MASS GRADING PLANS

FOR

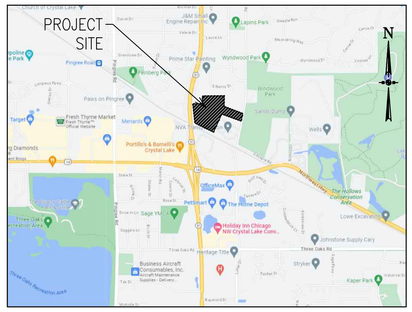
NVA TRUCKING FACILITY EXPANSION

CRYSTAL LAKE, ILLINOIS
NVA PROP IL LLC

G985
NVA TRUCKING
12/20/23

LEGEND

PROPOSED	DESCRIPTION	EXISTING
C	STORM SEWER	C
8W	WATER MAIN (WITH SIZE)	W
	SANITARY SEWER	
	FORCE MAIN	
E	UNDERGROUND ELECTRIC	E
OHE	OVERHEAD ELECTRIC	OHE
T	UNDERGROUND TELEPHONE	T
G	UNDERGROUND GAS	G
700	CONTOUR	700
HWL/NWL	HIGH/NORMAL WATER LEVEL	
XX	SILT FENCE	
	RIGHT-OF-WAY	
	CURB	
	DEPRESSED CURB FOR RAMP/DRIVEWAY	
X	FENCE LINE	X
	GUARD RAIL	
	SANITARY MANHOLE	
	STORM MANHOLE	
	STORM INLET	
	STORM CATCH BASIN	
	CLEAN OUT	
	FIRE HYDRANT	
	GATE VALVE AND VAULT	
	STREET LIGHT	
	STREET LIGHT WITH MAST	
T	TRANSFORMER	T
	UTILITY POLE	
	SIGN	
	DRAINAGE DIRECTION	
	OVERFLOW ROUTE	
700.50	SPOT GRADE	701.30
FF	FINISHED FLOOR	
TF	TOP OF FOUNDATION	
G	GROUND	
EP	EDGE OF PAVEMENT	
BC	BACK/TOP OF CURB	
W	TOP OF SIDEWALK	
TW	TOP OF RETAINING WALL	
BW	BOTTOM OF RETAINING WALL	
R=	RIM FOR STRUCTURES	
R	RISER FOR SANITARY SERVICE	
I=	INVERT FOR SEWERS	



LOCATION MAP
NOT TO SCALE

SURVEY REFERENCE NOTE:

EXISTING CONDITIONS AND TOPOGRAPHY ARE SHOWN PER THE 'BOUNDARY AND TOPOGRAPHIC SURVEY,' DATED APRIL 27, 2022 AS PREPARED BY VANDERSTAPPEN LAND SURVEYING, INC.

CONTRACTOR SHALL FIELD VERIFY EXISTING SITE CONDITIONS AND ELEVATIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES OR OMISSIONS.

BASIS OF BEARINGS:
NAD 1983, ILLINOIS STATE PLANE
EAST ZONE

BASIS OF ELEVATION:
ELEVATIONS ARE BASED ON NAVD1988 VERTICAL DATUM

BENCHMARK AND LOCATIONS:

REFERENCE BENCHMARKS:

MCHENRY COUNTY GEODETIC CONTROL STATION DESIGNATION "CARY"

ELEVATION = 824.54' (NAVD88)

SITE BENCHMARKS:

BENCH TIE IN EAST FACE OF POWER POLE

ELEVATION = 916.76' (NAVD88

DRAWING INDEX

SHEET	TITLE
C1	COVER SHEET
C2	OVERALL SITE PLAN
C3.0–C3.4	EXISTING CONDITIONS AND DEMOLITION PLAN
C4.0–C4.4	DIMENSIONAL CONTROL AND PAVING PLAN
C5.0–C5.4	GRADING PLAN
C6.0–C6.4	UTILITY PLAN
C7.0–C7.4	EROSION CONTROL PLAN
C8.0–C8.1	STORMWATER POLLUTION PREVENTION PLAN
C9.0–C9.2	DETAILS
C10	GENERAL NOTES AND SPECIFICATIONS

CONTACTS

CIVIL ENGINEER
JACOB & HEFNER ASSOCIATES, INC
1333 BUTTERFIELD ROAD, SUITE 300
DOWNERS GROVE, IL 60515
CONTACT: RYAN BLOCKER, P.E.
RBLOCKER@JACOBANDHEFNER.COM
(630) 652-4630

ARCHITECT
OLYMPUS DESIGN & DEVELOPMENT
1425 MADELINE LANE, SUITE 201
ELGIN, IL 60124
CONTACT: DYLAN CALLAHAN
DYLAN.CALLAHAN@OLYMPUSDEVELOPMENT.COM
(312) 858-6782

SURVEYOR
JACOB & HEFNER ASSOCIATES, INC
1333 BUTTERFIELD ROAD, SUITE 300
DOWNERS GROVE, IL 60515
CONTACT: CARL COOK, P.L.S.
CCOOK@JACOBANDHEFNER.COM
(630) 652-4661

LANDSCAPE ARCHITECT
GARY R. WEBER ASSOCIATES, INC.
402 WEST LIBERTY DRIVE
WHEATON, IL 60187
CONTACT: GAGE BERGER, P.L.A.
GBERGER@GRWAINC.COM
(630) 668-7197

WARNING

CALL JULIE TOLL FREE 1-800-892-0123

CALL BEFORE YOU DIG

(48 HOURS NOTICE REQUIRED PRIOR TO DIGGING)

811

Know what's **below.**
Call before you dig.

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23
REVISIONS		

Ryan J. Blocker
12/20/23
ENGINEER
RYAN J. BLOCKER
RBLOCKER@JACOBANDHEFNER.COM
DATE

ILLINOIS REGISTRATION NO. 062-060791
EXPIRES 11/30/2025
ENGINEER ONLY CERTIFIES SHEETS C1-C10

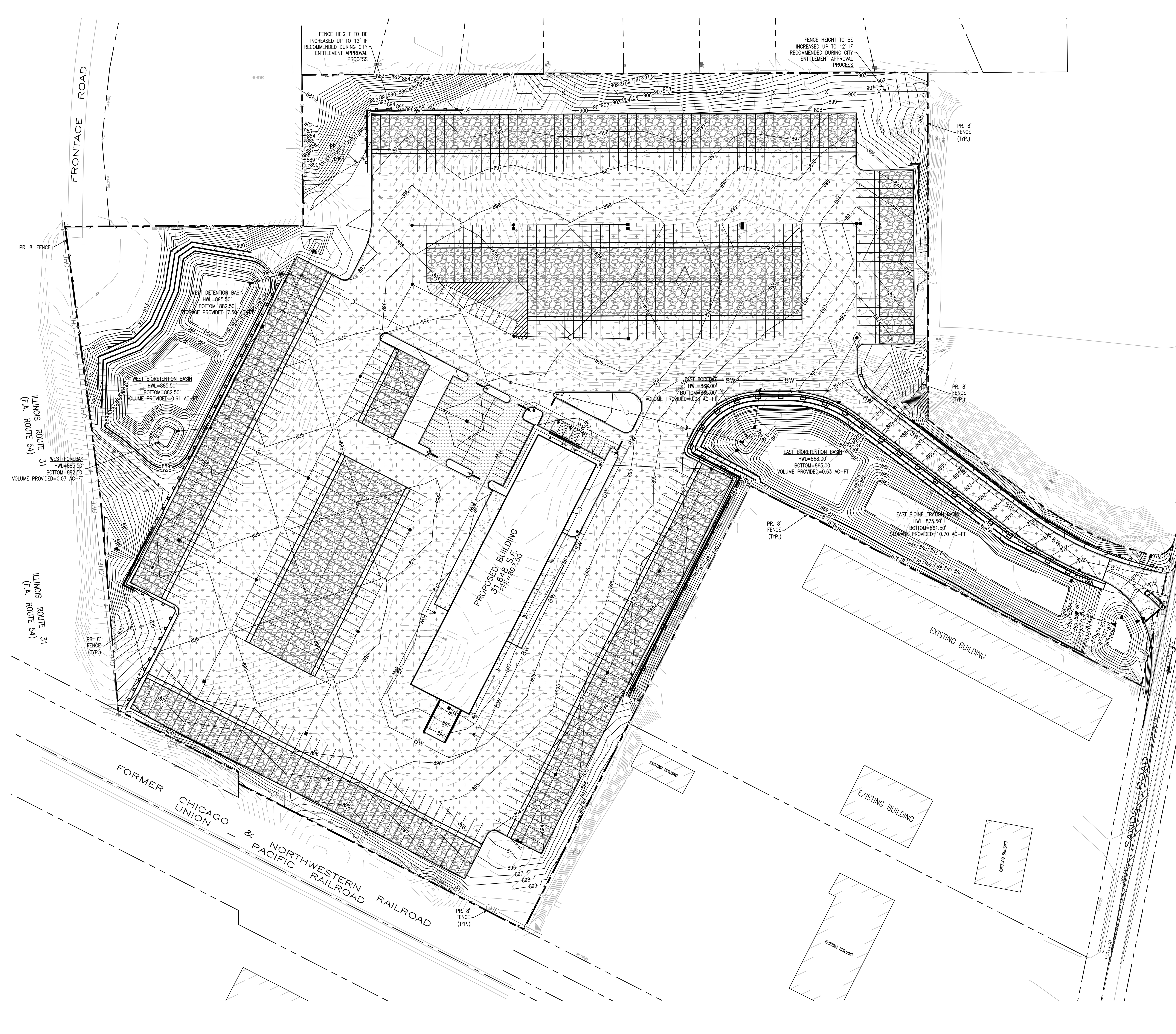
THESE PLANS OR ANY PART THEREOF SHALL BE CONSIDERED VOID WITHOUT THE ORIGINAL SIGNATURE, IMPRESSED SEAL, EXPIRATION DATE OF SEAL OF THE ENGINEER AND MARKED "FOR CONSTRUCTION".

LICENSED PROFESSIONAL ENGINEER
RYAN J. BLOCKER
062-060791
OF ILLINOIS

Municipality: CRYSTAL LAKE
County: MCHENRY
Section: 3
Township: 43N
Range: 8E

FOR REVIEW PURPOSES ONLY

JACOB & HEFNER
ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
www.jacobandhefner.com



PAVEMENT HATCH LEGEND:

- HEAVY DUTY ASPHALT PAVEMENT
- ASPHALT PAVEMENT
- HEAVY DUTY ASPHALT GRINDINGS
- HEAVY DUTY CONCRETE PAVEMENT
- CONCRETE SIDEWALK

SITE DATA TABLE:

ZONING:	(M) MANUFACTURING (SOUTH) (M-L) MANUFACTURING LIMITED (NORTH)
REQUIRED SETBACKS:	
FRONT YARD:	30'
REAR YARD:	20'
SIDE YARD:	15'
ABUTTING RESIDENTIAL:	50'
LOT AREA:	21.48 ACRES
IMPERVIOUS AREA: (69%)	14.91 AC
PERVIOUS AREA: (31%)	6.57 AC
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TRAILER PARKING PROVIDED:	328

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OVERALL SITE PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

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G985

1" = 60'

C2

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N

GRAPHIC SCALE 1"= 60'

0 30' 60' 120'

DEMOLITION HATCH LEGEND:

EXISTING ASPHALT PAVEMENT TO BE REMOVED

DEMOLITION NOTES:

1. CONTRACTOR SHALL CONTACT J.U.L.I.E (1-800-832-0123 OR 811) AND/OR PRIVATE LOCATING SERVICE TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO STARTING ANY DEMOLITION AND/OR EXCAVATION. EXACT LOCATIONS OF ANY EXISTING ELECTRIC, GAS, TELEPHONE, ETC. LINES ARE UNKNOWN.
2. CONTRACTOR SHALL PERFORM ALL DEMOLITION WORK IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REQUIREMENTS.
3. CONTRACTOR SHALL OBTAIN ALL NECESSARY DEMOLITION PERMITS AND COORDINATE ALL DEMOLITION WORK WITH THE MUNICIPALITY AND OWNERS REPRESENTATIVE.
4. ALL EROSION AND SEDIMENTATION CONTROL MEASURES AND DEVICES SHALL BE INSTALLED AND FUNCTIONAL BEFORE THE SITE IS OTHERWISE DISTURBED. THEY SHALL BE KEPT OPERATIONAL AND CONTINUOUSLY MAINTAINED THROUGHOUT ALL CONSTRUCTION UNTIL PERMANENT SITE STABILIZATION HAS BEEN ACHIEVED (SEE EROSION CONTROL AND STORMWATER POLLUTION PREVENTION PLANS FOR ADDITIONAL INFORMATION AND DETAILS).
5. THE PURPOSE OF THIS DRAWING IS TO CONVEY THE OVERALL SCOPE OF DEMOLITION WORK AND IT IS NOT INTENDED TO COVER ALL DETAILS OR SPECIFICATIONS REQUIRED TO COMPLY WITH GENERALLY ACCEPTED DEMOLITION PRACTICES. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE SITE, SCOPE OF WORK, AND ALL EXISTING CONDITIONS AT THE JOB SITE PRIOR TO BIDDING AND COMMENCING THE WORK. THE DEMOLITION CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEANS, METHODS, TECHNIQUES, OR PROCEDURES USED TO COMPLETE THE WORK IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND IS LIABLE FOR THE SAFETY OF THE PUBLIC AND CONTRACTOR'S EMPLOYEES DURING THE COURSE OF THE PROJECT.
6. THE DEMOLITION PLAN IS INTENDED TO SHOW REMOVAL OF KNOWN SITE FEATURES AND UTILITIES AS SHOWN ON THE SURVEY PROVIDED TO THE ENGINEER FOR DESIGN. THERE MAY BE OTHER SITE FEATURES, UTILITIES, STRUCTURES, AND MISCELLANEOUS ITEMS BOTH BURIED AND ABOVE GROUND THAT ARE WITHIN THE LIMITS OF WORK THAT MAY REQUIRE REMOVAL FOR THE PROPOSED SITE IMPROVEMENTS BUT THAT ARE NOT SHOWN HEREON. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL OF SUCH ITEMS.
7. CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY COMPANIES PRIOR TO COMMENCING ANY SITE DEMOLITION OPERATIONS TO COORDINATE ANY DISCONNECTION OR REMOVAL OF EXISTING UTILITIES WITHIN THE PROPOSED AREA OF WORK.
8. REMOVED
9. ALL EXISTING BUILDINGS, FOUNDATIONS, CONCRETE OR ASPHALT PAVEMENT OR WALKS, CURB AND GUTTER AND MISCELLANEOUS STRUCTURES (INCLUDING, BUT NOT LIMITED TO FENCES, POLES, YARD LIGHTS, ELECTRICAL PANELS, WHEEL STOPS AND MISCELLANEOUS DEBRIS) NOTED TO BE REMOVED SHALL BE DEMOLISHED, REMOVED FROM THE SITE AND LEGALLY DISPOSED OF BY THE CONTRACTOR.
10. VOIDS LEFT BY ANY ITEM REMOVED UNDER ANY PROPOSED BUILDINGS, PAVEMENTS, OR WALKS OR WITHIN 24" THEREOF SHALL BE BACKFILLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND GEOTECHNICAL REPORT.
11. AS SOON AS DEMOLITION WORK HAS BEEN COMPLETED, FINAL GRADE OF BACKFILL IN DEMOLITION AREAS SHALL BE COMPACTED PER THE GEOTECHNICAL REPORT TO PRESENT A NEAT, WELL DRAINED APPEARANCE, AND TO PREVENT WATER FROM DRAINING UNNECESSARILY ONTO ADJACENT PROPERTIES. CONTRACTOR SHALL PROVIDE TEMPORARY DIVERSION SWALES OR OTHER MEANS OF MAINTAINING ADEQUATE SITE DRAINAGE.
12. CONTRACTOR SHALL UTILIZE CARE WHEN WORKING NEAR EXISTING UTILITIES TO REMAIN. ANY DAMAGE TO EXISTING UTILITIES NOT NOTED TO BE REMOVED SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE OWNER AND/OR ENGINEER.
13. CONTRACTOR SHALL REPAIR AT HIS EXPENSE ANY DAMAGE TO EXISTING ASPHALT, CONCRETE, CURBS, SIDEWALKS, ETC. RESULTING FROM CONSTRUCTION TRAFFIC AND/OR OPERATIONS. REPAIRS SHALL BE MADE TO THE SATISFACTION OF THE OWNER AND/OR ENGINEER.
14. ALL FIRE ACCESS LANES WITHIN THE PROJECT AREA SHALL REMAIN IN SERVICE, CLEAN OF DEBRIS, AND ACCESSIBLE FOR USE BY EMERGENCY VEHICLES.
15. ALL EXISTING SANITARY SEWERS, STORM SEWERS, WATER MAINS OR IRRIGATION LINES AND APPURTENANCES NOTED FOR REMOVAL WITHIN THE AREA OF THE PROPOSED CONSTRUCTION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR OR ABANDONED IN PLACE. UNLESS OTHERWISE NOTED ON PLANS, ALL ABANDONED SEWER LINES SHALL BE PLUGGED AT BOTH ENDS WITH A MINIMUM OF TWO (2) FOOT LONG NON-SHRINK CONCRETE OR MORTAR PLUGS.
16. SEE GENERAL NOTES AND SPECIFICATIONS SHEET FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

OVERALL EXISTING CONDITIONS AND DEMOLITION PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

JACOB & HEFNER ASSOCIATES
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PHONE: (630) 652-4600, FAX: (630) 652-4601
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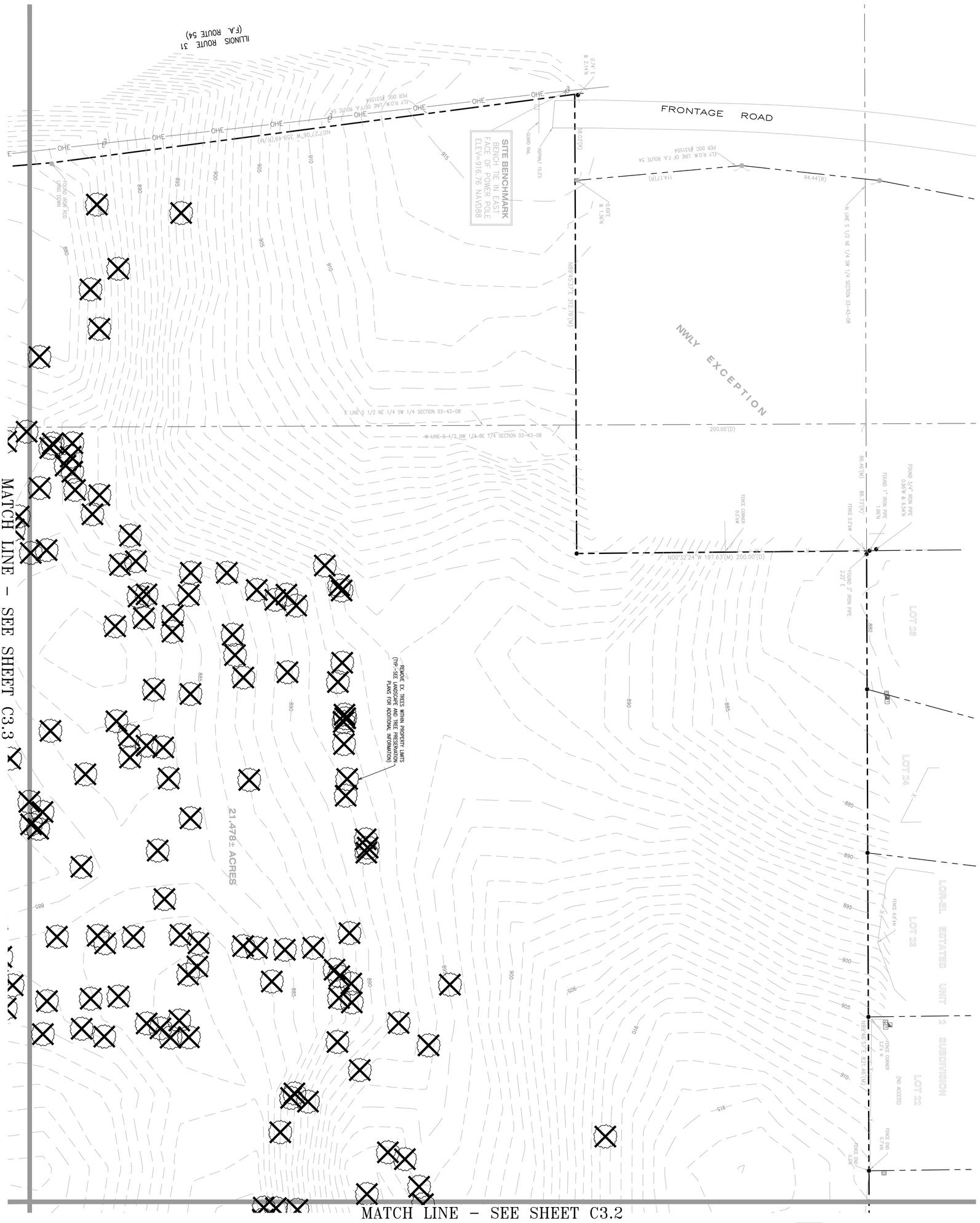
G985

1" = 60'

C3.0

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C3.1	1" = 30'	G985	JACOB & HEFNER ASSOCIATES 1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515 PHONE: (630) 652-4600, FAX: (630) 652-4601 www.jacobandhefner.com	EXISTING CONDITIONS AND DEMOLITION PLAN NVA TRUCKING FACILITY EXPANSION NVA PROP IL LLC CRYSTAL LAKE, IL	2 PER CITY 12/20/23 1 MASS GRADING SUBMITTAL 10/20/23 No. Description Date

LOT 21

LOT 20

LOT 19

LOR-EL ESTATES UNIT 2 SUBDIVISION

LOT 18

LOT 17

(NO ACCESS)

FENCE 0.6'±S

FENCE 7.2'±S

FENCE END 4.1'±N

0.97'N

2.41'N

FENCE 0.3'±N

N LINE S 1/2 NW 1/4 SE 1/4 SECTION 03-43-08
AS MONUMENTED BY LOR-EL ESTATES UNIT 2 SUBDIVISION

S89°00'30"W 413.67'(D)

NE CORNER S 1/2 NW 1/4 SE 1/4 OF SECTION 3-43-8
PLACE OF BEGINNING OF EXCEPTION

MATCH LINE - SEE SHEET C3.1

REMOVE EX. TREES WITHIN PROPERTY LIMITS
(TYP.-SEE LANDSCAPE AND TREE PRESERVATION
PLANS FOR ADDITIONAL INFORMATION)

ASPHALT

S00°59'30"E(D)
S00°04'21"E 455.94'(M) 458.29'(D)

E LINE NW 1/4 SE 1/4 SECTION 03-43-08

L=471.09'(M) R=2000.00'

NELY EXCEPTION

S89°00'30"W 417.50'(M) 417.40'(D)

N12°29'14"E 155.00'(D)

SANDS ROAD

GRAVEL 2.5'±SLY & 1.5'±ELY

0.20'W

FENCE CORNER
0.8'S & 0.4'E

MATCH LINE - SEE SHEET C3.4

N

GRAPHIC SCALE 1"= 30'

0 15' 30' 60'

DEMOLITION HATCH LEGEND:

EXISTING ASPHALT PAVEMENT TO BE REMOVED

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

EXISTING CONDITIONS AND DEMOLITION PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

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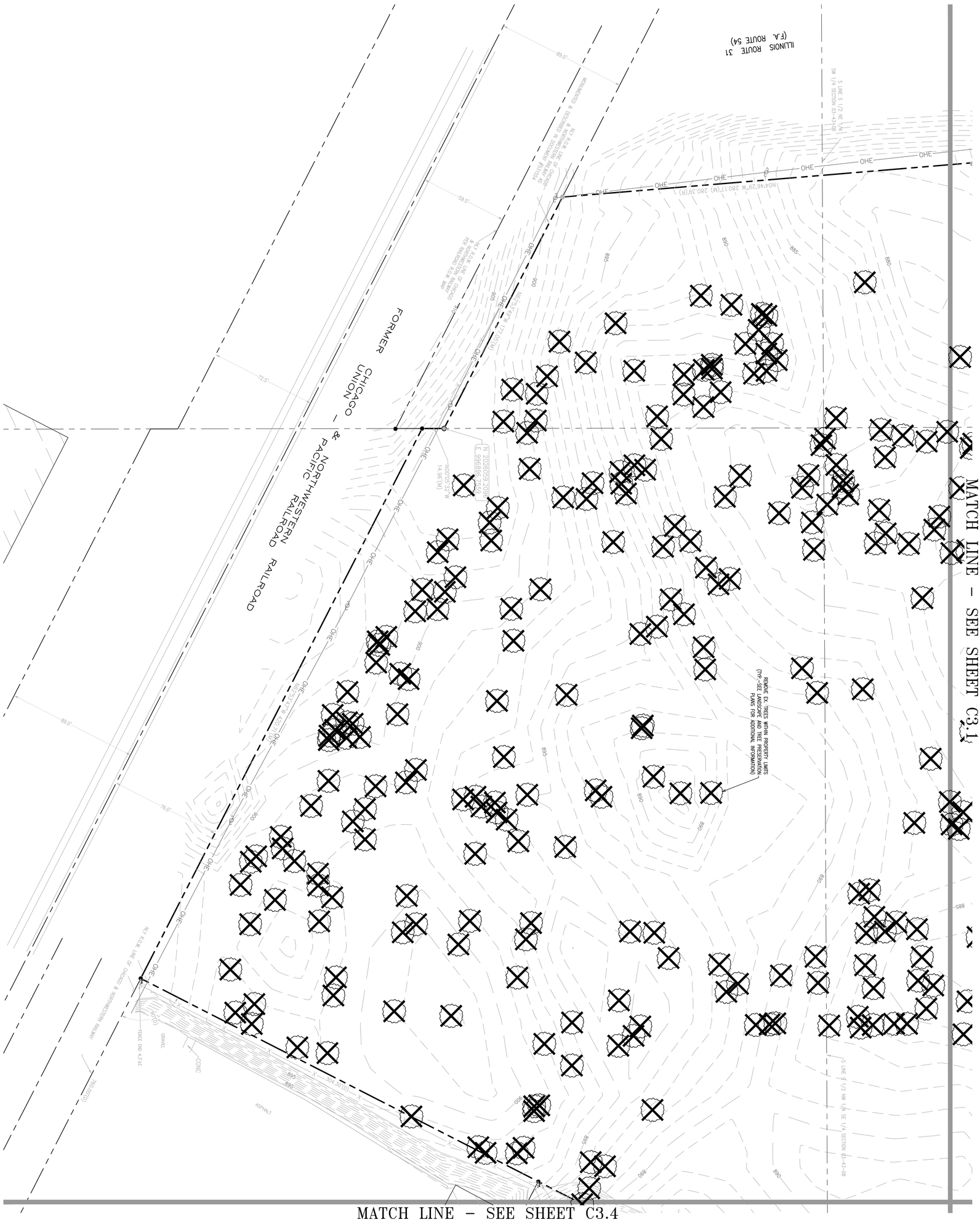
G985

1" = 30'

C3.2

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C3.3	1" = 30'	G985	

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EXISTING CONDITIONS AND DEMOLITION PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

No.	Description	Date
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1	MASS GRADING SUBMITTAL	10/20/23

MATCH LINE – SEE SHEET C3.2

MATCH LINE – SEE SHEET C3.3



GRAPHIC SCALE 1"= 30'

0 15' 30' 60'

DEMOLITION HATCH LEGEND:

EXISTING ASPHALT PAVEMENT TO BE REMOVED

No.	Description	Date
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EXISTING CONDITIONS AND DEMOLITION PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

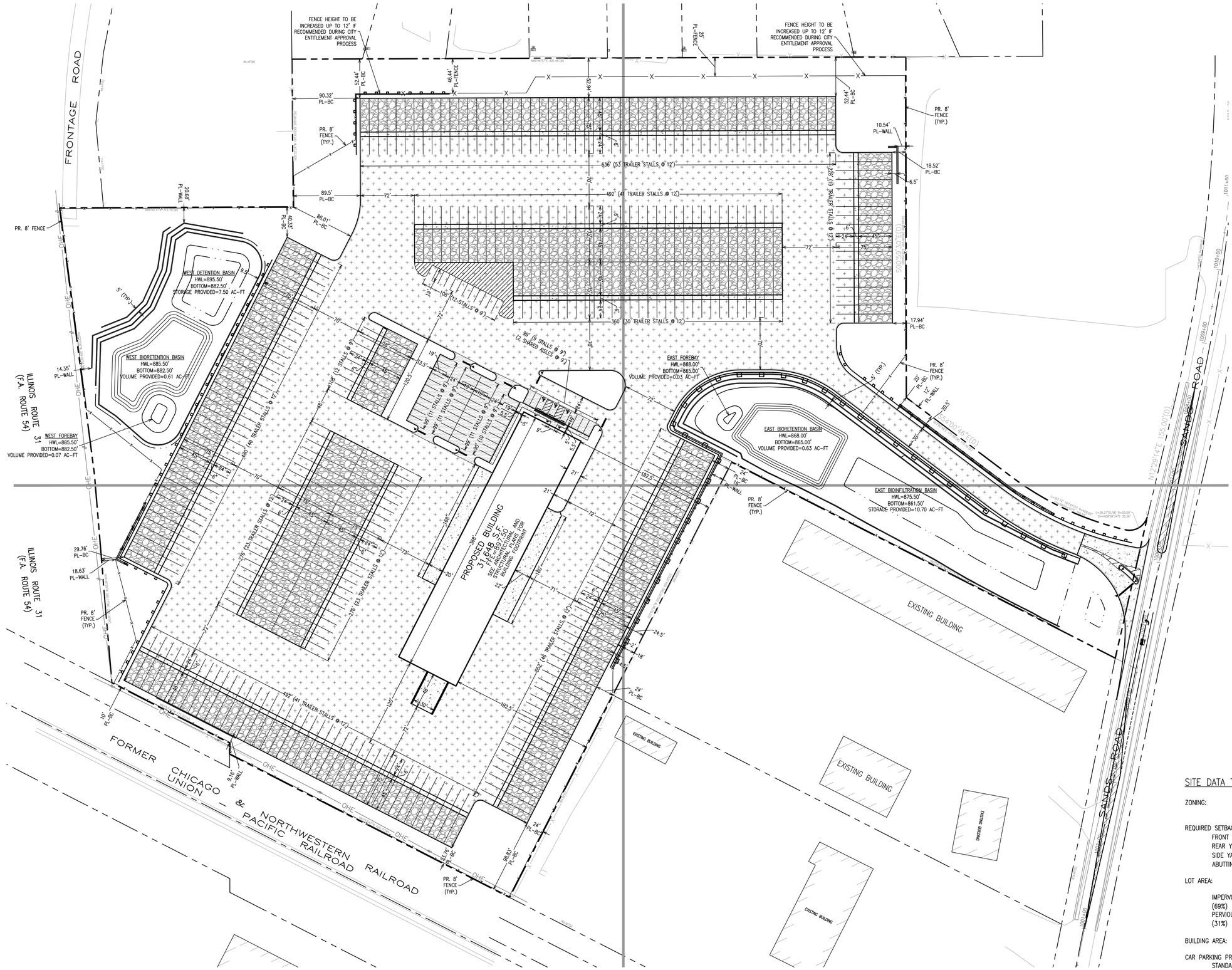
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1" = 30'

C3.4

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GRAPHIC SCALE 1"= 60'
0 30' 60' 120'

GEOMETRIC NOTES:

1. ALL DIMENSIONS ARE MEASURED FROM FACE OF CURB OR CENTER OF PAVEMENT MARKING UNLESS OTHERWISE NOTED.
2. ALL CURB RADII ARE 4.5' UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL COORDINATE ALL SITE IMPROVEMENTS WITH ARCHITECTURAL PLANS.
4. ALL PROPOSED PAVEMENT MARKINGS SHALL BE 4" UNLESS OTHERWISE NOTED. PAVEMENT MARKINGS SHALL CONFORM TO ARTICLE 1095.02 OF THE I.D.O.T. STANDARD SPECIFICATIONS.
5. BUILDING DIMENSIONS AND DOORWAY LOCATIONS ARE SHOWN FOR REFERENCE ONLY. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR ADDITIONAL INFORMATION AND DETAILS.
6. CONTRACTOR SHALL REPAIR AT HIS EXPENSE ANY DAMAGE TO EXISTING ASPHALT, CONCRETE, CURBS, SIDEWALKS, ETC. RESULTING FROM CONSTRUCTION TRAFFIC AND/OR OPERATIONS. REPAIRS SHALL BE MADE TO THE SATISFACTION OF THE OWNER AND/OR ENGINEER.
7. SEE LANDSCAPE PLANS FOR PROPOSED TREE AND PLANTING REQUIREMENTS.
8. SEE GENERAL NOTES AND SPECIFICATIONS SHEET FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

PAVEMENT HATCH LEGEND:

HEAVY DUTY ASPHALT PAVEMENT
1-1/2" HMA SURFACE COUSE, MIX D, N50
3-1/2" HMA BINDER COURSE, IL 19.0, N50
10" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

ASPHALT PAVEMENT
1-1/2" HMA SURFACE COUSE, MIX D, N50
2-1/2" HMA BINDER COURSE, IL 19.0, N50
8" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

HEAVY DUTY ASPHALT GRINDINGS
5" HMA GRINDINGS COUSE
10" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

HEAVY DUTY CONCRETE PAVEMENT
8" PORTLAND CEMENT CONCRETE
4" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

CONCRETE SIDEWALK
4" PORTLAND CEMENT CONCRETE
2" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

SITE DATA TABLE:

ZONING:		(M) MANUFACTURING (SOUTH) (M-L) MANUFACTURING LIMITED (NORTH)
REQUIRED SETBACKS:		
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ABUTTING RESIDENTIAL:	50'	
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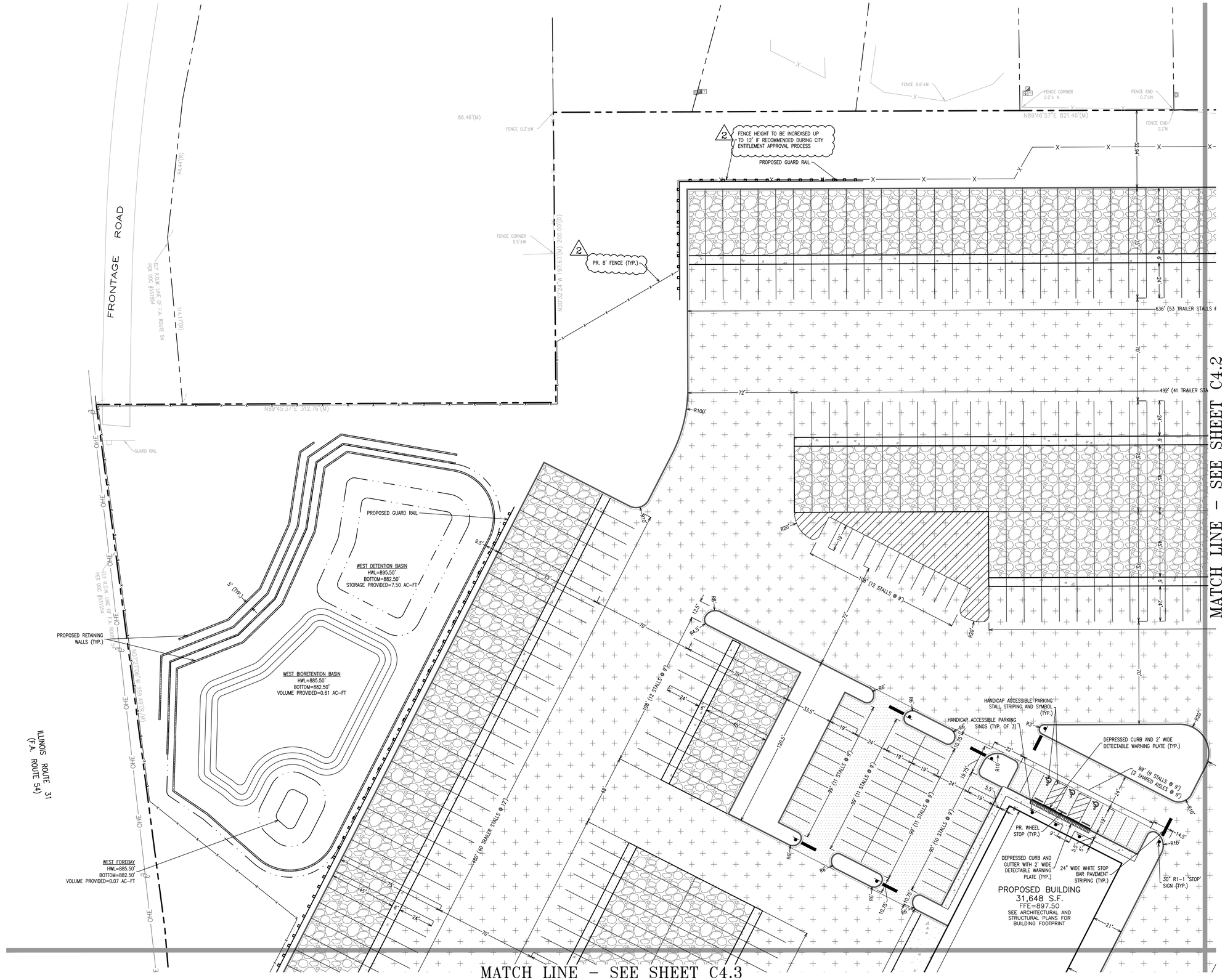
OVERALL DIMENSIONAL CONTROL AND PAVING PLAN

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1" = 60'
C4.0

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N

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0 15' 30' 60'

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2" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

GEOMETRIC NOTES:

SEE SHEET C4.0 FOR ALL GEOMETRIC NOTES.

No.	Description	Date
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2	PER CITY	12/20/23

DIMENSIONAL CONTROL AND PAVING PLAN

NVA TRUCKING FACILITY EXPANSION

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CRYSTAL LAKE, IL

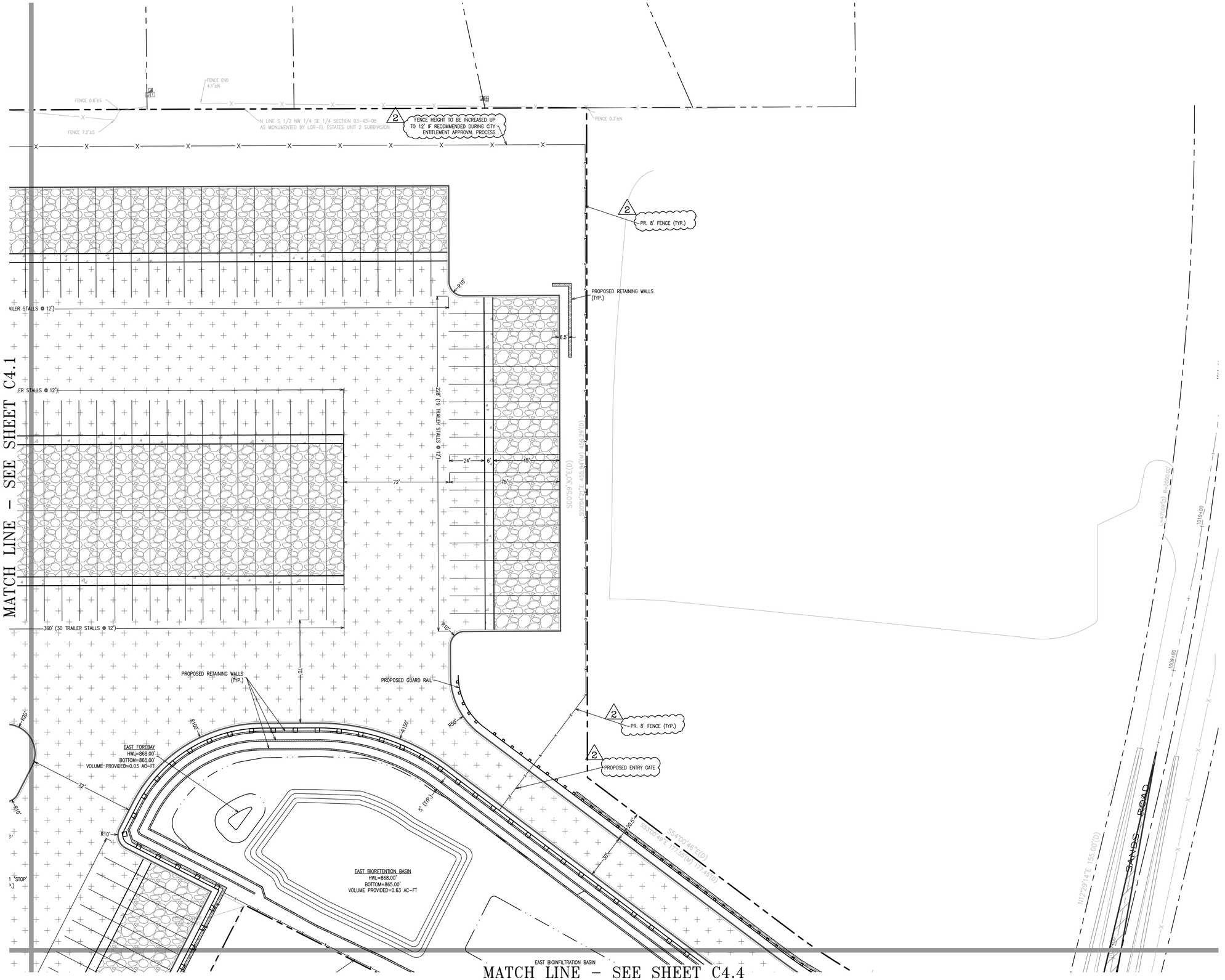
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G985

1" = 30'

C4.1

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N

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0 15' 30' 60'

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2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

DIMENSIONAL CONTROL AND PAVING PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
www.jacobandhefner.com

G985

1" = 30'

C4.2

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MATCH LINE – SEE SHEET C4.1

MATCH LINE – SEE SHEET C4.4

PROPOSED BUILDING
31,648 S.F.
FFE=897.50
SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR BUILDING FOOTPRINT

PROPOSED RETAINING WALLS (TYP.)

PROPOSED GUARD RAIL

2 PR. 8' FENCE (TYP.)

ILLINOIS ROUTE 31
(F.A. ROUTE 54)

N00°49'56"W 1320.00'(M)

NLY R.O.W. LINE OF CHICAGO & NORTHWESTERN RAILWAY AS MONUMENTED & DESCRIBED IN DOCUMENT #31154

NLY R.O.W. LINE OF CHICAGO & NORTHWESTERN RAILWAY PER RAILROAD R.O.W. MAP

FORMER CHICAGO UNION – & NORTHWESTERN PACIFIC RAILROAD RAILROAD

N89°42'34"W 420.00'(M)

FENCE END 4.3'±E

NLY R.O.W. LINE OF CHICAGO & NORTHWESTERN RAILWAY

N

GRAPHIC SCALE 1"= 30'
0 15' 30' 60'

PAVEMENT HATCH LEGEND:

HEAVY DUTY ASPHALT PAVEMENT
1-1/2" HMA SURFACE COUSE, MIX D, N50
3-1/2" HMA BINDER COURSE, IL 19.0, N50
10" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

ASPHALT PAVEMENT
1-1/2" HMA SURFACE COUSE, MIX D, N50
2-1/2" HMA BINDER COURSE, IL 19.0, N50
8" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

HEAVY DUTY ASPHALT GRINDINGS
5" HMA GRINDINGS COUSE
10" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

HEAVY DUTY CONCRETE PAVEMENT
8" PORTLAND CEMENT CONCRETE
4" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

CONCRETE SIDEWALK
4" PORTLAND CEMENT CONCRETE
2" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

GEOMETRIC NOTES:

SEE SHEET C4.0 FOR ALL GEOMETRIC NOTES.

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

DIMENSIONAL CONTROL AND PAVING PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

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C4.3

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MATCH LINE – SEE SHEET C4.2

MATCH LINE – SEE SHEET C4.3

EAST BIOINFILTRATION BASIN
HWL=875.50'
BOTTOM=861.50'
STORAGE PROVIDED=10.70 AC-FT

PR. 8' FENCE (TYP.)

PROPOSED GUARD RAIL

PROPOSED RETAINING WALLS (TYP.)

PROPOSED GUARD RAILS

EXISTING BUILDING

EXISTING BUILDING

EXISTING BUILDING

EXISTING BUILDING

EXISTING BUILDING

R4-7 "KEEP RIGHT" SIGN

30" R1-1 "STOP" SIGN

R3-2 "NO LEFT TURN" SIGN

24" WIDE WHITE STOP BAR PAVEMENT STRIPING

SANDS ROAD

N

GRAPHIC SCALE 1"= 30'

0 15' 30' 60'

PAVEMENT HATCH LEGEND:

HEAVY DUTY ASPHALT PAVEMENT
1-1/2" HMA SURFACE COUSE, MIX D, N50
3-1/2" HMA BINDER COURSE, IL 19.0, N50
10" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

ASPHALT PAVEMENT
1-1/2" HMA SURFACE COUSE, MIX D, N50
2-1/2" HMA BINDER COURSE, IL 19.0, N50
8" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

HEAVY DUTY ASPHALT GRINDINGS
5" HMA GRINDINGS COUSE
10" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

HEAVY DUTY CONCRETE PAVEMENT
8" PORTLAND CEMENT CONCRETE
4" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

CONCRETE SIDEWALK
4" PORTLAND CEMENT CONCRETE
2" CA-6 CRUSHED STONE
COMPACT SUBGRADE, 95% MODIFIED PROCTOR

GEOMETRIC NOTES:

SEE SHEET C4.0 FOR ALL GEOMETRIC NOTES.

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

DIMENSIONAL CONTROL AND PAVING PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

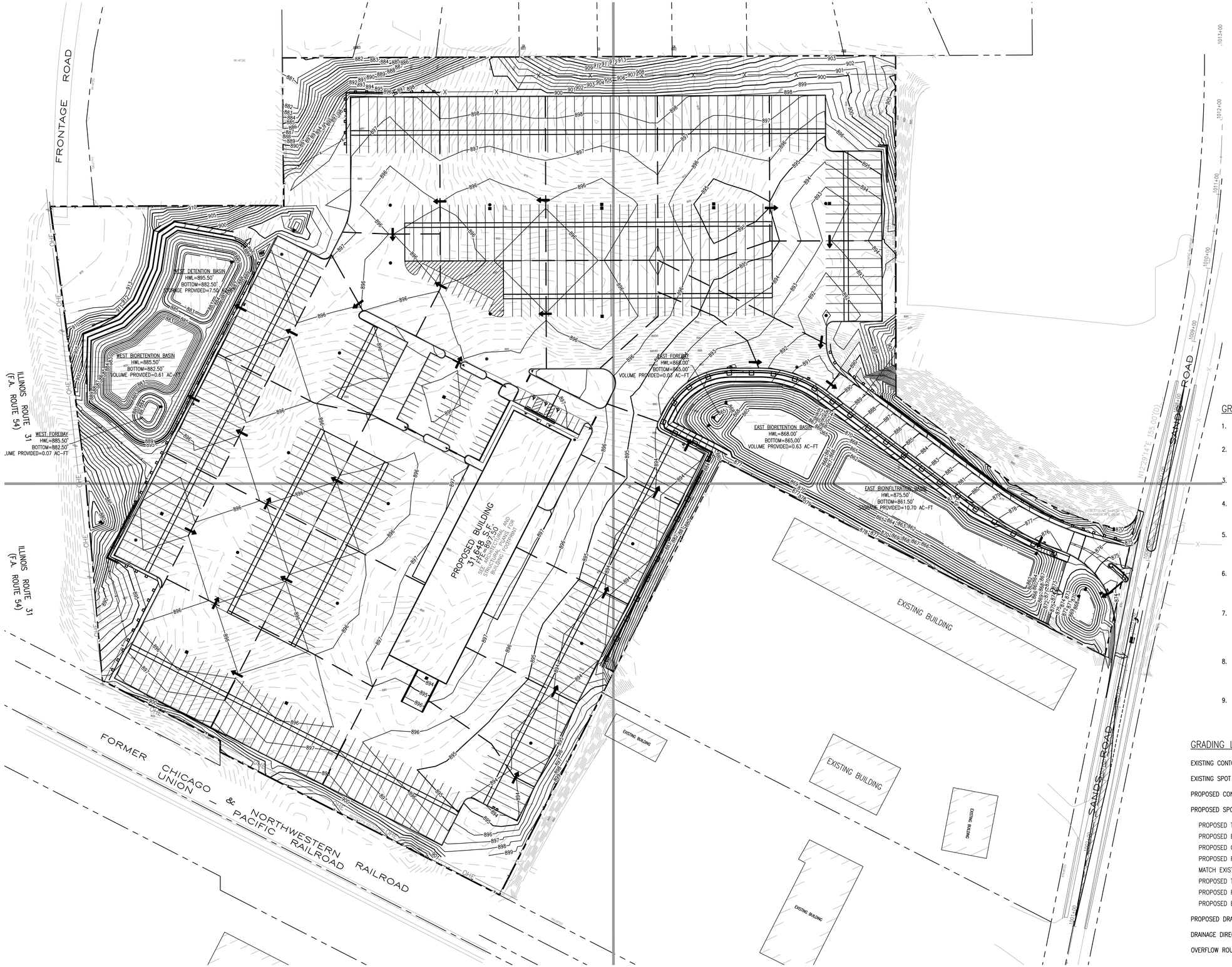
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C4.4

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GRADING NOTES:

1. ALL PROPOSED SPOT ELEVATIONS ARE TOP OF PAVEMENT OR FINISHED GRADE ELEVATIONS UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO COMMENCEMENT OF SITE GRADING OPERATIONS.
3. ALL PROPOSED GRADING, PAVEMENT, APRONS, CURBS, SIDEWALKS, ETC. SHALL MATCH EXISTING GRADES FLUSH.
4. MAXIMUM CROSS SLOPES AND LONGITUDINAL SLOPES FOR ALL CONCRETE SIDEWALKS AND HANDICAP ACCESSIBLE ROUTES SHALL NOT EXCEED 2% AND 5%, RESPECTIVELY.
5. MAXIMUM SLOPES WITHIN THE HANDICAP ACCESSIBLE PARKING AREAS AND ACCESSIBLE ROUTE TO THE BUILDING SHALL NOT EXCEED 2% IN ANY DIRECTION. HANDICAP ACCESSIBLE ROUTE DENOTED BY:
6. MAXIMUM GRADE DIFFERENCE BETWEEN PAVEMENT SURFACES AND ADJACENT CONCRETE SIDEWALKS FOR THE HANDICAP ACCESSIBLE ROUTE TO THE BUILDING SHALL NOT EXCEED 1/4" VERTICAL OR 1/2" WHEN BEVELED.
7. CONTRACTOR SHALL UTILIZE CARE WHEN WORKING NEAR EXISTING UTILITIES TO REMAIN. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE OWNER AND/OR ENGINEER.
8. CONTRACTOR SHALL CONTINUOUSLY MAINTAIN ALL EXISTING STORM SEWERS WITHIN THE PROJECT AREA DURING CONSTRUCTION OPERATIONS AS NECESSARY TO PREVENT SILT OR DEBRIS ACCUMULATION.
9. SEE GENERAL NOTES AND SPECIFICATIONS SHEET FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

GRADING LEGEND:

EXISTING CONTOUR	—600—
EXISTING SPOT ELEVATION	×XXX.XX
PROPOSED CONTOUR	—600—
PROPOSED SPOT ELEVATION	×XXX.XX
PROPOSED TOP OF SIDEWALK ELEVATION	×W:XXX.XX
PROPOSED BACK OF CURB ELEVATION	×BC=XXX.XX
PROPOSED CURB CUT ELEVATION	×CC=XXX.XX
PROPOSED RIM ELEVATION	×R=XXX.XX
MATCH EXISTING ELEVATION	×XXX.XX(ME)
PROPOSED TOP OF WALL ELEVATION	T/WALL:XXX.XX
PROPOSED FINISHED GRADE AT TOP OF WALL	T/WALL:XXX.XX(FG)
PROPOSED BOTTOM OF WALL ELEVATION	B/WALL:XXX.XX
PROPOSED DRAINAGE DIVIDE	
DRAINAGE DIRECTION	
OVERFLOW ROUTE	

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

OVERALL GRADING PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

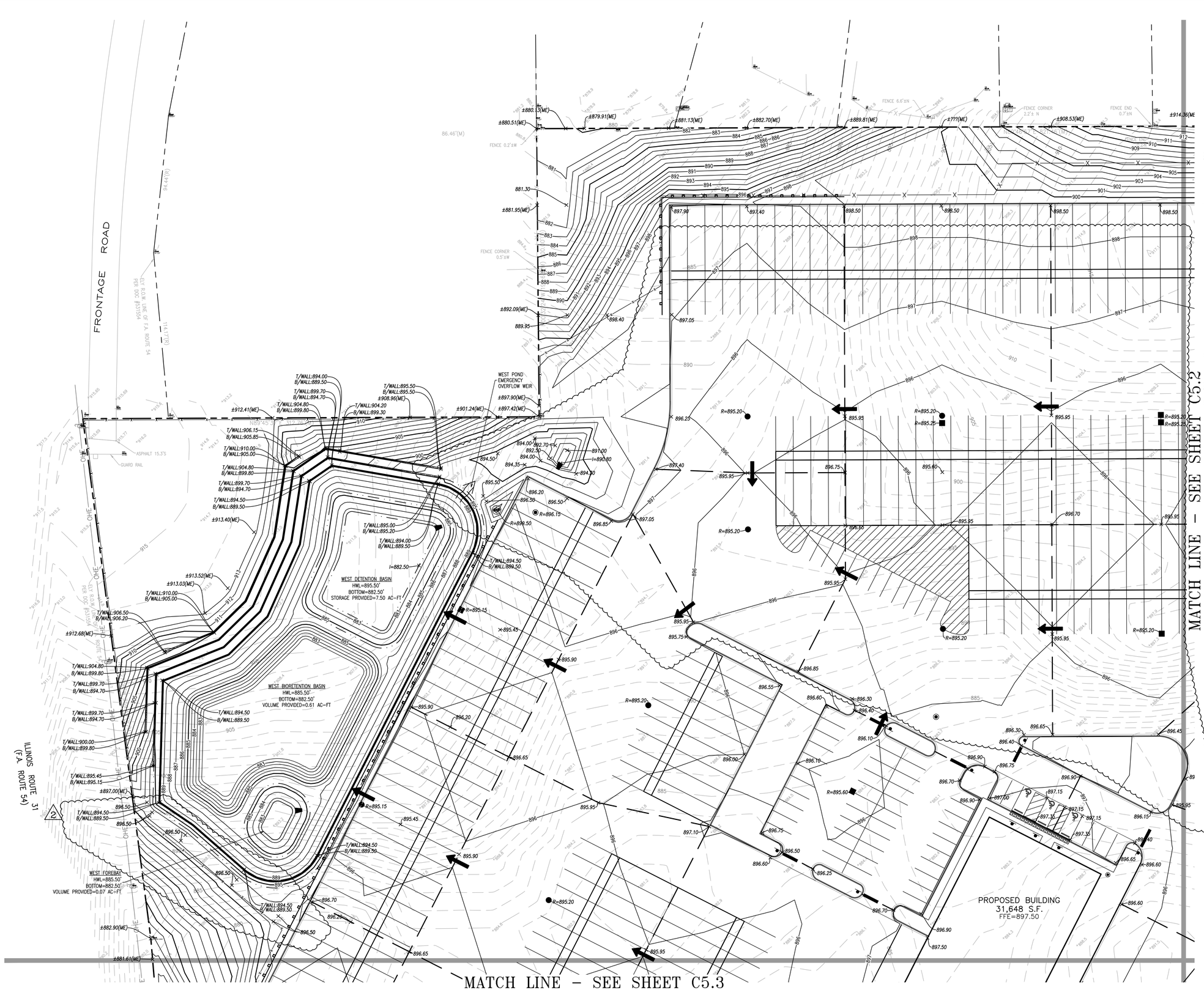
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1" = 60'

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No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

GRADING PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

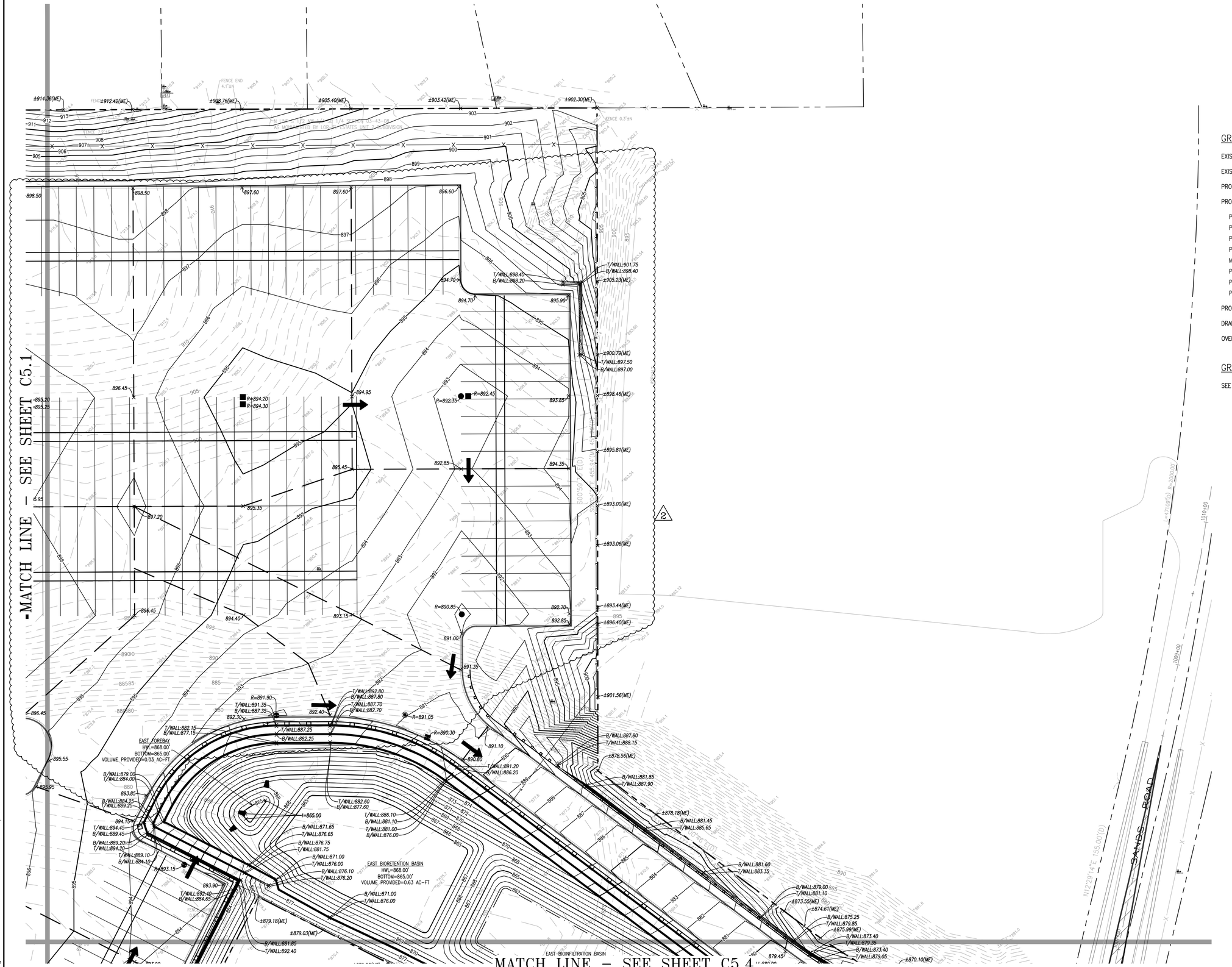
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1" = 30'

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No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

GRADING PLAN

NVA TRUCKING FACILITY EXPANSION

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CRYSTAL LAKE, IL

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MATCH LINE - SEE SHEET C5.4

ILLINOIS ROUTE 31
(F.A. ROUTE 54)

FORMER CHICAGO & NORTHWESTERN UNION PACIFIC RAILROAD RAILROAD

PROPOSED BUILDING
31,648 S.F.
FFE=897.50

GRAPHIC SCALE 1"= 30'
0 15' 30' 60'

GRADING LEGEND:

EXISTING CONTOUR	600
EXISTING SPOT ELEVATION	× XXX.XX
PROPOSED CONTOUR	600
PROPOSED SPOT ELEVATION	× XXX.XX
PROPOSED TOP OF SIDEWALK ELEVATION	× W:XXX.XX
PROPOSED BACK OF CURB ELEVATION	× BC=XXX.XX
PROPOSED CURB CUT ELEVATION	× CC=XXX.XX
PROPOSED RIM ELEVATION	× R=XXX.XX
MATCH EXISTING ELEVATION	× XXX.XX(ME)
PROPOSED TOP OF WALL ELEVATION	T/WALL:XXX.XX
PROPOSED FINISHED GRADE AT TOP OF WALL	T/WALL:XXX.XX(FG)
PROPOSED BOTTOM OF WALL ELEVATION	B/WALL:XXX.XX
PROPOSED DRAINAGE DIVIDE	
DRAINAGE DIRECTION	
OVERFLOW ROUTE	

GRADING NOTES:

SEE SHEET C5.0 FOR ALL GRADING NOTES.

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

GRADING PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

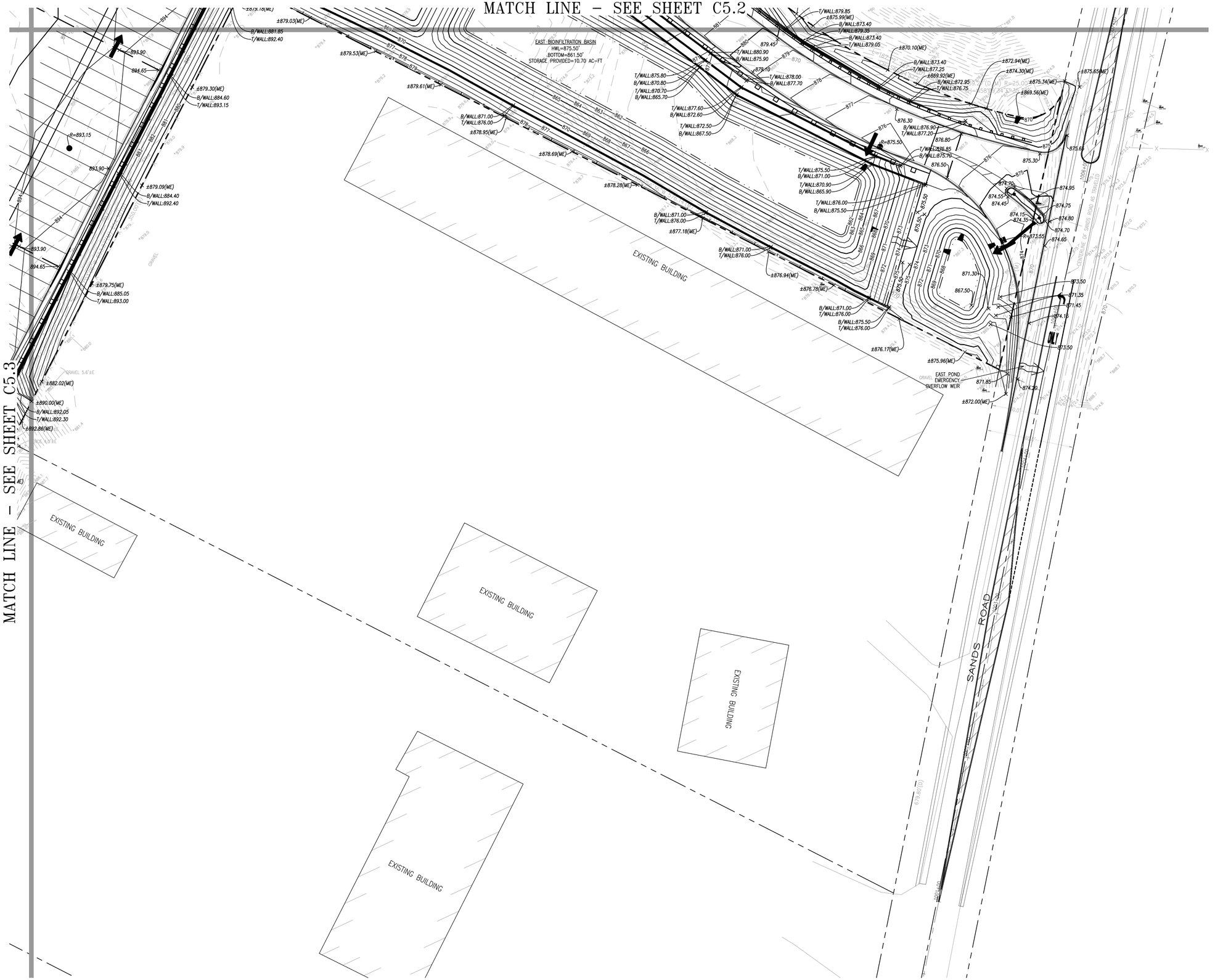
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MATCH LINE – SEE SHEET C5.3



GRADING LEGEND:

EXISTING CONTOUR	600
EXISTING SPOT ELEVATION	× XXX.XX
PROPOSED CONTOUR	600
PROPOSED SPOT ELEVATION	× XXX.XX
PROPOSED TOP OF SIDEWALK ELEVATION	× W:XXX.XX
PROPOSED BACK OF CURB ELEVATION	× BC=XXX.XX
PROPOSED CURB CUT ELEVATION	× CC=XXX.XX
PROPOSED RIM ELEVATION	× R=XXX.XX
MATCH EXISTING ELEVATION	× XXX.XX(ME)
PROPOSED TOP OF WALL ELEVATION	T/WALL:XXX.XX
PROPOSED FINISHED GRADE AT TOP OF WALL	T/WALL:XXX.XX(FG)
PROPOSED BOTTOM OF WALL ELEVATION	B/WALL:XXX.XX
PROPOSED DRAINAGE DIVIDE	
DRAINAGE DIRECTION	
OVERFLOW ROUTE	

GRADING NOTES:

SEE SHEET C5.0 FOR ALL GRADING NOTES.

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

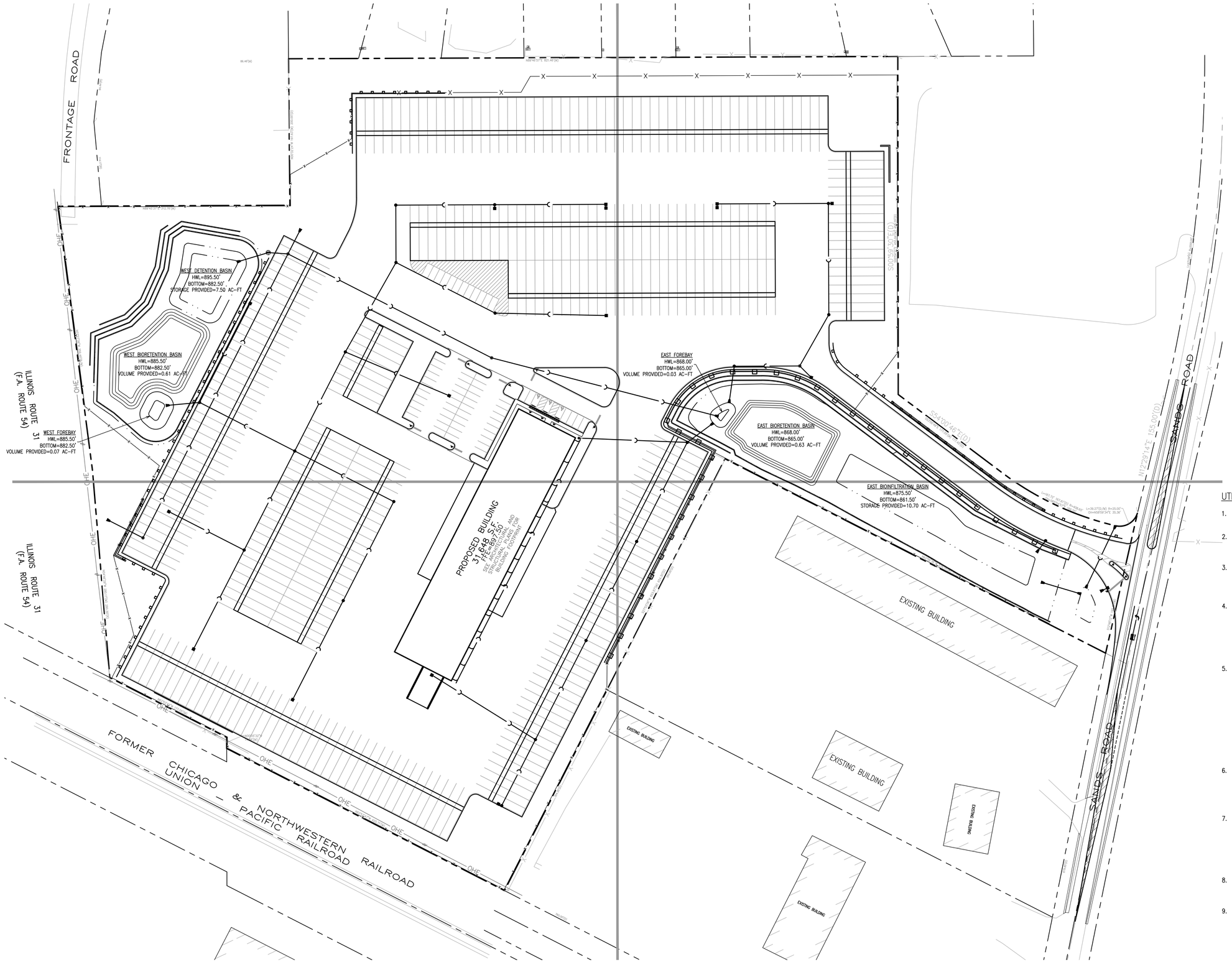
GRADING PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

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UTILITY NOTES:

1. ALL UTILITY LENGTHS SHOWN ARE MEASURED FROM CENTER OF STRUCTURES IN LINEAR FEET.
2. ALL EXISTING UTILITY RIMS, GRADE RINGS, PEDESTALS, ETC. SHALL BE RAISED OR LOWERED AS REQUIRED TO MEET PROPOSED FINISHED GRADE.
3. ALL PROPOSED CONNECTIONS TO EXISTING UTILITY STRUCTURES OR PIPING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE GOVERNING AUTHORITY REQUIREMENTS AND SPECIFICATIONS.
4. GRANULAR TRENCH BACKFILL MATERIAL, IDOT GRADATION CA-7, SHALL BE PLACED AND COMPACTED TO A MINIMUM OF 95% MODIFIED PROCTOR DENSITY, PER ASTM D1557, OVER ALL UTILITIES WHICH ARE CONSTRUCTED UNDER, OR WITHIN TWO (2) FEET OF, ANY PROPOSED OR EXISTING PAVEMENT, PARKING LOTS, SIDEWALKS, ETC. GRANULAR TRENCH BACKFILL NOTED ON THE PLANS BY:
5. CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST FORTY-EIGHT (48) HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED SITE IMPROVEMENTS SHOWN ON THE PLANS.
6. CONTRACTOR SHALL UTILIZE CARE WHEN WORKING NEAR EXISTING UTILITIES TO REMAIN. ANY DAMAGE TO EXISTING UTILITIES NOT NOTED TO BE REMOVED SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE OWNER AND/OR ENGINEER.
7. CONTRACTOR SHALL EXCAVATE AND FIELD VERIFY ALL EXISTING UTILITY LOCATIONS, SIZES, CONDITIONS AND ELEVATIONS AT PROPOSED POINTS OF CONNECTION PRIOR TO COMMENCING ANY UNDERGROUND CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF ANY DISCREPANCIES OR CONFLICTS PRIOR TO PROCEEDING WITH CONSTRUCTION.
8. CONTRACTOR SHALL CONTINUOUSLY MAINTAIN ALL EXISTING SEWER SYSTEMS DURING CONSTRUCTION OPERATIONS AS NECESSARY TO PREVENT SILT OR DEBRIS ACCUMULATION.
9. SEE GENERAL NOTES AND SPECIFICATIONS SHEET FOR ADDITIONAL INFORMATION AND REQUIREMENTS INCLUDING ALL PIPE MATERIAL AND JOINT SPECIFICATIONS.

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

OVERALL UTILITY PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

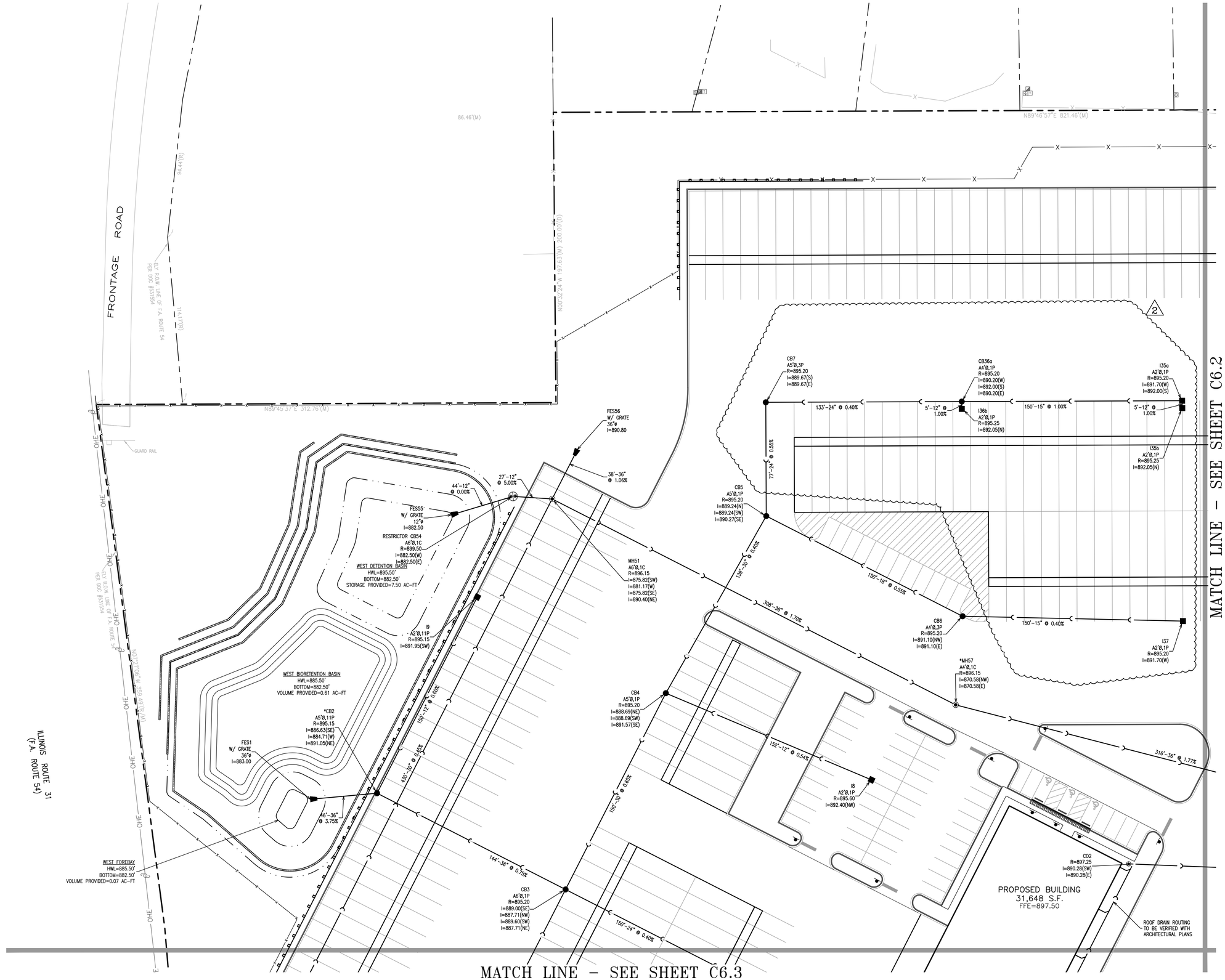
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C6.0

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UTILITY NOTES:

SEE C6.0 FOR ALL UTILITY NOTES.

STORM SEWER NOTES:

STORM SEWER STRUCTURE SYMBOL LEGEND:
I = INLET
CB = CATCH BASIN
MH = MANHOLE
RD = ROOF DRAIN

STORM SEWER FRAME AND GRATE/LID SYMBOL LEGEND:
1C: IDOT TYPE 1 (CLOSED), NEENAH R-1714, EJIW 1050Z1
1P: IDOT TYPE 1 (OPEN), NEENAH R-2504-D,
EJIW 1050Z1 (M1 GRATE)
3P: IDOT TYPE 1 (OPEN), R-2504-C
8P: IDOT TYPE 8 (OPEN),
11P: IDOT TYPE 11, NEENAH R3281-A,
EJIW 7210 (M1 GRATE)

EXAMPLE:
MH3
A4Ø,1P
MANHOLE #3, TYPE A, 4' DIAMETER, IDOT TYPE 1 FRAME AND GRATE (OPEN)

1. ALL 12" AND 15" STORM SEWER SHALL BE RCP CLASS V. ALL OTHER STORM SEWER SHALL BE RCP CLASS IV, UNLESS OTHERWISE NOTED ON THE PLANS.
2. ALL STORM SEWER UNDERDRAIN PIPE SHALL BE PERFORATED ADS N-12 OR APPROVED EQUAL UNLESS OTHERWISE NOTED
3. ALL STORM SEWER CASTINGS SHALL BE EMBOSSED WITH A FISH IMAGE AND "DUMP NO WASTE – DRAINS TO WATERWAYS"
4. ALL STORM STRUCTURES NOTED WITH A "*" SHALL HAVE AN SNOUT OIL AND DEBRIS STOP HOOD FITTED ON THE OUTLET PIPE. (SEE DETAILS)

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

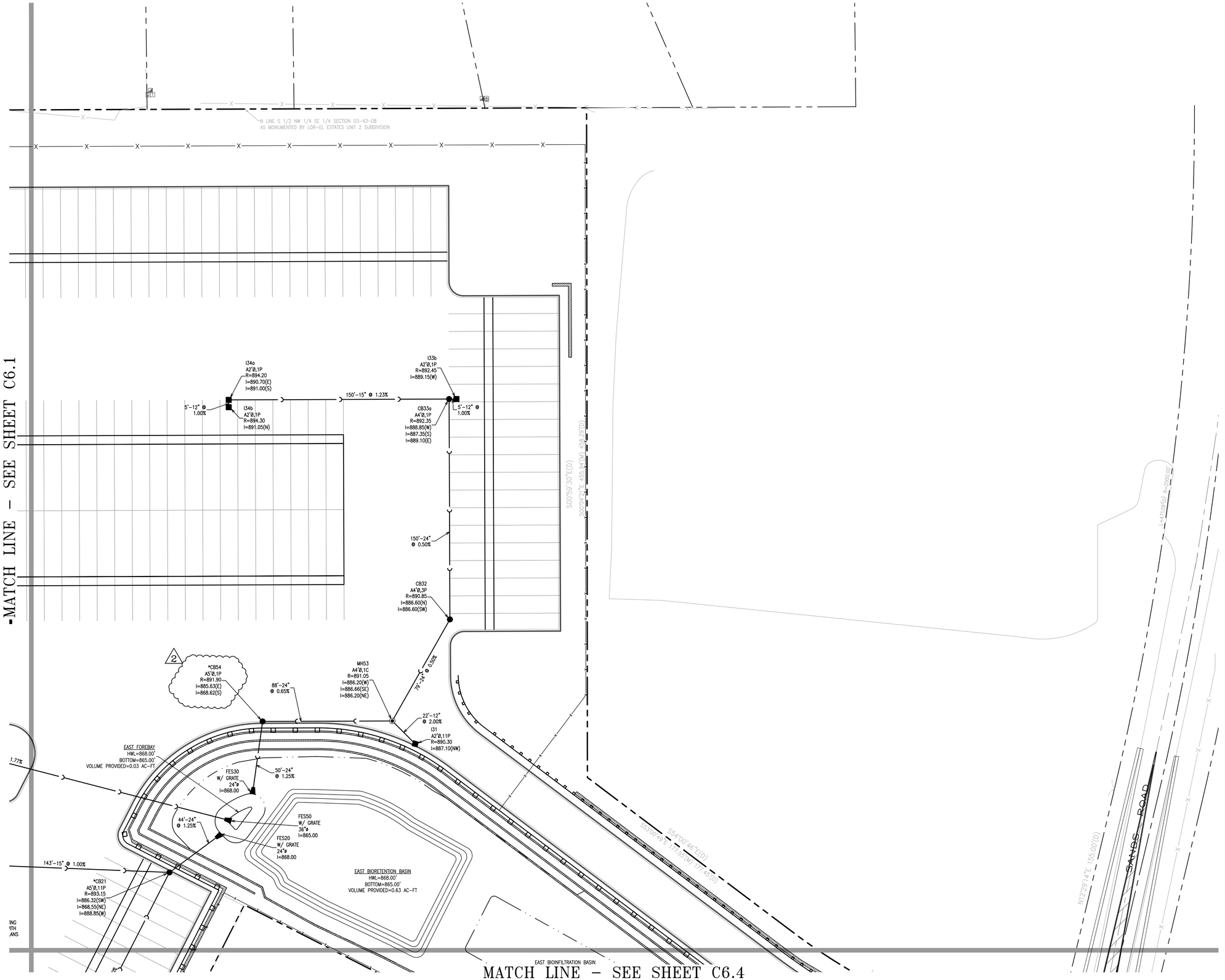
UTILITY PLAN

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CRYSTAL LAKE, IL

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GRAPHIC SCALE 1"= 30'
0 15' 30' 60'

UTILITY NOTES:

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STORM SEWER NOTES:

STORM SEWER STRUCTURE SYMBOL LEGEND:
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MH = MANHOLE
RD = ROOF DRAIN

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1P: IDOT TYPE 1 (OPEN), NEENAH R-2504-D,
EJIW 1050Z1 (M1 GRATE)
3P: IDOT TYPE 1 (OPEN), R-2504-C
8P: IDOT TYPE 8 (OPEN),
11P: IDOT TYPE 11, NEENAH R3281-A,
EJIW 7210 (M1 GRATE)

EXAMPLE:
MH3
A4Ø,1P
MANHOLE #3, TYPE A, 4' DIAMETER, IDOT TYPE 1 FRAME AND GRATE (OPEN)

1. ALL 12" AND 15" STORM SEWER SHALL BE RCP CLASS V. ALL OTHER STORM SEWER SHALL BE RCP CLASS IV, UNLESS OTHERWISE NOTED ON THE PLANS.
2. ALL STORM SEWER UNDERDRAIN PIPE SHALL BE PERFORATED ADS N-12 OR APPROVED EQUAL UNLESS OTHERWISE NOTED
3. ALL STORM SEWER CASTINGS SHALL BE EMBOSSED WITH A FISH IMAGE AND "DUMP NO WASTE – DRAINS TO WATERWAYS"
4. ALL STORM STRUCTURES NOTED WITH A "*" SHALL HAVE AN SNOUT OIL AND DEBRIS STOP HOOD FITTED ON THE OUTLET PIPE. (SEE DETAILS)

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

UTILITY PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

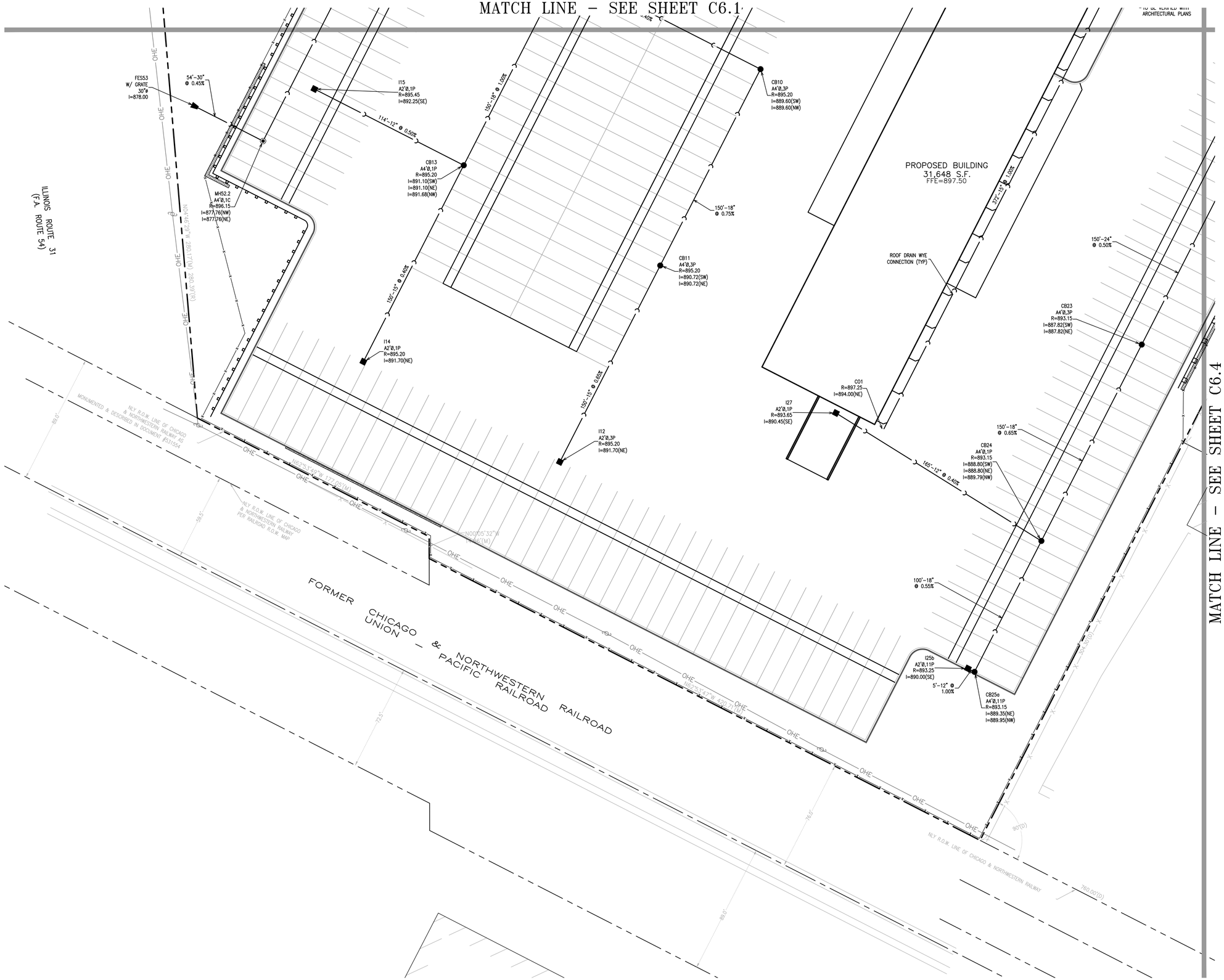
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MATCH LINE – SEE SHEET C6.1

MATCH LINE – SEE SHEET C6.4



GRAPHIC SCALE 1"= 30'
0 15' 30' 60'

ARCHITECTURAL PLANS

UTILITY NOTES:

SEE C6.0 FOR ALL UTILITY NOTES.

STORM SEWER NOTES:

STORM SEWER STRUCTURE SYMBOL LEGEND:
I = INLET
CB = CATCH BASIN
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STORM SEWER FRAME AND GRATE/LID SYMBOL LEGEND:
1C: IDOT TYPE 1 (CLOSED), NEENAH R-1714, EJIW 1050Z1
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3P: IDOT TYPE 1 (OPEN), R-2504-C
8P: IDOT TYPE 8 (OPEN),
11P: IDOT TYPE 11, NEENAH R3281-A, EJIW 7210 (M1 GRATE)

EXAMPLE:
MH3
A4Ø,1P
MANHOLE #3, TYPE A, 4' DIAMETER, IDOT TYPE 1 FRAME AND GRATE (OPEN)

1. ALL 12" AND 15" STORM SEWER SHALL BE RCP CLASS V. ALL OTHER STORM SEWER SHALL BE RCP CLASS IV, UNLESS OTHERWISE NOTED ON THE PLANS.
2. ALL STORM SEWER UNDERDRAIN PIPE SHALL BE PERFORATED ADS N-12 OR APPROVED EQUAL UNLESS OTHERWISE NOTED
3. ALL STORM SEWER CASTINGS SHALL BE EMBOSSED WITH A FISH IMAGE AND "DUMP NO WASTE – DRAINS TO WATERWAYS"
4. ALL STORM STRUCTURES NOTED WITH A "*" SHALL HAVE AN SNOUT OIL AND DEBRIS STOP HOOD FITTED ON THE OUTLET PIPE. (SEE DETAILS)

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

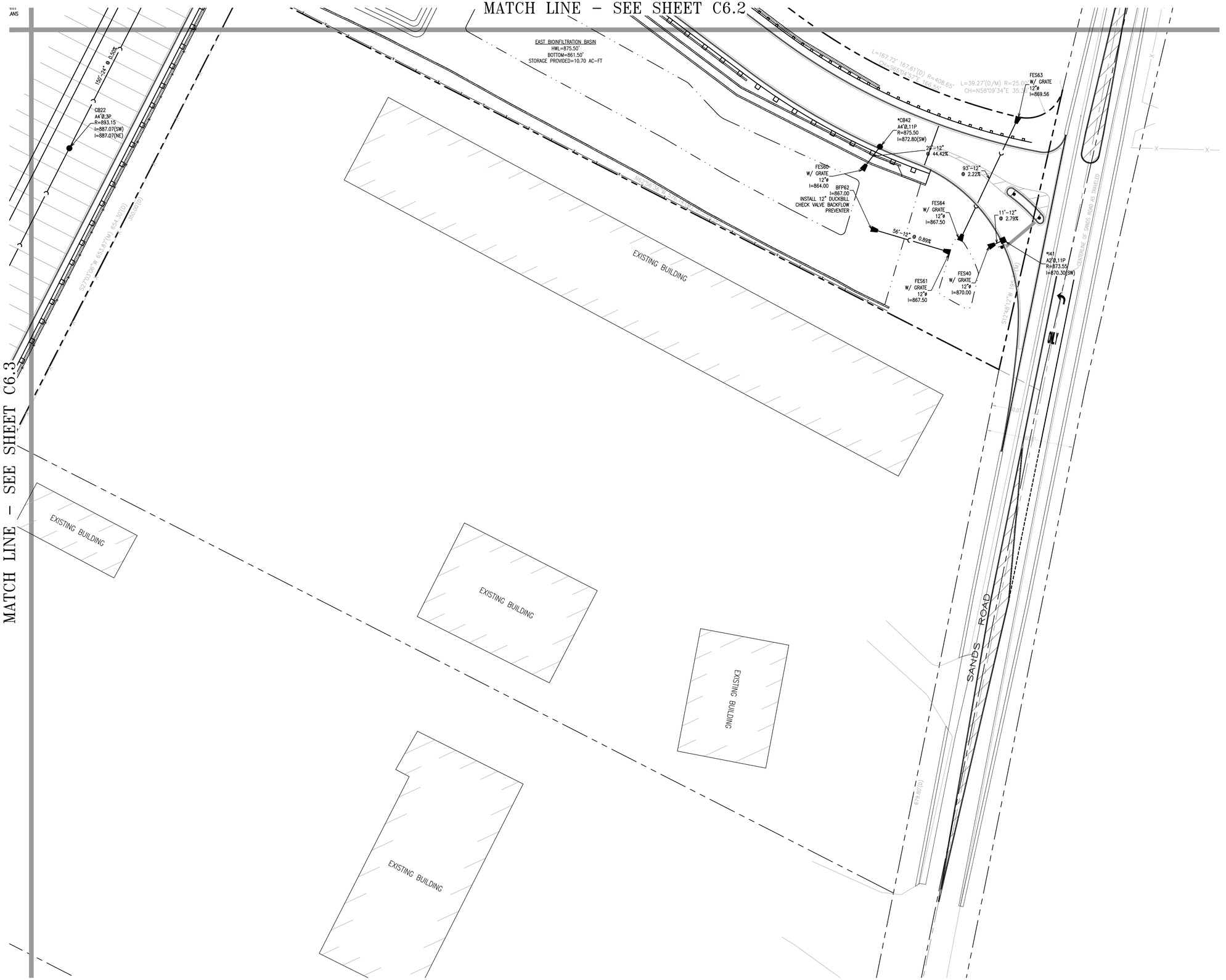
UTILITY PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

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1" = 30'
C6.3

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GRAPHIC SCALE 1"= 30'
0 15' 30' 60'

UTILITY NOTES:

SEE C6.0 FOR ALL UTILITY NOTES.

STORM SEWER NOTES:

STORM SEWER STRUCTURE SYMBOL LEGEND:
I = INLET
CB = CATCH BASIN
MH = MANHOLE
RD = ROOF DRAIN

STORM SEWER FRAME AND GRATE/LID SYMBOL LEGEND:
1C: IDOT TYPE 1 (CLOSED), NEENAH R-1714, EJIW 1050Z1
1P: IDOT TYPE 1 (OPEN), NEENAH R-2504-D,
EJIW 1050Z1 (M1 GRATE)
3P: IDOT TYPE 1 (OPEN), R-2504-C
8P: IDOT TYPE 8 (OPEN),
11P: IDOT TYPE 11, NEENAH R3281-A,
EJIW 7210 (M1 GRATE)

EXAMPLE:
MH3
A4Ø,1P
MANHOLE #3, TYPE A, 4' DIAMETER, IDOT TYPE 1 FRAME AND GRATE (OPEN)

1. ALL 12" AND 15" STORM SEWER SHALL BE RCP CLASS V. ALL OTHER STORM SEWER SHALL BE RCP CLASS IV, UNLESS OTHERWISE NOTED ON THE PLANS.
2. ALL STORM SEWER UNDERDRAIN PIPE SHALL BE PERFORATED ADS N-12 OR APPROVED EQUAL UNLESS OTHERWISE NOTED
3. ALL STORM SEWER CASTINGS SHALL BE EMBOSSED WITH A FISH IMAGE AND "DUMP NO WASTE - DRAINS TO WATERWAYS"
4. ALL STORM STRUCTURES NOTED WITH A "*" SHALL HAVE AN SNOUT OIL AND DEBRIS STOP HOOD FITTED ON THE OUTLET PIPE. (SEE DETAILS)

No.	Description	Date
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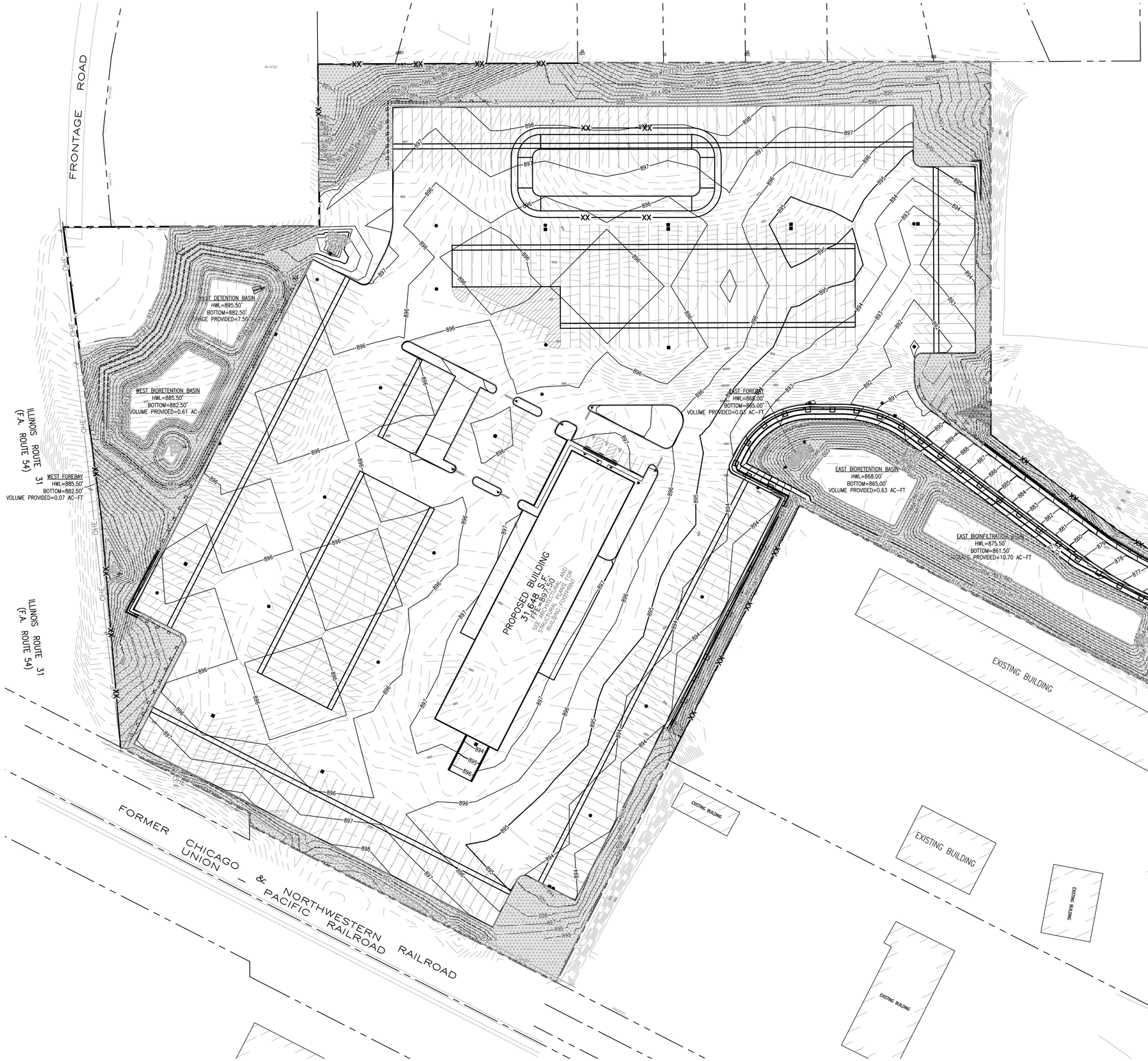
UTILITY PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
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EROSION CONTROL LEGEND:

- (IP) INLET PROTECTION
- (SF) SILT FENCE
- (SE) STABILIZED CONSTRUCTION ENTRANCE
- (CW) CONCRETE WASHOUT
- (ECB) EROSION CONTROL BLANKET AND IDOT CLASS 3 SEEDING (NORTH AMERICAN GREEN S75)
- (PS) PERMANENT SEEDING (SEE LANDSCAPE PLANS FOR ADDITIONAL INFORMATION AND DETAILS)
- (SS) STREET SWEEPING
- (LA) LINED APRON

SWPPP CONSTRUCTION SCHEDULE:

1. OBTAIN ALL APPLICABLE SITE PERMITS AND THOROUGHLY REVIEW PROJECT'S STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND EROSION CONTROL PLANS PRIOR TO COMMENCEMENT OF CONSTRUCTION OPERATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AND UPDATING THE SWPPP THROUGHOUT THE DURATION OF CONSTRUCTION AS NECESSARY UNTIL FINAL SITE STABILIZATION IS ACHIEVED.
2. INSTALL PERIMETER SEDIMENT CONTROL MEASURES (I.E. SILT FENCE AND STABILIZED CONSTRUCTION ENTRANCE).
3. INSTALL INLET PROTECTION DEVICES FOR EXISTING STORM SEWER INLETS AND DRAINAGE STRUCTURES.
4. PERFORM STORMWATER POLLUTION PREVENTION SITE INSPECTIONS ON A WEEKLY BASIS AND WITHIN TWENTY-FOUR (24) HOURS OF THE END OF A RAINFALL EVENT THAT IS 0.5 INCH OR GREATER (OR EQUIVALENT SNOWFALL). AT A MINIMUM, THE INSPECTIONS SHALL INCLUDE THE DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED, ALL STRUCTURAL CONTROL MEASURES, LOCATIONS WHERE VEHICLES ENTER OR EXIST THE SITE, AND ANY ADDITIONAL BEST MANAGEMENT PRACTICES IDENTIFIED IN THE SWPPP.
   - 4.1. ALL SITE EROSION AND SEDIMENT CONTROL MEASURES AND BEST MANAGEMENT PRACTICES SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND SHALL BE CONTINUOUSLY MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION. CONTRACTOR SHALL MAKE AND COMPLETE THE REQUIRED REPAIRS WITHIN FORTY-EIGHT (48) HOURS OF THE INSPECTION.
   - 4.2. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL STRUCTURAL CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE SITE INSPECTIONS.
5. INSTALL NEW STORM SEWERS AND OTHER SITE UTILITIES AS INDICATED ON THE PLANS.
6. PROVIDE TEMPORARY SEEDING AND/OR MULCHING FOR ALL DISTURBED SITE AREAS THAT WILL NOT BE WORKED ON FOR MORE THAN FOURTEEN (14) DAYS.
7. INSTALL TEMPORARY CONCRETE WASHOUT PRIOR TO COMMENCEMENT OF ANY CONCRETE WORK ON SITE.
8. BEGIN SITE PAVING OPERATIONS (I.E. DRIVES, PARKING LOTS, ETC.)
9. PERFORM STREET CLEANING OPERATIONS AND OTHER BEST MANAGEMENT PRACTICES AS NEEDED FOR AREAS ADJACENT TO THE PROJECT SITE.
10. INSTALL BUILDING FOUNDATIONS AND COMPLETE BUILDING CONSTRUCTION AND REMAINING SITE IMPROVEMENTS INDICATED ON THE PLANS.
11. REMOVE ALL TEMPORARY SITE EROSION AND SEDIMENT CONTROL MEASURES WITHIN THIRTY (30) DAYS OF FINAL SITE STABILIZATION.

EROSION CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE PRIOR TO COMMENCEMENT OF SITE GRADING OR DEMOLITION OPERATIONS.
2. CONTRACTOR SHALL IMPLEMENT APPROPRIATE DUST CONTROL MEASURES AS NECESSARY.
3. EROSION CONTROL MEASURES INDICATED ON THE PLANS ARE THE MINIMUM REQUIREMENTS ANTICIPATED BY THE ENGINEER. ADDITIONAL MEASURES MAY BE REQUIRED DURING CONSTRUCTION AS WARRANTED BY SITE CONDITIONS OR AS DIRECTED BY THE ENGINEER AND/OR PROJECT GOVERNING AUTHORITIES.
4. SEE GENERAL NOTES AND SPECIFICATIONS SHEETS AND STORMWATER POLLUTION PREVENTION PLANS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

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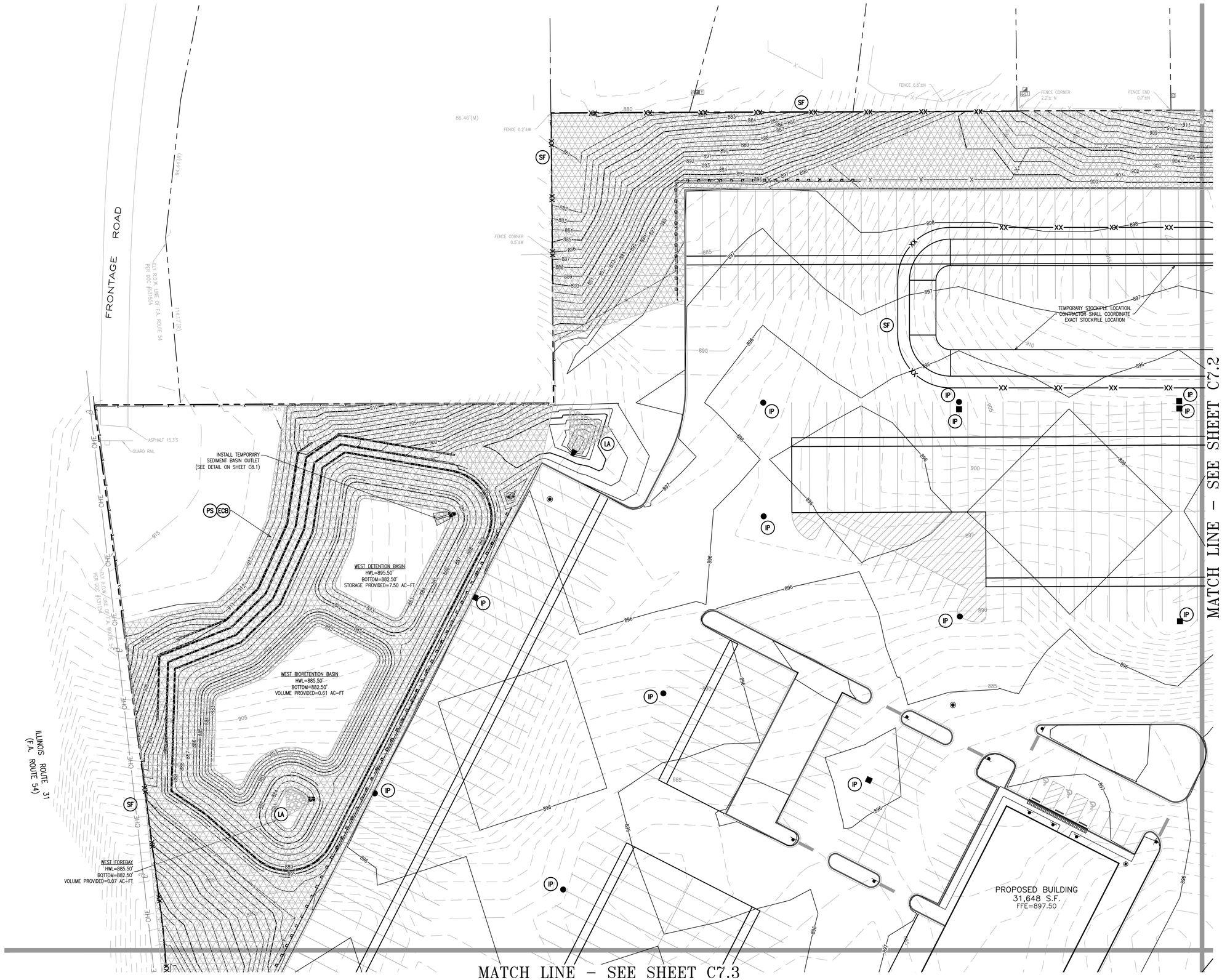
OVERALL EROSION CONTROL PLAN

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

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EROSION CONTROL NOTES:

SEE SHEET C7.0 FOR ALL EROSION CONTROL NOTES

SWPPP CONSTRUCTION SCHEDULE:

SEE SHEET C7.0 FOR SWPPP CONSTRUCTION SCHEDULE.

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EROSION CONTROL PLAN

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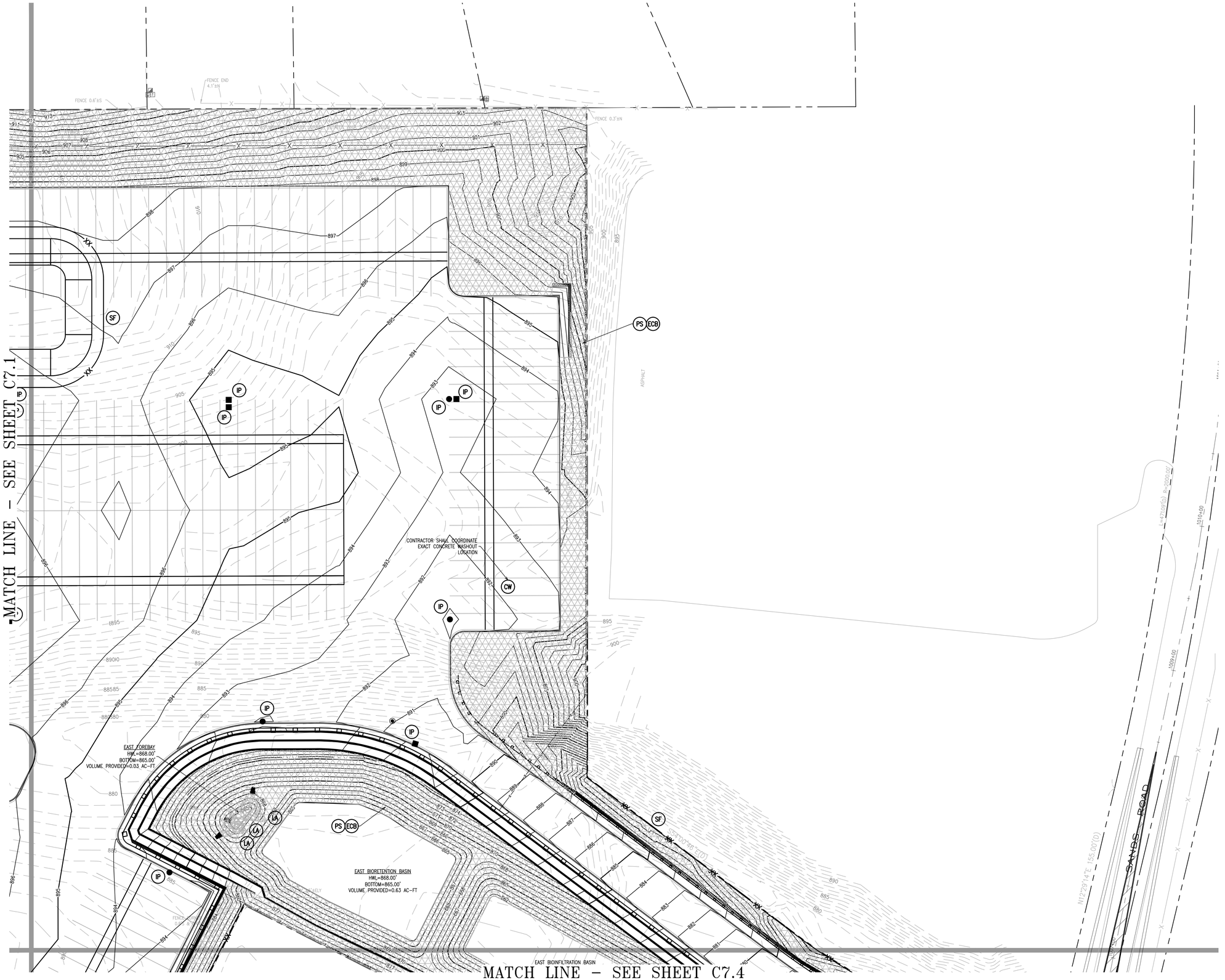
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SWPPP CONSTRUCTION SCHEDULE:

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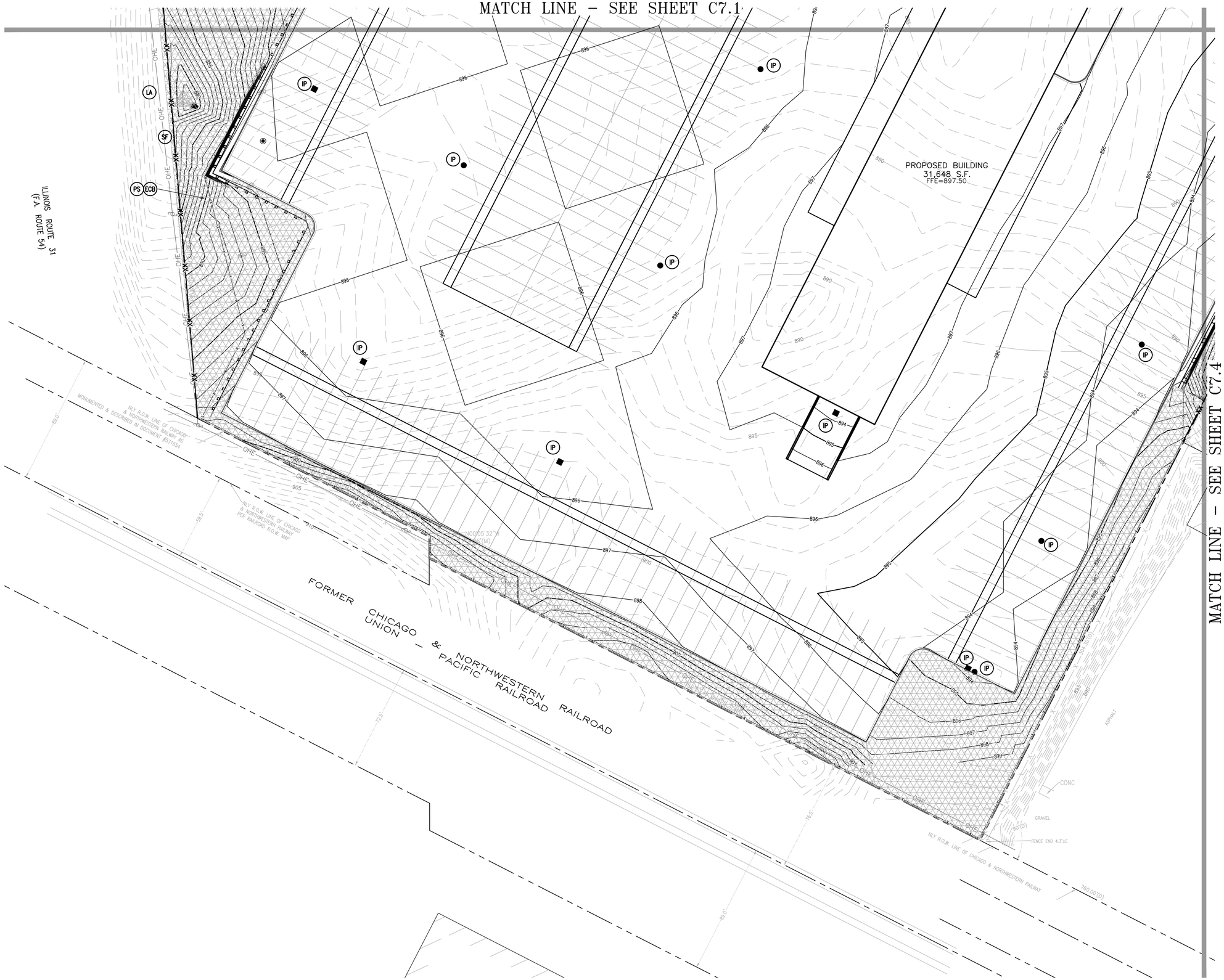
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MATCH LINE – SEE SHEET C7.1

MATCH LINE – SEE SHEET C7.4



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SWPPP CONSTRUCTION SCHEDULE:

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EROSION CONTROL PLAN

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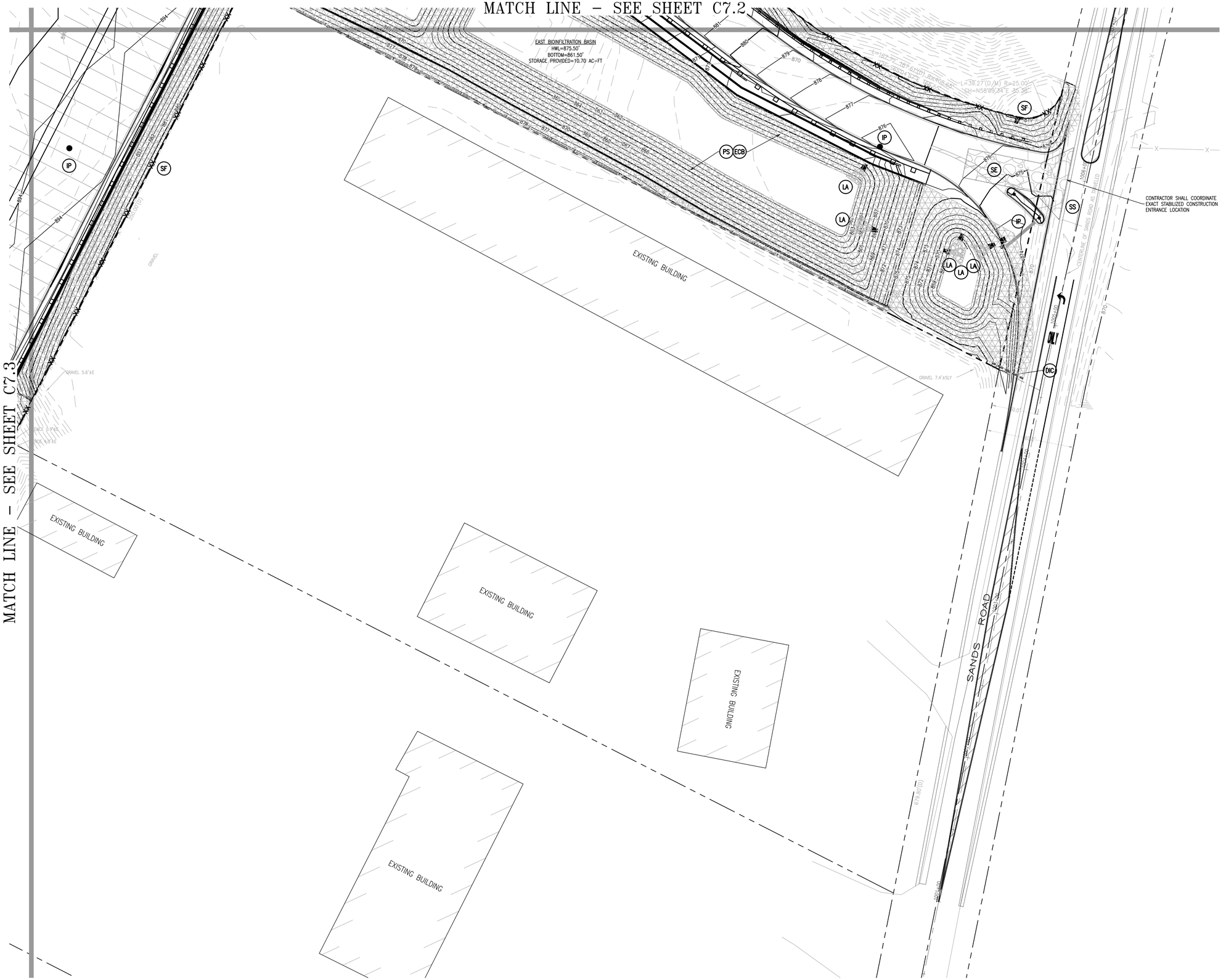
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EROSION CONTROL NOTES:

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SWPPP CONSTRUCTION SCHEDULE:

SEE SHEET C7.0 FOR SWPPP CONSTRUCTION SCHEDULE.

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CONTROL MEASURE GROUP	CONTROL MEASURE	APPLICABLE	SYMBOL	CONTROL MEASURE CHARACTERISTICS	TEMPORARY	PERMANENT	REQUIRED MAINTENANCE
VEGETATIVE SOIL COVER	TEMPORARY SEEDING		TS	PROVIDES QUICK TEMPORARY COVER TO CONTROL EROSION WHEN PERMANENT SEEDING IS NOT DESIRED OR TIME OF YEAR IS INAPPROPRIATE	X		RESEED ANY FAILING AREAS
	PERMANENT SEEDING	X	PS	PROVIDES PERMANENT VEGETATIVE COVER TO CONTROL EROSION AND FILTERS SEDIMENT FROM WATER. MAY BE PART OF FINAL LANDSCAPE PLAN		X	RESEED ANY FAILING AREAS
	DORMANT SEEDING		DS	SAME AS PERMANENT SEEDING EXCEPT IS DONE DURING DORMANT SEASON. HIGHER RATES OF SEED APPLICATION ARE REQUIRED	X	X	RESEED AS NEEDED
	SODDING		SO	QUICK PERMANENT VEGETATIVE COVER USED TO CONTROL EROSION AND ESTABLISH VEGETATIVE FILTER STRIP, CAN BE USED ON STEEP SLOPES OR IN DRAINAGE WAYS OR OTHER AREAS WHERE SEEDING MAY BE DIFFICULT	X	X	N/A
NON VEGETATIVE SOIL COVER	MACHINE TRACKING		GC	PROVIDES SOIL ROUGHING TO PREVENT EROSION		X	N/A
	POLYMER		P	USED AS ADDED INSURANCE IN CONJUNCTION WITH TEMPORARY OR PERMANENT SEEDING. PROVIDES TEMPORARY COVER WHERE VEGETATION CANNOT BE ESTABLISHED	X	X	REAPPLY EVERY 1-1/2 MONTHS
	AGGREGATE COVER		AG	PROVIDES SOIL COVER ON ROADS, PARKING LOTS AND OTHER AREAS WHERE VEGETATION CANNOT BE ESTABLISHED. PREVENTS MUD FROM BEING PICKED UP AND CARRIED OFF-SITE	X	X	CLEAN DIRT AND SEDIMENT FROM STONE AS NEEDED
	PAVING	X	PV	PROVIDES PERMANENT COVER ON ROADS, PARKING LOTS AND OTHER AREAS WHERE VEGETATION CANNOT BE ESTABLISHED		X	N/A
DIVERSIONS	RIDGE DIVERSION		RD	TYPICALLY USED ABOVE SLOPES TO COLLECT RUNOFF AND TRANSFER DOWNSTREAM	X	X	CLEAN OUT SILT WHEN HALF FULL
	CHANNEL DIVERSION		CD	TYPICALLY USED TO DIVERT RUNOFF TO PREVENT EROSION	X	X	REPLACE PROTECTION AS NEEDED
	COMBINATION DIVERSION		DC	TYPICALLY USED ANYWHERE ON A SLOPE. SOIL TAKEN OUT OF A CHANNEL IS USED TO BUILD THE RIDGE	X	X	REPLACE PROTECTION AS NEEDED
	CURB AND GUTTER		CG	SPECIAL CASE OF DIVERSION USED IN CONJUNCTION WITH A ROAD TO DIVERT RUNOFF FROM AN AREA NEEDING EROSION PROTECTION		X	N/A
	BENCHES		B	SPECIAL CASE OF DIVERSION CONSTRUCTED WHEN WORKING ON CUT SLOPES TO SHORTEN LENGTH OF SLOPE AND PROVIDE SLOPE STABILITY	X	X	N/A
WATERWAYS	VEGETATIVE CHANNEL		VC	PROVIDES ADDITIONAL STABILITY TO CHANNEL AND USED WITH RELATIVELY LOW FLOW VELOCITIES	X	X	REDO ANY FAILING AREAS
	LINED CHANNEL		LC	USED WHEN VEGETATION IS INADEQUATE TO PROTECT A CHANNEL FROM HIGH FLOW VELOCITIES OR WHERE VEGETATION CANNOT BE ESTABLISHED	X	X	REPLACE PROTECTION AS NEEDED
ENCLOSED DRAINAGE	STORM SEWER		STM	CAN BE USED TO CONVEY SEDIMENT LADEN RUNOFF TO SEDIMENT BASIN OR IN CONJUNCTION WITH A WATERWAY	X	X	CLEAN OUT SEDIMENT AS NEEDED
	UNDER DRAIN		UD	USED TO LOWER WATER TABLE AND INTERCEPT GROUNDWATER FOR BETTER VEGETATION GROWTH AND SLOPE STABILITY. USED TO CARRY BASE FLOW IN WATERWAYS AND TO DEWATER SEDIMENT BASINS.	X	X	N/A
SPILLWAYS	STRAIGHT PIPE SPILLWAY		SPS	USED FOR RELATIVELY SMALL VERTICAL DROPS AND SMALL FLOWS OF WATER		X	CLEAN OUT CONSTRUCTION DEBRIS AS NEEDED
	DROP INLET PIPE SPILLWAY		DIS	SAME AS PIPE SPILLWAY EXCEPT LARGER FLOWS AND LARGE VERTICAL DROPS CAN BE ACCOMMODATED		X	CLEAN OUT CONSTRUCTION DEBRIS AS NEEDED
	WEIR SPILLWAY		W	USED FOR RELATIVELY SMALL VERTICAL DROPS AND FLOWS IN EXCESS OF THE STORM SEWER SYSTEM	X	X	CLEAN OUT CONSTRUCTION DEBRIS AS NEEDED
	BOX INLET WEIR SPILLWAY		BS	SAME AS WEIR SPILLWAY EXCEPT LARGER FLOWS CAN BE ACCOMMODATED DUE TO LOWER WEIR LENGTH	X	X	CLEAN OUT CONSTRUCTION DEBRIS AS NEEDED
OUTLETS	LINED APRON	X	LA	PROTECTS DOWNSTREAM CHANNEL FROM HIGH VELOCITY OF FLOW DISCHARGING FROM FLARED END SECTIONS OR OTHER OUTLET STRUCTURES	X	X	REPAIR DISLODGED STONES AND EROSION UNDER RIP-RAP AS NEEDED
SEDIMENT BASINS	SEDIMENT BASIN		SB	USED TO COLLECT SMALLER PARTICLES AND TO DETAIN WATER WITH A CONTROLLED RELEASE	X	X	CLEAN OUT SEDIMENT WHEN HALF FULL
	SEDIMENT TRAP		ST	USED TO COLLECT LARGER PARTICLES AND TO DETAIN WATER WITH A CONTROLLED RELEASE	X	X	CLEAN OUT SEDIMENT WHEN HALF FULL
SEDIMENT FILTERS	SILT FENCE	X	SF	USED TO FILTER SEDIMENT FROM RUNOFF	X		CLEAN OUT SEDIMENT WHEN HALF FULL AND REPAIR AS NEEDED
	VEGETATIVE FILTER		VF	USED ALONG DRAINAGE WAYS OR PROPERTY LINES TO FILTER SEDIMENT FROM RUNOFF	X	X	REDO ANY FAILING AREAS
MUD AND DUST CONTROL	STABILIZED CONSTRUCTION ENTRANCE	X	SE	PREVENTS MUD AND SEDIMENT FROM BEING PICKED UP AND CARRIED OFF-SITE	X		SCRAPE MUD AND REPLACE STONE AS NEEDED
	DUST CONTROL	X	DT	PREVENTS DUST FROM LEAVING CONSTRUCTION SITE	X		REAPPLY AS NEEDED
EROSION CONTROL	EROSION CONTROL BLANKET	X	ECB	PROTECTS SOIL, PREVENTS SEED WASHOUT AND HELPS GROW VEGETATION	X		REPLACE AS NEEDED
	TURF REINFORCEMENT MAT	X	TRM	REINFORCES TURF IN CHANNELS, SHORELINES AND HIGH FLOW AREAS		X	REPLACE AS NEEDED
	CELLULAR CONFINEMENT		CF	USED FOR SOIL STABILIZATION	X	X	REPLACE AS NEEDED
	GABIONS		GA	USED TO PREVENT EROSION IN HIGH FLOW AREAS	X	X	REPLACE AS NEEDED
	GEOTEXTILE FABRIC		GF	USED FOR EROSION AND SEDIMENT CONTROL, SOIL SEPARATION AND SOIL STABILIZATION	X	X	REPLACE AS NEEDED
	GEOBLOCK POROUS PAVEMENT		PP	USED FOR FIRE LANE ACCESS OR VEGETATIVE PAVEMENT	X	X	REPLACE AS NEEDED
SEDIMENT CONTROL	INLET PROTECTION	X	IP	USED TO PREVENT SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM	X		REPLACE OR CLEAN WHEN CLOGGED
	SLOPE INTERRUPT		SI	USED TO BREAK UP RUNOFF FLOW ON A SLOPE	X		CLEAN OUT SEDIMENT WHEN HALF FULL
	DITCH CHECK		DIC	USED FOR SEDIMENT FLOW CONTROL IN SWALES AND CHANNELS	X	X	CLEAN OUT SEDIMENT WHEN HALF FULL
	FLOC LOG		FL	USED TO CLARIFY WATER THAT HAS SEDIMENT IN THE WATERY COLUMN	X	X	REPLACE WHEN HALF DISSOLVED
	SILT CURTAIN		SC	USED FOR SEDIMENT CONTROL IN STREAMS, PONDS, ETC.	X	X	REPLACE WHEN FABRIC IS TORN OR HOLES BEGIN TO FORM
	PUMPING DISCHARGE BAG		PB	USED FOR PUMP DISCHARGE LINES	X		REPLACE WHEN HALF FULL, FABRIC IS TORN OR HOLES BEGIN TO FORM
	CONCRETE WASHOUT	X	CW	USED TO WASH OUT CONCRETE TRUCKS	X		CLEAN OUT WHEN HALF FULL AND CLEAN WASHOUT GRAVEL AREA AS NEEDED
	STREET SWEEPING	X	SS	USED TO PREVENT SILT BUILD UP IN STREETS	X	X	CLEAN ONCE A WEEK OR AS NEEDED TO KEEP STREET CLEAN

SWPPP NOTES:

THIS PLAN HAS BEEN PREPARED TO COMPLY WITH THE PROVISIONS OF THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT NUMBER ILR10, ISSUED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY, WHICH AUTHORIZES STORMWATER DISCHARGES RESULTING FROM CONSTRUCTION SITE ACTIVITIES AND THE SOIL EROSION AND SEDIMENT CONTROL ORDINANCES AND REQUIREMENTS OF THE LOCAL GOVERNING AUTHORITIES.

1. SITE DESCRIPTION

A. THE FOLLOWING IS A DESCRIPTION OF THE PROPOSED CONSTRUCTION ACTIVITIES THAT ARE THE SUBJECT OF THIS PLAN:

THE SITE IMPROVEMENTS ASSOCIATED WITH THE PROPOSED INDUSTRIAL DEVELOPMENT WILL INCLUDE THE FOLLOWING: MASS GRADING, INSTALLATION OF UTILITIES INCLUDING STORM SEWERS AND SOIL EROSION AND SEDIMENTATION CONTROL MEASURES.

B. THE FOLLOWING IS A DESCRIPTION OF THE INTENDED SEQUENCE OF MAJOR ACTIVITIES WHICH WILL DISTURB SOILS FOR MAJOR PORTIONS OF THE CONSTRUCTION SITE, SUCH AS GRUBBING, EXCAVATION, AND GRADING:

THE SEQUENCE OF THE CONSTRUCTION ACTIVITIES MAY BE AS FOLLOWS: 1) INSTALL PERIMETER CONTROLS INCLUDING SILT FENCE AND STABILIZED CONSTRUCTION ENTRANCE, 2) MASS GRADING, 3) UNDERGROUND UTILITIES INSTALLATION. THE SOIL EROSION AND SEDIMENTATION CONTROL ITEMS WILL BE CONSTRUCTED AND MAINTAINED AS NEEDED DURING THE ABOVE CONSTRUCTION ACTIVITIES.

C. THE TOTAL AREA OF THE CONSTRUCTION SITE IS ESTIMATED TO BE 21.48 ACRES.

THE TOTAL AREA OF THE SITE THAT IS ESTIMATED TO BE DISTURBED BY EXCAVATION, GRADING, OR OTHER CONSTRUCTION ACTIVITIES IS 21.14 ACRES.

D. THE ESTIMATED RUNOFF COEFFICIENTS OF THE VARIOUS AREAS OF THE SITE AFTER CONSTRUCTION ACTIVITIES ARE COMPLETED ARE CONTAINED IN THE PROJECT DRAINAGE STUDY, TITLED STORMWATER MANAGEMENT REPORT FOR NVA TRUCKING FACILITY EXPANSION, AS PREPARED BY JACOB & HEFNER ASSOCIATES, INC. WHICH IS HEREBY INCORPORATED BY REFERENCE IN THIS PLAN.

THE ESTIMATED PROPOSED OVERALL SITE RUNOFF COEFFICIENT IS .93.4 .

E. EXISTING DATA DESCRIBING SOILS OR QUALITY OF DISCHARGE (SEE SOILS REPORT IF AVAILABLE) POOR/FAIR/GOOD/NOT AVAILABLE: (SEE MIDLAND STANDARD ENGINEERING & TESTING, INC., SOIL EXPLORATION AND ANALYSIS REPORT DATED SEPTEMBER 9, 2022).

F. NAME OF RECEIVING WATER(S): INFILTRATION ON SITE. OVERFLOW TO WEST LAKE
NAME OF ULTIMATE RECEIVING WATER(S): CRYSTAL LAKE OUTLE TO THE FOX RIVER

G. EXISTING AREAS EXHIBITING WETLAND CHARACTERISTICS: 0.07 ACRES

2. CONTROLS

THIS SECTION OF THE PLAN ADDRESSES THE VARIOUS CONTROLS THAT WILL BE IMPLEMENTED FOR EACH OF THE MAJOR CONSTRUCTION ACTIVITIES DESCRIBED IN 1.B ABOVE. FOR EACH MEASURE DISCUSSED, THE CONTRACTOR(S) SHALL BE RESPONSIBLE FOR ITS IMPLEMENTATION AS INDICATED. EACH SUCH CONTRACTOR HAS SIGNED THE REQUIRED CERTIFICATION ON FORMS WHICH ARE ATTACHED TO, AND ARE A PART OF, THIS PLAN.

A. EROSION AND SEDIMENT CONTROLS

(I) STABILIZATION PRACTICES: PROVIDED BELOW IS A DESCRIPTION OF INTERIM AND PERMANENT STABILIZATION PRACTICES, INCLUDING SITE-SPECIFIC SCHEDULING OF THE IMPLEMENTATION OF THE PRACTICES. SITE PLANS WILL ENSURE THAT EXISTING VEGETATION IS PRESERVED WHERE ATTAINABLE AND DISTURBED PORTIONS OF THE SITE WILL BE STABILIZED. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 7 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED ON ALL DISTURBED PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITY WILL NOT OCCUR FOR A PERIOD OF 21 OR MORE CALENDAR DAYS.

WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY OR PERMANENTLY CEASES IS PRECLUDED BY SNOW COVER, STABILIZATION MEASURES SHALL BY INITIATED AS SOON AS PRACTICABLE THEREAFTER.

THE FOLLOWING INTERIM AND PERMANENT STABILIZATION PRACTICES, AS A MINIMUM, WILL BE IMPLEMENTED TO STABILIZE THE DISTURBED AREA OF THE SITE:

1. PERMANENT SEEDING
2. SILT FENCE
3. VEGETATIVE FILTER
4. STABILIZED CONSTRUCTION ENTRANCE
5. BARRIER FILTER

(II) STRUCTURAL PRACTICES: PROVIDED BELOW IS A DESCRIPTION OF STRUCTURAL PRACTICES THAT WILL BE IMPLEMENTED, TO THE DEGREE ATTAINABLE, TO DIVERT FLOWS FROM EXPOSED SOILS, STORE FLOWS OR OTHERWISE LIMIT RUNOFF AND THE DISCHARGE OF POLLUTANTS FROM EXPOSED AREAS OF THE SITE. THE INSTALLATION OF THESE DEVICES MAY BE SUBJECT TO SECTION 404 OF THE CLEAN WATER ACT.

1. DETENTION/RETENTION POND(S)
2. STORM SEWER SYSTEM
3. RIP-RAP OUTLET PROTECTION
4. PERMANENT SEEDING

(III) DUST CONTROL: DUST CONTROL SHALL BE PROVIDED PER STANDARD 825 OF ILLINOIS URBAN MANUAL. THE FOLLOWING DUST CONTROL METHODS CAN BE USED:

1. IRRIGATION
2. SPRAY ON ADHESIVE
3. VEGETATIVE COVER
4. MULCHING

B. STORMWATER MANAGEMENT

(I) PROVIDED BELOW IS A DESCRIPTION OF MEASURES THAT WILL BE INSTALLED DURING THE CONSTRUCTION PROCESS TO CONTROL POLLUTANTS IN STORMWATER DISCHARGES THAT WILL OCCUR AFTER CONSTRUCTION OPERATIONS HAVE BEEN COMPLETED. THE INSTALLATION OF THESE DEVICES MAY BE SUBJECT TO SECTION 404 OF THE CLEAN WATER ACT.

THE PRACTICES SELECTED FOR IMPLEMENTATION WERE DETERMINED ON THE BASIS OF THE TECHNICAL GUIDANCE CONTAINED IN IEPA'S STANDARD SPECIFICATIONS FOR SOIL EROSION AND SEDIMENTATION CONTROL, AND OTHER ORDINANCES LISTED IN THE SPECIFICATIONS.

THE STORMWATER POLLUTANT CONTROL MEASURES SHALL INCLUDE:

1. SILT FENCE
2. BARRIER FILTERS
3. STORM SEWER SYSTEM
4. DETENTION/RETENTION POND(S)

(II) VELOCITY DISSIPATION DEVICES WILL BE PLACED AT DISCHARGE LOCATIONS AND ALONG THE LENGTH OF ANY OUTFALL CHANNEL AS NECESSARY TO PROVIDE A NON-EROSIVE VELOCITY FLOW FROM THE STRUCTURE TO A WATER COURSE SO THAT THE NATURAL PHYSICAL AND BIOLOGICAL CHARACTERISTICS AND FUNCTIONS ARE MAINTAINED AND PROTECTED (E.G., MAINTENANCE OF HYDROLOGIC CONDITIONS, SUCH AS THE HYDROPERIOD AND HYDRODYNAMICS PRESENT PRIOR TO THE INITIATION OF CONSTRUCTION ACTIVITIES).

STORMWATER MANAGEMENT CONTROL INCLUDES:

1. RIP-RAP FOR OUTLET PROTECTION
2. DITCH CHECKS

C. OTHER CONTROLS

(I) WASTE DISPOSAL: THE SOLID WASTE MATERIALS INCLUDING TRASH, CONSTRUCTION DEBRIS, EXCESS CONSTRUCTION MATERIALS, MACHINERY, TOOLS AND OTHER ITEMS WILL BE COLLECTED AND DISPOSED OF OFF-SITE BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO ACQUIRE ANY PERMIT REQUIRED FOR SUCH DISPOSAL. BURNING ON THE SITE WILL NOT BE PERMITTED. NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED INTO WATERS OF THE STATE, EXCEPT AS AUTHORIZED BY A SECTION 404 PERMIT.

(II) THE PROVISIONS OF THIS PLAN SHALL ENSURE AND DEMONSTRATE COMPLIANCE WITH APPLICABLE STATE AND/OR LOCAL WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS.

ANY AND ALL SANITARY SEWAGE SHALL BE DISCHARGED TO THE EXISTING AND/OR PROPOSED SANITARY SEWER SYSTEM CONSTRUCTED PER IEPA AND LOCAL STANDARDS.

D. APPROVED STATE OR LOCAL PLANS

(I) THE MANAGEMENT PRACTICES, CONTROLS, AND OTHER PROVISIONS CONTAINED IN THIS PLAN ARE AT LEAST AS PROTECTIVE AS THE REQUIREMENTS CONTAINED IN THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY'S STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL DATED OCTOBER 1987, ILLINOIS PROCEDURES AND STANDARDS FOR URBAN SOIL EROSION AND SEDIMENTATION PLAN, AND THE MUNICIPAL SUBDIVISION ORDINANCE. REQUIREMENTS SPECIFIED IN SEDIMENT AND EROSION CONTROL SITE PLANS, STORMWATER MANAGEMENT SITE PLANS OR SITE PERMITS APPROVED BY LOCAL OFFICIALS THAT ARE APPLICABLE TO PROTECTING SURFACE WATER RESOURCES ARE, UPON SUBMITTAL OF AN NOI, TO BE AUTHORIZED TO DISCHARGE UNDER THIS PERMIT, INCORPORATED BY REFERENCE AND ARE ENFORCEABLE UNDER THIS PERMIT EVEN IF THEY ARE NOT SPECIFICALLY INCLUDED IN THE PLAN.

3. MAINTENANCE

THE FOLLOWING IS A DESCRIPTION OF PROCEDURES THAT WILL BE USED TO MAINTAIN, IN GOOD AND EFFECTIVE OPERATING CONDITIONS, VEGETATION, EROSION AND SEDIMENT CONTROL MEASURES AND OTHER PROTECTIVE MEASURES IDENTIFIED IN THIS PLAN AND THE STANDARD SPECIFICATIONS.

A. STABILIZED CONSTRUCTION ENTRANCE: THE ENTRANCE SHALL BE MAINTAINED TO PREVENT TRACKING OF SEDIMENT ONTO PUBLIC STREETS. THIS WILL BE DONE BY TOP DRESSING WITH ADDITIONAL STONES, REMOVING AND REPLACING TOP LAYER OF STONES OR WASHING THE ENTRANCE. THE SEDIMENT WASHED ON THE PUBLIC RIGHT-OF-WAY WILL BE REMOVED IMMEDIATELY.

B. VEGETATIVE EROSION CONTROL MEASURES: THE VEGETATIVE GROWTH OF TEMPORARY AND PERMANENT SEEDING, SODDING, VEGETATIVE CHANNELS, VEGETATIVE FILTER, ETC. SHALL BE MAINTAINED PERIODICALLY AND SUPPLIED WITH ADEQUATE WATERING AND FERTILIZER. THE VEGETATIVE COVER SHALL BE REMOVED AND RESEEDED AS NECESSARY.

C. SEDIMENTATION BASINS/TRAPS: SEDIMENT SHALL BE REMOVED WHEN 40-50 PERCENT OF THE TOTAL ORIGINAL CAPACITY OF THE SEDIMENT BASIN/TRAP IS FILLED WITH SEDIMENT. IN NO CASE SHALL THE SEDIMENT BE BUILT UP TO MORE THAN 1 FOOT BELOW THE CREST ELEVATION. AT THIS STAGE, THE BASIN SHALL BE CLEANED OUT TO RESTORE ITS ORIGINAL VOLUME.

D. SILT FENCE: THE DAMAGED SILT FENCE SHALL BE RESTORED TO MEET THE STANDARDS OR REMOVED AND REPLACED AS NEEDED.

E. STRAW BALE BARRIER FILTERS: THE STRAW BALE BARRIER FILTER SHALL BE INSPECTED FREQUENTLY AND SHALL BE REPAIRED OR REMOVED AND REPLACED AS NEEDED.

F. RIP-RAP OUTLET PROTECTION: RIP-RAP OUTLET PROTECTION SHALL BE INSPECTED AFTER HIGH FLOWS FOR ANY SCOUR BENEATH THE RIP-RAP OR FOR STONES THAT HAVE BEEN DISLODGED. IT SHALL BE REPAIRED IMMEDIATELY AS NEEDED.

4. INSPECTIONS

THE OWNER OR OWNER'S REPRESENTATIVE SHALL PROVIDE QUALIFIED PERSONNEL TO INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE WHICH HAVE NOT BEEN FINALLY STABILIZED, STRUCTURAL CONTROL MEASURES, AND LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE. SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT THAT IS 0.5 INCHES OR GREATER OR EQUIVALENT SNOWFALL.

A. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM. EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN SHALL BE OBSERVED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATERS. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE INSPECTED FOR EVIDENCE OF OFF SITE SEDIMENT TRACKING.

B. BASED ON THE RESULTS OF THE INSPECTION, THE DESCRIPTION OF POTENTIAL POLLUTANT SOURCES IDENTIFIED IN SECTION 1 ABOVE AND POLLUTION PREVENTION MEASURES IDENTIFIED IN SECTION 2 ABOVE SHALL BE REVISED AS APPROPRIATE AS SOON AS PRACTICABLE AFTER SUCH INSPECTION. ANY CHANGES TO THIS PLAN RESULTING FROM THE REQUIRED INSPECTIONS SHALL BE IMPLEMENTED WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE INSPECTION.

C. A REPORT SUMMARIZING THE SCOPE OF THE INSPECTION, NAME(S) AND QUALIFICATIONS OF PERSONNEL MAKING THE INSPECTION, THE DATE(S) OF THE INSPECTION, MAJOR OBSERVATIONS RELATING TO THE IMPLEMENTATION OF THIS STORMWATER POLLUTION PREVENTION PLAN, AND ACTIONS TAKEN IN ACCORDANCE WITH SECTION 4.B. SHALL BE MADE AND RETAINED AS PART OF THE PLAN FOR AT LEAST THREE (3) YEARS AFTER THE DATE OF THE INSPECTION. THE REPORT SHALL BE SIGNED IN ACCORDANCE WITH PART VI.G OF THE GENERAL NPDES PERMIT.

D. IF ANY VIOLATION OF THE PROVISIONS OF THIS PLAN IS IDENTIFIED DURING THE CONDUCT OF THE CONSTRUCTION WORK COVERED BY THIS PLAN, THE RESIDENT ENGINEER OR RESIDENT TECHNICIAN SHALL COMPLETE AND FILE AN "INCIDENCE OF NONCOMPLIANCE" (ION) REPORT FOR THE IDENTIFIED VIOLATION. THE RESIDENT ENGINEER OR RESIDENT TECHNICIAN SHALL USE FORMS PROVIDED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY AND SHALL INCLUDE SPECIFIC INFORMATION ON THE CAUSE OF NONCOMPLIANCE, ACTIONS WHICH WERE TAKEN TO PREVENT ANY FURTHER CAUSES OF NONCOMPLIANCE, AND A STATEMENT DETAILING ANY ENVIRONMENTAL IMPACT WHICH MAY HAVE RESULTED FROM THE NONCOMPLIANCE. ALL REPORTS OF NONCOMPLIANCE SHALL BE SIGNED BY A RESPONSIBLE AUTHORITY IN ACCORDANCE WITH PART VI. G OF THE GENERAL NPDES PERMIT. THE REPORT OF NONCOMPLIANCE SHALL BE MAILED TO THE FOLLOWING ADDRESS:

ALL PACKAGES:
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
ATTN: COMPLIANCE ASSURANCE SECTION
1021 NORTH GRAND AVENUE, EAST
SPRINGFIELD, IL 62794

ALL LETTERS:
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
ATTN: COMPLIANCE ASSURANCE SECTION
POST OFFICE BOX 19276
SPRINGFIELD, IL 62794-9276

5. NON-STORMWATER DISCHARGE

EXCEPT FOR FLOWS FROM FIRE FIGHTING ACTIVITIES, SOURCES OF NON-STORMWATER THAT MAY BE COMBINED WITH STORMWATER DISCHARGES ASSOCIATED WITH THE CONSTRUCTION ACTIVITY ADDRESSED IN THIS PLAN ARE DESCRIBED BELOW:

1. WATER MAIN FLUSHING
2. FIRE HYDRANT FLUSHING
3. WATERING FOR DUST CONTROL
4. IRRIGATION DRAINAGE FOR VEGETATIVE GROWTH FOR SEEDING, ETC.

THE FIRE HYDRANT AND WATER MAIN SHALL NOT BE FLUSHED DIRECTLY ONTO ANY EXPOSED PAVEMENT AREA OR SUBGRADE. HOSES SHALL BE USED TO DIRECT THE FLOW INTO THE STORM SEWER SYSTEM.

NPDES GENERAL CONTRACTOR CERTIFICATION

THIS CERTIFICATION STATEMENT IS A PART OF THE STORM WATER POLLUTION PREVENTION PLAN FOR THE PROJECT DESCRIBED BELOW, IN ACCORDANCE WITH NPDES GENERAL PERMIT NO. ILR10 AS ISSUED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY:

PROJECT TITLE: NVA TRUCKING FACILITY EXPANSION

PROJECT LOCATION: CRYSTAL LAKE (MUNICIPALITY) MCHENRY (COUNTY) ILLINOIS (STATE)

CONTRACTOR: _____

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE READ AND UNDERSTAND THE TERMS AND CONDITIONS OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT NO. ILR10 THAT AUTHORIZES STORMWATER DISCHARGES RESULTING FROM CONSTRUCTION ACTIVITIES AND THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).

SIGNATURE _____ DATE _____

NPDES SUBCONTRACTOR CERTIFICATIONS

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE READ AND UNDERSTAND THE TERMS AND CONDITIONS OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT NO. ILR10 AND THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND AGREE TO FOLLOW THE BEST MANAGEMENT PRACTICES DESCRIBED THEREIN FOR ANY WORK PERFORMED ON SITE.

SUBCONTRACTOR: _____
SCOPE OF WORK: _____
SIGNATURE _____ DATE _____

SUBCONTRACTOR: _____
SCOPE OF WORK: _____
SIGNATURE _____ DATE _____

SUBCONTRACTOR: _____
SCOPE OF WORK: _____
SIGNATURE _____ DATE _____

SUBCONTRACTOR: _____
SCOPE OF WORK: _____
SIGNATURE _____ DATE _____

SUBCONTRACTOR: _____
SCOPE OF WORK: _____
SIGNATURE _____ DATE _____

STORMWATER POLLUTION PREVENTION CONSTRUCTION AND MAINTENANCE SCHEDULE

EROSION/SEDIMENT CONTROL MEASURE	INSTALLATION SEQUENCE	MAINTENANCE FREQUENCY
TEMPORARY DIVERSION SWALE AND SILT TRAPS	PRIOR TO CLEARING AND GRADING	AS NEEDED
STONE STABILIZED CONSTRUCTION ENTRANCE	PRIOR TO CLEARING AND GRADING	AS NEEDED
SILT FENCE	PRIOR TO CLEARING AND GRADING	WEEKLY, AFTER STORM EVENTS AND AS NEEDED
EXISTING INLET PROTECTION	PRIOR TO CLEARING AND GRADING	WEEKLY, AFTER STORM EVENTS AND AS NEEDED
TREE PROTECTION	PRIOR TO CLEARING AND GRADING	WEEKLY, AFTER STORM EVENTS AND AS NEEDED
TEMPORARY DIVERSIONS	ALONG WITH ROUGH GRADING	WEEKLY, AFTER STORM EVENTS AND AS NEEDED
TEMPORARY SEEDING	AFTER ROUGH GRADING	WATER AS NEEDED
PERMANENT SEEDING, SOD, LANDSCAPING	AFTER FINISH GRADING	WATER AS NEEDED
EROSION CONTROL MATTING	AFTER FINISH GRADING	WEEKLY, AFTER STORM EVENTS AND AS NEEDED
INLET PROTECTION	AFTER EACH INLET IS CONSTRUCTED	WEEKLY, AFTER STORM EVENTS AND AS NEEDED
REMOVAL OF EROSION/SEDIMENT CONTROL MEASURES	AFTER ALL DISTURBED AREAS ARE STABILIZED	N/A

SEEDING CHART

STABILIZATION TYPE	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
PERMANENT SEEDING			A →			* →	* →		→		B →	
DORMANT SEEDING	B →											
TEMPORARY SEEDING			C →				D →		→			
SODDING			E ** →						→			
MULCHING	F →											

A. KENTUCKY BLUEGRASS 90 LBS/ACRE MIXED WITH PERENNIAL RYEGRASS 30 LBS/ACRE

B. KENTUCKY BLUEGRASS 135 LBS/ACRE MIXED WITH PERENNIAL RYEGRASS 45 LBS/ACRE + 2 TONS STRAW MULCH/ACRE

C. SPRING OATS 100 LBS/ACRE

D. WHEAT OR CEREAL RYE 150 LBS/ACRE

E. SOD

F. STRAW MULCH 2 TONS/ACRE

* IRRIGATION NEEDED DURING JUNE AND JULY

** IRRIGATION NEEDED FOR 2 TO 3 WEEKS AFTER APPLYING SOD

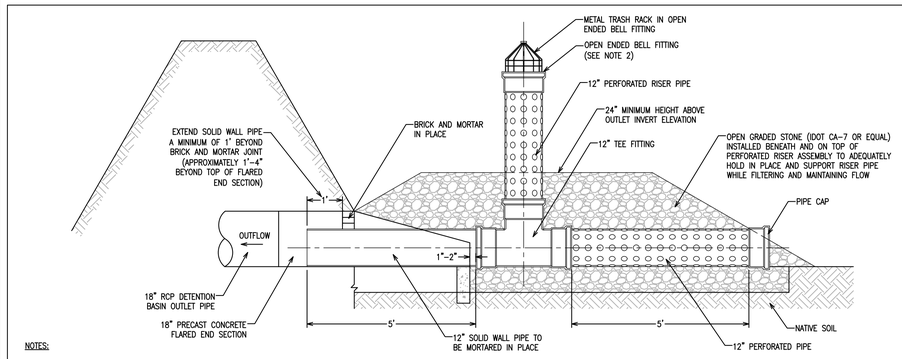
No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

STORMWATER POLLUTION PREVENTION PLAN
NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
www.jacobandhefner.com

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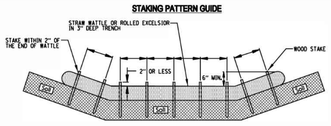
NOTES:

1. ALL PIPES AND FITTINGS SHALL BE P.V.C. OR H.D.P.E UNLESS OTHERWISE NOTED.
2. TOP OF PERFORATED RISER PIPE SHALL BE SET 1'-0" BELOW DETENTION BASIN EMERGENCY OVERFLOW ELEVATION INDICATED ON THE PLANS.
3. TEMPORARY SEDIMENT BASIN AND RISER PIPE ASSEMBLY SHALL BE CONTINUOUSLY MAINTAINED DURING CONSTRUCTION OPERATIONS TO ENSURE PROPER FUNCTIONALITY. AT A MINIMUM, THE SEDIMENT BASIN AND RISER PIPE ASSEMBLY SHALL BE INSPECTED PRIOR TO FORECASTED RAIN EVENTS, AFTER EACH RAINFALL EVENT OF 0.5" OR GREATER AND DAILY DURING EXTENDED RAIN EVENTS. ACCUMULATED SEDIMENT AND DEBRIS SHALL BE REMOVED PERIODICALLY AS WARRANTED BY SITE CONDITIONS.

TEMPORARY SEDIMENT BASIN OUTLET DETAIL

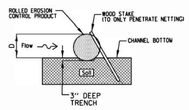
ROLLED EROSION CONTROL PRODUCTS

STAKING PATTERN GUIDE



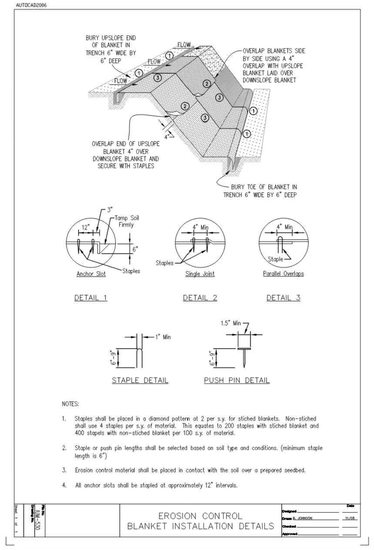
NOTES:
1. OVERLAP MINIMUM IS THE DIAMETER OF THE ROLL.
2. 4' SPACING FOR WATTLES.
3. 2' SPACING FOR ROLLED EXCELSIOR.
4. OR SPACE ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

STAKE DETAIL



NOTES:
1. DRAWINGS ARE NOT TO SCALE.
2. ENDS OF WATTLES OR ROLLED EXCELSIOR SHALL BE TURNED AT LEAST 6" UPSLOPE.
3. RECOMMENDED STAKES ARE 1 1/8" WIDE X 1 1/8" THICK X 30" LONG.
4. STAKES SHALL NOT EXTEND ABOVE THE STRAW WATTLE MORE THAN 2".
5. SPACING THE TOE OF THE UPSTREAM DITCH CHECK SHALL CREATE A HORIZONTAL LINE WITH THE TOP OF THE DOWNSTREAM DITCH CHECK.

REFERENCE		STANDARD DWG. NO.
Project		IUM-514
Designed ____ Date ____	NRCS Natural Resources Conservation Service	SHEET 1 OF 1
Checked ____ Date ____		DATE 08-2-2019
Approved ____ Date ____		

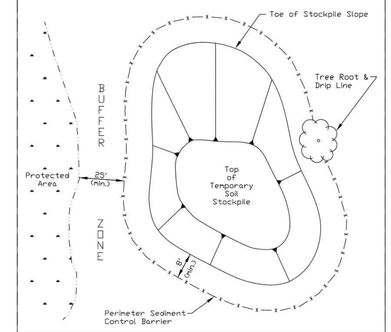


NOTES:

1. Staples shall be placed in a diamond pattern at 2 per s.y. for stiched blankets. Non-stiched shall use 4 staples per s.y. of material. This equates to 200 staples with stiched blanket and 400 staples with non-stiched blanket per 100 s.y. of material.
2. Staple or push pin lengths shall be selected based on soil type and conditions. (minimum staple length is 6")
3. Erosion control material shall be placed in contact with the soil over a prepared seedbed.
4. All anchor slots shall be stapled at approximately 12" intervals.

REFERENCE		STANDARD DWG. NO.
Project	EROSION CONTROL BLANKET INSTALLATION DETAILS	IUM-626
Designed ____ Date ____		SHEET 1 OF 1
Checked ____ Date ____		DATE JANUARY 2017
Approved ____ Date ____		

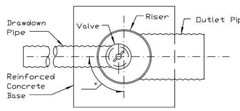
TEMPORARY SOIL STOCKPILE DETAIL



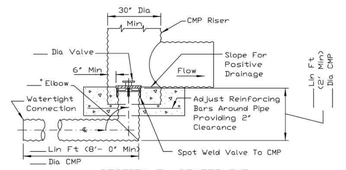
NOTES:
1. Stockpile slopes should be based on angle of repose of the soil material to avoid potential sloughing of the slope.
2. Soil stockpile to be stabilized in accordance with practical standards.
3. Do not locate stockpile within overland drainage flow path, designated floodways, drip line or over the root crown of adjacent trees.
4. Provisions for sediment control practices may be required along haul roads and entrance/exit locations for access the soil stockpile that can create flow path for stormwater runoff.
5. Installation of benches, terraces, or slope interrupters should be considered.
6. Avoid building soil stockpiles on impervious surfaces.
7. Linear sediment trap surrounding the stockpile base may be used to control sediment.

REFERENCE		STANDARD DWG. NO.
Project		IUM-627
Designed ____ Date ____	NRCS Natural Resources Conservation Service	SHEET 1 OF 1
Checked ____ Date ____		DATE JANUARY 2017
Approved ____ Date ____		

DRAIN DETAILS FOR PONDS WITH CMP RISERS USING 8", 10" & 12" VALVES



PLAN



SECTION ON CENTERLINE



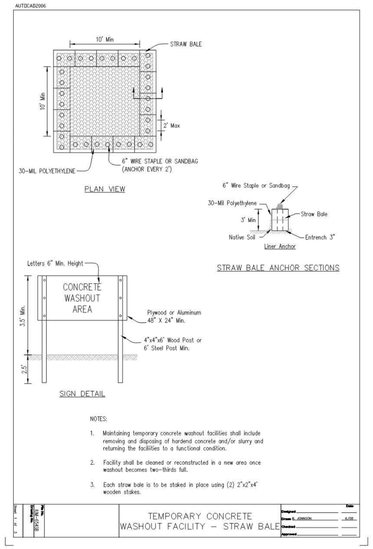
NOTE: Dimension "L" Equals Distance From Valve To Top Of Trash Rack Plus 4".

NOTE: Use Alfalfa Valve Similar To Thompsons Alfalfa Valve Or Waterman's Type 2 Alfalfa Frame And Valve, With Frame Welded To Drawdown Pipe As Shown.

Fabricate From 3/4" Pipe And 1/4" x 2" Strap Iron

VALVE WRENCH DETAIL

REFERENCE		STANDARD DWG. NO.
Project		IL-121
Designed ____ Date ____	NRCS Natural Resources Conservation Service	SHEET 1 OF 1
Checked ____ Date ____		DATE 3-1-95
Approved ____ Date ____		

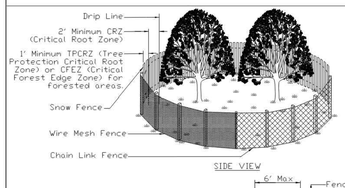


NOTES:

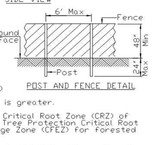
1. Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete and/or slurry and returning the facilities to a functional condition.
2. Facility shall be cleaned or reconstructed in a new area once washout becomes two-thirds full.
3. Each straw bale is to be staked in place using (2) 2"x2"x4" wooden stakes.

Revised:	Drawing Name	Drawing Number
	TEMPORARY CONCRETE WASHOUT FACILITY – STRAW BALE	IUM-690-A
		SHEET 1 OF 1
		DATE 09-14-2017

TREE PROTECTION - FENCING
(Moderately Urbanized to Open Space Areas)



SIDE VIEW



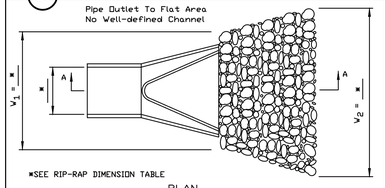
POST AND FENCE DETAIL

NOTES:

1. Call JULIE (800-892-0123) for the location of existing utilities 48 hours prior to commencement of work.
2. The CRZ is located 2' from the farthest outreaching branch (drip edge) or the distance as determined by the ISA trunk diameter method or whichever is greater.
3. The fence shall be located 1' from the Critical Root Zone (CRZ) of the protected tree, thus creating the Tree Protection Critical Root Zone (TPCRZ) and the Critical Forest Edge Zone (CFEZ) for forested areas.
4. Fence Posts shall be either 6' steel posts @ 1.33Lbs./Ft. or 2" x 2" nominal wood posts.
5. For projects without highly significant or historical trees and that will last for no less than 6 months duration, a non-treated wood lath snow fence or wire mesh fencing shall be used with appropriate posts that are securely anchored into the ground. For projects over 6 months in duration or trees considered significant or historical, a chain link fence with Construction Specification Chain Link Fence IUM 91 or better (as approved by the local forester per local ordinances singularly or in tandem with the project Engineer) shall be used. Fencing shall be a minimum height of 4'. For chain link fencing, metal posts shall be placed 6' on center (OC) and the fencing securely anchored to the post.
6. Outside the TPCRZ or CFEZ, erosion and sediment control measures shall be installed to prevent sediment reaching the TPCRZ or the CFEZ. These measures shall extend out from the fence 10' and shall be continuous around the perimeter of the fence. These measures include, but are not limited to vegetative filter strip, rolled excelsior blankets and mulch with a 3" to 5" depth. Other measures may be used if approved by the Professional Forester, Certified Arborist or Horticulturalist. Installation shall cause no disturbance to soils.

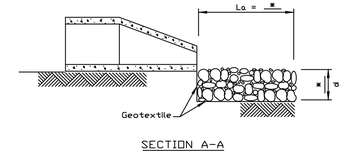
REFERENCE		STANDARD DWG. NO.
Project		IUM-690-A
Designed ____ Date ____		SHEET 1 OF 1
Checked ____ Date ____		DATE 09-14-2017
Approved ____ Date ____		

PIPE OUTLET TO FLAT AREA



■SEE RIP-RAP DIMENSION TABLE

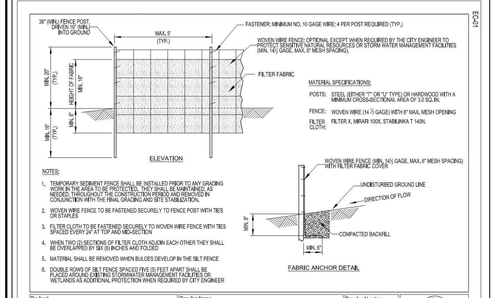
PLAN



SECTION A-A

NOTES:
1. The filter fabric shall meet the requirements in material specifications 592 GEOTEXTILE Table 1 or 2, class I, II or III .
2. The rock riprap shall meet the IDOT requirements for the following gradation: RR ■ , Quality ■ .
3. The riprap shall be placed according to construction specification 61 LOOSE ROCK RIPRAP. The rock may be equipment placed.

REFERENCE		STANDARD DWG. NO.
Project		IL-610
Designed ____ Date ____	NRCS Natural Resources Conservation Service	SHEET 1 OF 1
Checked ____ Date ____		DATE 9-15-93
Approved ____ Date ____		

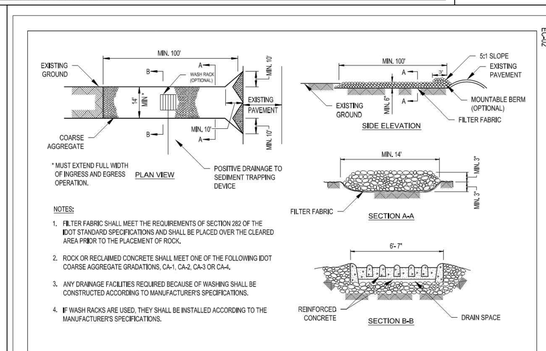


NOTES:

1. TEMPORARY SEDIMENT FENCE SHALL BE INSTALLED PRIOR TO ANY GRADING WORK IN AREAS TO BE PROTECTED. IT SHALL REMAIN IN EFFECT AS NEEDED THROUGHOUT CONSTRUCTION OPERATIONS AND REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POST WITH TIES OR STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID-SECTION
4. WHEN TWO (2) SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX (6) INCHES AND FOLDED
5. MATERIAL SHALL BE REMOVED WHEN BULGES DEVELOP IN THE SILT FENCE
6. DOUBLE ROWS OF SILT FENCE SPACED FIVE (5) FEET APART SHALL BE PLACED AROUND LIMITING STORMWATER MANAGEMENT FACILITIES OR WETLANDS AS ADDITIONAL PROTECTION WHEN REQUIRED BY CITY ENGINEER

Revised:	Drawing Name	Drawing Number	
1. 06/12/2015	SILT FENCE	EC-01	City of Crystal Lake Illinois
2.		Date: 12/4/2012	
3.		Drawn DD / Checked AW	
4.			

1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS

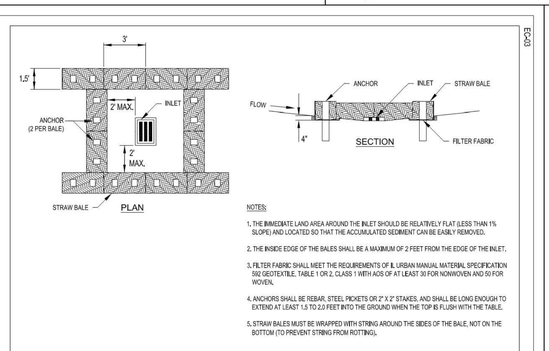


NOTES:

1. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF SECTION 282 OF THE IDOT STANDARD SPECIFICATIONS AND SHALL BE PLACED OVER THE CLEARED AREA PRIOR TO THE PLACEMENT OF ROCK.
2. ROCK OR RECLAIMED CONCRETE SHALL MEET ONE OF THE FOLLOWING IDOT COARSE AGGREGATE GRADATIONS, CA-1, CA-2, CA-3 OR CA-4.
3. ANY DRAINAGE FACILITIES REQUIRED BECAUSE OF WASHING SHALL BE CONSTRUCTED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. IF WASH RACKS ARE USED, THEY SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

Revised:	Drawing Name	Drawing Number	
1. 06/12/2015	CONSTRUCTION ENTRANCE	EC-02	City of Crystal Lake Illinois
2.		Date: 07/31/2012	
3.		Drawn DD / Checked AW	
4.			

1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS

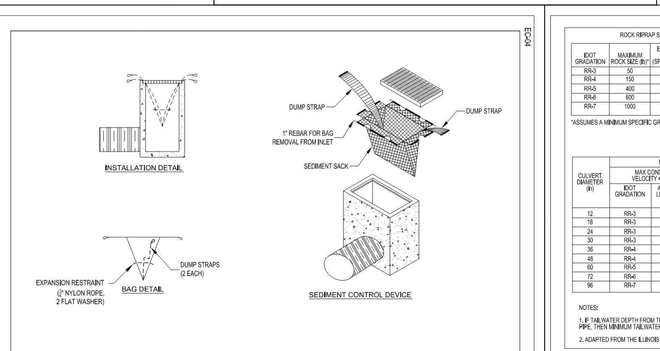


NOTES:

1. THE IMMEDIATE LAND AREA AROUND THE INLET SHOULD BE RELATIVELY FLAT (LESS THAN 1% SLOPE) AND LOCATED SO THAT THE ACCUMULATED SEDIMENT CAN BE EASILY REMOVED.
2. THE INSIDE EDGE OF THE BALES SHALL BE A MAXIMUM OF 2 FEET FROM THE EDGE OF THE INLET.
3. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF IL URBAN MANUAL MATERIAL SPECIFICATION 592 GEOTEXTILE, TABLE 1 OR 2, CLASS 1 WITH AOS OF AT LEAST 30 FOR NONWOVEN AND 50 FOR WOVEN.
4. ANCHORS SHALL BE REBAR, STEEL PICKETS OR 2" X 2" STAKES, AND SHALL BE LONG ENOUGH TO EXTEND AT LEAST 1.5 TO 2.0 FEET INTO THE GROUND WHEN THE TOP IS FLUSH WITH THE TABLE.
5. STRAW BALES MUST BE WRAPPED WITH STRING AROUND THE SIDES OF THE BALE, NOT ON THE BOTTOM (TO PREVENT STRING FROM ROTTING).

Revised:	Drawing Name	Drawing Number	
1. 06/12/2015	INLET PROTECTION STRAW BALE BARRIER	EC-03	City of Crystal Lake Illinois
2.		Date: 4/15/2007	
3.		Drawn EM / Checked AW	
4.			

1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS



Revised:	Drawing Name	Drawing Number	
1. 06/12/2015	INLET SEDIMENT CONTROL DEVICE	EC-04	City of Crystal Lake Illinois
2.		Date: 11/2/2007	
3.		Drawn EM / Checked AW	
4.			

1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS

ROCK RIPRAP SPECIFICATIONS AND BEDDING

IDOT GRADATION	MAXIMUM ROCK SIZE (ft)*	EQUIVALENT DIAMETER (SPHERICAL) (ft)*	MINIMUM BEDDING THICKNESS (in)	MINIMUM THICKNESS (in)
RR3	50	10	-	8
RR4	150	15	8	16
RR5	400	21	8	22
RR6	600	24	10	26
RR7	1000	28	12	30

*ASSUMES A MINIMUM SPECIFIC GRAVITY OF 2,650 AND A MINIMUM UNIT WEIGHT OF 153 lb/cf

ROCK RIPRAP SIZE REQUIREMENTS AND THICKNESS

CULVERT DIAMETER (ft)	MINIMUM TAILWATER: MAX CONDUIT VELOCITY = 5 fps: IDOT GRADATION	MINIMUM TAILWATER: MAX CONDUIT VELOCITY = 5 fps: APRON LENGTH (ft)	MINIMUM TAILWATER: MAX CONDUIT VELOCITY = 10 fps: IDOT GRADATION	MINIMUM TAILWATER: MAX CONDUIT VELOCITY = 10 fps: APRON LENGTH (ft)	MAXIMUM TAILWATER: MAX CONDUIT VELOCITY = 5 fps: IDOT GRADATION	MAXIMUM TAILWATER: MAX CONDUIT VELOCITY = 5 fps: APRON LENGTH (ft)	MAXIMUM TAILWATER: MAX CONDUIT VELOCITY = 10 fps: IDOT GRADATION	MAXIMUM TAILWATER: MAX CONDUIT VELOCITY = 10 fps: APRON LENGTH (ft)
12	RR3	10	RR3	12	RR3	12	RR3	15
18	RR3	14	RR4	16	RR3	12	RR3	16
24	RR3	16	RR4	20	RR3	14	RR4	17
30	RR3	18	RR4	22	RR3	16	RR4	20
36	RR4	20	RR6	24	RR3	16	RR4	22
48	RR4	24	RR6	28	RR4	20	RR4	24
60	RR5	32	RR6	36	RR4	22	RR5	28
72	RR6	40	RR6	44	RR5	24	RR6	29
96	RR7	50	RR7	54	RR5	28	RR6	32

NOTES:

1. IF TAILWATER DEPTH FROM THE PIPE INVERT IS LESS THAN HALF THE DIAMETER OF THE PIPE, THEN MINIMUM TAILWATER CONDITIONS EXIST.
2. ADAPTED FROM THE ILLINOIS URBAN MANUAL

NOTES:

1. RIPRAP SHALL CONFORM TO SECT. 281 OF THE STANDARD SPECIFICATIONS.
2. INSTALL FILTER FABRIC UNDER ALL RIPRAP AND BEDDING. FILTER FABRIC SHALL CONFORM TO SECT. 282 OF THE STANDARD SPECIFICATIONS.

Revised:	Drawing Name	Drawing Number	
1.	RIPRAP DETAILS	UD-02e	City of Crystal Lake Illinois
2.		Date: 08/27/2015	
3.		Drawn DD / Checked AW	
4.			

1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS

STORMWATER POLLUTION PREVENTION PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
www.jacobandhefner.com

G985

N.T.S.

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TR-03

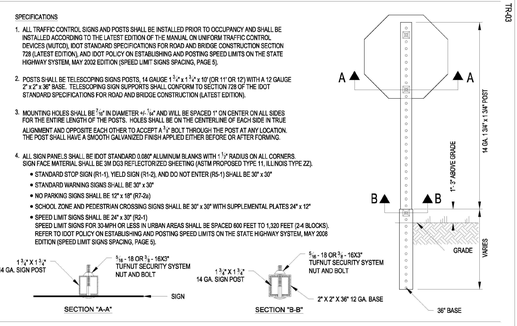
SPECIFICATIONS

1. ALL TRAFFIC CONTROL SIGNS AND POSTS SHALL BE INSTALLED PRIOR TO OCCUPANCY AND SHALL BE INSTALLED ACCORDING TO THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), IDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SECTION 728 (LATEST EDITION), AND IDOT POLICY ON ESTABLISHING AND POSTING SPEED LIMITS ON THE STATE HIGHWAY SYSTEM, MAY 2002 EDITION (SPEED LIMIT" SIGNS SPACING, PAGE 5).

2. POSTS SHALL BE TELESCOPING SIGNS POSTS, 14 GAUGE 1 ¾"x 1 ¾"x 15' (OR 17' OR 12') WITH A 12 GAUGE 2" x 2" x 36" BASE. TELESCOPING SIGN SUPPORTS SHALL CONFORM TO SECTION 728 OF THE IDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (LATEST EDITION).

3. MOUNTING HOLES SHALL BE ⅜" IN DIAMETER +/- ⅛" AND WILL BE SPACED 1" ON CENTER ON ALL SIDES FOR THE ENTIRE LENGTH OF THE POSTS. HOLES SHALL BE ON THE CENTERLINE OF EACH SIDE IN TRUE ALIGNMENT AND OPPOSITE EACH OTHER TO ACCEPT A ⅜" BOLT THROUGH THE POST AT ANY LOCATION. THE POST SHALL HAVE A SMOOTH GALVANIZED FINISH APPLIED EITHER BEFORE OR AFTER FORMING.

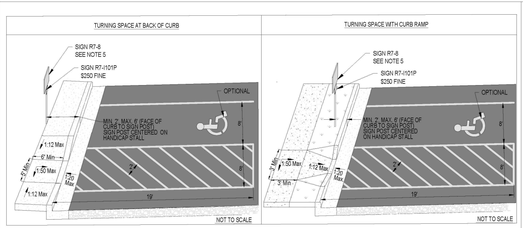
4. ALL SIGN PANELS SHALL BE IDOT STANDARD 0.080" ALUMINUM BLANKS WITH ⅛" RADIUS ON ALL CORNERS. SIGN FACE MATERIAL SHALL BE 3M DG3 RETROREFLECTORIZED SHEETING (ASTM PROPOSED TYPE 11, ILLINOIS TYPE ZZ).
   - STANDARD STOP SIGN (R1-1). YIELD SIGN (R1-2), AND DO NOT ENTER (R5-1) SHALL BE 30" x 30"
   - STANDARD WARNING SIGNS SHALL BE 30" x 30"
   - NO PARKING SIGNS SHALL BE 12" x 18" (R7-2a)
   - SCHOOL ZONE AND PEDESTRIAN CROSSING SIGNS SHALL BE 30" x 30" WITH SUPPLEMENTAL PLATES 24" x 12"
   - SPEED LIMIT SIGNS SHALL BE 24" x 30" (R2-1)
     SPEED LIMIT SIGNS FOR 30 MPH OR LESS IN URBAN AREAS SHALL BE SPACED 600 FEET TO 1,320 FEET (2-4 BLOCKS). REFER TO IDOT POLICY ON ESTABLISHING AND POSTING SPEED LIMITS ON THE STATE HIGHWAY SYSTEM, MAY 2008 EDITION (SPEED LIMIT SIGNS SPACING, PAGE 5).



Revised:	Drawing Name	Drawing Number
1. 06/12/2015	TRAFFIC CONTROL SIGN AND POST	TR-03
2.		Date: 04/15/2007
3.		Drawn EM / Checked AW
4.		City of Crystal Lake Illinois

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TR-06



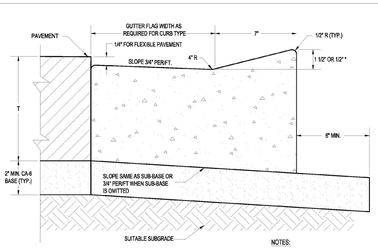
NOTES:

1. CONCRETE PARKING BUMPERS REQUIRED IF BARRIER CURB NOT PRESENT
2. REFER TO CURRENT EDITION OF THE ILLINOIS ACCESSIBILITY CODE, SECTION 502 PARKING SPACES
3. IF DEPRESSED CURB OPENING IS GREATER THAN 3.0 FEET, THE LANDING SHALL BE AS WIDE THE DEPRESSED OPENING.
4. MOUNT SIGNS SO BOTTOM OF R7-8 SIGN IS BETWEEN 5 FEET - 9 FEET ABOVE FINISH GRADE. MOUNT R7-1101P DIRECTLY BELOW.
5. TWO PARKING SPACES ARE PERMITTED TO SHARE A COMMON ACCESS AISLE IN PERPENDICULAR PARKING ONLY
6. PAVEMENT MARKINGS SHALL BE HIGH QUALITY YELLOW PAINT OR THERMOPLASTIC PER ILLINOIS ACCESSIBILITY CODE AND MUTCD.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	TYPICAL HANDICAP ACCESSIBLE PARKING STALL	TR-06
2. 3/22/2022 KL - Center sign, height, landing options specified.		Date: 06/01/2007
3.		Drawn EM / Checked AW
4.		City of Crystal Lake Illinois

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RD-04b



* ADJACENT TO CURB RAMP ACCESSIBLE TO THE DISABLED

NOTES:

1. THE TOP OF CURB SHALL BE DEPRESSED WHERE THE CURB AND GUTTER IS CONSTRUCTED ACROSS ALLEYS AND FOR PRIVATE DRIVES OR WHERE DIRECTED BY THE ENGINEER.
2. THICKNESS OF PAVEMENT "T". WHEN CURB AND GUTTER IS CONSTRUCTED ADJACENT TO FLEXIBLE PAVEMENT, THE VERTICAL THICKNESS OF THE GUTTER FLAG SHALL BE 9 INCHES. FOR B&M PAVEMENT SECTIONS THE FLAG SHALL BE THE SAME THICKNESS AS THE PAVEMENT.

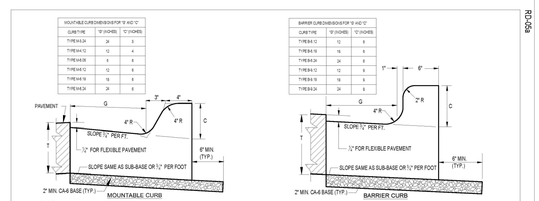
Revised:	Drawing Name	Drawing Number
1. 06/12/2015	DEPRESSED CURB: DETAIL	RD-04b
2.		Date: 01/30/15
3.		Drawn DD / Checked AW
4.		City of Crystal Lake Illinois

L:\ENGINEERING AND BUILDING\ENGINEERING\DETAILS AND STANDARDS\

RD-05a

VOLUTE/CURB CHEEK DESIGN FOR 'E' AND 'C'		
CURB TYPE	"B" (INCHES)	"C" (INCHES)
TYPE B-6.24	24	6
TYPE B-6.12	12	6
TYPE B-6.06	6	6
TYPE B-6.00	0	6
TYPE B-6.12	12	6
TYPE B-6.18	18	6
TYPE B-6.24	24	6

BARRIER CURB CHEEK DESIGN FOR 'B' AND 'C'		
CURB TYPE	"B" (INCHES)	"C" (INCHES)
TYPE B-6.12	12	6
TYPE B-6.18	18	6
TYPE B-6.24	24	6
TYPE B-6.12	12	6
TYPE B-6.18	18	6
TYPE B-6.24	24	6



NOTES:

THICKNESS - T - THICKNESS OF PAVEMENT WHEN CURB AND GUTTER IS CONSTRUCTED ADJACENT TO FLEXIBLE OR RIGID PAVEMENT. THE VERTICAL THICKNESS OF THE GUTTER FLAG SHALL BE 9". ALSO, TIE BARS SHALL BE OMITTED.

DRAINAGE OPENINGS - AT ALL LOCATIONS WHERE METAL CASTINGS ARE TO BE PLACED IN CURB AND GUTTER, THE CONTRACTOR SHALL FURNISH AND PLACE EXPANSION JOINT FILLER, CONFORMING TO THE CROSS SECTION OF THE CURB AND GUTTER. EXPANSION JOINT FILLER SHALL BE INSTALLED IN THE CURB AND GUTTER A DISTANCE OF 5 FT. FROM EACH SIDE OF THE METAL CASTING, WHEN THE WIDTH OF THE METAL CASTING IS LESS THAN THE WIDTH OF THE CURB AND GUTTER, 2- NO. 4 REBARS @ 12" c EXISTING CURB AND GUTTER SHALL BE DOWELED TO THE CONTINUOUS OF CONCRETE GUTTER IN FRONT OF THE CASTING.

TRANSITIONS - THE TRANSITION FROM FULL HEIGHT CURB TO DEPRESSED CURB SHALL BE MADE AT THE RATE OF 3" PER FOOT OF LENGTH OR FLATTER.

(2) - NO. 4 STEEL REINFORCING BARS SHALL BE INCORPORATED OVER TRENCH CROSSINGS IF REQUIRED BY THE CITY ENGINEER.

JOINTS - IN ADDITION TO THE REQUIREMENTS OF ARTICLE 606.06 OF THE STANDARD SPECIFICATIONS, JOINTS SHALL BE CONSTRUCTED AS FOLLOWS:

CONTRACTION JOINTS AND EXPANSION JOINTS SHALL BE INSTALLED IN THE CURB OR CURB AND GUTTER IN PROLONGATION WITH JOINTS IN ADJACENT P.C.C. PAVEMENT OR BASE COURSE.

WHEN CURB AND GUTTER IS CONSTRUCTED ADJACENT TO FLEXIBLE PAVEMENT, A ½ INCH PRE-FORMED EXPANSION JOINT FILLER, CONFORMING TO THE CROSS SECTION OF THE CURB AND GUTTER SHALL BE INSTALLED AT CONTRACTION JOINTS. FOR SHORT RADII OR SHALL BE INSTALLED AT CONTRACTION JOINTS SHALL BE PLACED BETWEEN EXPANSION JOINTS AT DISTANCES NOT TO EXCEED 15 FEET.

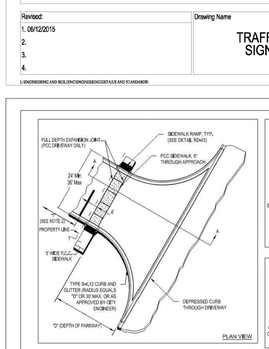
ALL CONTRACTION JOINTS SHALL BE PROVIDED WITH A 12" DIA. X 18" DOWELED SLIP-FORM CURB, GUTTER AND PAVEMENT SHALL BE DOWELED PER IDOT SPECIFICATIONS. THE DOWEL BAR SHALL BE FITTED WITH A CAP HAVING A PINCHED STOP THAT WILL PROVIDE 1" OF EXPANSION.

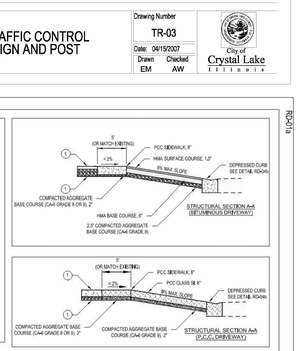
ALL CONSTRUCTION JOINTS SHALL BE PROVIDED WITH 1" DIA. DEFORMED STEEL TIE BARS 30" LONG SUSPENDED TWO LAYERS DEEP OF WIRE. TIE BARS SHALL BE PLACED ON 9" CENTERS (MINIMUM 3 PER JOINT)

EXPANSION JOINTS SHALL BE PLACED AT INTERVALS NOT TO EXCEED 100 FEET.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	CURB: CONCRETE CURB AND GUTTER	RD-05a
2. KL 1/25/2021 M-4.12 ADDED		Date: 08/21/2018
3.		Drawn DD / Checked AW
4.		City of Crystal Lake Illinois

RD-05b





NOTES:

1. MAX. CONSTRUCTED APPROACH GRADE = 8%. APPROACH SHALL BE DESIGNED AT 6% UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
2. FOR THICKNESS OF PAVEMENT "T". VERTICAL THICKNESS OF THE GUTTER FLAG SHALL BE A MINIMUM OF 9 INCHES. FOR HMA BASE COURSE PAVEMENT SECTIONS THE GUTTER FLAG SHALL BE SAME THICKNESS AS PAVEMENT STRUCTURE.
3. TRANSITION FROM FULL CURB TO DEPRESSED CURB IN 2 LINEAL FEET, WHEN APPLICABLE.

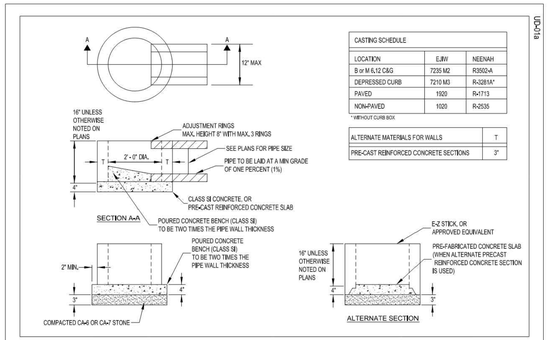
LEGEND:

(1) FOR PARKING LOT SEE UNIFIED DEVELOPMENT ORDINANCE, APPENDIX SECTION A-700L

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	DRIVEWAY: COMMERCIAL APPROACH	RD-01a
2. 02/25/2020		Date: 01/30/15
3. 08/18/2023 JRG - Update curb radius and transitions details		Drawn DD / Checked AW
4.		City of Crystal Lake Illinois

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UD-01a



CASTING SCHEDULE		
LOCATION	EJIW	NEENAH
B or M-6.12 C&G	7235 M2	R3502-A
DEPRESSED CURB	7210 M3	R-2281A*
PAVED	1920	R-4713
NON-PAVED	1020	R-2535

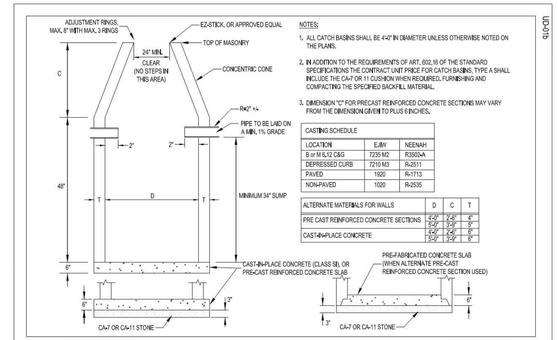
* WITHOUT CURB BOX

ALTERNATE MATERIALS FOR WALLS	T
PRE-CAST REINFORCED CONCRETE SECTIONS	3"

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	DRAINAGE STRUCTURES: INLET, TYPE A	UD-01a
2.		Date: 05/28/2015
3.		Drawn JH / Checked AW
4.		City of Crystal Lake Illinois

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UD-01b



NOTES:

1. ALL CATCH BASINS SHALL BE 4'-0" IN DIAMETER UNLESS OTHERWISE NOTED ON THE PLANS.
2. IN ADDITION TO THE REQUIREMENTS OF ART. 602.16 OF THE STANDARD SPECIFICATIONS THE CONTRACT UNIT PRICE FOR CATCH BASINS, TYPE A SHALL INCLUDE THE CA-7 OR 11 CUSHION WHEN REQUIRED, FURNISHING AND COMPACTING THE SPECIFIED BACKFILL MATERIAL.
3. DIMENSION "C" FOR PRECAST REINFORCED CONCRETE SECTIONS MAY VARY FROM THE DIMENSION GIVEN TO PLUS 6 INCHES.

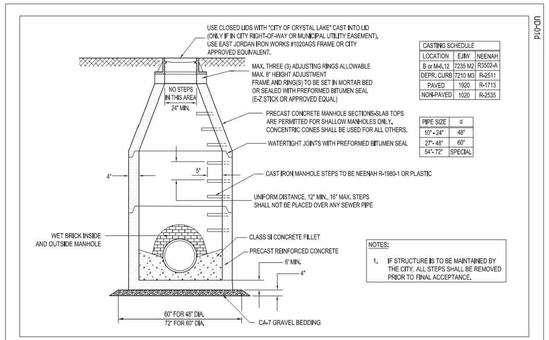
CASTING SCHEDULE		
LOCATION	EJIW	NEENAH
B or M-6.12 C&G	7235 M2	R3502-A
DEPRESSED CURB	7210 M3	R-2511
PAVED	1920	R-1713
NON-PAVED	1020	R-2535

ALTERNATE MATERIALS FOR WALLS	D	C	T
PRE CAST REINFORCED CONCRETE SECTIONS	4'-0"	2'-0"	4"
	5'-0"	2'-0"	5"
	6'-0"	2'-0"	6"
CAST-IN-PLACE CONCRETE	5'-0"	2'-0"	5"
	6'-0"	2'-0"	6"

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	CATCH BASIN TYPE A	UD-01b
2. 08/18/2023		Date: 09/18/2012
3.		Drawn DD / Checked AW
4.		City of Crystal Lake Illinois

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UD-01d



CASTING SCHEDULE	
PIPE SIZE	d
12" - 24"	48"
27" - 48"	60"
54" - 72"	SPECIAL

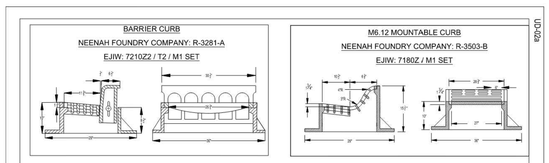
NOTES:

1. IF STRUCTURE IS TO BE MAINTAINED BY THE CITY, ALL STEPS SHALL BE REMOVED PRIOR TO FINAL ACCEPTANCE.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	STORM MANHOLE TYPE A	UD-01d
2. 08/18/2023 JRG NOTE 1		Date: 05/19/2015
3.		Drawn JH / Checked AW
4.		City of Crystal Lake Illinois

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UD-02a

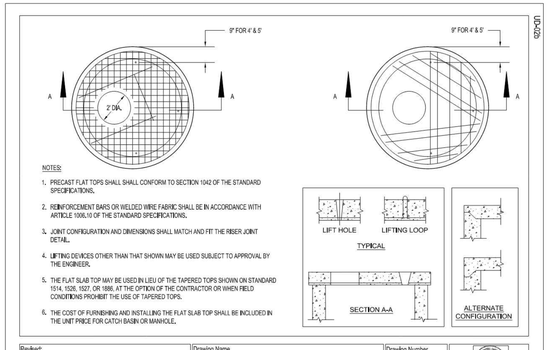


CITY REQUIREMENTS
1) CONCRETE MUST BE POURED A MINIMUM OF 6" AROUND THE CIRCUMFERENCE OF THE FRAME AND AT LEAST 6" BELOW THE FRAME TO ENSURE THAT THERE WILL BE NO INFILTRATION BETWEEN THE FRAME AND STRUCTURE.
2) FRAMES SHALL BE SET IN LINE WITH THE EDGE OF PAVEMENT.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	CURB INLET FRAME AND GRATE	UD-02a
2. 01/25/2021 KL ADDED R-3281-A, R-3503-B, AND R3501-P		Date: 5/28/2015
3.		Drawn JH / Checked AW
4.		City of Crystal Lake Illinois

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UD-02b



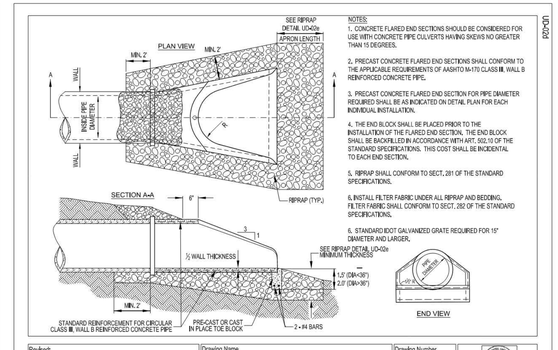
NOTES:

1. PRECAST FLAT TOPS SHALL SHALL CONFORM TO SECTION 1042 OF THE STANDARD SPECIFICATIONS.
2. REINFORCEMENT BARS OR WELDED WIRE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 1006.10 OF THE STANDARD SPECIFICATIONS.
3. JOINT CONFIGURATION AND DIMENSIONS SHALL MATCH AND FIT THE RISER JOINT DETAIL.
4. LIFTING DEVICES OTHER THAN THAT SHOWN MAY BE USED SUBJECT TO APPROVAL BY THE ENGINEER.
5. THE FLAT SLAB TOP MAY BE USED IN LIEU OF THE TAPERED TOPS SHOWN ON STANDARD 1514, 1526, 1527, OR 1886, AT THE OPTION OF THE CONTRACTOR OR WHEN FIELD CONDITIONS PROHIBIT THE USE OF TAPERED TOPS.
6. THE COST OF FURNISHING AND INSTALLING THE FLAT SLAB TOP SHALL BE INCLUDED IN THE UNIT PRICE FOR CATCH BASIN OR MANHOLE.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	ECCENTRIC FLAT TOPS FOR CURB INLET STORM MANHOLES	UD-02b
2.		Date: 01/30/15
3.		Drawn DD / Checked AW
4.		City of Crystal Lake Illinois

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UD-02d



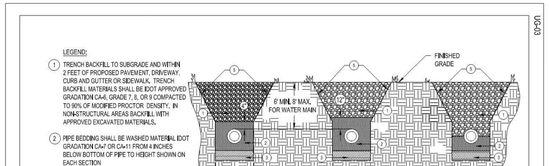
NOTES:

1. CONCRETE FLARED END SECTIONS SHOULD BE CONSIDERED FOR USE WITH CONCRETE PIPE CULVERTS HAVING SKEWS NO GREATER THAN 15 DEGREES.
2. PRECAST CONCRETE FLARED END SECTIONS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-170 CLASS III, WALL B REINFORCED CONCRETE PIPE.
3. PRECAST CONCRETE FLARED END SECTION FOR PIPE DIAMETER REQUIRED SHALL BE AS INDICATED ON DETAIL PLAN FOR EACH INDIVIDUAL INSTALLATION.
4. THE END BLOCK SHALL BE PLACED PRIOR TO THE INSTALLATION OF THE FLARED END SECTION. THE END BLOCK SHALL BE BACKFILLED IN ACCORDANCE WITH ART. 502.10 OF THE STANDARD SPECIFICATIONS. THIS COST SHALL BE INCIDENTAL TO EACH END SECTION.
5. RIPRAP SHALL CONFORM TO SECT. 281 OF THE STANDARD SPECIFICATIONS.
6. INSTALL FILTER FABRIC UNDER ALL RIPRAP AND BEDDING. FILTER FABRIC SHALL CONFORM TO SECT. 282 OF THE STANDARD SPECIFICATIONS.
7. STANDARD IDOT GALVANIZED GRATE REQUIRED FOR 15" DIAMETER AND LARGER.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	FLARED END SECTION (PRECAST CONCRETE PIPE)	UD-02d
2. 8/27/2015		Date: 04/15/2007
3.		Drawn DD / Checked AW
4.		City of Crystal Lake Illinois

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UG-03



LEGEND:

1. TRENCH BACKFILL TO SUBGRADE AND WITHIN 2 FEET OF PROPOSED PAVEMENT, DRIVEWAY, CURB AND GUTTER OR SIDEWALK, TRENCH BACKFILL MATERIALS SHALL BE IDOT APPROVED GRADATIONS CA-6, GRADE 7, 8, OR 9 COMPACTED TO 90% OF MODIFIED PROCTOR DENSITY. IN NON-STRUCTURAL AREAS BACKFILL WITH APPROVED EXCAVATED MATERIALS.
2. PIPE BEDDING SHALL BE WASHED MATERIAL IDOT GRADATIONS CA-7 OR CA-11 FROM 4 INCHES BELOW BOTTOM OF PIPE TO HEIGHT SHOWN ON EACH SECTION
3. UNSUITABLE MATERIAL TO BE REMOVED WHERE DIRECTED BY THE ENGINEER AND REPLACED WITH COMPACTED SUITABLE MATERIAL.
4. TRENCH WIDTH: PIPE O.D. + 12 INCHES MINIMUM PIPE O.D. + 18 INCHES MAXIMUM
5. CONTRACTORS SHALL COMPLY WITH ALL CURRENT OSHA STANDARDS.

* NOTE: ALL DUCTILE IRON SHALL BE WRAPPED WITH APPROVED POLYETHYLENE PIPE WRAP
** NOTE: PVC WATERMAIN ONLY ALLOWED FOR REPAIRS TO EXISTING PVC WATERMAIN

Revised:	Drawing Name	Drawing Number
1. 06/12/2015	TYPICAL TRENCH CROSS SECTION	UG-03
2. 02/04/2021 KL CA-7 WASHED STONE		Date: 05/29/2015
3. 07/14/2023 JRG PVC ALLOWED ONLY AS STATED		Drawn JH / Checked AW
4.		City of Crystal Lake Illinois

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No.	Description	Date
2.	PER CITY	12/20/23
1.	MASS GRADING SUBMITTAL	10/20/23

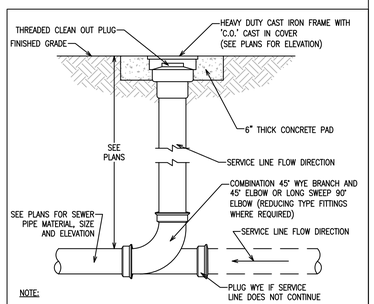
DETAILS

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
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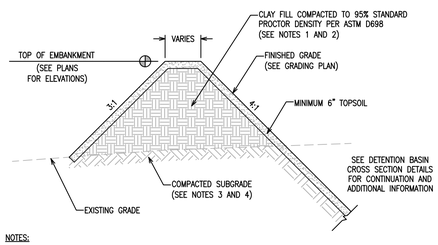
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NOTE:

1. SEE APPLICABLE DETAIL FOR PIPE BEDDING AND BACKFILL REQUIREMENTS.

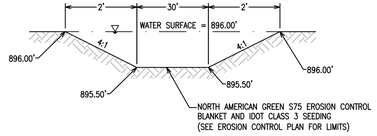
CLEAN OUT DETAIL



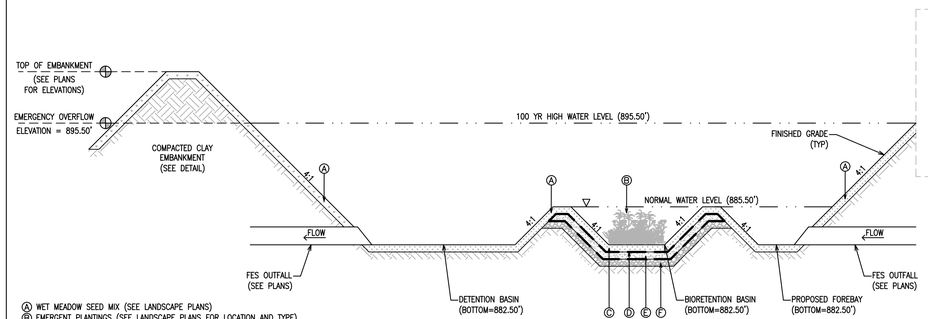
NOTES:

1. EMBANKMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 205 OF THE ILLINOIS DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," LATEST EDITION (IDOT STANDARD SPECIFICATIONS).
2. CLAY FILL MATERIALS REQUIRED FOR THE EMBANKMENT SHALL BE PLACED IN 8" MAXIMUM LIFTS OR AS OTHERWISE DIRECTED BY A LICENSED GEOTECHNICAL ENGINEER.
3. REMOVE ALL UNSUITABLE MATERIALS BELOW EMBANKMENT AND SCARIFY EXISTING SOIL PRIOR TO EMBANKMENT CONSTRUCTION.
4. POROSITY OF EXISTING SUBGRADE SOILS AND REMOVAL OF ANY UNSUITABLE MATERIALS SHALL BE WITNESSED AND APPROVED BY A LICENSED GEOTECHNICAL ENGINEER PRIOR TO EMBANKMENT CONSTRUCTION. ALL PERMEABLE SUBGRADE SOILS ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH CLAY FILL MATERIALS COMPACTED TO 90% MODIFIED PROCTOR DENSITY PER ASTM D1557.

COMPACTED CLAY EMBANKMENT DETAIL

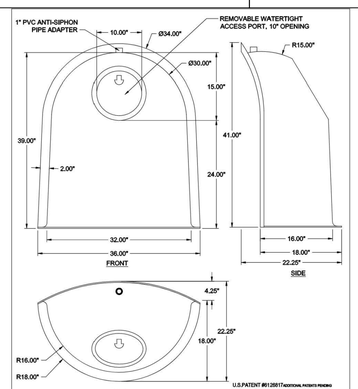


WEST POND EMERGENCY OVERFLOW WEIR DETAIL



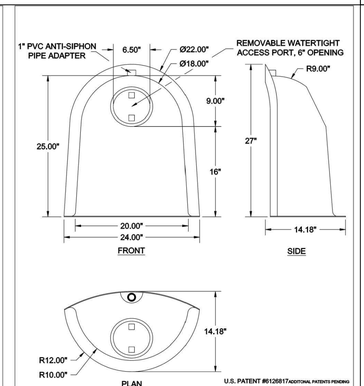
(A) WET MEADOW SEED MIX (SEE LANDSCAPE PLANS)
(B) EMERGENT PLANTINGS (SEE LANDSCAPE PLANS FOR LOCATION AND TYPE)
(C) 8" ENGINEERED SOIL BED (WITH 2" MUSHROOM COMPOST MIXED INTO TOP 6")
(D) THRACE LINQ 160EX NON-WOVEN NEEDLE PUNCH FABRIC
(E) 18" SAND FILTRATION MEDIA – IDOT FA-2
(F) 8" WASHED GRAVEL, IDOT CA-4

WEST BIORETENTION AND DETENTION BASIN CROSS SECTION DETAIL



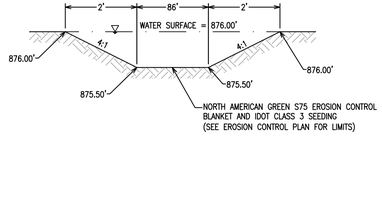
DESIGNED TO FIT 60"-72" DIAM. STRUCTURES

BMP, INC. 53 MT. ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 FAX: (860)434-3195		
DESCRIPTION	DATE	SCALE
30R SNOUT OIL & DEBRIS STOP	10/04/99	NONE
	DRAWING NUMBER	30R

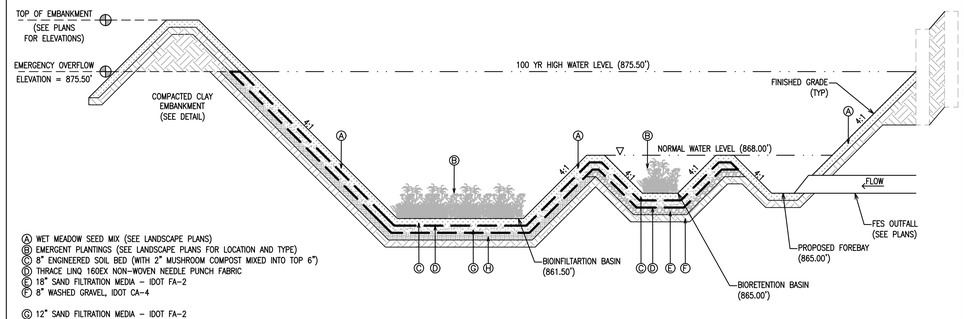


DESIGNED TO FIT 48"-60" DIAM. STRUCTURES

BMP, INC. 53 MT. ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 FAX: (860)434-3195		
DESCRIPTION	DATE	SCALE
18R SNOUT OIL & DEBRIS STOP	09/06/99	NONE
	DRAWING NUMBER	18R



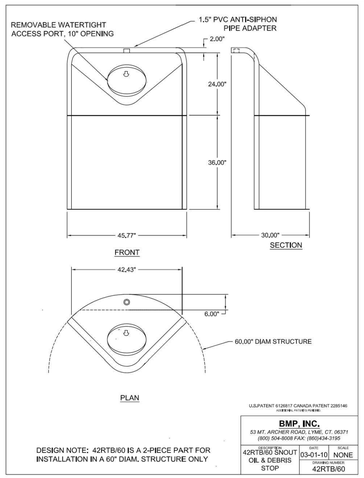
EAST POND EMERGENCY OVERFLOW WEIR DETAIL



(A) WET MEADOW SEED MIX (SEE LANDSCAPE PLANS)
(B) EMERGENT PLANTINGS (SEE LANDSCAPE PLANS FOR LOCATION AND TYPE)
(C) 8" ENGINEERED SOIL BED (WITH 2" MUSHROOM COMPOST MIXED INTO TOP 6")
(D) THRACE LINQ 160EX NON-WOVEN NEEDLE PUNCH FABRIC
(E) 18" SAND FILTRATION MEDIA – IDOT FA-2
(F) 8" WASHED GRAVEL, IDOT CA-4

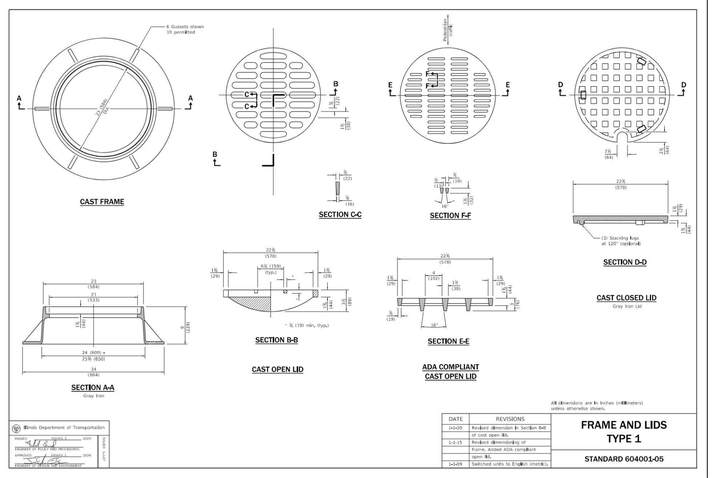
(G) 12" SAND FILTRATION MEDIA – IDOT FA-2
(H) 12" NATIVE SUBGRADE TO BE TILLED TO MITIGATE COMPACTION

EAST BIORETENTION AND BIOINFILTRATION BASIN CROSS SECTION DETAIL



DESIGN NOTE: 42RTB/60 IS A 2-PIECE PART FOR INSTALLATION IN A 60" DIAM. STRUCTURE ONLY

BMP, INC. 53 MT. ARCHER ROAD, LYME, CT. 06371 (800) 504-8008 FAX: (860)434-3195		
DESCRIPTION	DATE	SCALE
42RTB/60 SNOUT OIL & DEBRIS STOP	03-01-10	NONE
	DRAWING NUMBER	42RTB/60



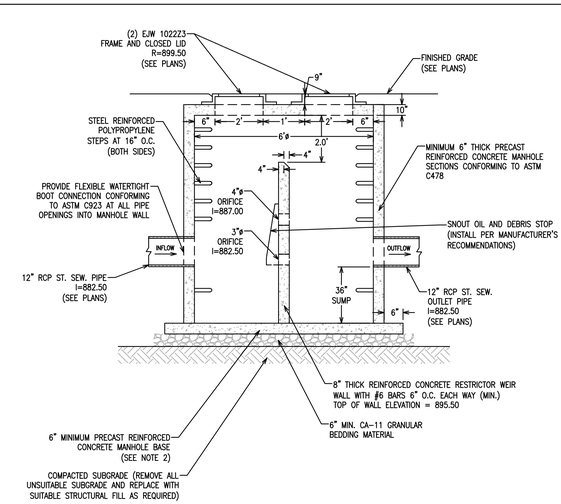
All dimensions are in inches (millimeters) unless otherwise shown.

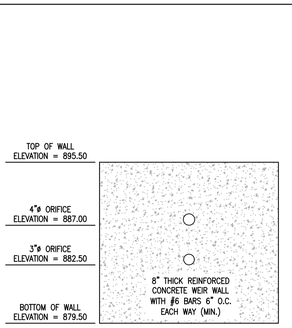
DATE	REVISIONS
2-0-01	Revised dimension B Section B-B at cast open lid.
2-0-15	Revised dimensioning of frame. Added ADA compliant open lid.
2-0-09	Switched units to English (metric).

Illinois Department of Transportation

FRAME AND LIDS TYPE 1
STANDARD 604001-05

RESTRICTOR CATCH BASIN #54 DETAIL





RESTRICTOR WEIR WALL

NOTES:

1. SEE PLANS FOR OUTLET CONTROL STRUCTURE LOCATION AND ORIENTATION.
2. PRECAST REINFORCED MONOLITHIC CONCRETE MANHOLE BOTTOM WITH INTEGRAL SIDEWALLS CAN BE SUBSTITUTED IN PLACE OF THE CONCRETE BOTTOM SLAB DESIGN SHOWN.
3. MANHOLE BARREL SECTIONS SHALL BE TONGUE AND GROOVE TYPE
4. CONTINUOUS LAYER OF NON-HARDENING, PREFORMED, BITUMINOUS, MASTIC MATERIAL (RAMNEK OR APPROVED EQUAL) SHALL BE APPLIED TO EACH MANHOLE JOINT TO PREVENT INFLOW.
5. ALL INTERIOR MANHOLE JOINTS SHALL BE MORTARED WITH HYDRAULIC CEMENT
6. FLAT-TOP REINFORCED CONCRETE SLAB SHALL BE DESIGNED FOR HS-20 TRAFFIC LOADING.
7. PRECAST CONCRETE ADJUSTING RINGS SHALL CONFORM TO ASTM C39 (COMPRESSIVE STRENGTH TEST). MAXIMUM ALLOWABLE HEIGHT FOR ADJUSTING RINGS SHALL BE 8".

RESTRICTOR CATCH BASIN #54 DETAIL

DETAILS

NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
www.jacobandhefner.com

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GE-02a

GENERAL SITE-WORK:

1. Pre-Construction meeting shall be conducted with City Staff and all Contractors prior to commencing any grading or underground utility construction activities (schedule meeting with the Community Development Department at 815-356-3605).
2. 24-hour Emergency contact numbers shall be provided to City Staff at the Pre-Construction meeting.
3. Working hours shall be limited to the hours of 7:00 a.m. and 7:00 p.m. on weekdays only (except in cases of emergency). Non-emergency work on weekends or holidays is not permitted per City Code except under written permission from the City Engineer. The owner is responsible for the City Inspector cost of overtime inspection beyond the normal eight (8) hour day, including weekends and holidays.
4. Public/private streets shall be kept free of dirt and debris with regular cleaning, sweeping, and scraping conducted by the Contractor. Junk and debris shall not be allowed to accumulate, blow, or scatter onto streets or adjacent properties.
5. UTILITIES shall be contacted for utility locations on-site and in the adjacent rights-of-way.
6. Contractor shall provide and maintain fencing, barricades, traffic control signs, and other safeguarding measures during the course of all work to protect the public from the construction operations.
7. Maintain access to adjacent streets during construction. No closing of streets unless approval is first obtained from the agency with jurisdiction (City of Crystal Lake, McHenry County Department of Transportation, Illinois Department of Transportation, etc).
8. Any damage to public rights-of-way, public utilities, streets, curb, etc. shall be repaired/replaced as soon as possible and as directed by the City Engineer.
9. The contractor shall give the City of Crystal Lake, Illinois Department of Transportation, and any other governmental agency having jurisdiction, at least two (2) working days notice excluding Saturday and Sunday prior to the initiation of any phase of construction. Contractor shall immediately notify if construction has ceased and renew the two (2) workday day notification thereafter.
10. The Contractor shall be responsible for obtaining all required permits for construction prior to commencement along or across existing streets or highways. The Contractor shall make arrangements for the proper bracing, shoring and other protection of all roadways before construction begins.

GRADING:

1. The grading and construction of the site improvements shall not cause ponding of storm sewer water. All areas adjacent to these improvements shall be graded to allow positive drainage.
2. The proposed grading elevations shown on the plans are finished grade. A minimum of six (6) inches of topsoil is to be placed before finished grade elevations are achieved.
3. Embankment material within parkway and open space areas shall be compacted to a minimum of ninety percent (90%) of maximum density in accordance with ASTM Specification D-1557 (modified proctor method), or to such other density as may be determined appropriate by the soils engineer.
4. All subgrade material shall have a minimum CBR (California Bearing Ratio) of 3.0 as determined by the soils engineer, or base replacement and pavement design revisions shall be provided which are adequate to obtain equivalent pavement strength.
5. Proposed pavement areas, building pads, driveways and sidewalks and yard/open space areas shall be excavated or filled to plus or minus 0.1 foot of design subgrade elevations by the Contractor.
6. Any borrow pit locations shall be identified by the Contractor on a copy of the approved site plans and forwarded to the Engineering Division at least 24-hours prior to excavation. Provide backfill compaction reports from a geotechnical engineer and as-built plans to the Engineering Division for any borrow pit area.
7. Backfill shall be monitored by a geotechnical engineer on-site with compaction reports forwarded to the Engineering Division for review.
8. Water truck shall be on-site at all times during mass-grading operations and be available as needed for the purposes of dust control or at the request of City Staff.
9. Use of City fire hydrants is not allowed unless approved (separate from this permit) by the Public Works Department and a hydrant meter and RPZ is obtained from the City of Crystal Lake Water Division (815-356-3614). Only the City of Crystal Lake Water Division may operate valves and hydrants.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015 2. 3. 4.	STANDARD NOTES AND SPECIFICATIONS	GE-02a Date: 01/30/15 Drawn: DD, Checked: AW

City of Crystal Lake Illinois

1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS

GE-02b

TOPSOIL STOCKPILING:

1. Location of any on-site topsoil stockpiles shall be identified on the approved plans with silt fence installed around the perimeter of the stockpile.
2. Topsoil stockpiled for future use shall be relatively free from large roots, sticks, weeds, brush, stones larger than one (1) inch diameter, or other litter and waste products including other extraneous materials not conducive to plant growth.
3. Topsoil shall be stockpiled in sequence to eliminate any re-handling or double movements by the Contractor. Failure to properly sequence the stockpiling operations shall not constitute a claim for additional compensation. No material shall be stockpiled in front yards, in utility easements, or in the right-of-way lines.
4. If a stockpile is to remain in place for more than (14) calendar days, it is required that the stockpile meet the requirements as outlined in section 555 of the City Code.

UNDERGROUND UTILITY:

1. The Contractor shall coordinate water main, water service, sanitary and storm sewer inspections and testing with the Community Development at least 24 hours in advance.
2. All main line sanitary shall be cleaned and televised (provide DVD to the City's Engineering Division).
3. All manhole or valve covers shall be imprinted "City of Crystal Lake Sanitary", or "City of Crystal Lake Storm", or "City of Crystal Lake Water" as directed by the City.
4. Reference the latest edition of the Standard Specifications for Water and Sewer Main Construction in Illinois.
5. Existing manholes to be circular cored and booted.

EROSION CONTROL:

1. All specified erosion control measures shall be installed and maintained per the requirements of the Crystal Lake Stormwater Ordinance in accordance with the active NPDES permit.
2. All slopes 4:1 or steeper shall be sodded or blanketed immediately after mass earthwork.
3. All overland flow routes to be stabilized by sod or blanket.
4. Erosion control measures to be inspected and approved by City Engineering Division prior to additional work on site.
5. Continuous monitoring of erosion control measures is required. Maintain records of weekly reports per the City of Crystal Lake Stormwater Ordinance.
6. The Contractor shall implement any additional erosion control measures deemed necessary by the City per the standards of the City Of Crystal Lake Stormwater Ordinance.
7. All storm sewer catch basins, sumps and/or retention basins provided are to be cleaned at the end of construction of the project prior to final acceptance. Cleaning may also be required during the course of the construction of the project if it is determined that the silt and debris traps are not properly functioning and their performance is impaired.
8. Rip-rap material RR 2 (6") - RR4 (18") shall be in accordance with Article 281
9. Projects of 1 Acre or greater must obtain an NPDES permit prior to commencement of any construction activity.

Revised:	Drawing Name	Drawing Number
1. 06/12/2015 2. 02/25/2020 3. 4.	STANDARD NOTES AND SPECIFICATIONS	GE-02b Date: 01/30/15 Drawn: DD, Checked: AW

City of Crystal Lake Illinois

1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS

GE-02c

WATER MAIN:

1. Water main shall be Ductile Iron.
   a) Ductile iron water main shall be Class 52 conforming to ANSI/AWWA C151/A21.51-09.
   b) Ductile iron fittings shall conform to ANSI/AWWA C153/A21.53 with mechanical joint gaskets.
2. All bolted connections shall be torqued to the manufacturer's specification. The Contractor shall verify the manufacturer's specification with an approved torque wrench.
3. Thrust blocking or Mega-Lug with Mega-Bond coating or pre-approved equal shall be installed on water mains at all bends, tees, elbows, etc. except as noted below.
4. Thrust blocks not permitted with 45 degree vertical bends in water main (these shall be restrained with Mega-Lug or pre-approved equal.
5. Ductile iron pipe shall be encased in polyethylene and shall conform with ANSI/AWWA C105/A21.10 - 10 and ASTM A674-10.
6. Minimum cover from finished grade to top of water main shall be six (6) feet. Maximum cover shall be eight (8) feet.
7. Water Main Tapst An Illinois licensed plumber is required for any water main tap..
8. All water mains shall be subjected to a 2 hour pressure and leakage test by the Contractor in accordance with City Detail UW-09A and UW-09B. Water mains shall be chlorinated in accordance with City Detail UW-09A.
9. The Underground Contractor shall consider incidental to the contract any chlorination and testing of existing water main where connections to and conclusion of such mains is indicated on the drawing.
10. For repairs to existing PVC watermains, see details UW-12 and UW-13

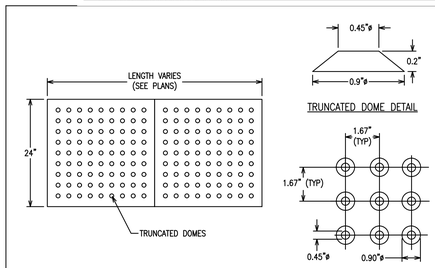
PAVING:

1. All subgrades and bases shall be proof-rolled and approved by the Engineering Division prior to base or binder installation.
2. Subgrade and proposed pavements shall be finished by the Excavation Contractor to within 0.1 foot plus or minus, of plan elevation.
3. The Paving Contractor shall ensure that the subgrade has been properly prepared and that the finished top of subgrade elevation has been graded within the tolerances allowed in these specifications. Unless the Paving Contractor advises the owner and engineer in writing prior to fine grading for base course construction, it is understood that the Contractor has approved and accepts responsibility for the subgrade.
4. For the purpose of providing handicap accessibility and complying with the American Disability Act and City Standards, curbs shall be depressed at locations where public walks or pedestrian paths intersect curb lines at street intersections and other locations as directed.
5. ½ Inch thick premolded fiber expansion joints with two (2) No. 4 dia.in round steel dowel bars shall be installed at designated intervals and at all P.C., P.T., curb returns and at the end of each pour. Alternate ends of the dowel bars shall be greased and fitted with metal expansion tubes.
6. ½ Inch thick fiber expansion joints shall be used in every case where the sidewalk coincides with the curb and gutter. Contraction joints shall be saw cut at designated intervals in the curb. The cost of these joints shall be considered as incidental to the cost of the contract.
7. All poured in place concrete curb and gutter shall incorporate two (2) No. 4 reinforcing bars installed wherever the curb and gutter crosses utility service lines, the cost of which shall be considered incidental to the cost of concrete curb and gutter.
8. Sidewalks (where required) shall be of the thickness and dimensions as shown in the construction plans. All sidewalk concrete shall be a minimum of 6.1 bag mix (or IDOT class SI concrete) and shall develop a minimum of 3,500 psi compressive strength at fourteen (14) days. Contraction joints shall be set at five (5) foot centers, and one-half inch (½ inch) premolded fiber expansion joints at fifty (50) foot centers and where the sidewalk meets the curb or another sidewalk, or at the end of each pour. All sidewalks constructed over utility trenches and/or abutting driveway aprons shall be reinforced with three (3) No. 4 reinforcing bars (10 foot minimum length).

Revised:	Drawing Name	Drawing Number
1. 06/12/2015 2. XL 01/25/2021 Torque Specification 3. 02/06/2023 JRG - Update Water Main Note 8 4. 07/14/2023 JRG - Update Water Main Notes 1, 5, 10	STANDARD NOTES AND SPECIFICATIONS	GE-02d Date: 01/30/15 Drawn: DD, Checked: AW

City of Crystal Lake Illinois

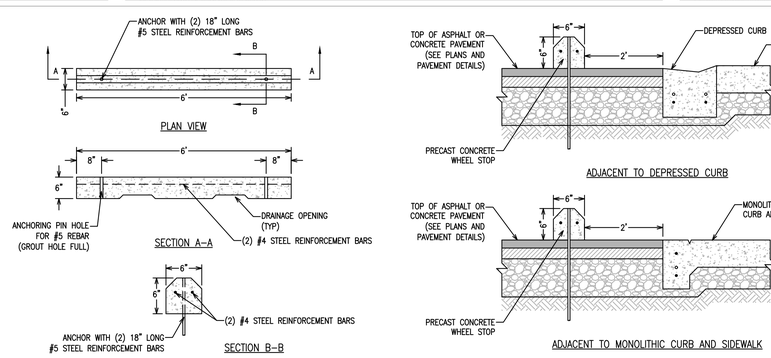
1. ENGINEERING AND BUILDING ENGINEERING DETAILS AND STANDARDS



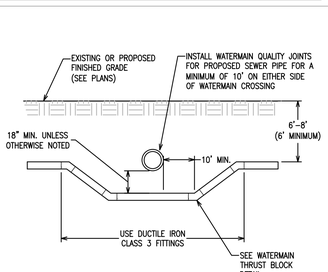
NOTES:

1. DETECTABLE WARNING PLATES SHALL BE EAST JORDAN INSERTS, HEAVY DUTY LOAD RATING, WITH BRICK RED POWDER COATING RAL3016 PER VILLAGE OF ROMEOVILLE REQUIREMENTS.
2. TILES SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

DETECTABLE WARNING DETAIL



CONCRETE WHEEL STOP DETAIL



NOTE:

1. ALL WATER MAIN AND SEWER PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION IN ILLINOIS," LATEST EDITION.

WATER MAIN LOWERING DETAIL

DETAILS

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
www.jacobandhefner.com

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N.T.S.

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GENERAL NOTES

1. ALL PAVING AND RELATED CONSTRUCTION SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION BY ILLINOIS DEPARTMENT OF TRANSPORTATION AND ALL AMENDMENTS THERETO AND IN ACCORDANCE WITH THE LATEST EDITION OF THE SUBDIVISION REGULATIONS OF THE MUNICIPALITY. IN CASE OF CONFLICT, THE MORE STRINGENT CODE SHALL TAKE PRECEDENCE.
2. ALL STORM SEWER, SANITARY SEWER AND WATER MAIN CONSTRUCTION SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS, LATEST EDITION, AND IN ACCORDANCE WITH THE CURRENT SUBDIVISION REGULATIONS OF THE MUNICIPALITY UNLESS OTHERWISE NOTED ON THE PLANS.
3. STANDARD SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND RECURRING SPECIAL PROVISIONS, CONSTRUCTION PLANS, AND SUBSEQUENT DETAILS ARE ALL TO BE CONSIDERED AS PART OF THE CONTRACT. INCIDENTAL ITEMS OR ACCESSORIES NECESSARY TO COMPLETE THIS WORK MAY NOT BE SPECIFICALLY NOTED BUT ARE CONSIDERED A PART OF THIS CONTRACT.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING THE UTILITY COMPANIES LOCATE THEIR FACILITIES IN THE FIELD PRIOR TO CONSTRUCTION AND SHALL ALSO BE RESPONSIBLE FOR THE MAINTENANCE AND PRESERVATION OF THESE FACILITIES. THE ENGINEER DOES NOT WARRANT THE LOCATION OF ANY EXISTING UTILITIES SHOWN ON THE PLAN. THE CONTRACTOR SHALL CALL J.U.L.I.E. AT 1-800-892-0123, AND THE MUNICIPALITY FOR UTILITY LOCATIONS.
5. NO CONSTRUCTION PLAN SHALL BE USED FOR CONSTRUCTION UNLESS SPECIFICALLY MARKED "FOR CONSTRUCTION." PRIOR TO COMMENCEMENT OF CONSTRUCTION THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AFFECTING THE WORK WITH THE ACTUAL CONDITIONS AT THE JOB SITE. IN ADDITION, THE CONTRACTOR MUST VERIFY THE ENGINEER'S LINE AND GRADE STAKES. IF THERE ARE ANY DISCREPANCIES WITH WHAT IS SHOWN ON THE CONSTRUCTION PLANS, HE MUST IMMEDIATELY REPORT SAME TO ENGINEER BEFORE DOING ANY WORK, OTHERWISE THE CONTRACTOR ASSUMES FULL RESPONSIBILITY. IN THE EVENT OF DISAGREEMENT BETWEEN THE CONSTRUCTION PLANS, SPECIFICATIONS AND/OR SPECIAL DETAILS, THE CONTRACTOR SHALL SECURE WRITTEN INSTRUCTION FROM THE ENGINEER PRIOR TO PROCEEDING WITH ANY PART OF THE WORK AFFECTED BY OMISSIONS OR DISCREPANCIES. FAILING TO SECURE SUCH INSTRUCTION, THE CONTRACTOR WILL BE CONSIDERED TO HAVE PROCEEDED AT HIS OWN RISK AND EXPENSE. IN THE EVENT OF ANY DOUBT OR QUESTIONS ARISING WITH RESPECT TO THE TRUE MEANING OF THE CONSTRUCTION PLANS OR SPECIFICATIONS, THE DECISION OF THE ENGINEER SHALL BE FINAL AND CONCLUSIVE.
6. NOTIFICATION OF COMMENCING CONSTRUCTION

   6.1. THE CONTRACTOR SHALL NOTIFY THE OWNER AND/OR HIS REPRESENTATIVE AND THE AFFECTED GOVERNMENTAL AGENCIES IN WRITING AT LEAST THREE FULL WORKING DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION. IN ADDITION, THE CONTRACTOR SHALL NOTIFY AS NECESSARY, ALL TESTING AGENCIES, EITHER MUNICIPALITY'S OR THE OWNER'S, SUFFICIENTLY IN ADVANCE OF CONSTRUCTION. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD WITH THE VILLAGE AND ENGINEER PRIOR TO THE START OF CONSTRUCTION.

   6.2. FAILURE OF CONTRACTOR TO ALLOW PROPER NOTIFICATION TIME WHICH RESULTS IN TESTING COMPANIES TO BE UNABLE TO VISIT SITE AND PERFORM TESTING WILL CAUSE CONTRACTOR TO SUSPEND OPERATION (PERTAINING TO TESTING) UNTIL TESTING AGENCY CAN SCHEDULE TESTING OPERATIONS. COST OF SUSPENSION OF WORK TO BE BORNE BY CONTRACTOR.
7. ALL CONTRACTORS SHALL KEEP ACCESS AVAILABLE AT ALL TIMES FOR ALL TYPES OF TRAFFIC. AT NO TIME SHALL ACCESS BE DENIED TO PROPERTIES SURROUNDING THE SITE.
8. ALL PROPOSED ELEVATIONS SHOWN ON THE PLANS ARE FINISHED SURFACE ELEVATIONS, UNLESS OTHERWISE SPECIFIED.
9. THE CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES UNTIL THEY ARE NO LONGER NEEDED. ANY STAKES DESTROYED OR DISTURBED BY THE CONTRACTOR PRIOR TO THEIR USE SHALL BE RESET AT CONTRACTOR'S COST.
10. ALL FRAMES AND LIDS FOR STORM AND SANITARY SEWER STRUCTURES ARE TO BE ADJUSTED TO MEET FINAL FINISH GRADE. THIS ADJUSTMENT IS TO BE MADE BY THE SEWER CONTRACTOR AND THE COST IS TO BE CONSIDERED INCIDENTAL. THESE ADJUSTMENTS TO FINISHED GRADE WILL NOT ALLEVIATE THE CONTRACTOR FROM ANY ADDITIONAL ADJUSTMENTS AS REQUIRED BY THE VILLAGE UPON FINAL INSPECTION OF THE PROJECT. FINAL GRADES TO BE DETERMINED BY THE VILLAGE AT THE TIME OF FINAL INSPECTION AND MAY VARY FROM PLAN GRADE.
11. ANY EXISTING SIGNS, LIGHT STANDARDS AND UTILITY POLES WHICH INTERFERE WITH CONSTRUCTION OPERATIONS AND NOT NOTED FOR DISPOSAL SHALL BE REMOVED AND RESET BY THE CONTRACTOR AT HIS OWN EXPENSE AS DIRECTED BY THE ENGINEER. ANY DAMAGE TO THESE ITEMS SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE TO THE SATISFACTION OF THE OWNER. ANY SIGNS NOT REQUIRED TO BE RESET, SHALL BE DELIVERED TO THE RESPECTIVE OWNERS.
12. REMOVAL OF SPECIFIED ITEMS, INCLUDING BUT NOT LIMITED TO, PAVEMENT, SIDEWALK, CURB, CURB AND GUTTER, CULVERTS, ETC. SHALL BE DISPOSED OF OFF-SITE BY THE CONTRACTOR AT HIS OWN EXPENSE. HE IS RESPONSIBLE FOR ANY PERMIT REQUIRED FOR SUCH DISPOSAL.
13. ALL FIELD TILE ENCOUNTERED DURING CONSTRUCTION OPERATIONS SHALL BE CONNECTED TO THE PROPOSED STORM SEWER SYSTEM OR SHALL BE RESTORED TO PROPER OPERATING CONDITION. A RECORD OF THE LOCATION OF ALL FIELD TILE OR DRAIN PIPE ENCOUNTERED SHALL BE KEPT BY THE CONTRACTOR AND TURNED OVER TO THE ENGINEER UPON COMPLETION OF THE PROJECT. THE COST OF THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED BY THE OWNER AND/OR PROJECT GOVERNING AUTHORITY.
14. ALL WORK PERFORMED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR AND HIS SURETY FOR A PERIOD OF 12 MONTHS FROM THE DATE OF FINAL ACCEPTANCE OF THE PROJECT. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ALL DEFECTS IN MATERIALS AND WORKMANSHIP OF WHATEVER NATURE DURING THAT PERIOD.
15. BEFORE ACCEPTANCE BY THE OWNER AND FINAL PAYMENT, ALL WORK SHALL BE INSPECTED BY THE OWNER OR HIS REPRESENTATIVE. FINAL PAYMENT WILL BE MADE AFTER ALL THE CONTRACTOR'S WORK HAS BEEN APPROVED AND ACCEPTED BY THE OWNER AND MUNICIPALITY.
16. UPON AWARDING OF THE CONTRACT AND WHEN REQUIRED BY THE MUNICIPALITY, THE CONTRACTOR SHALL FURNISH A LABOR, MATERIAL AND PERFORMANCE BOND AND INSURANCE IN THE AMOUNT REQUIRED BY THE MUNICIPALITY GUARANTEEING COMPLETION OF THE WORK. THE UNDERWRITER SHALL BE ACCEPTABLE TO THE MUNICIPALITY.
17. EASEMENTS FOR THE EXISTING UTILITIES, BOTH PUBLIC AND PRIVATE, AND UTILITIES WITHIN PUBLIC RIGHTS-OF-WAY ARE SHOWN ON THE PLANS ACCORDING TO KNOWN AVAILABLE RECORDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION IN THE FIELD OF THESE UTILITY LINES AND THEIR PROTECTION FROM DAMAGE DUE TO CONSTRUCTION OPERATIONS. IF EXISTING UTILITY LINES OF ANY NATURE ARE ENCOUNTERED WHICH CONFLICT WITH LOCATIONS OF THE NEW CONSTRUCTION, JACOB AND HEFNER ASSOCIATES, INC. IS RESPONSIBLE TO RESOLVE THE CONFLICT. JACOB AND HEFNER ASSOCIATES, INC. IS NOT RESPONSIBLE FOR THE COST OF CONSTRUCTION.
18. OWNER SHALL OBTAIN EASEMENTS AND PERMITS NECESSARY TO FACILITATE CONSTRUCTION OF THE PROPOSED UTILITIES. THE CONTRACTOR, HOWEVER, SHALL FURNISH ALL REQUIRED BONDS AND EVIDENCE OF INSURANCE NECESSARY TO SECURE THESE PERMITS.
19. THE CONTRACTORS SHALL PLAN THEIR WORK BASED ON THEIR OWN BORINGS, EXPLORATIONS AND OBSERVATIONS TO DETERMINE SOIL CONDITIONS AT THE LOCATION OF THE PROPOSED WORK.
20. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SAFETY ON THE JOB IN ACCORDANCE WITH OSHA REGULATIONS.
21. THE CONTRACTOR SHALL COLLECT AND REMOVE ALL CONSTRUCTION DEBRIS, EXCESS MATERIALS, TRASH, OIL AND GREASE RESIDUE, MACHINERY, TOOLS, STAKES OR LATH SET BY SURVEYORS FOR CONSTRUCTION, AND OTHER MISCELLANEOUS ITEMS WHICH WERE NOT PRESENT PRIOR TO PROJECT COMMENCEMENT AT NO ADDITIONAL EXPENSE TO THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ANY AND ALL PERMITS NECESSARY FOR THE HAULING AND DISPOSAL REQUIRED FOR CLEAN-UP AS DIRECTED BY THE ENGINEER OR OWNER. BURNING ON THE SITE IS NOT PERMITTED.
22. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE PROPER BARRICADING, WARNING DEVICES AND THE SAFE MANAGEMENT OF TRAFFIC AND PEDESTRIANS WITHIN THE AREA OF CONSTRUCTION. ALL SUCH DEVICES AND THEIR INSTALLATION SHALL CONFORM TO THE ILLINOIS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS, LATEST EDITION AND IN CONFORMANCE WITH REGULATIONS OF THE MUNICIPALITY OR D.O.T.
23. NO UNDERGROUND WORK SHALL BE COVERED UNTIL IT HAS BEEN APPROVED BY THE VILLAGE. APPROVAL TO PROCEED MUST BE OBTAINED FROM THE VILLAGE PRIOR TO INSTALLING PAVEMENT BASE, BINDER, SURFACE AND PRIOR TO POURING ANY CONCRETE AFTER FORMS HAVE BEEN SET.
24. ALL EXISTING UTILITIES OR IMPROVEMENTS, INCLUDING WALKS, CURBS, PAVEMENT AND PARKWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE PROMPTLY RESTORED TO THEIR RESPECTIVE ORIGINAL CONDITION.
25. AT THE CLOSE OF EACH WORKING DAY AND AT THE CONCLUSION OF CONSTRUCTION OPERATIONS, ALL DRAINAGE STRUCTURES AND FLOW LINES SHALL BE FREE FROM DIRT AND DEBRIS.
26. TREES NOT MARKED FOR REMOVAL SHALL BE CONSIDERED AS DESIGNATED TO BE SAVED AND SHALL BE PROTECTED UNDER THE PROVISIONS OF ARTICLE 201.05 OF THE STANDARD SPECIFICATIONS.
27. LIMB PRUNING SHALL BE PERFORMED UNDER THE SUPERVISION OF AN APPROVED LANDSCAPE ARCHITECT AND SHALL BE UNDERTAKEN IN A TIMELY FASHION SO AS NOT TO INTERFERE WITH CONSTRUCTION.
28. ALL LIMBS, BRANCHES, AND OTHER DEBRIS RESULTING FROM THIS WORK SHALL BE DISPOSED OF OFF-SITE BY THE CONTRACTOR AT HIS OWN EXPENSE.
29. ALL CUTS OVER ONE-INCH IN DIAMETER SHALL BE MADE FLUSH WITH THE NEXT LARGE BRANCH. WOUNDS OVER ONE-INCH IN DIAMETER SHALL BE PAINTED WITH AN APPROVED TREE PAINT.
30. ANY DEWATERING OF SEWER AND WATER TRENCHES AS WELL AS TEMPORARY SHEETING OR BRACING THAT MAY BE REQUIRED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL NOT BE CONSIDERED EXTRA WORK. IN THE EVENT THAT SOFT MATERIALS WITH UNCONFINED COMPRESSIVE STRENGTH LESS THAN 0.5 TSF ARE ENCOUNTERED IN SEWER AND WATER MAIN CONSTRUCTION, THE CONTRACTOR SHALL (UPON APPROVAL OF THE OWNER AND/OR ENGINEER) OVER-EXCAVATE TO A DEPTH OF AT LEAST ONE (1) FOOT BELOW THE BOTTOM OF THE PIPE AND BACKFILL WITH COMPACTED CRUSHED STONE, PROPERLY FORMED TO FIT THE BOTTOM OF THE PIPE.
31. CONTRACTOR SHALL RECORD VIDEO OF THE WORK AREA PRIOR TO CONSTRUCTION FOR THE PURPOSE OF DOCUMENTING EXISTING CONDITIONS. A COPY OF THE VIDEO SHALL BE PROVIDED TO THE VILLAGE.
32. TRENCH BACKFILL WILL BE REQUIRED TO THE FULL DEPTH ABOVE ALL UNDERGROUND UTILITIES WITHIN TWO FEET OF PROPOSED OR EXISTING PAVEMENTS, UTILITIES, BUILDINGS, AND SIDEWALKS. THE TRENCH BACKFILL SHALL BE DONE IN ACCORDANCE WITH IDOT STANDARD SPECIFICATIONS. THE TRENCH BACKFILL MATERIAL SHALL CONSIST OF CRUSHED GRAVEL CONFORMING TO IDOT GRADATION CA-7.
33. WHERE SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER, EXISTING DRAINAGE STRUCTURES AND SYSTEMS SHALL BE CLEANED OF DEBRIS AND PATCHED AS NECESSARY TO ASSURE INTEGRITY OF THE STRUCTURE.

GENERAL NOTES (CONT.)

34. HYDRANTS SHALL NOT BE FLUSHED DIRECTLY ONTO THE ROAD SUBGRADES. WHEREVER POSSIBLE, HOSES SHALL BE USED TO DIRECT THE WATER INTO STORM SEWERS. DAMAGE TO THE ROAD SUBGRADE OR LOT AREAS DUE TO EXCESSIVE WATER SATURATION AND/OR EROSION FROM HYDRANT FLUSHING OR FROM LEAKS IN THE WATER DISTRIBUTION SYSTEM, WILL BE THE RESPONSIBILITY OF THE CONTRACTOR FLUSHING OR USING THE HYDRANT TO MAKE ALL NECESSARY REPAIRS AT HIS EXPENSE. THE CONTRACTOR SHALL PROVIDE ALL CONSTRUCTION WATER AT HIS EXPENSE.
35. AFTER THE STORM SEWER SYSTEM HAS BEEN CONSTRUCTED THE CONTRACTOR SHALL PLACE EROSION CONTROL AT LOCATIONS SHOWN ON THE PLANS OR AS SELECTED IN THE FIELD BY THE ENGINEER. INLET PROTECTION (INLET BASKETS) SHALL BE INSTALLED IN EACH STRUCTURE AS SOON AS THE STRUCTURE INSTALLATION IS COMPLETE. THE PURPOSE OF THE EROSION CONTROL WILL BE TO MINIMIZE THE AMOUNT OF SILTATION, WHICH NORMALLY WOULD ENTER THE STORM SEWER SYSTEM FROM ADJACENT AND/OR UPSTREAM DRAINAGE AREAS.
36. EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH ILLINOIS URBAN MANUAL AND SHALL BE MAINTAINED BY THE CONTRACTOR AND SHALL REMAIN IN PLACE UNTIL A SUITABLE GROWTH OF GRASS ACCEPTABLE TO THE ENGINEER HAS BEEN DEVELOPED.
37. UPON PROJECT COMPLETION, THE CONTRACTOR SHALL PROVIDE FINAL RECORD DRAWINGS TO THE OWNER AND ENGINEER FOR REVIEW PRIOR TO ANY REQUEST FOR FINAL INSPECTION. AT A MINIMUM, THE RECORD DRAWINGS SHALL INDICATE THE FINAL LOCATION AND LAYOUT OF ALL SITE IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO, VERIFICATION OF ALL BUILDING PAD AND FINISHED FLOOR ELEVATIONS, UTILITY RIM AND INVERT ELEVATIONS, SPOT GRADE ELEVATIONS, LOCATIONS OF ALL WATER SERVICE B-BOXES, SANITARY SEWER SERVICES, AND STORM SEWER SERVICES AND SHALL INCORPORATE ALL FIELD DESIGN CHANGES INCLUDING THOSE APPROVED BY THE OWNER, ENGINEER AND/OR PROJECT GOVERNING AUTHORITY. RECORD DRAWINGS SHALL BE PREPARED BY OR UNDER THE DIRECT SUPERVISION OF A LICENSED PROFESSIONAL LAND SURVEYOR.
38. RECORD DRAWINGS SHALL BE SUBMITTED TO THE VILLAGE AT THE COMPLETION OF THE PROJECT AND PRIOR TO ACCEPTING THE IMPROVEMENTS.

EARTHWORK

1. TOPSOIL EXCAVATION

   A. TOPSOIL, ORGANIC MATERIAL, OR ANY OTHER UNSUITABLE MATERIALS SHALL BE REMOVED FROM AREAS REQUIRING STRUCTURAL FILL.

   B. PLACEMENT OF EXCAVATED MATERIAL SHALL BE DESIGNATED BY THE OWNER FOR FUTURE USE WITHIN AREAS TO BE LANDSCAPED OR AS FILL IN THE AREAS NOT REQUIRING STRUCTURAL FILL MATERIAL.

   C. EXCESS MATERIALS NOT UTILIZED AS FILL OR NOT STOCKPILED FOR FUTURE LANDSCAPING, SHALL BE COMPLETELY REMOVED FROM THE CONSTRUCTION SITE AND DISPOSED OF OFF-SITE BY THE CONTRACTOR.

2. EARTH EXCAVATION

   A. EXCAVATION OF EARTH AND OTHER MATERIALS, WHICH ARE SUITABLE FOR USE AS STRUCTURAL FILL SHALL BE WITHIN A TOLERANCE OF 0.05 FEET FOR PADS AND PAVEMENT, AT 0.1 FEET +/- OF THE PLAN SUBGRADE ELEVATIONS. THE +/- TOLERANCE WITHIN PAVEMENT AREAS UTILIZING EARTH MATERIALS SHALL "BALANCE" AS PART OF THE FINE GRADING OPERATION.

   B. PLACEMENT OF EARTH AND OTHER SUITABLE MATERIALS SHALL BE PLACED WITHIN THOSE AREAS REQUIRING STRUCTURAL FILL TO ACHIEVE THE PLAN SUBGRADE ELEVATIONS WITHIN A TOLERANCE OF 0.1 FEET +/-. THE FILL MATERIAL SHALL BE PLACED IN LOOSE LIFTS, NOT EXCEED EIGHT INCHES IN THICKNESS. THE WATER CONTENT SHALL BE ADJUSTED IN ORDER TO ACHIEVE THE REQUIRED COMPACTION. EARTH MATERIAL MAY BE PLACED WITHIN THOSE AREAS OF THE SITE NOT REQUIRING STRUCTURAL FILL, WITHIN THE PLAN SUBGRADE ELEVATION. IN AREAS REQUIRING STRUCTURAL FILL, THE EARTH MATERIAL SHALL NOT BE PLACED OVER TOPSOIL OR OTHER UNSUITABLE MATERIALS. THE STRUCTURAL SUBGRADE AREA SHALL EXTEND TO THE ZONE OF INFLUENCE IN ALL FILL AREAS.

   C. COMPACTION OF THE EARTH AND OTHER SUITABLE MATERIALS SHALL BE TO A MINIMUM OF 95% OF THE MODIFIED PROCTOR DRY DENSITY. THIS INCLUDES AREAS WITHIN PROPOSED PAVEMENT AND BUILDING PAD LOCATIONS, SIDEWALKS, ETC. IN NON-STRUCTURAL FILL AREAS, 90% TO 95% OF THE MODIFIED PROCTOR DRY DENSITY IS REQUIRED.

3. UNSUITABLE MATERIAL

   A. UNSUITABLE MATERIAL SHALL BE CONSIDERED AS MATERIAL THAT IS NOT SUITABLE FOR THE SUPPORT OF PAVEMENT AND BUILDING CONSTRUCTION. IF IT IS ENCOUNTERED BELOW NORMAL TOPSOIL DEPTHS AND THE PROPOSED SUBGRADE ELEVATION, IT SHALL BE REMOVED AND REPLACED WITH SELECT GRANULAR MATERIAL APPROVED BY THE SOILS ENGINEER. THE DECISION TO REMOVE SAID MATERIAL AND TO WHAT EXTENT, SHALL BE MADE BY A SOILS ENGINEER WITH THE CONCURRENCE OF THE OWNER.

4. THE GRADING CONTRACTORS RESPONSIBILITIES

   A. MAINTAIN POSITIVE DRAINAGE AT ALL TIMES DURING THE COURSE OF CONSTRUCTION AND PREVENT STORM WATER FROM RUNNING INTO OR STANDING IN EXCAVATED AREAS.

   B. SPREAD AND COMPACT UNIFORMLY ALL EXCESS TRENCH SPOIL, AS SPECIFIED, AFTER COMPLETION OF THE UNDERGROUND IMPROVEMENTS.

   C. SCARIFY AND COMPACT THE UPPER 12 INCHES OF THE SUITABLE SUBGRADE MATERIAL, AS SPECIFIED, IN ALL AREAS THAT MAY BE SOFT DUE TO EXCESS MOISTURE CONTENT. THIS APPLIES TO CUT AREAS AS WELL AS FILL AREAS.

   D. PROVIDE ADDITIONAL WATER TO DRY MATERIAL TO ADJUST THE MOISTURE CONTENT FOR THE PURPOSE OF ACHIEVING THE SPECIFIED COMPACTION.

   E. BACKFILL THE CURB AND GUTTER AFTER CONSTRUCTION AND PRIOR TO THE PLACEMENT OF THE BASE COURSE MATERIAL.

   F. ACCOUNTABLE FOR IMPLEMENTATION OF THE "SOIL EROSION AND SEDIMENTATION CONTROL MEASURES" AS DESCRIBED ON THE PLANS. ALL CONTRACTORS SHALL COMPLY WITH THE SWPPP AND NPDES REQUIREMENTS.

   G. PERFORM LIME STABILIZATION OF THE SUBGRADE MATERIAL IF REQUIRED BY THE SOILS ENGINEER.

5. TESTING AND FINAL ACCEPTANCE

   A. THE CONTRACTOR SHALL PROVIDE, AS A MINIMUM, A TANDEM AXLE TRUCK LOADED TO 14 TONS FOR PROOF ROLLING THE PAVEMENT SUBGRADE. PROOF ROLLING SHALL BE PERFORMED PRIOR TO THE PLACEMENT OF THE CURB AND GUTTER AND BASE MATERIAL. THIS SHALL BE WITNESSED AND APPROVED BY THE MUNICIPAL ENGINEER AND OWNER.

   B. ANY UNSUITABLE AREA ENCOUNTERED AS A RESULT OF PROOF ROLLING, SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIAL APPROVED BY THE SOILS CONSULTANT. PROOF ROLLING SHALL BE PERFORMED UNTIL THE SUBGRADE IS APPROVED BY THE MUNICIPAL ENGINEER, OWNER AND SOILS ENGINEER.

   C. THE WORK AREAS SHALL BE POSITIVELY DRAINED DURING CONSTRUCTION. FINAL GRADES SHALL BE PROTECTED AGAINST DAMAGE FROM EROSION, SEDIMENTATION AND TRAFFIC.

PAVEMENT

1. FINE GRADING

   A. PRIOR TO THE CONSTRUCTION OF CURB AND GUTTER AND PLACEMENT OF THE BASE MATERIAL, THE STREETS SHALL BE FINE GRADED TO WITHIN 0.05 FEET OF FINAL SUBGRADE ELEVATION, TO A POINT TWO FEET BEYOND THE BACK OF CURB.

2. CURB AND GUTTER

   A. THE TYPE OF THE CURB AND GUTTER SHALL BE AS DETAILED ON THE ENGINEERING PLANS.

   B. THE CURBS SHALL BE BACKFILLED AFTER CONSTRUCTION AND PRIOR TO THE PLACEMENT OF THE BASE COURSE.

   C. THE STONE COST UNDER THE CURB AND GUTTER SHALL BE CONSIDERED INCIDENTAL.

   D. DEPRESSED CURBS FOR DRIVEWAYS AND HANDICAPPED RAMPS SHALL BE INSTALLED PER THE PLANS AND IDOT STANDARDS.

3. PAVEMENT

   A. THE PAVEMENT MATERIALS SHALL BE AS DETAILED ON THE ENGINEERING PLANS. DEPTHS SPECIFIED SHALL BE CONSIDERED THE MINIMUM COMPACTED THICKNESS.

4. GENERAL

   THE PAVING CONTRACTOR SHALL:

   A. REPAIR ANY BASE COURSE AND BINDER COURSE FAILURES PRIOR TO THE INSTALLATION OF THE FINAL BITUMINOUS CONCRETE SURFACE COURSE.

   B. SWEEP CLEAN THE BINDER COURSE PRIOR TO THE INSTALLATION OF THE FINAL BITUMINOUS CONCRETE SURFACE COURSE. ANY DAMAGE TO THE BINDER COURSE SHALL BE REPAIRED BY THE CONTRACTORS AT NO ADDITIONAL COST TO THE OWNER.

   D. PROVIDE CONSTRUCTION, EXPANSION AND CONTRACTION JOINTS FOR CURB AND GUTTER AND P.C.C. SIDEWALK PER IDOT STANDARDS AND MUNICIPAL STANDARDS.

   E. REMOVE ALL EXCESS MATERIALS AND DEBRIS. DISPOSE OF MATERIALS OFF-SITE AT NO ADDITIONAL COST TO THE OWNER.

5. TESTING AND FINAL ACCEPTANCE

   A. PRIOR TO THE PLACEMENT OF THE BASE COURSE, THE SUBGRADE MUST BE PROOF ROLLED AND INSPECTED FOR UNSUITABLE LOCATIONS. IF UNSUITABLE SUBGRADE IS ENCOUNTERED, IT SHALL BE REMOVED AND REPLACED WITH GRANULAR MATERIAL APPROVED BY THE OWNER OR HIS REPRESENTATIVE. THE SUBGRADE SHALL HAVE A MINIMUM IBR VALUE OF 3.0.

   B. PRIOR TO PLACEMENT OF THE BITUMINOUS CONCRETE SURFACE COURSE, THE CONTRACTOR SHALL OBTAIN SPECIMENS OF THE BINDER COURSE WITH A CORE DRILL WHERE DIRECTED AND AS REQUIRED. THICKNESS VERIFICATION WILL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION."

   C. FINAL ACCEPTANCE OF THE TOTAL PAVEMENT INSTALLATION SHALL BE SUBJECT TO THE TESTING AND VERIFICATION REQUIREMENTS CITED ABOVE.

6. METHOD OF MEASUREMENT

   A. CURB AND GUTTER AND BASE COURSE SHALL BE MEASURED IN THE FIELD BY THE CONTRACTOR. THE QUANTITIES SHALL BE SUBMITTED TO THE ENGINEER FOR VERIFICATION WHEN REQUESTED BY THE OWNER.

   B. WHEN REQUESTED BY THE OWNER, DOCUMENTATION FOR THE INSTALLED BASE COURSE, BITUMINOUS CONCRETE BINDER AND SURFACE COURSE, SHALL BE SUBMITTED TO THE ENGINEER FOR VERIFICATION AS REQUIRED BY THE MUNICIPALITY. WHERE DIRECTED, THE CONTRACTOR SHALL OBTAIN SPECIMENS OF THE BITUMINOUS CONCRETE WITH A CORE DRILL TO CONFIRM THE PLAN THICKNESS. DEFICIENCIES IN THICKNESS SHALL BE ADJUSTED BY THE METHOD DESCRIBED IN THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION."

7. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE PROPER BARRICADING, WARNING DEVICES AND SAFE TRAFFIC MANAGEMENT WITHIN THE AREA OF CONSTRUCTION. ALL SUCH DEVICES AND THEIR INSTALLATION SHALL CONFORM TO THE ILLINOIS "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION. THIS SHALL BE IN ACCORDANCE WITH THE SUBDIVISION CONTROL ORDINANCE OF THE MUNICIPALITY.

8. LONGITUDINAL JOINT CONSTRUCTION

   A. AS MANY LONGITUDINAL JOINTS AS PRACTICAL SHALL BE CLOSED AT THE END OF EACH DAY OF PAVING. A TACK COAT SHALL BE APPLIED TO THE "COLD" SIDE OF THE LONGITUDINAL JOINT PRIOR TO THE PLACEMENT OF THE HOT SIDE MAT.

   B. LONGITUDINAL JOINT CONSTRUCTION SHALL BE COMPLETED BEFORE THE "COLD" SIDE OF THE JOINT FALLS BELOW 200°F.

   C. IN THE EVENT THE TEMPERATURE OF THE "COLD" SIDE OF A JOINT FALLS BELOW 200°F PRIOR TO JOINT CONSTRUCTION COMPLETION, THE CONTRACTOR SHALL PERFORM THE FOLLOWING:
      1. HEAT THE COLD SIDE JOINT TO 200°F EITHER BY MEANS OF A HAND TORCH OR AN INFRARED HEATER. THE CONTRACTOR SHALL AVOID BURNING THE ASPHALT DURING REHEATING.
      2. APPLY TACK COAT TO THE REHEATED JOINT PRIOR TO ASPHALT PLACEMENT.

   D. THE CONTRACTOR SHALL OFFSET SURFACE COURSE JOINTS FROM BINDER COURSE JOINTS, WHEREVER PRACTICABLE.

9. LONGITUDINAL JOINT DENSITY SPECIFICATIONS

   A. COMPLETED LONGITUDINAL JOINTS SHALL BE ASSESSED BASED ON SECTION 1030 OF THE STANDARD SPECIFICATIONS AND THE "HOT MIX ASPHALT – DENSITY TESTING OF LONGITUDINAL JOINTS" (BDE) AS FOLLOWS:

   LONGITUDINAL JOINT DENSITY TESTING SHALL BE PERFORMED AT EACH RANDOM DENSITY TEST LOCATION. LONGITUDINAL JOINT TESTING SHALL BE LOCATED AT A DISTANCE EQUAL TO THE LIFT THICKNESS OR A MINIMUM OF TWO INCHES FROM EACH PAVEMENT EDGE; I.E. FOR A FOUR INCH LIFT, THE NEAR EDGE OF THE DENSITY GAUGE OR CORE BARREL SHALL BE WITHIN FOUR INCHES FROM THE EDGE OF PAVEMENT. LONGITUDINAL JOINT DENSITY TESTING SHALL BE PERFORMED USING EITHER A CORRELATED NUCLEAR GAUGE OR CORES.

   1. CONFINED EDGE: EACH CONFINED EDGE DENSITY TEST SHALL BE REPRESENTED BY A ONE MINUTE NUCLEAR DENSITY READING OR A CORE DENSITY. THE TESTING SHALL BE INCLUDED IN THE AVERAGE OF DENSITY READINGS OR CORE DENSITIES TAKEN ACROSS THE MAT, WHICH REPRESENTS THE INDIVIDUAL TEST.

   2. UNCONFINED EDGE: EACH UNCONFINED EDGE JOINT DENSITY TEST SHALL BE REPRESENTED BY AN AVERAGE OF THREE, ONE MINUTE DENSITY READINGS OR A SINGLE CORE DENSITY AT THE GIVEN DENSITY TEST LOCATION. THE TESTING SHALL MEET THE DENSITY REQUIREMENTS SPECIFIED HEREIN. THE THREE, ONE MINUTE READINGS SHALL BE SPACED TEN FEET APART LONGITUDINALLY ALONG THE UNCONFINED PAVEMENT EDGE AND CENTERED AT THE RANDOM DENSITY TEST LOCATION.

DENSITY CONTROL LIMITS TABLE

MIXTURE COMPOSITION	PARAMETER	INDIVIDUAL TEST (INCLUDES CONFINED EDGES)	UNCONFINED EDGE JOINT DENSITY MINIMUM
IL-9.5, IL12.5	Ndesign >= 90	92.0-96.0%	90%
IL-9.5, IL9.5L, IL-12.5	Ndesign < 90	92.5-97.4%	90%
IL-19.0, IL-25.0	Ndesign >= 90	93.0-96.0%	90%
IL-19.0, IL-19.0L, IL-25.0	Ndesign < 90	93.0-97.4%	90%
SMA	Ndesign = 50 & 80	93.5-97.4%	91%
ALL OTHER	Ndesign = 30	93.0-97.4%	90%

SOIL EROSION AND SEDIMENT CONTROL

1. THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE SUBDIVISION CONTROL ORDINANCE OF THE MUNICIPALITY, AND THE ILLINOIS URBAN MANUAL.
2. BEFORE STARTING CLEARING AND SITE GRADING WORK, A CONSTRUCTION ENTRANCE AND SILT FENCE SHALL BE INSTALLED AS SHOWN ON THE PLANS.
3. THE CONSTRUCTION ENTRANCE TO THE SITE SHALL BE STABILIZED WITH GRAVEL PRIOR TO BEGINNING ANY WORK ON THE SITE. THE ENTRANCE SHALL BE MAINTAINED PERIODICALLY FOR ITS EFFECTIVENESS TO REMOVE DIRT WHICH COULD LEAVE THE SITE BY CONSTRUCTION VEHICLES.
4. SILT FILTER FENCE SHALL BE PLACED AS SHOWN ON THE PLANS AND AS DIRECTED BY THE MUNICIPALITY'S ENGINEERING INSPECTOR TO PREVENT SEDIMENT FROM LEAVING THE SITE.
5. STAKED SILT FENCE SHALL BE INSTALLED AND MAINTAINED AROUND THE INLETS AND CATCH BASINS AS SHOWN ON THE PLANS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSTALLATION AND MAINTENANCE OF ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
7. THE CONTRACTOR SHALL INSPECT EROSION CONTROL MEASURES WEEKLY AND AFTER ANY STORM EVENT IN EXCESS OF 1/2". AN INSPECTION REPORT SHALL BE FILLED OUT EACH TIME AND SHALL BE KEPT IN A BINDER AT JOB SITE AT ALL TIMES ALONG WITH NOI, NPDES PERMIT & SWPPP PLAN.
8. AT THE COMPLETION OF THE PROJECT, ALL STORM SEWER PIPES AND STRUCTURES SHALL BE CLEANED AND FREE OF DIRT AND DEBRIS. THE SEDIMENTATION SHALL BE REMOVED FROM THE STORM SEWER SYSTEM AND SHALL NOT BE WASHED OUT IN THE STORM SEWER SYSTEM.
9. THE TEMPORARY EROSION CONTROL MEASURES SHALL BE IN PLACE EFFECTIVELY UNTIL ALL THE PERMANENT EROSION CONTROL ITEMS ARE FULLY FUNCTIONAL.
10. THE GUARANTEE PERIOD SHALL START AFTER ALL THE PERMANENT EROSION CONTROL MEASURES ARE FULLY FUNCTIONAL AND ACCEPTABLE TO OWNER OR HIS REPRESENTATIVE.
11. A. STOCKPILES OF ANY KIND SHALL NOT BE PLACED IN SPECIAL MANAGEMENT AREAS.

    B. IF A STOCKPILE IS TO REMAIN IN PLACE FOR MORE THAN SEVEN DAYS, THEN SEDIMENT AND EROSION CONTROL SHALL BE PROVIDED FOR SUCH STOCKPILE.
12. IF THE VOLUME, VELOCITY, SEDIMENT LOAD, OR PEAK FLOW RATES OF STORM WATER RUNOFF ARE TEMPORARILY INCREASED DURING CONSTRUCTION, THEN PROPERTIES AND SPECIAL MANAGEMENT AREAS DOWNSTREAM FROM SUCH DEVELOPMENT SITES SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION.
13. STORM SEWER INLETS SHALL BE PROTECTED WITH SEDIMENT TRAPPING OR FILTER CONTROL DEVICES DURING CONSTRUCTION.
14. THE SURFACE OF STRIPPED AREAS SHALL BE PERMANENTLY OR TEMPORARILY PROTECTED FROM SOIL EROSION WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED UNLESS A ½" OR GREATER RAINFALL EVENT IS FORECAST PRIOR TO 7 DAYS. IN THAT CASE THE PROPER SOIL PROTECTION SHALL BE INSTALLED IMMEDIATELY. STRIPPED AREAS NOT AT FINAL GRADE THAT WILL REMAIN UNDISTURBED FOR MORE THAN 7 DAYS AFTER INITIAL DISTURBANCE SHALL BE PROTECTED FROM EROSION UNLESS GRADING ACTIVITIES ARE RESUMED WITHIN 14 DAYS FROM WHEN ACTIVITIES CEASED. TEMPORARY COVER SHALL BE MAINTAINED CONTINUOUSLY UNTIL PERMANENT COVER IS ESTABLISHED.
15. WATER PUMPED OR OTHERWISE DISCHARGED FROM THE SITE DURING CONSTRUCTION DEWATERING, IRRIGATION, OR FIRE HYDRANT FLUSHING SHALL BE FILTERED PRIOR TO LEAVING PROJECT SITE.
16. GRAVELED ROADS, ACCESS DRIVES, PARKING AREAS OF SUFFICIENT WIDTH AND LENGTH, AND VEHICLE WASHDOWN FACILITIES IF NECESSARY, SHALL BE PROVIDED TO PREVENT THE DEPOSIT OF SOIL FROM BEING TRACKED ONTO PUBLIC OR PRIVATE ROADWAYS. ANY SOIL REACHING A PUBLIC OR PRIVATE ROADWAY SHALL BE REMOVED CONTINUOUSLY.
17. ALL CONTRACTORS SHALL COMPLY WITH SWPPP PLAN AND NPDES REQUIREMENT & SHALL SIGN SWPPP ON FILE WITH OWNER OR GENERAL CONTRACTOR.

STORM SEWER

1. ALL STORM SEWER SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS, IN ADDITION TO THE SUBDIVISION CONTROL ORDINANCE OF THE MUNICIPALITY.
2. UNLESS OTHERWISE NOTED ON THE PLANS, ALL STORM SEWERS SHALL BE REINFORCED CONCRETE CULVERT PIPE (RCP), ASTM C 76, WITH "O" RING RUBBER GASKET JOINTS CONFORMING TO ASTM C-443.
3. HDPE STORM SEWER PIPE SHALL BE HIGH DENSITY POLYETHYLENE PIPE PER ASTM F-2306 WITH WATERTIGHT JOINTS CONFORMING TO ASTM D-3212.
4. ALL STORM SEWER UNDERDRAIN PIPE SHALL BE PERFORATED ADS N-12 OR APPROVED EQUAL, UNLESS OTHERWISE NOTED.
5. ALL DOWNSPOUT AND FOOTING DRAINS SHALL BE DISCHARGED TO THE STORM SEWER SYSTEM OR ONTO THE GROUND.
6. MANHOLE, CATCH BASIN AND INLET BOTTOMS SHALL BE PRECAST CONCRETE SECTIONAL UNITS OR MONOLITHIC CONCRETE. MANHOLES AND CATCH BASINS SHALL BE FOUR FEET IN DIAMETER UNLESS OTHERWISE SPECIFIED ON THE PLANS. MANHOLE JOINTS SHALL BE "O" RING GASKET JOINTS. A MAXIMUM OF SIX INCHES OF ADJUSTING RINGS SHALL BE USED TO ADJUST FRAME ELEVATIONS. THE ADJUSTING RINGS SHALL BE SET WITHIN A FULL MORTAR BED.
7. ALL STORM SEWERS SHALL BE INSTALLED ON TYPE "A" BEDDING, 1/4 TO 3/4 INCH IN SIZE, WITH A MINIMUM THICKNESS EQUAL TO 1/4 OF THE OUTSIDE DIAMETER OF THE SEWER PIPE, BUT NOT LESS THAN FOUR INCHES. USING BLOCKS OF ANY KIND FOR GRADE IS NOT PERMITTED. THE GRANULAR MATERIAL FOR BEDDING AND TRENCH BACKFILL MATERIAL SHALL CONFORM TO IDOT GRADATION CA-6. THE GRANULAR MATERIAL FOR BEDDING AND INITIAL BACKFILL OF FLEXIBLE PIPE SHALL BE NON-ANGULAR GRAVEL MATERIAL CONFORMING TO ASTM D-2321, CLASS I. THE COST OF BEDDING MATERIAL SHALL BE MERGED WITH THE UNIT PRICE BID FOR THE SEWER. THE BEDDING MATERIALS SHALL BE COMPACTED TO 95% OF THE MODIFIED PROCTOR DENSITY.
8. THE FRAME AND GRATE OR CLOSED LID TYPE SHALL BE AS SPECIFIED ON THE UTILITY PLAN. THE MANHOLE LIDS SHALL BE A MACHINE SURFACED, NON-ROCKING DESIGN. ALL CASTINGS SHALL BE EMBOSSED WITH A FISH IMAGE AND "DUMP NO WASTE-DRAINS TO WATERWAYS" MESSAGE. THE CLOSED LIDS SHALL HAVE THE WORD "STORM" AND THE MUNICIPALITY NAME EMBOSSED ON THE LID. THE JOINT BETWEEN THE CONCRETE SECTION AND FRAME SHALL BE SEALED WITH A MASTIC COMPOUND.
9. ALL STORM SEWERS SHALL BE THOROUGHLY CLEANED PRIOR TO FINAL INSPECTION AND TESTING.
10. AFTER THE STORM SEWER STRUCTURE HAS BEEN CONSTRUCTED, THE CONTRACTOR SHALL PLACE EROSION CONTROL AT LOCATIONS SHOWN ON THE PLANS OR AS SELECTED IN THE FIELD BY THE ENGINEER. THE PURPOSE OF THE EROSION CONTROL WILL BE TO MINIMIZE THE AMOUNT OF SILTATION NORMALLY ENTERING THE STORM SEWER SYSTEM FROM ADJECENT AND/OR UPSTREAM DRAINAGE AREAS.

CRYSTAL LAKE SOIL EROSION AND SEDIMENT CONTROL

1. CONTROL MEASURES SHALL MEET THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE ILLINOIS URBAN MANUAL UNLESS STATED OTHERWISE. [AMENDED 11-17-2020 BY ORD. NO. 7671]
2. SOIL DISTURBANCE SHALL BE CONDUCTED IN SUCH A MANNER AS TO MINIMIZE EROSION. AREAS OF THE DEVELOPMENT SITE THAT ARE NOT TO BE DISTURBED SHALL BE PROTECTED FROM CONSTRUCTION TRAFFIC OR OTHER DISTURBANCE UNTIL FINAL STABILIZATION IS ACHIEVED.
3. SOIL STABILIZATION MEASURES SHALL CONSIDER THE TIME OF YEAR, DEVELOPMENT SITE CONDITIONS AND THE USE OF TEMPORARY OR PERMANENT MEASURES.
4. STABILIZATION BY SEEDING SHALL INCLUDE TOPSOIL PLACEMENT AND FERTILIZATION, AS NECESSARY.
5. NATIVE SEED MIXTURES SHALL INCLUDE RAPID-GROWING ANNUAL GRASSES OR SMALL GRAINS TO PROVIDE INITIAL, TEMPORARY SOIL STABILIZATION.
6. OFF-SITE PROPERTY SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. VELOCITY DISSIPATION DEVICES SHALL BE PLACED AT CONCENTRATED DISCHARGE LOCATIONS AND ALONG THE LENGTH OF ANY OUTFALL CHANNEL, AS NECESSARY TO PREVENT EROSION.
7. SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE DISTURBANCE OF TRIBUTARY AREAS.
8. STABILIZATION OF DISTURBED AREAS SHALL BE INITIATED IMMEDIATELY WHENEVER ANY CLEARING, GRADING, EXCAVATING OR OTHER EARTH-DISTURBING ACTIVITIES HAVE PERMANENTLY CEASED ON ANY PORTION OF THE DEVELOPMENT SITE, OR TEMPORARILY CEASED ON ANY PORTION OF THE DEVELOPMENT SITE AND WILL NOT RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS. STABILIZATION OF DISTURBED AREAS SHALL BE INITIATED WITHIN ONE WORKING DAY OF PERMANENT OR TEMPORARY CESSATION OF EARTH-DISTURBING ACTIVITIES AND SHALL BE COMPLETED AS SOON AS POSSIBLE, BUT NOT LATER THAN 14 CALENDAR DAYS FROM THE INITIATION OF STABILIZATION WORK IN AN AREA. EXCEPTIONS TO THESE TIME FRAMES ARE SPECIFIED BELOW:

   8.a. WHERE THE INITIATION OF STABILIZATION MEASURES IS PRECLUDED BY SNOW COVER, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE; AND

   8.b. IN AREAS WHERE CONSTRUCTION ACTIVITY HAS TEMPORARILY CEASED AND WILL RESUME AFTER 14 DAYS, A TEMPORARY STABILIZATION METHOD MAY BE USED.
9. DISTURBANCE OF STEEP SLOPES SHALL BE MINIMIZED. AREAS OR EMBANKMENTS HAVING SLOPES STEEPER THAN 3:1 SHALL BE STABILIZED WITH STAKED-IN-PLACE SOD, EROSION CONTROL BLANKETS IN COMBINATION WITH SEEDING, OR AN EQUIVALENT CONTROL MEASURE.
10. PERIMETER CONTROL MEASURES SHALL BE PROVIDED DOWNSLOPE AND PERPENDICULAR TO THE FLOW OF RUNOFF FROM DISTURBED AREAS, WHERE THE TRIBUTARY AREA IS GREATER THAN 5,000 SQUARE FEET, AND WHERE RUNOFF WILL FLOW IN A SHEET FLOW MANNER. PERIMETER EROSION CONTROL SHALL ALSO BE PROVIDED AT THE BASE OF SOIL STOCKPILES.
11. THE STORMWATER MANAGEMENT SYSTEM SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION DOWNSLOPE FROM DISTURBED AREAS. INLET PROTECTION THAT REDUCES SEDIMENT LOADING, WHILE ALLOWING RUNOFF TO ENTER THE INLET, SHALL BE REQUIRED FOR ALL STORM SEWERS. CHECK DAMS, OR AN EQUIVALENT CONTROL MEASURE, SHALL BE REQUIRED FOR ALL CHANNELS. FILTER FABRIC INLET PROTECTION AND STRAW BALE DITCH CHECKS ARE NOT ACCEPTABLE CONTROL MEASURES.
12. IF DEWATERING SERVICES ARE USED, DISCHARGES SHALL BE ROUTED THROUGH AN EFFECTIVE SEDIMENT CONTROL MEASURE (E.G., SEDIMENT TRAP OR AN EQUIVALENT CONTROL MEASURE). THE ENFORCEMENT OFFICER SHALL BE NOTIFIED PRIOR TO THE COMMENCEMENT OF DEWATERING ACTIVITIES.
13. ALL TEMPORARY SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL STABILIZATION OF THE DEVELOPMENT SITE IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NECESSARY. TRAPPED SEDIMENT SHALL BE REMOVED AND DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED.
14. STOCKPILED SOIL AND MATERIALS SHALL BE REMOVED FROM FLOOD HAZARD AREAS AT THE END OF EACH WORK DAY. SOIL AND MATERIALS STOCKPILED IN IWMC OR BUFFER AREAS SHALL BE PLACED ON TIMBER MATS, OR AN EQUIVALENT CONTROL MEASURE.
15. EFFECTIVE CONTROL MEASURES SHALL BE UTILIZED TO MINIMIZE THE DISCHARGE OF POLLUTANTS FROM THE DEVELOPMENT SITE. AT A MINIMUM, CONTROL MEASURES SHALL BE IMPLEMENTED IN ORDER TO:

    15.a. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER, AND OTHER WASH WATER; AND

    15.b. MINIMIZE THE EXPOSURE OF BUILDING MATERIALS, BUILDING PRODUCTS, CONSTRUCTION WASTES, TRASH, LANDSCAPE MATERIALS, FERTILIZERS, PESTICIDES, HERBICIDES, DETERGENTS, VEHICLE FLUIDS, SANITARY WASTE, AND OTHER MATERIALS PRESENT ON THE DEVELOPMENT SITE TO PRECIPITATION AND TO STORMWATER.
16. ADEQUATE RECEPTACLES SHALL BE PROVIDED FOR THE DEPOSITING OF ALL CONSTRUCTION MATERIAL DEBRIS GENERATED DURING THE DEVELOPMENT PROCESS. THE APPLICANT SHALL NOT CAUSE OR PERMIT THE DUMPING, DEPOSITING, DROPPING, THROWING, DISCARDING OR LEAVING OF CONSTRUCTION MATERIAL DEBRIS UPON OR INTO ANY DEVELOPMENT SITE, CHANNEL, OR IWMC. THE DEVELOPMENT SITE SHALL BE MAINTAINED FREE OF CONSTRUCTION MATERIAL DEBRIS.
17. THE ENFORCEMENT OFFICER MAY REQUIRE ADDITIONAL OR ALTERNATE SOIL EROSION AND SEDIMENT CONTROL MEASURES, BASED ON DEVELOPMENT-SITE-SPECIFIC CONSIDERATIONS AND THE EFFECTIVENESS OF THE INSTALLED CONTROL MEASURES.

CRYSTAL LAKE STANDARD DRAIN TILE NOTES

1. DRAIN TILES DISTURBED DURING REGULATED DEVELOPMENT SHALL BE RECONNECTED BY THOSE RESPONSIBLE FOR THEIR DISTURBANCE, UNLESS THE DEVELOPMENT PLANS SPECIFY ABANDONMENT OF THE DRAIN TILES.
2. ALL ABANDONED DRAIN TILES WITHIN DISTURBED AREAS SHALL BE REMOVED IN THEIR ENTIRETY.
3. DRAIN TILES WITHIN THE DISTURBED AREA OF A DEVELOPMENT SITE SHALL BE REPLACED, BYPASSED AROUND THE DEVELOPMENT SITE OR INTERCEPTED AND CONNECTED TO THE STORMWATER MANAGEMENT SYSTEM FOR THE DEVELOPMENT SITE. THE SIZE OF THE REPLACED OR BYPASSED DRAIN TILE SHALL BE EQUIVALENT TO THE EXISTING DRAIN TILE.

NOTE:

IN THE EVENT OF A CONFLICT BETWEEN THE SOIL EROSION AND SEDIMENT CONTROL NOTES AND SPECIFICATIONS AND THE CRYSTAL LAKE SOIL EROSION AND SEDIMENT CONTROL NOTES AND SPECIFICATIONS ON THIS SHEET, THE CITY OF CRYSTAL LAKE SPECIFICATIONS SHALL TAKE PRECEDENCE.

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

GENERAL NOTES AND SPECIFICATIONS

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

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1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
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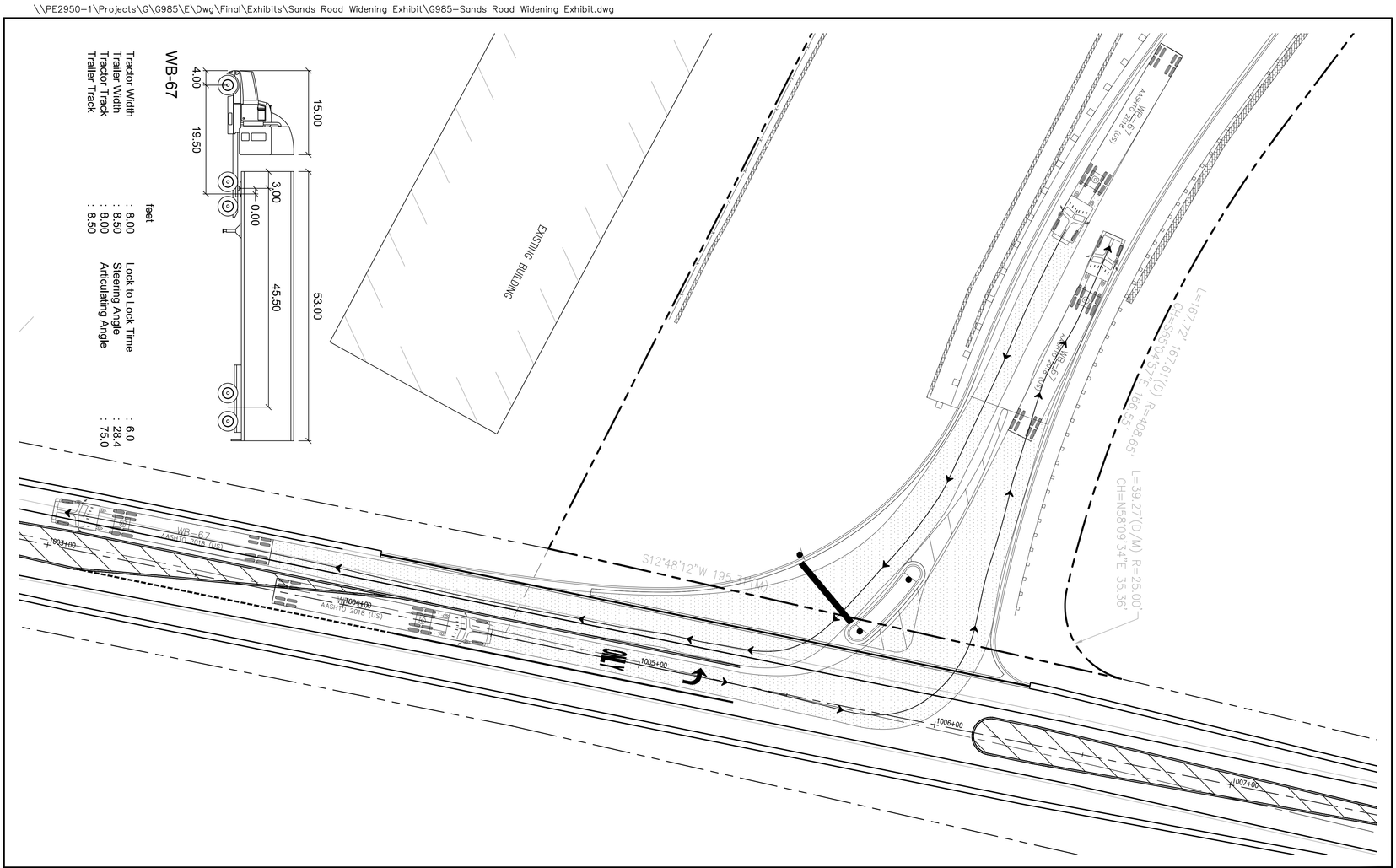
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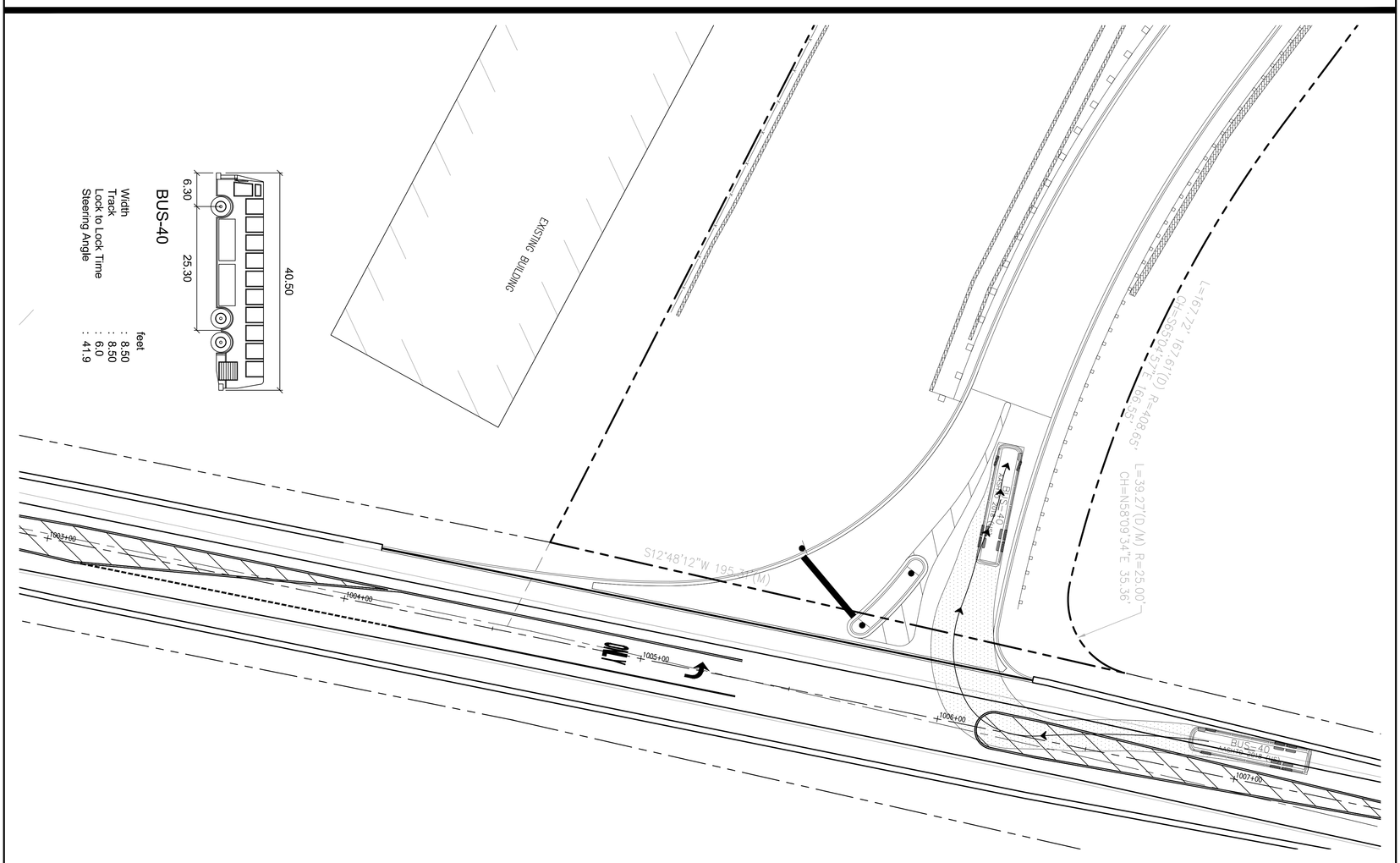
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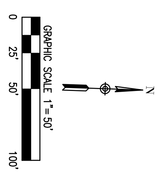
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SRWE-2 | G985 | 1" = 50'

JACOB & HEFNER ASSOCIATES
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SANDS ROAD WIDENING EXHIBIT-TRUCK MOVEMENTS
NVA TRUCKING FACILITY
NVA PROP IL LLC
CRYSTAL LAKE, ILLINOIS

No.	Description	Date
2	REVISED GEOMETRY	12/20/23
1	ORIGINAL EXHIBIT DATE	12/5/23

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GRAPHIC SCALE 1"=60'
0 30' 60' 120'

WME-1	G985	1" = 60'	

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WATER MAIN EXTENSION EXHIBIT
NVA TRUCKING FACILITY EXPANSION
NAV PROP IL LLC
CRYSTAL LAKE, IL

No.	Description	Date
1	ORIGINAL EXHIBIT DATE	10/20/23

Stormwater Management Report
for
NVA Trucking Facility Expansion
Crystal Lake, Illinois
JHA Project No. G985
December 20, 2023

Prepared By:
Jacob and Hefner Associates, Inc.
1333 Butterfield Road, Suite 300
Downers Grove, Illinois 60515

Prepared For:
Olympus Design & Development
1425 Madeline Lane
Elgin, IL 60124

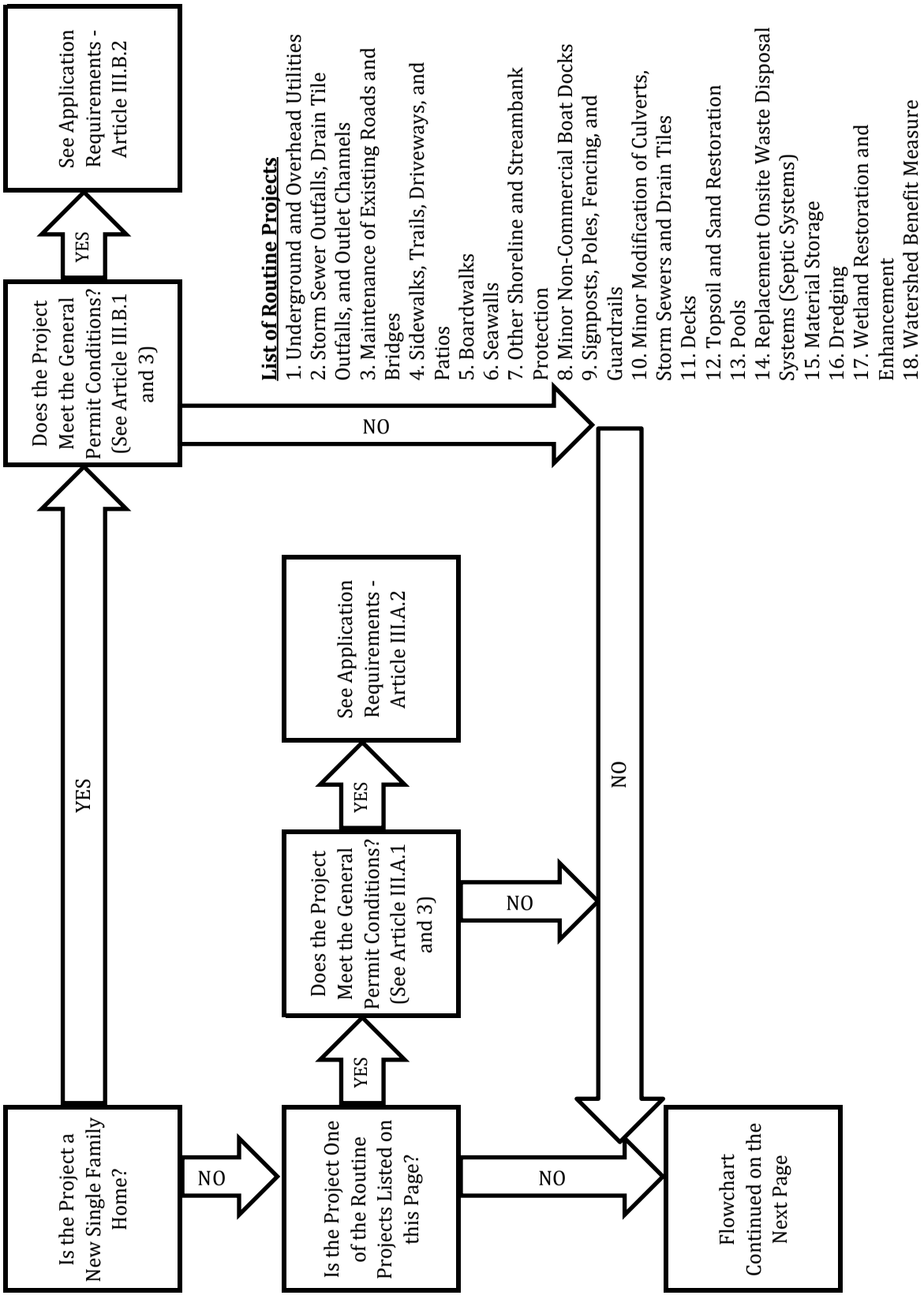
Ryan J. Blocker

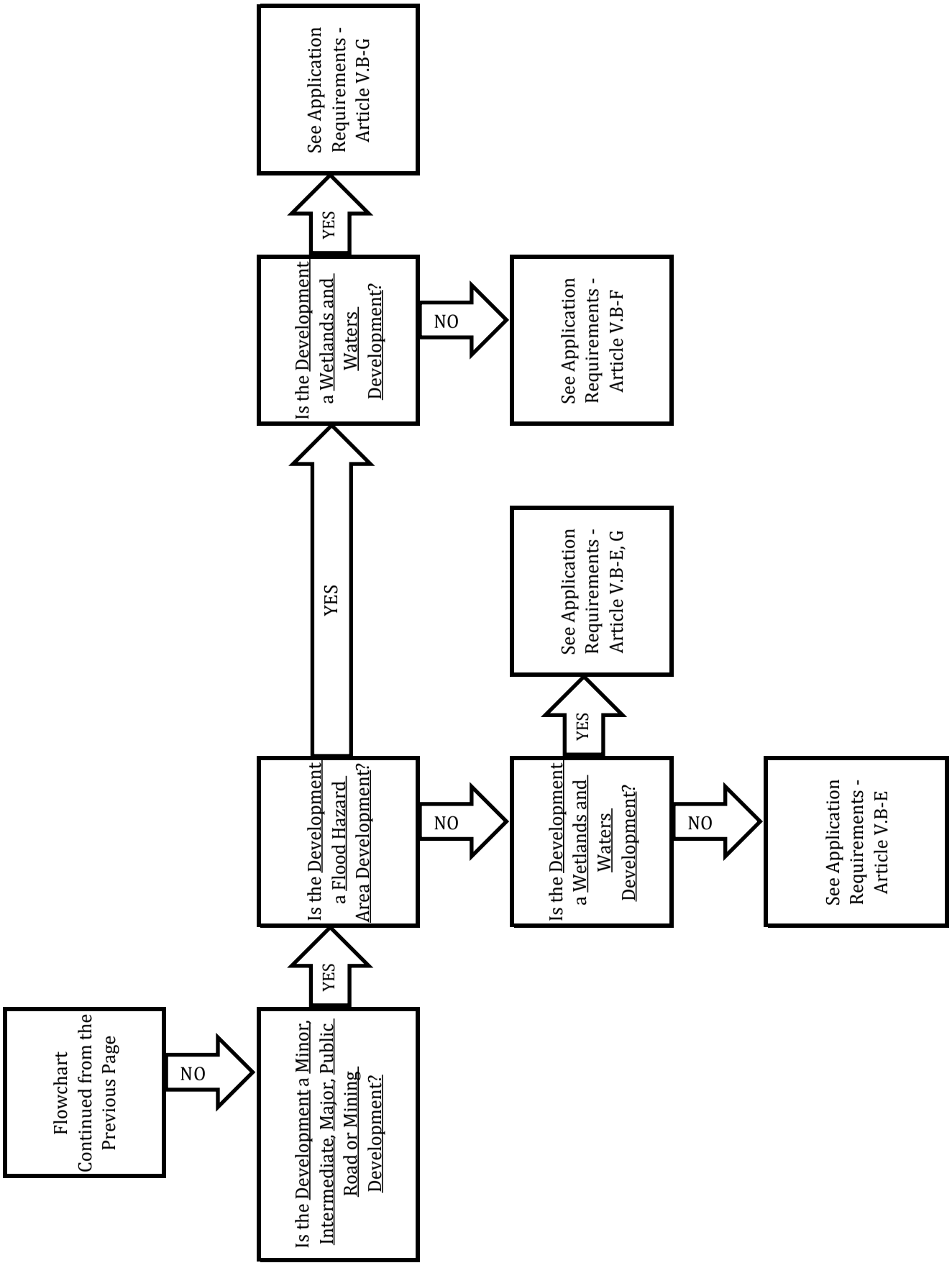
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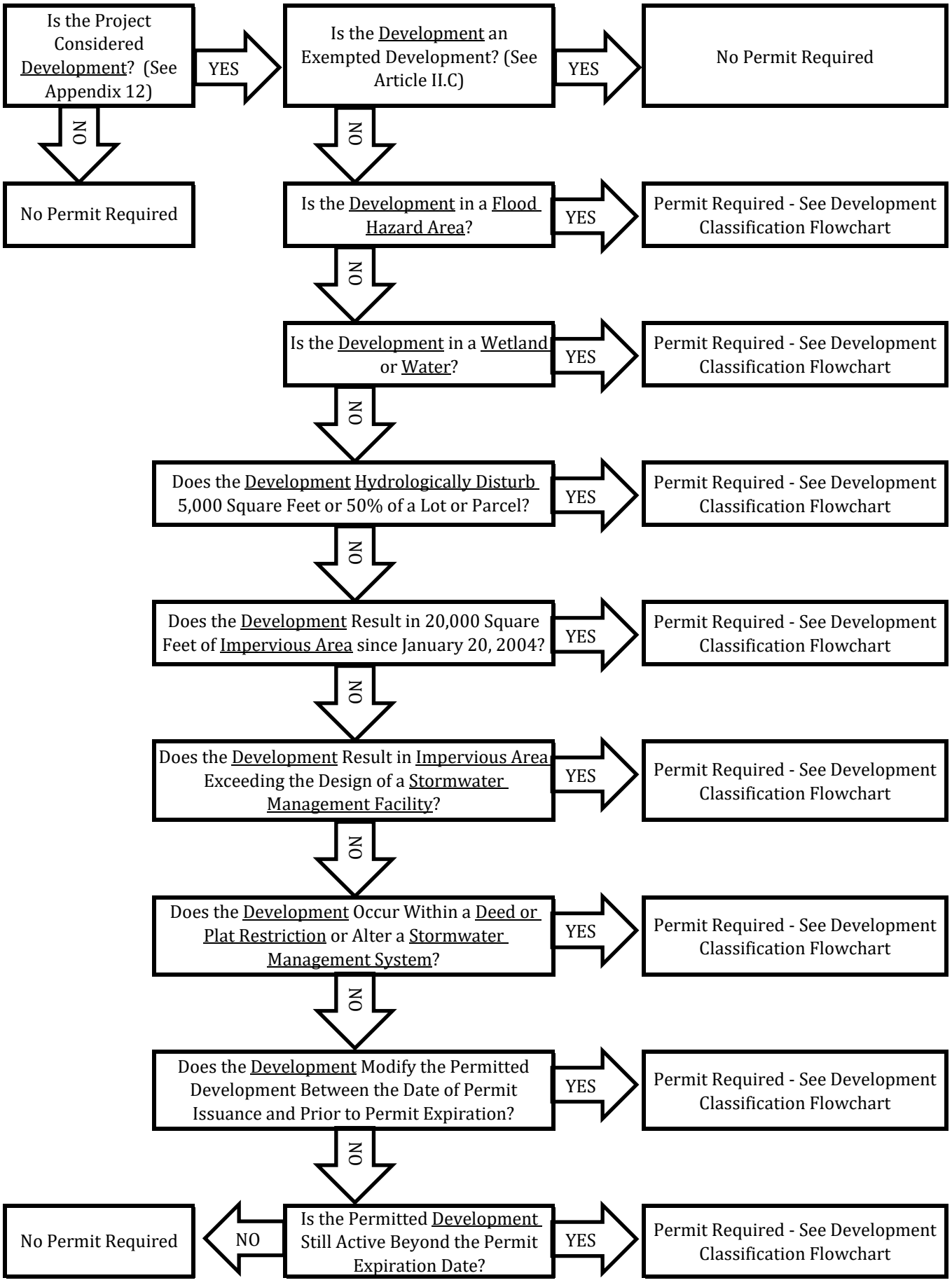
Engineer — Date
Ryan J. Blocker
Illinois Registration No. 062-060791
Expires 11/30/2025

RYAN J. BLOCKER
062-060791
LICENSED
PROFESSIONAL
ENGINEER
OF
ILLINOIS

JACOB & HEFNER
ASSOCIATES


Is the Project a New Single Family Home?
YES
NO
Does the Project Meet the General Permit Conditions? (See Article III.B.1 and 3)
YES
See Application Requirements - Article III.B.2
NO
Is the Project One of the Routine Projects Listed on this Page?
YES
Does the Project Meet the General Permit Conditions? (See Article III.A.1 and 3)
YES
See Application Requirements - Article III.A.2
NO
NO
Flowchart Continued on the Next Page
List of Routine Projects
1. Underground and Overhead Utilities
2. Storm Sewer Outfalls, Drain Tile Outfalls, and Outlet Channels
3. Maintenance of Existing Roads and Bridges
4. Sidewalks, Trails, Driveways, and Patios
5. Boardwalks
6. Seawalls
7. Other Shoreline and Streambank Protection
8. Minor Non-Commercial Boat Docks
9. Signposts, Poles, Fencing, and Guardrails
10. Minor Modification of Culverts, Storm Sewers and Drain Tiles
11. Decks
12. Topsoil and Sand Restoration
13. Pools
14. Replacement Onsite Waste Disposal Systems (Septic Systems)
15. Material Storage
16. Dredging
17. Wetland Restoration and Enhancement
18. Watershed Benefit Measure


Flowchart Continued from the Previous Page
NO
Is the Development a Minor, Intermediate, Major, Public Road or Mining Development?
YES
Is the Development a Flood Hazard Area Development?
YES
NO
Is the Development a Wetlands and Waters Development?
YES
See Application Requirements - Article V.B-G
NO
See Application Requirements - Article V.B-F
NO
See Application Requirements - Article V.B-E, G
See Application Requirements - Article V.B-E


Is the Project Considered Development? (See Appendix 12)
YES
Is the Development an Exempted Development? (See Article II.C)
YES
No Permit Required
NO
NO
No Permit Required
Is the Development in a Flood Hazard Area?
YES
Permit Required - See Development Classification Flowchart
NO
Is the Development in a Wetland or Water?
YES
Permit Required - See Development Classification Flowchart
NO
Does the Development Hydrologically Disturb 5,000 Square Feet or 50% of a Lot or Parcel?
YES
Permit Required - See Development Classification Flowchart
NO
Does the Development Result in 20,000 Square Feet of Impervious Area since January 20, 2004?
YES
Permit Required - See Development Classification Flowchart
NO
Does the Development Result in Impervious Area Exceeding the Design of a Stormwater Management Facility?
YES
Permit Required - See Development Classification Flowchart
NO
Does the Development Occur Within a Deed or Plat Restriction or Alter a Stormwater Management System?
YES
Permit Required - See Development Classification Flowchart
NO
Does the Development Modify the Permitted Development Between the Date of Permit Issuance and Prior to Permit Expiration?
YES
Permit Required - See Development Classification Flowchart
NO
No Permit Required
NO
Is the Permitted Development Still Active Beyond the Permit Expiration Date?
YES
Permit Required - See Development Classification Flowchart

McHenry County
Department of Planning & Development
2200 North Seminary Ave.
Woodstock, IL 60098
plandev@mchenrycountyil.gov
815.334.4560

MCH MCHENRY COUNTY · IL

For internal use only

Permit #: _____

Date: _____

Twp Road Jurisdiction: _____

STORMWATER MANAGEMENT PERMIT APPLICATION

Property Owner's Name: _____

Company Name (if any): NVA Prop IL LLC

Address: 7013 Sands Road
Crystal Lake, IL 60014

Phone: _____

Use Email As Preferred Correspondence Method: ☐ Yes ☐ No

Email Address: _____

Preferred Method of Permit Release: ☐ Pick-up ☐ Mail ($6 add'l fee)

Primary Contact (if different)**: Ryan Blocker

Company Name (if any): Jacob & Hefner Associates, Inc.

Address: 1333 Butterfield Road, Suite 300
Downers Grove, IL 60515

Phone: 630-652-4630

Email Address: rblocker@jhainc.com

If Primary Contact is different than Owner, the Statement of Authorization section must be completed (see below)

PROPERTY INFORMATION

Parcel/Tax Number: 19-03-401-021

Parcel/tax numbers can be found at: www.mchenrycountygis.org/planning

Project Address: & 19-03-453-003 *(If different than Owner's)*

PROJECT INFORMATION

Description of proposed project: Mass Grading, storm sewer installation, and erosion control for future site development.

21.48 acre(s) Size of parcel(s) where work is being performed

14.91 (ac) sq. ft. Proposed impervious area for this project (areas of any gravel/pavement/buildings/etc.)

21.14 (ac) sq. ft. Proposed disturbance area (where buildings/driveways are placed plus where soil is graded, vegetation removed, etc.)

0 sq. ft. Total impervious area created from **other** projects since January 2004

☐ ☑ Will any work occur on neighboring properties?
If yes, provide property owner approval letter

☑ ☐ Will any work occur within road rights-of-way?
If yes, provide road district approval letter

☑ ☐ Will any additional structural components be installed (e.g., retaining wall, seawall, foundation)?
Retaining Walls
If yes, provide type

Will the excavated material be kept ON SITE or hauled OFF SITE? *(pick one)*
On-site
If on-site, show on drawing and include in disturbed area calculation above

Attach a drawing showing the location of work on the site.

The drawing shall include:

- Property lines
- Easements
- Existing ground elevations
- Proposed ground elevations
- Buildings
- Driveways/parking areas
- Details of construction
- Patio/retaining wall/seawall/pier/deck
- Utilities/septic system/culverts
- Temporary disturbance areas
- Spoil locations (note if hauled off-site)
- Erosion control & stabilization details
- Dimensions of proposed work
- Clearly label existing vs. proposed

OWNER / PRIMARY CONTACT CERTIFICATION

I declare that this Application is true and correct to the best of my knowledge. I realize that the information that I have provided forms the basis for the issuance of the Permit and have included all work to be authorized with this Permit. I agree to construct said development in compliance with the permitted documents.

Signature:_____ **Date:**_____

STATEMENT OF AUTHORIZATION

(Only required if Primary Contact is not Owner) **

I hereby authorize _____ (Primary Contact) to act on my behalf as my agent in the processing of this Application and to furnish, upon request, supplemental information in support of this Permit Application. This person will act on my behalf as the point of contact for permit correspondence.

Owner's Signature:_____ **Date:**_____

HOA AUTHORIZATION

I, _____, owner of the parcel identified by McHenry County PIN# ____ - ____ - _____ - _____ hereby acknowledge that as the owner of said property I am responsible for ensuring that construction on my property complies with any covenants, codes, and restrictions adopted by the subdivision or any authority that regulates construction within the subdivision for which my property is located, including, but not limited to, any Home Owner's Association, Neighborhood Association, Property Owner's Association, Master Property Owner's Association, and Architecture Review Committee. I understand that issuance of any permit by McHenry County for construction does not replace or satisfy any approvals required by the above authorities. I further attest that I am responsible for notifying said authorities governing the subdivision for which the property is in of the intended scope of work.

Owner's Signature:_____ **Date:**_____

JACOB & HEFNER ASSOCIATES

1333 Butterfield Road, Suite 300
Downers Grove, IL 60515
P 630-652-4600
F 630-652-4601

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      - 2-Year, 24 Hour Storm Event
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Project Narrative

Project Description

On behalf of our client, Olympus Design & Development, Jacob and Hefner (JHA) is proposing site improvements to existing undeveloped land located on Sands Road approximately 1,500 feet north of US-Route 14, in Crystal Lake, IL. The proposed site improvements include the construction of a new light industrial warehouse building with all associated site work including new perimeter drives, truck bays, trailer parking lots, water and sanitary sewer services to the new building, storm sewer, stormwater detention ponds, and all associated erosion control measures.

Existing Conditions

In existing conditions, the project site is currently undeveloped vacant land. The topography of the existing site is significantly variable. Elevations generally decrease from west to east until the site reaches Sands Road. There is a small portion of the site that sheet flows to the adjacent residential subdivision to the north. The remainder of the site has no positively draining outlet. Located in this area of the site are several pockets of depressional storage areas. Per the enclosed maps there are no documented special flood hazard areas. There is one wetland located along the western boundary line of the site. This wetland was reported to be 0.07 acres in size. There is a portion of offsite drainage area tributary to the site from the west and south.

Proposed Conditions

Under proposed conditions, the site will be developed with a light industrial warehouse/maintenance facility with all associated site improvements. To address the stormwater management requirements of the City of Crystal lake and the McHenry County stormwater codes, a new interior storm sewer system will be constructed to collect and convey the 10-year runoff from the proposed improvements to the new stormwater detention ponds. Overland flood routes sized to convey the 100-year runoff will direct flow to the proposed stormwater detention pond. In cases where an overland path was not possible, the 100-year storm is conveyed to the proposed detention pond via storm sewer.

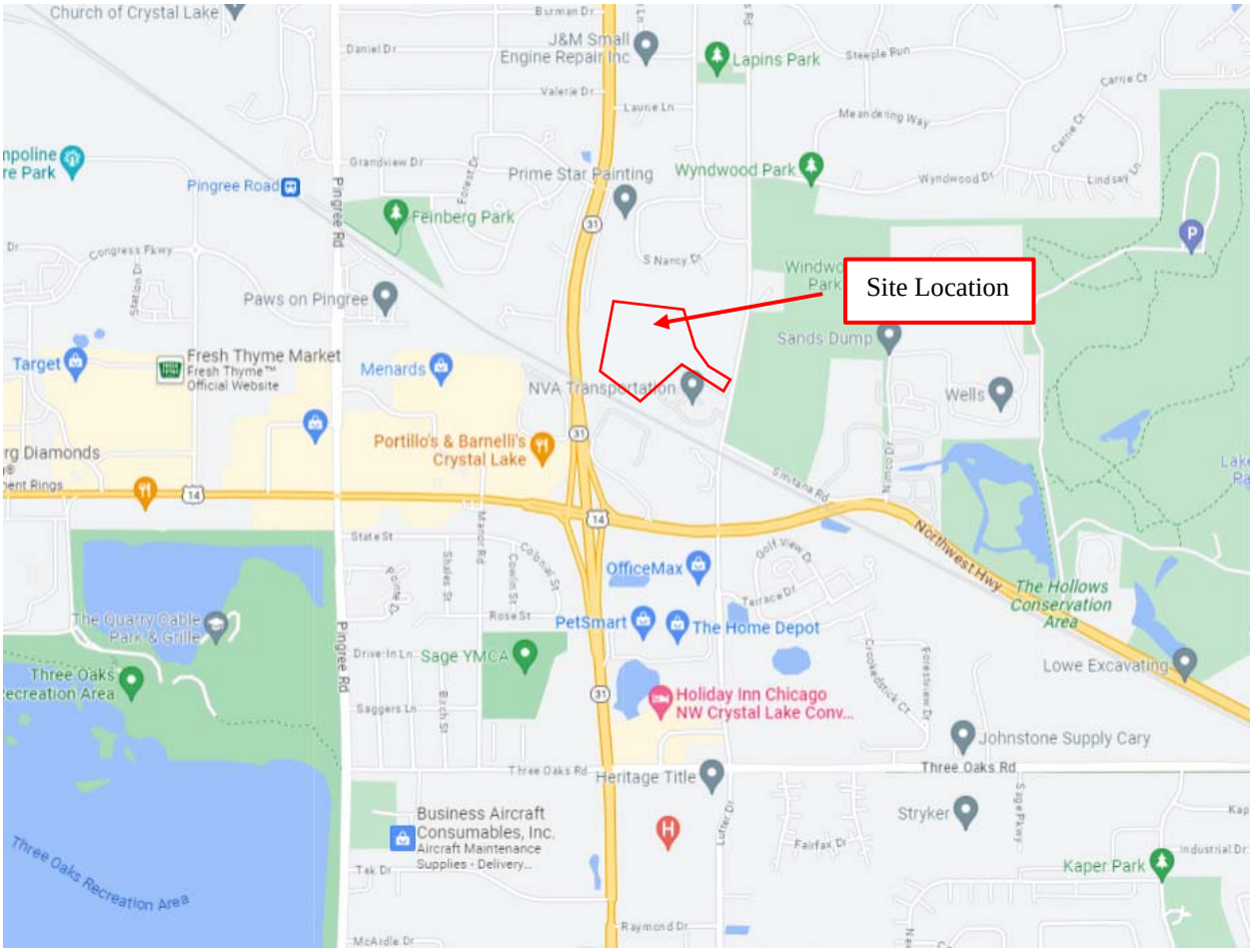
The stormwater detention pond has been sized to accommodate the 100-year, 24-hour stormwater runoff from the entire site tributary drainage area. The volume retained was determined using an allowable release rate of 0.04 cfs/are for a 2 year event and 0.15 cfs per acre for a 100-year event for the entire disturbed area. Given the specific nature of the site, a infiltration basin will be utilized for the required storage per the above release rate requirements. The existing depressional storage volume is also maintained in the proposed detention ponds at a ratio of 1 to 1. The detention ponds have been designed accordingly to treat the runoff prior to infiltration. The stormwater will first enter the storm sewer system via catch basins with sumps. Also, pretreatment forebays have been incorporated at storm sewer outfalls. Finally, bioretention facilities have been incorporated to treat the stormwater runoff prior to infiltration.

A stormwater management summary table for the proposed drainage improvements is provided on the following page and is supported by the exhibits and calculations contained within this report.

Stormwater Management Summary

Overall Property Area:	**21.48 Acres**
Hydrologically Disturbed Area:	**21.06 Acres**
Proposed Impervious Area (CN=98):	14.56 Acres
Proposed Pervious Area (CN=61):	6.50 Acres
Site Drainage Area:	CN=86.6
Release Rates:	
2-Year Allowable Release Rate: *(21.06 Acres * 0.04 cfs/Acre)*	0.84 cfs
2-Year Design Release Rate:	0.84 cfs
100-Year Allowable Release Rate: *(21.06 Acres * 0.15 cfs/Acre)*	3.16 cfs
100-Year Design Release Rate:	3.14 cfs
Total Detention Volume Required:	9.15 Acre-Feet
Total Detention Volume Provided:	10.48 Acre-Feet
West Detention Volume Provided:	6.85 Acre-Feet
East Detention Volume Provided:	3.63 Acre-Feet
Total Compensatory Volume Required:	9.06 Acre-Feet
Total Compensatory Volume Provided:	9.06 Acre-Feet
West Compensatory Volume Provided:	1.33 Acre-Feet
East Compensatory Volume Provided:	7.73 Acre-Feet

Location Map



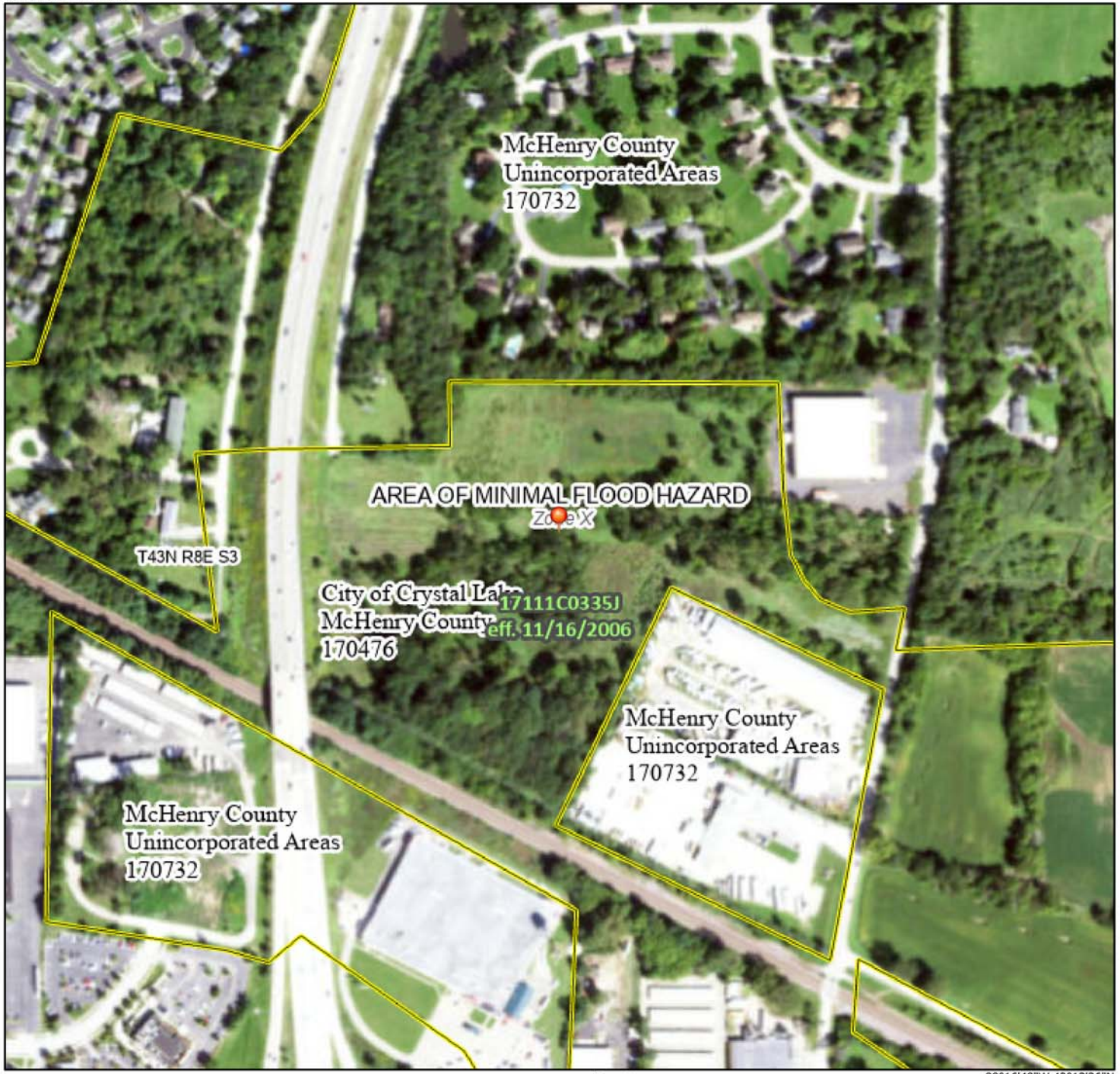
Aerial Map



National Flood Hazard Layer FIRMette

FEMA

88°17'26"W 42°14'3"N



88°16'48"W 42°13'36"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

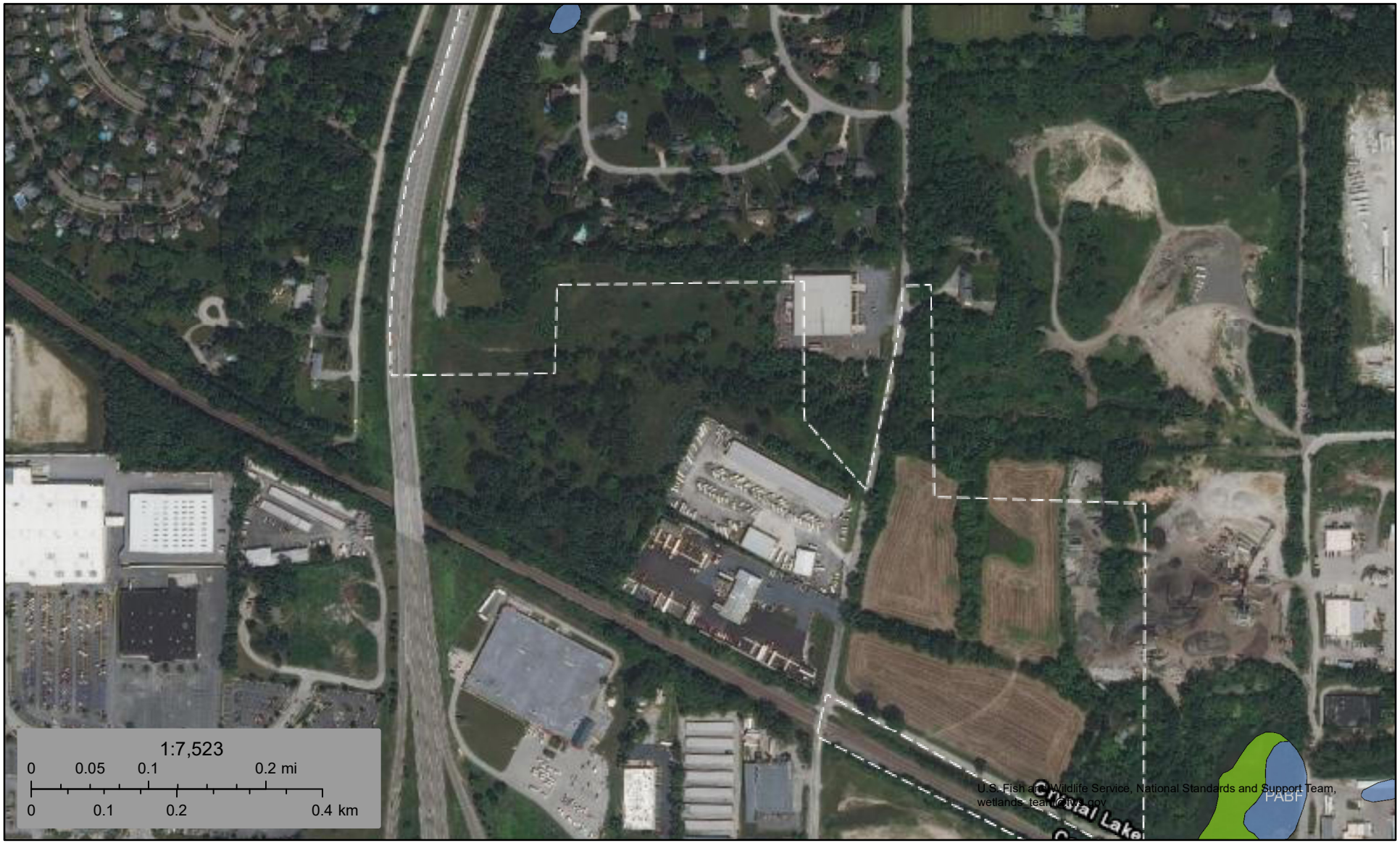
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/20/2023 at 4:12 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

U.S. Fish and Wildlife Service

National Wetlands Inventory

G985

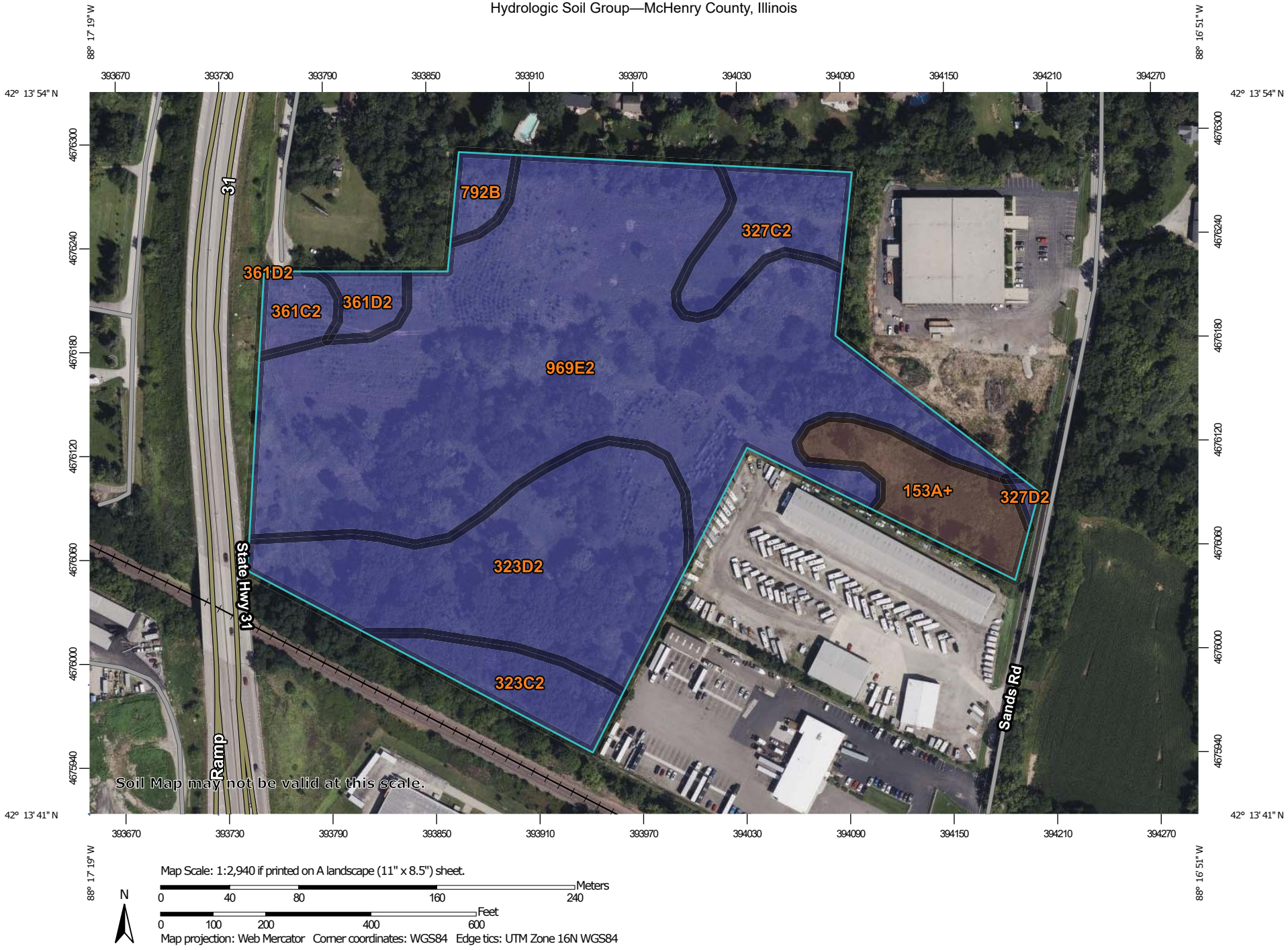


October 20, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



Map Scale: 1:2,940 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: McHenry County, Illinois
Survey Area Data: Version 19, Aug 28, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 19, 2022—Sep 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
153A+	Pella silt loam, 0 to 2 percent slopes, overwash	B/D	1.4	6.1%
323C2	Casco loam, 4 to 6 percent slopes, eroded	B	1.0	4.5%
323D2	Casco loam, 6 to 12 percent slopes, eroded	B	4.8	21.4%
327C2	Fox silt loam, 4 to 6 percent slopes, eroded	B	1.2	5.5%
327D2	Fox loam, 6 to 12 percent slopes, eroded	B	0.1	0.3%
361C2	Kidder loam, 4 to 6 percent slopes, eroded	B	0.4	2.0%
361D2	Kidder loam, 6 to 12 percent slopes, eroded	B	0.4	1.7%
792B	Bowes silt loam, 2 to 4 percent slopes	B	0.4	1.6%
969E2	Casco-Rodman complex, 12 to 20 percent slopes, eroded	B	12.7	56.9%
Totals for Area of Interest			**22.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

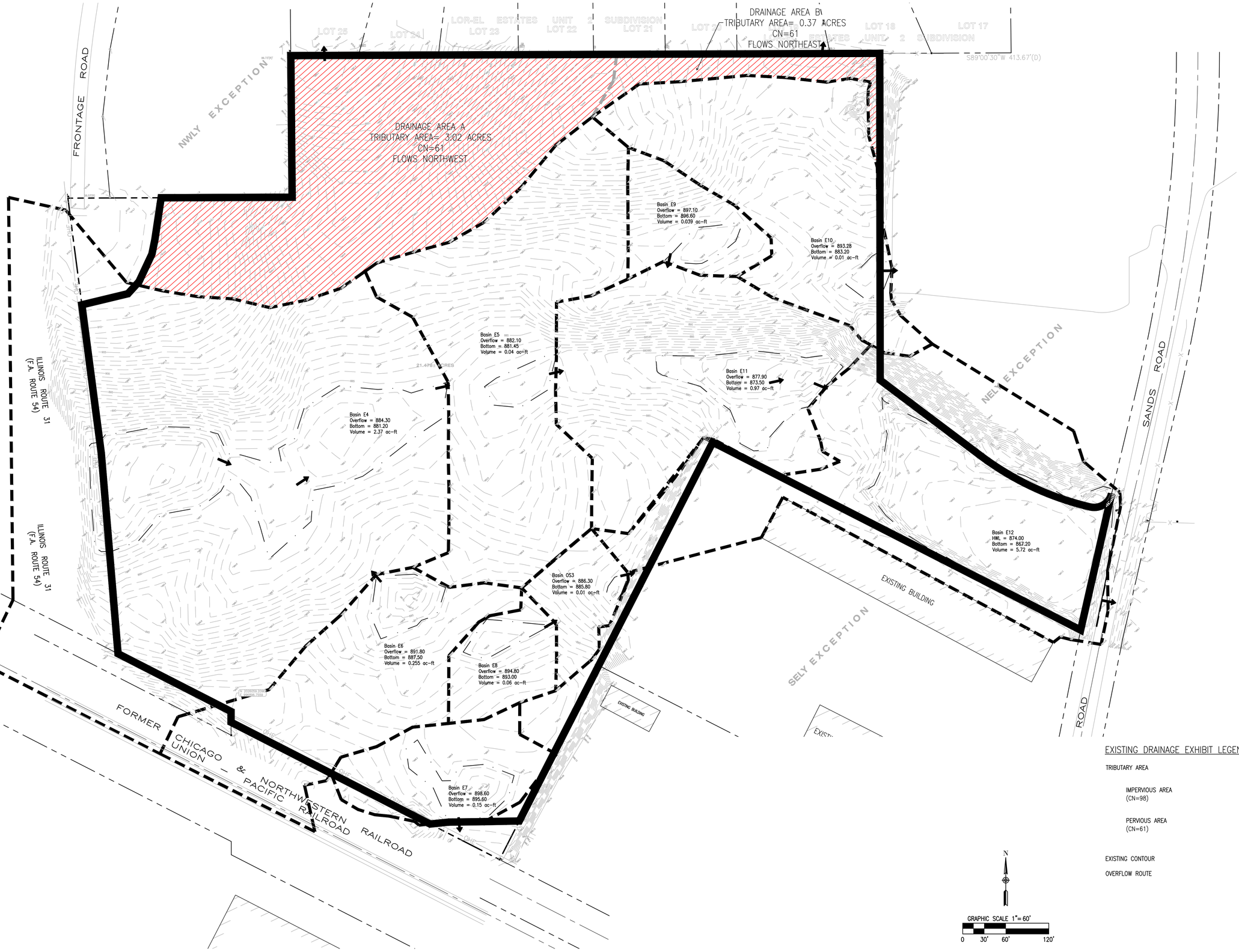
Tie-break Rule: Higher

Stormwater Detention Calculations

- Existing Drainage Plan – EX-1
  - Existing Conditions Hydrograph

- Proposed Drainage Plan – EX-2

  - Proposed Conditions Curve Number Calculations
  - Proposed Conditions Stage – Storage – Discharge Calculations
  - Proposed Conditions Hydrographs and Stage Storage Calculations
    - 2-Year, 24 Hour Storm Event
    - 100-Year, 24 Hour Storm Event
  - Runoff Volume Reduction Calculations
  - Overflow Weir Exhibit – OW-1
  - Overland Flow Weir Calculations
  - Driveway Channel Critical Duration
  - Driveway Channel Capacity Calculations



EXISTING DRAINAGE PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

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G985

1" = 50'

EDP

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JACOB & HEFNER
ASSOCIATES

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Curve Number (CN) Computation
EXISTING CONDITIONS

Project: NVA Trucking Facility Expansion By: TB Date: 10/20/2023
Location: Crystal Lake Checked: Date:
Project #: G985

Existing Total Drainage Area			
Runoff Coefficients	**CN**	**Area (ac)**	**CN Factor**
Pervious Areas	61	21.14	1289.5
Impervious Areas	98	0	0.0
	Totals:	**21.14**	**61.0**

Hydraflow Table of Contents

Ex. Conditions Hydrographs

G579 Existing Hydrographs.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Friday, 12 / 2 / 2022

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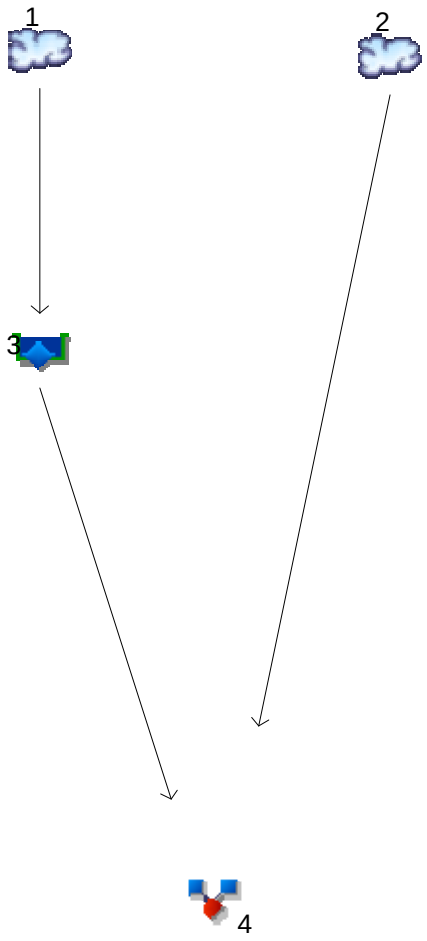
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Watershed Model Schematic

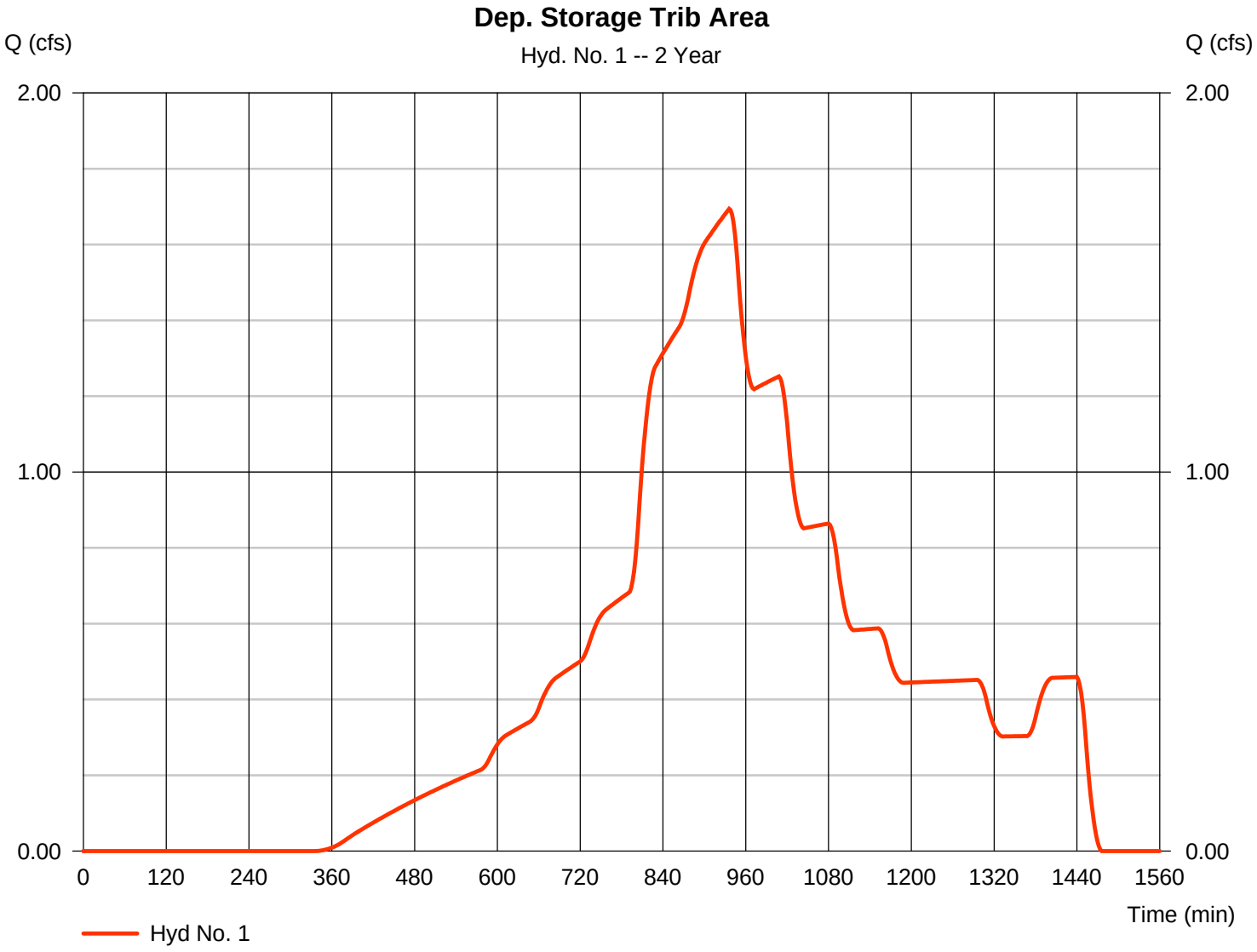


Hydrograph Report

Hyd. No. 1

Dep. Storage Trib Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.694 cfs
Storm frequency	=	2 yrs	Time to peak	=	936 min
Time interval	=	2 min	Hyd. volume	=	0.909 acft
Drainage area	=	6.690 ac	Curve number	=	81.3
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.40 min
Total precip.	=	3.34 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

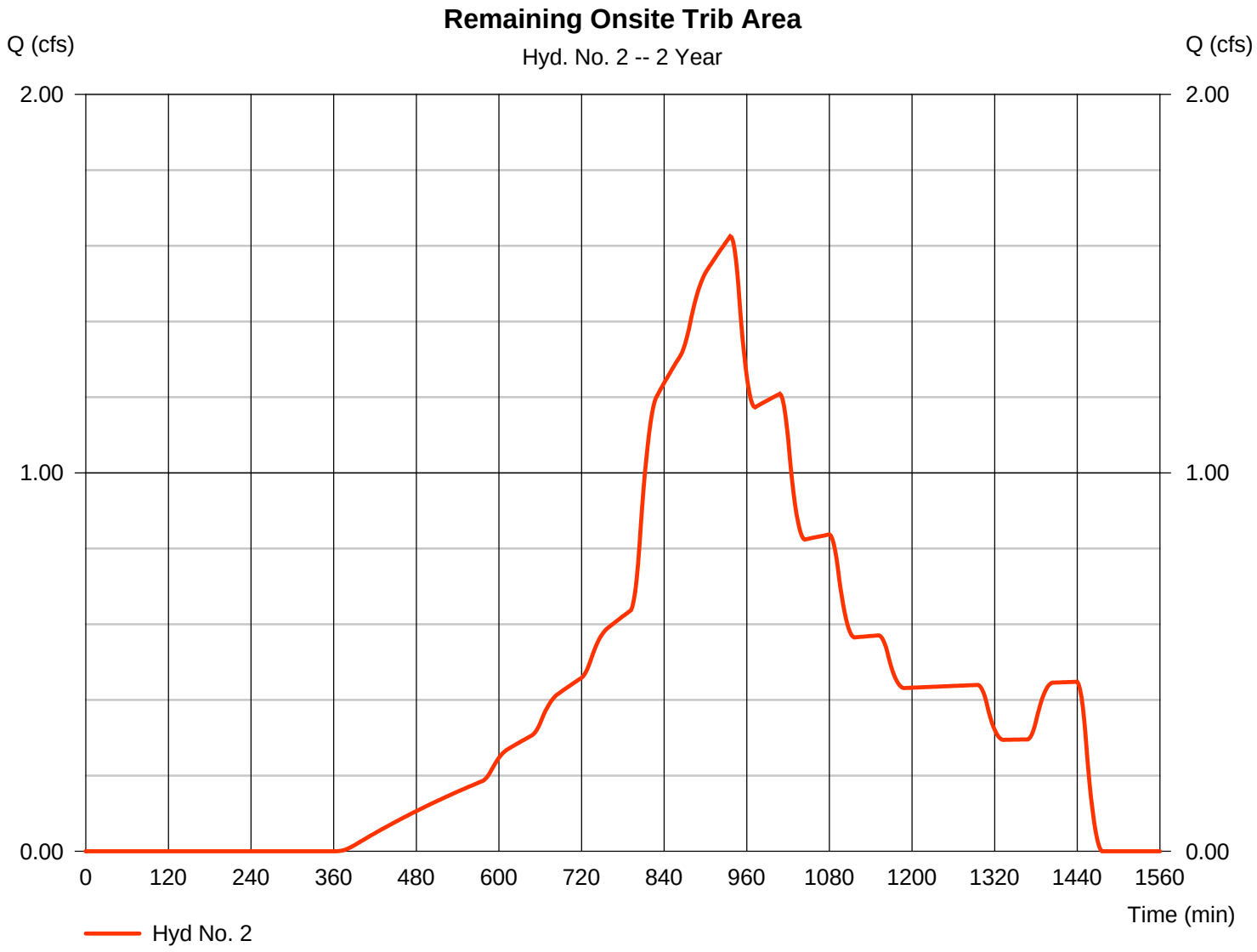


Hydrograph Report

Hyd. No. 2

Remaining Onsite Trib Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.625 cfs
Storm frequency	=	2 yrs	Time to peak	=	936 min
Time interval	=	2 min	Hyd. volume	=	0.860 acft
Drainage area	=	6.710 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.90 min
Total precip.	=	3.34 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



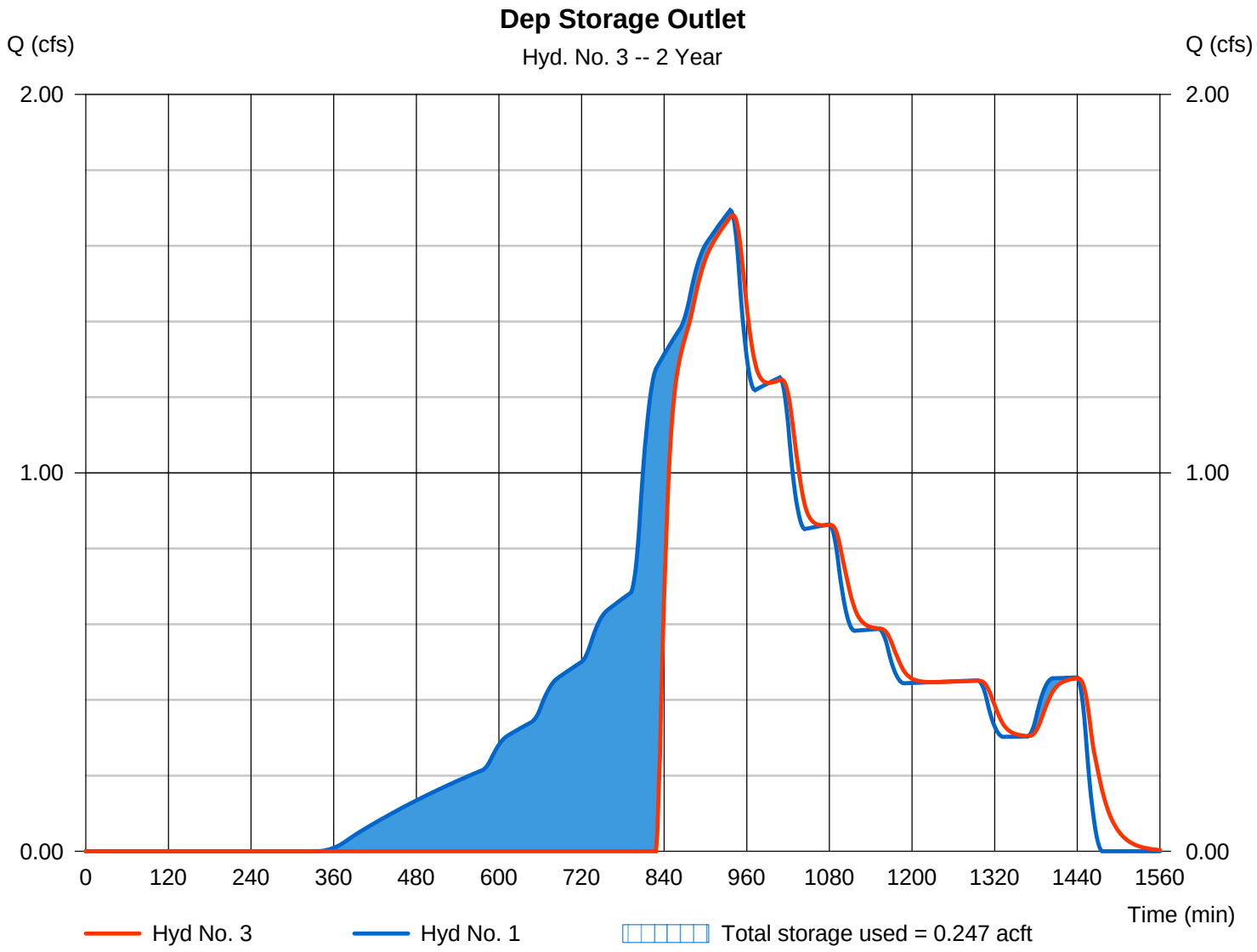
Hydrograph Report

Hyd. No. 3

Dep Storage Outlet

Hydrograph type	=	Reservoir	Peak discharge	=	1.681 cfs
Storm frequency	=	2 yrs	Time to peak	=	940 min
Time interval	=	2 min	Hyd. volume	=	0.688 acft
Inflow hyd. No.	=	1 - Dep. Storage Trib Area	Max. Elevation	=	553.03 ft
Reservoir name	=	<New Pond>	Max. Storage	=	0.247 acft

Storage Indication method used.



Pond Report

Pond No. 1 - <New Pond>

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 551.90 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	551.90	185	0.000	0.000
0.10	552.00	933	0.001	0.001
0.20	552.10	1,523	0.003	0.004
0.30	552.20	2,323	0.004	0.009
0.40	552.30	3,393	0.007	0.015
0.50	552.40	4,879	0.009	0.025
0.60	552.50	6,784	0.013	0.038
0.70	552.60	8,955	0.018	0.056
0.80	552.70	11,435	0.023	0.079
0.90	552.80	16,838	0.032	0.112
1.00	552.90	23,443	0.046	0.158
1.10	553.00	30,829	0.062	0.220
1.20	553.10	39,313	0.081	0.301
1.30	553.20	49,469	0.102	0.403
1.40	553.30	60,316	0.126	0.529
1.50	553.40	70,999	0.151	0.680
1.60	553.50	79,469	0.173	0.852

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)	= 105.00	0.00	0.00	0.00
Crest El. (ft)	= 553.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

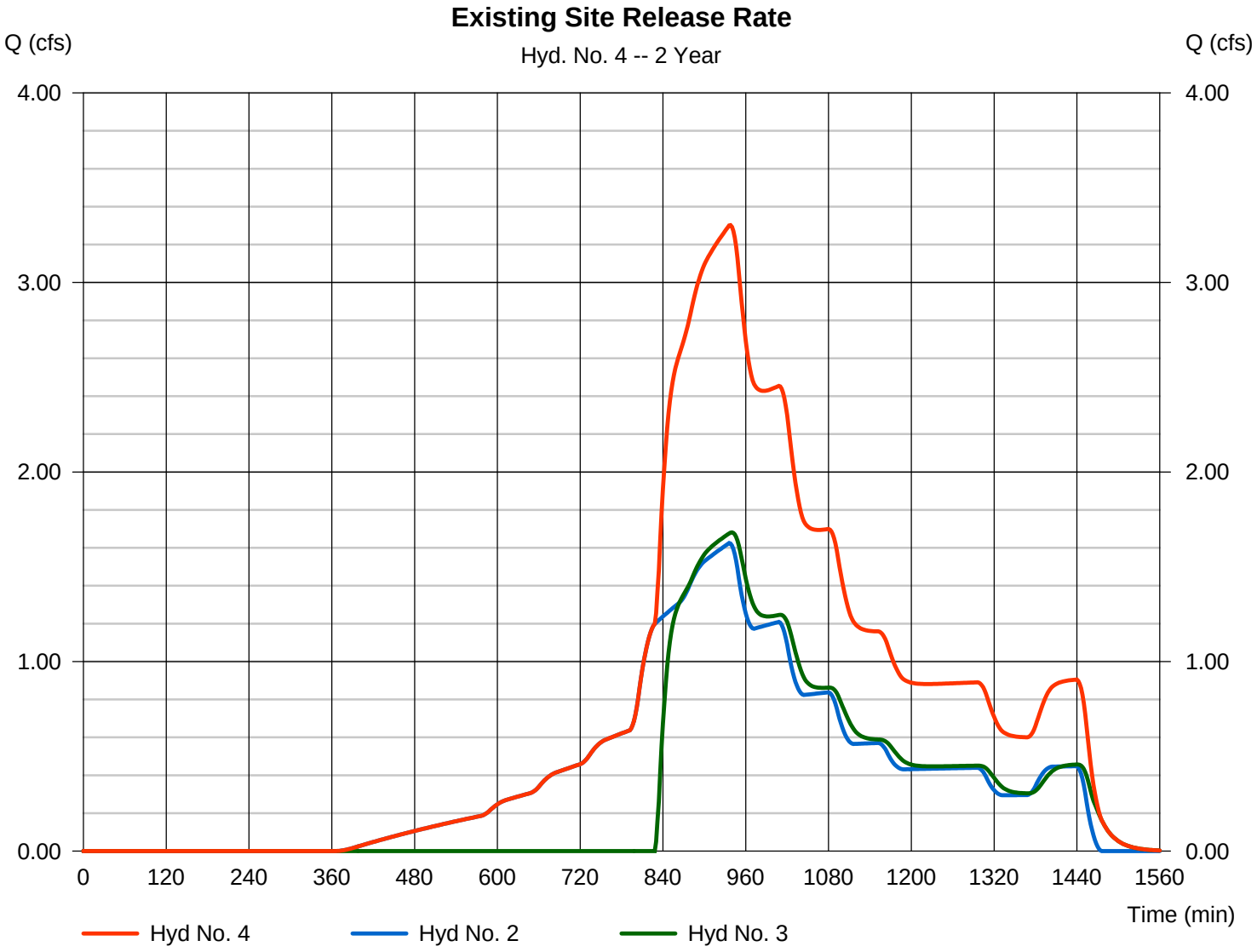
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	551.90	---	---	---	---	0.00	---	---	---	---	---	0.000
0.10	0.001	552.00	---	---	---	---	0.00	---	---	---	---	---	0.000
0.20	0.004	552.10	---	---	---	---	0.00	---	---	---	---	---	0.000
0.30	0.009	552.20	---	---	---	---	0.00	---	---	---	---	---	0.000
0.40	0.015	552.30	---	---	---	---	0.00	---	---	---	---	---	0.000
0.50	0.025	552.40	---	---	---	---	0.00	---	---	---	---	---	0.000
0.60	0.038	552.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.70	0.056	552.60	---	---	---	---	0.00	---	---	---	---	---	0.000
0.80	0.079	552.70	---	---	---	---	0.00	---	---	---	---	---	0.000
0.90	0.112	552.80	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	0.158	552.90	---	---	---	---	0.00	---	---	---	---	---	0.000
1.10	0.220	553.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.20	0.301	553.10	---	---	---	---	8.64	---	---	---	---	---	8.638
1.30	0.403	553.20	---	---	---	---	24.42	---	---	---	---	---	24.42
1.40	0.529	553.30	---	---	---	---	44.87	---	---	---	---	---	44.87
1.50	0.680	553.40	---	---	---	---	69.07	---	---	---	---	---	69.07
1.60	0.852	553.50	---	---	---	---	96.52	---	---	---	---	---	96.52

Hydrograph Report

Hyd. No. 4

Existing Site Release Rate

Hydrograph type	= Combine	Peak discharge	= 3.302 cfs
Storm frequency	= 2 yrs	Time to peak	= 938 min
Time interval	= 2 min	Hyd. volume	= 1.548 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 6.710 ac

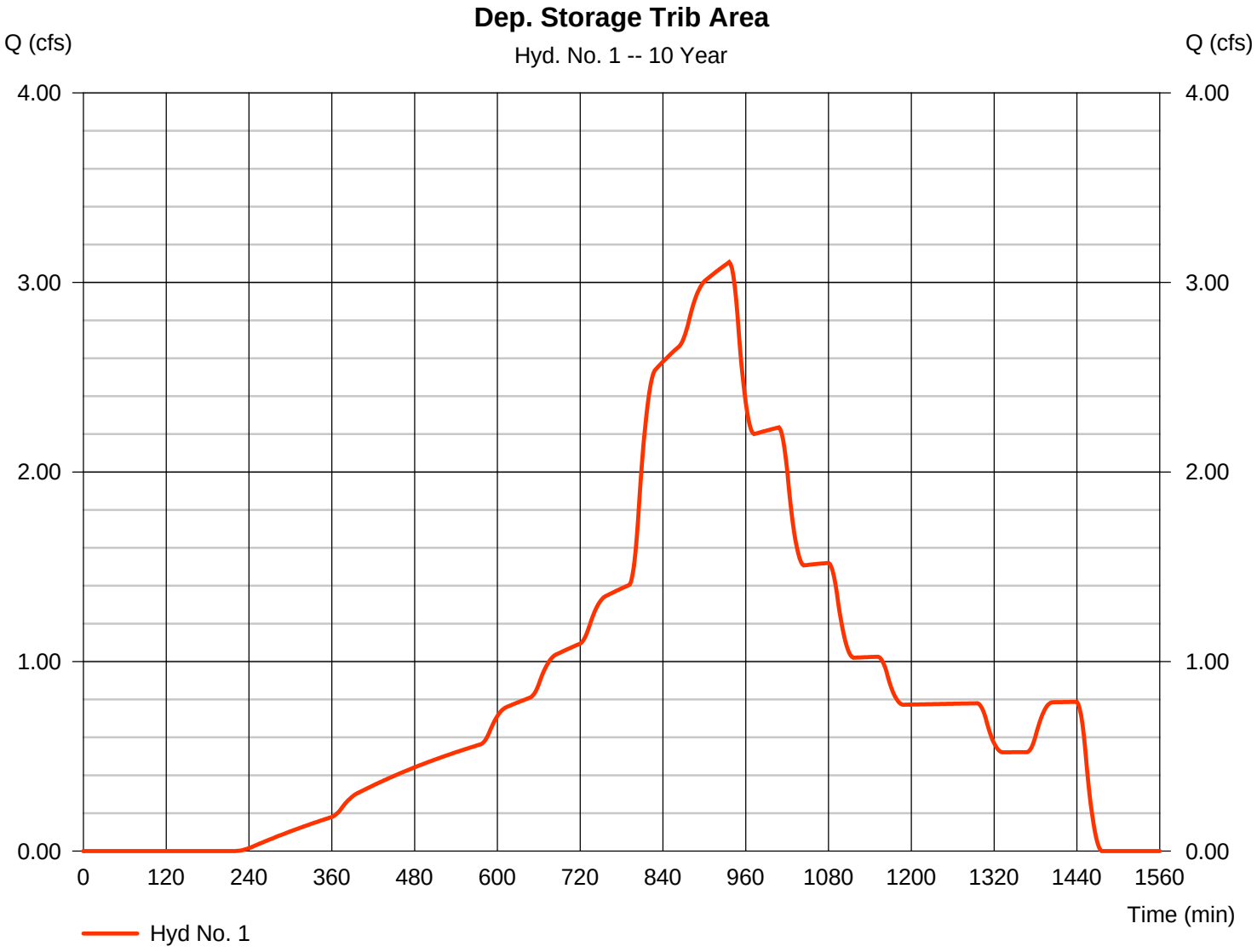


Hydrograph Report

Hyd. No. 1

Dep. Storage Trib Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.107 cfs
Storm frequency	=	10 yrs	Time to peak	=	936 min
Time interval	=	2 min	Hyd. volume	=	1.786 acft
Drainage area	=	6.690 ac	Curve number	=	81.3
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.40 min
Total precip.	=	5.15 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

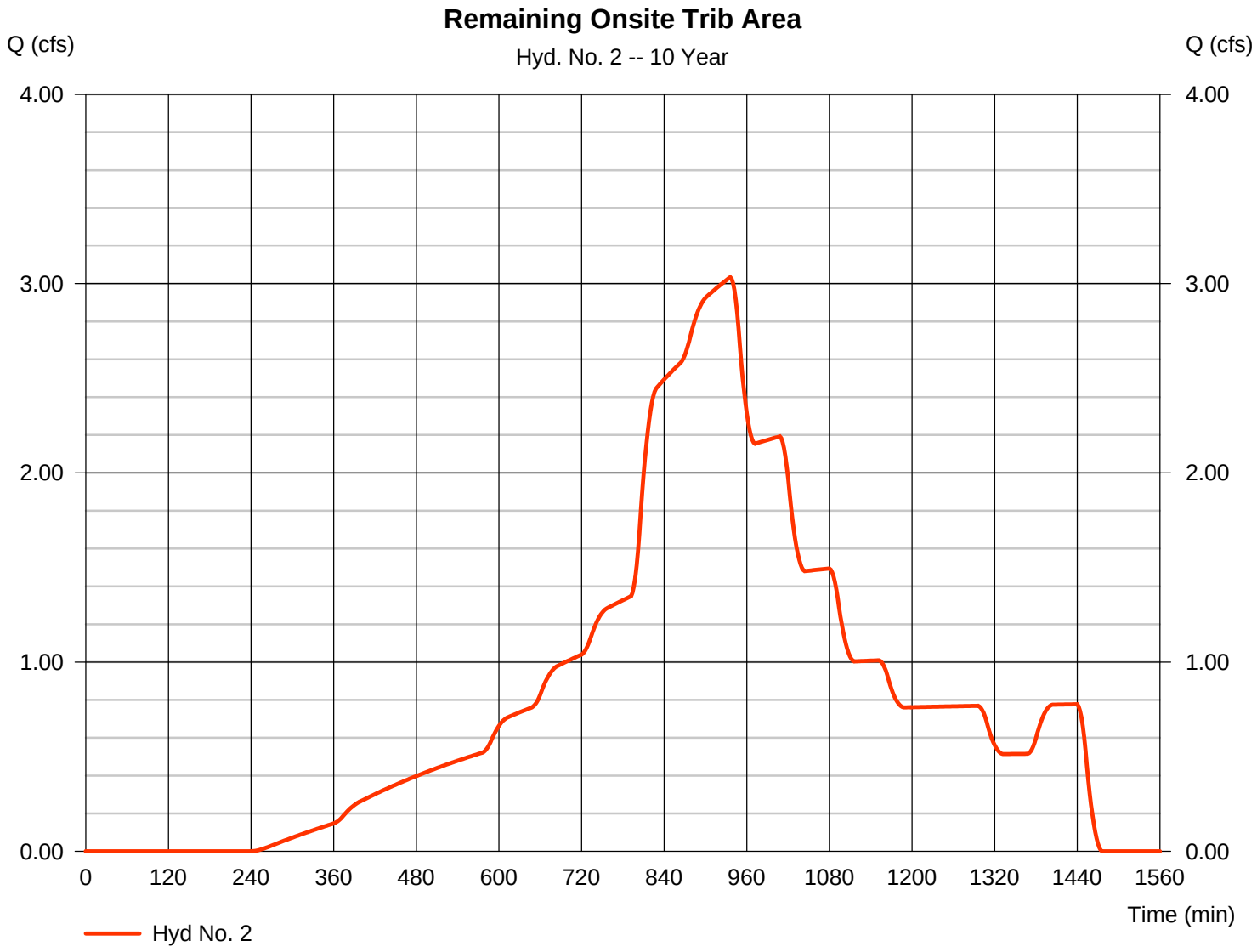


Hydrograph Report

Hyd. No. 2

Remaining Onsite Trib Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.034 cfs
Storm frequency	=	10 yrs	Time to peak	=	936 min
Time interval	=	2 min	Hyd. volume	=	1.721 acft
Drainage area	=	6.710 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.90 min
Total precip.	=	5.15 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



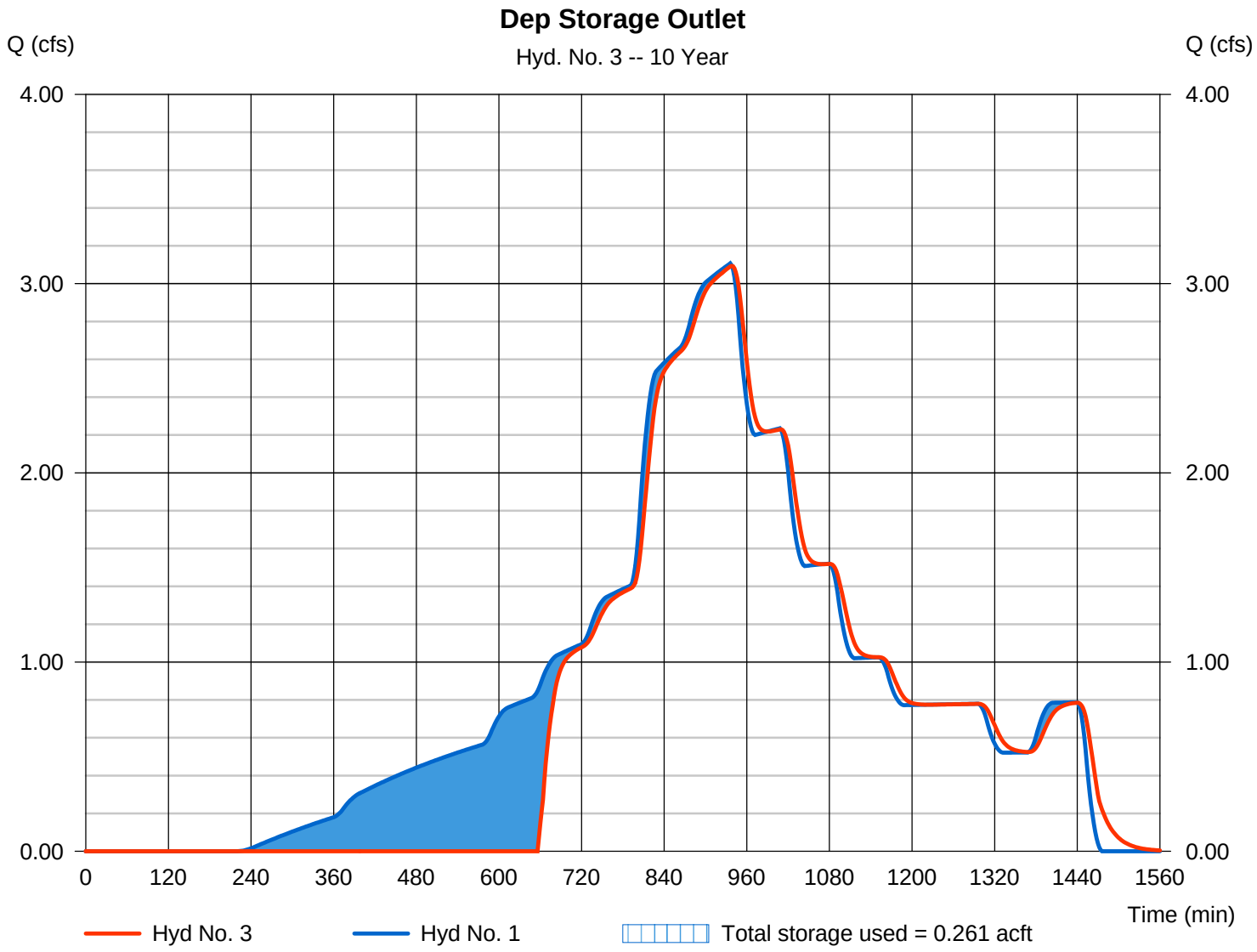
Hydrograph Report

Hyd. No. 3

Dep Storage Outlet

Hydrograph type	=	Reservoir	Peak discharge	=	3.094 cfs
Storm frequency	=	10 yrs	Time to peak	=	938 min
Time interval	=	2 min	Hyd. volume	=	1.565 acft
Inflow hyd. No.	=	1 - Dep. Storage Trib Area	Max. Elevation	=	553.05 ft
Reservoir name	=	<New Pond>	Max. Storage	=	0.261 acft

Storage Indication method used.

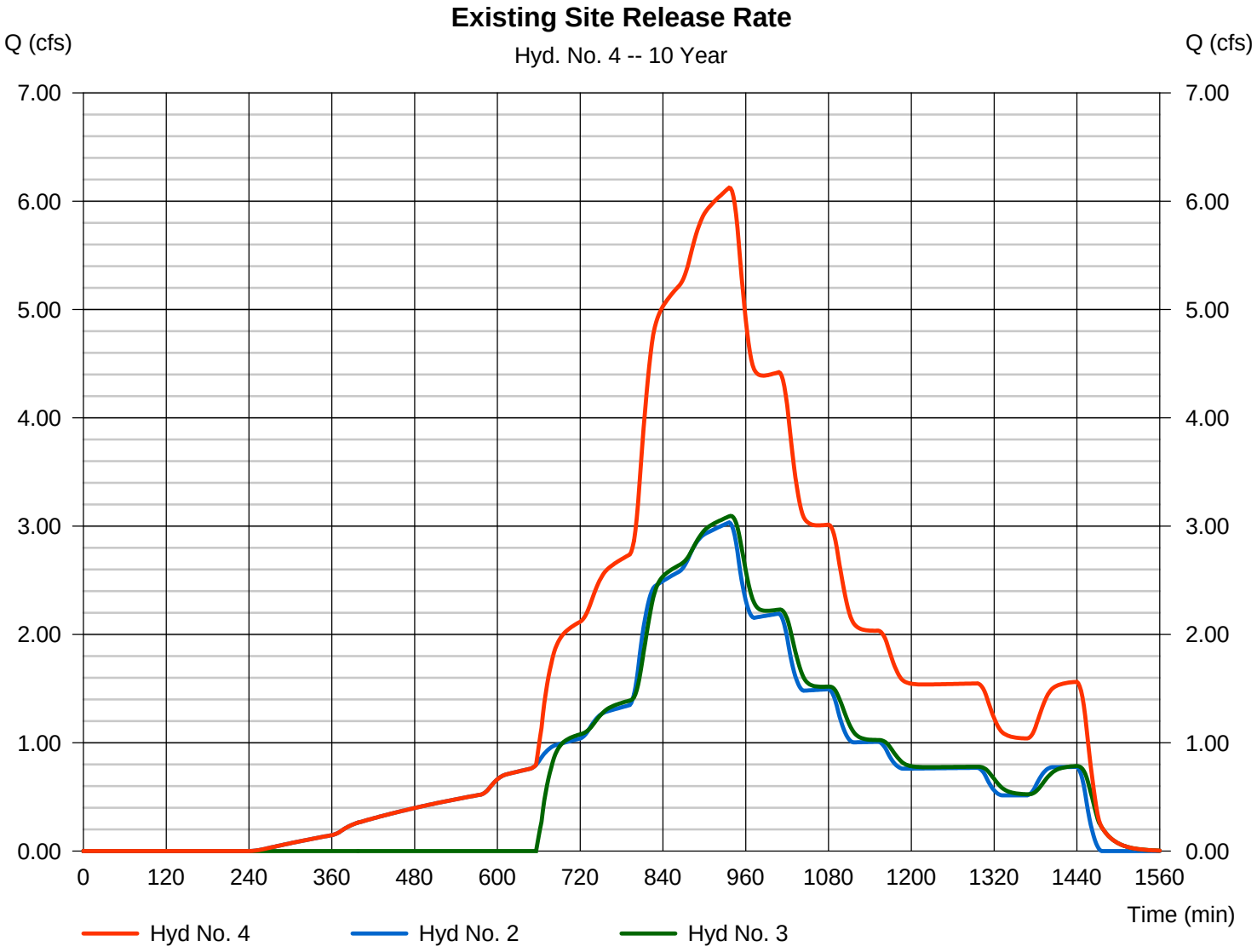


Hydrograph Report

Hyd. No. 4

Existing Site Release Rate

Hydrograph type	= Combine	Peak discharge	= 6.125 cfs
Storm frequency	= 10 yrs	Time to peak	= 936 min
Time interval	= 2 min	Hyd. volume	= 3.286 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 6.710 ac

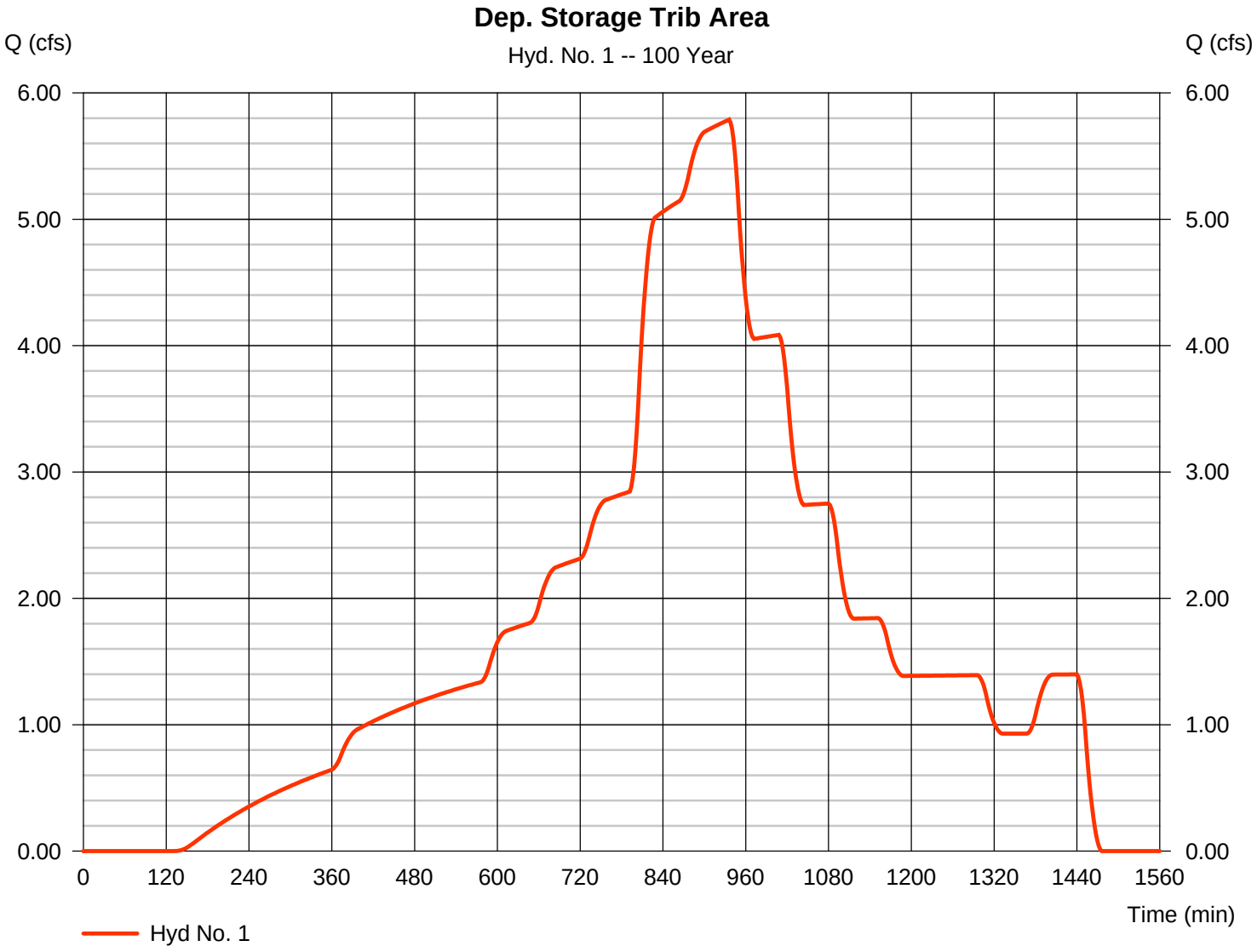


Hydrograph Report

Hyd. No. 1

Dep. Storage Trib Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.788 cfs
Storm frequency	=	100 yrs	Time to peak	=	936 min
Time interval	=	2 min	Hyd. volume	=	3.585 acft
Drainage area	=	6.690 ac	Curve number	=	81.3
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.40 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

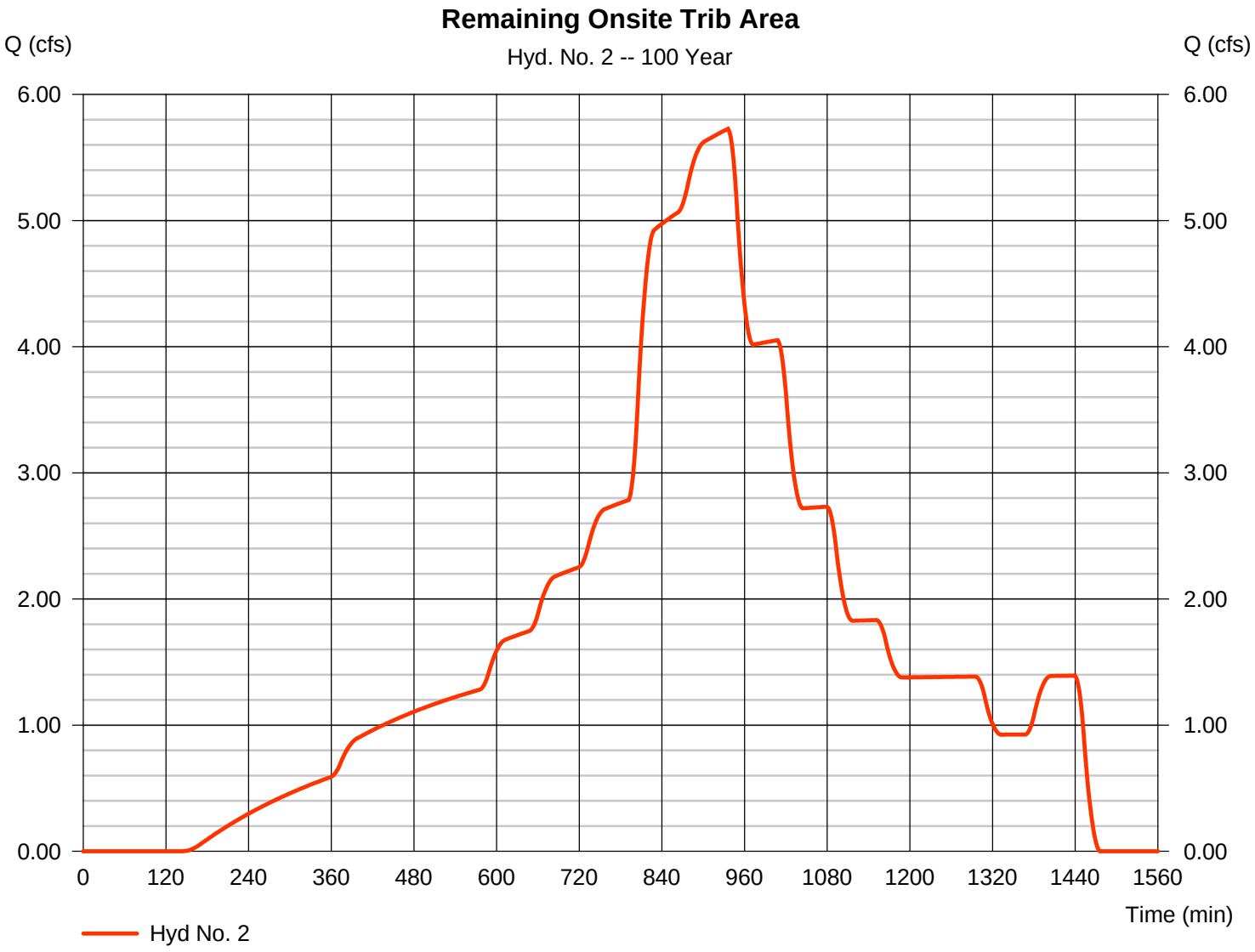


Hydrograph Report

Hyd. No. 2

Remaining Onsite Trib Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.727 cfs
Storm frequency	=	100 yrs	Time to peak	=	936 min
Time interval	=	2 min	Hyd. volume	=	3.507 acft
Drainage area	=	6.710 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.90 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



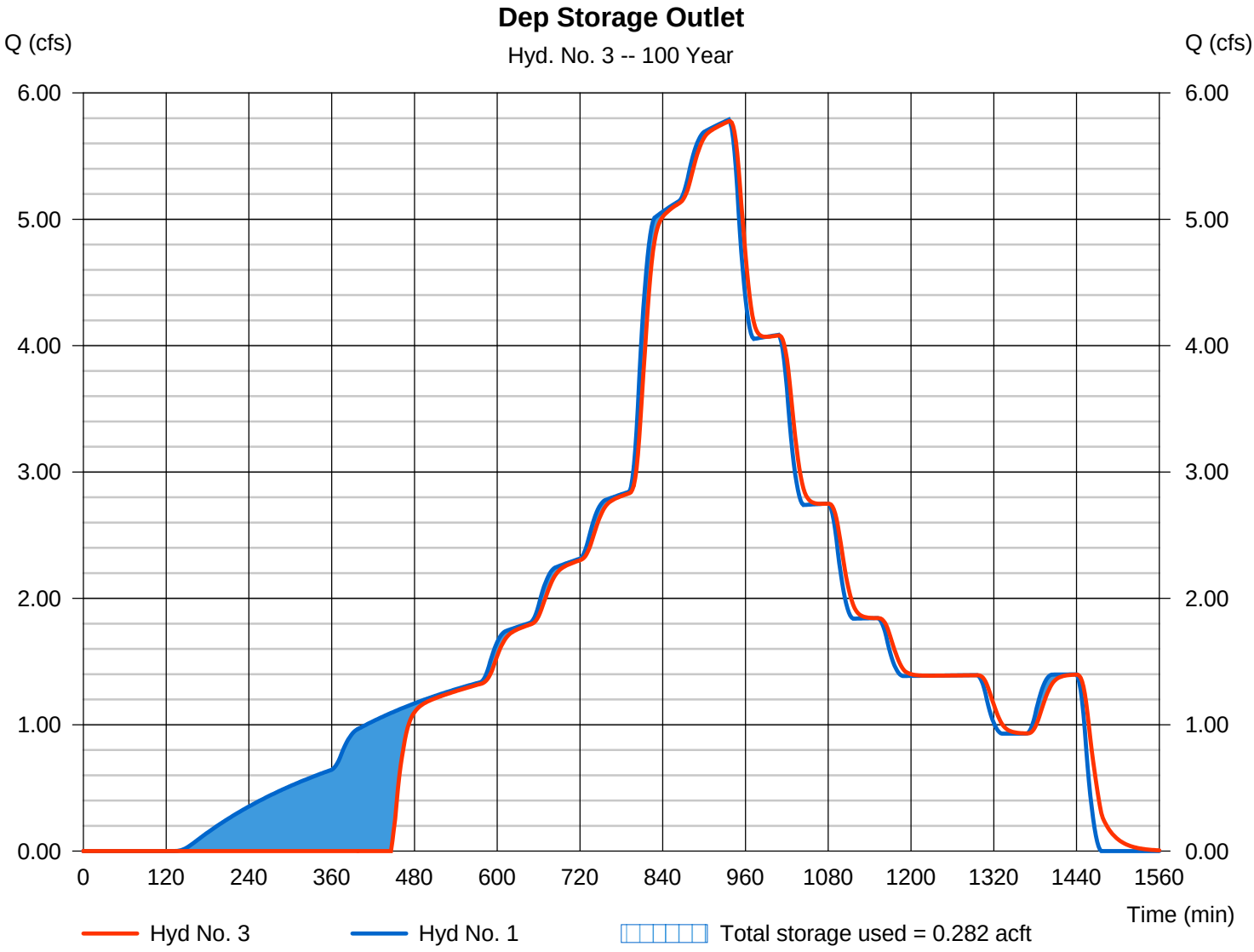
Hydrograph Report

Hyd. No. 3

Dep Storage Outlet

Hydrograph type	=	Reservoir	Peak discharge	=	5.776 cfs
Storm frequency	=	100 yrs	Time to peak	=	938 min
Time interval	=	2 min	Hyd. volume	=	3.365 acft
Inflow hyd. No.	=	1 - Dep. Storage Trib Area	Max. Elevation	=	553.08 ft
Reservoir name	=	<New Pond>	Max. Storage	=	0.282 acft

Storage Indication method used.

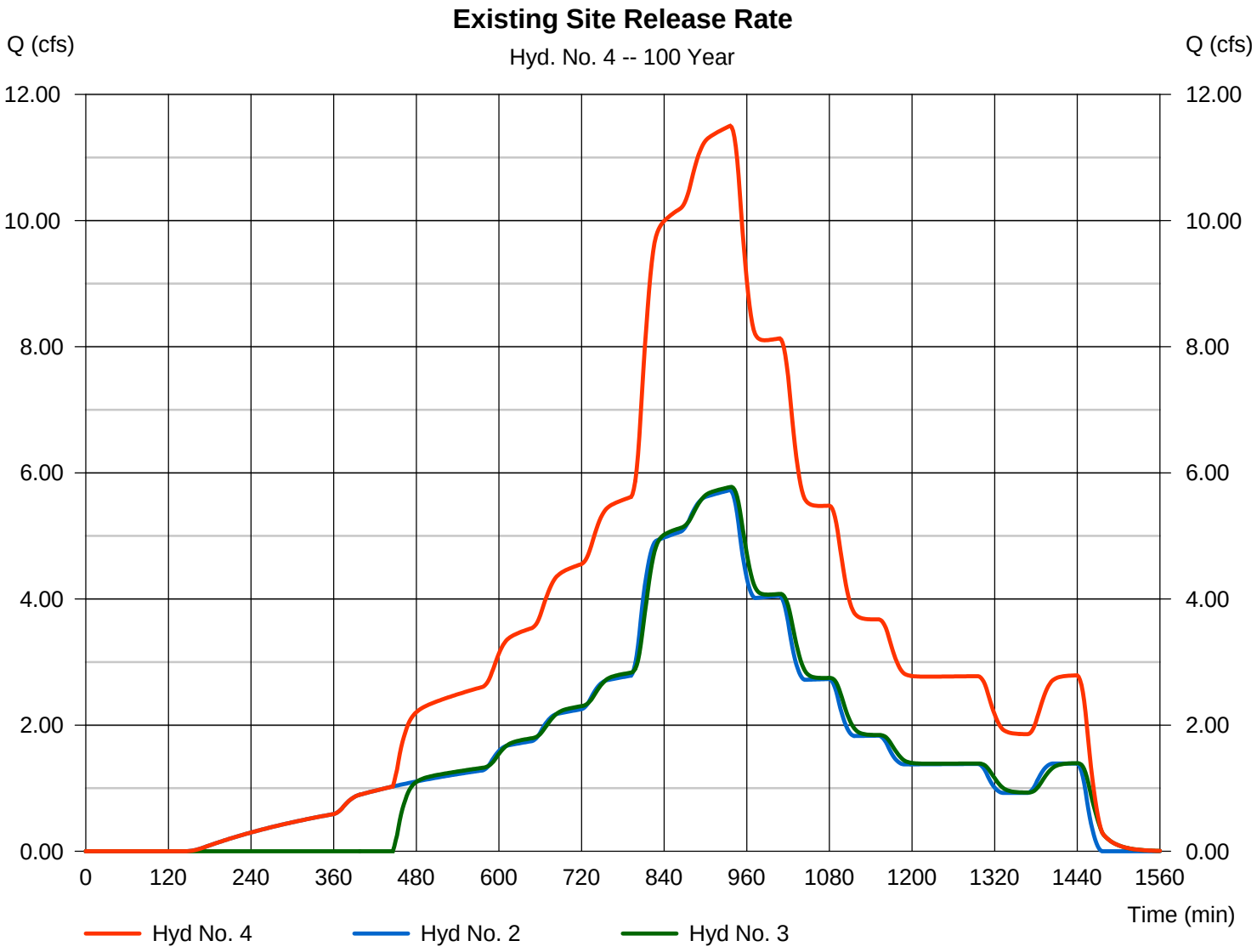


Hydrograph Report

Hyd. No. 4

Existing Site Release Rate

Hydrograph type	= Combine	Peak discharge	= 11.50 cfs
Storm frequency	= 100 yrs	Time to peak	= 936 min
Time interval	= 2 min	Hyd. volume	= 6.871 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 6.710 ac



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Existing Depressional Storage
Critical Duration Summary

Project: NVA
Location: Crystal Lake, IL
Project #: G985

By: DM
Checked: RJB

Date: 10/23/2023
Date: 10/23/2023

Hydrograph Flow Rate Summary

Storm Duration	E4	E5	E6	E9	E11	E12
(hour)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
0.25	0.090	0.028	0.021	0.007	0.035	0.032
0.5	0.271	0.037	0.062	0.020	0.158	0.095
1	0.520	0.040	0.119	0.036	0.331	0.181
2	0.849	0.040	0.194	0.038	0.579	0.296
3	1.050	0.040	0.240	0.038	0.731	0.366
6	1.530	0.037	0.248	0.038	0.853	0.786
12	2.100	0.037	0.251	0.039	0.877	1.300
18	2.340	0.037	0.254	0.039	0.906	1.790
24	2.340	0.037	0.255	0.038	0.910	2.360
48	2.370	0.040	0.250	0.036	0.970	3.190
72	2.370	0.039	0.248	0.036	0.945	3.860
					At elevation 874.00 =	5.720

Comopensatory storage is provided for depressional areas large enough to be considered depressional storage areas (>0.75 ac-ft)

As E12 does not overflow, storage is provided to an elevation of 874, adjacent to the roadway without ponding in the roadway.

Total depressional storage = 2.370 + 0.970 + 5.720
Total depressional storage = **9.06 ac-ft**

Hydraflow Table of Contents

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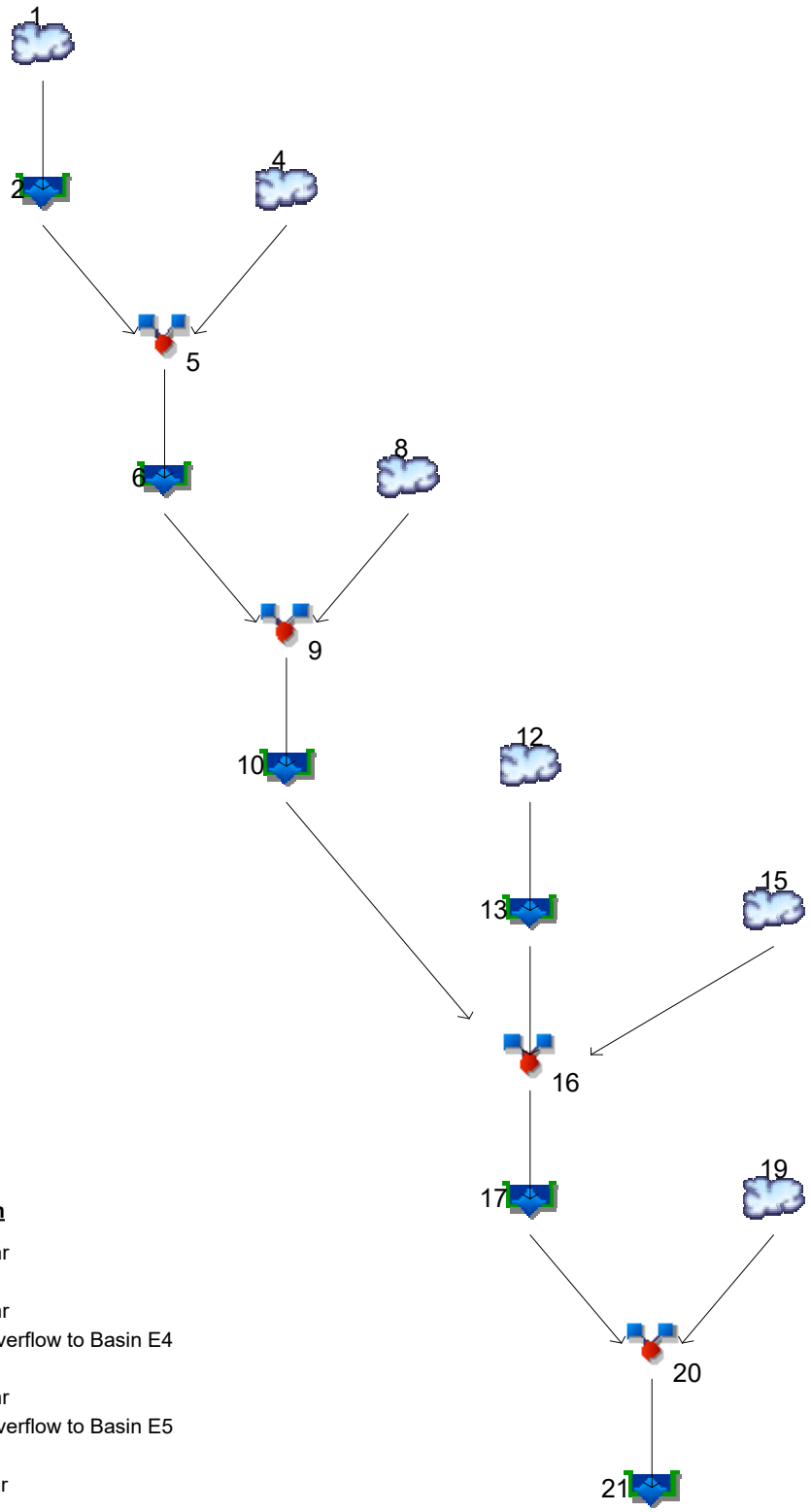
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100 Year-0.25 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

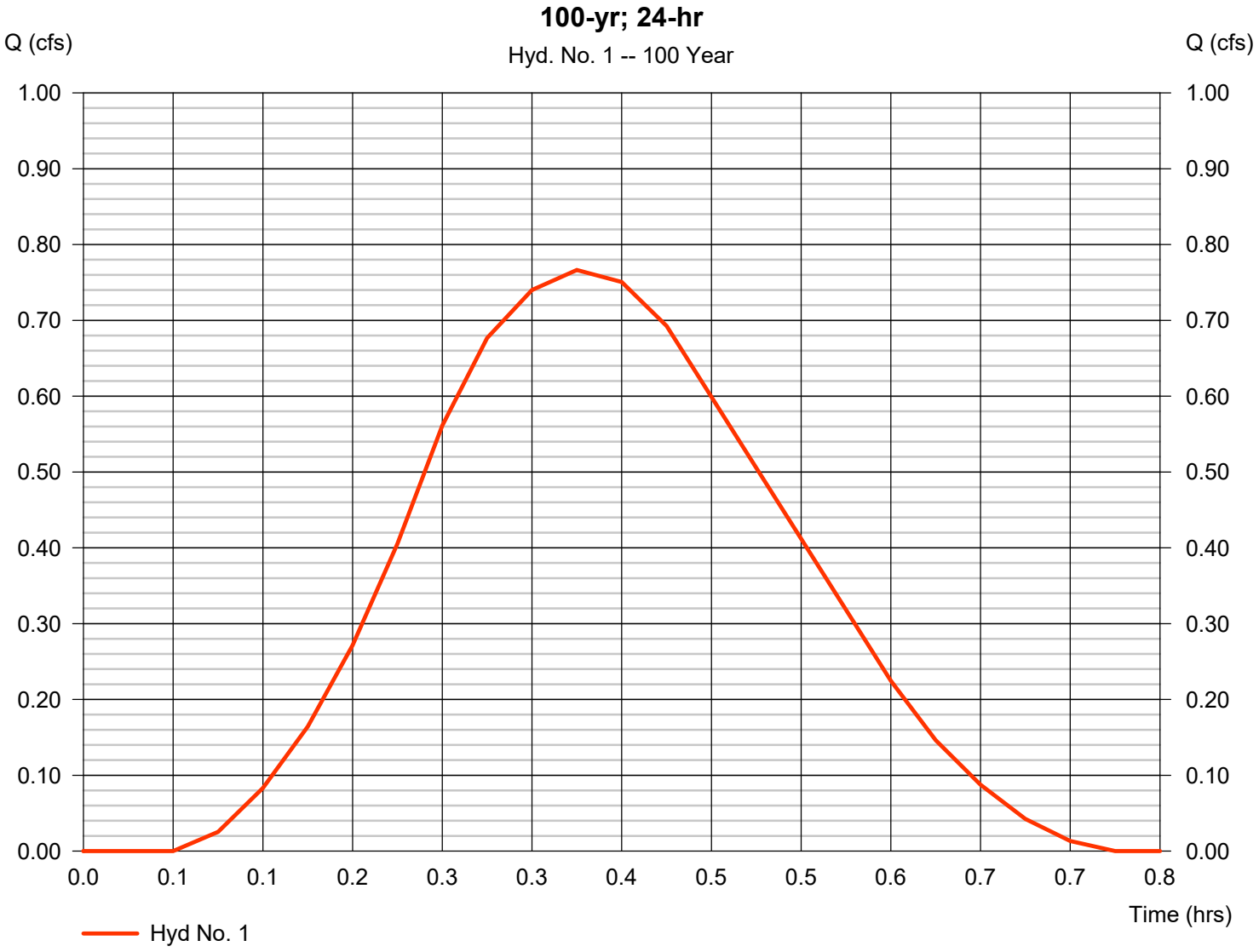
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	0.766	2	22	0.021	------	------	------	100-yr; 24-hr
2	Reservoir	0.000	2	n/a	0.000	1	889.07	0.021	Basin E6
4	SCS Runoff	1.635	2	38	0.090	------	------	------	100-yr; 24-hr
5	Combine	1.635	2	38	0.090	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	0.000	2	n/a	0.000	5	880.12	0.090	Basin E4
8	SCS Runoff	0.890	2	28	0.033	------	------	------	100-yr; 24-hr
9	Combine	0.890	2	28	0.033	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	0.362	2	46	0.007	9	882.12	0.028	Basin E5
12	SCS Runoff	0.324	2	18	0.007	------	------	------	100-yr; 24 hr
13	Reservoir	0.000	2	n/a	0.000	12	896.78	0.007	Basin E9
15	SCS Runoff	1.038	2	22	0.028	------	------	------	100-yr; 24-hr
16	Combine	1.038	2	22	0.035	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	0.000	2	n/a	0.000	16	874.58	0.035	Basin E11
19	SCS Runoff	0.839	2	28	0.032	------	------	------	100-yr; 24-hr
20	Combine	0.839	2	28	0.032	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	867.33	0.032	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.766 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.37 hrs
Time interval	=	2 min	Hyd. volume	=	0.021 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	2.32 in	Distribution	=	Huff-1st
Storm duration	=	0.25 hrs	Shape factor	=	484



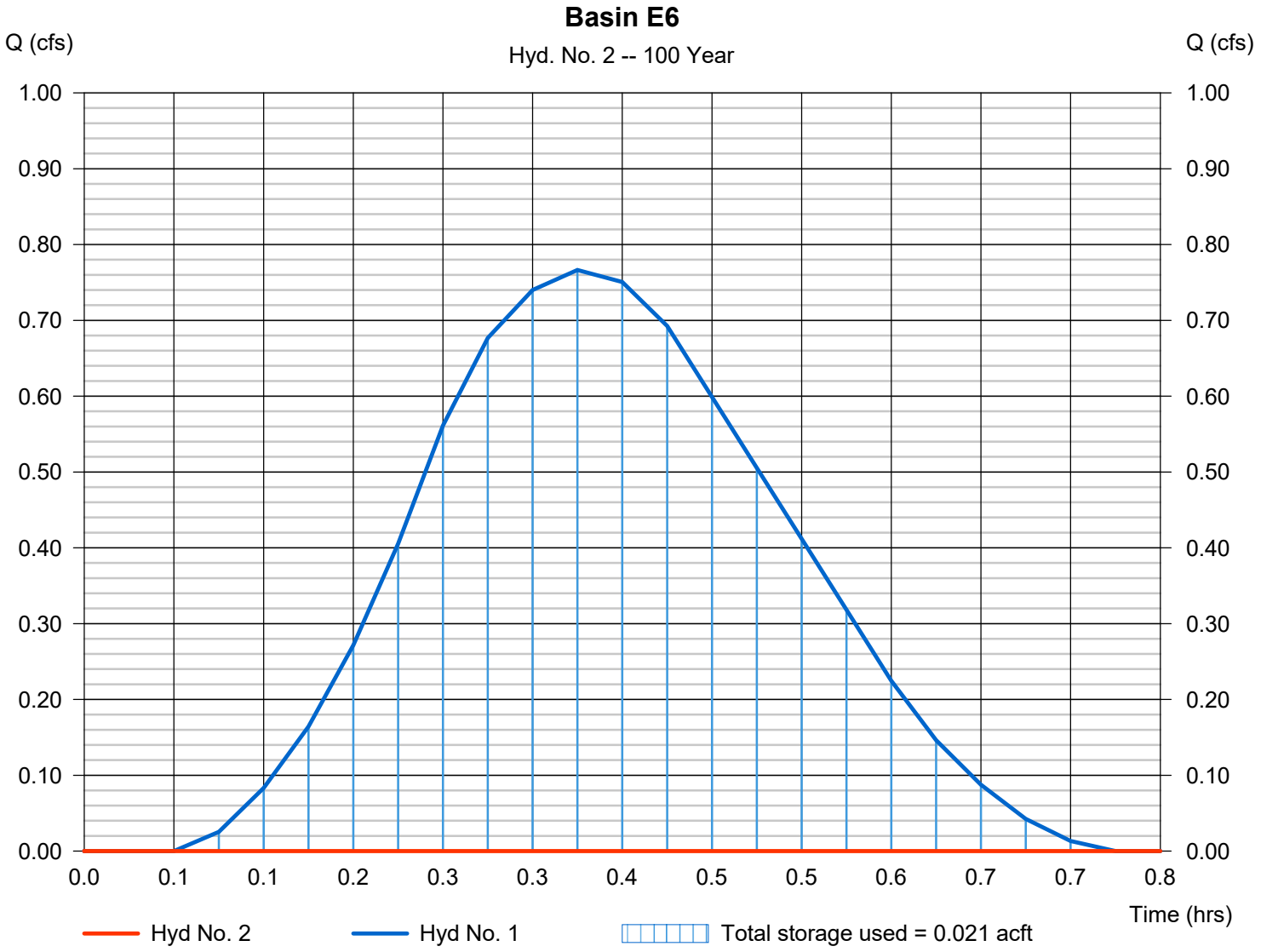
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	889.07 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.021 acft

Storage Indication method used.



Pond Report

Pond No. 1 - Basin E6

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 887.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	887.50	200	0.000	0.000
0.50	888.00	233	0.002	0.002
1.50	889.00	1,100	0.015	0.018
2.50	890.00	2,476	0.041	0.059
3.50	891.00	4,526	0.080	0.139
4.30	891.80	6,602	0.102	0.241
5.10	892.60	7,000	0.125	0.366

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)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 891.80	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

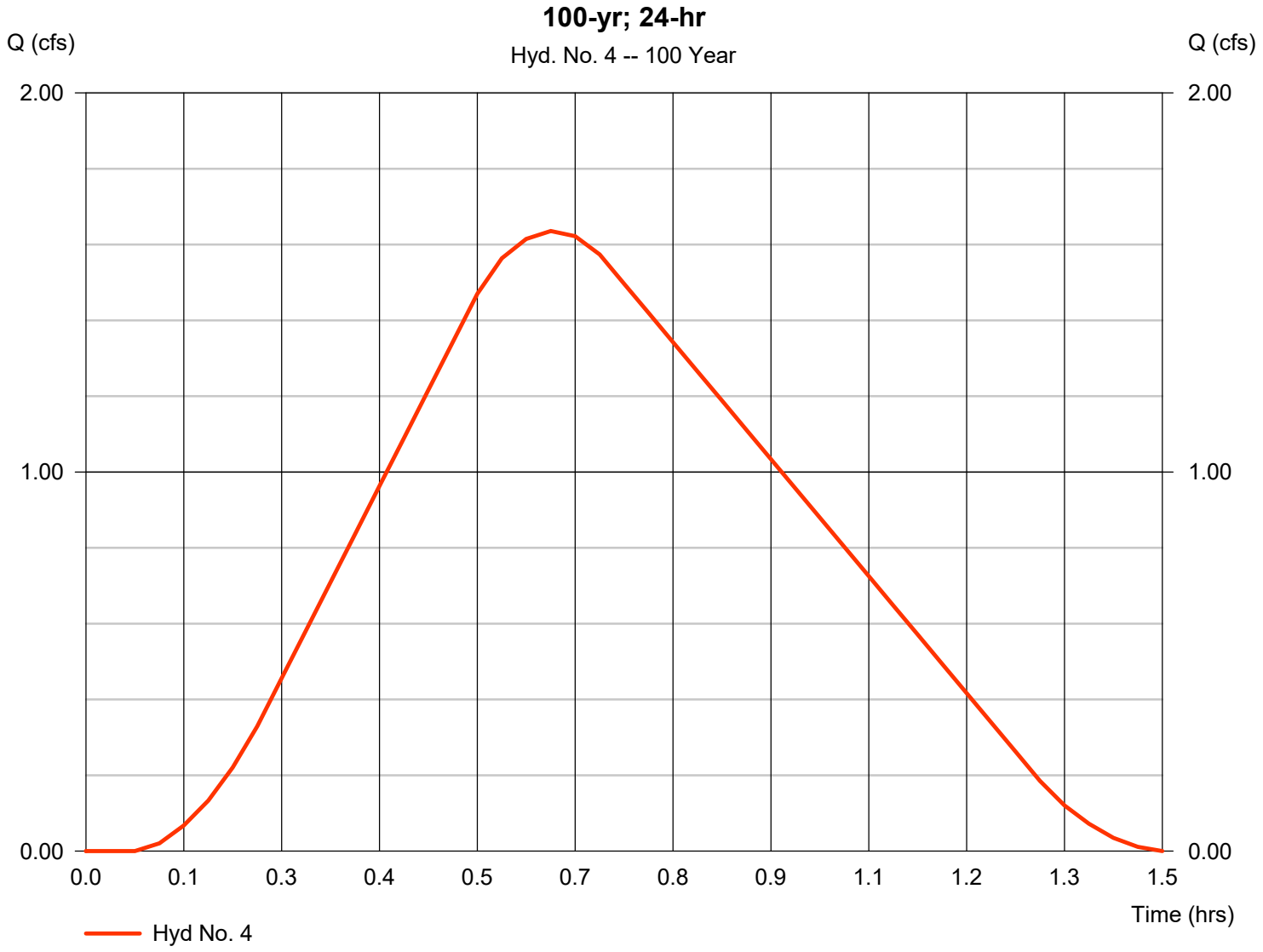
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	887.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.50	0.002	888.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.50	0.018	889.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	0.059	890.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.50	0.139	891.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.30	0.241	891.80	---	---	---	---	0.00	---	---	---	---	---	0.000
5.10	0.366	892.60	---	---	---	---	28.59	---	---	---	---	---	28.59

Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.635 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.63 hrs
Time interval	=	2 min	Hyd. volume	=	0.090 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	2.32 in	Distribution	=	Huff-1st
Storm duration	=	0.25 hrs	Shape factor	=	484

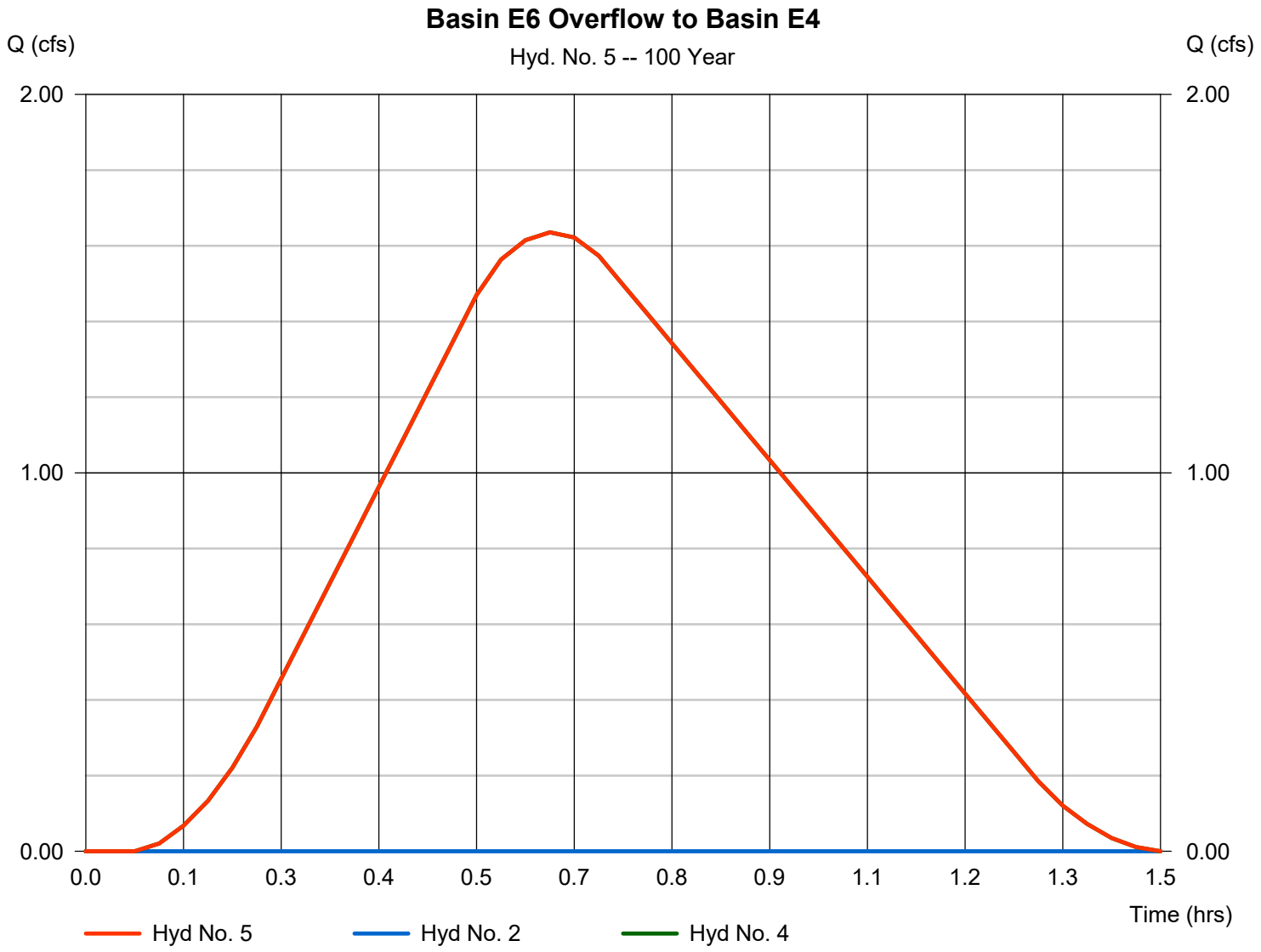


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 1.635 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.63 hrs
Time interval	= 2 min	Hyd. volume	= 0.090 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



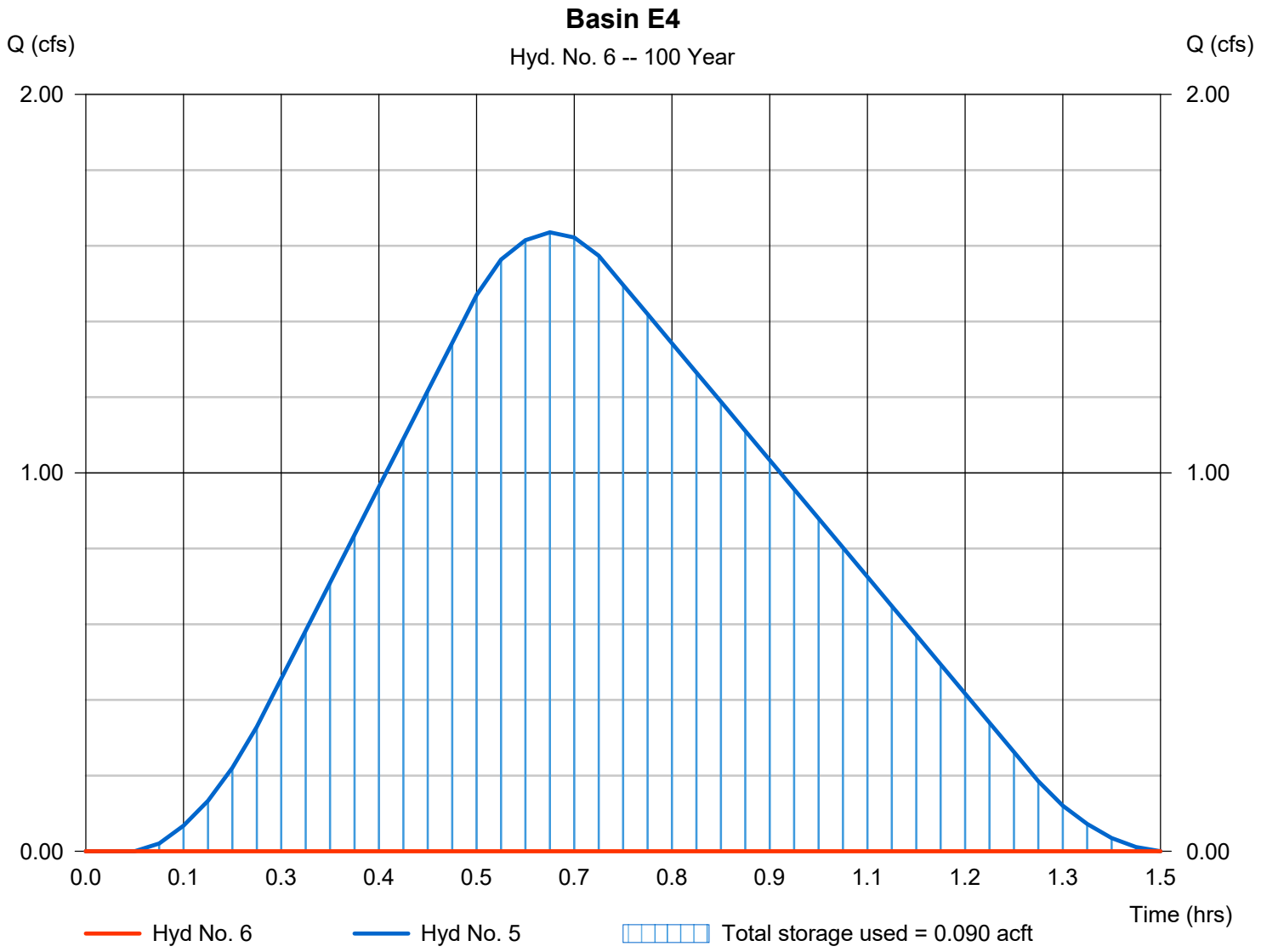
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	880.12 ft
Reservoir name	=	Basin E4	Max. Storage	=	0.090 acft

Storage Indication method used.



Pond Report

Pond No. 2 - Basin E4

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 879.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	879.00	718	0.000	0.000
1.00	880.00	5,318	0.069	0.069
2.00	881.00	9,960	0.175	0.245
2.20	881.20	11,936	0.050	0.295
3.00	882.00	16,656	0.263	0.557
4.00	883.00	28,898	0.523	1.080
5.00	884.00	45,273	0.851	1.932
5.30	884.30	55,023	0.345	2.277
6.30	885.30	60,000	1.320	3.597

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)	= 30.00	0.00	0.00	0.00
Crest El. (ft)	= 884.30	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

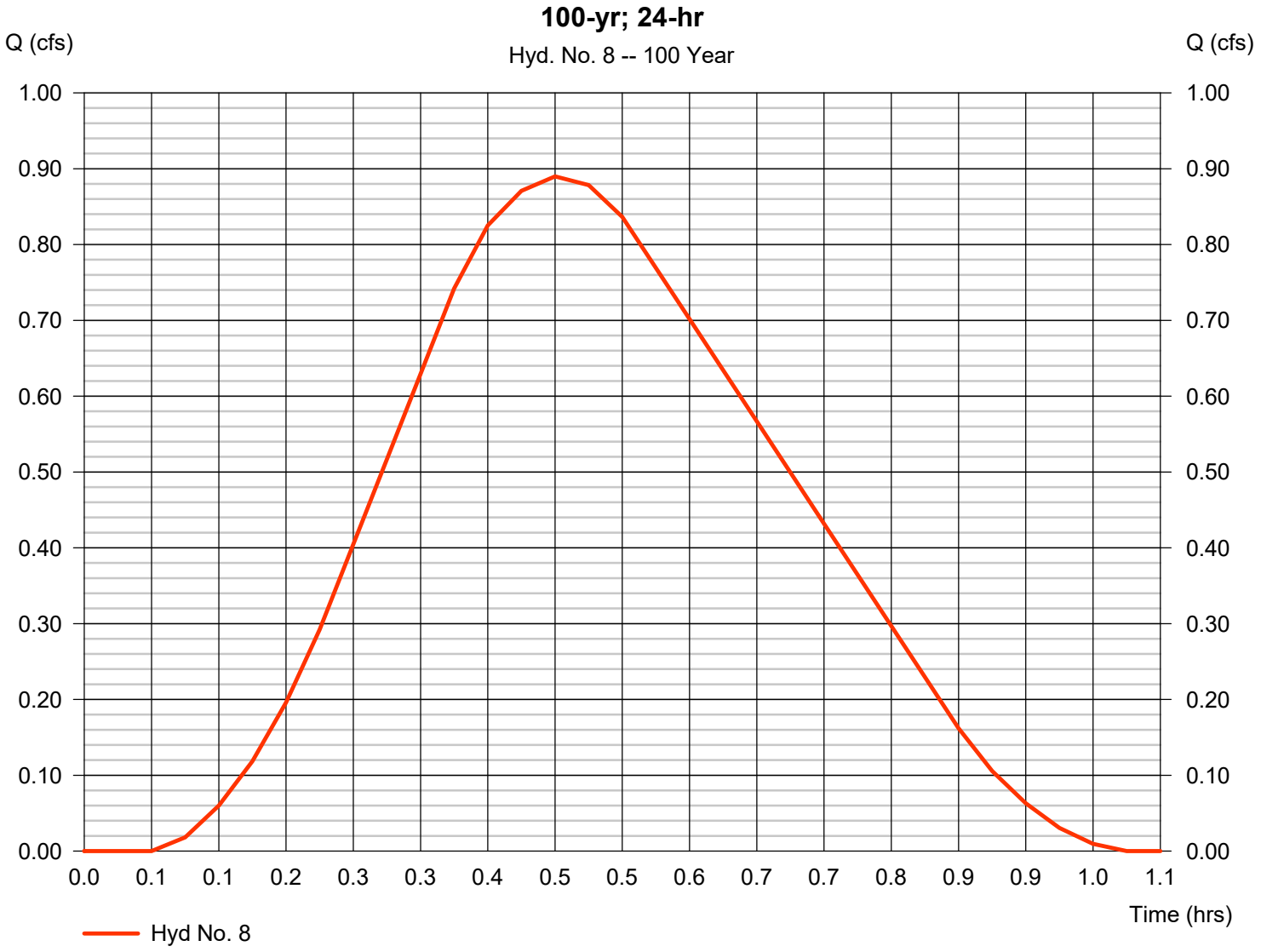
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	879.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	0.069	880.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	0.245	881.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.20	0.295	881.20	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	0.557	882.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.00	1.080	883.00	---	---	---	---	0.00	---	---	---	---	---	0.000
5.00	1.932	884.00	---	---	---	---	0.00	---	---	---	---	---	0.000
5.30	2.277	884.30	---	---	---	---	0.00	---	---	---	---	---	0.000
6.30	3.597	885.30	---	---	---	---	99.90	---	---	---	---	---	99.90

Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.890 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.47 hrs
Time interval	=	2 min	Hyd. volume	=	0.033 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	2.32 in	Distribution	=	Huff-1st
Storm duration	=	0.25 hrs	Shape factor	=	484

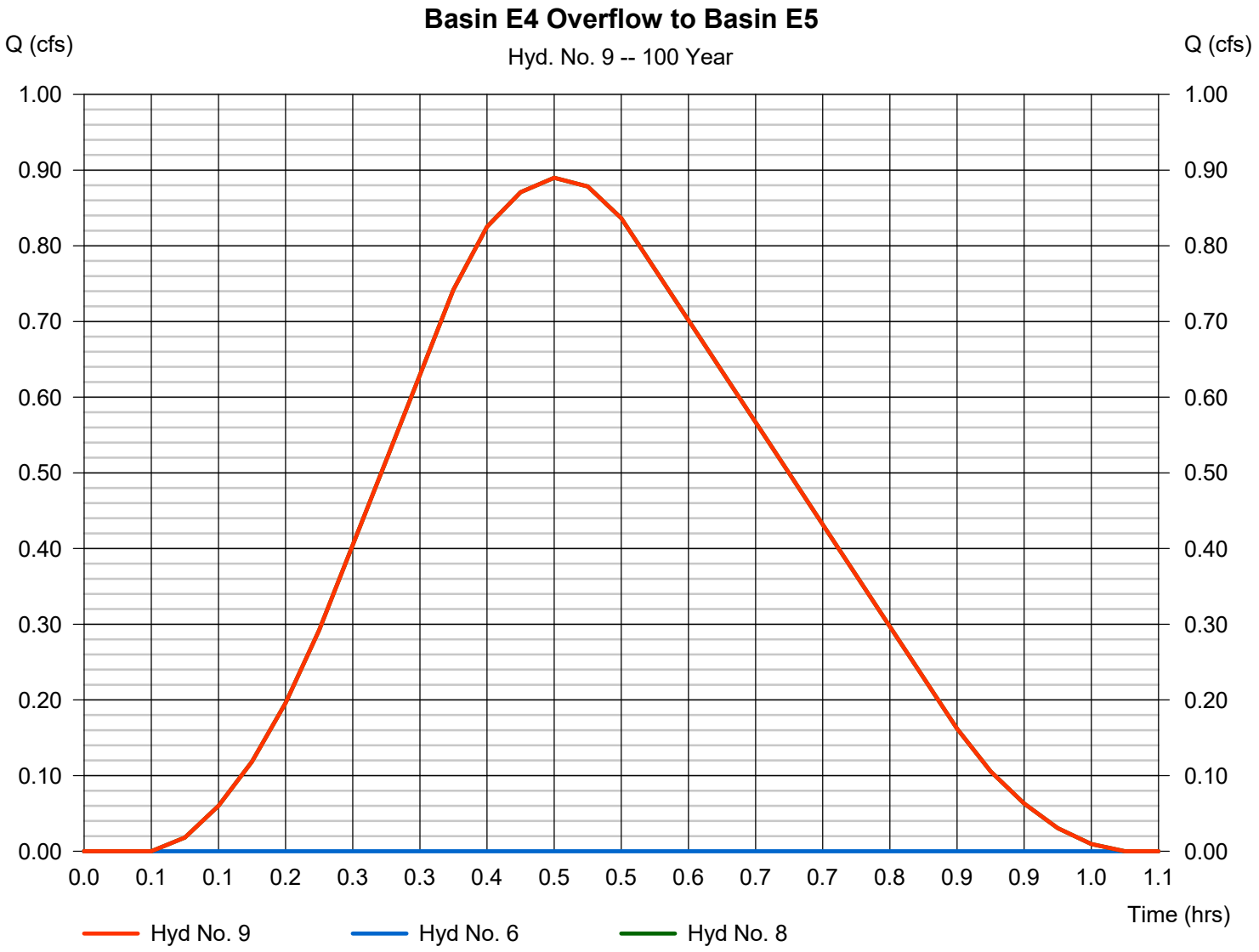


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	0.890 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.47 hrs
Time interval	=	2 min	Hyd. volume	=	0.033 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



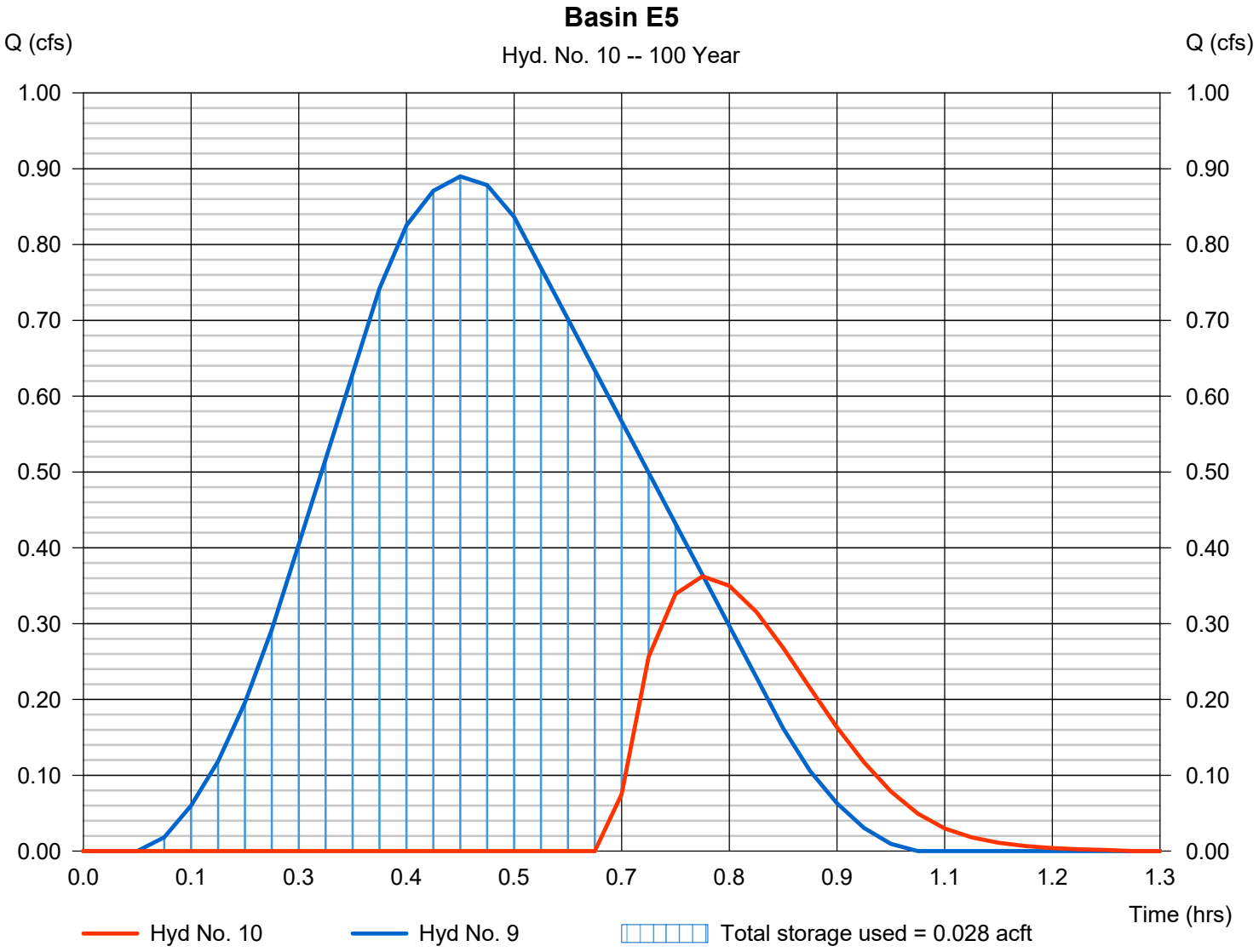
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	0.362 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.77 hrs
Time interval	=	2 min	Hyd. volume	=	0.007 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.12 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.028 acft

Storage Indication method used.



Pond Report

Pond No. 3 - Basin E5

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 881.45 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	881.45	100	0.000	0.000
0.55	882.00	2,766	0.018	0.018
0.65	882.10	4,218	0.008	0.026
1.65	883.10	5,000	0.106	0.132

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)	= 18.00	0.00	0.00	0.00
Crest El. (ft)	= 882.10	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

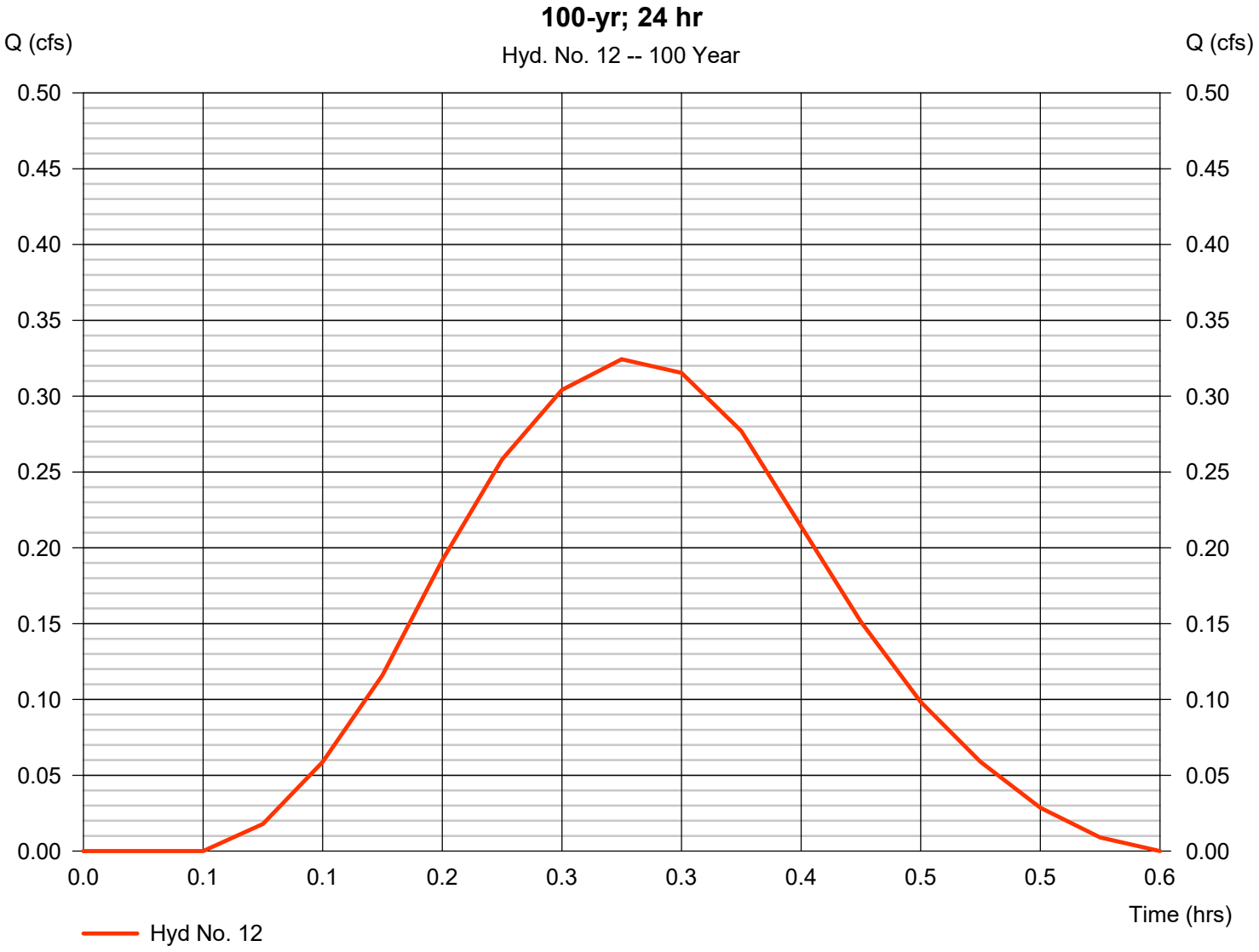
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	881.45	---	---	---	---	0.00	---	---	---	---	---	0.000
0.55	0.018	882.00	---	---	---	---	0.00	---	---	---	---	---	0.000
0.65	0.026	882.10	---	---	---	---	0.00	---	---	---	---	---	0.000
1.65	0.132	883.10	---	---	---	---	59.94	---	---	---	---	---	59.94

Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.324 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.30 hrs
Time interval	=	2 min	Hyd. volume	=	0.007 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	2.32 in	Distribution	=	Huff-1st
Storm duration	=	0.25 hrs	Shape factor	=	484



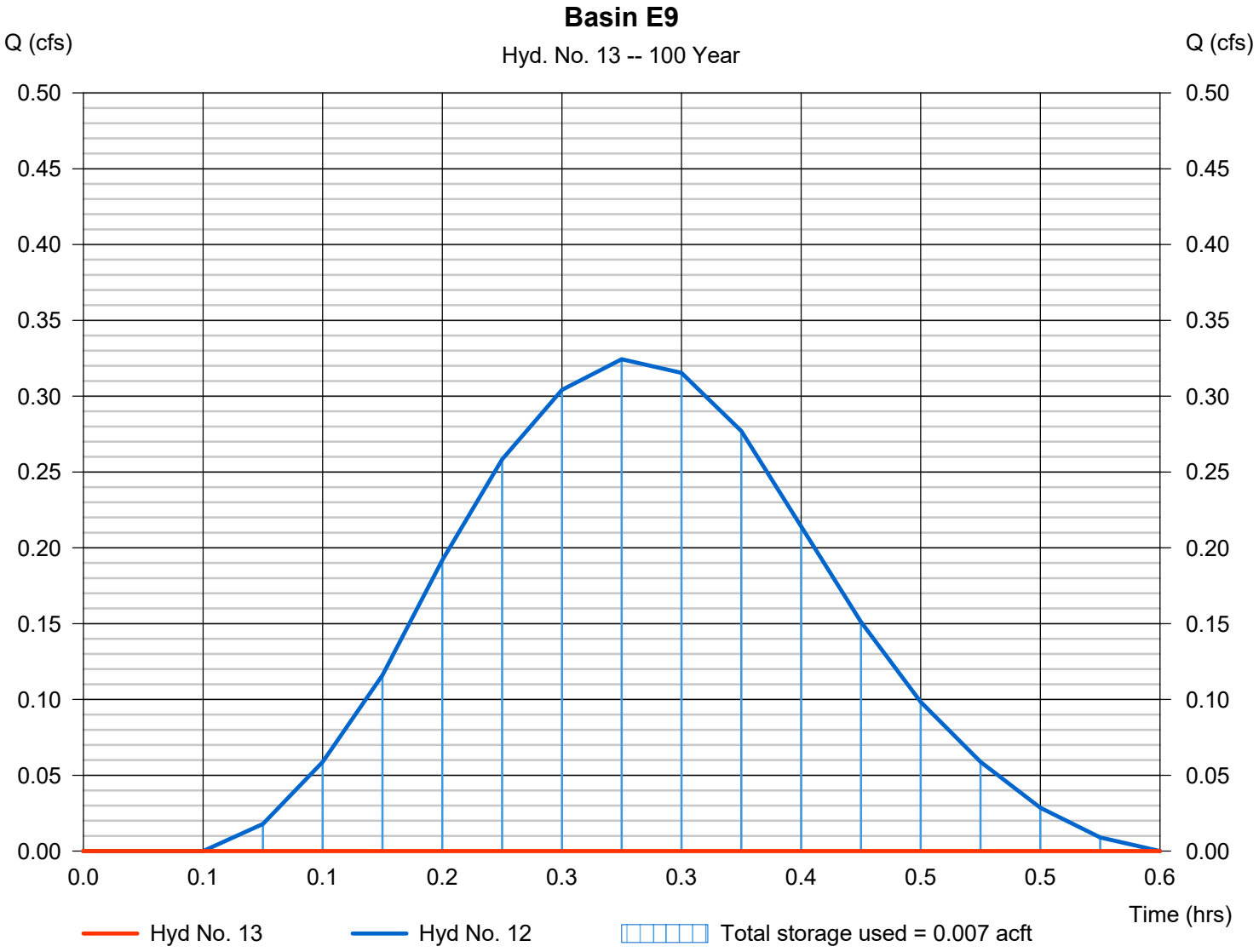
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	896.78 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.007 acft

Storage Indication method used.



Pond Report

Pond No. 4 - Basin E9

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 896.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	896.60	1,000	0.000	0.000
0.40	897.00	2,143	0.014	0.014
0.70	897.30	3,517	0.019	0.034
1.70	898.30	4,000	0.086	0.120

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)	= 7.00	0.00	0.00	0.00
Crest El. (ft)	= 897.30	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

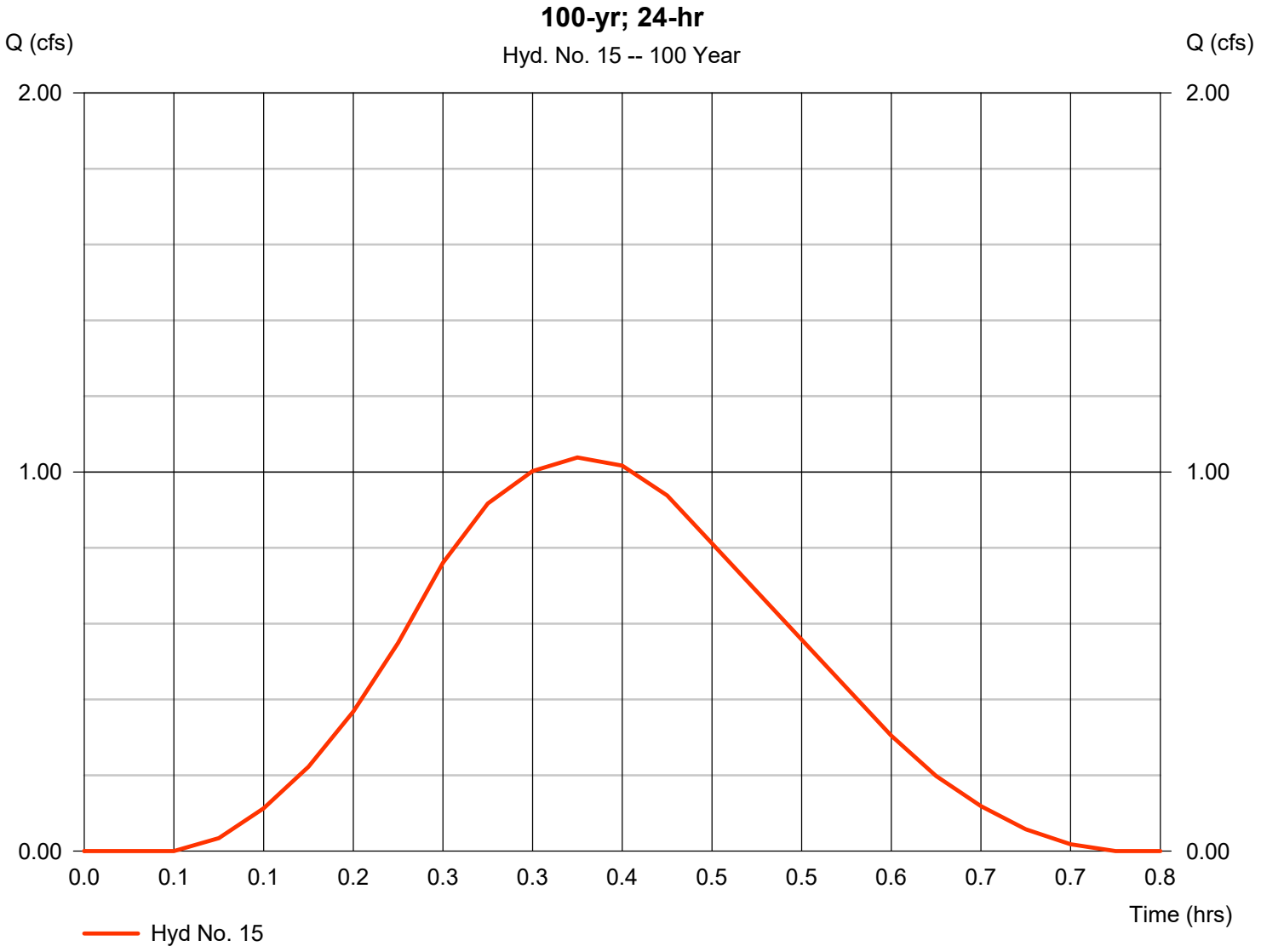
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	896.60	---	---	---	---	0.00	---	---	---	---	---	0.000
0.40	0.014	897.00	---	---	---	---	0.00	---	---	---	---	---	0.000
0.70	0.034	897.30	---	---	---	---	0.00	---	---	---	---	---	0.000
1.70	0.120	898.30	---	---	---	---	23.31	---	---	---	---	---	23.31

Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.038 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.37 hrs
Time interval	=	2 min	Hyd. volume	=	0.028 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	2.32 in	Distribution	=	Huff-1st
Storm duration	=	0.25 hrs	Shape factor	=	484

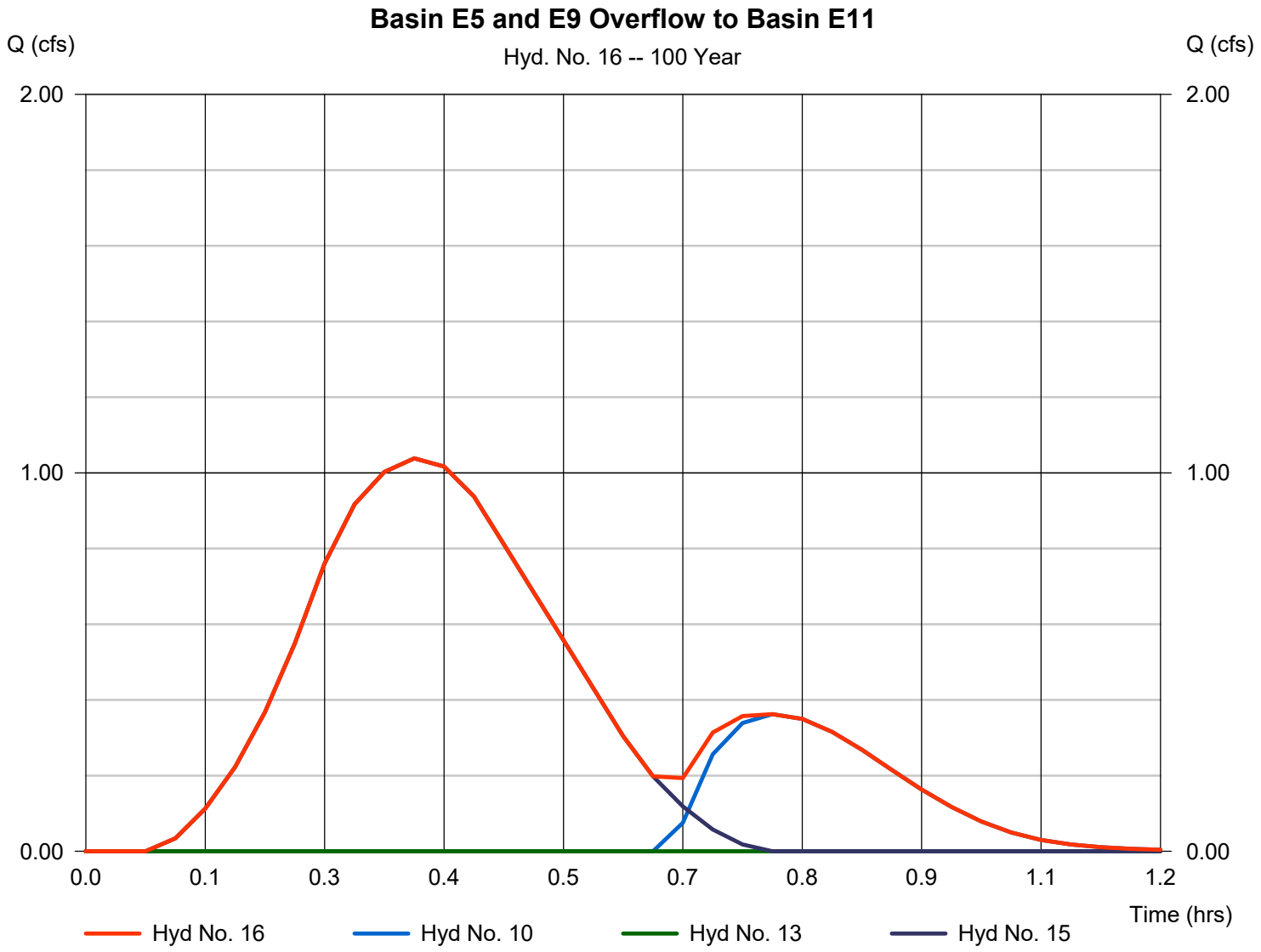


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	1.038 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.37 hrs
Time interval	=	2 min	Hyd. volume	=	0.035 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



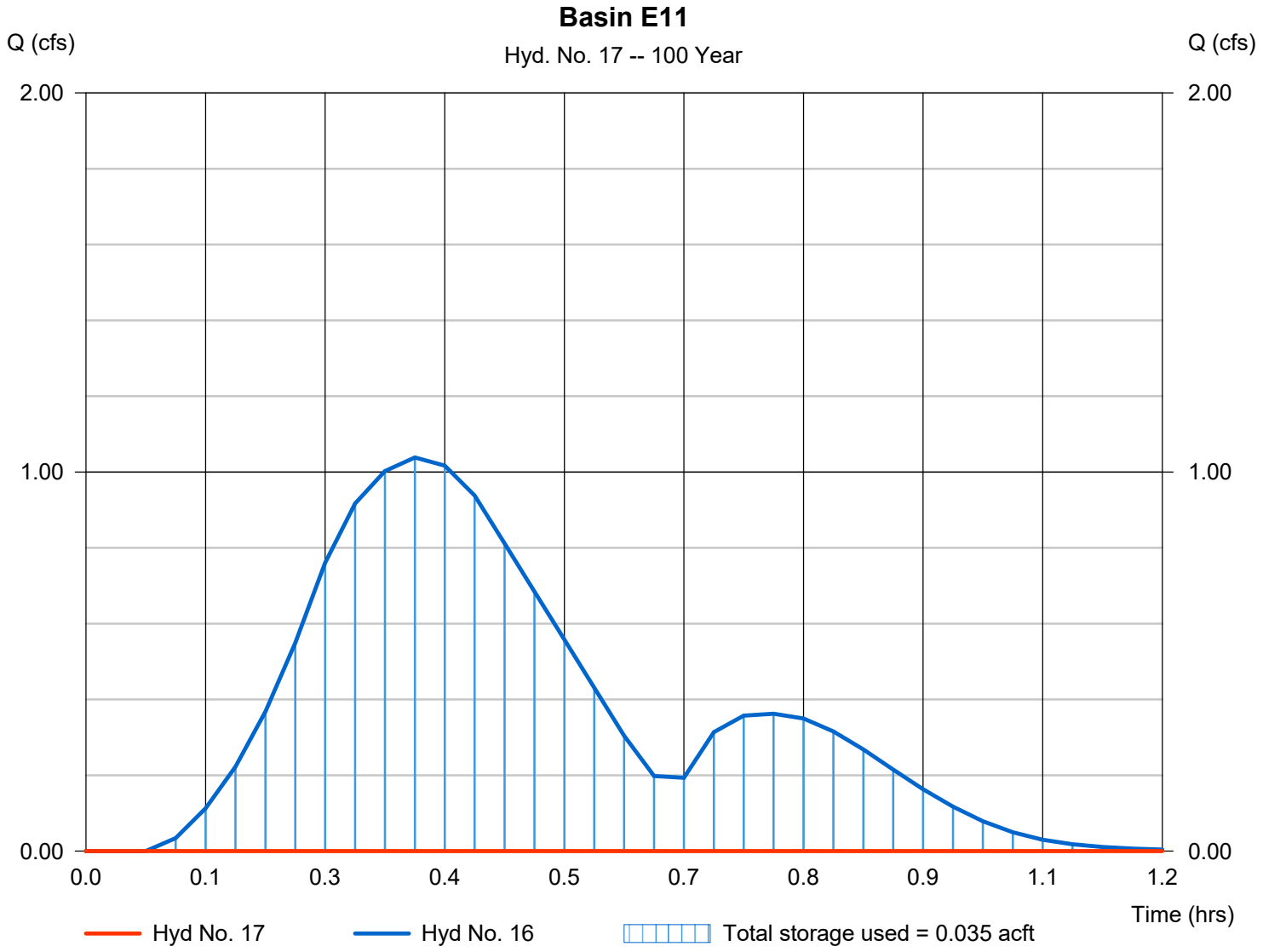
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow to E11	Max. Elevation	=	874.58 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.035 acft

Storage Indication method used.



Pond Report

Pond No. 5 - Basin E11

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 873.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	873.50	100	0.000	0.000
0.50	874.00	357	0.003	0.003
1.50	875.00	4,560	0.056	0.059
2.50	876.00	8,288	0.147	0.207
3.50	877.00	11,730	0.230	0.436
4.40	877.90	18,131	0.308	0.745
5.40	878.90	20,000	0.438	1.182

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)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 877.90	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

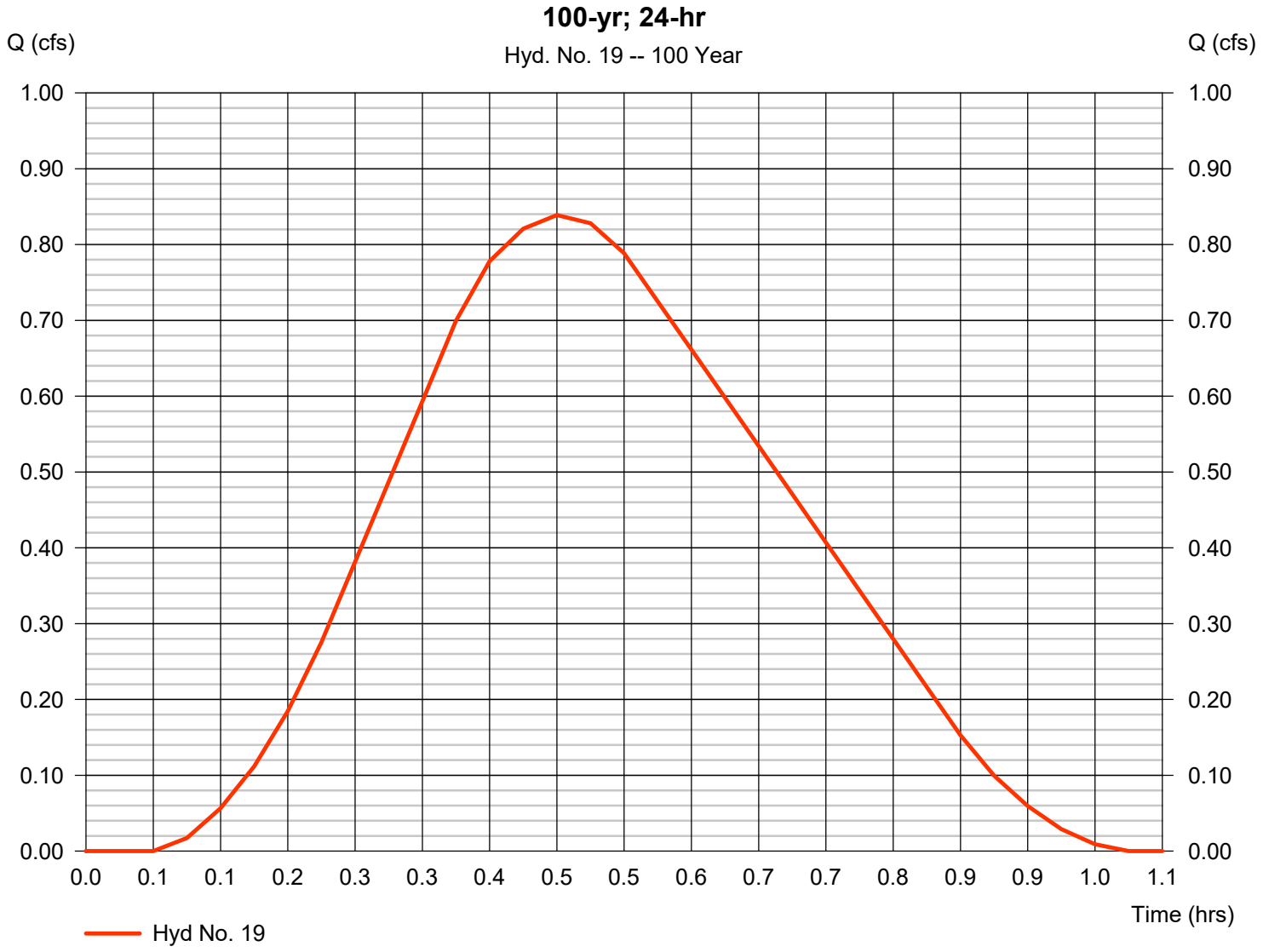
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	873.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.50	0.003	874.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.50	0.059	875.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	0.207	876.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.50	0.436	877.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.40	0.745	877.90	---	---	---	---	0.00	---	---	---	---	---	0.000
5.40	1.182	878.90	---	---	---	---	9.99	---	---	---	---	---	9.990

Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.839 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.47 hrs
Time interval	=	2 min	Hyd. volume	=	0.032 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	2.32 in	Distribution	=	Huff-1st
Storm duration	=	0.25 hrs	Shape factor	=	484

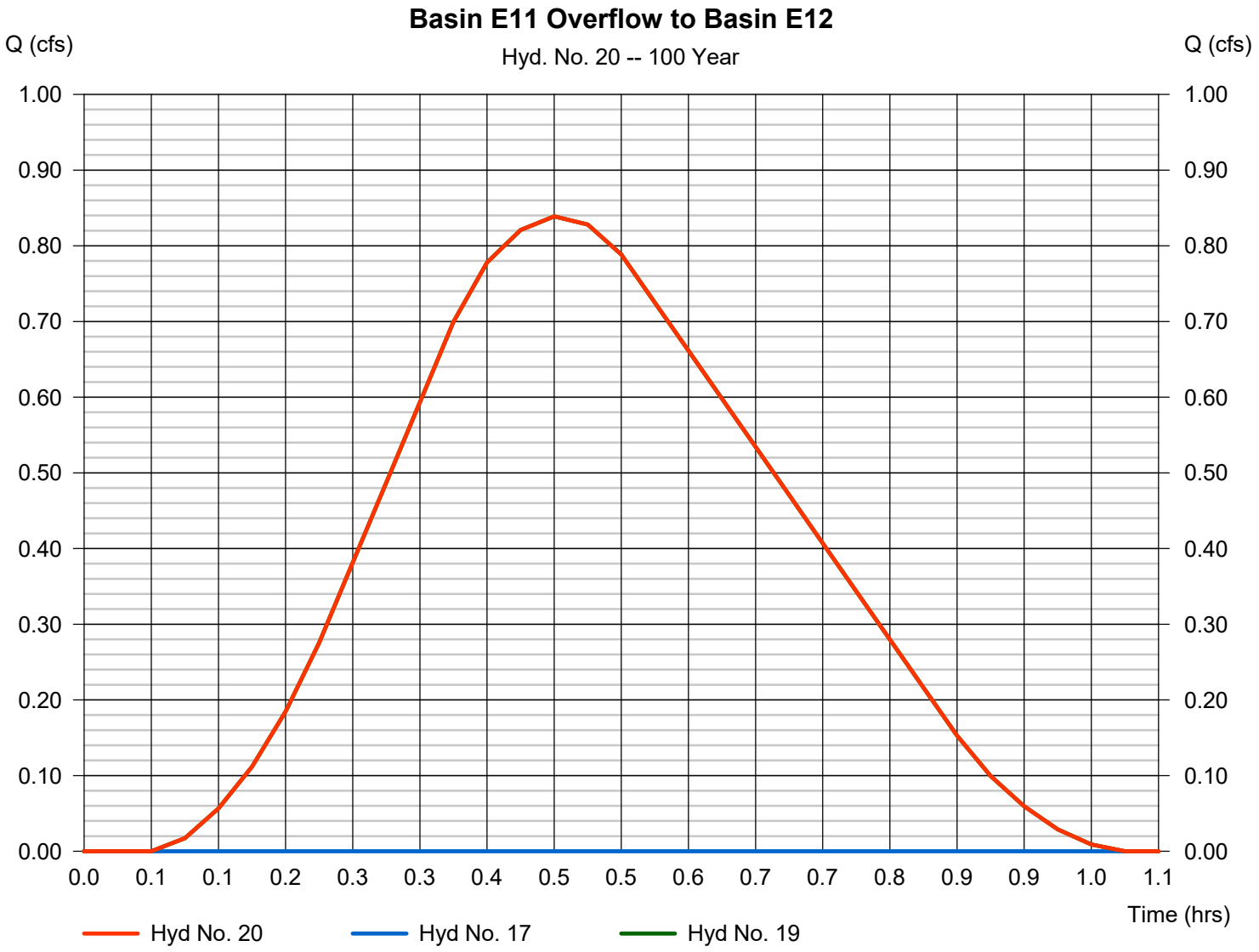


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	0.839 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.47 hrs
Time interval	=	2 min	Hyd. volume	=	0.032 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



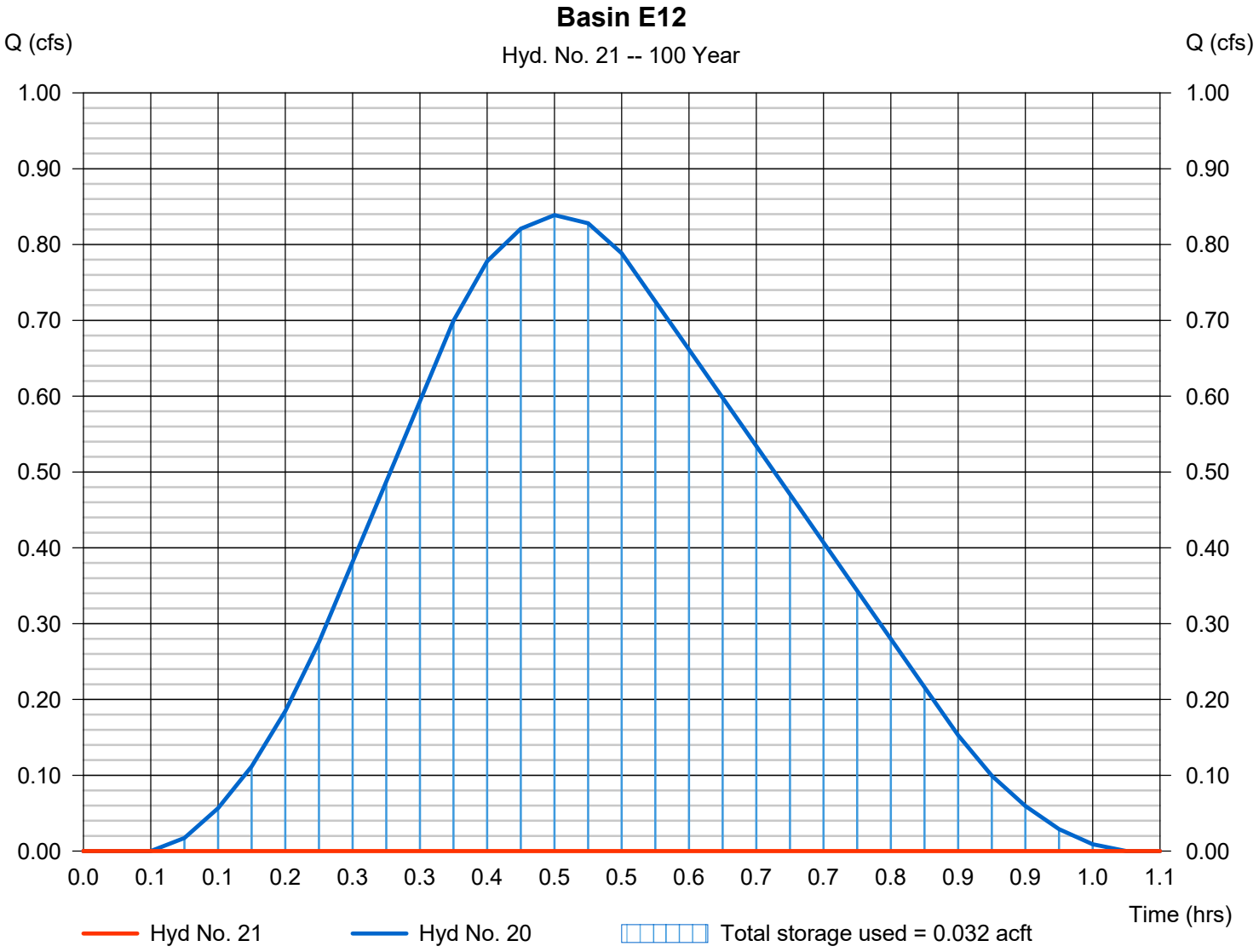
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	867.33 ft
Reservoir name	=	Basin E12	Max. Storage	=	0.032 acft

Storage Indication method used.



Pond Report

Pond No. 6 - Basin E12

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 867.20 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	867.20	3,000	0.000	0.000
0.80	868.00	18,092	0.194	0.194
1.80	869.00	29,069	0.541	0.735
2.80	870.00	37,054	0.759	1.494
3.80	871.00	43,187	0.921	2.415
4.80	872.00	46,992	1.035	3.450
5.80	873.00	49,917	1.112	4.563
6.80	874.00	52,815	1.179	5.742
7.30	874.50	55,402	0.621	6.363
8.30	875.50	60,000	1.325	7.687

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)	= 24.00	0.00	0.00	0.00
Crest El. (ft)	= 874.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	867.20	---	---	---	---	0.00	---	---	---	---	---	0.000
0.80	0.194	868.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.80	0.735	869.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.80	1.494	870.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.80	2.415	871.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.80	3.450	872.00	---	---	---	---	0.00	---	---	---	---	---	0.000
5.80	4.563	873.00	---	---	---	---	0.00	---	---	---	---	---	0.000
6.80	5.742	874.00	---	---	---	---	0.00	---	---	---	---	---	0.000
7.30	6.363	874.50	---	---	---	---	0.00	---	---	---	---	---	0.000
8.30	7.687	875.50	---	---	---	---	79.92	---	---	---	---	---	79.92

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G985-Ex. Depressional Storage.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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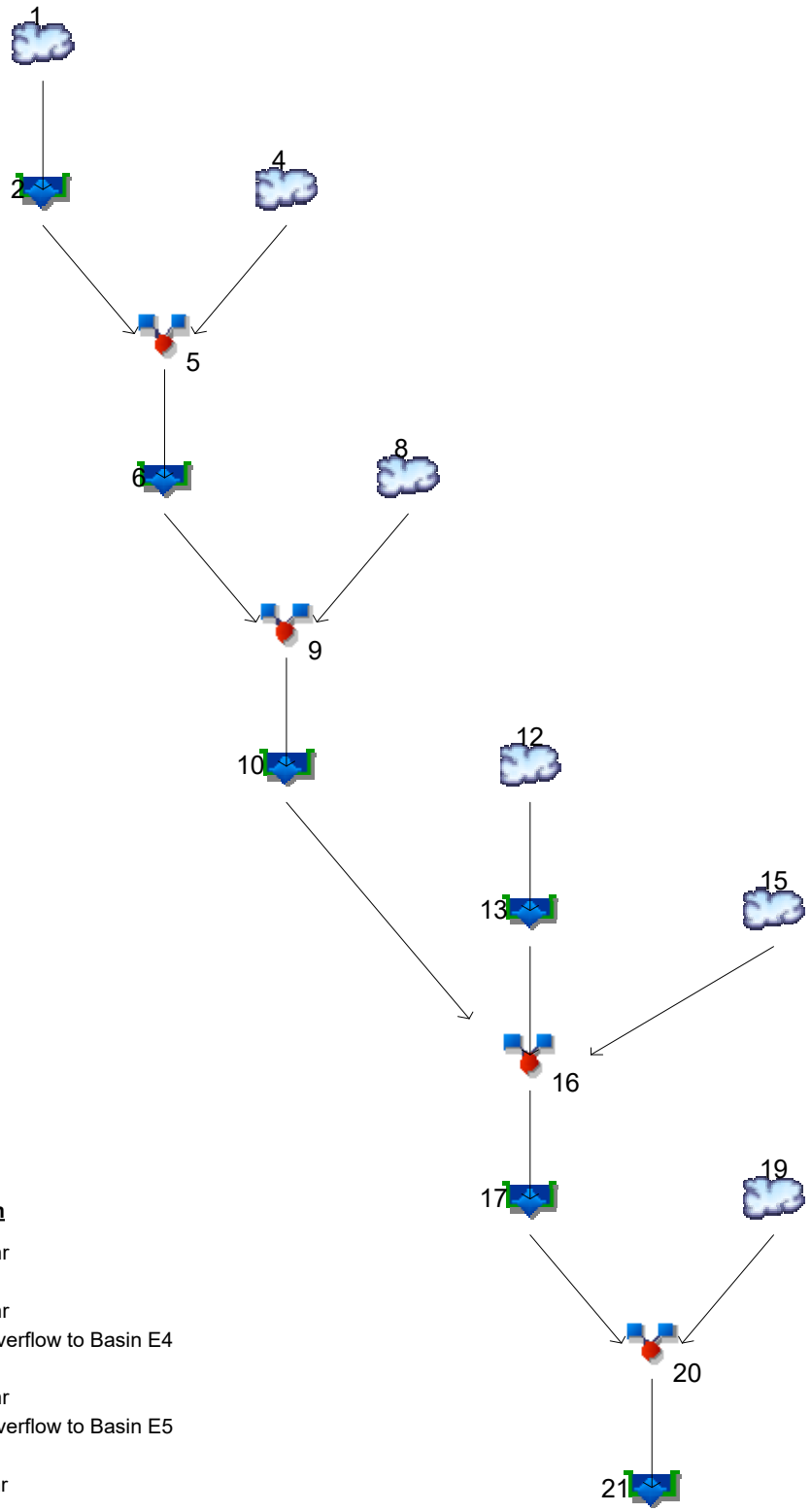
Hydrograph No. 20, Combine, Basin E11 Overflow to Basin E12..... 22

Hydrograph No. 21, Reservoir, Basin E12..... 23

Pond Report - Basin E12..... 24

100 Year-0.50 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

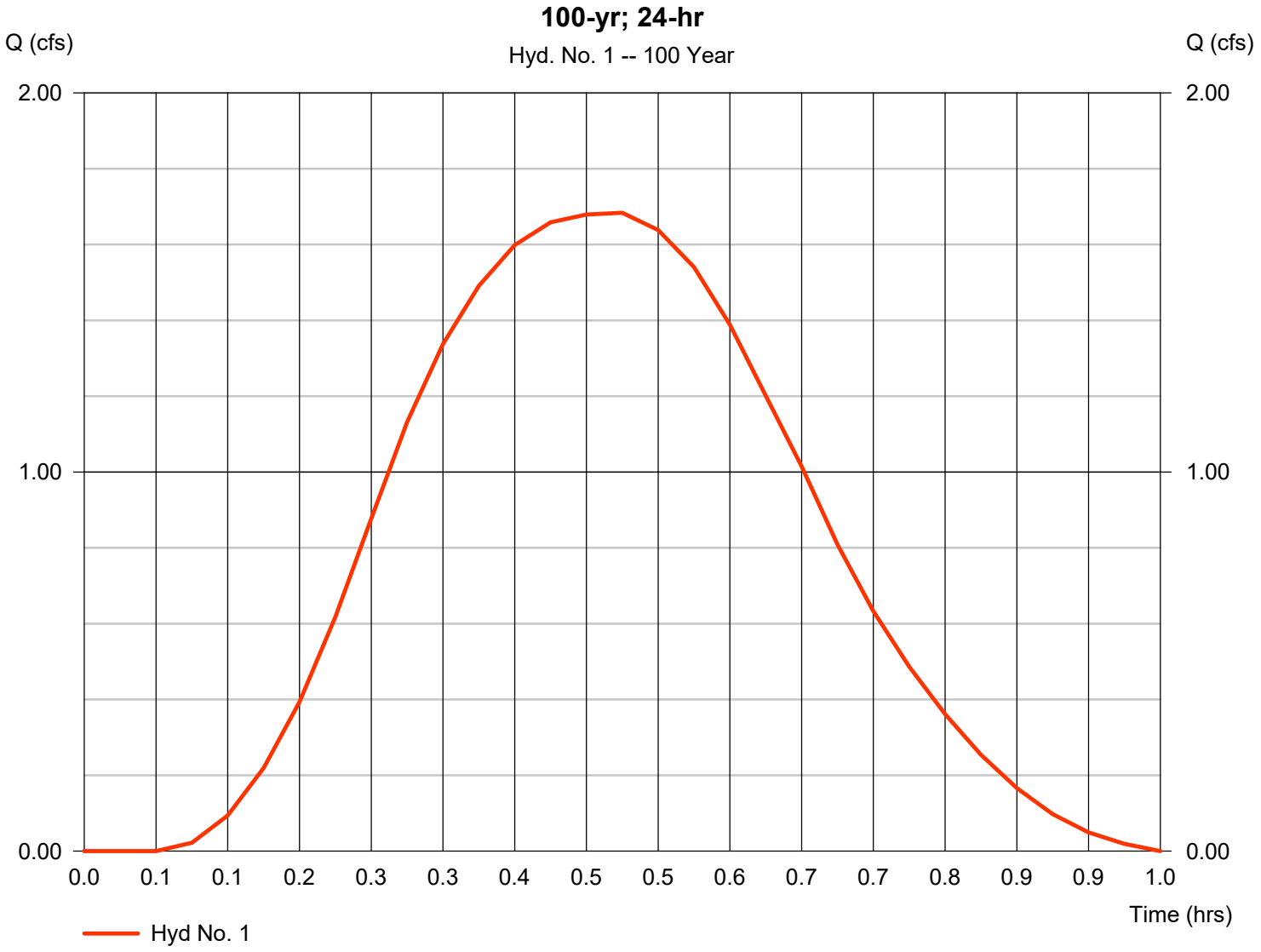
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	1.684	2	30	0.062	------	------	------	100-yr; 24-hr
2	Reservoir	0.000	2	n/a	0.000	1	890.04	0.062	Basin E6
4	SCS Runoff	4.402	2	46	0.271	------	------	------	100-yr; 24-hr
5	Combine	4.402	2	46	0.271	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	0.000	2	n/a	0.000	5	881.11	0.271	Basin E4
8	SCS Runoff	2.226	2	36	0.100	------	------	------	100-yr; 24-hr
9	Combine	2.226	2	36	0.100	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.124	2	40	0.074	9	882.21	0.037	Basin E5
12	SCS Runoff	0.615	2	22	0.020	------	------	------	100-yr; 24 hr
13	Reservoir	0.000	2	n/a	0.000	12	897.09	0.020	Basin E9
15	SCS Runoff	2.281	2	30	0.084	------	------	------	100-yr; 24-hr
16	Combine	3.753	2	36	0.158	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	0.000	2	n/a	0.000	16	875.67	0.158	Basin E11
19	SCS Runoff	2.098	2	36	0.095	------	------	------	100-yr; 24-hr
20	Combine	2.098	2	36	0.095	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	867.59	0.095	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.684 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.50 hrs
Time interval	=	2 min	Hyd. volume	=	0.062 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	3.17 in	Distribution	=	Huff-1st
Storm duration	=	0.50 hrs	Shape factor	=	484



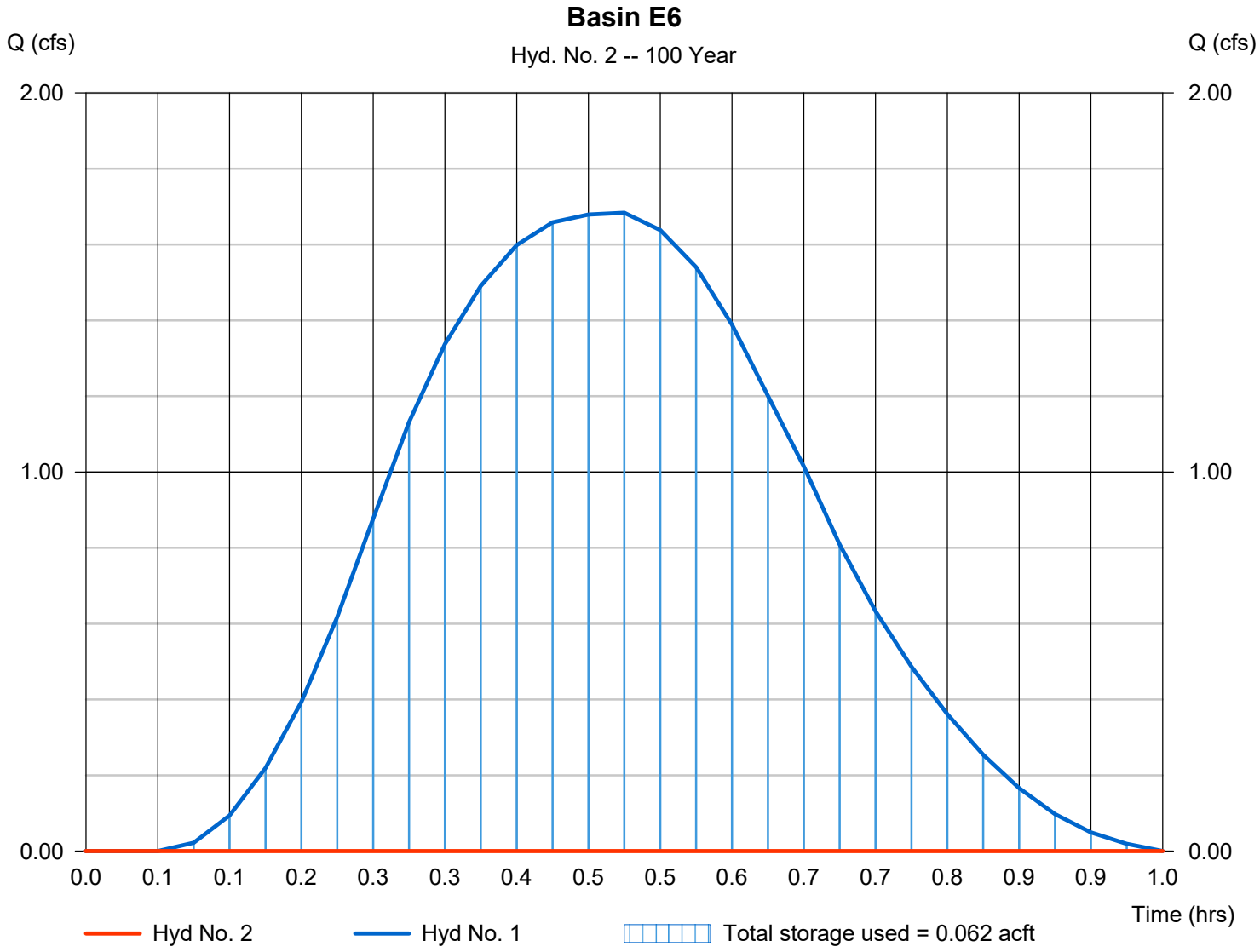
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	890.04 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.062 acft

Storage Indication method used.



Pond Report

Pond No. 1 - Basin E6

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 887.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	887.50	200	0.000	0.000
0.50	888.00	233	0.002	0.002
1.50	889.00	1,100	0.015	0.018
2.50	890.00	2,476	0.041	0.059
3.50	891.00	4,526	0.080	0.139
4.30	891.80	6,602	0.102	0.241
5.10	892.60	7,000	0.125	0.366

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)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 891.80	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

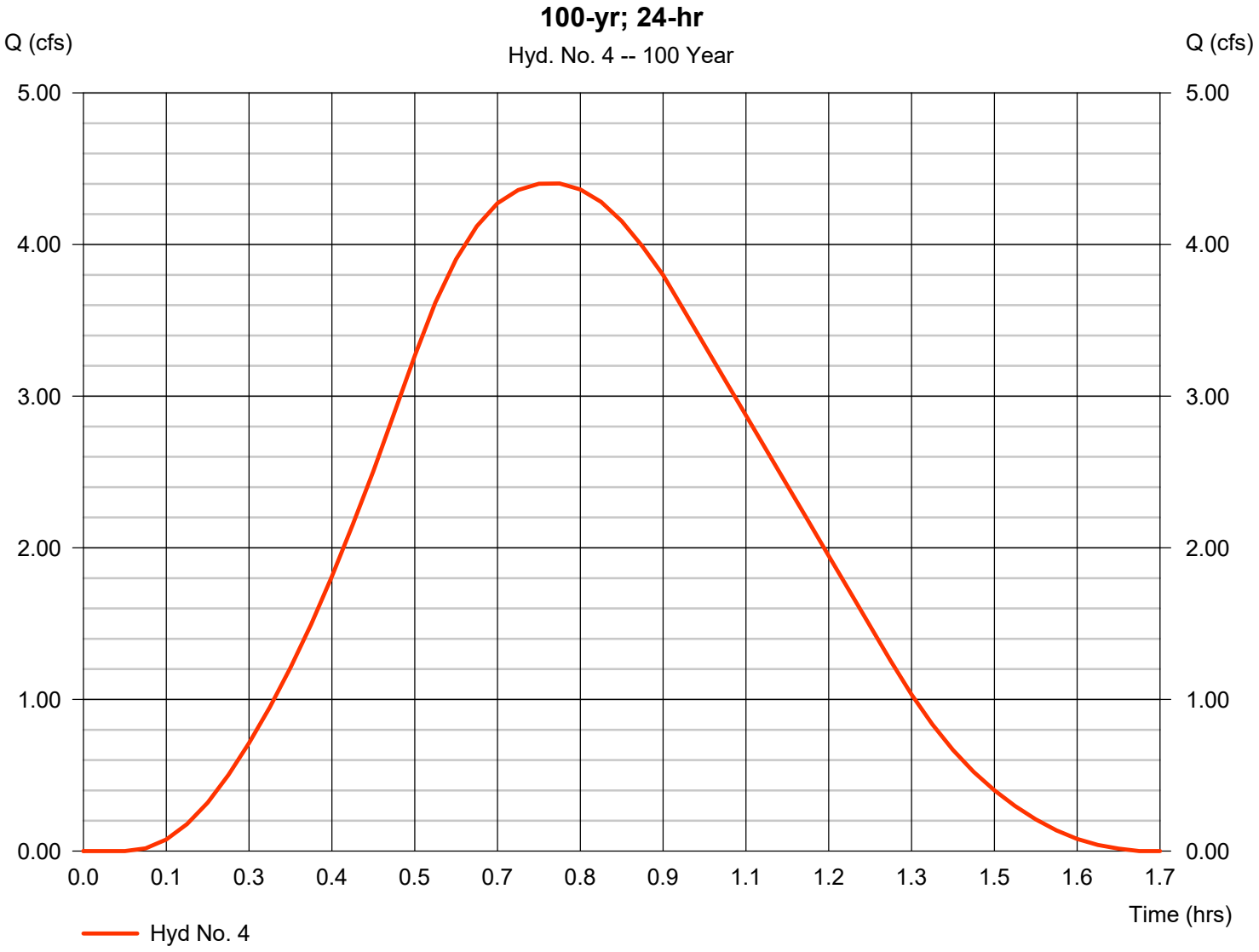
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	887.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.50	0.002	888.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.50	0.018	889.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	0.059	890.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.50	0.139	891.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.30	0.241	891.80	---	---	---	---	0.00	---	---	---	---	---	0.000
5.10	0.366	892.60	---	---	---	---	28.59	---	---	---	---	---	28.59

Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.402 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.77 hrs
Time interval	=	2 min	Hyd. volume	=	0.271 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	3.17 in	Distribution	=	Huff-1st
Storm duration	=	0.50 hrs	Shape factor	=	484

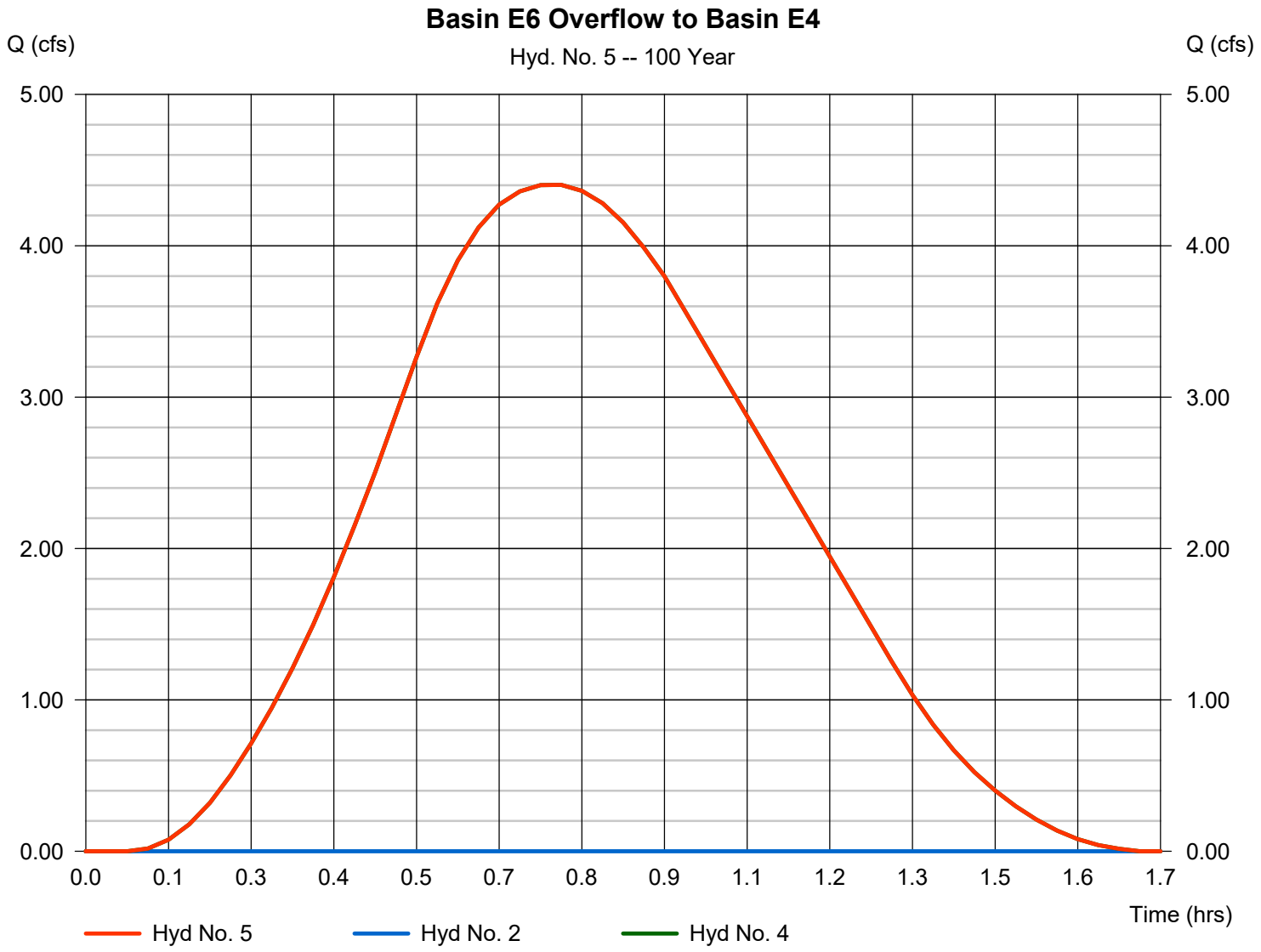


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 4.402 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.77 hrs
Time interval	= 2 min	Hyd. volume	= 0.271 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



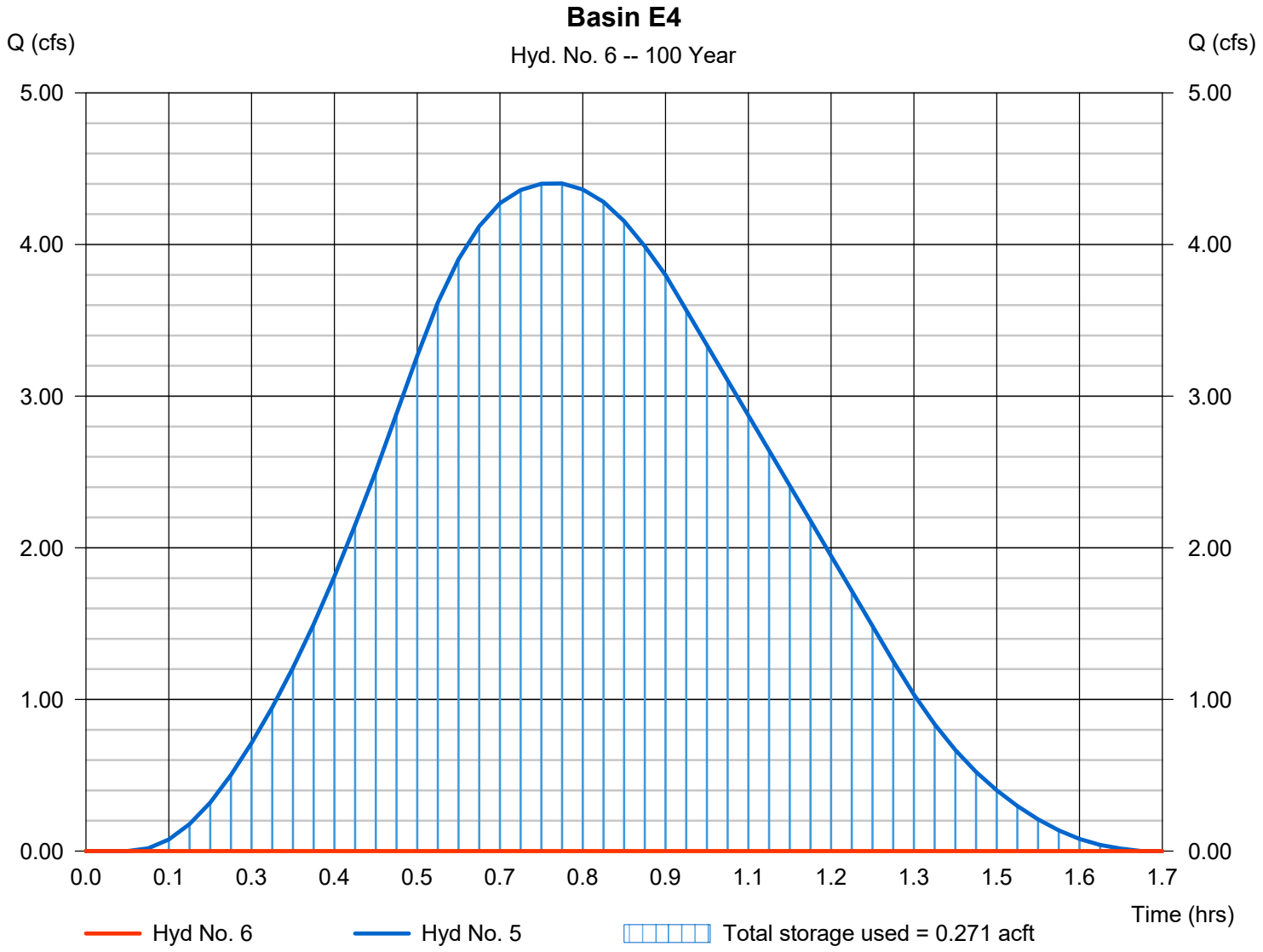
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	881.11 ft
Reservoir name	=	Basin E4	Max. Storage	=	0.271 acft

Storage Indication method used.



Pond Report

Pond No. 2 - Basin E4

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 879.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	879.00	718	0.000	0.000
1.00	880.00	5,318	0.069	0.069
2.00	881.00	9,960	0.175	0.245
2.20	881.20	11,936	0.050	0.295
3.00	882.00	16,656	0.263	0.557
4.00	883.00	28,898	0.523	1.080
5.00	884.00	45,273	0.851	1.932
5.30	884.30	55,023	0.345	2.277
6.30	885.30	60,000	1.320	3.597

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)	= 30.00	0.00	0.00	0.00
Crest El. (ft)	= 884.30	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

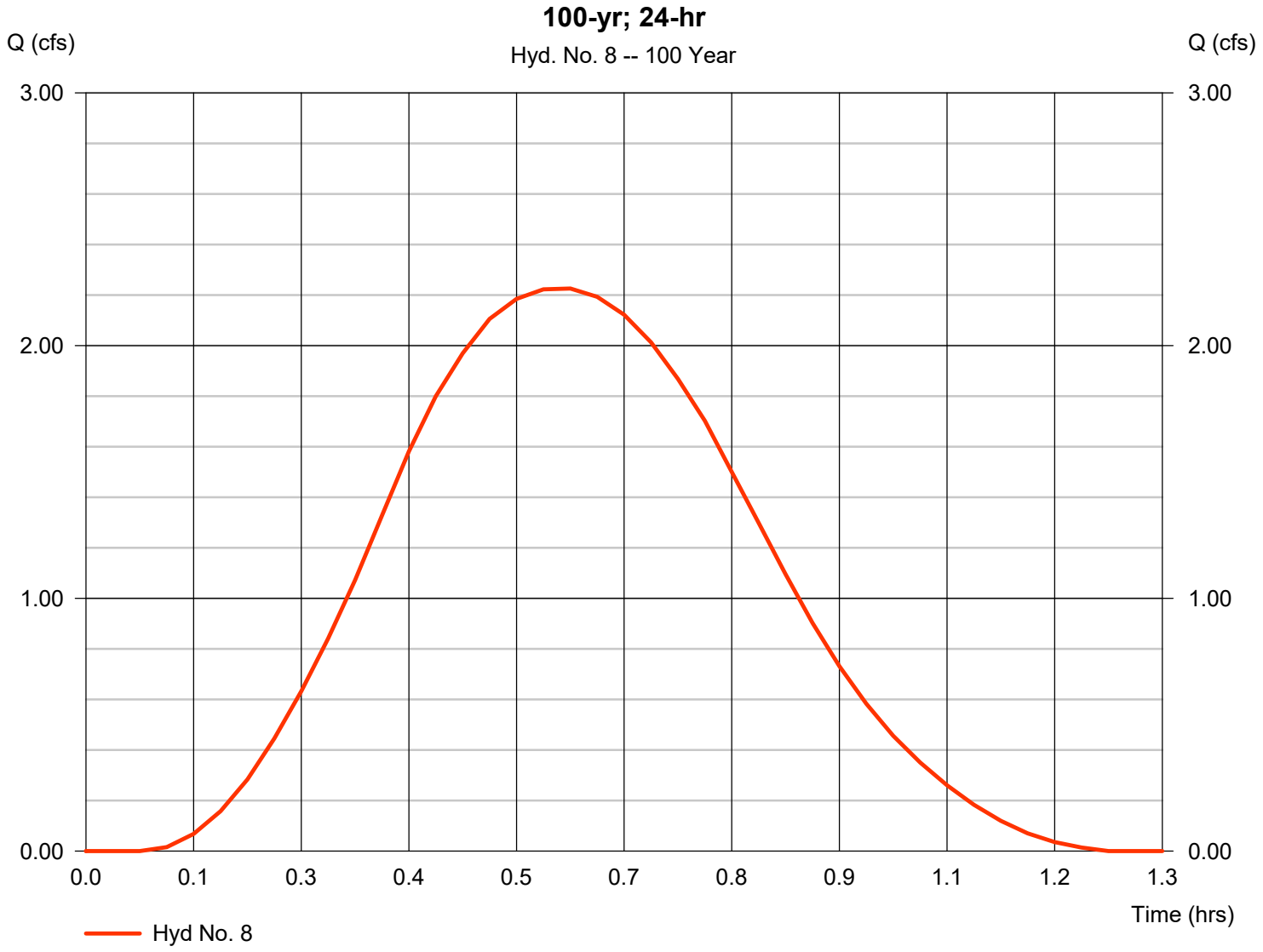
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	879.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	0.069	880.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	0.245	881.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.20	0.295	881.20	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	0.557	882.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.00	1.080	883.00	---	---	---	---	0.00	---	---	---	---	---	0.000
5.00	1.932	884.00	---	---	---	---	0.00	---	---	---	---	---	0.000
5.30	2.277	884.30	---	---	---	---	0.00	---	---	---	---	---	0.000
6.30	3.597	885.30	---	---	---	---	99.90	---	---	---	---	---	99.90

Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.226 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.100 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	3.17 in	Distribution	=	Huff-1st
Storm duration	=	0.50 hrs	Shape factor	=	484

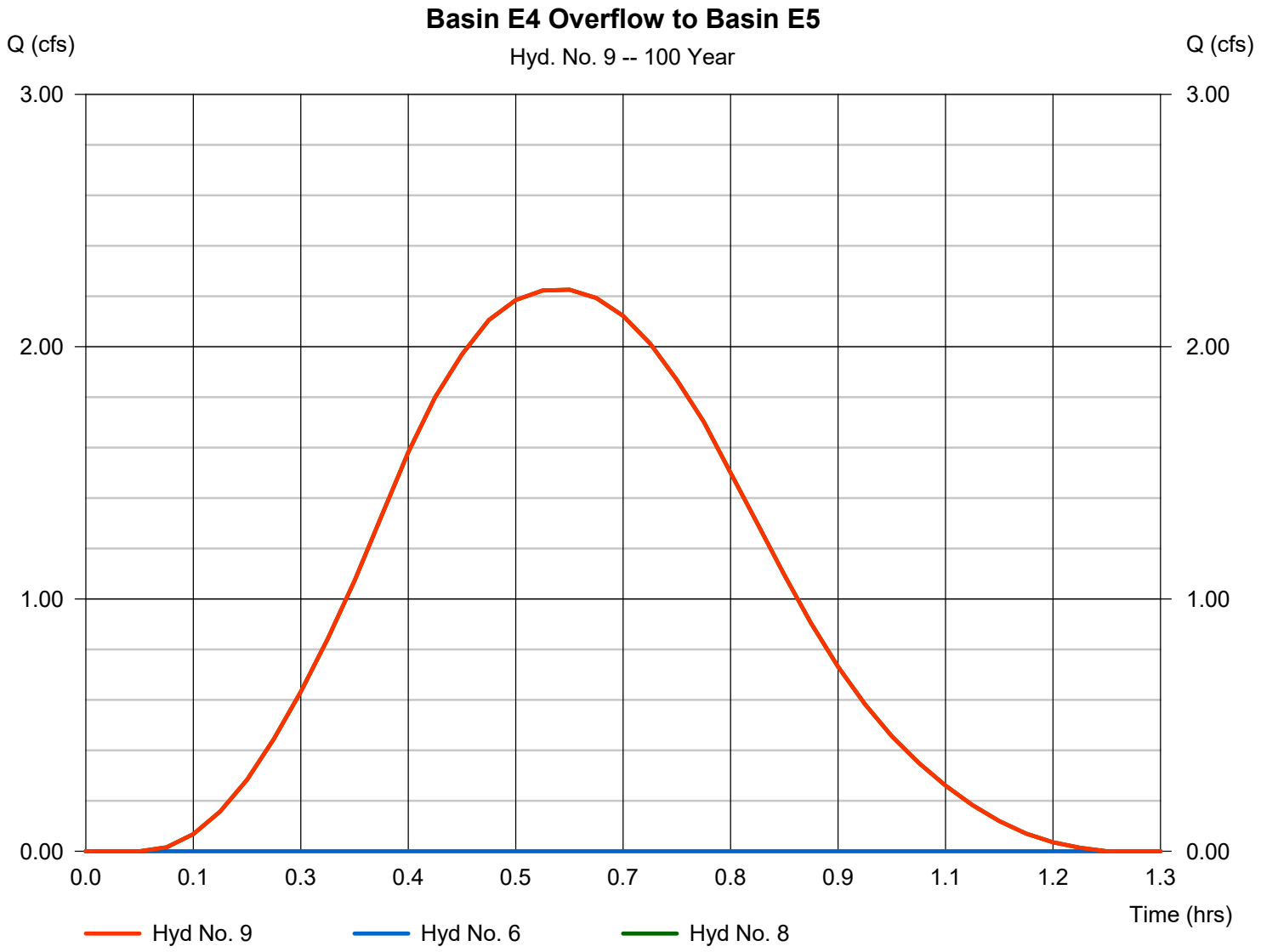


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	2.226 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.100 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



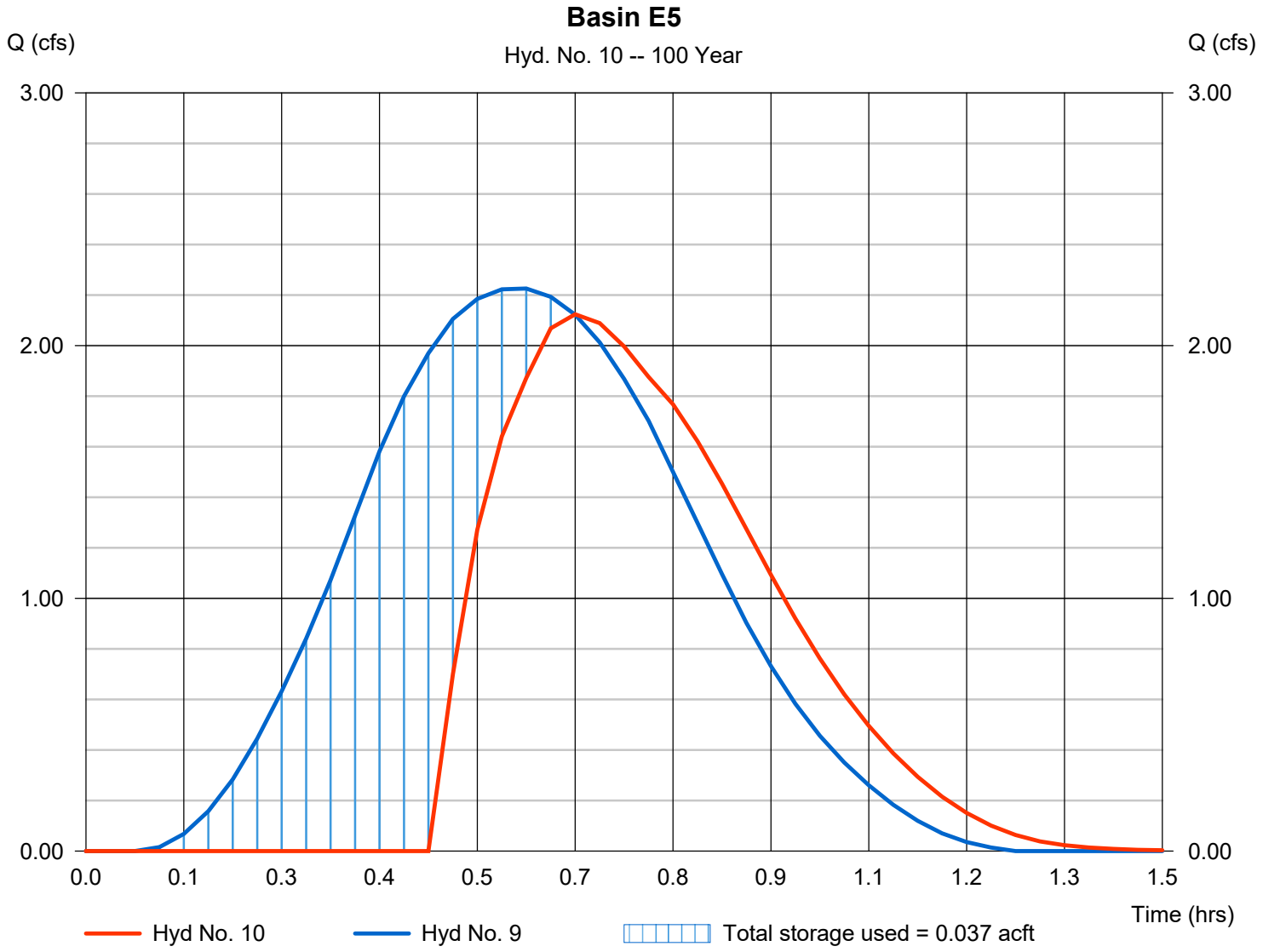
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.124 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.67 hrs
Time interval	=	2 min	Hyd. volume	=	0.074 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.21 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.037 acft

Storage Indication method used.



Pond Report

Pond No. 3 - Basin E5

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 881.45 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	881.45	100	0.000	0.000
0.55	882.00	2,766	0.018	0.018
0.65	882.10	4,218	0.008	0.026
1.65	883.10	5,000	0.106	0.132

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)	= 18.00	0.00	0.00	0.00
Crest El. (ft)	= 882.10	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

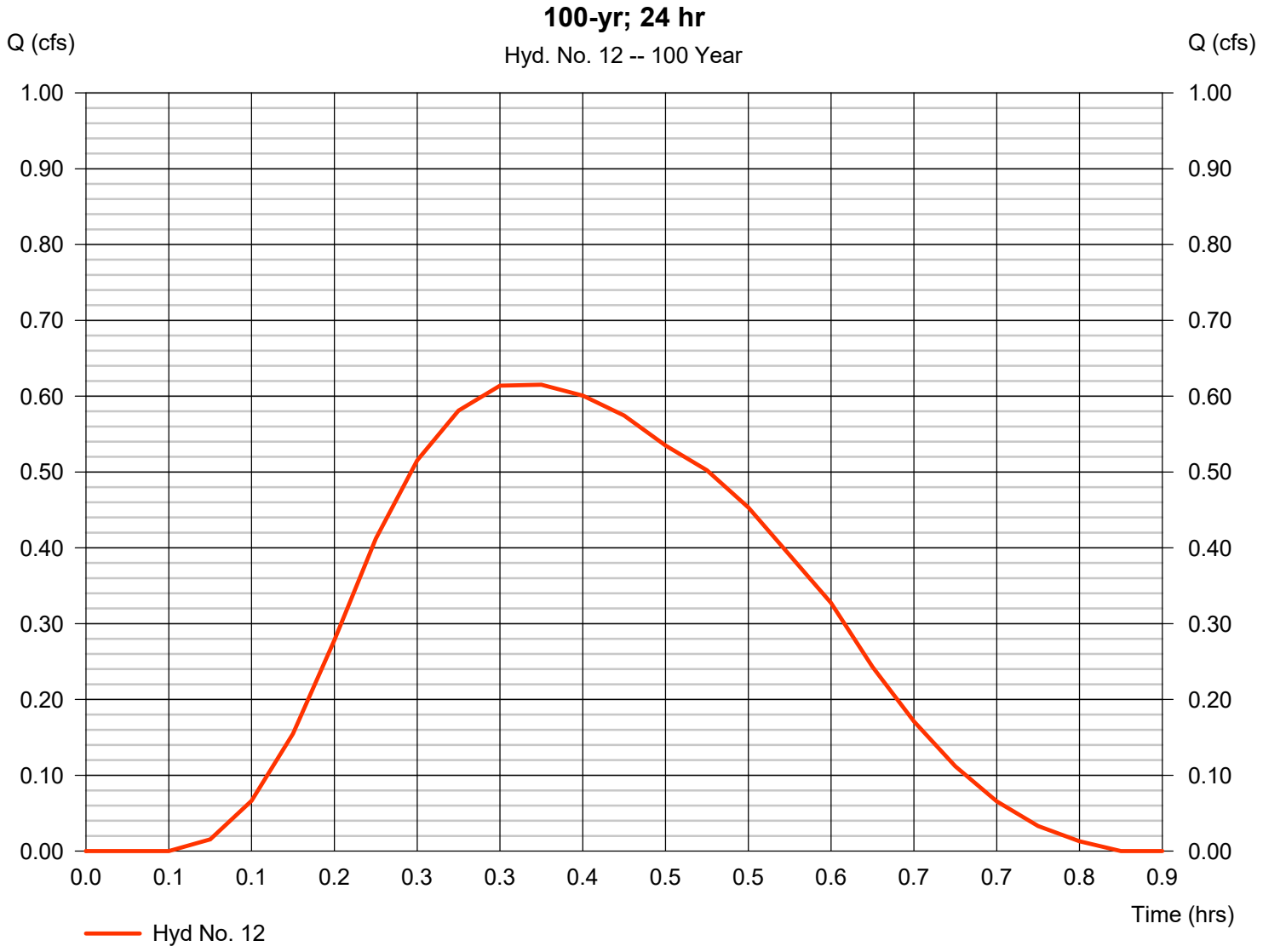
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	881.45	---	---	---	---	0.00	---	---	---	---	---	0.000
0.55	0.018	882.00	---	---	---	---	0.00	---	---	---	---	---	0.000
0.65	0.026	882.10	---	---	---	---	0.00	---	---	---	---	---	0.000
1.65	0.132	883.10	---	---	---	---	59.94	---	---	---	---	---	59.94

Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.615 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.37 hrs
Time interval	=	2 min	Hyd. volume	=	0.020 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.17 in	Distribution	=	Huff-1st
Storm duration	=	0.50 hrs	Shape factor	=	484



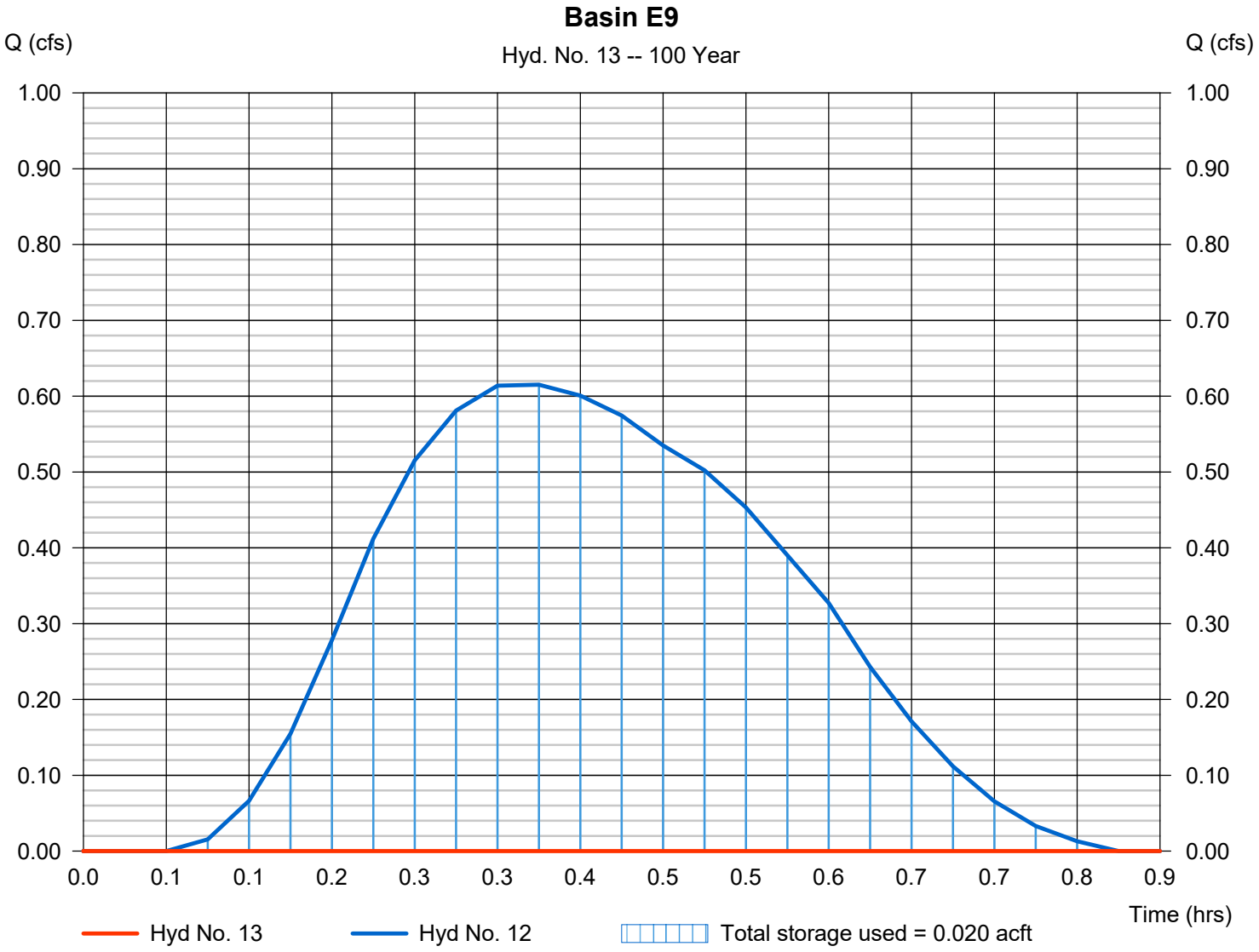
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.09 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.020 acft

Storage Indication method used.



Pond Report

Pond No. 4 - Basin E9

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 896.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	896.60	1,000	0.000	0.000
0.40	897.00	2,143	0.014	0.014
0.70	897.30	3,517	0.019	0.034
1.70	898.30	4,000	0.086	0.120

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)	= 7.00	0.00	0.00	0.00
Crest El. (ft)	= 897.30	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

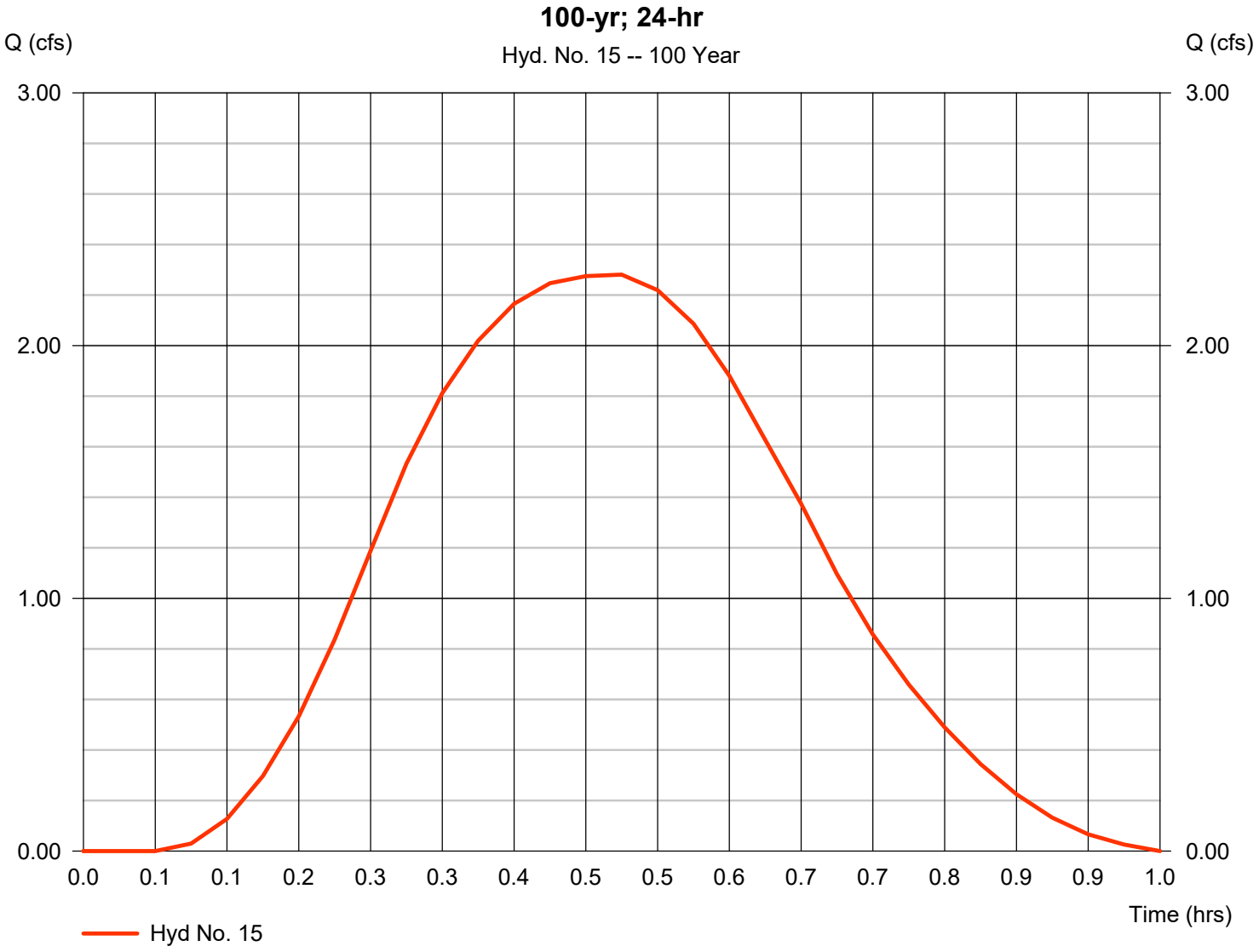
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	896.60	---	---	---	---	0.00	---	---	---	---	---	0.000
0.40	0.014	897.00	---	---	---	---	0.00	---	---	---	---	---	0.000
0.70	0.034	897.30	---	---	---	---	0.00	---	---	---	---	---	0.000
1.70	0.120	898.30	---	---	---	---	23.31	---	---	---	---	---	23.31

Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.281 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.50 hrs
Time interval	=	2 min	Hyd. volume	=	0.084 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	3.17 in	Distribution	=	Huff-1st
Storm duration	=	0.50 hrs	Shape factor	=	484

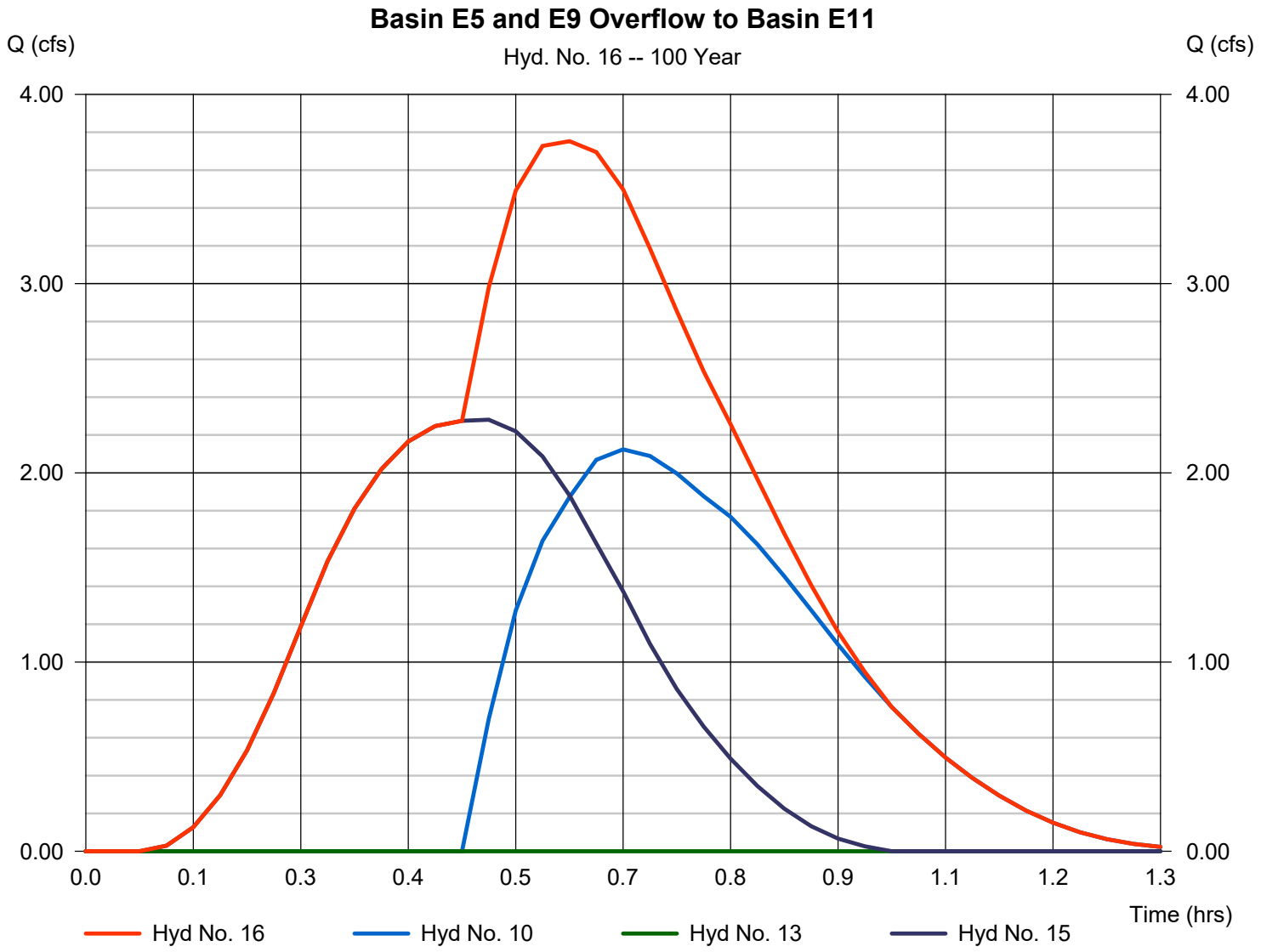


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	3.753 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.158 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



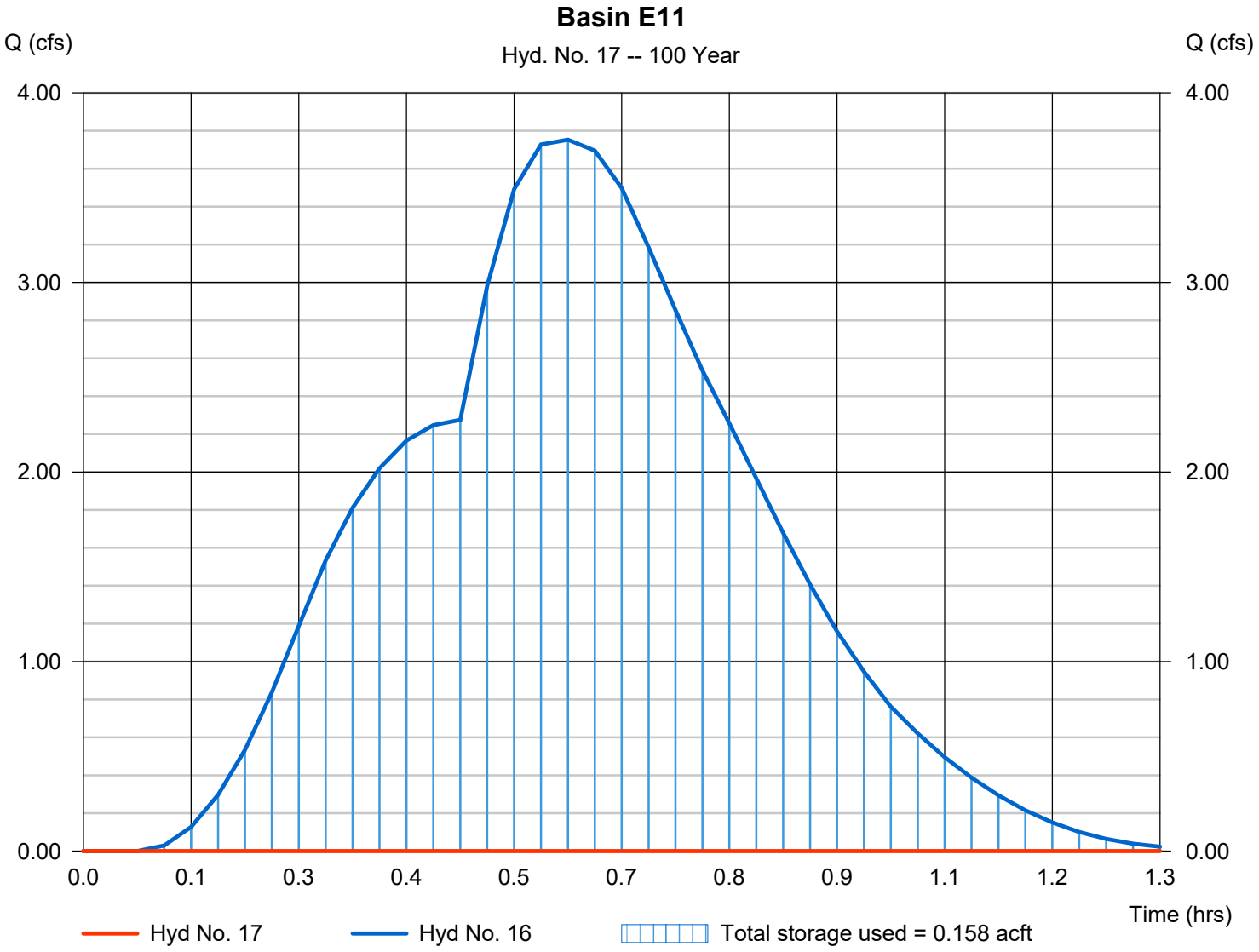
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow to E11	Max. Elevation	=	875.67 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.158 acft

Storage Indication method used.



Pond Report

Pond No. 5 - Basin E11

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 873.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	873.50	100	0.000	0.000
0.50	874.00	357	0.003	0.003
1.50	875.00	4,560	0.056	0.059
2.50	876.00	8,288	0.147	0.207
3.50	877.00	11,730	0.230	0.436
4.40	877.90	18,131	0.308	0.745
5.40	878.90	20,000	0.438	1.182

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)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 877.90	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

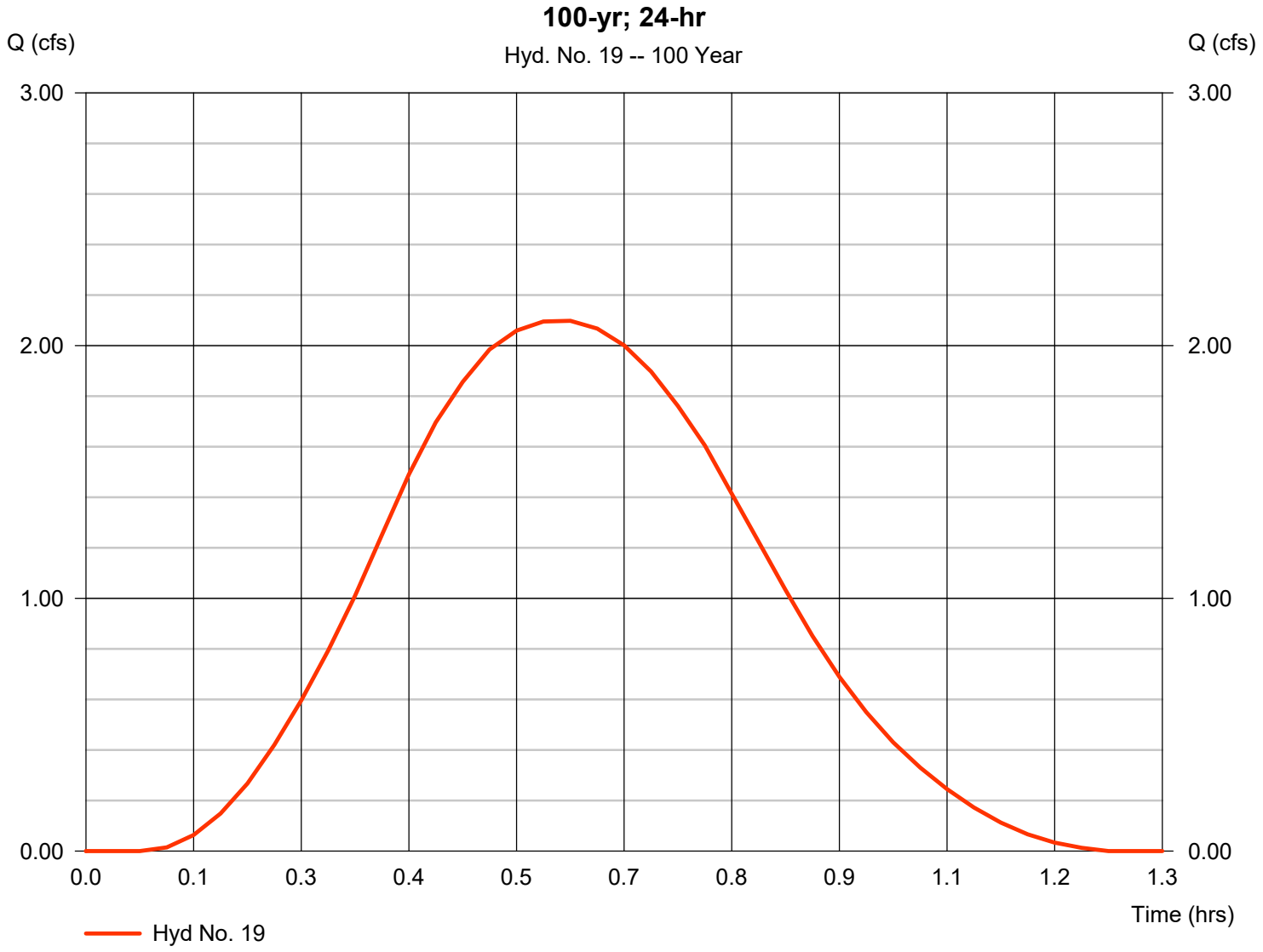
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	873.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.50	0.003	874.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.50	0.059	875.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	0.207	876.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.50	0.436	877.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.40	0.745	877.90	---	---	---	---	0.00	---	---	---	---	---	0.000
5.40	1.182	878.90	---	---	---	---	9.99	---	---	---	---	---	9.990

Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.098 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.095 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	3.17 in	Distribution	=	Huff-1st
Storm duration	=	0.50 hrs	Shape factor	=	484

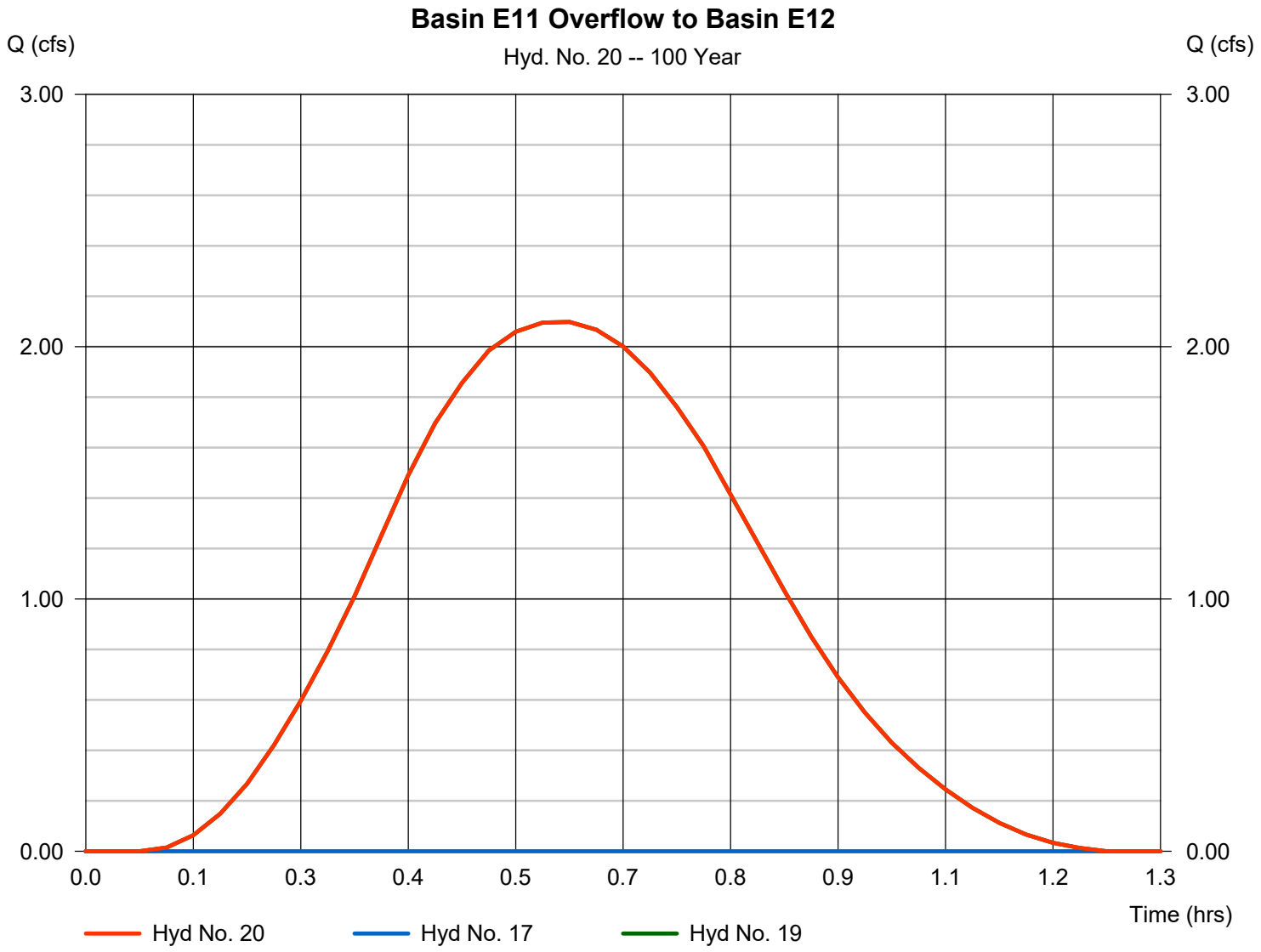


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	2.098 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.095 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



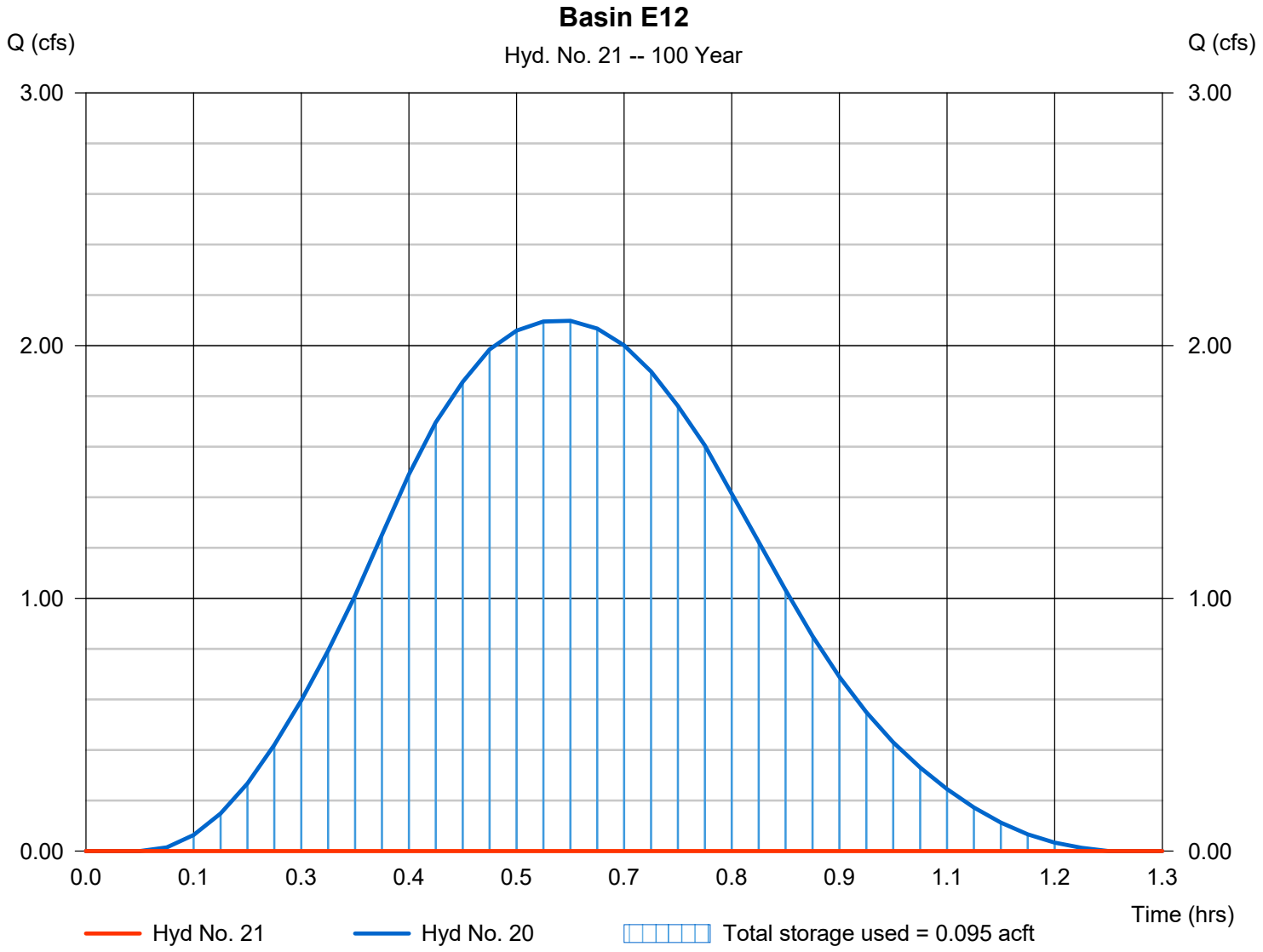
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	867.59 ft
Reservoir name	=	Basin E12	Max. Storage	=	0.095 acft

Storage Indication method used.



Pond Report

Pond No. 6 - Basin E12

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 867.20 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	867.20	3,000	0.000	0.000
0.80	868.00	18,092	0.194	0.194
1.80	869.00	29,069	0.541	0.735
2.80	870.00	37,054	0.759	1.494
3.80	871.00	43,187	0.921	2.415
4.80	872.00	46,992	1.035	3.450
5.80	873.00	49,917	1.112	4.563
6.80	874.00	52,815	1.179	5.742
7.30	874.50	55,402	0.621	6.363
8.30	875.50	60,000	1.325	7.687

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)	= 24.00	0.00	0.00	0.00
Crest El. (ft)	= 874.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	867.20	---	---	---	---	0.00	---	---	---	---	---	0.000
0.80	0.194	868.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.80	0.735	869.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.80	1.494	870.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.80	2.415	871.00	---	---	---	---	0.00	---	---	---	---	---	0.000
4.80	3.450	872.00	---	---	---	---	0.00	---	---	---	---	---	0.000
5.80	4.563	873.00	---	---	---	---	0.00	---	---	---	---	---	0.000
6.80	5.742	874.00	---	---	---	---	0.00	---	---	---	---	---	0.000
7.30	6.363	874.50	---	---	---	---	0.00	---	---	---	---	---	0.000
8.30	7.687	875.50	---	---	---	---	79.92	---	---	---	---	---	79.92

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G985-Ex. Depressional Storage.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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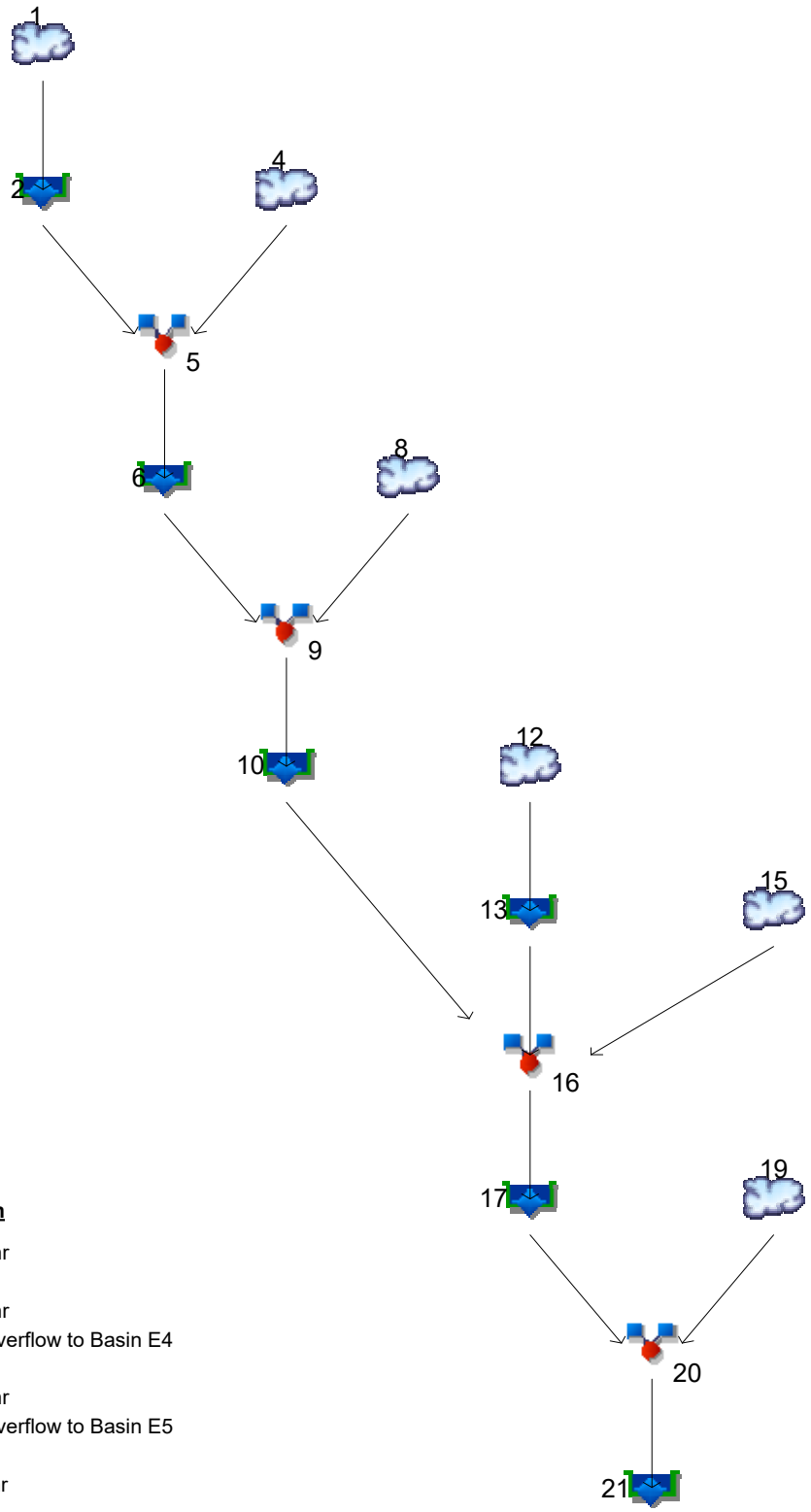
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100 Year-1 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

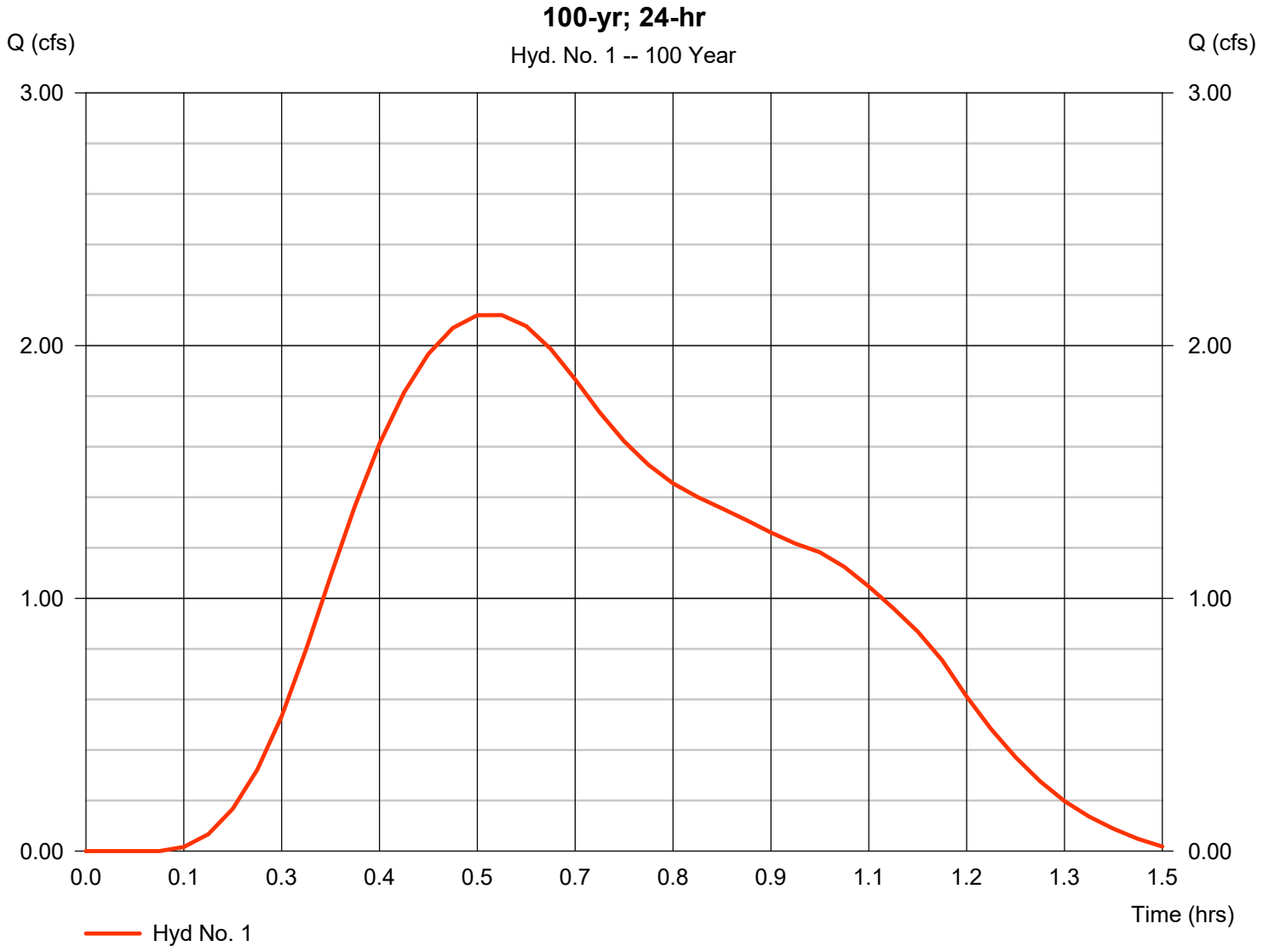
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	2.121	2	34	0.119	------	------	------	100-yr; 24-hr
2	Reservoir	0.000	2	n/a	0.000	1	890.74	0.119	Basin E6
4	SCS Runoff	6.536	2	60	0.520	------	------	------	100-yr; 24-hr
5	Combine	6.536	2	60	0.520	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	0.000	2	n/a	0.000	5	881.89	0.520	Basin E4
8	SCS Runoff	2.917	2	42	0.192	------	------	------	100-yr; 24-hr
9	Combine	2.917	2	42	0.192	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.890	2	46	0.166	9	882.23	0.040	Basin E5
12	SCS Runoff	0.758	2	26	0.038	------	------	------	100-yr; 24 hr
13	Reservoir	0.172	2	68	0.004	12	897.32	0.036	Basin E9
15	SCS Runoff	2.873	2	34	0.161	------	------	------	100-yr; 24-hr
16	Combine	5.254	2	40	0.331	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	0.000	2	n/a	0.000	16	876.54	0.331	Basin E11
19	SCS Runoff	2.750	2	42	0.181	------	------	------	100-yr; 24-hr
20	Combine	2.750	2	42	0.181	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	867.95	0.181	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.121 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.57 hrs
Time interval	=	2 min	Hyd. volume	=	0.119 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	4.03 in	Distribution	=	Huff-1st
Storm duration	=	1.00 hrs	Shape factor	=	484



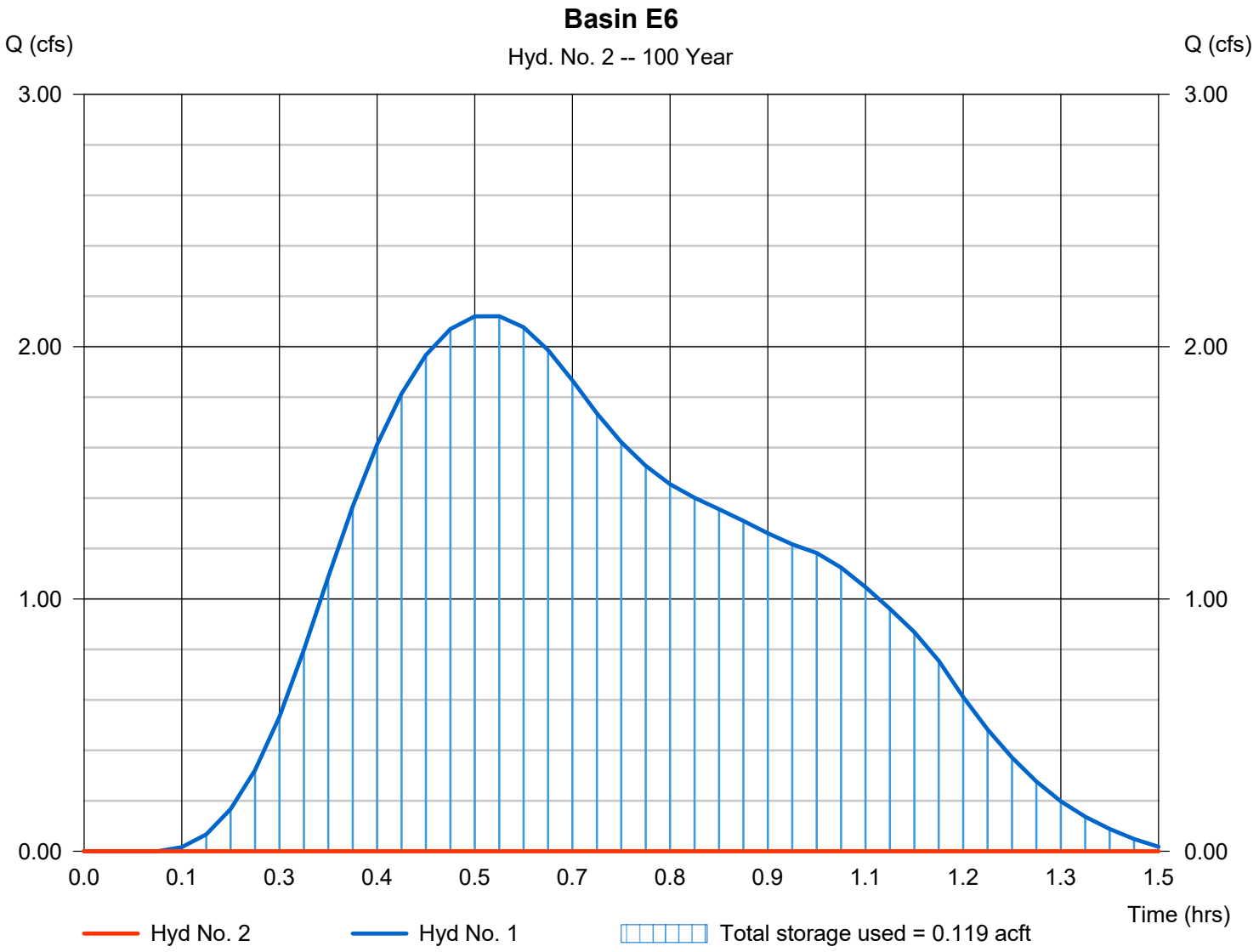
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	890.74 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.119 acft

Storage Indication method used.

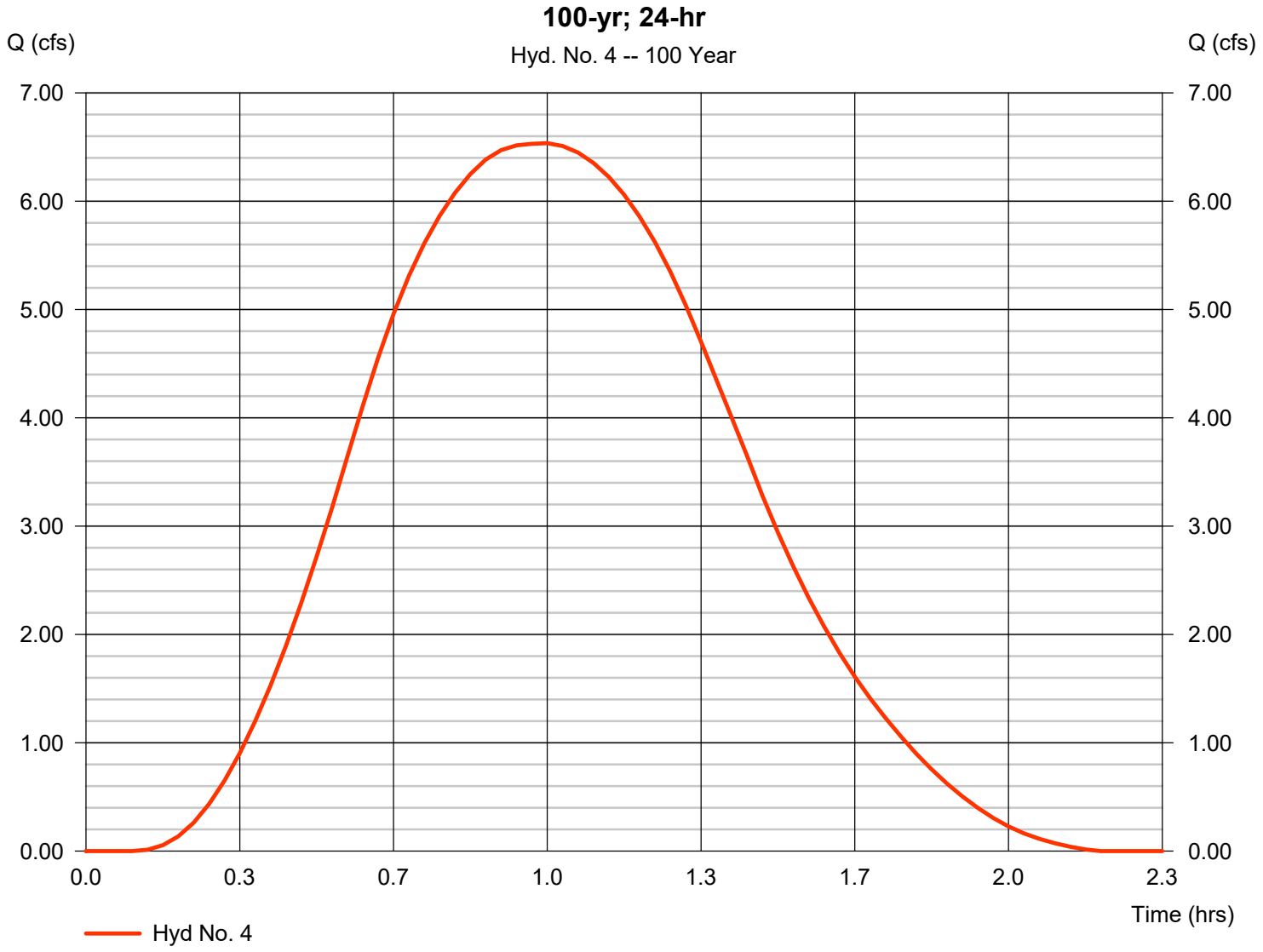


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.536 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.00 hrs
Time interval	=	2 min	Hyd. volume	=	0.520 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	4.03 in	Distribution	=	Huff-1st
Storm duration	=	1.00 hrs	Shape factor	=	484

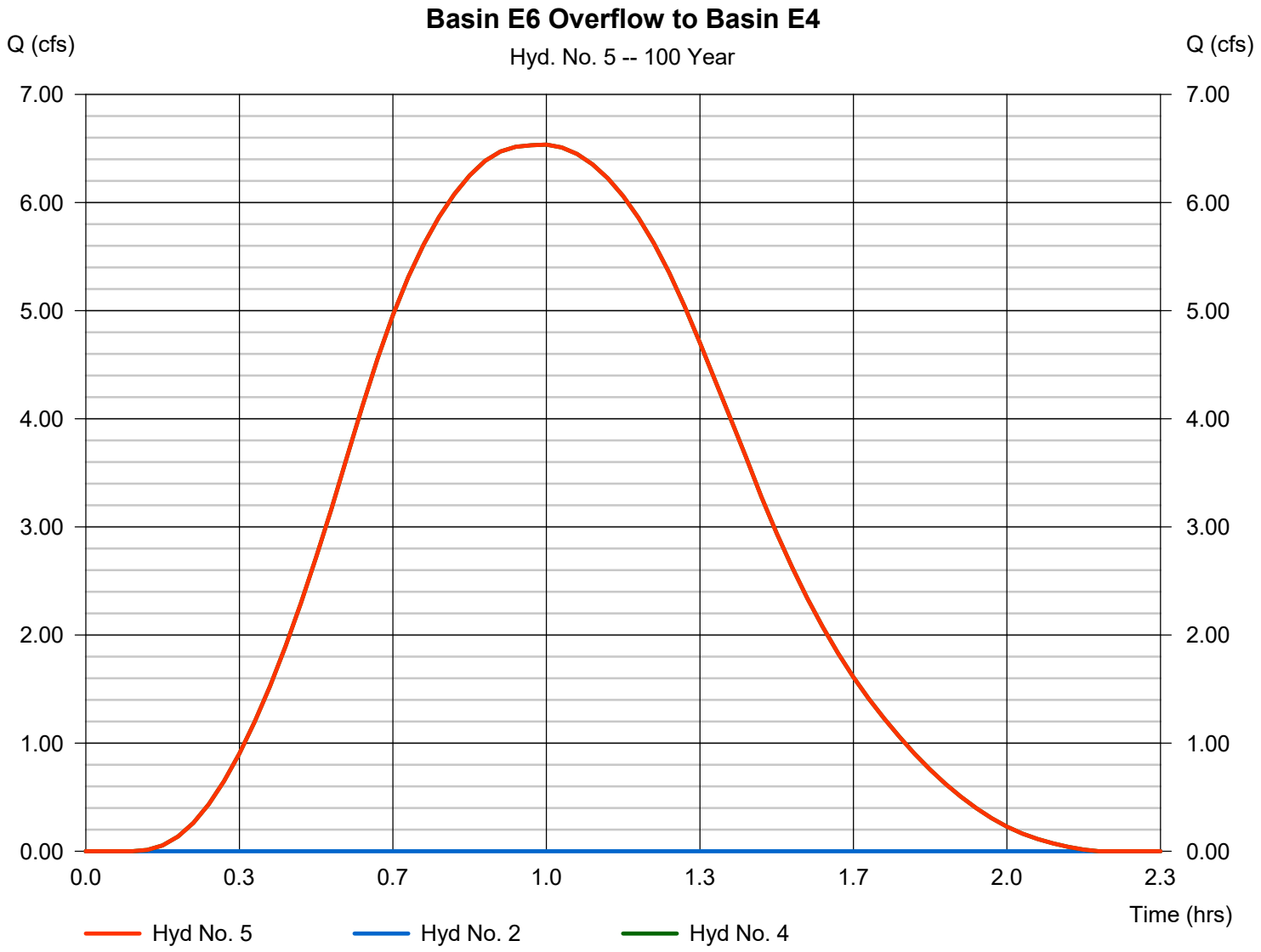


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 6.536 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.00 hrs
Time interval	= 2 min	Hyd. volume	= 0.520 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



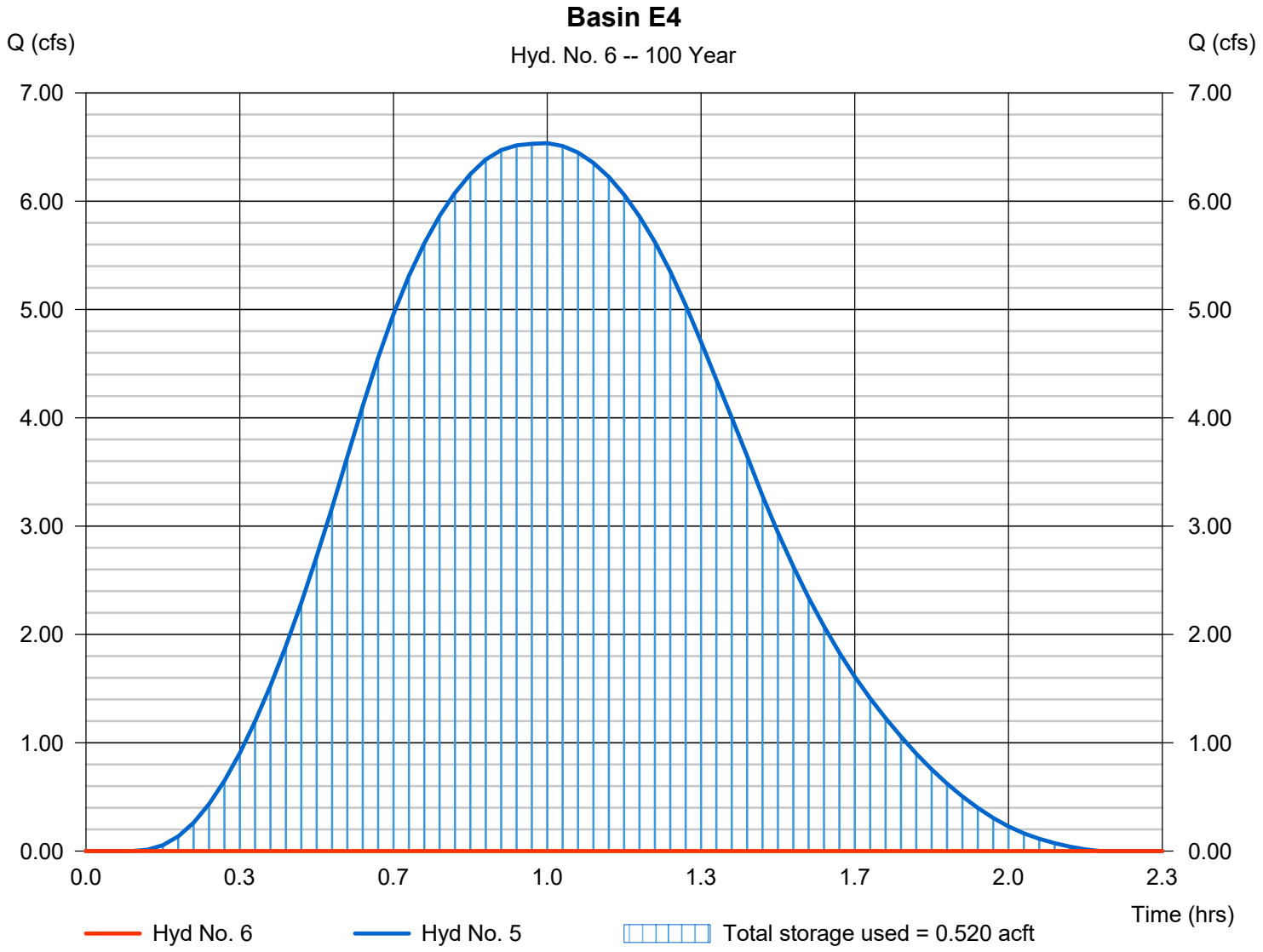
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	881.89 ft
Reservoir name	=	Basin E4	Max. Storage	=	0.520 acft

Storage Indication method used.

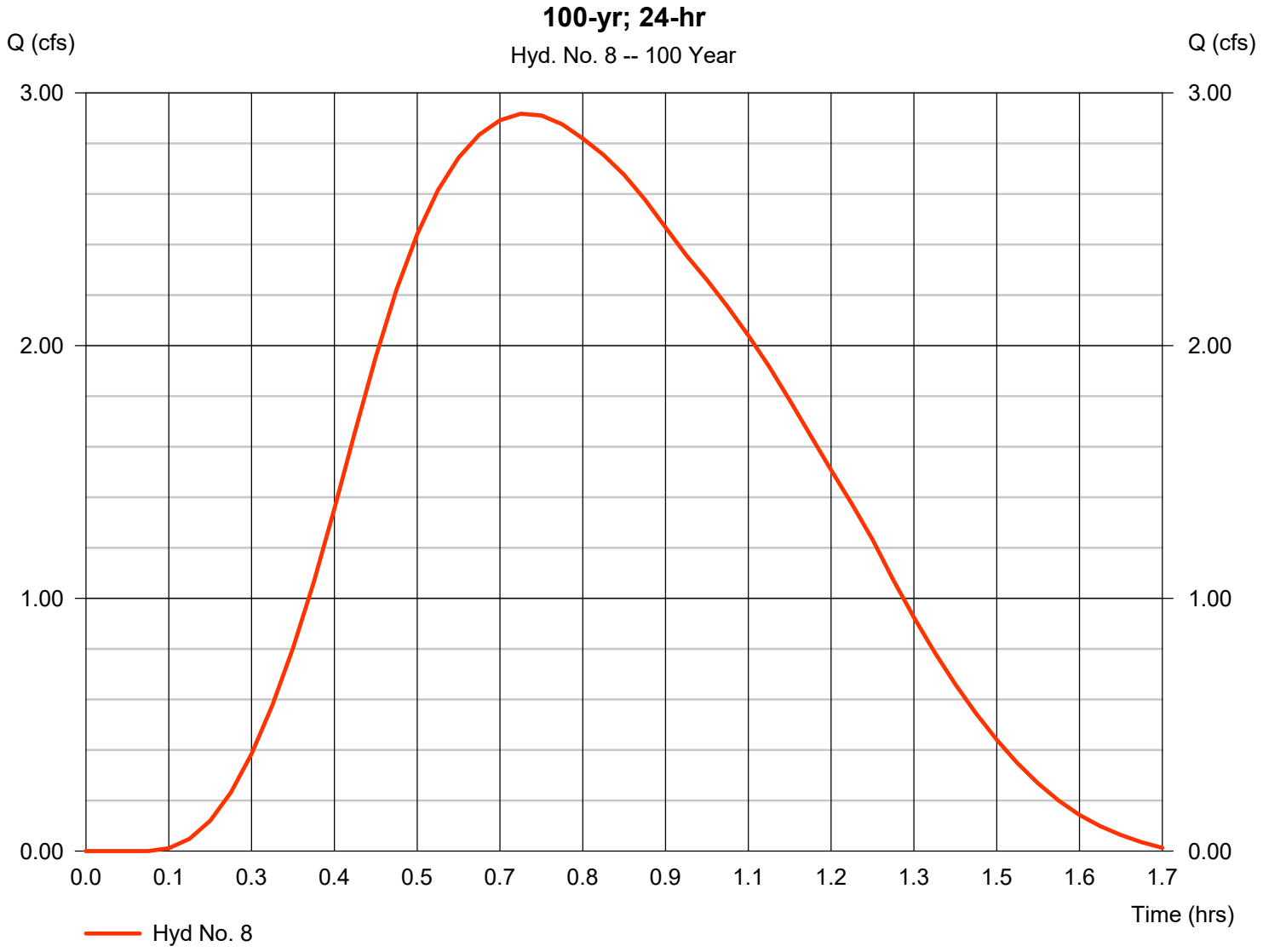


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.917 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.192 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	4.03 in	Distribution	=	Huff-1st
Storm duration	=	1.00 hrs	Shape factor	=	484

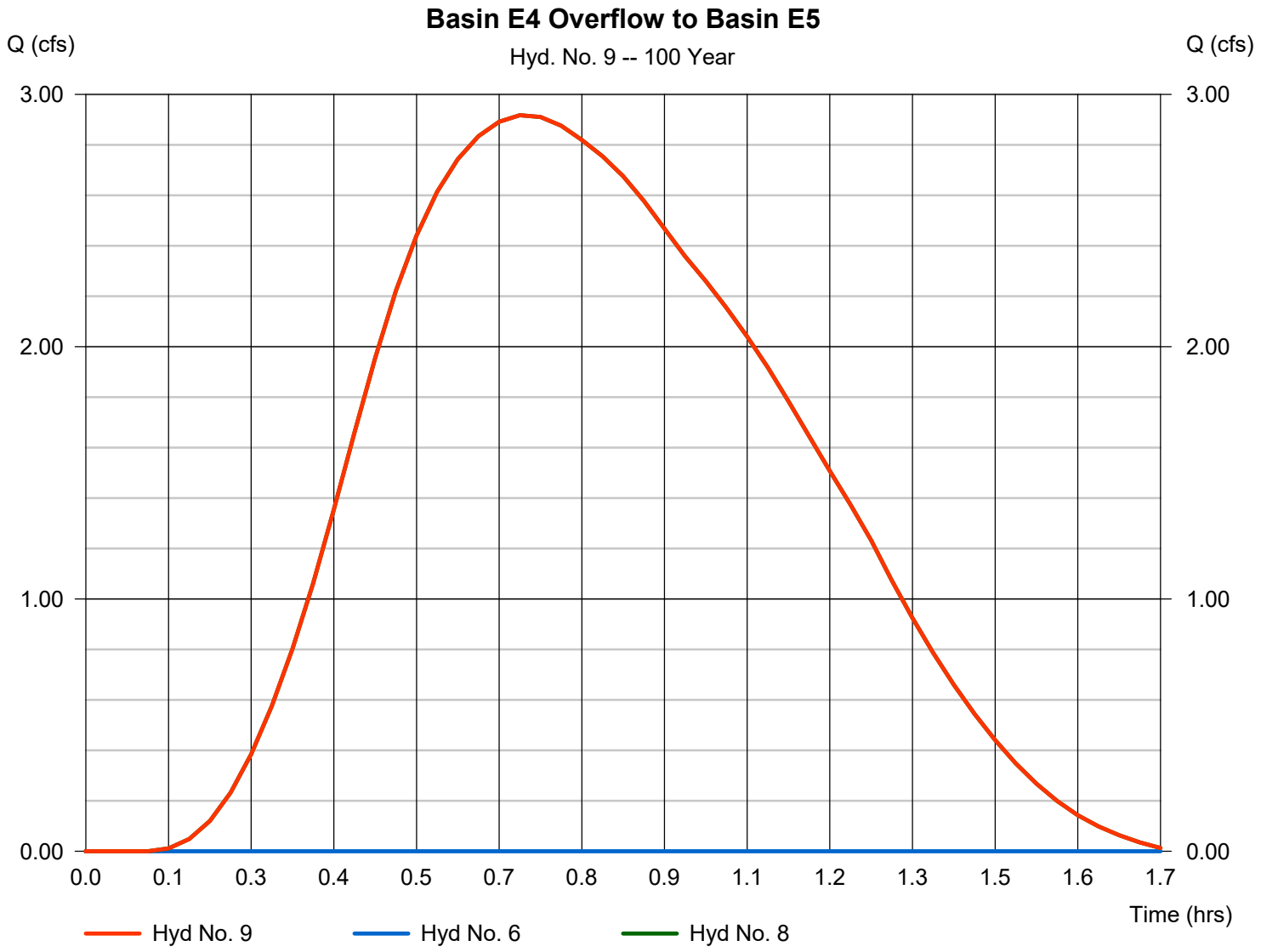


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	2.917 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.192 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



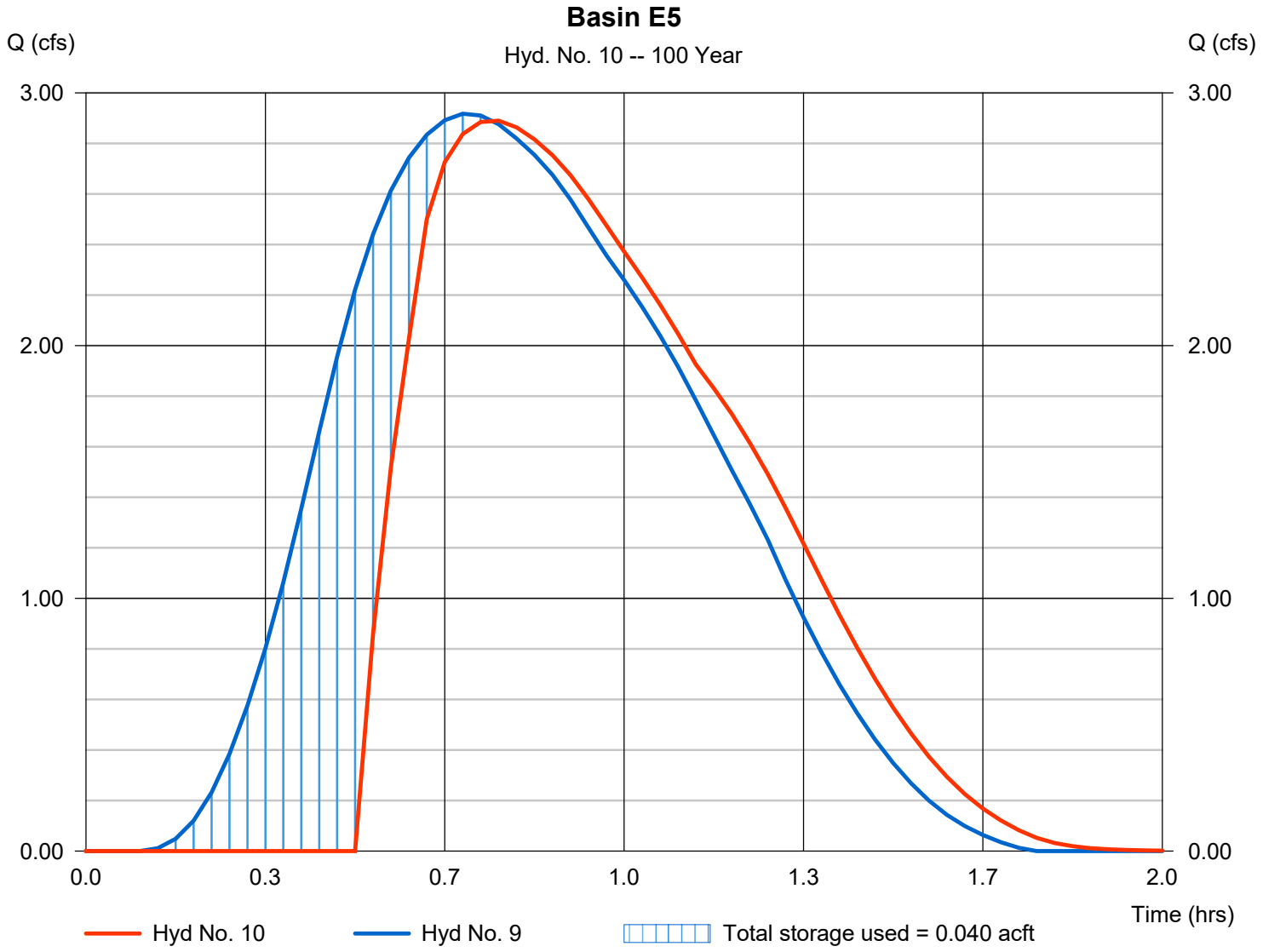
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.890 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.77 hrs
Time interval	=	2 min	Hyd. volume	=	0.166 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.23 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.040 acft

Storage Indication method used.

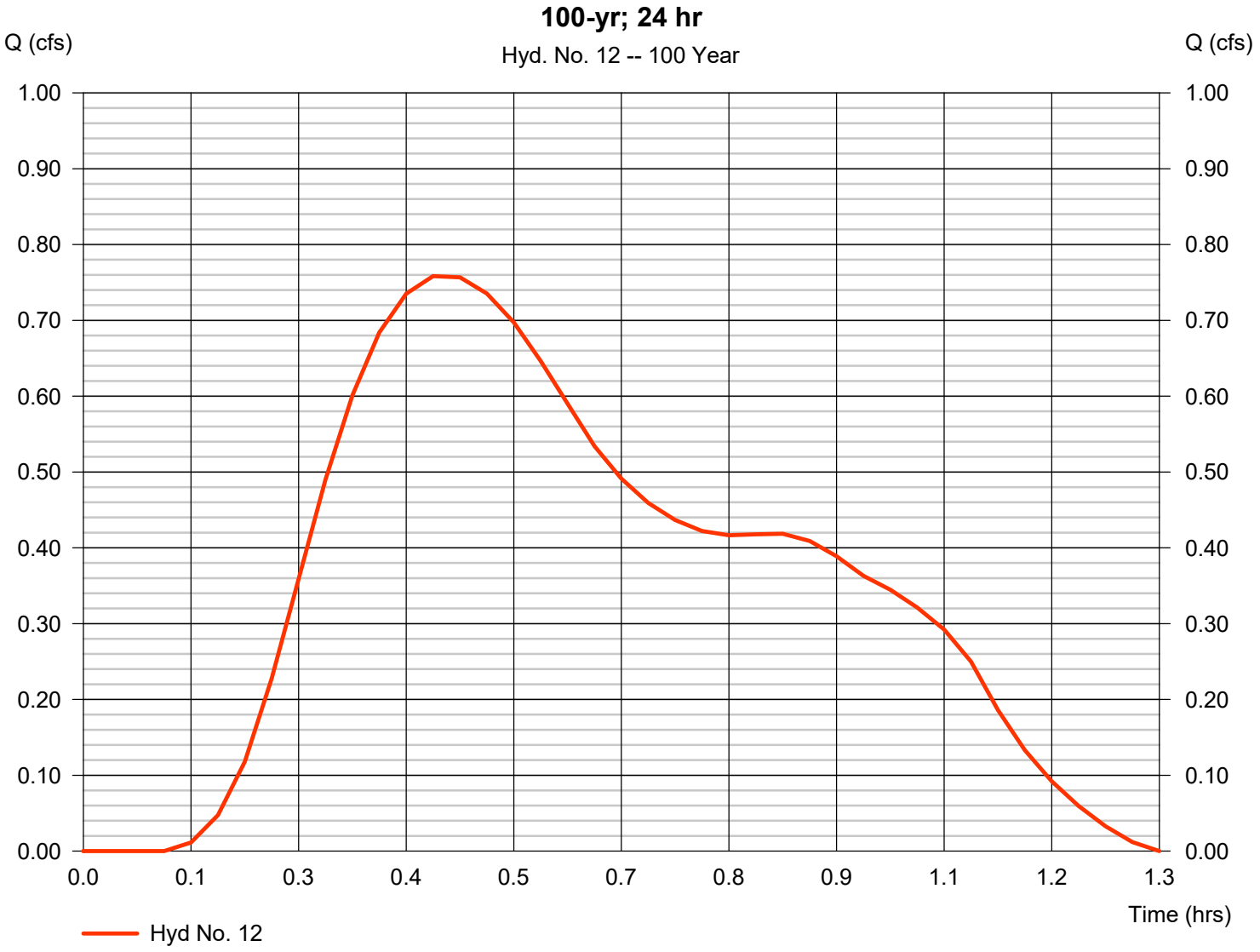


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.758 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.43 hrs
Time interval	=	2 min	Hyd. volume	=	0.038 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.03 in	Distribution	=	Huff-1st
Storm duration	=	1.00 hrs	Shape factor	=	484



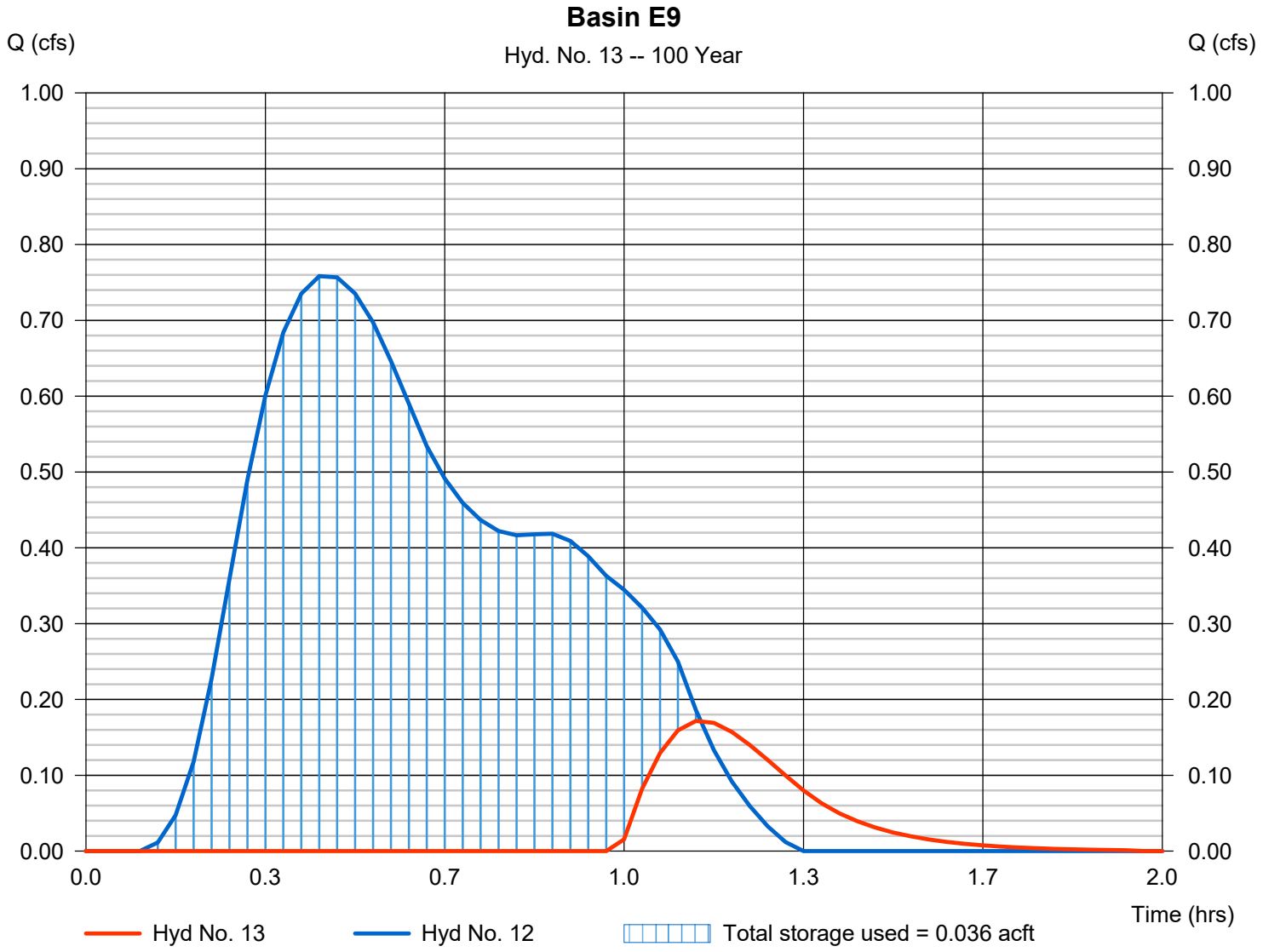
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.172 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.13 hrs
Time interval	=	2 min	Hyd. volume	=	0.004 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.32 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.036 acft

Storage Indication method used.

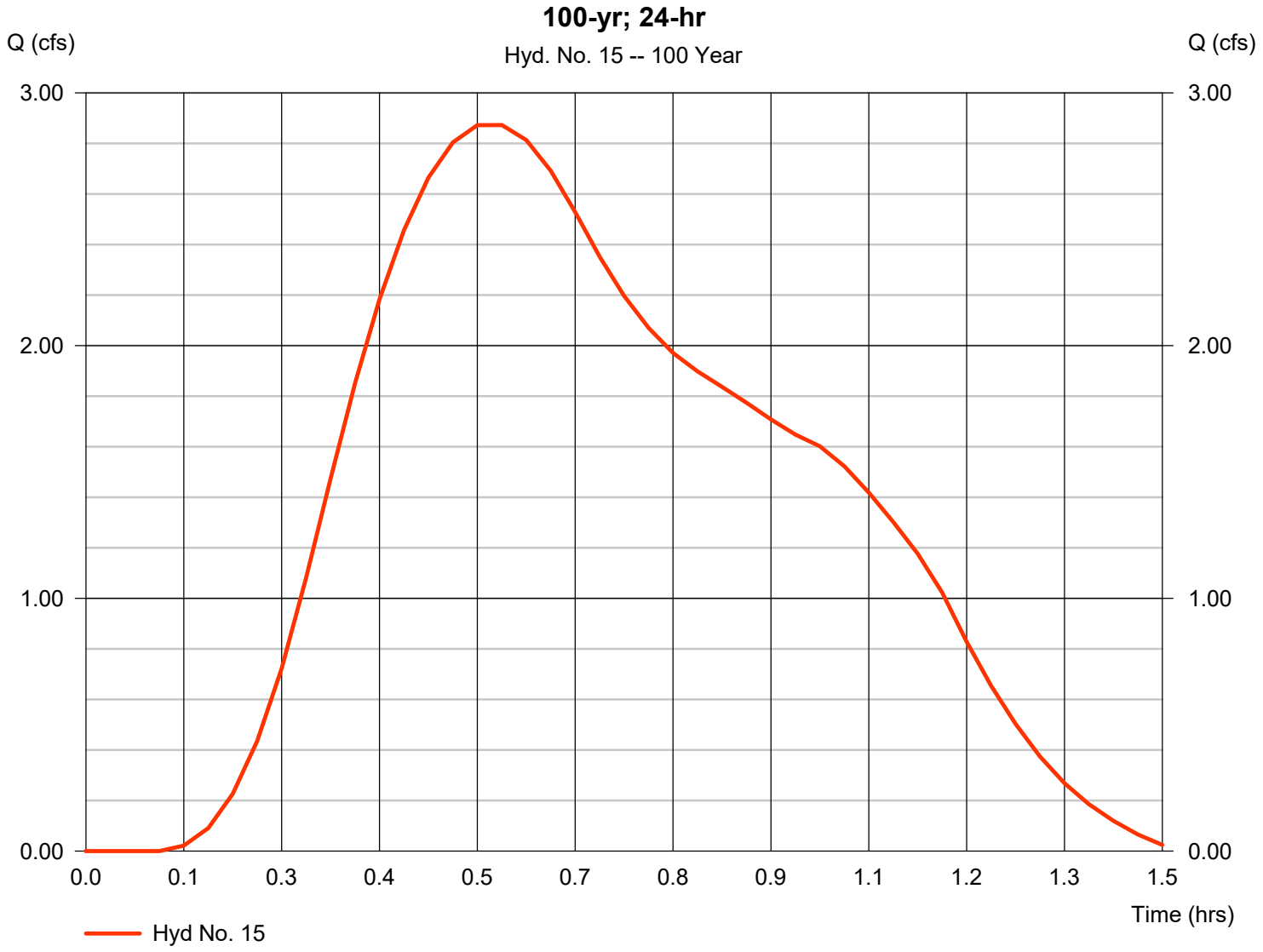


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.873 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.57 hrs
Time interval	=	2 min	Hyd. volume	=	0.161 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	4.03 in	Distribution	=	Huff-1st
Storm duration	=	1.00 hrs	Shape factor	=	484

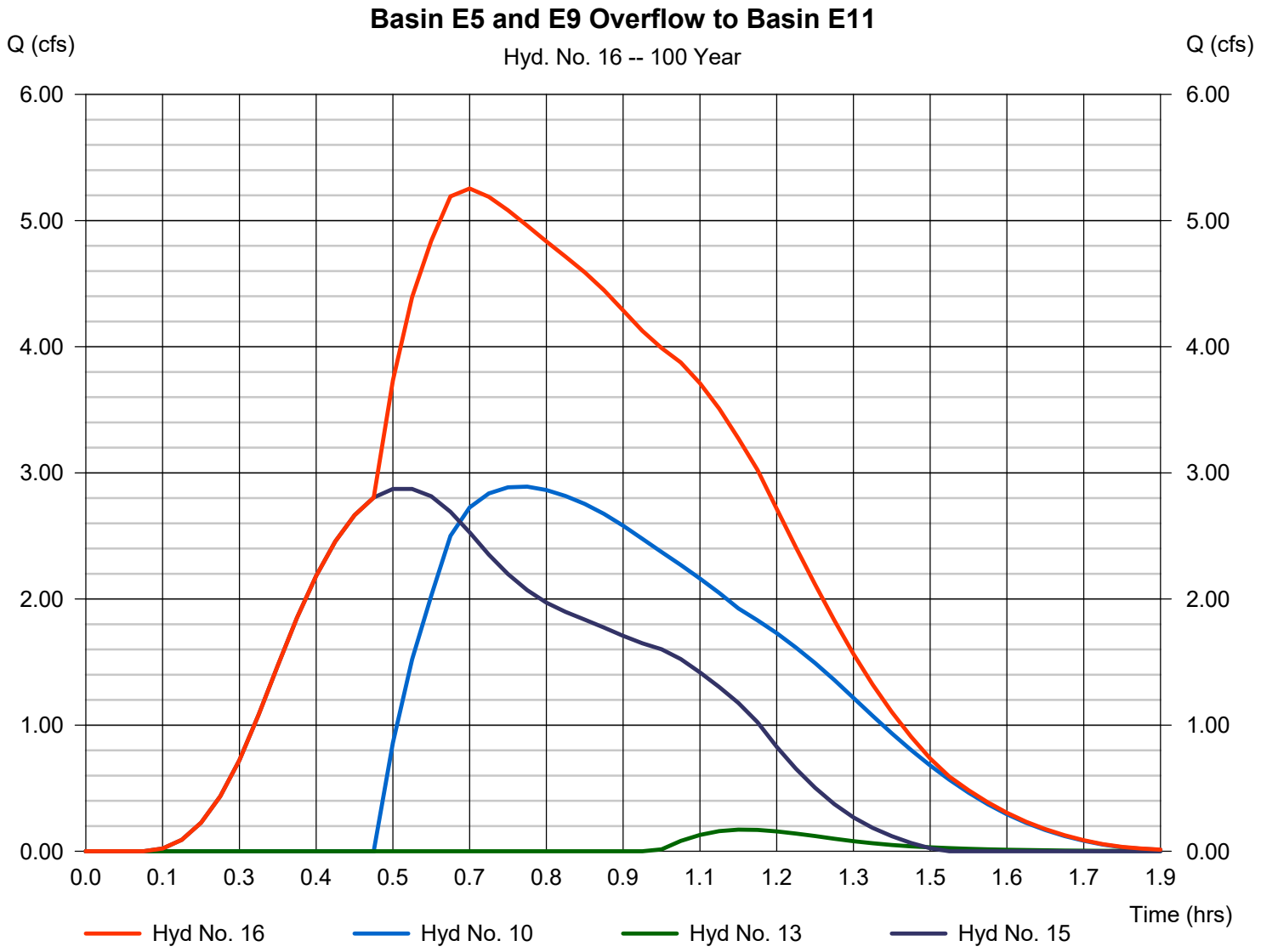


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	5.254 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.67 hrs
Time interval	=	2 min	Hyd. volume	=	0.331 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



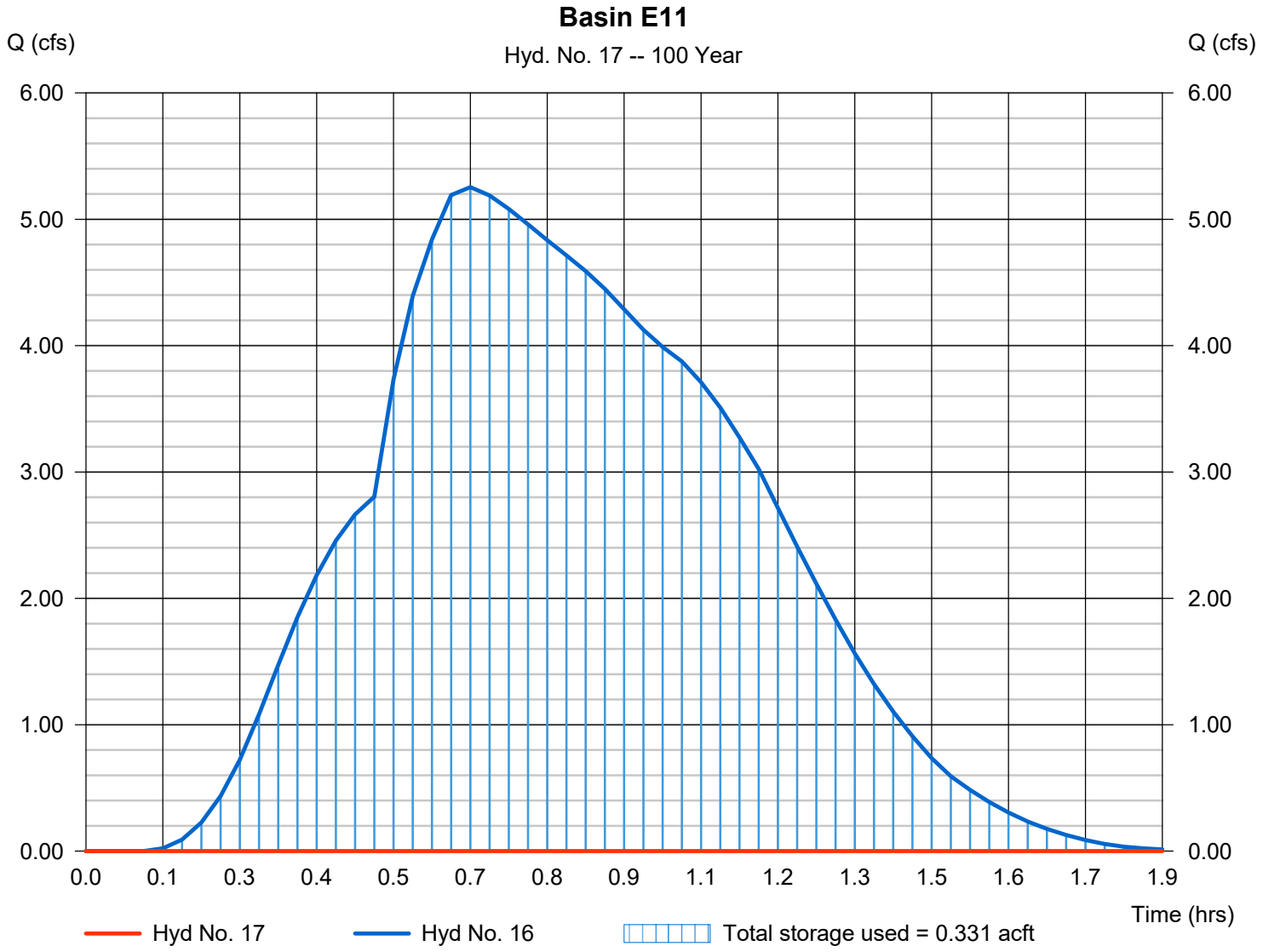
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow to E11	Max. Elevation	=	876.54 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.331 acft

Storage Indication method used.

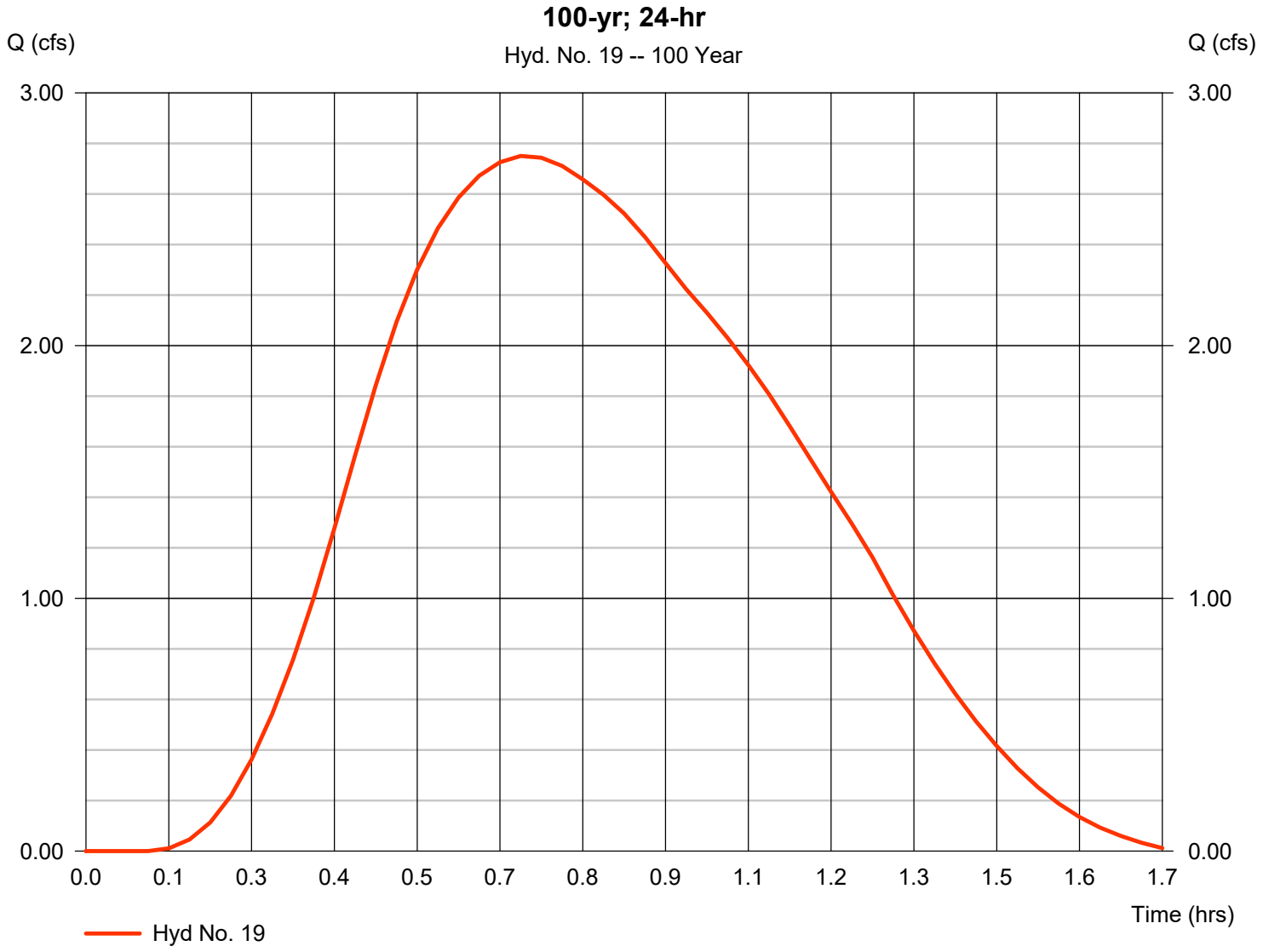


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.750 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.181 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	4.03 in	Distribution	=	Huff-1st
Storm duration	=	1.00 hrs	Shape factor	=	484

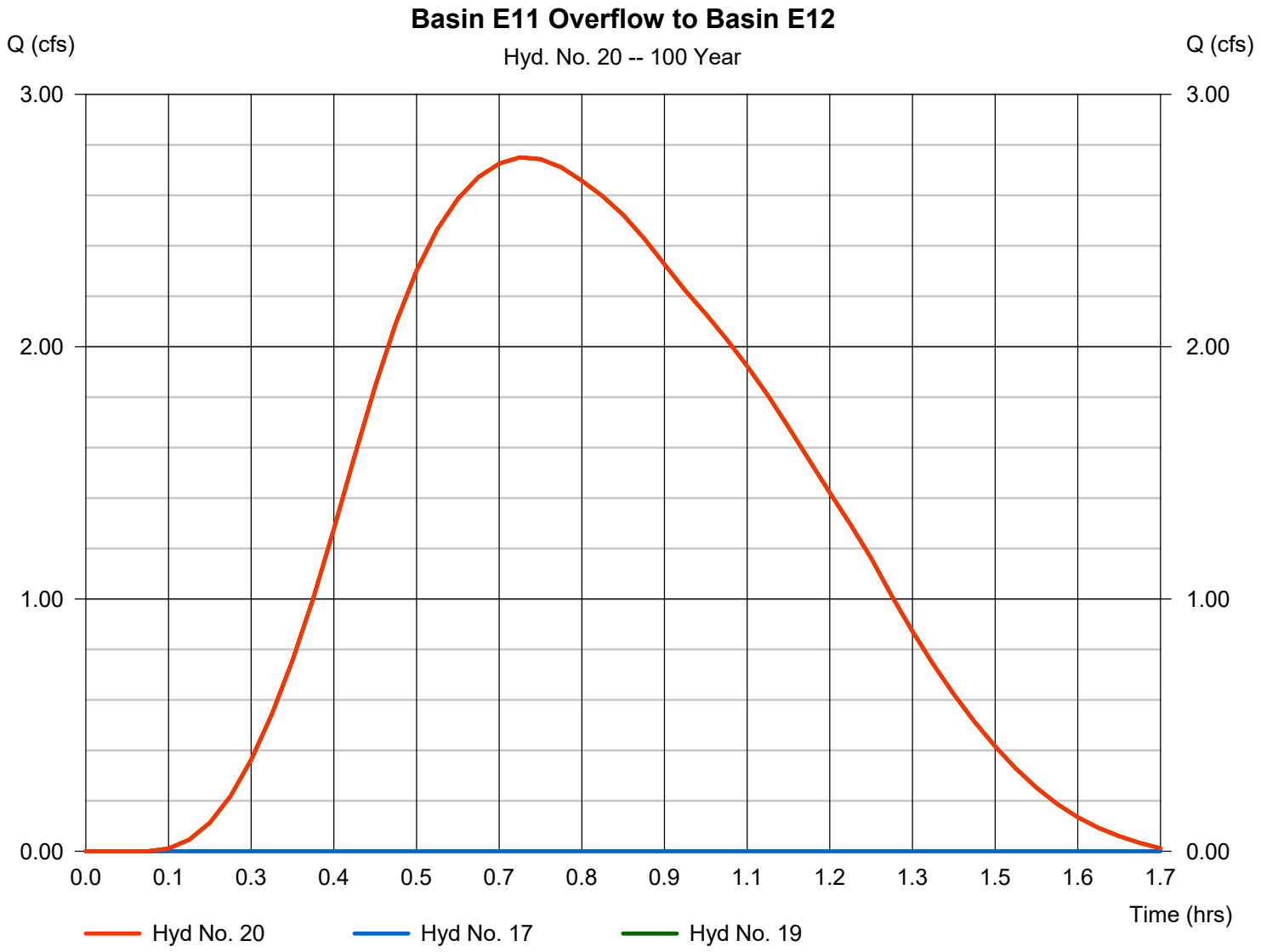


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	2.750 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.181 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



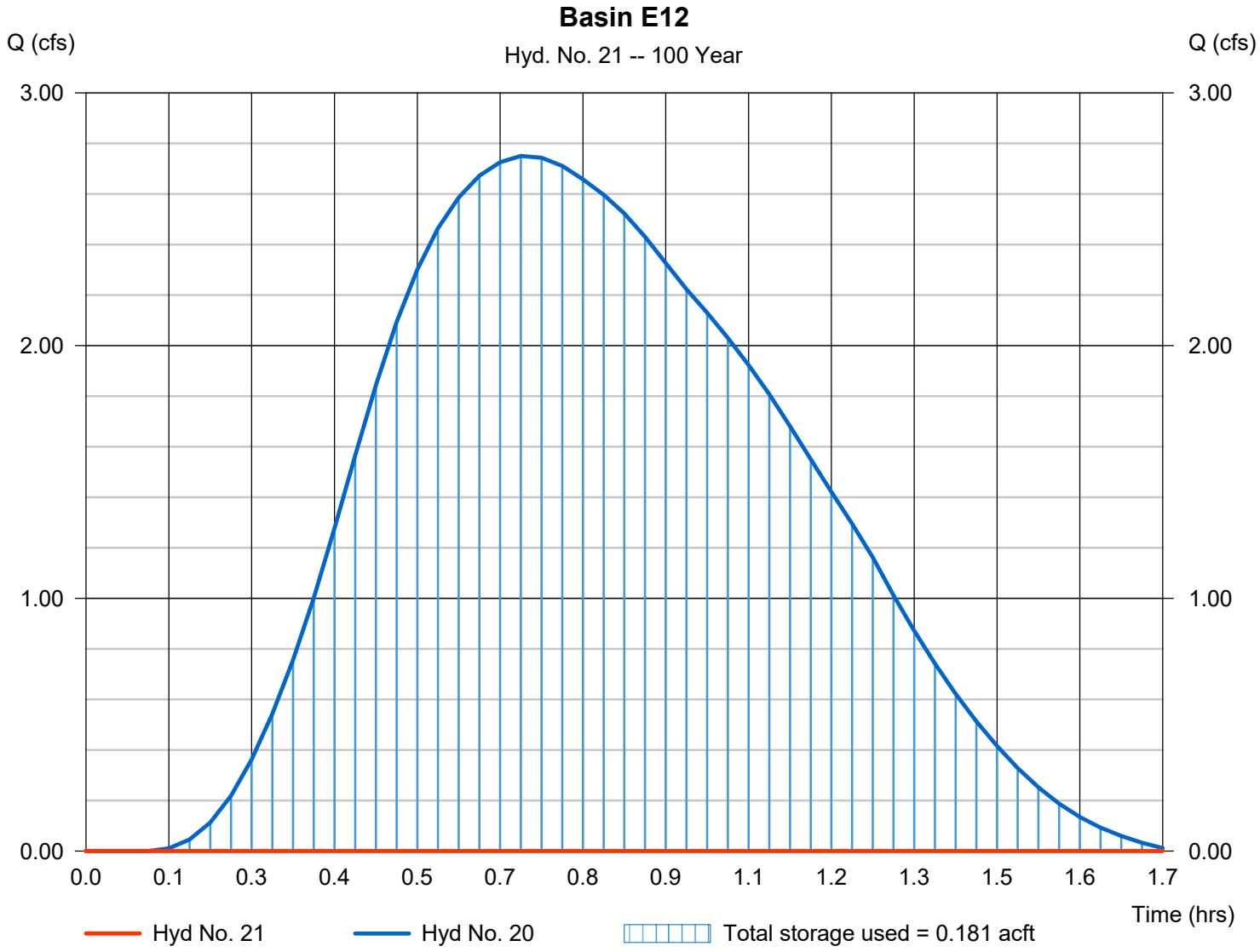
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	867.95 ft
Reservoir name	=	Basin E12	Max. Storage	=	0.181 acft

Storage Indication method used.



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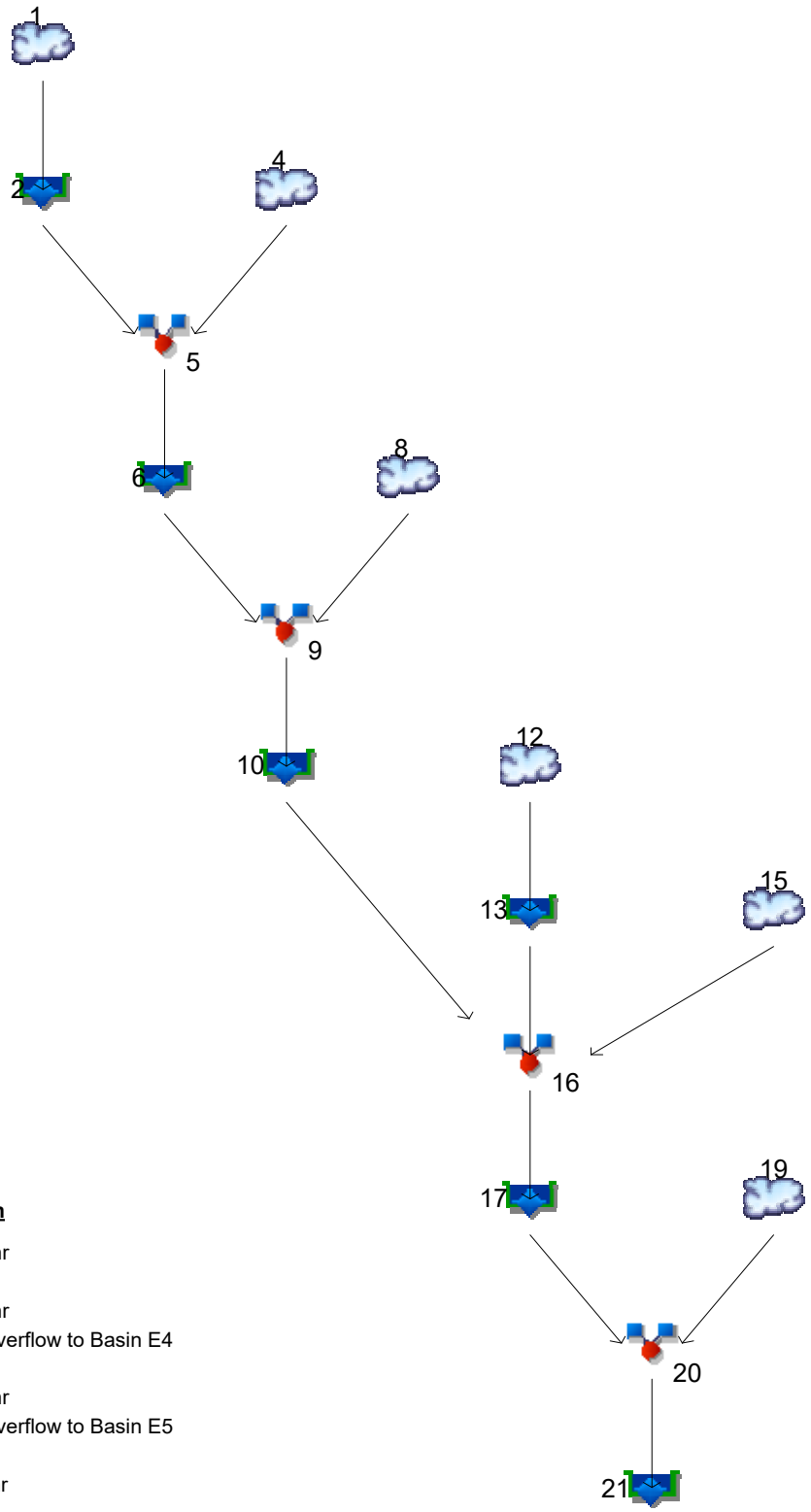
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100 Year-2 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

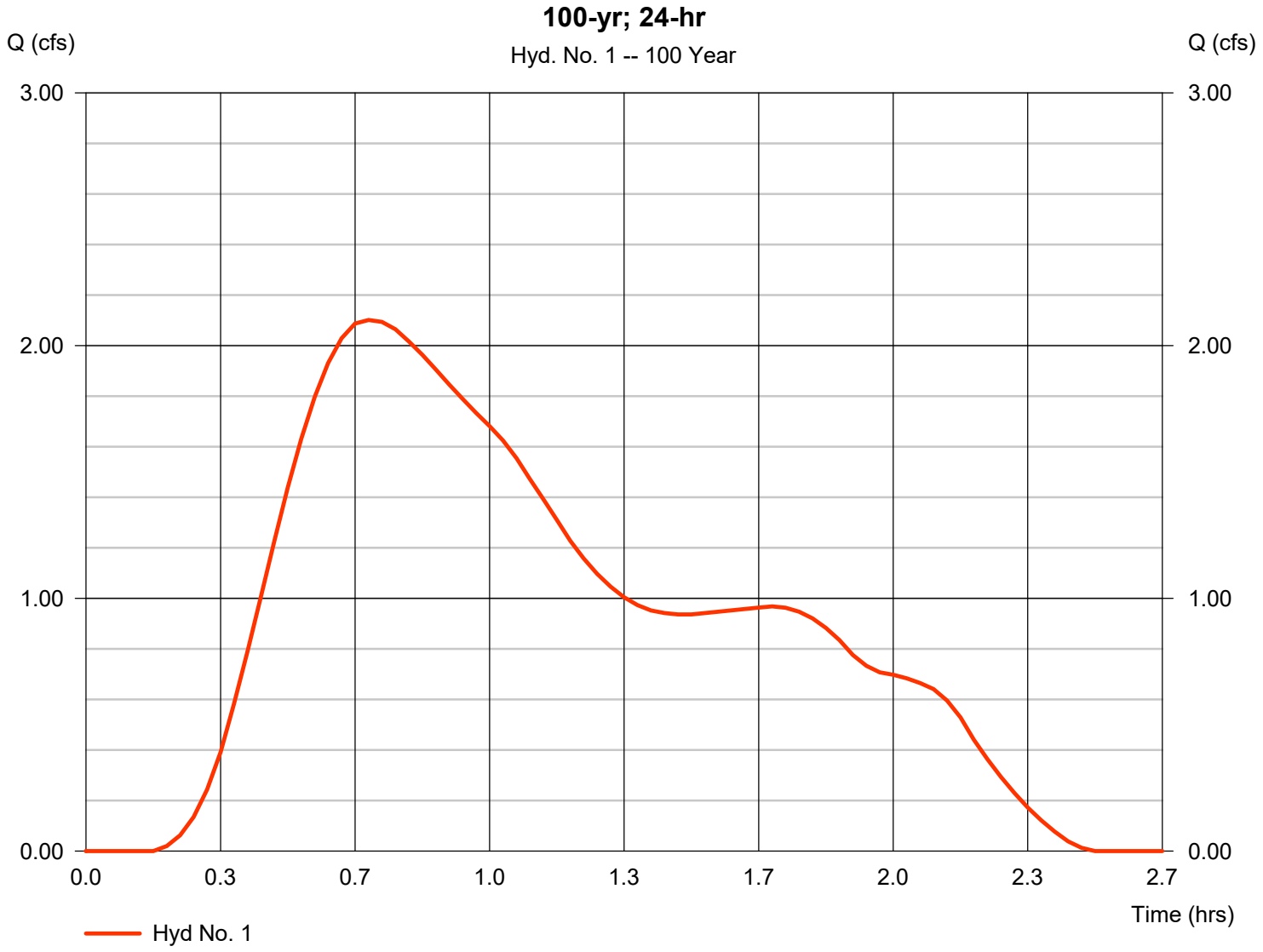
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	2.101	2	42	0.194	------	------	------	100-yr; 24-hr
2	Reservoir	0.000	2	n/a	0.000	1	891.43	0.194	Basin E6
4	SCS Runoff	7.336	2	68	0.849	------	------	------	100-yr; 24-hr
5	Combine	7.336	2	68	0.849	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	0.000	2	n/a	0.000	5	882.56	0.849	Basin E4
8	SCS Runoff	3.134	2	54	0.314	------	------	------	100-yr; 24-hr
9	Combine	3.134	2	54	0.314	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	3.118	2	56	0.288	9	882.24	0.040	Basin E5
12	SCS Runoff	0.718	2	36	0.063	------	------	------	100-yr; 24 hr
13	Reservoir	0.312	2	104	0.029	12	897.34	0.038	Basin E9
15	SCS Runoff	2.847	2	42	0.262	------	------	------	100-yr; 24-hr
16	Combine	5.651	2	50	0.579	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	0.000	2	n/a	0.000	16	877.42	0.579	Basin E11
19	SCS Runoff	2.954	2	54	0.296	------	------	------	100-yr; 24-hr
20	Combine	2.954	2	54	0.296	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	868.19	0.296	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.101 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.194 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	4.97 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484



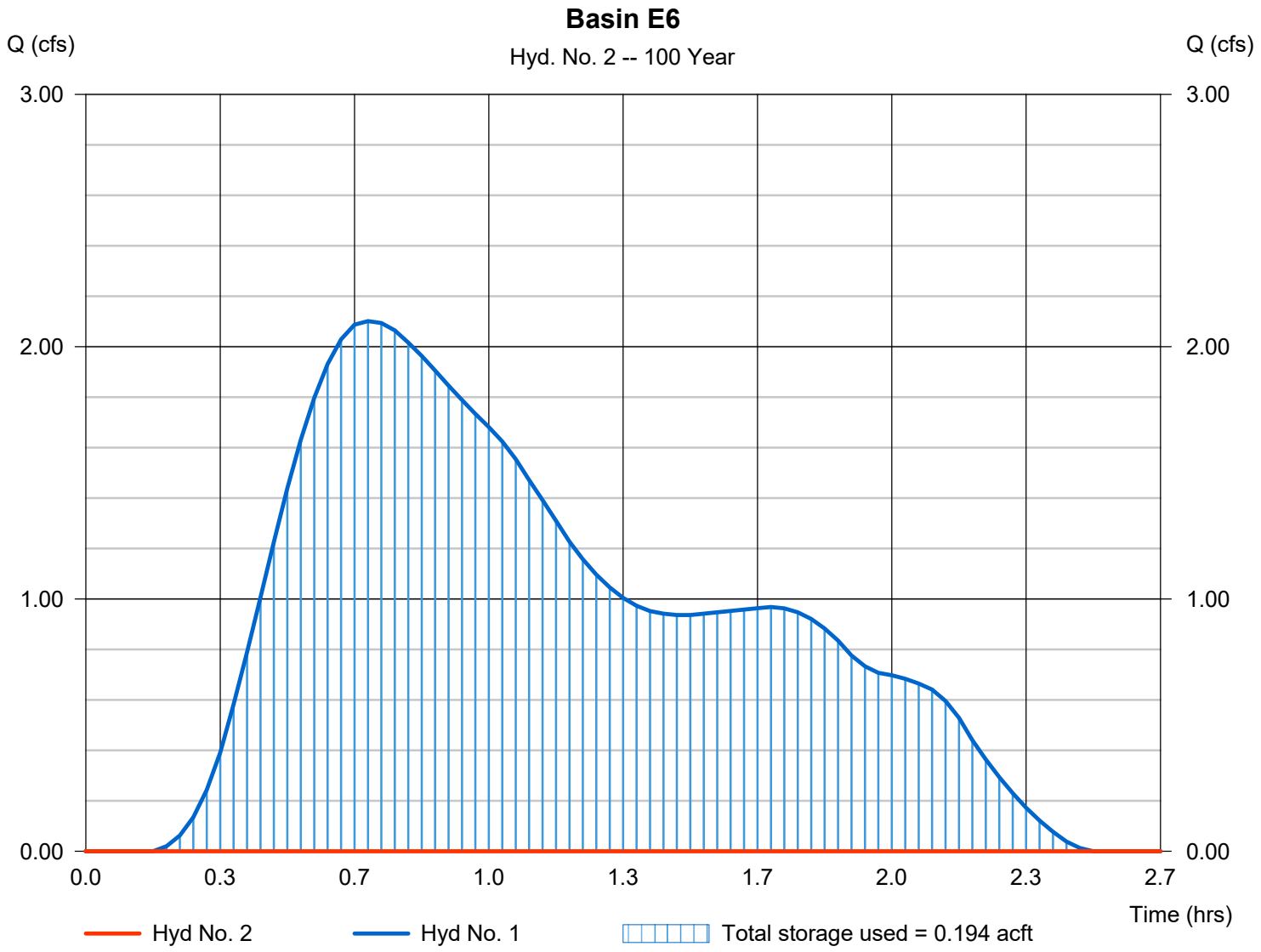
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.43 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.194 acft

Storage Indication method used.

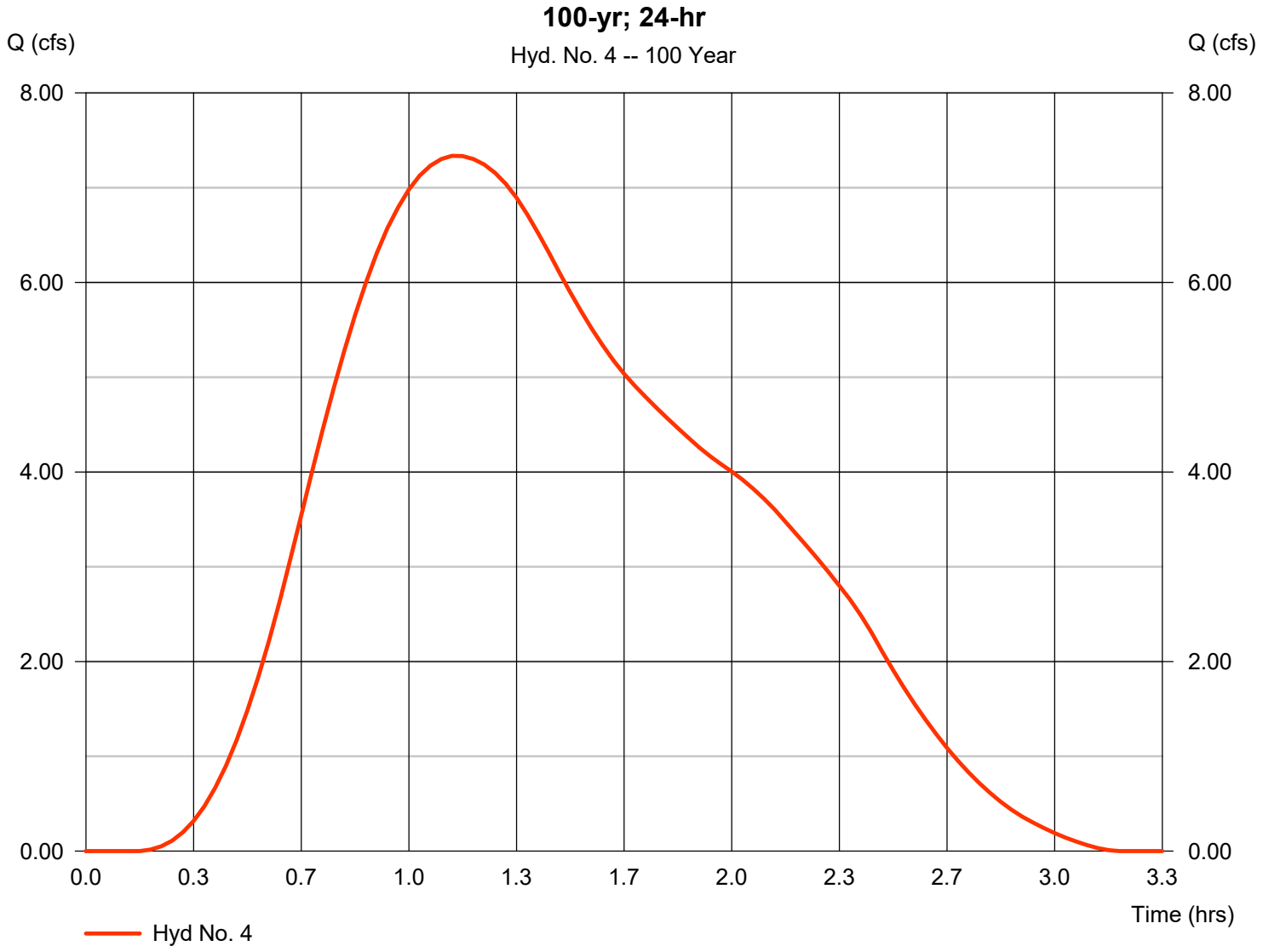


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.336 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.13 hrs
Time interval	=	2 min	Hyd. volume	=	0.849 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	4.97 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484

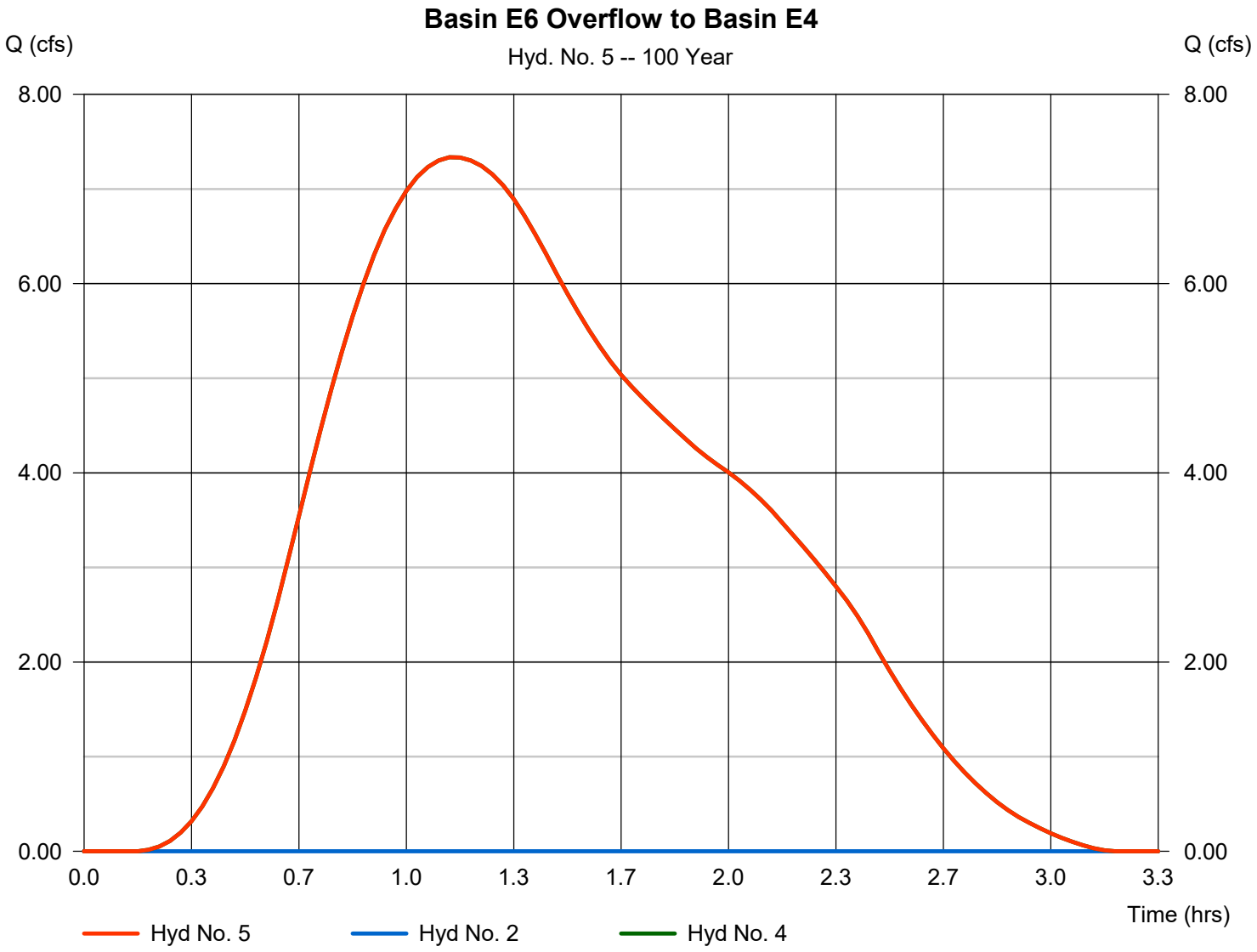


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 7.336 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.13 hrs
Time interval	= 2 min	Hyd. volume	= 0.849 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



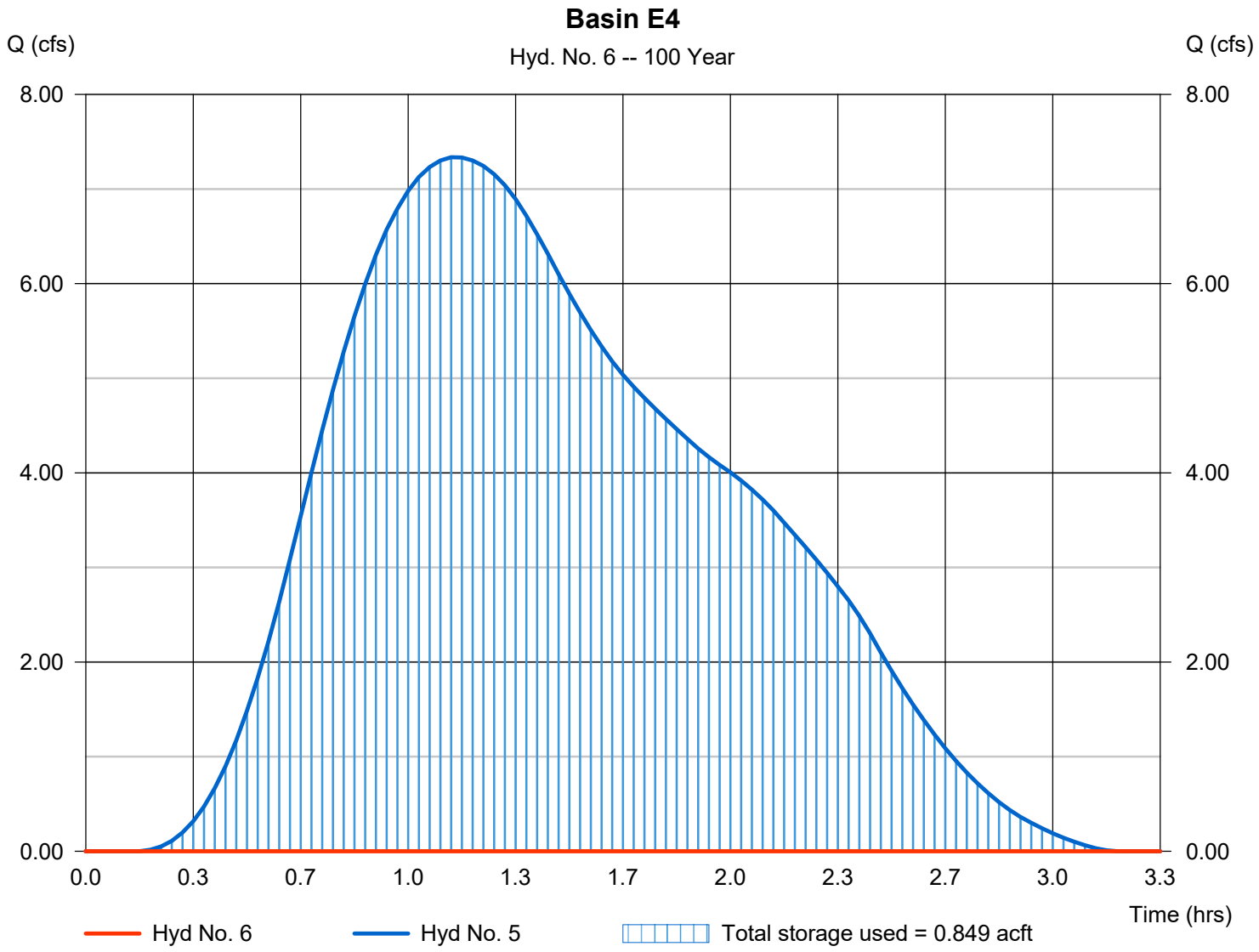
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	882.56 ft
Reservoir name	=	Basin E4	Max. Storage	=	0.849 acft

Storage Indication method used.

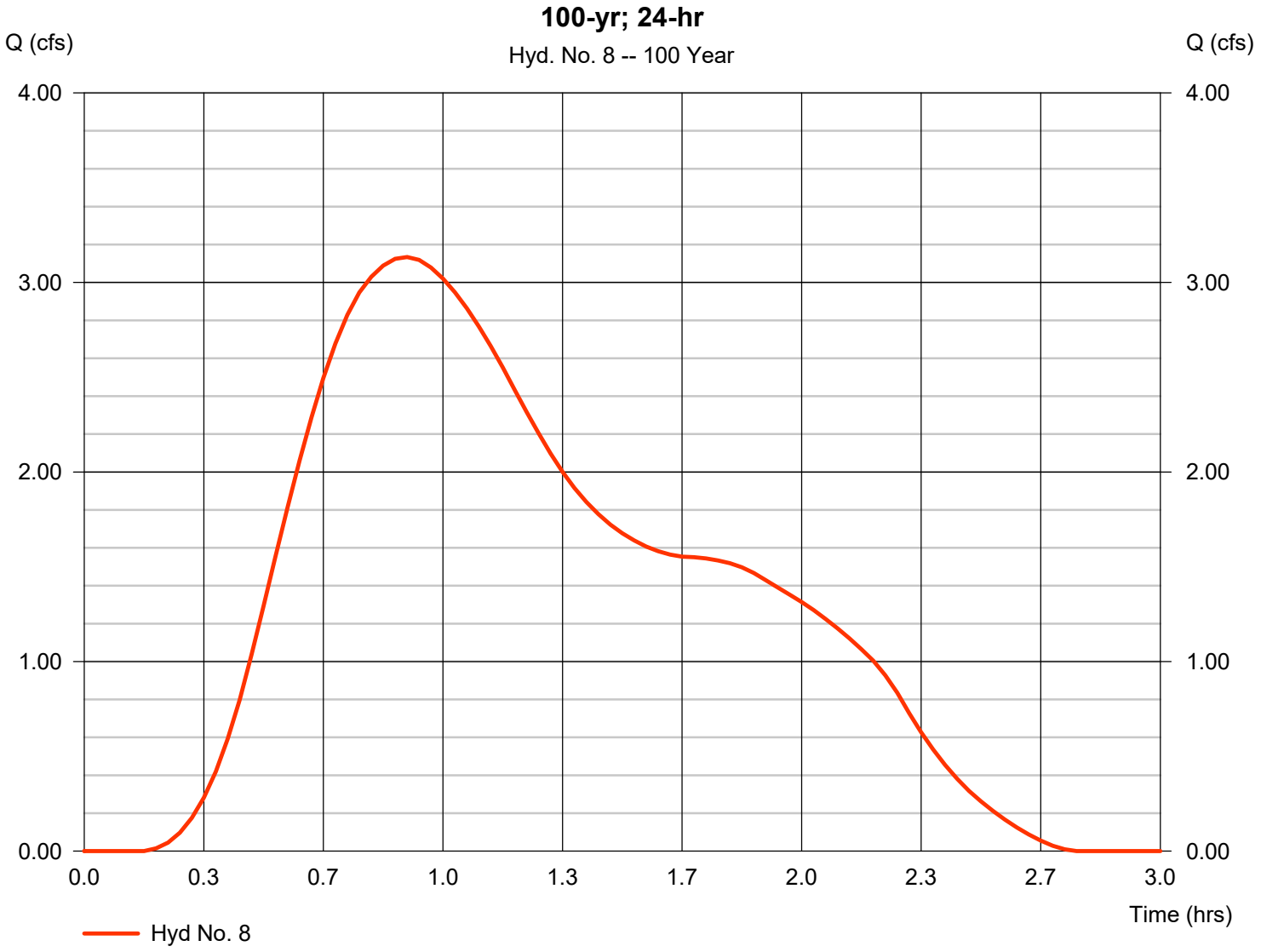


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.134 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.90 hrs
Time interval	=	2 min	Hyd. volume	=	0.314 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	4.97 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484

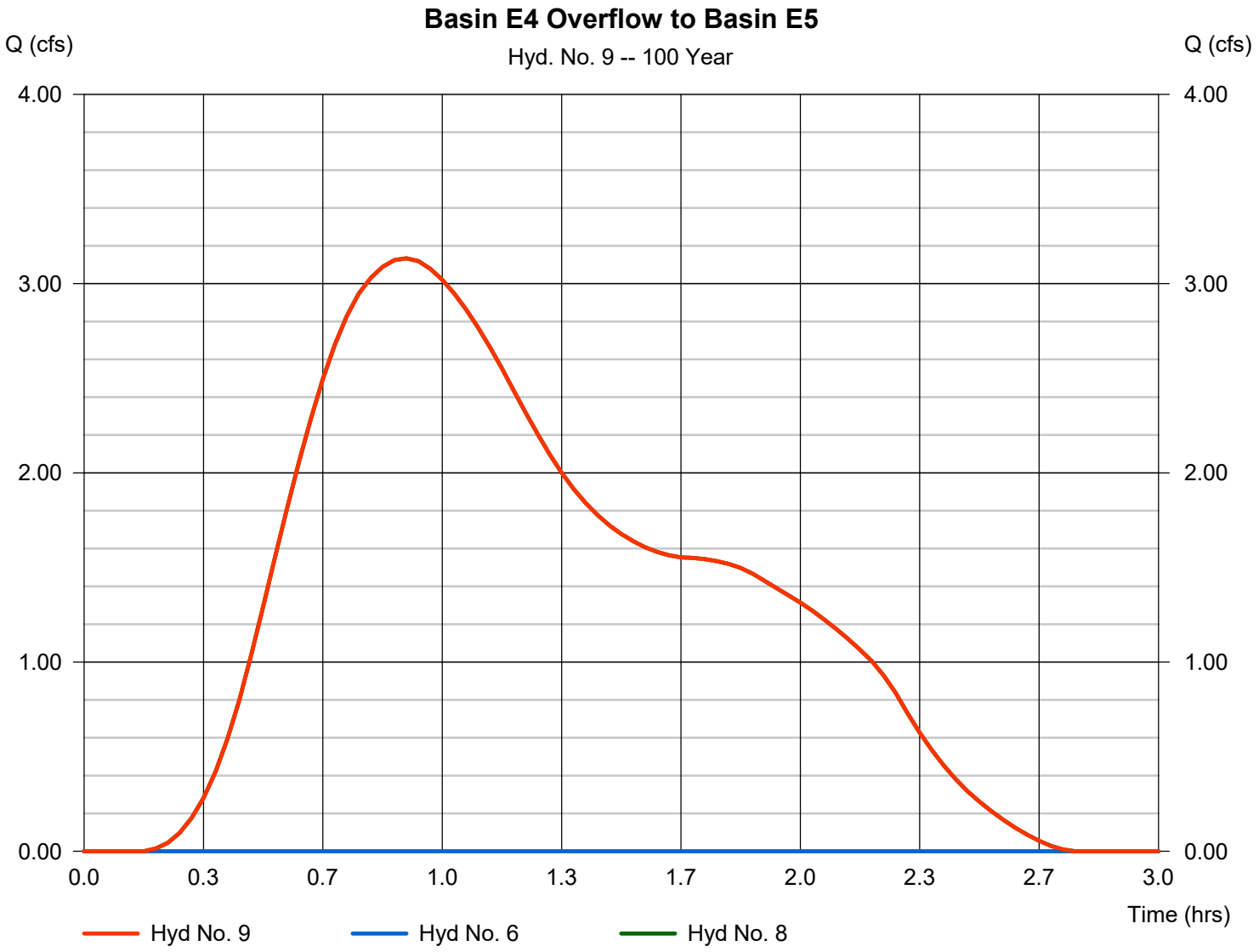


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	3.134 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.90 hrs
Time interval	=	2 min	Hyd. volume	=	0.314 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



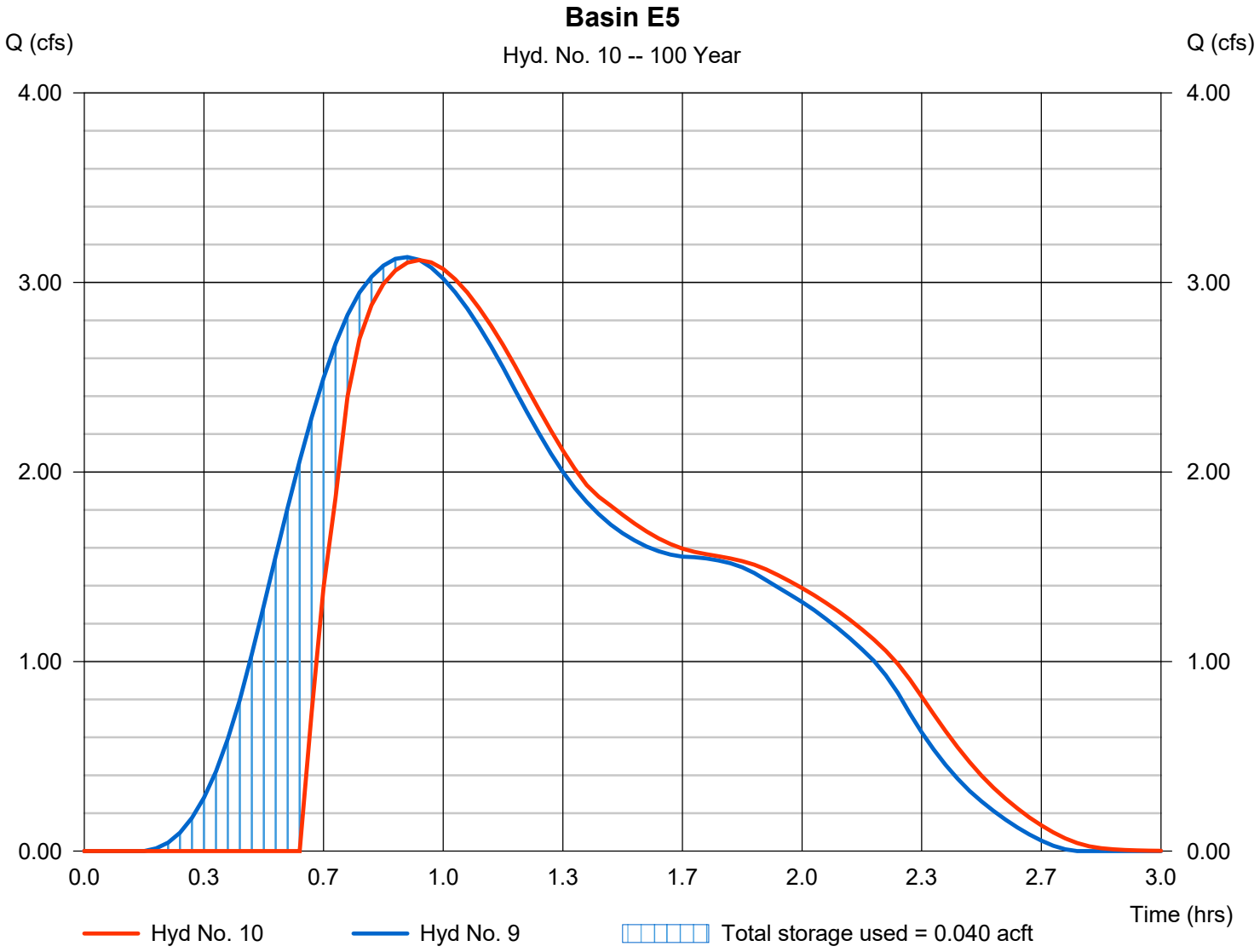
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	3.118 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.93 hrs
Time interval	=	2 min	Hyd. volume	=	0.288 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.24 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.040 acft

Storage Indication method used.

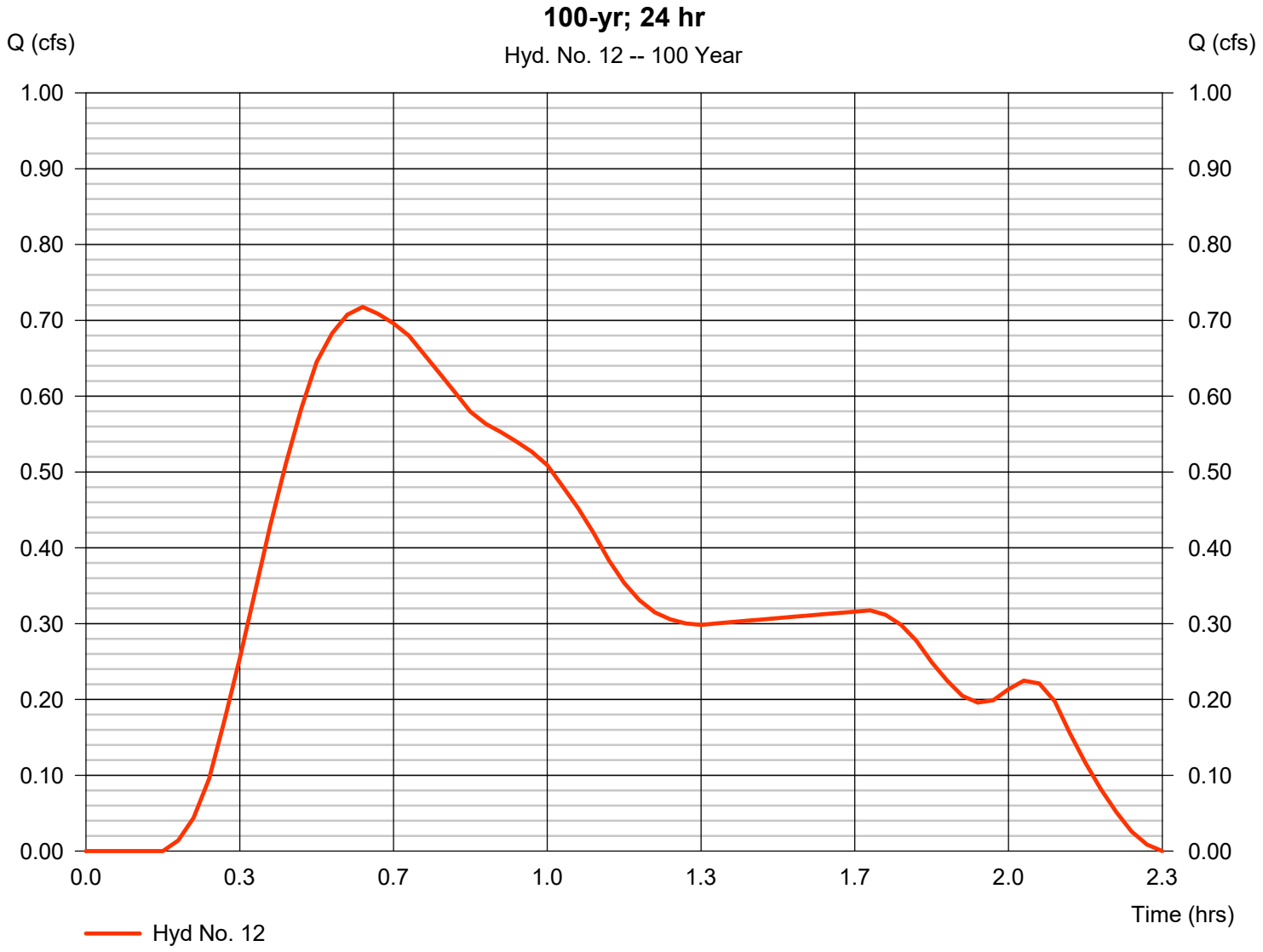


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	= SCS Runoff	Peak discharge	= 0.718 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.60 hrs
Time interval	= 2 min	Hyd. volume	= 0.063 acft
Drainage area	= 0.540 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484



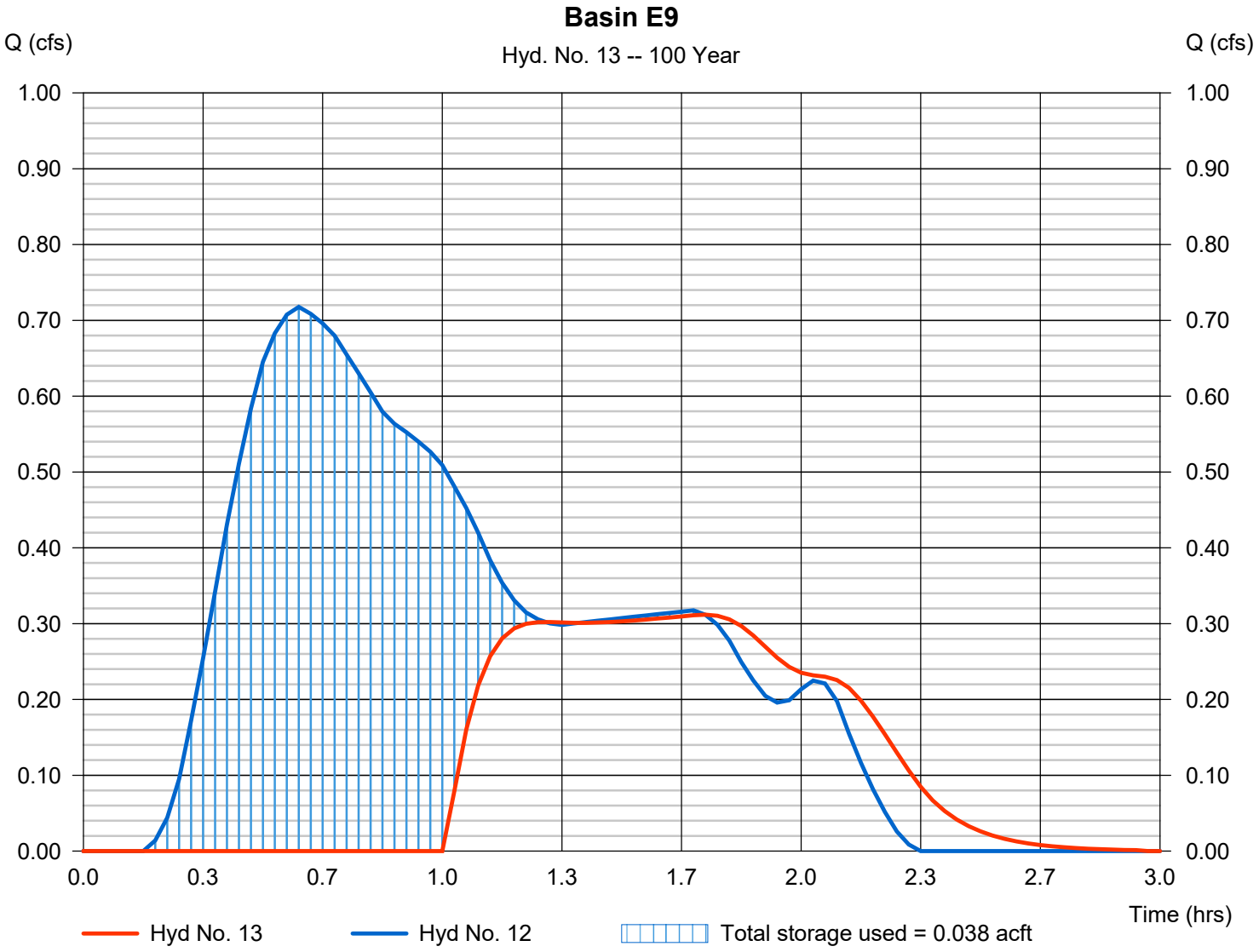
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.312 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.73 hrs
Time interval	=	2 min	Hyd. volume	=	0.029 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.34 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.038 acft

Storage Indication method used.

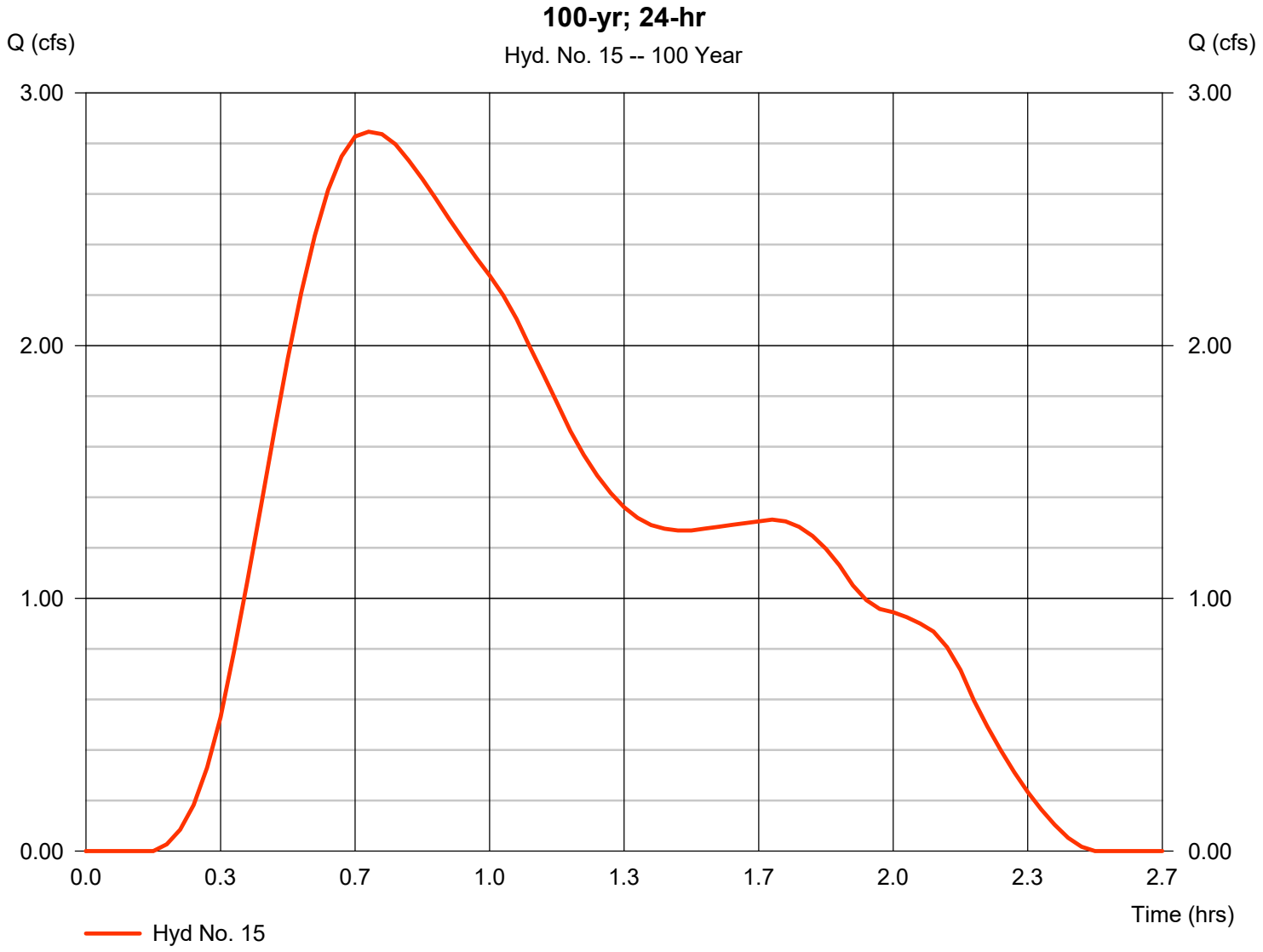


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.847 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.262 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	4.97 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484

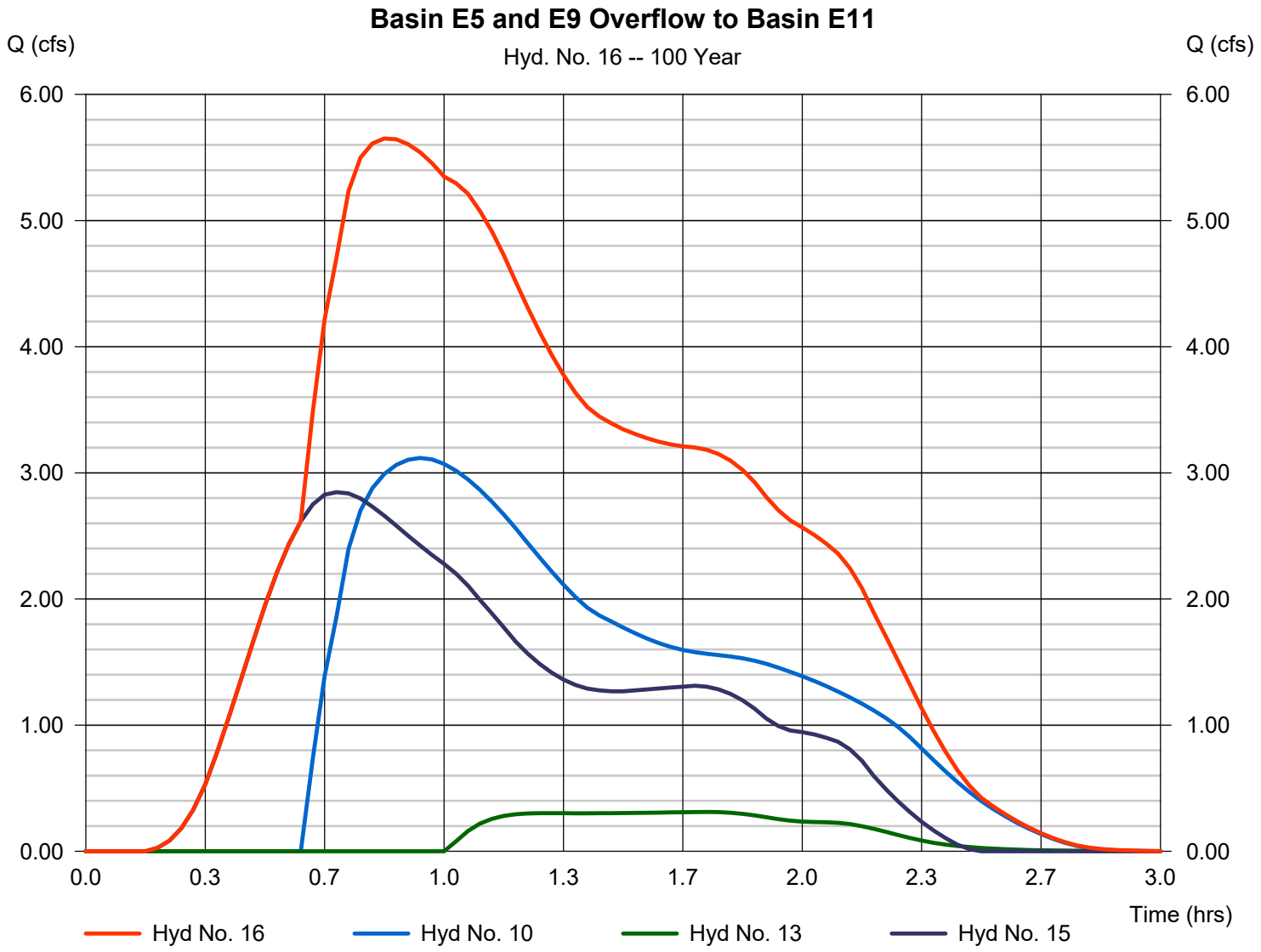


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	5.651 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.83 hrs
Time interval	=	2 min	Hyd. volume	=	0.579 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



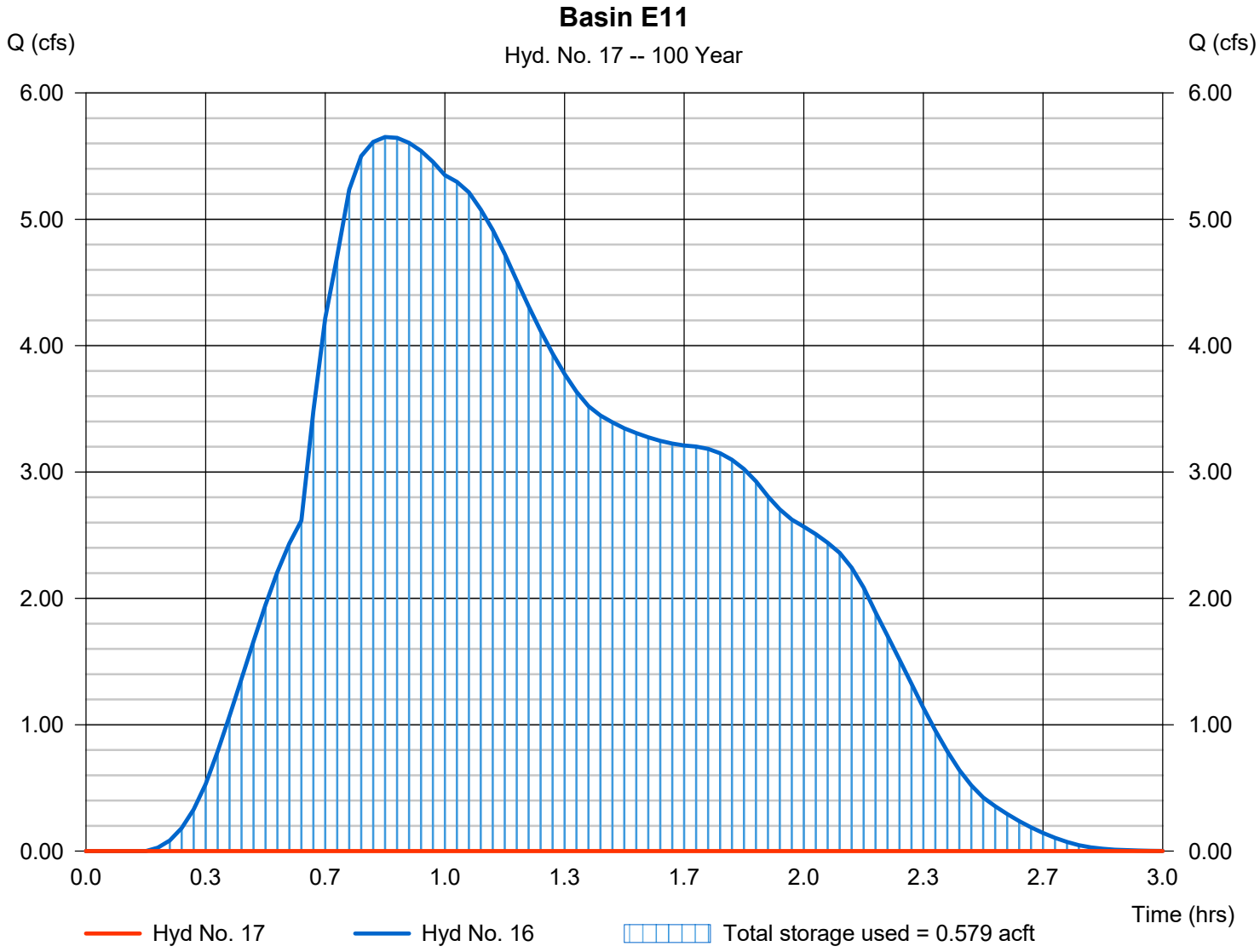
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow to E11	Max. Elevation	=	877.42 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.579 acft

Storage Indication method used.

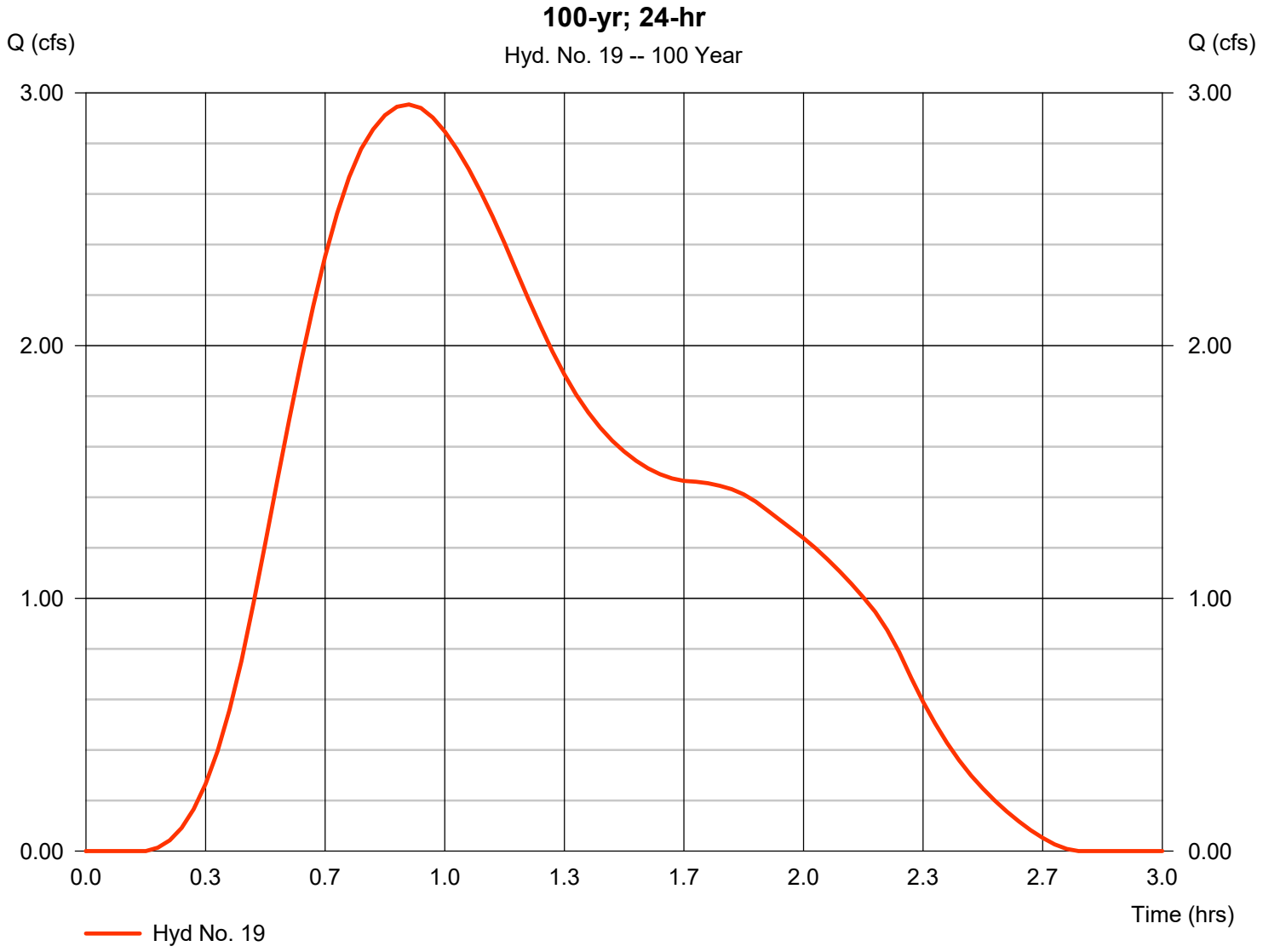


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.954 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.90 hrs
Time interval	=	2 min	Hyd. volume	=	0.296 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	4.97 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484

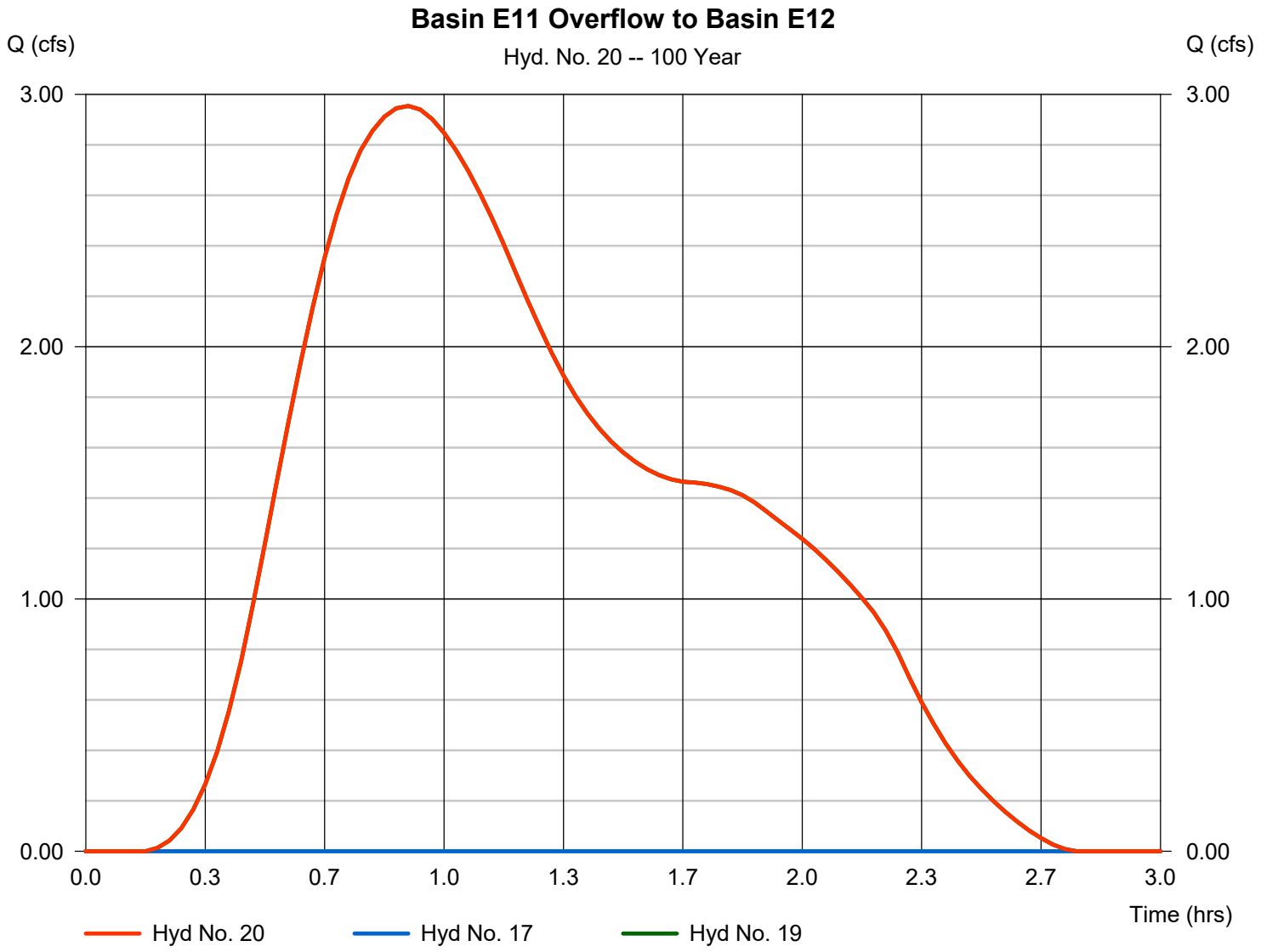


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	2.954 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.90 hrs
Time interval	=	2 min	Hyd. volume	=	0.296 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



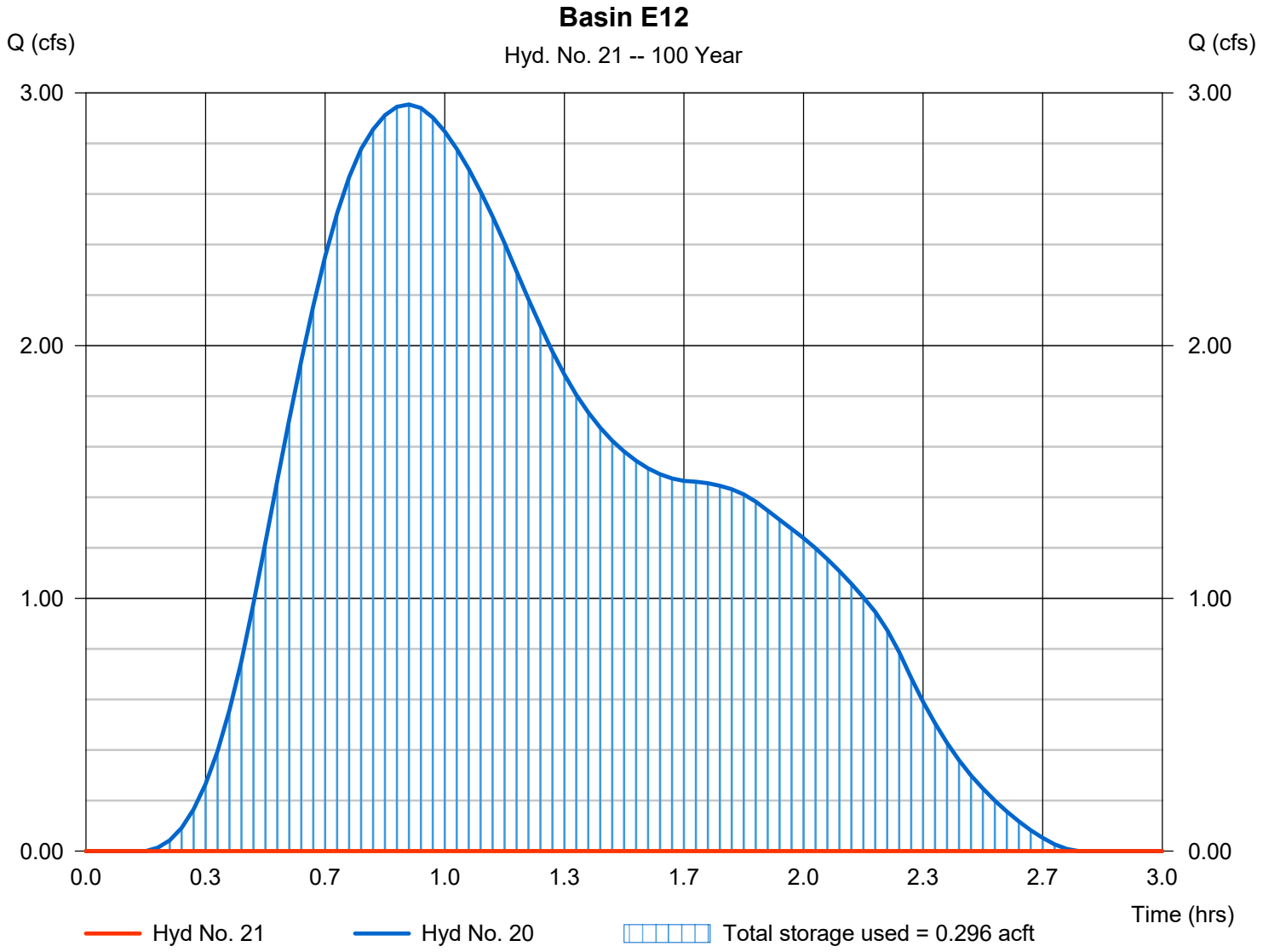
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	868.19 ft
Reservoir name	=	Basin E12	Max. Storage	=	0.296 acft

Storage Indication method used.



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Hydrograph No. 16, Combine, Basin E5 and E9 Overflow to Basin E11..... 14

Hydrograph No. 17, Reservoir, Basin E11..... 15

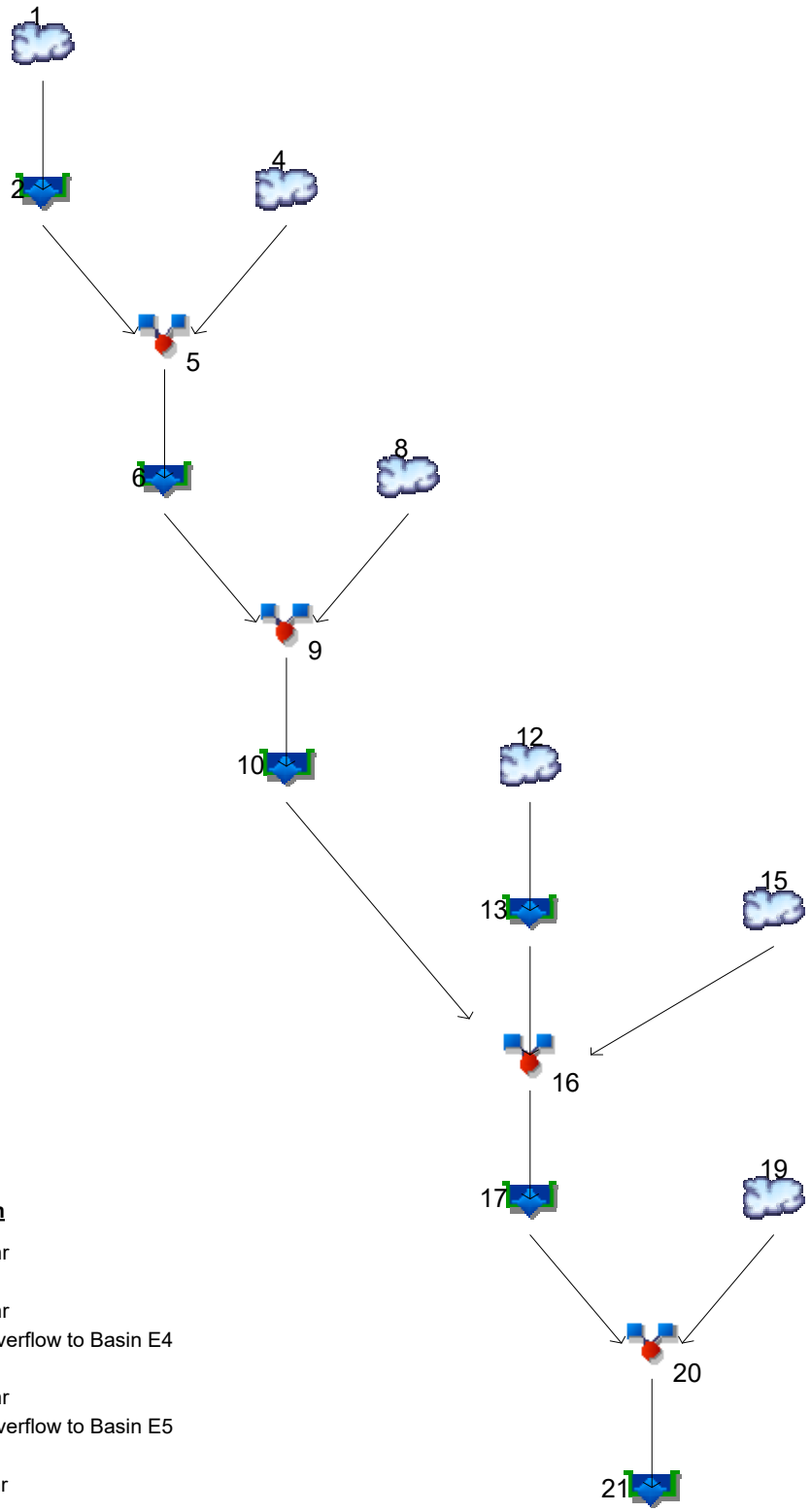
Hydrograph No. 19, SCS Runoff, 100-yr; 24-hr..... 16

Hydrograph No. 20, Combine, Basin E11 Overflow to Basin E12..... 17

Hydrograph No. 21, Reservoir, Basin E12..... 18

100 Year-3 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

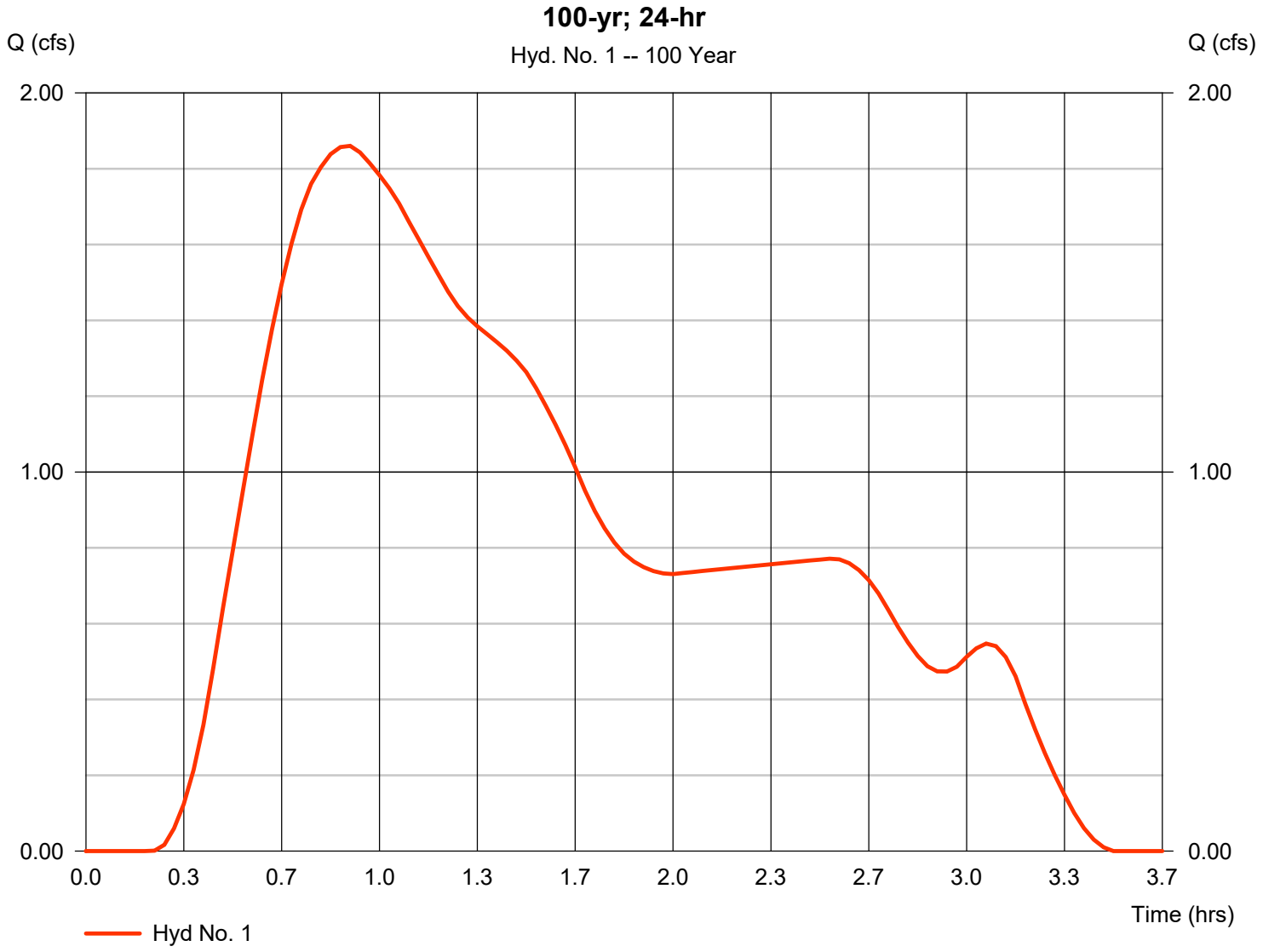
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	1.860	2	54	0.240	------	------	------	100-yr; 24-hr
2	Reservoir	0.000	2	n/a	0.000	1	891.79	0.240	Basin E6
4	SCS Runoff	7.026	2	80	1.050	------	------	------	100-yr; 24-hr
5	Combine	7.026	2	80	1.050	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	0.000	2	n/a	0.000	5	882.94	1.05	Basin E4
8	SCS Runoff	2.862	2	62	0.389	------	------	------	100-yr; 24-hr
9	Combine	2.862	2	62	0.389	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.849	2	64	0.362	9	882.23	0.040	Basin E5
12	SCS Runoff	0.621	2	48	0.078	------	------	------	100-yr; 24 hr
13	Reservoir	0.377	2	90	0.044	12	897.35	0.038	Basin E9
15	SCS Runoff	2.520	2	54	0.324	------	------	------	100-yr; 24-hr
16	Combine	5.217	2	60	0.731	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	0.000	2	n/a	0.000	16	877.86	0.731	Basin E11
19	SCS Runoff	2.697	2	62	0.366	------	------	------	100-yr; 24-hr
20	Combine	2.697	2	62	0.366	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	868.32	0.366	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.860 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.90 hrs
Time interval	=	2 min	Hyd. volume	=	0.240 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	5.49 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484



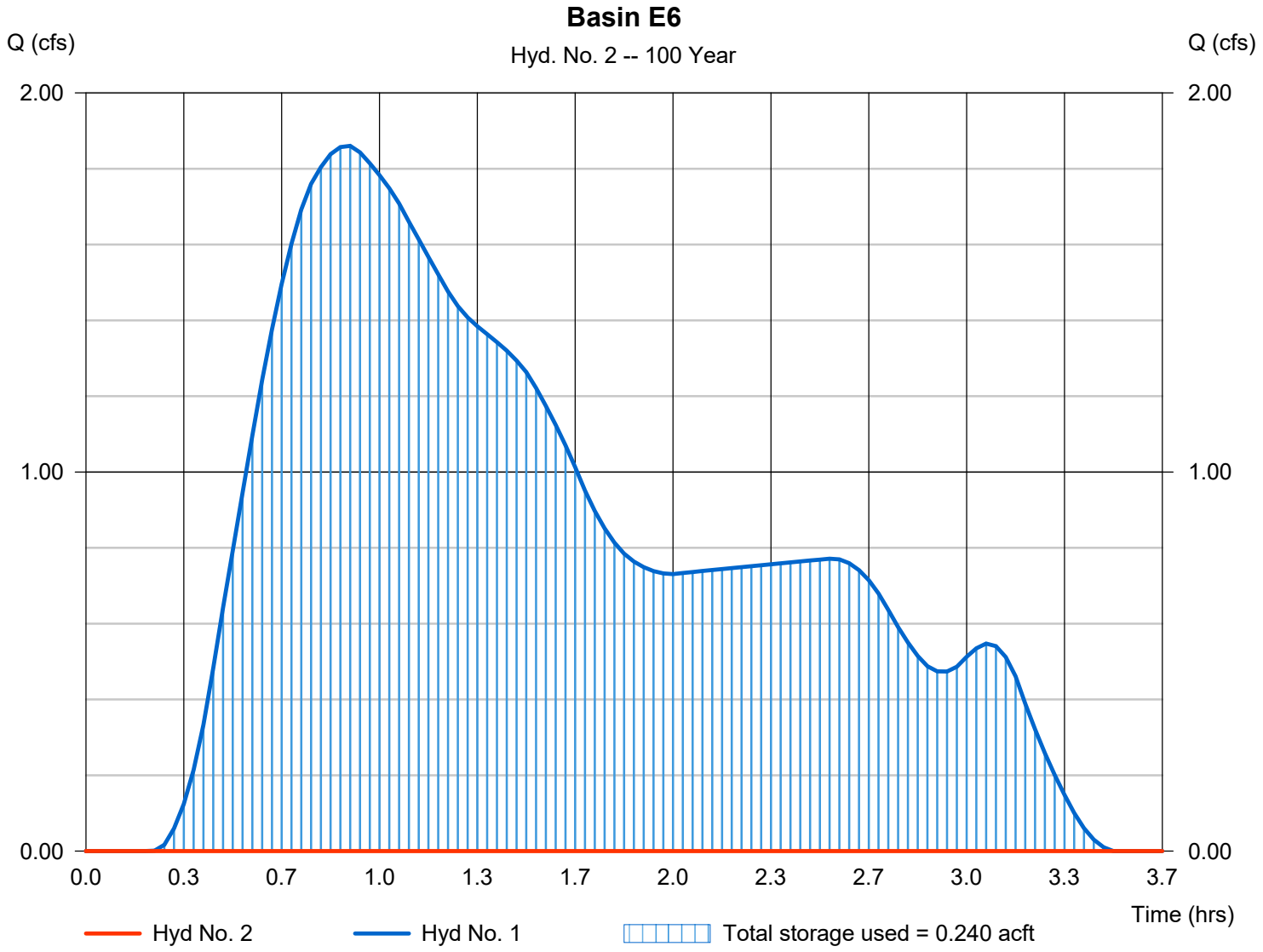
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.79 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.240 acft

Storage Indication method used.

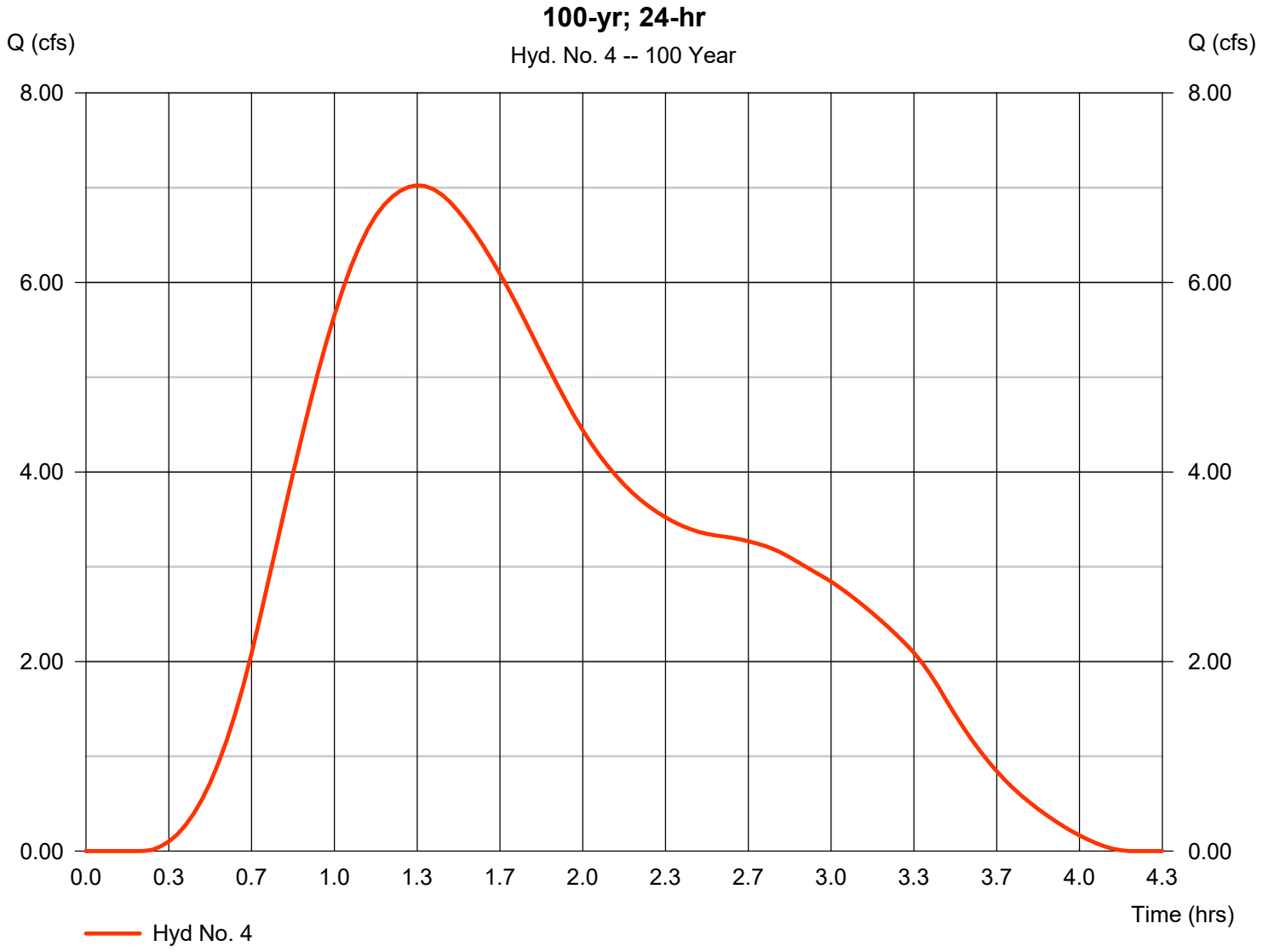


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.026 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.33 hrs
Time interval	=	2 min	Hyd. volume	=	1.050 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	5.49 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484

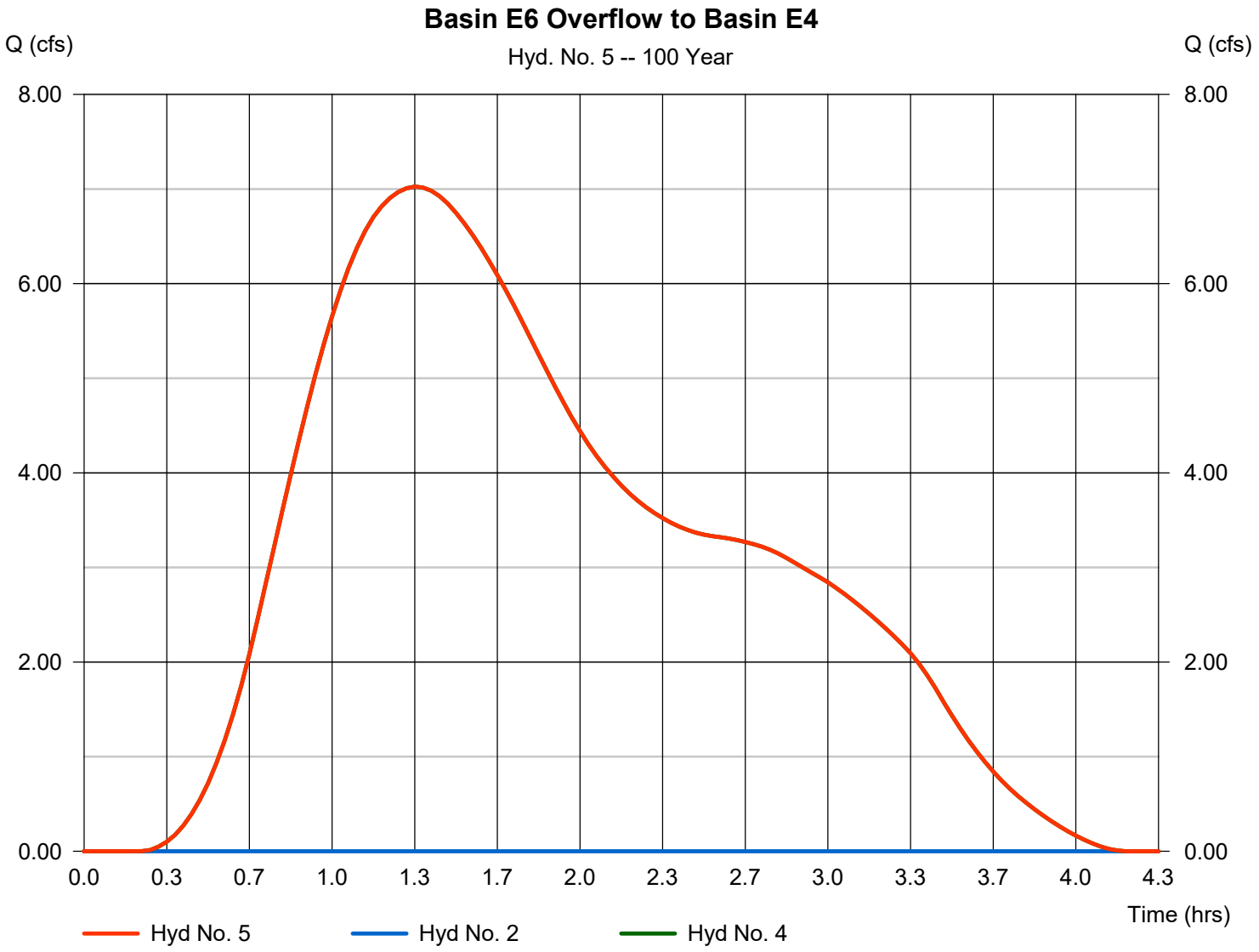


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 7.026 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.33 hrs
Time interval	= 2 min	Hyd. volume	= 1.050 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



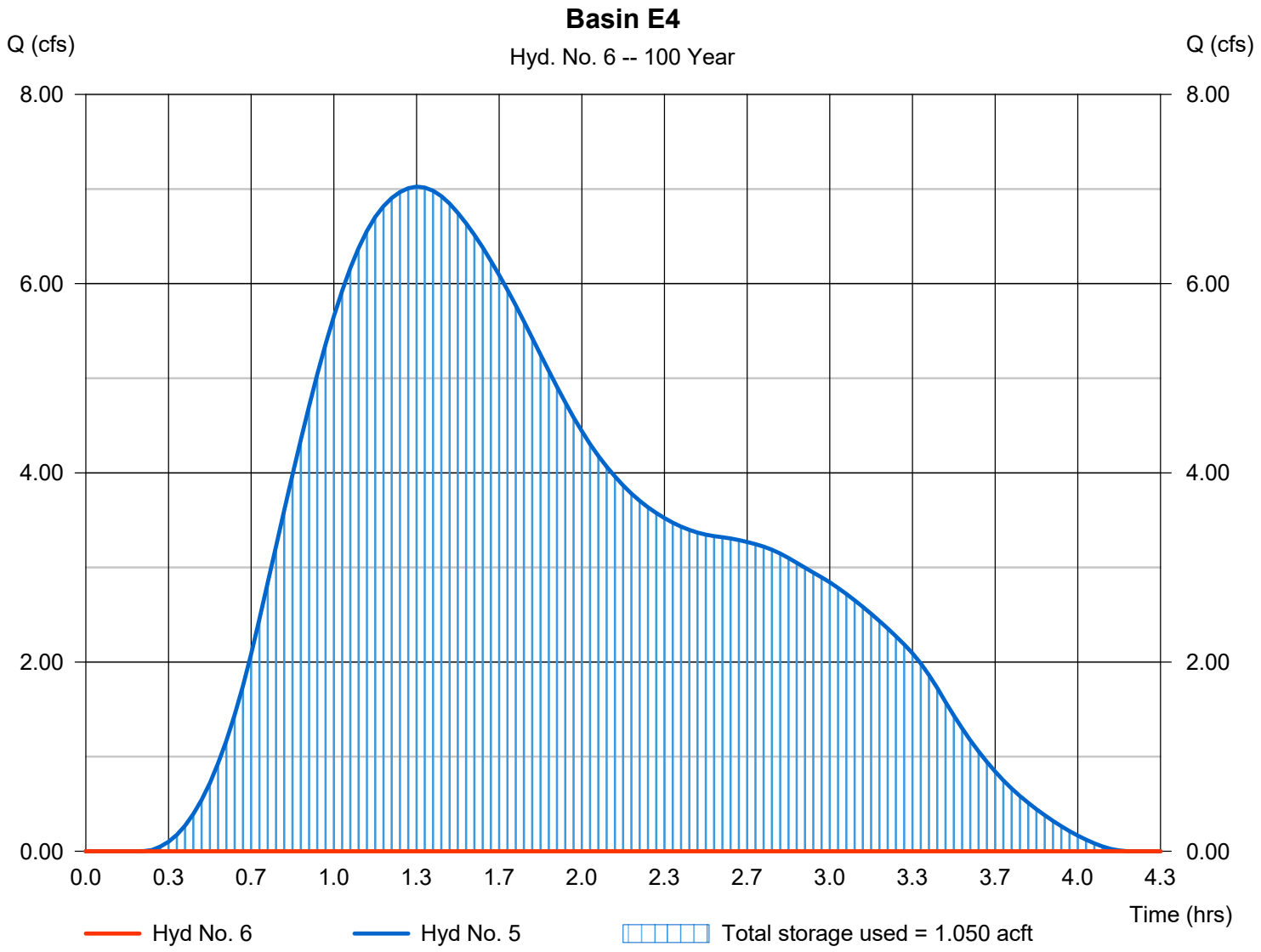
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	882.94 ft
Reservoir name	=	Basin E4	Max. Storage	=	1.050 acft

Storage Indication method used.

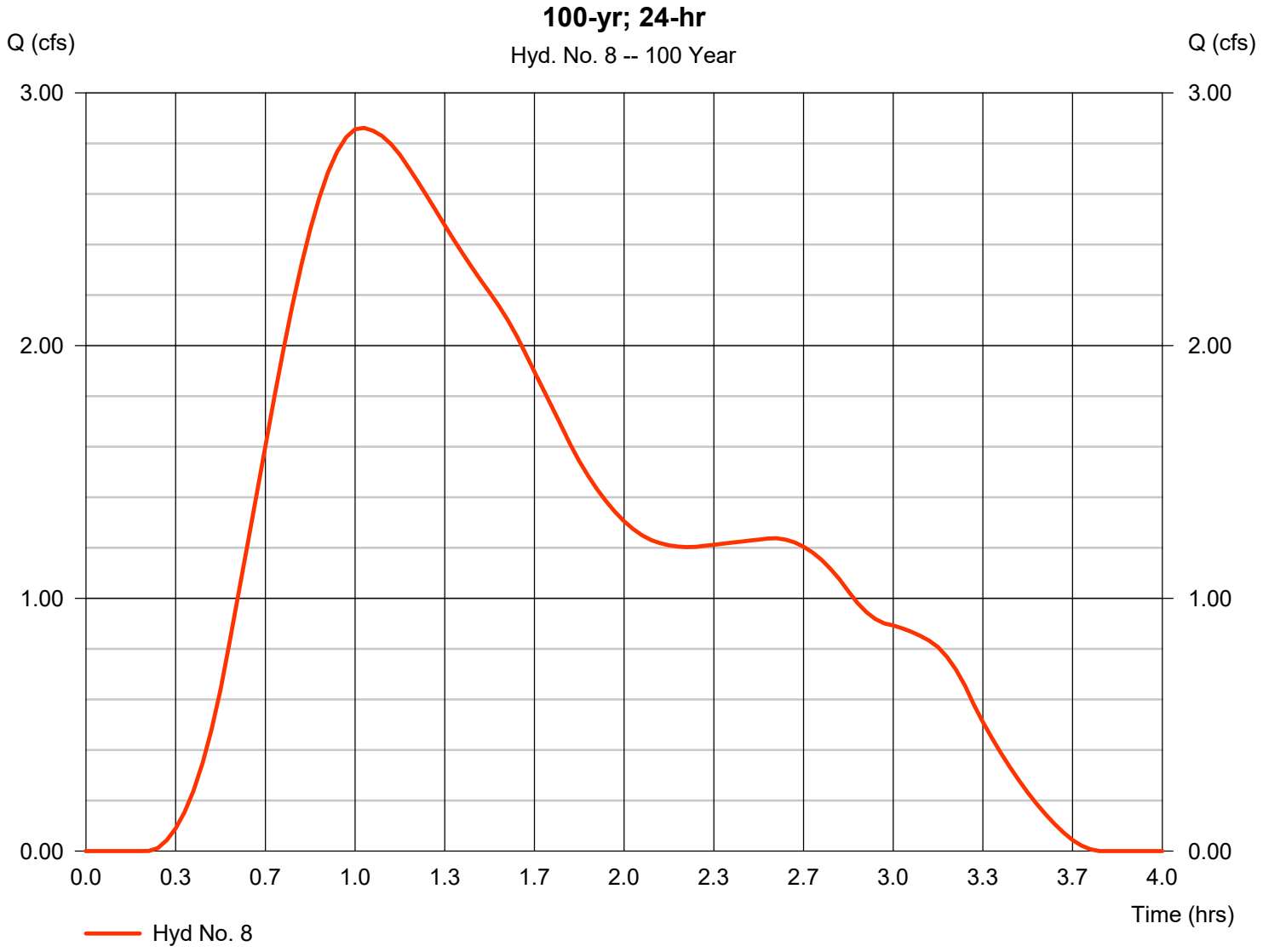


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.862 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.03 hrs
Time interval	=	2 min	Hyd. volume	=	0.389 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	5.49 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484

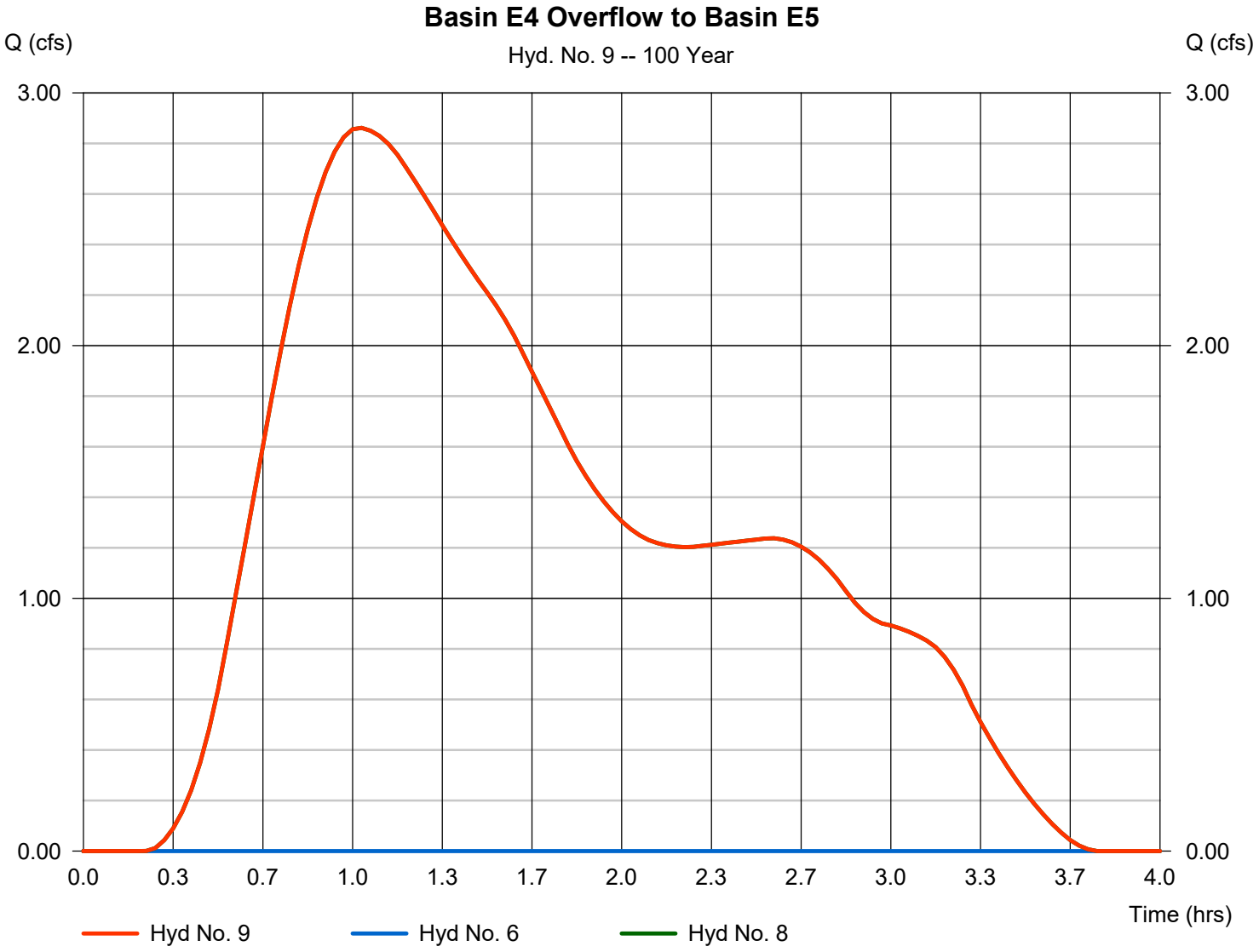


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	= Combine	Peak discharge	= 2.862 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.03 hrs
Time interval	= 2 min	Hyd. volume	= 0.389 acft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 2.790 ac



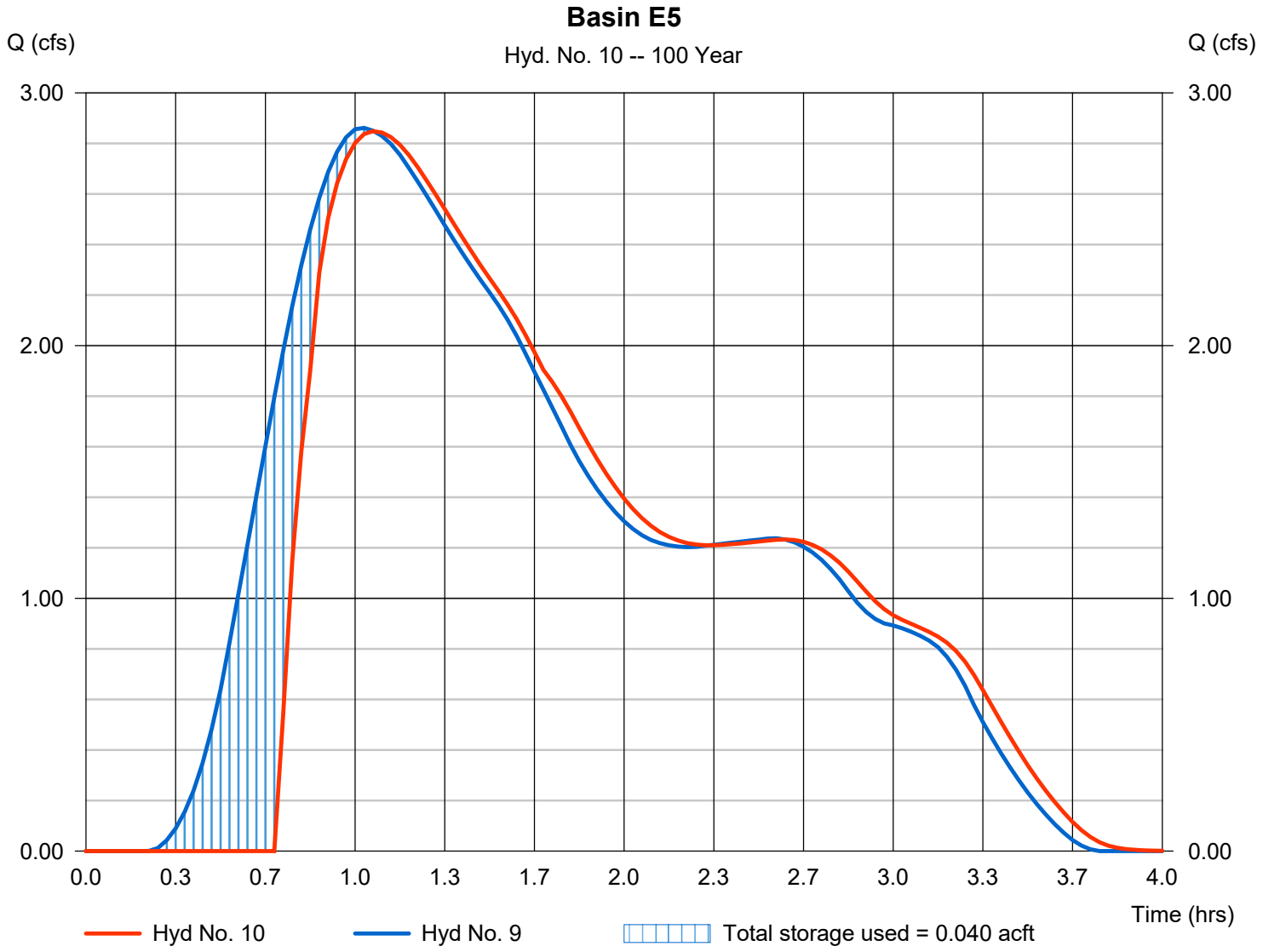
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.849 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.07 hrs
Time interval	=	2 min	Hyd. volume	=	0.362 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.23 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.040 acft

Storage Indication method used.

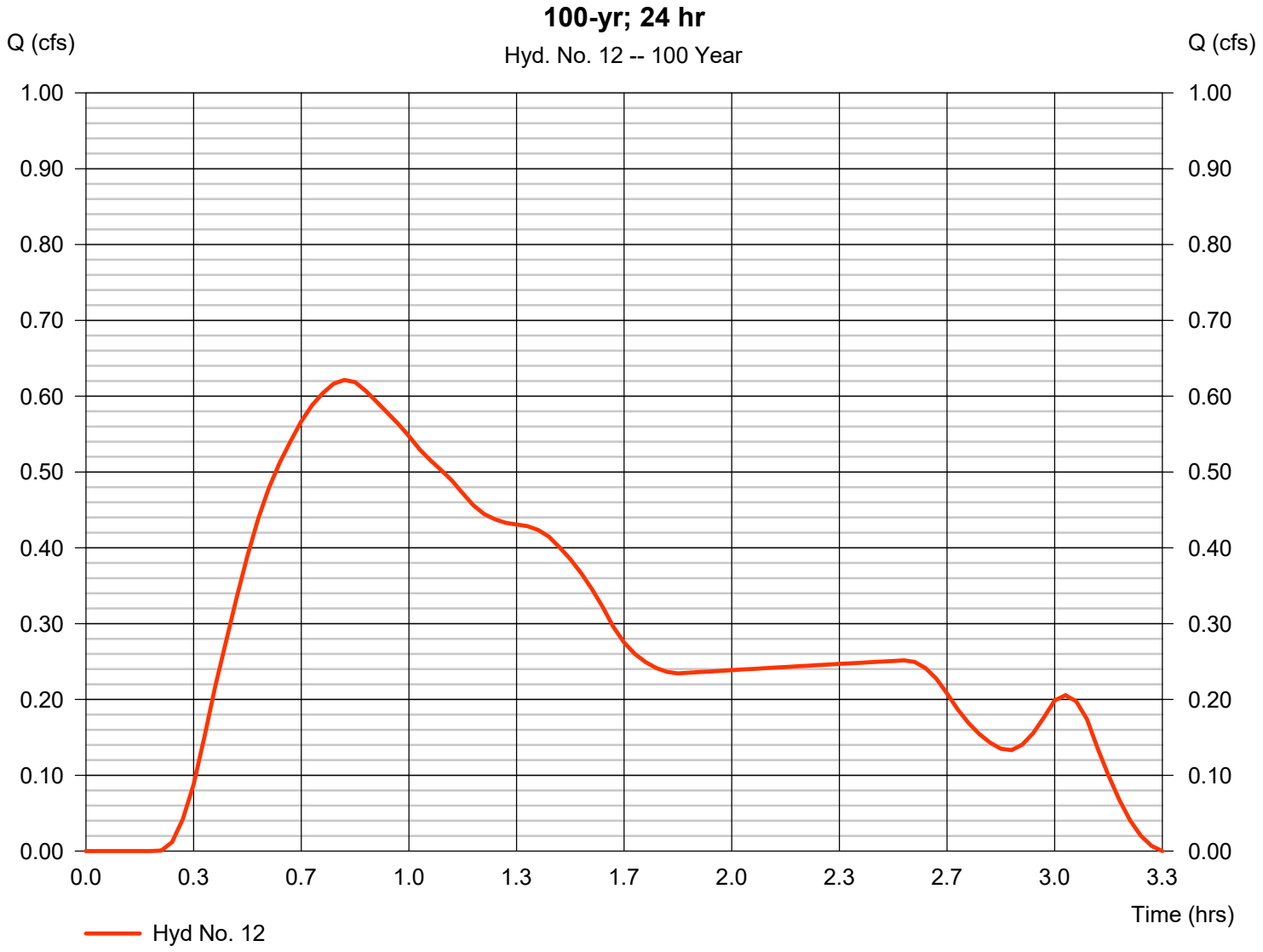


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.621 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.80 hrs
Time interval	=	2 min	Hyd. volume	=	0.078 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.49 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484



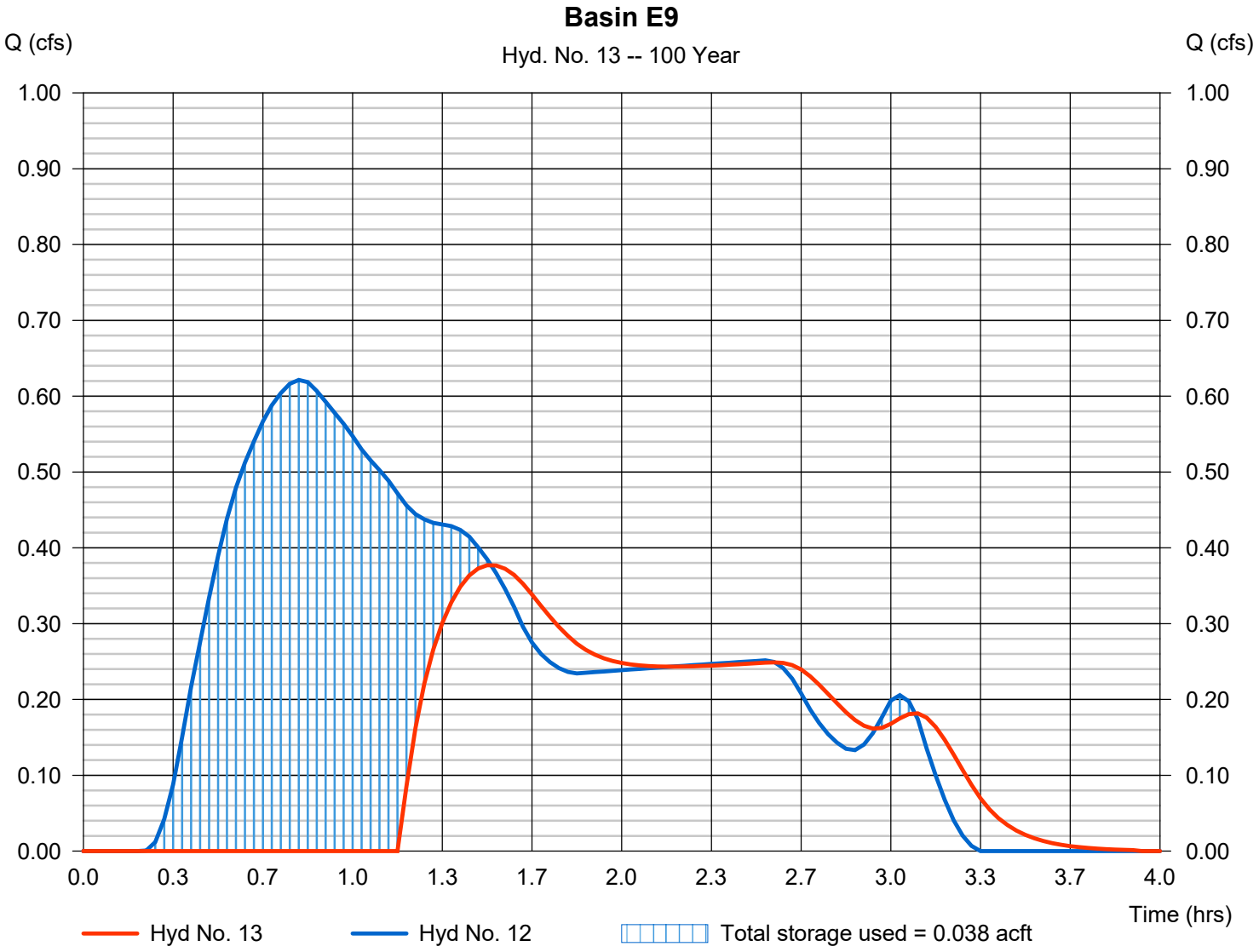
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.377 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.50 hrs
Time interval	=	2 min	Hyd. volume	=	0.044 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.35 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.038 acft

Storage Indication method used.

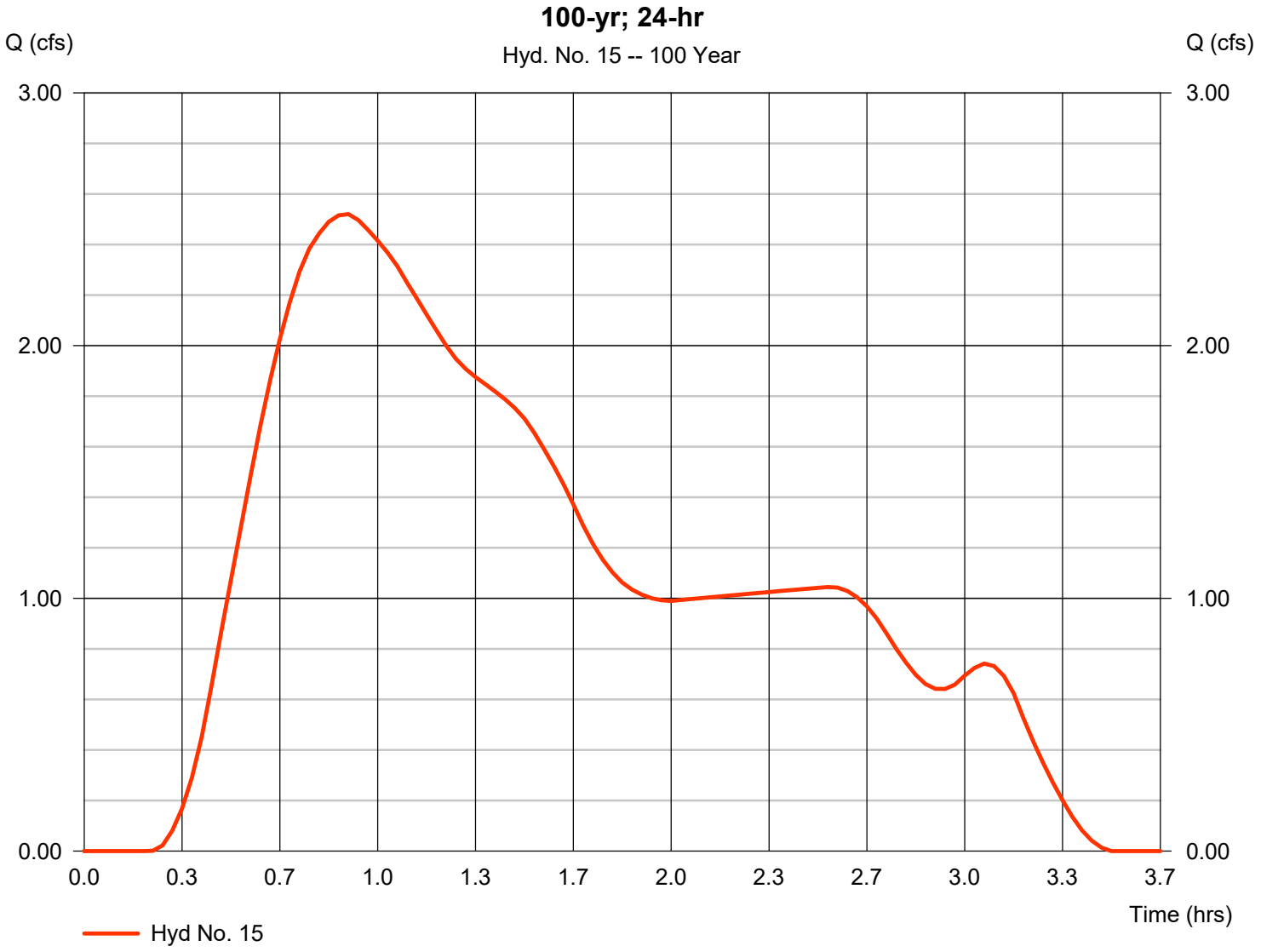


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.520 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.90 hrs
Time interval	=	2 min	Hyd. volume	=	0.324 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	5.49 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484

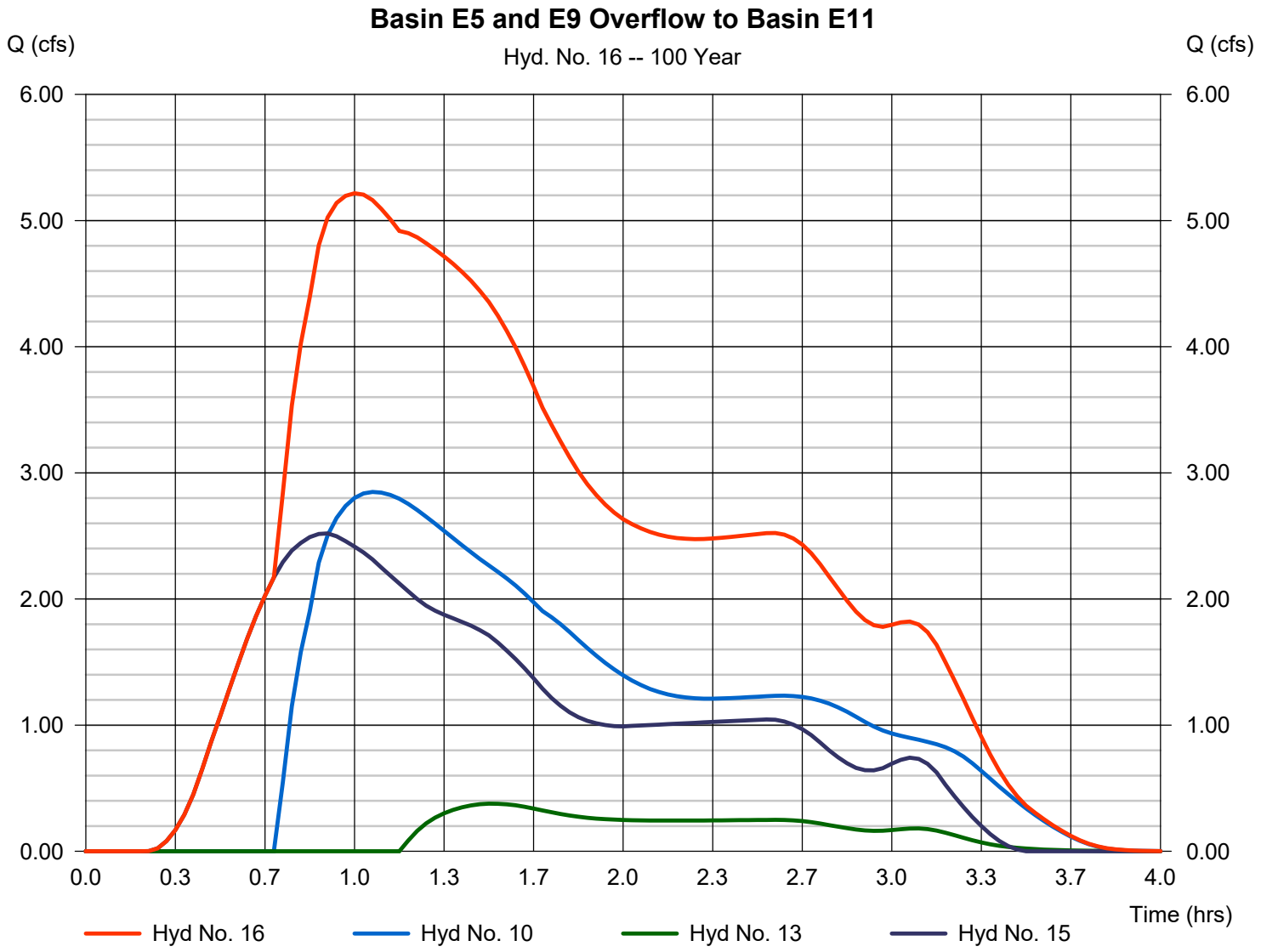


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	5.217 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.00 hrs
Time interval	=	2 min	Hyd. volume	=	0.731 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



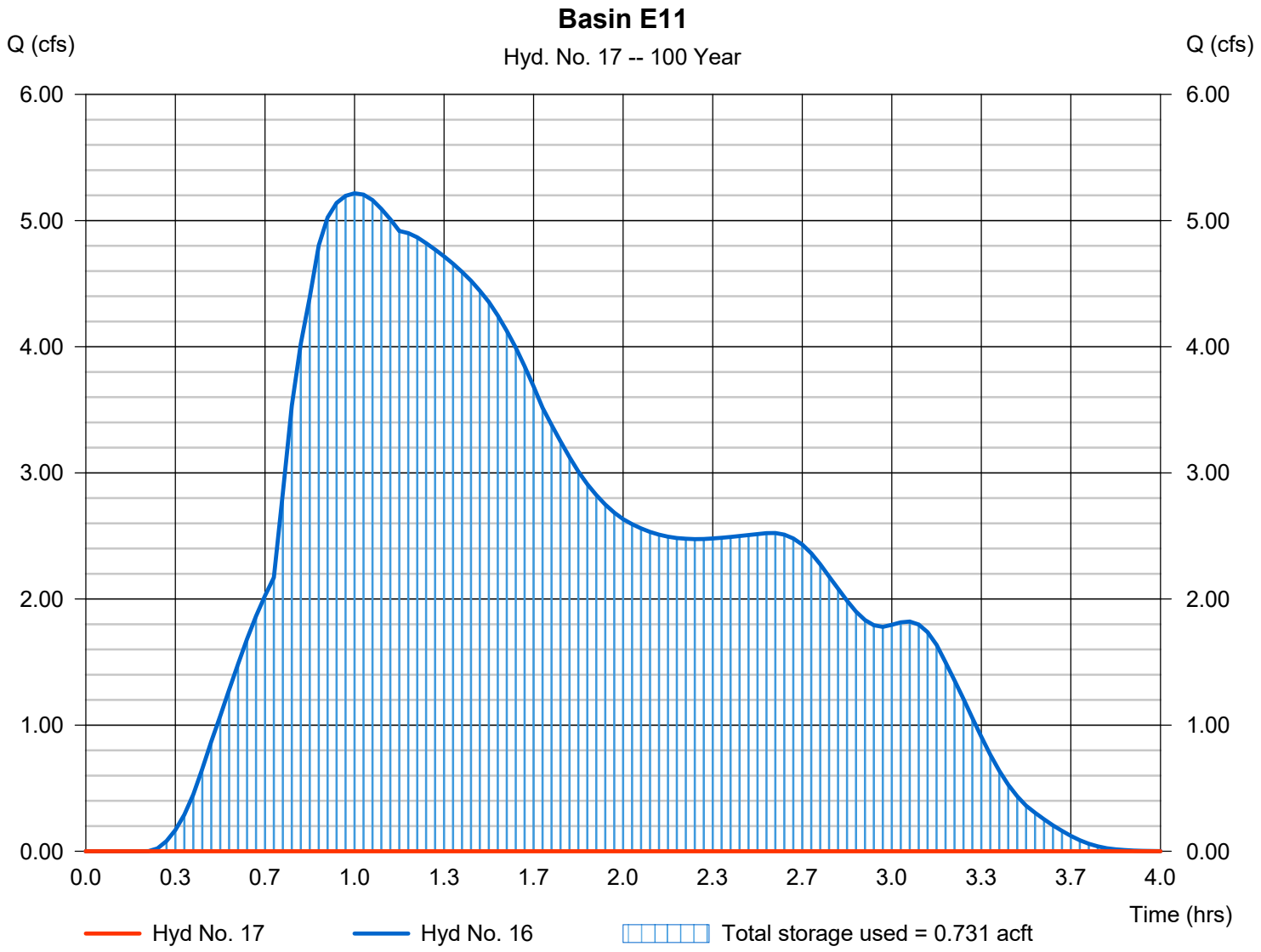
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow	Max. Elevation	=	877.86 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.731 acft

Storage Indication method used.

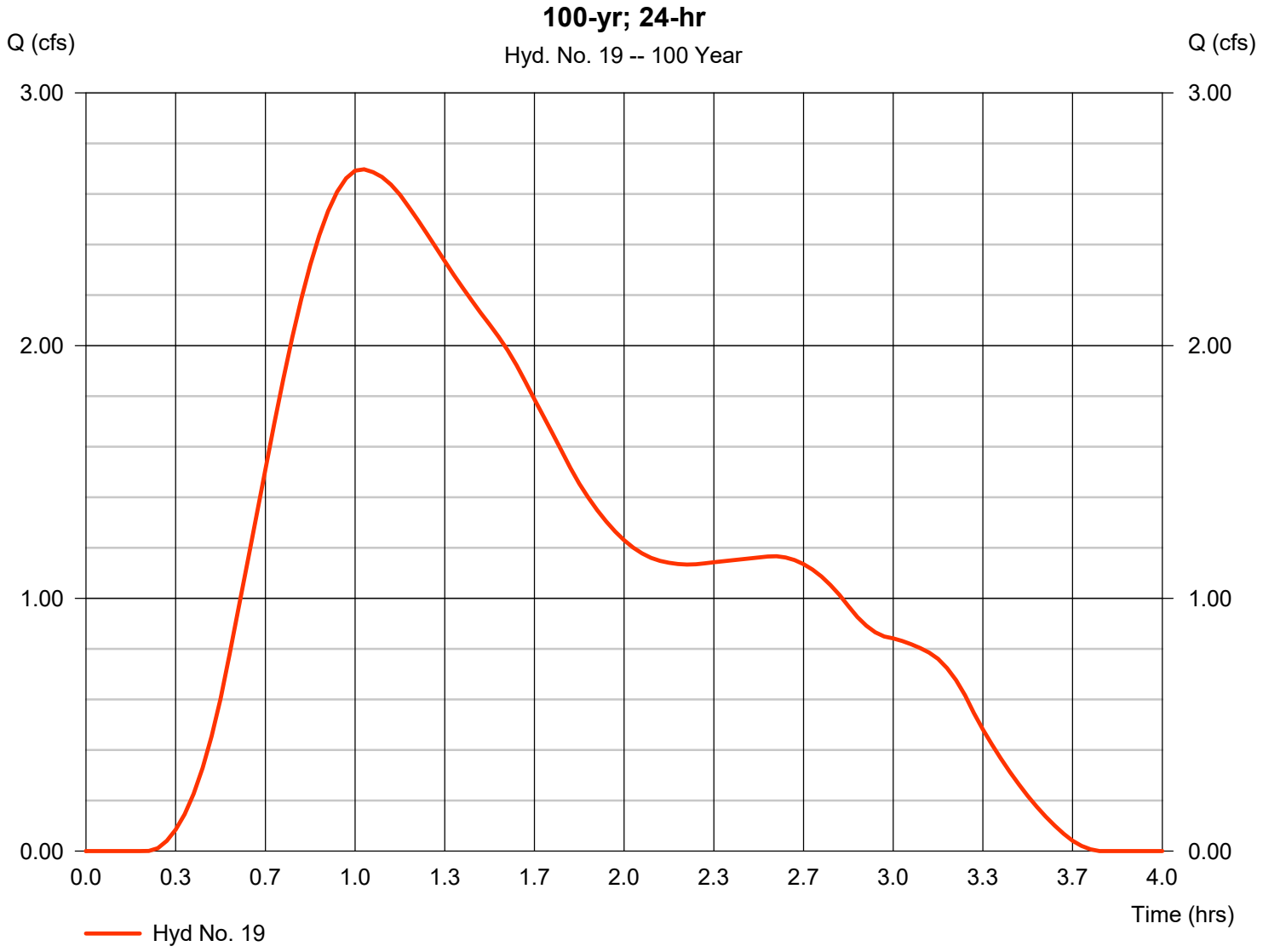


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.697 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.03 hrs
Time interval	=	2 min	Hyd. volume	=	0.366 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	5.49 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484

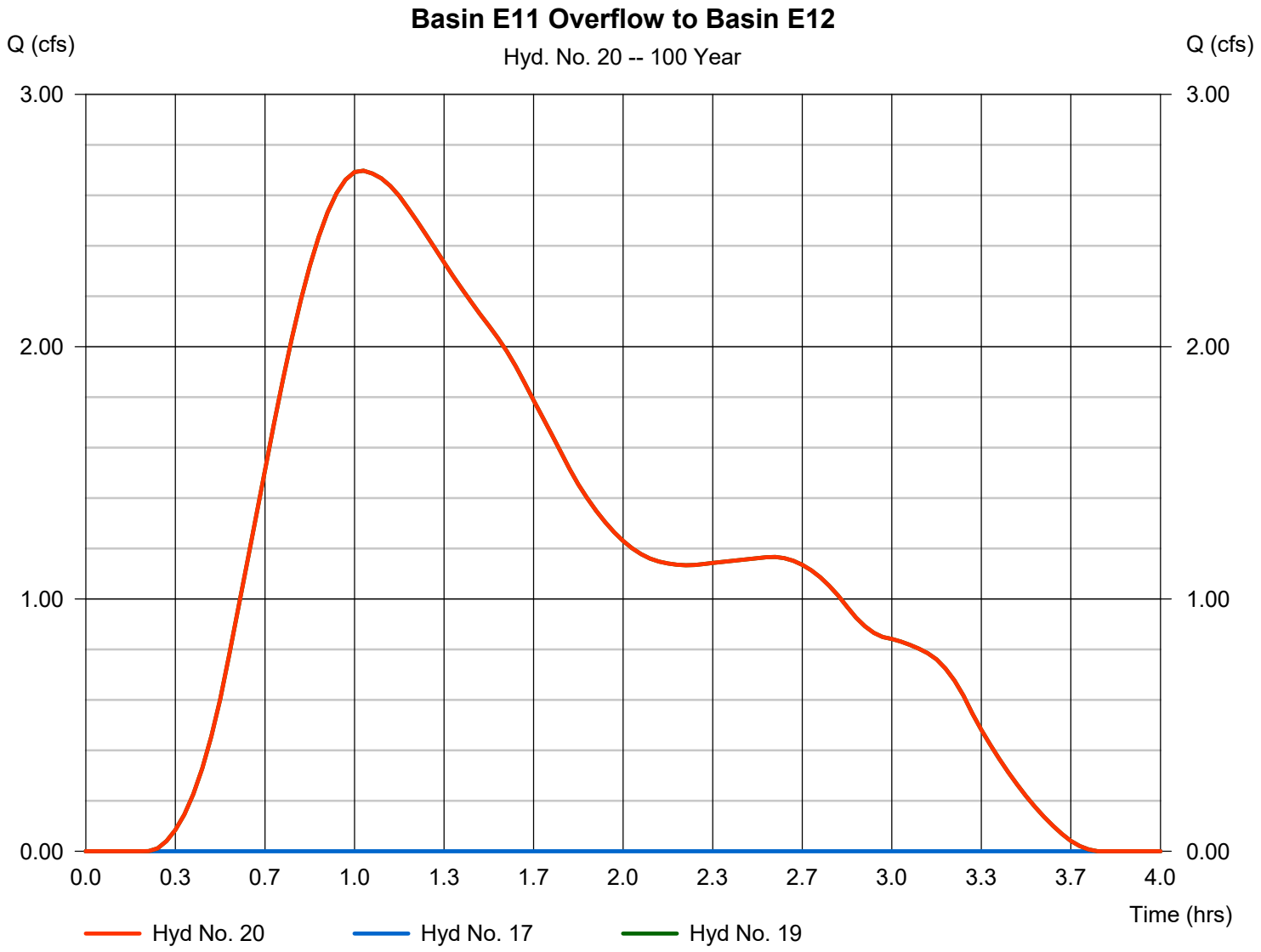


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	= Combine	Peak discharge	= 2.697 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.03 hrs
Time interval	= 2 min	Hyd. volume	= 0.366 acft
Inflow hyds.	= 17, 19	Contrib. drain. area	= 2.630 ac



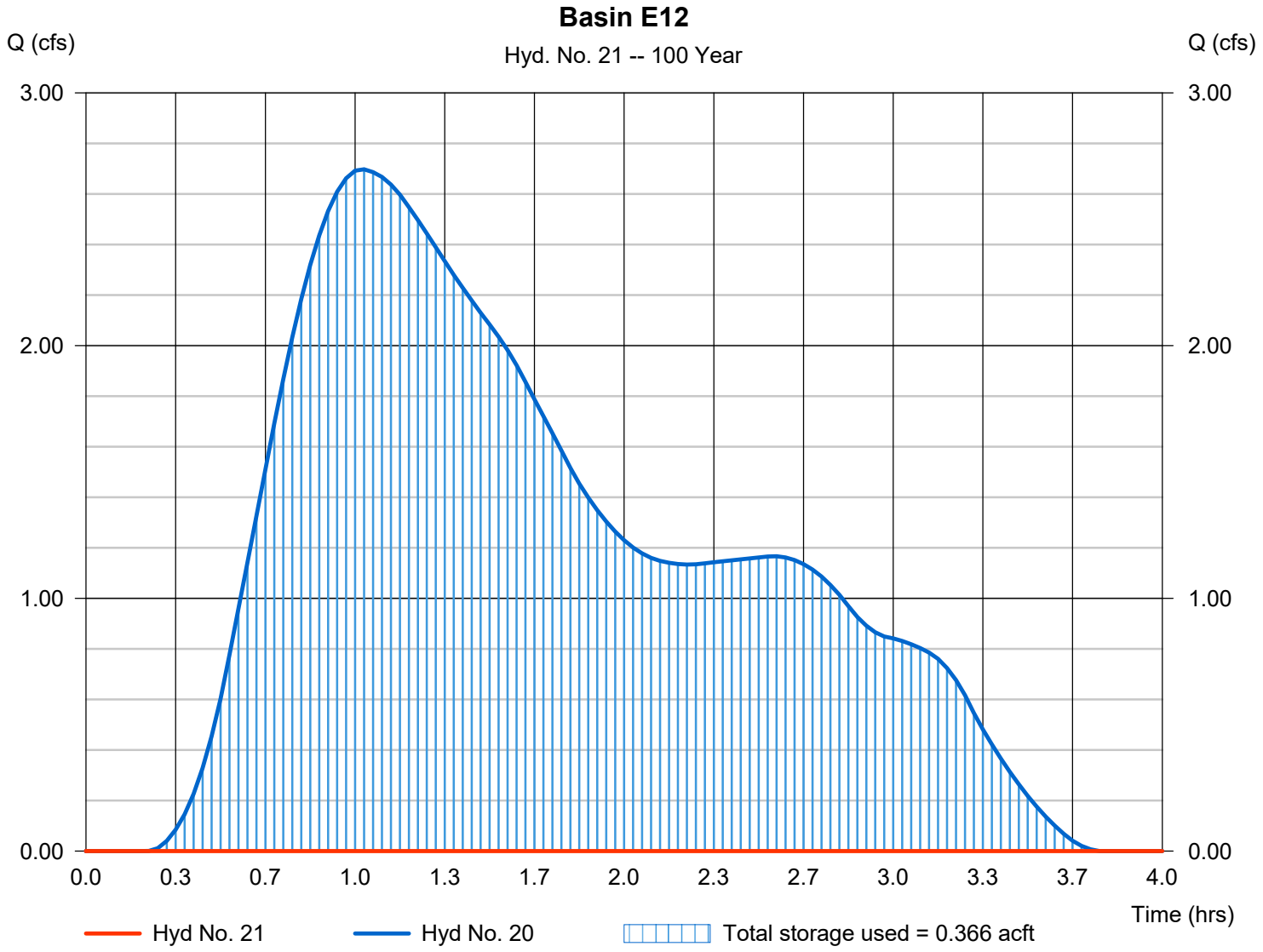
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	868.32 ft
Reservoir name	=	Basin E12	Max. Storage	=	0.366 acft

Storage Indication method used.



Hydraflow Table of Contents

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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Hydrograph No. 15, SCS Runoff, 100-yr; 24-hr..... 13

Hydrograph No. 16, Combine, Basin E5 and E9 Overflow to Basin E11..... 14

Hydrograph No. 17, Reservoir, Basin E11..... 15

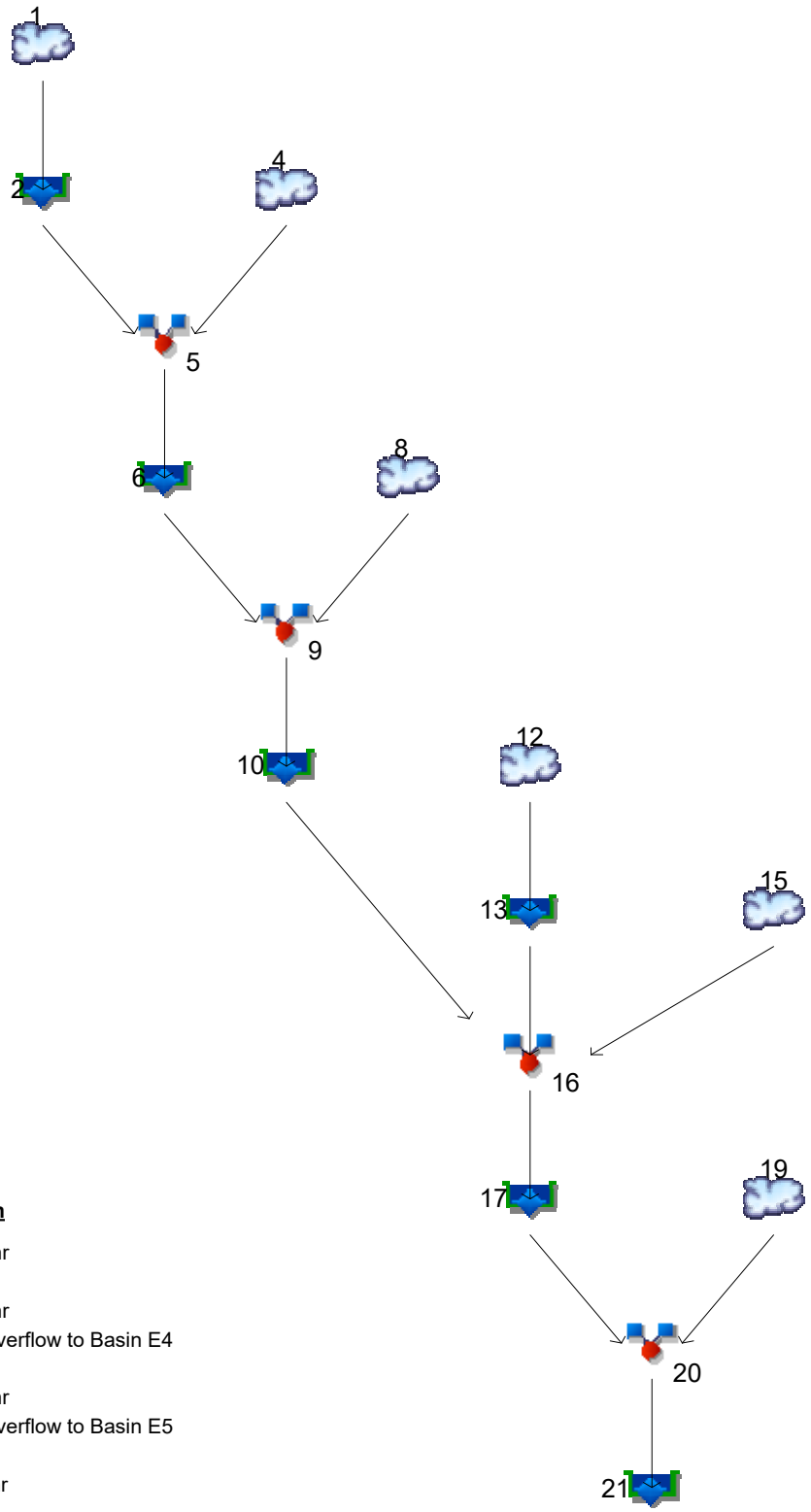
Hydrograph No. 19, SCS Runoff, 100-yr; 24-hr..... 16

Hydrograph No. 20, Combine, Basin E11 Overflow to Basin E12..... 17

Hydrograph No. 21, Reservoir, Basin E12..... 18

100 Year--6 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

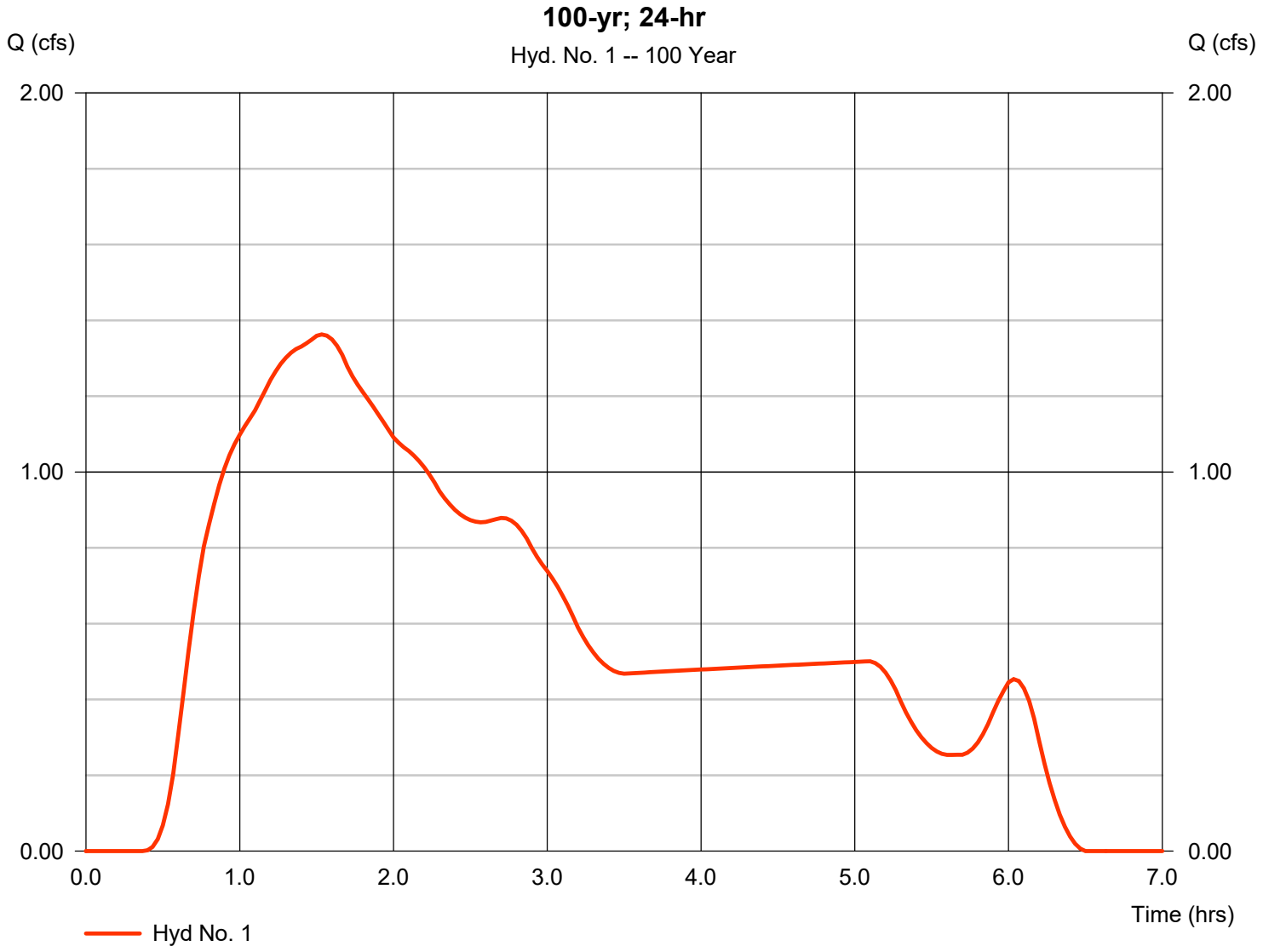
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	1.363	2	92	0.329	------	------	------	100-yr; 24-hr
2	Reservoir	0.498	2	308	0.088	1	891.84	0.248	Basin E6
4	SCS Runoff	5.632	2	110	1.445	------	------	------	100-yr; 24-hr
5	Combine	5.632	2	110	1.533	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	0.000	2	n/a	0.000	5	883.53	1.53	Basin E4
8	SCS Runoff	2.163	2	96	0.534	------	------	------	100-yr; 24-hr
9	Combine	2.163	2	96	0.534	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.159	2	98	0.508	9	882.21	0.037	Basin E5
12	SCS Runoff	0.446	2	90	0.107	------	------	------	100-yr; 24 hr
13	Reservoir	0.333	2	124	0.073	12	897.35	0.038	Basin E9
15	SCS Runoff	1.846	2	92	0.446	------	------	------	100-yr; 24-hr
16	Combine	4.023	2	104	1.027	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	1.242	2	324	0.282	16	878.15	0.853	Basin E11
19	SCS Runoff	2.039	2	96	0.504	------	------	------	100-yr; 24-hr
20	Combine	2.039	2	96	0.786	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	869.07	0.786	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.363 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.53 hrs
Time interval	=	2 min	Hyd. volume	=	0.329 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	6.43 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484



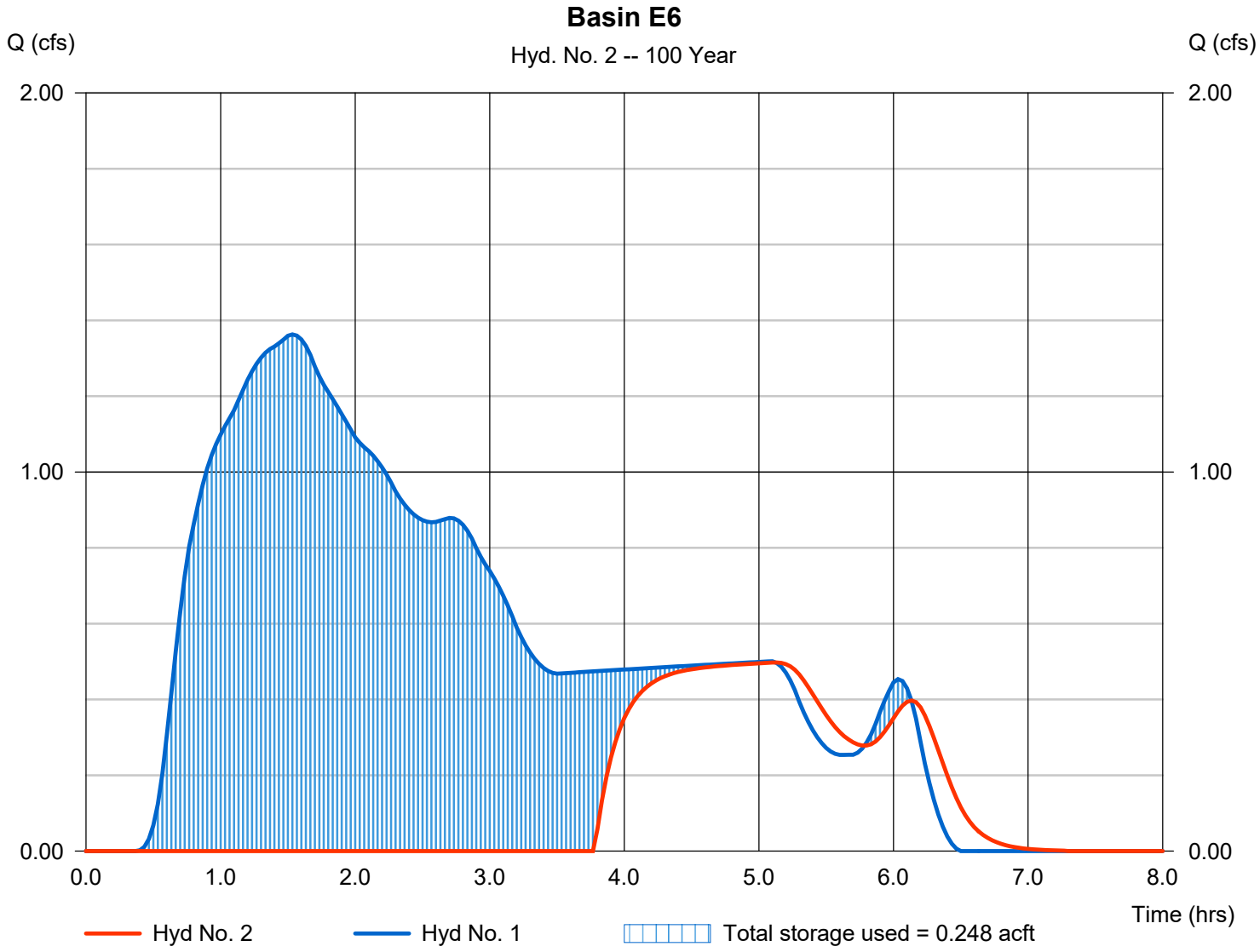
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.498 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.13 hrs
Time interval	=	2 min	Hyd. volume	=	0.088 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.84 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.248 acft

Storage Indication method used.

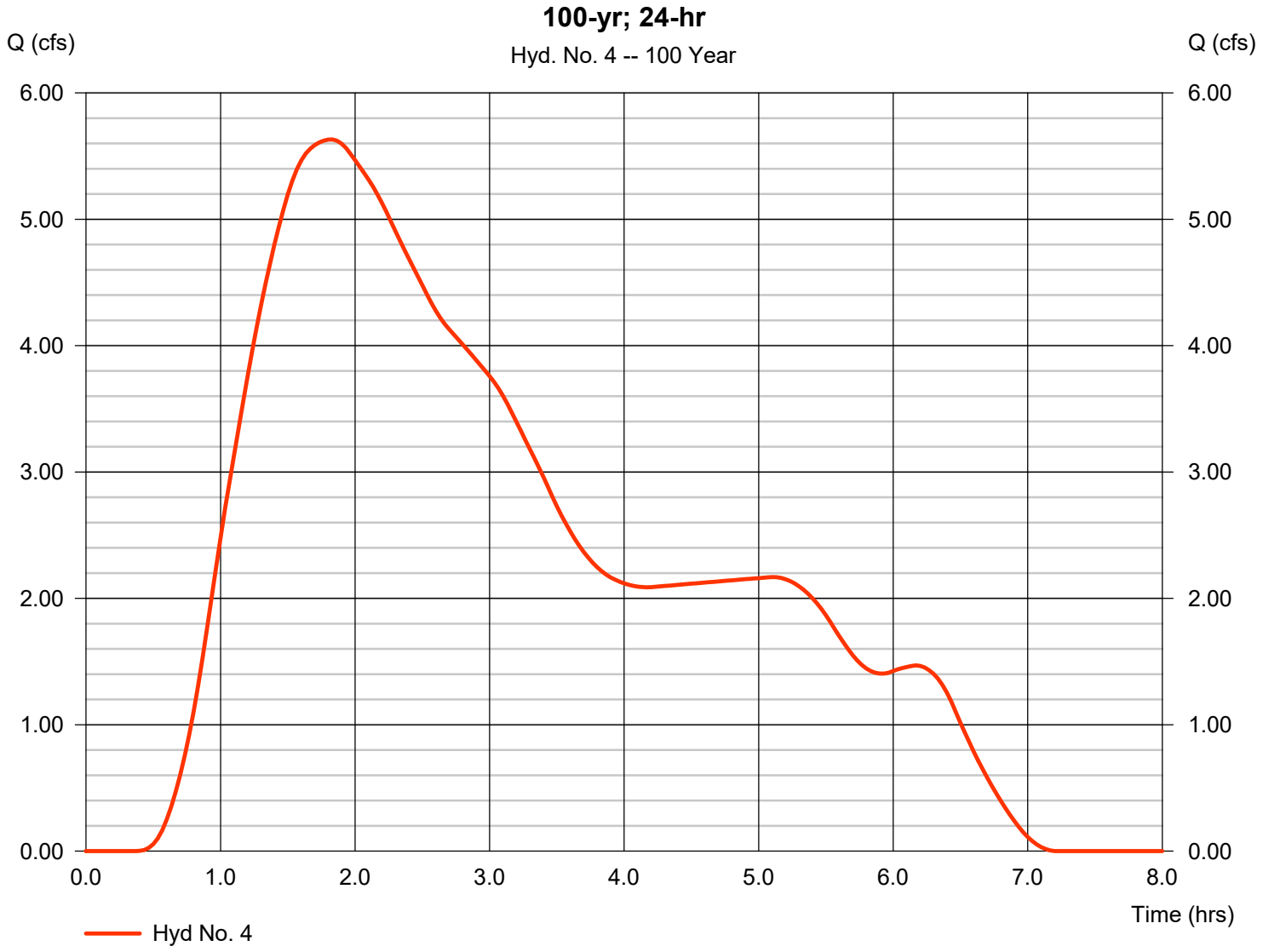


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.632 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.83 hrs
Time interval	=	2 min	Hyd. volume	=	1.445 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	6.43 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

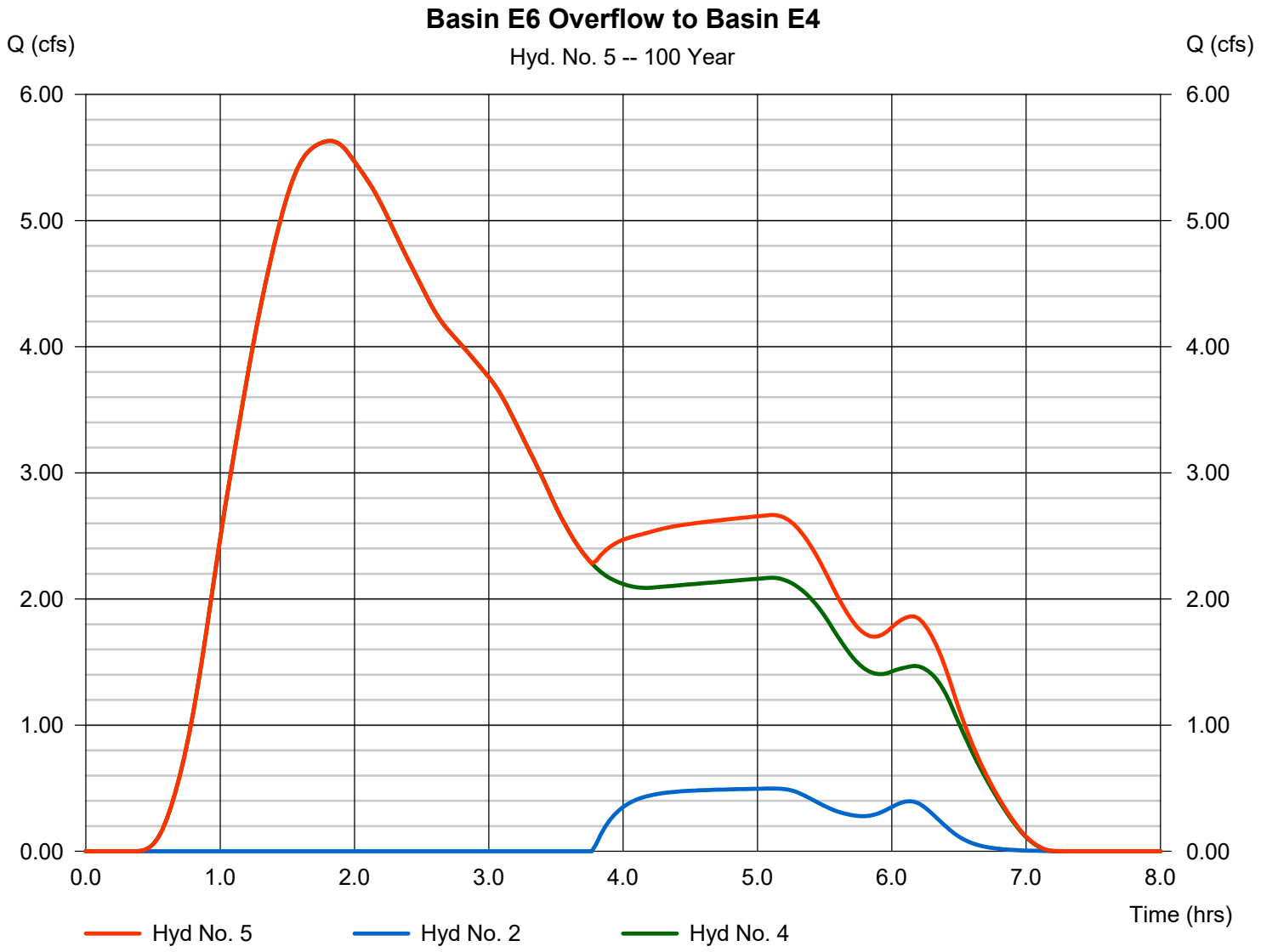


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 5.632 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.83 hrs
Time interval	= 2 min	Hyd. volume	= 1.533 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



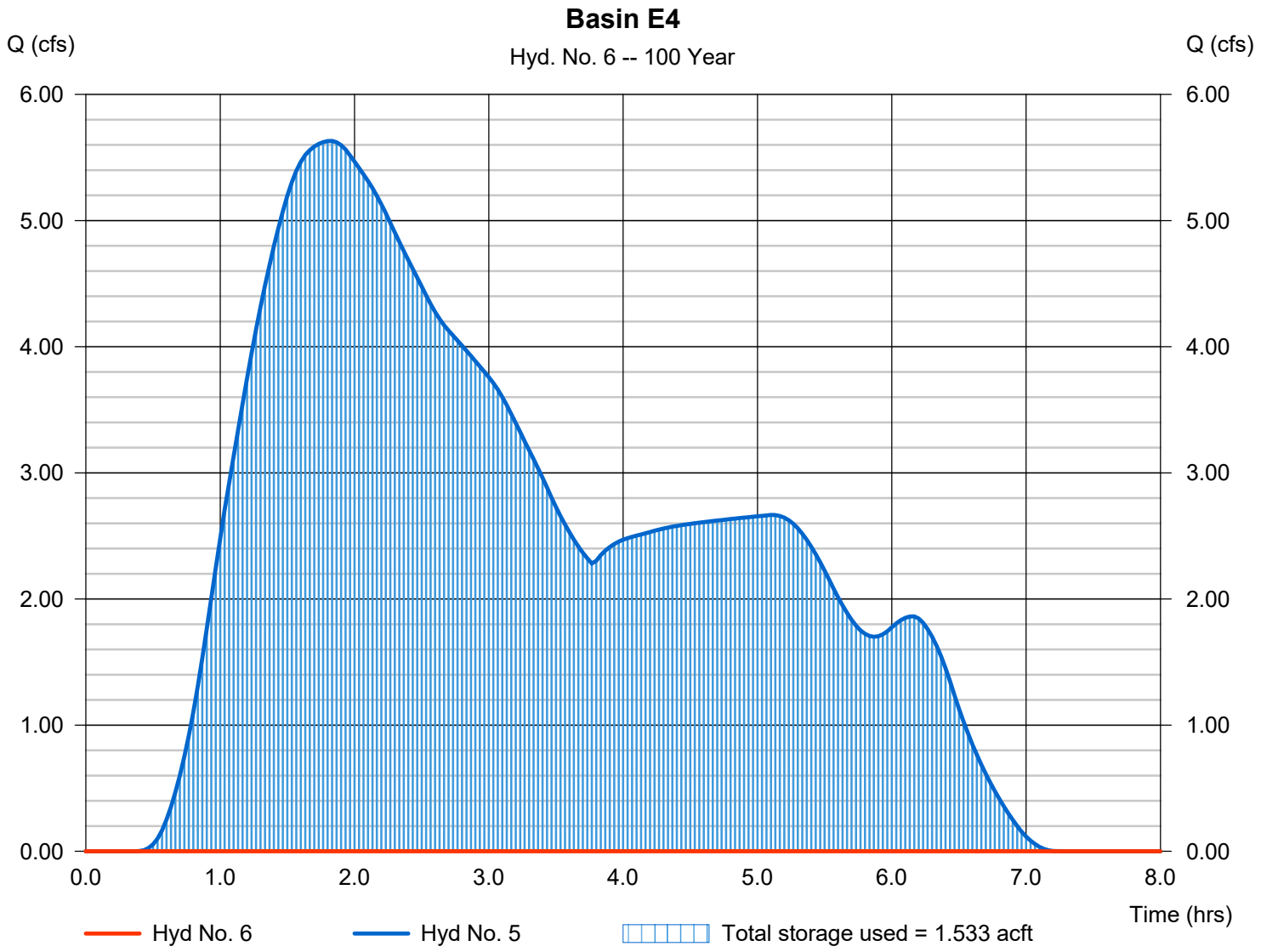
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	883.53 ft
Reservoir name	=	Basin E4	Max. Storage	=	1.533 acft

Storage Indication method used.

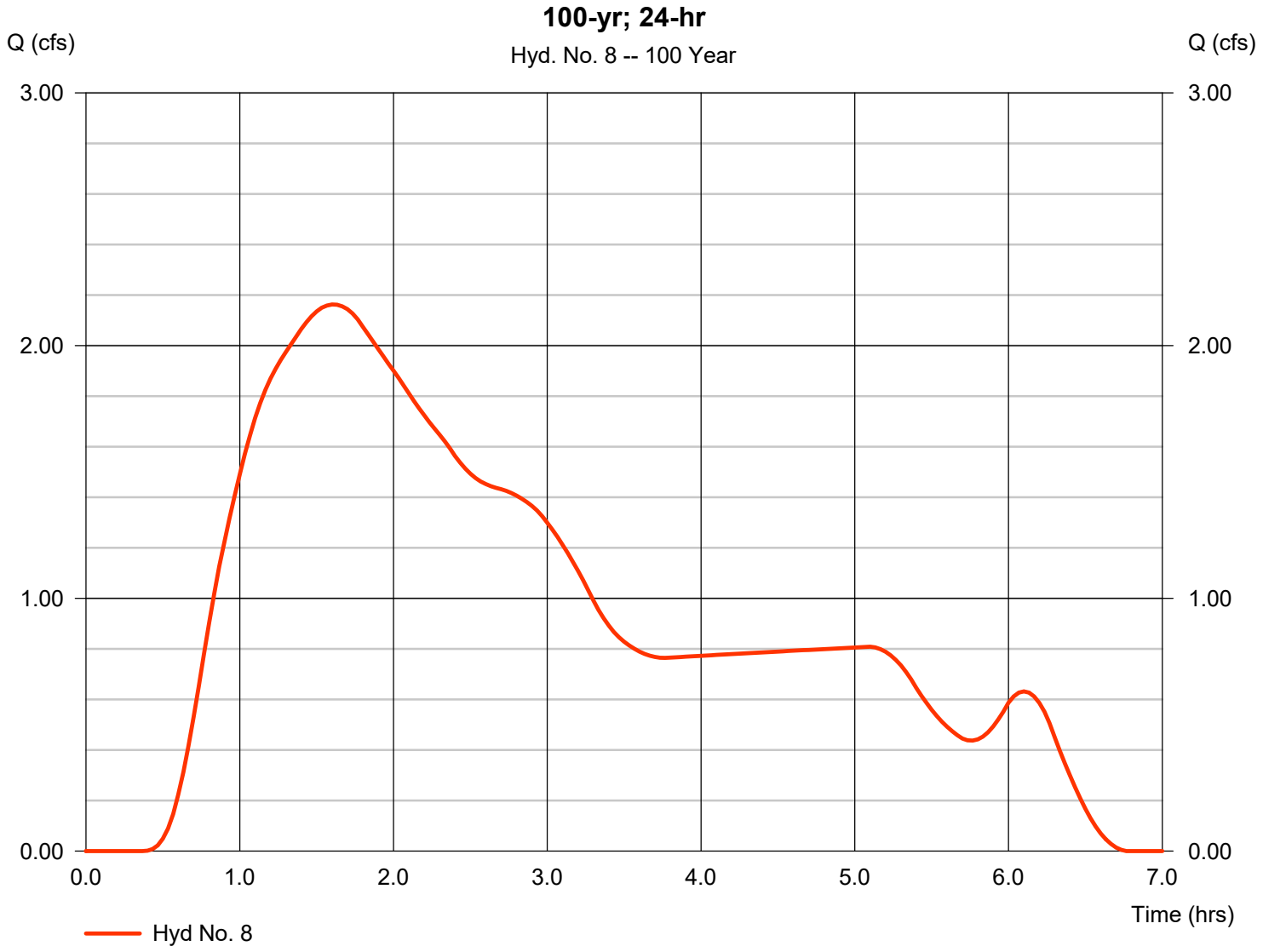


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.163 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.534 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	6.43 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

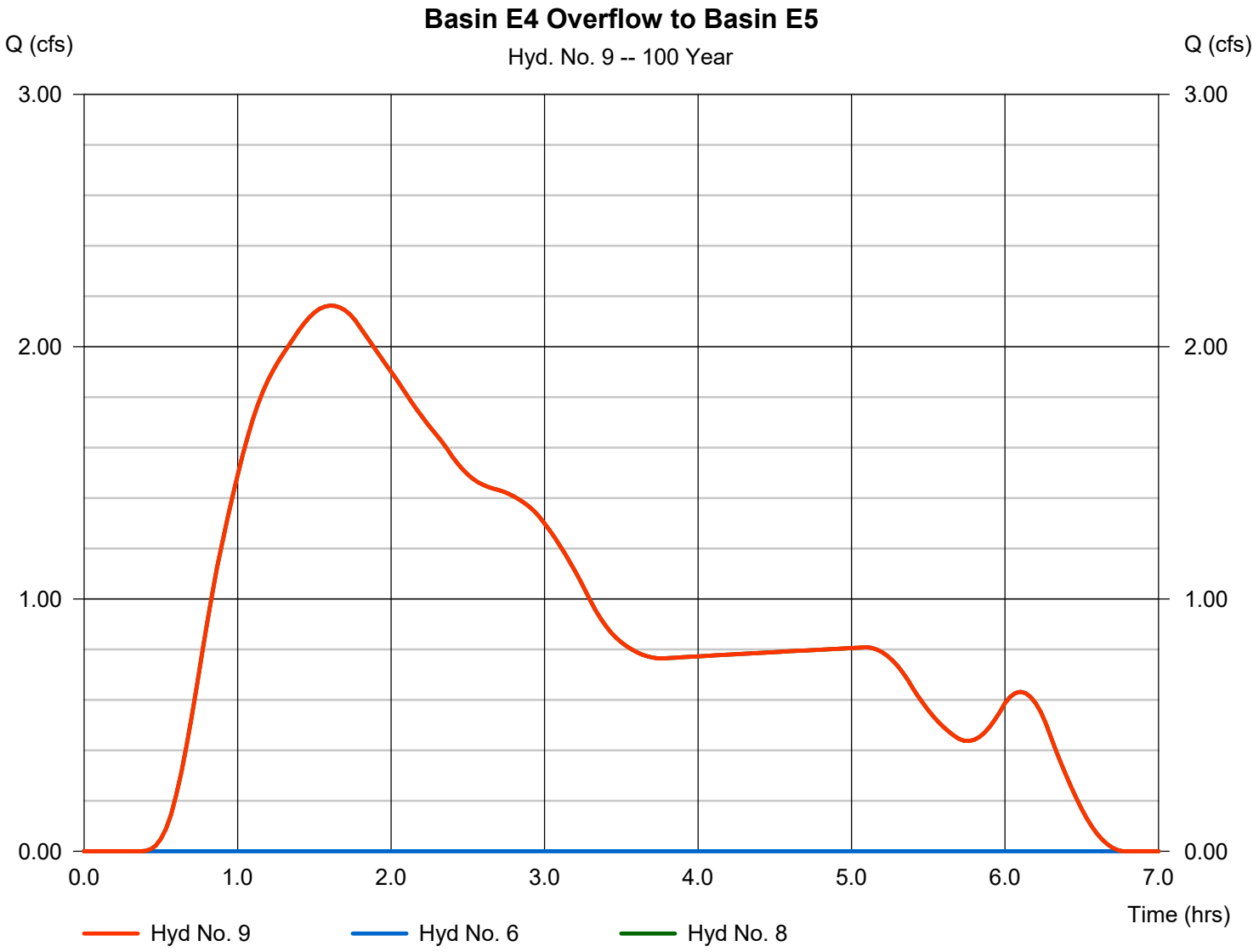


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	= Combine	Peak discharge	= 2.163 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.60 hrs
Time interval	= 2 min	Hyd. volume	= 0.534 acft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 2.790 ac



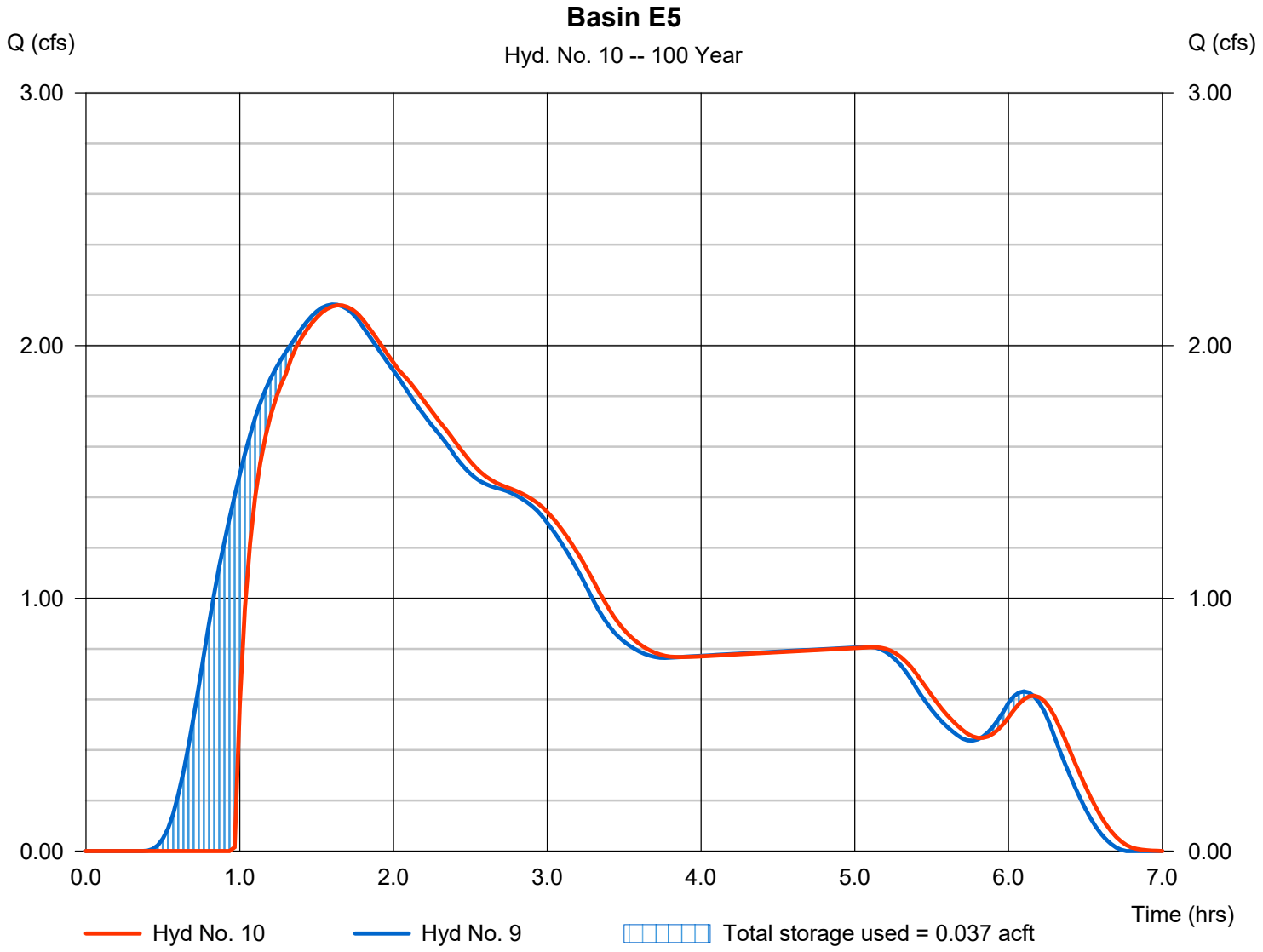
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.159 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.63 hrs
Time interval	=	2 min	Hyd. volume	=	0.508 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.21 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.037 acft

Storage Indication method used.

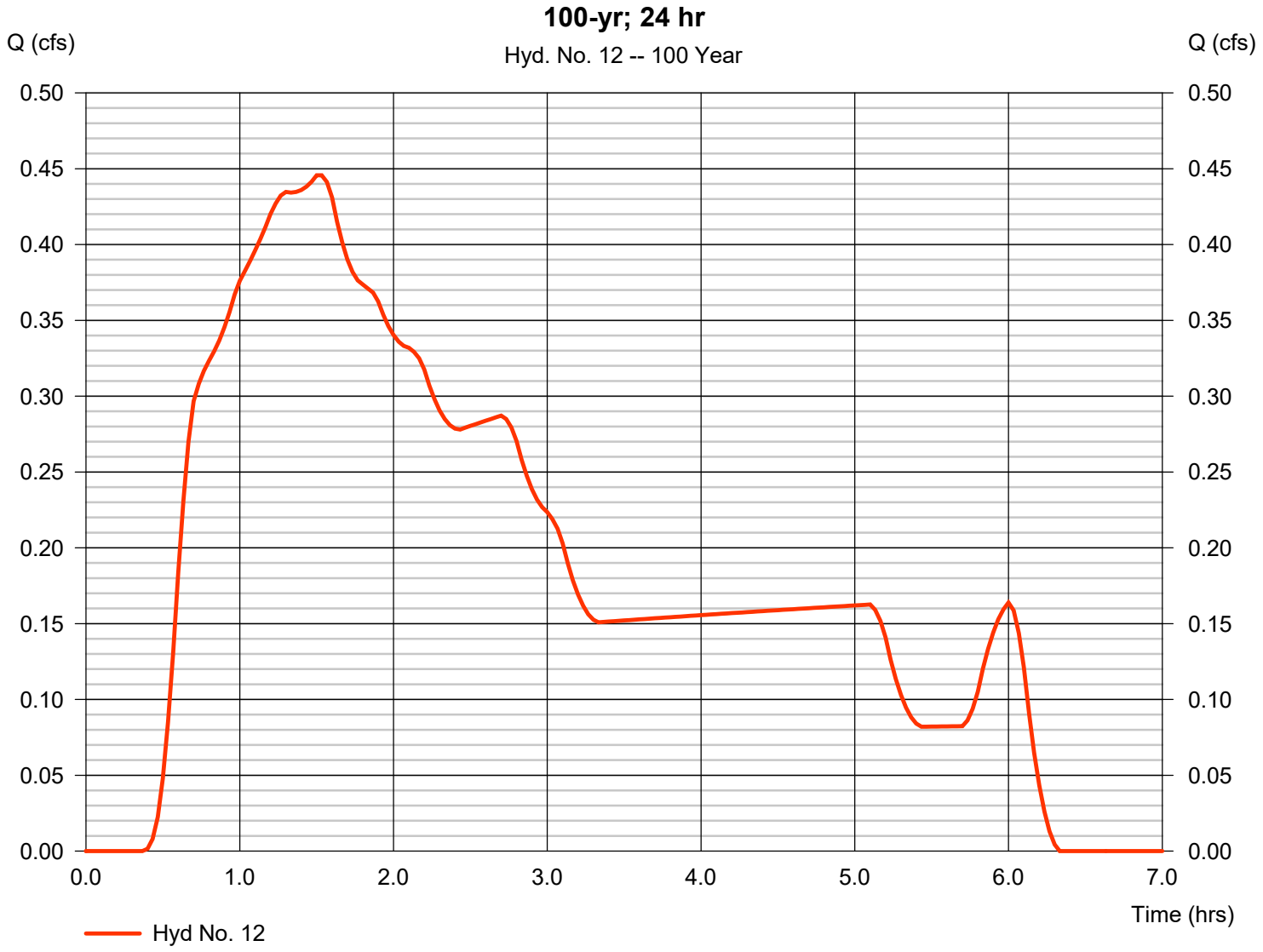


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.446 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.50 hrs
Time interval	=	2 min	Hyd. volume	=	0.107 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.43 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484



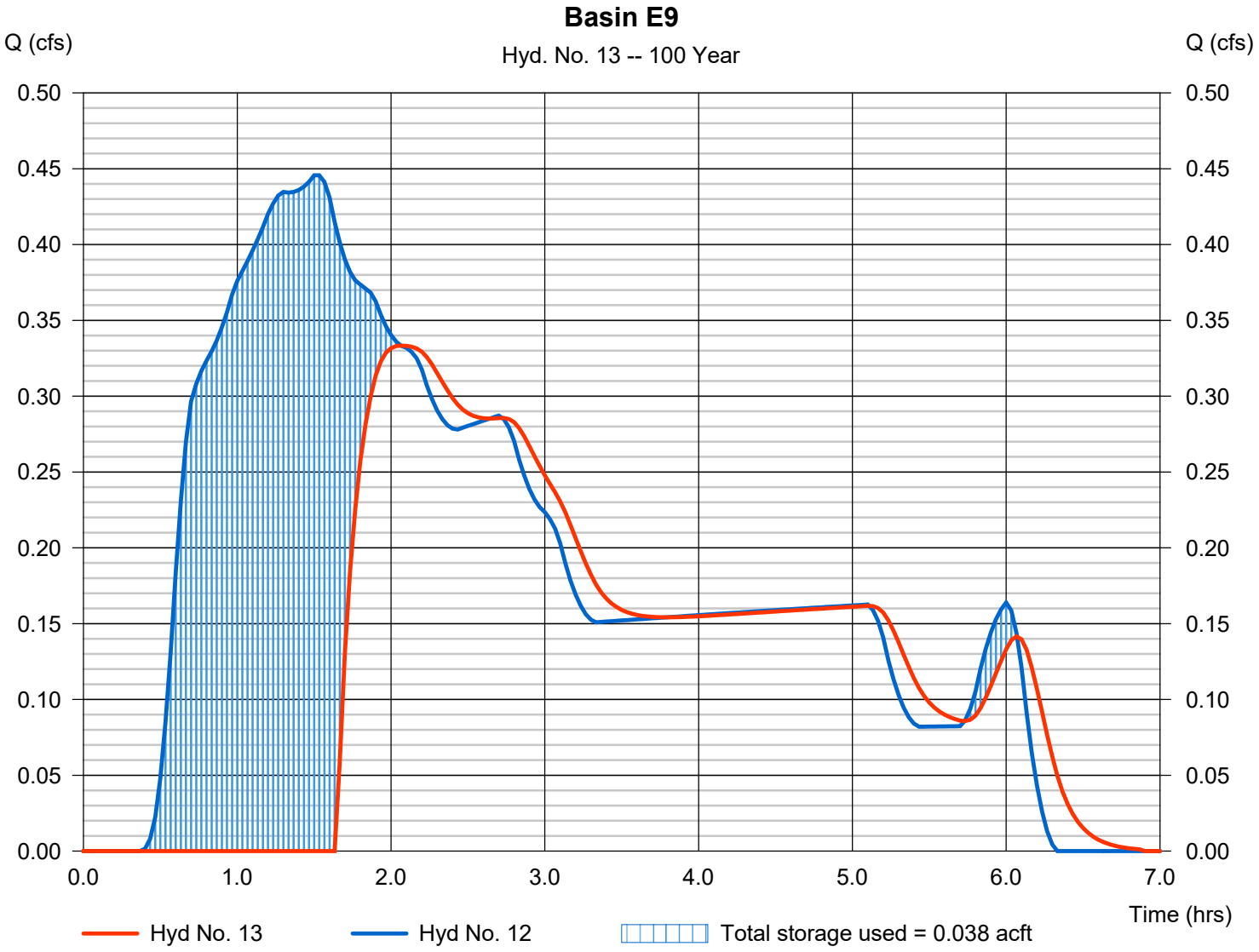
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.333 cfs
Storm frequency	=	100 yrs	Time to peak	=	2.07 hrs
Time interval	=	2 min	Hyd. volume	=	0.073 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.35 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.038 acft

Storage Indication method used.

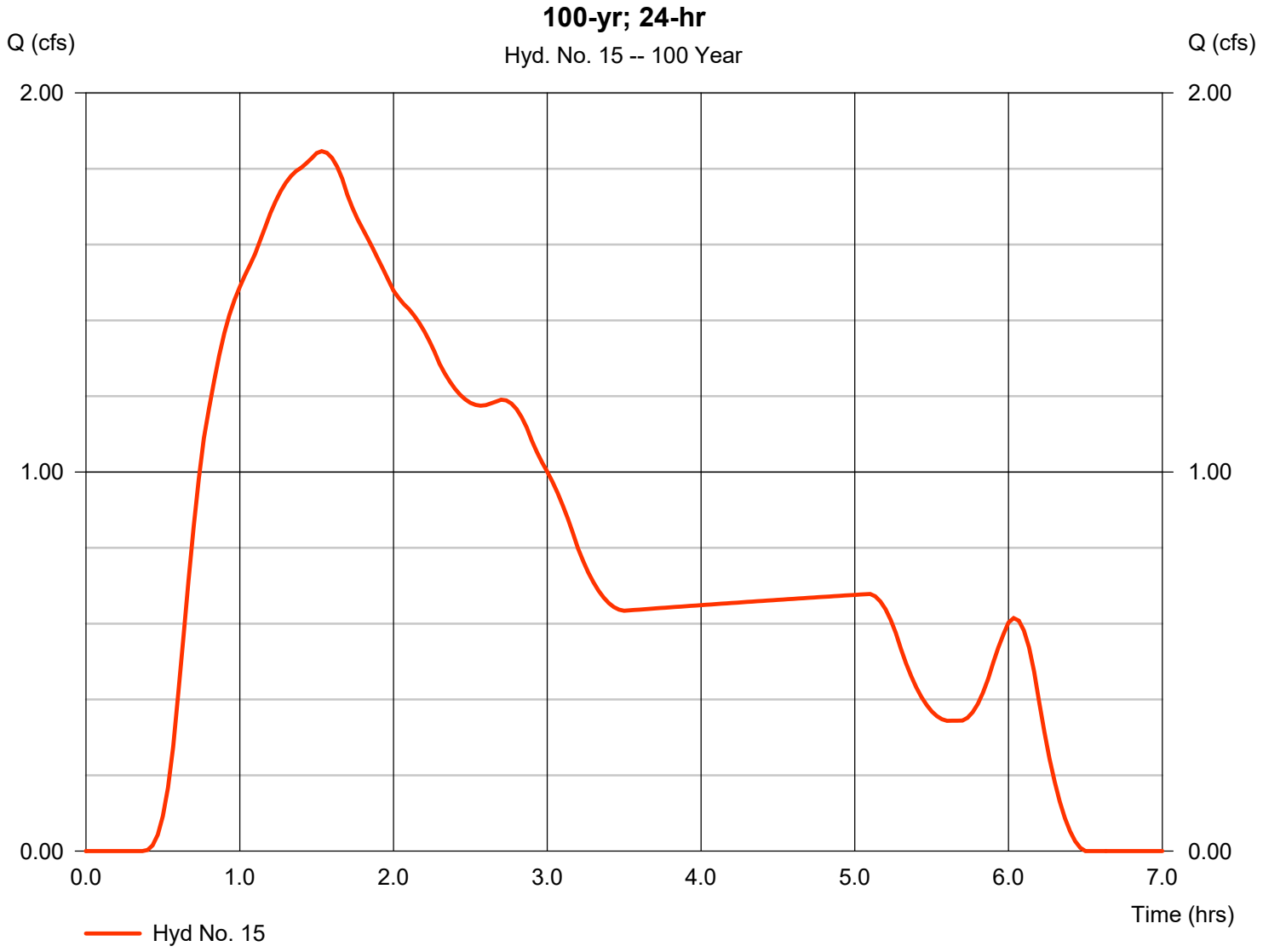


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.846 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.53 hrs
Time interval	=	2 min	Hyd. volume	=	0.446 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	6.43 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

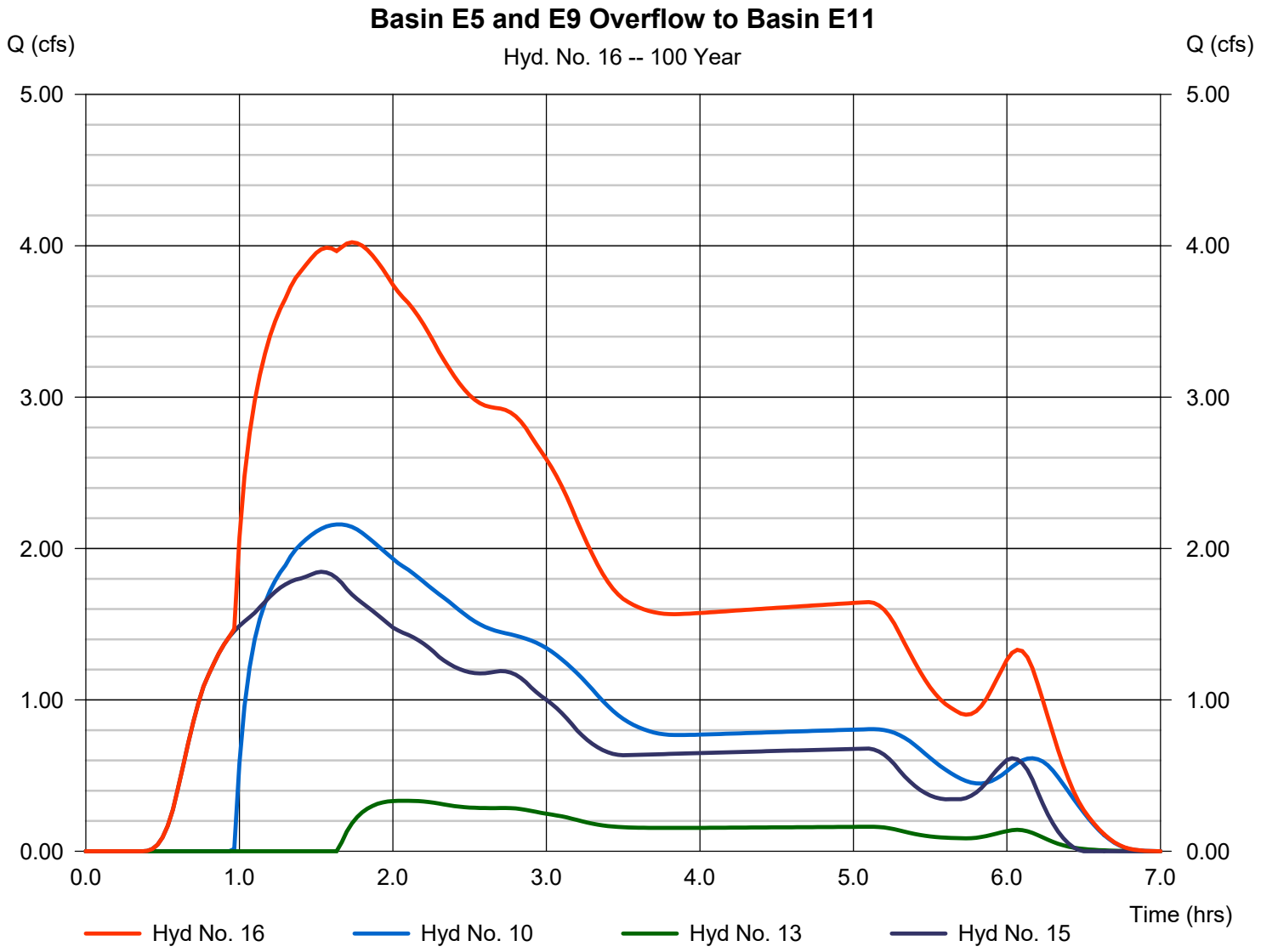


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	4.023 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.73 hrs
Time interval	=	2 min	Hyd. volume	=	1.027 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



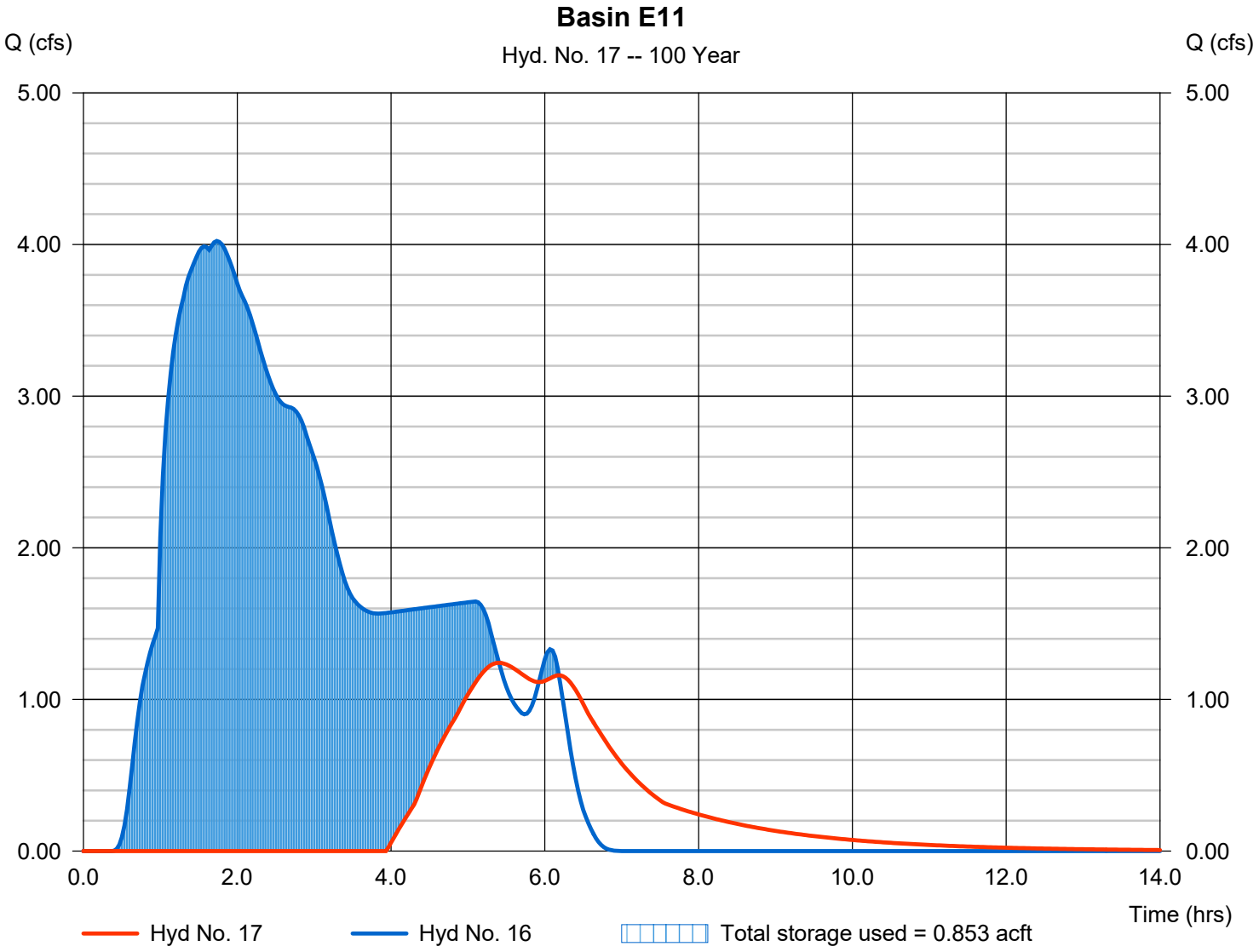
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	1.242 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.40 hrs
Time interval	=	2 min	Hyd. volume	=	0.282 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow	Max. Elevation	=	878.15 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.853 acft

Storage Indication method used.

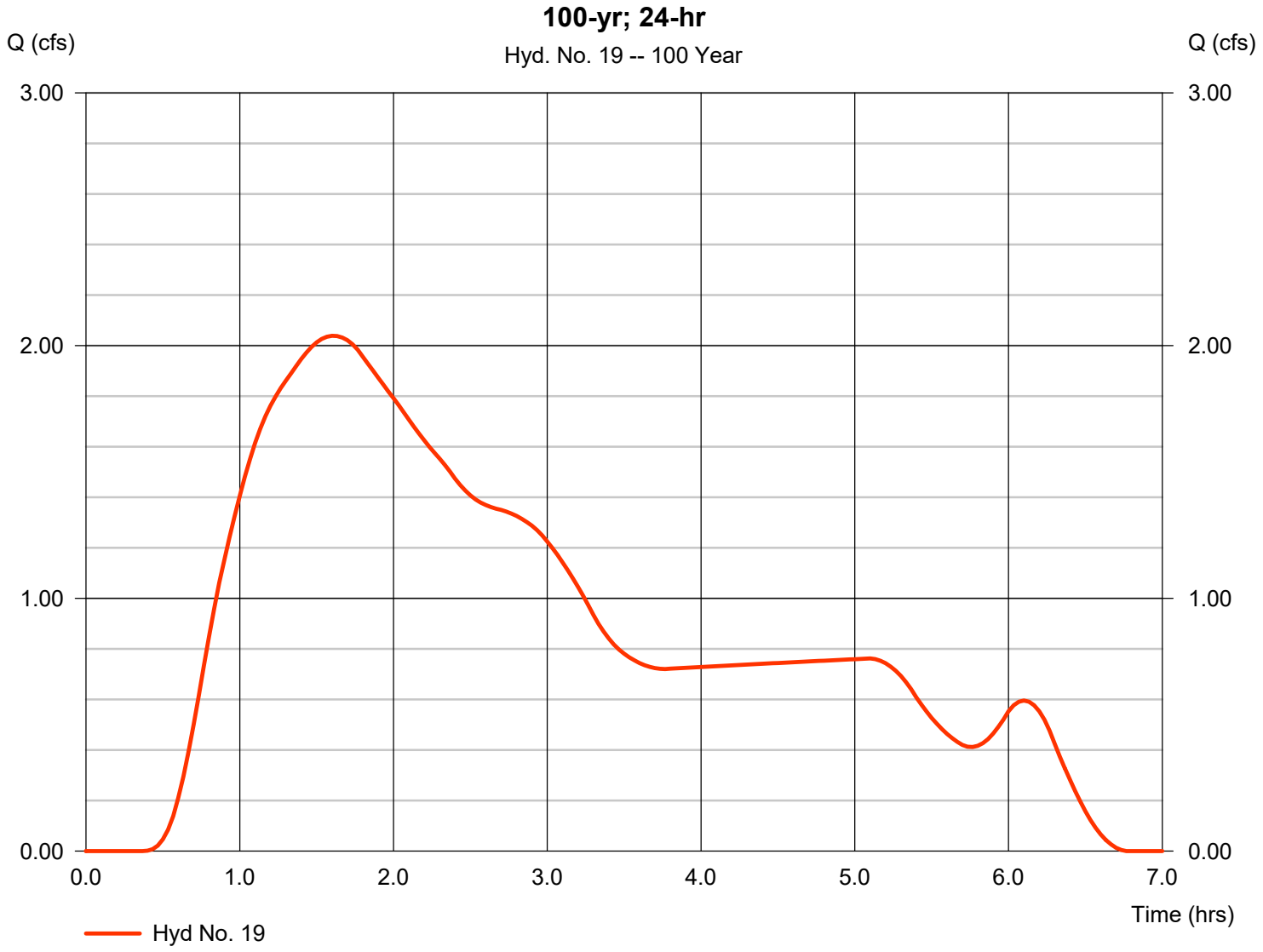


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.039 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.504 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	6.43 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

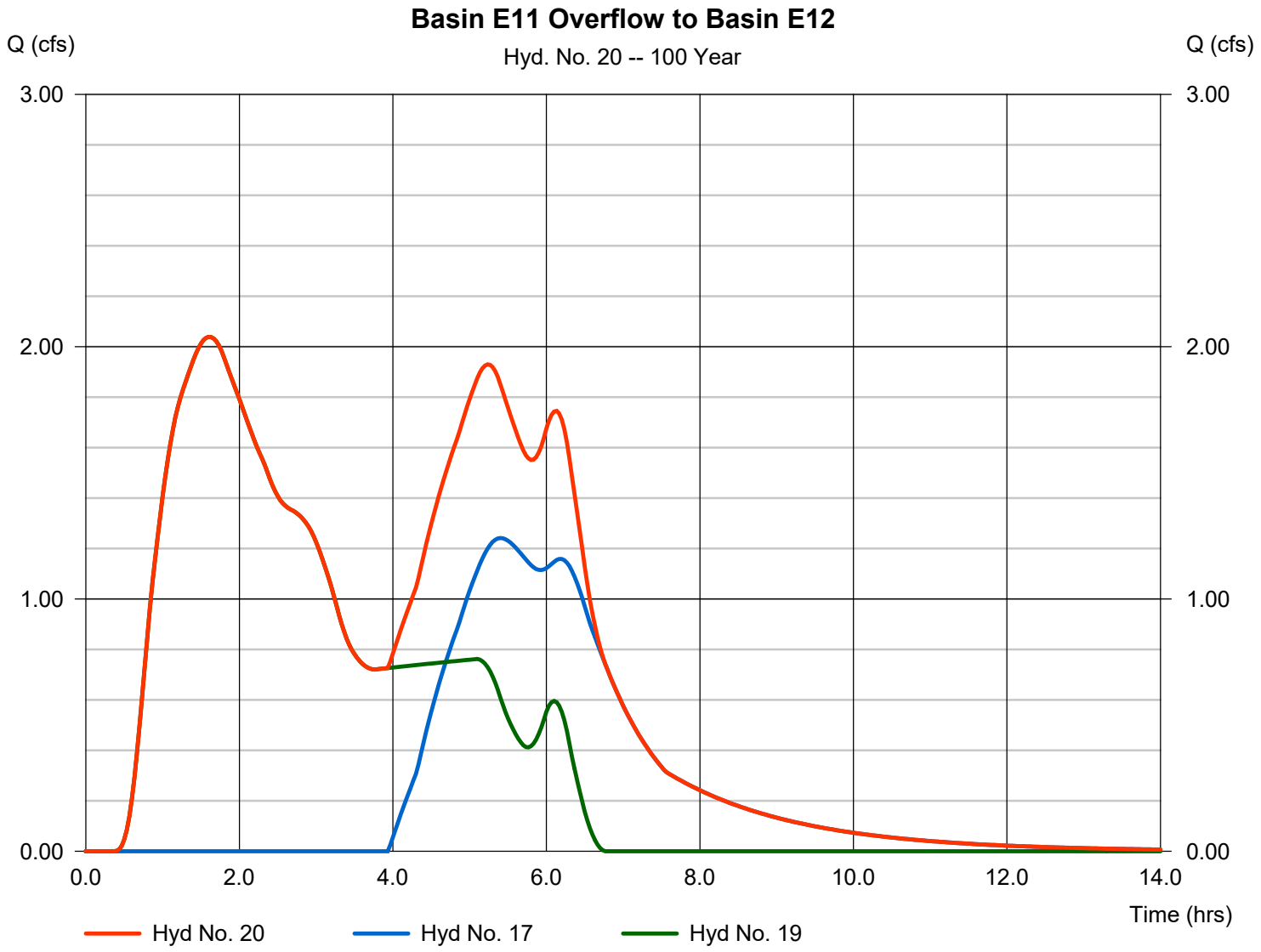


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	2.039 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.786 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



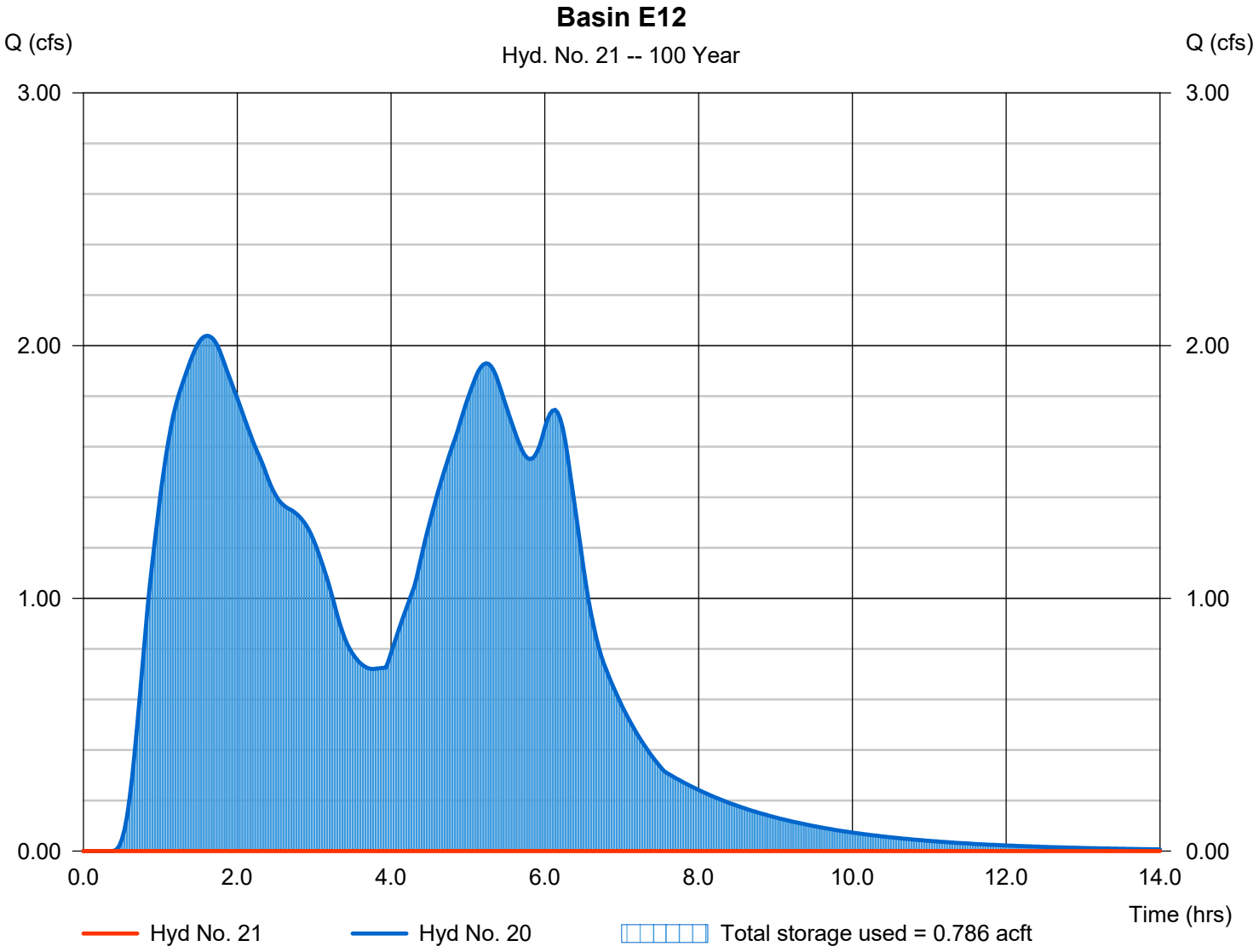
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	869.07 ft
Reservoir name	=	Basin E12	Max. Storage	=	0.786 acft

Storage Indication method used.



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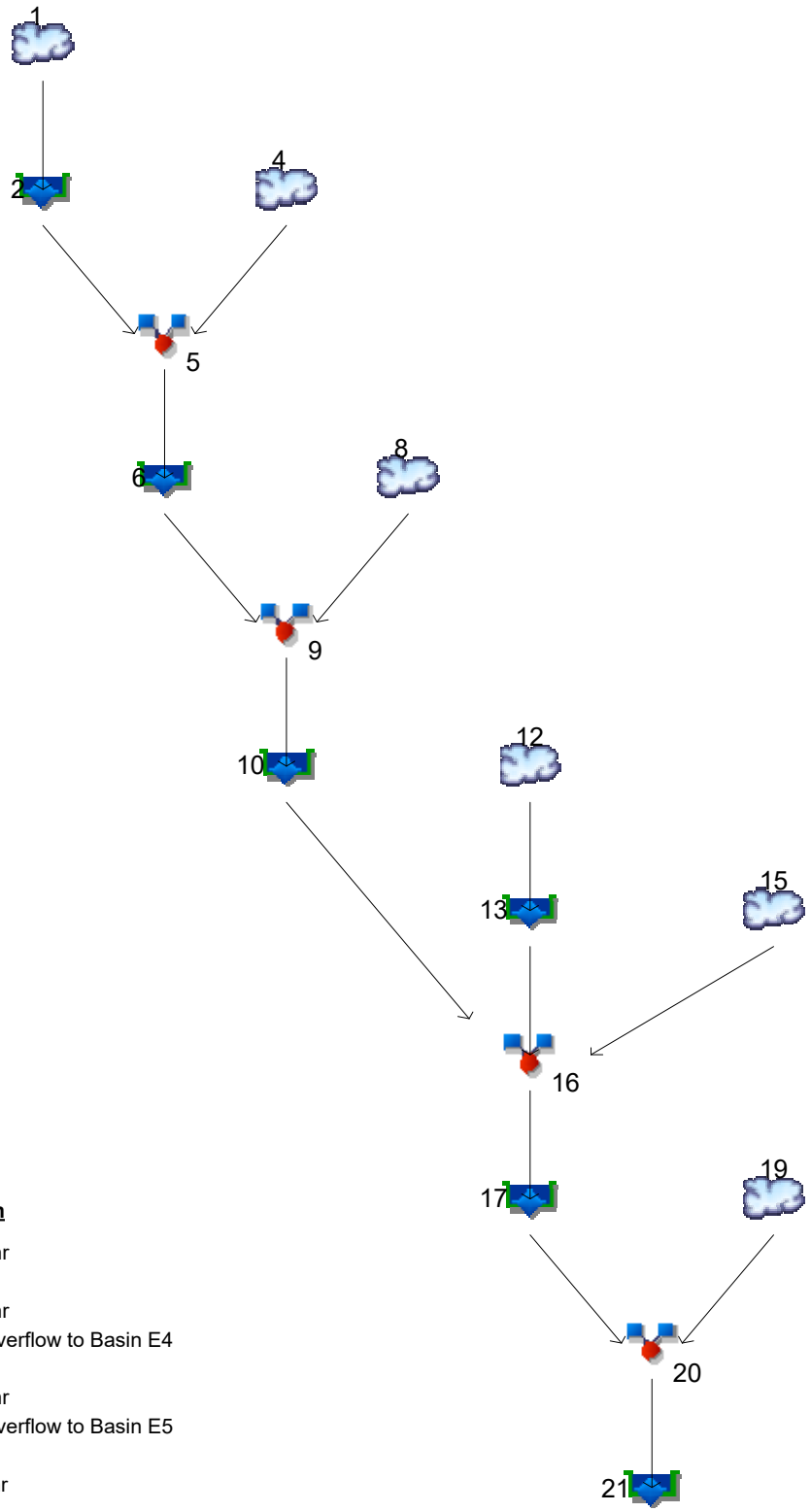
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100 Year-12 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

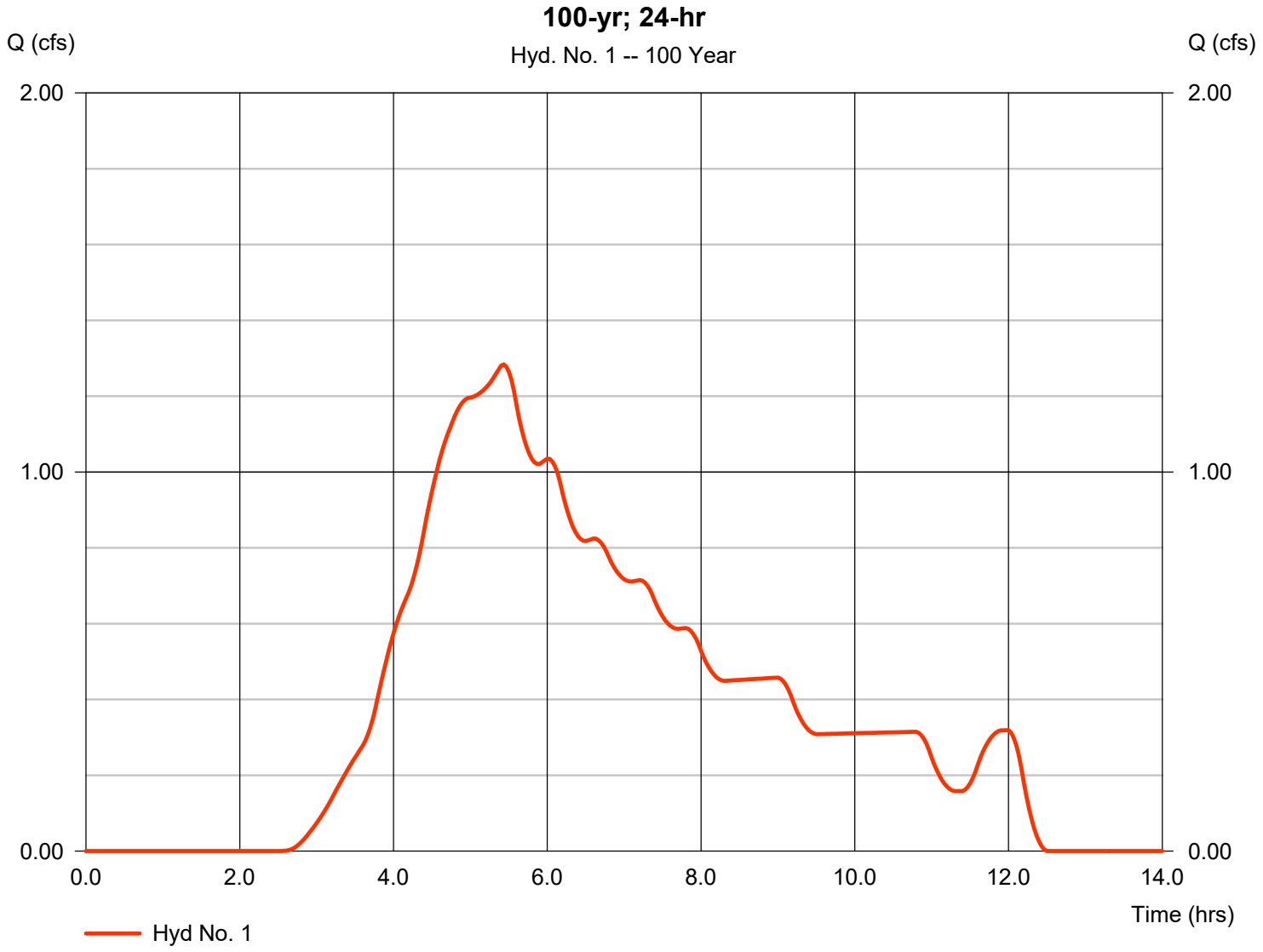
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	1.283	2	326	0.436	------	------	------	100-yr; 24-hr
2	Reservoir	0.706	2	436	0.194	1	891.86	0.251	Basin E6
4	SCS Runoff	5.365	2	334	1.910	------	------	------	100-yr; 24-hr
5	Combine	5.365	2	334	2.104	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	0.000	2	n/a	0.000	5	884.15	2.10	Basin E4
8	SCS Runoff	2.035	2	328	0.706	------	------	------	100-yr; 24-hr
9	Combine	2.035	2	328	0.706	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.032	2	330	0.680	9	882.20	0.037	Basin E5
12	SCS Runoff	0.423	2	324	0.141	------	------	------	100-yr; 24 hr
13	Reservoir	0.402	2	330	0.107	12	897.35	0.039	Basin E9
15	SCS Runoff	1.738	2	326	0.590	------	------	------	100-yr; 24-hr
16	Combine	4.161	2	328	1.377	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	1.655	2	490	0.632	16	878.20	0.877	Basin E11
19	SCS Runoff	1.918	2	328	0.666	------	------	------	100-yr; 24-hr
20	Combine	2.492	2	478	1.298	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	869.74	1.30	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.283 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.43 hrs
Time interval	=	2 min	Hyd. volume	=	0.436 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	7.46 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484



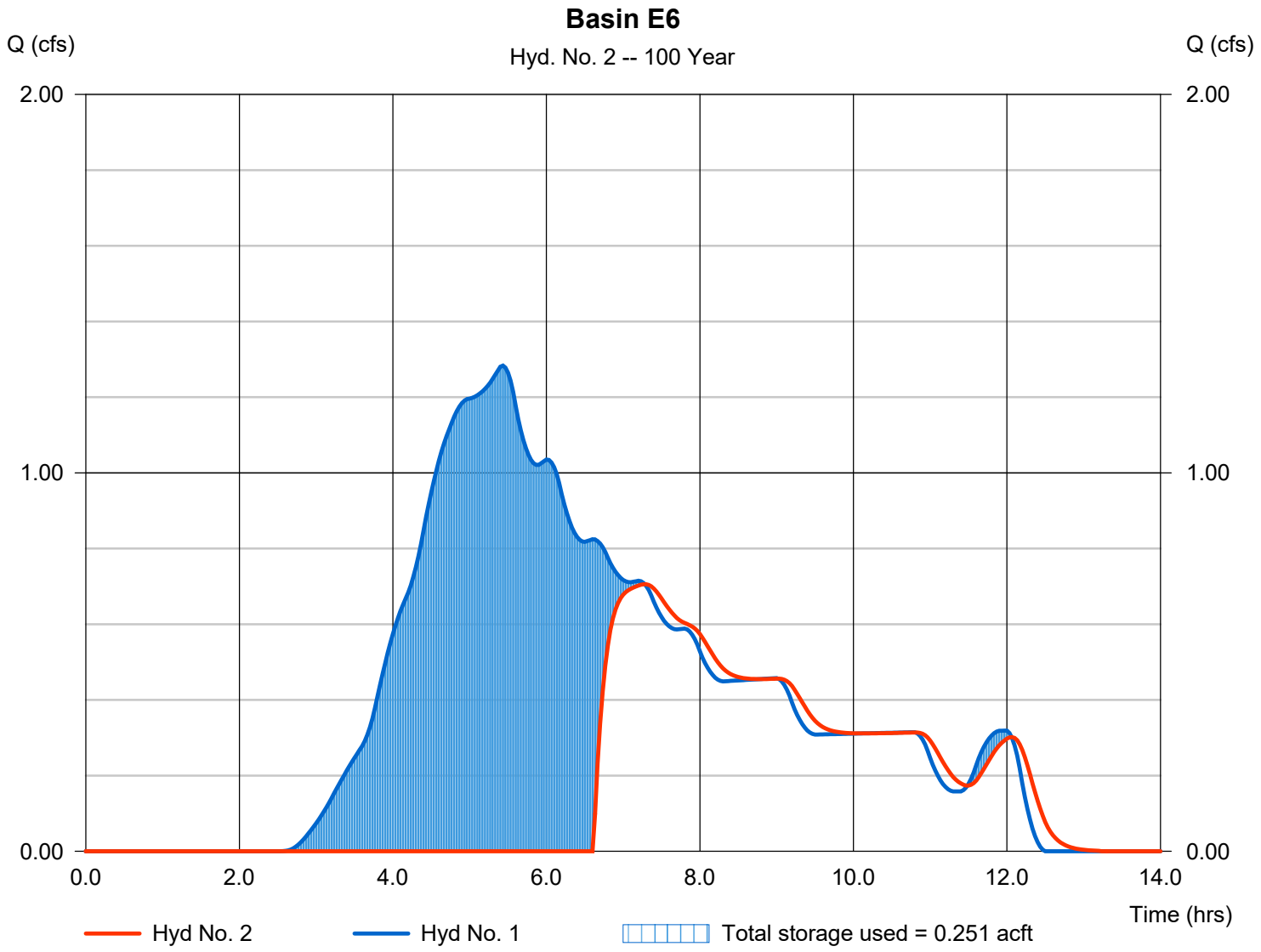
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.706 cfs
Storm frequency	=	100 yrs	Time to peak	=	7.27 hrs
Time interval	=	2 min	Hyd. volume	=	0.194 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.86 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.251 acft

Storage Indication method used.

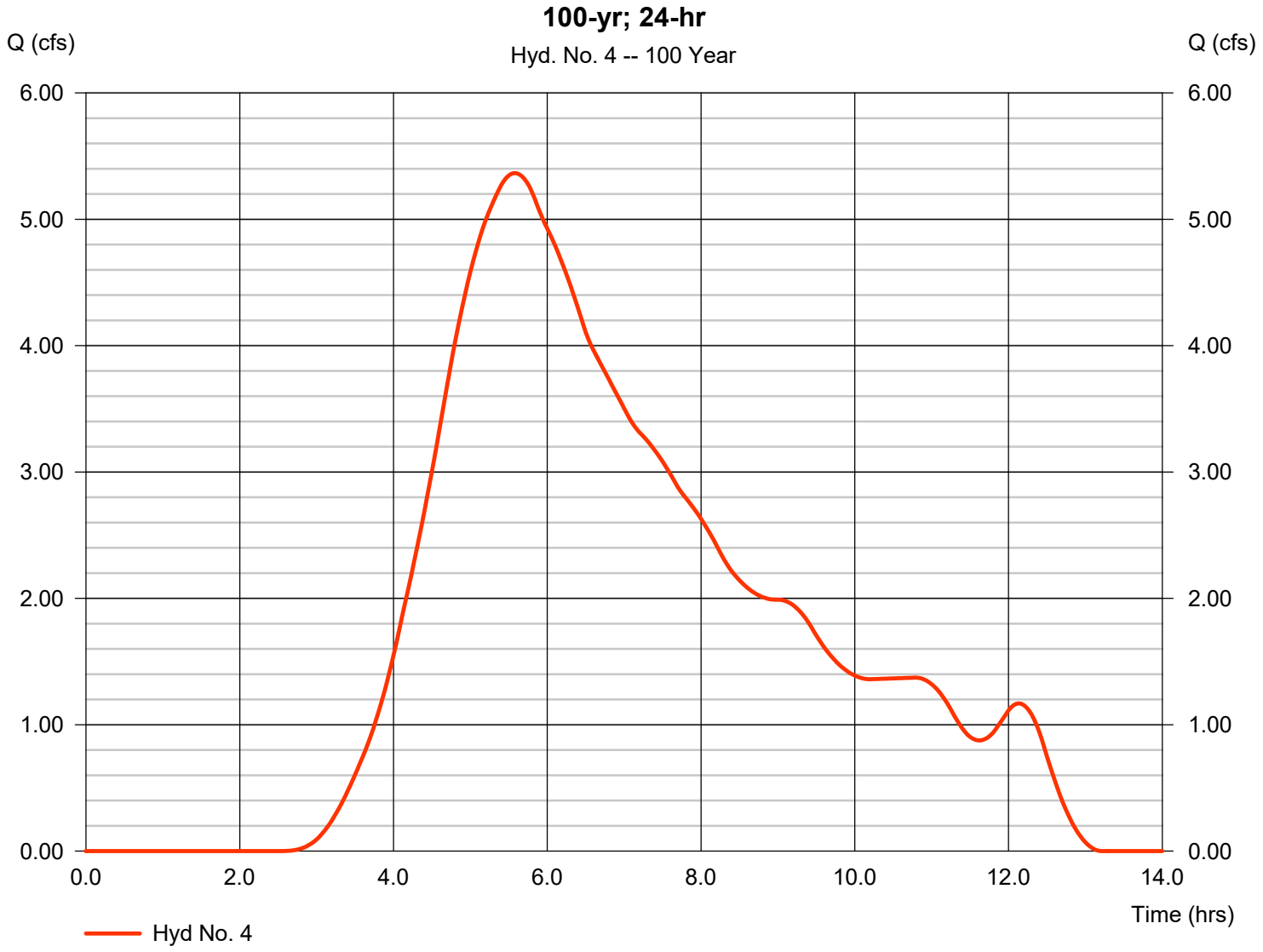


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.365 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.57 hrs
Time interval	=	2 min	Hyd. volume	=	1.910 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	7.46 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

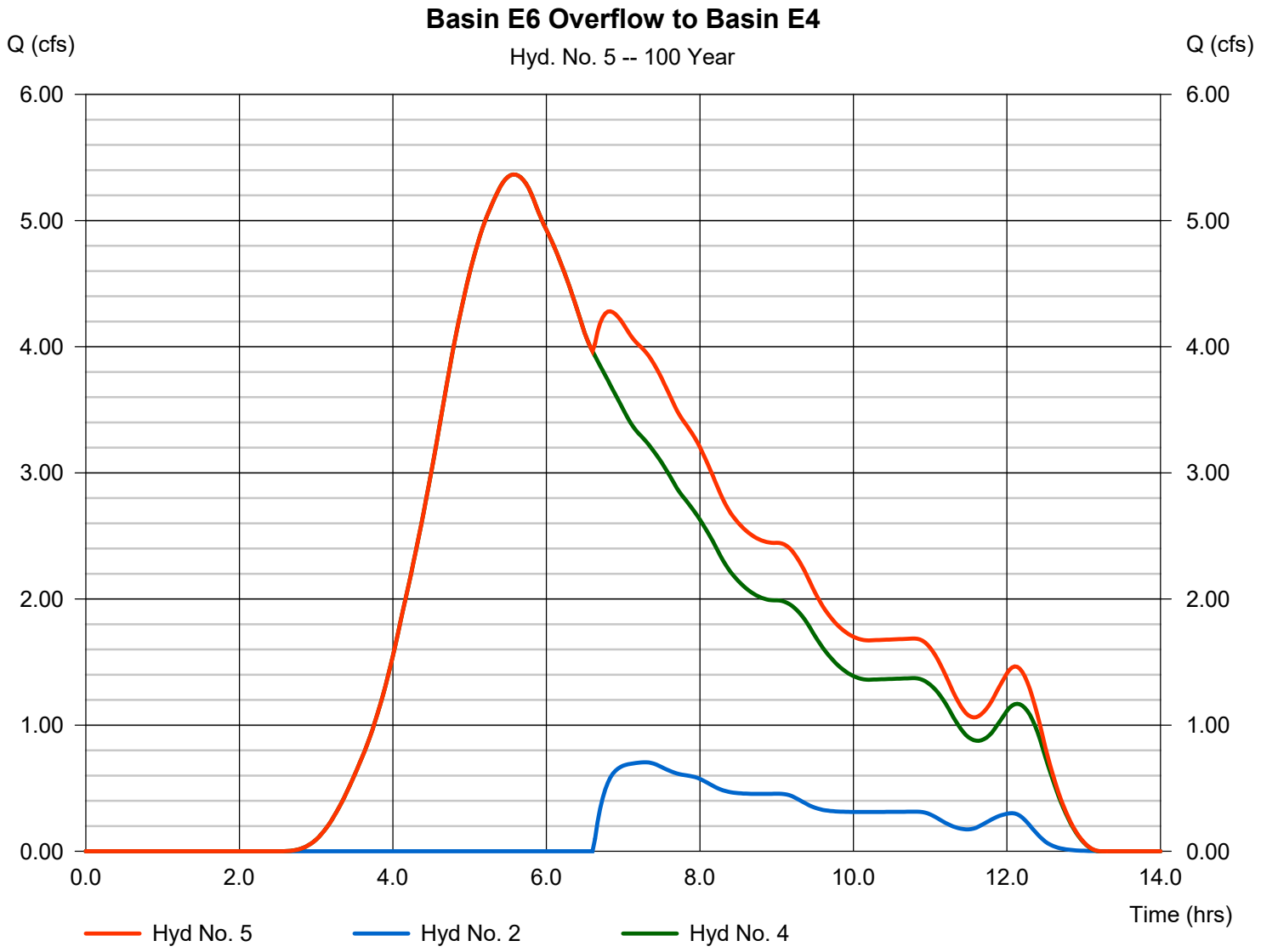


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	=	Combine	Peak discharge	=	5.365 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.57 hrs
Time interval	=	2 min	Hyd. volume	=	2.104 acft
Inflow hyds.	=	2, 4	Contrib. drain. area	=	7.610 ac



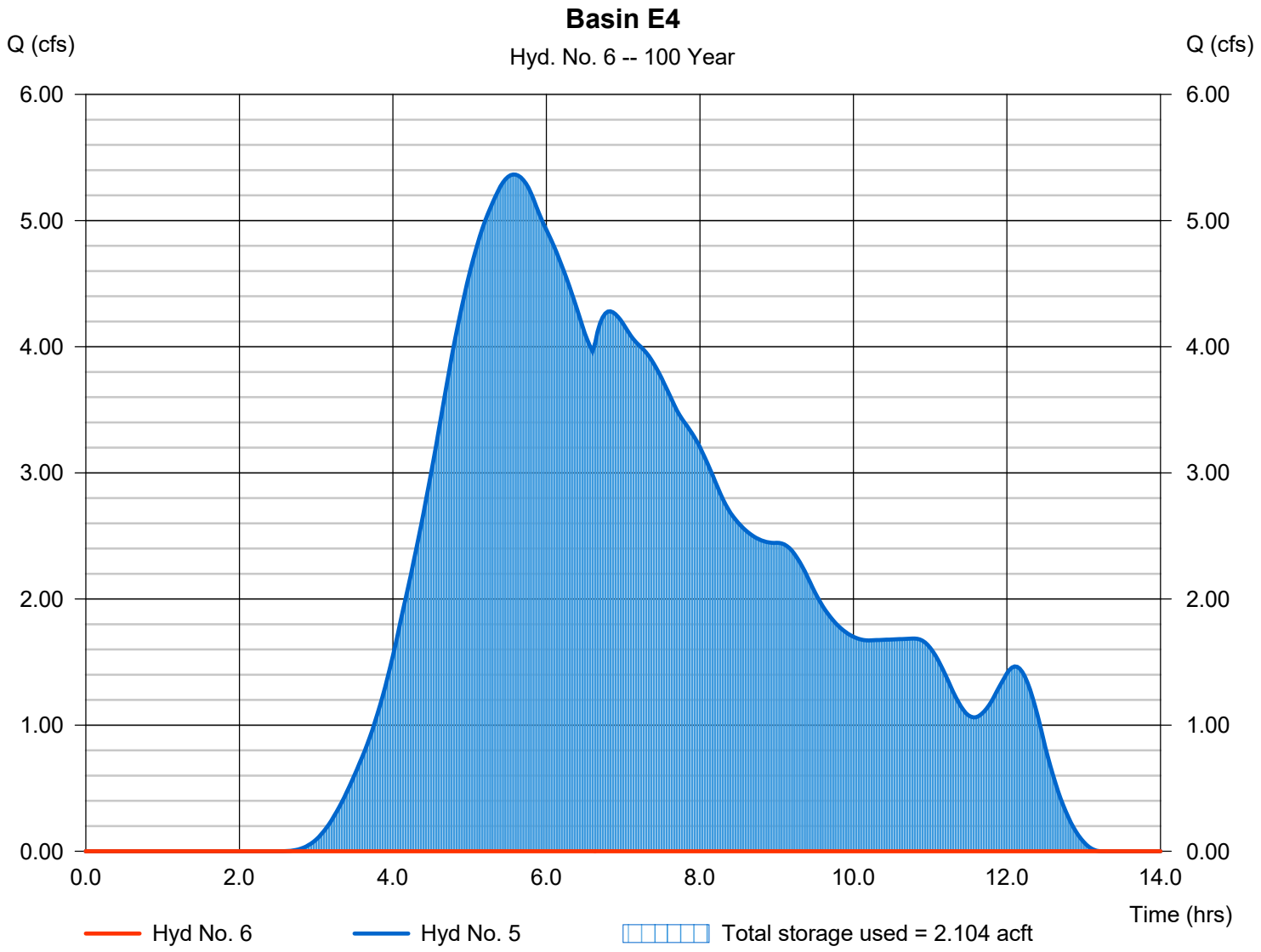
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	884.15 ft
Reservoir name	=	Basin E4	Max. Storage	=	2.104 acft

Storage Indication method used.

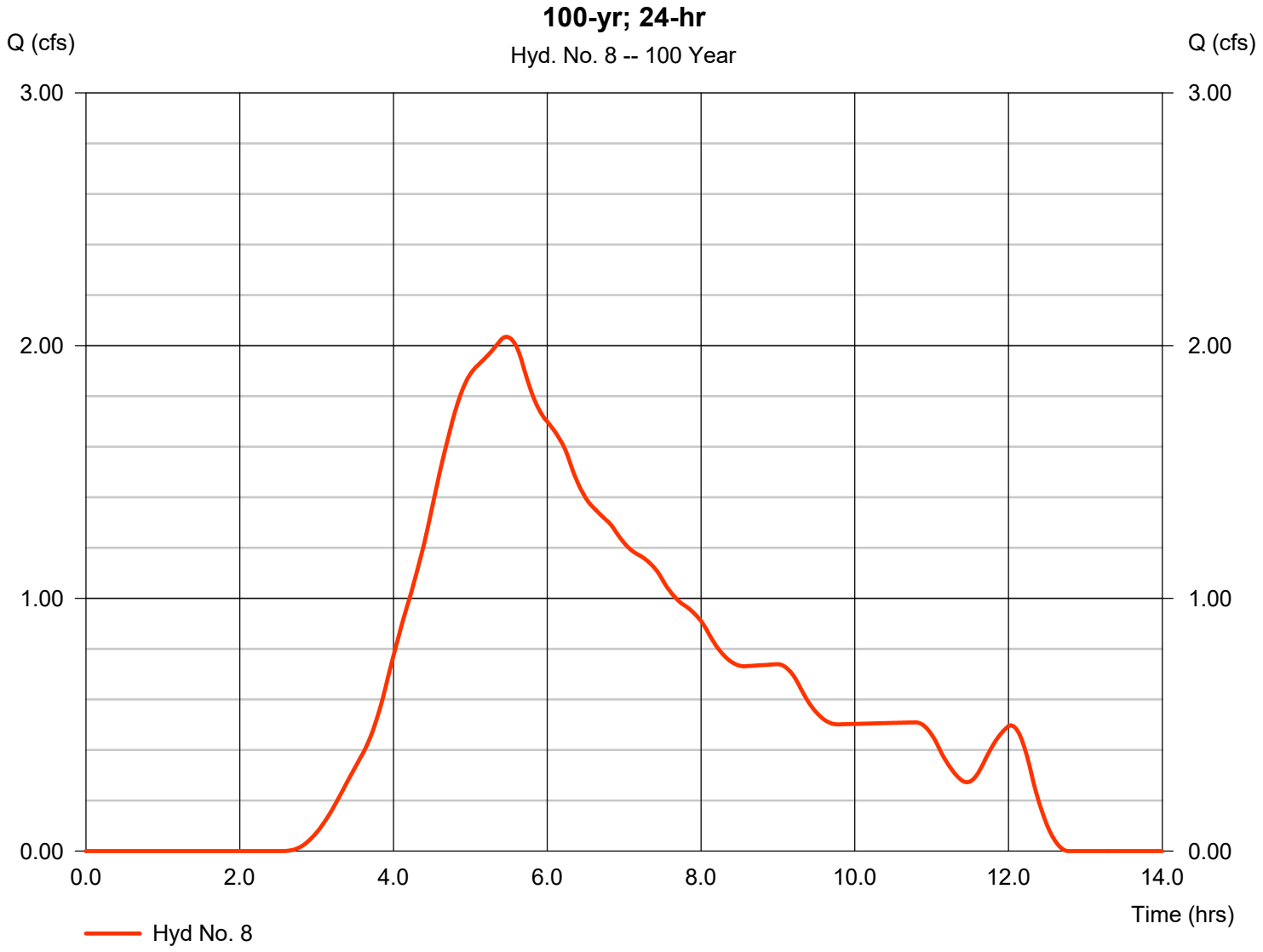


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.035 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.47 hrs
Time interval	=	2 min	Hyd. volume	=	0.706 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	7.46 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

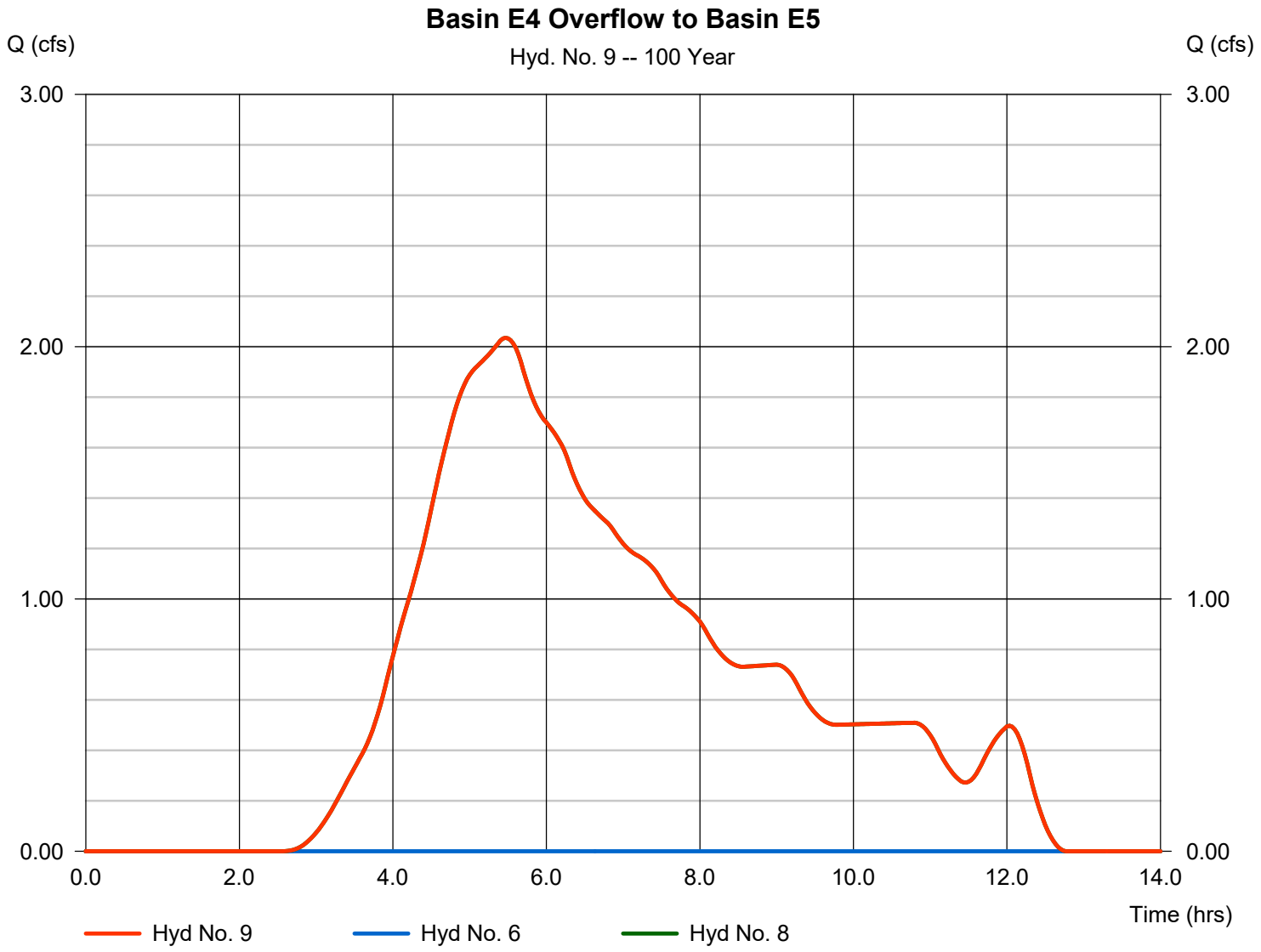


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	2.035 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.47 hrs
Time interval	=	2 min	Hyd. volume	=	0.706 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



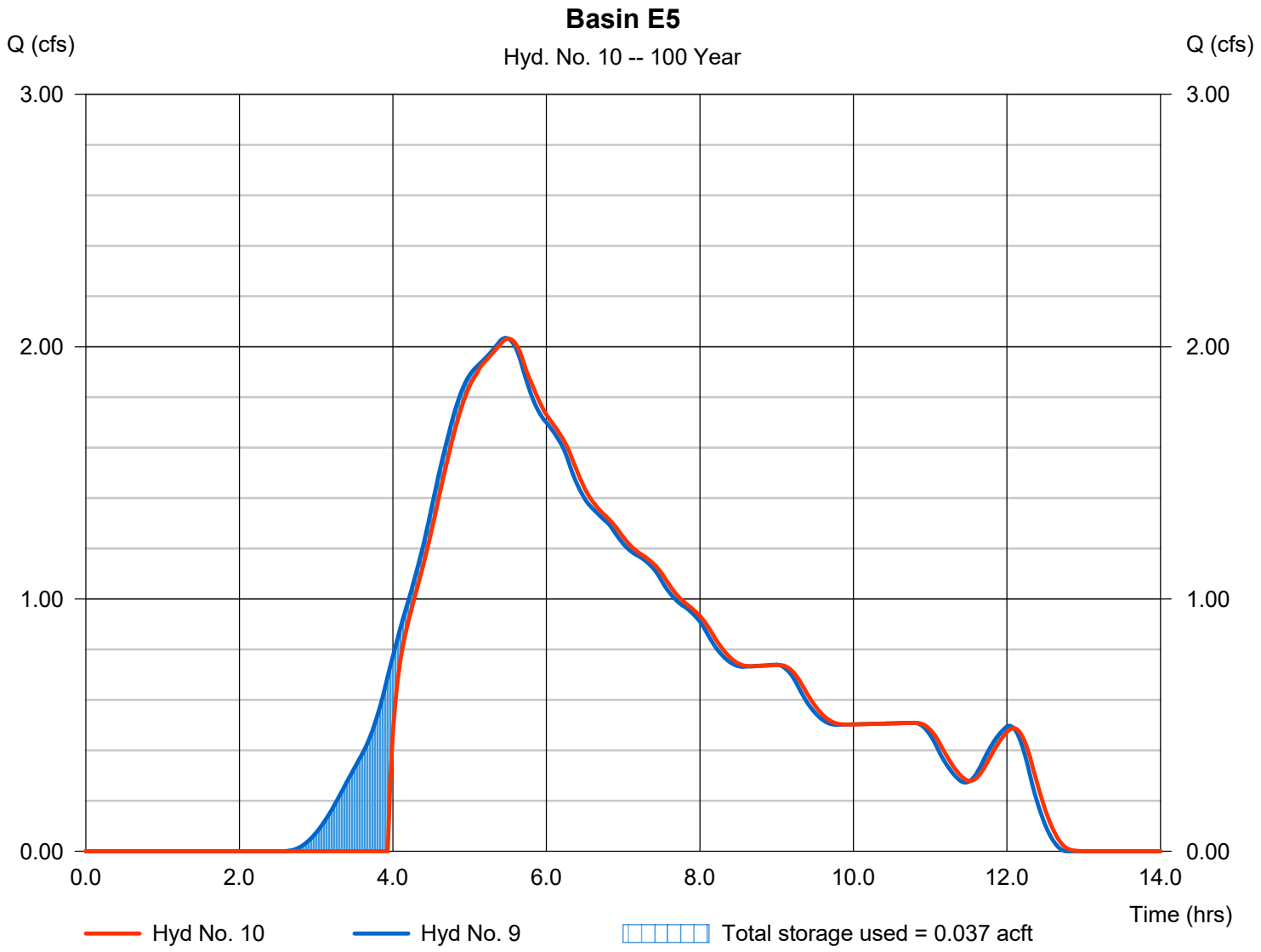
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.032 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.50 hrs
Time interval	=	2 min	Hyd. volume	=	0.680 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.20 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.037 acft

Storage Indication method used.

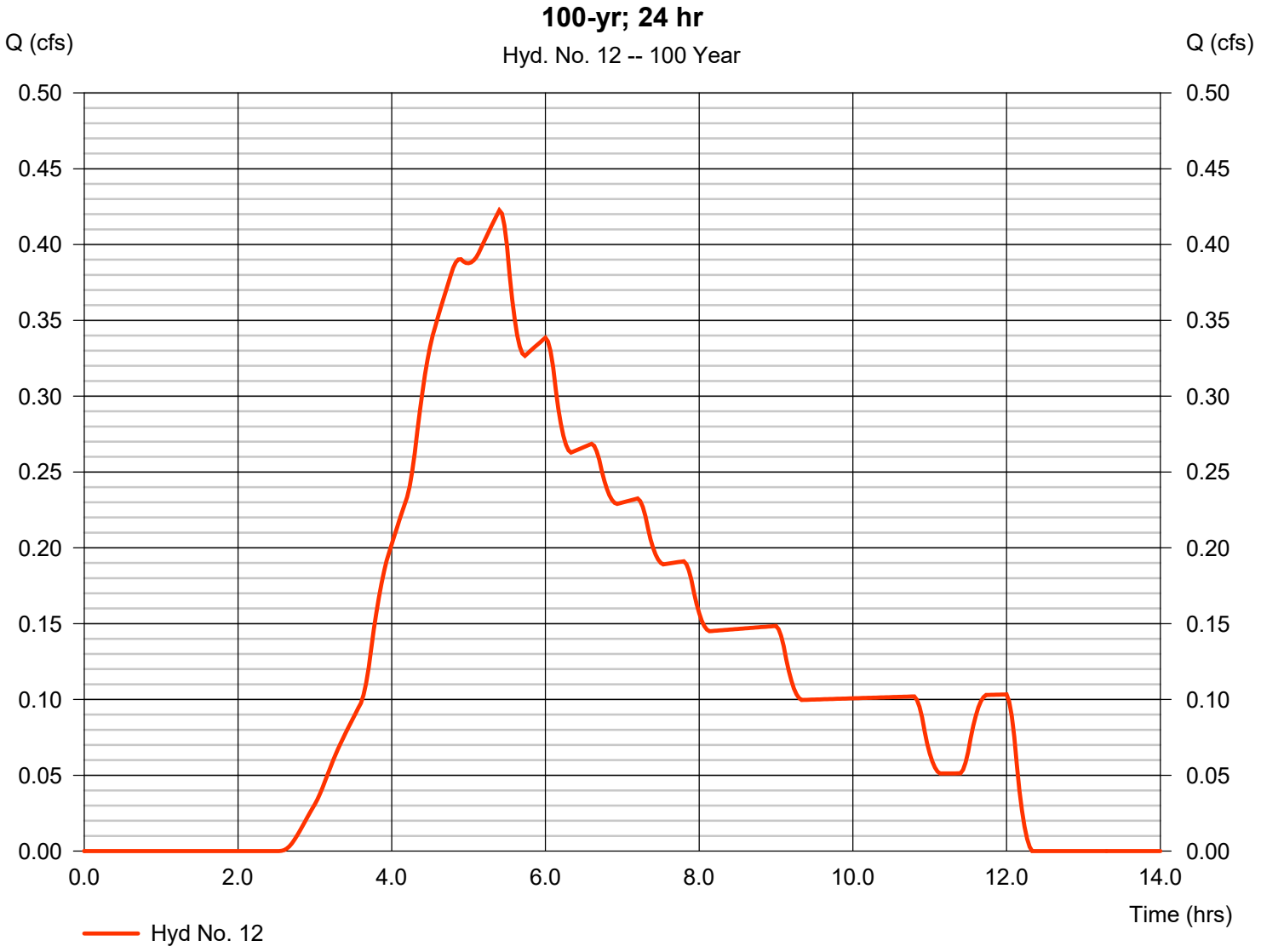


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.423 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.40 hrs
Time interval	=	2 min	Hyd. volume	=	0.141 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.46 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484



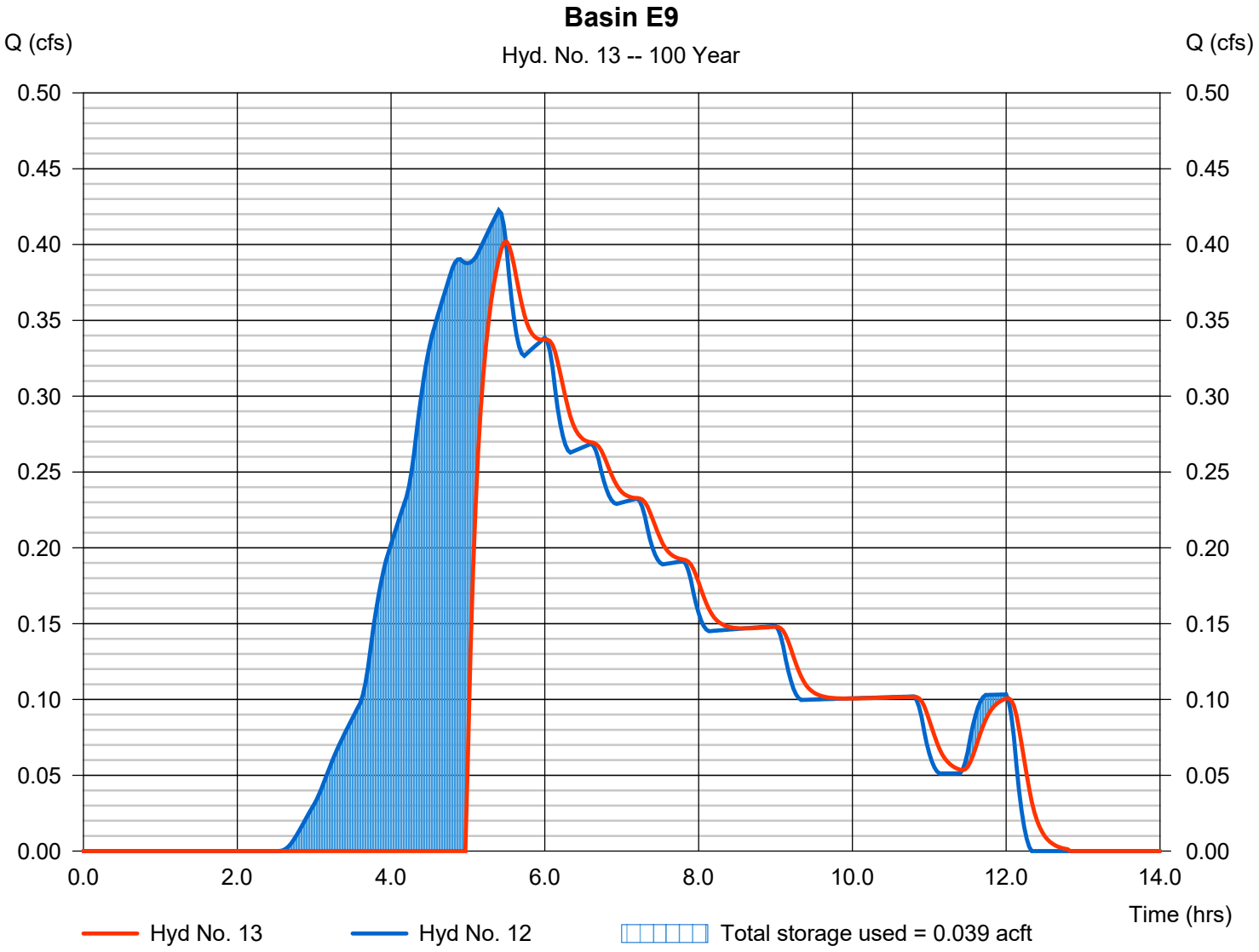
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.402 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.50 hrs
Time interval	=	2 min	Hyd. volume	=	0.107 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.35 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.039 acft

Storage Indication method used.

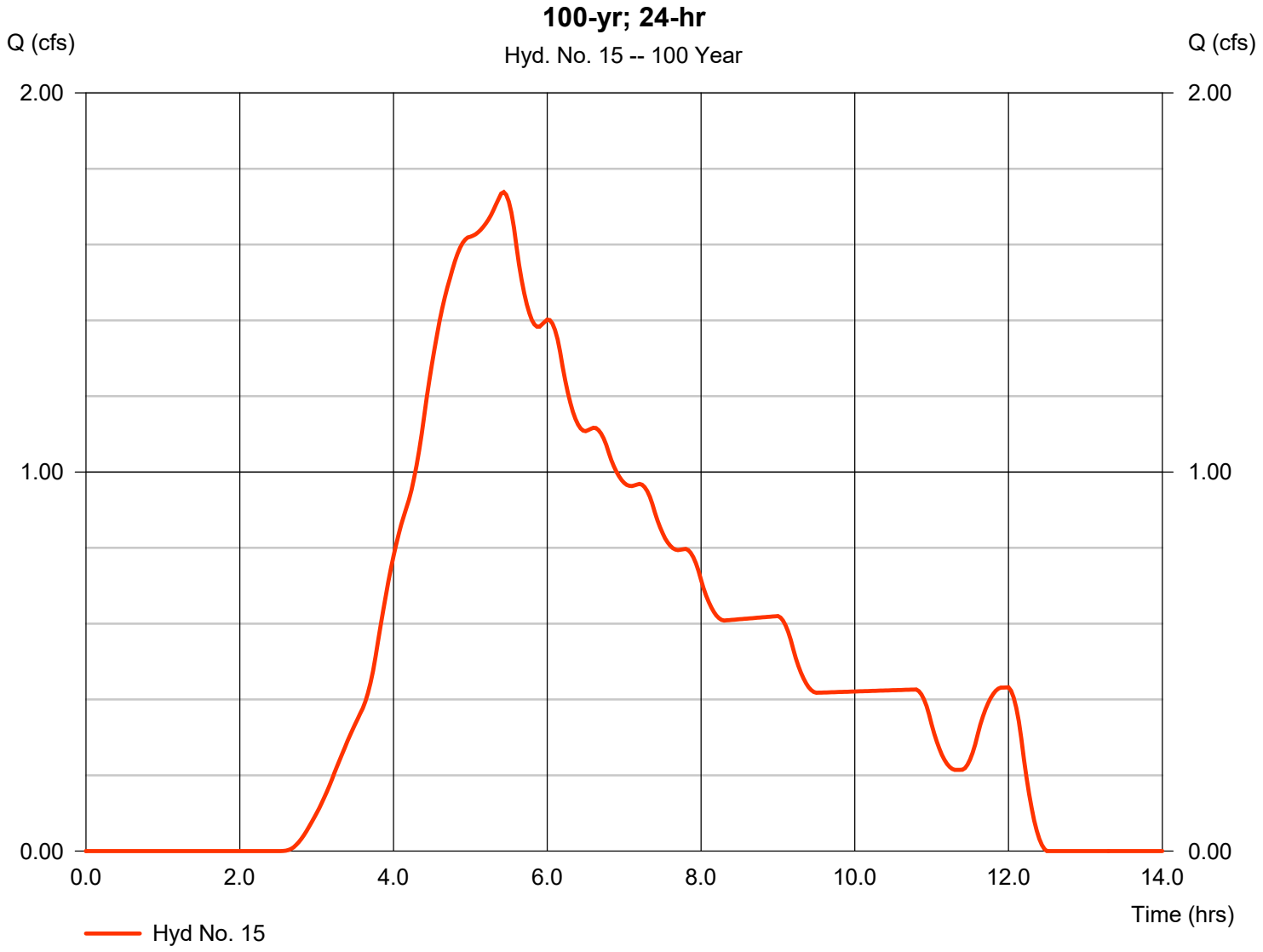


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.738 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.43 hrs
Time interval	=	2 min	Hyd. volume	=	0.590 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	7.46 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

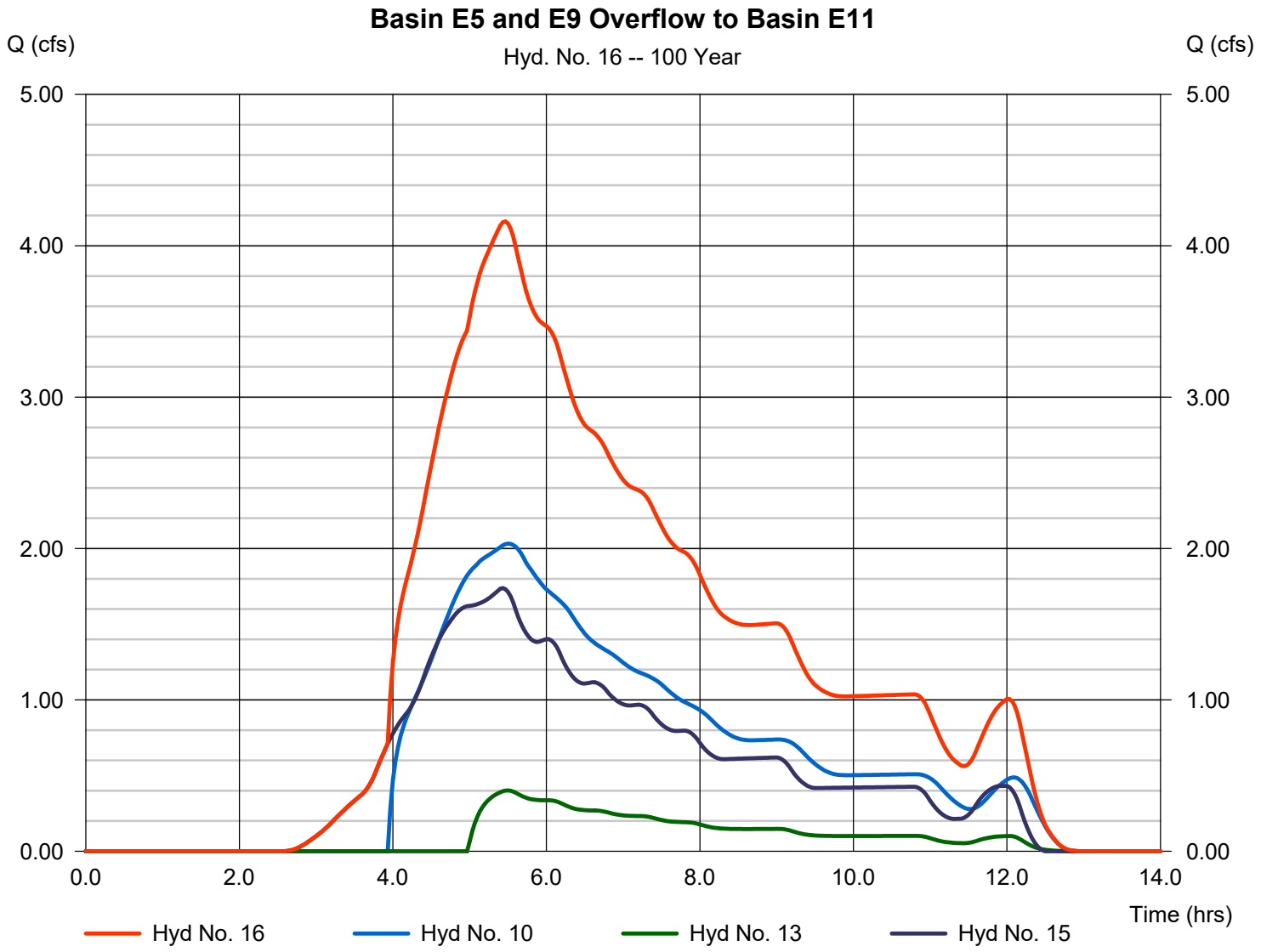


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	4.161 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.47 hrs
Time interval	=	2 min	Hyd. volume	=	1.377 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



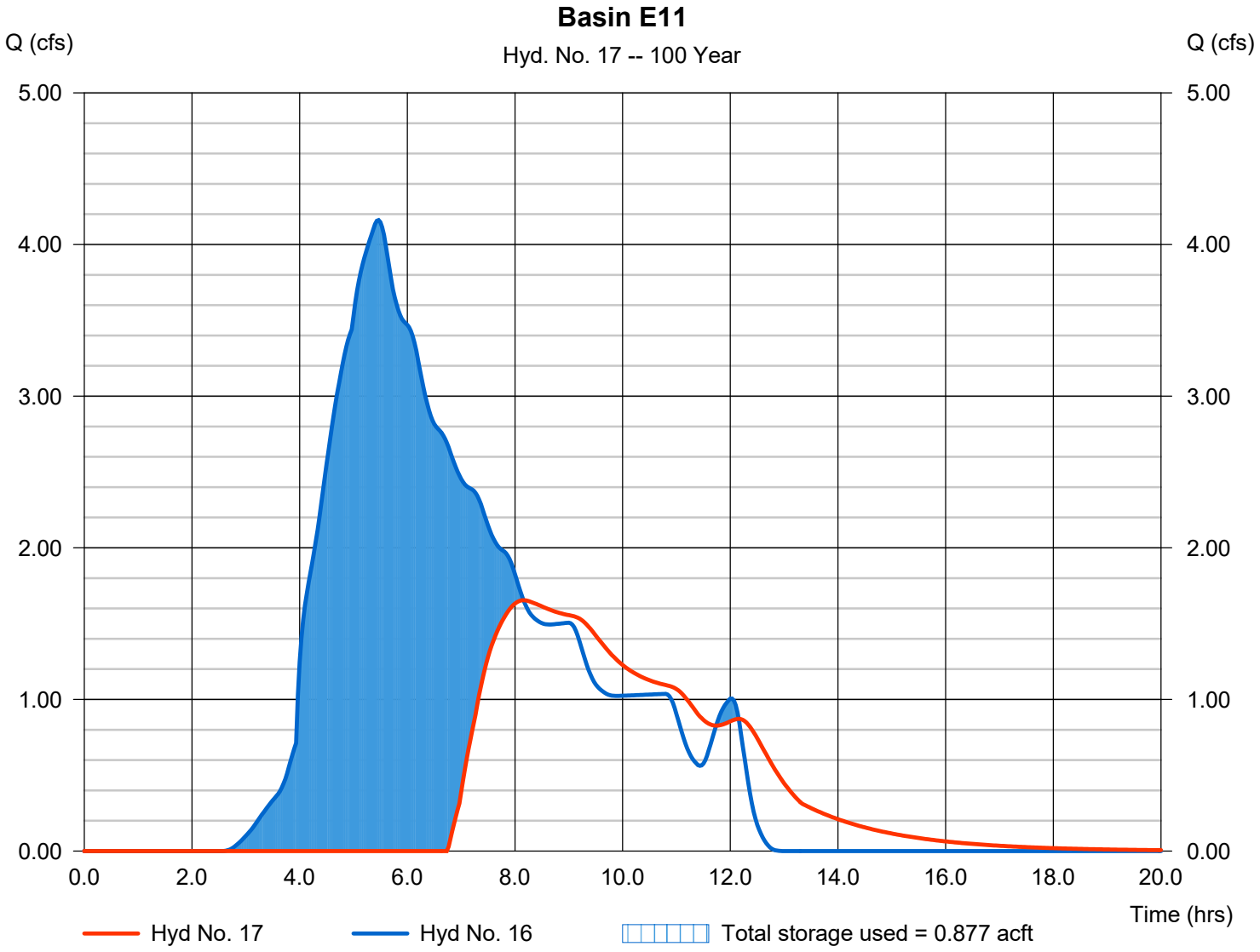
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	1.655 cfs
Storm frequency	=	100 yrs	Time to peak	=	8.17 hrs
Time interval	=	2 min	Hyd. volume	=	0.632 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow	Max. Elevation	=	878.20 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.877 acft

Storage Indication method used.

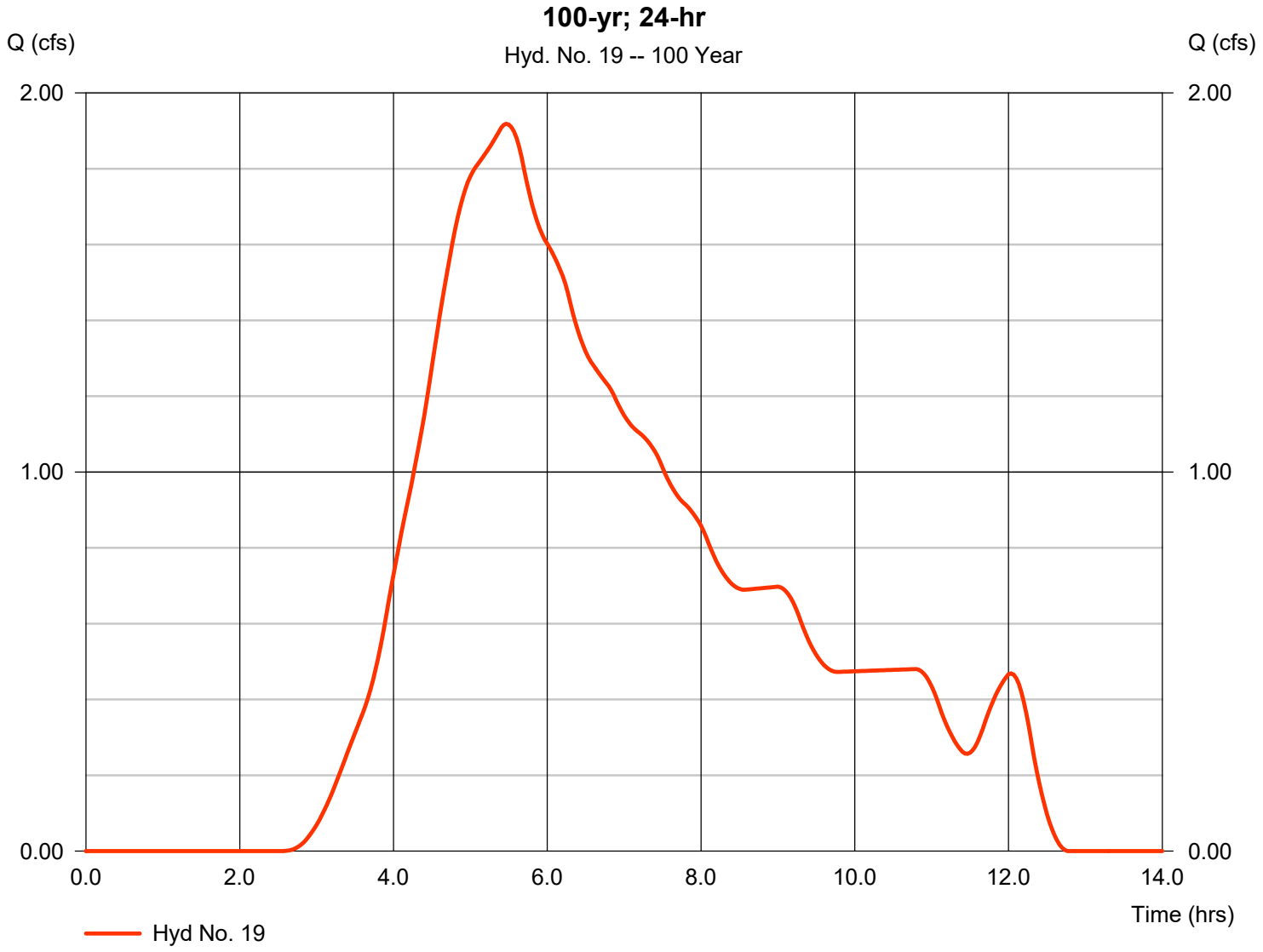


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.918 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.47 hrs
Time interval	=	2 min	Hyd. volume	=	0.666 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	7.46 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

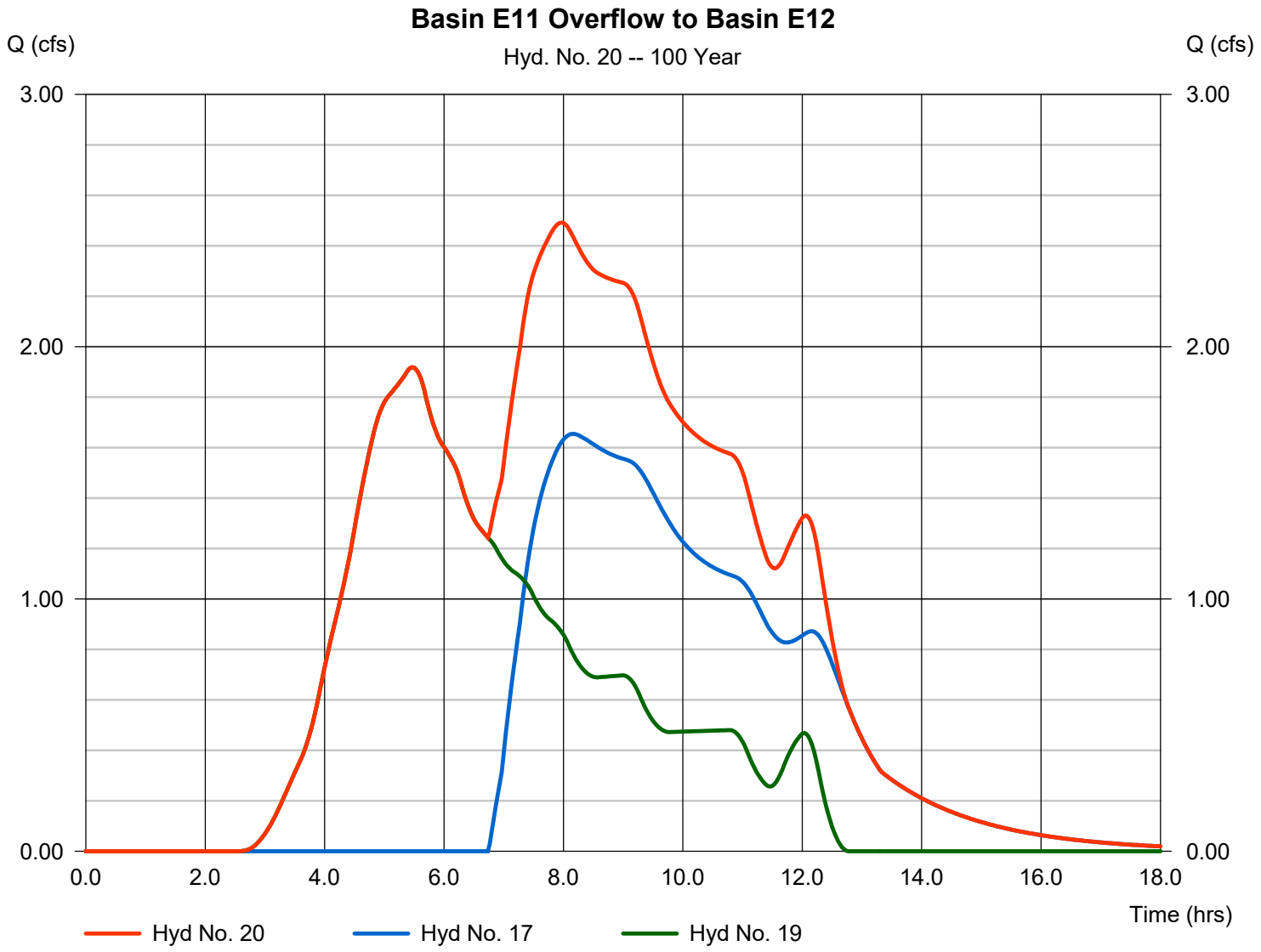


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	2.492 cfs
Storm frequency	=	100 yrs	Time to peak	=	7.97 hrs
Time interval	=	2 min	Hyd. volume	=	1.298 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



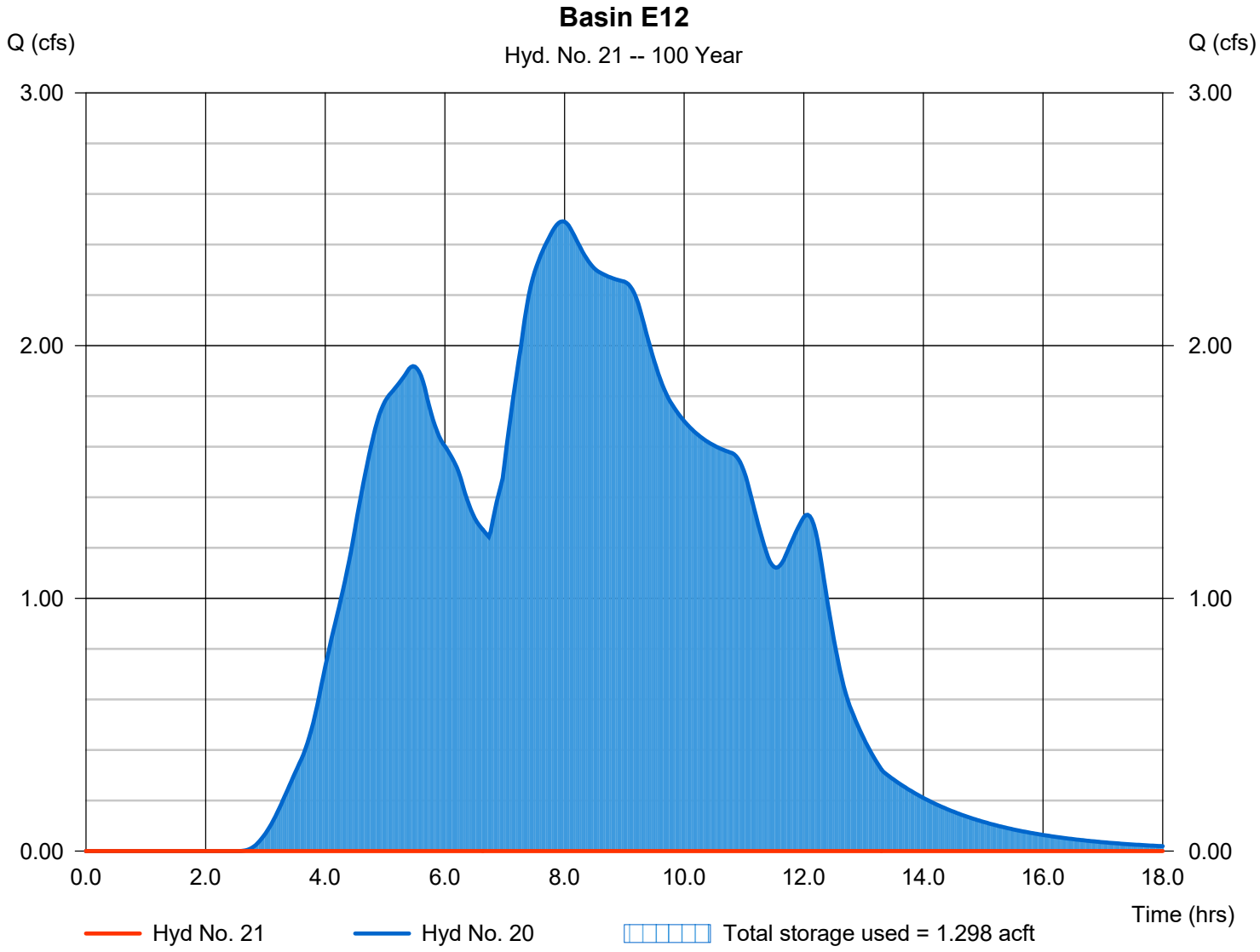
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	869.74 ft
Reservoir name	=	Basin E12	Max. Storage	=	1.298 acft

Storage Indication method used.



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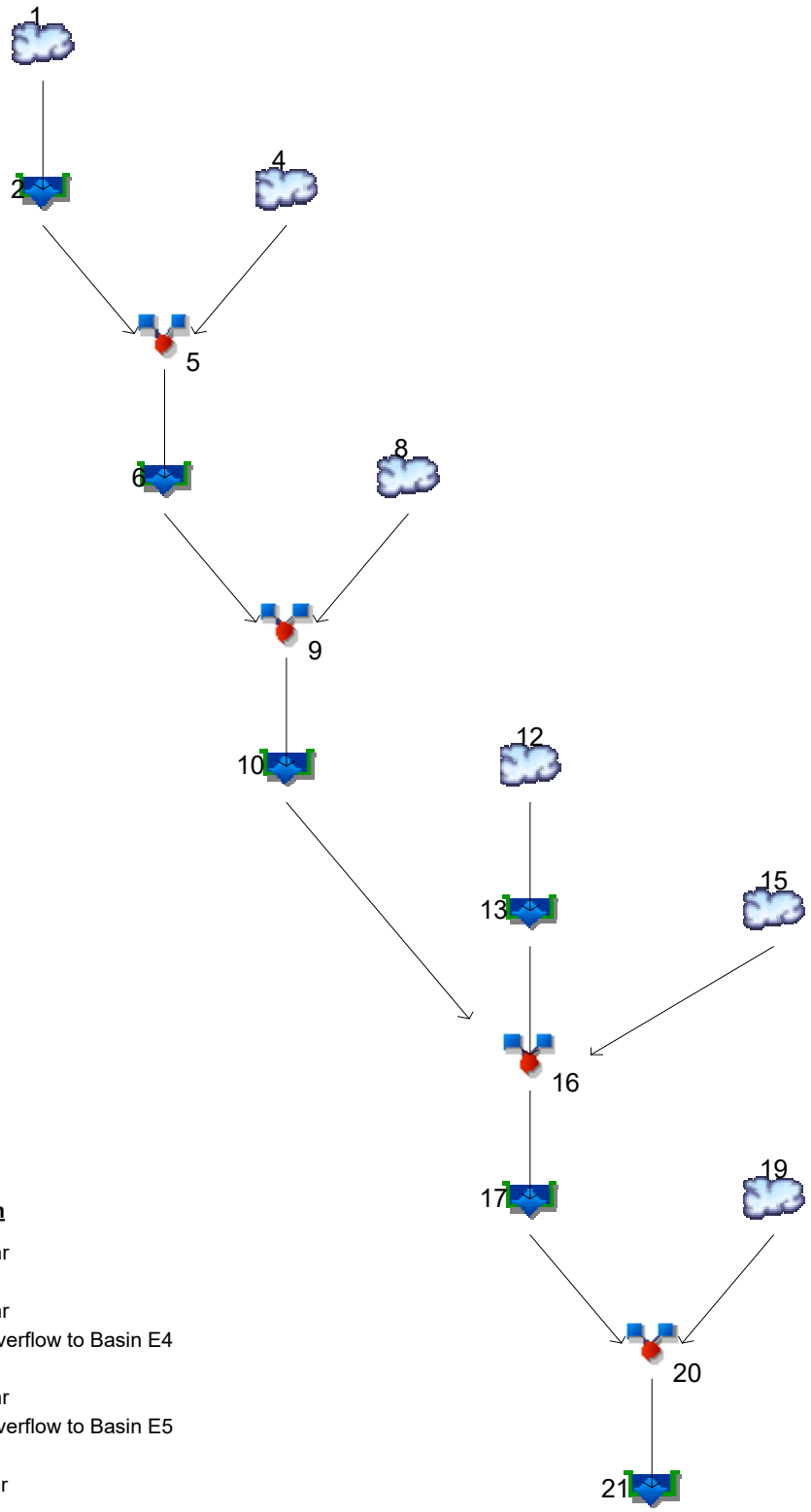
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100 Year-18 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

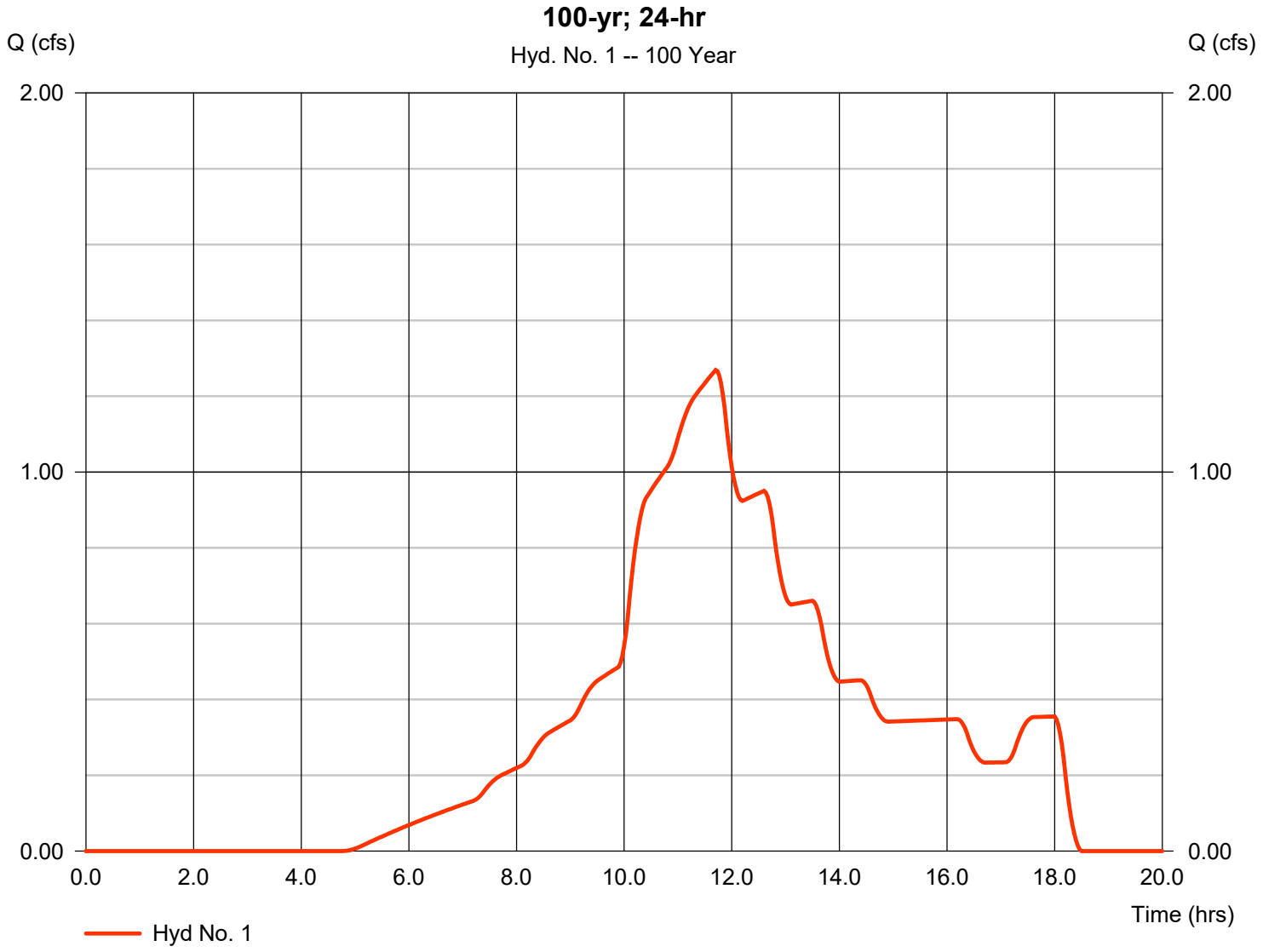
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	1.269	2	702	0.500	------	------	------	100-yr; 24-hr
2	Reservoir	0.945	2	758	0.259	1	891.88	0.254	Basin E6
4	SCS Runoff	5.333	2	710	2.194	------	------	------	100-yr; 24-hr
5	Combine	5.967	2	722	2.453	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	1.473	2	1098	0.176	5	884.35	2.34	Basin E4
8	SCS Runoff	2.027	2	704	0.812	------	------	------	100-yr; 24-hr
9	Combine	2.027	2	704	0.987	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.024	2	706	0.961	9	882.20	0.037	Basin E5
12	SCS Runoff	0.415	2	702	0.162	------	------	------	100-yr; 24 hr
13	Reservoir	0.408	2	704	0.128	12	897.36	0.039	Basin E9
15	SCS Runoff	1.719	2	702	0.678	------	------	------	100-yr; 24-hr
16	Combine	4.144	2	704	1.767	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	2.246	2	792	1.022	16	878.27	0.906	Basin E11
19	SCS Runoff	1.911	2	704	0.765	------	------	------	100-yr; 24-hr
20	Combine	3.433	2	772	1.787	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	870.32	1.79	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.269 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.500 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	8.06 in	Distribution	=	Huff-3rd
Storm duration	=	18.00 hrs	Shape factor	=	484



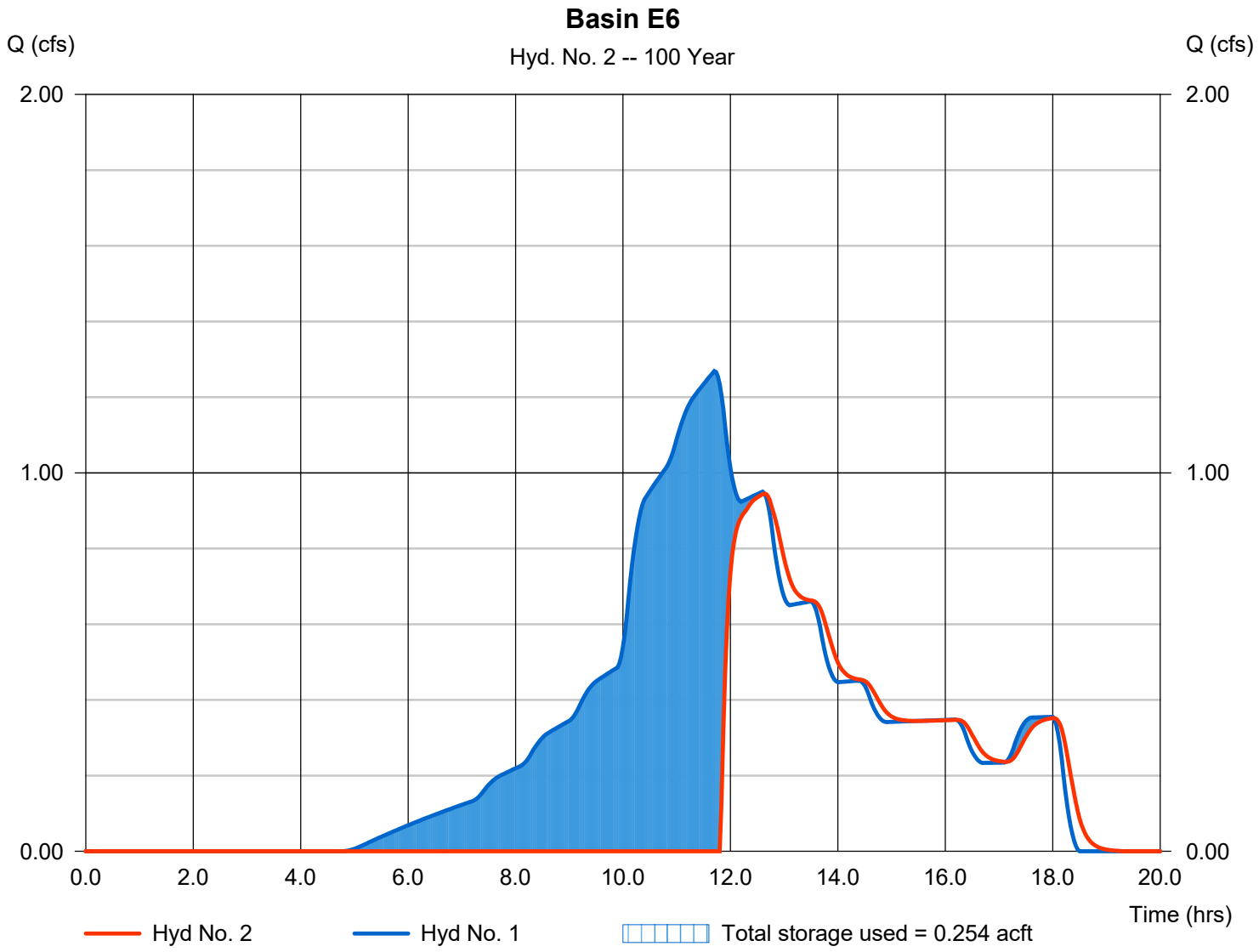
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.945 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.63 hrs
Time interval	=	2 min	Hyd. volume	=	0.259 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.88 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.254 acft

Storage Indication method used.

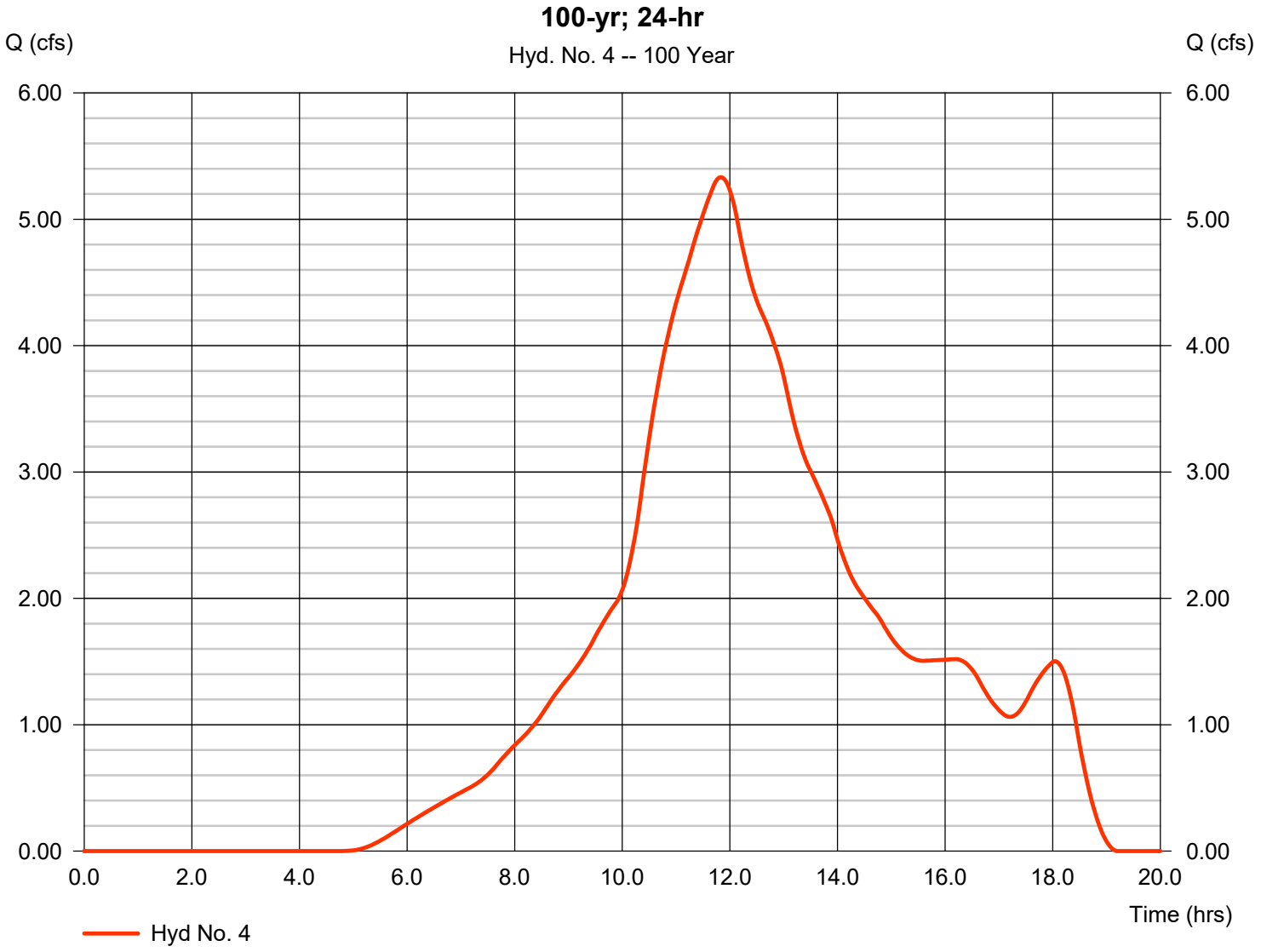


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.333 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.83 hrs
Time interval	=	2 min	Hyd. volume	=	2.194 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	8.06 in	Distribution	=	Huff-3rd
Storm duration	=	18.00 hrs	Shape factor	=	484

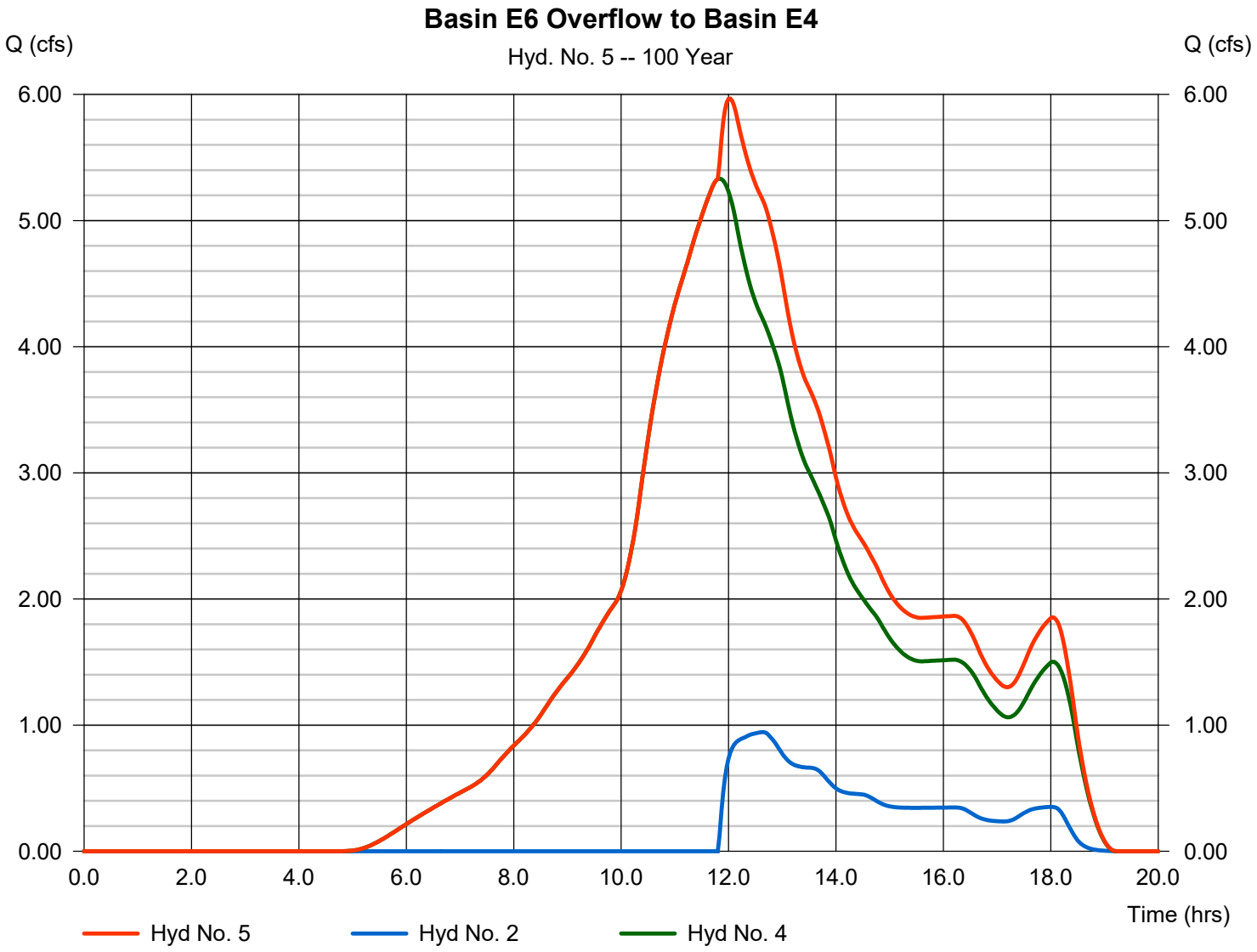


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 5.967 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 2.453 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



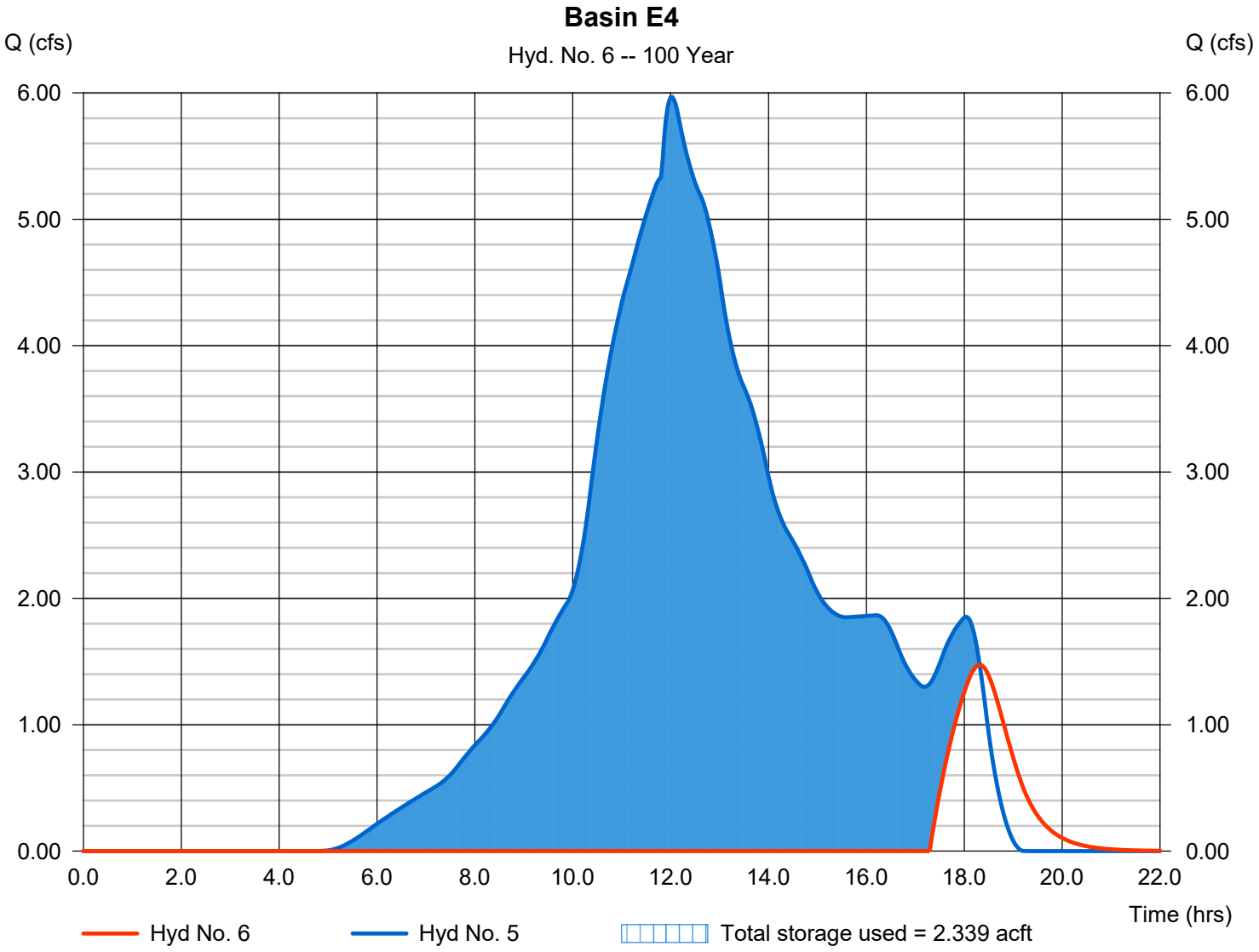
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	1.473 cfs
Storm frequency	=	100 yrs	Time to peak	=	18.30 hrs
Time interval	=	2 min	Hyd. volume	=	0.176 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	884.35 ft
Reservoir name	=	Basin E4	Max. Storage	=	2.339 acft

Storage Indication method used.

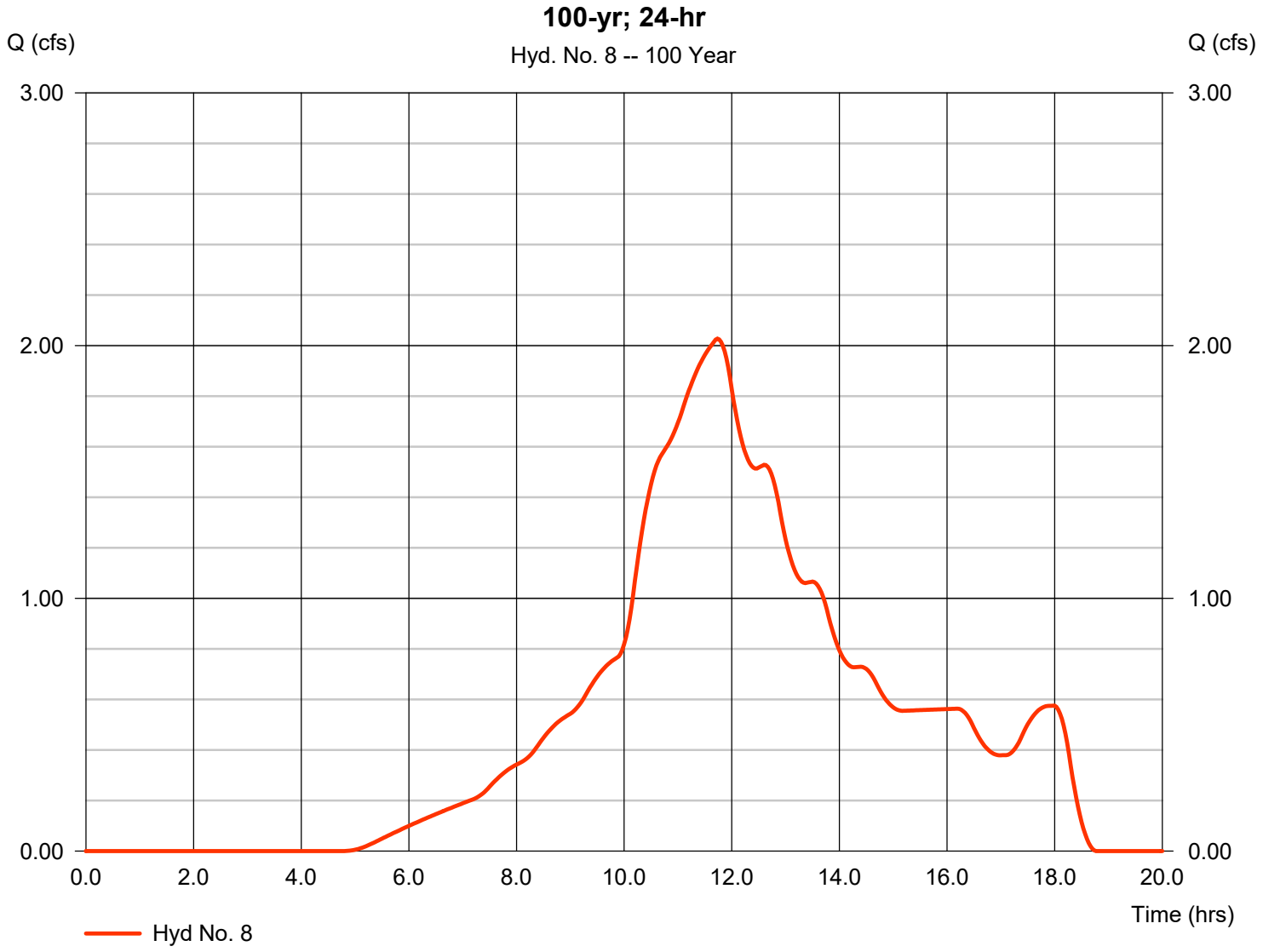


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.027 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.73 hrs
Time interval	=	2 min	Hyd. volume	=	0.812 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	8.06 in	Distribution	=	Huff-3rd
Storm duration	=	18.00 hrs	Shape factor	=	484

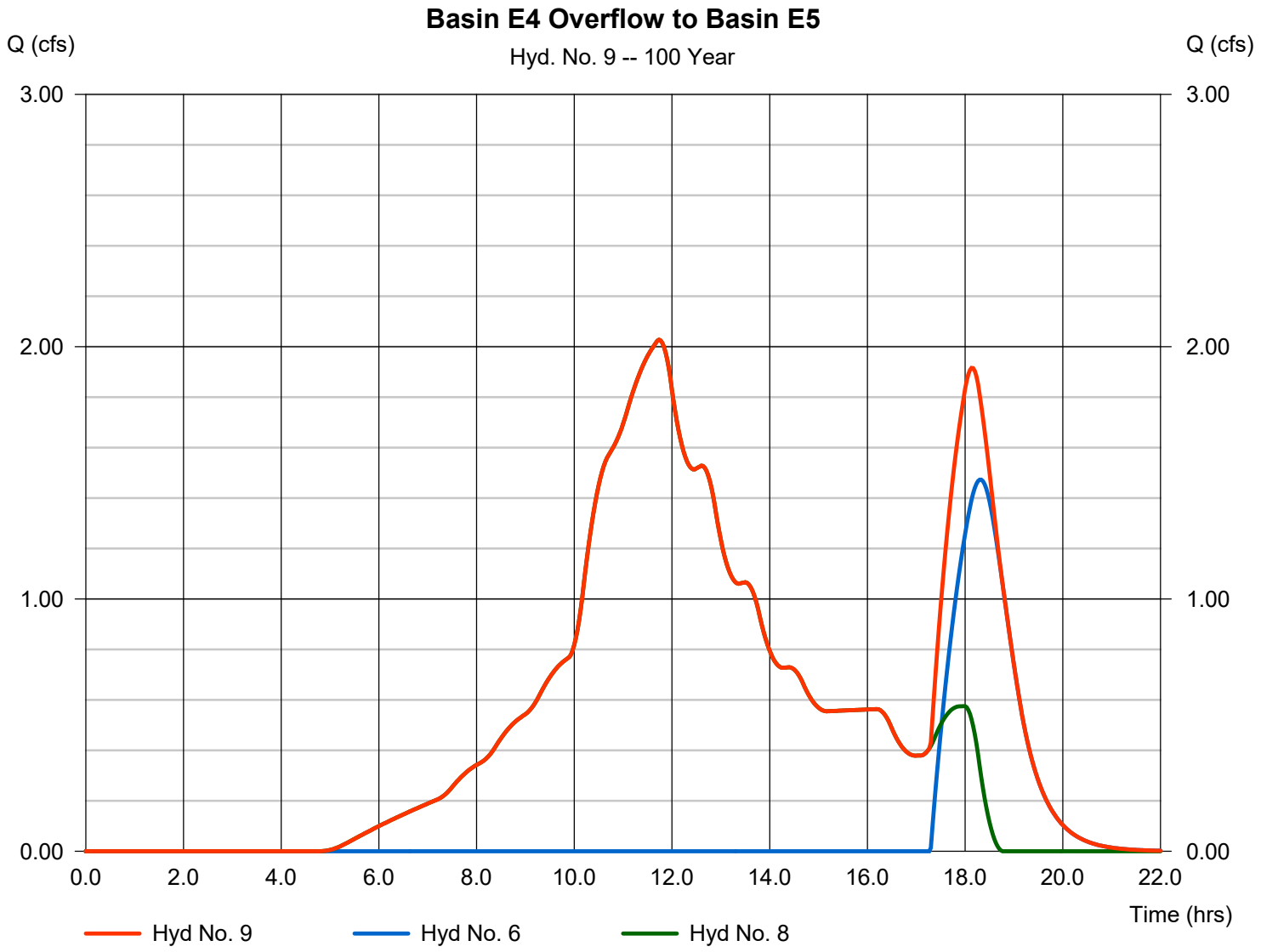


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	2.027 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.73 hrs
Time interval	=	2 min	Hyd. volume	=	0.987 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



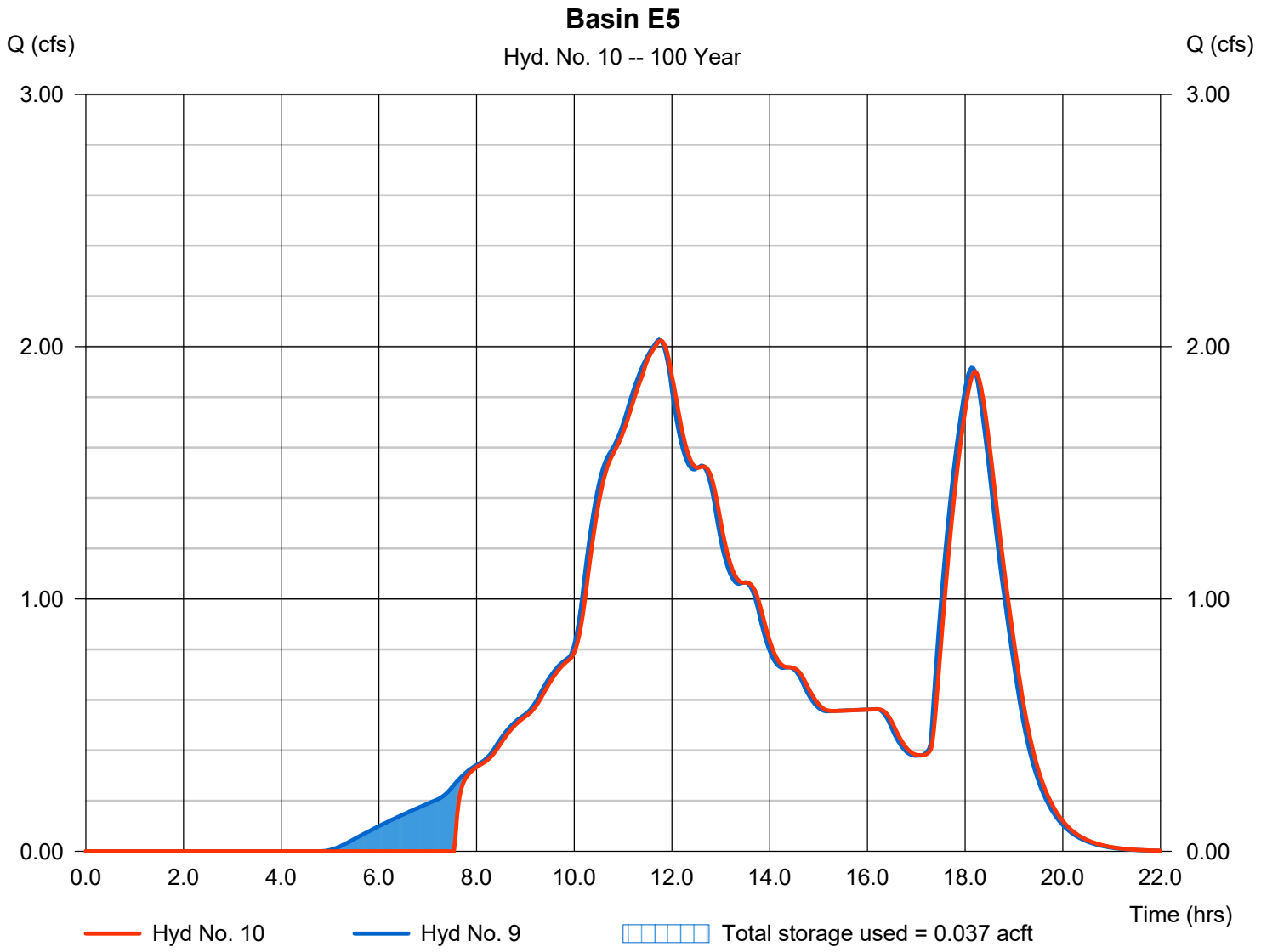
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.024 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.77 hrs
Time interval	=	2 min	Hyd. volume	=	0.961 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.20 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.037 acft

Storage Indication method used.

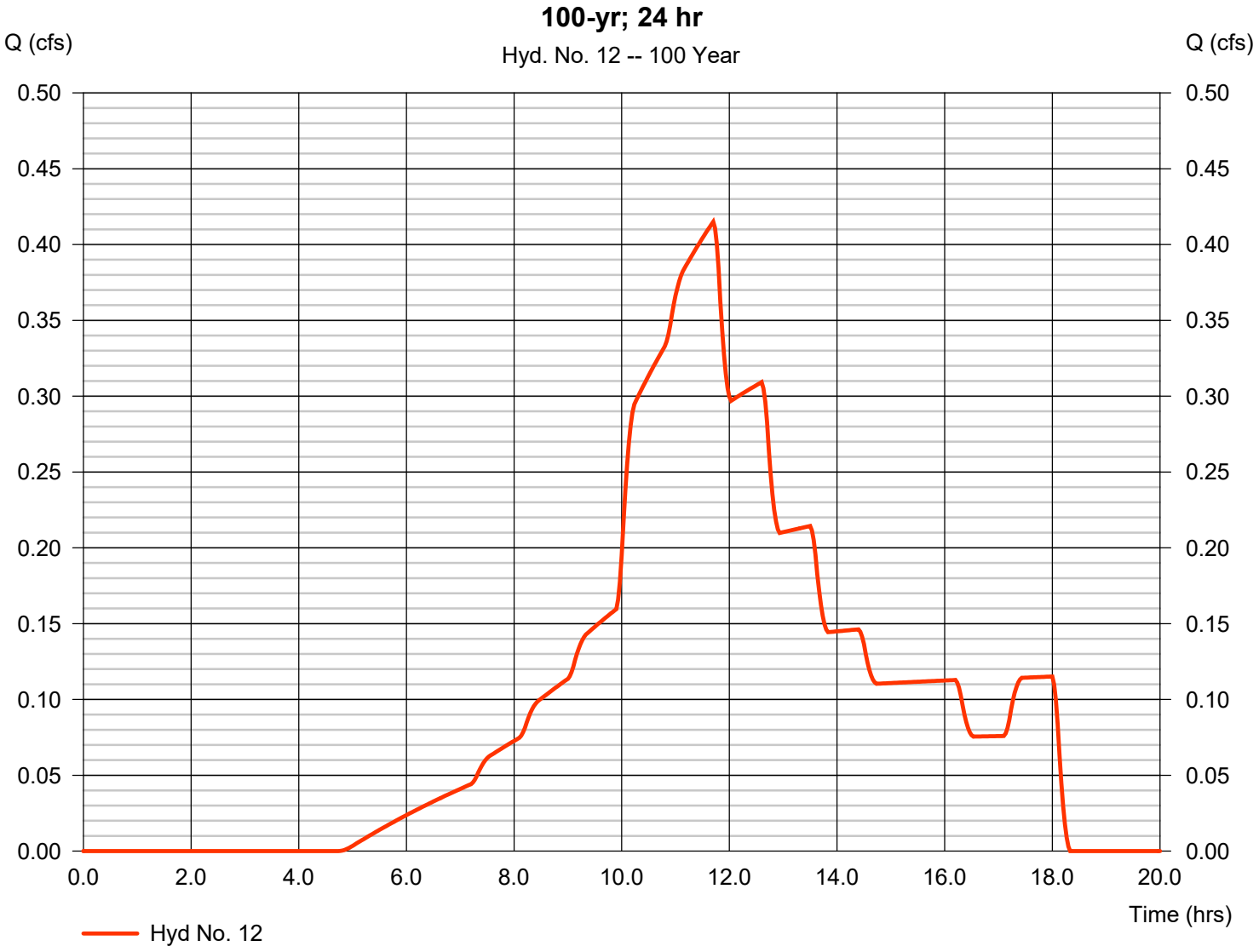


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.415 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.162 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.06 in	Distribution	=	Huff-3rd
Storm duration	=	18.00 hrs	Shape factor	=	484



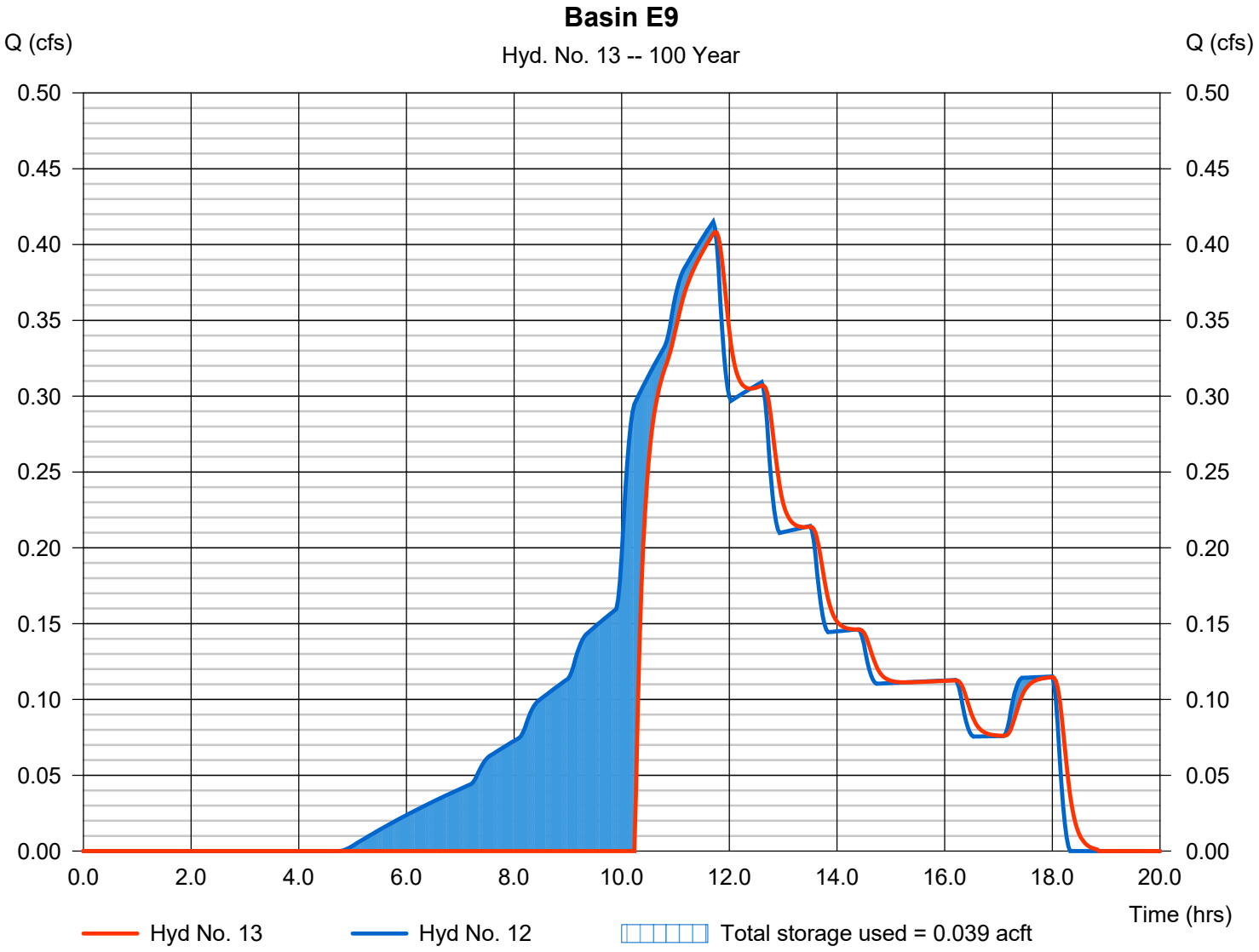
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.408 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.73 hrs
Time interval	=	2 min	Hyd. volume	=	0.128 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.36 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.039 acft

Storage Indication method used.

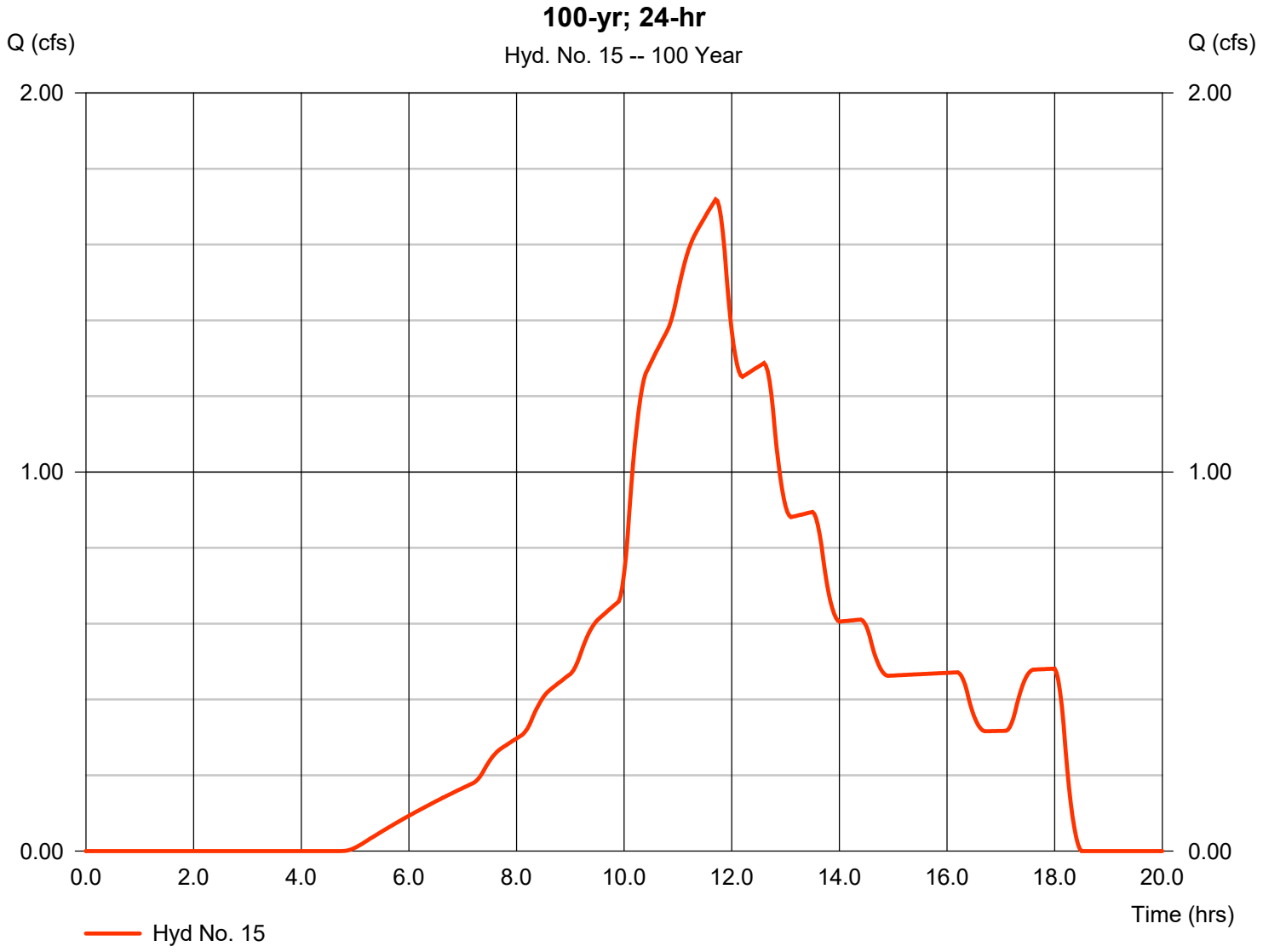


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.719 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.70 hrs
Time interval	=	2 min	Hyd. volume	=	0.678 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	8.06 in	Distribution	=	Huff-3rd
Storm duration	=	18.00 hrs	Shape factor	=	484

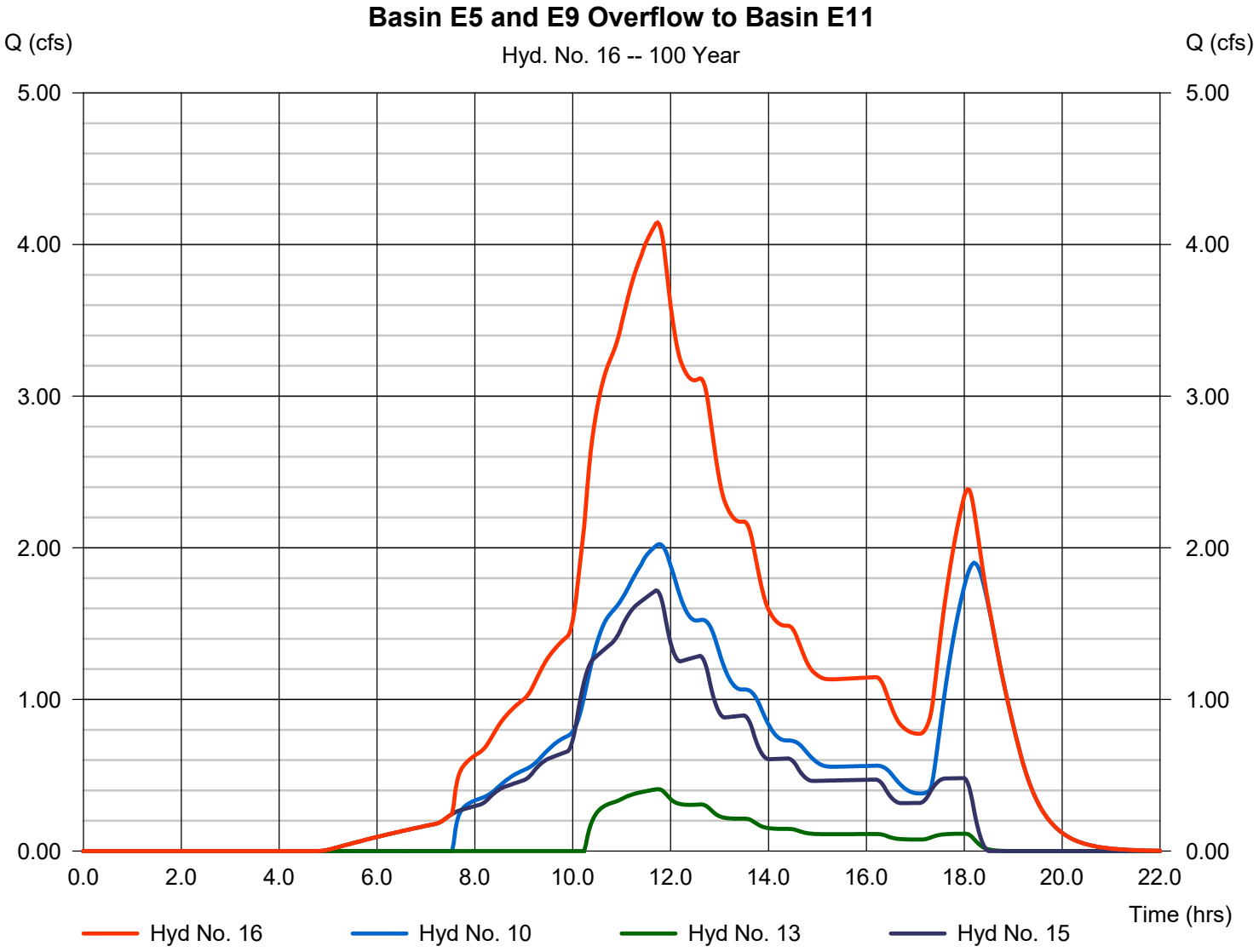


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	= Combine	Peak discharge	= 4.144 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.73 hrs
Time interval	= 2 min	Hyd. volume	= 1.767 acft
Inflow hyds.	= 10, 13, 15	Contrib. drain. area	= 2.330 ac



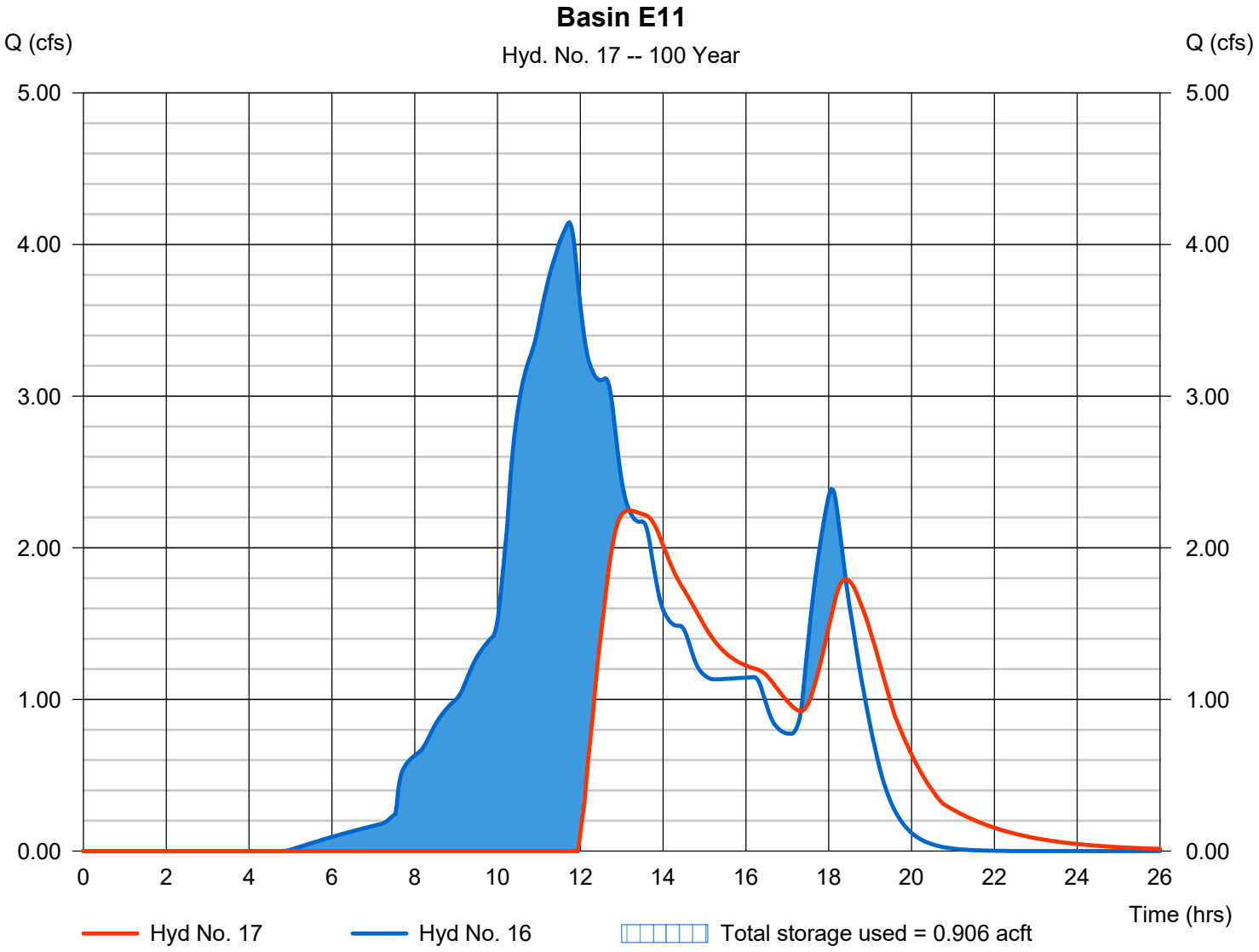
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	2.246 cfs
Storm frequency	=	100 yrs	Time to peak	=	13.20 hrs
Time interval	=	2 min	Hyd. volume	=	1.022 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow to Basin E11	Max. Elevation	=	878.27 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.906 acft

Storage Indication method used.

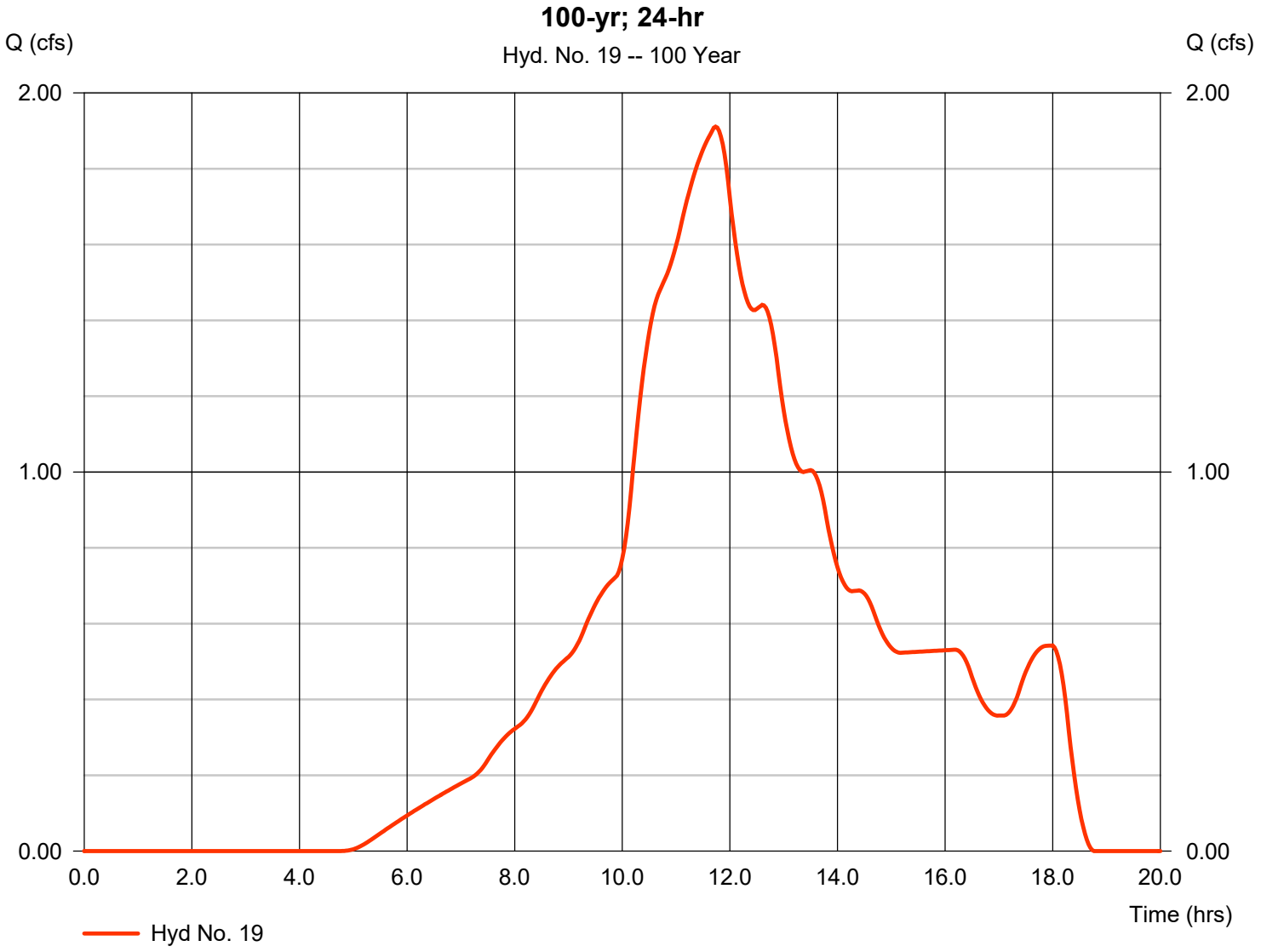


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.911 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.73 hrs
Time interval	=	2 min	Hyd. volume	=	0.765 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	8.06 in	Distribution	=	Huff-3rd
Storm duration	=	18.00 hrs	Shape factor	=	484

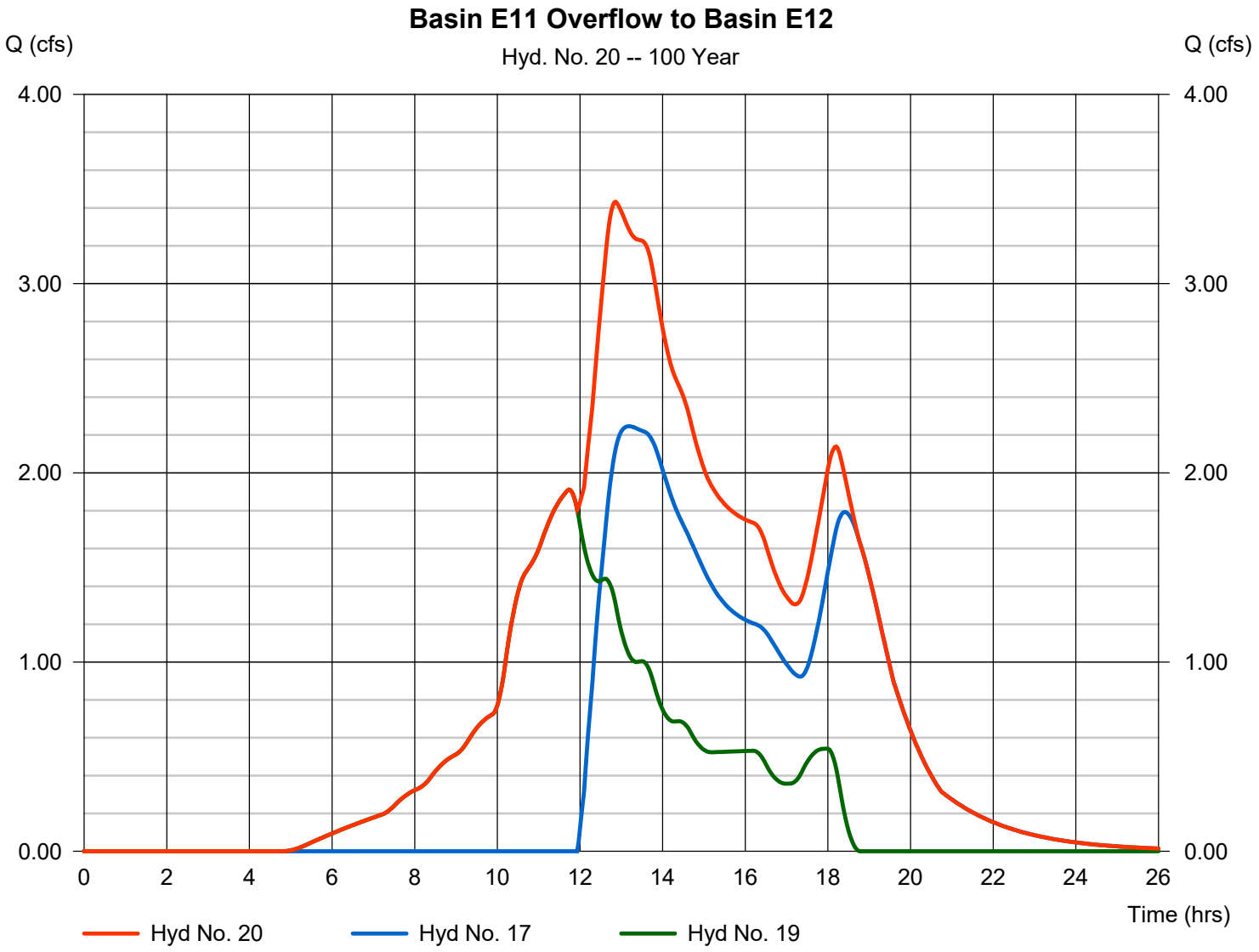


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	= Combine	Peak discharge	= 3.433 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.87 hrs
Time interval	= 2 min	Hyd. volume	= 1.787 acft
Inflow hyds.	= 17, 19	Contrib. drain. area	= 2.630 ac



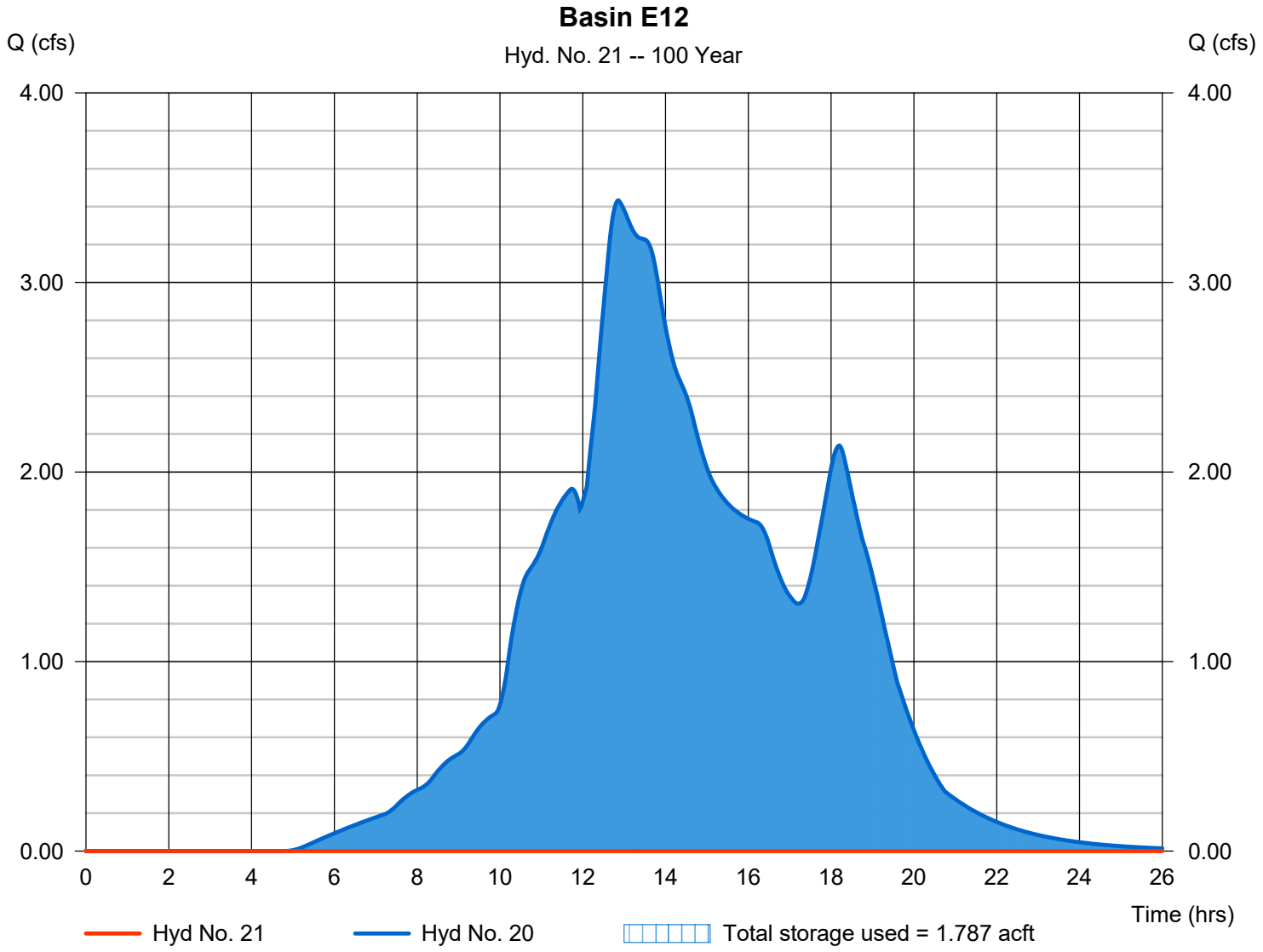
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	870.32 ft
Reservoir name	=	Basin E12	Max. Storage	=	1.787 acft

Storage Indication method used.



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Hydrograph No. 12, SCS Runoff, 100-yr; 24 hr..... 11

Hydrograph No. 13, Reservoir, Basin E9..... 12

Hydrograph No. 15, SCS Runoff, 100-yr; 24-hr..... 13

Hydrograph No. 16, Combine, Basin E5 and E9 Overflow to Basin E11..... 14

Hydrograph No. 17, Reservoir, Basin E11..... 15

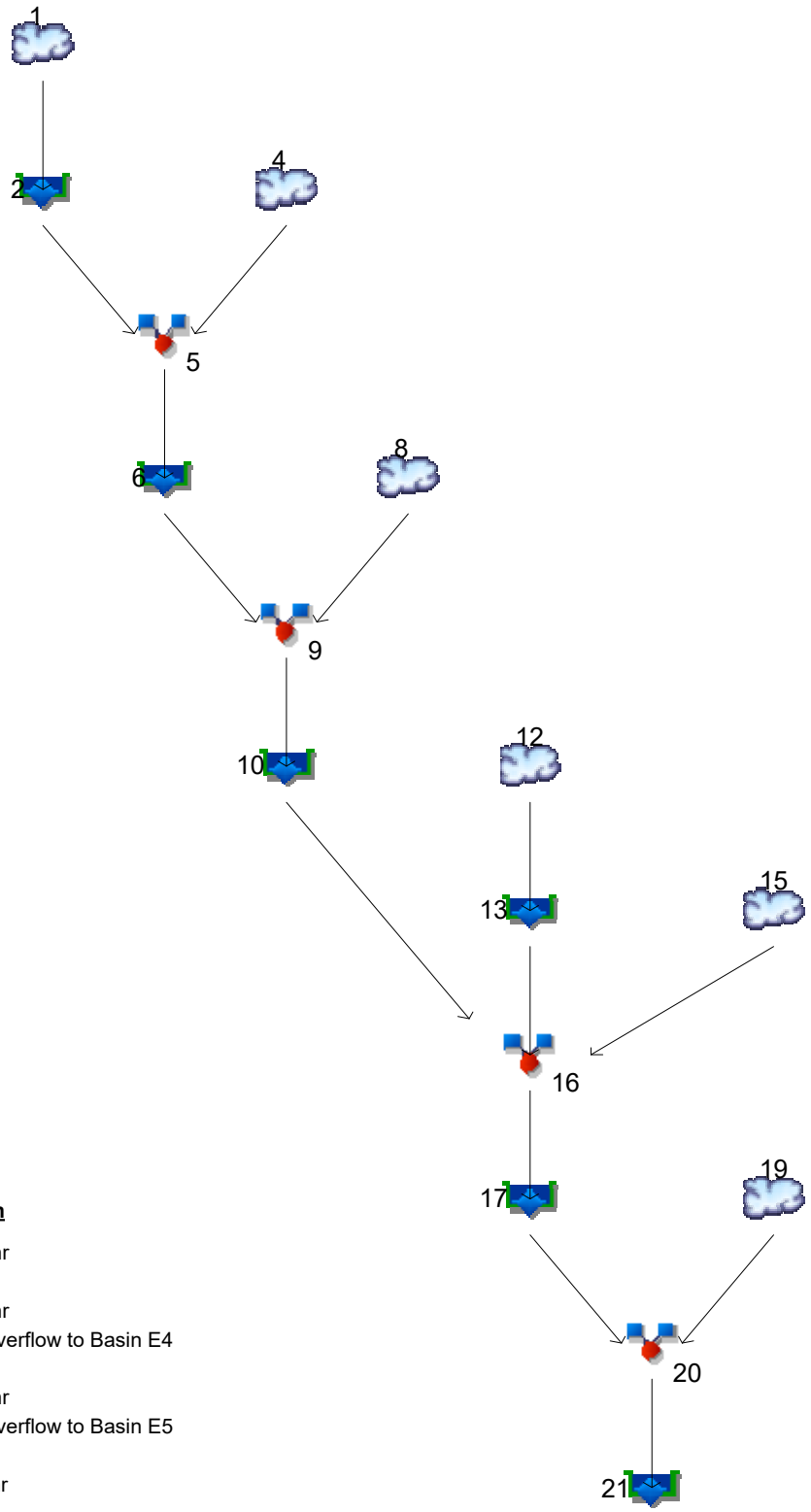
Hydrograph No. 19, SCS Runoff, 100-yr; 24-hr..... 16

Hydrograph No. 20, Combine, Basin E11 Overflow to Basin E12..... 17

Hydrograph No. 21, Reservoir, Basin E12..... 18

100 Year-24 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

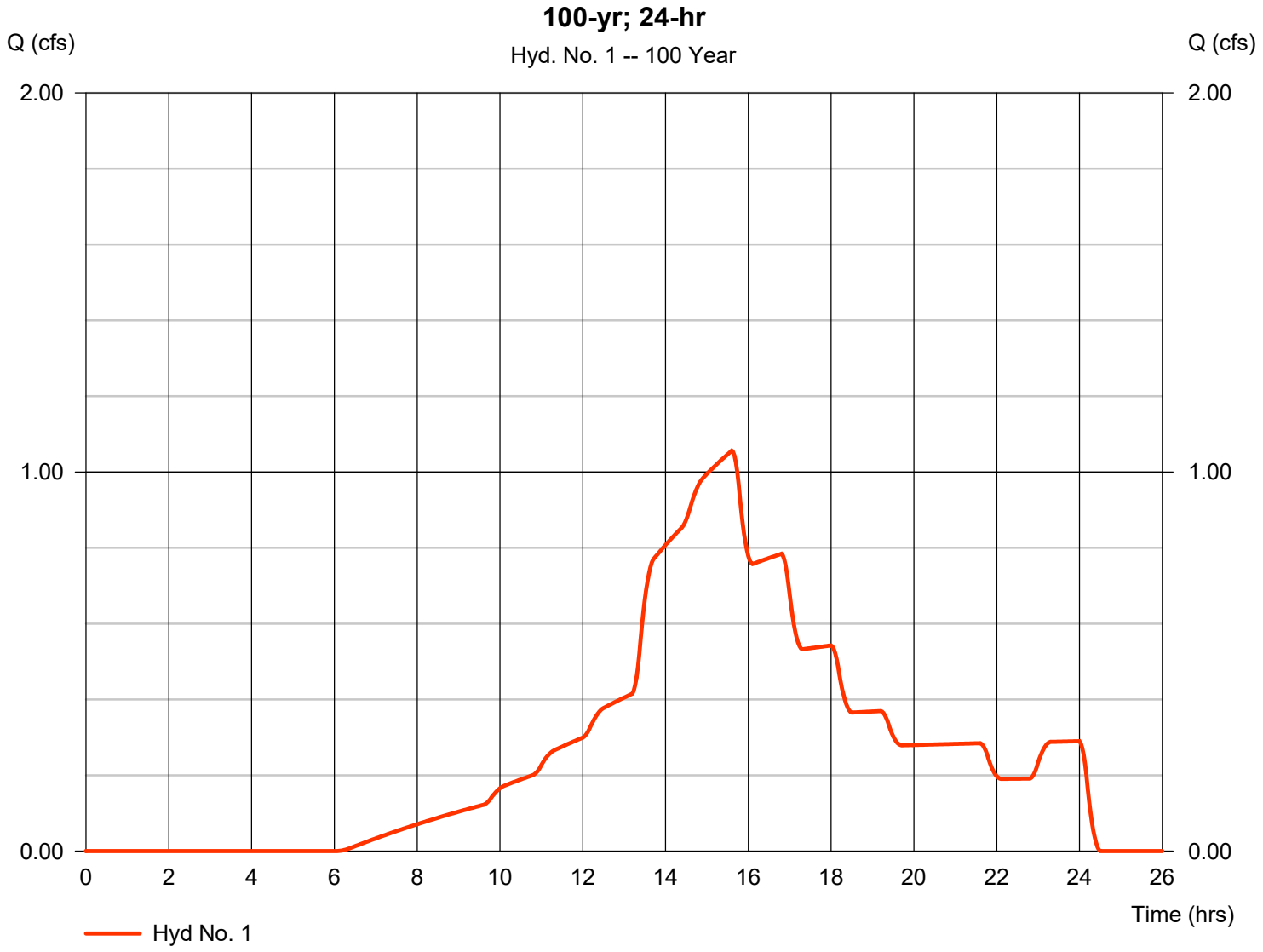
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	1.056	2	936	0.557	------	------	------	100-yr; 24-hr
2	Reservoir	0.987	2	944	0.315	1	891.88	0.255	Basin E6
4	SCS Runoff	4.502	2	940	2.442	------	------	------	100-yr; 24-hr
5	Combine	5.480	2	944	2.757	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	1.441	2	1450	0.480	5	884.35	2.34	Basin E4
8	SCS Runoff	1.694	2	938	0.903	------	------	------	100-yr; 24-hr
9	Combine	1.885	2	1442	1.383	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	1.877	2	1446	1.357	9	882.20	0.037	Basin E5
12	SCS Runoff	0.344	2	936	0.180	------	------	------	100-yr; 24 hr
13	Reservoir	0.340	2	938	0.146	12	897.35	0.038	Basin E9
15	SCS Runoff	1.431	2	936	0.754	------	------	------	100-yr; 24-hr
16	Combine	3.454	2	936	2.258	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	2.336	2	1020	1.513	16	878.28	0.910	Basin E11
19	SCS Runoff	1.597	2	938	0.851	------	------	------	100-yr; 24-hr
20	Combine	3.490	2	1014	2.364	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	870.94	2.36	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.056 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.557 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



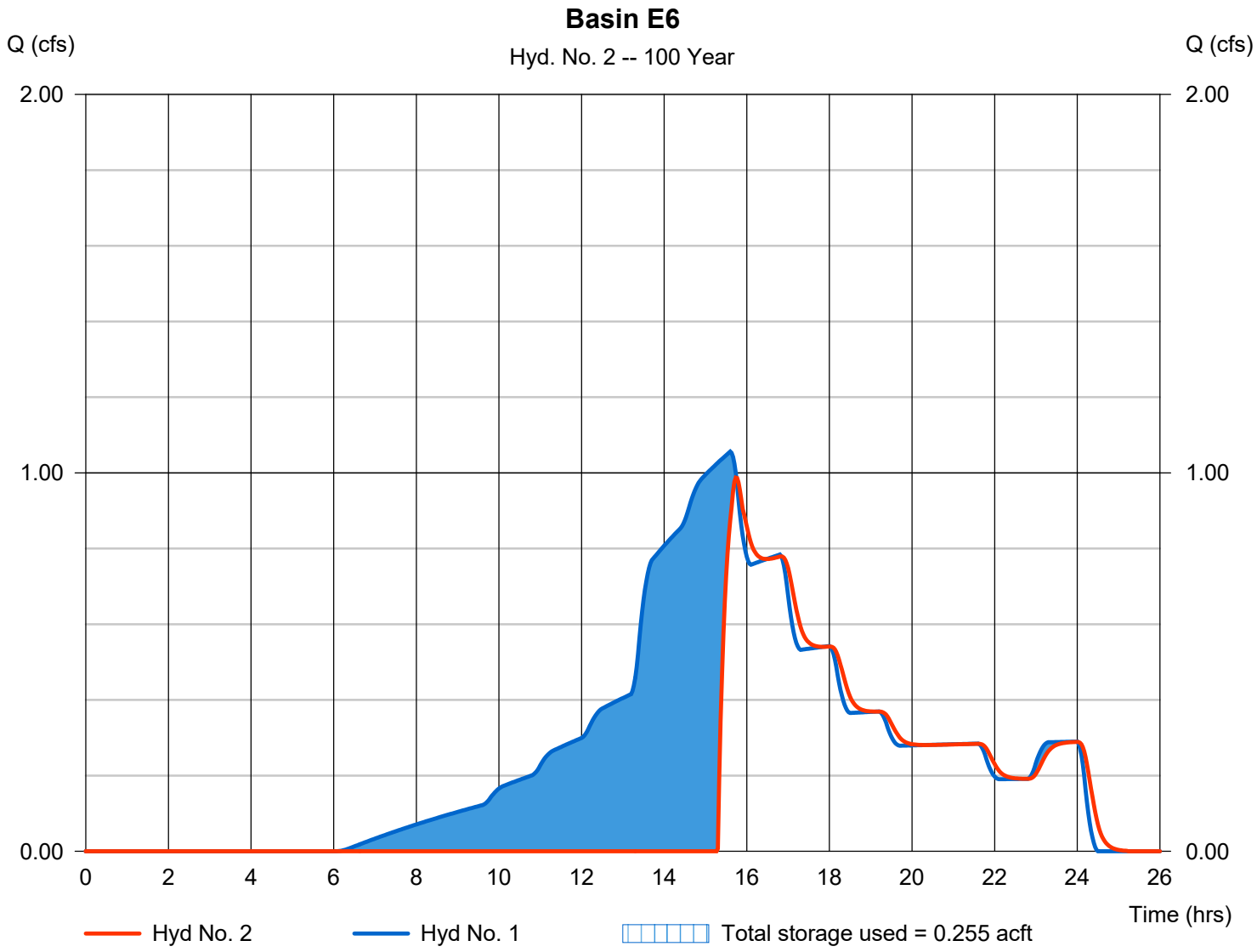
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.987 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.73 hrs
Time interval	=	2 min	Hyd. volume	=	0.315 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.88 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.255 acft

Storage Indication method used.

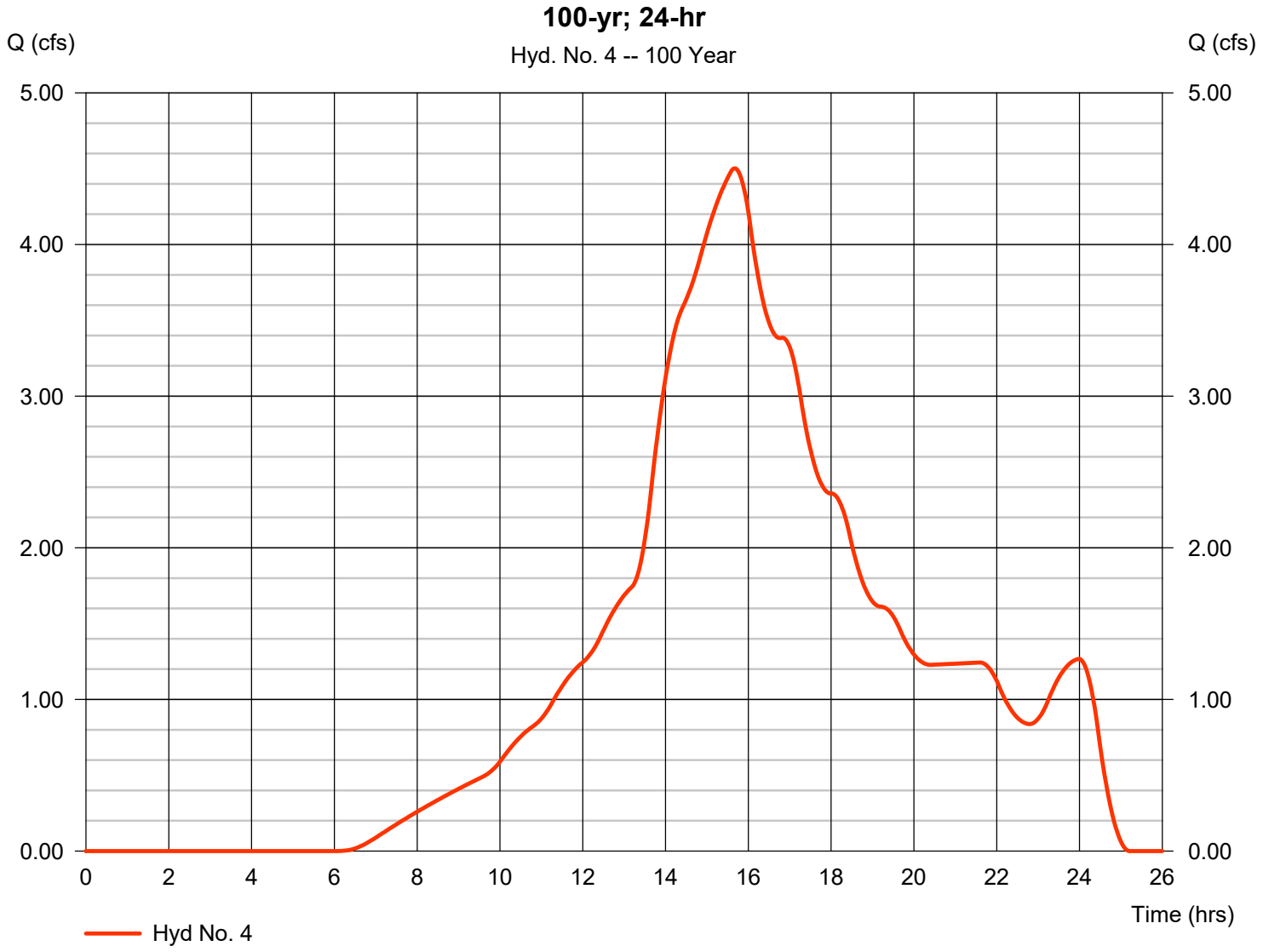


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.502 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.67 hrs
Time interval	=	2 min	Hyd. volume	=	2.442 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

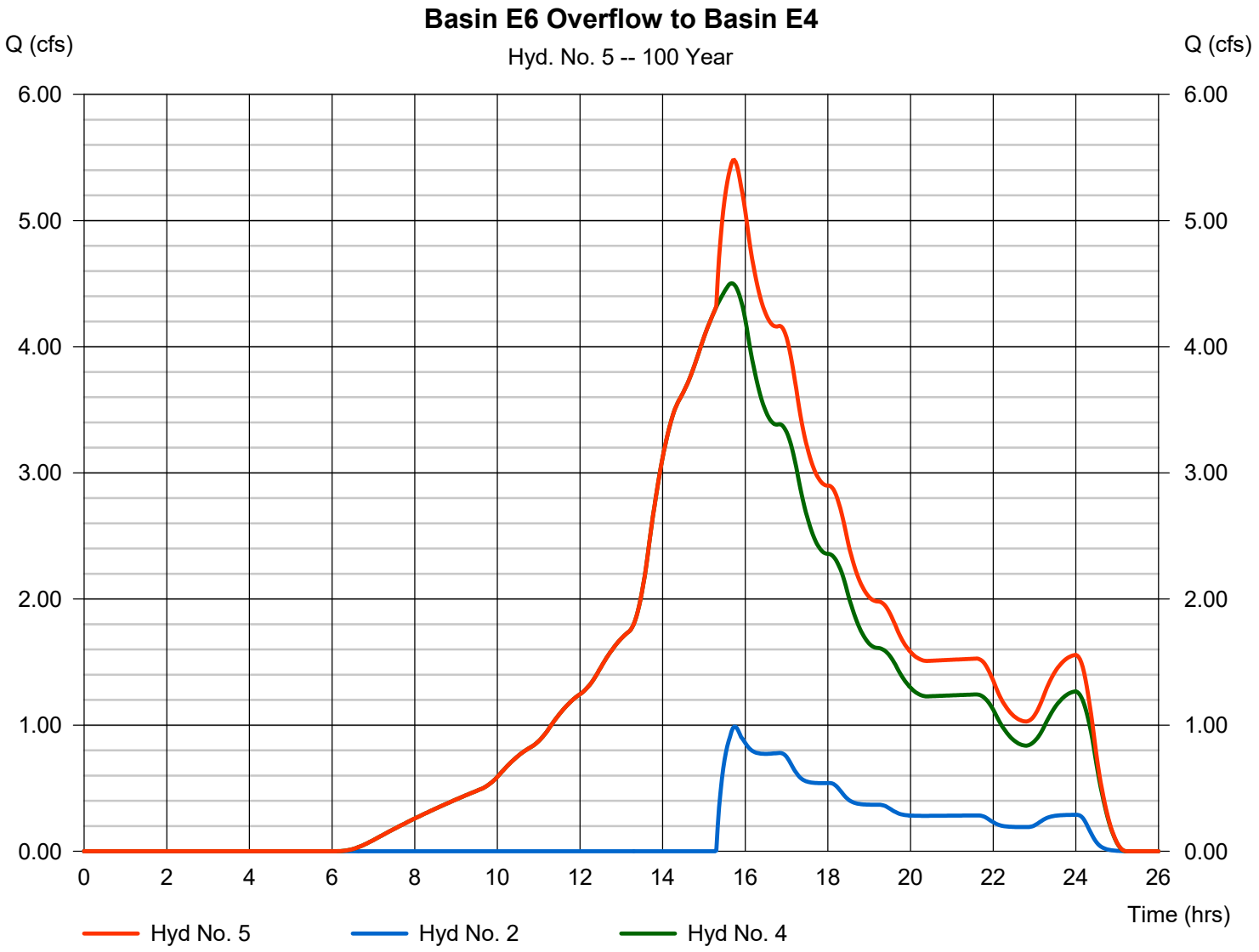


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 5.480 cfs
Storm frequency	= 100 yrs	Time to peak	= 15.73 hrs
Time interval	= 2 min	Hyd. volume	= 2.757 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



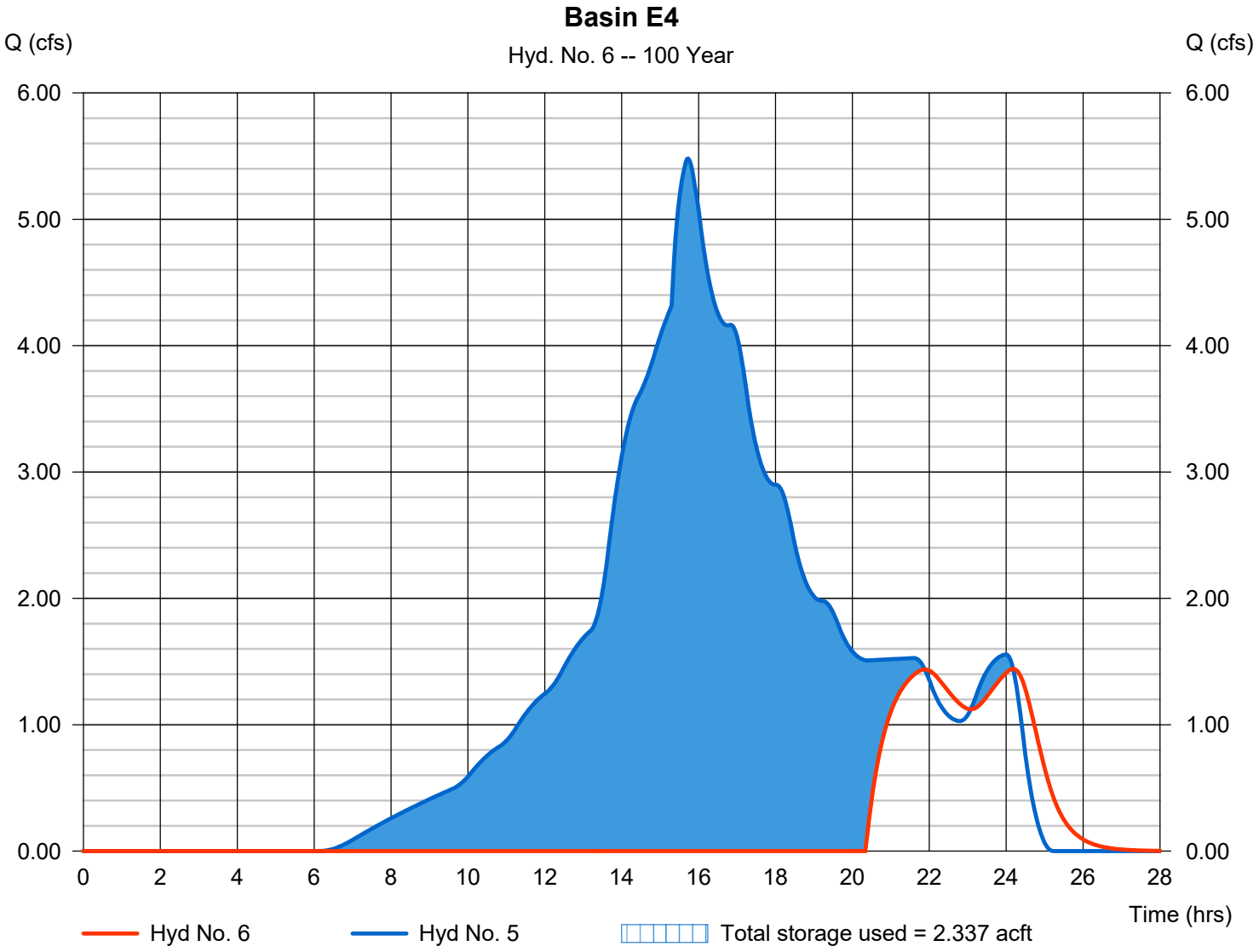
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	1.441 cfs
Storm frequency	=	100 yrs	Time to peak	=	24.17 hrs
Time interval	=	2 min	Hyd. volume	=	0.480 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	884.35 ft
Reservoir name	=	Basin E4	Max. Storage	=	2.337 acft

Storage Indication method used.

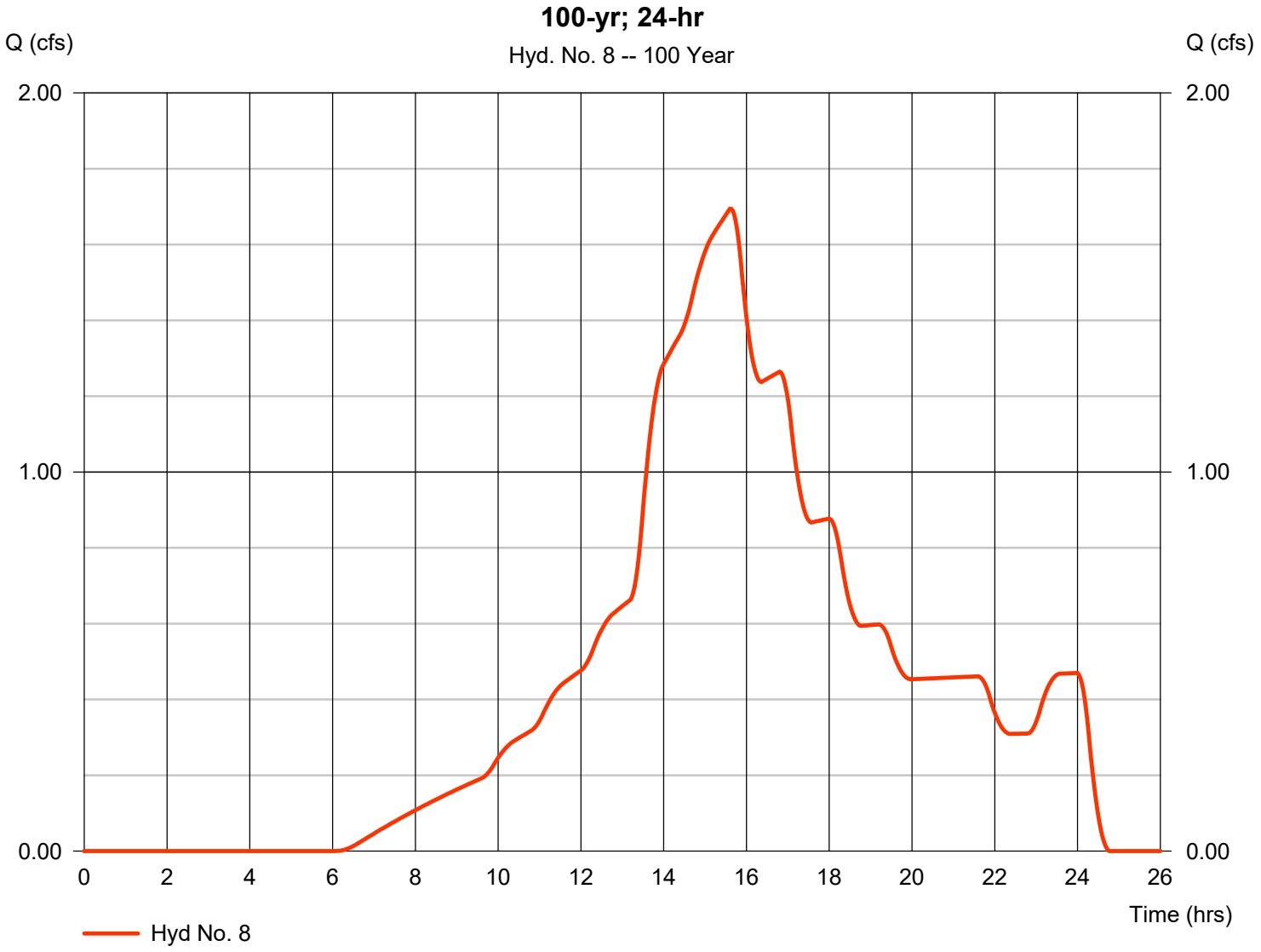


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.694 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.63 hrs
Time interval	=	2 min	Hyd. volume	=	0.903 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

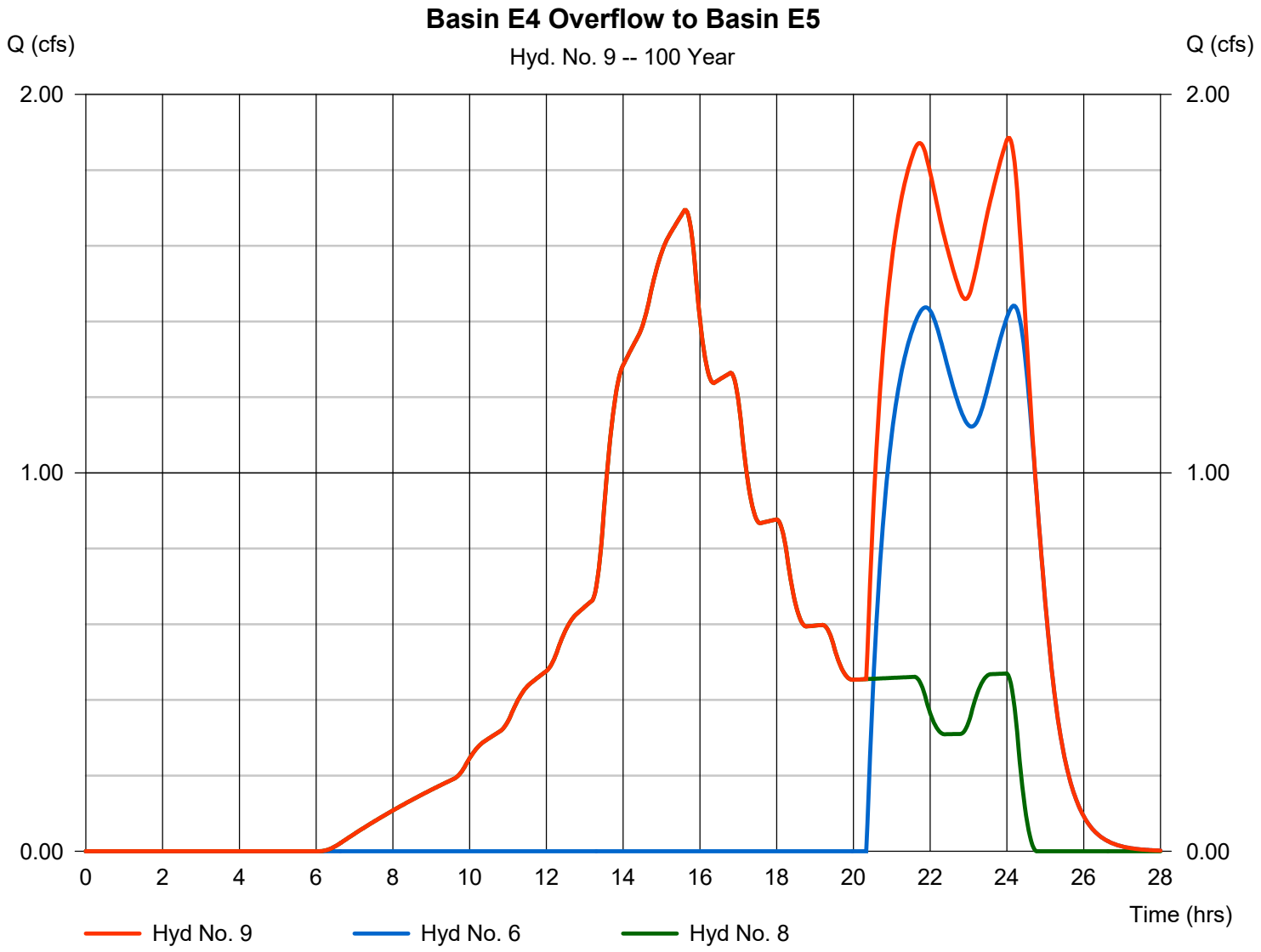


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	1.885 cfs
Storm frequency	=	100 yrs	Time to peak	=	24.03 hrs
Time interval	=	2 min	Hyd. volume	=	1.383 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



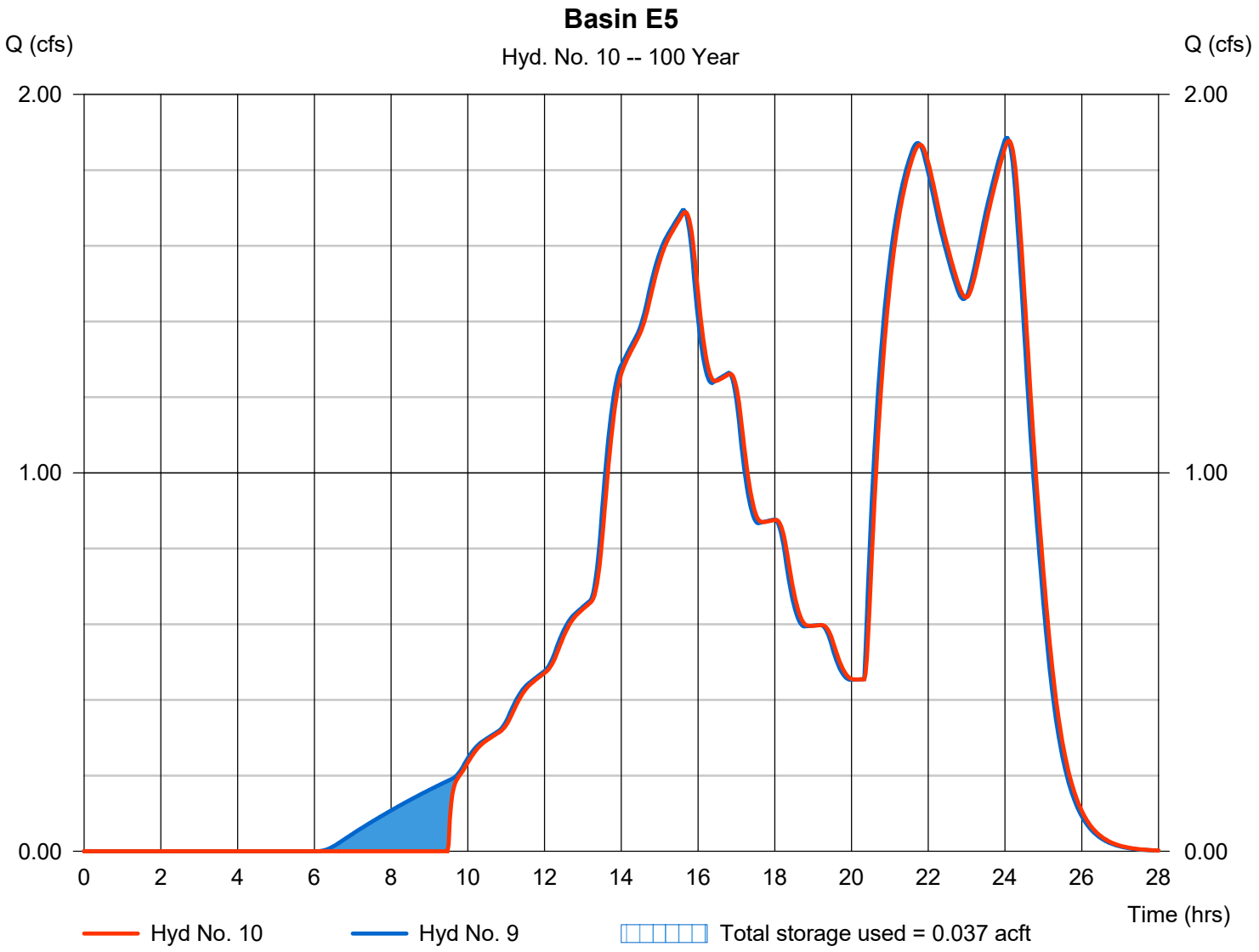
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	1.877 cfs
Storm frequency	=	100 yrs	Time to peak	=	24.10 hrs
Time interval	=	2 min	Hyd. volume	=	1.357 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.20 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.037 acft

Storage Indication method used.

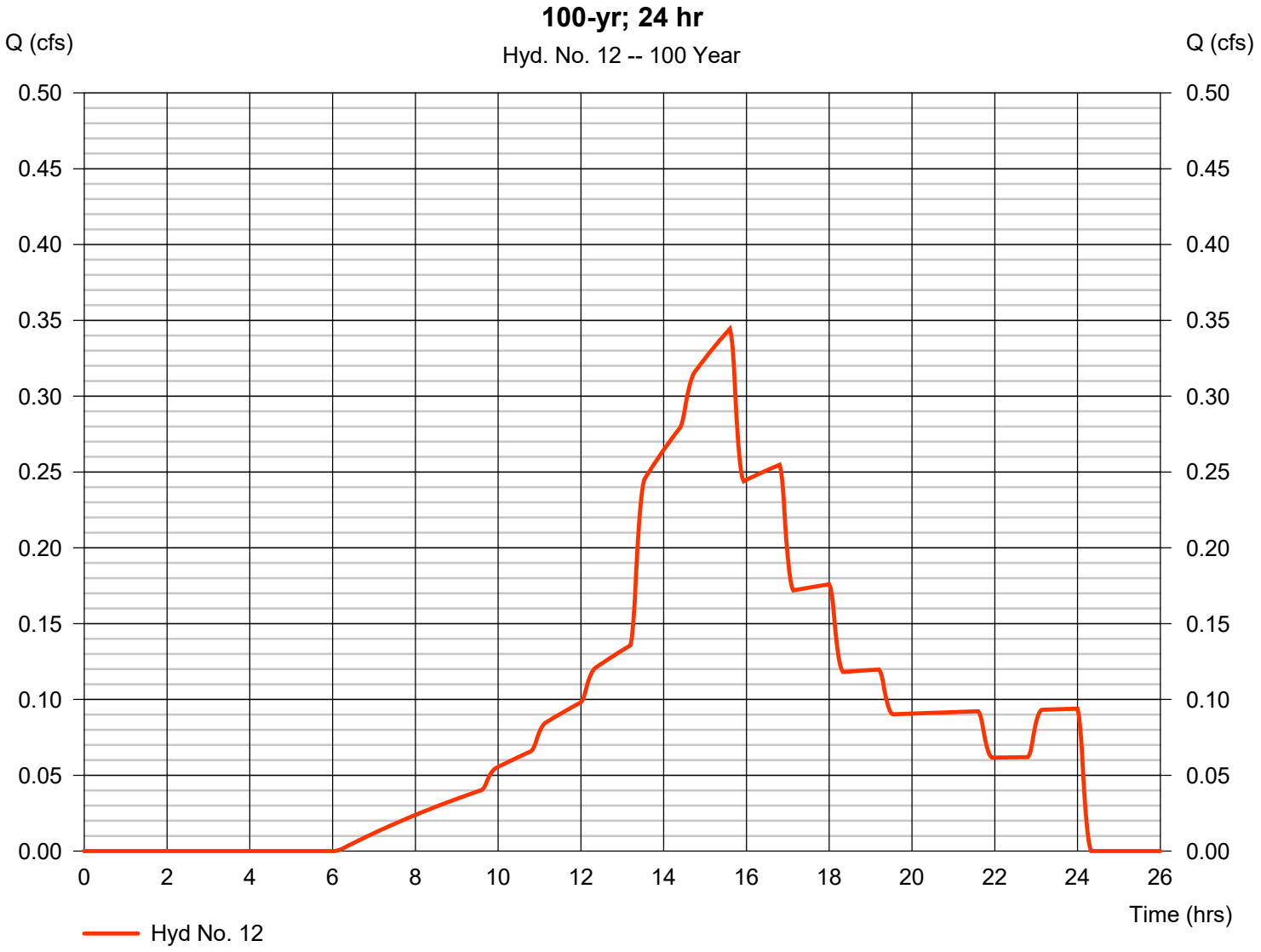


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.344 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.180 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



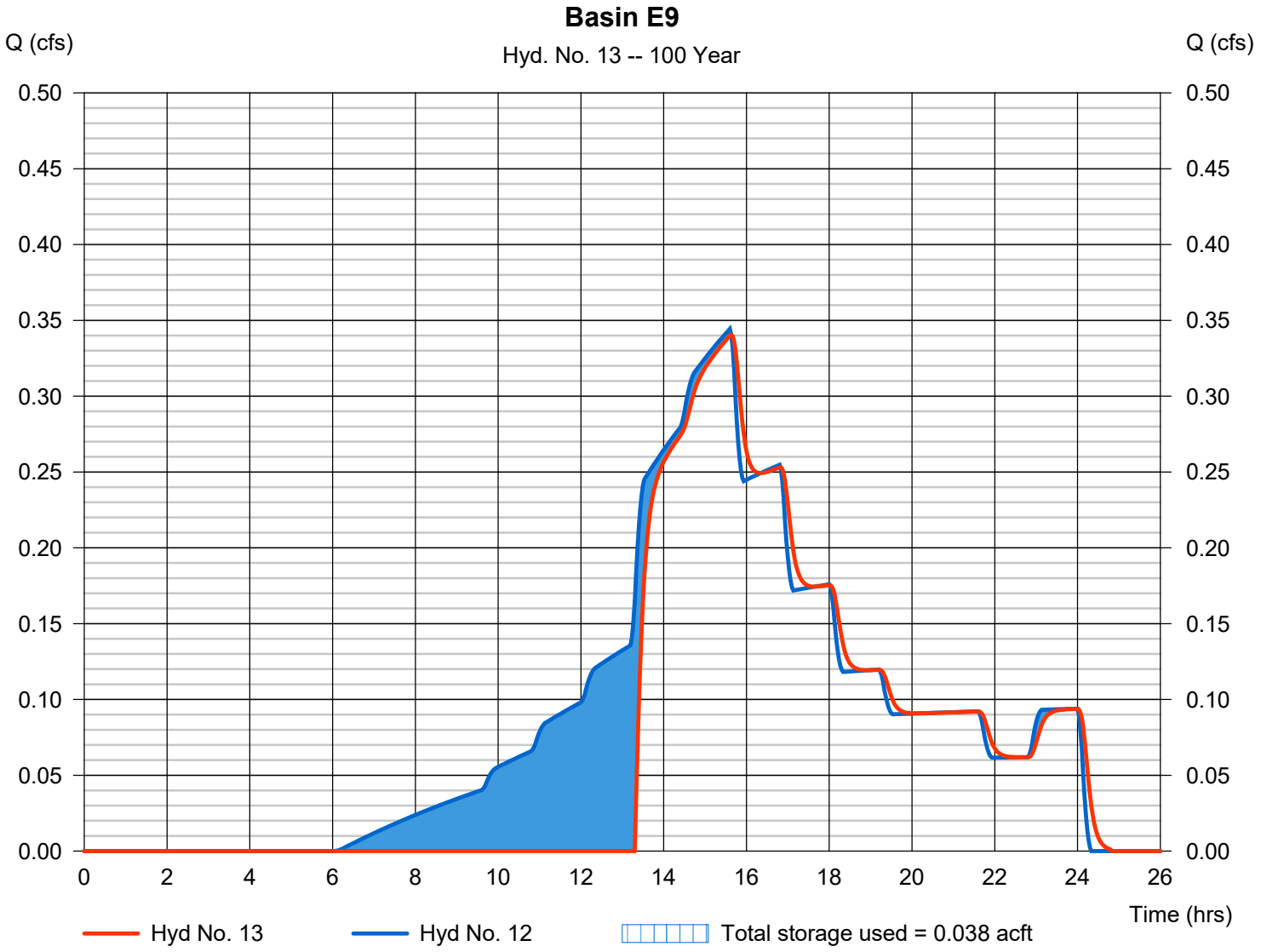
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.340 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.63 hrs
Time interval	=	2 min	Hyd. volume	=	0.146 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.35 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.038 acft

Storage Indication method used.

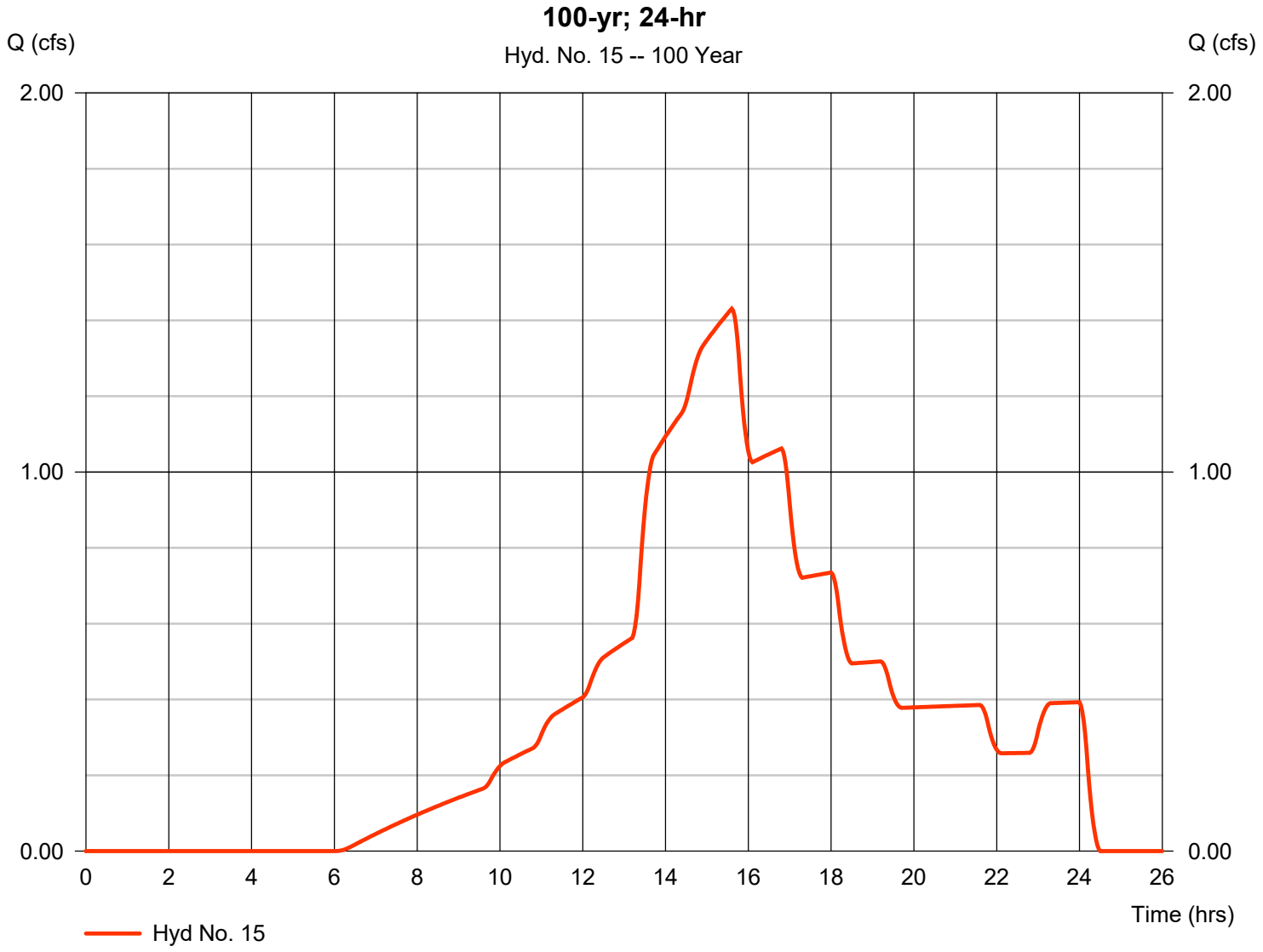


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.431 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	0.754 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

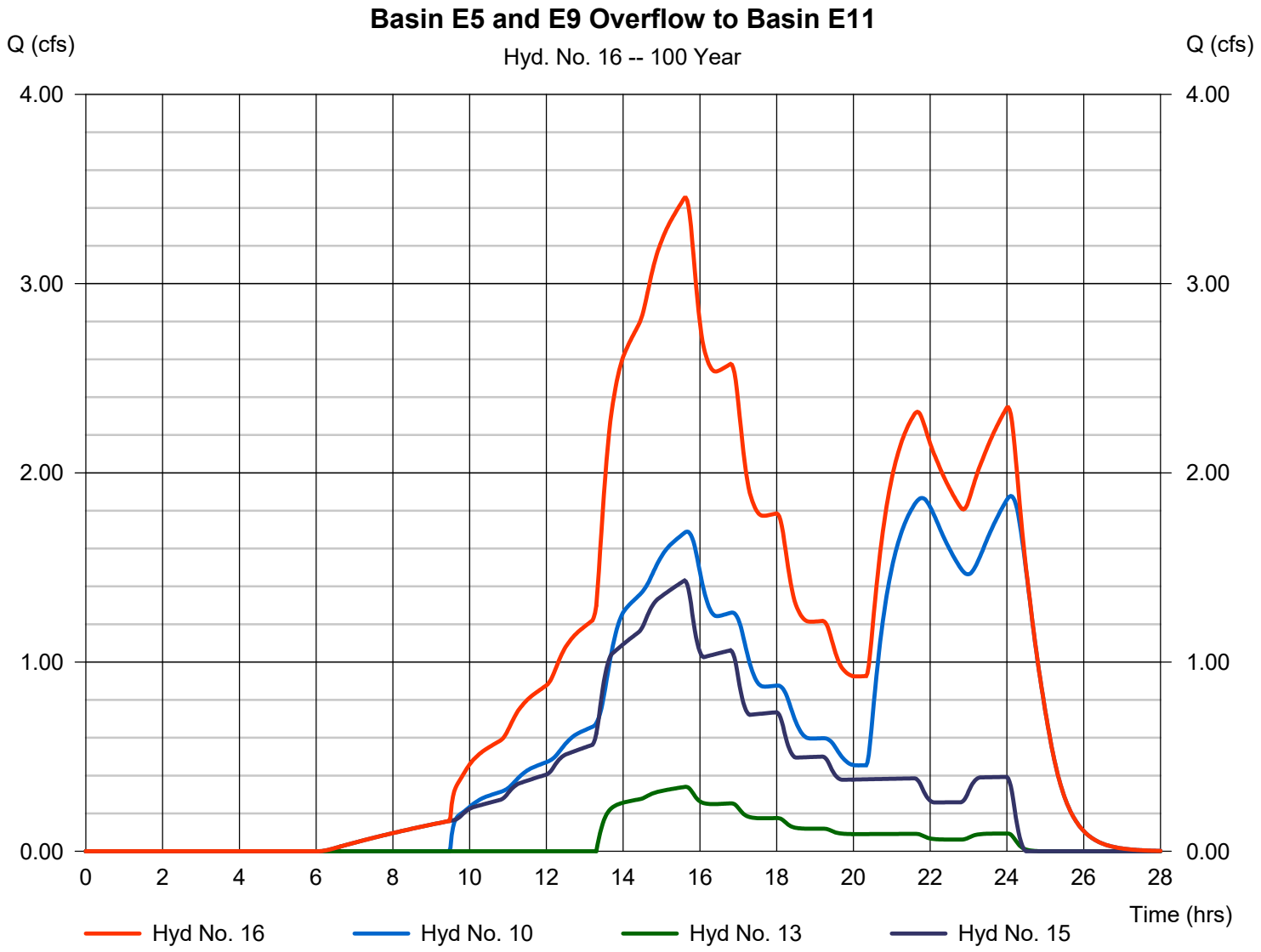


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	3.454 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	2.258 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



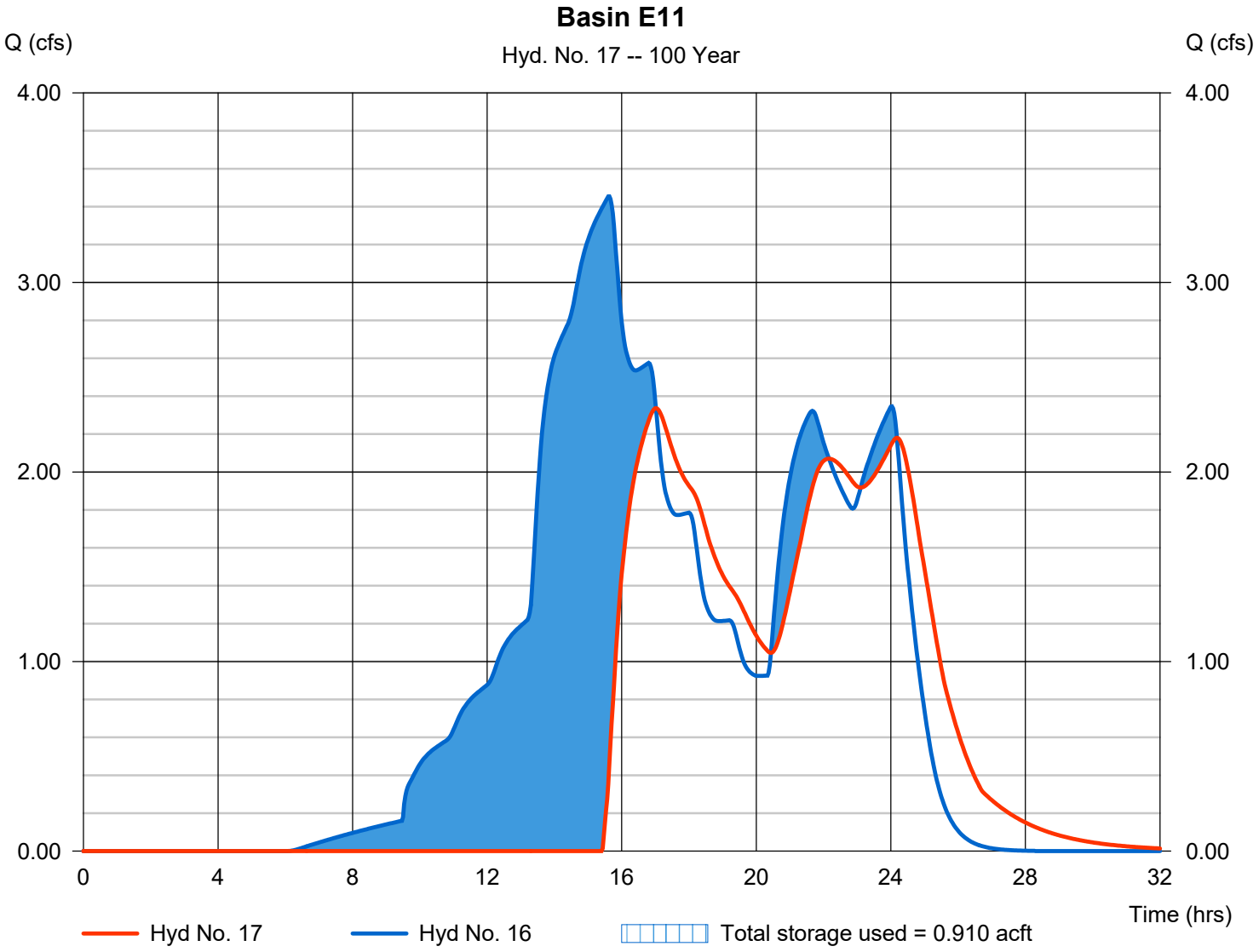
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	2.336 cfs
Storm frequency	=	100 yrs	Time to peak	=	17.00 hrs
Time interval	=	2 min	Hyd. volume	=	1.513 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow	Max. Elevation	=	878.28 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.910 acft

Storage Indication method used.

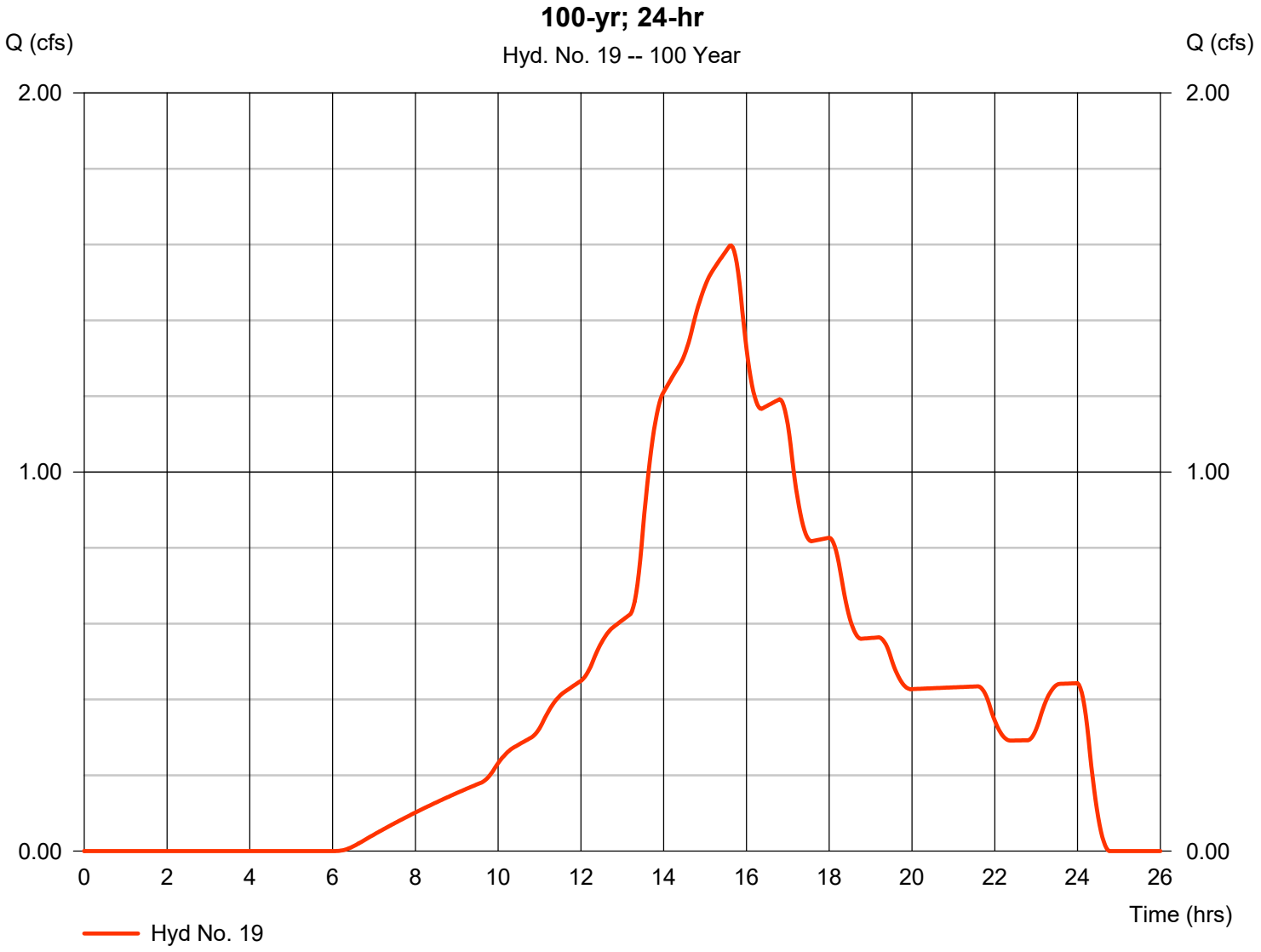


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.597 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.63 hrs
Time interval	=	2 min	Hyd. volume	=	0.851 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

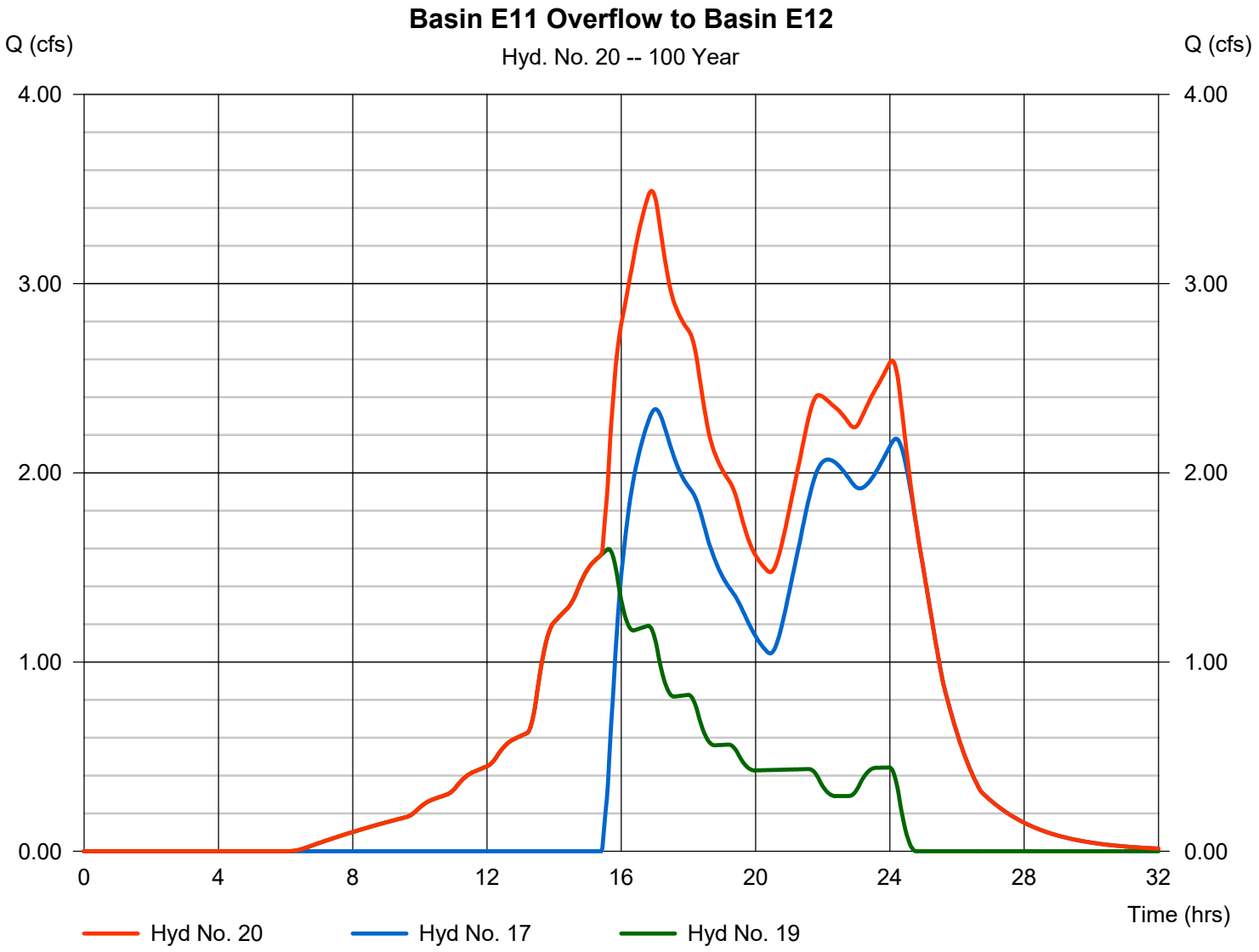


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	3.490 cfs
Storm frequency	=	100 yrs	Time to peak	=	16.90 hrs
Time interval	=	2 min	Hyd. volume	=	2.364 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



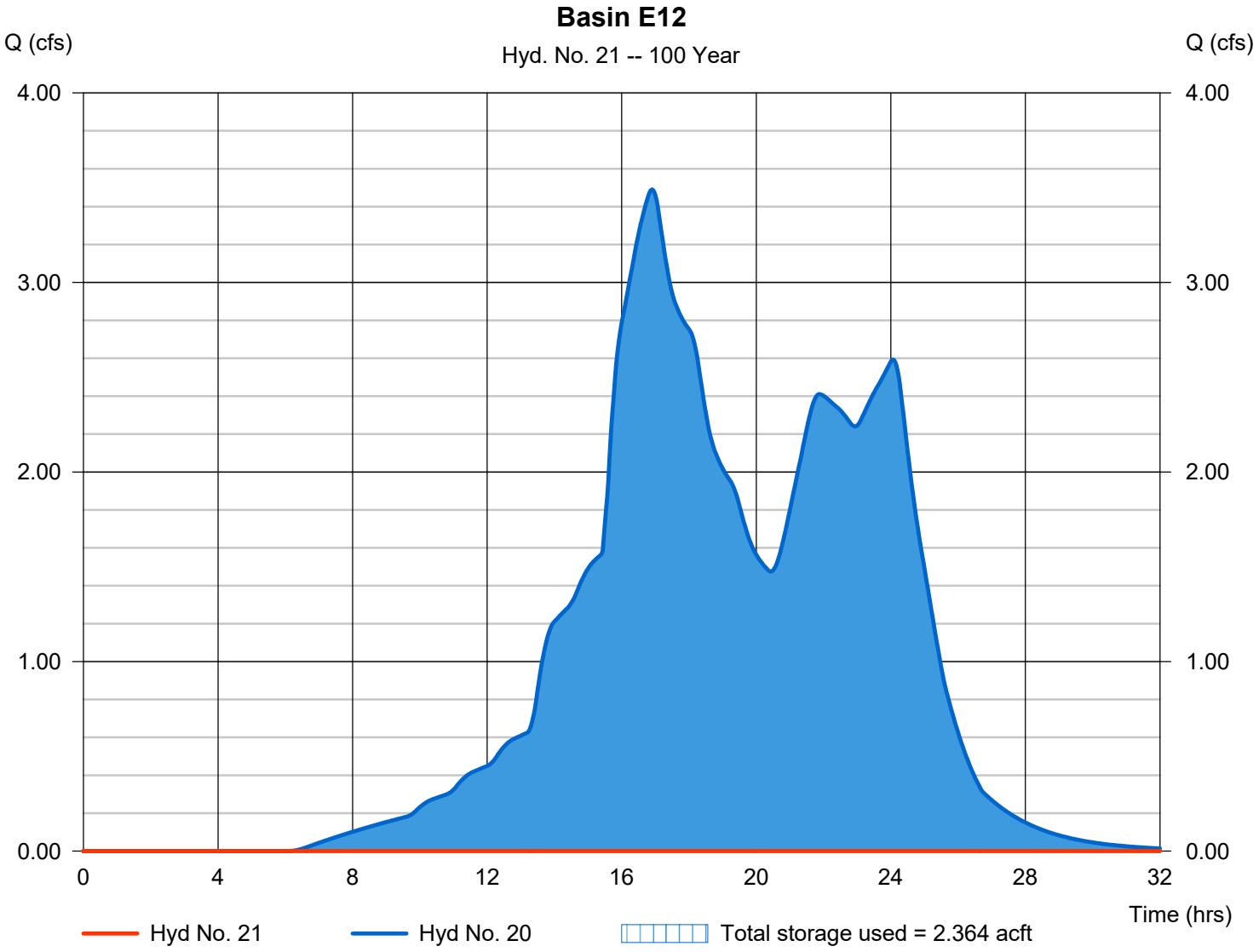
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	870.94 ft
Reservoir name	=	Basin E12	Max. Storage	=	2.364 acft

Storage Indication method used.



Hydraflow Table of Contents

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Hydrograph No. 15, SCS Runoff, 100-yr; 24-hr..... 13

Hydrograph No. 16, Combine, Basin E5 and E9 Overflow to Basin E11..... 14

Hydrograph No. 17, Reservoir, Basin E11..... 15

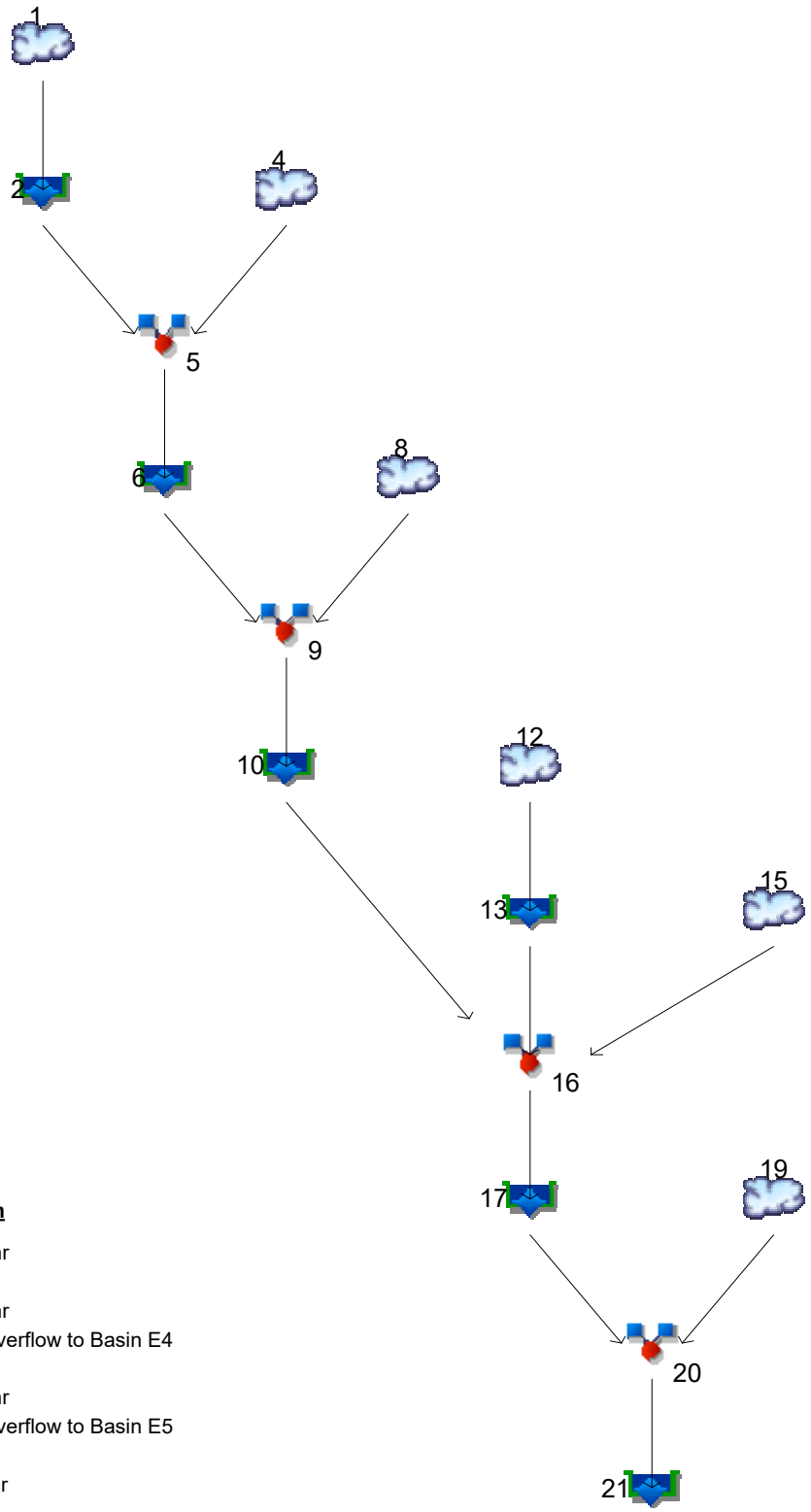
Hydrograph No. 19, SCS Runoff, 100-yr; 24-hr..... 16

Hydrograph No. 20, Combine, Basin E11 Overflow to Basin E12..... 17

Hydrograph No. 21, Reservoir, Basin E12..... 18

100 Year-48 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

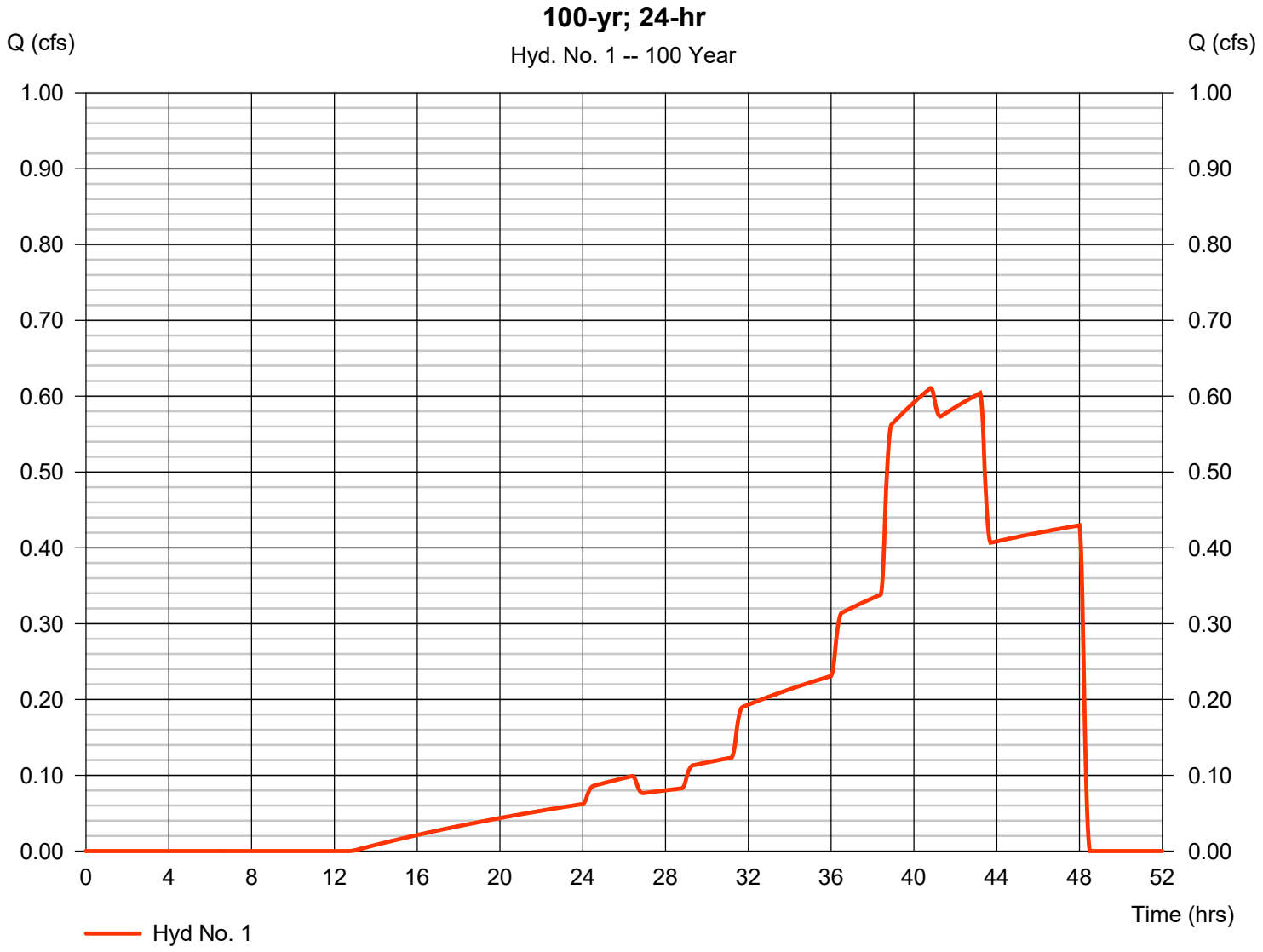
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	0.611	2	2448	0.637	------	------	------	100-yr; 24-hr
2	Reservoir	0.608	2	2454	0.396	1	891.85	0.250	Basin E6
4	SCS Runoff	2.650	2	2456	2.795	------	------	------	100-yr; 24-hr
5	Combine	3.258	2	2454	3.191	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	2.293	2	2882	0.914	5	884.37	2.37	Basin E4
8	SCS Runoff	0.987	2	2450	1.034	------	------	------	100-yr; 24-hr
9	Combine	2.988	2	2880	1.948	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.987	2	2880	1.922	9	882.23	0.040	Basin E5
12	SCS Runoff	0.198	2	2448	0.206	------	------	------	100-yr; 24 hr
13	Reservoir	0.197	2	2450	0.172	12	897.33	0.036	Basin E9
15	SCS Runoff	0.827	2	2448	0.864	------	------	------	100-yr; 24-hr
16	Combine	3.708	2	2880	2.958	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	3.686	2	2882	2.213	16	878.41	0.970	Basin E11
19	SCS Runoff	0.930	2	2450	0.975	------	------	------	100-yr; 24-hr
20	Combine	4.341	2	2880	3.188	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	871.75	3.19	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.611 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.80 hrs
Time interval	=	2 min	Hyd. volume	=	0.637 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	9.28 in	Distribution	=	Huff-4th
Storm duration	=	48.00 hrs	Shape factor	=	484



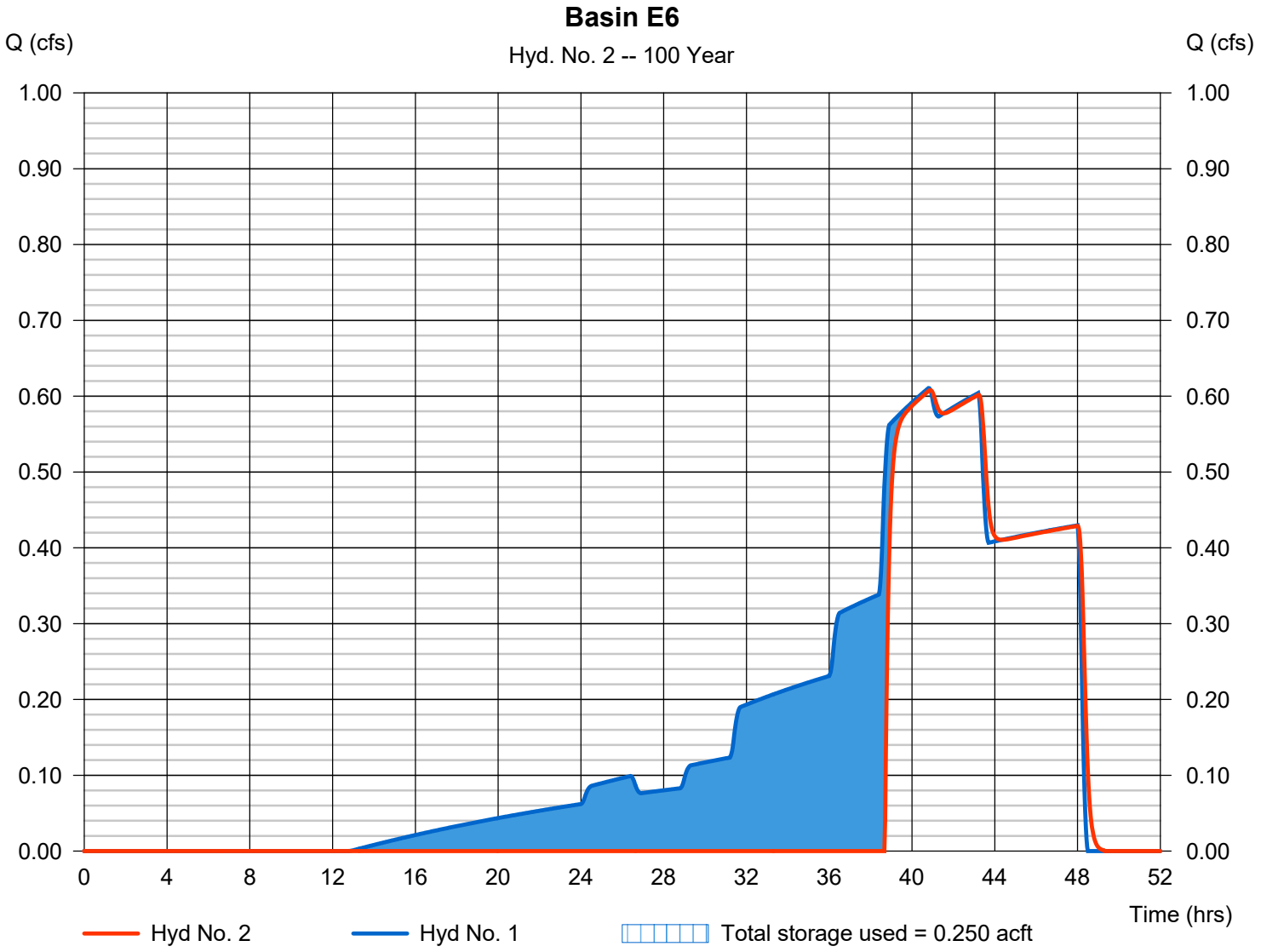
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.608 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.90 hrs
Time interval	=	2 min	Hyd. volume	=	0.396 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.85 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.250 acft

Storage Indication method used.

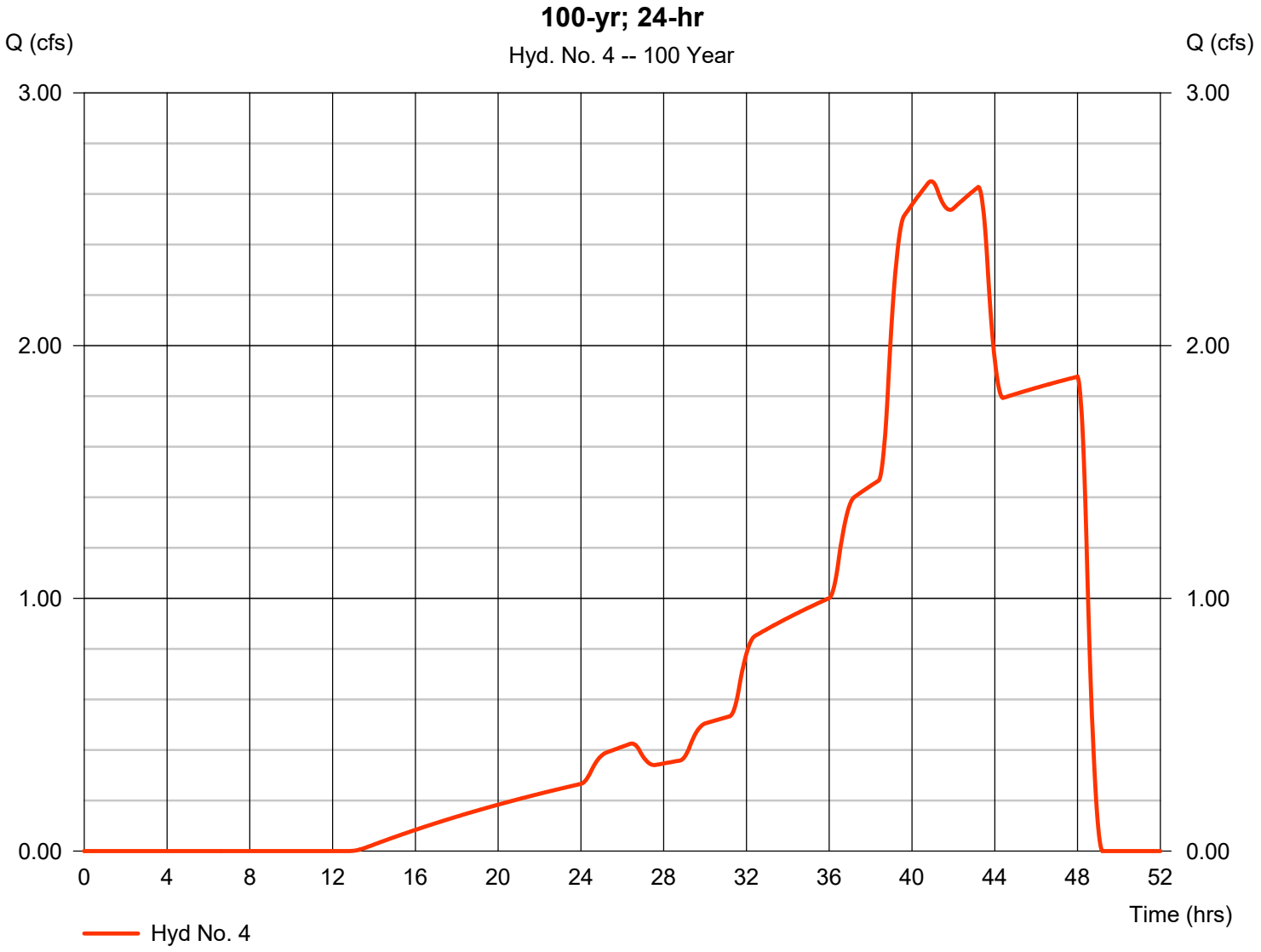


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.650 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.93 hrs
Time interval	=	2 min	Hyd. volume	=	2.795 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	9.28 in	Distribution	=	Huff-4th
Storm duration	=	48.00 hrs	Shape factor	=	484

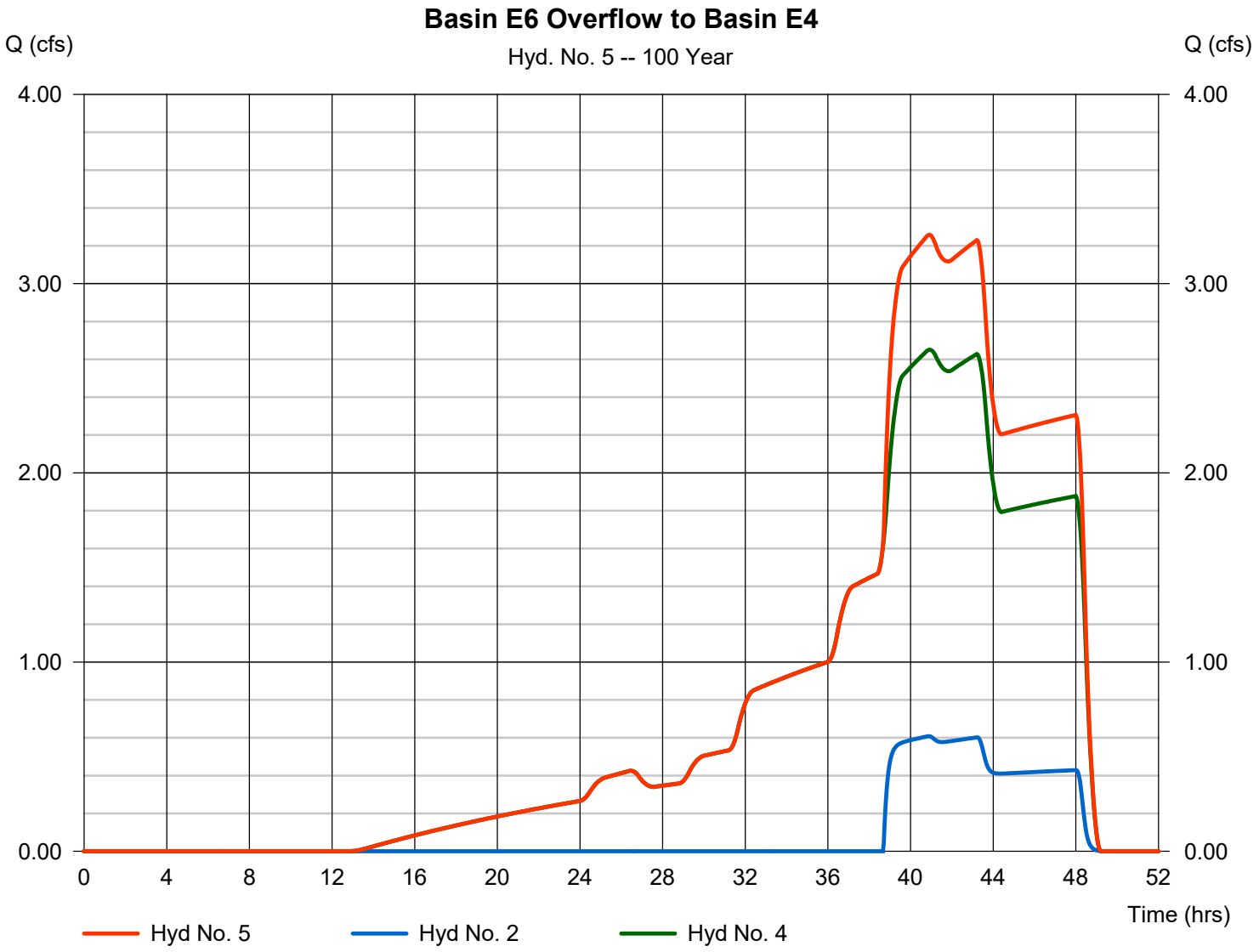


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 3.258 cfs
Storm frequency	= 100 yrs	Time to peak	= 40.90 hrs
Time interval	= 2 min	Hyd. volume	= 3.191 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



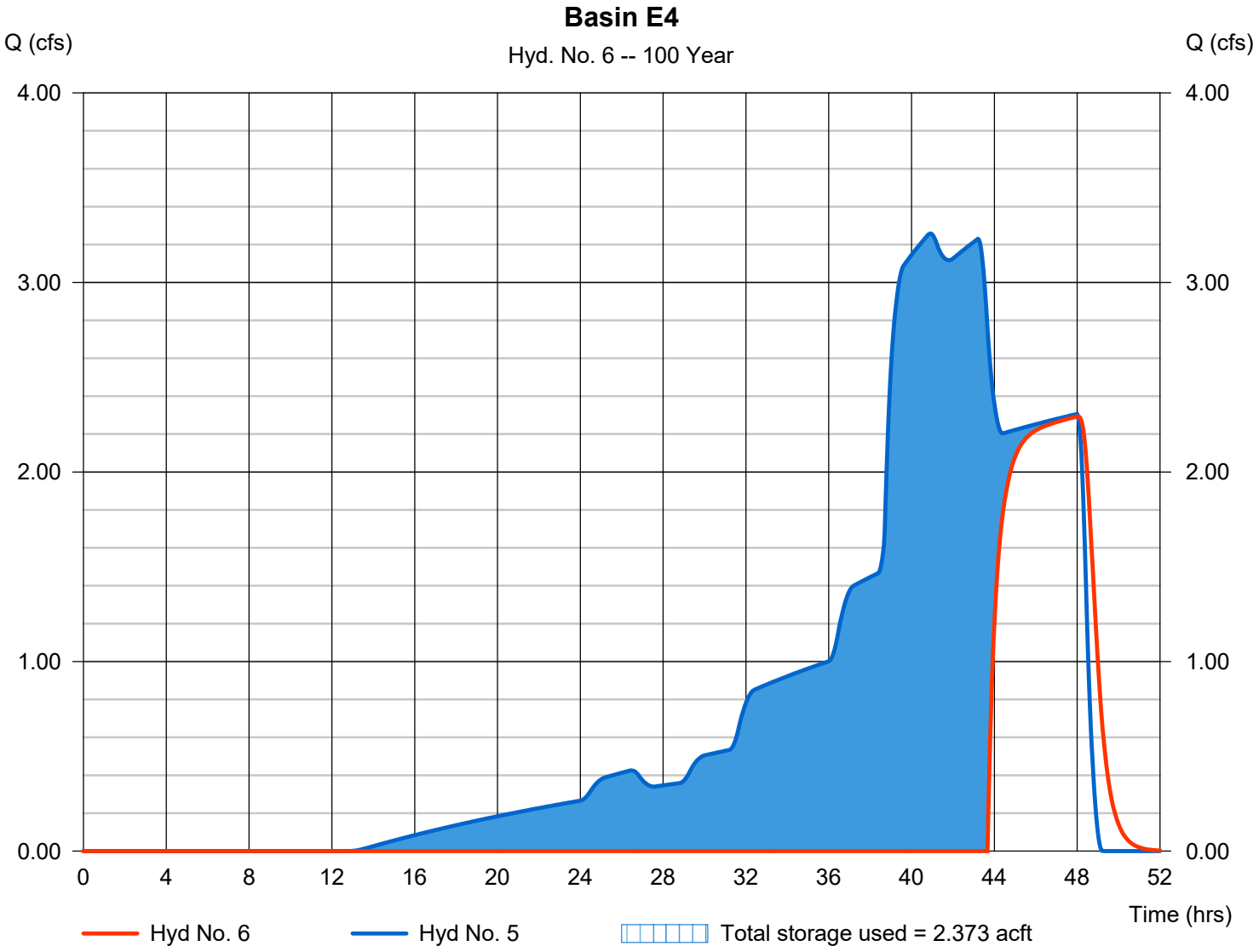
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	2.293 cfs
Storm frequency	=	100 yrs	Time to peak	=	48.03 hrs
Time interval	=	2 min	Hyd. volume	=	0.914 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	884.37 ft
Reservoir name	=	Basin E4	Max. Storage	=	2.373 acft

Storage Indication method used.

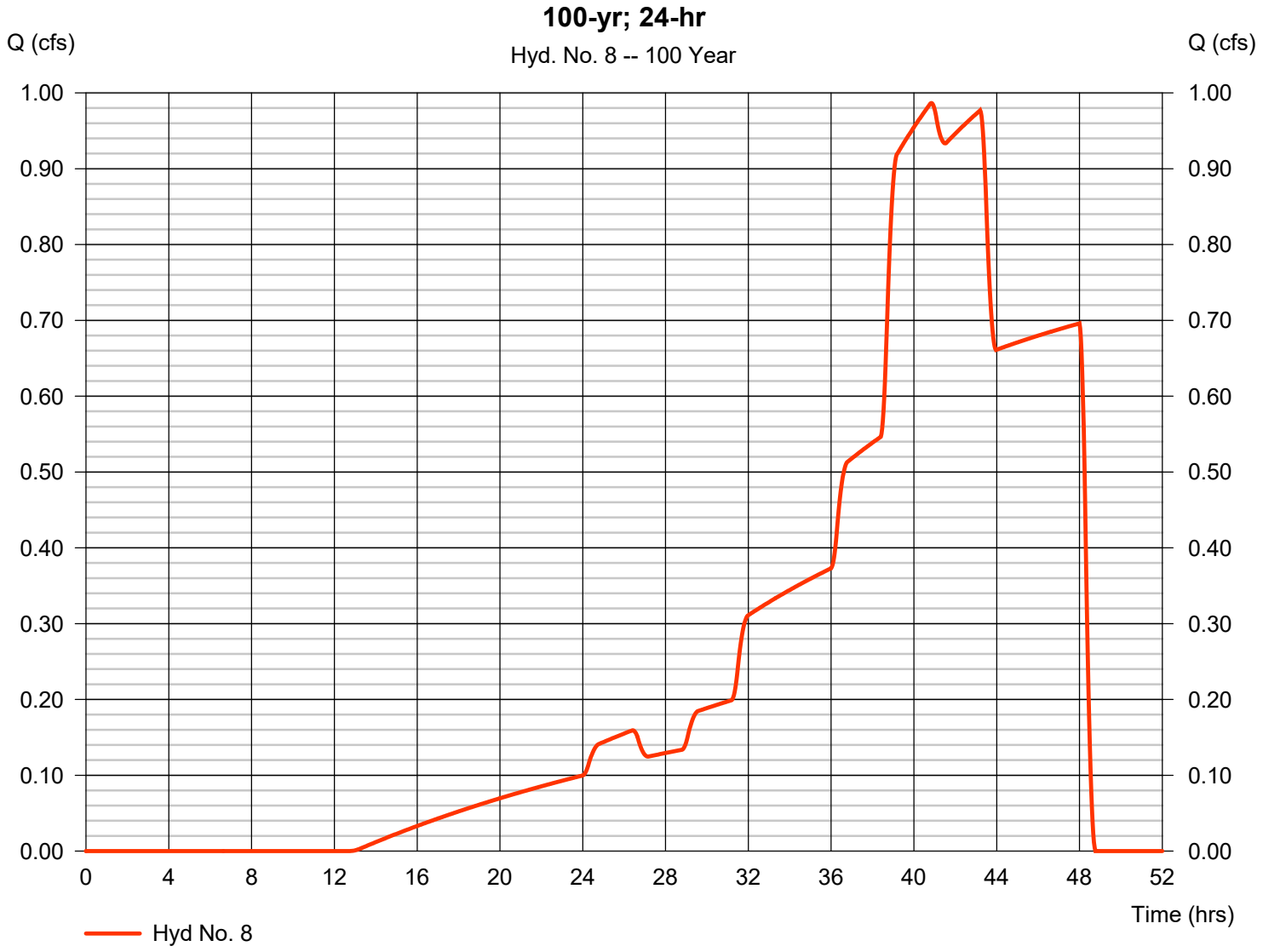


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.987 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.83 hrs
Time interval	=	2 min	Hyd. volume	=	1.034 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	9.28 in	Distribution	=	Huff-4th
Storm duration	=	48.00 hrs	Shape factor	=	484

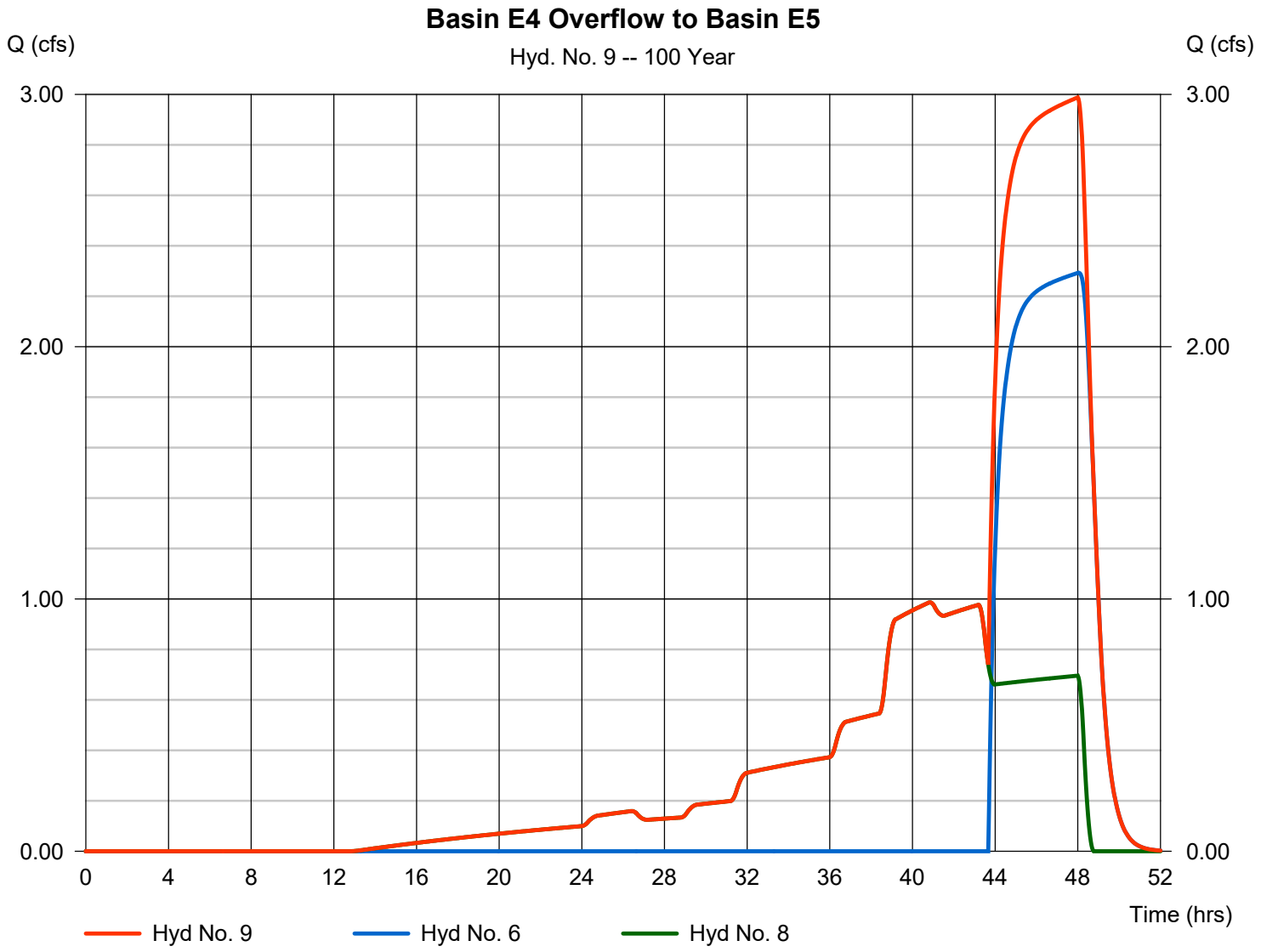


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	=	Combine	Peak discharge	=	2.988 cfs
Storm frequency	=	100 yrs	Time to peak	=	48.00 hrs
Time interval	=	2 min	Hyd. volume	=	1.948 acft
Inflow hyds.	=	6, 8	Contrib. drain. area	=	2.790 ac



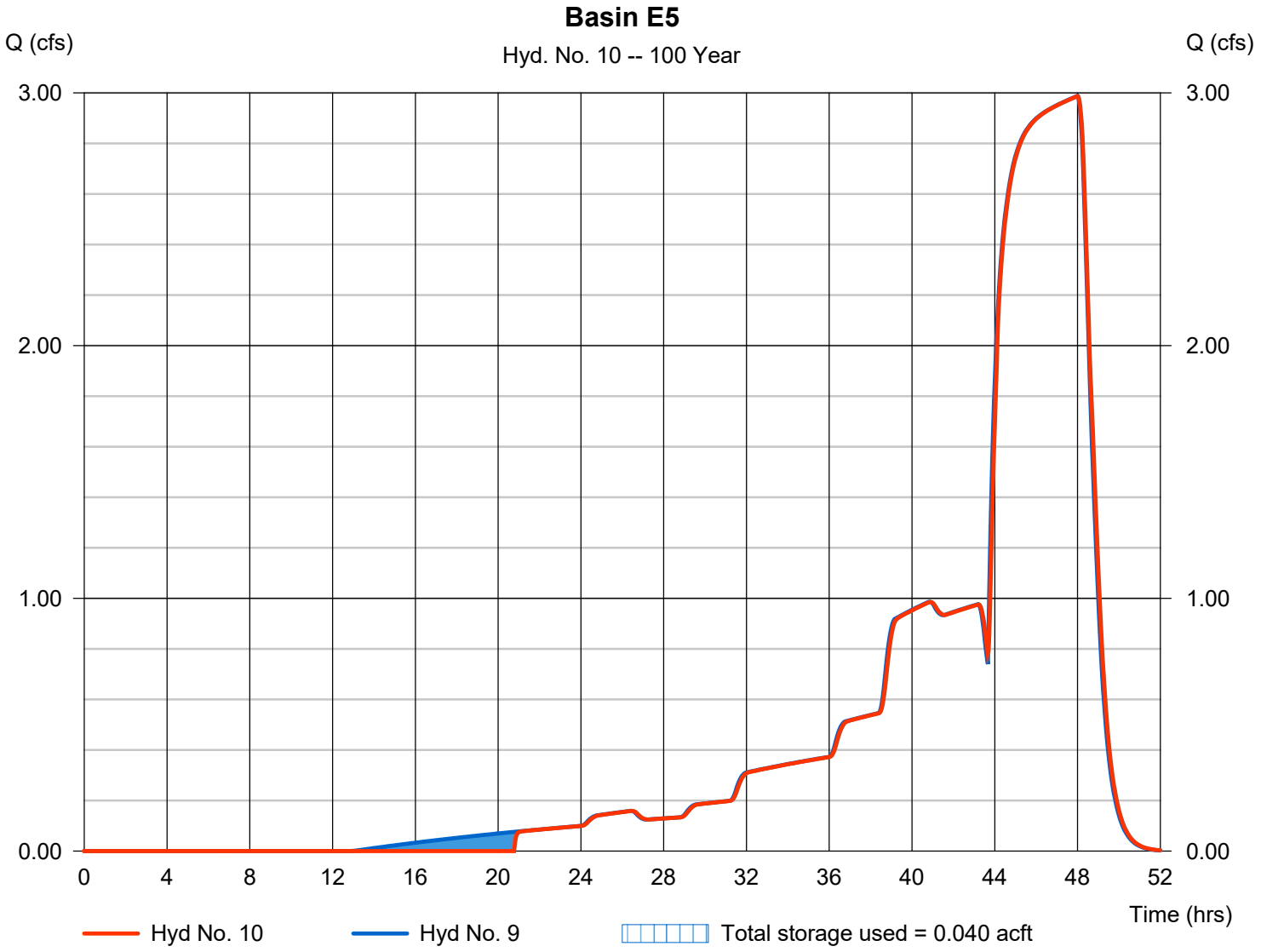
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.987 cfs
Storm frequency	=	100 yrs	Time to peak	=	48.00 hrs
Time interval	=	2 min	Hyd. volume	=	1.922 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.23 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.040 acft

Storage Indication method used.

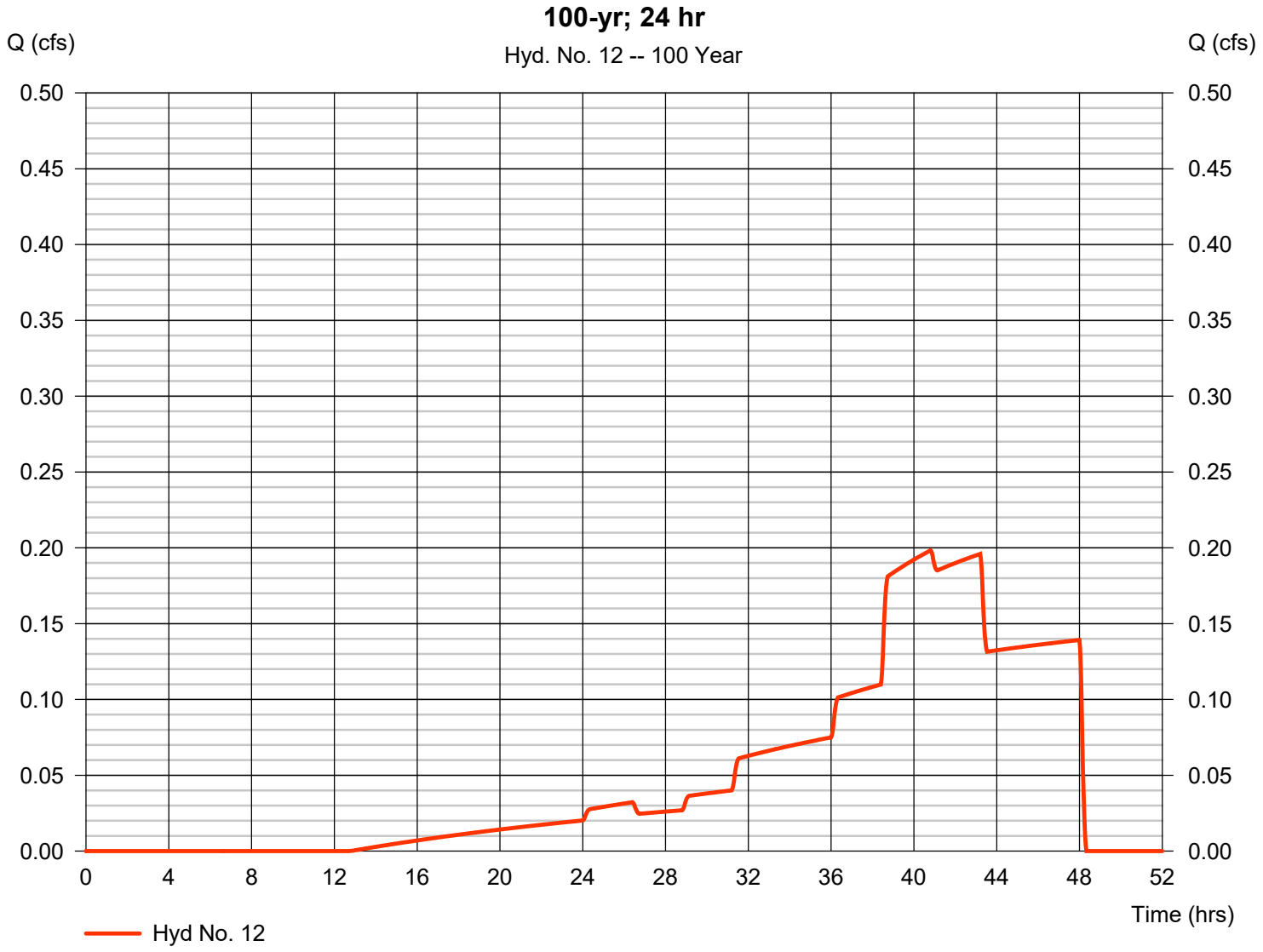


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.198 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.80 hrs
Time interval	=	2 min	Hyd. volume	=	0.206 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	9.28 in	Distribution	=	Huff-4th
Storm duration	=	48.00 hrs	Shape factor	=	484



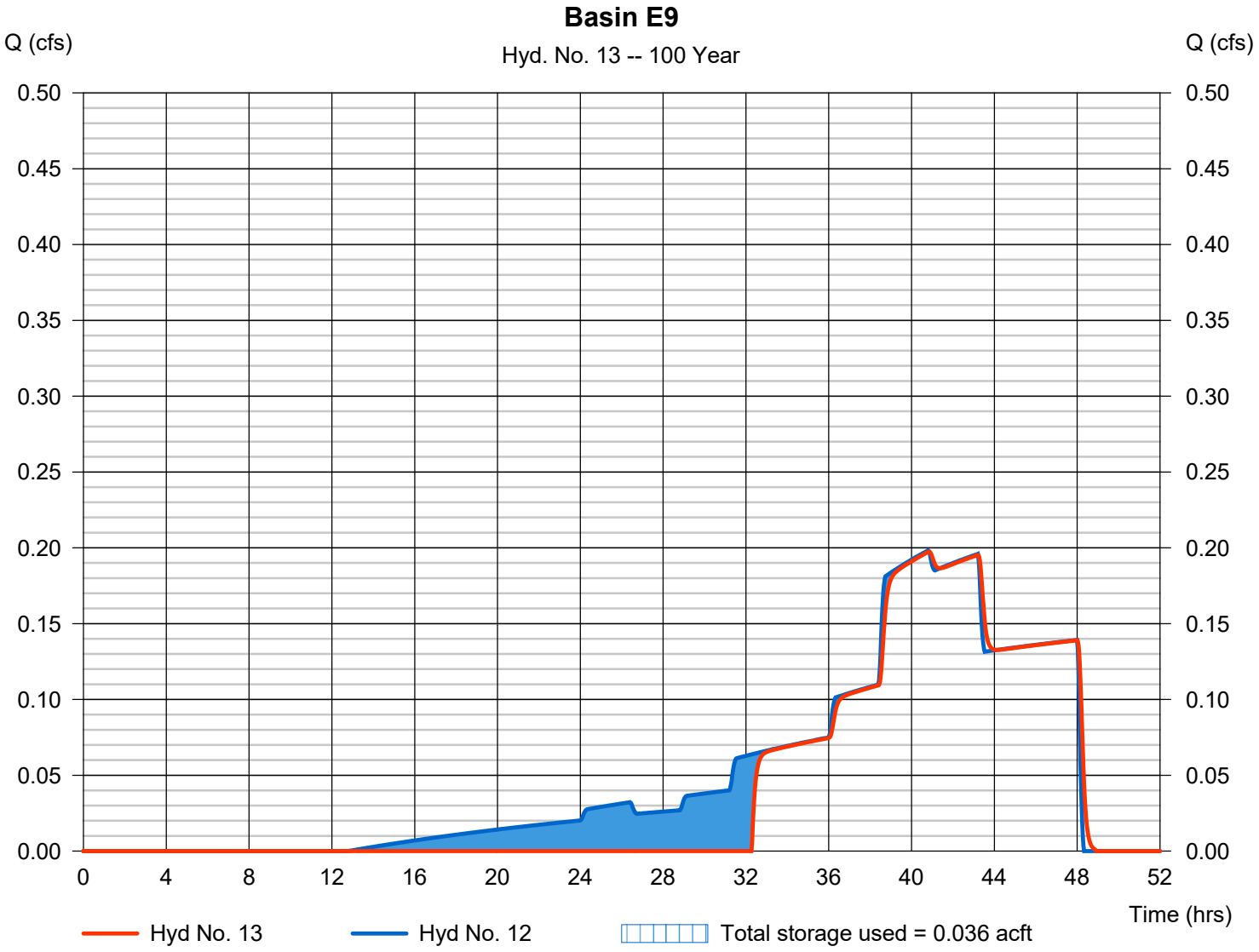
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.197 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.83 hrs
Time interval	=	2 min	Hyd. volume	=	0.172 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.33 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.036 acft

Storage Indication method used.

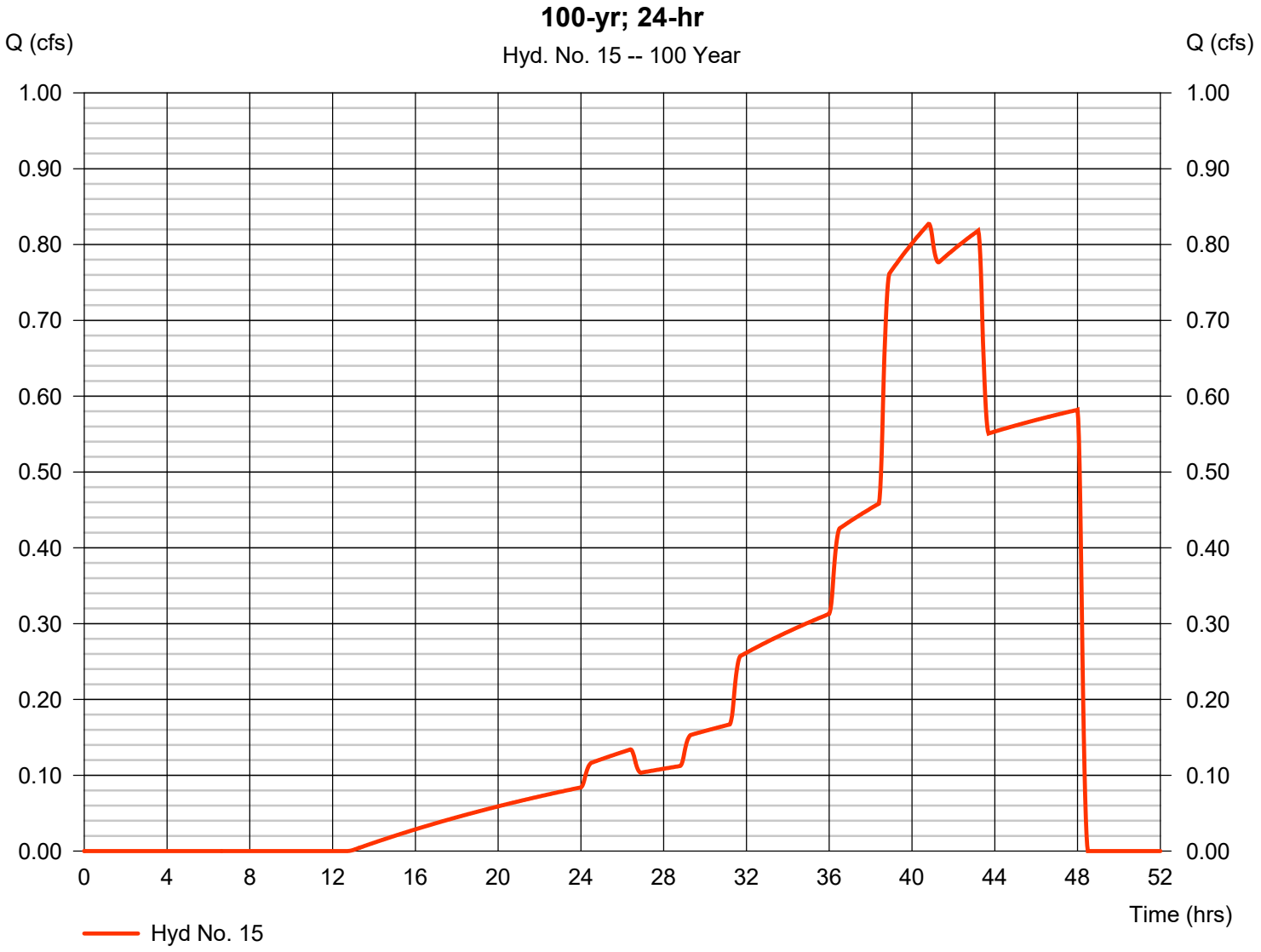


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.827 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.80 hrs
Time interval	=	2 min	Hyd. volume	=	0.864 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	9.28 in	Distribution	=	Huff-4th
Storm duration	=	48.00 hrs	Shape factor	=	484

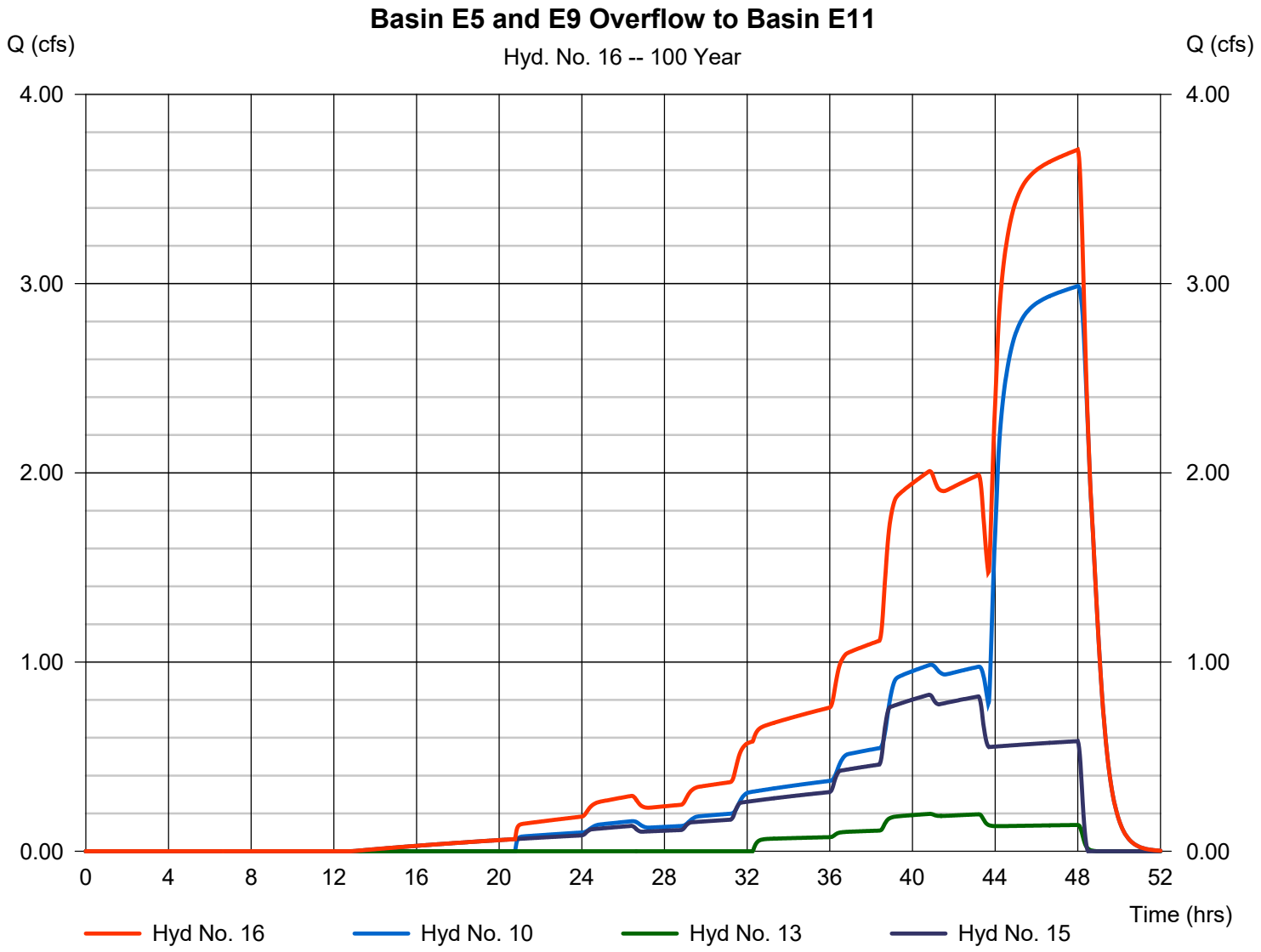


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	3.708 cfs
Storm frequency	=	100 yrs	Time to peak	=	48.00 hrs
Time interval	=	2 min	Hyd. volume	=	2.958 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



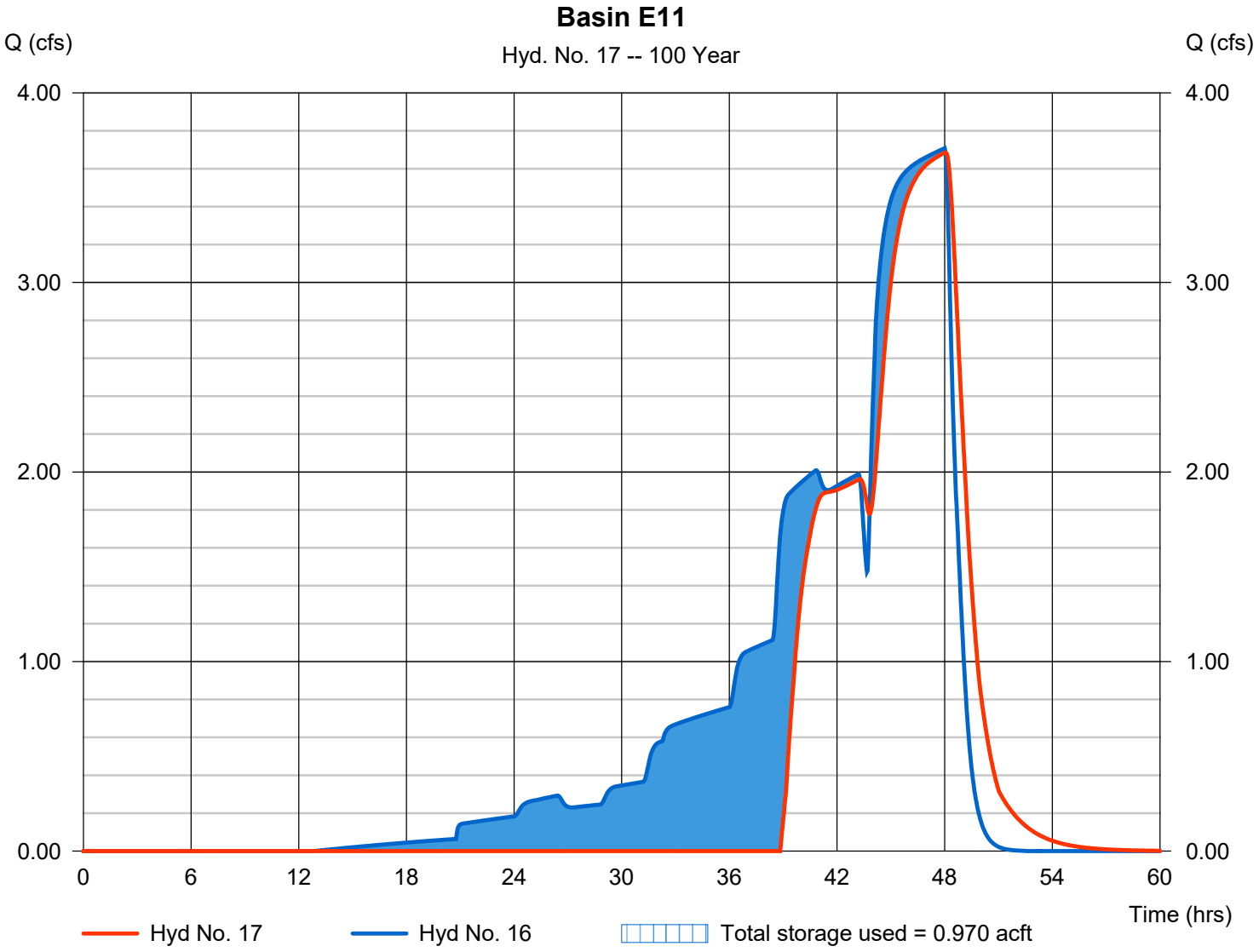
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	3.686 cfs
Storm frequency	=	100 yrs	Time to peak	=	48.03 hrs
Time interval	=	2 min	Hyd. volume	=	2.213 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow to Basin E11	Max. Elevation	=	878.41 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.970 acft

Storage Indication method used.

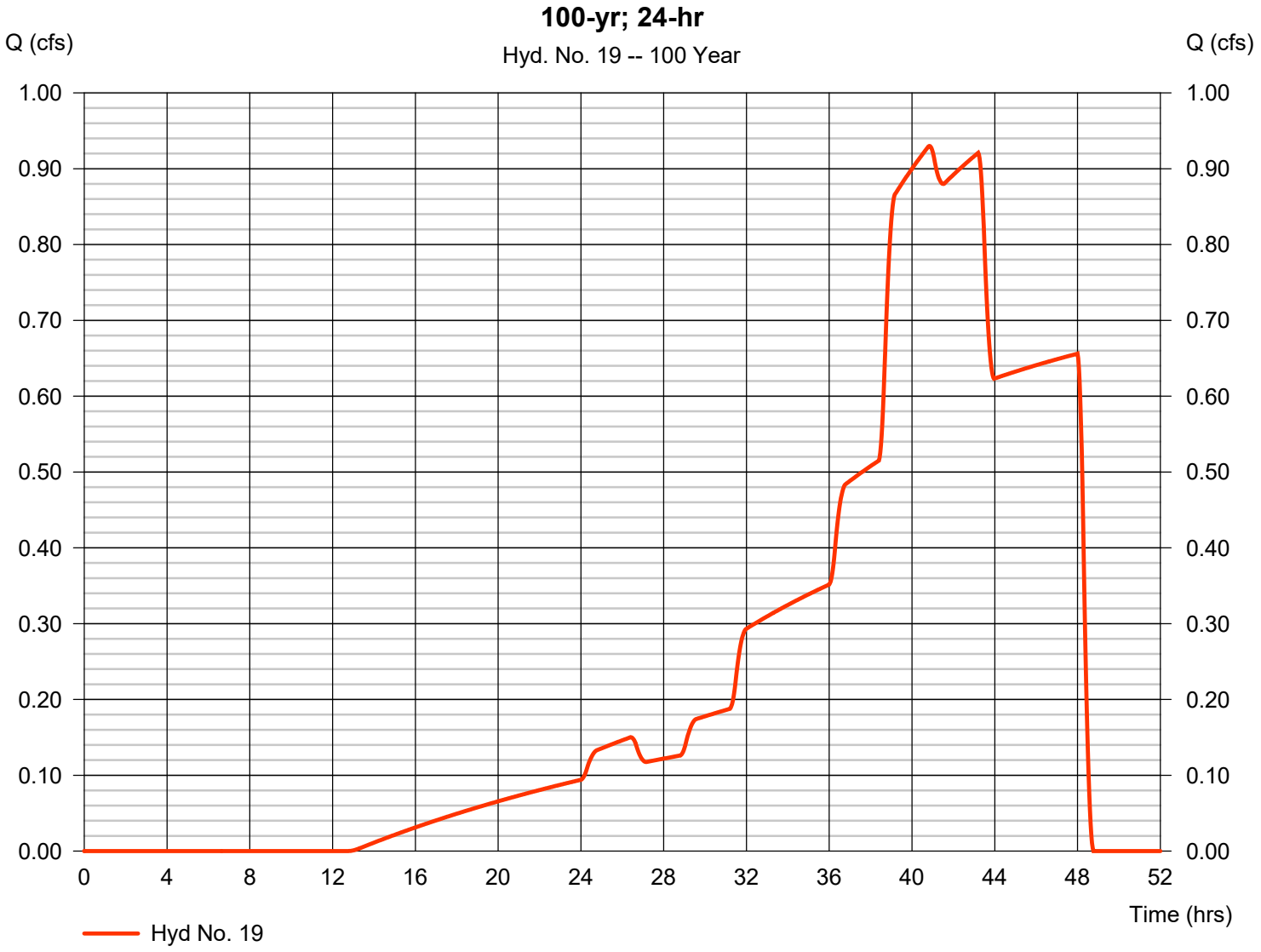


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.930 cfs
Storm frequency	=	100 yrs	Time to peak	=	40.83 hrs
Time interval	=	2 min	Hyd. volume	=	0.975 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	9.28 in	Distribution	=	Huff-4th
Storm duration	=	48.00 hrs	Shape factor	=	484

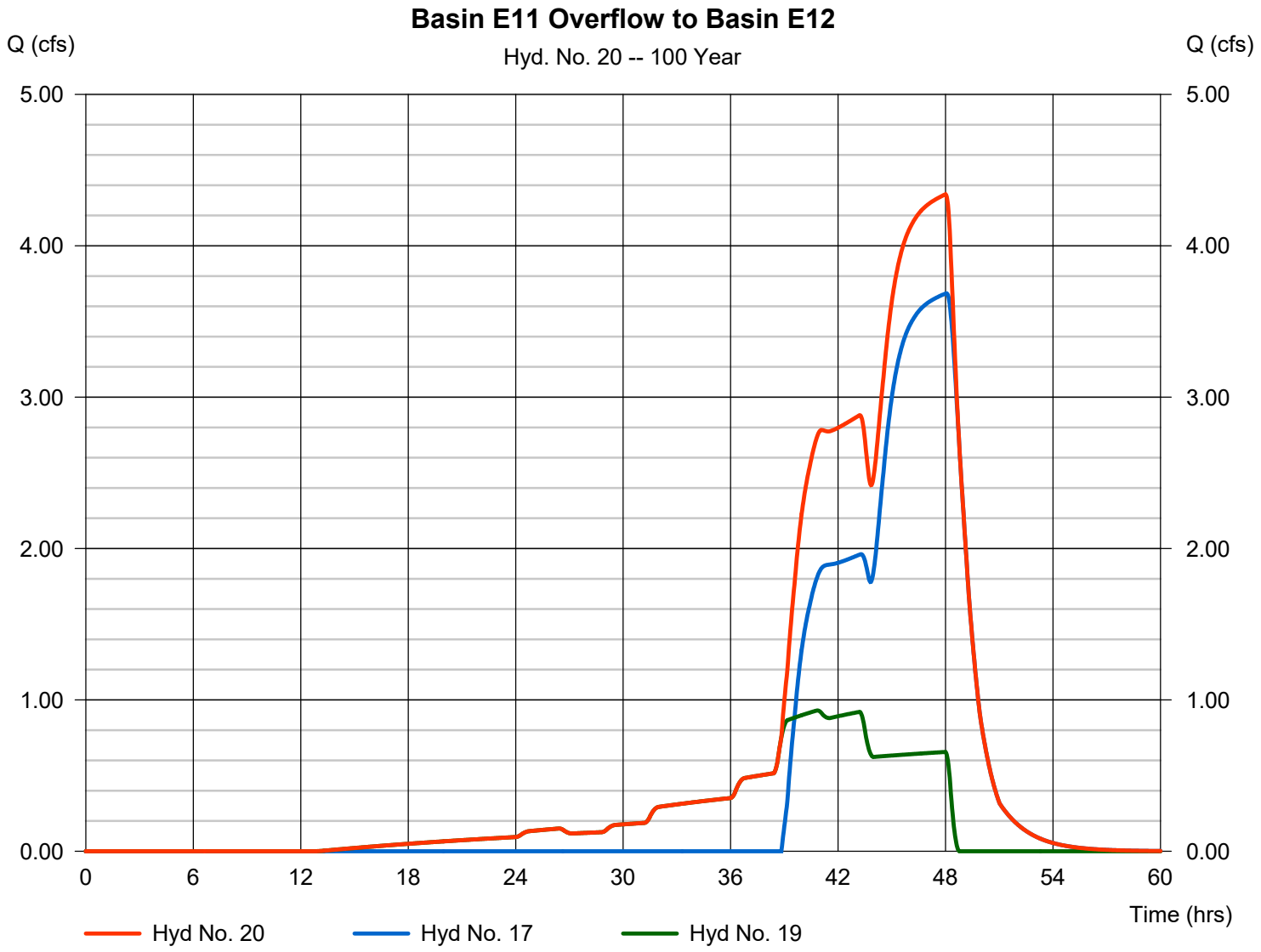


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	4.341 cfs
Storm frequency	=	100 yrs	Time to peak	=	48.00 hrs
Time interval	=	2 min	Hyd. volume	=	3.188 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



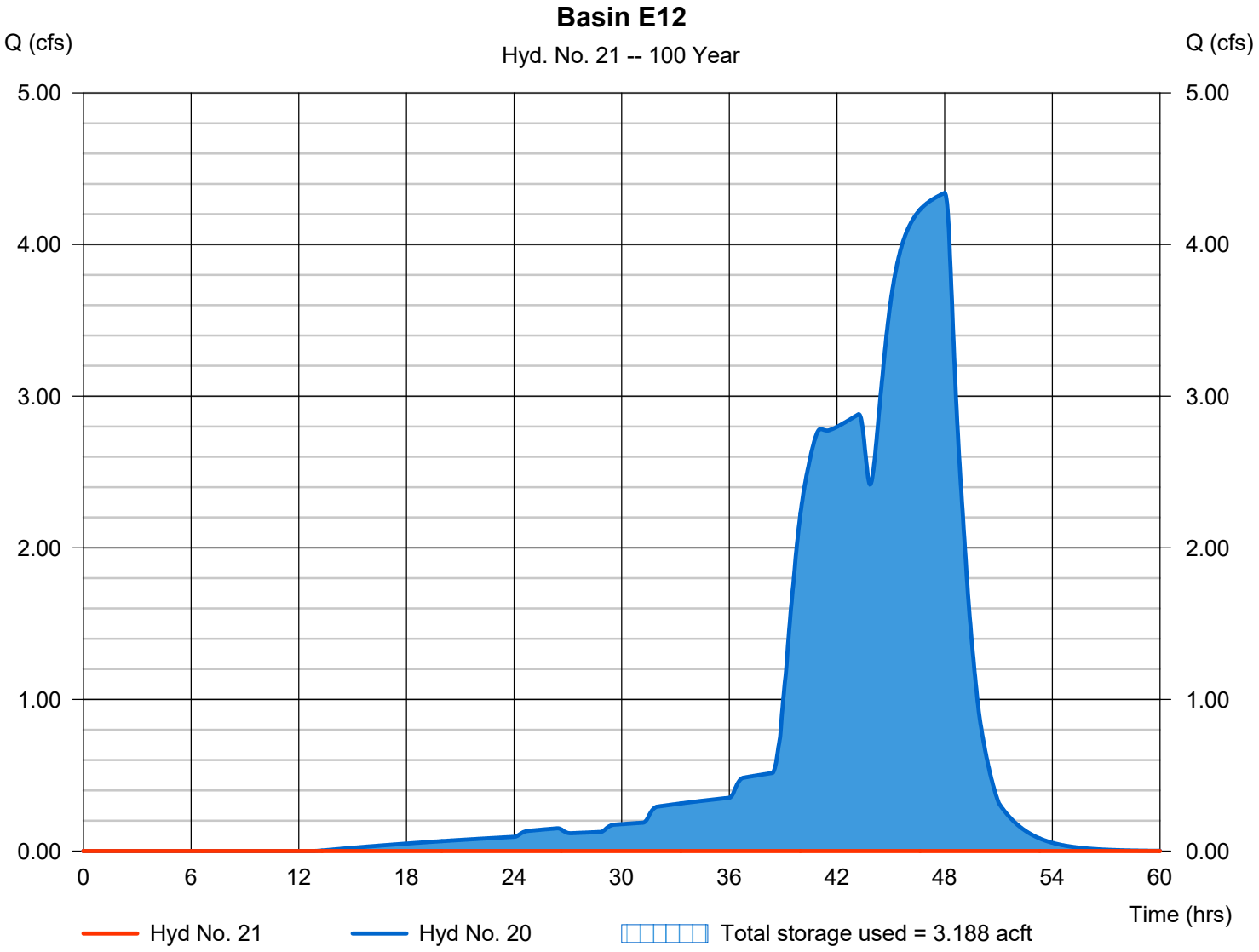
Hydrograph Report

Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	871.75 ft
Reservoir name	=	Basin E12	Max. Storage	=	3.188 acft

Storage Indication method used.



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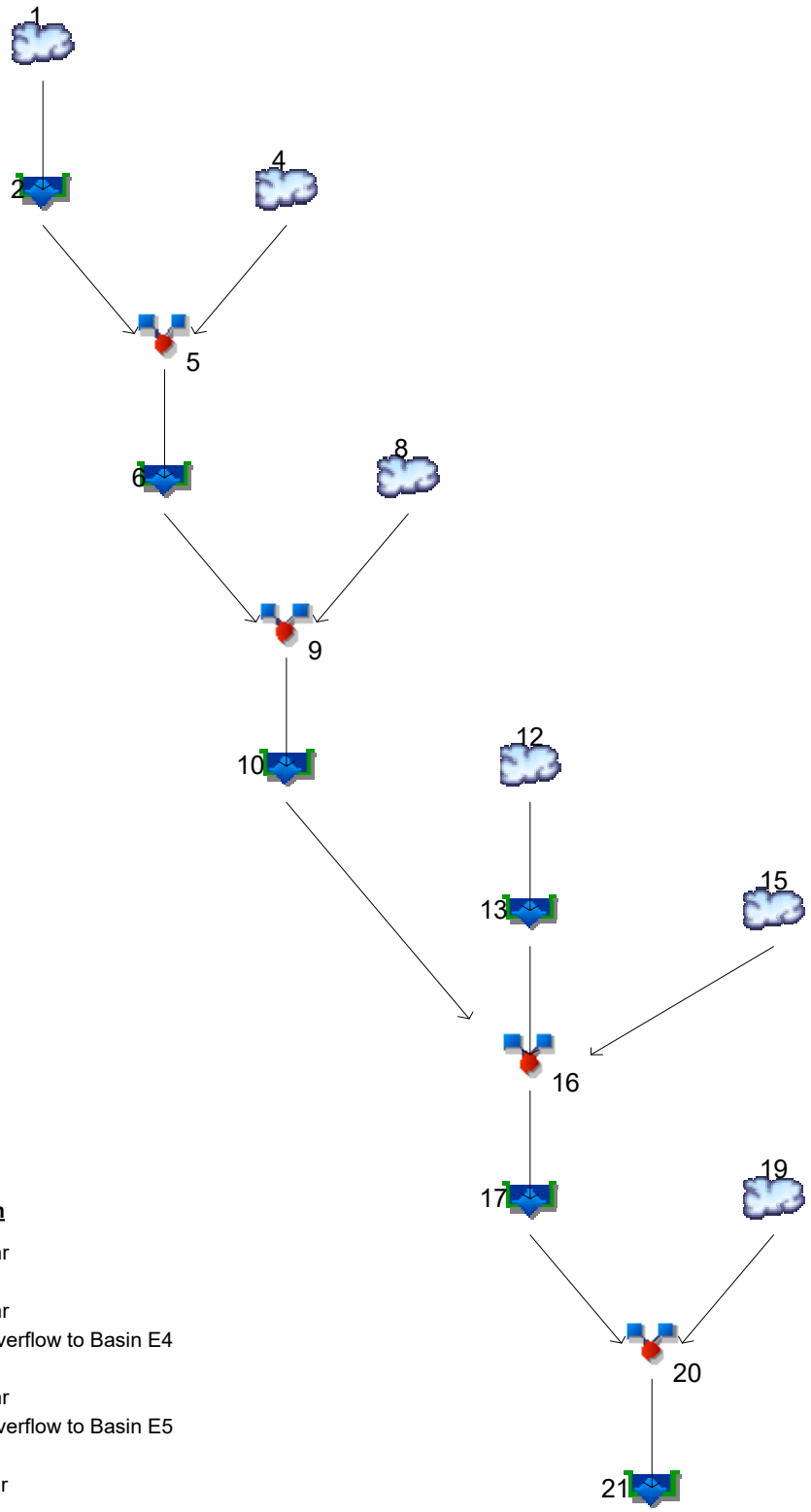
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100 Year-72 Hour Critical Duration

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	100-yr; 24-hr
2	Reservoir	Basin E6
4	SCS Runoff	100-yr; 24-hr
5	Combine	Basin E6 Overflow to Basin E4
6	Reservoir	Basin E4
8	SCS Runoff	100-yr; 24-hr
9	Combine	Basin E4 Overflow to Basin E5
10	Reservoir	Basin E5
12	SCS Runoff	100-yr; 24 hr
13	Reservoir	Basin E9
15	SCS Runoff	100-yr; 24-hr
16	Combine	Basin E5 and E9 Overflow to Basin E11
17	Reservoir	Basin E11
19	SCS Runoff	100-yr; 24-hr
20	Combine	Basin E11 Overflow to Basin E12
21	Reservoir	Basin E12

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

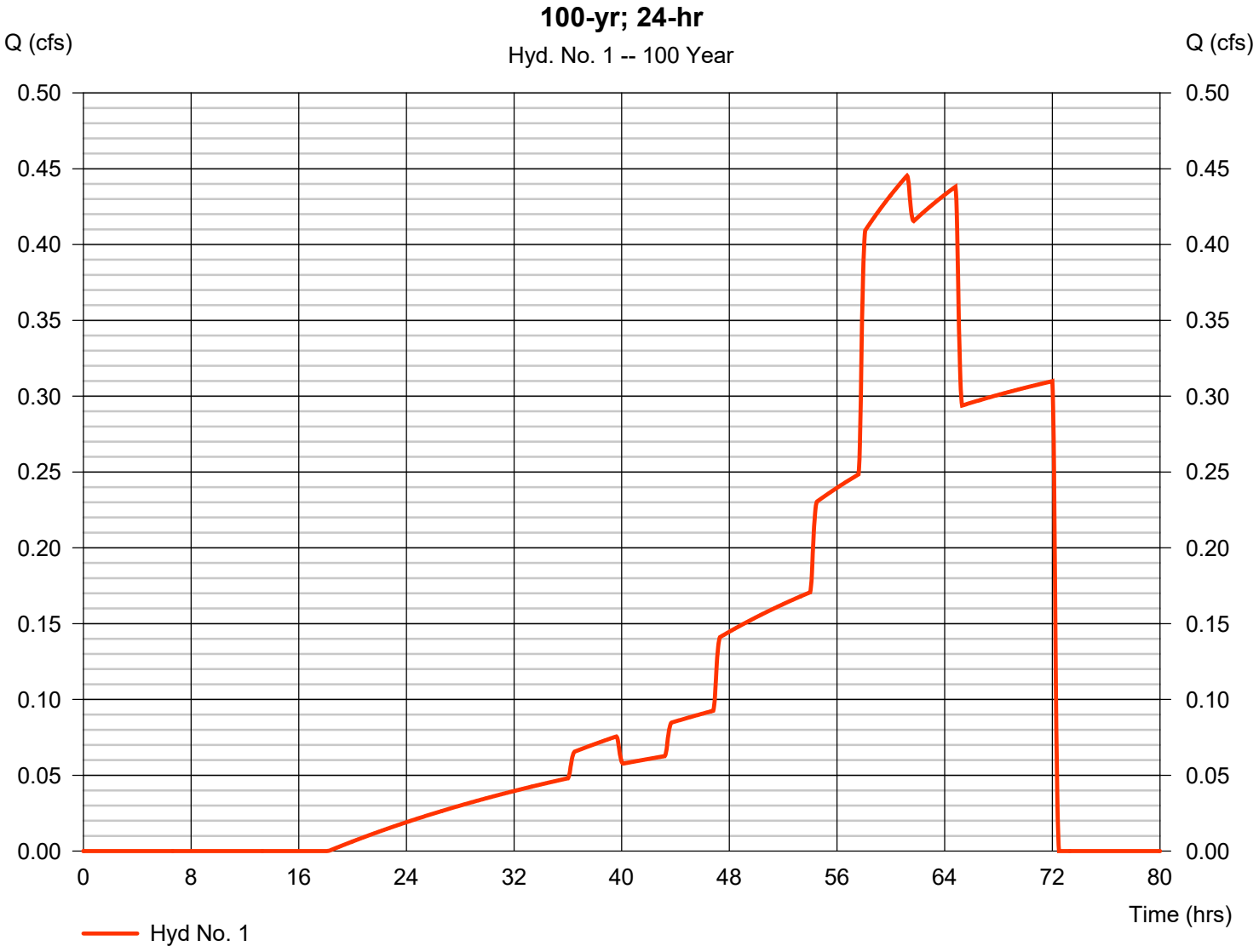
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	0.445	2	3672	0.704	------	------	------	100-yr; 24-hr
2	Reservoir	0.444	2	3676	0.462	1	891.84	0.248	Basin E6
4	SCS Runoff	1.940	2	3676	3.086	------	------	------	100-yr; 24-hr
5	Combine	2.384	2	3676	3.548	2, 4	------	------	Basin E6 Overflow to Basin E4
6	Reservoir	2.154	2	3908	1.271	5	884.37	2.37	Basin E4
8	SCS Runoff	0.720	2	3674	1.141	------	------	------	100-yr; 24-hr
9	Combine	2.800	2	3898	2.412	6, 8	------	------	Basin E4 Overflow to Basin E5
10	Reservoir	2.797	2	3900	2.386	9	882.23	0.039	Basin E5
12	SCS Runoff	0.144	2	3672	0.228	------	------	------	100-yr; 24 hr
13	Reservoir	0.144	2	3674	0.194	12	897.32	0.036	Basin E9
15	SCS Runoff	0.603	2	3672	0.953	------	------	------	100-yr; 24-hr
16	Combine	3.486	2	3894	3.533	10, 13, 15	------	------	Basin E5 and E9 Overflow to Basin E
17	Reservoir	3.096	2	3924	2.788	16	878.36	0.945	Basin E11
19	SCS Runoff	0.679	2	3674	1.076	------	------	------	100-yr; 24-hr
20	Combine	3.593	2	3910	3.864	17, 19	------	------	Basin E11 Overflow to Basin E12
21	Reservoir	0.000	2	n/a	0.000	20	872.37	3.86	Basin E12

Hydrograph Report

Hyd. No. 1

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.445 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.20 hrs
Time interval	=	2 min	Hyd. volume	=	0.704 acft
Drainage area	=	1.720 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	9.85 in	Distribution	=	Huff-4th
Storm duration	=	72.00 hrs	Shape factor	=	484



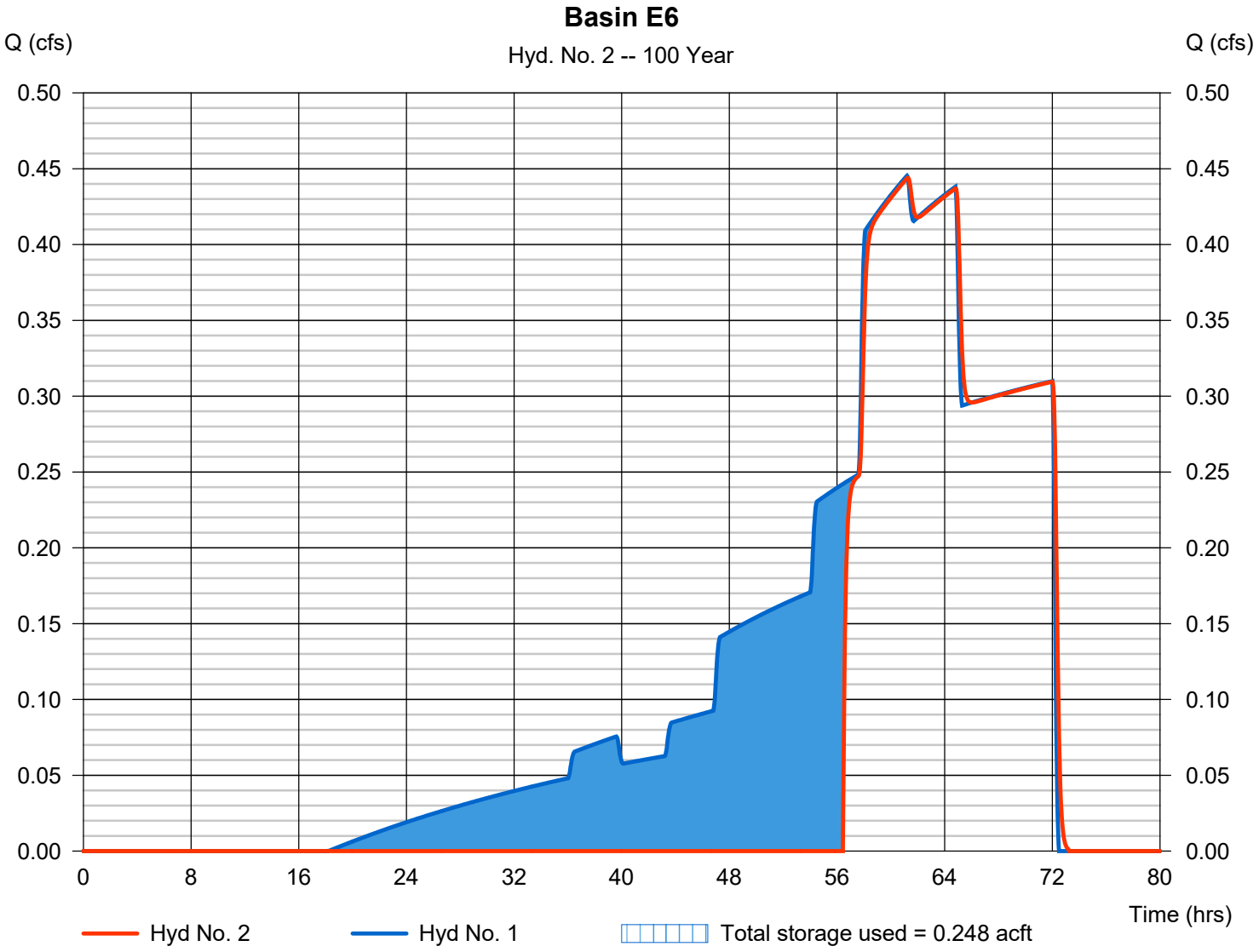
Hydrograph Report

Hyd. No. 2

Basin E6

Hydrograph type	=	Reservoir	Peak discharge	=	0.444 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.27 hrs
Time interval	=	2 min	Hyd. volume	=	0.462 acft
Inflow hyd. No.	=	1 - 100-yr; 24-hr	Max. Elevation	=	891.84 ft
Reservoir name	=	Basin E6	Max. Storage	=	0.248 acft

Storage Indication method used.

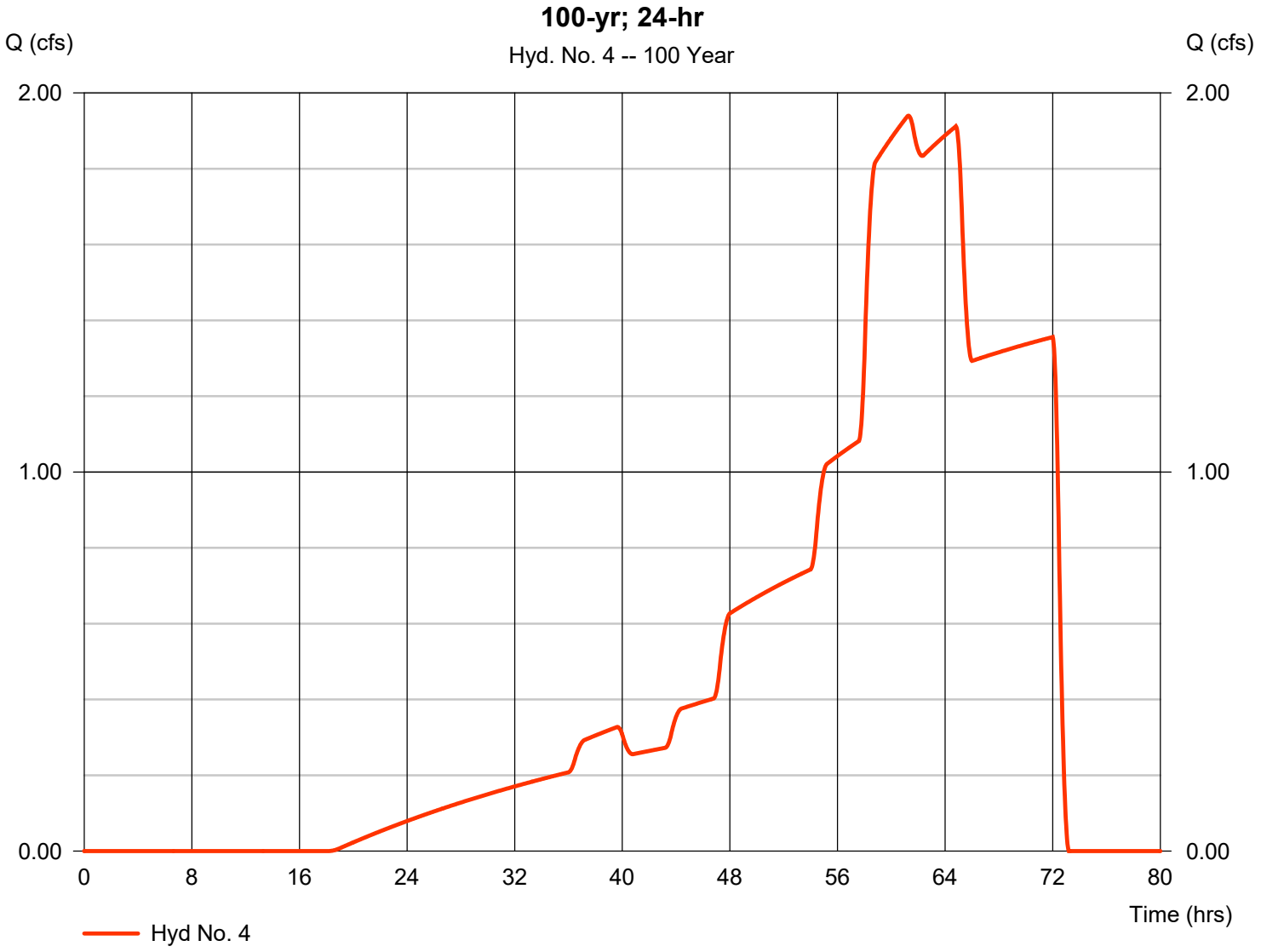


Hydrograph Report

Hyd. No. 4

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.940 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.27 hrs
Time interval	=	2 min	Hyd. volume	=	3.086 acft
Drainage area	=	7.610 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	45.00 min
Total precip.	=	9.85 in	Distribution	=	Huff-4th
Storm duration	=	72.00 hrs	Shape factor	=	484

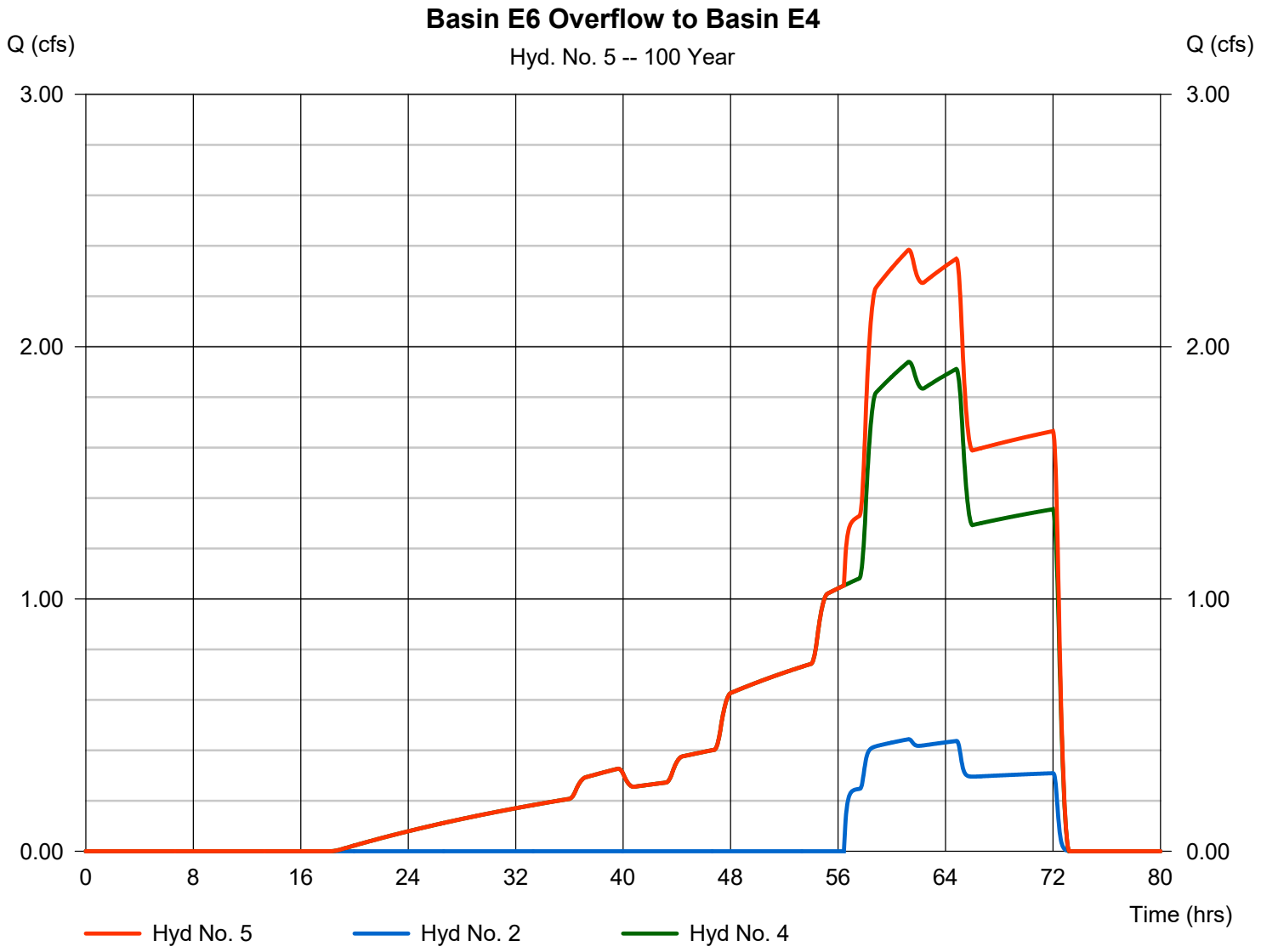


Hydrograph Report

Hyd. No. 5

Basin E6 Overflow to Basin E4

Hydrograph type	= Combine	Peak discharge	= 2.384 cfs
Storm frequency	= 100 yrs	Time to peak	= 61.27 hrs
Time interval	= 2 min	Hyd. volume	= 3.548 acft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 7.610 ac



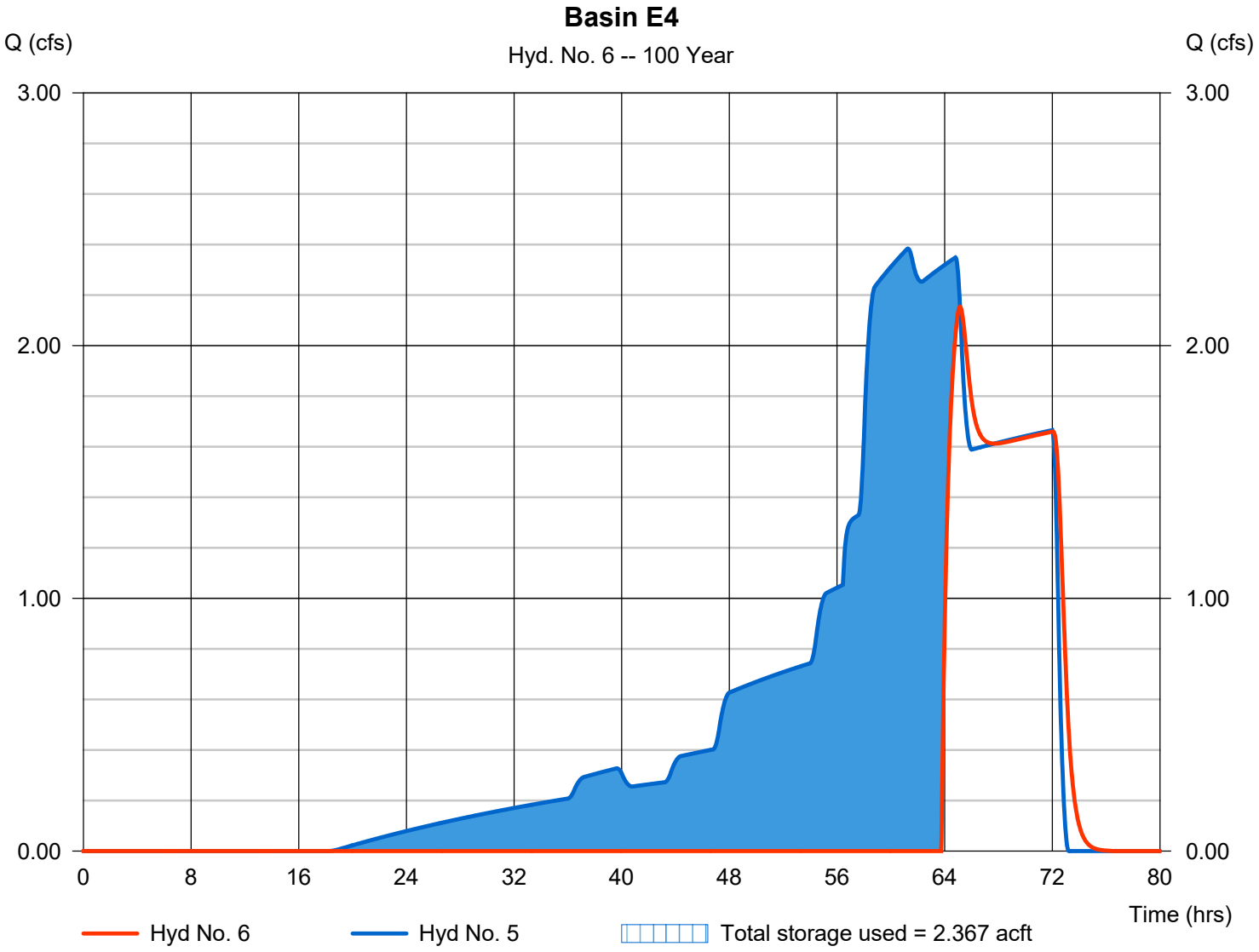
Hydrograph Report

Hyd. No. 6

Basin E4

Hydrograph type	=	Reservoir	Peak discharge	=	2.154 cfs
Storm frequency	=	100 yrs	Time to peak	=	65.13 hrs
Time interval	=	2 min	Hyd. volume	=	1.271 acft
Inflow hyd. No.	=	5 - Basin E6 Overflow to Basin E4	Max. Elevation	=	884.37 ft
Reservoir name	=	Basin E4	Max. Storage	=	2.367 acft

Storage Indication method used.

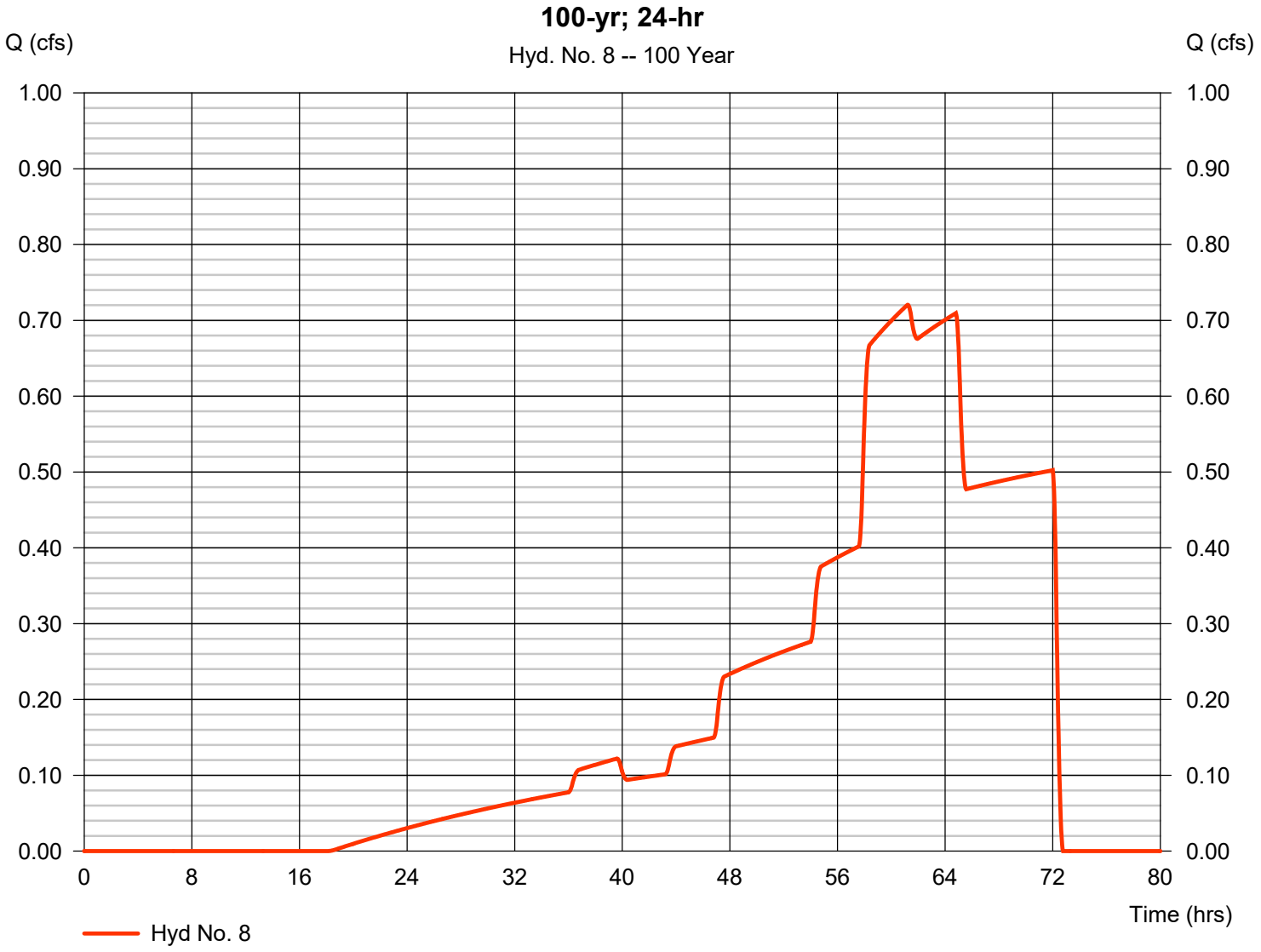


Hydrograph Report

Hyd. No. 8

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.720 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.23 hrs
Time interval	=	2 min	Hyd. volume	=	1.141 acft
Drainage area	=	2.790 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	9.85 in	Distribution	=	Huff-4th
Storm duration	=	72.00 hrs	Shape factor	=	484

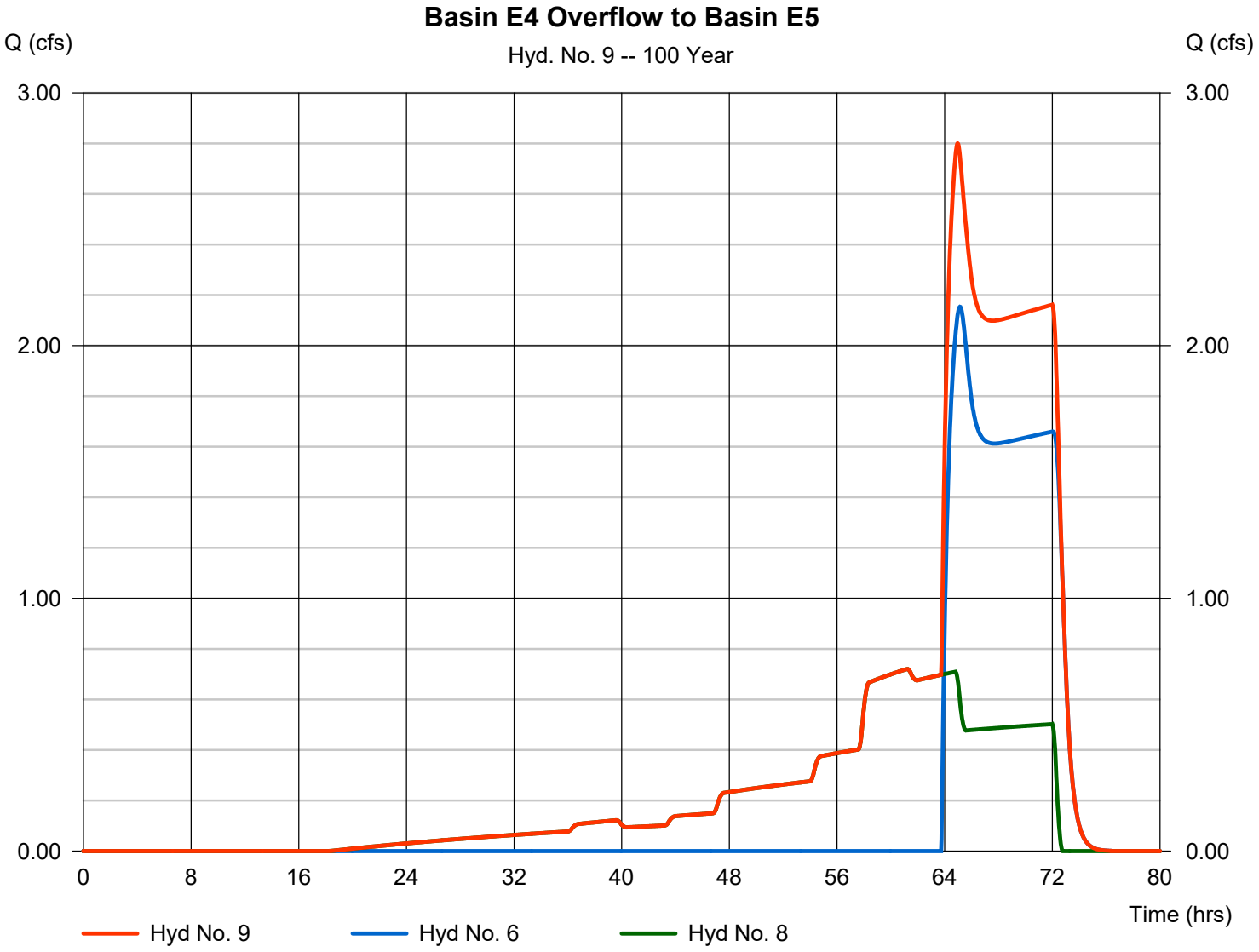


Hydrograph Report

Hyd. No. 9

Basin E4 Overflow to Basin E5

Hydrograph type	= Combine	Peak discharge	= 2.800 cfs
Storm frequency	= 100 yrs	Time to peak	= 64.97 hrs
Time interval	= 2 min	Hyd. volume	= 2.412 acft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 2.790 ac



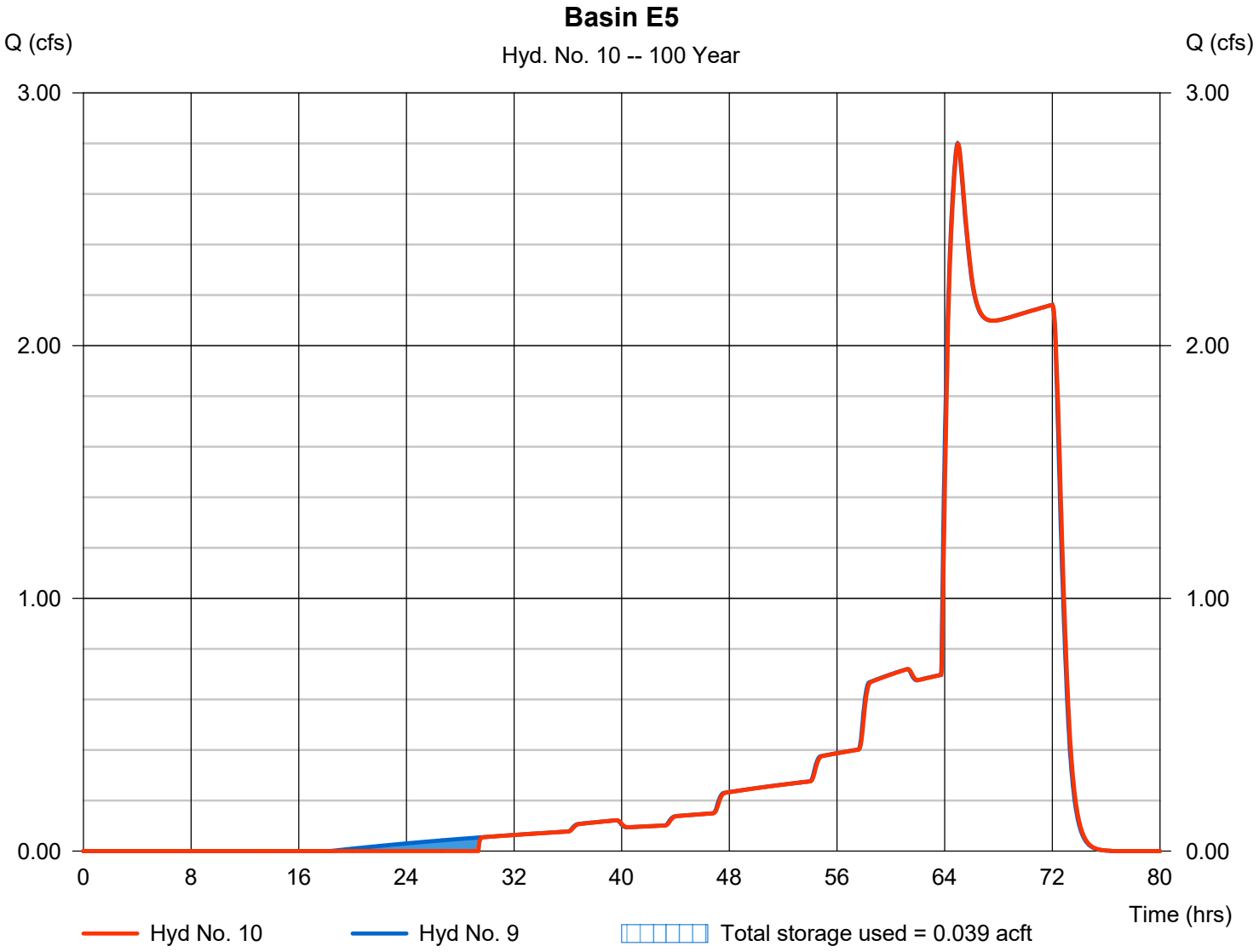
Hydrograph Report

Hyd. No. 10

Basin E5

Hydrograph type	=	Reservoir	Peak discharge	=	2.797 cfs
Storm frequency	=	100 yrs	Time to peak	=	65.00 hrs
Time interval	=	2 min	Hyd. volume	=	2.386 acft
Inflow hyd. No.	=	9 - Basin E4 Overflow to Basin E5	Max. Elevation	=	882.23 ft
Reservoir name	=	Basin E5	Max. Storage	=	0.039 acft

Storage Indication method used.

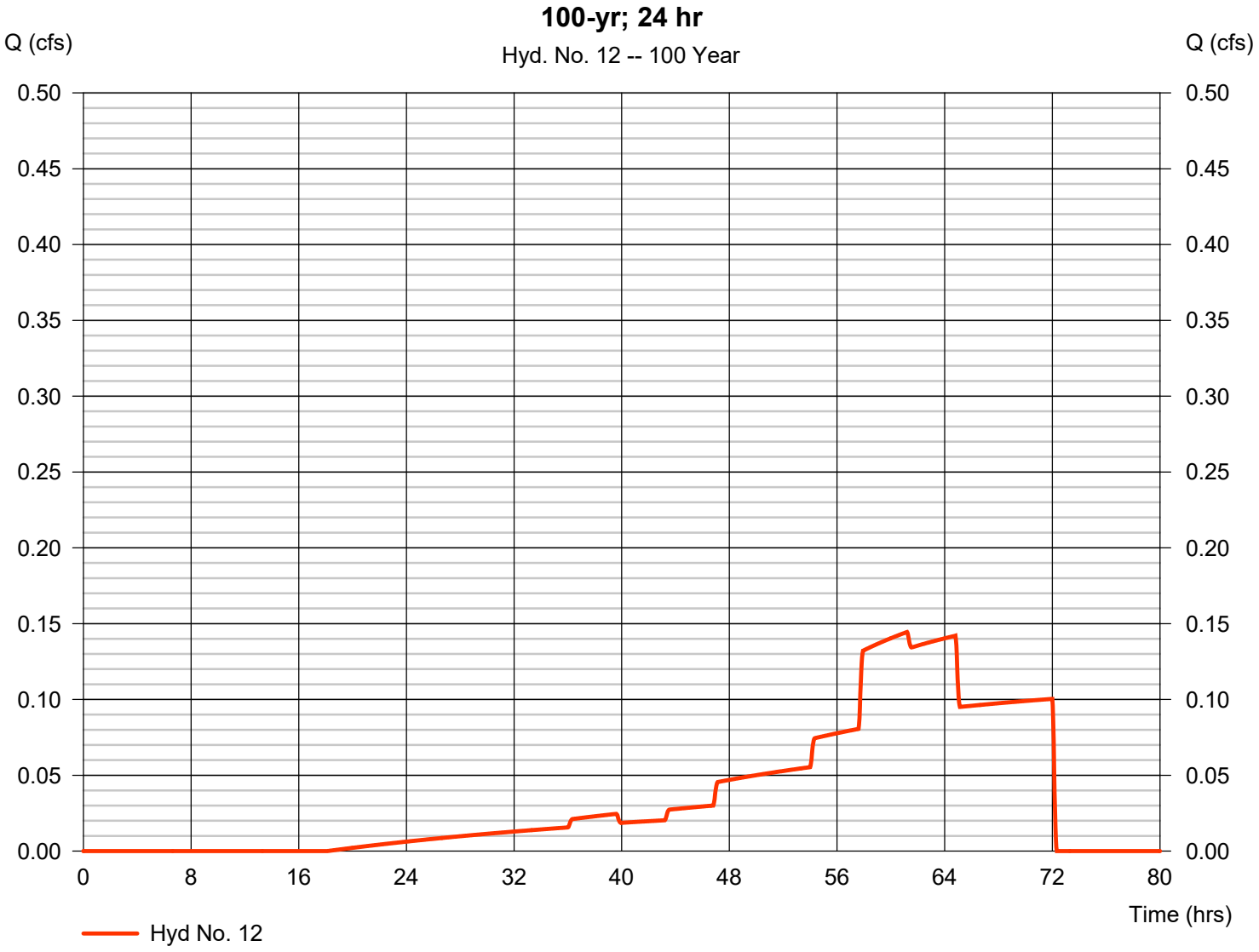


Hydrograph Report

Hyd. No. 12

100-yr; 24 hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.144 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.20 hrs
Time interval	=	2 min	Hyd. volume	=	0.228 acft
Drainage area	=	0.540 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	9.85 in	Distribution	=	Huff-4th
Storm duration	=	72.00 hrs	Shape factor	=	484



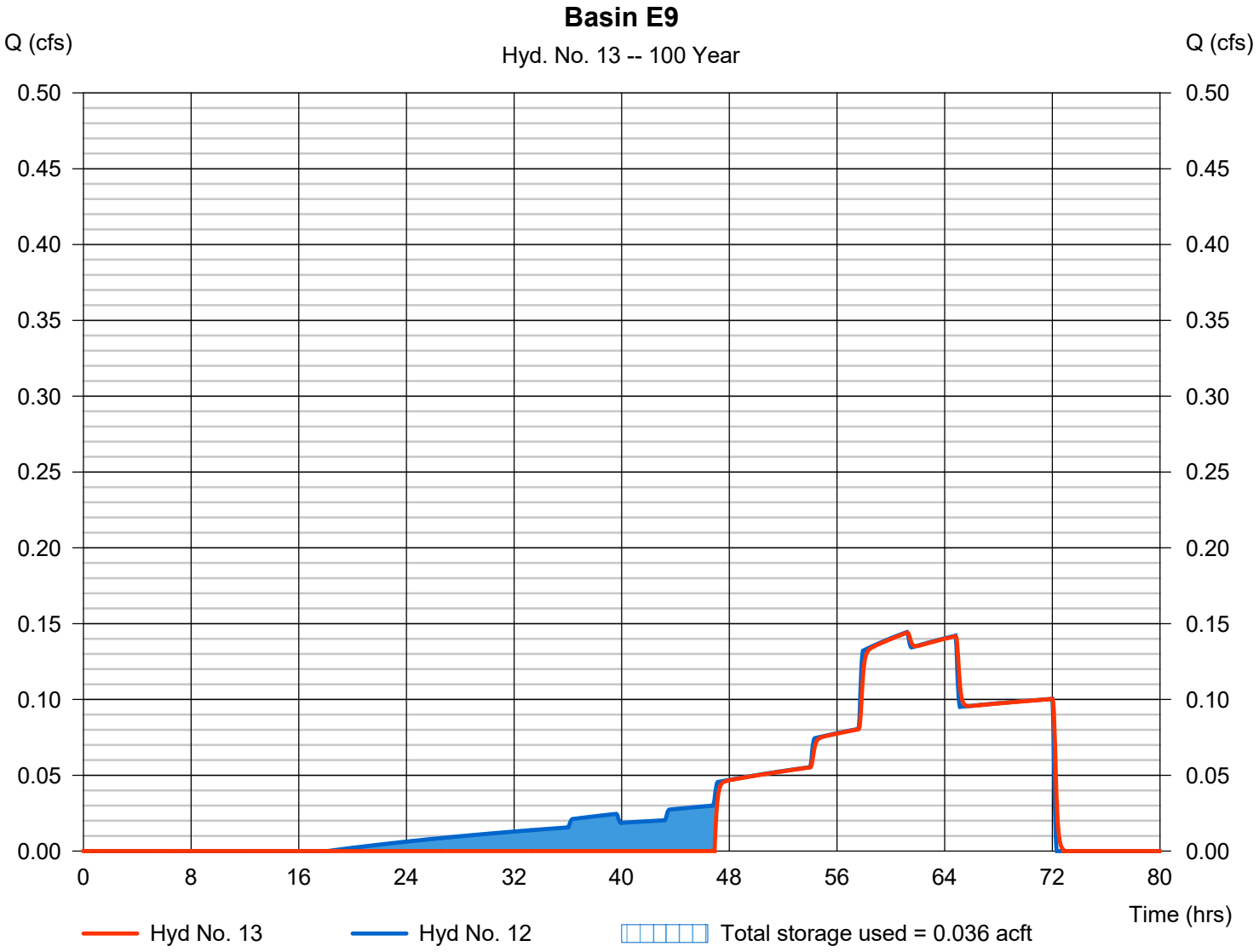
Hydrograph Report

Hyd. No. 13

Basin E9

Hydrograph type	=	Reservoir	Peak discharge	=	0.144 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.23 hrs
Time interval	=	2 min	Hyd. volume	=	0.194 acft
Inflow hyd. No.	=	12 - 100-yr; 24 hr	Max. Elevation	=	897.32 ft
Reservoir name	=	Basin E9	Max. Storage	=	0.036 acft

Storage Indication method used.

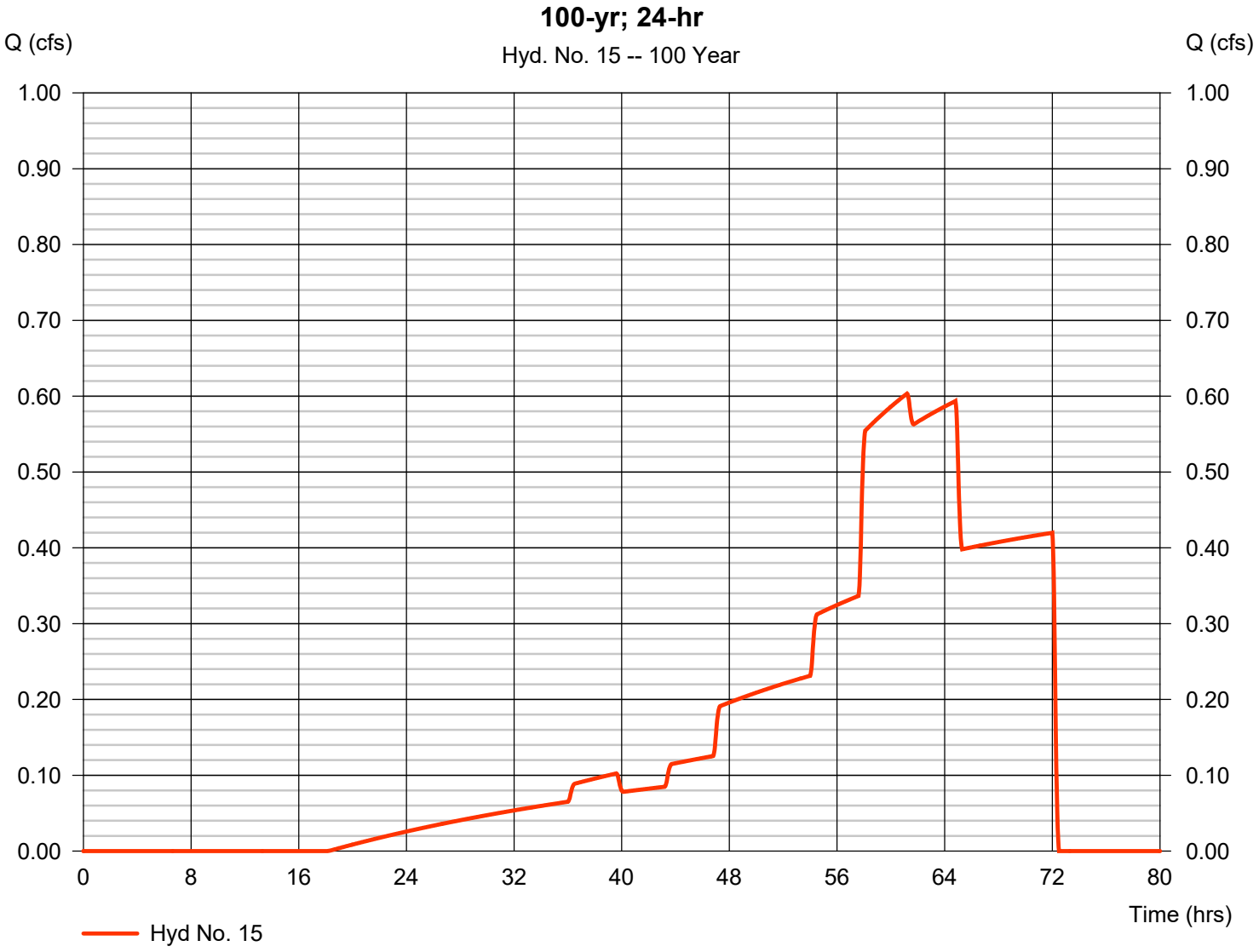


Hydrograph Report

Hyd. No. 15

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.603 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.20 hrs
Time interval	=	2 min	Hyd. volume	=	0.953 acft
Drainage area	=	2.330 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	20.00 min
Total precip.	=	9.85 in	Distribution	=	Huff-4th
Storm duration	=	72.00 hrs	Shape factor	=	484

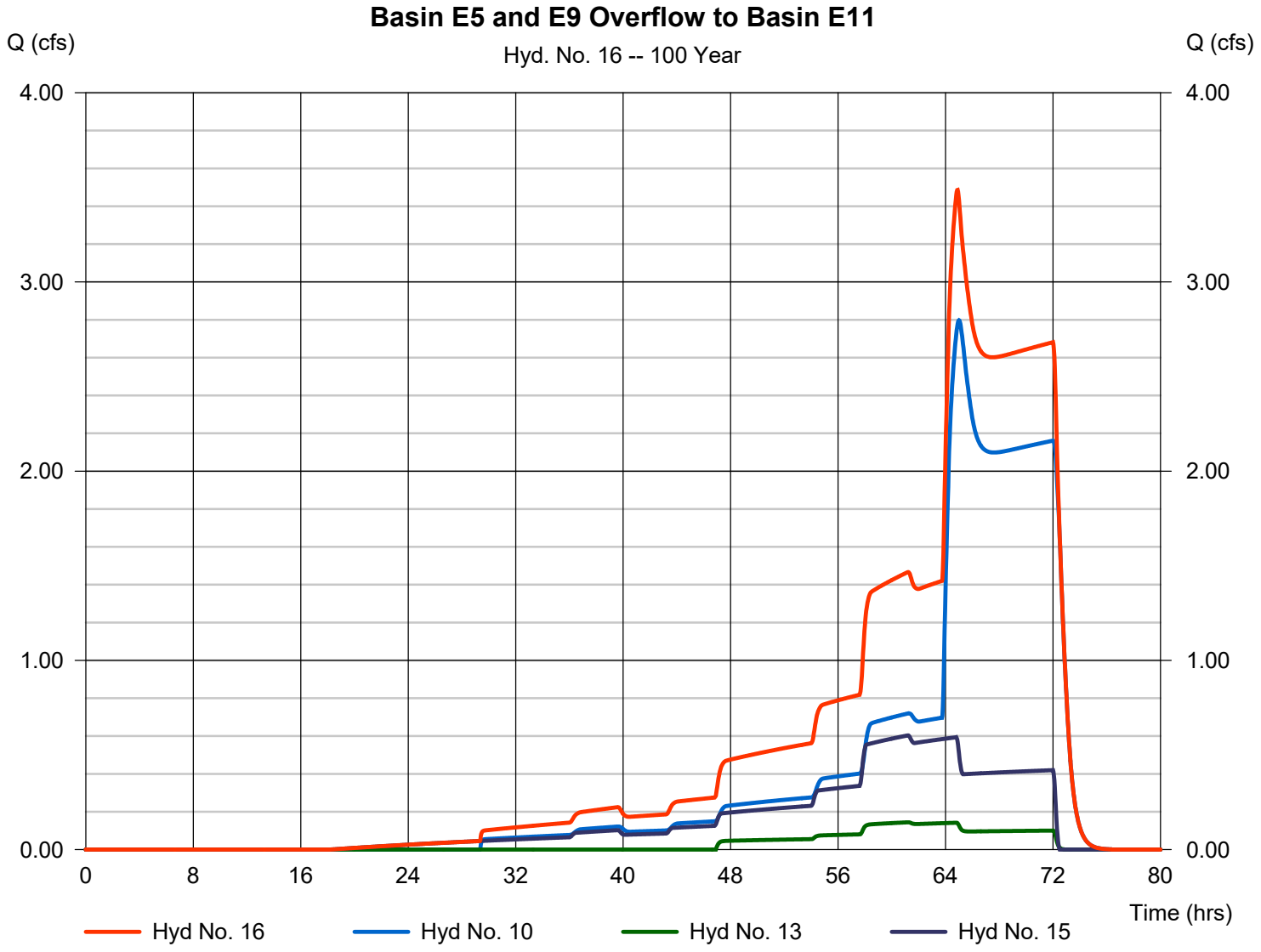


Hydrograph Report

Hyd. No. 16

Basin E5 and E9 Overflow to Basin E11

Hydrograph type	=	Combine	Peak discharge	=	3.486 cfs
Storm frequency	=	100 yrs	Time to peak	=	64.90 hrs
Time interval	=	2 min	Hyd. volume	=	3.533 acft
Inflow hyds.	=	10, 13, 15	Contrib. drain. area	=	2.330 ac



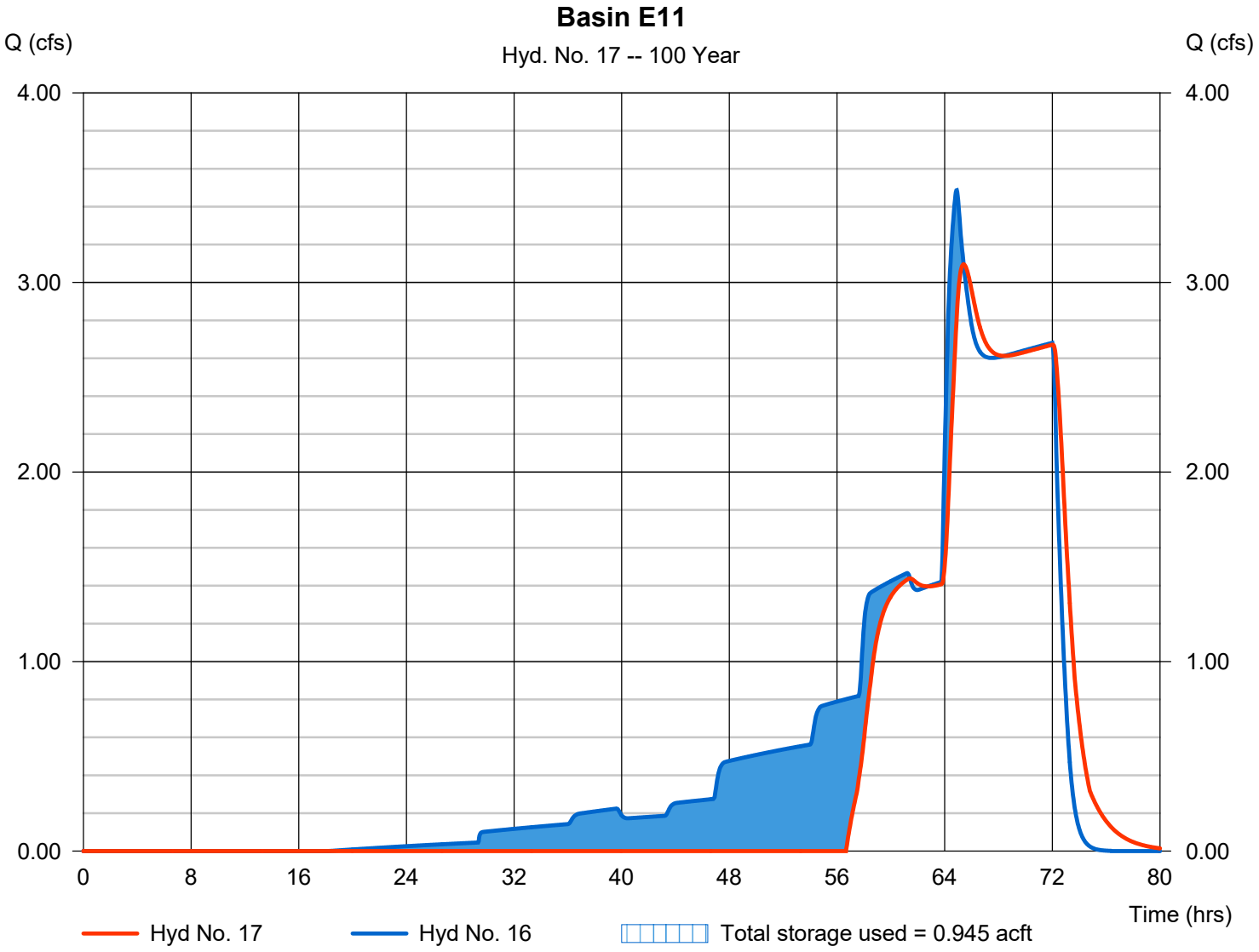
Hydrograph Report

Hyd. No. 17

Basin E11

Hydrograph type	=	Reservoir	Peak discharge	=	3.096 cfs
Storm frequency	=	100 yrs	Time to peak	=	65.40 hrs
Time interval	=	2 min	Hyd. volume	=	2.788 acft
Inflow hyd. No.	=	16 - Basin E5 and E9 Overflow to E11	Max. Elevation	=	878.36 ft
Reservoir name	=	Basin E11	Max. Storage	=	0.945 acft

Storage Indication method used.

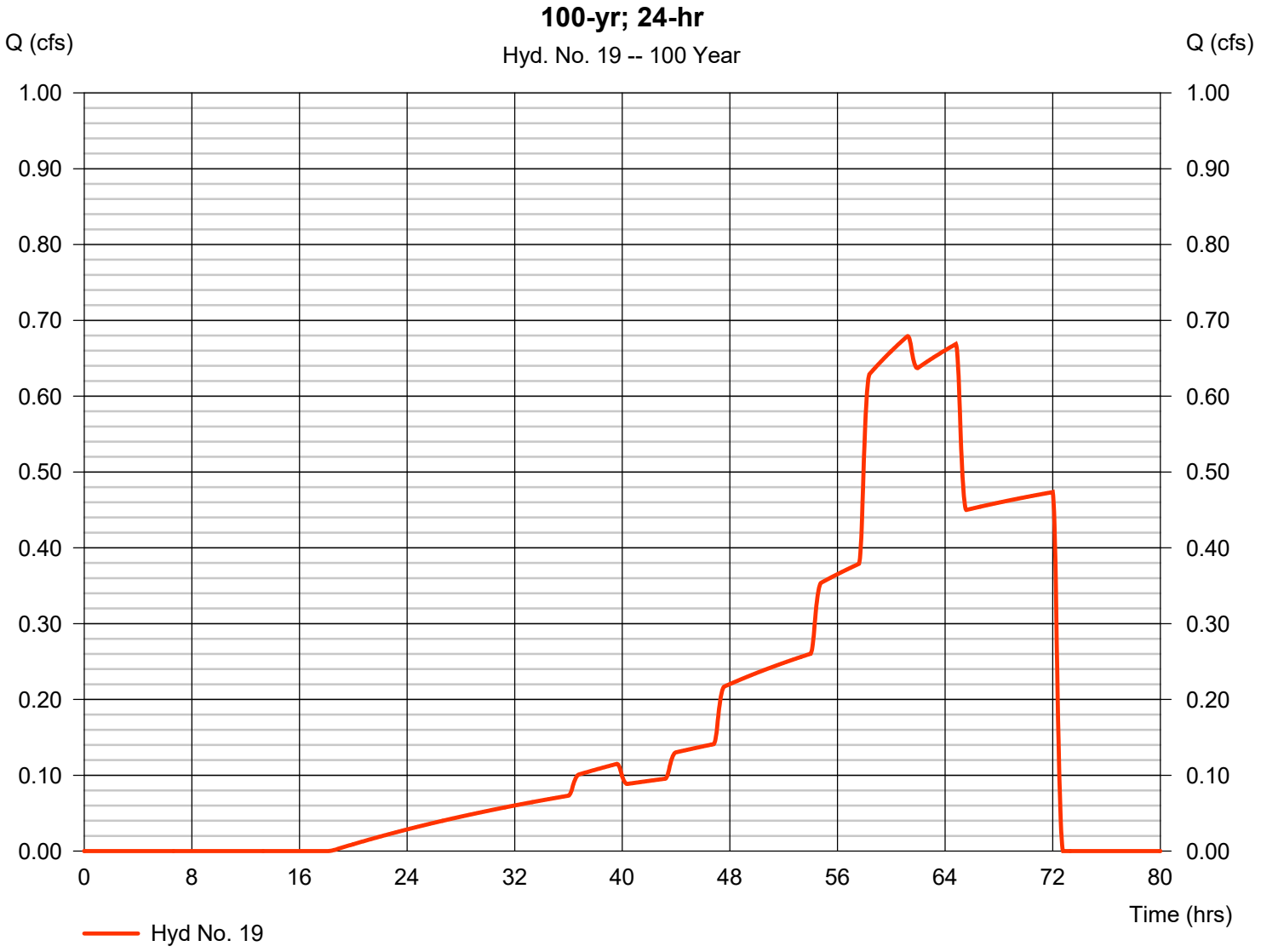


Hydrograph Report

Hyd. No. 19

100-yr; 24-hr

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.679 cfs
Storm frequency	=	100 yrs	Time to peak	=	61.23 hrs
Time interval	=	2 min	Hyd. volume	=	1.076 acft
Drainage area	=	2.630 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	9.85 in	Distribution	=	Huff-4th
Storm duration	=	72.00 hrs	Shape factor	=	484

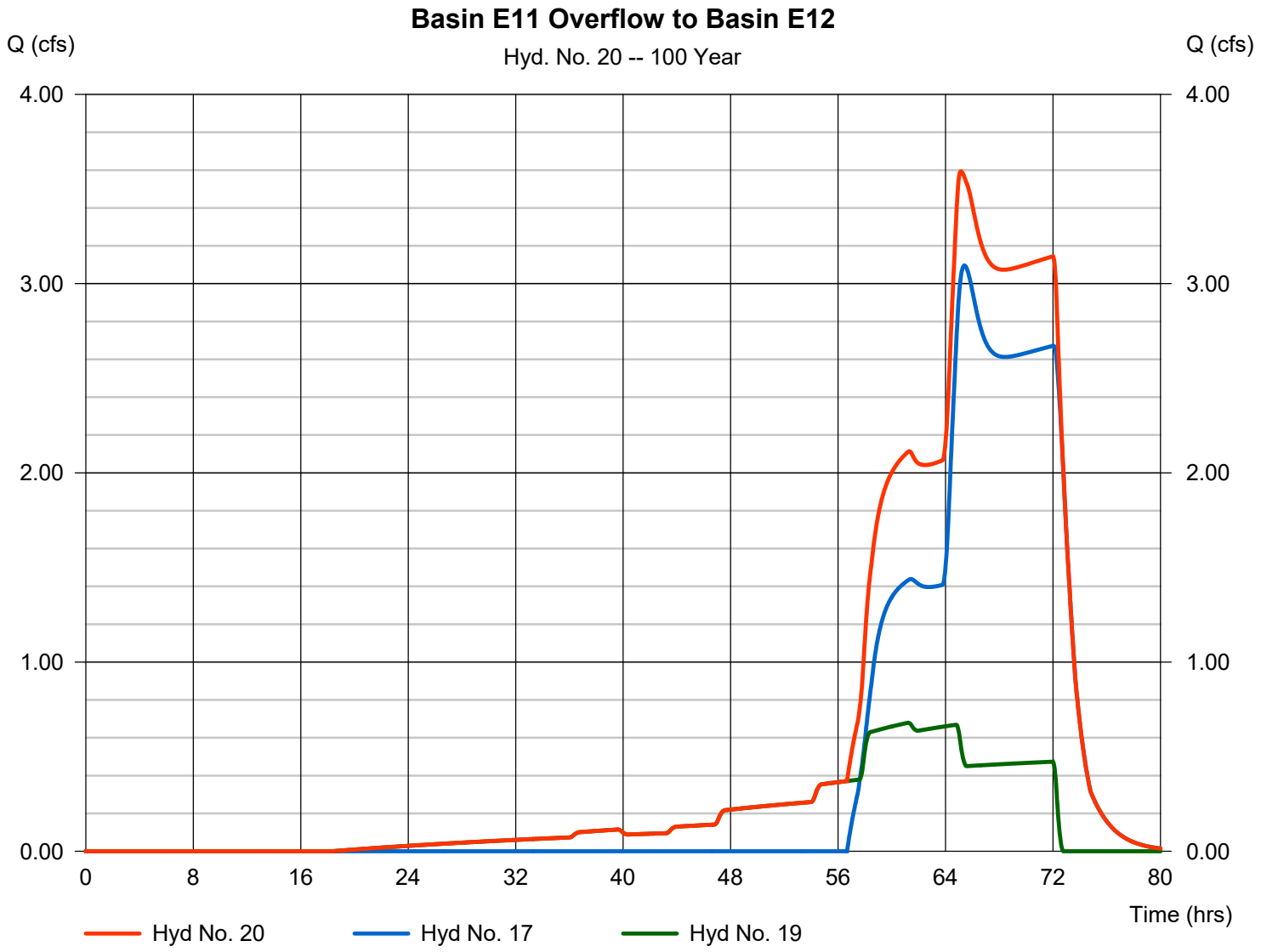


Hydrograph Report

Hyd. No. 20

Basin E11 Overflow to Basin E12

Hydrograph type	=	Combine	Peak discharge	=	3.593 cfs
Storm frequency	=	100 yrs	Time to peak	=	65.17 hrs
Time interval	=	2 min	Hyd. volume	=	3.864 acft
Inflow hyds.	=	17, 19	Contrib. drain. area	=	2.630 ac



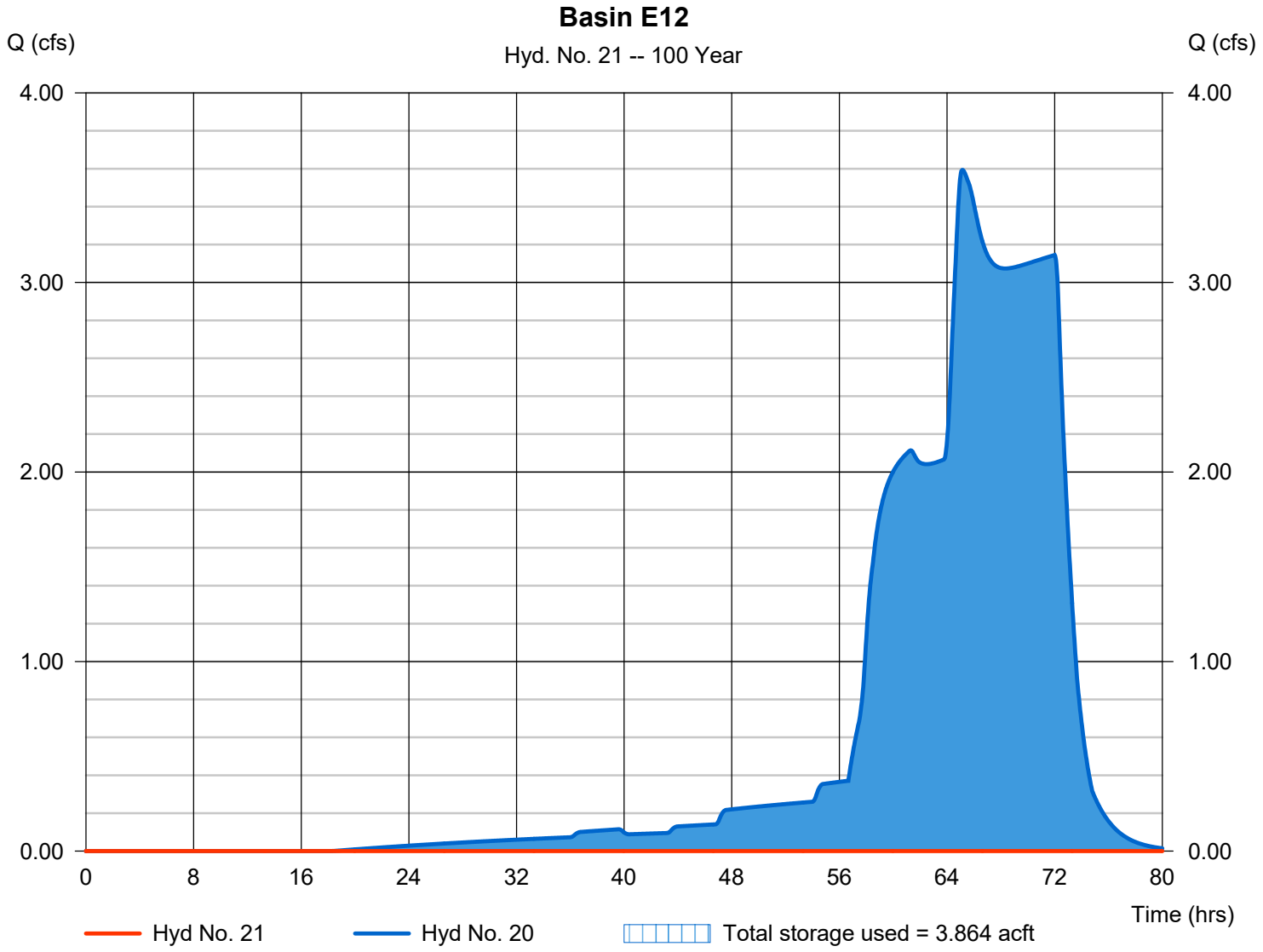
Hydrograph Report

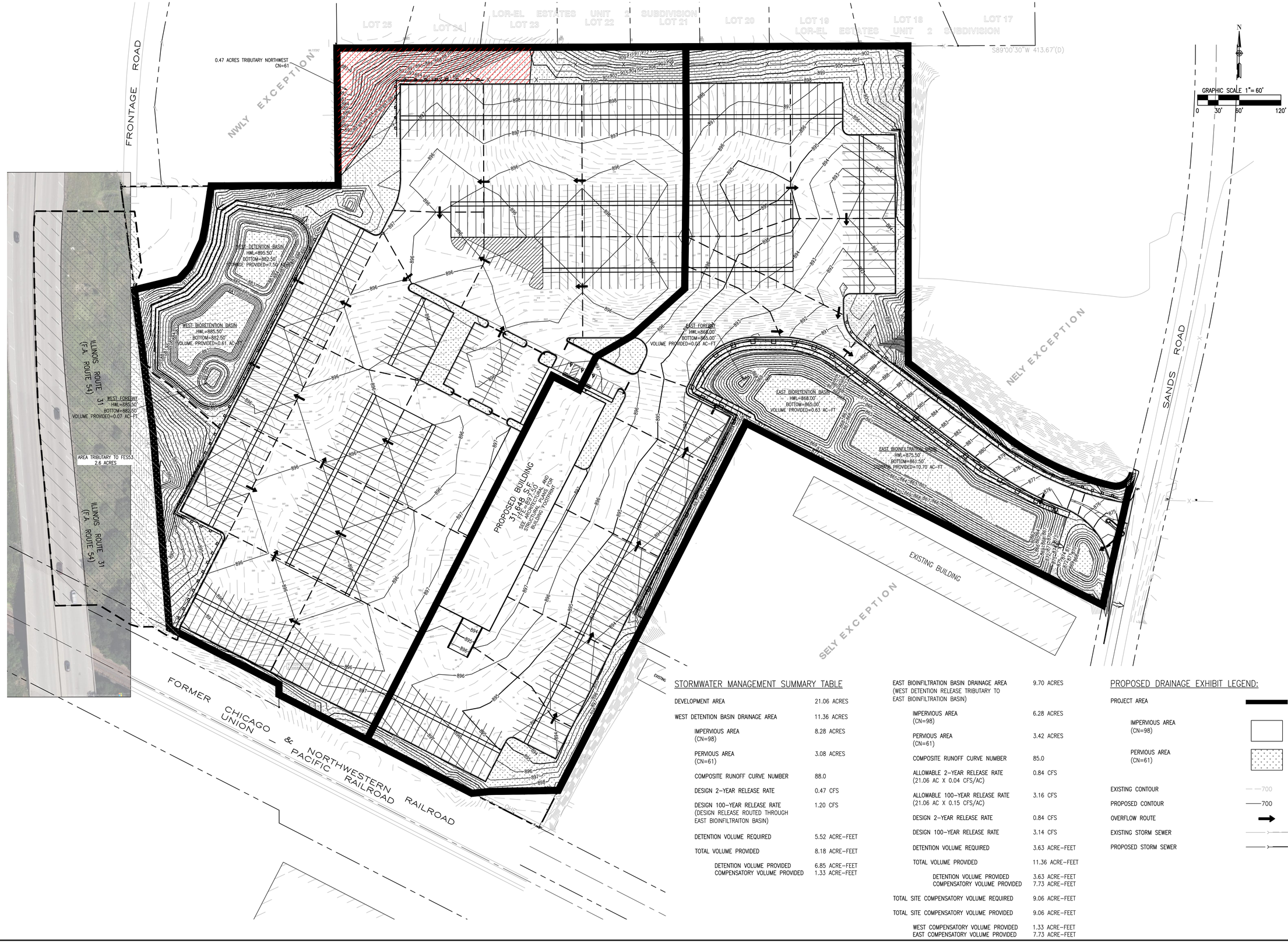
Hyd. No. 21

Basin E12

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0.000 acft
Inflow hyd. No.	=	20 - Basin E11 Overflow to Basin E12	Max. Elevation	=	872.37 ft
Reservoir name	=	Basin E12	Max. Storage	=	3.864 acft

Storage Indication method used.





STORMWATER MANAGEMENT SUMMARY TABLE

DEVELOPMENT AREA	21.06 ACRES
WEST DETENTION BASIN DRAINAGE AREA	11.36 ACRES
IMPERVIOUS AREA (CN=98)	8.28 ACRES
PERVIOUS AREA (CN=61)	3.08 ACRES
COMPOSITE RUNOFF CURVE NUMBER	88.0
DESIGN 2-YEAR RELEASE RATE	0.47 CFS
DESIGN 100-YEAR RELEASE RATE (DESIGN RELEASE ROUTED THROUGH EAST BIOINFILTRAITON BASIN)	1.20 CFS
DETENTION VOLUME REQUIRED	5.52 ACRE-FEET
TOTAL VOLUME PROVIDED	8.18 ACRE-FEET
DETENTION VOLUME PROVIDED	6.85 ACRE-FEET
COMPENSATORY VOLUME PROVIDED	1.33 ACRE-FEET
EAST BIOINFILTRATION BASIN DRAINAGE AREA (WEST DETENTION RELEASE TRIBUTARY TO EAST BIOINFILTRATION BASIN)	9.70 ACRES
IMPERVIOUS AREA (CN=98)	6.28 ACRES
PERVIOUS AREA (CN=61)	3.42 ACRES
COMPOSITE RUNOFF CURVE NUMBER	85.0
ALLOWABLE 2-YEAR RELEASE RATE (21.06 AC X 0.04 CFS/AC)	0.84 CFS
ALLOWABLE 100-YEAR RELEASE RATE (21.06 AC X 0.15 CFS/AC)	3.16 CFS
DESIGN 2-YEAR RELEASE RATE	0.84 CFS
DESIGN 100-YEAR RELEASE RATE	3.14 CFS
DETENTION VOLUME REQUIRED	3.63 ACRE-FEET
TOTAL VOLUME PROVIDED	11.36 ACRE-FEET
DETENTION VOLUME PROVIDED	3.63 ACRE-FEET
COMPENSATORY VOLUME PROVIDED	7.73 ACRE-FEET
TOTAL SITE COMPENSATORY VOLUME REQUIRED	9.06 ACRE-FEET
TOTAL SITE COMPENSATORY VOLUME PROVIDED	9.06 ACRE-FEET
WEST COMPENSATORY VOLUME PROVIDED	1.33 ACRE-FEET
EAST COMPENSATORY VOLUME PROVIDED	7.73 ACRE-FEET

PROPOSED DRAINAGE EXHIBIT LEGEND:

PROJECT AREA	
IMPERVIOUS AREA (CN=98)	
PERVIOUS AREA (CN=61)	
EXISTING CONTOUR	700
PROPOSED CONTOUR	700
OVERFLOW ROUTE	
EXISTING STORM SEWER	
PROPOSED STORM SEWER	

PROPOSED DRAINAGE PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
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G985

1" = 50'

PDP

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JACOB & HEFNER ASSOCIATES

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Downers Grove, IL 60515
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Curve Number (CN) Computation
PROPOSED CONDITIONS

Project: NVA Trucking Facility Expansion By: DM Date: 12/20/2023
Location: Crystal Lake Checked: Date:
Project #: G985

Proposed West Tributary Drainage Area			
Runoff Coefficients	CN	Area (ac)	CN Factor
Pervious Areas	61	3.08	187.9
Impervious Areas	98	8.28	811.4
	Totals:	11.36	88.0

Proposed East Tributary Drainage Area			
Runoff Coefficients	CN	Area (ac)	CN Factor
Pervious Areas	61	3.42	208.6
Impervious Areas	98	6.28	615.4
	Totals:	9.70	85.0

Hydraflow Table of Contents

G985-Hydrograph.gpw

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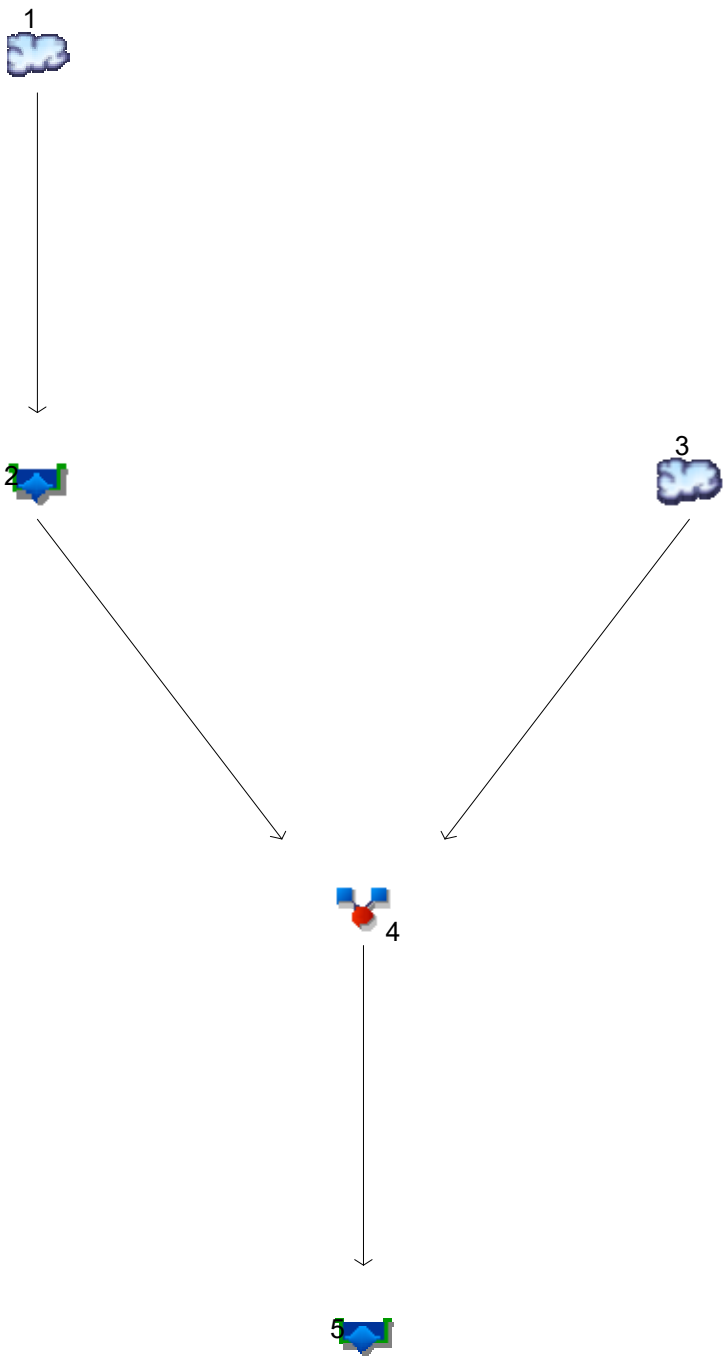
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Proposed Detention Hydrograph

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4



Legend

Hyd.	Origin	Description
1	SCS Runoff	West Drainage Area
2	Reservoir	West Route
3	SCS Runoff	Drainage Area
4	Combine	Inflow Combine
5	Reservoir	East Route

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

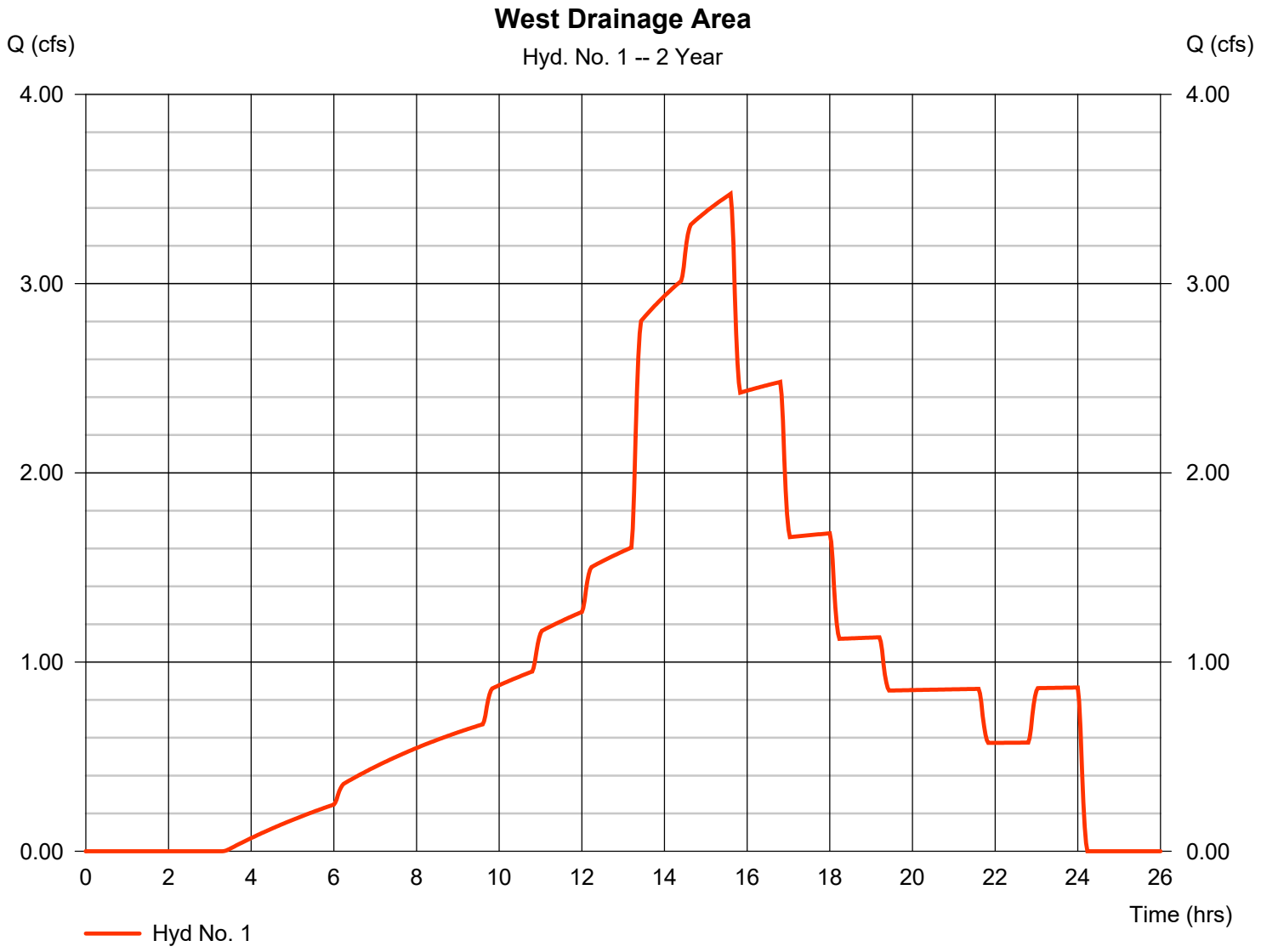
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	3.474	2	936	2.010	------	------	------	West Drainage Area
2	Reservoir	0.462	2	1446	1.985	1	886.44	1.54	West Route
3	SCS Runoff	2.739	2	936	1.518	------	------	------	Drainage Area
4	Combine	3.131	2	936	3.503	2, 3	------	------	Inflow Combine
5	Reservoir	0.840	2	1446	3.467	4	864.97	1.19	East Route

Hydrograph Report

Hyd. No. 1

West Drainage Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.474 cfs
Storm frequency	=	2 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	2.010 acft
Drainage area	=	11.360 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	7.80 min
Total precip.	=	3.34 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



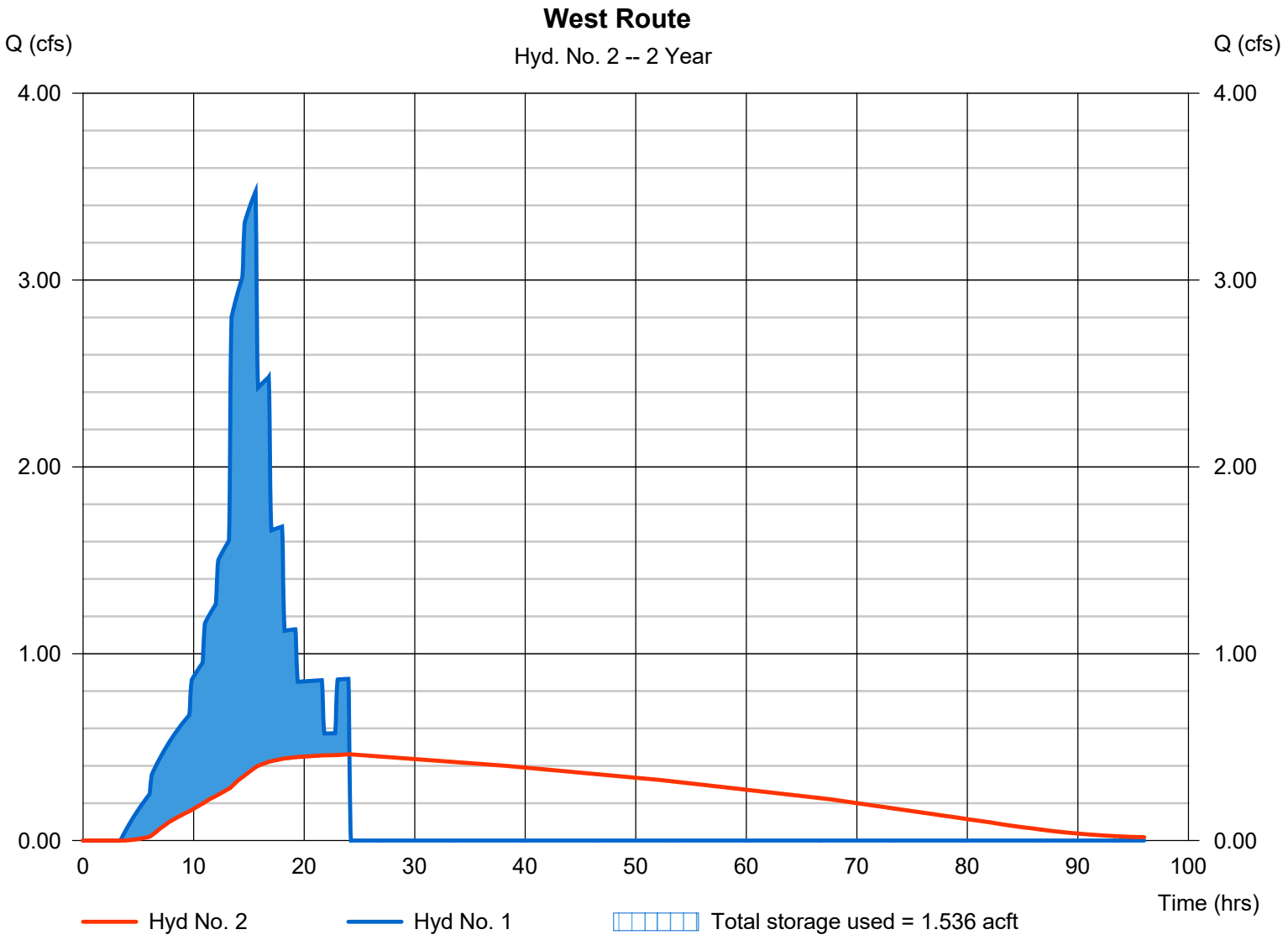
Hydrograph Report

Hyd. No. 2

West Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.462 cfs
Storm frequency	=	2 yrs	Time to peak	=	24.10 hrs
Time interval	=	2 min	Hyd. volume	=	1.985 acft
Inflow hyd. No.	=	1 - West Drainage Area	Max. Elevation	=	886.44 ft
Reservoir name	=	West Detention	Max. Storage	=	1.536 acft

Storage Indication method used.



Pond No. 2 - West Detention

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 882.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	882.50	10,265	0.000	0.000
1.00	883.50	13,304	0.271	0.271
2.00	884.50	16,645	0.344	0.614
2.99	885.49	20,405	0.421	1.035
3.00	885.50	21,591	0.005	1.040
4.00	886.50	24,344	0.527	1.567
5.00	887.50	27,203	0.592	2.159
6.00	888.50	30,164	0.658	2.818
7.00	889.50	33,329	0.729	3.546
8.00	890.50	33,329	0.765	4.311
9.00	891.50	33,329	0.765	5.077
10.00	892.50	33,329	0.765	5.842
11.00	893.50	33,329	0.765	6.607
12.00	894.50	33,329	0.765	7.372
13.00	895.50	37,337	0.811	8.183
14.00	896.50	40,000	0.888	9.071

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	3.00	0.00	0.00
Span (in)	= 3.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 882.50	888.00	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 Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

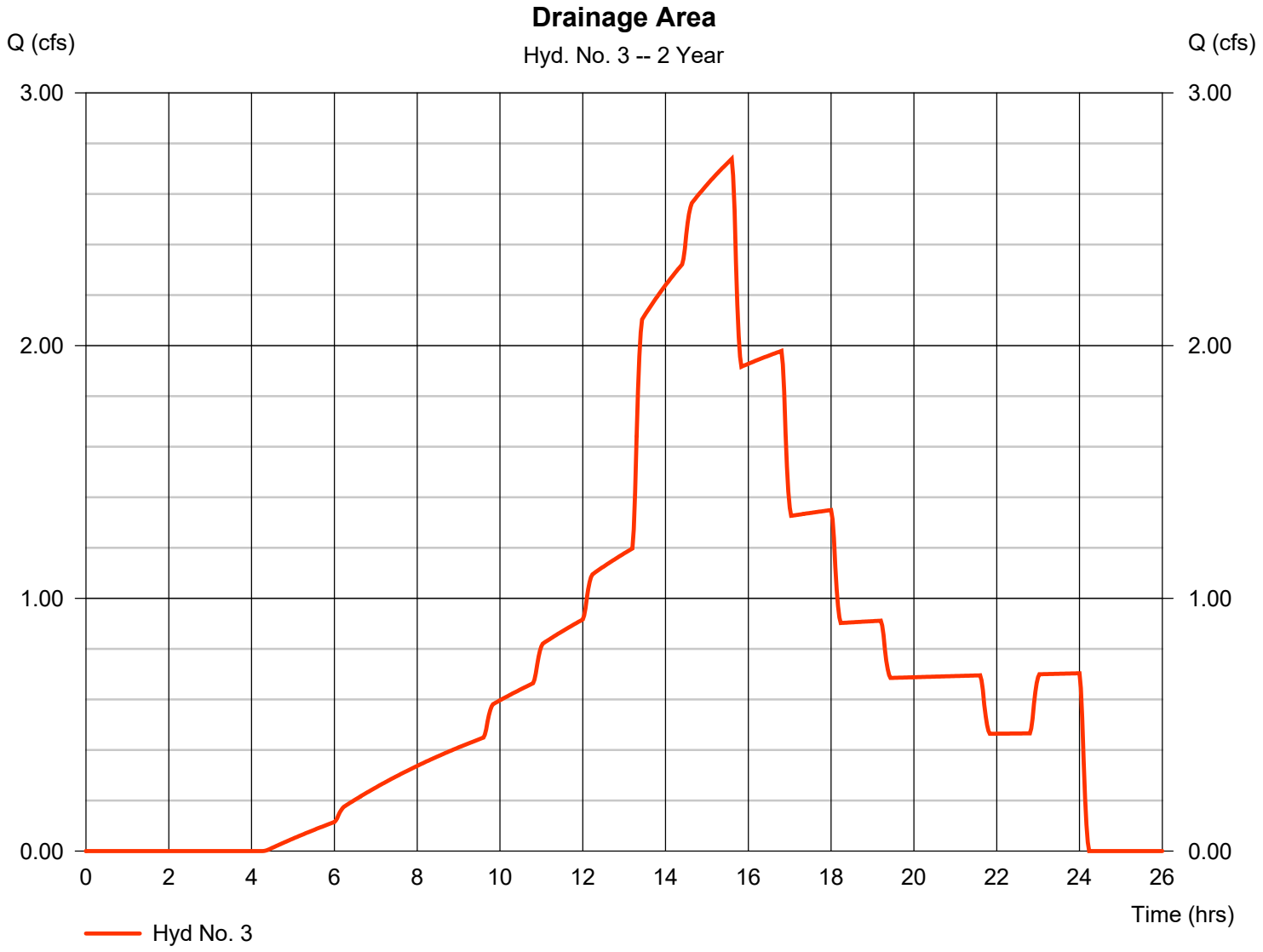
Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	882.50	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.00	0.271	883.50	0.22 ic	0.00	---	---	---	---	---	---	---	---	0.221
2.00	0.614	884.50	0.32 ic	0.00	---	---	---	---	---	---	---	---	0.324
2.99	1.035	885.49	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.400
3.00	1.040	885.50	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.401
4.00	1.567	886.50	0.47 ic	0.00	---	---	---	---	---	---	---	---	0.465
5.00	2.159	887.50	0.52 ic	0.00	---	---	---	---	---	---	---	---	0.522
6.00	2.818	888.50	0.57 ic	0.14 ic	---	---	---	---	---	---	---	---	0.718
7.00	3.546	889.50	0.62 ic	0.28 ic	---	---	---	---	---	---	---	---	0.897
8.00	4.311	890.50	0.66 ic	0.36 ic	---	---	---	---	---	---	---	---	1.027
9.00	5.077	891.50	0.70 ic	0.43 ic	---	---	---	---	---	---	---	---	1.138
10.00	5.842	892.50	0.74 ic	0.49 ic	---	---	---	---	---	---	---	---	1.237
11.00	6.607	893.50	0.78 ic	0.55 ic	---	---	---	---	---	---	---	---	1.327
12.00	7.372	894.50	0.81 ic	0.60 ic	---	---	---	---	---	---	---	---	1.411
13.00	8.183	895.50	0.85 ic	0.64 ic	---	---	---	---	---	---	---	---	1.490
14.00	9.071	896.50	0.88 ic	0.68 ic	---	---	---	---	---	---	---	---	1.564

Hydrograph Report

Hyd. No. 3

Drainage Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.739 cfs
Storm frequency	=	2 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	1.518 acft
Drainage area	=	9.700 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.80 min
Total precip.	=	3.34 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

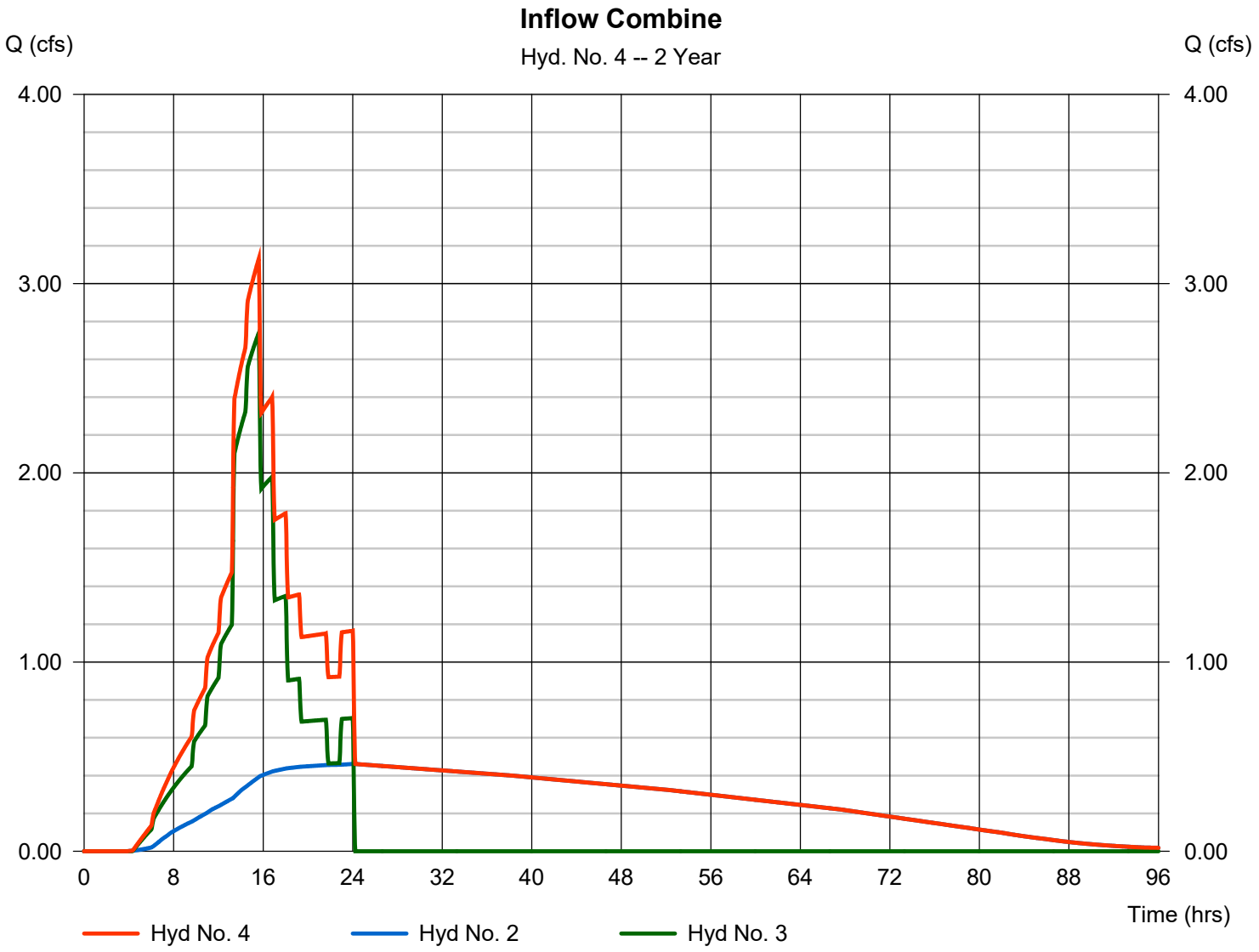


Hydrograph Report

Hyd. No. 4

Inflow Combine

Hydrograph type	=	Combine	Peak discharge	=	3.131 cfs
Storm frequency	=	2 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	3.503 acft
Inflow hyds.	=	2, 3	Contrib. drain. area	=	9.700 ac



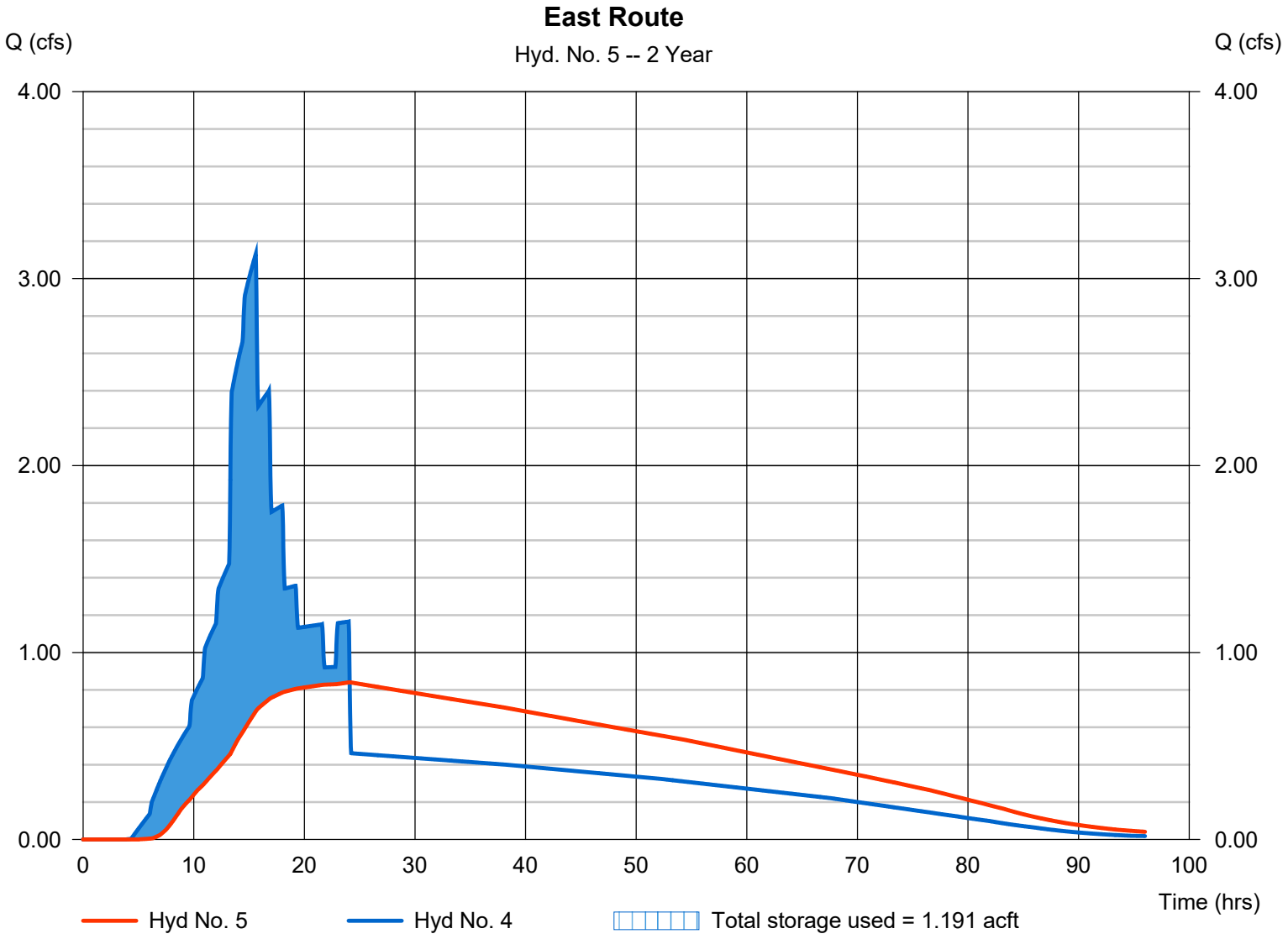
Hydrograph Report

Hyd. No. 5

East Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.840 cfs
Storm frequency	=	2 yrs	Time to peak	=	24.10 hrs
Time interval	=	2 min	Hyd. volume	=	3.467 acft
Inflow hyd. No.	=	4 - Inflow Combine	Max. Elevation	=	864.97 ft
Reservoir name	=	Infiltration Pond	Max. Storage	=	1.191 acft

Storage Indication method used.



Pond No. 1 - Infiltration Pond

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 861.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	861.50	11,377	0.000	0.000
0.50	862.00	12,373	0.136	0.136
1.50	863.00	14,421	0.308	0.444
2.50	864.00	16,540	0.355	0.799
3.50	865.00	18,732	0.405	1.204
3.51	865.01	26,315	0.005	1.209
4.50	866.00	29,837	0.638	1.847
5.50	867.00	33,323	0.725	2.572
6.50	868.00	37,586	0.814	3.386
6.51	868.01	37,515	0.009	3.395
7.50	869.00	40,251	0.884	4.279
8.50	870.00	42,991	0.955	5.234
9.50	871.00	45,813	1.019	6.253
10.50	872.00	47,732	1.074	7.327
11.50	873.00	49,342	1.114	8.441
12.50	874.00	50,624	1.147	9.589
13.50	875.00	51,837	1.176	10.765
14.00	875.50	52,384	0.598	11.363
15.00	876.50	55,000	1.233	12.596

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.20	6.55	0.00	0.00
Span (in)	= 4.20	6.55	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 861.50	865.00	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)	Inactive	0.00	0.00	0.00
Crest El. (ft)	= 876.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	861.50	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.50	0.136	862.00	0.26 ic	0.00	---	---	0.00	---	---	---	---	---	0.264
1.50	0.444	863.00	0.53 ic	0.00	---	---	0.00	---	---	---	---	---	0.533
2.50	0.799	864.00	0.71 ic	0.00	---	---	0.00	---	---	---	---	---	0.706
3.50	1.204	865.00	0.84 ic	0.00	---	---	0.00	---	---	---	---	---	0.845
3.51	1.209	865.01	0.85 ic	0.00 ic	---	---	0.00	---	---	---	---	---	0.846
4.50	1.847	866.00	0.96 ic	0.96 ic	---	---	0.00	---	---	---	---	---	1.924
5.50	2.572	867.00	1.07 ic	1.48 ic	---	---	0.00	---	---	---	---	---	2.549
6.50	3.386	868.00	1.16 ic	1.86 ic	---	---	0.00	---	---	---	---	---	3.025
6.51	3.395	868.01	1.17 ic	1.86 ic	---	---	0.00	---	---	---	---	---	3.030
7.50	4.279	869.00	1.25 ic	2.17 ic	---	---	0.00	---	---	---	---	---	3.429
8.50	5.234	870.00	1.34 ic	2.45 ic	---	---	0.00	---	---	---	---	---	3.786
9.50	6.253	871.00	1.41 ic	2.70 ic	---	---	0.00	---	---	---	---	---	4.110
10.50	7.327	872.00	1.49 ic	2.92 ic	---	---	0.00	---	---	---	---	---	4.410
11.50	8.441	873.00	1.56 ic	3.13 ic	---	---	0.00	---	---	---	---	---	4.690
12.50	9.589	874.00	1.63 ic	3.33 ic	---	---	0.00	---	---	---	---	---	4.954
13.50	10.765	875.00	1.69 ic	3.51 ic	---	---	0.00	---	---	---	---	---	5.204
14.00	11.363	875.50	1.72 ic	3.60 ic	---	---	0.00	---	---	---	---	---	5.325
15.00	12.596	876.50	1.78 ic	3.77 ic	---	---	0.00	---	---	---	---	---	5.558

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

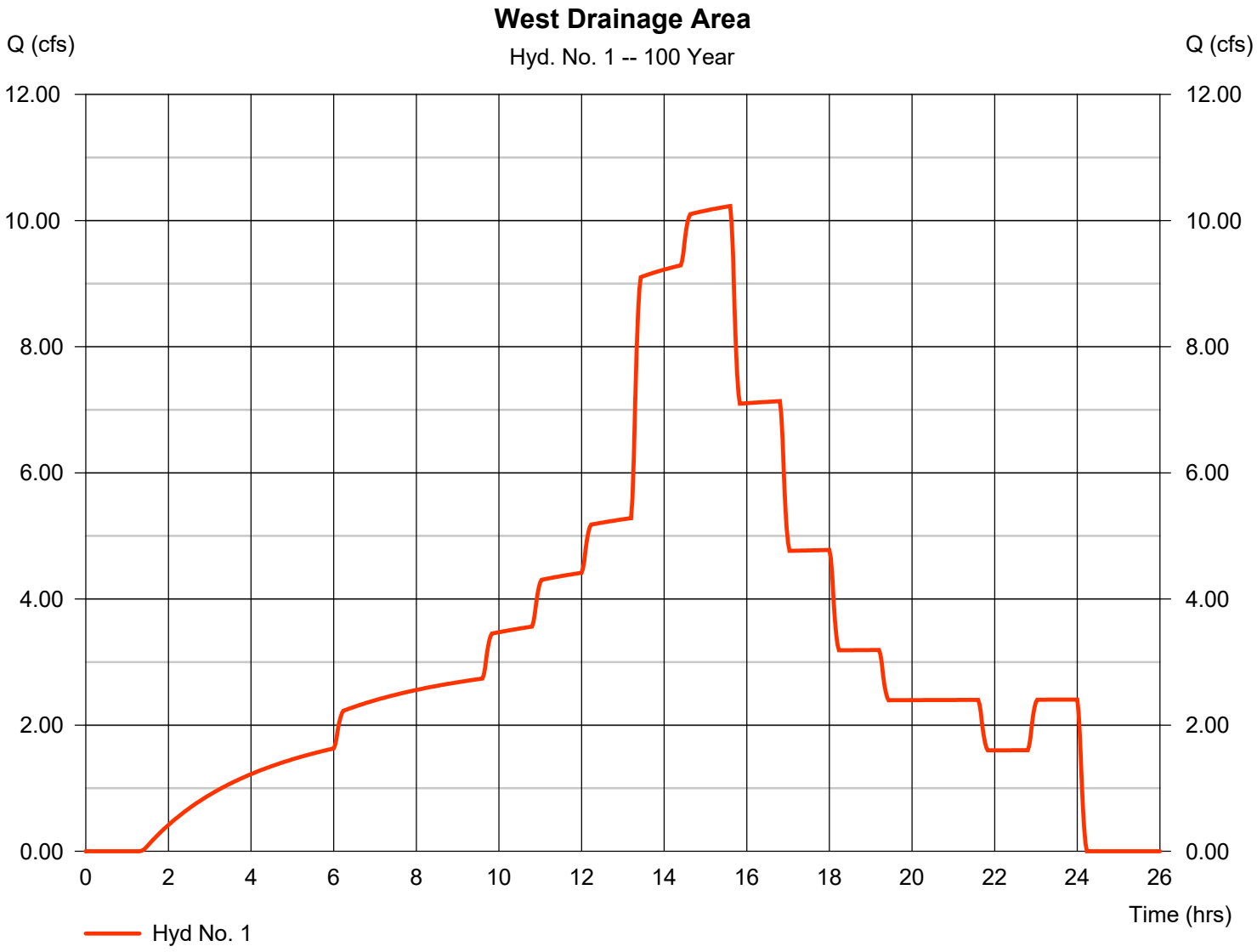
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	10.23	2	936	6.746	------	------	------	West Drainage Area
2	Reservoir	1.197	2	1446	5.543	1	892.08	5.52	West Route
3	SCS Runoff	8.552	2	936	5.468	------	------	------	Drainage Area
4	Combine	9.506	2	936	11.011	2, 3	------	------	Inflow Combine
5	Reservoir	3.140	2	1298	10.455	4	868.27	3.63	East Route

Hydrograph Report

Hyd. No. 1

West Drainage Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.23 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	6.746 acft
Drainage area	=	11.360 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	7.80 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



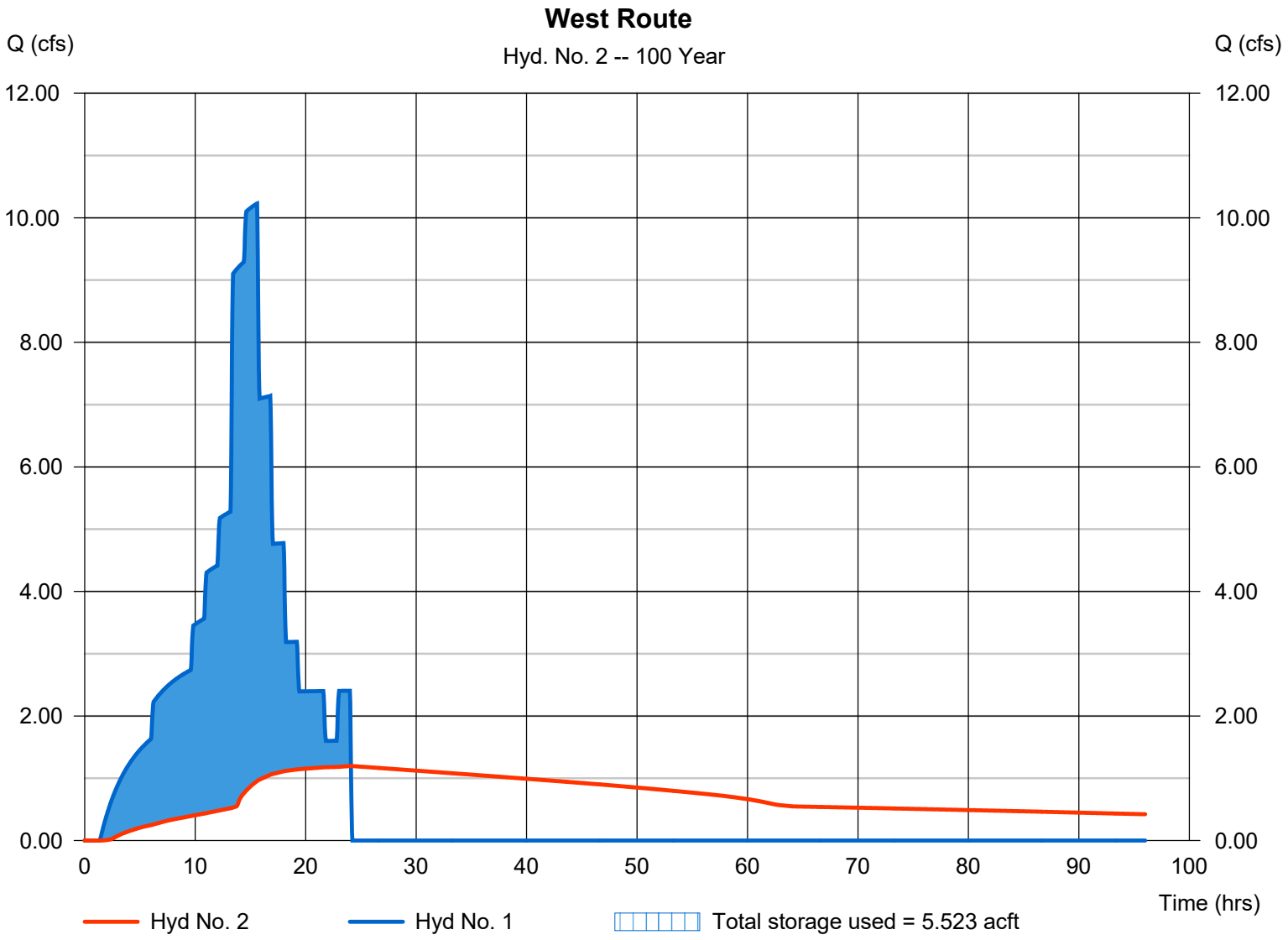
Hydrograph Report

Hyd. No. 2

West Route

Hydrograph type	=	Reservoir	Peak discharge	=	1.197 cfs
Storm frequency	=	100 yrs	Time to peak	=	24.10 hrs
Time interval	=	2 min	Hyd. volume	=	5.543 acft
Inflow hyd. No.	=	1 - West Drainage Area	Max. Elevation	=	892.08 ft
Reservoir name	=	West Detention	Max. Storage	=	5.523 acft

Storage Indication method used.

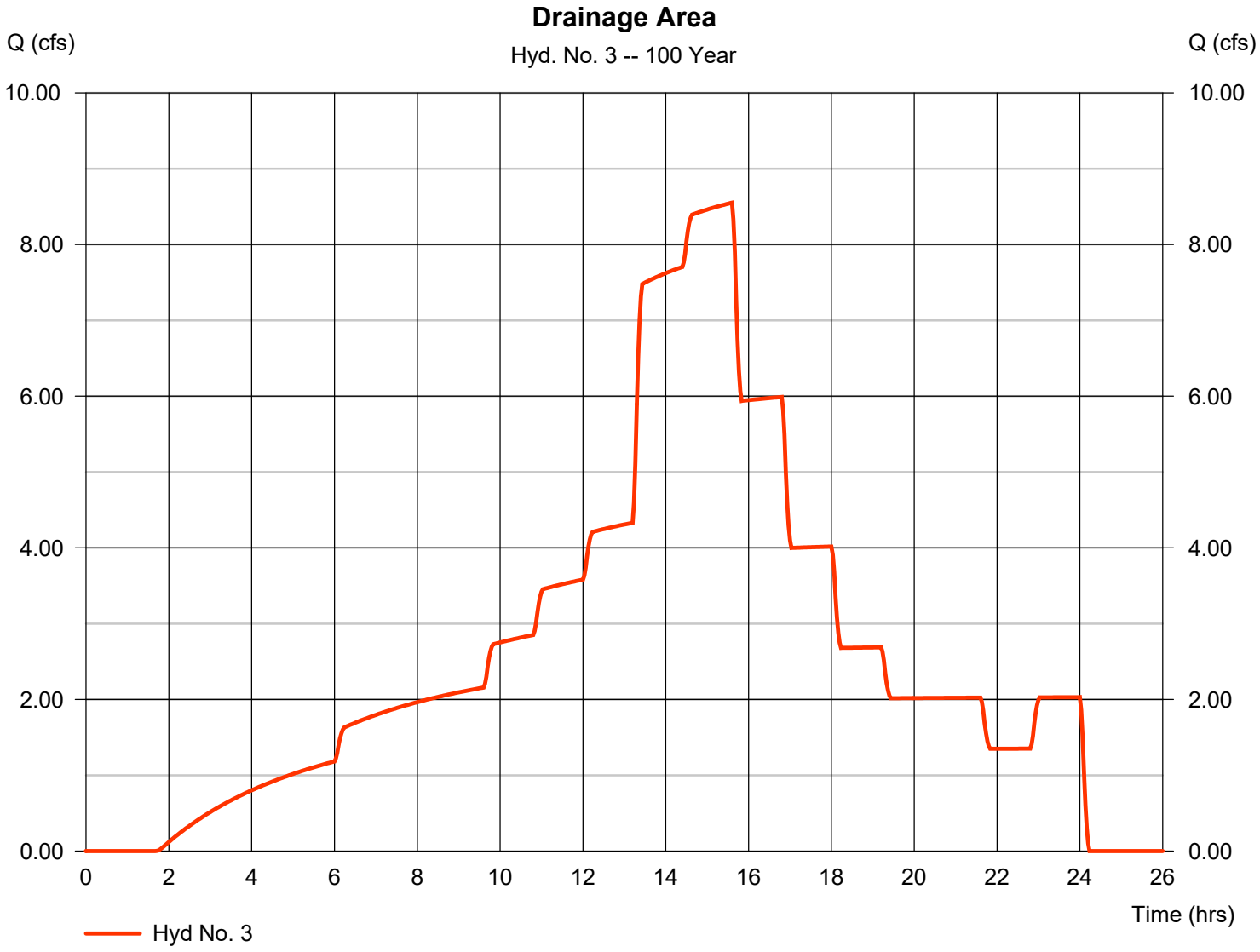


Hydrograph Report

Hyd. No. 3

Drainage Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.552 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	5.468 acft
Drainage area	=	9.700 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.80 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

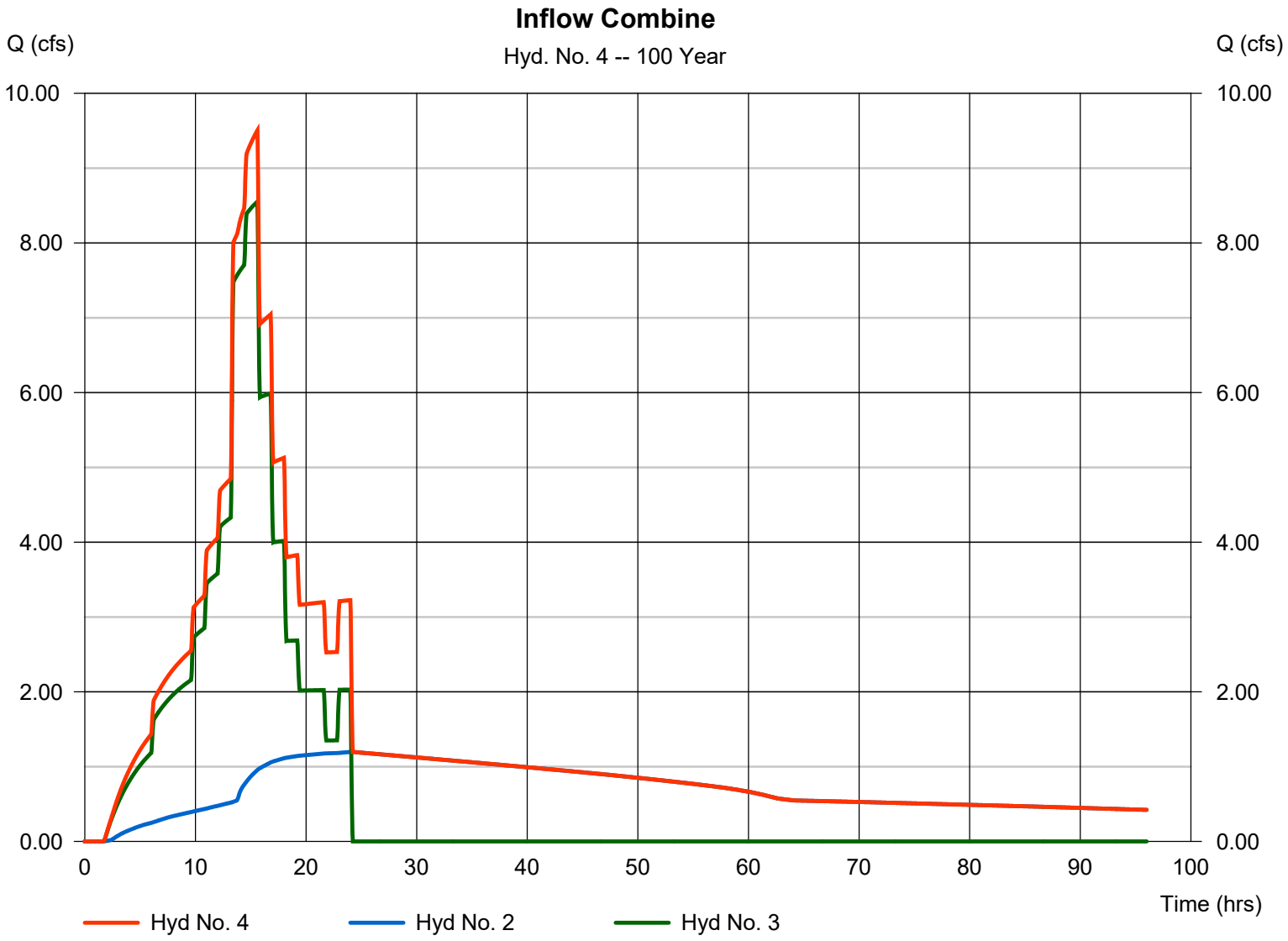


Hydrograph Report

Hyd. No. 4

Inflow Combine

Hydrograph type	= Combine	Peak discharge	= 9.506 cfs
Storm frequency	= 100 yrs	Time to peak	= 15.60 hrs
Time interval	= 2 min	Hyd. volume	= 11.011 acft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 9.700 ac



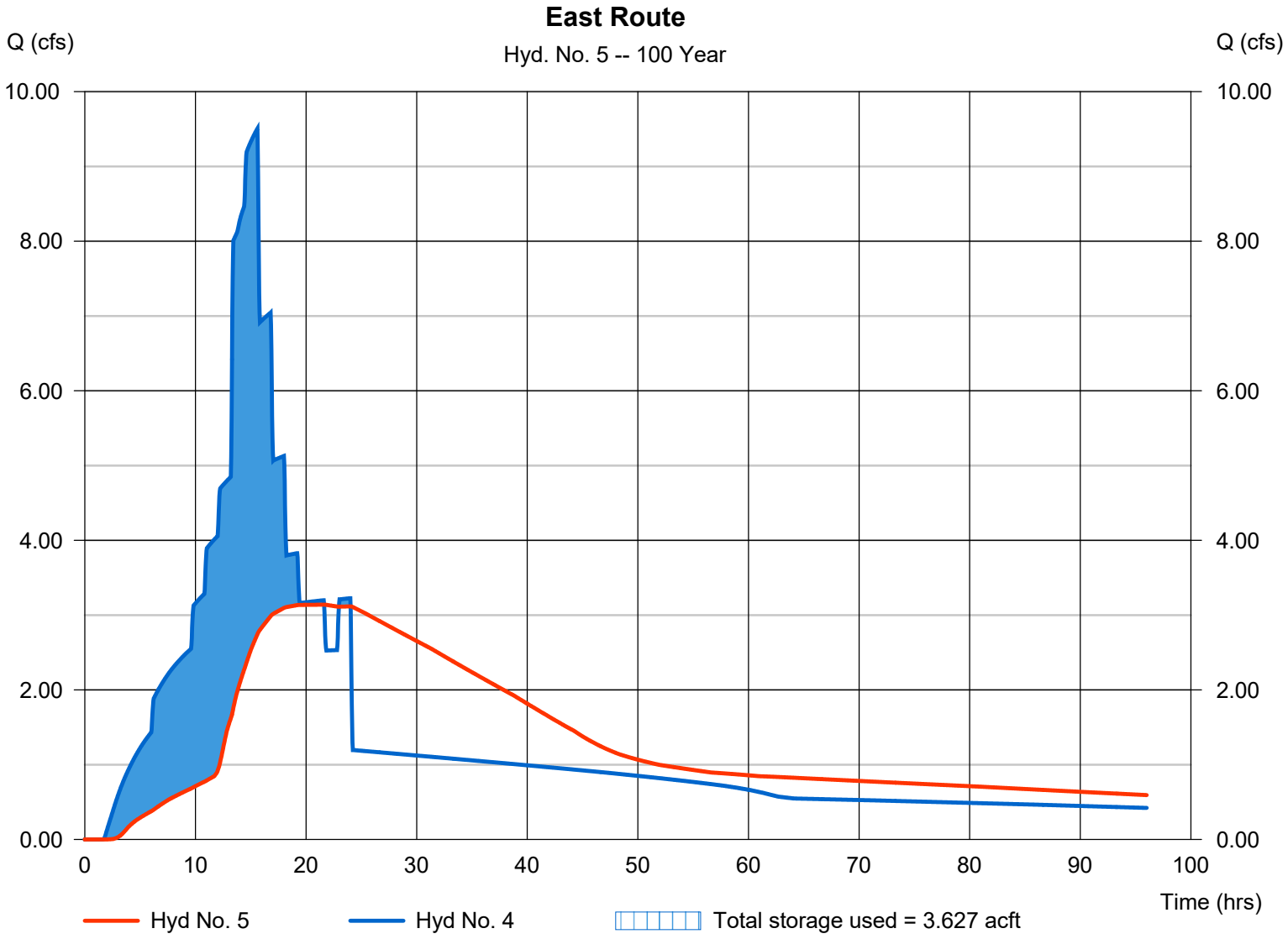
Hydrograph Report

Hyd. No. 5

East Route

Hydrograph type	=	Reservoir	Peak discharge	=	3.140 cfs
Storm frequency	=	100 yrs	Time to peak	=	21.63 hrs
Time interval	=	2 min	Hyd. volume	=	10.455 acft
Inflow hyd. No.	=	4 - Inflow Combine	Max. Elevation	=	868.27 ft
Reservoir name	=	Infiltration Pond	Max. Storage	=	3.627 acft

Storage Indication method used.



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NVA Trucking Facility Expansion

Crystal Lake, IL

Engineer: DRM
Job #: G985

Date: 10/23/2023

Stage Storage Calculation

West Detention Bioinfiltration

Elevation (ft)	Area (sf)	Volume (ac-ft)	Storage (ac-ft)
882.50	6,497	0.00	0.00
883.50	7,964	0.17	0.17
884.50	9,534	0.20	0.37
885.50	11,196	0.24	0.60

East Detention Bioinfiltration

Elevation (ft)	Area (sf)	Volume (ac-ft)	Storage (ac-ft)
865.00	7,475	0.00	0.00
866.00	8,554	0.18	0.18
867.00	9,699	0.21	0.39
868.00	10,912	0.24	0.63

Total Storage = **1.23 ac-ft**

Required Storage = **1.21 ac-ft**
(1" over impervious area)
(8.53 acres x 1")

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 12 / 20 / 2023

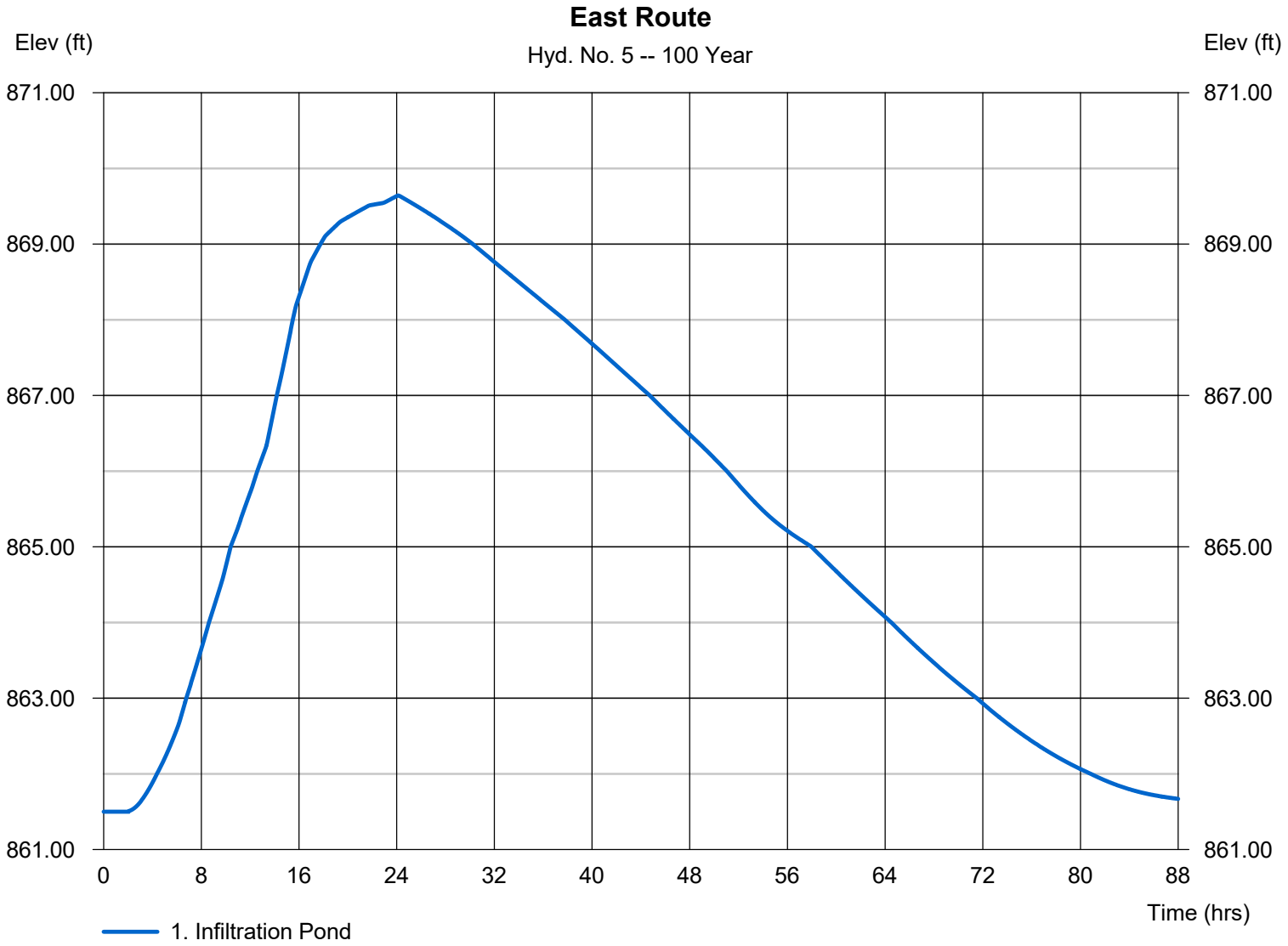
Hyd. No. 5 East Infiltration Pond Drawdown Calculation

East Route

Hydrograph type	= Reservoir	Peak discharge	= 3.662 cfs
Storm frequency	= 100 yrs	Time to peak	= 24.10 hrs
Time interval	= 2 min	Hyd. volume	= 12.191 acft
Inflow hyd. No.	= 4 - Inflow Combine	Max. Elevation	= 869.64 ft
Reservoir name	= Infiltration Pond	Max. Storage	= 4.892 acft

Storage Indication method used.

Does not include additional infiltration past the allowable Village release rate used for required detention volume design



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 12 / 20 / 2023

Hyd. No. 2

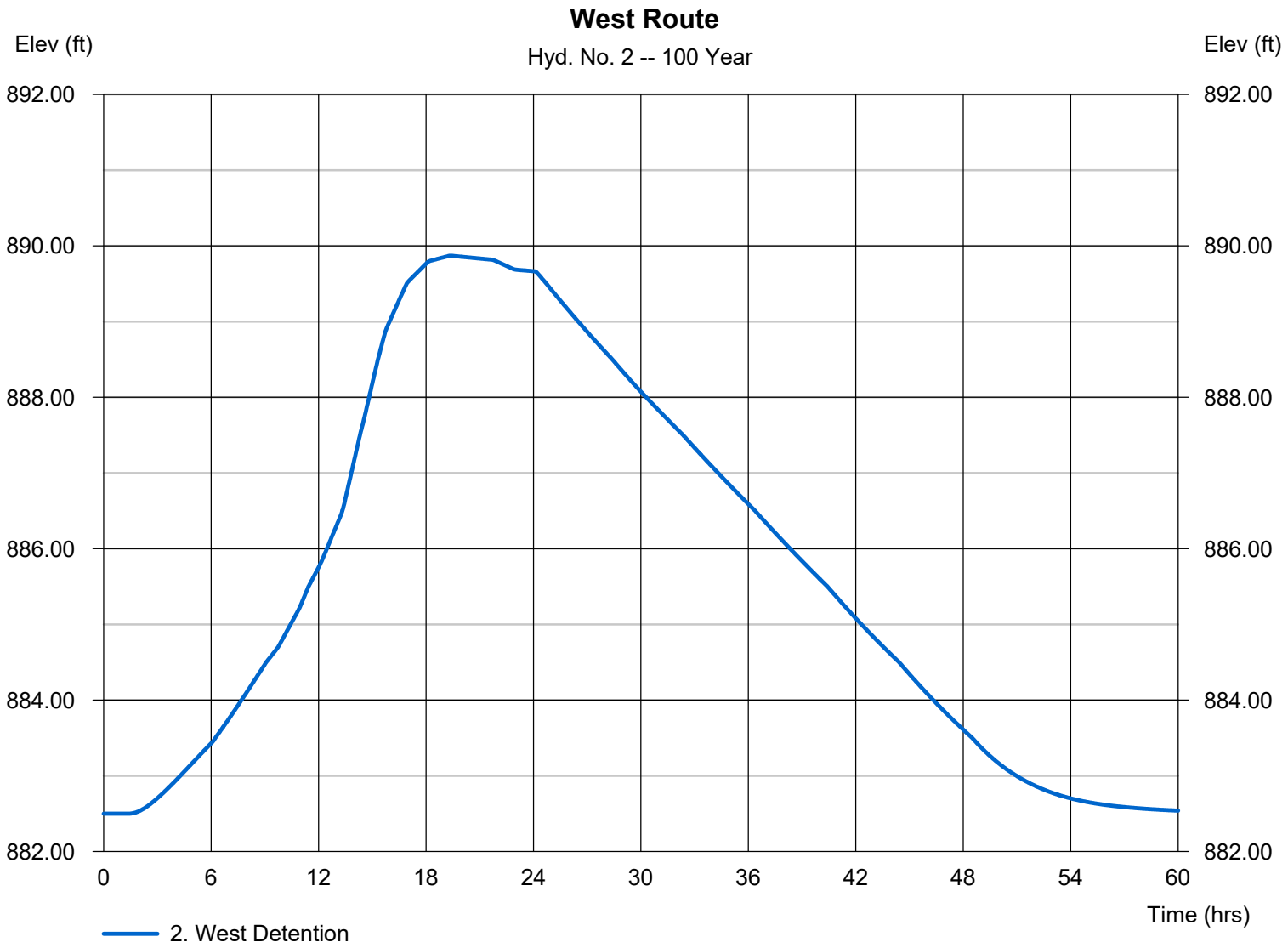
West Detention Drawdown Calculation

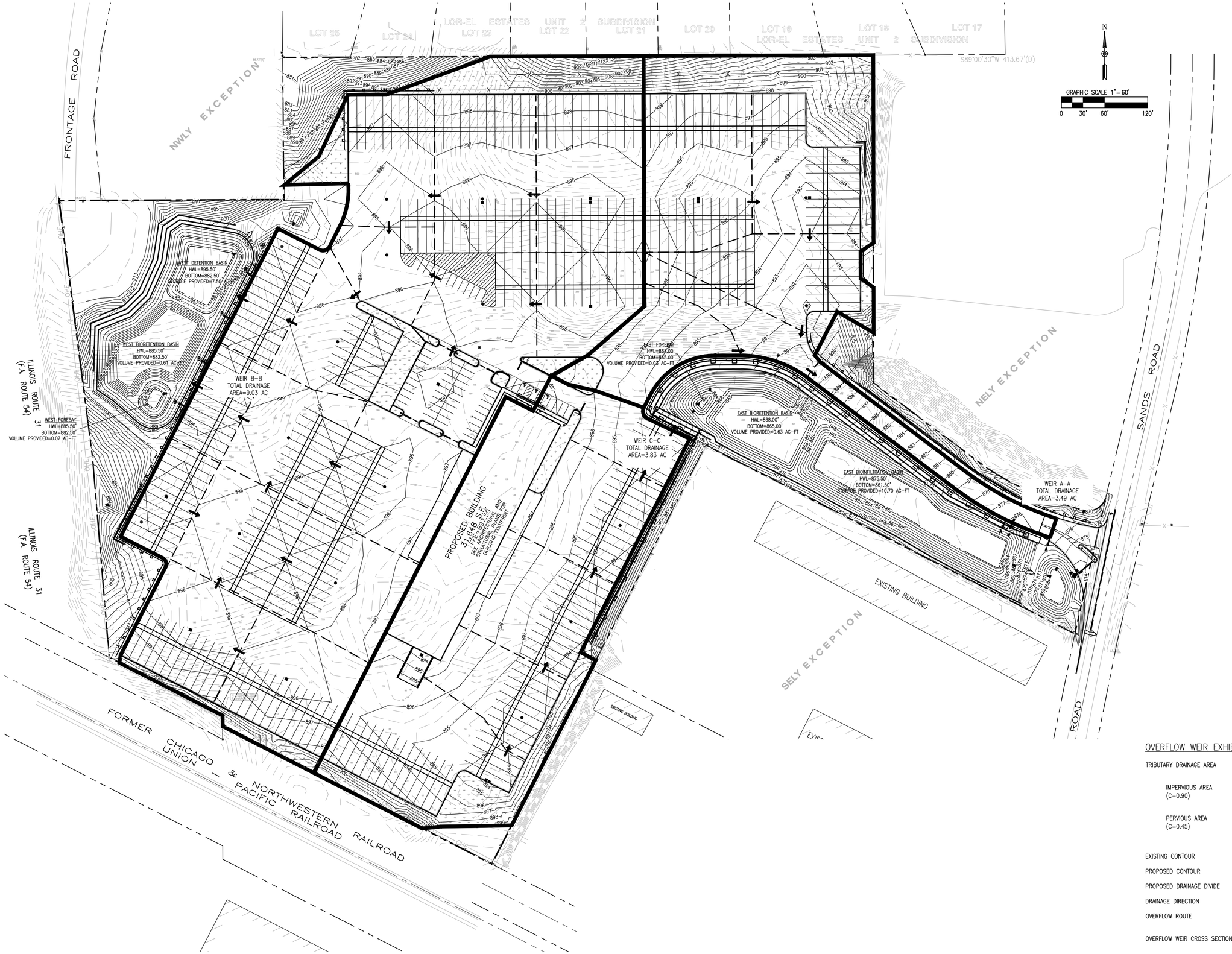
West Route

Hydrograph type	= Reservoir	Peak discharge	= 2.615 cfs
Storm frequency	= 100 yrs	Time to peak	= 19.33 hrs
Time interval	= 2 min	Hyd. volume	= 6.746 acft
Inflow hyd. No.	= 1 - West Drainage Area	Max. Elevation	= 889.87 ft
Reservoir name	= West Detention	Max. Storage	= 3.829 acft

Storage Indication method used. Outflow includes exfiltration.

Including 0.05 cfs/1000 sf infiltration per soil report





OVERFLOW WEIR EXHIBIT LEGEND:

- TRIBUTARY DRAINAGE AREA
- IMPERVIOUS AREA (C=0.90)
- PERVIOUS AREA (C=0.45)
- EXISTING CONTOUR — 700 —
- PROPOSED CONTOUR — 700 —
- PROPOSED DRAINAGE DIVIDE
- DRAINAGE DIRECTION
- OVERFLOW ROUTE
- OVERFLOW WEIR CROSS SECTION A A

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23
2	PER CITY	12/20/23

OVERFLOW WEIR EXHIBIT

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

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1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-4600, FAX: (630) 652-4601
www.jacobandhefner.com

G985

1" = 60'

OW-1

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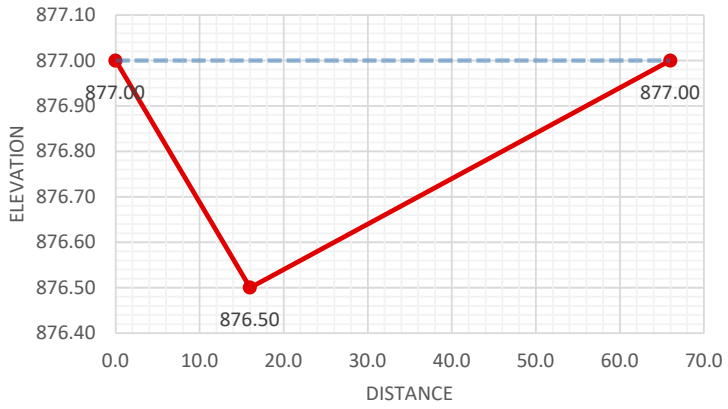
OVERFLOW WEIR CALCULATIONS
WEIR A-A

Project: *NVA Trucking Facility* By: *DRM* Date: *12/20/2023*
Location: *Crystal Lake, Illinois* Checked: *RJB* Date: *12/20/2023*
Project #: *G985*

Elevation Data:

Elevation (ft)	Distance (ft)
877.00	0.0
876.50	16.0
877.00	66.0

Cross Section View



Weir Capacity

Max Flow Depth	0.50 ft
Water Surface Elevation	877.00 ft
Cross Sectional Area	16.50 sq-ft
Weir Coefficient	2.60
Weir Capacity	**30.33 cfs**

Proposed Runoff

Tributary Area	3.49 Acre
Runoff Coeficient	0.85
Time of Concentration	6.8 min
Intensity	11.56 inch/hour
Runoff (Rational Method)	34.29 cfs
10-Year Flow Storm Sewer*	21.32 cfs
Design Runoff	**12.97 cfs**

*10-Year Flow from Hydraflow Run #20 & #38

Notes:

1) Intensity Obtained from Bulletin 75 - Northeast Zone - 100 Year Recurrence Interval
2) Runoff utilizes the rational method. Q = C*I*A
3) Weir capacity equation: Q = C*A*H^(1/2)

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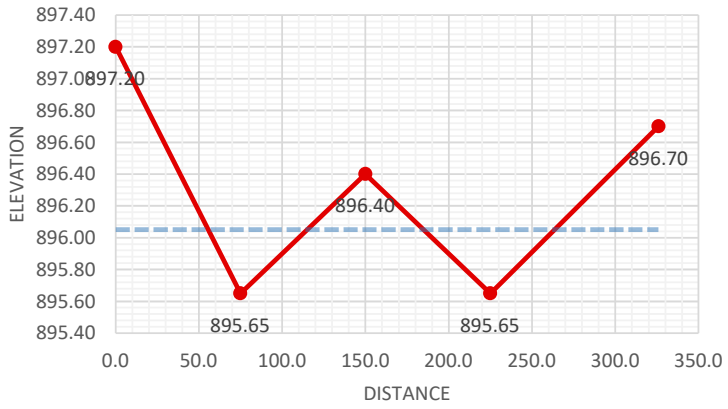
OVERFLOW WEIR CALCULATIONS
WEIR B-B

Project: *NVA Trucking Facility* By: *DRM* Date: *12/20/2023*
Location: *Crystal Lake, Illinois* Checked: *RJB* Date: *12/20/2023*
Project #: *G985*

Elevation Data:

Elevation (ft)	Distance (ft)
897.20	0.0
895.65	75.0
896.40	150.0
895.65	225.0
896.70	326.0

Cross Section View



Weir Capacity

Max Flow Depth	0.40 ft
Water Surface Elevation	896.05 ft
Cross Sectional Area	27.57 sq-ft
Weir Coefficient	2.60
Weir Capacity	**45.33 cfs**

Proposed Runoff

Tributary Area	9.03 Acre
Runoff Coeficient	0.91
Time of Concentration	7.8 min
Intensity	11.23 inch/hour
Runoff (Rational Method)	92.28 cfs
10-Year Flow Storm Sewer*	55.35 cfs
Design Runoff	**36.93 cfs**

*10-Year Flow from Hydraflow Run #1

Notes:

1) Intensity Obtained from Bulletin 75 - Northeast Zone - 100 Year Recurrence Interval
2) Runoff utilizes the rational method. Q = C*I*A
3) Weir capacity equation: Q = C*A*H^(1/2)

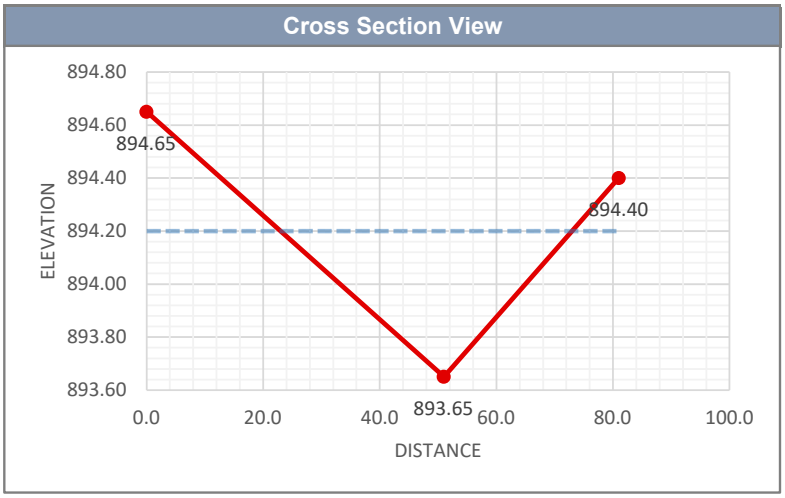
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OVERFLOW WEIR CALCULATIONS
WEIR C-C

Project: *NVA Trucking Facility* By: *DRM* Date: *12/20/2023*
Location: *Crystal Lake, Illinois* Checked: *RJB* Date: *12/20/2023*
Project #: *G985*

Elevation Data:

Elevation (ft)	Distance (ft)
894.65	0.0
893.65	51.0
894.40	81.0



Weir Capacity

Max Flow Depth	0.55 ft
Water Surface Elevation	894.20 ft
Cross Sectional Area	13.76 sq-ft
Weir Coefficient	2.60
Weir Capacity	**26.54 cfs**

Proposed Runoff

Tributary Area	3.83 Acre
Runoff Coeficient	0.89
Time of Concentration	6.5 min
Intensity	11.63 inch/hour
Runoff (Rational Method)	39.64 cfs
10-Year Flow Storm Sewer*	18.33 cfs
Design Runoff	**21.31 cfs**

*10-Year Flow from Hydraflow Run #28

Notes:

1) Intensity Obtained from Bulletin 75 - Northeast Zone - 100 Year Recurrence Interval
2) Runoff utilizes the rational method. Q = C*I*A
3) Weir capacity equation: Q = C*A*H^(1/2)

Hydrograph Report

Proposed Channel
Critical Duration

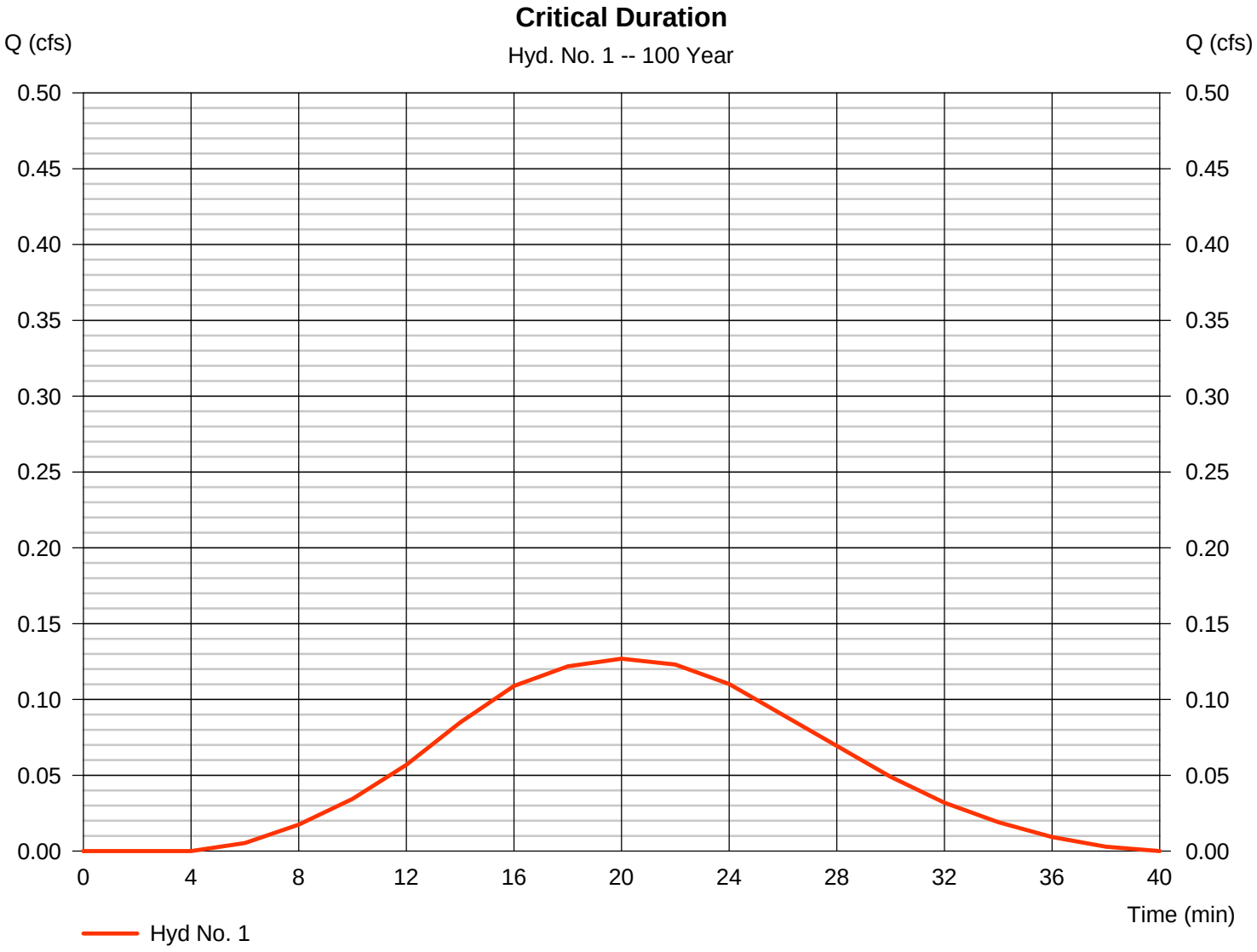
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.127 cfs
Storm frequency	=	100 yrs	Time to peak	=	20 min
Time interval	=	2 min	Hyd. volume	=	0.003 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	2.32 in	Distribution	=	Huff-1st
Storm duration	=	0.25 hrs	Shape factor	=	484



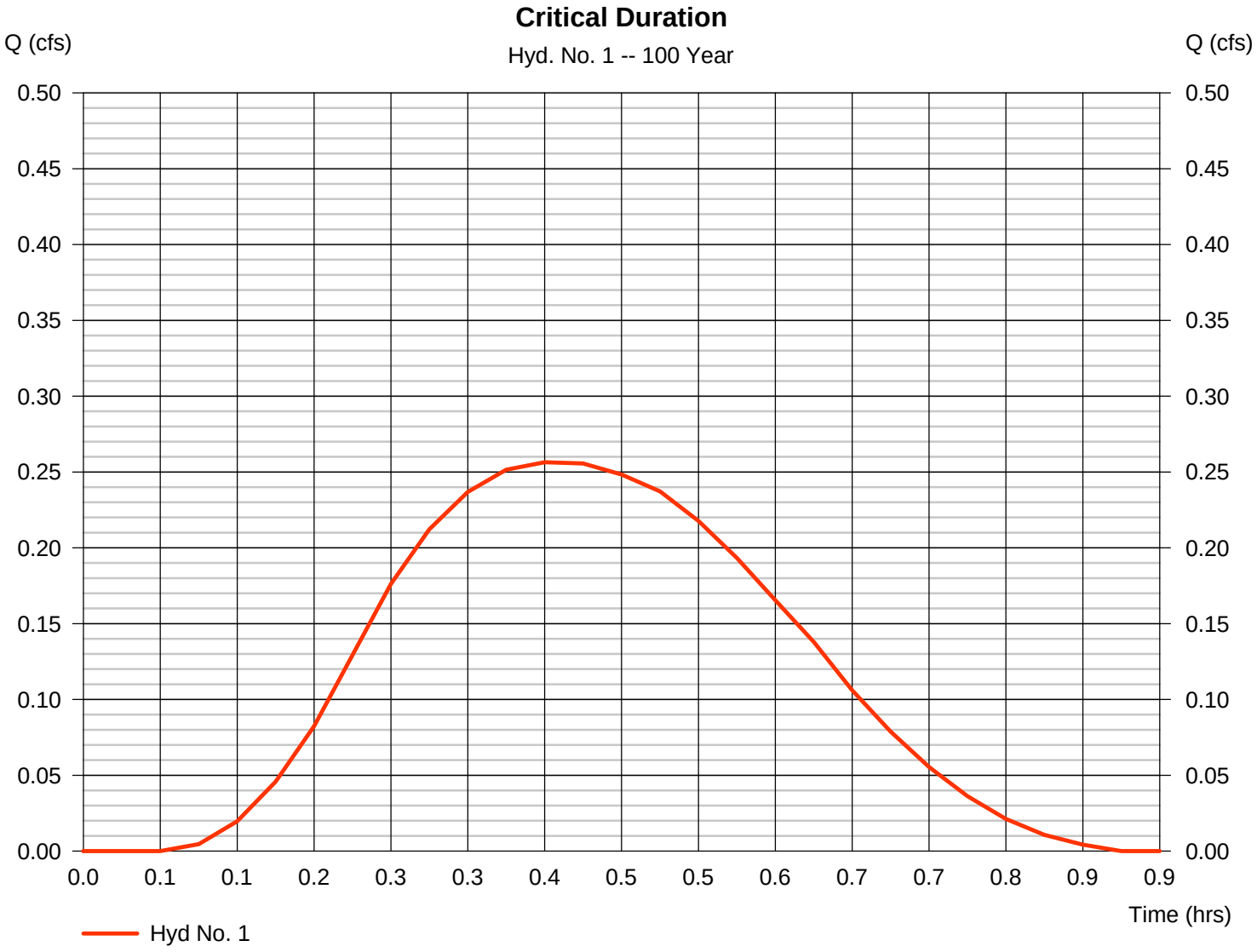
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.256 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.40 hrs
Time interval	=	2 min	Hyd. volume	=	0.009 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.17 in	Distribution	=	Huff-1st
Storm duration	=	0.50 hrs	Shape factor	=	484



Hydrograph Report

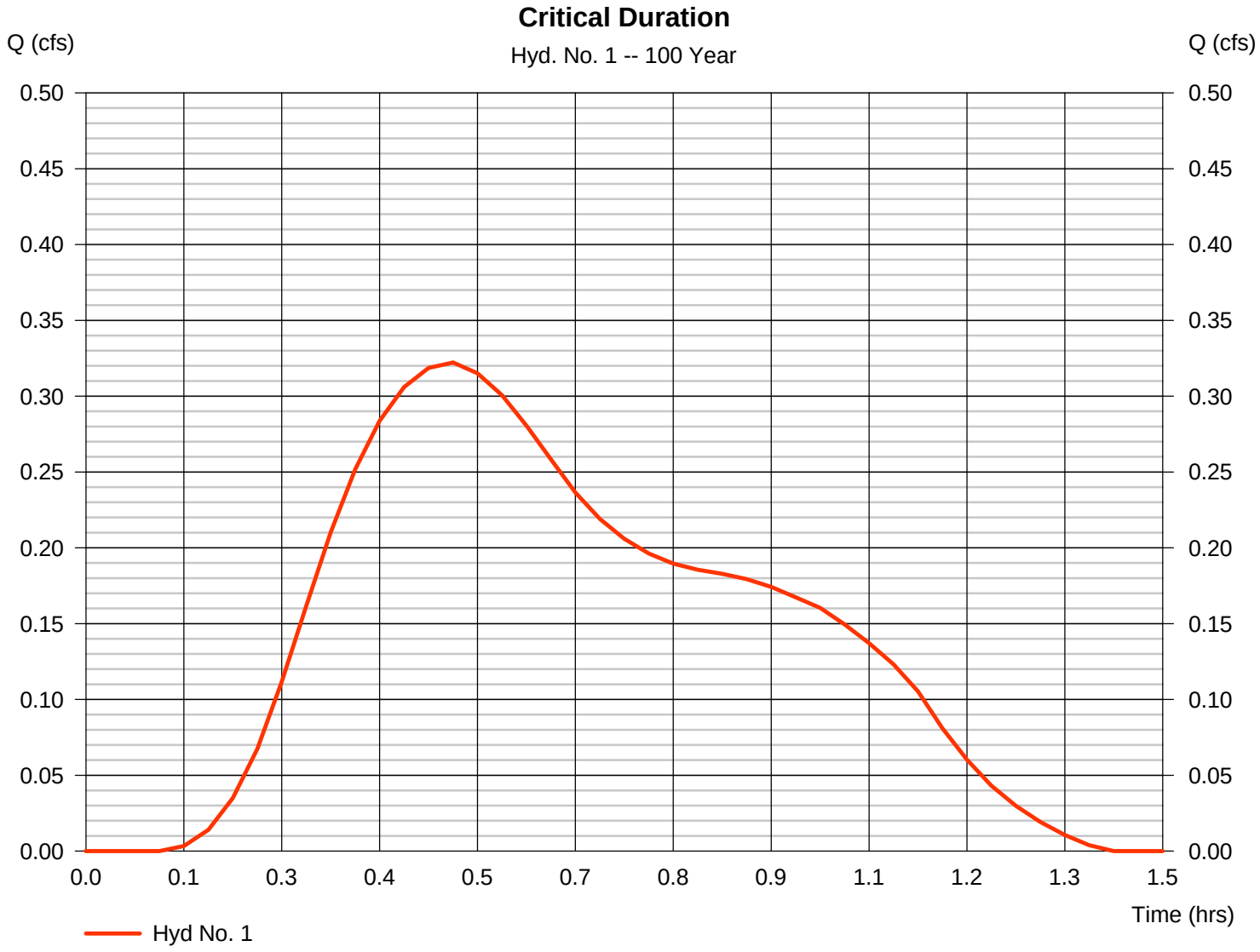
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Peak Flow to Channel

Hydrograph type	= SCS Runoff	Peak discharge	= 0.322 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.50 hrs
Time interval	= 2 min	Hyd. volume	= 0.017 acft
Drainage area	= 0.250 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.03 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484



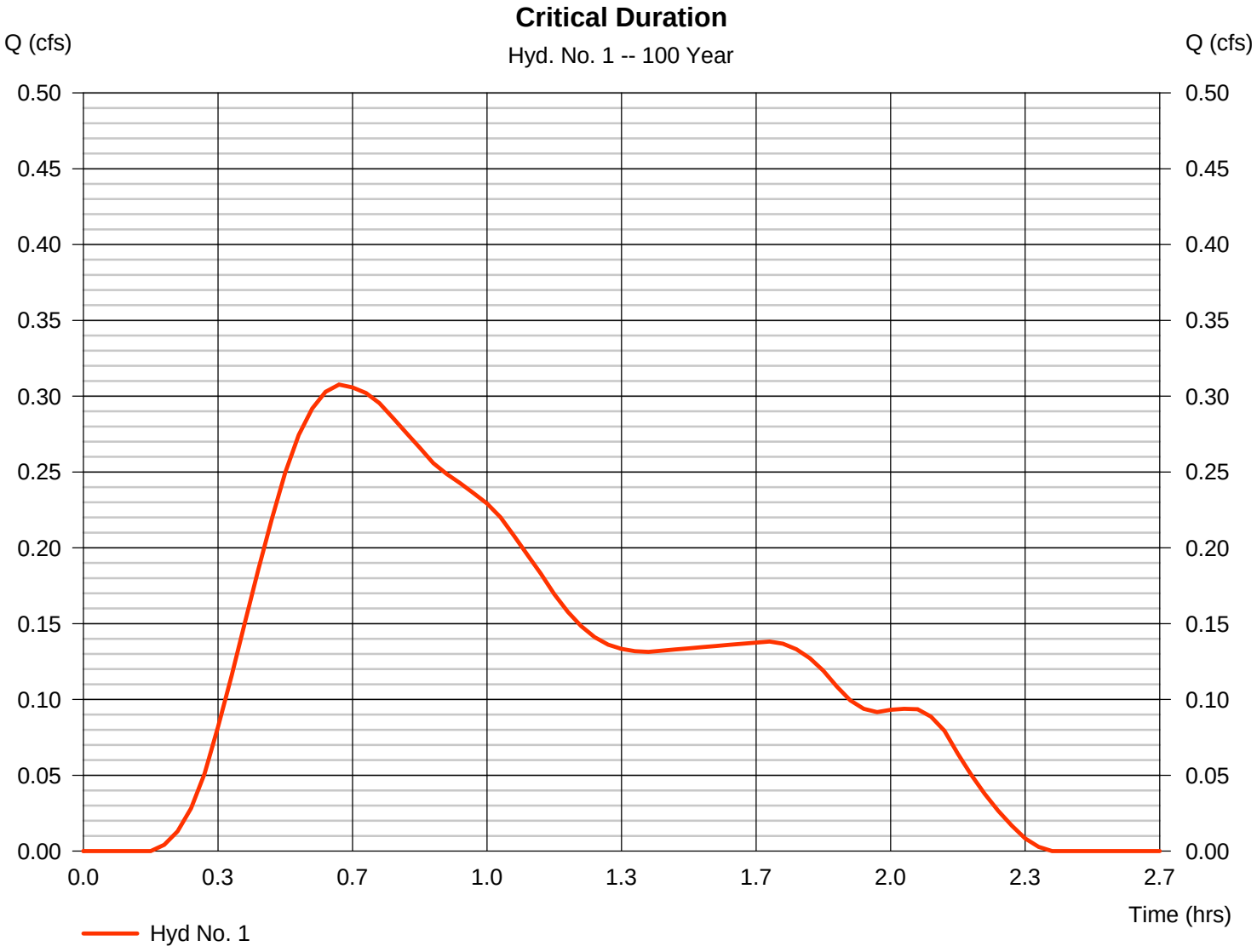
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.308 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.63 hrs
Time interval	=	2 min	Hyd. volume	=	0.027 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.97 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484



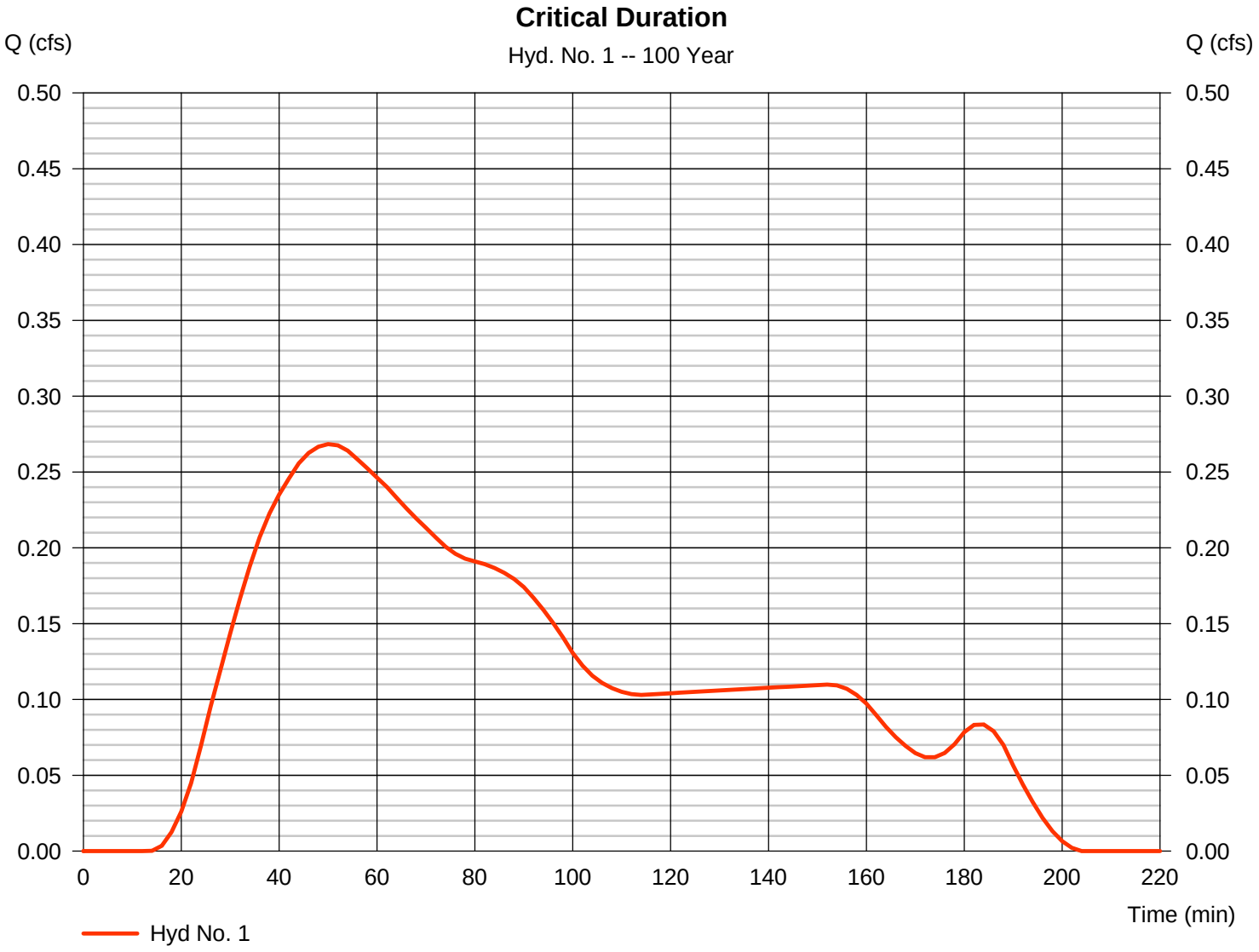
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.268 cfs
Storm frequency	=	100 yrs	Time to peak	=	50 min
Time interval	=	2 min	Hyd. volume	=	0.034 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.49 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484



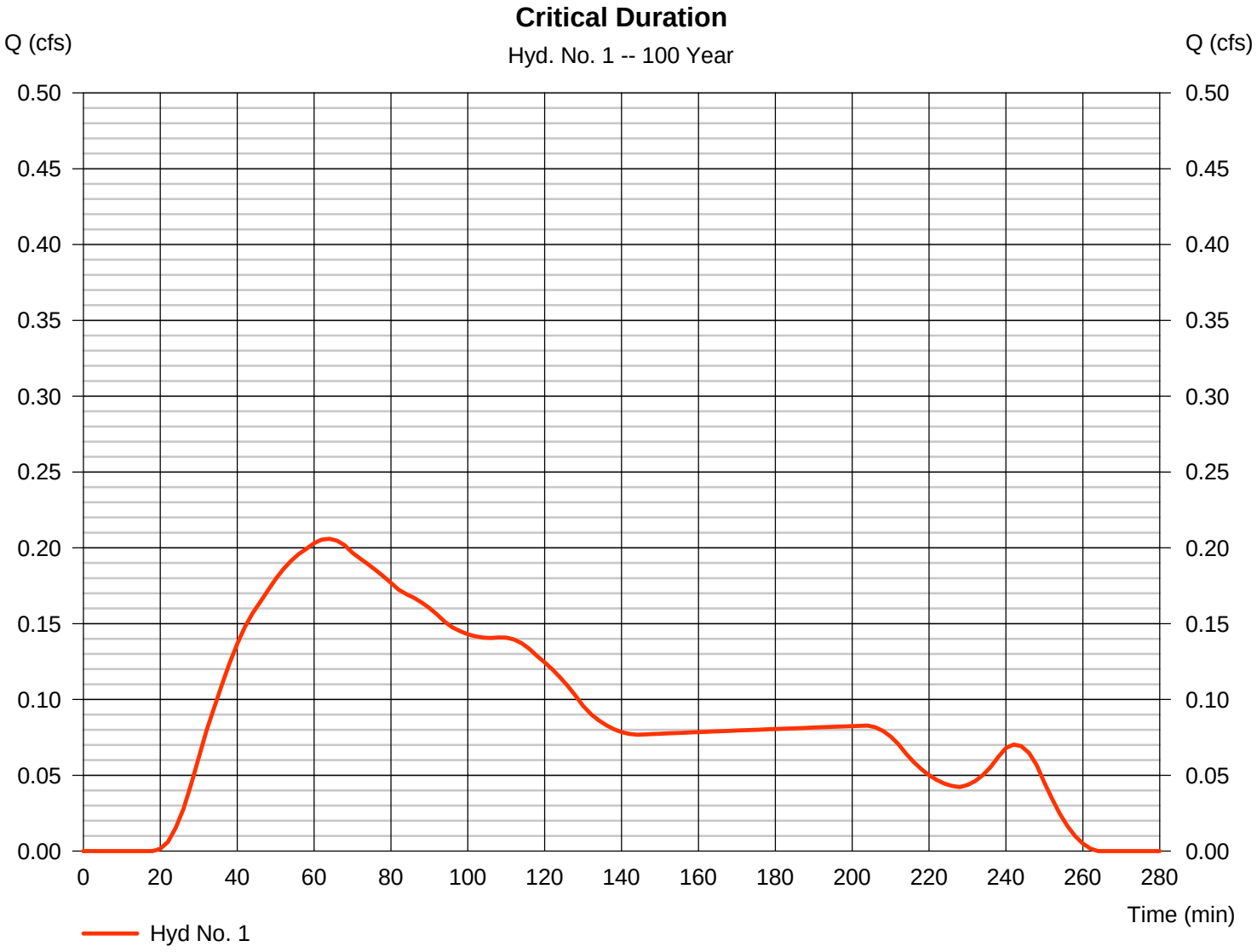
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.206 cfs
Storm frequency	=	100 yrs	Time to peak	=	64 min
Time interval	=	2 min	Hyd. volume	=	0.034 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.43 in	Distribution	=	Huff-1st
Storm duration	=	4.00 hrs	Shape factor	=	484



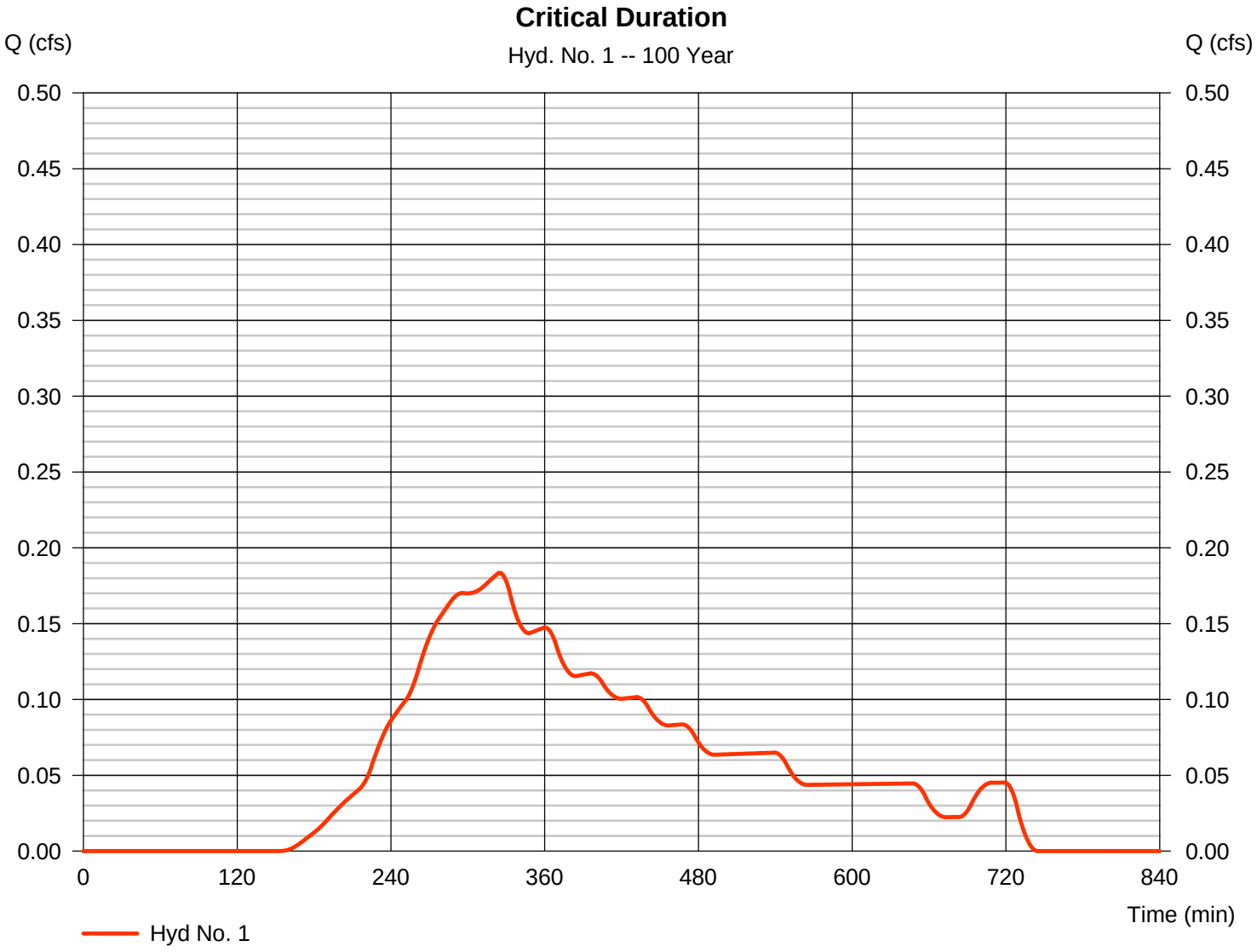
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.183 cfs
Storm frequency	=	100 yrs	Time to peak	=	324 min
Time interval	=	2 min	Hyd. volume	=	0.062 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.46 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484



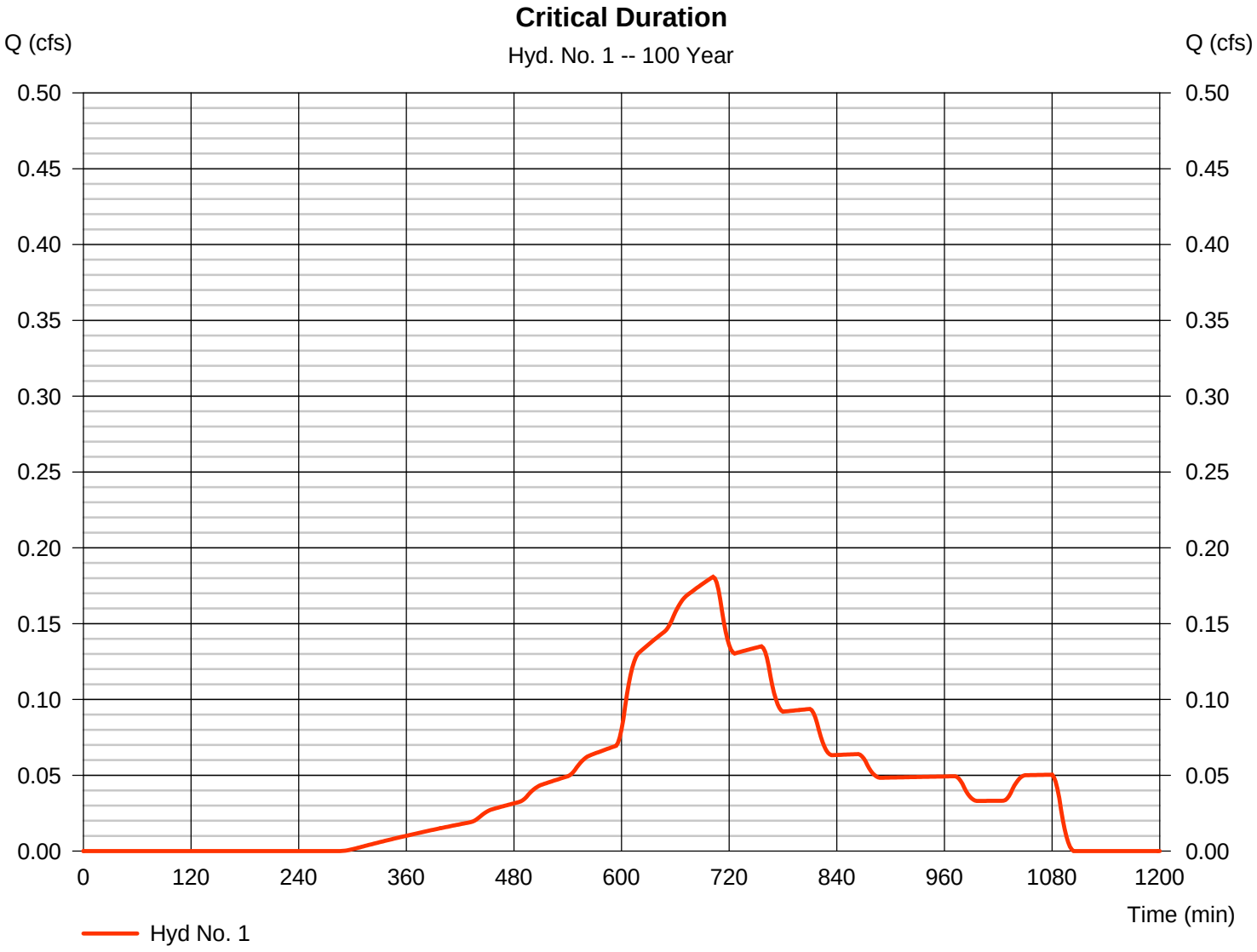
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.181 cfs
Storm frequency	=	100 yrs	Time to peak	=	702 min
Time interval	=	2 min	Hyd. volume	=	0.071 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	8.06 in	Distribution	=	Huff-3rd
Storm duration	=	18.00 hrs	Shape factor	=	484



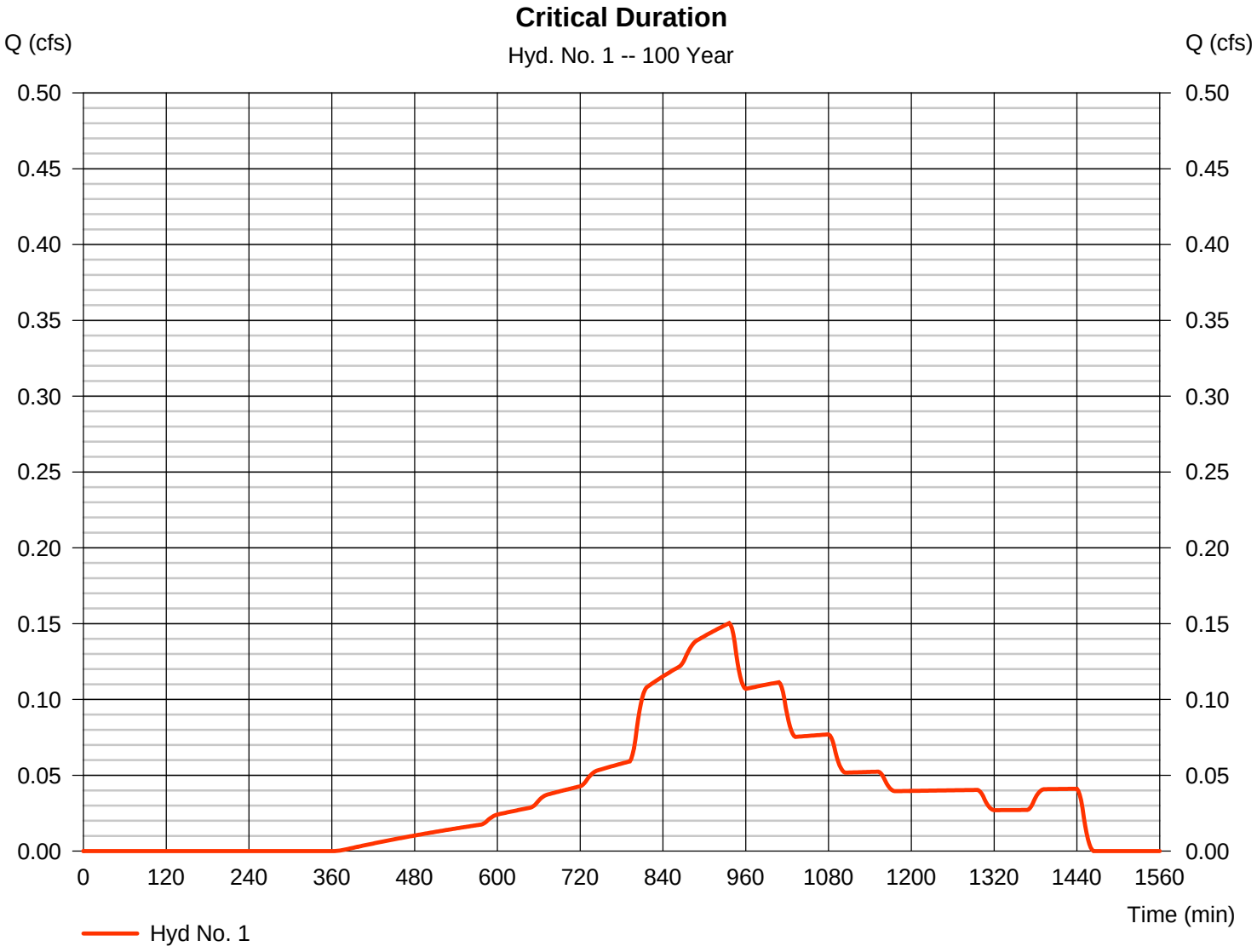
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 10 / 23 / 2023

Hyd. No. 1

Critical Duration

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.150 cfs
Storm frequency	=	100 yrs	Time to peak	=	936 min
Time interval	=	2 min	Hyd. volume	=	0.079 acft
Drainage area	=	0.250 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	8.57 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Oct 23 2023

Driveway Channel

Trapezoidal

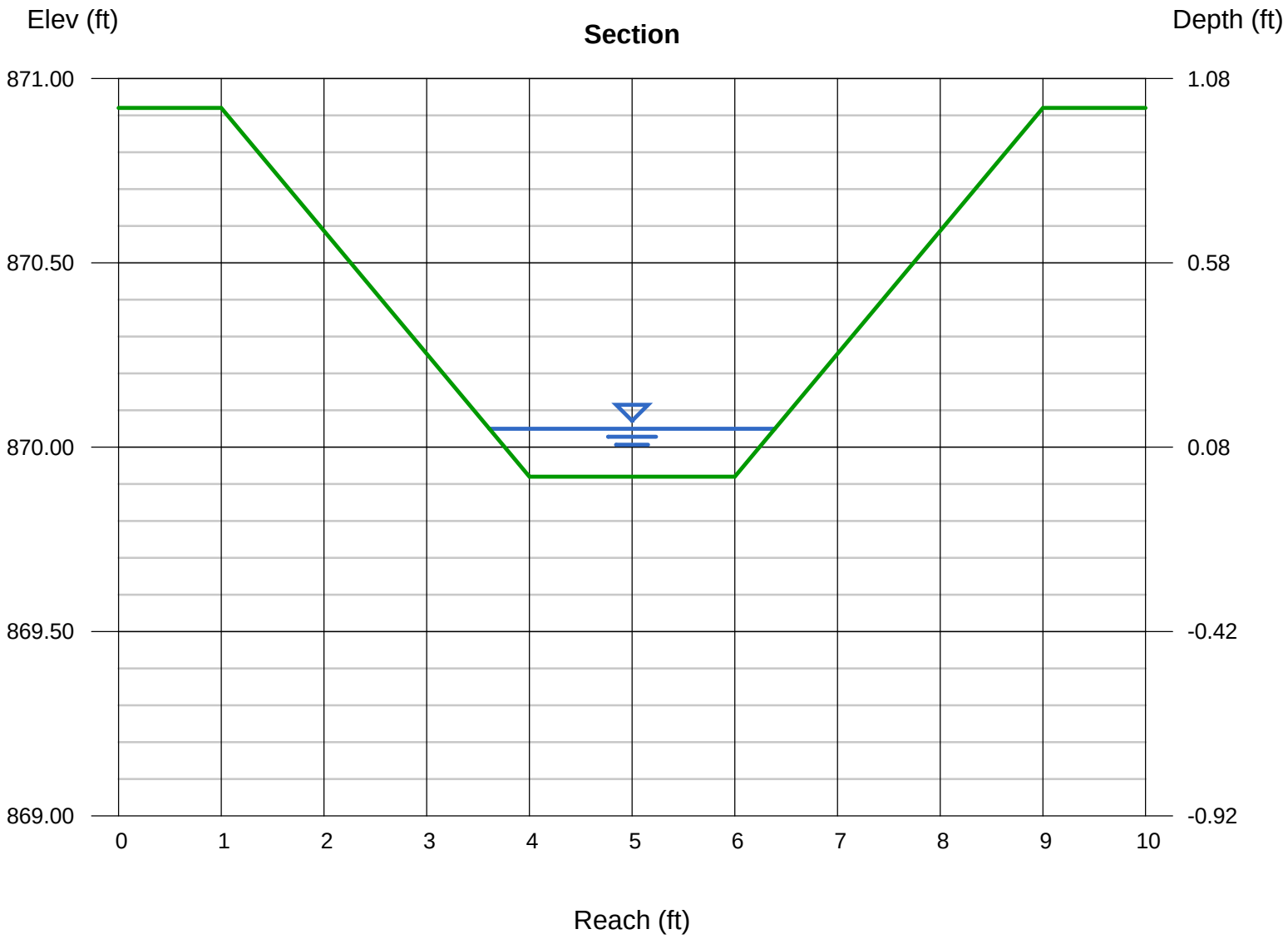
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 869.92
Slope (%)	= 1.00
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.32

Highlighted

Depth (ft)	= 0.13
Q (cfs)	= 0.320
Area (sqft)	= 0.31
Velocity (ft/s)	= 1.03
Wetted Perim (ft)	= 2.82
Crit Depth, Yc (ft)	= 0.09
Top Width (ft)	= 2.78
EGL (ft)	= 0.15



JACOB & HEFNER ASSOCIATES
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Unrestricted Flow Summary

North Drainage Area - Peak Flowrate Summary

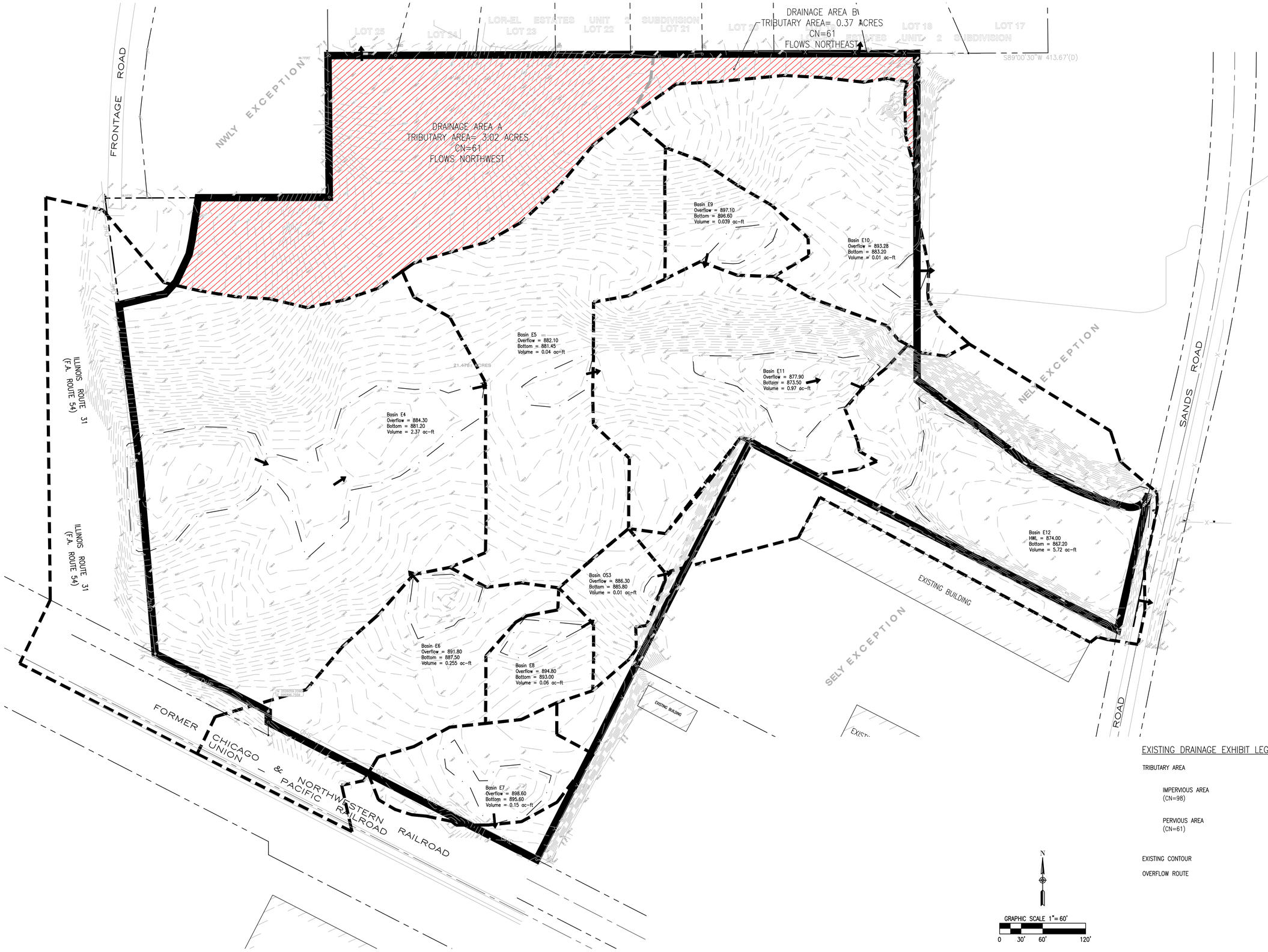
Project: NVA Trucking Facility
Location: Crystal Lake, IL
Project #: G985

By: DRM
Rev.:
Checked:

Date: 11/21/2023
Date:
Date:

Drainage Summary

Tributary Area	Drainage Area (ac)	CN	2-Year Peak Flow (cfs)	10-Year Peak Flow (cfs)	100-Year Peak Flow (cfs)
Existing Northwest	3.02	61	0.315 (18 Hour Storm)	0.936 (2 Hour Storm)	4.241 (1 Hour Storm)
Proposed Northwest	0.47	61	0.049 (18 Hour Storm)	0.146 (2 Hour Storm)	0.660 (1 Hour Storm)
Reduction Northwest	-2.55	0	-.266 (84% Reduction)	-.790 (84% Reduction)	-3.581 (84% Reduction)
Existing Northeast	0.37	61	0.039 (18 Hour Storm)	0.115 (2 Hour Storm)	0.520 (1 Hour Storm)
Proposed Northeast	0	N/A	0.000	0.000	0.000
Reduction Northwest	-0.37	N/A	-.039 (100% Reduction)	-0.115 (100% Reduction)	-0.52 (100% Reduction)
Total Existing North	3.39	61	0.354 (18 Hour Storm)	1.051 (2 Hour Storm)	4.761 (1 Hour Storm)
Total Proposed North	0.47	61	0.049 (18 Hour Storm)	0.146 (2 Hour Storm)	0.660 (1 Hour Storm)
Total Reduction North	-2.92	0	-0.305 (86% Reduction)	-0.905 (86% Reduction)	-4.101 (86% Reduction)



EXISTING DRAINAGE PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23

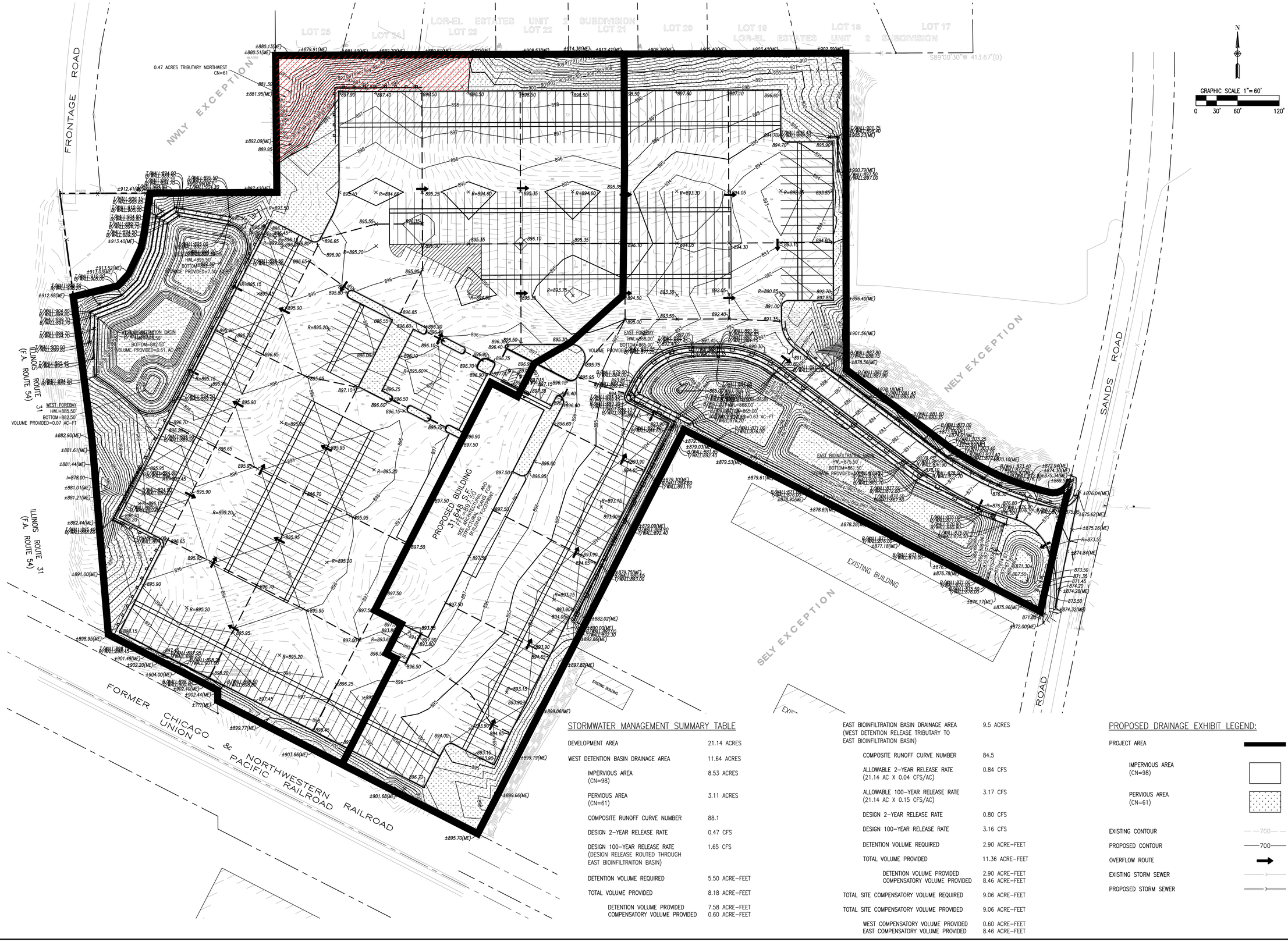
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www.jacobandhefner.com

G985

1" = 50'

EDP

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STORMWATER MANAGEMENT SUMMARY TABLE

DEVELOPMENT AREA	21.14 ACRES
WEST DETENTION BASIN DRAINAGE AREA	11.64 ACRES
IMPERVIOUS AREA (CN=98)	8.53 ACRES
PERVIOUS AREA (CN=61)	3.11 ACRES
COMPOSITE RUNOFF CURVE NUMBER	88.1
DESIGN 2-YEAR RELEASE RATE	0.47 CFS
DESIGN 100-YEAR RELEASE RATE (DESIGN RELEASE ROUTED THROUGH EAST BIOINFILTRAITON BASIN)	1.65 CFS
DETENTION VOLUME REQUIRED	5.50 ACRE-FEET
TOTAL VOLUME PROVIDED	8.18 ACRE-FEET
DETENTION VOLUME PROVIDED	7.58 ACRE-FEET
COMPENSATORY VOLUME PROVIDED	0.60 ACRE-FEET
EAST BIOINFILTRATION BASIN DRAINAGE AREA (WEST DETENTION RELEASE TRIBUTARY TO EAST BIOINFILTRATION BASIN)	9.5 ACRES
COMPOSITE RUNOFF CURVE NUMBER	84.5
ALLOWABLE 2-YEAR RELEASE RATE (21.14 AC X 0.04 CFS/AC)	0.84 CFS
ALLOWABLE 100-YEAR RELEASE RATE (21.14 AC X 0.15 CFS/AC)	3.17 CFS
DESIGN 2-YEAR RELEASE RATE	0.80 CFS
DESIGN 100-YEAR RELEASE RATE	3.16 CFS
DETENTION VOLUME REQUIRED	2.90 ACRE-FEET
TOTAL VOLUME PROVIDED	11.36 ACRE-FEET
DETENTION VOLUME PROVIDED	2.90 ACRE-FEET
COMPENSATORY VOLUME PROVIDED	8.46 ACRE-FEET
TOTAL SITE COMPENSATORY VOLUME REQUIRED	9.06 ACRE-FEET
TOTAL SITE COMPENSATORY VOLUME PROVIDED	9.06 ACRE-FEET
WEST COMPENSATORY VOLUME PROVIDED	0.60 ACRE-FEET
EAST COMPENSATORY VOLUME PROVIDED	8.46 ACRE-FEET

PROPOSED DRAINAGE EXHIBIT LEGEND:

- PROJECT AREA
- IMPERVIOUS AREA (CN=98)
- PERVIOUS AREA (CN=61)
- EXISTING CONTOUR — —700— —
- PROPOSED CONTOUR ——700——
- OVERFLOW ROUTE
- EXISTING STORM SEWER
- PROPOSED STORM SEWER

No.	Description	Date
1	MASS GRADING SUBMITTAL	10/20/23

PROPOSED DRAINAGE PLAN

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

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1" = 50'

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	0.097	2	60	0.003	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.012	2	60	0.000	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.015	2	60	0.001	------	------	------	Proposed Northwest Drainage Area

2 Year-1 Hour Storm Event

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	0.820	2	34	0.045	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.100	2	34	0.005	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.128	2	34	0.007	------	------	------	Proposed Northwest Drainage Area

10 Year-1 Hour Storm Event

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	4.241	2	26	0.215	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.520	2	26	0.026	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.660	2	26	0.033	------	------	------	Proposed Northwest Drainage Area

Peak Event for 100-Year Storm

100 Year-1 Hour Storm Event

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	0.178	2	102	0.016	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.022	2	102	0.002	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.028	2	102	0.003	------	------	------	Proposed Northwest Drainage Area

2 Year-2 Hour Storm Event

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	0.936	2	46	0.094	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.115	2	46	0.011	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.146	2	46	0.015	------	------	------	Proposed Northwest Drainage Area

Peak Event for 10-Year Storm

10 Year-2 Hour Storm Event

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	4.014	2	36	0.350	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.492	2	36	0.043	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.625	2	36	0.055	------	------	------	Proposed Northwest Drainage Area

100 Year-2 Hour Storm Event

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	0.315	2	702	0.109	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.039	2	702	0.013	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.049	2	702	0.017	------	------	------	Proposed Northwest Drainage Area

Peak Event for 2-Year Storm

2 Year-18 Hour Storm Event

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	0.923	2	702	0.331	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.113	2	702	0.041	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.144	2	702	0.051	------	------	------	Proposed Northwest Drainage Area

10 Year-18 Hour Storm Event

Hydrograph Summary Report

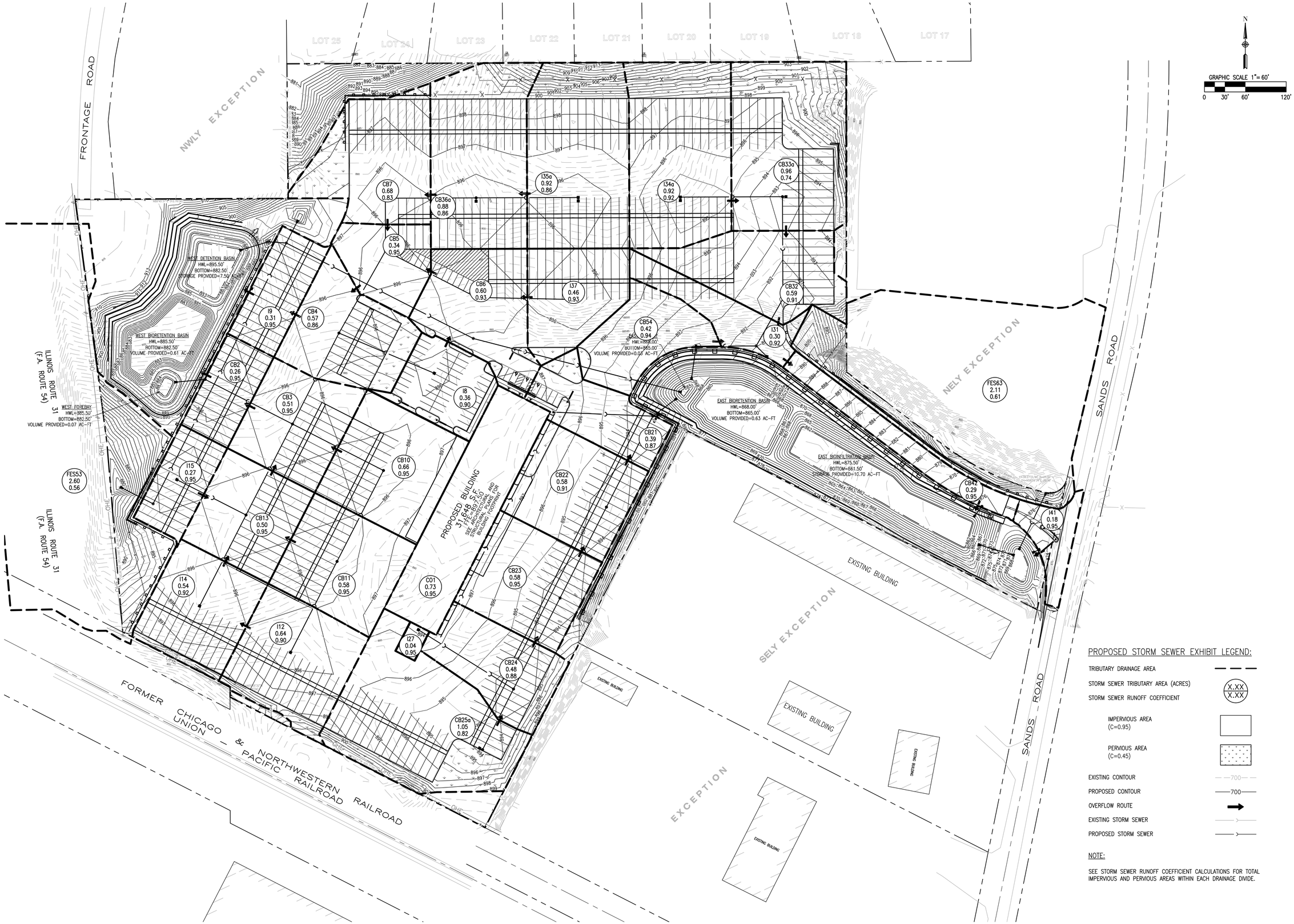
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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	2.321	2	702	0.906	------	------	------	Existing Northwest Drainage Area A
2	SCS Runoff	0.284	2	702	0.111	------	------	------	Existing Northeast Drainage Area B
3	SCS Runoff	0.361	2	702	0.141	------	------	------	Proposed Northwest Drainage Area

100 Year-18 Hour Storm Event

Storm Sewer Sizing Calculations

- Proposed Storm Sewer Tributary Area Exhibit – ST1
- Runoff Coefficient Calculations
- 10-Year Inlet Capacity Calculations
- 10-Year Storm Sewer Calculations



PROPOSED STORM SEWER EXHIBIT LEGEND:

- TRIBUTARY DRAINAGE AREA
- STORM SEWER TRIBUTARY AREA (ACRES) / STORM SEWER RUNOFF COEFFICIENT (X.XX / X.XX)
- IMPERVIOUS AREA (C=0.95)
- PERVIOUS AREA (C=0.45)
- EXISTING CONTOUR 700
- PROPOSED CONTOUR 700
- OVERFLOW ROUTE
- EXISTING STORM SEWER
- PROPOSED STORM SEWER

NOTE:

SEE STORM SEWER RUNOFF COEFFICIENT CALCULATIONS FOR TOTAL IMPERVIOUS AND PERVIOUS AREAS WITHIN EACH DRAINAGE DIVIDE.

No.	Description	Date
2	PER CITY	12/20/23
1	MASS GRADING SUBMITTAL	10/20/23

STORM SEWER TRIBUTARY EXHIBIT

NVA TRUCKING FACILITY EXPANSION

NVA PROP IL LLC

CRYSTAL LAKE, IL

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ST1

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Runoff Coefficient (RC) Calculations

Project: *NVA Trucking Facility Expansion* By: *DRM* Date: *12/20/2023*
Location: *Crystal Lake, IL* Checked: Date:
Project #: *G985*

PROPOSED STORM SEWER

Sub Basin	A_i	A_p	A_T	RC
	(AC)	(AC)	(AC)	
CB2	0.26	0.00	0.26	0.95
CB3	0.51	0.00	0.51	0.95
CB4	0.47	0.10	0.57	0.86
CB5	0.34	0.00	0.34	0.95
CB6	0.57	0.03	0.60	0.93
I37	0.44	0.02	0.46	0.93
CB7	0.51	0.17	0.68	0.83
CB36	0.72	0.16	0.88	0.86
CB35	0.76	0.16	0.92	0.86
I8	0.32	0.04	0.36	0.90
I9	0.31	0.00	0.31	0.95
CB10	0.66	0.00	0.66	0.95
CB11	0.58	0.00	0.58	0.95
I12	0.58	0.06	0.64	0.90
CB13	0.50	0.00	0.50	0.95
I14	0.51	0.03	0.54	0.92
I15	0.27	0.00	0.27	0.95
CB21	0.33	0.06	0.39	0.87
CB22	0.54	0.04	0.58	0.91
CB23	0.58	0.00	0.58	0.95
CB24	0.41	0.07	0.48	0.88
CB25	0.78	0.27	1.05	0.82
I27	0.04	0.00	0.04	0.95
CB54	0.41	0.01	0.42	0.94
I31	0.28	0.02	0.30	0.92
CB32	0.54	0.05	0.59	0.91
CB33	0.55	0.41	0.96	0.74
CB34	0.73	0.19	0.92	0.85
I41	0.18	0.00	0.18	0.95
CB42	0.29	0.00	0.29	0.95
CO1	0.73	0.00	0.73	0.95
Bypass	14.91	6.57	21.48	0.80

A_T = Total Area
Ai = Impervious Area
Ap = Pervious Area
I = Inlet
CB = Catch Basin
MH = Manhole
TD = Trench Drain
RG = Riser Grate
RD = Roof Drain
DA = Drainage Area

Notes

1) Impervious Runoff Coefficient = 0.95
2) Pervious Runoff Coefficient = 0.45
3) Areas are assumed to be fully developed (both proposed and future condition)

10-YEAR INLET CAPACITY CALCULATIONS

Project: *NVA Trucking Facility Expansion* By: *DRM* Date: *12/20/2023*
Location: *Crystal Lake, IL* Checked: Date:
Project #: *G985*

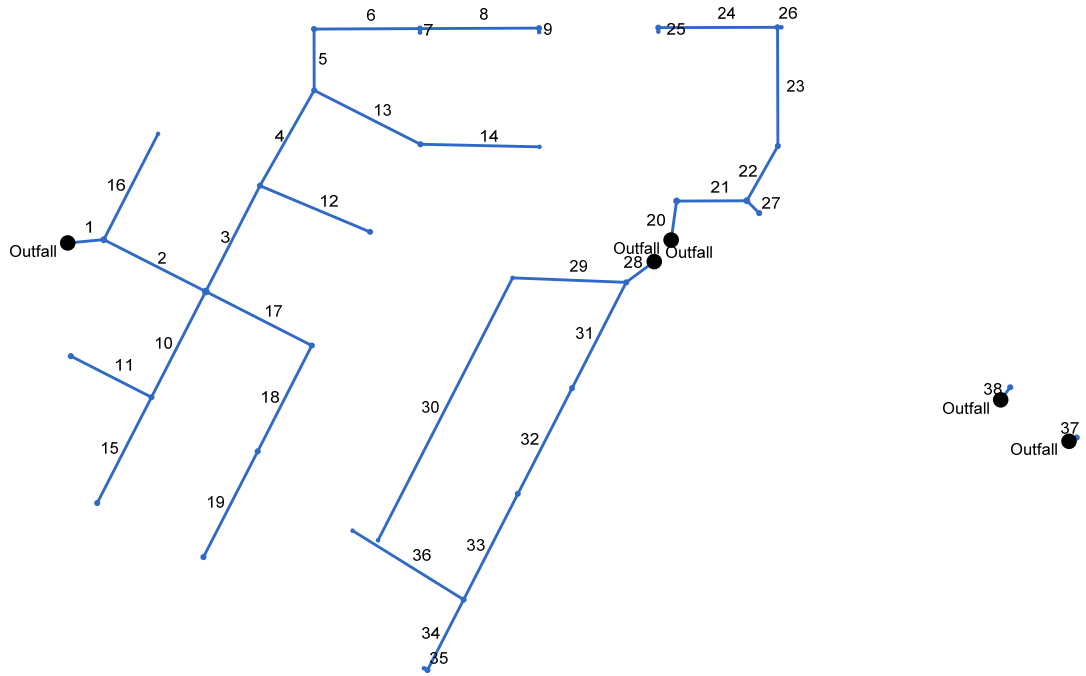
STRUCTURE #	DRAINAGE AREA (AC)	RUNOFF COEFFICIENT	FLOW (CFS)	PONDING DEPTH (ft)	PERIMETER OF GRATE (FT)	OPEN AREA OF GRATE (S.F.)	WEIR FLOW CAPACITY (CFS)	ORIFICE FLOW CAPACITY (CFS)	GRATE TYPE
CB2	0.26	0.95	1.84	0.50	4.30	1.00	NA	3.40	IDOT Type 11P
CB3	0.51	0.95	3.60	0.70	6.00	0.90	NA	3.63	IDOT Type 1P
CB4	0.57	0.86	3.65	0.75	6.00	0.90	NA	3.75	IDOT Type 1P
CB5	0.34	0.95	2.40	0.75	6.00	0.90	NA	3.75	IDOT Type 1P
CB6	0.60	0.93	4.13	0.75	6.00	1.20	NA	5.00	IDOT Type 3P
I37	0.46	0.93	3.17	0.75	6.00	0.90	NA	3.75	IDOT Type 1P
CB7	0.68	0.83	4.17	0.75	6.00	1.20	NA	5.00	IDOT Type 3P
CB36	0.88	0.86	5.63	0.75	12.00	1.80	NA	7.51	IDOT Type 1Px2
CB35	0.92	0.86	5.90	0.75	12.00	1.80	NA	7.51	IDOT Type 1Px2
I8	0.36	0.90	2.40	0.50	6.00	0.90	NA	3.06	IDOT Type 1P
I9	0.31	0.95	2.19	0.50	4.30	1.00	NA	3.40	IDOT Type 11P
CB10	0.66	0.95	4.66	0.75	6.00	1.20	NA	5.00	IDOT Type 3P
CB11	0.58	0.95	4.10	0.75	6.00	1.20	NA	5.00	IDOT Type 3P
I12	0.64	0.90	4.29	0.75	6.00	1.20	NA	5.00	IDOT Type 3P
CB13	0.50	0.95	3.53	0.75	6.00	0.90	NA	3.75	IDOT Type 1P
I14	0.54	0.92	3.69	0.75	6.00	0.90	NA	3.75	IDOT Type 1P
I15	0.27	0.95	1.91	0.75	6.00	0.90	NA	3.75	IDOT Type 1P
CB21	0.39	0.87	2.53	0.50	4.30	1.00	NA	3.40	IDOT Type 11P
CB22	0.58	0.91	3.95	0.75	6.00	1.20	NA	5.00	IDOT Type 3P
CB23	0.58	0.95	4.10	0.75	6.00	1.20	NA	5.00	IDOT Type 3P
CB24	0.48	0.88	3.14	0.75	6.00	0.90	NA	3.75	IDOT Type 1P
CB25	1.05	0.82	6.42	0.75	8.60	2.00	NA	8.34	IDOT Type 11Px2
I27	0.04	0.95	0.28	0.50	6.00	0.90	NA	3.06	IDOT Type 1P
CB54	0.42	0.94	2.93	0.50	4.30	1.00	NA	3.40	IDOT Type 11P
I31	0.30	0.92	2.05	0.50	4.30	1.00	NA	3.40	IDOT Type 11P
CB32	0.59	0.91	3.99	0.50	6.00	1.20	NA	4.09	IDOT Type 3P
CB33	0.96	0.74	5.26	0.50	12.00	1.80	NA	6.13	IDOT Type 1Px2
CB34	0.92	0.85	5.80	0.75	12.00	1.80	NA	7.51	IDOT Type 1Px2
I41	0.18	0.95	1.27	0.50	4.30	1.00	NA	3.40	IDOT Type 11P
CB42	0.29	0.95	2.05	0.50	4.30	1.00	NA	3.40	IDOT Type 11P

flow	weir flow	orifice flow
Q=cia	Q=3.3 P (h)^1.5	Q=CA(2gh)½
c = Runoff Coefficient		Recurrence Interval (years)
i = Intensity (in./hr),	7.44	5
a = Drainage Area (acres)		
C = 0.6		
A = Open Area of Grate (SF)		
h = Ponding Above Rim (feet)		
P = Perimeter of grate (feet)		

Grate Geometry

IDOT Type 1P	(Neenah R-2504-D, EJIW 1050Z1 (M3 GRATE))		
Weir Perimeter L.F.=	6.0	Sq. Ft. Open:	0.9
IDOT Type 2P	(Neenah R-4341-A (BEEHIVE GRATE))		
Weir Perimeter L.F.=	6.0	Sq. Ft. Open:	2.5
IDOT Type 3P	(Neenah R-2504-C)		
Weir Perimeter L.F.=	6.0	Sq. Ft. Open:	1.2
IDOT Type 11P	(Neenah R-3281-A, EJIW 7210)		

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



Project File: 231215-G985-Hydraflow-10-Year.stm	Number of lines: 38	Date: 12/21/2023

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	45.564	0.26	9.07	0.95	0.25	8.24	5.0	7.8	6.7	55.35	129.2	13.33	36	3.75	883.00	884.71	884.37	887.12	885.88	895.15	Pipe 10
2	1	144.000	0.51	8.49	0.95	0.49	7.69	5.0	7.5	6.8	52.30	57.76	9.03	36	0.75	886.63	887.71	888.87	890.06	895.15	895.20	Pipe 9
3	2	150.035	0.57	4.80	0.86	0.49	4.22	5.0	7.0	6.9	29.19	33.06	6.82	30	0.65	887.71	888.69	890.06	890.53	895.20	895.20	Pipe 16
4	3	138.595	0.34	3.87	0.95	0.32	3.41	5.0	6.6	7.0	24.02	25.94	6.00	30	0.40	888.69	889.24	890.59	891.14	895.20	895.20	Pipe 15
5	4	77.432	0.68	2.48	0.83	0.56	2.11	5.0	6.2	7.1	15.06	16.77	4.80	24	0.55	889.24	889.67	891.70	892.04	895.20	895.20	Pipe 14
6	5	133.330	0.44	1.80	0.86	0.38	1.55	5.0	5.5	7.3	11.31	14.26	3.60	24	0.40	889.67	890.20	892.40	892.73	895.20	895.20	Pipe 23
7	6	5.000	0.44	0.44	0.86	0.38	0.38	5.0	5.0	7.5	2.82	3.56	4.18	12	1.00	892.00	892.05	892.94	892.77	895.20	895.25	Pipe 57
8	6	149.916	0.46	0.92	0.86	0.40	0.79	5.0	5.0	7.5	5.90	6.46	4.81	15	1.00	890.20	891.70	892.94	894.19	895.20	895.20	Pipe 24
9	8	5.000	0.46	0.46	0.86	0.40	0.40	5.0	5.0	7.5	2.95	3.56	3.76	12	1.00	892.00	892.05	894.55	894.58	895.20	895.32	Pipe 56
10	2	150.000	0.50	1.30	0.95	0.47	1.22	5.0	5.8	7.2	8.83	10.50	6.37	18	1.00	889.60	891.10	890.65	892.25	895.20	895.20	Pipe 12
11	10	114.000	0.27	0.27	0.95	0.26	0.26	5.0	5.0	7.5	1.92	2.52	3.53	12	0.50	891.68	892.25	892.33	892.90	895.20	895.45	Pipe 13
12	3	150.409	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.5	2.39	2.64	3.81	12	0.55	891.57	892.40	892.32	893.15	895.20	895.62	Pipe 33
13	4	150.000	0.60	1.06	0.93	0.56	0.99	5.0	5.9	7.2	7.10	7.79	4.44	18	0.55	890.28	891.10	891.70	892.28	895.20	895.20	Pipe 17
14	13	149.950	0.46	0.46	0.93	0.43	0.43	5.0	5.0	7.5	3.19	4.08	2.71	15	0.40	891.10	891.70	892.45	892.78	895.20	895.20	Pipe 29
15	10	150.000	0.54	0.54	0.92	0.49	0.49	5.0	5.0	7.5	3.68	4.08	3.34	15	0.40	891.10	891.70	892.25	892.68	895.20	895.20	Pipe 11
16	1	149.965	0.31	0.31	0.95	0.30	0.30	5.0	5.0	7.5	2.22	2.76	3.91	12	0.60	891.05	891.95	891.73	892.63	895.15	895.15	Pipe 36
17	2	149.965	0.66	1.88	0.95	0.63	1.76	5.0	6.2	7.1	12.49	14.31	5.13	24	0.40	889.00	889.60	890.45	891.05	895.20	895.20	Pipe 8
18	17	149.965	0.58	1.22	0.95	0.55	1.13	5.0	5.7	7.3	8.20	9.09	4.64	18	0.75	889.60	890.72	891.46	892.37	895.20	895.20	Pipe 7
19	18	150.035	0.64	0.64	0.90	0.58	0.58	5.0	5.0	7.5	4.30	5.21	3.50	15	0.65	890.72	891.70	892.42	893.09	895.20	895.20	Pipe 6
20	End	49.799	0.42	3.19	0.94	0.39	2.77	5.0	6.8	7.0	19.31	25.24	8.05	24	1.25	868.00	868.62	869.31	870.20	870.88	891.90	Pipe 28
21	20	88.291	0.00	2.77	0.00	0.00	2.37	0.0	6.5	7.1	16.73	18.24	6.58	24	0.65	885.63	886.20	887.13	887.71	891.90	891.04	Pipe 44
22	21	79.485	0.59	2.47	0.91	0.54	2.10	5.0	6.2	7.1	14.95	15.99	4.76	24	0.50	886.20	886.60	888.31	888.65	891.04	890.85	Pipe 27

Project File: 231215-G985-Hydraflow-10-Year.stm | Number of lines: 38 | Run Date: 12/21/2023

NOTES:Intensity = 148.99 / (Inlet time + 18.90) ^ 0.94; Return period =Yrs. 10 ; c = cir e = ellip b = box

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)	
23	22	150.000	0.48	1.88	0.74	0.36	1.56	5.0	5.5	7.3	11.39	15.99	3.70	24	0.50	886.60	887.35	888.85	889.19	890.85	892.35	Pipe 26
24	23	150.014	0.46	0.92	0.92	0.42	0.85	5.0	5.0	7.5	6.31	7.17	6.26	15	1.23	888.85	890.70	889.76	891.71	892.35	894.20	Pipe 25
25	24	5.000	0.46	0.46	0.92	0.42	0.42	5.0	5.0	7.5	3.16	3.56	5.02	12	1.00	891.00	891.05	891.73	891.81	894.20	894.28	Pipe 55
26	23	5.000	0.48	0.48	0.74	0.36	0.36	5.0	5.0	7.5	2.65	3.56	4.75	12	1.00	889.10	889.15	889.74	889.85	892.35	892.50	Pipe 58
27	21	22.019	0.30	0.30	0.92	0.27	0.27	5.0	5.0	7.5	2.05	5.04	2.61	12	2.00	886.66	887.10	888.31	888.38	891.04	890.30	Pipe 45
28	End	43.921	0.39	3.84	0.87	0.34	3.43	5.0	15.1	5.3	18.32	25.31	7.92	24	1.25	868.00	868.55	869.26	870.09	870.33	893.15	Pipe 22
29	28	143.178	0.00	0.73	0.00	0.00	0.69	0.0	6.5	7.1	4.87	6.46	5.48	15	1.00	888.85	890.28	889.66	891.17	893.15	897.26	Pipe 47
30	29	372.204	0.73	0.73	0.95	0.69	0.69	5.0	5.0	7.5	5.15	6.46	5.40	15	1.00	890.28	894.00	891.17	894.92	897.26	897.23	Pipe 46
31	28	150.000	0.58	2.73	0.91	0.53	2.40	5.0	14.7	5.4	12.99	15.99	5.67	24	0.50	886.32	887.07	887.69	888.44	893.15	893.15	Pipe 21
32	31	150.000	0.58	2.15	0.95	0.55	1.87	5.0	14.1	5.5	10.30	15.99	4.89	24	0.50	887.07	887.82	888.51	888.97	893.15	893.15	Pipe 20
33	32	150.000	0.48	1.57	0.88	0.42	1.32	5.0	13.6	5.6	7.36	8.47	5.32	18	0.65	887.83	888.80	888.97	889.85	893.15	893.15	Pipe 19
34	33	100.000	0.53	1.05	0.82	0.43	0.86	5.0	5.0	7.5	6.42	7.79	3.79	18	0.55	888.80	889.35	890.33	890.65	893.15	893.15	Pipe 18
35	34	5.011	0.53	0.53	0.82	0.43	0.43	5.0	5.0	7.5	3.21	3.56	4.58	12	1.00	889.95	890.00	890.89	890.77	893.15	893.26	Pipe 54
36	33	164.597	0.04	0.04	0.95	0.03	0.03	5.0	5.0	7.5	0.25	2.25	1.28	12	0.40	889.79	890.45	890.33	890.67	893.15	893.65	Pipe 34
37	End	10.750	0.18	0.18	0.95	0.17	0.17	5.0	5.0	7.5	1.28	5.95	4.74	12	2.79	870.00	870.30	870.31	870.78	871.25	873.55	Pipe 31
38	End	19.810	0.29	0.29	0.95	0.27	0.27	5.0	5.0	7.5	2.03	23.74	11.25	12	44.42	864.00	872.80	864.20	873.41	865.25	875.50	Pipe 32

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NOTES:Intensity = 148.99 / (Inlet time + 18.90) ^ 0.94; Return period =Yrs. 10 ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	55.35	883.00	884.37	1.37	3.15	17.57	1.28	885.66	0.000	45.564	884.71	887.12	2.41**	6.09	9.09	1.28	888.40	0.000	0.000	n/a	0.87	n/a
2	36	52.30	886.63	888.87	2.24*	5.65	9.25	1.21	890.07	0.000	144.000	887.71	890.06	2.35**	5.94	8.81	1.21	891.27	0.000	0.000	n/a	1.00	1.21
3	30	29.19	887.71	890.06	2.34	3.87	6.10	0.88	890.94	0.000	150.035	888.69	890.53 j	1.84**	3.87	7.54	0.88	891.41	0.000	0.000	n/a	1.00	n/a
4	30	24.02	888.69	890.59	1.90*	4.00	6.00	0.56	891.15	0.400	138.595	889.24	891.14	1.90	4.00	6.00	0.56	891.70	0.401	0.400	0.555	1.00	0.56
5	24	15.06	889.24	891.70	2.00	3.14	4.80	0.36	892.06	0.444	77.432	889.67	892.04	2.00	3.14	4.79	0.36	892.40	0.444	0.444	0.344	1.00	0.36
6	24	11.31	889.67	892.40	2.00	3.14	3.60	0.20	892.60	0.250	133.330	890.20	892.73	2.00	3.14	3.60	0.20	892.94	0.250	0.250	0.334	1.00	0.20
7	12	2.82	892.00	892.94	0.94	0.61	3.70	0.34	893.27	0.000	5.000	892.05	892.77	0.72**	0.61	4.67	0.34	893.11	0.000	0.000	n/a	1.00	0.34
8	15	5.90	890.20	892.94	1.25	1.23	4.81	0.36	893.30	0.836	149.916	891.70	894.19	1.25	1.23	4.81	0.36	894.55	0.835	0.835	1.252	1.00	0.36
9	12	2.95	892.00	894.55	1.00	0.79	3.76	0.22	894.77	0.688	5.000	892.05	894.58	1.00	0.79	3.76	0.22	894.80	0.688	0.688	0.034	1.00	0.22
10	18	8.83	889.60	890.65	1.05*	1.33	6.66	0.57	891.23	0.000	150.000	891.10	892.25	1.15**	1.45	6.08	0.57	892.82	0.000	0.000	n/a	1.00	n/a
11	12	1.92	891.68	892.33	0.65*	0.54	3.53	0.19	892.53	0.500	114.000	892.25	892.90	0.65	0.54	3.53	0.19	893.10	0.500	0.500	0.570	1.00	0.19
12	12	2.39	891.57	892.32	0.75*	0.63	3.81	0.23	892.54	0.550	150.409	892.40	893.15	0.75	0.63	3.81	0.23	893.37	0.550	0.550	0.827	1.00	0.23
13	18	7.10	890.28	891.70	1.42	1.73	4.09	0.26	891.96	0.396	150.000	891.10	892.28	1.18	1.49	4.78	0.35	892.63	0.498	0.447	0.670	0.49	0.17
14	15	3.19	891.10	892.45	1.25	1.23	2.60	0.10	892.55	0.244	149.950	891.70	892.78	1.08	1.13	2.82	0.12	892.91	0.224	0.234	0.350	1.00	0.12
15	15	3.68	891.10	892.25	1.15	1.18	3.12	0.15	892.40	0.282	150.000	891.70	892.68	0.98	1.03	3.57	0.20	892.88	0.355	0.318	0.478	1.00	0.20
16	12	2.22	891.05	891.73	0.68*	0.57	3.90	0.24	891.97	0.600	149.965	891.95	892.63	0.68	0.57	3.91	0.24	892.87	0.600	0.600	0.900	1.00	0.24
17	24	12.49	889.00	890.45	1.45*	2.43	5.13	0.41	890.86	0.400	149.965	889.60	891.05	1.45	2.43	5.13	0.41	891.46	0.400	0.400	0.600	1.00	0.41
18	18	8.20	889.60	891.46	1.50	1.77	4.64	0.33	891.79	0.610	149.965	890.72	892.37	1.50	1.77	4.64	0.33	892.71	0.609	0.610	0.914	0.15	0.05
19	15	4.30	890.72	892.42	1.25	1.23	3.50	0.19	892.61	0.443	150.035	891.70	893.09	1.25	1.23	3.50	0.19	893.28	0.443	0.443	0.664	1.00	0.19
20	24	19.31	868.00	869.31	1.31*	2.18	8.85	0.82	870.13	0.000	49.799	868.62	870.20	1.58**	2.66	7.26	0.82	871.02	0.000	0.000	n/a	0.99	n/a
21	24	16.73	885.63	887.13	1.51*	2.54	6.58	0.67	887.81	0.650	88.291	886.20	887.71	1.51	2.54	6.58	0.67	888.38	0.650	0.650	0.574	0.89	0.60
22	24	14.95	886.20	888.31	2.00	3.14	4.76	0.35	888.66	0.437	79.485	886.60	888.65	2.00	3.14	4.76	0.35	889.01	0.437	0.437	0.347	0.55	0.19

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Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

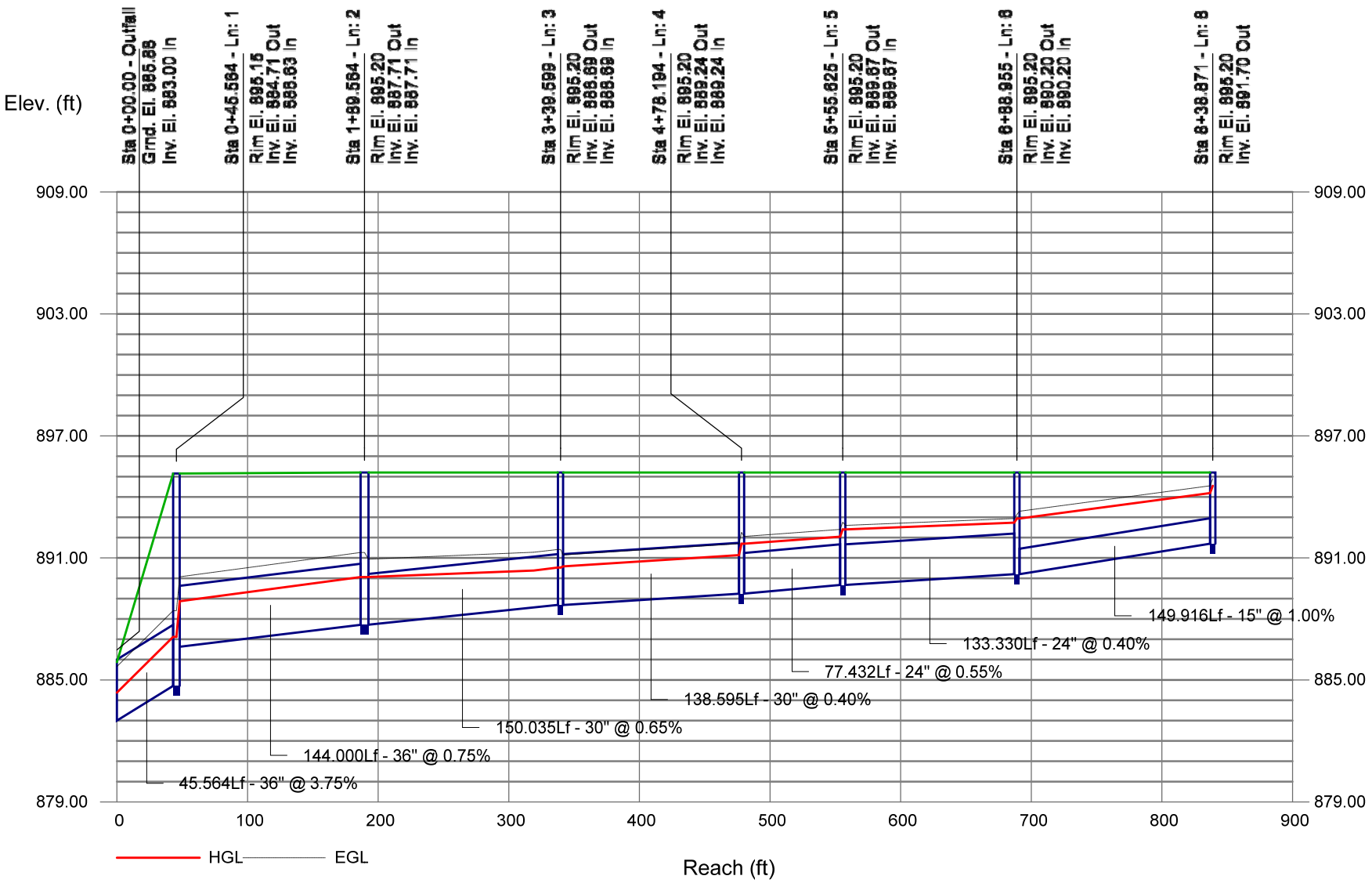
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	24	11.39	886.60	888.85	2.00	3.14	3.63	0.20	889.05	0.254	150.000	887.35	889.19	1.84	3.02	3.77	0.22	889.41	0.220	0.237	0.356	1.00	0.22
24	15	6.31	888.85	889.76	0.91*	0.96	6.59	0.55	890.31	0.000	150.014	890.70	891.71	1.01**	1.07	5.93	0.55	892.26	0.000	0.000	n/a	1.00	0.55
25	12	3.16	891.00	891.73	0.73*	0.62	5.12	0.38	892.11	0.000	5.000	891.05	891.81	0.76**	0.64	4.93	0.38	892.19	0.000	0.000	n/a	1.00	n/a
26	12	2.65	889.10	889.74	0.64*	0.53	4.97	0.32	890.06	0.000	5.000	889.15	889.85	0.70**	0.58	4.53	0.32	890.17	0.000	0.000	n/a	1.00	0.32
27	12	2.05	886.66	888.31	1.00	0.79	2.61	0.11	888.41	0.331	22.019	887.10	888.38	1.00	0.79	2.61	0.11	888.49	0.331	0.331	0.073	1.00	0.11
28	24	18.32	868.00	869.26	1.26*	2.09	8.77	0.77	870.04	0.000	43.921	868.55	870.09	1.54**	2.60	7.06	0.77	870.86	0.000	0.000	n/a	0.68	n/a
29	15	4.87	888.85	889.66	0.81*	0.84	5.78	0.42	890.08	0.000	143.178	890.28	891.17	0.89**	0.94	5.19	0.42	891.59	0.000	0.000	n/a	0.92	0.38
30	15	5.15	890.28	891.17	0.90	0.94	5.47	0.44	891.62	0.000	372.204	894.00	894.92	0.92**	0.97	5.33	0.44	895.36	0.000	0.000	n/a	1.00	n/a
31	24	12.99	886.32	887.69	1.37*	2.29	5.67	0.50	888.19	0.500	150.000	887.07	888.44	1.37	2.29	5.68	0.50	888.94	0.502	0.501	0.751	0.15	0.08
32	24	10.30	887.07	888.51	1.44	1.87	4.25	0.28	888.79	0.275	150.000	887.82	888.97 j	1.15**	1.87	5.52	0.47	889.44	0.527	0.401	n/a	0.15	0.07
33	18	7.36	887.83	888.97	1.14	1.32	5.09	0.40	889.37	0.570	150.000	888.80	889.85 j	1.05**	1.33	5.55	0.48	890.33	0.695	0.632	0.949	1.00	0.48
34	18	6.42	888.80	890.33	1.50	1.77	3.63	0.21	890.54	0.374	100.000	889.35	890.65	1.30	1.63	3.94	0.24	890.89	0.342	0.358	0.358	1.00	0.24
35	12	3.21	889.95	890.89	0.94	0.65	4.18	0.38	891.28	0.000	5.011	890.00	890.77	0.77**	0.65	4.97	0.38	891.15	0.000	0.000	n/a	1.00	0.38
36	12	0.25	889.79	890.33	0.54	0.43	0.58	0.01	890.34	0.015	164.597	890.45	890.67	0.22	0.13	1.98	0.06	890.73	0.458	0.237	0.389	1.00	0.06
37	12	1.28	870.00	870.31	0.31*	0.21	6.03	0.19	870.50	0.000	10.750	870.30	870.78	0.48**	0.37	3.46	0.19	870.96	0.000	0.000	n/a	1.00	0.19
38	12	2.03	864.00	864.20	0.20*	0.11	18.44	0.26	864.46	0.000	19.810	872.80	873.41	0.61**	0.50	4.07	0.26	873.67	0.000	0.000	n/a	1.00	n/a

Project File: 231215-G985-Hydraflow-10-Year.stm | Number of lines: 38 | Run Date: 12/21/2023

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

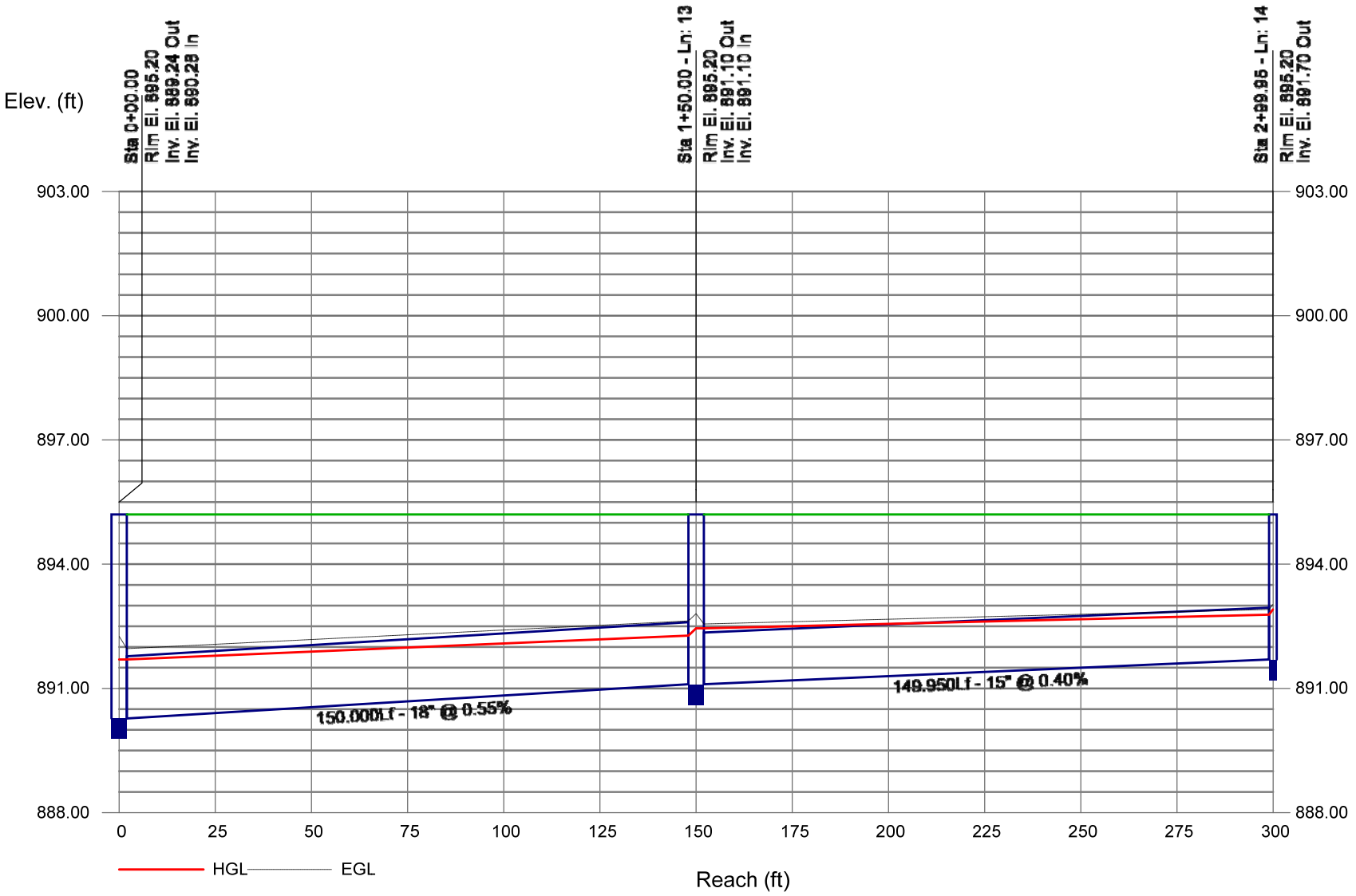
Storm Sewer Profile

Proj. file: 231215-G985-Hydraflow-10-Year.stm



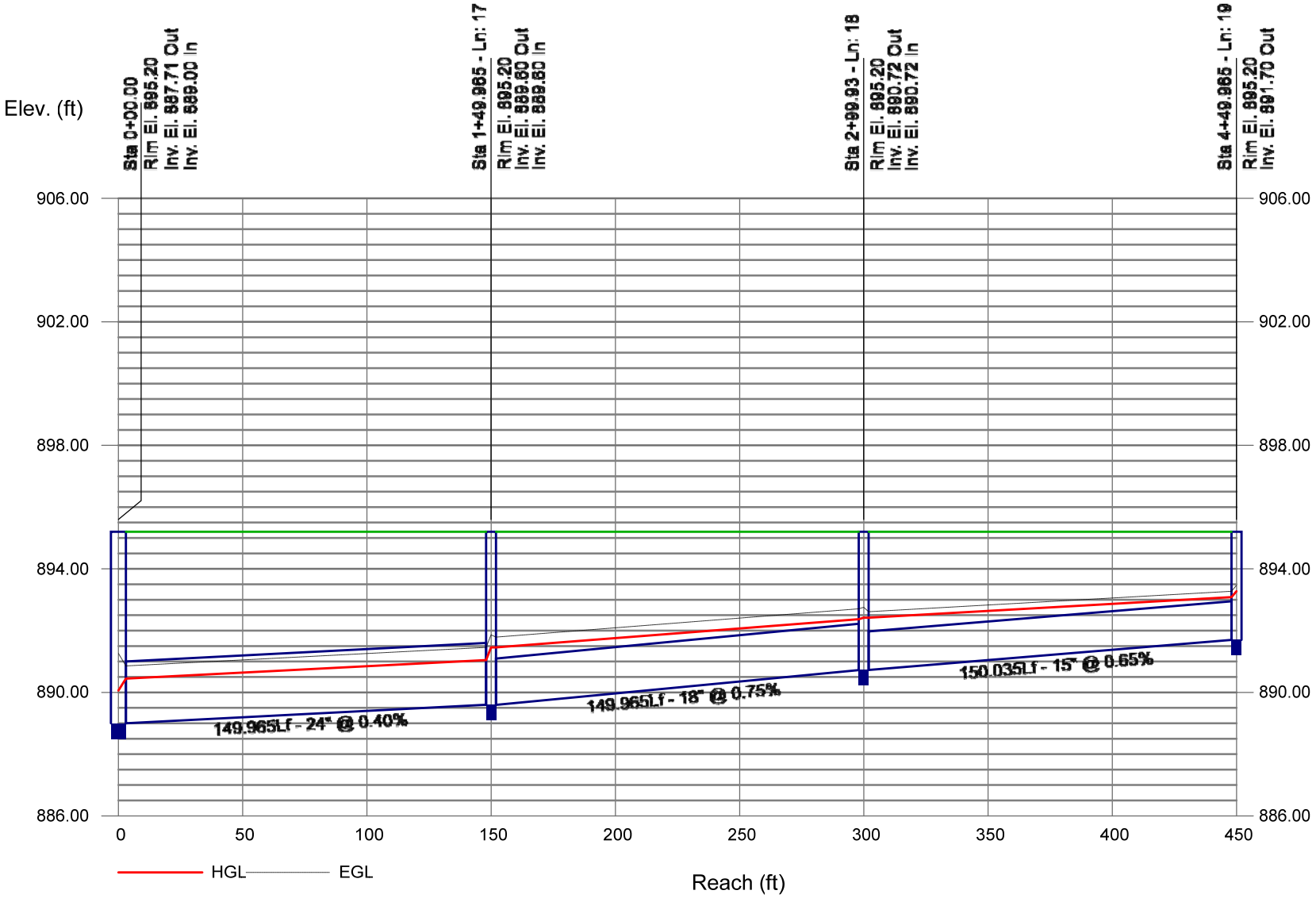
Storm Sewer Profile

Proj. file: 231215-G985-Hydraflow-10-Year.stm



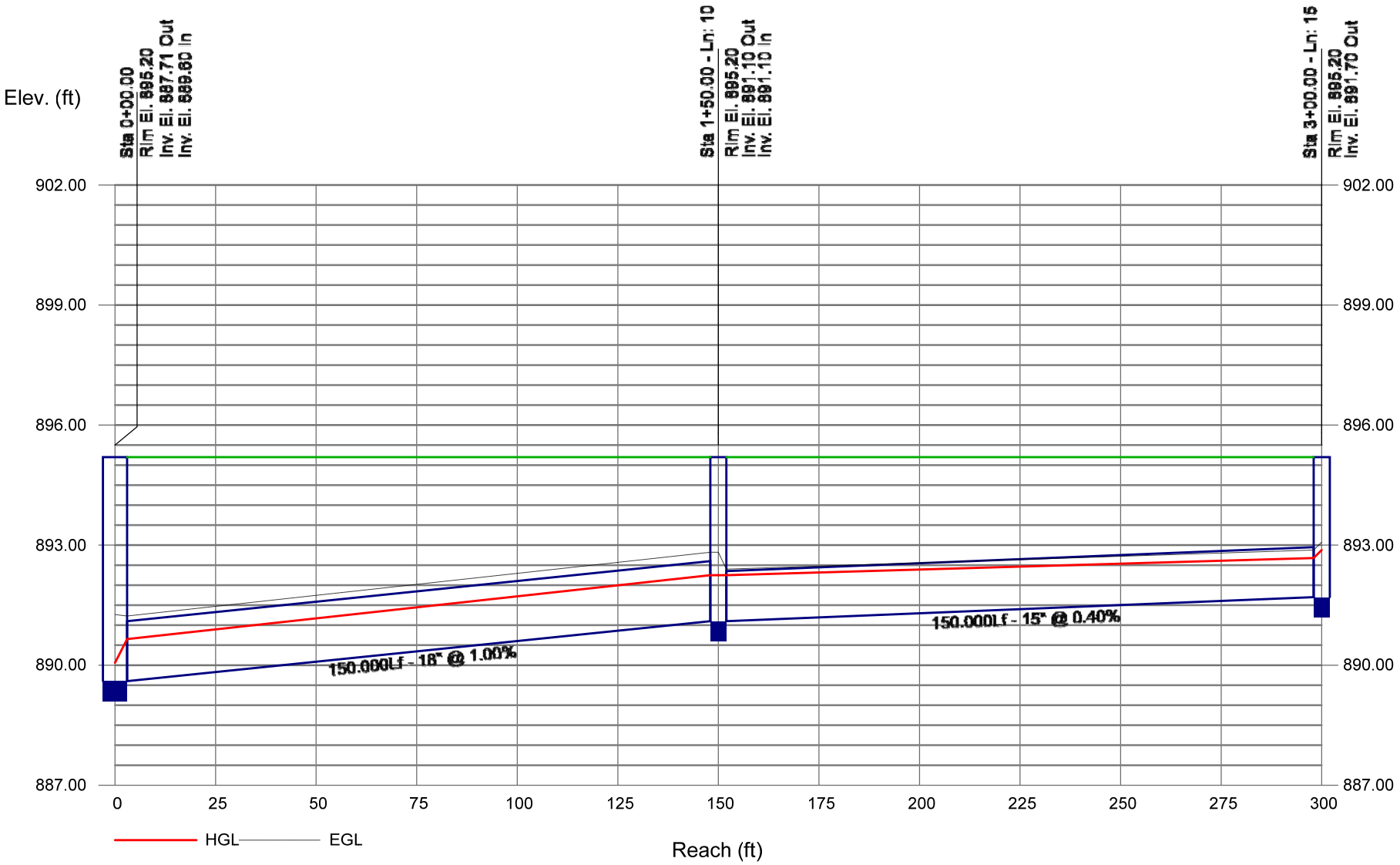
Storm Sewer Profile

Proj. file: 231215-G985-Hydraflow-10-Year.stm



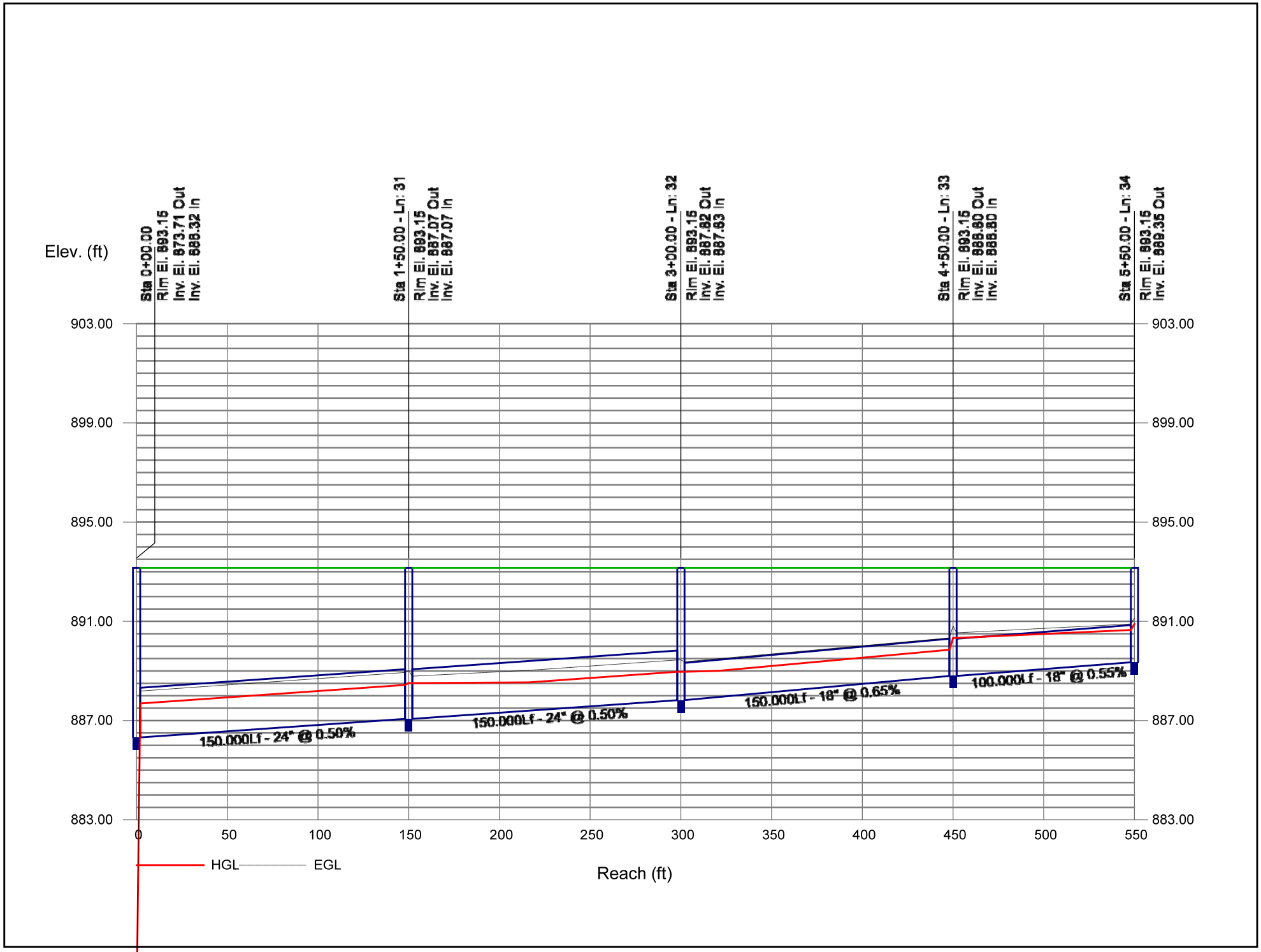
Storm Sewer Profile

Proj. file: 231215-G985-Hydraflow-10-Year.stm



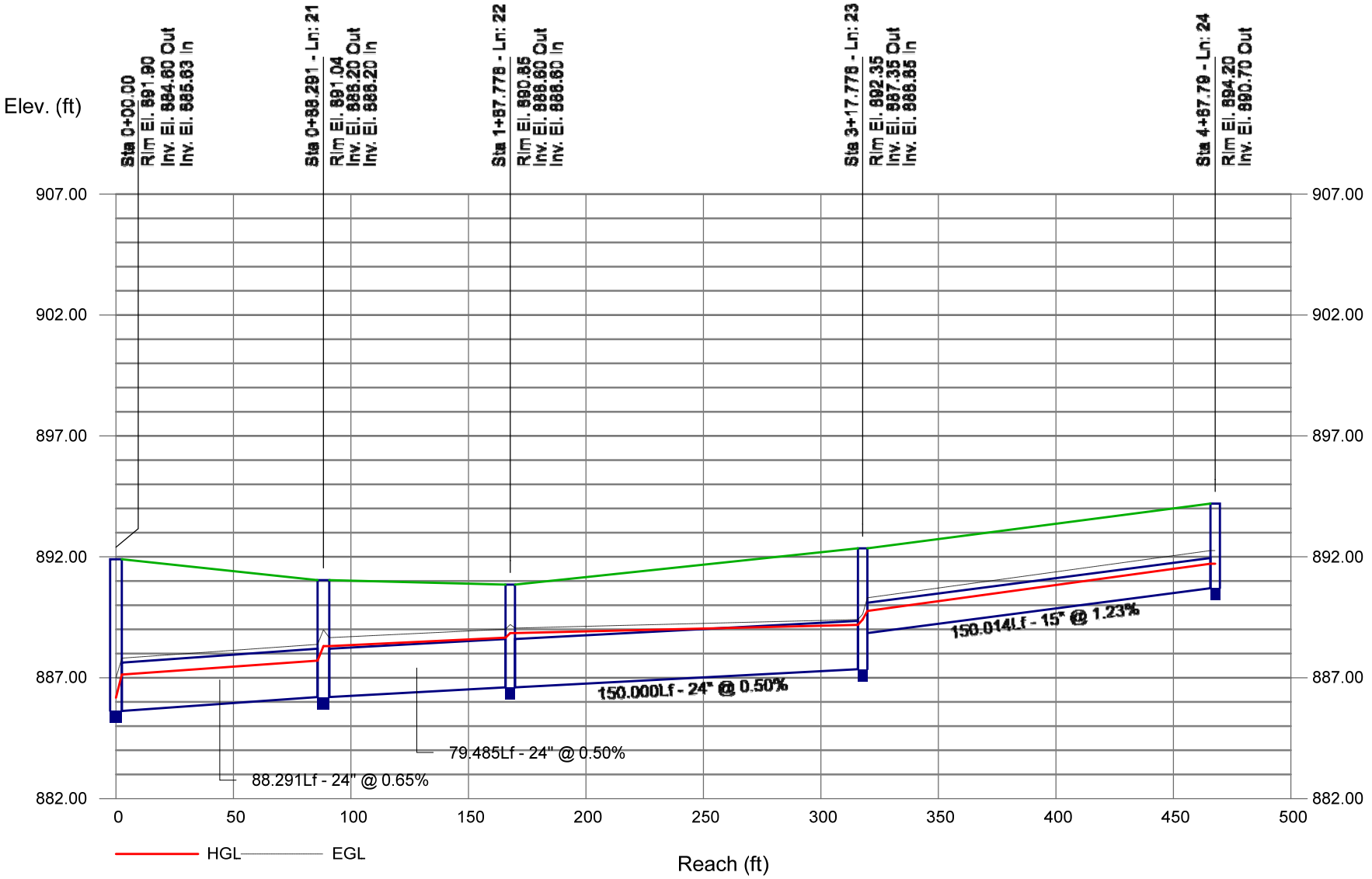
Storm Sewer Profile

Proj. file: 231215-G985-Hydraflow-10-Year.stm



Storm Sewer Profile

Proj. file: 231215-G985-Hydraflow-10-Year.stm



Hydrograph Report

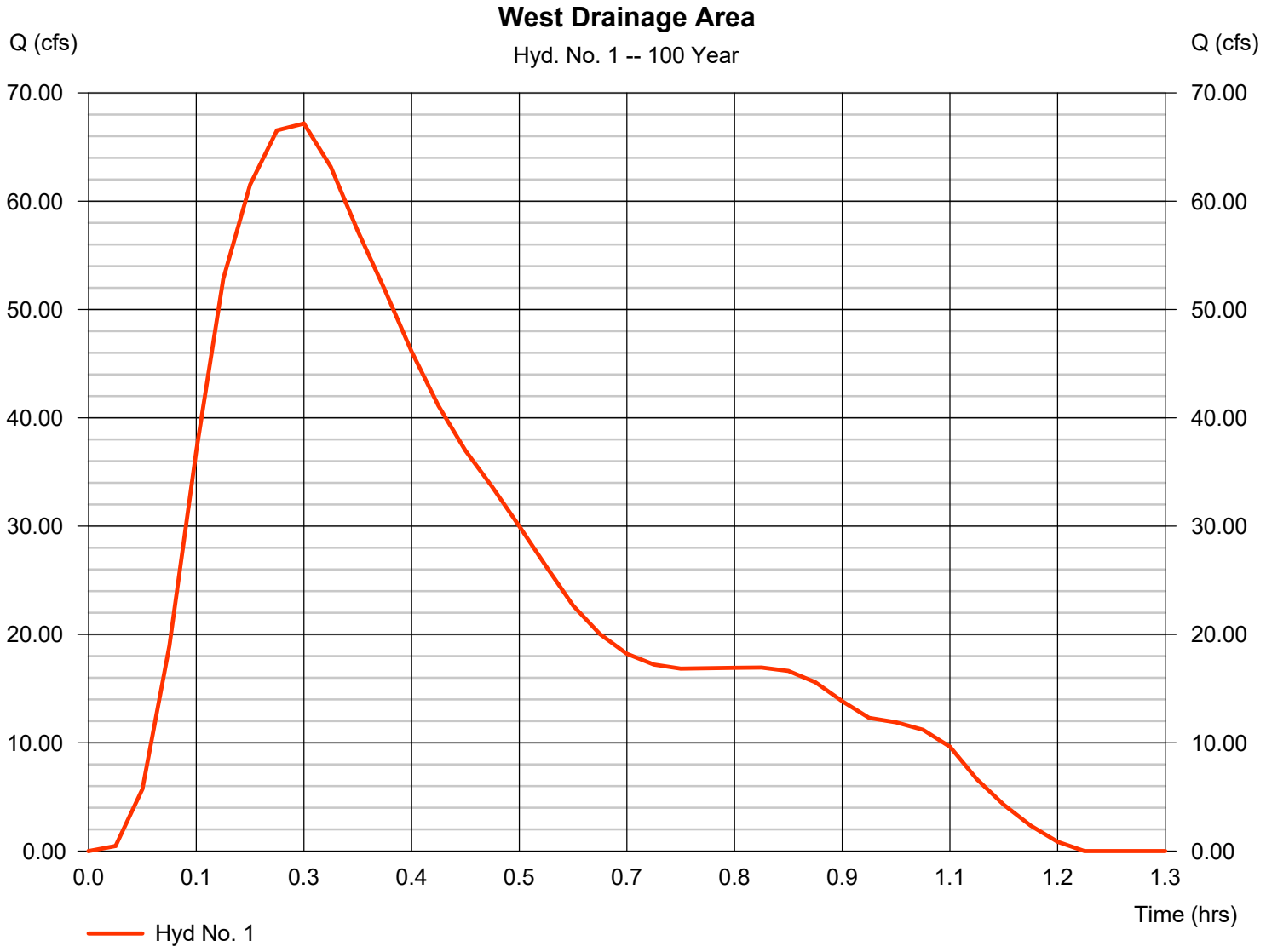
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 12 / 20 / 2023

Hyd. No. 1

1 Hour Storm Event Flow to West Detention Area
Used for emergency bypass flow calculations

West Drainage Area

Hydrograph type	= SCS Runoff	Peak discharge	= 67.17 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.27 hrs
Time interval	= 2 min	Hyd. volume	= 2.610 acft
Drainage area	= 11.360 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.80 min
Total precip.	= 4.03 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484



Weir Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Oct 23 2023

West Detention Overflow Weir

Rectangular Weir

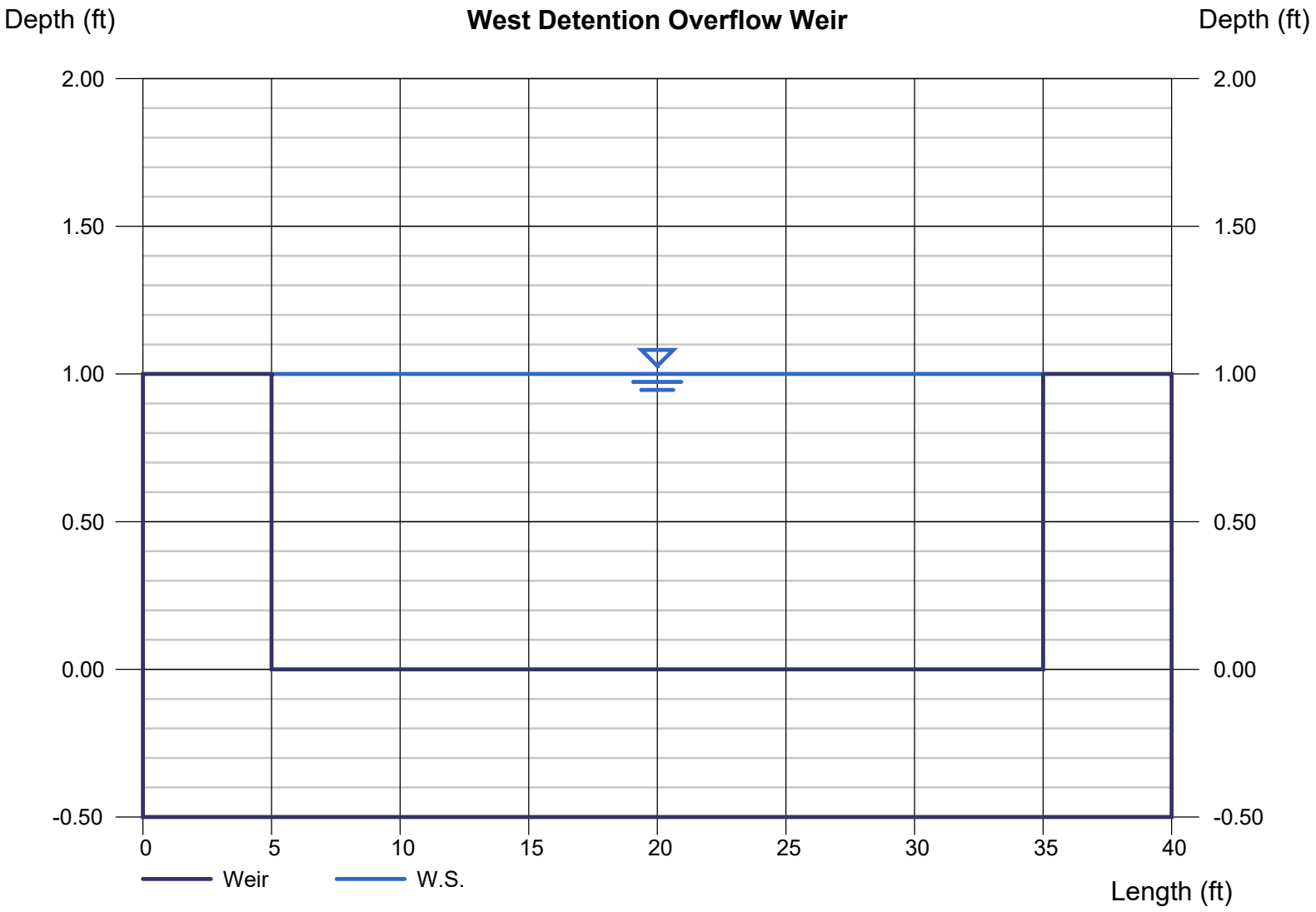
Crest	= Broad
Bottom Length (ft)	= 30.00
Total Depth (ft)	= 1.00

Calculations

Weir Coeff. Cw	= 2.60
Compute by:	Q vs Depth
No. Increments	= 1

Highlighted

Depth (ft)	= 1.00
Q (cfs)	= 78.00
Area (sqft)	= 30.00
Velocity (ft/s)	= 2.60
Top Width (ft)	= 30.00



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Dec 20 2023

FES56 Inlet Capacity

Invert Elev Dn (ft)	=	890.40
Pipe Length (ft)	=	38.00
Slope (%)	=	1.05
Invert Elev Up (ft)	=	890.80
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

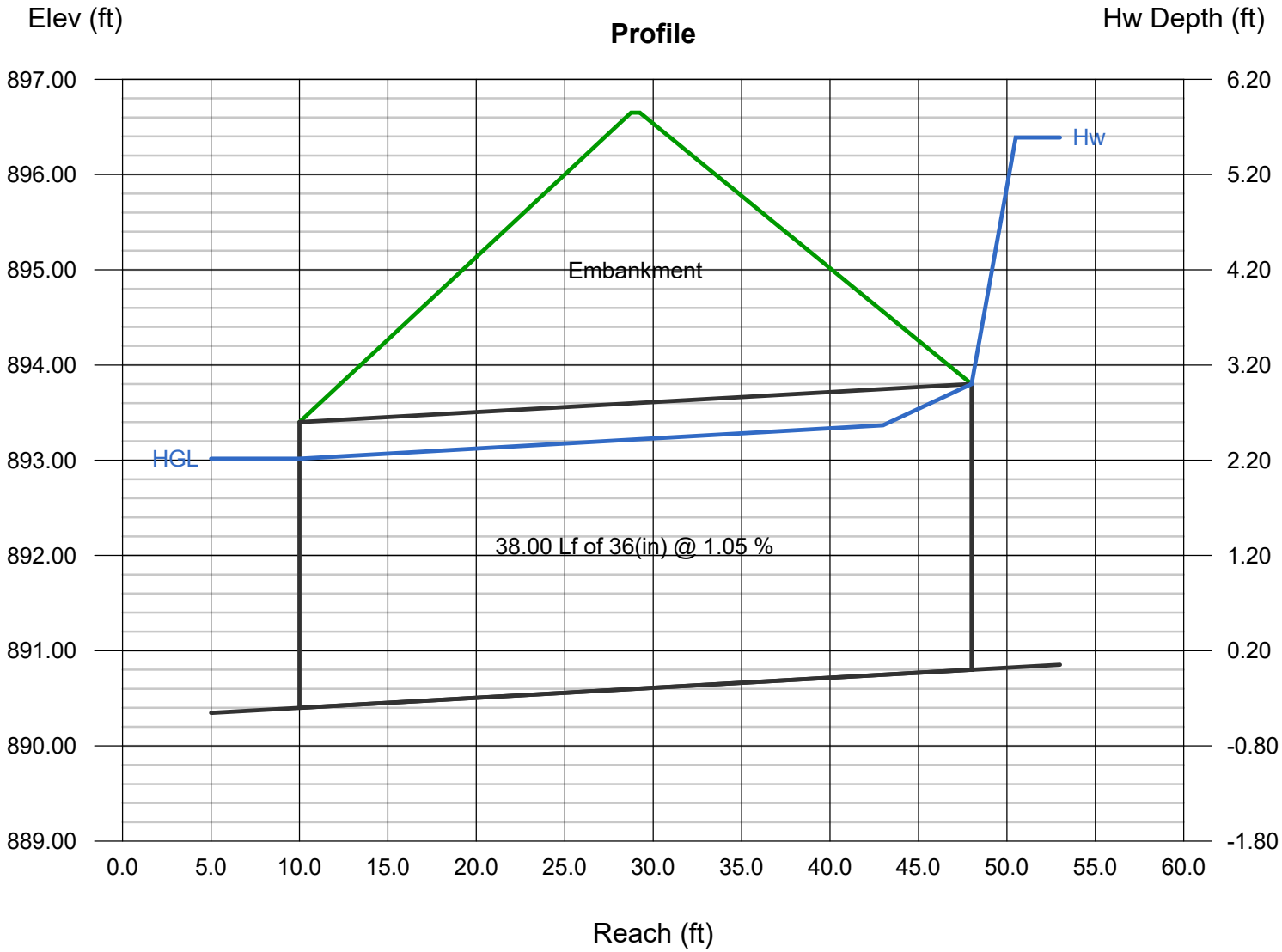
Top Elevation (ft)	=	896.65
Top Width (ft)	=	0.50
Crest Width (ft)	=	50.00

Calculations

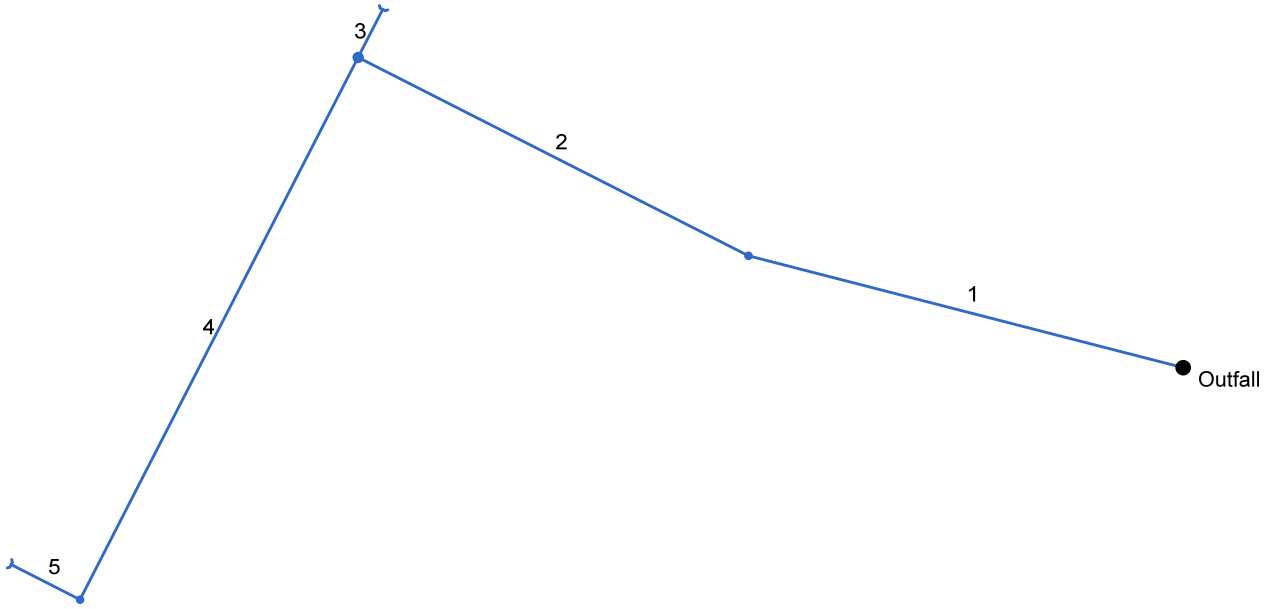
Qmin (cfs)	=	67.17
Qmax (cfs)	=	67.17
Tailwater Elev (ft)	=	0.00

Highlighted

Qtotal (cfs)	=	67.17
Qpipe (cfs)	=	67.17
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	10.27
Veloc Up (ft/s)	=	10.25
HGL Dn (ft)	=	893.02
HGL Up (ft)	=	893.42
Hw Elev (ft)	=	896.39
Hw/D (ft)	=	1.86
Flow Regime	=	Inlet Control



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



Project File: 231215-G985-Hydraflow-100-Year.stm	Number of lines: 5	Date: 12/20/2023

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	315.804	0.00	2.60	0.00	0.00	1.46	0.0	7.6	11.2	83.51	88.65	13.21	36	1.77	865.00	870.58	867.32	873.38	868.42	896.00	Pipe 42 (1)
2	1	308.236	0.00	2.60	0.00	0.00	1.46	0.0	7.2	11.4	83.76	86.96	12.20	36	1.70	870.58	875.82	873.38	878.62	896.00	896.13	Pipe 42
3	2	38.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	67.17	68.42	10.65	36	1.05	890.40	890.80	892.81	893.42	896.13	894.15	Pipe 43
4	2	430.007	0.00	2.60	0.00	0.00	1.46	0.0	5.2	12.3	17.84	27.55	4.32	30	0.45	875.82	877.76	878.62	879.47	896.13	896.15	Pipe 38
5	4	54.354	2.60	2.60	0.56	1.46	1.46	5.0	5.0	12.4	17.99	27.25	4.28	30	0.44	877.76	878.00	879.85	879.92	896.15	880.50	Pipe 37

Project File: 231215-G985-Hydraflow-100-Year.stm | Number of lines: 5 | Run Date: 12/20/2023

NOTES:Intensity = 277.62 / (Inlet time + 20.10) ^ 0.97; Return period =Yrs. 100 ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	83.51	865.00	867.32	2.32	5.86	14.26	2.30	869.62	0.000	315.804	870.58	873.38	2.80**	6.87	12.16	2.30	875.68	0.000	0.000	n/a	0.26	n/a
2	36	83.76	870.58	873.38	2.80	6.87	12.20	2.31	875.69	0.000	308.236	875.82	878.62	2.80**	6.87	12.20	2.31	880.93	0.000	0.000	n/a	1.00	n/a
3	36	67.17	890.40	892.81	2.41*	6.09	11.03	1.64	894.45	0.000	38.000	890.80	893.42	2.62**	6.54	10.27	1.64	895.06	0.000	0.000	n/a	1.00	1.64
4	30	17.84	875.82	878.62	2.50	4.91	3.63	0.21	878.83	0.189	430.007	877.76	879.47	1.71	3.57	5.00	0.39	879.85	0.289	0.239	1.028	1.00	0.39
5	30	17.99	877.76	879.85	2.09	4.39	4.10	0.26	880.12	0.185	54.354	878.00	879.92	1.92	4.04	4.45	0.31	880.23	0.220	0.203	0.110	1.00	0.31

Project File: 231215-G985-Hydraflow-100-Year.stm | Number of lines: 5 | Run Date: 12/20/2023

Notes: * depth assumed; ** Critical depth. ; c = cir e = ellip b = box

Appendix

- Wetland Delineation Report

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

26575 W. Commerce Drive, Suite 601
Volo, Illinois 60073
Phone (847) 740-0888
Fax (847) 740-2888

May 24, 2023

Mr. James E. Condon, P.E.
J. Condon & Associates, Inc.
5415 Business Parkway
Ringwood, IL 60072

Project No.: 23-0081

Re: Wetland Delineation
RVA Trucking Expansion
Crystal Lake, McHenry County, Illinois

Dear Jim:

As requested, we conducted a wetland delineation was conducted at the subject property on March 23, 2023. Wetlands on the project area were delineated by Vincent Mosca of Hey and Associates, Inc. (McHenry County Certified Wetland Specialist) using procedures outlined in the 1987 U. S. Army Corps of Engineers' (USACE) Wetland Delineation Manual and the 2010 Regional Supplement: Midwest Region. The entire project area was inspected, with areas supporting wetland plant species prioritized for investigation. If inspection revealed that wetland plant species comprised more than 50 percent of the plant cover, the suspected wetland was further examined for field indicators of hydric soil and hydrology. The USACE-accepted field indicators of hydric soil include: gleyed and low chroma matrix and mottle colors, and iron and manganese concretions. Necessary hydric soil indicators were field verified in the wetland areas. The USACE-approved field indicators of hydrology include: visual observation or photographic evidence of soil inundation or saturation during the growing season, oxidized channels associated with living roots and rhizomes, water marks, drift lines, waterborne sediment deposits, water stained leaves, surface scoured areas and drainage patterns. Wetland hydrologic criteria were met in the areas delineated as wetland.

Exhibit 1 is the site location map. Exhibit 2 is the USGS topography map. Exhibit 3 is the National Wetland Inventory map which does not indicate any wetland areas. Exhibit 4 is the McHenry County Wetland Inventory map which also does not indicate any wetland areas on the site. Exhibit 5 is the FEMA Flood Hazard Zones which has nothing mapped. Exhibit 6 is the Hydrologic Atlas which shows one depressional area along the western property line. Exhibit 7 is the NRCS soil map which has one hydric soil, Pella silty clay loam near Sands Road on the east side of the property. Exhibit 8 is the surveyed wetland boundaries indicating 0.07 acres on-site (0.12 acre overall). Exhibit 9 are the representative data forms. Representative site photographs are provided as Exhibit 10.

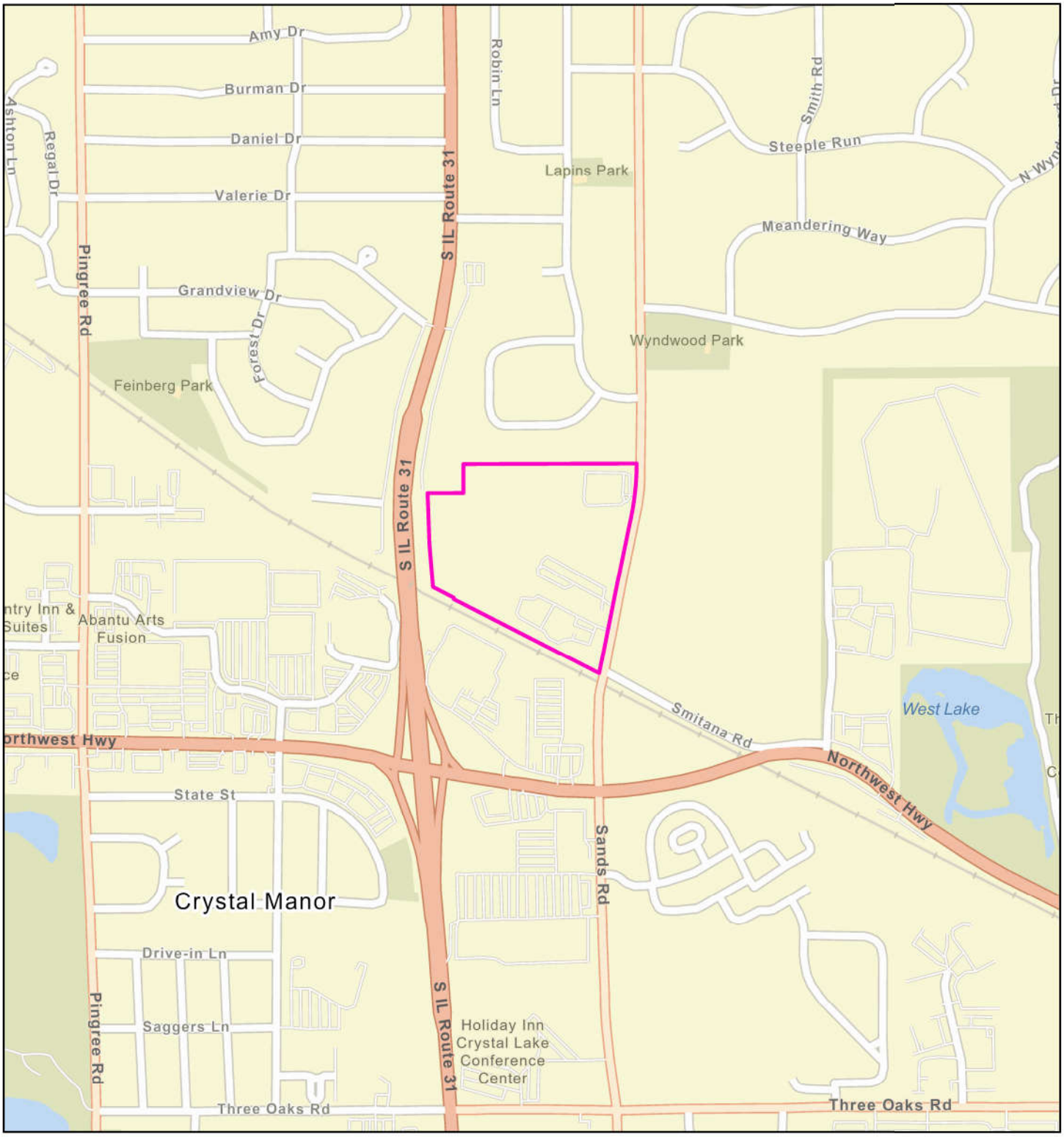
We identified one small wetland area along the western property. The wetland was not mapped, and the soil map did not show any hydric soil in the area that ultimately was delineated as wetland. However, hydric conditions were identified within the upper soil profile. There was evidence of hydrology apparently being generated from the slope/embankment for State Route 31. The vegetation was primarily reed canary grass (greater than 85% cover), with a small stand of river bulrush. The area of mapped hydric soil near Sands Road was found to have old fill and/or erosional material at the surface and did not display hydric soil features in the upper part.

A Preliminary Jurisdictional Determination (PJD) was requested from the McHenry-Lake Soil and Water Conservation District and the US Army Corps of Engineers. The PJD was conducted on April 27, 2023 and determined that the one on-site wetland is isolated and not subject to federal jurisdiction (Appendix 1).

Sincerely,

Vincent J. Mosca, CWS
Senior Principal Ecologist

Attachments



0 1000 Feet

N
W E
S

Legend:
Project Boundary

Project Name:
Condon - NVA Trucking Expansion

Project Number:23-0081

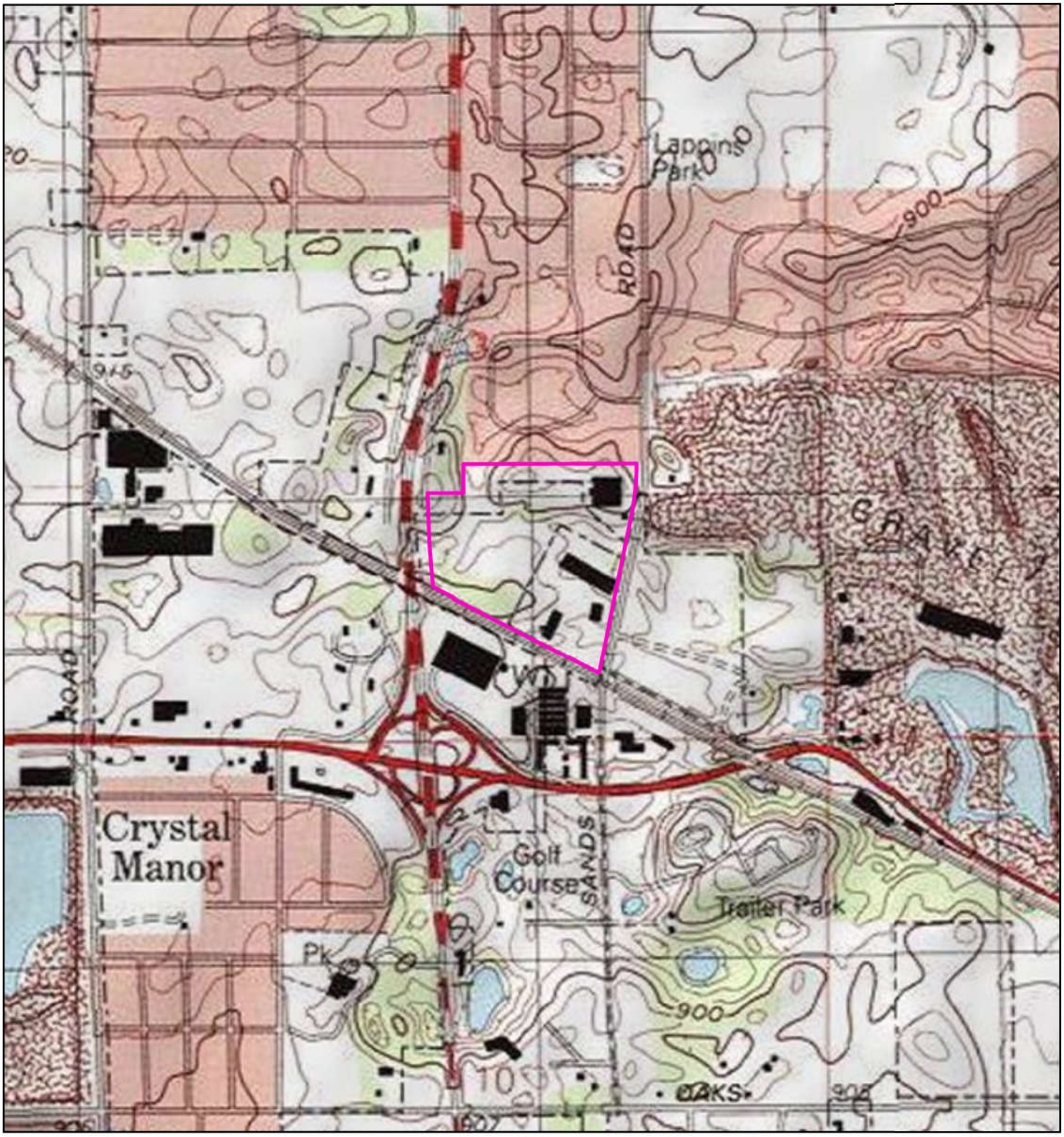
Date: 3/28/2023

Location Information:
T.43N, R.8E, Section 3

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
Project Location

Exhibit:
1



0 1000 Feet

N
W E
S

Legend:
Project Boundary

Project Name:
Condon - NVA Trucking Expansion

Project Number:23-0081

Date: 3/28/2023

Location Information:
Crystal Lake Quadrangle

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
USGS Topographic Map

Exhibit:
2



0 400 Feet

N
W E
S

Legend:
Project Boundary
National Wetland Inventory

Project Name:
Condon - NVA Trucking Expansion

Project Number:23-0081

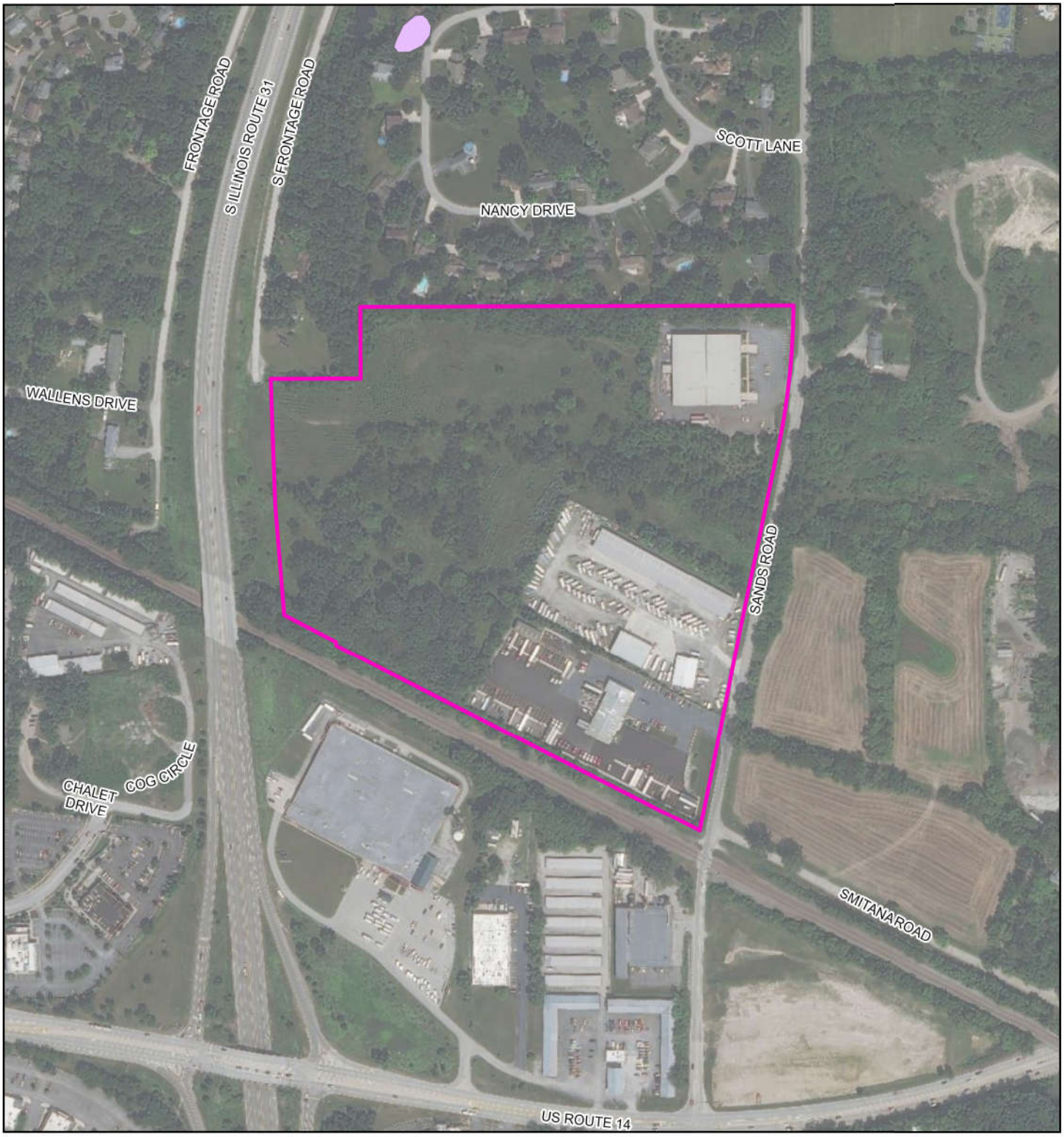
Date: 3/28/2023

Location Information:
Crystal Lake Quadrangle

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
National Wetland Inventory

Exhibit:
3



0 400 Feet

N
W E
S

Legend:

- Project Boundary
- ADID High Habitat Value
- ADID High Functional Value
- Wetland
- Farmed Wetland
- Lake High Quality
- Lake
- ADID High Quality River/Stream
- River/Stream

Project Name:
Condon - NVA Trucking Expansion

Project Number:23-0081

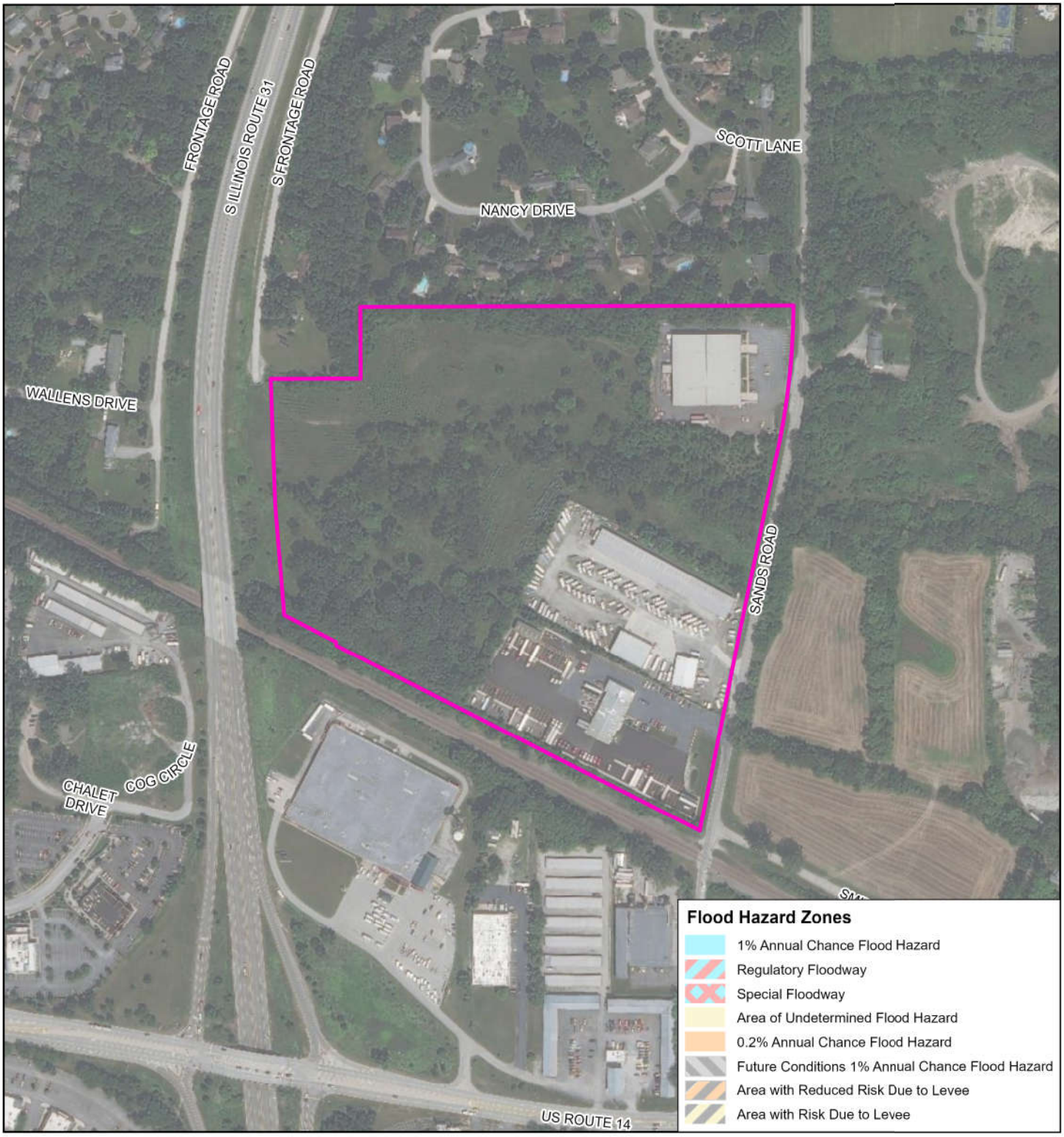
Date: 3/28/2023

Study Date:
1998

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
McHenry County ADID Study

Exhibit:
4



0 400 Feet

N
W E
S

Legend:
Project Boundary

Project Name:
Condon - NVA Trucking Expansion

Project Number:23-0081

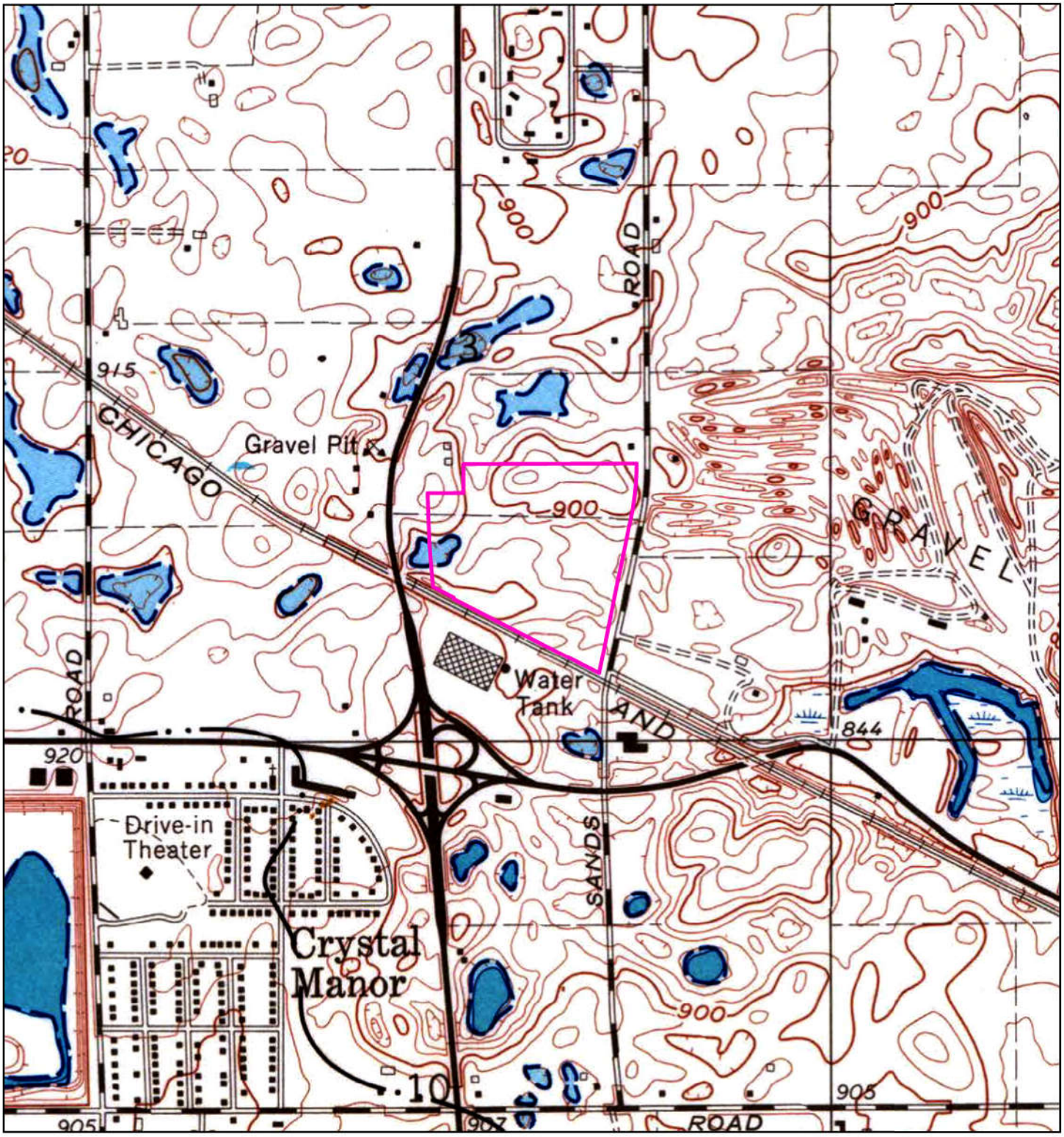
Date: 3/28/2023

Effective Date:
11/16/2006

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
FEMA Flood Hazard Zones

Exhibit:
5



0 1000 Feet

N
W E
S

Legend:

Project Boundary

Project Name:
Condon - NVA Trucking Expansion

Project Number: 23-0081

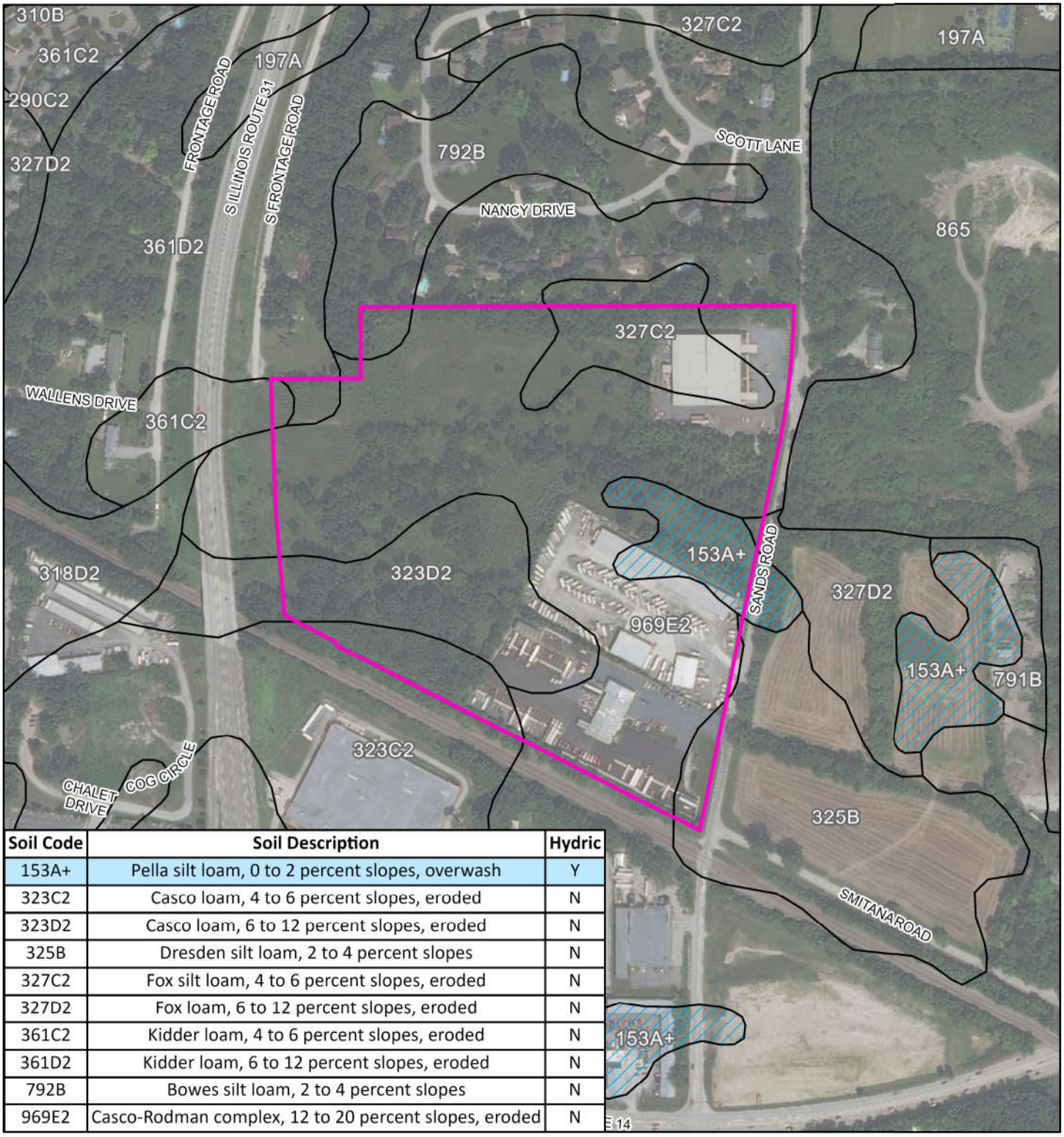
Date: 3/28/2023

Hydrologic Atlas Date:
1967

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
USGS Hydrologic Atlas

Exhibit:
6



Soil Code	Soil Description	Hydric
153A+	Pella silt loam, 0 to 2 percent slopes, overwash	Y
323C2	Casco loam, 4 to 6 percent slopes, eroded	N
323D2	Casco loam, 6 to 12 percent slopes, eroded	N
325B	Dresden silt loam, 2 to 4 percent slopes	N
327C2	Fox silt loam, 4 to 6 percent slopes, eroded	N
327D2	Fox loam, 6 to 12 percent slopes, eroded	N
361C2	Kidder loam, 4 to 6 percent slopes, eroded	N
361D2	Kidder loam, 6 to 12 percent slopes, eroded	N
792B	Bowes silt loam, 2 to 4 percent slopes	N
969E2	Casco-Rodman complex, 12 to 20 percent slopes, eroded	N

0 400 Feet

N
W E
S

Legend:
- Project Boundary
- Soils Units
- Hydric Soils

Project Name:
Condon - NVA Trucking Expansion

Project Number: 23-0081

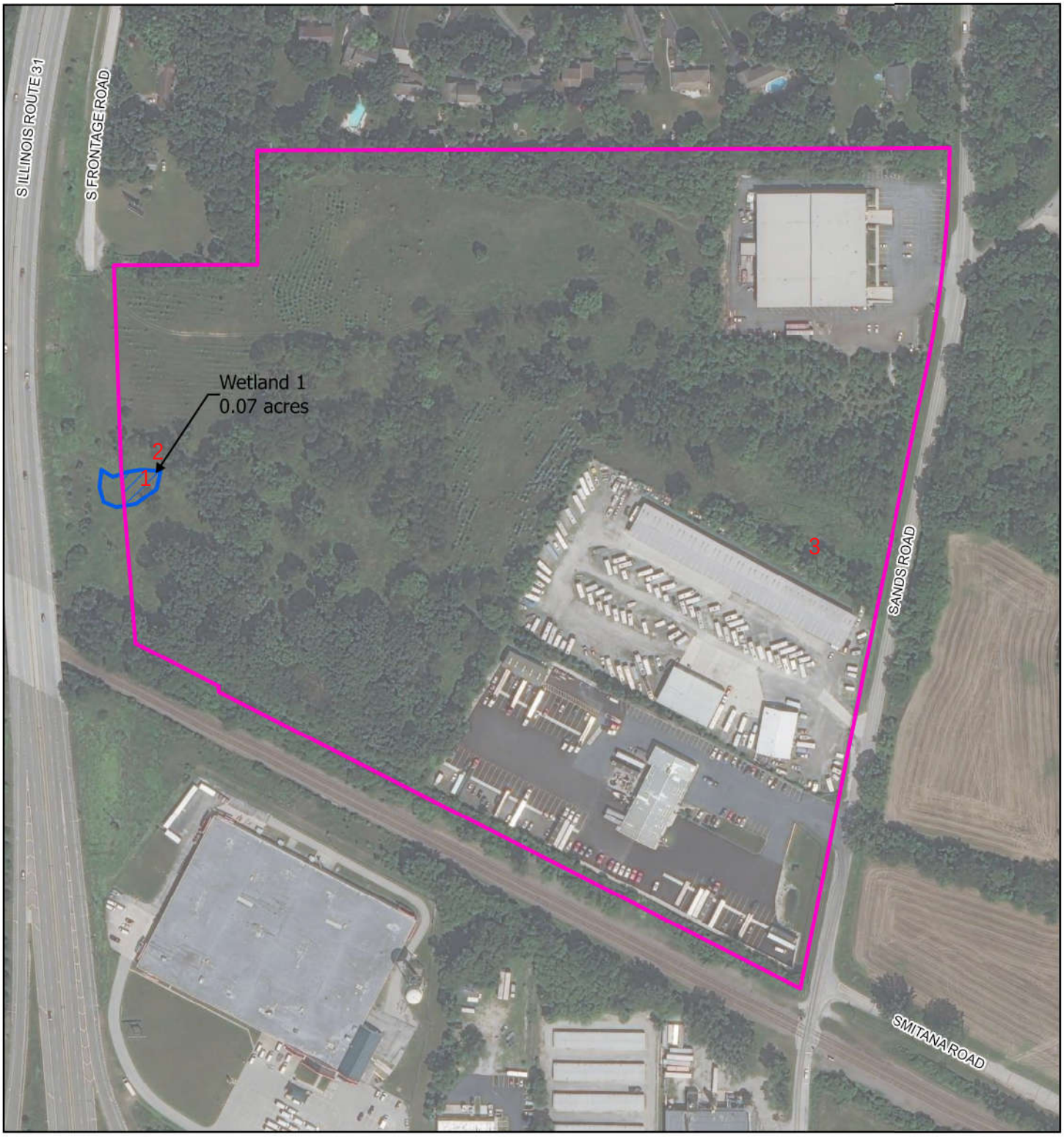
Date: 3/28/2023

Soil Survey Date:
2019

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
NRCS Soil Survey

Exhibit:
7



0 250 Feet

N
W E
S

Legend:
- Project Boundary
- Surveyed Wetland Boundary
- Surveyed Wetland Boundary (Offsite)

Project Name:
Condon - NVA Trucking Expansion

Project Number: 23-0081

Date: 3/28/2023

X - Wetland Data Points

Aerial Date:
2020

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
Wetland Boundary

Exhibit:
8

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: NVA Trucking City/County: Crystal Lake/McHenry Sampling Date: 3-24-23

Applicant/Owner: NVA Trucking State: IL Sampling Point: 1

Investigator(s): Mosca - Hey and Associates, Inc Section, Township, Range: T43N R8E S3

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concve Slope %: 12-20

Subregion (LRR or MLRA): LRR L Lat: 42 13'49 36 Long: 88 17'1217 Datum:

Soil Map Unit Name: Casco-Rodman Complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 1

Remarks: (Explain alternative procedures here or in a separate report.)
Low snow winter; relatively dry spring at time of visit.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- x Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 3
Water Table Present?	Yes X	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Drainage appears to come from ROW of Rt. 31 swales and small "seep". Water disappears at east end of depression, apparently through infiltration.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2						Loamy/Clayey	Minor erosion
4-13	10YR 4/3						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No redox in upper surface.

VEGETATION – Use scientific names of plants.

Sampling Point: 3

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Bare soil*	30	Yes	
2. *Solidago altissima*	25	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	25 (A)		100 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Vegetation was disturbed and hard to identify but not a wetland area.

Exhibit 10 – Representative Site Photographs



Wetland looking east



From Sands Road looking west

McHenry County
Department of Planning and Development
www.co.mchenry.il.us/plandev
OFFICE: McHenry County Admin. Bldg. 667 Ware Road, Woodstock, Illinois
MAIL: 2200 N. Seminary Ave. Woodstock, Illinois 60098
EMAIL: plandev@co.mchenry.il.us
P: 815-334-4560 F: 815-334-4546

May 1, 2023

Ivan Nartsev
NVA Transportation, Inc.
7013 Sands Rd.
Crystal Lake, IL 60014
Email: ivan@nvatrans.com

Subject: ***PJD-23-002***
NVA Transportation, Inc.
LRC-2023-260
PRELIMINARY WETLAND JURISDICTIONAL DETERMINATION

Dear Mr. Nartsev:

This letter is in regard to a preliminary wetland jurisdictional determination (PJD) for the project area described in PJD-23-002. Our stormwater wetland consultant reviewed source materials and performed a site reconnaissance on April 27, 2023, in the company of Mr. Michael Machalek and Mr. Erich Ceisel of the U.S. Army Corps of Engineers, Chicago District (USACE), and Mr. Vincent Mosca of Hey and Associates, Inc. Note that Wetland 1 referenced in this letter, is depicted on the attached Wetland Boundary Map, prepared by Hey and Associates, Inc, dated 3/28/2023.

Based on our findings, Wetland 1 of the project area, appears to be *Isolated Waters of McHenry County* (IWMC), which is subject to regulation by McHenry County under the McHenry County Stormwater Management Ordinance (SMO). This wetland area lacks a clearly discernible hydrologic connection to a navigable water.

For your information, we determined jurisdiction of potential *Waters of the United States* (WOUS) areas on the subject property, based on the 2023 "Revised Definition of 'Waters of the United States" and guidance provided in the *United States Army Corps of Engineers (USACE) Regulatory Program Approved Jurisdictional Determination Form User Manual (Interim) 2023 Rule,* dated March 20, 2023. For areas not considered to be WOUS, we determined jurisdiction using the definition of *Isolated Waters of McHenry County* (IWMC) contained in Appendix 12 of the SMO.

This PJD letter satisfies the requirement for a written jurisdictional determination under SMO Article V, Section G.4.a.

This PJD has been approved by the McHenry County Department of Planning and Development, Water Resources Division's Chief Stormwater Engineer and the findings are valid for a period of three (3) years from the date of this letter, unless new information warrants a revision before the expiration date.

If you have any questions, please call our office at (815) 334-4560.

Sincerely,

MCHENRY COUNTY DEPARTMENT OF PLANNING AND DEVELOPMENT



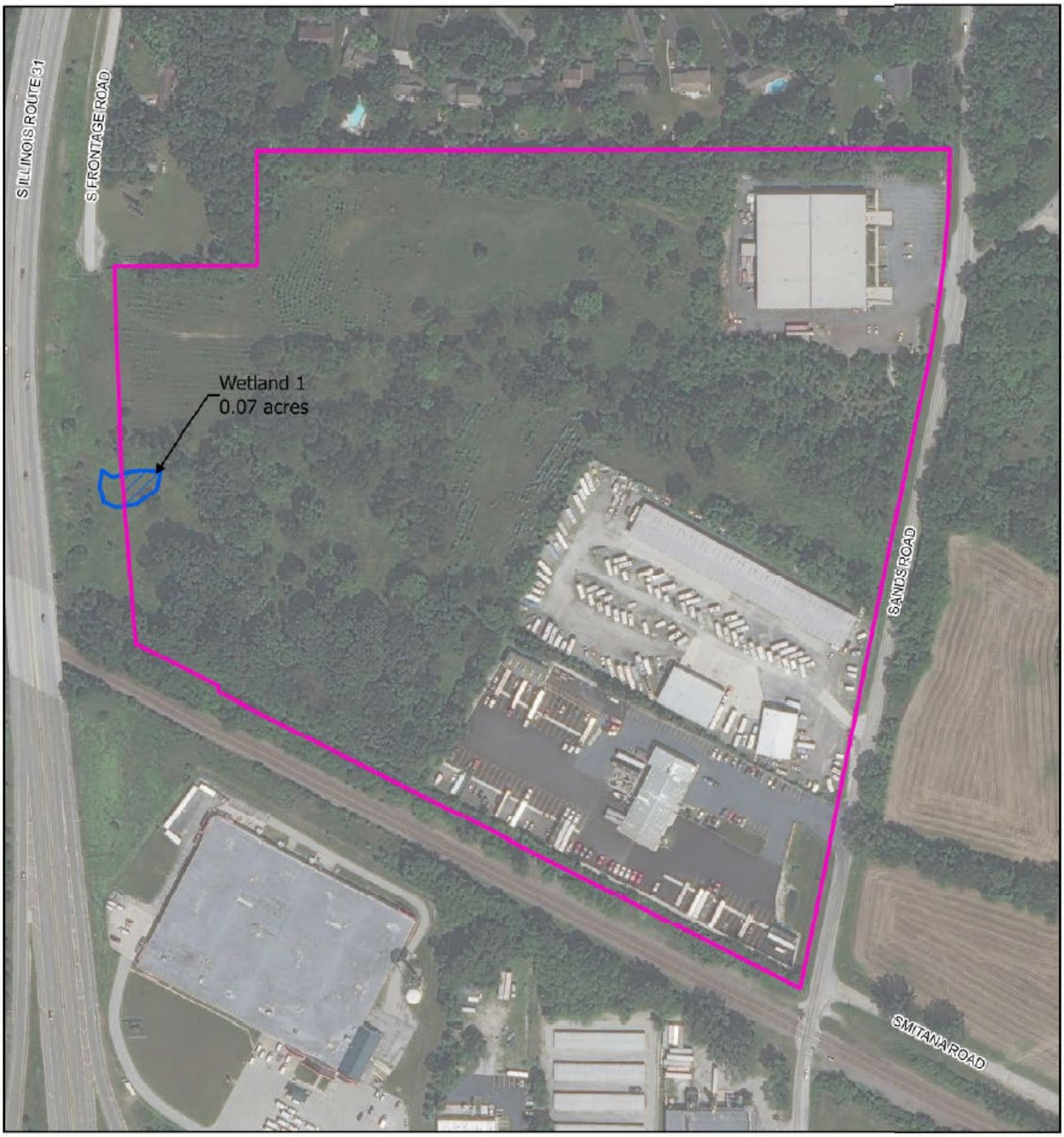


Joanna S. Colletti, P.E., CFM
Chief Stormwater Engineer

Spring Duffey
Wetland Consultant

Enclosure: Exhibit

cc: File
Michael Machalek, U.S. Army Corps of Engineers (email)
Vincent Mosca, Hey and Associates, Inc (email)



0 250 Feet

N
W E
S

Legend:
Project Boundary
Surveyed Wetland Boundary
Surveyed Wetland Boundary (Offsite)

Project Name:
Condon - NVA Trucking Expansion

Project Number: 23-0081

Date: 3/28/2023

Aerial Date:
2020

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

Exhibit Title:
Wetland Boundary

Exhibit:
8

CIVILTECH

Civiltech Engineering, Inc.
www.civiltechinc.com

Two Pierce Place, Suite 1400
Itasca, IL 60143
Phone: 630.773.3900
Fax: 630.773.3975

30 N LaSalle Street, Suite 3220
Chicago, IL 60602
Phone: 312.726.5910
Fax: 312.726.5911

Transportation Design
Traffic Engineering
Civil Engineering
Construction Engineering
Environmental Studies
Water Resources
Structural Design
Right of Way
Urban Design
Transportation Planning
Program Management

Technical Memorandum

Date: November 28, 2023

To: Abby Wilgreen, P.E., CFM
City of Crystal Lake

From: Steven A. Pautsch, P.E., PTOE
Mark Shorey
Civiltech Engineering, Inc.

Re: NVA Trucking Facility Expansion Traffic Impact Study
Sands Road North of Smitana Road

Civiltech Engineering, Inc. is retained by the City of Crystal Lake to perform a traffic impact study (TIS) for the development of a 21.48-acre property located on Sands Road north of Smitana Avenue, in the City of Crystal Lake.

Exhibit 1 is a map showing the location of the proposed site in relation to the area roadway system. **Exhibit 2** is an aerial photograph showing the existing conditions at and adjacent to the proposed site. See **Exhibit 3** for a proposed site plan.

The purpose of this study is to examine existing traffic conditions adjacent to the proposed site, assess any impacts that the proposed development will have on traffic conditions, and determine if any roadway improvements are necessary to accommodate traffic generated by the proposed redevelopment. This memorandum contains the following:

- A description of the study area and proposed development
- A trip generation, distribution and assignment analysis
- A determination of existing traffic conditions
- An analysis of traffic conditions on the adjacent roadway network with site-generated traffic
- An analysis of the proposed site access intersections
- Conclusions and recommendations

I. EXISTING CONDITIONS

The proposed site currently consists of vacant land. The site is bounded by Illinois Route 31 to the west and Sands Road to the east. Existing land use near the site include:

- Outdoor storage facility and a mixed use industrial building north of the project to the northwest of the Sands/Smitana intersection

- Industrial development including truck rental, a flooring store, and car repair shops in the southwest quadrant of the Sands/Smitana intersection
- Vacant land on the east side of Sands Road across from the project
- Single family residential homes in an unincorporated area north of the site
- A Casey's General Store and Gas Station with outlots is under construction at the northeast corner of the US-14/Sands Road intersection.

A. Existing Roadway System Characteristics

Sands Road is a local roadway with a north/south orientation under the jurisdiction of Crystal Lake immediately adjacent to the site. To the north of the proposed site, Sands Road becomes township jurisdiction and prohibits vehicles with axle weights of greater than six tons. The road provides one lane of travel in each direction and has a rural cross section with unenclosed drainage. Per 2021 Illinois Department of Transportation (IDOT) data, it carries an Average Annual Daily Traffic (AADT) of 2,900 veh/day within the project area. The roadway has a posted speed limit of 30 mph. Union Pacific Railroad/Metra UP-Northwest tracks cross Sands Road approximately 75 feet south of Smitana Road. The crossing is protected by dual-quadrant crossing arms and flashing light signals. Sands Road has no designated turn lanes on the north or south approach at the T-intersection with Smitana Road. At the signalized intersection of Sands Road and Northwest Highway (US-14), both approaches of Sands Road provide one exclusive left turn lane and one shared through/right lane.

Smitana Road is a local roadway with a northwest/southeast orientation near the development primarily used to access minor industrial uses east of Sands Road. The roadway is under the jurisdiction of Crystal Lake. It is a low-volume roadway, and IDOT does not provide an AADT estimate. It intersects Sands Road on the east side in a T-shaped intersection with no designated right or left turn lanes.

Northwest Highway (US-14) is a principal arterial with an east/west orientation. The roadway is under the jurisdiction of IDOT. According to 2021 IDOT data, it carries an Average Annual Daily Volume (AADT) of 20,600 veh/day near the project area. The east approach of Northwest Highway at Sands Road provides one designated left turn lane, one designated through lane, and one shared through/right turn lane while the west approach provides a designated left turn lane, two through lanes, and one designated right turn lane. The signalized intersection of US-14 with Sands Road is approximately 1,100 feet east of the IL Route 31 interchange with US-14. The signal at the Sands Road intersection is interconnected with the signals at that interchange.

The existing roadway network and traffic control in the vicinity of the proposed site are shown on **Exhibit 4**.

B. Existing Traffic Conditions

In order to quantify current traffic conditions in the vicinity of the site, 24-hour traffic counts were conducted using Miovision Video Collection Units (VCUs) at the following intersections:

- Sands Road and Smitana Road
- Sands Road and Northwest Highway (US-14)

The traffic counts were conducted over the entire day (midnight to midnight) on Thursday, September 7, 2023 and Saturday, September 9, 2021. The results of the traffic counts show that the weekday morning peak hour of traffic occurs from 7:00 A.M. to 8:00 A.M., the weekday evening peak hour of traffic occurs from 4:30 P.M. to 5:30 P.M., and the Saturday midday peak hour occurs from 11:45 A.M. to 12:45 P.M. The existing peak hour traffic volumes are summarized on **Exhibit 5**. The raw traffic count data for the Crystal Lake Avenue and Main Street intersection are contained in **Appendix A**. Existing traffic signal timings for the intersection were obtained from IDOT and showed that the traffic signal at this intersection has a cycle length of 130 seconds during the A.M. peak hour and mid-day, and has a cycle length of 145 seconds during the P.M. peak hour.

II. TRAFFIC CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

In order to evaluate future traffic conditions in the surrounding area, it is necessary to determine the traffic characteristics of the proposed development, including estimating the directional distribution and volumes of traffic that it will generate.

A. Proposed Development Plan

See **Exhibit 3** for the proposed site plan, dated August 3, 2023. The proposed site consists of an approximately 33,000 square foot office and maintenance building, and a large surface lot for parking semi-trailers. This surface lot provides 325 trailer parking spots, of which about 200-220 are expected to be used for high-turnover operations, 50-70 would be for long-term trailer parking, and the remaining 50-70 spots for medium-term parking. High turnover spaces are anticipated to be accessed regularly, on a daily basis to every several days. Medium turnover spaces would be accessed less often, between a weekly to monthly basis. Turnover in the long-term truck spaces would be very low, with truck parked for longer than one month at a time. Sixty-four car parking spaces are proposed, with three of them being handicap accessible. Access to the site is recommended to be provided via a three-quarter access driveway located on Sands Road approximately 450 feet north of the Smitana Road intersection and 200 feet north of the existing NVA Transportation access driveway. This driveway would allow left and right turns in, and right turns out. The left turn onto northbound Sands Road would be prohibited by installation of signage, pavement markings, and an angled, concrete "pork chop" island within the driveway. The north edge of the driveway would have a small radius so southbound trucks would not be able to turn right into the site.

B. Background Traffic Estimate

It is anticipated that the traffic volumes currently on the roadway network will increase while the proposed development is being constructed. Based on 2050 traffic projections obtained from the Chicago Metropolitan Agency for Planning (CMAP), the ambient traffic growth rate within the study area is projected to be 1.5 percent per year. Copies of the correspondence with CMAP are provided in **Appendix B.** This projected growth was applied based on a design year in the time of construction plus five years per current IDOT policy for traffic impact studies. Assuming construction on the site is complete in 2025, the resulting analysis year for the TIS is 2030. The yearly growth rate was compounded over seven years. In addition, traffic will be generated by the Casey's General Store and Gas Station and outlots, which will open at the northeast corner of the US-14 and Sands Road intersection. Traffic volumes for the full build-out of the site, as presented in the 2021 traffic study prepared by Civiltech Engineering were incorporated into the traffic study along with the compounded 1.5% per year increase to obtain 2030 background traffic volumes. These are shown in **Exhibit 6.**

C. Estimate of Site-Generated Trip Distribution

The distribution of development-generated trips on the roadway system is a function of several variables. For the proposed development, truck trips generated by the proposed site will travel to and from the site from US-14 because large trucks are prohibited on Sands Road north of the proposed development. Passenger cars exiting the site would be prohibited from turning left to the north on Sands Road but could arrive via Sands Road from the north. At the US-14/Sands intersection, it is assumed that more traffic will travel to and from the west, due to the proximity of IL-31, which provides access to I-90. **Exhibit 7a** shows the estimated trip distribution percentages for passenger cars destined to and from the site, and **Exhibit 7b** shows the estimated trip distribution percentages for trucks destined to and from the site.

D. Estimated Site Traffic Generation

A Traffic Impact Study projects future traffic conditions and recommends methods to offset the impacts of the anticipated increase in traffic volumes due to land development. The volume of traffic generated by a development is based on the type of land use and the size of the development.

One of the most accurate ways to project the volume of future traffic that would be generated by a development is to sample traffic at a similar nearby site. Trip generation for this project is based on the existing NVA facility just south of the proposed project area. Gate data between Monday, October 2nd, 2023 and Saturday, October 7th was analyzed to determine the average number of entering and exiting passenger cars and trucks from the existing facility. Data from the five weekdays was averaged to develop an average weekday trip generation rate. The temporal pattern and purpose of trips at the existing facility is expected to be identical for the proposed larger facility.

To scale the number of existing trips to the number of expected trips, the average passenger car trips are multiplied by the ratio of floor space in the new facility and the floor space of the existing facility. The existing facility has a building floor area of 14,000 SF while the proposed building has a floor area of 33,000 SF. The ratio of the new floor area to the existing floor area is 2.35. The factor for truck trips is determined by using the ratio of trailer parking spots in the proposed facility and the existing facility. The existing facility has 60 trailer parking spots while the proposed facility has 325, resulting in a ratio equal to 5.41. Projected volumes based on these factors were rounded to the nearest five and shown in **Table 1** below. A copy of the data as well as the trip generation calculations are provided in **Appendix C.**

Table 1: Projected Site-Generated Traffic Volumes

Type of Vehicle	Weekday Total		Weekday Morning Peak Hour		Weekday Evening Peak Hour		Saturday Mid-day Peak Hour	
	In	Out	In	Out	In	Out	In	Out
	Total		Total		Total		Total	
Passenger Car	135	135	55	5	5	20	15	15
	270		60		25		30	
Truck	45	50	0	10	5	0	10	5
	95		10		5		15	
Total	**180**	**185**	**55**	**15**	**10**	**20**	**25**	**20**
	365		**70**		**30**		**45**	

As shown in the above tables, the development is predicted to add between 30 and 70 new trips to the roadway network during the three peak hours analyzed. Trucks trips range from 5 to 15 per hour during the peaks, which is about one vehicle every four to twelve minutes.

The additional trips anticipated to be generated by the proposed development as shown in **Table 1** were distributed on the roadway network based on the percentages shown on **Exhibit 7a** for passenger cars and **Exhibit 7b** for trucks. **Exhibit 8a** shows the site-generated passenger car trips, **Exhibit 8b** shows the site-generated truck trips, and **Exhibit 8c** shows the total site-generated trips.

E. Alternative Land Use Trip Generation Comparison

An analysis of a warehouse development on the same site has been requested to compare the trip generation based on NVA data to industry standard trip generation techniques. This trip generation calculation was completed to determine the amount of traffic that would be generated by a 206,000 square foot warehousing/shipping & receiving development which is feasible on the same site.

The trip generation estimate for this alternative site was completed with the aid of the publication *Trip Generation, 10th Edition,* published by the Institute of Transportation Engineers (ITE). *Trip Generation* provides average trip generation rates representing weighted averages of traffic counts and studies collected from various land uses throughout the United States and Canada since the 1980's. **Table 2** summarizes the peak hour traffic estimated to be generated by the development based on the rates contained in the ITE *Trip Generation* Manual. For the purposes of this estimate, the land use type is assumed to be 150 – Warehousing.

For this study, the peak hour of the land use (generator) was used to determine the number of trips generated by the proposed development for the weekday morning and evening peak hours. Based on a comparison of the two types of land uses, trip generation rates would be similar for each type of development. Copies of the relevant *Trip Generation* pages are provided for reference in **Appendix D**.

Table 2: Projected Site-Generated Traffic Volumes, per ITE *Trip Generation, 10th Edition*

ITE Land Use Code	Land Use	1000 Sq. Ft. Gross Floor Area (GFA)	Weekday Total		Weekday Morning Peak Hour		Weekday Evening Peak Hour		Saturday Midday Peak Hour*	
			In	Out	In	Out	In	Out	In	Out
			Total		Total		Total		Total	
150	Warehousing	206	180	180	35	20	15	40	10*	0*
			360		55		55		10*	

* ITE *Trip Generation, 10th Edition* has a small sample size warning for the Saturday Midday Peak Hour Data for this land use

F. Total Traffic

The site-generated trips shown in **Exhibit 8c** were then added to the 2030 background traffic shown in **Exhibit 6**. The resulting existing plus site-generated (i.e., total) traffic volumes are shown in **Exhibit 9**. The total traffic volumes were then used in the traffic analyses for the proposed development.

II. TRAFFIC ANALYSIS

A. Auxiliary Turn Lane Evaluation

The proposed access to the development from Sands Road was evaluated for the need to install an exclusive northbound left-turn lane from Sands Road. The evaluation is based on a variety of factors including traffic volumes, roadway characteristics, and vehicle operations. While the proposed development will not generate a large amount of turning traffic on Sands Road, the operating characteristics of this traffic, i.e. large tractor-trailer trucks and the proximity to adjacent intersections, support the recommendation to provide an exclusive left-turn lane for northbound Sands Road. As such, it is recommended to install a northbound left turn lane to serve the site driveway. Due to low volumes expected in the northbound left turn lane, the minimum storage length of 115 feet should be used per BLRS Section 34-3.02(b). A northbound left turn lane will facilitate traffic flow and safety by allowing vehicles turning left into the site to pull out of traffic, eliminating the need for any northbound through vehicles to stop for traffic turning left.

B. Intersection Capacity Analyses

Traffic analyses were performed for the US-14/Sands Road signalized intersection to evaluate existing traffic operations and to help evaluate the extent of the impacts of the proposed site development on existing traffic operations. A traffic analysis was also performed at the stop-controlled intersection of Sands Road and Smitana Road south of the proposed site. Finally, an analysis was performed at the site driveway to evaluate the ease with which motorists will be able to enter and exit the site during peak hours of adjacent street traffic. Analyses were performed for the 2023 Existing, 2030 Background, and the Total traffic volumes during peak traffic hours. For all traffic analyses, the existing signal timings described previously were used to analyze the intersection operations.

Traffic analyses in this study were performed using the methodologies in the Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) as implemented in the Highway Capacity Software (HCS 7) capacity analysis software package. This is the industry-standard method for evaluating the capacity of signalized and unsignalized intersections.

Level-of-Service (LOS) is the most commonly used measure to describe the ability of an intersection to accommodate traffic flow and is characterized by the amount of control delay that the average motorist experiences for each traffic movement. Control delay is that portion of the total delay attributed to the traffic signal or stop sign control operation, and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. LOS is assigned a letter grade from A to F based on the average control delay experienced by vehicles passing through the intersection. LOS A is the highest grade (best traffic flow and least delay), LOS E represents saturated or at-capacity conditions, and LOS F is the lowest grade (oversaturated conditions, extensive delays). The Highway Capacity Manual definitions for Levels-of-Service and the corresponding control delay for both unsignalized and signalized intersections are shown in **Table 4.** Level of Service "D" is typically the minimum LOS accepted by agencies in the Chicago region at signalized intersections. However, LOS E is often acceptable on side-street signalized approaches at major roadway due to signal timings plans which require drivers have to wait a long time for the light to turn green. Furthermore, Levels of Service below LOS D are not uncommon at unsignalized intersections or driveways during peak hours along urban and suburban arterials, and are sometimes unavoidable given the need to balance access to land with mobility on the major street network in urban and suburban areas.

Table 4: Level-of-Service Criteria

Unsignalized Intersections		
Level of Service	Average Control Delay (seconds per vehicle)	
A	0 - 10	
B	> 10 – 15	
C	> 15 – 25	
D	> 25 – 35	
E	> 35 – 50	
F	> 50 **or** volume to capacity (v/c) ratio ≥ 1.0	
Signalized Intersections		
Level of Service	Description	Avg. Control
A	Very good progression. Most vehicles arrive on green and proceed without stopping.	≤ 10
B	Good progression. Increased number of vehicles stopping.	> 10 – 20
C	At times, one or more vehicles may have to wait more than one signal cycle (cycle failure). Significant number of vehicles stopping, although many still pass through without stopping.	> 20 – 35
D	Volumes approaching capacity and either progression is not effective or cycle length is too long. Many vehicles stop and cycle failures are noticeable.	> 35 – 55
E	Poor Progression. High v/c ratio and long cycle length. Frequent cycle failures.	> 55 – 80
F	Very poor progression. Very high v/c ratio and long cycle lengths. Most signal cycles fail to clear vehicle queues.	≥ 80 **or** v/c ≥ 1.0

Source: Adapted from 2010 *Highway Capacity Manual*.

The capacity analysis results are summarized in **Table 5** for 2023 existing traffic conditions, **Table 6** for 2023 background traffic conditions, and **Table 7** for total traffic conditions. Summary reports from the HCS analyses are provided in **Appendix E**.

Table 5: Capacity Analysis Results – 2023 Existing Traffic Conditions

Intersection	Weekday AM Peak		Weekday PM Peak		Saturday Midday	
	LOS	Delay	LOS	Delay	LOS	Delay
U.S. Route 14 and Sands Road						
Overall	B	11.0	B	18.1	C	20.7
Eastbound Approach	A	6.0	A	8.9	B	10.0
Westbound Approach	A	6.3	B	12.1	B	10.9
Northbound Approach	E	56.2	E	62.6	E	70.4
Southbound Approach	E	64.1	E	69.2	E	61.2
Smitana Road and Sands Road						
Westbound Approach	A	9.3	A	9.6	A	9.3

LOS = Level-of-Service. Delay reported in seconds per vehicle.

Table 6: Capacity Analysis Results – 2030 Background Traffic Conditions

Intersection	Weekday AM Peak		Weekday PM Peak		Saturday Midday	
	LOS	Delay	LOS	Delay	LOS	Delay
U.S. Route 14 and Sands Road						
Overall	B	15.0	C	23.5	C	26.3
Eastbound Approach	A	8.5	B	12.6	B	13.2
Westbound Approach	A	9.6	B	17.7	B	15.8
Northbound Approach	D	54.6	E	64.6	F	83.7
Southbound Approach	E	60.4	E	68.5	E	58.2
Smitana Road and Sands Road						
Westbound Approach	A	9.4	A	9.8	A	9.4

LOS = Level-of-Service. Delay reported in seconds per vehicle.

Table 7: Capacity Analysis Results – Total Traffic Conditions

Intersection	Weekday AM Peak		Weekday PM Peak		Saturday Midday	
	LOS	Delay	LOS	Delay	LOS	Delay
U.S. Route 14 and Sands Road						
Overall	B	15.4	C	24.3	C	26.9
Eastbound Approach	A	8.7	B	13.0	B	13.6
Westbound Approach	B	10.1	B	18.2	B	16.4
Northbound Approach	E	55.0	E	65.1	F	84.4
Southbound Approach	E	59.9	E	69.3	E	58.2
Smitana Road and Sands Road						
Westbound Approach	A	9.7	A	9.9	A	9.6
Project Driveway and Sands Road						
Eastbound Approach	A	9.6	A	9.0	A	9.3

LOS = Level-of-Service. Delay reported in seconds per vehicle.

C. Queue Analysis

Peak hour queue lengths were analyzed and are reported below in **Table 8** for 2023 Existing traffic conditions, **Table 9** for 2030 background traffic conditions, and **Table 10** for total traffic conditions. At signalized intersections, 95th percentile queues are only anticipated to be experienced during five percent of signal cycles during a peak hour. At a typical IDOT signal such as US-14/Sands, the queues of the stated lengths would only be expected during one or two signal cycles during each peak hour.

Table 8: Queuing Results – 2023 Existing Traffic Conditions

Intersection	Existing Storage Bay (Ft.)	95th Percentile Queue		
		Weekday AM Peak (Ft.)	Weekday PM Peak (Ft.)	Saturday Midday (Ft.)
US-14 and Sands Road				
Eastbound Left	220	20	50	35
Eastbound Right	150	20	55	110
Westbound Left	250	5	20	30
Northbound Left	80	70	230	185
Southbound Left	80	30	60	20
Eastbound Through	N/A	185	220	230
Westbound Through	N/A	135	370	260
Northbound Through/Right	N/A	60	190	215
Southbound Through/Right	N/A	105	150	125

Table 9: Queuing Results – 2030 Background Traffic Conditions

Intersection	Existing Storage Bay (Ft.)	95th Percentile Queue		
		Weekday AM Peak (Ft.)	Weekday PM Peak (Ft.)	Saturday Midday (Ft.)
US-14 and Sands Road				
Eastbound Left	220	50	125	85
Eastbound Right	150	30	75	150
Westbound Left	250	10	30	50
Northbound Left	80	80	255	275
Southbound Left	275*	80	120	70
Eastbound Through	N/A	255	275	290
Westbound Through	N/A	210	520	360
Northbound Through/Right	N/A	85	225	250
Southbound Through/Right	N/A	200	245	210

*This turn lane extension was completed in October 2023 as part of the Casey's Development project per their requirements.

Table 10: Queuing Results – Total Traffic Conditions

Intersection	Existing Storage Bay (Ft.)	95th Percentile Queue		
		Weekday AM Peak (Ft.)	Weekday PM Peak (Ft.)	Saturday Midday (Ft.)
US-14 and Sands Road				
Eastbound Left	220	60	130	90
Eastbound Right	150	30	75	155
Westbound Left	250	10	35	50
Northbound Left	80	80	260	280
Southbound Left	275	95	140	80
Eastbound Through	N/A	260	280	295
Westbound Through	N/A	220	525	370
Northbound Through/Right	N/A	85	225	250
Southbound Through/Right	N/A	205	265	225

III. TRAFFIC EVALUATION

The results of the capacity analyses and the queue analysis at the roadway network intersections and site access driveways are discussed below.

A. US-14 and Sands Road

Existing Traffic

The results of the existing capacity analysis indicate that the signalized intersection of US-14 and Sands Road currently operates at an acceptable Level-of-Service (LOS) B overall during the weekday morning and evening peak hours and LOS C overall during the Saturday midday peak hour. The major (eastbound and westbound) approaches operate under LOS of A or B. It is noted that the northbound and southbound approaches currently operate at LOS E under all three peak hours analyzed. LOS E is not uncommon on side streets at major signalized intersections because of the long signal cycle lengths and because the signal is timed to allocate most of the green time to the busy route. The results of the queue analysis indicate that the existing storage bay lengths for the turn lanes are adequate for the eastbound left, westbound, and southbound left turning lanes but insufficient for the northbound left turn movement during the PM and Saturday peaks. This is likely due to the high volume of traffic originating from the commercial area south of US-14.

2030 Background Traffic

Delays and queues increase slightly in the 2030 Background (No-Build) condition. The overall intersection LOS remains at a B or C while the eastbound and westbound approaches are projected to operate at A or B. The northbound approach degrades to LOS F while the southbound approach remains at LOS E. While some of the increase in delay at the US-14/Sands intersection is due to expected growth in traffic volumes, most of the increased delay can be attributed to Casey's development.

In the 2030 Background condition, the most notable increase in 95th percentile queueing is on the north leg of the intersection. The increase in queue length will be mitigated by the recently-completed widening of the north leg to extend the left turn lane to 275 feet of storage as part of Phase I construction on the Casey's site.

2030 Total Traffic

Under 2030 Total (Build) conditions, vehicle delays increase very slightly compared to the 2030 Background condition. The difference in delay between the 2030 Background and Total traffic conditions is generally around one second or less for the various movements, which would be imperceptible to motorists. This shows that the traffic generated by the proposed NVA development will not substantially impact operations at this intersection. Most notably, the delay for the southbound approach would increase a maximum of 0.8 seconds during the PM peak period.

With the exception of the northbound Sands Road left turn lane and the eastbound right turn lane, the 95th percentile queues will all be accommodated within their respective storage bays. The northbound left turn and eastbound right turn deficiencies are attributable to existing traffic and vehicles heading to and from the NVA development will not utilize these movements. Analysis shows that the eastbound left turn lane 95th percentile queue length would be 130 feet which is easily accommodated by the existing 220-foot-long turn lane. The southbound left turn queue would

increase from 120 feet to 140 feet, which will be contained within the 275-foot left turn bay constructed as part of the Casey's project.

It was also requested to review queuing with respect to the Union Pacific Railroad tracks, which lie approximately 700 feet north of the intersection. The maximum 95th percentile through/right queue anticipated for this movement is 265 feet during the PM rush hour, which will not come close to approaching the tracks. Stopping sight distance was analyzed to ensure that drivers traversing the tracks will be able to see the back of the queue. Per AASHTO *Policy on Geometric Design of Streets and Highways,* stopping sight distance is 250 feet for roadway with a 35 mph design speed. The sum of the maximum 95th percentile queue and the 250 foot stopping sight distance is 515 feet, which less than the 700 foot distance between the tracks and Sands Road. This means that drivers will easily have adequate time to stop before reaching the back of the queue when crossing the railroad tracks north of the intersection.

Based on the capacity and queuing analysis results no additional improvements are recommended at the US-14 and Sands Road intersection.

B. Sands Road and Smitana Road

The results of the capacity analysis for the Existing, 2030 No-Build, and 2030 Total traffic conditions indicate that the stop-controlled westbound approach of Smitana Road at the Sands Road intersection operates at a Level-of-Service (LOS) A during all analyzed peak hours. Trips generated to and from the proposed site will have negligible impact on traffic turning to or from Smitana Road. Therefore, no improvements are recommended at the intersection of Sands Road and Smitana Road.

C. Proposed Sands Road Three-Quarter Access Drive

The results of the capacity analysis for Total traffic conditions indicate that the movements at the unsignalized intersection of Sands Road at the three-quarter access driveway will operate at a Level-of-Service (LOS) A during all analyzed peak hours. The 95th percentile queue is less than one vehicle during all peak hours for the eastbound approach. Therefore, the proposed site driveway will operate efficiently at all times of day.

Although turning volumes are expected to be low at the site access driveway, a northbound left turn lane should be installed at the site driveway on Sands Road. The addition of this left turn lane will facilitate northbound traffic flow at the site driveway, eliminating any potential for delays on the northbound approach at the access driveway.

D. US-14/IL-31 Interchange

The interchange of US-14 and IL-31 is approximately 1,000 feet west of the US-14 and Sands Road intersection. Only 35% of the site-generated passenger car trips and 65% of truck trips are expected to pass through the interchange, which means that fewer than 200 new vehicles would be using the interchange daily. These 200 new daily trips comprise less than 1% of the existing average of 20,600 vehicles per day east of the interchange. This difference of less than 1% will not result in a quantifiable difference to interchange operations. Based on a review of the daily traffic volumes and in accordance with standard industry practices for scoping traffic studies, it was determined that turning movement counts and traffic analyses were not required at this intersection. No traffic impacts are expected to the interchange as a result of the NVA project.

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the proposed development plans and the preceding traffic impact study, the following conclusions and recommendations are presented:

- The roadway system surrounding the proposed site will have sufficient reserve capacity to accommodate the development of the site.

- Future NVA development traffic will increase delays at the intersection of US-14 and Sands Road by less than one second. Intersection queues attributable to development traffic will increase by 20 feet or less.

- A northbound left turn lane is recommended on Sands Road at the proposed development access driveway. This turn lane should be designed with 115 feet of storage and taper rates as detailed in IDOT's *Bureau of Local Roads and Streets Manual*. This turn lane will facilitate northbound traffic flow, eliminating the potential for turning vehicles to delay northbound roadway users.

- Outbound left turns should be restricted at the proposed site driveway on Sands Road through pavement markings, signage and a concrete pork chop median. The radius on the north edge of the driveway will be such to discourage large southbound trucks from turning right into the site. This three-quarter access drive will operate satisfactorily and will limit the volume of traffic heading to and from the north.

- Trucks are not expected to utilize Sands Road north of the proposed site due to the six ton per axle weight limit. Furthermore, the north edge of the site driveway will be designed with a small radius which will discourage trucks from entering the site from the north.

- US-14/IL-31 interchange will experience negligible change in operations due to the project's generated traffic.



City of Crystal Lake

NVA Trucking Facility Expansion TIS

Location Map

CIVILTECH

Not to Scale

Exhibit 1



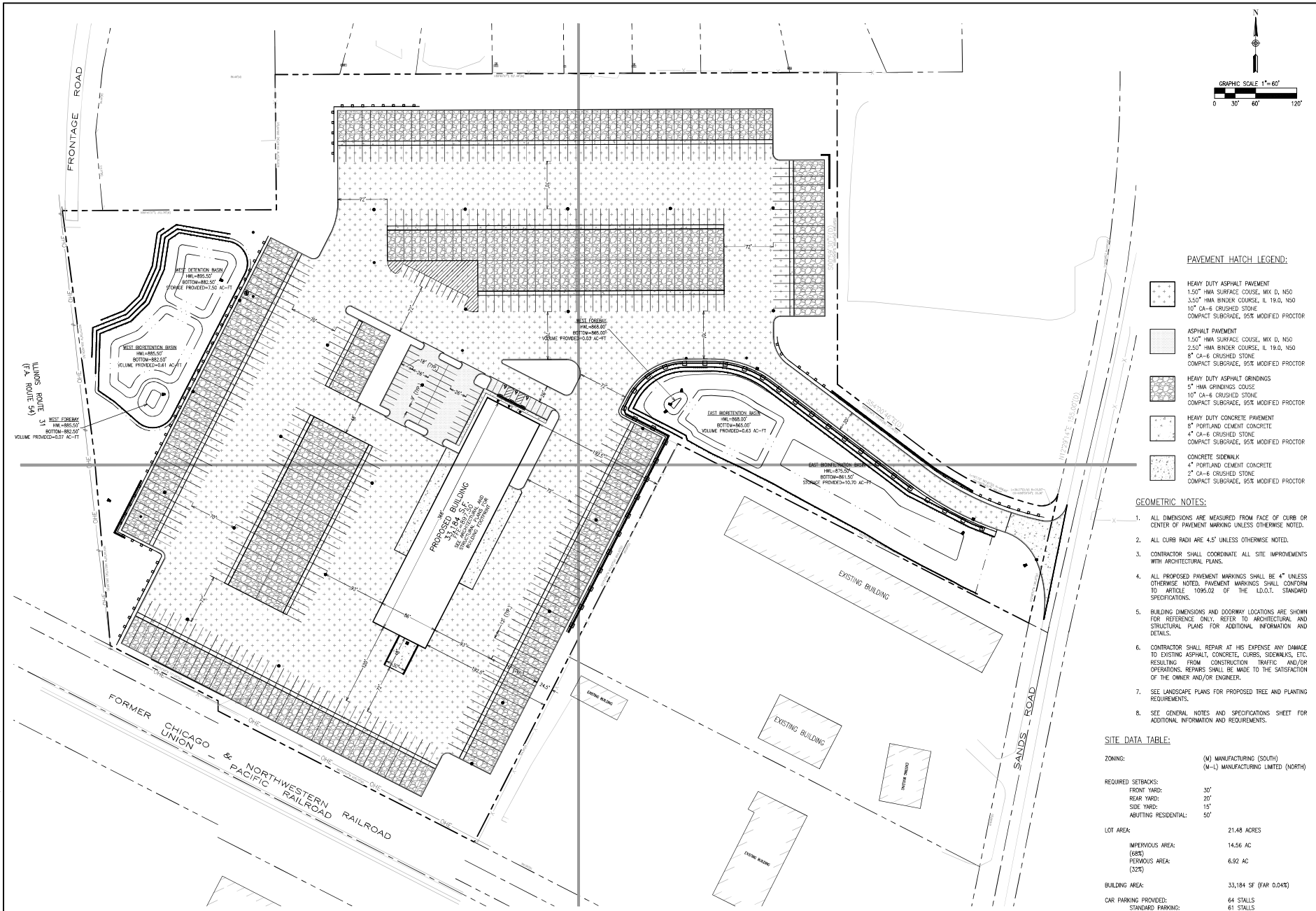
City of Crystal Lake

NNVA Trucking Facility Expansion TIS

Existing Conditions Aerial

Not to Scale

Exhibit 2



PAVEMENT HATCH LEGEND:

- HEAVY DUTY ASPHALT PAVEMENT
  1.50" HMA SURFACE COUSE, MIX D, N50
  3.50" HMA BINDER COURSE, IL 19.0, N50
  10" CA-6 CRUSHED STONE
  COMPACT SUBGRADE, 95% MODIFIED PROCTOR
- ASPHALT PAVEMENT
  1.50" HMA SURFACE COUSE, MIX D, N50
  2.50" HMA BINDER COURSE, IL 19.0, N50
  8" CA-6 CRUSHED STONE
  COMPACT SUBGRADE, 95% MODIFIED PROCTOR
- HEAVY DUTY ASPHALT GRINDINGS
  5" HMA GRINDINGS COUSE
  10" CA-6 CRUSHED STONE
  COMPACT SUBGRADE, 95% MODIFIED PROCTOR
- HEAVY DUTY CONCRETE PAVEMENT
  8" PORTLAND CEMENT CONCRETE
  4" CA-6 CRUSHED STONE
  COMPACT SUBGRADE, 95% MODIFIED PROCTOR
- CONCRETE SIDEWALK
  4" PORTLAND CEMENT CONCRETE
  2" CA-6 CRUSHED STONE
  COMPACT SUBGRADE, 95% MODIFIED PROCTOR

GEOMETRIC NOTES:

1. ALL DIMENSIONS ARE MEASURED FROM FACE OF CURB OR CENTER OF PAVEMENT MARKING UNLESS OTHERWISE NOTED.
2. ALL CURB RADII ARE 4.5' UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL COORDINATE ALL SITE IMPROVEMENTS WITH ARCHITECTURAL PLANS.
4. ALL PROPOSED PAVEMENT MARKINGS SHALL BE 4" UNLESS OTHERWISE NOTED. PAVEMENT MARKINGS SHALL CONFORM TO ARTICLE 1095.02 OF THE I.D.O.T. STANDARD SPECIFICATIONS.
5. BUILDING DIMENSIONS AND DOORWAY LOCATIONS ARE SHOWN FOR REFERENCE ONLY. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR ADDITIONAL INFORMATION AND DETAILS.
6. CONTRACTOR SHALL REPAIR AT HIS EXPENSE ANY DAMAGE TO EXISTING ASPHALT, CONCRETE, CURBS, SIDEWALKS, ETC. RESULTING FROM CONSTRUCTION TRAFFIC AND/OR OPERATIONS. REPAIRS SHALL BE MADE TO THE SATISFACTION OF THE OWNER AND/OR ENGINEER.
7. SEE LANDSCAPE PLANS FOR PROPOSED TREE AND PLANTING REQUIREMENTS.
8. SEE GENERAL NOTES AND SPECIFICATIONS SHEET FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

SITE DATA TABLE:

ZONING:		(M) MANUFACTURING (SOUTH) (M-L) MANUFACTURING LIMITED (NORTH)
REQUIRED SETBACKS:		
FRONT YARD:	30'	
REAR YARD:	20'	
SIDE YARD:	15'	
ABUTTING RESIDENTIAL:	50'	
LOT AREA:		21.48 ACRES
IMPERVIOUS AREA: (68%)		14.56 AC
PERVIOUS AREA: (32%)		6.92 AC
BUILDING AREA:		33,184 SF (FAR 0.04%)
CAR PARKING PROVIDED:		64 STALLS
STANDARD PARKING:		61 STALLS
HANDICAP ACCESSIBLE PARKING:		3
TRAILER PARKING PROVIDED:		325

No.	Description	Date
1	CLIENT REVIEW	8/3/23

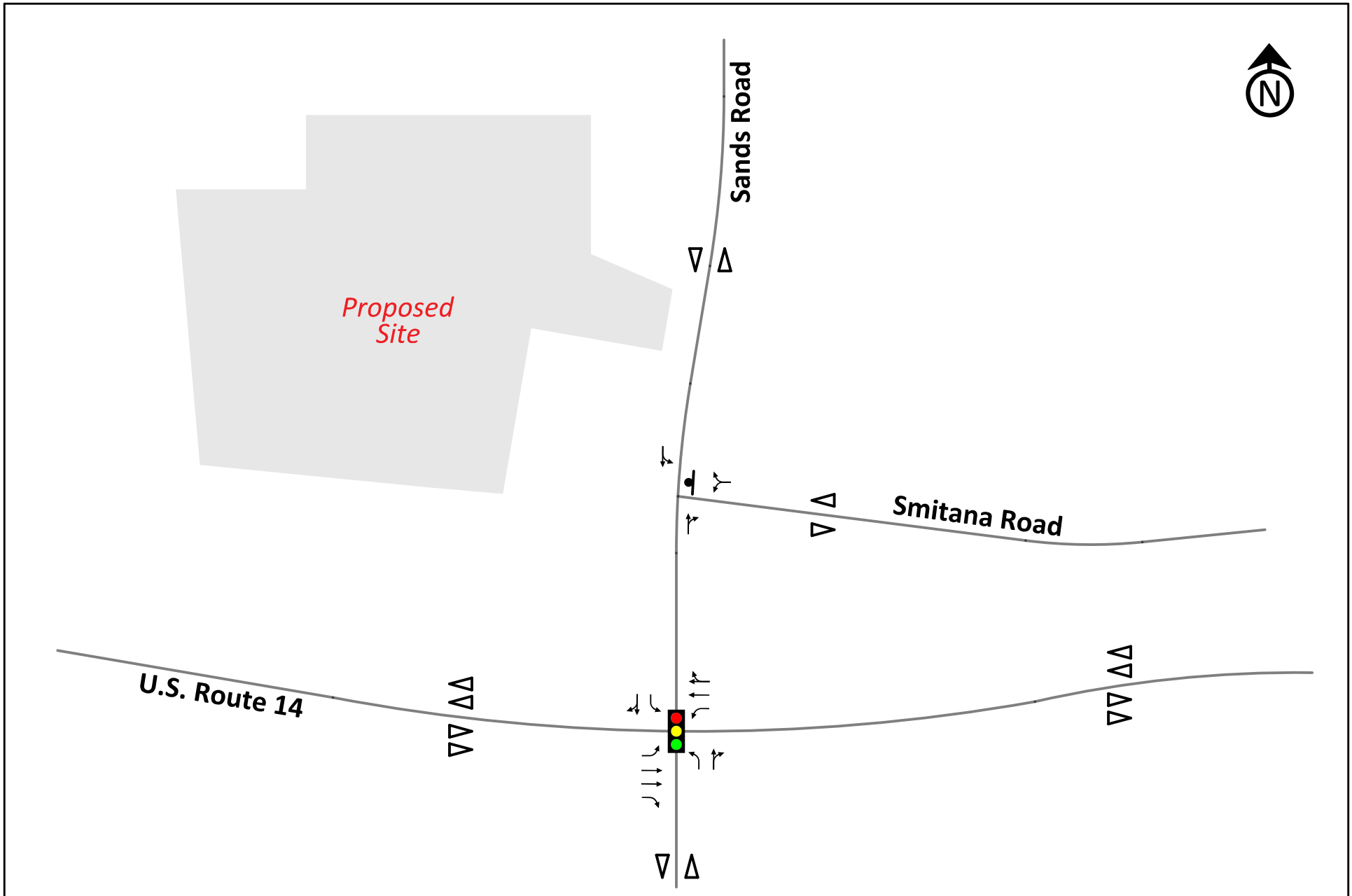
DIMENSIONAL CONTROL AND PAVING PLAN
NVA TRUCKING FACILITY EXPANSION
NVA PROP IL LLC
CRYSTAL LAKE, IL

JACOB & HEFNER ASSOCIATES
1333 Butterfield Rd, Suite 300, Downers Grove, IL 60515
PHONE: (630) 652-6600, FAX: (630) 652-6601
www.jacobandhefner.com

G985
1" = 60'
C3.0

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Exhibit 3



CIVILTECH

Legend

Existing Lane Configuration

Number of Existing Through Lanes

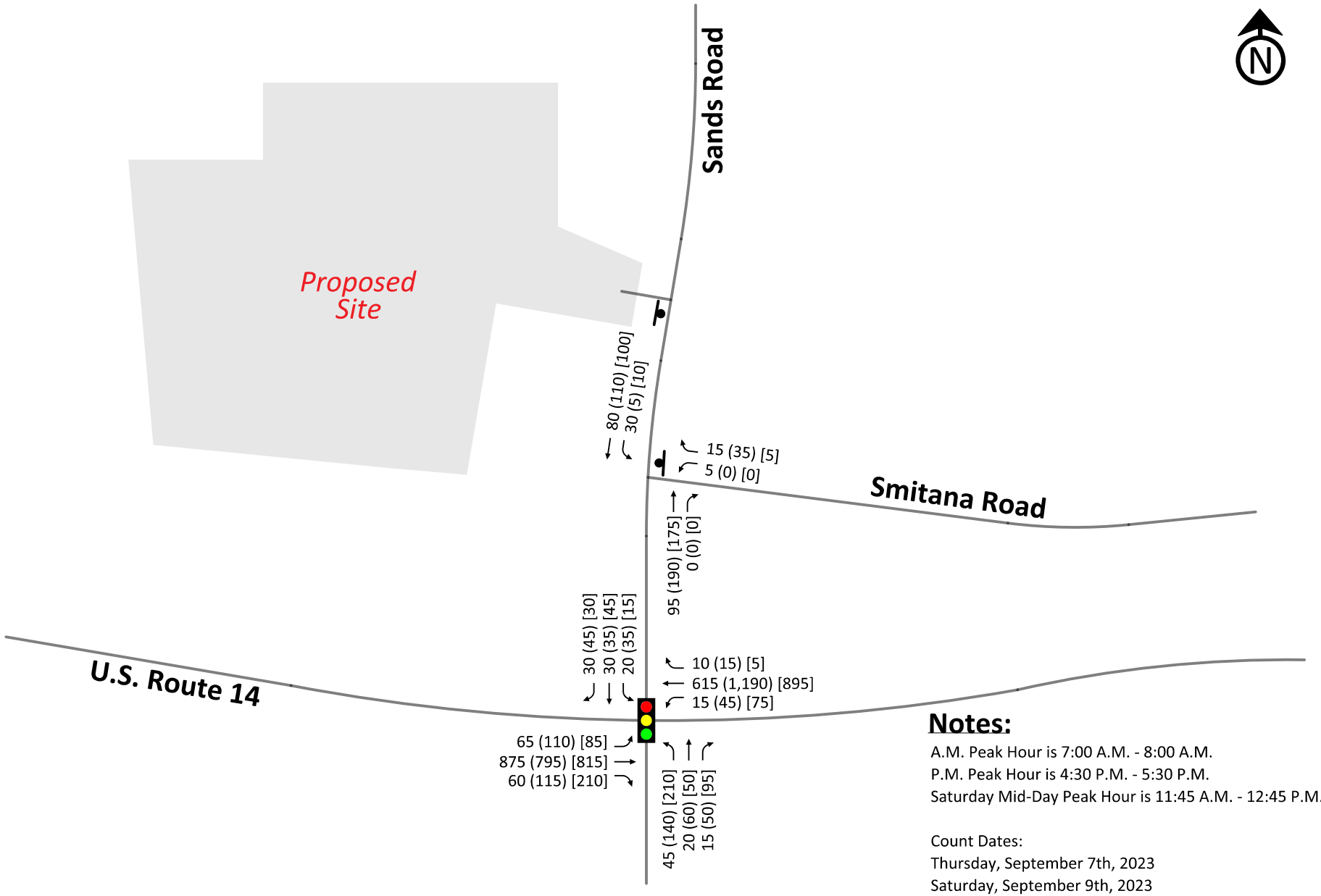
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

Existing Lane Configuration and Traffic Control

Exhibit 4



Notes:

A.M. Peak Hour is 7:00 A.M. - 8:00 A.M.
P.M. Peak Hour is 4:30 P.M. - 5:30 P.M.
Saturday Mid-Day Peak Hour is 11:45 A.M. - 12:45 P.M.

Count Dates:
Thursday, September 7th, 2023
Saturday, September 9th, 2023

CIVILTECH

Legend

000 (000) [000] - A.M. (P.M.) [Sat.] Peak Hour Volumes (veh/hr)

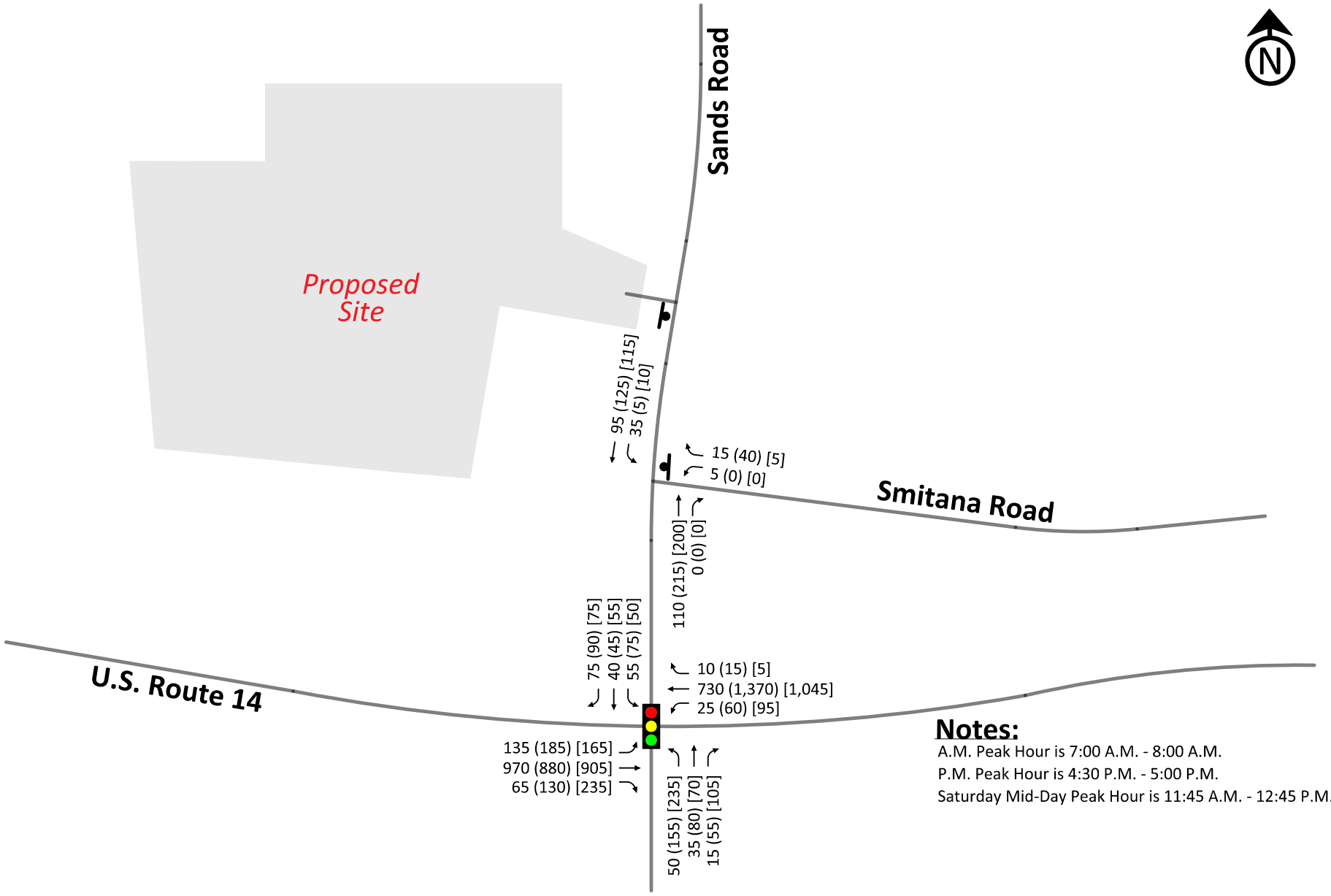
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

2023 Existing A.M. (P.M.) [Saturday] Peak Hour Traffic Volumes

Exhibit 5



CIVILTECH

Legend

000 (000) [000] - A.M. (P.M.) [Sat.] Peak Hour Volumes (veh/hr)

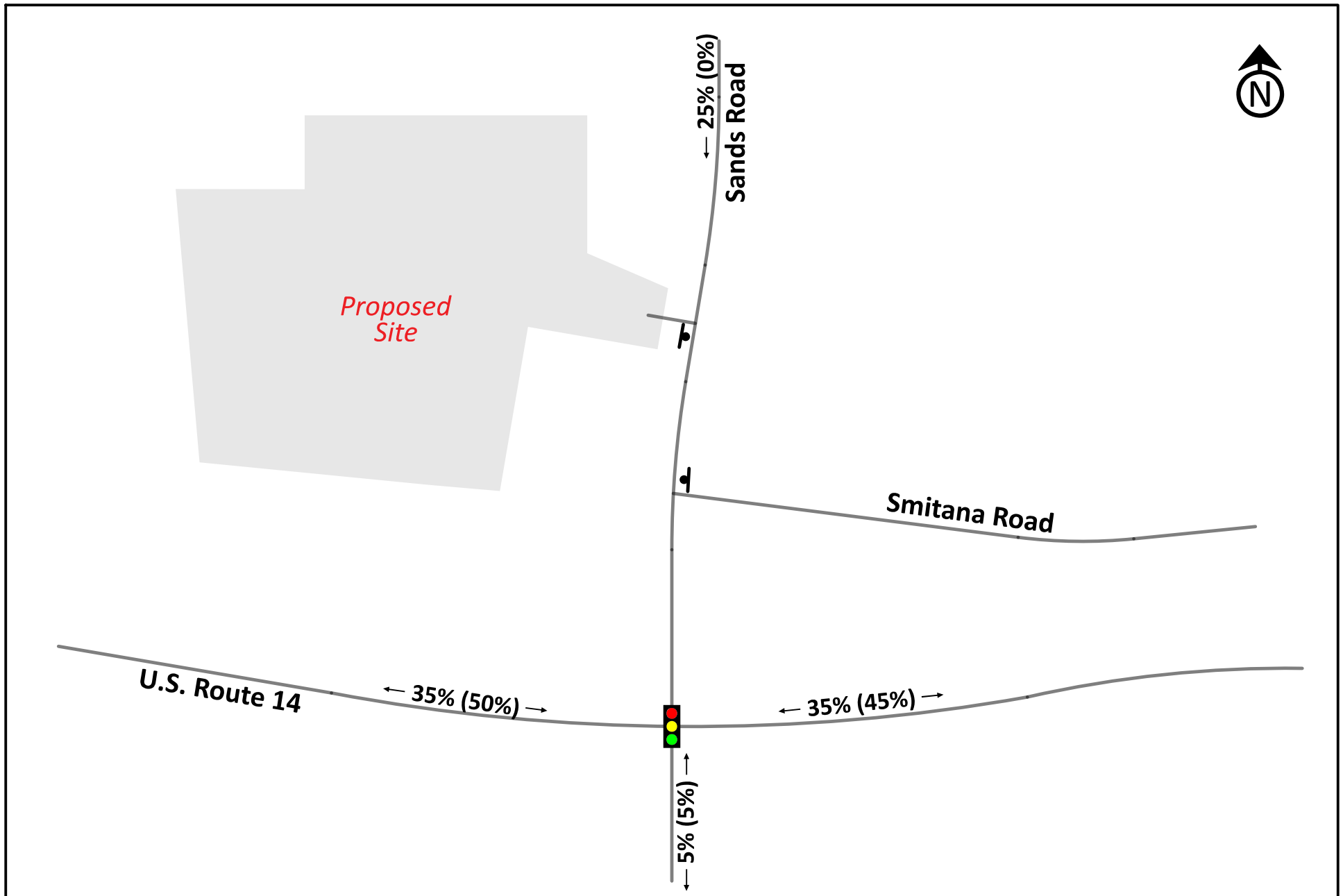
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

2030 No Build A.M. (P.M.) [Saturday] Peak Hour Traffic Volumes

Exhibit 6



CIVILTECH

Legend

00% (00%) Percent Distribution Inbound (Outbound)

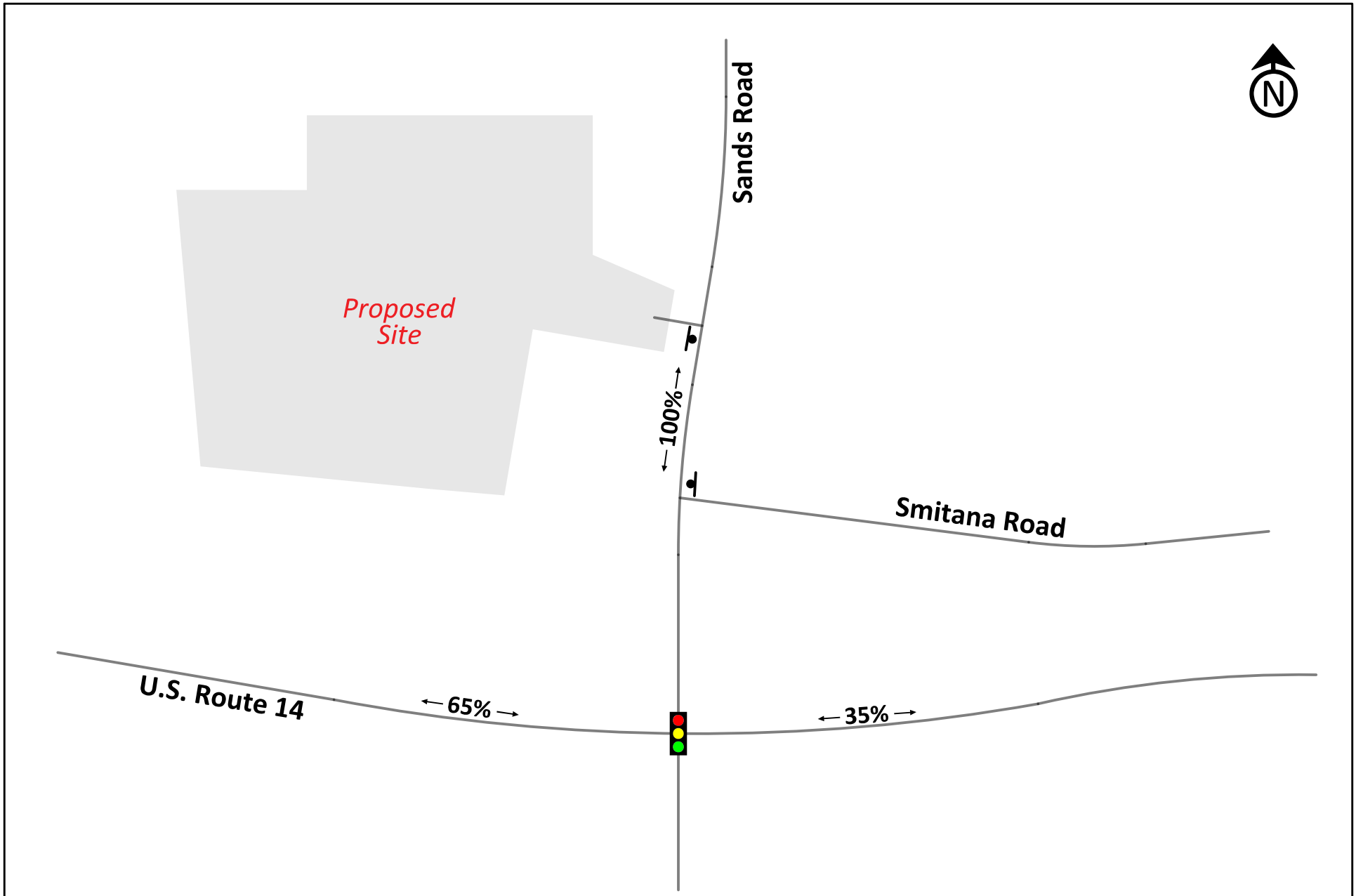
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

Directional Distribution of Site-Generated Passenger Car Trips

Exhibit 7a



CIVILTECH

Legend

00% Percent Distribution

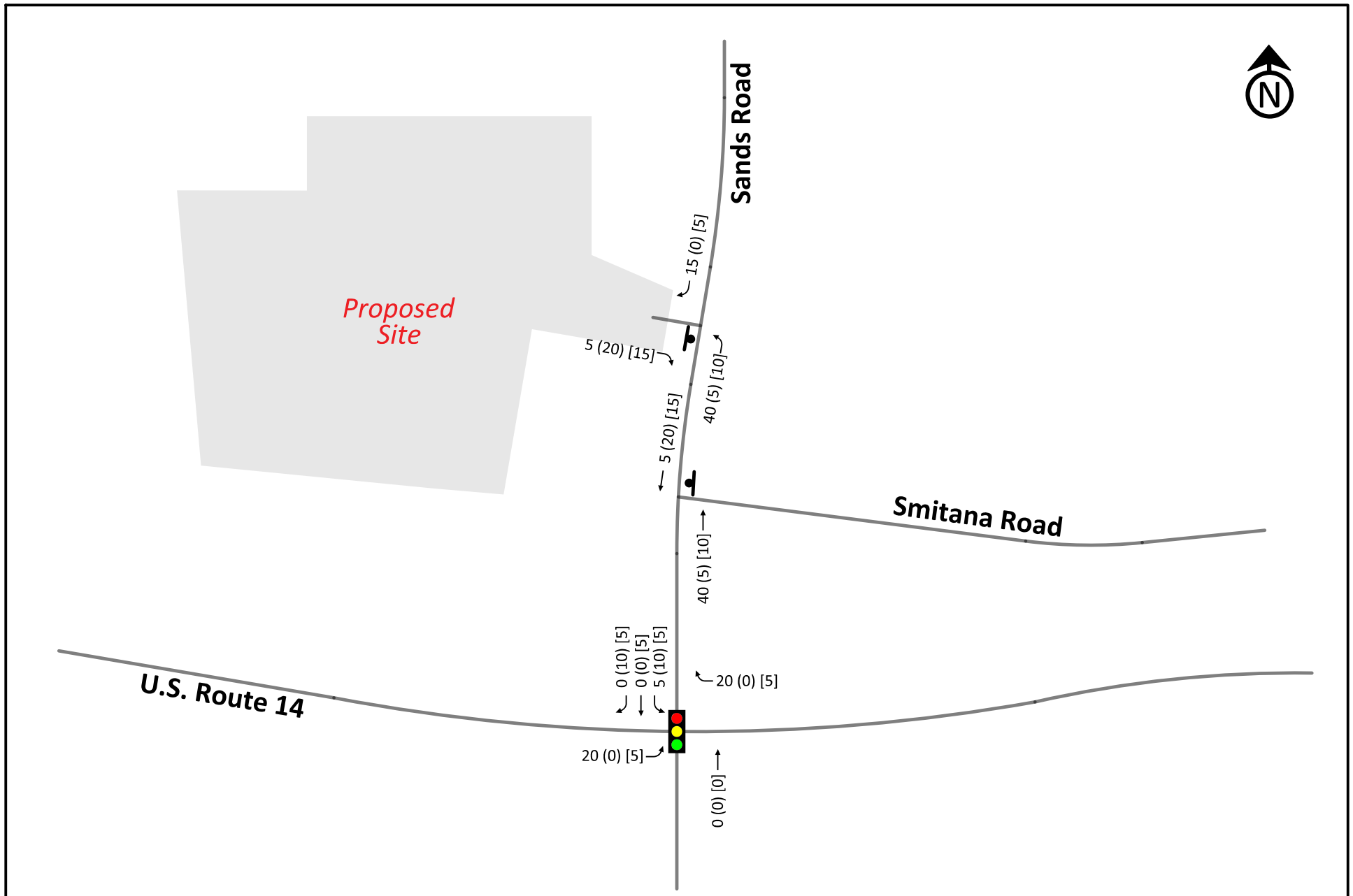
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

Directional Distribution of Site-Generated Truck Trips

Exhibit 7b



CIVILTECH

Legend

000 (000) [000] - A.M. (P.M.) [Sat.] Peak Hour Volumes (veh/hr)

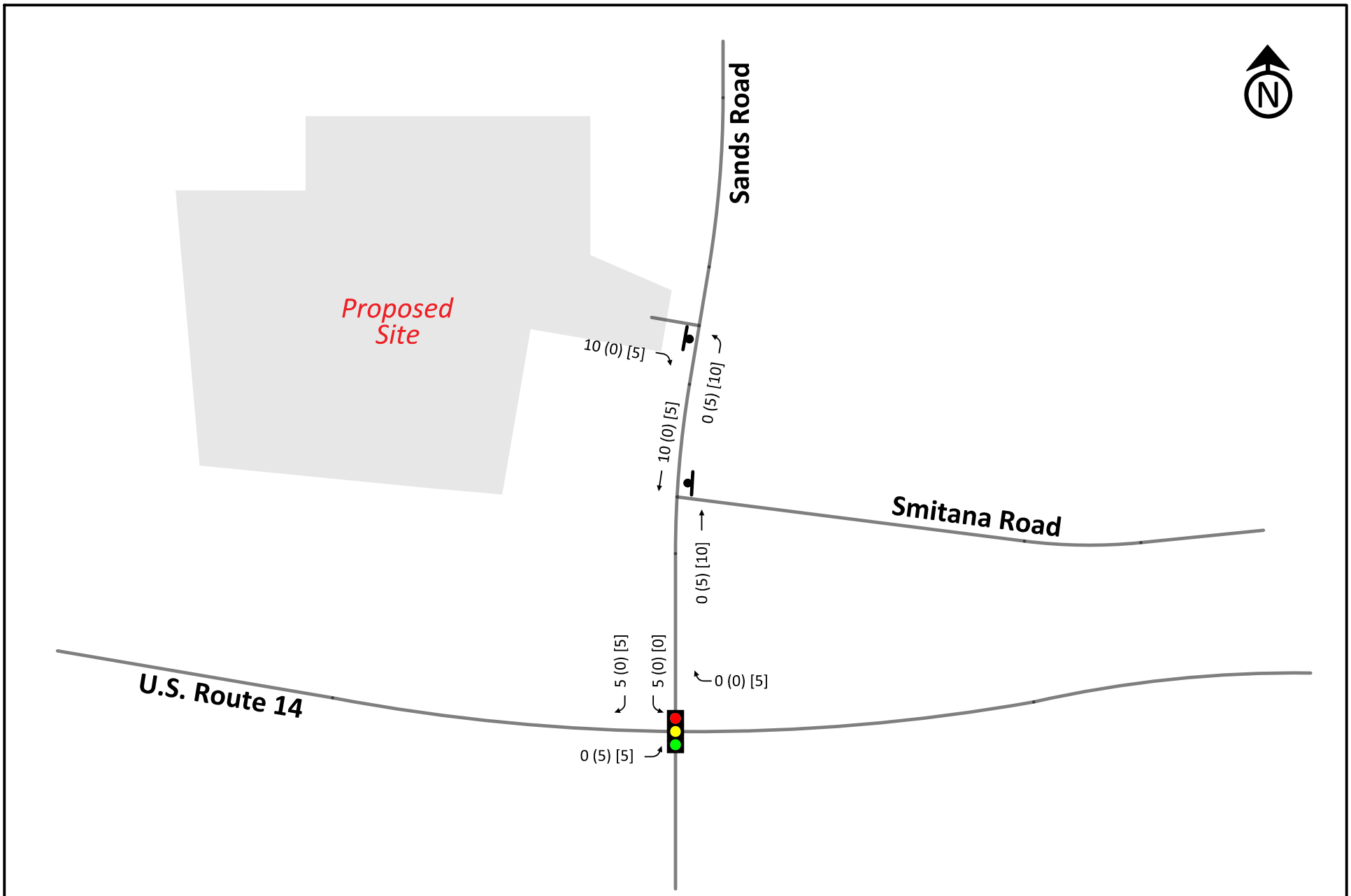
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

Projected Site-Generated Passenger Car Trips

Exhibit 8a



CIVILTECH

Legend

000 (000) [000] - A.M. (P.M.) [Sat.] Peak Hour Volumes (veh/hr)

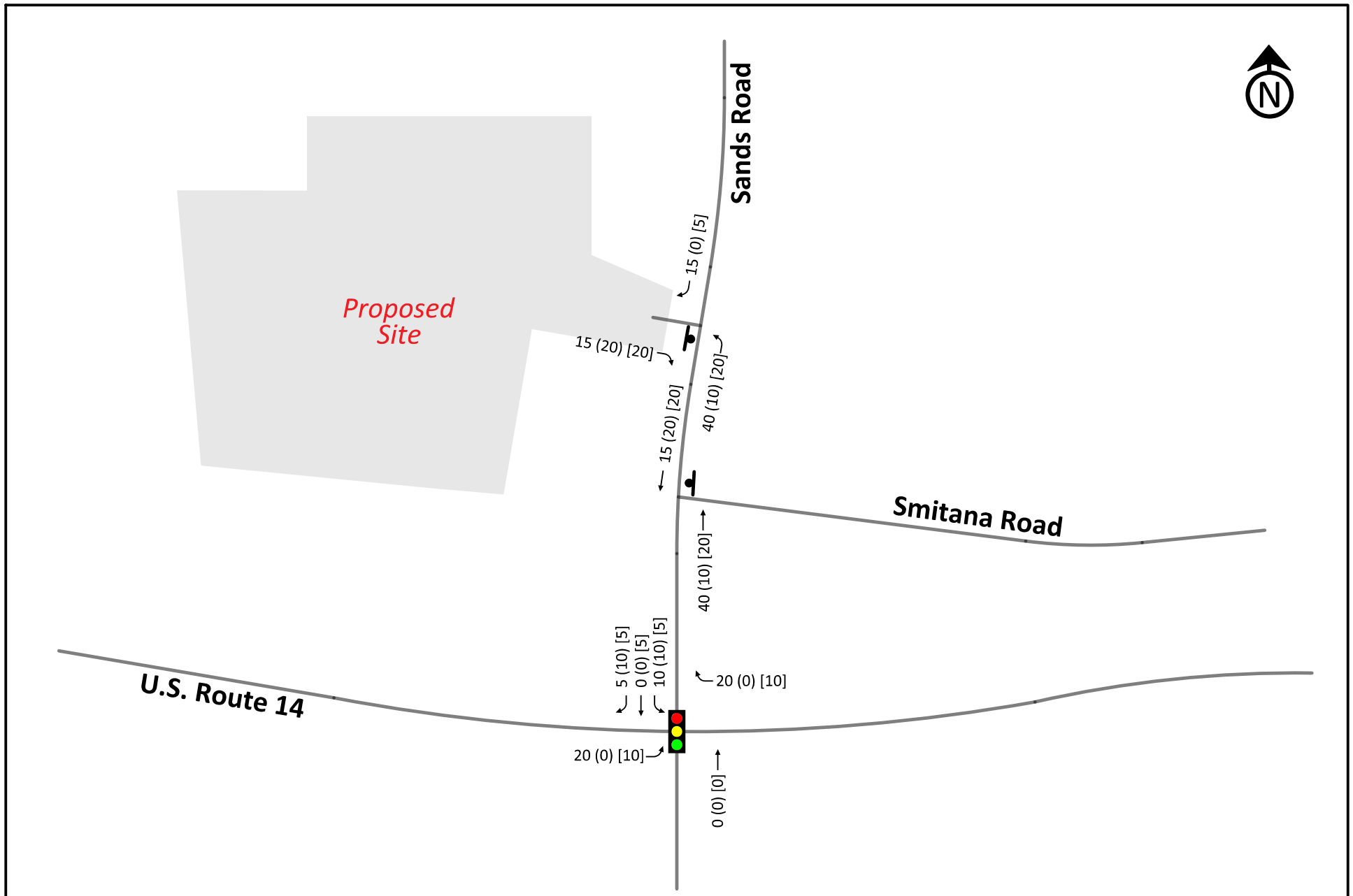
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

Projected Site-Generated Truck Trips

Exhibit 8b



CIVILTECH

Legend

000 (000) [000] - A.M. (P.M.) [Sat.] Peak Hour Volumes (veh/hr)

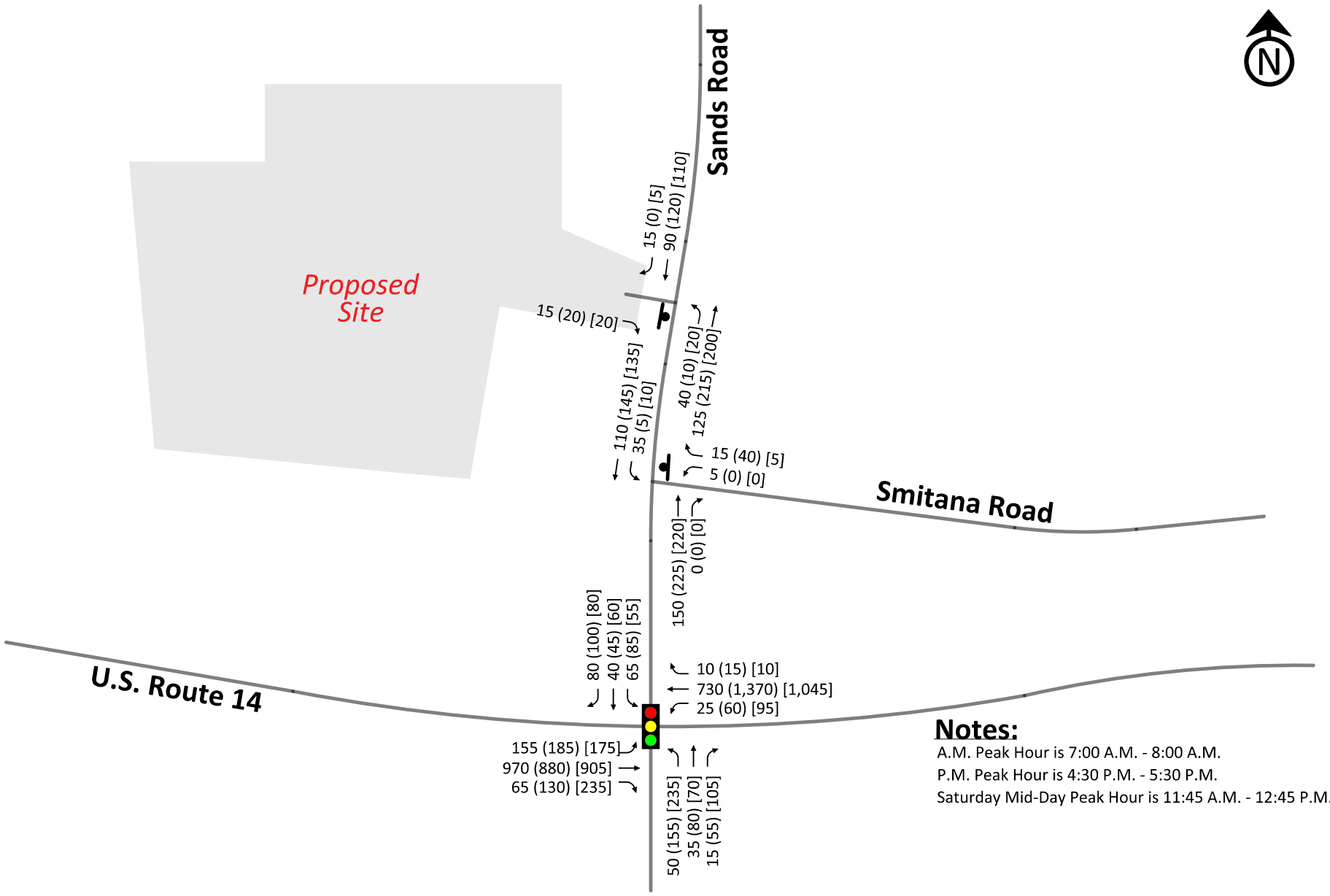
Stop Sign

Traffic Signal

NVA Trucking Facility Expansion TIS

Total Projected Site-Generated Trips

Exhibit 8c



Notes:

A.M. Peak Hour is 7:00 A.M. - 8:00 A.M.
P.M. Peak Hour is 4:30 P.M. - 5:30 P.M.
Saturday Mid-Day Peak Hour is 11:45 A.M. - 12:45 P.M.

CIVILTECH

Legend

000 (000) [000] - A.M. (P.M.) [Sat.] Peak Hour Volumes (veh/hr)

Stop Sign

Traffic Signal

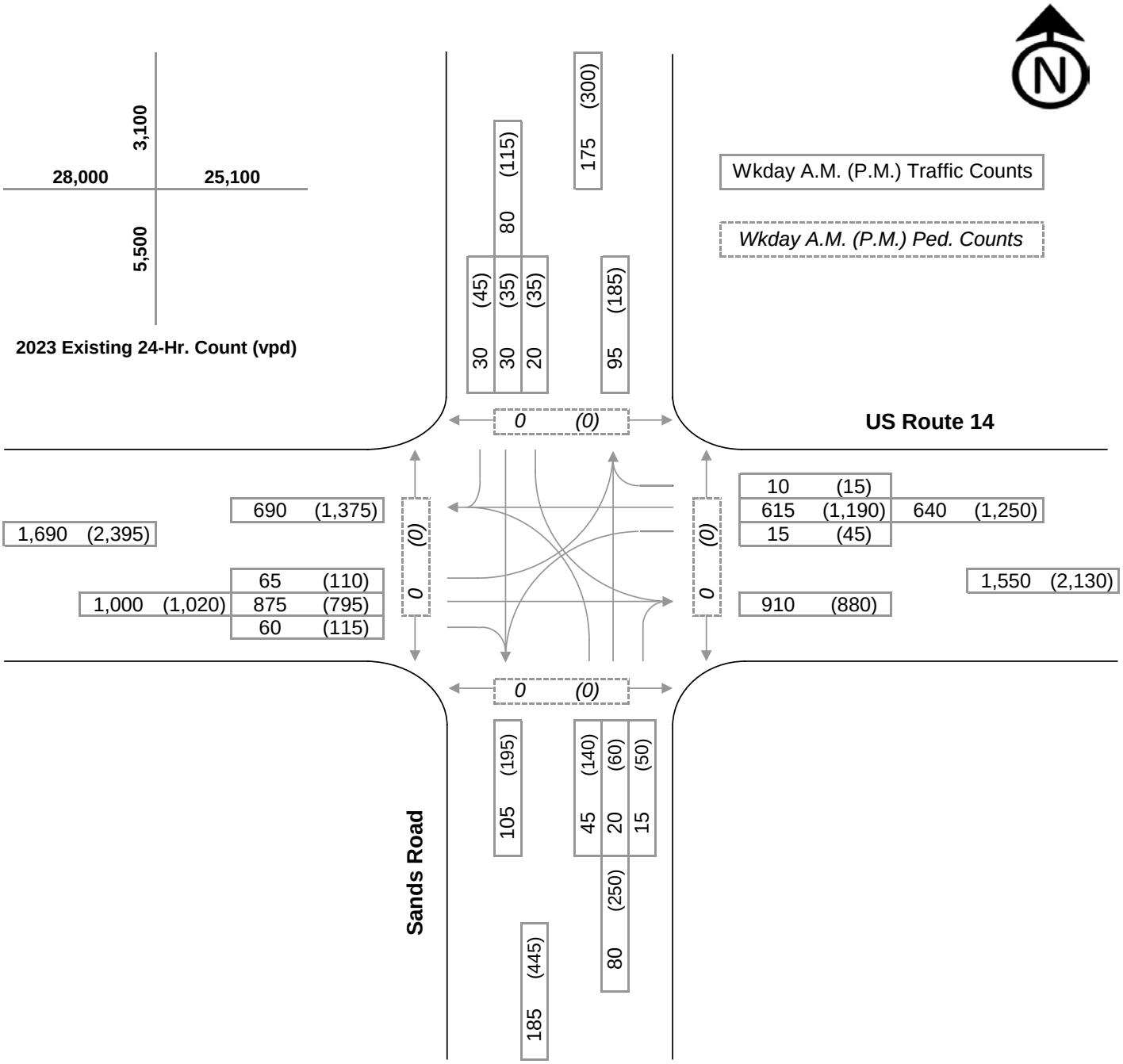
NVA Trucking Facility Expansion TIS

Total Projected A.M. (P.M.) [Saturday] Peak Hour Traffic Volumes

Exhibit 9

APPENDIX A

Traffic Count Data



Vehicle Traffic Peak Hours:

7:00 A.M. to 8:00 A.M.

4:30 P.M. to 5:30 P.M.

Count Date(s):

Thursday, September 7, 2023

Prepared: 10/13/2023

Village of Crystal Lake

Crystal Lake Engineering Services

2023 Existing Peak Hour Traffic

US Route 14 & Sands Road

CIVILTECH

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (1-hour intervals)

	Sands Road									US Route 14									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	1	1	3	5	4	0	2	6	11	1	58	0	59	0	38	5	43	102	113
1:00 AM	0	0	0	0	0	0	0	0	0	1	32	1	34	1	22	0	23	57	57
2:00 AM	0	0	0	0	1	2	0	3	3	0	21	0	21	2	33	0	35	56	59
3:00 AM	0	0	1	1	1	0	0	1	2	0	22	0	22	2	45	0	47	69	71
4:00 AM	1	0	0	1	1	0	2	3	4	0	62	0	62	9	120	0	129	191	195
5:00 AM	7	6	2	15	3	1	7	11	26	1	138	6	145	17	349	5	371	516	542
6:00 AM	16	11	11	38	17	12	26	55	93	1	353	10	364	39	711	26	776	1140	1233
7:00 AM	32	30	22	84	17	22	44	83	167	11	617	16	644	61	874	64	999	1643	1810
8:00 AM	36	34	29	99	28	18	68	114	213	10	722	35	767	52	659	32	743	1510	1723
9:00 AM	33	42	17	92	43	25	86	154	246	9	664	47	720	78	584	39	701	1421	1667
10:00 AM	23	32	19	74	55	31	131	217	291	10	711	54	775	116	583	53	752	1527	1818
11:00 AM	25	40	23	88	59	44	146	249	337	8	731	66	805	133	641	51	825	1630	1967
12:00 PM	39	38	12	89	77	39	141	257	346	15	799	65	879	128	705	80	913	1792	2138
1:00 PM	28	30	22	80	64	48	145	257	337	14	735	64	813	141	680	82	903	1716	2053
2:00 PM	23	32	25	80	61	44	167	272	352	15	853	45	913	139	706	88	933	1846	2198
3:00 PM	43	41	20	104	51	41	119	211	315	14	1046	43	1103	119	739	106	964	2067	2382
4:00 PM	38	36	26	100	49	50	153	252	352	9	1127	54	1190	113	790	92	995	2185	2537
5:00 PM	52	29	34	115	71	59	132	262	377	16	1162	44	1222	102	766	119	987	2209	2586
6:00 PM	33	33	9	75	39	36	85	160	235	16	906	44	966	72	662	110	844	1810	2045
7:00 PM	24	22	8	54	27	26	68	121	175	12	573	28	613	87	534	91	712	1325	1500
8:00 PM	9	11	6	26	20	17	54	91	117	7	370	8	385	47	395	73	515	900	1017
9:00 PM	2	7	2	11	13	10	28	51	62	3	222	7	232	20	262	27	309	541	603
10:00 PM	3	1	3	7	1	5	16	22	29	1	153	5	159	14	140	8	162	321	350
11:00 PM	0	0	0	0	1	3	4	8	8	1	97	1	99	5	49	3	57	156	164
TOTAL	**468**	**476**	**294**	**1238**	**703**	**533**	**1624**	**2860**	**4098**	**175**	**12174**	**643**	**12992**	**1497**	**11087**	**1154**	**13738**	**26730**	**30828**

24-Hour Vehicle Traffic Count

North Leg	3,100
South Leg	5,500
East Leg	25,100
West Leg	28,000

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	1	1	2	1	0	1	2	4	1	15	0	16	0	8	0	8	24	28	113
12:15 AM	1	0	2	3	0	0	0	0	3	0	15	0	15	0	11	1	12	27	30	100
12:30 AM	0	0	0	0	1	0	1	2	2	0	13	0	13	0	8	4	12	25	27	87
12:45 AM	0	0	0	0	2	0	0	2	2	0	15	0	15	0	11	0	11	26	28	73
1:00 AM	0	0	0	0	0	0	0	0	0	0	10	0	10	0	5	0	5	15	15	57
1:15 AM	0	0	0	0	0	0	0	0	0	0	10	0	10	0	7	0	7	17	17	54
1:30 AM	0	0	0	0	0	0	0	0	0	1	8	0	9	0	4	0	4	13	13	45
1:45 AM	0	0	0	0	0	0	0	0	0	0	4	1	5	1	6	0	7	12	12	53
2:00 AM	0	0	0	0	0	0	0	0	0	0	7	0	7	0	5	0	5	12	12	59
2:15 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4	0	4	8	8	70
2:30 AM	0	0	0	0	0	0	0	0	0	0	7	0	7	0	14	0	14	21	21	75
2:45 AM	0	0	0	0	1	2	0	3	3	0	3	0	3	2	10	0	12	15	18	67
3:00 AM	0	0	1	1	1	0	0	1	2	0	4	0	4	0	17	0	17	21	23	71
3:15 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	8	0	8	13	13	76
3:30 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	1	6	0	7	13	13	91
3:45 AM	0	0	0	0	0	0	0	0	0	0	7	0	7	1	14	0	15	22	22	142
4:00 AM	0	0	0	0	1	0	0	1	1	0	12	0	12	1	14	0	15	27	28	195
4:15 AM	0	0	0	0	0	0	0	0	0	0	9	0	9	0	19	0	19	28	28	240
4:30 AM	0	0	0	0	0	0	1	1	1	0	19	0	19	3	41	0	44	63	64	343
4:45 AM	1	0	0	1	0	0	1	1	2	0	22	0	22	5	46	0	51	73	75	434
5:00 AM	0	0	1	1	0	0	4	4	5	0	22	1	23	0	45	0	45	68	73	542
5:15 AM	3	2	1	6	0	0	2	2	8	0	37	2	39	1	83	0	84	123	131	675
5:30 AM	2	2	0	4	1	1	0	2	6	0	37	2	39	4	103	3	110	149	155	814
5:45 AM	2	2	0	4	2	0	1	3	7	1	42	1	44	12	118	2	132	176	183	1006
6:00 AM	1	1	1	3	3	0	5	8	11	0	56	3	59	11	124	1	136	195	206	1233
6:15 AM	5	3	3	11	5	2	5	12	23	1	53	2	56	8	181	2	191	247	270	1442
6:30 AM	6	4	3	13	5	6	9	20	33	0	102	3	105	8	194	7	209	314	347	1606
6:45 AM	4	3	4	11	4	4	7	15	26	0	142	2	144	12	212	16	240	384	410	1745
7:00 AM	10	3	7	20	4	7	8	19	39	0	134	5	139	15	204	18	237	376	415	1810
7:15 AM	10	11	4	25	4	5	8	17	42	2	133	3	138	17	220	17	254	392	434	1798
7:30 AM	9	6	4	19	3	4	16	23	42	3	179	4	186	12	229	17	258	444	486	1805
7:45 AM	3	10	7	20	6	6	12	24	44	6	171	4	181	17	221	12	250	431	475	1717

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	9	6	6	21	3	4	15	22	43	2	150	9	161	8	182	9	199	360	403	1723
8:15 AM	14	5	12	31	6	5	17	28	59	3	197	7	207	10	159	6	175	382	441	1689
8:30 AM	10	8	3	21	10	3	17	30	51	0	180	5	185	12	144	6	162	347	398	1644
8:45 AM	3	15	8	26	9	6	19	34	60	5	195	14	214	22	174	11	207	421	481	1708
9:00 AM	11	15	3	29	10	7	15	32	61	1	134	10	145	23	131	9	163	308	369	1667
9:15 AM	8	11	5	24	9	7	22	38	62	2	152	13	167	13	140	14	167	334	396	1731
9:30 AM	7	6	5	18	11	6	23	40	58	3	199	10	212	20	164	8	192	404	462	1780
9:45 AM	7	10	4	21	13	5	26	44	65	3	179	14	196	22	149	8	179	375	440	1751
10:00 AM	3	9	7	19	10	4	35	49	68	3	175	8	186	27	142	10	179	365	433	1818
10:15 AM	5	7	2	14	14	8	36	58	72	2	163	14	179	24	155	15	194	373	445	1871
10:30 AM	9	10	4	23	8	12	26	46	69	4	165	12	181	36	141	6	183	364	433	1878
10:45 AM	6	6	6	18	23	7	34	64	82	1	208	20	229	29	145	22	196	425	507	1979
11:00 AM	1	11	5	17	18	15	33	66	83	4	186	15	205	35	153	10	198	403	486	1967
11:15 AM	8	10	6	24	13	11	36	60	84	0	161	17	178	31	150	9	190	368	452	2006
11:30 AM	7	11	5	23	14	8	37	59	82	3	213	16	232	42	163	15	220	452	534	2085
11:45 AM	9	8	7	24	14	10	40	64	88	1	171	18	190	25	175	17	217	407	495	2112
12:00 PM	10	14	4	28	22	11	33	66	94	3	193	16	212	33	171	15	219	431	525	2138
12:15 PM	11	10	3	24	18	8	40	66	90	7	186	15	208	29	175	29	233	441	531	2106
12:30 PM	13	7	4	24	18	11	38	67	91	2	219	16	237	31	182	20	233	470	561	2067
12:45 PM	5	7	1	13	19	9	30	58	71	3	201	18	222	35	177	16	228	450	521	2045
1:00 PM	9	6	7	22	14	8	32	54	76	2	179	18	199	38	159	21	218	417	493	2053
1:15 PM	7	10	3	20	18	11	26	55	75	3	182	19	204	36	154	23	213	417	492	2081
1:30 PM	6	6	5	17	19	14	36	69	86	3	202	13	218	32	178	25	235	453	539	2124
1:45 PM	6	8	7	21	13	15	51	79	100	6	172	14	192	35	189	13	237	429	529	2166
2:00 PM	6	8	6	20	12	10	46	68	88	5	191	14	210	30	175	18	223	433	521	2198
2:15 PM	4	5	8	17	14	11	35	60	77	2	219	10	231	36	168	23	227	458	535	2261
2:30 PM	6	7	2	15	15	11	45	71	86	3	215	11	229	43	202	21	266	495	581	2306
2:45 PM	7	12	9	28	20	12	41	73	101	5	228	10	243	30	161	26	217	460	561	2349
3:00 PM	16	8	1	25	11	13	40	64	89	2	235	10	247	34	190	24	248	495	584	2382
3:15 PM	3	6	5	14	15	7	30	52	66	7	262	15	284	26	176	28	230	514	580	2405
3:30 PM	13	14	11	38	19	12	30	61	99	0	275	10	285	32	182	26	240	525	624	2464
3:45 PM	11	13	3	27	6	9	19	34	61	5	274	8	287	27	191	28	246	533	594	2457

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	6	10	5	21	15	11	34	60	81	2	243	16	261	33	208	24	265	526	607	2537
4:15 PM	9	9	6	24	11	5	49	65	89	2	295	13	310	25	194	21	240	550	639	2580
4:30 PM	10	11	3	24	13	15	33	61	85	3	267	9	279	26	204	23	253	532	617	2633
4:45 PM	13	6	12	31	10	19	37	66	97	2	322	16	340	29	184	24	237	577	674	2630
5:00 PM	14	4	5	23	15	14	38	67	90	3	289	15	307	28	193	32	253	560	650	2586
5:15 PM	9	13	13	35	14	10	32	56	91	6	310	7	323	34	213	31	278	601	692	2481
5:30 PM	12	8	4	24	22	18	31	71	95	4	276	12	292	20	179	28	227	519	614	2305
5:45 PM	17	4	12	33	20	17	31	68	101	3	287	10	300	20	181	28	229	529	630	2193
6:00 PM	6	5	1	12	9	10	17	36	48	6	276	10	292	17	165	23	205	497	545	2045
6:15 PM	8	7	4	19	7	10	21	38	57	3	204	12	219	27	181	32	240	459	516	1902
6:30 PM	13	10	2	25	11	12	28	51	76	3	200	10	213	12	172	29	213	426	502	1771
6:45 PM	6	11	2	19	12	4	19	35	54	4	226	12	242	16	144	26	186	428	482	1641
7:00 PM	6	8	3	17	7	5	20	32	49	3	170	2	175	23	135	20	178	353	402	1500
7:15 PM	6	2	3	11	4	8	17	29	40	3	136	12	151	21	153	20	194	345	385	1400
7:30 PM	5	6	1	12	8	6	14	28	40	4	142	11	157	15	130	30	175	332	372	1292
7:45 PM	7	6	1	14	8	7	17	32	46	2	125	3	130	28	116	21	165	295	341	1169
8:00 PM	5	2	0	7	6	5	19	30	37	3	107	3	113	19	105	28	152	265	302	1017
8:15 PM	3	6	1	10	5	2	14	21	31	0	105	3	108	8	114	16	138	246	277	920
8:30 PM	1	1	2	4	7	5	14	26	30	3	86	2	91	13	100	15	128	219	249	803
8:45 PM	0	2	3	5	2	5	7	14	19	1	72	0	73	7	76	14	97	170	189	691
9:00 PM	1	1	2	4	3	4	11	18	22	2	71	4	77	7	89	10	106	183	205	603
9:15 PM	0	4	0	4	4	2	5	11	15	0	63	1	64	6	70	5	81	145	160	511
9:30 PM	0	0	0	0	3	2	9	14	14	1	49	1	51	4	63	5	72	123	137	451
9:45 PM	1	2	0	3	3	2	3	8	11	0	39	1	40	3	40	7	50	90	101	387
10:00 PM	0	0	1	1	1	1	14	16	17	1	40	2	43	4	46	3	53	96	113	350
10:15 PM	2	0	0	2	0	0	1	1	3	0	50	0	50	3	42	2	47	97	100	273
10:30 PM	1	1	0	2	0	3	1	4	6	0	29	1	30	6	29	2	37	67	73	215
10:45 PM	0	0	2	2	0	1	0	1	3	0	34	2	36	1	23	1	25	61	64	187
11:00 PM	0	0	0	0	0	2	0	2	2	0	24	1	25	1	6	2	9	34	36	164
11:15 PM	0	0	0	0	0	0	1	1	1	0	23	0	23	2	16	0	18	41	42	
11:30 PM	0	0	0	0	1	1	1	3	3	1	24	0	25	1	15	1	17	42	45	
11:45 PM	0	0	0	0	0	0	2	2	2	0	26	0	26	1	12	0	13	39	41	
TOTAL	**468**	**476**	**294**	**1238**	**703**	**533**	**1624**	**2860**	**4098**	**175**	**12174**	**643**	**12992**	**1497**	**11087**	**1154**	**13738**	**26730**	**30828**	

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Morning Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
7:00 AM	32	30	22	84	17	22	44	83	167	11	617	16	644	61	874	64	999	1643	1810
Percent Trucks	6.3%	0.0%	0.0%	2.4%	17.6%	4.5%	6.8%	8.4%	5.4%	0.0%	6.5%	6.3%	6.4%	8.2%	6.2%	1.6%	6.0%	6.1%	6.1%

Intersection Peak Hour Factor = 0.93

Evening Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
4:30 PM	46	34	33	113	52	58	140	250	363	14	1188	47	1249	117	794	110	1021	2270	2633
Percent Trucks	2.2%	0.0%	3.0%	1.8%	3.8%	0.0%	0.7%	1.2%	1.4%	14.3%	1.5%	0.0%	1.6%	0.0%	1.6%	2.7%	1.6%	1.6%	1.6%

Intersection Peak Hour Factor = 0.95

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (1-hour intervals)

	Sands Road									US Route 14									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3
1:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3
2:00 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
3:00 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	4	0	4	9	9
4:00 AM	0	0	0	0	0	0	1	1	1	0	7	0	7	1	2	0	3	10	11
5:00 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	10	0	10	15	15
6:00 AM	1	0	0	1	1	0	2	3	4	0	29	0	29	1	51	0	52	81	85
7:00 AM	2	0	0	2	3	1	3	7	9	0	40	1	41	5	54	1	60	101	110
8:00 AM	4	0	1	5	0	1	3	4	9	0	31	2	33	5	37	1	43	76	85
9:00 AM	1	1	0	2	1	1	5	7	9	0	57	5	62	5	41	2	48	110	119
10:00 AM	2	2	1	5	2	1	5	8	13	0	51	2	53	4	46	2	52	105	118
11:00 AM	0	0	3	3	1	0	2	3	6	0	41	2	43	2	45	4	51	94	100
12:00 PM	5	0	0	5	4	2	7	13	18	0	57	1	58	7	32	3	42	100	118
1:00 PM	2	1	0	3	1	1	3	5	8	1	41	4	46	2	38	1	41	87	95
2:00 PM	1	1	3	5	3	1	0	4	9	1	39	2	42	2	33	1	36	78	87
3:00 PM	0	1	0	1	1	2	0	3	4	1	27	0	28	2	24	1	27	55	59
4:00 PM	1	0	2	3	3	0	3	6	9	1	22	2	25	1	21	6	28	53	62
5:00 PM	1	0	0	1	0	0	1	1	2	1	15	0	16	0	14	1	15	31	33
6:00 PM	1	0	0	1	0	0	1	1	2	0	7	0	7	2	8	0	10	17	19
7:00 PM	1	0	1	2	0	0	0	0	2	1	5	0	6	0	10	0	10	16	18
8:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5
9:00 PM	0	0	0	0	0	1	0	1	1	0	3	1	4	0	0	0	0	4	5
10:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	3	3
11:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2
TOTAL	**22**	**6**	**11**	**39**	**20**	**11**	**36**	**67**	**106**	**6**	**492**	**22**	**520**	**39**	**480**	**24**	**543**	**1063**	**1169**

24-Hour Truck Traffic Count

North Leg	100
South Leg	100
East Leg	1,000
West Leg	1,100

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	4
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
1:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
1:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	7
2:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	5
2:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	6
2:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	5
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
3:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	9
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
3:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	7
3:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5	13
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	11
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
4:30 AM	0	0	0	0	0	0	1	1	1	0	4	0	4	1	1	0	2	6	7	15
4:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3	3	16
5:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	15
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	30
5:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	5	0	5	8	8	47
5:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	65
6:00 AM	0	0	0	0	0	0	1	1	1	0	4	0	4	1	12	0	13	17	18	85
6:15 AM	0	0	0	0	1	0	0	1	1	0	4	0	4	0	14	0	14	18	19	101
6:30 AM	1	0	0	1	0	0	1	1	2	0	9	0	9	0	15	0	15	24	26	108
6:45 AM	0	0	0	0	0	0	0	0	0	0	12	0	12	0	10	0	10	22	22	110
7:00 AM	0	0	0	0	0	0	2	2	2	0	11	0	11	2	19	0	21	32	34	110
7:15 AM	1	0	0	1	1	0	0	1	2	0	10	1	11	2	10	1	13	24	26	94
7:30 AM	1	0	0	1	1	0	1	2	3	0	12	0	12	0	13	0	13	25	28	87
7:45 AM	0	0	0	0	1	1	0	2	2	0	7	0	7	1	12	0	13	20	22	79

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	2	0	0	2	0	0	0	0	2	0	5	0	5	2	9	0	11	16	18	85
8:15 AM	2	0	0	2	0	0	1	1	3	0	12	0	12	0	4	0	4	16	19	90
8:30 AM	0	0	0	0	0	1	2	3	3	0	4	1	5	1	11	0	12	17	20	108
8:45 AM	0	0	1	1	0	0	0	0	1	0	10	1	11	2	13	1	16	27	28	127
9:00 AM	0	1	0	1	0	0	1	1	2	0	10	1	11	1	9	0	10	21	23	119
9:15 AM	0	0	0	0	0	0	1	1	1	0	23	1	24	0	10	2	12	36	37	125
9:30 AM	1	0	0	1	0	1	1	2	3	0	18	2	20	2	14	0	16	36	39	118
9:45 AM	0	0	0	0	1	0	2	3	3	0	6	1	7	2	8	0	10	17	20	108
10:00 AM	0	1	0	1	0	1	1	2	3	0	14	0	14	2	10	0	12	26	29	118
10:15 AM	0	0	0	0	0	0	2	2	2	0	11	2	13	0	14	1	15	28	30	115
10:30 AM	0	0	0	0	2	0	0	2	2	0	15	0	15	1	10	1	12	27	29	107
10:45 AM	2	1	1	4	0	0	2	2	6	0	11	0	11	1	12	0	13	24	30	94
11:00 AM	0	0	0	0	0	0	0	0	0	0	15	2	17	1	7	1	9	26	26	100
11:15 AM	0	0	1	1	0	0	1	1	2	0	9	0	9	0	9	2	11	20	22	99
11:30 AM	0	0	1	1	1	0	0	1	2	0	5	0	5	0	8	1	9	14	16	105
11:45 AM	0	0	1	1	0	0	1	1	2	0	12	0	12	1	21	0	22	34	36	120
12:00 PM	1	0	0	1	2	0	0	2	3	0	14	0	14	2	6	0	8	22	25	118
12:15 PM	2	0	0	2	1	0	1	2	4	0	15	0	15	2	6	1	9	24	28	110
12:30 PM	2	0	0	2	0	1	2	3	5	0	15	1	16	1	8	1	10	26	31	115
12:45 PM	0	0	0	0	1	1	4	6	6	0	13	0	13	2	12	1	15	28	34	101
1:00 PM	0	0	0	0	0	0	0	0	0	0	6	1	7	0	9	1	10	17	17	95
1:15 PM	1	0	0	1	0	1	1	2	3	1	16	1	18	0	12	0	12	30	33	99
1:30 PM	0	0	0	0	0	0	0	0	0	0	9	0	9	2	6	0	8	17	17	85
1:45 PM	1	1	0	2	1	0	2	3	5	0	10	2	12	0	11	0	11	23	28	82
2:00 PM	0	0	1	1	0	0	0	0	1	1	11	1	13	0	6	1	7	20	21	87
2:15 PM	0	0	1	1	0	1	0	1	2	0	10	1	11	1	5	0	6	17	19	78
2:30 PM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	9	0	9	14	14	80
2:45 PM	1	1	1	3	3	0	0	3	6	0	13	0	13	1	13	0	14	27	33	81
3:00 PM	0	1	0	1	1	0	0	1	2	0	3	0	3	1	6	0	7	10	12	59
3:15 PM	0	0	0	0	0	1	0	1	1	0	12	0	12	0	8	0	8	20	21	61
3:30 PM	0	0	0	0	0	0	0	0	0	0	9	0	9	0	6	0	6	15	15	63
3:45 PM	0	0	0	0	0	1	0	1	1	1	3	0	4	1	4	1	6	10	11	59

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	1	1	1	0	4	1	5	0	6	2	8	13	14	62
4:15 PM	0	0	1	1	1	0	1	2	3	0	7	1	8	1	9	2	12	20	23	53
4:30 PM	0	0	1	1	2	0	1	3	4	0	4	0	4	0	2	1	3	7	11	41
4:45 PM	1	0	0	1	0	0	0	0	1	1	7	0	8	0	4	1	5	13	14	40
5:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5	33
5:15 PM	0	0	0	0	0	0	0	0	0	1	4	0	5	0	5	1	6	11	11	35
5:30 PM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	6	0	6	10	10	30
5:45 PM	1	0	0	1	0	0	1	1	2	0	4	0	4	0	1	0	1	5	7	23
6:00 PM	1	0	0	1	0	0	0	0	1	0	5	0	5	0	1	0	1	6	7	19
6:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	2	3	0	5	6	6	19
6:30 PM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	2	0	2	2	3	16
6:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	18
7:00 PM	0	0	1	1	0	0	0	0	1	0	4	0	4	0	2	0	2	6	7	18
7:15 PM	1	0	0	1	0	0	0	0	1	0	0	0	0	0	2	0	2	2	3	11
7:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5	10
7:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	2	3	3	7
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
8:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	7
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	6
8:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
9:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	2	2	5
9:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	4
9:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	4
9:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	3
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3
10:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	
TOTAL	**22**	**6**	**11**	**39**	**20**	**11**	**36**	**67**	**106**	**6**	**492**	**22**	**520**	**39**	**480**	**24**	**543**	**1063**	**1169**	

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Morning Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
7:00 AM	2	0	0	2	3	1	3	7	9	0	40	1	41	5	54	1	60	101	110

Evening Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
4:30 PM	1	0	1	2	2	0	1	3	5	2	18	0	20	0	13	3	16	36	41

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Peds + Bikes in Crosswalks (1-hour intervals)

	Sands Road						US Route 14						
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road						**US Route 14**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Peds + Bikes in Crosswalks

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road						US Route 14							
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road						**US Route 14**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road						US Route 14							
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Totals for Traffic Peak Hour

A.M. Peak	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
P.M. Peak													
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	1	1	2	1	0	1	2	4	1	15	0	16	0	8	0	8	24	28	110
12:15 AM	1	0	2	3	0	0	0	0	3	0	15	0	15	0	11	1	12	27	30	97
12:30 AM	0	0	0	0	1	0	1	2	2	0	13	0	13	0	8	4	12	25	27	83
12:45 AM	0	0	0	0	2	0	0	2	2	0	14	0	14	0	9	0	9	23	25	69
1:00 AM	0	0	0	0	0	0	0	0	0	0	10	0	10	0	5	0	5	15	15	54
1:15 AM	0	0	0	0	0	0	0	0	0	0	9	0	9	0	7	0	7	16	16	49
1:30 AM	0	0	0	0	0	0	0	0	0	1	8	0	9	0	4	0	4	13	13	40
1:45 AM	0	0	0	0	0	0	0	0	0	0	3	1	4	1	5	0	6	10	10	46
2:00 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	0	4	0	4	10	10	54
2:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	4	7	7	64
2:30 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	0	13	0	13	19	19	70
2:45 AM	0	0	0	0	1	2	0	3	3	0	3	0	3	2	10	0	12	15	18	63
3:00 AM	0	0	1	1	1	0	0	1	2	0	2	0	2	0	16	0	16	18	20	62
3:15 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	8	0	8	13	13	69
3:30 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	1	6	0	7	12	12	84
3:45 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	1	11	0	12	17	17	129
4:00 AM	0	0	0	0	1	0	0	1	1	0	12	0	12	1	13	0	14	26	27	184
4:15 AM	0	0	0	0	0	0	0	0	0	0	9	0	9	0	19	0	19	28	28	227
4:30 AM	0	0	0	0	0	0	0	0	0	0	15	0	15	2	40	0	42	57	57	328
4:45 AM	1	0	0	1	0	0	1	1	2	0	19	0	19	5	46	0	51	70	72	418
5:00 AM	0	0	1	1	0	0	4	4	5	0	21	1	22	0	43	0	43	65	70	527
5:15 AM	3	2	1	6	0	0	2	2	8	0	37	2	39	1	81	0	82	121	129	645
5:30 AM	2	2	0	4	1	1	0	2	6	0	34	2	36	4	98	3	105	141	147	767
5:45 AM	2	2	0	4	2	0	1	3	7	1	41	1	43	12	117	2	131	174	181	941
6:00 AM	1	1	1	3	3	0	4	7	10	0	52	3	55	10	112	1	123	178	188	1148
6:15 AM	5	3	3	11	4	2	5	11	22	1	49	2	52	8	167	2	177	229	251	1341
6:30 AM	5	4	3	12	5	6	8	19	31	0	93	3	96	8	179	7	194	290	321	1498
6:45 AM	4	3	4	11	4	4	7	15	26	0	130	2	132	12	202	16	230	362	388	1635
7:00 AM	10	3	7	20	4	7	6	17	37	0	123	5	128	13	185	18	216	344	381	1700
7:15 AM	9	11	4	24	3	5	8	16	40	2	123	2	127	15	210	16	241	368	408	1704
7:30 AM	8	6	4	18	2	4	15	21	39	3	167	4	174	12	216	17	245	419	458	1718
7:45 AM	3	10	7	20	5	5	12	22	42	6	164	4	174	16	209	12	237	411	453	1638

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	7	6	6	19	3	4	15	22	41	2	145	9	156	6	173	9	188	344	385	1638
8:15 AM	12	5	12	29	6	5	16	27	56	3	185	7	195	10	155	6	171	366	422	1599
8:30 AM	10	8	3	21	10	2	15	27	48	0	176	4	180	11	133	6	150	330	378	1536
8:45 AM	3	15	7	25	9	6	19	34	59	5	185	13	203	20	161	10	191	394	453	1581
9:00 AM	11	14	3	28	10	7	14	31	59	1	124	9	134	22	122	9	153	287	346	1548
9:15 AM	8	11	5	24	9	7	21	37	61	2	129	12	143	13	130	12	155	298	359	1606
9:30 AM	6	6	5	17	11	5	22	38	55	3	181	8	192	18	150	8	176	368	423	1662
9:45 AM	7	10	4	21	12	5	24	41	62	3	173	13	189	20	141	8	169	358	420	1643
10:00 AM	3	8	7	18	10	3	34	47	65	3	161	8	172	25	132	10	167	339	404	1700
10:15 AM	5	7	2	14	14	8	34	56	70	2	152	12	166	24	141	14	179	345	415	1756
10:30 AM	9	10	4	23	6	12	26	44	67	4	150	12	166	35	131	5	171	337	404	1771
10:45 AM	4	5	5	14	23	7	32	62	76	1	197	20	218	28	133	22	183	401	477	1885
11:00 AM	1	11	5	17	18	15	33	66	83	4	171	13	188	34	146	9	189	377	460	1867
11:15 AM	8	10	5	23	13	11	35	59	82	0	152	17	169	31	141	7	179	348	430	1907
11:30 AM	7	11	4	22	13	8	37	58	80	3	208	16	227	42	155	14	211	438	518	1980
11:45 AM	9	8	6	23	14	10	39	63	86	1	159	18	178	24	154	17	195	373	459	1992
12:00 PM	9	14	4	27	20	11	33	64	91	3	179	16	198	31	165	15	211	409	500	2020
12:15 PM	9	10	3	22	17	8	39	64	86	7	171	15	193	27	169	28	224	417	503	1996
12:30 PM	11	7	4	22	18	10	36	64	86	2	204	15	221	30	174	19	223	444	530	1952
12:45 PM	5	7	1	13	18	8	26	52	65	3	188	18	209	33	165	15	213	422	487	1944
1:00 PM	9	6	7	22	14	8	32	54	76	2	173	17	192	38	150	20	208	400	476	1958
1:15 PM	6	10	3	19	18	10	25	53	72	2	166	18	186	36	142	23	201	387	459	1982
1:30 PM	6	6	5	17	19	14	36	69	86	3	193	13	209	30	172	25	227	436	522	2039
1:45 PM	5	7	7	19	12	15	49	76	95	6	162	12	180	35	178	13	226	406	501	2084
2:00 PM	6	8	5	19	12	10	46	68	87	4	180	13	197	30	169	17	216	413	500	2111
2:15 PM	4	5	7	16	14	10	35	59	75	2	209	9	220	35	163	23	221	441	516	2183
2:30 PM	6	7	2	15	15	11	45	71	86	3	210	11	224	43	193	21	257	481	567	2226
2:45 PM	6	11	8	25	17	12	41	70	95	5	215	10	230	29	148	26	203	433	528	2268
3:00 PM	16	7	1	24	10	13	40	63	87	2	232	10	244	33	184	24	241	485	572	2323
3:15 PM	3	6	5	14	15	6	30	51	65	7	250	15	272	26	168	28	222	494	559	2344
3:30 PM	13	14	11	38	19	12	30	61	99	0	266	10	276	32	176	26	234	510	609	2401
3:45 PM	11	13	3	27	6	8	19	33	60	4	271	8	283	26	187	27	240	523	583	2398

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	6	10	5	21	15	11	33	59	80	2	239	15	256	33	202	22	257	513	593	2475
4:15 PM	9	9	5	23	10	5	48	63	86	2	288	12	302	24	185	19	228	530	616	2527
4:30 PM	10	11	2	23	11	15	32	58	81	3	263	9	275	26	202	22	250	525	606	2592
4:45 PM	12	6	12	30	10	19	37	66	96	1	315	16	332	29	180	23	232	564	660	2590
5:00 PM	14	4	5	23	15	14	38	67	90	3	286	15	304	28	191	32	251	555	645	2553
5:15 PM	9	13	13	35	14	10	32	56	91	5	306	7	318	34	208	30	272	590	681	2446
5:30 PM	12	8	4	24	22	18	31	71	95	4	272	12	288	20	173	28	221	509	604	2275
5:45 PM	16	4	12	32	20	17	30	67	99	3	283	10	296	20	180	28	228	524	623	2170
6:00 PM	5	5	1	11	9	10	17	36	47	6	271	10	287	17	164	23	204	491	538	2026
6:15 PM	8	7	4	19	7	10	21	38	57	3	203	12	218	25	178	32	235	453	510	1883
6:30 PM	13	10	2	25	11	12	27	50	75	3	200	10	213	12	170	29	211	424	499	1755
6:45 PM	6	11	2	19	12	4	19	35	54	4	225	12	241	16	142	26	184	425	479	1623
7:00 PM	6	8	2	16	7	5	20	32	48	3	166	2	171	23	133	20	176	347	395	1482
7:15 PM	5	2	3	10	4	8	17	29	39	3	136	12	151	21	151	20	192	343	382	1389
7:30 PM	5	6	1	12	8	6	14	28	40	4	141	11	156	15	126	30	171	327	367	1282
7:45 PM	7	6	1	14	8	7	17	32	46	1	125	3	129	28	114	21	163	292	338	1162
8:00 PM	5	2	0	7	6	5	19	30	37	3	107	3	113	19	105	28	152	265	302	1012
8:15 PM	3	6	1	10	5	2	14	21	31	0	104	3	107	8	113	16	137	244	275	913
8:30 PM	1	1	2	4	7	5	14	26	30	3	86	2	91	13	98	15	126	217	247	797
8:45 PM	0	2	3	5	2	5	7	14	19	1	71	0	72	7	76	14	97	169	188	686
9:00 PM	1	1	2	4	3	4	11	18	22	2	70	3	75	7	89	10	106	181	203	598
9:15 PM	0	4	0	4	4	1	5	10	14	0	63	1	64	6	70	5	81	145	159	507
9:30 PM	0	0	0	0	3	2	9	14	14	1	48	1	50	4	63	5	72	122	136	447
9:45 PM	1	2	0	3	3	2	3	8	11	0	38	1	39	3	40	7	50	89	100	384
10:00 PM	0	0	1	1	1	1	14	16	17	1	40	2	43	4	46	2	52	95	112	347
10:15 PM	2	0	0	2	0	0	1	1	3	0	49	0	49	3	42	2	47	96	99	271
10:30 PM	1	1	0	2	0	3	1	4	6	0	29	1	30	6	29	2	37	67	73	213
10:45 PM	0	0	2	2	0	1	0	1	3	0	34	2	36	1	22	1	24	60	63	185
11:00 PM	0	0	0	0	0	2	0	2	2	0	24	1	25	1	6	2	9	34	36	162
11:15 PM	0	0	0	0	0	0	1	1	1	0	22	0	22	2	16	0	18	40	41	
11:30 PM	0	0	0	0	1	1	1	3	3	1	24	0	25	1	15	1	17	42	45	
11:45 PM	0	0	0	0	0	0	2	2	2	0	26	0	26	1	11	0	12	38	40	
TOTAL	**446**	**470**	**283**	**1199**	**683**	**522**	**1588**	**2793**	**3992**	**169**	**11682**	**621**	**12472**	**1458**	**10607**	**1130**	**13195**	**25667**	**29659**	

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
1:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	3
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	1
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:30 AM	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	1	2	5
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	5
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	14
5:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	22
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
6:00 AM	0	0	0	0	0	0	1	1	1	0	2	0	2	1	7	0	8	10	11	55
6:15 AM	0	0	0	0	1	0	0	1	1	0	2	0	2	0	6	0	6	8	9	68
6:30 AM	0	0	0	0	0	0	1	1	1	0	4	0	4	0	12	0	12	16	17	77
6:45 AM	0	0	0	0	0	0	0	0	0	0	9	0	9	0	9	0	9	18	18	79
7:00 AM	0	0	0	0	0	0	2	2	2	0	7	0	7	2	13	0	15	22	24	74
7:15 AM	0	0	0	0	1	0	0	1	1	0	5	1	6	2	8	1	11	17	18	61
7:30 AM	1	0	0	1	1	0	1	2	3	0	9	0	9	0	7	0	7	16	19	55
7:45 AM	0	0	0	0	1	1	0	2	2	0	2	0	2	1	8	0	9	11	13	50

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	2	0	0	2	0	0	0	0	2	0	3	0	3	2	4	0	6	9	11	52
8:15 AM	2	0	0	2	0	0	1	1	3	0	7	0	7	0	2	0	2	9	12	58
8:30 AM	0	0	0	0	0	1	2	3	3	0	3	1	4	1	6	0	7	11	14	72
8:45 AM	0	0	1	1	0	0	0	0	1	0	3	0	3	2	9	0	11	14	15	82
9:00 AM	0	1	0	1	0	0	0	0	1	0	7	1	8	1	7	0	8	16	17	77
9:15 AM	0	0	0	0	0	0	1	1	1	0	18	1	19	0	6	0	6	25	26	78
9:30 AM	0	0	0	0	0	1	1	2	2	0	13	1	14	0	8	0	8	22	24	68
9:45 AM	0	0	0	0	1	0	0	1	1	0	2	0	2	2	5	0	7	9	10	63
10:00 AM	0	1	0	1	0	1	0	1	2	0	9	0	9	1	6	0	7	16	18	67
10:15 AM	0	0	0	0	0	0	2	2	2	0	6	1	7	0	7	0	7	14	16	63
10:30 AM	0	0	0	0	1	0	0	1	1	0	9	0	9	0	8	1	9	18	19	59
10:45 AM	1	1	1	3	0	0	0	0	3	0	5	0	5	1	5	0	6	11	14	49
11:00 AM	0	0	0	0	0	0	0	0	0	0	8	2	10	0	3	1	4	14	14	56
11:15 AM	0	0	1	1	0	0	0	0	1	0	4	0	4	0	6	1	7	11	12	53
11:30 AM	0	0	0	0	1	0	0	1	1	0	4	0	4	0	4	0	4	8	9	59
11:45 AM	0	0	1	1	0	0	1	1	2	0	6	0	6	0	13	0	13	19	21	72
12:00 PM	0	0	0	0	1	0	0	1	1	0	7	0	7	1	2	0	3	10	11	76
12:15 PM	1	0	0	1	1	0	0	1	2	0	10	0	10	0	5	1	6	16	18	75
12:30 PM	2	0	0	2	0	1	1	2	4	0	11	1	12	0	5	1	6	18	22	74
12:45 PM	0	0	0	0	1	1	2	4	4	0	11	0	11	2	7	1	10	21	25	64
1:00 PM	0	0	0	0	0	0	0	0	0	0	3	1	4	0	6	0	6	10	10	62
1:15 PM	1	0	0	1	0	1	0	1	2	1	7	0	8	0	7	0	7	15	17	68
1:30 PM	0	0	0	0	0	0	0	0	0	0	7	0	7	2	3	0	5	12	12	62
1:45 PM	0	1	0	1	1	0	2	3	4	0	10	1	11	0	8	0	8	19	23	63
2:00 PM	0	0	1	1	0	0	0	0	1	1	8	1	10	0	4	1	5	15	16	66
2:15 PM	0	0	1	1	0	1	0	1	2	0	6	1	7	1	1	0	2	9	11	59
2:30 PM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	8	0	8	13	13	62
2:45 PM	1	0	1	2	3	0	0	3	5	0	11	0	11	1	9	0	10	21	26	58
3:00 PM	0	1	0	1	1	0	0	1	2	0	2	0	2	0	5	0	5	7	9	39
3:15 PM	0	0	0	0	0	1	0	1	1	0	9	0	9	0	4	0	4	13	14	39
3:30 PM	0	0	0	0	0	0	0	0	0	0	7	0	7	0	2	0	2	9	9	39
3:45 PM	0	0	0	0	0	1	0	1	1	1	1	0	2	1	3	0	4	6	7	36

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	1	1	1	0	3	1	4	0	3	1	4	8	9	38
4:15 PM	0	0	1	1	1	0	0	1	2	0	6	1	7	0	3	2	5	12	14	33
4:30 PM	0	0	1	1	1	0	0	1	2	0	3	0	3	0	0	1	1	4	6	25
4:45 PM	0	0	0	0	0	0	0	0	0	1	6	0	7	0	2	0	2	9	9	26
5:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4	23
5:15 PM	0	0	0	0	0	0	0	0	0	1	1	0	2	0	3	1	4	6	6	22
5:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7	7	21
5:45 PM	1	0	0	1	0	0	1	1	2	0	3	0	3	0	1	0	1	4	6	16
6:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3	3	12
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	5	5	5	13
6:30 PM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	2	11
6:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	14
7:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4	15
7:15 PM	1	0	0	1	0	0	0	0	1	0	0	0	0	0	2	0	2	2	3	11
7:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5	10
7:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	2	3	3	7
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
8:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	7
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	6
8:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
9:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	2	2	5
9:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
9:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	3
9:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**13**	**5**	**9**	**27**	**17**	**11**	**22**	**50**	**77**	**6**	**305**	**16**	**327**	**27**	**292**	**13**	**332**	**659**	**736**	

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Multi-Unit Trucks

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	3
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
2:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	4
2:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
2:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	4
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	8
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
3:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	7
3:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5	11
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	9
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
4:30 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	1	0	1	5	5	10
4:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3	3	11
5:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	10
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	16
5:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	4	0	4	6	6	25
5:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	28
6:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7	7	30
6:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	8	0	8	10	10	33
6:30 AM	1	0	0	1	0	0	0	0	1	0	5	0	5	0	3	0	3	8	9	31
6:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4	31
7:00 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	6	0	6	10	10	36
7:15 AM	1	0	0	1	0	0	0	0	1	0	5	0	5	0	2	0	2	7	8	33
7:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	6	0	6	9	9	32
7:45 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	4	0	4	9	9	29

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Multi-Unit Trucks

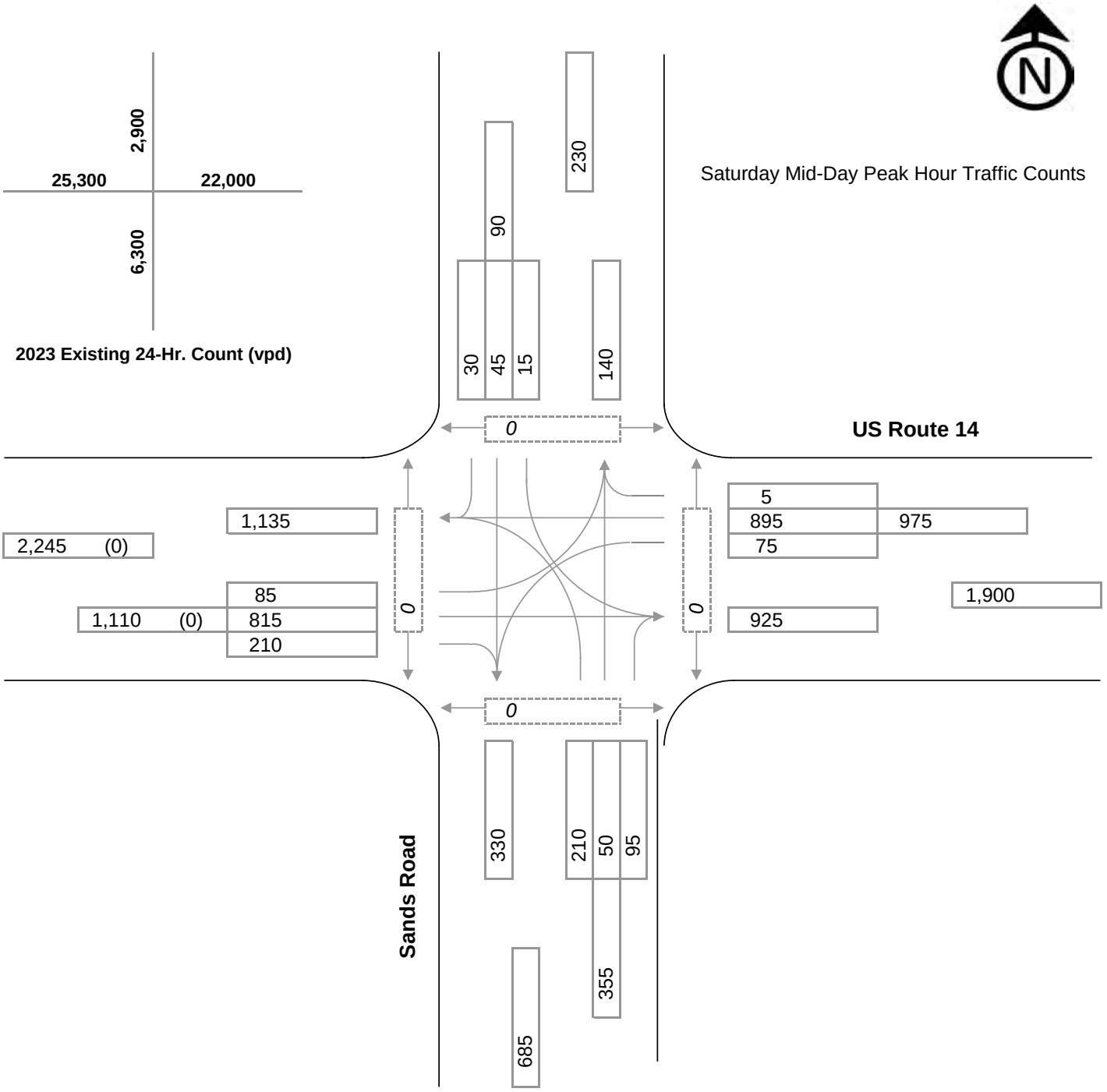
Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7	7	33
8:15 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	2	0	2	7	7	32
8:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	5	0	5	6	6	36
8:45 AM	0	0	0	0	0	0	0	0	0	0	7	1	8	0	4	1	5	13	13	45
9:00 AM	0	0	0	0	0	0	1	1	1	0	3	0	3	0	2	0	2	5	6	42
9:15 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	4	2	6	11	11	47
9:30 AM	1	0	0	1	0	0	0	0	1	0	5	1	6	2	6	0	8	14	15	50
9:45 AM	0	0	0	0	0	0	2	2	2	0	4	1	5	0	3	0	3	8	10	45
10:00 AM	0	0	0	0	0	0	1	1	1	0	5	0	5	1	4	0	5	10	11	51
10:15 AM	0	0	0	0	0	0	0	0	0	0	5	1	6	0	7	1	8	14	14	52
10:30 AM	0	0	0	0	1	0	0	1	1	0	6	0	6	1	2	0	3	9	10	48
10:45 AM	1	0	0	1	0	0	2	2	3	0	6	0	6	0	7	0	7	13	16	45
11:00 AM	0	0	0	0	0	0	0	0	0	0	7	0	7	1	4	0	5	12	12	44
11:15 AM	0	0	0	0	0	0	1	1	1	0	5	0	5	0	3	1	4	9	10	46
11:30 AM	0	0	1	1	0	0	0	0	1	0	1	0	1	0	4	1	5	6	7	46
11:45 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	1	8	0	9	15	15	48
12:00 PM	1	0	0	1	1	0	0	1	2	0	7	0	7	1	4	0	5	12	14	42
12:15 PM	1	0	0	1	0	0	1	1	2	0	5	0	5	2	1	0	3	8	10	35
12:30 PM	0	0	0	0	0	0	1	1	1	0	4	0	4	1	3	0	4	8	9	41
12:45 PM	0	0	0	0	0	0	2	2	2	0	2	0	2	0	5	0	5	7	9	37
1:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	1	4	7	7	33
1:15 PM	0	0	0	0	0	0	1	1	1	0	9	1	10	0	5	0	5	15	16	31
1:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5	23
1:45 PM	1	0	0	1	0	0	0	0	1	0	0	1	1	0	3	0	3	4	5	19
2:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5	21
2:15 PM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4	0	4	8	8	19
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	18
2:45 PM	0	1	0	1	0	0	0	0	1	0	2	0	2	0	4	0	4	6	7	23
3:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	2	3	3	20
3:15 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	4	7	7	22
3:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	4	0	4	6	6	24
3:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	1	2	4	4	23

Project	Crystal Lake Engineering Services					**Multi-Unit Trucks**			Subtitle or Limits:					Client:	Village of Crystal Lake		
Count Date	9/7/2023													Project #:	3045 - 01.09		

	Sands Road									**US Route 14**										
	North Approach				**South Approach**				Both	**East Approach**				**West Approach**				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	1	4	5	5	24
4:15 PM	0	0	0	0	0	0	1	1	1	0	1	0	1	1	6	0	7	8	9	20
4:30 PM	0	0	0	0	1	0	1	2	2	0	1	0	1	0	2	0	2	3	5	16
4:45 PM	1	0	0	1	0	0	0	0	1	0	1	0	1	0	2	1	3	4	5	14
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	10
5:15 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5	13
5:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	9
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	7
6:00 PM	1	0	0	1	0	0	0	0	1	0	2	0	2	0	1	0	1	3	4	7
6:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	6
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	5
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	4
7:00 PM	0	0	1	1	0	0	0	0	1	0	1	0	1	0	1	0	1	2	3	3
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	
TOTAL	**9**	**1**	**2**	**12**	**3**	**0**	**14**	**17**	**29**	**0**	**187**	**6**	**193**	**12**	**188**	**11**	**211**	**404**	**433**	



Vehicle Traffic Peak Hours:

11:45 A.M. to 12:45 P.M.

Count Date(s):

Saturday, September 9, 2023

Prepared: 10/13/2023

Village of Crystal Lake

Crystal Lake Engineering Services

2023 Existing Peak Hour Traffic

US Route 14 & Sands Road

CIVILTECH

File: 02_US Route 14-Sands Count Data Reduction and Peak Hour Diagram 09-09-23.xlsx

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (1-hour intervals)

	Sands Road									US Route 14									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	1	0	0	1	0	1	2	3	4	2	77	3	82	1	54	3	58	140	144
1:00 AM	2	0	1	3	1	0	3	4	7	1	45	1	47	1	30	4	35	82	89
2:00 AM	0	1	1	2	0	0	1	1	3	0	38	0	38	1	31	2	34	72	75
3:00 AM	0	0	1	1	2	3	2	7	8	0	28	0	28	2	28	2	32	60	68
4:00 AM	0	0	2	2	0	0	1	1	3	1	37	2	40	5	50	1	56	96	99
5:00 AM	3	4	2	9	0	0	1	1	10	0	58	2	60	9	90	2	101	161	171
6:00 AM	6	10	4	20	4	2	14	20	40	1	162	6	169	13	173	3	189	358	398
7:00 AM	20	10	6	36	20	10	26	56	92	7	364	21	392	42	306	28	376	768	860
8:00 AM	14	24	15	53	32	13	71	116	169	11	569	35	615	56	417	32	505	1120	1289
9:00 AM	40	41	20	101	54	19	114	187	288	6	696	58	760	125	480	47	652	1412	1700
10:00 AM	31	49	26	106	54	47	159	260	366	14	885	68	967	149	625	88	862	1829	2195
11:00 AM	31	48	15	94	67	39	177	283	377	7	854	62	923	207	798	90	1095	2018	2395
12:00 PM	30	35	17	82	93	48	209	350	432	7	885	81	973	204	787	89	1080	2053	2485
1:00 PM	28	39	22	89	85	47	202	334	423	10	875	58	943	183	723	84	990	1933	2356
2:00 PM	36	50	21	107	81	76	202	359	466	15	796	62	873	163	705	95	963	1836	2302
3:00 PM	28	37	19	84	74	60	179	313	397	11	739	48	798	162	727	77	966	1764	2161
4:00 PM	25	41	23	89	80	45	170	295	384	8	722	42	772	135	680	95	910	1682	2066
5:00 PM	19	36	14	69	46	44	148	238	307	18	672	43	733	109	681	71	861	1594	1901
6:00 PM	23	25	11	59	40	26	109	175	234	8	618	41	667	103	566	85	754	1421	1655
7:00 PM	17	19	10	46	31	23	98	152	198	5	525	40	570	66	496	62	624	1194	1392
8:00 PM	10	11	2	23	25	12	43	80	103	4	344	11	359	30	378	57	465	824	927
9:00 PM	8	3	3	14	6	6	27	39	53	4	242	8	254	21	383	36	440	694	747
10:00 PM	0	5	4	9	2	3	12	17	26	4	179	2	185	8	212	18	238	423	449
11:00 PM	4	1	4	9	0	3	3	6	15	0	140	2	142	6	125	20	151	293	308
TOTAL	**376**	**489**	**243**	**1108**	**797**	**527**	**1973**	**3297**	**4405**	**144**	**10550**	**696**	**11390**	**1801**	**9545**	**1091**	**12437**	**23827**	**28232**

24-Hour Vehicle Traffic Count

North Leg	2,900
South Leg	6,300
East Leg	22,000
West Leg	25,300

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	2	2	2	0	21	1	22	0	16	2	18	40	42	144
12:15 AM	0	0	0	0	0	1	0	1	1	1	17	0	18	1	14	0	15	33	34	128
12:30 AM	0	0	0	0	0	0	0	0	0	1	23	1	25	0	12	1	13	38	38	115
12:45 AM	1	0	0	1	0	0	0	0	1	0	16	1	17	0	12	0	12	29	30	97
1:00 AM	0	0	1	1	1	0	0	1	2	0	15	0	15	0	8	1	9	24	26	89
1:15 AM	0	0	0	0	0	0	0	0	0	0	7	0	7	0	11	3	14	21	21	86
1:30 AM	0	0	0	0	0	0	1	1	1	1	9	0	10	1	8	0	9	19	20	80
1:45 AM	2	0	0	2	0	0	2	2	4	0	14	1	15	0	3	0	3	18	22	77
2:00 AM	0	0	0	0	0	0	0	0	0	0	15	0	15	0	8	0	8	23	23	75
2:15 AM	0	0	1	1	0	0	0	0	1	0	9	0	9	1	4	0	5	14	15	65
2:30 AM	0	1	0	1	0	0	0	0	1	0	7	0	7	0	9	0	9	16	17	63
2:45 AM	0	0	0	0	0	0	1	1	1	0	7	0	7	0	10	2	12	19	20	64
3:00 AM	0	0	0	0	1	2	0	3	3	0	5	0	5	0	5	0	5	10	13	68
3:15 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	0	6	1	7	13	13	77
3:30 AM	0	0	0	0	0	0	0	0	0	0	8	0	8	1	9	0	10	18	18	84
3:45 AM	0	0	1	1	1	1	2	4	5	0	9	0	9	1	8	1	10	19	24	91
4:00 AM	0	0	1	1	0	0	0	0	1	0	5	0	5	2	14	0	16	21	22	99
4:15 AM	0	0	1	1	0	0	0	0	1	0	9	0	9	1	9	0	10	19	20	101
4:30 AM	0	0	0	0	0	0	1	1	1	0	11	0	11	0	12	1	13	24	25	125
4:45 AM	0	0	0	0	0	0	0	0	0	1	12	2	15	2	15	0	17	32	32	146
5:00 AM	0	0	1	1	0	0	0	0	1	0	9	1	10	0	13	0	13	23	24	171
5:15 AM	1	1	1	3	0	0	0	0	3	0	19	1	20	1	19	1	21	41	44	204
5:30 AM	1	1	0	2	0	0	0	0	2	0	11	0	11	1	32	0	33	44	46	261
5:45 AM	1	2	0	3	0	0	1	1	4	0	19	0	19	7	26	1	34	53	57	331
6:00 AM	2	2	0	4	1	0	2	3	7	0	22	1	23	3	24	0	27	50	57	398
6:15 AM	2	3	0	5	0	1	3	4	9	1	44	0	45	4	43	0	47	92	101	508
6:30 AM	1	5	0	6	0	1	3	4	10	0	44	4	48	1	55	2	58	106	116	584
6:45 AM	1	0	4	5	3	0	6	9	14	0	52	1	53	5	51	1	57	110	124	727
7:00 AM	2	2	2	6	3	4	5	12	18	0	66	8	74	4	62	9	75	149	167	860
7:15 AM	3	3	1	7	3	2	2	7	14	2	74	4	80	10	69	4	83	163	177	968
7:30 AM	8	3	0	11	6	3	9	18	29	3	116	5	124	12	86	8	106	230	259	1089
7:45 AM	7	2	3	12	8	1	10	19	31	2	108	4	114	16	89	7	112	226	257	1173

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	2	2	5	9	4	4	17	25	34	1	128	10	139	8	92	2	102	241	275	1289
8:15 AM	2	2	5	9	2	3	11	16	25	3	147	5	155	17	94	7	118	273	298	1390
8:30 AM	6	6	1	13	12	3	23	38	51	3	149	6	158	14	107	13	134	292	343	1506
8:45 AM	4	14	4	22	14	3	20	37	59	4	145	14	163	17	124	10	151	314	373	1623
9:00 AM	10	12	3	25	12	2	20	34	59	1	166	11	178	22	109	8	139	317	376	1700
9:15 AM	10	10	6	26	8	5	26	39	65	1	173	17	191	32	117	9	158	349	414	1850
9:30 AM	12	11	1	24	22	9	32	63	87	2	178	19	199	36	124	14	174	373	460	1979
9:45 AM	8	8	10	26	12	3	36	51	77	2	179	11	192	35	130	16	181	373	450	2108
10:00 AM	11	9	8	28	10	11	36	57	85	3	222	11	236	35	150	20	205	441	526	2195
10:15 AM	4	12	7	23	18	15	40	73	96	5	226	19	250	39	136	22	197	447	543	2233
10:30 AM	7	12	4	23	15	11	43	69	92	2	231	17	250	36	181	30	247	497	589	2264
10:45 AM	9	16	7	32	11	10	40	61	93	4	206	21	231	39	158	16	213	444	537	2304
11:00 AM	9	12	4	25	21	10	44	75	100	1	206	13	220	46	175	23	244	464	564	2395
11:15 AM	6	10	3	19	13	14	42	69	88	4	216	10	230	44	190	22	256	486	574	2459
11:30 AM	12	11	3	26	11	4	41	56	82	1	225	29	255	64	203	25	292	547	629	2488
11:45 AM	4	15	5	24	22	11	50	83	107	1	207	10	218	53	230	20	303	521	628	2528
12:00 PM	11	9	3	23	24	10	53	87	110	3	240	20	263	45	188	22	255	518	628	2485
12:15 PM	8	12	5	25	25	11	50	86	111	1	203	25	229	48	198	17	263	492	603	2456
12:30 PM	5	9	4	18	24	17	57	98	116	1	244	18	263	64	201	25	290	553	669	2449
12:45 PM	6	5	5	16	20	10	49	79	95	2	198	18	218	47	200	25	272	490	585	2359
1:00 PM	8	13	4	25	19	10	52	81	106	2	235	17	254	41	174	24	239	493	599	2356
1:15 PM	7	7	8	22	22	7	42	71	93	4	218	12	234	51	203	15	269	503	596	2354
1:30 PM	6	6	7	19	26	16	44	86	105	3	224	12	239	41	172	22	235	474	579	2322
1:45 PM	7	13	3	23	18	14	64	96	119	1	198	17	216	50	174	23	247	463	582	2329
2:00 PM	8	18	7	33	24	17	56	97	130	6	200	17	223	37	175	32	244	467	597	2302
2:15 PM	7	8	4	19	23	13	51	87	106	4	176	17	197	47	190	24	261	458	564	2226
2:30 PM	9	12	3	24	17	23	48	88	112	4	245	15	264	35	161	14	210	474	586	2216
2:45 PM	12	12	7	31	17	23	47	87	118	1	175	13	189	44	179	25	248	437	555	2188
3:00 PM	5	11	6	22	23	21	31	75	97	3	160	14	177	46	183	18	247	424	521	2161
3:15 PM	10	7	4	21	17	12	59	88	109	2	177	10	189	46	191	19	256	445	554	2165
3:30 PM	6	13	4	23	23	18	56	97	120	3	200	9	212	34	169	23	226	438	558	2134
3:45 PM	7	6	5	18	11	9	33	53	71	3	202	15	220	36	184	17	237	457	528	2065

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	11	9	6	26	21	10	46	77	103	4	170	4	178	32	187	25	244	422	525	2066
4:15 PM	6	7	8	21	15	15	38	68	89	1	181	17	199	32	178	25	235	434	523	2048
4:30 PM	5	10	4	19	20	9	37	66	85	2	173	12	187	35	157	25	217	404	489	1979
4:45 PM	3	15	5	23	24	11	49	84	107	1	198	9	208	36	158	20	214	422	529	1954
5:00 PM	7	15	5	27	12	18	34	64	91	2	173	10	185	32	184	15	231	416	507	1901
5:15 PM	4	7	4	15	14	10	39	63	78	2	155	12	169	28	157	22	207	376	454	1842
5:30 PM	2	9	3	14	14	4	42	60	74	5	182	12	199	23	150	18	191	390	464	1835
5:45 PM	6	5	2	13	6	12	33	51	64	9	162	9	180	26	190	16	232	412	476	1778
6:00 PM	5	11	3	19	8	4	34	46	65	3	175	12	190	21	147	25	193	383	448	1655
6:15 PM	10	3	4	17	10	10	28	48	65	1	164	12	177	30	152	23	205	382	447	1561
6:30 PM	2	6	3	11	6	7	31	44	55	1	157	7	165	25	144	18	187	352	407	1456
6:45 PM	6	5	1	12	16	5	16	37	49	3	122	10	135	27	123	19	169	304	353	1423
7:00 PM	3	9	3	15	7	5	32	44	59	1	136	14	151	16	115	13	144	295	354	1392
7:15 PM	6	1	2	9	11	9	24	44	53	3	130	9	142	19	115	13	147	289	342	1294
7:30 PM	3	4	4	11	10	5	19	34	45	1	157	7	165	13	133	18	164	329	374	1200
7:45 PM	5	5	1	11	3	4	23	30	41	0	102	10	112	18	133	18	169	281	322	1059
8:00 PM	2	4	0	6	6	4	12	22	28	1	98	4	103	12	100	13	125	228	256	927
8:15 PM	4	4	2	10	8	3	11	22	32	0	87	1	88	5	107	16	128	216	248	887
8:30 PM	1	2	0	3	7	3	12	22	25	1	91	3	95	8	86	19	113	208	233	824
8:45 PM	3	1	0	4	4	2	8	14	18	2	68	3	73	5	85	9	99	172	190	769
9:00 PM	2	0	1	3	3	3	9	15	18	2	65	2	69	4	109	16	129	198	216	747
9:15 PM	1	1	2	4	2	2	11	15	19	0	61	2	63	5	92	6	103	166	185	674
9:30 PM	2	1	0	3	1	0	3	4	7	0	61	1	62	6	96	7	109	171	178	627
9:45 PM	3	1	0	4	0	1	4	5	9	2	55	3	60	6	86	7	99	159	168	538
10:00 PM	0	0	0	0	1	1	4	6	6	0	54	1	55	3	72	7	82	137	143	449
10:15 PM	0	0	2	2	0	1	4	5	7	1	62	0	63	1	66	1	68	131	138	400
10:30 PM	0	2	1	3	0	1	2	3	6	1	30	1	32	3	40	8	51	83	89	339
10:45 PM	0	3	1	4	1	0	2	3	7	2	33	0	35	1	34	2	37	72	79	319
11:00 PM	2	0	2	4	0	0	1	1	5	0	42	0	42	1	40	6	47	89	94	308
11:15 PM	0	1	0	1	0	0	0	0	1	0	38	1	39	0	36	1	37	76	77	
11:30 PM	1	0	0	1	0	3	1	4	5	0	27	1	28	1	25	10	36	64	69	
11:45 PM	1	0	2	3	0	0	1	1	4	0	33	0	33	4	24	3	31	64	68	
TOTAL	**376**	**489**	**243**	**1108**	**797**	**527**	**1973**	**3297**	**4405**	**144**	**10550**	**696**	**11390**	**1801**	**9545**	**1091**	**12437**	**23827**	**28232**	

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Mid-Day Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
11:45 AM	28	45	17	90	95	49	210	354	444	6	894	73	973	210	817	84	1111	2084	2528
Percent Trucks	3.6%	0.0%	0.0%	1.1%	0.0%	2.0%	0.5%	0.6%	0.7%	0.0%	2.3%	0.0%	2.2%	0.0%	1.8%	0.0%	1.4%	1.7%	1.5%

Intersection Peak Hour Factor = 0.94

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (1-hour intervals)

	Sands Road									US Route 14									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
1:00 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	3	2	5	10	10
2:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2
3:00 AM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	1	1	2	7	7
4:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	1	2	0	3	5	5
5:00 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	3	0	3	7	7
6:00 AM	0	0	0	0	0	0	1	1	1	0	11	0	11	1	9	0	10	21	22
7:00 AM	1	0	0	1	1	1	0	2	3	0	7	1	8	1	10	5	16	24	27
8:00 AM	0	0	1	1	0	0	1	1	2	0	10	1	11	1	11	1	13	24	26
9:00 AM	0	0	1	1	0	0	0	0	1	0	15	0	15	2	12	0	14	29	30
10:00 AM	1	2	0	3	1	1	1	3	6	1	7	0	8	1	10	2	13	21	27
11:00 AM	2	0	0	2	0	1	0	1	3	0	8	0	8	0	11	2	13	21	24
12:00 PM	2	0	0	2	0	0	1	1	3	0	25	0	25	0	14	0	14	39	42
1:00 PM	0	0	0	0	0	0	1	1	1	0	5	0	5	1	9	2	12	17	18
2:00 PM	0	0	0	0	0	0	2	2	2	0	7	1	8	0	3	0	3	11	13
3:00 PM	0	0	0	0	1	0	0	1	1	0	13	0	13	1	6	0	7	20	21
4:00 PM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	6	0	6	11	11
5:00 PM	0	1	0	1	0	0	0	0	1	0	2	0	2	0	3	0	3	5	6
6:00 PM	3	1	0	4	0	0	0	0	4	0	2	0	2	0	8	1	9	11	15
7:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5
8:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	1	4	5	5
9:00 PM	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	1	2
10:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	3	3
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**9**	**4**	**2**	**15**	**3**	**3**	**8**	**14**	**29**	**1**	**138**	**3**	**142**	**9**	**131**	**18**	**158**	**300**	**329**

24-Hour Truck Traffic Count

North Leg	-
South Leg	-
East Leg	300
West Leg	300

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
1:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	10
1:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	2	4	5	5	9
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	4
1:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3	3	4
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
2:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	7
3:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	7
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	7
3:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	8
3:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	5
4:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	2	2	4
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
4:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	7
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	7
5:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3	3	9
5:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	15
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	16
6:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	22
6:15 AM	0	0	0	0	0	0	1	1	1	0	6	0	6	0	2	0	2	8	9	29
6:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	28
6:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	1	3	0	4	7	7	29
7:00 AM	0	0	0	0	0	1	0	1	1	0	1	0	1	0	4	4	8	9	10	27
7:15 AM	1	0	0	1	0	0	0	0	1	0	2	0	2	1	3	1	5	7	8	20
7:30 AM	0	0	0	0	0	0	0	0	0	0	3	1	4	0	0	0	0	4	4	20
7:45 AM	0	0	0	0	1	0	0	1	1	0	1	0	1	0	3	0	3	4	5	26

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	26
8:15 AM	0	0	1	1	0	0	0	0	1	0	2	1	3	1	3	0	4	7	8	30
8:30 AM	0	0	0	0	0	0	1	1	1	0	6	0	6	0	3	0	3	9	10	31
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	5	5	5	27
9:00 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	3	0	3	7	7	30
9:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	1	5	0	6	9	9	30
9:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6	27
9:45 AM	0	0	1	1	0	0	0	0	1	0	5	0	5	1	1	0	2	7	8	26
10:00 AM	1	0	0	1	1	0	0	1	2	0	1	0	1	0	4	0	4	5	7	27
10:15 AM	0	1	0	1	0	1	1	2	3	0	1	0	1	1	0	1	2	3	6	23
10:30 AM	0	1	0	1	0	0	0	0	1	0	1	0	1	0	3	0	3	4	5	23
10:45 AM	0	0	0	0	0	0	0	0	0	1	4	0	5	0	3	1	4	9	9	26
11:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	3	3	24
11:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	4	0	4	6	6	36
11:30 AM	1	0	0	1	0	0	0	0	1	0	4	0	4	0	2	1	3	7	8	40
11:45 AM	1	0	0	1	0	1	0	1	2	0	1	0	1	0	4	0	4	5	7	39
12:00 PM	0	0	0	0	0	0	0	0	0	0	9	0	9	0	6	0	6	15	15	42
12:15 PM	0	0	0	0	0	0	1	1	1	0	8	0	8	0	1	0	1	9	10	34
12:30 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	4	7	7	26
12:45 PM	2	0	0	2	0	0	0	0	2	0	5	0	5	0	3	0	3	8	10	22
1:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	1	4	7	7	18
1:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	15
1:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	2	3	3	15
1:45 PM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	4	1	5	5	6	15
2:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4	13
2:15 PM	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	1	2	12
2:30 PM	0	0	0	0	0	0	1	1	1	0	1	0	1	0	1	0	1	2	3	14
2:45 PM	0	0	0	0	0	0	0	0	0	0	2	1	3	0	1	0	1	4	4	17
3:00 PM	0	0	0	0	1	0	0	1	1	0	1	0	1	0	1	0	1	2	3	21
3:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	1	1	0	2	4	4	22
3:30 PM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	1	0	1	6	6	19
3:45 PM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	3	0	3	8	8	16

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4	11
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	7
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3	8
4:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	6
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	11
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	14
5:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	2	0	2	2	3	15
6:00 PM	1	0	0	1	0	0	0	0	1	0	1	0	1	0	3	0	3	4	5	15
6:15 PM	1	0	0	1	0	0	0	0	1	0	1	0	1	0	3	0	3	4	5	11
6:30 PM	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	2	6
6:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	2	2	3	6
7:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	6
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	5
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	5
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	4
8:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	4
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	3
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
9:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	3
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
9:45 PM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	4
10:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	3
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**9**	**4**	**2**	**15**	**3**	**3**	**8**	**14**	**29**	**1**	**138**	**3**	**142**	**9**	**131**	**18**	**158**	**300**	**329**	

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Mid-Day Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
11:45 AM	1	0	0	1	0	1	1	2	3	0	21	0	21	0	15	0	15	36	39

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Peds + Bikes in Crosswalks (1-hour intervals)

	Sands Road						US Route 14						
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road						**US Route 14**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road						US Route 14							
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road						**US Route 14**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services | **Peds + Bikes in Crosswalks** | Subtitle or Limits: | Client: Village of Crystal Lake
Count Date: 9/9/2023 | Project #: 3045 - 01.09

	Sands Road						US Route 14							
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Totals for Traffic Peak Hour

Mid-Day Peak	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	2	2	2	0	21	1	22	0	15	2	17	39	41	143
12:15 AM	0	0	0	0	0	1	0	1	1	1	17	0	18	1	14	0	15	33	34	127
12:30 AM	0	0	0	0	0	0	0	0	0	1	23	1	25	0	12	1	13	38	38	109
12:45 AM	1	0	0	1	0	0	0	0	1	0	16	1	17	0	12	0	12	29	30	90
1:00 AM	0	0	1	1	1	0	0	1	2	0	14	0	14	0	8	1	9	23	25	79
1:15 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	0	9	1	10	16	16	77
1:30 AM	0	0	0	0	0	0	1	1	1	1	9	0	10	1	7	0	8	18	19	76
1:45 AM	2	0	0	2	0	0	2	2	4	0	11	1	12	0	3	0	3	15	19	73
2:00 AM	0	0	0	0	0	0	0	0	0	0	15	0	15	0	8	0	8	23	23	73
2:15 AM	0	0	1	1	0	0	0	0	1	0	9	0	9	1	4	0	5	14	15	61
2:30 AM	0	1	0	1	0	0	0	0	1	0	6	0	6	0	9	0	9	15	16	58
2:45 AM	0	0	0	0	0	0	1	1	1	0	7	0	7	0	9	2	11	18	19	57
3:00 AM	0	0	0	0	1	2	0	3	3	0	3	0	3	0	5	0	5	8	11	61
3:15 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	0	6	0	6	12	12	70
3:30 AM	0	0	0	0	0	0	0	0	0	0	6	0	6	1	8	0	9	15	15	76
3:45 AM	0	0	1	1	1	1	2	4	5	0	8	0	8	1	8	1	10	18	23	86
4:00 AM	0	0	1	1	0	0	0	0	1	0	5	0	5	2	12	0	14	19	20	94
4:15 AM	0	0	1	1	0	0	0	0	1	0	8	0	8	0	9	0	9	17	18	97
4:30 AM	0	0	0	0	0	0	1	1	1	0	11	0	11	0	12	1	13	24	25	120
4:45 AM	0	0	0	0	0	0	0	0	0	1	11	2	14	2	15	0	17	31	31	139
5:00 AM	0	0	1	1	0	0	0	0	1	0	9	1	10	0	12	0	12	22	23	164
5:15 AM	1	1	1	3	0	0	0	0	3	0	16	1	17	1	19	1	21	38	41	195
5:30 AM	1	1	0	2	0	0	0	0	2	0	10	0	10	1	31	0	32	42	44	246
5:45 AM	1	2	0	3	0	0	1	1	4	0	19	0	19	7	25	1	33	52	56	315
6:00 AM	2	2	0	4	1	0	2	3	7	0	21	1	22	3	22	0	25	47	54	376
6:15 AM	2	3	0	5	0	1	2	3	8	1	38	0	39	4	41	0	45	84	92	479
6:30 AM	1	5	0	6	0	1	3	4	10	0	43	4	47	1	53	2	56	103	113	556
6:45 AM	1	0	4	5	3	0	6	9	14	0	49	1	50	4	48	1	53	103	117	698
7:00 AM	2	2	2	6	3	3	5	11	17	0	65	8	73	4	58	5	67	140	157	833
7:15 AM	2	3	1	6	3	2	2	7	13	2	72	4	78	9	66	3	78	156	169	948
7:30 AM	8	3	0	11	6	3	9	18	29	3	113	4	120	12	86	8	106	226	255	1069
7:45 AM	7	2	3	12	7	1	10	18	30	2	107	4	113	16	86	7	109	222	252	1147

Project: Crystal Lake Engineering Services | **Passenger Cars** | Subtitle or Limits: | Client: Village of Crystal Lake
Count Date: 9/9/2023 | Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	2	2	5	9	4	4	17	25	34	1	126	10	137	8	91	2	101	238	272	1263
8:15 AM	2	2	4	8	2	3	11	16	24	3	145	4	152	16	91	7	114	266	290	1360
8:30 AM	6	6	1	13	12	3	22	37	50	3	143	6	152	14	104	13	131	283	333	1475
8:45 AM	4	14	4	22	14	3	20	37	59	4	145	14	163	17	120	9	146	309	368	1596
9:00 AM	10	12	3	25	12	2	20	34	59	1	162	11	174	22	106	8	136	310	369	1670
9:15 AM	10	10	6	26	8	5	26	39	65	1	170	17	188	31	112	9	152	340	405	1820
9:30 AM	12	11	1	24	22	9	32	63	87	2	175	19	196	36	121	14	171	367	454	1952
9:45 AM	8	8	9	25	12	3	36	51	76	2	174	11	187	34	129	16	179	366	442	2082
10:00 AM	10	9	8	27	9	11	36	56	83	3	221	11	235	35	146	20	201	436	519	2168
10:15 AM	4	11	7	22	18	14	39	71	93	5	225	19	249	38	136	21	195	444	537	2210
10:30 AM	7	11	4	22	15	11	43	69	91	2	230	17	249	36	178	30	244	493	584	2241
10:45 AM	9	16	7	32	11	10	40	61	93	3	202	21	226	39	155	15	209	435	528	2278
11:00 AM	9	12	4	25	21	10	44	75	100	1	205	13	219	46	174	22	242	461	561	2371
11:15 AM	6	10	3	19	13	14	42	69	88	4	214	10	228	44	186	22	252	480	568	2423
11:30 AM	11	11	3	25	11	4	41	56	81	1	221	29	251	64	201	24	289	540	621	2448
11:45 AM	3	15	5	23	22	10	50	82	105	1	206	10	217	53	226	20	299	516	621	2489
12:00 PM	11	9	3	23	24	10	53	87	110	3	231	20	254	45	182	22	249	503	613	2443
12:15 PM	8	12	5	25	25	11	49	85	110	1	195	25	221	48	197	17	262	483	593	2422
12:30 PM	5	9	4	18	24	17	57	98	116	1	241	18	260	64	197	25	286	546	662	2423
12:45 PM	4	5	5	14	20	10	49	79	93	2	193	18	213	47	197	25	269	482	575	2337
1:00 PM	8	13	4	25	19	10	52	81	106	2	232	17	251	41	171	23	235	486	592	2338
1:15 PM	7	7	8	22	22	7	42	71	93	4	217	12	233	51	202	15	268	501	594	2339
1:30 PM	6	6	7	19	26	16	44	86	105	3	223	12	238	40	171	22	233	471	576	2307
1:45 PM	7	13	3	23	18	14	63	95	118	1	198	17	216	50	170	22	242	458	576	2314
2:00 PM	8	18	7	33	24	17	56	97	130	6	197	17	220	37	174	32	243	463	593	2289
2:15 PM	7	8	4	19	23	13	50	86	105	4	175	17	196	47	190	24	261	457	562	2214
2:30 PM	9	12	3	24	17	23	47	87	111	4	244	15	263	35	160	14	209	472	583	2202
2:45 PM	12	12	7	31	17	23	47	87	118	1	173	12	186	44	178	25	247	433	551	2171
3:00 PM	5	11	6	22	22	21	31	74	96	3	159	14	176	46	182	18	246	422	518	2140
3:15 PM	10	7	4	21	17	12	59	88	109	2	175	10	187	45	190	19	254	441	550	2143
3:30 PM	6	13	4	23	23	18	56	97	120	3	195	9	207	34	168	23	225	432	552	2115
3:45 PM	7	6	5	18	11	9	33	53	71	3	197	15	215	36	181	17	234	449	520	2049

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	11	9	6	26	21	10	46	77	103	4	168	4	176	32	185	25	242	418	521	2055
4:15 PM	6	7	8	21	15	15	38	68	89	1	180	17	198	32	178	25	235	433	522	2041
4:30 PM	5	10	4	19	20	9	37	66	85	2	173	12	187	35	154	25	214	401	486	1971
4:45 PM	3	15	5	23	24	11	49	84	107	1	196	9	206	36	157	20	213	419	526	1948
5:00 PM	7	15	5	27	12	18	34	64	91	2	173	10	185	32	184	15	231	416	507	1895
5:15 PM	4	7	4	15	14	10	39	63	78	2	153	12	167	28	157	22	207	374	452	1831
5:30 PM	2	9	3	14	14	4	42	60	74	5	182	12	199	23	149	18	190	389	463	1821
5:45 PM	6	4	2	12	6	12	33	51	63	9	162	9	180	26	188	16	230	410	473	1763
6:00 PM	4	11	3	18	8	4	34	46	64	3	174	12	189	21	144	25	190	379	443	1640
6:15 PM	9	3	4	16	10	10	28	48	64	1	163	12	176	30	149	23	202	378	442	1550
6:30 PM	1	6	3	10	6	7	31	44	54	1	157	7	165	25	143	18	186	351	405	1450
6:45 PM	6	4	1	11	16	5	16	37	48	3	122	10	135	27	122	18	167	302	350	1417
7:00 PM	3	9	3	15	7	5	32	44	59	1	135	14	150	16	115	13	144	294	353	1387
7:15 PM	6	1	2	9	11	9	24	44	53	3	130	9	142	19	115	13	147	289	342	1289
7:30 PM	3	4	4	11	10	5	19	34	45	1	157	7	165	13	131	18	162	327	372	1194
7:45 PM	5	5	1	11	3	4	23	30	41	0	102	10	112	18	131	18	167	279	320	1054
8:00 PM	2	4	0	6	6	4	12	22	28	1	98	4	103	12	99	13	124	227	255	922
8:15 PM	4	4	2	10	8	3	11	22	32	0	87	1	88	5	106	16	127	215	247	883
8:30 PM	1	2	0	3	7	3	12	22	25	1	90	3	94	8	86	19	113	207	232	820
8:45 PM	3	1	0	4	4	2	8	14	18	2	68	3	73	5	84	8	97	170	188	766
9:00 PM	2	0	1	3	3	3	9	15	18	2	65	2	69	4	109	16	129	198	216	745
9:15 PM	1	1	2	4	2	2	11	15	19	0	60	2	62	5	92	6	103	165	184	671
9:30 PM	2	1	0	3	1	0	3	4	7	0	61	1	62	6	96	7	109	171	178	625
9:45 PM	3	1	0	4	0	1	3	4	8	2	55	3	60	6	86	7	99	159	167	534
10:00 PM	0	0	0	0	1	1	4	6	6	0	53	1	54	3	72	7	82	136	142	446
10:15 PM	0	0	2	2	0	1	4	5	7	1	62	0	63	1	66	1	68	131	138	398
10:30 PM	0	2	1	3	0	1	2	3	6	1	30	1	32	3	39	7	49	81	87	337
10:45 PM	0	3	1	4	1	0	2	3	7	2	33	0	35	1	34	2	37	72	79	319
11:00 PM	2	0	2	4	0	0	1	1	5	0	42	0	42	1	40	6	47	89	94	308
11:15 PM	0	1	0	1	0	0	0	0	1	0	38	1	39	0	36	1	37	76	77	
11:30 PM	1	0	0	1	0	3	1	4	5	0	27	1	28	1	25	10	36	64	69	
11:45 PM	1	0	2	3	0	0	1	1	4	0	33	0	33	4	24	3	31	64	68	
TOTAL	**367**	**485**	**241**	**1093**	**794**	**524**	**1965**	**3283**	**4376**	**143**	**10412**	**693**	**11248**	**1792**	**9414**	**1073**	**12279**	**23527**	**27903**	

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	3
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2
1:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	1
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	3
3:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	3
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3	3	6
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	9
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	10
6:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	15
6:15 AM	0	0	0	0	0	0	1	1	1	0	4	0	4	0	1	0	1	5	6	18
6:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	18
6:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	1	2	0	3	6	6	18
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	3	3	4	4	16
7:15 AM	1	0	0	1	0	0	0	0	1	0	2	0	2	1	1	1	3	5	6	15
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	2	2	16
7:45 AM	0	0	0	0	1	0	0	1	1	0	1	0	1	0	2	0	2	3	4	22

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	21
8:15 AM	0	0	1	1	0	0	0	0	1	0	1	1	2	1	3	0	4	6	7	24
8:30 AM	0	0	0	0	0	0	1	1	1	0	4	0	4	0	3	0	3	7	8	26
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3	24
9:00 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6	28
9:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	1	5	0	6	9	9	27
9:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6	22
9:45 AM	0	0	1	1	0	0	0	0	1	0	4	0	4	1	1	0	2	6	7	20
10:00 AM	1	0	0	1	1	0	0	1	2	0	1	0	1	0	2	0	2	3	5	20
10:15 AM	0	1	0	1	0	1	1	2	3	0	0	0	0	1	0	0	1	1	4	15
10:30 AM	0	1	0	1	0	0	0	0	1	0	1	0	1	0	2	0	2	3	4	15
10:45 AM	0	0	0	0	0	0	0	0	0	1	3	0	4	0	2	1	3	7	7	15
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
11:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4	21
11:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4	26
11:45 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	2	0	2	2	3	27
12:00 PM	0	0	0	0	0	0	0	0	0	0	9	0	9	0	1	0	1	10	10	29
12:15 PM	0	0	0	0	0	0	1	1	1	0	7	0	7	0	1	0	1	8	9	23
12:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5	15
12:45 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5	12
1:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	1	2	4	4	12
1:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	12
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2	2	13
1:45 PM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	3	1	4	4	5	14
2:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4	13
2:15 PM	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	1	2	11
2:30 PM	0	0	0	0	0	0	1	1	1	0	1	0	1	0	1	0	1	2	3	12
2:45 PM	0	0	0	0	0	0	0	0	0	0	2	1	3	0	1	0	1	4	4	15
3:00 PM	0	0	0	0	1	0	0	1	1	0	1	0	1	0	0	0	0	1	2	16
3:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	2	3	3	16
3:30 PM	0	0	0	0	0	0	0	0	0	0	5	0	5	0	1	0	1	6	6	14
3:45 PM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	1	0	1	5	5	11

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									US Route 14										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	9
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	7
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3	6
4:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	4
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	11
5:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	2	11
6:00 PM	1	0	0	1	0	0	0	0	1	0	1	0	1	0	3	0	3	4	5	11
6:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	7
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	4
6:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	2	5
7:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	5
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	4
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
9:45 PM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	2
10:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**3**	**4**	**2**	**9**	**3**	**2**	**8**	**13**	**22**	**1**	**100**	**3**	**104**	**9**	**83**	**8**	**100**	**204**	**226**	

Project	Crystal Lake Engineering Services	**Multi-Unit Trucks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

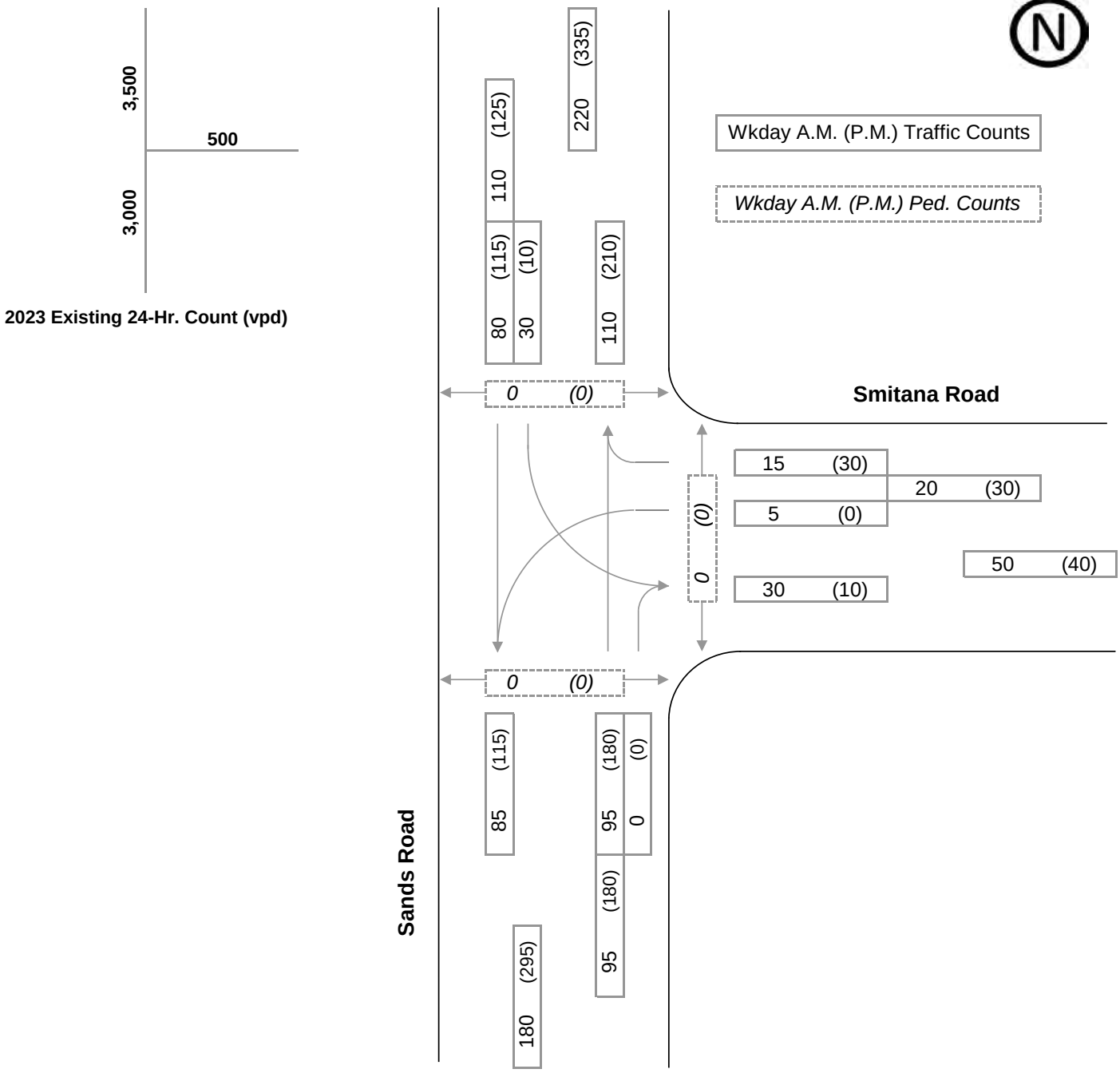
	Sands Road									**US Route 14**										
	North Approach				**South Approach**				Both	**East Approach**				**West Approach**				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
1:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	7
1:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	3	4	4	6
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	3
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	6
3:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	6
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	4
4:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	3
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	3
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	6
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	7
6:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	11
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	10
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	11
7:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	4	1	5	5	6	11
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	5
7:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	4
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	4

Project	Crystal Lake Engineering Services	**Multi-Unit Trucks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road									**US Route 14**										
	North Approach				**South Approach**				Both	**East Approach**				**West Approach**				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	6
8:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	5
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	3
9:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
9:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	6
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	7
10:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	2	2	8
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	8
10:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	11
11:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	3	3	13
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	15
11:30 AM	1	0	0	1	0	0	0	0	1	0	1	0	1	0	1	1	2	3	4	14
11:45 AM	1	0	0	1	0	0	0	0	1	0	1	0	1	0	2	0	2	3	4	12
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5	5	13
12:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	11
12:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	11
12:45 PM	2	0	0	2	0	0	0	0	2	0	2	0	2	0	1	0	1	3	5	10
1:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	6
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	3
1:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	5
3:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	6
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
3:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3	5

Project	Crystal Lake Engineering Services	**Multi-Unit Trucks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road									**US Route 14**										
	North Approach				**South Approach**				Both	**East Approach**				**West Approach**				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	2
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	4
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6:15 PM	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	2	4
6:30 PM	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	3
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2
8:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	2
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	1
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**6**	**0**	**0**	**6**	**0**	**1**	**0**	**1**	**7**	**0**	**38**	**0**	**38**	**0**	**48**	**10**	**58**	**96**	**103**	



Vehicle Traffic Peak Hours:

7:00 A.M. to 8:00 A.M.
4:30 P.M. to 5:30 P.M.

Count Date(s):

Thursday, September 7, 2023

Prepared: 10/13/2023

Village of Crystal Lake

Crystal Lake Engineering Services

2023 Existing Peak Hour Traffic

Sands Road & Smitana Road

CIVILTECH

File: 03_Sands-Smitana Count Data Reduction and Peak Hour Diagram 9-07-23.xlsx

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (1-hour intervals)

	Sands Road									Smitana Road									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	0	5	3	8	0	6	0	6	14	2	0	0	2	0	0	0	0	2	16
1:00 AM	0	0	1	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2
2:00 AM	0	0	4	4	0	2	0	2	6	1	0	0	1	0	0	0	0	1	7
3:00 AM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
4:00 AM	0	1	5	6	0	0	0	0	6	1	0	0	1	0	0	0	0	1	7
5:00 AM	0	15	28	43	0	6	0	6	49	1	0	0	1	0	0	0	0	1	50
6:00 AM	0	40	31	71	0	34	0	34	105	7	0	0	7	0	0	0	0	7	112
7:00 AM	0	82	29	111	0	97	0	97	208	15	0	1	16	0	0	0	0	16	224
8:00 AM	0	101	13	114	2	56	0	58	172	18	0	0	18	0	0	0	0	18	190
9:00 AM	0	90	12	102	0	74	0	74	176	9	0	0	9	0	0	0	0	9	185
10:00 AM	0	70	14	84	0	90	1	91	175	14	0	0	14	0	0	0	0	14	189
11:00 AM	0	79	15	94	1	102	0	103	197	18	0	1	19	0	0	0	0	19	216
12:00 PM	0	87	8	95	0	123	0	123	218	10	0	0	10	0	0	0	0	10	228
1:00 PM	0	70	4	74	4	137	0	141	215	9	0	1	10	0	0	0	0	10	225
2:00 PM	0	78	9	87	3	145	0	148	235	29	0	2	31	0	0	0	0	31	266
3:00 PM	0	98	6	104	0	157	0	157	261	29	0	1	30	0	0	0	0	30	291
4:00 PM	0	98	9	107	0	152	0	152	259	33	0	1	34	0	0	0	0	34	293
5:00 PM	0	114	10	124	0	189	0	189	313	31	0	0	31	0	0	0	0	31	344
6:00 PM	0	72	15	87	2	166	0	168	255	17	0	0	17	0	0	0	0	17	272
7:00 PM	0	52	5	57	0	127	0	127	184	18	0	2	20	0	0	0	0	20	204
8:00 PM	0	24	4	28	0	95	0	95	123	8	0	0	8	0	0	0	0	8	131
9:00 PM	0	11	1	12	0	39	0	39	51	8	0	0	8	0	0	0	0	8	59
10:00 PM	0	7	2	9	0	16	0	16	25	4	0	0	4	0	0	0	0	4	29
11:00 PM	0	0	4	4	0	7	0	7	11	2	0	0	2	0	0	0	0	2	13
TOTAL	**0**	**1195**	**233**	**1428**	**12**	**1821**	**1**	**1834**	**3262**	**284**	**0**	**9**	**293**	**0**	**0**	**0**	**0**	**293**	**3555**

24-Hour Vehicle Traffic Count

North Leg	3,500
South Leg	3,000
East Leg	500
West Leg	-

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	2	0	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3	16
12:15 AM	0	3	0	3	0	1	0	1	4	0	0	0	0	0	0	0	0	0	4	13
12:30 AM	0	0	2	2	0	3	0	3	5	1	0	0	1	0	0	0	0	1	6	10
12:45 AM	0	0	1	1	0	1	0	1	2	1	0	0	1	0	0	0	0	1	3	5
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
1:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
2:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	8
2:45 AM	0	0	4	4	0	2	0	2	6	0	0	0	0	0	0	0	0	0	6	7
3:00 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:45 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
4:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	14
4:30 AM	0	0	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	23
4:45 AM	0	1	2	3	0	0	0	0	3	1	0	0	1	0	0	0	0	1	4	38
5:00 AM	0	1	6	7	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7	50
5:15 AM	0	6	4	10	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	57
5:30 AM	0	4	9	13	0	4	0	4	17	0	0	0	0	0	0	0	0	0	17	65
5:45 AM	0	4	9	13	0	2	0	2	15	1	0	0	1	0	0	0	0	1	16	81
6:00 AM	0	3	7	10	0	2	0	2	12	2	0	0	2	0	0	0	0	2	14	112
6:15 AM	0	11	3	14	0	3	0	3	17	1	0	0	1	0	0	0	0	1	18	151
6:30 AM	0	14	8	22	0	10	0	10	32	1	0	0	1	0	0	0	0	1	33	194
6:45 AM	0	12	13	25	0	19	0	19	44	3	0	0	3	0	0	0	0	3	47	214
7:00 AM	0	18	12	30	0	20	0	20	50	2	0	1	3	0	0	0	0	3	53	224
7:15 AM	0	26	4	30	0	27	0	27	57	4	0	0	4	0	0	0	0	4	61	223
7:30 AM	0	18	5	23	0	23	0	23	46	7	0	0	7	0	0	0	0	7	53	211
7:45 AM	0	20	8	28	0	27	0	27	55	2	0	0	2	0	0	0	0	2	57	194

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	23	4	27	0	16	0	16	43	9	0	0	9	0	0	0	0	9	52	190
8:15 AM	0	30	1	31	0	14	0	14	45	4	0	0	4	0	0	0	0	4	49	185
8:30 AM	0	21	4	25	2	9	0	11	36	0	0	0	0	0	0	0	0	0	36	185
8:45 AM	0	27	4	31	0	17	0	17	48	5	0	0	5	0	0	0	0	5	53	195
9:00 AM	0	26	0	26	0	20	0	20	46	1	0	0	1	0	0	0	0	1	47	185
9:15 AM	0	24	5	29	0	19	0	19	48	1	0	0	1	0	0	0	0	1	49	180
9:30 AM	0	18	4	22	0	20	0	20	42	4	0	0	4	0	0	0	0	4	46	172
9:45 AM	0	22	3	25	0	15	0	15	40	3	0	0	3	0	0	0	0	3	43	181
10:00 AM	0	18	4	22	0	16	0	16	38	4	0	0	4	0	0	0	0	4	42	189
10:15 AM	0	13	1	14	0	25	0	25	39	2	0	0	2	0	0	0	0	2	41	203
10:30 AM	0	22	6	28	0	21	0	21	49	6	0	0	6	0	0	0	0	6	55	207
10:45 AM	0	17	3	20	0	28	1	29	49	2	0	0	2	0	0	0	0	2	51	205
11:00 AM	0	15	6	21	0	30	0	30	51	5	0	0	5	0	0	0	0	5	56	216
11:15 AM	0	18	1	19	0	19	0	19	38	6	0	1	7	0	0	0	0	7	45	221
11:30 AM	0	22	3	25	0	23	0	23	48	5	0	0	5	0	0	0	0	5	53	246
11:45 AM	0	24	5	29	1	30	0	31	60	2	0	0	2	0	0	0	0	2	62	250
12:00 PM	0	28	5	33	0	24	0	24	57	4	0	0	4	0	0	0	0	4	61	228
12:15 PM	0	24	1	25	0	42	0	42	67	3	0	0	3	0	0	0	0	3	70	220
12:30 PM	0	21	2	23	0	33	0	33	56	1	0	0	1	0	0	0	0	1	57	210
12:45 PM	0	14	0	14	0	24	0	24	38	2	0	0	2	0	0	0	0	2	40	210
1:00 PM	0	21	1	22	1	28	0	29	51	2	0	0	2	0	0	0	0	2	53	225
1:15 PM	0	17	3	20	2	35	0	37	57	3	0	0	3	0	0	0	0	3	60	242
1:30 PM	0	15	0	15	1	39	0	40	55	1	0	1	2	0	0	0	0	2	57	240
1:45 PM	0	17	0	17	0	35	0	35	52	3	0	0	3	0	0	0	0	3	55	240
2:00 PM	0	18	2	20	1	35	0	36	56	12	0	2	14	0	0	0	0	14	70	266
2:15 PM	0	17	2	19	1	34	0	35	54	4	0	0	4	0	0	0	0	4	58	266
2:30 PM	0	15	3	18	0	33	0	33	51	6	0	0	6	0	0	0	0	6	57	269
2:45 PM	0	28	2	30	1	43	0	44	74	7	0	0	7	0	0	0	0	7	81	285
3:00 PM	0	25	2	27	0	37	0	37	64	6	0	0	6	0	0	0	0	6	70	291
3:15 PM	0	14	1	15	0	40	0	40	55	6	0	0	6	0	0	0	0	6	61	289
3:30 PM	0	32	1	33	0	34	0	34	67	5	0	1	6	0	0	0	0	6	73	294
3:45 PM	0	27	2	29	0	46	0	46	75	12	0	0	12	0	0	0	0	12	87	294

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	20	3	23	0	34	0	34	57	11	0	0	11	0	0	0	0	11	68	293
4:15 PM	0	24	3	27	0	33	0	33	60	6	0	0	6	0	0	0	0	6	66	310
4:30 PM	0	24	2	26	0	39	0	39	65	7	0	1	8	0	0	0	0	8	73	335
4:45 PM	0	30	1	31	0	46	0	46	77	9	0	0	9	0	0	0	0	9	86	344
5:00 PM	0	25	1	26	0	50	0	50	76	9	0	0	9	0	0	0	0	9	85	344
5:15 PM	0	34	4	38	0	46	0	46	84	7	0	0	7	0	0	0	0	7	91	324
5:30 PM	0	22	0	22	0	50	0	50	72	10	0	0	10	0	0	0	0	10	82	306
5:45 PM	0	33	5	38	0	43	0	43	81	5	0	0	5	0	0	0	0	5	86	300
6:00 PM	0	12	4	16	0	45	0	45	61	4	0	0	4	0	0	0	0	4	65	272
6:15 PM	0	22	6	28	0	44	0	44	72	1	0	0	1	0	0	0	0	1	73	261
6:30 PM	0	23	2	25	1	43	0	44	69	7	0	0	7	0	0	0	0	7	76	231
6:45 PM	0	15	3	18	1	34	0	35	53	5	0	0	5	0	0	0	0	5	58	205
7:00 PM	0	15	2	17	0	29	0	29	46	6	0	2	8	0	0	0	0	8	54	204
7:15 PM	0	9	1	10	0	26	0	26	36	7	0	0	7	0	0	0	0	7	43	197
7:30 PM	0	12	0	12	0	37	0	37	49	1	0	0	1	0	0	0	0	1	50	181
7:45 PM	0	16	2	18	0	35	0	35	53	4	0	0	4	0	0	0	0	4	57	163
8:00 PM	0	7	0	7	0	37	0	37	44	3	0	0	3	0	0	0	0	3	47	131
8:15 PM	0	9	1	10	0	16	0	16	26	1	0	0	1	0	0	0	0	1	27	108
8:30 PM	0	4	2	6	0	23	0	23	29	3	0	0	3	0	0	0	0	3	32	93
8:45 PM	0	4	1	5	0	19	0	19	24	1	0	0	1	0	0	0	0	1	25	69
9:00 PM	0	4	0	4	0	17	0	17	21	3	0	0	3	0	0	0	0	3	24	59
9:15 PM	0	4	0	4	0	7	0	7	11	1	0	0	1	0	0	0	0	1	12	45
9:30 PM	0	0	0	0	0	8	0	8	8	0	0	0	0	0	0	0	0	0	8	36
9:45 PM	0	3	1	4	0	7	0	7	11	4	0	0	4	0	0	0	0	4	15	39
10:00 PM	0	1	0	1	0	7	0	7	8	2	0	0	2	0	0	0	0	2	10	29
10:15 PM	0	2	0	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3	24
10:30 PM	0	2	2	4	0	5	0	5	9	2	0	0	2	0	0	0	0	2	11	24
10:45 PM	0	2	0	2	0	3	0	3	5	0	0	0	0	0	0	0	0	0	5	18
11:00 PM	0	0	0	0	0	4	0	4	4	1	0	0	1	0	0	0	0	1	5	13
11:15 PM	0	0	3	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	
11:30 PM	0	0	1	1	0	3	0	3	4	1	0	0	1	0	0	0	0	1	5	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**1195**	**233**	**1428**	**12**	**1821**	**1**	**1834**	**3262**	**284**	**0**	**9**	**293**	**0**	**0**	**0**	**0**	**293**	**3555**	

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Morning Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
7:00 AM	0	82	29	111	0	97	0	97	208	15	0	1	16	0	0	0	0	16	224
Percent Trucks	#DIV/0!	2.4%	0.0%	1.8%	#DIV/0!	1.0%	#DIV/0!	1.0%	1.4%	6.7%	#DIV/0!	0.0%	6.3%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	6.3%	1.8%

Intersection Peak Hour Factor = 0.92

Evening Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
4:30 PM	0	113	8	121	0	181	0	181	302	32	0	1	33	0	0	0	0	33	335
Percent Trucks	#DIV/0!	1.8%	0.0%	1.7%	#DIV/0!	2.2%	#DIV/0!	2.2%	2.0%	0.0%	#DIV/0!	0.0%	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	1.8%

Intersection Peak Hour Factor = 0.92

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (1-hour intervals)

	Sands Road									Smitana Road									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
7:00 AM	0	2	0	2	0	1	0	1	3	1	0	0	1	0	0	0	0	1	4
8:00 AM	0	6	0	6	0	1	0	1	7	0	0	0	0	0	0	0	0	0	7
9:00 AM	0	2	0	2	0	5	0	5	7	1	0	0	1	0	0	0	0	1	8
10:00 AM	0	5	0	5	0	3	0	3	8	0	0	0	0	0	0	0	0	0	8
11:00 AM	0	1	1	2	0	3	0	3	5	1	0	0	1	0	0	0	0	1	6
12:00 PM	0	4	1	5	0	3	0	3	8	2	0	0	2	0	0	0	0	2	10
1:00 PM	0	0	0	0	1	2	0	3	3	0	0	0	0	0	0	0	0	0	3
2:00 PM	0	4	0	4	0	0	0	0	4	0	0	1	1	0	0	0	0	1	5
3:00 PM	0	0	0	0	0	3	0	3	3	0	0	0	0	0	0	0	0	0	3
4:00 PM	0	4	0	4	0	7	0	7	11	0	0	0	0	0	0	0	0	0	11
5:00 PM	0	1	0	1	0	4	0	4	5	0	0	0	0	0	0	0	0	0	5
6:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
7:00 PM	0	2	0	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**33**	**2**	**35**	**1**	**35**	**0**	**36**	**71**	**5**	**0**	**1**	**6**	**0**	**0**	**0**	**0**	**6**	**77**

24-Hour Truck Traffic Count

North Leg	100
South Leg	100
East Leg	-
West Leg	-

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:30 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	4
7:15 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	5
7:30 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	7
8:15 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	7
8:30 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	7
8:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	8
9:00 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	8
9:15 AM	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	1	2	8
9:30 AM	0	1	0	1	0	2	0	2	3	0	0	0	0	0	0	0	0	0	3	7
9:45 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	5
10:00 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	8
10:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	8
10:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	8
10:45 AM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	9
11:00 AM	0	0	1	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	6
11:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	5
11:30 AM	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	1	2	9
11:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	9
12:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	10
12:15 PM	0	2	1	3	0	1	0	1	4	1	0	0	1	0	0	0	0	1	5	11
12:30 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	7
12:45 PM	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	1	2	5
1:00 PM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	3
1:15 PM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	5
2:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
2:45 PM	0	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	4
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	5
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
3:45 PM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	11

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	11
4:15 PM	0	1	0	1	0	4	0	4	5	0	0	0	0	0	0	0	0	0	5	10
4:30 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	6
4:45 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	6
5:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	5
5:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	5
5:30 PM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	4
5:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
6:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
7:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**33**	**2**	**35**	**1**	**35**	**0**	**36**	**71**	**5**	**0**	**1**	**6**	**0**	**0**	**0**	**0**	**6**	**77**	

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Morning Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
7:00 AM	0	2	0	2	0	1	0	1	3	1	0	0	1	0	0	0	0	1	4

Evening Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
4:30 PM	0	2	0	2	0	4	0	4	6	0	0	0	0	0	0	0	0	0	6

Project Crystal Lake Engineering Services

Count Date 9/7/2023

Peds + Bikes in Crosswalks (1-hour intervals)

	Sands Road						Smitana Road						
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road						**Smitana Road**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road						**Smitana Road**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road						**Smitana Road**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road						**Smitana Road**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Totals for Traffic Peak Hour

A.M. Peak	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
P.M. Peak													
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	2	0	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3	16
12:15 AM	0	3	0	3	0	1	0	1	4	0	0	0	0	0	0	0	0	0	4	13
12:30 AM	0	0	2	2	0	3	0	3	5	1	0	0	1	0	0	0	0	1	6	10
12:45 AM	0	0	1	1	0	1	0	1	2	1	0	0	1	0	0	0	0	1	3	5
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
1:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
2:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	8
2:45 AM	0	0	4	4	0	2	0	2	6	0	0	0	0	0	0	0	0	0	6	7
3:00 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:45 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
4:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	14
4:30 AM	0	0	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	23
4:45 AM	0	1	2	3	0	0	0	0	3	1	0	0	1	0	0	0	0	1	4	38
5:00 AM	0	1	6	7	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7	50
5:15 AM	0	6	4	10	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	57
5:30 AM	0	4	9	13	0	4	0	4	17	0	0	0	0	0	0	0	0	0	17	65
5:45 AM	0	4	9	13	0	2	0	2	15	1	0	0	1	0	0	0	0	1	16	80
6:00 AM	0	3	7	10	0	2	0	2	12	2	0	0	2	0	0	0	0	2	14	111
6:15 AM	0	11	3	14	0	3	0	3	17	1	0	0	1	0	0	0	0	1	18	149
6:30 AM	0	13	8	21	0	10	0	10	31	1	0	0	1	0	0	0	0	1	32	190
6:45 AM	0	12	13	25	0	19	0	19	44	3	0	0	3	0	0	0	0	3	47	210
7:00 AM	0	18	12	30	0	20	0	20	50	1	0	1	2	0	0	0	0	2	52	220
7:15 AM	0	25	4	29	0	26	0	26	55	4	0	0	4	0	0	0	0	4	59	218
7:30 AM	0	17	5	22	0	23	0	23	45	7	0	0	7	0	0	0	0	7	52	206
7:45 AM	0	20	8	28	0	27	0	27	55	2	0	0	2	0	0	0	0	2	57	188

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	21	4	25	0	16	0	16	41	9	0	0	9	0	0	0	0	9	50	183
8:15 AM	0	28	1	29	0	14	0	14	43	4	0	0	4	0	0	0	0	4	47	178
8:30 AM	0	20	4	24	2	8	0	10	34	0	0	0	0	0	0	0	0	0	34	178
8:45 AM	0	26	4	30	0	17	0	17	47	5	0	0	5	0	0	0	0	5	52	187
9:00 AM	0	25	0	25	0	19	0	19	44	1	0	0	1	0	0	0	0	1	45	177
9:15 AM	0	24	5	29	0	18	0	18	47	0	0	0	0	0	0	0	0	0	47	172
9:30 AM	0	17	4	21	0	18	0	18	39	4	0	0	4	0	0	0	0	4	43	165
9:45 AM	0	22	3	25	0	14	0	14	39	3	0	0	3	0	0	0	0	3	42	176
10:00 AM	0	17	4	21	0	15	0	15	36	4	0	0	4	0	0	0	0	4	40	181
10:15 AM	0	13	1	14	0	24	0	24	38	2	0	0	2	0	0	0	0	2	40	195
10:30 AM	0	22	6	28	0	20	0	20	48	6	0	0	6	0	0	0	0	6	54	199
10:45 AM	0	13	3	16	0	28	1	29	45	2	0	0	2	0	0	0	0	2	47	196
11:00 AM	0	15	5	20	0	29	0	29	49	5	0	0	5	0	0	0	0	5	54	210
11:15 AM	0	18	1	19	0	18	0	18	37	6	0	1	7	0	0	0	0	7	44	216
11:30 AM	0	22	3	25	0	22	0	22	47	4	0	0	4	0	0	0	0	4	51	237
11:45 AM	0	23	5	28	1	30	0	31	59	2	0	0	2	0	0	0	0	2	61	241
12:00 PM	0	27	5	32	0	24	0	24	56	4	0	0	4	0	0	0	0	4	60	218
12:15 PM	0	22	0	22	0	41	0	41	63	2	0	0	2	0	0	0	0	2	65	209
12:30 PM	0	20	2	22	0	32	0	32	54	1	0	0	1	0	0	0	0	1	55	203
12:45 PM	0	14	0	14	0	23	0	23	37	1	0	0	1	0	0	0	0	1	38	205
1:00 PM	0	21	1	22	1	26	0	27	49	2	0	0	2	0	0	0	0	2	51	222
1:15 PM	0	17	3	20	1	35	0	36	56	3	0	0	3	0	0	0	0	3	59	240
1:30 PM	0	15	0	15	1	39	0	40	55	1	0	1	2	0	0	0	0	2	57	238
1:45 PM	0	17	0	17	0	35	0	35	52	3	0	0	3	0	0	0	0	3	55	238
2:00 PM	0	18	2	20	1	35	0	36	56	12	0	1	13	0	0	0	0	13	69	261
2:15 PM	0	16	2	18	1	34	0	35	53	4	0	0	4	0	0	0	0	4	57	262
2:30 PM	0	15	3	18	0	33	0	33	51	6	0	0	6	0	0	0	0	6	57	265
2:45 PM	0	25	2	27	1	43	0	44	71	7	0	0	7	0	0	0	0	7	78	281
3:00 PM	0	25	2	27	0	37	0	37	64	6	0	0	6	0	0	0	0	6	70	288
3:15 PM	0	14	1	15	0	39	0	39	54	6	0	0	6	0	0	0	0	6	60	284
3:30 PM	0	32	1	33	0	34	0	34	67	5	0	1	6	0	0	0	0	6	73	285
3:45 PM	0	27	2	29	0	44	0	44	73	12	0	0	12	0	0	0	0	12	85	283

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	19	3	22	0	33	0	33	55	11	0	0	11	0	0	0	0	11	66	282
4:15 PM	0	23	3	26	0	29	0	29	55	6	0	0	6	0	0	0	0	6	61	300
4:30 PM	0	23	2	25	0	38	0	38	63	7	0	1	8	0	0	0	0	8	71	329
4:45 PM	0	29	1	30	0	45	0	45	75	9	0	0	9	0	0	0	0	9	84	338
5:00 PM	0	25	1	26	0	49	0	49	75	9	0	0	9	0	0	0	0	9	84	339
5:15 PM	0	34	4	38	0	45	0	45	83	7	0	0	7	0	0	0	0	7	90	319
5:30 PM	0	22	0	22	0	48	0	48	70	10	0	0	10	0	0	0	0	10	80	302
5:45 PM	0	32	5	37	0	43	0	43	80	5	0	0	5	0	0	0	0	5	85	298
6:00 PM	0	11	4	15	0	45	0	45	60	4	0	0	4	0	0	0	0	4	64	271
6:15 PM	0	22	6	28	0	44	0	44	72	1	0	0	1	0	0	0	0	1	73	260
6:30 PM	0	23	2	25	1	43	0	44	69	7	0	0	7	0	0	0	0	7	76	229
6:45 PM	0	15	3	18	1	34	0	35	53	5	0	0	5	0	0	0	0	5	58	203
7:00 PM	0	14	2	16	0	29	0	29	45	6	0	2	8	0	0	0	0	8	53	201
7:15 PM	0	8	1	9	0	26	0	26	35	7	0	0	7	0	0	0	0	7	42	195
7:30 PM	0	12	0	12	0	37	0	37	49	1	0	0	1	0	0	0	0	1	50	180
7:45 PM	0	16	2	18	0	34	0	34	52	4	0	0	4	0	0	0	0	4	56	162
8:00 PM	0	7	0	7	0	37	0	37	44	3	0	0	3	0	0	0	0	3	47	131
8:15 PM	0	9	1	10	0	16	0	16	26	1	0	0	1	0	0	0	0	1	27	108
8:30 PM	0	4	2	6	0	23	0	23	29	3	0	0	3	0	0	0	0	3	32	92
8:45 PM	0	4	1	5	0	19	0	19	24	1	0	0	1	0	0	0	0	1	25	68
9:00 PM	0	4	0	4	0	17	0	17	21	3	0	0	3	0	0	0	0	3	24	58
9:15 PM	0	4	0	4	0	6	0	6	10	1	0	0	1	0	0	0	0	1	11	43
9:30 PM	0	0	0	0	0	8	0	8	8	0	0	0	0	0	0	0	0	0	8	35
9:45 PM	0	3	1	4	0	7	0	7	11	4	0	0	4	0	0	0	0	4	15	38
10:00 PM	0	1	0	1	0	6	0	6	7	2	0	0	2	0	0	0	0	2	9	28
10:15 PM	0	2	0	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3	24
10:30 PM	0	2	2	4	0	5	0	5	9	2	0	0	2	0	0	0	0	2	11	24
10:45 PM	0	2	0	2	0	3	0	3	5	0	0	0	0	0	0	0	0	0	5	18
11:00 PM	0	0	0	0	0	4	0	4	4	1	0	0	1	0	0	0	0	1	5	13
11:15 PM	0	0	3	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	
11:30 PM	0	0	1	1	0	3	0	3	4	1	0	0	1	0	0	0	0	1	5	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**1162**	**231**	**1393**	**11**	**1786**	**1**	**1798**	**3191**	**279**	**0**	**8**	**287**	**0**	**0**	**0**	**0**	**287**	**3478**	

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	3
7:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	4
7:30 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	7
8:15 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	6
8:30 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	5
8:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
9:00 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
9:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	4
9:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
10:00 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	6
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
10:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	7
10:45 AM	0	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	7
11:00 AM	0	0	1	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	5
11:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
11:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	6
11:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	7
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
12:15 PM	0	1	1	2	0	1	0	1	3	1	0	0	1	0	0	0	0	1	4	9
12:30 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	6
12:45 PM	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	1	2	4
1:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
1:15 PM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	4
2:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2:45 PM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	3
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
3:45 PM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	8

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
4:15 PM	0	1	0	1	0	3	0	3	4	0	0	0	0	0	0	0	0	0	4	7
4:30 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	4
4:45 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	4
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	4
5:30 PM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	3
5:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**22**	**2**	**24**	**1**	**24**	**0**	**25**	**49**	**5**	**0**	**1**	**6**	**0**	**0**	**0**	**0**	**6**	**55**	

Project	Crystal Lake Engineering Services	**Multi-Unit Trucks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/7/2023

Multi-Unit Trucks

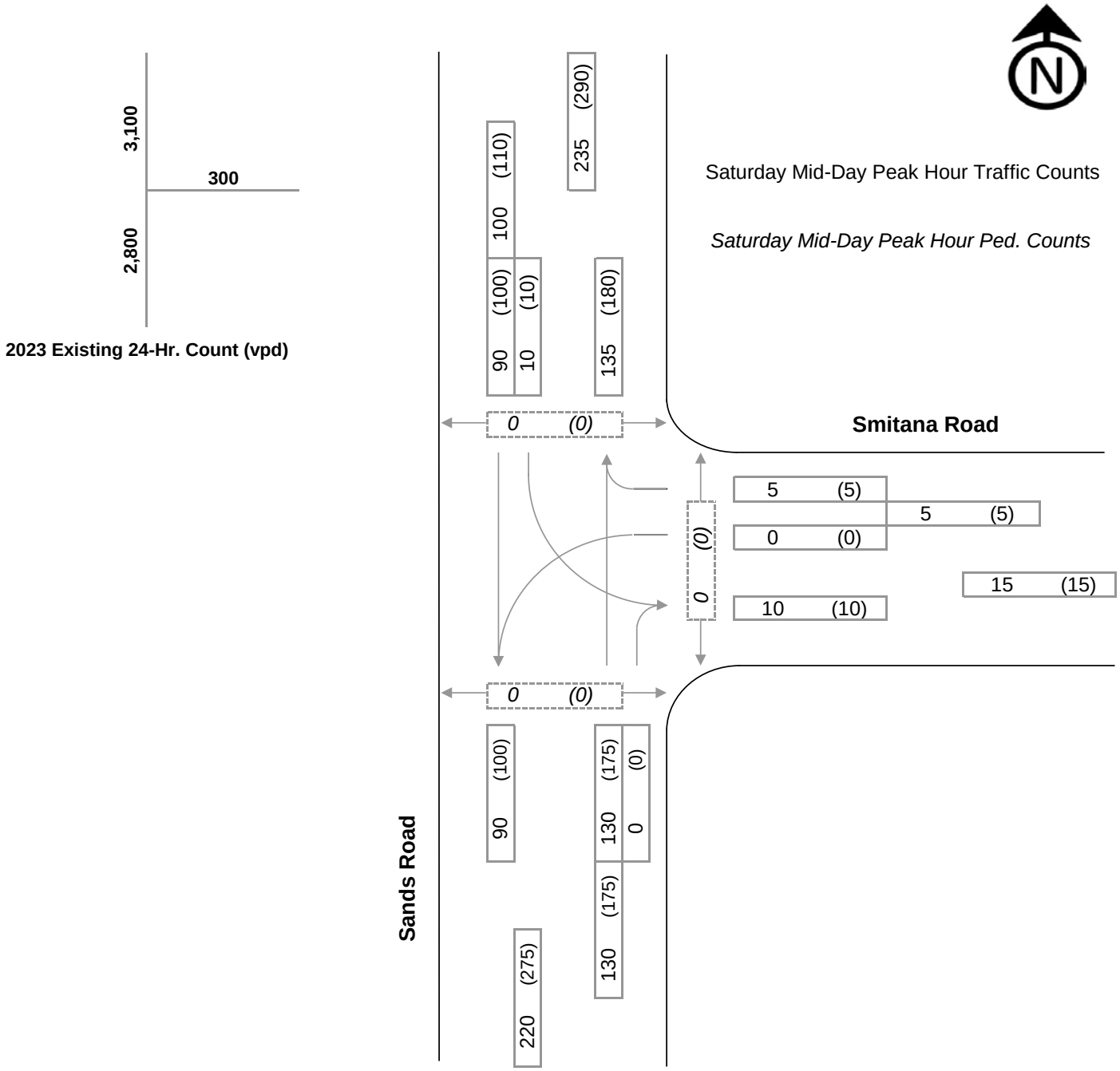
Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
9:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	5
9:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	4
9:30 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	4
9:45 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
12:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3

Project	Crystal Lake Engineering Services	**Multi-Unit Trucks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/7/2023			Project #:	3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	4
4:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
5:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**11**	**0**	**11**	**0**	**11**	**0**	**11**	**22**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	



Vehicle Traffic Peak Hours:

11:45 A.M. to 12:45 P.M.

2:00 P.M. to 3:00 P.M.

Count Date(s):

Saturday, September 9, 2023

Prepared: 10/13/2023

Village of Crystal Lake

Crystal Lake Engineering Services

2023 Existing Peak Hour Traffic

Sands Road & Smitana Road

CIVILTECH

File: 04_Sands-Smitana Count Data Reduction and Peak Hour Diagram 9-09-23.xlsx

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (1-hour intervals)

	Sands Road									Smitana Road									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	0	1	1	2	0	5	0	5	7	3	0	0	3	0	0	0	0	3	10
1:00 AM	0	2	0	2	0	5	0	5	7	2	0	0	2	0	0	0	0	2	9
2:00 AM	0	3	0	3	0	2	0	2	5	0	0	0	0	0	0	0	0	0	5
3:00 AM	0	1	2	3	0	5	0	5	8	1	0	0	1	0	0	0	0	1	9
4:00 AM	0	2	0	2	0	2	0	2	4	1	0	0	1	0	0	0	0	1	5
5:00 AM	0	9	1	10	0	2	0	2	12	1	0	0	1	0	0	0	0	1	13
6:00 AM	0	21	3	24	0	6	0	6	30	0	0	0	0	0	0	0	0	0	30
7:00 AM	0	36	12	48	5	38	0	43	91	5	0	0	5	0	0	0	0	5	96
8:00 AM	0	48	20	68	2	46	0	48	116	5	0	6	11	0	0	0	0	11	127
9:00 AM	0	101	2	103	4	71	1	76	179	9	0	2	11	0	0	0	0	11	190
10:00 AM	0	101	10	111	1	143	0	144	255	15	0	0	15	0	0	0	0	15	270
11:00 AM	0	91	10	101	1	135	0	136	237	7	0	0	7	0	0	0	0	7	244
12:00 PM	0	81	10	91	0	140	0	140	231	8	0	0	8	0	0	0	0	8	239
1:00 PM	0	90	8	98	2	142	0	144	242	15	0	0	15	0	0	0	0	15	257
2:00 PM	0	98	9	107	0	176	1	177	284	7	0	0	7	0	0	0	0	7	291
3:00 PM	0	81	10	91	0	151	0	151	242	8	0	0	8	0	0	0	0	8	250
4:00 PM	0	89	8	97	0	145	0	145	242	15	0	0	15	0	0	0	0	15	257
5:00 PM	0	68	10	78	0	131	0	131	209	12	0	0	12	0	0	0	0	12	221
6:00 PM	0	57	4	61	0	117	1	118	179	16	0	0	16	0	0	0	0	16	195
7:00 PM	0	41	6	47	0	83	1	84	131	6	0	0	6	0	0	0	0	6	137
8:00 PM	0	21	3	24	0	74	0	74	98	4	0	0	4	0	0	0	0	4	102
9:00 PM	0	12	1	13	0	45	0	45	58	5	0	0	5	0	0	0	0	5	63
10:00 PM	0	10	3	13	0	24	0	24	37	5	0	0	5	0	0	0	0	5	42
11:00 PM	0	9	3	12	0	24	0	24	36	4	0	0	4	0	0	0	0	4	40
TOTAL	**0**	**1073**	**136**	**1209**	**15**	**1712**	**4**	**1731**	**2940**	**154**	**0**	**8**	**162**	**0**	**0**	**0**	**0**	**162**	**3102**

24-Hour Vehicle Traffic Count

North Leg	3,100
South Leg	2,800
East Leg	300
West Leg	-

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	10
12:15 AM	0	0	0	0	0	2	0	2	2	1	0	0	1	0	0	0	0	1	3	10
12:30 AM	0	0	1	1	0	1	0	1	2	1	0	0	1	0	0	0	0	1	3	11
12:45 AM	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	2	10
1:00 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	9
1:15 AM	0	0	0	0	0	3	0	3	3	1	0	0	1	0	0	0	0	1	4	8
1:30 AM	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	1	2	5
1:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
2:00 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
2:15 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6
2:30 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	7
2:45 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	7
3:00 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	9
3:15 AM	0	0	1	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	9
3:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	8
3:45 AM	0	1	1	2	0	2	0	2	4	0	0	0	0	0	0	0	0	0	4	7
4:00 AM	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	2	5
4:15 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
4:45 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	11
5:00 AM	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	2	13
5:15 AM	0	3	1	4	0	1	0	1	5	0	0	0	0	0	0	0	0	0	5	15
5:30 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	20
5:45 AM	0	3	0	3	0	1	0	1	4	0	0	0	0	0	0	0	0	0	4	27
6:00 AM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	30
6:15 AM	0	6	2	8	0	2	0	2	10	0	0	0	0	0	0	0	0	0	10	44
6:30 AM	0	5	1	6	0	3	0	3	9	0	0	0	0	0	0	0	0	0	9	51
6:45 AM	0	6	0	6	0	1	0	1	7	0	0	0	0	0	0	0	0	0	7	74
7:00 AM	0	6	1	7	4	7	0	11	18	0	0	0	0	0	0	0	0	0	18	96
7:15 AM	0	7	3	10	0	7	0	7	17	0	0	0	0	0	0	0	0	0	17	105
7:30 AM	0	11	2	13	1	13	0	14	27	5	0	0	5	0	0	0	0	5	32	111
7:45 AM	0	12	6	18	0	11	0	11	29	0	0	0	0	0	0	0	0	0	29	115

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	9	8	17	0	6	0	6	23	1	0	3	4	0	0	0	0	4	27	127
8:15 AM	0	7	4	11	0	11	0	11	22	1	0	0	1	0	0	0	0	1	23	142
8:30 AM	0	13	4	17	0	18	0	18	35	1	0	0	1	0	0	0	0	1	36	163
8:45 AM	0	19	4	23	2	11	0	13	36	2	0	3	5	0	0	0	0	5	41	181
9:00 AM	0	25	1	26	2	12	1	15	41	1	0	0	1	0	0	0	0	1	42	190
9:15 AM	0	26	0	26	0	15	0	15	41	1	0	2	3	0	0	0	0	3	44	209
9:30 AM	0	23	1	24	2	24	0	26	50	4	0	0	4	0	0	0	0	4	54	238
9:45 AM	0	27	0	27	0	20	0	20	47	3	0	0	3	0	0	0	0	3	50	247
10:00 AM	0	25	2	27	0	33	0	33	60	1	0	0	1	0	0	0	0	1	61	270
10:15 AM	0	24	5	29	0	39	0	39	68	5	0	0	5	0	0	0	0	5	73	271
10:30 AM	0	24	1	25	0	34	0	34	59	4	0	0	4	0	0	0	0	4	63	261
10:45 AM	0	28	2	30	1	37	0	38	68	5	0	0	5	0	0	0	0	5	73	261
11:00 AM	0	23	3	26	0	33	0	33	59	3	0	0	3	0	0	0	0	3	62	244
11:15 AM	0	18	6	24	1	37	0	38	62	1	0	0	1	0	0	0	0	1	63	241
11:30 AM	0	25	1	26	0	34	0	34	60	3	0	0	3	0	0	0	0	3	63	234
11:45 AM	0	25	0	25	0	31	0	31	56	0	0	0	0	0	0	0	0	0	56	232
12:00 PM	0	22	4	26	0	33	0	33	59	0	0	0	0	0	0	0	0	0	59	239
12:15 PM	0	25	2	27	0	27	0	27	54	2	0	0	2	0	0	0	0	2	56	248
12:30 PM	0	17	4	21	0	39	0	39	60	1	0	0	1	0	0	0	0	1	61	244
12:45 PM	0	17	0	17	0	41	0	41	58	5	0	0	5	0	0	0	0	5	63	249
1:00 PM	0	25	2	27	0	38	0	38	65	3	0	0	3	0	0	0	0	3	68	257
1:15 PM	0	21	0	21	0	25	0	25	46	6	0	0	6	0	0	0	0	6	52	275
1:30 PM	0	19	3	22	2	40	0	42	64	2	0	0	2	0	0	0	0	2	66	283
1:45 PM	0	25	3	28	0	39	0	39	67	4	0	0	4	0	0	0	0	4	71	286
2:00 PM	0	29	1	30	0	54	0	54	84	2	0	0	2	0	0	0	0	2	86	291
2:15 PM	0	18	2	20	0	39	0	39	59	1	0	0	1	0	0	0	0	1	60	279
2:30 PM	0	25	4	29	0	37	0	37	66	3	0	0	3	0	0	0	0	3	69	274
2:45 PM	0	26	2	28	0	46	1	47	75	1	0	0	1	0	0	0	0	1	76	268
3:00 PM	0	21	4	25	0	47	0	47	72	2	0	0	2	0	0	0	0	2	74	250
3:15 PM	0	21	0	21	0	32	0	32	53	2	0	0	2	0	0	0	0	2	55	244
3:30 PM	0	22	1	23	0	37	0	37	60	3	0	0	3	0	0	0	0	3	63	251
3:45 PM	0	17	5	22	0	35	0	35	57	1	0	0	1	0	0	0	0	1	58	258

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	25	2	27	0	37	0	37	64	4	0	0	4	0	0	0	0	4	68	257
4:15 PM	0	19	2	21	0	38	0	38	59	3	0	0	3	0	0	0	0	3	62	253
4:30 PM	0	23	3	26	0	38	0	38	64	6	0	0	6	0	0	0	0	6	70	243
4:45 PM	0	22	1	23	0	32	0	32	55	2	0	0	2	0	0	0	0	2	57	222
5:00 PM	0	28	1	29	0	31	0	31	60	4	0	0	4	0	0	0	0	4	64	221
5:15 PM	0	12	5	17	0	32	0	32	49	3	0	0	3	0	0	0	0	3	52	212
5:30 PM	0	14	3	17	0	30	0	30	47	2	0	0	2	0	0	0	0	2	49	214
5:45 PM	0	14	1	15	0	38	0	38	53	3	0	0	3	0	0	0	0	3	56	205
6:00 PM	0	18	0	18	0	32	0	32	50	5	0	0	5	0	0	0	0	5	55	195
6:15 PM	0	16	2	18	0	33	1	34	52	2	0	0	2	0	0	0	0	2	54	172
6:30 PM	0	11	1	12	0	26	0	26	38	2	0	0	2	0	0	0	0	2	40	156
6:45 PM	0	12	1	13	0	26	0	26	39	7	0	0	7	0	0	0	0	7	46	154
7:00 PM	0	13	0	13	0	17	1	18	31	1	0	0	1	0	0	0	0	1	32	137
7:15 PM	0	8	0	8	0	28	0	28	36	2	0	0	2	0	0	0	0	2	38	135
7:30 PM	0	13	3	16	0	20	0	20	36	2	0	0	2	0	0	0	0	2	38	130
7:45 PM	0	7	3	10	0	18	0	18	28	1	0	0	1	0	0	0	0	1	29	116
8:00 PM	0	6	2	8	0	21	0	21	29	1	0	0	1	0	0	0	0	1	30	102
8:15 PM	0	11	1	12	0	20	0	20	32	1	0	0	1	0	0	0	0	1	33	100
8:30 PM	0	2	0	2	0	21	0	21	23	1	0	0	1	0	0	0	0	1	24	80
8:45 PM	0	2	0	2	0	12	0	12	14	1	0	0	1	0	0	0	0	1	15	64
9:00 PM	0	3	1	4	0	19	0	19	23	5	0	0	5	0	0	0	0	5	28	63
9:15 PM	0	4	0	4	0	9	0	9	13	0	0	0	0	0	0	0	0	0	13	44
9:30 PM	0	2	0	2	0	6	0	6	8	0	0	0	0	0	0	0	0	0	8	39
9:45 PM	0	3	0	3	0	11	0	11	14	0	0	0	0	0	0	0	0	0	14	47
10:00 PM	0	1	0	1	0	7	0	7	8	1	0	0	1	0	0	0	0	1	9	42
10:15 PM	0	2	1	3	0	4	0	4	7	1	0	0	1	0	0	0	0	1	8	48
10:30 PM	0	3	1	4	0	10	0	10	14	2	0	0	2	0	0	0	0	2	16	43
10:45 PM	0	4	1	5	0	3	0	3	8	1	0	0	1	0	0	0	0	1	9	42
11:00 PM	0	4	1	5	0	7	0	7	12	3	0	0	3	0	0	0	0	3	15	40
11:15 PM	0	1	1	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3	
11:30 PM	0	1	1	2	0	12	0	12	14	1	0	0	1	0	0	0	0	1	15	
11:45 PM	0	3	0	3	0	4	0	4	7	0	0	0	0	0	0	0	0	0	7	
TOTAL	**0**	**1073**	**136**	**1209**	**15**	**1712**	**4**	**1731**	**2940**	**154**	**0**	**8**	**162**	**0**	**0**	**0**	**0**	**162**	**3102**	

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Vehicles (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Mid-Day Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
11:45 AM	0	89	10	99	0	130	0	130	229	3	0	0	3	0	0	0	0	3	232
Percent Trucks	#DIV/0!	1.1%	0.0%	1.0%	#DIV/0!	0.8%	#DIV/0!	0.8%	0.9%	0.0%	#DIV/0!	#DIV/0!	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.9%

Intersection Peak Hour Factor = 0.95

Mid-Day Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
2:00 PM	0	98	9	107	0	176	1	177	284	7	0	0	7	0	0	0	0	7	291
Percent Trucks	#DIV/0!	1.0%	0.0%	0.9%	#DIV/0!	0.0%	0.0%	0.0%	0.4%	0.0%	#DIV/0!	#DIV/0!	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.3%

Intersection Peak Hour Factor = 0.85

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (1-hour intervals)

	Sands Road									Smitana Road									
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	2	1	3	4	2	0	6	9	2	0	0	2	0	0	0	0	2	11
8:00 AM	0	0	2	2	2	3	0	5	7	2	0	6	8	0	0	0	0	8	15
9:00 AM	0	1	1	2	4	0	1	5	7	3	0	2	5	0	0	0	0	5	12
10:00 AM	0	3	3	6	1	4	0	5	11	4	0	0	4	0	0	0	0	4	15
11:00 AM	0	2	0	2	0	3	0	3	5	0	0	0	0	0	0	0	0	0	5
12:00 PM	0	2	0	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3
1:00 PM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2
2:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
6:00 PM	0	5	0	5	0	1	0	1	6	0	0	0	0	0	0	0	0	0	6
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**19**	**7**	**26**	**11**	**20**	**1**	**32**	**58**	**11**	**0**	**8**	**19**	**0**	**0**	**0**	**0**	**19**	**77**

24-Hour Truck Traffic Count

North Leg	100
South Leg	100
East Leg	-
West Leg	-

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:15 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	2
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
7:00 AM	0	0	0	0	3	1	0	4	4	0	0	0	0	0	0	0	0	0	4	11
7:15 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	13
7:30 AM	0	1	0	1	1	0	0	1	2	2	0	0	2	0	0	0	0	2	4	13
7:45 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	9

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	1	1	0	1	0	1	2	1	0	3	4	0	0	0	0	4	6	15
8:15 AM	0	0	1	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	12
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
8:45 AM	0	0	0	0	2	1	0	3	3	1	0	3	4	0	0	0	0	4	7	18
9:00 AM	0	0	0	0	2	0	1	3	3	0	0	0	0	0	0	0	0	0	3	12
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	2	12
9:30 AM	0	0	1	1	2	0	0	2	3	3	0	0	3	0	0	0	0	3	6	16
9:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	10
10:00 AM	0	1	2	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	15
10:15 AM	0	1	1	2	0	2	0	2	4	2	0	0	2	0	0	0	0	2	6	13
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
10:45 AM	0	1	0	1	1	2	0	3	4	2	0	0	2	0	0	0	0	2	6	10
11:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	5
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
11:30 AM	0	1	0	1	0	2	0	2	3	0	0	0	0	0	0	0	0	0	3	5
11:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
12:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:45 PM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	3
1:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:45 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:30 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
6:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6
6:15 PM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	5
6:30 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
6:45 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	2
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:30 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**19**	**7**	**26**	**11**	**20**	**1**	**32**	**58**	**11**	**0**	**8**	**19**	**0**	**0**	**0**	**0**	**19**	**77**	

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Total Trucks (15-minute intervals)

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums

Mid-Day Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
11:45 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2

Mid-Day Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
2:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1

Project Crystal Lake Engineering Services

Count Date 9/9/2023

Peds + Bikes in Crosswalks (1-hour intervals)

	Sands Road						Smitana Road						
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road						**Smitana Road**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road						Smitana Road							
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road						**Smitana Road**							
	Across North Leg			**Across South Leg**			**Across East Leg**			**Across West Leg**			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project	Crystal Lake Engineering Services	**Peds + Bikes in Crosswalks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road						Smitana Road							
	Across North Leg			Across South Leg			Across East Leg			Across West Leg			Intersection	Hour
Start Time	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total	Sums
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Totals for Traffic Peak Hour

Mid-Day Peak	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Mid-Day Peak	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total	Total
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	10
12:15 AM	0	0	0	0	0	2	0	2	2	1	0	0	1	0	0	0	0	1	3	10
12:30 AM	0	0	1	1	0	1	0	1	2	1	0	0	1	0	0	0	0	1	3	9
12:45 AM	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	2	8
1:00 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	7
1:15 AM	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	1	2	6
1:30 AM	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	1	2	5
1:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
2:00 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
2:15 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6
2:30 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6
2:45 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	6
3:00 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	8
3:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	8
3:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	8
3:45 AM	0	1	1	2	0	2	0	2	4	0	0	0	0	0	0	0	0	0	4	7
4:00 AM	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	2	5
4:15 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
4:45 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	11
5:00 AM	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	2	13
5:15 AM	0	3	1	4	0	1	0	1	5	0	0	0	0	0	0	0	0	0	5	15
5:30 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	20
5:45 AM	0	3	0	3	0	1	0	1	4	0	0	0	0	0	0	0	0	0	4	27
6:00 AM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	30
6:15 AM	0	6	2	8	0	2	0	2	10	0	0	0	0	0	0	0	0	0	10	40
6:30 AM	0	5	1	6	0	3	0	3	9	0	0	0	0	0	0	0	0	0	9	45
6:45 AM	0	6	0	6	0	1	0	1	7	0	0	0	0	0	0	0	0	0	7	64
7:00 AM	0	6	1	7	1	6	0	7	14	0	0	0	0	0	0	0	0	0	14	85
7:15 AM	0	6	3	9	0	6	0	6	15	0	0	0	0	0	0	0	0	0	15	92
7:30 AM	0	10	2	12	0	13	0	13	25	3	0	0	3	0	0	0	0	3	28	98
7:45 AM	0	12	5	17	0	11	0	11	28	0	0	0	0	0	0	0	0	0	28	106

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	9	7	16	0	5	0	5	21	0	0	0	0	0	0	0	0	0	21	112
8:15 AM	0	7	3	10	0	10	0	10	20	1	0	0	1	0	0	0	0	1	21	130
8:30 AM	0	13	4	17	0	18	0	18	35	1	0	0	1	0	0	0	0	1	36	151
8:45 AM	0	19	4	23	0	10	0	10	33	1	0	0	1	0	0	0	0	1	34	163
9:00 AM	0	25	1	26	0	12	0	12	38	1	0	0	1	0	0	0	0	1	39	178
9:15 AM	0	26	0	26	0	15	0	15	41	1	0	0	1	0	0	0	0	1	42	197
9:30 AM	0	23	0	23	0	24	0	24	47	1	0	0	1	0	0	0	0	1	48	222
9:45 AM	0	26	0	26	0	20	0	20	46	3	0	0	3	0	0	0	0	3	49	237
10:00 AM	0	24	0	24	0	33	0	33	57	1	0	0	1	0	0	0	0	1	58	255
10:15 AM	0	23	4	27	0	37	0	37	64	3	0	0	3	0	0	0	0	3	67	258
10:30 AM	0	24	1	25	0	34	0	34	59	4	0	0	4	0	0	0	0	4	63	254
10:45 AM	0	27	2	29	0	35	0	35	64	3	0	0	3	0	0	0	0	3	67	251
11:00 AM	0	23	3	26	0	32	0	32	58	3	0	0	3	0	0	0	0	3	61	239
11:15 AM	0	18	6	24	1	37	0	38	62	1	0	0	1	0	0	0	0	1	63	236
11:30 AM	0	24	1	25	0	32	0	32	57	3	0	0	3	0	0	0	0	3	60	229
11:45 AM	0	24	0	24	0	31	0	31	55	0	0	0	0	0	0	0	0	0	55	230
12:00 PM	0	22	4	26	0	32	0	32	58	0	0	0	0	0	0	0	0	0	58	236
12:15 PM	0	25	2	27	0	27	0	27	54	2	0	0	2	0	0	0	0	2	56	245
12:30 PM	0	17	4	21	0	39	0	39	60	1	0	0	1	0	0	0	0	1	61	241
12:45 PM	0	15	0	15	0	41	0	41	56	5	0	0	5	0	0	0	0	5	61	246
1:00 PM	0	25	2	27	0	37	0	37	64	3	0	0	3	0	0	0	0	3	67	255
1:15 PM	0	21	0	21	0	25	0	25	46	6	0	0	6	0	0	0	0	6	52	274
1:30 PM	0	19	3	22	2	40	0	42	64	2	0	0	2	0	0	0	0	2	66	282
1:45 PM	0	25	3	28	0	38	0	38	66	4	0	0	4	0	0	0	0	4	70	284
2:00 PM	0	29	1	30	0	54	0	54	84	2	0	0	2	0	0	0	0	2	86	290
2:15 PM	0	18	2	20	0	39	0	39	59	1	0	0	1	0	0	0	0	1	60	278
2:30 PM	0	24	4	28	0	37	0	37	65	3	0	0	3	0	0	0	0	3	68	273
2:45 PM	0	26	2	28	0	46	1	47	75	1	0	0	1	0	0	0	0	1	76	268
3:00 PM	0	21	4	25	0	47	0	47	72	2	0	0	2	0	0	0	0	2	74	250
3:15 PM	0	21	0	21	0	32	0	32	53	2	0	0	2	0	0	0	0	2	55	244
3:30 PM	0	22	1	23	0	37	0	37	60	3	0	0	3	0	0	0	0	3	63	250
3:45 PM	0	17	5	22	0	35	0	35	57	1	0	0	1	0	0	0	0	1	58	257

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Passenger Cars

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	25	2	27	0	37	0	37	64	4	0	0	4	0	0	0	0	4	68	256
4:15 PM	0	18	2	20	0	38	0	38	58	3	0	0	3	0	0	0	0	3	61	252
4:30 PM	0	23	3	26	0	38	0	38	64	6	0	0	6	0	0	0	0	6	70	243
4:45 PM	0	22	1	23	0	32	0	32	55	2	0	0	2	0	0	0	0	2	57	222
5:00 PM	0	28	1	29	0	31	0	31	60	4	0	0	4	0	0	0	0	4	64	220
5:15 PM	0	12	5	17	0	32	0	32	49	3	0	0	3	0	0	0	0	3	52	210
5:30 PM	0	14	3	17	0	30	0	30	47	2	0	0	2	0	0	0	0	2	49	210
5:45 PM	0	13	1	14	0	38	0	38	52	3	0	0	3	0	0	0	0	3	55	200
6:00 PM	0	17	0	17	0	32	0	32	49	5	0	0	5	0	0	0	0	5	54	189
6:15 PM	0	14	2	16	0	33	1	34	50	2	0	0	2	0	0	0	0	2	52	167
6:30 PM	0	10	1	11	0	26	0	26	37	2	0	0	2	0	0	0	0	2	39	153
6:45 PM	0	11	1	12	0	25	0	25	37	7	0	0	7	0	0	0	0	7	44	152
7:00 PM	0	13	0	13	0	17	1	18	31	1	0	0	1	0	0	0	0	1	32	137
7:15 PM	0	8	0	8	0	28	0	28	36	2	0	0	2	0	0	0	0	2	38	135
7:30 PM	0	13	3	16	0	20	0	20	36	2	0	0	2	0	0	0	0	2	38	130
7:45 PM	0	7	3	10	0	18	0	18	28	1	0	0	1	0	0	0	0	1	29	116
8:00 PM	0	6	2	8	0	21	0	21	29	1	0	0	1	0	0	0	0	1	30	102
8:15 PM	0	11	1	12	0	20	0	20	32	1	0	0	1	0	0	0	0	1	33	99
8:30 PM	0	2	0	2	0	21	0	21	23	1	0	0	1	0	0	0	0	1	24	79
8:45 PM	0	2	0	2	0	12	0	12	14	1	0	0	1	0	0	0	0	1	15	63
9:00 PM	0	2	1	3	0	19	0	19	22	5	0	0	5	0	0	0	0	5	27	62
9:15 PM	0	4	0	4	0	9	0	9	13	0	0	0	0	0	0	0	0	0	13	44
9:30 PM	0	2	0	2	0	6	0	6	8	0	0	0	0	0	0	0	0	0	8	39
9:45 PM	0	3	0	3	0	11	0	11	14	0	0	0	0	0	0	0	0	0	14	46
10:00 PM	0	1	0	1	0	7	0	7	8	1	0	0	1	0	0	0	0	1	9	41
10:15 PM	0	2	1	3	0	4	0	4	7	1	0	0	1	0	0	0	0	1	8	47
10:30 PM	0	3	1	4	0	9	0	9	13	2	0	0	2	0	0	0	0	2	15	42
10:45 PM	0	4	1	5	0	3	0	3	8	1	0	0	1	0	0	0	0	1	9	42
11:00 PM	0	4	1	5	0	7	0	7	12	3	0	0	3	0	0	0	0	3	15	40
11:15 PM	0	1	1	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3	
11:30 PM	0	1	1	2	0	12	0	12	14	1	0	0	1	0	0	0	0	1	15	
11:45 PM	0	3	0	3	0	4	0	4	7	0	0	0	0	0	0	0	0	0	7	
TOTAL	**0**	**1054**	**129**	**1183**	**4**	**1692**	**3**	**1699**	**2882**	**143**	**0**	**0**	**143**	**0**	**0**	**0**	**0**	**143**	**3025**	

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
7:00 AM	0	0	0	0	3	0	0	3	3	0	0	0	0	0	0	0	0	0	3	10
7:15 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	13
7:30 AM	0	1	0	1	1	0	0	1	2	2	0	0	2	0	0	0	0	2	4	13
7:45 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	9

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	1	1	0	1	0	1	2	1	0	3	4	0	0	0	0	4	6	14
8:15 AM	0	0	1	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	11
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
8:45 AM	0	0	0	0	2	0	0	2	2	1	0	3	4	0	0	0	0	4	6	17
9:00 AM	0	0	0	0	2	0	1	3	3	0	0	0	0	0	0	0	0	0	3	12
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	2	12
9:30 AM	0	0	1	1	2	0	0	2	3	3	0	0	3	0	0	0	0	3	6	15
9:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	9
10:00 AM	0	1	2	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	14
10:15 AM	0	1	1	2	0	1	0	1	3	2	0	0	2	0	0	0	0	2	5	11
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
10:45 AM	0	1	0	1	1	2	0	3	4	2	0	0	2	0	0	0	0	2	6	8
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
11:30 AM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	3
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:00 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:45 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:30 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Single-Unit Trucks/Buses

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
6:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
6:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**14**	**7**	**21**	**11**	**10**	**1**	**22**	**43**	**11**	**0**	**8**	**19**	**0**	**0**	**0**	**0**	**19**	**62**	

Project	Crystal Lake Engineering Services	**Multi-Unit Trucks**	Subtitle or Limits:	Client:	Village of Crystal Lake
Count Date	9/9/2023			Project #:	3045 - 01.09

	Sands Road									**Smitana Road**										
	North Approach				**South Approach**				Both	**East Approach**				**West Approach**				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:15 AM	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	2
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Multi-Unit Trucks

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	3
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
11:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:45 PM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: Crystal Lake Engineering Services
Count Date: 9/9/2023

Multi-Unit Trucks

Subtitle or Limits:

Client: Village of Crystal Lake
Project #: 3045 - 01.09

	Sands Road									Smitana Road										
	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection	Hour
Start Time	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total	Sums
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:15 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
6:30 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
6:45 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:30 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
10:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	**0**	**5**	**0**	**5**	**0**	**10**	**0**	**10**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15**	

APPENDIX B

CMAP Correspondence

Civiltech Engineering, Inc.
www.civiltechinc.com

Two Pierce Place, Suite 1400
Itasca, IL 60143
Phone: 630.773.3900
Fax: 630.773.3975

30 N LaSalle Street, Suite 2624
Chicago, IL 60602
Phone: 312.726.5910
Fax: 312.726.5911

Transportation

Civil

Construction

Environmental

Water Resources

Structural

Appraisal

November 11, 2020

Mr. Jose Rodriguez, PTP, AICP
Senior Planner, Research Analysis
Attn: Traffic Projections
Chicago Metropolitan Agency for Planning (CMAP)
233 South Wacker Drive, Suite 800
Chicago, IL 60606

Re: Casey's General Store and Gas Station Traffic Impact Study
City of Crystal Lake
2050 Traffic Projections

Dear Mr. Rodriguez:

The City of Crystal Lake has requested a Traffic Impact Study (TIS) for a proposed redevelopment of a 6.8 acre property located on the north east quadrant of the intersection of U.S. Route 14 (Northwest Highway) and Sands Road.

As IDOT will be reviewing the study as part of their permit process, we are requesting that your office furnish us with Design Year (2050) traffic projections for the intersection of U.S. Route 14 (Northwest Highway) and Sands Road.

Included for your reference are the following items:

Exhibit 1 – Regional Location Map

Exhibit 2 – Existing Conditions Map

Exhibit 3 – 2020 Peak Hour Diagram and ADT

Exhibit 4 - Current Site Plan dated October 12, 2020.

Please note that the enclosed Peak Hour Diagram includes ADT estimates based on peak hour intersection turning movement counts performed November 3, 2020.

U.S. Route 14 (Northwest Highway) is generally a four-lane other principal arterial that has an east/west orientation. The roadway is under the jurisdiction of the Illinois Department of Transportation (IDOT), and has been designated a Strategic Regional Arterial (SRA). At its intersection with Sands Road, U.S. Route 14 provides one exclusive left-turn lane, a through lane, and one shared through/right-turn lane on the east approach and provides one exclusive left-turn lane, two through lanes, and one shared through/right-turn lane on the west approach. U.S. Route 14 has a posted speed limit of 40 mph. The signalized intersection of U.S. Route 14 with Sands Road is approximately 1,100 feet east of the IL Route 31 interchange with U.S. Route 14 and is interconnected to the signals at that interchange.

Sands Road is a two-lane north/south-oriented local road under the jurisdiction of the City of Crystal Lake that provides one travel lane in each direction. At its intersection with U.S. Route 14, there is one exclusive left turn lane and one

shared through lane/right turn lane in both directions. Sands Road has a posted speed limit of 30 mph.

Surrounding land uses include strip commercial on the northwest and southwest quadrants of the intersection, low density residential on the southeast quadrant of the intersection, and some light industrial uses north of the intersection along the west side of Sands Road.

Please review the enclosed traffic data and provide us with suggested Design Year 2050 Build ADTs with respect to your model for our project area for the two alternatives.

If you have any questions, please contact me at bdesalle@civiltechinc.com.

Very truly yours,



Brian R. DeSalle, P.E., PTOE
Civiltech Engineering, Inc.

Enclosures

Cc: Abby Wilgreen, P.E., City of Crystal Lake

TRAFFIC FORECAST RECORD

Record Number: mc-15-20

Type of Report: Projection

Year Sought: 2050

Analyst: JAR

Organization requesting forecast: Civiltech

Contact: Anmol Shrivastava, P.E., PTOE

Email or Phone AShrivastava@civiltechinc.com

Sponsor: City of Crystal Lake

Date request was received: November 11, 2020

Date that response was emailed: November 11, 2020

Facility Location: US 14 (Northwest Highway) @ Sands Road

Municipality: Crystal Lake

Chicago Metropolitan Agency for Planning

433 West Van Buren Street
Suite 450
Chicago, IL 60607

312-454-0400
cmap.illinois.gov

November 11, 2020

Anmol Shrivastava, P.E., PTOE
Civiltech Engineering, Inc.
Two Pierce Place
Suite 1400
Itasca, IL 60143

Subject: ***US 14 (Northwest Highway) @ Sands Road***
City of Crystal Lake

Dear Mr. Shrivastava:

In response to a request made on your behalf and dated November 11, 2020, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current Volumes	Year 2050 ADT
US 14 west of Sands Road	25,300	48,200
US 14 east of Sands Road	23,000	47,000
Sands Road north of US 14	2,700	3,460
Sands Road south of US 14	4,800	6,160

Traffic projections are developed using existing ADT data provided in the request letter and the results from the June 2020 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2050 socioeconomic projections and assumes the implementation of the ON TO 2050 Comprehensive Regional Plan for the Northeastern Illinois area. The provision of this data in support of your request does not constitute a CMAP endorsement of the proposed development or any subsequent developments.

If you have any questions, please call me at (312) 386-8806.

Sincerely,

Jose Rodriguez, PTP, AICP
Senior Planner, Research & Analysis

cc: Wintergreen (City of Crystal Lake); Quigley (IDOT)
\2020_TrafficForecast\CrystalLake\mc-15-20\mc-15-20.docx

APPENDIX C

NVA Facility Traffic Data

Enter 10-02-23			
Hour Start	assenger Ca	Trucks	Total
12:00 AM	CI-1		1
1:00 AM			
2:00 AM	CI-2		2
3:00 AM	CI-1		1
4:00 AM			
5:00 AM	CI-3		3
6:00 AM	CI-7		7
7:00 AM	CI-26		26
8:00 AM	CI-9	TI-1	10
9:00 AM	CI-4	TI-2	6
10:00 AM	CI-5	TI-2	7
11:00 AM	CI-2		2
12:00 PM		TI-2	2
1:00 PM	CI-3	TI-2	5
2:00 PM	CI-3		3
3:00 PM	CI-1		1
4:00 PM	CI1	TI-1	2
5:00 PM	CI-1	TI-2	3
6:00 PM			
7:00 PM			
8:00 PM			
9:00 PM			
10:00 PM			
11:00 PM			

Enter 10-03-23			
Hour Start	assenger C	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM	CI-1		1
6:00 AM	CI-1	TI-1	2
7:00 AM	CI-24		24
8:00 AM	CI-5		5
9:00 AM			
10:00 AM	CI-4		4
11:00 AM	CI-5	TI-2	7
12:00 PM	CI-5		5
1:00 PM	CI-5		5
2:00 PM	CI-1		1
3:00 PM	CI-3		3
4:00 PM	CI-1		1
5:00 PM	CI-1		1
6:00 PM	CI-2		2
7:00 PM			
8:00 PM			
9:00 PM			
10:00 PM	CI-1		1
11:00 PM			

Enter 10-04-23			
Hour Start	assenger C	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM	CI-1		1
7:00 AM	CI-23	TI-1	24
8:00 AM	CI-3		3
9:00 AM	CI-3		3
10:00 AM	CI-3		3
11:00 AM	CI-1		1
12:00 PM	CI-4	TI-3	7
1:00 PM	CI-7		7
2:00 PM	CI-5		5
3:00 PM	CI-3	TI-1	4
4:00 PM		TI-1	1
5:00 PM		TI-1	1
6:00 PM		TI-1	1
7:00 PM	CI-1		1
8:00 PM			
9:00 PM		TI-1	1
10:00 PM			
11:00 PM			

Enter 10-05-23			
Hour Start	assenger C	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM	CI-1		1
6:00 AM			
7:00 AM	CI-23		23
8:00 AM	CI-4		4
9:00 AM	CI-1	TI-1	2
10:00 AM	CI-6	TI-1	7
11:00 AM			
12:00 PM	CI-1		1
1:00 PM	CI-7	TI-1	8
2:00 PM	CI-2		2
3:00 PM		TI-1	1
4:00 PM	CI-2		2
5:00 PM			
6:00 PM		TI-1	1
7:00 PM			
8:00 PM		TI-1	1
9:00 PM			
10:00 PM			
11:00 PM			

Enter Friday 10.6.2023			
Hour Start	assenger C	Trucks	Total
12:00 AM		TI-1	1
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM			
7:00 AM	CI-23	TI-1	24
8:00 AM	CI-3		3
9:00 AM	CI-4	TI-2	6
10:00 AM	CI-4	TI-4	8
11:00 AM	CI-5		5
12:00 PM		TI-2	2
1:00 PM	CI-5	TI-1	6
2:00 PM	ci-1		1
3:00 PM	CI-3		3
4:00 PM	CI-4	TI-1	5
5:00 PM	CI-2	TI-1	3
6:00 PM	CI-3	TI-3	6
7:00 PM	CI-3	TI-2	5
8:00 PM	CI-2	TI-4	6
9:00 PM	CI-1	TI-2	3
10:00 PM	CI-1		1
11:00 PM		TI-2	2

Exiting Traffic 10-02-23			
Hour Start	assenger Ca	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM	Cr-1	Tr-2	3
6:00 AM		Tr-2	2
7:00 AM	Cr-2	Tr-6	8
8:00 AM	Cr-5	Tr-5	10
9:00 AM	Cr-5	Tr-4	9
10:00 AM	Cr-7	Tr-4	11
11:00 AM	Cr-1		1
12:00 PM	Cr-4	Tr-2	6
1:00 PM			
2:00 PM	Cr-5		5
3:00 PM	Cr-1		1
4:00 PM	Cr-8		8
5:00 PM	Cr-8		8
6:00 PM	Cr-11	Tr-1	12
7:00 PM	Cr-1	Tr-1	2
8:00 PM			
9:00 PM			
10:00 PM			
11:00 PM			

Exiting Traffic 10-03-23			
Hour Start	assenger C	Trucks	Total
12:00 AM			
1:00 AM	Cr-1		1
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM		Tr-1	1
7:00 AM		Tr-1	1
8:00 AM			
9:00 AM	Cr-2		2
10:00 AM	Cr-3	Tr-1	4
11:00 AM	Cr-6		6
12:00 PM	Cr-1	Tr-1	2
1:00 PM	Cr-3		3
2:00 PM	Cr-3	Tr-1	4
3:00 PM	Cr-3		3
4:00 PM	Cr-8		8
5:00 PM	Cr-8		8
6:00 PM	Cr-11		11
7:00 PM	Cr-1		1
8:00 PM			
9:00 PM			
10:00 PM			
11:00 PM			

Exiting Traffic 10-04-23			
Hour Start	assenger C	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM			
7:00 AM			
8:00 AM	Cr-1		1
9:00 AM	Cr-1	Tr-2	3
10:00 AM	Cr-4	Tr-1	5
11:00 AM	Cr-3	Tr-1	4
12:00 PM	Cr-6	Tr-1	7
1:00 PM	Cr-7	Tr-2	9
2:00 PM	Cr-4		4
3:00 PM	Cr-2		2
4:00 PM	Cr-9		9
5:00 PM	Cr-8	Tr-1	9
6:00 PM	Cr15		15
7:00 PM			
8:00 PM	Cr-1		1
9:00 PM			
10:00 PM			
11:00 PM			

Exiting Traffic 10-05-23			
Hour Start	assenger C	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM	Cr-1		1
6:00 AM			
7:00 AM			
8:00 AM	Cr-2		2
9:00 AM	Cr-1	Tr-2	3
10:00 AM	Cr-6	Tr-1	7
11:00 AM			
12:00 PM	Cr-2		2
1:00 PM	Cr-6		6
2:00 PM		Tr-1	1
3:00 PM	Cr-2		2
4:00 PM	Cr-2		2
5:00 PM	Cr-10		10
6:00 PM	Cr-9		9
7:00 PM			
8:00 PM	Cr-1		1
9:00 PM			
10:00 PM			
11:00 PM			

Exiting Traffic Friday 10.6.23			
Hour Start			
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM			
7:00 AM	Cr-1	Tr-1	2
8:00 AM	Cr-3		3
9:00 AM	Cr-3		3
10:00 AM	Cr-2	Tr-1	3
11:00 AM	Cr-5		5
12:00 PM	Cr-3		3
1:00 PM	Cr-7		7
2:00 PM	Cr-1		1
3:00 PM	Cr-1		1
4:00 PM	Cr-7		7
5:00 PM	Cr-11		11
6:00 PM	Cr-8		8
7:00 PM	Cr-7		7
8:00 PM	Cr-6		6
9:00 PM	Cr-4		4
10:00 PM	Cr-1		1
11:00 PM	Cr-2		2

Entering 10.07.2023			
Hour Start	Passenger Cars	Trucks	Total
12:00 AM		Tl-1	1
1:00 AM		Tl-2	2
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM		Tl-1	1
6:00 AM	Cl-1		1
7:00 AM	Cl-10	Tl-2	12
8:00 AM	Cl-4		4
9:00 AM	Cl-1		1
10:00 AM	Cl-2	Tl-1	3
11:00 AM	Cl-6		6
12:00 PM	Cl-3	Tl-2	5
1:00 PM	Cl-2		2
2:00 PM	Cl-2	Tl-1	3
3:00 PM	Cl2	Tl-1	3
4:00 PM			
5:00 PM	Cl-2		2
6:00 PM			
7:00 PM			
8:00 PM	Cl-1		1
9:00 PM	Cl-1		1
10:00 PM			
11:00 PM			

Entering Sunday 10.8.2023			
Hour Start	Passenger Cars	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM	Cl-1		1
7:00 AM			
8:00 AM	Cl-2		2
9:00 AM	Cl-2		2
10:00 AM	Cl-1	Tl-1	2
11:00 AM	Cl-2		2
12:00 PM	Cl-3		3
1:00 PM			
2:00 PM	Cl-1		1
3:00 PM			
4:00 PM	Cl-6		6
5:00 PM	Cl-3	Tl-1	4
6:00 PM	Cl-1		1
7:00 PM	Cl-2		2
8:00 PM	Cl-2		2
9:00 PM	Cl-1		1
10:00 PM	Cl-1		1
11:00 PM			

Exit 10.07.2023			
Hour Start	Passenger Cars	Trucks	Total
12:00 AM	Cr-1		1
1:00 AM	Cr-2		2
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM			
7:00 AM			
8:00 AM	Cr-4		4
9:00 AM	Cr-1		1
10:00 AM	Cr-2		2
11:00 AM	Cr-7		7
12:00 PM	Cr-4	Tr-1	5
1:00 PM	Cr-4		4
2:00 PM	Cr-3	Tr-3	6
3:00 PM	Cr-10	Tr-1	11
4:00 PM	Cr-4		4
5:00 PM	Cr-2		2
6:00 PM			
7:00 PM			
8:00 PM	Cr-1		1
9:00 PM			
10:00 PM	Cr-1		1
11:00 PM			

Exit Sunday 10.8.2023			
Hour Start	Passenger Cars	Trucks	Total
12:00 AM			
1:00 AM			
2:00 AM			
3:00 AM			
4:00 AM			
5:00 AM			
6:00 AM			
7:00 AM			
8:00 AM			
9:00 AM	Cr-2	Tr-2	4
10:00 AM	Cr-1	Tr-2	3
11:00 AM	Cr-1	Tr-1	2
12:00 PM	Cr-5	Tr-3	8
1:00 PM		Tr-1	1
2:00 PM	Cr-1		1
3:00 PM	Cr-1	Tr-1	2
4:00 PM	Cr-1	Tr-1	2
5:00 PM	Cr-3	Tr-4	7
6:00 PM		Tr-1	1
7:00 PM	Cr-1		1
8:00 PM	Cr-1	Tr-1	2
9:00 PM			
10:00 PM	Cr-1		1
11:00 PM			

Avg Existing Entering Traffic, Weekday

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	0	0	0
1:00 AM	0	0	0
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	1	0	1
6:00 AM	2	0	2
7:00 AM	24	0	24
8:00 AM	5	0	5
9:00 AM	2	1	3
10:00 AM	4	1	5
11:00 AM	3	0	3
12:00 PM	2	1	3
1:00 PM	5	1	6
2:00 PM	2	0	2
3:00 PM	2	0	2
4:00 PM	2	1	3
5:00 PM	1	1	2
6:00 PM	1	1	2
7:00 PM	1	0	1
8:00 PM	0	1	1
9:00 PM	0	1	1
10:00 PM	0	0	0
11:00 PM	0	0	0
Grand Total:	57	9	66

TRUCK SCALING FACTOR =	5.41
PC SCALING FACTOR =	2.35

Site Plan Total:
- 325 Truck Spots
- 61 Regular Spots
- 3 ADA Spots
- 33,000 SF

Existing Total:
- 60 truck spots
- 47 regular spots
- 3 ADA spots
- 14,000 SF

Site/Existing Ratios:

By Floor: 2.35

By Truck Spots: 5.41

By Parking Spots: 1.29

Weekday Trip Gen - Enter

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	0	0	0
1:00 AM	0	0	0
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	2	0	2
6:00 AM	5	0	5
7:00 AM	56	0	56
8:00 AM	12	0	12
9:00 AM	5	5	10
10:00 AM	9	5	14
11:00 AM	7	0	7
12:00 PM	5	5	10
1:00 PM	12	5	17
2:00 PM	5	0	5
3:00 PM	5	0	5
4:00 PM	5	5	10
5:00 PM	2	5	7
6:00 PM	2	5	7
7:00 PM	2	0	2
8:00 PM	0	5	5
9:00 PM	0	5	5
10:00 PM	0	0	0
11:00 PM	0	0	0
Grand Total:	134	45	179

Avg Existing Exiting Traffic, Weekday

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	0	0	0
1:00 AM	0	0	0
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	0	0	0
6:00 AM	0	1	1
7:00 AM	1	2	3
8:00 AM	2	1	3
9:00 AM	2	2	4
10:00 AM	4	2	6
11:00 AM	3	0	3
12:00 PM	3	1	4
1:00 PM	5	0	5
2:00 PM	3	0	3
3:00 PM	2	0	2
4:00 PM	7	0	7
5:00 PM	9	0	9
6:00 PM	11	0	11
7:00 PM	2	0	2
8:00 PM	2	0	2
9:00 PM	1	0	1
10:00 PM	0	0	0
11:00 PM	0	0	0
Grand Total:	57	9	66

Weekday Trip Gen - Exit

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	0	0	0
1:00 AM	0	0	0
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	0	0	0
6:00 AM	0	5	5
7:00 AM	2	11	13
8:00 AM	5	5	10
9:00 AM	5	11	16
10:00 AM	9	11	20
11:00 AM	7	0	7
12:00 PM	7	5	12
1:00 PM	12	0	12
2:00 PM	7	0	7
3:00 PM	5	0	5
4:00 PM	16	0	16
5:00 PM	21	0	21
6:00 PM	26	0	26
7:00 PM	5	0	5
8:00 PM	5	0	5
9:00 PM	2	0	2
10:00 PM	0	0	0
11:00 PM	0	0	0
Grand Total:	134	48	182

Existing Entering Traffic Sat

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	0	1	1
1:00 AM	0	2	2
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	0	1	1
6:00 AM	1	0	1
7:00 AM	10	2	12
8:00 AM	4	0	4
9:00 AM	1	0	1
10:00 AM	2	1	3
11:00 AM	6	0	6
12:00 PM	3	2	5
1:00 PM	2	0	2
2:00 PM	2	1	3
3:00 PM	2	1	3
4:00 PM	0	0	0
5:00 PM	2	0	2
6:00 PM	0	0	0
7:00 PM	0	0	0
8:00 PM	1	0	1
9:00 PM	1	0	1
10:00 PM	0	0	0
11:00 PM	0	0	0
Grand Total:	37	11	48

TRUCK SCALING FACTOR =	5.41
PC SCALING FACTOR =	2.35

Site Plan Total:
- 325 Truck Spots
- 61 Regular Spots
- 3 ADA Spots
- 33,000 SF

Existing Total:
- 60 truck spots
- 47 regular spots
- 3 ADA spots
- 14,000 SF

Site/Existing Ratios:

By Floor: 2.35

By Truck Spots: 5.41

By Parking Spots: 1.29

Weekend Trip Gen - Enter

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	0	5	5
1:00 AM	0	11	11
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	0	5	5
6:00 AM	2	0	2
7:00 AM	24	11	35
8:00 AM	9	0	9
9:00 AM	2	0	2
10:00 AM	5	5	10
11:00 AM	14	0	14
12:00 PM	7	11	18
1:00 PM	5	0	5
2:00 PM	5	5	10
3:00 PM	5	5	10
4:00 PM	0	0	0
5:00 PM	5	0	5
6:00 PM	0	0	0
7:00 PM	0	0	0
8:00 PM	2	0	2
9:00 PM	2	0	2
10:00 PM	0	0	0
11:00 PM	0	0	0
Grand Total:	87	58	145

Existing Exiting Traffic Sat

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	1	0	1
1:00 AM	2	0	2
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	0	0	0
6:00 AM	0	0	0
7:00 AM	0	0	0
8:00 AM	4	0	4
9:00 AM	1	0	1
10:00 AM	2	0	2
11:00 AM	7	0	7
12:00 PM	4	1	5
1:00 PM	4	0	4
2:00 PM	3	3	6
3:00 PM	10	1	11
4:00 PM	4	0	4
5:00 PM	2	0	2
6:00 PM	0	0	0
7:00 PM	0	0	0
8:00 PM	1	0	1
9:00 PM	0	0	0
10:00 PM	1	0	1
11:00 PM	0	0	0
Grand Total:	46	5	51

Weekend Trip Gen - Exit

Hour Start	Passenger Cars	Trucks	Total
12:00 AM	2	0	2
1:00 AM	5	0	5
2:00 AM	0	0	0
3:00 AM	0	0	0
4:00 AM	0	0	0
5:00 AM	0	0	0
6:00 AM	0	0	0
7:00 AM	0	0	0
8:00 AM	9	0	9
9:00 AM	2	0	2
10:00 AM	5	0	5
11:00 AM	16	0	16
12:00 PM	9	5	14
1:00 PM	9	0	9
2:00 PM	7	16	23
3:00 PM	24	5	29
4:00 PM	9	0	9
5:00 PM	5	0	5
6:00 PM	0	0	0
7:00 PM	0	0	0
8:00 PM	2	0	2
9:00 PM	0	0	0
10:00 PM	2	0	2
11:00 PM	0	0	0
Grand Total:	106	26	132

APPENDIX D

ITE Trip Generation Manual Excerpts

Warehousing
(150)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Saturday, Peak Hour of Generator**

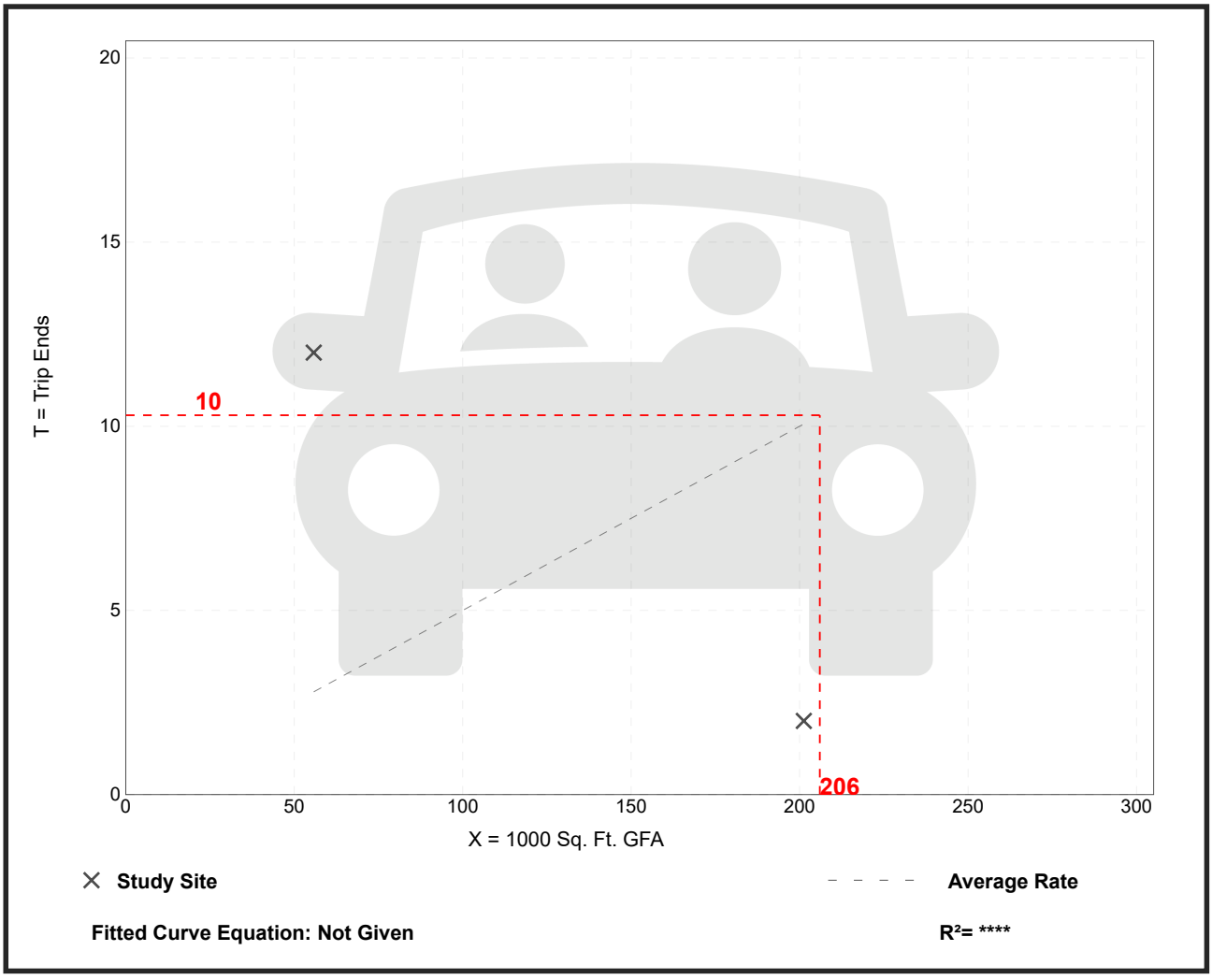
Setting/Location: **General Urban/Suburban**
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 129
Directional Distribution: 64% entering, 36% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.05	0.01 - 0.22	*

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= **

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Warehousing
(150)

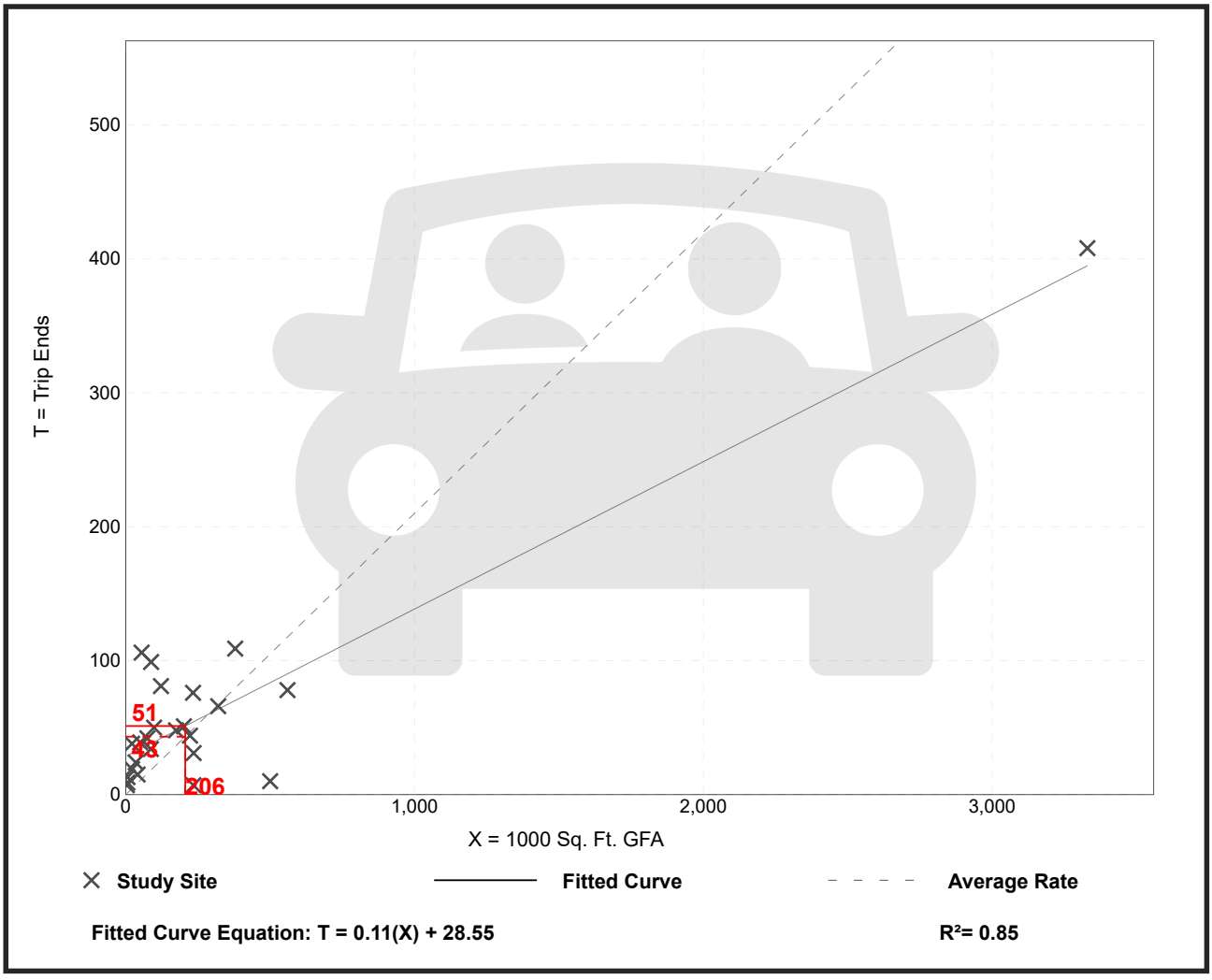
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
AM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. 1000 Sq. Ft. GFA: 284
Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.21	0.02 - 2.08	0.26

Data Plot and Equation



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Warehousing
(150)

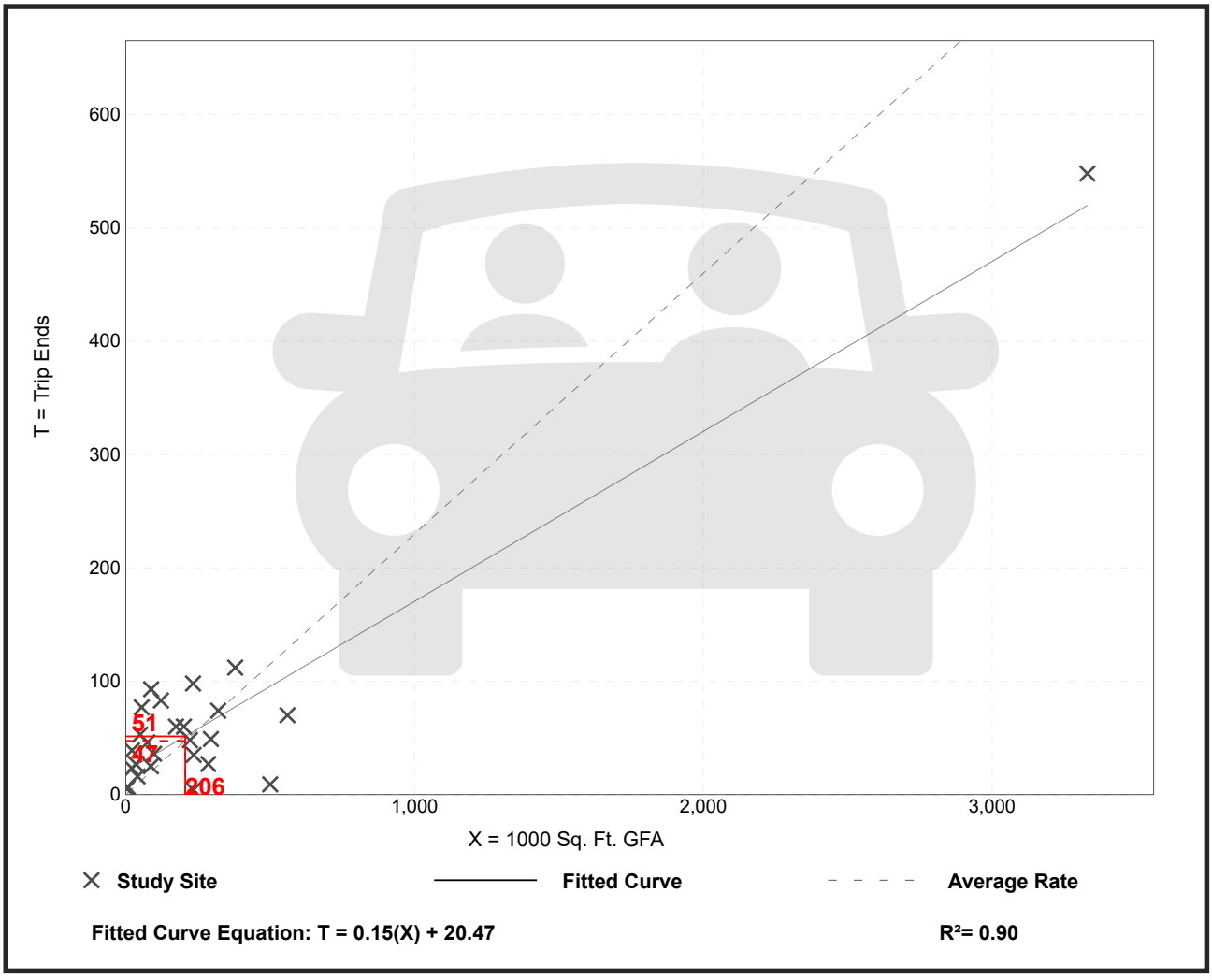
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
PM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. 1000 Sq. Ft. GFA: 284
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.23	0.02 - 1.80	0.23

Data Plot and Equation



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Warehousing
(150)

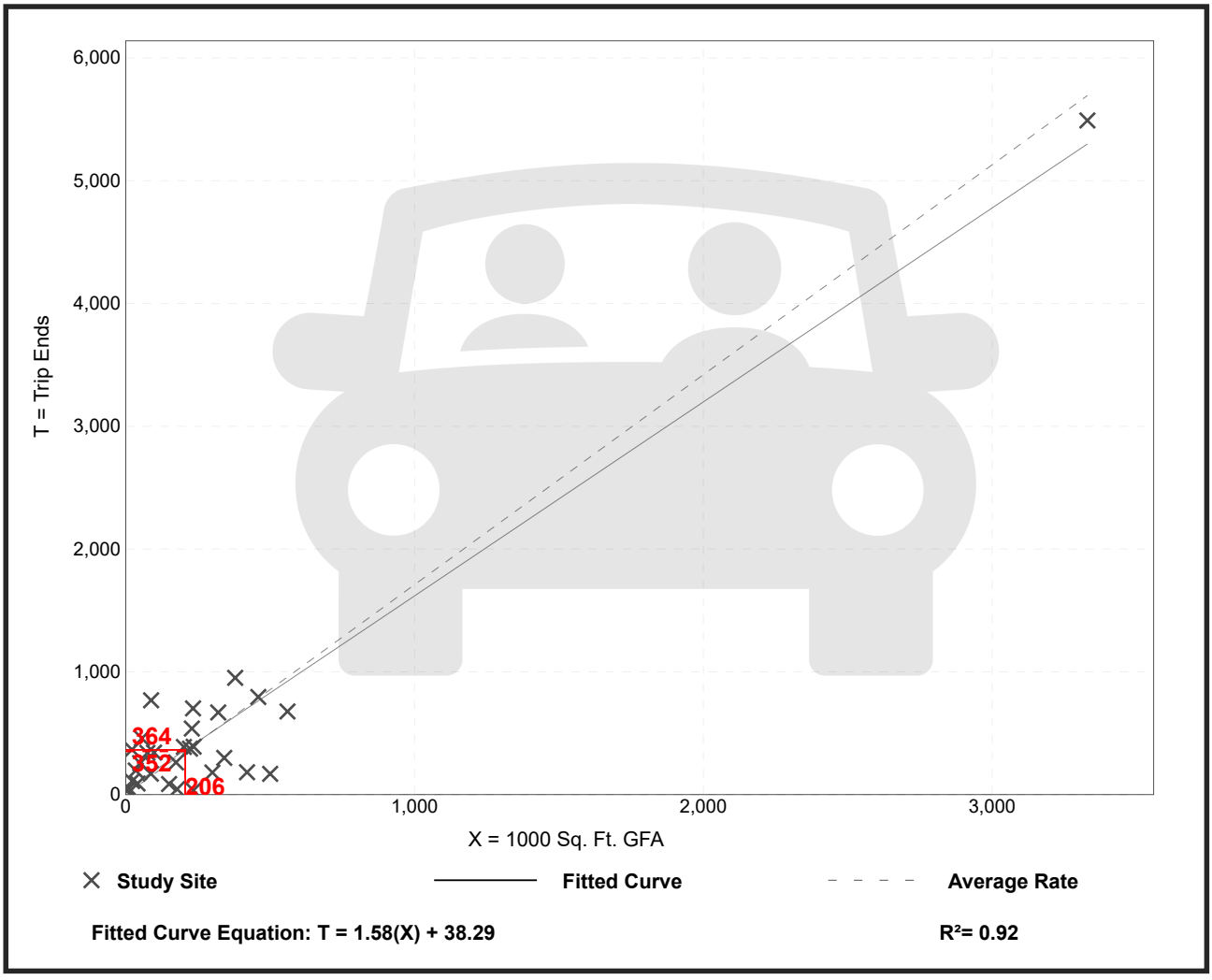
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 31
Avg. 1000 Sq. Ft. GFA: 292
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.71	0.15 - 16.93	1.48

Data Plot and Equation



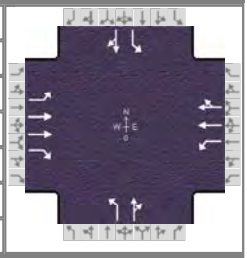
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APPENDIX E

HCS Analysis Results

HCS7 Signalized Intersection Results Summary

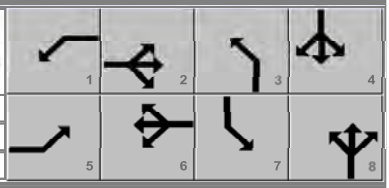
General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.93
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Existing_AM.xus		
Project Description	Sands TIS, AM Weekday Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	65	875	60	15	615	10	45	20	15	20	30	30

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.3	1.9	94.4	1.9	2.6	7.9	
Yellow	3.5	0.0	4.5	3.5	0.0	4.5	
Red	0.0	0.0	2.0	0.0	0.0	2.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	6.7	102.8	4.8	100.9	8.0	17.0	5.4	14.4
Change Period, ($Y+R_c$), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.2	4.2	9.2
Queue Clearance Time (g_s), s	3.3		2.3		5.4	4.7	3.4	6.6
Green Extension Time (g_e), s	0.2	0.0	0.0	0.0	0.0	1.3	0.0	1.1
Phase Call Probability	0.92		0.44		0.83	1.00	0.54	0.99
Max Out Probability	0.00		0.00		0.22	0.02	0.01	0.10

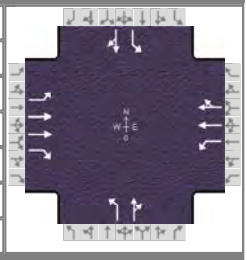
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	70	941	65	16	337	335	48	38		22	65	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1815	1510	1725	1906	1895	1711	1712		1810	1792	
Queue Service Time (g_s), s	1.3	11.8	1.5	0.3	7.6	7.6	3.4	2.7		1.4	4.6	
Cycle Queue Clearance Time (g_c), s	1.3	11.8	1.5	0.3	7.6	7.6	3.4	2.7		1.4	4.6	
Green Ratio (*g/C*)	0.75	0.74	0.74	0.74	0.73	0.73	0.10	0.08		0.08	0.06	
Capacity (*c*), veh/h	610	2688	1118	439	1385	1377	147	139		144	109	
Volume-to-Capacity Ratio (*X*)	0.115	0.350	0.058	0.037	0.243	0.243	0.328	0.272		0.149	0.592	
Back of Queue (*Q*), ft/ln (95 th percentile)	19.1	186.9	20.9	4.9	133.4	127	72.1	59.4		30.7	105.5	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.8	7.1	0.8	0.2	5.1	5.1	2.7	2.2		1.2	4.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.09	0.00	0.14	0.02	0.00	0.00	0.90	0.00		0.38	0.00	
Uniform Delay (d_1), s/veh	4.4	5.9	4.6	5.1	5.9	5.9	53.8	56.1		56.3	59.5	
Incremental Delay (d_2), s/veh	0.1	0.4	0.1	0.0	0.4	0.4	1.3	1.5		0.5	7.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	4.5	6.3	4.7	5.2	6.3	6.3	55.1	57.6		56.8	66.6	
Level of Service (LOS)	A	A	A	A	A	A	E	E		E	E	
Approach Delay, s/veh / LOS	6.0	A		6.3	A		56.2	E		64.1	E	
Intersection Delay, s/veh / LOS	11.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.86	B	1.86	B	2.32	B	2.47	B
Bicycle LOS Score / LOS	1.37	A	1.06	A	0.63	A	0.63	A

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HCS7 Signalized Intersection Results Summary

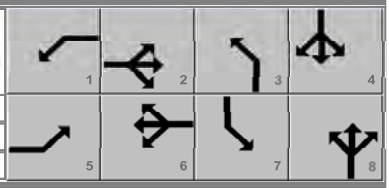
General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.95
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Existing_PM.xus		
Project Description	Sands TIS, PM Weekday Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	110	795	115	45	1190	15	140	60	50	35	35	45

Signal Information			
Cycle, s	145.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.8	2.3		98.4	3.7	3.8	10.5					
Yellow	3.5	0.0		4.5	3.5	3.5	4.5					
Red	0.0	0.0		2.0	0.0	0.0	2.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	8.6	107.2	6.3	104.9	14.5	24.3	7.2	17.0
Change Period, (*Y+R c*), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (*g s*), s	4.8		3.2		12.9	10.6	4.8	8.6
Green Extension Time (*g e*), s	0.3	0.0	0.1	0.0	0.0	2.5	0.0	1.9
Phase Call Probability	0.99		0.85		1.00	1.00	0.77	1.00
Max Out Probability	0.00		0.00		1.00	0.24	0.01	0.70

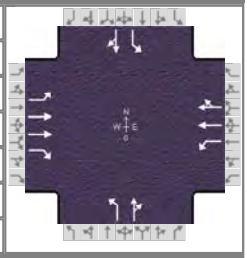
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	116	837	121	47	636	633	147	116		37	84	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1874	1610	1810	1969	1960	1795	1820		1767	1802	
Queue Service Time (*g s*), s	2.8	12.7	3.6	1.2	22.2	22.2	10.9	8.6		2.8	6.6	
Cycle Queue Clearance Time (*g c*), s	2.8	12.7	3.6	1.2	22.2	22.2	10.9	8.6		2.8	6.6	
Green Ratio (*g/C*)	0.72	0.69	0.69	0.70	0.68	0.68	0.16	0.12		0.10	0.07	
Capacity (*c*), veh/h	341	2603	1118	480	1336	1330	222	223		158	131	
Volume-to-Capacity Ratio (*X*)	0.339	0.321	0.108	0.099	0.476	0.476	0.664	0.518		0.234	0.644	
Back of Queue (*Q*), ft/ln (95 th percentile)	47.4	217.7	55.4	19.8	368.2	361.8	231.9	190.9		59.4	150.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.9	8.6	2.2	0.8	14.5	14.5	9.2	7.5		2.3	6.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.22	0.00	0.37	0.08	0.00	0.00	2.90	0.00		0.74	0.00	
Uniform Delay (*d 1*), s/veh	8.6	8.7	7.3	7.4	11.0	11.0	55.7	59.6		60.2	65.4	
Incremental Delay (*d 2*), s/veh	0.6	0.3	0.2	0.1	1.2	1.2	7.3	2.6		0.8	7.3	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.2	9.0	7.5	7.5	12.3	12.3	63.0	62.2		61.0	72.7	
Level of Service (LOS)	A	A	A	A	B	B	E	E		E	E	
Approach Delay, s/veh / LOS	8.9	A		12.1	B		62.6	E		69.2	E	
Intersection Delay, s/veh / LOS	18.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.87	B	1.88	B	2.32	B	2.48	B
Bicycle LOS Score / LOS	1.37	A	1.57	B	0.92	A	0.69	A

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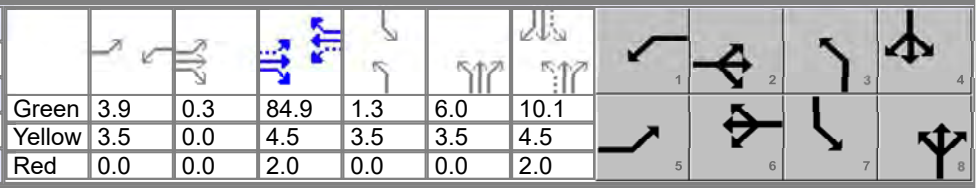
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.94
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Existing_Sat_Midday.xus		
Project Description	Sands TIS, Midday Weekend Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	85	815	210	75	895	5	210	50	95	15	45	30

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	3.9	0.3	84.9	1.3	6.0	10.1	
Yellow	3.5	0.0	4.5	3.5	3.5	4.5	
Red	0.0	0.0	2.0	0.0	0.0	2.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.7	91.8	7.4	91.4	14.3	26.0	4.8	16.6
Change Period, ($Y+R_c$), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (g_s), s	4.2		3.9		12.8	12.5	3.1	7.4
Green Extension Time (g_e), s	0.2	0.0	0.2	0.0	0.0	3.2	0.0	2.7
Phase Call Probability	0.96		0.94		1.00	1.00	0.44	1.00
Max Out Probability	0.00		0.00		1.00	0.22	0.00	0.48

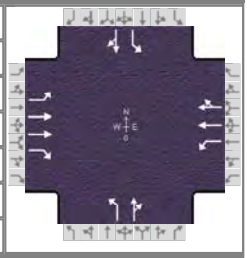
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	90	867	223	80	479	478	223	154		16	80	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1874	1610	1810	1969	1965	1795	1775		1810	1851	
Queue Service Time (g_s), s	2.2	13.5	7.2	1.9	14.5	14.5	10.8	10.5		1.1	5.4	
Cycle Queue Clearance Time (g_c), s	2.2	13.5	7.2	1.9	14.5	14.5	10.8	10.5		1.1	5.4	
Green Ratio (*g/C*)	0.69	0.66	0.66	0.68	0.65	0.65	0.18	0.15		0.09	0.08	
Capacity (*c*), veh/h	436	2458	1056	457	1286	1284	253	267		142	144	
Volume-to-Capacity Ratio (*X*)	0.207	0.353	0.212	0.175	0.373	0.373	0.885	0.578		0.113	0.555	
Back of Queue (*Q*), ft/ln (95 th percentile)	35.5	228.9	111.9	31.3	257.8	253.8	184	215.1		22.4	123.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.4	9.0	4.5	1.3	10.2	10.2	7.3	8.5		0.9	4.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00	0.75	0.13	0.00	0.00	2.30	0.00		0.28	0.00	
Uniform Delay (d_1), s/veh	7.7	10.0	8.9	7.8	10.3	10.3	52.8	51.4		54.6	57.8	
Incremental Delay (d_2), s/veh	0.2	0.4	0.5	0.2	0.8	0.8	28.8	2.8		0.3	4.7	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	8.0	10.4	9.4	8.0	11.2	11.2	81.6	54.2		54.9	62.5	
Level of Service (LOS)	A	B	A	A	B	B	F	D		D	E	
Approach Delay, s/veh / LOS	10.0	B		10.9	B		70.4	E		61.2	E	
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.88	B	2.31	B	2.47	B
Bicycle LOS Score / LOS	1.46	A	1.34	A	1.11	A	0.65	A

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.93
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Background 2030_AM.xus		
Project Description	Sands TIS, AM Weekday 2030 Background				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	135	970	65	25	730	10	50	35	15	55	40	75

Signal Information					EB			WB			NB		
Cycle, s	130.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	1.9	0.1		86.9	4.9	0.3	12.4		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5		4.5	3.5	0.0	4.5		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0		2.0	0.0	0.0	2.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.0	97.1	5.4	93.4	8.4	18.9	8.7	19.2
Change Period, (*Y+R c*), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (*g s*), s	5.2		2.7		5.7	5.7	5.8	10.9
Green Extension Time (*g e*), s	0.4	0.0	0.0	0.0	0.0	2.3	0.0	1.8
Phase Call Probability	0.99		0.62		0.86	1.00	0.88	1.00
Max Out Probability	0.00		0.00		0.32	0.19	0.39	0.56

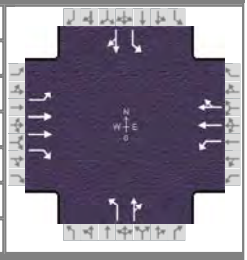
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	145	1043	70	27	399	397	54	54		59	124	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1815	1510	1725	1906	1897	1711	1750		1810	1748	
Queue Service Time (*g s*), s	3.2	15.9	1.9	0.7	11.4	11.4	3.7	3.7		3.8	8.9	
Cycle Queue Clearance Time (*g c*), s	3.2	15.9	1.9	0.7	11.4	11.4	3.7	3.7		3.8	8.9	
Green Ratio (*g/C*)	0.73	0.70	0.70	0.68	0.67	0.67	0.13	0.10		0.14	0.10	
Capacity (*c*), veh/h	527	2528	1052	373	1275	1269	136	167		219	171	
Volume-to-Capacity Ratio (*X*)	0.275	0.413	0.066	0.072	0.313	0.313	0.395	0.321		0.270	0.724	
Back of Queue (*Q*), ft/ln (95 th percentile)	48.9	253.8	28.4	10.8	211.6	201.6	78.2	83.7		79.6	198.2	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.9	9.7	1.1	0.4	8.1	8.1	3.0	3.1		3.2	7.7	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.22	0.00	0.19	0.04	0.00	0.00	0.98	0.00		1.00	0.00	
Uniform Delay (*d 1*), s/veh	6.2	8.4	6.3	7.5	9.0	9.0	50.9	54.8		50.3	56.9	
Incremental Delay (*d 2*), s/veh	0.3	0.5	0.1	0.1	0.6	0.6	1.8	1.6		0.7	8.0	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	6.5	8.9	6.4	7.5	9.7	9.7	52.7	56.4		51.0	64.9	
Level of Service (LOS)	A	A	A	A	A	A	D	E		D	E	
Approach Delay, s/veh / LOS	8.5	A		9.6	A		54.6	D		60.4	E	
Intersection Delay, s/veh / LOS	15.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.87	B	1.88	B	2.32	B	2.47	B
Bicycle LOS Score / LOS	1.53	B	1.17	A	0.67	A	0.79	A

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HCS7 Signalized Intersection Results Summary

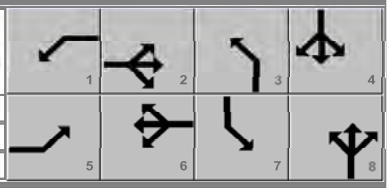
General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.95
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Background 2030_PM.xus		
Project Description	Sands TIS, PM Weekday Background 2030				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	185	880	130	60	1370	15	155	80	55	75	45	90

Signal Information			
Cycle, s	145.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.6	0.7	91.0	7.5	0.0	15.2						
Yellow	3.5	3.5	4.5	3.5	3.5	4.5						
Red	0.0	0.0	2.0	0.0	0.0	2.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.3	101.7	7.1	97.5	14.5	25.2	11.0	21.7
Change Period, (*Y+R c*), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (g_s), s	7.4		3.8		13.0	12.6	7.7	13.3
Green Extension Time (g_e), s	0.4	0.0	0.1	0.0	0.0	2.8	0.1	1.9
Phase Call Probability	1.00		0.92		1.00	1.00	0.96	1.00
Max Out Probability	0.06		0.00		1.00	0.83	0.54	1.00

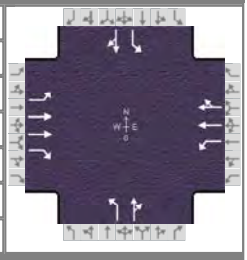
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	195	926	137	63	730	728	163	142		79	142	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1874	1610	1810	1969	1961	1795	1834		1767	1772	
Queue Service Time (g_s), s	5.4	16.3	4.6	1.8	31.8	31.9	11.0	10.6		5.7	11.3	
Cycle Queue Clearance Time (g_c), s	5.4	16.3	4.6	1.8	31.8	31.9	11.0	10.6		5.7	11.3	
Green Ratio (*g/C*)	0.70	0.66	0.66	0.65	0.63	0.63	0.19	0.13		0.16	0.10	
Capacity (*c*), veh/h	294	2461	1057	420	1236	1231	219	237		193	186	
Volume-to-Capacity Ratio (*X*)	0.662	0.376	0.129	0.150	0.591	0.591	0.744	0.600		0.410	0.766	
Back of Queue (*Q*), ft/ln (95 th percentile)	125.9	274.5	73.8	32	518.2	509.5	255.1	226.5		121.8	244.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	5.0	10.8	3.0	1.3	20.4	20.4	10.1	8.9		4.8	9.7	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.57	0.00	0.49	0.13	0.00	0.00	3.19	0.00		1.52	0.00	
Uniform Delay (d_1), s/veh	16.1	11.4	9.3	9.8	16.0	16.0	53.2	59.6		54.3	63.2	
Incremental Delay (d_2), s/veh	2.6	0.4	0.3	0.2	2.1	2.1	12.8	3.4		1.4	12.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	18.6	11.8	9.6	10.0	18.0	18.1	66.0	63.1		55.7	75.6	
Level of Service (LOS)	B	B	A	A	B	B	E	E		E	E	
Approach Delay, s/veh / LOS	12.6	B		17.7	B		64.6	E		68.5	E	
Intersection Delay, s/veh / LOS	23.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.89	B	2.32	B	2.47	B
Bicycle LOS Score / LOS	1.53	B	1.74	B	0.99	A	0.85	A

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HCS7 Signalized Intersection Results Summary

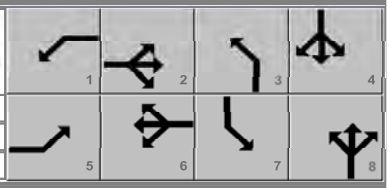
General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.94
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Background 2030_Sat_Midday.xus		
Project Description	Sands TIS, Midday Weekend Background 2030				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	165	905	235	95	1045	5	235	70	105	50	55	75

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.9	2.3	77.5	4.6	2.7	14.6	
Yellow	3.5	0.0	4.5	3.5	3.5	4.5	
Red	0.0	0.0	2.0	0.0	0.0	2.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.6	86.2	8.4	84.0	14.3	27.2	8.1	21.1
Change Period, (*Y+R c*), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (*g s*), s	6.8		4.8		12.8	14.7	5.4	11.6
Green Extension Time (*g e*), s	0.4	0.0	0.2	0.0	0.0	3.6	0.1	2.9
Phase Call Probability	1.00		0.97		1.00	1.00	0.85	1.00
Max Out Probability	0.01		0.00		1.00	0.67	0.00	1.00

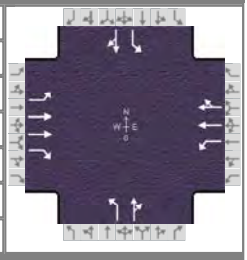
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	176	963	250	101	559	558	250	186		53	138	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1874	1610	1810	1969	1965	1795	1791		1810	1798	
Queue Service Time (*g s*), s	4.8	17.4	9.2	2.8	20.8	20.8	10.8	12.7		3.4	9.6	
Cycle Queue Clearance Time (*g c*), s	4.8	17.4	9.2	2.8	20.8	20.8	10.8	12.7		3.4	9.6	
Green Ratio (*g/C*)	0.66	0.61	0.61	0.63	0.60	0.60	0.21	0.16		0.15	0.11	
Capacity (*c*), veh/h	378	2300	988	399	1174	1172	252	286		176	201	
Volume-to-Capacity Ratio (*X*)	0.464	0.419	0.253	0.253	0.476	0.476	0.990	0.652		0.301	0.687	
Back of Queue (*Q*), ft/ln (95 th percentile)	83	290.2	149	49.3	360.8	355.2	275.7	252		70.8	207.9	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.3	11.4	6.0	2.0	14.2	14.2	10.9	10.0		2.8	8.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.38	0.00	0.99	0.20	0.00	0.00	3.45	0.00		0.88	0.00	
Uniform Delay (*d 1*), s/veh	11.2	13.1	11.5	10.6	14.8	14.8	51.4	51.3		48.9	55.5	
Incremental Delay (*d 2*), s/veh	0.9	0.6	0.6	0.3	1.4	1.4	53.8	3.6		0.9	5.8	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	12.1	13.6	12.1	10.9	16.2	16.2	105.2	54.8		49.9	61.3	
Level of Service (LOS)	B	B	B	B	B	B	F	D		D	E	
Approach Delay, s/veh / LOS	13.2	B		15.8	B		83.7	F		58.2	E	
Intersection Delay, s/veh / LOS	26.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.89	B	1.89	B	2.31	B	2.47	B
Bicycle LOS Score / LOS	1.63	B	1.49	A	1.21	A	0.80	A

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.93
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Projected_AM.xus		
Project Description	Sands TIS, AM Weekday Projected				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	155	970	65	25	730	10	50	35	15	65	40	80

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.9	0.8	85.8	4.9	1.1	12.0						
Yellow	3.5	3.5	4.5	3.5	0.0	4.5						
Red	0.0	0.0	2.0	0.0	0.0	2.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.6	96.6	5.4	92.3	8.4	18.5	9.5	19.6
Change Period, (*Y+R c*), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (*g s*), s	5.7		2.7		5.7	5.7	6.5	11.3
Green Extension Time (*g e*), s	0.4	0.0	0.0	0.0	0.0	2.3	0.1	1.8
Phase Call Probability	1.00		0.62		0.86	1.00	0.92	1.00
Max Out Probability	0.00		0.00		0.33	0.23	0.88	0.62

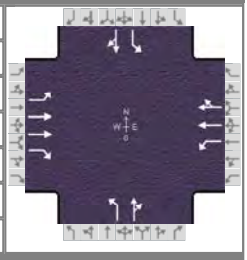
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	167	1043	70	27	399	397	54	54		70	129	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1815	1510	1725	1906	1897	1711	1750		1810	1744	
Queue Service Time (*g s*), s	3.7	16.1	1.9	0.7	11.7	11.7	3.7	3.7		4.5	9.3	
Cycle Queue Clearance Time (*g c*), s	3.7	16.1	1.9	0.7	11.7	11.7	3.7	3.7		4.5	9.3	
Green Ratio (*g/C*)	0.72	0.69	0.69	0.67	0.66	0.66	0.13	0.09		0.14	0.10	
Capacity (*c*), veh/h	529	2516	1046	370	1259	1253	136	162		226	176	
Volume-to-Capacity Ratio (*X*)	0.315	0.415	0.067	0.073	0.317	0.317	0.394	0.333		0.309	0.732	
Back of Queue (*Q*), ft/ln (95 th percentile)	57.9	256.9	28.8	11.2	217.3	207	78.5	84.3		94.2	204.8	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.3	9.8	1.1	0.4	8.3	8.3	3.0	3.1		3.8	8.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.26	0.00	0.19	0.04	0.00	0.00	0.98	0.00		1.18	0.00	
Uniform Delay (*d 1*), s/veh	6.5	8.6	6.4	7.8	9.5	9.5	51.2	55.3		50.2	56.7	
Incremental Delay (*d 2*), s/veh	0.3	0.5	0.1	0.1	0.7	0.7	1.8	1.7		0.8	8.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	6.8	9.1	6.5	7.8	10.1	10.1	53.1	57.0		51.0	64.8	
Level of Service (LOS)	A	A	A	A	B	B	D	E		D	E	
Approach Delay, s/veh / LOS	8.7	A		10.1	B		55.0	E		59.9	E	
Intersection Delay, s/veh / LOS	15.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.87	B	1.88	B	2.32	B	2.47	B
Bicycle LOS Score / LOS	1.54	B	1.17	A	0.67	A	0.82	A

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HCS7 Signalized Intersection Results Summary

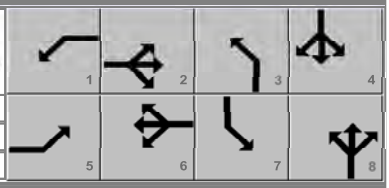
General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.95
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Projected_PM.xus		
Project Description	Sands TIS, PM Weekday Background 2030				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	185	880	130	60	1370	15	155	80	55	85	45	100

Signal Information			
Cycle, s	145.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.6	0.7	90.2	8.3	2.7	15.9	
Yellow	3.5	3.5	4.5	3.5	0.0	4.5	
Red	0.0	0.0	2.0	0.0	0.0	2.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.3	100.9	7.1	96.7	14.5	25.1	11.8	22.4
Change Period, (*Y+R c*), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (g_s), s	7.5		3.8		13.0	12.6	8.4	14.2
Green Extension Time (g_e), s	0.3	0.0	0.1	0.0	0.0	2.8	0.1	1.7
Phase Call Probability	1.00		0.92		1.00	1.00	0.97	1.00
Max Out Probability	0.11		0.00		1.00	0.94	1.00	1.00

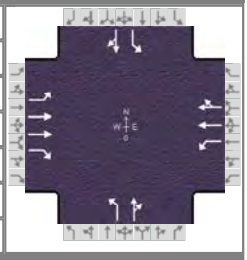
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	195	926	137	63	730	728	163	142		89	153	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1874	1610	1810	1969	1961	1795	1834		1767	1765	
Queue Service Time (g_s), s	5.5	16.6	4.7	1.8	32.3	32.3	11.0	10.6		6.4	12.2	
Cycle Queue Clearance Time (g_c), s	5.5	16.6	4.7	1.8	32.3	32.3	11.0	10.6		6.4	12.2	
Green Ratio (*g/C*)	0.69	0.65	0.65	0.65	0.62	0.62	0.19	0.13		0.17	0.11	
Capacity (*c*), veh/h	292	2442	1049	416	1225	1220	218	236		202	194	
Volume-to-Capacity Ratio (*X*)	0.668	0.379	0.130	0.152	0.596	0.596	0.750	0.603		0.443	0.787	
Back of Queue (*Q*), ft/ln (95 th percentile)	130	278.9	75.2	32.8	526.8	518	256.1	226.9		136.9	262.8	
Back of Queue (*Q*), veh/ln (95 th percentile)	5.1	11.0	3.0	1.3	20.7	20.7	10.2	8.9		5.3	10.4	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.59	0.00	0.50	0.13	0.00	0.00	3.20	0.00		1.71	0.00	
Uniform Delay (d_1), s/veh	16.5	11.7	9.6	10.1	16.4	16.4	53.2	59.7		53.4	62.9	
Incremental Delay (d_2), s/veh	3.0	0.4	0.3	0.2	2.1	2.2	13.4	3.5		1.5	14.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	19.5	12.2	9.9	10.3	18.6	18.6	66.7	63.2		54.9	77.8	
Level of Service (LOS)	B	B	A	B	B	B	E	E		D	E	
Approach Delay, s/veh / LOS	13.0	B		18.2	B		65.1	E		69.3	E	
Intersection Delay, s/veh / LOS	24.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.89	B	2.32	B	2.47	B
Bicycle LOS Score / LOS	1.53	B	1.74	B	0.99	A	0.89	A

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HCS7 Signalized Intersection Results Summary

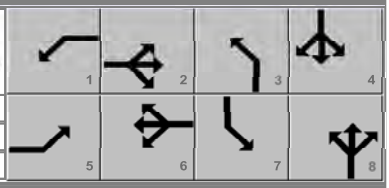
General Information				Intersection Information	
Agency	Civiltech Engineering			Duration, h	0.25
Analyst	MRS	Analysis Date	10/19/2023	Area Type	Other
Jurisdiction	IDOT/Crystal Lake	Time Period		PHF	0.94
Urban Street	US-14 (Northwest Hwy)	Analysis Year	2023	Analysis Period	1> 7:00
Intersection	US-14 and Sands Road	File Name	US14-Sands_Projected_Sat_Midday.xus		
Project Description	Sands TIS, Midday Weekend Projected Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	175	905	235	95	1045	10	235	70	105	55	60	80

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.9	2.6	76.5	5.1	2.2	15.2	
Yellow	3.5	0.0	4.5	3.5	3.5	4.5	
Red	0.0	0.0	2.0	0.0	0.0	2.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.0	85.6	8.4	83.0	14.3	27.5	8.6	21.7
Change Period, (*Y+R c*), s	3.5	6.5	3.5	6.5	3.5	6.5	3.5	6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.2	9.3	4.2	9.3
Queue Clearance Time (*g s*), s	7.2		4.9		12.8	14.7	5.7	12.4
Green Extension Time (*g e*), s	0.4	0.0	0.2	0.0	0.0	3.7	0.1	2.8
Phase Call Probability	1.00		0.97		1.00	1.00	0.88	1.00
Max Out Probability	0.02		0.00		1.00	0.71	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	186	963	250	101	562	560	250	186		59	149	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1874	1610	1810	1969	1962	1795	1791		1810	1799	
Queue Service Time (*g s*), s	5.2	17.6	9.4	2.9	21.4	21.4	10.8	12.7		3.7	10.4	
Cycle Queue Clearance Time (*g c*), s	5.2	17.6	9.4	2.9	21.4	21.4	10.8	12.7		3.7	10.4	
Green Ratio (*g/C*)	0.65	0.61	0.61	0.63	0.59	0.59	0.22	0.16		0.16	0.12	
Capacity (*c*), veh/h	376	2280	979	395	1158	1154	251	289		185	210	
Volume-to-Capacity Ratio (*X*)	0.495	0.422	0.255	0.256	0.485	0.485	0.996	0.645		0.317	0.708	
Back of Queue (*Q*), ft/ln (95 th percentile)	89.7	294.3	151.6	50.4	371	364.7	279.1	251.7		77.2	221.5	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.6	11.6	6.1	2.0	14.6	14.6	11.1	10.0		3.1	8.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.41	0.00	1.01	0.20	0.00	0.00	3.49	0.00		0.97	0.00	
Uniform Delay (*d 1*), s/veh	11.7	13.4	11.8	11.0	15.4	15.4	51.1	51.0		48.2	55.3	
Incremental Delay (*d 2*), s/veh	1.0	0.6	0.6	0.3	1.5	1.5	55.5	3.6		1.0	6.5	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	12.7	14.0	12.4	11.3	16.9	16.9	106.6	54.6		49.2	61.8	
Level of Service (LOS)	B	B	B	B	B	B	F	D		D	E	
Approach Delay, s/veh / LOS	13.6	B		16.4	B		84.4	F		58.2	E	
Intersection Delay, s/veh / LOS	26.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.89	B	1.89	B	2.31	B	2.47	B
Bicycle LOS Score / LOS	1.64	B	1.50	A	1.21	A	0.83	A

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HCS7 Two-Way Stop-Control Report

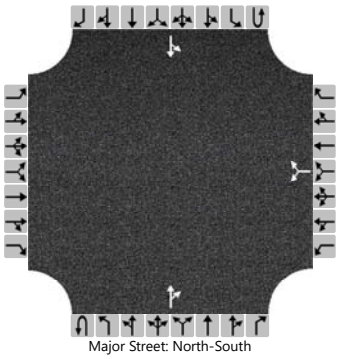
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana AM Existing
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						5		15			95	0		30	80	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							22							33		
Capacity, c (veh/h)							867							1495		
v/c Ratio							0.03							0.02		
95% Queue Length, Q_{95} (veh)							0.1							0.1		
Control Delay (s/veh)							9.3							7.5		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.3								2.2			
Approach LOS					A											

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HCS7 Two-Way Stop-Control Report

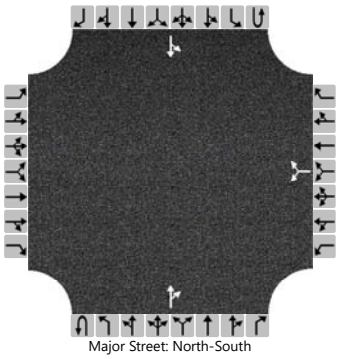
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana PM Existing
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						0		35			190	0		5	110	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							38							5		
Capacity, c (veh/h)							821							1371		
v/c Ratio							0.05							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							9.6							7.6		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.6								0.4			
Approach LOS					A											

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HCS7 Two-Way Stop-Control Report

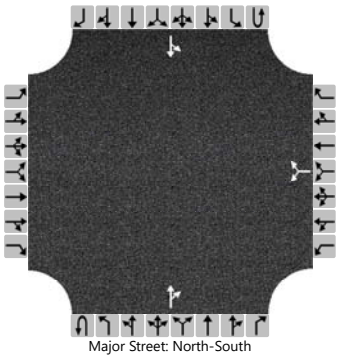
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana Sat Existin
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						0		5			175	0		10	100	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							5							11		
Capacity, c (veh/h)							839							1390		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							9.3							7.6		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.3								0.7			
Approach LOS					A											

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HCS7 Two-Way Stop-Control Report

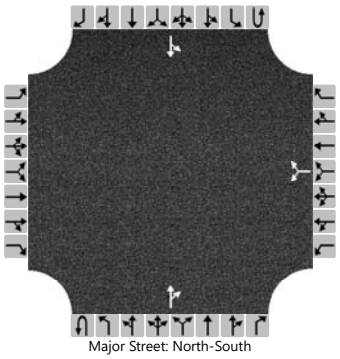
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana 2030
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						5		15			110	0		35	95	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							22							38		
Capacity, c (veh/h)							838							1475		
v/c Ratio							0.03							0.03		
95% Queue Length, Q_{95} (veh)							0.1							0.1		
Control Delay (s/veh)							9.4							7.5		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)						9.4								2.2		
Approach LOS						A										

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HCS7 Two-Way Stop-Control Report

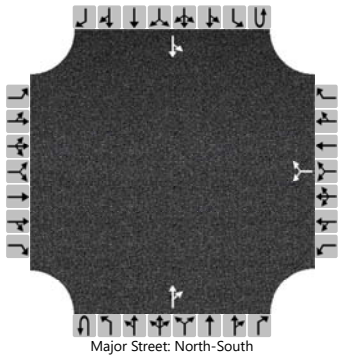
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana PM 2030
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						0		40			215	0		5	125	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							43							5		
Capacity, c (veh/h)							793							1340		
v/c Ratio							0.05							0.00		
95% Queue Length, Q_{95} (veh)							0.2							0.0		
Control Delay (s/veh)							9.8							7.7		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.8								0.3			
Approach LOS					A											

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HCS7 Two-Way Stop-Control Report

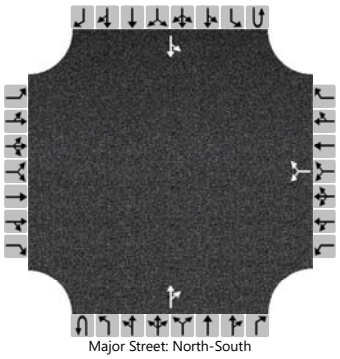
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana Sat 2030
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						0		5			200	0		10	115	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							5							11		
Capacity, c (veh/h)							817							1366		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							9.4							7.7		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.4								0.7			
Approach LOS					A											

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HCS7 Two-Way Stop-Control Report

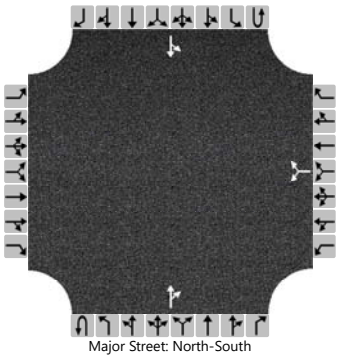
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana AM Project
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						5		15			150	0		35	110	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							22							38		
Capacity, c (veh/h)							786							1422		
v/c Ratio							0.03							0.03		
95% Queue Length, Q_{95} (veh)							0.1							0.1		
Control Delay (s/veh)							9.7							7.6		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)						9.7								2.0		
Approach LOS						A										

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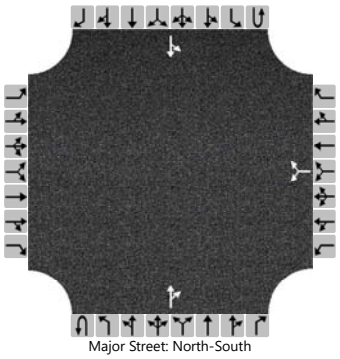
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana PM Project
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						0		40			225	0		5	145	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							43							5		
Capacity, c (veh/h)							782							1327		
v/c Ratio							0.06							0.00		
95% Queue Length, Q_{95} (veh)							0.2							0.0		
Control Delay (s/veh)							9.9							7.7		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.9								0.3			
Approach LOS					A											

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HCS7 Two-Way Stop-Control Report

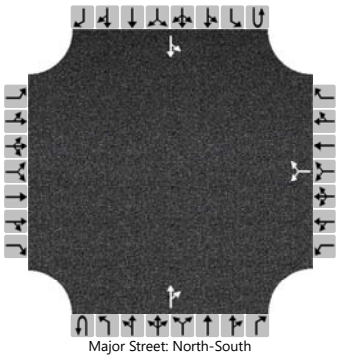
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	
Intersection Orientation	North-South
Project Description	Sands TIS

Site Information

Intersection	Sands/Smitana Sat Project
Jurisdiction	
East/West Street	Smitana Road
North/South Street	Sands Road
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						0		5			220	0		10	135	
Percent Heavy Vehicles (%)						7		7						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							5							11		
Capacity, c (veh/h)							795							1342		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							9.6							7.7		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.6								0.6			
Approach LOS					A											

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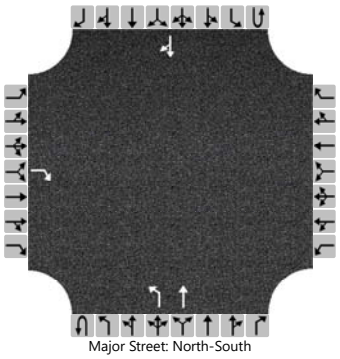
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	AM Peak - Projected
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Project Driveway/Sands
Jurisdiction	
East/West Street	Project Driveway
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	1	1	0	0	0	1	0
Configuration				R						L	T					TR
Volume (veh/h)				15						40	125				90	15
Percent Heavy Vehicles (%)				66						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)				6.2						4.1						
Critical Headway (sec)				6.86						4.10						
Base Follow-Up Headway (sec)				3.3						2.2						
Follow-Up Headway (sec)				3.89						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				16						43						
Capacity, c (veh/h)				800						1488						
v/c Ratio				0.02						0.03						
95% Queue Length, Q_{95} (veh)				0.1						0.1						
Control Delay (s/veh)				9.6						7.5						
Level of Service (LOS)				A						A						
Approach Delay (s/veh)		9.6								1.8						
Approach LOS		A														

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HCS7 Two-Way Stop-Control Report

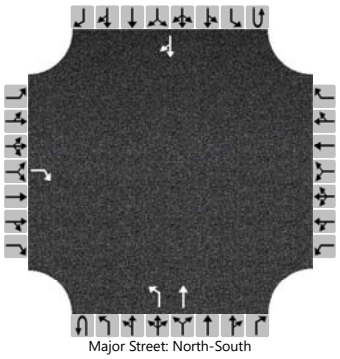
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	PM Peak - Projected
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Project Driveway/Sands
Jurisdiction	
East/West Street	Project Driveway
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	1	1	0	0	0	1	0
Configuration				R						L	T					TR
Volume (veh/h)				20						10	215				120	0
Percent Heavy Vehicles (%)				0						50						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)				6.2						4.1						
Critical Headway (sec)				6.20						4.60						
Base Follow-Up Headway (sec)				3.3						2.2						
Follow-Up Headway (sec)				3.30						2.65						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				22						11						
Capacity, c (veh/h)				925						1206						
v/c Ratio				0.02						0.01						
95% Queue Length, Q_{95} (veh)				0.1						0.0						
Control Delay (s/veh)				9.0						8.0						
Level of Service (LOS)				A						A						
Approach Delay (s/veh)		9.0								0.4						
Approach LOS		A														

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HCS7 Two-Way Stop-Control Report

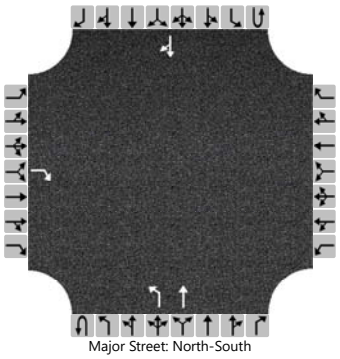
General Information

Analyst	Civiltech Engineering
Agency/Co.	Crystal Lake
Date Performed	11/2/2023
Analysis Year	2023
Time Analyzed	Sat Mid Peak - Projected
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Project Driveway/Sands
Jurisdiction	
East/West Street	Project Driveway
North/South Street	Sands Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	1	1	0	0	0	1	0
Configuration				R						L	T					TR
Volume (veh/h)				20						20	200				110	5
Percent Heavy Vehicles (%)				33						50						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)				6.2						4.1						
Critical Headway (sec)				6.53						4.60						
Base Follow-Up Headway (sec)				3.3						2.2						
Follow-Up Headway (sec)				3.60						2.65						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				22						22						
Capacity, c (veh/h)				852						1212						
v/c Ratio				0.03						0.02						
95% Queue Length, Q_{95} (veh)				0.1						0.1						
Control Delay (s/veh)				9.3						8.0						
Level of Service (LOS)				A						A						
Approach Delay (s/veh)		9.3								0.7						
Approach LOS		A														

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