

**Willamette Vistas Subdivision**

Property Address: 1555 6<sup>th</sup> Street  
West Linn, Oregon 97068

Legal Description: Tax lot 1100, 21E 35 DD.

Applicant: Ralph Tahrán, Architect  
Tahrán Architecture & Planning LLC  
13741 Knaus Road  
Lake Oswego, Oregon 97034

Owners: Steven Wong/Ralph Tahrán/Bev Willis/Philip Barbar  
4260 Galewood St. Suite B  
Lake Oswego, Oregon 97035

**TAHRAN ARCHITECTURE & PLANNING LLC**  
13741 KNAUS ROAD LAKE OSWEGO, OREGON 97034  
Phone: 503-539-8802 Fax: 503-697-1958 [ralphtahrán@comcast.net](mailto:ralphtahrán@comcast.net)

## Introduction

The proposed Willamette Vistas subdivision is a proposal for 8 lots specifically designed for the unique physical conditions of the 1.47 Acre site and the existing neighborhood. The site is zoned R7 to allow one single family home for each 7000 square feet. In addition, the West Linn code allows for duplexes in an R7 zone to be built on an 11,000 square foot minimum lot size. Willamette Vistas proposes seven single family homes on lots meeting all the requirements of the R7 zone and one duplex lot on the corner of 5<sup>th</sup> Avenue and 5<sup>th</sup> Street directly across the street from an existing duplex to offer a couple of housing choices in the neighborhood. The subject site is a unique infill site in the neighborhood that is fully serviced by roads and utilities for a very efficient extension of the Willamette Neighborhood. The lot pattern layout reflects the patterns of the Willamette Neighborhood and offers excellent solar orientation for each of the lots. Access to the lots is from a variety of directions to respond to the site conditions. We are able to take access to a maximum of two of the lots via an existing access easement off Sixth Street. The two other lots at the high side of the site will access off 5<sup>th</sup> street. Fifth Street is currently a substandard narrow, mostly gravel street, except for an existing portion of half street improvement serving only one existing single family residence. Fifth Street is a street that will most likely never extend past the existing single family home because it ends at a major Metro drainage corridor that will not accept further development. In discussions with the City Engineering staff we will develop a half street improvement along our 5<sup>th</sup> Street frontage to provide a finished, safe access road to the new lots. Originally we had anticipated accessing the four lots that front on 5<sup>th</sup> Avenue directly off 5<sup>th</sup> Avenue, as it is a local street and it is perfectly acceptable. As we studied the grading options for those lots accessed off 5<sup>th</sup> Avenue, it called for substantial grading to provide acceptable driveways to what we consider marketable homes. Fifth Avenue functions as an important pedestrian corridor, so it occurred to us to study an option of accessing the garages for these four lots via a rear joint driveway that removes the safety consideration of vehicles backing into 5<sup>th</sup> Avenue, minimizes grading, fits the topography better maintains a continuous pedestrian sidewalk along the frontage and presents a more pleasant streetscape. Although the lots have the required public frontage on 5<sup>th</sup> Avenue, we propose vehicular access from a joint driveway off 5<sup>th</sup> Street, a much lower use street. Visually, the resulting streetscape will be more in character with the existing neighborhood patterns. The site naturally terraces to provide two tiers of housing to maintain privacy for all lots. All the lots have very desirable building pads, some building envelopes have been restricted to work around significant trees. We feel the proposed design offers a very desirable living environment that has been designed to fit the physical characteristics of the site and to fit into the existing neighborhood fabric. Over the past year we have met twice with the Willamette Neighborhood to give updates on the progress of the evolving design. The following narrative addresses the submittal requirements and approval criteria of Community Development Code Chapter 85.

Response to: Community Development West Linn Code Chapter 85

85.140 Pre-application conference required.

A pre-application conference was held with Planner Peter Spir and Dennis Wright, Engineer on January 18, 2007. A follow up engineering pre-design meeting was held with City Engineering staff on January 29, 2008 to review the proposed subdivision design.

85.150 The Application – The Tentative Plan

A. This application submittal includes a completed application form, copies of the tentative plan and supplemental drawings (3 copies at the original scale plus 3 copies reduced to not greater than 11x17 inches) and a narrative describing all aspects of the land division per Section 85.200. The applicant has held two neighborhood meetings in accordance with CDC Section 99.038, with the Willamette Neighborhood Association, one on February 14, 2007 and one on November 14, 2007.

B. The applicant is paying the requisite fee for an 8 lot subdivision with this submittal, a fee of \$4,200 + \$200/lot deposit.

85.160 Submittal Requirements for the Tentative Plan

A. A vicinity map covering  $\frac{1}{4}$  mile radius from the development is included in the submittal.

B. The tentative subdivision plan has been prepared by a registered civil engineer, Don Cushing, PE., of Don Cushing Associates, who has stamped the plans. In addition the plans and grading have been reviewed for design and buildability by a registered architect, Ralph Tahrán.

C. The tentative plans are drawn at a scale of one-inch equals 20 feet.

D. The following information is shown on the tentative plan of subdivision.

1.) The proposed name of the subdivision is ‘Willamette Vistas.’ No new streets are being created so no new street names are necessary.

2.) The date, north arrow, scale of drawing and graphic bar scale is on the drawings.

3.) The tentative plan is labeled as a tentative plan.

4.) The location of the proposed land division is tied to City datum and identified by a legal description.

5.) The names and addresses of the owner, developer, engineer and surveyor are provided.

E. The following existing conditions are shown on the tentative plan of the subdivision:

1.) The location, widths, and names of all existing or platted streets and rights-of-ways within 50 feet with easements have been shown.

2.) Two-foot contour intervals are shown for the entire site, elevations are on NGVD 1929 Datum.

3.) Benchmarks are shown on the mapping.

4.) No watercourses or drainageways exist on site. The site is not in any flood hazard area.

5.) All natural features have been surveyed and are shown on the mapping. All trees 6-inch diameter and greater are shown on the mapping, with significant trees as noted by the City Arborist, Mike Perkins on March 6, 2007.

6.) Existing uses including location of all existing structures are shown on the plan. All existing structures will be removed.

7.) All existing sizes and locations of existing utilities have been shown on subject site and adjoining streets.

8.) Zoning for the subject site and adjacent to the property has been noted.

9.) Existing uses that will remain on adjoining property are shown.

10.) No bicycle paths exist, the adjoining or adjacent pedestrian ways are shown.

11.) There are no adjacent transit stops.

F. The following proposed improvements are shown on the tentative plan or supplemental drawings:

1.) No new streets are being created.

- 2.) A complete Erosion Control plan has been prepared and submitted for review.
- 3.) The street improvements shown in the submittal are the result of working closely with the City of West Linn Engineering staff to arrive at the optimum design.
- 4.) The proposed sidewalk improvements are as required by the West Linn Engineering staff. No transit stop is proposed as we are not on a transit line or a bus line.
- 5.) Easements have been shown on the drawings.
- 6.) The lot configuration with dimensions and lot areas are shown on the tentative plan.
- 7.) We anticipate street trees will be planted at approximately 30-feet on center along 5<sup>th</sup> Avenue. Chapter 54.020 F. "Landscaping (trees) in New Subdivision" mandates that street trees shall be planted by the City of any new subdivision in conformity with the Street Tree Plan for the area and that the street trees shall be paid by the developer of the subdivision. We assume the City will plant the street trees according to their designed plan and that we (the developer) will pay for the trees and placement.
- 8.) No land is anticipated to be dedicated to the City except for street improvements.
- 9.) The project is not anticipated to be phased.

85.170

#### Supplemental Submittal Requirements for a Tentative Subdivision.

##### A. General

- 1.) This narrative states how the plan meets each of the applicable approval criteria.
- 2.) The applicants, Steven Wong and Ralph Tahrán, are the owners of the property, Tax lot 1100, 21E 3500 and are shown as such on the plan.
- 3.) The legal description of the parcel is: Lot 'D' and a portion of Lot 'C,' Block 10, "Willamette and Tualatin Tracts" and the vacated portion of 5<sup>th</sup> Avenue, in the SE ¼ Section 35, T.2S., R.1E., W.M., City of West Linn, Clackamas County, Oregon., as shown on the plans.

- 4.) The project is not intended to be phased.
- 5.) The surrounding parcels are developed; this submittal completes the orderly, efficient development of the block.
- 6.) The site does not include hillsides where erosion hazard potential exists as defined in the West Linn Comprehensive Inventory Plan Report.
- 7.) A table and calculations showing the allowable number of lots under the zone and the number of proposed lots is included on the tentative plan.
- 8.) A slope analysis map with a table of the square footage of slopes has been provided in this submittal.

#### B. Transportation

- 1.) No street extensions will be provided with this project. City defined street improvements are shown in this submittal as discussed with the West Linn engineering department.
- 2.) A traffic study has not been required by the City Engineer.

#### C. Grading

- 1.) A grading plan has been provided in the submittal for the development of the lots.
- 2.) Several grading and access studies to create appropriate building sites were done to arrive at the proposed plan that minimizes grading and provides access to the lots in a safe manner that does not require cars to back out of the driveway into 5<sup>th</sup> Avenue. This design will allow for a more continuous pedestrian path along 5<sup>th</sup> Avenue and a more pleasant streetscape.

#### D. Water

- 1.) A domestic potable water plan has been prepared by a licensed engineer that complies with the adopted Comprehensive Water System Plan.
- 2.) The location and sizing of on-site and off-site water lines has been shown on the preliminary engineering plans.

3.) The proposed infill subdivision does not require looping the water system.

4.) The subdivision is all single-family homes, so fire flow calculations are not required.

#### E. Sewer

1.) A sanitary sewer plan has been prepared by a licensed civil engineer in accordance with the City's Sanitary Sewer Master Plan and has been discussed with the City's engineering staff.

2.) The Sanitary Sewer Plan shows plan view, manholes, locations and depths, for each lot with accompanying sections.

3.) Sanitary Sewer lines have been placed in public right-of-ways or in proposed utility easements, as required by the city engineering staff.

4.) The sanitary sewer lines have been designed at the optimum depths to fit in the city's overall system.

5.) The sewer lines have been designed to provide the minimum lineal feet that adequately serves the development.

6.) The sanitary sewer lines do not pass through any natural areas and has been designed to avoid tree disturbance.

7.) Surrounding properties are developed, so no sewer extensions or stubs are required of this development.

8.) The project engineers have designed the sewer system to be built to DEQ, City and Tri-City Service District sewer standards. The plans and standards will be reviewed during final design and at the pre-construction phase for compliance.

#### F. Storm

1.) A storm drainage plan and report has been prepared for this submittal by a licensed engineer that is in accordance with the adopted Storm Drainage Master Plan.

2.) The storm drainage plan includes designs for storm treatment and detention facilities sized for a 25-year storm incident. The storm drainage plan was done with consultation with city

engineering staff and includes ecological “green street” ideas as “infiltration planter boxes” and “vegetated street swales.”

3.) The plans show storm drainage from all impervious surfaces being directed to infiltration planters and vegetated street swales, and have been sized for a 10 year storm incident. The plan has been discussed during design with the city engineering staff.

4.) The detention facilities have been designed by a licensed engineer, Don Cushing, P.E. to meet City Standards.

85.180 Redivision Plan Requirement

A redivision plan is not being requested, the proposed subdivision is designed to meet all the requirements of the R7 Zone for the entire property with this submittal.

85.190 Additional Information Required and Waiver of Requirements

The applicant does not request a waiver of any requirements.

85.200 Approval Criteria

A. Streets

1.) No new streets are proposed to serve the subdivision as it is an infill site with significant street frontages. We will be improving 5<sup>th</sup> Avenue and 5<sup>th</sup> Street to city standards as discussed and required by city engineering staff. In addition, to minimize grading and to provide a continuous pedestrian pathway along 5<sup>th</sup> Avenue, we are proposing a common driveway to serve the four lots fronting 5<sup>th</sup> Avenue along the rear of these lots. The lot pattern and street improvements fit with the existing connected continuous pattern of streets in the neighborhood. The lot pattern provides for all lots to be oriented within 30 degrees of an east-west axis for excellent solar orientation for all lots. The street and driveway improvements avoid significant trees.

2.) The right-of-ways for the street improvements have been established by adjoining existing streets that we will match or provide as determined by the City Engineer. The submittal reflects our discussions with city engineering staff.

3.) Street widths for these local streets have been designed to match existing recent improvements and to best fit existing conditions as discussed with city engineering staff. Half street

improvements will be provided on 5<sup>th</sup> Avenue and 5<sup>th</sup> Street as shown on the submitted street plans and as discussed with city engineering staff.

4.) Street geometry, pavement width and design have been established by the adjoining existing recently developed street to the east. We are matching the established design as required by the city engineering staff.

5.) The street width on 5<sup>th</sup> Avenue has been determined by the existing recently developed street to the east. The 5<sup>th</sup> Street improvement has been determined based on function, existing conditions, future development potential of other properties and consultation with city engineering staff.

6.) No "Reserve Strips" are proposed.

7.) The proposed street improvements are in alignment with existing streets.

8.) The proposed street improvements extend to the boundaries of the subdivision to allow for the future extension of streets as required.

9.) The street intersection of 5<sup>th</sup> Avenue and 5<sup>th</sup> Street is at a right angle as required.

10.) No additional right of way is required for the street improvements.

11.) No cul-de-sacs are proposed for this subdivision as an established grid street system already exists.

12.) No new street names are required for this subdivision as it is an infill parcel with an established street system.

13.) The street improvements are on straight runs with no curves. Street grades do not exceed 15 percent.

14.) Although four of our lots have access and frontage on 5<sup>th</sup> Avenue, we are proposing a rear common driveway for access to garages to minimize grading along 5<sup>th</sup> Avenue and to minimize driveway cuts and interruption of the continuous sidewalk we will be providing along 5<sup>th</sup> Avenue. We feel this design will be a safer alternative to cars backing out across the sidewalk and into 5<sup>th</sup> Avenue.

15.) Our proposed common driveway is not considered an alley, but is being designed to an alley improvement standard. The common driveway is a private driveway.

16.) In discussions with City engineering staff we are providing a “curb tight” six foot sidewalk to better accommodate the existing grade and to allow for a vegetated street swale for storm drainage.

17.) The planter strip will be provided behind the sidewalk and will accommodate a vegetated street swale and street tree planting as discussed with city engineering staff and as shown on our submitted street plans.

18.) The streets are on dedicated rights of way without any reservations or restrictions.

19.) All lots have frontage on a public street. Two of the lots have frontage via a dedicated access easement that is part of the established pattern of the neighborhood.

20.) No gated streets are proposed.

21.) No entryway treatments or Street Isle designs are proposed.

22.) A traffic analysis was not deemed necessary for this small subdivision so no off-site improvements are anticipated for traffic mitigation other than required Systems Development Charges.

## B. Blocks and Lots

1.) The lots have been laid out to reflect the existing grid pattern of the neighborhood. We are proposing a controlled common driveway to provide for safer pedestrian movement, and to minimize grading. The orientation of the lots provides all lots with excellent solar orientation.

2.) The existing block that this infill site is a part of is approximately 400 feet long. The maximum length of the subject property is 313 feet long.

3.) The lot sizes, widths, shapes and orientation are consistent with the patterns of the adjoining properties and the larger extended neighborhood. The orientation offers each lot excellent solar orientation. To further extend the existing character of the larger neighborhood we have proposed a common rear driveway to serve the four lots fronting on 5<sup>th</sup> Avenue to minimize grading, and

provide for a continuous sidewalk along the frontage for a more pleasant traditional streetscape. No lots exceed two and one-half times the average width. Building envelopes have been adjusted to accommodate significant trees.

4.) All lots have at least one means of access. The lots fronting on 5<sup>th</sup> Avenue actually have two accepted means of access, although we are proposing a joint access driveway to provide garages at the rear of the lot. This design minimizes grading along 5<sup>th</sup> Avenue, allows for an uninterrupted sidewalk along the frontage, eliminates vehicles backing into 5<sup>th</sup> Avenue and provides a more pleasant streetscape. It appears that Chapter 48 encourages consolidation of driveways as proposed.

5.) No through lots are being proposed. Although we are proposing a joint drive for the lots along 5<sup>th</sup> Avenue, it is not a street and therefore, the lots are not through lots.

6.) The lines of the proposed lots run at right angles to the streets.

7.) One flag lot is proposed to access to 5<sup>th</sup> Street, and is 15 feet wide as required. The flag lot allows the lots to continue the lot pattern of the neighborhood, respond appropriately to the existing topography, and have excellent solar orientation. The setbacks will be based on the same lot line orientation as the rest of the lots.

8.) All the lots are designed to be the optimum size for the zone and no further lot divisions will be possible in this zone.

#### C. Pedestrian and Bicycle Trails

1.) A sidewalk built to ADA standards will be provided along the 5<sup>th</sup> Avenue frontage to continue the sidewalk that exists to the east. No trail through the site is designated by the Parks Master Plan.

2.) The sidewalk will be a six-foot-wide concrete walkway.

3.) The pedestrian way is not next to a corridor and does not require a chain link fence for separation.

4.) The site is not a multi-family or commercial site.

5.) The sidewalk is not within 10 feet of a wetland or natural drainageway.

6.) The sidewalk will accommodate pedestrians that are destination or non-destination oriented.

7.) The sidewalk will not exceed 12% grade and in fact will not exceed 5% grade to provide an ADA compliant walkway without railings or steps.

#### D. Transit Facilities

1.) No transit facilities are planned in the near vicinity of this site.

2.) No transit related improvements are required for this development.

3.) No transit stops are provided at this development.

4.) A transit stop is not required at this location.

#### E. Lot Grading

1.) All cuts and fills have been designed to comply with the excavation and grading provisions of the International Building Code (replaced the Uniform Building Code in 2004). No cut and fill slopes will exceed two feet horizontally to one foot vertically without being designed by a geotechnical engineer, as the code allows.

2.) The soil used for cuts and fills will be as specified by our geotechnical engineers, GeoDesign, Inc. for the purpose intended.

3.) Our soils engineers will review and advise on any cuts or fills of over four feet.

4.) The lots, accesses, and roadways have been designed to minimize grading to the greatest extent possible while meeting allowed driveway grades and creating efficient, appropriate building sites.

5.) No landslides have ever been recorded for this site and it is not listed as a hazard site. Our soils study has indicated various basalt rock occurrences and we have designed our utilities, building elevations and driveways to avoid rock excavation.

6.) All our cuts and fills will conform to the International Building Code (Replaced the Uniform Building Code in 2004).

7.)a.) The subdivision has portions of the site that have slopes in excess of 12 percent, and cuts and fills have been set back appropriately from adjoining sites as shown on our grading plan. No slope easements are required.

b.) No severe landslide or erosion hazard exists on this site.

c.) All structural fill will be designed by a registered engineer consistent with the Code in authority and standard engineering practices. The fills will be certified by the engineer when placed.

d.) Retaining walls will be constructed according to Section 2308(b) of the Oregon State Structural Specialty Code.

e.) The roads and driveways have been designed to be the minimum width necessary for the appropriate functions to minimize cut and fill and provide positive drainage control.

8.) The site has no land over 50 percent slope to be concerned with.

#### F. Water

1.) A plan for water supply and service that is consistent with the most recent Comprehensive Water System Plan has been prepared by a licensed engineer and submitted for review with this application.

2.) The plan has been designed to provide for and shows adequate location and sizing of the water lines.

3.) A looped water system is not required for this infill development site.

4.) This is a single-family development with no multifamily or commercial structures, so fire flow calculations are not required.

5.) Based on Pre-Application Conference notes, water service can be made available with some upgrades to the water line in 5<sup>th</sup> Avenue.

#### G. Sewer

1.) A sanitary sewer plan consistent with the latest Sanitary Sewer Master Plan has been prepared by a licensed engineer, Don Cushing, P.E. All sewer is gravity flow.

- 2.) The submittal plans include plan view and profiles of the sewer lines, including manholes and depth or invert elevations.
- 3.) Sanitary sewer line placements have been discussed at a pre-design engineering meeting with the city on January 29, 2008. The drawings reflect those design discussions for the most efficient layout.
- 4.) The sanitary sewer lines are at a depth that adequately serves the building lots and fits with the city's overall sewer plan in an efficient manner.
- 5.) The sanitary sewer lines have been designed to be as efficient as possible to minimize cost and disruption to the site.
- 6.) There are no wetlands or drainageways on this site.
- 7.) This is an infill site with all adjoining properties developed and on public sewer so no extensions or stubs are necessary.
- 8.) The sanitary system will be built to DEQ, City and Tri. City Service District sewer standards. The system has been designed by a licensed engineer who will supervise and inspect the construction in accordance with city standards and policies.
- 9.) The Engineering Comments from the Pre-Application Conference state that the sewer system capacity is sufficient to serve this development.

#### H. Storm

- 1.) A storm water quality and detention plan has been prepared by a licensed engineer that complies with criteria and approval standards in CDC Chapter 33 and is being submitted for review with this application.
- 2.) The storm treatment and detention facilities have been discussed at the engineering pre-design meeting with city engineers and have been designed in accordance with those discussions to accommodate a 25-year storm incident. A registered civil engineer, Don Cushing, P.E., has prepared the plans and report and is submitted with this application for City review.
- 3.) The submitted plans show storm drainage collected from all impervious surfaces directed to storm infiltration planters and a

streetside vegetated drainage swale designed to accommodate a 25-year storm incident.

4.) The treatment of storm runoff will meet the specified Municipal Code Standards.

#### I. Utility Easements

All lots will have minimum five-foot utility easements on front and rear lot lines. Side yard easements are provided as necessary to accommodate utilities as well.

#### J. Supplemental Provisions.

1.) There are no wetlands and/or natural drainageways to protect on this site.

2.) This site is not near the Willamette and Tualatin Greenways, so this standard does not apply.

3.) Chapter 54.020 F. requires street trees to be planted by the City in conformity with the Street Tree Plan for the area in accordance with the planting specifications of the Parks and Recreation Department, the trees are to be chosen by the City Arborist and that the trees and installation by the city shall be paid by the developer of the subdivision. We will comply with this requirement.

4.) We will install high or low pressure sodium light bulbs in all street lights as required. The lights will be shielded and directed downward.

5.) We will dedicate necessary land to construct a needed public improvement that is proportional to this application.

6.) Except for above ground utilities exempted by the City Engineer, all new utilities will be buried underground.

7.) The density proposed is greater than the 70-percent minimum density required.

8.) The "mix requirement" does not apply, this is an R7 zoned property.

9.) All trees six-inches in diameter and greater have been located by survey and are shown on the survey. No heritage trees exist on

**Ralph Tahrán**

**From:** Spir, Peter [PSpir@ci.west-linn.or.us]  
**Sent:** Friday, January 19, 2007 11:36 AM  
**To:** willisbv1@msn.com; realtorswong@hotmail.com; ralptahrán@comcast.net  
**Subject:** preapsumry-SUB-Tahrán-1-18-07.doc

**City of West Linn**  
**PRE-APPLICATION CONFERENCE MEETING**  
**SUMMARY NOTES**  
**January 18, 2007**

**SUBJECT:** 9-lot subdivision of single-family homes at 1555 6<sup>th</sup> Ave.

**ATTENDEES:** Applicant: Ralph Tahrán, Steve Wong, Bev Willis,  
Staff: Peter Spir (Planning Division); Dennis Wright (Engineering Division)

*The following is a summary of the meeting discussion provided to you from staff meeting notes. Additional information may be provided to address any "follow-up" items identified during the meeting. These comments are PRELIMINARY in nature. Please contact the Planning Department with any questions regarding approval criteria, submittal requirements, or any other planning-related items. Please note disclaimer statement below.*

**Project Details**

Applicant applied for the vacation of a portion of 6<sup>th</sup> Avenue ROW to add to his property. That ROW vacation was approved by City Council. With the added land, and, given the fact that the property is zoned R-7, the applicant was able to propose nine lots: all just over 7,000 square feet in size. The shape of the lots conforms to the standards of the R-7 zone.

Access to the lots on 6<sup>th</sup> Avenue will come directly off that street. The only issue for those lots is that the maximum driveway grade is 15% and the last 18 feet before the garage can't exceed 12%. Also, there is a 35-foot setback for the edge of driveways from the ROW intersection at 6<sup>th</sup> and 5<sup>th</sup>. Access to lots 3 and 4 is proposed via an access easement from 5<sup>th</sup>. Staff reminded the applicant that the square footage of the easement must be deducted from the lots across which it traverses. Access to lots 1 and 2 is via an existing easement across the property to the north. All access driveways must be at least 14 feet wide per City Standards and must satisfy the TVFR standards. The TVFR may modify their access needs by requiring that all homes be sprinklered.

The CDC requires that all significant trees, comprising up to 20% of the square footage of the Non-Type I and II lands must be protected. The applicant will need to provide a mapped tree inventory (by location, type and size (DBH)) to the City Arborist. *(Please note: No trees at this site may be removed without permit or land use application approval.)* Once the inventory is complete and trees mapped, contact the City Arborist, Mike Perkins, at (503) 557-4700, to conduct a site visit and identify significant trees for likely protection. No site clearing, grubbing, or grading is permitted without approval. Staff noted that the GIS mapping shows that less than 25% of the site comprises slopes over 25% so a PUD is probably not required. However, the applicant's submittal shall include a slope breakdown to demonstrate the exact amount of sloped areas. If it turns out that a PUD is required and/or

the protected tree area eliminates a lot, it may be possible to apply for a PUD and develop some attached/clustered town homes to achieve the desired density.

## ENGINEERING COMMENTS

### Streets:

- Frontage improvements: 14-foot half-street frontage improvements to bring road to current City standards (including street structural section (if needed), curb, gutter, sidewalk, planter strip, and stormdrainage). 28-foot buildout pavement width allows for parking on one side of the street.
- Right-of-way (ROW), width: 52-foot buildout ROW section required along property frontage (centered on street centerline). Additional ROW dedication required from property frontage on 5<sup>th</sup> Ave.
- Buildout ROW width for 5<sup>th</sup> St is 48-feet. Additional dedication required. Pavement width required on 5<sup>th</sup> St is 20-foot. Structural section must be to City standards.
- Fire hydrant and storm inlet will require replacement.
- Street lighting plan required along property frontages to ensure development's improvements provide street lighting to City standards.
- Street SDC based upon Trip Generation Manual

### Storm:

- Treatment and detention will be required. Impervious area from frontage improvements must be included in calculations. Alternative designs from City of Portland Stormwater Manual (as allowed by City codes) to mitigate storm drainage impact must be approved by City Engineer prior to construction.
- Public stormwater facility shall be constructed by developer to treat and detain stormwater to City standards (available on line).
- Stormwater discharge location to open drainageway in a location and method as approved by the City Engineer.
- Stormwater SDC

### Water:

- Water pressure zones: Willamette zone.
- Water service available in 5<sup>th</sup> Ave via 6-inch cast iron water pipe and in 6<sup>th</sup> St via 6-inch ductile iron pipe. Water service line up 5<sup>th</sup> St will need to be upgraded to a 4-inch ductile iron pipe.
- While water transmission is satisfactory, water storage not available for build-out. Water meters available on a first come-first serve basis.
- Water SDC \$\$

### Sanitary Sewer:

- System capacity sufficient to serve development.
- Service potentially available in both 5<sup>th</sup> Street and 5<sup>th</sup> Avenue frontages.
- SS SDC \$\$

### Other Utilities:

- Underground overhead utilities along property frontage unless (high voltage). All new utilities

shall be undergrounded.

All public improvements must be constructed in accordance with City of West Linn Public Works Design and Construction Standards.

### **Process**

A neighborhood meeting with the Willamette Neighborhood Association is required per CDC Section 99.038. Contact Ruth Offer at 657-1350 or by e-mail at offer.family@comcast.net. Follow the instructions of that Code section explicitly. The submittal requirements and approval criteria of Community Development Code Chapter 85 must be addressed on a point-by-point basis for a subdivision.

Prepare the application and submit to the Planning Division with deposit fees. Deposit fees are 4,200 dollars plus 200 dollars a lot for a subdivision. The City has 30 days to determine if the application is complete or not (most applications are incomplete but this is a fairly straight forward subdivision). The applicant has 180 days to make it complete, although usually it is complete within three months of the original submittal. Once complete, the City has 120 days to exhaust all local review and appeals.

Staff prepares public notice and schedules the hearing. The first hearing is usually four weeks from the date the application is deemed complete. The Planning Commission holds a hearing and renders a final decision. The decision may be appealed to the City Council. If appealed, the City Council hearing is 6-8 weeks from the Planning Commission hearing date. Subsequent appeals go to LUBA.

Once approved, the applicant has three years to record a final plat and satisfy conditions of approval before approval lapses and it is void.

***Typical land use applications can take 6-10 months from beginning to end. Street and utility improvements typically increase the amount of time required.***

**DISCLAIMER:** This summary discussion covers issues identified to date. It does not imply that these are the only issues. The burden of proof is on the applicant to demonstrate that all approval criteria have been met. These notes do not constitute an endorsement of the proposed application. Staff responses are based on limited material presented at this pre-application meeting. New issues, requirements, etc. could emerge as the application is developed. Please also note that these notes have a limited shelf life and as new codes are introduced the ability to develop per these provisions may no longer be possible.

:/devrvw/preapps/pre app sumry-SUB-Tahran-1-18-07

Name of applicant RALPH TAHRAN

Pre-App. No. 1-13-07

Subject of Property: Tax Lot(s) 1100, 2 1E 35DD

Tax Map(s) 2 1E 35 DD

Address or General Location: 1555 6th ST. WEST LINN, OR. 97068

**AFFIDAVIT OF POSTING NOTICE**

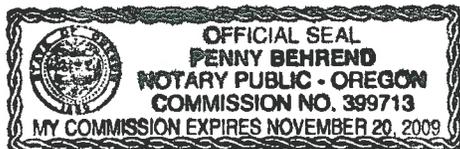
I, RALPH G. TAHRAN, do swear or affirm that I am (represent) the party initiating interest in a proposed SUBDIVISION affecting the land located at 1555 6th ST., WEST LINN, OR., and that pursuant to LOC 50.77.025, did on the 24th day of OCTOBER, 2007 personally post the notice indicating that the site may be proposed for a SUBDIVISION application.

The sign was posted at NORTH SIDE OF 5th AVE, BETWEEN 5th ST. AND 6th ST.  
(state location on property)

This 25th day of OCTOBER, 2007

[Signature]  
Signature

Subscribed and sworn to, or affirmed, before me this 2nd day of September, 2008.



[Signature]  
Notary Public for the State of Oregon  
My Commission Expires Nov. 20, 2009

**AFFIDAVIT OF MAILING**

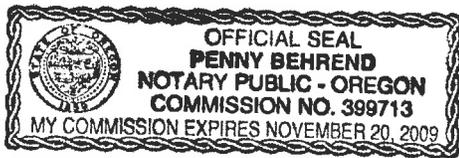
STATE OF OREGON )  
 ) SS  
County of Clackamas)

I, RALPH G. TAHRAN, being duly sworn, depose and say that on  
OCTOBER 23, 2007, I caused to have mailed to each of the  
persons on the attached list a notice of a meeting to discuss a proposed development at  
1555 6th ST., WEST LINN, a copy of which notice so mailed is  
attached hereto and made a part of hereof.

I further state that said notices were enclosed in envelopes plainly addressed to said  
persons and were deposited on the date indicated above in the United States Post Office  
with postage prepaid thereon.

[Handwritten Signature]  
Signature

Subscribed and sworn to, or affirmed, before me this 2<sup>nd</sup> day of September  
2008.



[Handwritten Signature]  
Notary Public for the State of Oregon  
My Commission Expires Nov. 20, 2009

Pre-App. No.: 1-18-07

7005 1160 0000 0747 3113

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)

**OFFICIAL USE**

Postage	\$	<i>JH PA</i> Postmark Here  <i>10/23/07</i>
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		
Total Postage & Fees	\$ 11.10	

Sent To *Reena Heideman*  
 Street, Apt. No., or PO Box No. *1935 Hillhouse Dr.*  
 City, State, ZIP+4 *West Linn, OR 97068*

7005 1160 0000 0747 3090

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)

**OFFICIAL USE**

Postage	\$	<i>JH PA</i> Postmark Here  <i>10/23/07</i>
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		
Total Postage & Fees	\$ 11.10	

Sent To *Ruth offer*  
 Street, Apt. No., or PO Box No. *1831 Fifth Avenue*  
 City, State, ZIP+4 *West Linn, OR 97068*

7005 1160 0000 0747 3106

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)

**OFFICIAL USE**

Postage	\$	<i>JH PA</i> Postmark Here  <i>10/23/07</i>
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		
Total Postage & Fees	\$ 11.10	

Sent To *Mark Jorgenson*  
 Street, Apt. No., or PO Box No. *1980 Willamette Falls Dr. # 230*  
 City, State, ZIP+4 *West Linn, OR 97068*

7005 1160 0000 0747 3120

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)

**OFFICIAL USE**

Postage	\$	<i>JH PA</i> Postmark Here  <i>10/23/07</i>
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		
Total Postage & Fees	\$ 11.10	

Sent To *Elizabeth Rocchia*  
 Street, Apt. No., or PO Box No. *957 Willamette Falls Dr.*  
 City, State, ZIP+4 *West Linn, OR 97068*

COPY 4 = certified  
3 = regular mail

October 22, 2007

Resident/Property Owner  
2401 5<sup>th</sup> Avenue  
West Linn, OR 97068

Dear Resident/Property Owner,

I am representing the owner of the property located at 1555 6<sup>th</sup> Street, West Linn, Oregon. I am considering proposing a subdivision in accordance with R7 zone requirements at this location. You are invited to attend a meeting with surrounding residents and interested parties, to discuss the proposal in more detail, per the requirements of CDC Section 99.038.

**Date: Wednesday, November 14, 2007**  
**Location: Willamette Primary School**  
**1403 12<sup>th</sup> Street, West Linn, OR 97068**  
**Time: 7:00 P.M.**

If you have any questions, please contact me at 503-539-8802, or e-mail me at [ralphtahran@comcast.net](mailto:ralphtahran@comcast.net).

Sincerely,

Ralph G Tahran, Architect

21E35DD03700  
STATE OF OREGON  
417 TRANSPORTATION BLDG  
SALEM OR, 97310

21E35DD00100  
HANSCHAR HARRY A & MARY M  
2681 WILLAMETTE FALLS DR  
WEST LINN OR, 97068

21E35DD03600  
RALPH D MCDOWELL LLC  
3200 SABO LN  
WEST LINN OR, 97068

21E35DD03500  
PATEL KATEN  
12700 SE MCLOUGHLIN BLVD  
MILWAUKIE OR, 97222

21E35DD00900  
CLARK JEFFREY A & JENNIFER  
1551 5TH AVE  
WEST LINN OR, 97068

~~21E35DD01000  
CONTRERAS MANUEL JR  
1557 6TH ST  
WEST LINN OR, 97068~~

21E35DD01800  
CONTRERAS MANUEL JR  
1557 6TH ST  
WEST LINN OR, 97068

~~21E35DD03400  
PATEL KATEN  
12700 SE MCLOUGHLIN BLVD  
MILWAUKIE OR, 97222~~

21E35DD00800  
THE PUBLIC  
22500 SALAMO RD  
WEST LINN OR, 97068

21E35DD01700  
WAGNER MICHAEL WILLIAM  
1575 6TH ST  
WEST LINN OR, 97068

21E35DD00400  
HARRIS TRAVIS E & HEATHER R  
2652 5TH AVE  
WEST LINN OR, 97068

21E35DD00500  
ZIMMERMAN JAY D & BRITA M  
2638 5TH AVE  
WEST LINN OR, 97068

21E35DD00300  
JOHNSON CHRISTIAN N & CONNIE K  
2678 5TH AVE  
WEST LINN OR, 97068

21E35DD00200  
WISHER TIMOTHY & ANGELA  
2692 5TH AVE  
WEST LINN OR, 97068

21E35DD00600  
WILLIAMS CHRISTOPHER  
2622 5TH AVE  
WEST LINN OR, 97068

21E35DD01900  
MAYFIELD ROBERT R II  
23510 SW STAFFORD RD  
TUALATIN OR, 97062

21E35DD03300  
BOYD MICHAEL A  
2475 WILLAMETTE FALLS DR  
WEST LINN OR, 97068

21E35DD01600  
KELLEY BRYAN C & KATE L  
1561 6TH ST  
WEST LINN OR, 97068

21E35DD01100  
WONG STEVEN  
4260 GALEWOOD ST STE B  
LAKE OSWEGO OR, 97035

21E35DD03200  
GIDDINGS WAYNE COLIN & MELINDA M  
1290 SW SCHAEFFER RD  
WEST LINN OR, 97068

21E35DD01500  
GODFREY MATTHEW E  
1567 6TH ST  
WEST LINN OR, 97068

21E35DD00700  
HESLER STEVE  
15846 HIGHPOINT DR  
SHERWOOD OR, 97140

21E35DD03100  
OAKES JANIS  
2482 FAIRVIEW WAY  
COSTA MESA CA, 92626

21E35DD03000  
SCHULTZ LUKE  
2435 WILLAMETTE FALLS DR  
WEST LINN OR, 97068

21E35DD02000  
HOGG GLENN R  
1572 6TH ST  
WEST LINN OR, 97068

21E35DD02900  
MORRIS MICHAEL L & MARIA D  
1595 7TH ST  
WEST LINN OR, 97068

21E35DD01400  
ELLIS RICHARD L  
282 NE 10TH AVE  
CANBY OR, 97013

21E35DD02100  
LEWIS ROBERT N & VIRGINIA L  
1566 6TH ST  
WEST LINN OR, 97068

21E35DD02800  
FLYNN BARBARA JEANE  
1555 7TH ST  
WEST LINN OR, 97068

21E35DD01200  
UNION PACIFIC RAILROAD CO  
1400 DOUGLAS STOP 1640  
OMAHA NE, 68179

15  
21E35DD02200  
STUART KEITH P & KAREN K  
1542 6TH ST  
WEST LINN OR, 97068

21E35DD01300  
MCMAHON ROBERT  
1515 6TH ST  
WEST LINN OR, 97068

21E35DD02700  
BUNCAK LAUREL A  
1549 7TH ST  
WEST LINN OR, 97068

21E35DD02300  
ROBINSON MYRON & JESSICA  
1510 6TH ST  
WEST LINN OR, 97068

21E35DD02400  
HAMPTON MICHAEL D & SARAH P  
2470 5TH AVE  
WEST LINN OR, 97068

21E35DD02600  
SATTER NATHAN P & ELISSA D  
1545 7TH ST  
WEST LINN OR, 97068

21E35DD02500  
MARTUS MICHAEL A & JOAN A  
2410 5TH AVE  
WEST LINN OR, 97068

21E36CC00300  
BRENNER LESLIE D & LAURENE K  
2715 WILLAMETTE FALLS DR  
WEST LINN OR, 97068

21E36CC00401  
HOUSE STEVEN R & GAYLA  
ANNETTE  
16618 S ARROWHEAD DR  
OREGON CITY OR, 97045

21E36CC00800  
DAVIDSON GALE D & CATHERINE P  
2750 5TH AVE  
WEST LINN OR, 97068

31E02AA00200  
~~BLUE HERON PAPER CO  
419 MAIN ST  
OREGON CITY OR, 97045~~

31E02AA00100  
~~BLUE HERON PAPER CO  
419 MAIN ST  
OREGON CITY OR, 97045~~

31E02AA00800  
BLUE HERON PAPER CO  
419 MAIN ST  
OREGON CITY OR, 97045

31E02 02200  
PORTLAND GEN ELEC CO  
121 SW SALMON ST  
PORTLAND OR, 97204

31E02AA00600  
CEDERQUIST ERIC L & RITA M  
2475 5TH AVE  
WEST LINN OR, 97068

31E02 00100  
BLUE HERON PAPER CO  
419 MAIN ST  
OREGON CITY OR, 97045

31E02AA00700  
BUEHLER MARK J  
2405 5TH AVE  
WEST LINN OR, 97068

31E02AA00702  
GROENER WILLIAM A  
2401 5TH AVE  
WEST LINN OR, 97068

# NEIGHBORHOOD MEETING

On Wednesday, November 14, 2007 at 7:00 P.M.  
A meeting will be held at:

Willamette Primary School, located at :

1403 12<sup>th</sup> Street, West Linn, Oregon 97068

To discuss a proposal for a subdivision at  
1555 6<sup>th</sup> Street, West Linn, Oregon 97068

( Tax Lot 1100, 2 1E 35DD)

For more information call: Ralph Tahran, Architect  
At 503-539-8802 or email at :  
ralphtahran@comcast.net

RUTH OFFER, PRES. Willamette Neighborhood Association  
November 14, 2007  
7 PM  
Willamette Primary School  
1403 12th Street

. STEVEN WONG.  
. RALPH TAHIRAN

Agenda

RALPH TAHIRAN  
0 - 267

Introductions

October 10, 2007 Minutes

Treasurers Report

Updates: a) Tualatin Valley Fire and Rescue  
b) Community Policing / Police Advisory Committee Report

Old Business

1. 1555 6th St Development, Ralph Tahran, update plan since WNA meeting presentation February 14, 2007
2. 10th Street Task Force: Update
3. 2008 Centennial Celebration committee report *100 YRS OF WILLAMETTE*
4. Historic District Task Force: Update of National Historic Register application
5. Pre-application meetings:
  - a. Thursday November 15<sup>th</sup>: Athletic Center at Northeast corner of Tannler Dr and Blankenship Rd
6. Planning Commission meeting night change to Mondays, WNA agenda items:
  - a. Variance request for sign at Willamette Marketplace heard on October 11, 2007
  - b. 2150 13<sup>th</sup> St, Zone change and Comp Plan change tonight
  - c. 2008 & 2011 13<sup>th</sup> St, 10 Lot Subdivision, Trend homes, continuance until December 5th
  - d. 945 Dollar St, 84 lot Subdivision, Renaissance Development, continuance until December 19, 2007
7. Willamette Parking concerns update
8. Willamette Falls Drive planters - Lat work day for the year!!!!  
Saturday November 17th from 9 - 11 am
8. Announcements:

Next Meeting: December 12, 2007 at Willamette Primary School, 7pm

Willamette Neighborhood Association  
November 14, 2007

Chairperson Ruth Offer opened the meeting at 7:05 pm. Introductions followed.

Treasurer Elizabeth Rocchia reported that there was \$3,585.06 in the account. After writing checks (\$242.16 - Yoga room, \$400 - Yoga teacher, \$500 - ECP Printing for the Centennial Calendar), balance of account on November 14 is \$2,442.90. Since we didn't have to pay \$515 for the Lockfest bus, as anticipated, that money is still in the treasury.

1. Ralph Tahrán presented the updated plans for the project at 1555 6<sup>th</sup> Street. Access to two of the lots will be provided by an existing easement. Another access will come from 5<sup>th</sup> Street and the third from 5<sup>th</sup> Avenue. Plans are for one and two-story single family dwellings and possibly one duplex. No motion made on project.
2. 10<sup>th</sup> St. - Jody Carson reported that due to the late finding that ODOT actually owns part of the land at 8<sup>th</sup> Ct. and 10<sup>th</sup> St and that they have taken a firm approach that if 8<sup>th</sup> Court ever becomes a through street, ODOT can request removal of the light there. Opening up 8<sup>th</sup> to Dollar is a recommendation. Issue is not on the City Council agenda as yet.
3. Susan Hartford reported on progress of the Centennial Committee. The city of West Linn is looking at our master plan for centennial projects and will be able to complete some. This would be long range and involve several local projects that will take a few years to complete. The committee will also include local businesses and neighborhood residents.
4. Historic District Task Force - Committee was appointed in January with a budget of \$24,800 from a grant. Committee will begin having meetings and including residents in the process to plan how to protect and improve the properties we have. The grant can be applied for annually. Previous surveys have been completed over the years. Every year, the committee will be protecting different areas, starting with the neighborhoods or other places or items in greatest danger. Elizabeth Rocchia motioned that we nominate the Butternut tree on PGE property and the Oak Savannah as heritage trees. Motion, seconded by Rae Henry. After discussion, motion was passed. The committee is geared to be sensitive caretakers.

5. Pre-application meetings:
  - a. November 15 at 1:30 pm - Athletic Center planned for Blankenship and Tannler.
6. Planning Commission meetings are now on Wednesdays, so they are in conflict with our regularly scheduled meetings
  - a. Variance request for sign at Willamette Marketplace was denied. Company has resubmitted a new design that meets criteria.
  - b. Zone change for 2150 13<sup>th</sup> Street is being decided tonight.
  - c. 10 Lot Subdivision by Trend Homes is continued until December 5th.
  - d. 945 Dollar subdivision by Renaissance Development is continued until December 19th.
7. Willamette parking concerns update: New restaurant opening at site of former L&B Restaurant. Traffic problems will continue. Two options are possible, one is urban renewal, the other taxes. A parking structure with exterior landscaping might be a positive solution. We need to look into how much system development money from local construction exists as a potential funding source for a garage. Maybe we could tap into that for construction. The last vacant lot is just across from Li'l Cooperstown.
8. Willamette Planters: The Neighborhood Association doesn't have enough active volunteer gardeners to support maintenance of the planters, perhaps part of the city business license fee could be dedicated to maintaining the planters that help to beautify our part of the city. The Rotary Club is new here and may be interested in a beautification project.
9. Announcements: Elizabeth reported that the Arbor built house in the old Cove property is open now and looks very nice. The burm is being relandscaped too.

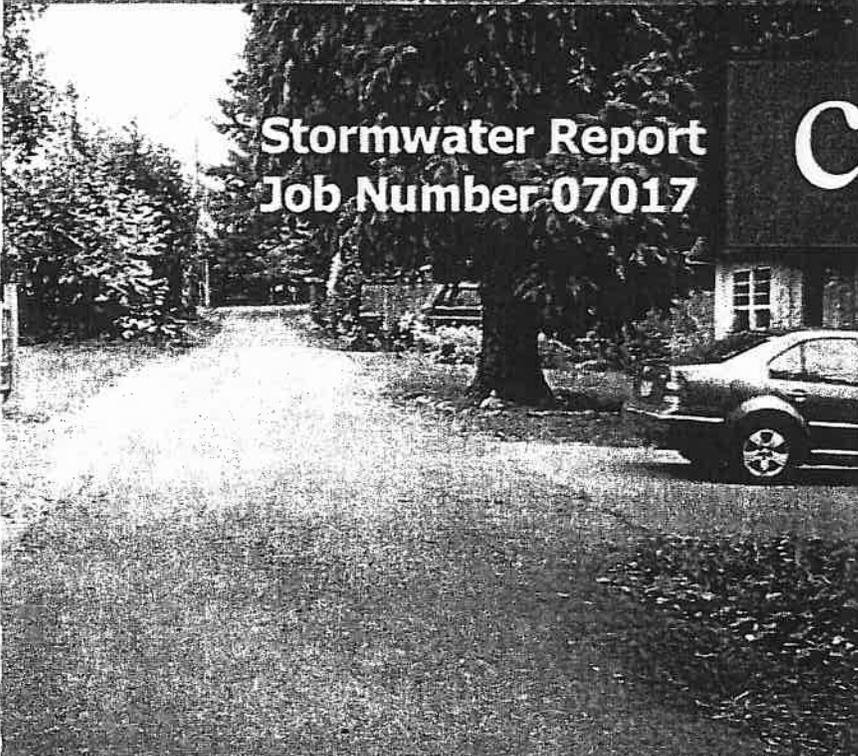
Ruth adjourned the meeting at 8:55 pm.

Next meeting is December 19, 2007 at Willamette Primary School at 7:00 pm.



# 5th & 5th 8 Lot Subdivision

1555 6th Street West Linn, OR 97608  
Preliminary Stormwater Report  
March 2008



**Stormwater Report  
Job Number 07017**

**Don Cushing Associates**

**cushing**  
Civil Engineers



3/7/08



EXP. DATE 12/31/09

**Owner:**

Ralph Tahrn  
13741 Knaus Road  
Lake Oswego, OR 97034

**Engineer:**

Don Cushing Associates  
6650 SW Redwood Lane, Suite 235  
Portland, OR 97224  
Ph. 503-620-7884  
F: 503-620-7884

Prepared by Gregg Saunders  
Reviewed by Don Cushing, PE

## Contents

This stormwater report contains:

<b>Section</b>	<b>Pg. #</b>
Purpose statement	1
Existing Conditions	1
Proposed Conditions	2
Data and Assumptions	2
Detention	3
Water Quality	3
Conveyance	3
Conclusion	4
Site Plan	5
Infiltration Planter Detail	6
Soil Information	7
Conveyance Calculations	8
Hydrographs	9-35

### Purpose

The purpose of this stormwater report is to provide the jurisdiction with the appropriate information, in order to obtain a site development permit. It also assures that all jurisdictional concerns have been addressed. Included in this report are the site plan and other data used in the stormwater analysis.

### Existing Conditions

The existing residential lot is located at the corner of 5<sup>th</sup> Avenue and 5<sup>th</sup> Street in West Linn, Oregon. The existing lot is 1.47 acres and has a gradual gradient downward from the northwest to the southeast. Slopes are generally flatter on the northwest one-third of the site, becoming steeper toward the southeast portion. An existing driveway, with access from 6<sup>th</sup> Street, borders the north side of the lot, with 5<sup>th</sup> Avenue bordering the south side of the site. On the west side of the site are two residential lots. To the east of the site is 5<sup>th</sup> Street, which is a partially improved roadway. The lot currently has an existing home and garage located approximately in the center of the lot with an accessory building and carport located approximately 100 feet to the northwest of the house and garage. The grounds surrounding the house consist of lawns, gardens, and individual mature trees, with the majority of the site generally covered by grass and blackberry brambles. The total existing impervious is 25,108 square feet. Infiltration testing was performed by GeoDesign Inc. and the site was found to have an infiltration rate of 2.3 inches per hour in the

southeastern corner of the site and a rate of less than 0.1 inches per hour in the northern corner of the site. The site has very little existing storm system in place. Currently there is only one ditch inlet at the intersection of 5<sup>th</sup> Street and 5<sup>th</sup> Avenue. The storm pipe then crosses 5<sup>th</sup> Street and into the public right-of-way, then to Bernert Creek. The site area used in this report is approximately 2.60 acres. This area includes half of 6<sup>th</sup> street and the two neighboring residential lots to the west of this site. This was done to include all the possible contributing areas in the calculations.

## Proposed Conditions

The proposed project will contain 8 new lots and half street improvements on 5<sup>th</sup> Avenue and on 5<sup>th</sup> Street. This project also contains two private driveways one serving 4 lots and the other serving two lots. Each house will be about 2,000 square feet with a 500 square foot driveway. The site will generate about 25,000 square feet of additional impervious surfaces. In order to manage the additional runoff generated from this new impervious surface there will be a storm system designed to provide pollution reduction and flow-control.

## Data and Assumptions

Rainfall intensities	
2-year	2.4"
5-year	2.9"
10-year	3.4"
25-year	3.9"
100-year	4.4"

	Areas	
	Pre-development	Post-development
Pervious	2.02 ac	1.30 ac
Impervious	0.58 ac	1.30 ac

- Soil types are Woodburn 91A, B. and Willamette silt 88A. Hydrologic soil group B.
- Curve number for impervious surfaces is 98
- Curve number for existing and proposed land cover is 70
- Manning's "n" is 0.24 (tall grass)
- Time of Concentration for pre-development is 14.80 minutes
- Amount of water from the retaining wall drains is assumed to be zero.
- Runoff coefficient used in rational method is 0.70
- Intensity used for water quality calculations is 0.19 inches per hour
- Intensity used for conveyance calculations is 3.9 inches per hour

## Detention

Detention will be accomplished through the use of a modified infiltration planter box and through the use of check dams within the vegetated street swale. The infiltration planter box has been sized using the 0.06 sizing factor per the SIM method. Roof and area drains from lots 5, 6, 7 and 8 along with the driveway in the middle serving the lower lots, will flow to an infiltration planter box that is designed to infiltrate and detain the runoff. In order to create detention the standard infiltration planter has been modified to contain an inlet structure at the end of the planter box. Please see attached detail. This structure will provide room for an outflow control orifice and an overflow for large storm events. In this structure there will be a 1-inch orifice that will cause the rainwater to back up and be stored within the planter box.

Detention will also be created within the swale by the use of check dams every 12 feet. The check dams will be made of rocks that are about 6" high. This will create ponding behind the check dams allowing for particle settlement and detention. The detention within the swale is simulated by the use of a higher Manning's "n" coefficient for the swale. With the combination of the detention within the infiltration planter box and the swale it will be shown that the post-development peak flows do not exceed the pre-development peak flows.

		Peak Flow (cfs)			
Hydrograph	Design Storm	2	5	10	25
1	Total Site Pre-development	0.24	0.44	0.66	0.90
7	Total Site Post-development	0.24	0.44	0.59	0.70

## Water Quality

Water quality will be accomplished through the use of infiltration planter boxes and a vegetated street swale. Runoff from lots 5, 6, 7, 8 and driveway will be collected and conveyed to the infiltration planter box. The planter box has been sized using the 0.06 sizing factor used in the City of Portland's Stormwater Management Manual 2004. This infiltration planter box will completely pass the entire 2-year storm event through the growing medium. The planter box will be planted with shrubs and large grass like plants from the approved plant list.

Water quality for the public street improvements along 5<sup>th</sup> Avenue and the roof drains from lots 1, 2, 3, and 4 will be achieved through the use of a vegetated street swale. The vegetated street swale is based on the City of Portland's vegetated street swale. It will be a minimum of 7 feet wide with a slope of 3%.

The runoff from 5<sup>th</sup> Street will end up not being treated because of limitations on the site. In order to make up for the area that will not be treated, areas of the existing 6<sup>th</sup> street and the two adjoining lots will be conveyed in an existing roadside ditch and into the vegetated swale. This area is currently not being treated but will be treated in exchange for the areas of 5<sup>th</sup> street that will not be treated. Please see the following figure and the attached site plan for areas of treatment exchange.

	Areas
5 <sup>th</sup> Street	0.10 ac
6 <sup>th</sup> Street	0.15 ac

### Conveyance

The conveyance for this project was analyzed at three different nodes as shown on the included site plan. Node 1 is in the 12-inch pipe exiting the infiltration planter box. Node 2 is in the 12-inch storm pipe that is connecting the vegetated swale to the proposed storm manhole in 5<sup>th</sup> Avenue. Node 3 is in the 12-inch pipe leaving the proposed manhole in 5<sup>th</sup> Avenue. The rational method was used to check capacity. This site will discharge into a existing outfall and then into an existing grassy channel that runs downhill to Bernert Creek.

	C	I (25-yr)	A(acres)	Q <sub>p</sub> (cfs)	Depth of flow in 12-inch pipe (in)
Node 1	0.70	3.9	1.42	3.88	2.54
Node 2	0.70	3.9	0.96	2.62	2.10
Node 3	0.70	3.9	2.60	7.10	4.06

### Conclusion

This project site is 2.60 acres and after development will create an additional 0.72 acres of impervious area. This increase will in turn cause an increase in the stormwater runoff from the site. This increase in the stormwater runoff will be managed though the use of an infiltration planter and a vegetated street swale. The planter and swale have been sized to provide water quality and detention for the site.

### REFERENCES

CITY OF WEST LINN SURFACE WATER MANUAL  
CITY OF PORTLAND STORMWATER MANUAL  
NRCS WEB SOIL SURVEY  
HYDROFLOW HYDROGLIAPHS 2007

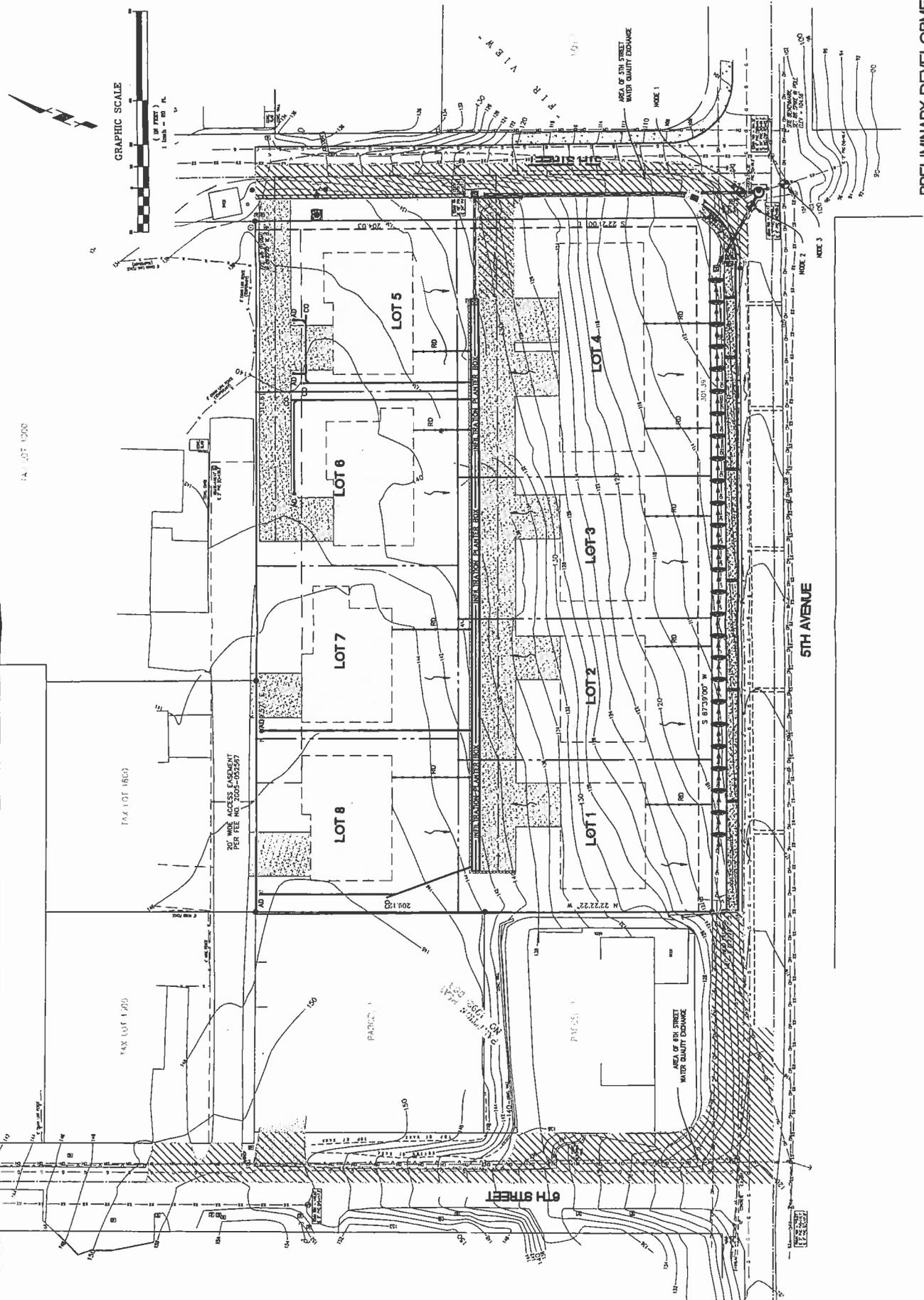
NO.	DESCRIPTION	DATE
1	PRELIMINARY PLAN	11/18/07

8TH AVENUE  
TARAN/WONG  
1555 6TH STREET  
WEST LINN, OREGON

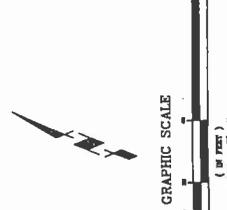
PRELIMINARY  
STORMWATER PLAN

**cushing**  
Deer Cushing Associates  
Civil Engineers  
10000 N. Renwood Lane  
Suite 235  
Portland, OR 97224  
Phone: (503) 629-7894  
Fax: (503) 629-7771

DATE: 11-18-07  
SCALE: 1" = 20'  
DRAWN: [Signature]  
CHECKED: [Signature]  
DATE: [Signature]  
SHEET: 1 OF 1



REVISIONS



1A LOT 1500

TAX LOT 1860

TAX LOT 1700

PARCEL 1

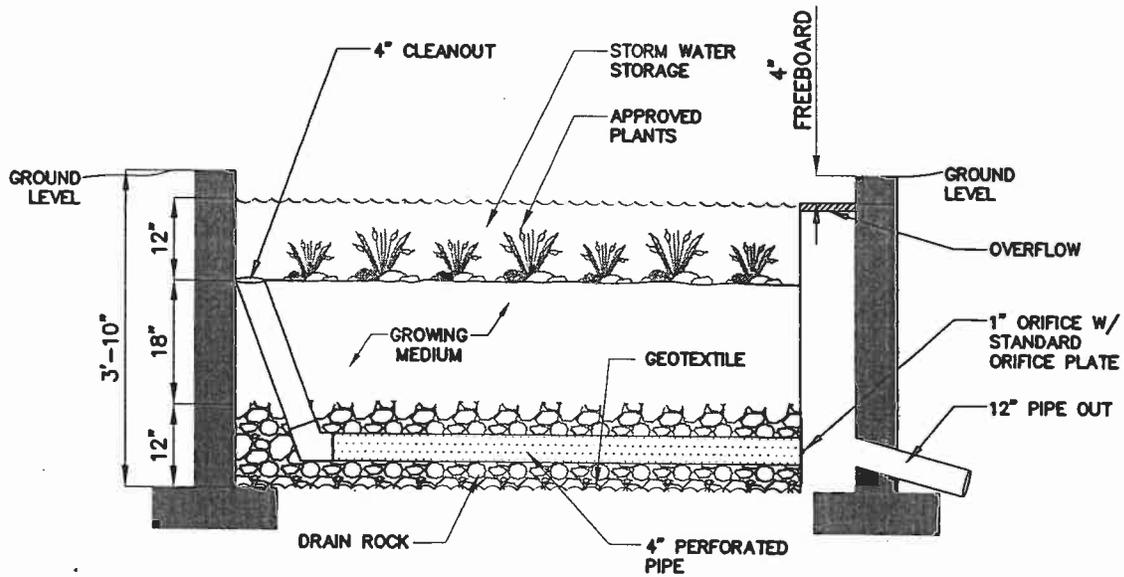
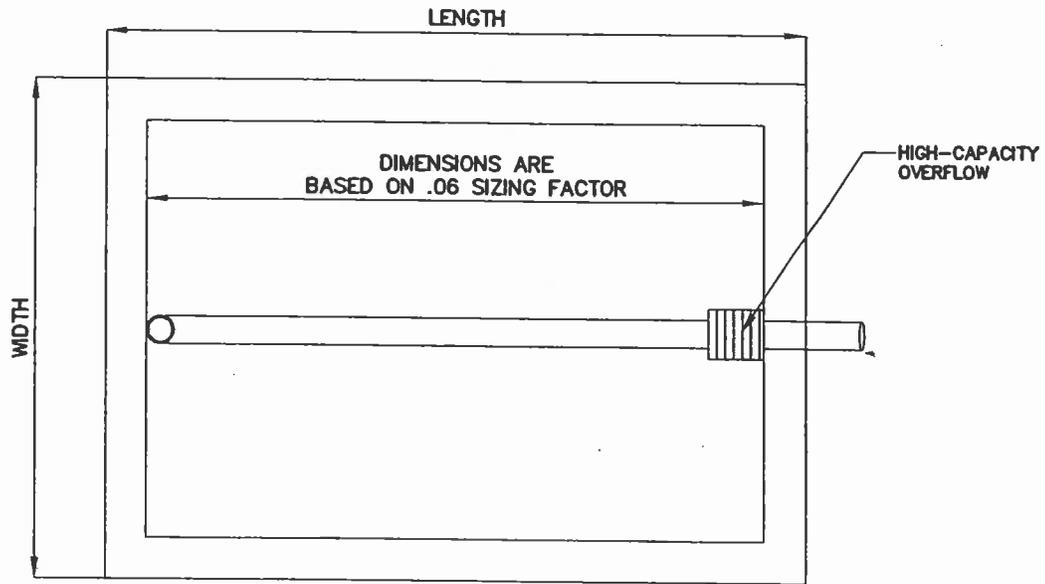
AREA OF 5TH STREET WATER QUALITY EXCHANGE

AREA OF 6TH STREET WATER QUALITY EXCHANGE

5TH AVENUE

6TH STREET

7TH STREET



# INFILTRATION PLANTER BOX

NTS

# Custom Soil Resource Report for Clackamas County Area, Oregon 5th and 5th

Custom Soil Resource Report  
Soil Map



## Map Unit Legend

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
88A	Willamette silt loam, wct. 0 to 3 percent slopes	0.1	6.2%
91B	Woodburn silt loam, 3 to 8 percent slopes	0.3	19.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	1.2	73.9%
Totals for Area of Interest (AOI)		1.6	100.0%

# Hydraflow Table of Contents

<b>Watershed Model Schematic .....</b>	<b>1</b>
<b>2 - Year</b>	
<b>Hydrograph Reports .....</b>	<b>2</b>
Hydrograph No. 1, SCS Runoff, Pre-Developed .....	2
TR-55 Tc Worksheet .....	3
Hydrograph No. 2, SCS Runoff, LOTS 5,6,7,8 .....	4
Hydrograph No. 3, Reservoir, through IPB .....	5
Pond Report - IPB .....	6
Hydrograph No. 4, SCS Runoff, lots 1,2,3,4 .....	7
Hydrograph No. 5, Reach, street swale with check dams .....	8
Hydrograph No. 6, SCS Runoff, 5th street .....	9
Hydrograph No. 7, Combine, <no description> .....	10
<b>5 - Year</b>	
<b>Hydrograph Reports .....</b>	<b>11</b>
Hydrograph No. 1, SCS Runoff, Pre-Developed .....	11
Hydrograph No. 2, SCS Runoff, LOTS 5,6,7,8 .....	12
Hydrograph No. 3, Reservoir, through IPB .....	13
Hydrograph No. 4, SCS Runoff, lots 1,2,3,4 .....	14
Hydrograph No. 5, Reach, street swale with check dams .....	15
Hydrograph No. 6, SCS Runoff, 5th street .....	16
Hydrograph No. 7, Combine, <no description> .....	17
<b>10 - Year</b>	
<b>Hydrograph Reports .....</b>	<b>18</b>
Hydrograph No. 1, SCS Runoff, Pre-Developed .....	18
Hydrograph No. 2, SCS Runoff, LOTS 5,6,7,8 .....	19
Hydrograph No. 3, Reservoir, through IPB .....	20
Hydrograph No. 4, SCS Runoff, lots 1,2,3,4 .....	21
Hydrograph No. 5, Reach, street swale with check dams .....	22
Hydrograph No. 6, SCS Runoff, 5th street .....	23
Hydrograph No. 7, Combine, <no description> .....	24
<b>25 - Year</b>	
<b>Hydrograph Reports .....</b>	<b>25</b>
Hydrograph No. 1, SCS Runoff, Pre-Developed .....	25
Hydrograph No. 2, SCS Runoff, LOTS 5,6,7,8 .....	26
Hydrograph No. 3, Reservoir, through IPB .....	27
Hydrograph No. 4, SCS Runoff, lots 1,2,3,4 .....	28
Hydrograph No. 5, Reach, street swale with check dams .....	29
Hydrograph No. 6, SCS Runoff, 5th street .....	30
Hydrograph No. 7, Combine, <no description> .....	31
<b>IDF Report .....</b>	<b>32</b>

<p><b>NODE 1</b>  <b>Given Input Data:</b>                  Shape ..... Circular                  Solving for ..... Depth of Flow                  Diameter ..... 12.0000 in                  Flowrate ..... 3.8800 cfs                  Slope ..... 0.1100 ft/ft                  Manning's n ..... 0.0110</p> <p><b>Computed Results:</b>                  Depth ..... 4.3250 in                  Area ..... 0.7854 ft2                  Wetted Area ..... 0.2549 ft2                  Wetted Perimeter ..... 15.4544 in                  Perimeter ..... 37.6991 in                  Velocity ..... 15.2187 fps                  Hydraulic Radius ..... 2.3755 in                  Percent Full ..... 36.0415 %                  Full flow Flowrate ..... 13.9649 cfs                  Full flow velocity ..... 17.7807 fps</p>	<p><b>NODE 2</b>  <b>Given Input Data:</b>                  Shape ..... Circular                  Solving for ..... Depth of Flow                  Diameter ..... 12.0000 in                  Flowrate ..... 2.6200 cfs                  Slope ..... 0.1100 ft/ft                  Manning's n ..... 0.0110</p> <p><b>Computed Results:</b>                  Depth ..... 3.5213 in                  Area ..... 0.7854 ft2                  Wetted Area ..... 0.1922 ft2                  Wetted Perimeter ..... 13.7390 in                  Perimeter ..... 37.6991 in                  Velocity ..... 13.6334 fps                  Hydraulic Radius ..... 2.0142 in                  Percent Full ..... 29.3440 %                  Full flow Flowrate ..... 13.9649 cfs                  Full flow velocity ..... 17.7807 fps</p>
<p><b>NODE 3</b>  <b>Given Input Data:</b>                  Shape ..... Circular                  Solving for ..... Depth of Flow                  Diameter ..... 12.0000 in                  Flowrate ..... 7.1000 cfs                  Slope ..... 0.0600 ft/ft                  Manning's n ..... 0.0110</p> <p><b>Computed Results:</b>                  Depth ..... 7.3162 in                  Area ..... 0.7854 ft2                  Wetted Area ..... 0.5015 ft2                  Wetted Perimeter ..... 21.5035 in                  Perimeter ..... 37.6991 in                  Velocity ..... 14.1577 fps                  Hydraulic Radius ..... 3.3583 in                  Percent Full ..... 60.9680 %                  Full flow Flowrate ..... 10.3138 cfs                  Full flow velocity ..... 13.1319 fps</p>	

# Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

1 - Pre-Developed  


2 - LOTS 5,6,7,8  


3 - through IPB  


4 - lots 1,2,3,4  


5 - street swale with check dams  
 6 - 5th street  


7 - <no description>  


**Legend**

Hyd.	Origin	Description
1	SCS Runoff	Pre-Developed
2	SCS Runoff	LOTS 5,6,7,8
3	Reservoir	through IPB
4	SCS Runoff	lots 1,2,3,4
5	Reach	street swale with check dams
6	SCS Runoff	5th street
7	Combine	<no description>

# Hydrograph Report

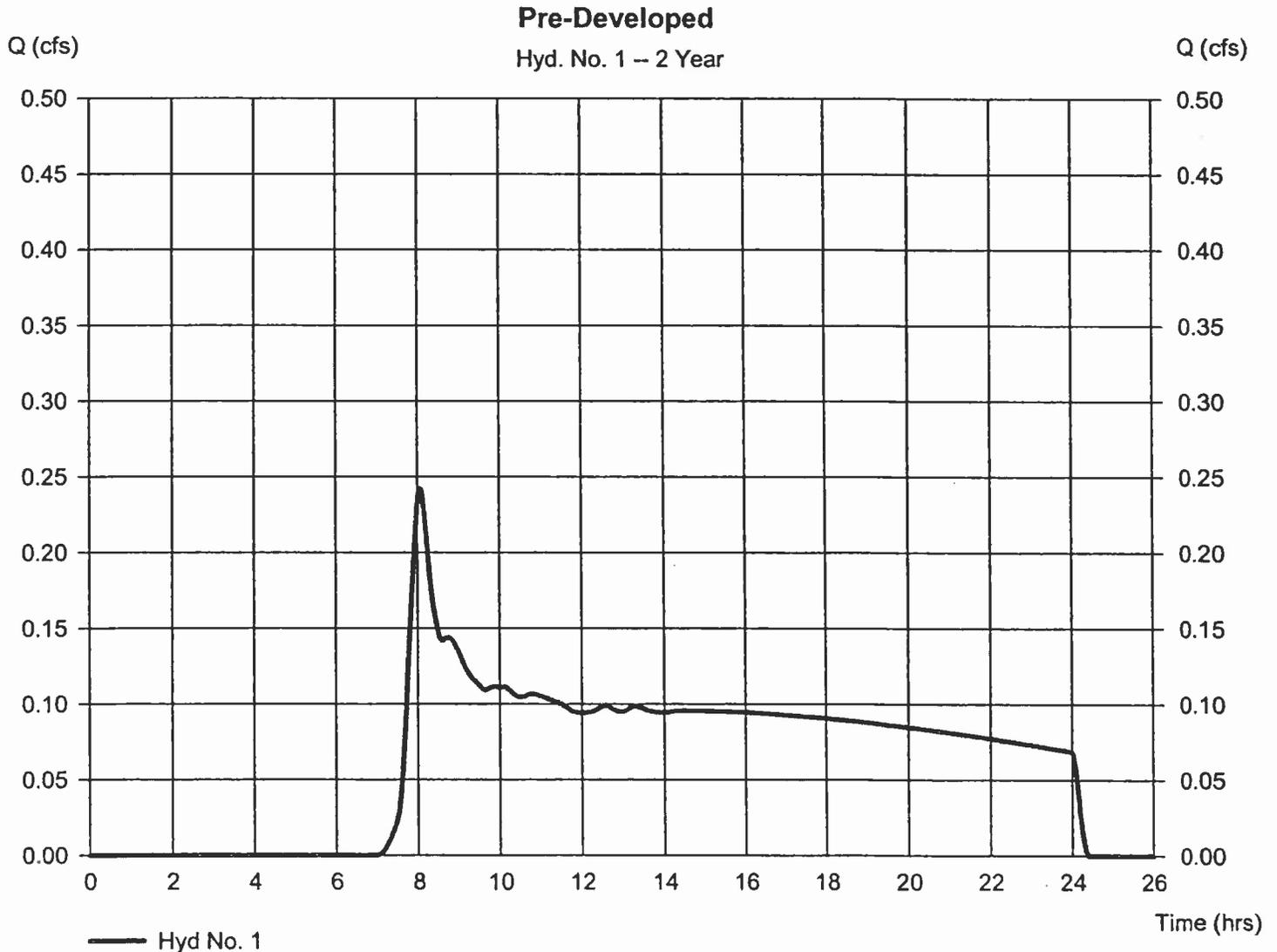
## Hyd. No. 1

### Pre-Developed

Hydrograph type = SCS Runoff  
Storm frequency = 2 yrs  
Time interval = 2 min  
Drainage area = 2.600 ac  
Basin Slope = 0.0 %  
Tc method = TR55  
Total precip. = 2.40 in  
Storm duration = 24 hrs

Peak discharge = 0.242 cfs  
Time to peak = 8.07 hrs  
Hyd. volume = 5,842 cuft  
Curve number = 76\*  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 14.80 min  
Distribution = Type IA  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.580 \times 98) + (2.020 \times 70)] / 2.600$



# TR55 Tc Worksheet

## Hyd. No. 1

Pre-Developed

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 13.84</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 13.84</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 300.00	0.00	0.00	
Watercourse slope (%)	= 10.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 6.43	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.78</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.78</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 4.00	0.00	0.00	
Wetted perimeter (ft)	= 2.50	0.00	0.00	
Channel slope (%)	= 6.00	0.00	0.00	
Manning's n-value	= 0.020	0.015	0.015	
Velocity (ft/s)	= 25.00	0.00	0.00	
Flow length (ft)	= 300.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.20</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.20</b>
<b>Total Travel Time, Tc .....</b>				<b>14.80 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

## Hyd. No. 2

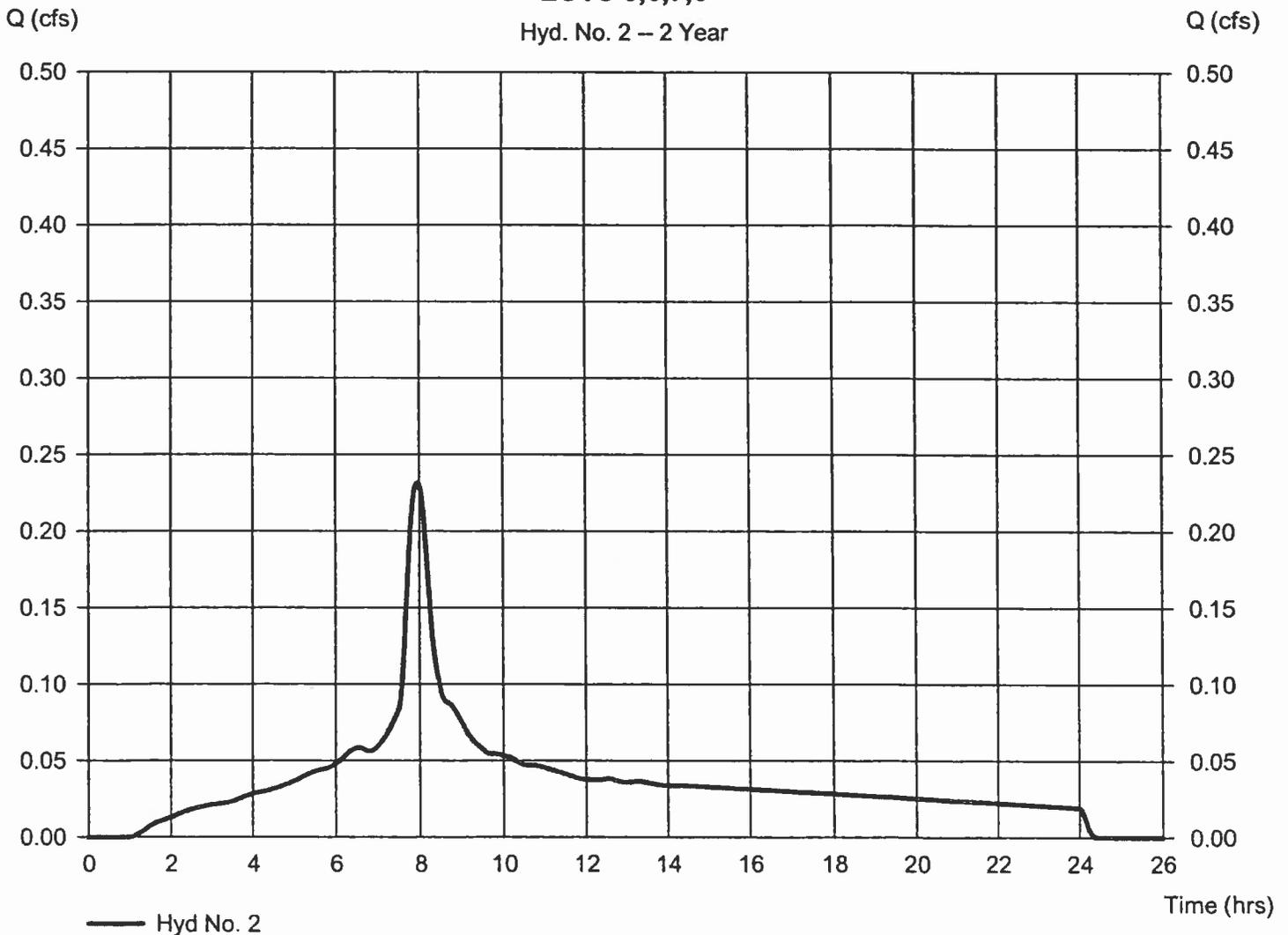
LOTS 5,6,7,8

Hydrograph type = SCS Runoff  
 Storm frequency = 2 yrs  
 Time interval = 2 min  
 Drainage area = 0.430 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 2.40 in  
 Storm duration = 24 hrs

Peak discharge = 0.232 cfs  
 Time to peak = 7.97 hrs  
 Hyd. volume = 3,305 cuft  
 Curve number = 98  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 15.00 min  
 Distribution = Type IA  
 Shape factor = 484

### LOTS 5,6,7,8

Hyd. No. 2 – 2 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

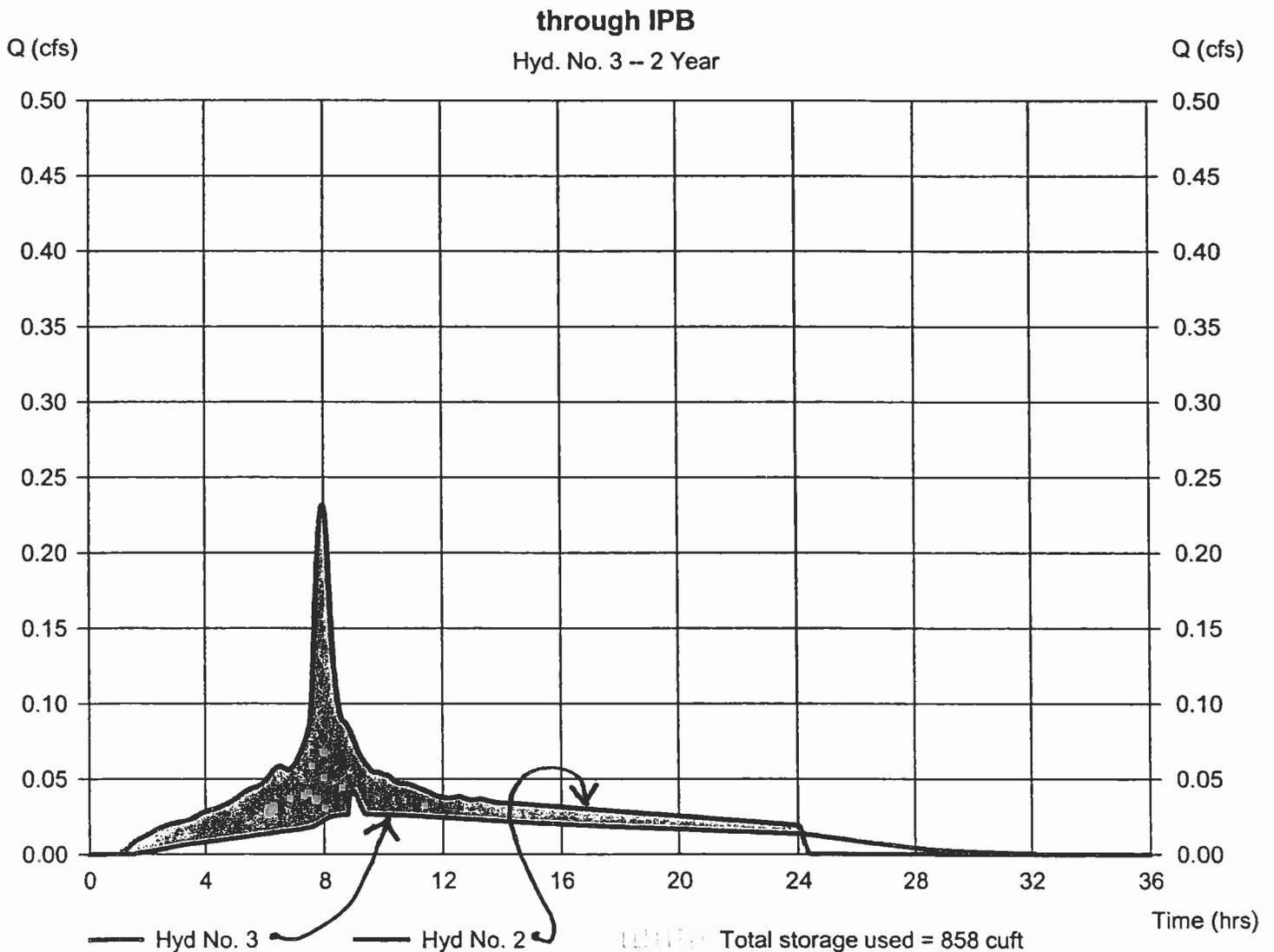
## Hyd. No. 3

through IPB

Hydrograph type = Reservoir  
 Storm frequency = 2 yrs  
 Time interval = 2 min  
 Inflow hyd. No. = 2 - LOTS 5,6,7,8  
 Reservoir name = IPB

Peak discharge = 0.043 cfs  
 Time to peak = 8.93 hrs  
 Hyd. volume = 1,578 cuft  
 Max. Elevation = 101.11 ft  
 Max. Storage = 858 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



# Pond Report

## Pond No. 1 - IPB

### Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 100.00 ft

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	776	0	0
1.00	101.00	776	776	776
2.00	102.00	776	776	1,552
3.00	103.00	776	776	2,328

### Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 8.00	1.00	0.00	0.00
Span (in)	= 8.00	1.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.00	100.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 8.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 101.10	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 2.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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

### 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	100.00	0.00	0.00	---	---	0.00	---	---	---	0.000	---	0.000
1.00	776	101.00	0.03 ic	0.03 ic	---	---	0.00	---	---	---	0.036	---	0.061
2.00	1,552	102.00	2.16 ic	0.00 ic	---	---	2.15 s	---	---	---	0.036	---	2.190
3.00	2,328	103.00	2.74 ic	0.00 ic	---	---	2.72 s	---	---	---	0.036	---	2.760

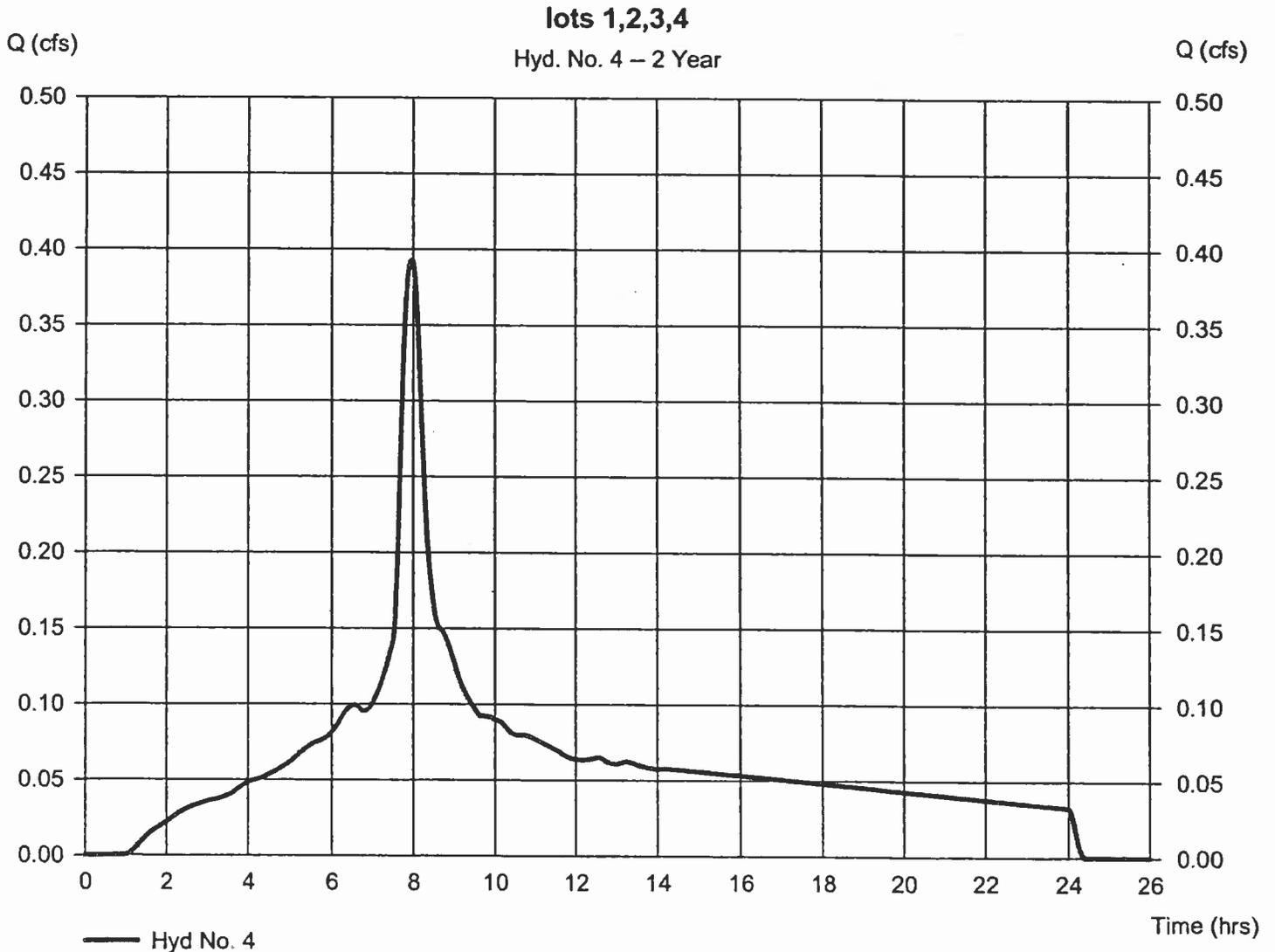
# Hydrograph Report

## Hyd. No. 4

lots 1,2,3,4

Hydrograph type = SCS Runoff  
Storm frequency = 2 yrs  
Time interval = 2 min  
Drainage area = 0.730 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 2.40 in  
Storm duration = 24 hrs

Peak discharge = 0.393 cfs  
Time to peak = 7.97 hrs  
Hyd. volume = 5,610 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type IA  
Shape factor = 484



# Hydrograph Report

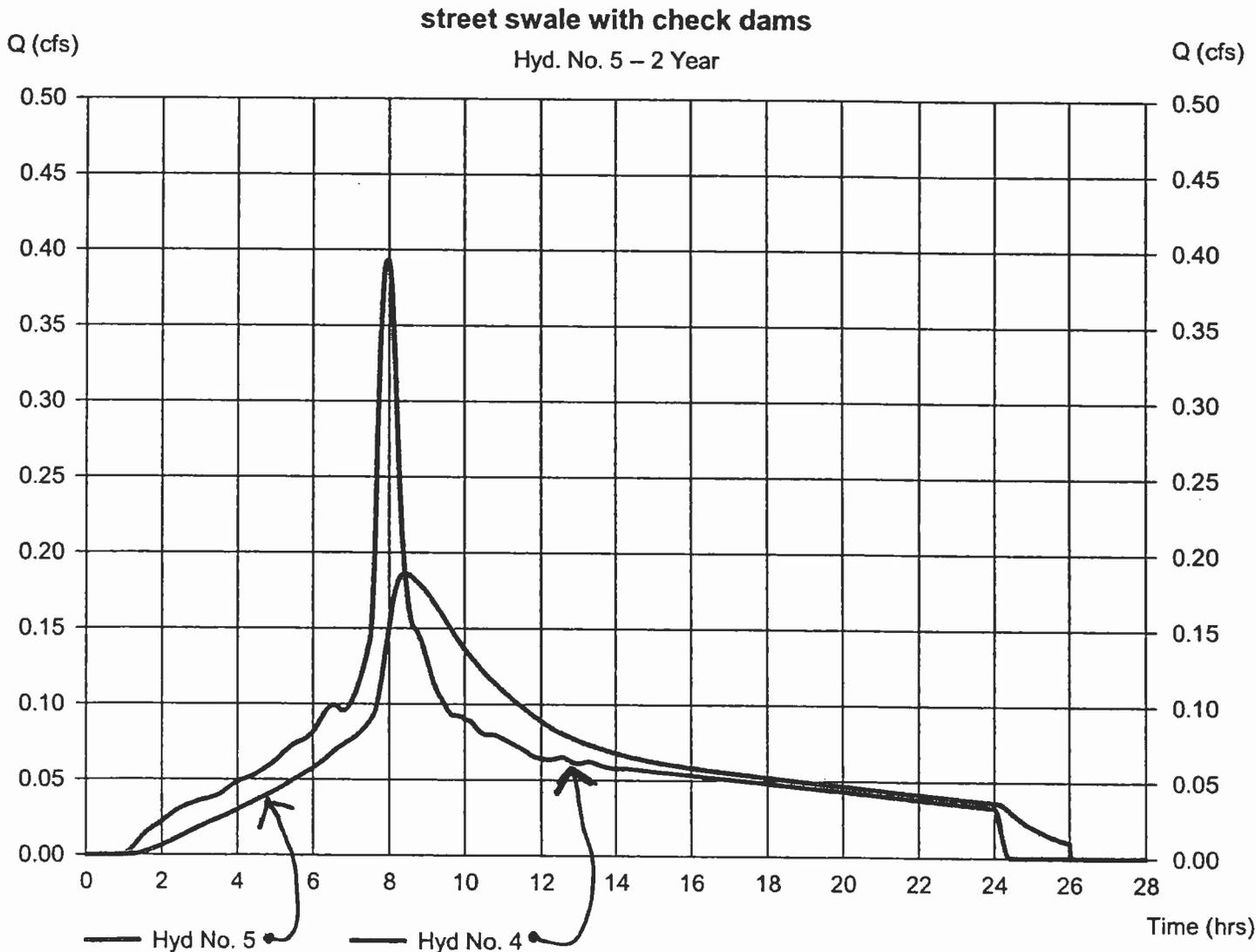
## Hyd. No. 5

street swale with check dams

Hydrograph type = Reach  
Storm frequency = 2 yrs  
Time interval = 2 min  
Inflow hyd. No. = 4 - lots 1,2,3,4  
Reach length = 500.0 ft  
Manning's n = 0.300  
Side slope = 3.0:1  
Rating curve x = 0.120  
Ave. velocity = 0.00 ft/s

Peak discharge = 0.186 cfs  
Time to peak = 8.43 hrs  
Hyd. volume = 5,559 cuft  
Section type = Trapezoidal  
Channel slope = 0.5 %  
Bottom width = 5.0 ft  
Max. depth = 0.5 ft  
Rating curve m = 0.912  
Routing coeff. = 0.0232

Modified Att-Kin routing method used.



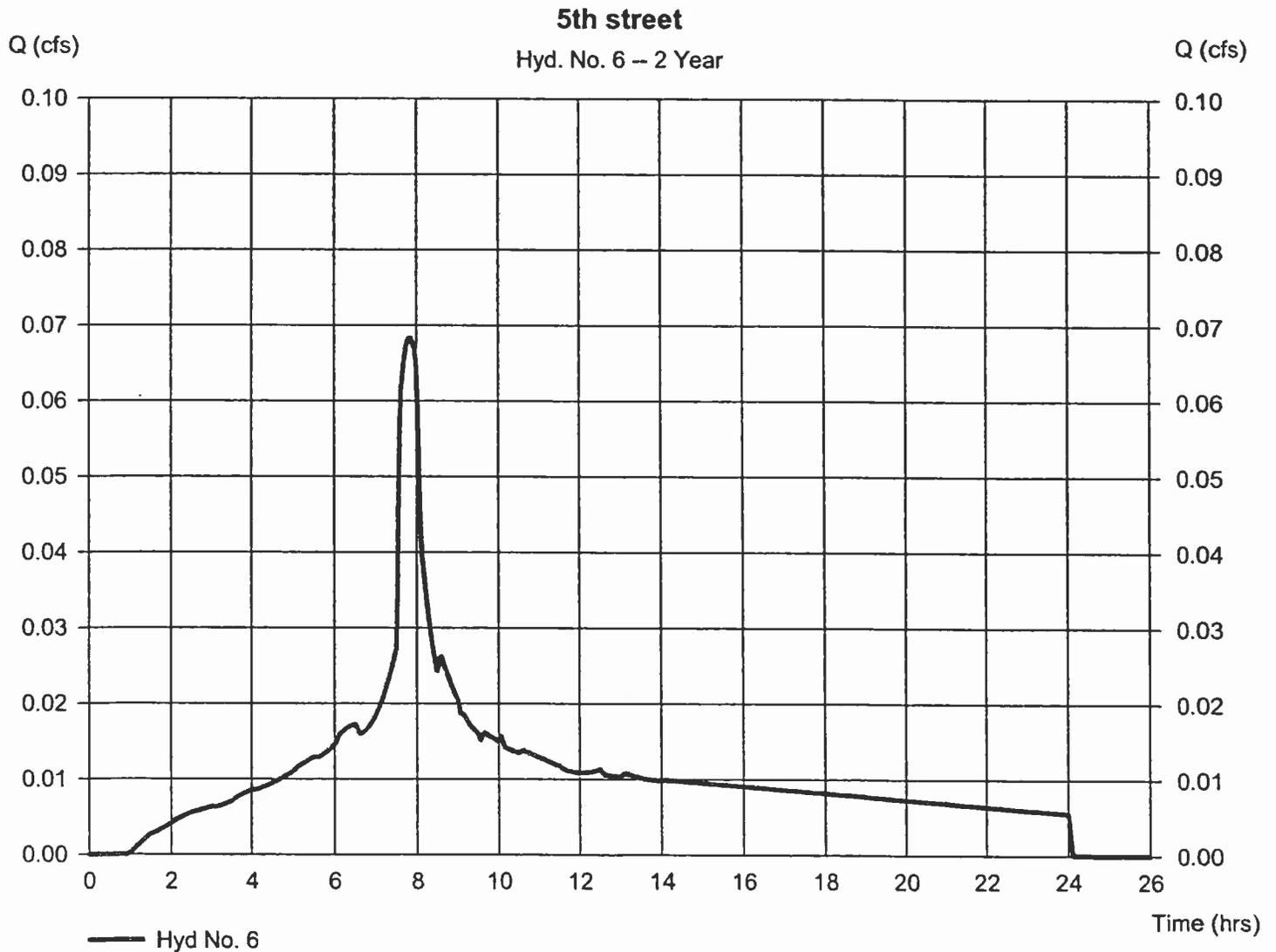
# Hydrograph Report

## Hyd. No. 6

5th street

Hydrograph type = SCS Runoff  
Storm frequency = 2 yrs  
Time interval = 2 min  
Drainage area = 0.130 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 2.40 in  
Storm duration = 24 hrs

Peak discharge = 0.068 cfs  
Time to peak = 7.83 hrs  
Hyd. volume = 961 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 5.00 min  
Distribution = Type IA  
Shape factor = 484



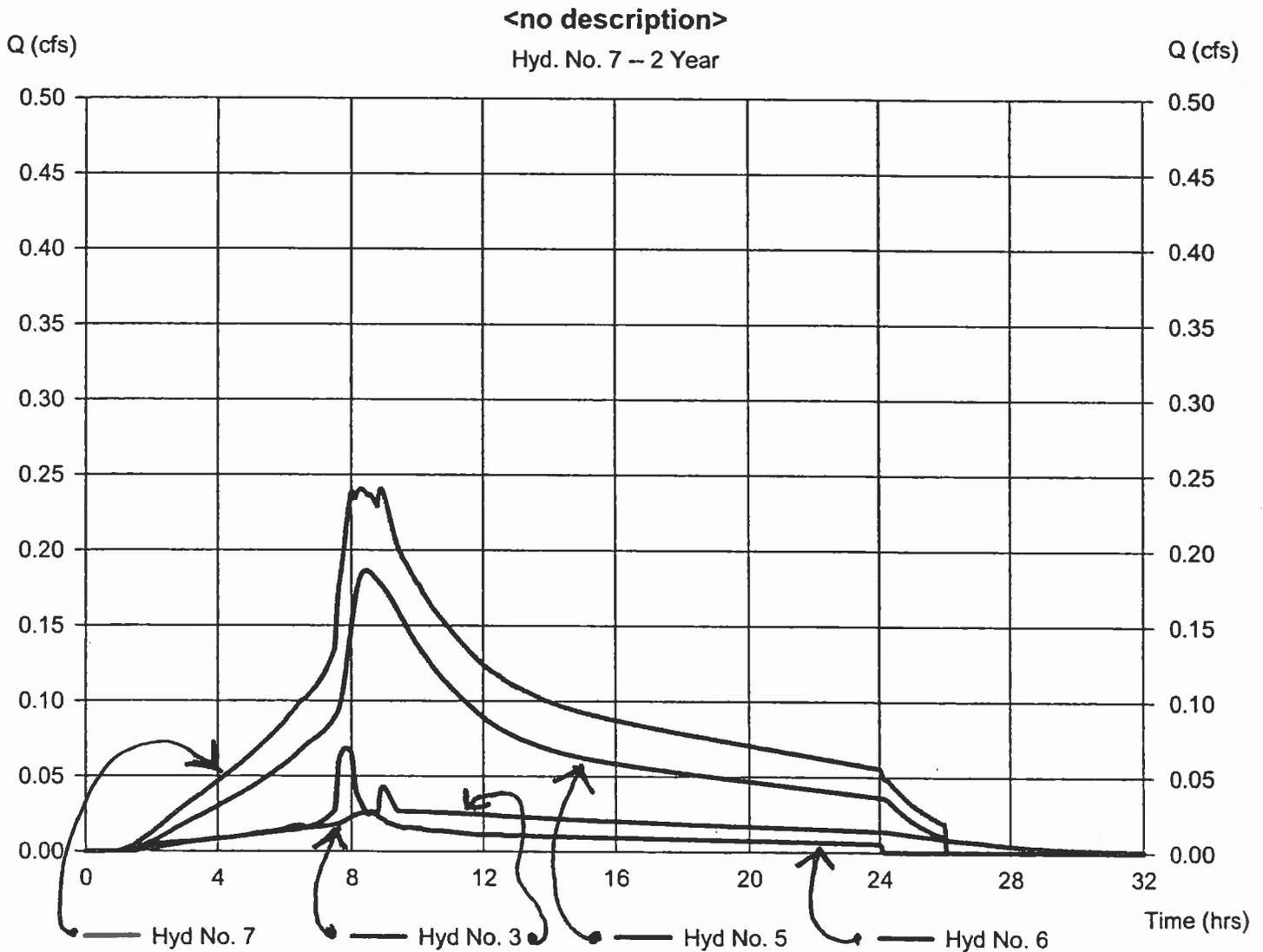
# Hydrograph Report

## Hyd. No. 7

<no description>

Hydrograph type = Combine  
Storm frequency = 2 yrs  
Time interval = 2 min  
Inflow hyds. = 3, 5, 6

Peak discharge = 0.241 cfs  
Time to peak = 8.90 hrs  
Hyd. volume = 8,097 cuft  
Contrib. drain. area = 0.130 ac



# Hydrograph Report

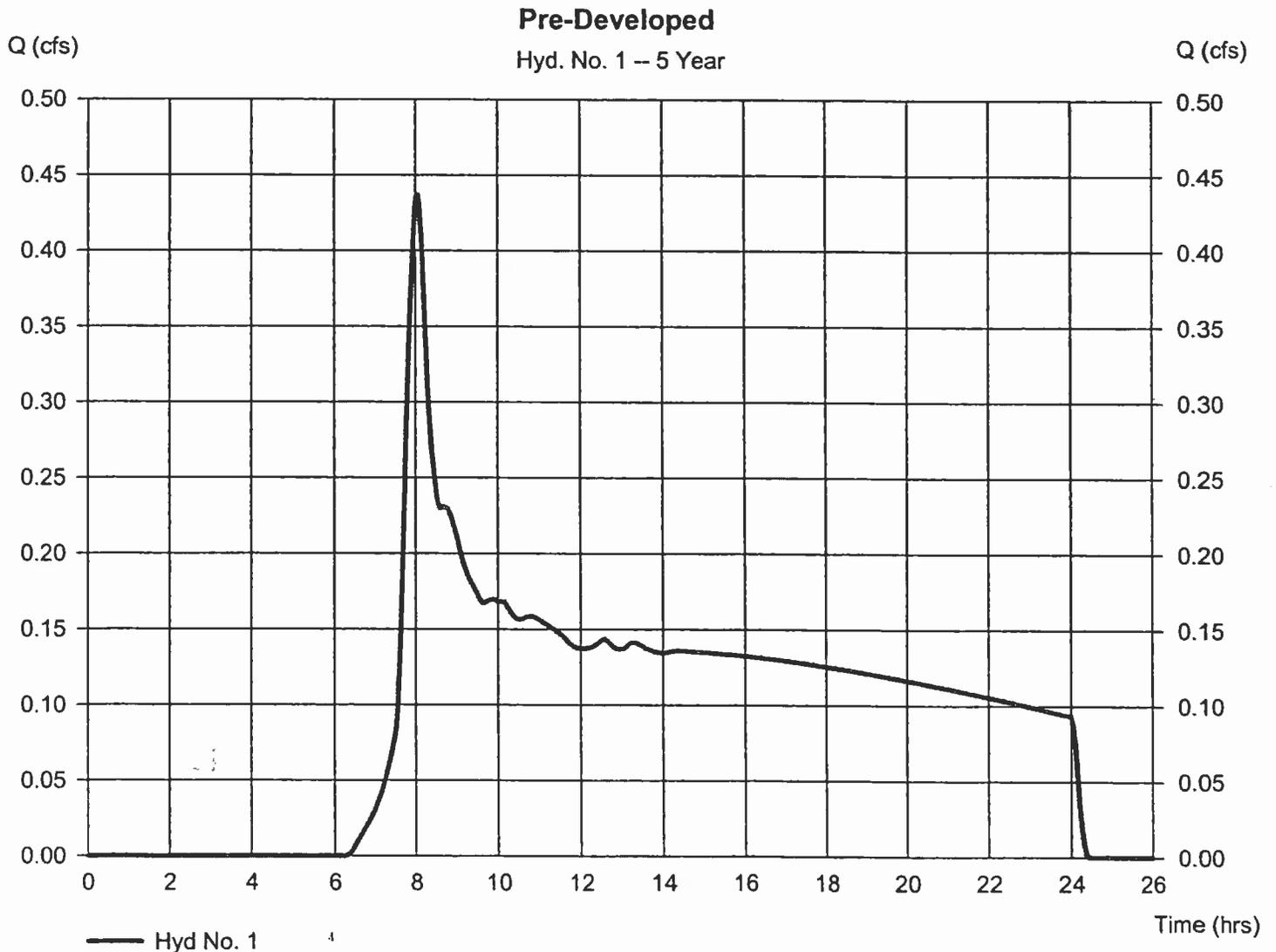
## Hyd. No. 1

Pre-Developed

Hydrograph type = SCS Runoff  
Storm frequency = 5 yrs  
Time interval = 2 min  
Drainage area = 2.600 ac  
Basin Slope = 0.0 %  
Tc method = TR55  
Total precip. = 2.90 in  
Storm duration = 24 hrs

Peak discharge = 0.437 cfs  
Time to peak = 8.07 hrs  
Hyd. volume = 8,726 cuft  
Curve number = 76\*  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 14.80 min  
Distribution = Type IA  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.580 \times 98) + (2.020 \times 70)] / 2.600$



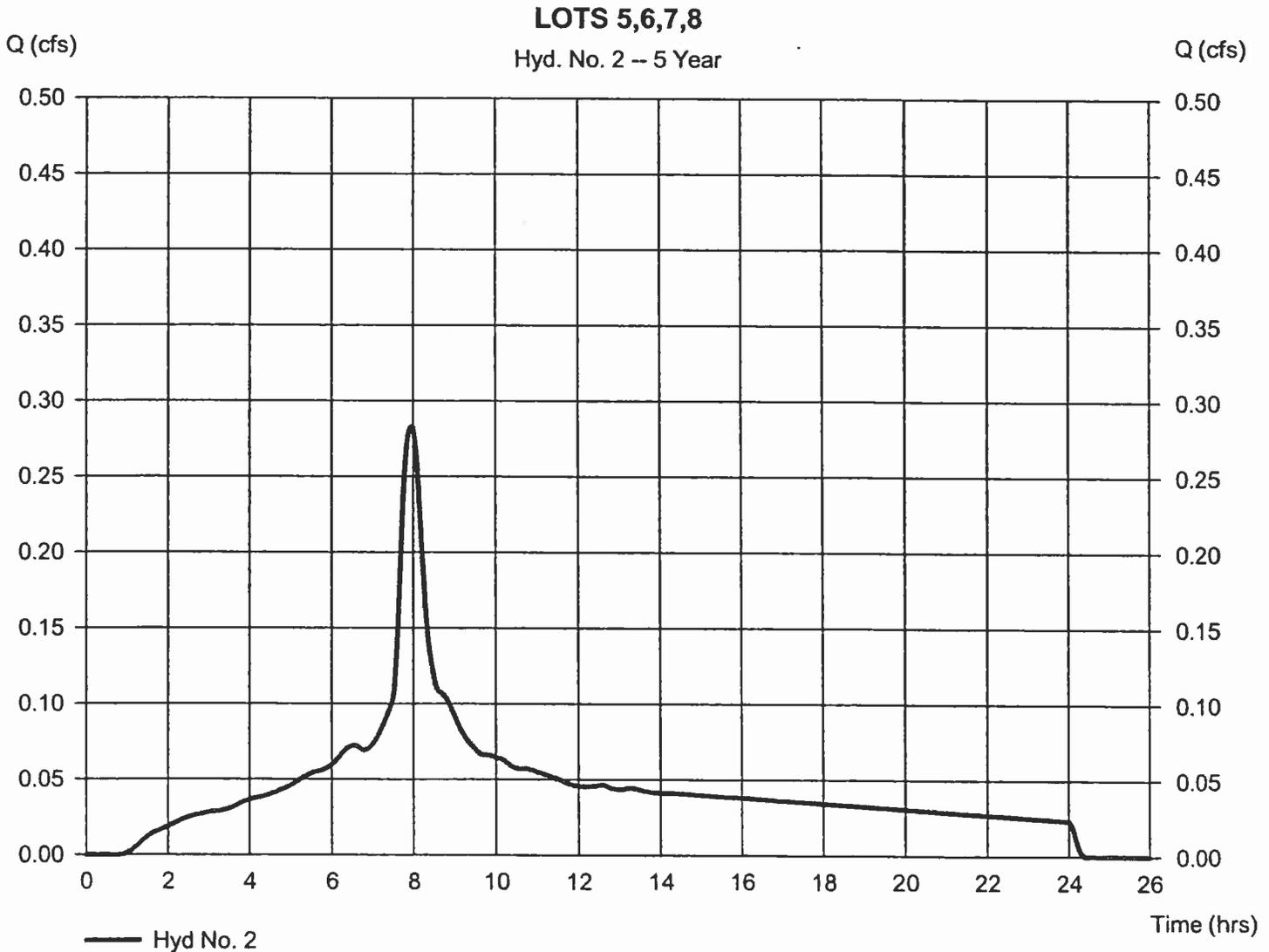
# Hydrograph Report

## Hyd. No. 2

LOTS 5,6,7,8

Hydrograph type = SCS Runoff  
Storm frequency = 5 yrs  
Time interval = 2 min  
Drainage area = 0.430 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 2.90 in  
Storm duration = 24 hrs

Peak discharge = 0.283 cfs  
Time to peak = 7.97 hrs  
Hyd. volume = 4,061 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type IA  
Shape factor = 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

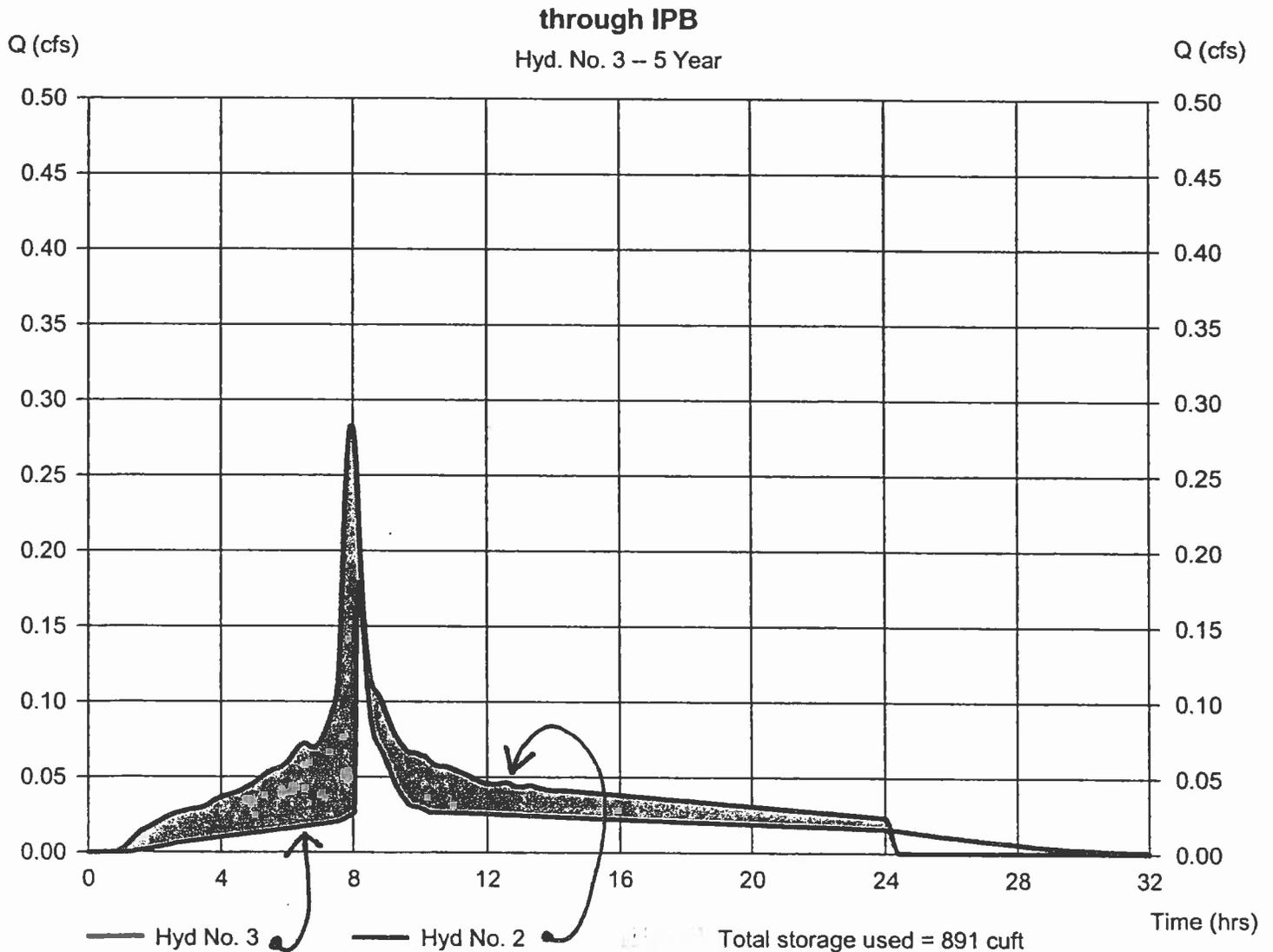
## Hyd. No. 3

through IPB

Hydrograph type = Reservoir  
Storm frequency = 5 yrs  
Time interval = 2 min  
Inflow hyd. No. = 2 - LOTS 5,6,7,8  
Reservoir name = IPB

Peak discharge = 0.179 cfs  
Time to peak = 8.20 hrs  
Hyd. volume = 2,051 cuft  
Max. Elevation = 101.15 ft  
Max. Storage = 891 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



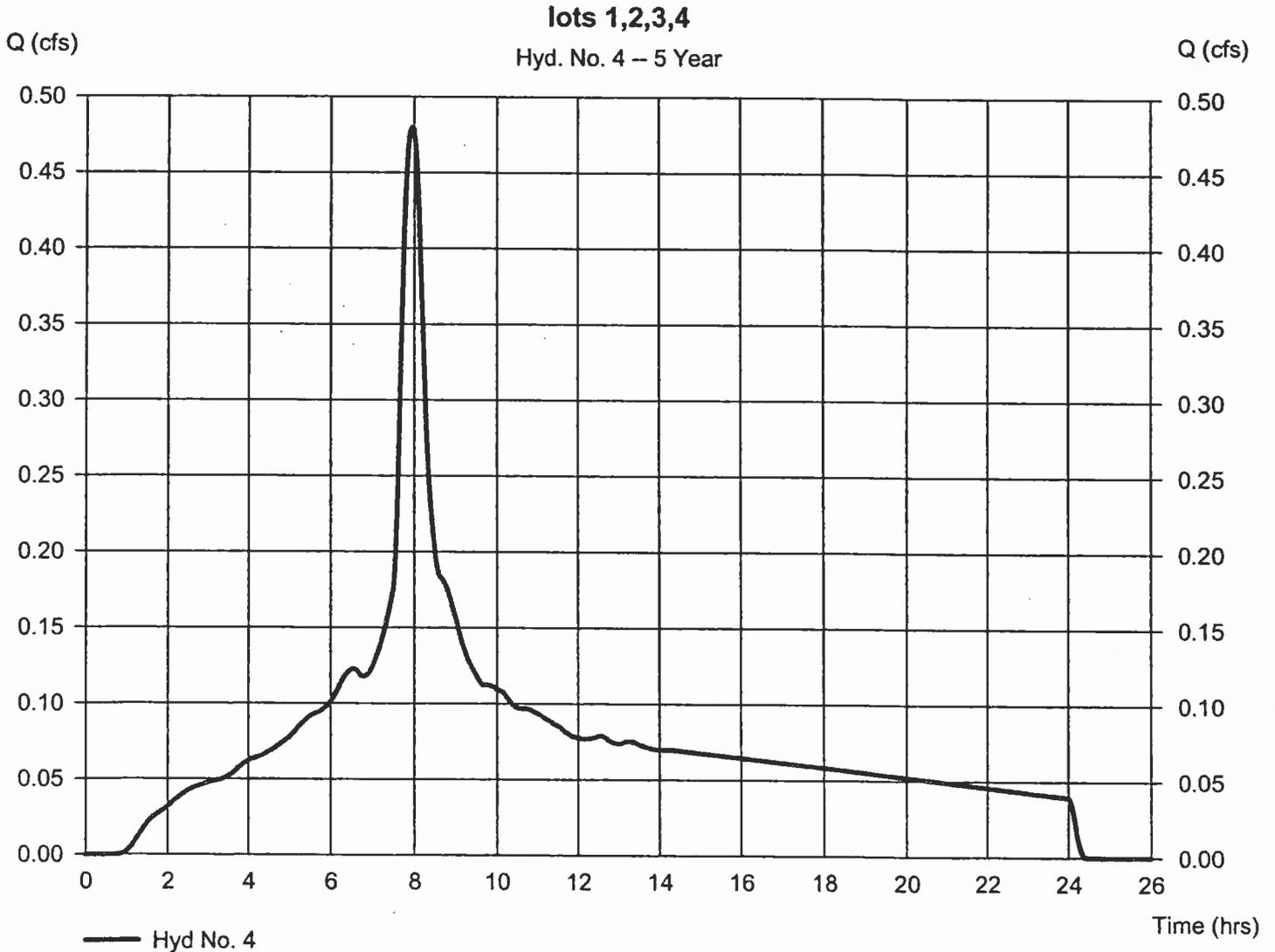
# Hydrograph Report

## Hyd. No. 4

lots 1,2,3,4

Hydrograph type = SCS Runoff  
Storm frequency = 5 yrs  
Time interval = 2 min  
Drainage area = 0.730 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 2.90 in  
Storm duration = 24 hrs

Peak discharge = 0.480 cfs  
Time to peak = 7.97 hrs  
Hyd. volume = 6,895 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type IA  
Shape factor = 484



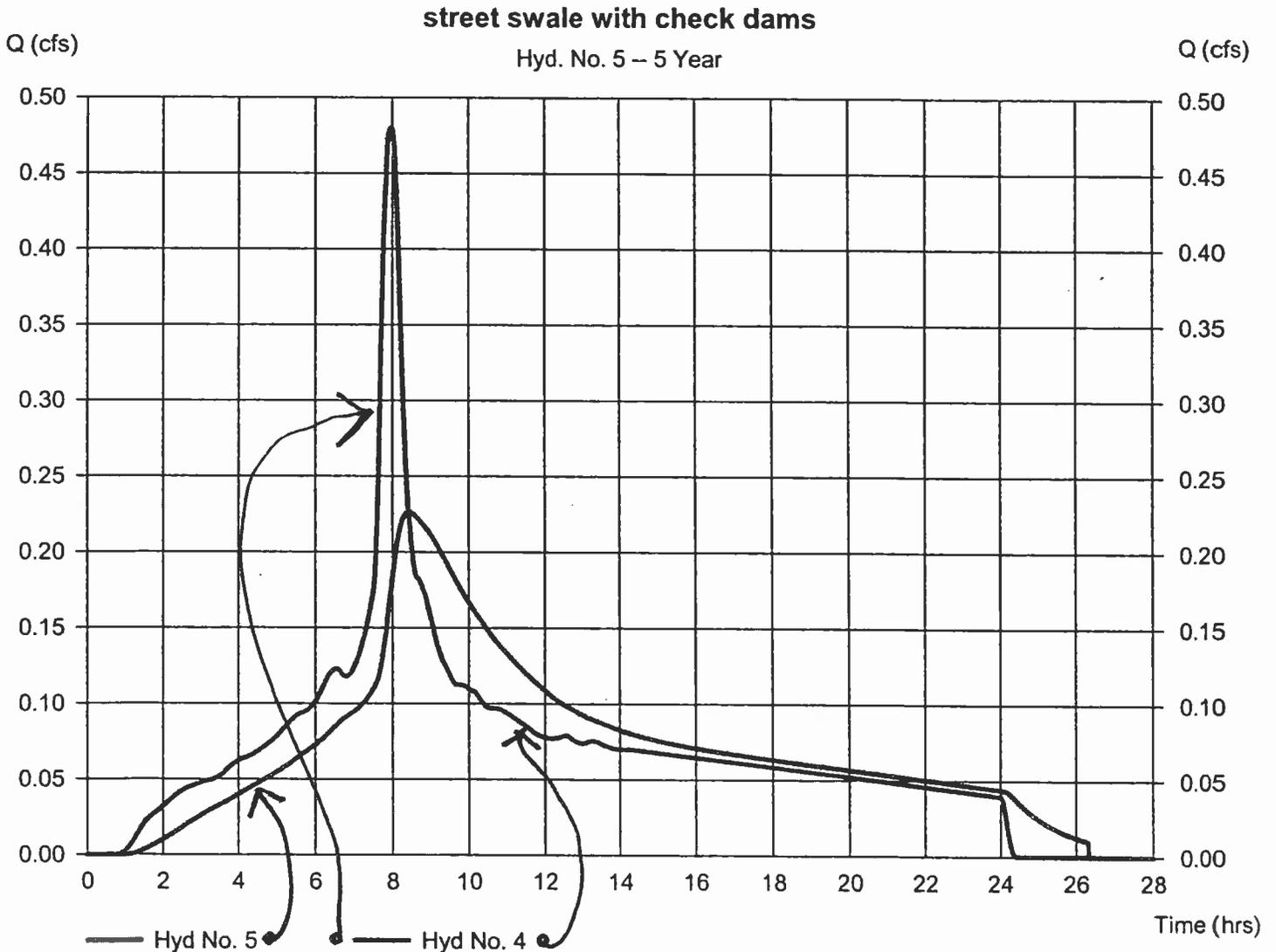
## Hyd. No. 5

street swale with check dams

Hydrograph type = Reach  
Storm frequency = 5 yrs  
Time interval = 2 min  
Inflow hyd. No. = 4 - lots 1,2,3,4  
Reach length = 500.0 ft  
Manning's n = 0.300  
Side slope = 3.0:1  
Rating curve x = 0.120  
Ave. velocity = 0.00 ft/s

Peak discharge = 0.227 cfs  
Time to peak = 8.43 hrs  
Hyd. volume = 6,842 cuft  
Section type = Trapezoidal  
Channel slope = 0.5 %  
Bottom width = 5.0 ft  
Max. depth = 0.5 ft  
Rating curve m = 0.912  
Routing coeff. = 0.0227

Modified Att-Kin routing method used.



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

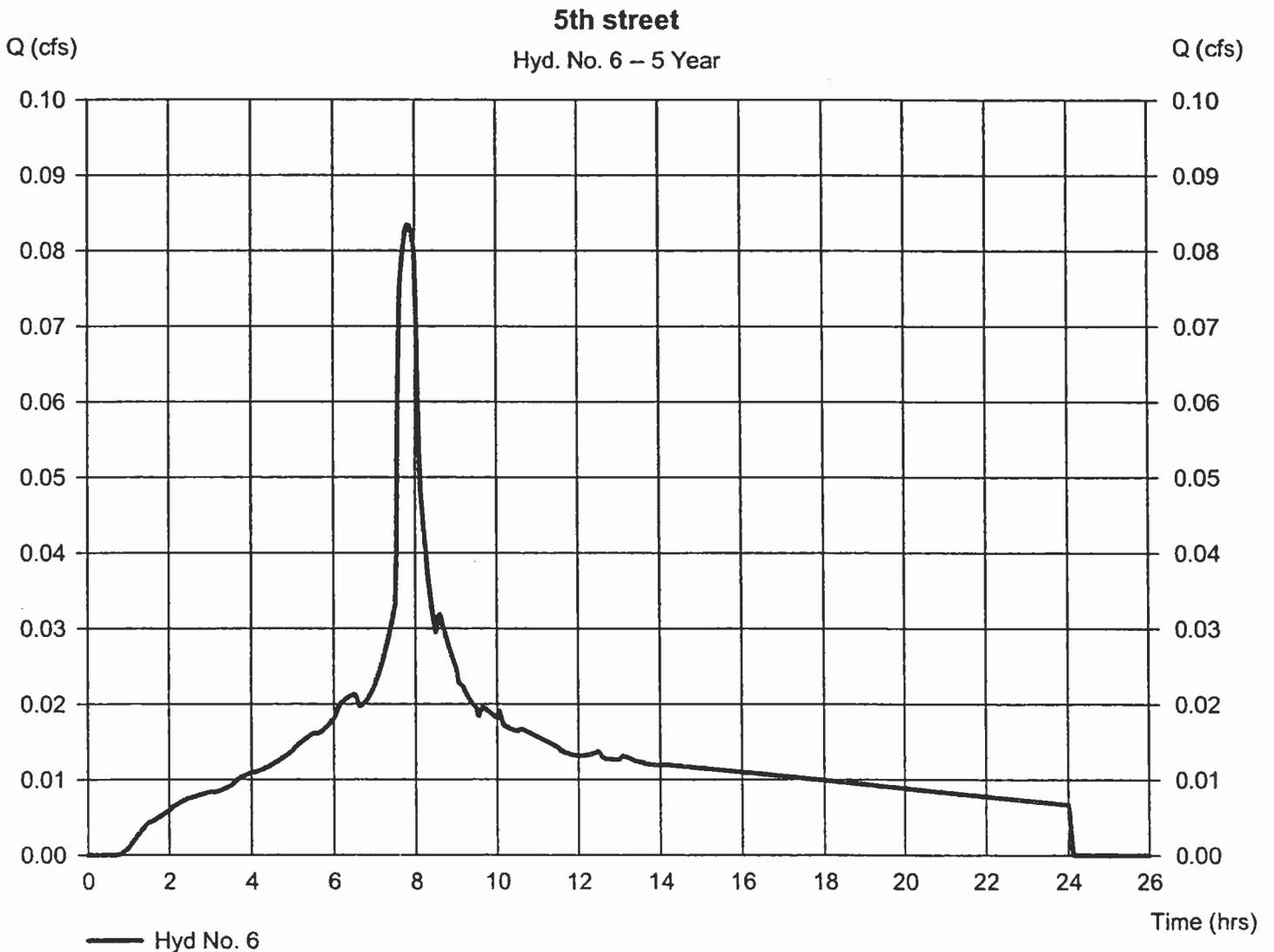
Friday, Mar 7, 2008

## Hyd. No. 6

5th street

Hydrograph type = SCS Runoff  
 Storm frequency = 5 yrs  
 Time interval = 2 min  
 Drainage area = 0.130 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 2.90 in  
 Storm duration = 24 hrs

Peak discharge = 0.084 cfs  
 Time to peak = 7.83 hrs  
 Hyd. volume = 1,181 cuft  
 Curve number = 98  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type IA  
 Shape factor = 484



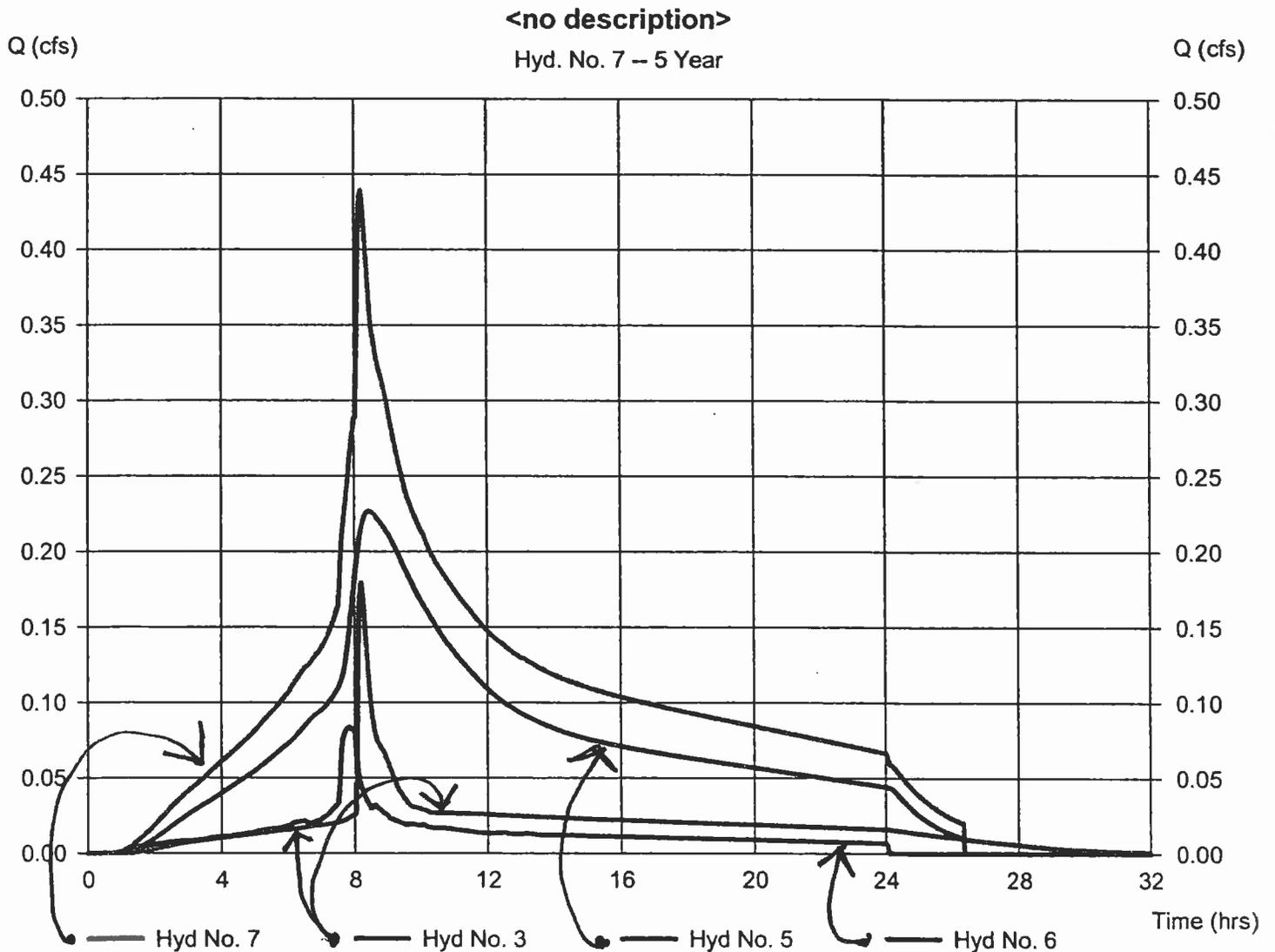
# Hydrograph Report

## Hyd. No. 7

<no description>

Hydrograph type = Combine  
Storm frequency = 5 yrs  
Time interval = 2 min  
Inflow hyds. = 3, 5, 6

Peak discharge = 0.439 cfs  
Time to peak = 8.20 hrs  
Hyd. volume = 10,074 cuft  
Contrib. drain. area = 0.130 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

## Hyd. No. 1

### Pre-Developed

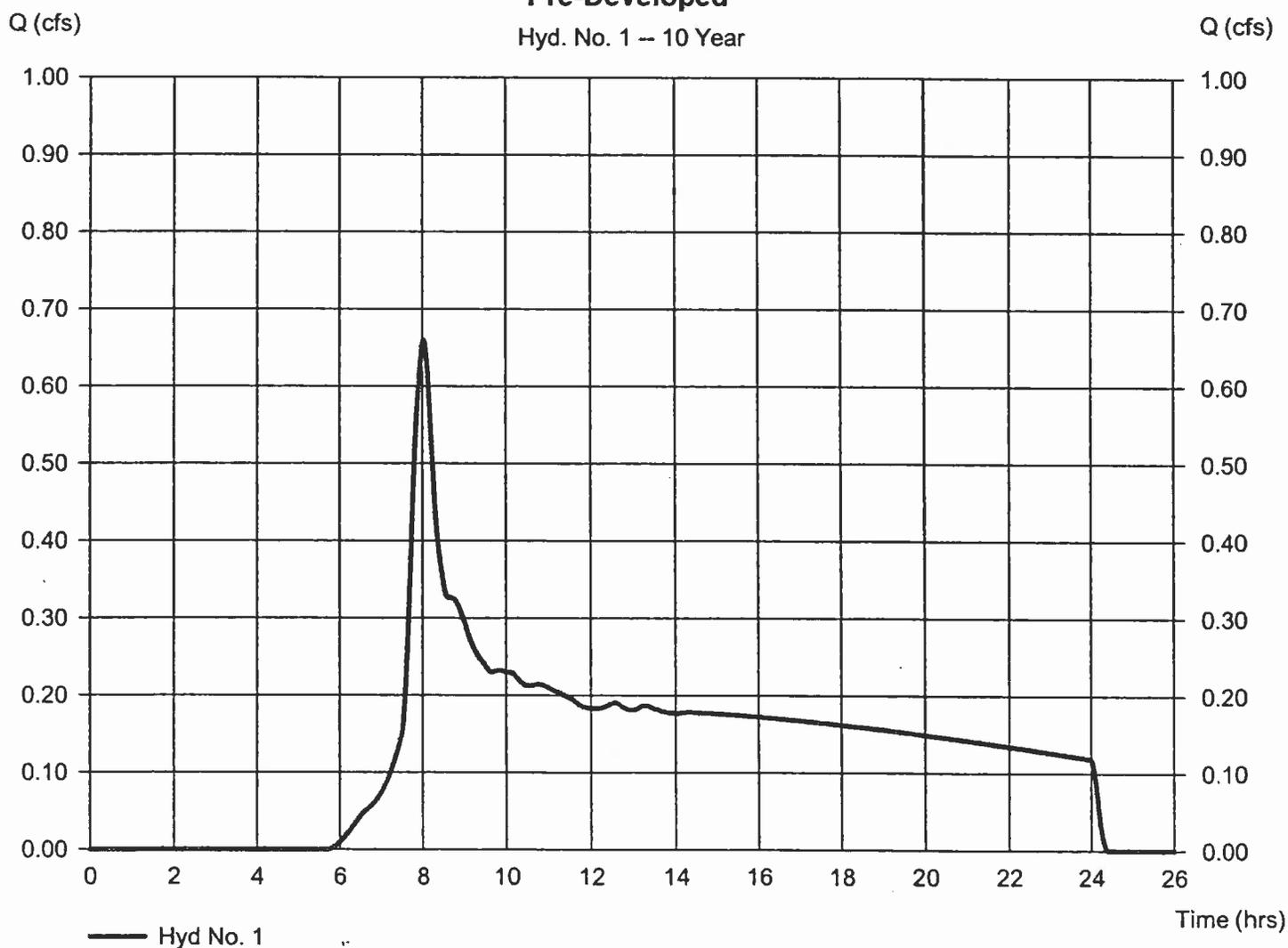
Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Drainage area = 2.600 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 3.40 in  
 Storm duration = 24 hrs

Peak discharge = 0.660 cfs  
 Time to peak = 8.03 hrs  
 Hyd. volume = 11,900 cuft  
 Curve number = 76\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 14.80 min  
 Distribution = Type IA  
 Shape factor = 484

\* Composite (Area/CN) = [(0.580 x 98) + (2.020 x 70)] / 2.600

### Pre-Developed

Hyd. No. 1 -- 10 Year



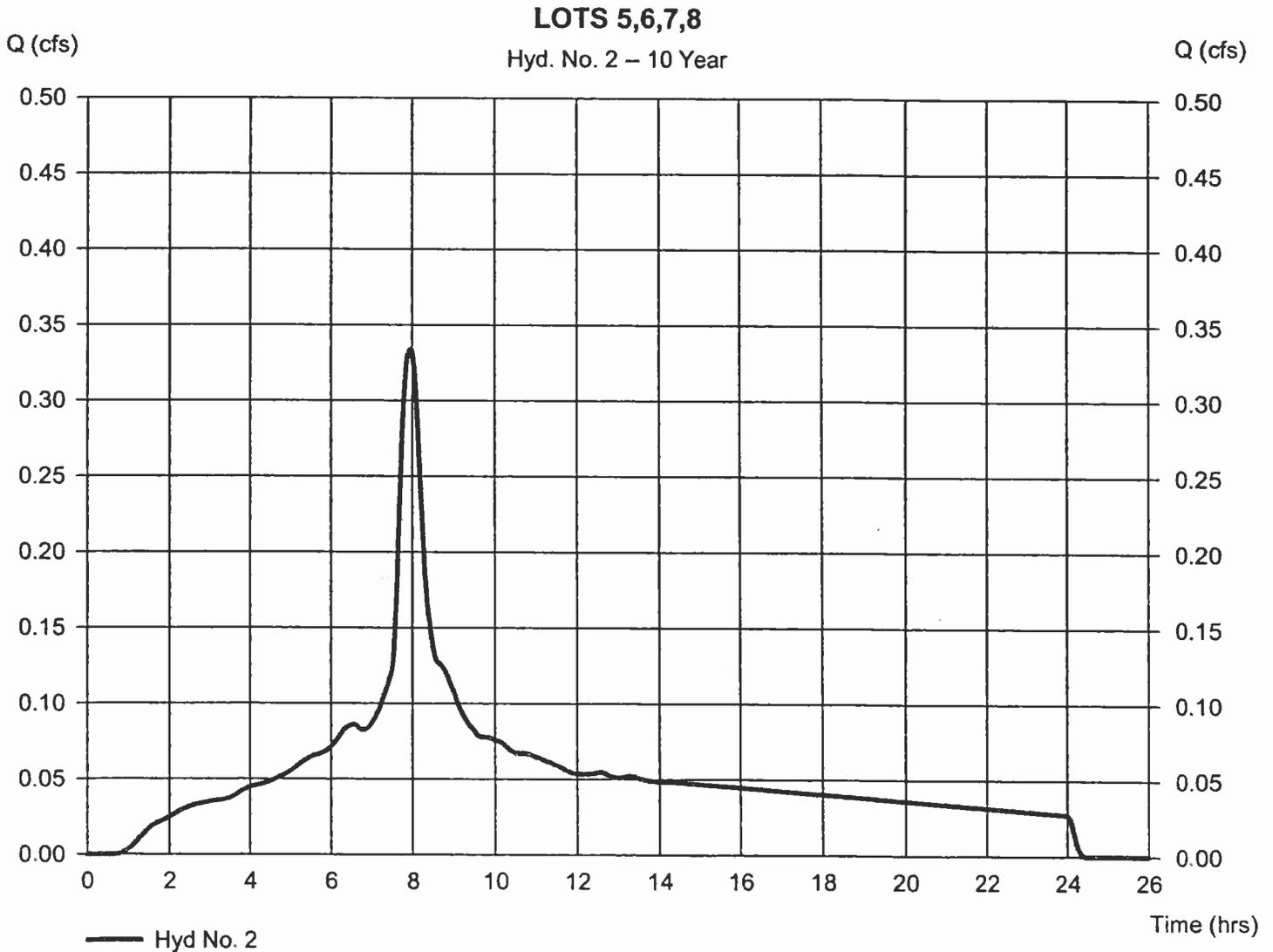
# Hydrograph Report

## Hyd. No. 2

LOTS 5,6,7,8

Hydrograph type = SCS Runoff  
Storm frequency = 10 yrs  
Time interval = 2 min  
Drainage area = 0.430 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 3.40 in  
Storm duration = 24 hrs

Peak discharge = 0.334 cfs  
Time to peak = 7.97 hrs  
Hyd. volume = 4,819 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type IA  
Shape factor = 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

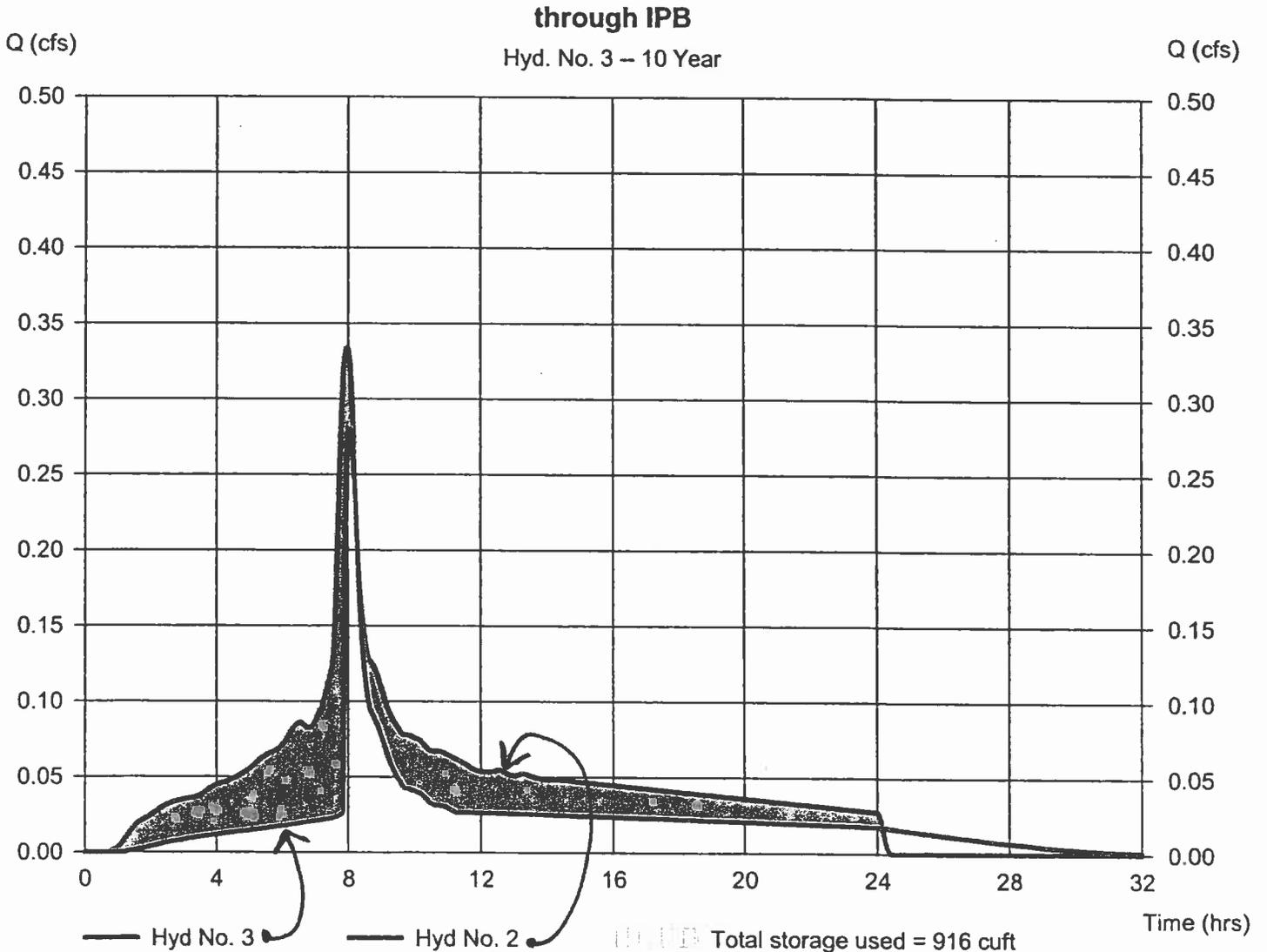
## Hyd. No. 3

through IPB

Hydrograph type = Reservoir  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Inflow hyd. No. = 2 - LOTS 5,6,7,8  
 Reservoir name = IPB

Peak discharge = 0.280 cfs  
 Time to peak = 8.07 hrs  
 Hyd. volume = 2,552 cuft  
 Max. Elevation = 101.18 ft  
 Max. Storage = 916 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

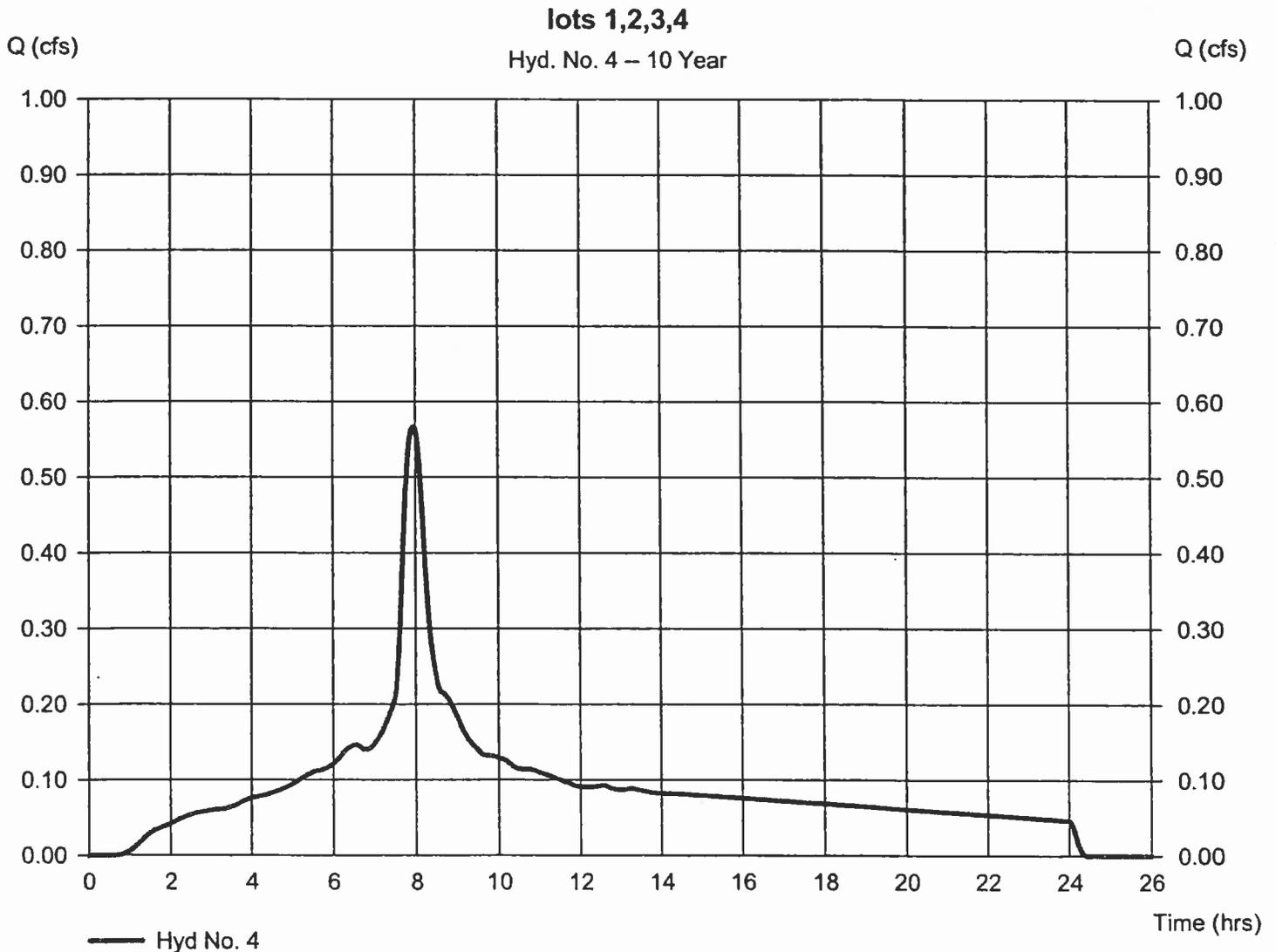
Friday, Mar 7, 2008

## Hyd. No. 4

lots 1,2,3,4

Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Drainage area = 0.730 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 3.40 in  
 Storm duration = 24 hrs

Peak discharge = 0.567 cfs  
 Time to peak = 7.97 hrs  
 Hyd. volume = 8,182 cuft  
 Curve number = 98  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 15.00 min  
 Distribution = Type IA  
 Shape factor = 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

## Hyd. No. 5

street swale with check dams

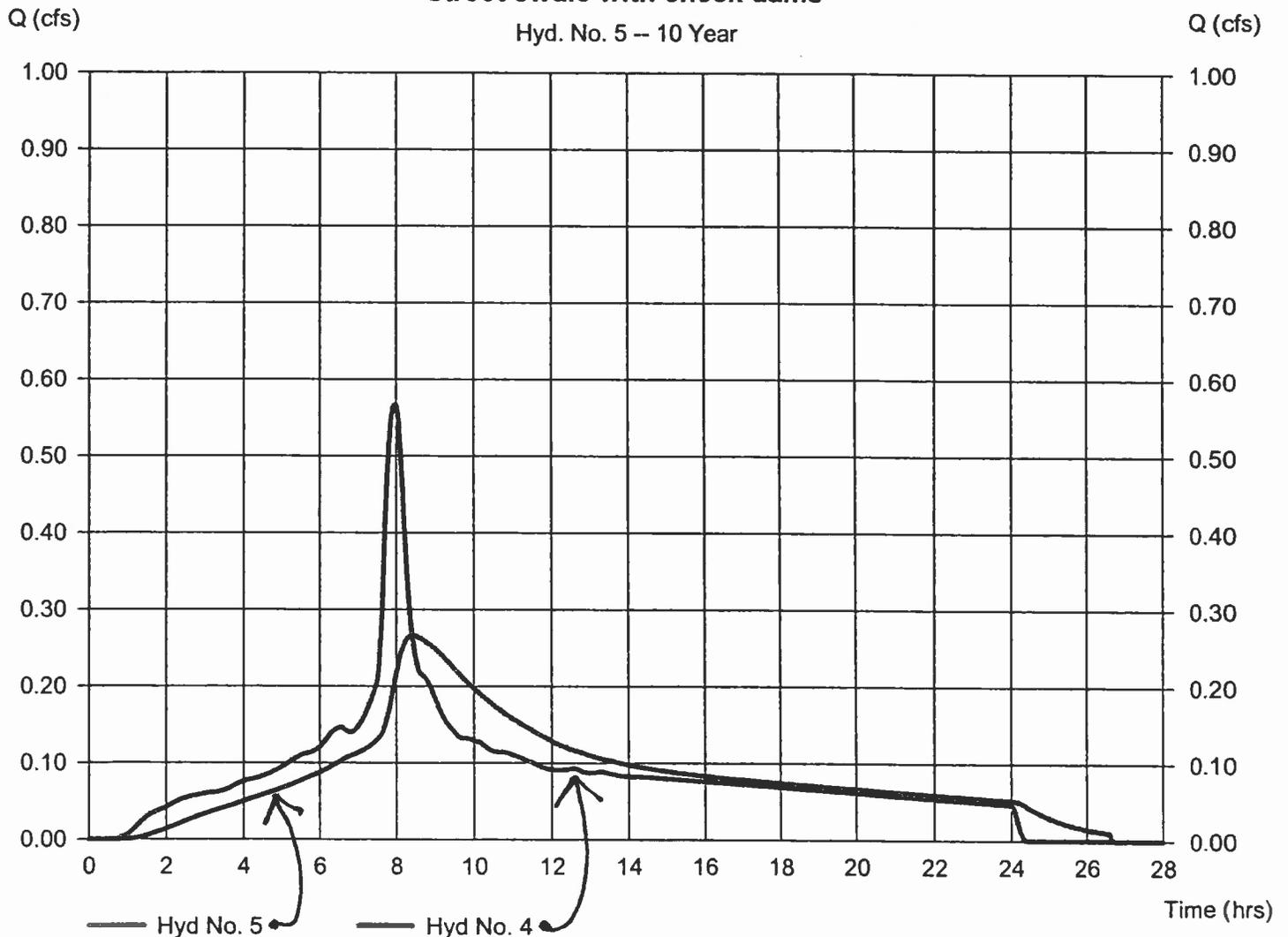
Hydrograph type = Reach  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Inflow hyd. No. = 4 - lots 1,2,3,4  
 Reach length = 500.0 ft  
 Manning's n = 0.300  
 Side slope = 3.0:1  
 Rating curve x = 0.120  
 Ave. velocity = 0.00 ft/s

Peak discharge = 0.266 cfs  
 Time to peak = 8.43 hrs  
 Hyd. volume = 8,129 cuft  
 Section type = Trapezoidal  
 Channel slope = 0.5 %  
 Bottom width = 5.0 ft  
 Max. depth = 0.5 ft  
 Rating curve m = 0.912  
 Routing coeff. = 0.0224

Modified Att-Kin routing method used.

### street swale with check dams

Hyd. No. 5 -- 10 Year



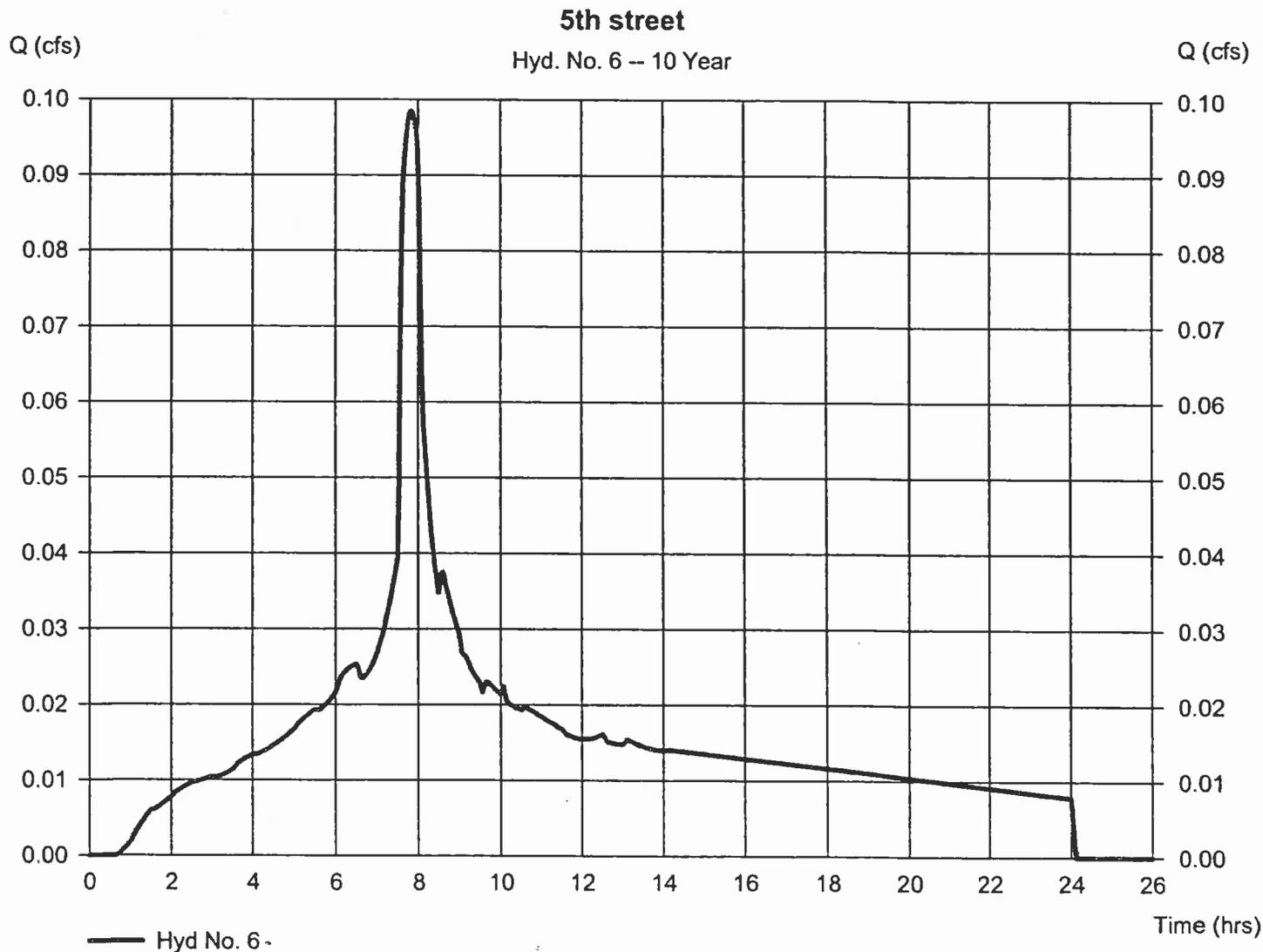
# Hydrograph Report

## Hyd. No. 6

5th street

Hydrograph type = SCS Runoff  
Storm frequency = 10 yrs  
Time interval = 2 min  
Drainage area = 0.130 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 3.40 in  
Storm duration = 24 hrs

Peak discharge = 0.099 cfs  
Time to peak = 7.83 hrs  
Hyd. volume = 1,401 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 5.00 min  
Distribution = Type IA  
Shape factor = 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

## Hyd. No. 7

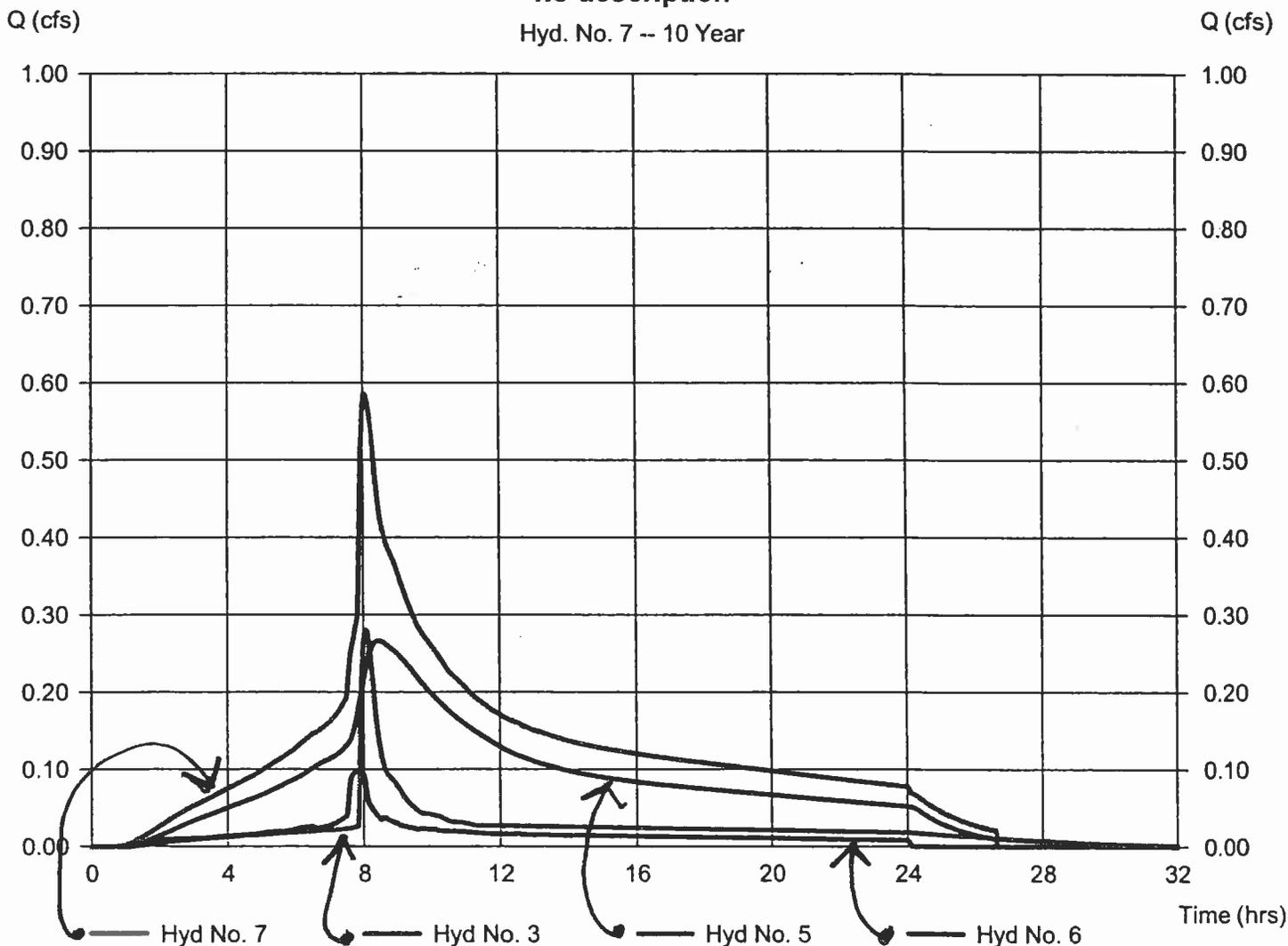
<no description>

Hydrograph type = Combine  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Inflow hyds. = 3, 5, 6

Peak discharge = 0.585 cfs  
 Time to peak = 8.03 hrs  
 Hyd. volume = 12,082 cuft  
 Contrib. drain. area = 0.130 ac

<no description>

Hyd. No. 7 -- 10 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

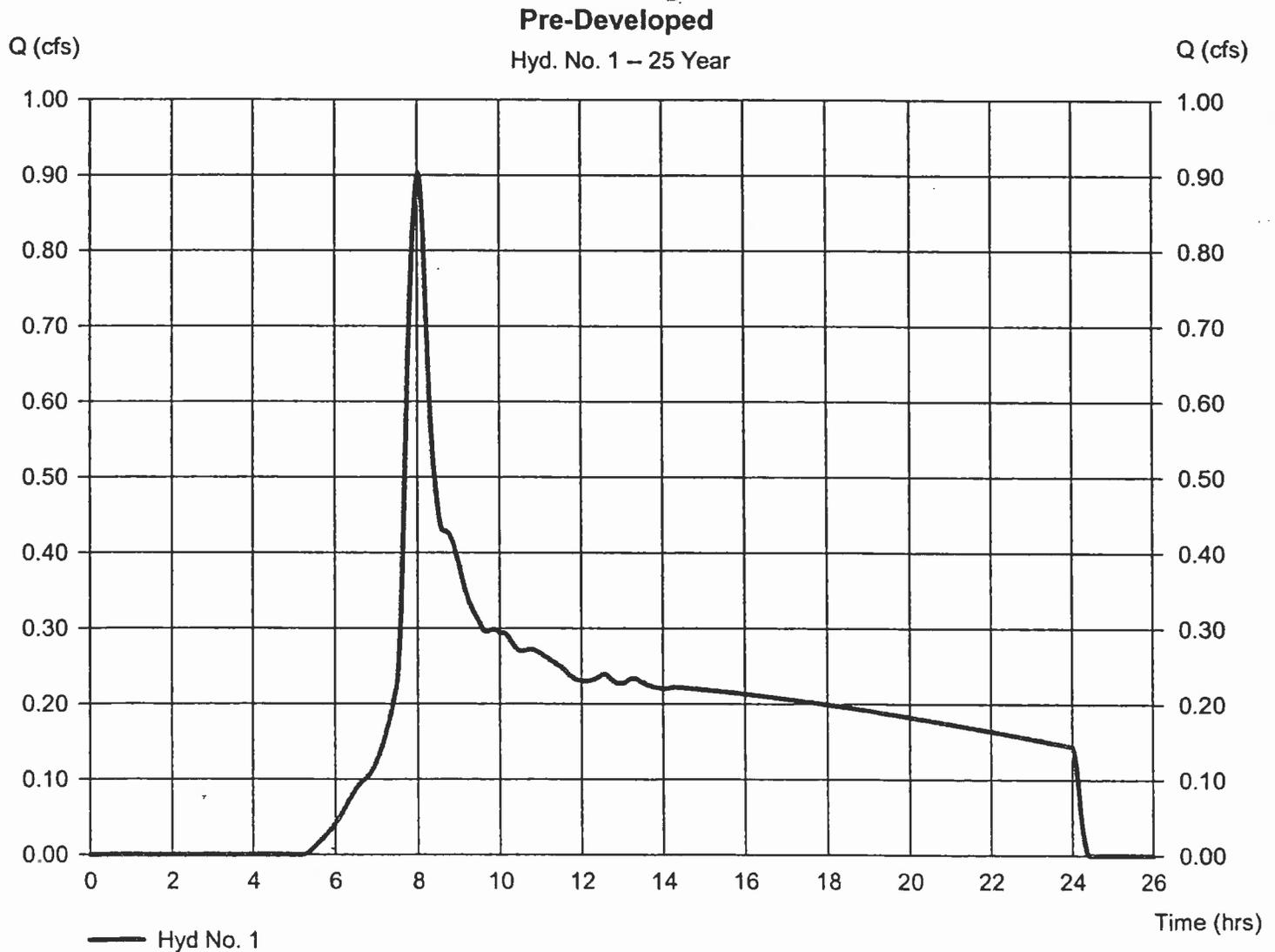
## Hyd. No. 1

Pre-Developed

Hydrograph type = SCS Runoff  
 Storm frequency = 25 yrs  
 Time interval = 2 min  
 Drainage area = 2.600 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 3.90 in  
 Storm duration = 24 hrs

Peak discharge = 0.903 cfs  
 Time to peak = 8.03 hrs  
 Hyd. volume = 15,297 cuft  
 Curve number = 76\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 14.80 min  
 Distribution = Type IA  
 Shape factor = 484

\* Composite (Area/CN) =  $[(0.580 \times 98) + (2.020 \times 70)] / 2.600$



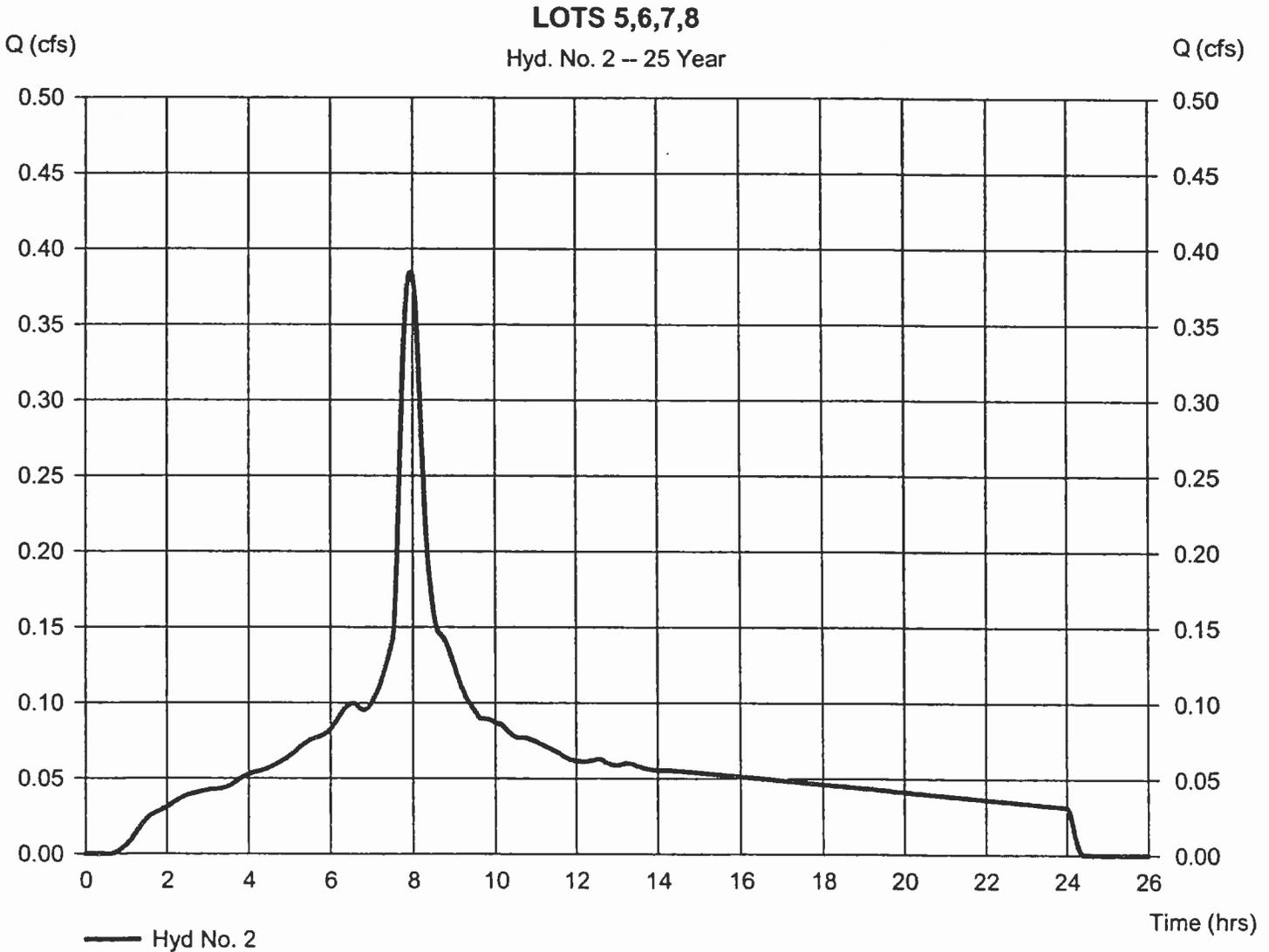
# Hydrograph Report

## Hyd. No. 2

LOTS 5,6,7,8

Hydrograph type = SCS Runoff  
Storm frequency = 25 yrs  
Time interval = 2 min  
Drainage area = 0.430 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 3.90 in  
Storm duration = 24 hrs

Peak discharge = 0.385 cfs  
Time to peak = 7.97 hrs  
Hyd. volume = 5,578 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type IA  
Shape factor = 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

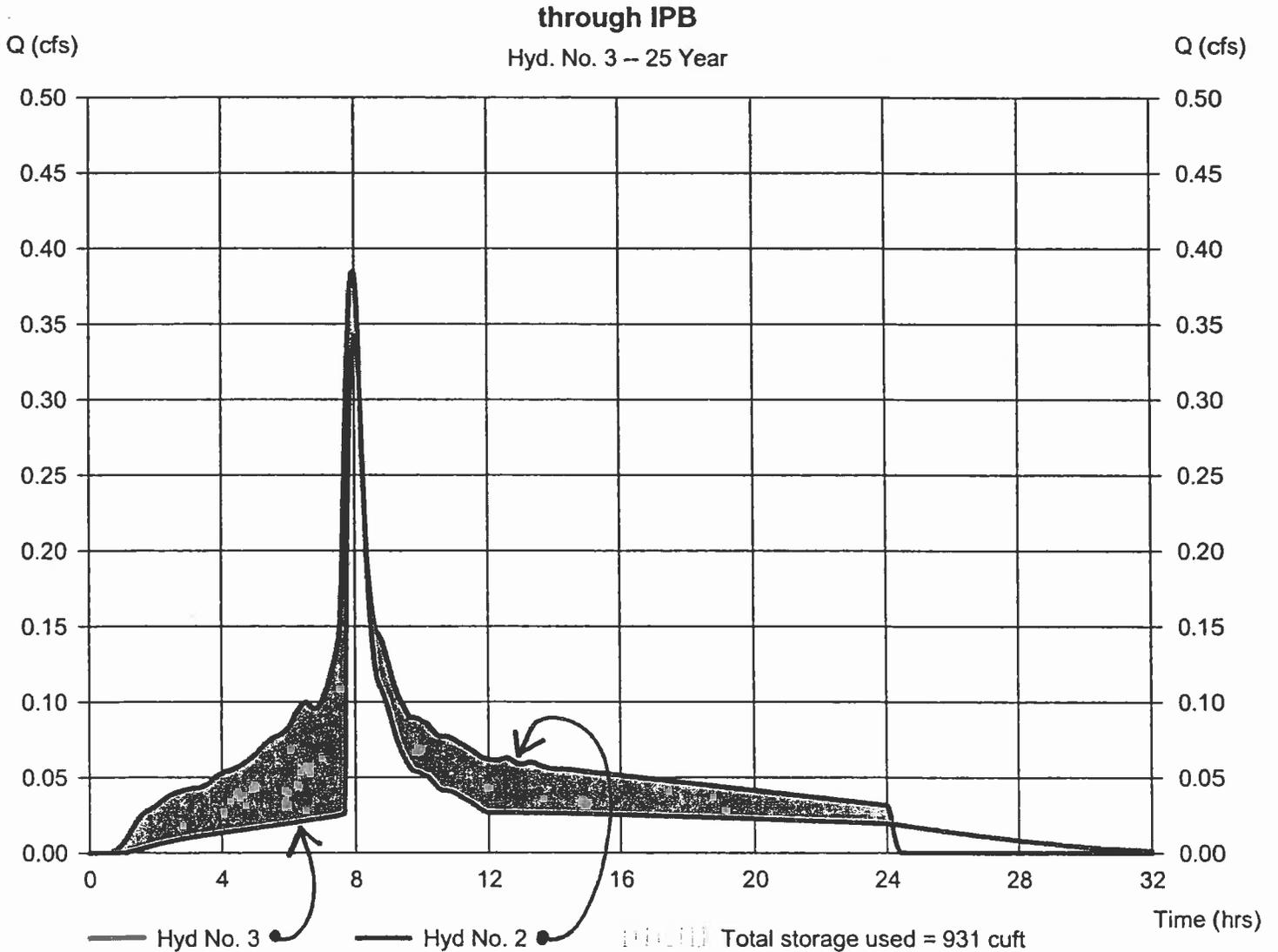
## Hyd. No. 3

through IPB

Hydrograph type = Reservoir  
Storm frequency = 25 yrs  
Time interval = 2 min  
Inflow hyd. No. = 2 - LOTS 5,6,7,8  
Reservoir name = IPB

Peak discharge = 0.342 cfs  
Time to peak = 8.03 hrs  
Hyd. volume = 3,075 cuft  
Max. Elevation = 101.20 ft  
Max. Storage = 931 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



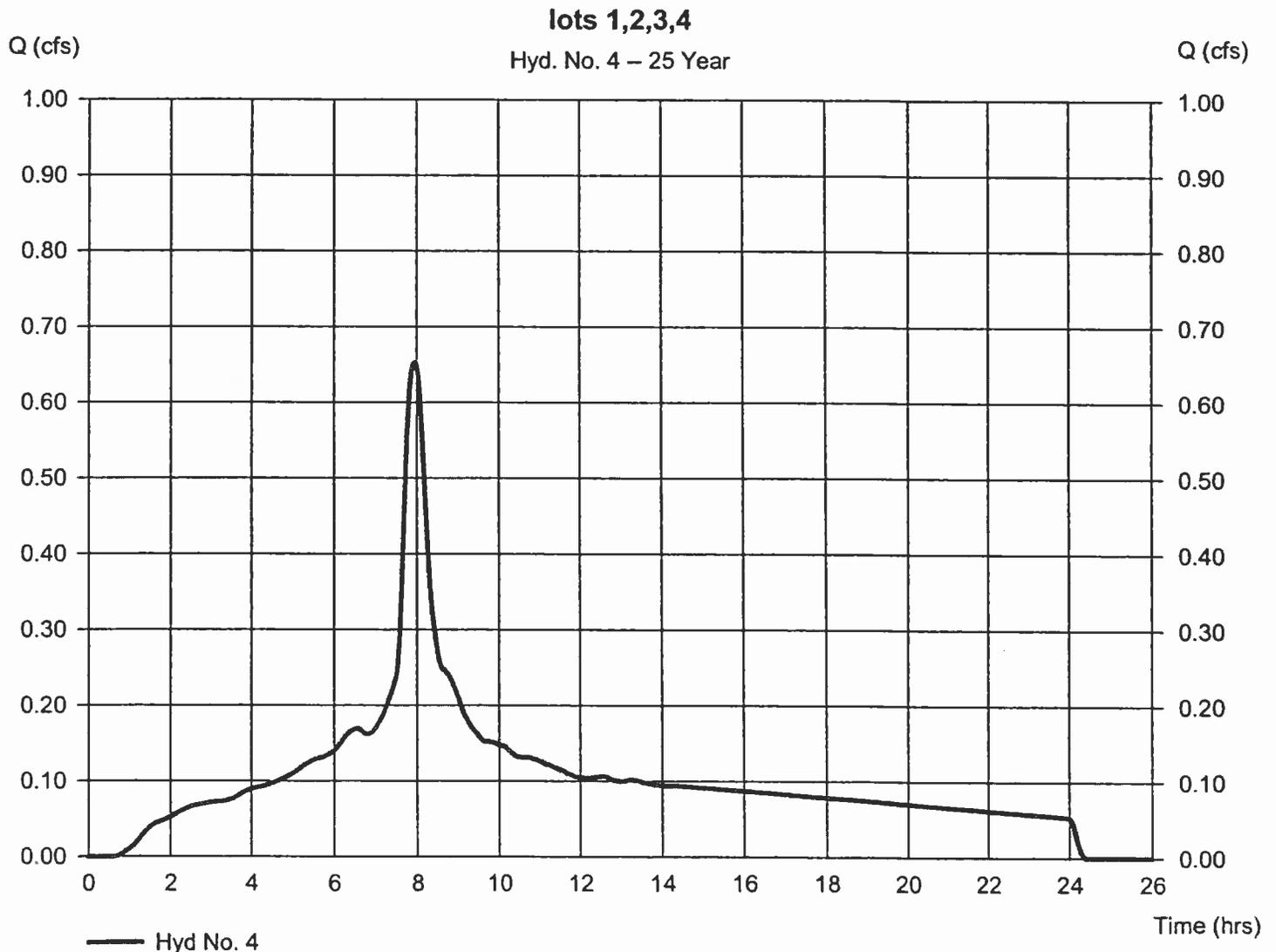
# Hydrograph Report

## Hyd. No. 4

lots 1,2,3,4

Hydrograph type = SCS Runoff  
Storm frequency = 25 yrs  
Time interval = 2 min  
Drainage area = 0.730 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 3.90 in  
Storm duration = 24 hrs

Peak discharge = 0.653 cfs  
Time to peak = 7.97 hrs  
Hyd. volume = 9,470 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 15.00 min  
Distribution = Type IA  
Shape factor = 484



# Hydrograph Report

## Hyd. No. 5

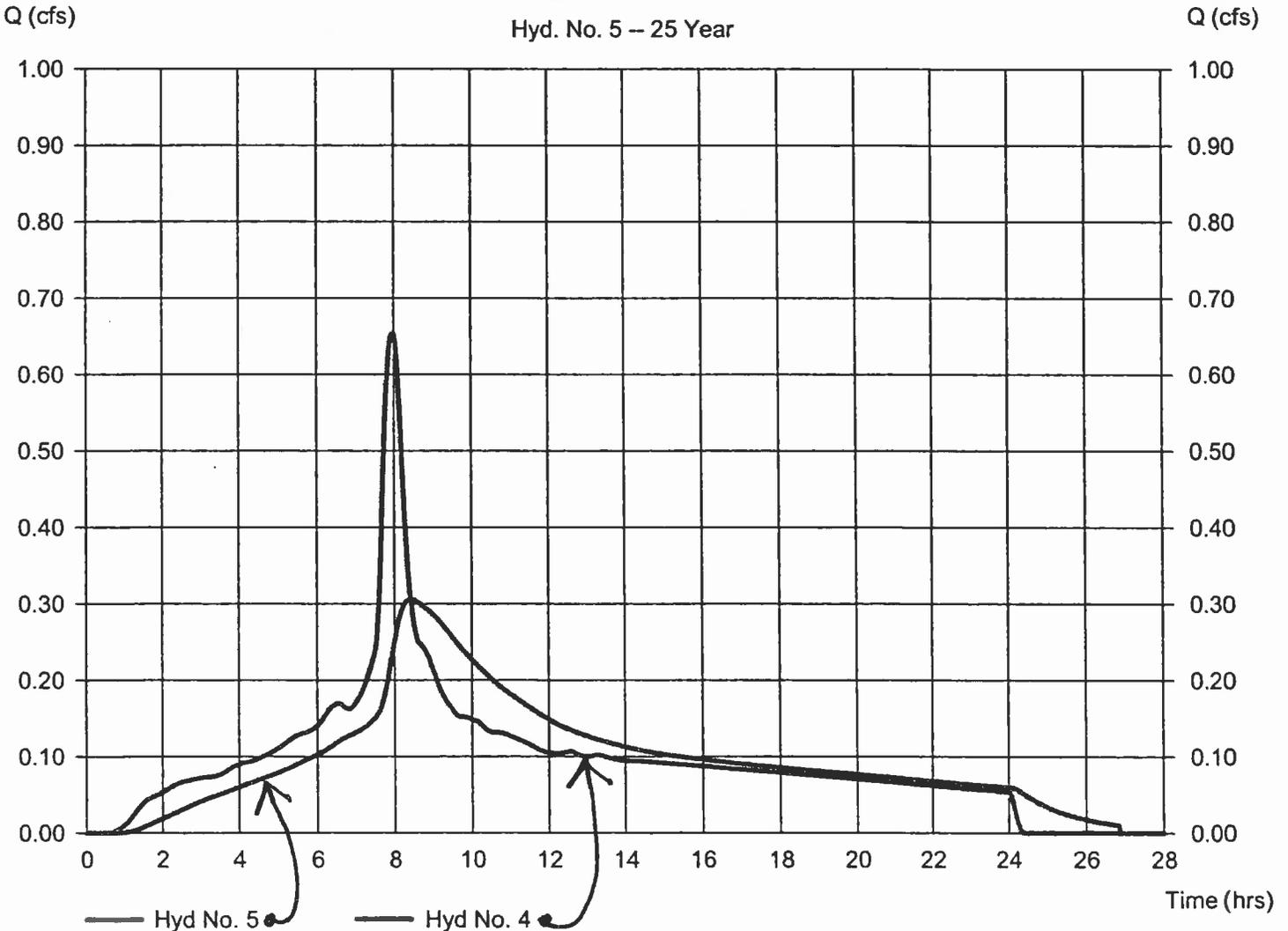
street swale with check dams

Hydrograph type = Reach  
Storm frequency = 25 yrs  
Time interval = 2 min  
Inflow hyd. No. = 4 - lots 1,2,3,4  
Reach length = 500.0 ft  
Manning's n = 0.300  
Side slope = 3.0:1  
Rating curve x = 0.120  
Ave. velocity = 0.00 ft/s

Peak discharge = 0.306 cfs  
Time to peak = 8.43 hrs  
Hyd. volume = 9,416 cuft  
Section type = Trapezoidal  
Channel slope = 0.5 %  
Bottom width = 5.0 ft  
Max. depth = 0.5 ft  
Rating curve m = 0.912  
Routing coeff. = 0.0221

Modified Att-Kin routing method used.

### street swale with check dams



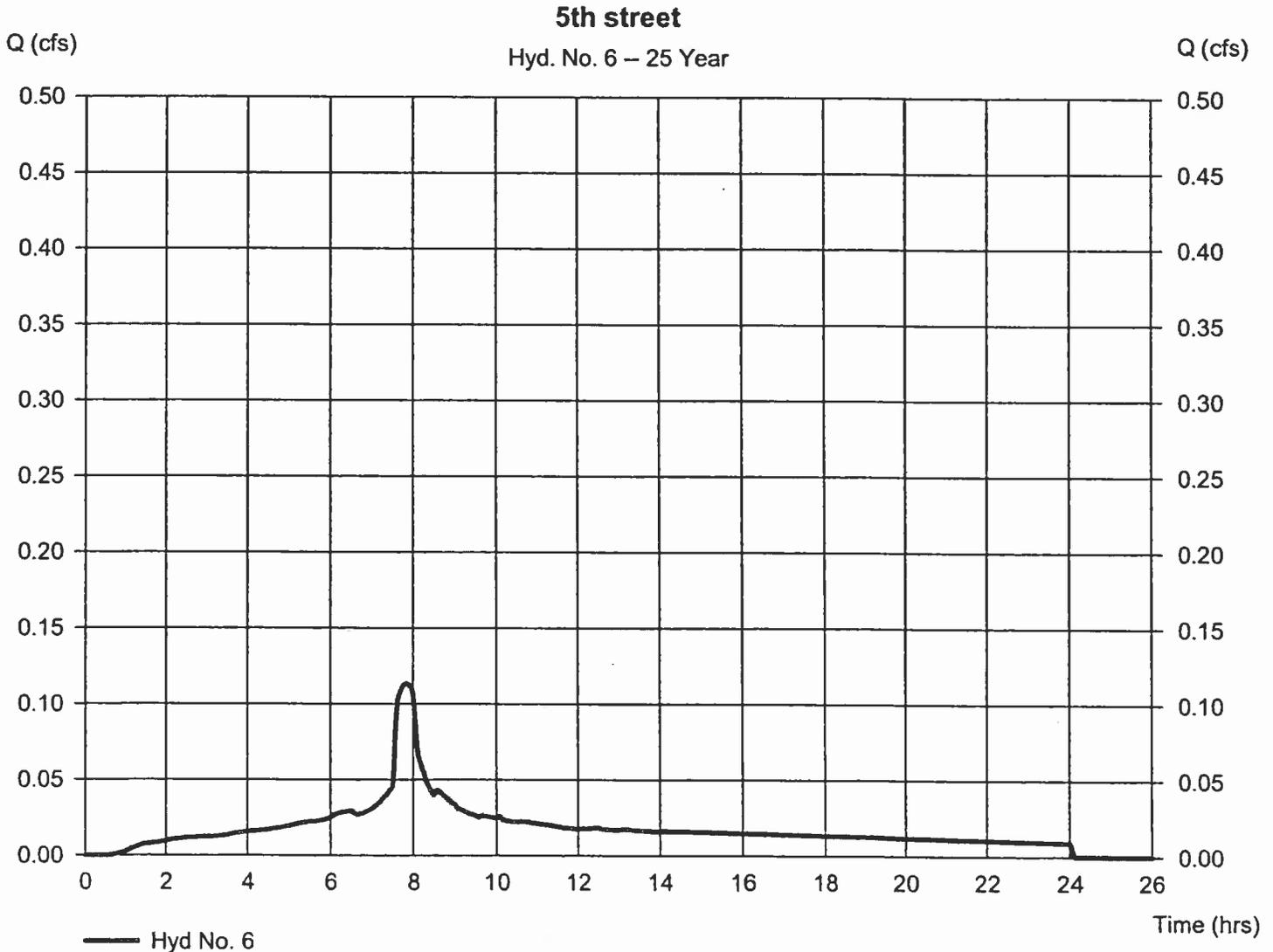
# Hydrograph Report

## Hyd. No. 6

5th street

Hydrograph type = SCS Runoff  
Storm frequency = 25 yrs  
Time interval = 2 min  
Drainage area = 0.130 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 3.90 in  
Storm duration = 24 hrs

Peak discharge = 0.114 cfs  
Time to peak = 7.83 hrs  
Hyd. volume = 1,622 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 5.00 min  
Distribution = Type IA  
Shape factor = 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Friday, Mar 7, 2008

## Hyd. No. 7

<no description>

Hydrograph type = Combine  
 Storm frequency = 25 yrs  
 Time interval = 2 min  
 Inflow hyds. = 3, 5, 6

Peak discharge = 0.698 cfs  
 Time to peak = 8.03 hrs  
 Hyd. volume = 14,113 cuft  
 Contrib. drain. area = 0.130 ac

