ENGINEERING SUCCESS

DRAINAGE REPORT
FOR

Canyon Properties Second Addition
Minneha Township
Wichita, Kansas

MKEC

411 N. Webb Rd.
Wichita, KS 67206
316.684.9600

PROJECT NUMBER: 1601010708
DATE: February 2017

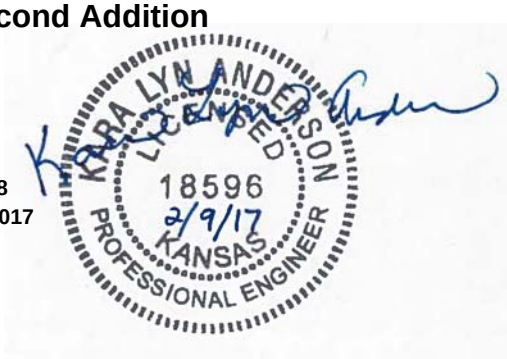


Table of Contents

Contents

Table of Contents 1
Contents 1
General Information Section 2
- **Purpose** 2
- **Location** 2
- **Development** 2
- **Datum** 2
- **Soils** 2
- **Flood Insurance Rate Map (FIRM)** 2

Drainage Patterns 2
- **Hydrologic Methods** 2
- **Drainage Patterns** 3
  - Draining to North Ellson Street Ditch 3
  - Draining to Foundations Second Addition 4

Utilities 5
- **Water** 5
- **Sanitary Sewer** 5
- **Storm Water Sewer** 6

Water Quality 6
Channel Protection 6
Downstream Peak Discharge Assessment (10% Rule) 6
Permitting 7
- **U.S. Army Corps of Engineers** 7
- **Federal Emergency Management Agency (FEMA)** 7
- **Kansas Department of Health and Environment (KDHE)** 7
- **Kansas Department of Health and Management (KDWPT)** 7
- **Kansas Historical Society (KHS)** 7
- **Kansas Division of Water Resources (DWR)** 7
  - Water Structure, Channel Changes, and Floodplain Fill 7
  - Water Appropriations 7

Summary 7
Appendix A - USGS Quadrangle 8
Appendix B - Aerial Photograph 9
Appendix C – Plat 10
Appendix D - Soil Survey 11
Appendix E - FEMA FIRM 12
Appendix F - Hydraflow Hydrograph Outputs 13
Appendix G - Existing Drainage and Utilities 14
Appendix H - Proposed Drainage and Utilities 15
Appendix I - North Ellson Street Ditch 16
Appendix J - North Ellson Street Culvert 17
Appendix K - Stormwater Sewer Calculations 18
Appendix L - Water Quality 19
Appendix M - Channel Protection 20
Appendix N - Existing Conditions (10% Rule) 21
Appendix O - Proposed Conditions (10% Rule) 22

General Information Section

Purpose

The purpose of this report is to evaluate drainage for the site of the proposed Minneha Township office and operation buildings that is being platted as Canyon Properties Second Addition. This report will review existing drainage conditions, proposed drainage conditions and detention needed to maintain peak flow rates from the property.

Location

The project is located in the City of Wichita, Minneha Township, Sedgwick County, Kansas. The site is 5.0 acres and lies east of North Greenwich Road between East Central Avenue and East Douglas Avenue. The site is located in Section 22, Township 27 South, Range 2 East. The site is shown on the USGS Quadrangle, Appendix A and the Aerial Photograph, Appendix B. To the north of the site, is the Fountains Second Addition which is single family housing. To the south is one undeveloped residential lot.

Development

The site is being developed into three lots ranging in size from 1.1 to 1.7 acres. The west lot will be used for the Minneha Township office building. The middle lot will be developed for an operation building for the township. The east lot will be for future development and an emergency exit road as needed. The plat is shown in Appendix C.

Datum

The project is shown in NAVD 88 Datum.

Soils

The drainage basins to each of the structures are comprised of the following soil types according to the NRCS (SCS) Soil Survey, Appendix D:

- Rosehill silty clay, 1 to 3 percent slopes, HSG “D”
- Irwin silty loam, 1 to 3 percent slopes, HSG “D”

The Hydrologic Soil Group (HSG) for selection of runoff curve numbers (CN) is HSG “D.”

Flood Insurance Rate Map (FIRM)

The structures are in Zone X, unshaded, areas determined to be outside of the 0.2% annual chance floodplain according to FEMA FIRM panel 20173C0379G effective December 22, 2016, Appendix E. The nearest Zone AE floodplain is approximately half a mile east of the property along Spring Branch Tributary 4.

Drainage Patterns

Hydrologic Methods

The drainage basins were modeled using Hydaflow Hydrographs by Autocad, Appendix F. The SCS method was used in calculations with rainfall depths determined from the Wichita Mid-Continent weather station, NOAA Atlas 14 Volume 8 Version 2, as shown in Table 1. Time of concentration fro sheet flow, shallow concentrated flow, and channel flow was calculated using the TR-55 method in Hyrdaflow Hydrograph by Autocad.

Table 1. Rainfall Depths (inches) for 24-Hour Design Storm

	1-Yr	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Sedgwick County	2.97	3.49	4.37	5.15	6.29	7.21	7.80

Drainage Patterns

The site drains in two directions. The west two-thirds of the site drains to the north into Fountains Second Addition and the remaining east one third of the site drains to the north into the North Ellison Street Ditch.

Draining to North Ellson Street Ditch

Basin A is located on the east third of the property and consists of 1.4 acres of pervious area under existing conditions, as shown in Appendix G. The basin drains from southwest to northeast into the North Ellson Street Ditch. The basin is undeveloped, with native grass and evergreen trees scattered throughout. Elevations range from 1384.2 to 1375.7. Existing area, time of concentration, curve number and peak flow rates for Basin A are shown in Table 2.

Table 2. Existing Drainage Conditions

	Area (acres)	Tc (min)	CN	1-yr (cfs)	2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)
Basin A	1.4	7.6	84	3.3	4.3	5.9	7.4	9.6	11.4	12.6
Basin B	2.1	19.7	84	3.6	4.7	6.6	8.3	10.7	12.7	14.0
Basin C	5.6	22.4	84	8.9	11.6	16.2	20.3	26.5	31.4	34.6
Basin D	4.0	7.8	84	9.5	12.2	17.0	21.3	27.6	32.6	35.9

Basin A will be reduced to 1.0 acre under proposed conditions. It has been designed for 70% impervious to allow for future development, as shown in Appendix H. A service road will be constructed through the basin as needed. Approximately 0.4 acres of Basin A will be routed through a proposed detention pond in Basin D. Because the area to that drains from Basin A to the North Ellson Street Ditch has been reduced with site improvements, it will eliminate the need for detention in Basin A. Proposed area, time of concentration, curve number and peak flow rates for Basin A are shown in Table 3.

Table 3. Proposed Drainage Conditions

	Area (acres)	Tc (min)	CN	1-yr (cfs)	2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)
Basin A	1.0	6.1	91	3.3	4.1	5.4	6.5	8.1	9.4	10.2
Basin B	2.1	19.7	84	3.6	4.7	6.6	8.3	10.7	12.7	14.0
Basin C	5.6	22.4	85	10.2	13.1	18.2	22.7	29.4	34.8	34.6
Basin D	4.2	6.9	91	13.3	16.3	21.4	25.9	32.4	37.6	40.9
Basin E	0.2	5.0	84	0.5	0.6	0.9	1.1	1.5	1.7	1.9

Basin B is located off-site, south of Basin A, as shown in Appendix G. Basin B consists of 2.1 acres of pervious area draining southwest to northeast. Approximately half of the water from Basin B flows into Basin A and into the North Ellson Street Ditch. The other half flows along the east property line into the North Ellson Street Ditch. The basin is undeveloped, with native grass and evergreen trees scattered throughout. Elevations range from 1386.2 to 1380.3. Existing area, time of concentration, curve number and peak flow rates for Basin B are shown in Table 2. This off-site basin will remain unchanged with the

proposed project. Table 4 shows a comparison of existing and proposed flow rates where it flows into the North Ellson Street Ditch.

Table 4. Existing and Proposed Flow Rates Leaving the Site

	1-yr (cfs)	2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)
Existing Outflow to North Ellson Street Ditch	6.5	8.4	11.7	14.7	19.1	22.7	25.0
Proposed Outflow to North Ellson Street Ditch	6.0	7.6	10.3	12.8	16.4	19.3	21.2
Percent Reduction to Ellson Street Ditch	7.7%	9.5%	12.0%	12.9%	14.1%	15.0%	15.2%
Existing Outflow to Fountains Second Addition	16.5	21.4	30.0	37.6	49.0	58.1	64.0
Proposed Outflow to Fountains Second Additions	0.9	2.8	10.0	17.5	29.0	39.9	45.3
Percent Reduction to Fountains Second Addition	94.5%	86.9%	66.7%	53.5%	40.8%	33.0%	29.2%

Stormwater from Basin A & B drains into the west side of the North Ellson Street Ditch. The ditch has a maximum capacity of 26.9 cfs, as shown in Appendix I. The ditch is able to convey the existing and proposed 100-year design event without overtopping North Ellson Street.

An existing 15" CMP culvert transfers stormwater from the south side of North Second Street to an inlet on the corner of East Second Street. The entrance to the pipe is currently three-fourths clogged with silt and debris. The stormwater from the site currently overtops East Second Street and enters the inlet on the south side of East Second Street. If the 15" CPM pipe was cleared, the 1-year design event would still overtop East Second Street, as shown in Appendix J.

If the proposed service road is built in Lot 3, a 24" pipe will need to be installed on the east side of the lot 3 to allow water to drain form the north side of the service road to North Ellson Street, as shown in Appendix H.

Draining to Foundations Second Addition

Basin C is located off-site, south of Basin D, as shown in Appendix G. Basin C consists of 5.5 acres of pervious area and 0.1 acre of impervious area flowing north into Basin D. Basin C is 2.5% impervious while roughly a third of the basin is a private residence and the remaining area is undeveloped with native grass and evergreen trees throughout. Elevations range from 1389.2 to 1379.2. Area, time of concentration, curve number and peak flow rates for basin C are shown in Table 2. This offsite basin will remain unchanged.

Basin D is located on the west two-thirds of the property and consists of 4.0 acres of pervious area, as shown in Appendix G. Basin D flows northerly and towards the center of the basin. It outfalls into a ditch that flows north through the Fountains Second Addition, and ultimately flows into an existing pond on the north side of the Fountains Second Addition. The basin is undeveloped, with of native grass and evergreen trees scattered throughout. Elevations range from 1386.1 to 1374.5. Existing area, time of concentration, curve number and peak flow rates for Basin D are shown in Table 2.

Basin D improvements will include an office building, operations building, connecting road, and supporting parking area as shown in Appendix H. Basin D is proposed for 3.2 acres of the property to be 90% impervious and 0.8 acres of pervious area. Proposed area, time of concentration, curve number and peak flow rates for Basin D are shown in Table 3. The operations building and supporting pavement area, located on the east portion of the basin, will drain into a proposed dry detention pond through a combination of

drainage swales and an underground stormwater pipe system. The east and south side of the operations building will be graded to drain to the southwest corner of the operations building and into an underground stormwater sewer system which will flow into the proposed detention pond.

An office building with additional parking is proposed in the west portion of the basin. This area will be graded to drain north into a stormwater sewer system. The runoff from this area will be piped east to the existing drainage swale which drains into the detention pond. The parking area will be graded to drain into a curb inlet on the northeast corner and connected to a proposed 12" storm water sewer pipe (Line 4). The stormwater from the west side of the Basin D will flow into the detention pond.

The center portion of Basin D will be the location for a dry detention pond. The pond has been designed to over detain stormwater in Basins C & D to accommodate 0.4 acres of drainage from Basin A. This will allow for future development in Basin A without future detention. The pond will have a bottom elevation of 1374.5, with a 100-year flood elevation of 1377.5, and a top of berm elevation of 1378.5. The detention capacity of the pond will be 1.7 acre-ft of storage for the 100-year design event. The detention pond provides 29.2% reduction in peak flow for the 100-year design storm, as shown in Table 4. The pond will be controlled by a pipe for storms smaller than or equal to a 1-year design storm and an earthen broad crested weir designed for larger storms. Table 5 shows peak flow in, peak flow out, water surface elevation, detention volume of the pond, and outlet structure.

Table 5. Detention Pond

	1-yr	2-Yr	5-Yr	10-Yr	25-yr	50-yr	100-yr
Peak Flow in (cfs)	17.3	21.8	31.4	39.1	50.3	59.1	65.0
Peak Flow out (cfs)	0.8	2.9	9.7	17.0	28.1	37.8	43.8
Elevation (ft)	1376.1	1376.3	1376.6	1376.8	1377.1	1377.4	1377.5
Storage Volume (acre-ft)	0.9	1.0	1.2	1.3	1.5	1.6	1.7
Outlet Structure	6" Pipe at 1374.5 & 11' broad crested weir at 1376.1 with an emergency overflow at 1388.5						

Basin E is an undetained portion of Basin D, as shown in Appendix H. Basin E is located on the north side of the detention pond berm and is approximately 0.2 acres. The outfall from the detention pond and Basin E flows to the north into the existing ditch in the Fountains Second Addition. Under proposed conditions, the 100-year peak flow is reduced by 29.2%, therefor no modifications to the existing ditch in Fountains Second Addition will be required. Proposed area, time of concentration, curve number and peak flow rates for Basin E are shown in Table 3.

Utilities

Water

An existing 12" water main runs along the east side of North Greenwich Road. An 8" water line is located in the neighboring subdivision to the northeast of the property. An 8" water line will be extended from the existing 12" main to service the administration and shop buildings. The line will be installed along the north side of the site access road connecting the office and operations building. Two fire hydrants will be installed along the proposed 8" line to service the office and operations buildings.

Sanitary Sewer

An existing 8" sanitary sewer line runs along the south property line of the Fountains Second Addition. This line will be used to connect new service lines for the proposed buildings.

Another 8" sanitary line is located near the south property of the proposed Canyon Properties Second Addition by way of a manhole that extends onto the property. The line flows to the south and then to the east. At this time no connection or extension of this sewer line is expected. Service lines will extend from the existing sanitary sewer line along the Fountains Second Addition to service the office and operations building.

Storm Water Sewer

Line 1 is a 4'x4' grated inlet and a 15" storm water sewer pipe as shown in Appendix K. The pipe will drain Basin A into the proposed dry detention pond. The pipe was sized for a 100-year design storm with an emergency escape route to the east at an elevation of 1379.5. Pipe sizing calculations were completed using Hydraflow Strom Sewers, Appendix I.

Line 2 is a 2'x2' grated inlet and a 12" storm water sewer pipe as shown in Appendix K. The inlet will catch stormwater from the east and south sides of the operations building flowing into the proposed detention pond. The pipe is sized for the 10-year design storm with an emergency escape route to the northwest of the inlet at an elevation of 1380.9.

Line 3 is a 3'x3' grated inlet and a 36" storm water sewer pipe as shown in Appendix K. The pipe will transfer stormwater from the south side of the road (Basin C) to the proposed dry detention pond. The pipe is sized for the 100-year design storm with an emergency escape route to the north over the road at an elevation of 1380.4.

Line 4 is a 2'x2' grated inlet and a 12" storm water sewer pipe as shown in Appendix K. The inlet captures water from in between the existing sidewalk and parking lot with an emergency escape route to the east over the parking lot road at an elevation of 1384.5. The stormwater from the parking lot will flow to the northeast side of the parking lot and be captured by a 5' Type 1 curb inlet with an emergency escape route of 1384.3. The curb inlet connects to the 12" storm water sewer pipe (Line 4) and discharges into the existing drainage swale on the north side of the property to flow into the proposed dry detention pond. Line 4 is sized for a 10-year design storm.

Line 5 consists of a 6" storm water sewer pipe at an elevation of 1374.5 to provide downstream channel protection as shown in Appendix K. The pipe is sized to allow 0.9 acre-ft of storage in the detention pond in the 1-year design storm.

Water Quality

As required by the City of Wichita to manage water quality of the runoff that leaves this development, 0.3 acre-ft treated to 80% TSS removal is required for a 1.2" rainfall (85^{th} percentile storm). The dry detention pond has the capacity to only treat to 60% TSS. Since the dry detention pond does not provide 80% TSS removal, the water quality will instead be obtained through the City of Wichita in lieu fee program. Calculations for water quality are in Appendix L.

Channel Protection

In order to provide downstream channel protection volume requirements, 0.8 acre-ft of storage is required for the 1-year design storm. With a 6" pipe at an elevation of 1374.5, the dry detention pond has a detention of 0.9 acre-ft in the 1-year design storm. Calculations for channel protection are in Appendix M. The dry detention pond provides the downstream channel protection volume required.

Downstream Peak Discharge Assessment (10% Rule)

The basin was analyzed to the point downstream at which the portion of the site within the drainage basin was less than 10% of the overall basin size. Basin F is approximately 87 acres and has weighted curve number of 87 and drains from southwest to northeast through two detention ponds. Approximately one-third of Basin F is single family homes, one-third of the site is grass, and the remaining area is pavement and industry (including the proposed site). Table 6 shows the existing and proposed conditions at the 10% point. Existing conditions for the 10% Rule can be found in Appendix N, and proposed conditions for the

10% Rule can be found in Appendix O. The peak flow rate is reduced below existing conditions for all design storms.

Table 6. Existing & Proposed Peak Flow Rate (10% Rule) at point A

	1-yr (cfs)	2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)
Existing Conditions Peak Flow Rate	148	187	255	316	404	476	521
Proposed Conditions Peak Flow Rate	130	165	225	287	383	458	502

Permitting

U.S. Army Corps of Engineers

Since there are no potential wetlands on the site and there is no blue line stream on the site, permitting through the U.S. Army Corps of Engineers will not be required.

Federal Emergency Management Agency (FEMA)

There are no FEMA floodplains on the site; therefore permitting through FEMA will not be required.

Kansas Department of Health and Environment (KDHE)

Since the site disturbs more than 1.0 acre, a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) will be required.

Kansas Department of Health and Management (KDWPT)

The KDWPT will be contacted during the KDHE NOI permitting process. It is not anticipated there will be any concerns.

Kansas Historical Society (KHS)

The KHS will be contacted during the KDHE NOI permitting process. Since there are no historical buildings on site, it is not anticipated there will be any concerns.

Kansas Division of Water Resources (DWR)

Water Structure, Channel Changes, and Floodplain Fill

Since all the drainage areas draining through the site are under 640 acres, water structures, channel change, and floodplain fill permits are not required.

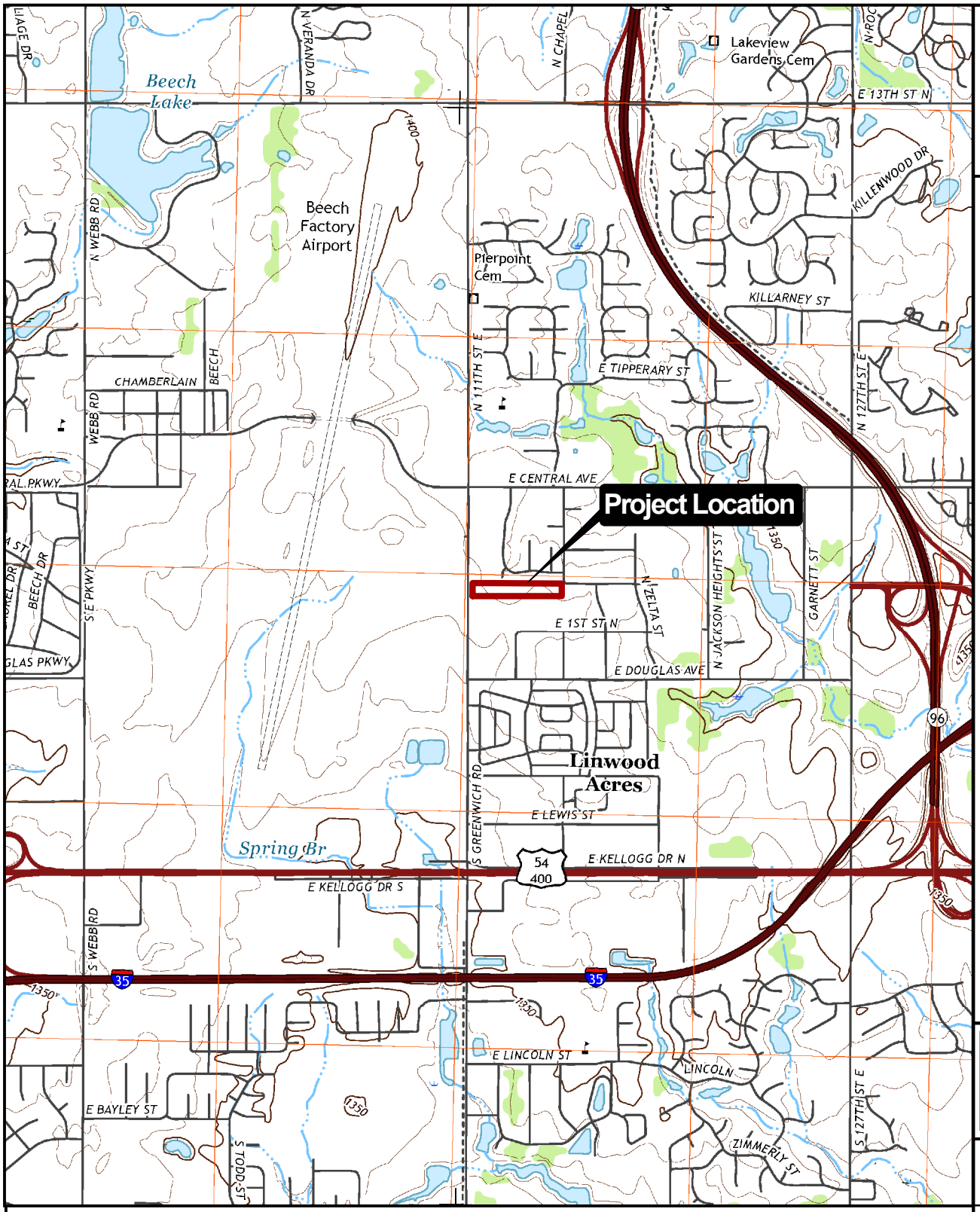
Water Appropriations

There will not be a pond with a permanent pool; therefore, a water appropriations permanent will not be provided

Summary

The project is located in the Township of Minneha, City of Wichita, Kansas in Section 22, Township 27 South, Range 2 East. The site is being developed into three lots. Lot 1 will be used for the Minneha Township office building. Lot 2 will be developed for an operation building. Lot 3 will be used for an emergency exit road and future development as needed. The improvements to the site will add 1.9 acres of impervious area with the addition of an office building, shop building, parking lot, and service road. A dry detention pond will provide 1.7 acre-ft of storage in the 100-year event in order to reduce the increased peak runoff from the development. The pond will also provide the required channel protection volume. The water quality requirement will be provided through the in-lieu fee program.

Appendix A - USGS Quadrangle



N

1 0.5 0 1 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

MKEC

Wichita, KS · 316.684.9600

USGS QUAD EXHIBIT
CANYON PROPERTIES
SECOND ADDITION

SEC: 22
TWP: T27S
RNG: R2E

PROJECT NO.	1301040174
DATE	1/27/2017
SCALE	1"=2000'

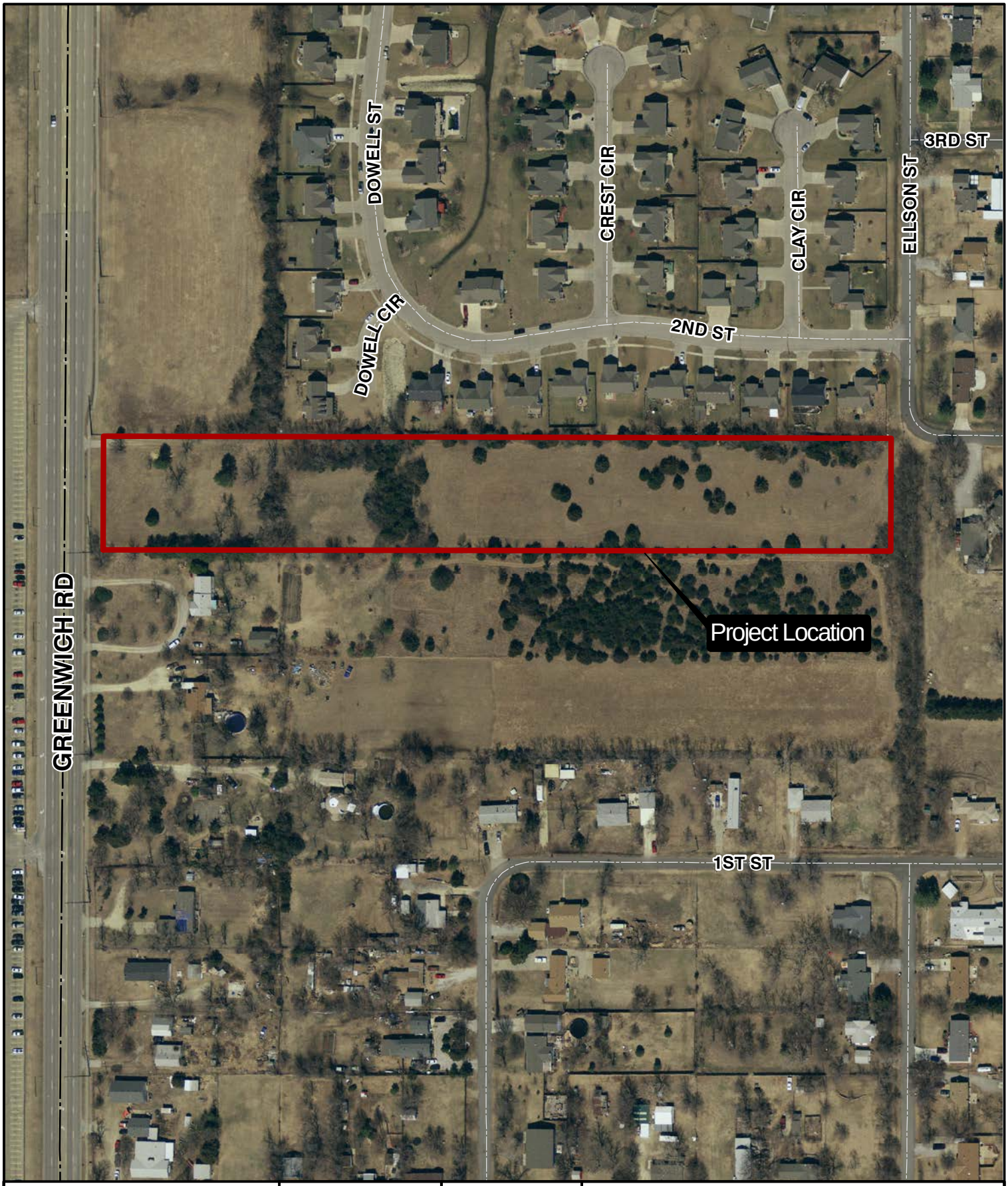
DESIGNED	DRAWN	CHECKED
JGD	JGD	KLA

NO.	REVISION	DATE

SHEET NO.
1 OF 1

Path: J:\Projects\2013\1301040174 Minneha TWP On-Call Services\5-Civil\GIS\Slawson Plat\USGS Quad Exhibit.mxd - Date: 1/27/2017

Appendix B - Aerial Photograph



SEC: 22
TWP: T27S
RNG: R2E

1 "=200 ' / 1:2400

0 50 100 200

MKEC
Wichita, KS • 316.684.9600

AERIAL EXHIBIT
CANYON PROPERTIES
SECOND ADDITION

PROJECT NO.	DATE:	SHEET NO.
1301040174	1/27/2017	1 OF 1

DRAWN BY:	DESIGNED BY:	APPROVED BY:
JGD	JGD	KLA

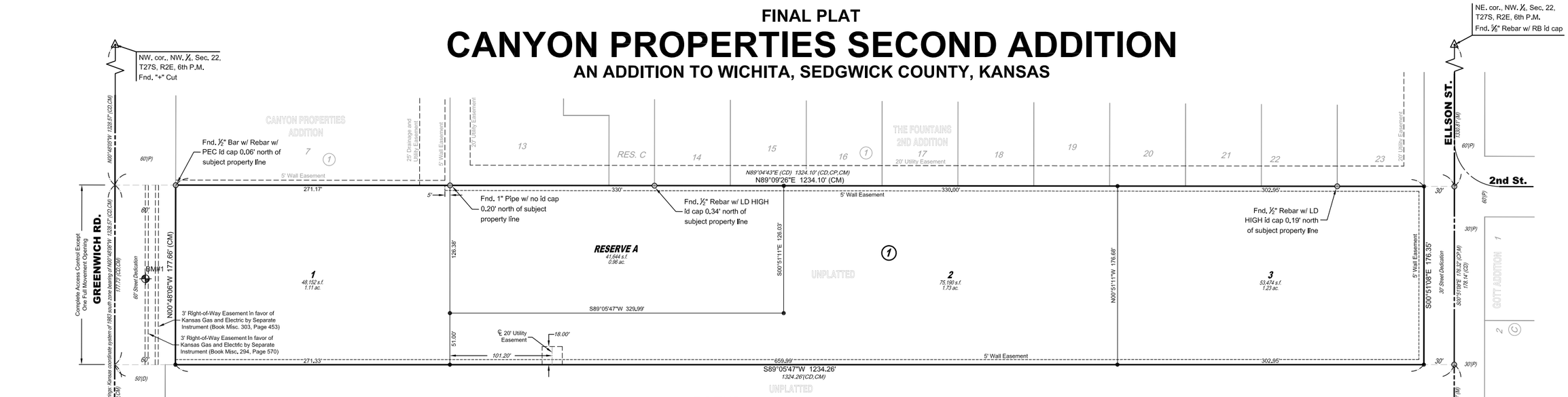
Path: J:\Projects\2013\1301040174 Minneha TWP On-Call Services\5-Civil\G\S\Slawson Plat\Aerial Exhibit.mxd - Date: 1/27/2017

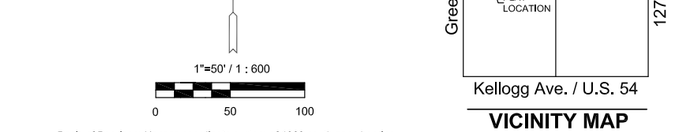
Appendix C – Plat

FINAL PLAT

CANYON PROPERTIES SECOND ADDITION

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS





Basis of Bearings: Kansas coordinate system of 1983 south zone bearing of N00°48'06"W on the west line of the Northwest Quarter, Section 22, Township 27 South, Range 2 East of the 6th Principal Meridian. This plat is surveyed and platted on NAD83 using Kansas state plane south zone coordinates, modified to the surface, having a combined adjustment scale factor of 1.000120014401728

VICINITY MAP

CERTIFICATE OF SURVEY

I, Curtis W. Luttrell, a Professional Surveyor in Kansas, do hereby certify that I have been in responsible charge of surveying and platting of "CANYON PROPERTIES SECOND ADDITION" an addition to Wichita, Sedgwick County, Kansas, into Lots, a Block, a Reserve, and Streets, the same being accurately set forth in the accompanying plat and described herein:

The Southwest Quarter of the Northwest Quarter of Section 22, Township 27 South, Range 2 East of the Sixth Principal Meridian, Sedgwick County, Kansas, EXCEPT the south 35 acres thereof.

Said contiguous tract CONTAINS: 1,162,585 square feet or 26.69 acres of land, more or less.

All streets, easements, rights-of-way, building setbacks, access controls; together with an easement for right-of-way recorded on Book Misc. 301, Page 453, together with an easement for sanitary sewer recorded on Film 1550, Page 257, together with an easement for temporary construction recorded on Film 1550, Page 259, together with an easement for temporary construction recorded on Film 1704, Page 2418, together with an easement for right-of-way recorded on Film 1704, Page 2419, together with all other public dedications within the above described property, are hereby vacated and replatted by virtue of K.S.A. 12-512b, as amended.

I hereby certify that the details of this plat are correct to the best of my knowledge and belief this_____ day of _____, 2017.

Curtis W. Luttrell, P.S. #1238
MKEC Engineering, Inc. (CLS 39)
411 North Webb Road
Wichita, Kansas 67206

LEGEND

Date of Survey: 10/20/16

- △ = Section Corner Monument Found
- ○ = Found ⅝" rebar w/ MKEC CLS 39 id cap (or see annotation for type)
- ● = Set ⅝" rebar w/ MKEC CLS 39 id. cap (or see annotation for type)
- ⌖ = Benchmark
- (M) = Measured
- (D) = Described
- (P) = Platted
- (CM) = Calculated from Measurement
- (CD) = Calculated from Described
- 1 = Lot
- (1) = Block

OWNER'S CERTIFICATE

Know all men by these presents that we the undersigned property owners of the land above set forth in the Professional Surveyor's Certificate, have caused the same to be surveyed and platted into Lots, a Block, a Reserve, and Streets, the same to be known as "CANYON PROPERTIES SECOND ADDITION" an addition to Wichita, Sedgwick County, Kansas.

The streets, Greenwich Road and Ellson Street, are hereby dedicated to and for the use of the public.

Easements for the construction and maintenance of sanitary sewer, utilities and a wall, as indicated hereon, are hereby granted to the public.

All abutters rights of access to or from Greenwich Road over and across the west line of "CANYON PROPERTIES SECOND ADDITION," are hereby granted to the appropriate governing body, provided however one full movement opening shall be allowed as indicated hereon.

Reserve A is platted for open space, berms, landscaping, irrigation, signs, monuments, sidewalks, fences, lighting, shade structures, parking, conveyance of cross-lot drainage, utilities confined to easements, and any uses as deemed appropriate by the undersigned owner's association and allowed by zoning regulations. The reserve is hereby reserved for the stated uses and shall be owned and maintained by the developer and/or a lot owner's association, and/or their successors or assigns.

A drainage plan has been developed for this plat. All drainage easements, rights-of-way, or reserves shall remain at established grades or as modified with the approval of the applicable City or County Engineer, and shall remain unobstructed to allow for the conveyance of stormwater.

At the direction of the Board of Trustees
Minneha Township,
a Kansas Corporation

_____ Donald E. Gragg, Trustee

_____ Paula Jabara, Secretary

STATE OF KANSAS, SEDGWICK COUNTY} ss:
This instrument was acknowledged before me on ____ day of _____, 2017, by Donald E. Gragg, Trustee, Board of Trustees, Minneha Township, a Kansas corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year last above written.

_____, Notary Public
Notary Public:
print name
My Term Expires: _____

STATE OF KANSAS, SEDGWICK COUNTY} ss:
This instrument was acknowledged before me on ____ day of _____, 2017, by Paula Jabara, Secretary, Board of Trustees, Minneha Township, a Kansas corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year last above written.

_____, Notary Public
Notary Public:
print name
My Term Expires: _____

BENCHMARK

BM#1 ⌖ Square cut top of curb on SW side of storm sewer inlet 10' N and 30.5' W of E/4 Corner Sec.30, T26S, R1W. Elev.=1359.08 NGVD 29.

PLANNING COMMISSION CERTIFICATE

This plat of "CANYON PROPERTIES SECOND ADDITION" has been submitted to and approved by the Wichita-Sedgwick County Area Planning Commission, Wichita, Kansas.

Dated this ____ day of _____, 2017.

WICHITA-SEDGWICK COUNTY METROPOLITAN AREA PLANNING COMMISSION

By_____
David W. Foster, Chairman

Attest:

_____
Dale Miller, Secretary

GOVERNING BODY CERTIFICATE

This plat approved and all dedications shown hereon, accepted by the Wichita City Council of the City of Wichita, Kansas dated this_____ day of _____, 2017.

At the direction of the City Council.

_____
Jeff Longwell, Mayor

Attest:

_____
Karen Sublett, City Clerk

REGISTER OF DEEDS' CERTIFICATE

STATE OF KANSAS, SEDGWICK COUNTY} ss:

This is to certify that this instrument was filed for record in the Register of Deeds office this ____ day of _____, 2017, at _____ o'clock __M; and is duly recorded.

_____
Tonya E. Buckingham, Register of Deeds

Attest:

_____
Judy J. Paget, Deputy

TRANSFER RECORD

STATE OF KANSAS, SEDGWICK COUNTY} ss:

Entered on transfer record this ____ day of _____, 2017.

_____
Kelly B. Arnold, County Clerk

COUNTY SURVEYOR

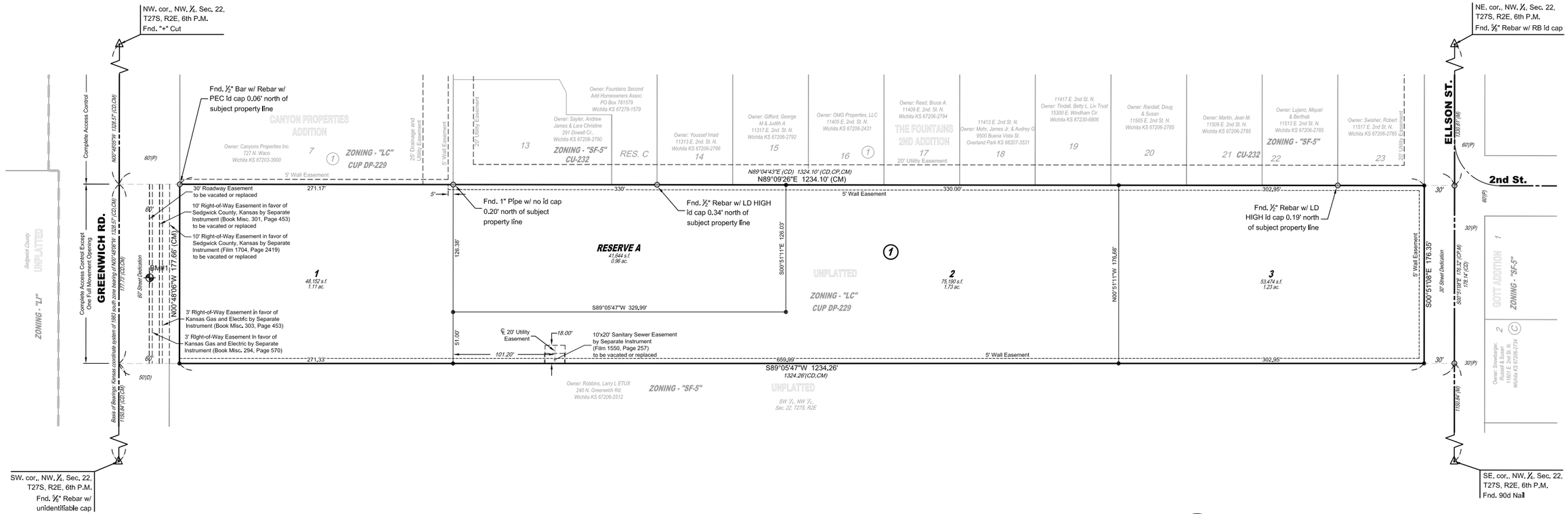
STATE OF KANSAS, SEDGWICK COUNTY} ss:

Reviewed in accordance with K.S.A. 58-2005 on this ____ day of _____, 2017.

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

MKEC
Wichita, KS • 316.684.9600

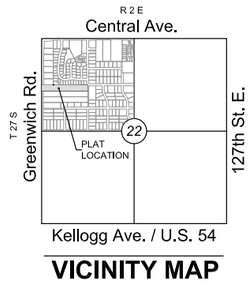
J:\Projects\2013\13010401714 Minneha TWP On-Call Services\5-Civil\CAD\Plat\131714.dwg 01/25/2017 07:39:24 AM CST



LEGAL DESCRIPTION

The Southwest Quarter of the Northwest Quarter of Section 22, Township 27 South, Range 2 East of the Sixth Principal Meridian, Sedgwick County, Kansas, EXCEPT the south 35 acres thereof.

Said contiguous tract CONTAINS: 234,413 square feet or 5.38 acres of land, more or less.



VICINITY MAP

BENCHMARK

BM#1 Chiseled square cut top of curb at FH, 1791' ± North of Center Line of Douglas Ave. on East on side of Greenwich Rd. Elev.=1386.71 NAVD 88.

NOTES

1. LOCATION: Located in east Wichita, southeast from Central Avenue and Greenwich Road in an area of mixed land uses having single-family housing to the north, east, and south, aircraft industrial to the west, and a limited commercial / vacant land on the northwest of the subject property.
2. LOT TOTAL: 3
3. EXSTING/PROPOSED USES: Existing - vacant land
   Proposed - "LC" Uses
4. ZONING: Existing - "LC" Limited Commercial with CUP DP-229
   Proposed - "LC" Limited Commercial with CUP DP-229
5. PLAT AREA: Gross: 234,413 sq. ft. or 5.38 acres ± Net: 218,461 sq. ft. or 5.03 acres ±
6. RESERVE: Reserve A is platted for open space, berms, landscaping, irrigation, signs, monuments, sidewalks, fences, lighting, shade structures, parking, conveyance of cross-lot drainage, utilities confined to easements, and any uses as deemed appropriate by the undersigned owner's association and allowed by zoning regulations.
7. SURVEY DATE: October 20, 2016 (by MKEC)
8. PUBLIC UTILITIES: Municipal sanitary sewer is provided by an existing manhole that lies on the south side of the plat. There is also an existing municipal sanitary sewer line that is north of the property and that runs parallel to the north property line. Municipal water is provided by a twelve inch main on the east side of Greenwich Road and also by a eight inch main southwest of Ellson Street and 2nd Street; extension of water main, if any is anticipated to be private.
9. ACCESS CONTROLS: Complete Access Control except for one full movement opening on the west side of property along Greenwich Road.
10. FLOOD: According to FEMA FIRM Community Unit Panel 20173C0379G, effective date December 22, 2016; this property lies within a portion of flood zone "X", *"Areas determined to be outside the 0.2% annual chance floodplain"*.
11. DRAINAGE: A drainage report shall accompany this final plat.
12. BUILDING SETBACKS: As per CUP DP-229.

NORTH
1"=50' / 1 : 600
0 50 100

Basis of Bearings: Kansas coordinate system of 1983 south zone bearing of N00°48'06"W on the west line of the Northwest Quarter, Section 22, Township 27 South, Range 2 East of the 6th Principal Meridian.
This plat is surveyed and platted on NAD83 using Kansas state plane south zone coordinates, modified to the surface, having a combined adjustment scale factor of 1.000120014401728

LEGEND

- 6IN - Coniferous Tree
- Edge Of Trees
- 3IN - Deciduous Tree
- SN - Sign
- Pole
- Mail Box
- TR - Telephone Riser
- T - Telephone Vault
- TV - Cable TV Riser
- FO - Fiber Optics Indicator Sign
- PP - Power Pole
- Light Pole
- Electric Transformer
- Sanitary Sewer Manhole
- Fire Hydrant
- WV - Water Valve
- Existing Structure
- Easement
- Fence
- Storm Sewer Pipe
- Water Line
- Sanitary Sewer Line
- Gas Line
- Overhead Electric
- Underground Telephone
- City Limits
- = Section Corner Monument Found
- = Found ⅝" rebar w/ MKEC CLS 39 id. cap (or see annotation for type)
- = Set ⅝" rebar w/ MKEC CLS 39 id. cap (or see annotation for type)
- = Benchmark
- (M) = Measured
- (D) = Described
- (P) = Platted
- (CM) = Calculated from Measurement
- (CD) = Calculated from Described
- = Lot
- = Block

PRELIMINARY PLAT

A portion of the NW. ¼, Sec. 22, T27S, R2E, 6th P.M.

CANYON PROPERTIES SECOND ADDITION

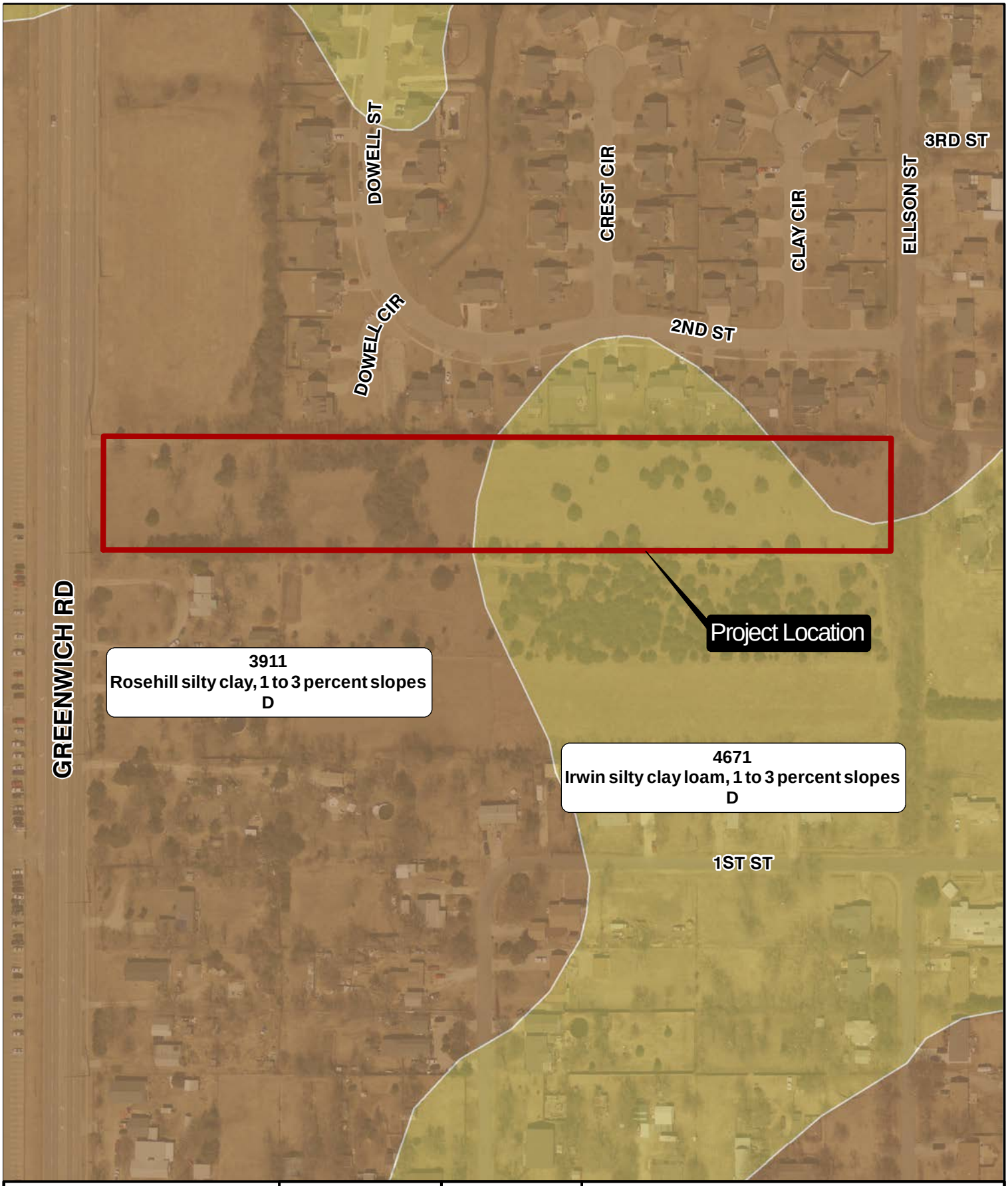
OWNER / DEVELOPER: Minneha Township, Attn: Don Gragg, Trustee #50 St. Cloud Place, Wichita, KS 67230 (316) 733-9099

Subdivision Meeting: February 16, 2017
Date submitted: March 30, 2017

MKEC Wichita, KS • 316.684.9600

J:\Projects\2013\1301\040714 Minneha TWP Ctr-Cat8 Services\5-Civil\CAD\Plat\13174pre.dwg 01/26/2017 04:06:42 PM CST

Appendix D - Soil Survey



SEC: 22
TWP: T27S
RNG: R2E

1 "=200 ' / 1:2400

0 50 100 200

MKEC
Wichita, KS • 316.684.9600

NRCS SOIL SURVEY EXHIBIT
CANYON PROPERTIES
SECOND ADDITION

PROJECT NO.	DATE:	SHEET NO.
1301040174	1/27/2017	1 OF 1

DRAWN BY:	DESIGNED BY:	APPROVED BY:
JGD	JGD	KLA

Path: J:\Projects\2013\1301040174 Minneha TWP On-Call Services\5-Civil\G\S\Slawson Plat\NRCS Soil Survey Exhibit.mxd - Date: 1/27/2017

Appendix E - FEMA FIRM

SEC: 20
TWP: T27S
RNG: R2E

1 "=300 ' / 1:3600

0 75 150 300

MKEC
Wichita, KS • 316.684.9600

FEMA FIRM EXHIBIT
CANYON PROPERTIES
SECOND ADDITION

PROJECT NO.	DATE:	SHEET NO.
1301040174	1/27/2017	1 OF 1

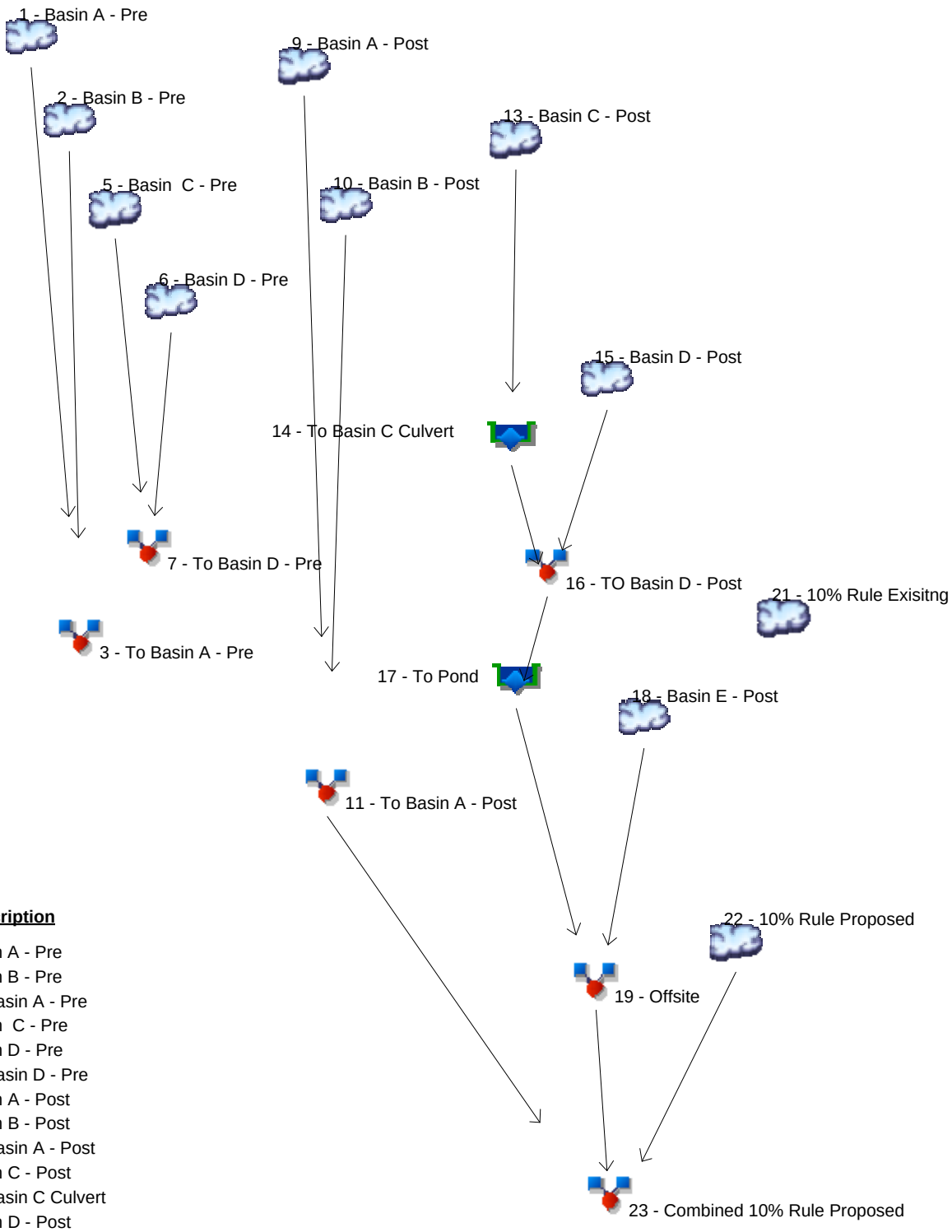
DRAWN BY:	DESIGNED BY:	APPROVED BY:
JGD	JGD	KLA

Path: J:\Projects\2013\1301040174 Minneha TWP On-Call Services\5-Civil\G\SI\Lawson Plat\FEMA FIRM Exhibit.mxd - Date: 1/27/2017

Appendix F - Hydraflow Hydrograph Outputs

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	SCS Runoff	Basin A - Pre
2	SCS Runoff	Basin B - Pre
3	Combine	To Basin A - Pre
5	SCS Runoff	Basin C - Pre
6	SCS Runoff	Basin D - Pre
7	Combine	To Basin D - Pre
9	SCS Runoff	Basin A - Post
10	SCS Runoff	Basin B - Post
11	Combine	To Basin A - Post
13	SCS Runoff	Basin C - Post
14	Reservoir	To Basin C Culvert
15	SCS Runoff	Basin D - Post
16	Combine	TO Basin D - Post
17	Reservoir	To Pond
18	SCS Runoff	Basin E - Post
19	Combine	Offsite
21	SCS Runoff	10% Rule Exisitng
22	SCS Runoff	10% Rule Proposed
23	Combine	Combined 10% Rule Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

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	SCS Runoff	3.314	2	718	0.174	------	------	------	Basin A - Pre
2	SCS Runoff	3.626	2	724	0.261	------	------	------	Basin B - Pre
3	Combine	6.469	2	720	0.435	1, 2	------	------	To Basin A - Pre
5	SCS Runoff	8.896	2	726	0.709	------	------	------	Basin C - Pre
6	SCS Runoff	9.468	2	718	0.497	------	------	------	Basin D - Pre
7	Combine	16.52	2	720	1.206	5, 6	------	------	To Basin D - Pre
9	SCS Runoff	3.340	2	716	0.160	------	------	------	Basin A - Post
10	SCS Runoff	3.626	2	724	0.261	------	------	------	Basin B - Post
11	Combine	6.008	2	718	0.421	9, 10	------	------	To Basin A - Post
13	SCS Runoff	8.896	2	726	0.709	------	------	------	Basin C - Post
14	Reservoir	8.467	2	730	0.708	13	1380.01	0.086	To Basin C Culvert
15	SCS Runoff	13.31	2	718	0.715	------	------	------	Basin D - Post
16	Combine	17.27	2	720	1.424	14, 15	------	------	TO Basin D - Post
17	Reservoir	0.785	2	904	1.410	16	1376.09	0.889	To Pond
18	SCS Runoff	0.503	2	716	0.023	------	------	------	Basin E - Post
19	Combine	0.893	2	718	1.433	17, 18	------	------	Offsite
21	SCS Runoff	147.81	2	728	12.450	------	------	------	10% Rule Exisitng
22	SCS Runoff	125.96	2	728	10.609	------	------	------	10% Rule Proposed
23	Combine	130.43	2	728	12.463	11, 19, 22	------	------	Combined 10% Rule Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

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	SCS Runoff	4.276	2	718	0.225	------	------	------	Basin A - Pre
2	SCS Runoff	4.700	2	724	0.337	------	------	------	Basin B - Pre
3	Combine	8.381	2	720	0.562	1, 2	------	------	To Basin A - Pre
5	SCS Runoff	11.55	2	726	0.916	------	------	------	Basin C - Pre
6	SCS Runoff	12.22	2	718	0.643	------	------	------	Basin D - Pre
7	Combine	21.42	2	720	1.558	5, 6	------	------	To Basin D - Pre
9	SCS Runoff	4.091	2	716	0.198	------	------	------	Basin A - Post
10	SCS Runoff	4.700	2	724	0.337	------	------	------	Basin B - Post
11	Combine	7.597	2	718	0.535	9, 10	------	------	To Basin A - Post
13	SCS Runoff	11.55	2	726	0.916	------	------	------	Basin C - Post
14	Reservoir	11.19	2	730	0.916	13	1380.03	0.094	To Basin C Culvert
15	SCS Runoff	16.32	2	718	0.886	------	------	------	Basin D - Post
16	Combine	21.83	2	720	1.802	14, 15	------	------	TO Basin D - Post
17	Reservoir	2.807	2	770	1.788	16	1376.29	0.999	To Pond
18	SCS Runoff	0.647	2	716	0.030	------	------	------	Basin E - Post
19	Combine	2.845	2	770	1.818	17, 18	------	------	Offsite
21	SCS Runoff	187.36	2	728	15.796	------	------	------	10% Rule Exisitng
22	SCS Runoff	159.66	2	728	13.461	------	------	------	10% Rule Proposed
23	Combine	165.33	2	728	15.814	11, 19, 22	------	------	Combined 10% Rule Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

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	SCS Runoff	5.946	2	718	0.315	------	------	------	Basin A - Pre
2	SCS Runoff	6.569	2	724	0.472	------	------	------	Basin B - Pre
3	Combine	11.71	2	720	0.787	1, 2	------	------	To Basin A - Pre
5	SCS Runoff	16.17	2	726	1.282	------	------	------	Basin C - Pre
6	SCS Runoff	16.99	2	718	0.900	------	------	------	Basin D - Pre
7	Combine	29.95	2	720	2.182	5, 6	------	------	To Basin D - Pre
9	SCS Runoff	5.357	2	716	0.263	------	------	------	Basin A - Post
10	SCS Runoff	6.569	2	724	0.472	------	------	------	Basin B - Post
11	Combine	10.34	2	718	0.736	9, 10	------	------	To Basin A - Post
13	SCS Runoff	16.17	2	726	1.282	------	------	------	Basin C - Post
14	Reservoir	15.79	2	728	1.282	13	1380.05	0.108	To Basin C Culvert
15	SCS Runoff	21.41	2	718	1.180	------	------	------	Basin D - Post
16	Combine	31.42	2	720	2.463	14, 15	------	------	TO Basin D - Post
17	Reservoir	9.873	2	744	2.448	16	1376.58	1.16	To Pond
18	SCS Runoff	0.897	2	716	0.042	------	------	------	Basin E - Post
19	Combine	9.958	2	744	2.490	17, 18	------	------	Offsite
21	SCS Runoff	255.27	2	728	21.645	------	------	------	10% Rule Exisitng
22	SCS Runoff	217.52	2	728	18.444	------	------	------	10% Rule Proposed
23	Combine	226.58	2	728	21.671	11, 19, 22	------	------	Combined 10% Rule Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

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	SCS Runoff	7.445	2	718	0.398	------	------	------	Basin A - Pre
2	SCS Runoff	8.253	2	724	0.596	------	------	------	Basin B - Pre
3	Combine	14.70	2	720	0.994	1, 2	------	------	To Basin A - Pre
5	SCS Runoff	20.33	2	726	1.619	------	------	------	Basin C - Pre
6	SCS Runoff	21.27	2	718	1.136	------	------	------	Basin D - Pre
7	Combine	37.64	2	720	2.755	5, 6	------	------	To Basin D - Pre
9	SCS Runoff	6.473	2	716	0.322	------	------	------	Basin A - Post
10	SCS Runoff	8.253	2	724	0.596	------	------	------	Basin B - Post
11	Combine	12.79	2	718	0.919	9, 10	------	------	To Basin A - Post
13	SCS Runoff	20.33	2	726	1.619	------	------	------	Basin C - Post
14	Reservoir	19.87	2	728	1.619	13	1380.07	0.121	To Basin C Culvert
15	SCS Runoff	25.89	2	718	1.445	------	------	------	Basin D - Post
16	Combine	39.31	2	720	3.063	14, 15	------	------	TO Basin D - Post
17	Reservoir	17.34	2	738	3.049	16	1376.81	1.29	To Pond
18	SCS Runoff	1.122	2	716	0.053	------	------	------	Basin E - Post
19	Combine	17.46	2	738	3.102	17, 18	------	------	Offsite
21	SCS Runoff	315.82	2	728	26.955	------	------	------	10% Rule Exisitng
22	SCS Runoff	269.13	2	728	22.970	------	------	------	10% Rule Proposed
23	Combine	289.64	2	728	26.991	11, 19, 22	------	------	Combined 10% Rule Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

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	SCS Runoff	9.647	2	718	0.521	------	------	------	Basin A - Pre
2	SCS Runoff	10.73	2	724	0.782	------	------	------	Basin B - Pre
3	Combine	19.11	2	720	1.303	1, 2	------	------	To Basin A - Pre
5	SCS Runoff	26.46	2	726	2.123	------	------	------	Basin C - Pre
6	SCS Runoff	27.56	2	718	1.490	------	------	------	Basin D - Pre
7	Combine	48.96	2	720	3.612	5, 6	------	------	To Basin D - Pre
9	SCS Runoff	8.092	2	716	0.409	------	------	------	Basin A - Post
10	SCS Runoff	10.73	2	724	0.782	------	------	------	Basin B - Post
11	Combine	16.39	2	718	1.191	9, 10	------	------	To Basin A - Post
13	SCS Runoff	26.46	2	726	2.123	------	------	------	Basin C - Post
14	Reservoir	26.19	2	728	2.122	13	1380.11	0.137	To Basin C Culvert
15	SCS Runoff	32.39	2	718	1.834	------	------	------	Basin D - Post
16	Combine	50.32	2	720	3.957	14, 15	------	------	TO Basin D - Post
17	Reservoir	28.84	2	732	3.942	16	1377.10	1.46	To Pond
18	SCS Runoff	1.451	2	716	0.070	------	------	------	Basin E - Post
19	Combine	29.02	2	732	4.012	17, 18	------	------	Offsite
21	SCS Runoff	404.33	2	728	34.851	------	------	------	10% Rule Exisitng
22	SCS Runoff	344.54	2	728	29.698	------	------	------	10% Rule Proposed
23	Combine	382.98	2	728	34.901	11, 19, 22	------	------	Combined 10% Rule Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

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	SCS Runoff	11.42	2	718	0.623	------	------	------	Basin A - Pre
2	SCS Runoff	12.73	2	724	0.934	------	------	------	Basin B - Pre
3	Combine	22.67	2	720	1.557	1, 2	------	------	To Basin A - Pre
5	SCS Runoff	31.42	2	726	2.536	------	------	------	Basin C - Pre
6	SCS Runoff	32.64	2	718	1.780	------	------	------	Basin D - Pre
7	Combine	58.11	2	720	4.316	5, 6	------	------	To Basin D - Pre
9	SCS Runoff	9.391	2	716	0.480	------	------	------	Basin A - Post
10	SCS Runoff	12.73	2	724	0.934	------	------	------	Basin B - Post
11	Combine	19.30	2	718	1.415	9, 10	------	------	To Basin A - Post
13	SCS Runoff	31.42	2	726	2.536	------	------	------	Basin C - Post
14	Reservoir	31.13	2	728	2.536	13	1380.12	0.146	To Basin C Culvert
15	SCS Runoff	37.61	2	718	2.151	------	------	------	Basin D - Post
16	Combine	59.09	2	720	4.687	14, 15	------	------	TO Basin D - Post
17	Reservoir	38.76	2	730	4.672	16	1377.32	1.59	To Pond
18	SCS Runoff	1.717	2	716	0.083	------	------	------	Basin E - Post
19	Combine	38.98	2	730	4.755	17, 18	------	------	Offsite
21	SCS Runoff	475.53	2	728	41.300	------	------	------	10% Rule Exisitng
22	SCS Runoff	405.22	2	728	35.194	------	------	------	10% Rule Proposed
23	Combine	456.76	2	728	41.364	11, 19, 22	------	------	Combined 10% Rule Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

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	SCS Runoff	12.56	2	718	0.689	------	------	------	Basin A - Pre
2	SCS Runoff	14.01	2	724	1.033	------	------	------	Basin B - Pre
3	Combine	24.95	2	720	1.722	1, 2	------	------	To Basin A - Pre
5	SCS Runoff	34.59	2	726	2.804	------	------	------	Basin C - Pre
6	SCS Runoff	35.88	2	718	1.968	------	------	------	Basin D - Pre
7	Combine	63.97	2	720	4.772	5, 6	------	------	To Basin D - Pre
9	SCS Runoff	10.22	2	716	0.526	------	------	------	Basin A - Post
10	SCS Runoff	14.01	2	724	1.033	------	------	------	Basin B - Post
11	Combine	21.16	2	718	1.559	9, 10	------	------	To Basin A - Post
13	SCS Runoff	34.59	2	726	2.804	------	------	------	Basin C - Post
14	Reservoir	34.26	2	728	2.804	13	1380.13	0.151	To Basin C Culvert
15	SCS Runoff	40.94	2	718	2.354	------	------	------	Basin D - Post
16	Combine	65.04	2	720	5.158	14, 15	------	------	TO Basin D - Post
17	Reservoir	45.08	2	728	5.143	16	1377.45	1.67	To Pond
18	SCS Runoff	1.887	2	716	0.092	------	------	------	Basin E - Post
19	Combine	45.33	2	728	5.236	17, 18	------	------	Offsite
21	SCS Runoff	521.06	2	728	45.462	------	------	------	10% Rule Exisitng
22	SCS Runoff	444.02	2	728	38.740	------	------	------	10% Rule Proposed
23	Combine	503.39	2	728	45.534	11, 19, 22	------	------	Combined 10% Rule Proposed

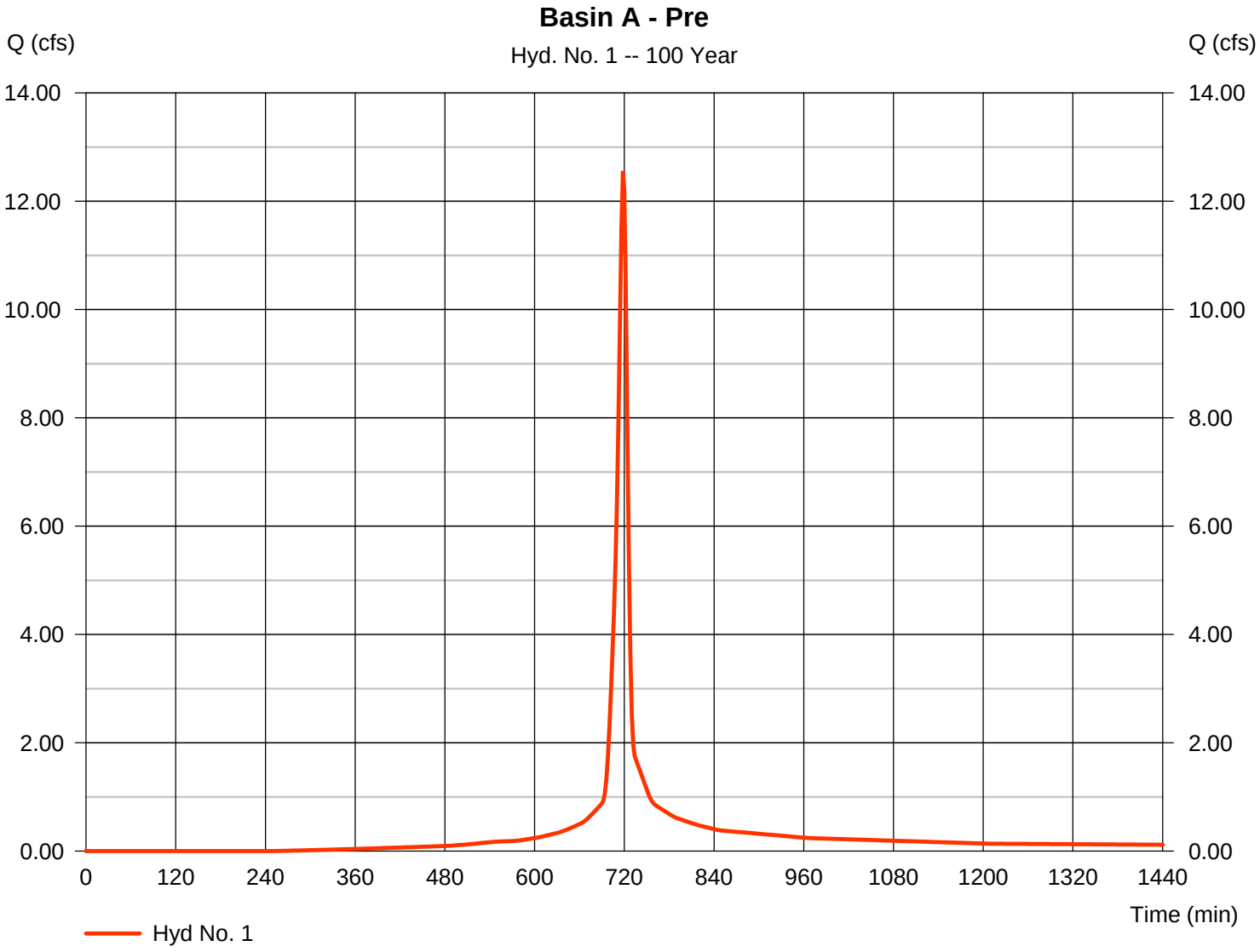
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Monday, 02 / 6 / 2017

Hyd. No. 1

Basin A - Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 12.56 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 0.689 acft
Drainage area	= 1.400 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.60 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

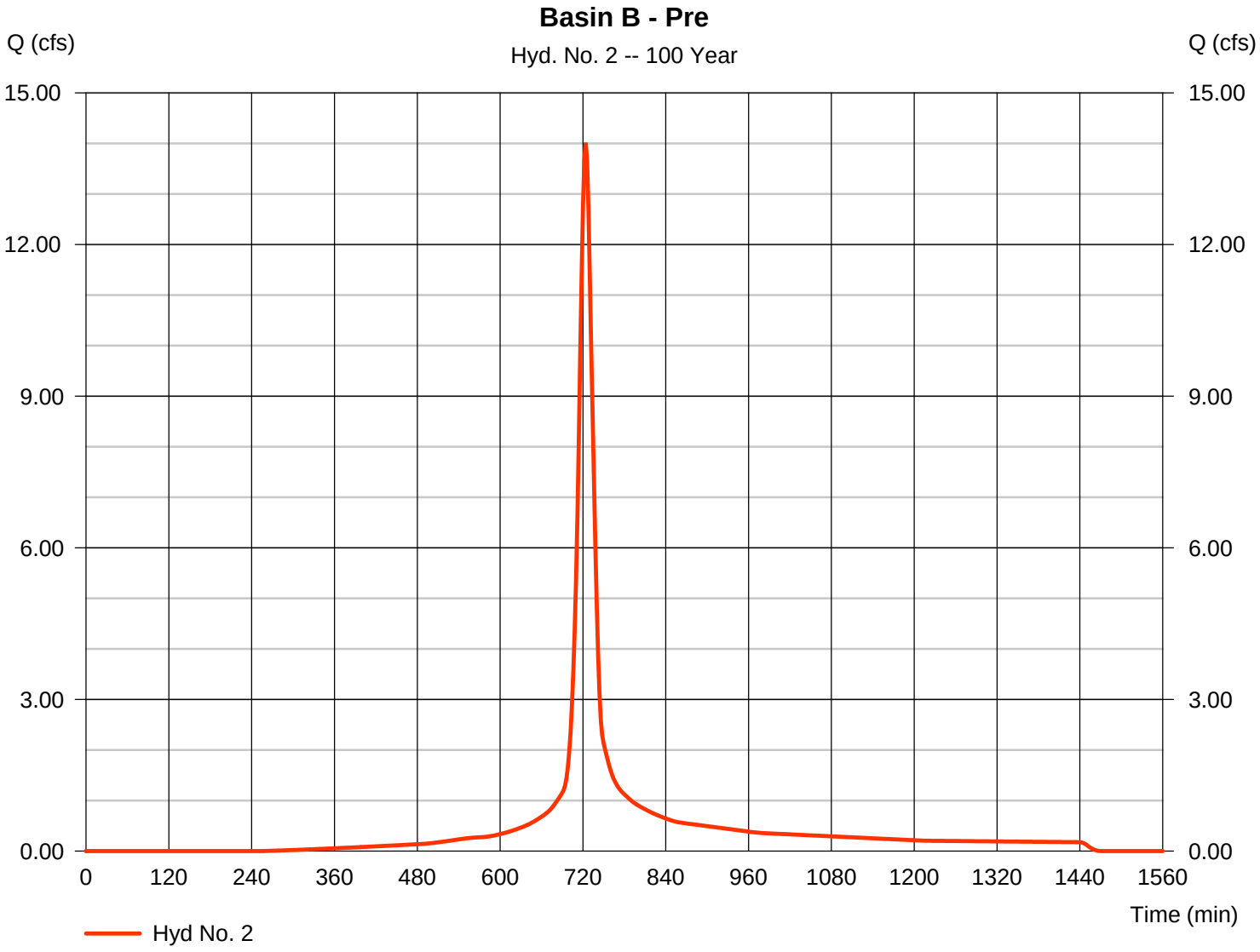


Hydrograph Report

Hyd. No. 2

Basin B - Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 14.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 1.033 acft
Drainage area	= 2.100 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

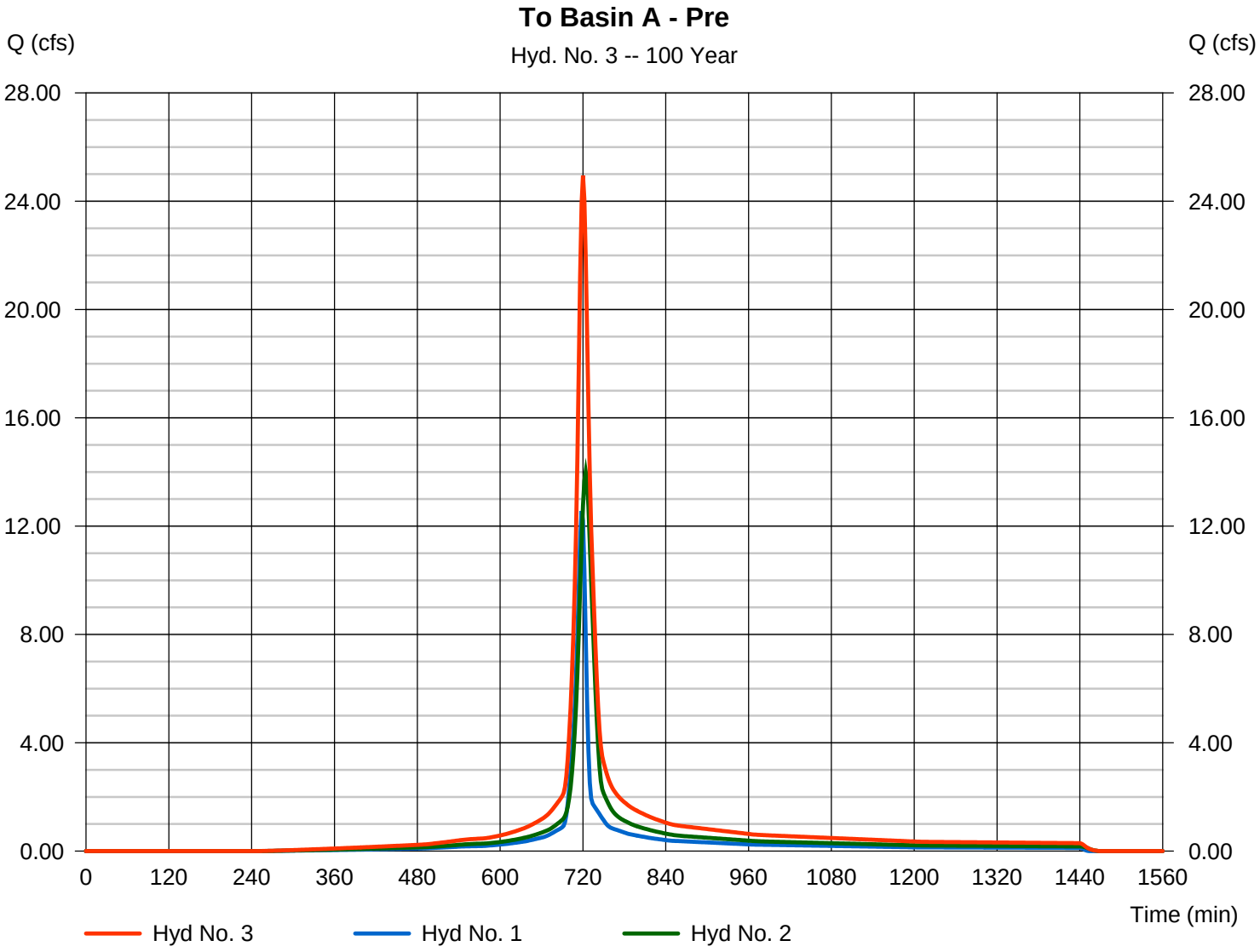


Hydrograph Report

Hyd. No. 3

To Basin A - Pre

Hydrograph type	= Combine	Peak discharge	= 24.95 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 1.722 acft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 3.500 ac



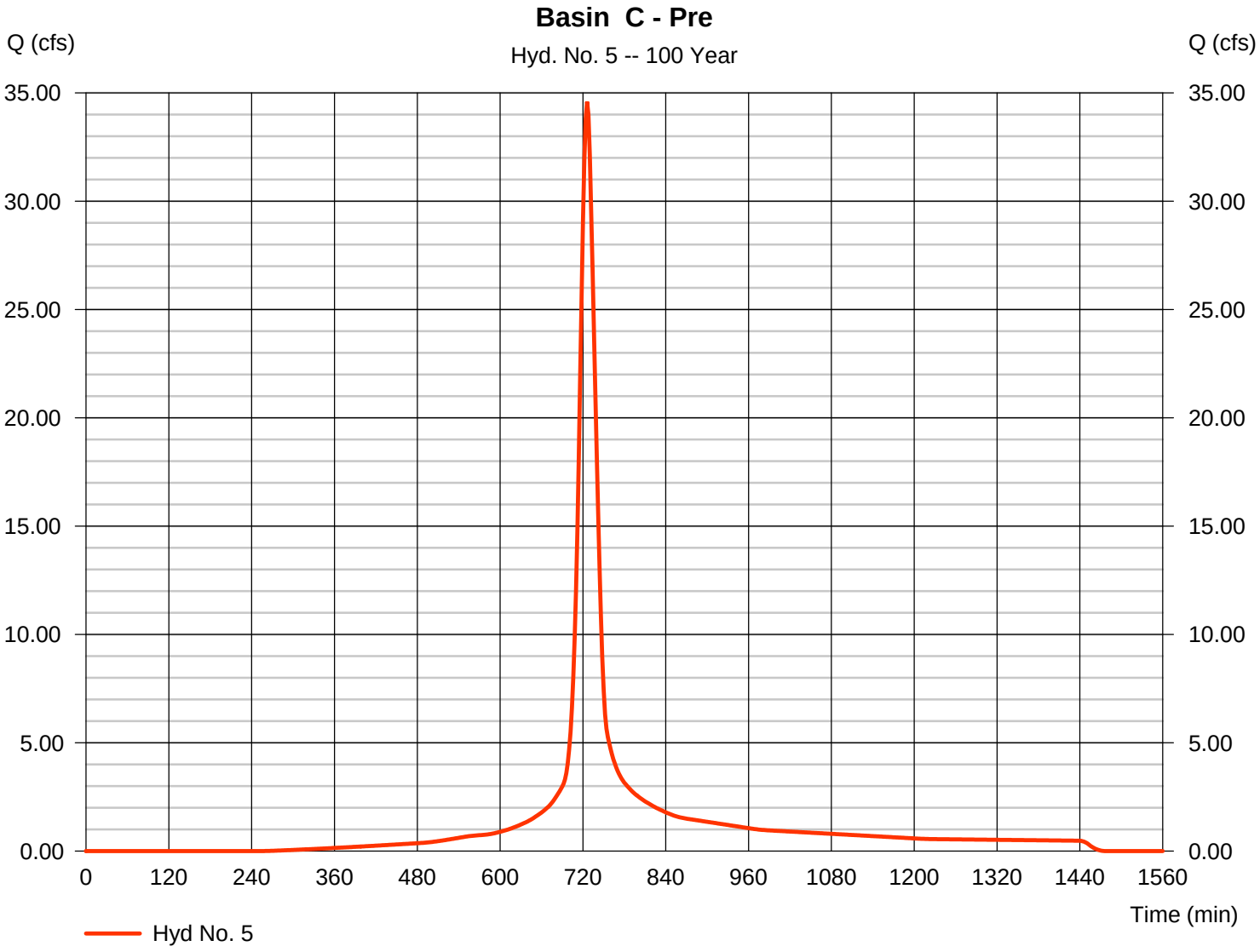
Hydrograph Report

Hyd. No. 5

Basin C - Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 34.59 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 2.804 acft
Drainage area	= 5.600 ac	Curve number	= 84*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 22.40 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 98) + (5.500 x 84)] / 5.600

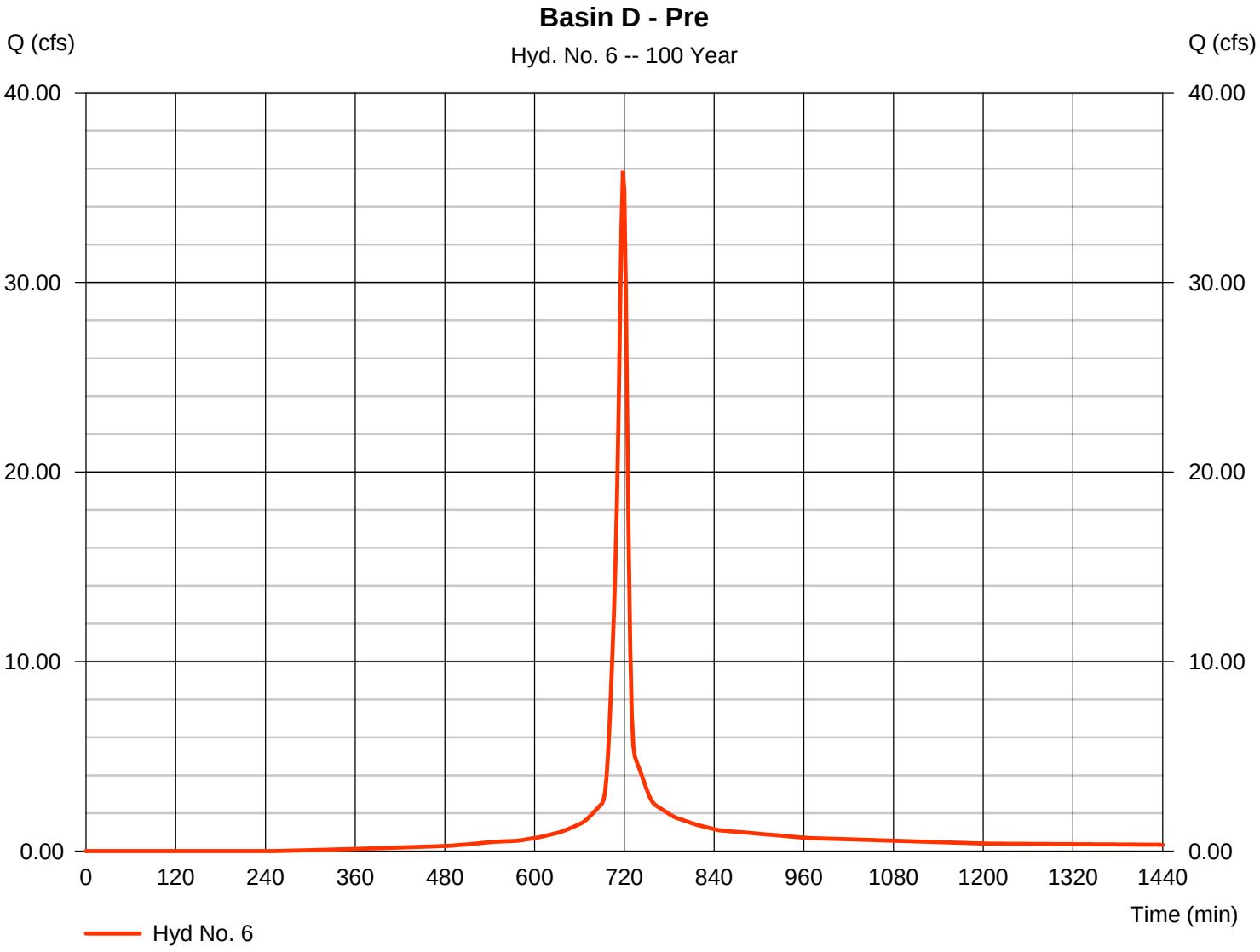


Hydrograph Report

Hyd. No. 6

Basin D - Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 35.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1.968 acft
Drainage area	= 4.000 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.80 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

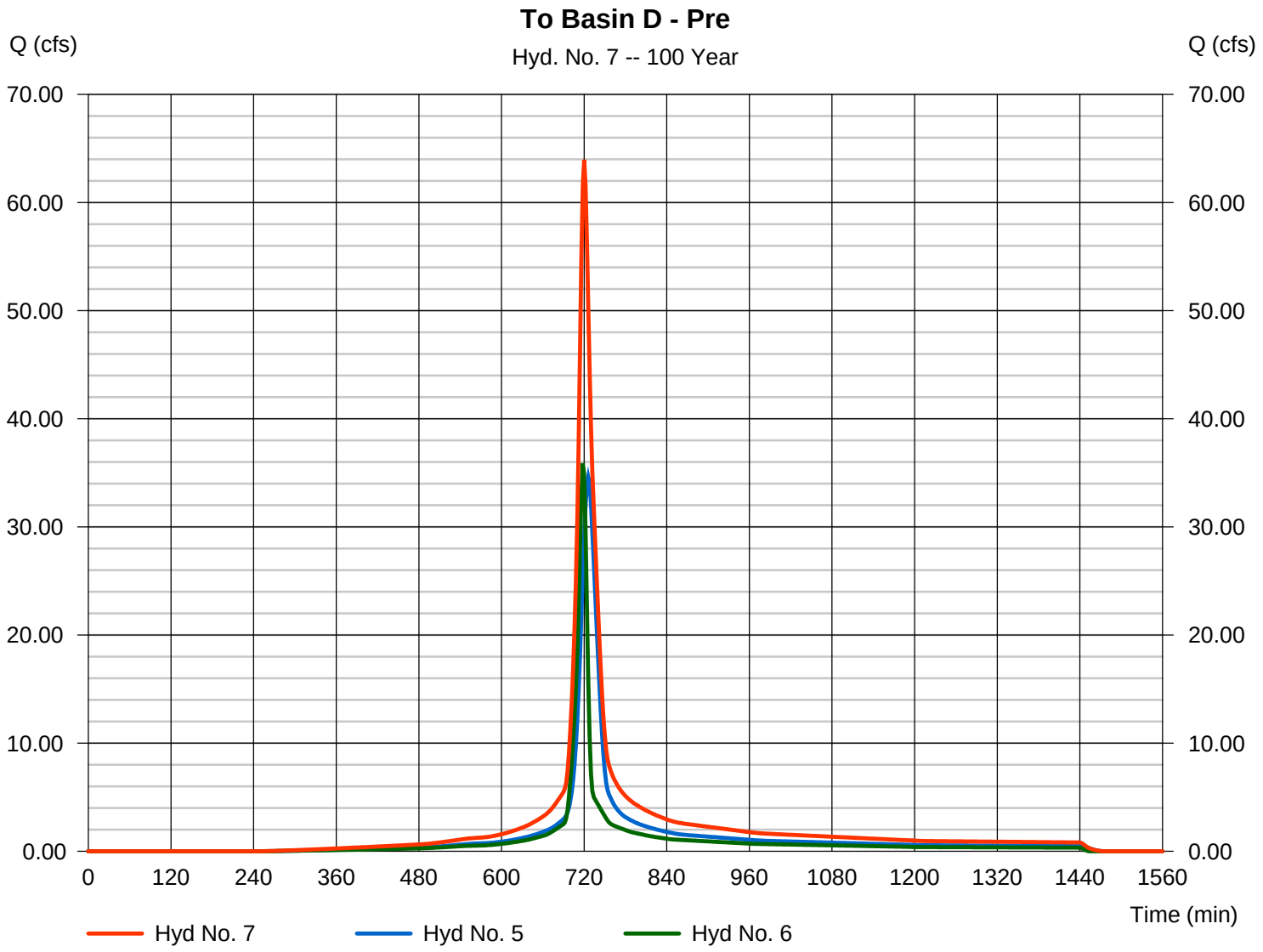


Hydrograph Report

Hyd. No. 7

To Basin D - Pre

Hydrograph type	= Combine	Peak discharge	= 63.97 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 4.772 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 9.600 ac

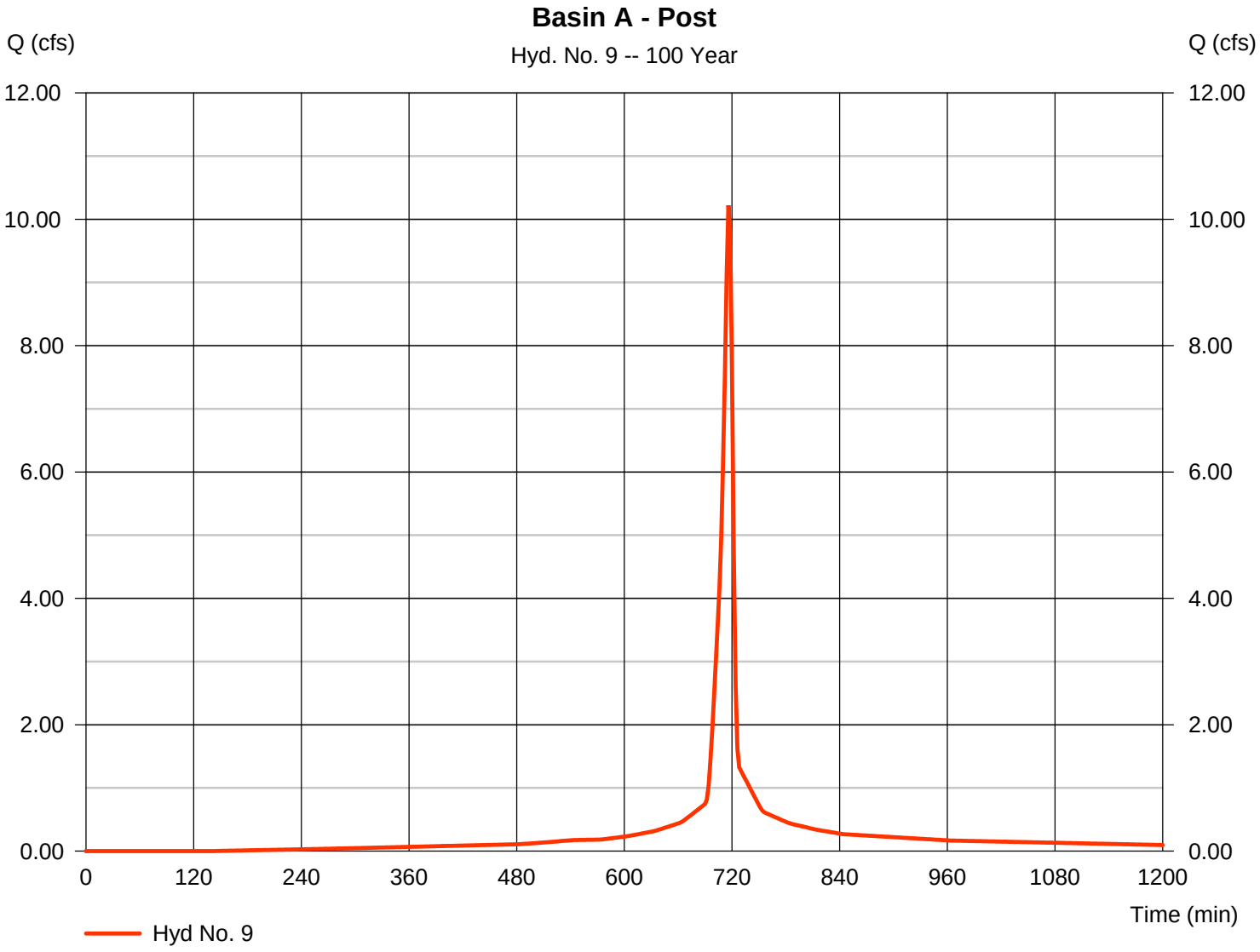


Hydrograph Report

Hyd. No. 9

Basin A - Post

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.22 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	0.526 acft
Drainage area	=	1.000 ac	Curve number	=	91
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.10 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



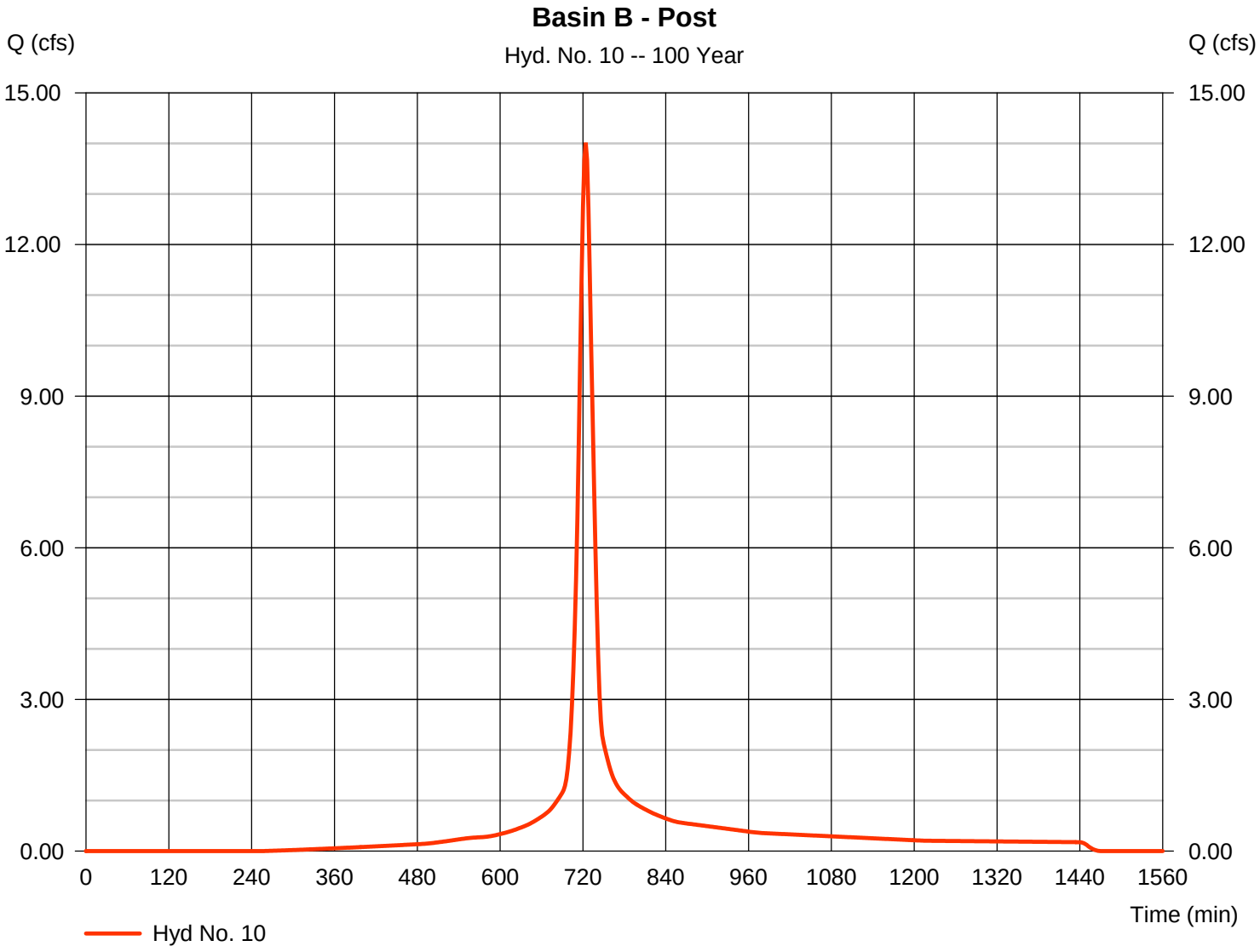
Hydrograph Report

Hyd. No. 10

Basin B - Post

Hydrograph type	= SCS Runoff	Peak discharge	= 14.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 1.033 acft
Drainage area	= 2.100 ac	Curve number	= 84*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.120 x 84) + (0.900 x 93)] / 2.100

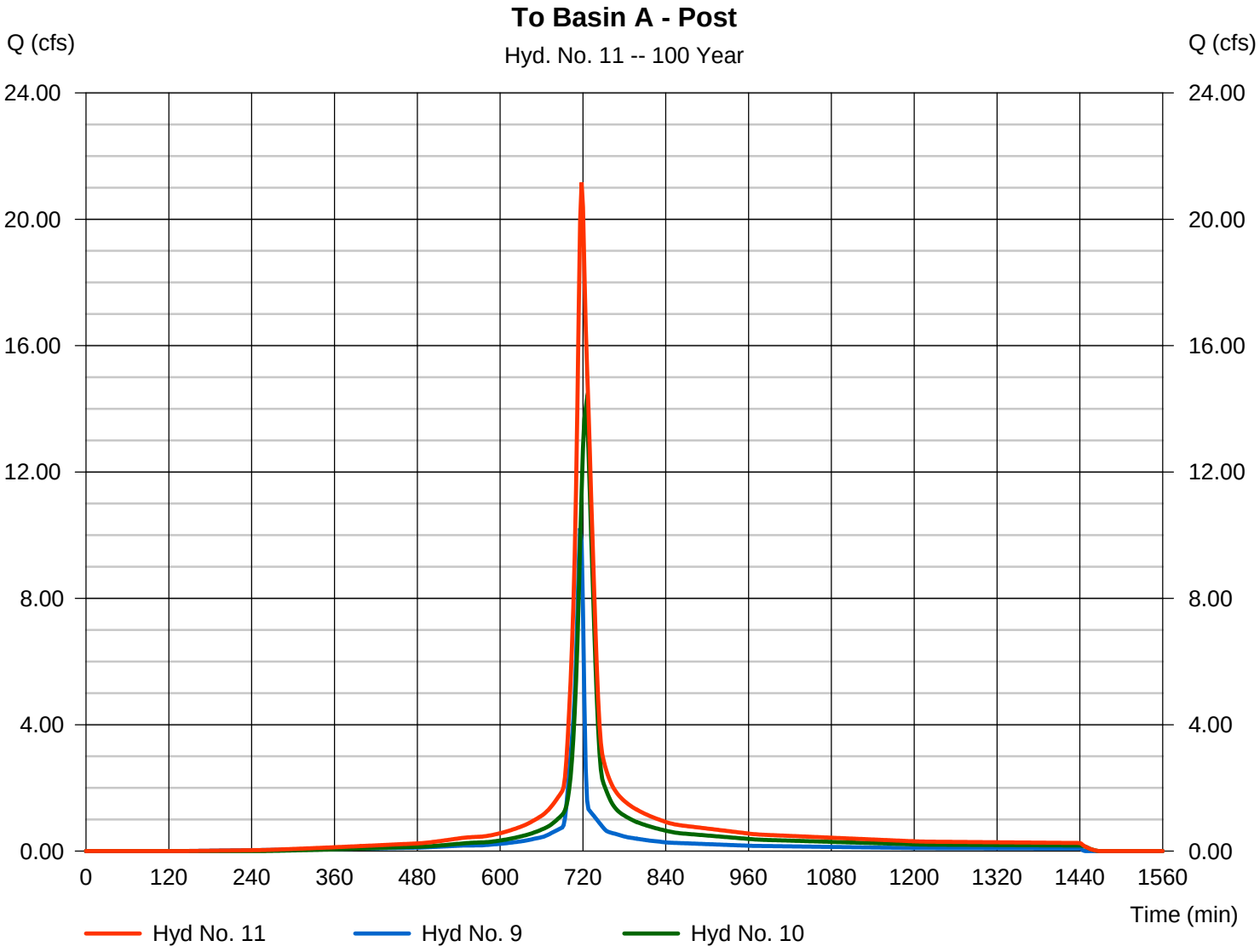


Hydrograph Report

Hyd. No. 11

To Basin A - Post

Hydrograph type	=	Combine	Peak discharge	=	21.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	1.559 acft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	3.100 ac



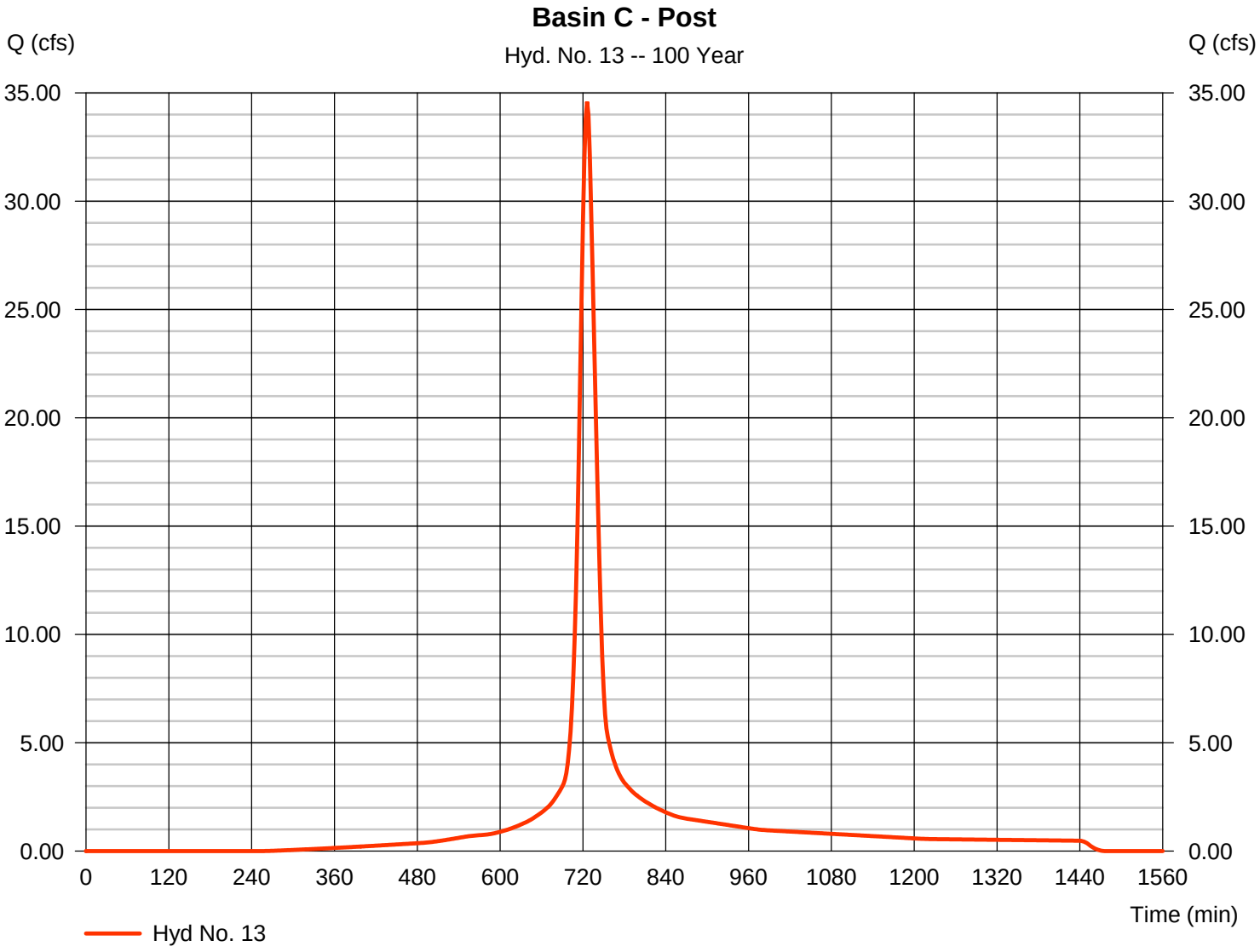
Hydrograph Report

Hyd. No. 13

Basin C - Post

Hydrograph type	=	SCS Runoff	Peak discharge	=	34.59 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	2.804 acft
Drainage area	=	5.600 ac	Curve number	=	84*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	22.40 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.100 x 98) + (5.500 x 84)] / 5.600



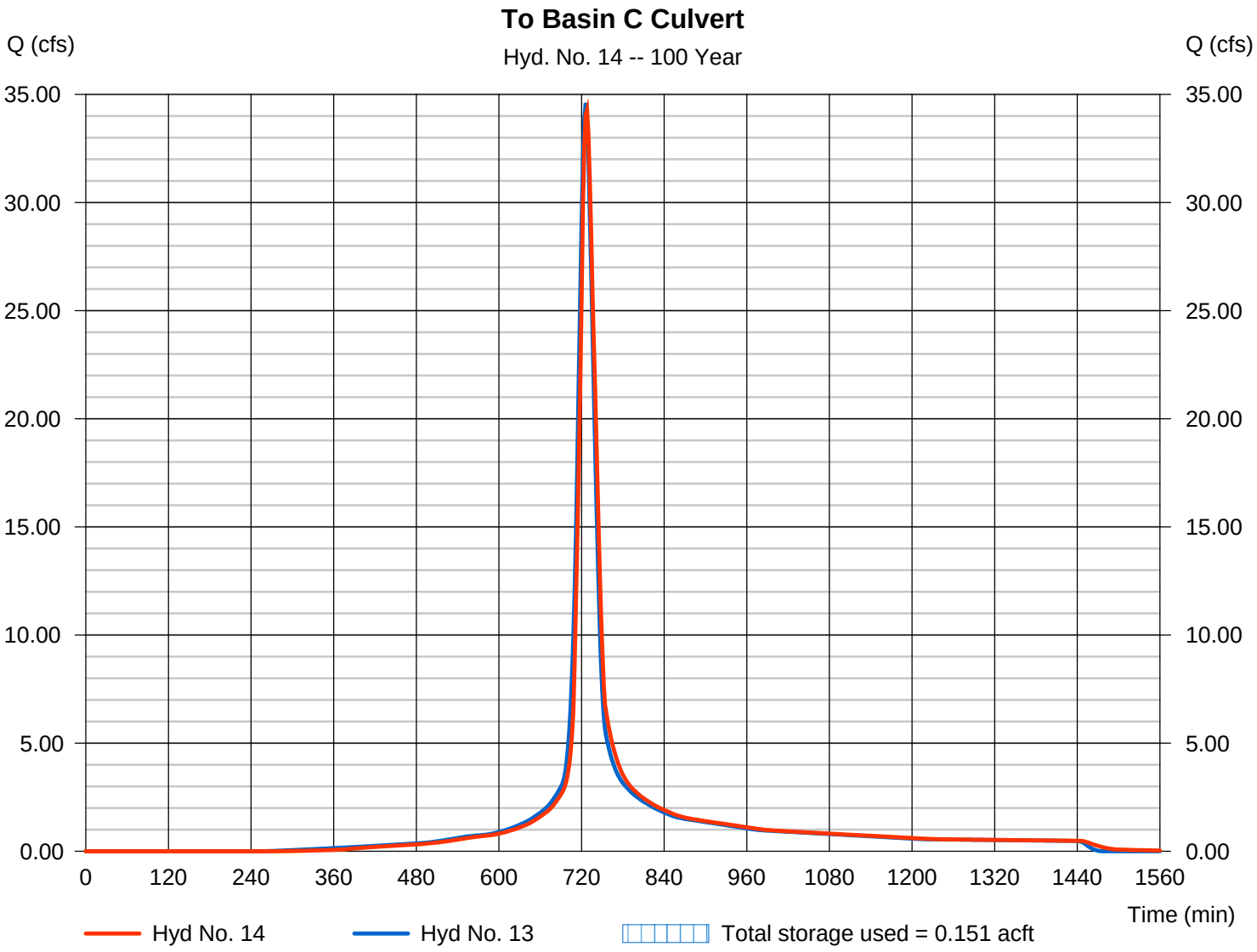
Hydrograph Report

Hyd. No. 14

To Basin C Culvert

Hydrograph type	=	Reservoir	Peak discharge	=	34.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	2.804 acft
Inflow hyd. No.	=	13 - Basin C - Post	Max. Elevation	=	1380.13 ft
Reservoir name	=	South Culvert	Max. Storage	=	0.151 acft

Storage Indication method used.



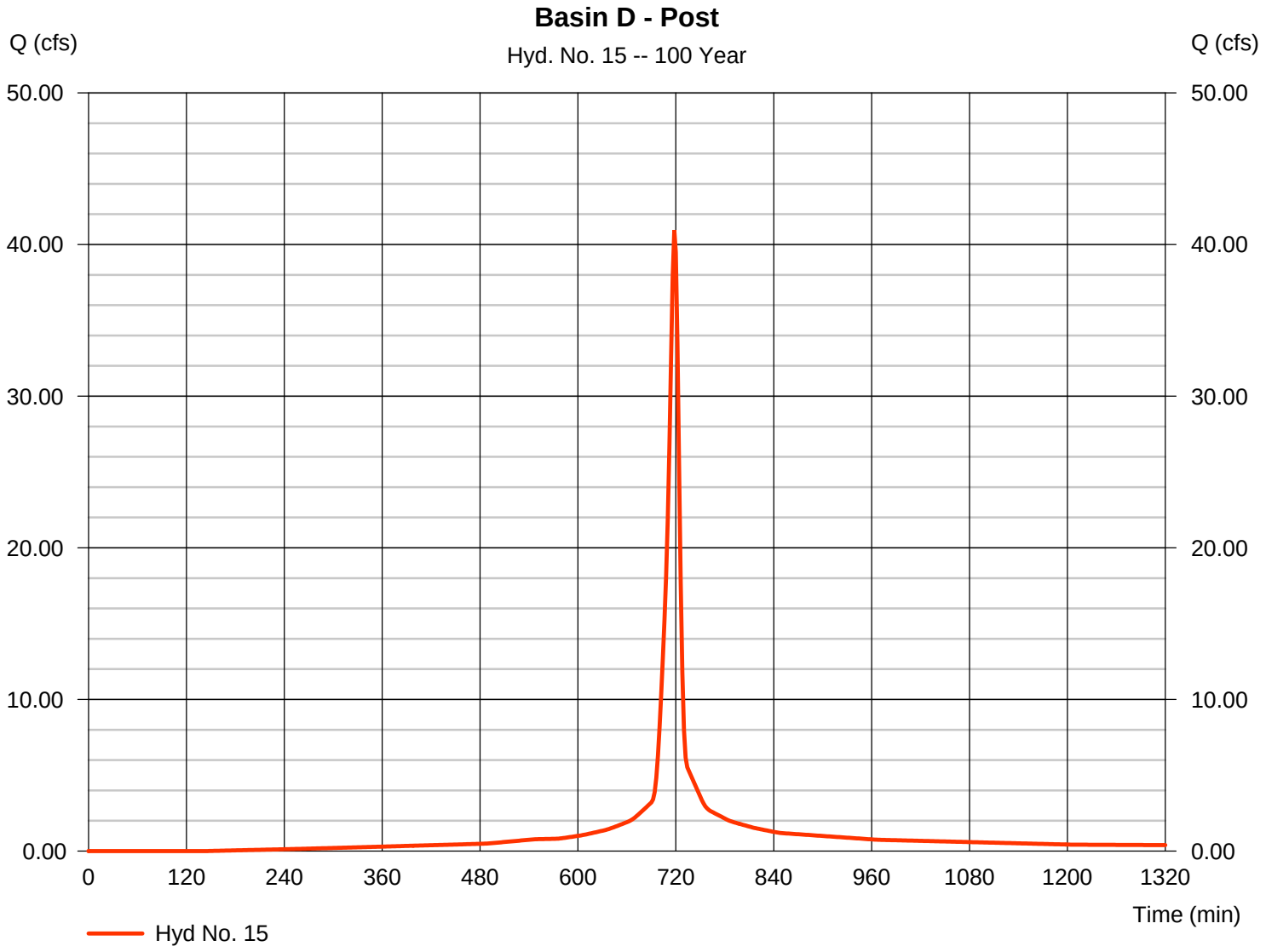
Hydrograph Report

Hyd. No. 15

Basin D - Post

Hydrograph type	=	SCS Runoff	Peak discharge	=	40.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2.354 acft
Drainage area	=	4.200 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.90 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.800 x 84) + (3.400 x 93)] / 4.200

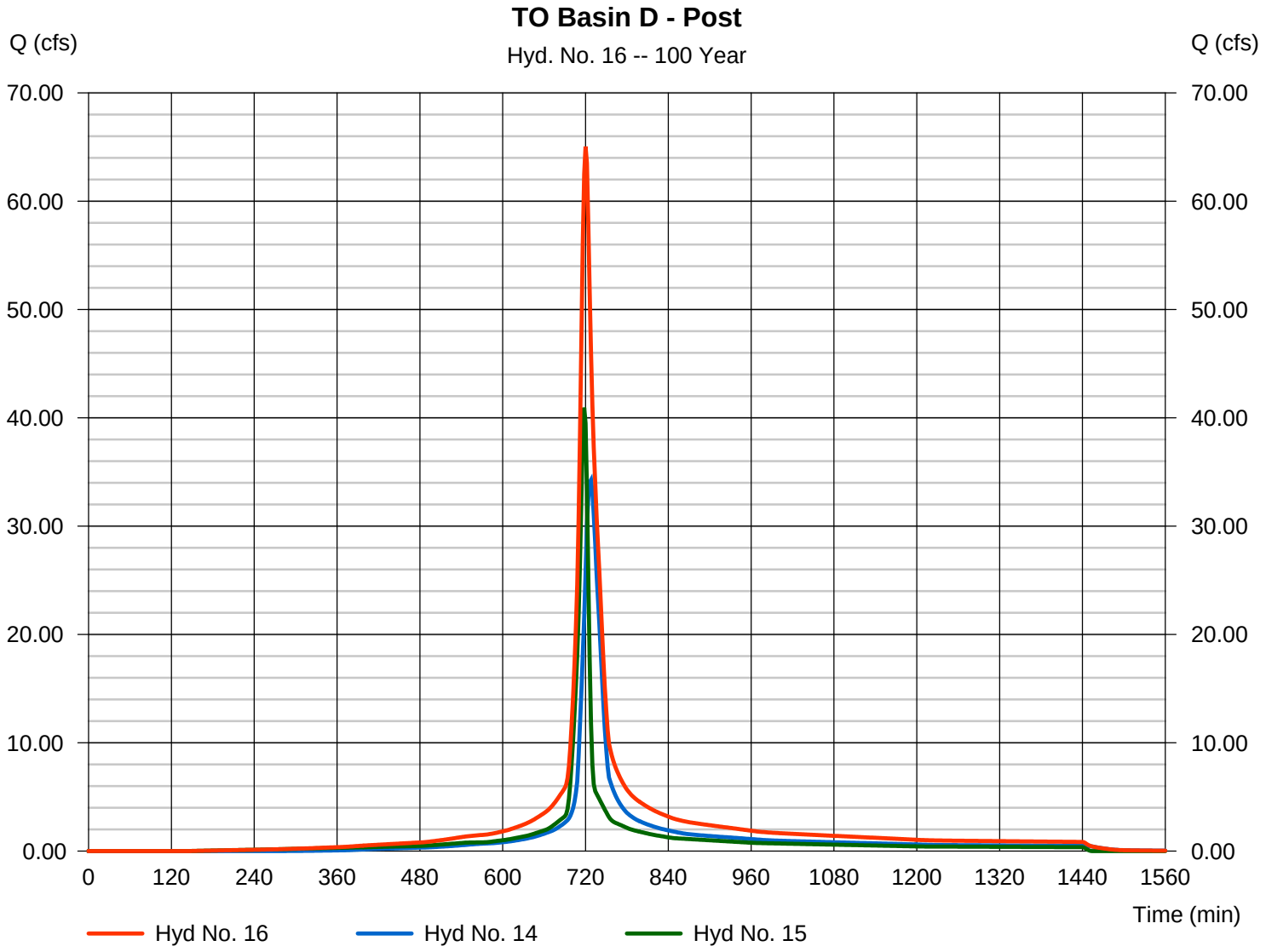


Hydrograph Report

Hyd. No. 16

TO Basin D - Post

Hydrograph type	= Combine	Peak discharge	= 65.04 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 5.158 acft
Inflow hyds.	= 14, 15	Contrib. drain. area	= 4.200 ac



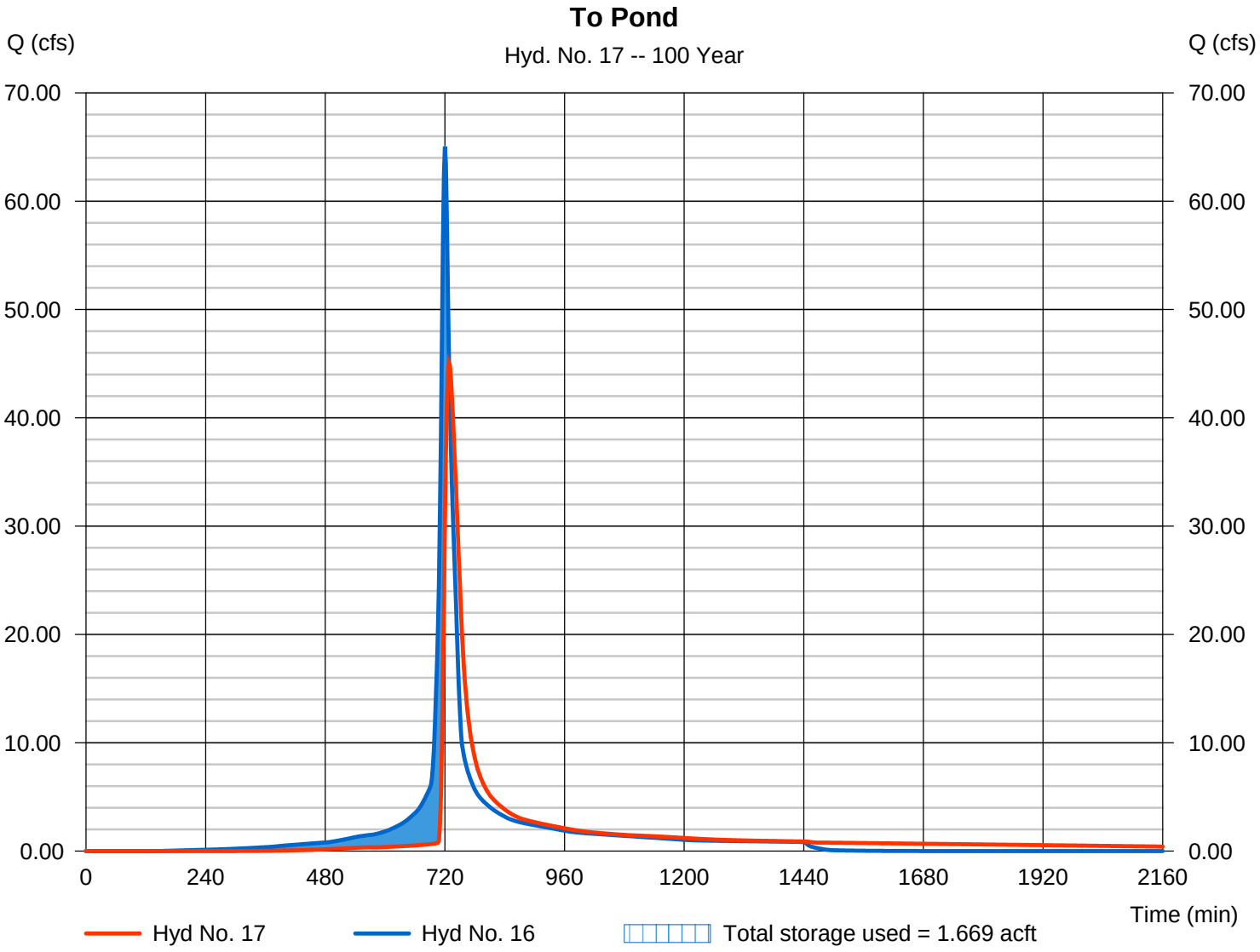
Hydrograph Report

Hyd. No. 17

To Pond

Hydrograph type	=	Reservoir	Peak discharge	=	45.08 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	5.143 acft
Inflow hyd. No.	=	16 - TO Basin D - Post	Max. Elevation	=	1377.45 ft
Reservoir name	=	Pond	Max. Storage	=	1.669 acft

Storage Indication method used.



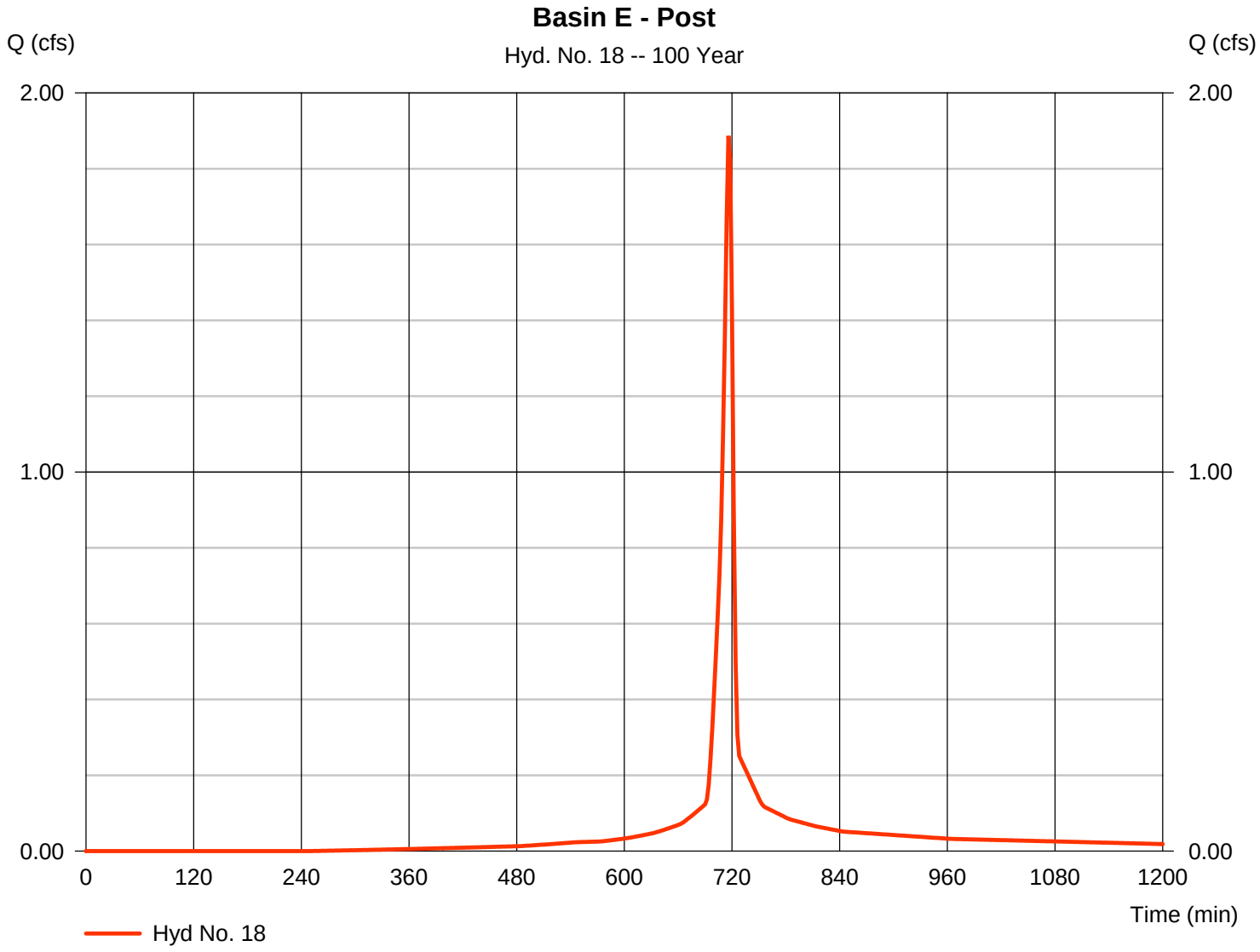
Hydrograph Report

Hyd. No. 18

Basin E - Post

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.887 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	0.092 acft
Drainage area	=	0.200 ac	Curve number	=	84*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.120 x 84) + (0.900 x 93)] / 0.200

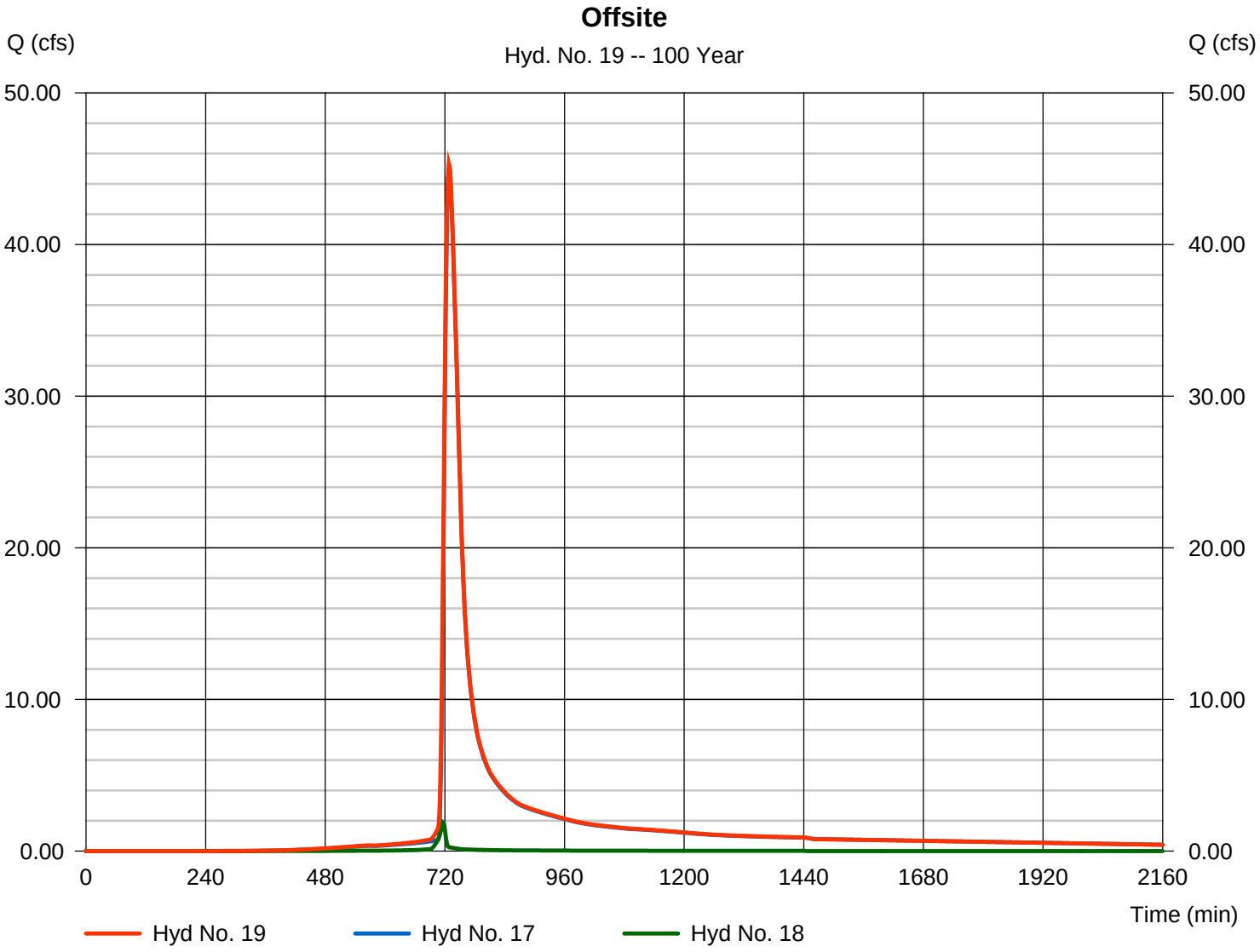


Hydrograph Report

Hyd. No. 19

Offsite

Hydrograph type	=	Combine	Peak discharge	=	45.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	5.236 acft
Inflow hyds.	=	17, 18	Contrib. drain. area	=	0.200 ac



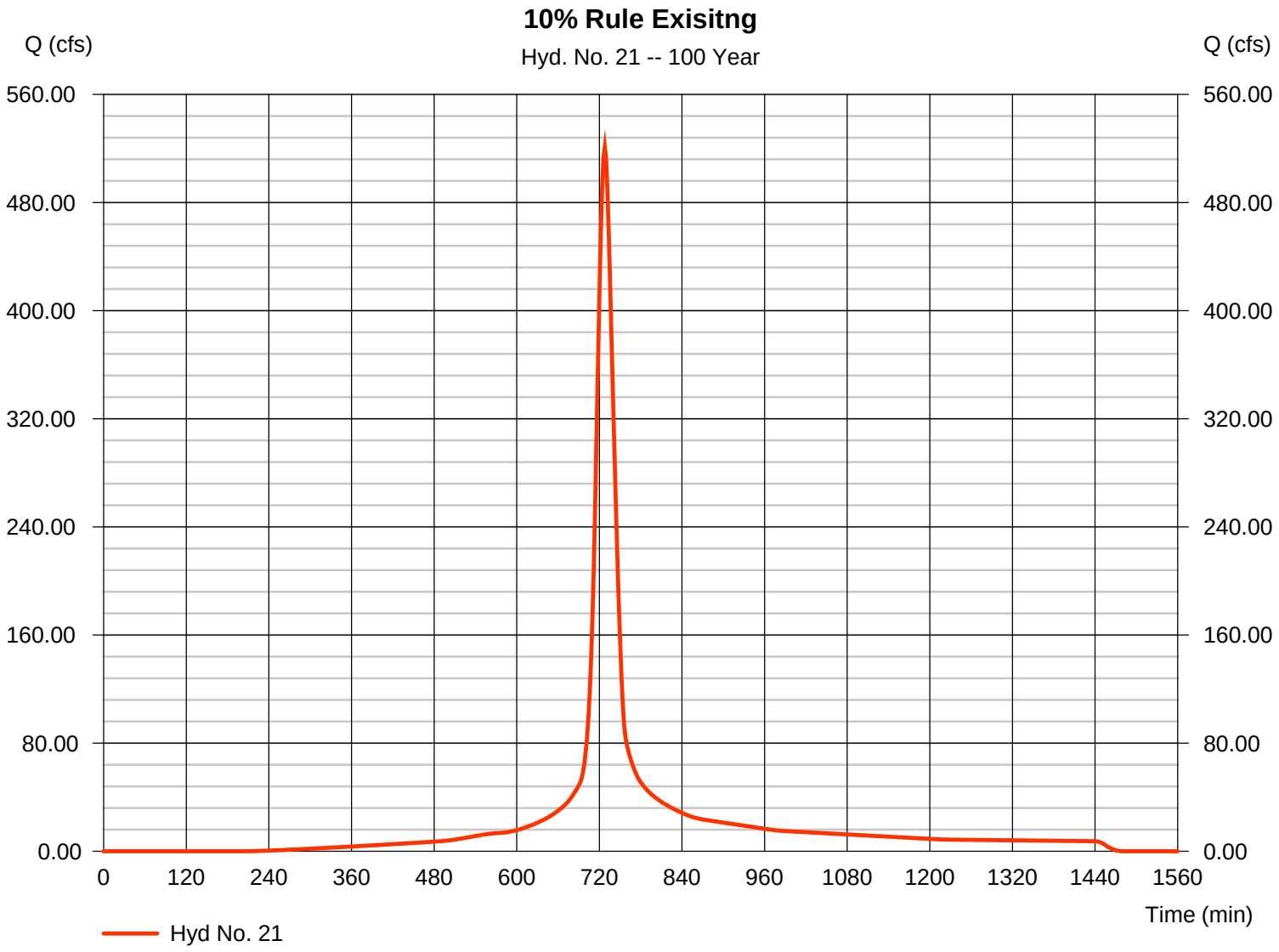
Hydrograph Report

Hyd. No. 21

10% Rule Exisitng

Hydrograph type	=	SCS Runoff	Peak discharge	=	521.06 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	45.462 acft
Drainage area	=	88.600 ac	Curve number	=	87*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	24.20 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(38.600 x 87) + (6.600 x 93) + (4.000 x 98) + (39.400 x 84)] / 88.600



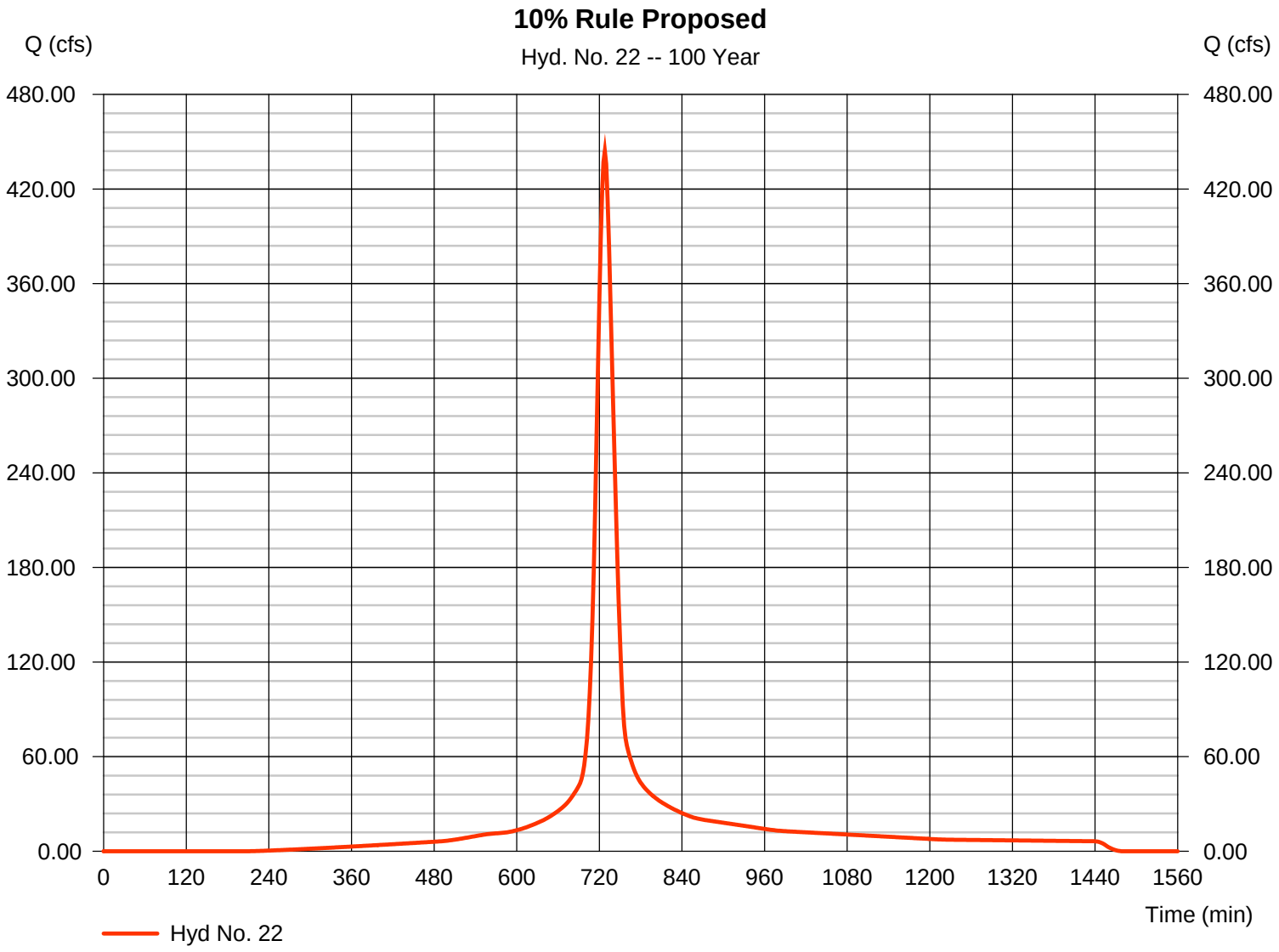
Hydrograph Report

Hyd. No. 22

10% Rule Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	444.02 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	38.740 acft
Drainage area	=	75.500 ac	Curve number	=	87*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	24.20 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(38.600 x 87) + (6.600 x 93) + (4.000 x 98) + (26.300 x 84)] / 75.500

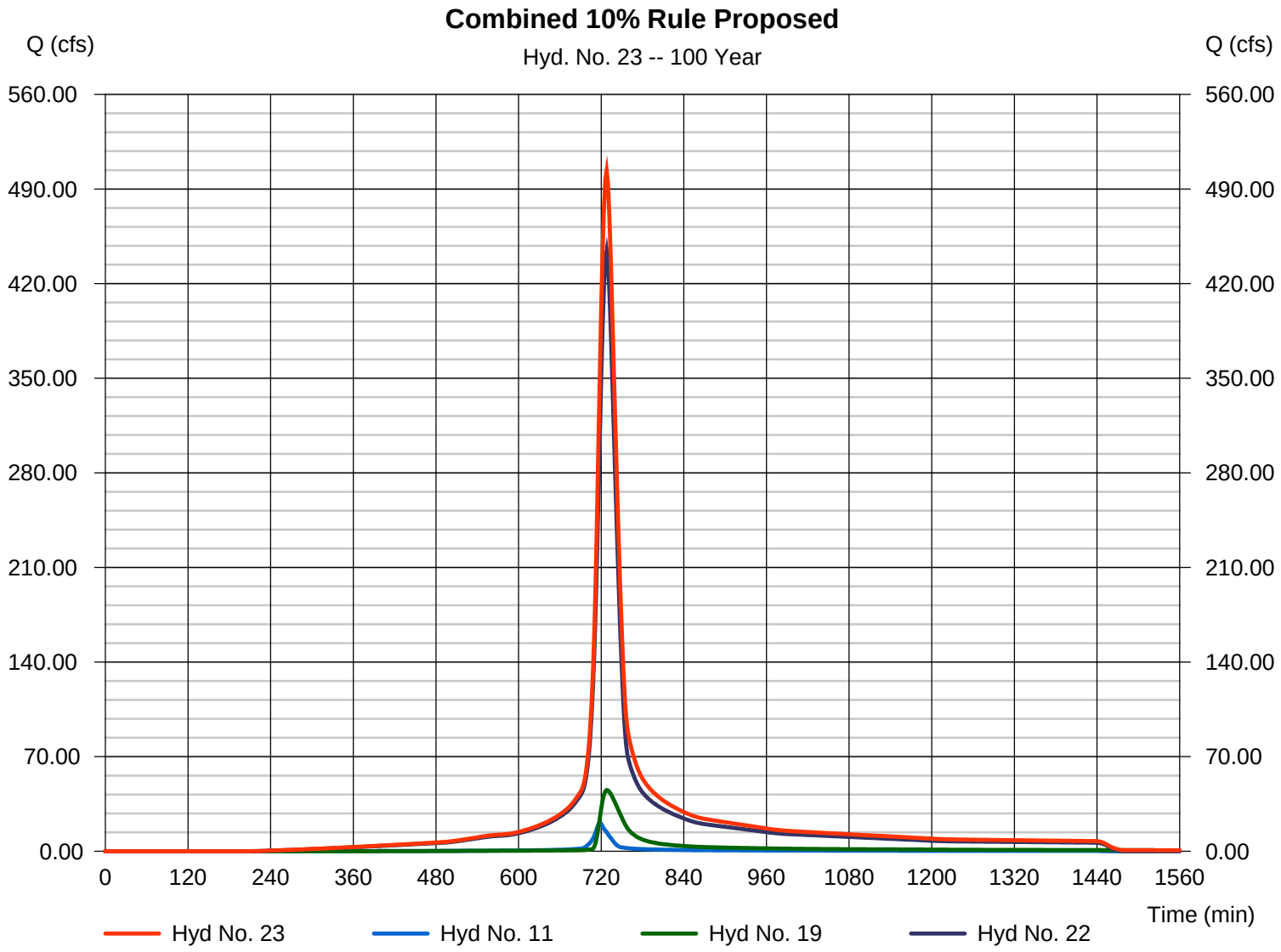


Hydrograph Report

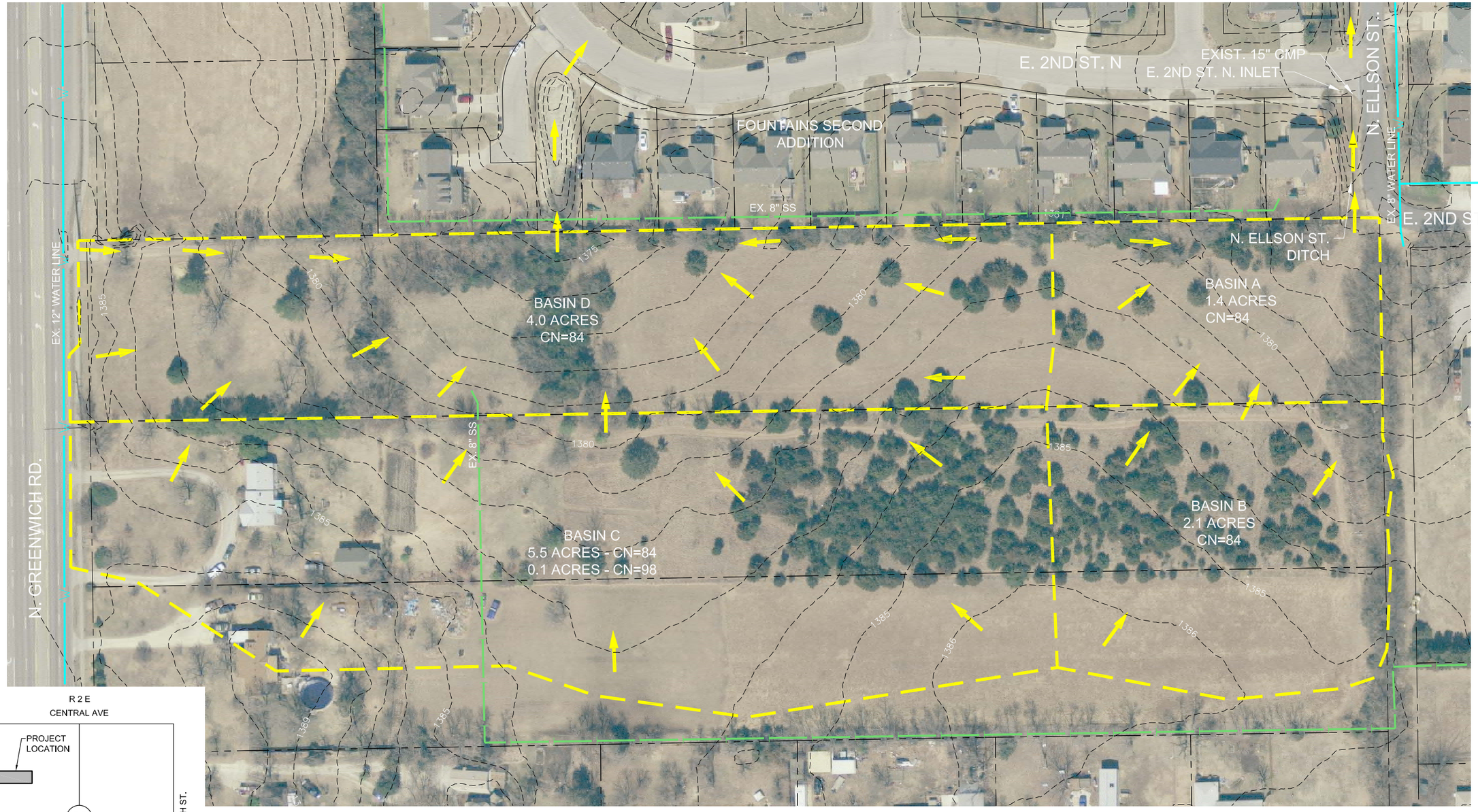
Hyd. No. 23

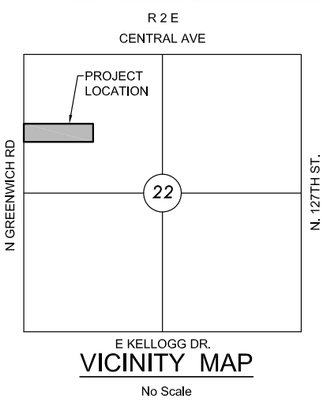
Combined 10% Rule Proposed

Hydrograph type	=	Combine	Peak discharge	=	503.39 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	45.534 acft
Inflow hyds.	=	11, 19, 22	Contrib. drain. area	=	75.500 ac



Appendix G - Existing Drainage and Utilities





VICINITY MAP

No Scale

BASIN A FLOW RATE	
	PEAK FLOW (CFS)
1 YR	3.3
2 YR	4.3
5 YR	5.9
10 YR	7.4
25 YR	9.6
50 YR	11.4
100 YR	12.6

BASIN B FLOW RATE	
	PEAK FLOW (CFS)
1 YR	3.6
2 YR	4.7
5 YR	6.6
10 YR	8.3
25 YR	10.7
50 YR	12.7
100 YR	14.0

BASIN C FLOW RATE	
	PEAK FLOW (CFS)
1 YR	8.9
2 YR	11.6
5 YR	16.2
10 YR	20.3
25 YR	26.5
50 YR	31.4
100 YR	34.6

BASIN D FLOW RATE	
	PEAK FLOW (CFS)
1 YR	9.5
2 YR	12.2
5 YR	17.0
10 YR	21.3
25 YR	27.6
50 YR	32.6
100 YR	35.9

OUTFLOW		
	PEAK FLOW TO FOUNDATIONS SECOND ADDITION (CFS)	PEAK FLOW TO THE N. ELLSON ST. DITCH (CFS)
1 YR	16.5	6.5
2 YR	21.4	8.4
5 YR	30.0	11.7
10 YR	37.6	14.7
25 YR	49.0	19.1
50 YR	58.1	22.7
100 YR	64.0	25.0

LEGEND

- EXISTING SANITARY SEWER
- EXISTING WATER
- BASIN BOUNDARY
- BASIN BOUNDARY

N

SCALE: 1"=50'

0 50 100

MKEC
Wichita, KS • 316-884-9800

EXISTING DRAINAGE & UTILITIES EXHIBIT

CANYON PROPERTIES SECOND ADD.

MINNEHA TOWNSHIP

EXISTING DRAINAGE & UTILITIES

PROJECT NO.	1601010708
DATE	FEB. 2017
SCALE	1" = 50'

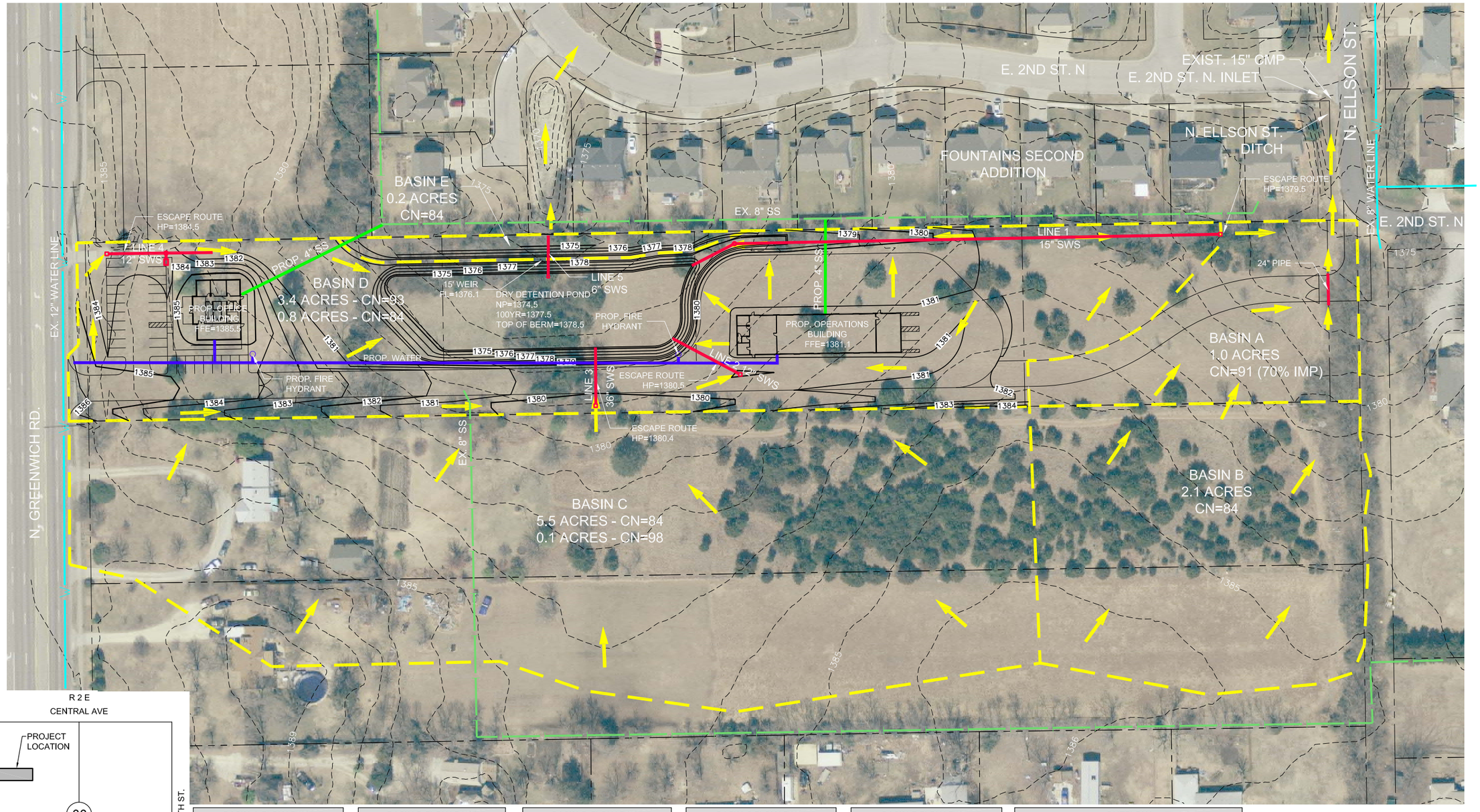
DESIGNED	DRAWN	CHECKED
KLA	CRM	KLA

NO.	REVISION	DATE

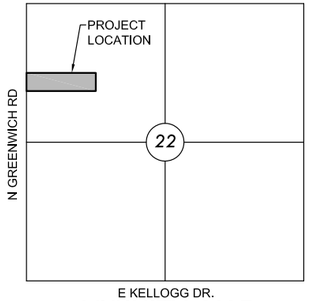
SHEET NO.

1 OF 1

Appendix H - Proposed Drainage and Utilities



R 2 E
CENTRAL AVE



VICINITY MAP
No Scale

BASIN A FLOW RATE	
	PEAK FLOW (CFS)
1 YR	3.3
2 YR	4.1
5 YR	5.4
10 YR	6.5
25 YR	8.1
50 YR	9.4
100 YR	10.2

BASIN B FLOW RATE	
	PEAK FLOW (CFS)
1 YR	3.6
2 YR	4.7
5 YR	6.6
10 YR	8.3
25 YR	10.7
50 YR	12.7
100 YR	14.0

BASIN D FLOW RATE	
	PEAK FLOW (CFS)
1 YR	13.3
2 YR	16.3
5 YR	21.4
10 YR	25.9
25 YR	32.4
50 YR	37.6
100 YR	40.9

BASIN C FLOW RATE	
	PEAK FLOW (CFS)
1 YR	8.9
2 YR	11.6
5 YR	16.2
10 YR	20.3
25 YR	26.5
50 YR	31.4
100 YR	34.6

BASIN E FLOW RATE	
	PEAK FLOW (CFS)
1 YR	0.5
2 YR	0.6
5 YR	0.9
10 YR	1.1
25 YR	1.5
50 YR	1.7
100 YR	1.9

OUTFLOW		
	PEAK FLOW TO FOUNDATIONS SECOND ADDITION (CFS)	PEAK FLOW TO THE N. ELLSON ST. DITCH (CFS)
1 YR	0.9	6.0
2 YR	2.8	7.6
5 YR	10.0	10.3
10 YR	17.5	12.8
25 YR	29.0	16.4
50 YR	38.9	19.3
100 YR	45.3	21.2

LEGEND

- PROPOSED STORMWATER
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- PROPOSED WATER
- EXISTING WATER
- BASIN BOUNDARY
- BASIN BOUNDARY

N

SCALE: 1"=50'
0 50 100

MKEC
Wichita, KS • 316-884-9800

CANYON PROPERTIES SECOND ADD.

PROPOSED DRAINAGE & UTILITY EXHIBIT FOR

MINNEHA TOWNSHIP

PROP. DRAINAGE & UTILITIES

PROJECT NO.	1601010708
DATE	FEB. 2017
SCALE	1" = 50'

DESIGNED	DRAWN	CHECKED
KLA	CRM	KLA

NO.	REVISION	DATE

SHEET NO.

1 OF 1

J:\PROJECTS\2016\1601010708_MINNEHA_CANYON SECOND PLATTING\5_1601010708 CAD\REF\MKEC\05 CIVIL\MODEL\SD\DRAINAGE\SLAWSON PROPERTY_PROP DRAINAGE BOUNDARIES.DWG

Appendix I - North Ellson Street Ditch

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Feb 8 2017

<Name>

Trapezoidal

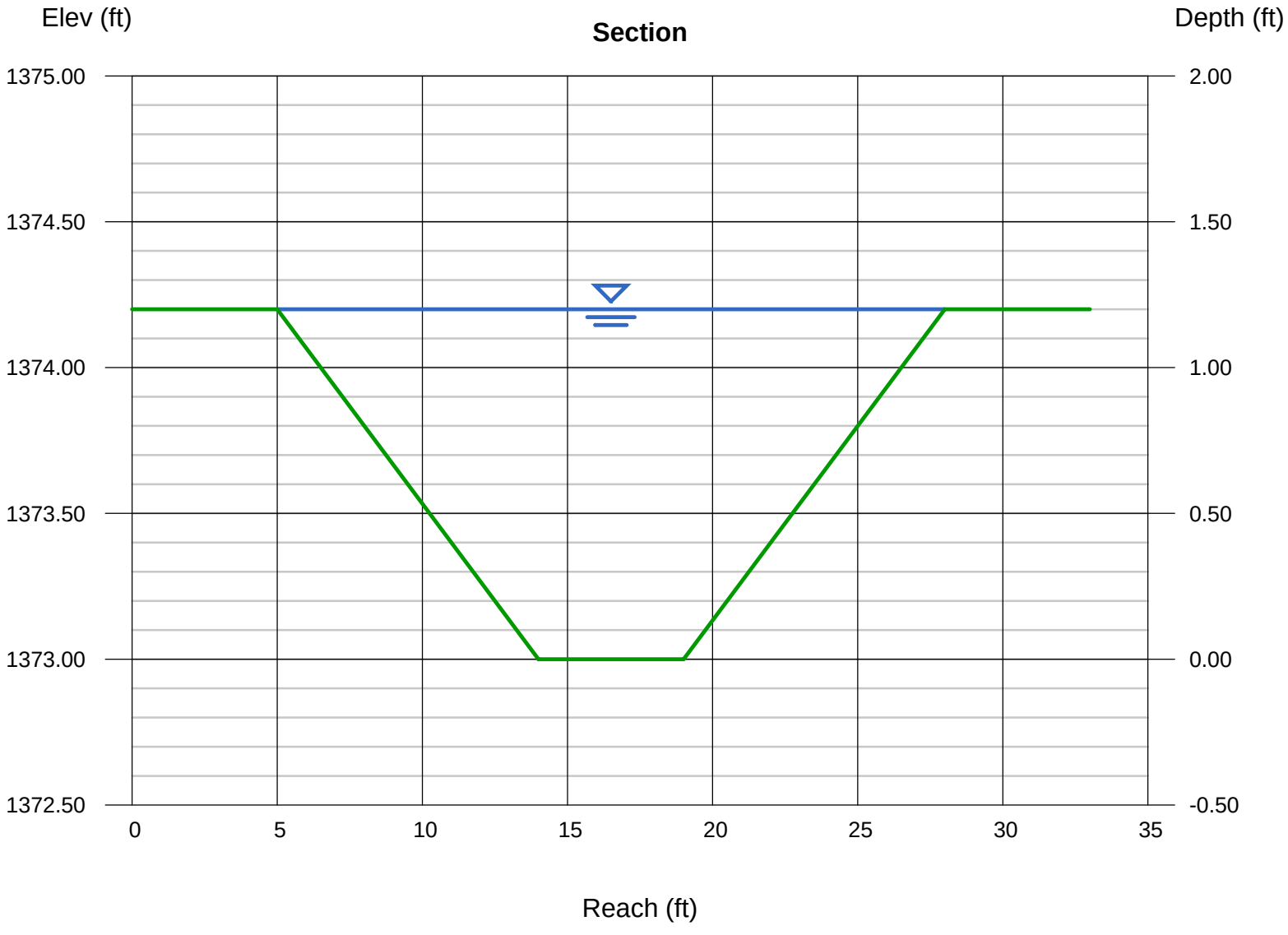
Bottom Width (ft)	= 5.00
Side Slopes (z:1)	= 7.50, 7.50
Total Depth (ft)	= 1.20
Invert Elev (ft)	= 1373.00
Slope (%)	= 4.00
N-Value	= 0.150

Calculations

Compute by:	Known Depth
Known Depth (ft)	= 1.20

Highlighted

Depth (ft)	= 1.20
Q (cfs)	= 26.87
Area (sqft)	= 16.80
Velocity (ft/s)	= 1.60
Wetted Perim (ft)	= 23.16
Crit Depth, Yc (ft)	= 0.69
Top Width (ft)	= 23.00
EGL (ft)	= 1.24



Appendix J - North Ellson Street Culvert

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Feb 8 2017

Circular Culvert

Invert Elev Dn (ft)	=	100.00
Pipe Length (ft)	=	30.00
Slope (%)	=	0.50
Invert Elev Up (ft)	=	100.15
Rise (in)	=	15.0
Shape	=	Circular
Span (in)	=	15.0
No. Barrels	=	1
n-Value	=	0.023
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Headwall
Coeff. K,M,c,Y,k	=	0.0078, 2, 0.0379, 0.69, 0.5

Embankment

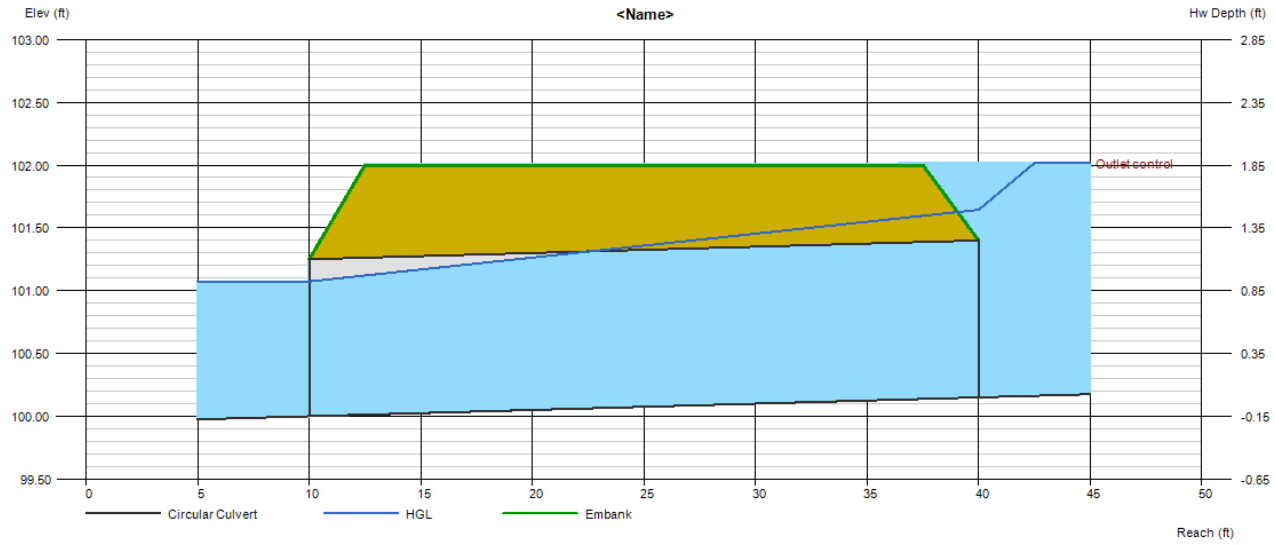
Top Elevation (ft)	=	102.00
Top Width (ft)	=	25.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	1.00
Qmax (cfs)	=	60.00
Tailwater Elev (ft)	=	(dc+D)/2

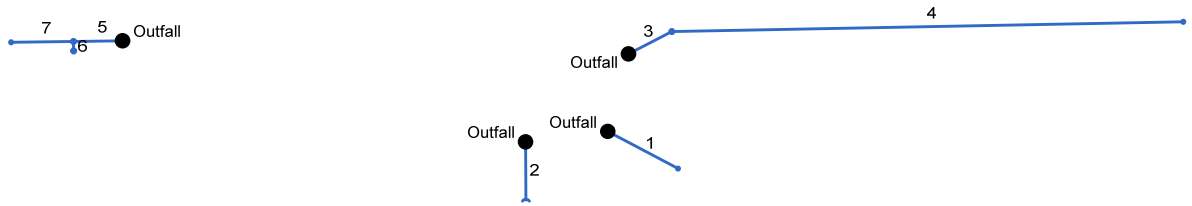
Highlighted

Qtotal (cfs)	=	5.00
Qpipe (cfs)	=	4.90
Qovertop (cfs)	=	0.10
Veloc Dn (ft/s)	=	4.37
Veloc Up (ft/s)	=	3.99
HGL Dn (ft)	=	101.07
HGL Up (ft)	=	101.64
Hw Elev (ft)	=	102.02
Hw/D (ft)	=	1.49
Flow Regime	=	Outlet Control



Appendix K - Stormwater Sewer Calculations

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



Project File: Pipe Sizing2.stm	Number of lines: 7	Date: 1/31/2017

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Line 2-1	3.14	12	Cir	75.862	1374.50	1376.00	1.977	1375.14	1376.76	n/a	1376.76	End	DropGrate
2	Line 3.1	40.00	36	Cir	55.384	1374.43	1376.29	3.358	1376.49	1378.35	n/a	1378.35	End	OpenHeadwall
3	Line 1-1	2.93	15	Cir	46.577	1374.50	1374.69	0.408	1375.19	1375.46	n/a	1375.56	End	Manhole
4	Line 1-2	3.26	15	Cir	487.793	1374.79	1376.74	0.400	1375.63	1377.58	n/a	1377.80	3	DropGrate
5	Line 4-2	2.28	12	Cir	46.796	1381.03	1381.22	0.406	1381.68	1382.01	n/a	1382.19	End	Manhole
6	Line 4-3	1.37	12	Cir	9.053	1381.32	1381.41	0.995	1382.19	1381.91	n/a	1381.91	5	Curb-
7	Line 4-1	0.99	12	Cir	59.464	1381.32	1382.20	1.480	1382.19	1382.62	n/a	1382.62	5	DropGrate

Project File: Pipe Sizing2.stm | Number of lines: 7 | Run Date: 1/30/2017

NOTES: Return period = 100 Yrs.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	75.862	0.38	0.38	0.80	0.30	0.30	5.0	5.0	10.3	3.14	5.01	5.41	12	1.98	1374.50	1376.00	1375.14	1376.76	0.00	1377.67	Line 2-1
2	End	55.384	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	40.00	0.00	7.74	36	3.36	1374.43	1376.29	1376.49	1378.35	0.00	1378.66	Line 3.1
3	End	46.577	0.00	0.44	0.00	0.00	0.35	0.0	10.8	8.3	2.93	0.00	3.96	15	0.41	1374.50	1374.69	1375.19	1375.46	0.00	1377.30	Line 1-1
4	3	487.793	0.44	0.44	0.80	0.35	0.35	7.7	7.7	9.2	3.26	0.00	3.69	15	0.40	1374.79	1376.74	1375.63	1377.58	1377.30	1380.00	Line 1-2
5	End	46.796	0.00	0.26	0.00	0.00	0.23	0.0	5.8	10.0	2.28	0.00	3.85	12	0.41	1381.03	1381.22	1381.68	1382.01	0.00	1383.03	Line 4-2
6	5	9.053	0.14	0.14	0.95	0.13	0.13	5.0	5.0	10.3	1.37	0.00	2.71	12	1.00	1381.32	1381.41	1382.19	1381.91	1383.03	1383.05	Line 4-3
7	5	59.464	0.12	0.12	0.80	0.10	0.10	5.0	5.0	10.3	0.99	0.00	2.28	12	1.48	1381.32	1382.20	1382.19	1382.62	1383.03	1385.19	Line 4-1

Project File: Pipe Sizing2.stm | Number of lines: 7 | Run Date: 1/30/2017

NOTES:Intensity = 62.28 / (Inlet time + 10.10) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	Line 2-1	3.14	0.00	3.14	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.200	0.200	0.013	0.26	4.57	0.26	4.57	0.0	Off
2	Line 3-1	40.00*	0.00	40.00	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
3	Line 1-1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
4	LIne 1-2	3.26	0.00	3.26	0.00	DrGrt	0.0	0.00	16.00	4.00	4.00	Sag	3.00	0.200	0.200	0.013	0.17	5.66	0.17	5.66	0.0	Off
5	Line 4-2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
6	LIne 4-3	1.37	0.00	1.37	0.00	Curb	0.5	5.00	0.00	0.00	0.00	Sag	2.00	0.200	0.200	0.013	0.17	0.84	0.34	0.84	2.0	Off
7	Line 4-1	0.99	0.00	0.99	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.200	0.200	0.013	0.12	3.19	0.12	3.19	0.0	Off

Project File: Pipe Sizing2.stm | Number of lines: 7 | Run Date: 1/30/2017

NOTES: Inlet N-Values = 0.016; Intensity = 62.28 / (Inlet time + 10.10) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

FL-DOT Report

Line No	To Line	Type of struc	n - Value	Len	Drainage Area			Time of conc	Time of Flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	ADD		Date: 1/30/2017
					C1 = 0.2 C2 = 0.5 C3 = 0.9							Total Flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: Pipe Sizing2.stm
					Increment (ac)	Sub-Total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	DrGrt	0.013	75.862	0.00	0.00	0.00	5.00	0.32	10.31	0.30	0.00	1377.67	1376.76	1375.14	1.62	12	2.13	5.41	3.14	Line 2-1
					0.00	0.00	0.00					3.14		1377.00	1375.50		12	1.98	6.38	5.01	
					0.00	0.00	0.00							1376.00	1374.50	1.50	Cir				
2	End	Hdwl	0.013	55.384	0.00	0.00	0.00	0.00	0.16	0.00	0.00	40.00	1378.66	1378.35	1376.49	1.86	36	3.35	7.74	40.00	Line 3.1
					0.00	0.00	0.00					40.00		1379.29	1377.43		36	3.36	0.00	0.00	
					0.00	0.00	0.00							1376.29	1374.43	1.86	Cir				
3	End	MH	0.012	46.577	0.00	0.00	0.00	10.76	0.32	8.32	0.35	0.00	1377.30	1375.46	1375.19	0.27	15	0.58	3.96	2.93	Line 1-1
					0.00	0.00	0.00					2.93		1375.94	1375.75		15	0.41	0.00	0.00	
					0.00	0.00	0.00							1374.69	1374.50	0.19	Cir				
4	3	DrGrt	0.013	487.793	0.00	0.00	0.00	7.70	3.06	9.25	0.35	0.00	1380.00	1377.58	1375.63	1.95	15	0.40	3.69	3.26	Line 1-2
					0.00	0.00	0.00					3.26		1377.99	1376.04		15	0.40	0.00	0.00	
					0.00	0.00	0.00							1376.74	1374.79	1.95	Cir				
5	End	MH	0.012	46.796	0.00	0.00	0.00	5.79	0.26	9.97	0.23	0.00	1383.03	1382.01	1381.68	0.33	12	0.71	3.85	2.28	Line 4-2
					0.00	0.00	0.00					2.28		1382.22	1382.03		12	0.41	0.00	0.00	
					0.00	0.00	0.00							1381.22	1381.03	0.19	Cir				
6	5	Curb	0.013	9.053	0.00	0.00	0.00	5.00	0.09	10.31	0.13	0.00	1383.05	1381.91	1382.19	-0.29	12	-3.17	2.71	1.37	Line 4-3
					0.00	0.00	0.00					1.37		1382.41	1382.32		12	1.00	0.00	0.00	
					0.00	0.00	0.00							1381.41	1381.32	0.09	Cir				
7	5	DrGrt	0.013	59.464	0.00	0.00	0.00	5.00	0.79	10.31	0.10	0.00	1385.19	1382.62	1382.19	0.42	12	0.71	2.28	0.99	Line 4-1
					0.00	0.00	0.00					0.99		1383.20	1382.32		12	1.48	0.00	0.00	
					0.00	0.00	0.00							1382.20	1381.32	0.88	Cir				

NOTES: Intensity = 62.28 / (Inlet time + 10.10) ^ 0.66 (in/hr) ; Time of flow in section is based on full flow.

Project File: Pipe Sizing2.stm

Appendix L - Water Quality

Water Quality Volume Calculations
Canyon Properties Second Addition

Volumetric Runoff Coefficients by Land Use and Hydraulic Soil Group

	Hydrologic Soil Group								Total
	A		B		C		D		
Land Use	**Area (ac)**	**R_V**	**Area (ac)**	**R_V**	**Area (ac)**	**R_V**	**Area (ac)**	**R_V**	**Area (ac)**
Undisturbed		0.02		0.03		0.04	5.6	0.05	5.6
Disturbed Pervious		0.15		0.20		0.22	2.1	0.25	2.1
Impervious Cover		0.95		0.95		0.95	1.7	0.95	1.7
Total Area (ac)	0.00		0.00		0.00		9.4		**9.4**
Volumetric Runoff Coefficient (R_V)	0.00		0.00		0.00		0.26		**0.26**

Rainfall Depth (P) (in)	1.2
Water Quality Protection Volume (WQ_V) (ac-ft)	0.24
Water Quality Protection Volume (Q_{WV}) (in)	0.31
Redevelopment	No

Appendix M - Channel Protection

Channel Protection Volume Calculations
Canyon Properties Second Addition

Rainfall Depth (P) (in)	2.80
Volumetric Runoff Coefficient (R_V)	0.26
Total Area (A) (ac)	9.40
Pond and Swamp Areas (% of Drainage Area)	5.00
Pond & Swamp Adjustment Factors (F_P)	0.72
Water Quality Protection Volume (Q_{wv}) (in)	0.72
Curve Number (CN)	88.00
Potential Maximum Abstraction (S)	1.36
Initial Abstraction (I_a)	0.27
Initial Abstraction/Rainfall Depth (I_a/P)	0.10
Time of Concentration (T_c) (min)	22.40
Time of Concentration (T_c) (hr)	0.37
Unit Peak Discharge (qu) (csm/in) (Figure 4-6)	625.00
Water Quality Peak Flow (Q_{wq})(cfs)	6.62
Rainfall Excess (Q) (in)	1.64
Peak Discharge (Q_p)	10.85
Ratio of Outflow to Inflow (q_0/q_i) (Figure 4-17)	0.03
Ratio of Storage Volume to Runoff Volume (V_s/V_r)	0.64
Channel Protection Volume (CP_v) (ac-ft)	0.82
Redevelopment	No

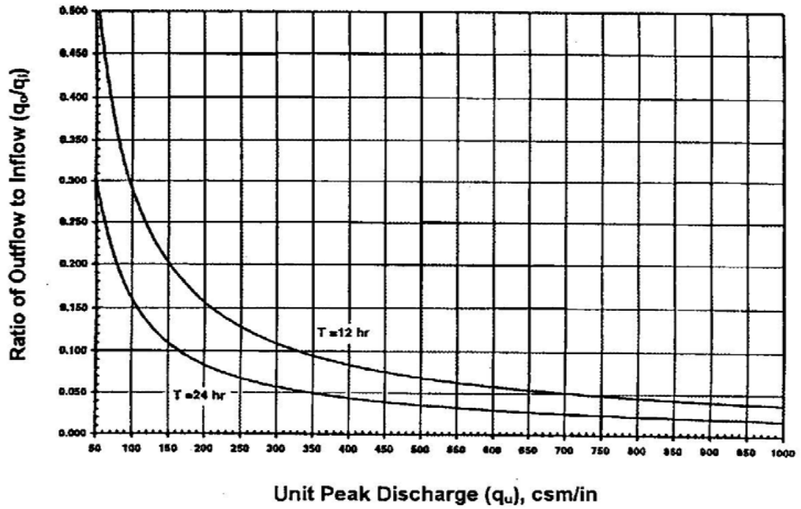


Figure 4-17 Detention Time vs Discharge Ratios
(Source: MDE, 1998)

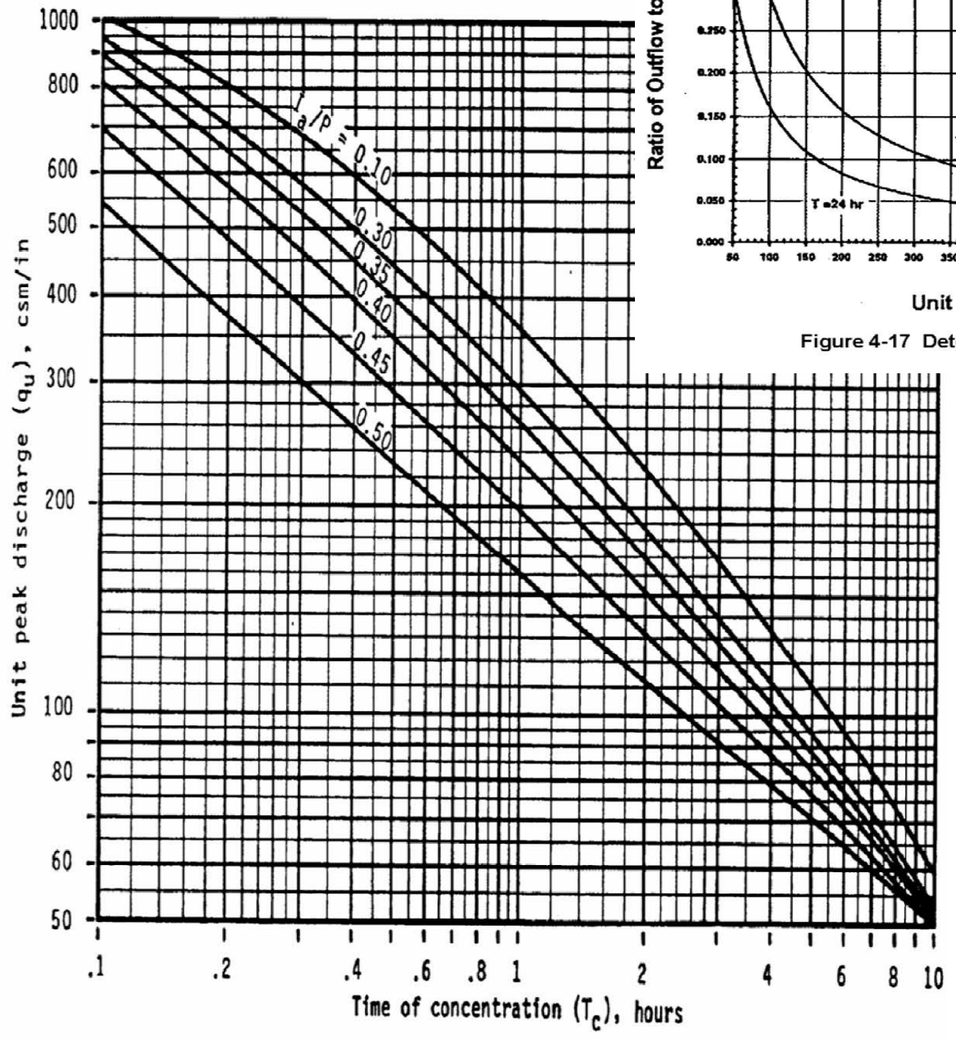
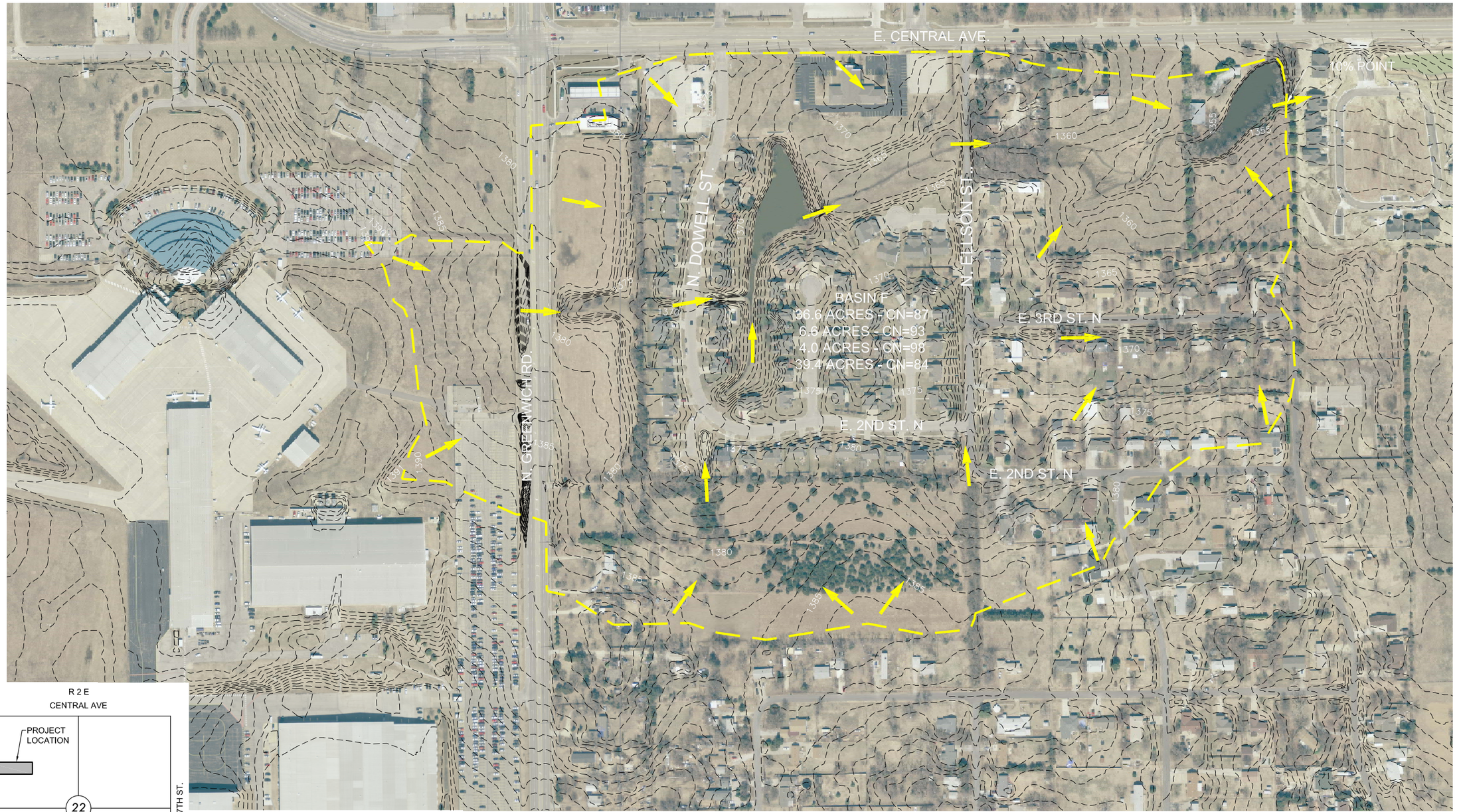


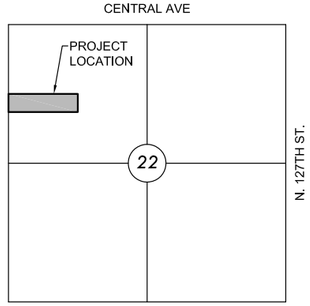
Figure 4-6 SCS Type II Unit Peak Discharge Graph
(Source: SCS, TR-55, Second Edition, June 1986)

Appendix N - Existing Conditions (10% Rule)



R 2 E

CENTRAL AVE



VICINITY MAP

No Scale

EXISISTING FLOW RATE (10% RULE)	
	PEAK FLOW (CFS)
1 YR	147.8
2 YR	187.4
5 YR	255.3
10 YR	315.8
25 YR	404.3
50 YR	475.5
100 YR	551.1

LEGEND

BASIN BOUNDARY

BASIN BOUNDARY

N

SCALE: 1" = 150'

150 0 150 300

MKEC

Wichita, KS • 316-884-9800

EXISTING DRAINAGE 10% RULE EXHIBIT FOR

CANYON PROPERTIES SECOND ADD.

MINNEHA TOWNSHIP

EXISTING DRAINAGE 10% RULE

PROJECT NO.	1601010708
DATE	FEB. 2017
SCALE	1" = 150'

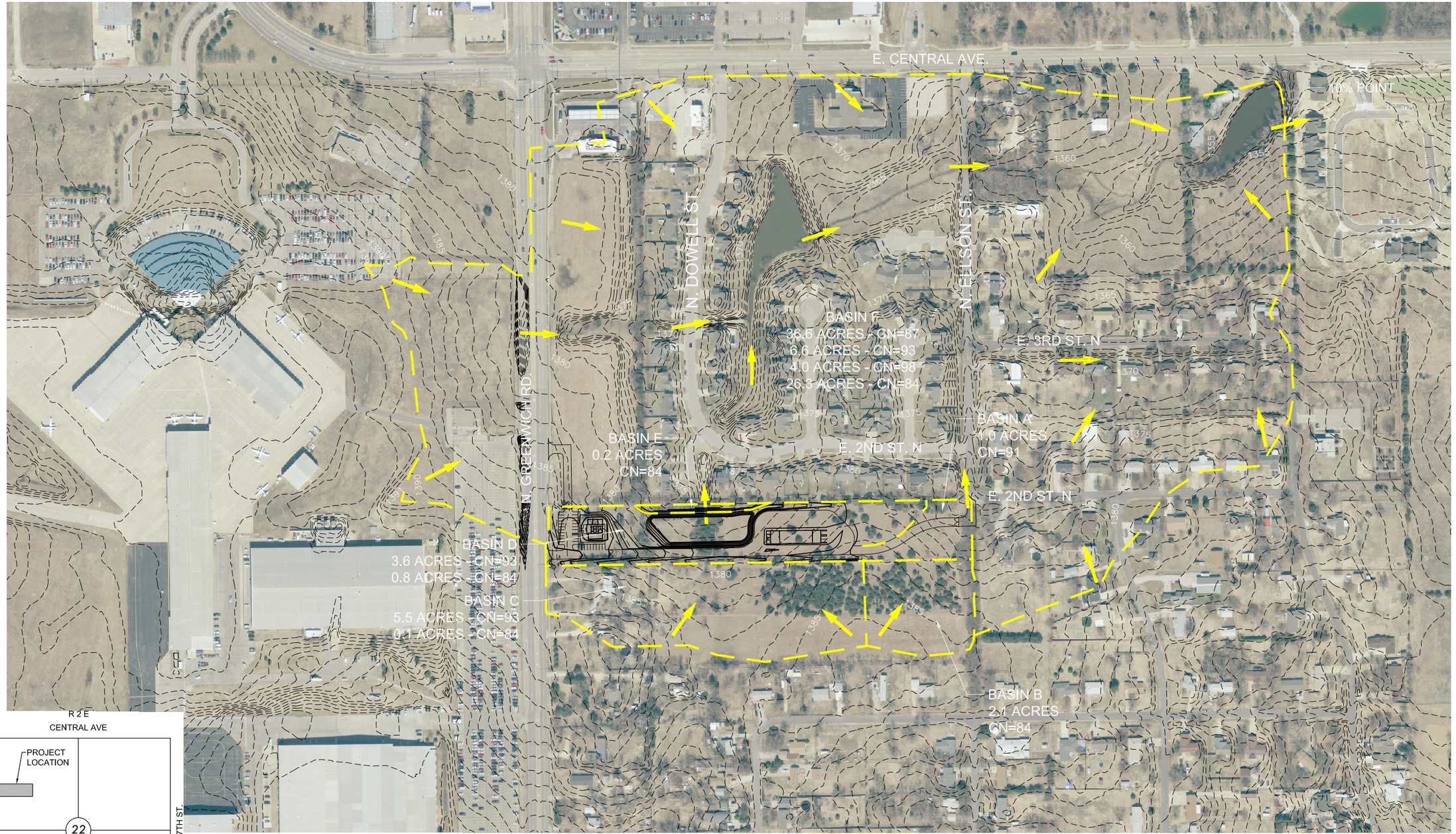
DESIGNED	DRAWN	CHECKED
KLA	CRM	KLA

NO.	REVISION	DATE

SHEET NO.

1 OF 1

Appendix O - Proposed Conditions (10% Rule)



R 2 E

CENTRAL AVE

PROJECT LOCATION

T 27 S

N GREENWICH RD

22

N. 127TH ST.

E KELLOGG DR.

VICINITY MAP

No Scale

PROPOSED FLOW RATE (10% RULE)	
	PEAK FLOW (CFS)
1 YR	130.4
2 YR	165.3
5 YR	225.2
10 YR	286.7
25 YR	383.2
50 YR	458.4
100 YR	536.3

LEGEND

BASIN BOUNDARY

BASIN BOUNDARY

N

SCALE: 1" = 150'

150 0 150 300

MKEC

Wichita, KS • 318-884-9800

PROPOSED DRAINAGE 10% RULE EXHIBIT FOR

CANYON PROPERTIES SECOND ADD.

MINNEHA TOWNSHIP

PROP.OSED DRAINAGE 10% RULE

PROJECT NO.	1601010708
DATE	FEB. 2017
SCALE	1" = 150'

DESIGNED	DRAWN	CHECKED
KLA	CRM	KLA

NO.	REVISION	DATE

SHEET NO.

1 OF 1

PLOTTED: Thursday, February 09, 2017 @ 10:23AM

J:\PROJECTS\2016\1601010708_MINNEHA_CANYON SECOND PLAT\ENGR_1601010708 CAD\XREF\MKEC\05 CIVIL\MODELS\DRAINAGE\SLAWSON PROPERTY_(10%) DRAINAGE BOUNDARIES.DWG