APPENDIX E

Stormwater Pollution Prevention Plan
By: McLaren Engineering Group
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STORMWATER POLLUTION PREVENTION PLAN

FOUR SEASONS AT ORANGETOWN
ORANGETOWN, NEW YORK

Prepared for:

The Town of Orangetown

McLaren Project No. 107203
December 2008
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McLaren ENGINEERING GROUP

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1.0 SCOPE OF REPORT

This Report has been prepared to provide the Preliminary Stormwater Pollution Prevention Plan (SWPPP) for the Four Seasons at Orangetown (the Project), located in Town of Orangetown, Rockland County, New York. This Report addresses the requirements set forth in the New York State Department of Environmental Protection's (NYSDEC) Pollution Discharge Elimination System (SPDES) for Discharges for Construction Activities, General Permit GP0-08-0001 (General Permit) and Chapter 30d, Sediment And Erosion Control And Stormwater Management of the Town of Orangetown Code. This SWPPP report has been prepared in conjunction with the General Environmental Impact Statement (DGEIS) prepared for the Project.

Drainage plans and details, and soil erosion and sediment control plans and details will be provided during Site Plan Approval phase. All site requirements set forth by the Town of Orangetown Planning Board will be reflected in the final SWPPP report. Upon Site Plan Approval, the SWPPP will be submitted to the governing Municipal Separate Storm Sewer System (MS4) agency for stormwater permit approval. The SWPPP will also be submitted to the NYSDEC in compliance with the General Permit.

The General Permit covers discharges that are associated with construction activity, specifically activities that result in the disturbance of one (1) acre or more of total land area. The General Permit requires site compliance with the technical standards for stormwater quantity and quality controls presented in the New York State Stormwater Management Design Manual (NYSDEC Design Manual).

1.1 Responsibilities of the Participants

It is the responsibility of the Owner, General Contractor, and Subcontractors to comply with all the measures set forth in this SWPPP and implement pollutant control measures set forth by the NYSDEC to maintain surface water quality and prevent sediment-laden runoff from entering rivers, streams, estuaries, wetlands and other sensitive environments. The responsibilities of the owner's engineer, owner/operator, and the contractors and subcontractors are outlined, but are not exclusively detailed within this section.

1.1.1 Owner's Engineer

1. Prepare the SWPPP using good Engineering practices, best management practices and in compliance with the General Permit.

2. Prepare Notice of Intent (NOI) for the Owner for submission to the NYSDEC.

3. Provide copies of the SWPPP and the "Acknowledgement of Notice of Intent" to the local government agencies having jurisdiction or regulatory control over the project.

4. Review the site prior to the beginning of construction and certify in an inspection report that the appropriate pre-construction erosion and sediment control measures, as detailed in this report, and control measures required by the General Permit have been installed, and will operate as designed.

5. Conduct on-site inspections as follows:
   - When soil disturbance activities are on going, conduct a site inspection at least once every seven (7)-calendar days.

   - When the project has received authorization to disturb greater than five (5) acres of soil at any one time, conduct at least two (2) site inspections every seven (7) calendar days, separated by a minimum of two (2) full calendar days.

   - For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, conduct a site inspection at least once every thirty (30)-calendar days. Notify the Regional Office stormwater contact person in writing prior to reducing the frequency of inspections. The inspections shall begin again as soon as soil disturbance activities resume.

   - For construction sites where soil disturbance activities have been shut down with partial project completion, inspections can be stopped if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. Notify the Regional Office stormwater contact person in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the Notice of Termination (NOT). Submit the completed NOT form to the NYSDEC.

6. Update the SWPPP each time there is a significant modification to the design or construction which may have a significant effect on the potential for discharge of pollutants into receiving waters.

7. When construction is complete, provide the Owner with certification that an inspection has been completed verifying that the site has undergone final stabilization.

8. When the site has undergone final stabilization, prepare the Notice of Termination (NOT) for the Owner for submission to the NYSDEC.

1.1.2 Owner/Operator

The following is a summary of the Owner's responsibilities:

1. Sign the NOI and certify the SWPPP by signing the Owner's Certification statement. Submit the NOI to NYSDEC "Notice of Intent", Bureau of Water Permits, 625 Broadway, Albany, NY 12233-3505.

2. Upon receiving the letter of "Acknowledgement of Notice of Intent" from the NYSDEC, the owner must post a copy of this letter at the site in a prominent place for public viewing. A record copy shall also be forwarded to the owner's Engineer.

3. Maintain a record of all inspection reports in a site logbook. The site logbook shall be maintained on site and be made available to the permitting authority upon request. The site logbook shall contain the following documents:

    a. NYSDEC Notice of Intent
    b. NYSDEC Notice of Acknowledgement
    c. Stormwater Pollution Prevention Plan (SWPPP)
    d. Owner/Operator SPDES Permit Certification (Signed copy)
    e. Contractor/Subcontractor SPDES Permit Certification (Signed copy)
    f. Site Inspection Reports
    g. Monthly Assessment Logs
    h. Final Certification
    i. SWPPP Modifications
    j. SDPES General Permit GP-0-08-001 for Stormwater Discharges from Construction Activity

4. The owner or operator must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site.

5. The owner or operator shall have each contractor and subcontractor identify at least one trained individual from their company that will be responsible for implementation of the SWPPP. The owner or operator shall ensure that at least one trained individual is on site on a daily basis when soil disturbance activities are being performed. The contractor shall certify the SWPPP, and all Subcontractors involved with earth disturbance during construction, by signing the certifying statement.

6. Upon project completion and when the site has reached final stabilization, the Owner should sign the Notice of Termination (NOT) prepared by the Owner's Engineer and submit to NYSDEC.

7. Retain all site records and documentation including Engineering reports, SWPPP reports, SWPPP inspection reports and all records of data used to complete the NOI for a minimum of five (5) years from the date the site reached final stabilization.

8. Provide an Operation & Maintenance (O&M) manual for future property Owners.

1.1.3 Contractors and Subcontractors

The following is summary of the Contractor's responsibilities:

1. Signing the Contractor's Certification statement and identify the name and title of the trained individual(s) responsible for SWPPP implementation

2. Full and complete compliance and implementation of this SWPPP, as well as the requirements set forth in the SPDES General Permit.

3. Provide the names and addresses of all sub-contractors involved in construction activities that disturb site soils for inclusion in the SWPPP.

4. Ensure all subcontractors involved in construction activities that disturb site soils to implement fully the SWPPP and the requirements set forth in the SPDES General

Permit. All subcontractors must certify the SWPPP by signing the Contractor's Certification statement contained in *Appendix A* of this report.

5. Conduct regular inspections of the erosion and sedimentation controls installed on site. Maintain and repair as necessary all erosion and sedimentation controls.

2.0 SITE DESCRIPTION

2.1 Location and Project Description

The Project Site is located in the Town Orangetown, New York. The Project Site is located west of the Palisades Parkway, east of Lake Tappan, south of Convent Road. The southern-most portion of the project site is adjacent to Veteran's Memorial Highway (Orangeburg Road).

Part of the project will consist of the construction of approximately 575 new dwelling units, including approximately 478 townhouse/condominium age-restricted (55+) units, 33 age-restricted single family homes, 32 age-restricted affordable units, 20 units for community volunteers, and 12 market-rate single family homes. The project will also include a community building and pool.

The proposed development will demolish the existing facilities and regrade the site for the proposed residential project. Earthwork at the northern portion of the project site will be independent from that of the southern portion of the project site. The final grading for the project will be developed during the Site Plan Approval review phase.

The southern portion of the development area will include the realignment of Blaisdell Road, the construction of 12 single-family homes along Blaisdell Road, and the construction of multifamily townhouse units with access from Old Orangeburg Road. The redevelopment of this portion of the site will disturb approximately 8.1 acres plus portions of Blaisdell Road that will be realigned and reconstructed. Grading to prepare the development sites for the homes, townhouse units, and parking lots will not require significant earthwork.

The northern portion of the development parcel includes a residential area and the reconstruction of the Broadacres Golf Club. The construction of the northern residential portion of the project will disturb approximately 64 acres. The topography of the proposed development will generally follow the existing topography. As a result, significant earthwork is not anticipated. The project will balance the cut-fill volume to the

extent practical, minimizing import/export of excess material. Based on the soil types on the site, rock excavation is not anticipated.

In the northern development, new north-south streets will follow the existing 1st and 2nd Avenue alignments, and it is anticipated that the proposed roadway elevation will be similar to the existing road elevations. The Project will tie into existing roadway elevations at Convent Road and 3rd Avenue at the extents of the Project Site. The new street system will have street slopes ranging from 2% to 5%.

An additional 35 acres within the Project Site will be disturbed for the construction of three (3) new golf holes and the redevelopment of two (2) existing holes. The redevelopment of the golf course will require re-grading along fairways, tees, greens, berms, and other golf course features. It will be possible to use excess excavated soil material from the residential area for the golf course if coordinated correctly during construction phasing.

2.2 Watercourses

The Project Site is located adjacent to Lake Tappan. Lake Tappan was formed by a dam placed on the Hackensack River in 1967. It straddles the border between River Vale and Old Tappan, New Jersey. It extends north past the New York state border and into Orangetown, New York. Lake Tappan is owned by United Water, a private utility company. The Lake Tappan reservoir covers 1,255 acres and contains 3.5 billion gallons of water, with up to 12 million to 13 million gallons released per day down stream to the Oradell Reservoir.

Lake Tappan is classified by NYSDEC as a Class A waterbody. The A classification is assigned to waters used as a source of drinking water. The streams flowing through the western portion of the RPC Campus, from the outfall of the site storm drains to the Lake are classified as A for a short distance from the Lake and then become Classification C, waters supporting fisheries and suitable for non-contact activities (Reference: NYSDEC Environmental Resource Mapper).

2.3 Land Cover

The majority of the existing project site has been previously developed. On-site pervious areas are limited to lawn areas with some trees and the existing golf course. The remainder of the site is composed of impervious features, such as buildings, parking lots, roads, and sidewalks.

2.4 Soils

A review of the USDA Natural Resources Conservation Service, National Cooperative Soil Survey indicates that there are seven (7) types of soils present within the limits of the proposed development.

Table I below summarizes the characteristics of the soil present on the site and the respective areas.

Table 1
Soil Characteristics

Map Unit	Soil Names	Hydrologic Group
CrB	Cheshire gravelly fine sandy loam, 2 to 8 percent slopes	B
CuB	Cheshire-Urban land complex, 2 to 8 percent slopes	B
Wc	Watchaug fine sandy loam	B
WeB	Wethersfield gravelly silt loam, 3 to 8 percent slopes	C
WeC	Wethersfield, gravelly silt loam, 8 to 15 percent slopes	C
WuB	Wethersfield-Urban land complex, 2 to 8 percent slopes	C
WuC	Wethersfield-Urban land complex, 8 to 15 percent slopes	C

Source: Natural Resource Conservation Center Web Soil Survey

2.5 Floodplain

The site is located within the Hackensack River drainage basin. A review of the Flood Insurance Rate Maps for Orangetown, NY (Community Panel Numbers 360686 0002 C and 3630686 0004 C, effective August 2, 1982) indicate that proposed development site is located within Zone C; areas of minimal flood hazard from the principle source of flood in the area and determined to be outside of the 0.2 percent annual chance floodplain.

2.6 Rainfall Data

Rainfall data utilized in the analysis was obtained in Exhibit 10.1 in the New York State Department of Environmental Conservation publication entitled, "New York State Stormwater Management Design Manual", October 2001. The data used specific to the Project site and various 24-hour storm events are presented in Table 2 below.

Table 2
Rainfall Data

24-Hour Storm Event	Type III, 24-Hour Rainfall (inches)
90% Rainfall Event Number*	1.3
2-Year	3.5
10-Year	5.0
25-Year	6.0
100-Year	7.5

3.0 METHODOLOGY

3.1 Stormwater Management

The Stormwater Management (SWM) Plan has been designed in accordance with Appendix D of the General Permit and the following publications:

- "Urban Hydrology for Small Watershed" (Technical Release No. 55), published by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS), dated June 1986.
- New York State Stormwater Management Design Manual, October 2001.

The pre and post-development runoff rates provided in this Report were calculated using the computer software program entitled "WinTR-55" published by USDA SCS and "Hydraflow Hydrographs 2009" published by Autodesk Inc. Both software programs incorporate the methodology used in TR-20 and TR-55 to model storm hydrographs, calculate storage volumes, and route detention structures.

3.2 Stormwater Water Quality

The objective of a Water Quality (WQ) management system is to capture and treat 90 percent of the average annual stormwater runoff volume (WQ_v). Water Quality criteria is met through the correct implementation of acceptable Stormwater Management Practices (SMPs) as listed in the NYSDEC Design Manual SMP systems capture and treat 100% of the required water quality volume, are capable of the removal of 80% total suspended solids (TSS) and the removal of 40% total phosphorus (TP), have acceptable longevity in the field, and have a pretreatment mechanism.

Large portions of the existing Project Site have been subject to prior development. Redevelopment is distinguished from development or new development in that new development refers to construction on land where there had not been previous construction. Redevelopment specifically applies to constructed areas with impervious surface.

The criteria set forth in Chapter 9: Redevelopment Projects of the NYSDEC Design Manual are applicable for this project. Chapter 9 details alternative stormwater measures that can be used when specific physical constraints are present at a site in reconstruction of an existing impervious area. Where site-specific circumstances do not allow proper sizing and installation of the standard management practices, the Stormwater Pollution Prevention Plan (SWPPP) must identify the design difficulties that meet redevelopment application criteria and provide documented justification for the use of proposed alternative approaches presented in this chapter. To make such determination, the following criteria must be met:

- An already impervious area is reconstructed, and
- There is inadequate space for controlling stormwater runoff from the reconstructed area, or
- The physical constraints of the site do not allow meeting the required elements of the standard practices.

Water Quality treatment objectives can be achieved for redevelopment projects using the following options, which at minimum must be equal to the existing treatment system:

- The plan proposes a reduction of impervious cover by a minimum of 25 percent of the existing total site impervious area.
- The plan proposes that a minimum of 25 percent of the water quality volume (WQv) from the disturbed area is captured and treated by the implementation of standard practices.

- The plan proposes the use of alternative practices to treat 75 percent of the water quality volume from the disturbed area as well as any additional runoff from tributary areas that are not within the disturbed area.
- The plan proposes a combination of impervious cover (IC) reduction and standard or alternative practices that provide a weighted average of at least two of the above methods.

3.3 Channel Protection Volume

Stream Channel Protection Volume Requirements (Cpv) are designed to protect stream channels from erosion through the extended detention of the one (1)-year, 24-hour storm event. The Cpv requirement does not apply in certain conditions, including when recharge of the entire Cpv volume is achieved at a site or the site discharges directly tidal waters or fourth order (fourth downstream) or larger streams.

3.4 Overbank Protection

The primary purpose of the overbank flood control is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development. In accordance with Section 4.3 of the NYSDEC Design Manual, overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The overbank flood control requirement (Qp) does not apply in certain conditions including when the site discharges directly tidal waters or fourth order (fourth downstream) or larger streams.

3.5 Extreme Storm

The Extreme Flood Control criteria is to prevent the increased risk of flood damage from large storm events, maintain boundaries of the pre-development 100-year floodplain and protect the integrity of stormwater management practices, the NYSDEC Design Manual requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qr) to predevelopment rates. The 100-year storm control requirement can be waived if:

- The site discharges directly to tidal waters or fourth order (fourth downstream) or larger streams.
- Development is prohibited within the ultimate 100-year floodplain.
- A downstream analysis reveals that 100-year control is not needed.

4.0 HYDROLOGIC AND HYDRAULIC ANALYSIS

4.1 Existing Conditions Drainage Area Description

The location of the existing storm drain system with the Rockland Psychiatric Center site and the specific outlet locations were obtained from the map entitled *Rockland Psychiatric Center Stormwater System Analysis, Watershed Delineation Map* by C.T. Male Associates, P.C. dated June 1996. The existing RPC facility has an extensive storm drain system that conveys runoff from the buildings, road and golf course area to outlets west of Third Avenue. The proposed northern development area will impact three (3) storm systems as follows:

- The storm drain system that conveys runoff from the northern portion of the RPC site and offsite areas to the north and east which discharges to an existing stream west of Third Avenue and south of Convent Road (Identified as Outlet #5).

- The storm drain system in the area of Maple Street, which conveys runoff from the golf course and developed portions of the RPC site north and south of Maple Street. This system continues west of Third Avenue, through RPC property, and discharges to an existing stream west of the Power Plant building (Identified as Outlet #4).

- The storm drain in the area of Oak Street which conveys runoff from the golf course and developed portions of the RPC site north, east and south of Oak Street. This system continues west of Third Avenue, through RPC and Town property, and discharges to an existing stream, near the sewer pump station (Identified as Outlet #3).

Through the analysis of existing area topography and existing stormwater drainage systems within the project area and adjacent to the project area, it has been determined that proposed development area contains nine (9) drainage areas (See Figure 5 Existing Conditions Drainage Area Map).

A description of the existing drainage areas are as follows:

- EX 1 - This offsite area, north of Convent Road and east of the Palisades Parkway, is comprised of approximately 3.52 acres of buildings, road and parking area, 2.36 acres of open space in fair condition, and 4.65 acres of woods in fair conditions. Runoff from this area enters the northeast corner of the site and drains to the irrigation pond. During the golf season, much of the runoff from this area is used for irrigation of the golf course. For the purpose of this study, all runoff from this area is assumed to convey to the design point. Stormwater runoff from this area

discharges into an open channel on the northeast side of the site, and flows through the project site, and discharges to Outfall #5, west of Third Avenue.

All soils in this drainage area are classified as Class C hydric soils. The weighted CN value was calculated to be 84.

- EX 2 - This offsite area north of Convent Road and east of the Palisades Parkway and is comprised of approximately 0.60 acres of open space in fair condition, and 2.40 acres of woods in fair conditions. Runoff from this area enters the northeast corner of the site and drains to the irrigation pond. During the golf season, much of the runoff from this area is used for irrigation of the golf course. For the purpose of this study, all runoff from this area is assumed to convey to the design point. Stormwater runoff from this area discharges into an open channel on the northeast side of the site, and flows through the project site, and discharges to Outfall #5, west of Third Avenue.

  All soils in this drainage area are classified as Class C hydric soils. The weighted CN value was calculated to be 77.

- EX 3 - This area is the portion of the existing golf course that will remain and is comprised of approximately 18.4 acres of open space in fair condition and 0.07 acres of impervious area. Stormwater runoff from this area is conveyed by the existing RPC storm drain system and discharges to Design Point 1, west of Third Avenue.

  All soils in this drainage area are classified as either Class B or Class C hydric soils. The weighted CN value was calculated to be 78.

- EX 4 - This area is the portion of the existing golf course that will be developed and comprised of approximately 6.09 acres of buildings, road and parking, 39.90 acres of open space in fair condition, and 0.69 acres of woods in fair conditions. Stormwater runoff from this area is conveyed by the existing RPC storm drain system and discharges to Design Point 1, west of Third Avenue, at Outfall #5.

  All soils in this drainage area are classified as either Class B or C hydric soils. The weighted CN value has been calculated to be 74.

- EX 5 - This is the area of the proposed residential development west of Third Avenue and is comprised of approximately 0.58 acres of buildings, road and parking, 0.68 acres of open space in fair condition, and 3.72 acres of woods in fair

conditions. Stormwater runoff from this area sheet flows west towards the stream in the northwest portion of the Campus and flows to Lake Tappan.

All soils in this drainage area are classified as Class C hydric soils. The weighted CN value has been calculated to be 79.

- EX 6 - This area contains portions of the golf course and RPC buildings and roads to remain east of First Avenue and is comprised of approximately 25.43 acres of buildings, road and parking, and 34.99 acres of open space in fair condition. Stormwater runoff flows in the existing storm drain system and discharges west of the power plant building, west of Third Avenue at Outfall #4.

  All soils in this drainage area are classified as either Class B or C hydric soils. The weighted CN value has been calculated to be 82.

- EX 7 - This is the area of the proposed new golf holes between Fist and Third Avenue, north of Oak Street and comprised of approximately 2.84 acres of buildings, road and parking and 9.17 acres of open space in fair condition. Stormwater runoff from this area discharges west of Third Avenue and flows towards Outfall #3.

  All soils in this drainage area are classified as either Class B or C hydric soils. The weighted CN value has been calculated to be 78.

- EX 8 - This area contains portions of the golf course and RPC buildings and roads to remain east and south of Oak Street. This area drains to the storm drain system in Oak Street along with area EX 8. This area is comprised of approximately 4.03 acres of buildings, road and parking and 26.13 acres of open space in fair condition. Stormwater runoff from this area discharges west of Third Avenue towards Outfall #3.

  All soils in this drainage area are classified as either Class B or Class C hydric soils. The weighted CN value has been calculated to be 74.

- EX 9 – This area is comprise of the development parcel along Blaisdell Road and Old Orangeburg Road and is comprised of approximately 1.69 acres of buildings, road and parking and 8.67 acres of open space in fair condition. Stormwater runoff from this area flows to Old Orangeburg Road to the north or Orangeburg Road to the south.

All soils in this drainage area are classified as either Class B or Class C hydric soils. The weighted CN value has been calculated to be 81.

Design Points have been identified for each of the drainage areas. A Design Point represents the location to which the majority of, or all of the stormwater runoff to which a drainage area discharges. One design point is designated for each drainage area. However, more than one drainage area can share the same design point. The design points are indicated on the Existing Conditions Drainage Area Map (See Figure 5).

A description of each of the design points follows:

- Design Point 1 – The point on west of Third Avenue at the site discharge to the existing stream, Outfall #5.
- Design Point 2 – Runoff at western edge of the development parcel, west of Third Avenue.
- Design Point 3 – The western limit of the development at Third Avenue. Storm water runoff from this location is conveyed by the existing storm drain system to the headwall at Outfall #4.
- Design Point 4 – The western limit of the development at Third Avenue. Storm water runoff from this location is conveyed by the existing storm drain system to the headwall at Outfall #3.
- EX 9 (Existing Drainage Area 9) –For the purpose of this investigation, the runoff from the southern development area is considered as a total combined flow. All of this area generally flows to the wetland area west of Blaisdell Road.

A summary of the existing peak discharge rates from the Project Site is shown in Table 3.

Table 3
Existing Peak Stormwater Discharge Rates

Location	Design Year Storm Discharge (CFS)			
	2-Year	10-Year	25-Year	100-Year
Design Point 1	89.4	170.3	227.3	314.8
Design Point 2	7.3	13.2	17.4	23.6
Design Point 3	95.6	165.2	212.8	284.8
Design Point 4	42.2	81.5	109.5	152.9
Drainage Area 9	18.7	32.7	46.3	60.8

4.2 Proposed Conditions

4.2.1 Proposed Conditions Drainage Area Description

Based on the building program for the Project, an analysis of the proposed runoff conditions was performed to determine the impact of the stormwater runoff from the project site and to determine the measures required to meet the General Permit and Town of Orangetown requirements. The project will result in an increase of 7.6 (21%) of impervious area within the northern development area and 1.9 acres within the southern development area.

Similar to the existing conditions analysis, drainage areas were established based on the proposed design. Peak flow rates were then calculated at the design points (See Figure 6 Proposed Conditions Drainage Area Map). The locations of the Design Points for proposed condition are the same as the Design Points for existing conditions.

A description of the impact of the development on the on the runoff conditions for each of the study areas is as follows:

- EX 1 - This offsite area will remain the same as in existing conditions analysis.

- EX 2 - This offsite area will remain the same as in existing conditions analysis.

- EX 3 - This onsite area will remain the same as in existing conditions analysis. Portions of the golf course in this area will be redeveloped.

- P 4 - This area will be comprised of approximately 20.06 acres of buildings, road and parking and 27.56 acres of open space in fair condition. Stormwater runoff from this area discharges to Design Point 1, west of Third Avenue, at Outfall #5.

  All soils in this drainage area are classified as either Class B or C hydric soils. The weighted CN value has been calculated to be 82.

- P 5 - This area will be comprised of approximately 2.93 acres of buildings, road and parking, 4.46 acres of open space in fair condition, and 0.10 acres of woods in fair conditions. Stormwater runoff from this area flows west towards Lake Tappan.

  All soils in this drainage area are classified as Class C hydric soils. The weighted CN value has been calculated to be 86.

- P 6 - This area will be comprised of approximately 7.17 acres of buildings, road and parking, and 27.12 acres of open space in fair condition. Stormwater runoff from this area discharges west of Third Avenue and flows to Outfall #4.

  All soils in this drainage area are classified as either Class B or C hydric soils. The weighted CN value has been calculated to be 75.

- P 6A - This area will be comprised of approximately 4.54 acres of buildings, road and parking, and 18.14 acres of open space in fair condition. Stormwater runoff from this area discharges west of Third Avenue and flows to Outfall #4.

  All soils in this drainage area are classified as either Class B or C hydric soils. The weighted CN value has been calculated to be 76.

- P 7 - This area will be comprised of approximately 1.20 acres of buildings, road and parking and 10.81 acres of open space in fair condition. Stormwater runoff from this area discharges west of Third Avenue and flows towards Outfall #3.

  All soils in this drainage area are classified as either Class B or C hydric soils. The weighted CN value has been calculated to be 75.

- EX 8 - This offsite area will remain the same as in existing conditions analysis.

- P 9 - This area will be comprised of approximately 3.59 acres of buildings, road and parking and 6.77 acres of open space in fair condition. Stormwater runoff from this area flows to Old Orangeburg Road to the north or Orangeburg Road to the south.

  All soils in this drainage area are classified as either Class B or Class C hydric soils. The weighted CN value has been calculated to be 85.

4.2.2 Proposed Condition Stormwater Runoff

The total peak discharge rates for existing and proposed conditions for the stormwater runoff from the Project at the respective design points is summarized in Table No. 4.

Table No. 4
Comparison of Stormwater Runoff

	`Design Year Storm (CFS)			
	2-Year	10-Year	25-Year	100-Year
Design Point 1				
Existing Condition	89.4	170.3	227.3	314.8
Proposed Condition	115.8	207.2	269.9	364.6
Difference	*26.5*	*36.9*	*42.7*	*49.9*
Design Point 2				
Existing Condition	7.3	13.2	17.4	23.6
Proposed Condition	16.6	27.1	34.1	44.6
Difference	*-9.3*	*13.9*	*16.8*	*21.0*
Design Point 3				
Existing Condition	95.6	165.2	212.8	284.8
Proposed Condition	67.3	129.6	173.9	242.3
Difference	-28.3	-35.6	-39.0	-42.5
Design Point 4				
Existing Condition	42.2	81.5	109.5	152.9
Proposed Condition	40.2	78.9	106.7	149.9
Difference	-2.0	-2.6	-2.8	-3.0
Total Combined Northern Development Area (1)				
Existing Condition	**232.1**	**426.7**	**563.1**	**771.5**
Proposed Condition	***234.0***	***433.6***	***572.9***	***785.8***
Difference	***+1.9***	***+6.8***	***+9.7***	***+14.2***
Drainage Area 9 (Southern Development Area)				
Existing Condition	18.7	32.7	42.4	56.9
Proposed Condition	*22.1*	*36.6*	*46.3*	*60.8*
Difference	*+3.4*	*+3.9*	*+3.9*	*+3.9*

1. Total Discharge is based on sum of hydrographs

Drainage Areas that have a net positive increase in total peak discharge offsite will require additional measures to reduce peak discharge as required by the NYSDEC and Town regulations. This can be accomplished by implementing detention systems. Drainage Areas that have a net zero or decrease in total peak discharge will not require any additional detention measures.

4.3 Water Quality

Portions of the Project Site will be considered a redevelopment project in accordance with Chapter 9 of the NYSDEC Design Manual. The site design will require that runoff from the previously developed areas will capture and treat 25% of the water quality volume by the implementation of standard practices. Additionally, 100% of the water quality volume must be captured and treated for new impervious areas.

Approximate calculations of the required WQv have been performed for the site in proposed conditions. Table 5 summarizes the required water quality volume for each drainage area.

Table 5
Estimated Water Quality Volume

DRAINAGE AREA	Water Quality Volume (acre-ft)
P4	1.83
P 5	0.29
P 6A	0.21
P 7	0.05
P 9	0.30

The overall design and layout of the Project Site must be considered when determining specific types, sizes, and locations of acceptable SMPS. SMPs will be determined during final site design, and all specific calculations and data will be submitted in a revised SWPPP. All SMPs shall be in accordance with the criteria set forth by the NYSDEC Design Manual.

4.4 Water Quantity

The approximate maximum storage volume required to detain the increase in peak stormwater discharge can be achieved by comparing the pre-development drainage area peak flow rate to post-development drainage area peak flow.

Drainage Areas that have an increase in total peak discharge offsite will require measures to reduce peak discharge to pre-development conditions. This can be accomplished by constructing detention or retention systems upstream from the corresponding design point. All details and design of detention and retention systems will be developed during the site plan approval phase of the project.

Table 6 indicates the approximate storage required to mitigate the difference in peak stormwater discharge between existing and proposed conditions. Drainage Areas that have a decrease in total peak discharge will not require any additional detention facilities.

Table 6
Estimated Water Storage Volume

DRAINAGE AREA	REQUIRED STORAGE acre-ft
P 4	5.48
P 5	1.73
P 6	0.00
P 6A	0.00
P 7	0.00
P 9	0.38

Lake Tappan is a fourth order stream. In accordance with NYSDEC regulations, the requirements for Channel Protection Volume, Overbank Flood, and Extreme Storm do not apply when a site discharges directly into tidal waters or fourth order streams or greater. However, site runoff discharges into existing open streams which flow into Lake Tappan. In order for the site to apply for exemption to Channel Protection Volume, Overbank Flood, and Extreme Storm measures, it will be necessary to provide an analysis to ensure there will be no adverse impacts to the 10-year and 100-year post-development flow rates on these existing streams.

Where the stormwater discharge is designed to be conveyed by the existing RPC facilities, detention facilities may be required to limit peak flow rates to the capacity of the existing storm drains.

4.5 Storm Drainage System

The proposed development will require the construction of a new storm drain system within the project streets to convey the runoff to discharge points west of Third Avenue. The storm drains would be designed in accordance with the Town of Orangetown Subdivision requirements. The proposed storm drains will discharge to water quality and quantity control facilities prior to discharge toward Lake Tappan.

The northern development area would either discharge to the existing RPC storm drains (Outfall # 3 and 4) or by a new storm drain in Third Avenue that would discharge to the existing stream, near the development area west of Third Avenue. The feasibility of which discharge location will be used will be determined during the Site Plan design and approval phase of the project. Also, inspection of these storm drains will be required to

determine existing conditions and if repairs or reconstruction are necessary. If it is determined that the existing RPC storm drains have the capacity to convey the proposed stormwater flow, appropriate easements and maintenance agreements with RPC must be obtained.

The proposed storm drain system in the northern development area must also convey runoff from the golf course, offsite areas and existing RPC facilities to the east. Storm drain systems conveying these flows should have appropriate easements and maintenance agreements.

5.0 EROSION AND SEDIMENT CONTROL

5.1 Erosion And Sediment Control Measures

During construction of the Project, the potential for soil erosion and sedimentation will be controlled through the use of temporary soil erosion and sediment control measures. These measures will be designed and installed in accordance with *New York Guidelines for Urban Erosion and Sediment Control* dated October 2005. The soil erosion and sediment control plan will minimize the downstream erosion by controlling runoff at its source, minimizing runoff from disturbed areas and de-concentrating storm water runoff. Temporary and permanent stabilization methods will be implemented before construction begins and will be continuously modified throughout the project to provide the best methods for stormwater management and pollution prevention.

Phasing of activities shall be as follows:

Pre-Construction Activities

- Identify all natural resources and mark and protect them as necessary i.e. trees, vegetation.
- Identify on-site and downstream surface water bodies and install controls to protect them from sedimentation.
- Establish temporary stone construction entrance pads to capture mud and debris from the tires of construction vehicles.
- Install perimeter sediment controls such as silt fence as shown on the project plans.
- All earth disturbances during this phase should be limited to work necessary to install erosion and sedimentation controls.

During Construction Activities

- Install runoff and drainage controls as shown on the project plans and as necessary. These controls should reduce run-off flow rates and velocities as well as divert off site and clean run-off.

- Stabilize the conveyance system (i.e. ditches, swales, berms etc.) by seeding, mulching, installing rock check dams.
- Stabilize all stormwater runoff outlets as shown on the project plans and as necessary.
- Stabilization measures should be initiated as soon as practical in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days. Where activities will resume within 21 days in that portion of the site, measures need not be initiated.
- Limit soil disturbance and exposure of bare earth to a minimum.
- All topsoil stockpiles should be staged in an area away from surface waters and storm drains and should be protected and stabilized.
- Construction vehicles shall enter and exit the site at the stabilized construction entrance. The construction entrances will be maintained during the life of the construction and repaired and/or cleaned periodically to ensure proper function.
- Water trucks will be used as needed during construction to reduce dust generated on the site. The contractor will provide dust control in compliance with applicable local and state dust control regulations.
- At any location where surface run-off from disturbed or graded areas may flow off-site, sedimentation control measures must be installed to prevent sedimentation from being transported.
- Regular inspections and maintenance should be performed as described in the following section.

Post-Construction Activities

- Identify the permanent structural or non-structural practices that will remain on the site.
- Provide an Operation & Maintenance (O&M) manual to the Owner who is expected to conduct the necessary O&M over the life of the structures.

5.2 Construction Sequence Scheduling

A phased construction sequence schedule of the Project will limit the acreage of exposed soils to 5-acres or less at any given time. The construction sequence and phasing is provided on the sediment and erosion control plans. Since the project site disturbance will be greater than 5-acres, the construction sequence will require the approval of the NYSDEC prior to the filing of the NOI. Limiting the exposed soils will reduce the amount of sediments in runoff water and ultimately preserve the quality of surface waters. The construction phasing method selected will be designed to combine development with responsible land management as well as protection of sensitive environments both within the proposed Project and the surrounding area.

5.3 Implementing the SWPPP

The General Permit requires that site assessment and inspections for all construction activities in excess of one (1) acre. The site assessment and inspections insure the implementation of the SWPPP to retain surface water quality and prevent sediment-laden runoff from entering rivers, streams, estuaries, wetlands and other sensitive environments.

The site assessment and inspections required for this project will include the following:

The operator shall have a "qualified inspector" conduct site inspections in conformance with the requirements of the General Permit a "Qualified inspector" is a person knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed Landscape Architect, or other Department endorsed individual(s). Someone working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing a site inspection has received four (4) hours of training, endorsed by the Department, from a Soil and Water Conservation District, CPESC, Inc. or other Department endorsed entity in proper erosion and sediment control principles no later than two (2) years from date this general permit is issued. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four (4) hours of training every three (3) years. Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

1. Following the commencement of construction, site inspections shall be conducted by the qualified inspector as follows:

    a. Where soil disturbance activities are on going, conduct a site inspection at least once every seven (7)-calendar days.

    b. Where the project has received authorization to disturb greater than five (5) acres of soil at any one time, conduct at least two (2) site inspections every seven (7) calendar days, separated by a minimum of two (2) full calendar days.

    c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, conduct a site inspection at least once

every thirty (30)-calendar days. Notify the Regional Office stormwater contact person in writing prior to reducing the frequency of inspections. The inspections shall begin again as soon as soil disturbance activities resume.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, inspections can be stopped if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. Notify the Regional Office stormwater contact person in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the Notice of Termination (NOT). Submit the completed NOT form to the NYSDEC.

2. The qualified inspector shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection.

b. Name and title of person(s) performing inspection.

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection.

d. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow Identification of all erosion and sediment control practices that need repair or maintenance.

e. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced.

f. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection.

g. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards.

h. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s).

3. The operator shall maintain a record of all inspection reports in a site logbook. The site logbook shall be maintained on site and be made available to the permitting authority upon request.

4. Prior to filing of the Notice of Termination or the end of permit term, the operator shall have the qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.

5. The SWPPP must clearly identify the contractor(s) and subcontractor(s) that will implement the measure(s). All contractors and subcontractors identified in a SWPPP must sign a copy of certification statement, see Appendix B, before undertaking any construction or activity at the site identified in the SWPPP. All certifications must be included in the SWPPP. The certification must include the name and title of the person providing the signature; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

5.4 Best Management Practices

Throughout construction, care shall be taken to ensure sediment does not enter surface water bodies and chemicals do not enter stormwater, potentially contaminating surface and groundwater supplies. The following Best Management Practices (BMP) shall be observed to maintain responsible environmental practices on the construction site.

Good Housekeeping

Good housekeeping is essential to reducing the risk of contaminating runoff waters during every stage of construction. The General Contractor shall ensure supervisors train each employee in good housekeeping practices as they pertain to the implementation of this SWPPP.

Immediately following mobilization, the General Contractor shall take an inventory of all equipment and containers containing hazardous or toxic materials and submit this inventory to the Owner to keep on-site with this Stormwater Pollution Prevention Plan. This inventory shall be updated regularly to reflect changes in the quantity or type of hazardous and toxic materials stored on site. In the event of a spill, the Spill Response Team can refer to the inventory if the contents of the spill are unknown.

All equipment shall be operational while it is stored on site. Inspections shall be conducted regularly to ensure all equipment is free of leaks and that oil and grease are not in contact with soils or stormwater. Portable equipment such as chain saws, drills as well as hand tools must be placed within a trailer or under cover at the end of each workday.

A storage area shall be designated on-site where all hazardous or toxic materials are stored. Each employee shall return the materials to the designated storage area following use. Chemicals, including oil, grease, solvents and detergents shall be stored on-site in approved containers only. Used chemicals shall be disposed of in refuse containers and removed periodically. Containers shall be regularly inspected to ensure the integrity of the container and seals to prevent leaks.

Paints and Solvents

During construction, temporary structures such as construction trailers may be moved on site to store items such as paints, solvents and gasoline pertinent to the continuation of construction activities. The intention of these structures is to shelter such items and reduce the potential of entering the stormwater runoff due to construction activities. After use, solvents shall be disposed of in approved containers and removed from site at scheduled intervals.

Fuels

Fuel for construction equipment shall either be obtained from a licensed distributor of petroleum products or from an approved above ground storage tank on site. Fuel from construction vehicles may come into contact with stormwater when vehicles are stored

outside. Good housekeeping and preventative maintenance procedures shall be implemented to ensure fuel spills and leaks are minimized during refueling and storage.

Temporary Facilities

Temporary sanitary facilities may be located on site for construction workers. This facility shall be located in an accessible and visible location. A waste management company may be contracted to arrive on site and provide the routine pumping and sanitization of the facility.

Solid Waste

No solid materials are allowed to be discharged from the site with stormwater. All solid waste shall be collected and placed in containers. The containers will be emptied periodically by a contract trash disposal service and hauled away from the site.

6.0 CONCLUSION

The proposed site stormwater management system will control and provide water treatment to stormwater generated within the Project study area through the use of storm sewer systems and stormwater management practices, thereby reducing impacts attributed to the proposed development. The Stormwater Pollution Prevention Plan for the proposed project, as described herein, will not adversely affect adjacent or downstream properties.

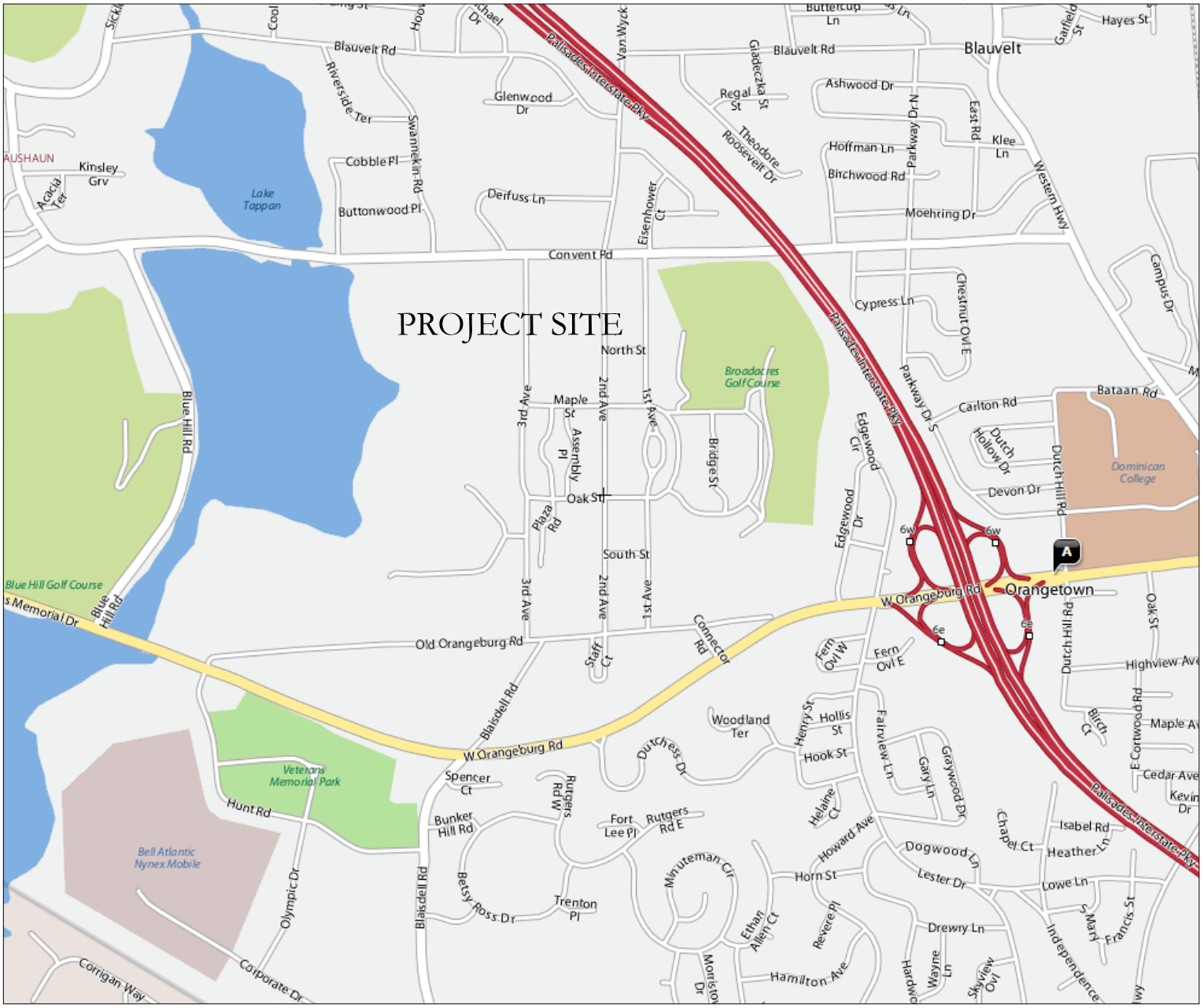
The project will comply with all requirements set forth by the General Permit and NYSDEC Design Manual.

Respectfully submitted by,

The Office of
McLaren Engineering Group
M.G. McLAREN, P.C.

Steven L. Grogg, P.E.
Site – Civil Division Chief
SLG/cmh/rjk

FIGURES



SITE LOCATION MAP

FIGURE No.1

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 6	85.69	Monument 301, on northeast side of Sickletown Road bridge over Nauraushaun Brook.
RM 7	108.16	Square cut on southeast corner of headwall on east side of Blauvelt Road over Nauraushaun Brook.
RM 8	143.64	PK nail on northwest corner of concrete retaining wall on north side of private road leading to Nauraushaun Brook.
RM 9	183.32	Square cut on northeast corner of wing wall on north end of abandoned railroad bridge over Nauraushaun Brook.

[1] National Geodetic Vertical Datum of 1929

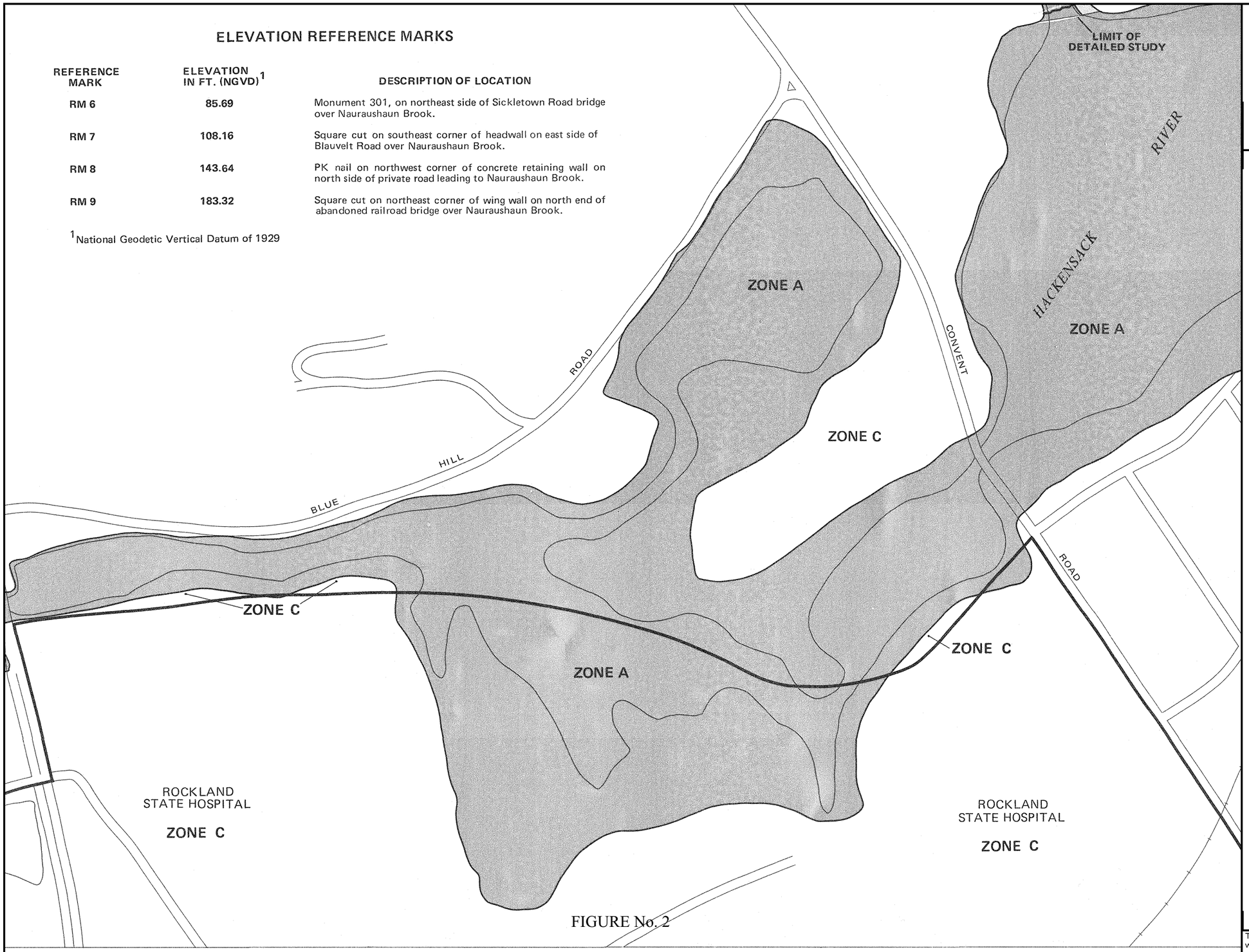


FIGURE No. 2

APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
ORANGETOWN,
NEW YORK
ROCKLAND COUNTY

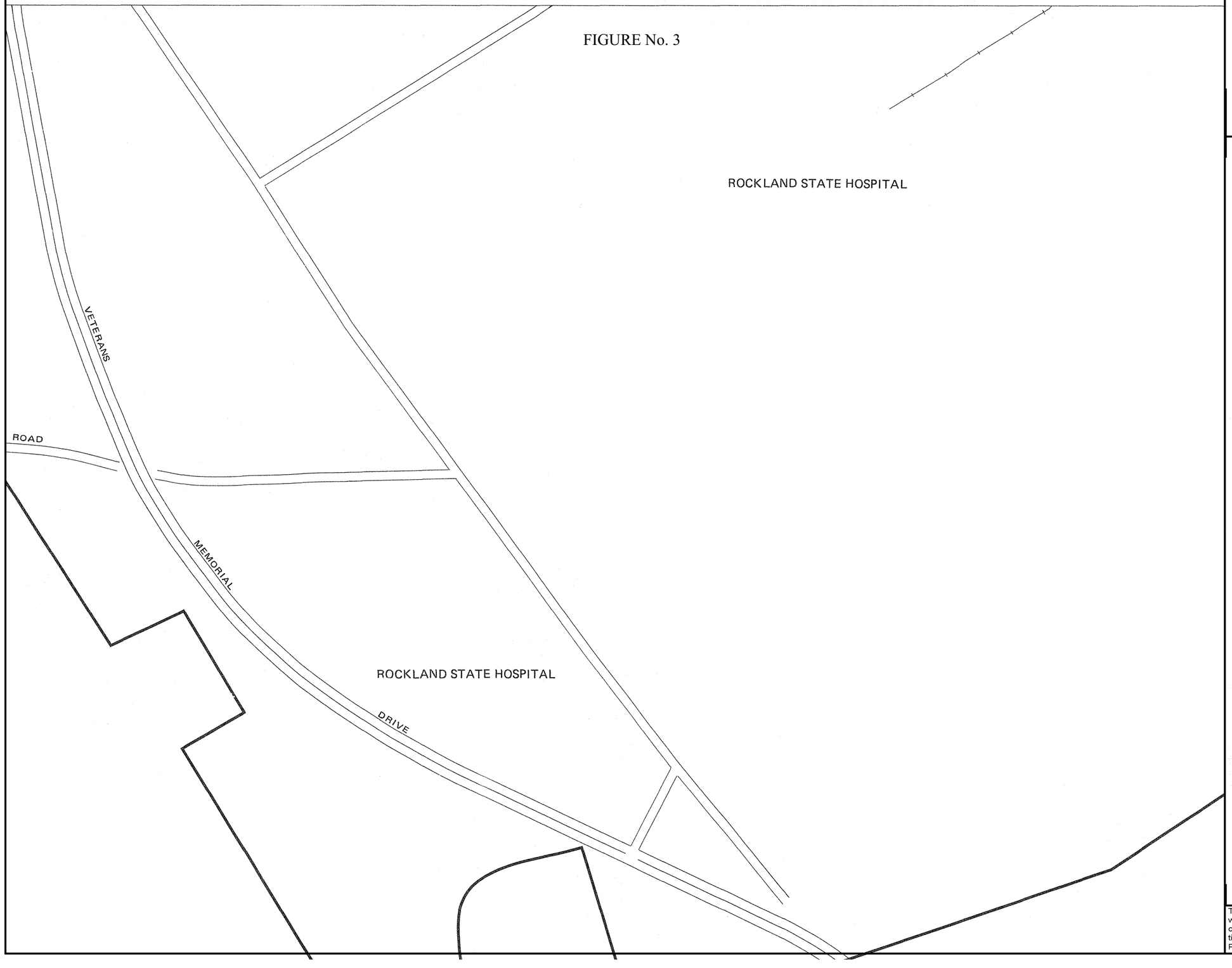
PANEL 2 OF 8
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360686 0002 C

EFFECTIVE DATE:
AUGUST 2, 1982

Federal Emergency Management Agency

FIGURE No. 3



APPROXIMATE SCALE
400 0 400 FEE

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
ORANGETOWN,
NEW YORK
ROCKLAND COUNTY

PANEL 4 OF 8
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360686 0004 C

EFFECTIVE DATE:
AUGUST 2, 1982

Federal Emergency Management Agency

Soil Properties and Qualities—Rockland County, New York
(Rockland Psych)

73° 59' 28"
73° 56' 51"
41° 3' 32"
41° 2' 25"
41° 3' 30"
41° 2' 23"

585000 585300 585600 585900 586200 586500 586800 587100 587400 587700 588000 588300

4545600 4545300 4545000 4544700 4544400 4544100 4543800

Nauraushaun Brook
Riverside Ter
Swannekin Rd
Cobble Pl
Kinsley Grv
Acacia Ter
Buttonwood Pl
Quaspec Rd
Derfuss Ln
Sickletown Rd
Van Wyck Rd
John F Kennedy Dr
Theodore Roosevelt Dr
Palisades Interstate Pkwy
Eisenhower Ct
Johnson Ln
Ashwood Dr
Hoffman Ln
Birchwood Rd
Parkway Dr
Beechwood Rd
Klee Ln
Klee Rd
East Rd
Kail Ct
Glenshaw St
Moehring Dr
Goehring Curv
Convent Rd
Chestnut Oval
Cypress Ln
Cannus Dr
Children's Psychiatric Center Rd
Blue Hill Rd
3rd Ave
North Cir
1st Ave
Maple St
Assembly Pl
2nd Ave
Plaza Way
Oak St
Bridge St
Edgewood Cir
Mountain View Ave
Bataan Rd
Carlton Rd
Dutch Hollow Dr
Devon Dr
Dutch Hill Rd
Town Hall Rd
Western Hwy
Orangeburg
Edgewood Dr
Palisades Interstate Pkwy
Fairbanks St
Oak St
Bradley Ave
Highview Ave
Old Orangeburg Rd
Staff Ct
Orangeburg Rd
Fern Oval
Lester Dr
704th St
Birch Ct
Cortwood Rd
Maple Ave
Wisteria Ct
Cedar Ave
Greenbush Rd
Woodland Ter
Henry St
Hollis St
Hook St
Fairview Ln
Gary Ln
Greywood Dr
Veterans Memorial Dr
Hunt Rd
Bielsdell Rd
Spencer Ct
Rutgers Rd
Dutchess Dr

CuB CeB Us Ux Uw W ReA WuC WuB WeB CrB Wc WeC Ud WeD Sa ReB

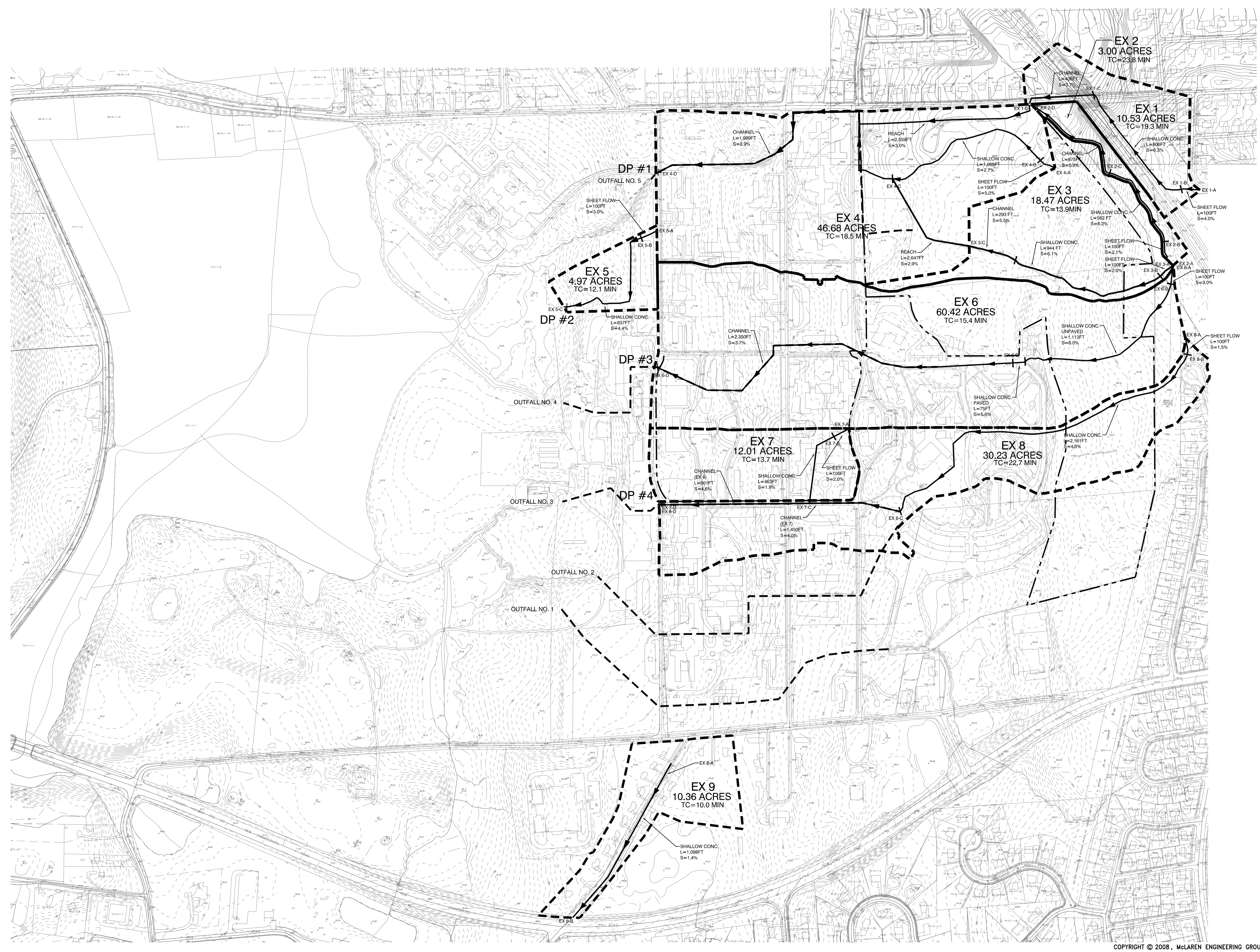
Map Scale: 1:9,850 if printed on B size (11" x 17") sheet.

N

Meters
0 150 300 600 900

Feet
0 500 1,000 2,000 3,000

FIGURE No. 4



McLaren ENGINEERING GROUP

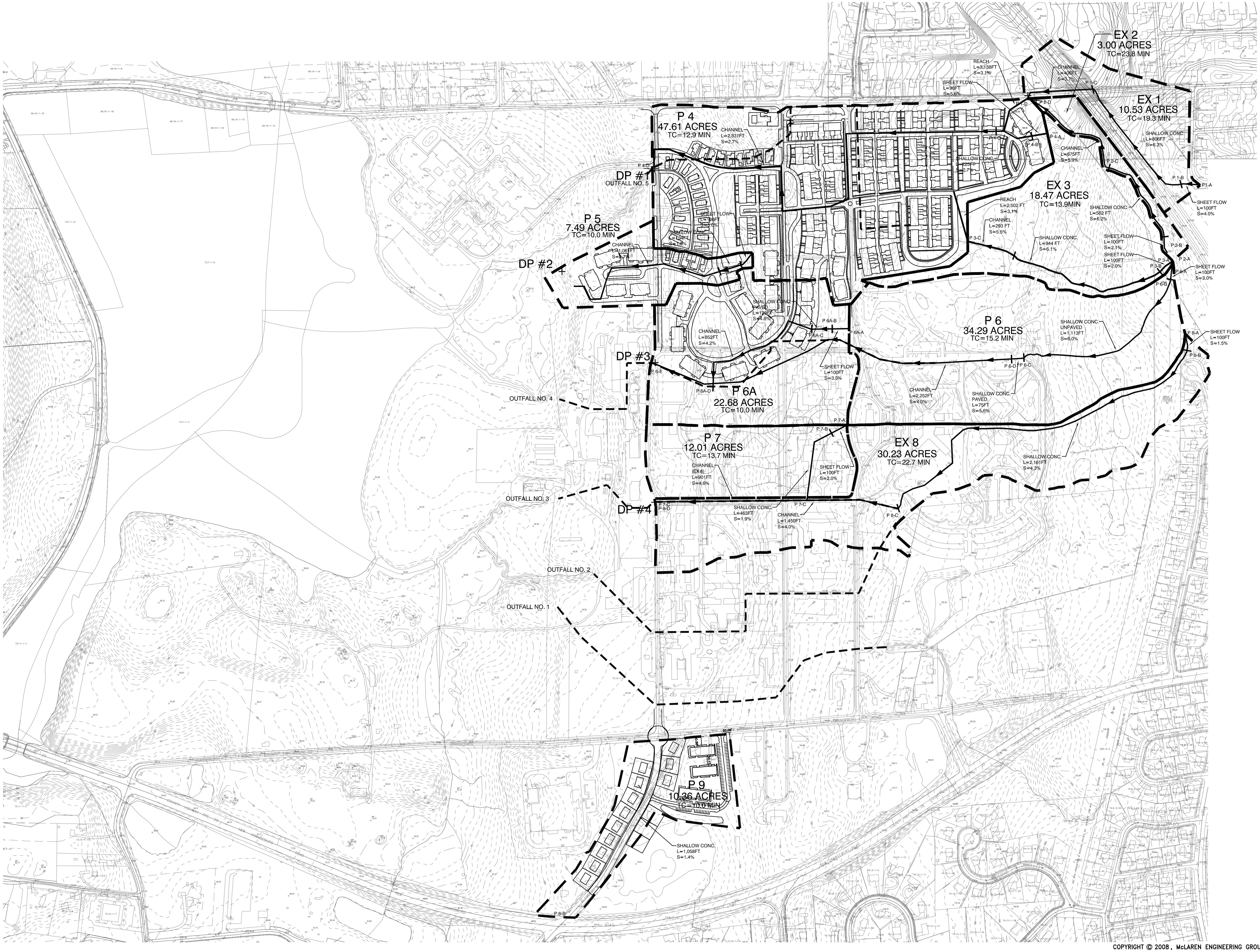
E-mail: mgmclaren@mgmclaren.com
100 Snake Hill Road, West Nyack, NY 10994
Tel. (845) 353-6400 Fax. (845) 353-6509

PROJECT
FOUR SEASONS
ORANGETOWN, NEW YORK

SHEET TITLE
EXISTING CONDITIONS
DRAINAGE AREA MAP

PROJECT NO.	107203
SCALE	12/17/08
DATE	NOT TO SCALE
DRAWN BY	CMH
CHECKED BY	SLG

DRAWING NO.
FIG 5
_____ OF _____ SHTS



McLaren ENGINEERING GROUP
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100 Snake Hill Road, West Nyack, NY 10994
Tel. (845) 353-6400 Fax. (845) 353-6509

PROJECT

FOUR SEASONS

ORANGETOWN, NEW YORK

SHEET TITLE

PROPOSED CONDITIONS
DRAINAGE AREA MAP

PROJECT NO.	107203
SCALE	12/17/08
DATE	NOT TO SCALE
DRAWN BY	CMH
CHECKED BY	SLG
DRAWING NO.	FIG 6

_____ OF _____ SHTS

FILE NAME: Q:\Cadd107\107203\Drainage\Proposed Drainage.dwg PLOT TIME: Thu, 12 Feb 2009 - 8:18am LAST SAVE: Wed, 04 Feb 2009 - 12:47pm BY: Chumphries

APPENDIX A

DESIGNATED QUALIFIED INSPECTOR'S CERTIFICATION

DESIGNATED QUALIFIED INSPECTOR'S CERTIFICATION

Project Name: **FOUR SEASONS AT ORANGETOWN**

Address: **Town of Orangetown, New York**

In accordance with the requirements of the NYSDEC SPDES General Permit for Construction Activities, GP-0-08-0001, I hereby certify that I am a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed [ ]Professional Engineer, [ ]Certified Professional in Erosion and Sediment Control (CPESC), [ ] licensed Landscape Architect, or [ ] other Department endorsed individual(s). Someone working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing a site inspection has received four (4) hours of training, endorsed by the Department, from a Soil and Water Conservation District, CPESC, Inc. or other Department endorsed entity in proper erosion and sediment control principles no later than two (2) years from date this general permit is issued. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four (4) hours of training every three (3) years.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

_____ _____

Signature **Date**

_____ _____

[Printed Name] **[Title]**

Company Name: _____

Address: _____

_____

Tel.: _____

Fax: _____

Individual Working Under Direct Supervision of the Licensed Professional:-_____

APPENDIX B

CONTRACTOR/SUBCONTRACTOR SPDES PERMIT CERTIFICATION

CONTRACTOR CERTIFICATION

Project Name: **FOUR SEASONS AT ORANGETOWN**

Address: **Town of Orangetown, New York**

In accordance with the requirements of the NYSDEC SPDES General Permit for Construction Activities, GP0-08-001, Any Contractor or Sub-Contractor performing an activity that involves soil disturbance shall provide a signed copy of this certification to the Owner/Operator prior to performing any Contract work.

> "I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

Company Name: _____

Address: _____

_____

Tel.: _____

Fax: _____

Individual Responsible for SWPPP Implementation: _____

_____ _____

Signature **Date**

_____ _____

Printed Name **Title**

APPENDIX C

EXISTING CONDITIONS ANALYSIS

CMH

Rockland Psych
Existing Conditions (MEG107203)
Rockland County, New York

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
EX 1							
SHEET	100	0.0400	0.400				0.259
SHALLOW	806	0.0630	0.050				0.055
CHANNEL	406	0.0370	0.013	6.00	9.32	16.111	0.007
					Time of Concentration		0.321
EX 2							
SHEET	100	0.0210	0.400				0.336
SHALLOW	562	0.0620	0.050				0.039
CHANNEL	675	0.0590	0.030	6.00	9.32	8.929	0.021
					Time of Concentration		.396
EX 3							
SHEET	100	0.0200	0.150				0.156
SHALLOW	944	0.0610	0.050				0.066
CHANNEL	293	0.0550	0.030	6.00	9.32	9.043	0.009
					Time of Concentration		0.231
EX 4							
SHEET	100	0.0500	0.240				0.158
SHALLOW	1055	0.0270	0.050				0.111
CHANNEL	1989	0.0290	0.013	1.76	2.87	14.167	0.039
					Time of Concentration		0.308
EX 5							
SHEET	100	0.0300	0.150				0.133
SHALLOW	837	0.0440	0.050				0.069
					Time of Concentration		0.202
EX 6							
SHEET	100	0.0300	0.150				0.133
SHALLOW	1113	0.0600	0.050				0.078
SHALLOW	75	0.0560	0.025				0.004
CHANNEL	2350	0.0370	0.013	1.76	2.87	15.921	0.041
					Time of Concentration		0.256
EX 7							
SHEET	100	0.0200	0.150				0.156
SHALLOW	463	0.0190	0.050				0.058
CHANNEL	901	0.0460	0.013	1.76	2.87	17.877	0.014
					Time of Concentration		0.228
EX 8							
SHEET	100	0.0150	0.150				0.175
SHALLOW	2161	0.0430	0.050				0.179
CHANNEL	1450	0.0400	0.013	1.76	2.87	16.782	0.024
					Time of Concentration		0.378

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/08
CHK BY:	SLG **DATE:** 12/17/08

SUBAREA EX 1

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
C	Impervious	Off-site	98	3.52	344.96
C	Open Space (Fair condition)	Off-site	79	2.36	186.44
C	Woods (Fair)	Off-site	76	4.65	353.40
			TOTAL	**10.53**	**884.80**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{884.80}{10.53}$$

CN = 84

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 2

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
C	Open Space (Fair condition)	On-site	79	0.60	47.40
C	Woods (Fair)	On-site	76	2.40	182.40
			TOTAL	**3.00**	**229.80**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{229.80}{3.00}$$

CN = 77

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 3

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Open Space (Fair condition)	On-site	69	2.11	145.73
C	Impervious	On-site	98	0.07	6.86
C	Open Space (Fair condition)	On-site	79	16.29	1286.75
			TOTAL	**18.47**	**1,439.34**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{1439.34}{18.47}$$

CN = 78

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 4

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	4.34	425.32
B	Open Space (Fair condition)	On-site	69	34.65	2390.85
B	Woods (Fair)	On-site	65	0.69	44.85
C	Impervious	On-site	98	1.75	171.50
C	Open Space (Fair condition)	On-site	79	5.25	414.75
			TOTAL	**46.68**	**3447.27**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{3447.27}{46.68}$$

CN = 74

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 5

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
C	Impervious	On-site	98	0.58	56.35
C	Open Space (Fair condition)	On-site	79	0.68	53.72
C	Woods (Fair)	On-site	76	3.72	282.34
			TOTAL	**4.97**	**392.41**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{392.41}{4.97}$$

CN = 79

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 6

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	24.14	2365.72
B	Open Space (Fair condition)	On-site	69	31.73	2189.51
C	Impervious	On-site	98	1.29	126.42
C	Open Space (Fair condition)	On-site	79	3.26	257.38
			TOTAL	**60.42**	**4,939.03**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{4,939.03}{60.42}$$

CN = 82

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 7

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	2.33	228.73
B	Open Space (Fair condition)	On-site	69	6.06	418.14
C	Impervious	On-site	98	0.51	49.69
C	Open Space (Fair condition)	On-site	79	3.11	245.61
			TOTAL	**12.01**	**942.17**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{942.17}{12.01}$$

CN = 78

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 8

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	3.52	344.96
B	Open Space (Fair condition)	On-site	69	22.88	1578.51
C	Impervious	On-site	98	0.51	49.69
C	Open Space (Fair condition)	On-site	79	3.33	262.75
			TOTAL	**30.23**	**2,235.91**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{2,235.91}{30.23}$$

CN = 74

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 9

WEIGHTED CURVE NUMBER CALCULATION

Existing Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	0.03	3.23
B	Open Space (Fair condition)	On-site	69	0.68	46.71
C	Impervious	On-site	98	1.66	162.68
C	Open Space (Fair condition)	On-site	79	7.99	631.21
			TOTAL	**10.36**	**843.84**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{843.84}{10.36}$$

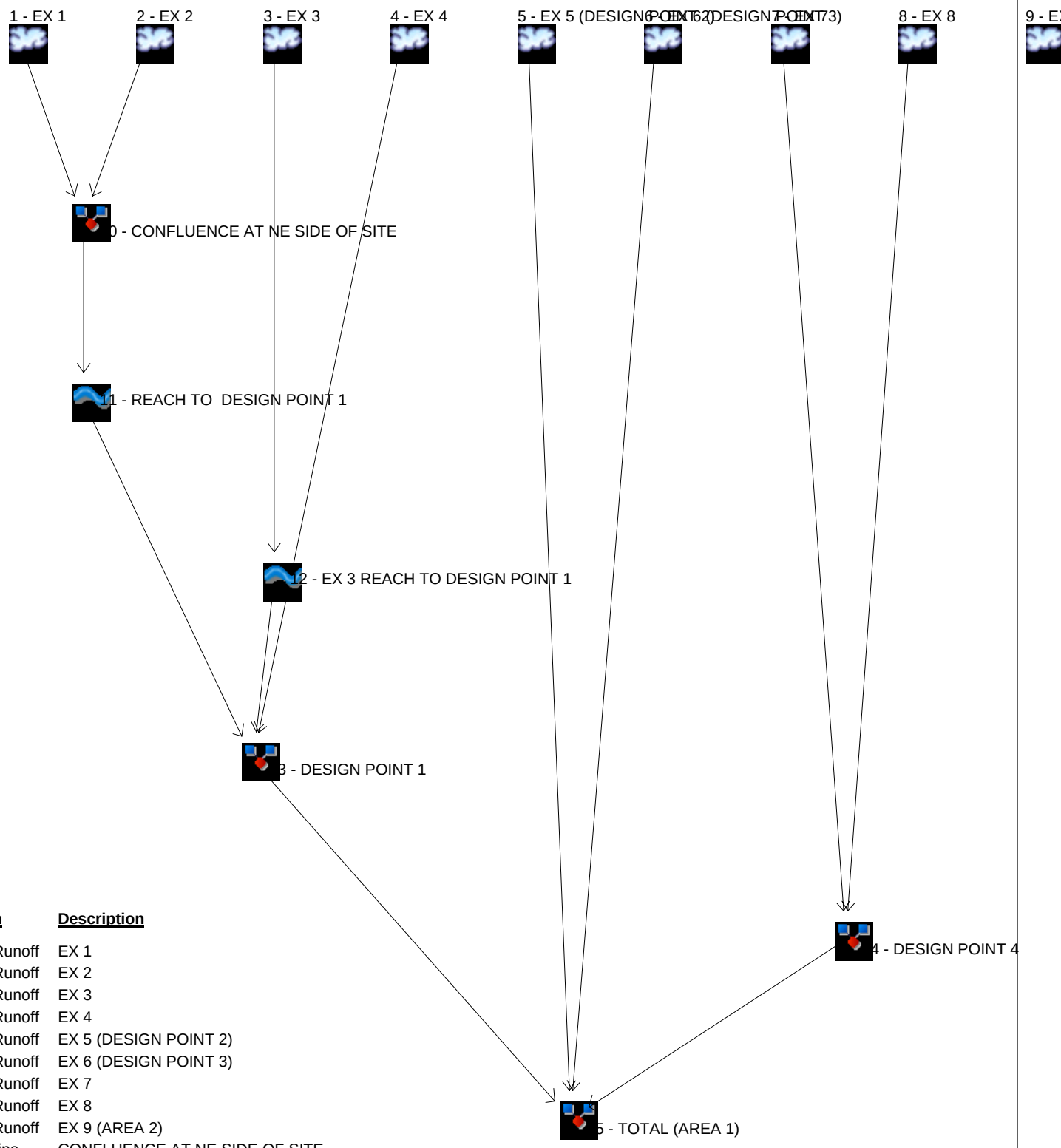
CN = 81

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX 1
2	SCS Runoff	EX 2
3	SCS Runoff	EX 3
4	SCS Runoff	EX 4
5	SCS Runoff	EX 5 (DESIGN POINT 2)
6	SCS Runoff	EX 6 (DESIGN POINT 3)
7	SCS Runoff	EX 7
8	SCS Runoff	EX 8
9	SCS Runoff	EX 9 (AREA 2)
10	Combine	CONFLUENCE AT NE SIDE OF SITE
11	Reach	REACH TO DESIGN POINT 1
12	Reach	EX 3 REACH TO DESIGN POINT 1
13	Combine	DESIGN POINT 1
14	Combine	DESIGN POINT 4
15	Combine	TOTAL (AREA 1)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	16.78	1	734	74,019	------	------	------	EX 1
2	SCS Runoff	3.160	1	738	15,578	------	------	------	EX 2
3	SCS Runoff	25.04	1	731	100,393	------	------	------	EX 3
4	SCS Runoff	47.02	1	733	207,714	------	------	------	EX 4
5	SCS Runoff	7.324	1	729	27,811	------	------	------	EX 5 (DESIGN POINT 2)
6	SCS Runoff	95.56	1	732	395,858	------	------	------	EX 6 (DESIGN POINT 3)
7	SCS Runoff	16.28	1	731	65,280	------	------	------	EX 7
8	SCS Runoff	27.71	1	737	134,847	------	------	------	EX 8
9	SCS Runoff	18.72	1	727	64,253	------	------	------	EX 9 (AREA 2)
10	Combine	19.78	1	734	89,598	1, 2,	------	------	CONFLUENCE AT NE SIDE OF SIT
11	Reach	19.18	1	738	89,596	10	------	------	REACH TO DESIGN POINT 1
12	Reach	24.22	1	734	100,391	3	------	------	EX 3 REACH TO DESIGN POINT 1
13	Combine	89.36	1	734	397,701	4, 11, 12	------	------	DESIGN POINT 1
14	Combine	42.23	1	735	200,127	7, 8,	------	------	DESIGN POINT 4
15	Combine	232.07	1	733	1,021,496	5, 6, 13, 14	------	------	TOTAL (AREA 1)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	28.19	1	733	125,008	------	------	------	EX 1
2	SCS Runoff	5.907	1	737	28,564	------	------	------	EX 2
3	SCS Runoff	46.02	1	730	181,809	------	------	------	EX 3
4	SCS Runoff	92.80	1	733	396,067	------	------	------	EX 4
5	SCS Runoff	13.24	1	729	49,755	------	------	------	EX 5 (DESIGN POINT 2)
6	SCS Runoff	165.20	1	731	683,757	------	------	------	EX 6 (DESIGN POINT 3)
7	SCS Runoff	29.92	1	730	118,220	------	------	------	EX 7
8	SCS Runoff	54.65	1	736	257,125	------	------	------	EX 8
9	SCS Runoff	32.74	1	727	112,269	------	------	------	EX 9 (AREA 2)
10	Combine	33.85	1	734	153,573	1, 2,	------	------	CONFLUENCE AT NE SIDE OF SIT
11	Reach	33.46	1	736	153,571	10	------	------	REACH TO DESIGN POINT 1
12	Reach	45.55	1	732	181,808	3	------	------	EX 3 REACH TO DESIGN POINT 1
13	Combine	170.25	1	733	731,445	4, 11, 12	------	------	DESIGN POINT 1
14	Combine	81.53	1	734	375,345	7, 8,	------	------	DESIGN POINT 4
15	Combine	426.74	1	732	1,840,301	5, 6, 13, 14	------	------	TOTAL (AREA 1)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	47.55	1	733	214,679	------	------	------	EX 1
2	SCS Runoff	10.83	1	737	52,465	------	------	------	EX 2
3	SCS Runoff	83.16	1	730	330,590	------	------	------	EX 3
4	SCS Runoff	176.80	1	732	750,678	------	------	------	EX 4
5	SCS Runoff	23.60	1	729	89,580	------	------	------	EX 5 (DESIGN POINT 2)
6	SCS Runoff	284.77	1	731	1,196,146	------	------	------	EX 6 (DESIGN POINT 3)
7	SCS Runoff	54.08	1	730	214,964	------	------	------	EX 7
8	SCS Runoff	104.23	1	736	487,337	------	------	------	EX 8
9	SCS Runoff	56.90	1	727	198,263	------	------	------	EX 9 (AREA 2)
10	Combine	57.94	1	734	267,144	1, 2,	------	------	CONFLUENCE AT NE SIDE OF SIT
11	Reach	57.75	1	735	267,143	10	------	------	REACH TO DESIGN POINT 1
12	Reach	82.96	1	731	330,588	3	------	------	EX 3 REACH TO DESIGN POINT 1
13	Combine	314.77	1	732	1,348,411	4, 11, 12	------	------	DESIGN POINT 1
14	Combine	152.85	1	734	702,301	7, 8,	------	------	DESIGN POINT 4
15	Combine	771.52	1	732	3,336,436	5, 6, 13, 14	------	------	TOTAL (AREA 1)

Hydraflow Table of Contents

Existing.gpw

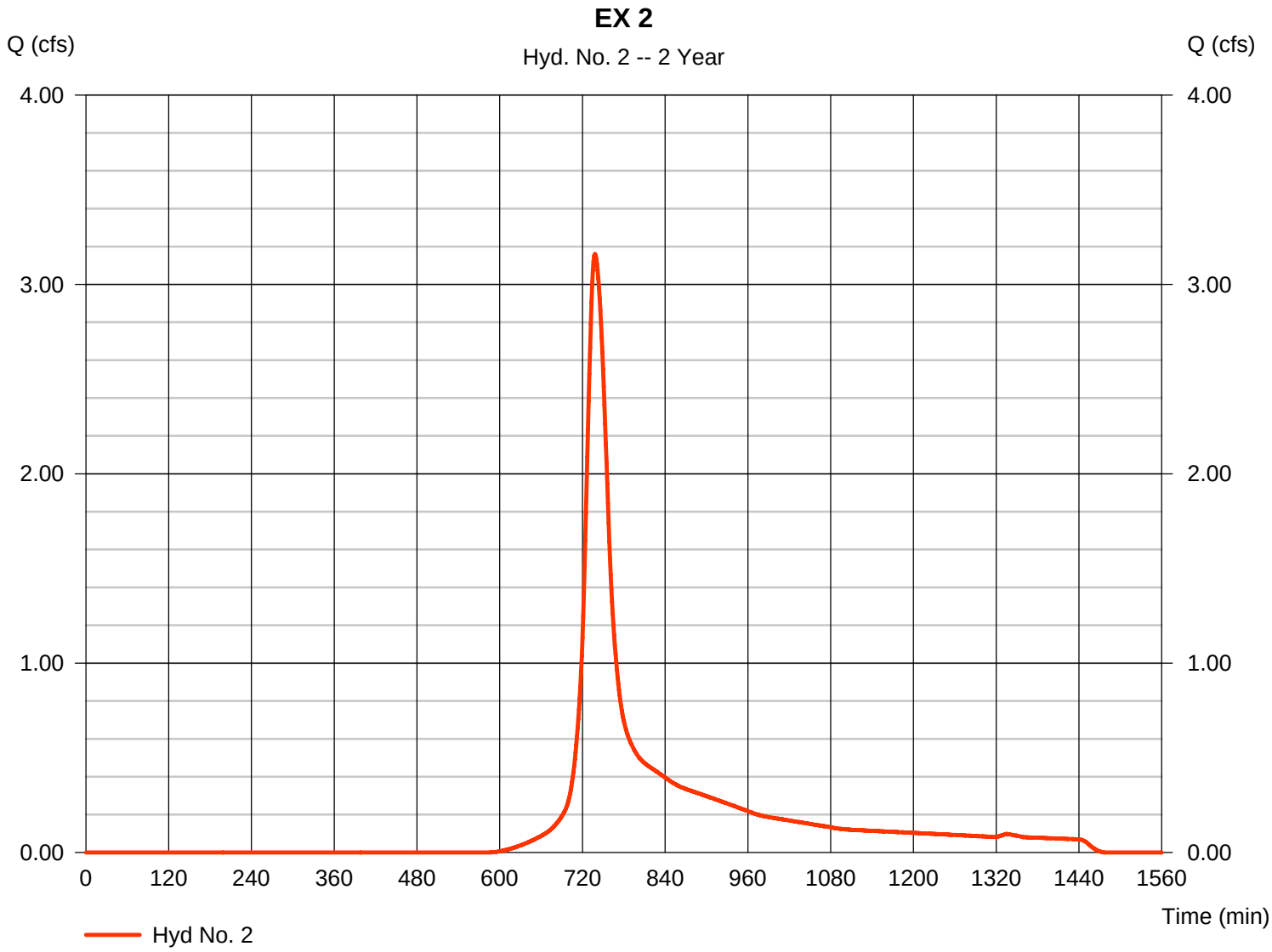
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 30, 2008

Hydrograph Report

Hyd. No. 2

EX 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.160 cfs
Storm frequency	=	2 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	15,578 cuft
Drainage area	=	3.000 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	23.80 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

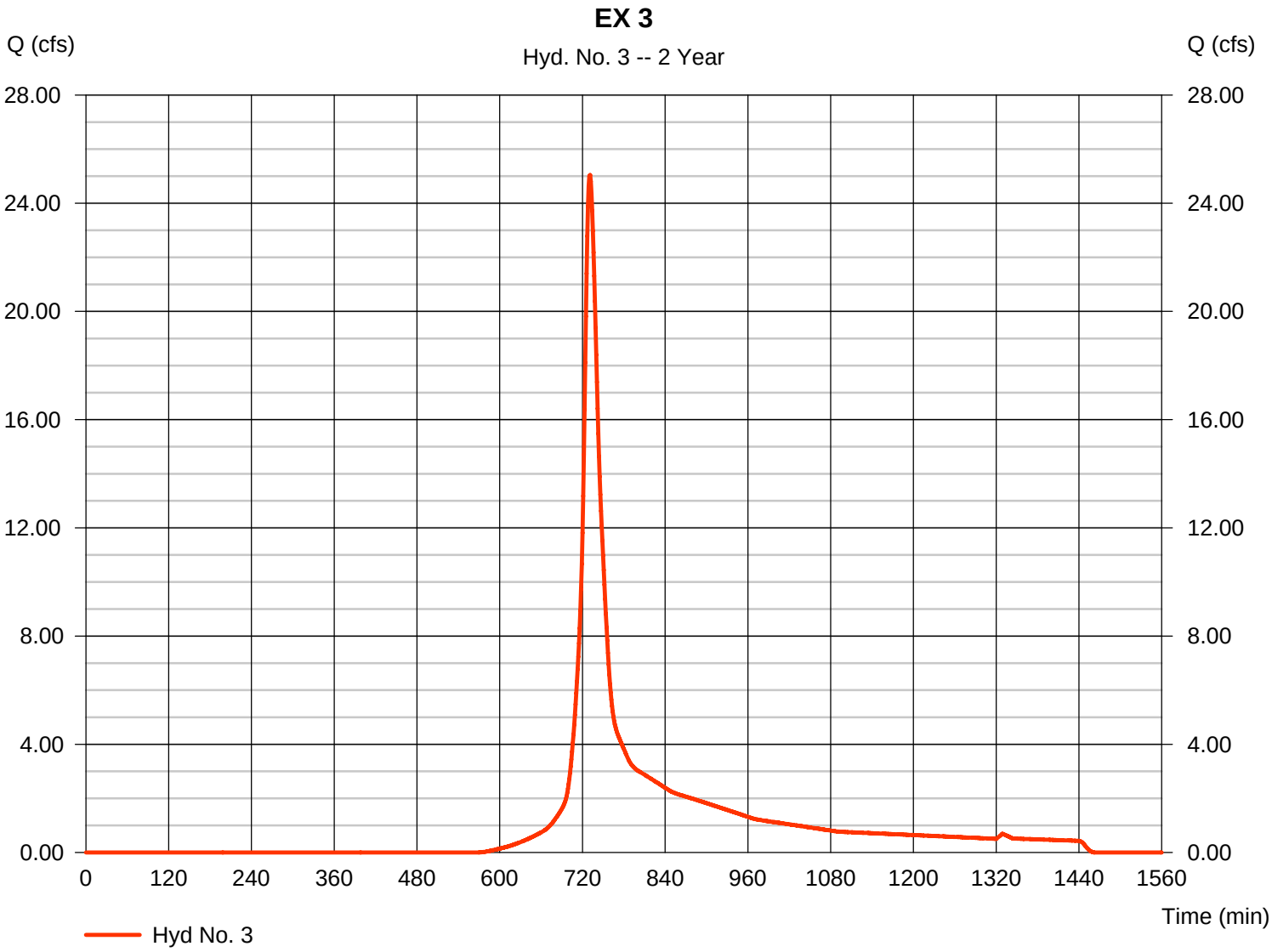


Hydrograph Report

Hyd. No. 3

EX 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.04 cfs
Storm frequency	=	2 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	100,393 cuft
Drainage area	=	18.470 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

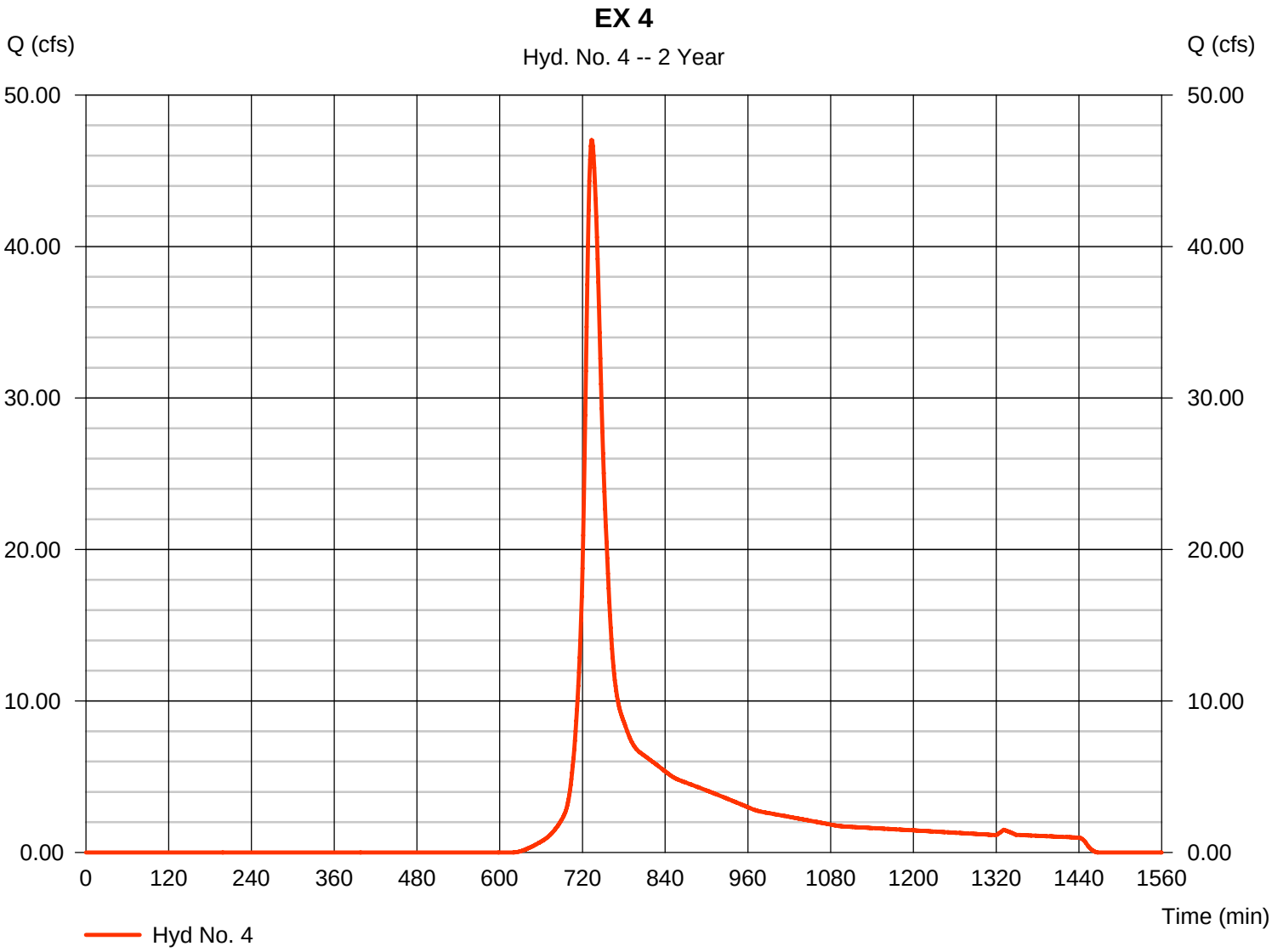


Hydrograph Report

Hyd. No. 4

EX 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	47.02 cfs
Storm frequency	=	2 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	207,714 cuft
Drainage area	=	46.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	18.50 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

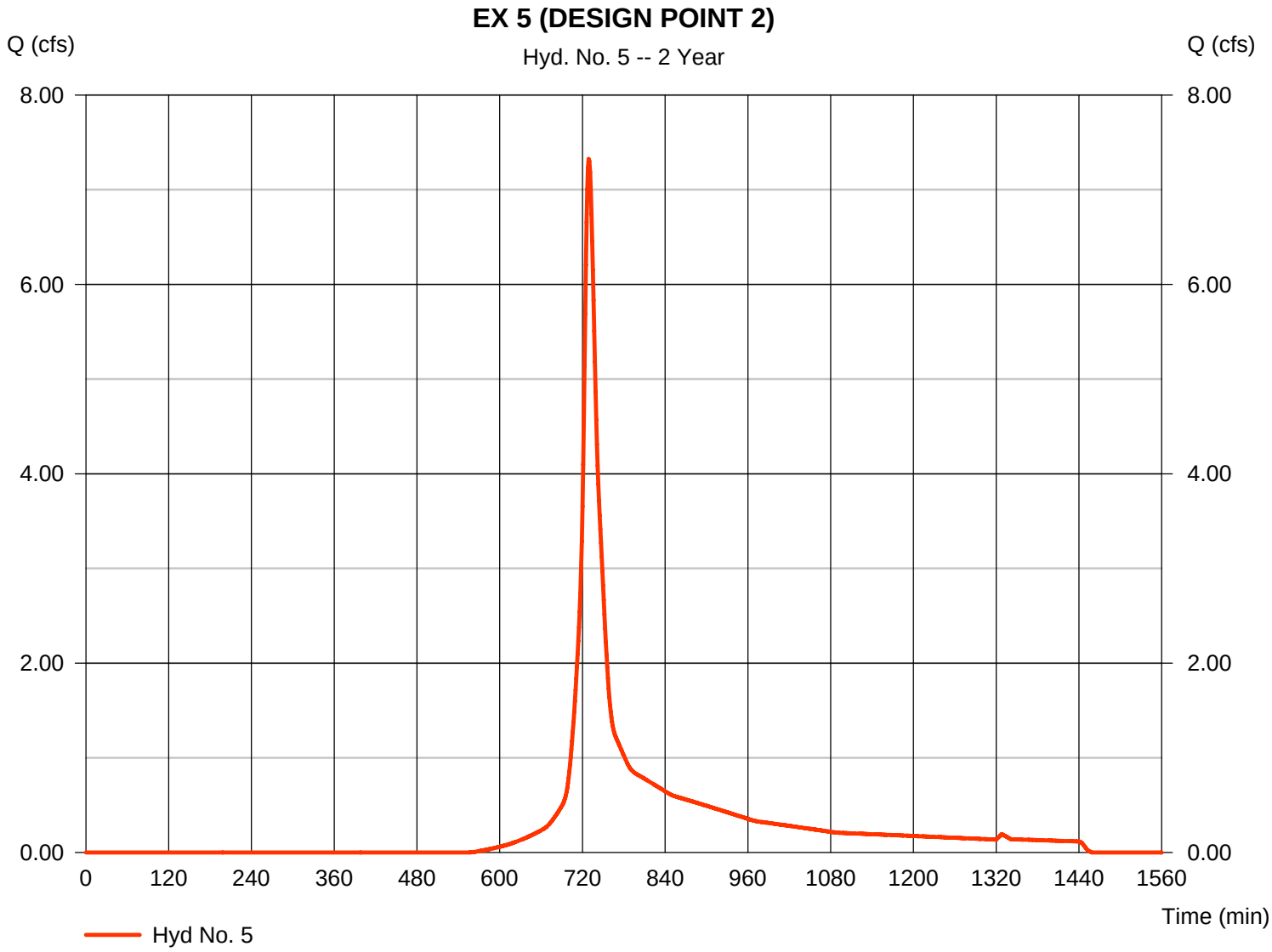


Hydrograph Report

Hyd. No. 5

EX 5 (DESIGN POINT 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.324 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	27,811 cuft
Drainage area	=	4.970 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	12.10 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

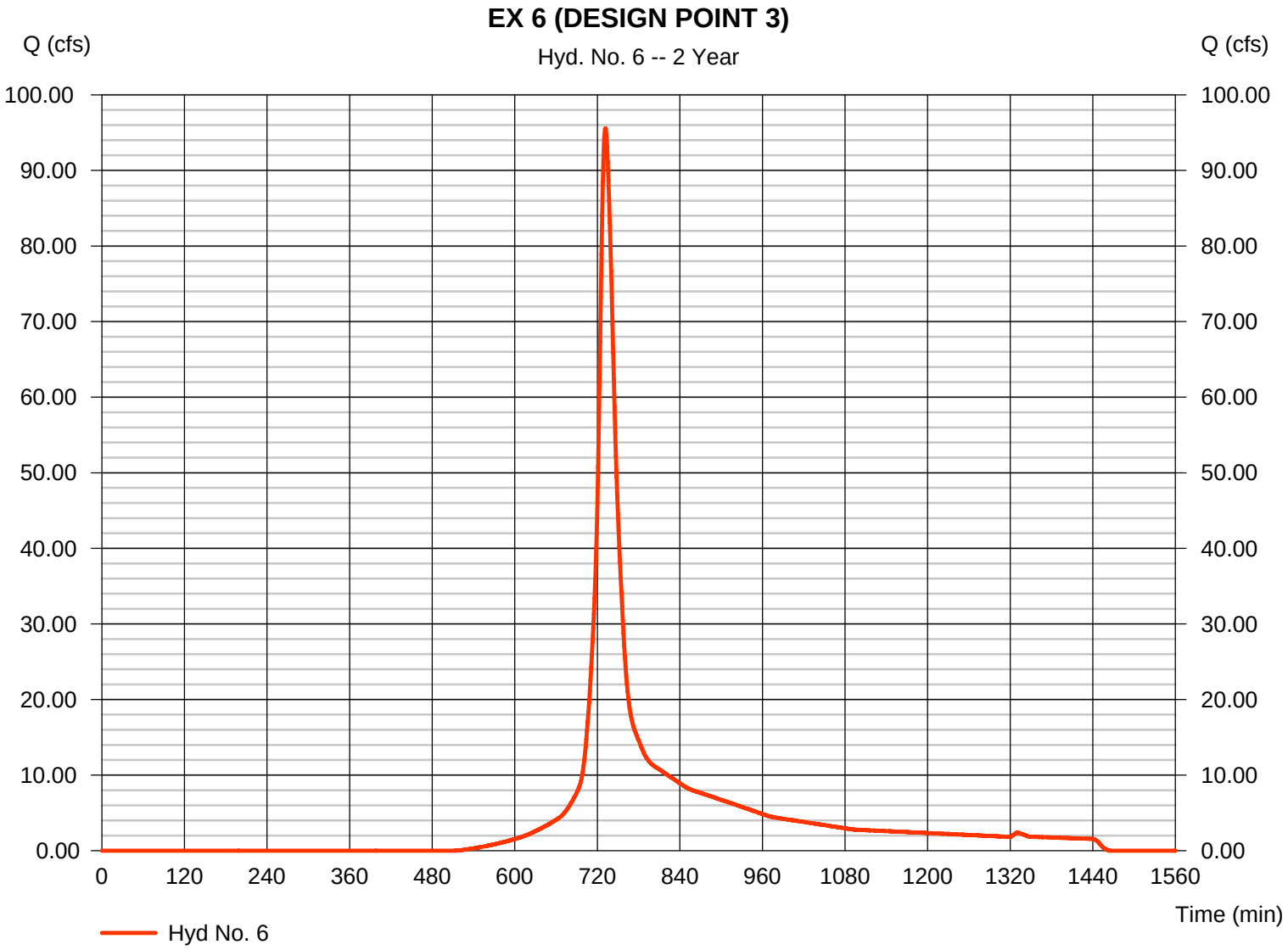


Hydrograph Report

Hyd. No. 6

EX 6 (DESIGN POINT 3)

Hydrograph type	=	SCS Runoff	Peak discharge	=	95.56 cfs
Storm frequency	=	2 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	395,858 cuft
Drainage area	=	60.420 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.40 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

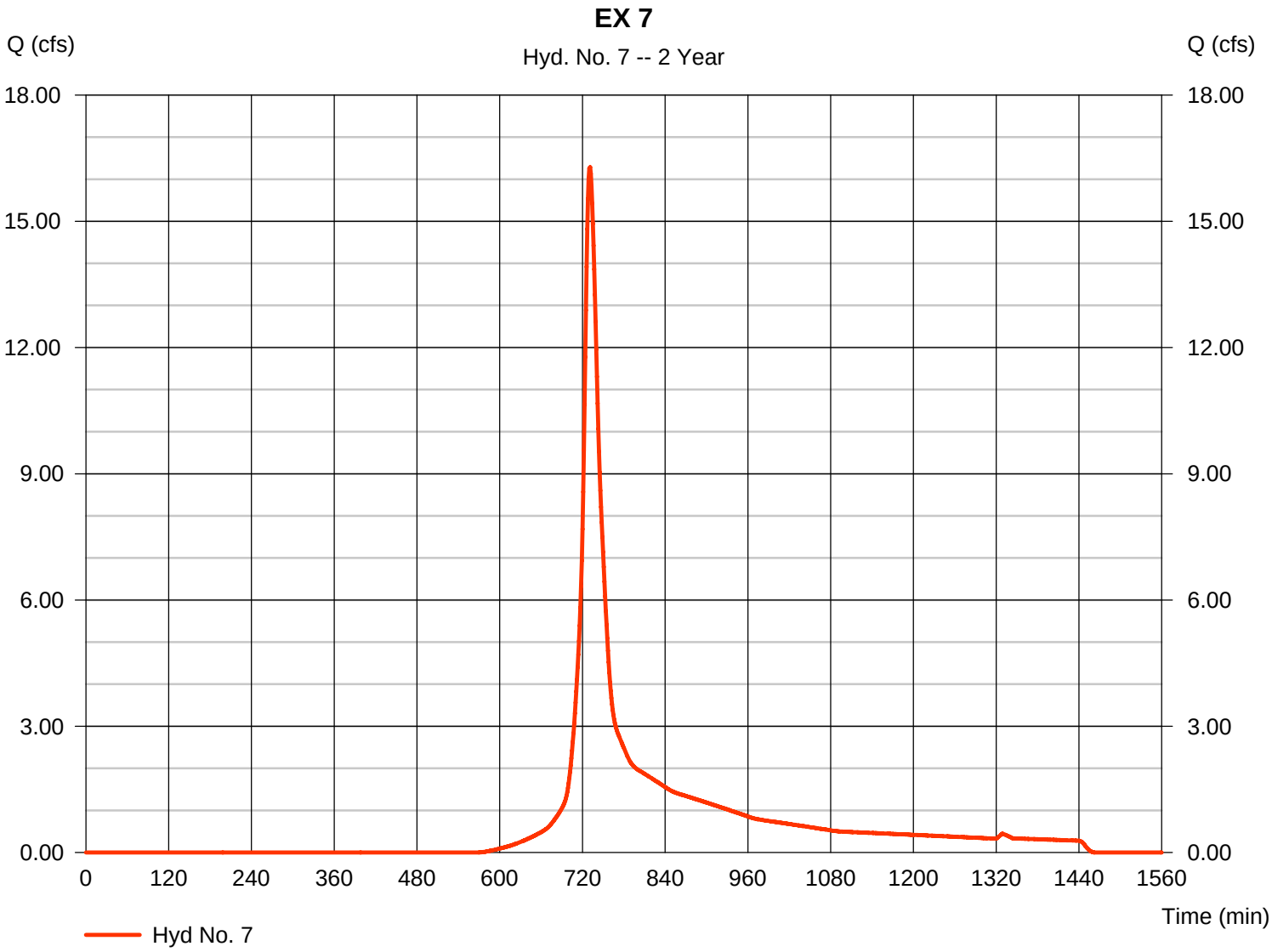


Hydrograph Report

Hyd. No. 7

EX 7

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.28 cfs
Storm frequency	=	2 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	65,280 cuft
Drainage area	=	12.010 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.70 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

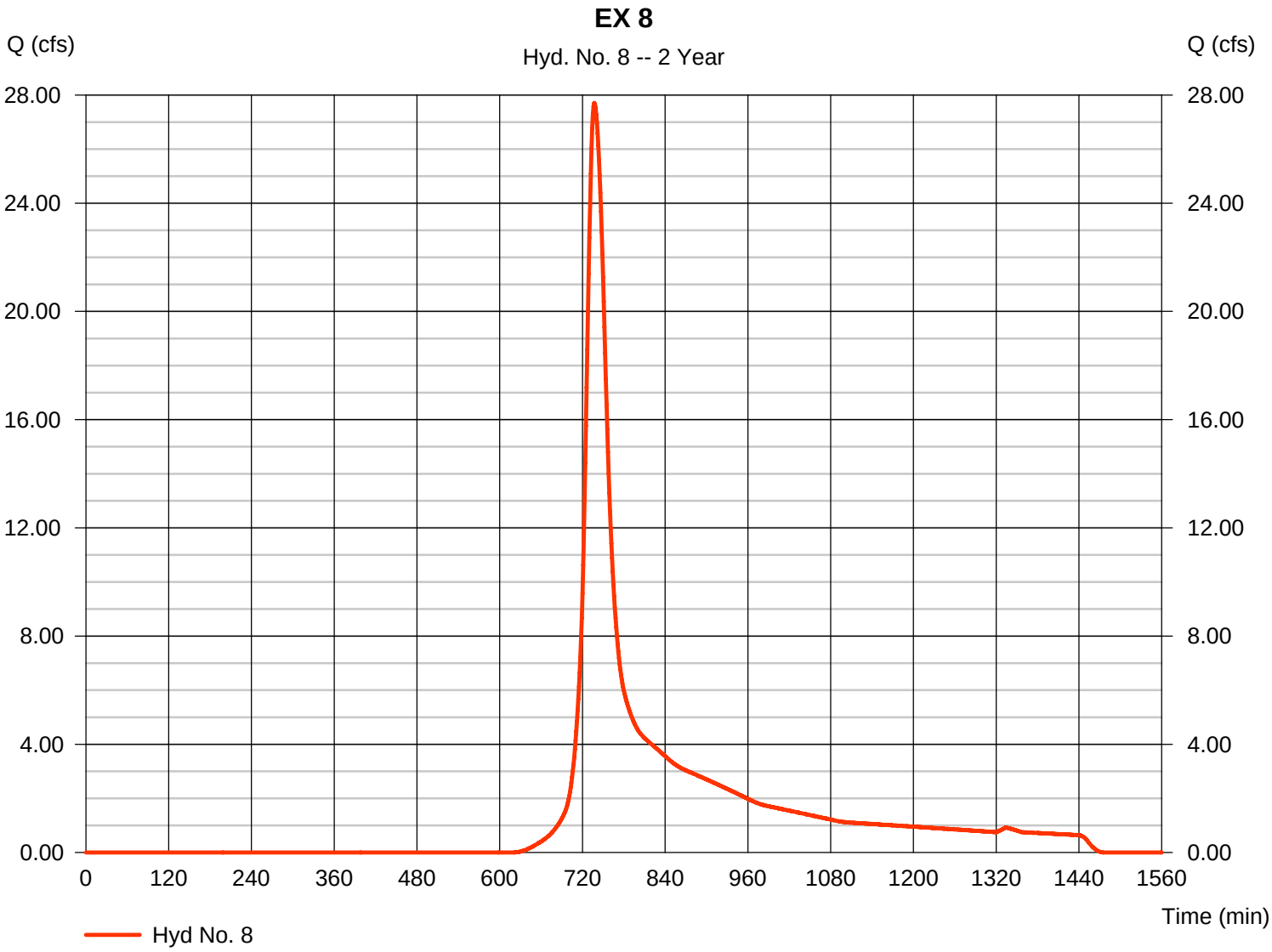


Hydrograph Report

Hyd. No. 8

EX 8

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.71 cfs
Storm frequency	=	2 yrs	Time to peak	=	737 min
Time interval	=	1 min	Hyd. volume	=	134,847 cuft
Drainage area	=	30.230 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	22.70 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

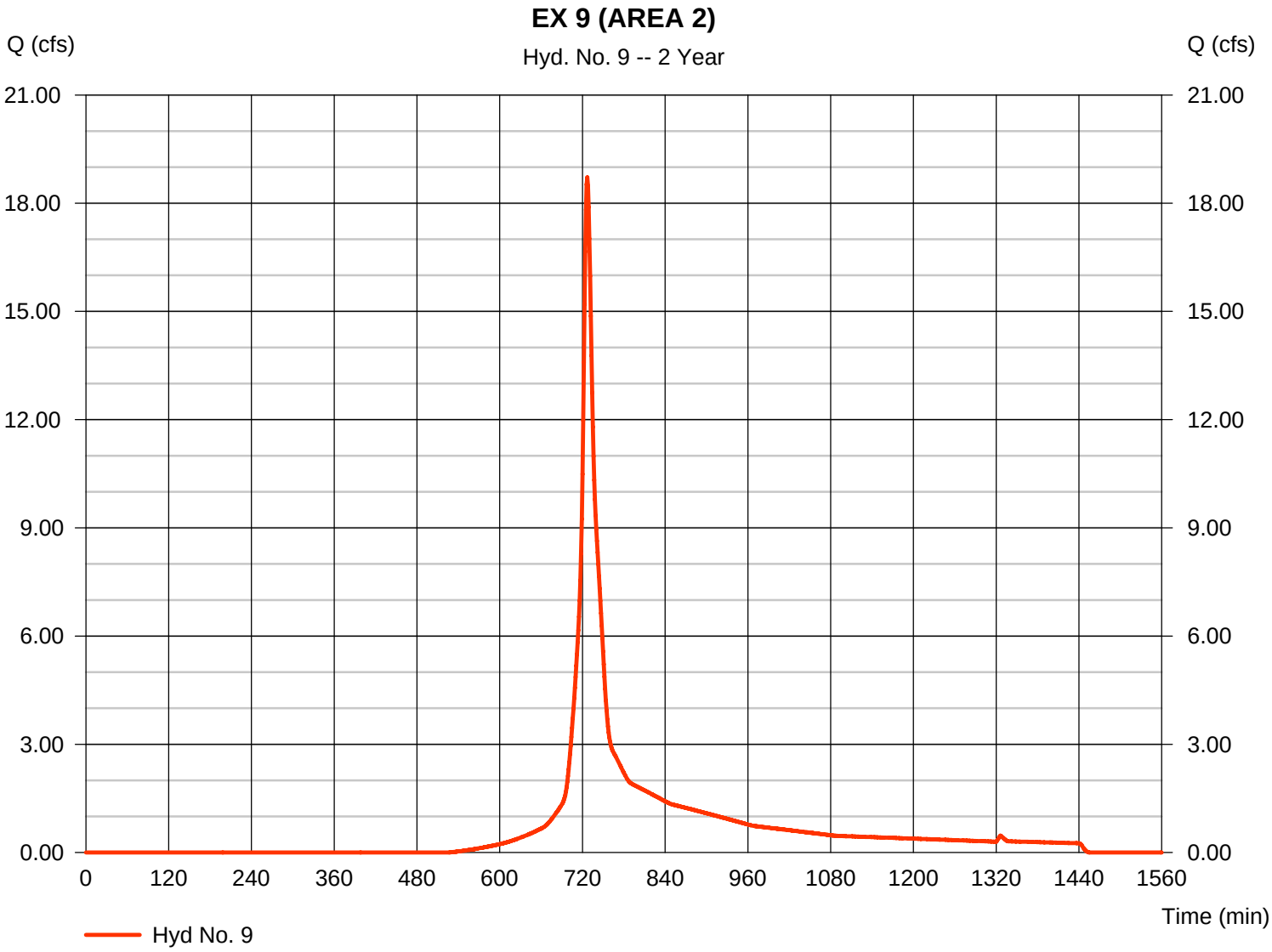


Hydrograph Report

Hyd. No. 9

EX 9 (AREA 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.72 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	64,253 cuft
Drainage area	=	10.360 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

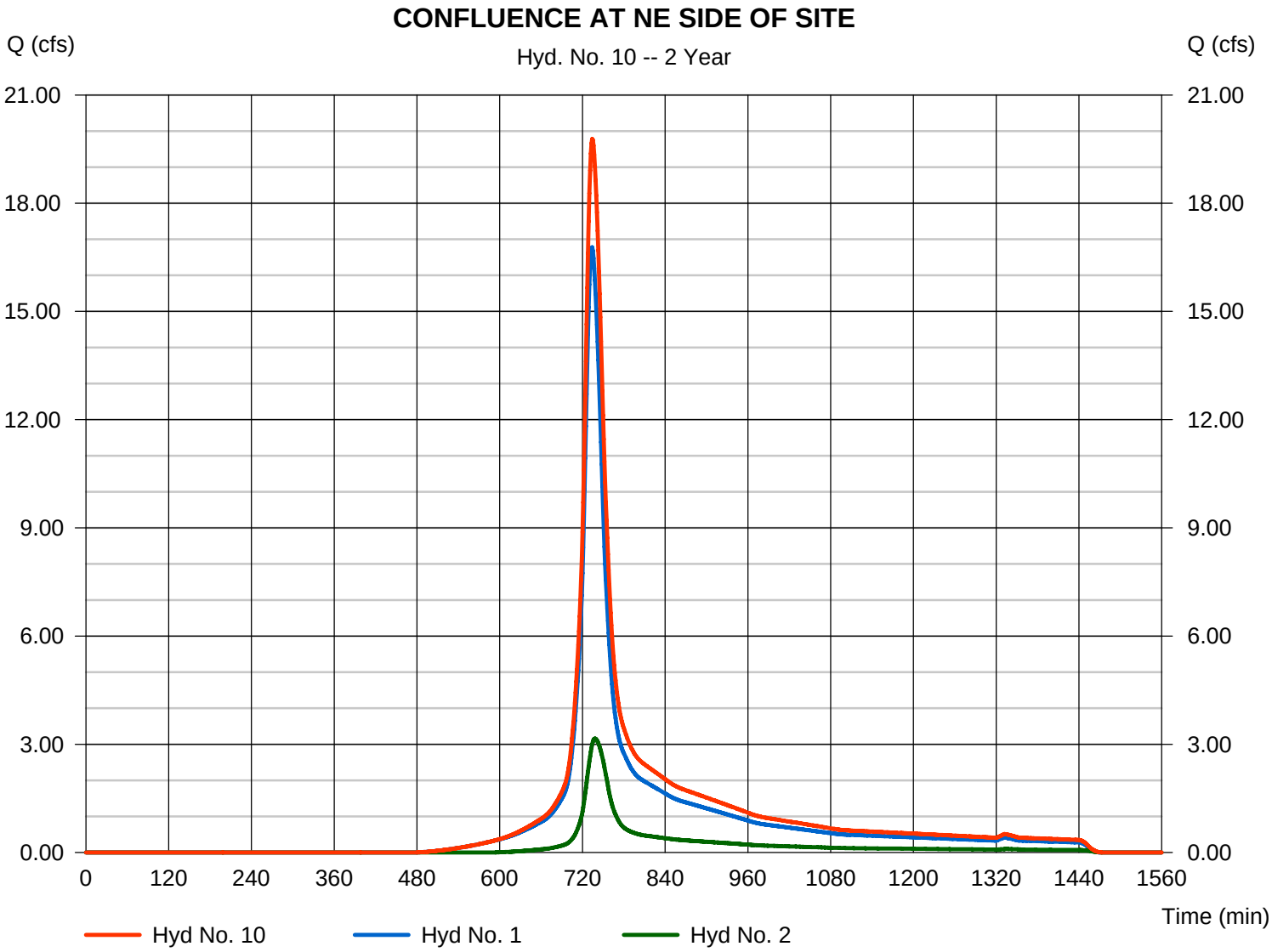


Hydrograph Report

Hyd. No. 10

CONFLUENCE AT NE SIDE OF SITE

Hydrograph type	= Combine	Peak discharge	= 19.78 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 89,598 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 13.530 ac



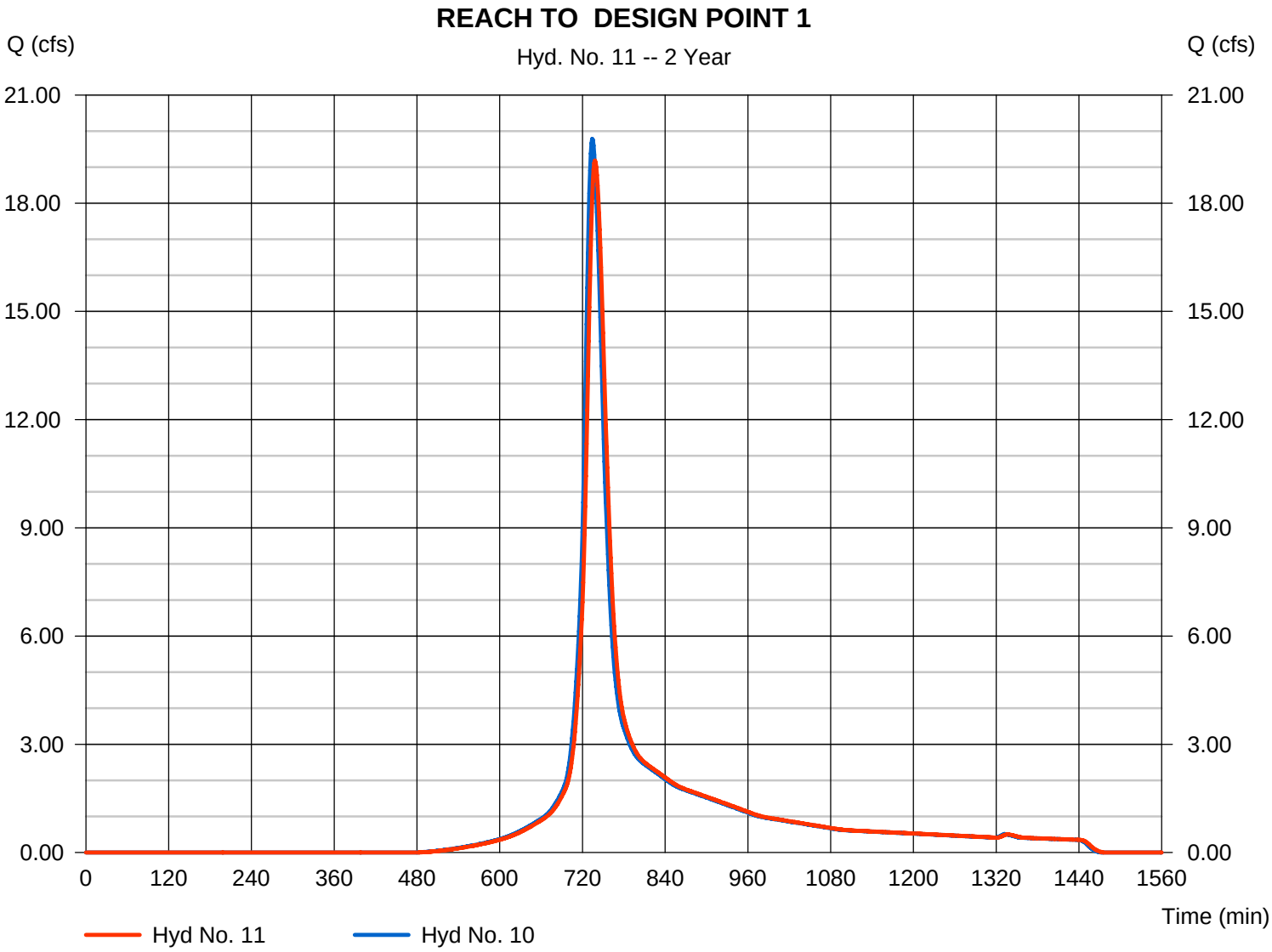
Hydrograph Report

Hyd. No. 11

REACH TO DESIGN POINT 1

Hydrograph type	=	Reach	Peak discharge	=	19.18 cfs
Storm frequency	=	2 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	89,596 cuft
Inflow hyd. No.	=	10 - CONFLUENCE AT NE SIDE OF SITE	Section type	=	Circular
Reach length	=	2559.0 ft	Channel slope	=	3.0 %
Manning's n	=	0.013	Bottom width	=	1.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	11.461	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2818

Modified Att-Kin routing method used.

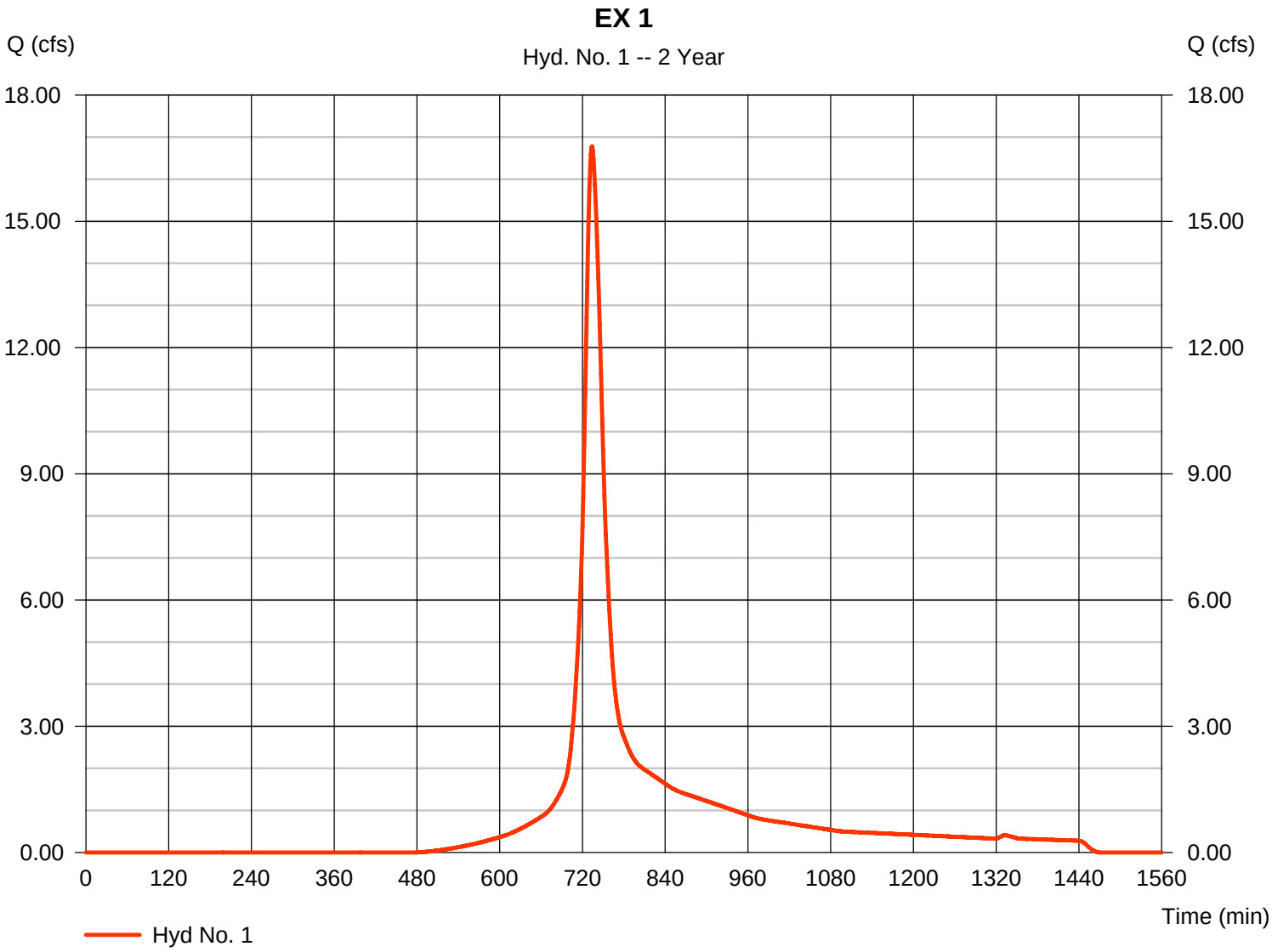


Hydrograph Report

Hyd. No. 1

EX 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.78 cfs
Storm frequency	=	2 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	74,019 cuft
Drainage area	=	10.530 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.30 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



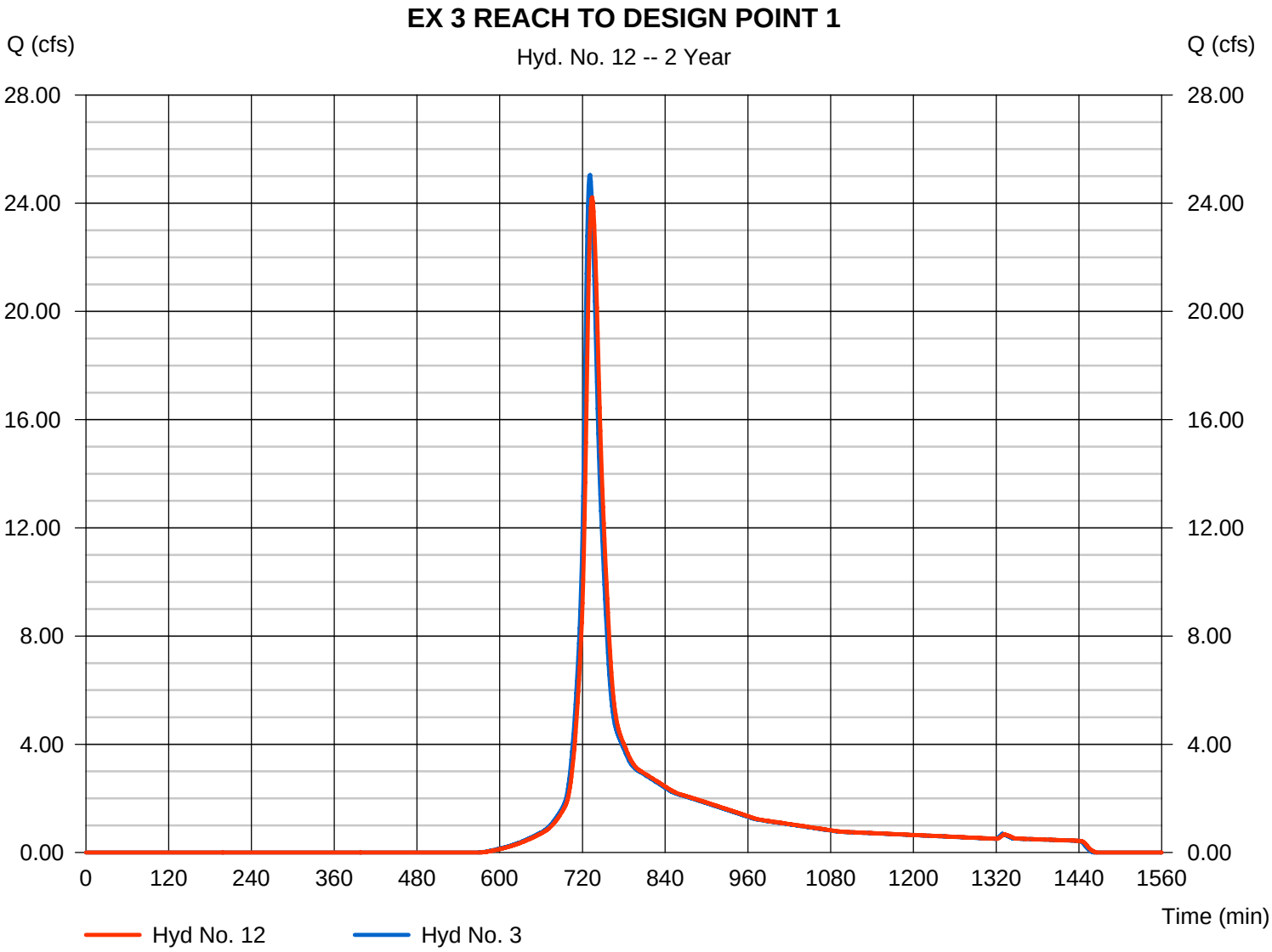
Hydrograph Report

Hyd. No. 12

EX 3 REACH TO DESIGN POINT 1

Hydrograph type	= Reach	Peak discharge	= 24.22 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 100,391 cuft
Inflow hyd. No.	= 3 - EX 3	Section type	= Circular
Reach length	= 2647.0 ft	Channel slope	= 2.9 %
Manning's n	= 0.013	Bottom width	= 1.5 ft
Side slope	= 0.0:1	Max. depth	= 0.0 ft
Rating curve x	= 11.269	Rating curve m	= 1.250
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.3344

Modified Att-Kin routing method used.

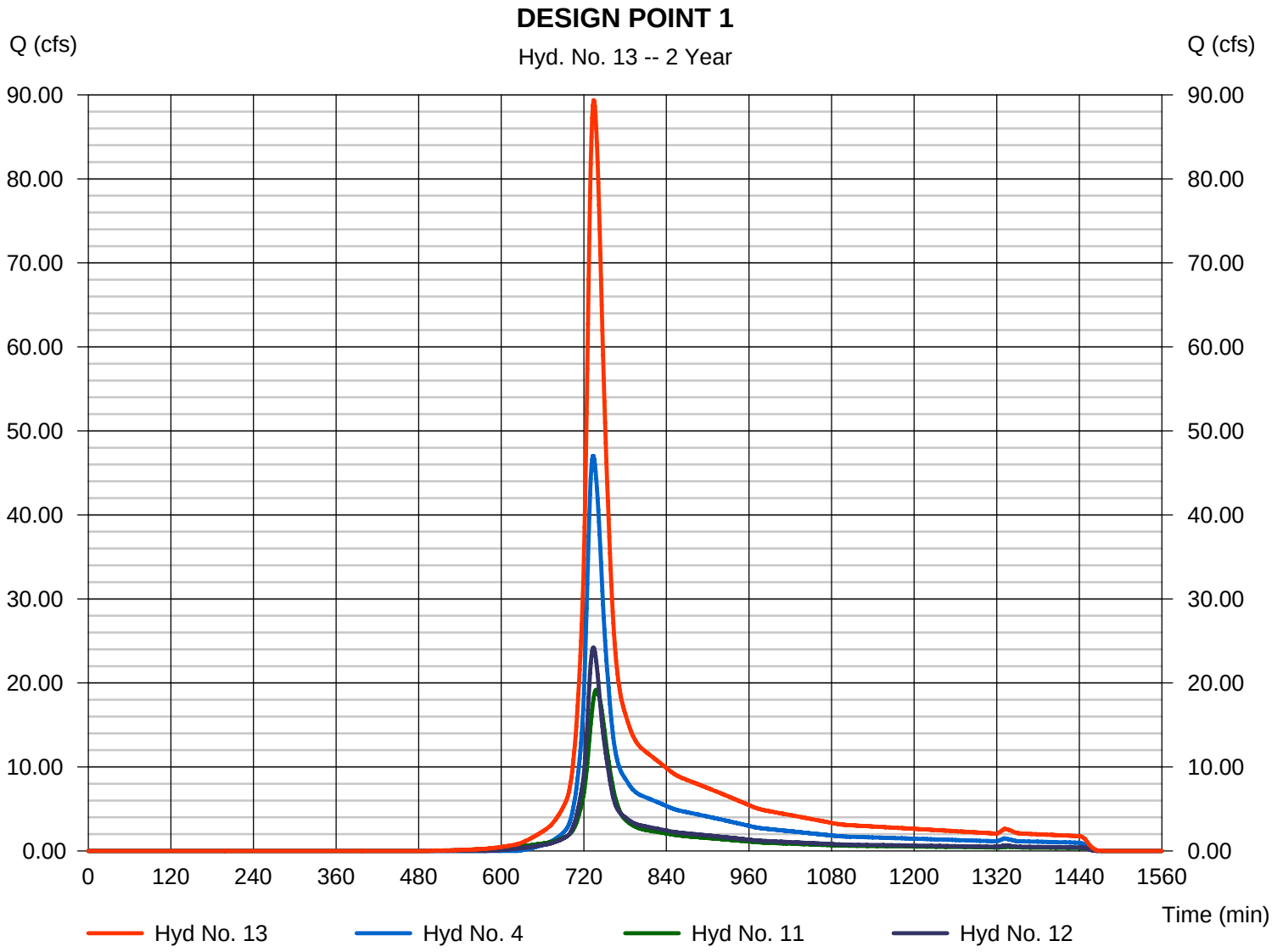


Hydrograph Report

Hyd. No. 13

DESIGN POINT 1

Hydrograph type	= Combine	Peak discharge	= 89.36 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 397,701 cuft
Inflow hyds.	= 4, 11, 12	Contrib. drain. area	= 46.680 ac

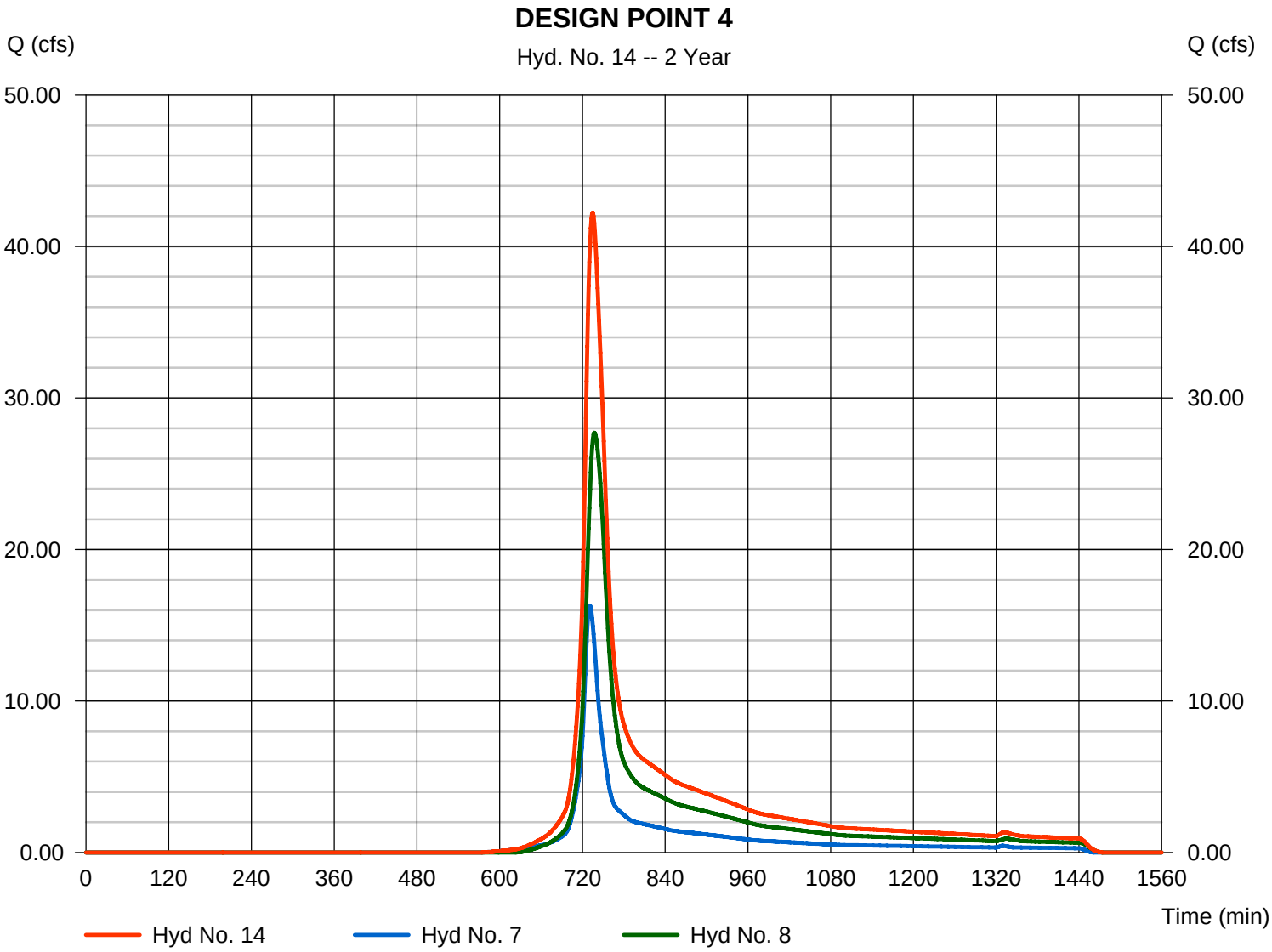


Hydrograph Report

Hyd. No. 14

DESIGN POINT 4

Hydrograph type	= Combine	Peak discharge	= 42.23 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 200,127 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 42.240 ac

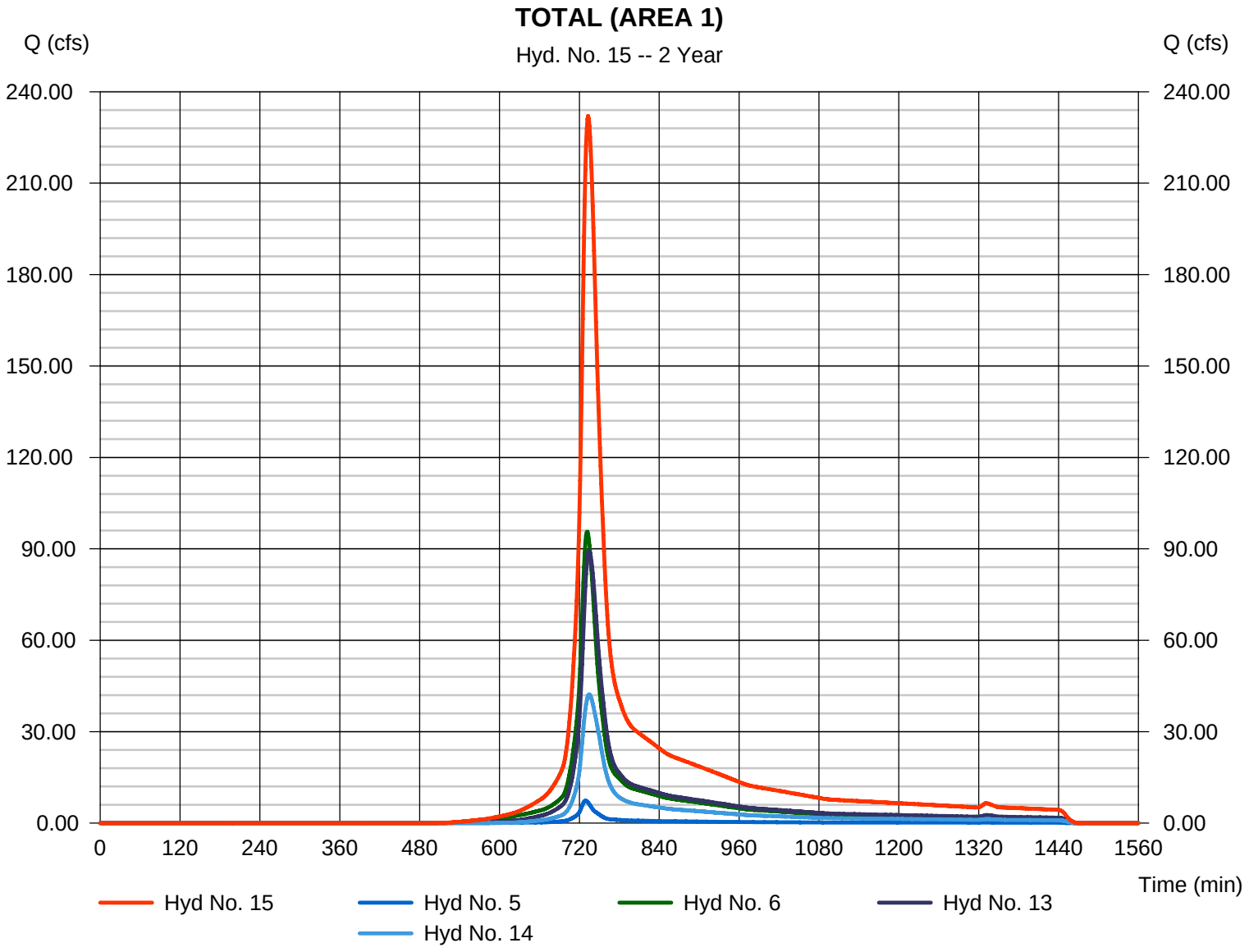


Hydrograph Report

Hyd. No. 15

TOTAL (AREA 1)

Hydrograph type	= Combine	Peak discharge	= 232.07 cfs
Storm frequency	= 2 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 1,021,496 cuft
Inflow hyds.	= 5, 6, 13, 14	Contrib. drain. area	= 65.390 ac

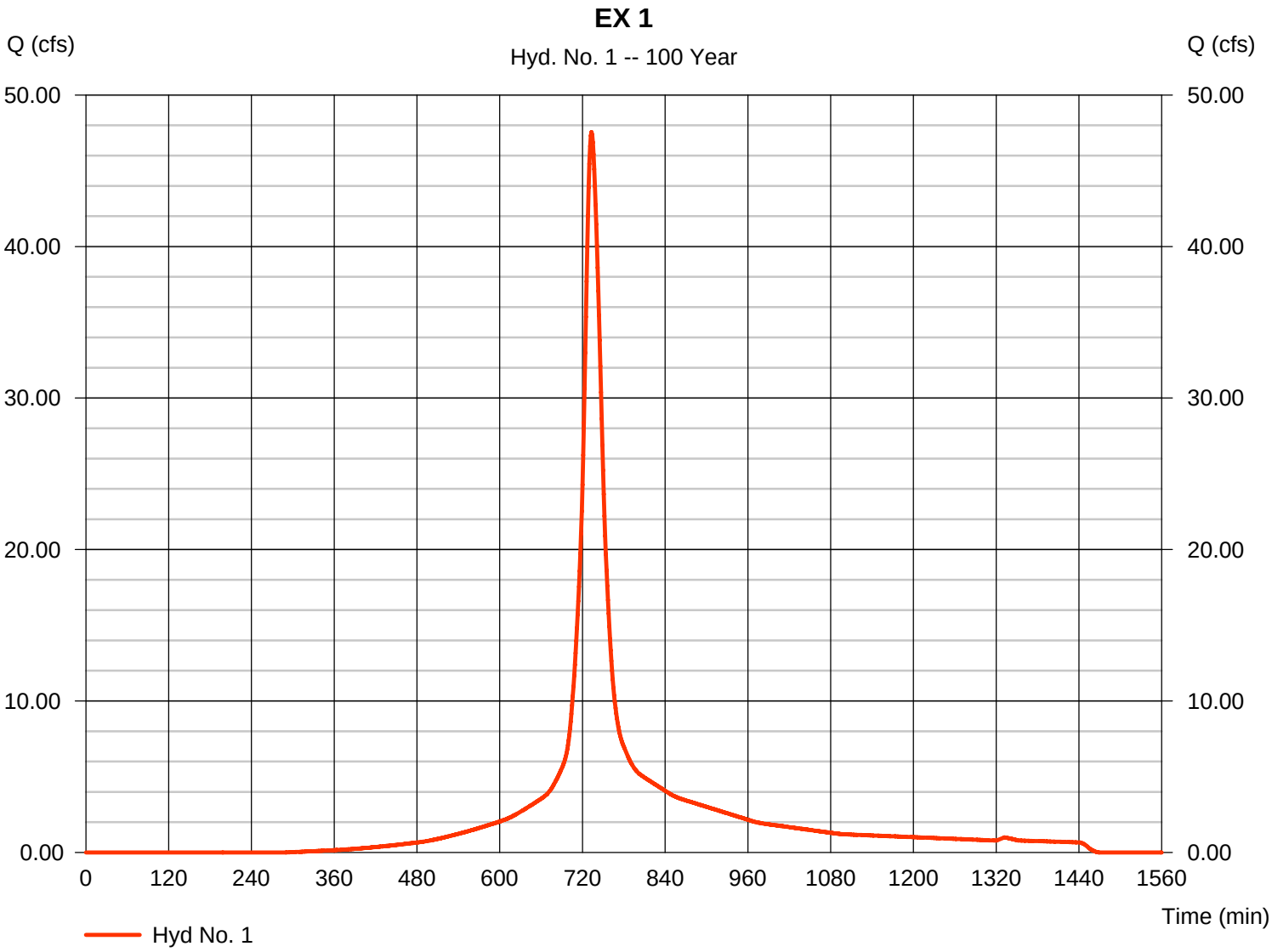


Hydrograph Report

Hyd. No. 1

EX 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	47.55 cfs
Storm frequency	=	100 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	214,679 cuft
Drainage area	=	10.530 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.30 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

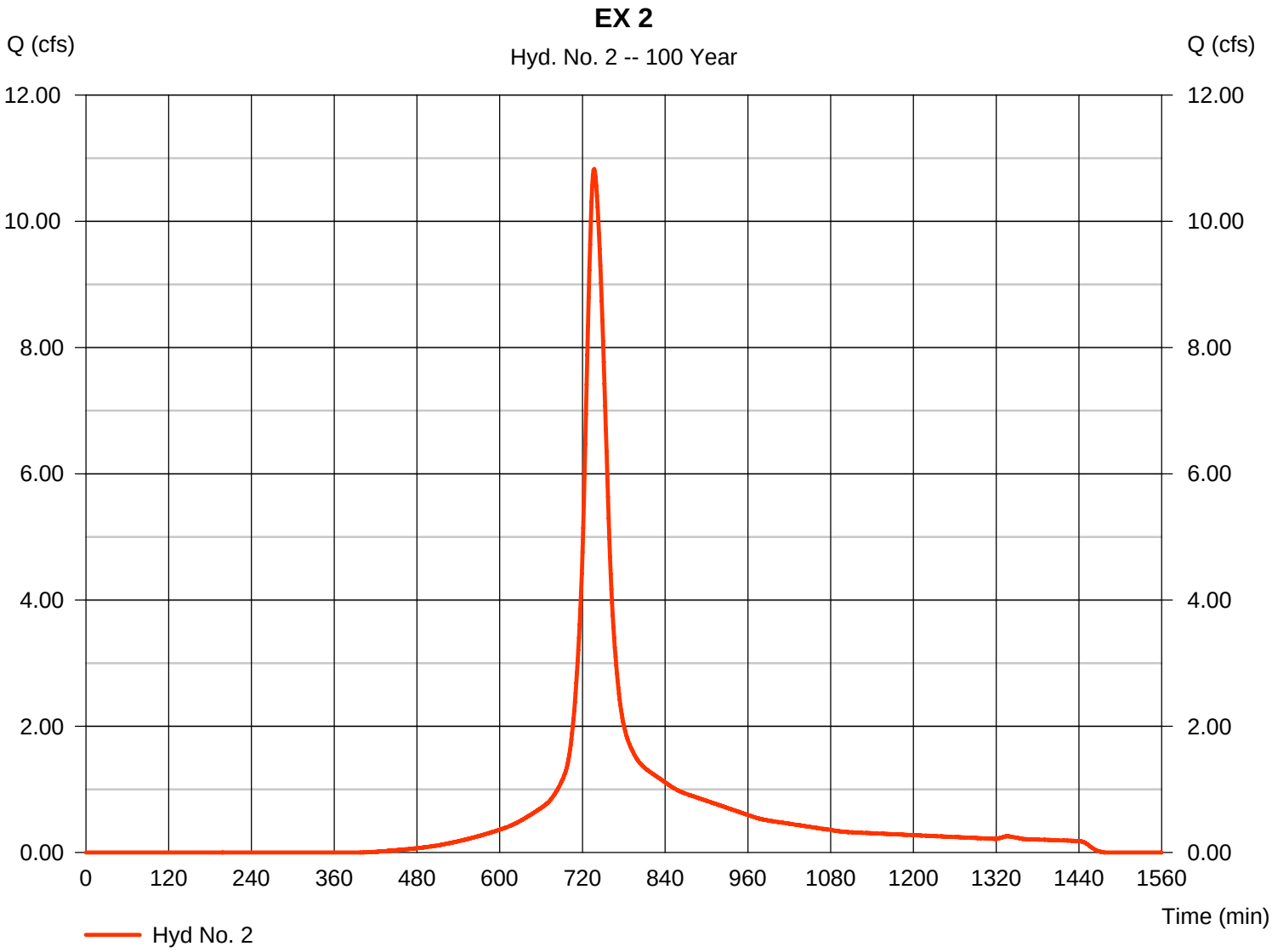


Hydrograph Report

Hyd. No. 2

EX 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	737 min
Time interval	=	1 min	Hyd. volume	=	52,465 cuft
Drainage area	=	3.000 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	23.80 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

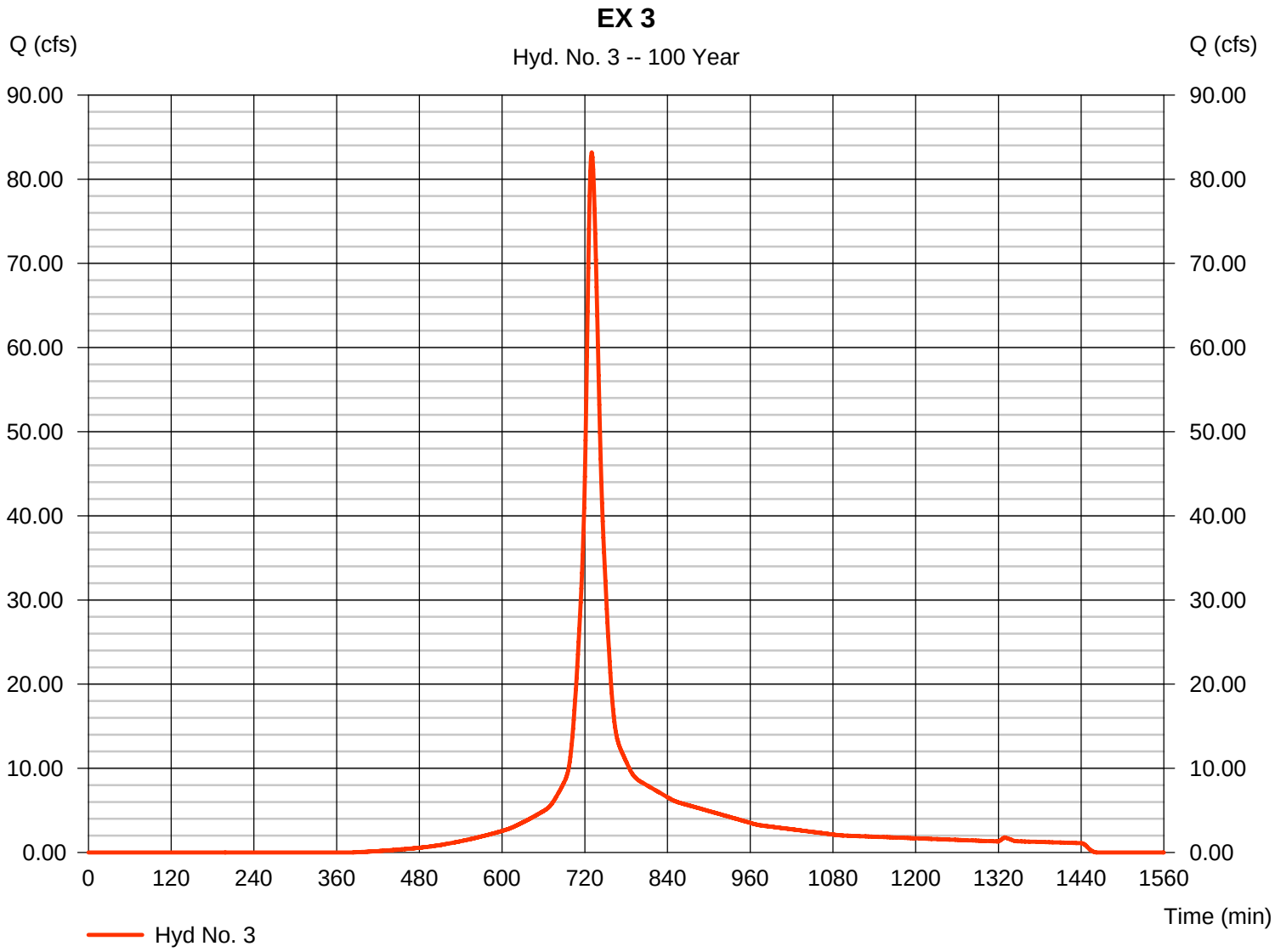


Hydrograph Report

Hyd. No. 3

EX 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	83.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	330,590 cuft
Drainage area	=	18.470 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

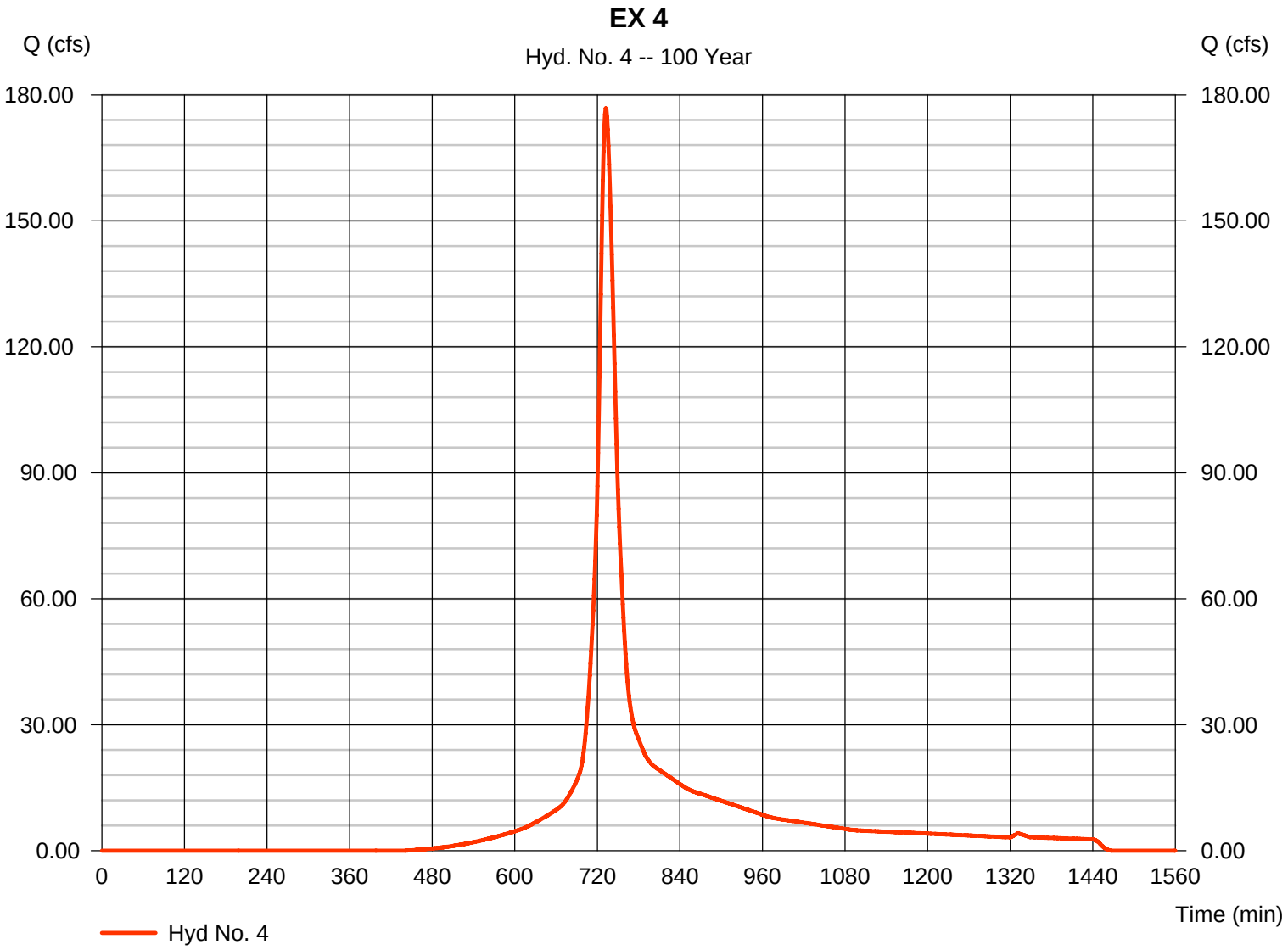


Hydrograph Report

Hyd. No. 4

EX 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	176.80 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	750,678 cuft
Drainage area	=	46.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	18.50 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

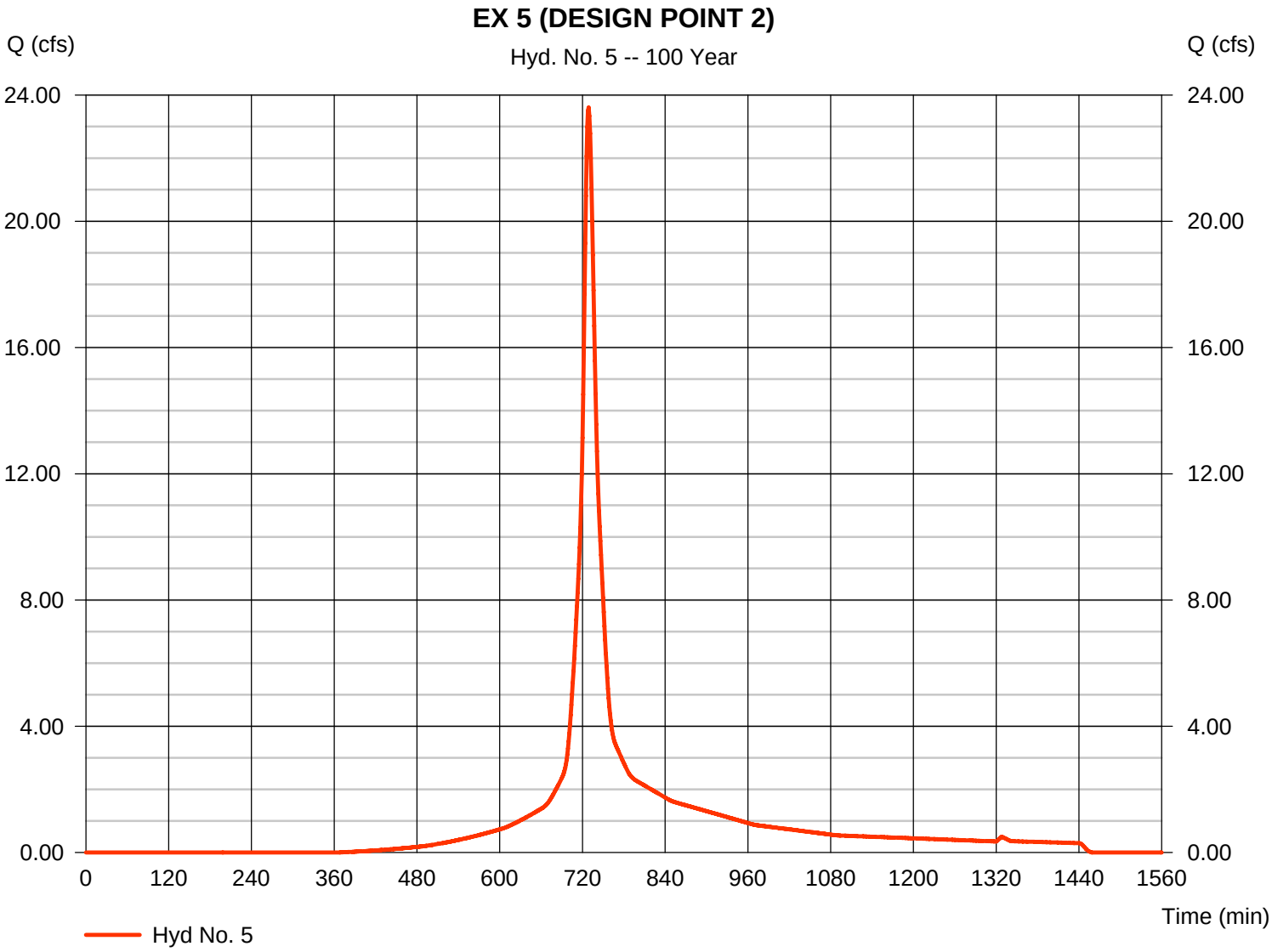


Hydrograph Report

Hyd. No. 5

EX 5 (DESIGN POINT 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	89,580 cuft
Drainage area	=	4.970 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	12.10 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

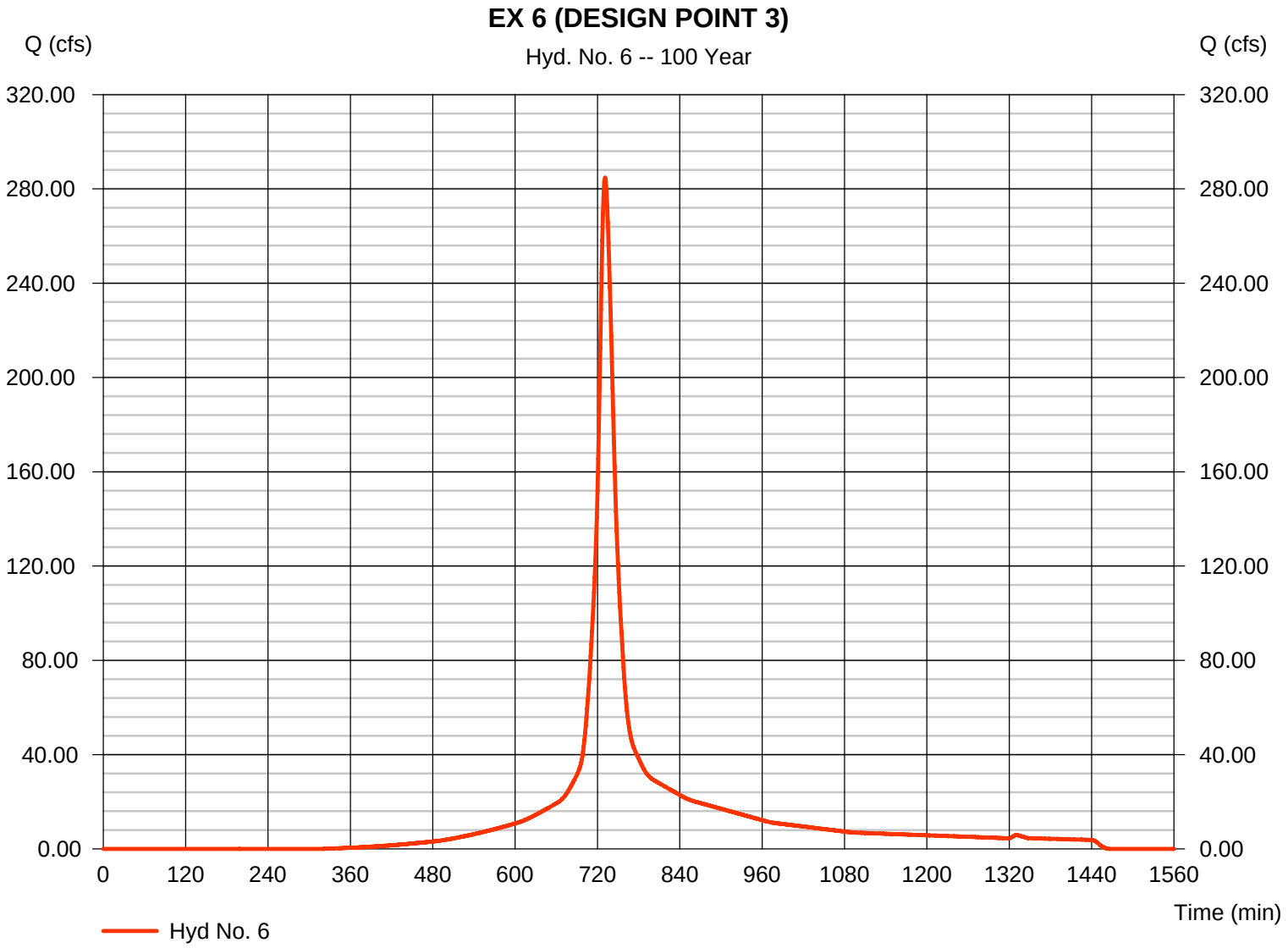


Hydrograph Report

Hyd. No. 6

EX 6 (DESIGN POINT 3)

Hydrograph type	=	SCS Runoff	Peak discharge	=	284.77 cfs
Storm frequency	=	100 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	1,196,146 cuft
Drainage area	=	60.420 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.40 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

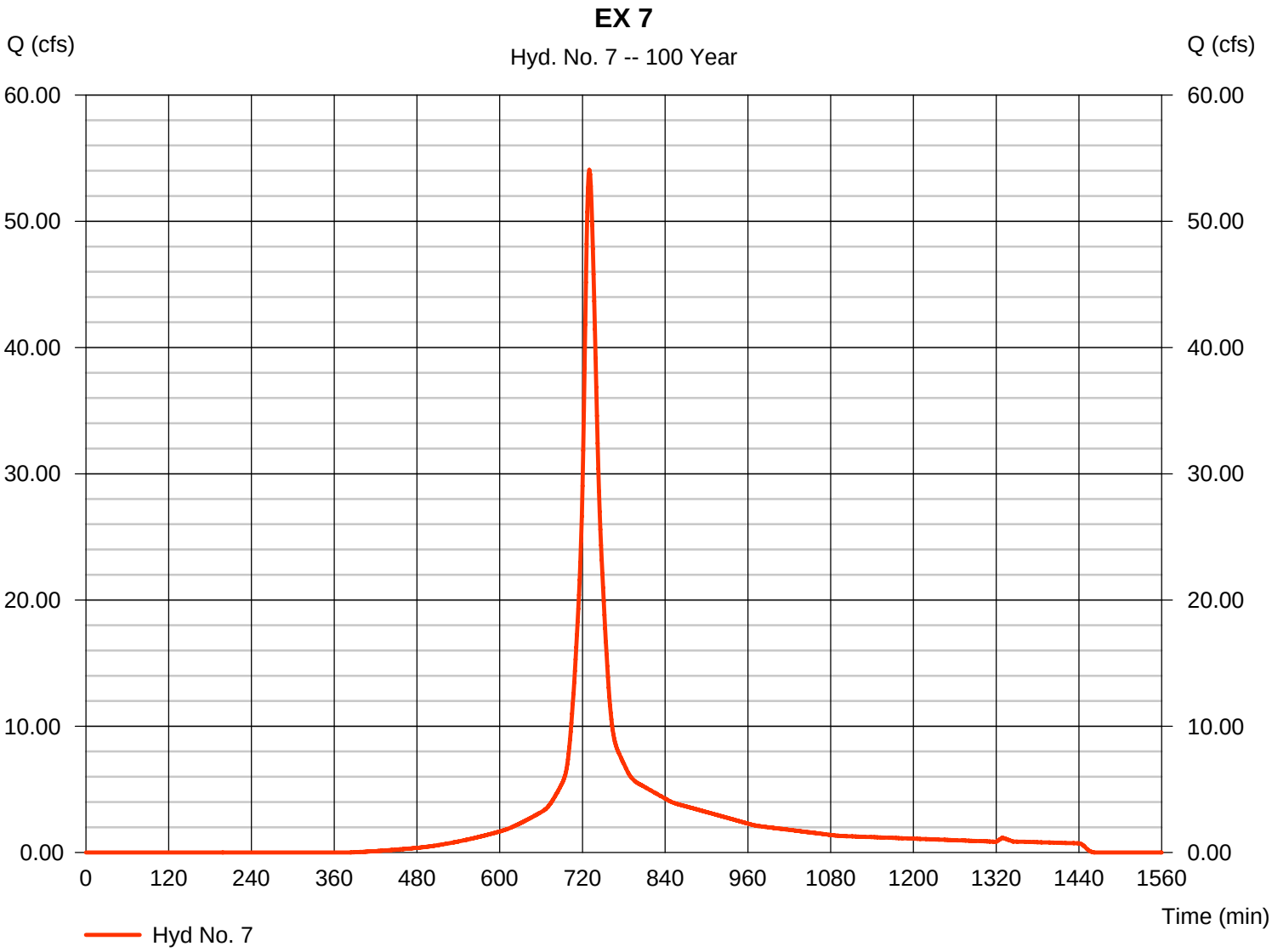


Hydrograph Report

Hyd. No. 7

EX 7

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.08 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	214,964 cuft
Drainage area	=	12.010 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.70 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

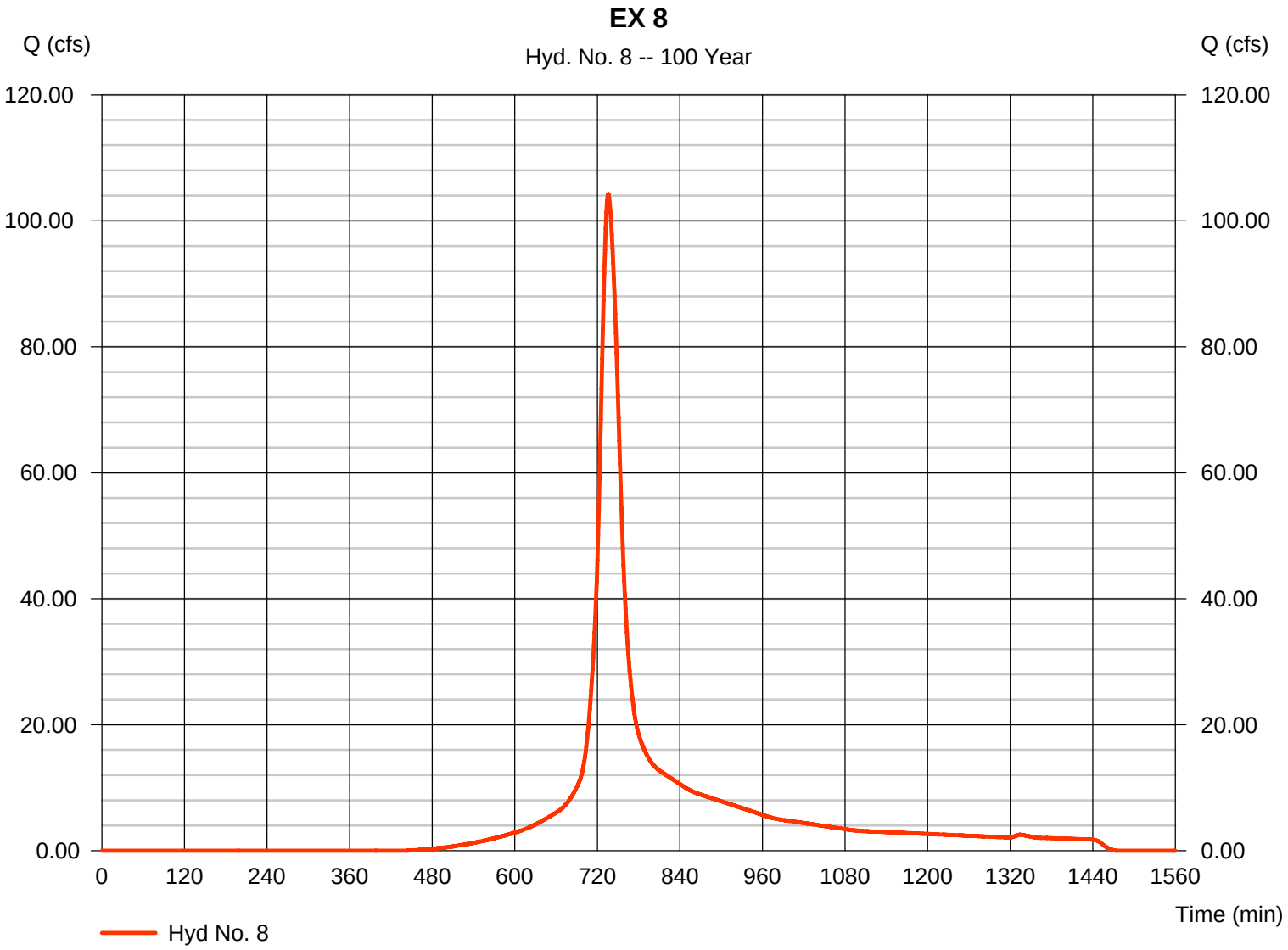


Hydrograph Report

Hyd. No. 8

EX 8

Hydrograph type	=	SCS Runoff	Peak discharge	=	104.23 cfs
Storm frequency	=	100 yrs	Time to peak	=	736 min
Time interval	=	1 min	Hyd. volume	=	487,337 cuft
Drainage area	=	30.230 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	22.70 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

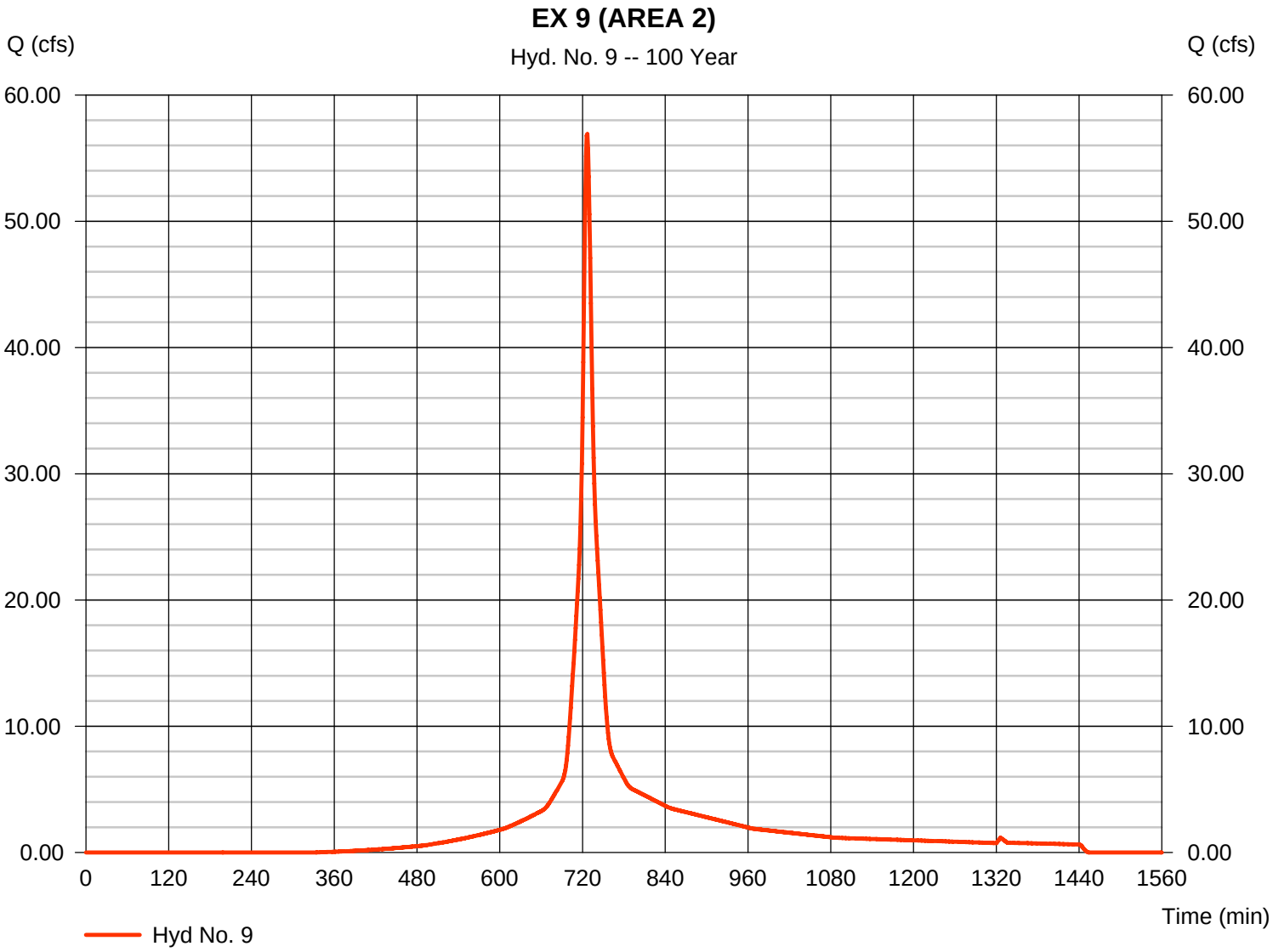


Hydrograph Report

Hyd. No. 9

EX 9 (AREA 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	56.90 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	198,263 cuft
Drainage area	=	10.360 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

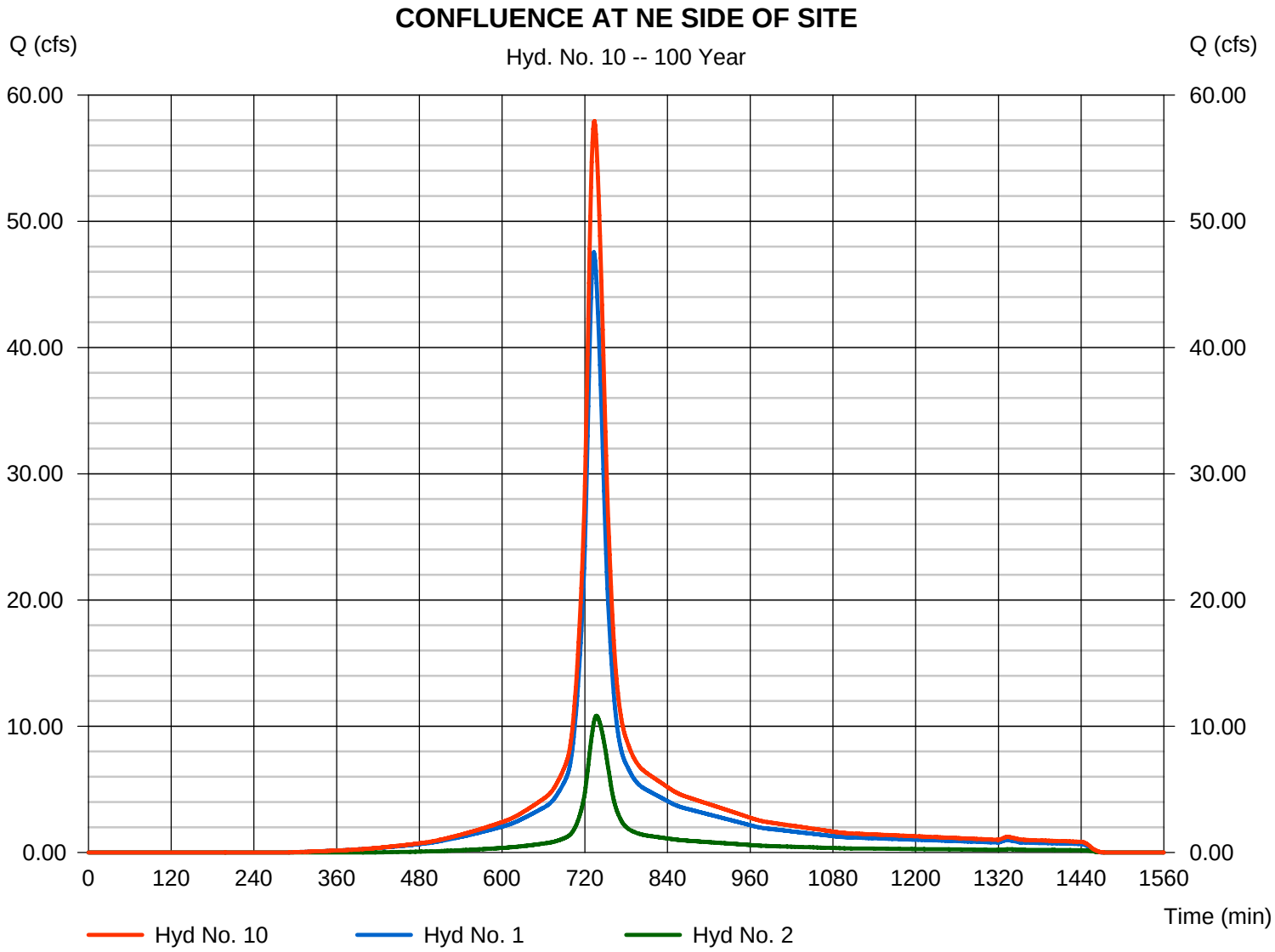


Hydrograph Report

Hyd. No. 10

CONFLUENCE AT NE SIDE OF SITE

Hydrograph type	= Combine	Peak discharge	= 57.94 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 267,144 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 13.530 ac



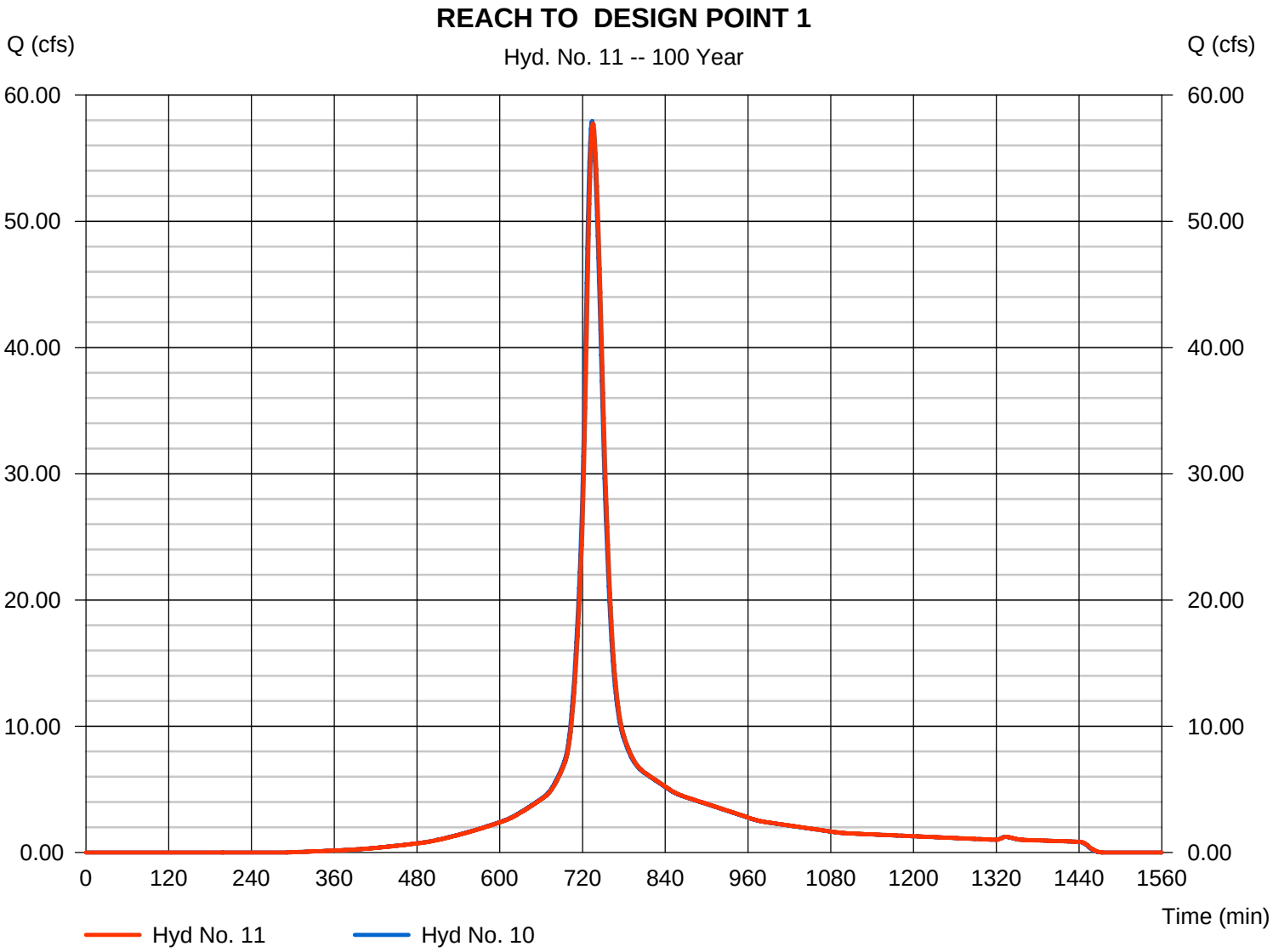
Hydrograph Report

Hyd. No. 11

REACH TO DESIGN POINT 1

Hydrograph type	=	Reach	Peak discharge	=	57.75 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	267,143 cuft
Inflow hyd. No.	=	10 - CONFLUENCE AT NE SIDE OF SITE	Section type	=	Circular
Reach length	=	2559.0 ft	Channel slope	=	3.0 %
Manning's n	=	0.013	Bottom width	=	1.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	11.461	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.6490

Modified Att-Kin routing method used.



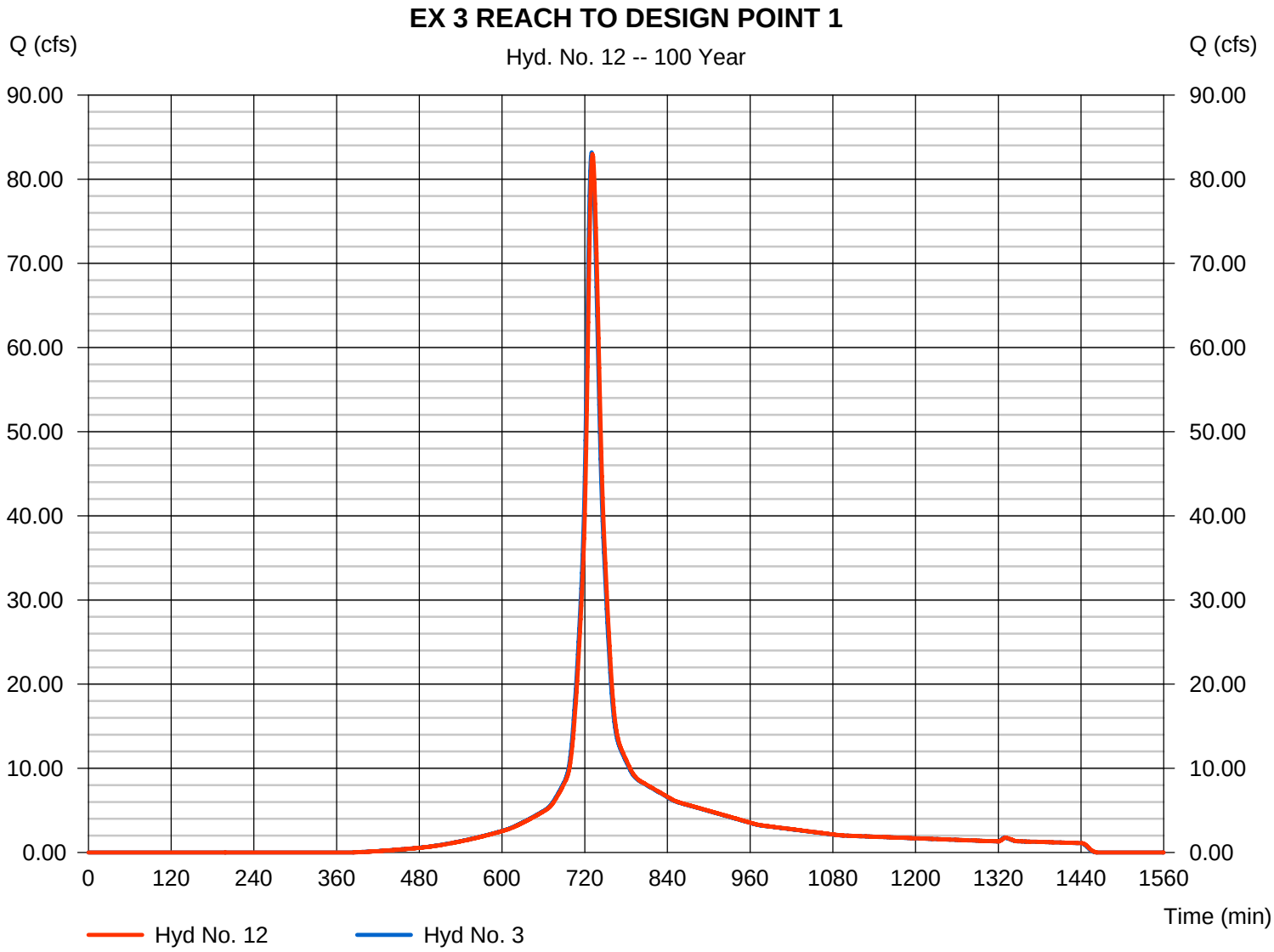
Hydrograph Report

Hyd. No. 12

EX 3 REACH TO DESIGN POINT 1

Hydrograph type	= Reach	Peak discharge	= 82.96 cfs
Storm frequency	= 100 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 330,588 cuft
Inflow hyd. No.	= 3 - EX 3	Section type	= Circular
Reach length	= 2647.0 ft	Channel slope	= 2.9 %
Manning's n	= 0.013	Bottom width	= 1.5 ft
Side slope	= 0.0:1	Max. depth	= 0.0 ft
Rating curve x	= 11.269	Rating curve m	= 1.250
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.8000

Modified Att-Kin routing method used.

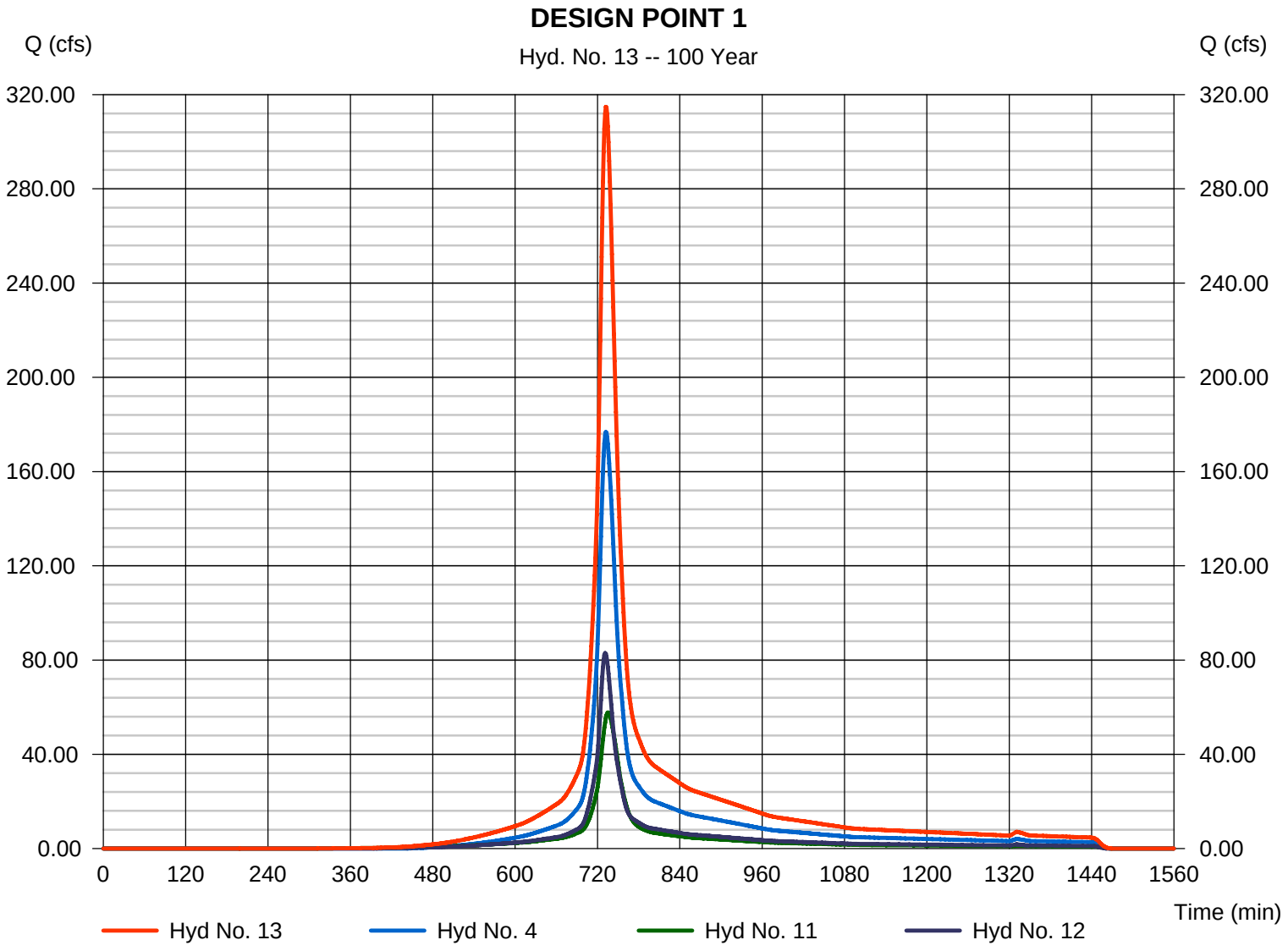


Hydrograph Report

Hyd. No. 13

DESIGN POINT 1

Hydrograph type	= Combine	Peak discharge	= 314.77 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 1,348,411 cuft
Inflow hyds.	= 4, 11, 12	Contrib. drain. area	= 46.680 ac

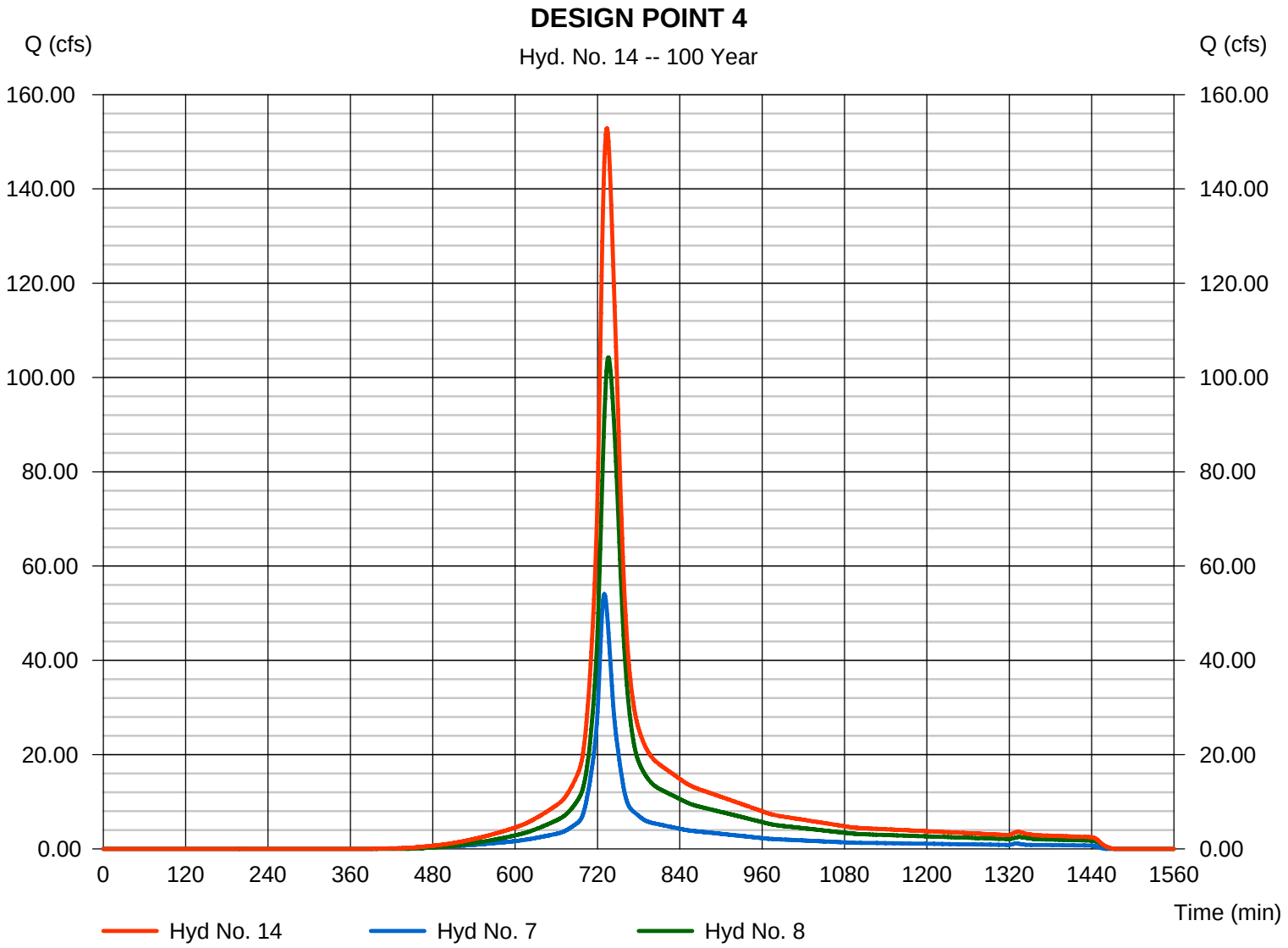


Hydrograph Report

Hyd. No. 14

DESIGN POINT 4

Hydrograph type	= Combine	Peak discharge	= 152.85 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 702,301 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 42.240 ac

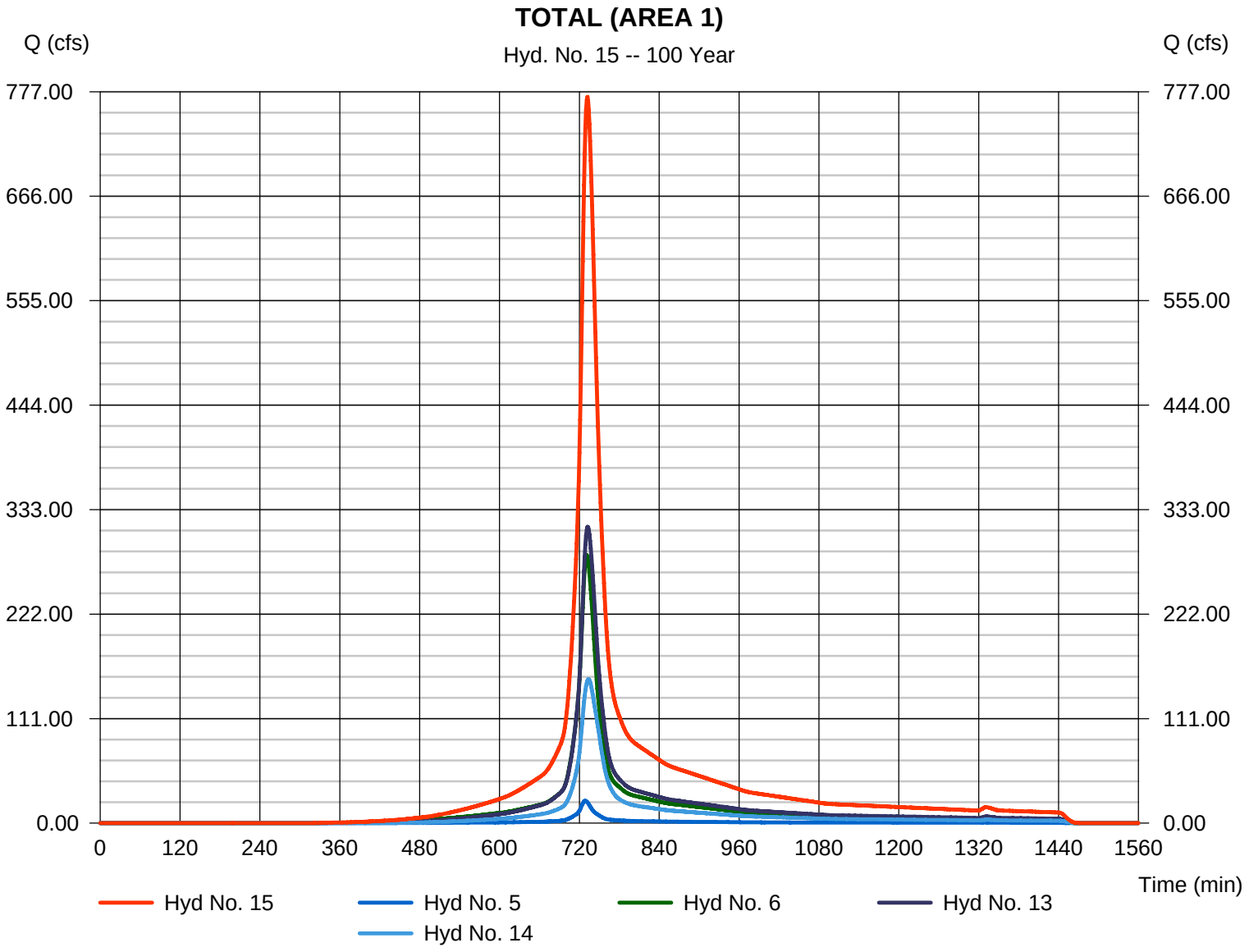


Hydrograph Report

Hyd. No. 15

TOTAL (AREA 1)

Hydrograph type	= Combine	Peak discharge	= 771.52 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 3,336,436 cuft
Inflow hyds.	= 5, 6, 13, 14	Contrib. drain. area	= 65.390 ac



APPENDIX D

PROPOSED CONDITIONS ANALYSIS

CMH

Rockland Psych
Proposed Conditions (MEG107203)
Rockland County, New York

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
EX 1							
SHEET	100	0.0400	0.400				0.259
SHALLOW	806	0.0630	0.050				0.055
CHANNEL	406	0.0370	0.013	6.00	9.32	16.111	0.007
					Time of Concentration		0.321
EX 2							
SHEET	100	0.0210	0.400				0.336
SHALLOW	562	0.0620	0.050				0.039
CHANNEL	675	0.0590	0.030	6.00	9.32	8.929	0.021
					Time of Concentration		0.396
EX 3							
SHEET	100	0.0200	0.150				0.156
SHALLOW	944	0.0610	0.050				0.066
CHANNEL	293	0.0550	0.030	6.00	9.32	9.043	0.009
					Time of Concentration		0.231
P 4							
SHEET	90	0.0560	0.240				0.138
SHALLOW	225	0.0270	0.025				0.019
CHANNEL	2831	0.0270	0.013	1.76	2.87	13.558	0.058
					Time of Concentration		0.215
P 5							
SHEET	100	0.0800	0.150				0.090
SHALLOW	134	0.0100	0.025				0.018
CHANNEL	1061	0.0270	0.013	1.76	2.87	13.396	0.022
					Time of Concentration		0.130
P 6							
SHEET	100	0.0300	0.150				0.133
SHALLOW	1113	0.0600	0.050				0.078
SHALLOW	75	0.0560	0.025				0.004
CHANNEL	2252	0.0400	0.013	1.76	2.87	16.462	0.038
					Time of Concentration		0.253
P 6A							
SHEET	100	0.0350	0.150				0.125
SHALLOW	123	0.0480	0.025				0.008
CHANNEL	852	0.0420	0.013	1.76	2.87	16.905	0.014
					Time of Concentration		0.147
P 7							
SHEET	100	0.0200	0.150				0.156
SHALLOW	463	0.0190	0.050				0.058
CHANNEL	1100	0.0460	0.013	1.76	2.87	17.277	0.014
					Time of Concentration		0.228

Sub-Area Time of Concentration Details (continued)

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
EX 8							
SHEET	100	0.0150	0.150				0.175
SHALLOW	2161	0.0430	0.050				0.179
CHANNEL	1450	0.0400	0.013	1.76	2.87	16.782	0.024
					Time of Concentration		0.378

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/08
CHK BY:	SLG **DATE:** 12/17/08

SUBAREA EX 1

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
C	Impervious	Off-site	98	3.52	344.96
C	Open Space (Fair condition)	Off-site	79	2.36	186.44
C	Woods (Fair)	Off-site	76	4.65	353.40
			TOTAL	**10.53**	**884.80**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{884.80}{10.53}$$

CN = 84

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 2

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
C	Open Space (Fair condition)	On-site	79	0.60	47.40
C	Woods (Fair)	On-site	76	2.40	182.40
			TOTAL	**3.00**	**229.80**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{229.80}{3.00}$$

CN = 77

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 3

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Open Space (Fair condition)	On-site	69	2.11	145.73
C	Impervious	On-site	98	0.07	6.86
C	Open Space (Fair condition)	On-site	79	16.29	1286.75
			TOTAL	**18.47**	**1,439.34**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{1439.34}{18.47}$$

CN = 78

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA P 4

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	18.19	1782.15
B	Open Space (Fair condition)	On-site	69	22.24	1534.72
C	Impervious	On-site	98	1.87	182.93
C	Open Space (Fair condition)	On-site	79	5.32	419.95
			TOTAL	**47.61**	**3919.75**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{3919.75}{47.61}$$

CN = 82

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA P 5

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
C	Impervious	On-site	98	2.93	287.14
C	Open Space (Fair condition)	On-site	79	4.46	352.52
C	Woods (Fair)	On-site	76	0.10	7.43
			TOTAL	**7.49**	**647.09**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{647.09}{7.49}$$

CN = 86

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA P 6

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	7.17	702.66
B	Open Space (Fair condition)	On-site	69	27.12	1871.28
			TOTAL	**34.29**	**2,573.94**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{2,573.94}{34.29}$$

CN = 75

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA P 6A

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	4.14	405.72
B	Open Space (Fair condition)	On-site	69	15.09	1041.21
C	Impervious	On-site	98	0.40	39.20
C	Open Space (Fair condition)	On-site	79	3.05	240.95
			TOTAL	**22.68**	**1,727.08**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{1,727.08}{22.68}$$

CN = 76

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA P 7

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	0.80	78.40
B	Open Space (Fair condition)	On-site	69	7.59	523.57
C	Impervious	On-site	98	0.40	39.20
C	Open Space (Fair condition)	On-site	79	3.22	254.54
			TOTAL	**12.01**	**895.71**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{895.71}{12.01}$$

CN = 75

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA EX 8

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	3.52	344.96
B	Open Space (Fair condition)	On-site	69	22.88	1578.51
C	Impervious	On-site	98	0.51	49.69
C	Open Space (Fair condition)	On-site	79	3.33	262.75
			TOTAL	**30.23**	**2,235.91**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{2,235.91}{30.23}$$

CN = 74

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

JOB:	Four Seasons at Orangetown
JOB #:	107203
CLIENT:	Sacardi & Schiff
CALC BY:	CMH **DATE:** 12/17/2008
CHK BY:	SLG **DATE:** 12/17/2008

SUBAREA P 9

WEIGHTED CURVE NUMBER CALCULATION

Proposed Conditions

Hydrologic Soil Group[1]	Cover Description	On-site/Off-site	Curve Number (CN)[2]	Area	CNxArea
B	Impervious	On-site	98	0.31	30.52
B	Open Space (Fair condition)	On-site	69	0.40	27.50
C	Impervious	On-site	98	3.28	321.44
C	Open Space (Fair condition)	On-site	79	6.37	503.23
			TOTAL	**10.36**	**882.69**

WEIGHTED CN

$$CN = \frac{CN_{TOTAL}}{AREA_{TOTAL}} = \frac{882.69}{10.36}$$

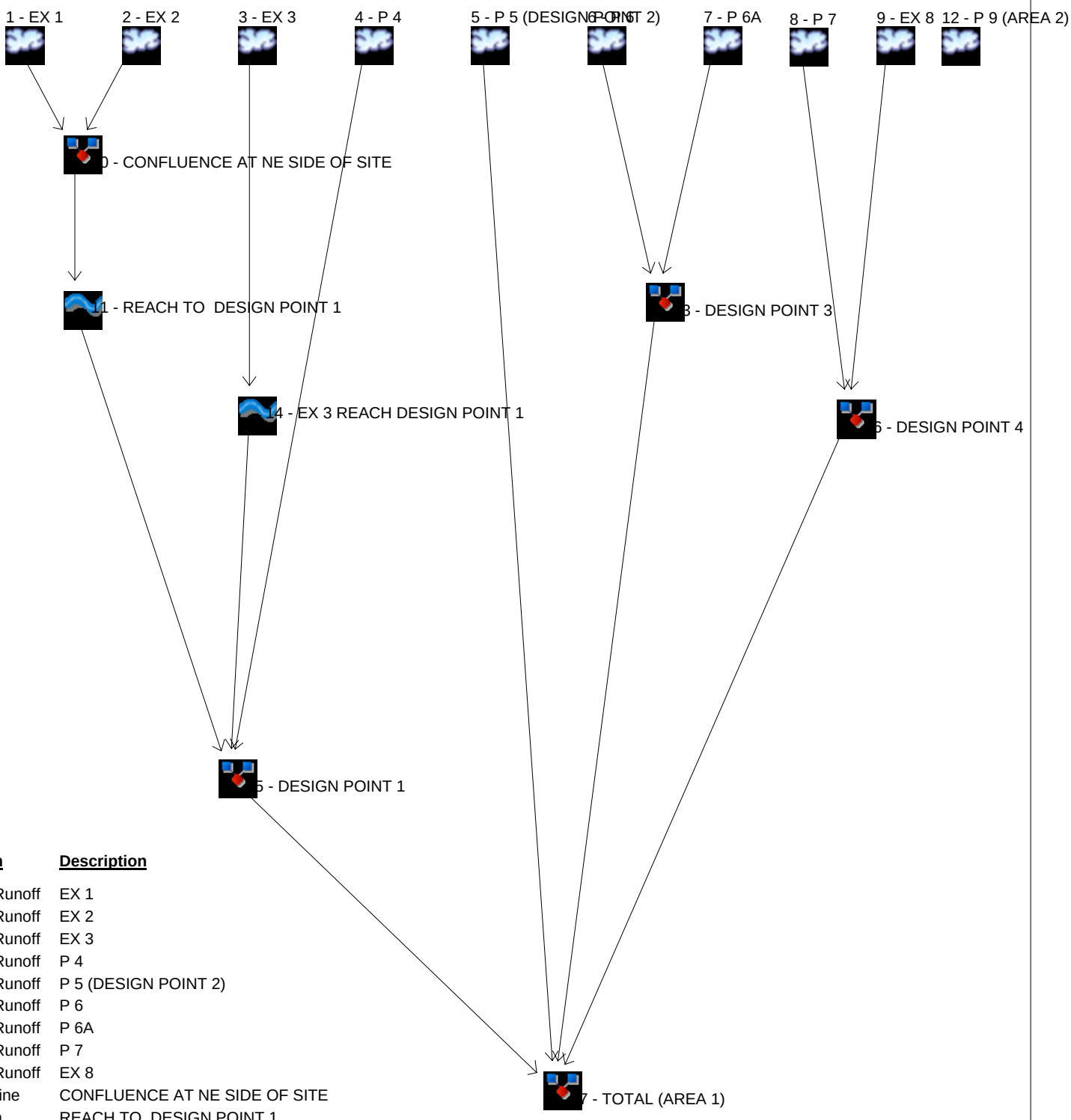
CN = 85

[1] SOURCE: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[2] SOURCE: WinTR-55

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX 1
2	SCS Runoff	EX 2
3	SCS Runoff	EX 3
4	SCS Runoff	P 4
5	SCS Runoff	P 5 (DESIGN POINT 2)
6	SCS Runoff	P 6
7	SCS Runoff	P 6A
8	SCS Runoff	P 7
9	SCS Runoff	EX 8
10	Combine	CONFLUENCE AT NE SIDE OF SITE
11	Reach	REACH TO DESIGN POINT 1
12	SCS Runoff	P 9 (AREA 2)
13	Combine	DESIGN POINT 3
14	Reach	EX 3 REACH DESIGN POINT 1
15	Combine	DESIGN POINT 1
16	Combine	DESIGN POINT 4
17	Combine	TOTAL (AREA 1)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	16.78	1	734	74,019	------	------	------	EX 1
2	SCS Runoff	3.160	1	738	15,578	------	------	------	EX 2
3	SCS Runoff	25.04	1	731	100,393	------	------	------	EX 3
4	SCS Runoff	78.98	1	729	297,340	------	------	------	P 4
5	SCS Runoff	16.63	1	727	57,051	------	------	------	P 5 (DESIGN POINT 2)
6	SCS Runoff	38.45	1	732	164,065	------	------	------	P 6
7	SCS Runoff	32.08	1	727	112,404	------	------	------	P 6A
8	SCS Runoff	13.92	1	731	56,754	------	------	------	P 7
9	SCS Runoff	27.71	1	737	134,847	------	------	------	EX 8
10	Combine	19.78	1	734	89,598	1, 2,	------	------	CONFLUENCE AT NE SIDE OF SIT
11	Reach	18.93	1	739	89,595	10	------	------	REACH TO DESIGN POINT 1
12	SCS Runoff	22.14	1	727	75,830	------	------	------	P 9 (AREA 2)
13	Combine	67.25	1	729	276,469	6, 7,	------	------	DESIGN POINT 3
14	Reach	24.29	1	734	100,392	3	------	------	EX 3 REACH DESIGN POINT 1
15	Combine	115.84	1	731	487,328	4, 11, 14	------	------	DESIGN POINT 1
16	Combine	40.21	1	735	191,601	8, 9,	------	------	DESIGN POINT 4
17	Combine	234.15	1	730	1,012,448	5, 13, 15, 16	------	------	TOTAL (AREA 1)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	28.19	1	733	125,008	------	------	------	EX 1
2	SCS Runoff	5.907	1	737	28,564	------	------	------	EX 2
3	SCS Runoff	46.02	1	730	181,809	------	------	------	EX 3
4	SCS Runoff	136.31	1	729	513,591	------	------	------	P 4
5	SCS Runoff	27.11	1	727	94,263	------	------	------	P 5 (DESIGN POINT 2)
6	SCS Runoff	74.40	1	732	308,679	------	------	------	P 6
7	SCS Runoff	60.91	1	727	208,745	------	------	------	P 6A
8	SCS Runoff	26.91	1	730	106,779	------	------	------	P 7
9	SCS Runoff	54.65	1	736	257,125	------	------	------	EX 8
10	Combine	33.85	1	734	153,573	1, 2,	------	------	CONFLUENCE AT NE SIDE OF SIT
11	Reach	33.28	1	737	153,571	10	------	------	REACH TO DESIGN POINT 1
12	SCS Runoff	36.57	1	727	126,662	------	------	------	P 9 (AREA 2)
13	Combine	129.58	1	729	517,424	6, 7,	------	------	DESIGN POINT 3
14	Reach	45.61	1	732	181,808	3	------	------	EX 3 REACH DESIGN POINT 1
15	Combine	207.19	1	730	848,970	4, 11, 14	------	------	DESIGN POINT 1
16	Combine	78.91	1	734	363,904	8, 9,	------	------	DESIGN POINT 4
17	Combine	433.58	1	730	1,824,563	5, 13, 15, 16	------	------	TOTAL (AREA 1)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	47.55	1	733	214,679	------	------	------	EX 1
2	SCS Runoff	10.83	1	737	52,465	------	------	------	EX 2
3	SCS Runoff	83.16	1	730	330,590	------	------	------	EX 3
4	SCS Runoff	234.50	1	729	898,462	------	------	------	P 4
5	SCS Runoff	44.63	1	726	158,988	------	------	------	P 5 (DESIGN POINT 2)
6	SCS Runoff	139.88	1	731	578,836	------	------	------	P 6
7	SCS Runoff	112.64	1	727	387,367	------	------	------	P 6A
8	SCS Runoff	50.61	1	730	200,233	------	------	------	P 7
9	SCS Runoff	104.23	1	736	487,337	------	------	------	EX 8
10	Combine	57.94	1	734	267,144	1, 2,	------	------	CONFLUENCE AT NE SIDE OF SIT
11	Reach	57.59	1	736	267,143	10	------	------	REACH TO DESIGN POINT 1
12	SCS Runoff	60.82	1	727	215,555	------	------	------	P 9 (AREA 2)
13	Combine	242.27	1	729	966,203	6, 7,	------	------	DESIGN POINT 3
14	Reach	83.01	1	731	330,589	3	------	------	EX 3 REACH DESIGN POINT 1
15	Combine	364.64	1	730	1,496,194	4, 11, 14	------	------	DESIGN POINT 1
16	Combine	149.89	1	734	687,570	8, 9,	------	------	DESIGN POINT 4
17	Combine	785.75	1	730	3,308,949	5, 13, 15, 16	------	------	TOTAL (AREA 1)

Hydraflow Table of Contents

Proposed.gpw

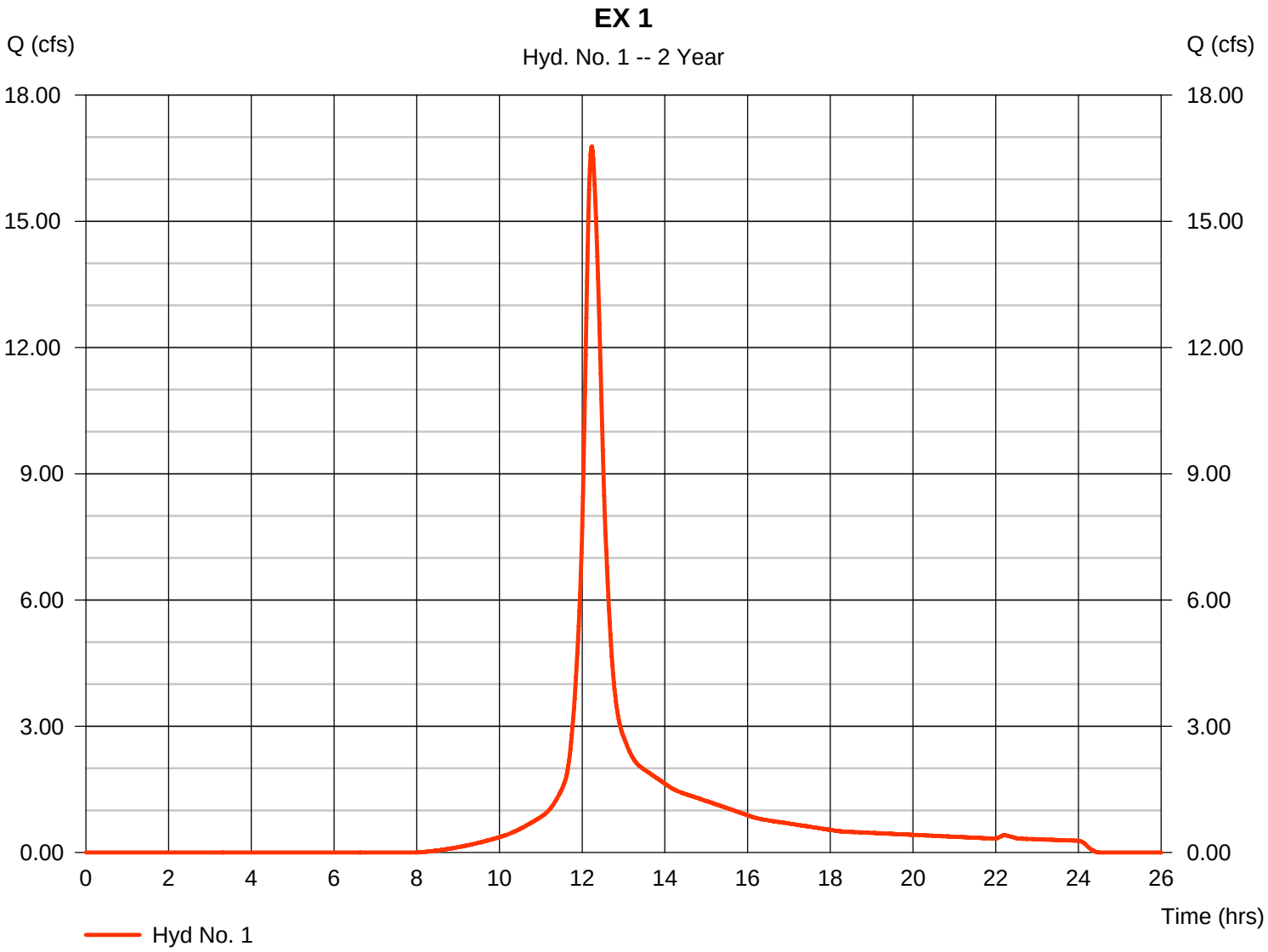
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 30, 2008

Hydrograph Report

Hyd. No. 1

EX 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.78 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.23 hrs
Time interval	=	1 min	Hyd. volume	=	74,019 cuft
Drainage area	=	10.530 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.30 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

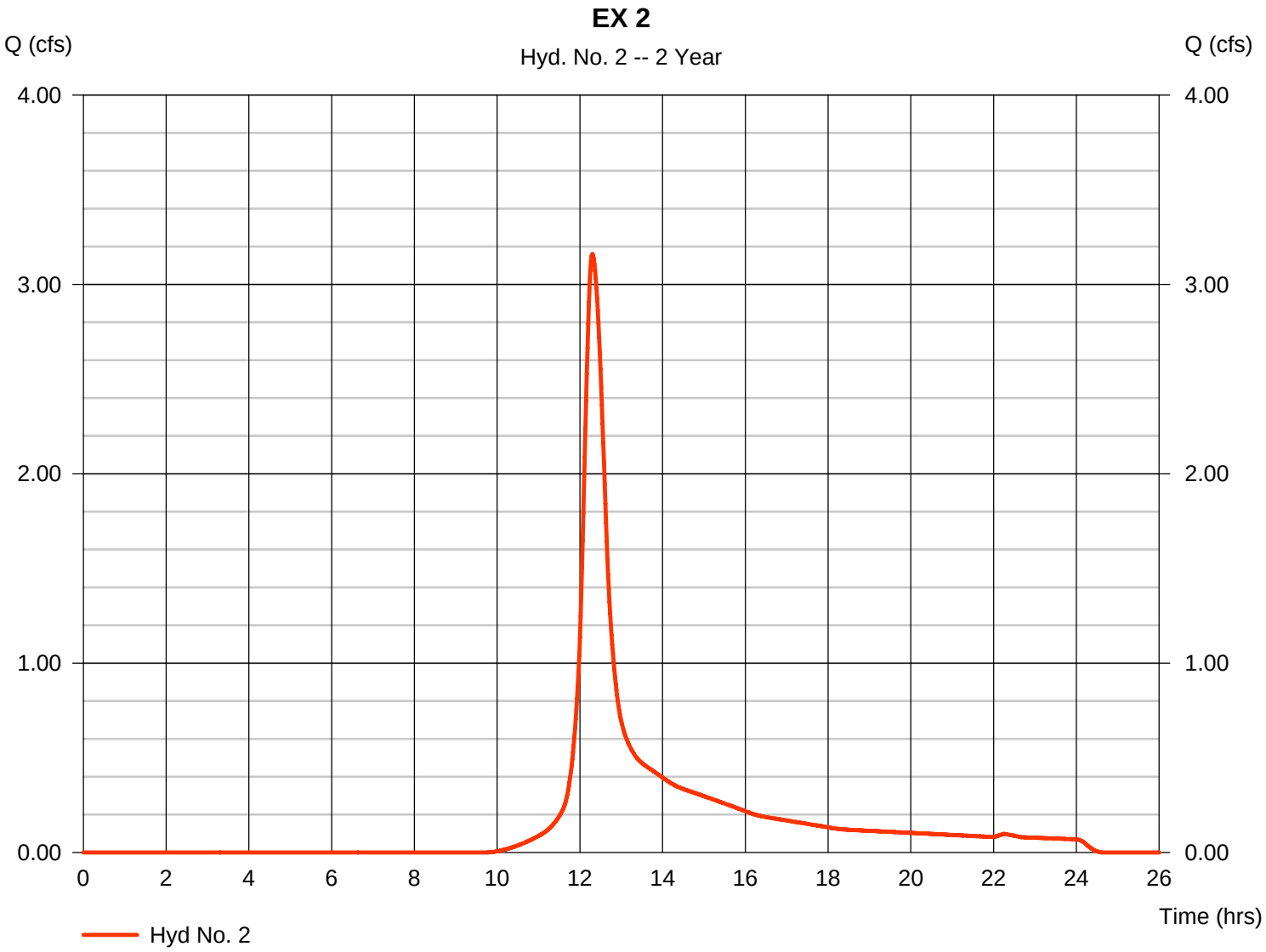


Hydrograph Report

Hyd. No. 2

EX 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.160 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.30 hrs
Time interval	=	1 min	Hyd. volume	=	15,578 cuft
Drainage area	=	3.000 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	23.80 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

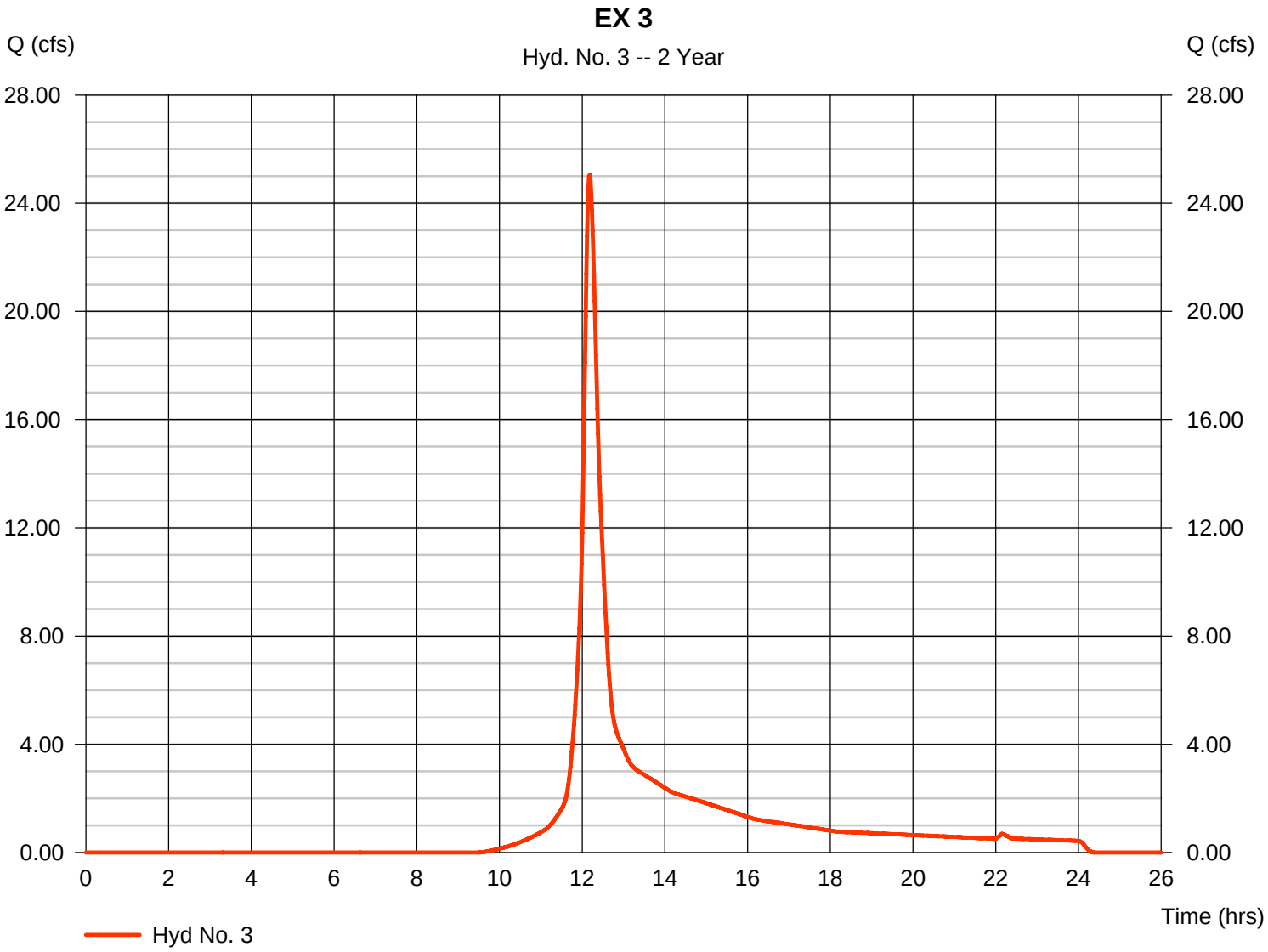


Hydrograph Report

Hyd. No. 3

EX 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.04 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	100,393 cuft
Drainage area	=	18.470 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

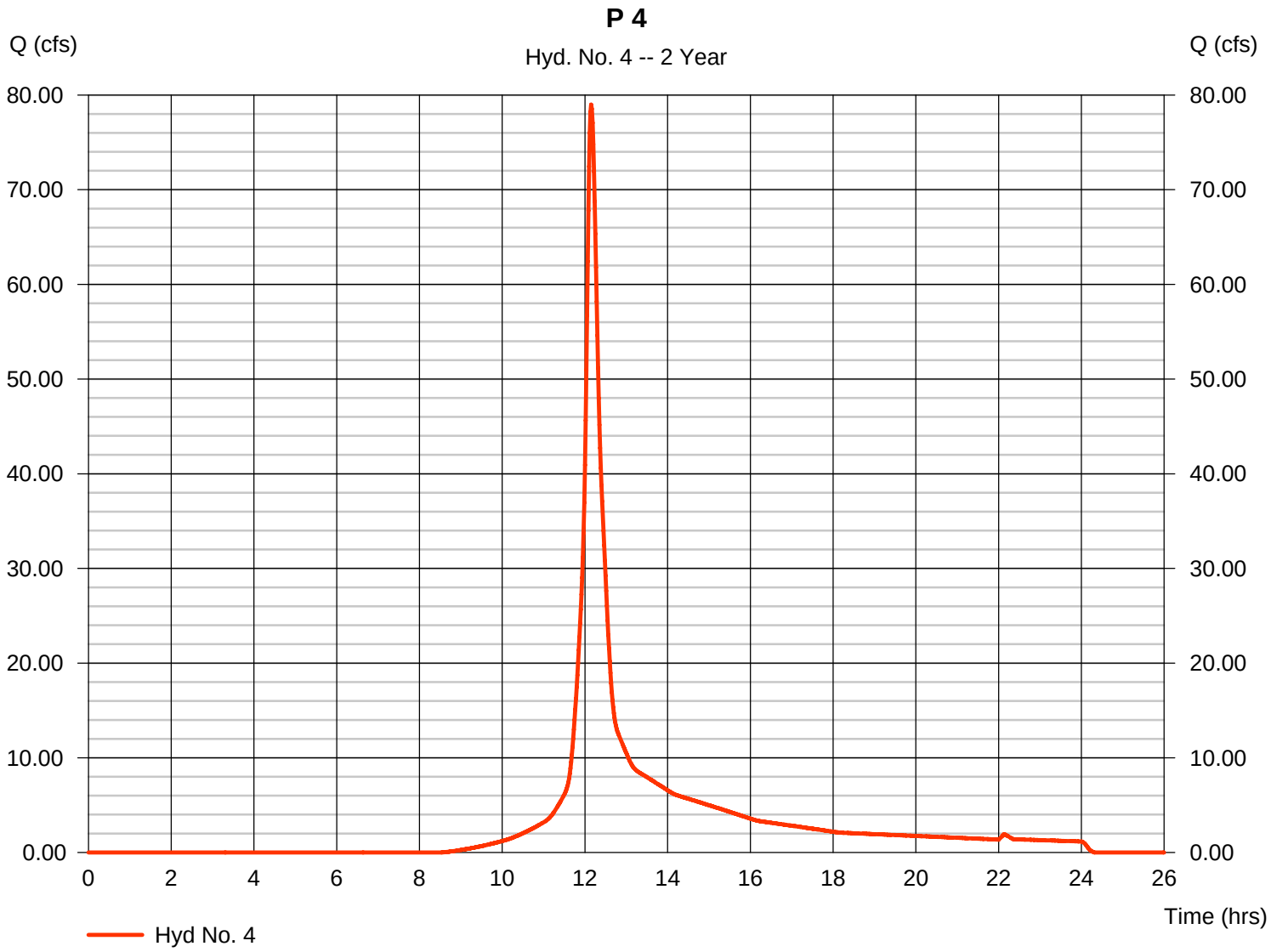


Hydrograph Report

Hyd. No. 4

P 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	78.98 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	297,340 cuft
Drainage area	=	46.680 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	12.90 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

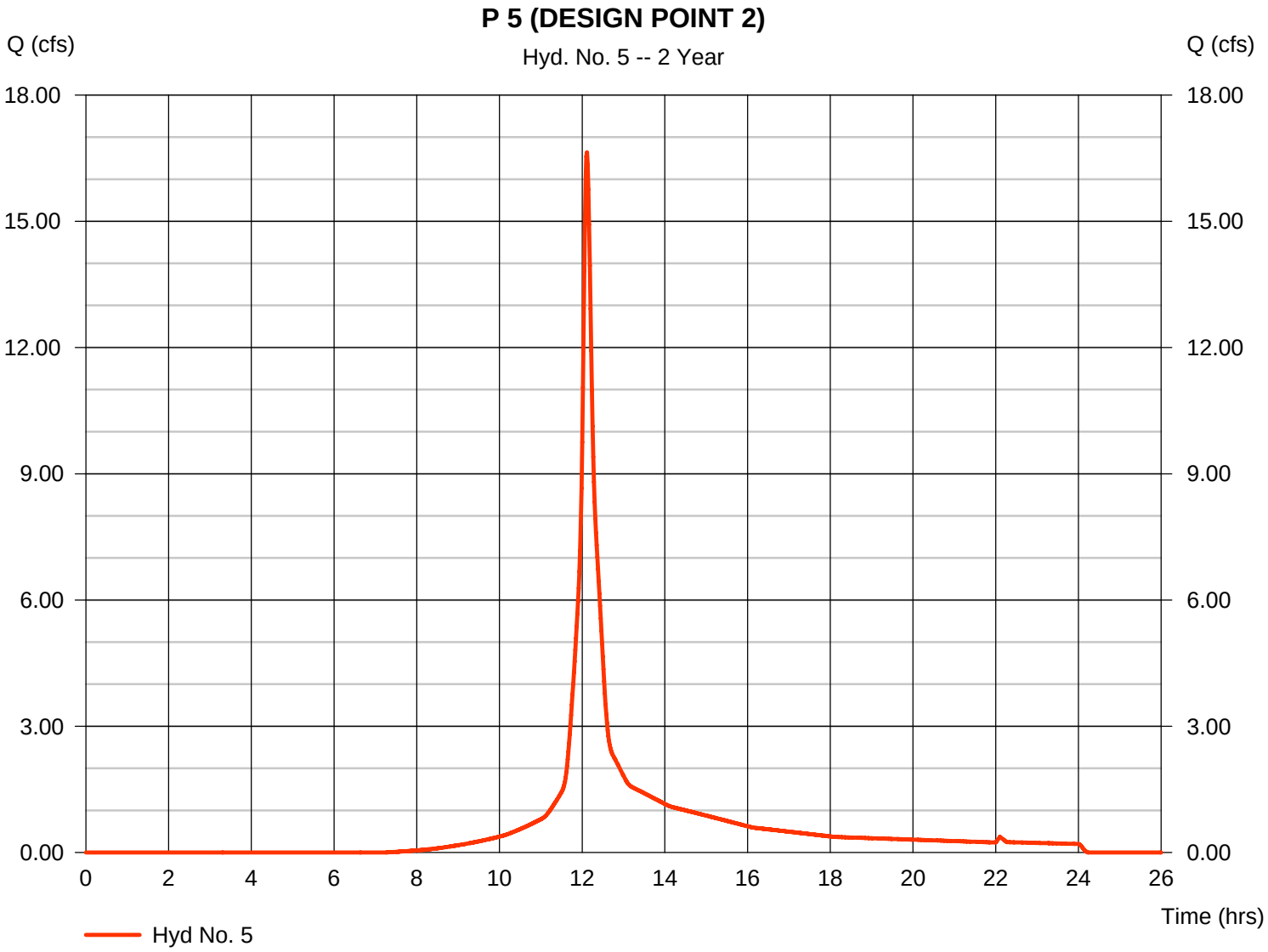


Hydrograph Report

Hyd. No. 5

P 5 (DESIGN POINT 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.63 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	57,051 cuft
Drainage area	=	7.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

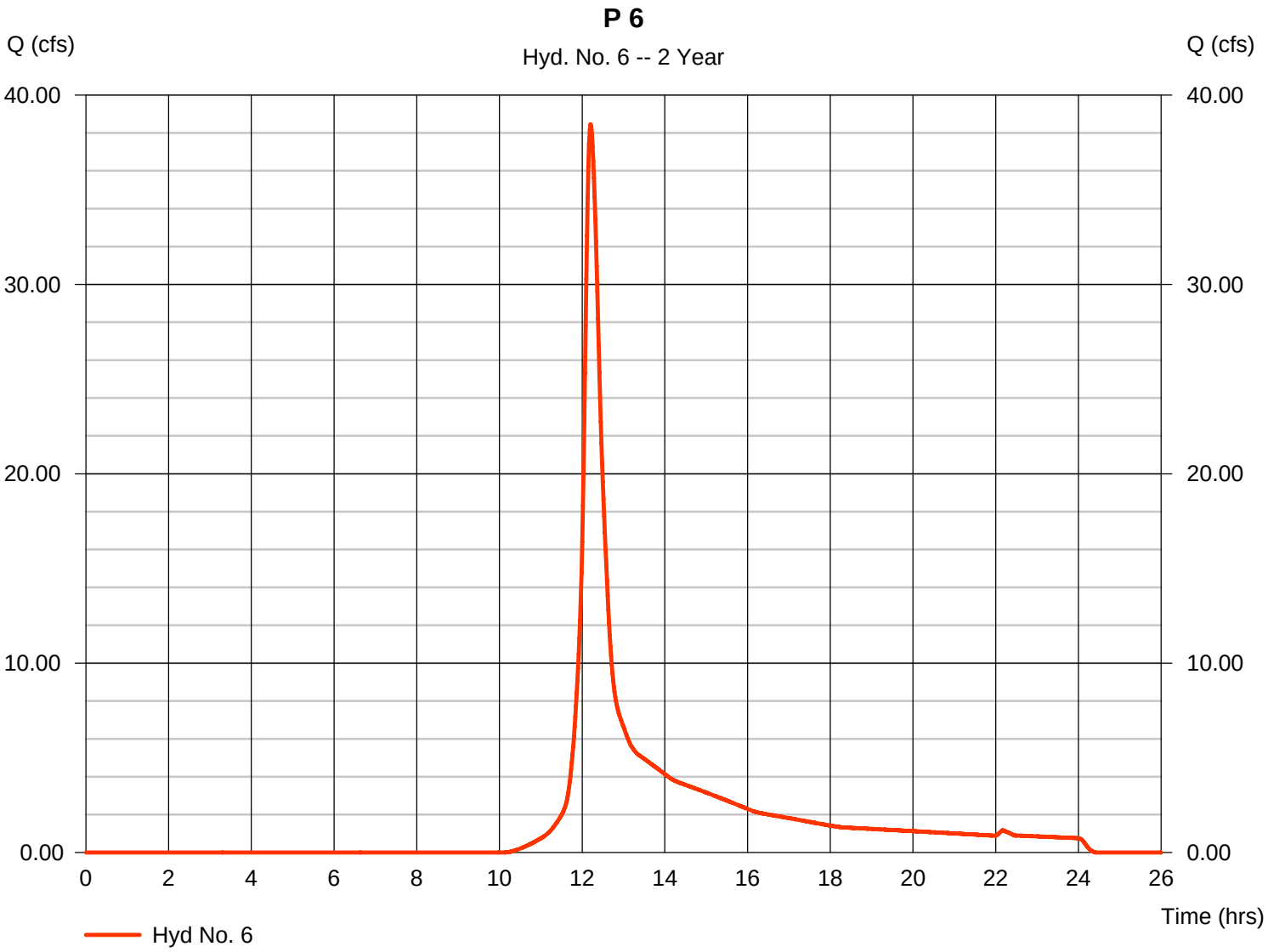


Hydrograph Report

Hyd. No. 6

P 6

Hydrograph type	=	SCS Runoff	Peak discharge	=	38.45 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.20 hrs
Time interval	=	1 min	Hyd. volume	=	164,065 cuft
Drainage area	=	34.290 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.20 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

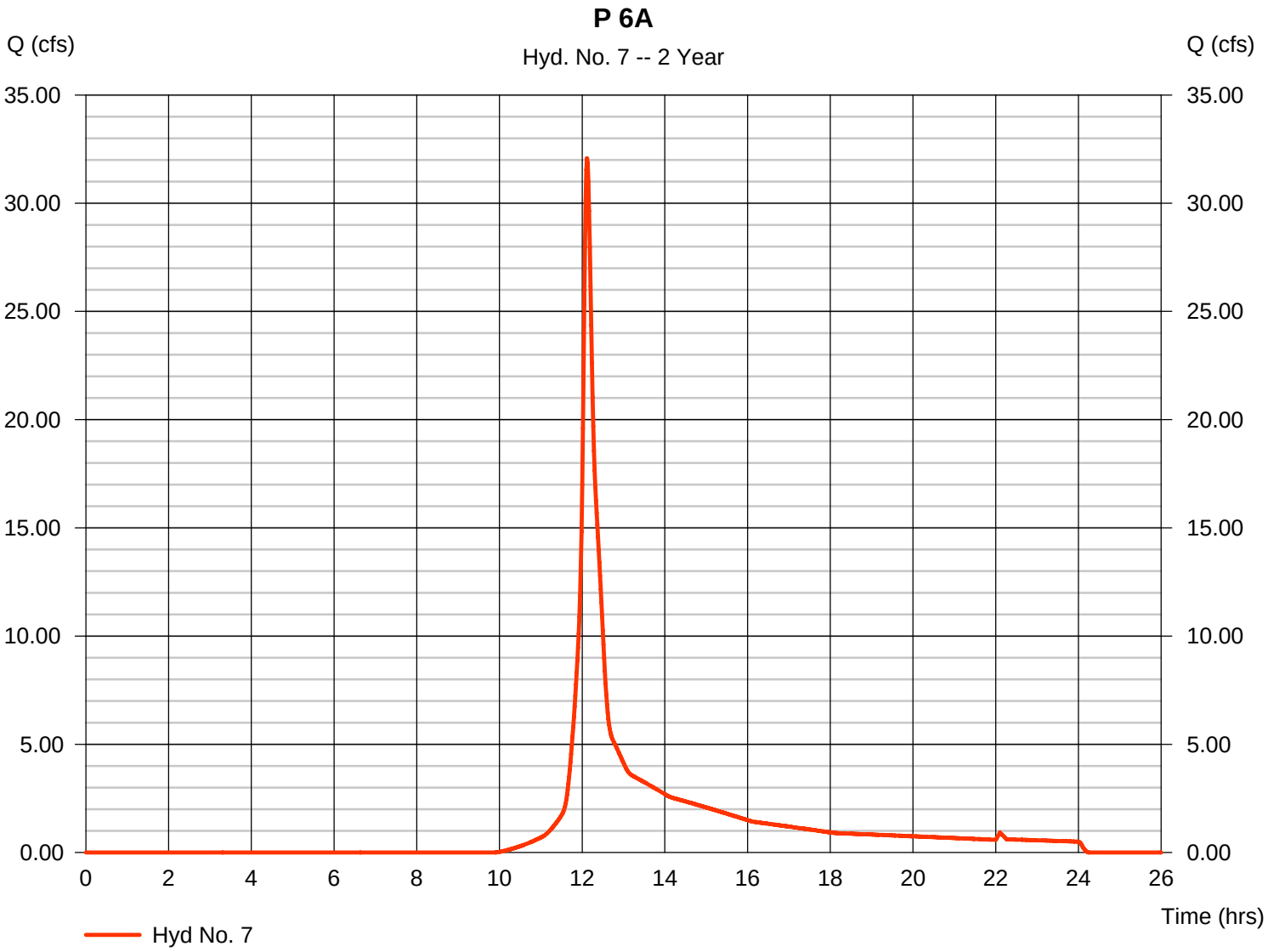


Hydrograph Report

Hyd. No. 7

P 6A

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.08 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	112,404 cuft
Drainage area	=	22.680 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

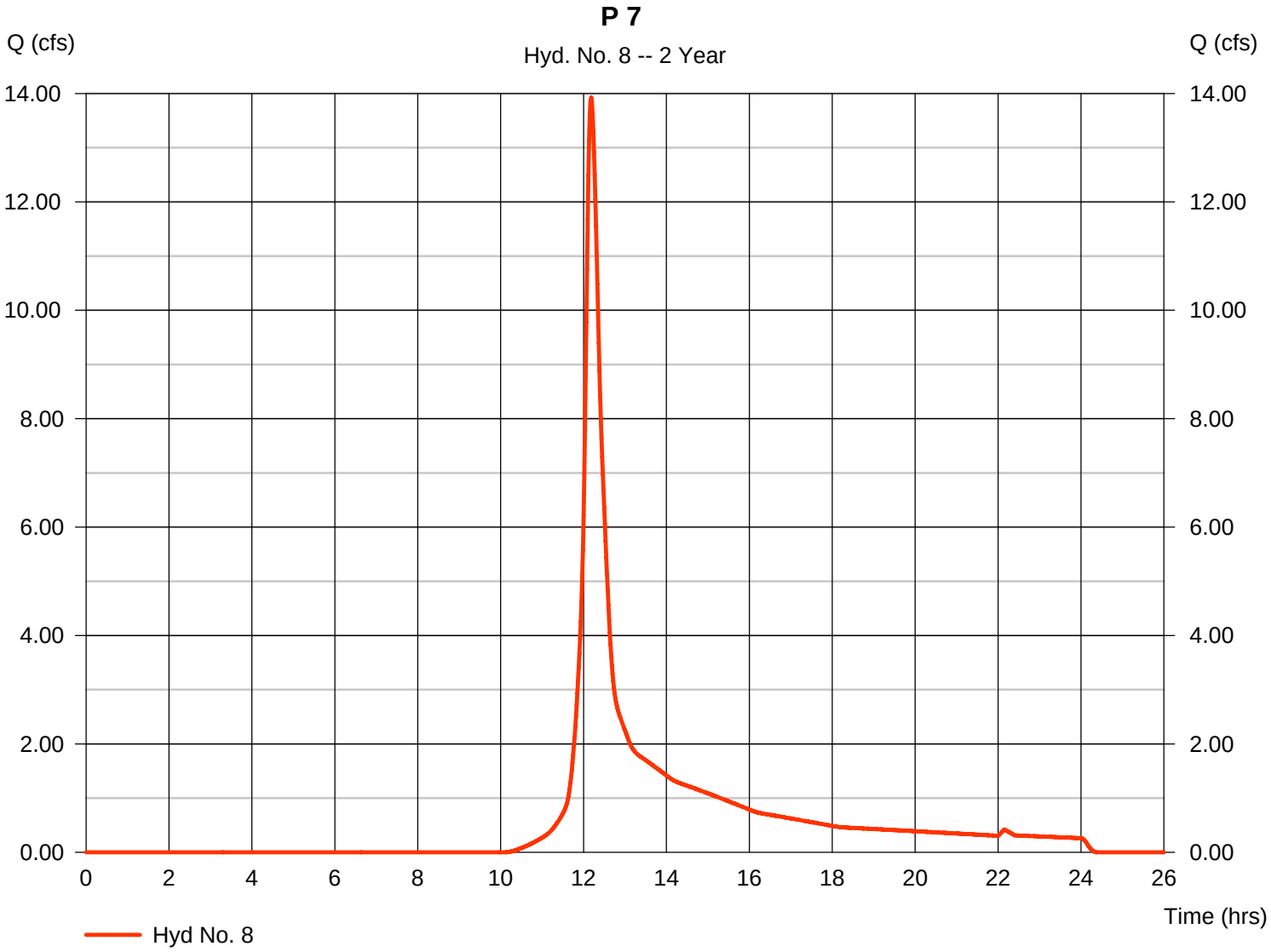


Hydrograph Report

Hyd. No. 8

P 7

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.92 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	56,754 cuft
Drainage area	=	12.010 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.70 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

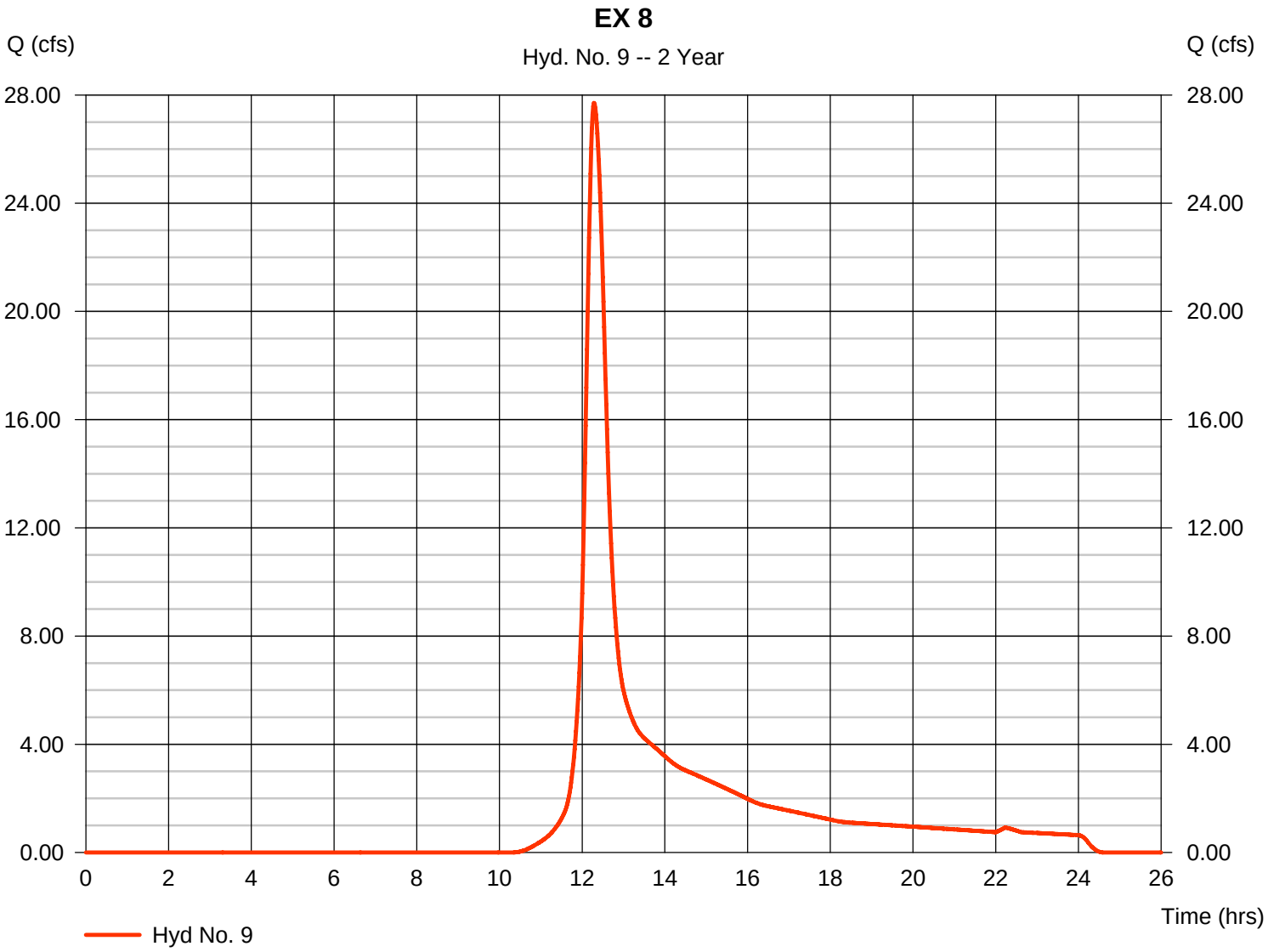


Hydrograph Report

Hyd. No. 9

EX 8

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.71 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.28 hrs
Time interval	=	1 min	Hyd. volume	=	134,847 cuft
Drainage area	=	30.230 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	22.70 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

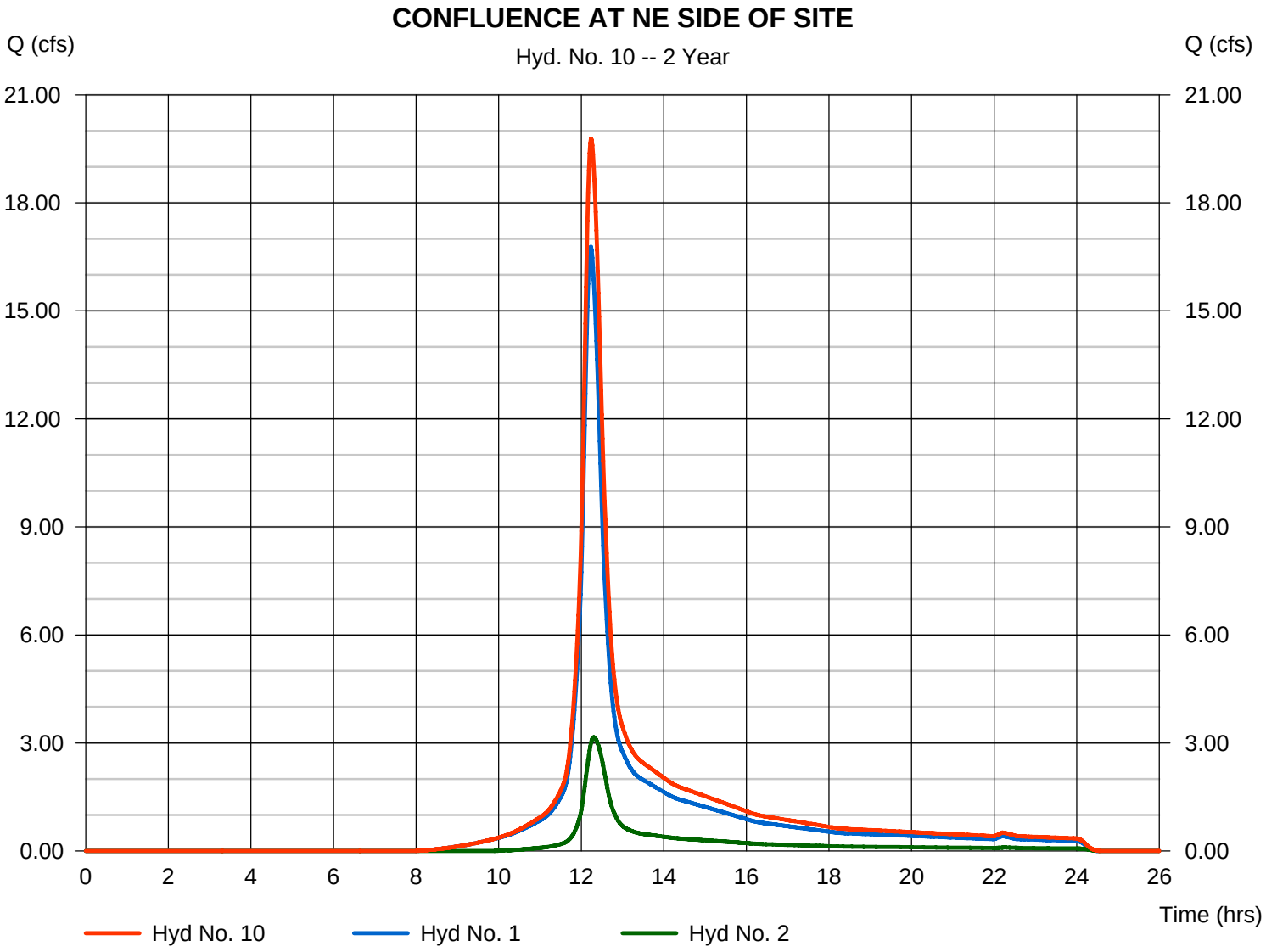


Hydrograph Report

Hyd. No. 10

CONFLUENCE AT NE SIDE OF SITE

Hydrograph type	= Combine	Peak discharge	= 19.78 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 89,598 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 13.530 ac



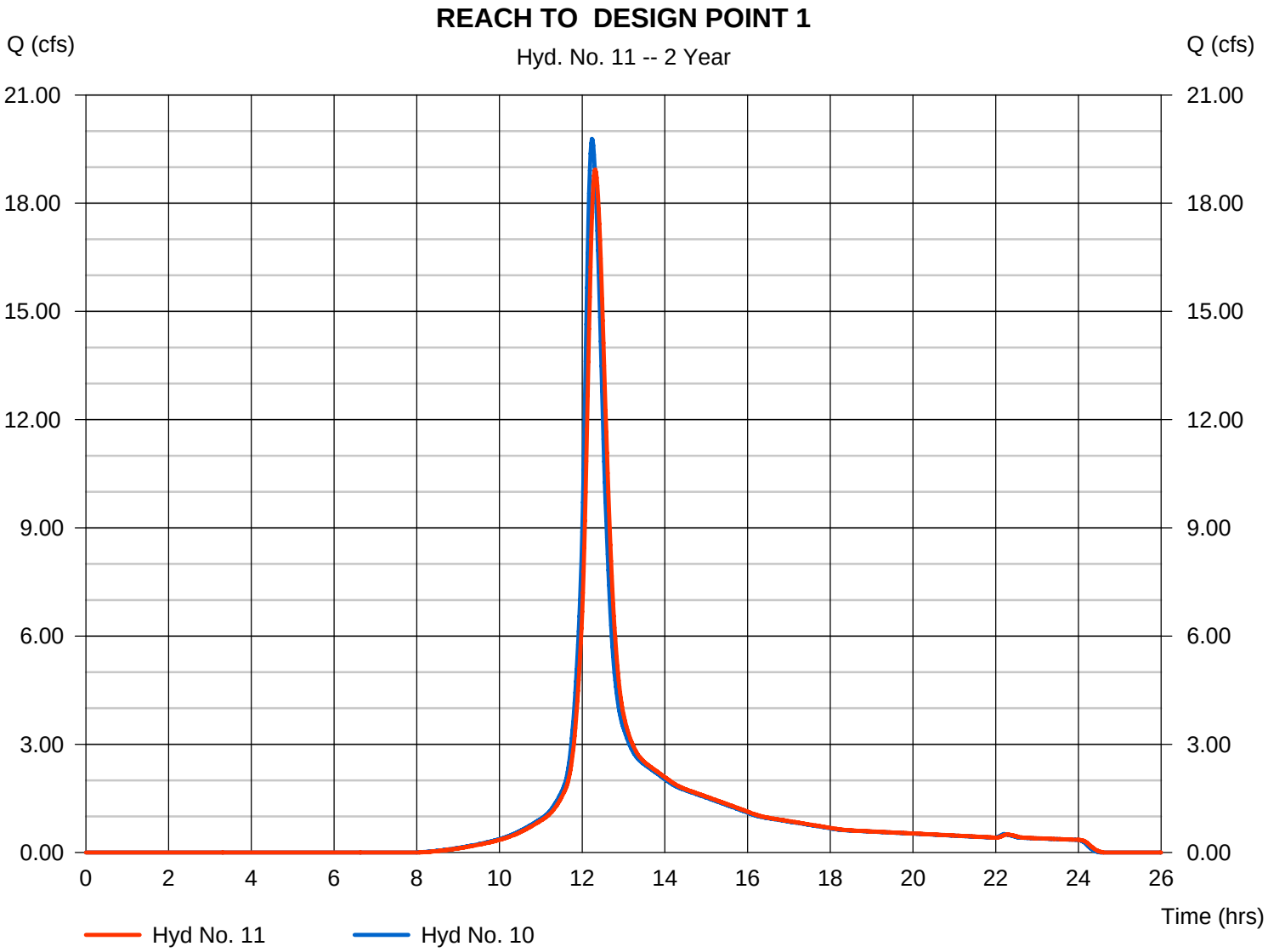
Hydrograph Report

Hyd. No. 11

REACH TO DESIGN POINT 1

Hydrograph type	=	Reach	Peak discharge	=	18.93 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.32 hrs
Time interval	=	1 min	Hyd. volume	=	89,595 cuft
Inflow hyd. No.	=	10 - CONFLUENCE AT NE SIDE OF SITE	Section type	=	Circular
Reach length	=	3138.0 ft	Channel slope	=	3.1 %
Manning's n	=	0.013	Bottom width	=	1.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	11.651	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2360

Modified Att-Kin routing method used.

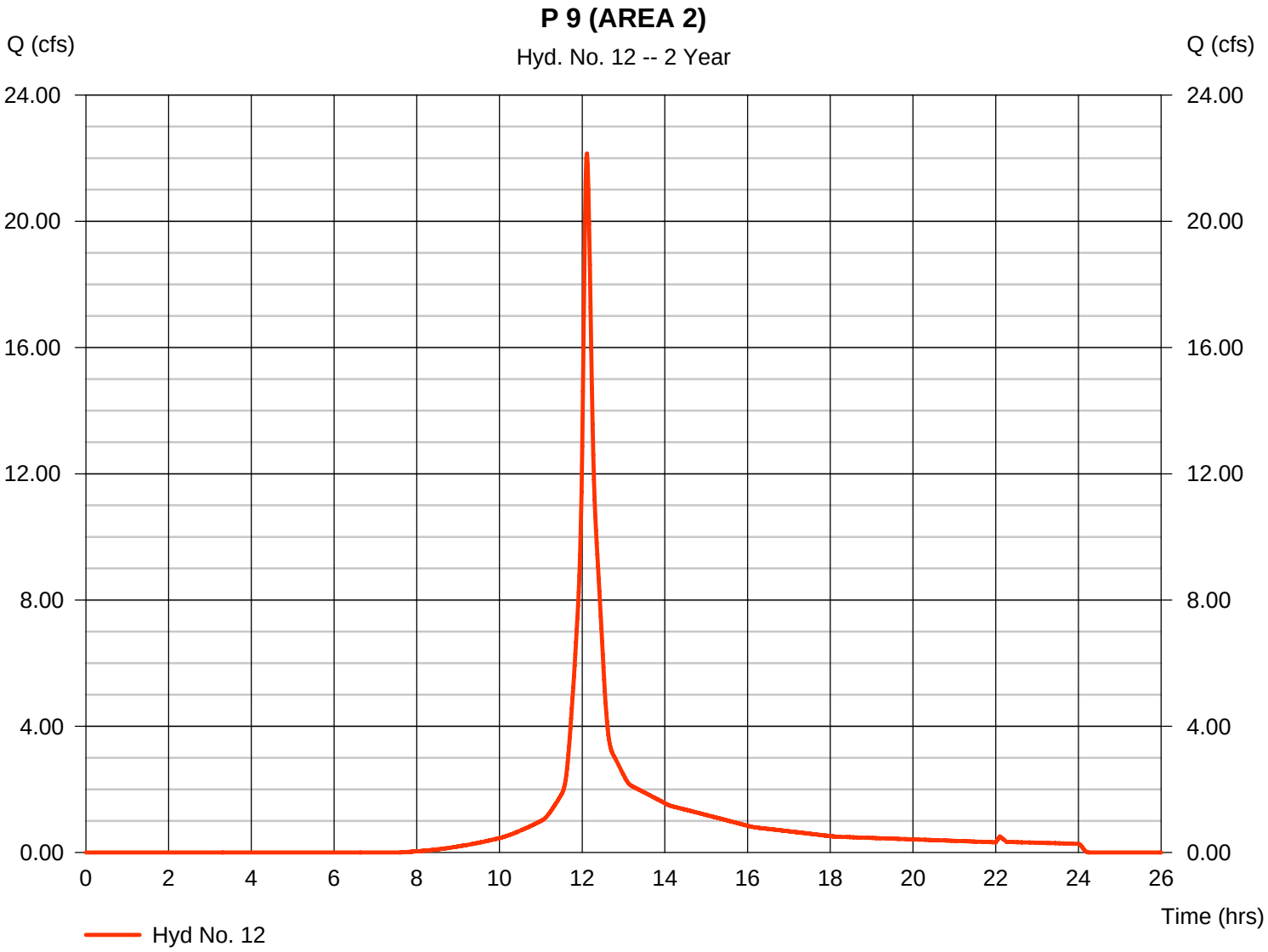


Hydrograph Report

Hyd. No. 12

P 9 (AREA 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.14 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	75,830 cuft
Drainage area	=	10.360 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

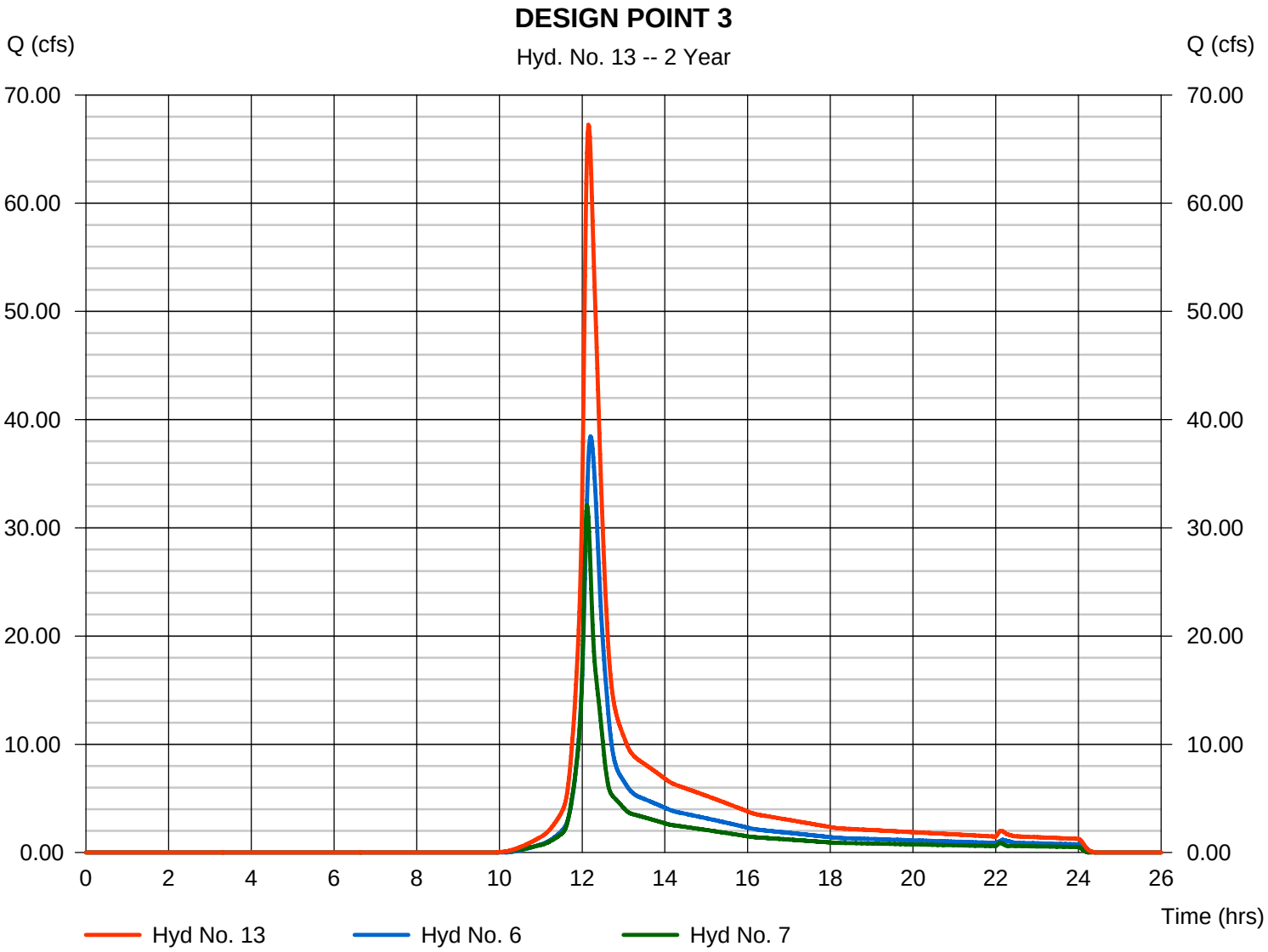


Hydrograph Report

Hyd. No. 13

DESIGN POINT 3

Hydrograph type	= Combine	Peak discharge	= 67.25 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 276,469 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 56.970 ac



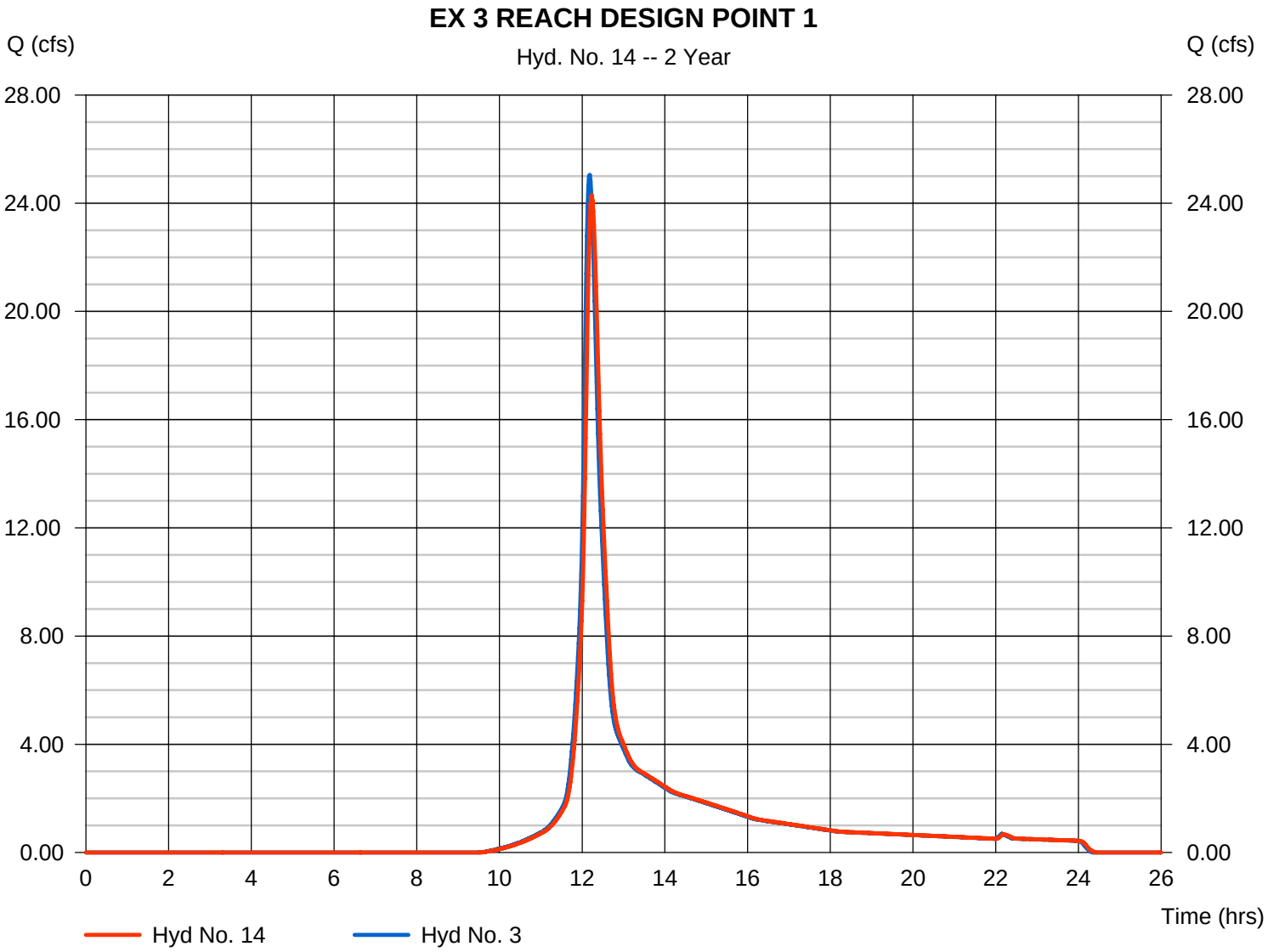
Hydrograph Report

Hyd. No. 14

EX 3 REACH DESIGN POINT 1

Hydrograph type	=	Reach	Peak discharge	=	24.29 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.23 hrs
Time interval	=	1 min	Hyd. volume	=	100,392 cuft
Inflow hyd. No.	=	3 - EX 3	Section type	=	Circular
Reach length	=	2502.0 ft	Channel slope	=	3.1 %
Manning's n	=	0.013	Bottom width	=	1.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	11.651	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.3504

Modified Att-Kin routing method used.

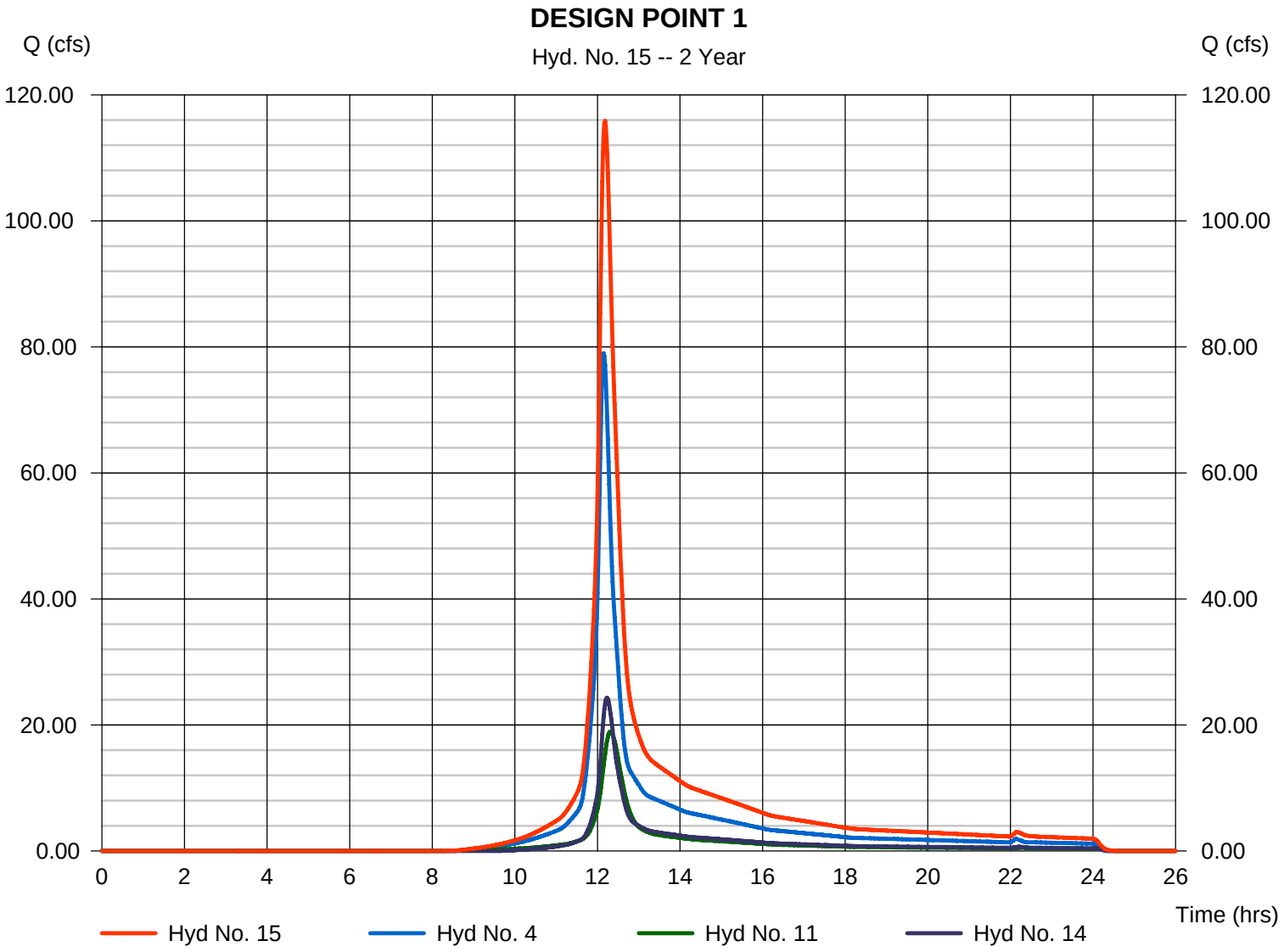


Hydrograph Report

Hyd. No. 15

DESIGN POINT 1

Hydrograph type	= Combine	Peak discharge	= 115.84 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.18 hrs
Time interval	= 1 min	Hyd. volume	= 487,328 cuft
Inflow hyds.	= 4, 11, 14	Contrib. drain. area	= 46.680 ac

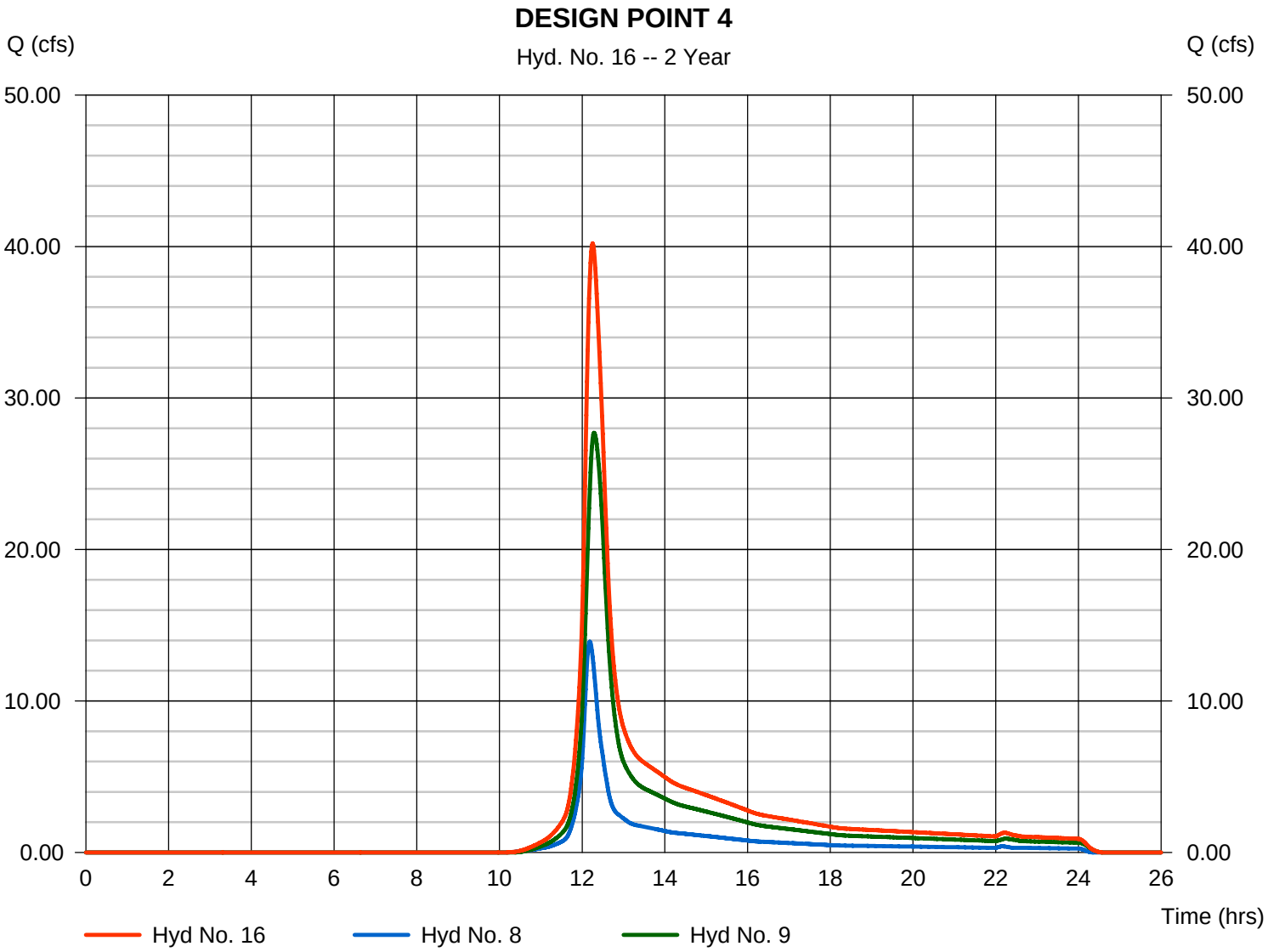


Hydrograph Report

Hyd. No. 16

DESIGN POINT 4

Hydrograph type	= Combine	Peak discharge	= 40.21 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.25 hrs
Time interval	= 1 min	Hyd. volume	= 191,601 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 42.240 ac

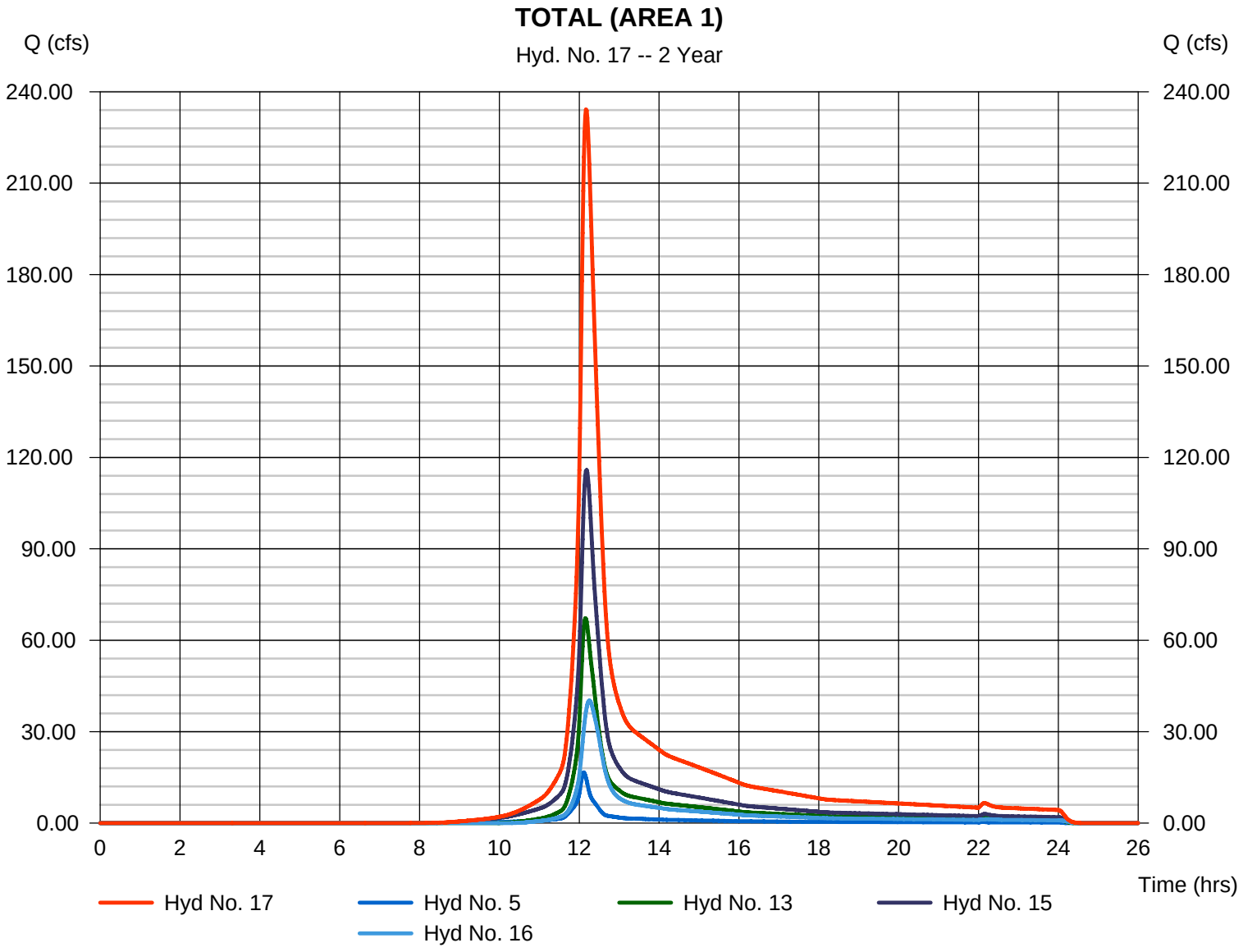


Hydrograph Report

Hyd. No. 17

TOTAL (AREA 1)

Hydrograph type	= Combine	Peak discharge	= 234.15 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,012,448 cuft
Inflow hyds.	= 5, 13, 15, 16	Contrib. drain. area	= 7.490 ac

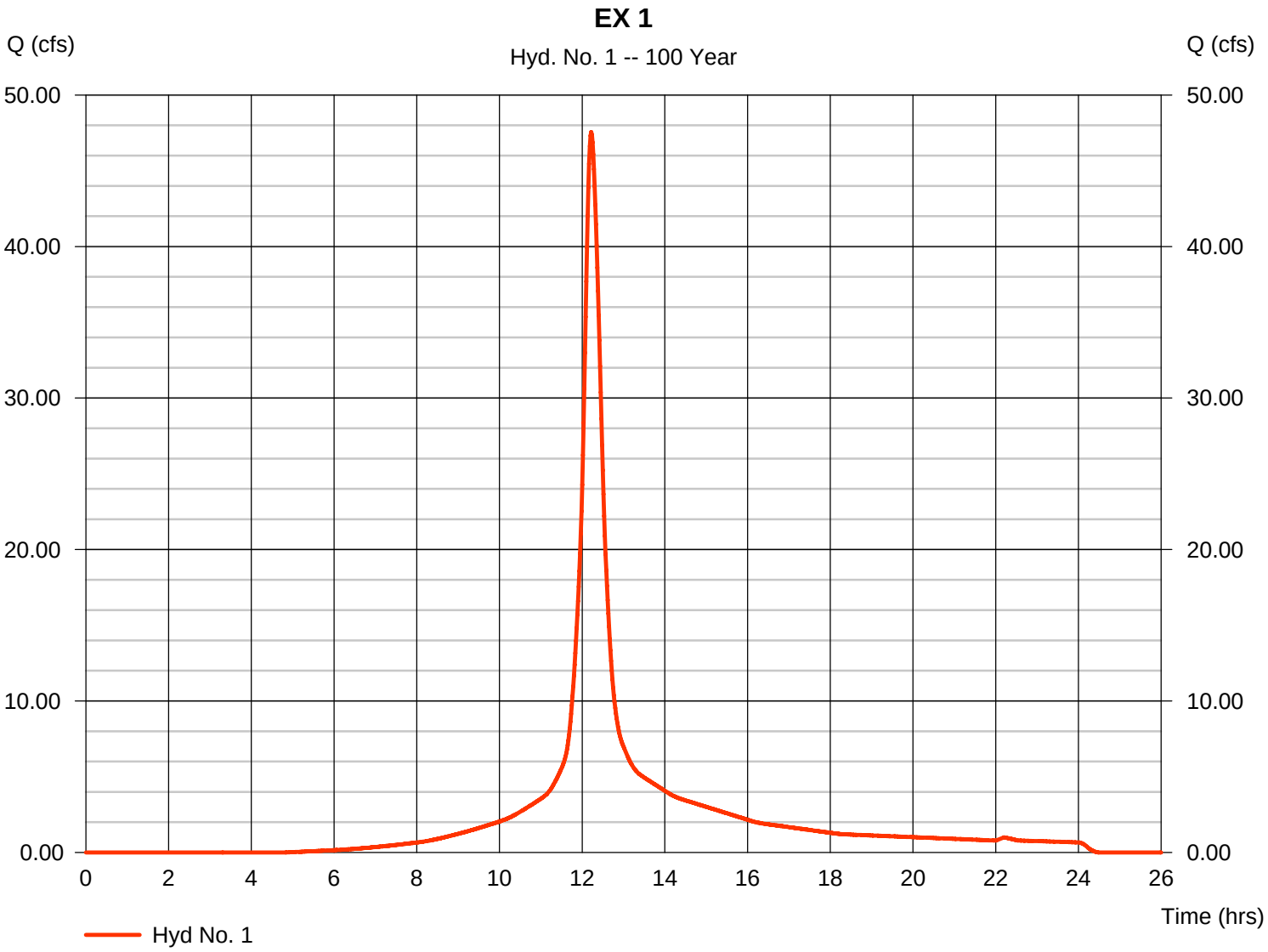


Hydrograph Report

Hyd. No. 1

EX 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	47.55 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.22 hrs
Time interval	=	1 min	Hyd. volume	=	214,679 cuft
Drainage area	=	10.530 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.30 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

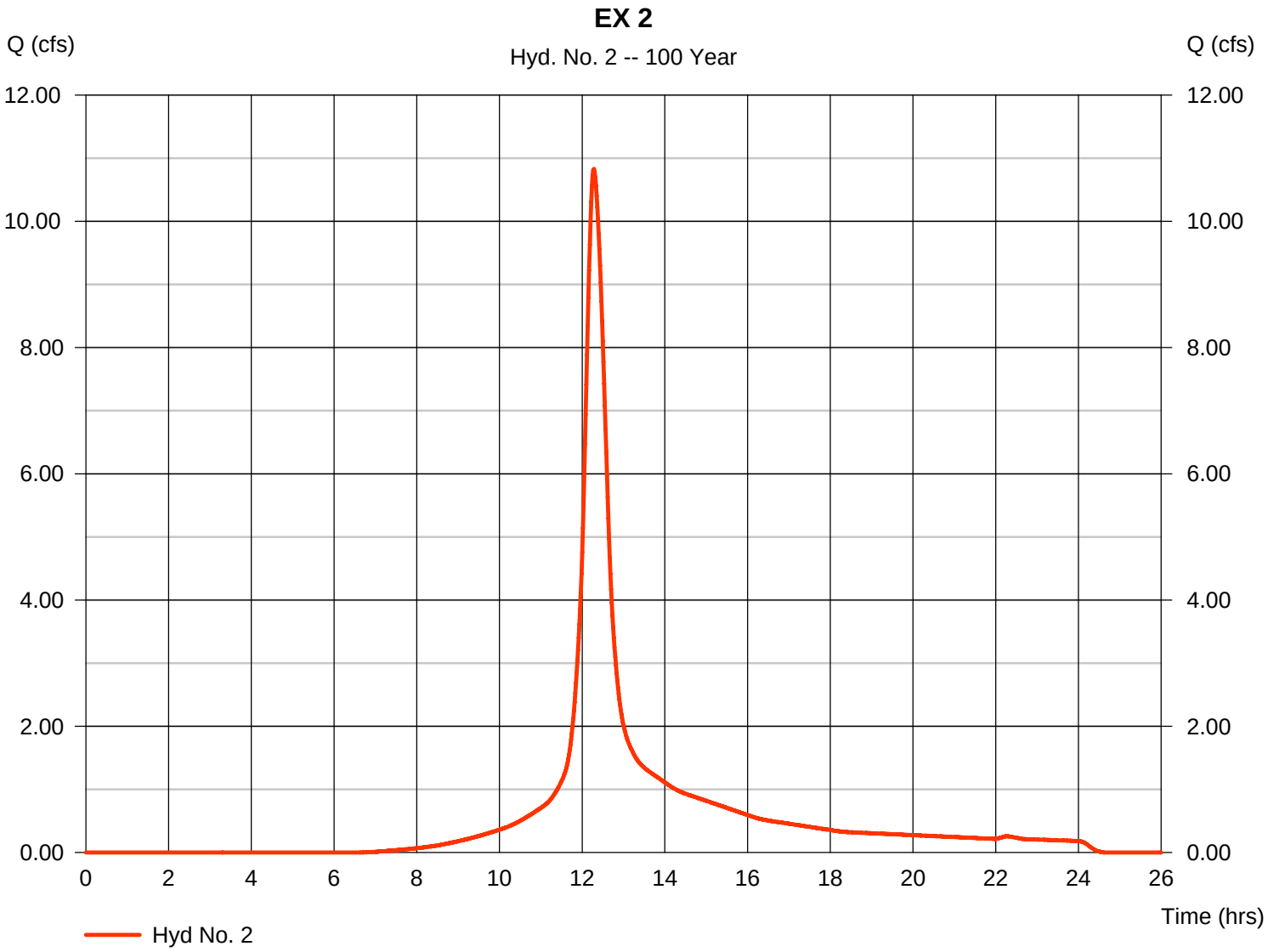


Hydrograph Report

Hyd. No. 2

EX 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.28 hrs
Time interval	=	1 min	Hyd. volume	=	52,465 cuft
Drainage area	=	3.000 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	23.80 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

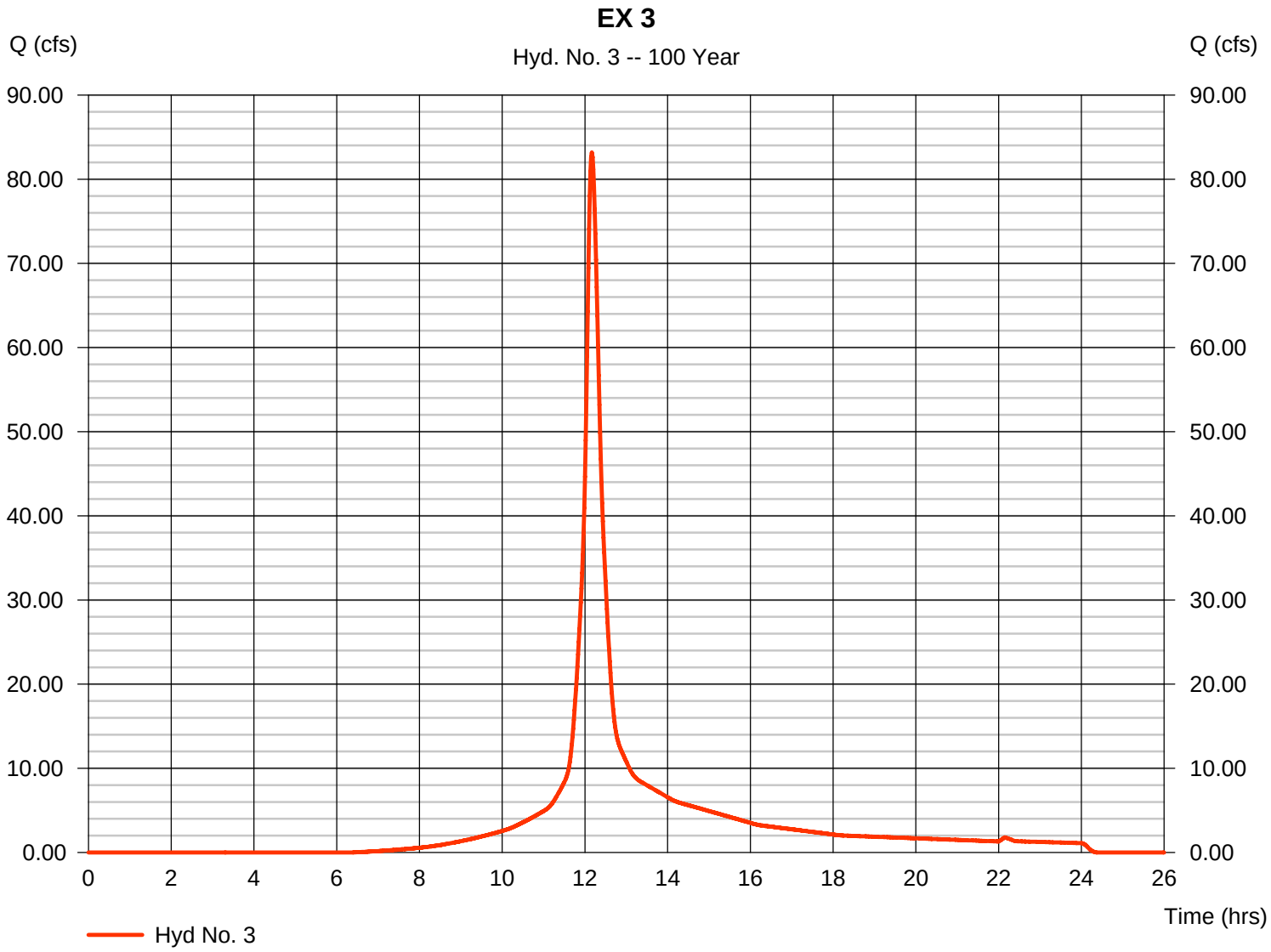


Hydrograph Report

Hyd. No. 3

EX 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	83.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	330,590 cuft
Drainage area	=	18.470 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

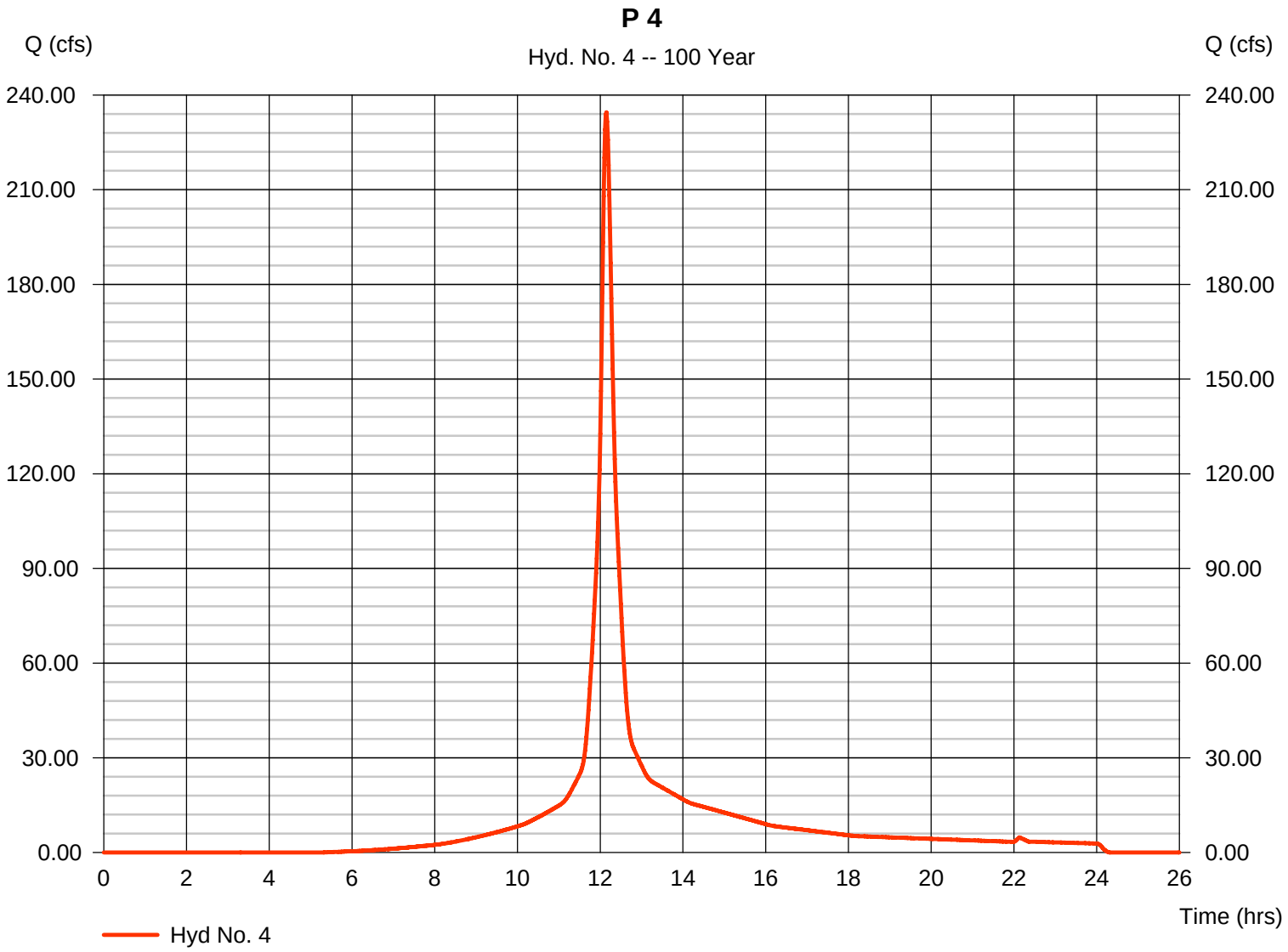


Hydrograph Report

Hyd. No. 4

P 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	234.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	898,462 cuft
Drainage area	=	46.680 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	12.90 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

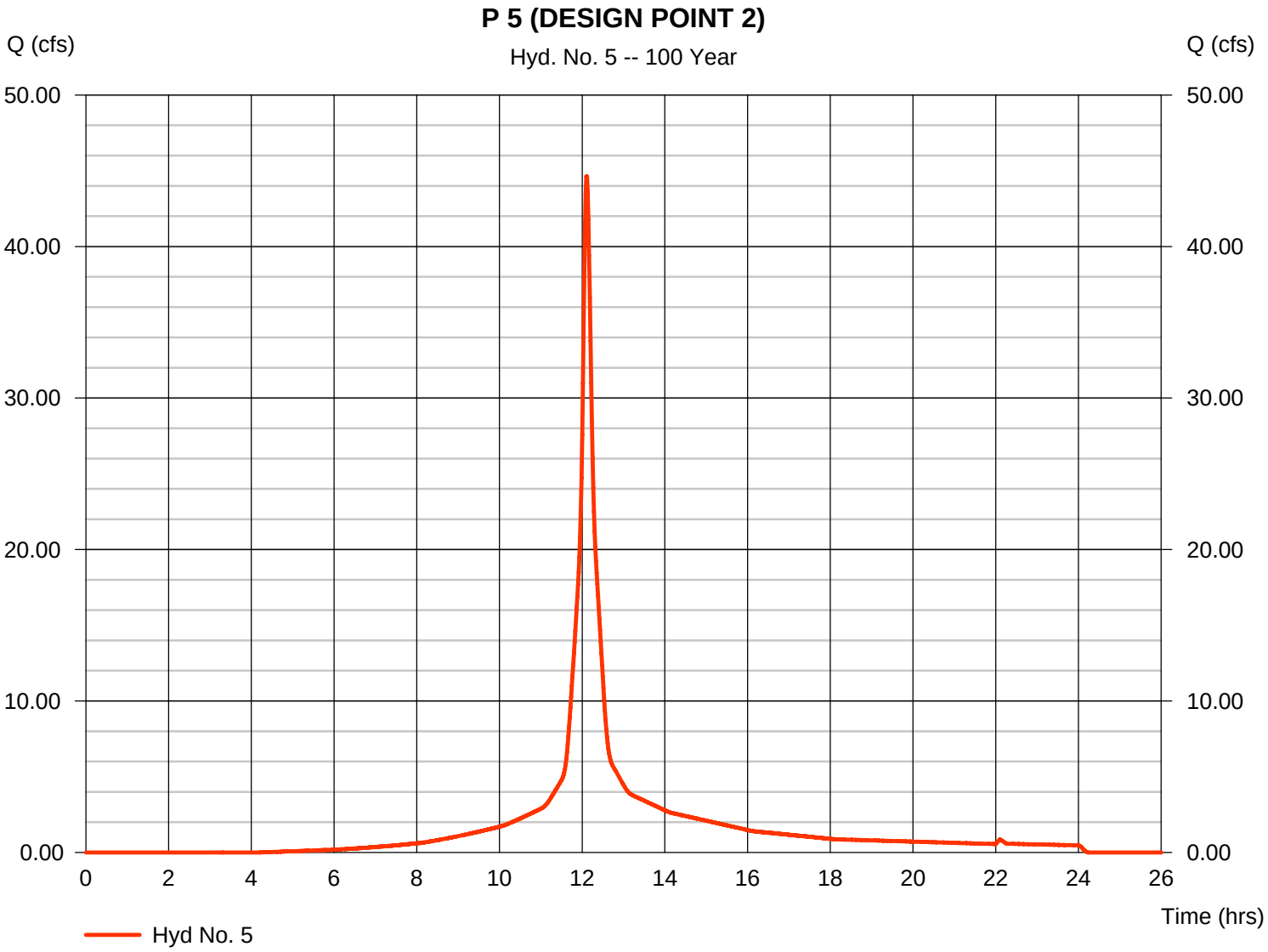


Hydrograph Report

Hyd. No. 5

P 5 (DESIGN POINT 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	44.63 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	158,988 cuft
Drainage area	=	7.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

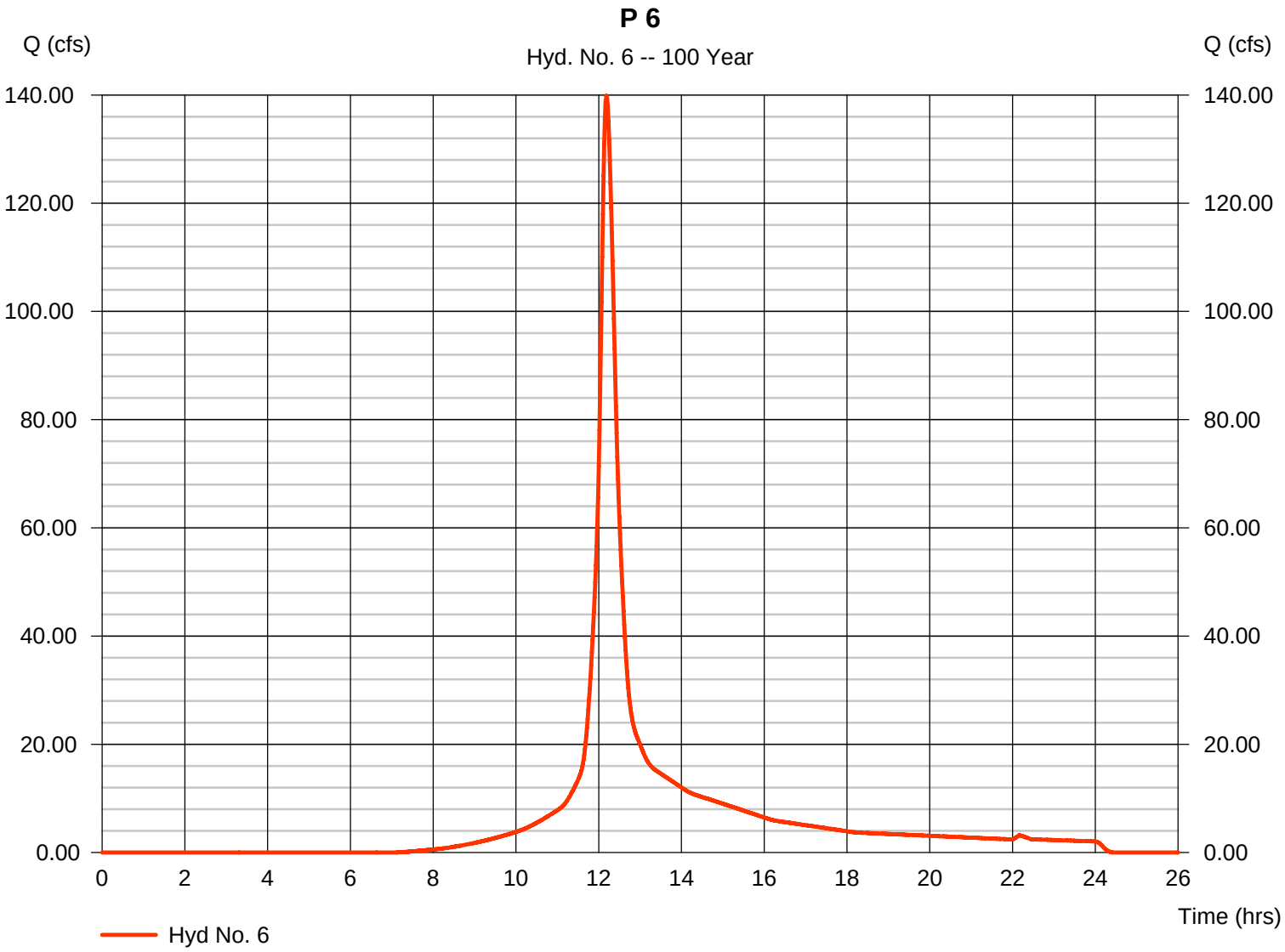


Hydrograph Report

Hyd. No. 6

P 6

Hydrograph type	=	SCS Runoff	Peak discharge	=	139.88 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	578,836 cuft
Drainage area	=	34.290 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.20 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

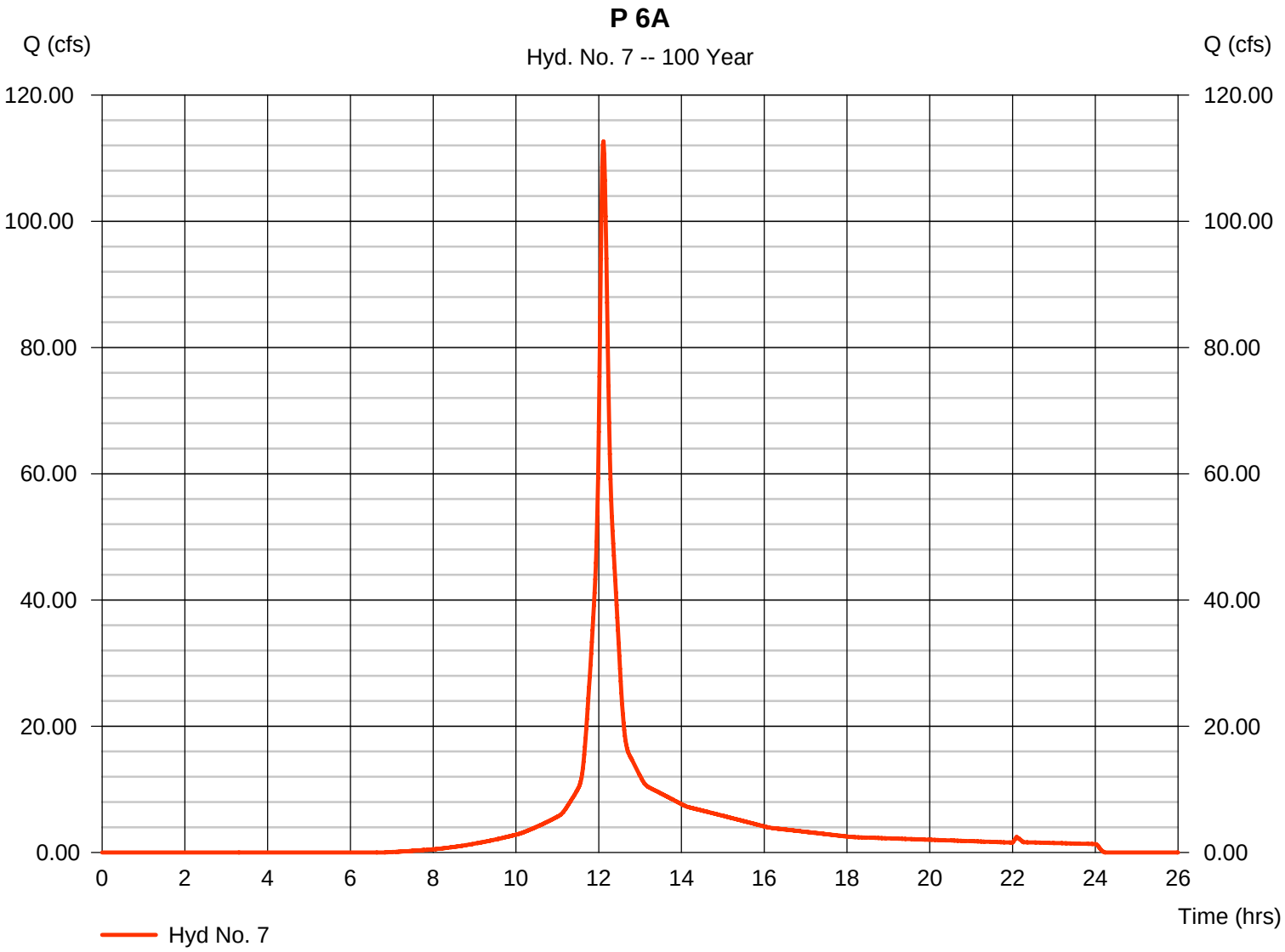


Hydrograph Report

Hyd. No. 7

P 6A

Hydrograph type	=	SCS Runoff	Peak discharge	=	112.64 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	387,367 cuft
Drainage area	=	22.680 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

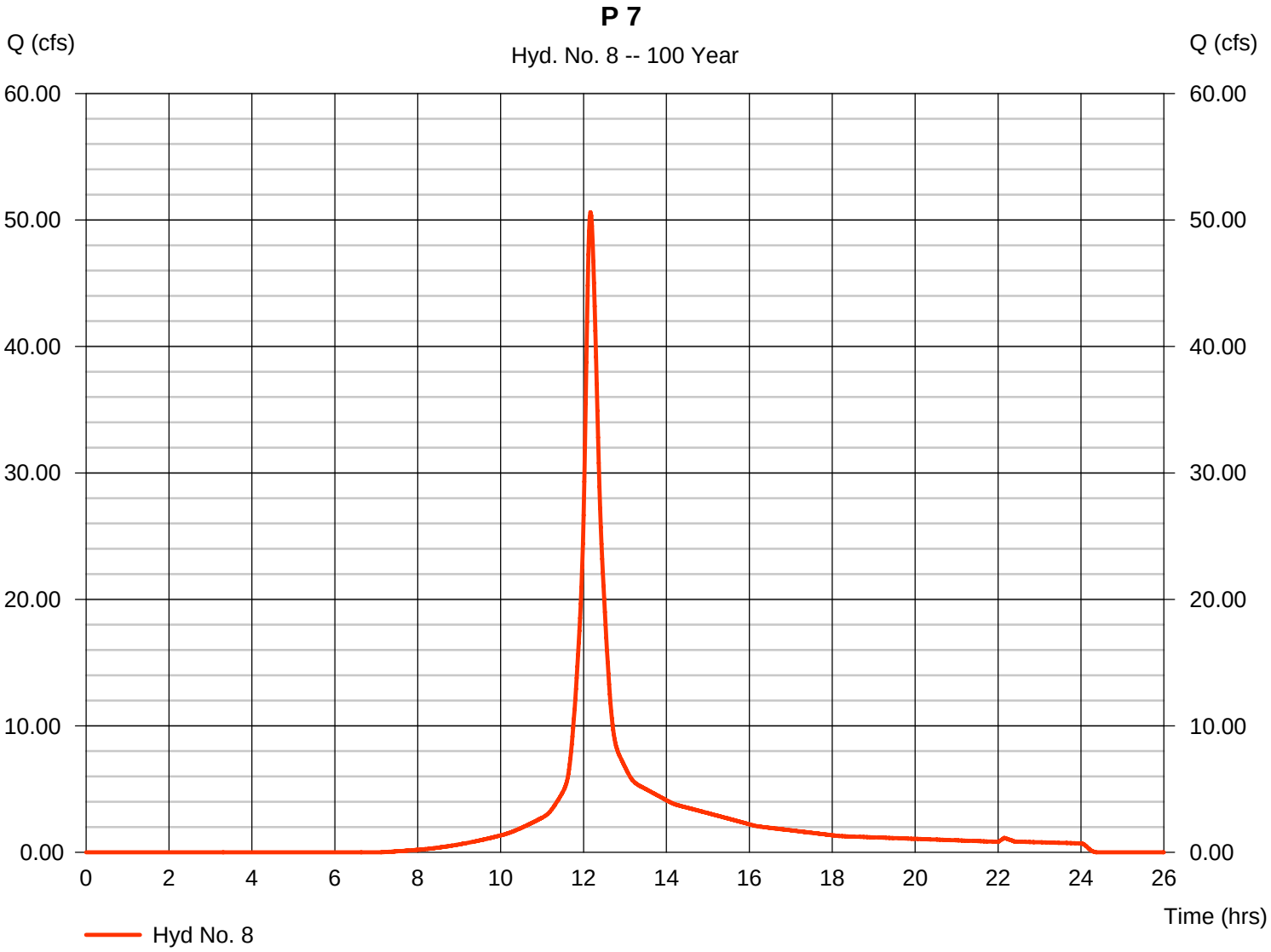


Hydrograph Report

Hyd. No. 8

P 7

Hydrograph type	=	SCS Runoff	Peak discharge	=	50.61 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	200,233 cuft
Drainage area	=	12.010 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.70 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

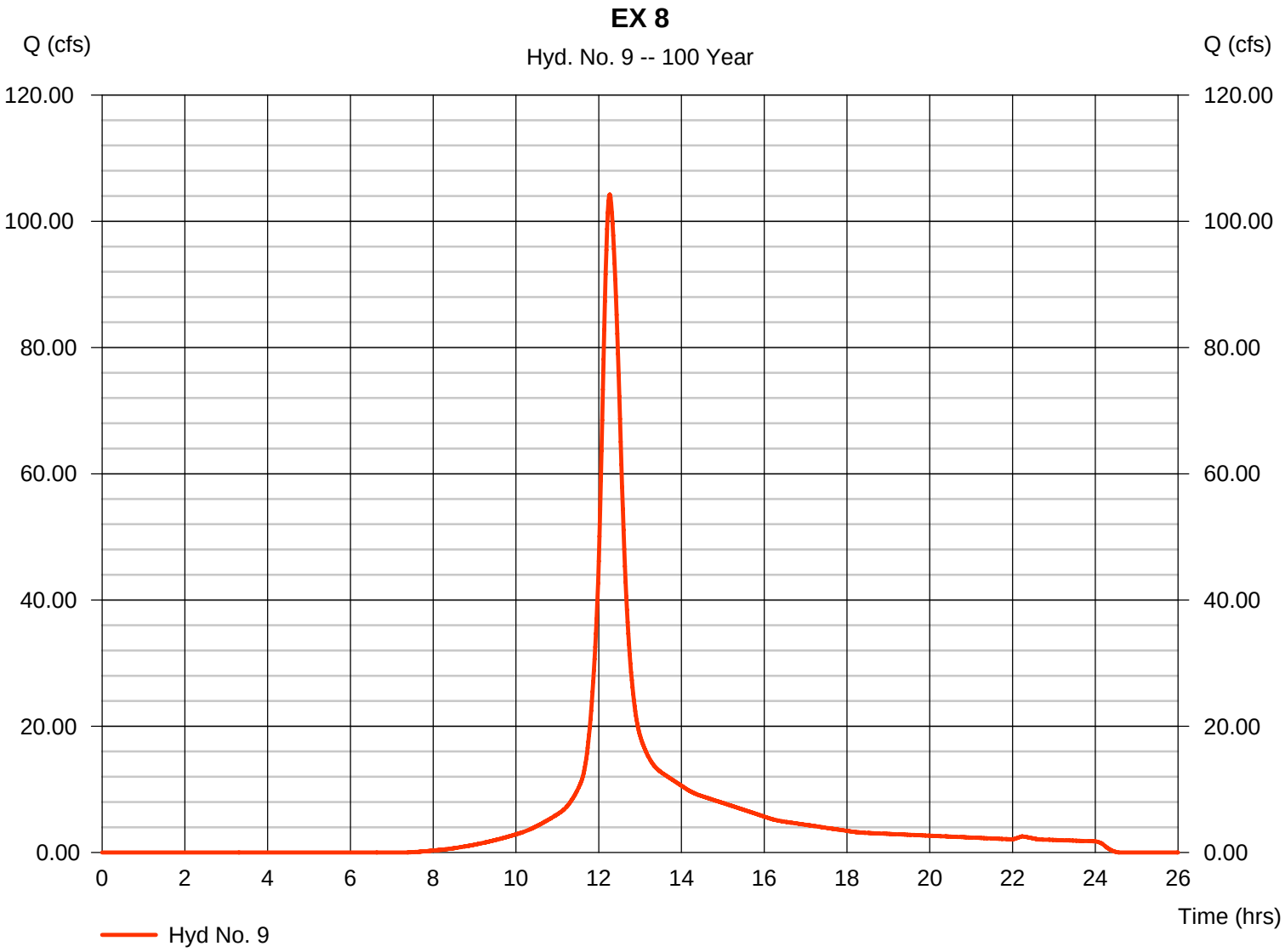


Hydrograph Report

Hyd. No. 9

EX 8

Hydrograph type	=	SCS Runoff	Peak discharge	=	104.23 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.27 hrs
Time interval	=	1 min	Hyd. volume	=	487,337 cuft
Drainage area	=	30.230 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	22.70 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

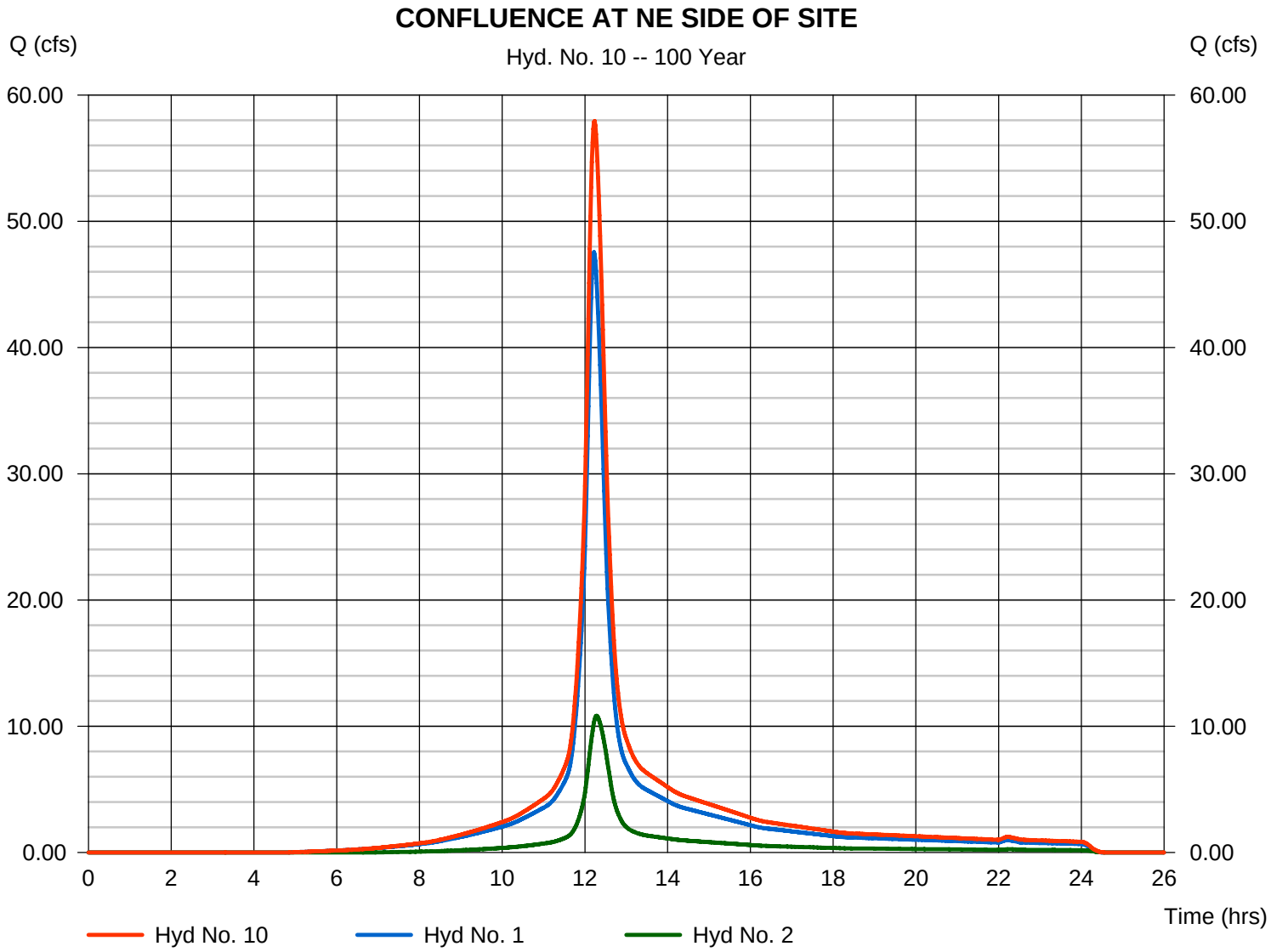


Hydrograph Report

Hyd. No. 10

CONFLUENCE AT NE SIDE OF SITE

Hydrograph type	= Combine	Peak discharge	= 57.94 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 267,144 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 13.530 ac



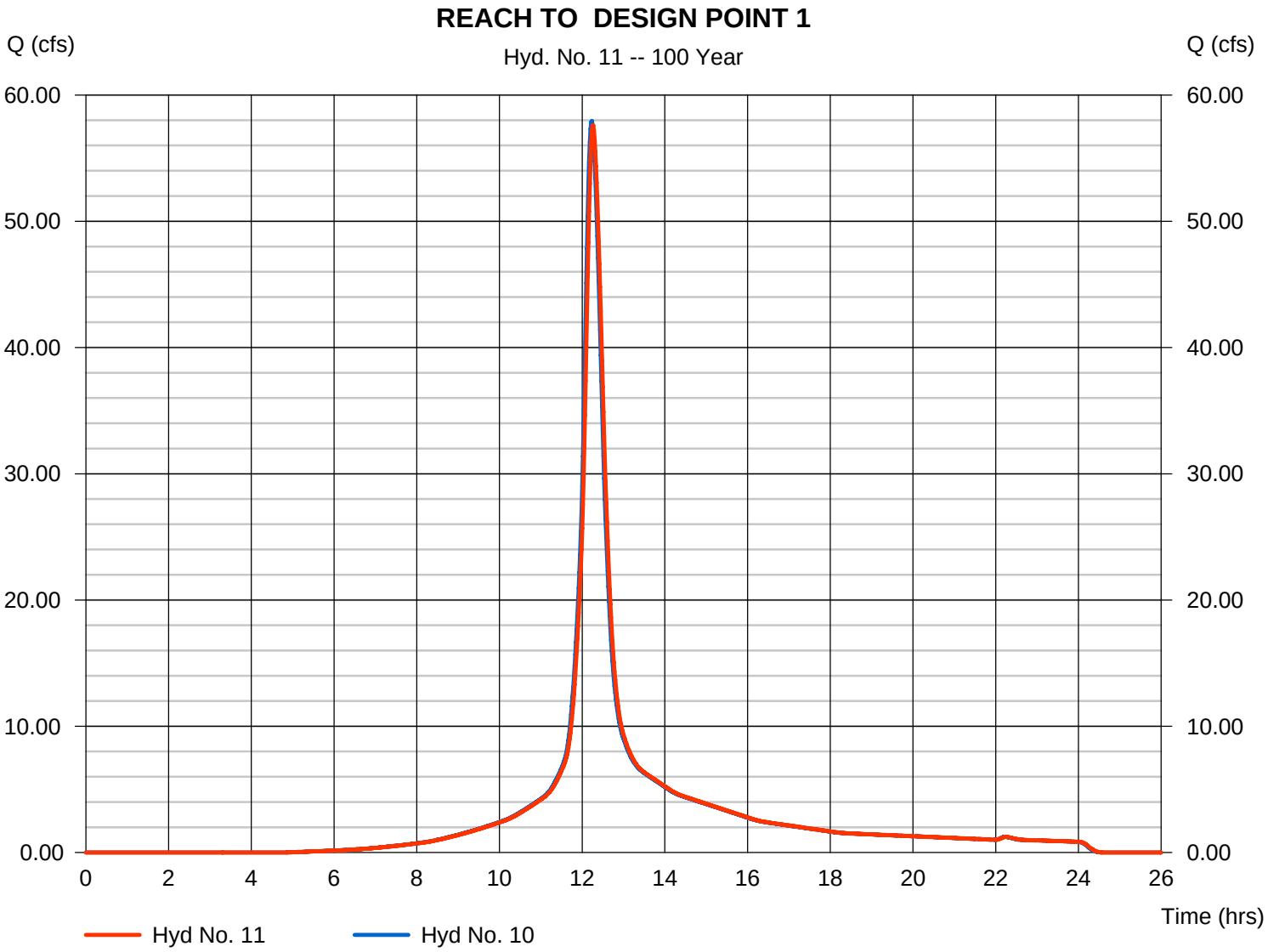
Hydrograph Report

Hyd. No. 11

REACH TO DESIGN POINT 1

Hydrograph type	=	Reach	Peak discharge	=	57.59 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.27 hrs
Time interval	=	1 min	Hyd. volume	=	267,143 cuft
Inflow hyd. No.	=	10 - CONFLUENCE AT NE SIDE OF SITE	Section type	=	Circular
Reach length	=	3138.0 ft	Channel slope	=	3.1 %
Manning's n	=	0.013	Bottom width	=	1.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	11.651	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.5630

Modified Att-Kin routing method used.

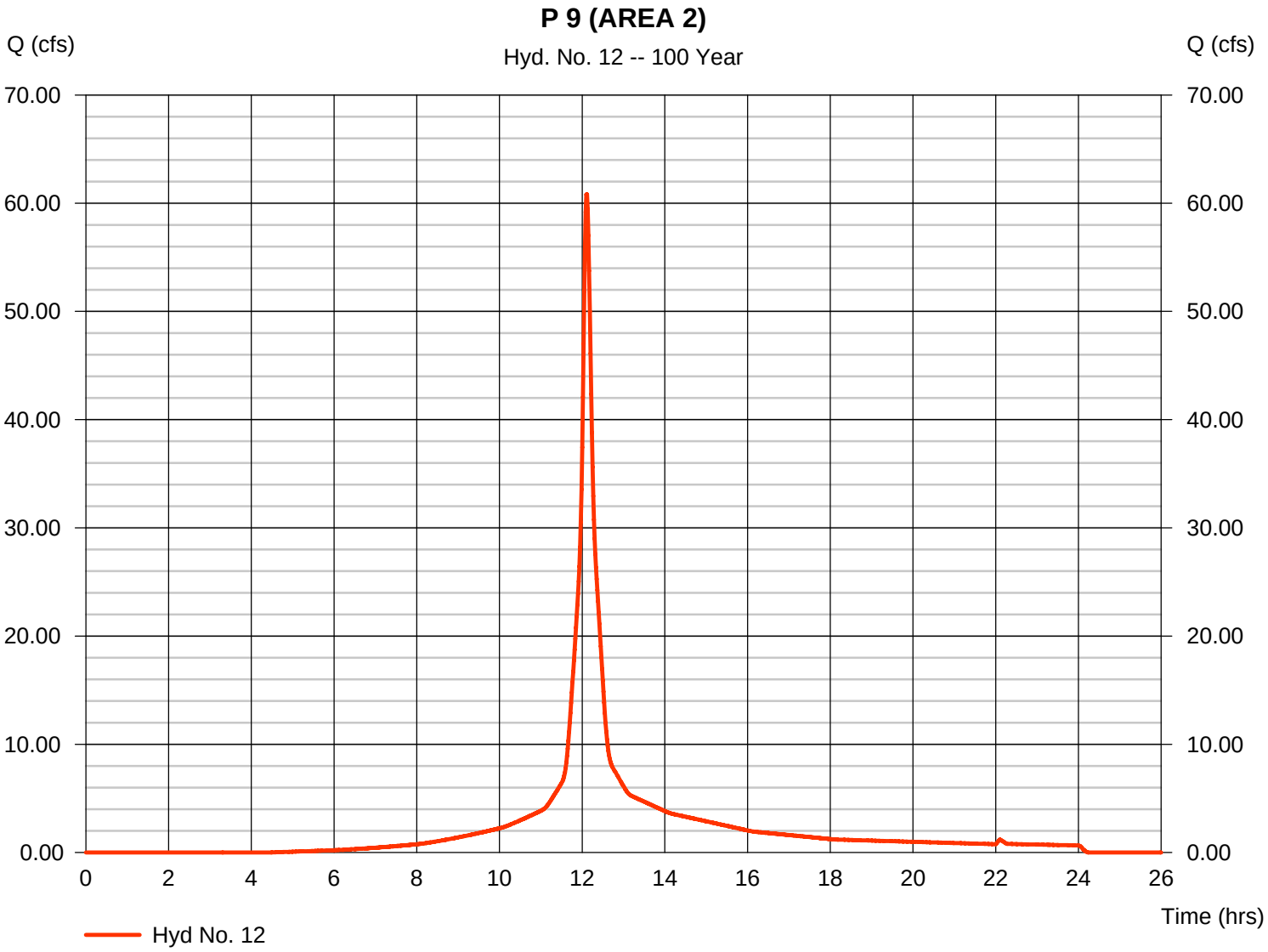


Hydrograph Report

Hyd. No. 12

P 9 (AREA 2)

Hydrograph type	=	SCS Runoff	Peak discharge	=	60.82 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	215,555 cuft
Drainage area	=	10.360 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

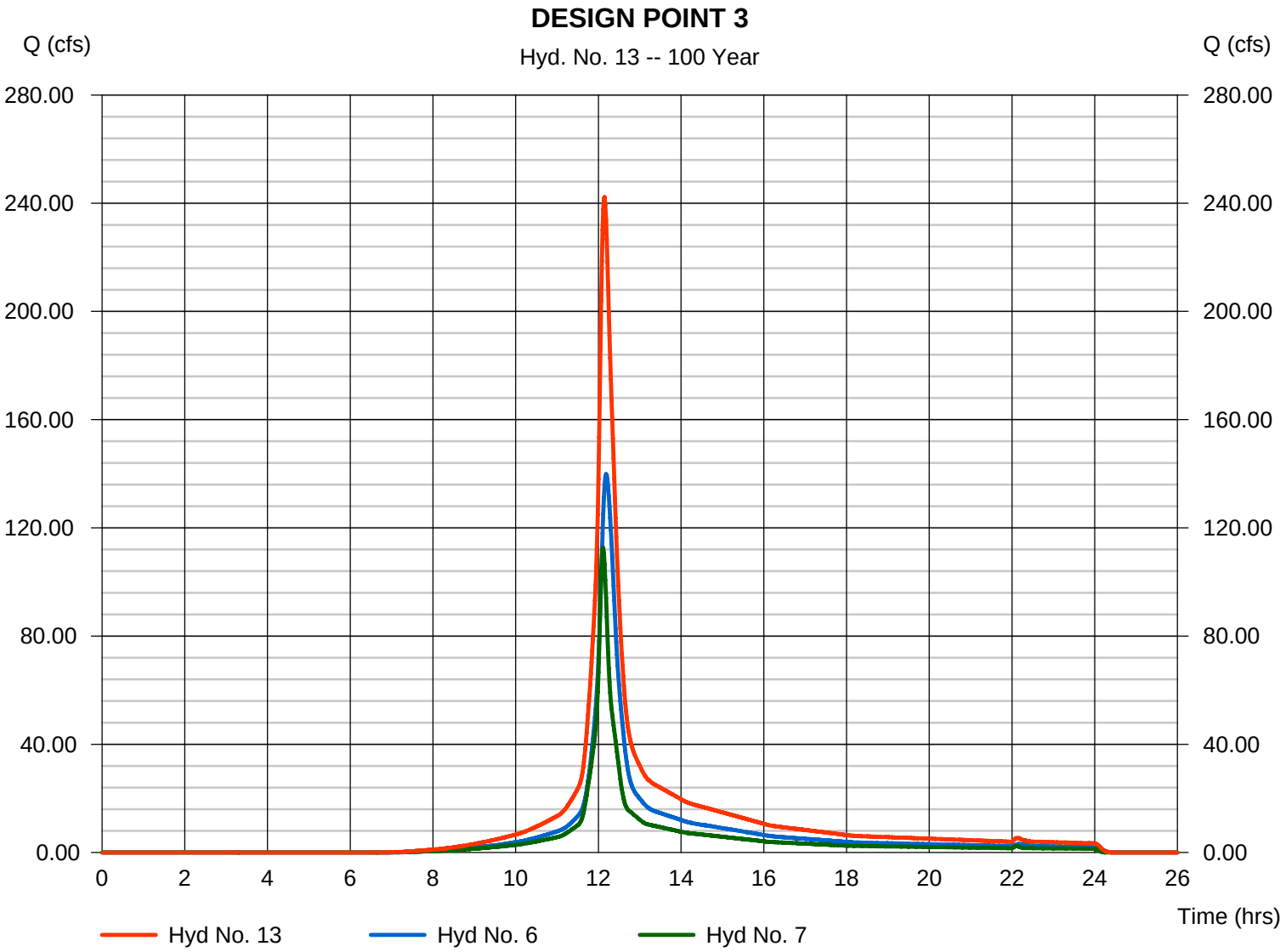


Hydrograph Report

Hyd. No. 13

DESIGN POINT 3

Hydrograph type	= Combine	Peak discharge	= 242.27 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 966,203 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 56.970 ac



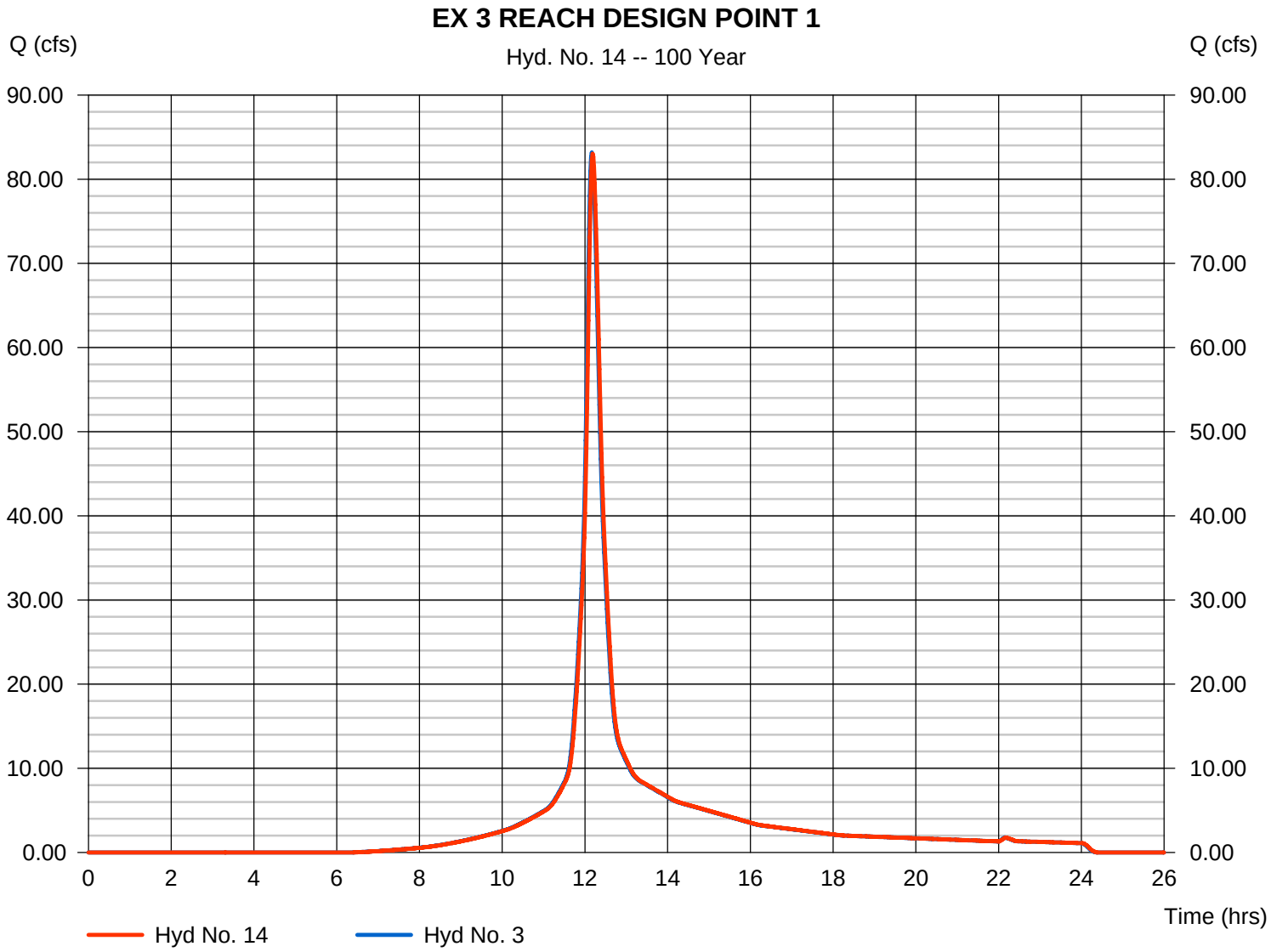
Hydrograph Report

Hyd. No. 14

EX 3 REACH DESIGN POINT 1

Hydrograph type	=	Reach	Peak discharge	=	83.01 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	330,589 cuft
Inflow hyd. No.	=	3 - EX 3	Section type	=	Circular
Reach length	=	2502.0 ft	Channel slope	=	3.1 %
Manning's n	=	0.013	Bottom width	=	1.5 ft
Side slope	=	0.0:1	Max. depth	=	0.0 ft
Rating curve x	=	11.651	Rating curve m	=	1.250
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.8272

Modified Att-Kin routing method used.

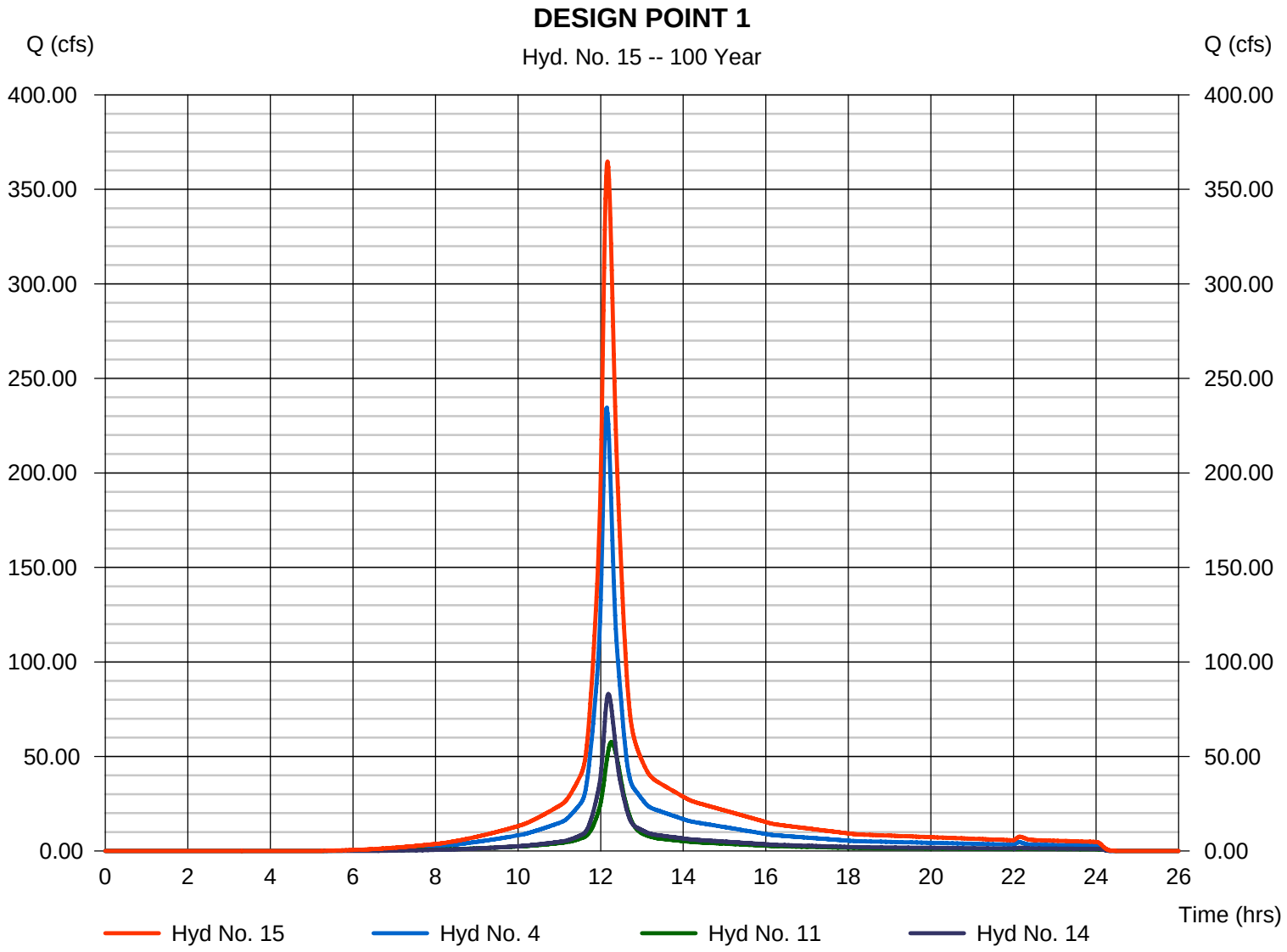


Hydrograph Report

Hyd. No. 15

DESIGN POINT 1

Hydrograph type	=	Combine	Peak discharge	=	364.64 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	1,496,194 cuft
Inflow hyds.	=	4, 11, 14	Contrib. drain. area	=	46.680 ac

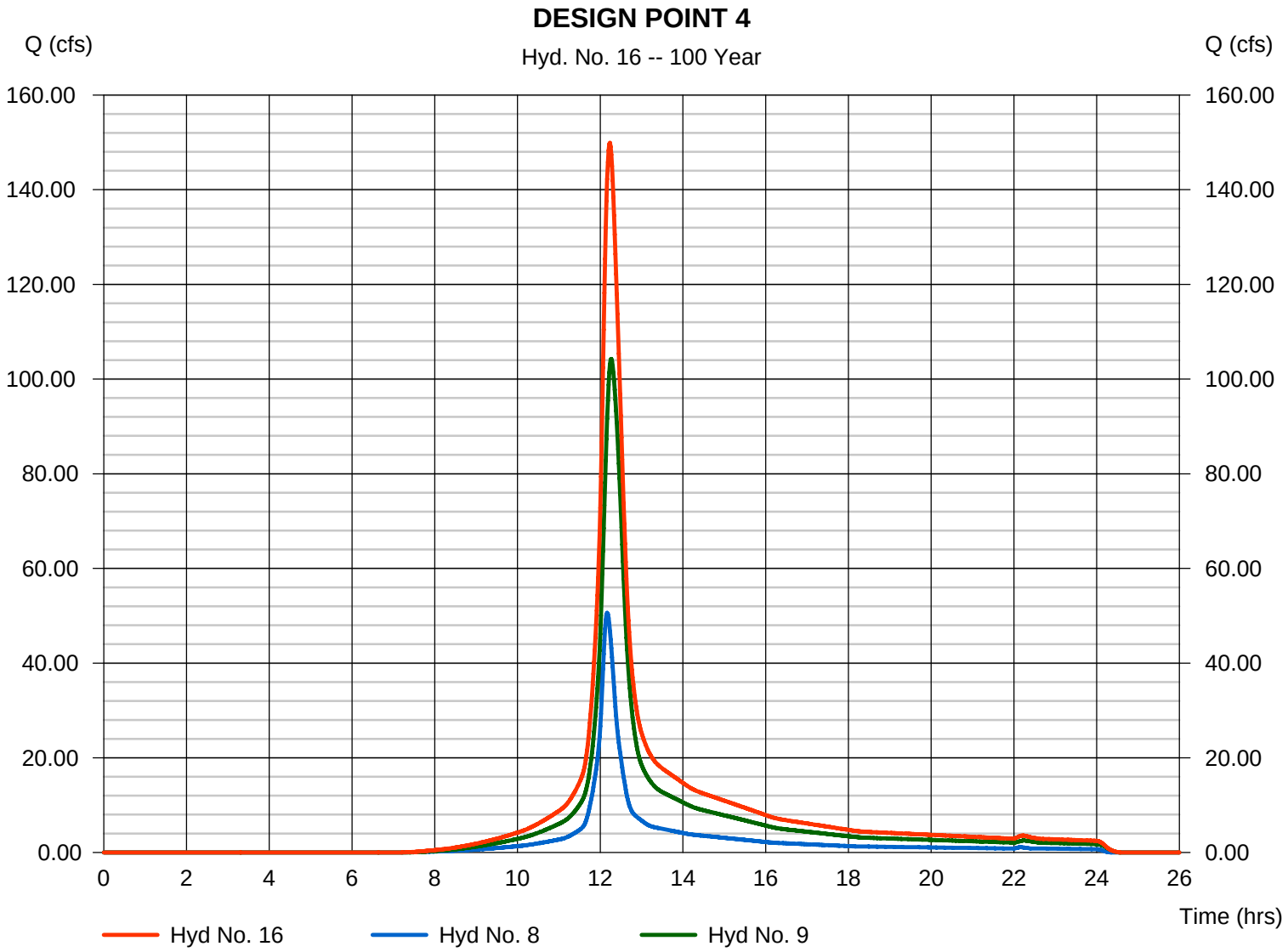


Hydrograph Report

Hyd. No. 16

DESIGN POINT 4

Hydrograph type	=	Combine	Peak discharge	=	149.89 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.23 hrs
Time interval	=	1 min	Hyd. volume	=	687,570 cuft
Inflow hyds.	=	8, 9	Contrib. drain. area	=	42.240 ac

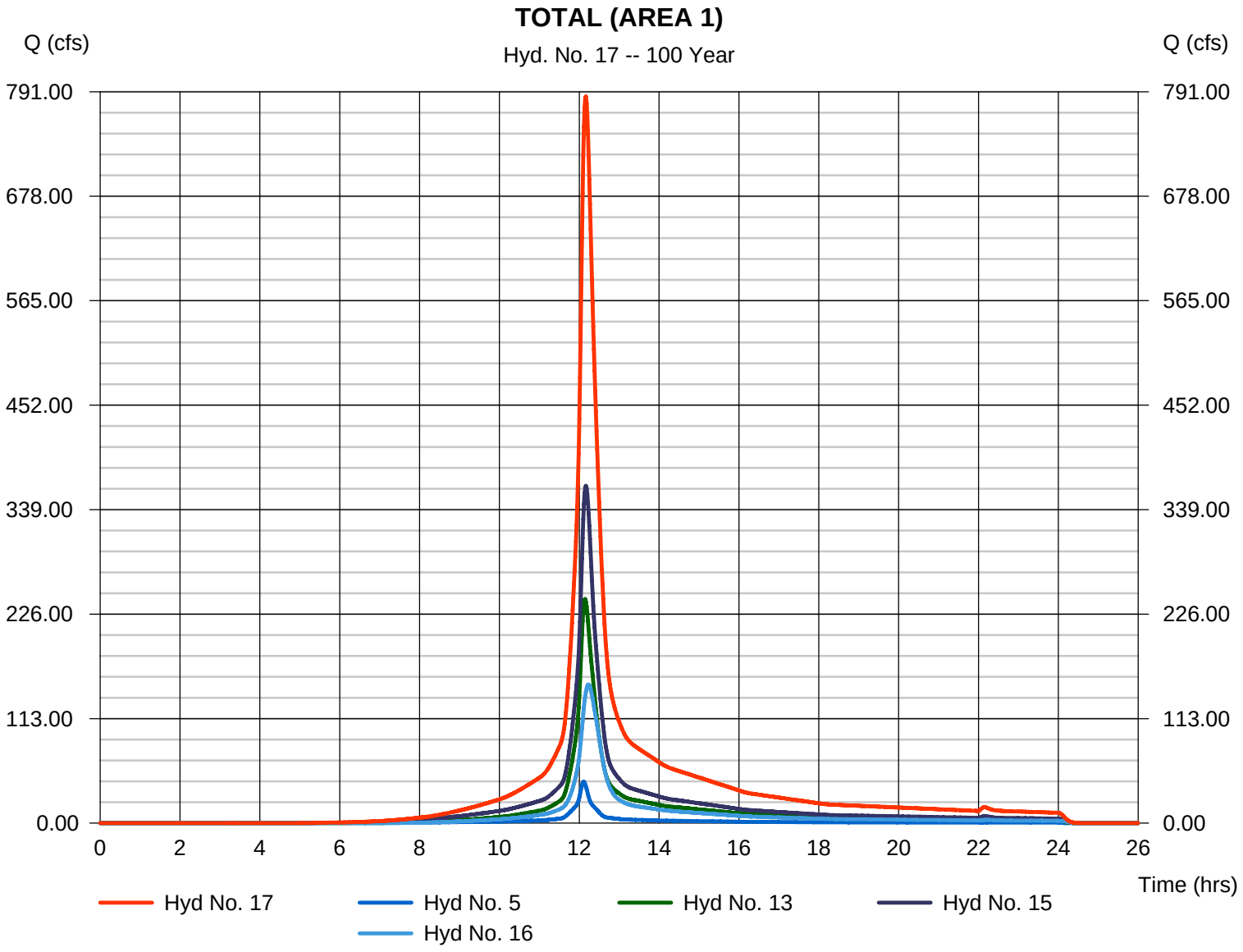


Hydrograph Report

Hyd. No. 17

TOTAL (AREA 1)

Hydrograph type	=	Combine	Peak discharge	=	785.75 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	3,308,949 cuft
Inflow hyds.	=	5, 13, 15, 16	Contrib. drain. area	=	7.490 ac



APPENDIX E

WATER QUALITY VOLUME CALCULATIONS

JOB:	Four Seasons at Orangetown		
JOB #:	107203		
CLIENT:	Sacardi & Schiff		
CALC BY:	CMH	**DATE:**	12/17/2008
CHK BY:	SLG	**DATE:**	12/17/2008

WATER QUALITY VOLUME CALCULATIONS

NYS STORMWATER MANAGEMENT DESIGN MANUAL
TREATMENT: NYDEC DESIGN MANUAL STANDARD PRACTICES
AREA: P 4

EXISTING IMPERVIOUS COVERAGE

C_{EX} = 6.09 ac

PROPOSED IMPERVIOUS COVERAGE

C_P = 20.05 ac

ADDITIONAL IMPERVIOUS COVERAGE

$C_P - C_{EX}$ = $I_{P\text{-}EX}$

$C_{P\text{-}EX}$ = 13.96 ac

DRAINAGE AREA

A = 46.68 ac

REDEVELOPMENT (EXISTING) IMPERVIOUS COVERAGE

I_{EX} = Impervious Cover = $\frac{C_{EX}}{A} * 100$

I_{EX} = Impervious Cover = $\frac{6.09}{46.68} * 100 = 13.05$ %

ADDITIONAL IMPERVIOUS COVERAGE

$I_{P\text{-}EX}$ = Impervious Cover = $\frac{C_{P\text{-}EX}}{A} * 100$

$I_{P\text{-}EX}$ = Impervious Cover = $\frac{13.96}{46.68} * 100 = 29.91$ %

$R_{V\text{-}EX} = 0.05 + (0.009 * I_{EX})$

$R_{V\text{-}EX} = 0.05 + (0.009 * 13.05)$

$R_{V\text{-}EX} = 0.17$

$R_{V\ P\text{-}EX} = 0.05 + (0.009 * I_{P\text{-}EX})$

$R_{V\ P\text{-}EX} = 0.05 + (0.009 * 29.91)$

$R_{V\ P\text{-}EX} = 0.32$

P = 1.3 in. (1-yr storm)

WQ_V CALCULATIONS BASED ON ASSUMPTION THAT SITE IMPLEMENTATION OF NYSDEC DESIGN MANUAL STANDARD TREATMENT PRACTICES

Redevelopment Impervious: 0.25 * WQ_V
Additional Impervious: 1.00 * WQ_V

$$WQ_V = 0.25 * \frac{1.3 * R_{V\text{-}EX} * 46.68}{12} + 1.00 * \frac{1.3 * R_{V\ P\text{-}EX} * 46.68}{12}$$

$$WQ_V = 0.25 * \frac{1.3 * 0.17 * 46.68}{12} + 1.00 * \frac{1.3 * 0.32 * 46.68}{12}$$

WQ_V = 1.83 ac-ft

WQ_V = 79,531 ft³

JOB:	Four Seasons at Orangetown		
JOB #:	107203		
CLIENT:	Sacardi & Schiff		
CALC BY:	CMH	**DATE:**	12/17/2008
CHK BY:	SLG	**DATE:**	12/17/2008

WATER QUALITY VOLUME CALCULATIONS

NYS STORMWATER MANAGEMENT DESIGN MANUAL
TREATMENT: NYDEC DESIGN MANUAL STANDARD PRACTICES
AREA: P 5

EXISTING IMPERVIOUS COVERAGE

C_{EX} = 0.58 ac

PROPOSED IMPERVIOUS COVERAGE

C_P = 2.93 ac

ADDITIONAL IMPERVIOUS COVERAGE

$C_P - C_{EX}$ = $I_{P\text{-}EX}$

$C_{P\text{-}EX}$ = 2.36 ac

DRAINAGE AREA

A = 7.49 ac

REDEVELOPMENT (EXISTING) IMPERVIOUS COVERAGE

I_{EX} = Percent Impervious Cover = $\frac{C_{EX}}{A} * 100$

I_{EX} = Percent Impervious Cover = $\frac{0.58}{7.49} * 100$ = 7.68 %

ADDITIONAL IMPERVIOUS COVERAGE

$I_{P\text{-}EX}$ = Percent Impervious Cover = $\frac{C_{P\text{-}EX}}{A} * 100$

$I_{P\text{-}EX}$ = Percent Impervious Cover = $\frac{2.36}{7.49} * 100$ = 31.44 %

$R_{V\text{-}EX}$ = 0.05 + (0.009 * I_{EX})

$R_{V\text{-}EX}$ = 0.05 + (0.009 * 7.68)

$R_{V\text{-}EX}$ = 0.12

$R_{V\ P\text{-}EX}$ = 0.05 + (0.009 * $I_{P\text{-}EX}$)

$R_{V\ P\text{-}EX}$ = 0.05 + (0.009 * 31.44)

$R_{V\ P\text{-}EX}$ = 0.33

P = 1.3 in. (1-yr storm)

WQ_v CALCULATIONS BASED ON ASSUMPTION THAT SITE IMPLEMENTATION OF NYSDEC DESIGN MANUAL STANDARD

Redevelopment Impervious: 0.25 * WQ_V
Additional Impervious: 1.00 * WQ_V

$$WQ_V = 0.25 * \frac{1.3 * R_{V\text{-}EX} * 7.49}{12} + 1.00 * \frac{1.3 * R_{V\ P\text{-}EX} * 7.49}{12}$$

$$WQ_V = 0.25 * \frac{1.3 * 0.12 * 7.49}{12} + 1.00 * \frac{1.3 * 0.33 * 7.49}{12}$$

WQ_V = 0.29 ac-ft

WQ_V = 12,822 ft³

JOB:	Four Seasons at Orangetown		
JOB #:	107203		
CLIENT:	Sacardi & Schiff		
CALC BY:	CMH	**DATE:**	12/17/2008
CHK BY:	SLG	**DATE:**	12/17/2008

WATER QUALITY VOLUME CALCULATIONS

NYS STORMWATER MANAGEMENT DESIGN MANUAL
TREATMENT: NYDEC DESIGN MANUAL STANDARD PRACTICES
AREA: P 6 A

EXISTING IMPERVIOUS COVERAGE

C_{EX} = 18.26 ac

PROPOSED IMPERVIOUS COVERAGE

C_P = 7.17 ac

NET REDUCTION OF IMPERVIOUS COVERAGE

$C_{EX} - C_P$ = 11.09 ac

DRAINAGE AREA

A = 22.68 ac

PERCENT REDUCTION OF IMPERVIOUS COVERAGE

$$I_{REDUCTION} = \frac{C_{EX} - C_P}{C_{EX}} * 100$$

$$I_{REDUCTION} = \frac{11.09}{18.26} * 100$$

$I_{REDUCTION}$ = 61 %

PERCENT IMPERVIOUS COVERAGE

$$I = \frac{C_P}{A} * 100$$

$$I = \frac{7.17}{22.68} * 100$$

I = 31.61 %

$R_V = 0.05 + (0.009 * I)$

$R_V = 0.05 + (0.009 * 31.61)$

R_V = 0.33

P = 1.3 in. (1-yr storm)

WQ_v CALCULATIONS BASED ON ASSUMPTION THAT SITE IMPLEMENTATION OF NYSDEC DESIGN MANUAL STANDARD TREATMENT PRACTICES

Redevelopment Impervious: 0.25 * WQ_V
Additional Impervious: 1.00 * WQ_V

DUE TO NET REDUCTION OF IMPERVIOUS AREA, ALL PROPOSED IMPERVIOUS AREA SUBJECT TO 0.25 WQv

$$WQ_V = 0.25 * \frac{P * R_V * A}{12}$$

$$WQ_V = 0.25 * \frac{1.3 * 0.33 * 22.68}{12}$$

WQ_v = 0.21 ac-ft

WQ_v = 8,951 ft³

JOB:	Four Seasons at Orangetown		
JOB #:	107203		
CLIENT:	Sacardi & Schiff		
CALC BY:	CMH	**DATE:**	12/17/2008
CHK BY:	SLG	**DATE:**	12/17/2008

WATER QUALITY VOLUME CALCULATIONS

NYS STORMWATER MANAGEMENT DESIGN MANUAL
TREATMENT: NYDEC DESIGN MANUAL STANDARD PRACTICES
AREA: P 7

EXISTING IMPERVIOUS COVERAGE

C_{EX} = 2.84 ac

PROPOSED IMPERVIOUS COVERAGE

C_P = 1.20 ac

NET REDUCTION OF IMPERVIOUS COVERAGE

$C_{EX} - C_P$ = 1.64 ac

DRAINAGE AREA

A = 12.01 ac

PERCENT REDUCTION OF IMPERVIOUS COVERAGE

$$I_{REDUCTION} = \frac{C_{EX} - C_P}{C_{EX}} * 100$$

$$I_{REDUCTION} = \frac{1.64}{2.84} * 100$$

$I_{REDUCTION}$ = 58 %

PERCENT IMPERVIOUS COVERAGE

$$I = \frac{C_P}{A} * 100$$

$$I = \frac{1.20}{12.01} * 100$$

I = 9.99 %

R_V = 0.05 + (0.009 * I)

R_V = 0.05 + (0.009 * 9.99)

R_V = 0.14

P = 1.3 in. (1-yr storm)

WQ_v CALCULATIONS BASED ON ASSUMPTION THAT SITE IMPLEMENTATION OF NYSDEC DESIGN MANUAL STANDARD

Redevelopment Impervious: 0.25 * WQ_V
Additional Impervious: 1.00 * WQ_V

DUE TO NET REDUCTION OF IMPERVIOUS AREA, ALL PROPOSED IMPERVIOUS AREA SUBJECT TO 0.25 WQv

$$WQ_V = 0.25 * \frac{P * R_V * A}{12}$$

$$WQ_V = 0.25 * \frac{1.3 * 0.14 * 12.01}{12}$$

WQ_V = 0.05 ac-ft

WQ_V = 1,983 ft³

JOB:	Four Seasons at Orangetown		
JOB #:	107203		
CLIENT:	Sacardi & Schiff		
CALC BY:	CMH	**DATE:**	12/17/2008
CHK BY:	SLG	**DATE:**	12/17/2008

WATER QUALITY VOLUME CALCULATIONS

NYS STORMWATER MANAGEMENT DESIGN MANUAL
TREATMENT: NYDEC DESIGN MANUAL STANDARD PRACTICES
AREA: P 9

EXISTING IMPERVIOUS COVERAGE

C_{EX} = 1.69 ac

PROPOSED IMPERVIOUS COVERAGE

C_P = 3.59 ac

ADDITIONAL IMPERVIOUS COVERAGE

$C_P - C_{EX}$ = I_{P-EX}

C_{P-EX} = 1.90 ac

DRAINAGE AREA

A = 10.36 ac

REDEVELOPMENT (EXISTING) IMPERVIOUS COVERAGE

I_{EX} = Impervious Cover = $\frac{C_{EX}}{A} * 100$

I_{EX} = Impervious Cover = $\frac{1.69}{10.36} * 100 = 16.34$ %

ADDITIONAL IMPERVIOUS COVERAGE

I_{P-EX} = Impervious Cover = $\frac{C_{P-EX}}{A} * 100$

I_{P-EX} = Impervious Cover = $\frac{1.90}{10.36} * 100 = 18.32$ %

$R_{V-EX} = 0.05 + (0.009 * I_{EX})$

$R_{V-EX} = 0.05 + (0.009 * 16.34)$

$R_{V-EX} = 0.20$

$R_{V\,P-EX} = 0.05 + (0.009 * I_{P-EX})$

$R_{V\,P-EX} = 0.05 + (0.009 * 18.32)$

$R_{V\,P-EX} = 0.21$

P = 1.3 in. (1-yr storm)

WQ_V CALCULATIONS BASED ON ASSUMPTION THAT SITE IMPLEMENTATION OF NYSDEC DESIGN MANUAL STANDARD

Redevelopment Impervious: 0.25 * WQ_V
Additional Impervious: 1.00 * WQ_V

$$WQ_V = 0.25 * \frac{1.3 * R_{V-EX} * 10.36}{12} + 1.00 * \frac{1.3 * R_{V\,P-EX} * 10.36}{12}$$

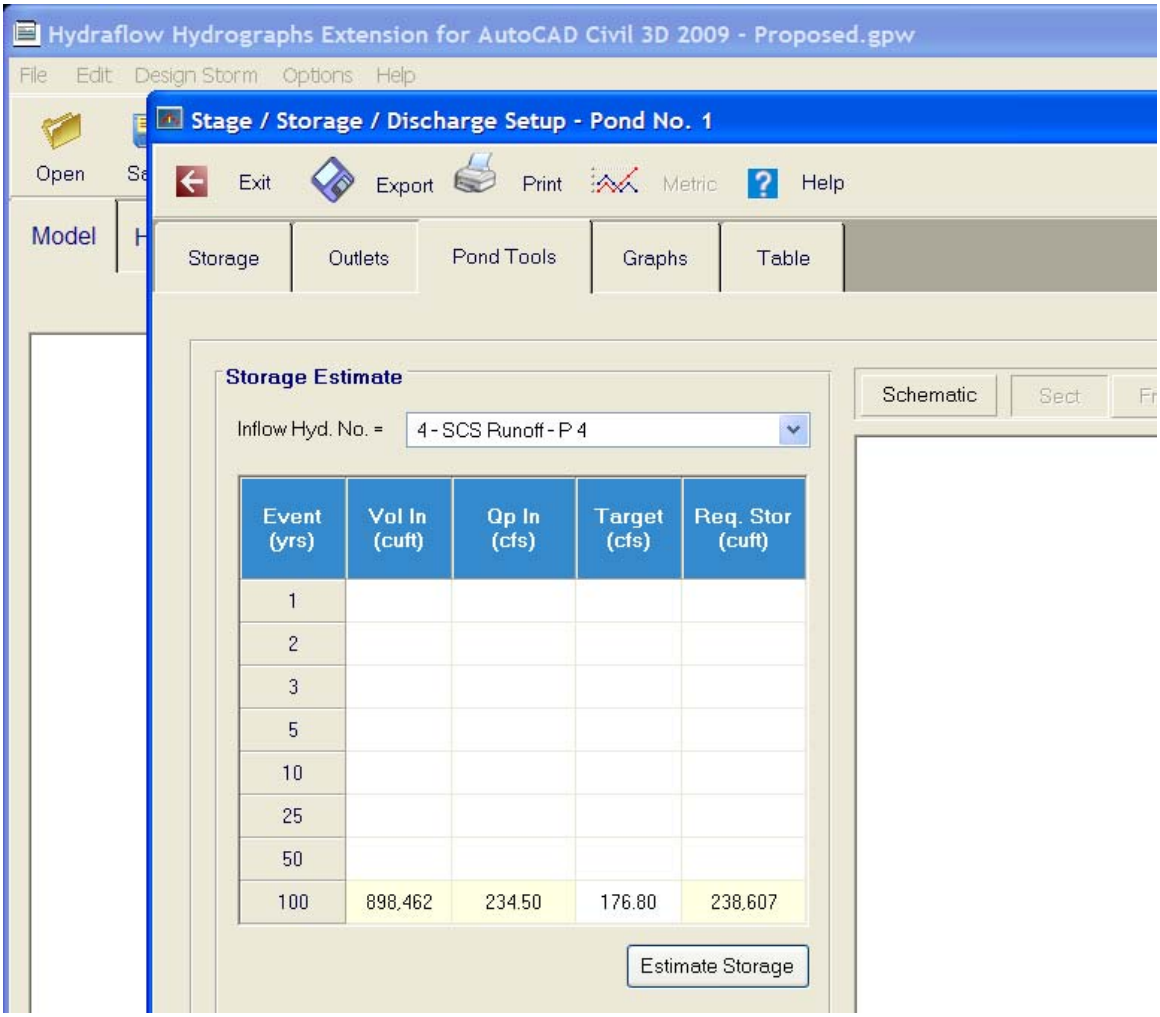
$$WQ_V = 0.25 * \frac{1.3 * 0.20 * 10.36}{12} + 1.00 * \frac{1.3 * 0.21 * 10.36}{12}$$

WQ_V = 0.30 ac-ft

WQ_V = 12,916 ft³

Hydraflow Hydrographs
Storage Volume Calculations

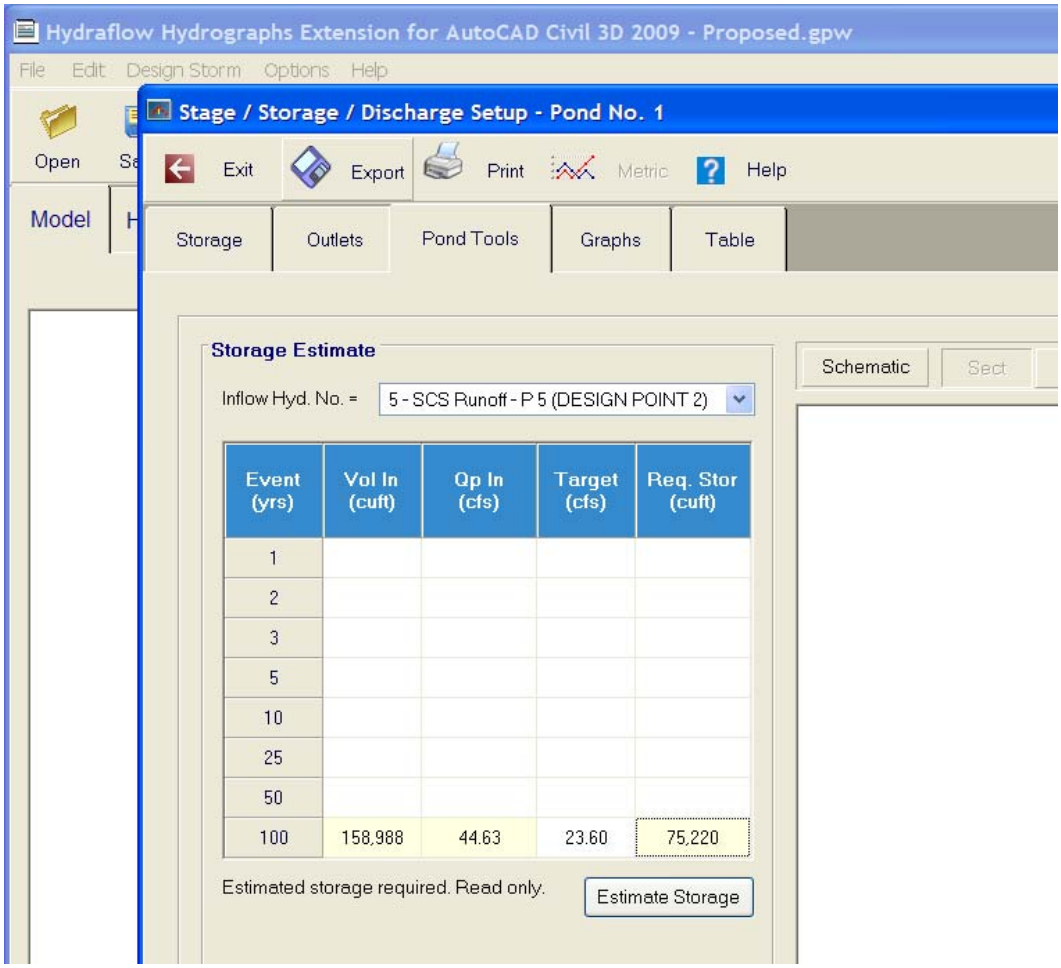
Drainage Area P 4



Req Stor = 238,607 cu ft
Req Stor = 5.48 ac-ft

Hydraflow Hydrographs
Storage Volume Calculations

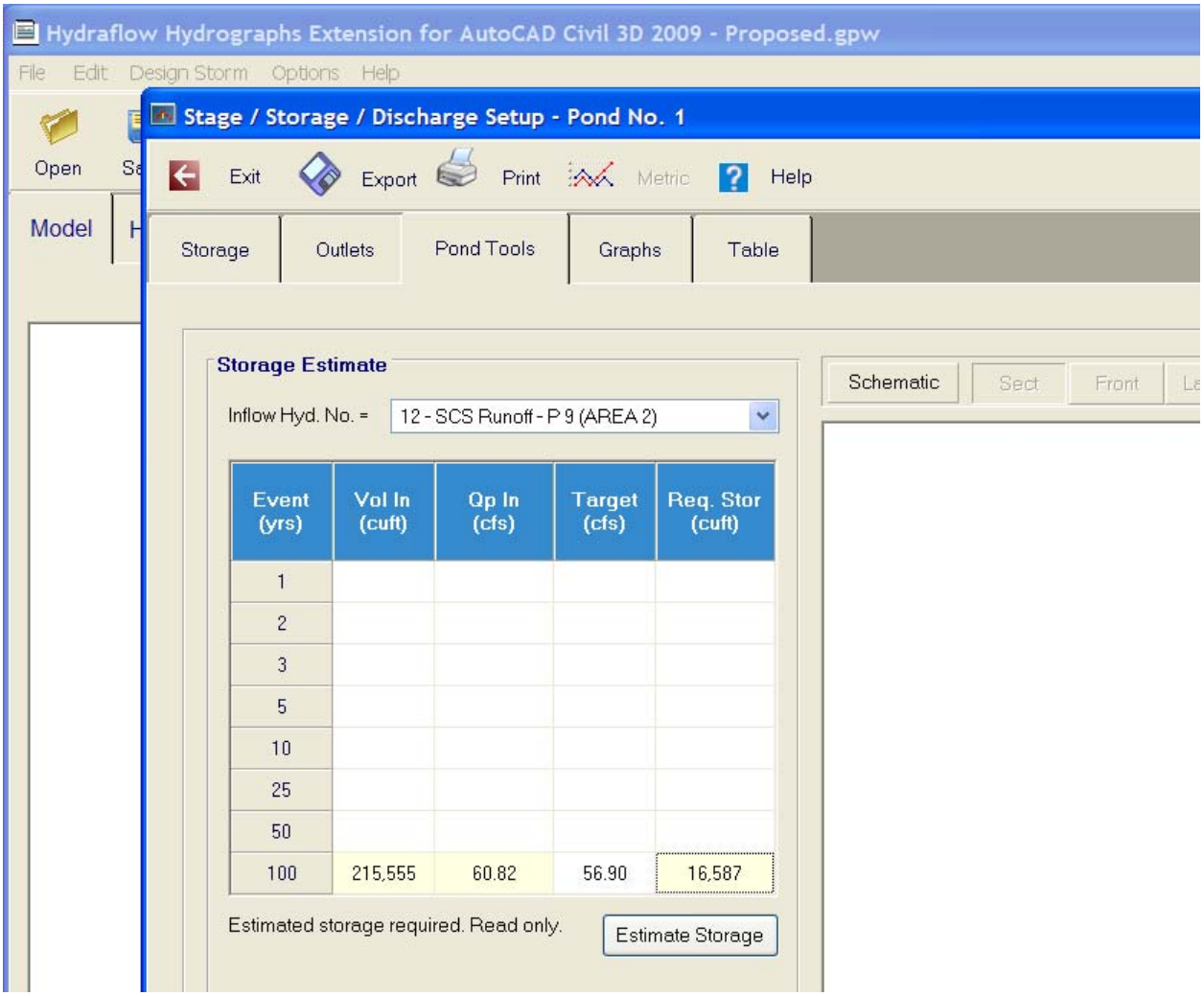
Drainage Area P 5



Req Stor = 75,220 cu ft
Req Stor = 1.73 ac-ft

Hydraflow Hydrographs
Storage Volume Calculations

Drainage Area P 9



Req Stor = 16,587 cu ft
Req Stor = 0.38 ac-ft

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