Ruggles & Bohm, P.A
Engineering, Surveying, Land Planning
924 N. Main
Wichita, Kansas 67203

MEMO

Date: Tuesday, November 22, 2011

To: Tim Davidson
City Hall
455 N. Main Street
Wichita, KS 67213

From: Alex M. Lane, P.E.

Project: Lampton Brothers 2nd Addition

RB Project No.: 3856P

Other Project Reference No.:

Description:
- ☐ Confirmation
- ☒ Transmittal
- ☐ Transmittal under separate cover by

Purpose:
- ☐ Approval
- ☐ Review & comment
- ☒ Use
- ☐ Other :
- ☐ Distribution
- ☐ Information
- ☐ Record

Enclosures/Attachments:
- ☐ Prints
- ☒ Originals
- ☒ Diskettes containing:
- ☐ Other:
- ☐ Change Order
- ☐ Shop Drawings

Copies	Description
1	Drainage Plan

Remarks:

Copies to:

If checked below, please:
- ☐ Acknowledge receipt of enclosures
- ☐ Return enclosures to us.

Signed

If Enclosures are not as noted above, please inform us immediately
Phone (316) 264-8008 Fax (316) 264-4621

DRAINAGE REPORT

Lampton Brothers 2nd Addition

WICHITA, SEDGWICK COUNTY, KANSAS

November 17, 2011

Lampton Brothers 2nd Addition
DRAINAGE ANALYSIS
November 17, 2011

INTRODUCTION

This report contains supporting documentation and calculations for the proposed Lampton Brothers 2nd Addition. The proposed site is a 7.29 acre site located in the SW ¼ of Section 16 T27S R1E on Central just west of Washington Street. The area is currently developed as a material storage facility and other industrial uses. The soil type located on site is Urban Elandco complex in hydrologic group B. The site generally drains in two directions with approximately 2.41 acres draining northwest to the Burlington Northern and Santa Fe Railroad right of way while the remaining 4.88 acres drains south to an area inlet just north of Central Avenue. No offsite tributary drain onto the proposed project site. The information located on the attached FEMA FIRM 20173C0355E, effective date Feb. 2, 2007, indicates the site is located in unshaded Zone X, defined as areas outside of the 0.2% floodplain.

DETENTION

Detention storage required to reduce the post development runoff to equal or less than existing condition peak runoffs. The detention pond is located at the south eastern portion of the plat and will outlet into the existing storm sewer system located in Central. The pre and post-development runoff for each of the design storms are listed in the tables below.

Existing	Area (ac.)	TC (min.)	C2	C5	C10	C100	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q100 (cfs)
Area A	4.88	15	0.53	0.54	0.59	0.68	14.5	17.2	19.7	27.8
Area B	2.41	15	0.53	0.54	0.59	0.68	5.9	6.9	8.0	11.2
Site Total	7.29	--	--	--	--	--	20.4	24.1	27.7	39.0

Proposed	Area (ac.)	TC (min.)	C2	C5	C10	C100	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q100 (cfs)
Area A	5.55	15	0.69	0.70	0.73	0.76	17.2	20.3	23.3	32.9
Area B	1.74	15	0.69	0.70	0.73	0.76	5.1	6.0	6.9	9.7
Site Total	7.29	--	--	--	--	--	6.8	8.5	10.0	14.4

CHANNEL PROTECTION AND WATER QUALITY VOLUMES

Channel protection volume will not be required for the site since it drains into an enclosed storm sewer system in Central Avenue. This pond will also provide the water quality volume required for the site. The calculations to determine the water quality volume are as follows;

Water Quality Volume

Eq. 4-26 $R_v = R_{vu}U + R_{vd}D + R_{vi}I = 0.00*0.05 + 0.29*0.25 + (0.45*0.3+0.26)*0.75 = 0.387$

Eq. 4-24 $WQ_v = PR_v A/12 = (1.2*0.387*7.29)/12 = 0.27$ ac.-ft.

The detention pond will drain dry when not in operation. Water quality treatment will also be provided in the pond. A weir structure will detain the water quality volume up to elevation 1298.10, while the release is controlled by a V-notch in the weir. The detention function of the pond will be controlled by a 15" RCP connecting to the existing area inlet. The pond stage and contour area is shown in the table below;

Stage	Area (ac.)
1296.65	0
1297	0.11
1298	0.30
1299	0.37

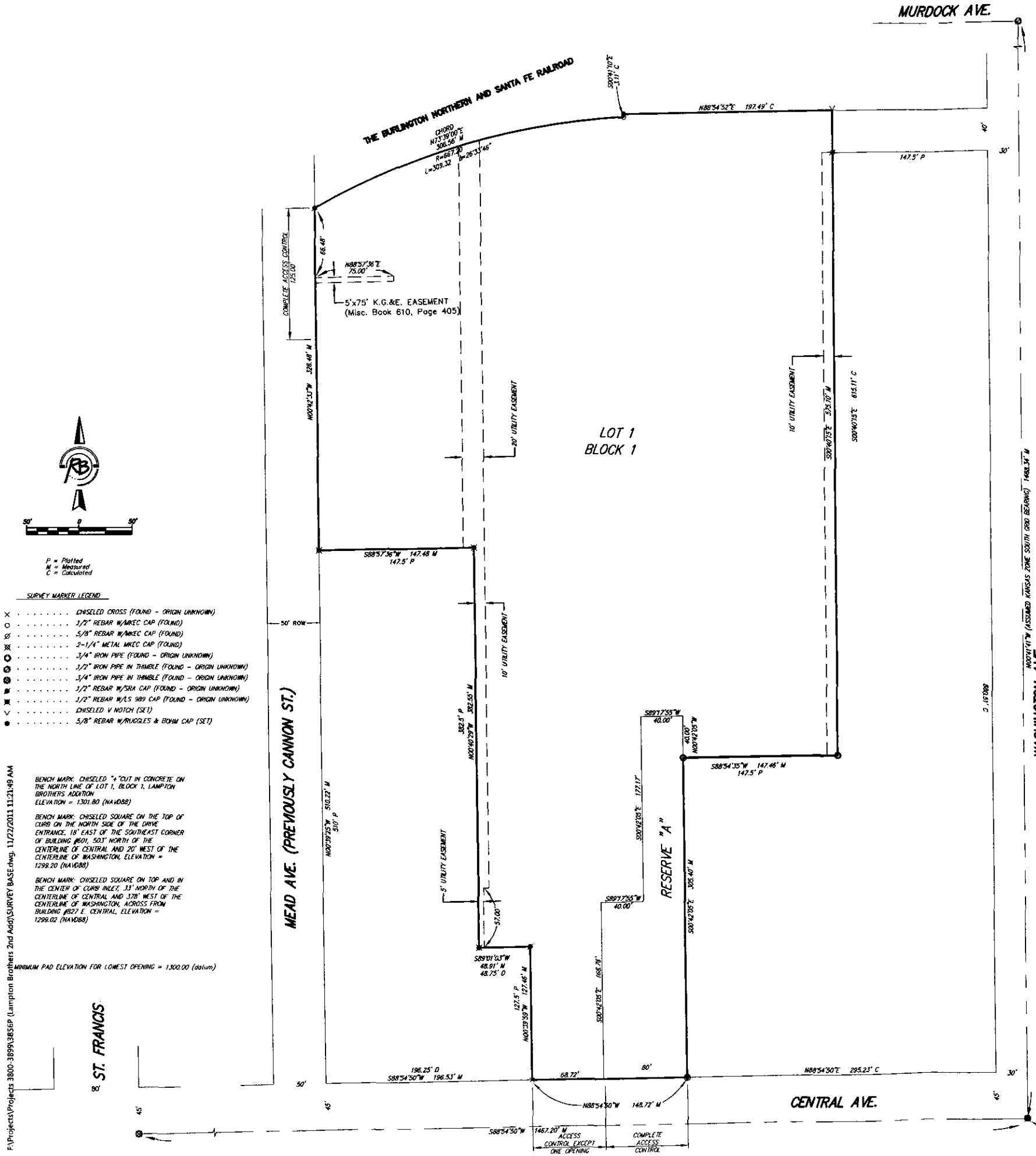
INTERNAL DRAINAGE

The internal drainage system shall sheet drain to onsite swales which will direct the runoff to the storm sewer controls. The particular details of the internal drainage system will have to be determined as the site is developed.

PLAT

LAMPTON BROTHERS 2ND ADDITION

Wichita, Sedgwick County, Kansas



P. = Platted
M. = Measured
C. = Calculated

SURVEY MARKER LEGEND

- × . . . . . CHISELED CROSS (FOUND - ORIGIN UNKNOWN)
- ○ . . . . . 1/2" REBAR W/MKEC CAP (FOUND)
- ⌀ . . . . . 5/8" REBAR W/MKEC CAP (FOUND)
- ⊠ . . . . . 2-1/4" METAL MKEC CAP (FOUND)
- ⬡ . . . . . 3/4" IRON PIPE (FOUND - ORIGIN UNKNOWN)
- ⊗ . . . . . 1/2" IRON PIPE IN THIMBLE (FOUND - ORIGIN UNKNOWN)
- ⊗ . . . . . 3/4" IRON PIPE IN THIMBLE (FOUND - ORIGIN UNKNOWN)
- ■ . . . . . 1/2" REBAR W/SRA CAP (FOUND - ORIGIN UNKNOWN)
- ▣ . . . . . 1/2" REBAR W/A.S. 989 CAP (FOUND - ORIGIN UNKNOWN)
- ◁ . . . . . CHISELED V NOTCH (SET)
- ● . . . . . 5/8" REBAR W/RUGGLES & BOHM CAP (SET)

BENCH MARK: CHISELED "+ CUT IN CONCRETE ON THE NORTH LINE OF LOT 1, BLOCK 1, LAMPTON BROTHERS ADDITION
ELEVATION = 1301.80 (NAVD88)

BENCH MARK: CHISELED SQUARE ON THE TOP OF CURB ON THE NORTH SIDE OF THE DRIVE ENTRANCE, 18' EAST OF THE SOUTHEAST CORNER OF BUILDING #601, 503' NORTH OF THE CENTERLINE OF CENTRAL AND 20' WEST OF THE CENTERLINE OF WASHINGTON, ELEVATION = 1299.20 (NAVD88)

BENCH MARK: CHISELED SQUARE ON TOP AND IN THE CENTER OF CURB INLET, 33' NORTH OF THE CENTERLINE OF CENTRAL AND 378' WEST OF THE CENTERLINE OF WASHINGTON, ACROSS FROM BUILDING #927 E. CENTRAL, ELEVATION = 1299.02 (NAVD88)

MINIMUM PAD ELEVATION FOR LOWEST OPENING = 1300.00 (datum)

F:\Projects\Projects 3800-3899\3856P (Lampton Brothers 2nd Add)\SURVEY BASE.dwg, 11/22/2011 11:21:49 AM

State of Kansas)
SS
Sedgwick County)

We, Ruggles & Bohm, P.A., Land Surveyors in aforesaid county and state, do hereby certify that, under the supervision of the undersigned, we have surveyed and platted "LAMPTON BROTHERS 2ND ADDITION", an Addition to Wichita, Sedgwick County, Kansas, and that the accompanying plat is a true and correct exhibit of the property surveyed, described as follows:

Lot 1, Block 1, AND Reserve A, Lampton Brothers Addition, an Addition to Wichita, Sedgwick County, Kansas.

Lots 1, 3, 5, 7, 9, 11, 13, 15, 17 and 19 on Dover, now Mosley, Throckmorton's Addition to Wichita, Sedgwick County, Kansas.

The east 25 feet of the W1/2 of Lot 1, the E1/2 of Lot 1, and all of Lots 3, 5, 7 and 9, on Dover Street, now Mosley Avenue, and Lots 10 and 12 on Cannon street, now Mead Avenue, all in Hiltons Addition to Hiltons Addition to Wichita, Sedgwick County, Kansas.

Lot 14 on Cannon Street, now Mead Avenue, lying south of the right-of-way of the south arm of the "Y" of the St. Louis and San Francisco Railroad as now located, in Hiltons Addition to Hiltons Addition to Wichita, Sedgwick County, Kansas.

That portion of the Burlington Northern and Santa Fe Railway Company's (formerly St. Louis San Francisco Railway company) Wye Track right-of-way at Wichita, Kansas, situated in the SW1/4 of Sec. 16, T27S, R1E of the 6th P.M., Sedgwick County, Kansas, described as follows: Beginning at the intersection of the east line of Mead Avenue, according to the recorded plat of Hiltons Addition to Wichita thereof, with a line drawn parallel with and distant 20.00 feet southerly of, as measured at right angles from the Wye Track centerline of said Railway Company's (Neodesha to Union Station) Southerly leg of the Wye, as now located and constructed; thence easterly parallel with said Wye Track centerline (generally being a curve concave southerly) to the intersection with the west line of Mosley Avenue, according to said recorded plat thereof; thence southerly along said west line of Mosley Avenue 32.0 feet, more or less, to the intersection with a line drawn with and distant 50.0 feet Southerly of, as measured at right angles from said Wye Track centerline; thence westerly parallel with said Wye Track centerline 312.0 feet, more or less, to the intersection with said east line of Mead Avenue; thence northerly along said east line of Mead Avenue to the point of beginning.

That part of Mosley Avenue platted in Hiltons Addition to Hiltons Addition to Wichita, Sedgwick County, Kansas, AND 40' Street Dedication recorded at Book 368, Page 557; described as beginning at the northwest corner of Lot 1, Block 1, Lampton Brothers Addition, Wichita, Sedgwick County, Kansas, being on the west line of said Mosley Avenue; thence N88°54'52"E along the north line of said Lot 1, 50.00 feet to the east line of said Mosley Avenue and the southwest corner of said 40' Street Dedication; thence continuing N88°54'52"E along said north line, 147.48 feet to the northeast corner of said Lot 1; thence N00°40'15"W along the extended east line of said Lot 1, 40.00 feet to the north line of said 40' Street Dedication; thence S88°54'52"W, parallel with said north line, 147.49 feet to the northwest corner of said 40' Street Dedication; thence continuing S88°54'52"W, parallel with said north line, 50.00 feet to said west line; thence S00°41'10"E along said west line, 40.00 feet to the point of beginning.

All public easements and dedications are hereby vacated by virtue of K.S.A. 12-512b.

Ruggles & Bohm, P.A.

WILLIAM K. CLEVENGER LICENSED LS-1437 KANSAS LAND SURVEYOR

William K. Clevenger, Land Surveyor

Know all men by these presents that we, the undersigned, have caused the land described in the surveyor's certificate to be platted into Lots, Blocks, a Reserve and Streets, to be known as "LAMPTON BROTHERS 2ND ADDITION", an Addition to Wichita, Sedgwick County, Kansas. The utility easements are hereby granted for the construction and maintenance of all public utilities. The drainage easement is hereby granted to the public as indicated for drainage purposes. Access Controls as indicated are hereby granted to the appropriate governing body. Reserve "A" is hereby reserved for irrigation, landscaping, berms, ponds, drainage, drainage structures, and utilities confined to easements. A drainage plan has been developed for this plat and all drainage easements shall remain at established grades, or as modified with the approval of the City Engineer, and unobstructed to allow for the conveyance of stormwater.

Lampton Brothers Investment, Inc.

_____ President/CEO
Douglas Lampton

State of Kansas)
SS
Sedgwick County)

The foregoing instrument acknowledged before me, this _____ day of _____, 2011, by Douglas Lampton, President/CEO, on behalf of Lampton Brothers Investments, Inc.

_____ Notary Public

My appointment expires _____.

This plat of "LAMPTON BROTHERS 2ND ADDITION", an Addition to Wichita, Sedgwick County, Kansas, has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this ___ day of _____, 2011.

Wichita-Sedgwick County Metropolitan Area Planning Commission

_____ Chair
Shawn Farney

_____ Secretary
John L. Schlegel

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this ___ day of _____, 2011.

At the Direction of the City Council

_____ Mayor
Carl Brewer

_____ City Clerk
Karen Sublett

Reviewed in accordance with K.S.A. 58-2005 on this _____ day of _____, 2011.

Deputy County Surveyor
_____ Sedgwick County Kansas
Tricia L. Robello, LS #1246

Entered on transfer record this ___ day of _____, 2011.

_____ County Clerk
Kelly B. Arnold

State of Kansas)
SS
Sedgwick County)

This is to certify that this plat has been filed for record in the office of the Register of Deeds, this ___ day of _____, 2011, at _____ o'clock __ M. and is duly recorded.

_____ Register of Deeds
Bill Meek

_____ Deputy
Tonya Buckingham

DWG FILE: SURVEY BASE
PROJECT NO. 3856P
OCTOBER 28, 2011

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main (316) 264-8008
Wichita, Kansas 67203 (316) 264-4621 fax
www.rbkansas.com E-mail: info@rbkansas.com

AERIAL

50' 0 50'

LAMPTON ADDITION
AERIAL
WICHITA, KANSAS

Ruggles & Bohm, P.A.
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924 North Main
Wichita, Kansas 67203
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(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com

DESIGN A
DRAWN A
REVIEW
UTILITY
DATE Nov. 1

DRAWING FILE SURVEY BASE {Aerial}
PROJECT NUMBER .

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DRAINAGE CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

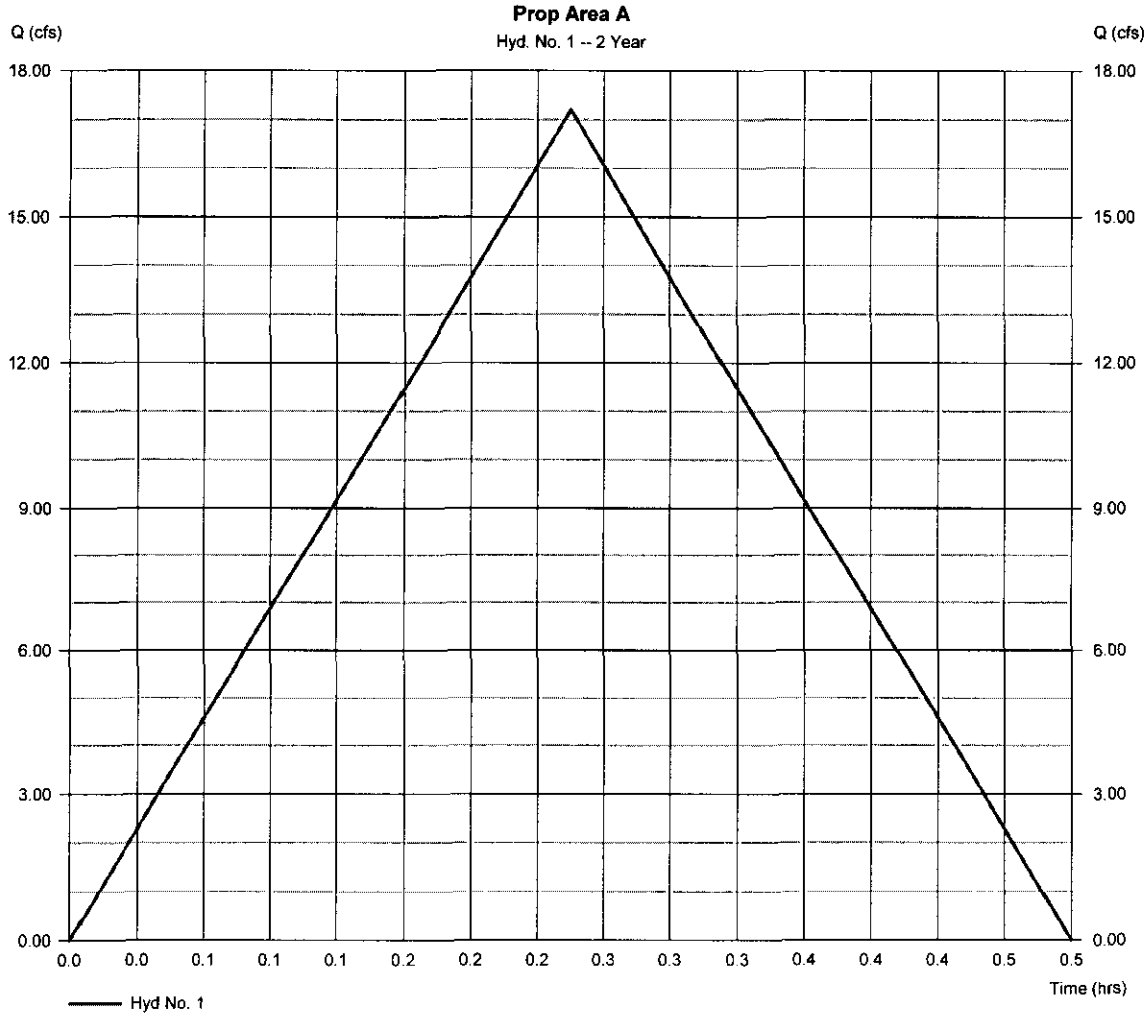
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	Rational	17.20	1	15	0.355	-----	-----	-----	Prop Area A
2	Rational	5.089	1	15	0.105	-----	-----	-----	Prop Area A
3	Reservoir	3.971	1	27	0.343	1	1298.34	0.305	Pond 1
4	Combine	6.836	1	19	0.459	2, 3	-----	-----	Proposed Total Site
5	Rational	14.52	1	15	0.300	-----	-----	-----	Exist Area A
6	Rational	5.862	1	15	0.121	-----	-----	-----	Exist Area B
7	Combine	20.39	1	15	0.421	5, 6	-----	-----	Existing Total Site

Hydrograph Report

Hyd. No. 1

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 17.20 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.355 acft
Drainage area	= 5.880 ac	Runoff coeff.	= 0.76
Intensity	= 3.849 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

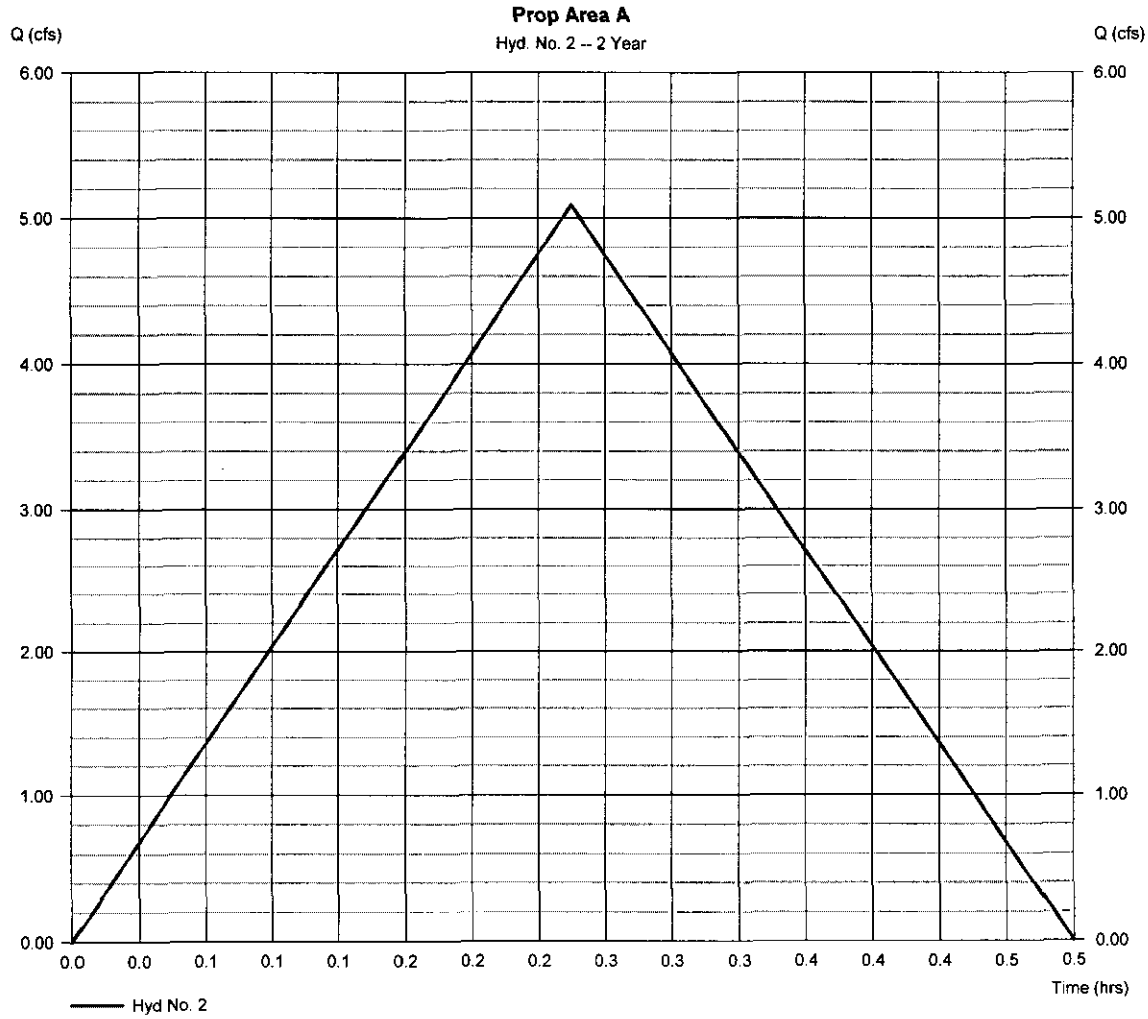


Hydrograph Report

Hyd. No. 2

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 5.089 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.105 acft
Drainage area	= 1.740 ac	Runoff coeff.	= 0.76
Intensity	= 3.849 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1



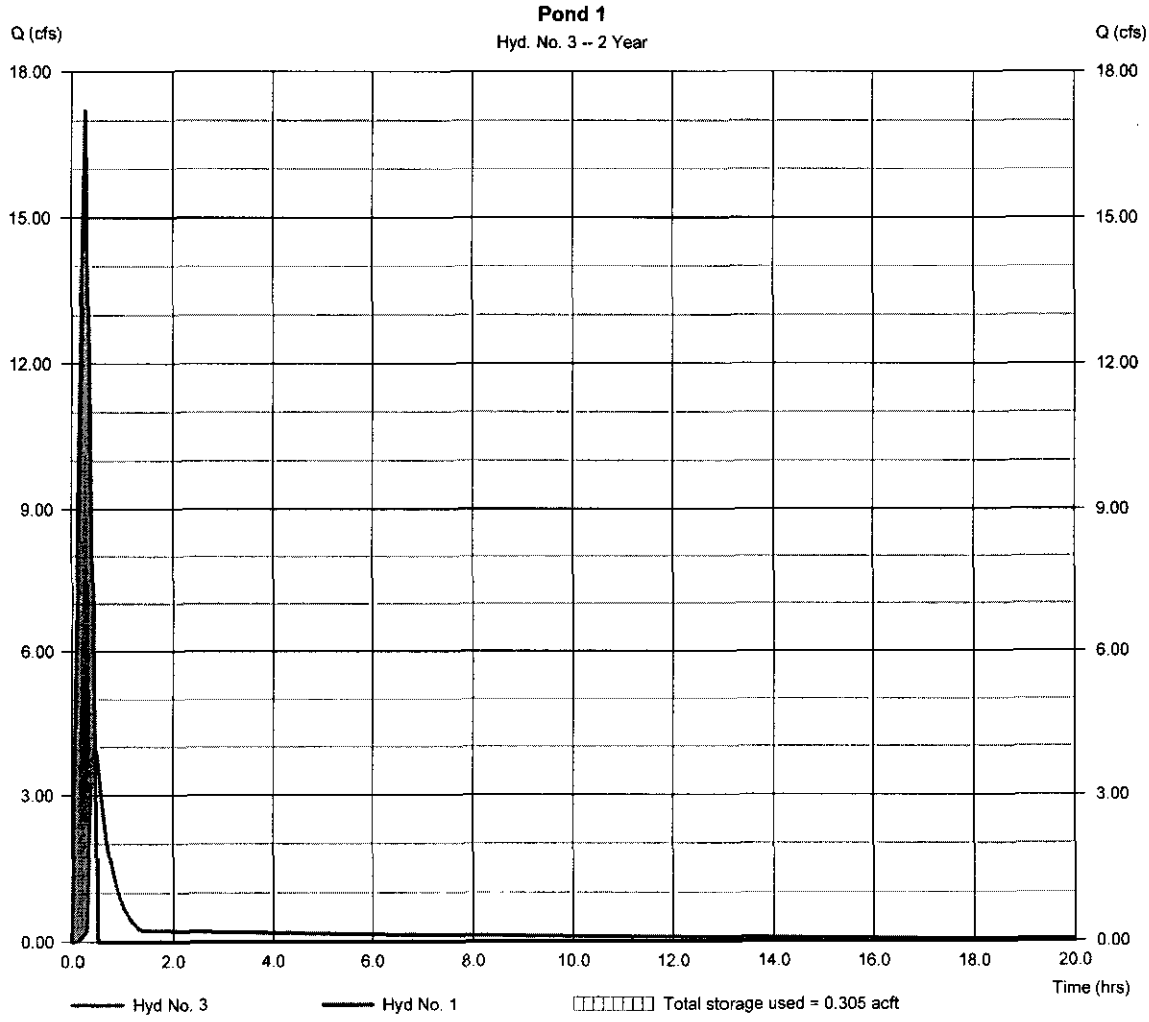
Hydrograph Report

Hyd. No. 3

Pond 1

Hydrograph type	= Reservoir	Peak discharge	= 3.971 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.45 hrs
Time interval	= 1 min	Hyd. volume	= 0.343 acft
Inflow hyd. No.	= 1 - Prop Area A	Max. Elevation	= 1298.34 ft
Reservoir name	= Pond 1	Max. Storage	= 0.305 acft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond 1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 1296.65 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1296.65	00	0.000	0.000
0.35	1297.00	4,607	0.019	0.019
1.35	1298.00	11,765	0.190	0.210
1.85	1298.50	13,132	0.143	0.352
2.35	1299.00	16,202	0.168	0.521
2.85	1299.50	500,000	2.963	3.483

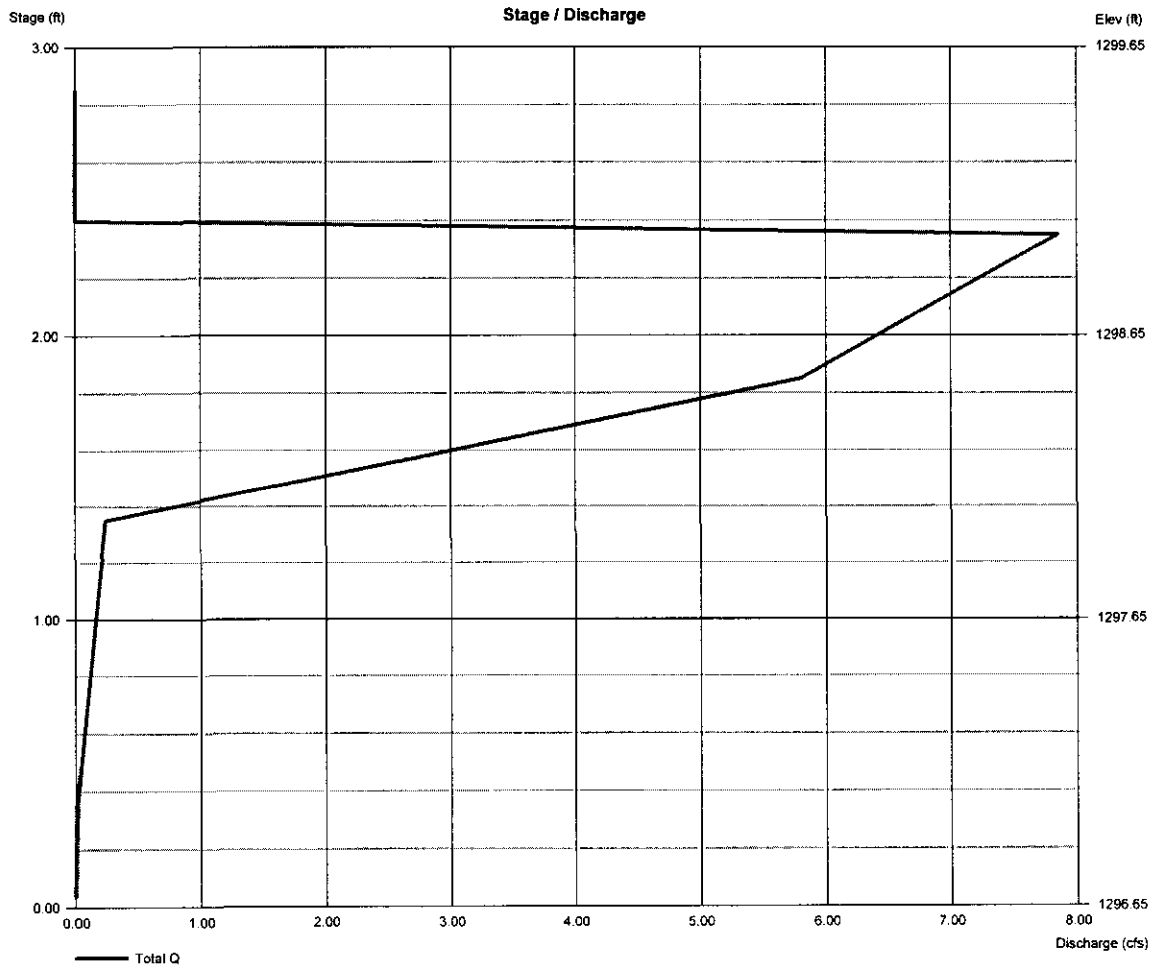
Culvert / Orifice Structures

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

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (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).

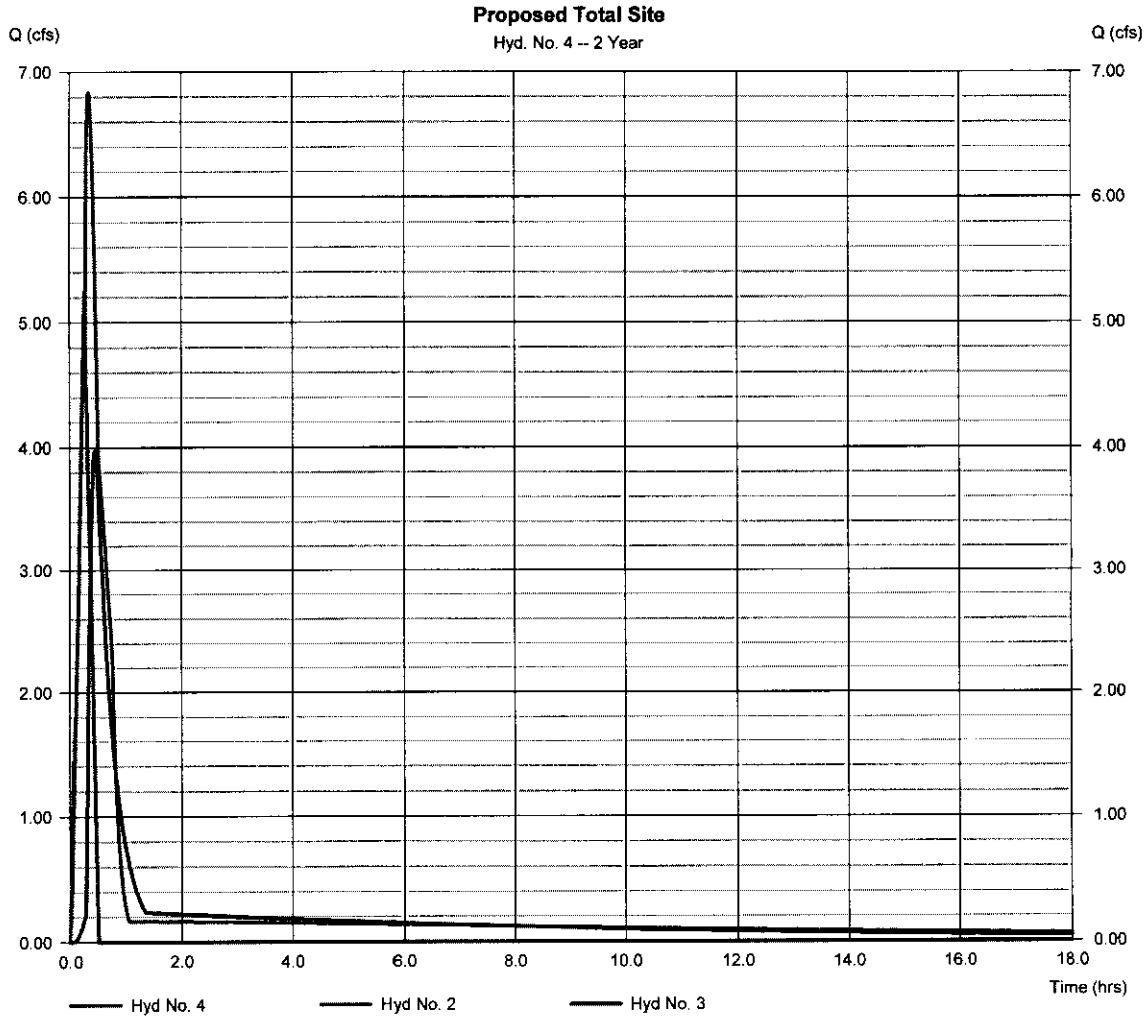


Hydrograph Report

Hyd. No. 4

Proposed Total Site

Hydrograph type	= Combine	Peak discharge	= 6.836 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 0.459 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.740 ac

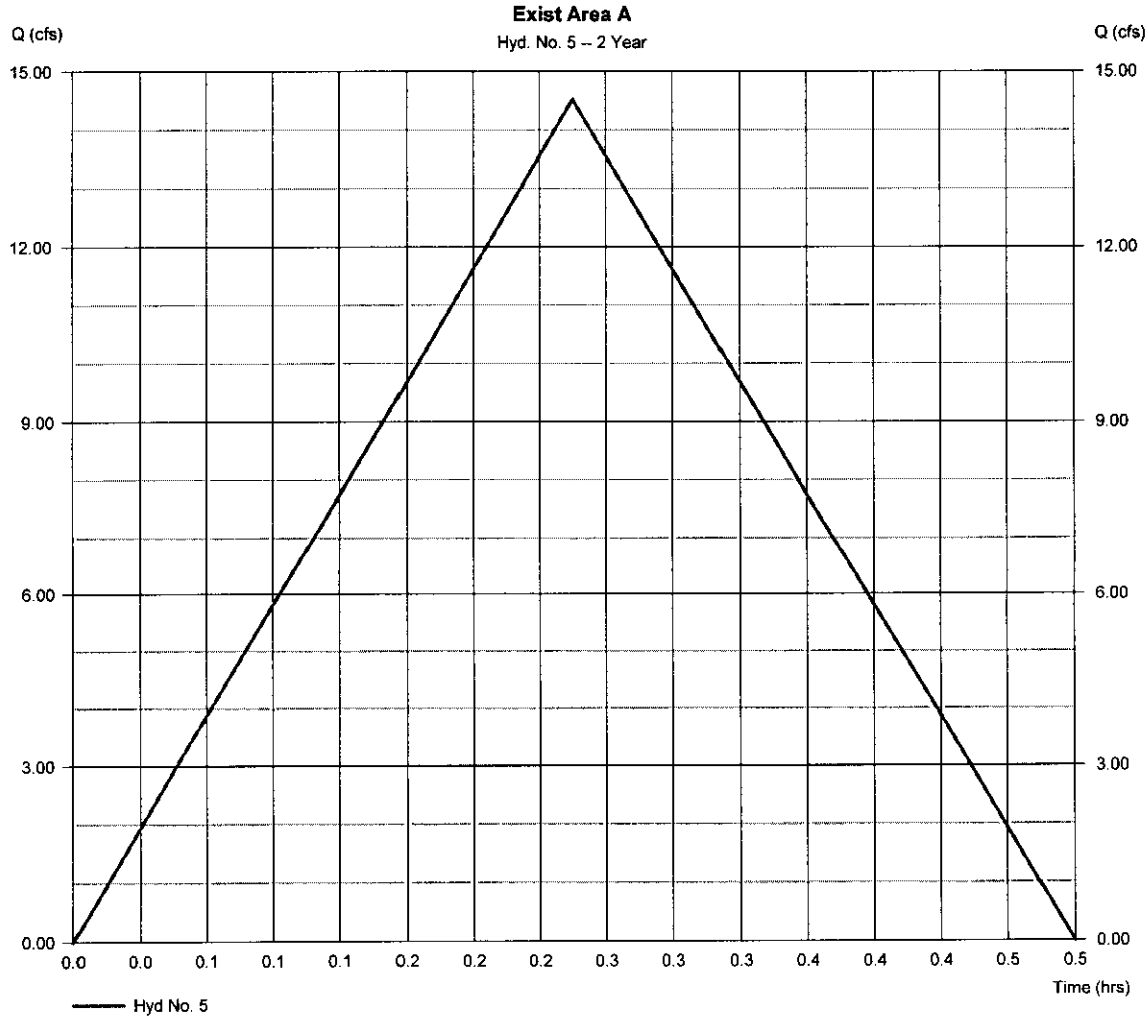


Hydrograph Report

Hyd. No. 5

Exist Area A

Hydrograph type	= Rational	Peak discharge	= 14.52 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.300 acft
Drainage area	= 5.550 ac	Runoff coeff.	= 0.68
Intensity	= 3.849 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

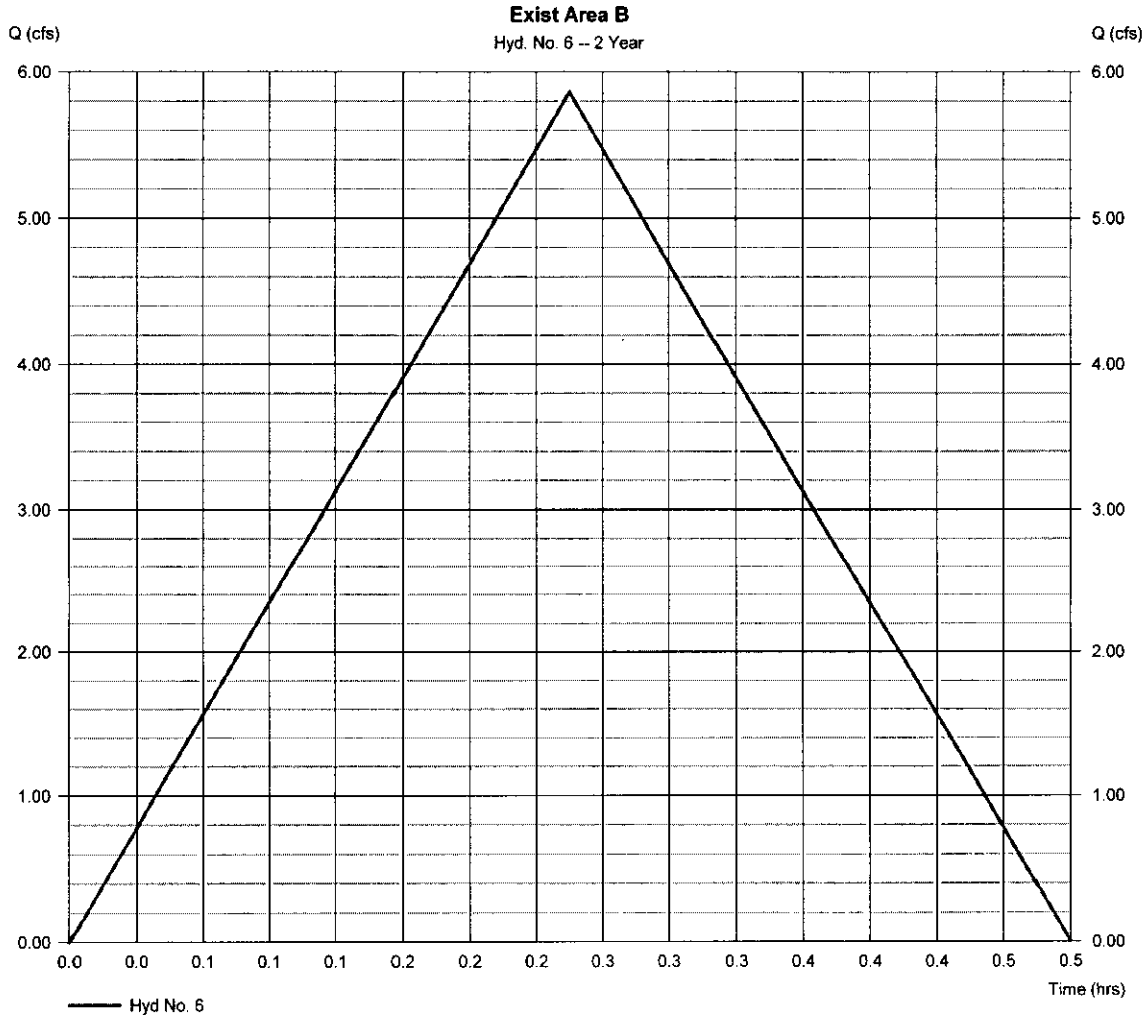


Hydrograph Report

Hyd. No. 6

Exist Area B

Hydrograph type	= Rational	Peak discharge	= 5.862 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.121 acft
Drainage area	= 2.240 ac	Runoff coeff.	= 0.68
Intensity	= 3.849 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

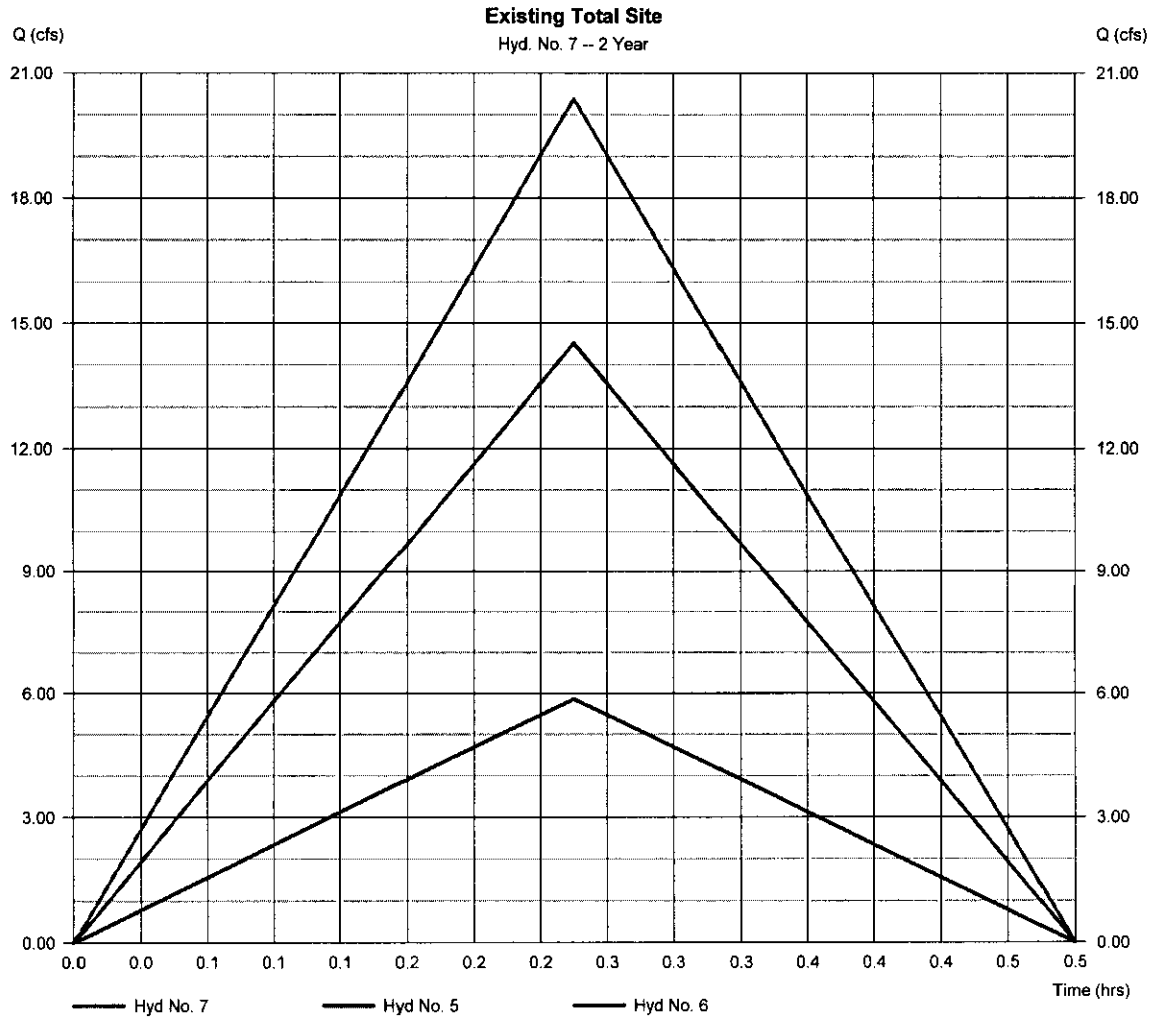


Hydrograph Report

Hyd. No. 7

Existing Total Site

Hydrograph type	= Combine	Peak discharge	= 20.39 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.421 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 7.790 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

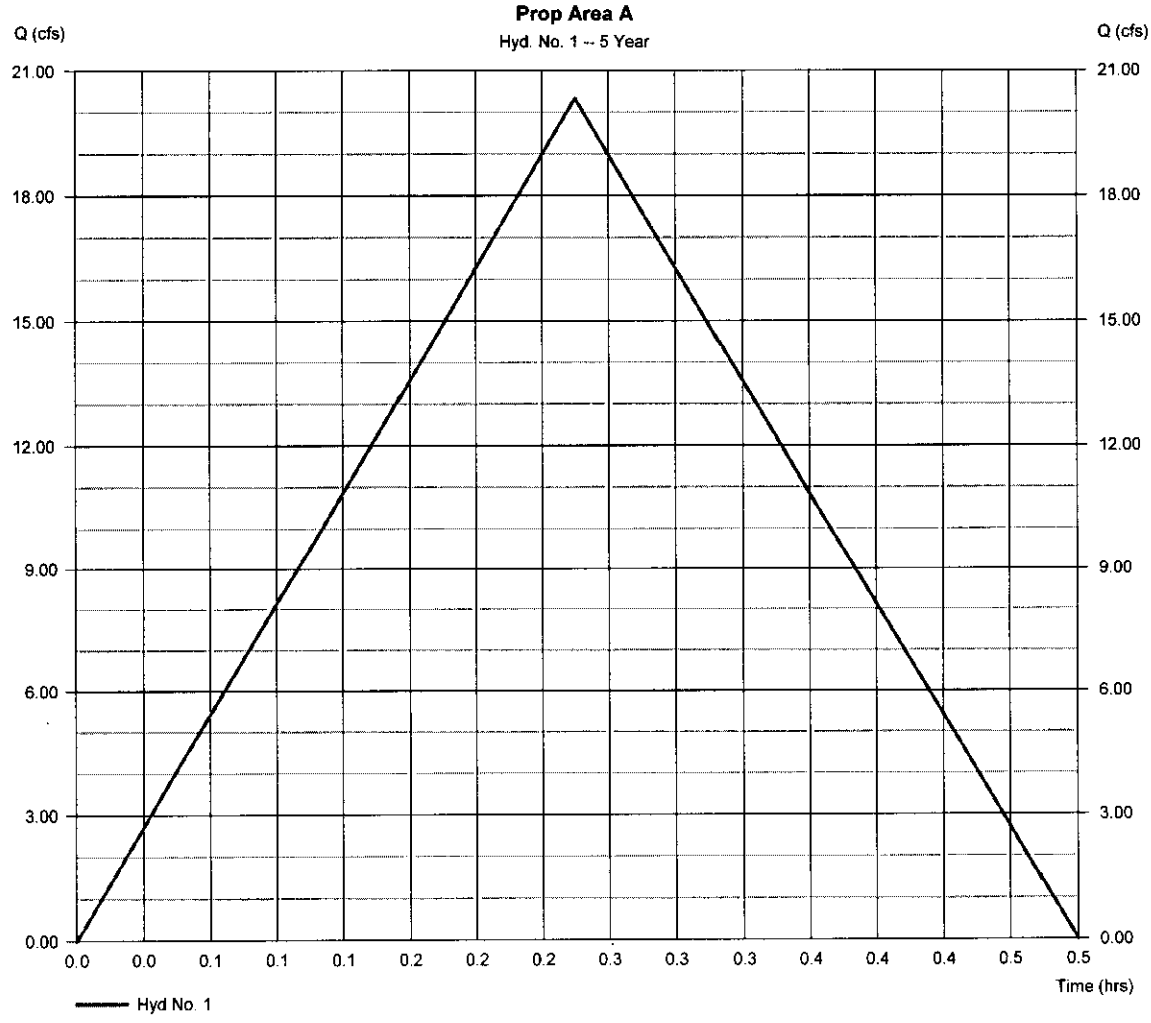
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	Rational	20.33	1	15	0.420	------	------	------	Prop Area A
2	Rational	6.016	1	15	0.124	------	------	------	Prop Area A
3	Reservoir	5.526	1	26	0.407	1	1298.48	0.345	Pond 1
4	Combine	8.466	1	18	0.543	2, 3	------	------	Proposed Total Site
5	Rational	17.17	1	15	0.355	------	------	------	Exist Area A
6	Rational	6.929	1	15	0.143	------	------	------	Exist Area B
7	Combine	24.10	1	15	0.498	5, 6	------	------	Existing Total Site

Hydrograph Report

Hyd. No. 1

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 20.33 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.420 acft
Drainage area	= 5.880 ac	Runoff coeff.	= 0.76
Intensity	= 4.549 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

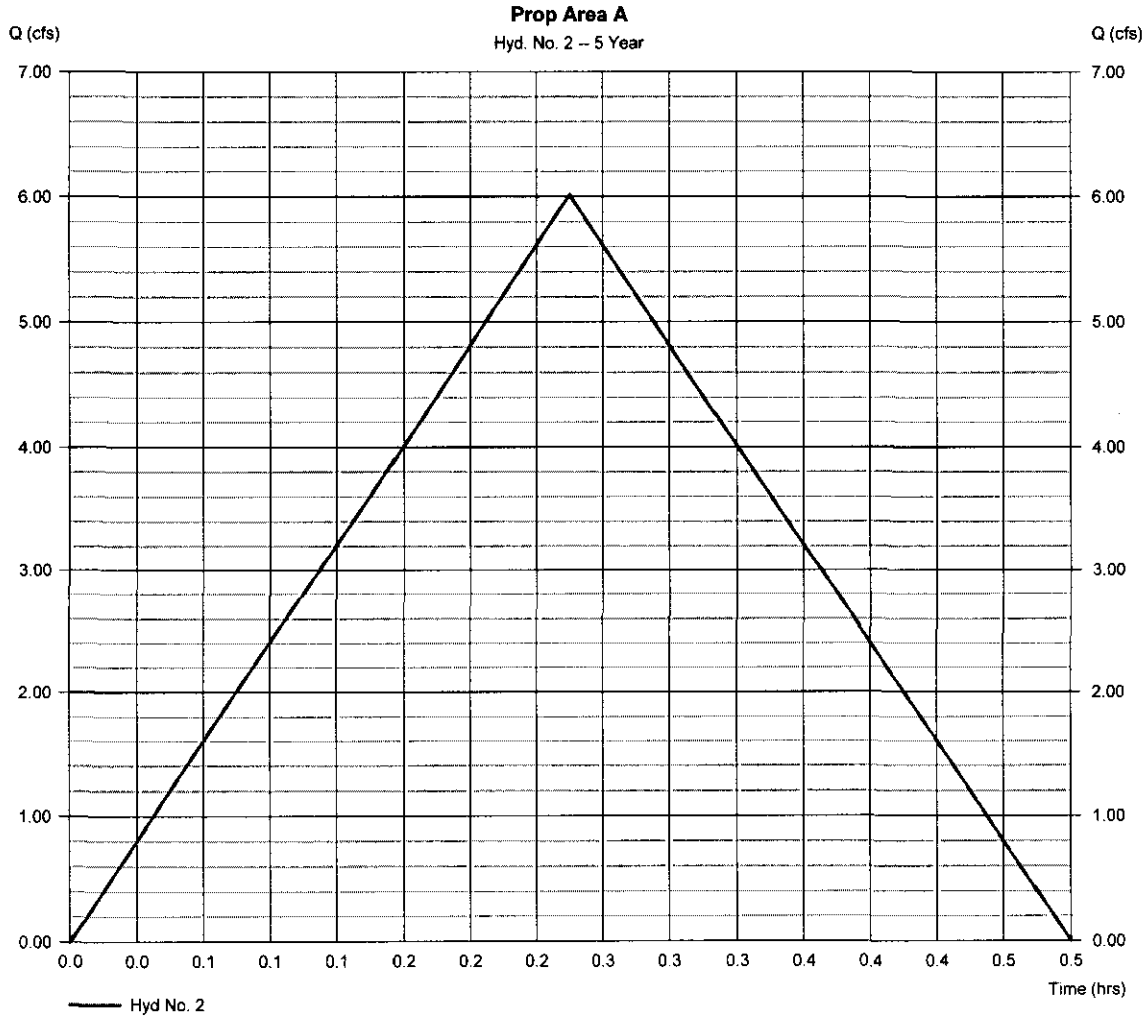


Hydrograph Report

Hyd. No. 2

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 6.016 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.124 acft
Drainage area	= 1.740 ac	Runoff coeff.	= 0.76
Intensity	= 4.549 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1



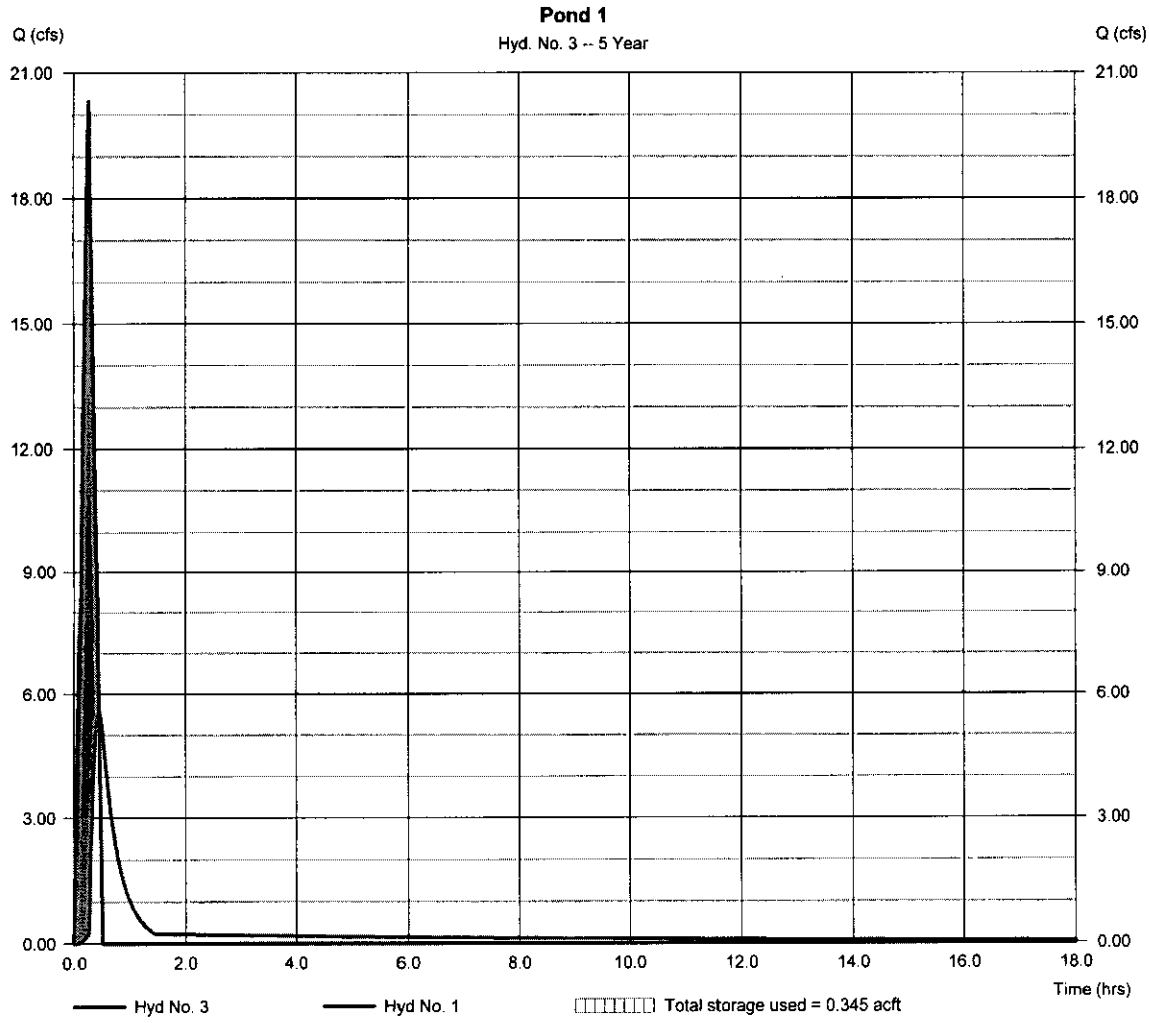
Hydrograph Report

Hyd. No. 3

Pond 1

Hydrograph type	= Reservoir	Peak discharge	= 5.526 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.43 hrs
Time interval	= 1 min	Hyd. volume	= 0.407 acft
Inflow hyd. No.	= 1 - Prop Area A	Max. Elevation	= 1298.48 ft
Reservoir name	= Pond 1	Max. Storage	= 0.345 acft

Storage Indication method used.

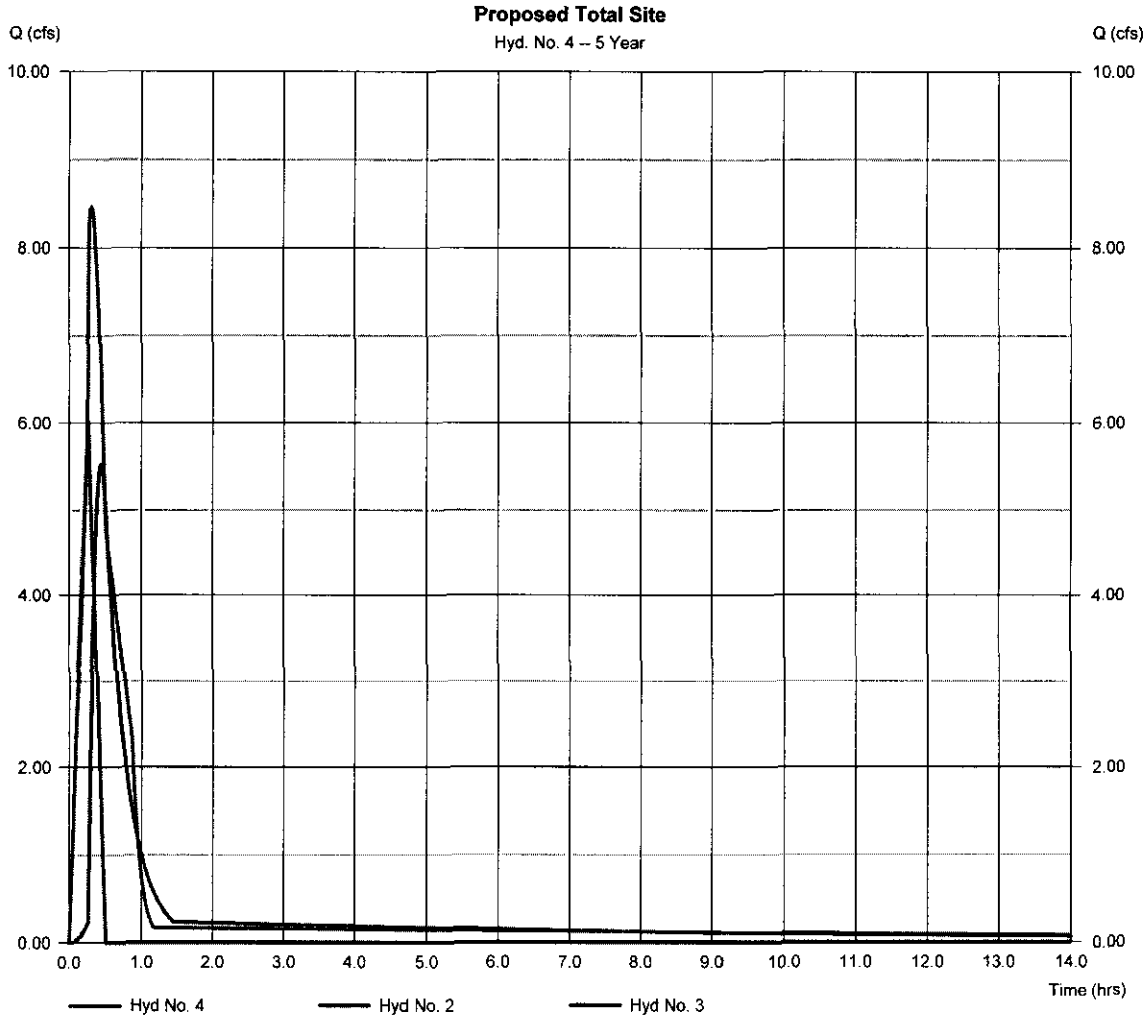


Hydrograph Report

Hyd. No. 4

Proposed Total Site

Hydrograph type	= Combine	Peak discharge	= 8.466 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 0.543 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.740 ac

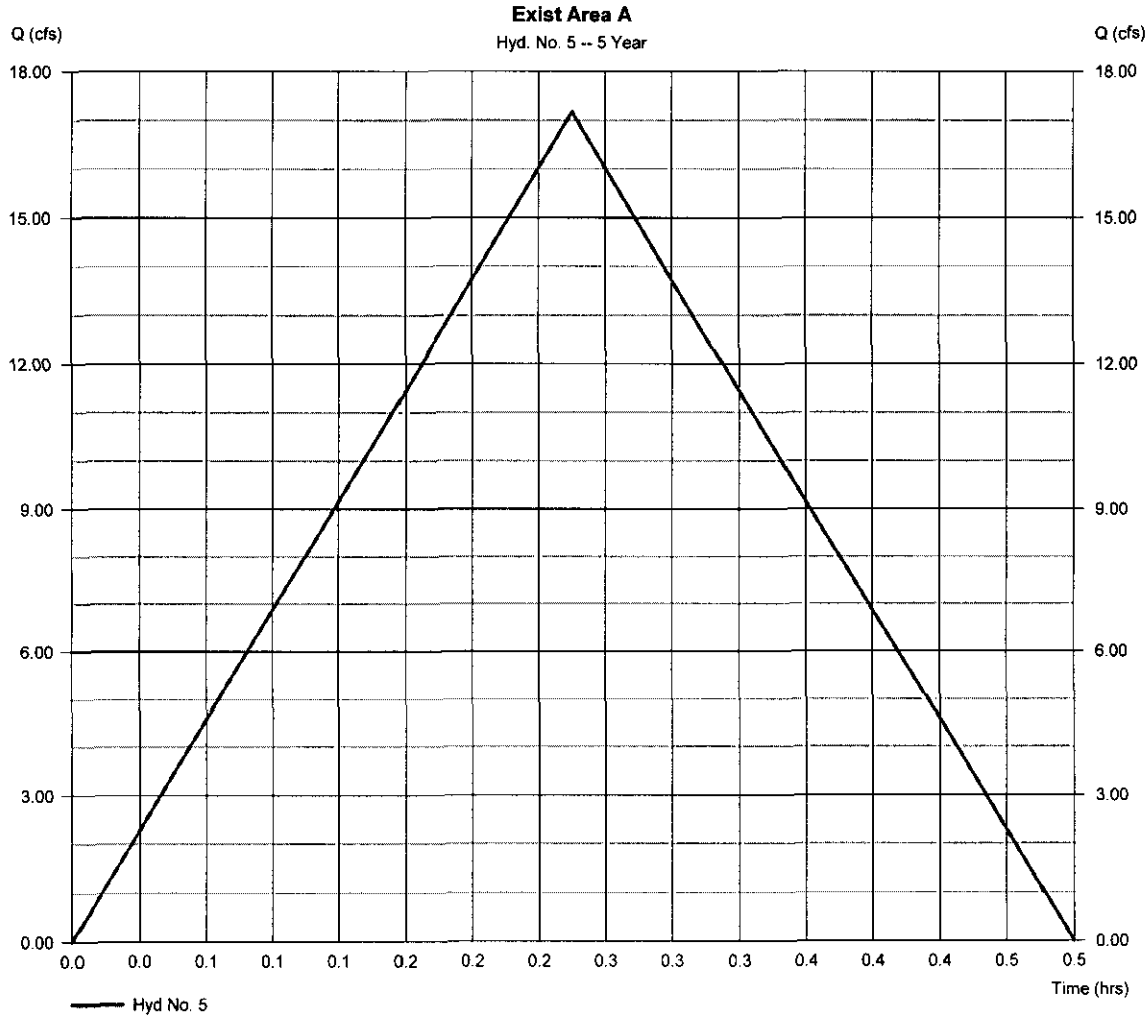


Hydrograph Report

Hyd. No. 5

Exist Area A

Hydrograph type	= Rational	Peak discharge	= 17.17 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.355 acft
Drainage area	= 5.550 ac	Runoff coeff.	= 0.68
Intensity	= 4.549 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

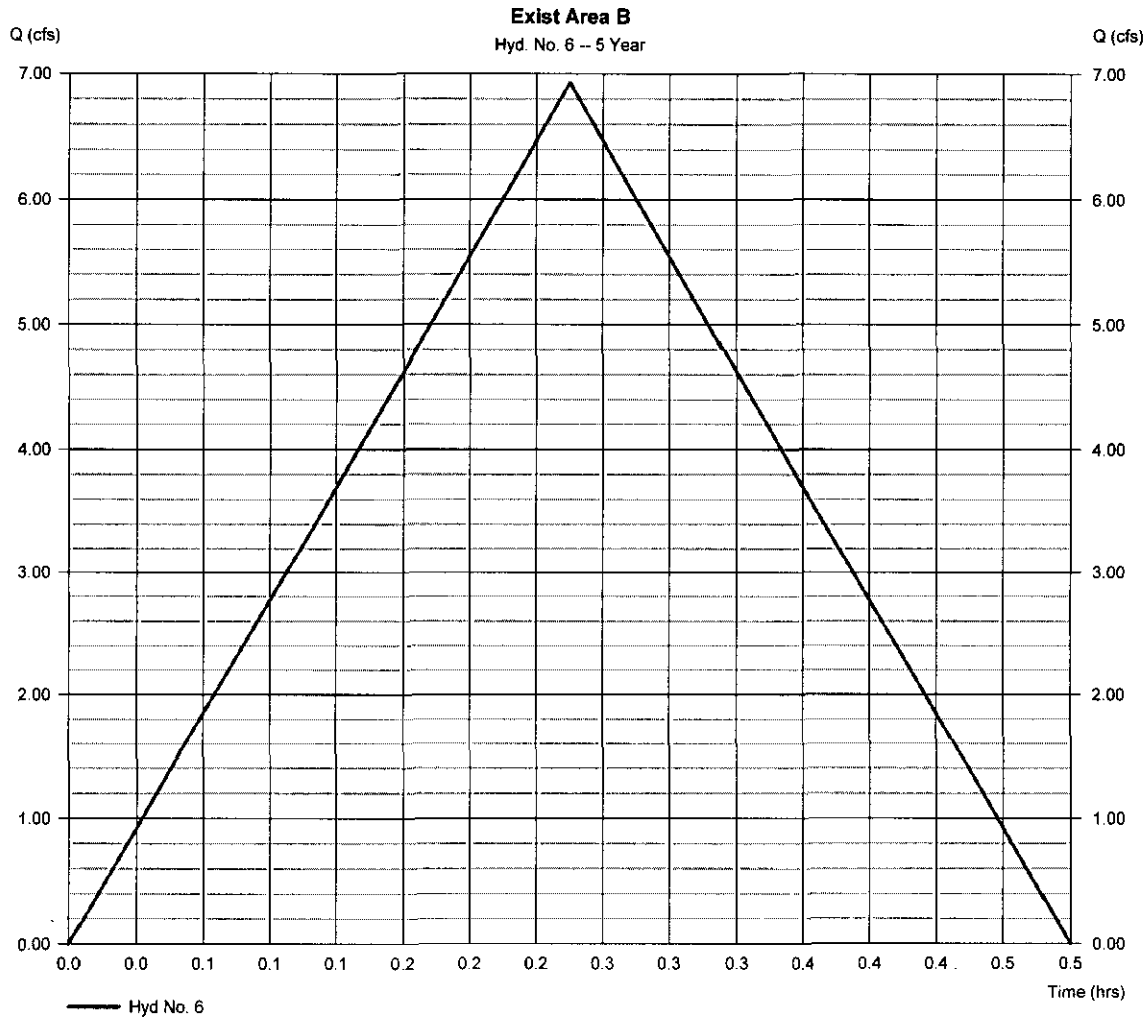


Hydrograph Report

Hyd. No. 6

Exist Area B

Hydrograph type	= Rational	Peak discharge	= 6.929 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.143 acft
Drainage area	= 2.240 ac	Runoff coeff.	= 0.68
Intensity	= 4.549 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

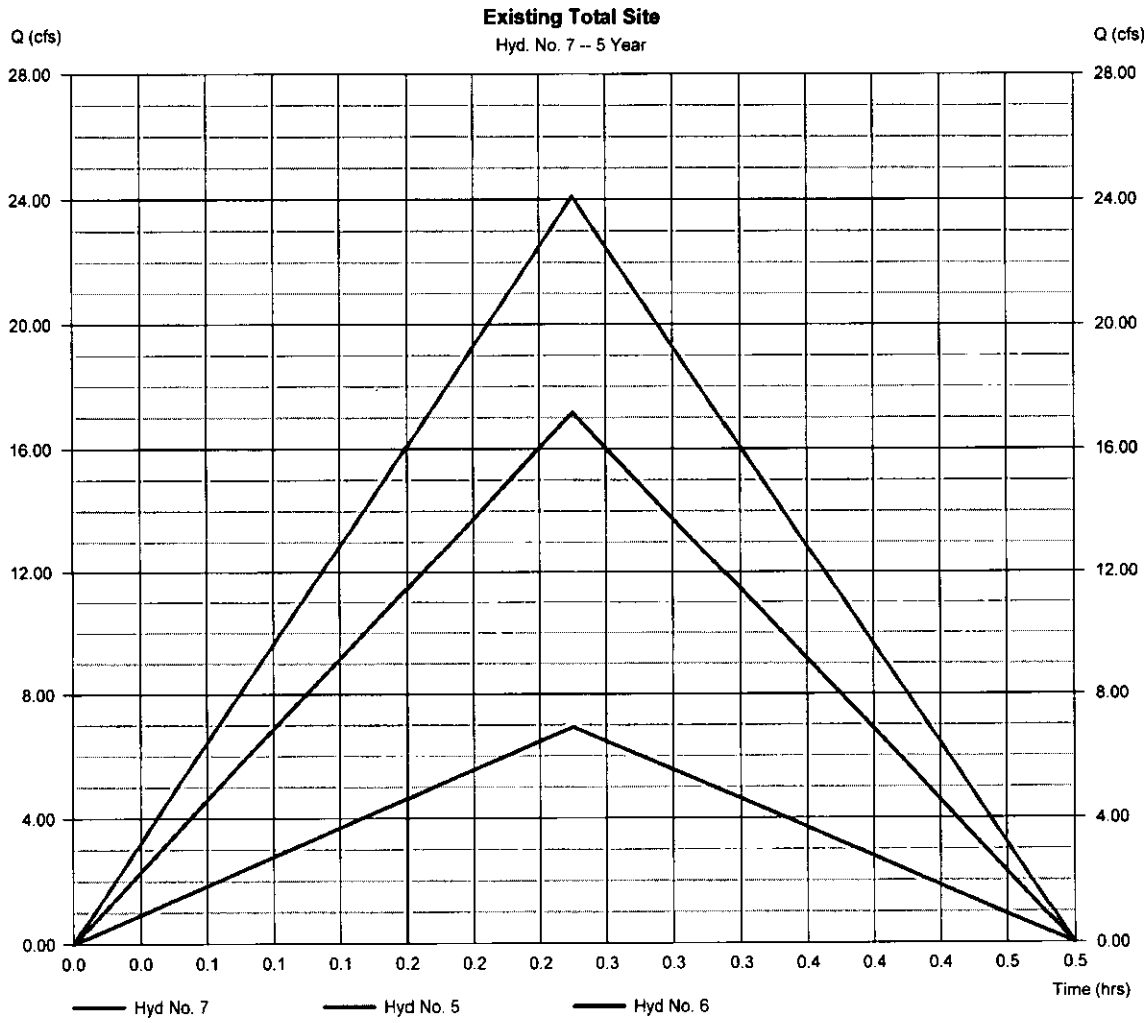


Hydrograph Report

Hyd. No. 7

Existing Total Site

Hydrograph type	= Combine	Peak discharge	= 24.10 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.498 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 7.790 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

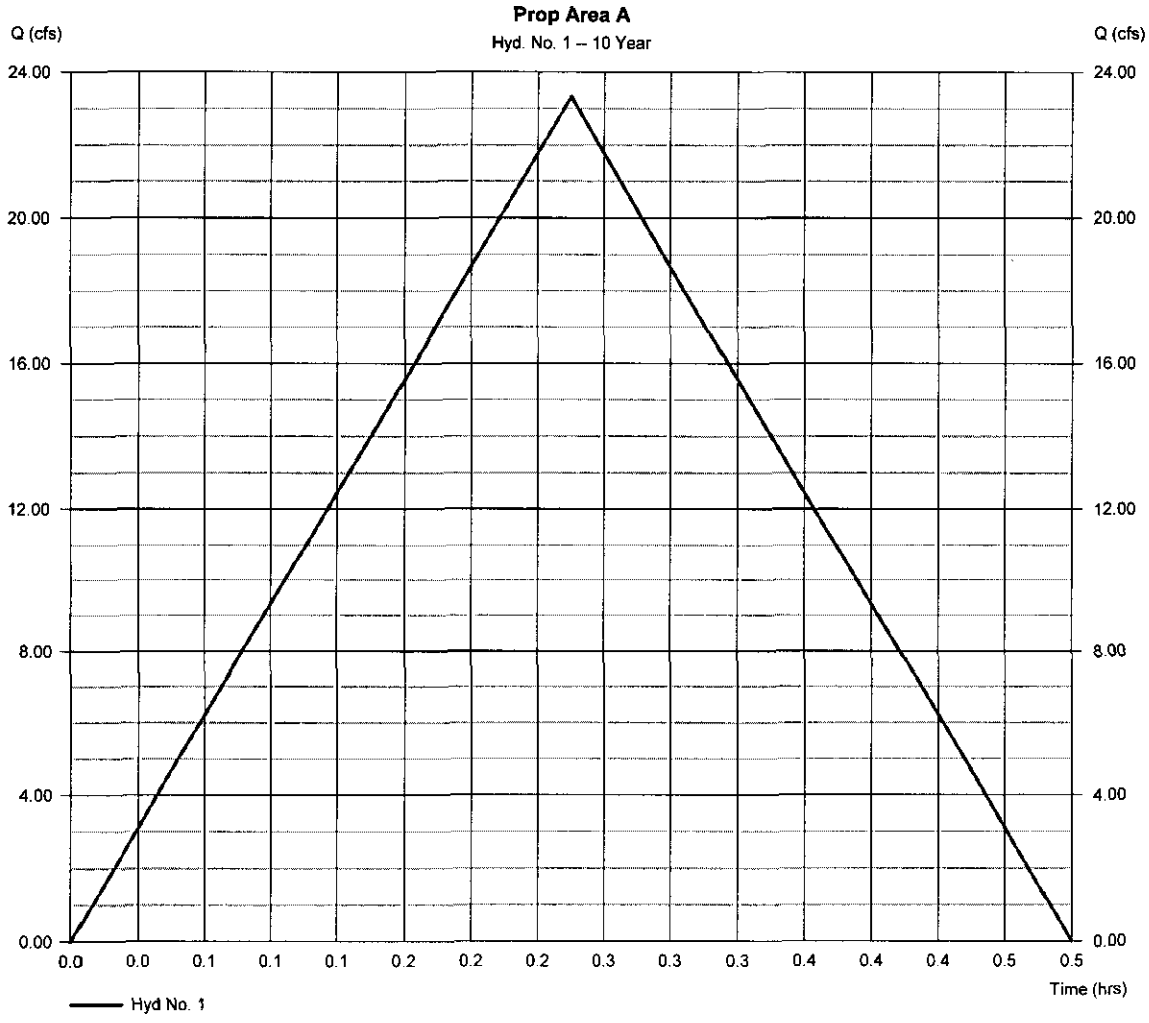
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	Rational	23.33	1	15	0.482	-----	-----	-----	Prop Area A
2	Rational	6.904	1	15	0.143	-----	-----	-----	Prop Area A
3	Reservoir	6.219	1	26	0.469	1	1298.60	0.387	Pond 1
4	Combine	9.954	1	17	0.623	2, 3	-----	-----	Proposed Total Site
5	Rational	19.70	1	15	0.407	-----	-----	-----	Exist Area A
6	Rational	7.952	1	15	0.164	-----	-----	-----	Exist Area B
7	Combine	27.66	1	15	0.571	5, 6	-----	-----	Existing Total Site

Hydrograph Report

Hyd. No. 1

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 23.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.482 acft
Drainage area	= 5.880 ac	Runoff coeff.	= 0.76
Intensity	= 5.221 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

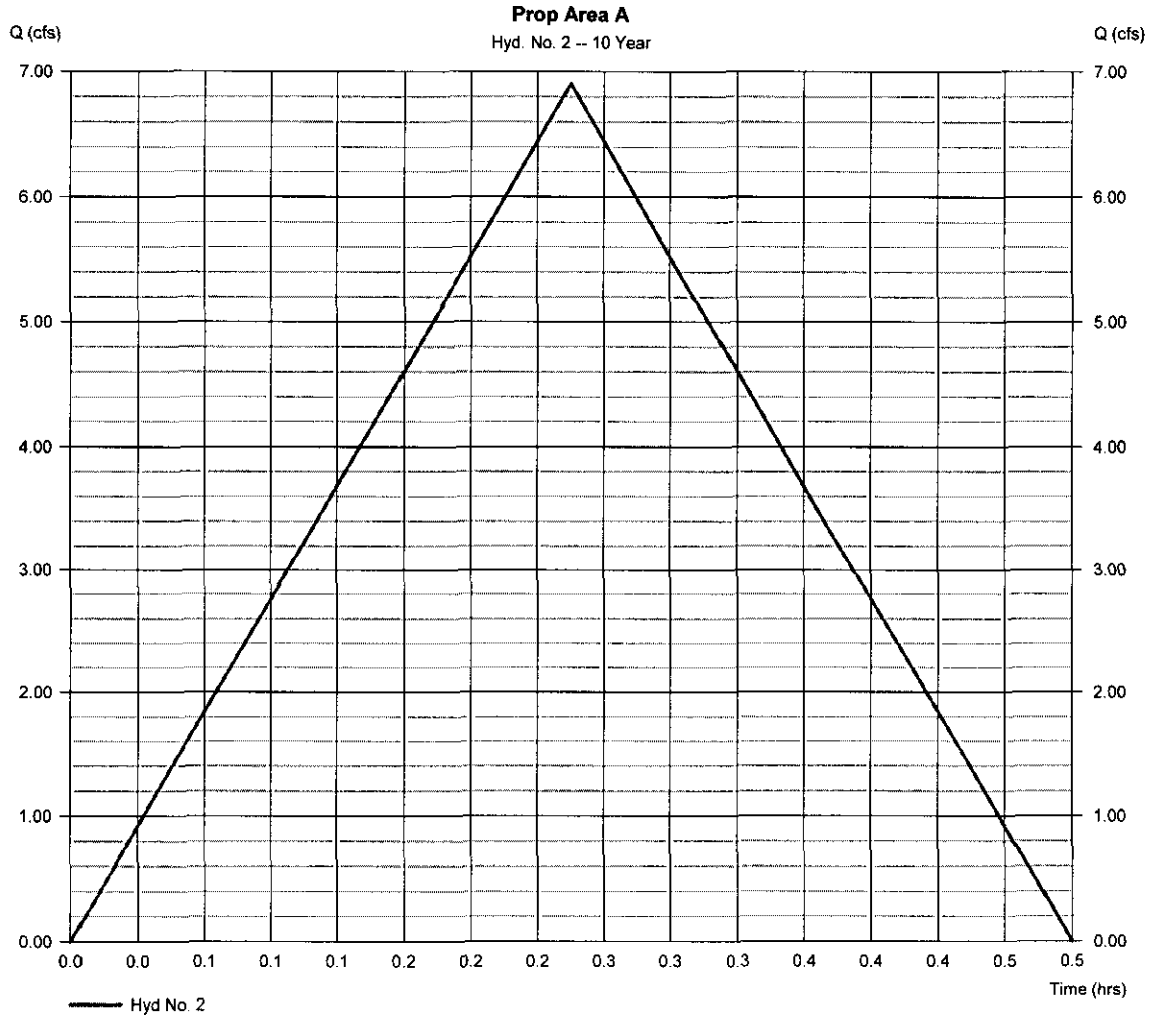


Hydrograph Report

Hyd. No. 2

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 6.904 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.143 acft
Drainage area	= 1.740 ac	Runoff coeff.	= 0.76
Intensity	= 5.221 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1



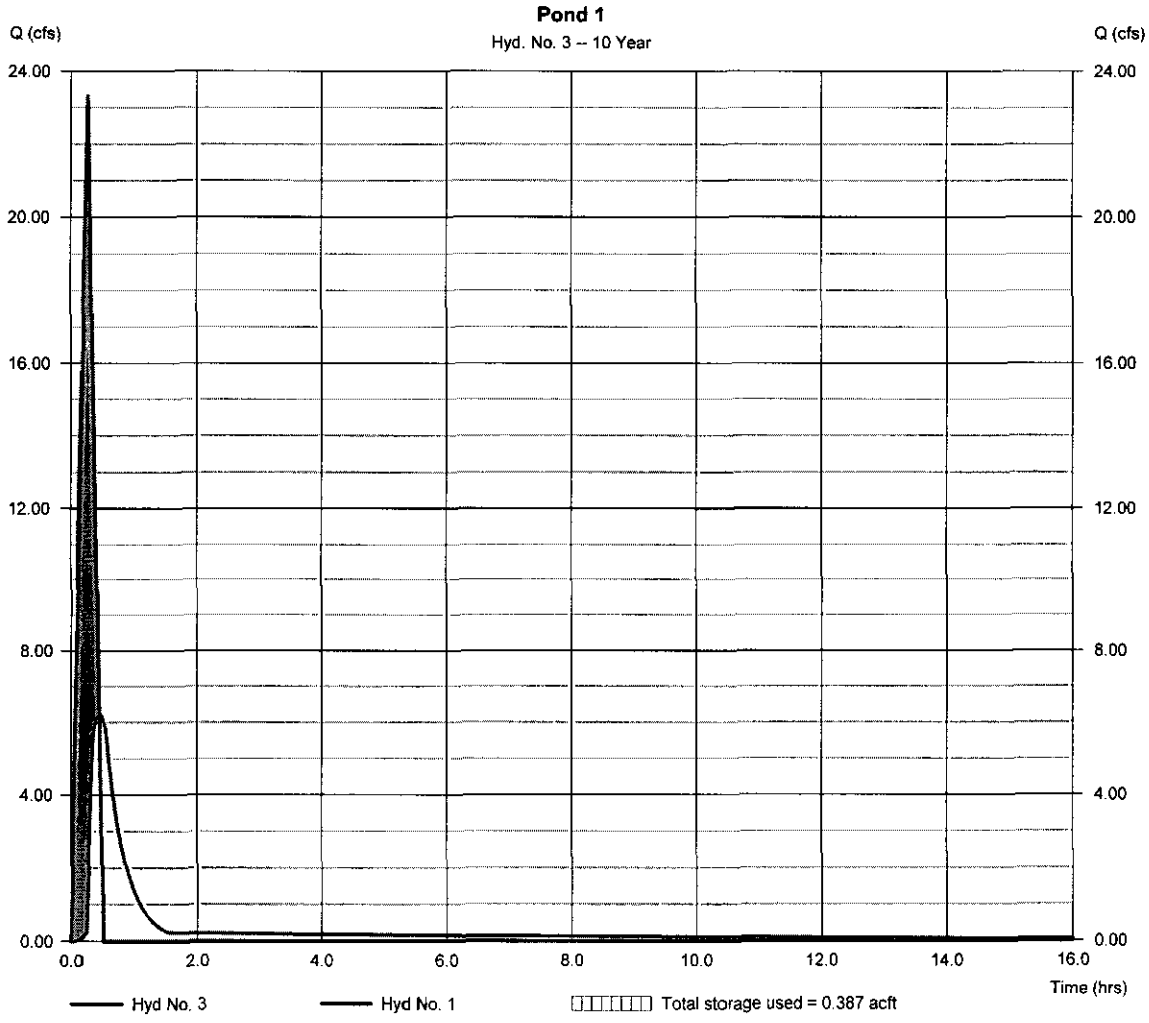
Hydrograph Report

Hyd. No. 3

Pond 1

Hydrograph type	= Reservoir	Peak discharge	= 6.219 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.43 hrs
Time interval	= 1 min	Hyd. volume	= 0.469 acft
Inflow hyd. No.	= 1 - Prop Area A	Max. Elevation	= 1298.60 ft
Reservoir name	= Pond 1	Max. Storage	= 0.387 acft

Storage Indication method used.

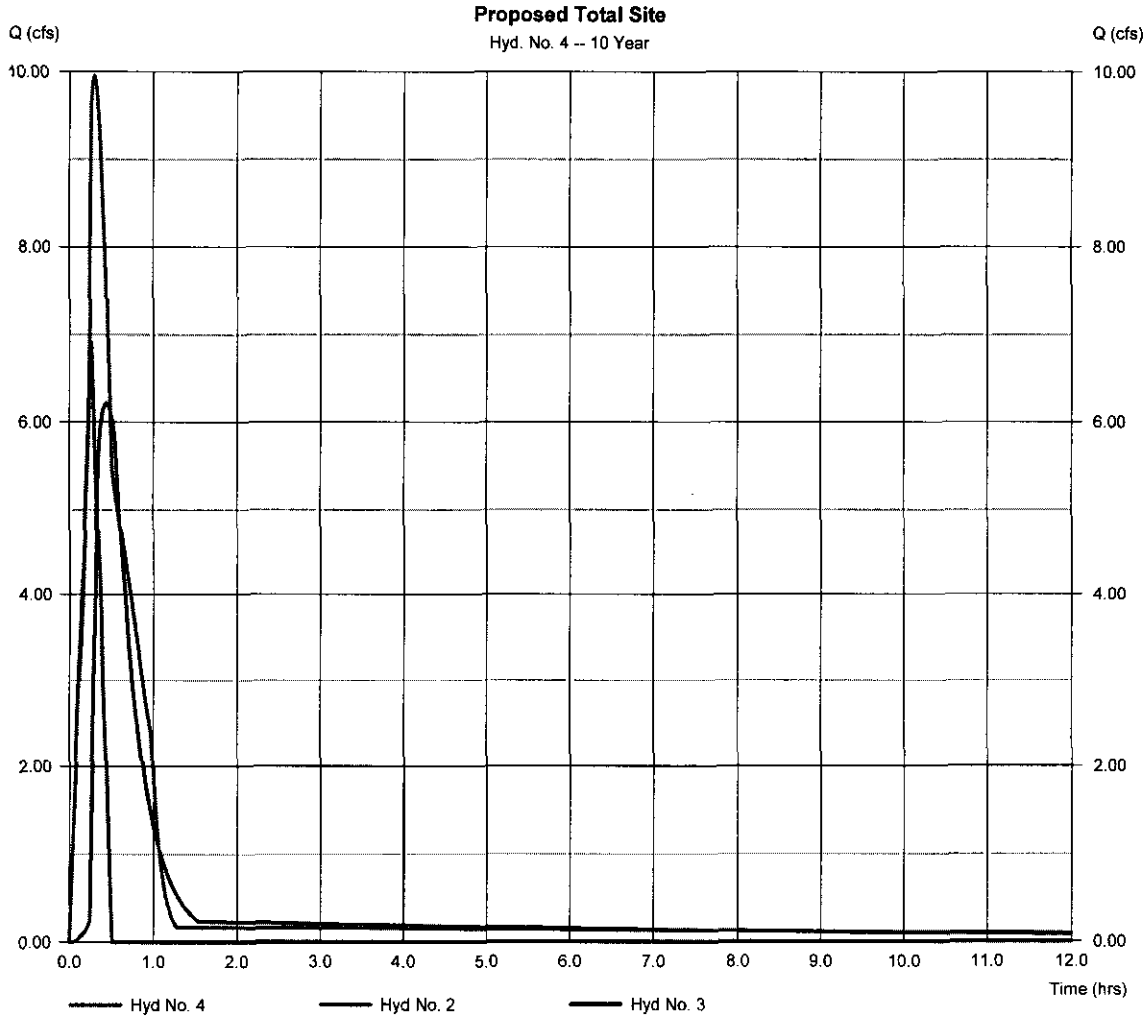


Hydrograph Report

Hyd. No. 4

Proposed Total Site

Hydrograph type	= Combine	Peak discharge	= 9.954 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 0.623 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.740 ac

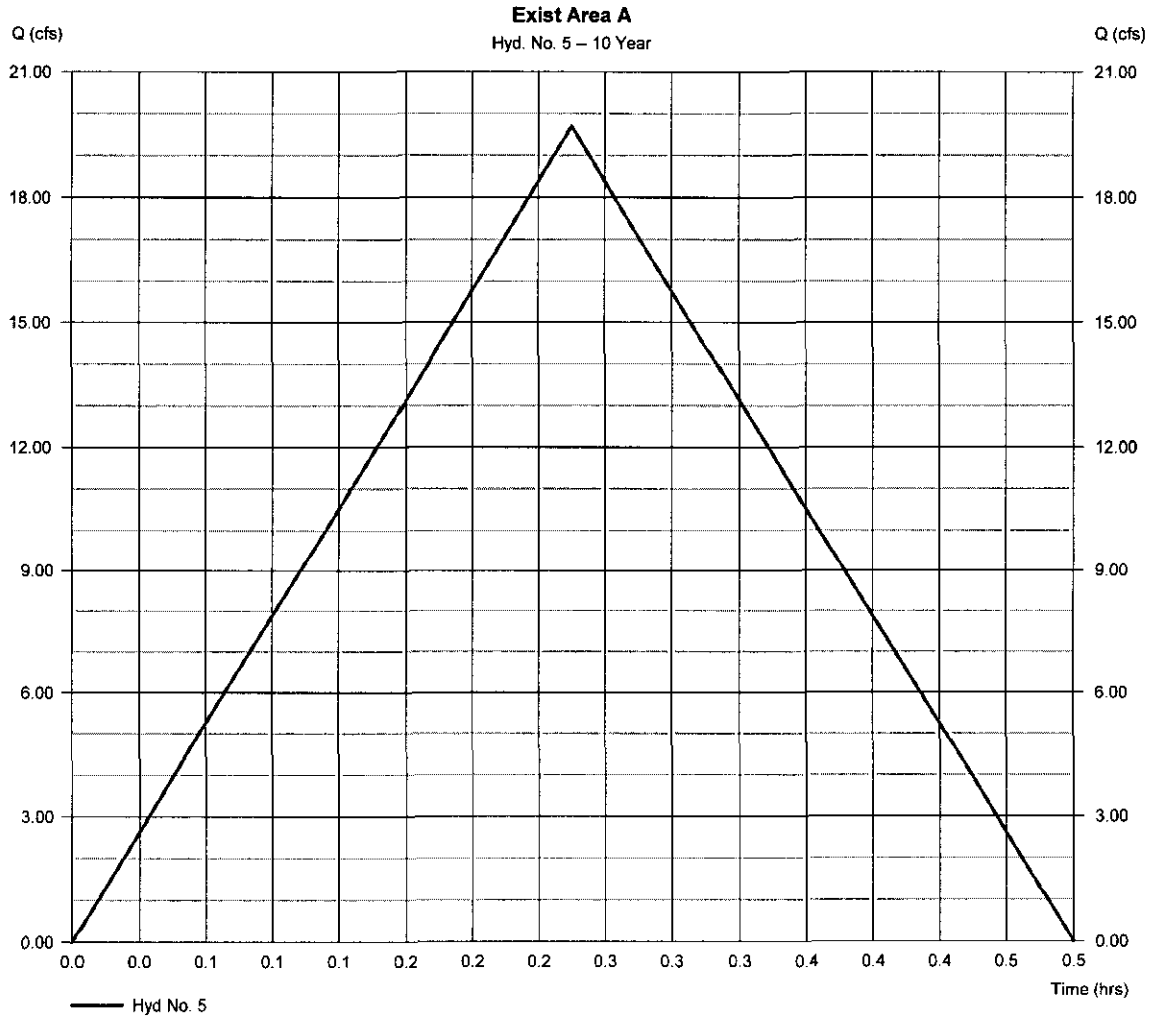


Hydrograph Report

Hyd. No. 5

Exist Area A

Hydrograph type	= Rational	Peak discharge	= 19.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.407 acft
Drainage area	= 5.550 ac	Runoff coeff.	= 0.68
Intensity	= 5.221 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

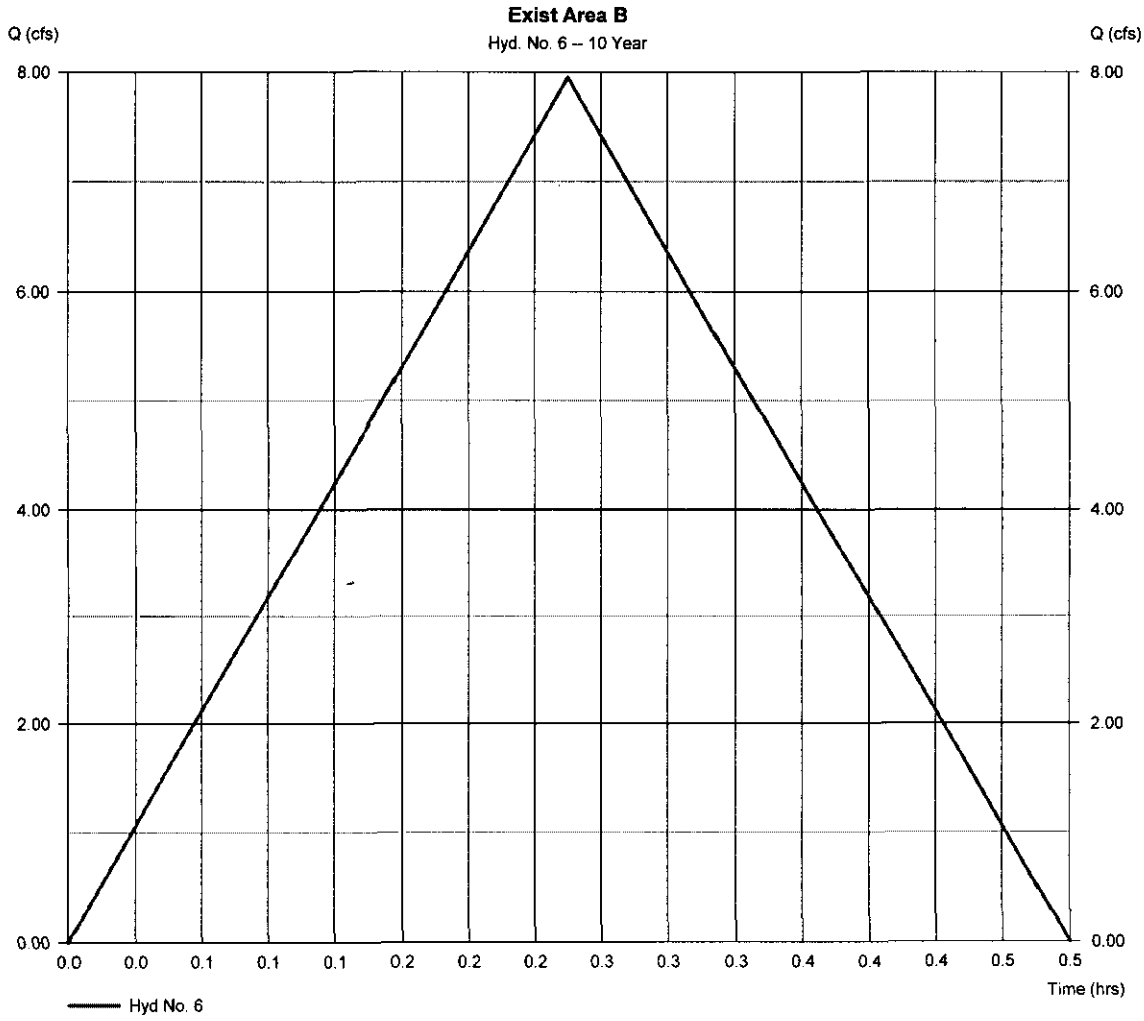


Hydrograph Report

Hyd. No. 6

Exist Area B

Hydrograph type	= Rational	Peak discharge	= 7.952 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.164 acft
Drainage area	= 2.240 ac	Runoff coeff.	= 0.68
Intensity	= 5.221 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

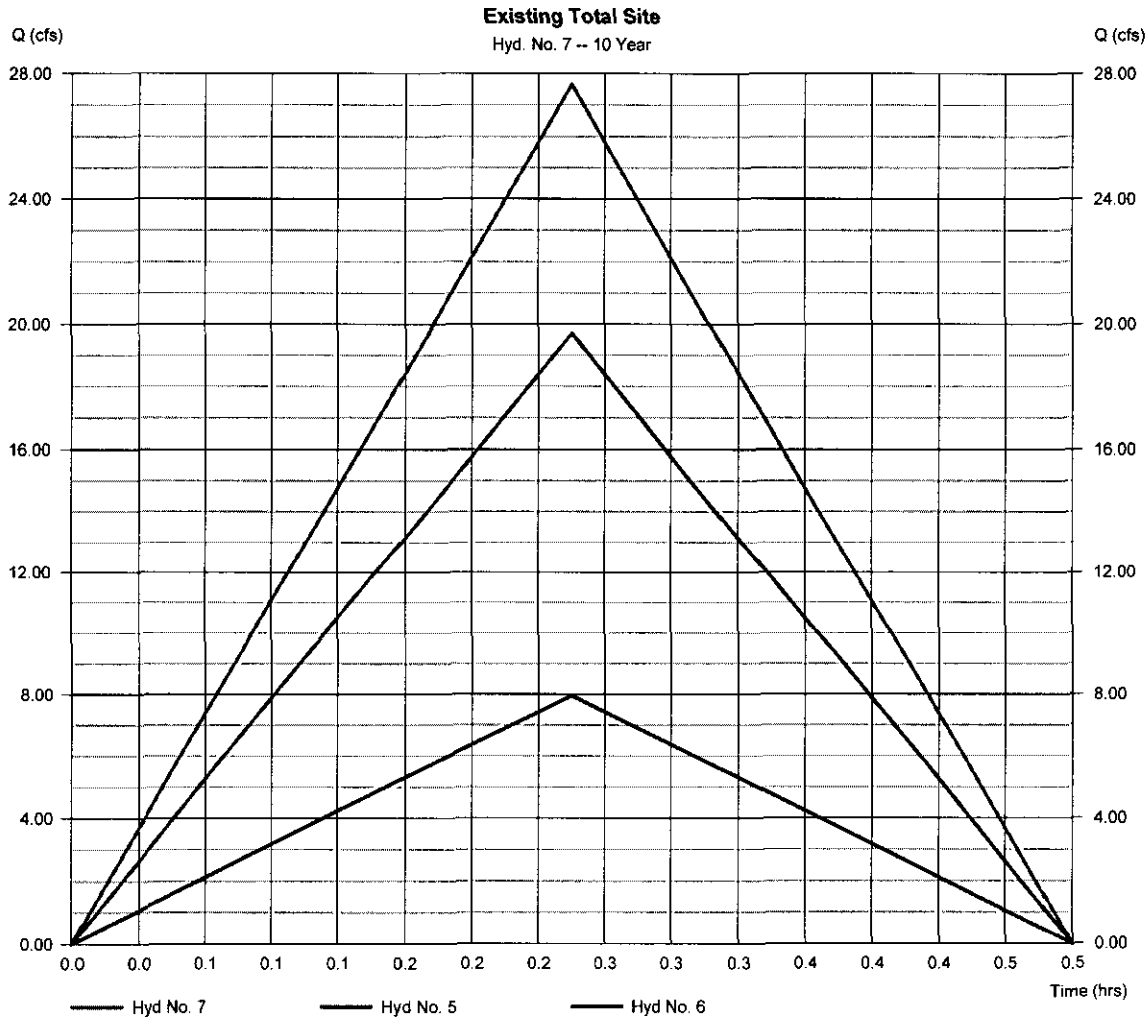


Hydrograph Report

Hyd. No. 7

Existing Total Site

Hydrograph type	= Combine	Peak discharge	= 27.66 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.571 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 7.790 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

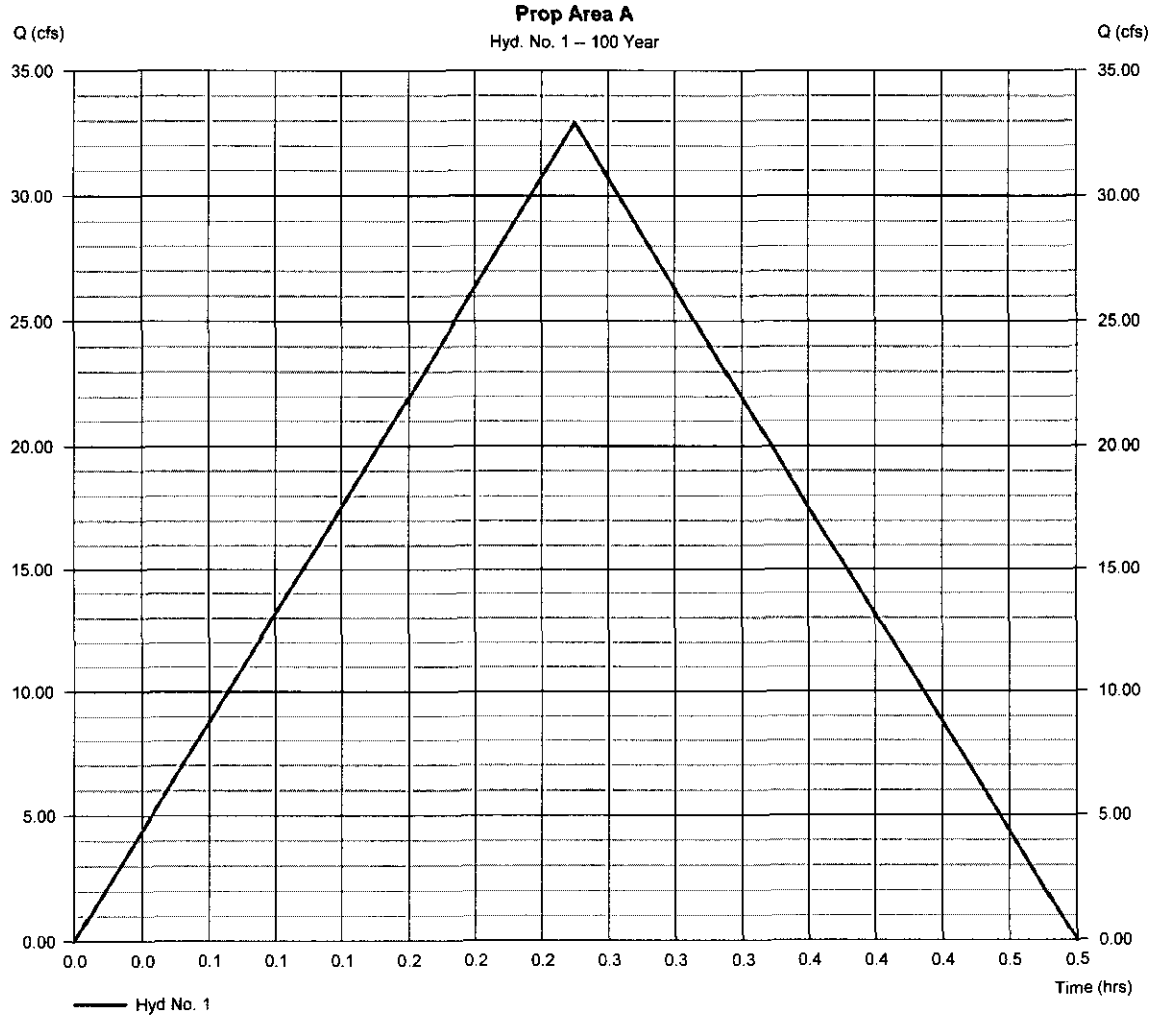
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time Interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	Rational	32.91	1	15	0.680	-----	-----	-----	Prop Area A
2	Rational	9.740	1	15	0.201	-----	-----	-----	Prop Area A
3	Reservoir	7.833	1	30	0.667	1	1299.00	0.537	Pond 1
4	Combine	14.39	1	15	0.880	2, 3	-----	-----	Proposed Total Site
5	Rational	27.80	1	15	0.574	-----	-----	-----	Exist Area A
6	Rational	11.22	1	15	0.232	-----	-----	-----	Exist Area B
7	Combine	39.01	1	15	0.806	5, 6	-----	-----	Existing Total Site

Hydrograph Report

Hyd. No. 1

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 32.91 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.680 acft
Drainage area	= 5.880 ac	Runoff coeff.	= 0.76
Intensity	= 7.365 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

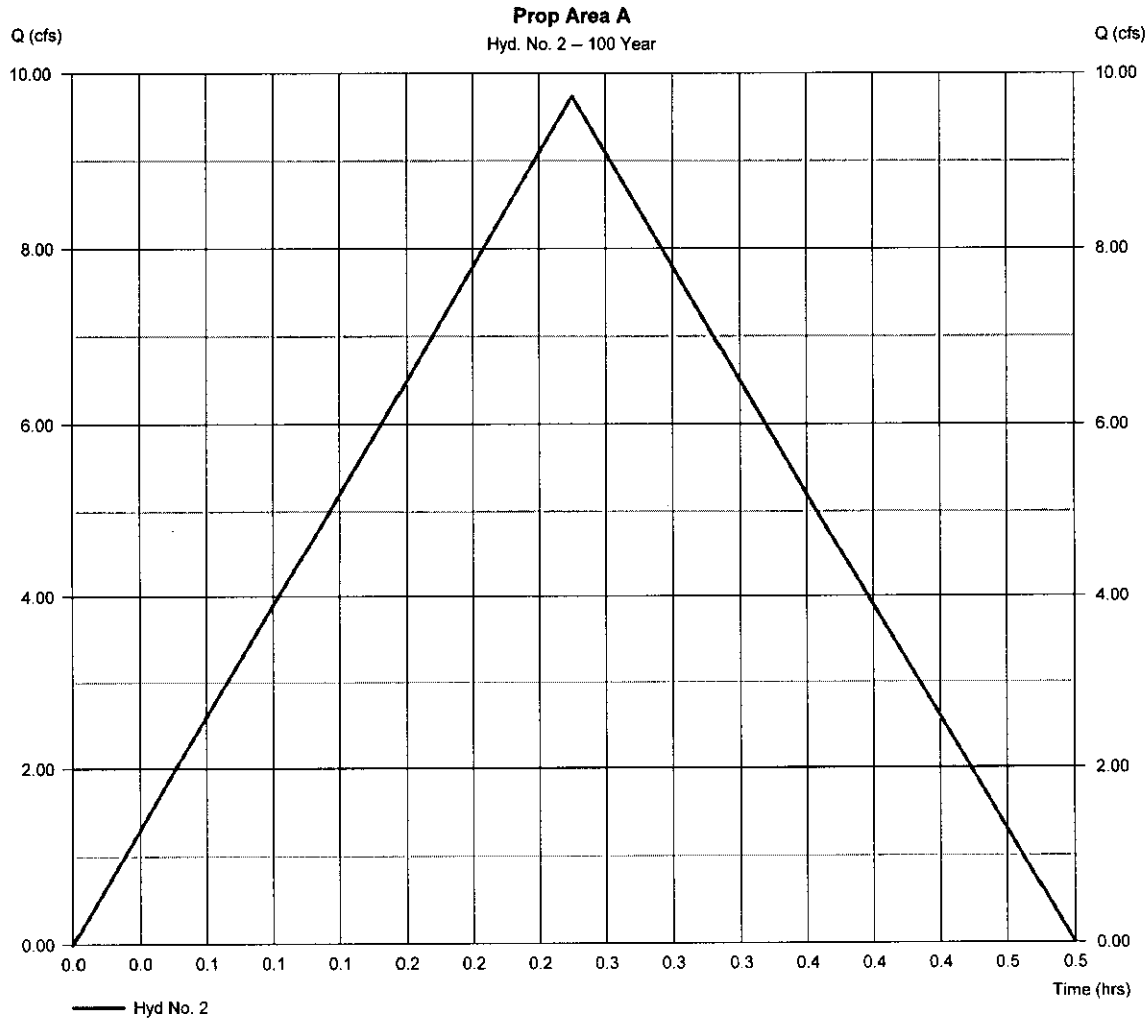


Hydrograph Report

Hyd. No. 2

Prop Area A

Hydrograph type	= Rational	Peak discharge	= 9.740 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.201 acft
Drainage area	= 1.740 ac	Runoff coeff.	= 0.76
Intensity	= 7.365 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1



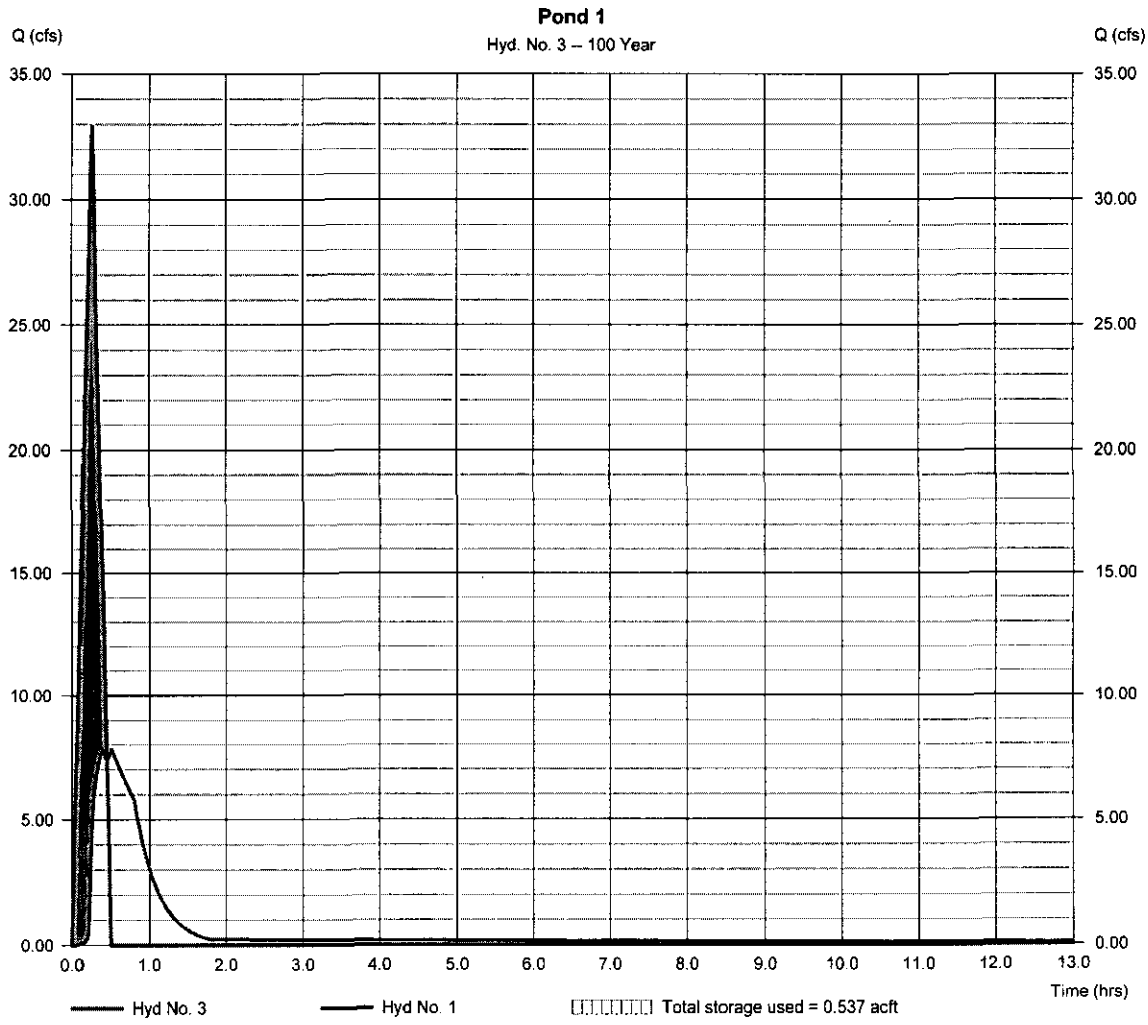
Hydrograph Report

Hyd. No. 3

Pond 1

Hydrograph type	= Reservoir	Peak discharge	= 7.833 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.50 hrs
Time interval	= 1 min	Hyd. volume	= 0.667 acft
Inflow hyd. No.	= 1 - Prop Area A	Max. Elevation	= 1299.00 ft
Reservoir name	= Pond 1	Max. Storage	= 0.537 acft

Storage Indication method used.

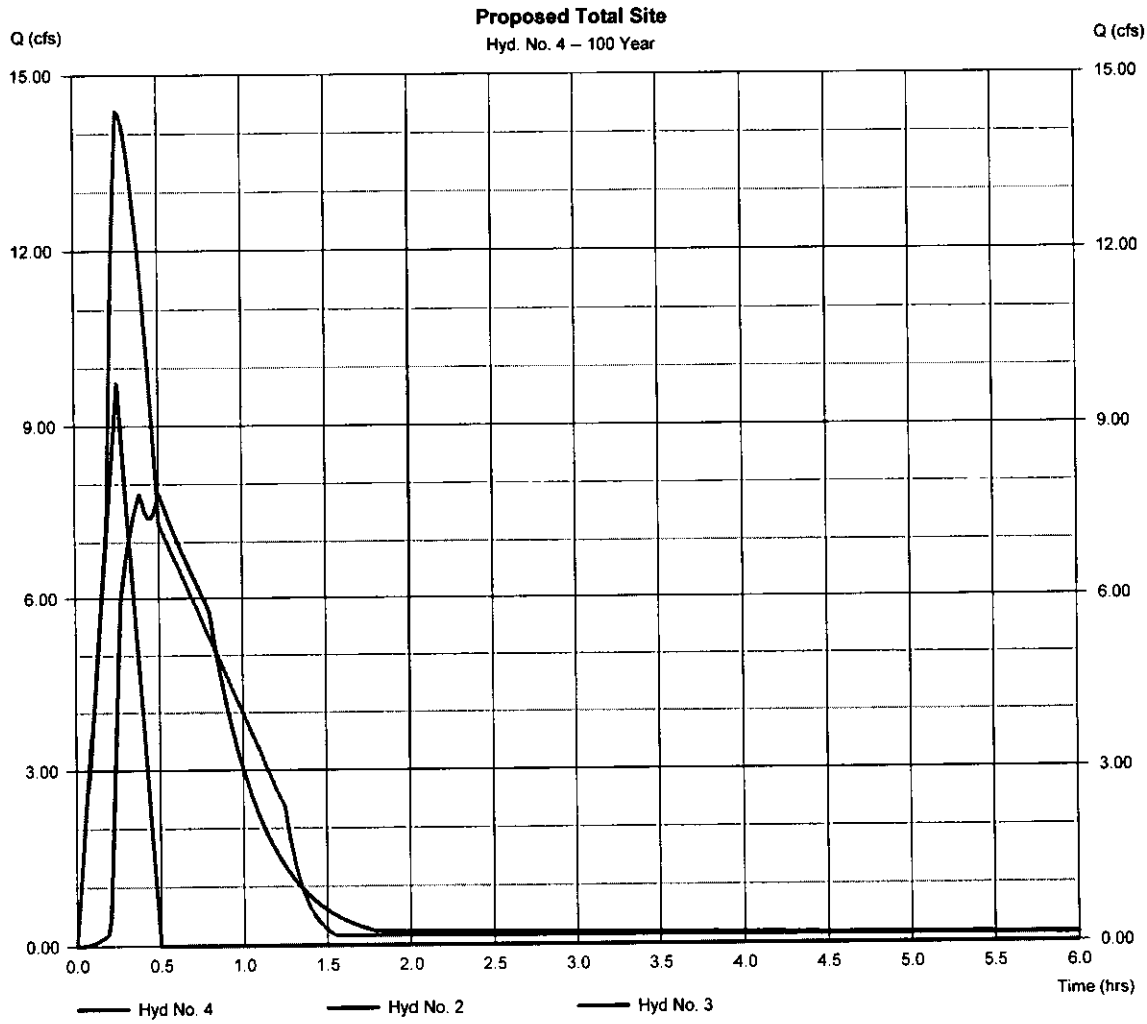


Hydrograph Report

Hyd. No. 4

Proposed Total Site

Hydrograph type	= Combine	Peak discharge	= 14.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.880 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.740 ac

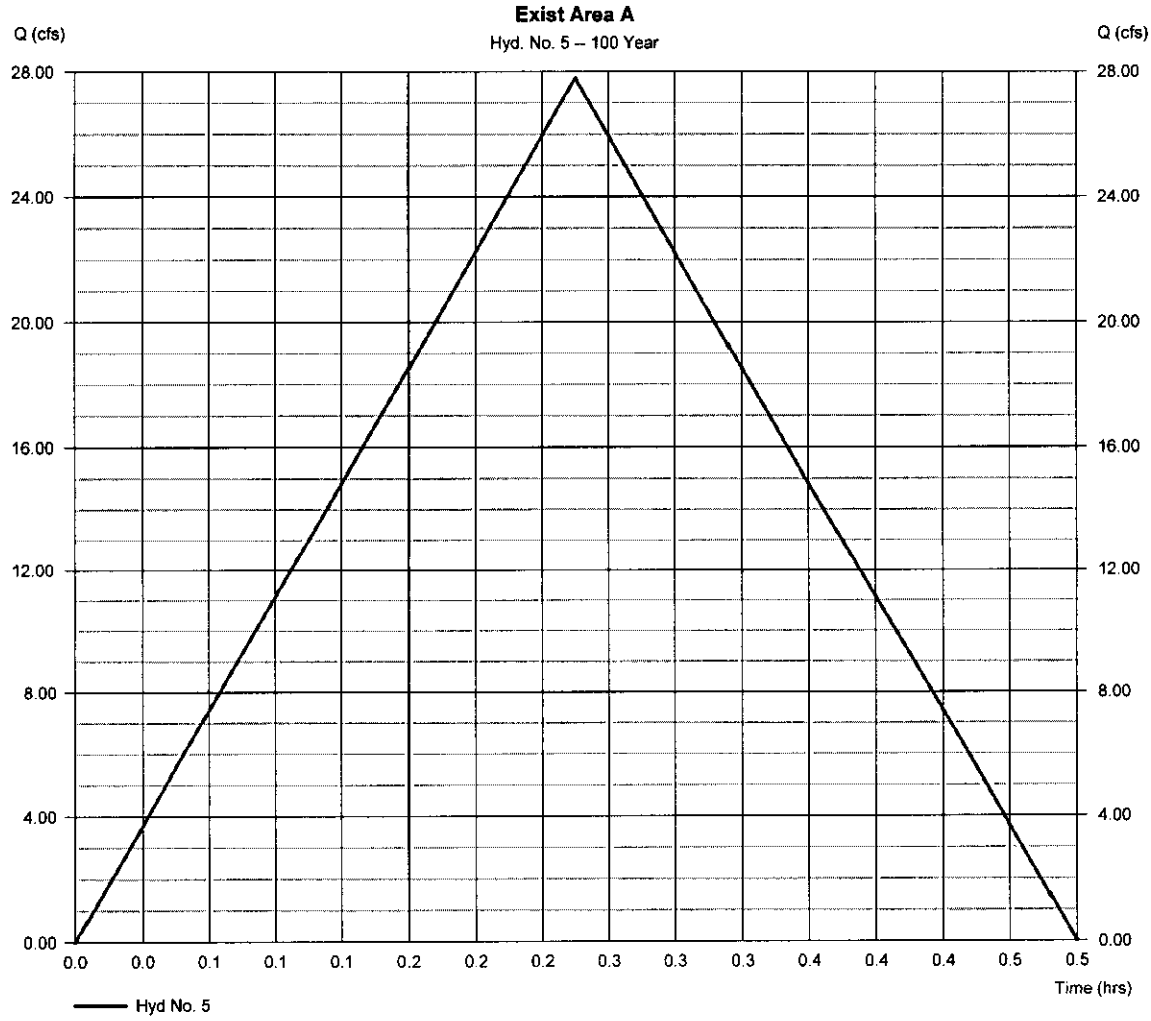


Hydrograph Report

Hyd. No. 5

Exist Area A

Hydrograph type	= Rational	Peak discharge	= 27.80 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.574 acft
Drainage area	= 5.550 ac	Runoff coeff.	= 0.68
Intensity	= 7.365 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

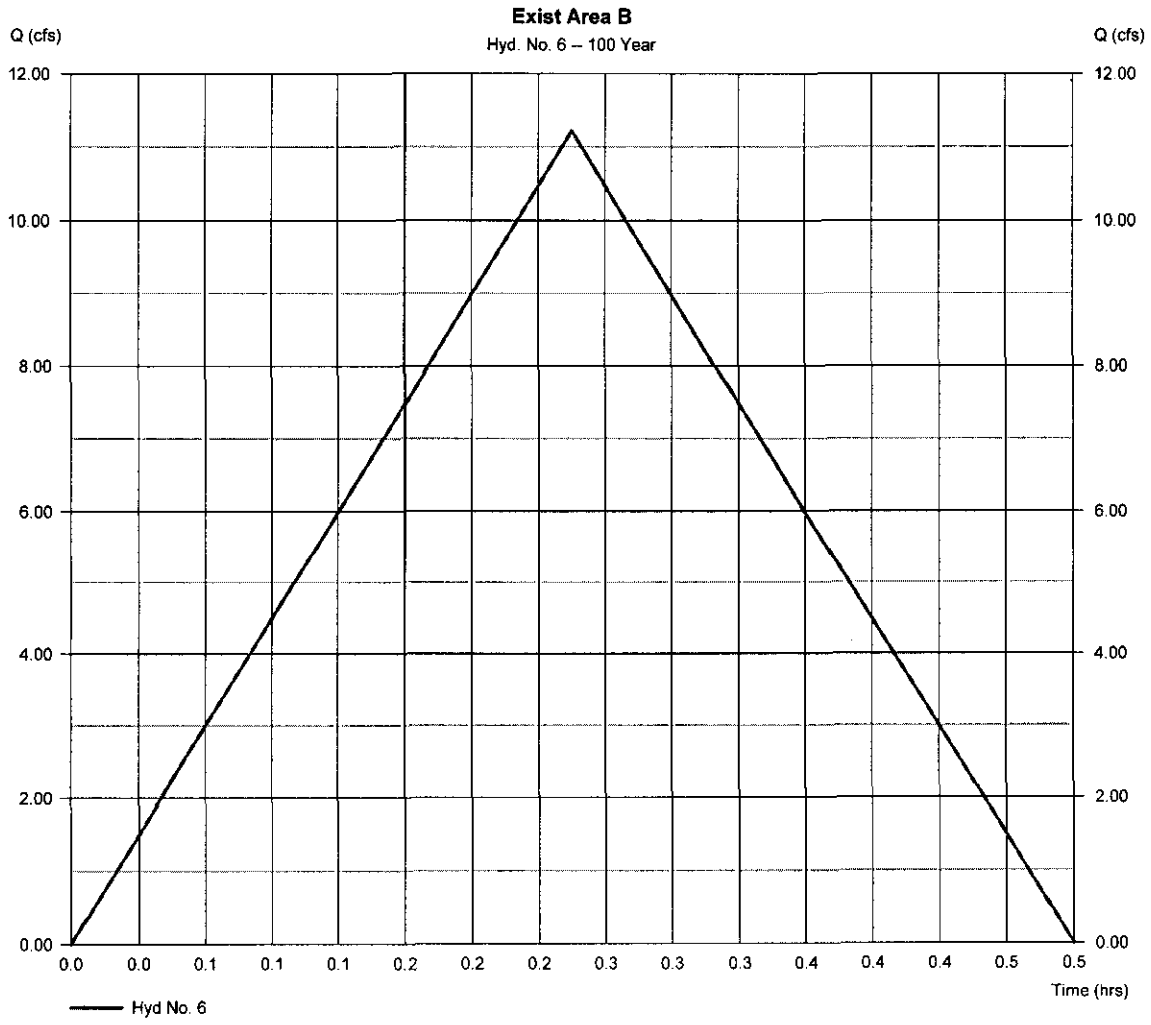


Hydrograph Report

Hyd. No. 6

Exist Area B

Hydrograph type	= Rational	Peak discharge	= 11.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.232 acft
Drainage area	= 2.240 ac	Runoff coeff.	= 0.68
Intensity	= 7.365 in/hr	Tc by User	= 15.00 min
IDF Curve	= wichita.IDF	Asc/Rec limb fact	= 1/1

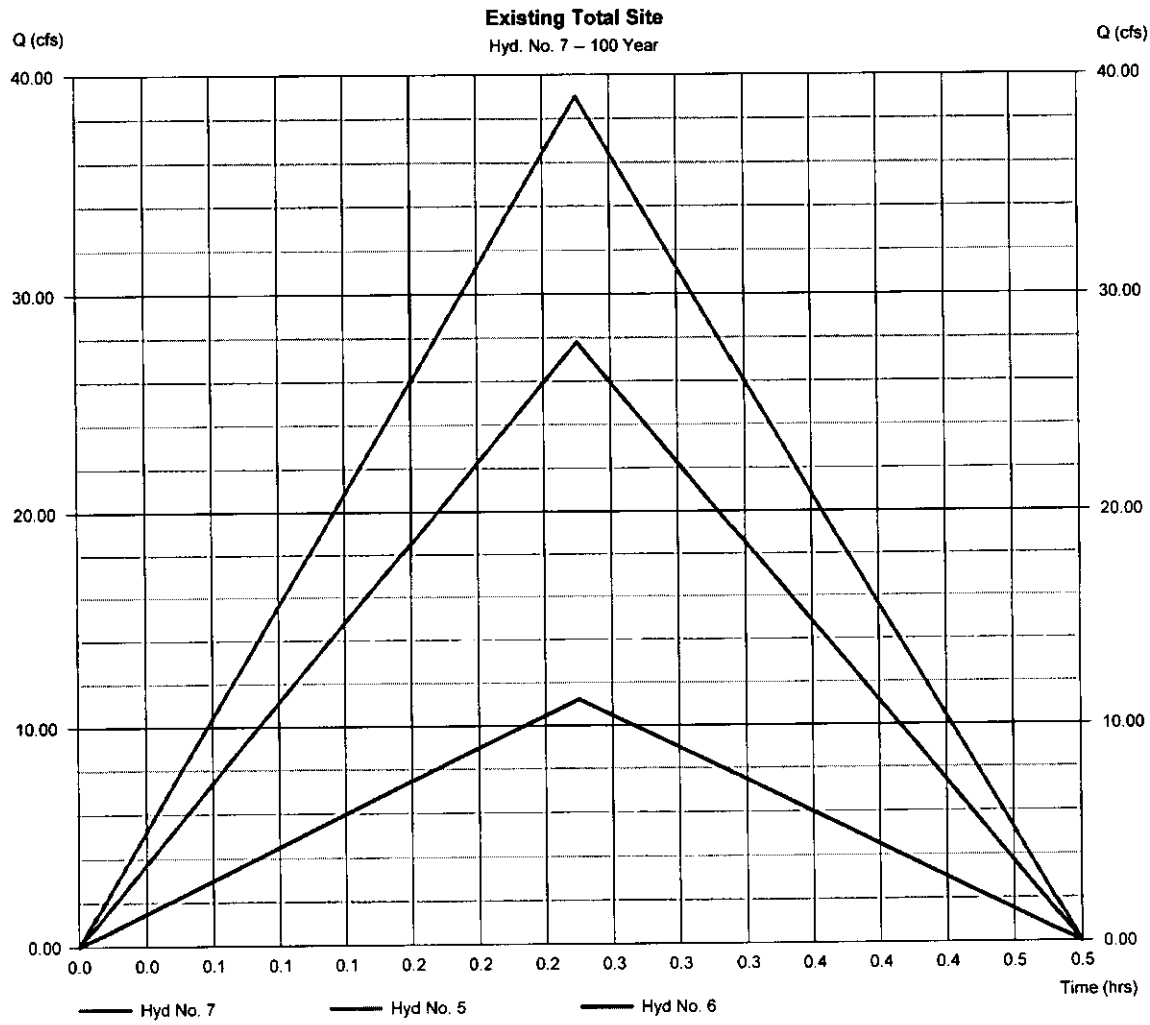


Hydrograph Report

Hyd. No. 7

Existing Total Site

Hydrograph type	= Combine	Peak discharge	= 39.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 0.806 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 7.790 ac



DRAINAGE REPORT

Lampton Brothers 2nd Addition

WICHITA, SEDGWICK COUNTY, KANSAS

November 17, 2011

Lampton Brothers 2nd Addition
DRAINAGE ANALYSIS
November 17, 2011

INTRODUCTION

This report contains supporting documentation and calculations for the proposed Lampton Brothers 2nd Addition. The proposed site is a 7.29 acre site located in the SW ¼ of Section 16 T27S R1E on Central just west of Washington Street. The area is currently developed as a material storage facility and other industrial uses. The soil type located on site is Urban Elandco complex in hydrologic group B. The site generally drains in two directions with approximately 2.41 acres draining northwest to the Burlington Northern and Santa Fe Railroad right of way while the remaining 4.88 acres drains south to an area inlet just north of Central Avenue. No offsite tributary drain onto the proposed project site. The information located on the attached FEMA FIRM 20173C0355E, effective date Feb. 2, 2007, indicates the site is located in unshaded Zone X, defined as areas outside of the 0.2% floodplain.

DETENTION

Detention storage required to reduce the post development runoff to equal or less than existing condition peak runoffs. The detention pond is located at the south eastern portion of the plat and will outlet into the existing storm sewer system located in Central. The pre and post-development runoff for each of the design storms are listed in the tables below.

Existing	Area (ac.)	TC (min.)	C2	C5	C10	C100	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q100 (cfs)
Area A	4.88	15	0.53	0.54	0.59	0.68	14.5	17.2	19.7	27.8
Area B	2.41	15	0.53	0.54	0.59	0.68	5.9	6.9	8.0	11.2
Site Total	7.29	--	--	--	--	--	20.4	24.1	27.7	39.0

Proposed	Area (ac.)	TC (min.)	C2	C5	C10	C100	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q100 (cfs)
Area A	5.55	15	0.69	0.70	0.73	0.76	17.2	20.3	23.3	32.9
Area B	1.74	15	0.69	0.70	0.73	0.76	5.1	6.0	6.9	9.7
Site Total	7.29	--	--	--	--	--	6.8	8.5	10.0	14.4

CHANNEL PROTECTION AND WATER QUALITY VOLUMES

Channel protection volume will not be required for the site since it drains into an enclosed storm sewer system in Central Avenue. This pond will also provide the water quality volume required for the site. The calculations to determine the water quality volume are as follows;

Water Quality Volume

Eq. 4-26 $R_v = R_{vu}U + R_{vd}D + R_{vi}I = 0.00*0.05 + 0.29*0.25 + (0.45*0.3+0.26)*0.75 = 0.387$

Eq. 4-24 $WQ_v = PR_v A/12 = (1.2*0.387*7.29)/12 = 0.27$ ac.-ft.

The detention pond will drain dry when not in operation. Water quality treatment will also be provided in the pond. A weir structure will detain the water quality volume up to elevation 1298.10, while the release is controlled by a V-notch in the weir. The detention function of the pond will be controlled by a 15" RCP connecting to the existing area inlet. The pond stage and contour area is shown in the table below;

Stage	Area (ac.)
1296.65	0
1297	0.11
1298	0.30
1299	0.37

INTERNAL DRAINAGE

The internal drainage system shall utilize grassed swales and storm sewer to direct the runoff to the proposed wet pond. The particular details of the internal drainage system will have to be determined as the site is developed and a final layout is available.

PLAT

AERIAL

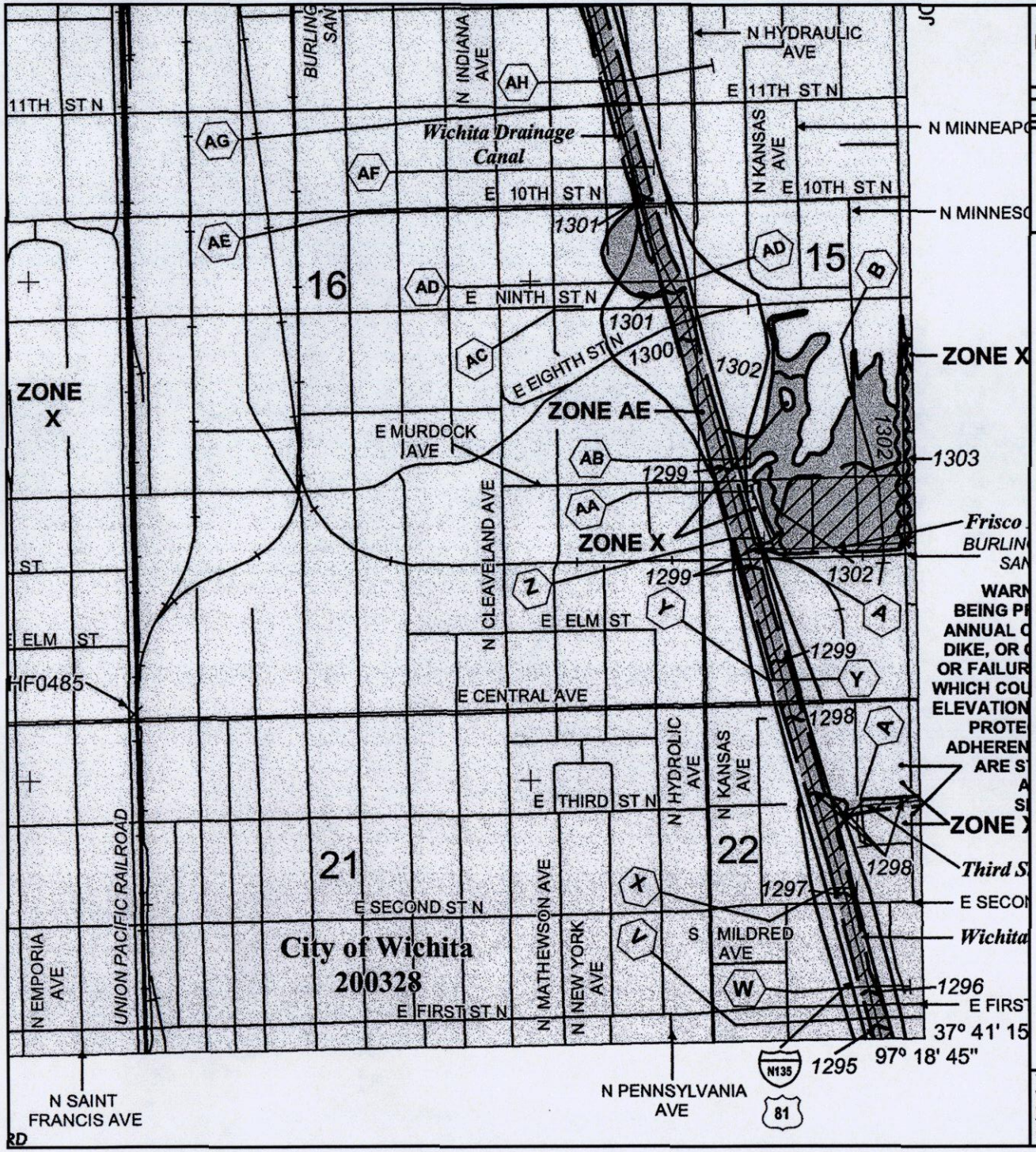
DETENTION POND

FEMA FIRM

USGS MAP

DRAINAGE MAP

FEMA FIRM



MAP SCALE 1" = 1000'

1000 2000 FEET

0 300 600 METERS

PANEL 0355E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS

AND INCORPORATED AREAS

PANEL 355 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WICHITA, CITY OF	200328	0355	E

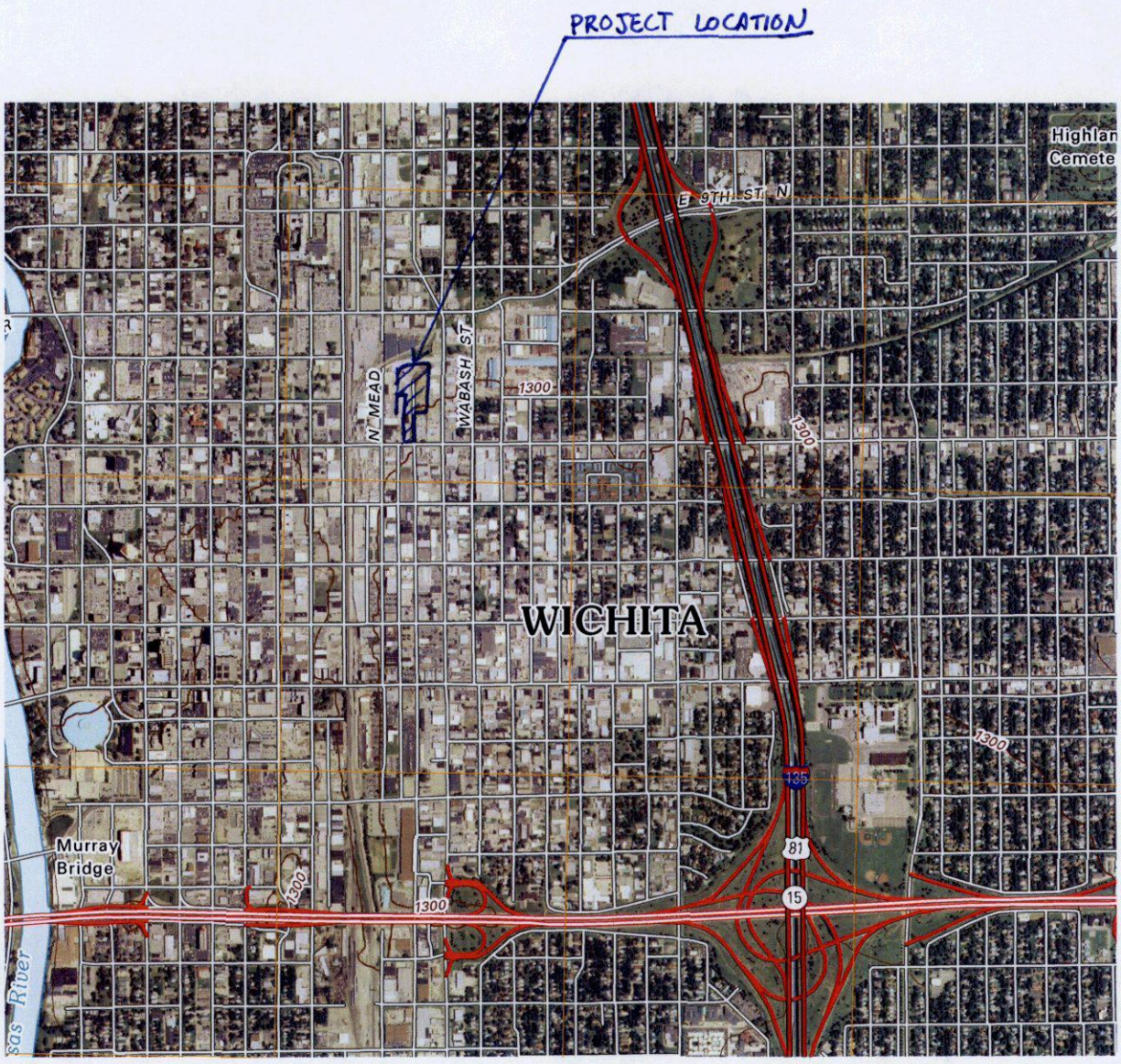
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
20173C0355E

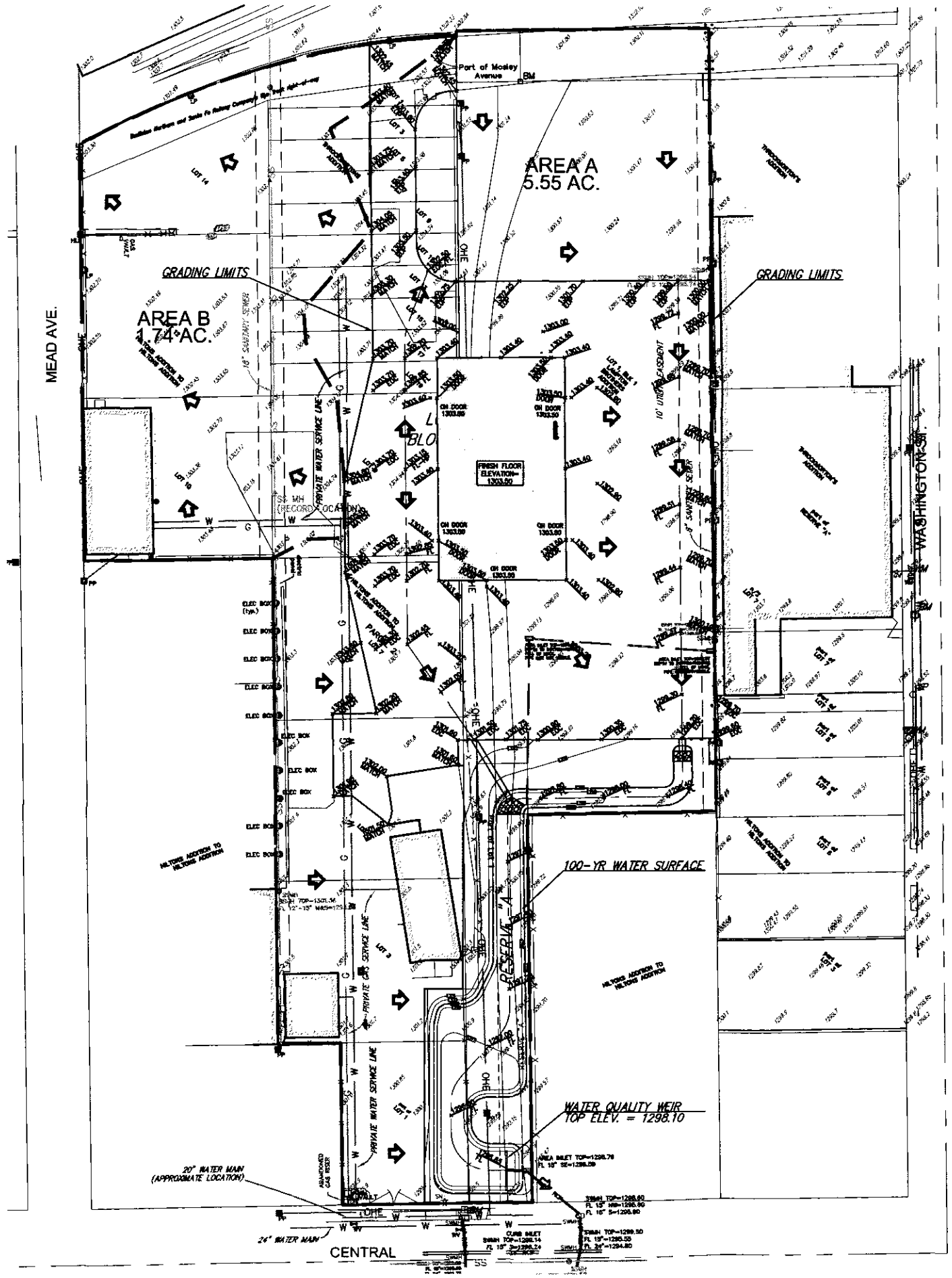
EFFECTIVE DATE
FEBRUARY 2, 2007

Federal Emergency Management Agency

USGS MAP


PROJECT LOCATION
Highlan
Cemete
E 9TH ST N
N MEAD
WABASH ST
1300
WICHITA
Murray
Bridge
135
81
15
Sas River

DRAINAGE MAP



50' 0 50'

MINIMUM BUILDING PAD ELEVATION FOR LOWEST OPENING INTO STRUCTURES		
BLOCK	LOT NO.	ELEVATION (NAVD88)
1	1	1301.0

EXISTING CONDITIONS
Total Site Area: 7.29 ac.
Impervious Area: 3.30 ac.

PROPOSED CONDITIONS
Total Site Area: 7.29 ac.
Impervious Area: 5.17 ac.

SOIL TYPE: URBAN ELANDCO COMPLEX
HYDROLOGIC GROUP: B

C-FACTOR

	2-yr	5-yr	10-yr	100-yr
GRAVEL AREAS	0.24	0.26	0.33	0.48
PAVEMENT AREAS	0.87	0.88	0.90	0.93
WEIGHTED C-FACTOR				
EXISTING	0.53	0.54	0.59	0.68
PROPOSED	0.69	0.70	0.73	0.76

POND SUMMARY

STAGE	AREA (SF)
1296.65	0
1297.00	4807
1298.00	11,765
1299.00	16,202

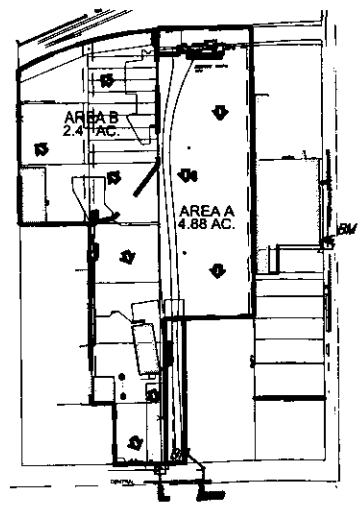
Q_{in} peak inflow=32.9 cfs
Q_{out} peak outflow=7.5 cfs
100-yr W.S. Elev.=1298.9

EXISTING

	AREA	TC	2-yr	5-yr	10-yr	100-yr
AREA A	4.88	15	14.5	17.2	19.7	27.8
AREA B	2.41	15	5.9	6.9	8.0	11.2
TOTAL SITE	7.29	---	20.4	24.1	27.7	39.0

PROPOSED

	AREA	TC	2-yr	5-yr	10-yr	100-yr
AREA A	5.55	15	17.2	20.3	23.3	32.9 ±
AREA B	1.74	15	5.1	6.0	6.9	9.7
TOTAL SITE	7.29	---	6.8	8.5	10.0	14.4



EXISTING DRAINAGE PATTERNS
1" = 200'

BENCHMARKS:

BENCH MARK: CHISELED "+" CUT IN CONCRETE ON THE NORTH LINE LOT 1, BLOCK 1, LAMPTON BROTHERS ADDITION
ELEVATION = 1301.80 (NAVD88)

BENCH MARK: CHISELED SQUARE ON THE TOP OF CURB ON THE NO SIDE OF THE DRIVE ENTRANCE, 18' EAST OF THE SOUTHEAST CORNE BUILDING #601, 503' NORTH OF THE CENTERLINE OF CENTRAL AND WEST OF THE CENTERLINE OF WASHINGTON, ELEVATION = 1299.20 (NAVD88)

BENCH MARK: CHISELED SQUARE ON TOP AND IN THE CENTER OF C INLET, 33' NORTH OF THE CENTERLINE OF CENTRAL AND 378' WEST THE CENTERLINE OF WASHINGTON, ACROSS FROM BUILDING #827 E. CENTRAL, ELEVATION = 1299.02 (NAVD88)

LAMPTON ADDITION
DRAINAGE PLAN
WICHITA, KANSAS

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DESIGN AML
DRAWN AML
REVIEW
UTILITY
DATE Nov. 15, 2

DRAWING FILE SURVEY BASE (Aerial)
PROJECT NUMBER .

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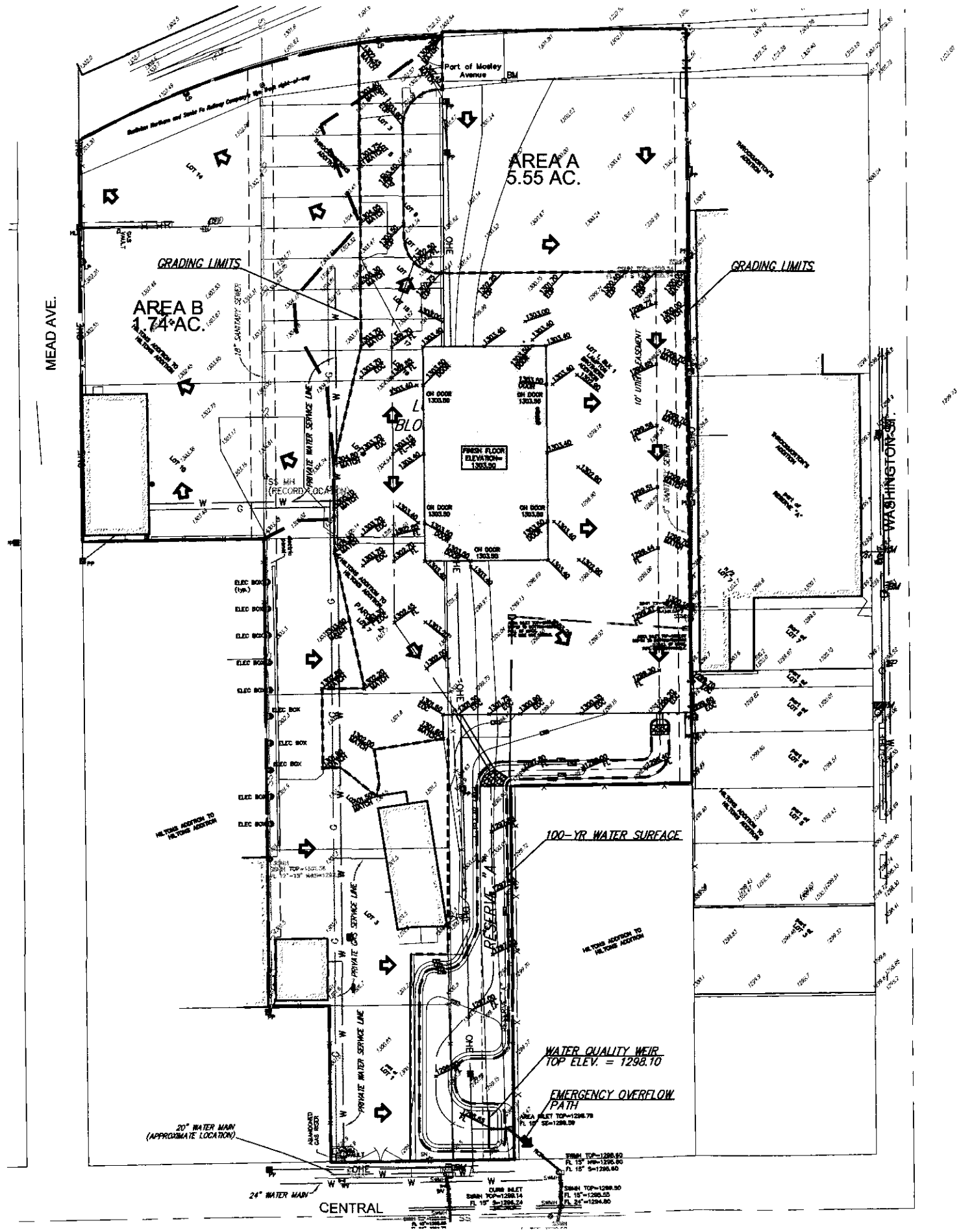


50' 0 50'

MINIMUM BUILDING PAD ELEVATION FOR LOWEST OPENING INTO STRUCTURES		
BLOCK	LOT NO.	ELEVATION (NAVD88)
1	1	1301.0

EXISTING CONDITIONS
Total Site Area: 7.29 ac.
Impervious Area: 3.30 ac.

PROPOSED CONDITIONS
Total Site Area: 7.29 ac.
Impervious Area: 5.17 ac.

SOIL TYPE: URBAN ELANDCO COMPLEX
HYDROLOGIC GROUP: B

C-FACTOR

	2-yr	5-yr	10-yr	100-yr
GRAVEL AREAS	0.24	0.26	0.33	0.48
PAVEMENT AREAS	0.87	0.88	0.90	0.93
WEIGHTED C-FACTOR				
EXISTING	0.53	0.54	0.59	0.68
PROPOSED	0.69	0.70	0.73	0.76

POND SUMMARY

STAGE	AREA (SF)
1296.65	0
1297.00	4807
1298.00	11,765
1299.00	16,202

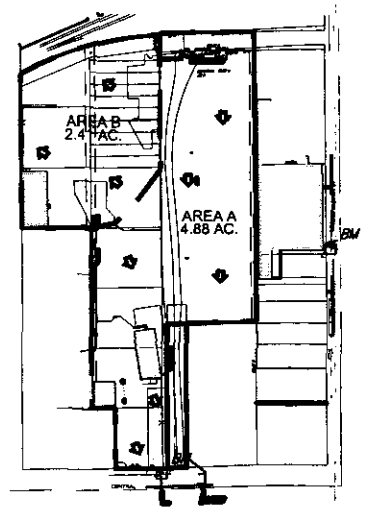
Q_{100} *peak inflow=32.9 cfs*
Q_{100} *peak outflow=7.5 cfs*
100-yr W.S. Elev.=1298.9

EXISTING

	AREA	TC	2-yr	5-yr	10-yr	100-yr
AREA A	4.88	15	14.5	17.2	19.7	27.8
AREA B	2.41	15	5.9	6.9	8.0	11.2
TOTAL SITE	7.29	--	20.4	24.1	27.7	39.0

PROPOSED

	AREA	TC	2-yr	5-yr	10-yr	100-yr
AREA A	5.55	15	17.2	20.3	23.3	32.9
AREA B	1.74	15	5.1	6.0	6.9	9.7
TOTAL SITE	7.29	--	6.8	8.5	10.0	14.4



EXISTING DRAINAGE PATTERNS
1" = 200'

BENCHMARKS:

BENCH MARK: CHISELED "+" CUT IN CONCRETE ON THE NORTH LINE
LOT 1, BLOCK 1, LAMPTON BROTHERS ADDITION
ELEVATION = 1301.80 (NAVD88)

BENCH MARK: CHISELED SQUARE ON THE TOP OF CURB ON THE NO
SIDE OF THE DRIVE ENTRANCE, 18' EAST OF THE SOUTHEAST CORN
BUILDING #601, 503' NORTH OF THE CENTERLINE OF CENTRAL AND
WEST OF THE CENTERLINE OF WASHINGTON, ELEVATION = 1299.20
(NAVD88)

BENCH MARK: CHISELED SQUARE ON TOP AND IN THE CENTER OF
INLET, 33' NORTH OF THE CENTERLINE OF CENTRAL AND 378' WEST
THE CENTERLINE OF WASHINGTON, ACROSS FROM BUILDING #827 E.
CENTRAL, ELEVATION = 1299.02 (NAVD88)

LAMPTON ADDITION
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