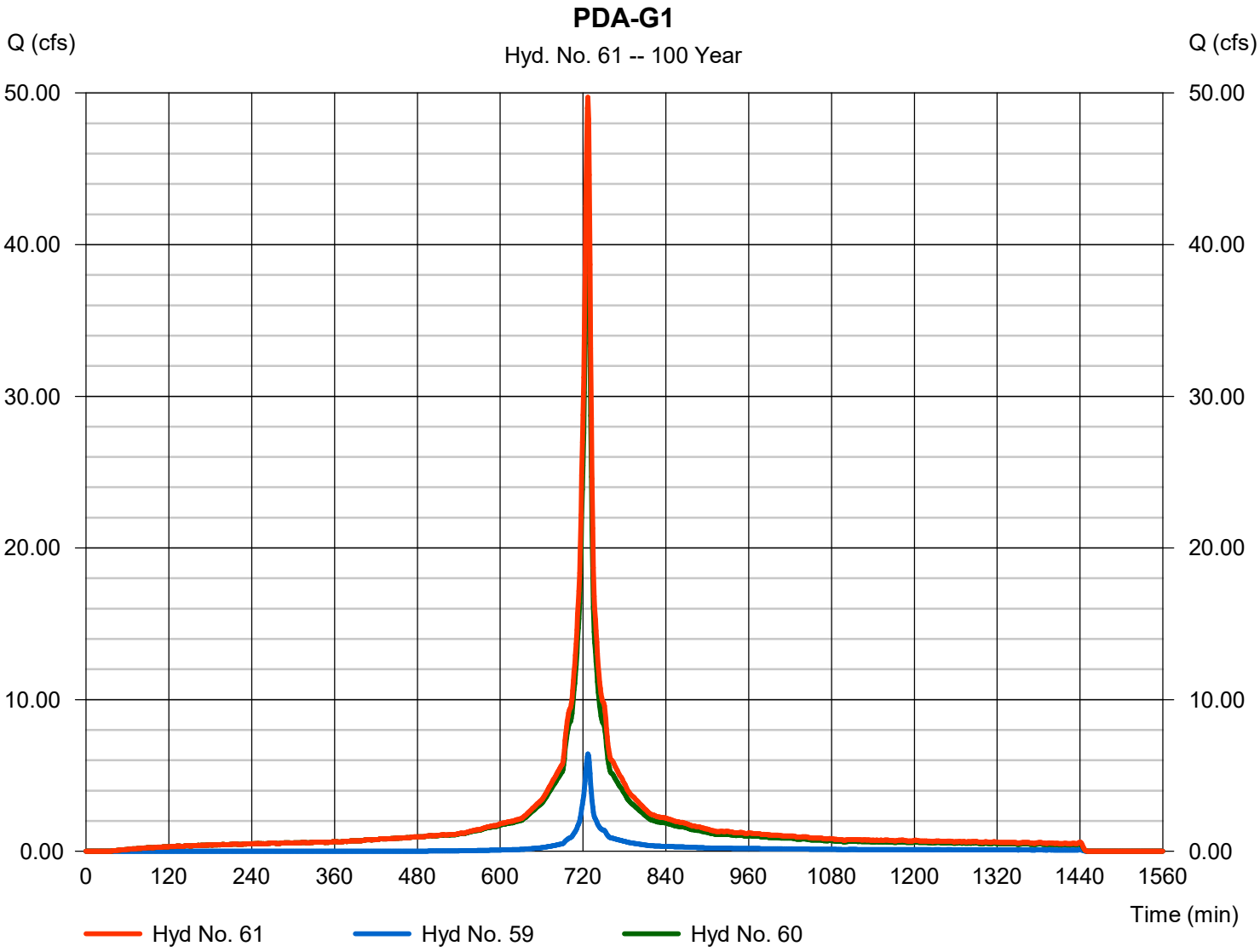


Hydrograph Report

Hyd. No. 61

PDA-G1

Hydrograph type	= Combine	Peak discharge	= 49.73 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 160,626 cuft
Inflow hyds.	= 59, 60	Contrib. drain. area	= 6.390 ac



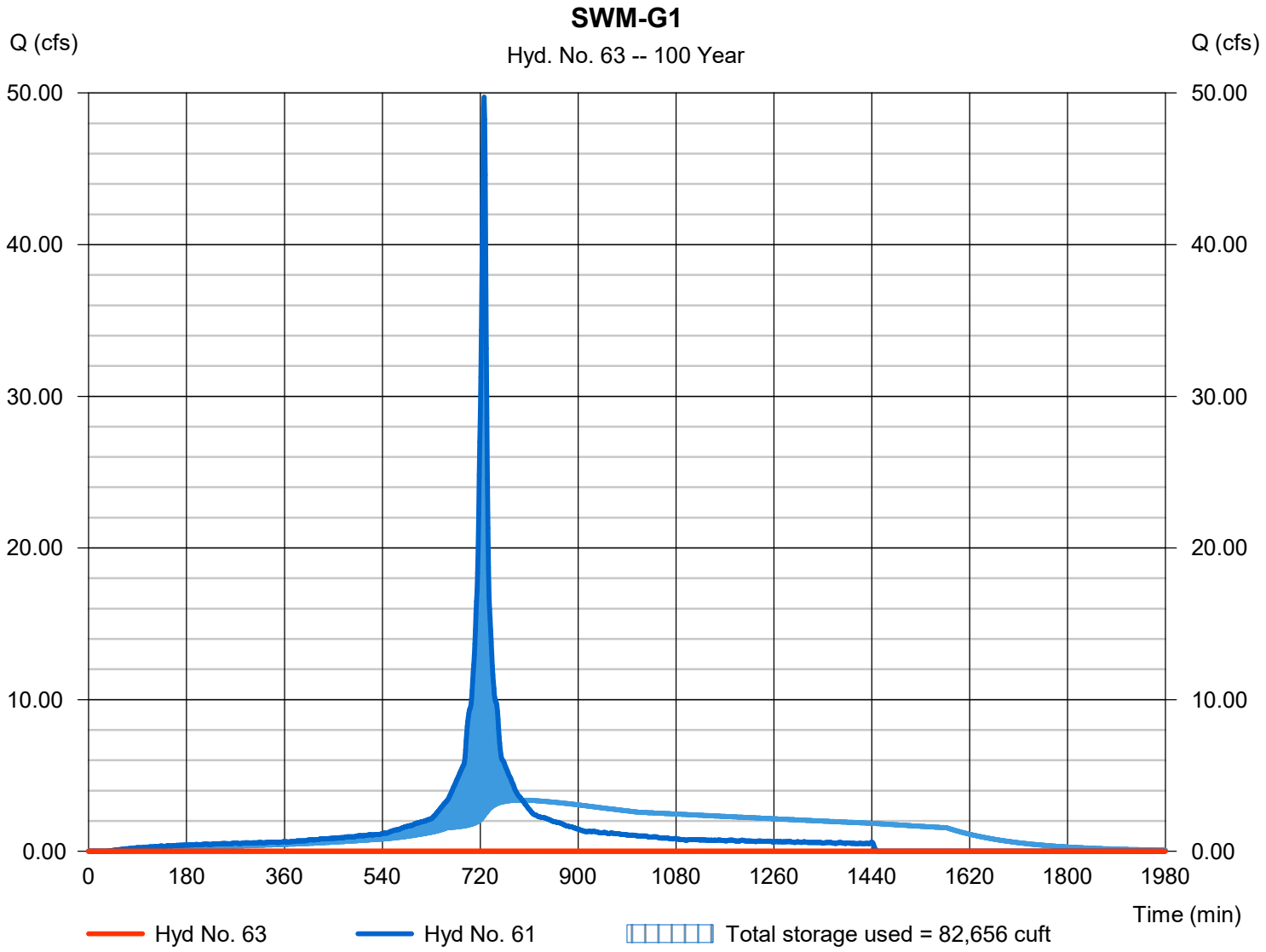
Hydrograph Report

Hyd. No. 63

SWM-G1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 61 - PDA-G1	Max. Elevation	= 600.64 ft
Reservoir name	= SWM-G1	Max. Storage	= 82,656 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

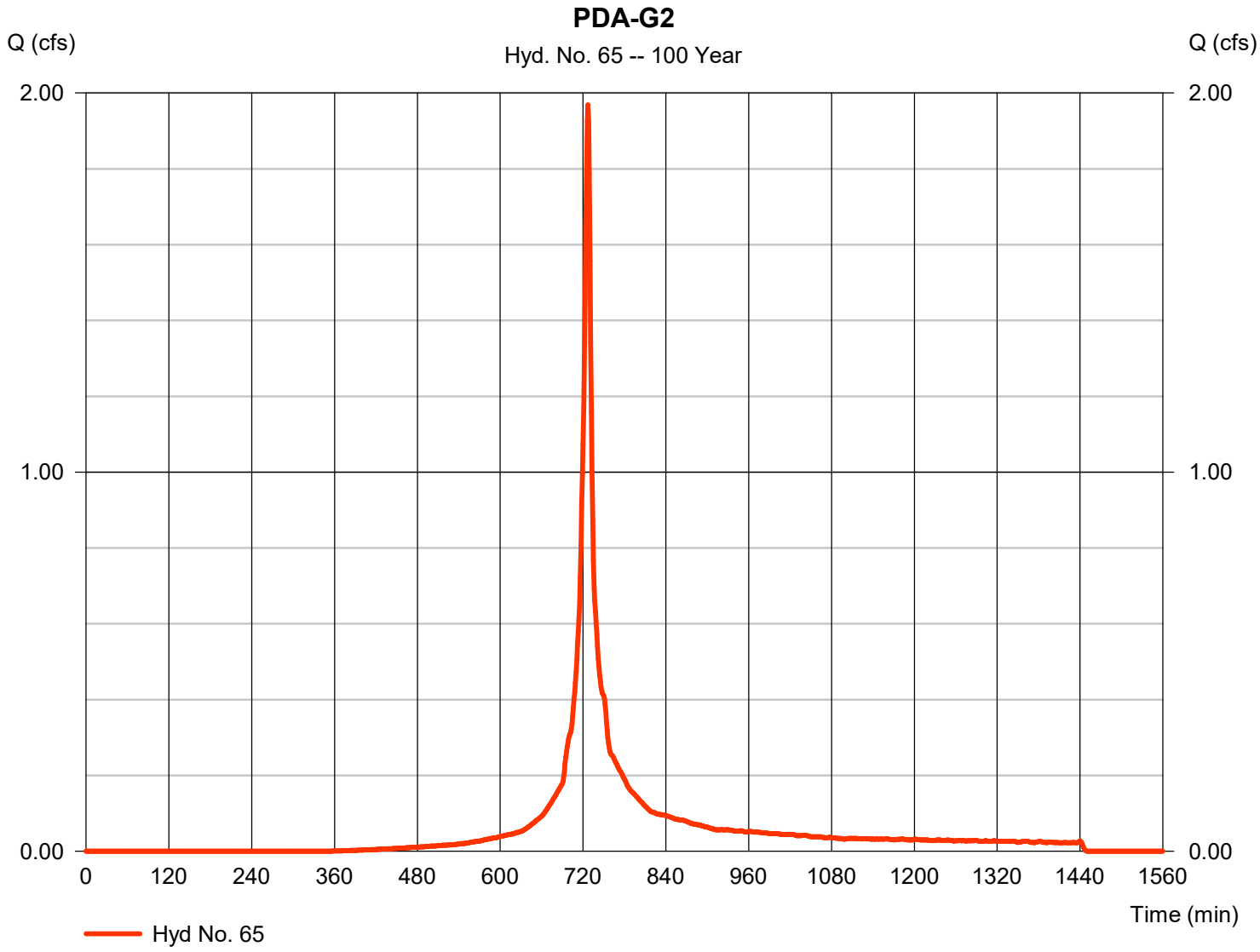


Hydrograph Report

Hyd. No. 65

PDA-G2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.969 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	5,548 cuft
Drainage area	=	0.300 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Region 4 Rainfall	Storm Distribution	=	NJ4AA_C_1 min.cds

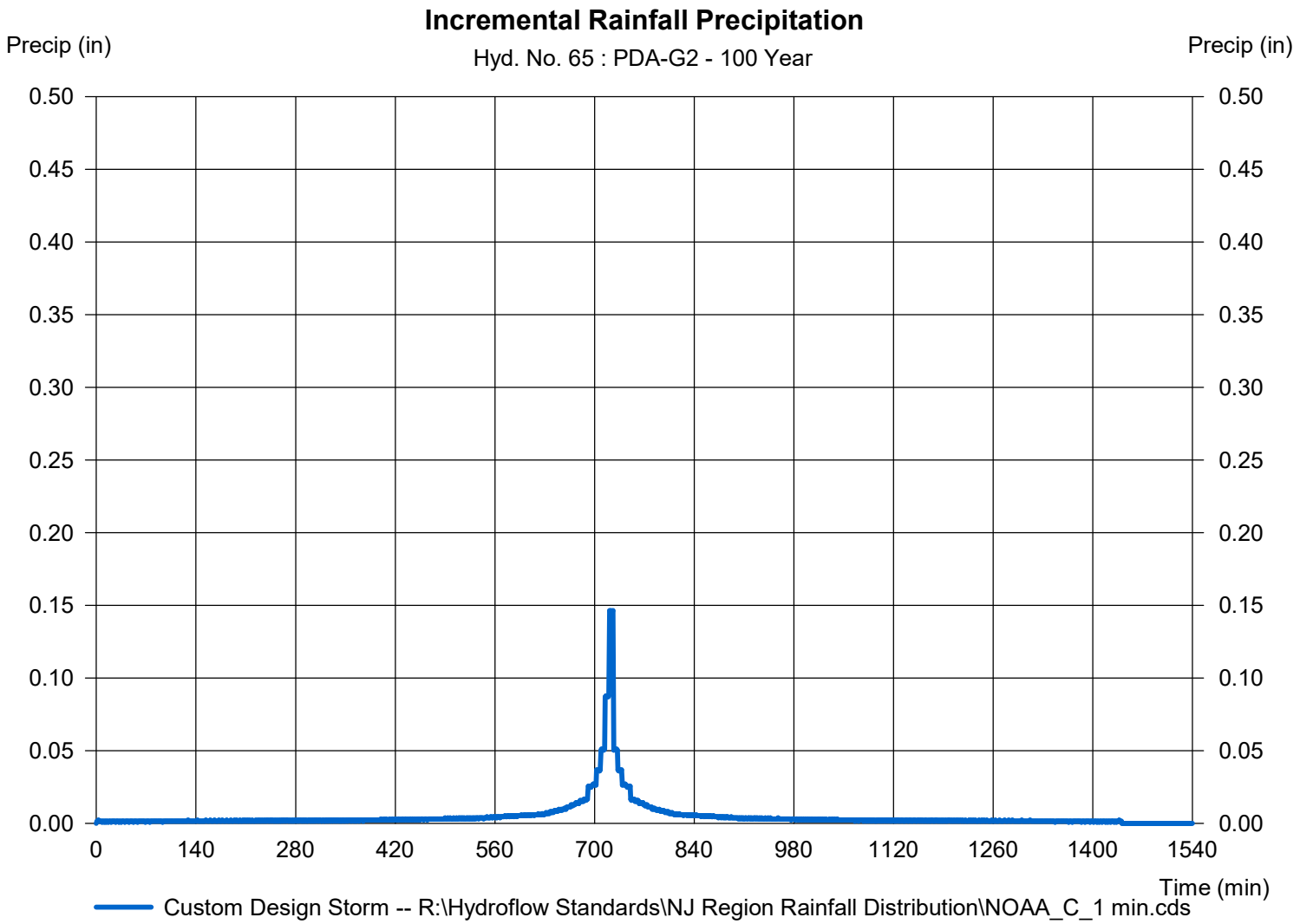


Precipitation Report

Hyd. No. 65

PDA-G2

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

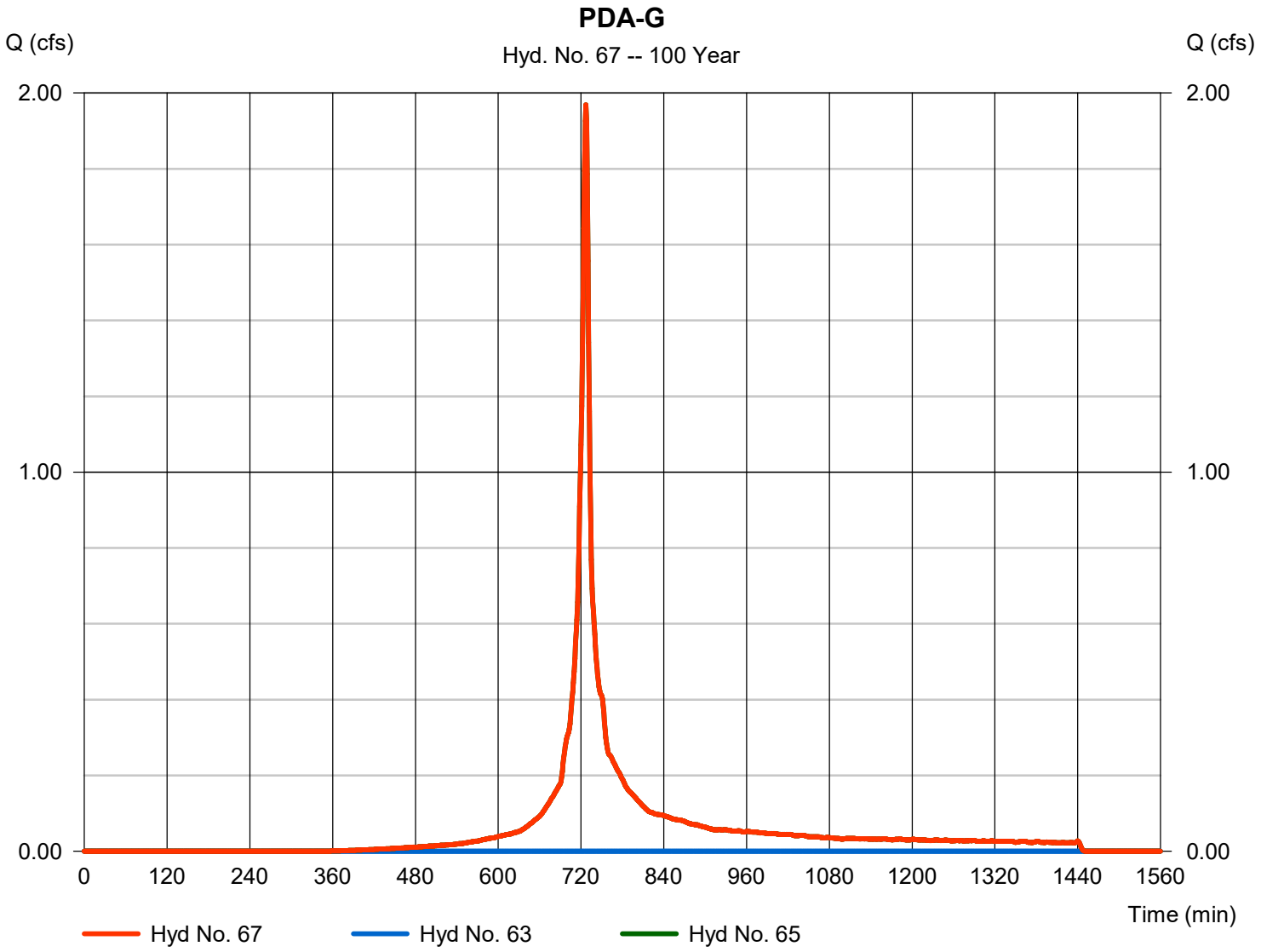


Hydrograph Report

Hyd. No. 67

PDA-G

Hydrograph type	=	Combine	Peak discharge	=	1.969 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	5,548 cuft
Inflow hyds.	=	63, 65	Contrib. drain. area	=	0.300 ac

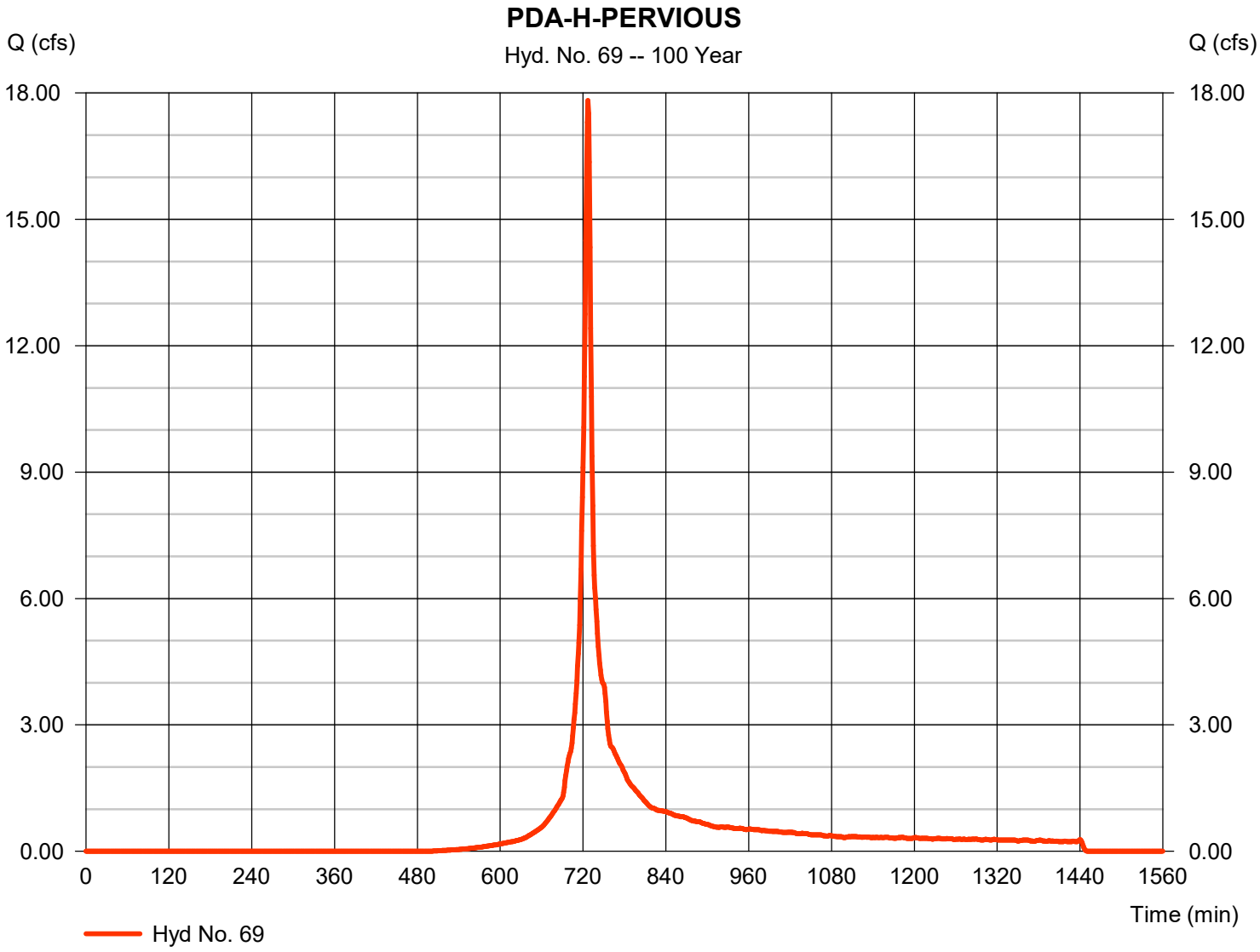


Hydrograph Report

Hyd. No. 69

PDA-H-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.82 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	49,140 cuft
Drainage area	=	3.430 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

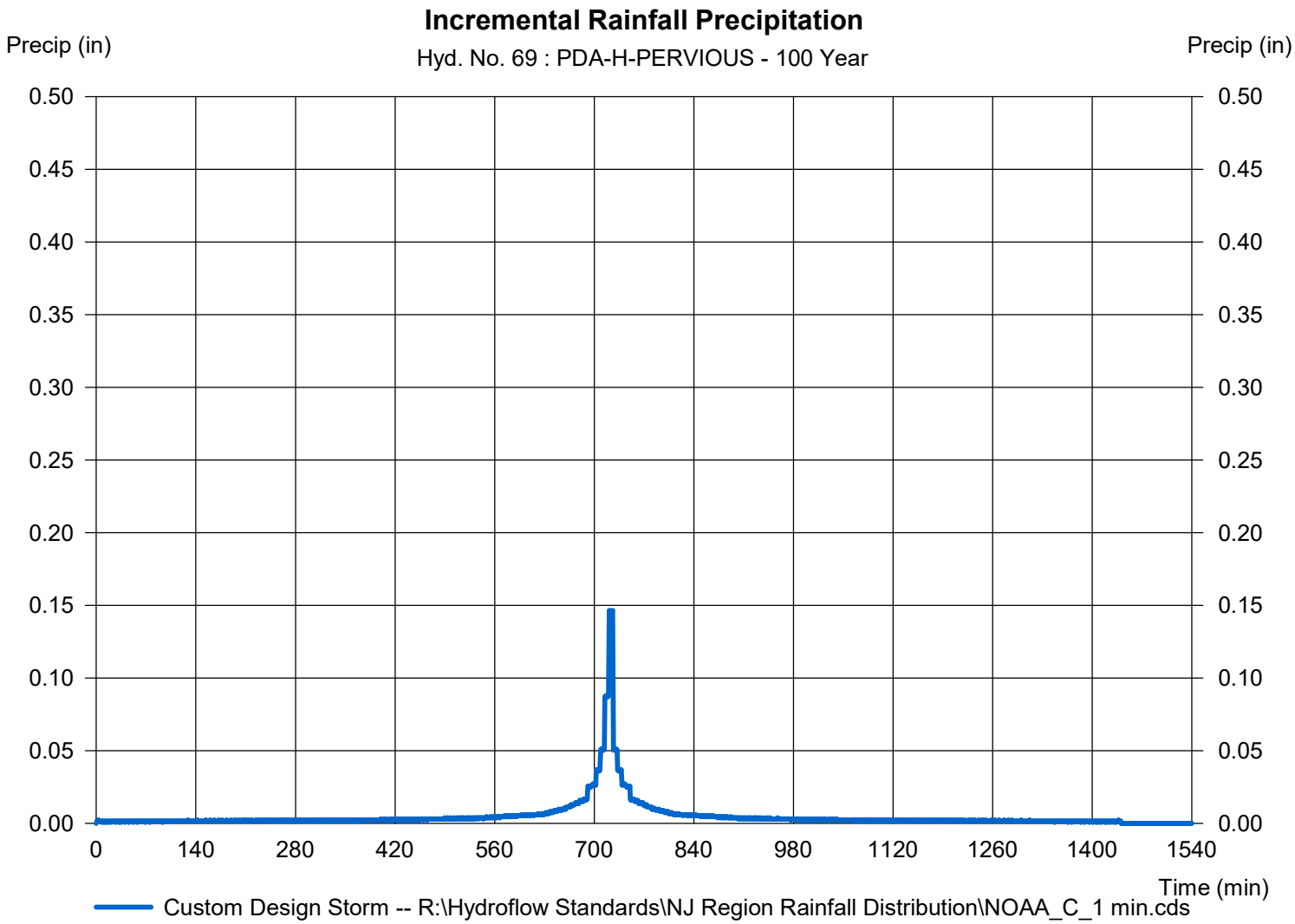


Precipitation Report

Hyd. No. 69

PDA-H-PERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

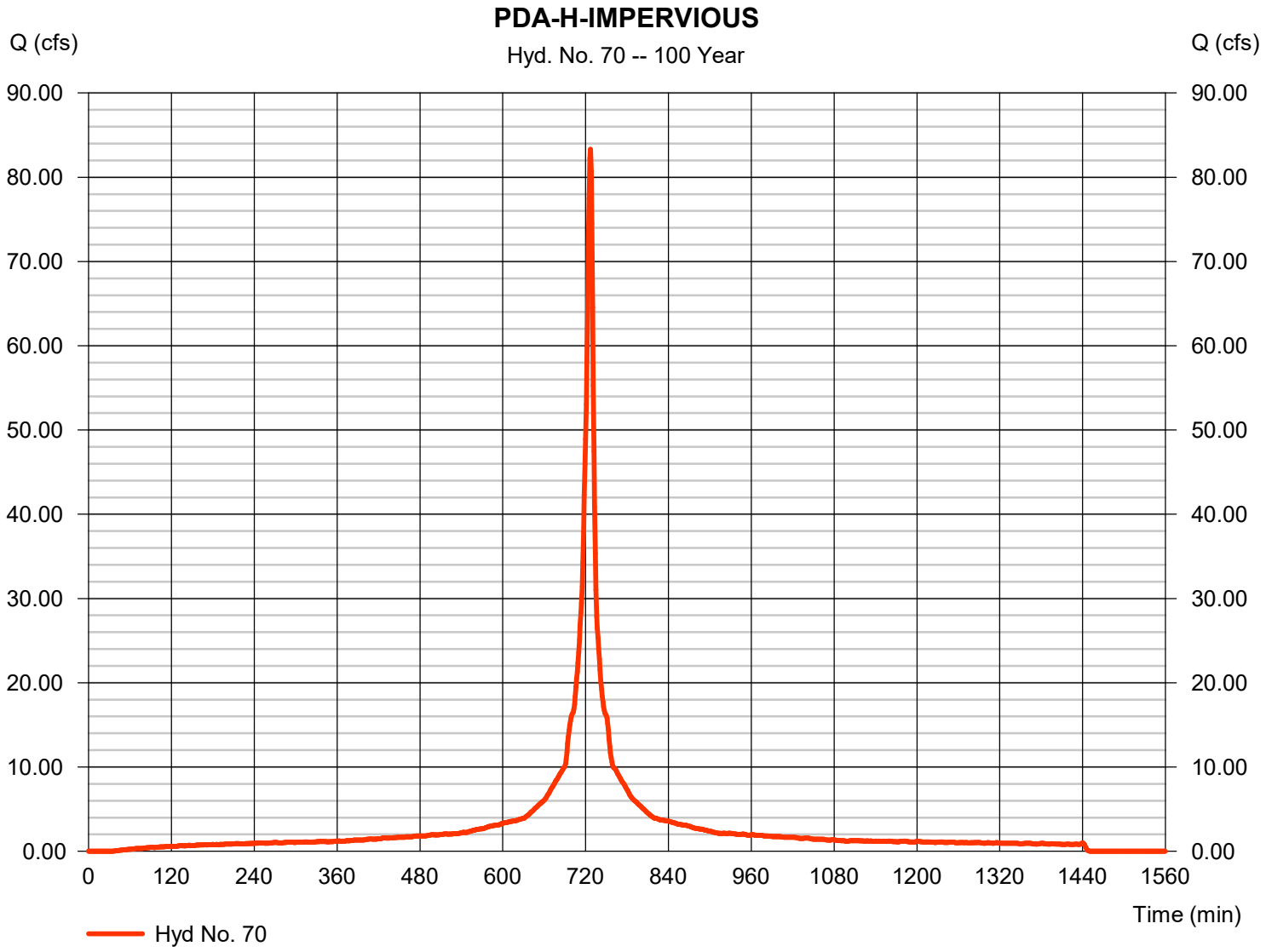


Hydrograph Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	83.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	274,889 cuft
Drainage area	=	10.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

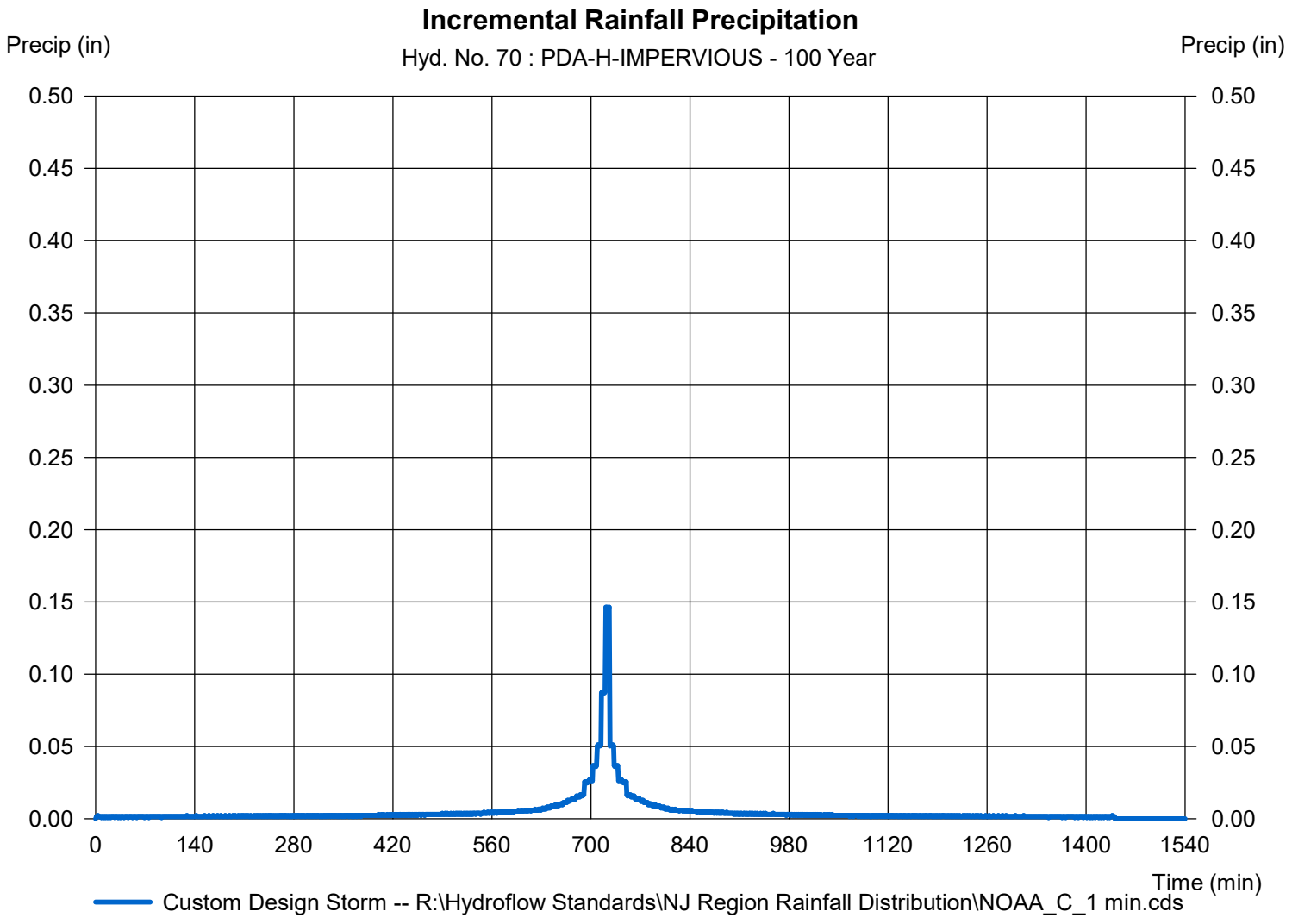


Precipitation Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

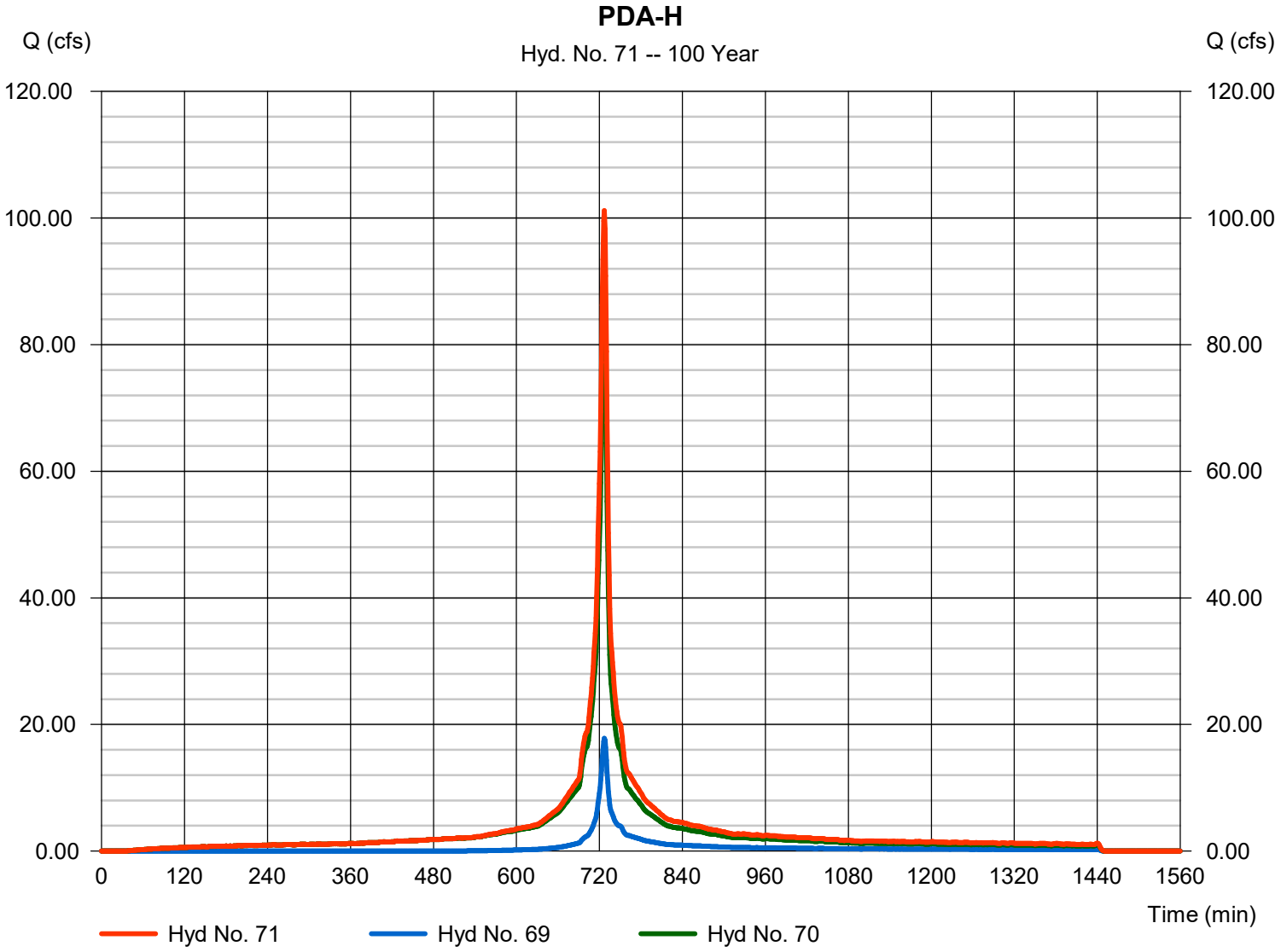


Hydrograph Report

Hyd. No. 71

PDA-H

Hydrograph type	= Combine	Peak discharge	= 101.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 324,029 cuft
Inflow hyds.	= 69, 70	Contrib. drain. area	= 13.530 ac



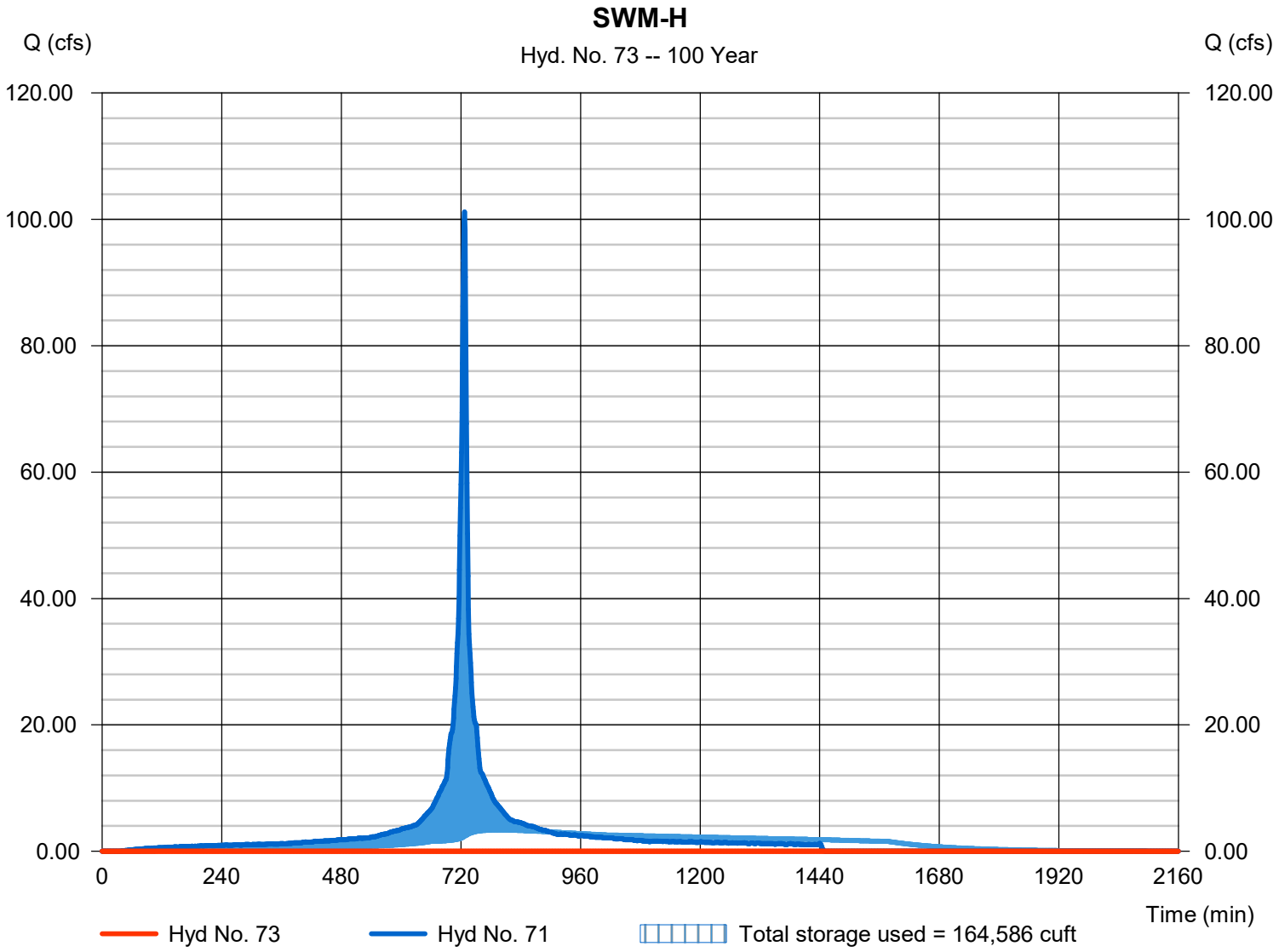
Hydrograph Report

Hyd. No. 73

SWM-H

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	1459 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	71 - PDA-H	Max. Elevation	=	599.63 ft
Reservoir name	=	SWM-H	Max. Storage	=	164,586 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

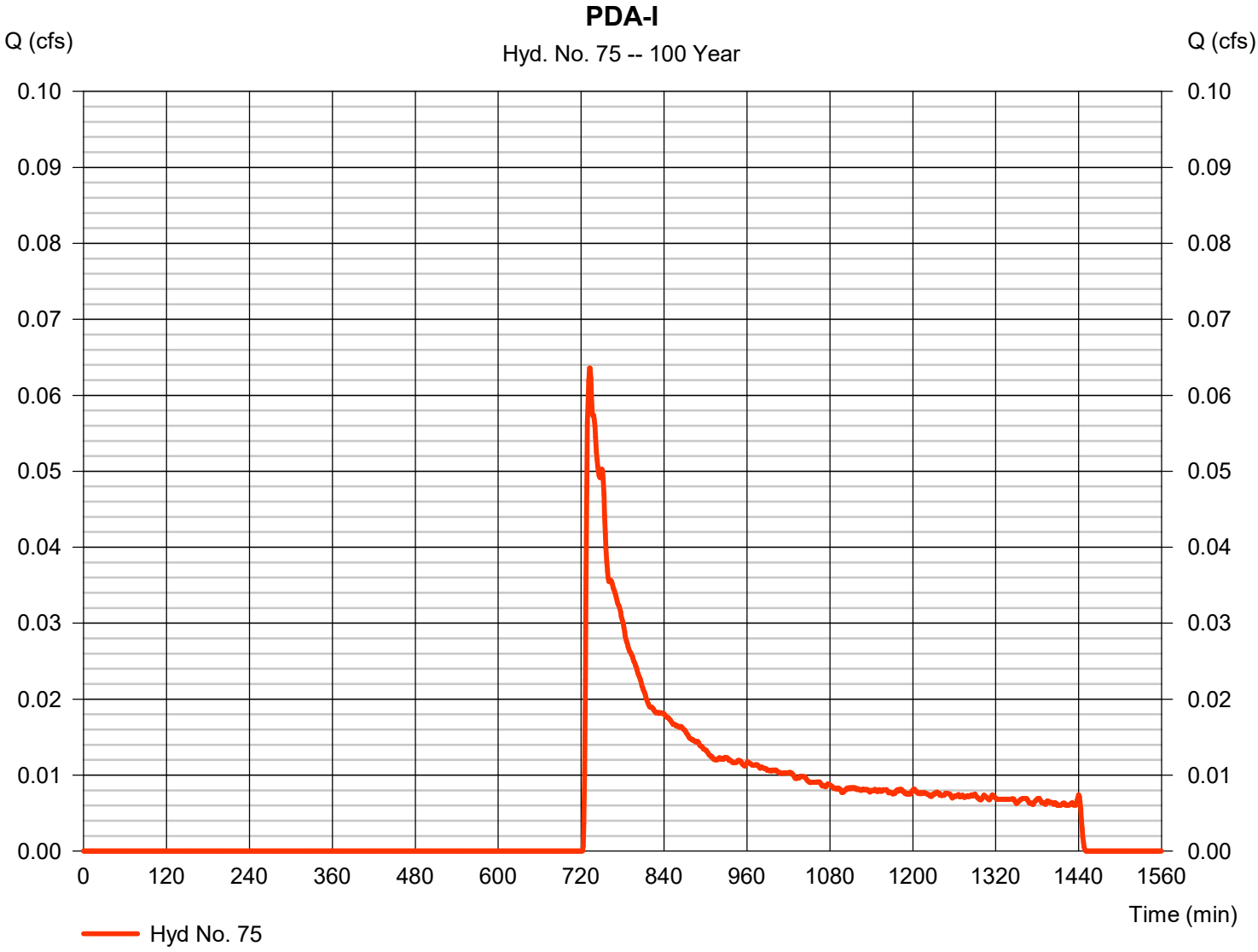


Hydrograph Report

Hyd. No. 75

PDA-I

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.064 cfs
Storm frequency	=	100 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	556 cuft
Drainage area	=	0.260 ac	Curve number	=	34
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	7.51 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Shape factor	=	484

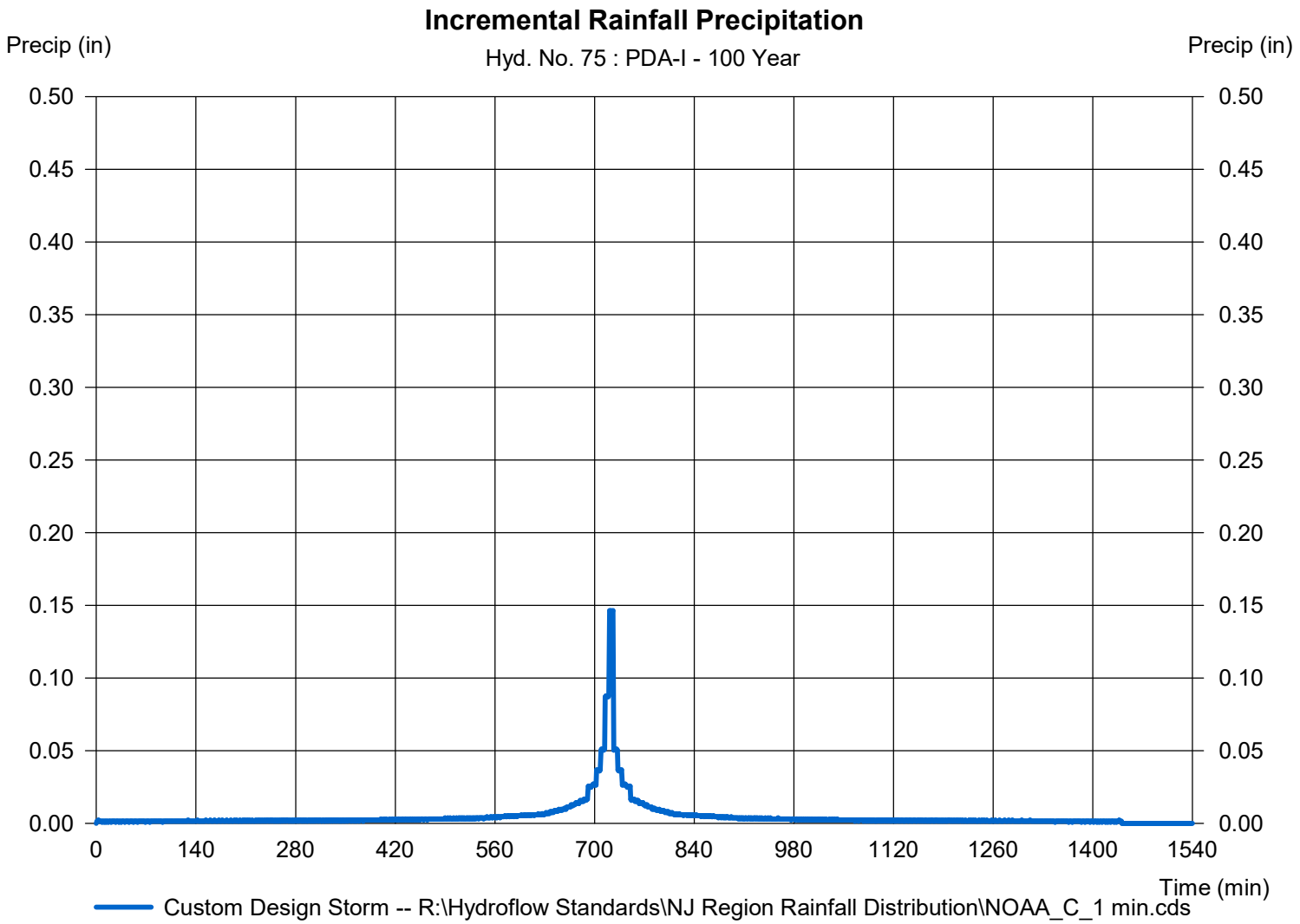


Precipitation Report

Hyd. No. 75

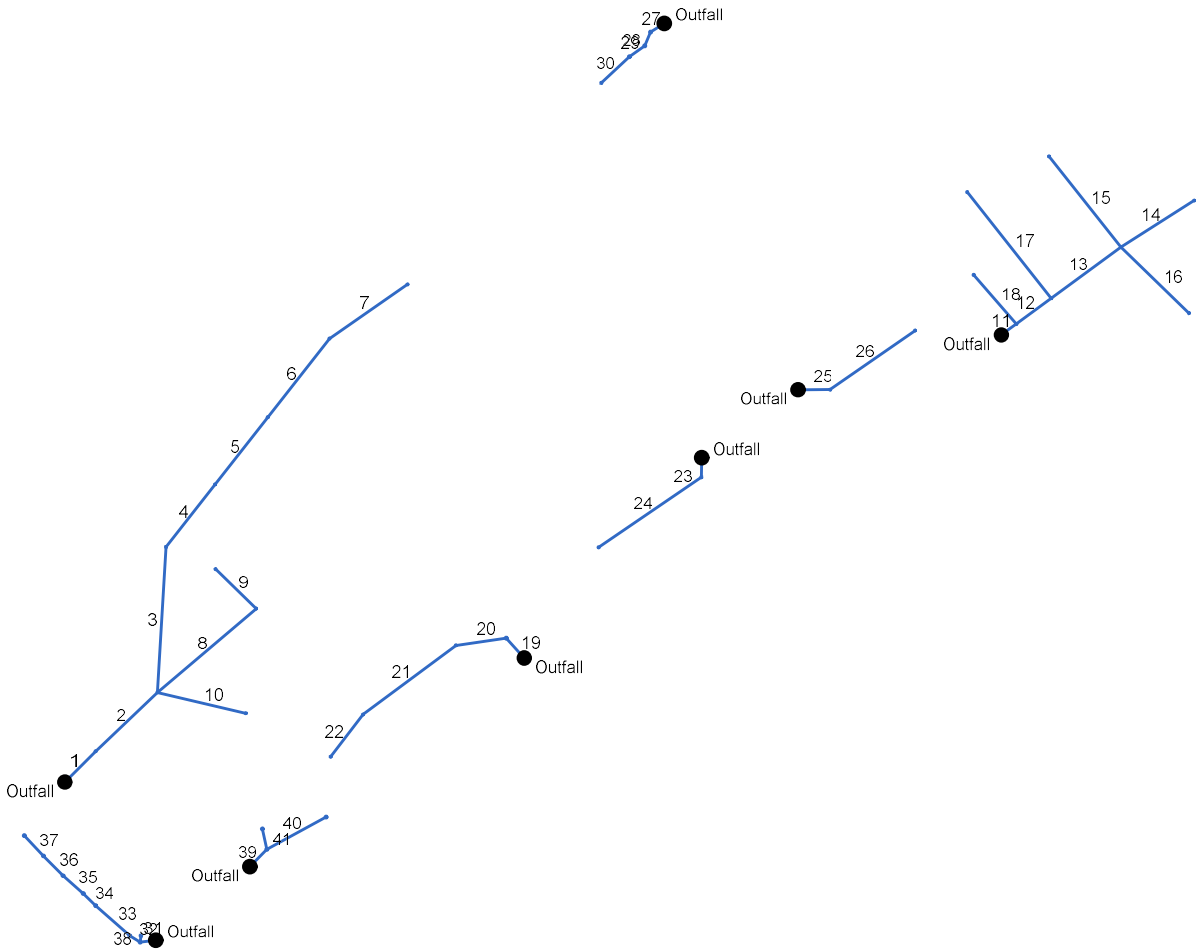
PDA-I

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.5100 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		



APPENDIX E –
STORM SEWER SIZING CALCULATIONS

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: SWM Pipe Sizing.stm	Number of lines: 41	Date: 11/2/2020

MyReport

Line No.	Inlet ID	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Line Size (in)	Line Slope (%)	n-val Pipe	Capac Full (cfs)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)	Line No.
1	D-2	1.53	10.0	5.79	0.99	41.69	36	0.50	0.013	46.98	605.48	601.33	600.73	600.10	1
2	D-3	2.03	10.0	5.79	0.99	35.71	36	0.50	0.013	47.21	606.66	605.48	601.38	600.85	2
3	D-6	0.54	10.0	5.79	0.99	29.89	30	1.64	0.013	52.44	609.02	606.66	606.77 j	602.13	3
4	D-7	1.16	10.0	5.79	0.99	27.39	24	1.35	0.012	28.50	611.29	609.02	609.14 j	606.77	4
5	D-8	1.45	10.0	5.79	0.99	21.57	24	1.35	0.013	26.30	613.80	611.29	611.57 j	609.14	5
6	D-9	0.81	10.0	5.79	0.99	14.15	24	1.35	0.013	26.30	615.98	613.80	614.29 j	611.57	6
7	D-10	1.72	10.0	5.79	0.99	9.85	18	0.75	0.012	9.84	617.06	615.98	615.71	614.29	7
8	D-4	0.07	10.0	5.79	0.99	2.47	15	1.76	0.012	9.28	609.85	606.66	605.09 j	602.13	8
9	D-5	0.38	10.0	5.79	0.99	2.18	15	1.50	0.012	8.58	609.88	609.85	606.94 j	605.09	9
10	D-11	0.08	10.0	5.79	0.99	0.46	15	0.50	0.012	4.96	607.20	606.66	602.13	602.13	10
11	B-21	0.79	10.0	5.79	0.99	42.60	36	0.79	0.013	59.14	602.27	600.25	600.44	599.89	11
12	B-23	2.61	10.0	5.79	0.99	37.33	33	0.77	0.013	46.29	602.73	602.27	601.08 j	600.44	12
13	B-25	0.62	10.0	5.79	0.99	27.63	30	0.71	0.013	34.56	603.70	602.73	602.19 j	601.08	13
14	B-28	0.87	10.0	5.79	0.99	4.98	27	0.60	0.013	23.98	604.82	603.70	602.30 j	602.19	14
15	B-26	2.58	10.0	5.79	0.99	14.78	24	0.81	0.013	20.33	605.01	603.70	603.88 j	602.19	15
16	B-27	1.22	10.0	5.79	0.99	6.99	18	0.50	0.013	7.42	603.97	603.70	603.12	602.19	16
17	B-24	0.17	10.0	5.79	0.99	0.97	15	1.53	0.013	7.99	606.99	602.73	604.33 j	601.08	17
18	B-22	0.41	10.0	5.79	0.99	2.35	15	0.77	0.013	5.67	602.80	602.27	600.63	600.44	18
19	B-2	0.00	0.0	0.00	0.00	7.97	18	0.50	0.013	7.44	602.60	598.98	599.63	599.09	19
20	B-3	1.17	10.0	5.79	0.99	8.05	18	0.50	0.013	7.46	601.54	602.60	600.59	599.95	20
21	B-4	0.56	10.0	5.79	0.99	2.94	15	0.50	0.013	4.56	603.13	601.54	601.25	600.76	21
22	B-5	0.07	10.0	5.79	0.99	0.40	15	0.50	0.013	4.58	604.54	603.13	601.29	601.28	22
23	B-7	0.15	10.0	5.79	0.99	3.29	24	0.51	0.013	16.16	602.26	600.25	598.86	598.63	23

Project File: SWM Pipe Sizing.stm | Number of lines: 41 | Date: 11/2/2020

NOTES: Intensity = 51.01 / (Inlet time + 9.00) ^ 0.74 -- Return period = 25 Yrs. ; ** Critical depth

MyReport

Line No.	Inlet ID	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Line Size (in)	Line Slope (%)	n-val Pipe	Capac Full (cfs)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)	Line No.
24	B-8	0.47	10.0	5.79	0.99	2.69	15	0.50	0.013	4.56	601.64	602.26	600.28	598.92	24
25	B-18	0.04	10.0	5.79	0.99	2.97	15	0.50	0.013	4.54	602.26	598.84	599.11	598.69	25
26	B-19	0.51	10.0	5.79	0.99	2.92	15	0.50	0.013	4.57	601.43	602.26	600.17	599.25	26
27	G-2	0.00	0.0	0.00	0.99	13.85	24	0.95	0.012	23.90	597.81	597.99	596.68 j	596.34	27
28	G-3	1.10	10.0	5.79	0.99	13.88	18	1.39	0.012	13.42	599.69	597.81	597.19	596.68	28
29	G-4	1.01	10.0	5.79	0.99	7.84	18	1.05	0.012	11.65	598.74	599.69	597.30 j	597.19	29
30	G-5	0.40	10.0	5.79	0.99	2.29	15	0.50	0.013	4.58	604.17	598.74	597.59	597.30	30
31	A-1A	0.04	10.0	5.79	0.99	8.85	24	1.04	0.012	24.97	596.69	593.15	592.41	592.06	31
32	A-2	0.04	10.0	5.79	0.99	1.23	15	0.95	0.012	6.80	595.70	596.69	592.04	592.41	32
33	A-3	0.04	10.0	5.79	0.99	1.10	15	1.10	0.012	7.34	595.22	595.70	593.12 j	592.04	33
34	A-4	0.04	10.0	5.79	0.99	0.94	15	1.84	0.012	9.48	596.00	595.22	593.80 j	593.12	34
35	A-5	0.04	10.0	5.79	0.99	0.78	15	2.19	0.012	10.36	597.25	596.00	595.07 j	593.80	35
36	A-6	0.04	10.0	5.79	0.99	0.62	15	2.19	0.012	10.36	598.60	597.25	596.39 j	595.07	36
37	A-7	0.08	10.0	5.79	0.99	0.46	15	2.20	0.012	10.39	599.96	598.60	597.71 j	596.39	37
38	A-1B	1.72	10.0	5.79	0.99	9.85	15	1.02	0.013	6.53	596.57	596.69	592.94	592.60	38
39	A-9	0.00	0.0	0.00	0.00	9.61	24	0.70	0.012	20.52	602.36	593.03	592.49 j	592.11	39
40	A-11	0.81	10.0	5.79	0.99	4.64	15	1.03	0.012	7.12	597.05	602.36	594.65	593.00	40
41	A-10	0.91	10.0	5.79	0.99	5.21	18	1.85	0.012	15.47	601.42	602.36	593.14 j	592.49	41

Project File: SWM Pipe Sizing.stm | Number of lines: 41 | Date: 11/2/2020

NOTES: Intensity = 51.01 / (Inlet time + 9.00) ^ 0.74 -- Return period = 25 Yrs. ; ** Critical depth

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	41.69	598.00	600.10	2.10	5.29	7.88	0.97	601.07	0.557	96.736	598.48	600.73	2.25	5.68	7.34	0.84	601.57	0.471	0.514	0.497	0.15	0.13
2	36	35.71	598.48	600.85	2.37	4.84	5.95	0.55	601.40	0.307	189.591	599.43	601.38	1.95**	4.86	7.35	0.84	602.22	0.503	0.405	0.767	0.89	0.75
3	30	29.89	599.43	602.13	2.50	3.92	6.09	0.58	602.70	0.531	335.112	604.91	606.77 j	1.86**	3.92	7.62	0.90	607.68	0.649	0.590	n/a	0.60	n/a
4	24	27.39	604.91	606.77	1.86	3.00	8.99	1.30	608.07	0.000	178.174	607.32	609.14 j	1.82**	3.00	9.14	1.30	610.43	0.000	0.000	n/a	0.15	0.19
5	24	21.57	607.32	609.14	1.82	2.79	7.20	0.93	610.07	0.000	191.586	609.91	611.57 j	1.66**	2.79	7.74	0.93	612.50	0.000	0.000	n/a	0.15	n/a
6	24	14.15	609.91	611.57	1.66	2.26	5.08	0.61	612.18	0.000	224.123	612.94	614.29 j	1.35**	2.26	6.25	0.61	614.90	0.000	0.000	n/a	0.35	n/a
7	18	9.85	612.94	614.29	1.35	1.53	5.87	0.54	614.83	0.659	208.661	614.50	615.71	1.21**	1.53	6.44	0.64	616.36	0.769	0.714	1.490	1.00	0.64
8	15	2.47	599.43	602.13	1.25	0.62	2.01	0.06	602.19	0.124	286.094	604.46	605.09 j	0.63**	0.62	3.99	0.25	605.34	0.489	0.307	n/a	1.00	0.25
9	15	2.18	604.46	605.09	0.63	0.57	3.52	0.23	605.32	0.000	125.777	606.35	606.94 j	0.59**	0.57	3.83	0.23	607.17	0.000	0.000	n/a	1.00	n/a
10	15	0.46	599.43	602.13	1.25	1.23	0.37	0.00	602.13	0.004	195.180	600.41	602.13	1.25	1.23	0.37	0.00	602.14	0.004	0.004	0.008	1.00	0.00
11	36	42.60	598.00	599.89	1.89	4.69	9.08	0.99	600.88	0.000	40.661	598.32	600.44	2.12**	5.35	7.96	0.99	601.43	0.000	0.000	n/a	1.00	n/a
12	33	37.33	598.32	600.44	2.12	4.71	7.58	0.98	601.42	0.000	95.278	599.05	601.08 j	2.03**	4.71	7.93	0.98	602.06	0.000	0.000	n/a	1.00	0.98
13	30	27.63	599.05	601.08	2.03	3.76	6.47	0.84	601.92	0.000	190.161	600.40	602.19 j	1.79**	3.76	7.34	0.84	603.03	0.000	0.000	n/a	1.00	n/a
14	27	4.98	600.40	602.19	1.79	1.18	1.47	0.28	602.47	0.000	190.138	601.54	602.30 j	0.76**	1.18	4.23	0.28	602.58	0.000	0.000	n/a	1.00	0.28
15	24	14.78	600.40	602.19	1.79	2.32	4.98	0.63	602.82	0.000	259.873	602.50	603.88 j	1.38**	2.32	6.37	0.63	604.52	0.000	0.000	n/a	1.00	0.63
16	18	6.99	600.40	602.19	1.50	1.77	3.96	0.24	602.43	0.443	210.037	601.45	603.12	1.50	1.77	3.95	0.24	603.36	0.443	0.443	0.930	1.00	0.24
17	15	0.97	599.30	601.08	1.25	0.32	0.79	0.01	601.09	0.023	303.400	603.94	604.33 j	0.39**	0.32	3.01	0.14	604.47	0.524	0.273	n/a	1.00	n/a
18	15	2.35	598.57	600.44	1.25	1.23	1.91	0.06	600.50	0.132	145.468	599.69	600.63	0.94	0.98	2.38	0.09	600.71	0.160	0.146	0.213	1.00	0.09
19	18	7.97	598.00	599.09	1.09*	1.38	5.78	0.52	599.61	0.743	59.831	598.30	599.63	1.33	1.65	4.82	0.36	599.99	0.515	0.629	0.376	0.88	0.32
20	18	8.05	598.30	599.95	1.50	1.77	4.55	0.32	600.27	0.587	109.121	598.85	600.59	1.50	1.77	4.55	0.32	600.91	0.587	0.587	0.641	0.55	0.18
21	15	2.94	598.85	600.76	1.25	1.23	2.39	0.09	600.85	0.207	254.525	600.12	601.25	1.13	1.17	2.52	0.10	601.35	0.182	0.194	0.495	0.32	0.03
22	15	0.40	600.12	601.28	1.16	1.19	0.34	0.00	601.28	0.003	119.495	600.72	601.29	0.57	0.54	0.74	0.01	601.30	0.022	0.012	0.015	1.00	0.01

Project File: SWM Pipe Sizing.stm | Number of lines: 41 | Run Date: 11/2/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
23	24	3.29	598.00	598.63	0.63	0.85	3.88	0.23	598.86	0.000	45.068	598.23	598.86	0.63**	0.85	3.85	0.23	599.09	0.000	0.000	n/a	0.83	0.19
24	15	2.69	598.23	598.92	0.69*	0.70	3.87	0.23	599.15	0.499	272.792	599.59	600.28	0.69	0.70	3.86	0.23	600.51	0.496	0.497	1.357	1.00	0.23
25	15	2.97	598.00	598.69	0.69*	0.70	4.26	0.28	598.97	0.603	68.673	598.34	599.11	0.77	0.80	3.73	0.22	599.33	0.429	0.516	0.354	0.65	0.14
26	15	2.92	598.34	599.25	0.91	0.69	3.04	0.14	599.40	0.262	227.136	599.48	600.17	0.69**	0.69	4.23	0.28	600.44	0.600	0.431	n/a	1.00	0.28
27	24	13.85	595.00	596.34	1.34	2.24	6.19	0.60	596.94	0.000	35.735	595.34	596.68 j	1.34**	2.24	6.20	0.60	597.28	0.000	0.000	n/a	0.61	n/a
28	18	13.88	595.34	596.68	1.34	1.66	8.34	1.04	597.72	0.000	33.782	595.81	597.19	1.38**	1.70	8.17	1.04	598.23	0.000	0.000	n/a	0.57	0.59
29	18	7.84	595.79	597.19	1.40	1.37	4.57	0.51	597.70	0.000	41.035	596.22	597.30 j	1.08**	1.37	5.74	0.51	597.82	0.000	0.000	n/a	0.17	n/a
30	15	2.29	596.55	597.30	0.75	0.59	2.96	0.14	597.44	0.274	85.558	596.98	597.59	0.61**	0.59	3.87	0.23	597.82	0.555	0.414	0.355	1.00	0.23
31	24	8.85	591.00	592.06	1.06	1.69	5.24	0.43	592.49	0.000	33.696	591.35	592.41	1.06**	1.69	5.23	0.43	592.84	0.000	0.000	n/a	1.00	0.43
32	15	1.23	591.35	592.41	1.06	0.38	1.11	0.16	592.57	0.000	26.421	591.60	592.04	0.44**	0.38	3.22	0.16	592.20	0.000	0.000	n/a	0.23	n/a
33	15	1.10	591.60	592.04	0.44	0.35	2.88	0.15	592.19	0.000	100.880	592.71	593.12 j	0.41**	0.35	3.11	0.15	593.27	0.000	0.000	n/a	0.15	0.02
34	15	0.94	592.71	593.12	0.41	0.31	2.65	0.14	593.26	0.000	38.648	593.42	593.80 j	0.38**	0.31	2.97	0.14	593.94	0.000	0.000	n/a	0.15	0.02
35	15	0.78	593.42	593.80	0.38	0.28	2.48	0.12	593.92	0.000	59.263	594.72	595.07 j	0.35**	0.28	2.82	0.12	595.19	0.000	0.000	n/a	0.15	n/a
36	15	0.62	594.72	595.07	0.35	0.23	2.25	0.11	595.17	0.000	61.976	596.08	596.39 j	0.31**	0.23	2.65	0.11	596.50	0.000	0.000	n/a	0.15	0.02
37	15	0.46	596.08	596.39	0.31	0.19	1.95	0.09	596.48	0.000	62.156	597.45	597.71 j	0.26**	0.19	2.44	0.09	597.81	0.000	0.000	n/a	1.00	0.09
38	15	9.85	591.35	592.60	1.25*	1.23	8.03	1.00	593.60	2.329	14.658	591.50	592.94	1.25	1.23	8.03	1.00	593.94	2.328	2.328	0.341	1.00	1.00
39	24	9.61	591.00	592.11	1.11	1.79	5.37	0.45	592.56	0.000	54.179	591.38	592.49 j	1.11**	1.79	5.38	0.45	592.94	0.000	0.000	n/a	0.83	0.37
40	15	4.64	592.26	593.00	0.74*	0.75	6.18	0.40	593.40	0.000	146.927	593.78	594.65	0.87**	0.91	5.07	0.40	595.05	0.000	0.000	n/a	1.00	0.40
41	18	5.21	591.38	592.49	1.11	1.08	3.73	0.37	592.85	0.000	47.601	592.26	593.14 j	0.88**	1.08	4.85	0.37	593.50	0.000	0.000	n/a	1.00	n/a

Project File: SWM Pipe Sizing.stm | Number of lines: 41 | Run Date: 11/2/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	96.736	1.53	9.77	0.99	1.51	9.67	10.0	19.3	4.3	41.69	46.98	7.61	36	0.50	598.00	598.48	600.10	600.73	601.33	605.48	Pipe - (22)
2	1	189.591	2.03	8.24	0.99	2.01	8.16	10.0	18.7	4.4	35.71	47.21	6.65	36	0.50	598.48	599.43	600.85	601.38	605.48	606.66	Pipe - (20) (1)
3	2	335.112	0.54	5.68	0.99	0.53	5.62	10.0	12.3	5.3	29.89	52.44	6.86	30	1.64	599.43	604.91	602.13	606.77	606.66	609.02	Pipe - (20)
4	3	178.174	1.16	5.14	0.99	1.15	5.09	10.0	12.0	5.4	27.39	28.50	9.07	24	1.35	604.91	607.32	606.77	609.14	609.02	611.29	Pipe - (19) (1) (1)
5	4	191.586	1.45	3.98	0.99	1.44	3.94	10.0	11.5	5.5	21.57	26.30	7.47	24	1.35	607.32	609.91	609.14	611.57	611.29	613.80	Pipe - (19) (1) (1)
6	5	224.123	0.81	2.53	0.99	0.80	2.50	10.0	10.6	5.6	14.15	26.30	5.66	24	1.35	609.91	612.94	611.57	614.29	613.80	615.98	Pipe - (19) (1)
7	6	208.661	1.72	1.72	0.99	1.70	1.70	10.0	10.0	5.8	9.85	9.84	6.15	18	0.75	612.94	614.50	614.29	615.71	615.98	617.06	Pipe - (19)
8	2	286.094	0.07	0.45	0.99	0.07	0.45	10.0	11.2	5.5	2.47	9.28	3.00	15	1.76	599.43	604.46	602.13	605.09	606.66	609.85	Pipe - (21)
9	8	125.777	0.38	0.38	0.99	0.38	0.38	10.0	10.0	5.8	2.18	8.58	3.68	15	1.50	604.46	606.35	605.09	606.94	609.85	609.88	Pipe - (23)
10	2	195.180	0.08	0.08	0.99	0.08	0.08	10.0	10.0	5.8	0.46	4.96	0.37	15	0.50	599.43	600.41	602.13	602.13	606.66	607.20	Pipe - (24)
11	End	40.661	0.79	9.27	0.99	0.78	9.18	10.0	16.6	4.6	42.60	59.14	8.52	36	0.79	598.00	598.32	599.89	600.44	600.25	602.27	Pipe - (36) (1)
12	11	95.278	2.61	8.07	0.99	2.58	7.99	10.0	16.4	4.7	37.33	46.29	7.76	33	0.77	598.32	599.05	600.44	601.08	602.27	602.73	Pipe - (36)
13	12	190.161	0.62	5.29	0.99	0.61	5.24	10.0	12.5	5.3	27.63	34.56	6.90	30	0.71	599.05	600.40	601.08	602.19	602.73	603.70	Pipe - (35)
14	13	190.138	0.87	0.87	0.99	0.86	0.86	10.0	10.0	5.8	4.98	23.98	2.85	27	0.60	600.40	601.54	602.19	602.30	603.70	604.82	Pipe - (39)
15	13	259.873	2.58	2.58	0.99	2.55	2.55	10.0	10.0	5.8	14.78	20.33	5.68	24	0.81	600.40	602.50	602.19	603.88	603.70	605.01	Pipe - (38)
16	13	210.037	1.22	1.22	0.99	1.21	1.21	10.0	10.0	5.8	6.99	7.42	3.95	18	0.50	600.40	601.45	602.19	603.12	603.70	603.97	Pipe - (37)
17	12	303.400	0.17	0.17	0.99	0.17	0.17	10.0	10.0	5.8	0.97	7.99	1.90	15	1.53	599.30	603.94	601.08	604.33	602.73	606.99	Pipe - (41)
18	11	145.468	0.41	0.41	0.99	0.41	0.41	10.0	10.0	5.8	2.35	5.67	2.15	15	0.77	598.57	599.69	600.44	600.63	602.27	602.80	Pipe - (40)
19	End	59.831	0.00	1.80	0.00	0.00	1.78	0.0	17.9	4.5	7.97	7.44	5.30	18	0.50	598.00	598.30	599.09	599.63	598.98	602.60	Pipe - (34) (1)
20	19	109.121	1.17	1.80	0.99	1.16	1.78	10.0	17.6	4.5	8.05	7.46	4.55	18	0.50	598.30	598.85	599.95	600.59	602.60	601.54	Pipe - (34)
21	20	254.525	0.56	0.63	0.99	0.55	0.62	10.0	16.1	4.7	2.94	4.56	2.46	15	0.50	598.85	600.12	600.76	601.25	601.54	603.13	Pipe - (32)
22	21	119.495	0.07	0.07	0.99	0.07	0.07	10.0	10.0	5.8	0.40	4.58	0.54	15	0.50	600.12	600.72	601.28	601.29	603.13	604.54	Pipe - (33)

Project File: SWM Pipe Sizing.stm

Number of lines: 41

Run Date: 11/2/2020

NOTES:Intensity = 51.01 / (Inlet time + 9.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	End	45.068	0.15	0.62	0.99	0.15	0.61	10.0	12.1	5.4	3.29	16.16	3.86	24	0.51	598.00	598.23	598.63	598.86	600.25	602.26	Pipe - (27)
24	23	272.792	0.47	0.47	0.99	0.47	0.47	10.0	10.0	5.8	2.69	4.56	3.87	15	0.50	598.23	599.59	598.92	600.28	602.26	601.64	Pipe - (26)
25	End	68.673	0.04	0.55	0.99	0.04	0.54	10.0	11.6	5.5	2.97	4.54	3.99	15	0.50	598.00	598.34	598.69	599.11	598.84	602.26	Pipe - (56)
26	25	227.136	0.51	0.51	0.99	0.50	0.50	10.0	10.0	5.8	2.92	4.57	3.64	15	0.50	598.34	599.48	599.25	600.17	602.26	601.43	Pipe - (55)
27	End	35.735	0.00	2.51	0.99	0.00	2.48	0.0	11.0	5.6	13.85	23.90	6.19	24	0.95	595.00	595.34	596.34	596.68	597.99	597.81	Pipe - (7)
28	27	33.782	1.10	2.51	0.99	1.09	2.48	10.0	10.9	5.6	13.88	13.42	8.26	18	1.39	595.34	595.81	596.68	597.19	597.81	599.69	Pipe - (6)
29	28	41.035	1.01	1.41	0.99	1.00	1.40	10.0	10.8	5.6	7.84	11.65	5.16	18	1.05	595.79	596.22	597.19	597.30	599.69	598.74	Pipe - (5)
30	29	85.558	0.40	0.40	0.99	0.40	0.40	10.0	10.0	5.8	2.29	4.58	3.42	15	0.50	596.55	596.98	597.30	597.59	598.74	604.17	Pipe - (46)
31	End	33.696	0.04	2.04	0.99	0.04	2.02	10.0	18.7	4.4	8.85	24.97	5.23	24	1.04	591.00	591.35	592.06	592.41	593.15	596.69	Pipe - (3) (1)
32	31	26.421	0.04	0.28	0.99	0.04	0.28	10.0	18.3	4.4	1.23	6.80	2.16	15	0.95	591.35	591.60	592.41	592.04	596.69	595.70	Pipe - (3)
33	32	100.880	0.04	0.24	0.99	0.04	0.24	10.0	16.7	4.6	1.10	7.34	3.00	15	1.10	591.60	592.71	592.04	593.12	595.70	595.22	Pipe - (8) (1) (1) (
34	33	38.648	0.04	0.20	0.99	0.04	0.20	10.0	16.0	4.7	0.94	9.48	2.81	15	1.84	592.71	593.42	593.12	593.80	595.22	596.00	Pipe - (8) (1) (1) (
35	34	59.263	0.04	0.16	0.99	0.04	0.16	10.0	14.6	4.9	0.78	10.36	2.65	15	2.19	593.42	594.72	593.80	595.07	596.00	597.25	Pipe - (8) (1) (1)
36	35	61.976	0.04	0.12	0.99	0.04	0.12	10.0	12.8	5.2	0.62	10.36	2.45	15	2.19	594.72	596.08	595.07	596.39	597.25	598.60	Pipe - (8) (1)
37	36	62.156	0.08	0.08	0.99	0.08	0.08	10.0	10.0	5.8	0.46	10.39	2.20	15	2.20	596.08	597.45	596.39	597.71	598.60	599.96	Pipe - (8)
38	31	14.658	1.72	1.72	0.99	1.70	1.70	10.0	10.0	5.8	9.85	6.53	8.03	15	1.02	591.35	591.50	592.60	592.94	596.69	596.57	Pipe - (57)
39	End	54.179	0.00	1.72	0.00	0.00	1.70	0.0	10.6	5.6	9.61	20.52	5.38	24	0.70	591.00	591.38	592.11	592.49	593.03	602.36	Pipe - (18)
40	39	146.927	0.81	0.81	0.99	0.80	0.80	10.0	10.0	5.8	4.64	7.12	5.62	15	1.03	592.26	593.78	593.00	594.65	602.36	597.05	Pipe - (16)
41	39	47.601	0.91	0.91	0.99	0.90	0.90	10.0	10.0	5.8	5.21	15.47	4.29	18	1.85	591.38	592.26	592.49	593.14	602.36	601.42	Pipe - (17)

Project File: SWM Pipe Sizing.stm

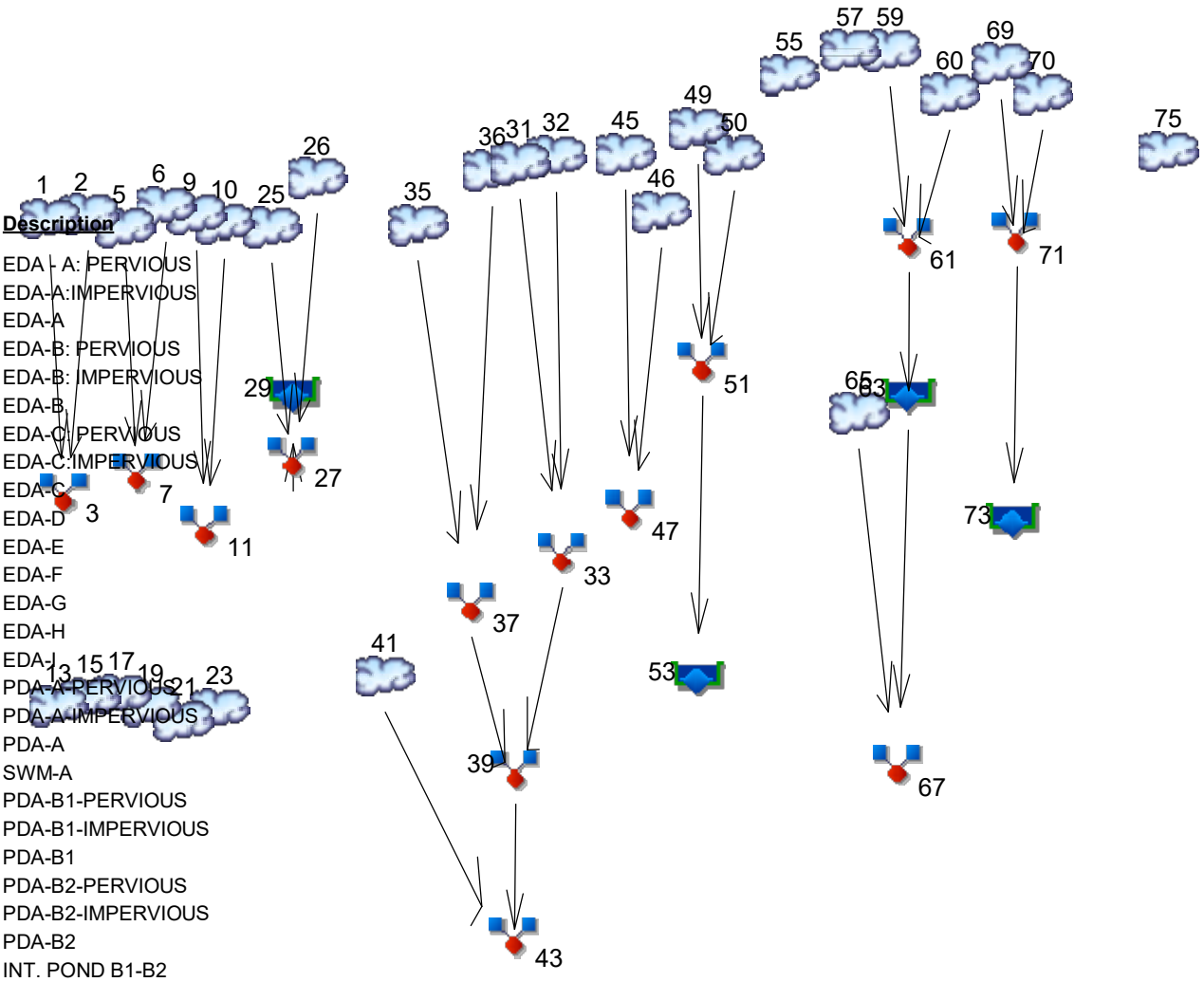
Number of lines: 41

Run Date: 11/2/2020

NOTES:Intensity = 51.01 / (Inlet time + 9.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

APPENDIX F –
WATER QUALITY STORM HYDROLOGIC ANALYSIS AND RUNOFF QUANTITY CALCULATIONS

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	EDA - A: PERVIOUS
2	SCS Runoff	EDA-A:IMPERVIOUS
3	Combine	EDA-A
5	SCS Runoff	EDA-B: PERVIOUS
6	SCS Runoff	EDA-B: IMPERVIOUS
7	Combine	EDA-B
9	SCS Runoff	EDA-C: PERVIOUS
10	SCS Runoff	EDA-C:IMPERVIOUS
11	Combine	EDA-C
13	SCS Runoff	EDA-D
15	SCS Runoff	EDA-E
17	SCS Runoff	EDA-F
19	SCS Runoff	EDA-G
21	SCS Runoff	EDA-H
23	SCS Runoff	EDA-I
25	SCS Runoff	PDA-A-PERVIOUS
26	SCS Runoff	PDA-A-IMPERVIOUS
27	Combine	PDA-A
29	Reservoir	SWM-A
31	SCS Runoff	PDA-B1-PERVIOUS
32	SCS Runoff	PDA-B1-IMPERVIOUS
33	Combine	PDA-B1
35	SCS Runoff	PDA-B2-PERVIOUS
36	SCS Runoff	PDA-B2-IMPERVIOUS
37	Combine	PDA-B2
39	Reservoir(i)	INT. POND B1-B2
41	SCS Runoff	PDA-B3
43	Combine	PDA-B
45	SCS Runoff	PDA-C-PERVIOUS
46	SCS Runoff	PDA-C-IMPERVIOUS
47	Combine	PDA-C
49	SCS Runoff	PDA-D-PERVIOUS
50	SCS Runoff	PDA-D-IMPERVIOUS
51	Combine	PDA-D
53	Reservoir	SWM-D
55	SCS Runoff	PDA-E
57	SCS Runoff	PDA-F
59	SCS Runoff	PDA-G1-PERVIOUS
60	SCS Runoff	PDA-G1-IMPERVIOUS
61	Combine	PDA-G1
63	Reservoir	SWM-G1
65	SCS Runoff	PDA-G2
67	Combine	PDA-G
69	SCS Runoff	PDA-H-PERVIOUS
70	SCS Runoff	PDA-H-IMPERVIOUS
71	Combine	PDA-H
73	Reservoir	SWM-H
75	SCS Runoff	PDA-I

Hydrograph Return Period Recap

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	------	0.000	-------	-------	-------	0.000	-------	-------	0.000	EDA - A: PERVIOUS
2	SCS Runoff	------	2.904	-------	-------	-------	0.000	-------	-------	0.000	EDA-A:IMPERVIOUS
3	Combine	1, 2	2.904	-------	-------	-------	0.000	-------	-------	0.000	EDA-A
5	SCS Runoff	------	0.000	-------	-------	-------	0.000	-------	-------	0.000	EDA-B: PERVIOUS
6	SCS Runoff	------	3.708	-------	-------	-------	0.000	-------	-------	0.000	EDA-B: IMPERVIOUS
7	Combine	5, 6	3.708	-------	-------	-------	0.000	-------	-------	0.000	EDA-B
9	SCS Runoff	------	0.022	-------	-------	-------	0.000	-------	-------	0.000	EDA-C: PERVIOUS
10	SCS Runoff	------	3.440	-------	-------	-------	0.000	-------	-------	0.000	EDA-C:IMPERVIOUS
11	Combine	9, 10	3.440	-------	-------	-------	0.000	-------	-------	0.000	EDA-C
13	SCS Runoff	------	0.965	-------	-------	-------	0.000	-------	-------	0.000	EDA-D
15	SCS Runoff	------	1.140	-------	-------	-------	0.000	-------	-------	0.000	EDA-E
17	SCS Runoff	------	0.351	-------	-------	-------	0.000	-------	-------	0.000	EDA-F
19	SCS Runoff	------	0.087	-------	-------	-------	0.000	-------	-------	0.000	EDA-G
21	SCS Runoff	------	0.000	-------	-------	-------	0.000	-------	-------	0.000	EDA-H
23	SCS Runoff	------	0.000	-------	-------	-------	0.000	-------	-------	0.000	EDA-I
25	SCS Runoff	------	0.000	-------	-------	-------	0.000	-------	-------	0.000	PDA-A-PERVIOUS
26	SCS Runoff	------	9.194	-------	-------	-------	0.000	-------	-------	0.000	PDA-A-IMPERVIOUS
27	Combine	25, 26	9.194	-------	-------	-------	0.000	-------	-------	0.000	PDA-A
29	Reservoir	27	0.000	-------	-------	-------	0.000	-------	-------	0.000	SWM-A
31	SCS Runoff	------	1.717	-------	-------	-------	0.000	-------	-------	0.000	PDA-B1-PERVIOUS
32	SCS Runoff	------	40.90	-------	-------	-------	0.000	-------	-------	0.000	PDA-B1-IMPERVIOUS
33	Combine	31, 32	41.63	-------	-------	-------	0.000	-------	-------	0.000	PDA-B1
35	SCS Runoff	------	0.027	-------	-------	-------	0.000	-------	-------	0.000	PDA-B2-PERVIOUS
36	SCS Runoff	------	10.68	-------	-------	-------	0.000	-------	-------	0.000	PDA-B2-IMPERVIOUS
37	Combine	35, 36	10.68	-------	-------	-------	0.000	-------	-------	0.000	PDA-B2
39	Reservoir(i)	33, 37	0.000	-------	-------	-------	0.000	-------	-------	0.000	INT. POND B1-B2
41	SCS Runoff	------	0.064	-------	-------	-------	0.000	-------	-------	0.000	PDA-B3

Hydrograph Return Period Recap

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	
43	Combine	39, 41,	0.064	-------	-------	-------	0.000	-------	-------	0.000	PDA-B
45	SCS Runoff	------	0.326	-------	-------	-------	0.000	-------	-------	0.000	PDA-C-PERVIOUS
46	SCS Runoff	------	1.127	-------	-------	-------	0.000	-------	-------	0.000	PDA-C-IMPERVIOUS
47	Combine	45, 46	1.401	-------	-------	-------	0.000	-------	-------	0.000	PDA-C
49	SCS Runoff	------	0.578	-------	-------	-------	0.000	-------	-------	0.000	PDA-D-PERVIOUS
50	SCS Runoff	------	35.26	-------	-------	-------	0.000	-------	-------	0.000	PDA-D-IMPERVIOUS
51	Combine	49, 50	35.74	-------	-------	-------	0.000	-------	-------	0.000	PDA-D
53	Reservoir	51	0.000	-------	-------	-------	0.000	-------	-------	0.000	SWM-D
55	SCS Runoff	------	0.379	-------	-------	-------	0.000	-------	-------	0.000	PDA-E
57	SCS Runoff	------	0.316	-------	-------	-------	0.000	-------	-------	0.000	PDA-F
59	SCS Runoff	------	0.084	-------	-------	-------	0.000	-------	-------	0.000	PDA-G1-PERVIOUS
60	SCS Runoff	------	15.57	-------	-------	-------	0.000	-------	-------	0.000	PDA-G1-IMPERVIOUS
61	Combine	59, 60	15.57	-------	-------	-------	0.000	-------	-------	0.000	PDA-G1
63	Reservoir	61	0.000	-------	-------	-------	0.000	-------	-------	0.000	SWM-G1
65	SCS Runoff	------	0.112	-------	-------	-------	0.000	-------	-------	0.000	PDA-G2
67	Combine	63, 65,	0.112	-------	-------	-------	0.000	-------	-------	0.000	PDA-G
69	SCS Runoff	------	0.110	-------	-------	-------	0.000	-------	-------	0.000	PDA-H-PERVIOUS
70	SCS Runoff	------	29.96	-------	-------	-------	0.000	-------	-------	0.000	PDA-H-IMPERVIOUS
71	Combine	69, 70	29.96	-------	-------	-------	0.000	-------	-------	0.000	PDA-H
73	Reservoir	71	0.000	-------	-------	-------	0.000	-------	-------	0.000	SWM-H
75	SCS Runoff	------	0.000	-------	-------	-------	0.000	-------	-------	0.000	PDA-I

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	0.000	1	n/a	0	------	------	------	EDA - A: PERVIOUS
2	SCS Runoff	2.904	1	74	5,483	------	------	------	EDA-A:IMPERVIOUS
3	Combine	2.904	1	74	5,483	1, 2	------	------	EDA-A
5	SCS Runoff	0.000	1	n/a	0	------	------	------	EDA-B: PERVIOUS
6	SCS Runoff	3.708	1	80	8,863	------	------	------	EDA-B: IMPERVIOUS
7	Combine	3.708	1	80	8,863	5, 6	------	------	EDA-B
9	SCS Runoff	0.022	1	110	31	------	------	------	EDA-C: PERVIOUS
10	SCS Runoff	3.440	1	65	4,493	------	------	------	EDA-C:IMPERVIOUS
11	Combine	3.440	1	65	4,523	9, 10	------	------	EDA-C
13	SCS Runoff	0.965	1	73	1,594	------	------	------	EDA-D
15	SCS Runoff	1.140	1	75	2,024	------	------	------	EDA-E
17	SCS Runoff	0.351	1	71	538	------	------	------	EDA-F
19	SCS Runoff	0.087	1	107	163	------	------	------	EDA-G
21	SCS Runoff	0.000	1	n/a	0	------	------	------	EDA-H
23	SCS Runoff	0.000	1	n/a	0	------	------	------	EDA-I
25	SCS Runoff	0.000	1	n/a	0	------	------	------	PDA-A-PERVIOUS
26	SCS Runoff	9.194	1	65	12,006	------	------	------	PDA-A-IMPERVIOUS
27	Combine	9.194	1	65	12,006	25, 26	------	------	PDA-A
29	Reservoir	0.000	1	68	0	27	592.76	8,755	SWM-A
31	SCS Runoff	1.717	1	69	2,574	------	------	------	PDA-B1-PERVIOUS
32	SCS Runoff	40.90	1	65	53,407	------	------	------	PDA-B1-IMPERVIOUS
33	Combine	41.63	1	65	55,980	31, 32	------	------	PDA-B1
35	SCS Runoff	0.027	1	105	59	------	------	------	PDA-B2-PERVIOUS
36	SCS Runoff	10.68	1	65	13,942	------	------	------	PDA-B2-IMPERVIOUS
37	Combine	10.68	1	65	14,001	35, 36	------	------	PDA-B2
39	Reservoir(i)	0.000	1	166	0	33, 37	598.62	50,977	INT. POND B1-B2
41	SCS Runoff	0.064	1	72	116	------	------	------	PDA-B3

Hydrograph Summary Report

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

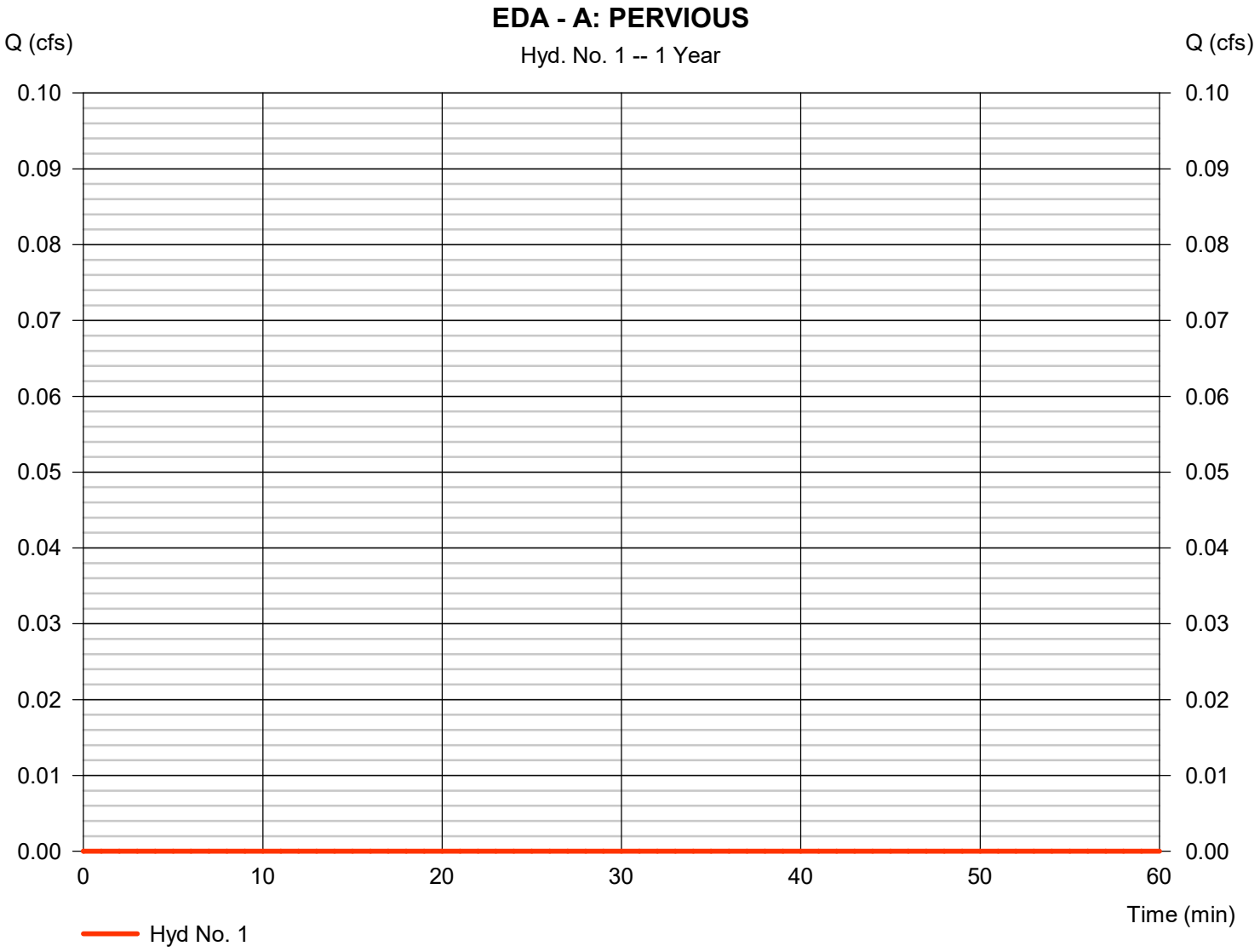
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
43	Combine	0.064	1	72	116	39, 41,	------	------	PDA-B
45	SCS Runoff	0.326	1	68	409	------	------	------	PDA-C-PERVIOUS
46	SCS Runoff	1.127	1	65	1,472	------	------	------	PDA-C-IMPERVIOUS
47	Combine	1.401	1	66	1,880	45, 46	------	------	PDA-C
49	SCS Runoff	0.578	1	68	704	------	------	------	PDA-D-PERVIOUS
50	SCS Runoff	35.26	1	65	46,048	------	------	------	PDA-D-IMPERVIOUS
51	Combine	35.74	1	65	46,753	49, 50	------	------	PDA-D
53	Reservoir	0.000	1	62	0	51	599.41	36,144	SWM-D
55	SCS Runoff	0.379	1	67	451	------	------	------	PDA-E
57	SCS Runoff	0.316	1	69	427	------	------	------	PDA-F
59	SCS Runoff	0.084	1	75	177	------	------	------	PDA-G1-PERVIOUS
60	SCS Runoff	15.57	1	65	20,332	------	------	------	PDA-G1-IMPERVIOUS
61	Combine	15.57	1	65	20,510	59, 60	------	------	PDA-G1
63	Reservoir	0.000	1	63	0	61	597.21	15,256	SWM-G1
65	SCS Runoff	0.112	1	69	151	------	------	------	PDA-G2
67	Combine	0.112	1	69	151	63, 65,	------	------	PDA-G
69	SCS Runoff	0.110	1	105	244	------	------	------	PDA-H-PERVIOUS
70	SCS Runoff	29.96	1	65	39,116	------	------	------	PDA-H-IMPERVIOUS
71	Combine	29.96	1	65	39,360	69, 70	------	------	PDA-H
73	Reservoir	0.000	1	75	0	71	596.75	28,710	SWM-H
75	SCS Runoff	0.000	1	n/a	0	------	------	------	PDA-I

Hydrograph Report

Hyd. No. 1

EDA - A: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 13.620 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.70 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 1

EDA - A: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 16.00		0.00		0.00		
Travel Time (min)	**= 9.29**	**+**	**0.00**	**+**	**0.00**	**=**	**9.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		274.00		479.00		
Watercourse slope (%)	= 0.00		4.20		0.50		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		3.31		1.14		
Travel Time (min)	**= 0.00**	**+**	**1.38**	**+**	**7.00**	**=**	**8.38**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

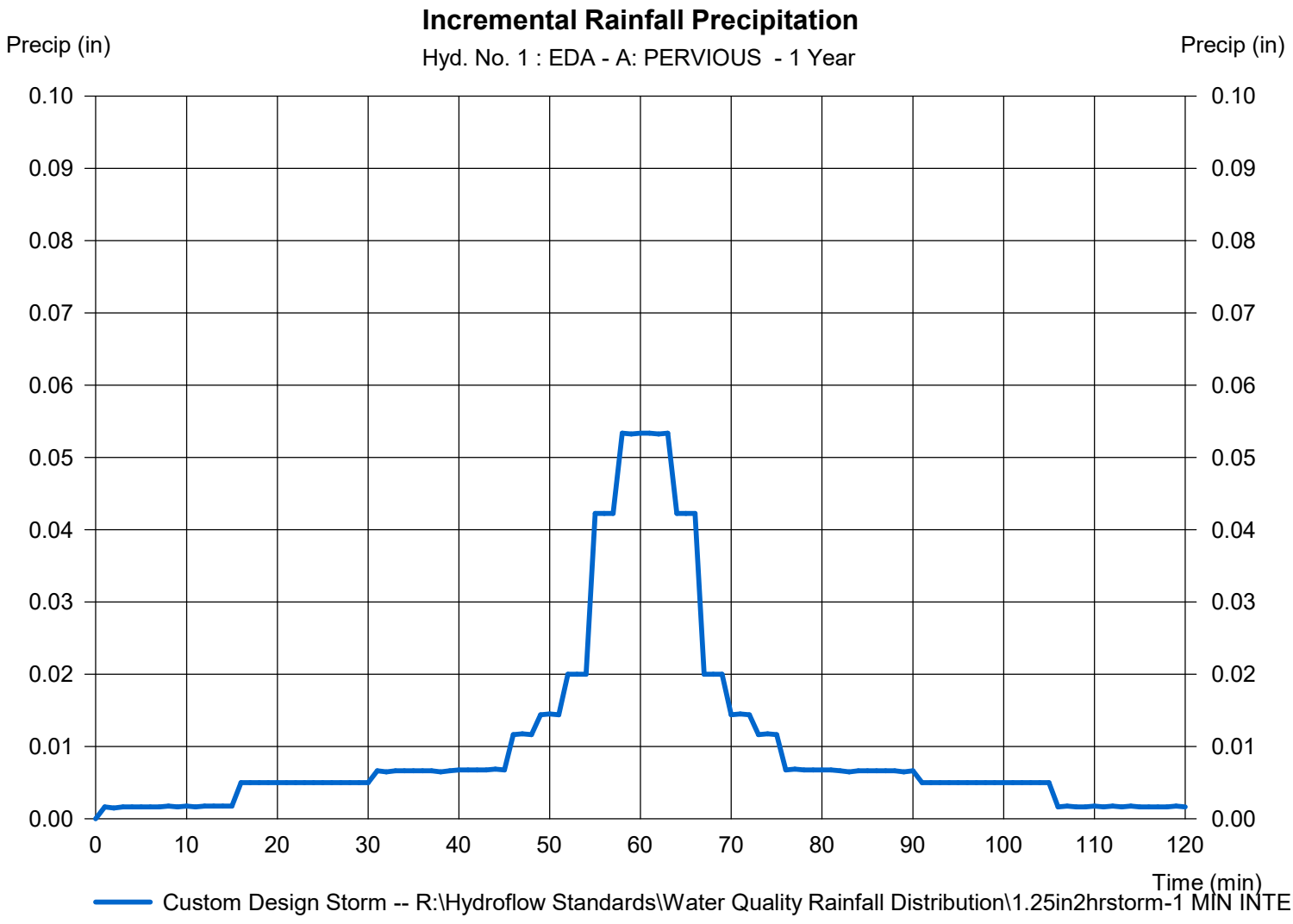
Total Travel Time, Tc ..... 17.70 min

Precipitation Report

Hyd. No. 1

EDA - A: PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

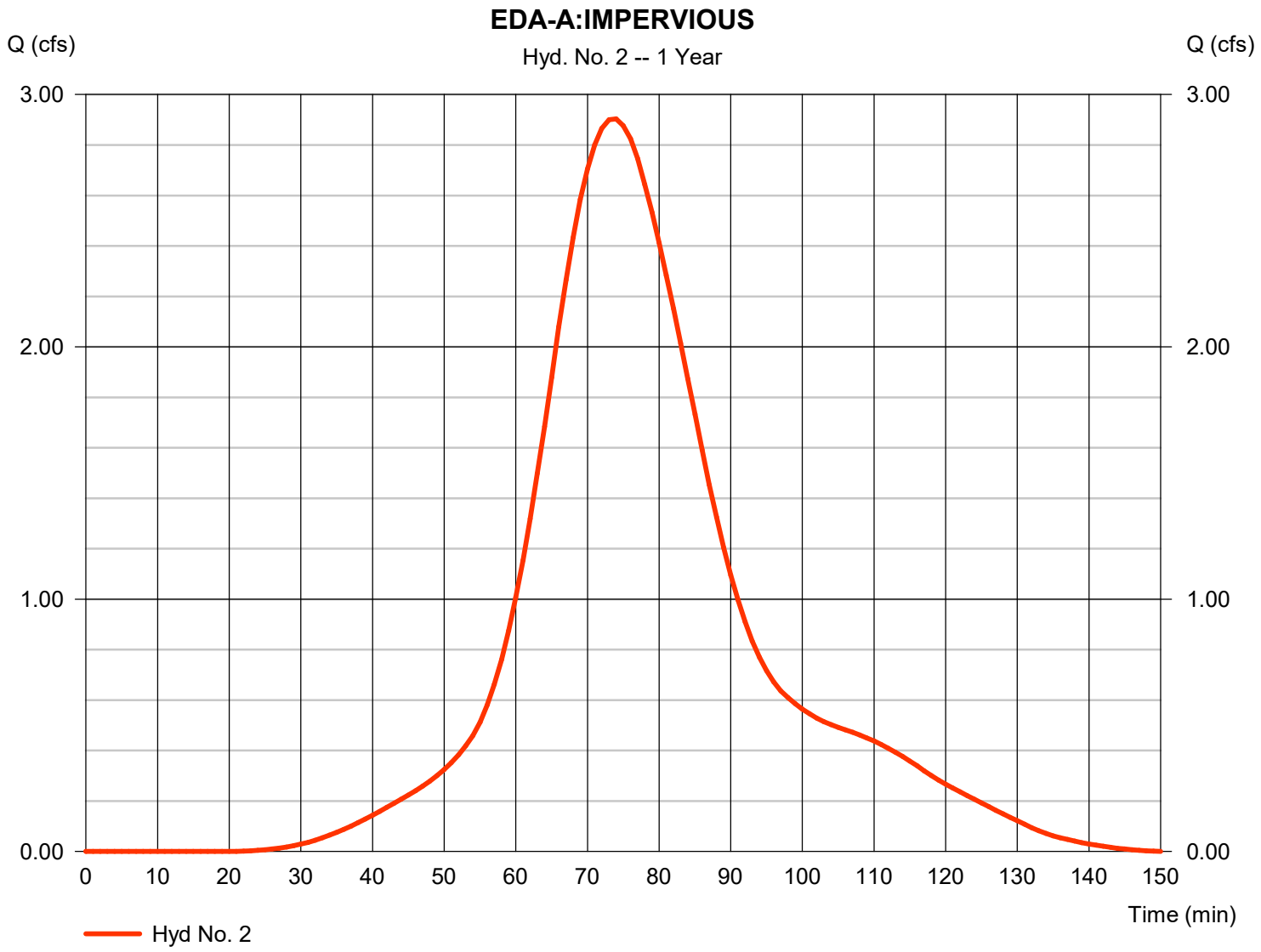


Hydrograph Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.904 cfs
Storm frequency	=	1 yrs	Time to peak	=	74 min
Time interval	=	1 min	Hyd. volume	=	5,483 cuft
Drainage area	=	1.460 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.60 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\Water Quality Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 2

EDA-A:IMPERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 0.40		0.00		0.00		
Travel Time (min)	**= 2.29**	**+**	**0.00**	**+**	**0.00**	**=**	**2.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		509.00		600.00		
Watercourse slope (%)	= 0.00		0.20		0.60		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.91		1.25		
Travel Time (min)	**= 0.00**	**+**	**9.33**	**+**	**8.00**	**=**	**17.33**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

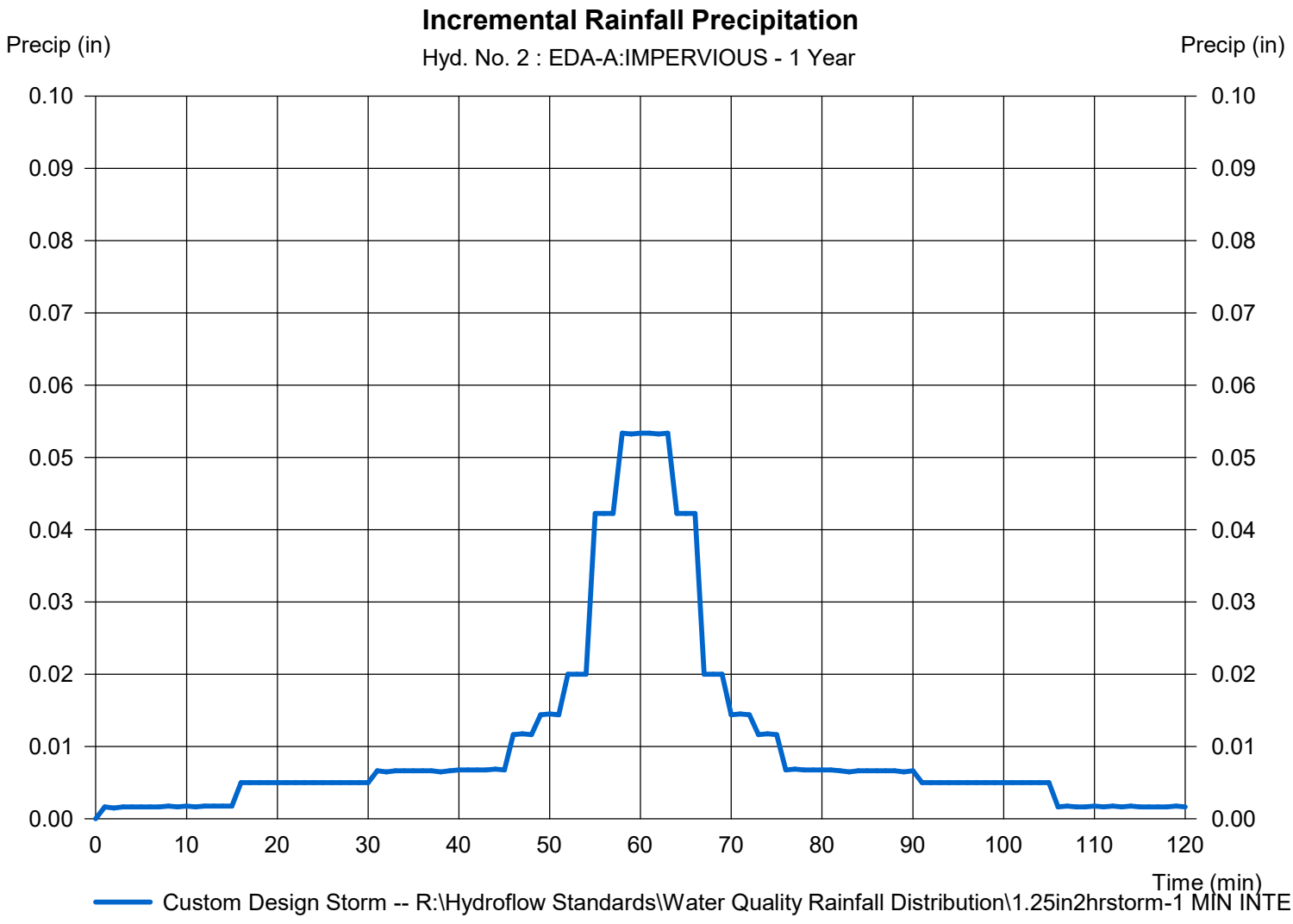
Total Travel Time, Tc ..... 19.60 min

Precipitation Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

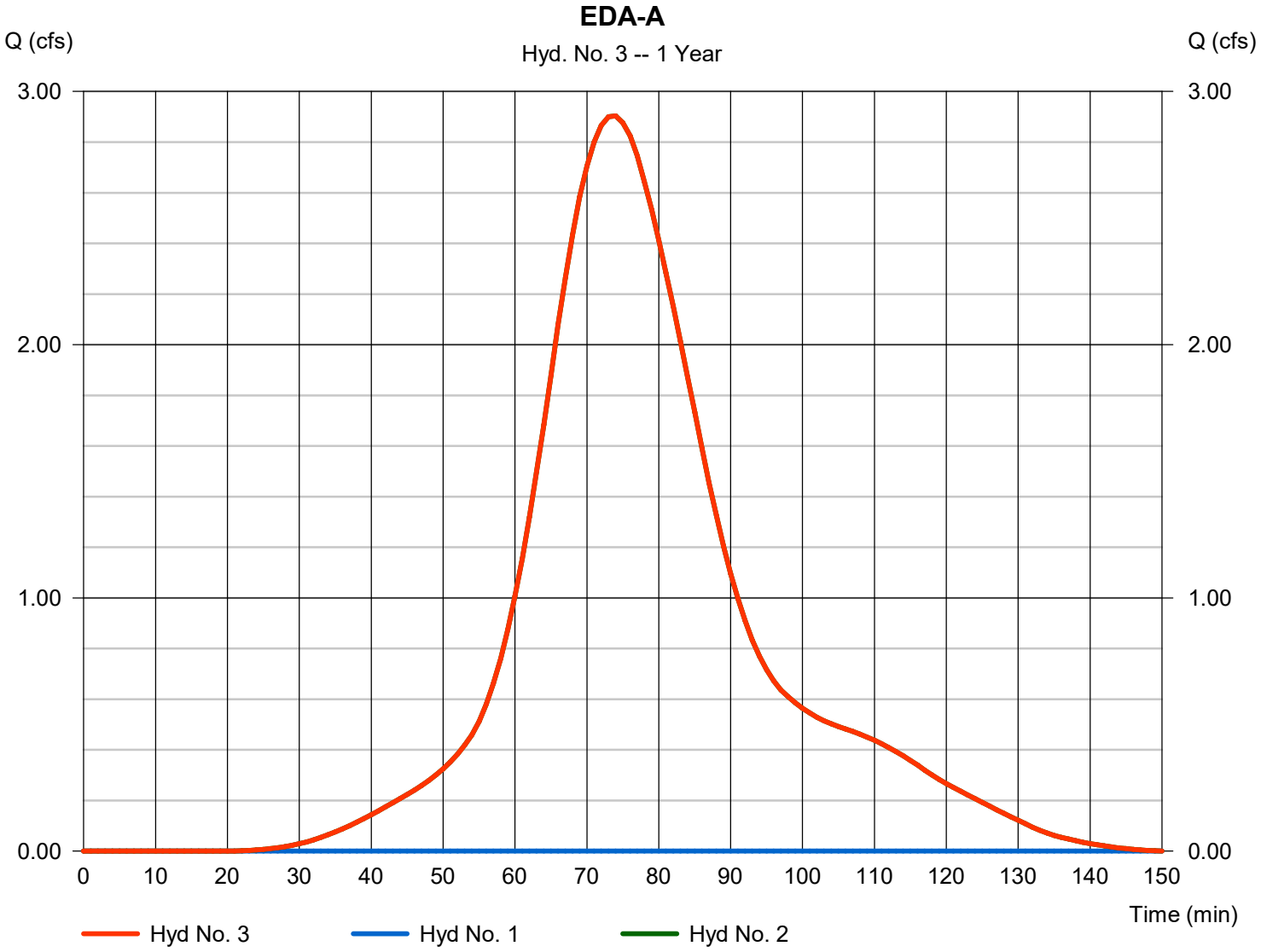


Hydrograph Report

Hyd. No. 3

EDA-A

Hydrograph type	= Combine	Peak discharge	= 2.904 cfs
Storm frequency	= 1 yrs	Time to peak	= 74 min
Time interval	= 1 min	Hyd. volume	= 5,483 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 15.080 ac

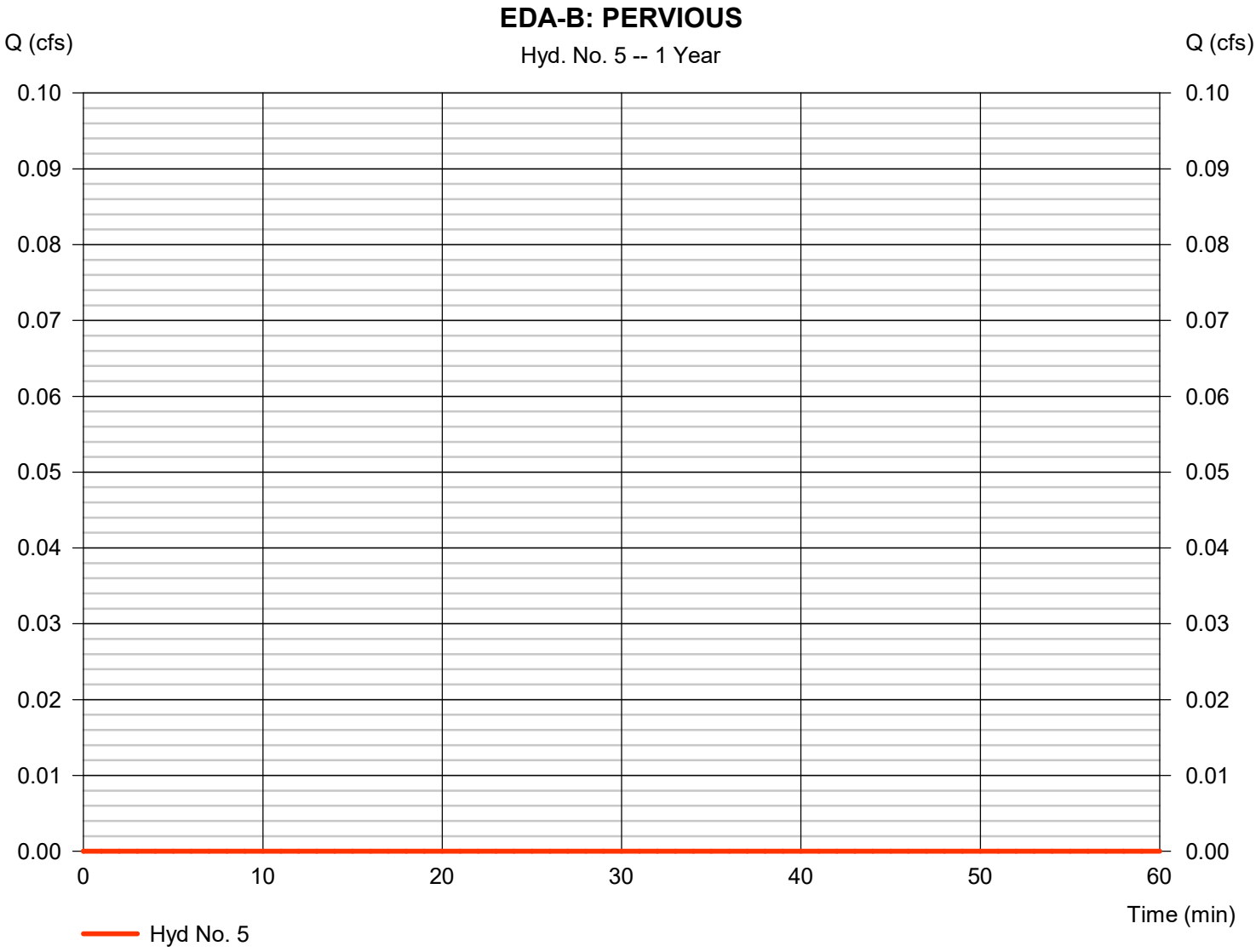


Hydrograph Report

Hyd. No. 5

EDA-B: PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Drainage area	=	15.720 ac	Curve number	=	47
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.40 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 5

EDA-B: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 7.30		0.00		0.00		
Travel Time (min)	**= 12.71**	**+**	**0.00**	**+**	**0.00**	**=**	**12.71**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		704.00		818.00		
Watercourse slope (%)	= 0.00		4.90		0.30		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		3.57		0.88		
Travel Time (min)	**= 0.00**	**+**	**3.29**	**+**	**15.43**	**=**	**18.71**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

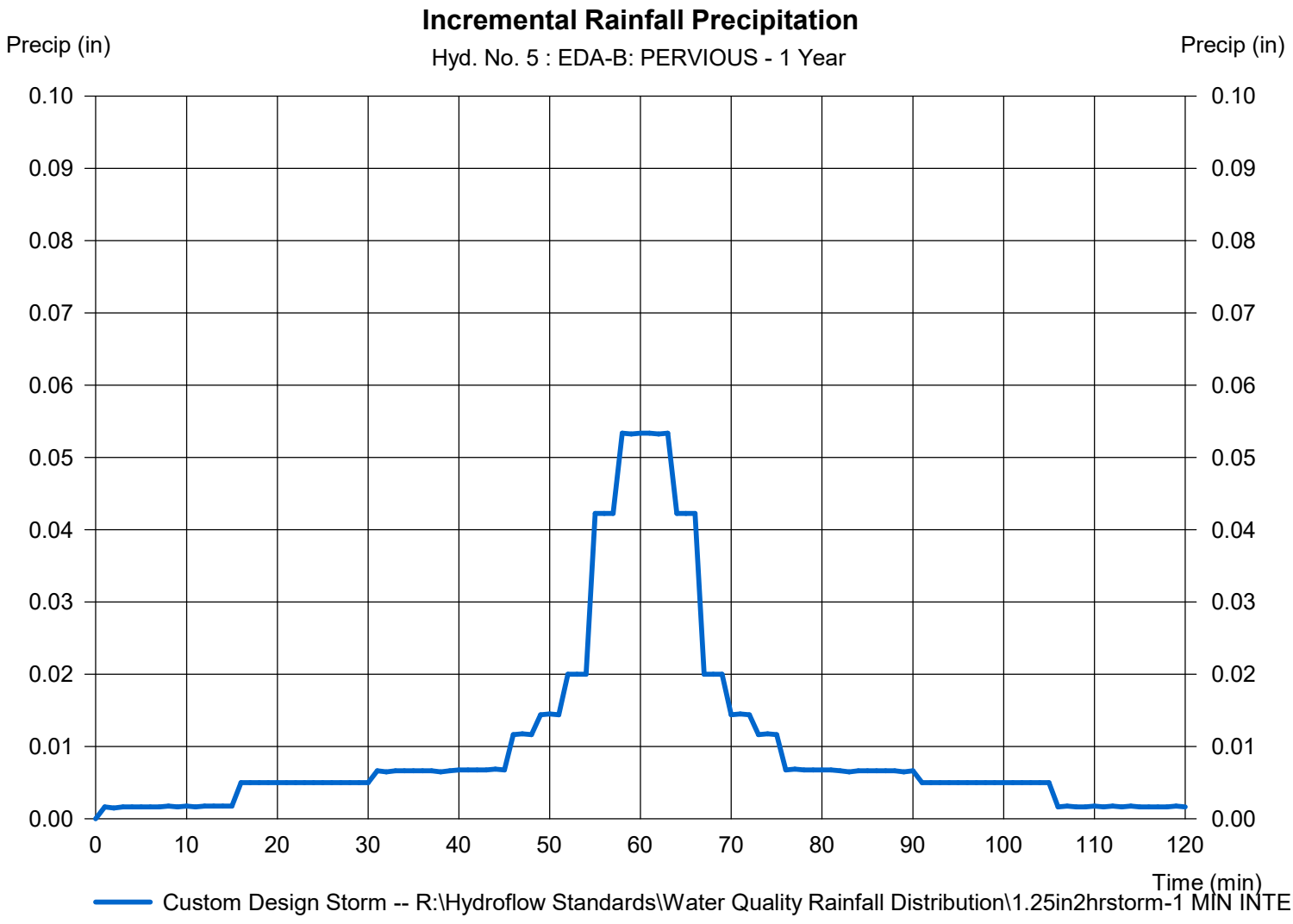
Total Travel Time, Tc ..... 31.40 min

Precipitation Report

Hyd. No. 5

EDA-B: PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

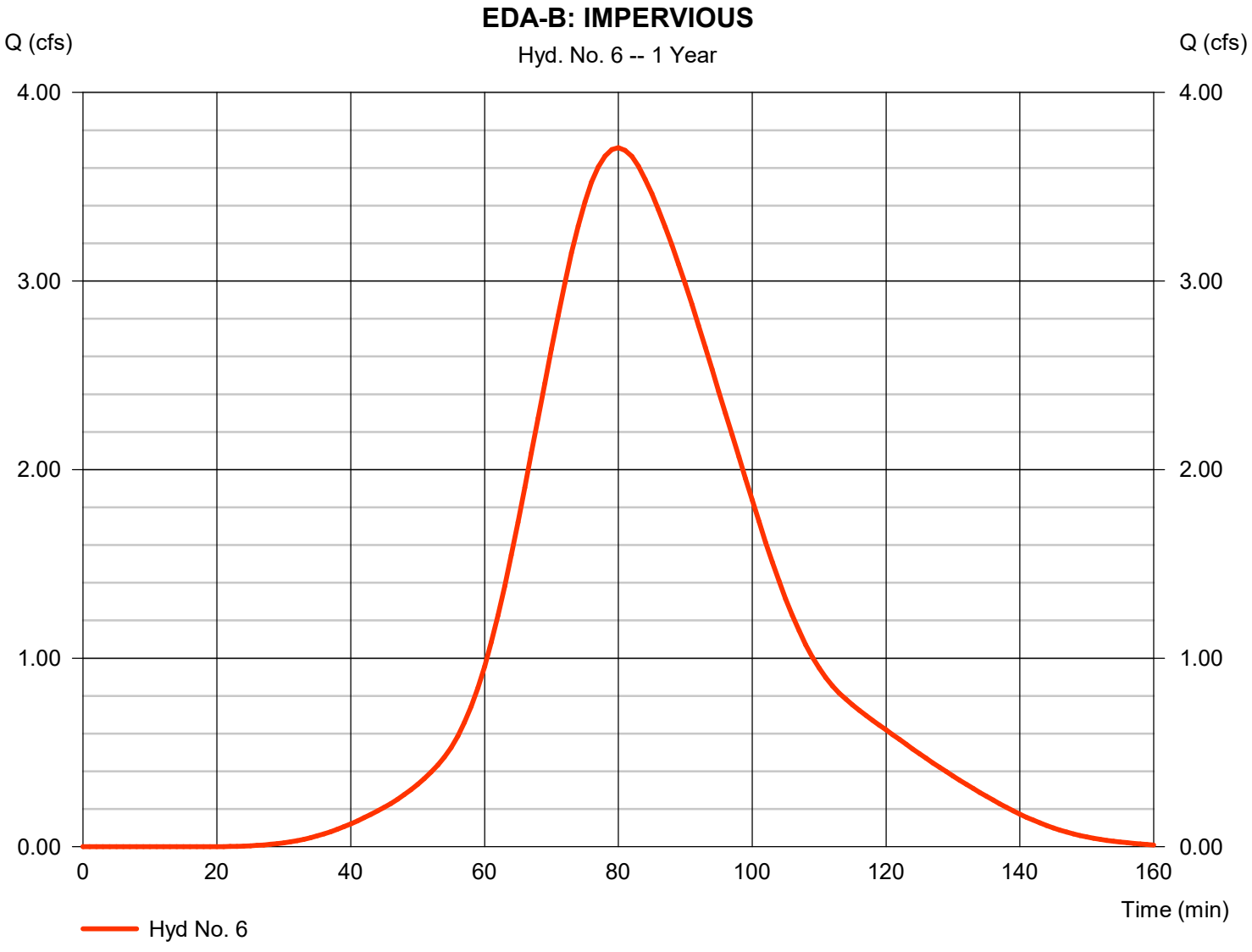


Hydrograph Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.708 cfs
Storm frequency	=	1 yrs	Time to peak	=	80 min
Time interval	=	1 min	Hyd. volume	=	8,863 cuft
Drainage area	=	2.360 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	29.70 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterSupply\Rainfall Distribution\1.25in2hrstorm-1 MIN	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 6

EDA-B: IMPERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 0.10		0.00		0.00		
Travel Time (min)	**= 3.99**	**+**	**0.00**	**+**	**0.00**	**=**	**3.99**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		1303.00		98.00		
Watercourse slope (%)	= 0.00		0.20		0.30		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.91		0.88		
Travel Time (min)	**= 0.00**	**+**	**23.89**	**+**	**1.85**	**=**	**25.74**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

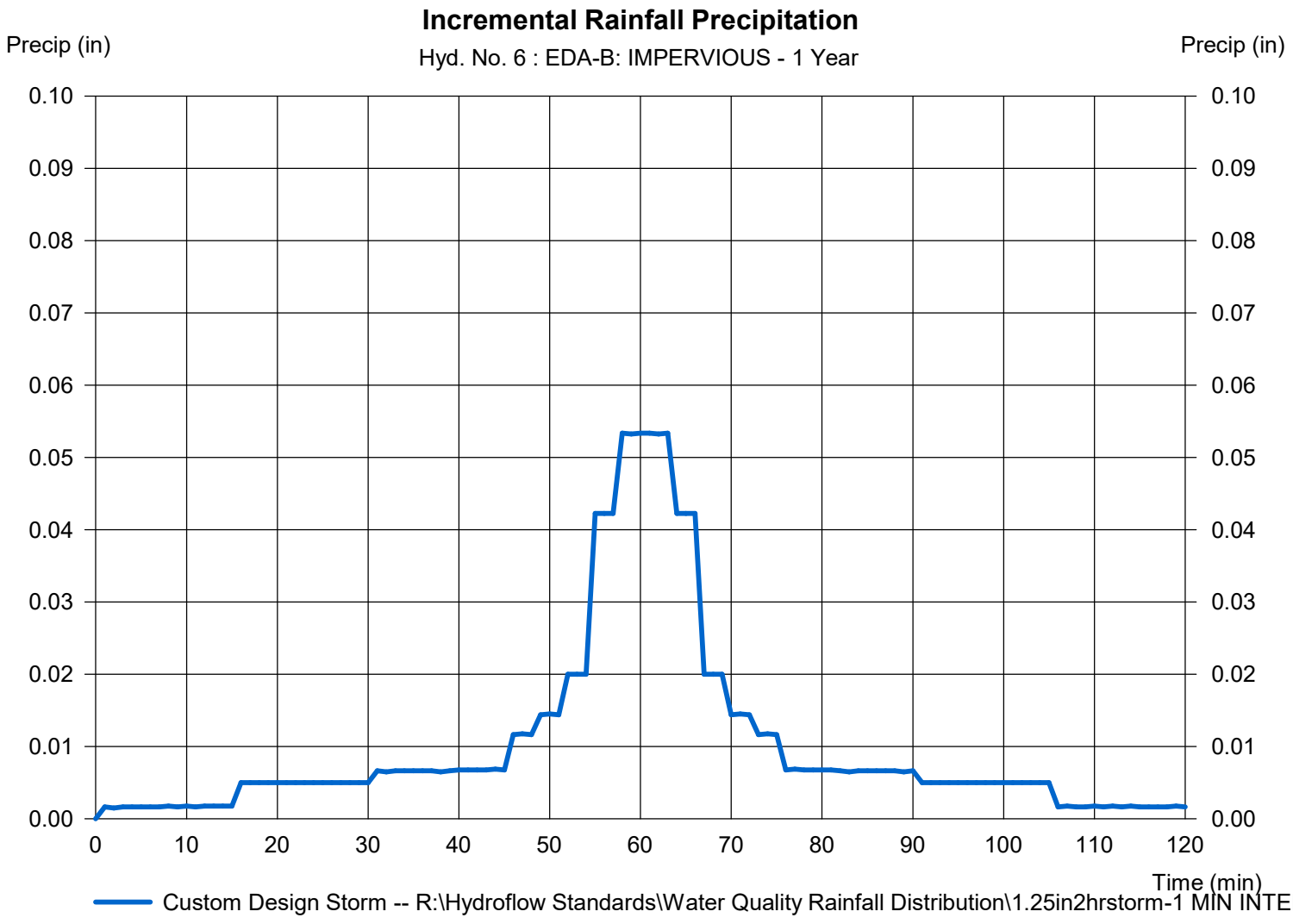
Total Travel Time, Tc ..... 29.70 min

Precipitation Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

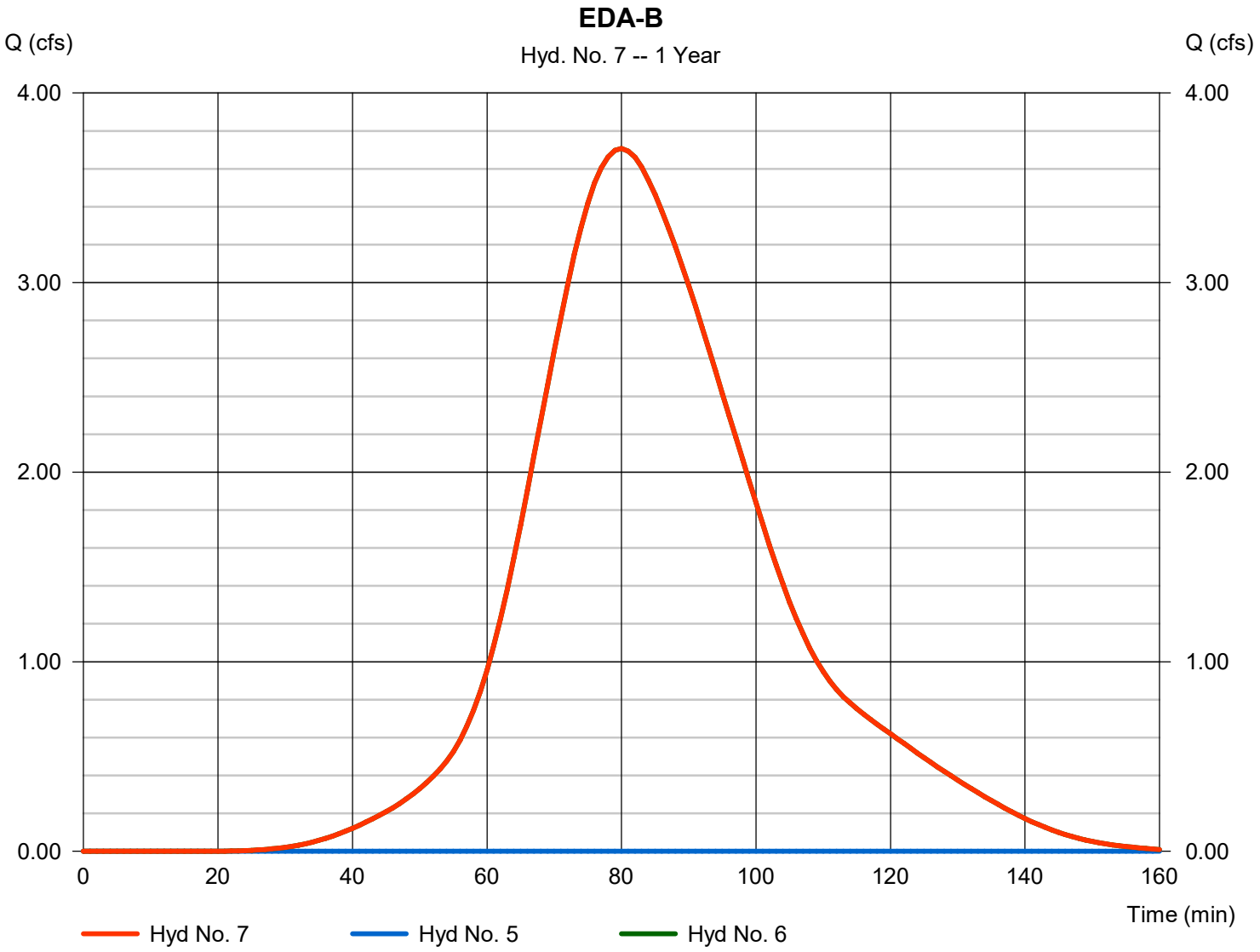


Hydrograph Report

Hyd. No. 7

EDA-B

Hydrograph type	=	Combine	Peak discharge	=	3.708 cfs
Storm frequency	=	1 yrs	Time to peak	=	80 min
Time interval	=	1 min	Hyd. volume	=	8,863 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	18.080 ac

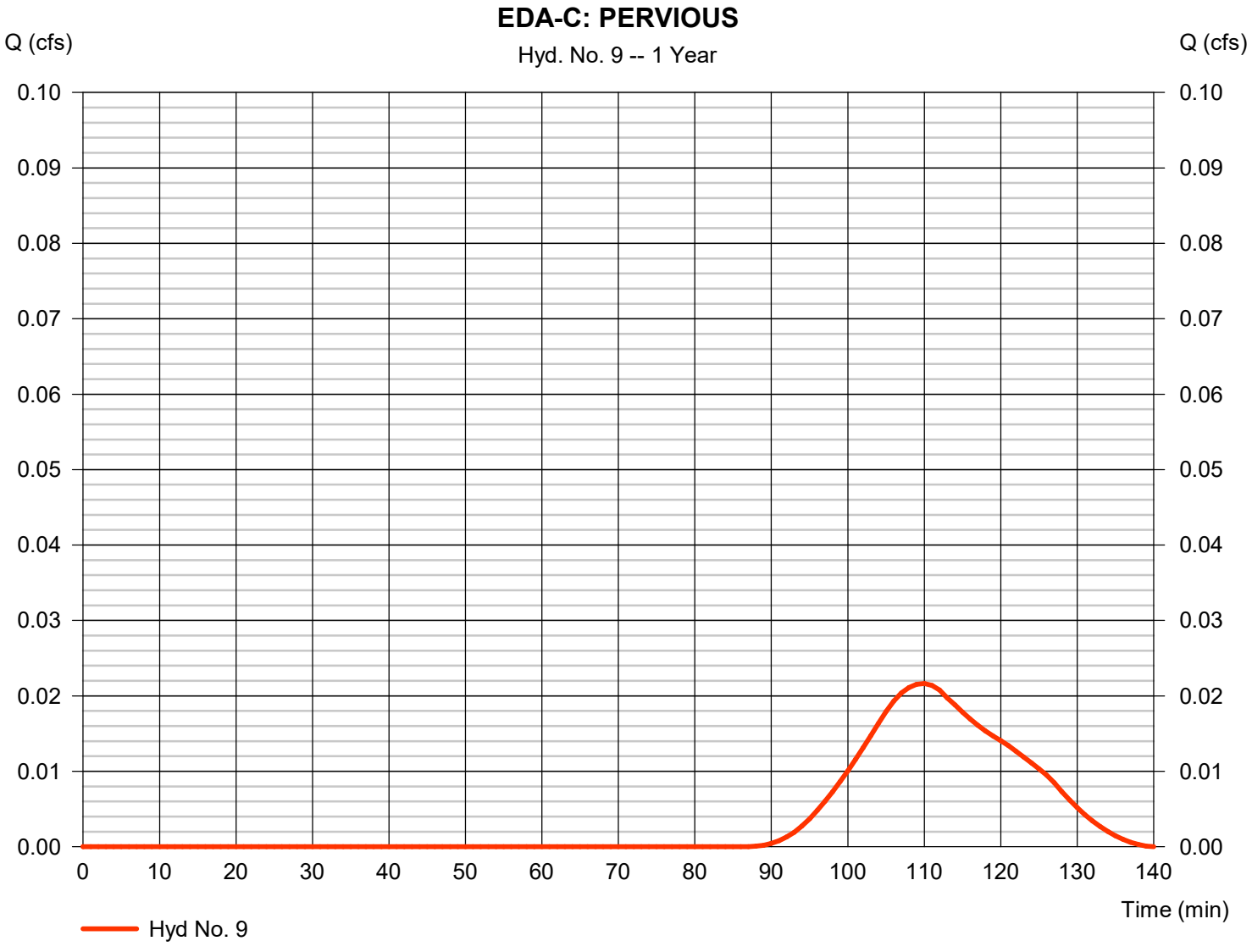


Hydrograph Report

Hyd. No. 9

EDA-C: PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.022 cfs
Storm frequency	=	1 yrs	Time to peak	=	110 min
Time interval	=	1 min	Hyd. volume	=	31 cuft
Drainage area	=	3.170 ac	Curve number	=	64
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 9

EDA-C: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 12.10		0.00		0.00		
Travel Time (min)	**= 10.39**	**+**	**0.00**	**+**	**0.00**	**=**	**10.39**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		73.00		265.00		
Watercourse slope (%)	= 0.00		12.00		1.70		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		5.59		2.10		
Travel Time (min)	**= 0.00**	**+**	**0.22**	**+**	**2.10**	**=**	**2.32**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

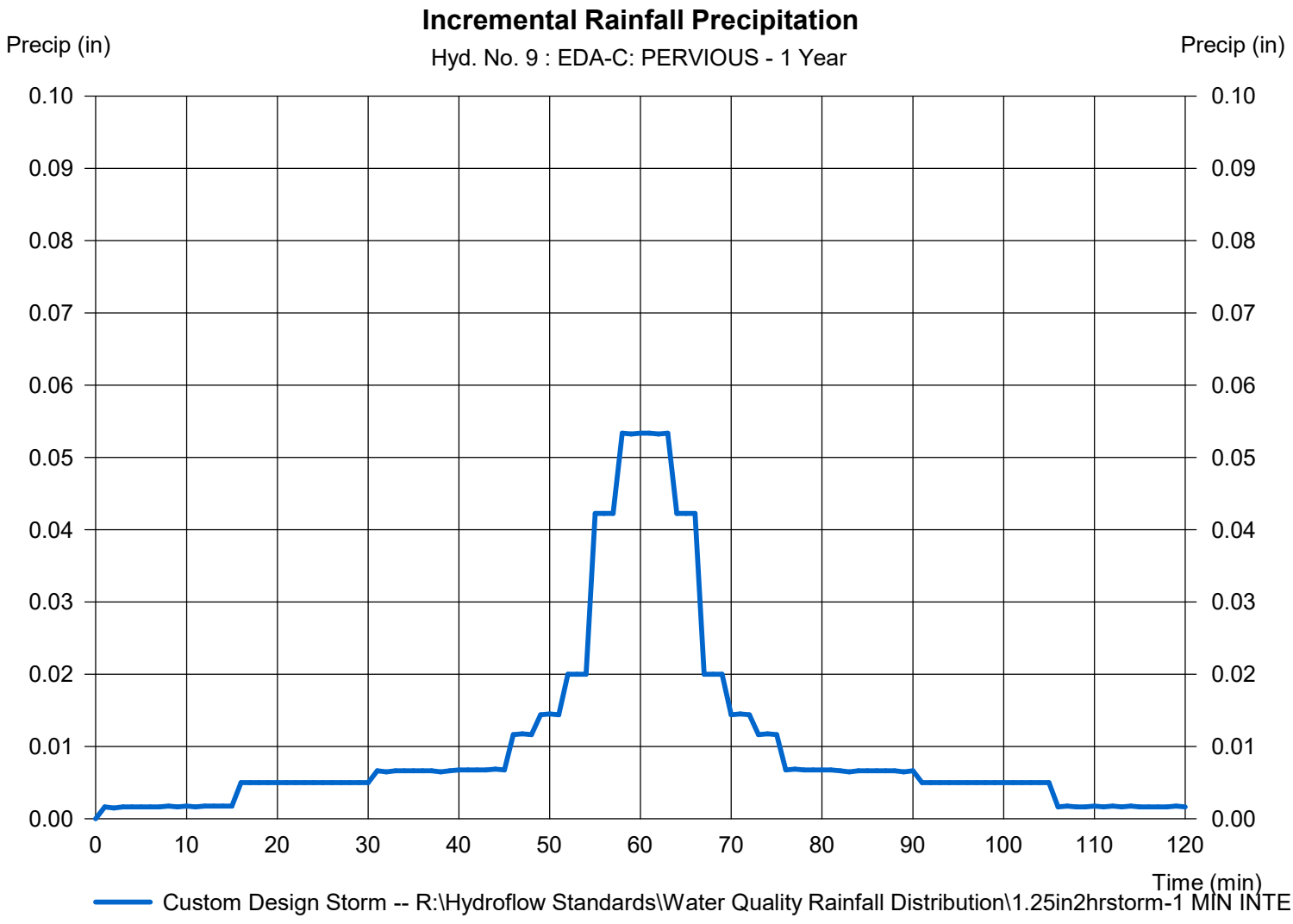
Total Travel Time, Tc ..... 12.70 min

Precipitation Report

Hyd. No. 9

EDA-C: PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

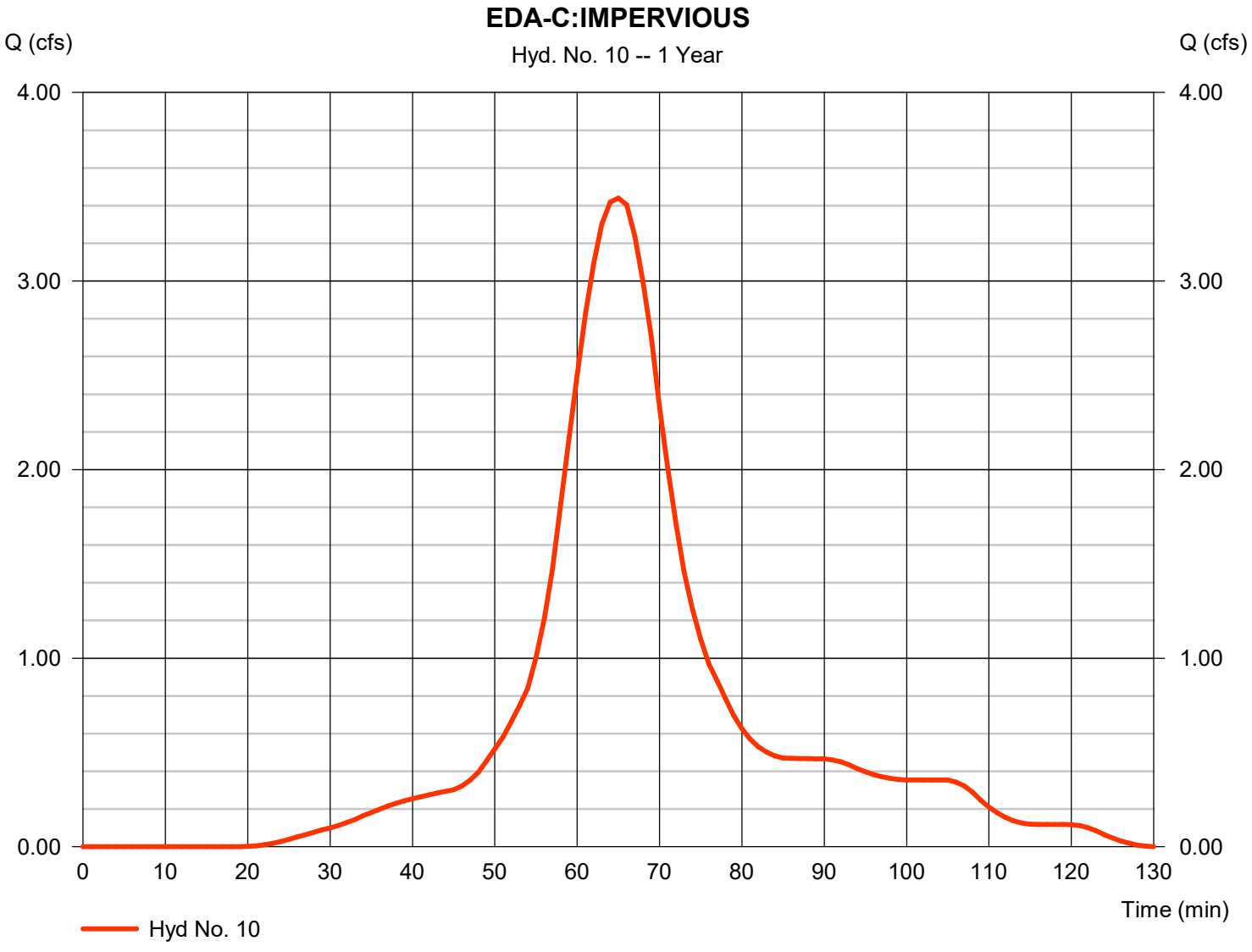


Hydrograph Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.440 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	4,493 cuft
Drainage area	=	1.160 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

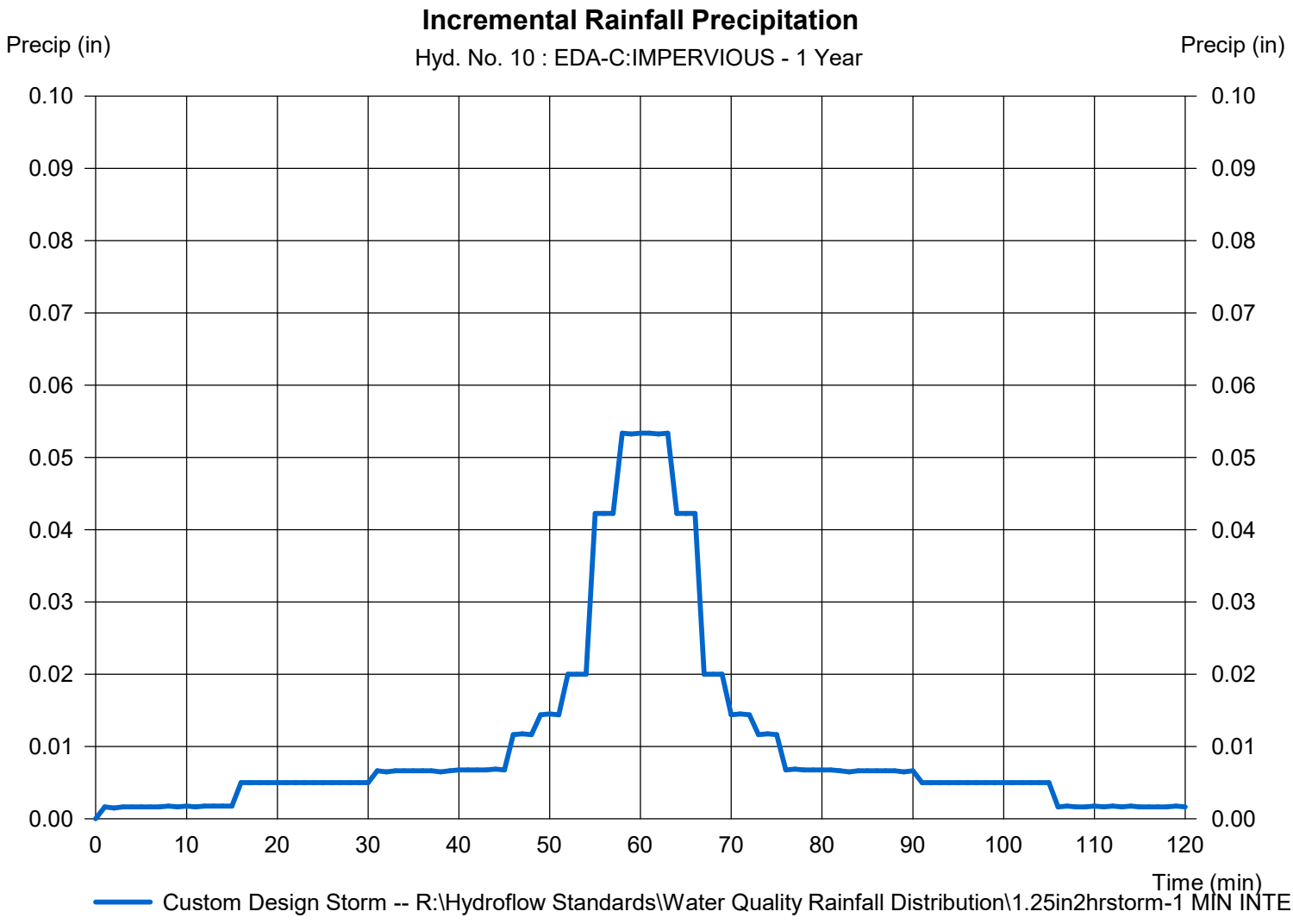


Precipitation Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

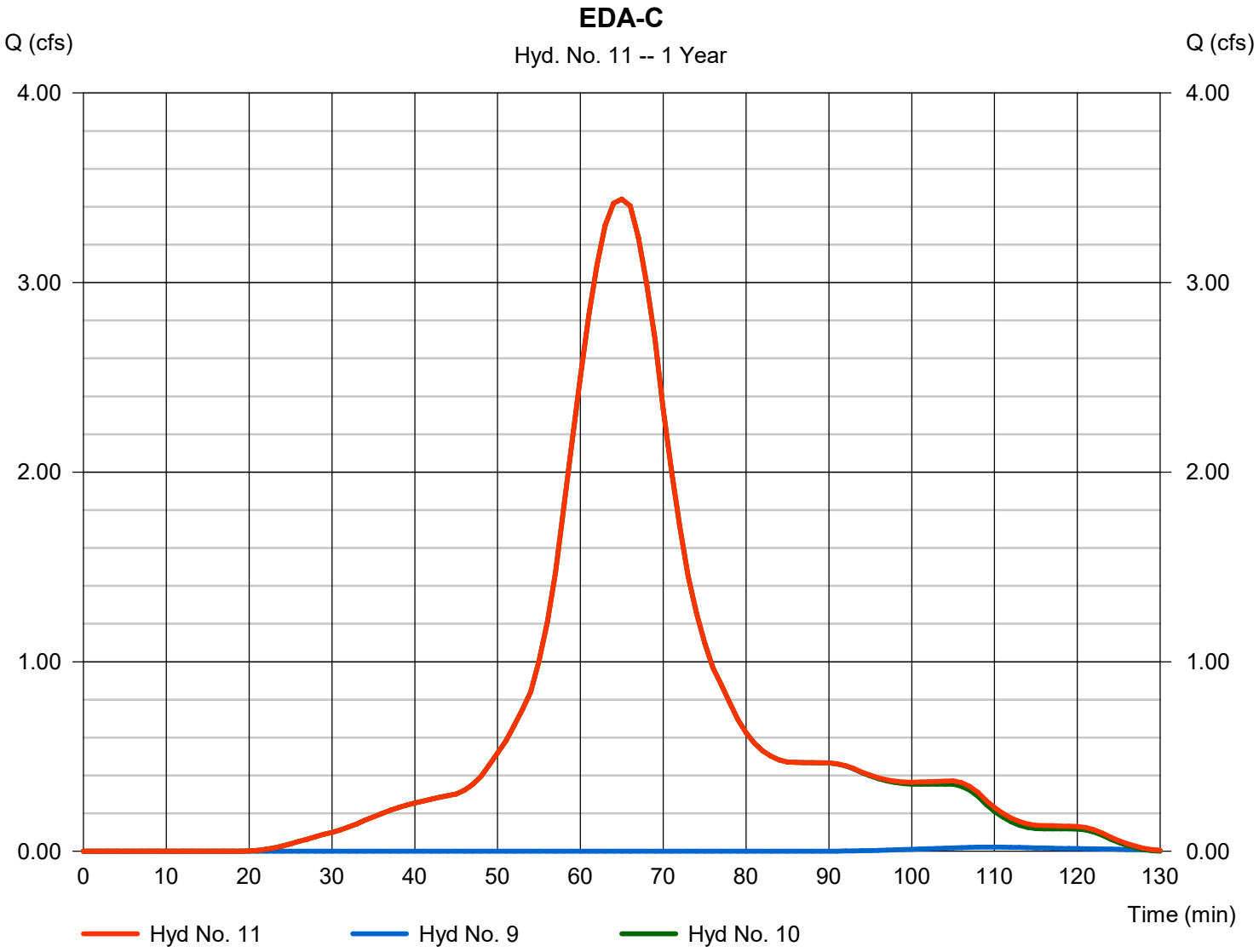


Hydrograph Report

Hyd. No. 11

EDA-C

Hydrograph type	= Combine	Peak discharge	= 3.440 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 4,523 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 4.330 ac

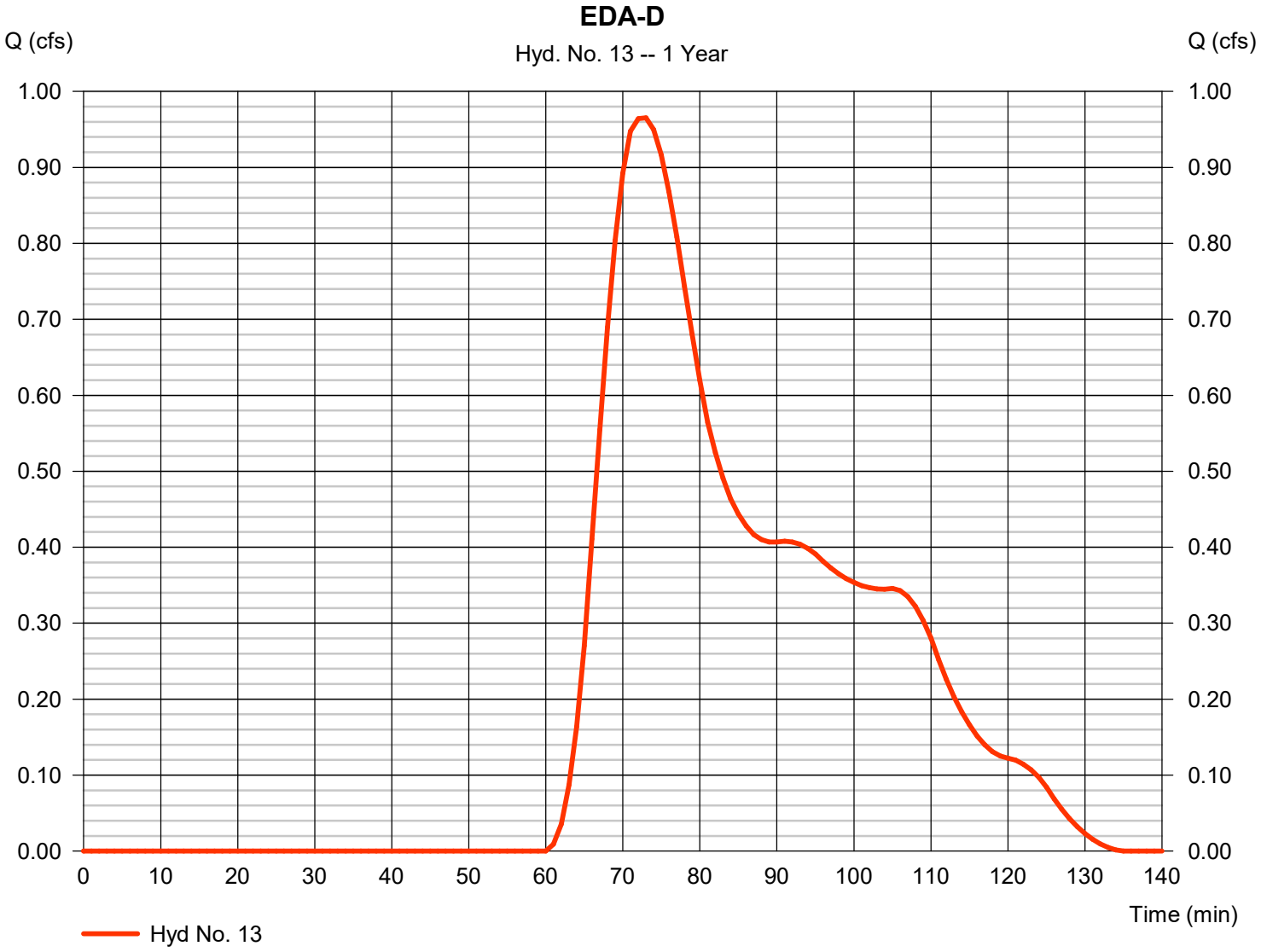


Hydrograph Report

Hyd. No. 13

EDA-D

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.965 cfs
Storm frequency	=	1 yrs	Time to peak	=	73 min
Time interval	=	1 min	Hyd. volume	=	1,594 cuft
Drainage area	=	3.760 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 13

EDA-D

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.000		0.000		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 21.20		0.00		0.00		
Travel Time (min)	**= 8.30**	**+**	**0.00**	**+**	**0.00**	**=**	**8.30**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		288.00		0.00		
Watercourse slope (%)	= 0.00		3.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		2.79		0.00		
Travel Time (min)	**= 0.00**	**+**	**1.72**	**+**	**0.00**	**=**	**1.72**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

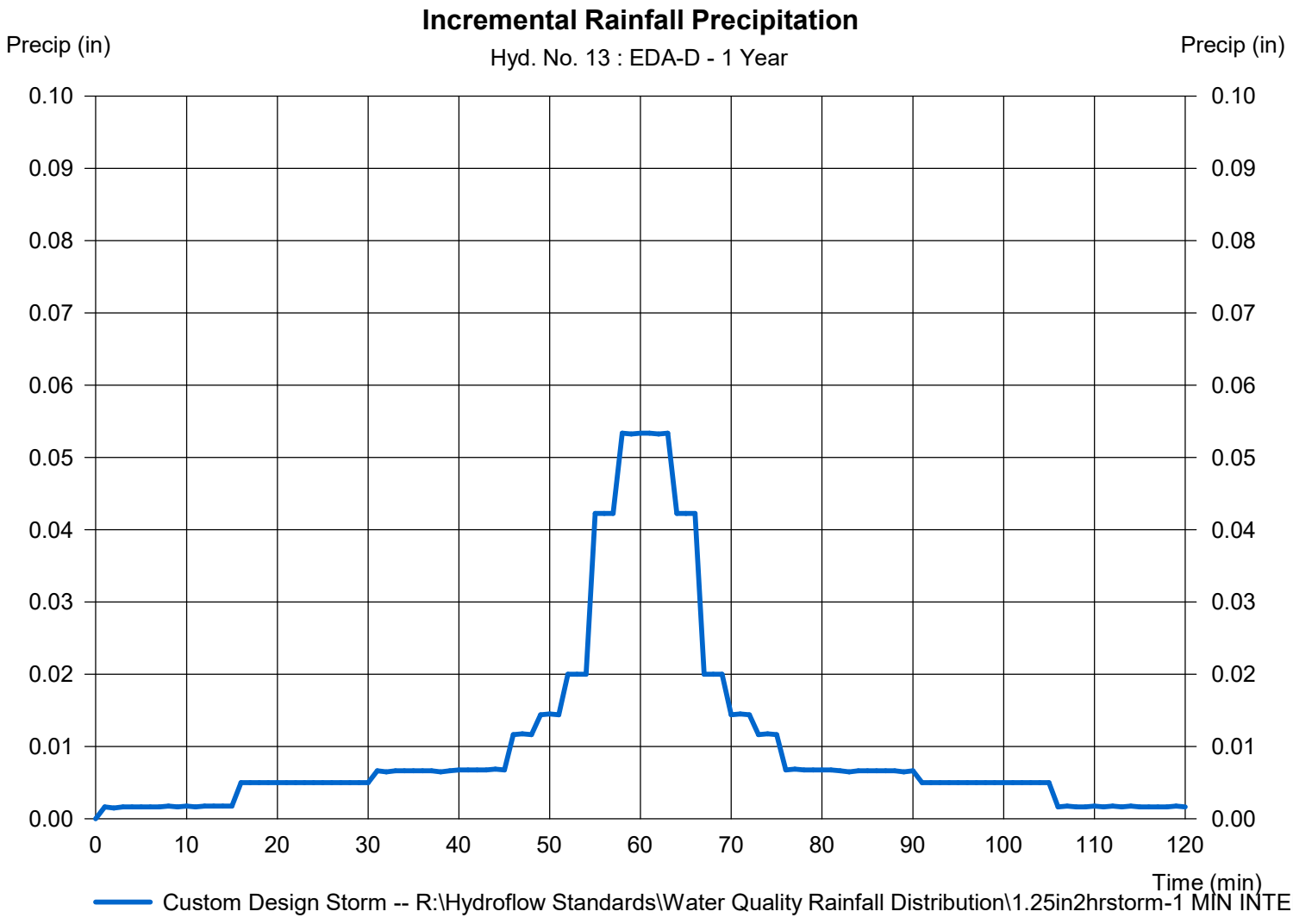
Total Travel Time, Tc ..... 10.00 min

Precipitation Report

Hyd. No. 13

EDA-D

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MIN		

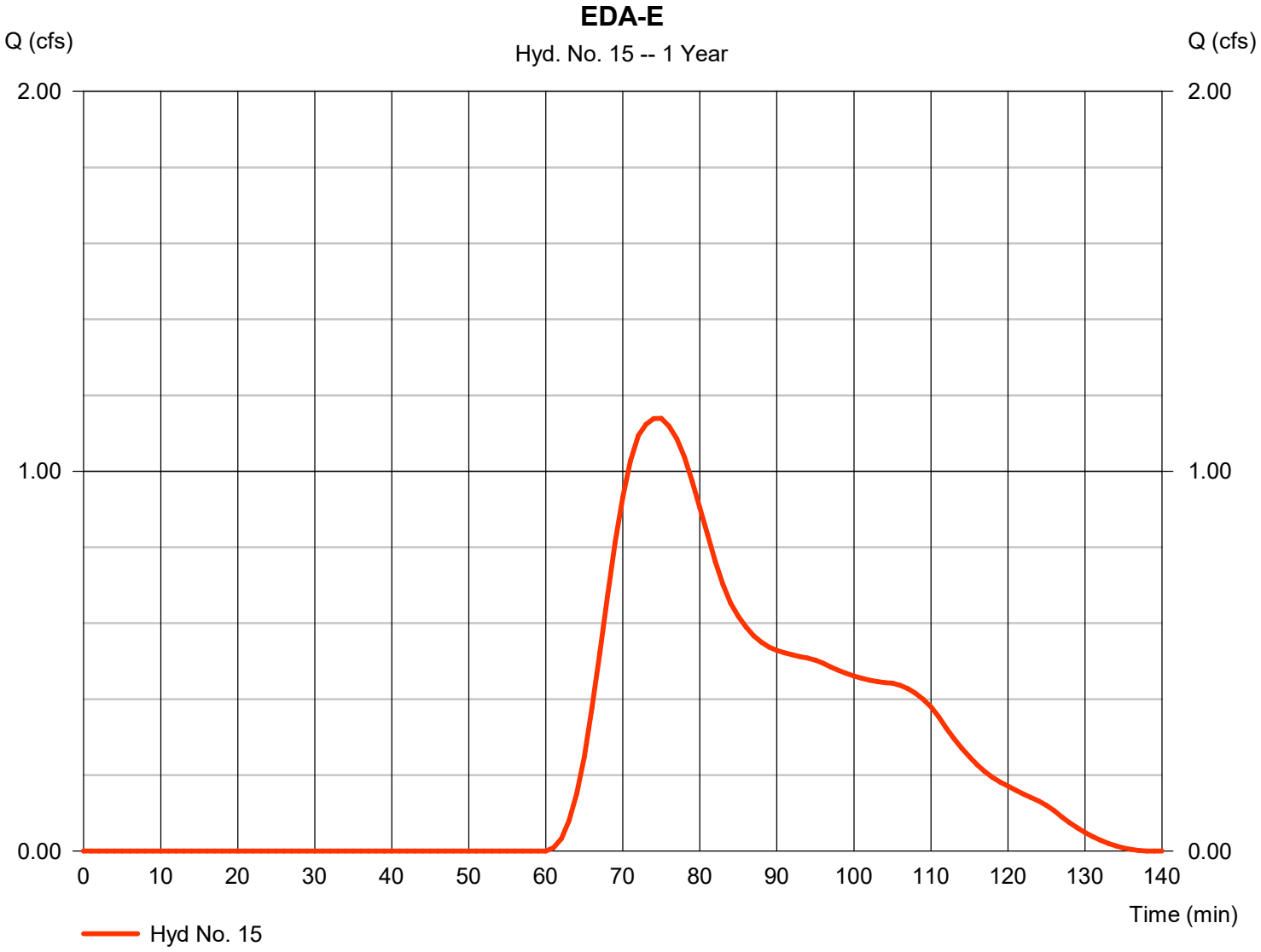


Hydrograph Report

Hyd. No. 15

EDA-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.140 cfs
Storm frequency	=	1 yrs	Time to peak	=	75 min
Time interval	=	1 min	Hyd. volume	=	2,024 cuft
Drainage area	=	4.690 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.40 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\1.25in2hrstorm-1 MIN	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 15

EDA-E

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 12.40		0.00		0.00		
Travel Time (min)	**= 10.29**	**+**	**0.00**	**+**	**0.00**	**=**	**10.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		257.00		0.00		
Watercourse slope (%)	= 0.00		5.30		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		3.71		0.00		
Travel Time (min)	**= 0.00**	**+**	**1.15**	**+**	**0.00**	**=**	**1.15**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

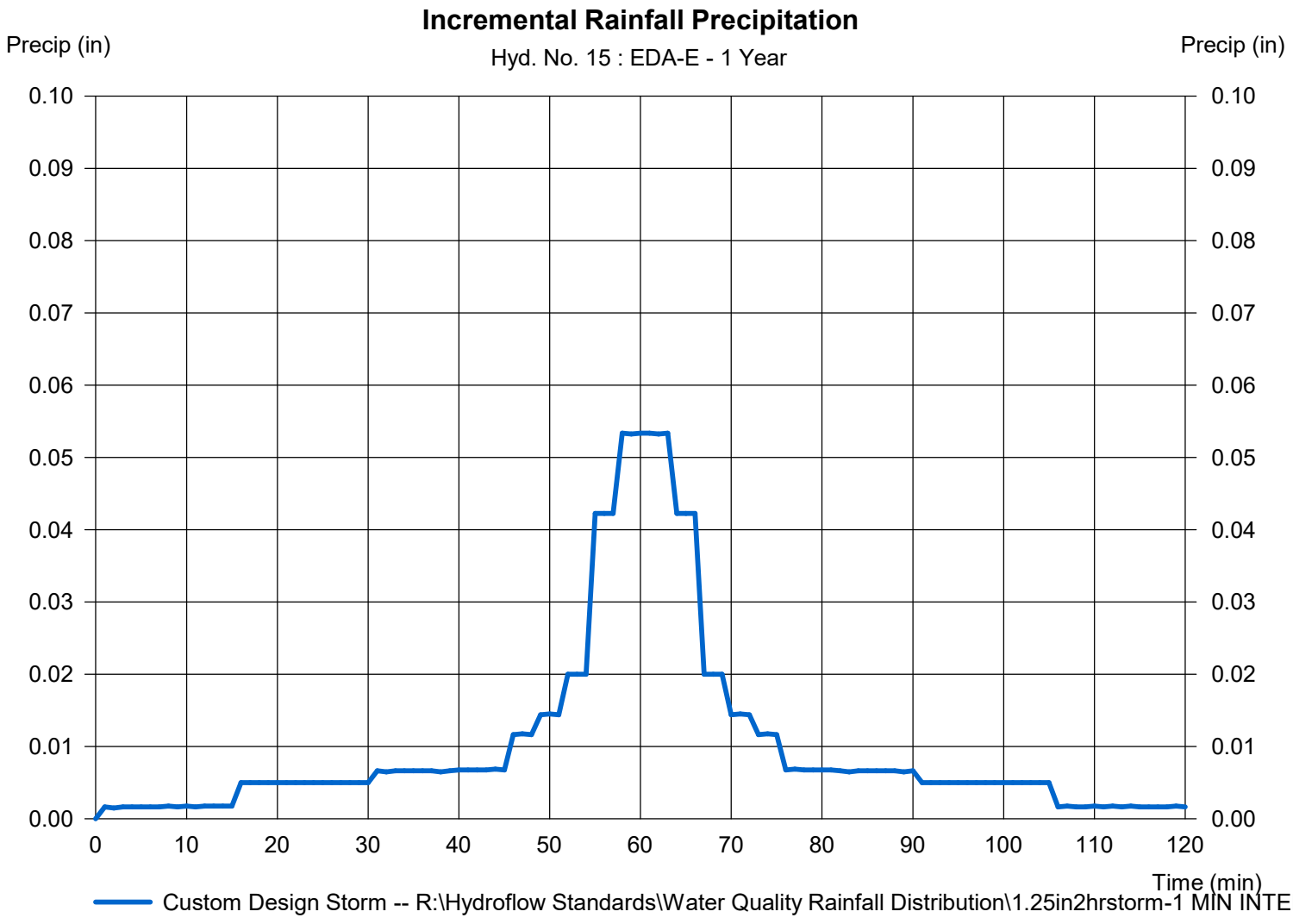
Total Travel Time, Tc ..... 11.40 min

Precipitation Report

Hyd. No. 15

EDA-E

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

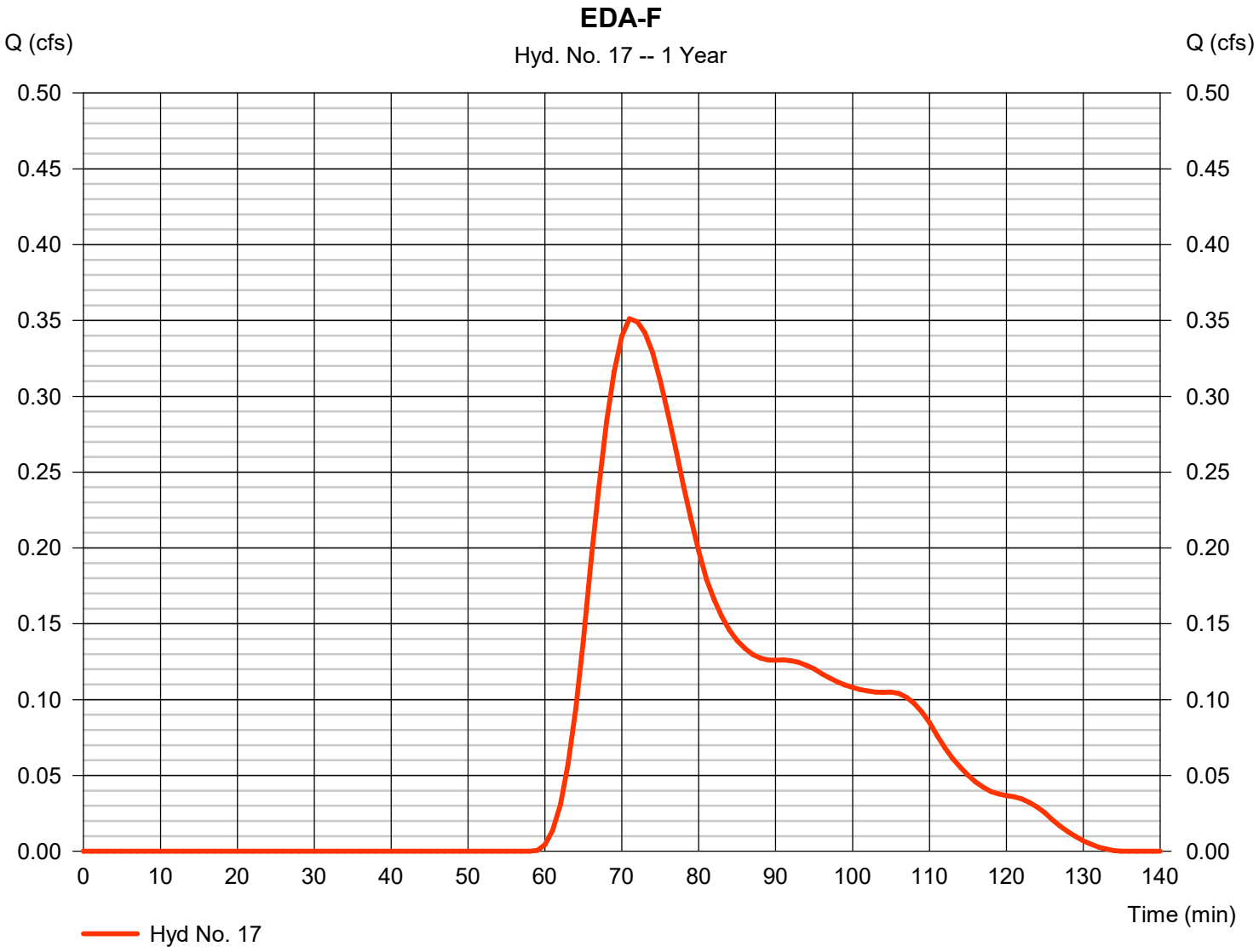


Hydrograph Report

Hyd. No. 17

EDA-F

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.351 cfs
Storm frequency	=	1 yrs	Time to peak	=	71 min
Time interval	=	1 min	Hyd. volume	=	538 cuft
Drainage area	=	0.970 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 17

EDA-F

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.240		0.011		
Flow length (ft)	= 40.0		35.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 16.30		3.50		0.00		
Travel Time (min)	**= 4.43**	**+**	**4.90**	**+**	**0.00**	**=**	**9.33**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		62.00		0.00		
Watercourse slope (%)	= 0.00		1.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		1.61		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.64**	**+**	**0.00**	**=**	**0.64**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

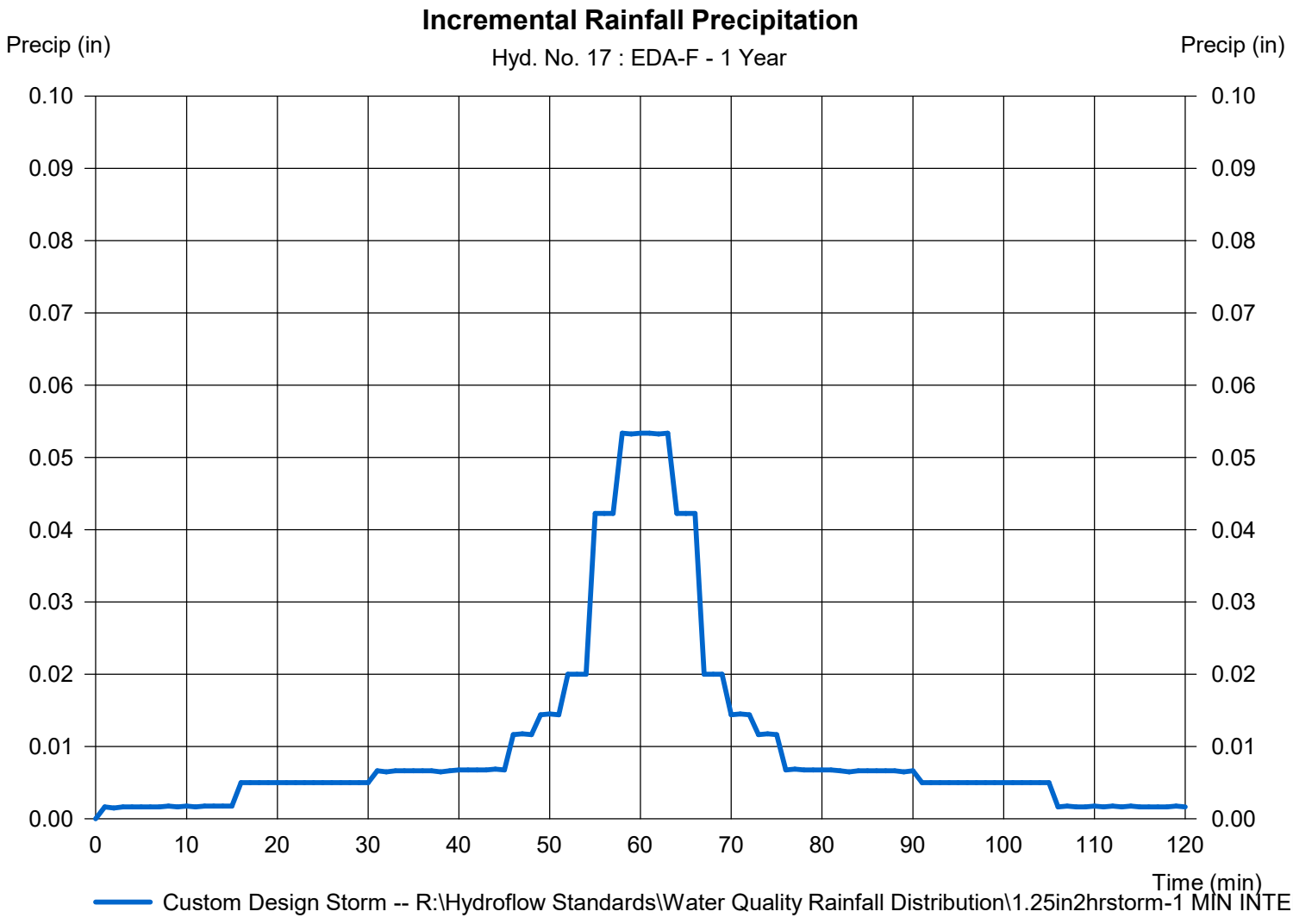
Total Travel Time, Tc ..... 10.00 min

Precipitation Report

Hyd. No. 17

EDA-F

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		



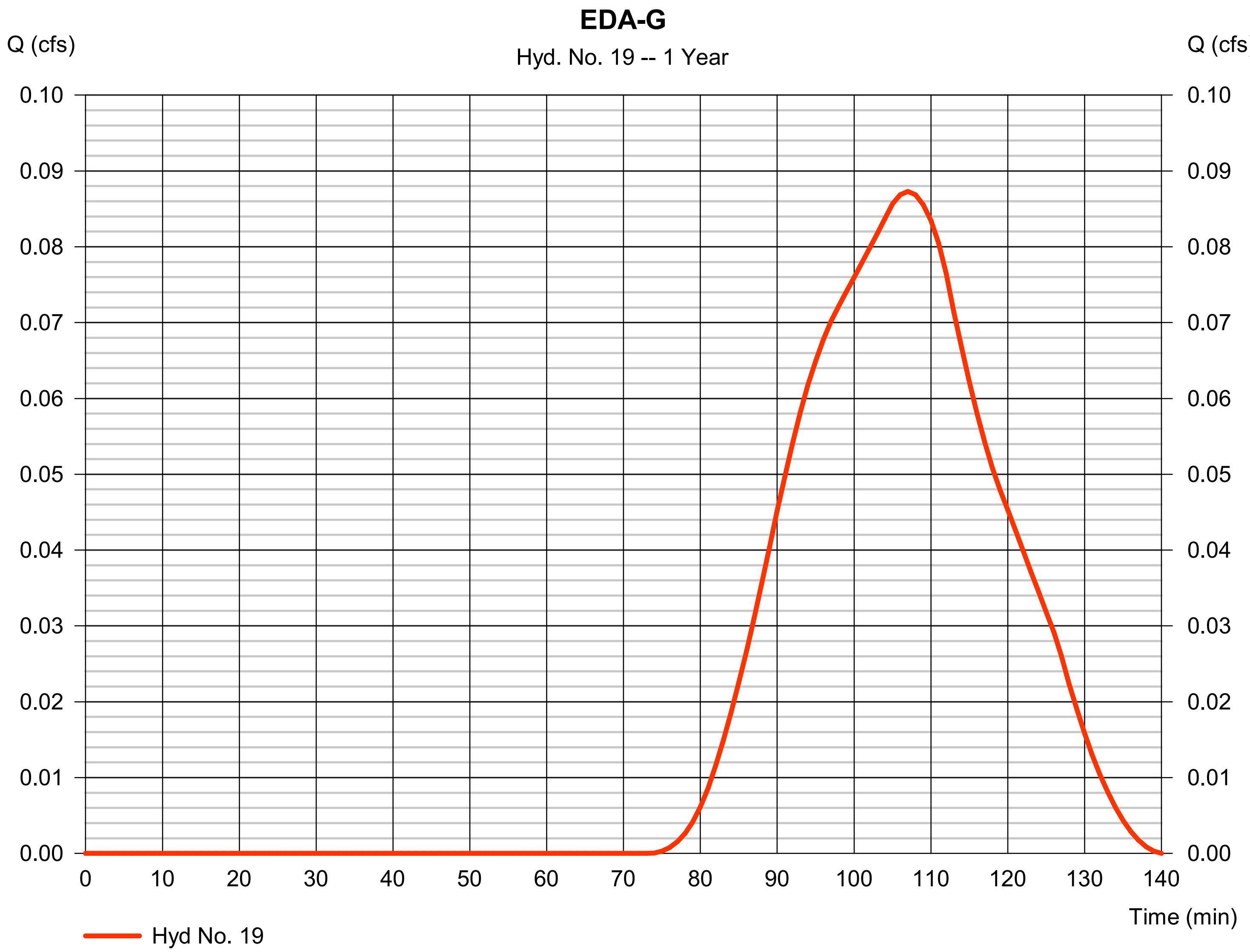
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 19

EDA-G

Hydrograph type	= SCS Runoff	Peak discharge	= 0.087 cfs
Storm frequency	= 1 yrs	Time to peak	= 107 min
Time interval	= 1 min	Hyd. volume	= 163 cuft
Drainage area	= 5.080 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.60 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\WaterQualityRainfall Distribution 1.25in2hrstorm-1 MIN	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 19

EDA-G

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 10.50		0.00		0.00		
Travel Time (min)	**= 10.99**	**+**	**0.00**	**+**	**0.00**	**=**	**10.99**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		159.00		276.00		
Watercourse slope (%)	= 0.00		12.20		6.70		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		5.64		4.18		
Travel Time (min)	**= 0.00**	**+**	**0.47**	**+**	**1.10**	**=**	**1.57**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

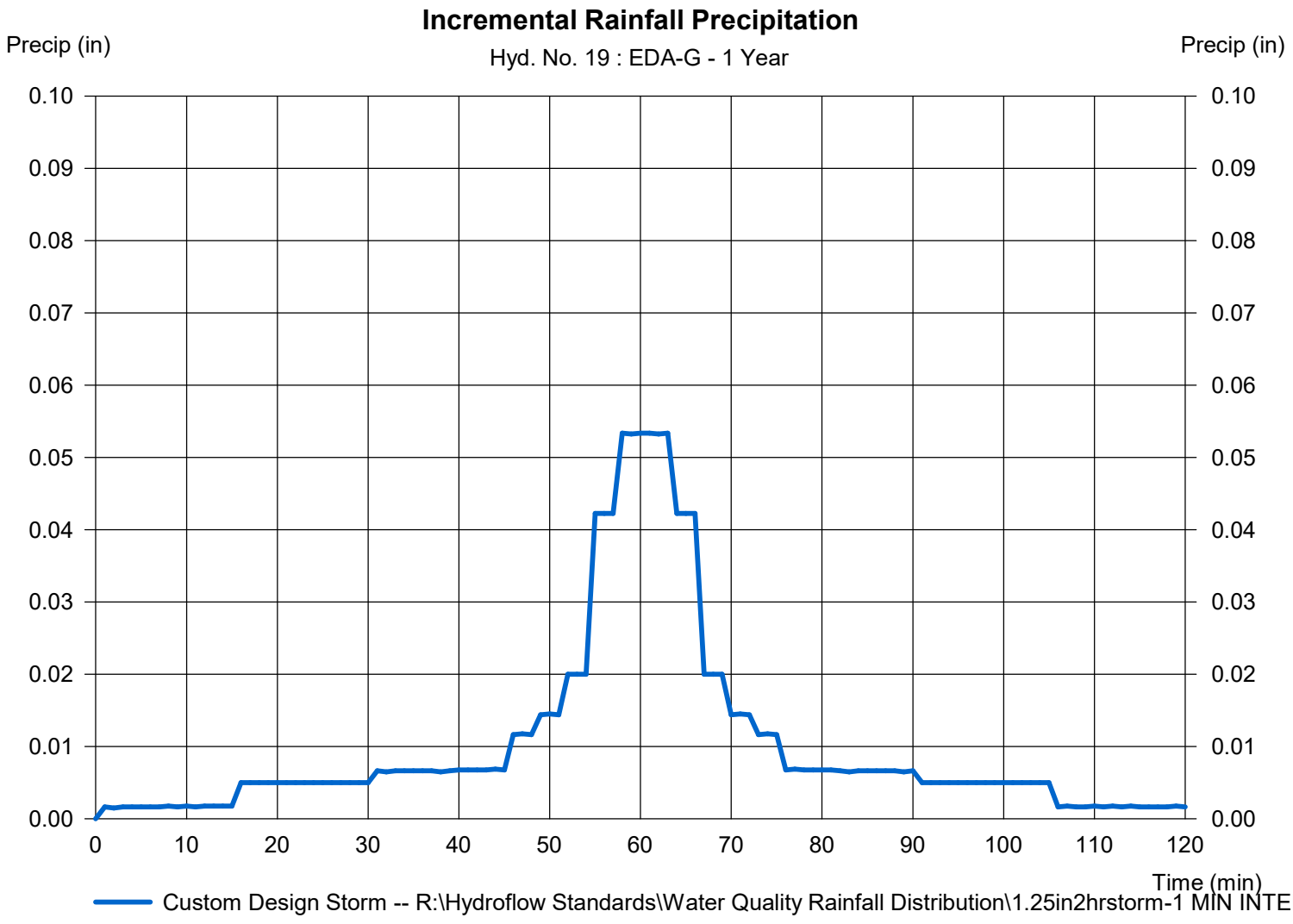
Total Travel Time, Tc ..... 12.60 min

Precipitation Report

Hyd. No. 19

EDA-G

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		



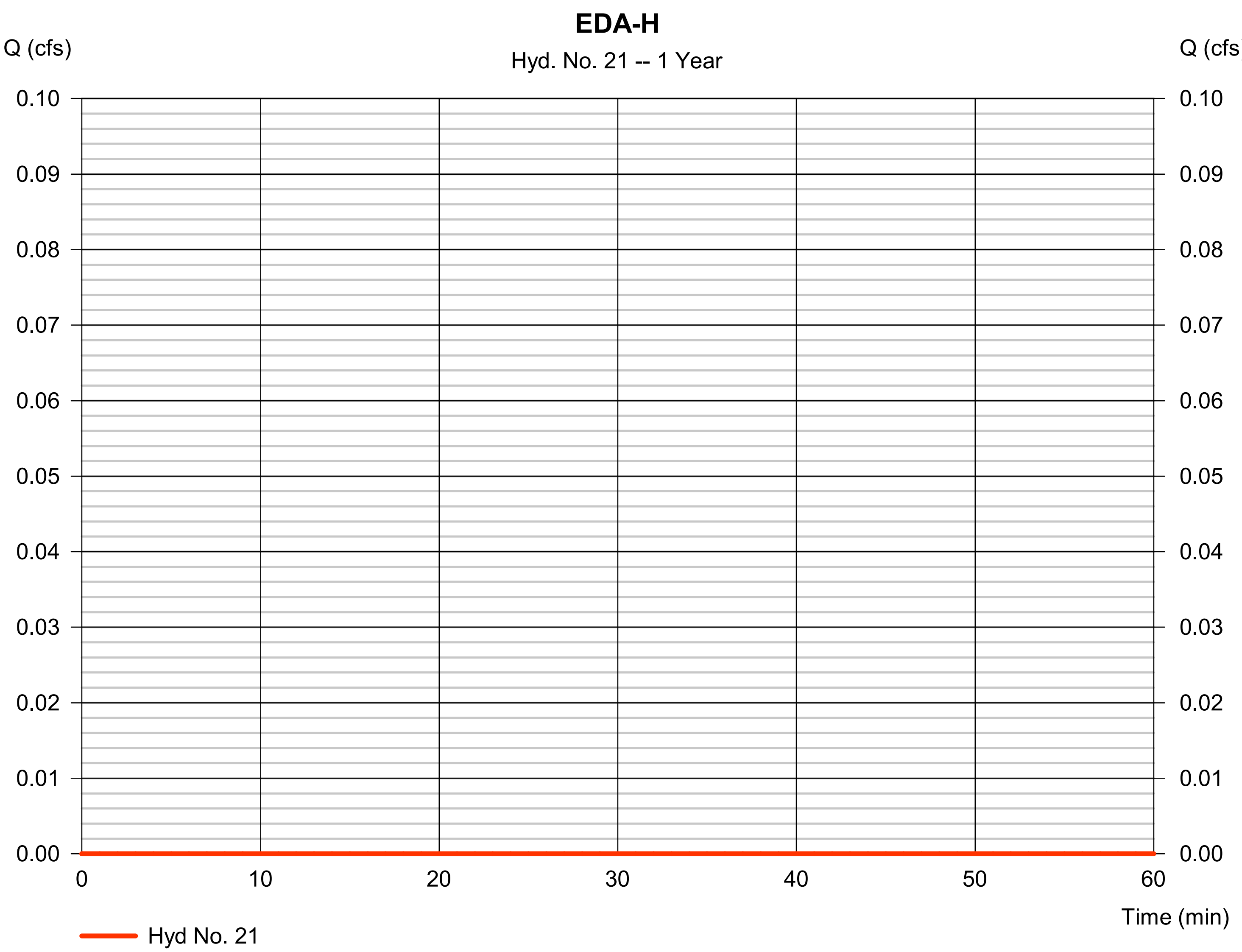
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 21

EDA-H

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 12.920 ac	Curve number	= 36
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 33.50 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution 1.25in2hrstorm-1 MIN	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 21

EDA-H

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.150		0.011		
Flow length (ft)	= 32.0		68.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 3.00		0.10		0.00		
Travel Time (min)	**= 7.29**	**+**	**23.71**	**+**	**0.00**	**=**	**31.00**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		452.00		
Watercourse slope (%)	= 0.00		0.00		3.40		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.00		2.98		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**2.53**	**=**	**2.53**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

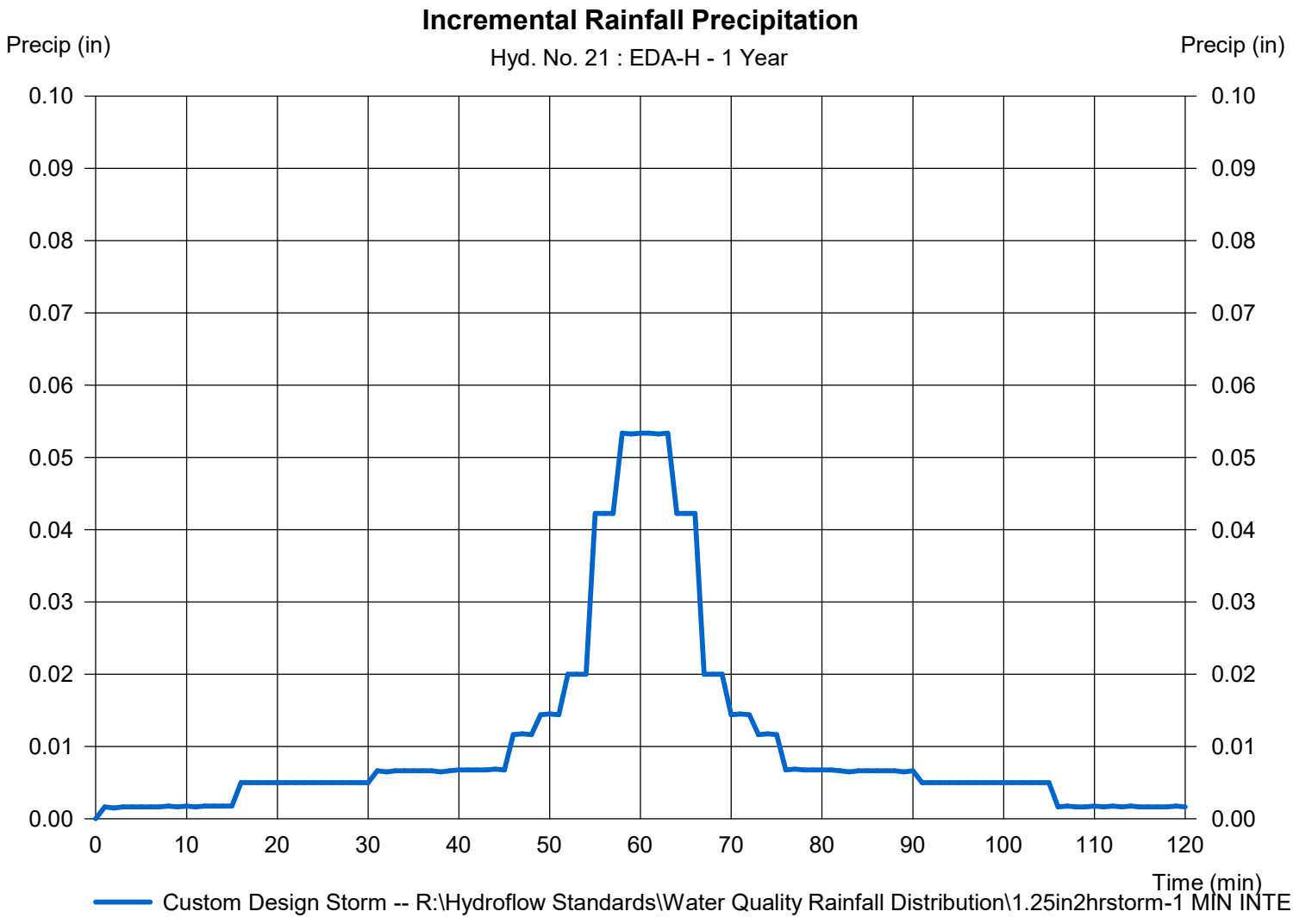
Total Travel Time, Tc ..... 33.50 min

Precipitation Report

Hyd. No. 21

EDA-H

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		



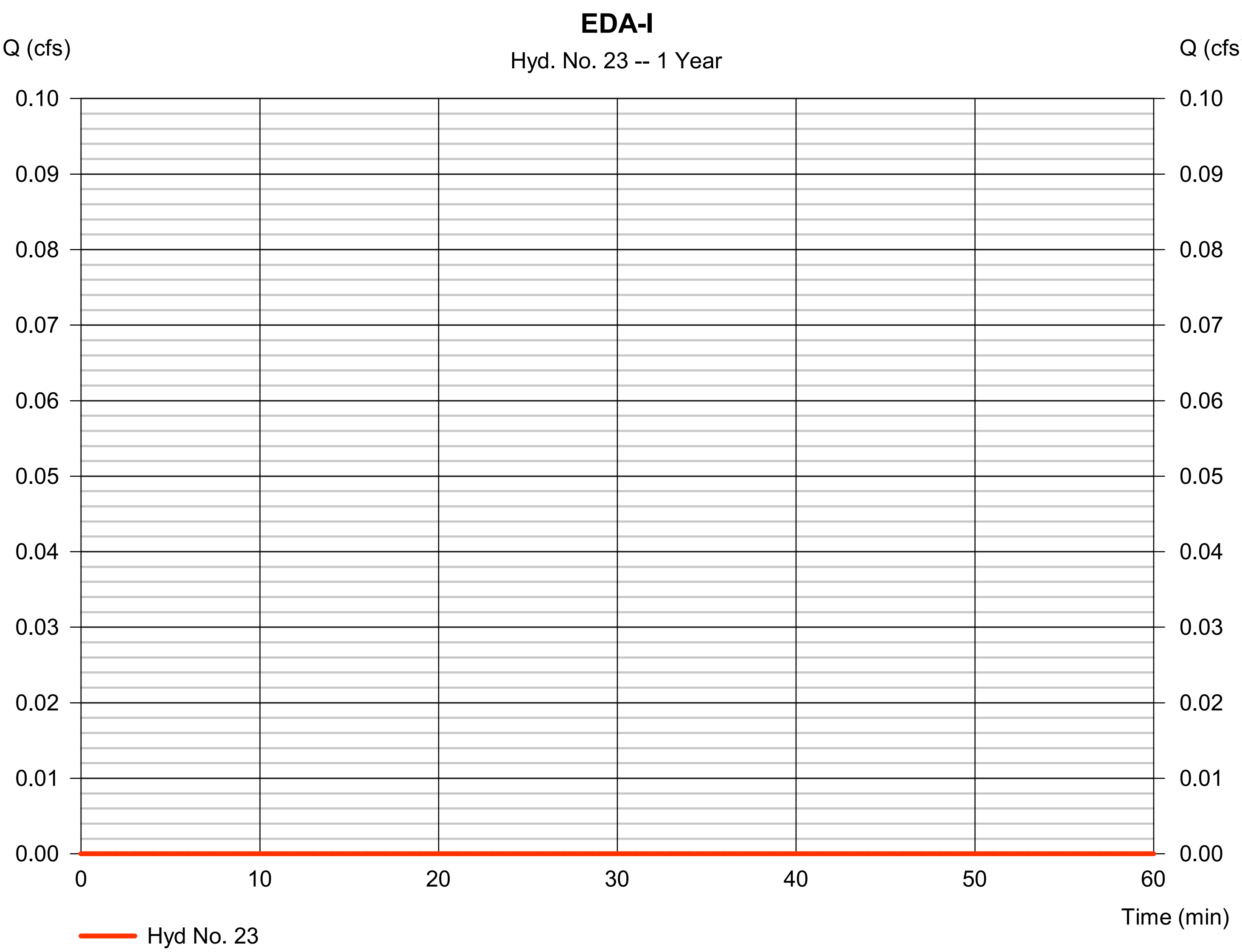
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Monday, 11 / 2 / 2020

Hyd. No. 23

EDA-I

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 1.100 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 22.10 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution 1.25in2hrstorm-1 MIN	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 23

EDA-I

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 1.90		0.00		0.00		
Travel Time (min)	**= 21.78**	**+**	**0.00**	**+**	**0.00**	**=**	**21.78**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		97.00		0.00		
Watercourse slope (%)	= 0.00		13.80		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		5.99		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.27**	**+**	**0.00**	**=**	**0.27**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

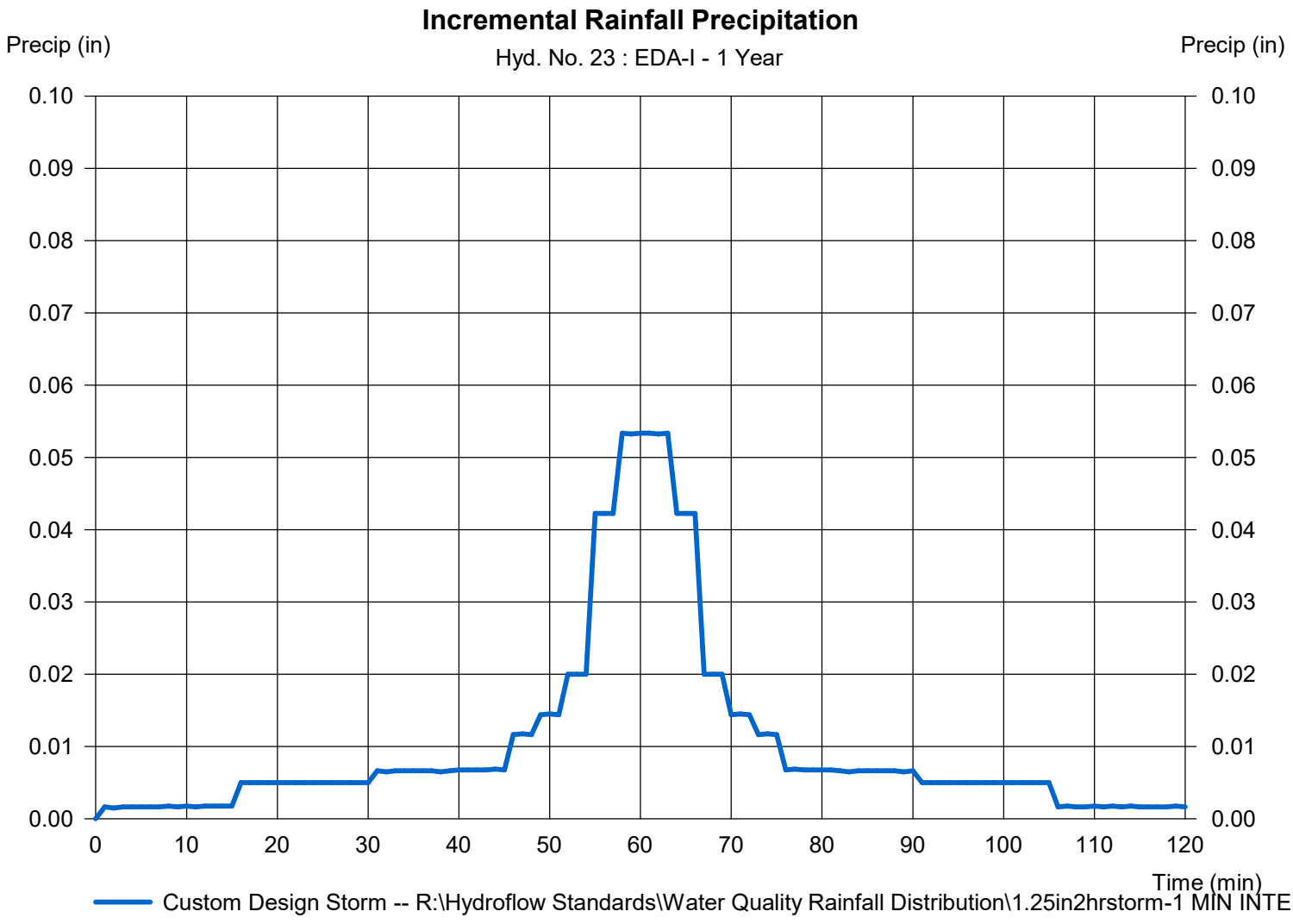
Total Travel Time, Tc ..... 22.10 min

Precipitation Report

Hyd. No. 23

EDA-I

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

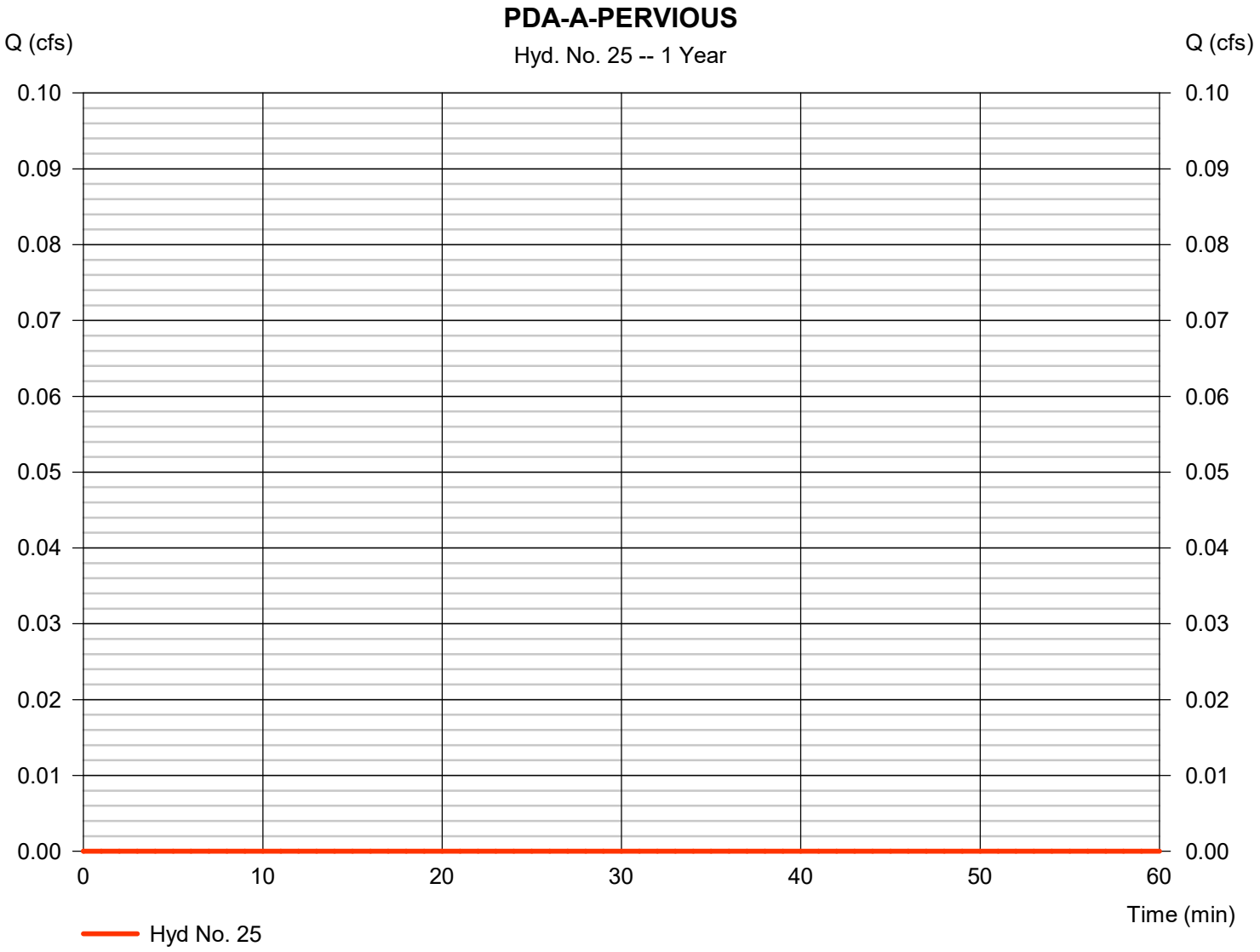


Hydrograph Report

Hyd. No. 25

PDA-A-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 2.030 ac	Curve number	= 9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	= 484

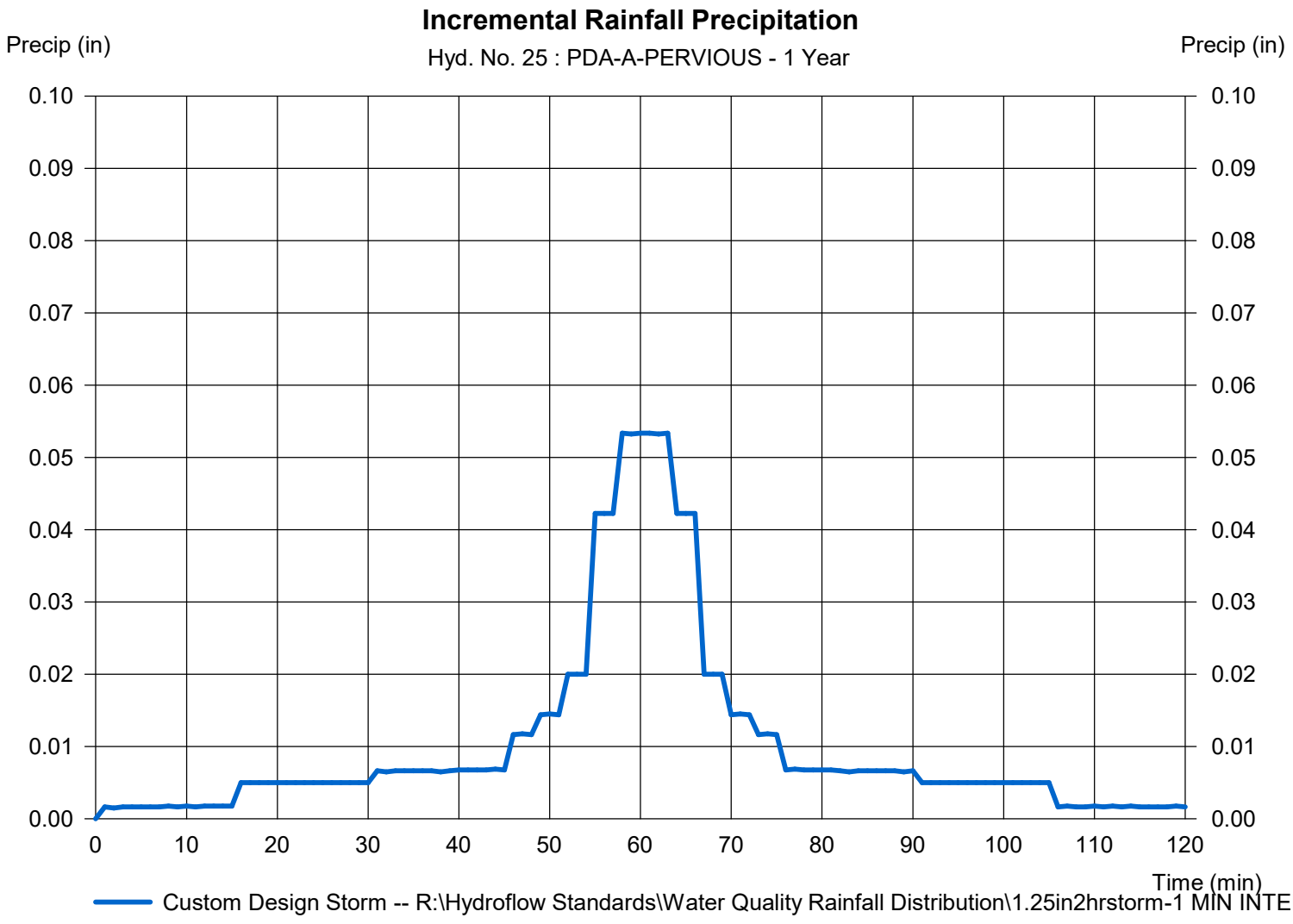


Precipitation Report

Hyd. No. 25

PDA-A-PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

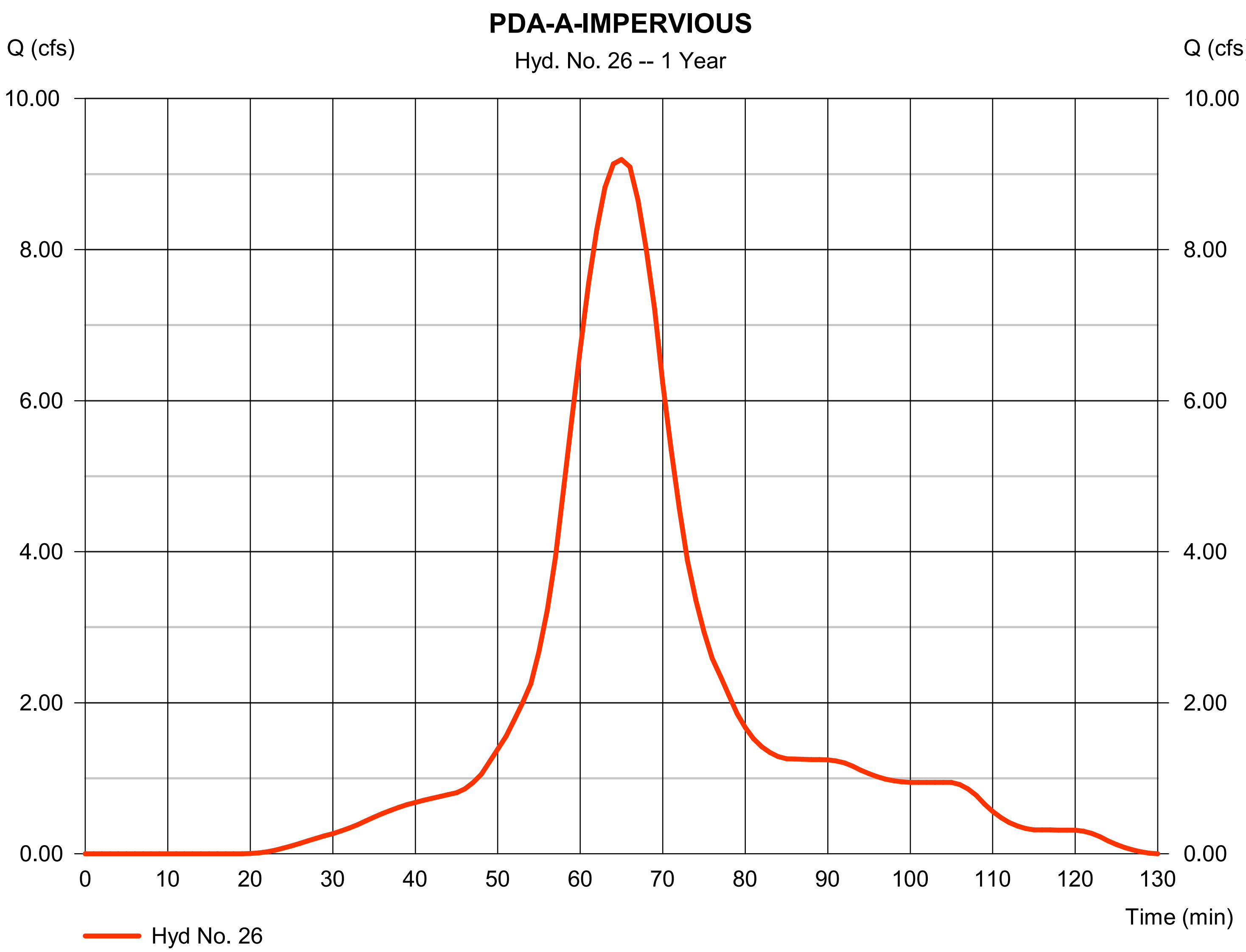


Hydrograph Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 9.194 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 12,006 cuft
Drainage area	= 3.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution.1.25in2hrstorm-1 MIN	Shape factor	= 484

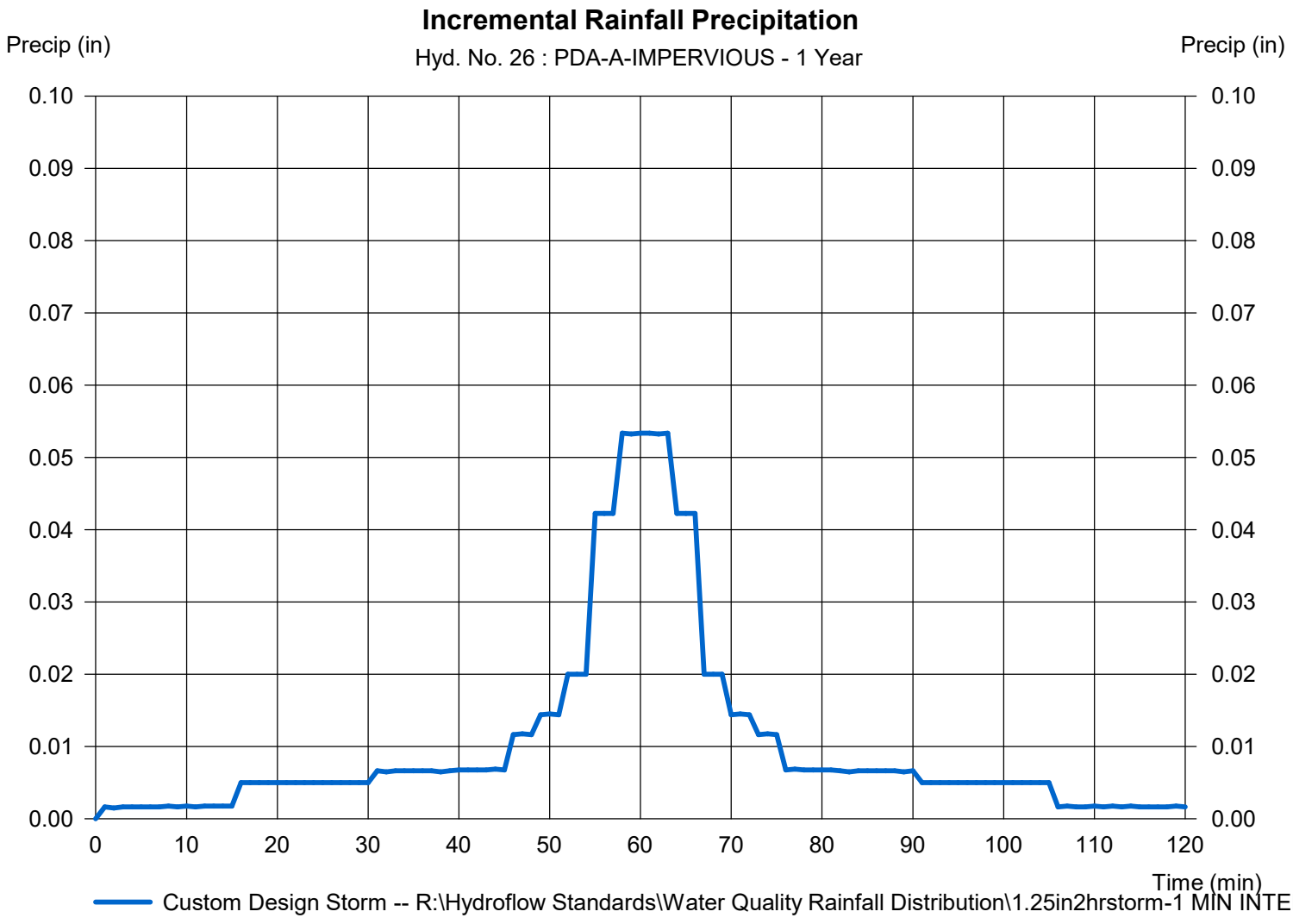


Precipitation Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

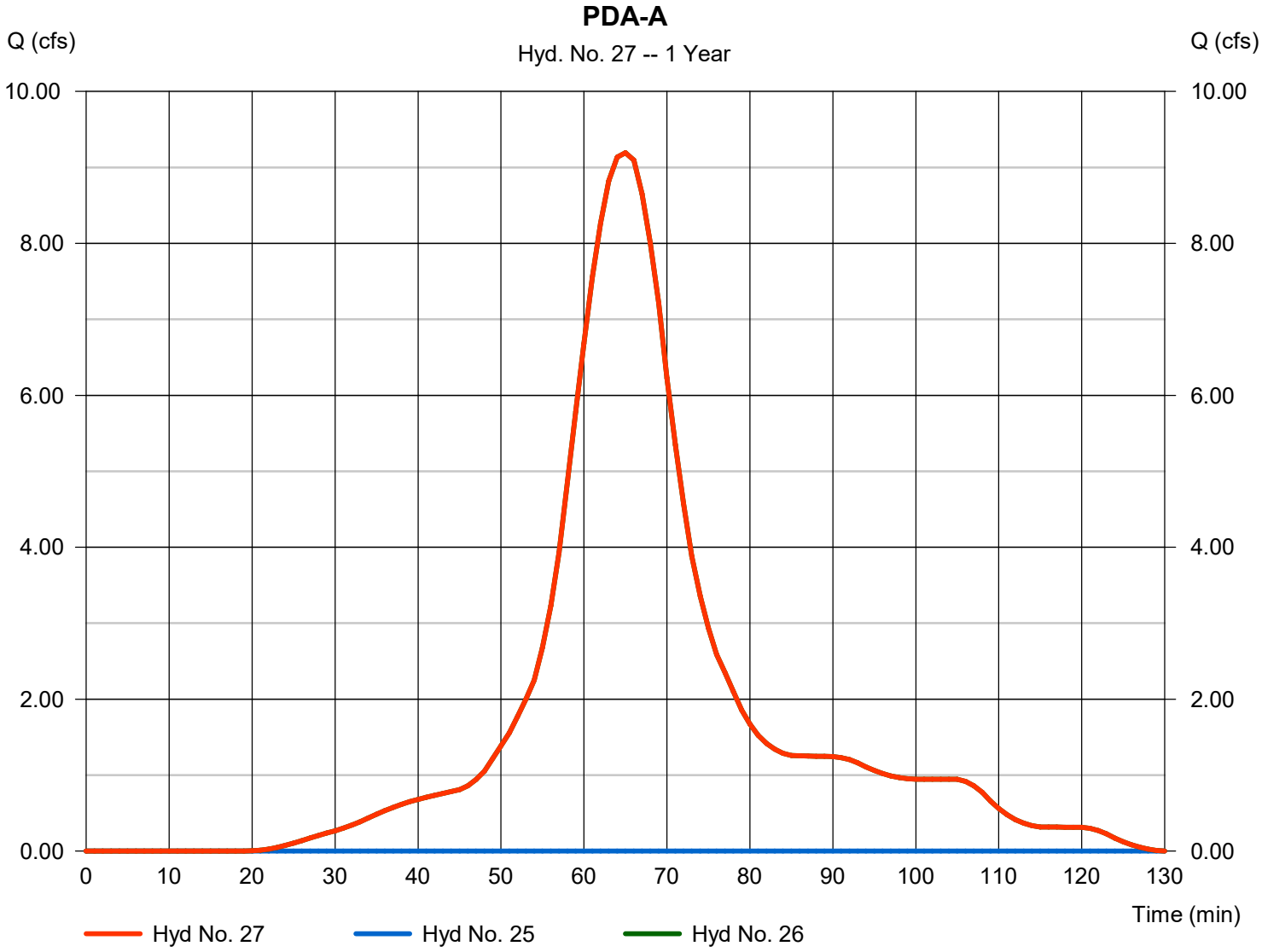


Hydrograph Report

Hyd. No. 27

PDA-A

Hydrograph type	= Combine	Peak discharge	= 9.194 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 12,006 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 5.130 ac



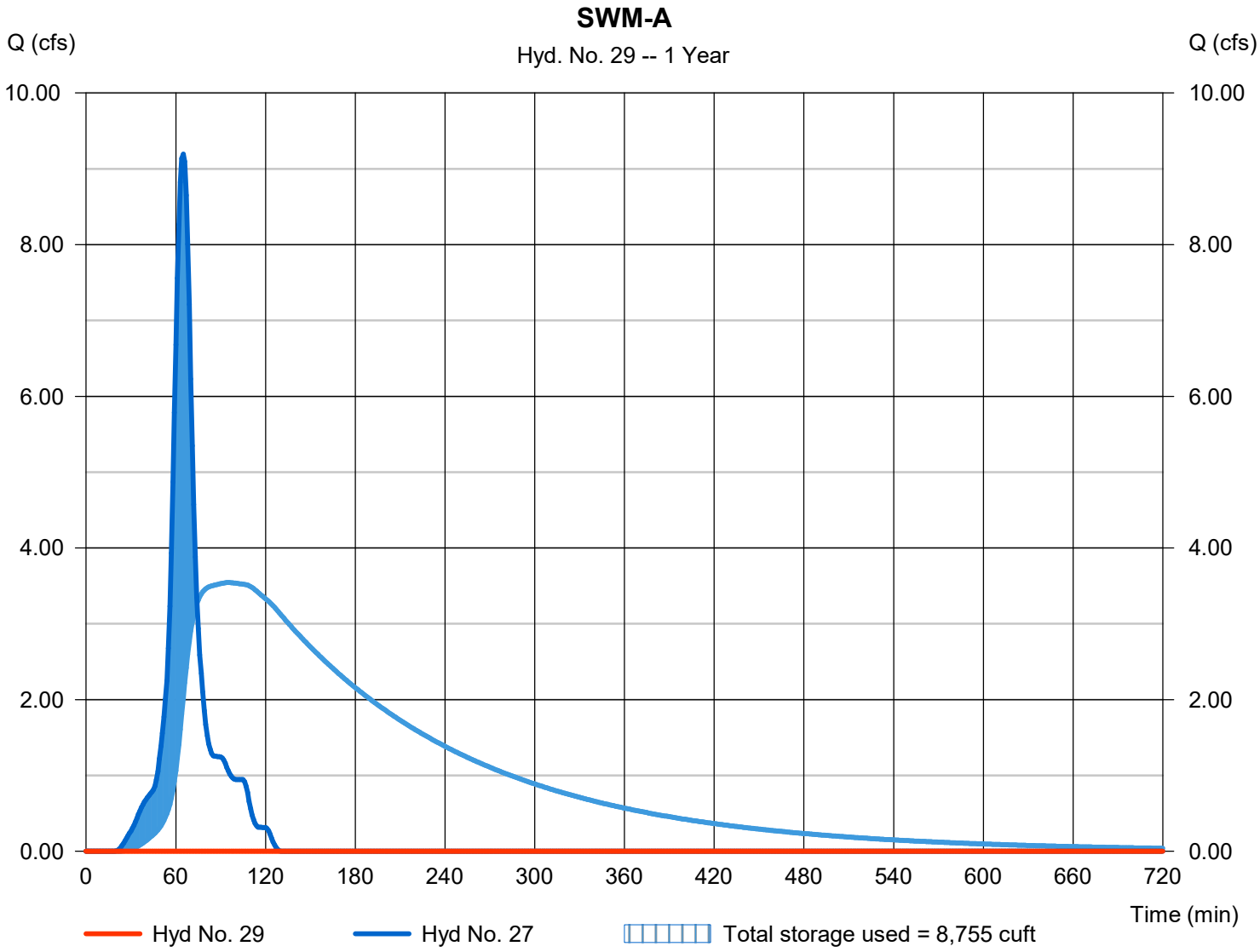
Hydrograph Report

Hyd. No. 29

SWM-A

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	68 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	27 - PDA-A	Max. Elevation	=	592.76 ft
Reservoir name	=	SWM-A	Max. Storage	=	8,755 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 1 - SWM-A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 592.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	592.00	10,637	0	0
1.00	593.00	12,473	11,542	11,542
2.00	594.00	14,370	13,409	24,951
3.00	595.00	16,330	15,338	40,289
4.00	596.00	18,354	17,330	57,619
5.00	597.00	20,441	19,386	77,006

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

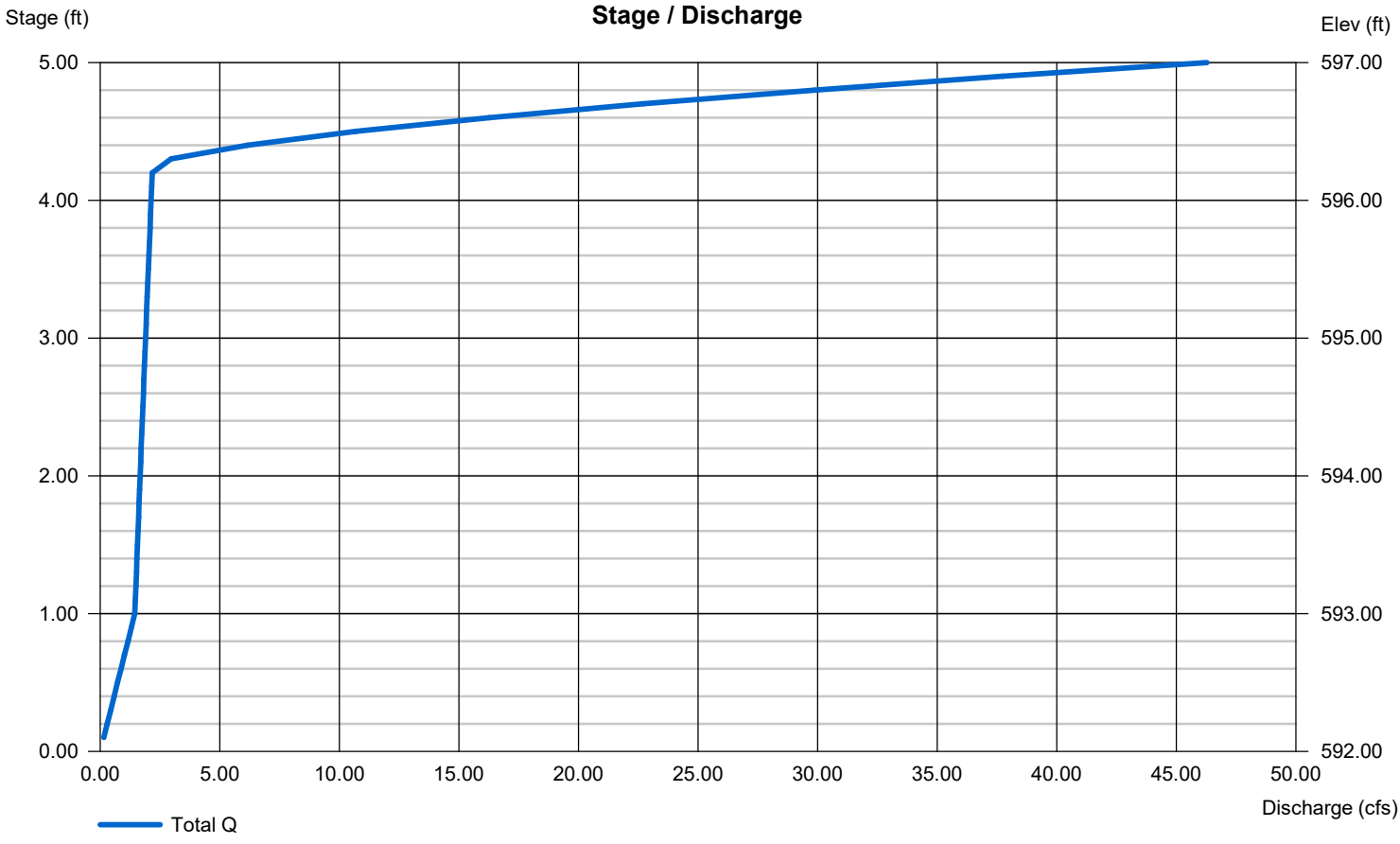
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 26.00	0.00	0.00	0.00
Crest El. (ft)	= 596.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

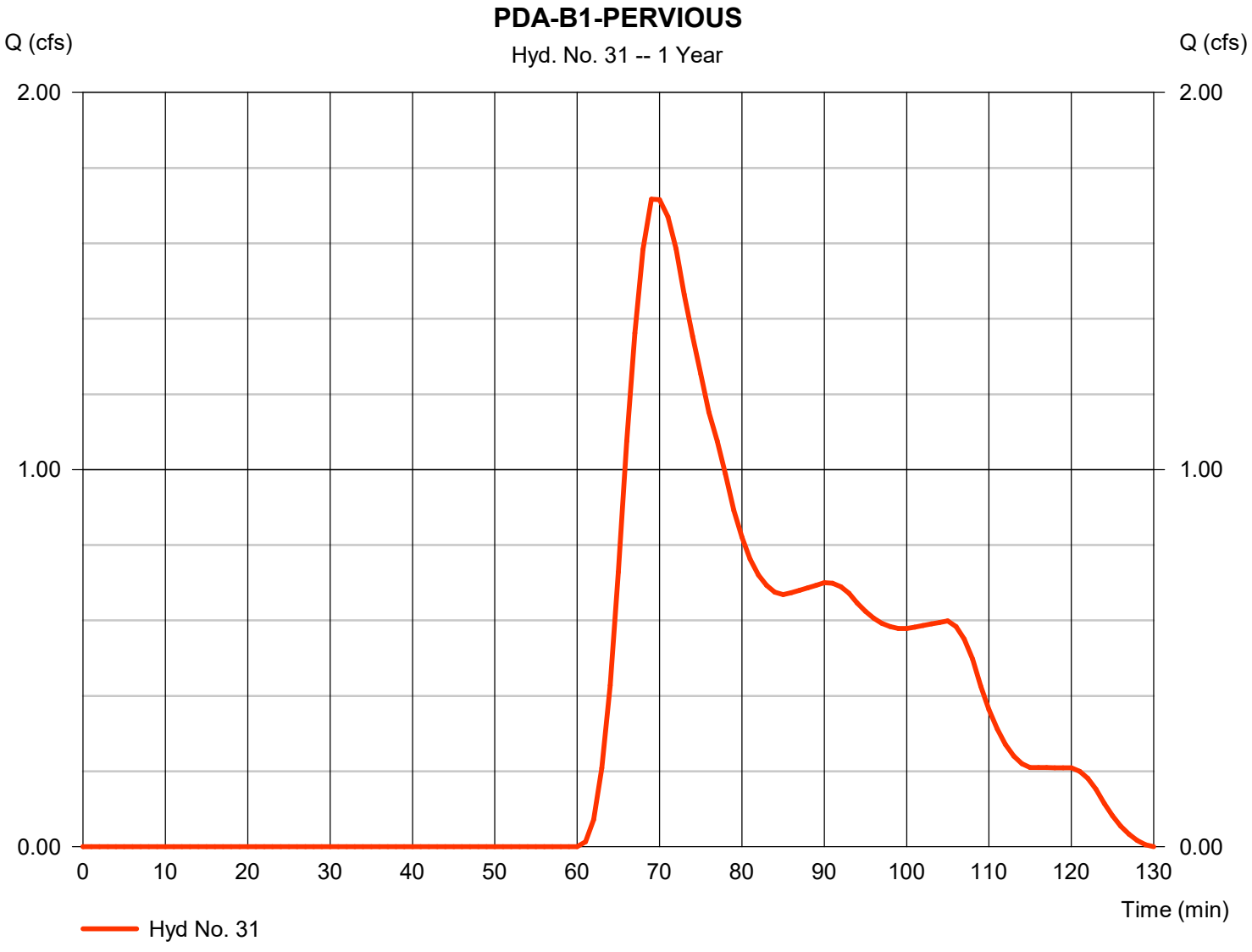


Hydrograph Report

Hyd. No. 31

PDA-B1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.717 cfs
Storm frequency	=	1 yrs	Time to peak	=	69 min
Time interval	=	1 min	Hyd. volume	=	2,574 cuft
Drainage area	=	6.790 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

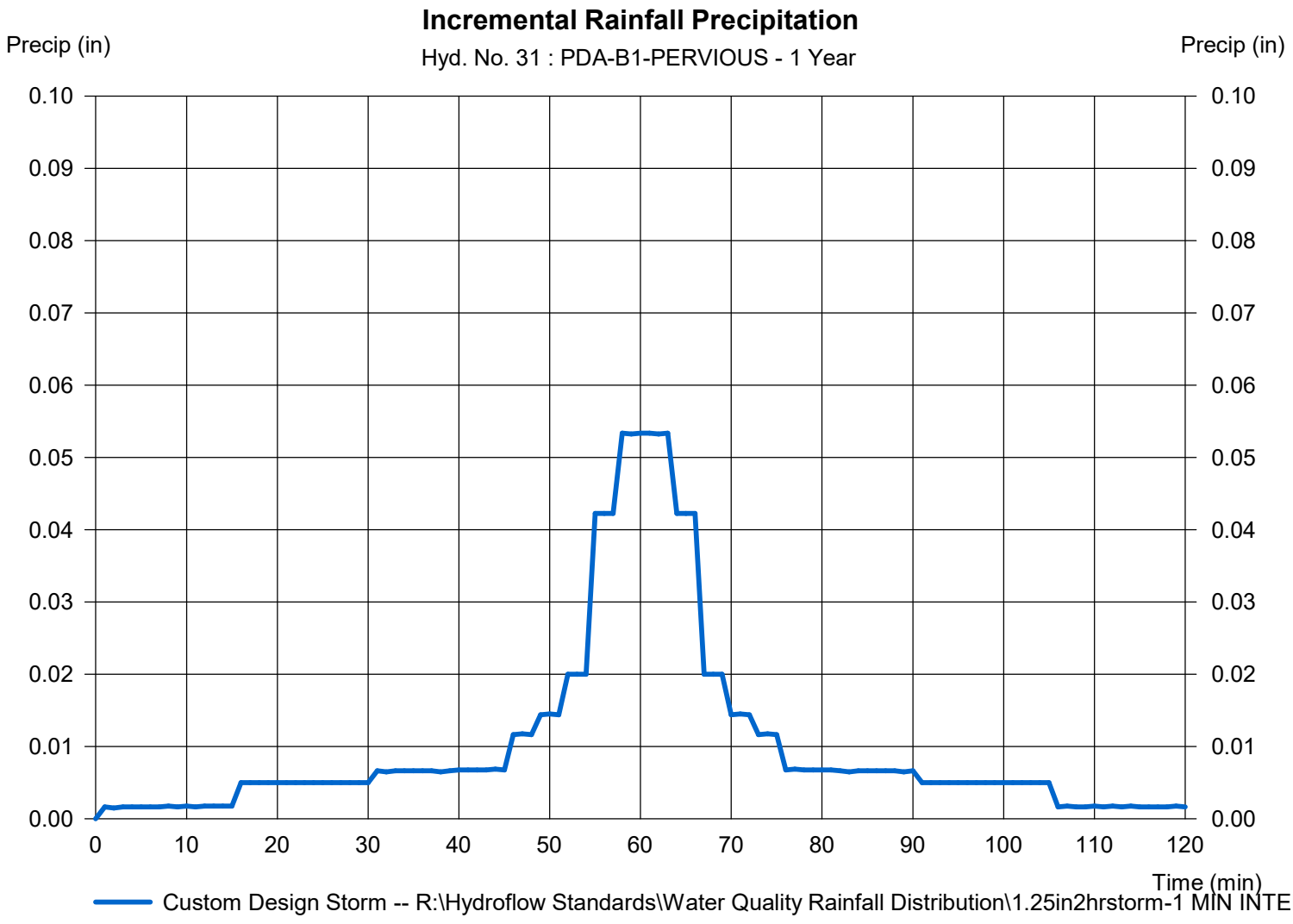


Precipitation Report

Hyd. No. 31

PDA-B1-PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

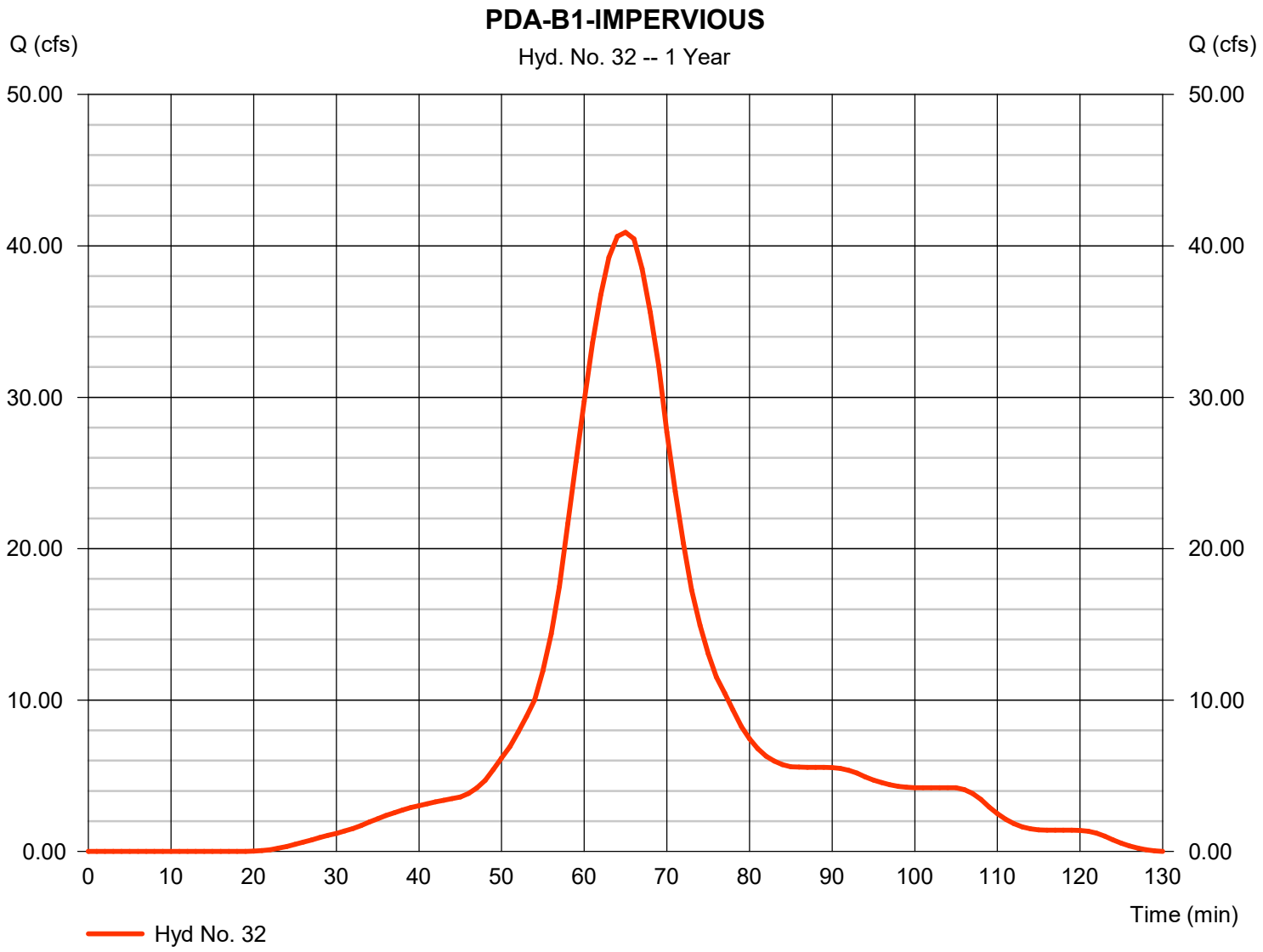


Hydrograph Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	40.90 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	53,407 cuft
Drainage area	=	13.790 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

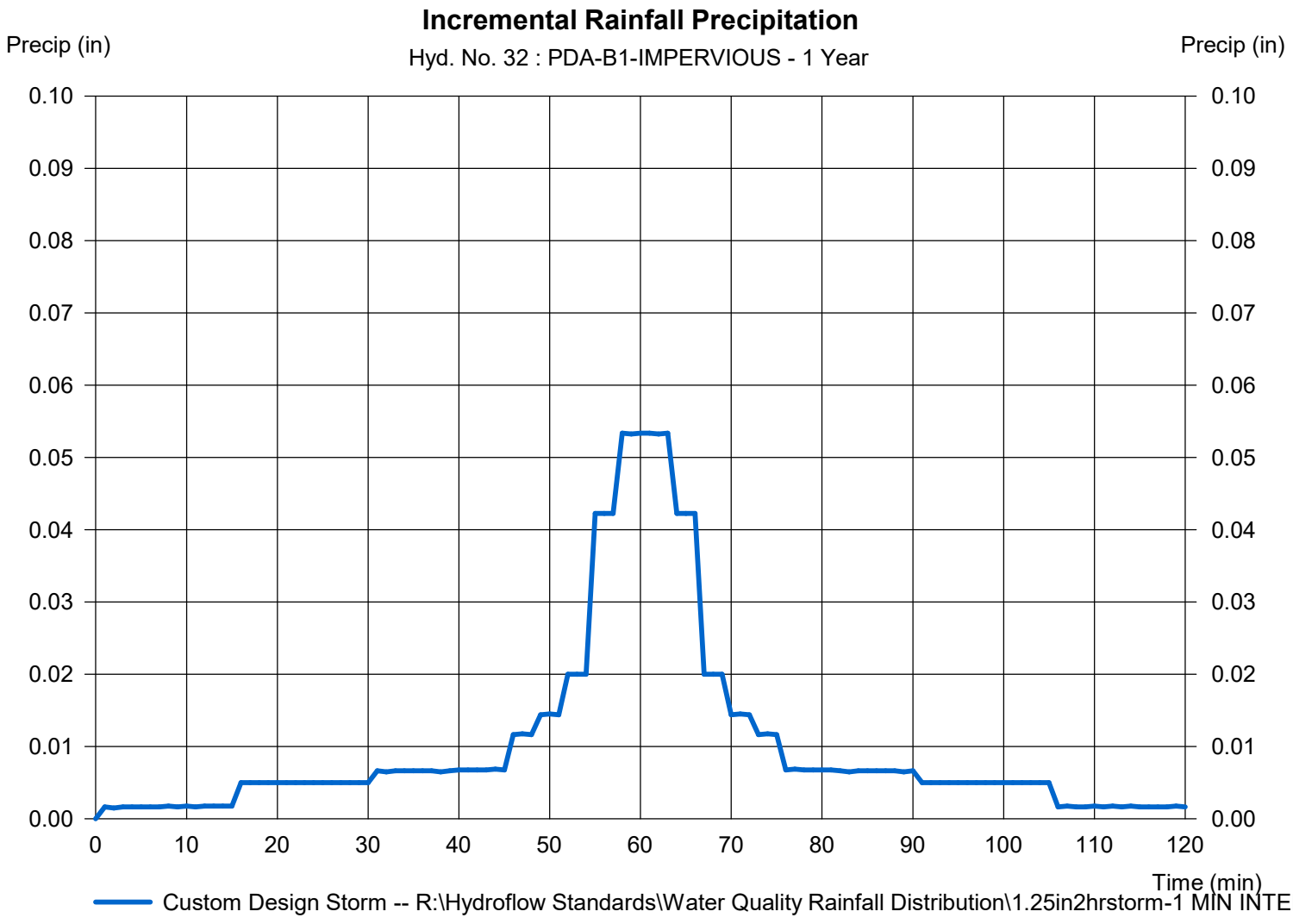


Precipitation Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

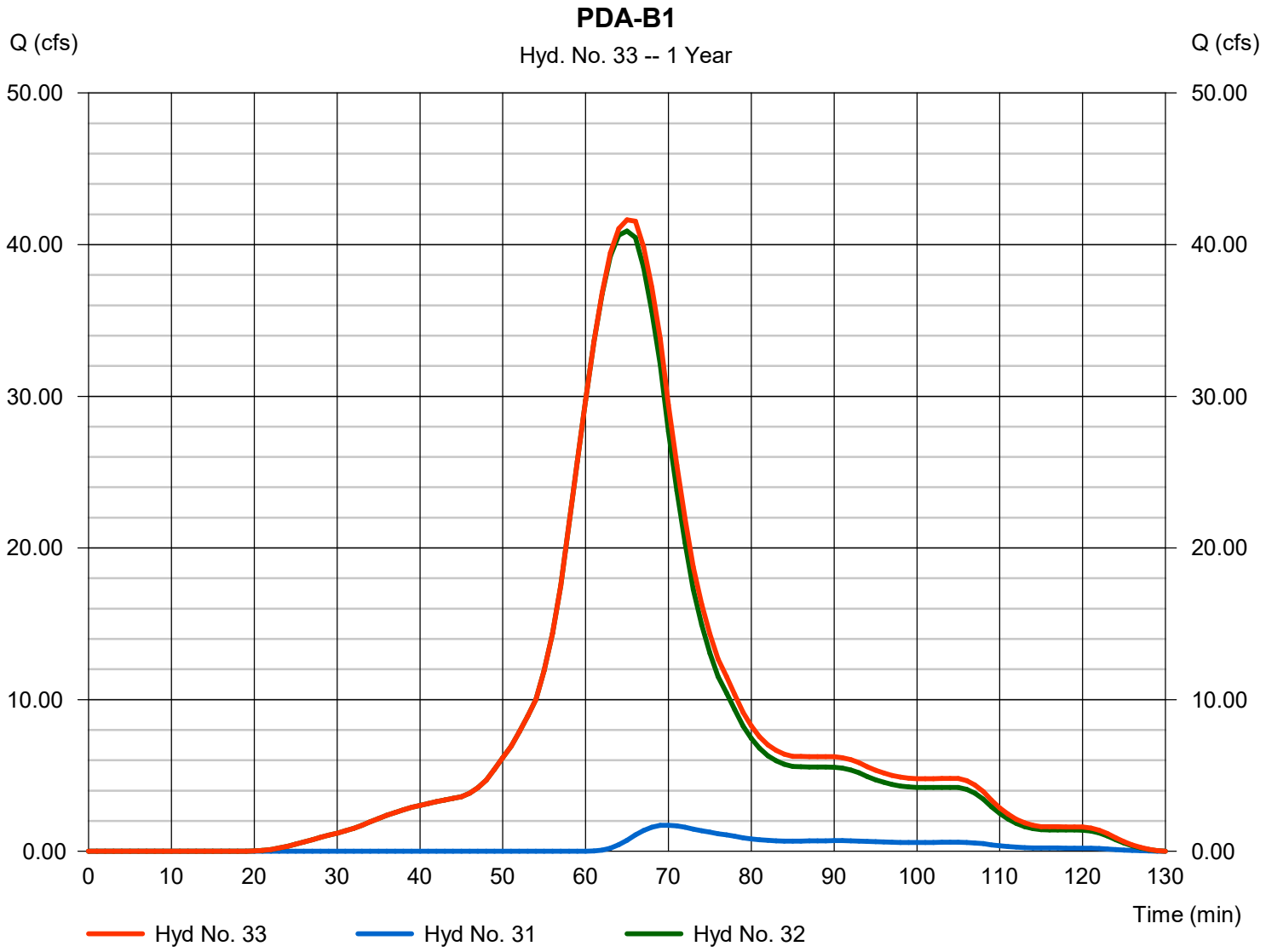


Hydrograph Report

Hyd. No. 33

PDA-B1

Hydrograph type	= Combine	Peak discharge	= 41.63 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 55,980 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 20.580 ac

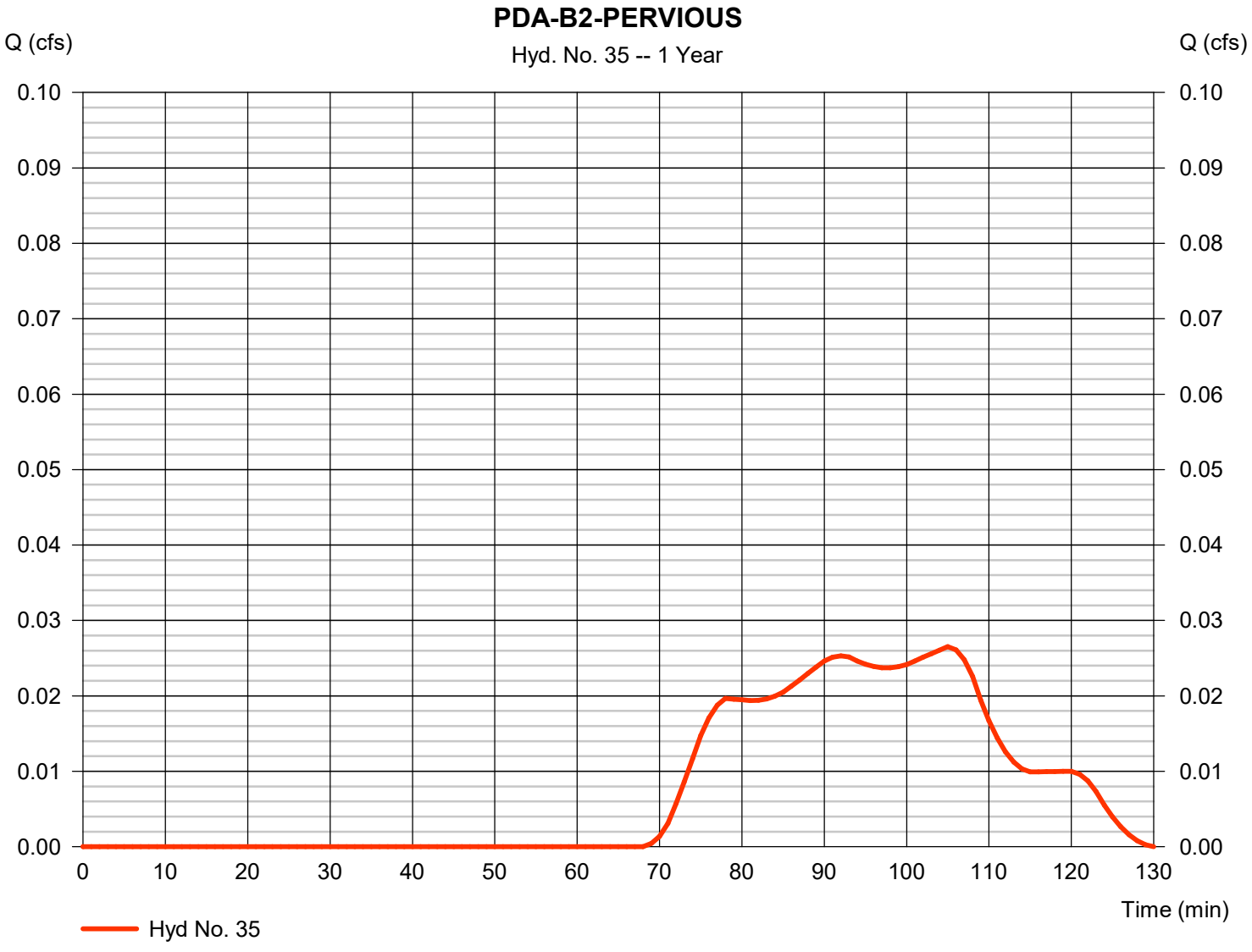


Hydrograph Report

Hyd. No. 35

PDA-B2-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.027 cfs
Storm frequency	=	1 yrs	Time to peak	=	105 min
Time interval	=	1 min	Hyd. volume	=	59 cuft
Drainage area	=	0.830 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

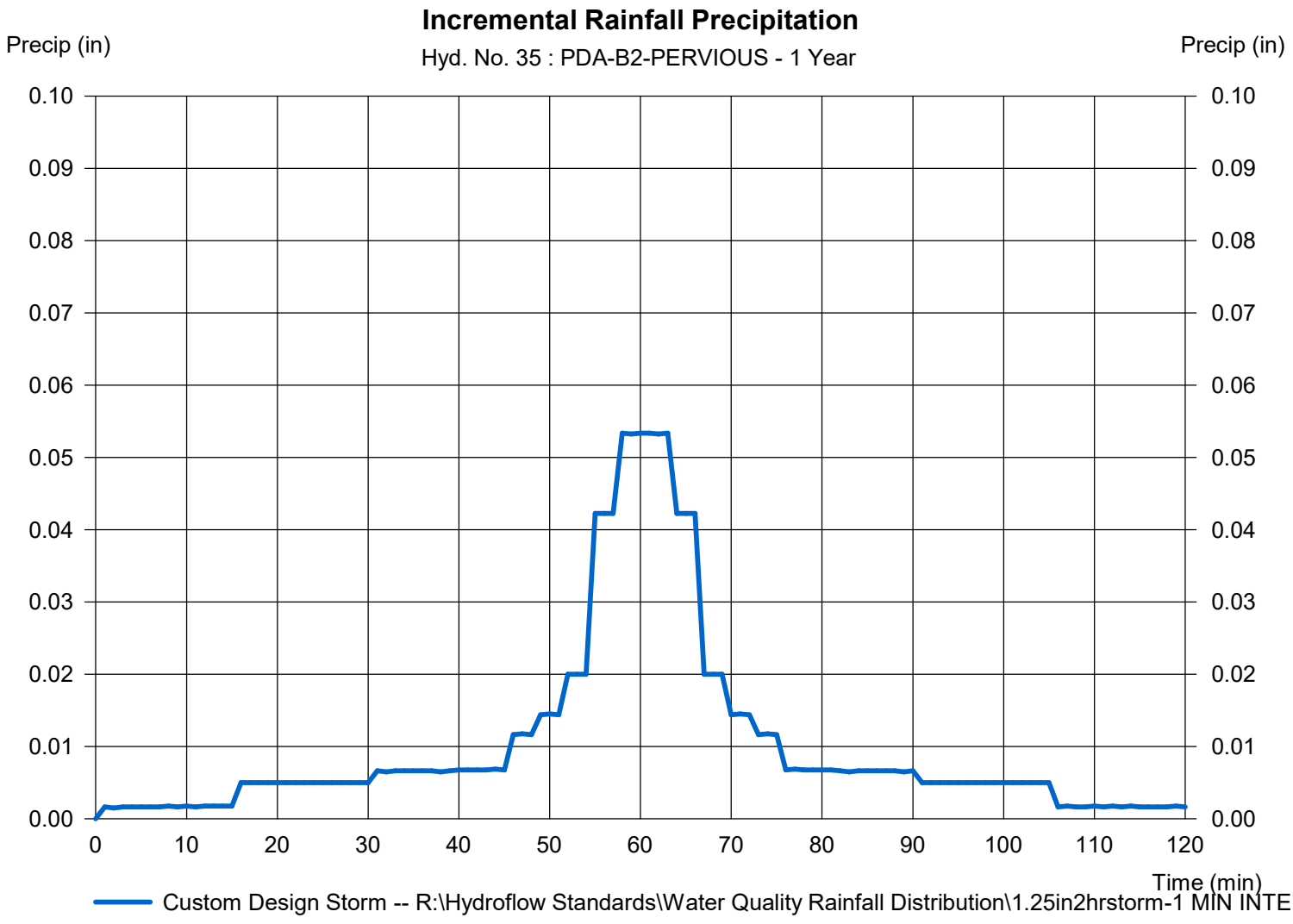


Precipitation Report

Hyd. No. 35

PDA-B2-PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

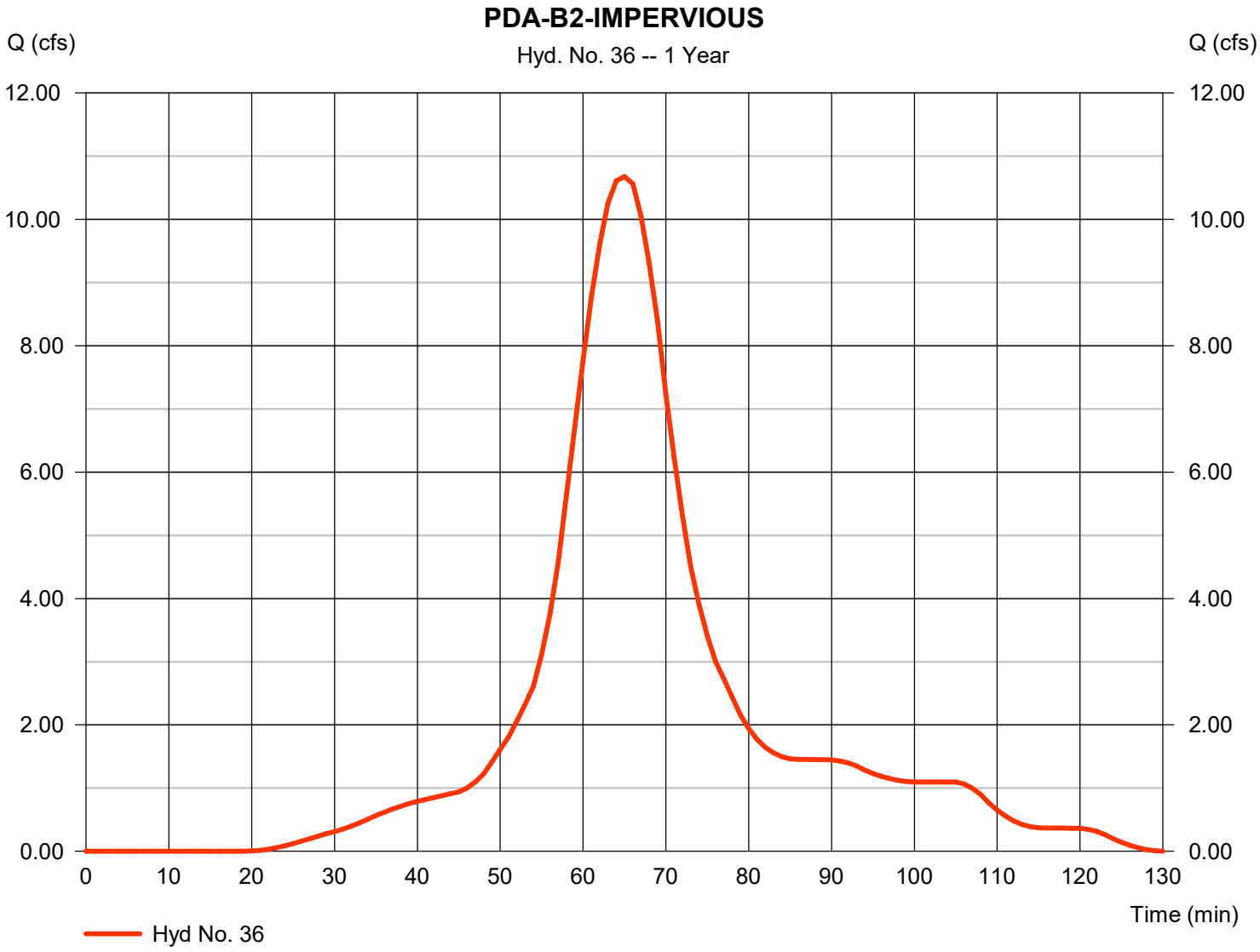


Hydrograph Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.68 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	13,942 cuft
Drainage area	=	3.600 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

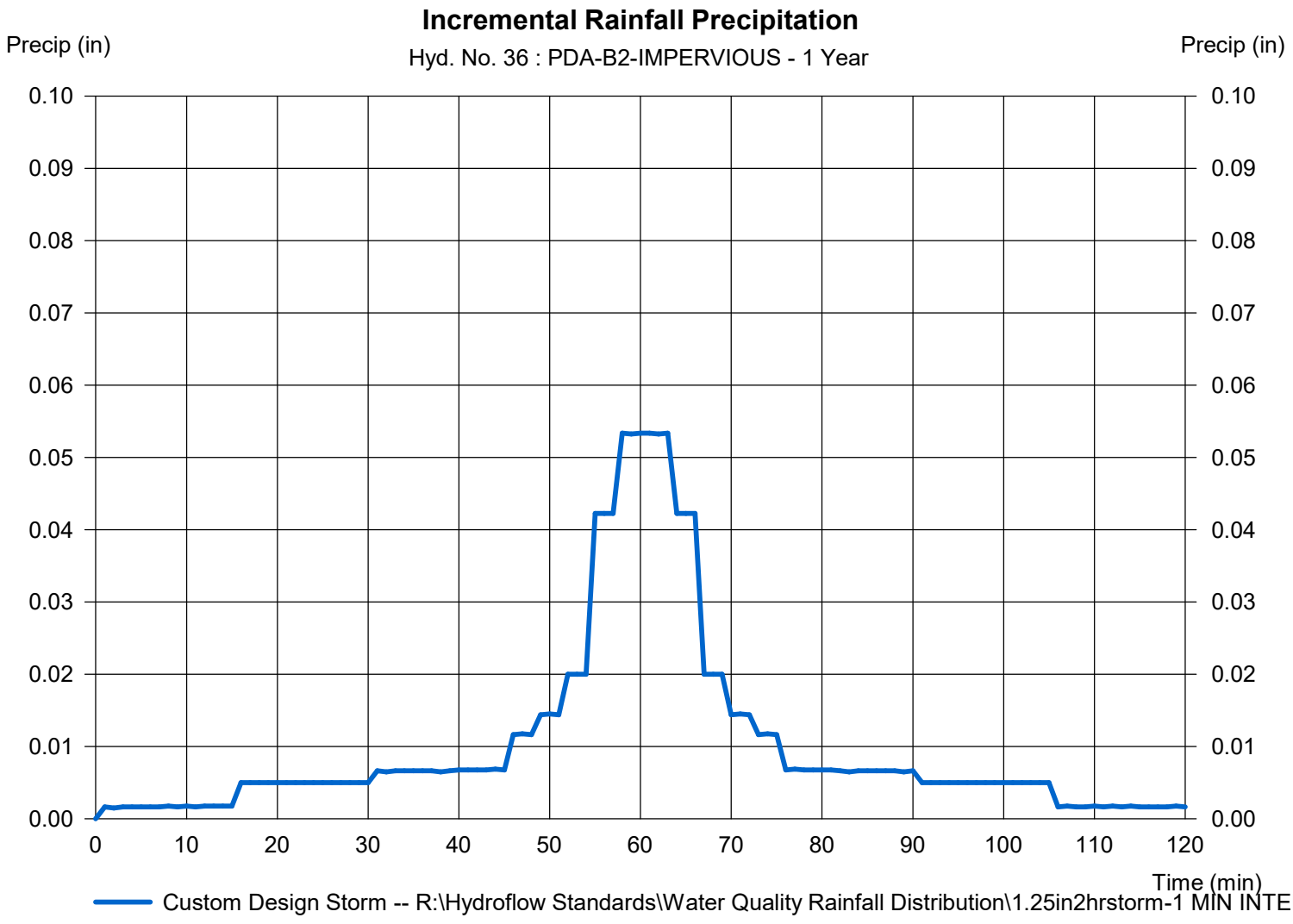


Precipitation Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

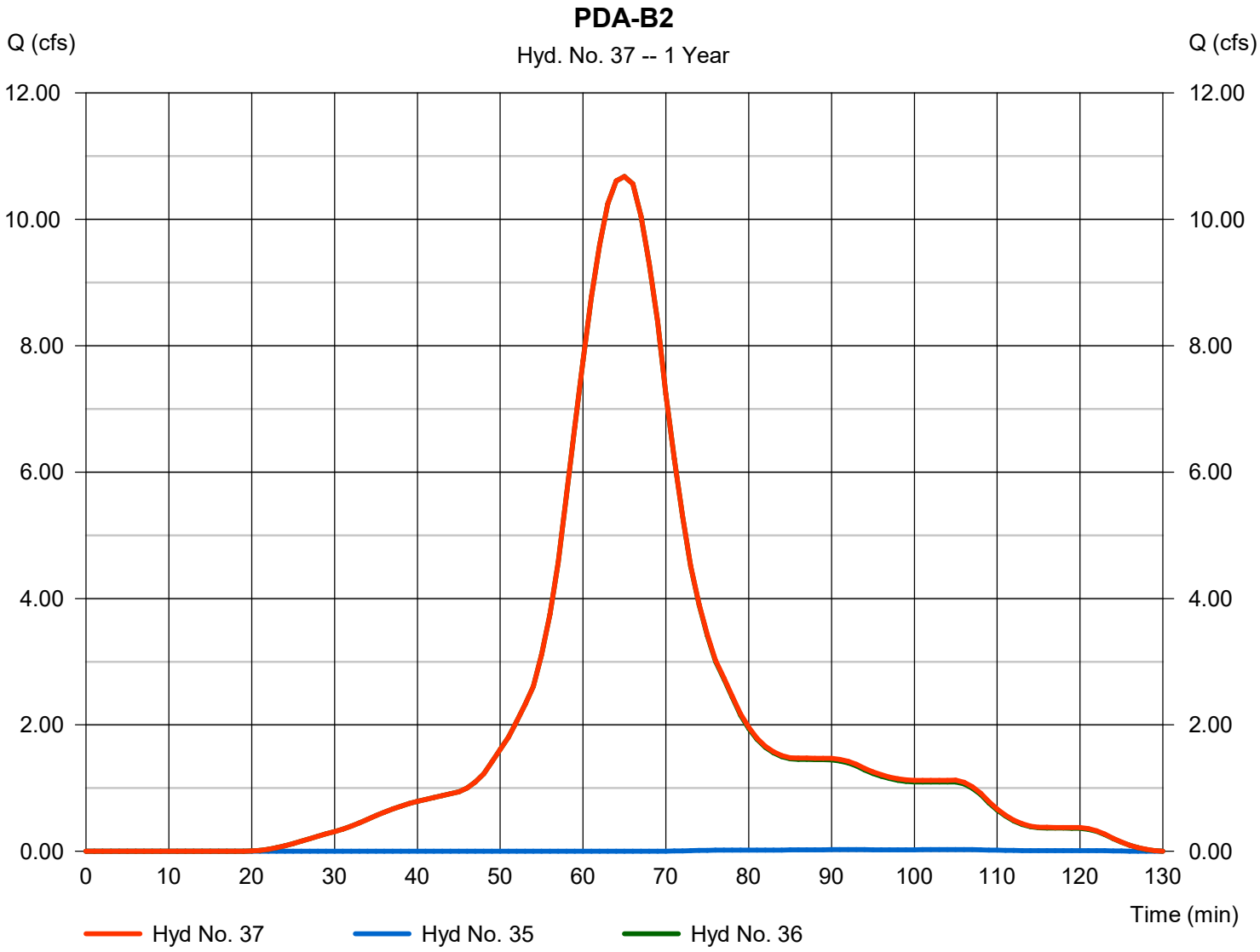


Hydrograph Report

Hyd. No. 37

PDA-B2

Hydrograph type	= Combine	Peak discharge	= 10.68 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 14,001 cuft
Inflow hyds.	= 35, 36	Contrib. drain. area	= 4.430 ac



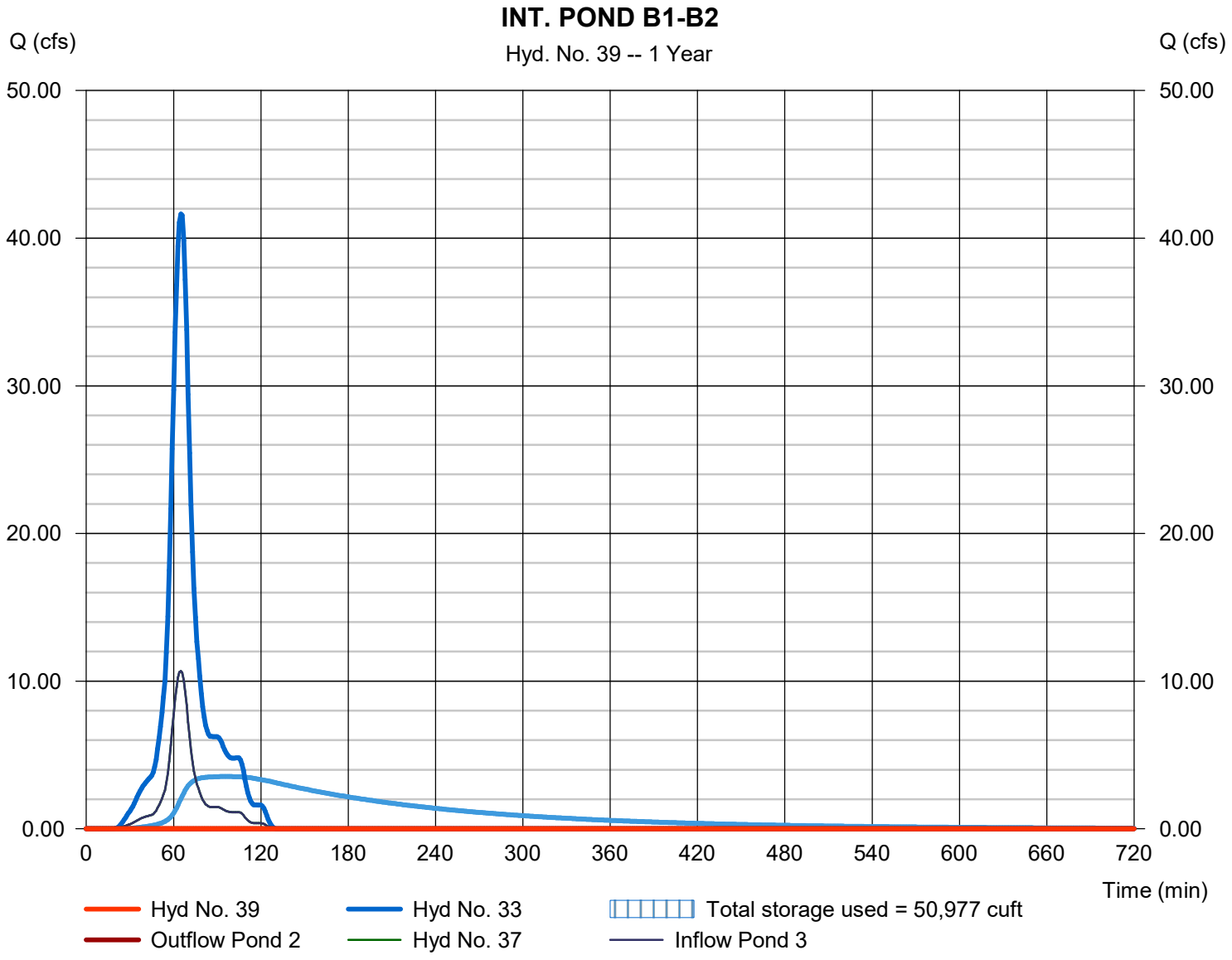
Hydrograph Report

Hyd. No. 39

INT. POND B1-B2

Hydrograph type	=	Reservoir (Interconnected)	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	166 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Upper Pond	=	SWM-B1	Lower Pond	=	SWM-B2
Inflow hyd.	=	33 - PDA-B1	Other Inflow hyd.	=	37 - PDA-B2
Max. Elevation	=	598.62 ft	Max. Elevation	=	598.46 ft
Max. Storage	=	40,716 cuft	Max. Storage	=	10,260 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 2 - SWM-B1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	61,258	0	0
1.00	599.00	69,679	65,417	65,417
2.00	600.00	78,515	74,046	139,463
3.00	601.00	87,768	83,090	222,553
4.00	602.00	97,511	92,588	315,140

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 598.00	0.00	0.00	0.00
Length (ft)	= 164.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

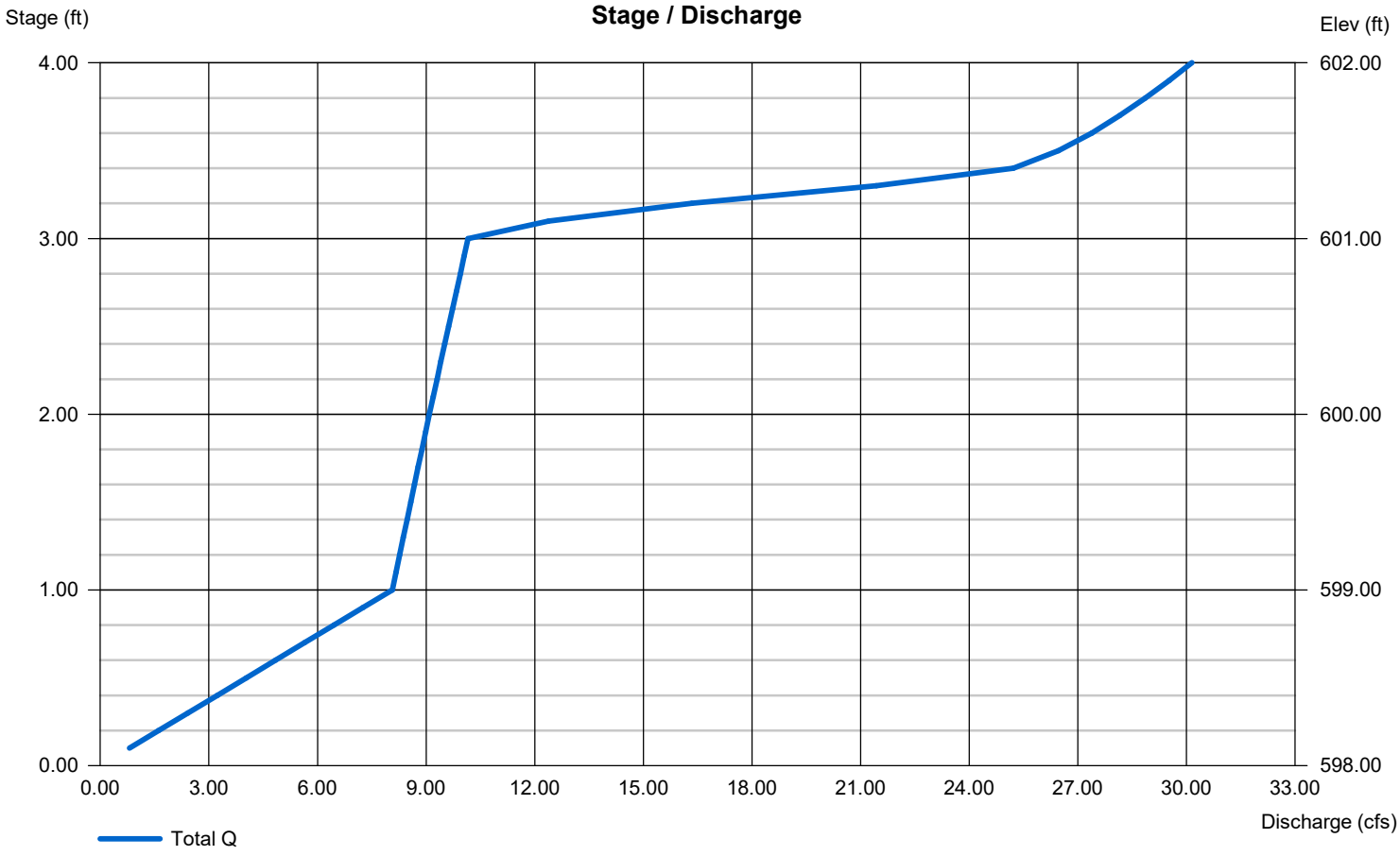
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	0.00	0.00	0.00
Crest El. (ft)	= 601.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Pond No. 3 - SWM-B2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	21,184	0	0
1.00	599.00	23,256	22,210	22,210
2.00	600.00	25,384	24,310	46,520
3.00	601.00	27,569	26,466	72,986
4.00	602.00	29,810	28,679	101,665

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

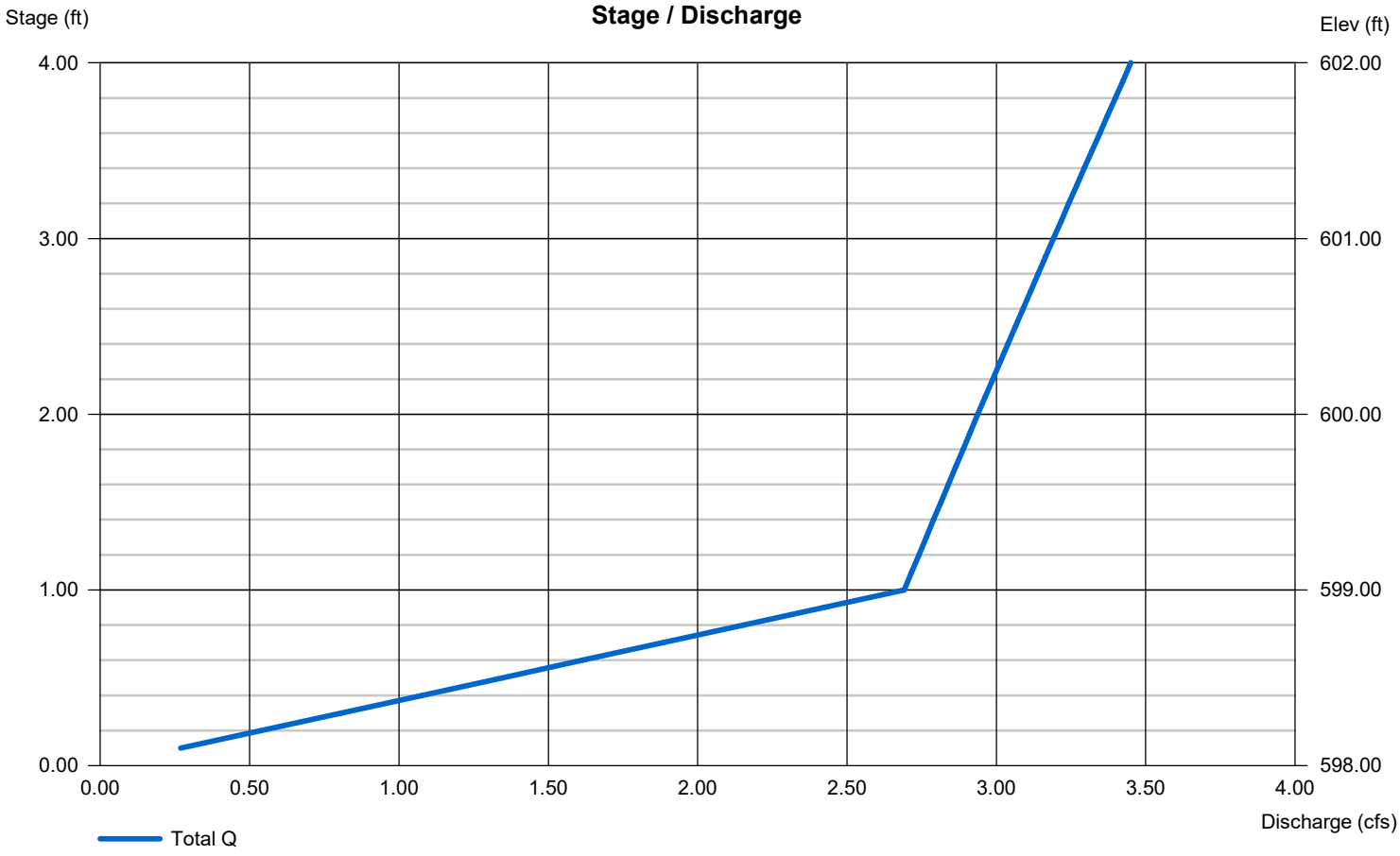
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

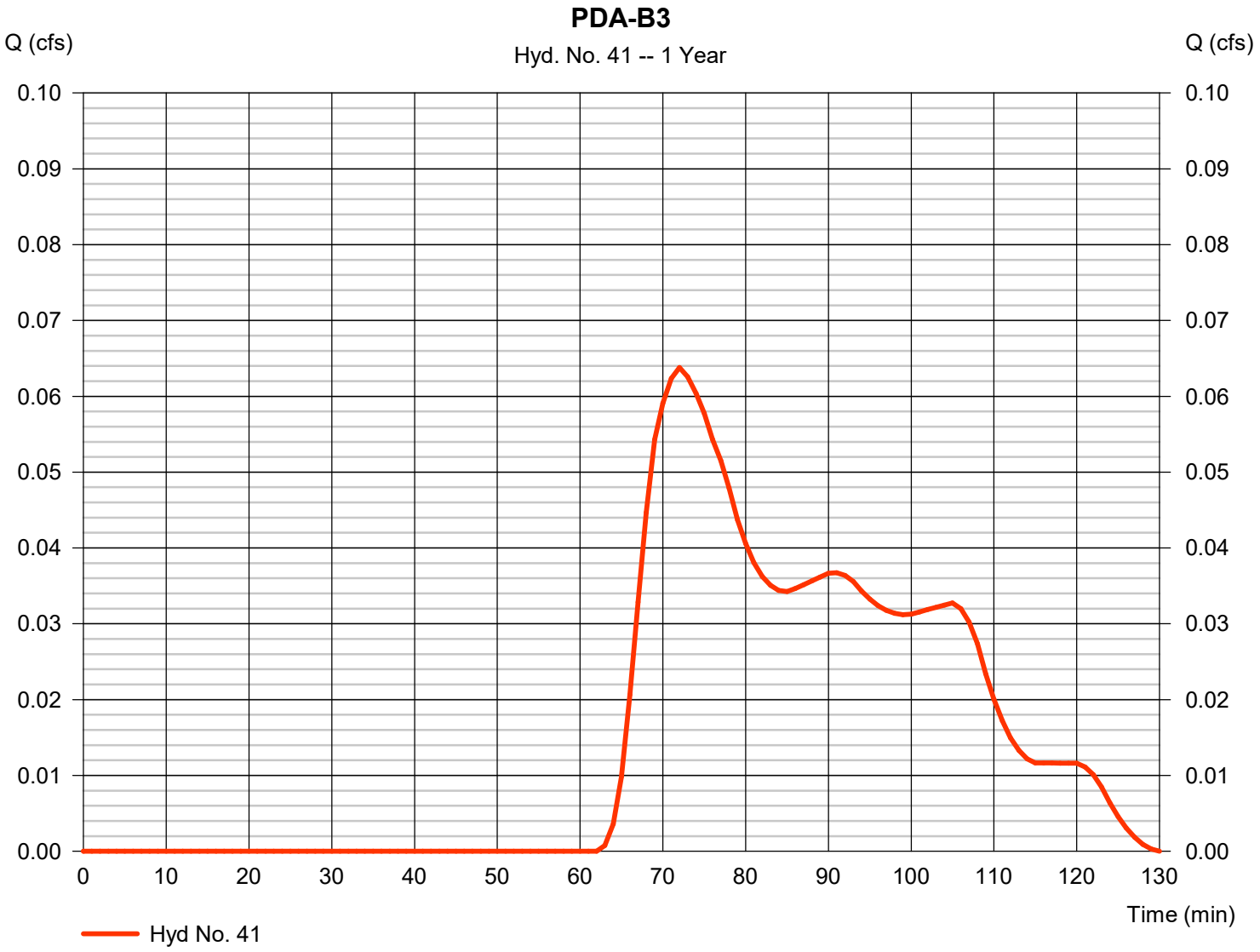


Hydrograph Report

Hyd. No. 41

PDA-B3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.064 cfs
Storm frequency	=	1 yrs	Time to peak	=	72 min
Time interval	=	1 min	Hyd. volume	=	116 cuft
Drainage area	=	0.500 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN			

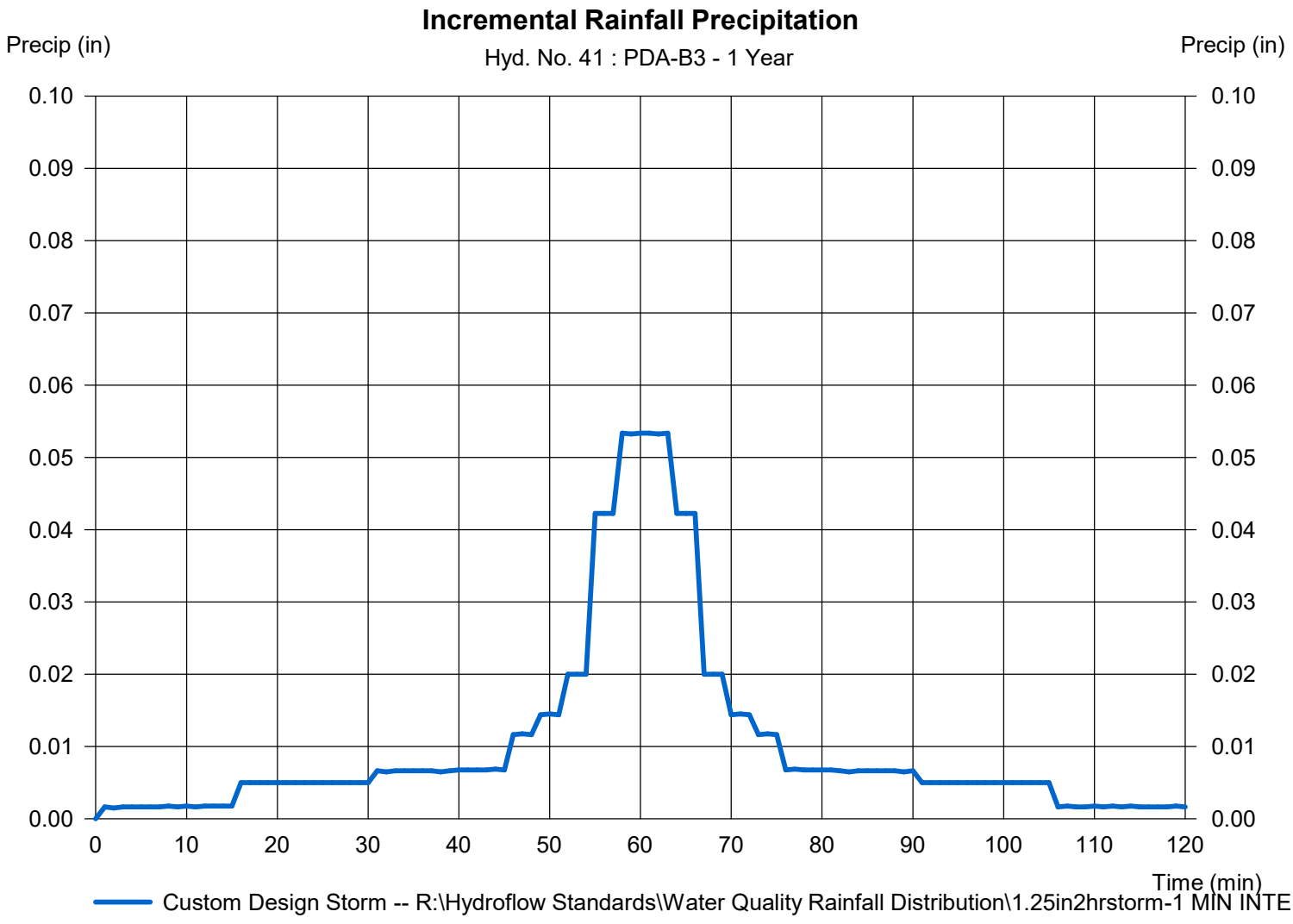


Precipitation Report

Hyd. No. 41

PDA-B3

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

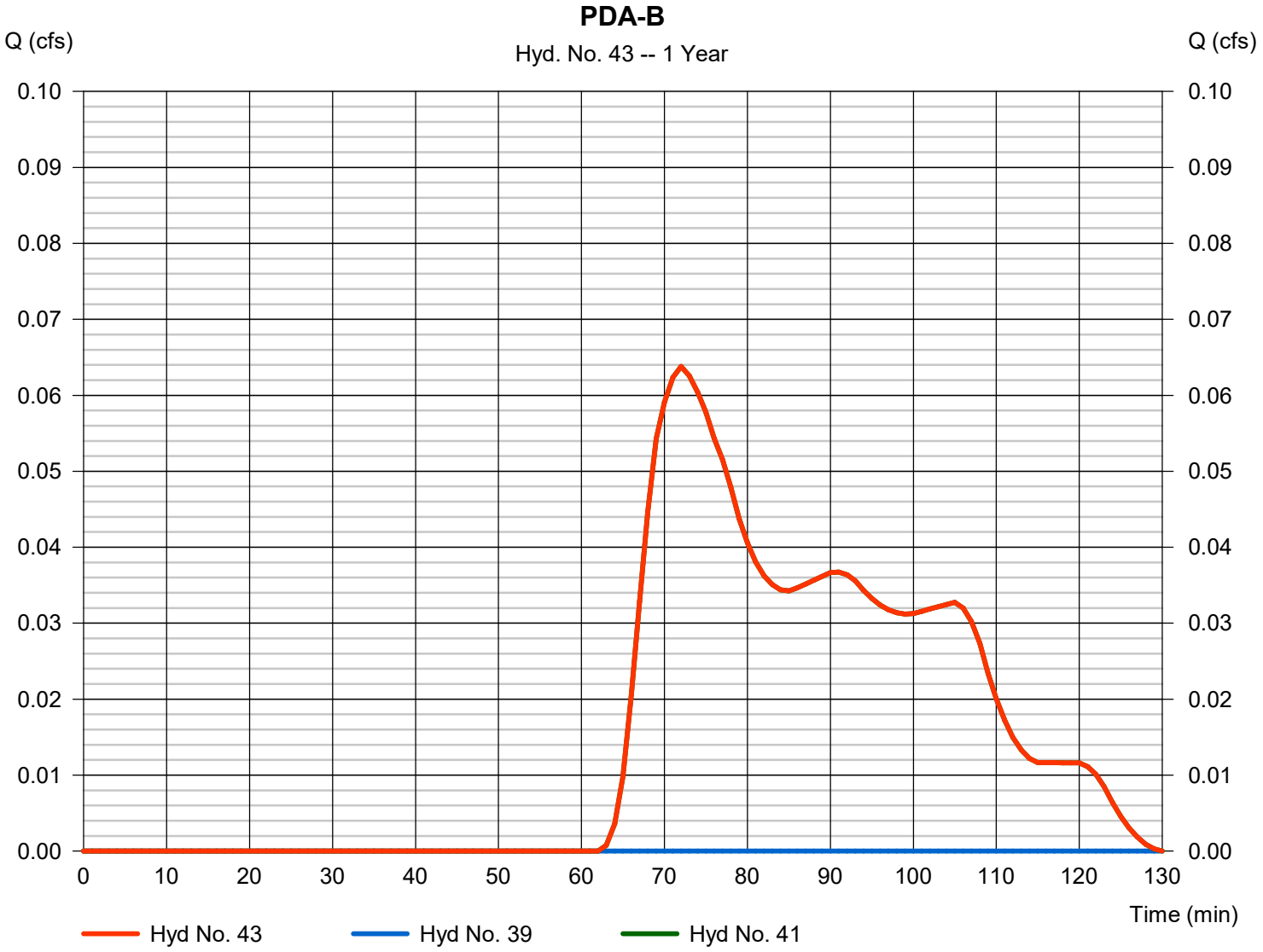


Hydrograph Report

Hyd. No. 43

PDA-B

Hydrograph type	=	Combine	Peak discharge	=	0.064 cfs
Storm frequency	=	1 yrs	Time to peak	=	72 min
Time interval	=	1 min	Hyd. volume	=	116 cuft
Inflow hyds.	=	39, 41	Contrib. drain. area	=	0.500 ac

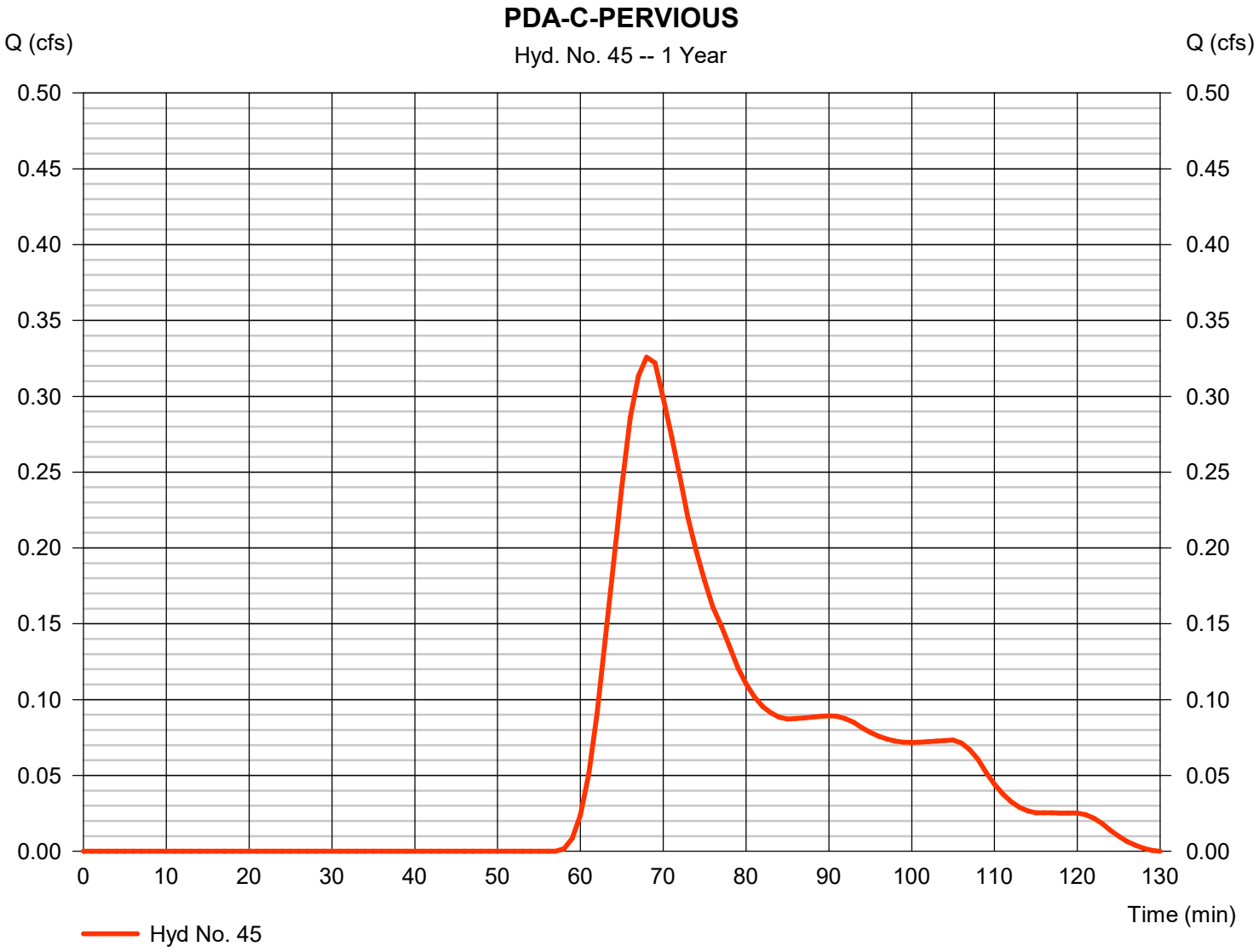


Hydrograph Report

Hyd. No. 45

PDA-C-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.326 cfs
Storm frequency	=	1 yrs	Time to peak	=	68 min
Time interval	=	1 min	Hyd. volume	=	409 cuft
Drainage area	=	0.560 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN			

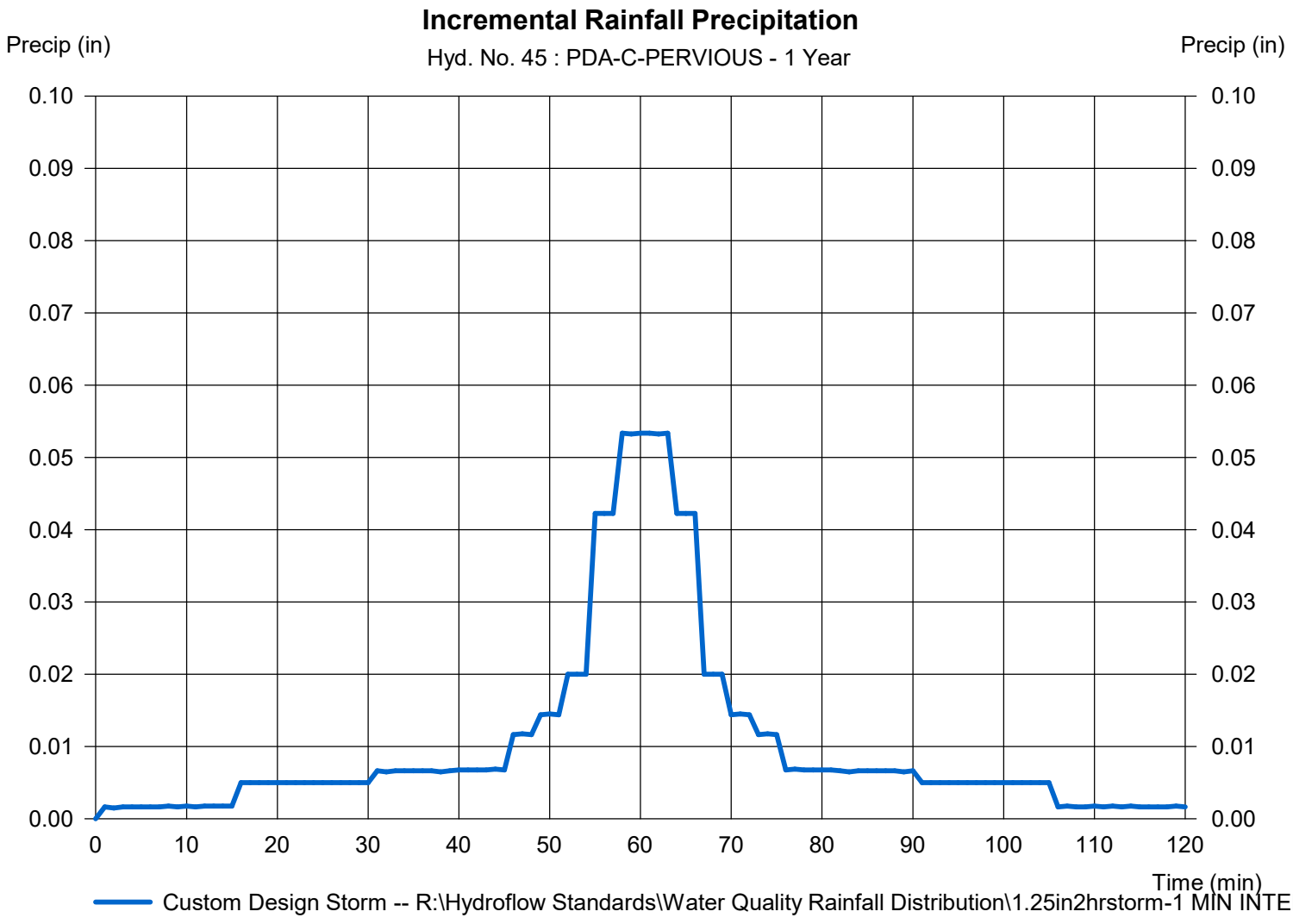


Precipitation Report

Hyd. No. 45

PDA-C-PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

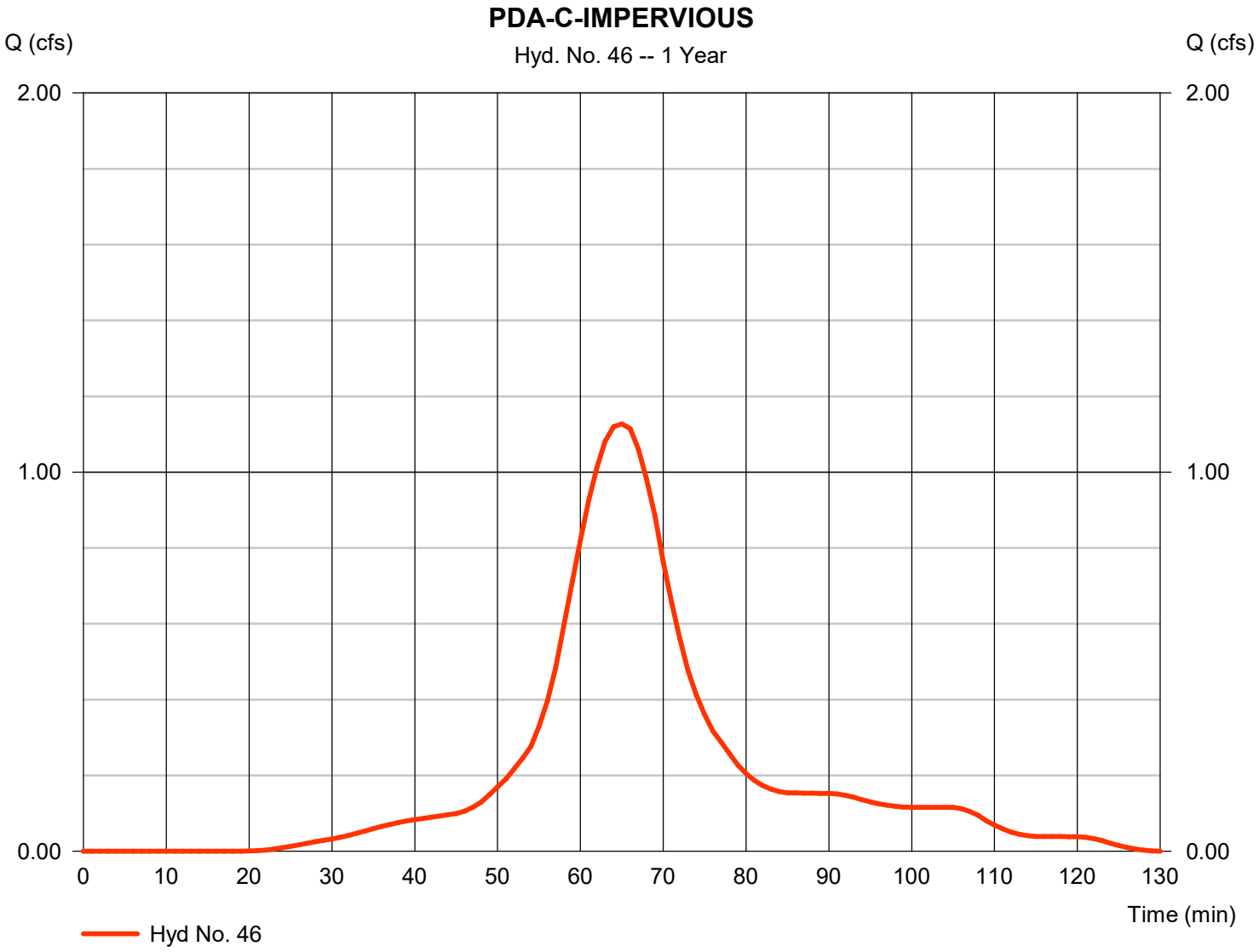


Hydrograph Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.127 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	1,472 cuft
Drainage area	=	0.380 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.50 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterQuality Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

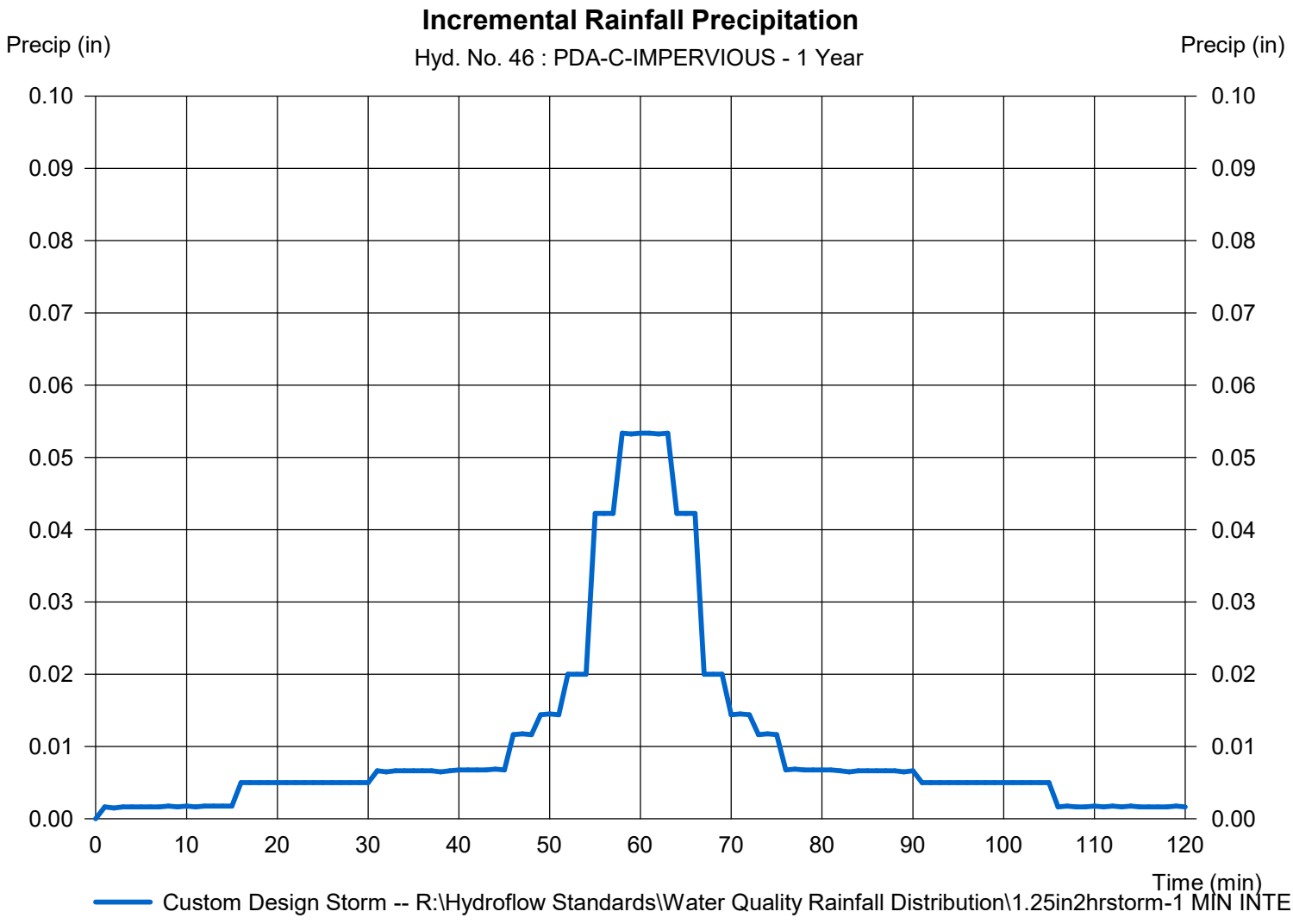


Precipitation Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

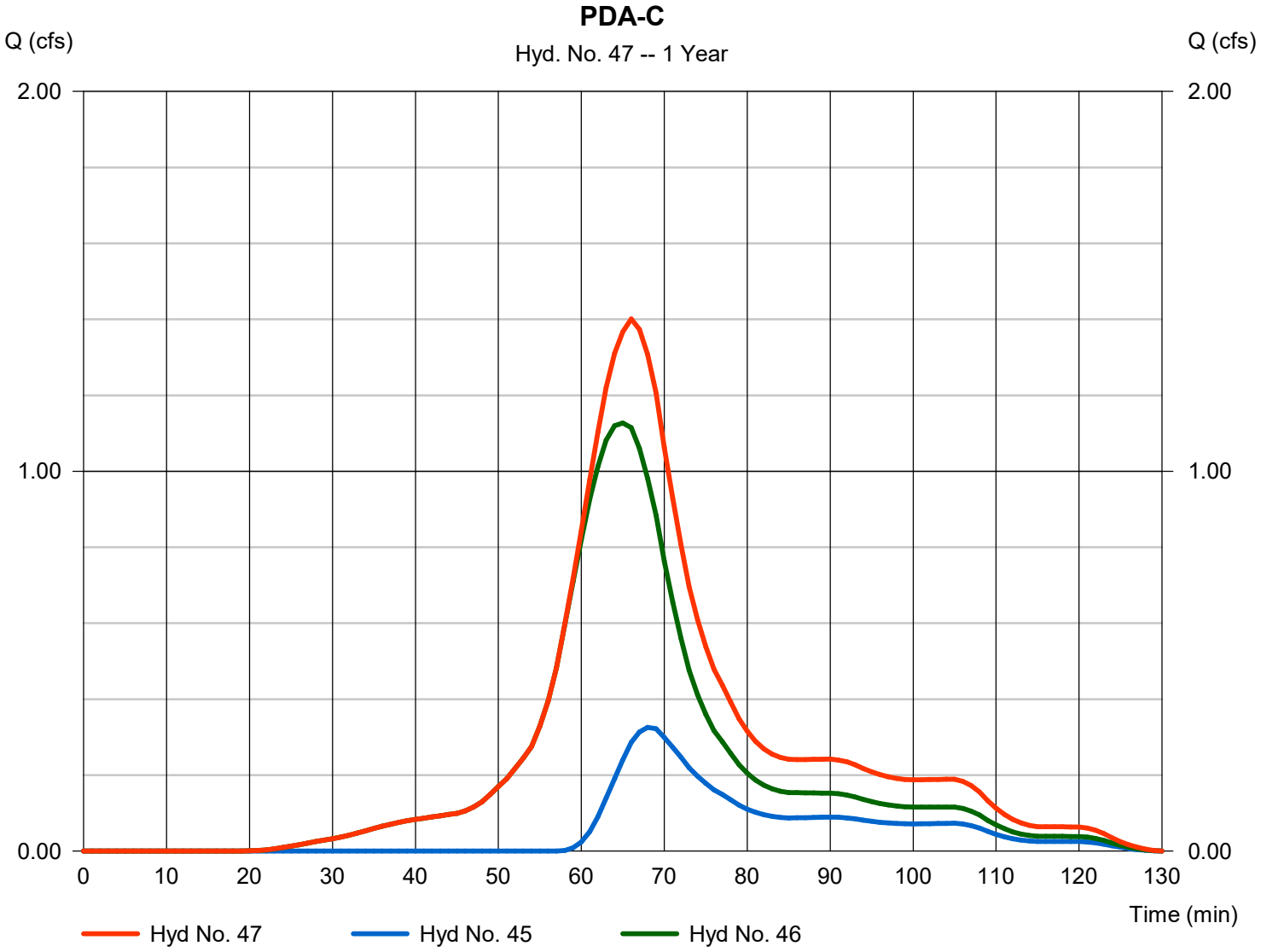


Hydrograph Report

Hyd. No. 47

PDA-C

Hydrograph type	= Combine	Peak discharge	= 1.401 cfs
Storm frequency	= 1 yrs	Time to peak	= 66 min
Time interval	= 1 min	Hyd. volume	= 1,880 cuft
Inflow hyds.	= 45, 46	Contrib. drain. area	= 0.940 ac

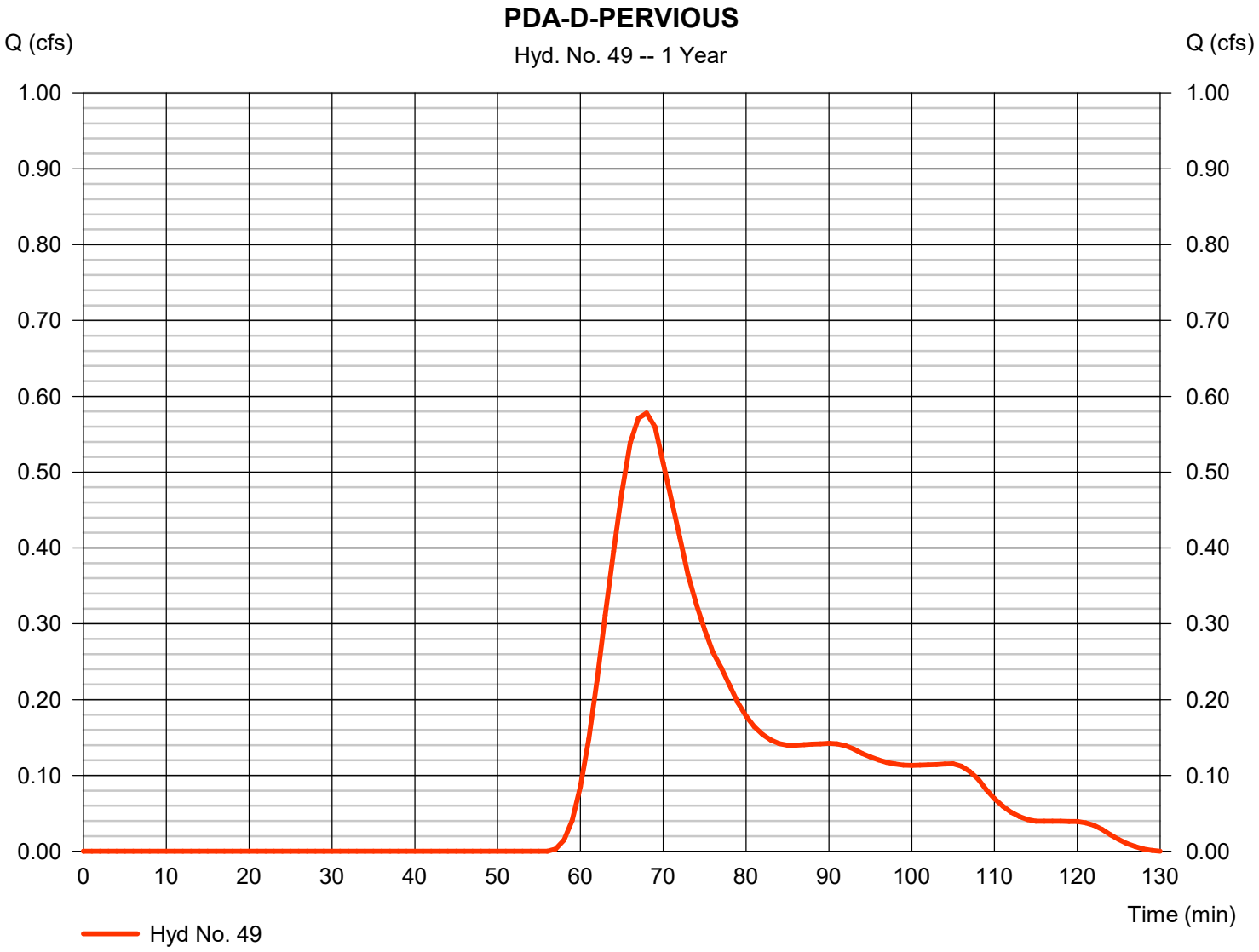


Hydrograph Report

Hyd. No. 49

PDA-D-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.578 cfs
Storm frequency	= 1 yrs	Time to peak	= 68 min
Time interval	= 1 min	Hyd. volume	= 704 cuft
Drainage area	= 0.770 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN		

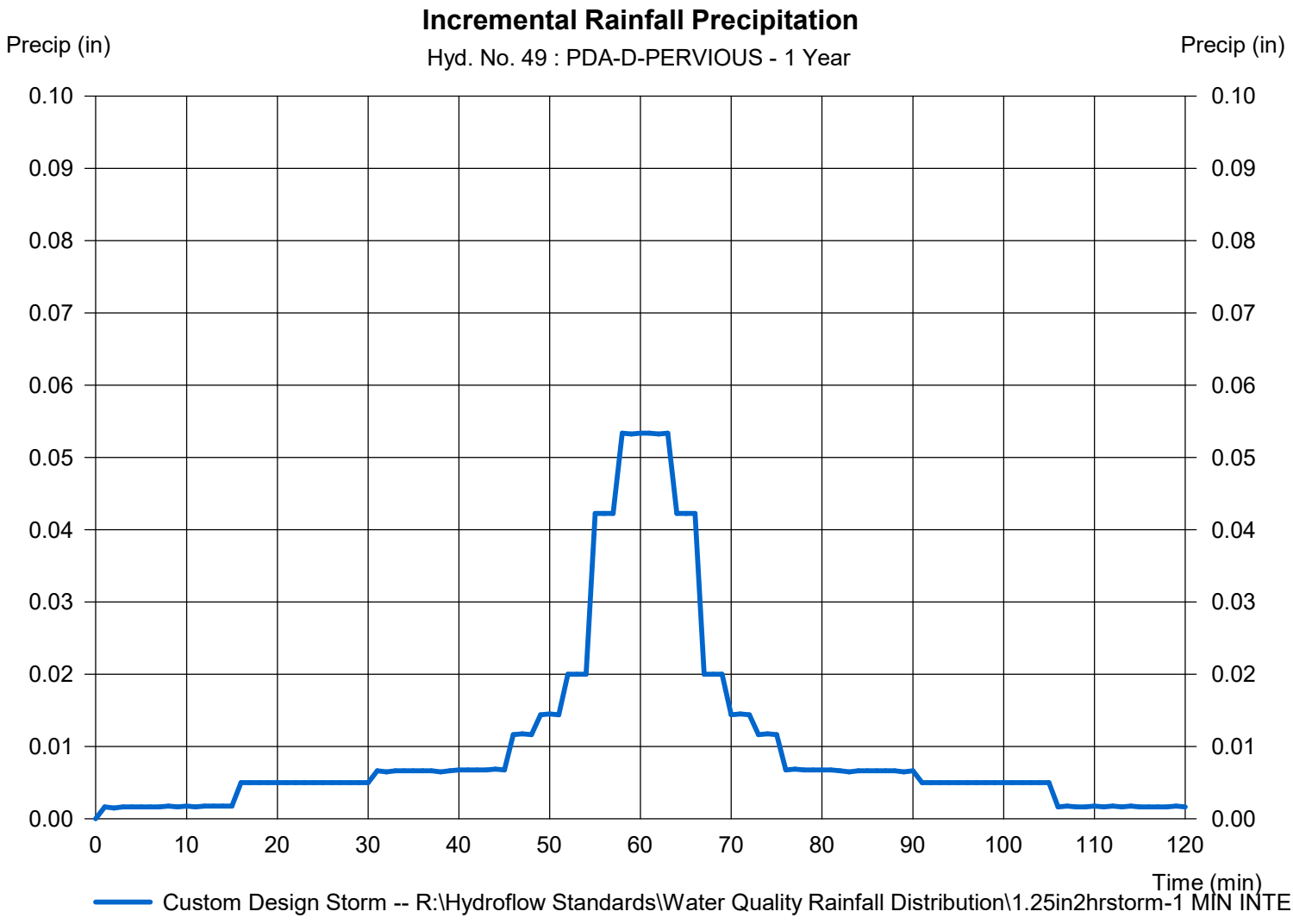


Precipitation Report

Hyd. No. 49

PDA-D-PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

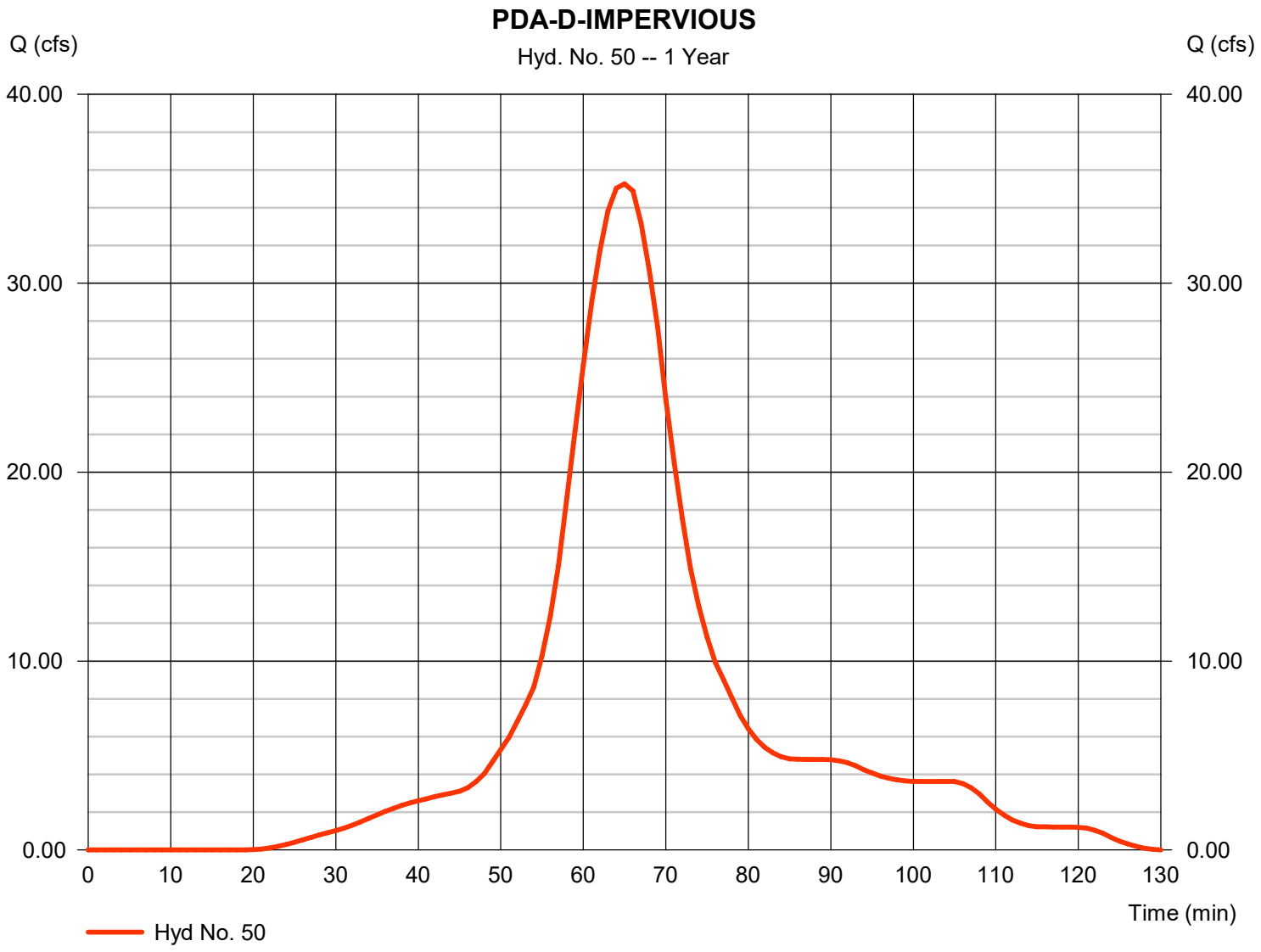


Hydrograph Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.26 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	46,048 cuft
Drainage area	=	11.890 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\1.25in2hrstorm-1 MIN	Shape factor	=	484

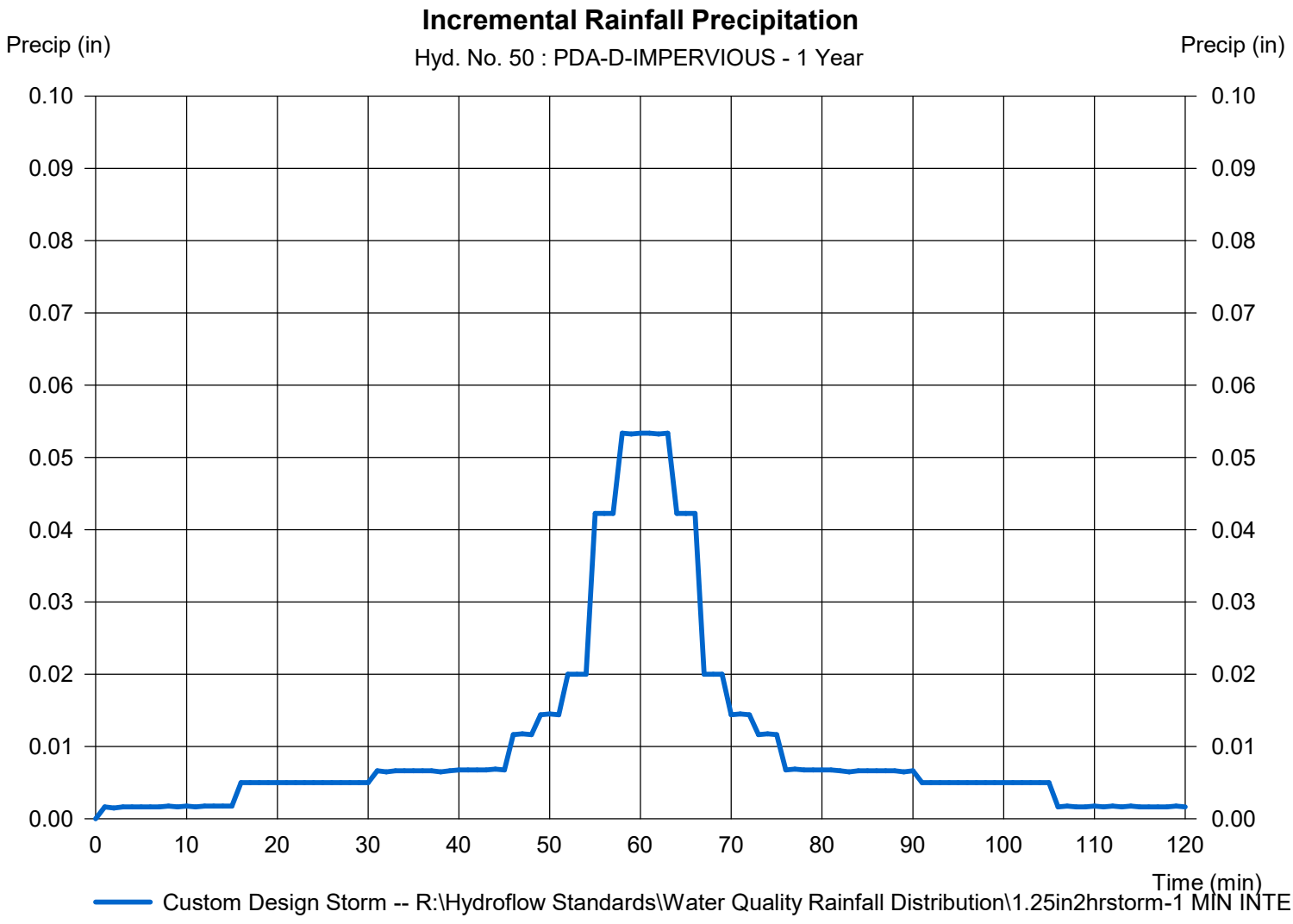


Precipitation Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

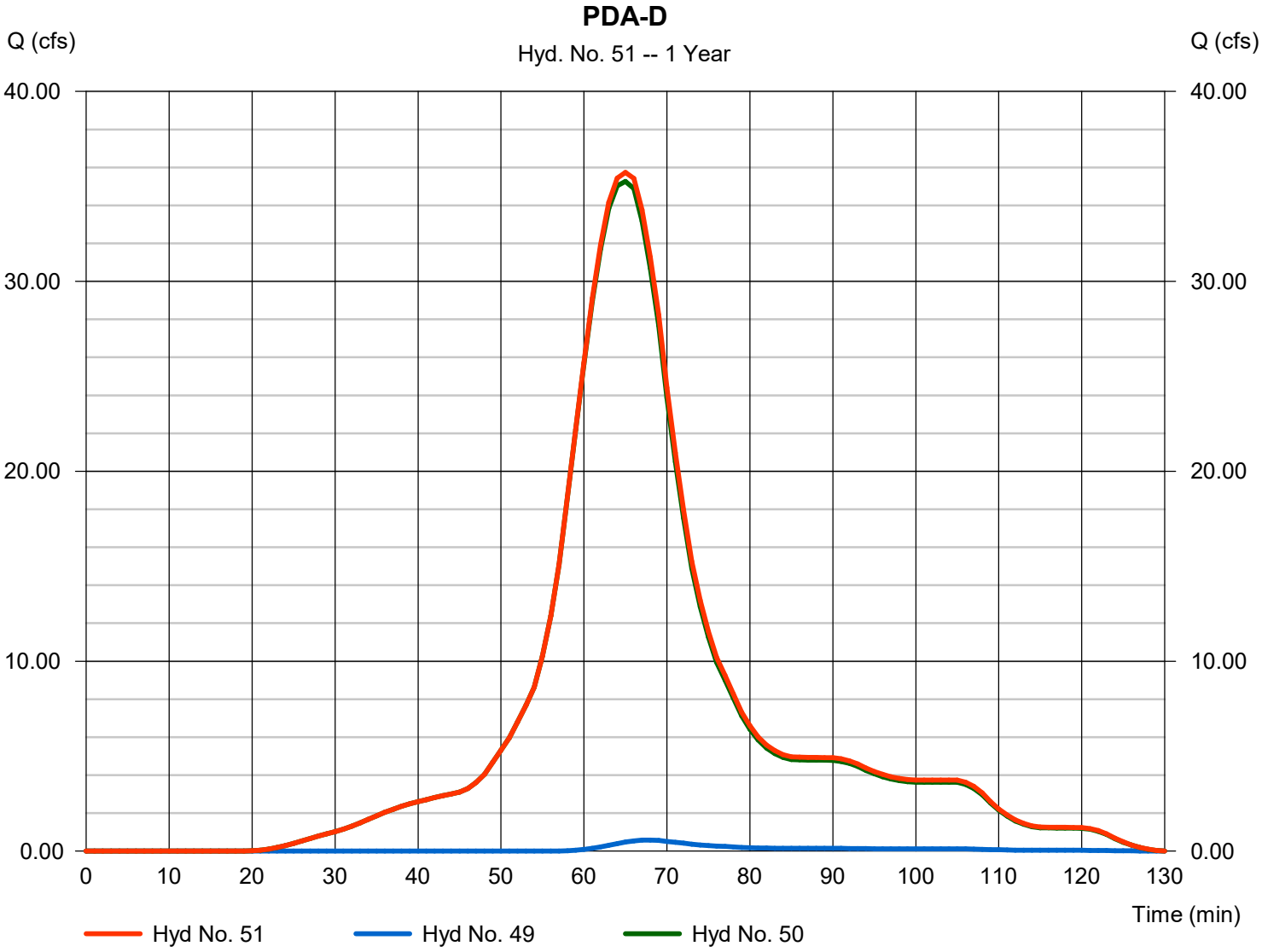


Hydrograph Report

Hyd. No. 51

PDA-D

Hydrograph type	= Combine	Peak discharge	= 35.74 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 46,753 cuft
Inflow hyds.	= 49, 50	Contrib. drain. area	= 12.660 ac



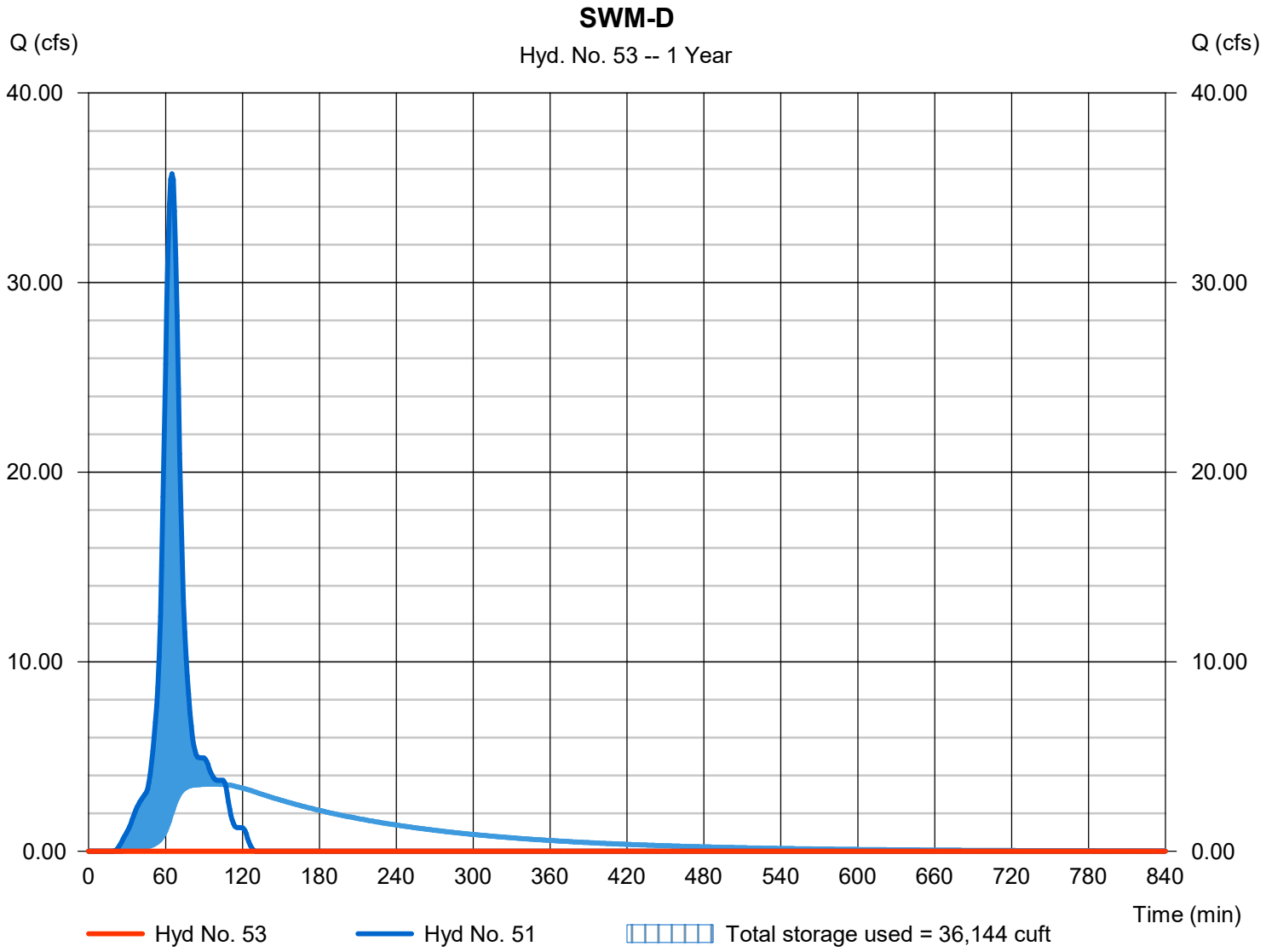
Hydrograph Report

Hyd. No. 53

SWM-D

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= 62 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 51 - PDA-D	Max. Elevation	= 599.41 ft
Reservoir name	= SWM-D	Max. Storage	= 36,144 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 4 - SWM-D

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	23,768	0	0
1.00	599.00	26,054	24,900	24,900
2.00	600.00	28,387	27,209	52,109
3.00	601.00	30,767	29,566	81,675
4.00	602.00	33,193	31,969	113,644
5.00	603.00	35,667	34,419	148,064
6.00	604.00	38,187	36,916	184,980
7.00	605.00	40,754	39,460	224,439

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

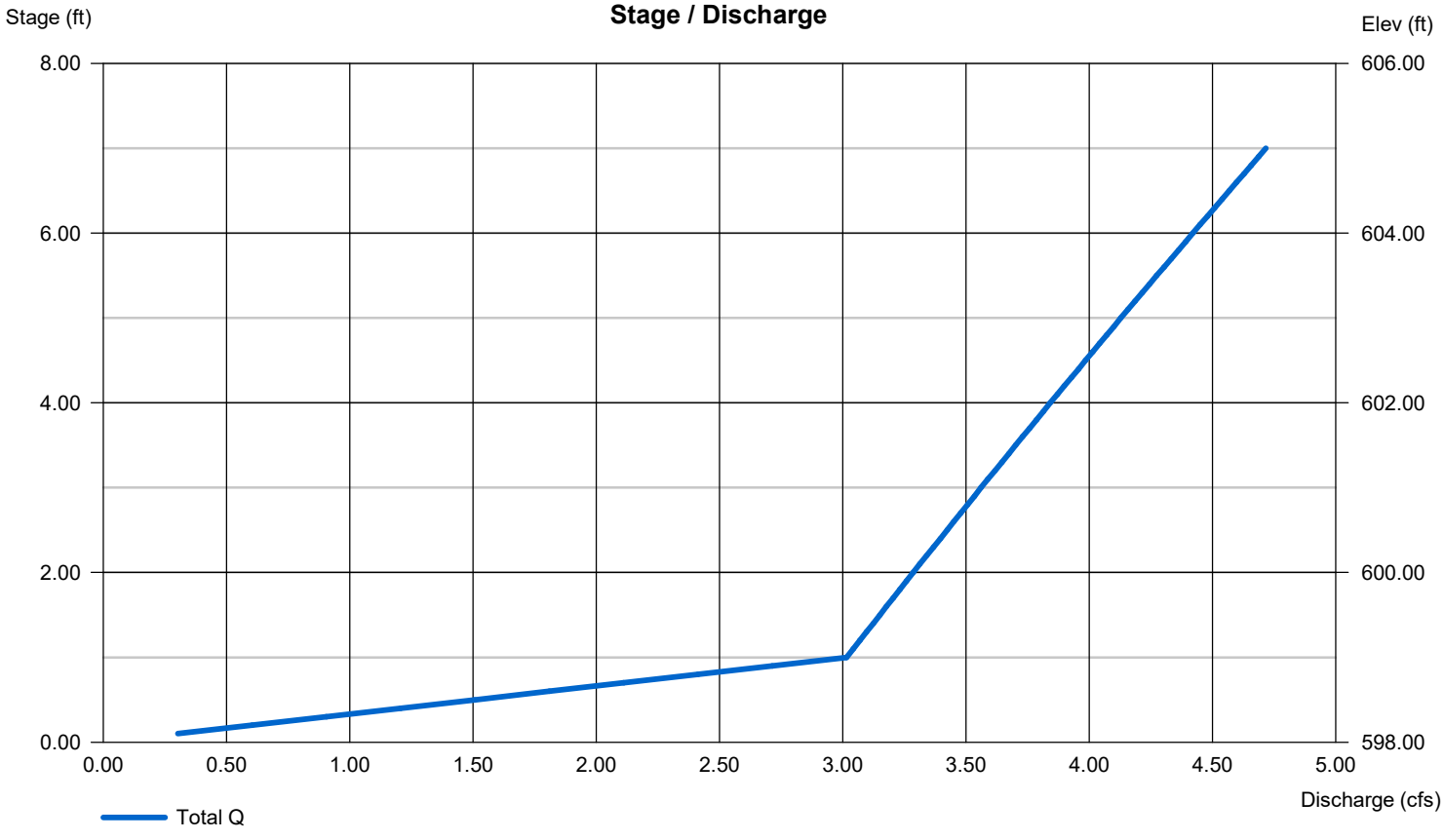
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

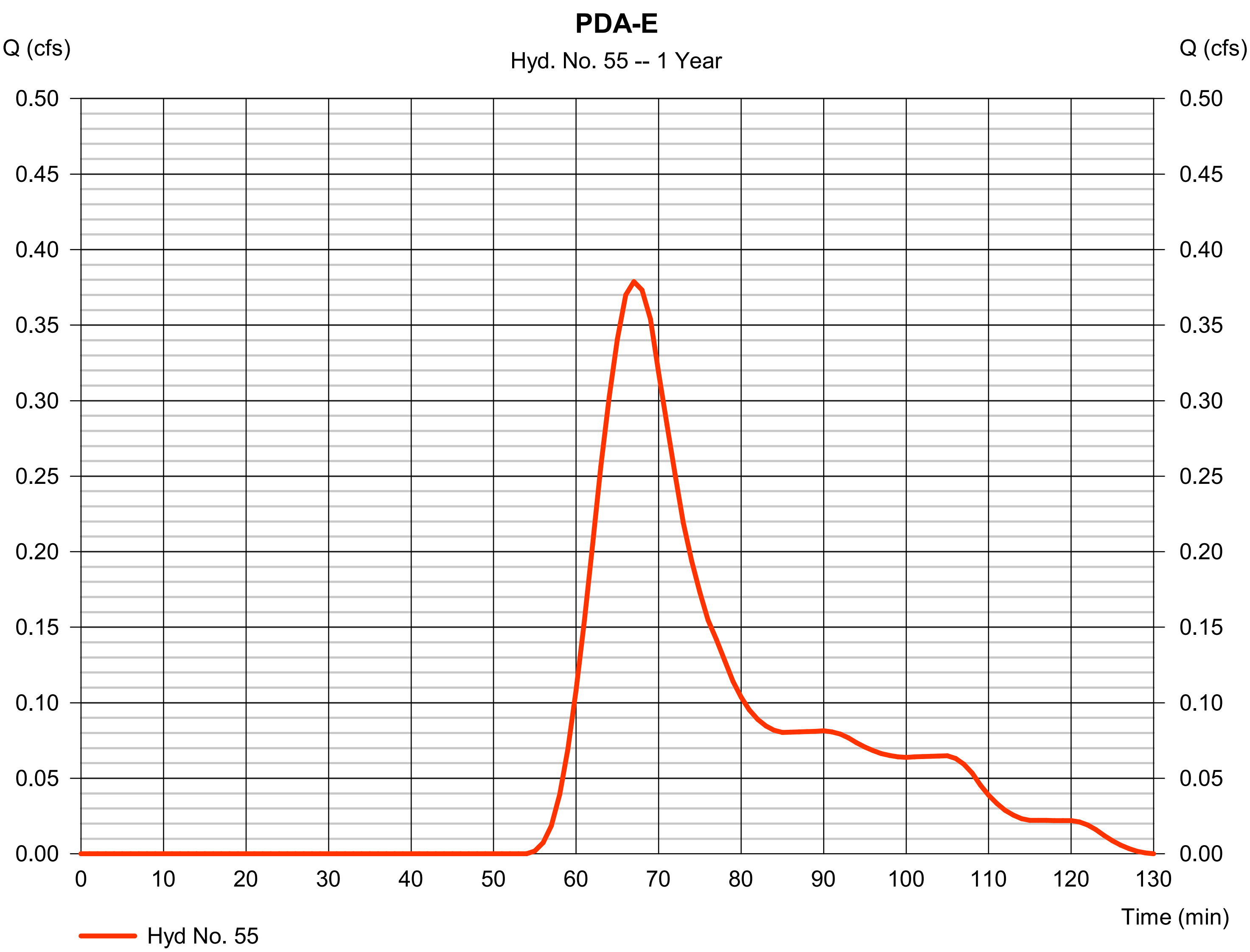


Hydrograph Report

Hyd. No. 55

PDA-E

Hydrograph type	= SCS Runoff	Peak discharge	= 0.379 cfs
Storm frequency	= 1 yrs	Time to peak	= 67 min
Time interval	= 1 min	Hyd. volume	= 451 cuft
Drainage area	= 0.360 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\WaterQualityRainfall Distribution\1.25in2hrstorm-1 MIN	Shape factor	= 484

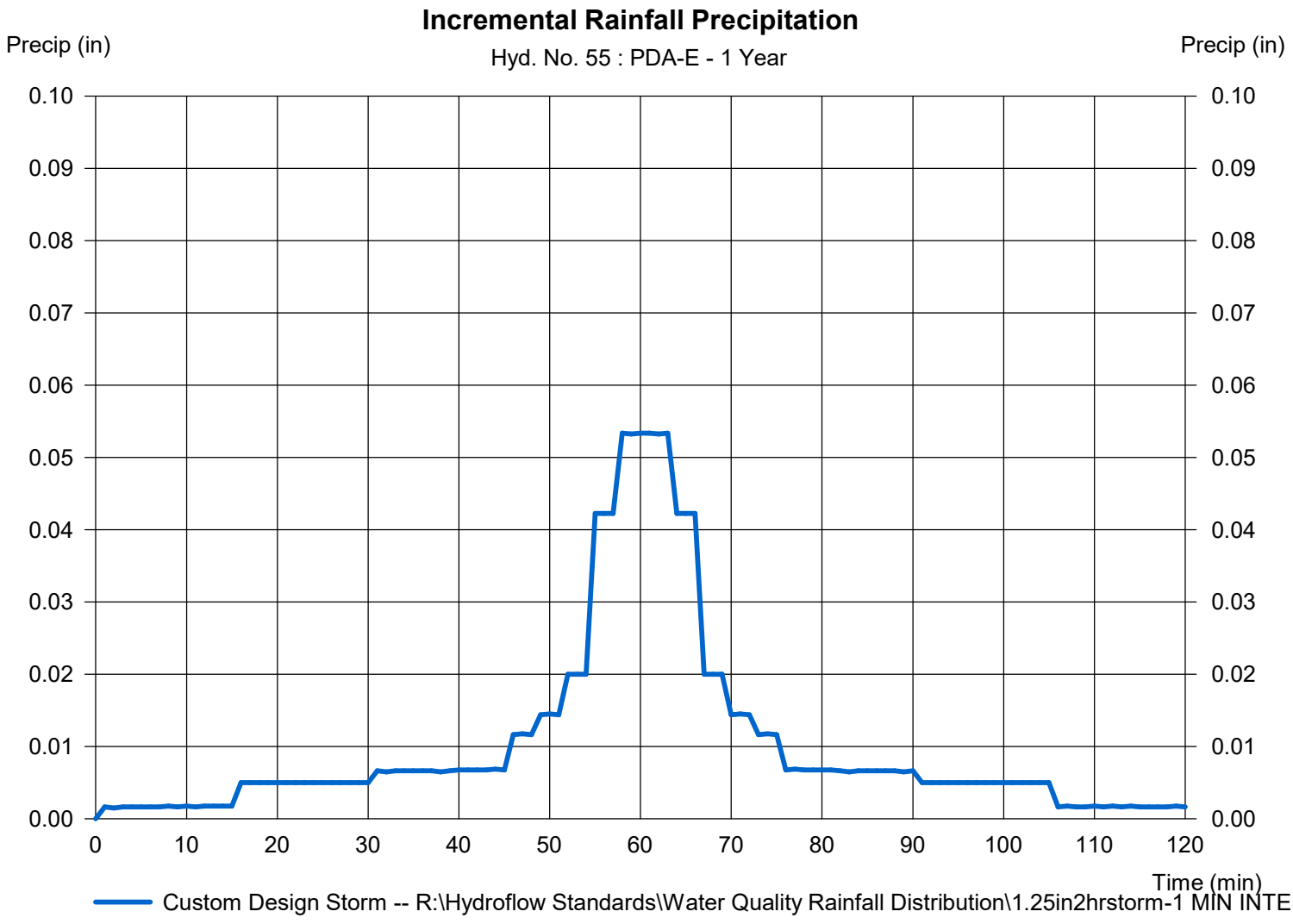


Precipitation Report

Hyd. No. 55

PDA-E

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MIN		

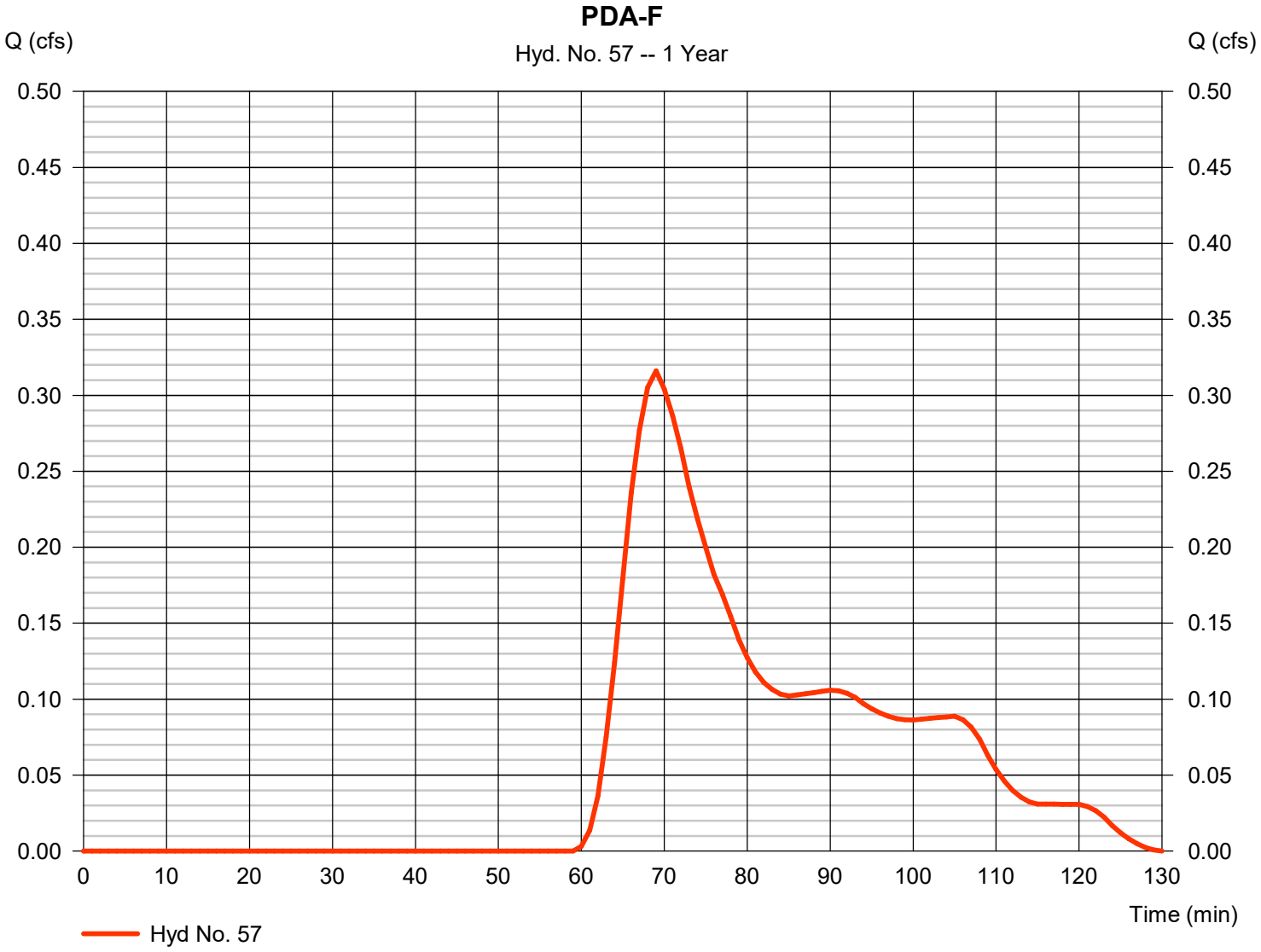


Hydrograph Report

Hyd. No. 57

PDA-F

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.316 cfs
Storm frequency	=	1 yrs	Time to peak	=	69 min
Time interval	=	1 min	Hyd. volume	=	427 cuft
Drainage area	=	0.850 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

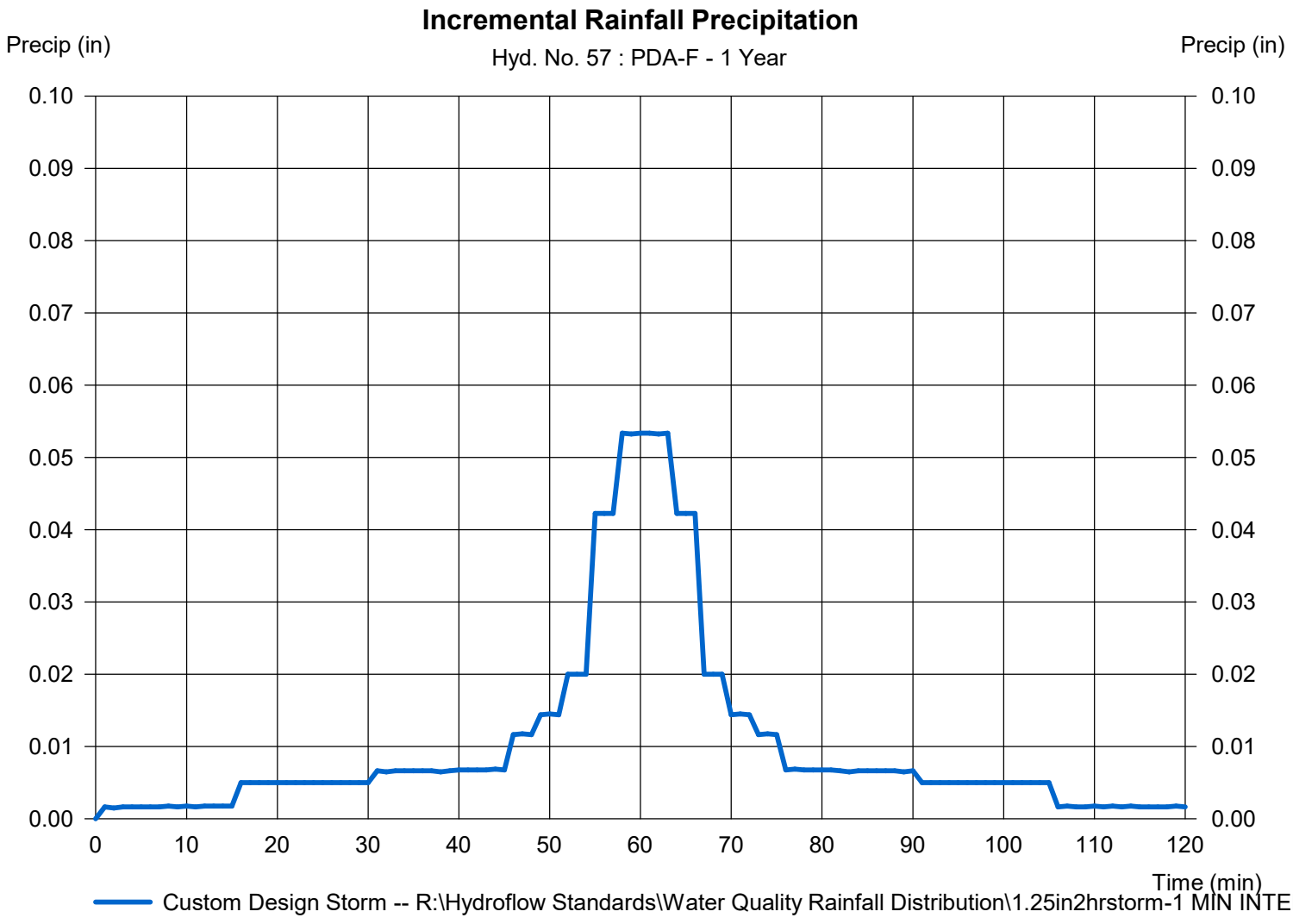


Precipitation Report

Hyd. No. 57

PDA-F

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

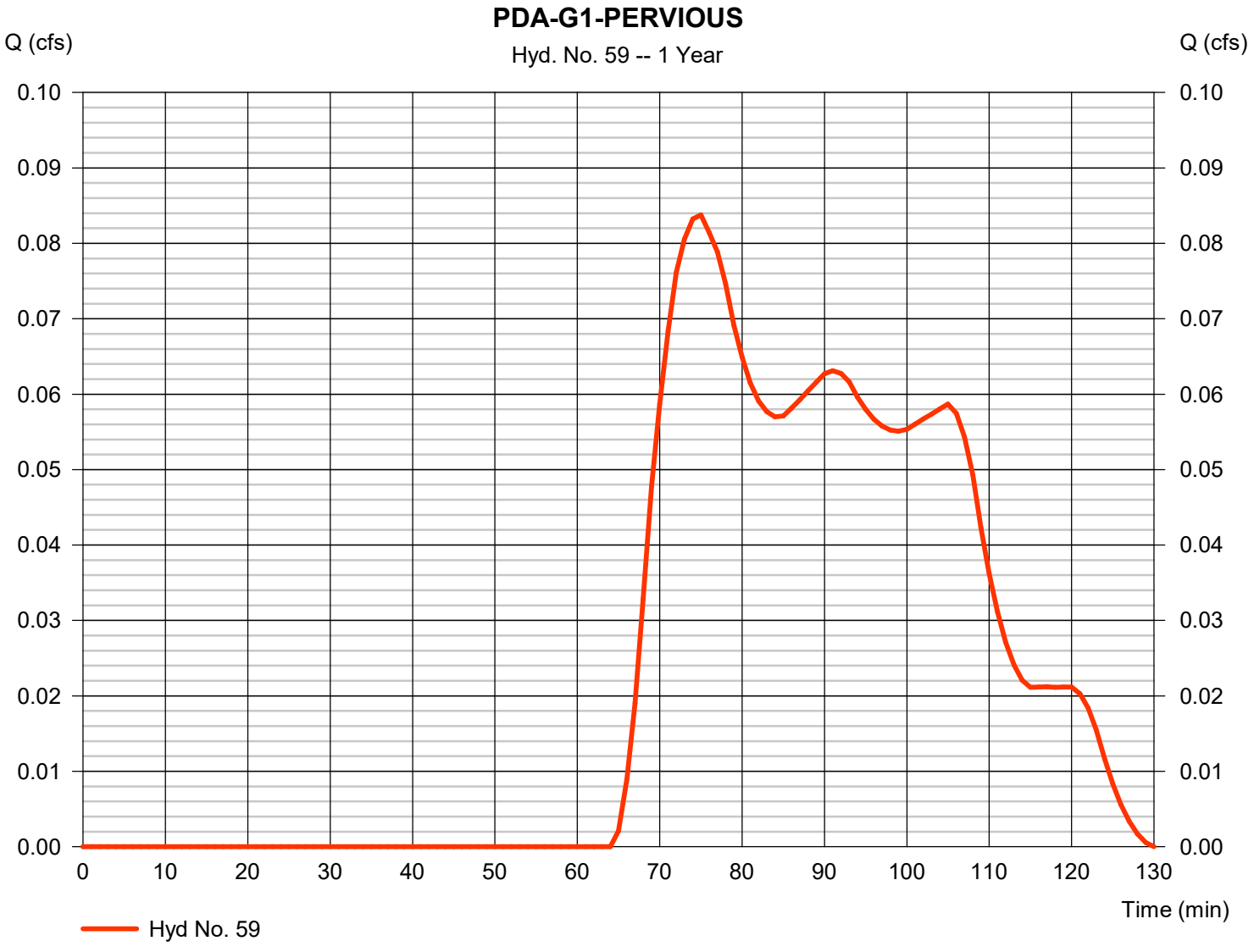


Hydrograph Report

Hyd. No. 59

PDA-G1-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.084 cfs
Storm frequency	=	1 yrs	Time to peak	=	75 min
Time interval	=	1 min	Hyd. volume	=	177 cuft
Drainage area	=	1.140 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

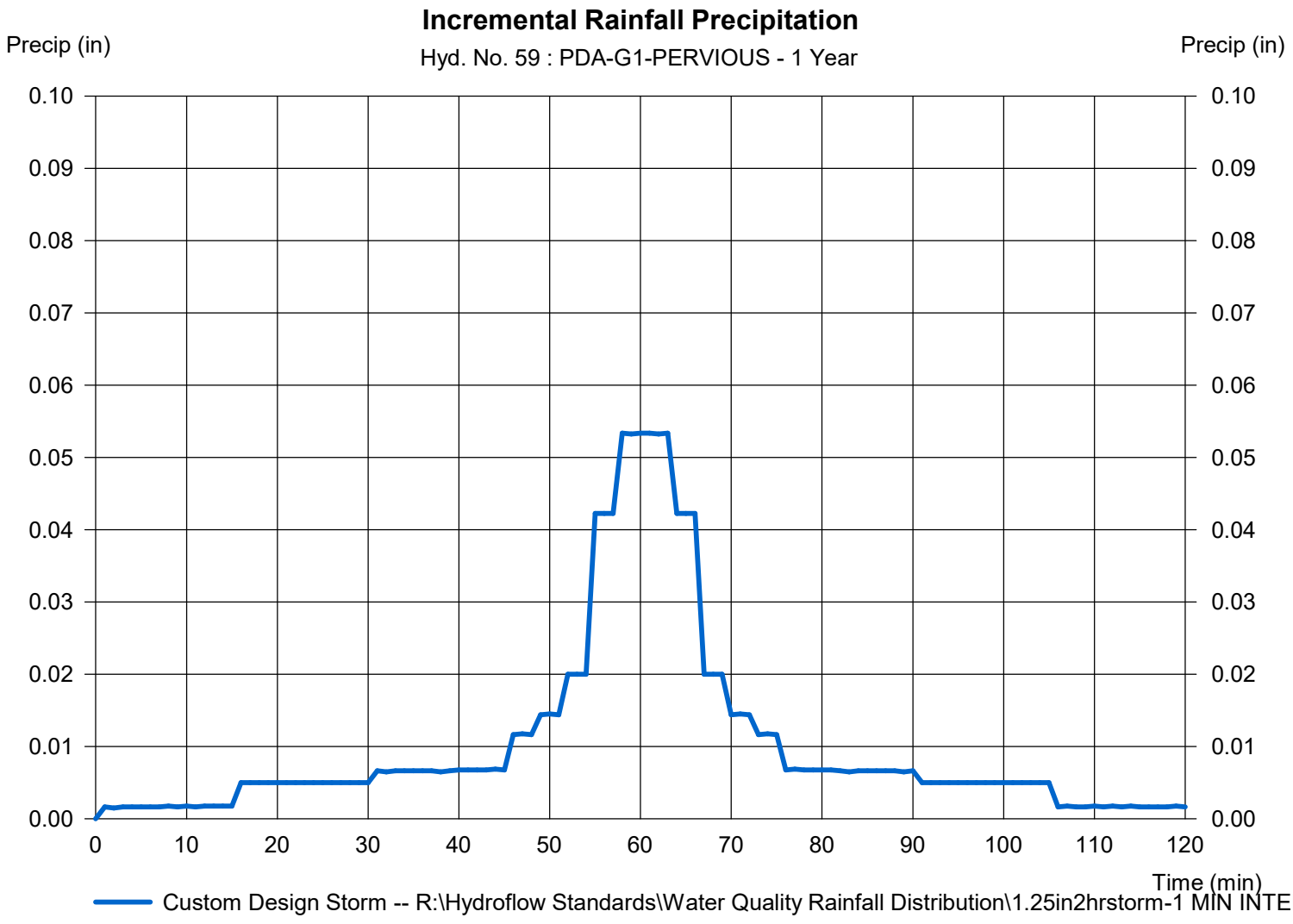


Precipitation Report

Hyd. No. 59

PDA-G1-PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

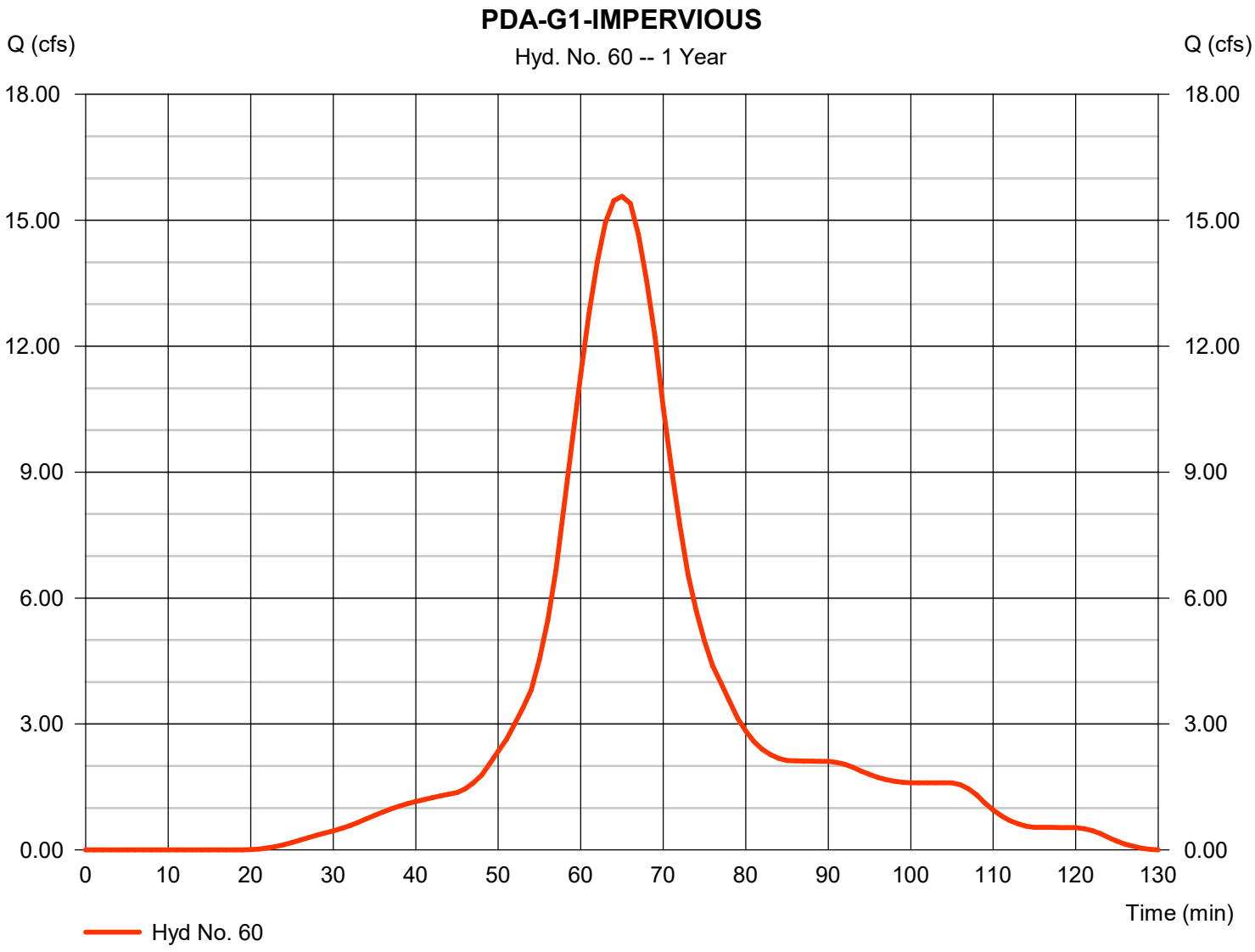


Hydrograph Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.57 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	20,332 cuft
Drainage area	=	5.250 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterSupply\Rainfall Distribution\484.25in2hrstorm-1 MIN Quality.tab			

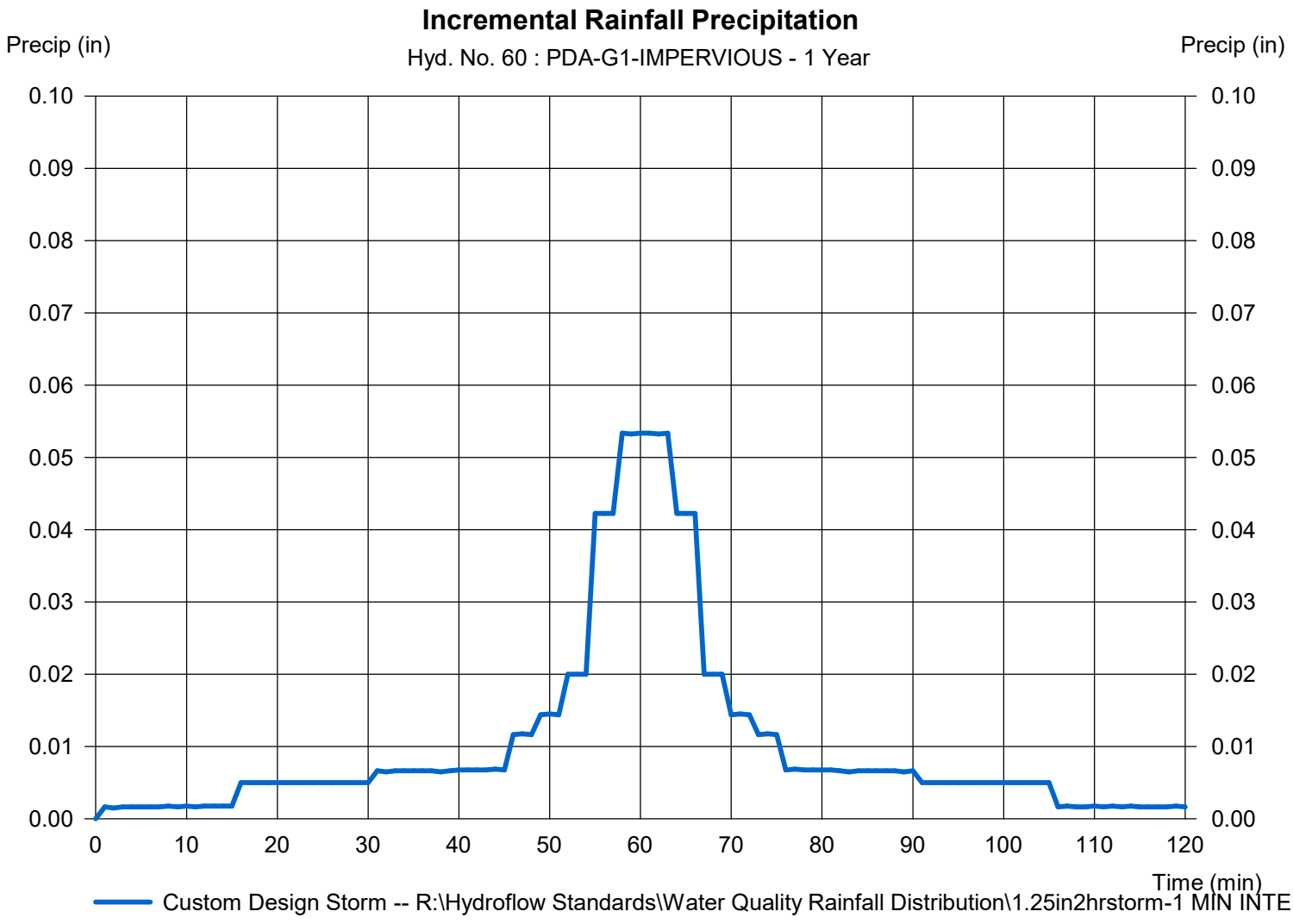


Precipitation Report

Hyd. No. 60

PDA-G1-IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

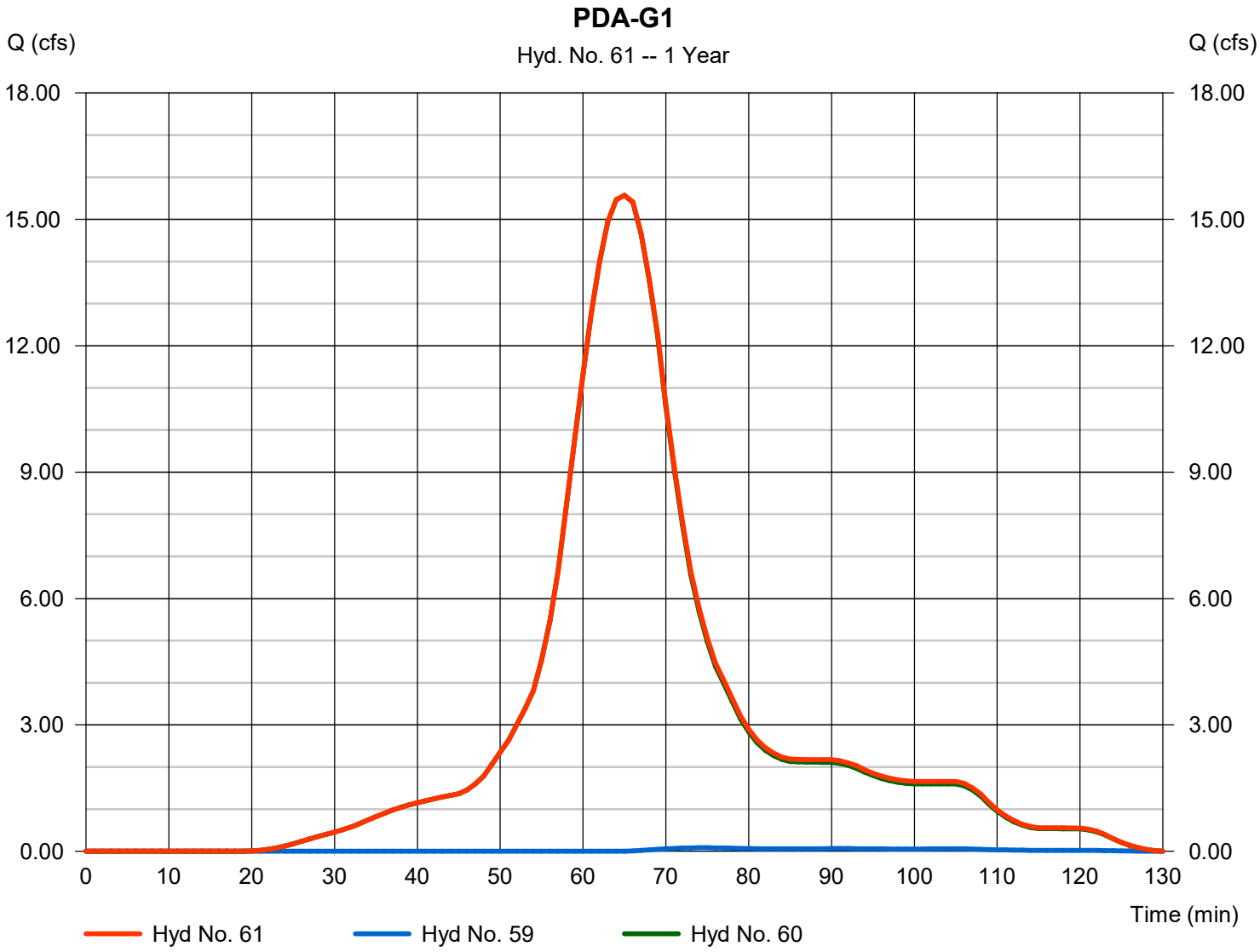


Hydrograph Report

Hyd. No. 61

PDA-G1

Hydrograph type	=	Combine	Peak discharge	=	15.57 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	20,510 cuft
Inflow hyds.	=	59, 60	Contrib. drain. area	=	6.390 ac



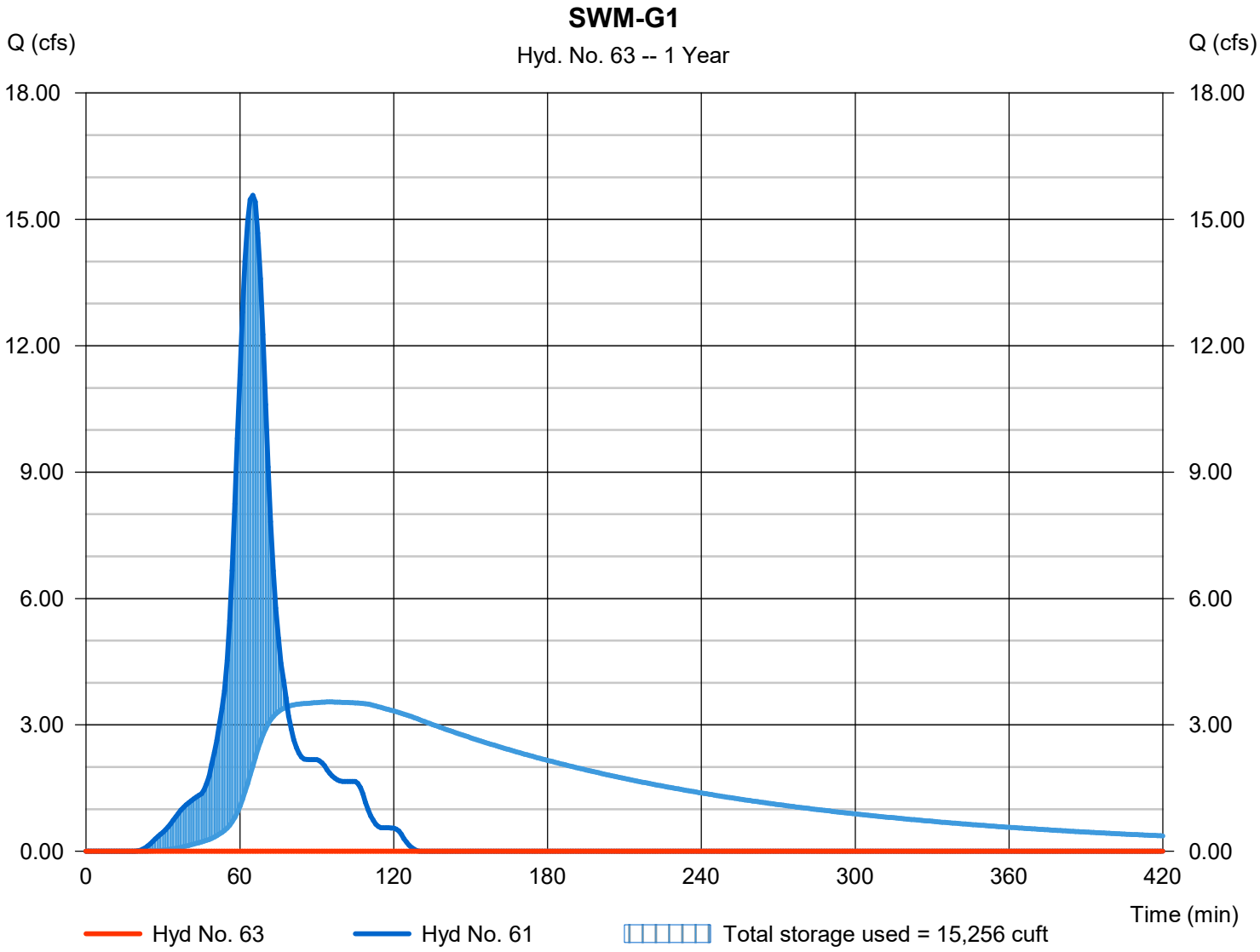
Hydrograph Report

Hyd. No. 63

SWM-G1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= 63 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 61 - PDA-G1	Max. Elevation	= 597.21 ft
Reservoir name	= SWM-G1	Max. Storage	= 15,256 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 5 - SWM-G1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 596.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	596.00	10,939	0	0
1.00	597.00	13,385	12,140	12,140
2.00	598.00	16,090	14,716	26,856
3.00	599.00	19,035	17,540	44,396
4.00	600.00	22,232	20,611	65,007
5.00	601.00	32,957	27,416	92,423

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

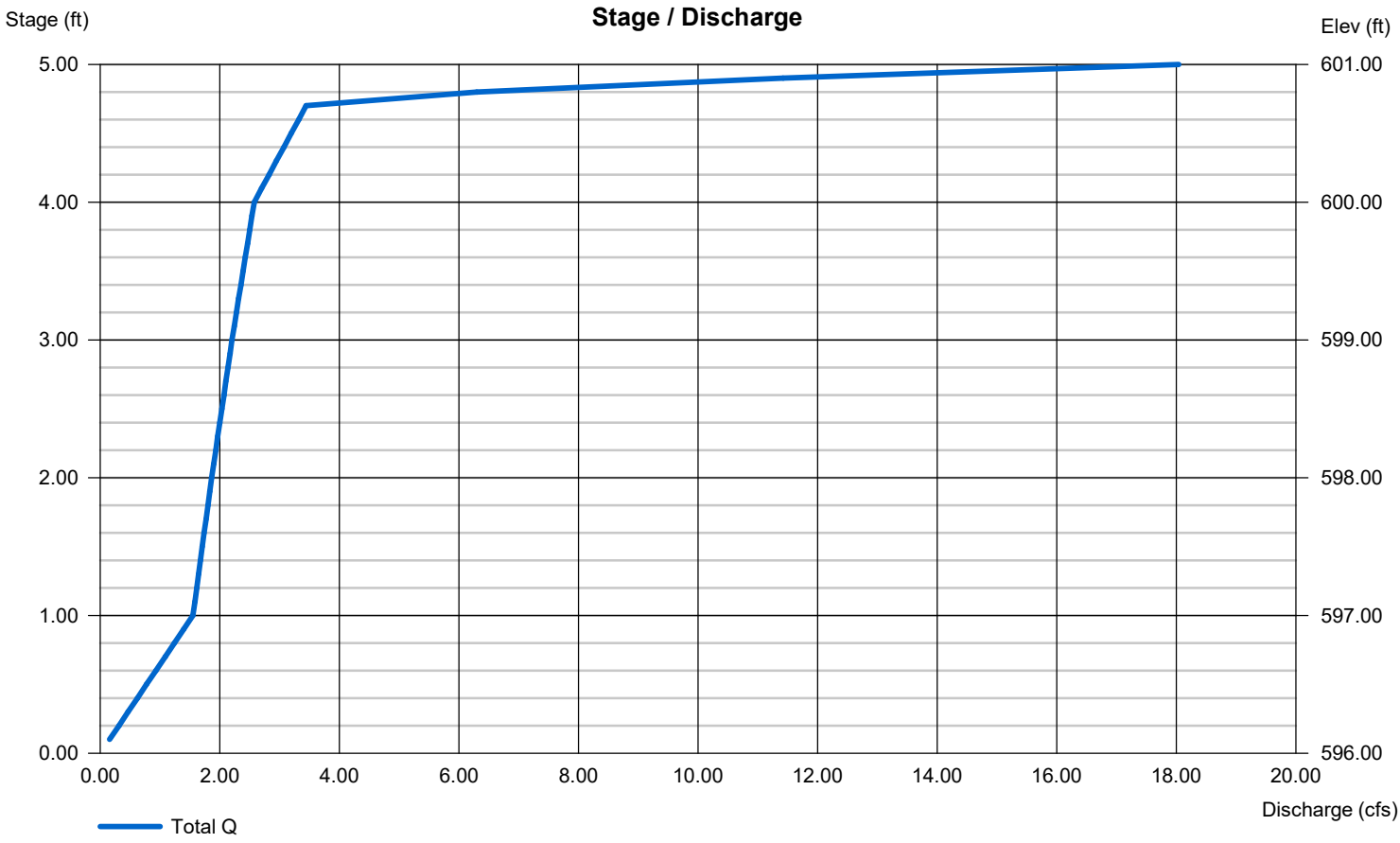
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 26.00	0.00	0.00	0.00
Crest El. (ft)	= 600.70	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

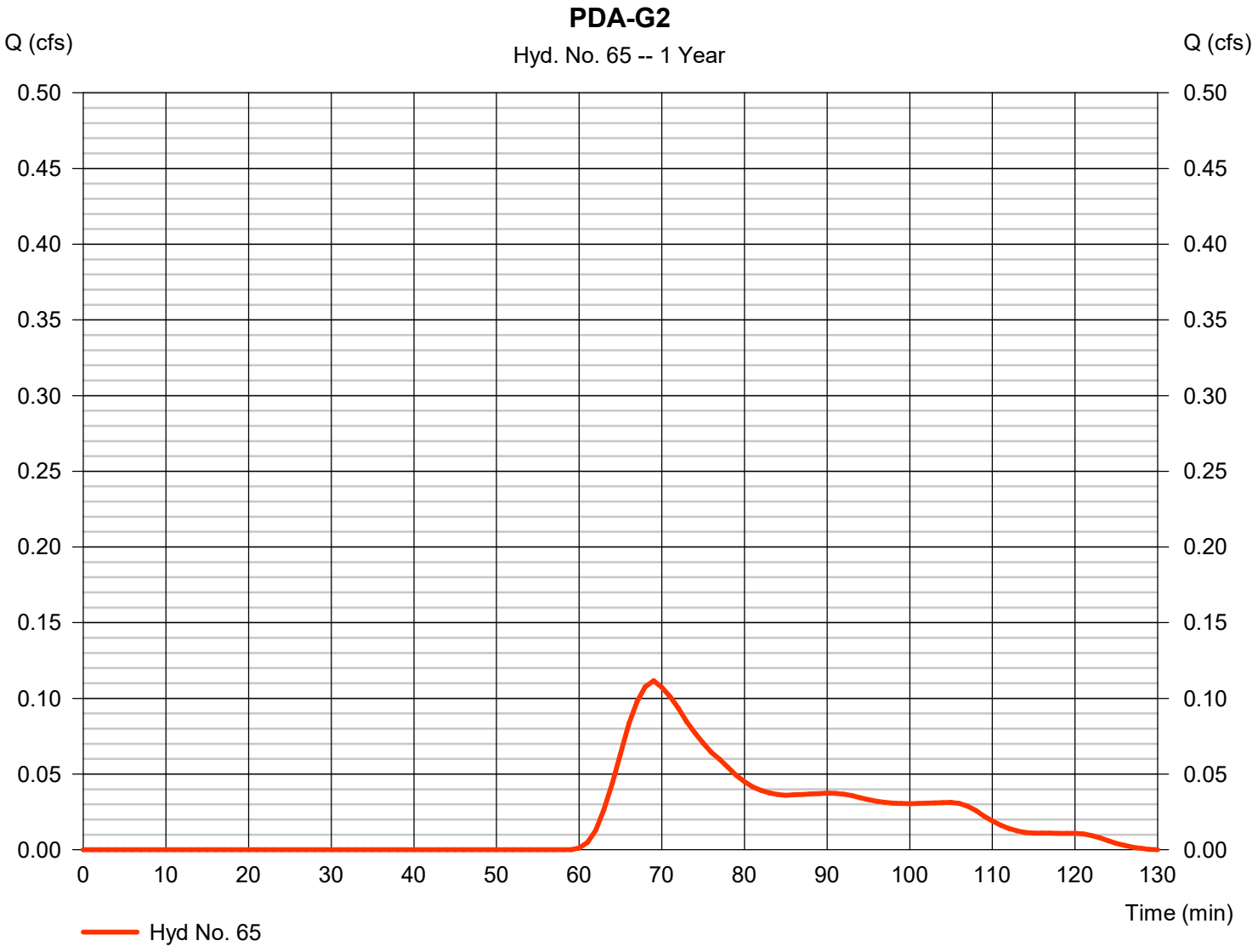


Hydrograph Report

Hyd. No. 65

PDA-G2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.112 cfs
Storm frequency	= 1 yrs	Time to peak	= 69 min
Time interval	= 1 min	Hyd. volume	= 151 cuft
Drainage area	= 0.300 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN		

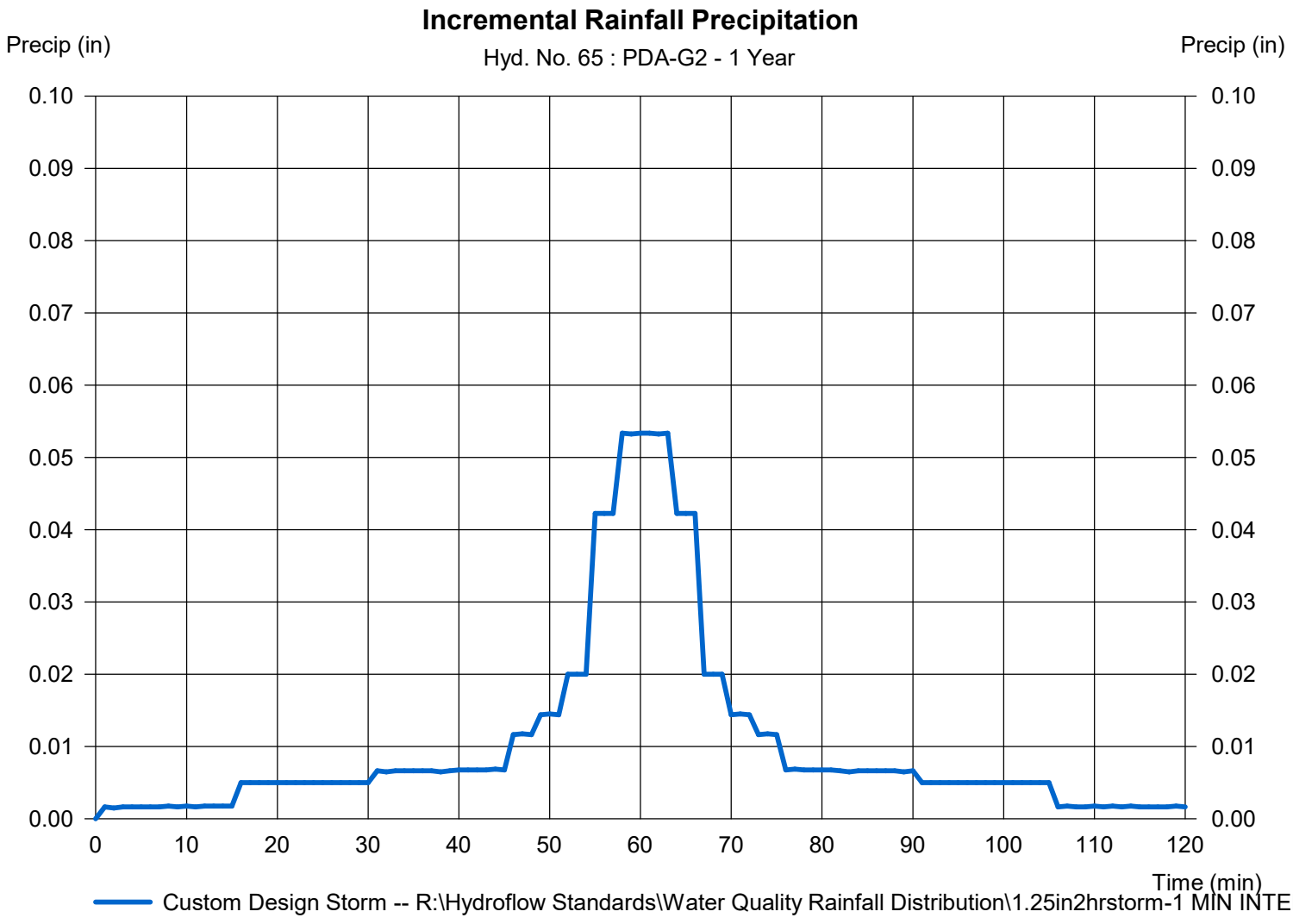


Precipitation Report

Hyd. No. 65

PDA-G2

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MIN		

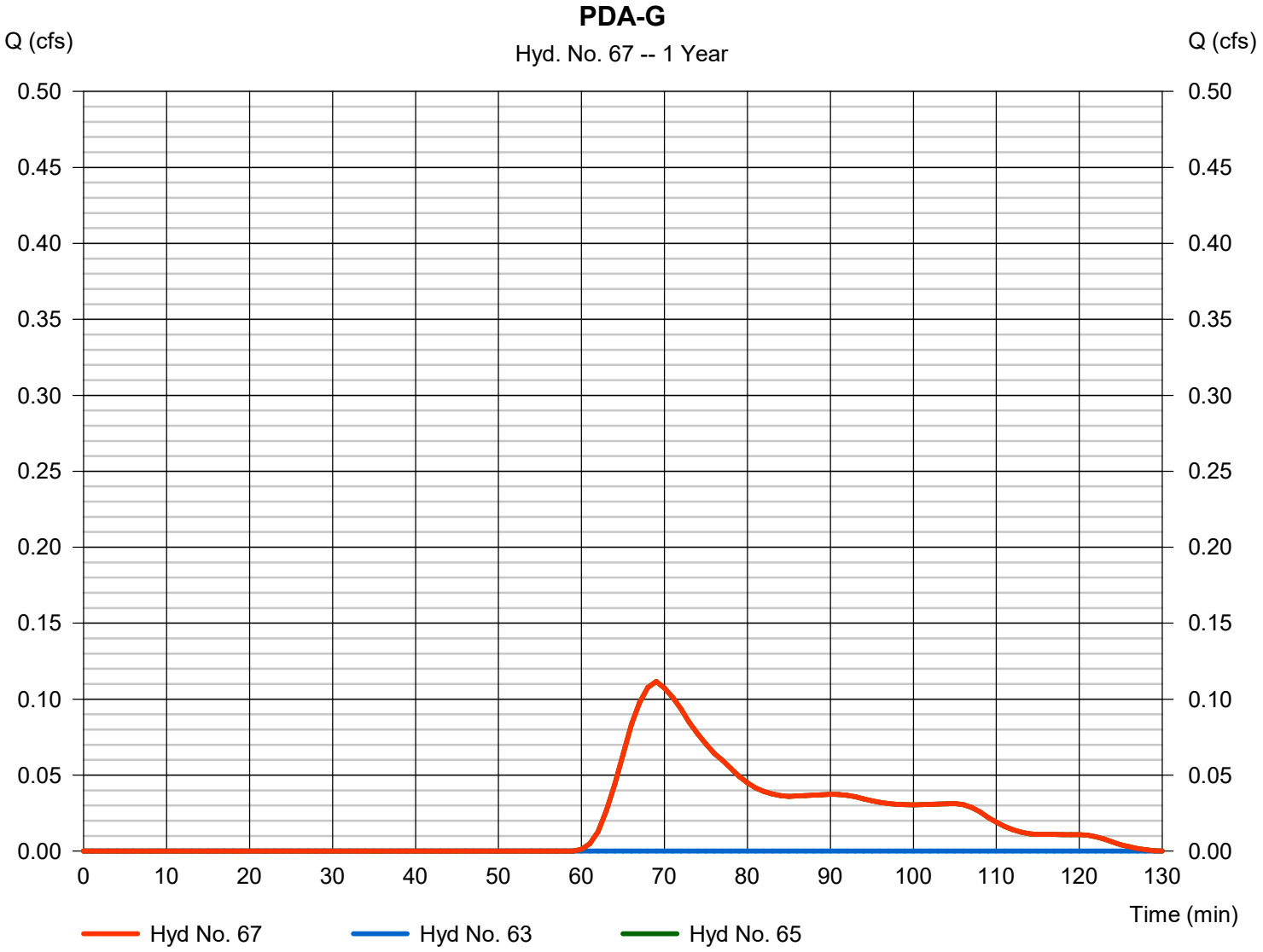


Hydrograph Report

Hyd. No. 67

PDA-G

Hydrograph type	= Combine	Peak discharge	= 0.112 cfs
Storm frequency	= 1 yrs	Time to peak	= 69 min
Time interval	= 1 min	Hyd. volume	= 151 cuft
Inflow hyds.	= 63, 65	Contrib. drain. area	= 0.300 ac

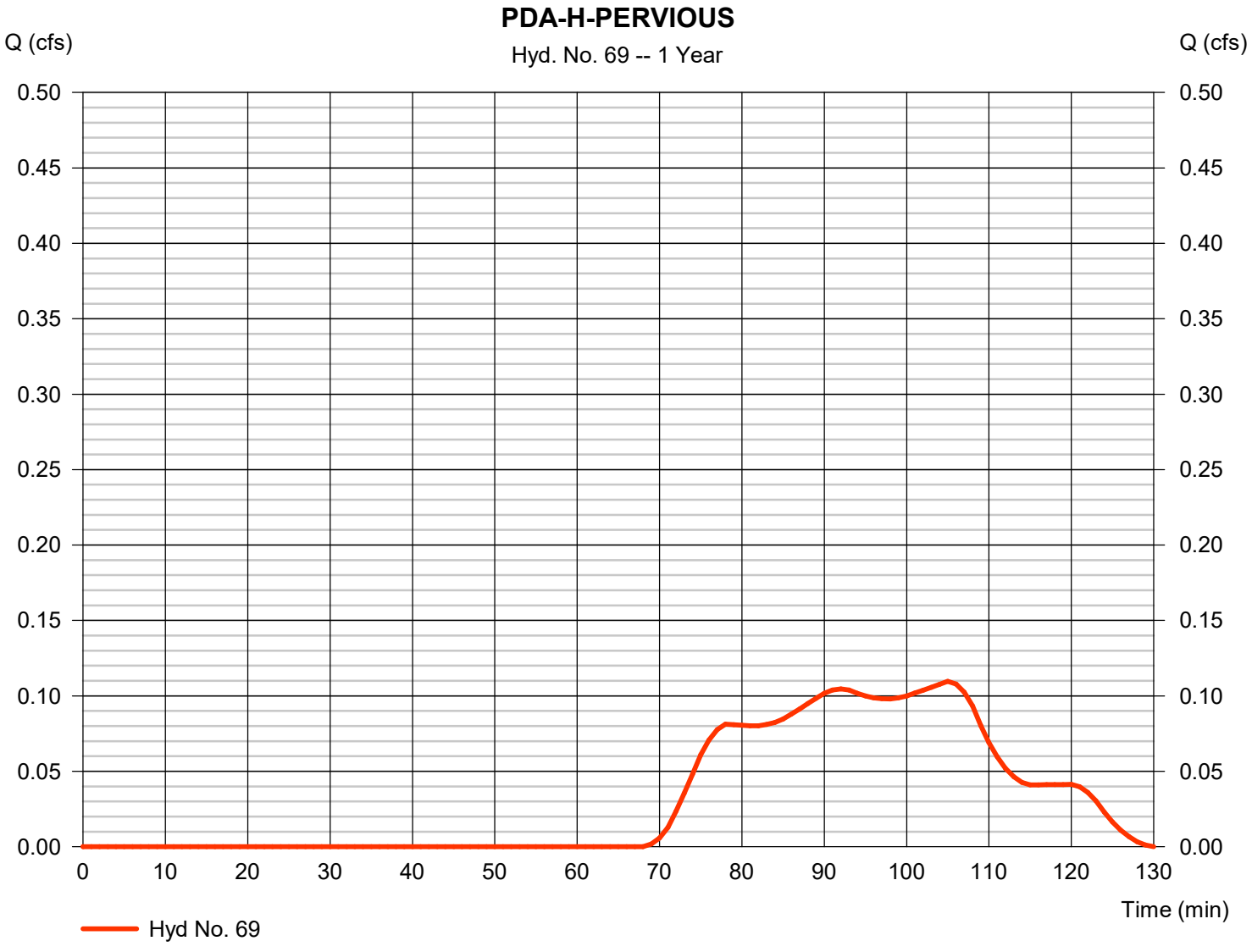


Hydrograph Report

Hyd. No. 69

PDA-H-PERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.110 cfs
Storm frequency	=	1 yrs	Time to peak	=	105 min
Time interval	=	1 min	Hyd. volume	=	244 cuft
Drainage area	=	3.430 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN	Shape factor	=	484

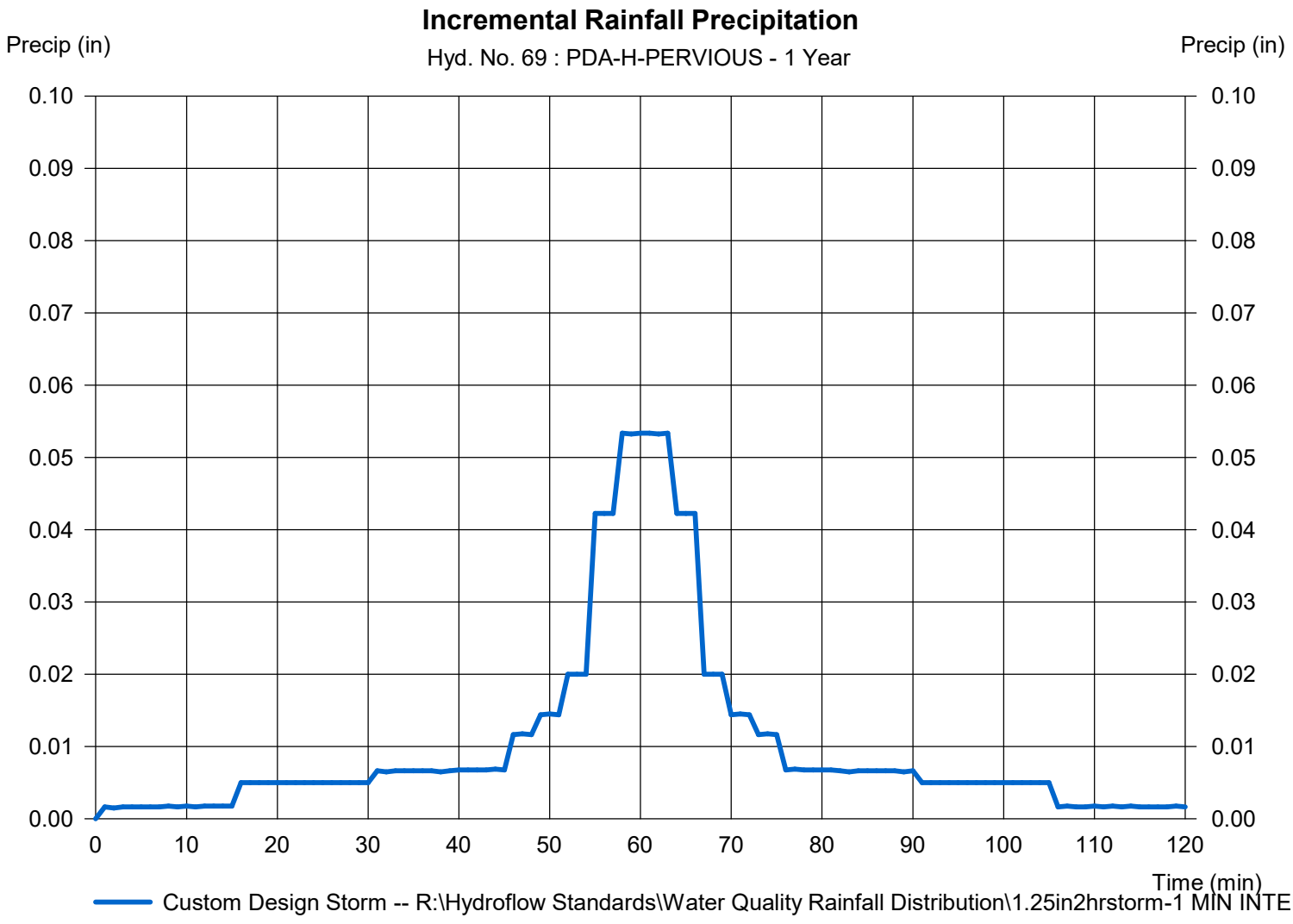


Precipitation Report

Hyd. No. 69

PDA-H-PERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

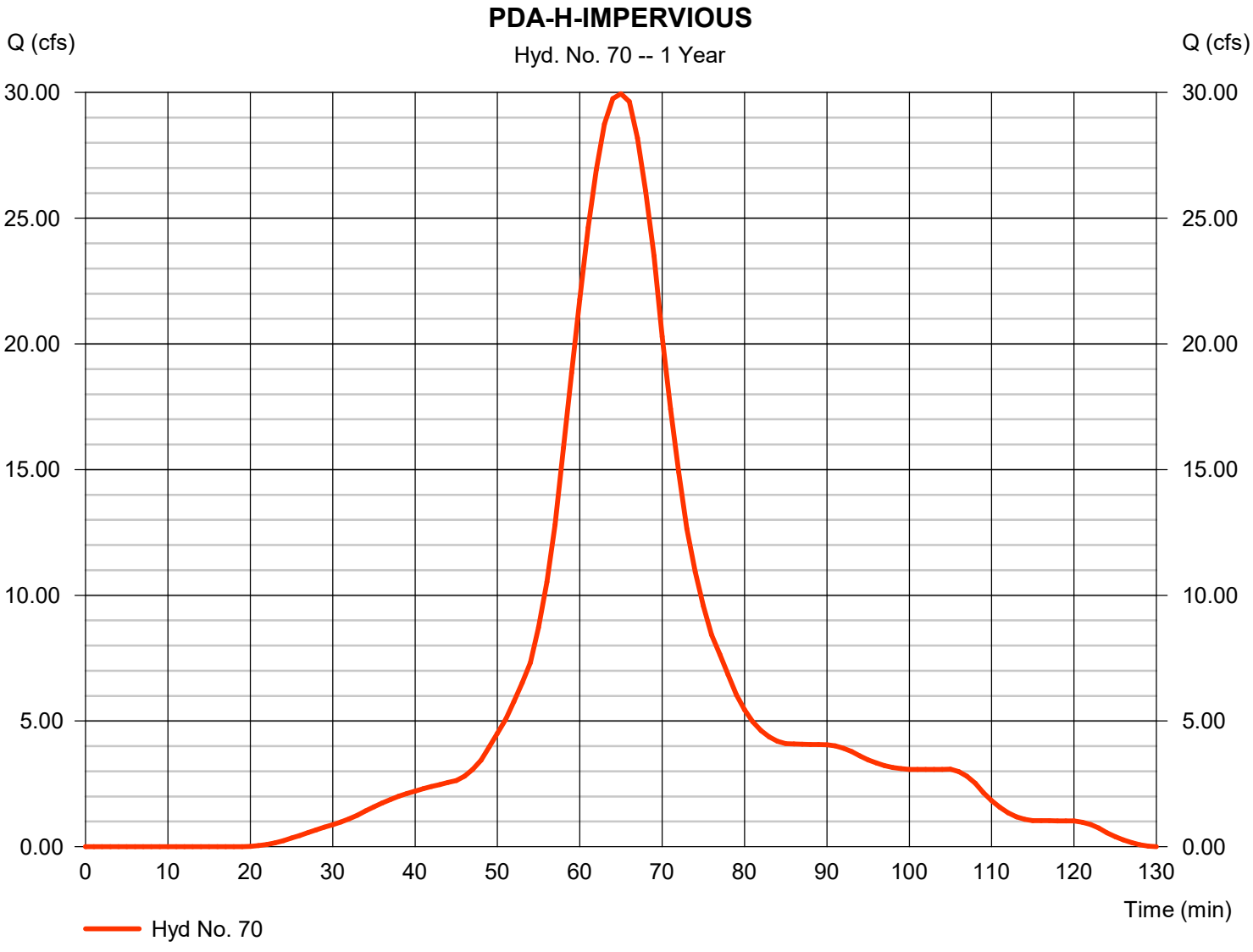


Hydrograph Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.96 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	39,116 cuft
Drainage area	=	10.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	R:\Hydroflow Standards\WaterSupplyFarm\Quality Rainfall Distribution\484.25in2hrstorm-1 MIN			

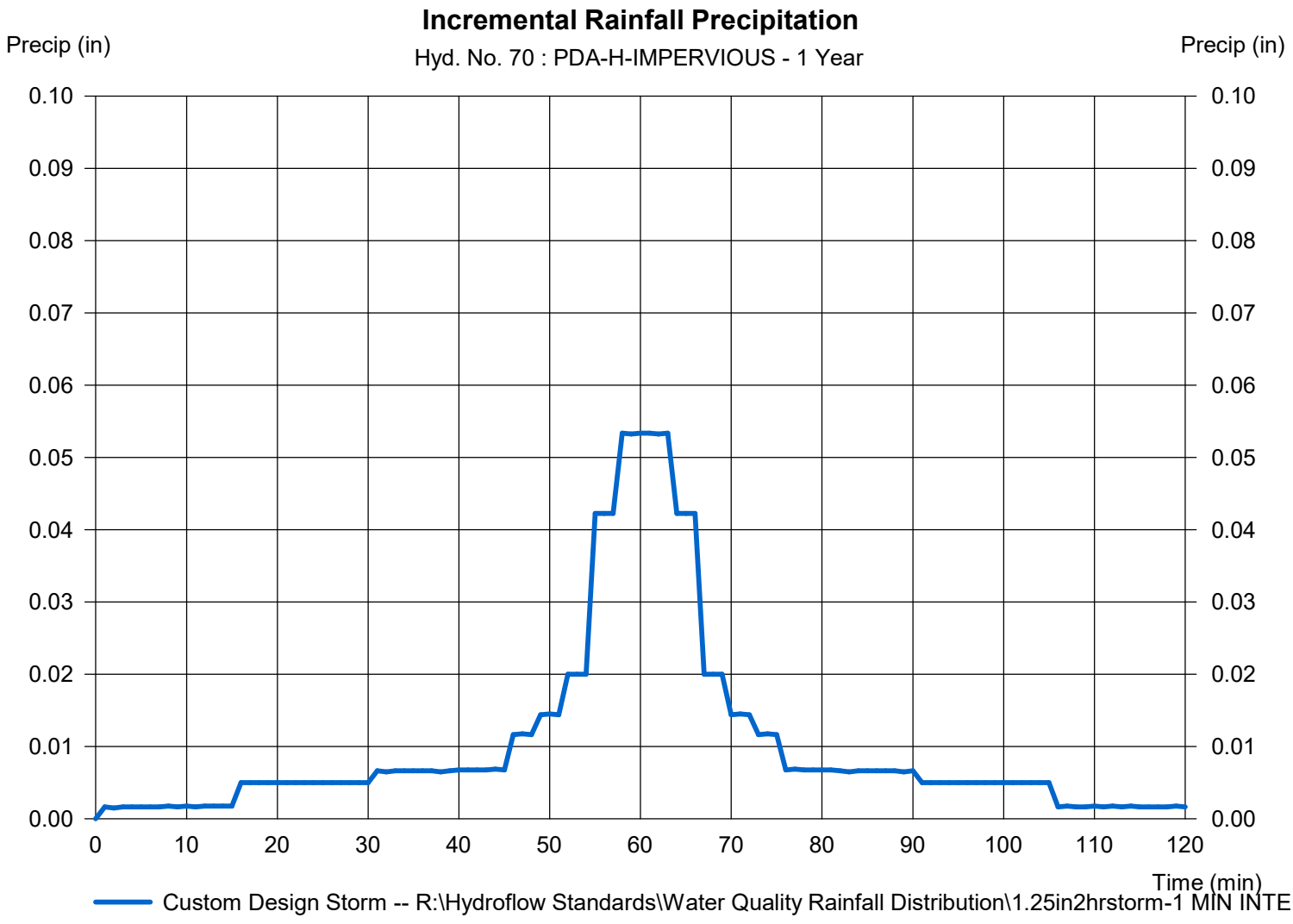


Precipitation Report

Hyd. No. 70

PDA-H-IMPERVIOUS

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		

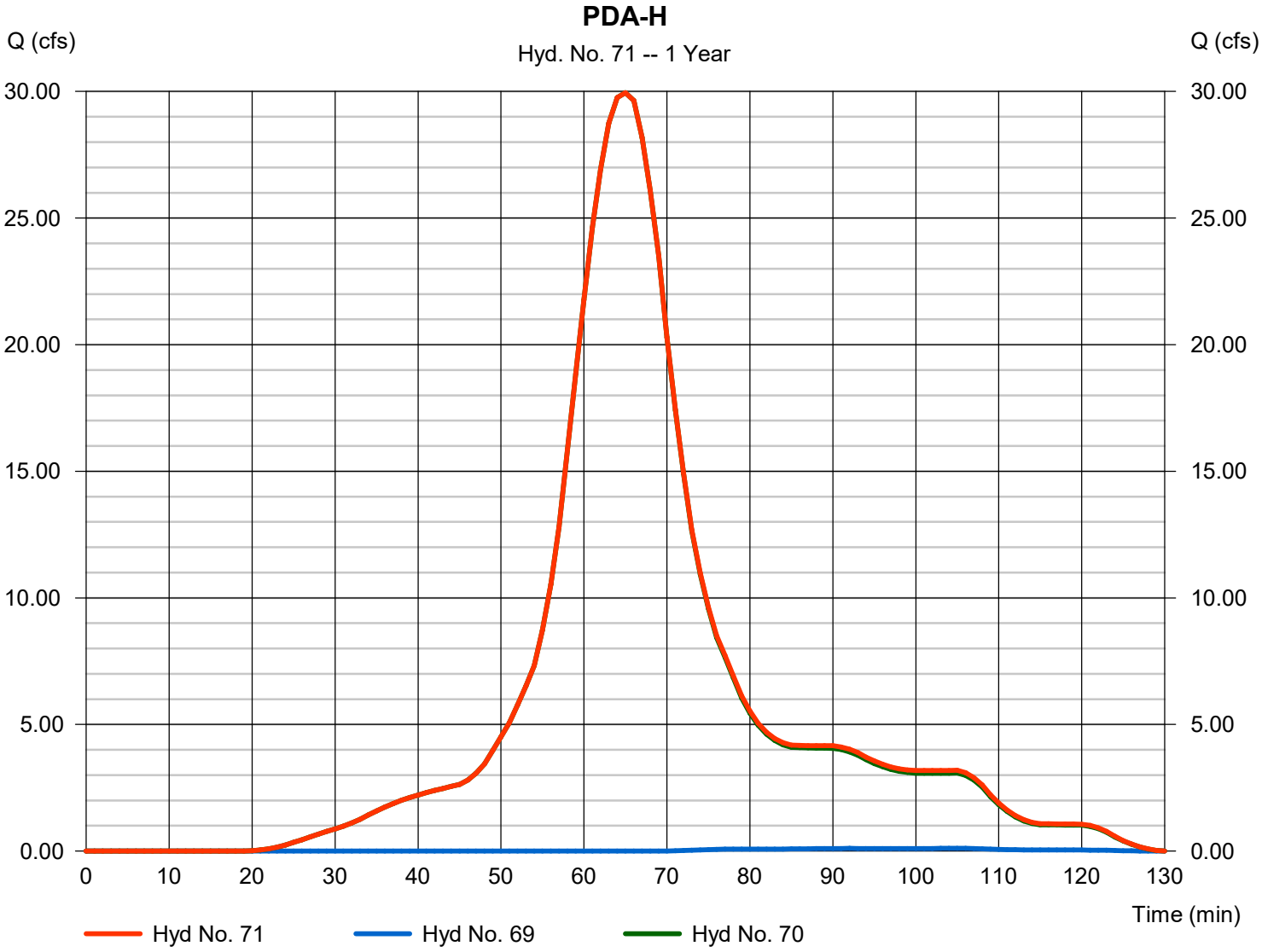


Hydrograph Report

Hyd. No. 71

PDA-H

Hydrograph type	= Combine	Peak discharge	= 29.96 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 39,360 cuft
Inflow hyds.	= 69, 70	Contrib. drain. area	= 13.530 ac



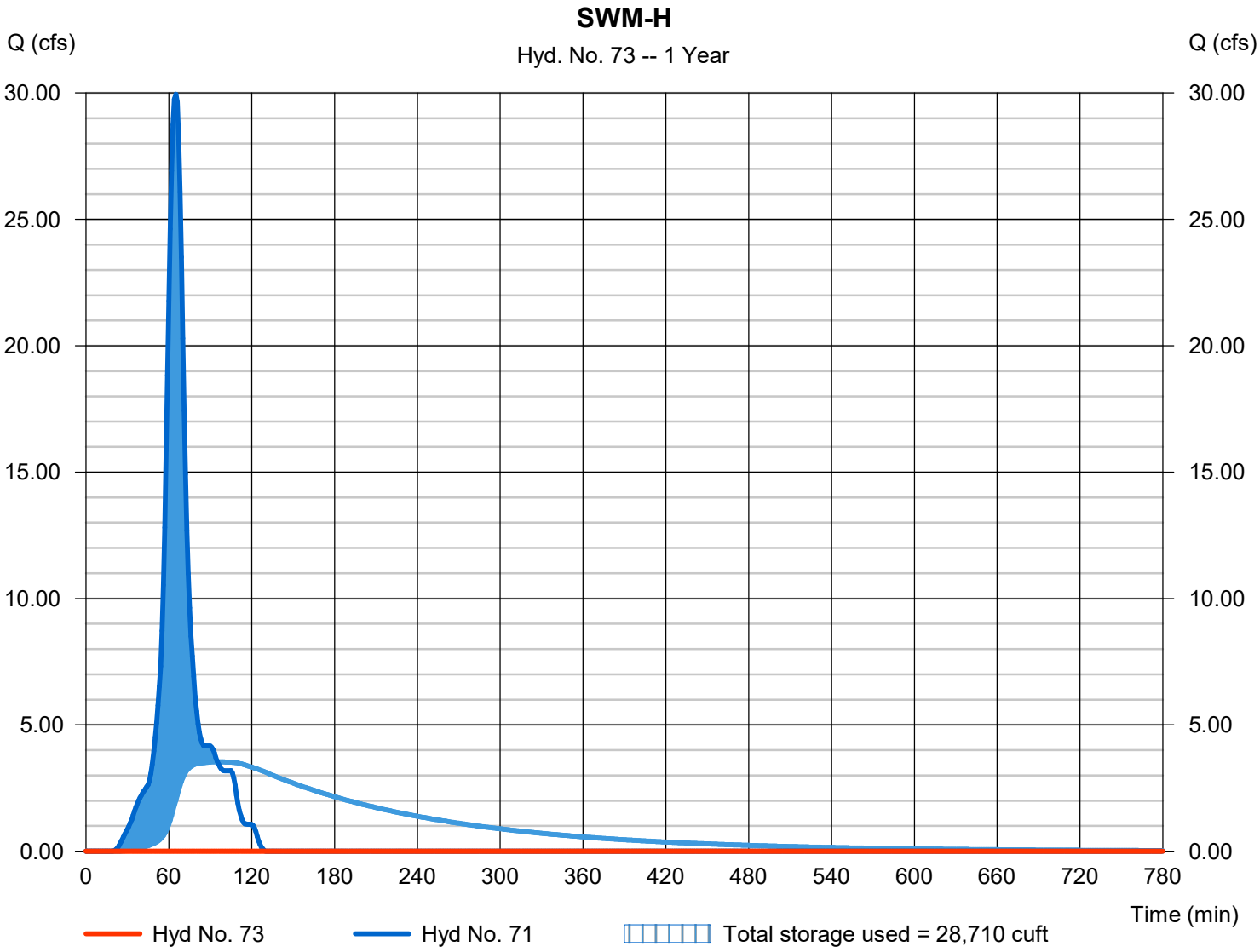
Hydrograph Report

Hyd. No. 73

SWM-H

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	75 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	71 - PDA-H	Max. Elevation	=	596.75 ft
Reservoir name	=	SWM-H	Max. Storage	=	28,710 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 6 - SWM-H

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 596.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	596.00	35,726	0	0
1.00	597.00	40,735	38,199	38,199
2.00	598.00	46,050	43,361	81,560
3.00	599.00	51,472	48,731	130,290
4.00	600.00	57,000	54,207	184,497

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

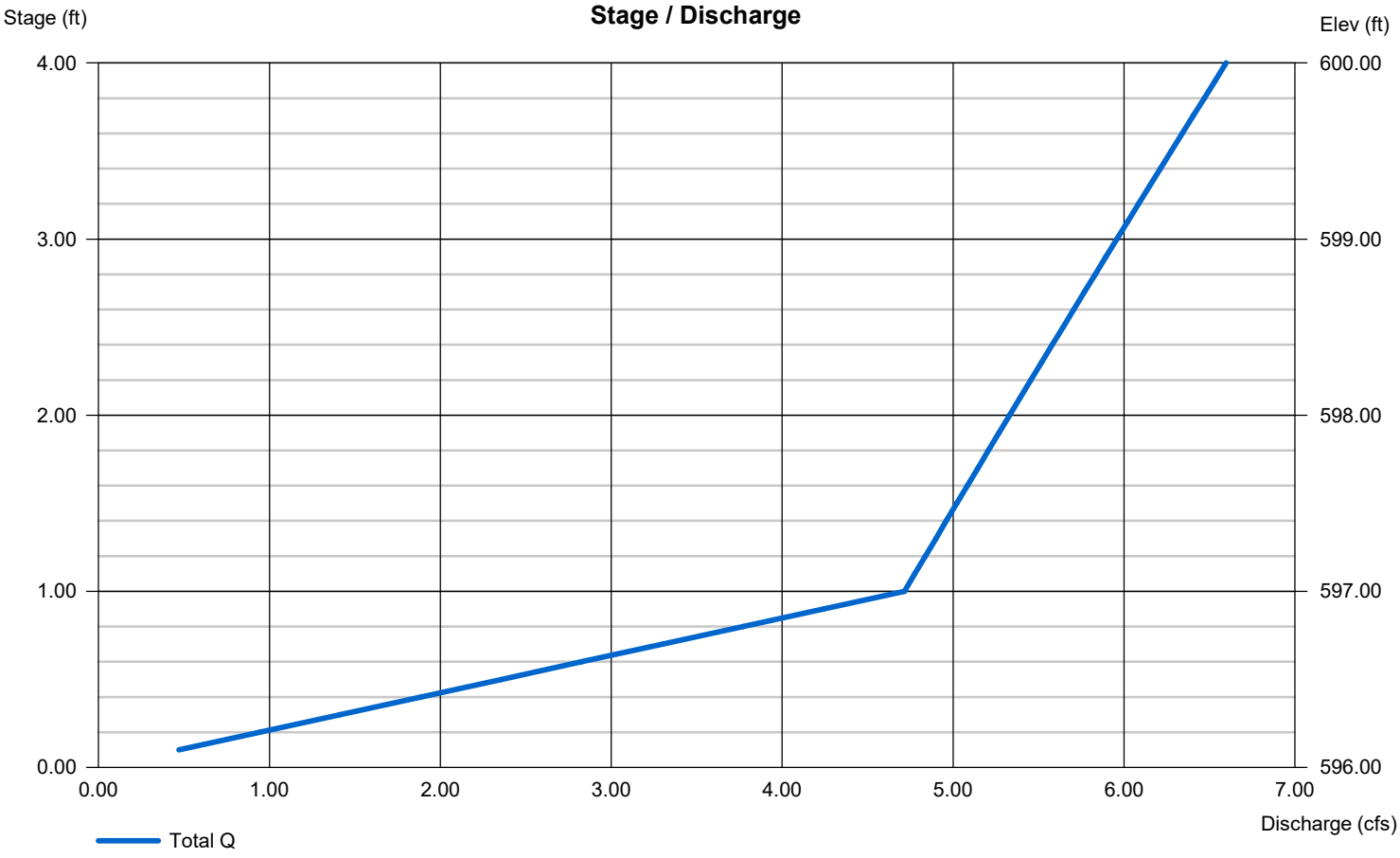
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

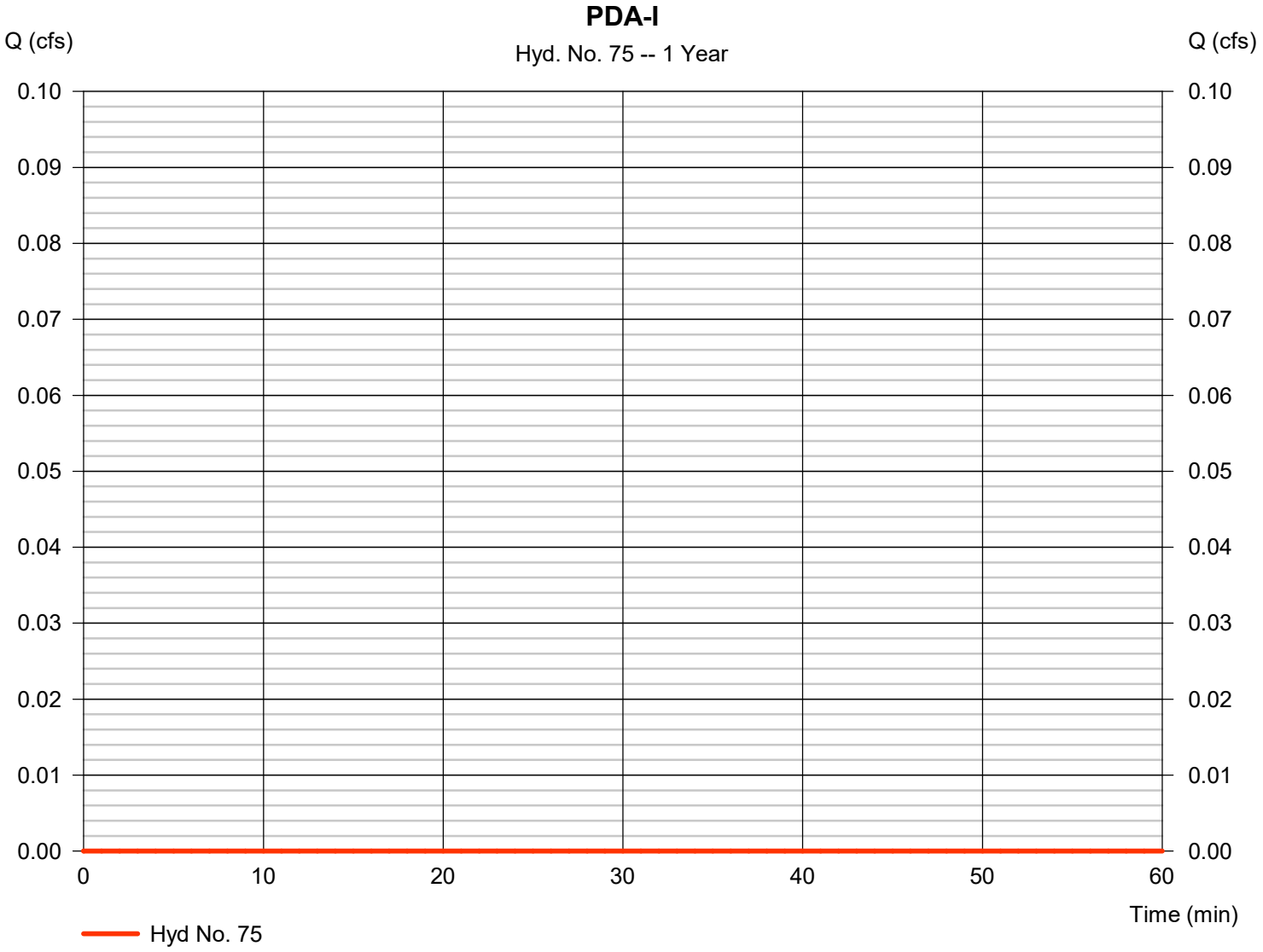


Hydrograph Report

Hyd. No. 75

PDA-I

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 0.260 ac	Curve number	= 34
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\WaterShapeyard\Rainfall Distribution\484.25in2hrstorm-1 MIN		

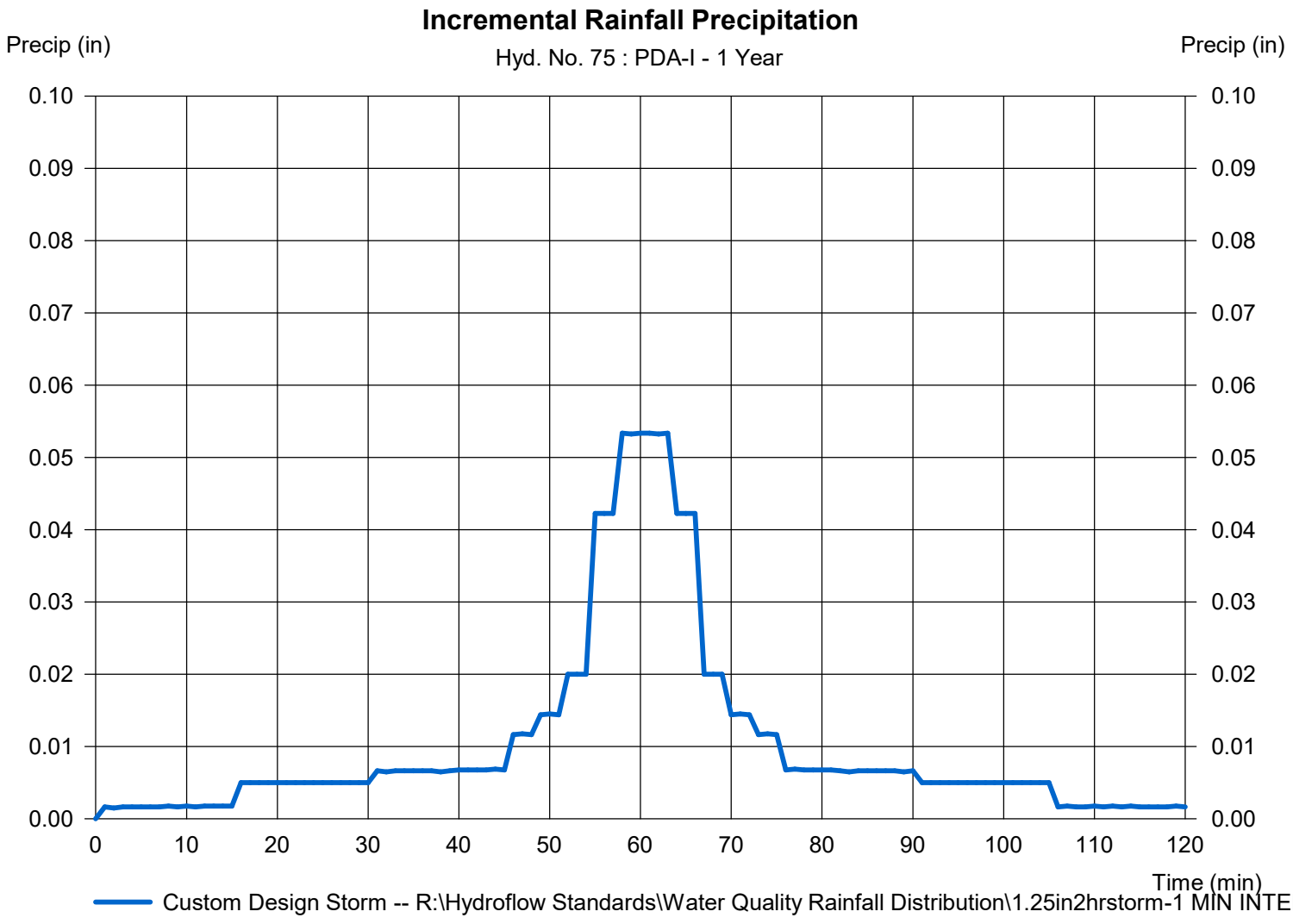


Precipitation Report

Hyd. No. 75

PDA-I

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\Water Quality Rainfall Distribution\1.25in2hrstorm-1 MI		



Hydraflow Table of Contents

APPENDIX G –
GROUNDWATER RECHARGE CALCULATIONS

New Jersey Groundwater Recharge Spreadsheet Version 2.0

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
SUSSEX CO., ANDOVER TWP	43.9	1.60

Project Name:	Stickles Pond Road
Description:	Recharge Calculations
Analysis Date:	11/01/20

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	30.66	Meadow, Pasture, Grassland or range	Hazen	16.2	1,807,889
2	8.24	Meadow, Pasture, Grassland or range	Sandy Land	17.4	519,199
3	2.75	Woods	Hazen	16.4	163,653
4	19.38	Woods	Sandy Land	17.7	1,242,370
5	4.94	Impervious areas	Urban Land*	0.0	-
6					
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	66.0			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				15.6	3,733,111

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	11.36	Open space	Hazen	16.1	662,345
2	6.23	Open space	Sandy Land	17.2	388,298
3	0.27	Woods	Hazen	16.4	16,068
4	48.11	Impervious areas	Urban Land*	0.0	-
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	66.0			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				4.5	1,066,711

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)
		2,095,672
Post-Development Annual Recharge Deficit=	*2,666,400*	(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	0.98	(in)	DRWC=	0.98	(in)
ERWC =	0.20	(in)	EDRWC=	0.20	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
Stickles Pond Road	Recharge Calculations	11/01/20	Above-Ground SWM-A

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	10637.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	60.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-60.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	4	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.00	in
ERWC Modified to consider dEXC	EDRWC	0.00	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.00	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	2.71	in
Inches of Rainfall to capture	Pdesign	2.94	in
Recharge Provided Avg. over Imp. Area		34.0	in
Runoff Captured Avg. over imp. Area		34.0	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.08	unitless
BMP Volume	VBMP	53,185	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	2,666,400	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	135,036	sq.ft
Root Zone Water Capacity	RWC	0.00	in
RWC Modified to consider dEXC	DRWC	0.00	in
Climatic Factor	C-factor	1.60	no units
Average Annual P	Pavg	43.9	in
Recharge Requirement over Imp. Area	dr	15.3	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		383,047	cu.ft
Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.5%	%
%Runoff Infiltrated		100.0%	%
%Runoff Recharged		6.4%	%
%Rainfall Recharged		5.0%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Stickles Pond Road	Recharge Calculations	11/01/20	Above-Ground SWM-B1

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	61258.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	48.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-48.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	4	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.00	in
ERWC Modified to consider dEXC	EDRWC	0.00	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.00	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	2.71	in
Inches of Rainfall to capture	Pdesign	2.94	in
Recharge Provided Avg. over Imp. Area		34.0	in
Runoff Captured Avg. over imp. Area		34.0	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.18	unitless
BMP Volume	VBMP	245,032	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	2,666,400	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	350,000	sq.ft
Root Zone Water Capacity	RWC	0.00	in
RWC Modified to consider dEXC	DRWC	0.00	in
Climatic Factor	C-factor	1.60	no units
Average Annual P	Pavg	43.9	in
Recharge Requirement over Imp. Area	dr	15.3	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		992,821	cu.ft
Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.5%	%
%Runoff Infiltrated		100.0%	%
%Runoff Recharged		16.7%	%
%Rainfall Recharged		12.9%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Stickles Pond Road	Recharge Calculations	11/01/20	Above-Ground SWM-B2

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	21184.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	48.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-48.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	4	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.00	in
ERWC Modified to consider dEXC	EDRWC	0.00	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.00	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	2.71	in
Inches of Rainfall to capture	Pdesign	2.94	in
Recharge Provided Avg. over Imp. Area		34.0	in
Runoff Captured Avg. over imp. Area		34.0	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.14	unitless
BMP Volume	VBMP	84,736	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	2,666,400	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	156,816	sq.ft
Root Zone Water Capacity	RWC	0.00	in
RWC Modified to consider dEXC	DRWC	0.00	in
Climatic Factor	C-factor	1.60	no units
Average Annual P	Pavg	43.9	in
Recharge Requirement over Imp. Area	dr	15.3	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		444,829	cu.ft
Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.5%	%
%Runoff Infiltrated		100.0%	%
%Runoff Recharged		7.5%	%
%Rainfall Recharged		5.8%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Stickles Pond Road	Recharge Calculations	11/01/20	Above-Ground SWM-D

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	23768.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	84.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-84.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	4	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.00	in
ERWC Modified to consider dEXC	EDRWC	0.00	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.00	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	2.71	in
Inches of Rainfall to capture	Pdesign	2.94	in
Recharge Provided Avg. over Imp. Area		34.0	in
Runoff Captured Avg. over imp. Area		34.0	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.07	unitless
BMP Volume	VBMP	166,376	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	2,666,400	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	350,000	sq.ft
Root Zone Water Capacity	RWC	0.00	in
RWC Modified to consider dEXC	DRWC	0.00	in
Climatic Factor	C-factor	1.60	no units
Average Annual P	Pavg	43.9	in
Recharge Requirement over Imp. Area	dr	15.3	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		992,821	cu.ft
Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.5%	%
%Runoff Infiltrated		100.0%	%
%Runoff Recharged		16.7%	%
%Rainfall Recharged		12.9%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Stickles Pond Road	Recharge Calculations	11/01/20	Above-Ground SWM-G1

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	10939.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	60.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-60.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	4	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.00	in
ERWC Modified to consider dEXC	EDRWC	0.00	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.00	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	2.71	in
Inches of Rainfall to capture	Pdesign	2.94	in
Recharge Provided Avg. over Imp. Area		34.0	in
Runoff Captured Avg. over imp. Area		34.0	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.05	unitless
BMP Volume	VBMP	54,695	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	2,666,400	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	228,690	sq.ft
Root Zone Water Capacity	RWC	0.00	in
RWC Modified to consider dEXC	DRWC	0.00	in
Climatic Factor	C-factor	1.60	no units
Average Annual P	Pavg	43.9	in
Recharge Requirement over Imp. Area	dr	15.3	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		648,709	cu.ft
Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.5%	%
%Runoff Infiltrated		100.0%	%
%Runoff Recharged		10.9%	%
%Rainfall Recharged		8.5%	%

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

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Project Name	Description	Analysis Date	BMP or LID Type
Stickles Pond Road	Recharge Calculations	11/01/20	Above-Ground SWM-H

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	35726.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	48.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-48.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	4	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.00	in
ERWC Modified to consider dEXC	EDRWC	0.00	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.00	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	2.71	in
Inches of Rainfall to capture	Pdesign	2.94	in
Recharge Provided Avg. over Imp. Area		34.0	in
Runoff Captured Avg. over imp. Area		34.0	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.10	unitless
BMP Volume	VBMP	142,904	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	2,666,400	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	350,000	sq.ft
Root Zone Water Capacity	RWC	0.00	in
RWC Modified to consider dEXC	DRWC	0.00	in
Climatic Factor	C-factor	1.60	no units
Average Annual P	Pavg	43.9	in
Recharge Requirement over Imp. Area	dr	15.3	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		992,821	cu.ft
Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.5%	%
%Runoff Infiltrated		100.0%	%
%Runoff Recharged		16.7%	%
%Rainfall Recharged		12.9%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

SWM-A Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10637.00	SF

Q	**2.77005**	**CFS**
	9972.188	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**12006**	cf	**1.2 Hours**	<72 Hours

SWM-A Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10637.00	SF

Q	**2.77005**	**CFS**
	9972.188	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**34899**	cf	**3.5 Hours**	<72 Hours

SWM-A Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10637.00	SF

Q	**2.77005**	**CFS**
	9972.188	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**52147**	cf	**5.2 Hours**	<72 Hours

SWM-A Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10637.00	SF

Q	**2.77005**	**CFS**
	9972.188	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**84372**	cf	**8.5 Hours**	<72 Hours

SWM-B1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	61258.00	SF

Q	**14.18009**	**CFS**
	51048.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**55980**	cf	**1.1 Hours**	<72 Hours

SWM-B1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	61258.00	SF

Q	**14.18009**	**CFS**
	51048.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**185237**	cf	**3.6 Hours**	<72 Hours

SWM-B1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	61258.00	SF

Q	**14.18009**	**CFS**
	51048.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**290807**	cf	**5.7 Hours**	<72 Hours

SWM-B1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	61258.00	SF

Q	**14.18009**	**CFS**
	51048.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**495143**	cf	**9.7 Hours**	<72 Hours

SWM-B2 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	21184.00	SF

Q	**4.90370**	**CFS**
	17653.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**14001**	cf	**0.8 Hours**	<72 Hours

SWM-B2 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	21184.00	SF

Q	**4.90370**	**CFS**
	17653.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**42872**	cf	**2.4 Hours**	<72 Hours

SWM-B2 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	21184.00	SF

Q	**4.90370**	**CFS**
	17653.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**65808**	cf	**3.7 Hours**	<72 Hours

SWM-B2 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	6.00	Ft
Davg	**4.00**	Ft
d	2.00	Ft
I	**2**	

A: Bottom	21184.00	SF

Q	**4.90370**	**CFS**
	17653.333	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**109871**	cf	**6.2 Hours**	<72 Hours

SWM-D Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	9.00	Ft
Davg	**5.50**	Ft
d	2.00	Ft
I	**2.75**	

A: Bottom	23768.00	SF

Q	**7.56505**	**CFS**
	27234.167	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**46753**	cf	**1.7 Hours**	<72 Hours

SWM-D Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	9.00	Ft
Davg	**5.50**	Ft
d	2.00	Ft
I	**2.75**	

A: Bottom	23768.00	SF

Q	**7.56505**	**CFS**
	27234.167	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**138588**	cf	**5.1 Hours**	<72 Hours

SWM-D Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	9.00	Ft
Davg	**5.50**	Ft
d	2.00	Ft
I	**2.75**	

A: Bottom	23768.00	SF

Q	**7.56505**	**CFS**
	27234.167	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**208457**	cf	**7.7 Hours**	<72 Hours

SWM-D Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	9.00	Ft
Davg	**5.50**	Ft
d	2.00	Ft
I	**2.75**	

A: Bottom	23768.00	SF

Q	**7.56505**	**CFS**
	27234.167	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**339491**	cf	**12.5 Hours**	<72 Hours

SWM-G1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10939.00	SF

Q	**2.84870**	**CFS**
	10255.313	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**20510**	cf	**2.0 Hours**	<72 Hours

SWM-G1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10939.00	SF

Q	**2.84870**	**CFS**
	10255.313	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**62954**	cf	**6.1 Hours**	<72 Hours

SWM-G1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10939.00	SF

Q	**2.84870**	**CFS**
	10255.313	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**96484**	cf	**9.4 Hours**	<72 Hours

SWM-G1 Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	10939.00	SF

Q	**2.84870**	**CFS**
	10255.313	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**160626**	cf	**15.7 Hours**	<72 Hours

SWM-H Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	35726.00	SF

Q	**9.30365**	**CFS**
	33493.125	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**39360**	cf	**1.2 Hours**	<72 Hours

SWM-H Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	35726.00	SF

Q	**9.30365**	**CFS**
	33493.125	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**123391**	cf	**3.7 Hours**	<72 Hours

SWM-H Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	35726.00	SF

Q	**9.30365**	**CFS**
	33493.125	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**191596**	cf	**5.7 Hours**	<72 Hours

SWM-H Draining Calculations:

248 Stickles Pond Road

Rate of Infiltration:

Q=KIA

Q: Rate of Infiltration (cfs)

K: Design Permeability (fps)

I: Hydraulic Gradient

A: Area of Infiltration (SF)

K	5	in/hr	per Permeability Test
	0.000115741	**fps**	

I=Davg/d

Davg=(D1+D2)/2

D1: Min Distance to Groundwater

D2: Max Distance to Groundwater

d: distance from bottom of BMP to Groundwater

D1	2.00	Ft
D2	7.00	Ft
Davg	**4.50**	Ft
d	2.00	Ft
I	**2.25**	

A: Bottom	35726.00	SF

Q	**9.30365**	**CFS**
	33493.125	**CF/Hr**

Volume			**Drain Time:**	t=V/Q
WQV	**324029**	cf	**9.7 Hours**	<72 Hours

APPENDIX H –
ON SITE SOIL TESTING

Engineering & Land Planning Associates

Project:	BHT Andover	Date:	10/22/2019
Location:	BHT Andover	Sample:	In Place
Test By:	Annika Asplund	Log Number:	SL-1
		Depth:	48"

				Disturbed	
L=	4.500	T1=	117	Tube Weight	686
H1=	6.000	T2=	311	Gross Weight	1,034
H2=	4.500	T3=	330	Net Weight	348
r=	1.125	T4=	346		
R=	1.125	T5=	419	Sample Vol. (in^3)	17.88328125
		T(sec.)=	419	(cm^3)	293.1069797
		T(min.)=	6.98		
				Bulk Density	1.187279813

Soil Permeability: 11.12

Soil Class: K4

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$ [Equation 4]

Where:

K = permeability of the soil sample, in inches per hour;
L = length of the soil core, in inches;
T = time required for the water level to drop from H_1 to H_2 during the final test interval, in minutes,;
r = radius of the standpipe, in centimeters or inches;
R = radius of the soil core, in the same units as "r";
H_1 = height of the water level above the rim of the test basin at the beginning of each test interval, in inches; and
H_2 = height of the water level above the rim of the test basin at the end of each test interval, in inches.

[Note: When the standpipe is not used, the term r^2/R^2 is omitted from the equation.]

Engineering & Land Planning Associates

Project:	BHT Andover	Date:	10/22/2019
Location:	BHT Andover	Sample:	In Place
Test By:	Kevin Meininger	Log Number:	SL-2
		Depth:	48"

				Disturbed	
L=	3.250	T1=	117	Tube Weight	694
H1=	5.000	T2=	116	Gross Weight	982
H2=	3.250	T3=	124	Net Weight	288
r=	1.125	T4=	125		
R=	1.125	T5=	125	Sample Vol. (in³)	12.91570313
		T(sec.)=	125	(cm³)	211.6883742
		T(min.)=	2.08		
				Bulk Density	1.360490396
Soil Permeability:			40.32		
Soil Class:			K5		

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$ [Equation 4]

Where:

K = permeability of the soil sample, in inches per hour;
L = length of the soil core, in inches;
T = time required for the water level to drop from H_1 to H_2 during the final test interval, in minutes,;
r = radius of the standpipe, in centimeters or inches;
R = radius of the soil core, in the same units as "r";
H_1 = height of the water level above the rim of the test basin at the beginning of each test interval, in inches; and
H_2 = height of the water level above the rim of the test basin at the end of each test interval, in inches.

[Note: When the standpipe is not used, the term r^2/R^2 is omitted from the equation.]

Engineering & Land Planning Associates

Project:	BHT Andover	Date:	10/22/2019
Location:	BHT Andover	Sample:	In Place
Test By:	Kevin Meininger	Log Number:	SL-3
		Depth:	48"

				Disturbed	
L=	4.000	T1=	15	Tube Weight	694
H1=	5.000	T2=	16	Gross Weight	1,083
H2=	4.000	T3=	23	Net Weight	389
r=	1.125	T4=	23		
R=	1.125	T5=	23	Sample Vol. (in^3)	15.89625
		T(sec.)=	23	(cm^3)	260.5395375
		T(min.)=	0.38		
				Bulk Density	1.493055541

Soil Permeability: 139.71

Soil Class: K5

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$ [Equation 4]

Where:

K = permeability of the soil sample, in inches per hour;
L = length of the soil core, in inches;
T = time required for the water level to drop from H_1 to H_2 during the final test interval, in minutes,;
r = radius of the standpipe, in centimeters or inches;
R = radius of the soil core, in the same units as "r";
H_1 = height of the water level above the rim of the test basin at the beginning of each test interval, in inches; and
H_2 = height of the water level above the rim of the test basin at the end of each test interval, in inches.

[Note: When the standpipe is not used, the term r^2/R^2 is omitted from the equation.]

Engineering & Land Planning Associates

Project:	BHT Andover	Date:	10/22/2019
Location:	BHT Andover	Sample:	In Place
Test By:	Annika Asplund	Log Number:	SL-4
		Depth:	100"

L=	4.000	T1=	62
H1=	5.000	T2=	102
H2=	4.000	T3=	126
r=	1.125	T4=	166
R=	1.125	T5=	127
		T(sec.)=	127
		T(min.)=	2.12

Soil Permeability: 25.30

Soil Class: K5

Disturbed

Tube Weight	686
Gross Weight	1,037
Net Weight	351
Sample Vol. (in³)	15.89625
(cm³)	260.5395375
Bulk Density	1.347204357

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$ [Equation 4]

Where:

K = permeability of the soil sample, in inches per hour;
L = length of the soil core, in inches;
T = time required for the water level to drop from H_1 to H_2 during the final test interval, in minutes,;
r = radius of the standpipe, in centimeters or inches;
R = radius of the soil core, in the same units as "r";
H_1 = height of the water level above the rim of the test basin at the beginning of each test interval, in inches; and
H_2 = height of the water level above the rim of the test basin at the end of each test interval, in inches.

[Note: When the standpipe is not used, the term r^2/R^2 is omitted from the equation.]

Engineering & Land Planning Associates

Project:	BHT Andover	Date:	10/22/2019
Location:	BHT Andover	Sample:	In Place
Test By:	Kevin Meininger	Log Number:	SL-5
		Depth:	56"

L=	3.000	T1=	35
H1=	5.000	T2=	37
H2=	3.000	T3=	32
r=	1.125	T4=	33
R=	1.125	T5=	34
		T(sec.)=	34
		T(min.)=	0.57

Soil Permeability: 162.26

Soil Class: K5

Disturbed

Tube Weight	694
Gross Weight	1,058
Net Weight	364
Sample Vol. (in³)	11.9221875
(cm³)	195.4046531
Bulk Density	1.862801086

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$ [Equation 4]

Where:

K = permeability of the soil sample, in inches per hour;
L = length of the soil core, in inches;
T = time required for the water level to drop from H_1 to H_2 during the final test interval, in minutes,;
r = radius of the standpipe, in centimeters or inches;
R = radius of the soil core, in the same units as "r";
H_1 = height of the water level above the rim of the test basin at the beginning of each test interval, in inches; and
H_2 = height of the water level above the rim of the test basin at the end of each test interval, in inches.

[Note: When the standpipe is not used, the term r^2/R^2 is omitted from the equation.]

Engineering & Land Planning Associates

Project:	BHT Andover	Date:	10/22/2019
Location:	BHT Andover	Sample:	In Place
Test By:	Kevin Meininger	Log Number:	SL- 6
		Depth:	48"

				Disturbed	
L=	4.000	T1=	15	Tube Weight	694
H1=	5.000	T2=	16	Gross Weight	1,083
H2=	4.000	T3=	23	Net Weight	389
r=	1.125	T4=	23		
R=	1.125	T5=	23	Sample Vol. (in^3)	15.89625
		T(sec.)=	23	(cm^3)	260.5395375
		T(min.)=	0.38		
				Bulk Density	1.493055541

Soil Permeability: 139.71

Soil Class: K5

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$ [Equation 4]

Where:

K = permeability of the soil sample, in inches per hour;
L = length of the soil core, in inches;
T = time required for the water level to drop from H_1 to H_2 during the final test interval, in minutes,;
r = radius of the standpipe, in centimeters or inches;
R = radius of the soil core, in the same units as "r";
H_1 = height of the water level above the rim of the test basin at the beginning of each test interval, in inches; and
H_2 = height of the water level above the rim of the test basin at the end of each test interval, in inches.

[Note: When the standpipe is not used, the term r^2/R^2 is omitted from the equation.]

Engineering & Land Planning Associates

Project:	BHT Andover	Date:	10/22/2019
Location:	BHT Andover	Sample:	In Place
Test By:	Kevin Meininger	Log Number:	SL-7
		Depth:	30"

L=	3.250	T1=	68
H1=	5.500	T2=	69
H2=	3.250	T3=	116
r=	1.125	T4=	115
R=	1.125	T5=	117
		T(sec.)=	117
		T(min.)=	1.95

Soil Permeability: 52.61

Soil Class: K5

Disturbed

Tube Weight	694
Gross Weight	975
Net Weight	281
Sample Vol. (in³)	12.91570313
(cm³)	211.6883742
Bulk Density	1.327422921

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$ [Equation 4]

Where:

K = permeability of the soil sample, in inches per hour;
L = length of the soil core, in inches;
T = time required for the water level to drop from H_1 to H_2 during the final test interval, in minutes,;
r = radius of the standpipe, in centimeters or inches;
R = radius of the soil core, in the same units as "r";
H_1 = height of the water level above the rim of the test basin at the beginning of each test interval, in inches; and
H_2 = height of the water level above the rim of the test basin at the end of each test interval, in inches.

[Note: When the standpipe is not used, the term r^2/R^2 is omitted from the equation.]

APPENDIX I –
SOIL EROSION MEASURES

PROJECT- 248 STICKLES POND RC
NUMBER- 19134
BY- EAJ
DATE- 11/2/2020

RIPRAP APRON CALCULATIONS FOR SWM-A1 (HW-A8)

Do =	2.00	
Wo =	2.00	
TW =	0.40	(0.2 Do ASSUMED)
Q =	9.61	CFS MAX. FLOW BASED ON HW
Y =	DEPTH OF SCOUR HOLE BELOW INVERT	
q=	4.81	CFS/FT (Q/Wo)

CASE 1 - TW < 1/2 Do

La =	1.8 (q/(Do ^0.5)) + 7Do	=	20.12	FEET
		USE	21.0	FEET
Wa =	3Wo +La	=	27.0	FEET
		USE	27.0	FEET

CASE 2 - TW > 1/2 Do

La =	3*Do (q/(Do ^0.5))	=	20.39	FEET
		USE	21.0	FEET
Wa =	3Wo + 0.4La	=	14.4	FEET
		USE	15.0	FEET

RIPRAP SIZING

D50 =	$\frac{0.02}{Tw} q^{1.33} \times 12$	=	4.84	INCHES
		USE	5.0	INCHES

PROJECT- 248 STICKLES POND RC
NUMBER- 19134
BY- EAJ
DATE- 11/2/2020

RIPRAP APRON CALCULATIONS FOR SWM-A1 (HW-A1)

Do = 2.00
Wo = 2.00
TW = 0.40 (0.2 Do ASSUMED)
Q = 8.85 CFS MAX. FLOW BASED ON HW
Y = DEPTH OF SCOUR HOLE BELOW INVERT
q= 4.43 CFS/FT (Q/Wo)

CASE 1 - TW < 1/2 Do

La =	1.8 (q/(Do ^0.5)) + 7Do	=	19.63	FEET
		USE	20.0	FEET
Wa =	3Wo +La	=	26.0	FEET
		USE	26.0	FEET

CASE 2 - TW > 1/2 Do

La =	3*Do (q/(Do ^0.5))	=	18.77	FEET
		USE	19.0	FEET
Wa =	3Wo + 0.4La	=	13.6	FEET
		USE	14.0	FEET

RIPRAP SIZING

D50 =	$\frac{0.02}{Tw} q^{1.33} \times 12$	=	4.34	INCHES
		USE	5.0	INCHES

PROJECT- 248 STICKLES POND RC
NUMBER- 19134
BY- EAJ
DATE- 11/2/2020

RIPRAP APRON CALCULATIONS FOR SWM-A1 (HW-B1)

Do =	2.00	
Wo =	2.00	
TW =	0.40	(0.2 Do ASSUMED)
Q =	7.97	CFS MAX. FLOW BASED ON HW
Y =	DEPTH OF SCOUR HOLE BELOW INVERT	
q=	3.99	CFS/FT (Q/Wo)

CASE 1 - TW < 1/2 Do

La =	1.8 (q/(Do ^0.5)) + 7Do	=	19.07	FEET
		USE	20.0	FEET
Wa =	3Wo +La	=	26.0	FEET
		USE	26.0	FEET

CASE 2 - TW > 1/2 Do

La =	3*Do (q/(Do ^0.5))	=	16.91	FEET
		USE	17.0	FEET
Wa =	3Wo + 0.4La	=	12.8	FEET
		USE	13.0	FEET

RIPRAP SIZING

D50 =	$\frac{0.02}{Tw} q^{1.33} \times 12$	=	3.77	INCHES
		USE	4.0	INCHES

PROJECT- 248 STICKLES POND RC
NUMBER- 19134
BY- EAJ
DATE- 11/2/2020

RIPRAP APRON CALCULATIONS FOR SWM-A1 (HW-B20)

Do =	3.00	
Wo =	3.00	
TW =	0.60	(0.2 Do ASSUMED)
Q =	42.60	CFS MAX. FLOW BASED ON HW
Y =	DEPTH OF SCOUR HOLE BELOW INVERT	
q=	14.20	CFS/FT (Q/Wo)

CASE 1 - TW < 1/2 Do

La =	1.8 (q/(Do ^0.5)) + 7Do	=	35.76	FEET
		USE	36.0	FEET
Wa =	3Wo +La	=	45.0	FEET
		USE	45.0	FEET

CASE 2 - TW > 1/2 Do

La =	3*Do (q/(Do ^0.5))	=	73.79	FEET
		USE	74.0	FEET
Wa =	3Wo + 0.4La	=	38.6	FEET
		USE	39.0	FEET

RIPRAP SIZING

D50 =	$\frac{0.02}{Tw} q^{1.33} \times 12$	=	13.63	INCHES
		USE	14.0	INCHES

PROJECT- 248 STICKLES POND RC
NUMBER- 19134
BY- EAJ
DATE- 11/2/2020

RIPRAP APRON CALCULATIONS FOR SWM-A1 (HW-B20)

Do =	3.00	
Wo =	3.00	
TW =	0.60	(0.2 Do ASSUMED)
Q =	41.69	CFS MAX. FLOW BASED ON HW
Y =	DEPTH OF SCOUR HOLE BELOW INVERT	
q=	13.90	CFS/FT (Q/Wo)

CASE 1 - TW < 1/2 Do

La =	1.8 (q/(Do ^0.5)) + 7Do	=	35.44	FEET
		USE	36.0	FEET
Wa =	3Wo +La	=	45.0	FEET
		USE	45.0	FEET

CASE 2 - TW > 1/2 Do

La =	3*Do (q/(Do ^0.5))	=	72.21	FEET
		USE	73.0	FEET
Wa =	3Wo + 0.4La	=	38.2	FEET
		USE	39.0	FEET

RIPRAP SIZING

D50 =	$\frac{0.02}{Tw} q^{1.33} \times 12$	=	13.25	INCHES
		USE	14.0	INCHES

PROJECT- 248 STICKLES POND RC
NUMBER- 19134
BY- EAJ
DATE- 11/2/2020

RIPRAP APRON CALCULATIONS FOR SWM-A1 (HW-G1)

Do =	2.00	
Wo =	2.00	
TW =	0.40	(0.2 Do ASSUMED)
Q =	13.85	CFS MAX. FLOW BASED ON HW
Y =	DEPTH OF SCOUR HOLE BELOW INVERT	
q=	6.93	CFS/FT (Q/Wo)

CASE 1 - TW < 1/2 Do

La =	1.8 (q/(Do ^0.5)) + 7Do	=	22.81	FEET
		USE	23.0	FEET
Wa =	3Wo +La	=	29.0	FEET
		USE	29.0	FEET

CASE 2 - TW > 1/2 Do

La =	3*Do (q/(Do ^0.5))	=	29.38	FEET
		USE	30.0	FEET
Wa =	3Wo + 0.4La	=	18.0	FEET
		USE	18.0	FEET

RIPRAP SIZING

D50 =	$\frac{0.02}{Tw} q^{1.33} \times 12$	=	7.87	INCHES
		USE	8.0	INCHES

APPENDIX J –
LOW IMPACT DEVELOPMENT CHECKLIST

New Jersey Stormwater Best Management Practices Manual

February 2004

APPENDIX A

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: Andover Township

County: Sussex County Date: 11/02/2019

Review board or agency: Planning Board of Andover Township

Proposed land development name: 248 Stickles Pond Road

Lot(s): 1 Block(s): 151

Project or application number:

Applicant's name: BHT Properties Group,C/O Ram Adar

Applicant's address: 5081 SW 48th Street, 1023, Davie, Florida 33314

Telephone: 305-433-7805 Fax:

Email address:

Designer's name: Wayne Ingram, Engineering & Land Planning Associates, Inc

Designer's address: 140 West Main Street, High Bridge, NJ 08829

Telephone: 908-238-0544 Fax:

Email address: Wayne@elp-inc.com

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

As per N.J.A.C. 7:8-5.3 requirements non-structural stormwater strategies have been incorporated into the design to the maximum extent practicable:

•The impervious surfaces are minimized on the project site to meet current codes and the runoff over the impervious surfaces flow into the proposed stormwater systems.

•The Time of Concentration decrease is minimized to the extent practicable.

•Land disturbance is being minimized to the extent practicable.

•Soil compaction will be minimized and any areas of over compaction will be mediated.

•Low maintenance trees and native grasses are proposed to encourage retention of all plantings.

•The use of natural open channel swales is utilized to convey the stormwater runoff through portions of the site where it is feasible.

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

N.J.A.C. 7:8 - June 20, 2016

Do regulations include nonstructural requirements? Yes: X No: _____

If yes, briefly describe: Protect areas that provide water quality benefits, minimize impervious surfaces, maximize the protection of natural drainage features and vegetation, minimize land disturbance and soil compaction (N.J.A.C. 7:8-5.3).

List LID-BMPs prohibited by local regulations: N/A

Pre-design meeting held? Yes: X Date: _____ No: _____

Meeting held with: X

Pre-design site walk held? Yes: X Date: _____ No: _____

Site walk held with: _____

Other agencies with stormwater review jurisdiction:

Name: Andover Township Planning Board

Required approval: Preliminary and Final Major Site Plan

Name: Sussex County Soil Conservation District

Required approval: Soil Erosion & Sediment Control Plan Certification

Name: NJ DEP

Required approval: Wetland General Permit, Wetland LOI, Flood Hazard Area Permit

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: _____ No: X

If yes, was this inventory a factor in the site's layout and design? Yes: _____ No: _____

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: X No: _____ If yes, specify % of site: _____

Native ground cover? Yes: X No: _____ If yes, specify % of site: _____

Vegetated buffers? Yes: X No: _____ If yes, specify % of site: _____

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: X If yes, specify % of site: _____

Native ground cover? Yes: _____ No: X If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: X If yes, specify % of site: _____

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: _____ No: X

Reduce runoff pollutant loads through runoff treatment: Yes: _____ No: X

Maintain groundwater recharge by preserving natural areas: Yes: X No: _____

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed? Yes: X No: _____

If yes, were these inventories factors in the site's layout and design? Yes: X No: _____

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: _____ No: X

If yes, how: _____

Restrict temporary site disturbance during construction? Yes: X No: _____

If yes, how: Access to the property is limited to the construction entrance only. The limit of disturbance will be fenced to prevent encroachment by equipment or materials.

Consider soils and slopes in selecting disturbance limits? Yes: X No: _____

If yes, how: Slope disturbance was limited to the greatest extents possible, while also proposing a safe design.

C. Specify percentage of site to be cleared: ±55% of Disturbed Area Regraded: ±45% of Disturbed area

D. Specify percentage of cleared areas done so for buildings: ±1% of Disturbed Area

For driveways and parking: ±30% of Disturbed Area For roadways: N/A

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

In order to reduce the percentages listed in C and D, the project scope would need to be significantly reduced.

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: 40% HSG B: _____ HSG C: _____ HSG D: 60%

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: 95% HSG B: _____ HSG C: _____ HSG D: 87%

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

To compensate for the permanent disturbance to hydrologic soil group A and D, measures have been taken to maintain groundwater recharge: Six above-ground infiltration basins have been proposed to compensate the groundwater recharge deficit generated by the proposed development.

I. Does the site include Karst topography? Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 4.94 Acres Proposed: 48.11 Acres

B. Specify maximum site impervious coverage allowed by regulations: 60.50 Acres (4% of Total Site Area)

C. Compare proposed street cartway widths with those required by regulations:

Type of Street	Proposed Cartway Width (feet)	Required Cartway Width (feet)
Residential access – low intensity		
Residential access – medium intensity		
Residential access – high intensity with parking		
Residential access – high intensity without parking		
Neighborhood		
Minor collector – low intensity without parking		
Minor collector – with one parking lane		
Minor collector – with two parking lanes		
Minor collector – without parking		
Major collector		

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: 9'x18' Regulations: 9'x18'

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: 11 Parking Spaces Regulations: 11 Parking Spaces

F. Specify percentage of total site impervious cover created by buildings:

By driveways and parking: 19% By roadways: n/a

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

In order to reduce the percentages listed above, the project scope would need to be significantly reduced.

H. Specify percentage of total impervious area that will be unconnected:

Total site: 0% Buildings: _____ Driveways and parking: _____ Roads: _____

I. Specify percentage of total impervious area that will be porous:

Total site: 0% Buildings: 0% Driveways and parking: 0% Roads: _____

J. Specify percentage of total building roof area that will be vegetated: 0%

K. Specify percentage of total parking area located beneath buildings: 0%

L. Specify percentage of total parking located within multi-level parking deck: 0%

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: 5% Vegetated swale: 2% Natural channel: _____

Stormwater management facility: 93% Other: _____

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

In order to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages, the project would need to be significantly altered. Due to the existing topography, and proposed scope of work, additionL vegetated swales are not suitable.

C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: _____

In order to reduce the overland flow slopes, a larger disturbance would be required. Due to the presence of wetlands with transitions areas and the encroachment of floodway, the site slope need to be maximized to the most practical extend.

Increase overland flow roughness: The project would need need to be significantly modified in order to increase overland flow roughness. Due to the proposed use, it is impractical to make any modifications without affecting the layout and usability of the facilities.

3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles

Specify the number of trash receptacles provided: 1 for building

Specify the spacing between the trash receptacles: N/A

Compare trash receptacles proposed with those required by regulations:

Proposed: N/A Regulations: N/A

B. Pet Waste Stations

Specify the number of pet waste stations provided: N/A

Specify the spacing between the pet waste stations: N/A

Compare pet waste stations proposed with those required by regulations:

Proposed: N/A Regulations: N/A

C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: 5 Inlets

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: N/A Regulations: N/A

Litter collection: Proposed: Per Township Regulations: N/A

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

Inlet silt sacks and NJDEPS-approved inlets grates.

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

No.	Nonstructural Strategy	Yes	No
1.	Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.	X	
2.	Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.	X	
3.	Maximize the protection of natural drainage features and vegetation.	X	
4.	Minimize the decrease in the pre-construction time of concentration.	X	
5.	Minimize land disturbance including clearing and grading.	X	
6.	Minimize soil compaction.	X	
7.	Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.	X	
8.	Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.	X	
9.	Provide preventative source controls.	X	

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.