

Planning Commission
Radnor Township
Wayne, Delaware County, Pennsylvania

Monday
June 2, 2014
7:00 P.M.

Agenda

Minutes of the May 5, 2014 meeting

613 W. Lancaster Avenue Final 2013-D-13
Remove existing bar/restaurant and construct new restaurant with parking

695 Clyde Road Preliminary 2014-D-05
Ithan Elementary School
Expand existing building by adding two classrooms and associated walkways

651 W. Wayne Avenue Preliminary 2014-D-06
Wayne Elementary School
Construct an addition for new classrooms and other facilities including new walkways and associated improvements

Ordinance No. 2014-03 An ordinance of Radnor Township, Delaware County, Pennsylvania, amending Chapter 245, Stormwater management, of the Radnor Code, by amending certain provisions regarding purpose, and existing conditions concerning calculation methodology.

ZHB Discussion: APPEAL #2916

The applicant, Radnor Chester Road Investment, L. P. & 252 RCR Investments, L.P., property located at 240-252 Radnor Chester Road and split zoned PB and R1 seeks variances from the following sections of the Zoning Code (1) 280-60(B) relating to Building Area; (2) 280-60(C) relating to setback along a 50' by 50' parcel owned by the Township; and (3) 280-61(D) relating to buffer along the 50' by 50' Township owned parcel. Applicant seeks a special exception under 280-101(A)(1), a variance from the cited sections, or contends that it is permitted by right or as a decrease in existing non-conformity from the following sections of the Zoning Code: (1)280-60(C) regarding continuation of the existing Rear Yard setback on the rear property line in common with Radnor Financial Center for the parking structure and (2) 280-4 regarding continuation of the existing size of parking spaces in parking structure. In addition, Applicant seeks any other zoning or alternative relief required pursuant to Plans presented with Application.

Public Participation

Next Special Planning Commission Meeting Tuesday, June 17, 2014 7 PM

Next Regular Planning Commission Meeting Monday, July 7, 2014 7 PM

Radnor Township Planning Commission
Minutes of the Meeting of May 5, 2014
301 Iven Ave., Wayne, PA

Co-Chair Skip Kunda called the meeting to order at 7 PM with the following Commission members present: Kathy Bogosian, Regina Majercak, Doug McCone, Elizabeth Springer and Susan Stern. Attendance included: Roger Phillips, PE, Township Engineer; Amy Kaminski, PE, Township Traffic Engineer; John Rice, Esq., and Stephen Norcini, PE, Director of Public Works. Julia Hurle, Steve Cooper and John Lord were absent.

Minutes of the Meetings of April 8, 2014

Susan Stern moved to approve the minutes. Seconded by Doug McCone, the motion passed.

ZHB Discussion – APPEAL # 2914 – The applicant, Cabrini College, property located at 610 King of Prussia Road and zoned PI, seeks a dimensional variance to Section 280-70.B of the Radnor Township Zoning Code regarding building length. The applicant desires to expand the existing Dixon Athletic Center.

Joanne Semeister, Esq. appeared with several of Cabrini's Administrative Staff. Robert Lambert, PE presented a power point describing the site including items that were approved on the Preliminary Plan and the proposed increase in length to the Dixon Center.

Susan Stern questioned the proposed additional uses and the possible requirement for additional parking. Skip Kunda questioned if this amended plan would have to comply with the new stormwater ordinance. Regina Majercak would like to see the applicant responsible for complying with the current stormwater ordinance when it goes to final and wants to see parking adequately addressed.

Regina Majercak moved to recommend that the zoning relief request be granted conditioned upon meeting the stormwater ordinance in place at the final plan approval as well as providing parking for the additional space that's new to this plan. Seconded by Doug McCone, the motion passed.

*Delaware County Act 537 Sewage Facilities Plan Update
Eastern Service Area*

Steve Norcini described the Act 537 which is submitted quite often in the Engineering Department for properties that transfer from septic to public sewer. This Act affects all of Delaware County and they are looking to get all of the municipalities on board to move forward. All sewage flows from the surrounding area move downstream through Haverford, Springfield and eventually ends up at Philadelphia. If flows are reduced to Philadelphia and the treatment plants, the costs and fees that the Township has to pay are reduced. Radnor is the largest component in the RHM (Radnor Haverford Marple) Sewer Authority. One way of finding inadequate laterals would be to institute inspections of laterals at the time of a property transfer. Cracked lines would have to be repaired which could in turn reduce the cost to the township due to the reduction in flows.

Steve Norcini recommends that inflow and infiltration (I & I) be instituted and he will recommend the same to the Board of Commissioners. A plan could be instituted to begin inspecting on a pro-active basis in addition to checking laterals during the transfer of real estate process. DEP is a driving force in aggressive elimination of I & I.

Susan Stern moved to accept the County's Act 537 Plan with the option that the Township moves forward in reducing the I & I. Seconded by Kathy Bogosian, the motion passed.

Public Comment - None

Regina Majercak announced that on Thursday, May 8th at 7 PM., the stormwater advisory committee would be meeting at the willows cottage. This meeting is open to the public.

Respectfully submitted,

Suzan Jones



Gannett Fleming

Excellence Delivered As Promised

MEMORANDUM

Date: May 28, 2014

To: Radnor Township Planning Commission

From: Roger Phillips, PE

cc: Stephen Norcini, P.E. – Director of Public Works
Kevin W. Kochanski, RLA, CZO – Director of Community Development
Peter Nelson, Esq. – Grim, Biehn, and Thatcher
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.
Suzan Jones – Radnor Township Engineering Department
William Miller – Radnor Township Codes Official
Ray Daly – Radnor Township Codes Official

RE: 613 W Lancaster Avenue
Eagle Green, LP – Applicant

Date Accepted: May 5, 2014
90 Day Expiration: August 3, 2014

Gannett Fleming, Inc. has completed a review of the 613W. Lancaster Avenue Final Land Development Plan for compliance with the Radnor Township Code. The existing property is located in the C-2 zoning district and contains a 1,881 s.f. restaurant/bar and parking. The applicant is proposing to remove the existing building and construct a 2,800 s.f. restaurant.

This Land Development Application is subject to Zoning, Subdivision and Land Development, Stormwater Management, and other applicable codes of the Township of Radnor.

Plans Prepared By: Site Engineering Concepts
Dated: 12/02/2013, last revised 04/30/2014

The Board of Commissioners approved the preliminary plan at their April 7, 2014 meeting. The following modifications to the subdivision and land development ordinance were approved by the Board of Commissioners preliminary plan resolution on April 7, 2014:

- a. §255.29.A (1) as to parking aisle dimensions and parking stall dimensions.
- b. §255.29.A (7) as to required off street parking spaces.
- c. §255.29.B (1) as to parking area tree planting.



Gannett Fleming

The following items must be addressed for final approval:

I Zoning Ordinance Review

1. The following items are existing non conformities, that the applicant intends to continue with the proposed project:
 - §280-52.E – Rear Yards – There shall be a rear yard of each lot of not less than 35 feet. The existing rear yard setback is 33.47 feet and the proposed rear yard setback is 34.4 feet.
 - §280-52.G – Impervious Lot Coverage – Not more than 70% of the lot maybe occupies by impervious surfaces. The existing conditions are 77.71% impervious and the proposed conditions are 71.41% impervious.
 - §280-4 – Parking Space – An outdoor space or garage space used for parking motor vehicles, which shall measure not less than nine feet six inches by 20 feet, accessible from a street, alley or driveway and surfaced with a Township approved durable dustproof all weather surface. The existing parking spaces are 7.8' – 9.0' x 15'.3" – 17'.0". The proposed parking spaces are 9' x 17' and the proposed Handicapped spaces are 8' x 17' with an aisle.

II. Stormwater Management

1. A general note shall be added to the plans indicating that a grading plan and erosion sediment and control plans will be submitted and approved prior to issuing any building permits. Any revisions to the size or location of the individual structures or other features will be addressed at that time, and a final approval of the stormwater management plan will be required as part of the Grading Permit process.
2. §245-18.S – Since the applicant intends to meet the stormwater management ordinance criteria through off site stormwater management measures, an agreement with the adjacent property should be provided in order to maintain stormwater controls without future modifications.

III General Comments

1. Sewage Facilities Planning must be addressed for the increase in wastewater discharge. A planning module exemption form will be completed for any increase in sewage flow due to the building expansion. The applicant has indicated in the response letter dated May 1, 2014 that a planning module or exemption request has been submitted. As of the date of this letter, we have not been provided with any such submission.
2. A Highway Occupancy Permit must be prepared for the modification to the existing driveway and curbing along Lancaster Avenue. The applicant has indicated they are in the process of submitting a Highway Occupancy Permit. A copy of the permit application must be submitted.

Gannett Fleming

3. All existing and proposed utility connections must be shown on the plans. The applicant has indicated that this will be provided on the permit plans once the architectural plans are further developed.
4. An easement has been shown on the plan for the construction of the parking island located on the adjacent parcel. The easement shall include a requirement that the parking island cannot be altered or removed without the written approval of the Radnor Township Board of Commissioners. A copy of the easement description must be submitted for review.

Should the Planning Commission consider recommending approval of this project, we recommend that the recommendation be conditioned on requiring the applicant to satisfactorily address the above comments.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.
Senior Project Manager



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

MEMORANDUM

Date: May 23, 2014

To: Steve Norcini, P.E.
Radnor Township Public Works Director

From: Damon Drummond, P.E., PTOE
G&A Senior Transportation Engineer

cc: Roger Phillips, P.E.
Gannett Fleming, Inc., Senior Project Manager

Amy Kaminski, P.E., PTOE
G&A Department Manager of Transportation

Reference: 613 W. Lancaster Avenue TMP No. 36-01-00274-00
Radnor Township Application No. 2013-D-13
Preliminary/Final Land Development Review
G&A Job #13-12043

Pursuant to your request, Gilmore & Associates, Inc. (G&A) has completed a transportation review of the above referenced Final Land Development Plans for 613 W. Lancaster Avenue Road. G&A offers the following for Radnor Township's consideration:

A. PROJECT DESCRIPTION

The applicant intends to demolish the existing 1,881 s.f. end building (Cooz Corner) and construct a 2,800 s.f. restaurant in its place. In addition, the applicant proposes to redesign the parking area and its access to Lancaster Pike, US Route 30. The existing parking area provides parking for the existing building and four other attached businesses. Per the application, the applicant requests a waiver for section §255-14 for developing preliminary plans.

B. REVIEWED MATERIALS

1. 613 W. Lancaster Avenue Road Final Land Development Plans (7 sheets), dated January 27, 2014 last revised April 30, 2014 prepared by Site Engineering Concepts, LLC., prepared for Eagle Green LP.
2. Submission letter prepared by Site Engineering Concepts, LLC, dated January 27, 2014, responding to Gilmore & Associates, Inc. comment letter, dated January 6, 2014.

Steve Norcini, P.E.
613 W. Lancaster Avenue TMP No. 36-01-00274-00
May 23, 2014

C. **REVIEW COMMENTS:**

Gilmore & Associates, Inc. (G&A) January 6, 2014 letter including, Site Engineering (SE) responses and G&A follow up discussions:

1. §255.20.B(5)(c)[2]: A limited Traffic Impact Analysis should be prepared to analyze the PM and Saturday peak hours along with the existing traffic counts and proposed trip generation of the new restaurant. The study should focus on the traffic operations at all accesses to Sugartown Road, Lancaster Avenue and the intersection of Sugartown Road and Lancaster Avenue.

SE Response: *The applicant requests the Board of Commissioners, at its discretion, not require this study. 255.20.B(5)(c)[1][b] of the Radnor Township code only requires traffic studies for commercial sites exceeding 50,000 sf, this site proposes 2,800 sf. In addition, the square footage of commercial space and number of parking spaces are reduced by this application.*

G&A follow up: A study of the intersection of Lancaster Avenue and Sugartown Road (PM and Saturday Peak Hours) would provide useful information regarding potential turn restrictions for accesses to both Lancaster Avenue and Sugartown Road/Old Eagle School Road. In addition, five (5) years of historical crash records (both reportable and non-reportable) would provide additional information regarding the turn maneuvers and parking maneuvers for the onstreet diagonal parking spaces located along Lancaster Avenue, in front of the site.

SE Response: *The historical crash records have been provided and per further correspondence the study is no longer required.*

G&A follow up: Based on the traffic support data provided we support a waiver for the township's traffic impact analysis requirement.

2. §255-29.A.(1):
 - a. Parking stalls are required to be a minimum 9.5-foot wide by 20-foot length. The plan indicates the existing parking dimensions do not meet the current SALDO requirements (various widths from 7.8 feet and lengths from 15.3 feet). With the redesign of the parking area, we recommend all parking stalls meet the current 9.5 feet wide by 20 feet in length as required by SALDO.

SE Response: *As approved by the Township Zoning Officer and discussed with the planning commission, the applicant proposes to reduce the existing non-conformity.*

- b. Parking aisles must include a minimum 22-foot wide two-way aisle width; the proposed plans do not meet this requirement.

SE Response: *The applicant has improved the existing non-conformity and proposes 21' aisles.*

Steve Norcini, P.E.
613 W. Lancaster Avenue TMP No. 36-01-00274-00
May 23, 2014

G&A follow up: The submitted plan does not meet the ordinance requirements; however, we defer to the Township Zoning Officer.

SE Response: This waiver has been granted.

G&A follow up: So Noted.

3. §255-27.1.(2): Driveway accesses must provide a minimum 200 feet between adjacent driveways. The Township may want to consider restricting turn movements or the elimination of one of the access driveways, with one shared access to Lancaster Avenue/SR 0030 or movement restrictions for 613 and 605 W. Lancaster Avenue.

SE Response: *As discussed with the Planning Commission, the applicant would like to provide as much access and maneuverability to this site as possible. Given the interplay between various neighboring properties and businesses, the plan is designed to provide multiple ingress/egress opportunities and allow motorists options to safely access to and from Lancaster Avenue and Old Eagle School Road.*

G&A follow up: We defer to PennDOT regarding elimination or consolidation of the driveway accesses to Lancaster Avenue.

SE Response: *The applicant is in the process of submitting a Highway Occupancy Permit.*

G&A follow up: So Noted.

4. §255-29.A.(9): Vehicular maneuvers in and out of the diagonal parking spaces adjacent to Lancaster Avenue/SR 0030 likely conflict with westbound traffic movements. The Township may want to consider eliminating the diagonal parking spaces or revise the layout to parallel parking spaces. The parallel parking spaces would allow parking maneuvers outside the travel lane and could reduce the potential for conflicts with vehicles traveling along Lancaster Avenue/SR-0030)

SE Response: *Many of these parking spaces are not on the applicant's property. One space will be eliminated to improve the driveway entrance with the site entrance curbing being greatly improved providing some protection to the existing angled spaces.*

G&A follow up: We continue to recommend investigating elimination of the on-street parking spaces along this frontage or minimally, a conversion to parallel parking spaces.

SE Response: *The spaces along Lancaster Avenue support the adjoining properties. These spaces are consistent with many others along Lancaster Avenue in Wayne.*

Steve Norcini, P.E.
613 W. Lancaster Avenue TMP No. 36-01-00274-00
May 23, 2014

G&A follow up: We will defer to PennDOT regarding parking along Lancaster Avenue.

5. Sheet 3:

- a. Parking Summary: The parking area serves more than just the existing restaurant building; the surface lot provides parking for the other four (4) attached buildings. The Parking Summary analysis should be revised to include any buildings utilizing the surface lot to ensure adequate facilities are provided.

SE Response: *This property is independent of the other stores along Lancaster Avenue. In the interest of being a good neighbor, the applicant has not historically restricted the use of the parking by the adjacent properties nor has current plans to do so. There is however, no right to use the property.*

G&A follow up: So noted.

SE Response: *Comment has been adequately addressed.*

- b. The applicant should verify that gore striping exists near the property due east of the parcel.

SE Response: *Following recent renovations and repairs at the Currie Spa property, the gore striping is re-painted.*

G&A follow up: Comment has been adequately addressed.

SE Response: *Comment has been adequately addressed.*

- c. The affected property owners adjacent to the site must provide written permission for any work shown outside the applicant's property line boundaries. To reduce the potential for encroachment during construction, we further recommend obtaining a five foot construction easement from adjacent property owners for any construction work located near the property lines.

SE Response: *If necessary, the adjacent property owner at 605 W Lancaster Avenue will provide written permission.*

G&A follow up: So noted.

SE Response: A proposed easement has been added to the plan in the area of the parking island on the adjacent parcel.

G&A follow up: So noted.

Steve Norcini, P.E.
613 W. Lancaster Avenue TMP No. 36-01-00274-00
May 23, 2014

6. All Sheets:

- a. For consistency, the Title Block and plans should identify the correct roadway name for SR 0030. The plans indicate *Lancaster Pike* and the Title Block indicates *Lancaster Avenue*.
- b. The legal right-of-way line for Lancaster Avenue (SR 0030) should be verified and identified on the plans.
- c. The plans should be revised to include labels for all radii in the parking area.

G&A follow up: Applicant has satisfactory addressed comments.

SE Response: *Comment has been adequately addressed.*

7. It appears the applicant will be altering the driveway configuration; as such, the applicant should reach out to PennDOT regarding the proposed changes and determine if an HOP is required. The Township requests the opportunity to review all HOP plan submissions to PennDOT; as well as be given the opportunity to attend all meetings with PennDOT and copied on all correspondence regarding the same. At a minimum, PennDOT may want to review the proposed ADA curb ramps crossing the revised site driveway.

SE Response: *The applicant is in the process of preparing a HOP permit for the improved driveway.*

G&A follow up: The Township should receive timely submissions concurrent with PennDOT and should be included in any meetings.

SE Response: *The applicant is in the process of submitting a Highway Occupancy Permit.*

G&A follow up: So noted.

8. During our field review, we noted a low hanging utility wire in the parking area (approximately 10' off the ground directly above several active parking spaces). The owner should immediately address this safety concern.

SE Response: *The applicant is working with the utility company (Verizon) to raise or relocate this wire onto the new pole recently installed by Peco.*

G&A follow up: So noted.

SE Response: *Comment has been adequately addressed.*

G&A follow up: So noted.

If you have any questions regarding the above, please contact this office.

ELAINE P. SCHAEFER
President

JAMES C. HIGGINS
Vice-President

WILLIAM A. SPINGLER

DONALD E. CURLEY

JOHN FISHER

JOHN NAGLE

RICHARD F. BOOKER



RADNOR TOWNSHIP
301 IVEN AVENUE
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600

Fax (610) 971-0450

www.radnor.com

ROBERT A. ZIENKOWSKI
Township Manager
Township Secretary

JOHN B. RICE, ESQ.
Solicitor

JOHN E. OSBORNE
Treasurer

May 13, 2014

Sean McCloskey
Eagle Green, LP
620 Righters Ferry Road
Bala Cynwyd, PA 19004

RE: 613 W. Lancaster Avenue
Land Development Application #2013-D-13 Final Plan

Dear Mr. McCloskey:

In accordance with Section 255-18 of the Code of the Township of Radnor, we have performed a completeness review of your land development application to remove the existing building and construct a 2,800 s.f. restaurant, and have determined your application to be administratively complete. Therefore, I have accepted the application for final land development for review by the Township Staff, Shade Tree Commission, Planning Commission, and Board of Commissioners.

These plans are available for public viewing in the Engineering Department. These plans will be reviewed by the Planning Commission at their meeting on **Monday June 2, 2014**. Subsequent to the Planning Commission meeting, your plan will be reviewed by the Board of Commissioners. You or your representative should plan to attend all scheduled meetings.

If the Planning Commission takes action, your plan will then be reviewed by the Board of Commissioners at a future meeting. These dates will be provided to you once it is placed on the agenda.

If you have any questions or require any additional information, please contact me.

Sincerely,

Roger A. Phillips, PE
Township Engineer

CC: Site Engineering Concepts, LLC.

SITE ENGINEERING CONCEPTS, LLC
Consulting Engineering and Land Development Services

01 May 2014

Suzan Jones.
Radnor Township
301 Iven Avenue
Radnor, PA 19087

Re: 613 W Lancaster Avenue
Final Land Development

Dear Ms. Jones:

Please find the enclosed 33 copies of the plan set for submission of a Final Plan Application. We have also included the appropriate fees, applications, permeability test report and copy of the deed.

We have addressed the comments from Gannett Fleming's March 3, 2014 and Gilmore's January 29, 2014 review letters.

Gannett Fleming (*comment, response*):

I Zoning Ordinance Review

1. *The following items are existing non conformities, that the applicant intends to continue with the proposed project:*
 - *§280-52.E – Rear Yards – There shall be a rear yard of each lot of not less than 35 feet. The existing rear yard setback is 33.47 feet and the proposed rear yard setback is 34.4 feet.*
Correct. This is a reduction in the existing non-conformity.
 - *§280-52.G – Impervious Lot Coverage – Not more than 70% of the lot maybe occuppies by impervious surfaces. The existing conditions are 77,71% impervious and the proposed conditions are 73.33% impervious.*
Correct. This is a reduction in the existing non-conformity.
 - *§280-4 – Parking Space – An outdoor space or garage space used for parking motor vehicles, which shall measure not less than nine feet six inches by 20 feet, accessible from a street, alley or driveway and surfaced with a Township approved durable dustproof all weather surface. The existing parking spaces are 7.8' – 9.0' x 15'.3" – 17'.0". The proposed parking spaces are 9' x 17' and the proposed Handicapped spaces are 8' x 17' with an aisle.*
Correct. This is a reduction in the existing non-conformity.

II Subdivision and Land Development Review

1. *§255.29.A(1) – A parking aisle with 90° parking and 2 direction is to be 22 feet. The existing two way parking aisle is 20.3 feet and the proposed parking aisle is 21 feet. The proposed parking aisle must meet the requirements or a waiver requested.*
This waiver has been granted.

2. *§255.29.A(1) – 90° parking stalls should be 9.5 feet x 20 feet. The existing parking spaces are 7.8' – 9.0' x 15'3" – 17'0". The proposed parking stall dimensions must meet the requirements or a waiver requested.*
This waiver has been granted.
3. *§255.29.A(7) – No one area for off street parking of motor vehicles shall exceed 30 cars in capacity. The existing parking area provided 40 spaces and the proposed parking area proposed 37 spaces. The proposed parking must meet the requirements or a waiver requested.*
This waiver has been granted.
4. *§255.29.B(1) – All parking areas shall have at least one tree 2 ½ inches minimum caliper for every five parking spaces in single bays and one tree 2 ½ inches minimum in caliper for every 10 parking spaces in double bays. There are two trees in the existing parking area. The proposed plan removes the two existing trees and plants 2 new canopy trees, 2 flowering trees, 32 shrubs and fountain grass. The applicant has indicated that approval was received at the January 22, 2014 Shade Tree Meeting.*
Approval was received.

III Stormwater Management

As discussed with Mr. Phillips, the applicant has performed additional testing including Ground Penetrating Radar (GPR) and a second Stormwater Soil Evaluation. The results concluded that an area in the Northeast corner had suitable soil for an additional small infiltration facility. A Rain Garden and Infiltration Bed are provided in this area.

1. *§245-5 D(4) – Construction of reconstruction of or addition of new impervious or semi pervious surfaces shall be regulated by the Stormwater Management Ordinance. Since this project is a reconstruction of an existing building, Stormwater Management must be addressed.*
See above response.
2. *§245-5 F – Table 105.1 located at the end of the Stormwater Management chapter summarized the applicability requirements of the chapter. Proposed impervious surface in table 105.1 includes new, additional or replacement impervious surface/cover. Repaving existing surfaces without reconstruction does not constitute "replacement".*
See above response.
3. *§245-12 – A drainage plan must be submitted in accordance with Article 3 – Drainage Plan Requirements.*
The drainage plan is included on the proposed plan.

IV General Comments

1. *Sewage Facilities Planning must be addressed for the increase in wastewater discharge. A planning module exemption form will be completed for any increase in sewage flow due to the building expansion.*
The applicant understands this requirement and has submitted a planning module or exemption request.

2. *A Highway Occupancy Permit must be prepared for the modification to the existing driveway and curbing along Lancaster Avenue.*
The applicant is in the process of submitting a Highway Occupancy Permit.
3. *All existing and proposed utility connections must be shown on the plans. The applicant has indicated that this will be provided on the permit plans.*
The utilities will be shown on the permit plans once the architectural plans are further developed.
4. *The location of the dumpster has been shown on the plans. Appropriate screenings as discussed in §206.4.J must be shown on the plans.*
A detail of the dumpster enclosure has been added to the detail sheet.
5. *The applicant has indicated that the 10 foot dead end driveway is an existing easement access Old Eagle School Road. Documentation must be provided.*
The easement language is included in the attached deed.
6. *An easement is required for the construction of the parking island located on the adjacent parcel. The easement shall include a requirement that the parking island cannot be altered or removed without the written approval of the Radnor Township Board of Commissioners.*
A proposed easement has been added to the plan in the area of the parking island on the adjacent parcel.

Gilmore and Associates (comment, response):

C. REVIEW COMMENTS:

Gilmore & Associates, Inc. (G&A) January 6, 2014 letter including, Site Engineering (SE) responses and G&A follow up discussions:

1. §255.20.B(5)(c)[2]: *A limited Traffic Impact Analysis should be prepared to analyze the PM and Saturday peak hours along with the existing traffic counts and proposed trip generation of the new restaurant. The study should focus on the traffic operations at all accesses to Sugartown Road, Lancaster Avenue and the intersection of Sugartown Road and Lancaster Avenue.*

SE Response: The applicant requests the Board of Commissioners, at its discretion, not require this study. 255.20.B(5)(c)[1][b] of the Radnor Township code only requires traffic studies for commercial sites exceeding 50,000 sf, this site proposes 2,800 sf. In addition, the square footage of commercial space and number of parking spaces are reduced by this application.

G&A follow up: A study of the intersection of Lancaster Avenue and Sugartown Road (PM and Saturday Peak Hours) would provide useful information regarding potential turn restrictions for accesses to both Lancaster Avenue and Sugartown Road/Old Eagle School Road. In addition, five (5) years of historical crash records (both reportable and non-reportable) would provide additional information regarding the turn maneuvers and parking maneuvers for the onstreet diagonal parking spaces located along Lancaster Avenue, in front of the site.

The historical crash records have been provided and per further correspondence the study is no longer required.

2. §255-29.A.(1):

a. *Parking stalls are required to be a minimum 9.5-foot wide by 20-foot length. The plan indicates the existing parking dimensions do not meet the current SALDO requirements (various widths from 7.8 feet and lengths from 15.3 feet). With the redesign of the parking area, we recommend all parking stalls meet the current 9.5 feet wide by 20 feet in length as required by SALDO.*

SE Response: As approved by the Township Zoning Officer and discussed with the planning commission, the applicant proposes to reduce the existing non-conformity.

b. *Parking aisles must include a minimum 22-foot wide two-way aisle width; the proposed plans do not meet this requirement.*

SE Response: The applicant has improved the existing non-conformity and proposes 21' aisles.

GE&A follow up: The submitted plan does not meet the ordinance requirements; however, we defer to the Township Zoning Officer.

This waiver has been granted.

3. §255-27.I.(2): *Driveway accesses must provide a minimum 200 feet between adjacent driveways. The Township may want to consider restricting turn movements or the elimination of one of the access driveways, with one shared access to Lancaster Avenue/SR 0030 or movement restrictions for 613 and 605*

W. Lancaster Avenue.

SE Response: As discussed with the Planning Commission, the applicant would like to provide as much access and maneuverability to this site as possible. Given the interplay between various neighboring properties and businesses, the plan is designed to provide multiple ingress/egress opportunities and allow motorists options to safely access to and from Lancaster Avenue and Old Eagle School Road.

GE&A follow up: We defer to PennDOT regarding elimination or consolidation of the driveway accesses to Lancaster Avenue.

The applicant is in the process of submitting a Highway Occupancy Permit.

4. §255-29.A.(9): *Vehicular maneuvers in and out of the diagonal parking spaces adjacent to Lancaster Avenue/SR 0030 likely conflict with westbound traffic movements. The Township may want to consider eliminating the diagonal parking spaces or revise the layout to parallel parking spaces. The parallel parking spaces would allow parking maneuvers outside the travel lane and could reduce the potential for conflicts with vehicles traveling along Lancaster Avenue/SR- 0030)*

SE Response: Many of these parking spaces are not on the applicant's property. One space will be eliminated to improve the driveway entrance with the site entrance curbing being greatly improved providing some protection to the existing angled spaces.

GE&A follow up: We continue to recommend investigating elimination of the on-street parking spaces along this frontage or minimally, a conversion to parallel parking spaces.

The spaces along Lancaster Avenue support the adjoining properties. These spaces are consistent with many others along Lancaster Avenue in Wayne.

5. *Sheet 3:*

a. *Parking Summary: The parking area serves more than just the existing restaurant building; the surface lot provides parking for the other four (4) attached buildings. The Parking Summary analysis should be revised to include any buildings utilizing the surface lot to ensure adequate facilities are provided.*

SE Response: This property is independent of the other stores along Lancaster Avenue. In the interest of being a good neighbor, the applicant has not historically restricted the use of the parking by the adjacent properties nor has current plans to do so. There is however, no right to use the property.

G&A follow up: So noted.

Comment has been adequately addressed.

b. *The applicant should verify that gore striping exists near the property due east of the parcel.*

SE Response: Following recent renovations and repairs at the Currie Spa property, the gore striping is re-painted.

G&A follow up: Comment has been adequately addressed.

Comment has been adequately addressed.

c. *The affected property owners adjacent to the site must provide written permission for any work shown outside the applicant's property line boundaries. To reduce the potential for encroachment during construction, we further recommend obtaining a five foot construction easement from adjacent property owners for any construction work located near the property lines.*

SE Response: If necessary, the adjacent property owner at 605 W Lancaster Avenue will provide written permission.

G&A follow up: So noted.

A proposed easement has been added to the plan in the area of the parking island on the adjacent parcel.

6. *All Sheets:*

a. *For consistency, the Title Block and plans should identify the correct roadway name for SR 0030. The plans indicate Lancaster Pike and the Title Block indicates Lancaster Avenue.*

b. *The legal right-of-way line for Lancaster Avenue (SR 0030) should be verified and identified on the plans.*

c. *The plans should be revised to include labels for all radii in the parking area.*

G&A follow up: Applicant has satisfactory addressed comments.

Comment has been adequately addressed.

Suzan Jones
Radnor Township
613 W Lancaster Avenue
01 May 2014
Page 6 of 6

7. *It appears the applicant will be altering the driveway configuration; as such, the applicant should reach out to PennDOT regarding the proposed changes and determine if an HOP is required. The Township requests the opportunity to review all HOP plan submissions to PennDOT; as well as be given the opportunity to attend all meetings with PennDOT and copied on all correspondence regarding the same. At a minimum, PennDOT may want to review the proposed ADA curb ramps crossing the revised site driveway.*

SE Response: The applicant is in the process of preparing a HOP permit for the improved driveway.

G&A follow up: The Township should receive timely submissions concurrent with PennDOT and should be included in any meetings.

The applicant is in the process of submitting a Highway Occupancy Permit.

8. *During our field review, we noted a low hanging utility wire in the parking area (approximately 10' off the ground directly above several active parking spaces). The owner should immediately address this safety concern.*

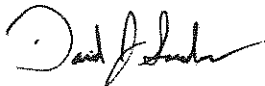
SE Response: The applicant is working with the utility company (Verizon) to raise or relocate this wire onto the new pole recently installed by Peco.

G&A follow up: So noted.

Comment has been adequately addressed.

I believe these comments satisfactorily address the requirements. Should you have any questions and/or comments, please feel free to contact me.

Sincerely,



David J. Sanders, P.E.

RADNOR TOWNSHIP
301 IVEN AVE
WAYNE PA 19087
P) 610 688-5600
F) 610 971-0450
WWW.RADNOR.COM

SUBDIVISION ~ LAND DEVELOPMENT

Location of Property 613 W Lancaster Avenue

Zoning District C-2 Application No. _____
(Twp. Use)

Fee \$1,550 Ward No. 1-1 Is property in HARB District No

Applicant: (Choose one) Owner X Equitable Owner _____

Name Eagle Green, LP

Address 620 Righters Ferry Road, Bala Cynwyd 19004

Telephone 610-668-0300 Fax 610-668-0365 Cell _____

Email glen@pennenergyrenewables.com

Designer: (Choose one) Engineer X Surveyor _____

Name SITE Engineering Concepts, LLC; Attn: Rob Lambert

Address P.O. Box 1992; Southeastern, PA 19399

Telephone 610-240-0450 Fax 610-240-0451

Email rlambert@site-engineers.com

Area of property 24,442 sf Area of disturbance 15,000 sf

Number of proposed buildings 1 Proposed use of property Restaurant

Number of proposed lots 1 (no change)

Plan Status: Sketch Plan _____ Preliminary _____ Final X Revised _____

Are there any requirements of Chapter 255 (SALDO) that are not in compliance with?

Are there any requirements of Chapter 255 (SALDO) not being adhered to?

Explain the reason for noncompliance.

There are several existing non-conformities that will remain

Are there any infringements of Chapter 280 (Zoning), and if so what and why?

There are several existing non-conformities that will remain

Individual/Corporation/Partnership Name

Eagle Green, LP

I do hereby certify that I am the owner, equitable owner or authorized representative of the property which is the subject of this application.

Signature

Sean M. Closkey

Print Name

SEAN M. CLOSKEY

By filing this application, you are hereby granting permission to Township officials to visit the site for review purposes.

NOTE:

All requirements of Chapter 255 (Subdivision of Lane) of the Code of the Township of Radnor must be complied with whether or not indicated in this application.

**RADNOR TOWNSHIP
301 IVEN AVE.
WAYNE, PA 19087
610 688 5600
WWW.RADNOR.COM**

SUBDIVISION AND LAND DEVELOPMENT SUBMISSION GUIDELINES

1. Complete the enclosed Radnor Township Subdivision and Land Development application form and the Delaware County Planning Department application form.
2. Submit the completed application forms, the three (3) required filing fees, and the appropriate number of copies of plans to the Township Engineer. **ALL DOCUMENTS MUST BE SUBMITTED NOT LESS THAN 31 CALENDAR DAYS PRIOR TO THE NEXT PLANNING COMMISSION MEETING DATE IN ORDER TO BE PLACED ON THE AGENDA.**
3. The applicant or his/her representative must be present at all meetings when the application is scheduled as an agenda item.
4. When approved or disapproved by the Planning Commission the application will go before the Radnor Township Board of Commissioners for their approval/disapproval. This will not occur any sooner than forty-five (45) days after first regular meeting of Planning Commission or until receipt of the Delaware County Planning Commission's comments.
5. The application will be approved/disapproved by the Township's Board of Commissioners within (90) days from the date of the first regular meeting of the Planning Commission, unless an extension is granted by the applicant.

Meeting Dates:

All meetings are held at the Township Municipal Building – 301 Iven Ave, Wayne, Pa.

Planning Commission - Regular Meetings – 1st Monday of the month – 7:00 PM

Board of Commissioner's - Regular Meetings – 2nd & 4th Monday of the month – 7:00 PM (except summer)

All meetings subject to change during summer months and around holidays

Required Dimensions and Number of Plans for Submission:

Plan Scale: Not less than 1"= 100'

Plan Size: Maximum 24" x 36" for all submissions.

Minimum 18" x 30"

THIRTY-FIVE (35) complete sets of plans **FOLDED** and **STAPLED** are required for all stages of plan reviews; Sketch Plan, Preliminary Plan and Final Plan. **Notarized signature of owner on eight (8) of the copies.**

Two (2) copies of any calculations/reports.

Any Waivers to the SALDO must be submitted **in writing at the time of the application.**

Copy of the deed or copy of sales agreement shall accompany this submission.

Title Report with all attachments required Not a title policy

Application Fee:

Three (3) checks are required – (1) Delaware County Planning Department Review (payable to DCPD), (1) Radnor Township Application Fee, and (1) Radnor Township Escrow Fee (Both payable to Radnor Township).

(The Fee Schedule on file at the Township Bldg. and website)

HILBEC Engineering & Geosciences, LLC

Wastewater, Stormwater, Hydrogeology, Environmental, Testing & Design

26 Beaver Run Road, Downingtown, PA 19335-2257
Office: 610.873.6204 www.hilbec.com Fax: 610.873.6206

April 16, 2014

Site Engineering Concepts, LLC
Mr. Robert Lambert, PE
PO Box 1992
Southeastern, PA 19399

Re: Stormwater Soil Evaluation
613 W. Lancaster Ave
Radnor Township, Delaware County

Dear Mr. Lambert:

On January 15 and April 8, 2014, I conducted soil evaluations for a proposed stormwater management system(s) at 613 W. Lancaster Ave. A backhoe was used to excavate test pits to determine the most suitable depth to conduct permeability testing within the soil horizons. Test holes are typically excavated to the limits of the reach of the machine, bedrock, or a depth where water may be encountered entering the excavation.

The entire property is covered by a parking lot which slopes roughly northeast to southwest. The site is underlain by mafic gneiss; not a carbonate material. Test pits #SWM-01 through #SWM-03 were conducted on January 15, 2014 while test pits #SWM-04 and #SWM-05, including two permeability tests, were completed on April 8, 2014. Hard rock and open voided rock was encountered in each of the test pits.

The January round of testing showed hard rock encountered at depths of 24" to 48" below the existing parking surface. Attempting to keep the PA DEP required 24" isolation buffer between the rock and the proposed system could not be achieved. Although the parking surface and underlying aggregate are not mineral soils and would be removed, the bituminous surface provides a suitable reference location. This depth has been included in the attached soil descriptions.

In April, the property owner enlisted the services of a firm specializing in Ground Penetrating Radar (GPR) to determine if areas of the site were clear of the shallow rock. The entire site was scanned and two areas were identified as less encumbered by rock toward the north-northeast side of the property. All other parts of the site indicated shallow rock conditions within 2 to 4 feet. Their report is included within the exhibits of this report.

On April 8, 2014, we cut through the bituminous paving in the center of the GPR identified area “A” located nearest the existing building and along the north property line. Labelled #SWM-04, hard rock was initially encountered at 39 inches toward the northwest but transitioned to open voided rock at 39” with refusal at 60 inches.

A second test pit (#SWM-05) was dug farther upslope at the second area identified by the GPR survey. Initially, hard rock was again found at 39” but tended to deepen after the first five feet toward the east, to a depth of 67 inches below the paving. This location yielded a rock shelf at 67” then deepened with open voided rock from 67 inches to a depth of 78” where refusal was again encountered. These conditions persisted for approximately 20 feet where the rock again rose to 67 inches. After another 6 to 7 feet, open voided rock was then encountered at 30” to 82” with no soil over a short length of approximately 8 feet. Below this, the rock became saprolitic below 82” to a depth of 95 inches where refusal again occurred. This area is aligned with the aforementioned rock orientation and is likely a rock fracture encased on either side by the harder rock.

As a rain garden was initially proposed toward the east-northeast corner of the site, test pit #SWM-05 was extended further to determine the subsoil at that location. Rock was encountered at 60 inches and was rising higher toward the east. No further excavation was conducted since the rock was rising toward the ground surface.

Soil Test Pit Limitations:

<i>Test ID</i>	#SWM-01	#SWM-02	#SWM-03	#SWM-04	#SWM-05
<i>Depth to Limiting Rock</i>	24”	48”	46”	39” to 60”	67”

A Guelph Permeameter was used to determine the permeability of the soil at the portion of #SWM-05 which exhibited the widest area of soil, free of rock with open voids or hard rock (see attached plan for test locations). The Guelph is a constant head borehole permeameter using the principle of the Mariotte Siphon to supply a constant level of water in the hole; unlike a percolation falling head test. The depth of the holes from existing grade level were adjusted to account for topographic variations.

The Guelph allows the Field Saturated Permeability (K_{fs}) to be determined by running the test twice, at two different heads. Two tests are run at different heads or water elevations in order to provide the “gradient” portion of the required calculations. The gradient is used to measure the flux or water movement within the soil. A fluid bulb quickly forms and allows the stabilized hydraulic conductivity to be calculated. Errors inherent in other types of permeability tests that are minimized or eliminated by the Guelph Permeameter are soil fracturing, varying heads, silted in holes, estimated readings due to scale, and leaking clay seals.

Permeability tests assume that homogeneous soil conditions exist at and below the test zone, which is why the central portions of one soil horizon are typically chosen for the test depths. However, soil suitability, PA DEP guidelines, and proposed system design may alter that test parameter. Even within a consistent soil, unseen heterogeneous soil conditions can exist and may consist of:

1. Changing soil horizons across or near the test zone
2. Rock or stony soil beneath the bottom of the test hole
3. Roots, animal burrows
4. Soil fractures & thinly laminated soils

The consistency of the soil can be estimated by comparing the assumed and calculated alpha value. The alpha value is a soil parameter that depends primarily upon the soil texture and structure. By definition, it is the ratio of gravity to capillary soil-water forces. The value of typical fine to coarse-grained soils ranges between 0.01 and 0.5 cm⁻¹. Values considerably outside of this range (and negative values) suggest that heterogeneous soil conditions, such as in stony areas, may be encountered. Large alpha values suggest coarse textured or highly structured soils. Low alpha values suggest finer grained soils or a fine matrix. The geometric mean of the single head tests can be used in place of the two head approach to provide the permeability values if heterogeneous soil conditions cannot be avoided, such as in rocky areas.

A summary of the permeability test results can be seen in the table below:

<i>Test ID</i>	<i>Test Probe #</i>	<i>Test Depth (inches)</i>	<i>Grade Elevation</i>	<i>Result (in/hr)</i>	<i>Geometric Mean</i>
P5-A	SWM-01	43	~424.75	1.93	1.09
P5-B		46	~425.0	0.62	

Permeability test holes were excavated outside of the test pit toward Rt. 30. Rock appeared in the shallow cut for the test at its southernmost edge. The depths were adjusted for elevation to maintain the 24" isolation buffer as based upon the findings of the test probe and topography as the rock in this area mimics the topographic slope. The permeability test data indicates that the soil can infiltrate the applied stormwater assuming that a properly dimensioned stormwater system is provided. The overall "deeper" soil area has rough dimensions of 30' (E-W) x 25' (N-S) including a 2 foot horizontal isolation buffer due to the vertical rock orientation. The designer may want to consider adding a safety factor to the bed size due to the varying rock depth and open voids, as those aspects of the geology could convey the applied stormwater to a less manageable location elsewhere on the site.

The open rock was nearly vertical in orientation and trends roughly northeast/southwest. For the test pits closer to the existing structures, the proximity of the open voided rock and its orientation raise concerns that any buildup of stormwater will allow it to migrate off site to the north, or southwestward toward the existing basements of the buildings. Farther downslope, the stormwater may seep

underneath the paving attempting to reach an outlet at the ground surface and weaken the paved surface over time. Little to no soil exists between the fractured voids in the rock. No ground water was encountered. Please refer to the photos below for reference to each test pit.

I certify that I have directly performed and/or supervised the test procedures and preparation of this report. All information contained herein is accurate to the best of my knowledge and all test procedures have been performed using accepted practices. HILBEC Engineering & Geosciences, LLC cannot and does not make claim, warranty or guarantee that surface and sub-surface site conditions other than described herein, either natural or as altered by construction activities, may be different at some time in the future and thus may affect these findings.

Please refer to the attached location map of the test areas. If you have any further questions, please contact our office.

Very truly yours,
For HILBEC Engineering & Geosciences, LLC



Kevin R. Sech, P.G., P.E.



Test Pit #SWM-01



Test Pit #SWM-02



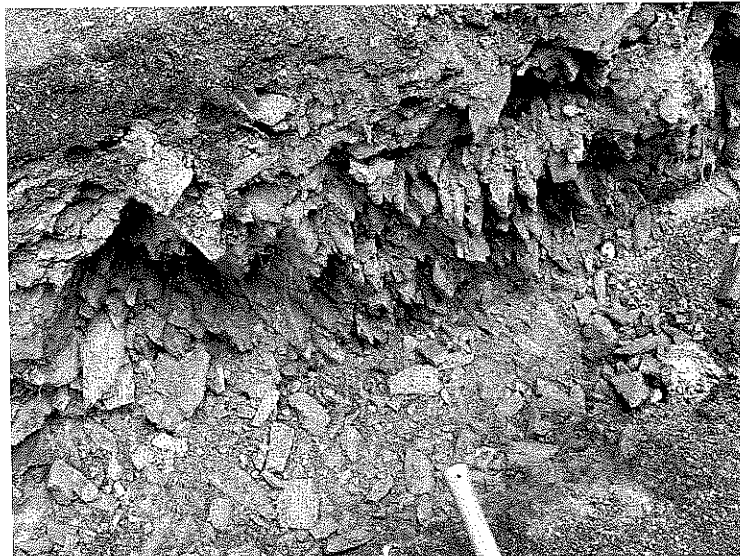
Test Pit #SWM-03



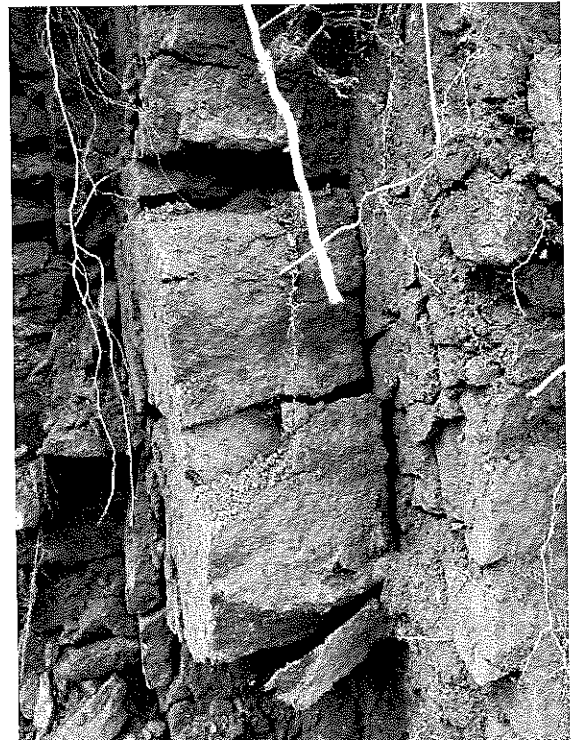
Test Pit #SWM-04 at 39 inches



Test Pit #SWM-04 at 48 to 60 inches



Test Pit #SWM-05 at 0 to 67 inches



Test Pit #SWM-05 at 48 inches

HILBEC ENGINEERING & GEOSCIENCES, LLC

SOIL DESCRIPTIONS

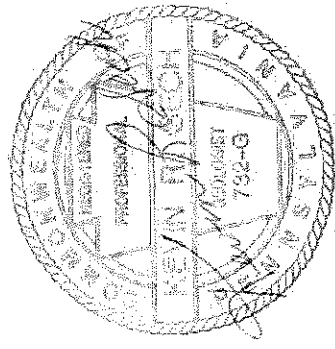
**Testing Conducted For
Stormwater Management**

HILBEC Engineering & Geosciences, LLC
26 Beaver Run Road, Downingtown, PA 19335-2257

Probe #:	SWM-04
Test Date:	April 8, 2014
Soil Profile Limitation:	Rock with little to no soil filling voids @ 39" No water or mottling observed

Project Name:	613 W. Lancaster Ave
Municipality:	Radnor Township, Delaware County
Soil Profile Description Prepared By:	Kevin R. Sech, P.G., P.E.
General Location of the Test Pit:	Westerly side along North lot line

Horizon	Up	Low	Color	Texture	Structure	Consistence	CF%	Boundary	Roots	Coats	Mottles
Ap	0	5	Black	---	---	---	---	---	---	---	---
Blacktop paving and stone aggregate											
Bt	5	23	5YR 4/3	Silty Clay Stony	Massive	Friable	40%	Clear	Wavy	No	---
			Reddish Brown								
Roots from trees grow horizontally along top of soil layer											
BC	23	60	7.5YR 4/6	Silty Clay	Massive	Friable	75%	Pit Base	---	No	---
			Brown								
Mafic Gneiss, near vertical orientation, little to no soil in joints. Open voids at 39" becoming competent at 60"											
Method of Excavation:											
Rubber Tired Backhoe											
Remarks:	Rock with open voids										



PROJECT LIMITATIONS:

I certify that I have directly performed and/or supervised all test procedures and/or preparation of this report. All information contained herein is accurate to the best of my knowledge and all test procedures have been performed using accepted practices. HILBEC Engineering & Geosciences, LLC cannot and does not make claim, warranty, or guarantee that surface and sub-surface site conditions or test results, other than described or conducted at the time of the test, may be different at some time in the future and thus may affect these findings hereon.

Kevin R. Sech
Kevin R. Sech, P.G., P.E.

**Testing Conducted For
Stormwater Management**

HILBEC Engineering & Geosciences, LLC
26 Beaver Run Road, Downingtown, PA 19335-2257

Probe #:	SWM-05
Test Date:	April 8, 2014
Soil Profile Limitation:	Rock with little to no soil filling voids @ 67" No water or mortling observed

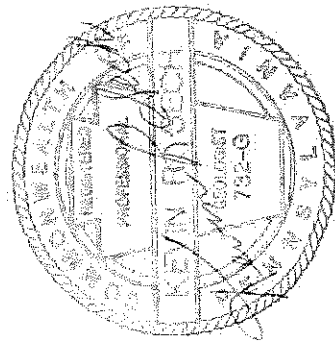
Project Name:	613 W. Lancaster Ave
Municipality:	Radnor Township, Delaware County
Soil Profile Description Prepared By:	Kevin R. Sech, P.G., P.E.
General Location of the Test Pit:	Easterly side along North lot line

Horizon	Up	Low	Color	Texture	Structure	Consistence	CF%	Boundary	Roots	Coats	Mottles
Ap	0	4	Black	---	---	---	---	---	---	---	---
Backtop paving and stone aggregate											
Bt	4	19	5YR 4/1 Dark Grey	Sandy Loam	Massive	V Friable	Avg Moisture 20%	Clear	Wavy	Yes	---
Roots from trees grow horizontally along top of soil layer											
BC	19	39	5YR 5/6 Yellowish Red	Silt Loam	Massive	Friable	Avg Moisture 30%	Clear	Wavy	No	---
C	39	67	5YR 5/2 Var Red Brown Greys	Sandy Loam	Massive	Structureless	50%	Pit Base	---	No	---
Mafic Gneiss, near vertical orientation, little to no soil in joints. Open voids at 39" toward east then becoming competent at 67"											
		67									
Rock Gneiss Backhoe would not penetrate for majority of the long pit. Hard rock at 39", 67", 78", 95" at various points in pit. See map and report											
Method of Excavation:	Rubber Tired Backhoe										
Remarks:	Rock with open voids										

PROJECT LIMITATIONS:

I certify that I have directly performed and/or supervised all test procedures and/or preparation of this report. All information contained herein is accurate to the best of my knowledge and all test procedures have been performed using accepted practices. HILBEC Engineering & Geosciences, LLC cannot and does not make claim, warranty, or guarantee that surface and sub-surface site conditions or test results, other than described or conducted at the time of the test, may be different at some time in the future and thus may affect these findings herein.

Kevin R. Sech
Kevin R. Sech, P.G., P.E.

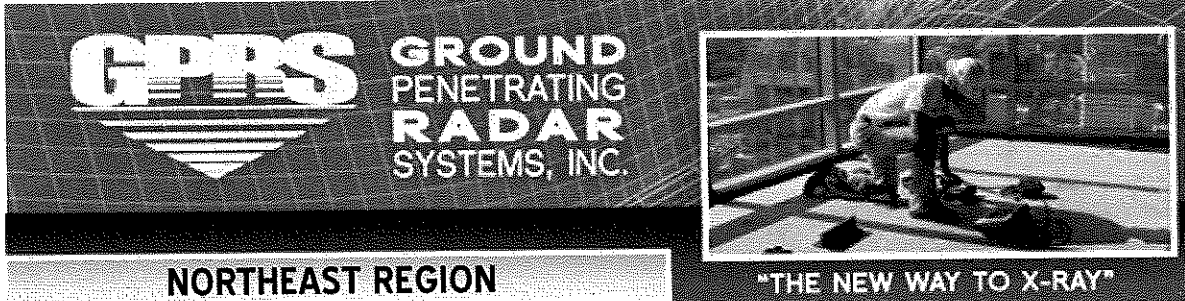


HILBEC ENGINEERING & GEOSCIENCES, LLC

**PERMEABILITY TEST RESULTS
AND CALCULATIONS**

HILBEC ENGINEERING & GEOSCIENCES, LLC

GPR REPORT
(by others)



NORTHEAST REGION

April 1, 2014

Attn: Peter Wieck

Penn Group of Companies

620 Righters Ferry Road, Bala Cynwyd PA 19004

Re: GPR Survey Soil Density Detection @ 613 W Lancaster Ave, Radnor, PA

We appreciate the opportunity to work with you on your project in Radnor Township, PA.

Table of Contents

- 1. Overview of GPR**
- 2. Equipment & Capabilities**
- 3. Site Description**
- 4. Inspection Methods**
- 5. Findings**
- 6. Qualifications**
- 7. Closing**

1. Overview of GPR-

Ground Penetrating Radar (GPR) is a non-destructive testing technology that sends a series of radar pulses into the surface which reflect back off of anomalies below. As the radar pulses through the ground, the waves bend slightly when encountering a material with differing physical properties, particularly density and conductivity. Thousands of pulses are sent and received in a small area, and the received signals are combined to form a real-time image of what is in the ground. The various places where the radar waves bend are displayed as anomalies which can be interpreted as utilities, steel pipes, PVC conduits, underground storage tanks, voids, foundations, etc. One of the many advantages of the technology is the ability to locate metal and non-metallic objects as well as determining depth to the object. GPR data acquisition is very fast and results are available immediately, allowing any discovered anomalies to be marked directly in the field. Although confused with X-Ray, GPR uses less than 1% of your cell phones radiation emissions and is safe to work with human presence in close proximity.

2. Equipment and Capabilities-

Ground Penetrating Radar (GPR)

- GSSI SIR-3000

-GPRS uses a Geophysical Survey Systems Inc. (GSSI) SIR-3000 radar unit. This is the most advanced GPR available. It allows for on-site interpretation, as well as stored data for later processing. This equipment is self-calibrating, allowing more precise depth and location measurements.

-GSSI is the world's leading GPR designer and manufacturer. Information can be found at www.geophysical.com.

- 400 MHZ GSSI Antenna

-For utility locating, we use a 400MHz antenna with the SIR-3000 GPR head unit. This antenna allows data collection to a maximum depth of approximately twelve feet, depending on soil conditions.

- RD-7000 Radiofrequency Detection System

- Locating specific pipes and cables in large underground networks is becoming increasingly complex. Ground distortion effects, caused by differing soil types and proximity to other conductors, make the operator's job more difficult and time-consuming. The most important requirements for a locator under these circumstances are ease of use, accuracy and reliability. The RD-7000 Utility Locator addresses this need with several groundbreaking features that deliver accurate, reliable and repeatable measurements. I use this only to determine any type of electrical current running in the concrete. I use this as a backup with the SIR-3000 due to the possibility of electricity within the concrete structures.

3. Site Description-

At this site our primary objective was to scan around the side of 613 West Lancaster Ave to identify any possible soil density changes subsurface that may be located on the property, I also scanned between buildings and detected numerous areas of solid rock subsurface. I then marked out the areas where I could see softer soil free of major rock.

4. Inspection Methods-

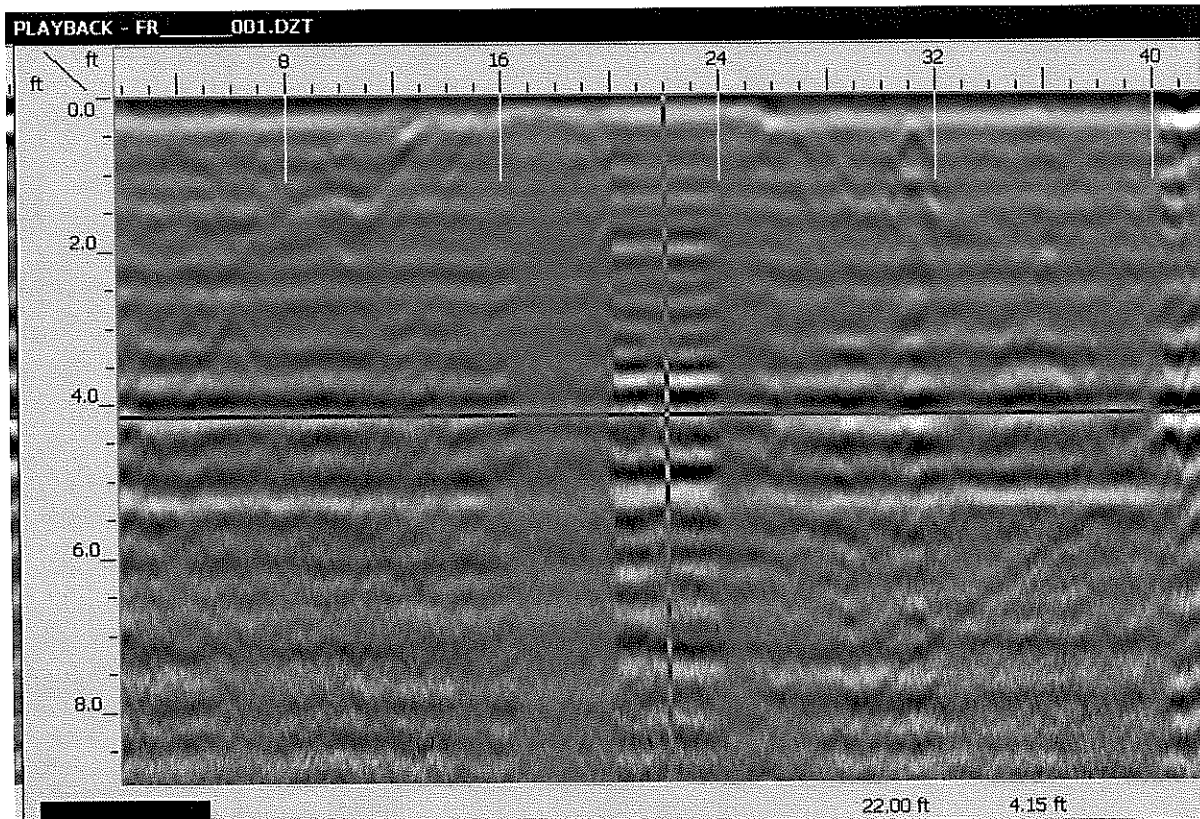
Since the surface was outside in asphalt location the scans were performed every two feet, our 400MHz antenna was utilized. When scanning around the parking lot location, we performed North-South and East-West scans to ensure the locations of any underground rock was mapped out within the proposed locations were identified. All markings were in white paint to show the pockets of rock detected or not detected.

5. Findings-

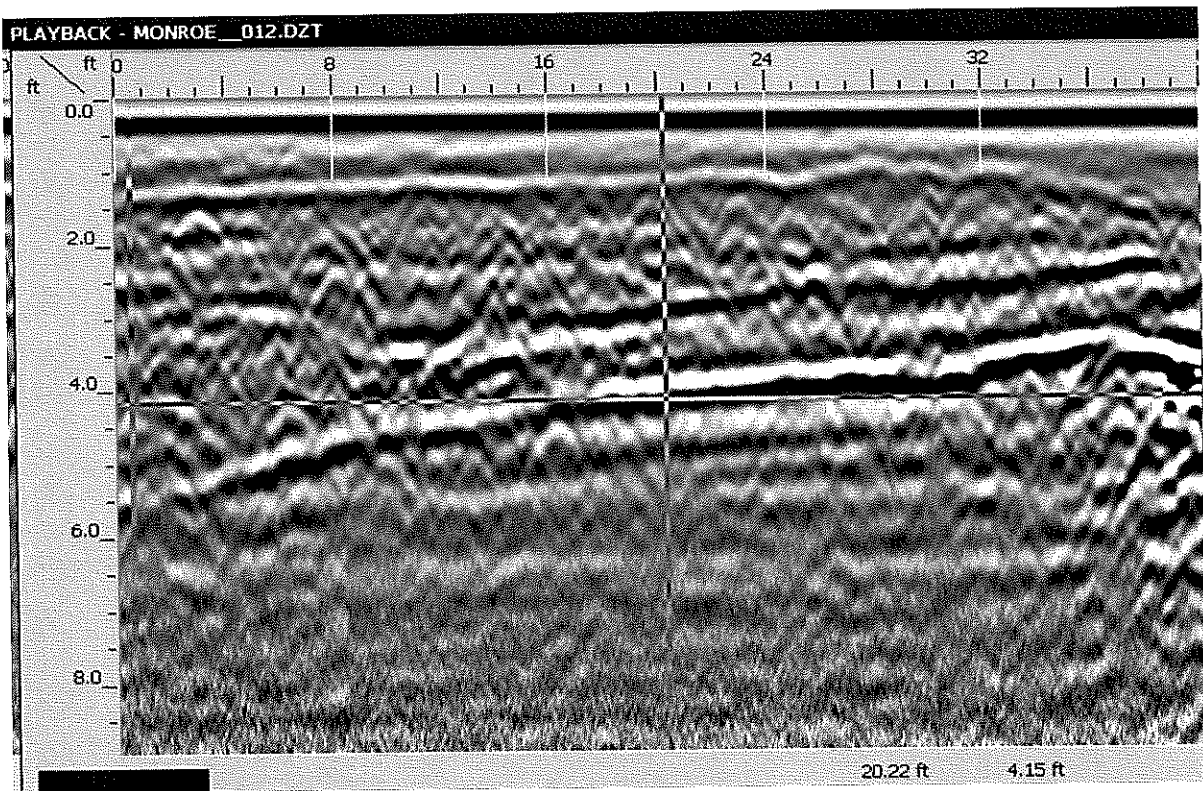
The survey results and data were interpreted in real time at the requested area. I performed scans 1'-2' apart using the SIR-3000 with the 400 MHz antenna to locate any major rock subsurface. When scanning the asphalt area facing the East side of the parking lot, the data was clear and able to interpret. After scanning that entire area, I was able to differentiate between solid rock and areas free of solid rock. All findings are marked directly on the surface for further review.

Conclusion:

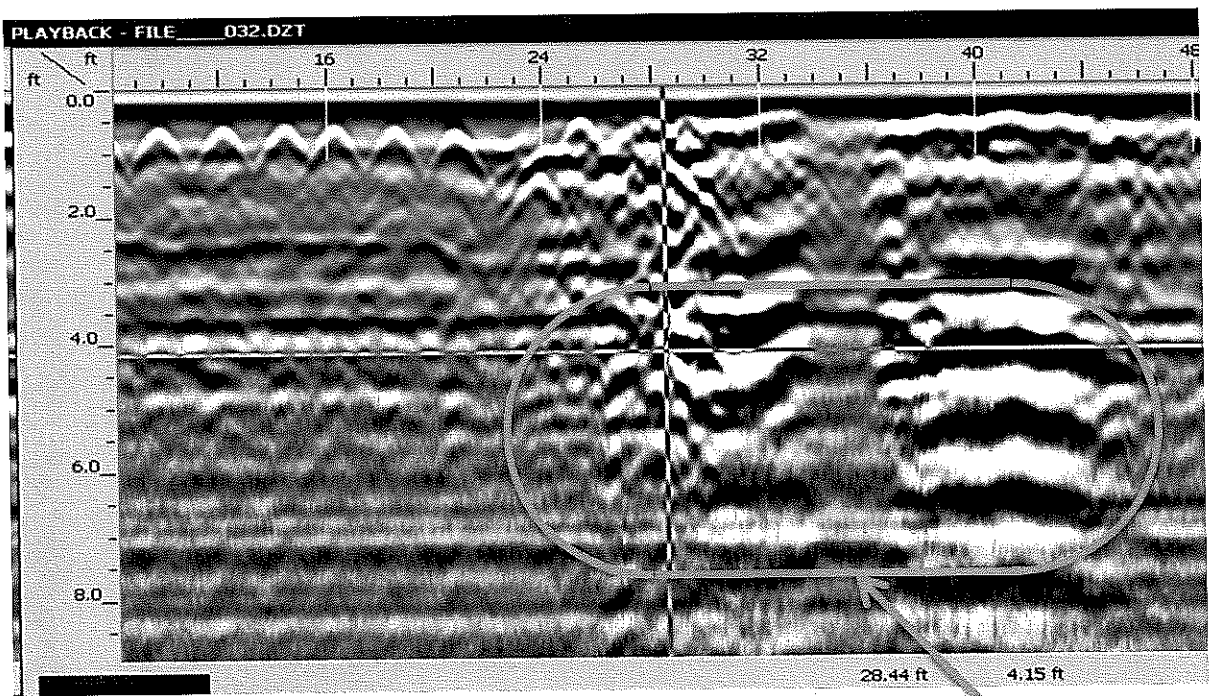
The data at this location was clear and able to interpret. After scanning the requested area, selected by the onsite contact, we were able to map out areas free of solid rock. If you have any questions or comments please feel free to contact me. Below are screen shots and photographs taken on site.



The above screen shot was taken from the SIR-3000 with the 400MHz antenna showing no solid rock beneath the surface. There are 2 gauges in each screen shot. The left side gives the technician the depth of each obstruction while the top allows you to see the distance of each scan performed.



This screen shot shows a solid rock shelf starting at 48'' and goes to as shallow as 24''.



This screen shows another area of good soil and turns into a sharp decline into hard rock subsurface.



Rhett Teller - Project Manager of Pennsylvania Tri-State Area
Rhett.Teller@gp-radar.com • (215) 694-4747



Rhett Teller - Project Manager of Pennsylvania Tri-State Area
Rhett.Teller@gp-radar.com • (215) 694-4747

6. Qualifications-

Ground Penetrating Radar Systems, Inc. (GPRS) was started in October 2001, by Matt Aston. The original intention in starting this business was to give contractors a reliable way to “see” into the concrete slabs in order to avoid cutting embedded electrical conduits and critical reinforcing steel. While GPRS performs this work on a regular basis, there are many other applications in which we use Ground Penetrating Radar to benefit our customer base.

Since our inception, GPRS has grown to be nationwide and has completed over six thousand projects. Unlike many other companies that provide GPR services, GPR is all we do. We are the only nationwide GPR company that only provides GPR services. We perform GPR services every day. This is not something we do once in a while. We are very proud of our performance. We are very proud of our ten years of zero recordables. We have had a reported incident of error on less than one percent of the projects we have completed. Our customers have expressed a high level of satisfaction, as evidenced by the fact that in 2010, nearly 80% of our business was either repeat or referred by our customers. GPRS has been involved on projects ranging from small residential jobs to major construction projects with values in excess of \$4 Billion.

7. Closing-

Thank you for the opportunity to serve you on this project. I hope this report has answered all the questions you had regarding this survey. However, if there is anything you have questions about or feel was omitted, please do not hesitate to contact me.

Thank you,

Rhett Teller

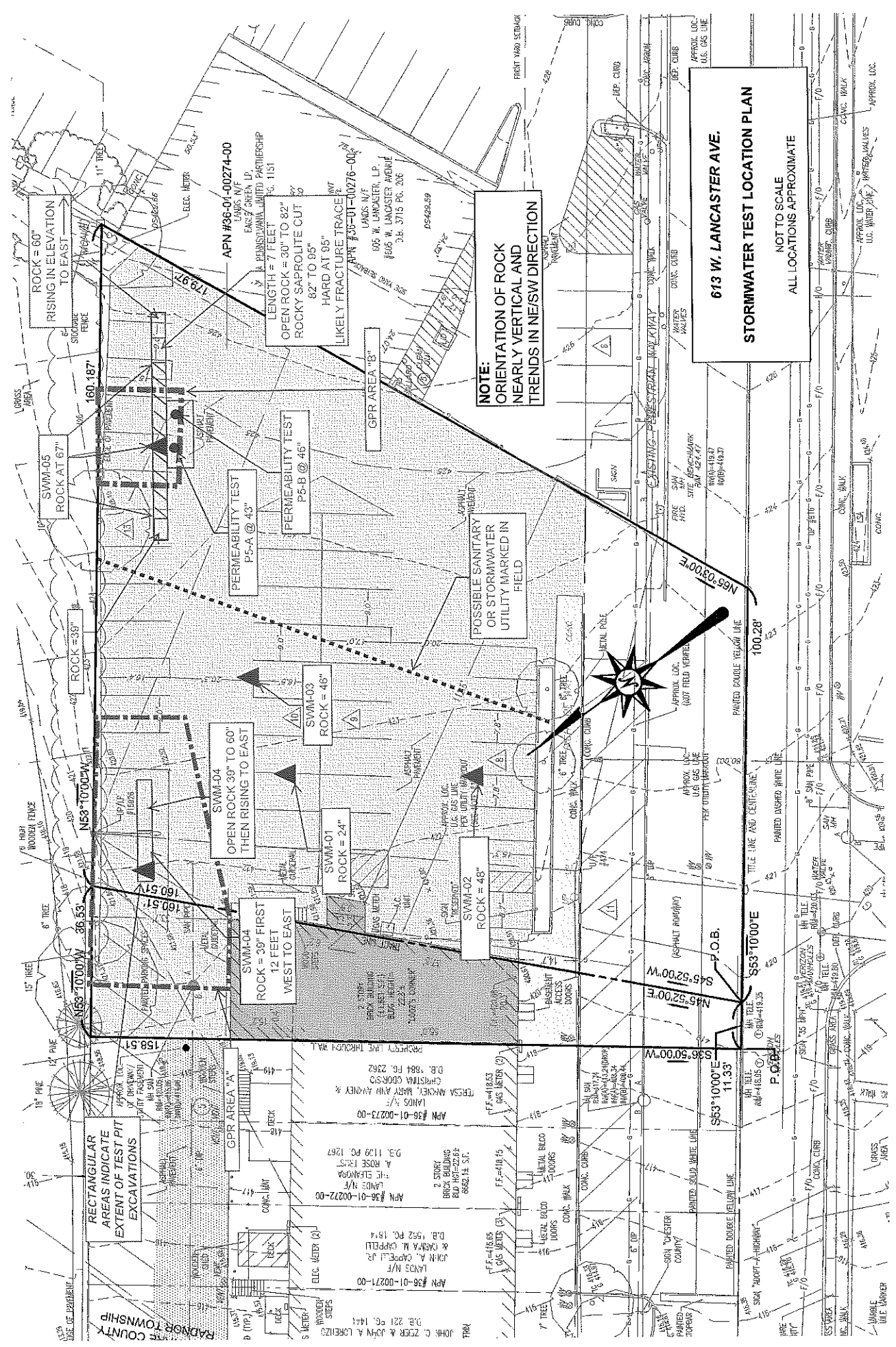
Project Manager of the Pennsylvania Tri-State Area

Ground Penetrating Radar Systems, Inc.

Philadelphia- 215-694-4747

Rhett.Teller@gp-radar.com

TEST LOCATION PLAN



RECTANGULAR AREAS INDICATE EXTENT OF TEST PIT EXCAVATIONS

NOTE:
ORIENTATION OF ROCK IS NEARLY VERTICAL AND TRENDS IN NE/SW DIRECTION

613 W. LANCASTER AVE.
STORMWATER TEST LOCATION PLAN
NOT TO SCALE
ALL LOCATIONS APPROXIMATE

POSSIBLE SANITARY OR STORMWATER UTILITY MARKED IN FIELD

APN #36-01-00274-00
LANDS N/F
EAST GREEN LP
PENNSYLVANIA UNITED PARTNERSHIP
% 1151
100 W. LANCASTER, LP.
8005 W. LANCASTER AVENUE
D.B. 3715 PG. 206
P5493.59

SWM-05
ROCK AT 67"
ROCK = 60"
RISING IN ELEVATION TO EAST

PERMEABILITY TEST
P5-A @ 43"

PERMEABILITY TEST
P5-B @ 46"

SWM-03
ROCK = 46"

SWM-04
OPEN ROCK 38" TO 60" THEN RISING TO EAST

SWM-01
ROCK = 24"

SWM-04
ROCK = 39" FIRST 12 FEET WEST TO EAST

SWM-02
ROCK = 48"

SWM-04
ROCK = 39" TO 60" THEN RISING TO EAST

SWM-01
ROCK = 24"

SWM-02
ROCK = 48"

SWM-04
ROCK = 39" TO 60" THEN RISING TO EAST

APN #36-01-00273-00
LANDS N/F
THE SHANGORA
D.B. 1129 PG. 1267

APN #36-01-00272-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00271-00
LANDS N/F
JOHN C. ZEMER & JOHN A. LORENZO
D.B. 221 PG. 1441

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00276-00
LANDS N/F
100 W. LANCASTER, LP.
8005 W. LANCASTER AVENUE
D.B. 3715 PG. 206
P5493.59

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00271-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00271-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00271-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00271-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00271-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00271-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00271-00
LANDS N/F
JOHN A. CORPPELLI
D.B. 1562 PG. 1874

APN #36-01-00273-00
LANDS N/F
TERESA ANKLEY MARY ANN HANNEY & CHRISTINA CORPSS
D.B. 1984 PG. 2362

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

APN #36-01-00273-00
LANDS N/F
D. ROSE
D.B. 1129 PG. 1267

Prepared By: Robert Chalpin Associates, Inc. (#145698-NFA)

Return To: Robert Chalpin Associates, Inc.
515 Swede Street
Norristown, Pa 19401
(610) 279-8290

RD BK05000-1151

DT-DEED

2011058015 10/07/2011 10:28:16 AM:1

RCD FEE: \$92.50 POL SUB TAX: \$8,625.00 ST TAX: \$5,750.00



DELAWARE
COUNTY

36-RADNOR \$8,625.00

THOMAS J. JUDGE SR. ROD

Property: 613 West Lancaster Avenue
Township of Radnor
Delaware County, Pennsylvania

Parcel # 36-01-00274-00.

Deed

**Francine Cappelli and John Cappelli Jr to
Eagle Green, LP, a Pennsylvania Limited Partnership**

THIS DEED, MADE THE

15th day of August, 2011.

BETWEEN, Francine Cappelli and John Cappelli Jr

(hereinafter called the "Grantors"), of the one part,

and

Eagle Green, L.P., a Pennsylvania Limited Partnership

(hereinafter called the "Grantee"), of the other part.

WITNESSETH, That the said Grantors for and in consideration of the sum of

----- **One Dollar and No Cents** ----- **(\$1.00)** -----

lawful money of the United States of America, unto them, the said Grantors, well and truly paid by the said Grantee, at or before the sealing and delivery hereof, the receipt whereof is hereby acknowledged, have granted, bargained and sold, aliened, enfeoffed, released and confirmed, and by these presents do grant, bargain and sell, alien, enfeoff, release and confirm unto the said Grantee, its successors and assigns, **as partnership property paid for with partnership funds:**

ALL THAT CERTAIN lot or piece of ground, Situate in the Township of Radnor, County of Delaware and Commonwealth of Pennsylvania, described according to a plan thereof made by Messrs, Over and Tingley, Civil Engineers, Upper Darby, Pennsylvania on October 20, 1925 revised October 11, 1928, and described according to said revised plan, as follows, to wit:

BEGINNING at a point in the center line of Lancaster Turnpike (eighty feet wide) at the distance of One hundred twenty eight and seventy one-hundredths feet measured South fifty three degrees, ten minutes East from the point of intersection of the center line of the said Lancaster Turnpike with the center line of Old Eagle School Road (thirty three feet wide); thence extending South fifty three degrees, ten minutes East along the center line of said Lancaster Turnpike One hundred and twenty eight one-hundredths feet, thence extending North sixty five degrees, three minutes East one hundred seventy nine and ninety seven one-hundredths feet to a point; thence North fifty three degrees ten minutes West One hundred sixty and one hundred eighty seven one-thousandths feet to a point; thence extending South forty five degrees, fifty two minutes West passing through the center line of a party wall of the buildings erected on the premises adjoining to the Northwest One hundred sixty and fifty one-hundredths feet to the first mentioned point and place of beginning.

continued

AND ALL THAT CERTAIN lot or piece of land with the buildings and improvements thereon erected, Situate at Strafford, Radnor Township, Delaware County Pennsylvania, bounded and described according to a survey and plan thereof made by Over and Tingley, Civil Engineers, Upper Darby, Pennsylvania, on October 20th, 1925, as follows, to wit:

BEGINNING at a point in the center line of Lancaster Turnpike (eighty feet wide) at the distance of One hundred seventeen and thirty seven one-hundredths feet measured Southeastwardly from the point of intersection of the center lines of said Lancaster Turnpike and Old Eagle School Road (thirty three feet wide); thence extending South fifty three degrees, ten minutes East along the center line of Lancaster Turnpike eleven and thirty three one-hundredths feet to a point; thence North forty five degrees, fifty two minutes East partly along the center line of a party wall One hundred sixty and fifty one-hundredths feet to a point; thence North fifty three degrees, ten minutes West, Thirty six and fifty three one-hundredths feet to a point and thence extending South thirty six degrees, fifty minutes West One hundred fifty eight and fifty one-hundredths feet to the place of beginning.

TOGETHER with the free use, right, liberty and privilege of a certain driveway laid out over the rear of the above described lots of ground between the yard and garage spaces and which leads Northwest into Old Eagle School Road, at all times hereafter forever, in common with the owners, tenants and occupiers of the above described lots over which said driveway extends.

BEING Folio No. 36-01-00274-00

BEING THE SAME PREMISES WHICH John Cappelli Jr. and Francine Cappelli, husband and wife, by Deed dated 4/1/2004 and recorded 6/11/2004 in the County of Delaware, Pennsylvania in Deed Volume 3203, Page 1453, granted and conveyed unto John Cappelli, Jr. and Francine Cappelli, as tenants in common, in fee.

TOGETHER with all and singular the improvements, ways, streets, alleys, passages, waters, water-courses, rights, liberties, privileges, hereditaments and appurtenances, whatsoever thereunto belonging, or in any wise appertaining, and the reversions and remainders, rents, issues, and profits thereof; and all the estate, right, title, interest, property, claim and demand whatsoever of it the said Grantors, as well at law as in equity, or otherwise howsoever, of, in, and to the same and every part thereof.

TO HAVE AND TO HOLD the said lot or piece of ground above described, with the buildings and improvements thereon erected, hereditaments and premises hereby granted, or mentioned and intended so to be, with the appurtenances, unto the said Grantee, its successors and assigns, to and for the only proper use and behoof of the said Grantee, its successors and assigns forever.

AND the said Grantors, for themselves, their heirs and assigns, do covenant, promise and agree, to and with the said Grantee, its successors and assigns, by these presents that they, the said Grantors, their heirs and assigns, all and singular the hereditaments and premises hereby granted or mentioned and intended so to be, with the appurtenances, unto the said Grantee, its successors and assigns, against them, the said Grantors, their heirs and assigns, and against all and every person or persons whomsoever lawfully claiming or to claim the same or any part thereof, by, from or under it, them or any of them, shall and will, **WARRANT and forever DEFEND.**

IN WITNESS WHEREOF, the party of the first part has hereunto set its hand and seal. Dated the day and year first above written.

Francine Cappelli

Francine Cappelli

John Cappelli, Jr

John Cappelli Jr

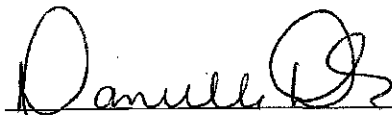
Commonwealth of Pennsylvania

County of Montgomery

On this 15th day of August, 2011, before me, the undersigned officer, personally appeared Francine Cappelli and John Cappelli Jr, known to me (or satisfactorily proven) to be the persons whose names are subscribed to the within instrument and acknowledged that they executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
DANIELLE DELUZZO, Notary Public
Norristown Borough, Montgomery Co.
My Commission Expires September 2, 2014


COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
DANIELLE DELUZZO, Notary Public
Norristown Borough, Montgomery Co.
My Commission Expires September 2, 2014
Notary Public

DEED

Francine Cappelli and
John Cappelli Jr

TO

Eagle Green, LP,
a Pennsylvania Limited
Partnership

Recorded in Deed Book _____ page _____

GIVEN under my hand and the seal of the said office, the date above written.

Recorder of Deeds

Robert Chalphin Associates, Inc.
515 Swede Street
Norristown, Pa 19401

(610) 279-8290
145698-NFA

The address of the above-named Grantee is:

620 Righters Ferry Road,
Bala Cynwyd, PA 19004



On behalf of the Grantee:



Excellence Delivered As Promised

MEMORANDUM

Date: May 28, 2014

To: Radnor Township Planning Commission

From: Roger Phillips, PE

cc: Stephen Norcini, P.E. – Director of Public Works
Kevin W. Kochanski, RLA, CZO – Director of Community Development
Peter Nelson, Esq. – Grim, Biehn, and Thatcher
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.
Suzan Jones – Radnor Township Engineering Department
William Miller – Radnor Township Codes Official
Ray Daly – Radnor Township Codes Official

RE: Ithan Elementary School
Radnor Township School District – Applicant

Date Accepted: May 5, 2014
90 Day Expiration: August 8, 2014

Gannett Fleming, Inc. has completed a review of the Ithan Elementary School Preliminary/Final Land Development Plans for compliance with the Radnor Township Code.

The existing property is located in the PLU zoning district. The applicant is proposing to construct a building addition to the Ithan Elementary School and relocate a walkway on the property.

This Land Development Application is subject to Zoning, Subdivision and Land Development, Stormwater Management, and other applicable codes of the Township of Radnor.

The applicant has indicated that the following waivers will be requested from the Subdivision and Land Development Code:

- §255-12 – Formal request from the land development process
- §255-20.B.5 – To not provide the transportation impact study
- §255-21(n) – Modification to allow an aerial photograph to depict features within 500' of property

Plans Prepared By: Momenee & Associates, Inc.
Dated: 05/02/2014, No Revisions



Gannett Fleming

I. Zoning

1. §280-103 – Off-street parking calculations should be provided that indicate the number of additional parking spaces required for this project.

II. Stormwater Management

1. A general note shall be added to the plans indicating that a grading plan and erosion sediment and control plans will be submitted and approved prior to issuing any building permits. Any revisions to the size or location of the individual structures or other features will be addressed at that time, and a final approval of the stormwater management plan will be required as part of the Grading Permit process.
2. Percolation tests must be provided to indicate that the stormwater facility will be able to drain within 96 hours. Final design and sizing of the stormwater facility should be based on the results of the percolation tests.

Should the Planning Commission consider recommending approval of this project, we recommend that the recommendation be conditioned on requiring the applicant to satisfactorily address the above comments.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.
Senior Project Manager



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

MEMORANDUM

Date: May 23, 2014

To: Steve Norcini, P.E.
Radnor Township Public Works Director

From: Damon Drummond, P.E., PTOE
G&A Senior Transportation Engineer

cc: Roger Phillips, P.E. - Gannett Fleming, Inc., Senior Project Manager
Amy Kaminski, P.E., PTOE - G&A Department Manager of Transportation
Kristin Norwood, P.E. - G&A Senior Transportation Engineer

Reference: The Ithan Elementary School (TMP 36-45-054-000)
Preliminary/Final Land Development Review
G&A Job #14-05022

Pursuant to your request, Gilmore & Associates, Inc. has completed a transportation review of the referenced Preliminary/Final Land Development Plans for Ithan Elementary School. The applicant proposes to construct an one-story building addition and walkway improvements at the existing elementary school situated on a 46.99 acre parcel. We offer the following for Radnor Township's consideration:

A. REVIEWED MATERIALS

1. Preliminary/Final Land Development Plans for The Ithan Elementary School dated May 02, 2014, prepared for Radnor Township School District by Momenee and Associates, Inc. (8 sheets).

B. REQUESTED SALDO WAIVERS

1. §255-12: Waiver request from the formal land development process.
2. §255-20.B.5: Waiver request from providing a Transportation Impact Study.
3. §255-21(n): Waiver request to use aerial photograph to depict features within 500' of the property.

C. PRELIMINARY/FINAL LAND DEVELOPMENT PLAN REVIEW COMMENTS

1. §255-20.A(5): The plan should clearly indicate which features are existing and which are proposed. Provide shading or hatching or another technique to clearly indicate the proposed building construction.

Steve Norcini, P.E.
The Ithan Elementary School
May 23, 2014

2. §255-20.B(5): Provide clarification as to whether the expansion is to accommodate additional students and/or staff and therefore generating additional trips.
3. §255-37: Ensure that the proposed walkway is ADA compliant. Provide a detail of the walkway indicating the width, grades, and cross-slopes.
4. Provide a R5-1 Do Not Enter at the end of the one-way circular driveway.
5. The proposed expansion is to be located in the vicinity of an existing playground. The applicant should indicate if this playground will be relocated and show the new location on the plans.
6. Provide existing driveway widths and radii. Include arrows showing the existing traffic circulation within the site distinguishing between bus and auto/carpool traffic to verify that adequate access is provided for the existing building and new expansion. Ensure that adequate access can be maintained for both vehicular and pedestrian traffic.

If you have any questions regarding the above, please contact this office.

ELAINE P. SCHAEFER
President

JAMES C. HIGGINS
Vice-President

WILLIAM A. SPINGLER

DONALD E. CURLEY

JOHN FISHER

JOHN NAGLE

RICHARD F. BOOKER



RADNOR TOWNSHIP
301 IVEN AVENUE
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600
Fax (610) 971-0450
www.radnor.com

ROBERT A. ZIENKOWSKI
Township Manager
Township Secretary

JOHN B. RICE, ESQ.
Solicitor

JOHN E. OSBORNE
Treasurer

May 13, 2014

Leo Bernabei
Radnor Township School District
135 S. Wayne Ave.
Wayne, PA 19087

**RE: Ithan Elementary School
Land Development Application #2014-D-05 Preliminary Plan**

Dear Mr. Bernabei:

In accordance with Section 255-18 of the Code of the Township of Radnor, we have performed a completeness review of your land development application to construct a building addition to the Ithan Elementary School and relocate a walkway on the property, and have determined your application to be administratively complete. Therefore, I have accepted the application for preliminary revised plan for review by the Township Staff, Shade Tree Commission, Planning Commission, and Board of Commissioners.

These plans are available for public viewing in the Engineering Department. These plans will be reviewed by the Planning Commission at their meeting on **Monday June 2, 2014**. Subsequent to the Planning Commission meeting, your plan will be reviewed by the Board of Commissioners. You or your representative should plan to attend all scheduled meetings.

If the Planning Commission takes action, your plan will then be reviewed by the Board of Commissioners at a future meeting. These dates will be provided to you once it is placed on the agenda.

If you have any questions or require any additional information, please contact me.

Sincerely,

Roger A. Phillips, PE
Township Engineer

CC: Momence & Associates, Inc.

MOMENEE AND ASSOCIATES, INC.

924 COUNTY LINE ROAD • BRYN MAWR, PENNSYLVANIA 19010

(610) 527-3030 • FAX (610) 527-9008

E-MAIL: info@momenee.com

www.momenee.com

May 2, 2014

Mr. Roger Phillips, P.E., Township Engineer
Radnor Township
301 Iven Avenue
Wayne, PA 19087

**RE: Ithan Elementary School
Wayne Elementary School
Preliminary / Final Land Development Applications
Radnor Township, Delaware County**

Our File No. 14-041

Our File No. 14-042

Dear Mr. Phillips:

On behalf of the Radnor Township School District, we are submitting land development applications for improvements associated with the Ithan Elementary School property and the Wayne Elementary School property. Along with this letter please find the following:

Ithan Elementary School

- One (1) copy of the signed Land Development Application,
- One (1) copy of the Delaware County Planning Commission review application,
- One (1) copy of the deed for the property,
- One (1) copy of the title report,
- A check in the amount of \$300 payable to "Treasurer of Delaware County",
- A check in the amount of \$1,550 payable to "Radnor Township",
- A check in the amount of \$10,000 payable to "Radnor Township",
- Two (2) copies of the Post Construction Stormwater Management Report,
- 35 copies of the Preliminary/Final Land Development Plans.

The Radnor Township School District proposes to construct a building addition to the Ithan Elementary School and to relocate a walkway on the property. The new one-story addition will consist of two new classrooms. The new improvements will create a slight increase in the total impervious cover on the property.

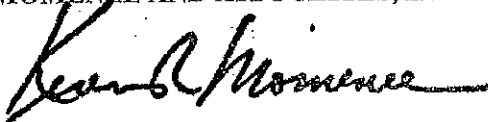
Wayne Elementary School

- One (1) copy of the signed Land Development Application,
- One (1) copy of the Delaware County Planning Commission review application,
- One (1) copy of the deed for the property,
- A check in the amount of \$400 payable to "Treasurer of Delaware County",
- A check in the amount of \$1,550 payable to "Radnor Township",
- A check in the amount of \$10,000 payable to "Radnor Township",
- Two (2) copies of the Post Construction Stormwater Management Report
- 35 copies of the Preliminary/Final Land Development Plans.

The Radnor Township School District proposes to construct a building addition to the Wayne Elementary School. The new one-story addition will consist of a new classroom and other multi-purpose rooms. In addition, the existing one-story building currently used for overflow classrooms will be removed. The new improvements will create an overall decrease in the total impervious cover on the property.

By filing these applications, the Radnor Township School District wishes to have these matters placed on the June 2, 2014 agenda of the Planning Commission meeting and the June meetings of the Board of Commissioners. If you have any questions or require any further information, please do not hesitate to contact me. Thank you for your attention to this matter.

Very truly yours,
MOMENEE AND ASSOCIATES, INC.

A handwritten signature in black ink, appearing to read "Kevin R. Momenee", written over a horizontal line.

Kevin R. Momenee, P.E., P.L.S.

14042L01.doc

cc: Leo Bernabei - Radnor Township School District

RADNOR TOWNSHIP
301 IVEN AVE
WAYNE PA 19087
P) 610 688-5600
F) 610 971-0450
WWW.RADNOR.COM

SUBDIVISION ~ LAND DEVELOPMENT

Location of Property 695 Clyde Road, Bryn Mawr, Pa 19010

Zoning District PLU Application No. _____
(Twp. Use)

Fee \$1,550.00 Ward No. 4-1 Is property in HARB District No

Applicant: (Choose one) Owner Equitable Owner

Name RADNOR TOWNSHIP SCHOOL DISTRICT

Address 135 S. WAYNE AVE. WAYNE, PA 19087

Telephone 610-688-8100 Fax 610-902-0207 Cell _____

Email LEO.BERNABEI@RTSD.ORG

Designer: (Choose one) Engineer Surveyor

Name Kevin R. Momenee, P.E., P.L.S.

Address 924 County Line Road, Bryn Mawr, Pa 19010

Telephone 610-527-3030 Fax 610-527-9008 Cell _____

Email kmomenee@momenee.com

Area of property 46.99 ac Area of disturbance 0.5 ac

Number of proposed buildings 1 Proposed use of property Institutional

Number of proposed lots 1

Plan Status: Sketch Plan Preliminary Final Revised

Are there any requirements of Chapter 255 (SALDO) not being adhered to?

Explain the reason for noncompliance.

255-12 - Waiver request from the formal land development process
255-20.B.5 - To not provide a Transportation Impact Study
255-21(c) - Modification to allow an aerial photograph to depict features within 500' of property.

Are there any infringements of Chapter 280 (Zoning), and if so what and why?

NO

Individual/Corporation/Partnership Name

RADNOR TOWNSHIP SCHOOL DISTRICT

I do hereby certify that I am the owner, equitable owner or authorized representative of the property which is the subject of this application.

Signature

Timothy E. Val

Print Name

Timothy E. Val

By filing this application, you are hereby granting permission to Township officials to visit the site for review purposes.

NOTE:

All requirements of Chapter 255 (Subdivision of Lane) of the Code of the Township of Radnor must be complied with whether or not indicated in this application.

DELAWARE COUNTY PLANNING COMMISSION

APPLICATION FOR ACT 247 REVIEW

Incomplete applications will be returned and will not be considered "received" until all required information is provided.

Please type or print legibly

DEVELOPER/APPLICANT

Name Radnor Township School District E-mail leo.bernabei@rtsd.org

Address 135 S. Wayne Avenue Wayne, PA 19087 Phone 610-688-8100 Ext 6103

Name of Development Ithan Elementary School

Municipality Radnor Township

ARCHITECT, ENGINEER, OR SURVEYOR

Name of Firm Momenee & Associates, Inc. Phone 610-527-3030

Address 924 County Line Road, Bryn Mawr, Pa 19010

Contact Kevin R. Momenee, P.E., P.L.S. E-mail knomenee@momenee.com

Type of Review	Plan Status	Utilities		Environmental Characteristics
		Existing	Proposed	
<input type="checkbox"/> Zoning Change	<input type="checkbox"/> Sketch	<input checked="" type="checkbox"/> Public Sewerage	<input checked="" type="checkbox"/> Public Sewerage	
<input checked="" type="checkbox"/> Land Development	<input checked="" type="checkbox"/> Preliminary	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Wetlands
<input type="checkbox"/> Subdivision	<input type="checkbox"/> Final	<input checked="" type="checkbox"/> Public Water	<input checked="" type="checkbox"/> Public Water	<input type="checkbox"/> Floodplain
<input type="checkbox"/> PRD	<input type="checkbox"/> Tentative	<input type="checkbox"/> Private Water	<input type="checkbox"/> Private Water	<input checked="" type="checkbox"/> Steep Slopes

Zoning District PLU

Tax Map # 36 / 45 / 054

Tax Folio # 36 / 04 / 02120 / 50

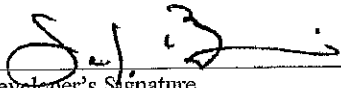
STATEMENT OF INTENT
WRITING "SEE ATTACHED PLAN" IS NOT ACCEPTABLE.

Existing and/or Proposed Use of Site/Buildings:

Existing elementary school to be expanded by adding two classrooms and associated walkways.

Total Site Area 19.939 Acres
Size of All Existing Buildings 89,213 Square Feet
Size of All Proposed Buildings 91,983 Square Feet
Size of Buildings to be Demolished 0 Square Feet

LEO BERNARDI
Print Developer's Name


Developer's Signature

MUNICIPAL SECTION
ALL APPLICATIONS AND THEIR CONTENT ARE A MUNICIPAL RESPONSIBILITY.

Local Planning Commission Regular Meeting _____

Local Governing Body Regular Meeting _____

Municipal request for DCPD staff comments prior to DCPC meeting, to meet municipal meeting date:

Actual Date Needed _____

IMPORTANT: If previously submitted, show assigned DCPD File # _____

Print Name and Title of Designated Municipal Official

Phone Number

Official's Signature

Date

FOR DCPD USE ONLY

Review Fee: Check # _____ Amount \$ _____ Date Received _____

Applications with original signatures must be submitted to DCPD.

**POST CONSTRUCTION STORMWATER
MANAGEMENT REPORT FOR
ITHAN ELEMENTARY SCHOOL**

TOWNSHIP OF RADNOR

JOB #14-041

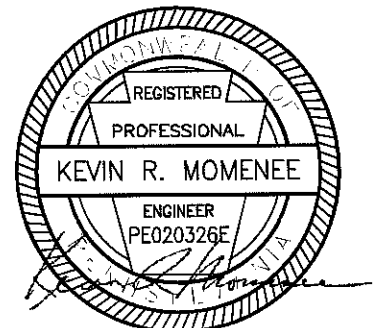
BY

MOMENEE AND ASSOCIATES, INC,

924 COUNTY LINE ROAD

BRYN MAWR, PA 19010

MAY 2, 2014



PROJECT NARRATIVE ITHAN ELEMENTARY SCHOOL

The Ithan Elementary School is a 46.99-acre development located northeast of the intersection of Sproul Road and South Bryn Mawr Avenue in Radnor Township. It is proposed to construct an addition to the existing school building along with other associated improvements. Some existing walkways and other impervious areas are proposed to be removed. The project will create 4,346 SF of new and/or replacement impervious cover. Due to Radnor Township regulations, storm water management will be provided. The site is developed under the provisions of Radnor Township's Regulations. These calculations are included as part of a Grading Permit for the site.

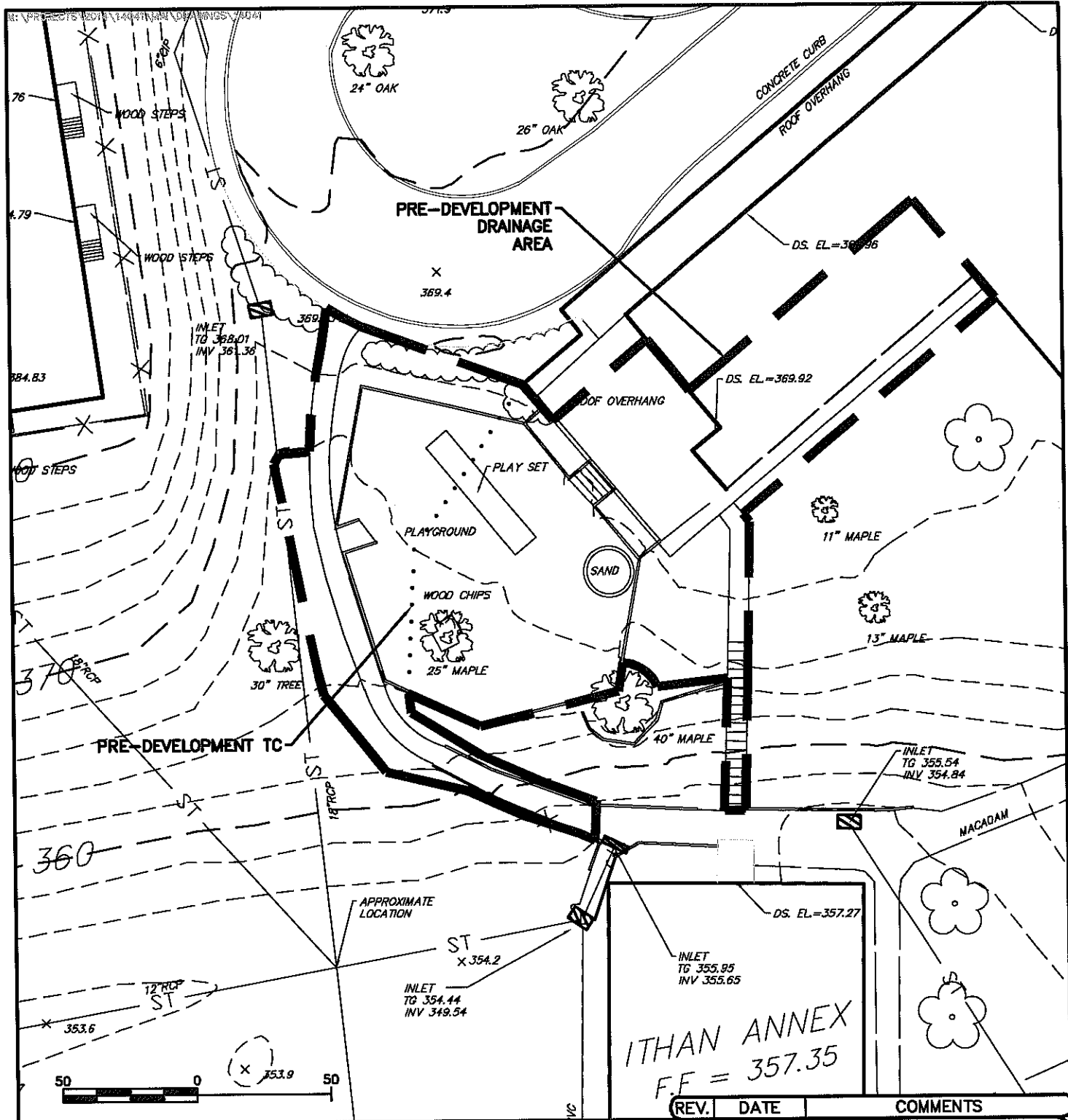
Storm water management is provided by one perforated pipe system sized to control the increase in storm water runoff from the developed sub-basin. This site is located in the Darby Creek watershed District B-2; as a result, several stormwater management guidelines were met. The increase in storm water runoff for the 2-year storm event must be recharged into the ground via percolation. Water quality treatment must be provided based on the township's calculation formula. The rate control through the 100-year storm must be provided as well as making the following reductions: the 2-year post rate shall be reduced to the 1-year pre rate, the 5-year post rate shall be reduced to the 2-year rate, the 10-year and 25-year post rates shall be reduced to the 5-year rate, the 50-year post rate shall be reduced to the 10-year rate.

Stormwater management system #1 consists of 20 linear feet of 72" fully perforated corrugated metal pipe. The system will be installed down grade of the new building addition and will collect and control the runoff from the new roof area via roof downspout leaders and conveyance piping. Discharge from the pipe system is piped to an existing inlet downgrade of the system. The pipe system is designed to provide groundwater recharge for the volume generated by the 2-year storm event for the new and/or replacement impervious surfaces.

In order to size the on lot storm facilities to contain the volume of runoff increase for the 2-year storm, the developed portion of the lot was evaluated by the Universal Rational method to determine the volume increase in runoff. C coefficients were assigned to the developed portion of the lot based on soil conditions and vegetation. The subbasin was established based on the location of the proposed storm facilities and the contributory post development watershed. Preliminary system design was based on the volume required to recharge the increase in the 2-year storm runoff generated by the proposed impervious cover. Once the volume increase was calculated, the storm facilities were sized to provide this minimum storage volume. Hydrographs were then calculated for both pre and post development conditions to determine the need for rate control. Times of concentration were established for the subbasin and each development condition and used to determine the peak rates of runoff.

The perforated pipe system was then further refined to provide control of the post development runoff rates. Post development flows were routed through the pipe system and volumes were adjusted along with outlet controls to limit the post development runoff to rates required by township ordinances.

An attached table summarizes the analysis of the lot. Detailed calculations and support data are included as part of this report.



ITHAN ANNEX
F.F. = 357.35

REV.	DATE	COMMENTS

**PRE DEVELOPMENT DRAINAGE AREA MAP
ITHAN ELEMENTARY SCHOOL**

DATE: MAY 2, 2014
SHEET NO.

MOMENEE & ASSOCIATES, INC.
CIVIL ENGINEERS AND LAND SURVEYORS
924 COUNTY LINE ROAD, BRYN MAWR, PA 19010 PHONE: (610) 527-3030 FAX: (610) 527-9008

1
OF 2
SCALE: 1" = 50'
FILE NO.: 14-041



ITHAN ANNEX
 F.F. = 357.35

REV.	DATE	COMMENTS

POST DEVELOPMENT DRAINAGE AREA MAP
 ITHAN ELEMENTARY SCHOOL

DATE: MAY 2, 2014
SHEET NO.
2
OF 2
SCALE: 1" = 50'
FILE NO.: 14-041

MOMENEE & ASSOCIATES, INC.
 CIVIL ENGINEERS AND LAND SURVEYORS
 924 COUNTY LINE ROAD, BRYN MAWR, PA 19010 PHONE: (610) 527-3030 FAX: (610) 527-9008

MOMENEE AND ASSOCIATES, INC.

CONSULTING ENGINEERS
 924 COUNTY LINE ROAD
 BRYN MAWR, PA 19010

JOB NAME: ITHAN ELEMENTARY SCHOOL
 LOCATION: RADNOR TOWNSHIP DELAWARE COUNTY

SUMMARY OF SITE RUNOFF:

PRE-DEVELOPMENT CONDITIONS

	1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
ENTIRE WATERSHED :	0.503	0.579	0.679	0.768	0.856	0.956	1.032
ALLOWABLE DISCHARGE :	0.503	0.503	0.579	0.679	0.679	0.768	1.032

POST DEVELOPMENT CONDITIONS

	1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
CONTROLLED SUBAREA #1:	0.000	0.030	0.159	0.225	0.286	0.350	0.422
UNCONTROLLED AREA :	0.203	0.230	0.270	0.310	0.345	0.386	0.417
TOTAL POST DEVELOPMENT :	0.203	0.260	0.429	0.535	0.631	0.736	0.839
ACTUAL POST DEVELOPMENT REDUCTION :	0.300	0.319	0.250	0.233	0.225	0.220	0.193

VOLUME CONTROL SUMMARY (2-YR) :

PREDEVELOPMENT :	521	CF
CONTROLLED AREA :	442	CF
UNCONTROLLED AREA :	210	CF
RECHARGE REQUIRED :	131	CF
SWMS VOLUME IN :	442	CF
SWMS VOLUME OUT :	0	CF
RECHARGE PROVIDED :	442	CF

MOMENEE AND ASSOCIATES, INC.

CONSULTING ENGINEERS
924 COUNTY LINE ROAD
BRYN MAWR, PA 19010

JOB NAME: ITHAN ELEMENTARY SCHOOL
LOCATION: RADNOR TOWNSHIP DELAWARE COUNTY

C CALCULATIONS FOR PREDEVELOPMENT AREA:

PRE-DEVELOPMENT C :	0.55		
PRE-DEVELOPMENT AREA :	9976 SF		0.229 ACRES
SOIL TYPE B - MEADOW		C = 0.25	5938 SF
IMPERVIOUS		C = 0.99	4038 SF
<hr/>			
CONTROLLED SUBAREA #1 C :	0.99		
CONTROLLED SUBAREA #1 AREA :	4692 SF		0.108 ACRES
SOIL TYPE B - LAWN		C = 0.25	0 SF
IMPERVIOUS		C = 0.99	4692 SF 100.0%
UNCONTROLLED C :	0.42		
UNCONTROLLED AREA :	5284 SF		0.121 ACRES
SOIL TYPE B - LAWN		C = 0.25	4066 SF
IMPERVIOUS		C = 0.99	1218 SF
POST-DEVELOPMENT C :	0.69		
POST-DEVELOPMENT AREA :	9976 SF		0.229 ACRES
SOIL TYPE B - LAWN		C = 0.25	4066 SF
IMPERVIOUS		C = 0.99	5910 SF
NET INCREASE			1872 SF

MOMENEE AND ASSOCIATES, INC.

CONSULTING ENGINEERS
924 COUNTY LINE ROAD
BRYN MAWR, PA 19010

JOB NAME: ITHAN ELEMENTARY SCHOOL
LOCATION: RADNOR TOWNSHIP DELAWARE COUNTY

WATER QUALITY VOLUME

$$WQ_v = [P \cdot R_v \cdot A] / 12$$

P = 1 INCH

A = AREA OF PROJECT CONTRIBUTING TO WATER QUALITY BMP's

$$R_v = 0.05 + 0.009I$$

I = PERCENT OF IMPERVIOUS COVERAGE

A = 0.108 ACRES
I = 100.00 %
R_v = 0.9500

WQ_v = 0.0086 ACRE-FEET
WQ_v = 372 CF

**RECHARGE CALCULATIONS FOR THE FIRST INCH OF RUNOFF
GENERATED FROM THE PROPOSED IMPROVEMENTS**

FORMULA USED: $Rev = I \cdot \text{Proposed Impervious Area (square feet)} / 12 \text{ (inches/foot)}$

WHERE:
I = 1.0 inch
Proposed Impervious Area = 4346 square feet
Rev = 362 cubic feet

INFILTRATION VOLUME PROVIDED (FT³) :

	Volume In (ft ³)	Volume Out (ft ³)	Recharge Volume (ft ³)
SWM #1	442	0	442
TOTAL :			442

Time of Concentration (T_c) Worksheet

Project ITHAN ELEMENTARY SCHOOL By JRM Date 5/2/2014
 Location RADNOR TOWNSHIP, DELAWARE COUNTY Checked _____ Date _____

PRE-DEVELOPMENT T_c:

<u>Flow Path</u>	Segment ID	A			
Surface Description		LAWN			
Flow Length, L.....	ft	76			
Watercourse Slope, s.....	ft/ft	0.06			
Average Velocity, V (Table 2.10.4.2).....	ft/sec	1.50			
T = L / 60V Compute T _c	min	0.84			= 0.84
Total Time of Concentration	min				0.84

***USE THE MINIMUM TIME OF CONCENTRATION OF 5 MINUTES**

CONTROLLED #1 T_c:

<u>Flow Path</u>	Segment ID	A	B		
Surface Description		PAVED	PIPE		
Flow Length, L.....	ft	44	73		
Watercourse Slope, s.....	ft/ft	0.08			
Average Velocity, V (Table 2.10.4.2).....	ft/sec	15.50	5.00		
T = L / 60V Compute T _c	min	0.05	0.24		= 0.29
Total Time of Concentration	min				0.29

***USE THE MINIMUM TIME OF CONCENTRATION OF 5 MINUTES**

UNCONTROLLED T_c:

<u>Flow Path</u>	Segment ID	A			
Surface Description		LAWN			
Flow Length, L.....	ft	76			
Watercourse Slope, s.....	ft/ft	0.06			
Average Velocity, V (Table 2.10.4.2).....	ft/sec	1.50			
T = L / 60V Compute T _c	min	0.84			= 0.84
Total Time of Concentration	min				0.84

***USE THE MINIMUM TIME OF CONCENTRATION OF 5 MINUTES**

MOMENEE AND ASSOCIATES, INC.
 924 COUNTY LINE ROAD
 BRYN MAWR, PA 19010

6' DIAMETER PERFORATED CMP

LENGTH OF 6 FT CMP = 20 FT

TOTAL VOLUME OF STORAGE PROVIDED = 564.2 CF

AREA OF STORAGE:

ELEV.	PIPE HEIGHT (FT)	WIDTH OF PIPE (FT)	PIPE STRG. (SF)	VOLUME STRG. (CF)
359.00	0	0	0.0	0.0
359.10	0.1	1.54	30.7	1.5
359.20	0.2	2.15	43.1	5.2
359.30	0.3	2.62	52.3	10.0
359.40	0.4	2.99	59.9	15.6
359.50	0.5	3.32	66.3	21.9
359.60	0.6	3.60	72.0	28.8
359.70	0.7	3.85	77.0	36.3
359.80	0.8	4.08	81.6	44.2
359.90	0.9	4.28	85.7	52.6
360.00	1.0	4.47	89.4	61.3
360.10	1.1	4.64	92.9	70.5
360.20	1.2	4.80	96.0	79.9
360.30	1.3	4.94	98.9	89.6
360.40	1.4	5.08	101.5	99.7
360.50	1.5	5.20	103.9	109.9
360.60	1.6	5.31	106.1	120.4
360.70	1.7	5.41	108.1	131.1
360.80	1.8	5.50	110.0	142.1
360.90	1.9	5.58	111.6	153.1
361.00	2.0	5.66	113.1	164.4
361.10	2.1	5.72	114.5	175.8
361.20	2.2	5.78	115.7	187.3
361.30	2.3	5.83	116.7	198.9
361.40	2.4	5.88	117.6	210.6
361.50	2.5	5.92	118.3	222.4
361.60	2.6	5.95	118.9	234.2
361.70	2.7	5.97	119.4	246.2
361.80	2.8	5.99	119.7	258.1
361.90	2.9	6.00	119.9	270.1
362.00	3	6.00	120.0	282.1
362.10	3.1	6.00	119.9	294.1
362.20	3.2	5.99	119.7	306.1

362.30	3.3	5.97	119.4	318.0
362.40	3.4	5.95	118.9	330.0
362.50	3.5	5.92	118.3	341.8
362.60	3.6	5.88	117.6	353.6
362.70	3.7	5.83	116.7	365.3
362.80	3.8	5.78	115.7	376.9
362.90	3.9	5.72	114.5	388.4
363.00	4	5.66	113.1	399.8
363.10	4.1	5.58	111.6	411.1
363.20	4.2	5.50	110.0	422.1
363.30	4.3	5.41	108.1	433.1
363.40	4.4	5.31	106.1	443.8
363.50	4.5	5.20	103.9	454.3
363.60	4.6	5.08	101.5	464.5
363.70	4.7	4.94	98.9	474.6
363.80	4.8	4.80	96.0	484.3
363.90	4.9	4.64	92.9	493.7
364.00	5	4.47	89.4	502.9
364.10	5.1	4.28	85.7	511.6
364.20	5.2	4.08	81.6	520.0
364.30	5.3	3.85	77.0	527.9
364.40	5.4	3.60	72.0	535.4
364.50	5.5	3.32	66.3	542.3
364.60	5.6	2.99	59.9	548.6
364.70	5.7	2.62	52.3	554.2
364.80	5.8	2.15	43.1	559.0
364.90	5.9	1.54	30.7	562.7
365.00	6	0.00	0.0	564.2

DATE 5/2/2014
BY JRM

PROJECT ITHAN ELEMENTARY SCHOOL
LOCATION RADNOR TOWNSHIP, DELAWARE COUNTY

FROM	TO	INCREMENT AREA		SUM OF TIME TO INLET	T	FLOW TIME IN PIPE	I	RAINFALL INTENSITY	C	ΔCA	ACRES	ACRES	CA	Q	DISCHARGE	L	FT	S	FT/FT	N	ROUGHNESS COEFFICIENT	PIPE SIZE	PIPE TYPE	V	FPS	Q	JUST FULL CAPACITY	INVERT UPPER END	FT	INVERT LOWER END	REMARKS
		ΔA	ACRES																												

SWM BASIN #1																															
ROOF	SUMP BOX	0.11	5	5	8.2	0.95	0.10	0.10	0.85	13	0.9515	0.011	6	PVC	7.88	1.51	366.17	365.50	368.17												
SUMP BOX	SWM #1	0.00	5	5	8.2	0.00	0.00	0.10	0.85	35	0.0286	0.011	6	PVC	6.27	1.12	365.50	364.50	367.50												
SWM #1	EX. INLET	Q ₁₀₀	FROM HYDROLOGIC STUDY →						0.42	61	0.9682	0.011	6	PVC	7.24	1.73	359.00	354.84	367.50												

Hydraflow Table of Contents

14041.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

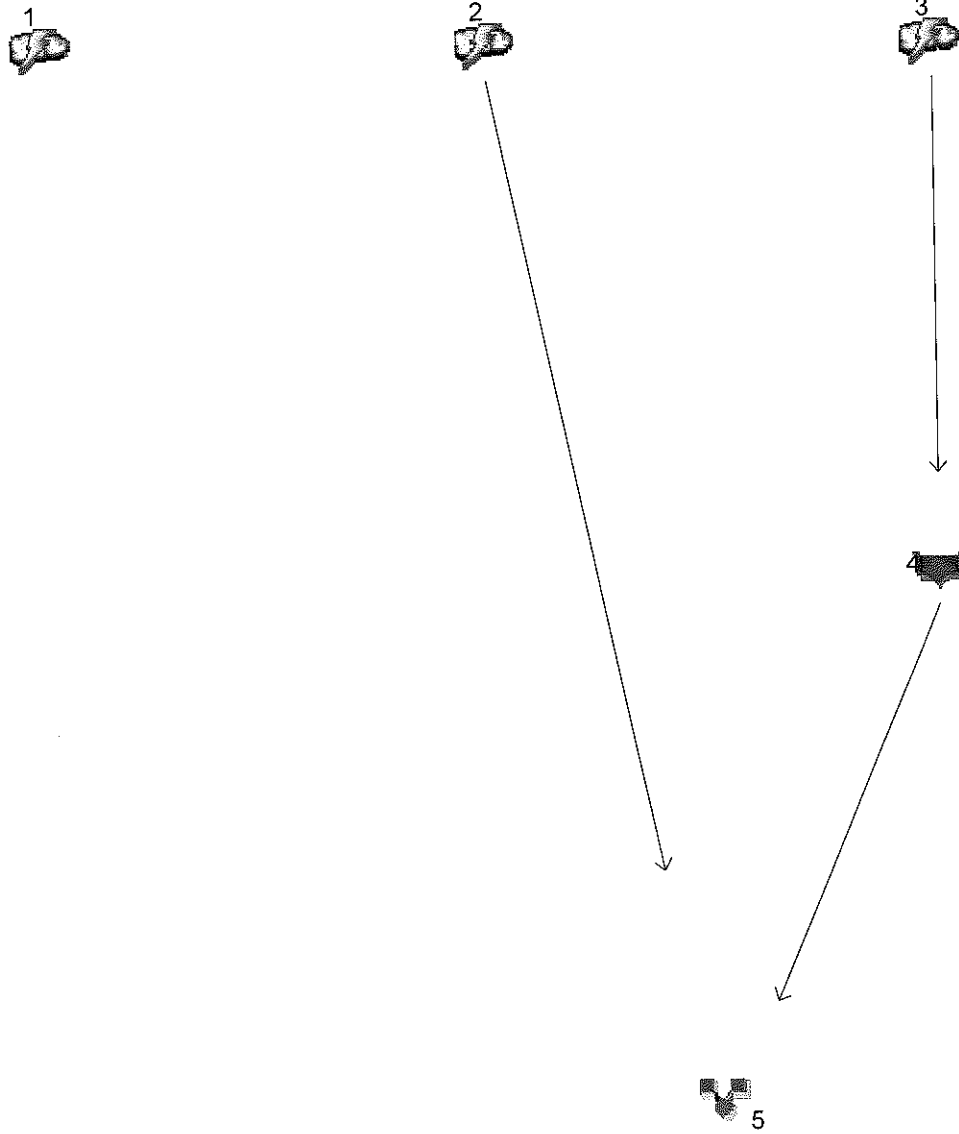
Thursday, 05 / 1 / 2014

Watershed Model Schematic.....	1
Hydrograph Return Period Recap.....	2
1 - Year	
Summary Report.....	3
Hydrograph Reports.....	4
Hydrograph No. 1, Rational, Pre Development.....	4
Hydrograph No. 2, Rational, Post Uncontrolled.....	5
Hydrograph No. 3, Rational, Controlled SWM Basin #1.....	6
Hydrograph No. 4, Reservoir, SWM BASIN #1.....	7
Pond Report - SWM #1.....	8
Hydrograph No. 5, Combine, Total Post.....	10
2 - Year	
Summary Report.....	11
Hydrograph Reports.....	12
Hydrograph No. 1, Rational, Pre Development.....	12
Hydrograph No. 2, Rational, Post Uncontrolled.....	13
Hydrograph No. 3, Rational, Controlled SWM Basin #1.....	14
Hydrograph No. 4, Reservoir, SWM BASIN #1.....	15
Hydrograph No. 5, Combine, Total Post.....	16
5 - Year	
Summary Report.....	17
Hydrograph Reports.....	18
Hydrograph No. 1, Rational, Pre Development.....	18
Hydrograph No. 2, Rational, Post Uncontrolled.....	19
Hydrograph No. 3, Rational, Controlled SWM Basin #1.....	20
Hydrograph No. 4, Reservoir, SWM BASIN #1.....	21
Hydrograph No. 5, Combine, Total Post.....	22
10 - Year	
Summary Report.....	23
Hydrograph Reports.....	24
Hydrograph No. 1, Rational, Pre Development.....	24
Hydrograph No. 2, Rational, Post Uncontrolled.....	25
Hydrograph No. 3, Rational, Controlled SWM Basin #1.....	26
Hydrograph No. 4, Reservoir, SWM BASIN #1.....	27
Hydrograph No. 5, Combine, Total Post.....	28
25 - Year	
Summary Report.....	29
Hydrograph Reports.....	30
Hydrograph No. 1, Rational, Pre Development.....	30
Hydrograph No. 2, Rational, Post Uncontrolled.....	31
Hydrograph No. 3, Rational, Controlled SWM Basin #1.....	32
Hydrograph No. 4, Reservoir, SWM BASIN #1.....	33

Hydrograph No. 5, Combine, Total Post.....	34
50 - Year	
Summary Report.....	35
Hydrograph Reports.....	36
Hydrograph No. 1, Rational, Pre Development.....	36
Hydrograph No. 2, Rational, Post Uncontrolled.....	37
Hydrograph No. 3, Rational, Controlled SWM Basin #1.....	38
Hydrograph No. 4, Reservoir, SWM BASIN #1.....	39
Hydrograph No. 5, Combine, Total Post.....	40
100 - Year	
Summary Report.....	41
Hydrograph Reports.....	42
Hydrograph No. 1, Rational, Pre Development.....	42
Hydrograph No. 2, Rational, Post Uncontrolled.....	43
Hydrograph No. 3, Rational, Controlled SWM Basin #1.....	44
Hydrograph No. 4, Reservoir, SWM BASIN #1.....	45
Hydrograph No. 5, Combine, Total Post.....	46
IDF Report.....	47

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3



Legend

<u>Hyd.</u>	<u>Origin</u>	<u>Description</u>
1	Rational	Pre Development
2	Rational	Post Uncontrolled
3	Rational	Controlled SWM Basin #1
4	Reservoir	SWM BASIN #1
5	Combine	Total Post

Hydrograph Return Period Recap

Hydroflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Rational	-----	0.503	0.579	-----	0.679	0.768	0.856	0.956	1.032	Pre Development
2	Rational	-----	0.203	0.234	-----	0.274	0.310	0.345	0.386	0.417	Post Uncontrolled
3	Rational	-----	0.427	0.491	-----	0.576	0.652	0.726	0.812	0.876	Controlled SWM Basin #1
4	Reservoir	3	0.000	0.030	-----	0.159	0.225	0.286	0.350	0.422	SWM BASIN #1
5	Combine	2, 4	0.203	0.234	-----	0.274	0.365	0.460	0.559	0.641	Total Post

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.503	1	15	453	-----	-----	-----	Pre Development
2	Rational	0.203	1	15	183	-----	-----	-----	Post Uncontrolled
3	Rational	0.427	1	15	384	-----	-----	-----	Controlled SWM Basin #1
4	Reservoir	0.000	1	367	0	3	362.81	379	SWM BASIN #1
5	Combine	0.203	1	15	183	2, 4	-----	-----	Total Post
14041.gpw					Return Period: 1 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

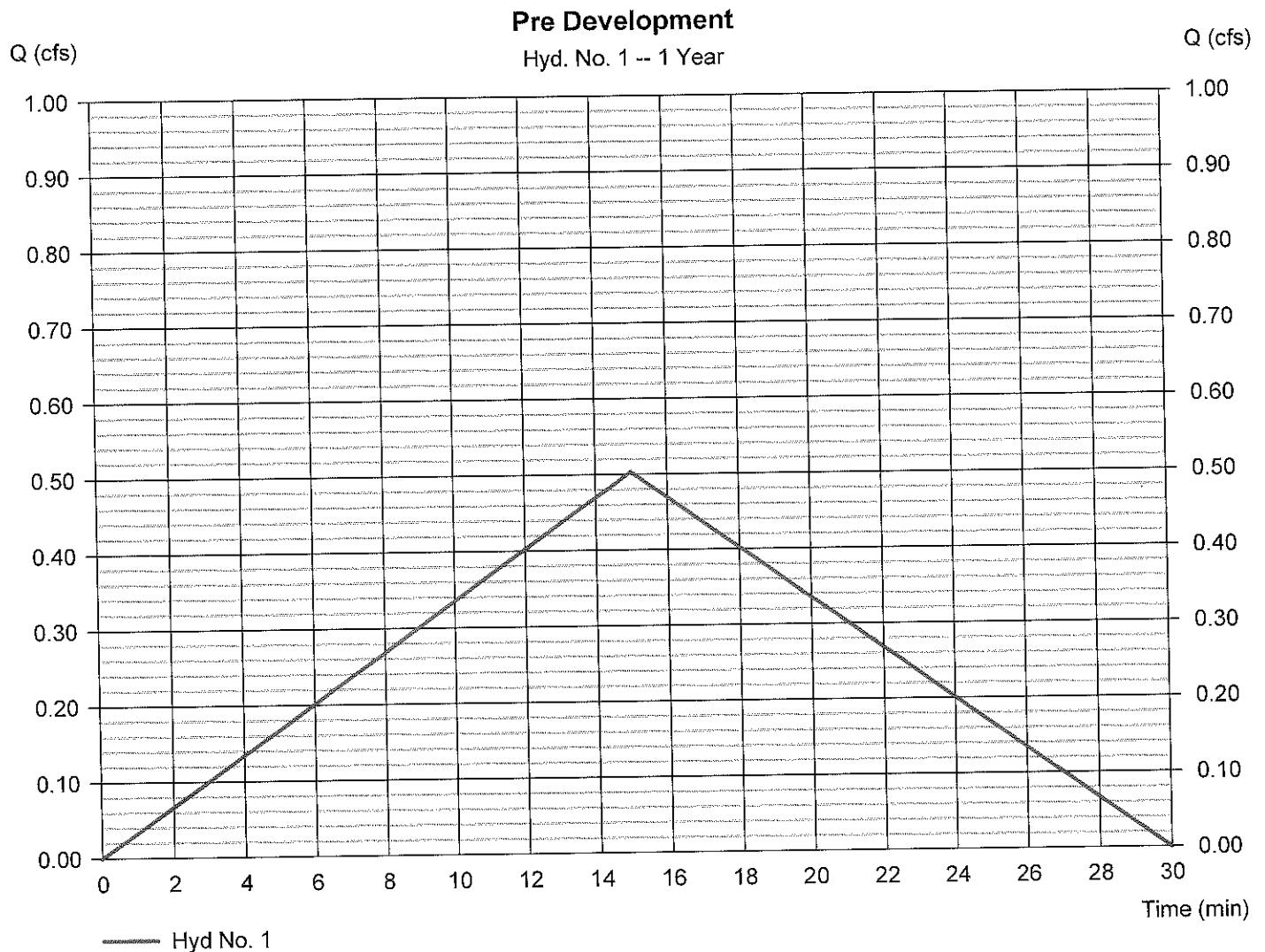
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.503 cfs
Storm frequency	= 1 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 453 cuft
Drainage area	= 0.229 ac	Runoff coeff.	= 0.55
Intensity	= 3.994 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

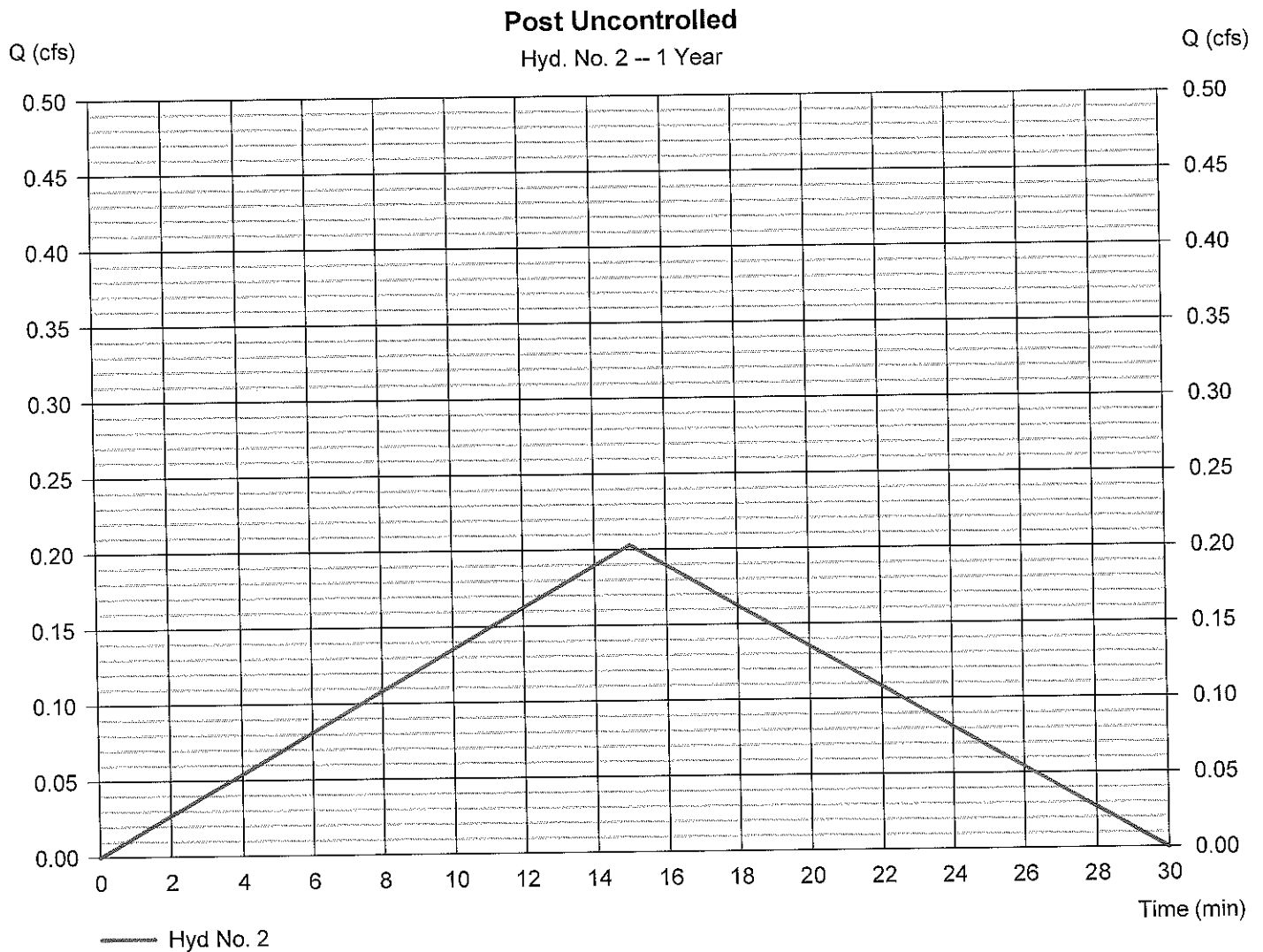
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 2

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.203 cfs
Storm frequency	= 1 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 183 cuft
Drainage area	= 0.121 ac	Runoff coeff.	= 0.42
Intensity	= 3.994 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

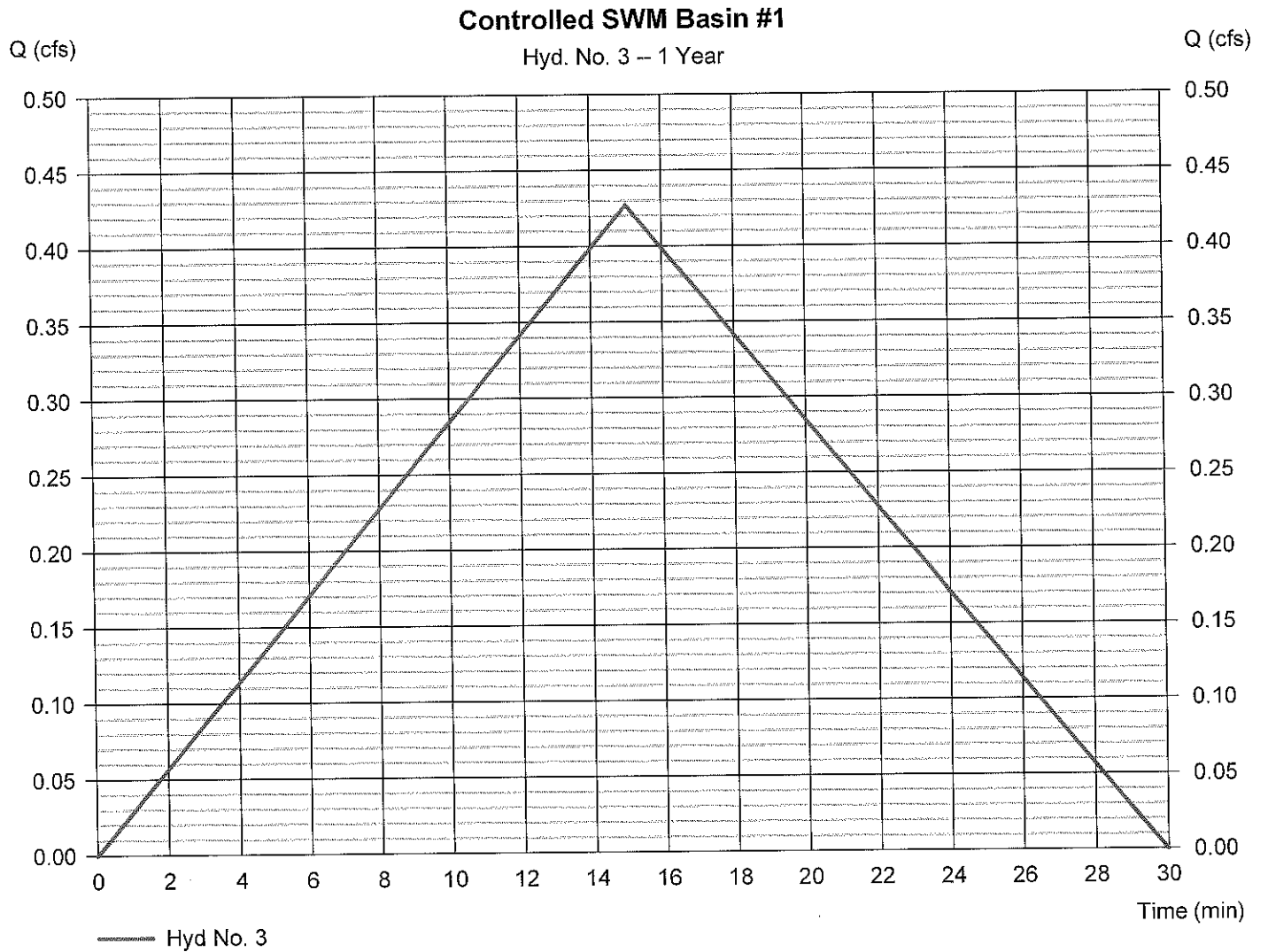
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.427 cfs
Storm frequency	= 1 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 384 cuft
Drainage area	= 0.108 ac	Runoff coeff.	= 0.99
Intensity	= 3.994 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

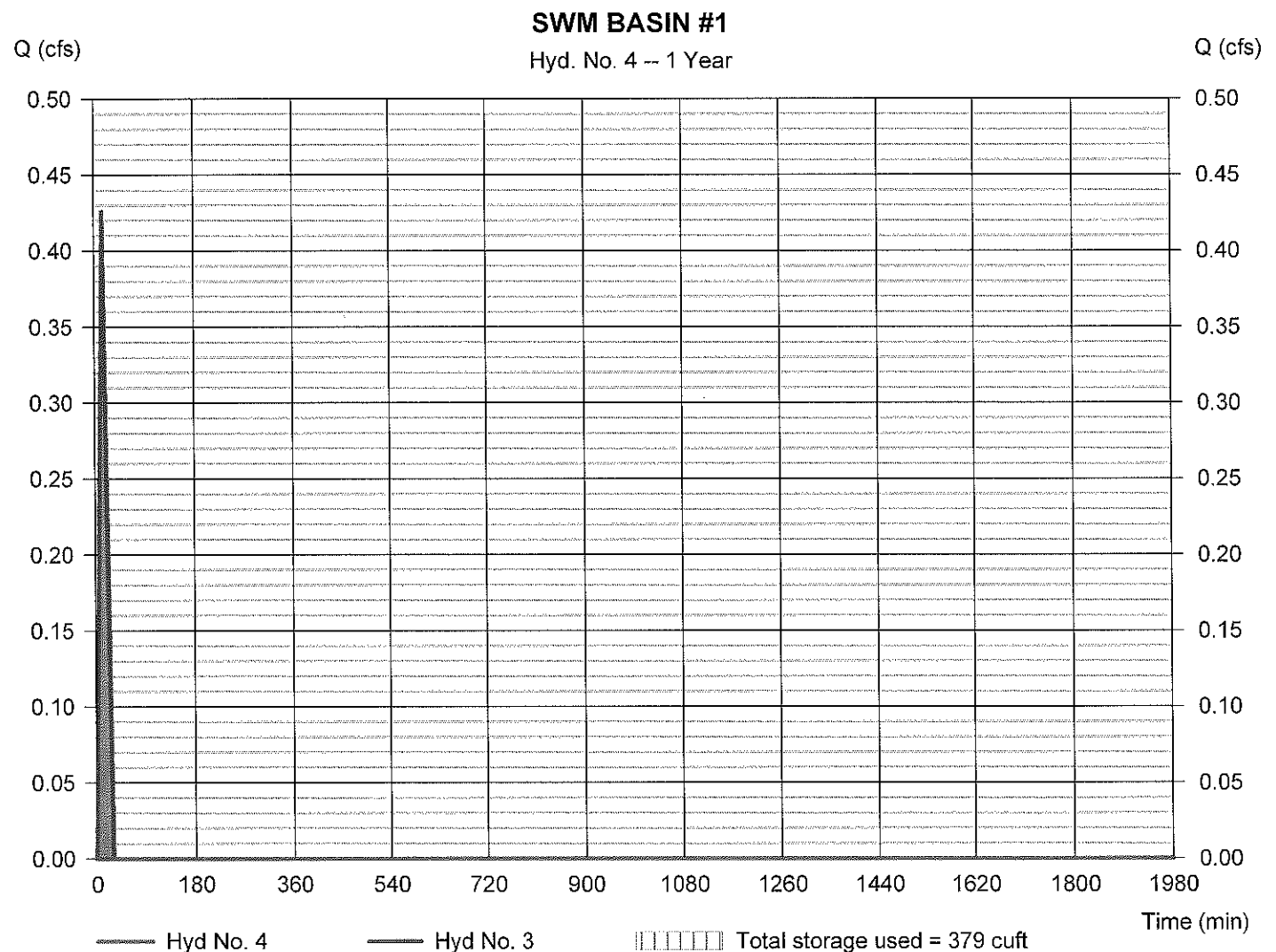
Thursday, 05 / 1 / 2014

Hyd. No. 4

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= 367 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - Controlled SWM Basin #1	Max. Elevation	= 362.81 ft
Reservoir name	= SWM #1	Max. Storage	= 379 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Pond No. 1 - SWM #1

Pond Data

UG Chambers -Invert elev. = 359.00 ft, Rise x Span = 6.00 x 6.00 ft, Barrel Len = 20.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	359.00	n/a	0	0
0.60	359.60	n/a	29	29
1.20	360.20	n/a	51	81
1.80	360.80	n/a	62	143
2.40	361.40	n/a	69	211
3.00	362.00	n/a	72	283
3.60	362.60	n/a	72	354
4.20	363.20	n/a	68	423
4.80	363.80	n/a	62	485
5.40	364.40	n/a	51	536
6.00	365.00	n/a	29	566

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	3.50	0.00	0.00
Span (in)	= 6.00	3.50	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 359.00	363.17	0.00	0.00
Length (ft)	= 61.00	0.00	0.00	0.00
Slope (%)	= 6.80	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.62	0.00	0.00	0.00
Crest El. (ft)	= 364.92	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 1.000	(by Wet area)		
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	359.00	0.00	0.00	---	---	0.00	---	---	---	0.000	---	0.000
0.06	3	359.06	0.00	0.00	---	---	0.00	---	---	---	0.001	---	0.001
0.12	6	359.12	0.00	0.00	---	---	0.00	---	---	---	0.001	---	0.001
0.18	9	359.18	0.00	0.00	---	---	0.00	---	---	---	0.001	---	0.001
0.24	12	359.24	0.00	0.00	---	---	0.00	---	---	---	0.001	---	0.001
0.30	15	359.30	0.00	0.00	---	---	0.00	---	---	---	0.001	---	0.001
0.36	18	359.36	0.00	0.00	---	---	0.00	---	---	---	0.001	---	0.001
0.42	21	359.42	0.00	0.00	---	---	0.00	---	---	---	0.001	---	0.001
0.48	24	359.48	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.54	26	359.54	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.60	29	359.60	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.66	35	359.66	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.72	40	359.72	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.78	45	359.78	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.84	50	359.84	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.90	55	359.90	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.96	60	359.96	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
1.02	65	360.02	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
1.08	70	360.08	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
1.14	75	360.14	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.20	81	360.20	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.26	87	360.26	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.32	93	360.32	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.38	99	360.38	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.44	105	360.44	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.50	112	360.50	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.56	118	360.56	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.62	124	360.62	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.68	130	360.68	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.74	137	360.74	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.80	143	360.80	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.86	150	360.86	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003

Continues on next page...

SWM #1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.92	156	360.92	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
1.98	163	360.98	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
2.04	170	361.04	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
2.10	177	361.10	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.16	184	361.16	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.22	191	361.22	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.28	198	361.28	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.34	204	361.34	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.40	211	361.40	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.46	218	361.46	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.52	226	361.52	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.58	233	361.58	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.64	240	361.64	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.70	247	361.70	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.76	254	361.76	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.82	261	361.82	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.88	269	361.88	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
2.94	276	361.94	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
3.00	283	362.00	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
3.06	290	362.06	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
3.12	297	362.12	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
3.18	304	362.18	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.24	311	362.24	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.30	319	362.30	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.36	326	362.36	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.42	333	362.42	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.48	340	362.48	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.54	347	362.54	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.60	354	362.60	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.66	361	362.66	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.72	368	362.72	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.78	375	362.78	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.84	382	362.84	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.90	389	362.90	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
3.96	396	362.96	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
4.02	402	363.02	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
4.08	409	363.08	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
4.14	416	363.14	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
4.20	423	363.20	0.00 ic	0.00 ic	---	---	0.00	---	---	---	0.006	---	0.008
4.26	429	363.26	0.02 ic	0.02 ic	---	---	0.00	---	---	---	0.006	---	0.023
4.32	435	363.32	0.05 ic	0.05 ic	---	---	0.00	---	---	---	0.006	---	0.051
4.38	442	363.38	0.08 ic	0.08 ic	---	---	0.00	---	---	---	0.006	---	0.087
4.44	448	363.44	0.11 ic	0.11 ic	---	---	0.00	---	---	---	0.006	---	0.120
4.50	454	363.50	0.14 ic	0.14 ic	---	---	0.00	---	---	---	0.006	---	0.144
4.56	460	363.56	0.16 ic	0.16 ic	---	---	0.00	---	---	---	0.006	---	0.165
4.62	466	363.62	0.18 ic	0.18 ic	---	---	0.00	---	---	---	0.006	---	0.183
4.68	473	363.68	0.19 ic	0.19 ic	---	---	0.00	---	---	---	0.006	---	0.200
4.74	479	363.74	0.21 ic	0.21 ic	---	---	0.00	---	---	---	0.006	---	0.216
4.80	485	363.80	0.22 ic	0.22 ic	---	---	0.00	---	---	---	0.006	---	0.230
4.86	490	363.86	0.24 ic	0.24 ic	---	---	0.00	---	---	---	0.006	---	0.244
4.92	495	363.92	0.25 ic	0.25 ic	---	---	0.00	---	---	---	0.006	---	0.256
4.98	500	363.98	0.26 ic	0.26 ic	---	---	0.00	---	---	---	0.006	---	0.269
5.04	506	364.04	0.27 ic	0.27 ic	---	---	0.00	---	---	---	0.006	---	0.280
5.10	511	364.10	0.28 ic	0.28 ic	---	---	0.00	---	---	---	0.007	---	0.291
5.16	516	364.16	0.30 ic	0.30 ic	---	---	0.00	---	---	---	0.007	---	0.302
5.22	521	364.22	0.31 ic	0.31 ic	---	---	0.00	---	---	---	0.007	---	0.313
5.28	526	364.28	0.32 ic	0.32 ic	---	---	0.00	---	---	---	0.007	---	0.323
5.34	531	364.34	0.33 ic	0.33 ic	---	---	0.00	---	---	---	0.007	---	0.332
5.40	536	364.40	0.34 ic	0.33 ic	---	---	0.00	---	---	---	0.007	---	0.342
5.46	539	364.46	0.34 ic	0.34 ic	---	---	0.00	---	---	---	0.007	---	0.351
5.52	542	364.52	0.35 ic	0.35 ic	---	---	0.00	---	---	---	0.007	---	0.360
5.58	545	364.58	0.36 ic	0.36 ic	---	---	0.00	---	---	---	0.007	---	0.369
5.64	548	364.64	0.37 ic	0.37 ic	---	---	0.00	---	---	---	0.007	---	0.378
5.70	551	364.70	0.38 ic	0.38 ic	---	---	0.00	---	---	---	0.007	---	0.386
5.76	554	364.76	0.39 ic	0.39 ic	---	---	0.00	---	---	---	0.008	---	0.394
5.82	557	364.82	0.40 ic	0.39 ic	---	---	0.00	---	---	---	0.008	---	0.402
5.88	560	364.88	0.40 ic	0.40 ic	---	---	0.00	---	---	---	0.008	---	0.410
5.94	563	364.94	0.43 ic	0.41 ic	---	---	0.02	---	---	---	0.008	---	0.443
6.00	566	365.00	0.61 ic	0.42 ic	---	---	0.20	---	---	---	0.009	---	0.624

...End

Hydrograph Report

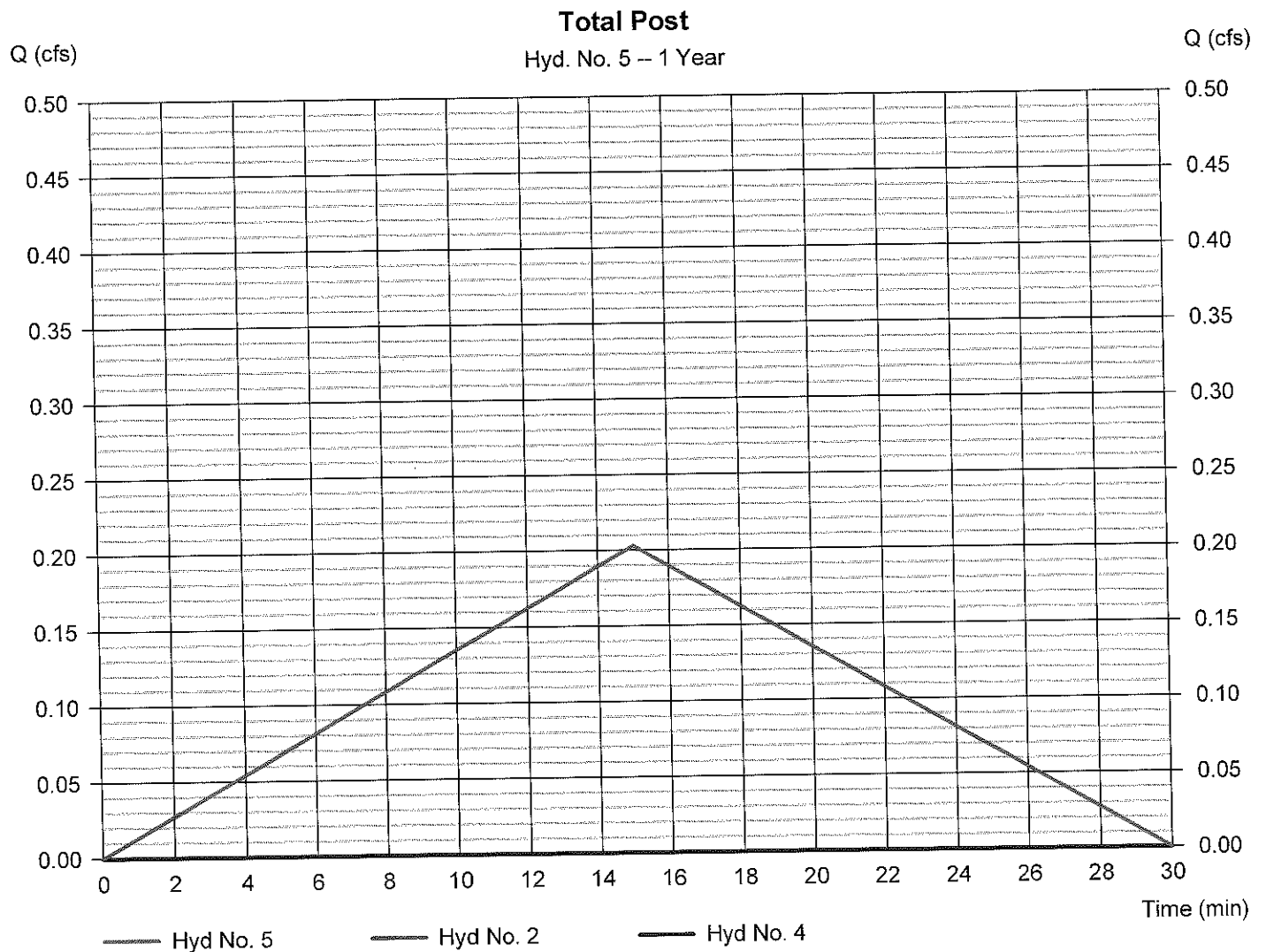
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 5

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.203 cfs
Storm frequency	= 1 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 183 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.121 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.579	1	15	521	----	----	----	Pre Development
2	Rational	0.234	1	15	210	----	----	----	Post Uncontrolled
3	Rational	0.491	1	15	442	----	----	----	Controlled SWM Basin #1
4	Reservoir	0.030	1	29	11	3	363.29	432	SWM BASIN #1
5	Combine	0.234	1	15	222	2, 4	----	----	Total Post
14041.gpw					Return Period: 2 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

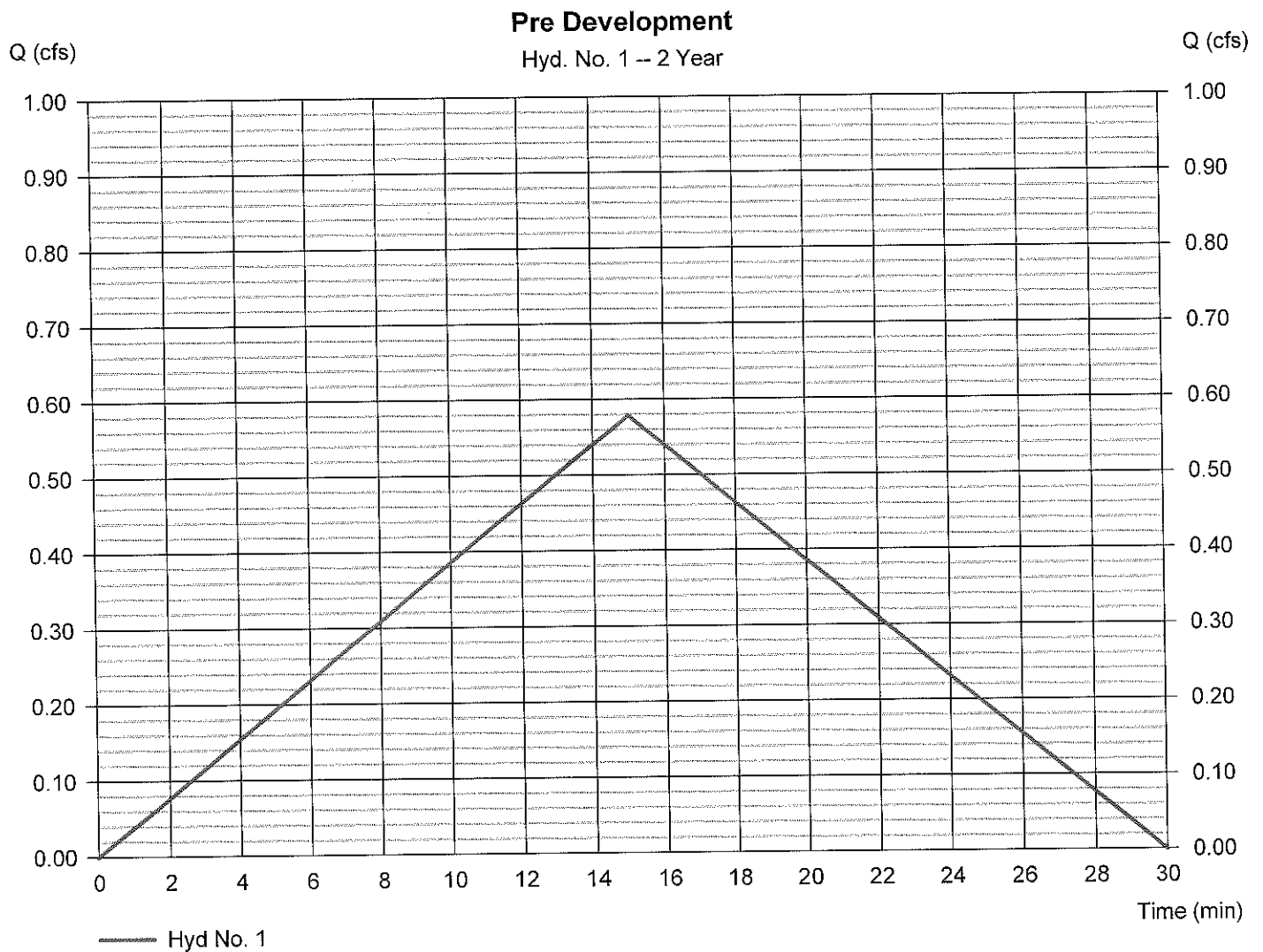
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.579 cfs
Storm frequency	= 2 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 521 cuft
Drainage area	= 0.229 ac	Runoff coeff.	= 0.55
Intensity	= 4.596 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

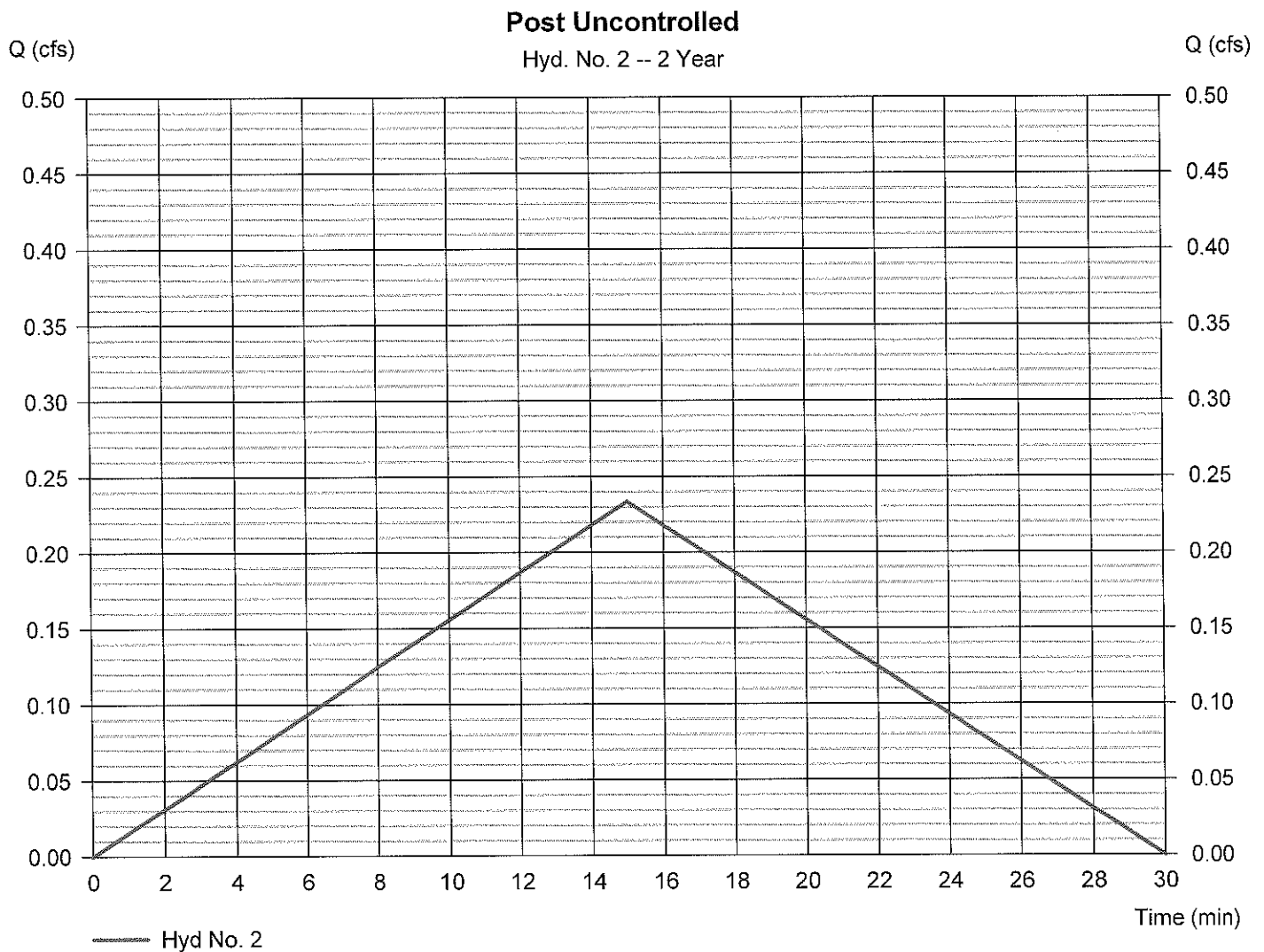
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 2

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.234 cfs
Storm frequency	= 2 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 210 cuft
Drainage area	= 0.121 ac	Runoff coeff.	= 0.42
Intensity	= 4.596 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

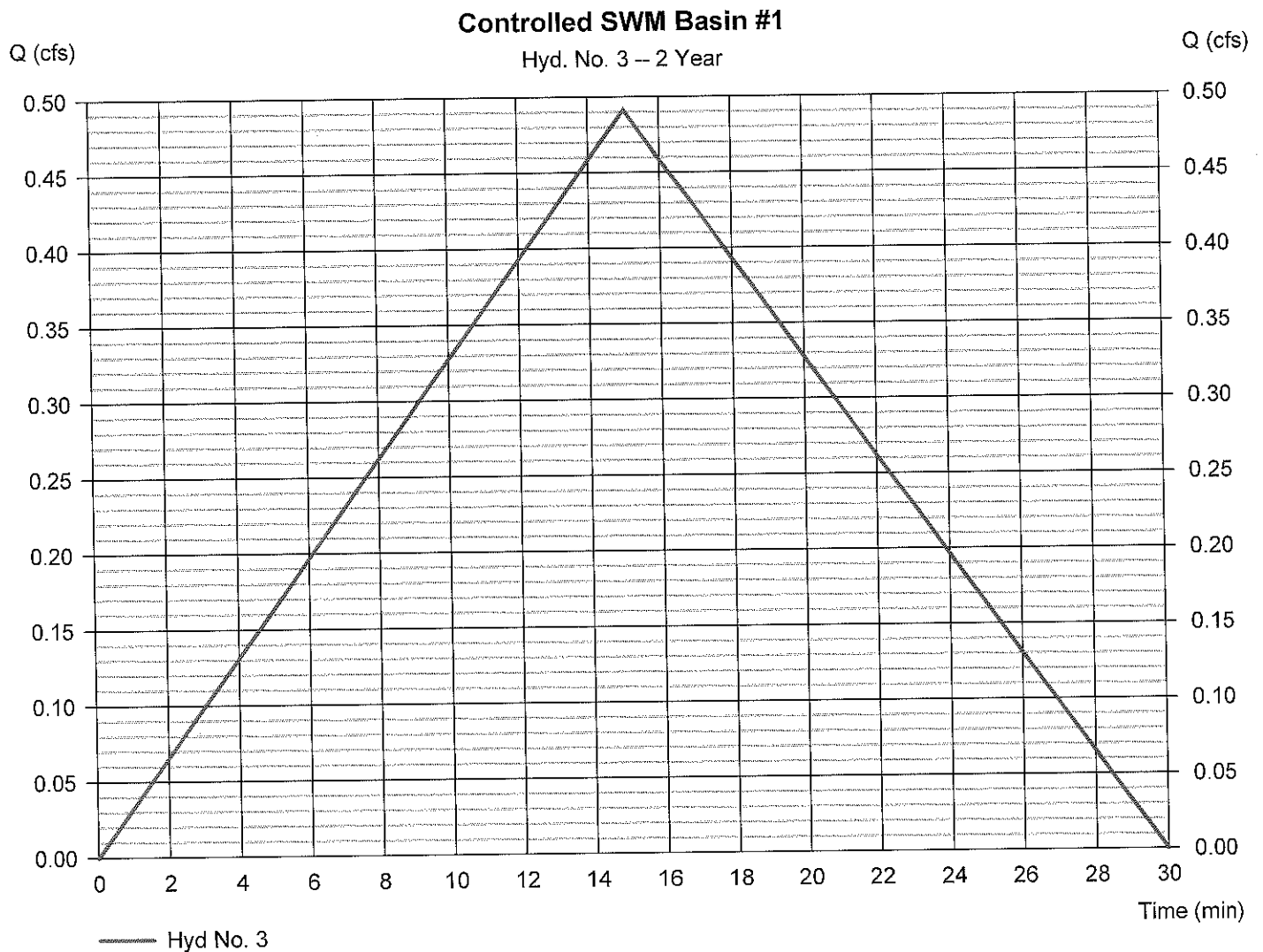
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.491 cfs
Storm frequency	= 2 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 442 cuft
Drainage area	= 0.108 ac	Runoff coeff.	= 0.99
Intensity	= 4.596 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

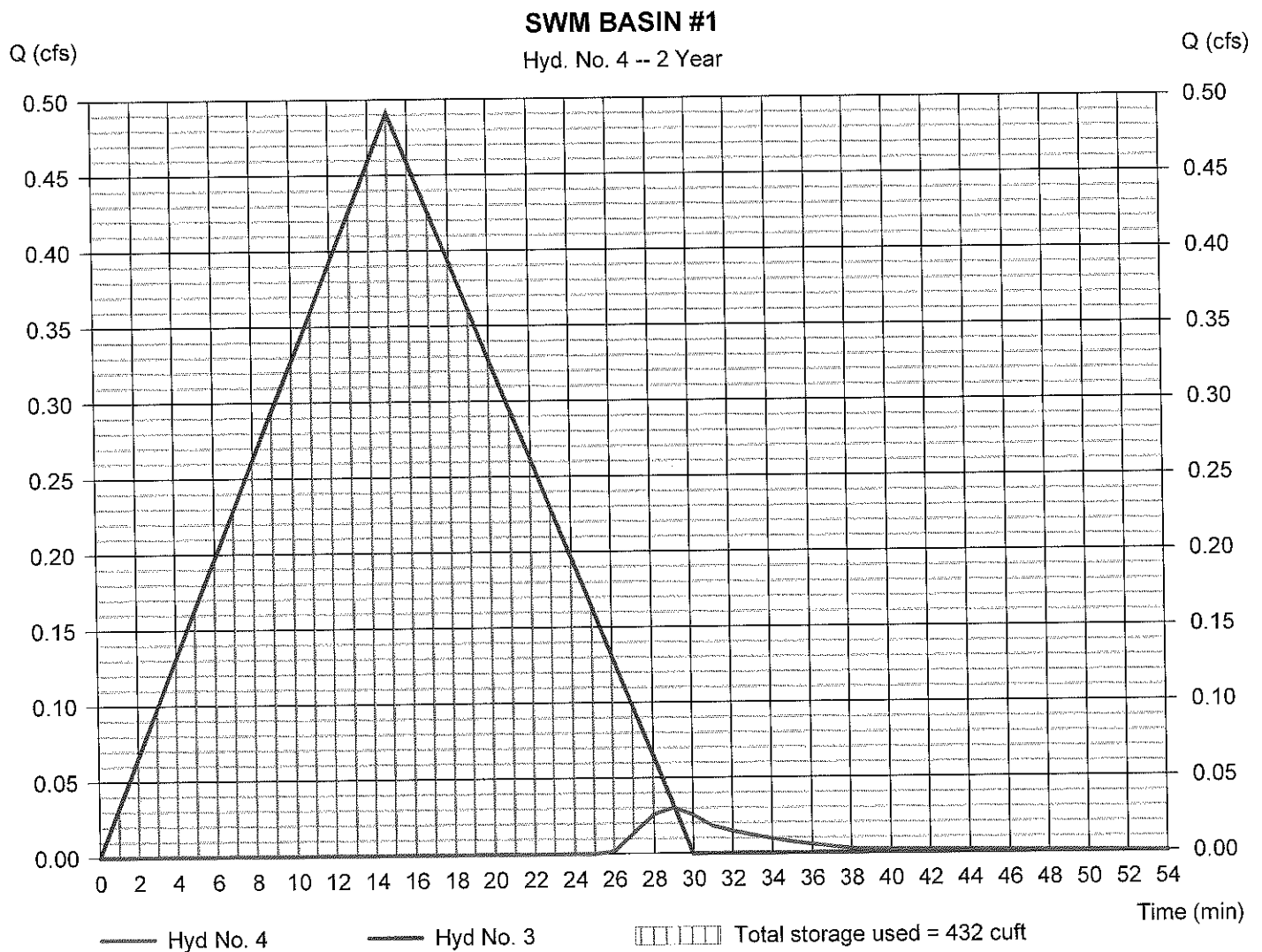
Thursday, 05 / 1 / 2014

Hyd. No. 4

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.030 cfs
Storm frequency	= 2 yrs	Time to peak	= 29 min
Time interval	= 1 min	Hyd. volume	= 11 cuft
Inflow hyd. No.	= 3 - Controlled SWM Basin #1	Max. Elevation	= 363.29 ft
Reservoir name	= SWM #1	Max. Storage	= 432 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

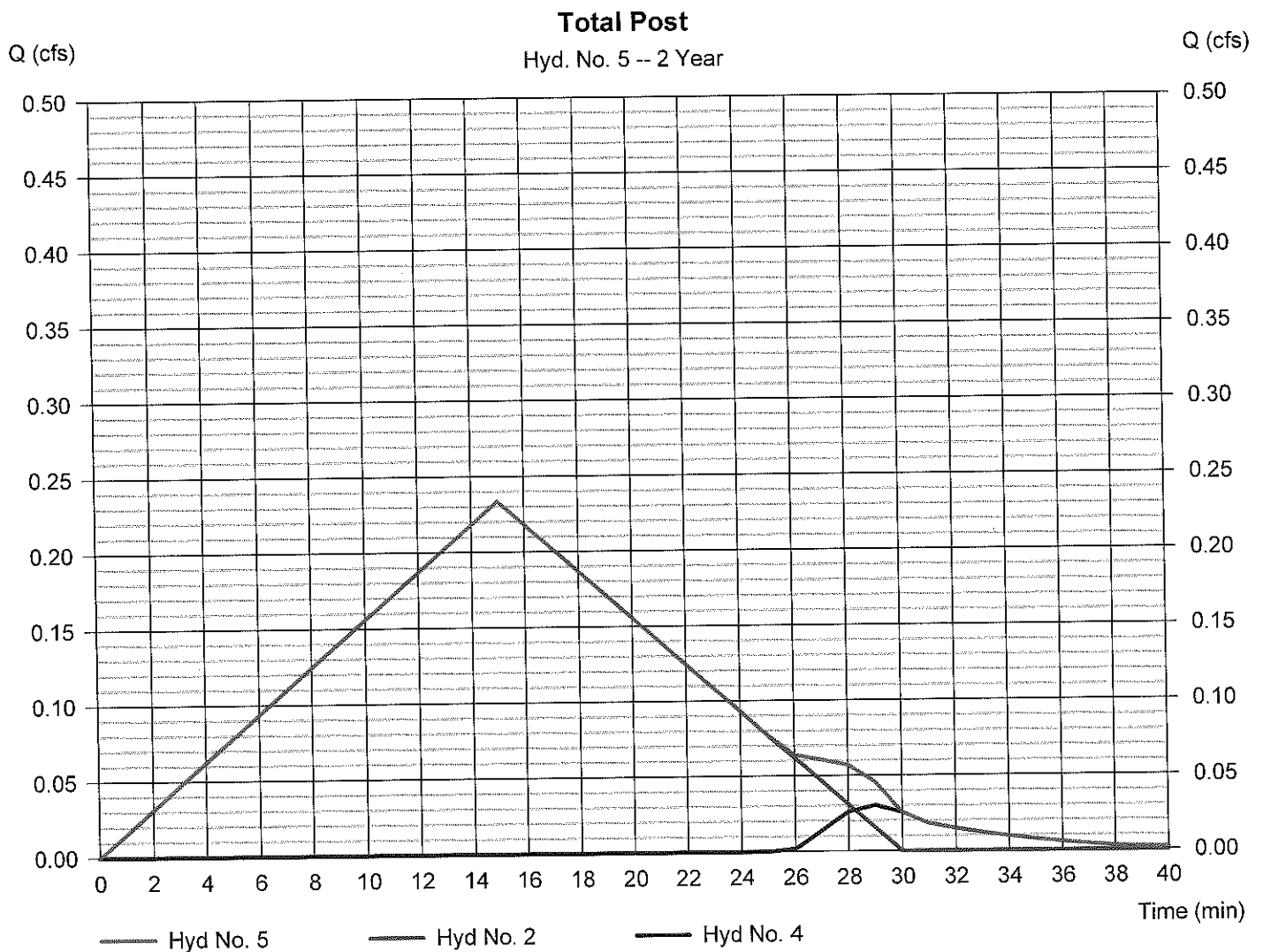
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 5

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.234 cfs
Storm frequency	= 2 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 222 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.121 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.679	1	15	611	----	----	----	Pre Development
2	Rational	0.274	1	15	247	----	----	----	Post Uncontrolled
3	Rational	0.576	1	15	519	----	----	----	Controlled SWM Basin #1
4	Reservoir	0.159	1	26	86	3	363.56	460	SWM BASIN #1
5	Combine	0.274	1	15	332	2, 4	----	----	Total Post
14041.gpw					Return Period: 5 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

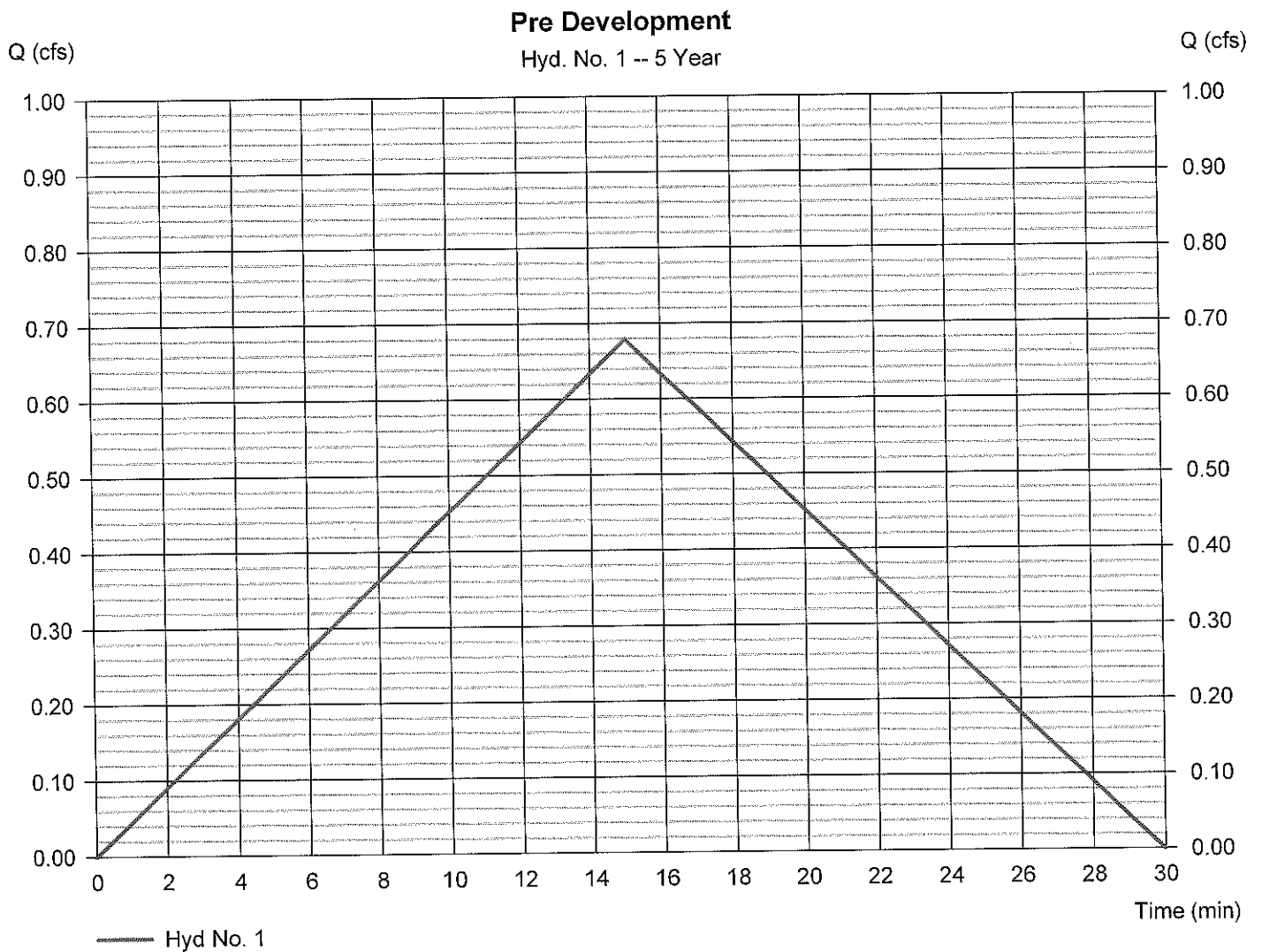
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.679 cfs
Storm frequency	= 5 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 611 cuft
Drainage area	= 0.229 ac	Runoff coeff.	= 0.55
Intensity	= 5.390 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

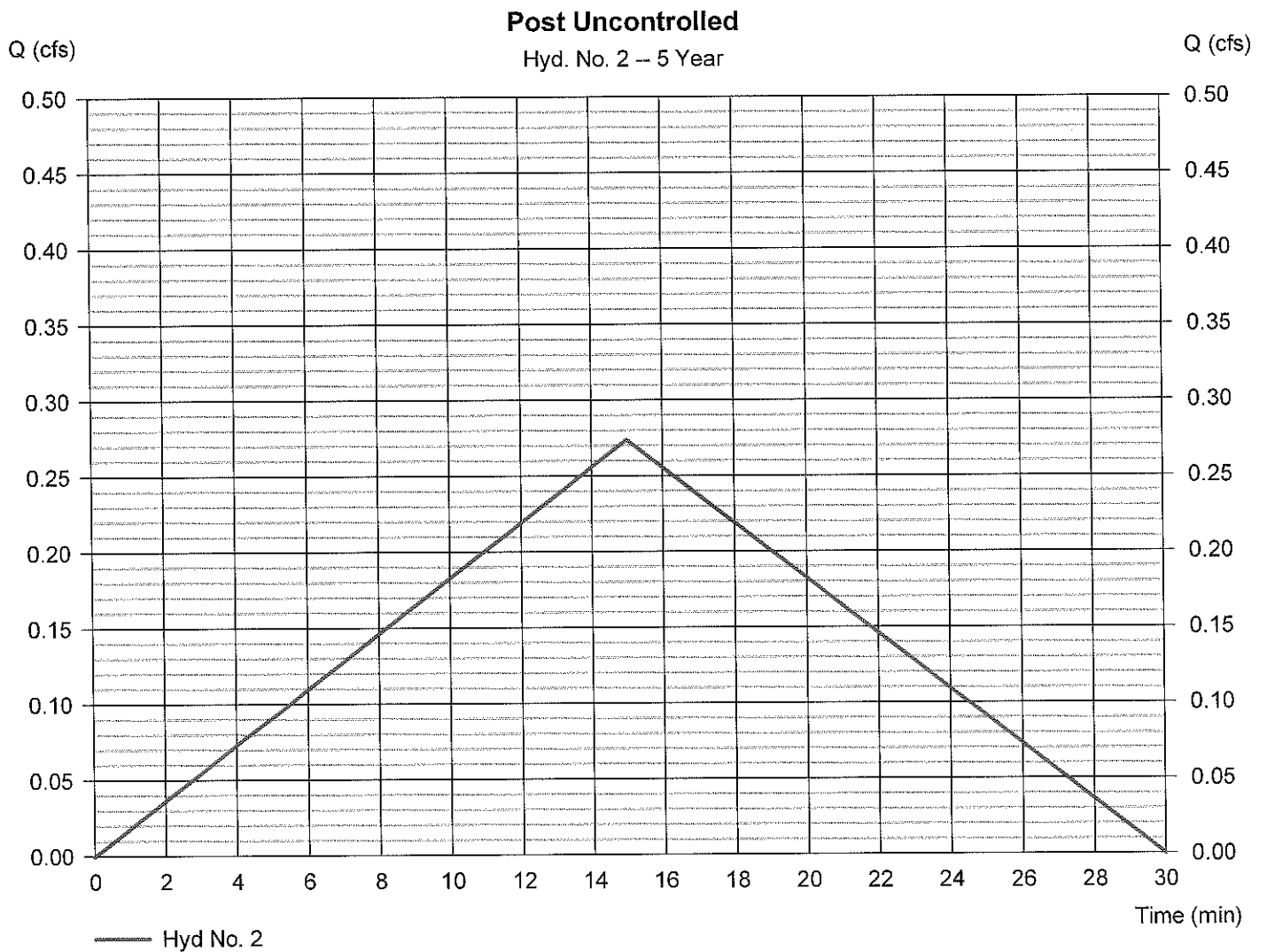
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 2

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.274 cfs
Storm frequency	= 5 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 247 cuft
Drainage area	= 0.121 ac	Runoff coeff.	= 0.42
Intensity	= 5.390 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

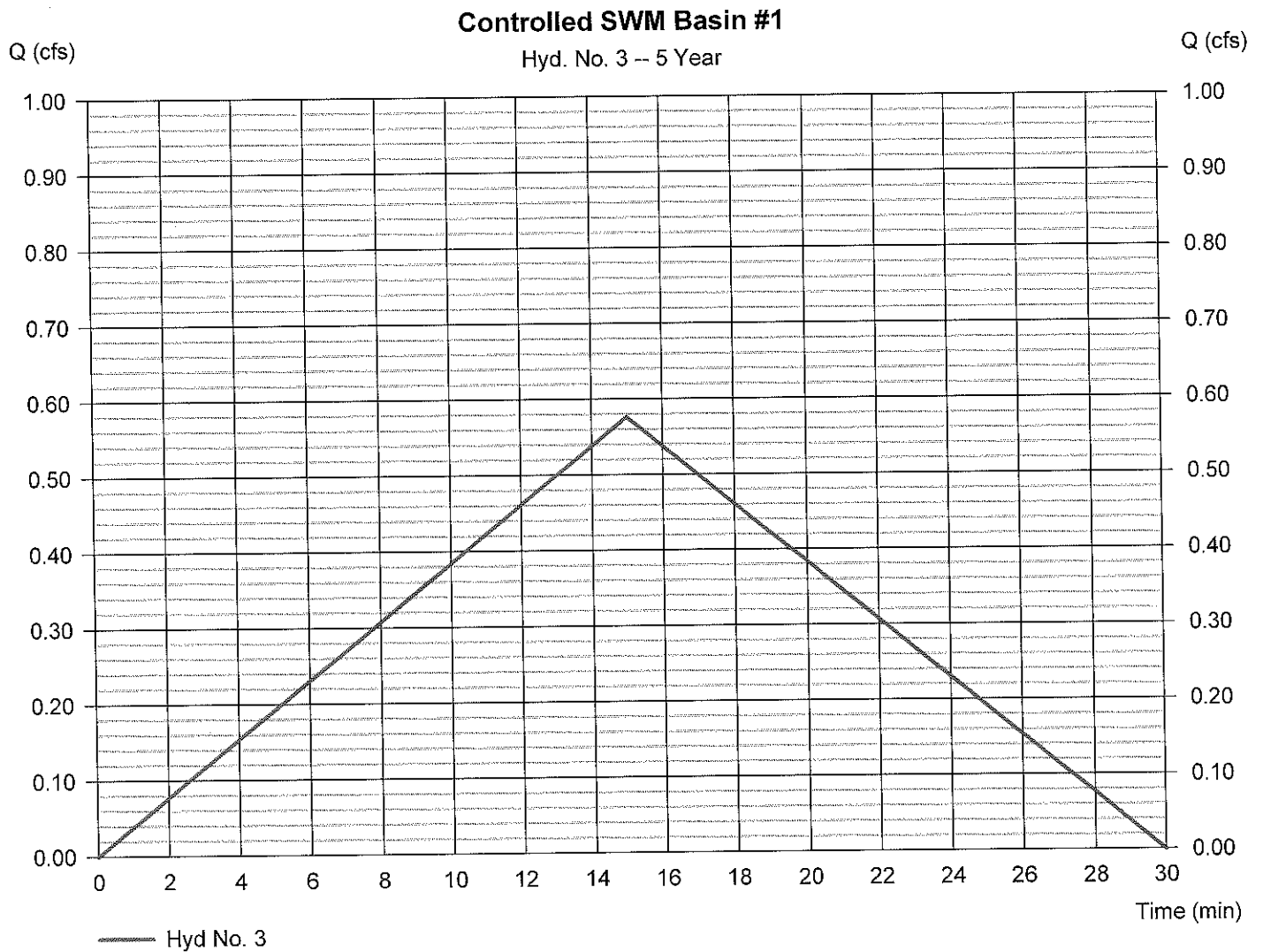
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.576 cfs
Storm frequency	= 5 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 519 cuft
Drainage area	= 0.108 ac	Runoff coeff.	= 0.99
Intensity	= 5.390 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

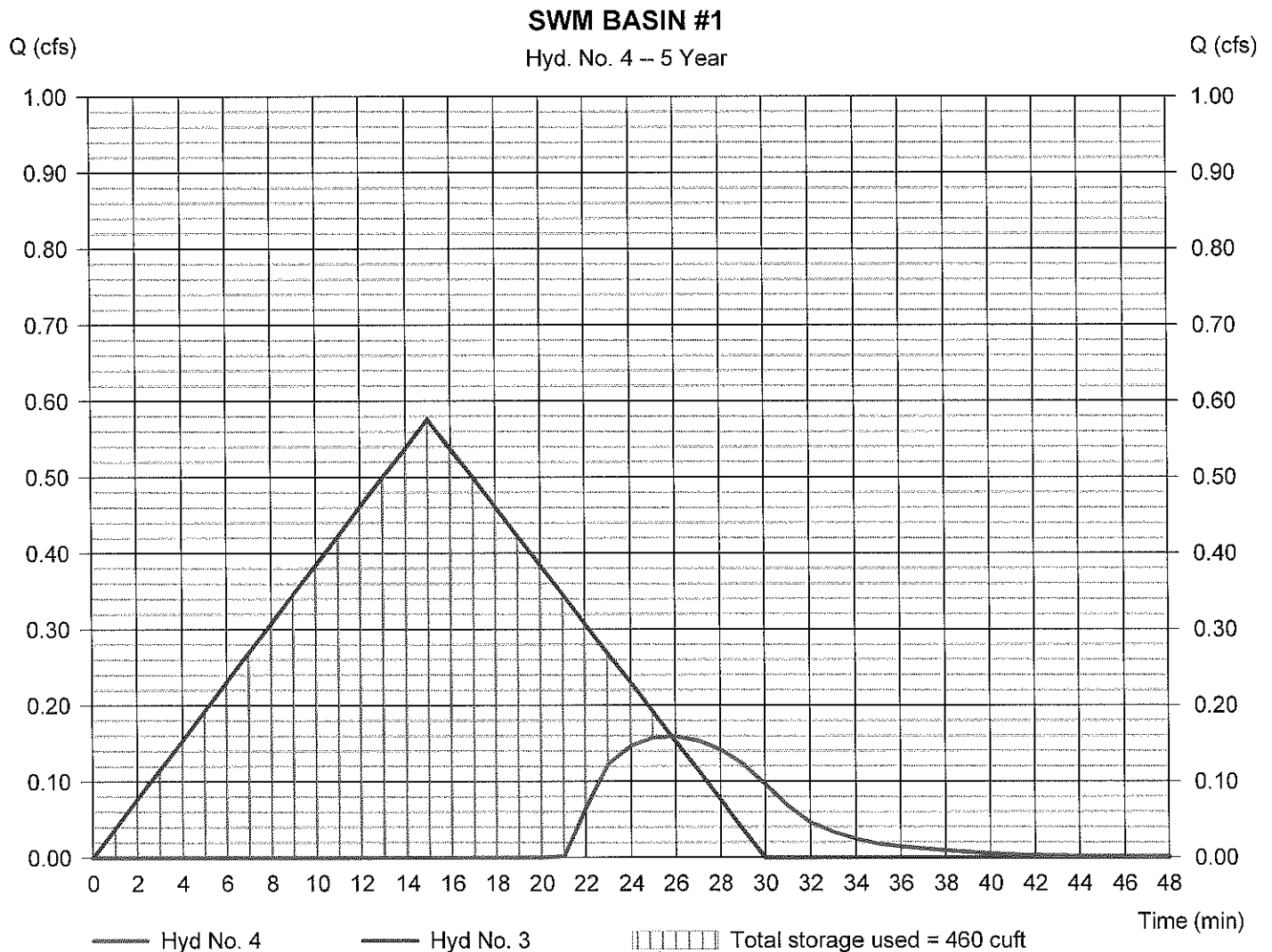
Thursday, 05 / 1 / 2014

Hyd. No. 4

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.159 cfs
Storm frequency	= 5 yrs	Time to peak	= 26 min
Time interval	= 1 min	Hyd. volume	= 86 cuft
Inflow hyd. No.	= 3 - Controlled SWM Basin #1	Max. Elevation	= 363.56 ft
Reservoir name	= SWM #1	Max. Storage	= 460 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

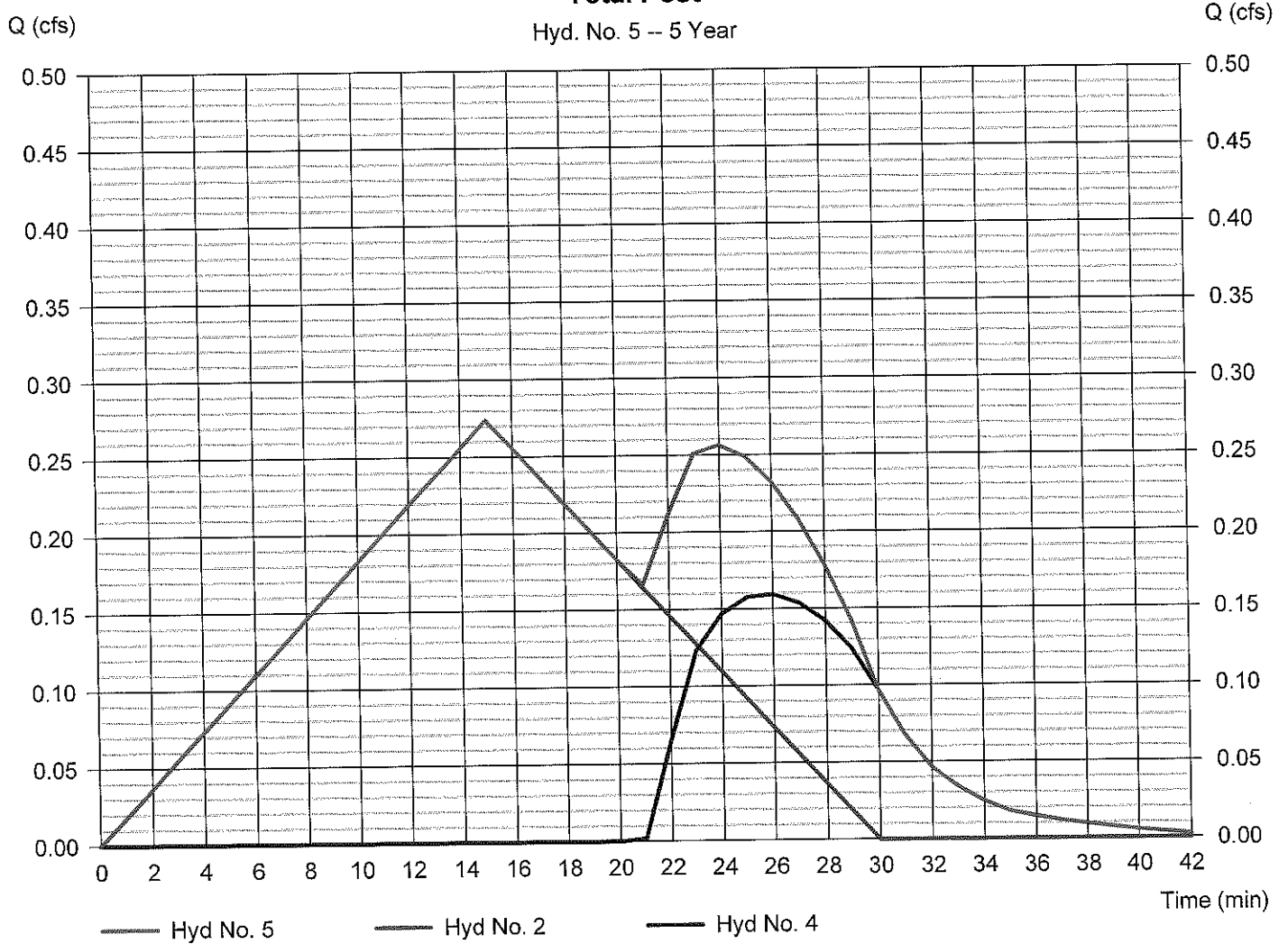
Thursday, 05 / 1 / 2014

Hyd. No. 5

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.274 cfs
Storm frequency	= 5 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 332 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.121 ac

Total Post
Hyd. No. 5 -- 5 Year



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.768	1	15	691	----	----	----	Pre Development
2	Rational	0.310	1	15	279	----	----	----	Post Uncontrolled
3	Rational	0.652	1	15	587	----	----	----	Controlled SWM Basin #1
4	Reservoir	0.225	1	25	153	3	363.81	486	SWM BASIN #1
5	Combine	0.365	1	22	432	2, 4	----	----	Total Post
14041.gpw					Return Period: 10 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

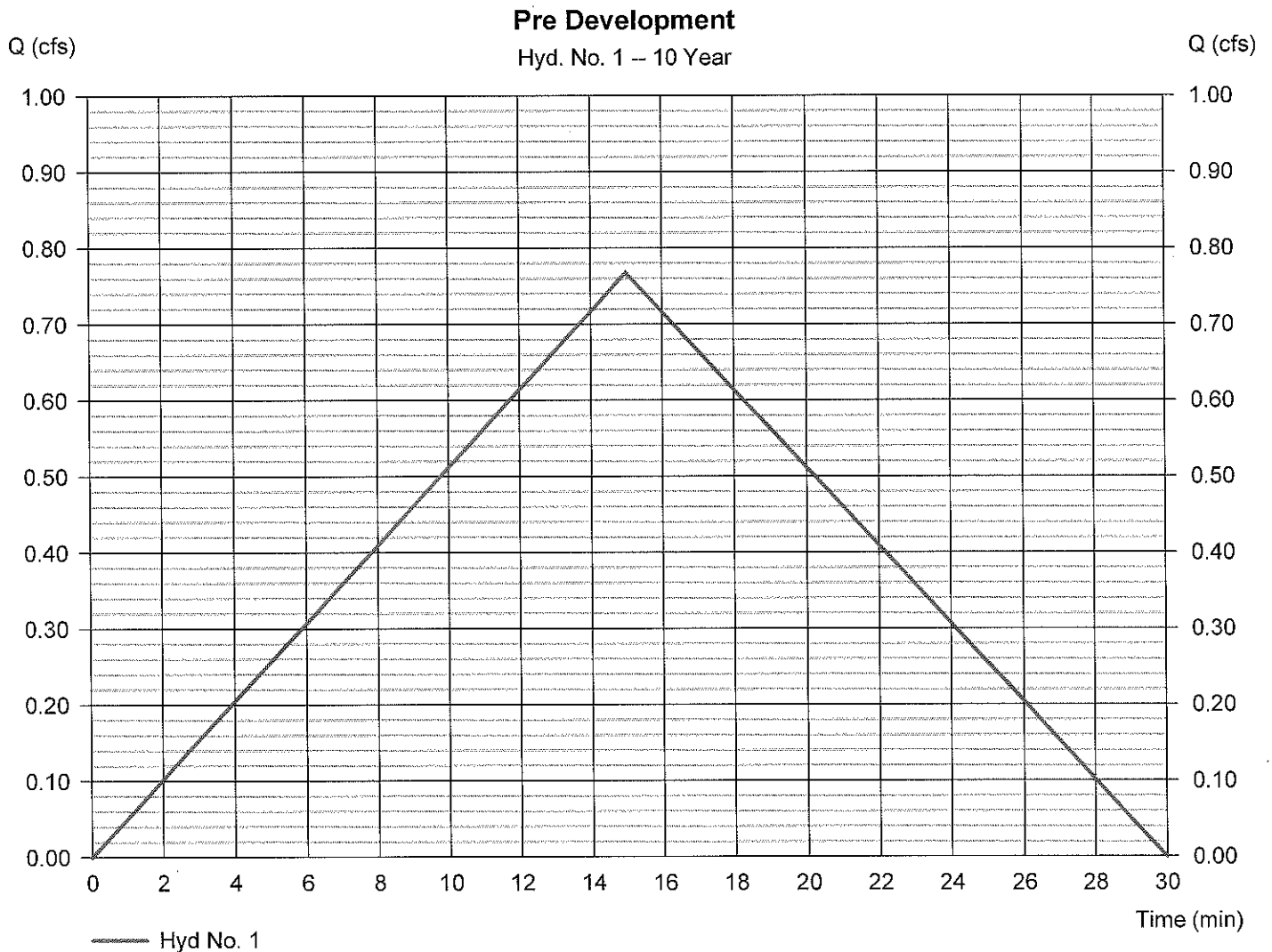
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.768 cfs
Storm frequency	= 10 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 691 cuft
Drainage area	= 0.229 ac	Runoff coeff.	= 0.55
Intensity	= 6.096 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

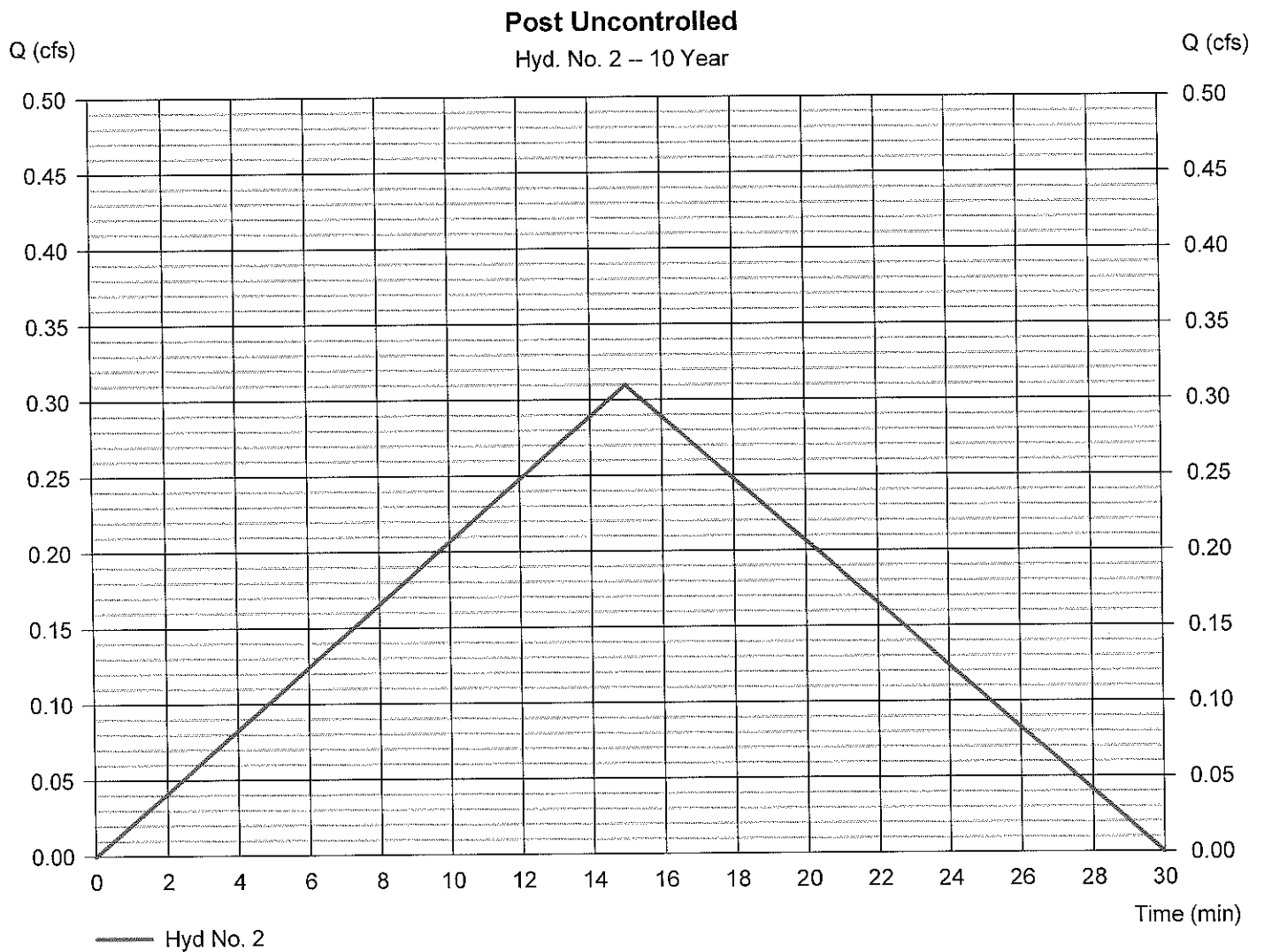
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 2

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.310 cfs
Storm frequency	= 10 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 279 cuft
Drainage area	= 0.121 ac	Runoff coeff.	= 0.42
Intensity	= 6.096 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

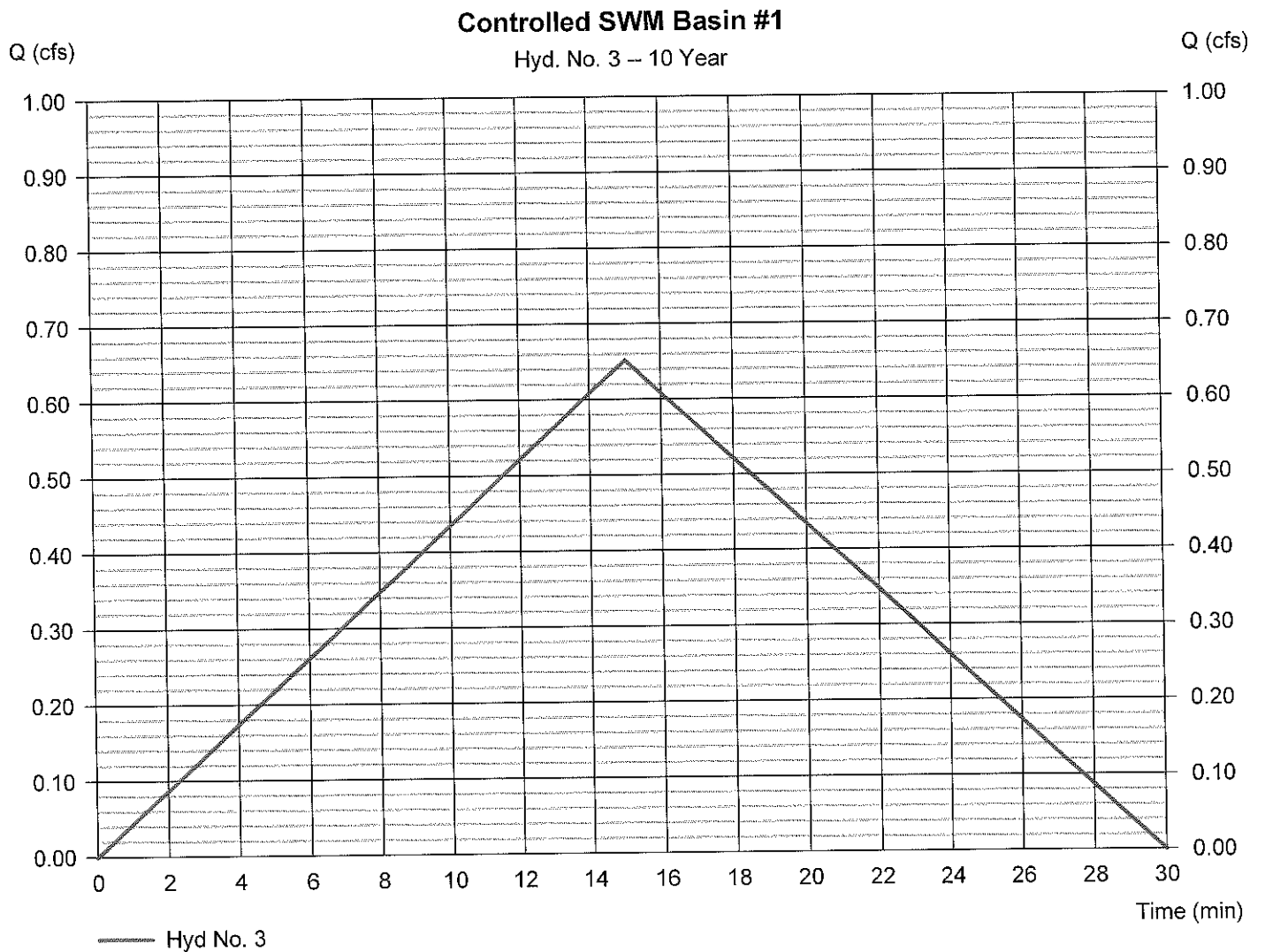
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.652 cfs
Storm frequency	= 10 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 587 cuft
Drainage area	= 0.108 ac	Runoff coeff.	= 0.99
Intensity	= 6.096 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

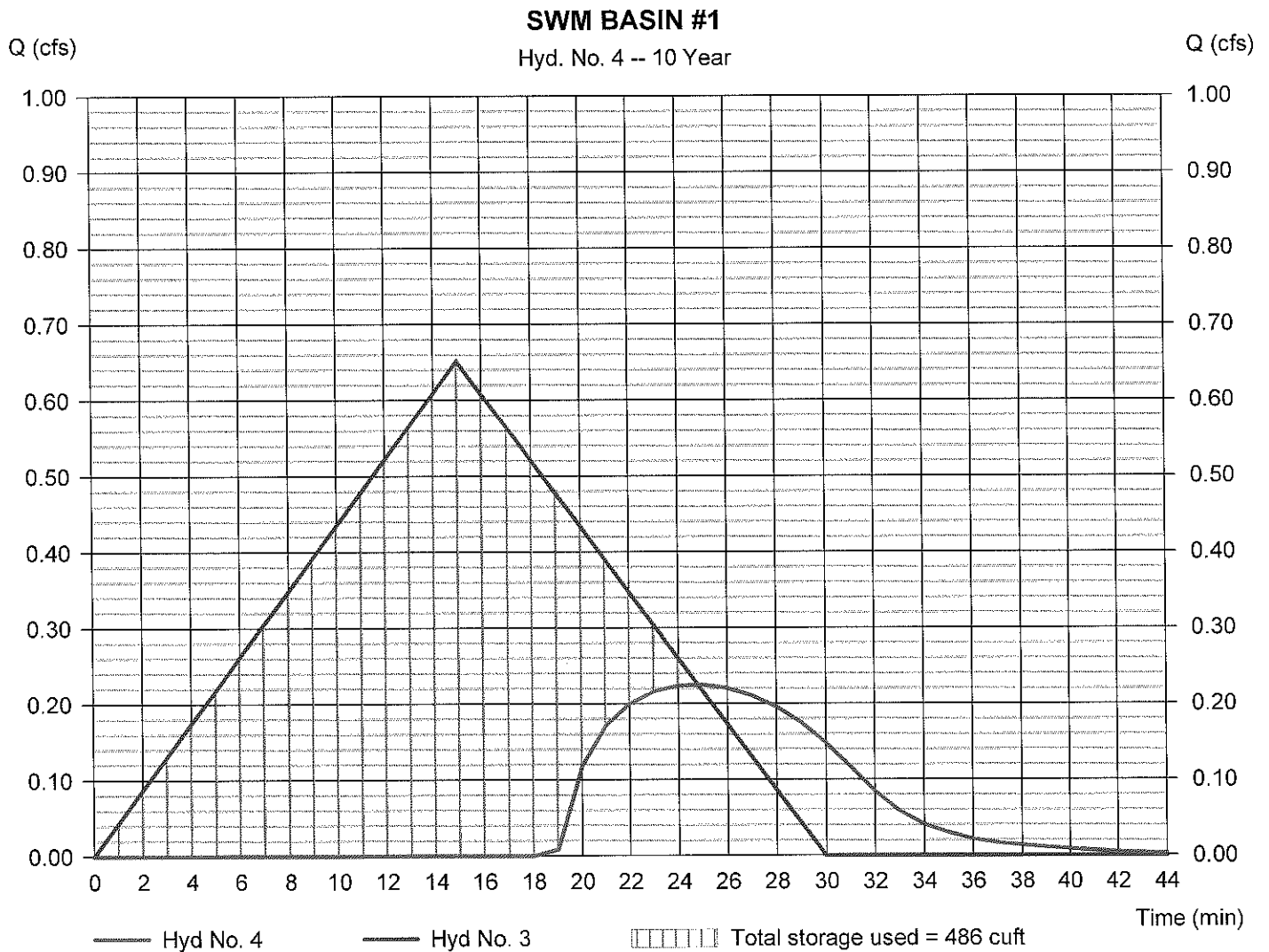
Thursday, 05 / 1 / 2014

Hyd. No. 4

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.225 cfs
Storm frequency	= 10 yrs	Time to peak	= 25 min
Time interval	= 1 min	Hyd. volume	= 153 cuft
Inflow hyd. No.	= 3 - Controlled SWM Basin #1	Max. Elevation	= 363.81 ft
Reservoir name	= SWM #1	Max. Storage	= 486 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

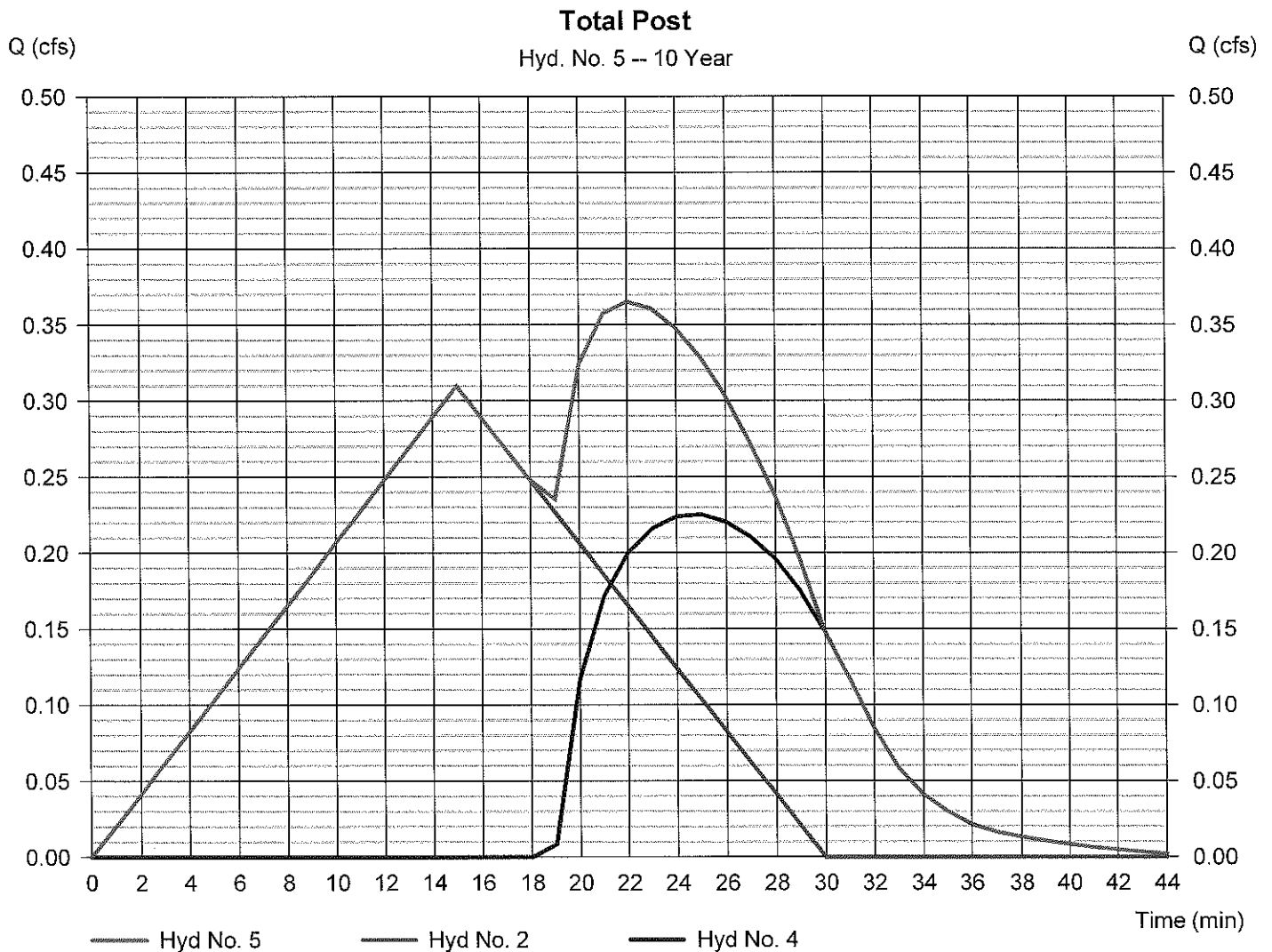
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 5

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.365 cfs
Storm frequency	= 10 yrs	Time to peak	= 22 min
Time interval	= 1 min	Hyd. volume	= 432 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.121 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.856	1	15	770	----	----	----	Pre Development
2	Rational	0.345	1	15	311	----	----	----	Post Uncontrolled
3	Rational	0.726	1	15	654	----	----	----	Controlled SWM Basin #1
4	Reservoir	0.286	1	24	219	3	364.11	511	SWM BASIN #1
5	Combine	0.460	1	21	530	2, 4	----	----	Total Post
14041.gpw					Return Period: 25 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

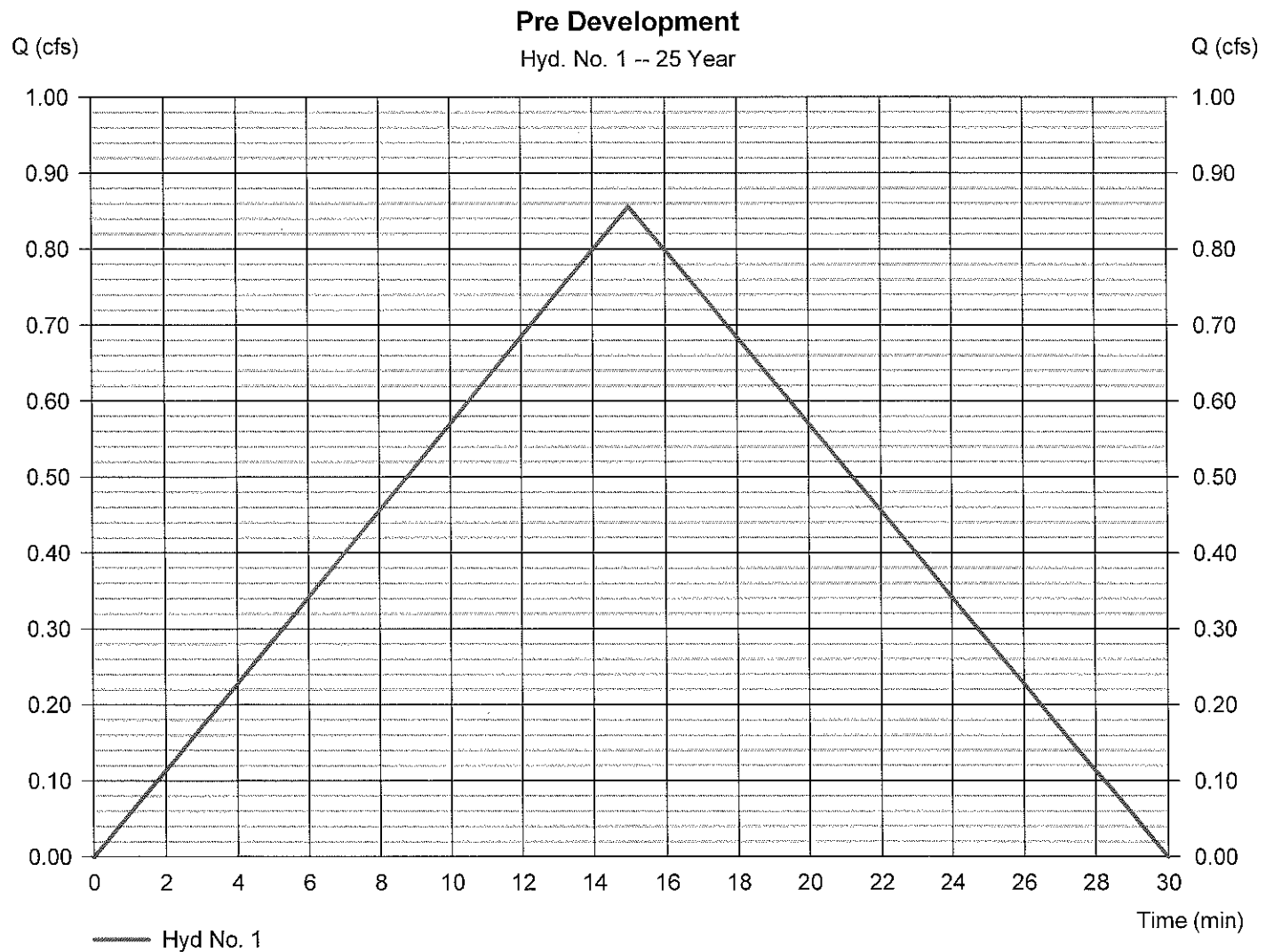
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.856 cfs
Storm frequency	= 25 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 770 cuft
Drainage area	= 0.229 ac	Runoff coeff.	= 0.55
Intensity	= 6.794 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

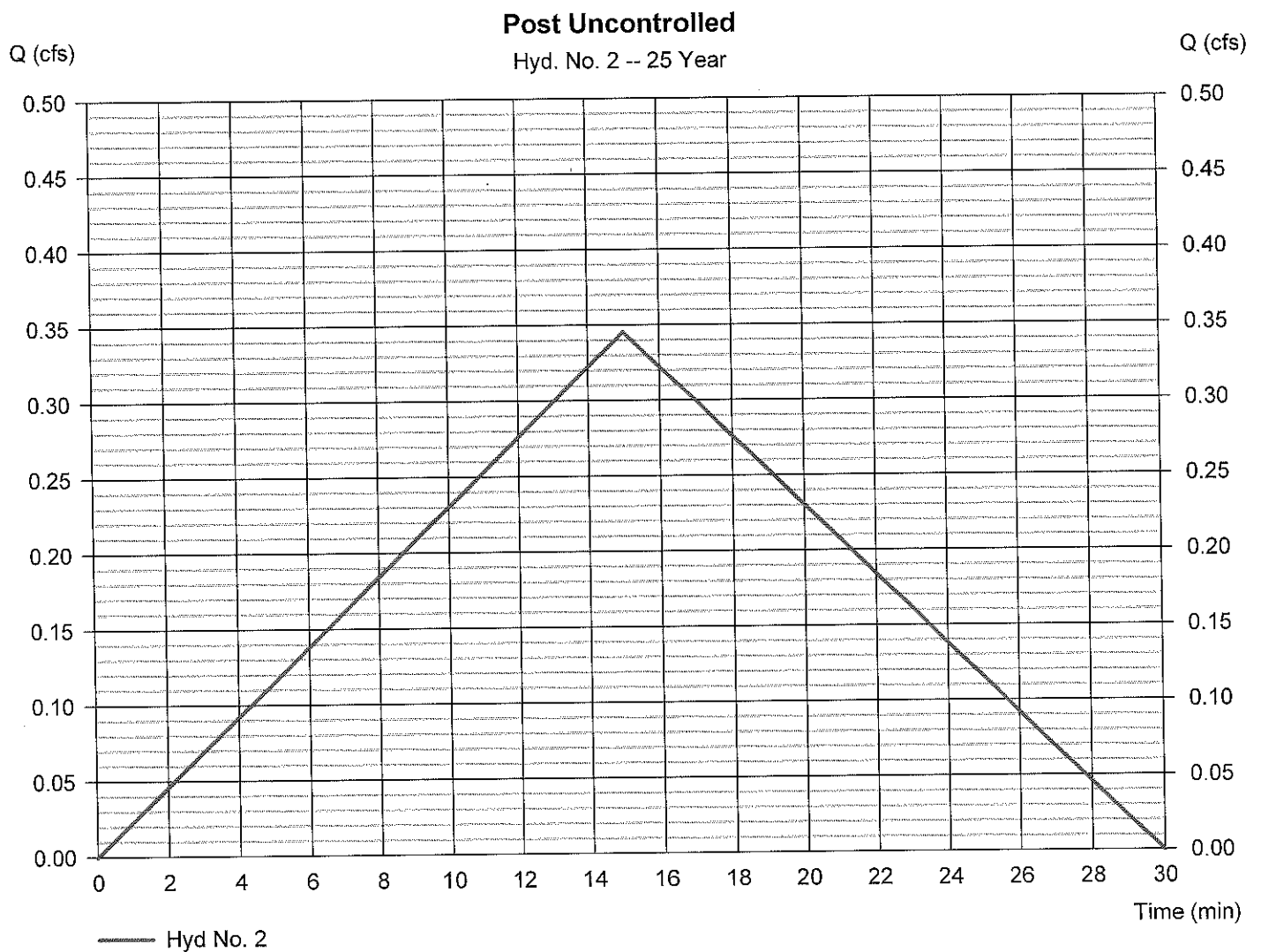
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 2

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.345 cfs
Storm frequency	= 25 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 311 cuft
Drainage area	= 0.121 ac	Runoff coeff.	= 0.42
Intensity	= 6.794 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

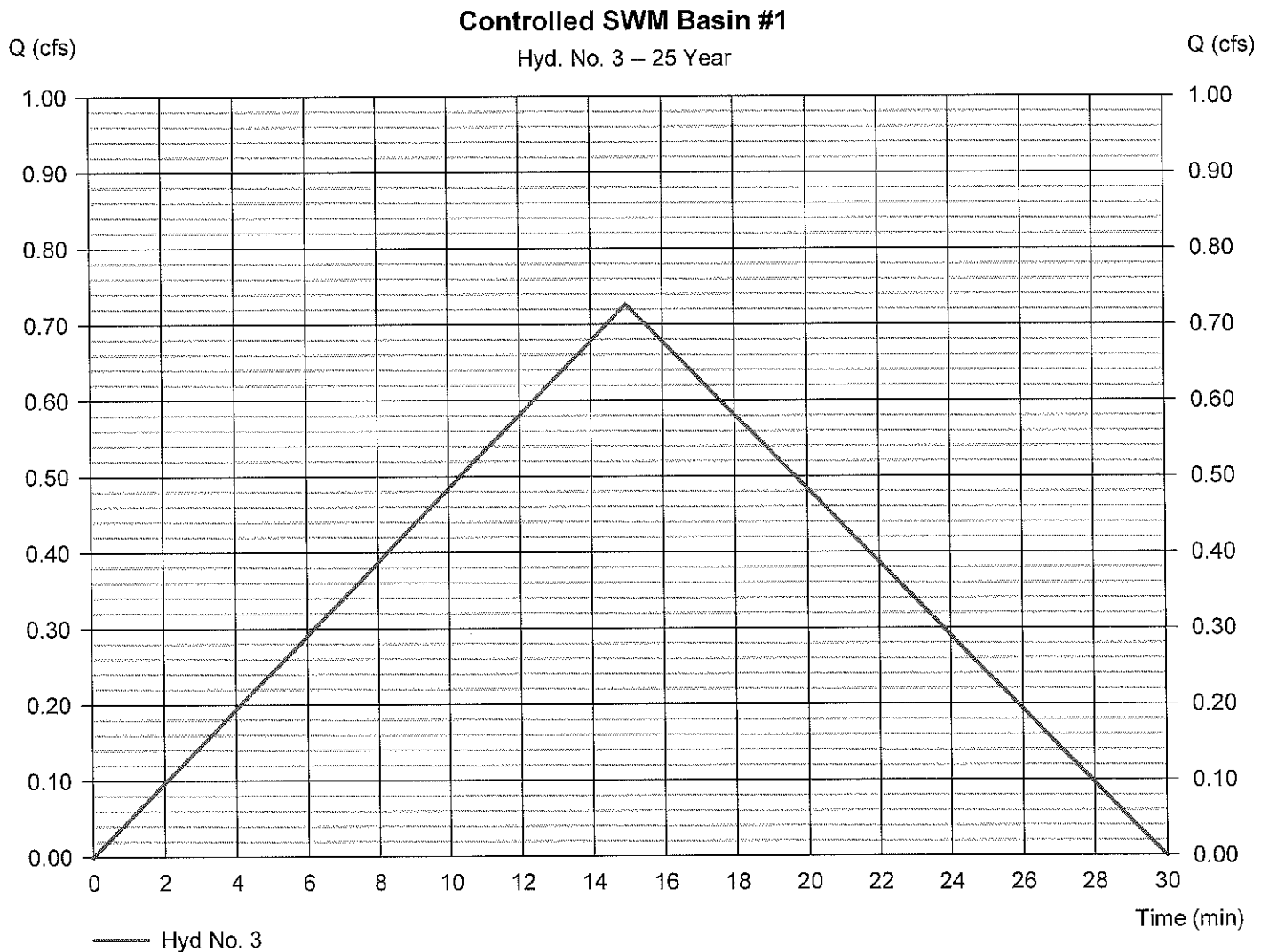
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.726 cfs
Storm frequency	= 25 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 654 cuft
Drainage area	= 0.108 ac	Runoff coeff.	= 0.99
Intensity	= 6.794 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

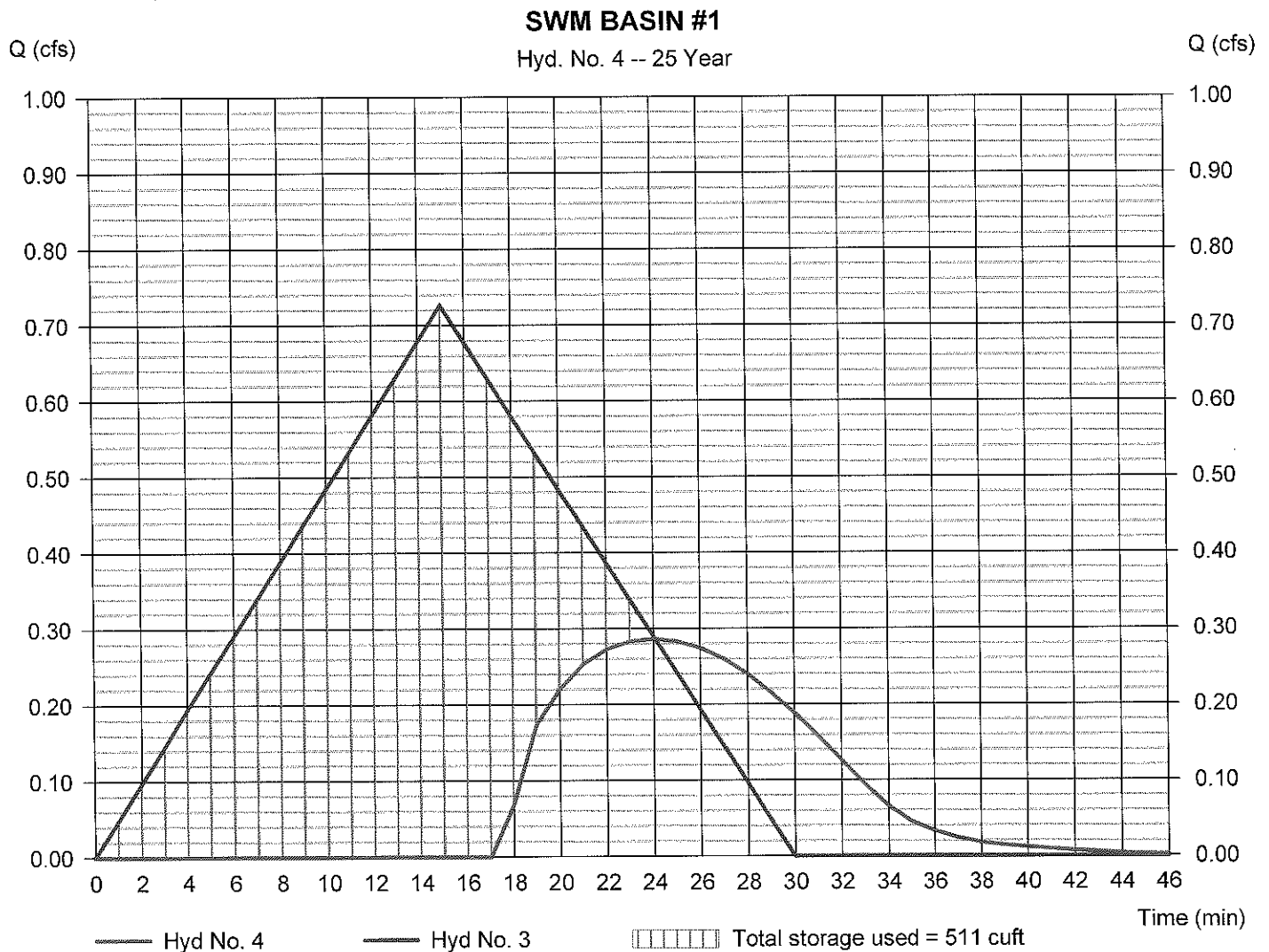
Thursday, 05 / 1 / 2014

Hyd. No. 4

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.286 cfs
Storm frequency	= 25 yrs	Time to peak	= 24 min
Time interval	= 1 min	Hyd. volume	= 219 cuft
Inflow hyd. No.	= 3 - Controlled SWM Basin #1	Max. Elevation	= 364.11 ft
Reservoir name	= SWM #1	Max. Storage	= 511 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

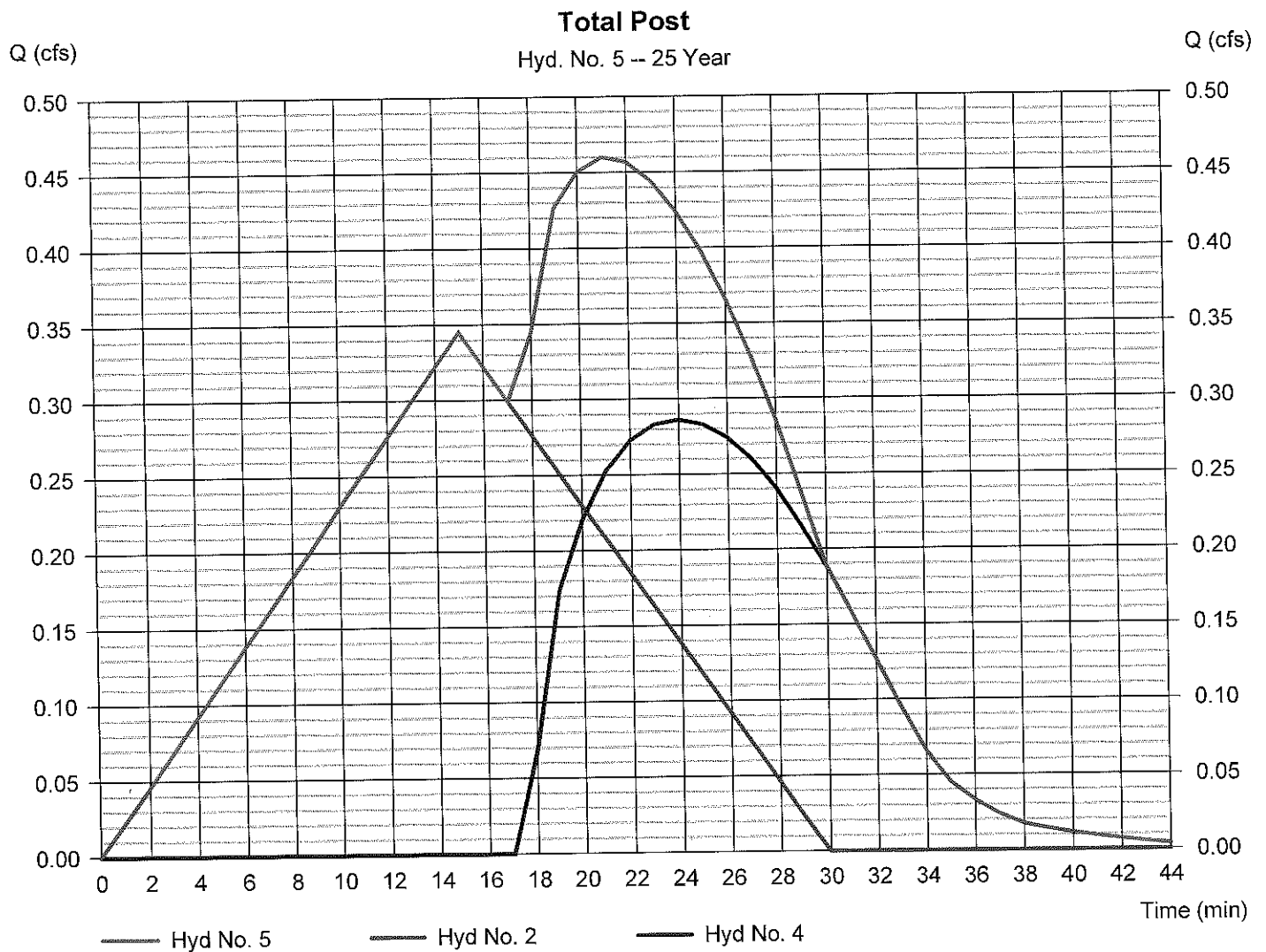
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 5

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.460 cfs
Storm frequency	= 25 yrs	Time to peak	= 21 min
Time interval	= 1 min	Hyd. volume	= 530 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.121 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.956	1	15	861	---	----	-----	Pre Development
2	Rational	0.386	1	15	347	----	----	-----	Post Uncontrolled
3	Rational	0.812	1	15	731	----	----	-----	Controlled SWM Basin #1
4	Reservoir	0.350	1	23	295	3	364.51	541	SWM BASIN #1
5	Combine	0.559	1	20	642	2, 4	---	-----	Total Post
14041.gpw					Return Period: 50 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

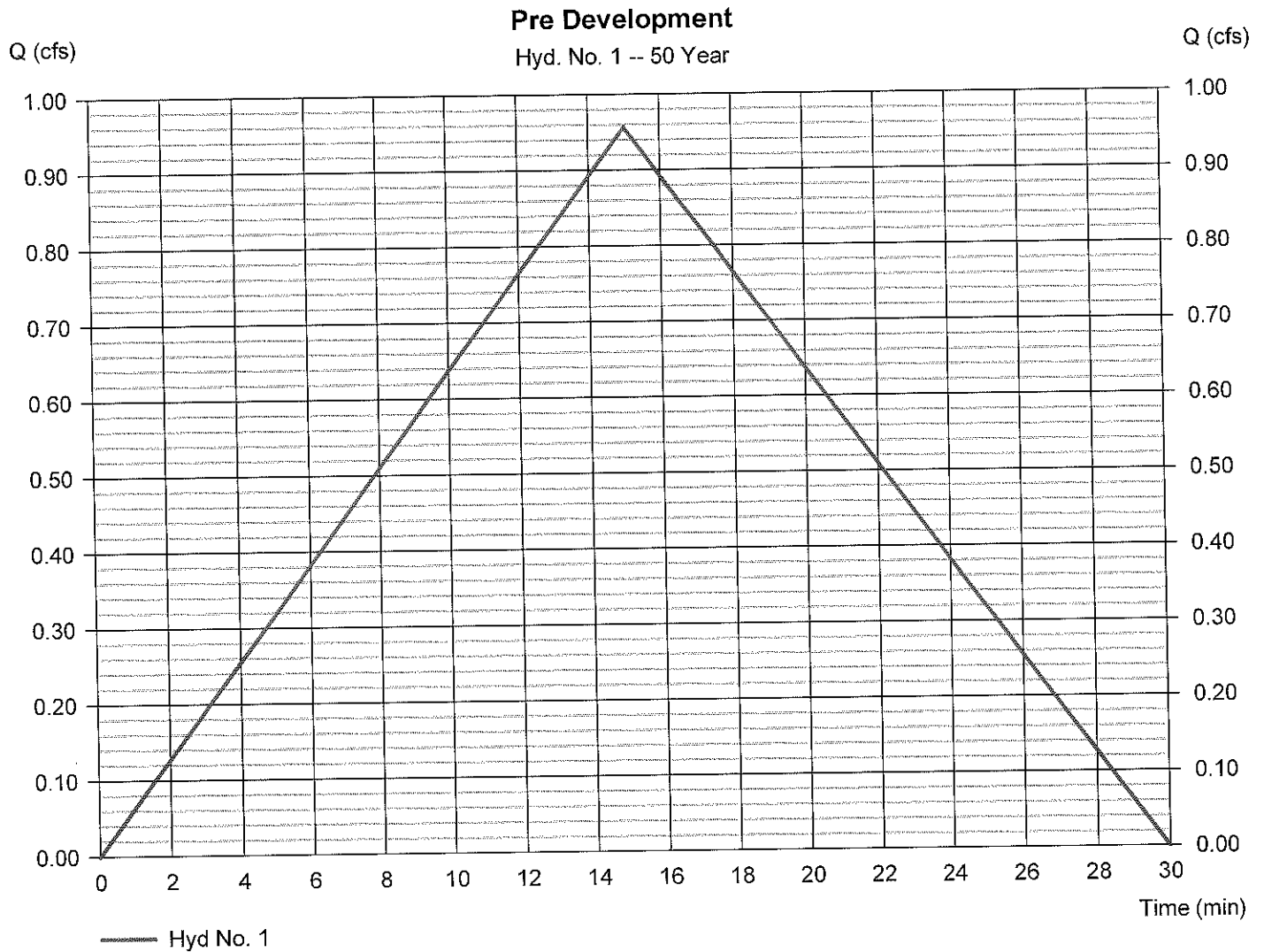
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.956 cfs
Storm frequency	= 50 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 861 cuft
Drainage area	= 0.229 ac	Runoff coeff.	= 0.55
Intensity	= 7.592 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

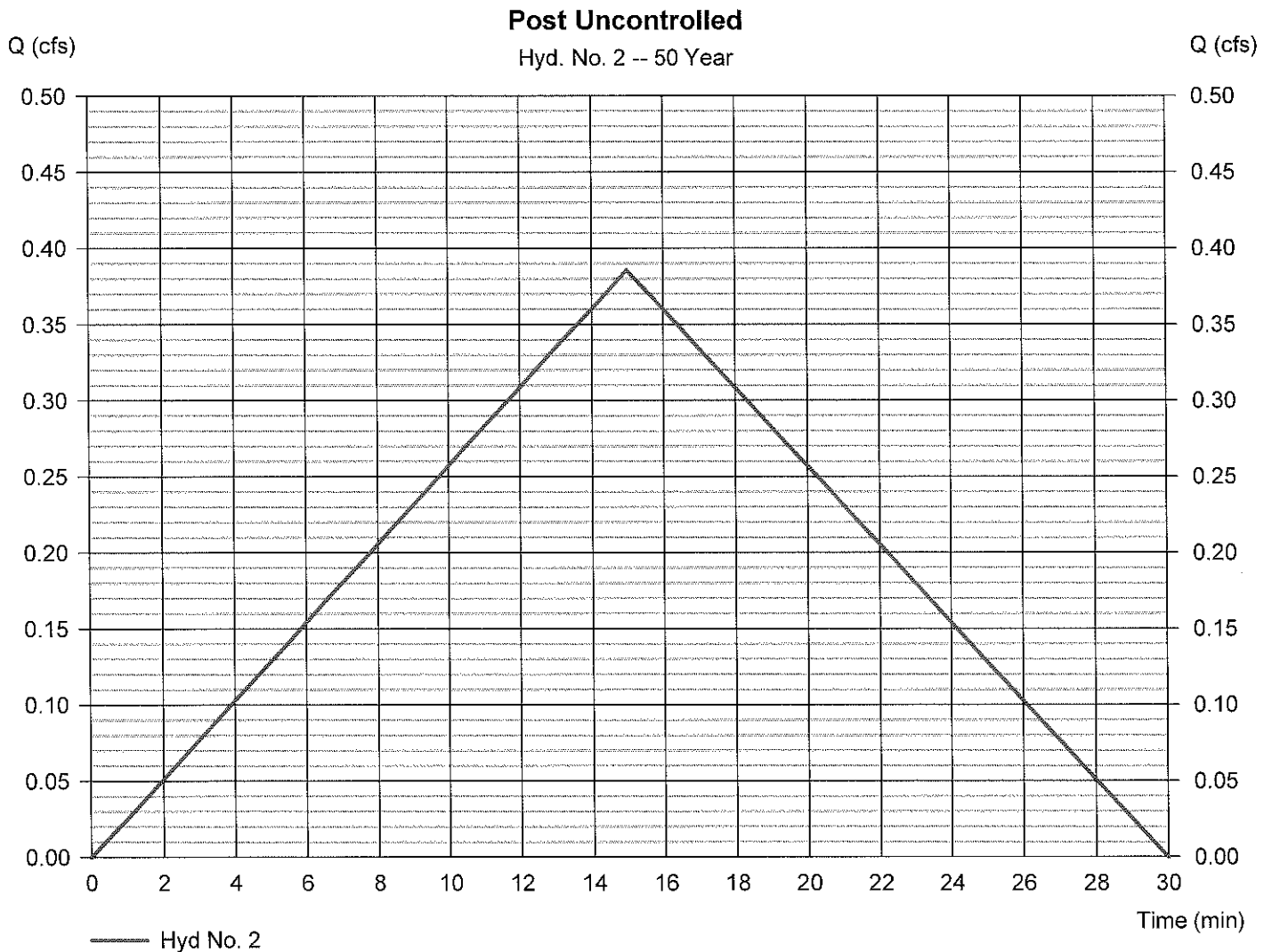
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 2

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.386 cfs
Storm frequency	= 50 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 347 cuft
Drainage area	= 0.121 ac	Runoff coeff.	= 0.42
Intensity	= 7.592 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

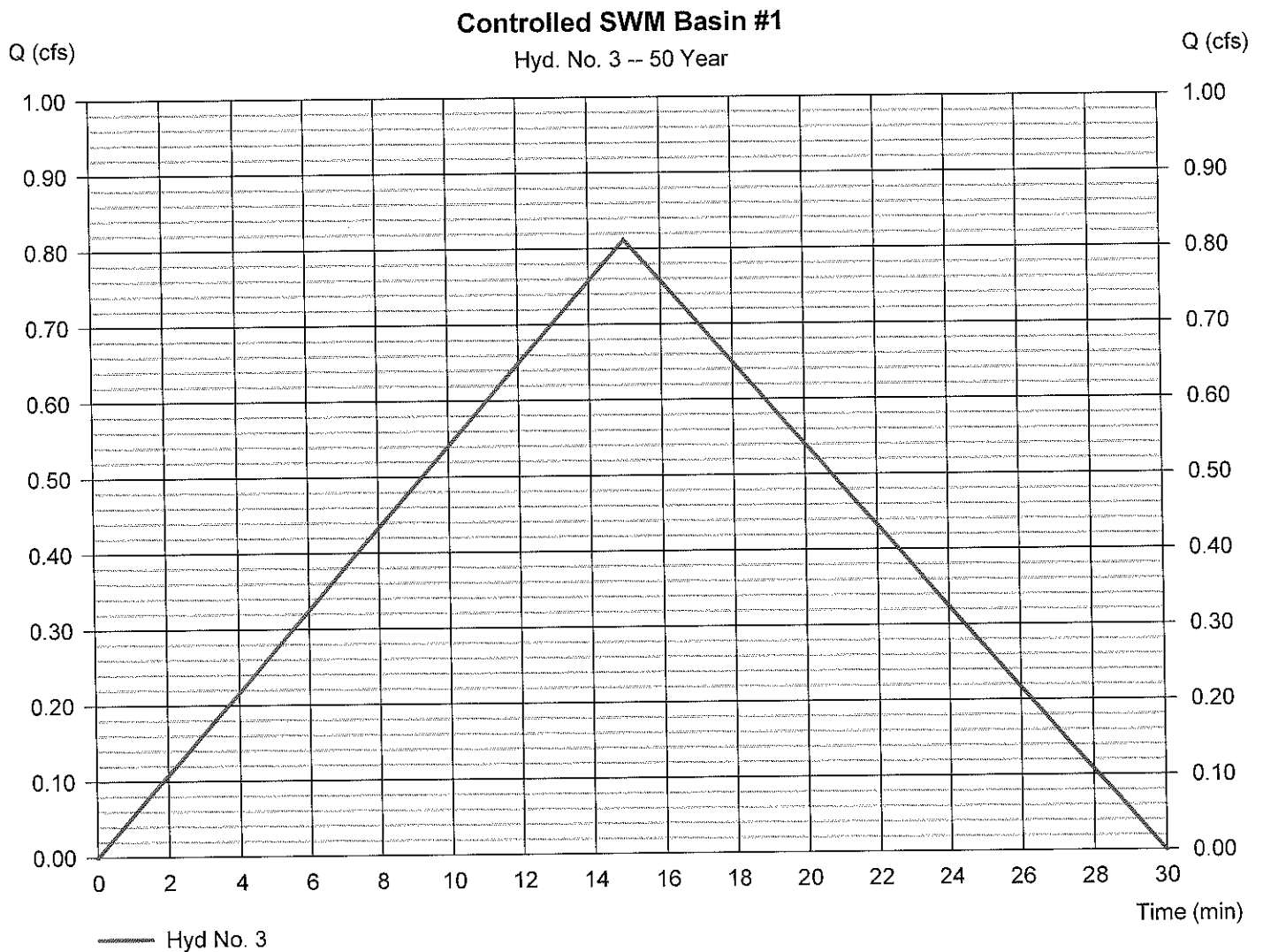
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.812 cfs
Storm frequency	= 50 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 731 cuft
Drainage area	= 0.108 ac	Runoff coeff.	= 0.99
Intensity	= 7.592 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

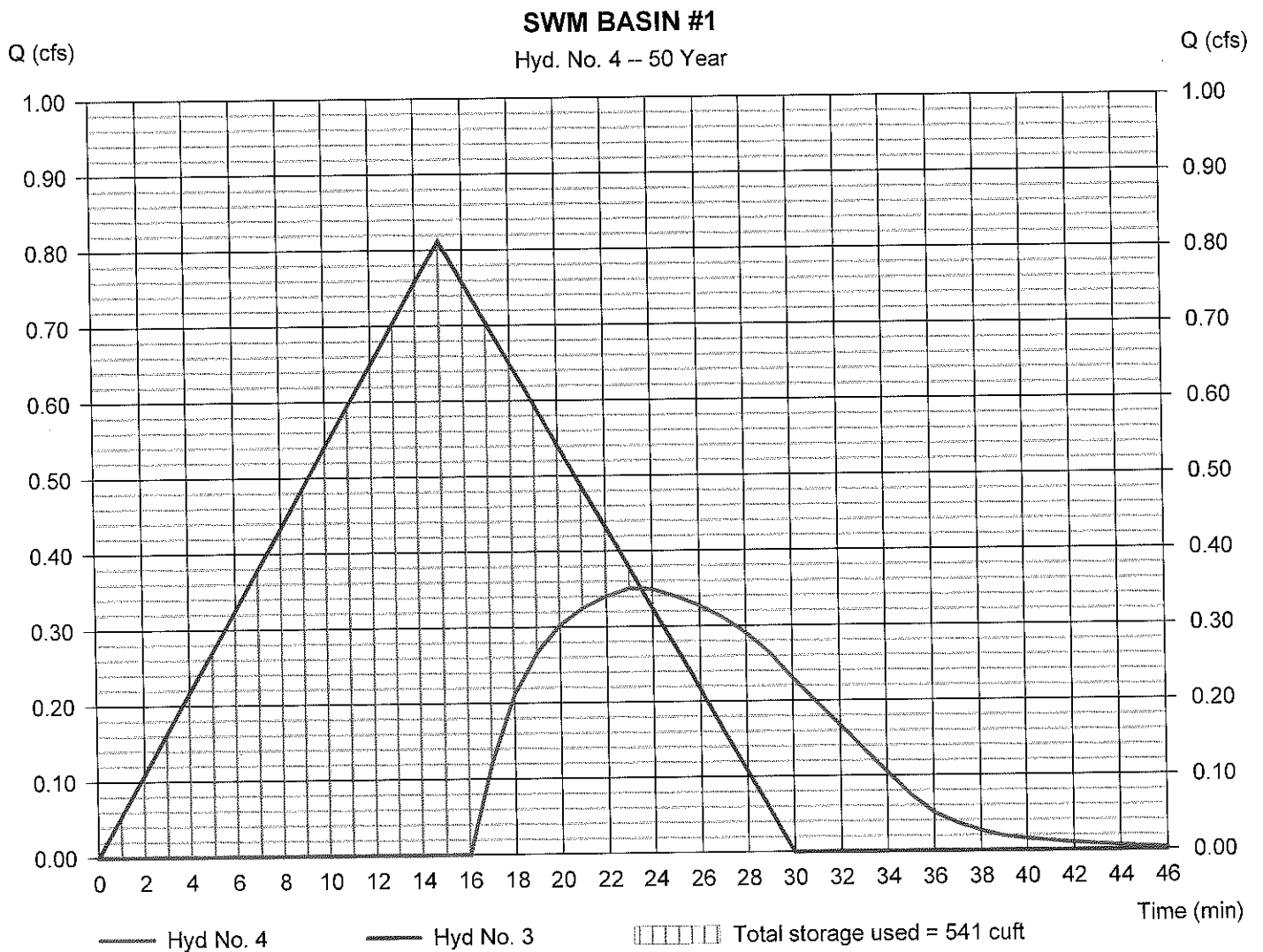
Thursday, 05 / 1 / 2014

Hyd. No. 4

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.350 cfs
Storm frequency	= 50 yrs	Time to peak	= 23 min
Time interval	= 1 min	Hyd. volume	= 295 cuft
Inflow hyd. No.	= 3 - Controlled SWM Basin #1	Max. Elevation	= 364.51 ft
Reservoir name	= SWM #1	Max. Storage	= 541 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

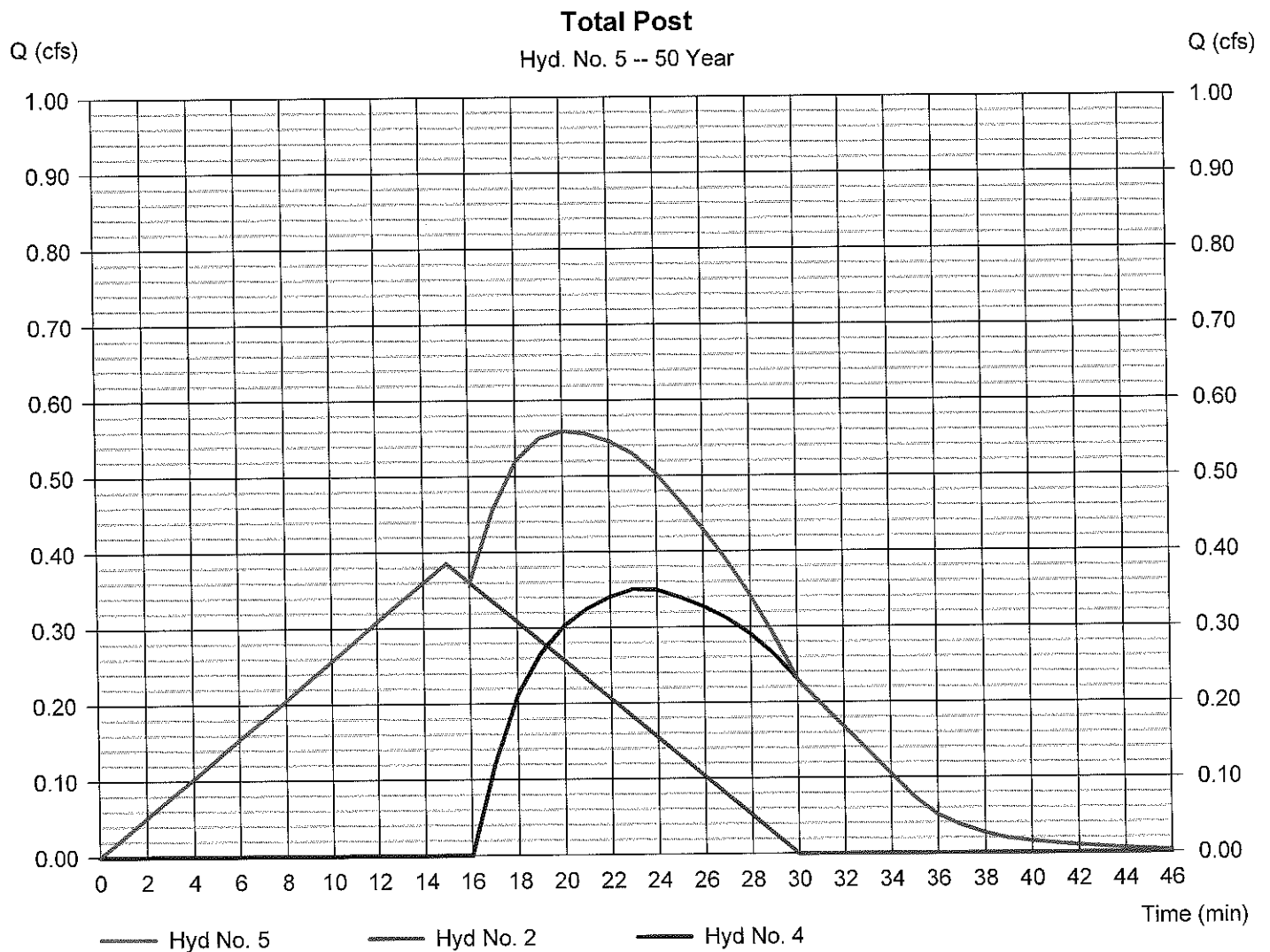
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 5

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.559 cfs
Storm frequency	= 50 yrs	Time to peak	= 20 min
Time interval	= 1 min	Hyd. volume	= 642 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.121 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	1.032	1	15	929	----	----	-----	Pre Development
2	Rational	0.417	1	15	375	----	----	-----	Post Uncontrolled
3	Rational	0.876	1	15	789	----	----	-----	Controlled SWM Basin #1
4	Reservoir	0.422	1	23	352	3	364.93	561	SWM BASIN #1
5	Combine	0.641	1	21	727	2, 4	----	-----	Total Post
14041.gpw					Return Period: 100 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

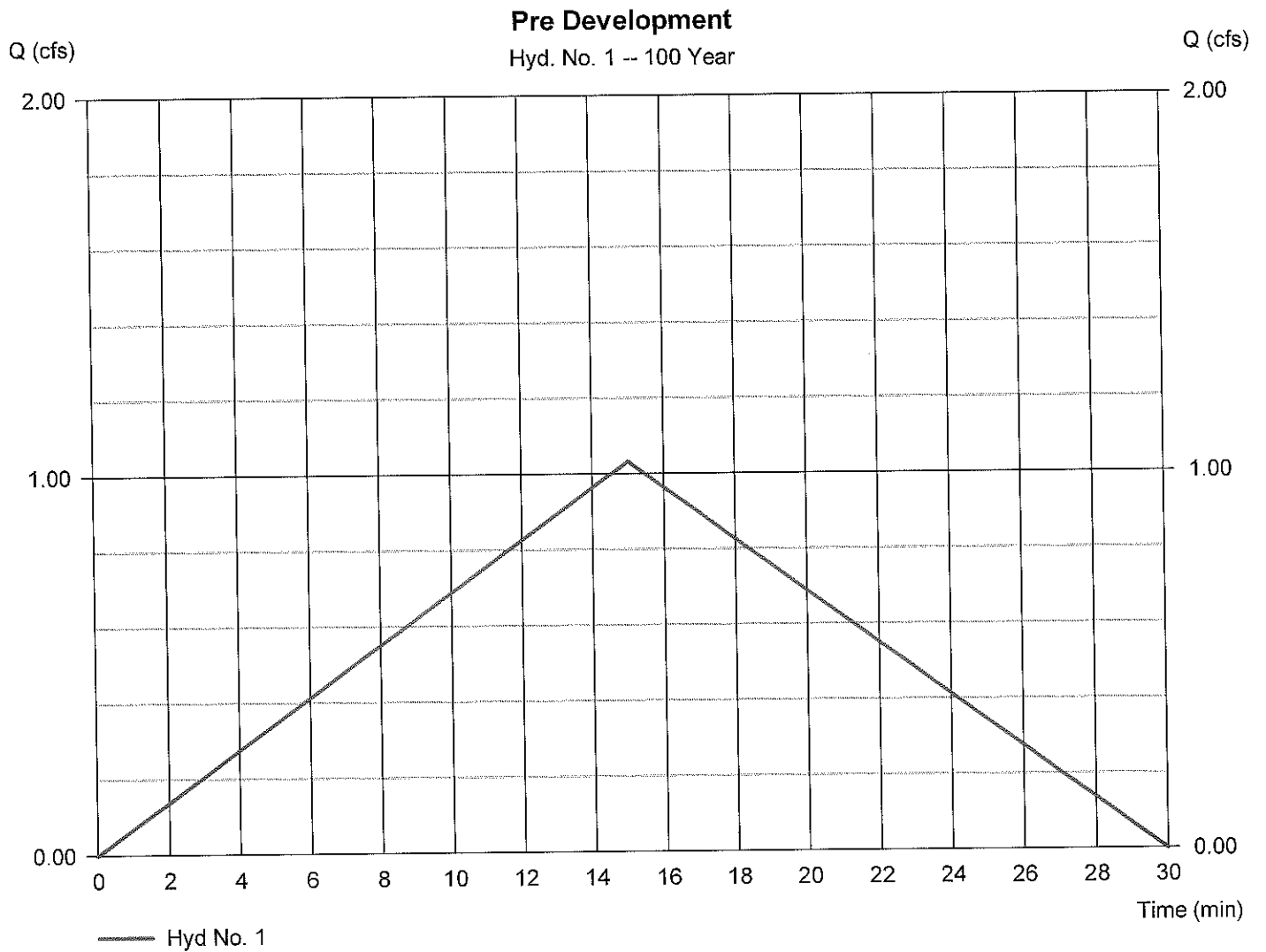
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 1.032 cfs
Storm frequency	= 100 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 929 cuft
Drainage area	= 0.229 ac	Runoff coeff.	= 0.55
Intensity	= 8.196 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

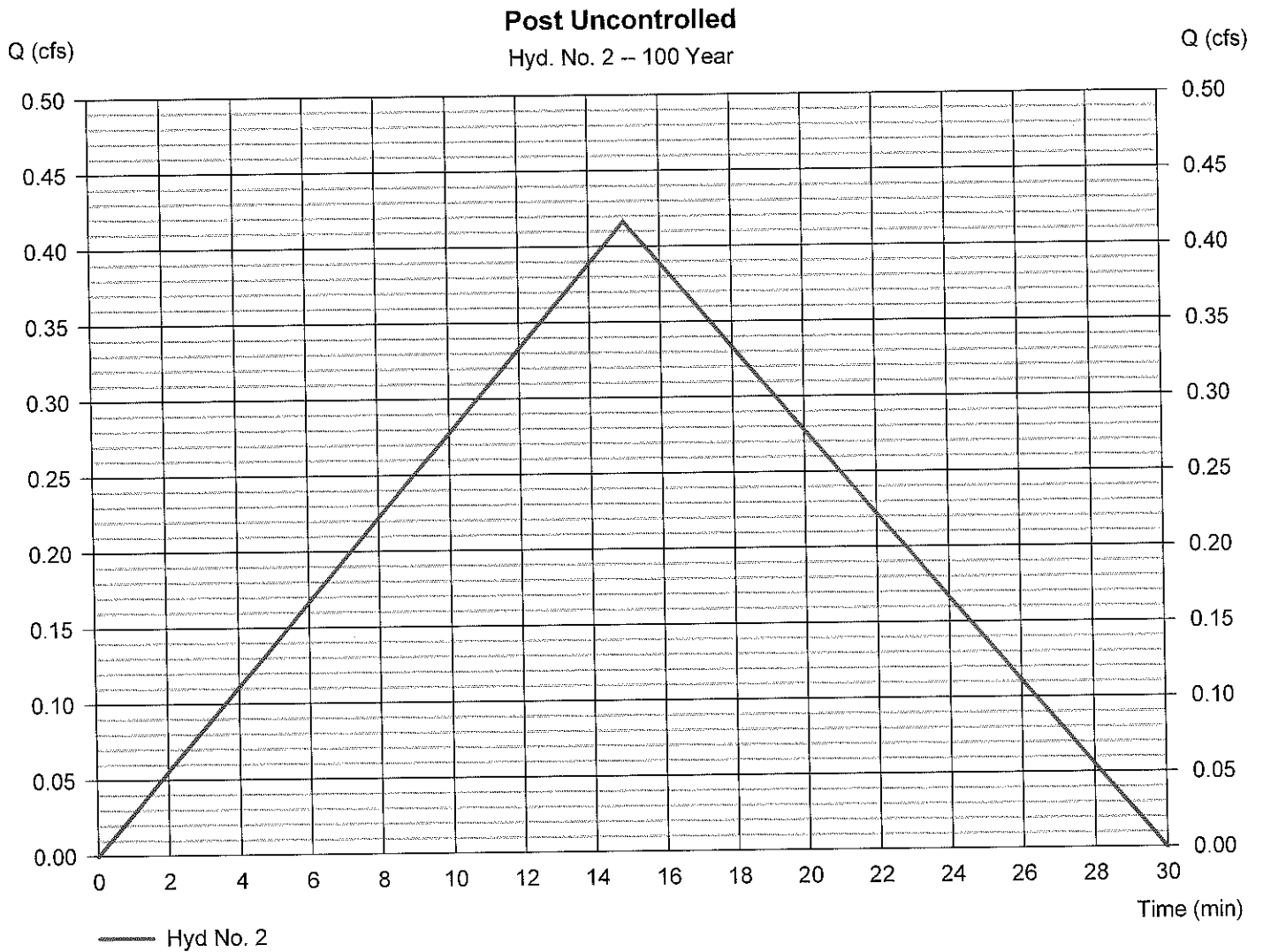
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 2

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.417 cfs
Storm frequency	= 100 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 375 cuft
Drainage area	= 0.121 ac	Runoff coeff.	= 0.42
Intensity	= 8.196 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

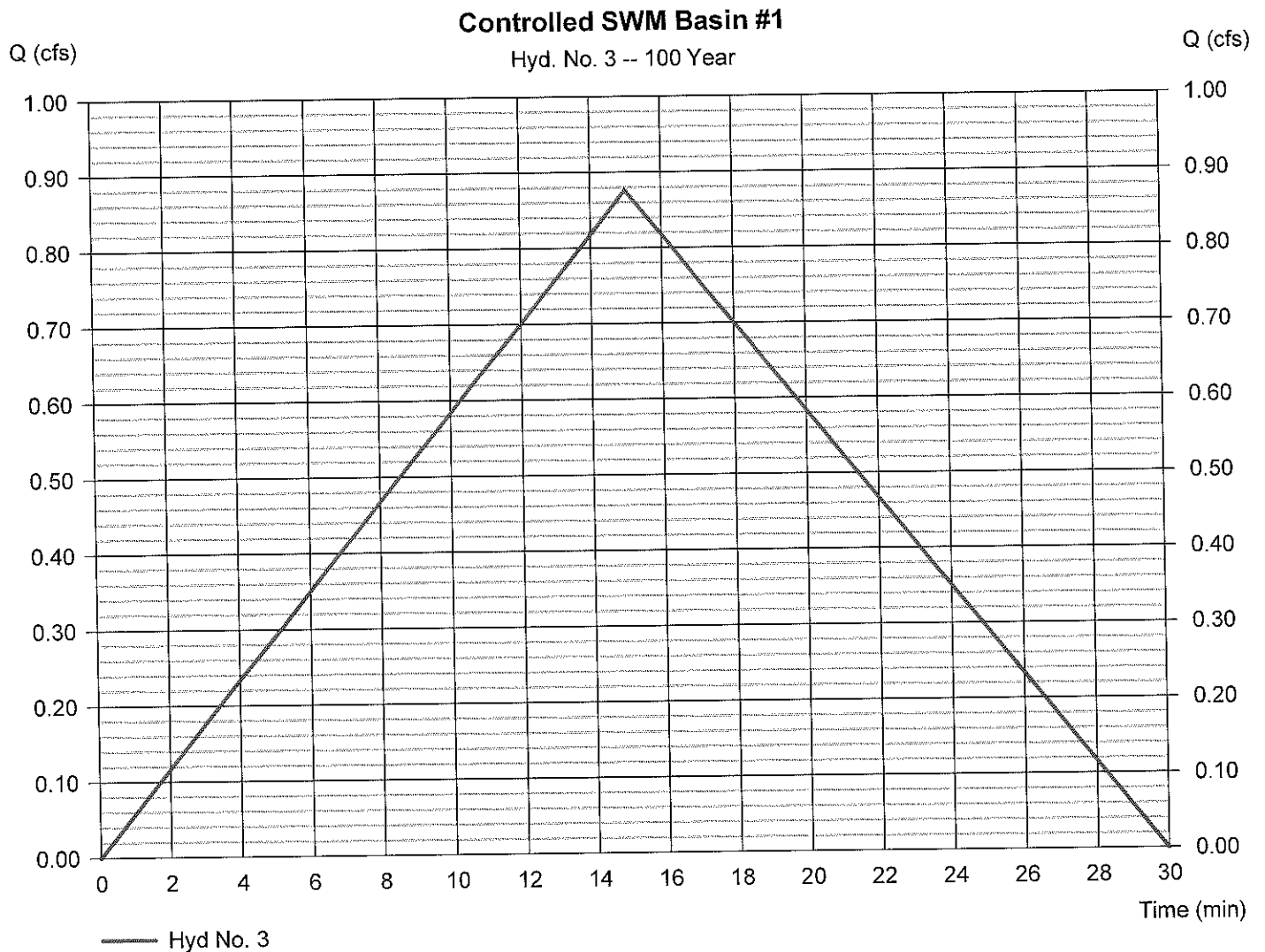
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.876 cfs
Storm frequency	= 100 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 789 cuft
Drainage area	= 0.108 ac	Runoff coeff.	= 0.99
Intensity	= 8.196 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

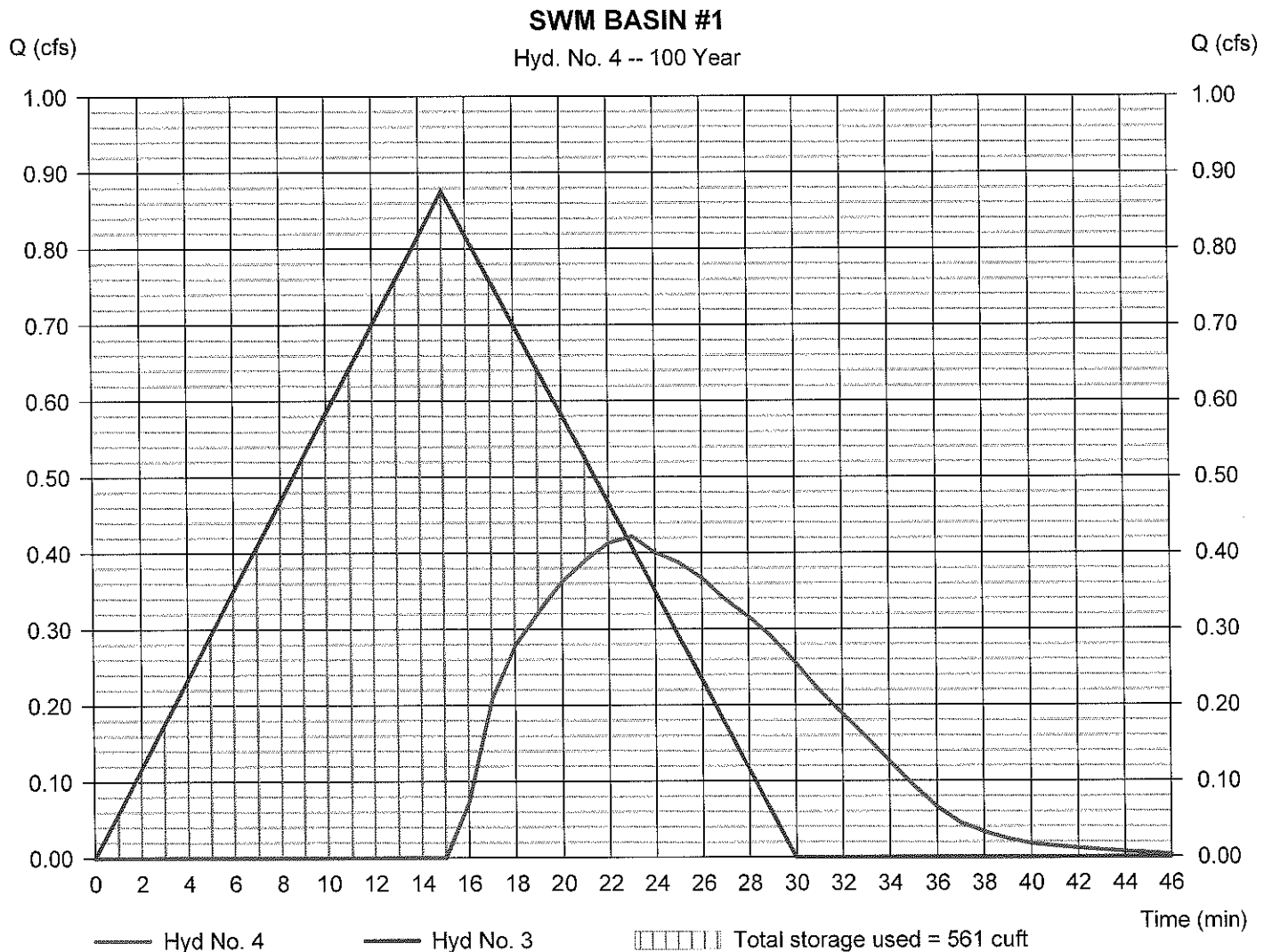
Thursday, 05 / 1 / 2014

Hyd. No. 4

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.422 cfs
Storm frequency	= 100 yrs	Time to peak	= 23 min
Time interval	= 1 min	Hyd. volume	= 352 cuft
Inflow hyd. No.	= 3 - Controlled SWM Basin #1	Max. Elevation	= 364.93 ft
Reservoir name	= SWM #1	Max. Storage	= 561 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

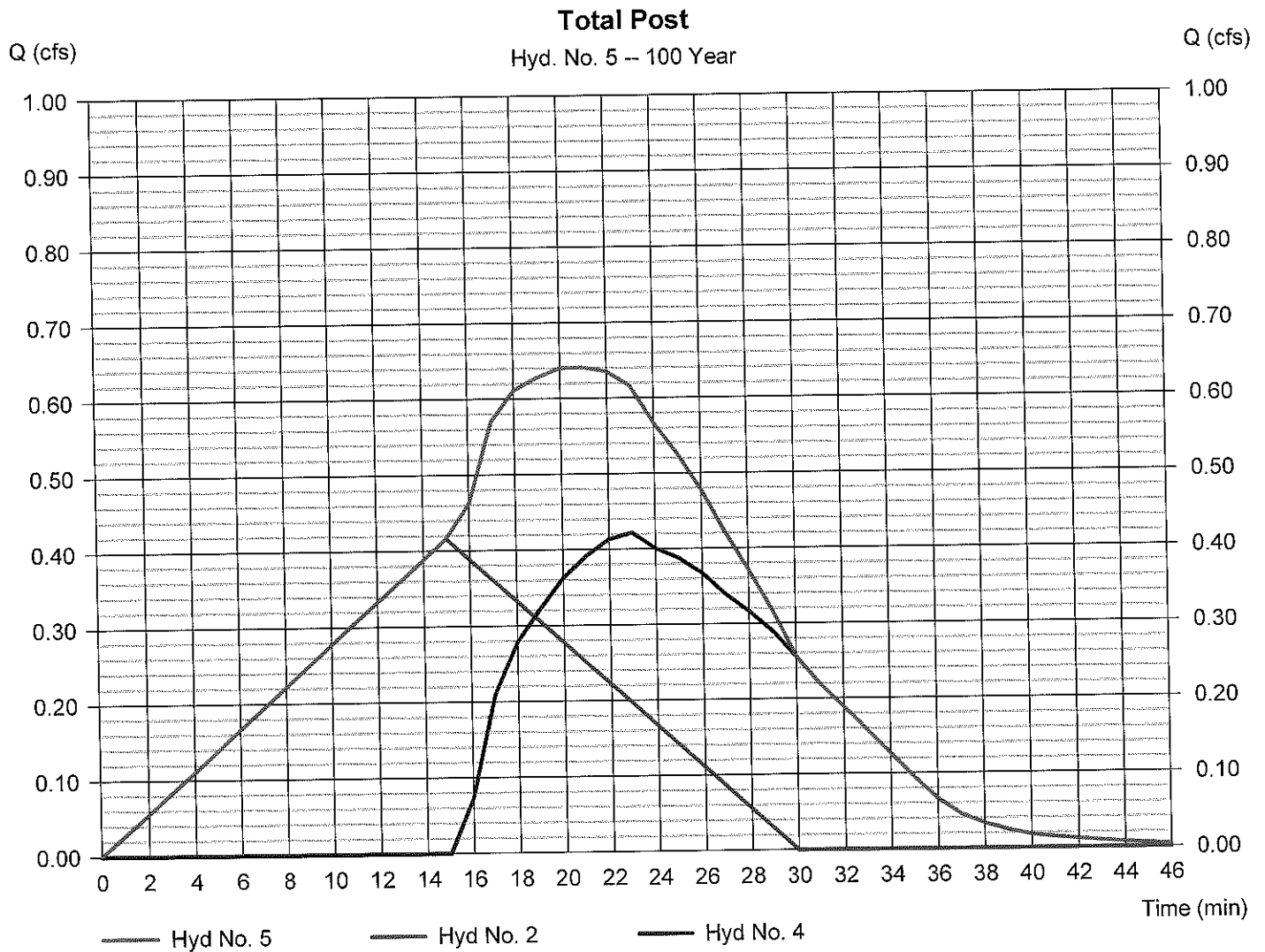
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 5

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.641 cfs
Storm frequency	= 100 yrs	Time to peak	= 21 min
Time interval	= 1 min	Hyd. volume	= 727 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.121 ac



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	22.1293	5.9000	0.7167	-----
2	26.2877	6.4000	0.7166	-----
3	0.0000	0.0000	0.0000	-----
5	25.3184	5.4000	0.6606	-----
10	50.7545	9.8000	0.7865	-----
25	27.8762	5.2000	0.6079	-----
50	41.8042	8.4000	0.6573	-----
100	129.6326	19.8000	0.8599	-----

File name: reg5.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	3.99	3.05	2.51	2.15	1.89	1.70	1.55	1.43	1.32	1.24	1.16	1.10
2	4.60	3.54	2.93	2.52	2.22	2.00	1.82	1.68	1.56	1.46	1.38	1.30
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.39	4.16	3.45	2.99	2.65	2.40	2.20	2.04	1.90	1.79	1.69	1.60
10	6.10	4.85	4.06	3.52	3.11	2.80	2.55	2.35	2.18	2.03	1.91	1.80
25	6.79	5.33	4.48	3.92	3.51	3.20	2.95	2.75	2.58	2.43	2.31	2.20
50	7.59	6.16	5.26	4.63	4.16	3.80	3.51	3.26	3.06	2.88	2.73	2.60
100	8.20	7.00	6.12	5.46	4.93	4.50	4.14	3.84	3.59	3.37	3.17	3.00

T_c = time in minutes. Values may exceed 60.

Precip. file name: LMT.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.20	0.00	4.20	5.00	5.80	6.50	7.20
SCS 6-Hr	1.40	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10



Excellence Delivered As Promised

MEMORANDUM

Date: May 28, 2014

To: Radnor Township Planning Commission

From: Roger Phillips, PE

cc: Stephen Norcini, P.E. – Director of Public Works
Kevin W. Kochanski, RLA, CZO – Director of Community Development
Peter Nelson, Esq. – Grim, Biehn, and Thatcher
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.
Suzan Jones – Radnor Township Engineering Department
William Miller – Radnor Township Codes Official
Ray Daly – Radnor Township Codes Official

RE: Wayne Elementary School
Radnor Township School District – Applicant

Date Accepted: May 5, 2014
90 Day Expiration: August 8, 2014

Gannett Fleming, Inc. has completed a review of the Wayne Elementary School Preliminary/Final Land Development Plans for compliance with the Radnor Township Code.

The existing property is located in the PLU zoning district. The applicant is proposing to construct a one story building addition to the Wayne Elementary School and the removal of an existing building, walk and deck.

This Land Development Application is subject to Zoning, Subdivision and Land Development, Stormwater Management, and other applicable codes of the Township of Radnor.

The applicant has indicated that the following waivers will be requested from the Subdivision and Land Development Code:

- §255-12 – Formal request from the land development process
- §255-20.B.5 – To not provide the transportation impact study
- §255-21(n) – Modification to allow an aerial photograph to depict features within 500' of property

Plans Prepared By: Momence & Associates, Inc.
Dated: 05/02/2014, No Revisions



Gannett Fleming

I Zoning

1. §280-103 – Off-street parking calculations should be provided that indicate the number of additional parking spaces required for this project.

II Stormwater Management

1. A general note shall be added to the plans indicating that a grading plan and erosion sediment and control plans will be submitted and approved prior to issuing any building permits. Any revisions to the size or location of the individual structures or other features will be addressed at that time, and a final approval of the stormwater management plan will be required as part of the Grading Permit process.
2. Percolation tests must be provided to indicate that the stormwater facility will be able to drain within 96 hours. Final design and sizing of the stormwater facility should be based on the results of the percolation tests.
3. The Hydrograph reports for the 1-100 year storm events have inconsistent intensity values with respect to the existing conditions and the controlled post conditions. Provide and explanation of these intensities.

III General Comments

1. The cover letter from Momenee and Associates indicates that the new improvements will create an overall decrease of the total impervious cover on the property. Plan sheet 2 indicates that there is a new increase of 6,323 SF and plan sheet 5 indicates and net decrease in impervious coverage of 2,383 SF.

Should the Planning Commission consider recommending approval of this project, we recommend that the recommendation be conditioned on requiring the applicant to satisfactorily address the above comments.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.
Senior Project Manager



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

MEMORANDUM

Date: May 23, 2014

To: Steve Norcini, P.E.
Radnor Township Public Works Director

From: Damon Drummond P.E., PTOE
G&A Senior Transportation Engineer

cc: Roger Phillips, P.E. - Gannett Fleming, Inc., Senior Project Manager
Amy Kaminski, P.E. PTOE- G&A Department Manager of Transportation
Kristin Norwood, P.E. - G&A Senior Transportation Engineer

Reference: Wayne Elementary School (TMP 36-19-230-000)
651 West Wayne Avenue
Preliminary/Final Land Development Review
G&A# 14-05021

Pursuant to your request, Gilmore & Associates, Inc. has completed a transportation review of the referenced Preliminary/Final Land Development Plan for Wayne Elementary School. The applicant proposes to construct a building addition and walkway improvements at the existing school situated on a 19.939 acre parcel. In addition, the applicant proposes to remove the current building being used for overflow classrooms. We offer the following for Radnor Township's consideration:

A. REVIEWED MATERIALS

1. Preliminary/Final Land Development Plans for Wayne Elementary School dated May 02, 2014, prepared for Radnor Township School District by Momenee and Associates, Inc. (8 sheets).

B. REQUESTED SALDO WAIVERS

1. §255-12: Waiver request from the formal land development process.
2. §255-20.B.5: Waiver request from providing a Transportation Impact Study.
3. §255-21(n): Waiver request to use aerial photograph to depict features within 500' of the property.

C. PRELIMINARY/FINAL LAND DEVELOPMENT PLAN REVIEW COMMENTS

1. §255-20.A(5): The plan should clearly indicate which features are existing and which are proposed. Provide shading or hatching or another technique to clearly indicate the proposed building construction.

Steve Norcini, P.E.
Wayne Elementary School
May 23, 2014

2. §255-20.B(5): Provide clarification as whether the expansion is to accommodate additional students and/or staff and therefore generating additional trips.
3. §255-37: Ensure that the proposed walkway is ADA compliant. Provide a detail of the walkway indicating the width, grades and cross-slopes.
4. Provide existing driveway widths and radii. Include arrows showing the existing traffic circulation within the site and distinguish between bus and auto/carpool traffic. Ensure that adequate access can be maintained for both vehicular and pedestrian traffic.
5. The existing parking lot on the eastern corner of the site does not provide circulation with dead end parking. Consider removing parking stalls at the end the middle of the aisle near Meadowood Avenue to complete circulation through the lot.

If you have any questions regarding the above, please contact this office.

ELAINE P. SCHAEFER
President

JAMES C. HIGGINS
Vice-President

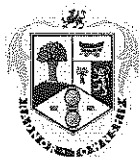
WILLIAM A. SPINGLER

DONALD E. CURLEY

JOHN FISHER

JOHN NAGLE

RICHARD F. BOOKER



RADNOR TOWNSHIP
301 IVEN AVENUE
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600

Fax (610) 971-0450

www.radnor.com

ROBERT A. ZIENKOWSKI
Township Manager
Township Secretary

JOHN B. RICE, ESQ.
Solicitor

JOHN E. OSBORNE
Treasurer

May 13, 2014

Leo Bernabei
Radnor Township School District
135 S. Wayne Ave.
Wayne, PA 19087

**RE: Wayne Elementary School
Land Development Application #2014-D-06 Preliminary Plan**

Dear Mr. Bernabei:

In accordance with Section 255-18 of the Code of the Township of Radnor, we have performed a completeness review of your land development application to construct a building addition to the Wayne Elementary School, and have determined your application to be administratively complete. Therefore, I have accepted the application for preliminary revised plan for review by the Township Staff, Shade Tree Commission, Planning Commission, and Board of Commissioners.

These plans are available for public viewing in the Engineering Department. These plans will be reviewed by the Planning Commission at their meeting on **Monday June 2, 2014**. Subsequent to the Planning Commission meeting, your plan will be reviewed by the Board of Commissioners. You or your representative should plan to attend all scheduled meetings.

If the Planning Commission takes action, your plan will then be reviewed by the Board of Commissioners at a future meeting. These dates will be provided to you once it is placed on the agenda.

If you have any questions or require any additional information, please contact me.

Sincerely,

Roger A. Phillips, PE
Township Engineer

CC: Momenee & Associates, Inc.

MOMENEE AND ASSOCIATES, INC.

924 COUNTY LINE ROAD • BRYN MAWR, PENNSYLVANIA 19010

(610) 527-3030 • FAX (610) 527-9008

E-MAIL: info@momenee.com

www.momenee.com

May 2, 2014

Mr. Roger Phillips, P.E., Township Engineer
Radnor Township
301 Iven Avenue
Wayne, PA 19087

**RE: Ithan Elementary School
Wayne Elementary School
Preliminary / Final Land Development Applications
Radnor Township, Delaware County**

Our File No. 14-041

Our File No. 14-042

Dear Mr. Phillips:

On behalf of the Radnor Township School District, we are submitting land development applications for improvements associated with the Ithan Elementary School property and the Wayne Elementary School property. Along with this letter please find the following:

Ithan Elementary School

- One (1) copy of the signed Land Development Application,
- One (1) copy of the Delaware County Planning Commission review application,
- One (1) copy of the deed for the property,
- One (1) copy of the title report,
- A check in the amount of \$300 payable to "Treasurer of Delaware County",
- A check in the amount of \$1,550 payable to "Radnor Township",
- A check in the amount of \$10,000 payable to "Radnor Township",
- Two (2) copies of the Post Construction Stormwater Management Report,
- 35 copies of the Preliminary/Final Land Development Plans.

The Radnor Township School District proposes to construct a building addition to the Ithan Elementary School and to relocate a walkway on the property. The new one-story addition will consist of two new classrooms. The new improvements will create a slight increase in the total impervious cover on the property.

Wayne Elementary School

- One (1) copy of the signed Land Development Application,
- One (1) copy of the Delaware County Planning Commission review application,
- One (1) copy of the deed for the property,
- A check in the amount of \$400 payable to "Treasurer of Delaware County",
- A check in the amount of \$1,550 payable to "Radnor Township",
- A check in the amount of \$10,000 payable to "Radnor Township",
- Two (2) copies of the Post Construction Stormwater Management Report
- 35 copies of the Preliminary/Final Land Development Plans.

The Radnor Township School District proposes to construct a building addition to the Wayne Elementary School. The new one-story addition will consist of a new classroom and other multi-purpose rooms. In addition, the existing one-story building currently used for overflow classrooms will be removed. The new improvements will create an overall decrease in the total impervious cover on the property.

By filing these applications, the Radnor Township School District wishes to have these matters placed on the June 2, 2014 agenda of the Planning Commission meeting and the June meetings of the Board of Commissioners. If you have any questions or require any further information, please do not hesitate to contact me. Thank you for your attention to this matter.

Very truly yours,
MOMENEY AND ASSOCIATES, INC.

A handwritten signature in black ink, appearing to read "Kevin R. Momenee", written over a horizontal line.

Kevin R. Momenee, P.E., P.L.S.

14042L01.doc

cc: Leo Bernabei - Radnor Township School District

RADNOR TOWNSHIP
301 IVEN AVE
WAYNE PA 19087
P) 610 688-5600
F) 610 971-0450
WWW.RADNOR.COM

SUBDIVISION ~ LAND DEVELOPMENT

Location of Property Wayne Elementary School, 651 West Wayne Avenue, Wayne, Pa 19087

Zoning District PLU _____ Application No. _____
(Twp. Use)

Fee \$1,550.00 Ward No. 6-2 Is property in HARB District No _____

Applicant: (Choose one) Owner Equitable Owner

Name RADNOR TOWNSHIP SCHOOL DISTRICT

Address 135 S. WAYNE AVE. WAYNE, PA 19087

Telephone 610-688-8100 Fax 610-902-0207 Cell _____

Email LED.BERNABE@RTSD.ORG

Designer: (Choose one) Engineer Surveyor

Name Kevin R. Momenee, P.E., P.L.S.

Address 924 County Line Road, Bryn Mawr, Pa 19010

Telephone 610-527-3030 Fax 610-527-9008 Cell _____

Email kmomenee@momenee.com

Area of property 19.939 ac Area of disturbance 0.4 ac

Number of proposed buildings 1 Proposed use of property Institutional

Number of proposed lots 1

Plan Status: Sketch Plan Preliminary Final Revised

Are there any requirements of Chapter 255 (SALDO) not being adhered to?

Explain the reason for noncompliance.

255-12: Waiver request from the formal land development process
255-20.B.5 To not provide a Transportation Impact Study
255-21(c) - modification to allow an aerial photograph to depict features
within 500' of property.

Are there any infringements of Chapter 280 (Zoning), and if so what and why?

NO

Individual/Corporation/Partnership Name

RADNOR TOWNSHIP SCHOOL DISTRICT

I do hereby certify that I am the owner, equitable owner or authorized representative of the property which is the subject of this application.

Signature

Timothy E. Vail

Print Name

Timothy E. Vail

By filing this application, you are hereby granting permission to Township officials to visit the site for review purposes.

NOTE: All requirements of Chapter 255 (Subdivision of Lane) of the Code of the Township of Radnor must be complied with whether or not indicated in this application.

DELAWARE COUNTY PLANNING COMMISSION

APPLICATION FOR ACT 247 REVIEW

Incomplete applications will be returned and will not be considered "received" until all required information is provided.

Please type or print legibly

DEVELOPER/APPLICANT

Name Radnor Township School District E-mail leo.bernabei@rtsd.org

Address 135 S. Wayne Avenue Wayne, PA 19087 Phone 610-688-8100 Ext 6103

Name of Development Wayne Elementary School

Municipality Radnor Township

ARCHITECT, ENGINEER, OR SURVEYOR

Name of Firm Momenee & Associates, Inc. Phone 610-527-3030

Address 924 County Line Road, Bryn Mawr, Pa 19010

Contact Kevin R. Momenee, P.E., P.L.S. E-mail kmomenee@momenee.com

Type of Review	Plan Status	Utilities		Environmental Characteristics
		Existing	Proposed	
<input type="checkbox"/> Zoning Change	<input type="checkbox"/> Sketch	<input checked="" type="checkbox"/> Public Sewerage	<input checked="" type="checkbox"/> Public Sewerage	
<input checked="" type="checkbox"/> Land Development	<input checked="" type="checkbox"/> Preliminary	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Wetlands
<input type="checkbox"/> Subdivision	<input type="checkbox"/> Final	<input checked="" type="checkbox"/> Public Water	<input checked="" type="checkbox"/> Public Water	<input type="checkbox"/> Floodplain
<input type="checkbox"/> PRD	<input type="checkbox"/> Tentative	<input type="checkbox"/> Private Water	<input type="checkbox"/> Private Water	<input checked="" type="checkbox"/> Steep Slopes

Zoning District PLU

Tax Map # 36 / 19 / 230

Tax Folio # 36 / 06 / 03988 / 50

STATEMENT OF INTENT

WRITING "SEE ATTACHED PLAN" IS NOT ACCEPTABLE.

Existing and/or Proposed Use of Site/Buildings:

Existing elementary school to be expanded by the construction of an addition to the existing school building consisting of new classrooms
and other facilities along with new walkways and associated improvements.

Total Site Area 46.99 Acres
Size of All Existing Buildings 68,528 Square Feet
Size of All Proposed Buildings 65,728 Square Feet
Size of Buildings to be Demolished 0 Square Feet

LEO BERNGOBI
Print Developer's Name

[Signature]
Developer's Signature

MUNICIPAL SECTION

ALL APPLICATIONS AND THEIR CONTENT ARE A MUNICIPAL RESPONSIBILITY.

Local Planning Commission Regular Meeting _____

Local Governing Body Regular Meeting _____

Municipal request for DCPD staff comments prior to DCPC meeting, to meet municipal meeting date:

Actual Date Needed _____

IMPORTANT: If previously submitted, show assigned DCPD File # _____

Print Name and Title of Designated Municipal Official Phone Number

Official's Signature Date

FOR DCPD USE ONLY

Review Fee: Check # _____ Amount \$ _____ Date Received _____

Applications with original signatures must be submitted to DCPD.

MOMENEE AND ASSOCIATES, INC.

924 COUNTY LINE ROAD • BRYN MAWR, PENNSYLVANIA 19010

(610) 527-3030 • FAX (610) 527-9008

E-MAIL: info@momenee.com

www.momenee.com

POST CONSTRUCTION STORMWATER MANAGEMENT REPORT FOR WAYNE ELEMENTARY SCHOOL

TOWNSHIP OF RADNOR

JOB #14-042

BY

MOMENEE AND ASSOCIATES, INC.,

924 COUNTY LINE ROAD

BRYN MAWR, PA 19010



MAY 2, 2014

PROJECT NARRATIVE WAYNE ELEMENTARY SCHOOL

The Wayne Elementary School is a 19.939-acre development located northwest of the intersection of Maplewood Avenue and Wayne Avenue in Radnor Township. It is proposed to construct an addition to the existing school building along with other associated improvements. Some existing walkways and other impervious areas are proposed to be removed. The project will create 7,264 SF of new and/or replacement impervious cover. Due to Radnor Township regulations, storm water management will be provided. The site is developed under the provisions of Radnor Township's Regulations. These calculations are included as part of a Grading Permit for the site.

Storm water management is provided one perforated pipe system sized to control the increase in storm water runoff from the developed sub-basin. This site is located in the Darby Creek watershed District A; as a result, several stormwater management guidelines were met. The increase in storm water runoff for the 2-year storm event must be recharged into the ground via percolation. Water quality treatment must be provided based on the township's calculation formula. The rate control through the 100-year storm must be provided as well as making the following reductions: the 2-year post rate shall be reduced to the 1-year pre rate. The stormwater management facilities are designed for the new and/or replacement impervious coverage plus an additional 736 square feet of additional impervious area to allow for future development. If this impervious cover is developed in the future 286 SF may be directed to the SWM system, and 450 SF may remain uncontrolled.

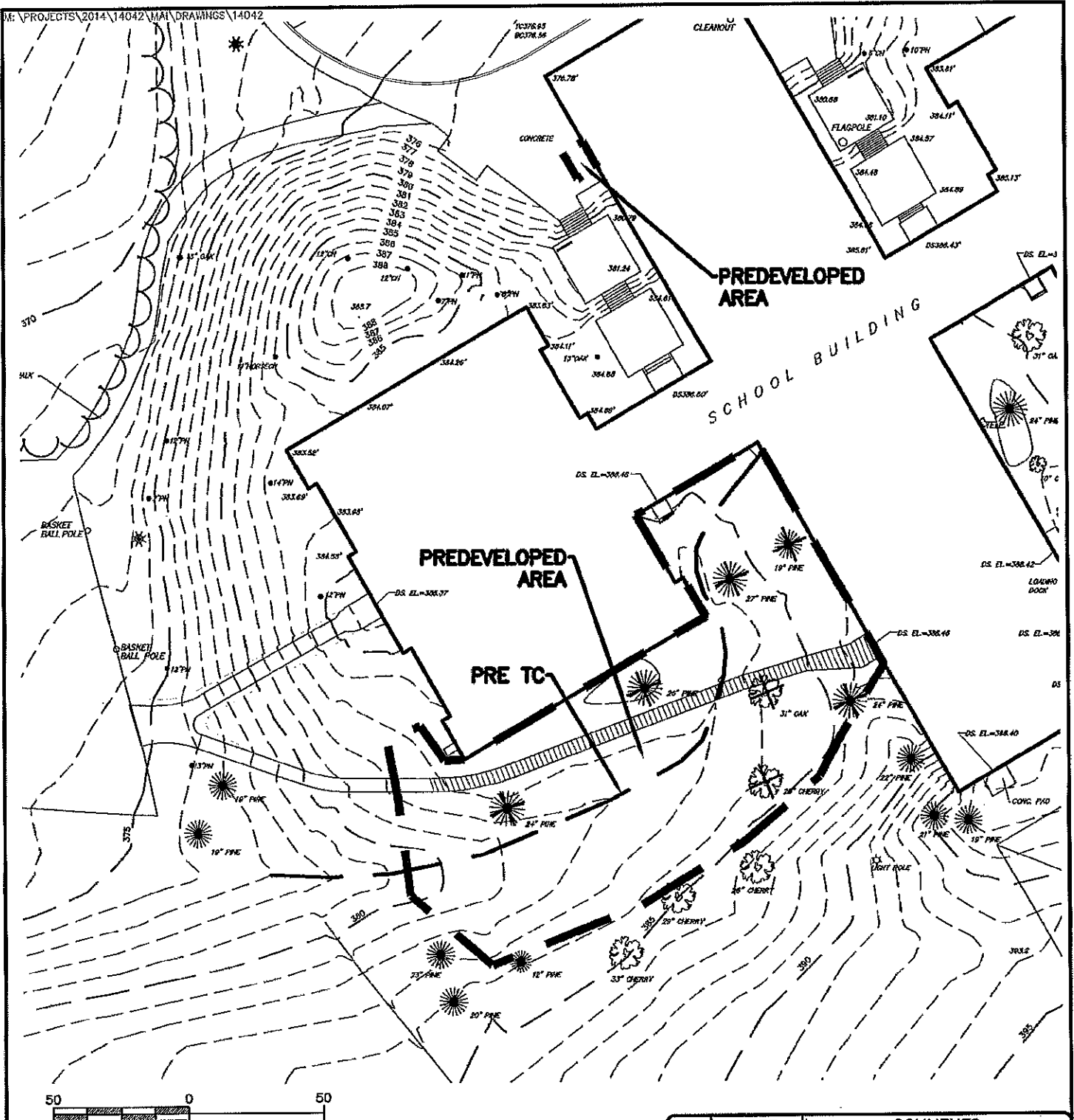
The lot is graded so that all developed portions are controlled by the perforated pipe system. Stormwater management system #1 consists of 90 linear feet of 48" fully perforated corrugated metal pipe. The system will be installed down grade of the new building addition and will collect and control the runoff from the new roof area and some grass areas via roof downspout leaders, a small park grate, and conveyance piping. In addition to the proposed improvements an additional impervious area of 736 square feet was included in the calculations to allow for possible future development. Discharge from the pipe system is piped to a proposed bubble-up spreader where it may be dissipated to grade in an un-concentrated manner. The pipe system is designed to provide groundwater recharge for the volume generated by the 2-year storm event for the new and/or replacement impervious surfaces.

In order to size the on lot storm facilities to contain the volume of runoff increase for the 2-year storm, the developed portion of the lot was evaluated by the Universal Rational method to determine the volume increase in runoff. C coefficients were assigned to the developed portion of the lot based on soil conditions and vegetation. The subbasin was established based on the location of the proposed storm facilities and the contributory post development watershed. Preliminary system design was based on the volume required to recharge the increase in the 2-year storm runoff generated by the proposed impervious cover. Once the volume increase was calculated, the storm facilities were sized to provide this minimum storage volume. Hydrographs were then calculated

for both pre and post development conditions to determine the need for rate control. Times of concentration were established for the subbasin and each development condition and used to determine the peak rates of runoff.

The perforated pipe system was then further refined to provide control of the post development runoff rates. Post development flows were routed through the pipe system and volumes were adjusted along with outlet controls to limit the post development runoff to rates required by township ordinances.

An attached table summarizes the analysis of the lot. Detailed calculations and support data are included as part of this report.

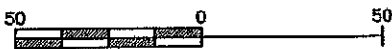
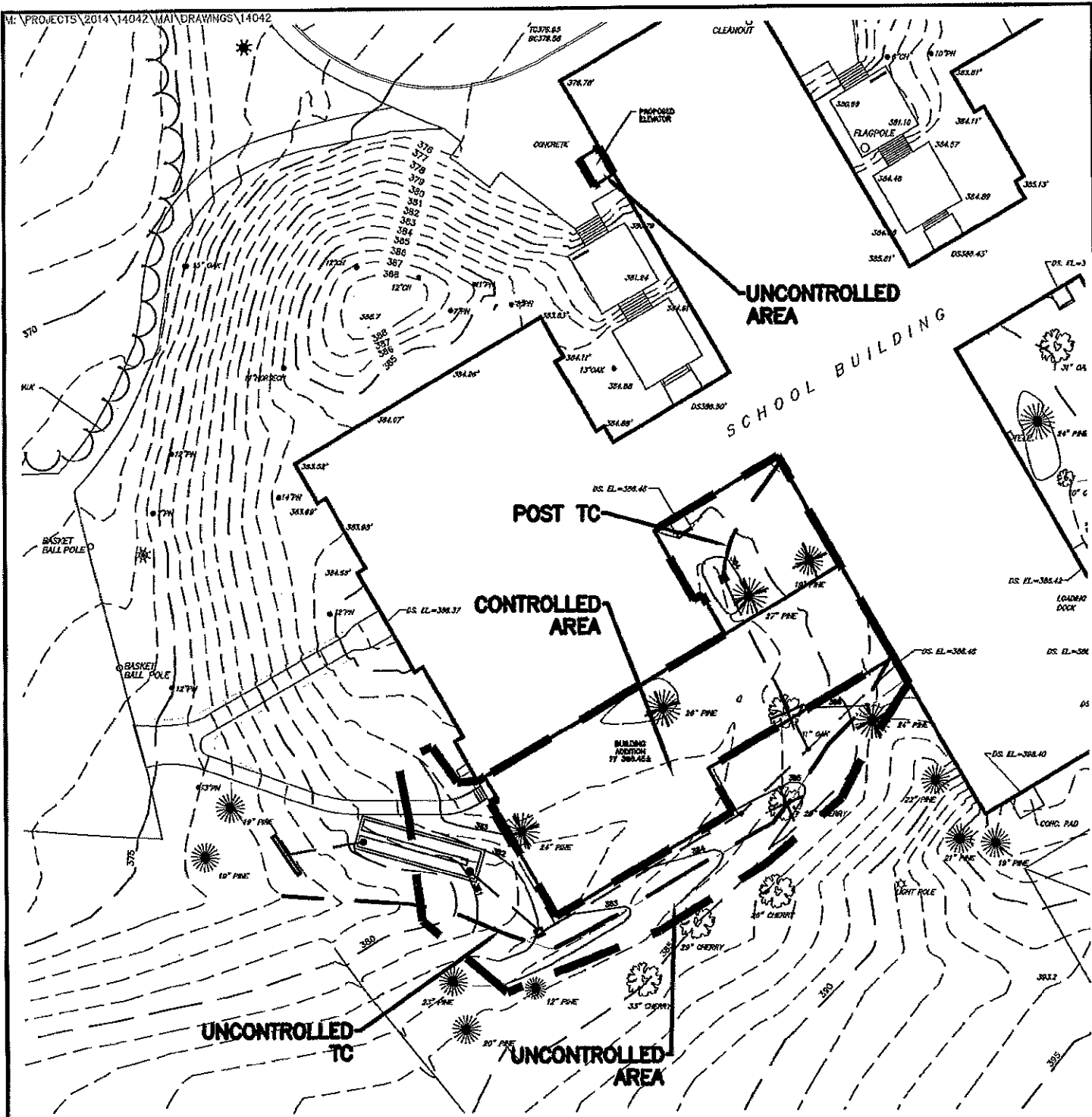


REV.	DATE	COMMENTS
------	------	----------

PRE DEVELOPMENT DRAINAGE AREA MAP
WAYNE ELEMENTARY SCHOOL

MOMENEE & ASSOCIATES, INC.
 CIVIL ENGINEERS AND LAND SURVEYORS
 924 COUNTY LINE ROAD, BRYN MAWR, PA 19010 PHONE: (610) 527-3030 FAX: (610) 527-9008

DATE: MAY 2, 2014
 SHEET NO.
 1
 OF 2
 SCALE: 1" = 50'
 FILE NO.: 14-042



REV.	DATE	COMMENTS
------	------	----------

**POST DEVELOPMENT DRAINAGE AREA MAP
WAYNE ELEMENTARY SCHOOL**

MOMENEE & ASSOCIATES, INC.
 CIVIL ENGINEERS AND LAND SURVEYORS
 924 COUNTY LINE ROAD, BRYN MAWR, PA 19010 PHONE: (610) 527-3030 FAX: (610) 527-9008

DATE: MAY 2, 2014
 SHEET NO.
 2
 OF 2
 SCALE: 1" = 50'
 FILE NO.: 14-042

MOMENEE AND ASSOCIATES, INC.

CONSULTING ENGINEERS
924 COUNTY LINE ROAD
BRYN MAWR, PA 19010

JOB NAME: WAYNE ELEMENTARY SCHOOL
LOCATION: RADNOR TOWNSHIP DELAWARE COUNTY

SUMMARY OF SITE RUNOFF:

PRE-DEVELOPMENT CONDITIONS

	1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
ENTIRE WATERSHED :	0.42	0.48	0.57	0.64	0.71	0.81	0.88
ALLOWABLE DISCHARGE :	0.42	0.42	0.57	0.64	0.71	0.81	0.88

POST DEVELOPMENT CONDITIONS

	1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
CONTROLLED SUBAREA #1:	0.00	0.00	0.00	0.10	0.22	0.31	0.45
UNCONTROLLED AREA :	0.19	0.22	0.26	0.29	0.32	0.36	0.40
TOTAL POST DEVELOPMENT :	0.19	0.22	0.26	0.39	0.54	0.67	0.85
ACTUAL POST DEVELOPMENT REDUCTION :	0.23	0.26	0.31	0.25	0.17	0.14	0.03

VOLUME CONTROL SUMMARY (2-YR) :

PREDEVELOPMENT :	520	CF
CONTROLLED AREA :	744	CF
UNCONTROLLED AREA :	235	CF
RECHARGE REQUIRED :	459	CF
SWMS VOLUME IN :	744	CF
SWMS VOLUME OUT :	0	CF
RECHARGE PROVIDED :	744	CF

MOMENEE AND ASSOCIATES, INC.

CONSULTING ENGINEERS
 924 COUNTY LINE ROAD
 BRYN MAWR, PA 19010

JOB NAME: WAYNE ELEMENTARY SCHOOL
 LOCATION: RADNOR TOWNSHIP DELAWARE COUNTY

C CALCULATIONS FOR PREDEVELOPMENT AREA:		SITE	
PRE-DEVELOPMENT C :	0.30		
PRE-DEVELOPMENT AREA :	16182 SF	0.371 ACRES	
SOIL TYPE B - MEADOW		C = 0.25	15136 SF
IMPERVIOUS		C = 0.99	1046 SF
IMPERVIOUS (WITHIN R/W)		C = 0.99	0 SF
<hr/>			
CONTROLLED SUBAREA #1 C :	0.84		
CONTROLLED SUBAREA #1 AREA :	9341 SF	0.214 ACRES	
SOIL TYPE B - LAWN		C = 0.25	1949 SF
IMPERVIOUS		C = 0.99	7106 SF 76.1%
IMPERVIOUS (WITHIN R/W)		C = 0.99	0 SF 0.0%
IMPERVIOUS (FUTURE)		C = 0.99	286 SF 3.1%
UNCONTROLLED C :	0.32		
UNCONTROLLED AREA :	6841 SF	0.157 ACRES	
SOIL TYPE B - LAWN		C = 0.25	6233 SF
IMPERVIOUS		C = 0.99	158 SF
IMPERVIOUS (WITHIN R/W)		C = 0.99	0 SF
IMPERVIOUS (FUTURE)		C = 0.99	450 SF
POST-DEVELOPMENT C :	0.62		
POST-DEVELOPMENT AREA :	16182 SF	0.371 ACRES	
SOIL TYPE B - LAWN		C = 0.25	8182 SF
IMPERVIOUS		C = 0.99	7264 SF
IMPERVIOUS (WITHIN R/W)		C = 0.99	0 SF
IMPERVIOUS (FUTURE)		C = 0.99	736 SF

MOMENEE AND ASSOCIATES, INC.

CONSULTING ENGINEERS
924 COUNTY LINE ROAD
BRYN MAWR, PA 19010

JOB NAME: WAYNE ELEMENTARY SCHOOL
LOCATION: RADNOR TOWNSHIP DELAWARE COUNTY

WATER QUALITY VOLUME

$$WQ_V = [P * R_V * A] / 12$$

P = 1 INCH

A = AREA OF PROJECT CONTRIBUTING TO WATER QUALITY BMP's

$$R_V = 0.05 + 0.009I$$

I = PERCENT OF IMPERVIOUS COVERAGE

A = 0.214 ACRES

I = 79.30 %

R_V = 0.7637

WQ_V = 0.0136 ACRE-FEET

WQ_V = 593 CF

**RECHARGE CALCULATIONS FOR THE FIRST INCH OF RUNOFF
GENERATED FROM THE PROPOSED IMPROVEMENTS**

FORMULA USED: $Rev = I * \text{Proposed Impervious Area (square feet)} / 12 \text{ (inches/foot)}$

WHERE: I = 1.0 inch
Proposed Impervious Area = 8000 square feet
Rev = 667 cubic feet

INFILTRATION VOLUME PROVIDED (FT^3) :

	Volume In (ft^3)	Volume Out (ft^3)	Recharge Volume (ft^3)
SWM #1	744	0	744
TOTAL :			744

MOMENEE AND ASSOCIATES, INC.
 924 COUNTY LINE ROAD
 BRYN MAWR, PA 19010

4' DIAMETER PERFORATED CMP

LENGTH OF 4 FT CMP = 90 FT

TOTAL VOLUME OF STORAGE PROVIDED = 1126.2 CF

AREA OF STORAGE:

ELEV.	PIPE HEIGHT (FT)	WIDTH OF PIPE (FT)	PIPE STRG. (SF)	VOLUME STRG. (CF)
375.00	0	0	0.0	0.0
375.10	0.1	1.25	112.4	5.6
375.20	0.2	1.74	156.9	19.1
375.30	0.3	2.11	189.6	36.4
375.40	0.4	2.40	216.0	56.7
375.50	0.5	2.65	238.1	79.4
375.60	0.6	2.86	257.1	104.2
375.70	0.7	3.04	273.6	130.7
375.80	0.8	3.20	288.0	158.8
375.90	0.9	3.34	300.7	188.2
376.00	1.0	3.46	311.8	218.8
376.10	1.1	3.57	321.5	250.5
376.20	1.2	3.67	329.9	283.1
376.30	1.3	3.75	337.2	316.4
376.40	1.4	3.82	343.4	350.5
376.50	1.5	3.87	348.6	385.1
376.60	1.6	3.92	352.7	420.1
376.70	1.7	3.95	355.9	455.6
376.80	1.8	3.98	358.2	491.3
376.90	1.9	3.99	359.5	527.1
377.00	2.0	4.00	360.0	563.1
377.10	2.1	3.99	359.5	599.1
377.20	2.2	3.98	358.2	635.0
377.30	2.3	3.95	355.9	670.7
377.40	2.4	3.92	352.7	706.1
377.50	2.5	3.87	348.6	741.2
377.60	2.6	3.82	343.4	775.8
377.70	2.7	3.75	337.2	809.8
377.80	2.8	3.67	329.9	843.2
377.90	2.9	3.57	321.5	875.8
378.00	3	3.46	311.8	907.4
378.10	3.1	3.34	300.7	938.0
378.20	3.2	3.20	288.0	967.5

378.30	3.3	3.04	273.6	995.6
378.40	3.4	2.86	257.1	1022.1
378.50	3.5	2.65	238.1	1046.8
378.60	3.6	2.40	216.0	1069.6
378.70	3.7	2.11	189.6	1089.8
378.80	3.8	1.74	156.9	1107.2
378.90	3.9	1.25	112.4	1120.6
379.00	4	0.00	0.0	1126.2

Time of Concentration (T_c) Worksheet

Project WAYNE ELEMENTARY SCHOOL By BDM Date 4/30/2014
 Location RADNOR TOWNSHIP, DELAWARE COUNTY Checked _____ Date _____

PRE-DEVELOPMENT T_c:

Flow Path
 Surface Description
 Flow Length, L.....
 Watercourse Slope, s.....
 Average Velocity, V (Table 2.10.4.2).....
 T = L / 60V Compute T_c.....

Segment ID	A		
	LAWN		
ft	290		
ft/ft	0.03		
ft/sec	0.80		
min	6.04		

= 6.04

Total Time of Concentration

min

6.04

CONTROLLED #1 T_c:

Flow Path
 Surface Description
 Flow Length, L.....
 Watercourse Slope, s.....
 Average Velocity, V (Table 2.10.4.2).....
 T = L / 60V Compute T_c.....

Segment ID	A	B	
	LAWN	PIPE	
ft	40	215	
ft/ft	0.03		
ft/sec	0.80	5.00	
min	0.83	0.72	

= 1.55

Total Time of Concentration

min

1.55

UNCONTROLLED T_c:

Flow Path
 Surface Description
 Flow Length, L.....
 Watercourse Slope, s.....
 Average Velocity, V (Table 2.10.4.2).....
 T = L / 60V Compute T_c.....

Segment ID	A		
	LAWN		
ft	265		
ft/ft	0.03		
ft/sec	0.80		
min	5.52		

= 5.52

Total Time of Concentration

min

5.52

2.10.20

**TABLE 2.10.4.1
RUNOFF FACTORS FOR
THE RATIONAL EQUATION**

TYPE OF DRAINAGE AREA OR SURFACE	RUNOFF FACTOR "C"	
	MINIMUM	MAXIMUM
Pavement, concrete or bituminous concrete	0.75	0.95
Pavement, bituminous macadam or surface-treated gravel	0.65	0.80
Pavement, gravel, macadam, etc.	0.25	0.60
Sandy soil, cultivated or light growth	0.15	0.30
Sandy soil, woods or heavy brush	0.15	0.30
Gravel, bare or light growth	0.20	0.40
Gravel, woods or heavy brush	0.15	0.35
Clay soil, bare or light growth	0.35	0.75
Clay soil, woods or heavy growth	0.25	0.60
City business sections	0.60	0.80
Dense residential sections	0.50	0.70
Suburban, normal residential areas	0.35	0.60
Rural areas, parks, golf courses	0.15	0.30

NOTES

- Higher values are applicable to denser soils and steep slopes.
- Consideration should be given to future land use changes in the drainage area in selecting the "C" factor.
- For drainage area containing several different types of ground cover, a weighted value of "C" factor shall be used.
- In special situations where sinkholes, stripped abandoned mines, etc. exist, careful evaluation shall be given to the selection of a suitable runoff factor with consideration given to possible reclamation of the land in the future.

**TABLE 2.10.4.2
RECOMMENDED AVERAGE VELOCITIES
OF OVERLAND FLOW FOR DETERMINING
TIME OF CONCENTRATION**

DESCRIPTION OF COURSE OF RUNOFF WATER	SLOPE (%)						
	VELOCITIES (F.P.S.)						
	0-3	4-7	8-10	11-15	16-20	21-25	26-30
Woodland	0.8	1.0	1.5	1.7	2.0	2.7	3.5
Pasture	0.8	1.5	2.2	2.6	3.0	4.1	4.5
Cultivated (Row Crop)	1.0	2.0	3.0	3.5	4.0	4.5	5.0
Pavement	5.0	12.0	15.5	18.0	—	—	—
Natural Draw (Not Well Defined)	0.8	2.5	4.0	6.0	—	—	—

PROJECT
LOCATION

WAYNE ELEMENTARY SCHOOL
RADNOR TWP, DELAWARE COUNTY

DATE 4/30/2014
BY BDM

100 YR STORM
SHEET 1 OF 1

LOCATION	INCREMENT AREA		SUM OF TIME TO INLET		FLOW TIME IN PIPE		RAINFALL INTENSITY		RUNOFF COEFFICIENT		ZACA		DISCHARGE		LENGTH OF PIPE		SLOPE		ROUGHNESS COEFFICIENT		PIPE SIZE		PIPE TYPE		MEAN VELOCITY		JUST FULL CAPACITY		INVERT UPPER END		INVERT LOWER END		REMARKS			
	AA	T	MIN	T	MIN	T	MIN	I	C	ACA	CA	Q	L	S	N	IN		V	Q	FT	FT		IN		FT	FT	FT	FT	FT	FT	TG	TYPE	MISC			
ROOF	0.16	5.0	8.20	0.95	0.15	0.15	1.26	0.0100	0.011	8	PVC	4.62	1.43																							
I-1	0.05	5.0	8.20	0.40	0.02	0.17	1.43	0.0135	0.012	10	HDPE	5.11	2.76	381.50	379.00	383.75	YARD																			
S-1	0.00	5.0	8.20	0.50	0.00	0.17	1.43	0.0259	0.012	10	HDPE	6.44	3.82	379.00	378.17	382.00	YARD																			
SWM #1							0.45	0.0386	0.012	10	HDPE	5.27	4.66	377.50	376.42																					
SWM #1																																				

SWM BASIN #1

SWM #1 SPREADER

MOMENEE AND ASSOCIATES, INC.

CONSULTING ENGINEERS
924 COUNTY LINE ROAD
BRYN MAWR, PA 19010

JOB NAME: WAYNE ELEMENTARY SCHOOL
LOCATION: RADNOR TOWNSHIP DELAWARE COUNTY

LEVEL SPREADER LENGTH CALCULATIONS - SPREADER #1

(C.F. 2006 PA DEP BMP 6.8.1; ROCCO, 2007)

PERFORATION DIAMETER, D :	(IN)	0.75	
PIPE PERFORATION AREA, A :	(IN ²)	0.44	$A = \pi * (D/2)^2$
SW SYS OUTLET INVERT :	(FT)	377.90	
LEVEL SPREADER GRADE ELEVATION :	(FT)	377.75	
HEAD LOSS, H :	(FT)	0.15	
ORIFICE COEFFICIENT, C _d :	(-)	0.60	
GRAVITY, g :	(FT/S ²)	32.2	
OUTFLOW/PERFORATION, Q _o :	(CFS)	0.01	$Q_o = C_d * A * (2 * g * H)^{0.5}$
No. OF PERFORATIONS / LINEAR FOOT :	(-)	20	
OUTFLOW/LINEAR FOOT, Q _L :	(CFS/FT)	0.11	$Q_L = Q_o * No./LF$
100-YR CONTROLLED OUTFLOW, Q :	(CFS)	0.45	
SAFETY FACTOR, F _s :	(CFS)	1.00	
MINIMUM LEVEL SPREADER LENGTH, L :	(FT)	3.93	$L = (Q / Q_L) * F_s$
PROPOSED SPREADER LENGTH, L :	(FT)	16.00	
SPREADER COVER :	(-)	GRASS	
WEIR COEFFICIENT, C _w :	(-)	3.00	
MAXIMUM ALLOWED VELOCITY, V _{max} :	(FPS)	4.00	
ACTUAL VELOCITY, V :	(FPS)	0.95	$V = (3/2) * C_w^{(2/3)} * (Q_L)^{(1/3)}$
PROPOSED SPREADER LENGTH, L :	(FT)	16.00	

Wayne Elementary School

PERMANENT SWALE						
BERM DESIGNATION	VEG 1	VEG 1				
DRAINAGE AREA (ACRES)	1.41	1.41				
INTENSITY (IN/HR)	8.20	8.20				
RUNOFF COEFFICIENT	0.35	0.35				
Qr (REQUIRED CAPACITY)	4.05	4.05				
S (BED SLOPE FT/FT) *	0.025	0.025				
PROTECTIVE LINING **	GRASS	CURLEX				
n (MANNING'S COEFFICIENT) **	0.050	0.034				
FREEBOARD	0.50	0.50				
d (DEPTH OF FLOW)	0.50	0.50				
BERM SIDE SLOPE ()H:(1)V	8.0	8.0				
BERM SIDE SLOPE ()H:(1)V	7.0	7.0				
CHANNEL BOTTOM WIDTH (FT)	3.00	3.00				
A (AREA)	3.38	3.38				
P (WETTED PERIMETER)	10.57	10.57				
R (HYDRAULIC RADIUS)	0.32	0.32				
Q full	7.38	10.86				
V (VELOCITY BASED ON Q full)	2.19	3.22				
Sc (CHANNEL'S CRITICAL SLOPE)	0.053	0.025				
STABLE FLOW (Y/N)	Y	N				
USS (LB/SQ FT) (UNIT SHEAR STRESS)	0.78	0.78				

Hydraflow Table of Contents

14042.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hydrograph Return Period Recap.....	1
1 - Year	
Summary Report.....	2
Hydrograph Reports.....	3
Hydrograph No. 1, Rational, Pre Development.....	3
Hydrograph No. 3, Rational, Post Uncontrolled.....	4
Hydrograph No. 4, Rational, Controlled SWM Basin #1.....	5
Hydrograph No. 5, Reservoir, SWM BASIN #1.....	6
Pond Report - SWM #1.....	7
Hydrograph No. 6, Combine, Total Post.....	10
2 - Year	
Summary Report.....	11
Hydrograph Reports.....	12
Hydrograph No. 1, Rational, Pre Development.....	12
Hydrograph No. 3, Rational, Post Uncontrolled.....	13
Hydrograph No. 4, Rational, Controlled SWM Basin #1.....	14
Hydrograph No. 5, Reservoir, SWM BASIN #1.....	15
Hydrograph No. 6, Combine, Total Post.....	16
5 - Year	
Summary Report.....	17
Hydrograph Reports.....	18
Hydrograph No. 1, Rational, Pre Development.....	18
Hydrograph No. 3, Rational, Post Uncontrolled.....	19
Hydrograph No. 4, Rational, Controlled SWM Basin #1.....	20
Hydrograph No. 5, Reservoir, SWM BASIN #1.....	21
Hydrograph No. 6, Combine, Total Post.....	22
10 - Year	
Summary Report.....	23
Hydrograph Reports.....	24
Hydrograph No. 1, Rational, Pre Development.....	24
Hydrograph No. 3, Rational, Post Uncontrolled.....	25
Hydrograph No. 4, Rational, Controlled SWM Basin #1.....	26
Hydrograph No. 5, Reservoir, SWM BASIN #1.....	27
Hydrograph No. 6, Combine, Total Post.....	28
25 - Year	
Summary Report.....	29
Hydrograph Reports.....	30
Hydrograph No. 1, Rational, Pre Development.....	30
Hydrograph No. 3, Rational, Post Uncontrolled.....	31
Hydrograph No. 4, Rational, Controlled SWM Basin #1.....	32
Hydrograph No. 5, Reservoir, SWM BASIN #1.....	33

Hydrograph No. 6, Combine, Total Post.....	34
50 - Year	
Summary Report.....	35
Hydrograph Reports.....	36
Hydrograph No. 1, Rational, Pre Development.....	36
Hydrograph No. 3, Rational, Post Uncontrolled.....	37
Hydrograph No. 4, Rational, Controlled SWM Basin #1.....	38
Hydrograph No. 5, Reservoir, SWM BASIN #1.....	39
Hydrograph No. 6, Combine, Total Post.....	40
100 - Year	
Summary Report.....	41
Hydrograph Reports.....	42
Hydrograph No. 1, Rational, Pre Development.....	42
Hydrograph No. 3, Rational, Post Uncontrolled.....	43
Hydrograph No. 4, Rational, Controlled SWM Basin #1.....	44
Hydrograph No. 5, Reservoir, SWM BASIN #1.....	45
Hydrograph No. 6, Combine, Total Post.....	46
IDF Report.....	47

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Rational	----	0.417	0.482	-----	0.565	0.644	0.714	0.806	0.882	Pre Development
3	Rational	----	0.188	0.217	-----	0.255	0.291	0.322	0.364	0.398	Post Uncontrolled
4	Rational	----	0.718	0.826	-----	0.969	1.096	1.221	1.365	1.473	Controlled SWM Basin #1
5	Reservoir	4	0.000	0.000	-----	0.000	0.096	0.219	0.311	0.452	SWM BASIN #1
6	Combine	3, 5	0.188	0.217	-----	0.255	0.291	0.397	0.533	0.695	Total Post

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.417	1	18	451	----	----	----	Pre Development
3	Rational	0.188	1	18	204	----	----	----	Post Uncontrolled
4	Rational	0.718	1	15	646	----	----	----	Controlled SWM Basin #1
5	Reservoir	0.000	1	66	0	4	377.18	630	SWM BASIN #1
6	Comblne	0.188	1	18	204	3, 5	----	----	Total Post
14042.gpw					Return Period: 1 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

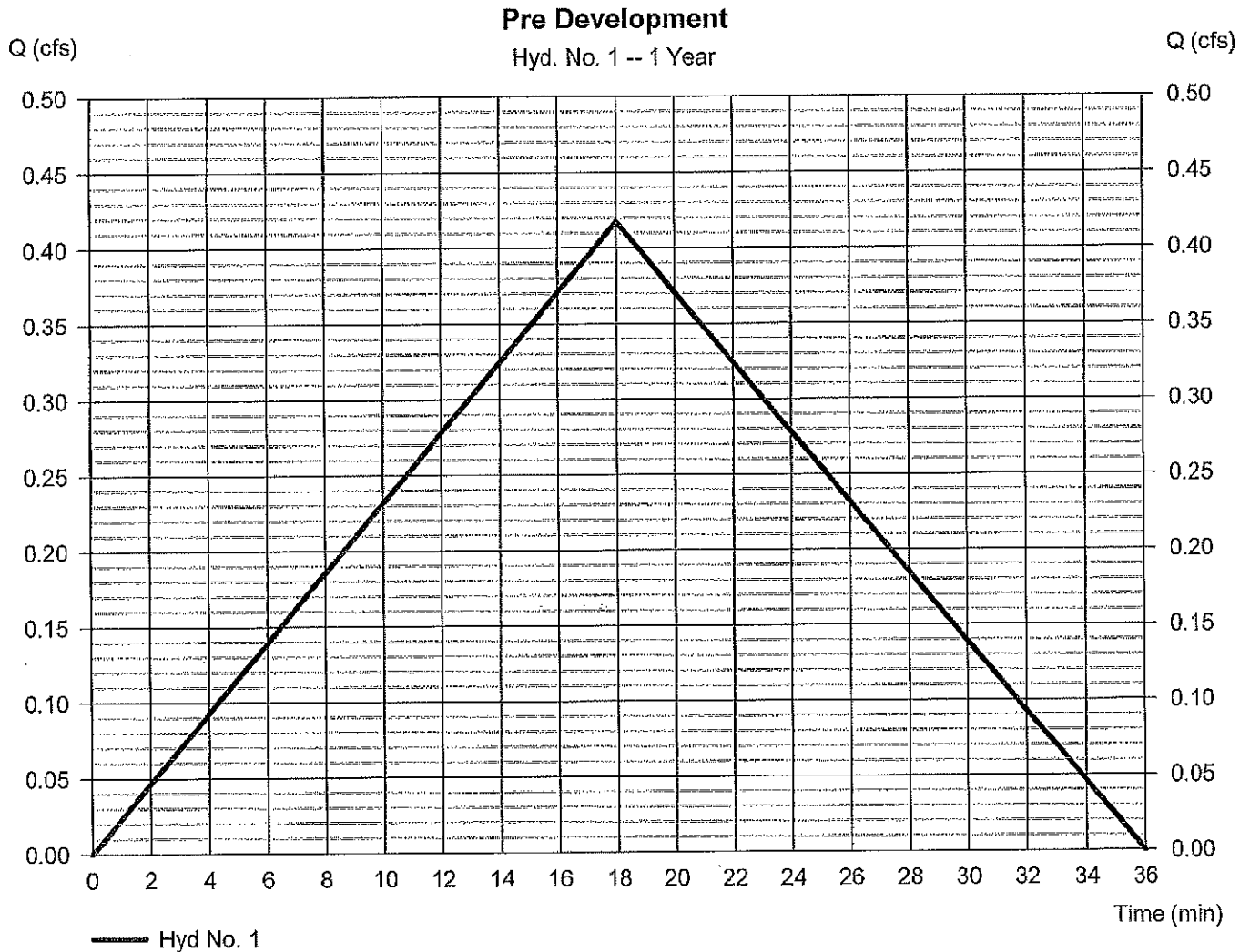
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.417 cfs
Storm frequency	= 1 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 451 cuft
Drainage area	= 0.371 ac	Runoff coeff.	= 0.3
Intensity	= 3.751 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

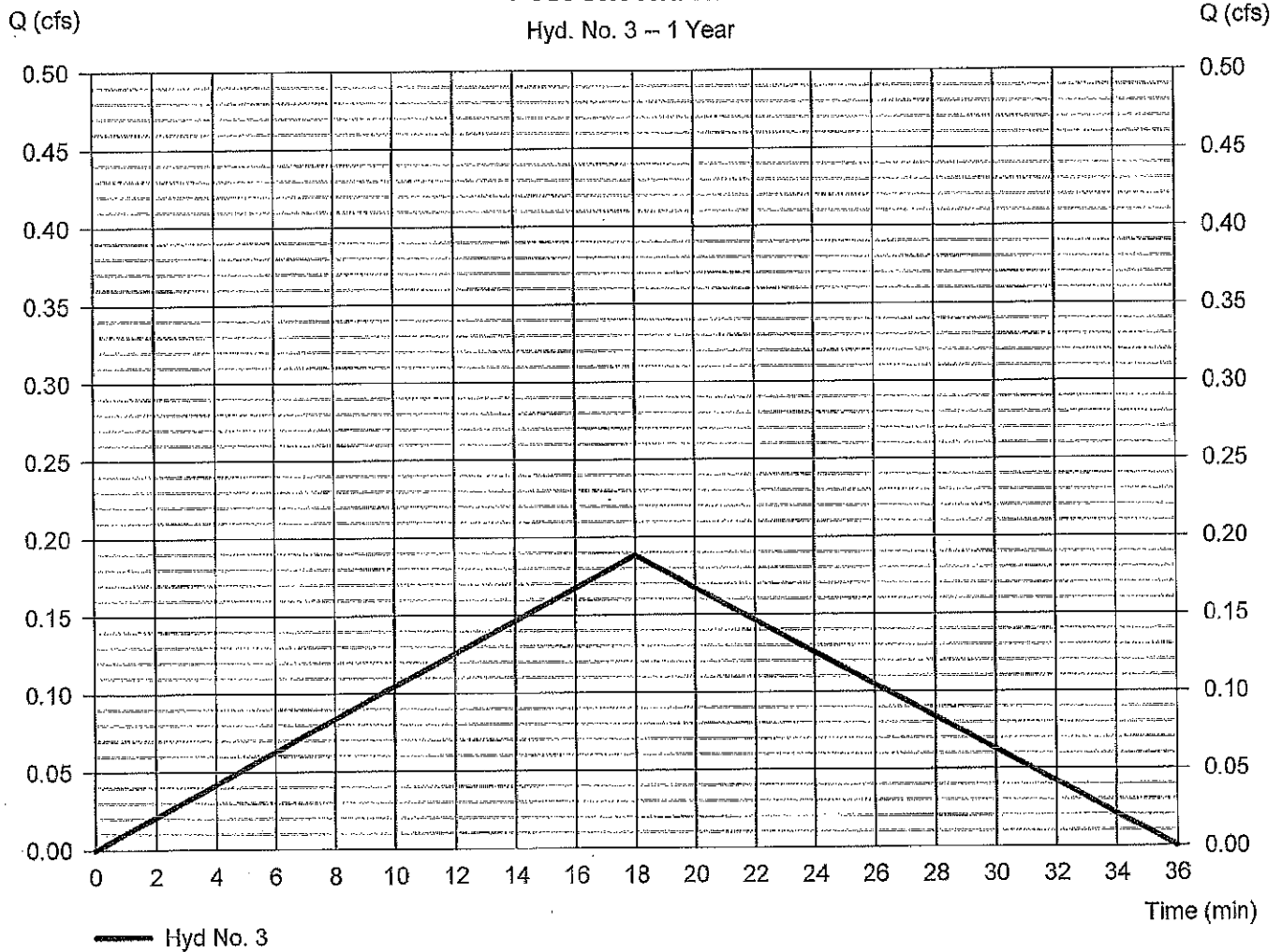
Hyd. No. 3

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.188 cfs
Storm frequency	= 1 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 204 cuft
Drainage area	= 0.157 ac	Runoff coeff.	= 0.32
Intensity	= 3.751 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3

Post Uncontrolled

Hyd. No. 3 -- 1 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

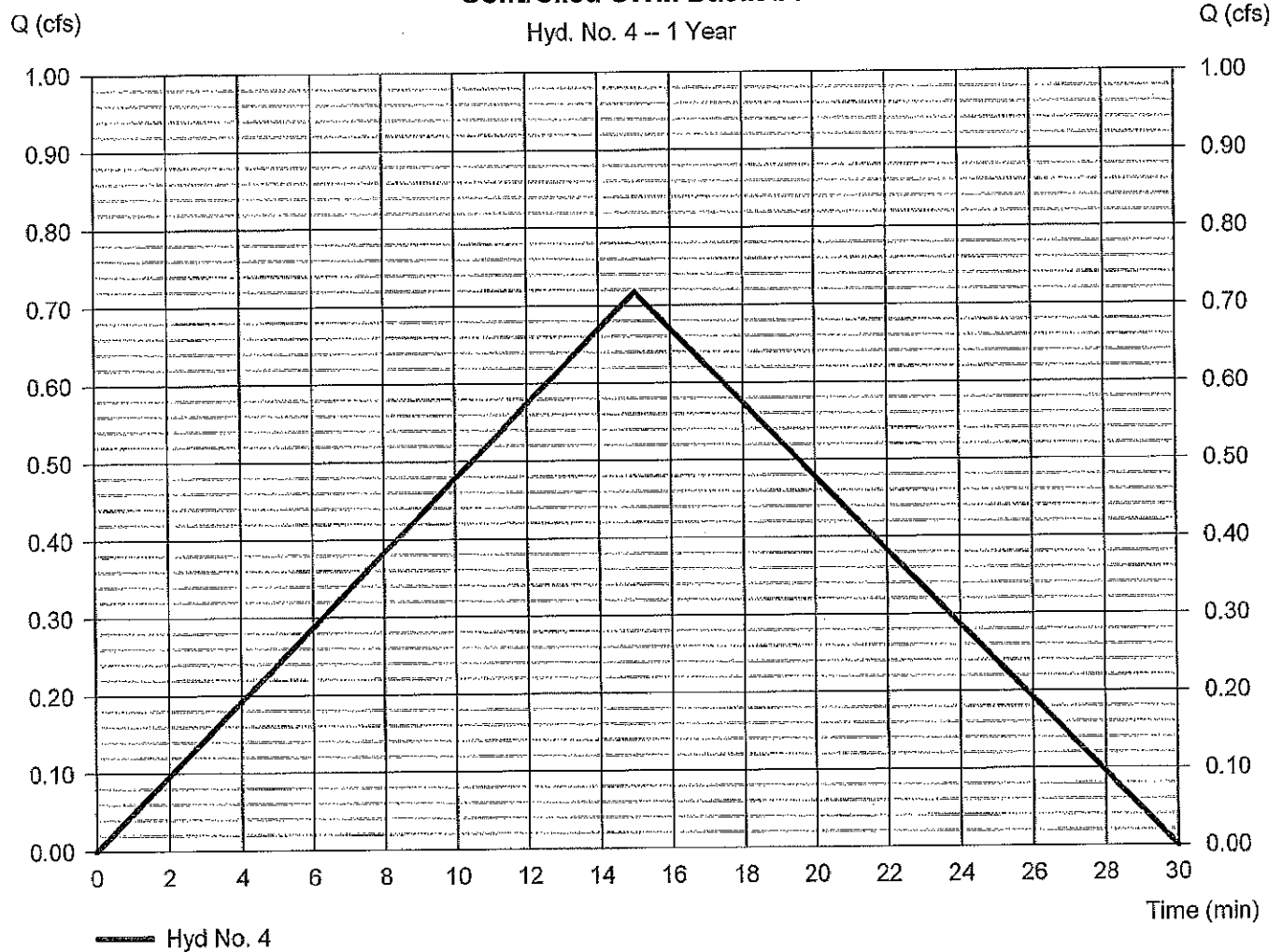
Hyd. No. 4

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.718 cfs
Storm frequency	= 1 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 646 cuft
Drainage area	= 0.214 ac	Runoff coeff.	= 0.84
Intensity	= 3.994 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3

Controlled SWM Basin #1

Hyd. No. 4 -- 1 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

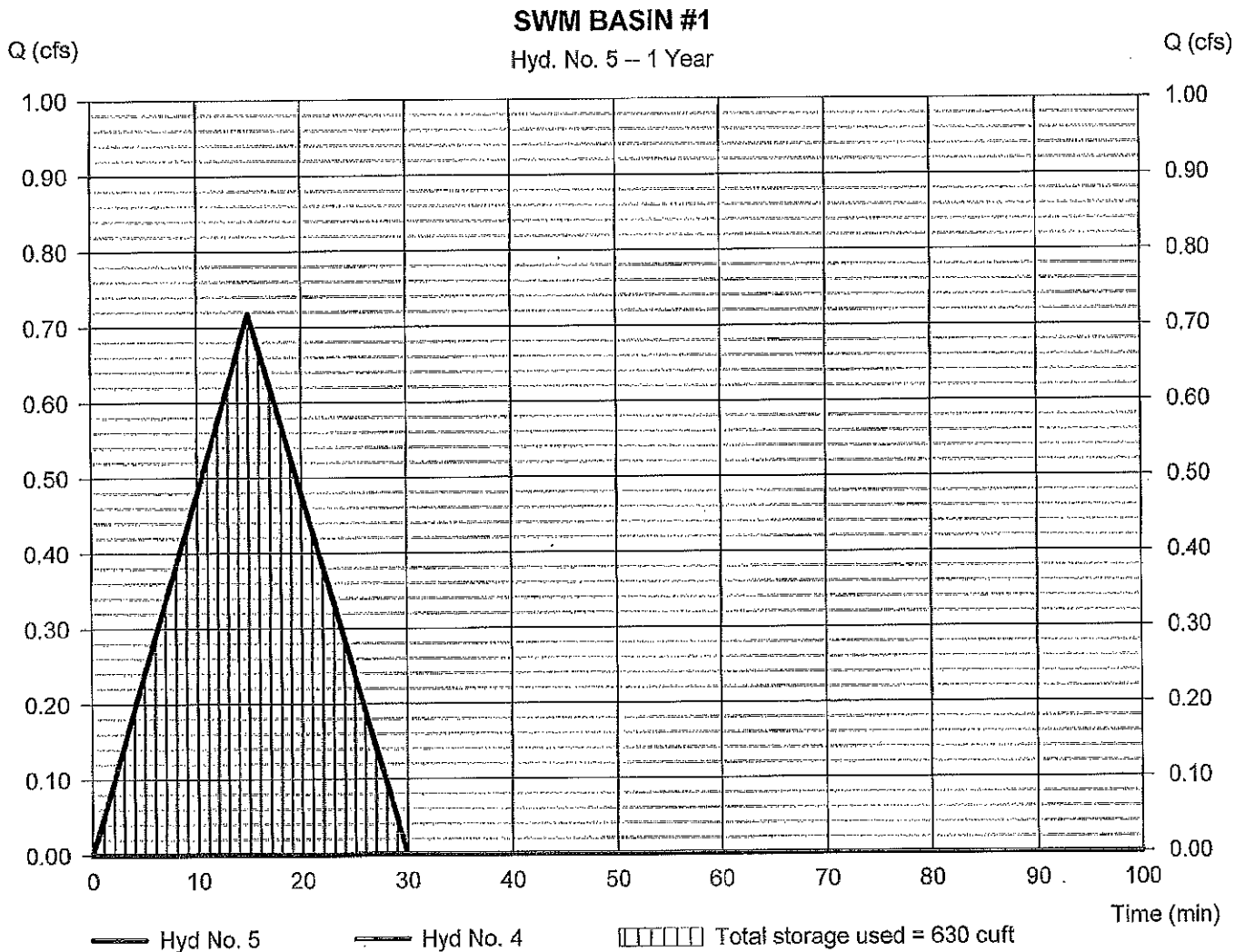
Thursday, 05/11/2014

Hyd. No. 5

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= 66 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - Controlled SWM Basin #1	Max. Elevation	= 377.18 ft
Reservoir name	= SWM #1	Max. Storage	= 630 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Pond No. 1 - SWM #1

Pond Data

UG Chambers -Invert elev. = 375.00 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 90.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	375.00	n/a	0	0
0.40	375.40	n/a	59	59
0.80	375.80	n/a	102	161
1.20	376.20	n/a	124	286
1.60	376.60	n/a	137	423
2.00	377.00	n/a	143	566
2.40	377.40	n/a	143	709
2.80	377.80	n/a	137	846
3.20	378.20	n/a	124	970
3.60	378.60	n/a	102	1,072
4.00	379.00	n/a	59	1,131

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 10.00	4.00	0.00	0.00
Span (in)	= 10.00	4.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 377.50	377.90	0.00	0.00
Length (ft)	= 28.00	0.00	0.00	0.00
Slope (%)	= 3.86	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.71	0.00	0.00	0.00
Crest El. (ft)	= 378.90	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil. (in/hr)	= 1.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	375.00	0.00	0.00	---	---	0.00	---	---	---	0.000	---	0.000
0.04	6	375.04	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.08	12	375.08	0.00	0.00	---	---	0.00	---	---	---	0.002	---	0.002
0.12	18	375.12	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
0.16	24	375.16	0.00	0.00	---	---	0.00	---	---	---	0.003	---	0.003
0.20	29	375.20	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
0.24	35	375.24	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
0.28	41	375.28	0.00	0.00	---	---	0.00	---	---	---	0.004	---	0.004
0.32	47	375.32	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
0.36	53	375.36	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
0.40	59	375.40	0.00	0.00	---	---	0.00	---	---	---	0.005	---	0.005
0.44	69	375.44	0.00	0.00	---	---	0.00	---	---	---	0.006	---	0.006
0.48	79	375.48	0.00	0.00	---	---	0.00	---	---	---	0.006	---	0.006
0.52	90	375.52	0.00	0.00	---	---	0.00	---	---	---	0.006	---	0.006
0.56	100	375.56	0.00	0.00	---	---	0.00	---	---	---	0.006	---	0.006
0.60	110	375.60	0.00	0.00	---	---	0.00	---	---	---	0.007	---	0.007
0.64	120	375.64	0.00	0.00	---	---	0.00	---	---	---	0.007	---	0.007
0.68	130	375.68	0.00	0.00	---	---	0.00	---	---	---	0.007	---	0.007
0.72	141	375.72	0.00	0.00	---	---	0.00	---	---	---	0.007	---	0.007
0.76	151	375.76	0.00	0.00	---	---	0.00	---	---	---	0.008	---	0.008
0.80	161	375.80	0.00	0.00	---	---	0.00	---	---	---	0.008	---	0.008
0.84	174	375.84	0.00	0.00	---	---	0.00	---	---	---	0.008	---	0.008
0.88	186	375.88	0.00	0.00	---	---	0.00	---	---	---	0.008	---	0.008
0.92	198	375.92	0.00	0.00	---	---	0.00	---	---	---	0.008	---	0.008
0.96	211	375.96	0.00	0.00	---	---	0.00	---	---	---	0.009	---	0.009
1.00	223	376.00	0.00	0.00	---	---	0.00	---	---	---	0.009	---	0.009
1.04	236	376.04	0.00	0.00	---	---	0.00	---	---	---	0.009	---	0.009
1.08	248	376.08	0.00	0.00	---	---	0.00	---	---	---	0.009	---	0.009
1.12	261	376.12	0.00	0.00	---	---	0.00	---	---	---	0.009	---	0.009
1.16	273	376.16	0.00	0.00	---	---	0.00	---	---	---	0.009	---	0.009

Continues on next page...

SWM #1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.20	286	376.20	0.00	0.00	---	---	0.00	---	---	---	0.010	---	0.010
1.24	299	376.24	0.00	0.00	---	---	0.00	---	---	---	0.010	---	0.010
1.28	313	376.28	0.00	0.00	---	---	0.00	---	---	---	0.010	---	0.010
1.32	327	376.32	0.00	0.00	---	---	0.00	---	---	---	0.010	---	0.010
1.36	340	376.36	0.00	0.00	---	---	0.00	---	---	---	0.010	---	0.010
1.40	354	376.40	0.00	0.00	---	---	0.00	---	---	---	0.011	---	0.011
1.44	368	376.44	0.00	0.00	---	---	0.00	---	---	---	0.011	---	0.011
1.48	381	376.48	0.00	0.00	---	---	0.00	---	---	---	0.011	---	0.011
1.52	395	376.52	0.00	0.00	---	---	0.00	---	---	---	0.011	---	0.011
1.56	409	376.56	0.00	0.00	---	---	0.00	---	---	---	0.011	---	0.011
1.60	423	376.60	0.00	0.00	---	---	0.00	---	---	---	0.011	---	0.011
1.64	437	376.64	0.00	0.00	---	---	0.00	---	---	---	0.012	---	0.012
1.68	451	376.68	0.00	0.00	---	---	0.00	---	---	---	0.012	---	0.012
1.72	466	376.72	0.00	0.00	---	---	0.00	---	---	---	0.012	---	0.012
1.76	480	376.76	0.00	0.00	---	---	0.00	---	---	---	0.012	---	0.012
1.80	494	376.80	0.00	0.00	---	---	0.00	---	---	---	0.012	---	0.012
1.84	508	376.84	0.00	0.00	---	---	0.00	---	---	---	0.012	---	0.012
1.88	523	376.88	0.00	0.00	---	---	0.00	---	---	---	0.013	---	0.013
1.92	537	376.92	0.00	0.00	---	---	0.00	---	---	---	0.013	---	0.013
1.96	551	376.96	0.00	0.00	---	---	0.00	---	---	---	0.013	---	0.013
2.00	566	377.00	0.00	0.00	---	---	0.00	---	---	---	0.013	---	0.013
2.04	580	377.04	0.00	0.00	---	---	0.00	---	---	---	0.013	---	0.013
2.08	594	377.08	0.00	0.00	---	---	0.00	---	---	---	0.013	---	0.013
2.12	609	377.12	0.00	0.00	---	---	0.00	---	---	---	0.014	---	0.014
2.16	623	377.16	0.00	0.00	---	---	0.00	---	---	---	0.014	---	0.014
2.20	637	377.20	0.00	0.00	---	---	0.00	---	---	---	0.014	---	0.014
2.24	652	377.24	0.00	0.00	---	---	0.00	---	---	---	0.014	---	0.014
2.28	666	377.28	0.00	0.00	---	---	0.00	---	---	---	0.014	---	0.014
2.32	680	377.32	0.00	0.00	---	---	0.00	---	---	---	0.014	---	0.014
2.36	695	377.36	0.00	0.00	---	---	0.00	---	---	---	0.015	---	0.015
2.40	709	377.40	0.00	0.00	---	---	0.00	---	---	---	0.015	---	0.015
2.44	723	377.44	0.00	0.00	---	---	0.00	---	---	---	0.015	---	0.015
2.48	736	377.48	0.00	0.00	---	---	0.00	---	---	---	0.015	---	0.015
2.52	750	377.52	0.00	0.00	---	---	0.00	---	---	---	0.015	---	0.015
2.56	764	377.56	0.00	0.00	---	---	0.00	---	---	---	0.015	---	0.015
2.60	777	377.60	0.00	0.00	---	---	0.00	---	---	---	0.016	---	0.016
2.64	791	377.64	0.00	0.00	---	---	0.00	---	---	---	0.016	---	0.016
2.68	805	377.68	0.00	0.00	---	---	0.00	---	---	---	0.016	---	0.016
2.72	818	377.72	0.00	0.00	---	---	0.00	---	---	---	0.016	---	0.016
2.76	832	377.76	0.00	0.00	---	---	0.00	---	---	---	0.016	---	0.016
2.80	846	377.80	0.00	0.00	---	---	0.00	---	---	---	0.017	---	0.017
2.84	858	377.84	0.00	0.00	---	---	0.00	---	---	---	0.017	---	0.017
2.88	871	377.88	0.00	0.00	---	---	0.00	---	---	---	0.017	---	0.017
2.92	883	377.92	0.00 ic	0.00 ic	---	---	0.00	---	---	---	0.017	---	0.018
2.96	896	377.96	0.01 ic	0.01 ic	---	---	0.00	---	---	---	0.017	---	0.026
3.00	908	378.00	0.02 ic	0.02 ic	---	---	0.00	---	---	---	0.017	---	0.041
3.04	920	378.04	0.05 ic	0.04 ic	---	---	0.00	---	---	---	0.018	---	0.062
3.08	933	378.08	0.07 ic	0.07 ic	---	---	0.00	---	---	---	0.018	---	0.088
3.12	945	378.12	0.10 ic	0.10 ic	---	---	0.00	---	---	---	0.018	---	0.116
3.16	958	378.16	0.13 ic	0.13 ic	---	---	0.00	---	---	---	0.018	---	0.145
3.20	970	378.20	0.16 ic	0.15 ic	---	---	0.00	---	---	---	0.018	---	0.173
3.24	980	378.24	0.18 ic	0.17 ic	---	---	0.00	---	---	---	0.019	---	0.194
3.28	991	378.28	0.19 ic	0.19 ic	---	---	0.00	---	---	---	0.019	---	0.213
3.32	1,001	378.32	0.21 ic	0.21 ic	---	---	0.00	---	---	---	0.019	---	0.231
3.36	1,011	378.36	0.23 ic	0.23 ic	---	---	0.00	---	---	---	0.019	---	0.247
3.40	1,021	378.40	0.24 ic	0.24 ic	---	---	0.00	---	---	---	0.020	---	0.262
3.44	1,032	378.44	0.26 ic	0.26 ic	---	---	0.00	---	---	---	0.020	---	0.277
3.48	1,042	378.48	0.28 ic	0.27 ic	---	---	0.00	---	---	---	0.020	---	0.290
3.52	1,052	378.52	0.29 ic	0.28 ic	---	---	0.00	---	---	---	0.020	---	0.303
3.56	1,062	378.56	0.30 ic	0.30 ic	---	---	0.00	---	---	---	0.021	---	0.316
3.60	1,072	378.60	0.31 ic	0.31 ic	---	---	0.00	---	---	---	0.021	---	0.328
3.64	1,078	378.64	0.33 ic	0.32 ic	---	---	0.00	---	---	---	0.021	---	0.339
3.68	1,084	378.68	0.33 ic	0.33 ic	---	---	0.00	---	---	---	0.021	---	0.350
3.72	1,090	378.72	0.34 ic	0.34 ic	---	---	0.00	---	---	---	0.022	---	0.361
3.76	1,096	378.76	0.35 ic	0.35 ic	---	---	0.00	---	---	---	0.022	---	0.372
3.80	1,102	378.80	0.37 ic	0.36 ic	---	---	0.00	---	---	---	0.022	---	0.382
3.84	1,108	378.84	0.37 ic	0.37 ic	---	---	0.00	---	---	---	0.023	---	0.392
3.88	1,114	378.88	0.38 ic	0.38 ic	---	---	0.00	---	---	---	0.023	---	0.402
3.92	1,119	378.92	0.44 ic	0.39 ic	---	---	0.04	---	---	---	0.024	---	0.457
3.96	1,125	378.96	0.63 ic	0.40 ic	---	---	0.23	---	---	---	0.025	---	0.653

Continues on next page...

SWM #1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
4.00	1,131	379.00	0.91 ic	0.41 ic	---	---	0.50	---	---	---	0.026	---	0.928

...End

Hydrograph Report

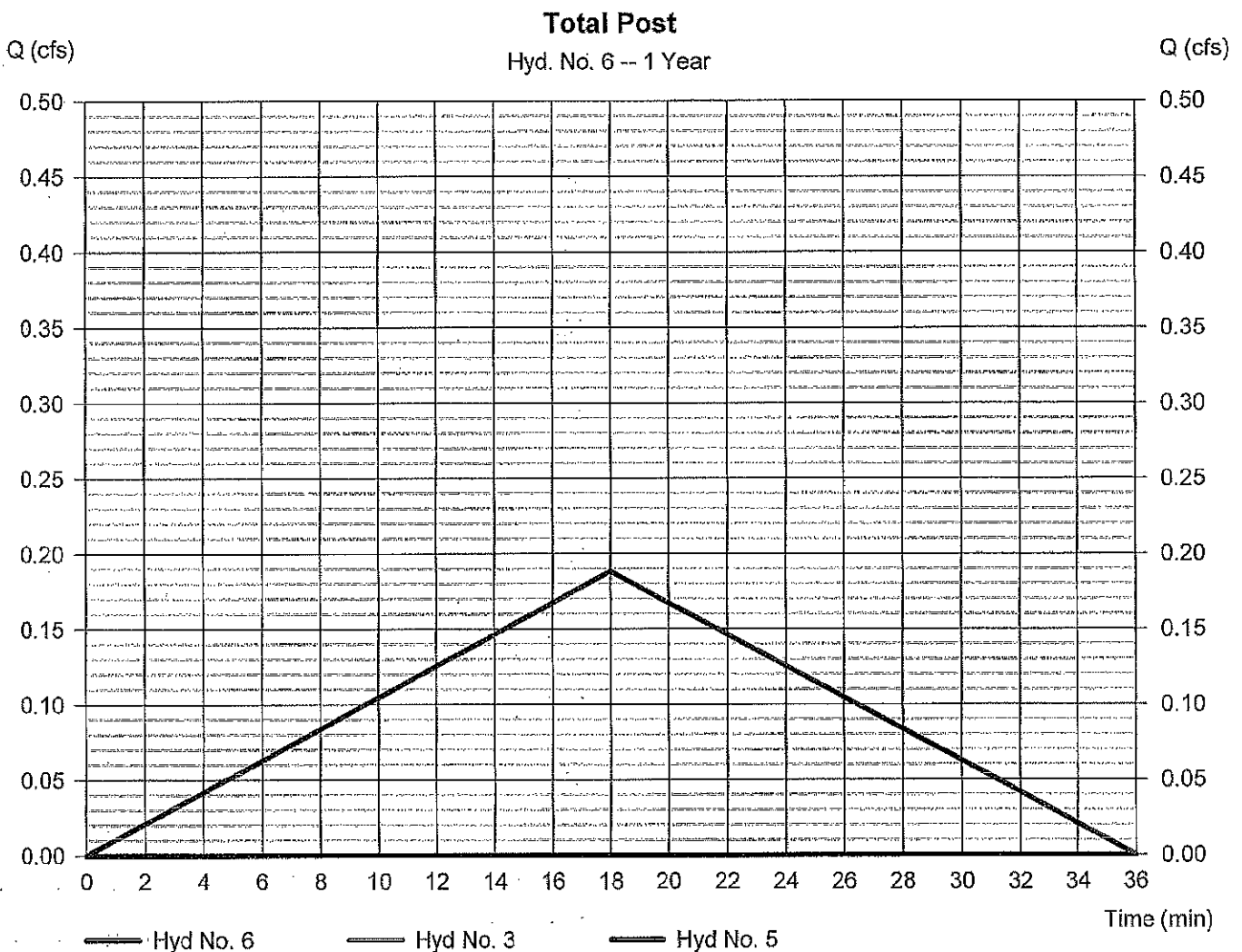
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 6

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.188 cfs
Storm frequency	= 1 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 204 cuft
Inflow hyd.	= 3, 5	Contrib. drain. area	= 0.157 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.482	1	18	520	----	----	----	Pre Development
3	Rational	0.217	1	18	235	----	----	----	Post Uncontrolled
4	Rational	0.826	1	15	744	----	----	----	Controlled SWM Basin #1
5	Reservoir	0.000	1	47	0	4	377.45	726	SWM BASIN #1
6	Combine	0.217	1	18	235	3, 5	----	----	Total Post
14042.gpw					Return Period: 2 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

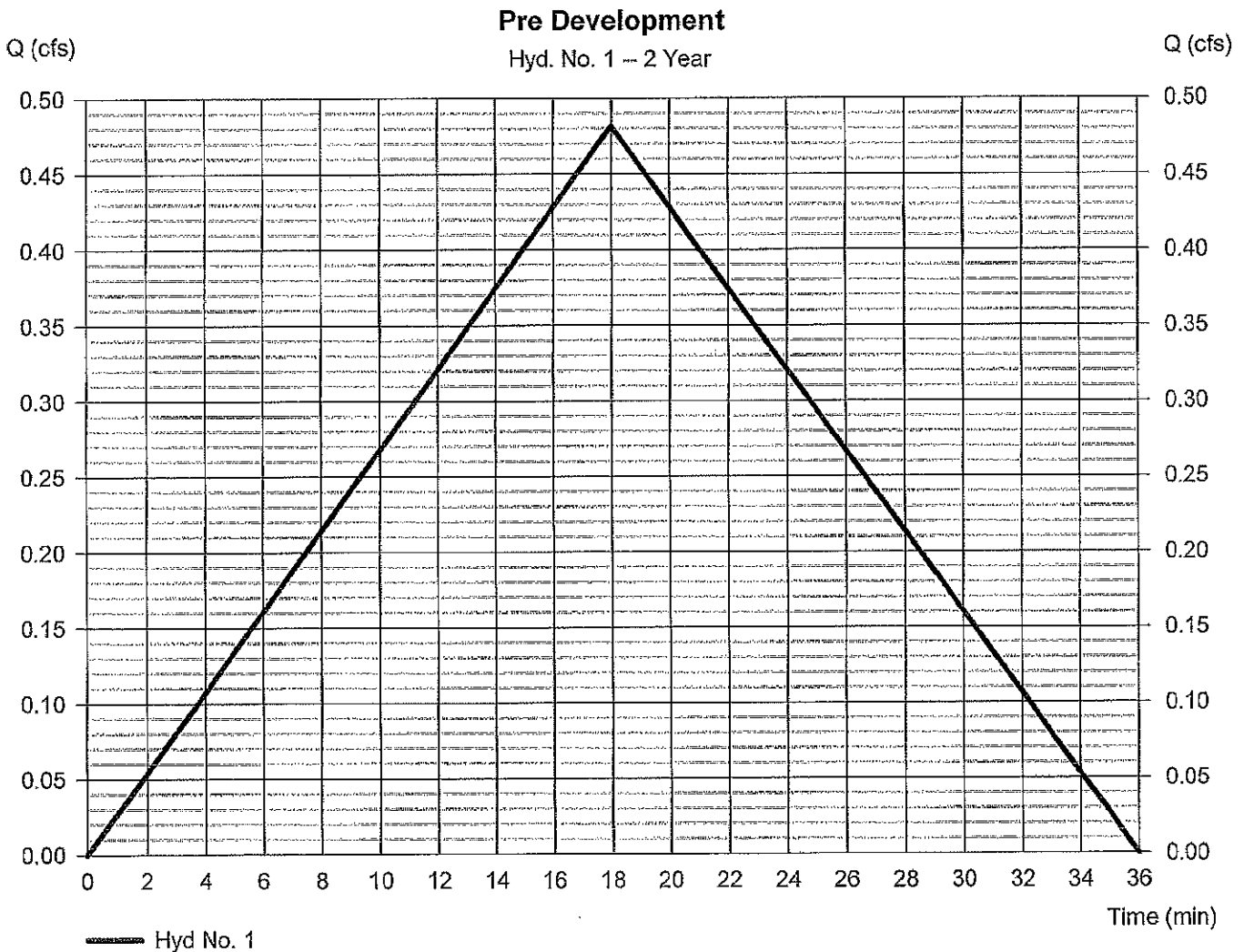
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.482 cfs
Storm frequency	= 2 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 520 cuft
Drainage area	= 0.371 ac	Runoff coeff.	= 0.3
Intensity	= 4.327 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

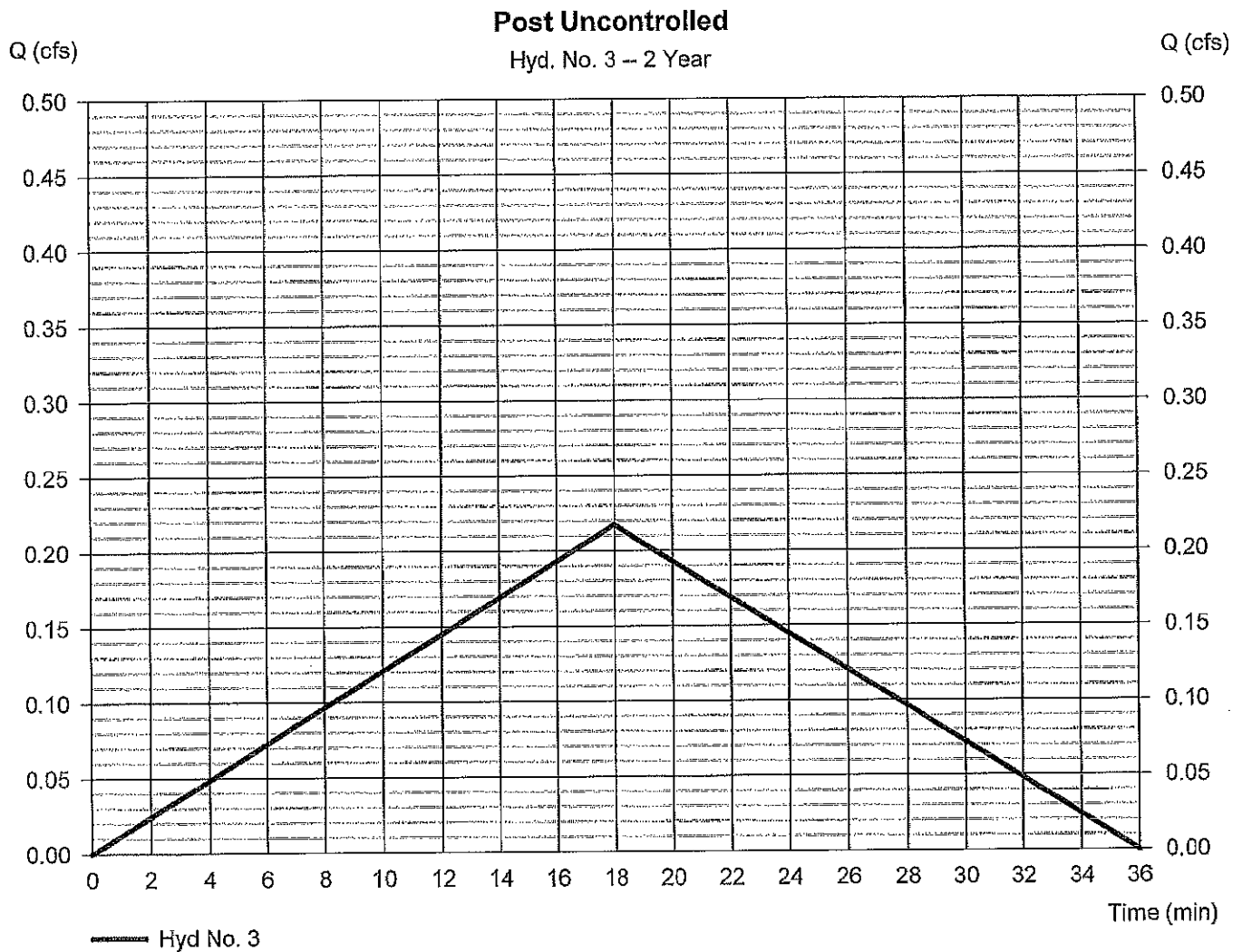
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05/11/2014

Hyd. No. 3

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.217 cfs
Storm frequency	= 2 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 235 cuft
Drainage area	= 0.157 ac	Runoff coeff.	= 0.32
Intensity	= 4.327 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

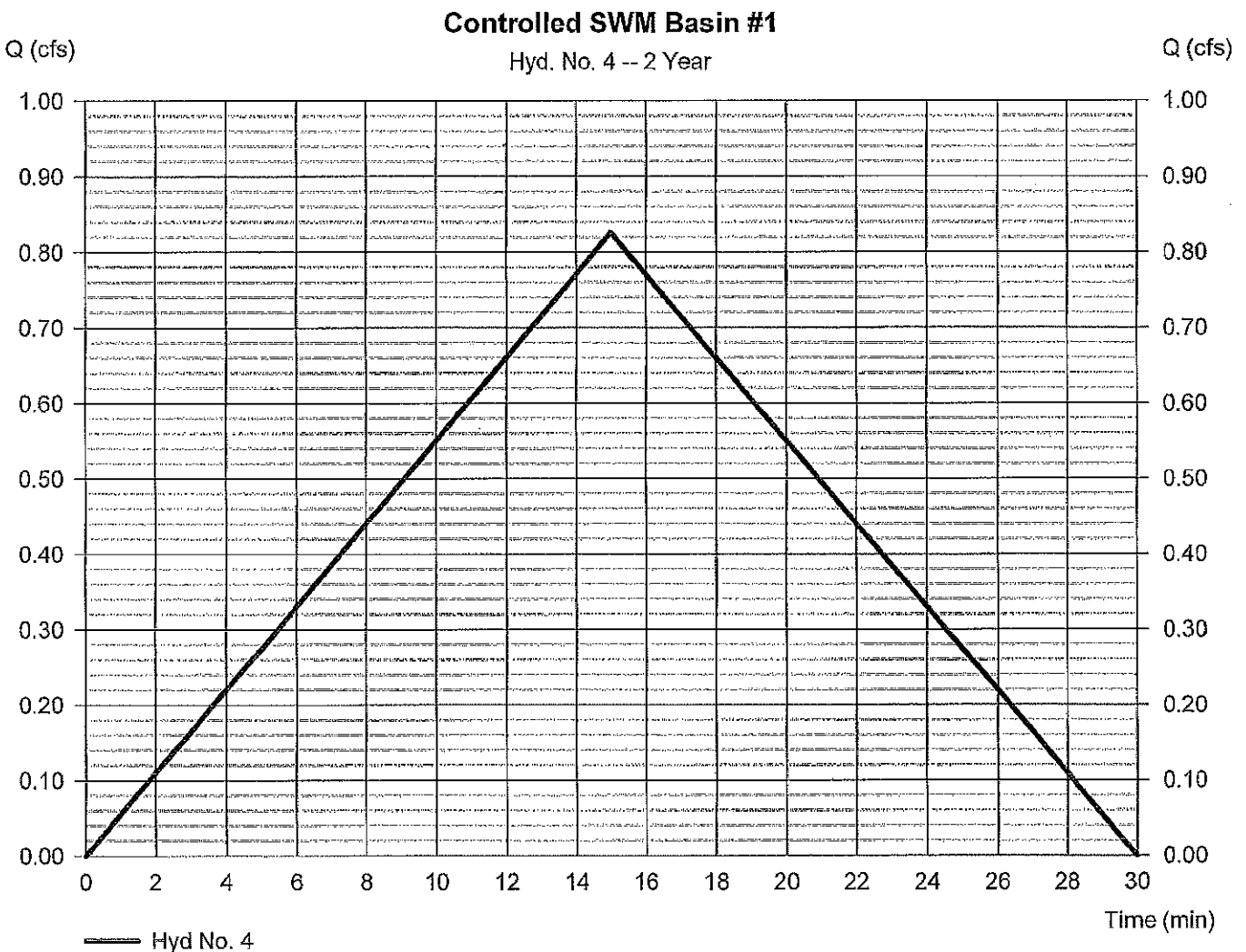
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 4

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.826 cfs
Storm frequency	= 2 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 744 cuft
Drainage area	= 0.214 ac	Runoff coeff.	= 0.84
Intensity	= 4.596 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

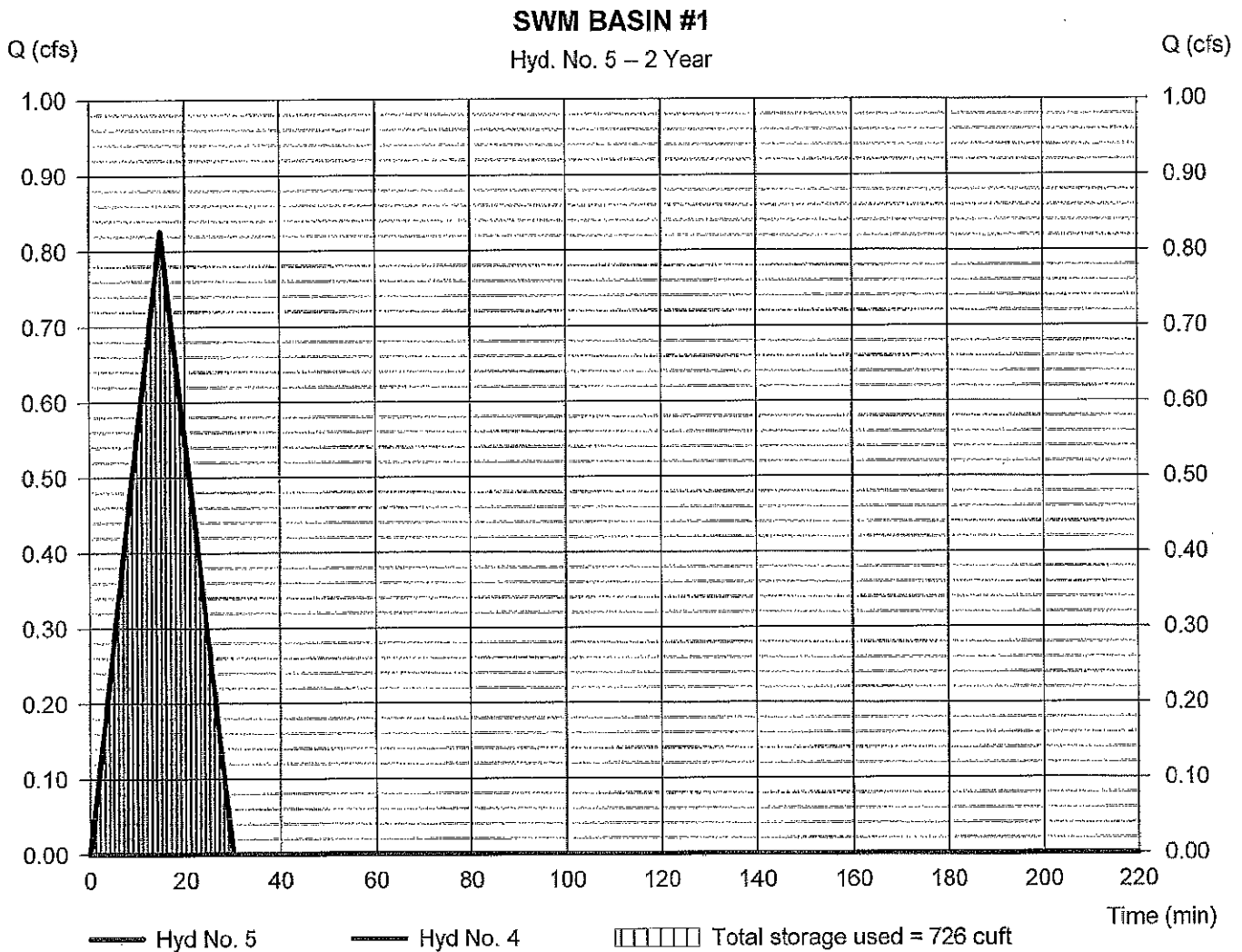
Thursday, 05 / 1 / 2014

Hyd. No. 5

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 47 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - Controlled SWM Basin #1	Max. Elevation	= 377.45 ft
Reservoir name	= SWM #1	Max. Storage	= 726 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

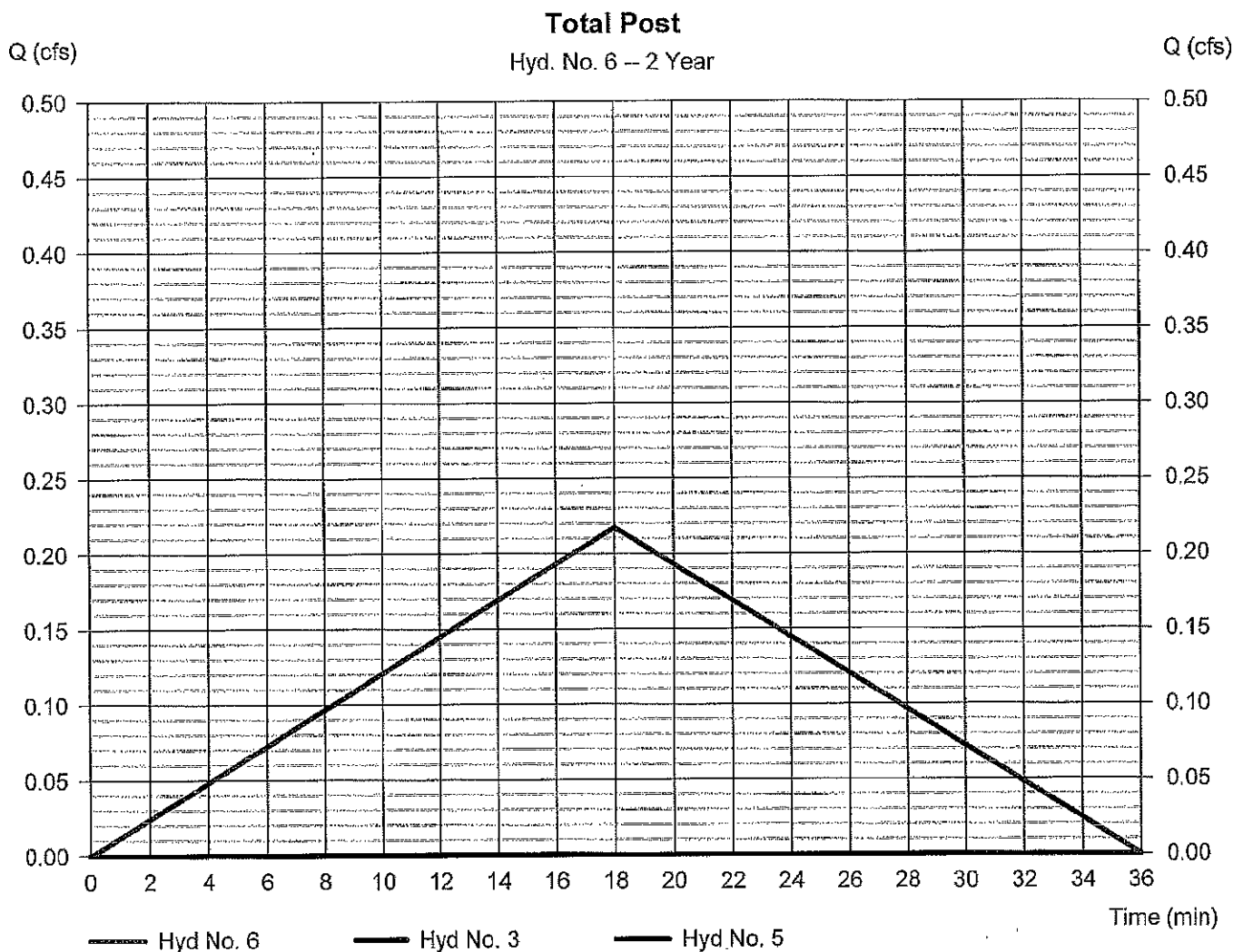
Thursday, 05 / 1 / 2014

Hyd. No. 6

Total Post

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 1 min
 Inflow hyds. = 3, 5

Peak discharge = 0.217 cfs
 Time to peak = 18 min
 Hyd. volume = 235 cuft
 Contrib. drain. area = 0.157 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.565	1	18	610	----	----	----	Pre Development
3	Rational	0.255	1	18	275	----	----	----	Post Uncontrolled
4	Rational	0.969	1	15	872	----	----	----	Controlled SWM Basin #1
5	Reservoir	0.000	1	37	0	4	377.82	853	SWM BASIN #1
6	Combine	0.255	1	18	275	3, 5	----	----	Total Post
14042.gpw					Return Period: 5 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

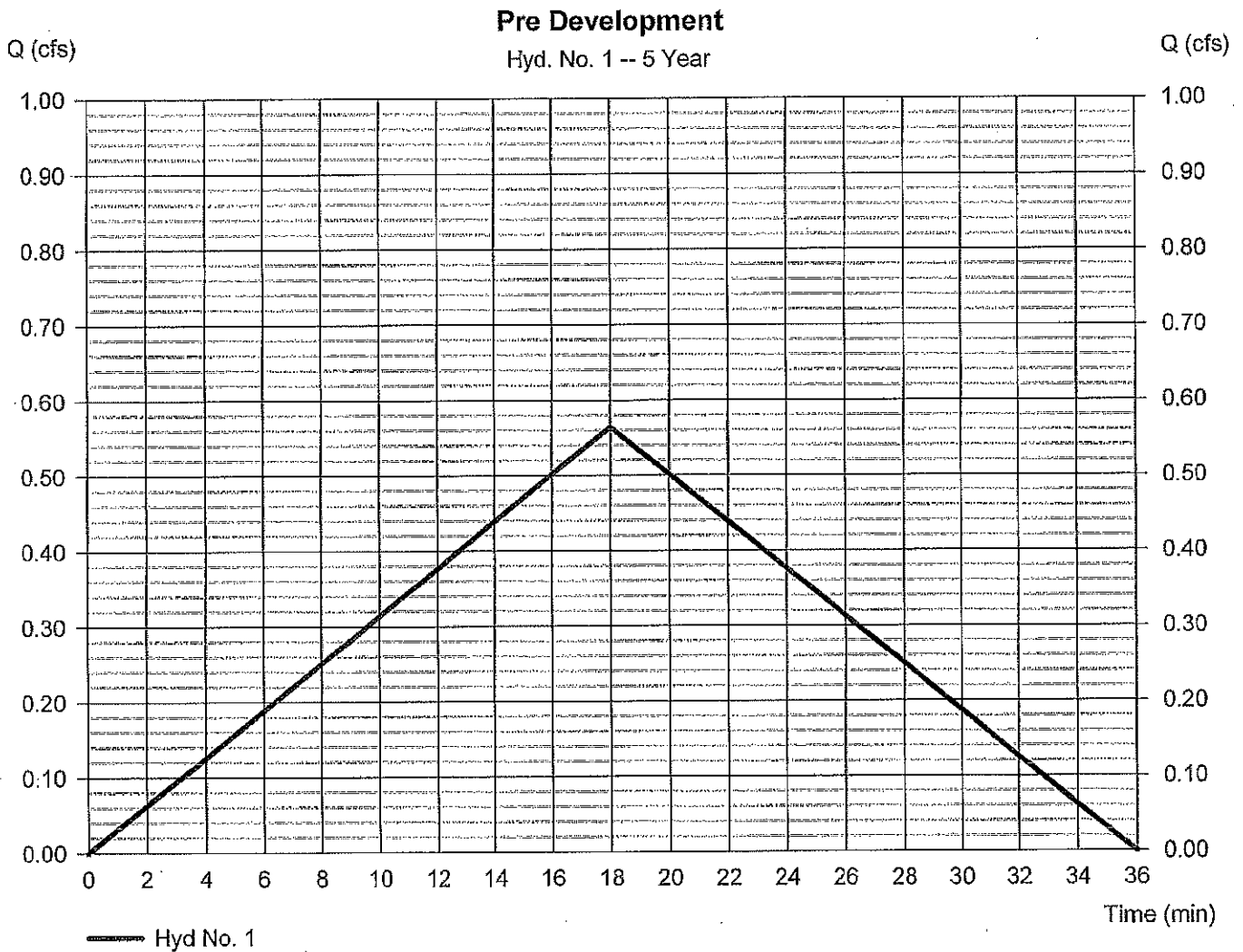
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.565 cfs
Storm frequency	= 5 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 610 cuft
Drainage area	= 0.371 ac	Runoff coeff.	= 0.3
Intensity	= 5.073 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

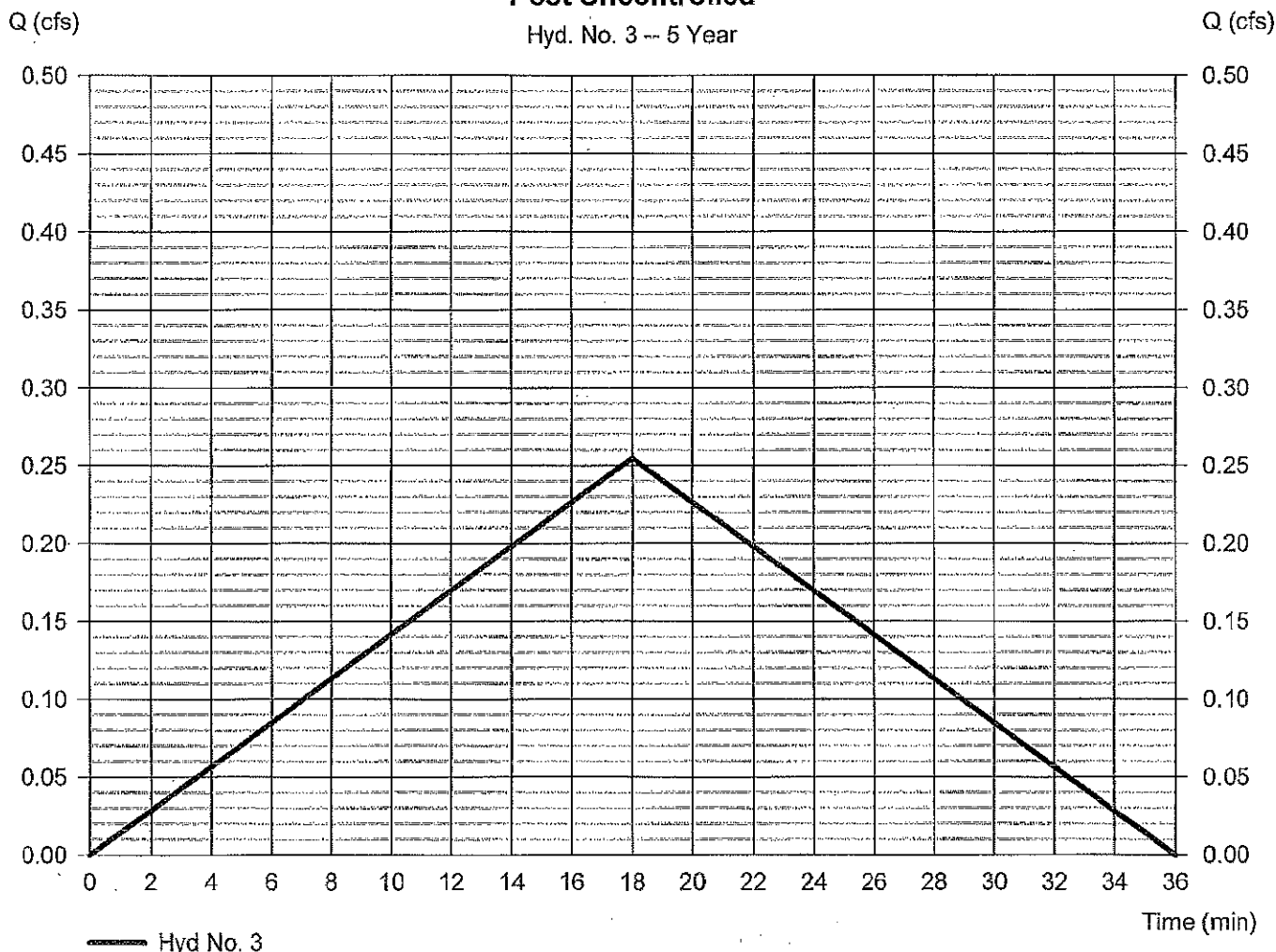
Thursday, 05 / 1 / 2014

Hyd. No. 3

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.255 cfs
Storm frequency	= 5 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 275 cuft
Drainage area	= 0.157 ac	Runoff coeff.	= 0.32
Intensity	= 5.073 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3

Post Uncontrolled
Hyd. No. 3 -- 5 Year



Hydrograph Report

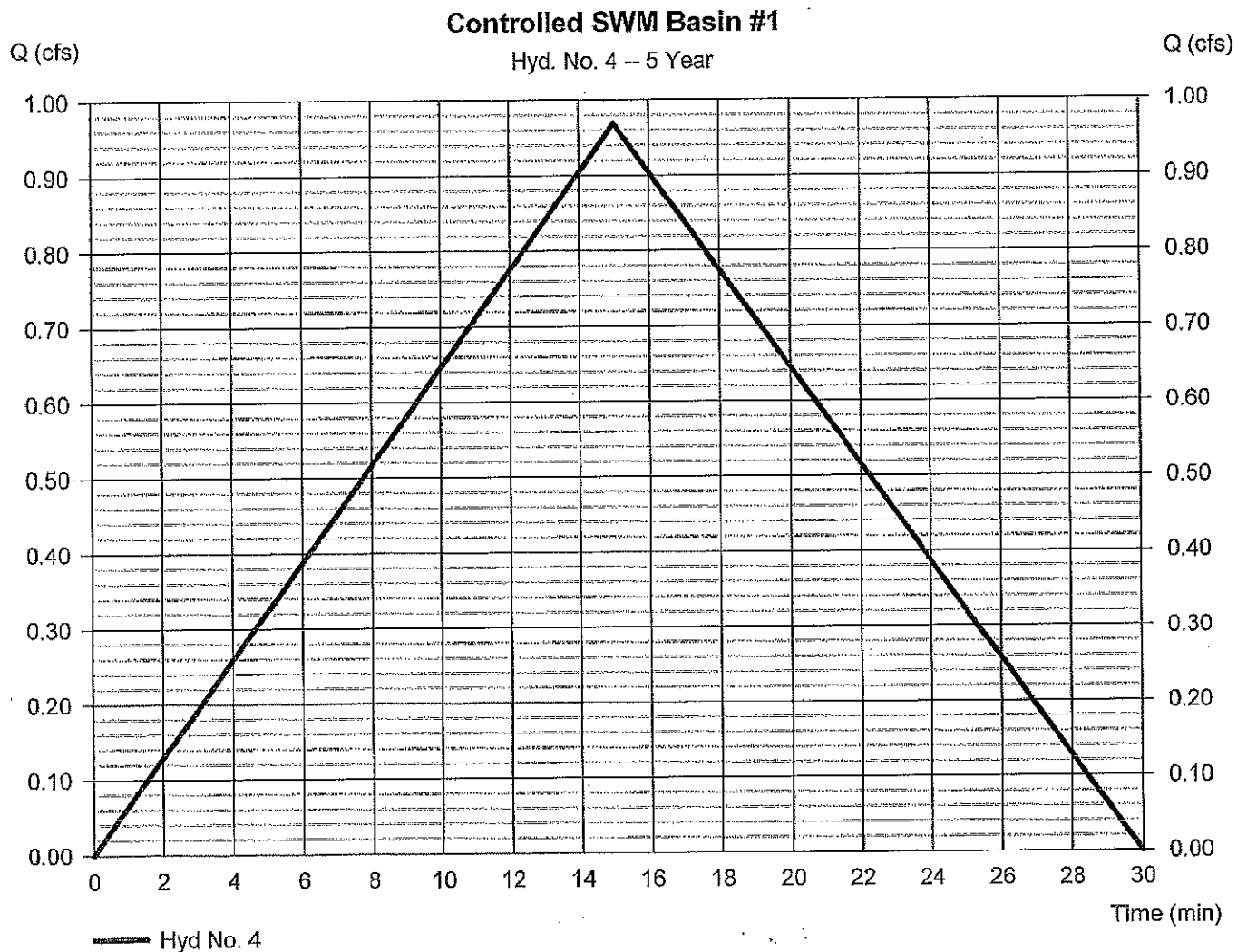
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 4

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 0.969 cfs
Storm frequency	= 5 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 872 cuft
Drainage area	= 0.214 ac	Runoff coeff.	= 0.84
Intensity	= 5.390 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

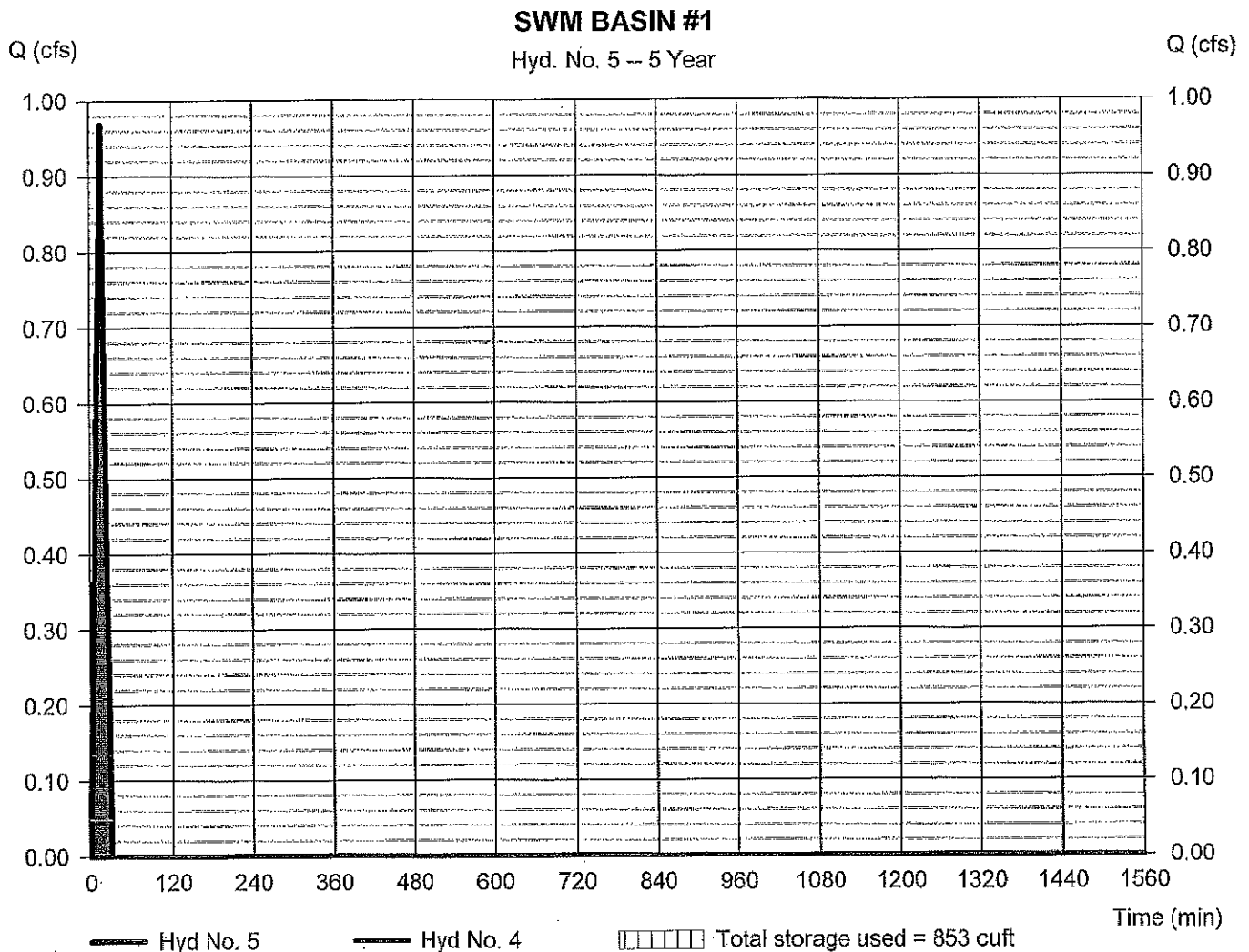
Thursday, 05 / 1 / 2014

Hyd. No. 5

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 5 yrs	Time to peak	= 37 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - Controlled SWM Basin #1	Max. Elevation	= 377.82 ft
Reservoir name	= SWM #1	Max. Storage	= 853 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

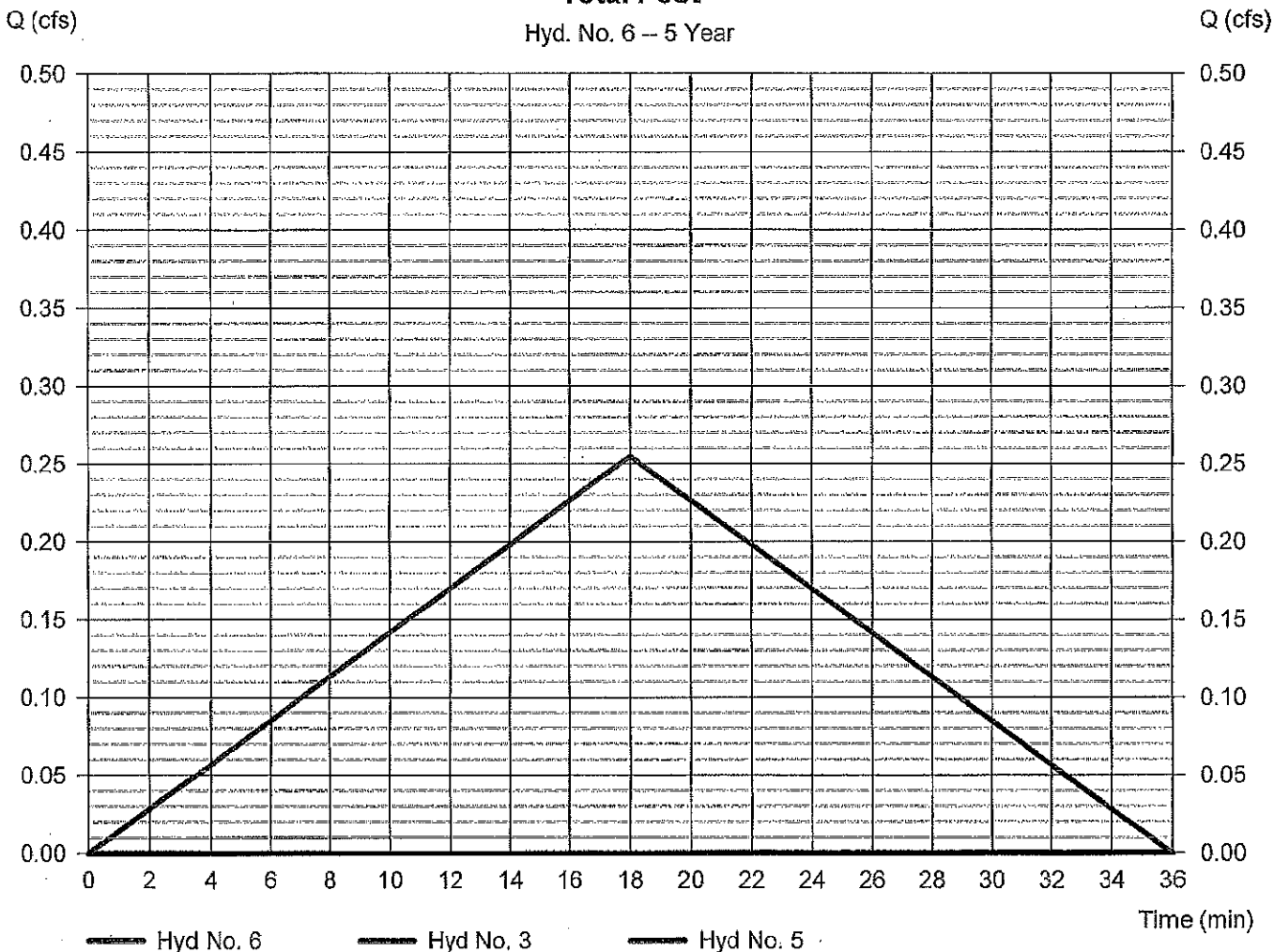
Thursday, 05 / 1 / 2014

Hyd. No. 6

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.255 cfs
Storm frequency	= 5 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 275 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 0.157 ac

Total Post
Hyd. No. 6 – 5 Year



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.644	1	18	696	-----	-----	-----	Pre Development
3	Rational	0.291	1	18	314	-----	-----	-----	Post Uncontrolled
4	Rational	1.096	1	15	986	-----	-----	-----	Controlled SWM Basin #1
5	Reservoir	0.096	1	28	58	4	378.12	945	SWM BASIN #1
6	Combine	0.291	1	18	373	3, 5	-----	-----	Total Post
14042.gpw					Return Period: 10 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

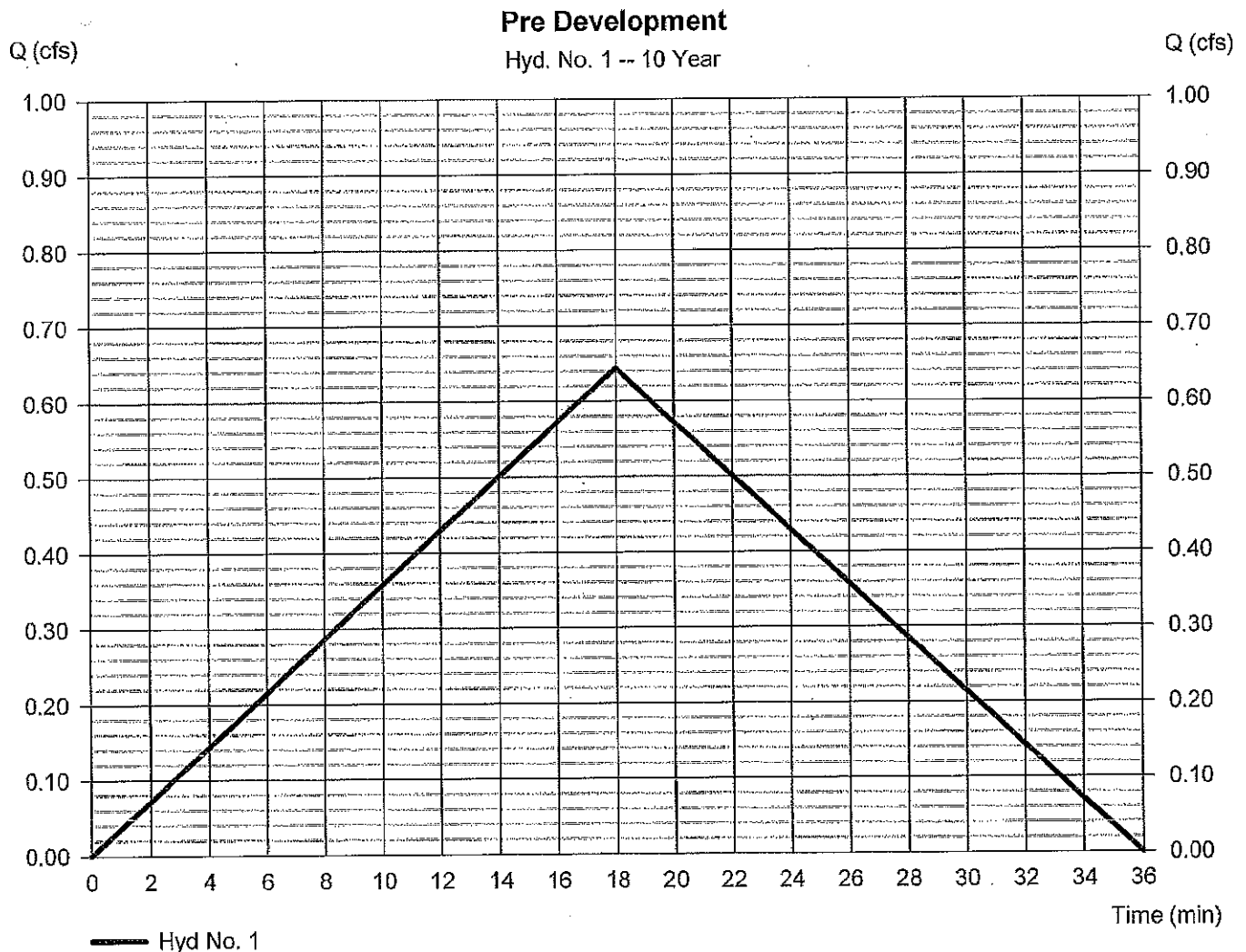
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.644 cfs
Storm frequency	= 10 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 696 cuft
Drainage area	= 0.371 ac	Runoff coeff.	= 0.3
Intensity	= 5.791 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec.limb fact	= 3/3



Hydrograph Report

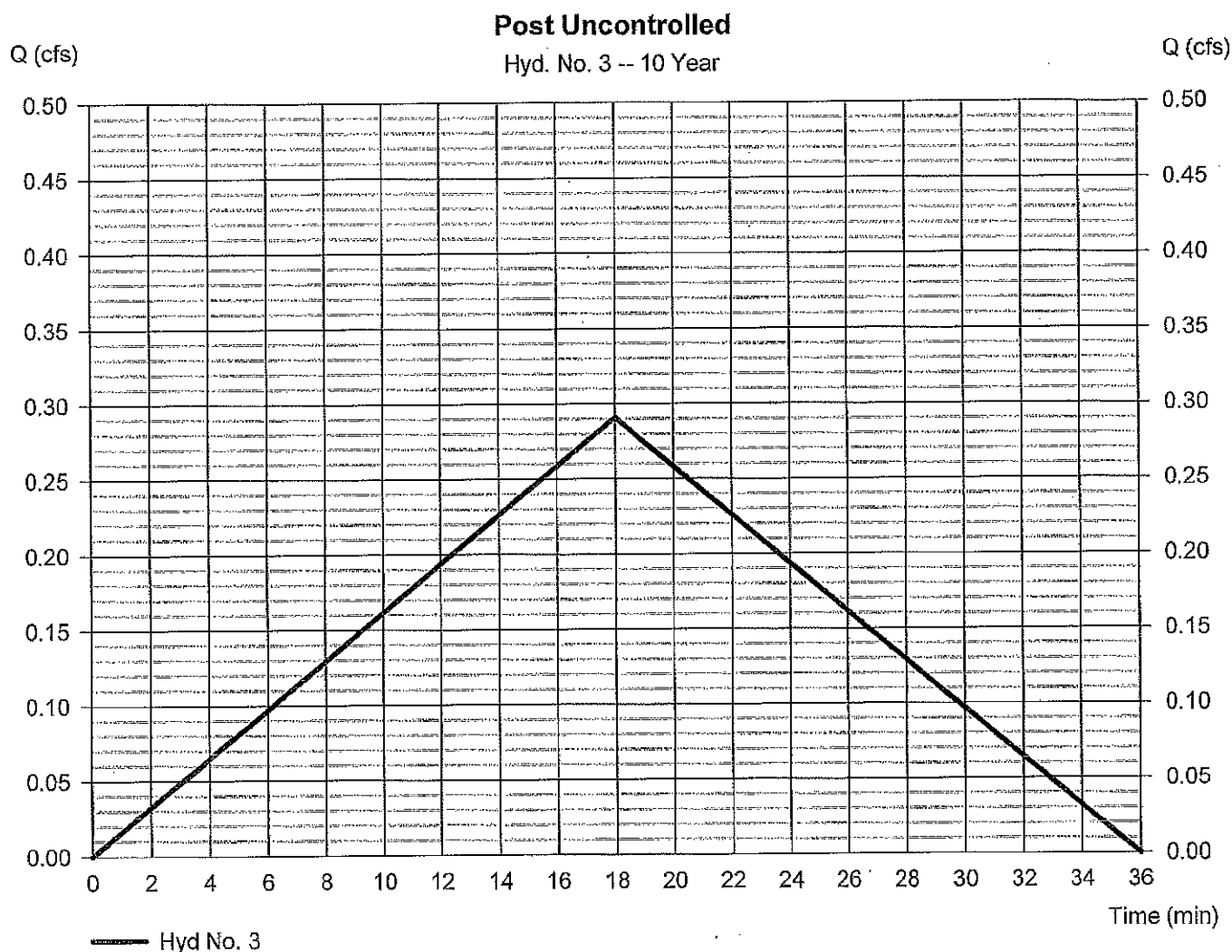
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.291 cfs
Storm frequency	= 10 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 314 cuft
Drainage area	= 0.157 ac	Runoff coeff.	= 0.32
Intensity	= 5.791 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

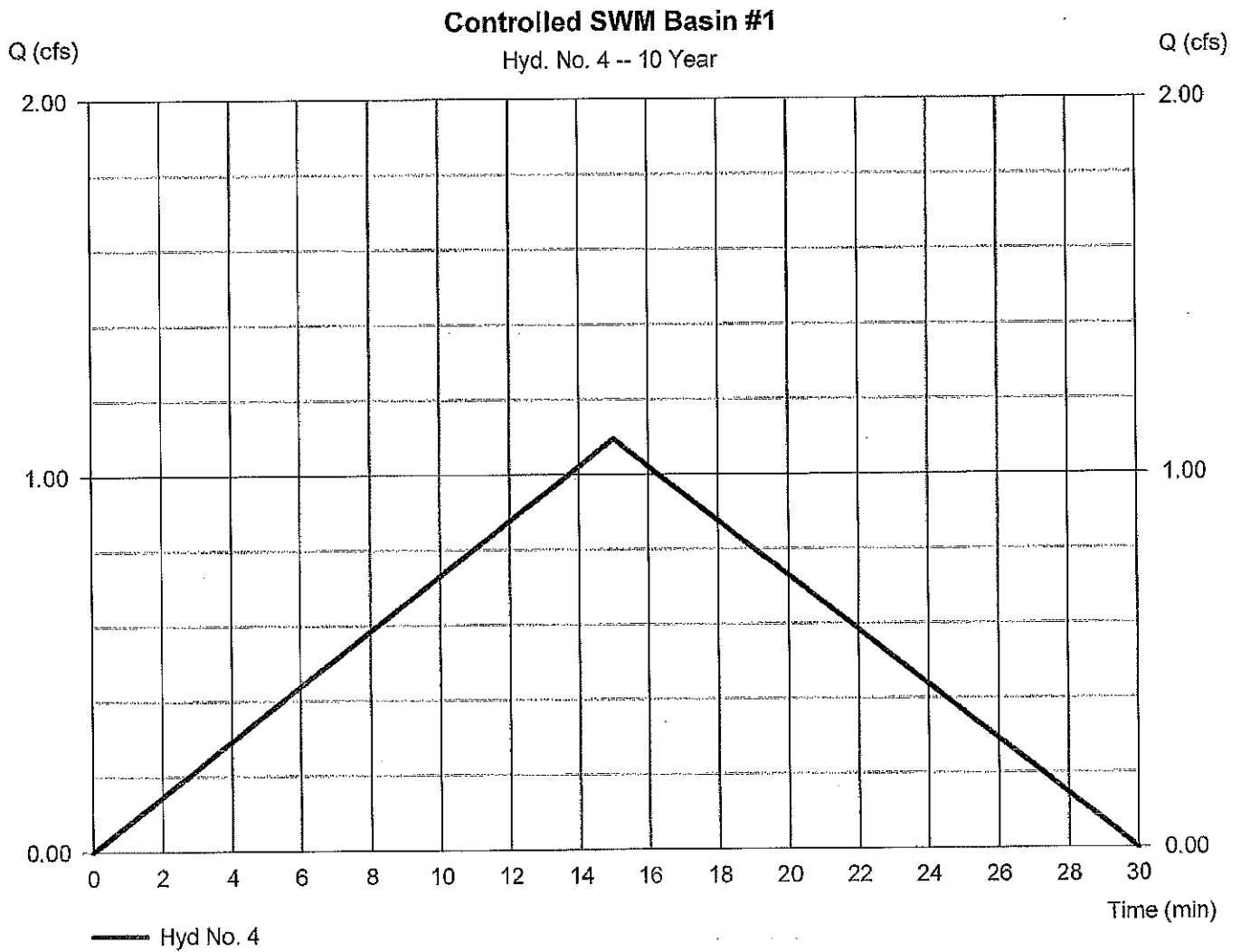
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 4

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 1.096 cfs
Storm frequency	= 10 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 986 cuft
Drainage area	= 0.214 ac	Runoff coeff.	= 0.84
Intensity	= 6.096 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

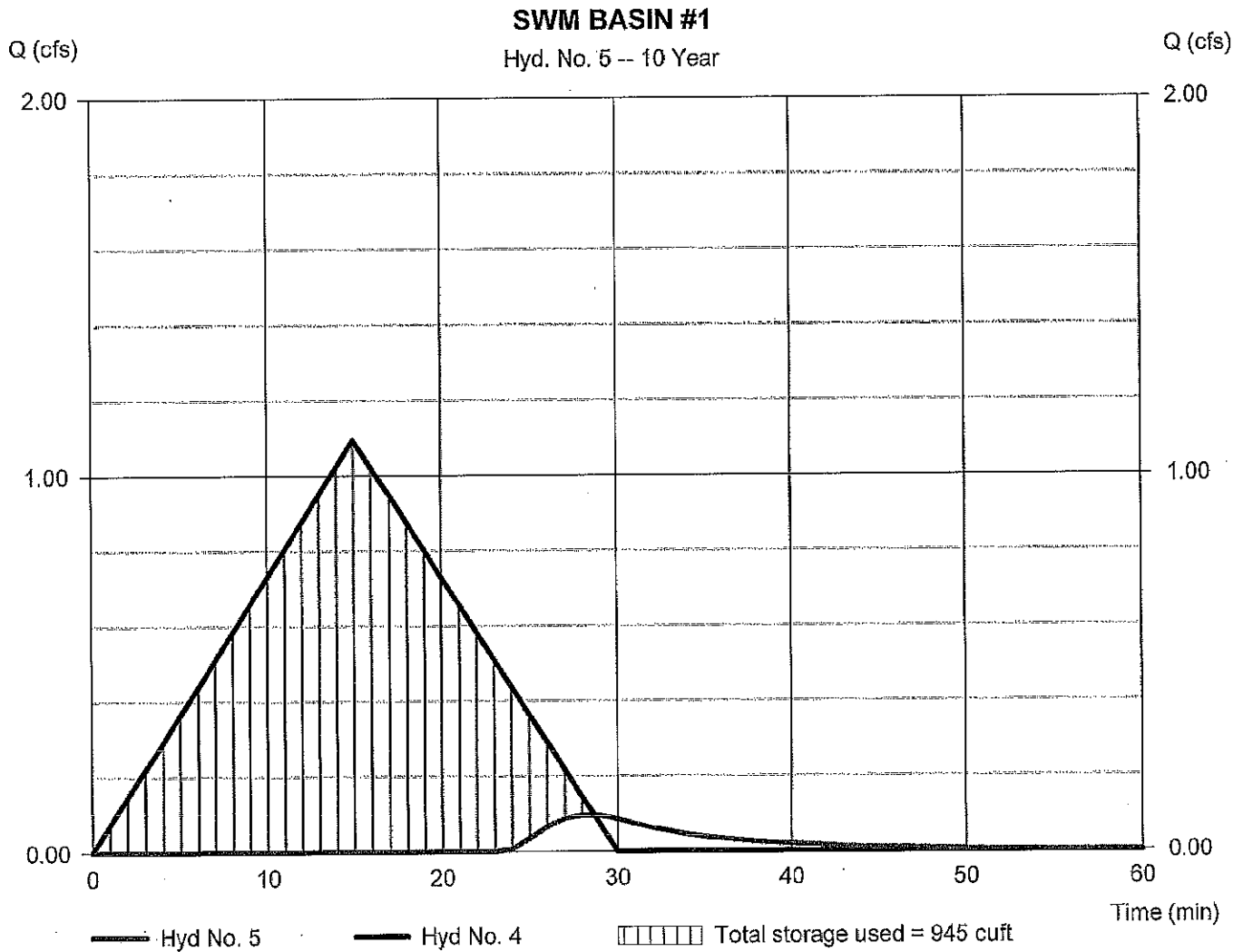
Thursday, 05/11/2014

Hyd. No. 5

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.096 cfs
Storm frequency	= 10 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 58 cuft
Inflow hyd. No.	= 4 - Controlled SWM Basin #1	Max. Elevation	= 378.12 ft
Reservoir name	= SWM #1	Max. Storage	= 945 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

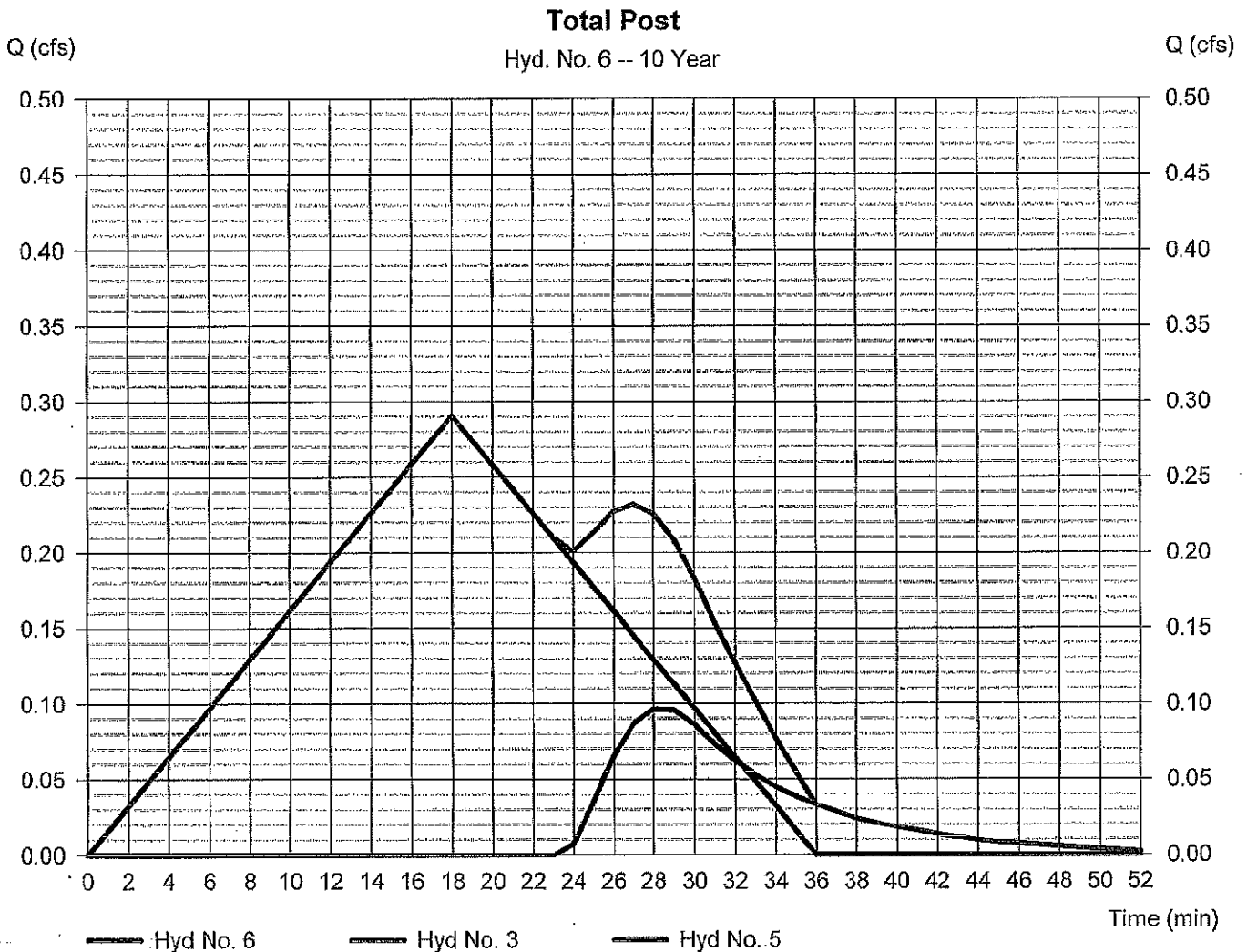
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 6

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.291 cfs
Storm frequency	= 10 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 373 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 0.157 ac



Hydrograph Summary Report

Hydroflow Hydrographs Extension for AutoCAD® CIVIL 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.714	1	18	772	---	---	---	Pre Development
3	Rational	0.322	1	18	348	---	---	---	Post Uncontrolled
4	Rational	1.221	1	15	1,099	---	---	---	Controlled SWM Basin #1
5	Reservoir	0.219	1	27	164	4	378.34	1,006	SWM BASIN #1
6	Combine	0.397	1	25	513	3, 5	---	---	Total Post
14042.gpw					Return Period: 25 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

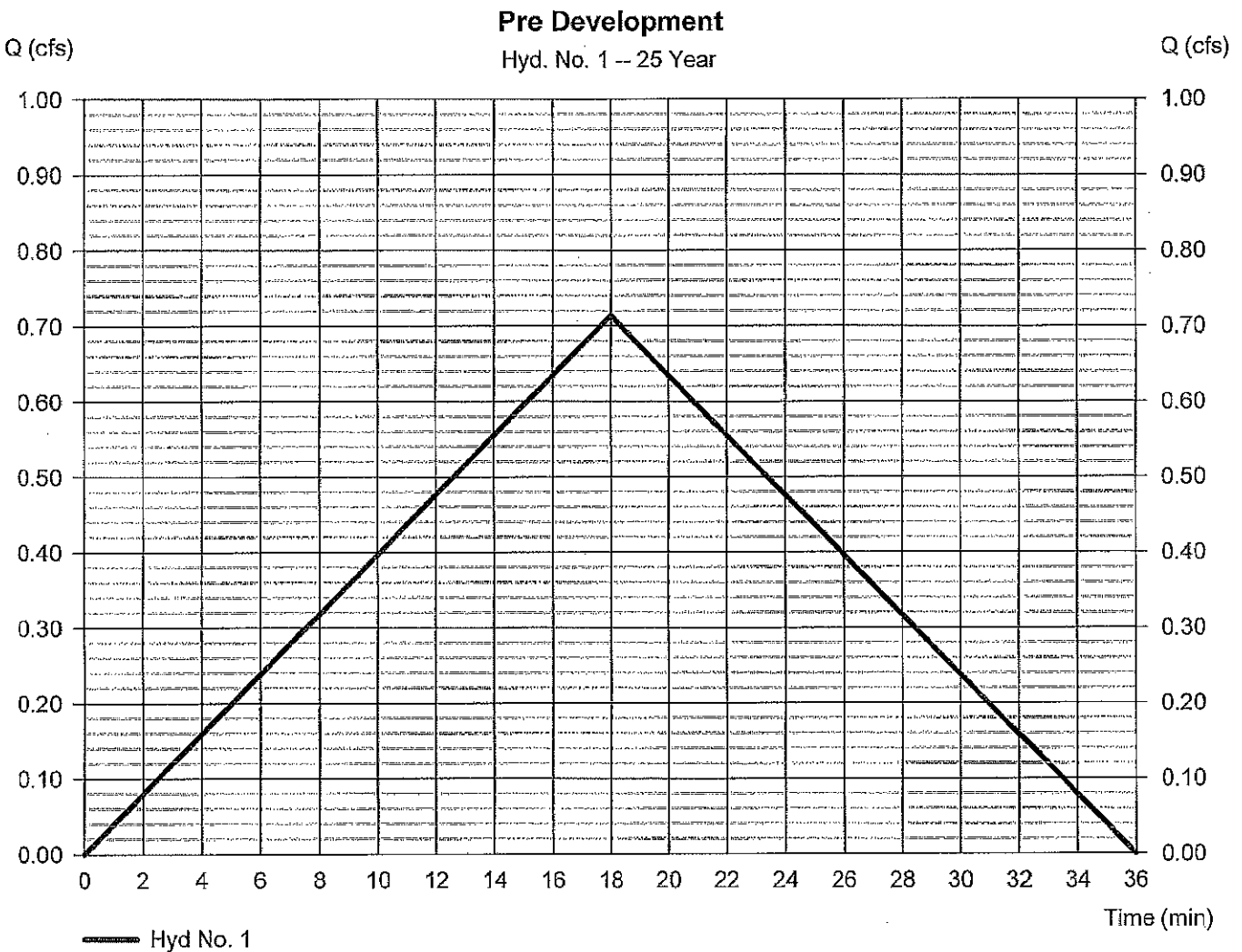
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05/1/2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.714 cfs
Storm frequency	= 25 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 772 cuft
Drainage area	= 0.371 ac	Runoff coeff.	= 0.3
Intensity	= 6.419 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

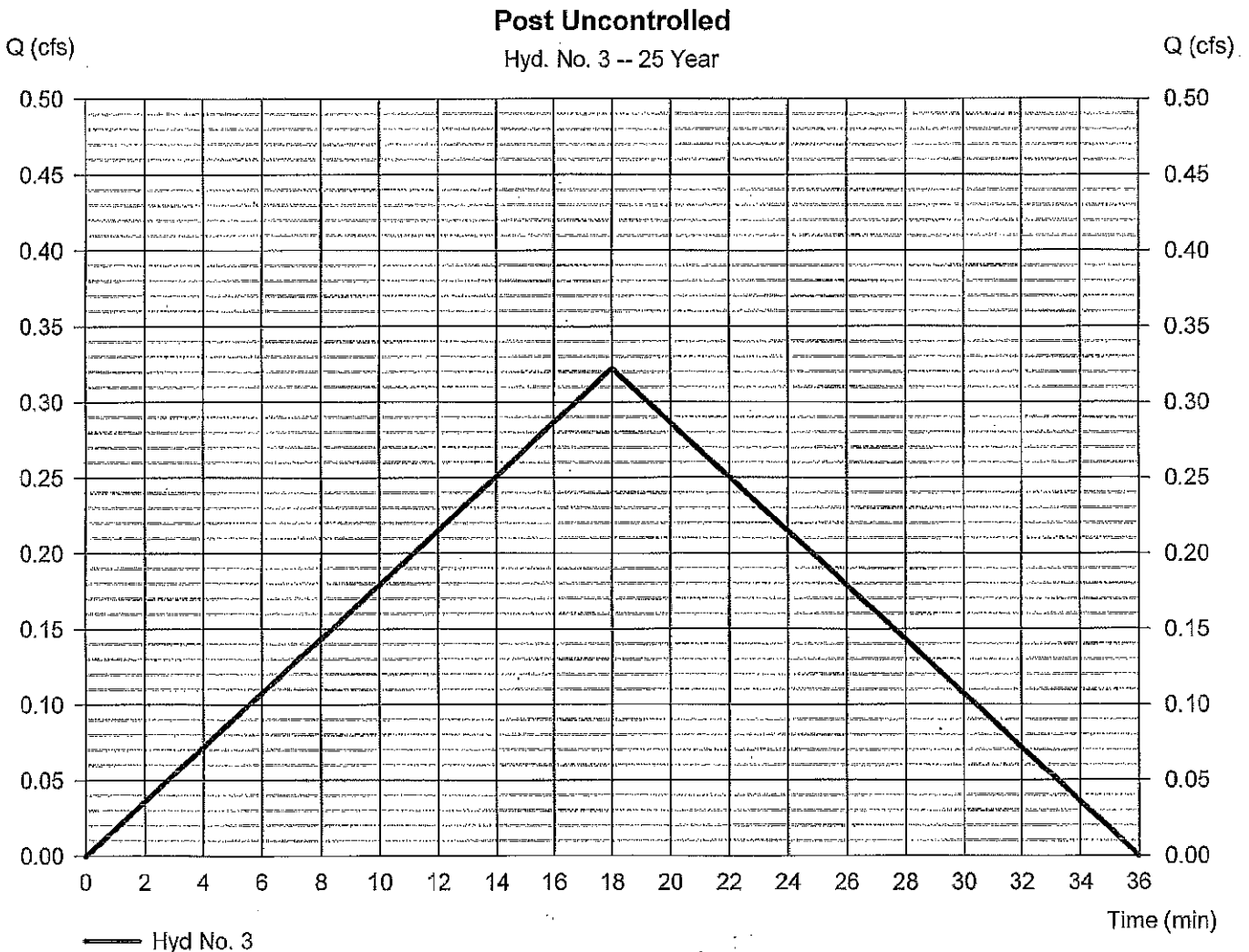
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.322 cfs
Storm frequency	= 25 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 348 cuft
Drainage area	= 0.157 ac	Runoff coeff.	= 0.32
Intensity	= 6.419 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

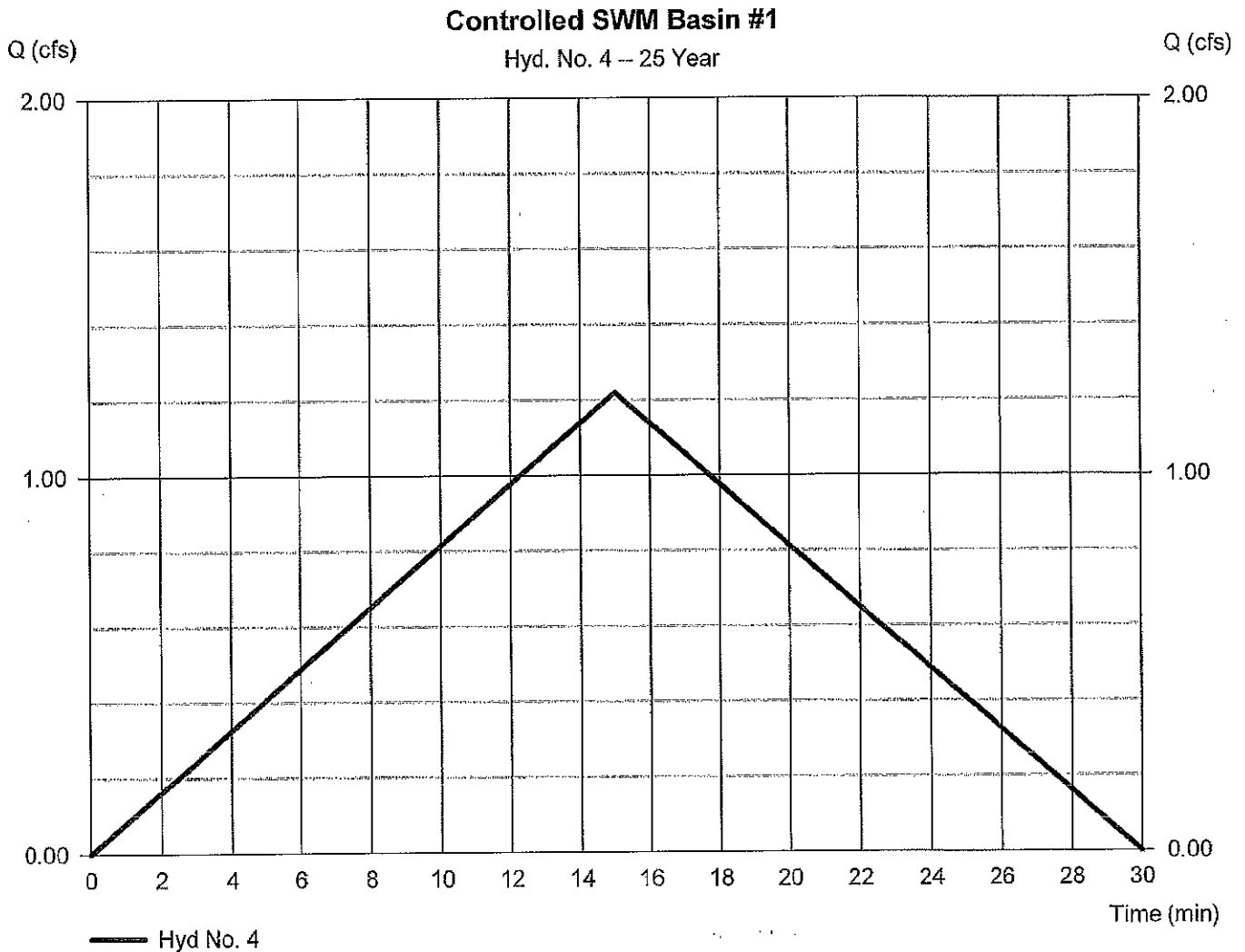
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 4

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 1.221 cfs
Storm frequency	= 25 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 1,099 cuft
Drainage area	= 0.214 ac	Runoff coeff.	= 0.84
Intensity	= 6.794 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

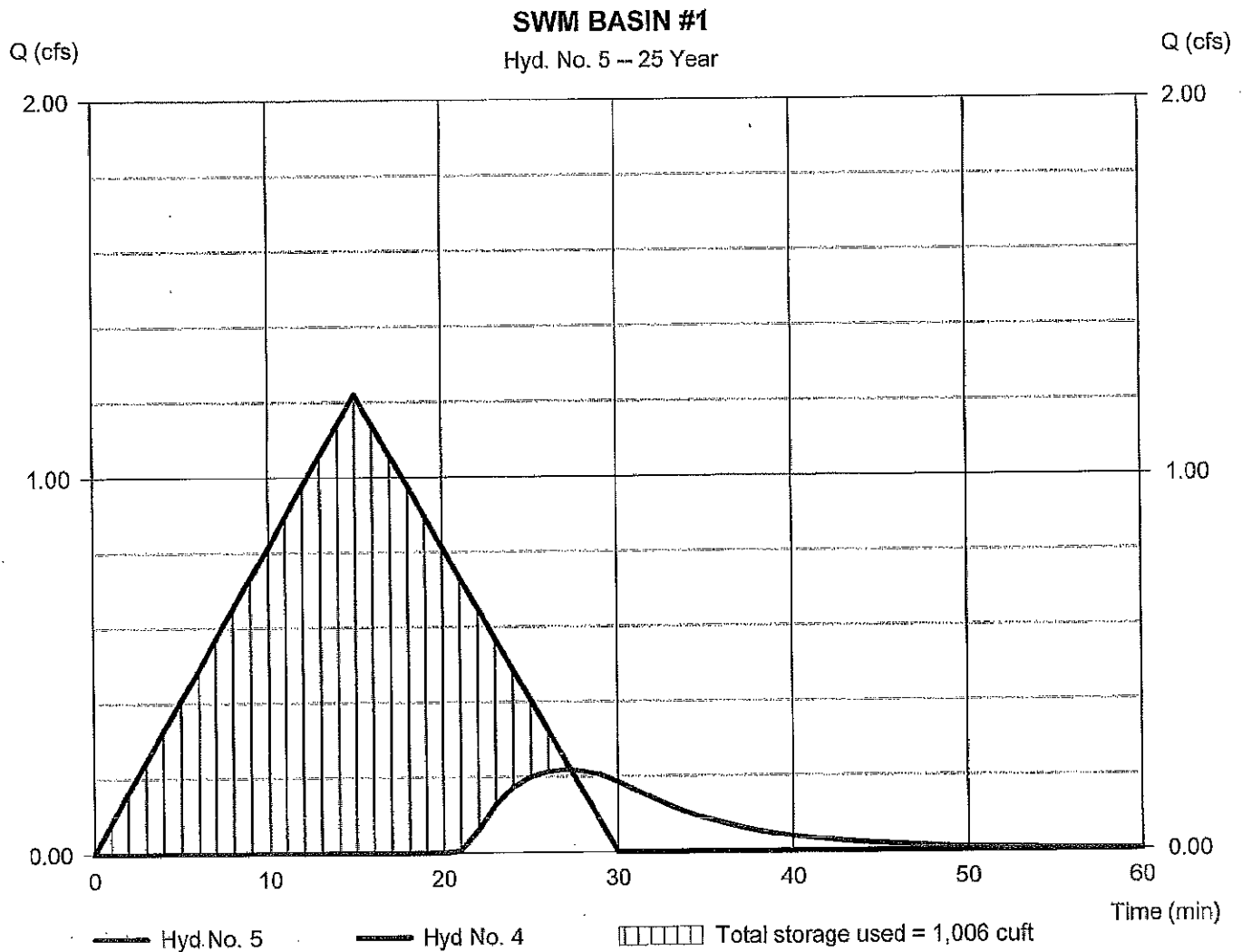
Thursday, 05 / 1 / 2014

Hyd. No. 5

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.219 cfs
Storm frequency	= 25 yrs	Time to peak	= 27 min
Time interval	= 1 min	Hyd. volume	= 164 cuft
Inflow hyd. No.	= 4 - Controlled SWM Basin #1	Max. Elevation	= 378.34 ft
Reservoir name	= SWM #1	Max. Storage	= 1,006 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

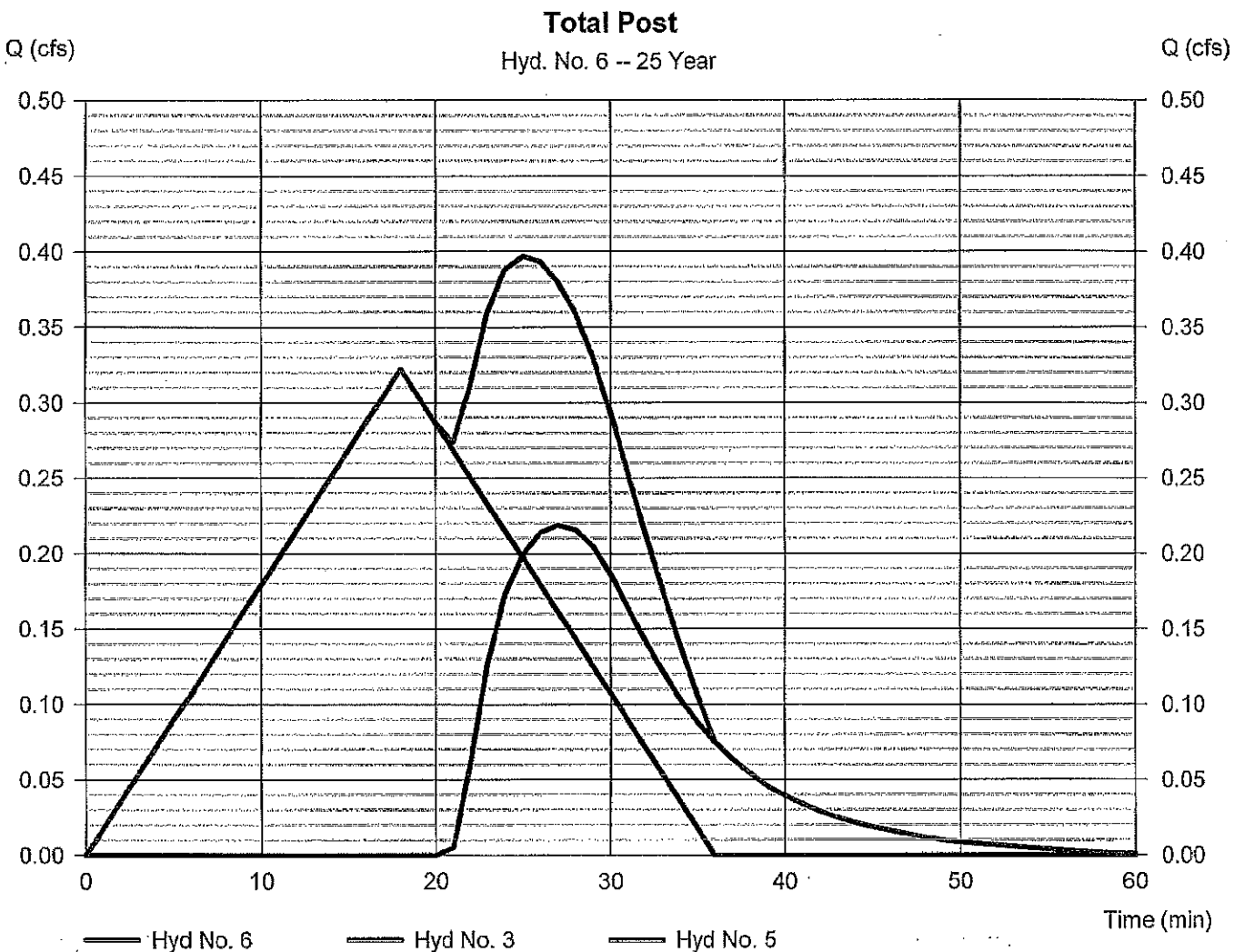
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3.

Thursday, 05 / 1 / 2014

Hyd. No. 6

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.397 cfs
Storm frequency	= 25 yrs	Time to peak	= 25 min
Time interval	= 1 min	Hyd. volume	= 513 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 0.157 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.806	1	18	870	----	----	----	Pre Development
3	Rational	0.364	1	18	393	----	----	----	Post Uncontrolled
4	Rational	1.365	1	15	1,228	----	----	----	Controlled SWM Basin #1
5	Reservoir	0.311	1	26	287	4	378.62	1,074	SWM BASIN #1
6	Combine	0.533	1	24	680	3, 5	----	----	Total Post
14042.gpw					Return Period: 50 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

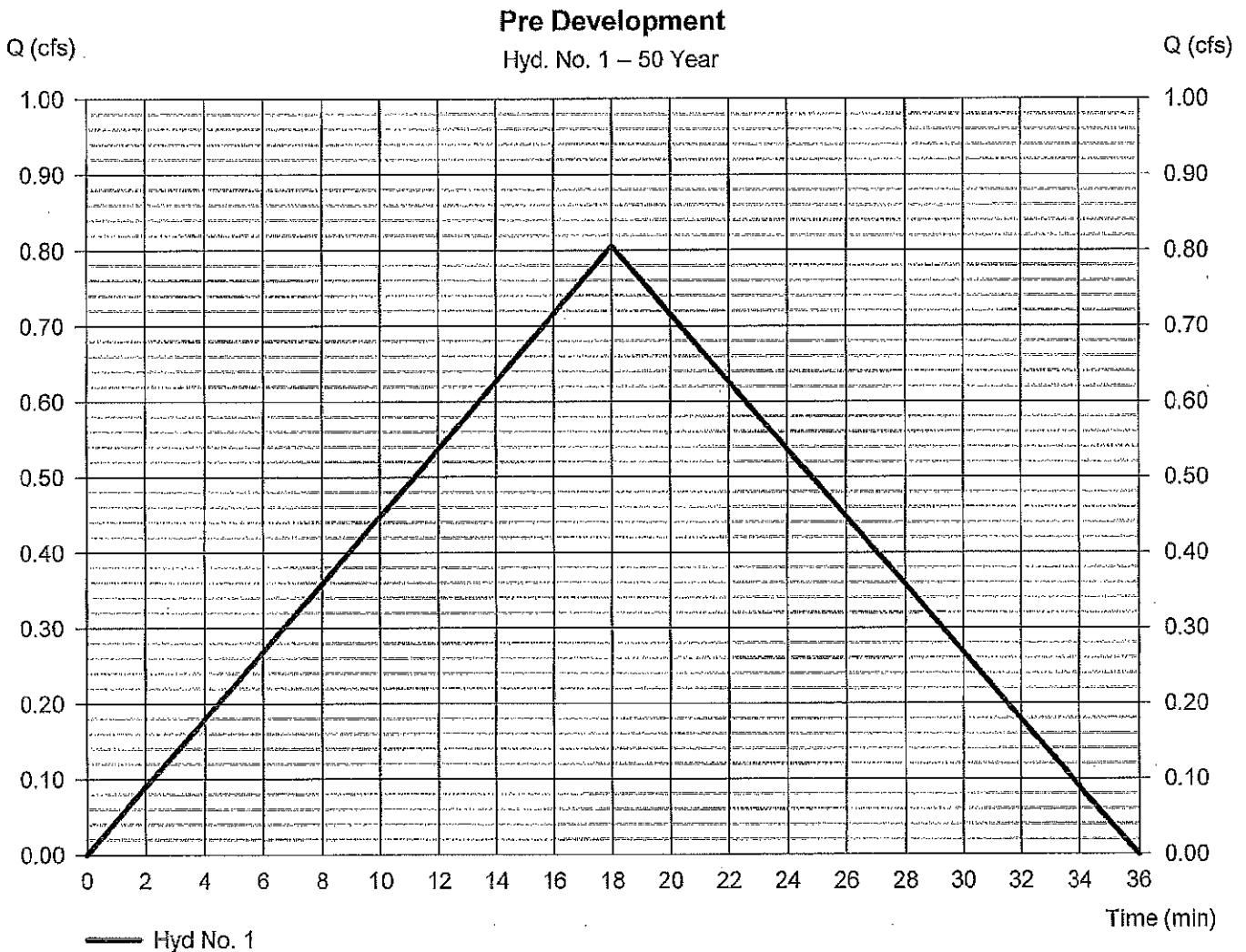
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.806 cfs
Storm frequency	= 50 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 870 cuft
Drainage area	= 0.371 ac	Runoff coeff.	= 0.3
Intensity	= 7.241 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

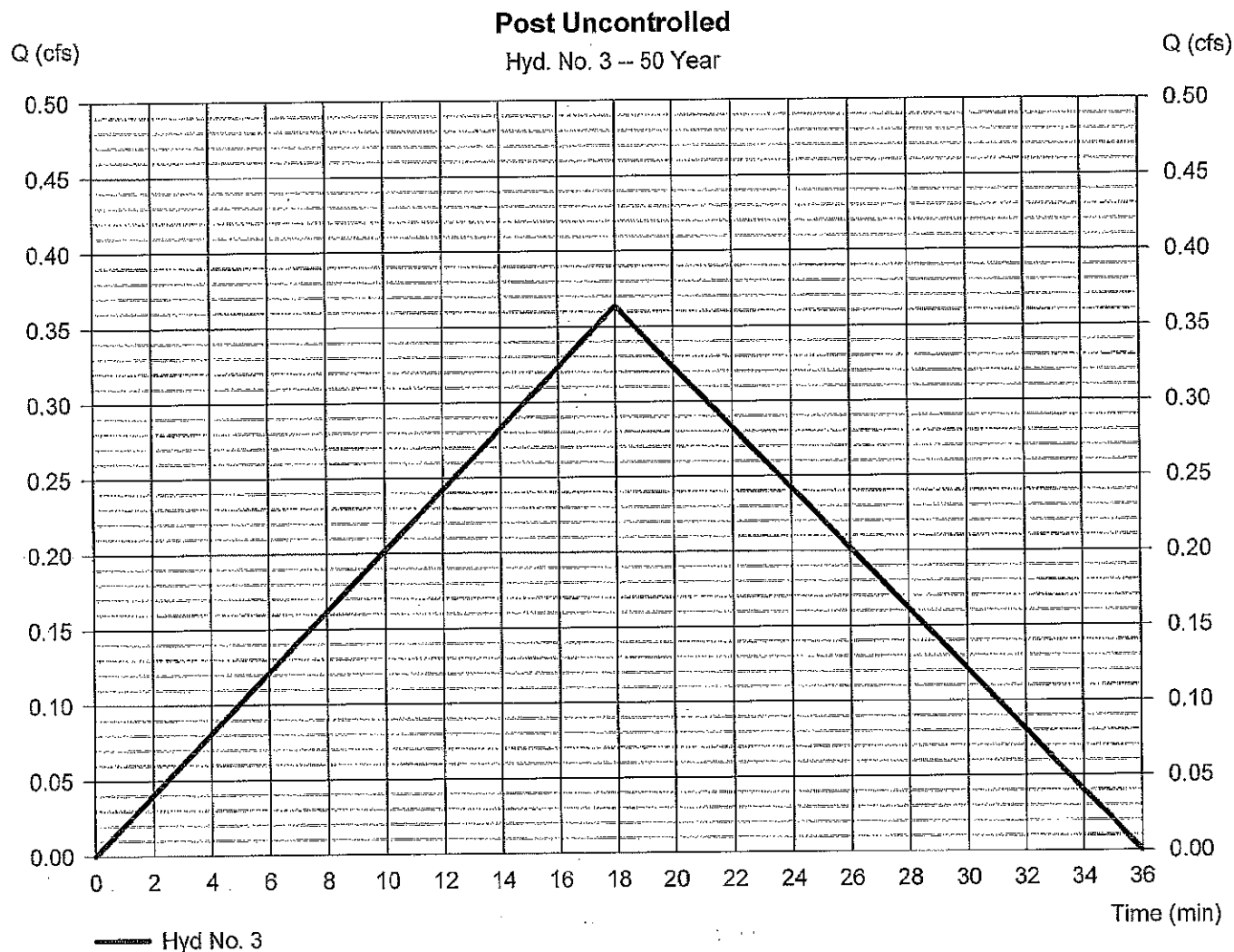
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.364 cfs
Storm frequency	= 50 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 393 cuft
Drainage area	= 0.157 ac	Runoff coeff.	= 0.32
Intensity	= 7.241 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

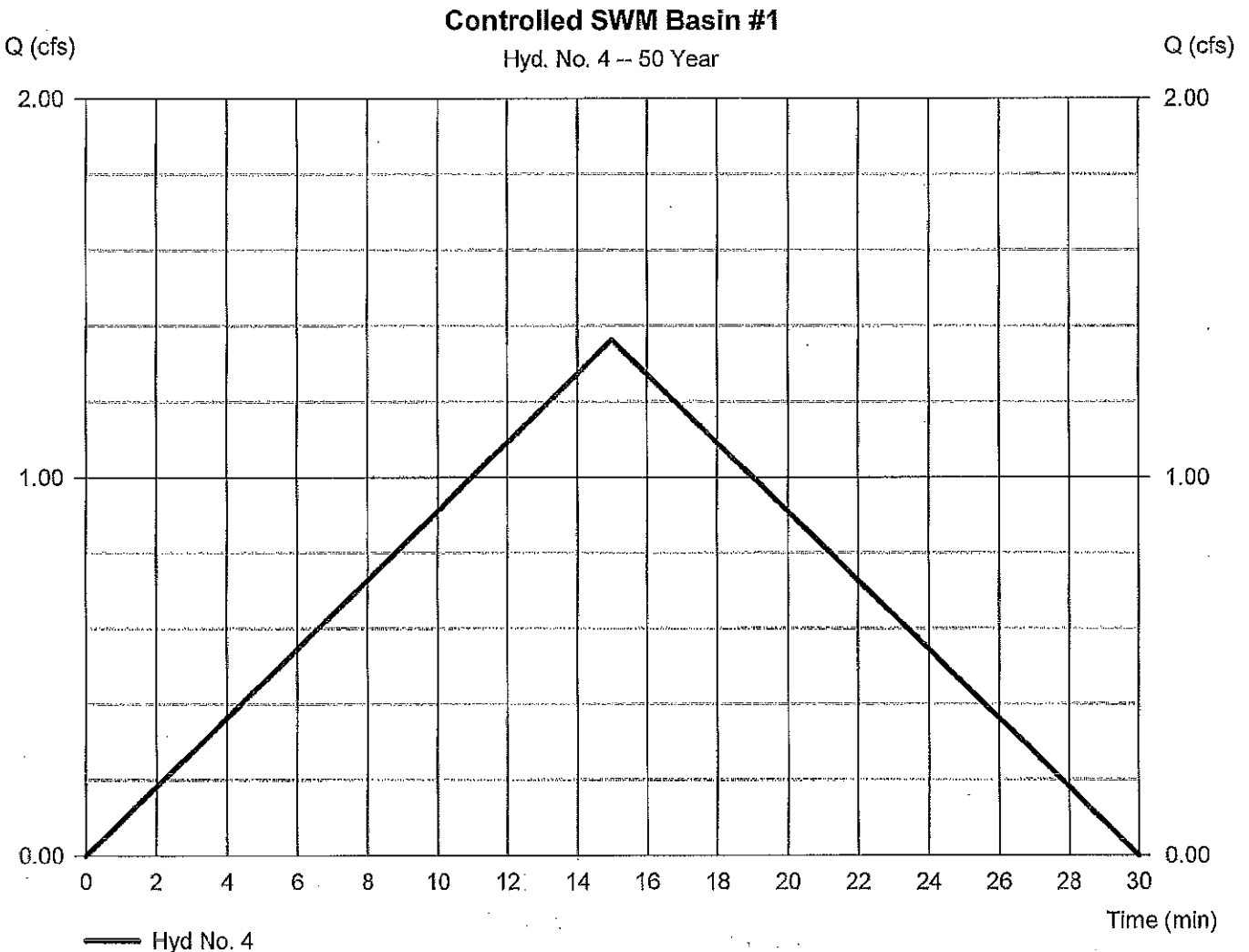
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 4

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 1.365 cfs
Storm frequency	= 50 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 1,228 cuft
Drainage area	= 0.214 ac	Runoff coeff.	= 0.84
Intensity	= 7.592 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

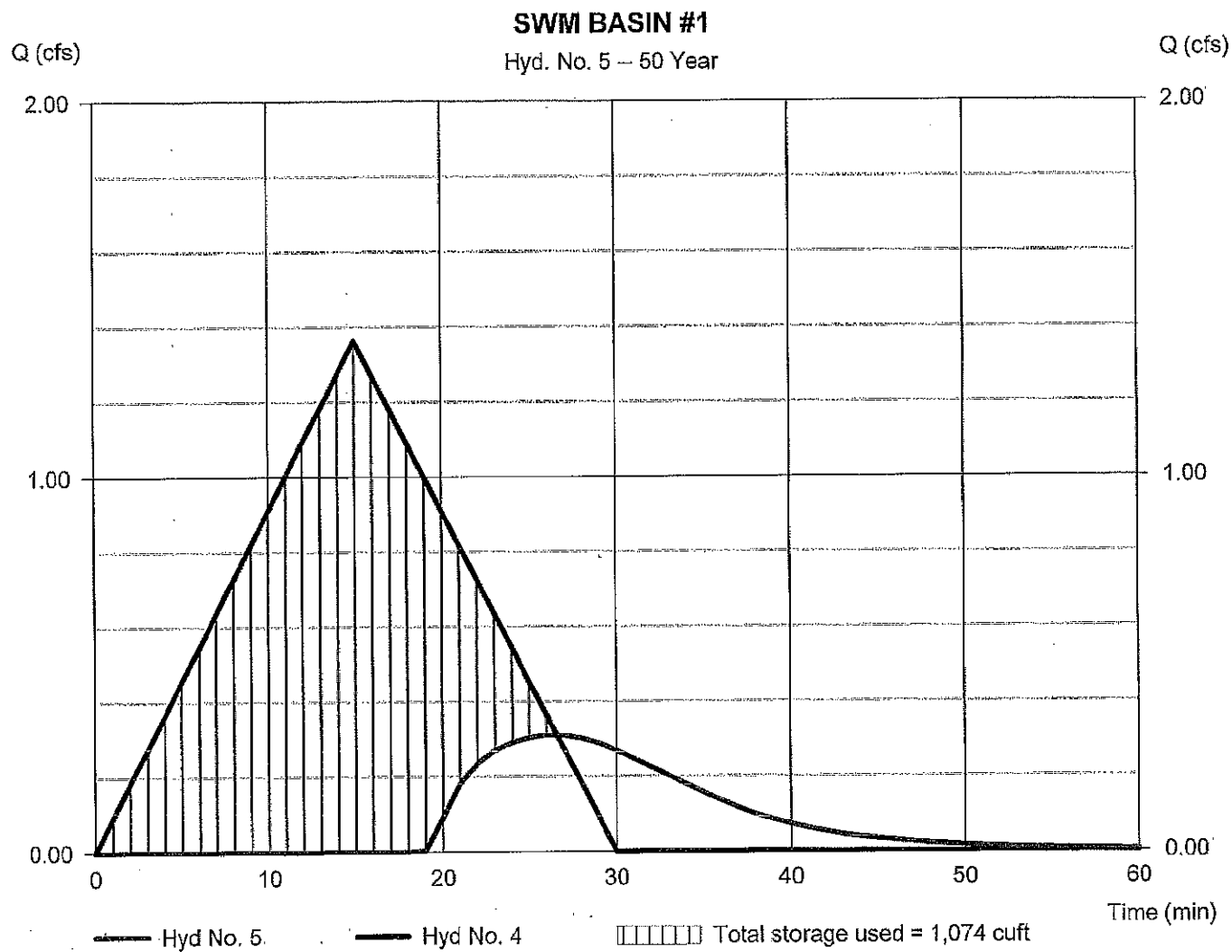
Thursday, 05 / 1 / 2014

Hyd. No. 5

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.311 cfs
Storm frequency	= 50 yrs	Time to peak	= 26 min
Time interval	= 1 min	Hyd. volume	= 287 cuft
Inflow hyd. No.	= 4 - Controlled SWM Basin #1	Max. Elevation	= 378.62 ft
Reservoir name	= SWM #1	Max. Storage	= 1,074 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

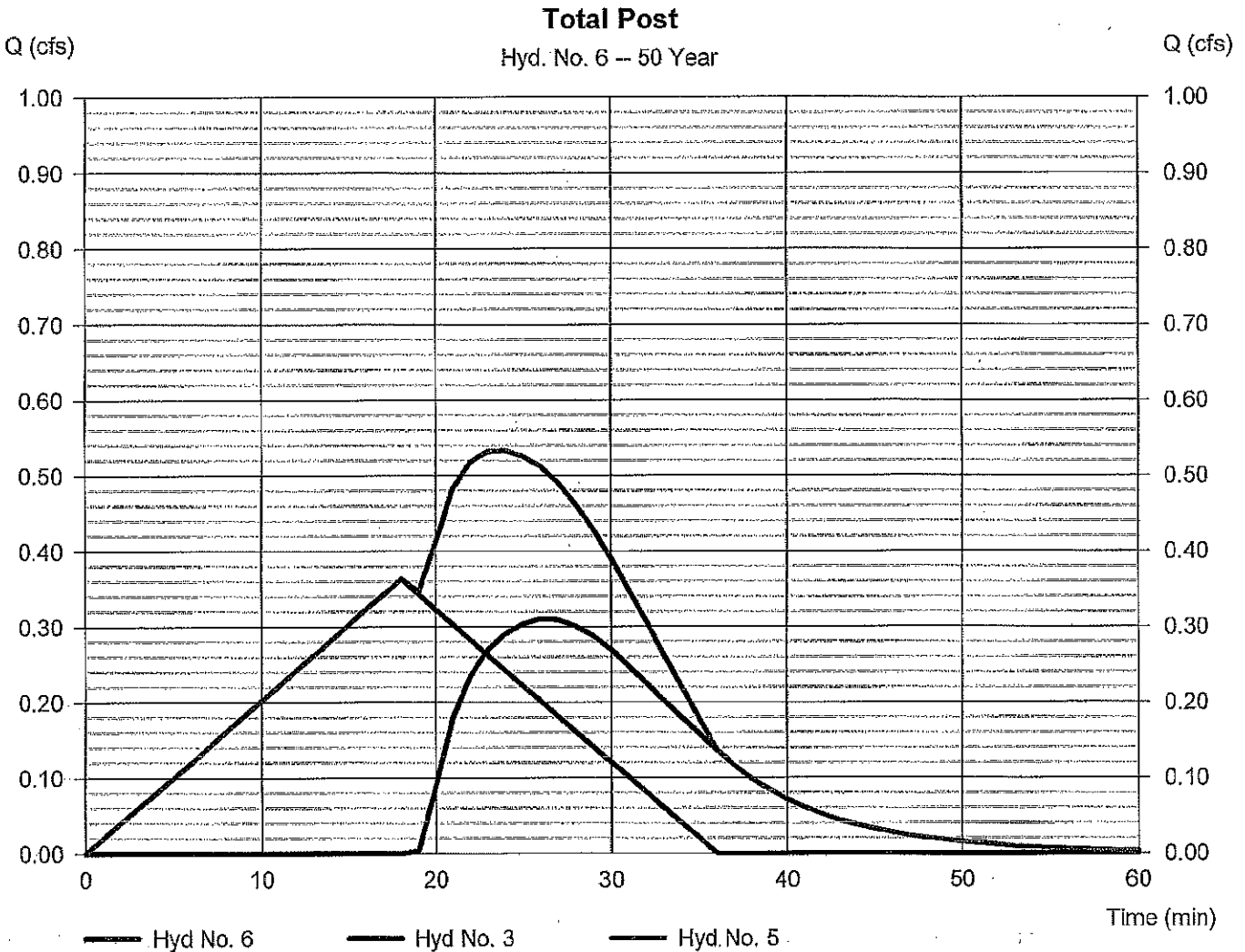
Thursday, 05 / 1 / 2014

Hyd. No. 6

Total Post

Hydrograph type = Combine
 Storm frequency = 50 yrs
 Time interval = 1 min
 Inflow hyds. = 3, 5

Peak discharge = 0.533 cfs
 Time to peak = 24 min
 Hyd. volume = 680 cuft
 Contrib. drain. area = 0.157 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	Rational	0.882	1	18	952	----	----	----	Pre Development
3	Rational	0.398	1	18	430	----	----	----	Post Uncontrolled
4	Rational	1.473	1	15	1,326	----	----	----	Controlled SWM Basin #1
5	Reservoir	0.452	1	25	381	4	378.93	1,120	SWM BASIN #1
6	Combine	0.695	1	25	811	3, 5	----	----	Total Post
14042.gpw					Return Period: 100 Year			Thursday, 05 / 1 / 2014	

Hydrograph Report

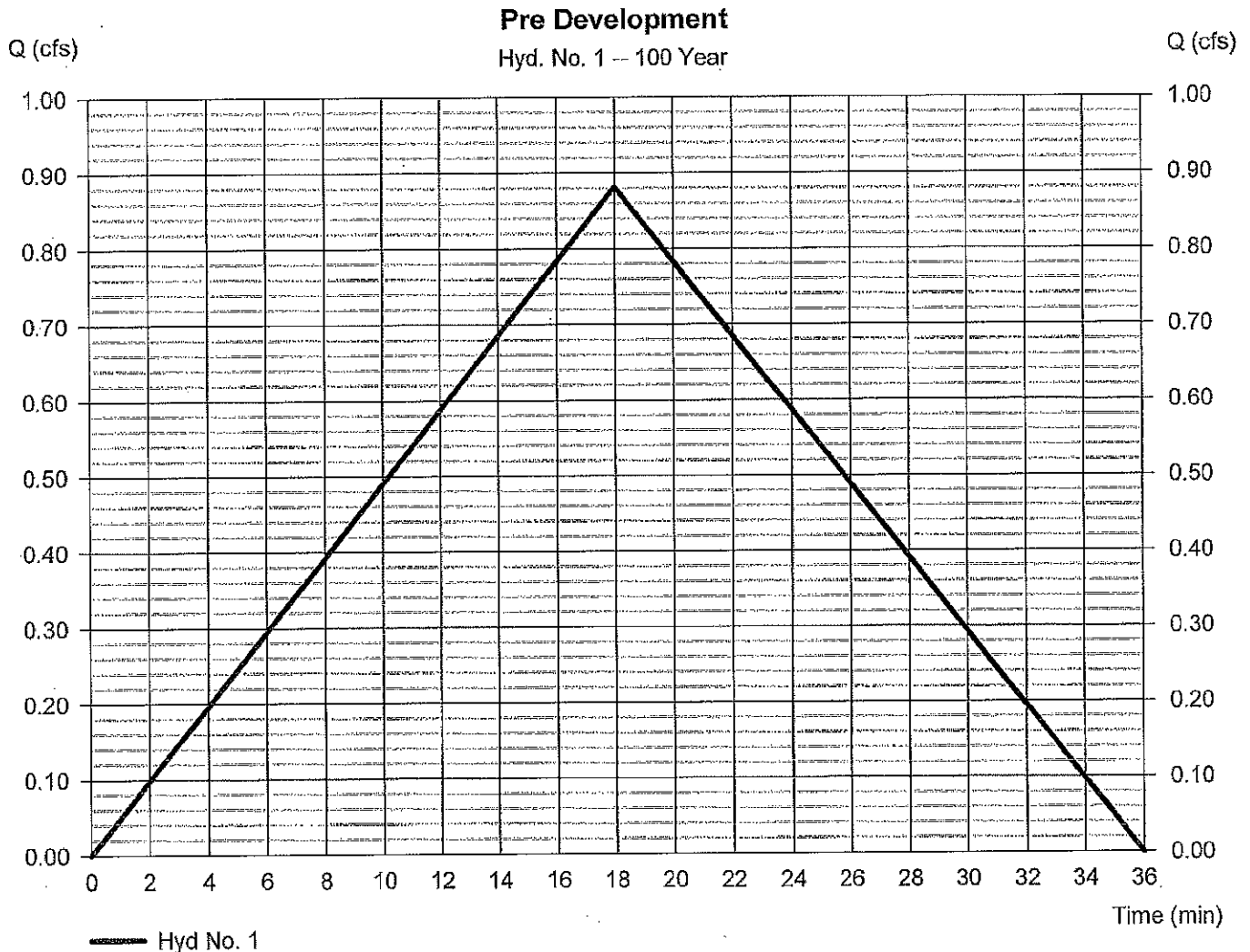
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 1

Pre Development

Hydrograph type	= Rational	Peak discharge	= 0.882 cfs
Storm frequency	= 100 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 952 cuft
Drainage area	= 0.371 ac	Runoff coeff.	= 0.3
Intensity	= 7.922 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

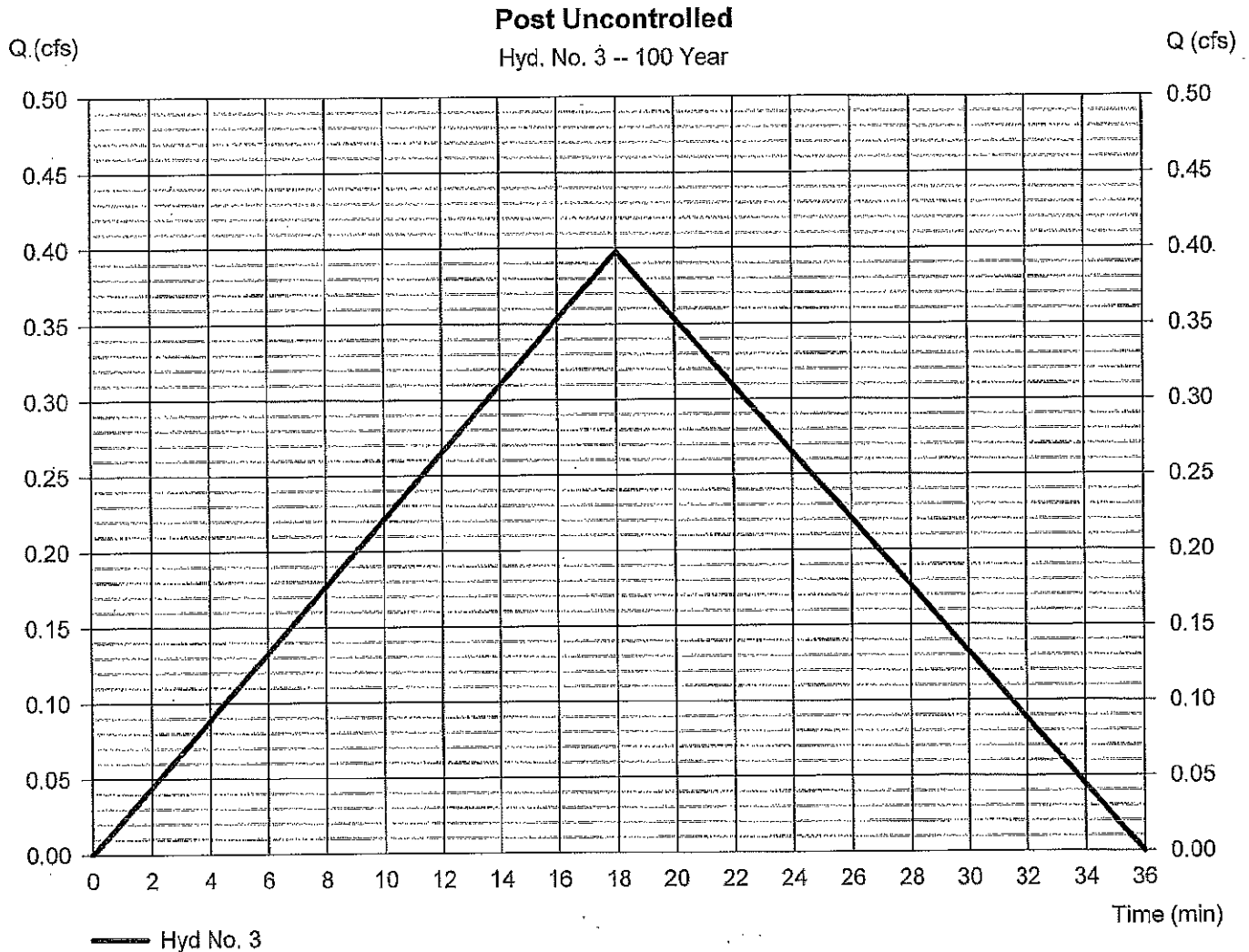
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 3

Post Uncontrolled

Hydrograph type	= Rational	Peak discharge	= 0.398 cfs
Storm frequency	= 100 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 430 cuft
Drainage area	= 0.157 ac	Runoff coeff.	= 0.32
Intensity	= 7.922 in/hr	Tc by User	= 6.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

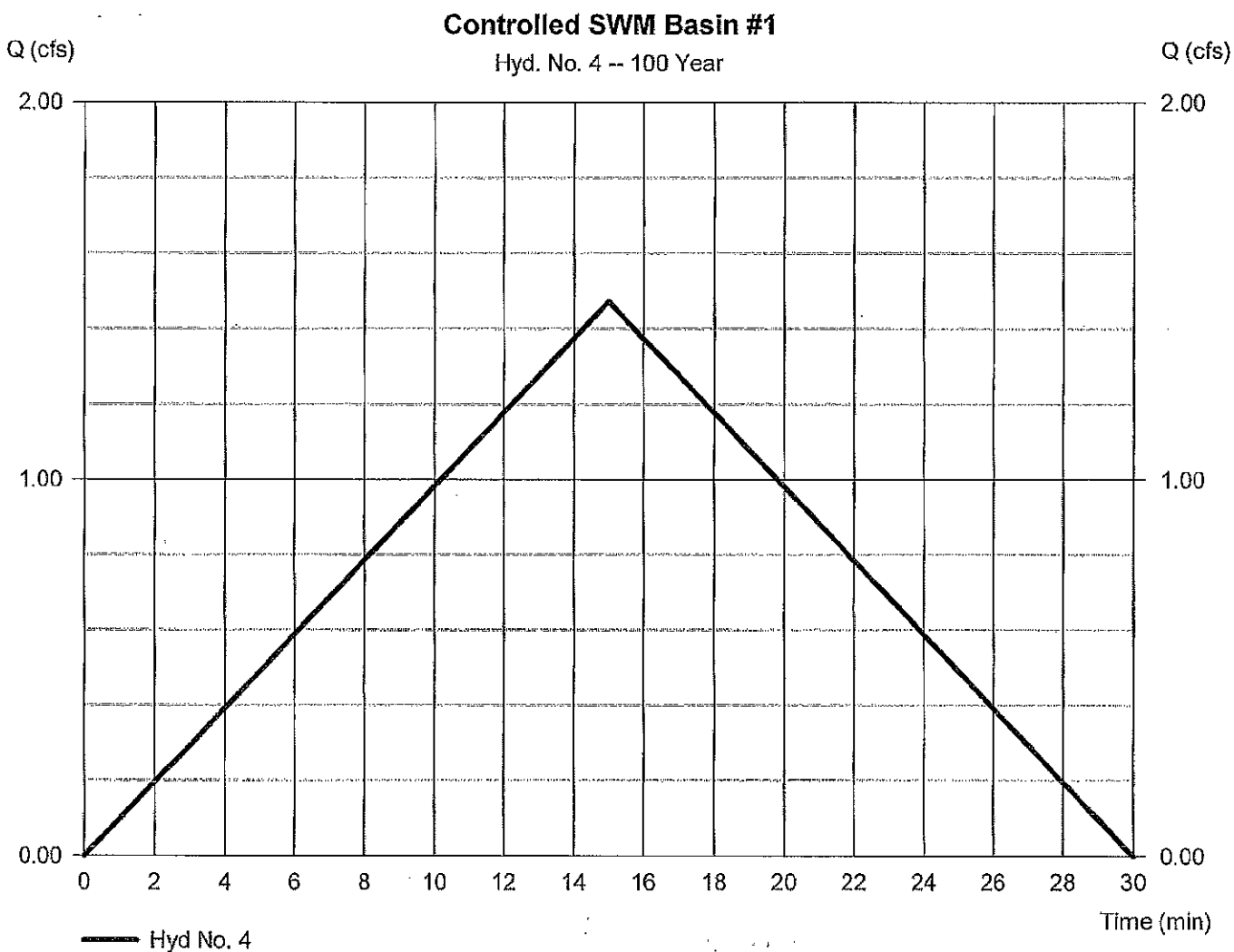
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 4

Controlled SWM Basin #1

Hydrograph type	= Rational	Peak discharge	= 1.473 cfs
Storm frequency	= 100 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 1,326 cuft
Drainage area	= 0.214 ac	Runoff coeff.	= 0.84
Intensity	= 8.196 in/hr	Tc by User	= 5.00 min
IDF Curve	= reg5.IDF	Asc/Rec limb fact	= 3/3



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

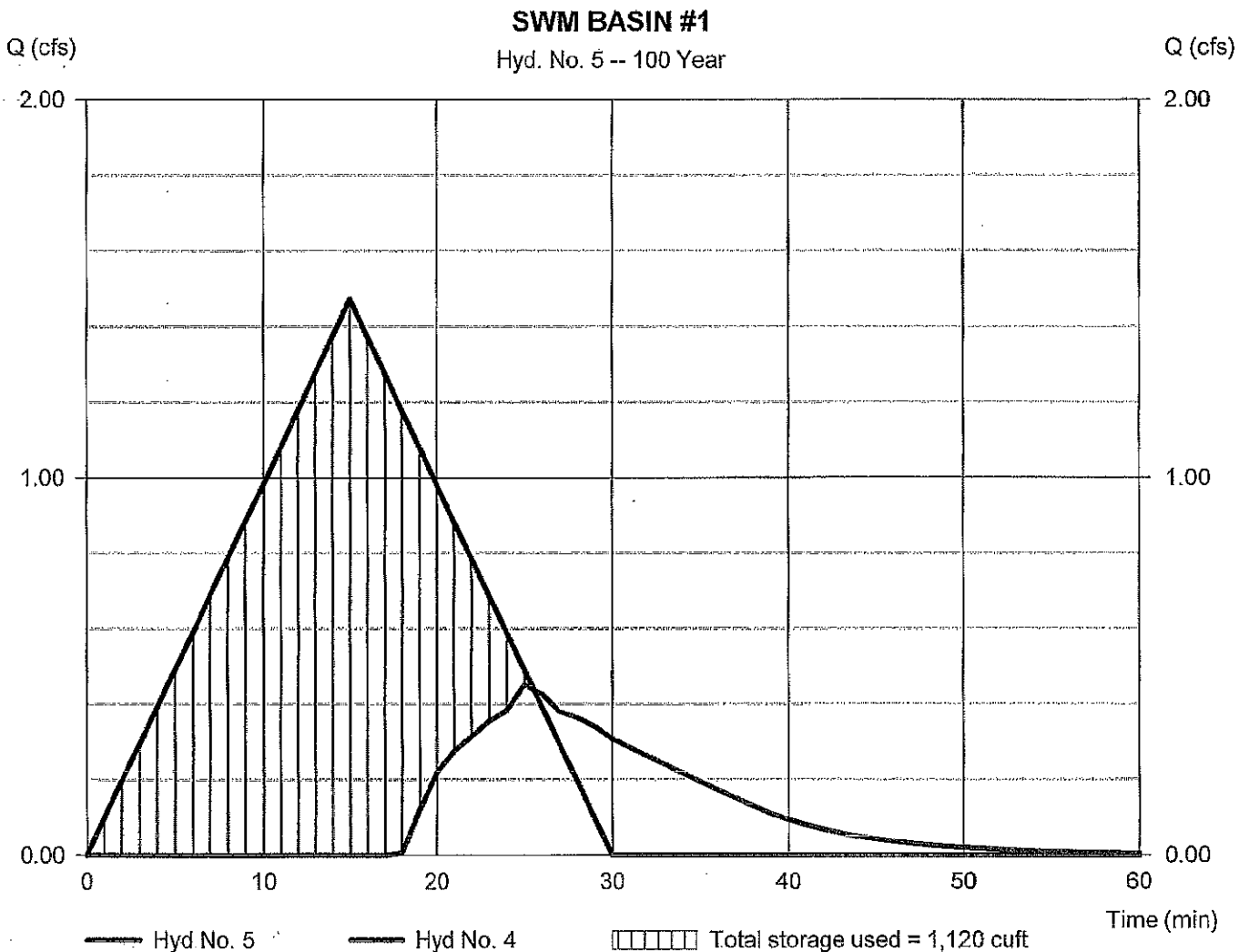
Thursday, 05 / 1 / 2014

Hyd. No. 5

SWM BASIN #1

Hydrograph type	= Reservoir	Peak discharge	= 0.452 cfs
Storm frequency	= 100 yrs	Time to peak	= 25 min
Time interval	= 1 min	Hyd. volume	= 381 cuft
Inflow hyd. No.	= 4 - Controlled SWM Basin #1	Max. Elevation	= 378.93 ft
Reservoir name	= SWM #1	Max. Storage	= 1,120 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

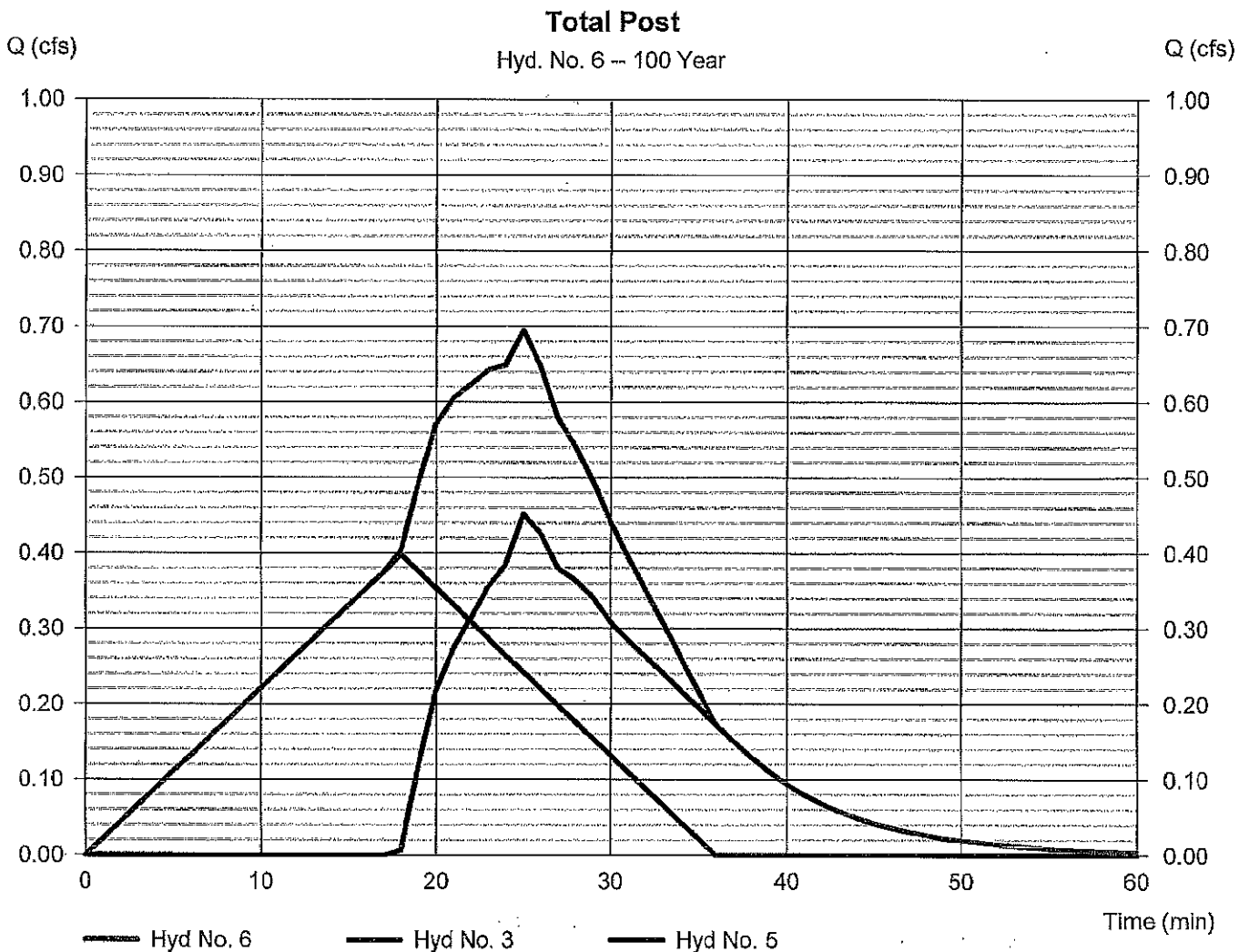
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05 / 1 / 2014

Hyd. No. 6

Total Post

Hydrograph type	= Combine	Peak discharge	= 0.695 cfs
Storm frequency	= 100 yrs	Time to peak	= 25 min
Time interval	= 1 min	Hyd. volume	= 811 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 0.157 ac



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 05/11/2014

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	22.1293	5.9000	0.7167	-----
2	26.2877	6.4000	0.7166	-----
3	0.0000	0.0000	0.0000	-----
5	25.3184	5.4000	0.6606	-----
10	50.7545	9.8000	0.7865	-----
25	27.8762	5.2000	0.6079	-----
50	41.8042	8.4000	0.6573	-----
100	129.6326	19.8000	0.8599	-----

File name: reg5.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	3.99	3.05	2.51	2.15	1.89	1.70	1.55	1.43	1.32	1.24	1.16	1.10
2	4.60	3.54	2.93	2.52	2.22	2.00	1.82	1.68	1.56	1.46	1.38	1.30
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.39	4.16	3.45	2.99	2.65	2.40	2.20	2.04	1.90	1.79	1.69	1.60
10	6.10	4.85	4.06	3.52	3.11	2.80	2.55	2.35	2.18	2.03	1.91	1.80
25	6.79	5.33	4.48	3.92	3.51	3.20	2.95	2.75	2.58	2.43	2.31	2.20
50	7.59	6.16	5.26	4.63	4.16	3.80	3.51	3.26	3.06	2.88	2.73	2.60
100	8.20	7.00	6.12	5.46	4.93	4.50	4.14	3.84	3.59	3.37	3.17	3.00

T_c = time in minutes. Values may exceed 60.

Precip. file name: LMT.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.20	0.00	4.20	5.00	5.80	6.50	7.20
SCS 6-Hr	1.40	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10



Gannett Fleming

Excellence Delivered As Promised

MEMORANDUM

Date: May 28, 2014

To: Radnor Township Planning Commission

From: Roger Phillips, PE

cc: Stephen Norcini, P.E. – Director of Public Works
Robert Zeinkowski, - Township Manager
John Rice, Esq. – Grim, Biehn, and Thatcher

RE: Stormwater Management Ordinance Revisions -
Radnor Code Ch 245

Enclosed herein is a revised copy of the proposed ordinance amending Chapter 245 of the Radnor Township Code – Stormwater Management. This ordinance was considered by the Board of Commissioners on May 19, 2014, and is being returned to you for further consideration.

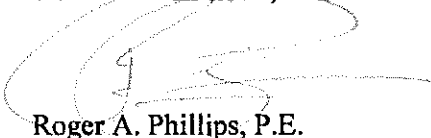
As you recall, the previous version provided a suggested revision to increase the infiltration volume to 1-inch over the entire parcel. The BOC has returned this for consideration of reducing the 1-inch infiltration volume to only the developed area. That suggested requirement is actually in the current ordinance, so no revision to that section is required.

The other portion of the ordinance recommended for revision was 245-26 C.(2) in which it was recommended to return all parcels for redevelopment back to meadow in good condition for the pre-development runoff calculations. The BOC has returned this for consideration of a revision to return 25% of the existing developed area on the site to “meadow in good condition” and the remainder of the site area to remain as currently exists.

The intent of this proposed ordinance is to provide an immediate impact for the reduction of stormwater discharge from future development. Township staff, in concert with the Stormwater Management Advisory Committee and the Planning Commission, will be undertaking a review of the entire stormwater management ordinance and will be bringing forth for further recommendations in the near future.

Please review this proposed ordinance modifications and provide recommendations.

Very truly yours,
GANNETT FLEMING, INC.



Roger A. Phillips, P.E.
Senior Project Manager



ORDINANCE NO. 2014-03

RADNOR TOWNSHIP

AN ORDINANCE OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AMENDING CHAPTER 245, STORMWATER MANAGEMENT, OF THE RADNOR CODE, BY AMENDING CERTAIN PROVISIONS REGARDING PURPOSE, AND EXISTING CONDITIONS CONCERNING CALCULATION METHODOLOGY.

The Radnor Township Board of Commissioners does hereby ENACT and ORDAIN, as follows:

ARTICLE I Purpose.

Section 245-3, Purpose, of Chapter 245, is amended by adding a new Subsection B and re-lettering the existing subsections "B" - R to "C" - "S". The new Subsection B. shall read as follows:

- B. Utilize Green Infrastructure, and Lower Impact Development design and practices to promote infiltration, evapotranspiration and re-use of stormwater.

ARTICLE II Calculation Methodology

Section 245-26 C.(2) is revised to read as follows:

C. (2) For redevelopment sites, the ground cover used in determining the existing conditions' flow rates for the developed portion of the site shall be based on actual existing conditions with the exception that a minimum of 25% of existing developed area be considered as "meadow in good condition".

ARTICLE III Repealer.

All ordinances or parts of ordinances which are inconsistent herewith are hereby repealed.

ARTICLE IV Severability.

If any section, paragraph, subsection, clause or provision of this Ordinance shall be declared invalid or unconstitutional by a court of competent jurisdiction, such decision shall not

affect the validity of this Ordinance as a whole or any part thereof other than that portion specifically declared invalid.

ARTICLE V Effective Date.

This Ordinance shall become effective in accordance with the Home Rule Charter of Radnor Township.

ENACTED AND ORDAINED this _____ day of _____, A.D., 2014.

**RADNOR TOWNSHIP
BOARD OF COMMISSIONERS**

By: _____
Name: Elaine P. Schaefer
Title: President

ATTEST: _____
Robert A. Zienkowski, Secretary

ZONING HEARING BOARD APPLICATION

TOWNSHIP OF RADNOR

301 IVEN AVENUE

WAYNE, PA 19087

610-688-5600

FAX: 610-971-0450

www.radnor.com

www.radnor.com

TOWNSHIP USE ONLY
APPEAL # <u>59116</u>
FEE: _____
DATE RECEIVED: _____

 GENERAL INFORMATION: Applicants are strongly encouraged to review the "Requirements and Information for Appeals to the Zoning Hearing Board" that are attached to his application. Ten (10) copies of this application and required attachments must be filed with the Community Development Department not less than thirty (30) calendar days prior to the hearing.
INCOMPLETE APPLICATIONS WILL NOT BE ACCEPTED FOR PROCESSING

REQUIRED FEE DUE AT FILING: Please refer to the Consolidated Fee Schedule, as amended, on our website at www.radnor.com for a copy of our current fees.

 TYPE OR PRINT

Property Address: 240-252 Radnor Chester Road, Radnor, PA

Name of applicant: Radnor Chester Road Investement, L.P. & 252 RCR Investments, L.P.

Telephone number: 267-266-4517 Email: SheldonEGross@gmail.com

Property Owner (if different than above): _____

Property address: _____

Telephone number: _____ Email: _____

A-1

Attorney's name: Nicholas J. Caniglia, Esquire

Address: 125 Strafford Avenue, Suite 110, Wayne, PA 19087

Telephone number: 610-688-2626 Email: NCaniglia@gmail.com

Relief requested and/or basis for appearing before the Zoning Hearing Board including *specific citation to any and all sections of the Zoning Code relevant to the appeal. (attach additional pages if necessary)*

See attached

Description of previous decisions by the Zoning Hearing Board pertinent to the property, or attach copies of decisions: *(attach additional pages if necessary)*

See attached

ZONING APPLICATION
240-252 Radnor Chester Road, Radnor, PA

Relief requested and/or basis for appearing before the Zoning Hearing Board including specific citation to any and all sections of the Zoning Code relevant to the appeal. (attach additional pages if necessary)

Applicant's property is split zoned PB-Planned Business and R-1 Residential. Applicant seeks variances from the following sections of the Zoning Code: (1) §280-60(B) relating to Building Area; (2) §280-60(C) relating to setback along a 50' by 50' parcel owned by the Township; and (3) §280-61(D) relating to buffer along the 50' by 50' Township owned parcel. Applicant seeks a special exception under §280-101(A)(1), a variance from the cited sections, or contends that it is permitted by right or as a decrease in existing non-conformity from the following sections of the Zoning Code: (1) §280-60(C) regarding continuation of the existing Rear Yard setback on the rear property line in common with Radnor Financial Center for the parking structure and (2) §280-4 regarding continuation of the existing size of parking spaces in parking structure. In addition, Applicant seeks any other zoning or alternative relief required pursuant to the Plans presented with this Application.

Description of previous decisions by the Zoning Hearing Board pertinent to the property, or attach copies of decisions: (attach additional pages if necessary)

Appeal Number 2805 dated April 1, 2009 granting relief to construct parking structure within rear yard setback and to reduce size of parking spaces within parking structure to be 8.5' by 19'.

Appeal Number 2911 – Denial of previous Plan of Applicant.

Brief narrative of proposed improvements:

Applicant intends to merge 240 Radnor Chester Road and 252 Radnor Chester Road into a single lot. 240 Radnor Chester Road is split zoned; mainly PB with a ring of R-1 surrounding it. 252 Radnor Chester Road is zoned R-1 and is a legally non-conforming office use. 240 Radnor Chester Road is legally non-conforming in regards to setback, building coverage, and impervious coverage. To the east of the Premises is a 50' by 50' parcel owned by Radnor Township. Applicant intends to raze the existing office building on 252 Radnor Chester Road in the R-1 Zoning District, which is non-conforming on use and front yard setback. No buildings or structures will be constructed on 252 Radnor Chester Road. Applicant proposed the construction of an additional office building in the PB Zoning District of 240 Radnor Chester Road together with additional structured parking in the existing parking deck only located in the PB Zone. Existing condition will remain unchanged except for the construction of the Building and garage structure within the PB zoned areas. There will be no other changes to the R-1 areas existing on 240 and 252 Radnor Chester Road except for additional plantings and buffering. The overall impervious coverage on the Premises will be less than existing. As a result of the 50' by 50' township owned parcel, the Applicant requires relief from the setback and buffer requirements of the Zoning Code. Applicant requests that the zoning relief granted previously in Appeal Number 2805 extend to the current request to permit 8.5' by 19' parking stall size in the parking structure. The proposed Plan varies from the previous Plan denied by the Zoning Board by the elimination of any additional buildings or structures in any of the R-1 zoned land.

List of Witnesses and Summary of Testimony:

Sheldon Gross - Principal of Applicant – Regarding Project as described above.
Alex Tweedie, P.E. – Site Engineer – Regarding engineering as described above.
Timothy Haahs – Parking Designer – Regarding stall size and parking.
Applicant reserves the right to present other witnesses at the hearing.

Brief narrative of improvements: *(attach additional pages if necessary)*

See attached

ATTACHMENTS: Ten (10) copies of each of the following must be provided:

1. Engineered plan or survey of the property drawn to scale, prepared by a registered architect, engineer or surveyor licensed in Pennsylvania, containing the following information:
 - a) lot lines and lot dimensions described in metes and bounds (in feet);
 - b) total lot area;
 - c) location of easements and rights of way, including ultimate rights of way;
 - d) location of all setback lines for existing and proposed structures;
 - e) location of steep slopes, floodplains, riparian buffers, wetlands, and other pertinent features;
 - f) location of existing and proposed improvements;
 - g) table of zoning data including zoning district, required setbacks, existing and proposed building coverage, impervious coverage, height, and other pertinent zoning restrictions, and any degree of compliance or noncompliance; and
 - h) all other features or matters pertinent to the application.

PLANS SHALL NOT EXCEED 24" X 36", AND MUST BE NEATLY FOLDED TO NO GREATER DIMENSION THAN 8 1/2" X 11" AT FILING

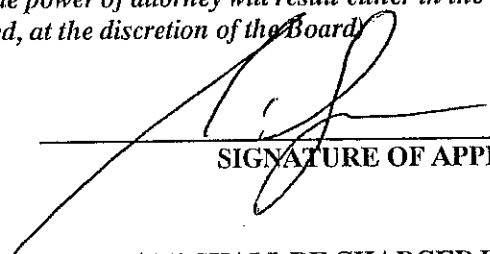
2. List of witnesses and summary of their testimony attached.
3. Photographs of the property at issue and all adjoining properties.
4. Copies of any written professional reports, including traffic studies, land planning studies,

appraisals, floodplain analyses, economic forecasts or other written reports, which the applicant wishes to present at the hearing (*note: the author of the study or a qualified representative of the entity who prepared the study must appear at the meeting and be available for cross-examination*).

5. Copy of deed, lease, agreement of sale, or other authorization to file the appeal. (*note: leases or agreements of sale either must expressly permit the tenant or buyer to file an appeal, or must be accompanied by a letter from the owner clearly authorizing tenant or buyer to file the appeal*).

ADDITIONAL REQUIREMENTS

1. Will this application involve the subdivision of land? Applications that involve the subdivision of land are referred to the Planning Commission for review and recommendation. *Applicants will be notified of the date and time of the Planning Commission meeting*
2. Will briefs or memoranda of law be filed in accordance with requirements of the Zoning Hearing Board? (*note -- 10 copies of any brief or memorandum of law to be submitted by the applicant must be received by the Community Development Department no later than 14 days before the hearing*).
3. Will the applicant (or duly authorized officer of the applicant, if applicant is not a natural person) be present at the hearing. If not, then power of attorney, notarized and in recordable form, authorizing the person who will testify on behalf of the applicant, and to bind the applicant in any proceedings of the Board must be presented at or before commencement of the hearing. Attorneys, agents, or other representatives of the applicant may not appear and testify on behalf of the applicant without power of attorney. Forms of power of attorney are available in the Community Development Department. (*note: failure to provide power of attorney will result either in the appeal being discontinued, or being dismissed, at the discretion of the Board*)



SIGNATURE OF APPLICANT

AN ADDITIONAL FEE F \$150 SHALL BE CHARGED FOR ANY CONTINUANCE REQUESTED BY THE APPLICANT. THIS FEE SHALL BE PAID PRIOR TO THE RESCHEDULING OF THE HEARING.