PRELIMINARY
STORMWATER STUDY

MCPL - COLBERN ROAD BRANCH REMODEL
1000 NORTHEAST COLBERN ROAD
LIBERTY, MISSOURI

PREPARED FOR
MID-CONTINENT PUBLIC LIBRARY

PREPARED BY
OLSSON, INC.
OLATHE, KANSAS

NOVEMBER, 2019

OLSSON PROJECT NO. B18-0330.182

7301 W. 133rd Street, Ste. 200 • , Overland Park, KS 66213 • (913) 381-1170

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TABLE OF CONTENTS

TABLES

APPENDICES

GENERAL INFORMATION

This Stormwater Management Study is being submitted on behalf of the Mid-Continent Public Library (MCPL) for the proposed remodel and expansion of the existing Colbern Road Branch Library facility located at 1000 Northeast Colbern Road in Lee's Summit, Missouri.

Project Location and Description

The site is located on Lot 1 of the Rice Acres Plat in the Northeast ¼ of Section 29, Township 48 North, Range 31 West, in Jackson County, Lee's Summit, Missouri and includes approximately 2.9 acres. MCPL has acquired an additional 100' of the unplatted property to the east for a total of approximately 4.0 acres to accommodate a larger library. The site is located at the on the north side of Colbern Road approximately ¼ mile of the I-470 interchange. The site is generally bounded by retail businesses to the south and undeveloped property to the west, north and east. The proposed remodel plans to demolish the existing 18,000 S.F. library facility and construct a new building (approximately 34,000 sf) The improvement will also involve the improvements and expansion of the existing parking, landscaping, grading, and utilities.

The entirety of the existing and acquired sites are located outside of the 100-Year FEMA Floodplain. Reference the flood map in Appendix B

Study Purpose

The purpose of this study is to provide a Stormwater Management Plan for the proposed development in accordance with the American Public Works Association (APWA) *Standard Specifications and Design Criteria* Section 5600 "Storm Drainage Systems and Facilities", APWA Manual of Best Management Practices (BMP) for Stormwater Quality, and applicable City of Lee's Summit, Missouri guidelines.

Soils Descriptions

Soil classifications were obtained from the Natural Resource Conservation Service's website by utilizing the Web Soil Survey feature. The site soil composition and classification are listed below:

10128 – Sharpsburg-Urban Land Complex, 2 to 5 percent slopes – HSG Type D.

*HSG – Hydrologic Soils Group

See Soils Map in Appendix C.

METHODOLOGY

General Criteria and References

Analytical and design criteria conform to those of Division V - *Section 5600 – "Storm Drainage Systems and Facilities*" of the Kansas City Metropolitan Chapter of the American Public Works Association's *"Standard Specifications and Design Criteria"*. Based on these criteria, Post-development discharge rates for 1, 10, and 100-year storm events will be limited to provisions in section 5608.4-C1 *Performance Criteria – "Comprehensive Control"*. Post-development discharge rates are limited to 0.5 cfs per acre for 1-Year, 2.0 cfs per acre for 10-year, and 3.0 cfs per acre for 100-year storm events. Pre and post-development flows from the site are shown below and were calculated using HEC-HMS for the 1, 10 and 100-year storm events. Existing and proposed hydrographs were calculated using the 24-hour SCS Type II rainfall distribution. Existing times of concentration were determined using Inlet Time and Travel Time equations found in Section 5602.7 of APWA Section 5600. A minimum inlet time of five minutes was used when calculated times were under five minutes. Proposed times of concentration were calculated in the same manner.

HYDROLOGIC/HYDRAULIC ANALYSES

Existing Conditions Analysis

The existing site is a currently functioning branch for MCPL. The acquired property to the east is undeveloped. The site is located at the on the north side of Colbern Road. The site is generally bounded by retail businesses to the south and undeveloped property to the west, north and east.

Runoff for the existing library is collected by roof drains and flumes in the parking lot that directs water to an existing detention basin on the east side of the site. The roof drains are pipe to the basin while the paved parking area generally drains to southeasterly to flumes that drain to a swale that directs the flow to the basin. The basin is connected to an existing public storm line on the north side of Colbern Road that drains to the east to an unnamed tributary that flows to Lake Jacomo.

The existing basin is not clearly defined, and the outflow structure is in disrepair. It seems to still function, but no clear indication of existing storage volume or outflow.

Since the comprehensive control method is being used for drainage design, existing curve number analysis is not required for the site is not required.

Proposed Conditions Analysis

The existing library will be demolished. A new 34,000 SF library will be constructed on the site. The size parking area will also be increased to accommodate the larger building. A site plan has been included in Appendix A. The location of the building, in regard to the parking area will essentially remain in the same configuration. The site will generally continue to drain in the same pattern as existing. An enclosed storm sewer system will be constructed to drain the increase in impervious areas on the site. The proposed system will collect drainage from the parking area and building. The increase in impervious area will increase runoff from the site. To mitigate the increase in runoff, the following strategy will be implemented.

Outfall A – All impervious areas for site will drain to the enclosed storm system and be directed into a new detention basin and water treatment facility. Due to the site design, the drainage area for this outfall will increase. However, the detention facility is designed to mitigate the increased runoff to this outfall. The drainage area being directed to the basin including the roof drains and the extended detention basin in approximately 3.4 acres for this outfall will increase A control structure will limit the 1, 10, and 100-year storm events to the comprehensive control levels.

Table 1: Post-Development Curve Number Analysis

Sub-Area	Area (AC)	Soil Group	Curve Number
Pavement, Buildings, Impervious	2.5	D	98
Turf (Good)	0.9	D	80
Turf (Good) Draining Offsite	0.6	D	80

A peak flow analysis of the post-development site was conducted using HEC-HMS, the composite curve number, and rainfall and distribution information acquired from APWA section 5600. Post-development peak flows to the outfall are summarized in the Table 2. Detailed reports from HEC-HMS are available in Appendix D

Table 2: Proposed Peak Flows

Sub-Area / Outfall	Tributary Area (acres)	Q (1-Year Storm) (cfs)	Q (10-Year Storm) (cfs)	Q (100-Year Storm) (cfs)
Outfall A	3.4	10.6	21.2	30.4

Stormwater Detention Requirements

A new detention pond will be constructed to mitigate the increase in flow due to an increase in impervious area. The Detention Basin will be located on the east side of the site on the newly acquired property. It will collect runoff from the 3.4 acres of the 4.0 acres property including all of the impervious areas. Outflow for the pond is directed to an outlet pipe that connects to a curb inlet/control structure that will then connect to the public storm system. An orifice/weir plate in the control structure will limit outflow in the 1, 10, and 100 year storms. During a storm event, runoff that is held back by the control structure will backflow into the pond through the outlet pipe. Once the storm has ended the basin will drain per the allowable flows designed for the control structure.

To meet water treatment requirements, the water quality volume (WQv) will be controlled by a series of 1" orifices at the bottom of the orifice plate. The conduit will release the water quality volume over a 40-hour period to allow pollutants to settle out of this precipitation event.

An orifice will be located above the WQv surface elevation to control the 1 and 10-year storms. Both storms have been analyzed through the control structure and will release below the pre-existing storm events. The 100-year storm event will flow into a weir placed at the top of the control structure. The dam will have an emergency spillway to control the 100-year overflow.

Table 3 provides the water surface elevations (WSE's) and peak flows for the proposed detention basin.

Table 3: Detention Basin, WSE's and Peak Flows

Description	Detention Basin
Bottom of Basin	959.5
Total Storage Volume	1.1 ac-ft
Top of Dam Elevation	965.5
WQv Orifice (IE Elevation, Pipe Size)	959.5, 2 – 1" (ft, # hole - diam)
Water Quality Volume WSE, Storage, Peak Outflow	961.8, 0.2, 0.08 (ft, ac-ft, cfs)
1-year & 10-Year Orifice (IE Elevation, Pipe Size)	962.5, 1-6" (ft, pipe size)
10–Year Storm WSE, Storage, Peak Outflow	963.1, 0.5, 5.4 (ft, ac-ft, cfs)
100–Year Storm Weir (Elevation, Length)	963, 3 (ft, lf)
100–Year Storm WSE, Storage, Peak Outflow	964, 0.6, 9.2 (ft, ac-ft, cfs)

Table 4 shows the allowable peak flow for the site based on the Comprehensive Control Method.

Table 4: Allowable Peak Flows Based on Comprehensive Control

Sub-Area / Outfall	Tributary Area (acres)	Q (1-Year Storm) (cfs)	Q (10-Year Storm) (cfs)	Q (100-Year Storm) (cfs)
Outfall A	3.4	1.7	6.8	10.2

Table 5 shows the peak flow for the site post-construction. Note that the peak flows for post-construction construction condition are below the allowable peak flows shown in Table 4.

Table 5: Detained Peak Flows

Sub-Area / Outfall	Tributary Area (acres)	Q (1-Year Storm) (cfs)	Q (10-Year Storm) (cfs)	Q (100-Year Storm) (cfs)
Outfall A	3.4	1.6	5.4	9.2

STORMWATER TREATMENT REQUIREMENTS

As stated previously, the proposed detention is designed to act an extended dry bottom detention facility will be used to treat stormwater per MARC water quality standards. The orifice plate for the basin will be sized to release the water quality volume (1.37") over a 40-hour period to allow pollutants to settle from runoff before entering the public stormwater system. The maximum storage for the water quality event in the basin will be 0.1 acre-ft reaching a peak water surface of elevation 961.8 feet.

CLEAN WATER ACT SECTION 404 PERMITTING REQUIREMENTS

No jurisdictional Waters of the United States have been identified on the study site. Therefore, a Section 404 permit is not required.

FEMA/DWR PERMIT REQUIREMENTS

No FEMA permitting or submittals will be required on this site because there are no FEMA delineated floodplains on the site. A copy of the FIRM map for this area has been included in Appendix B.

CONCLUSIONS AND RECOMMENDATIONS

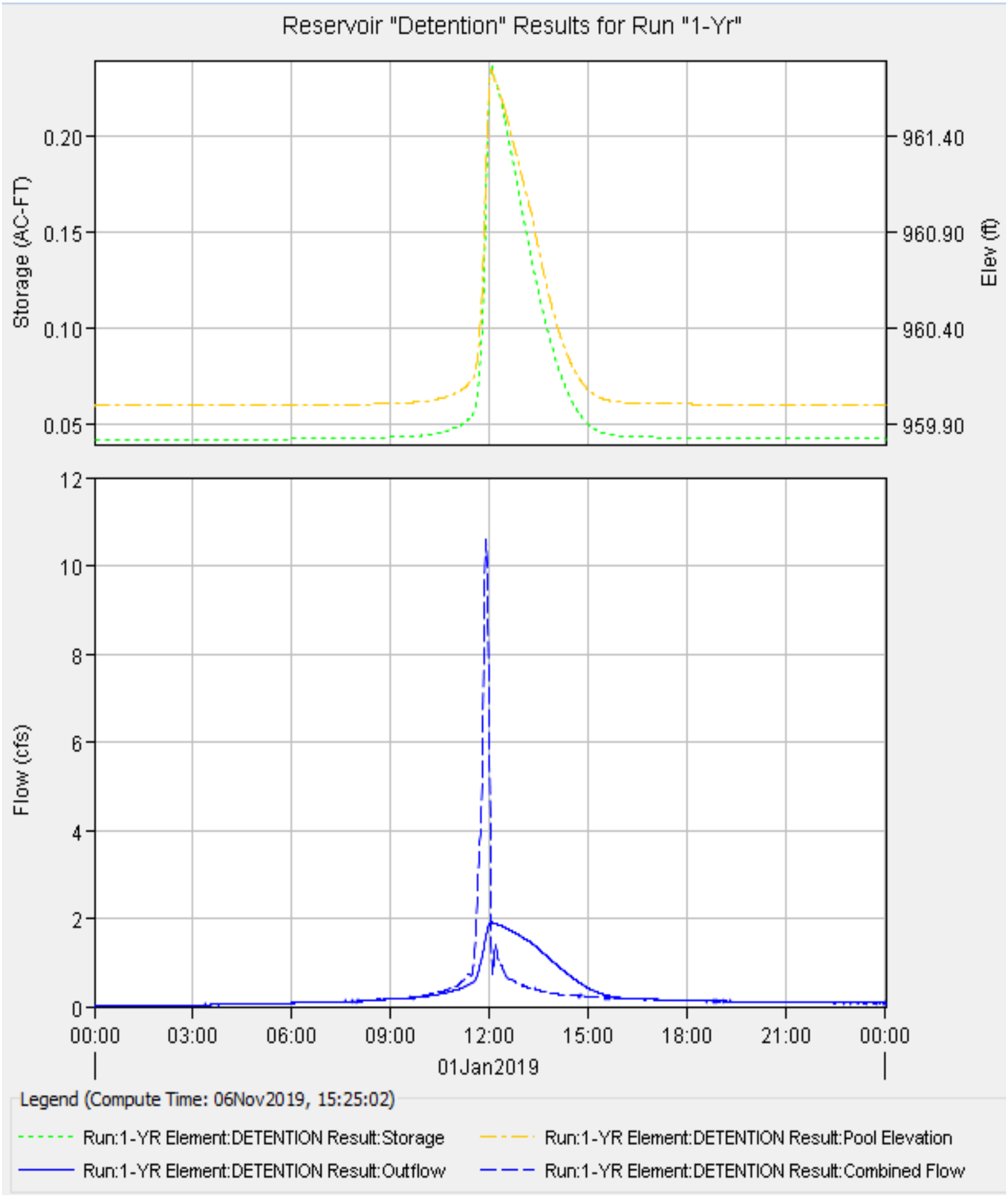
As outlined in the preceding report, increased runoff rates in the post-development conditions are mitigated by the detention basins. Drainage patterns on the site remain relatively unchanged. An extended dry detention basin has been designed to maintain or

improve storm water quality. Based on these facts and other information provided herein, we request that this stormwater study be approved.

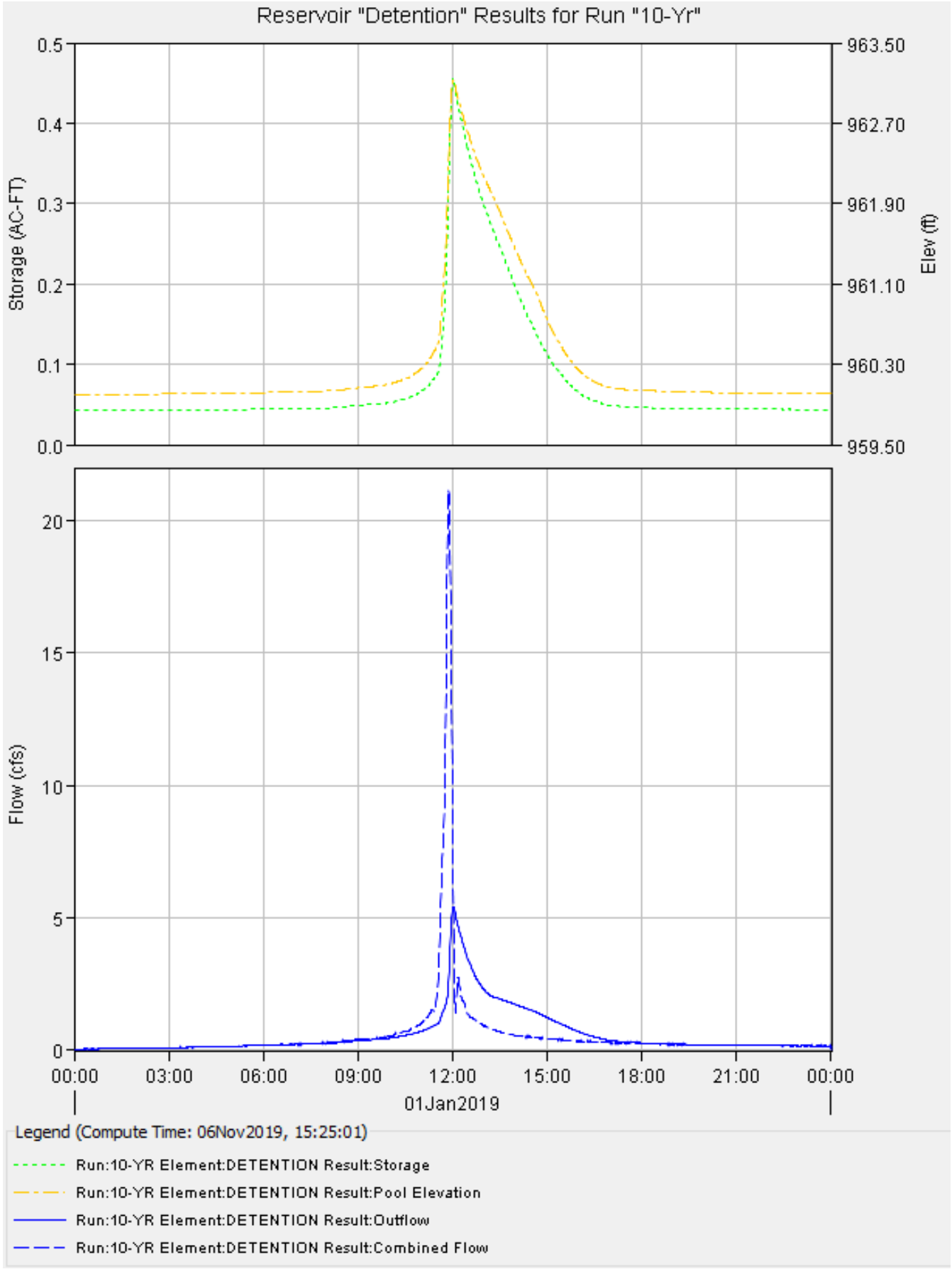
Appendix A

Map Exhibits

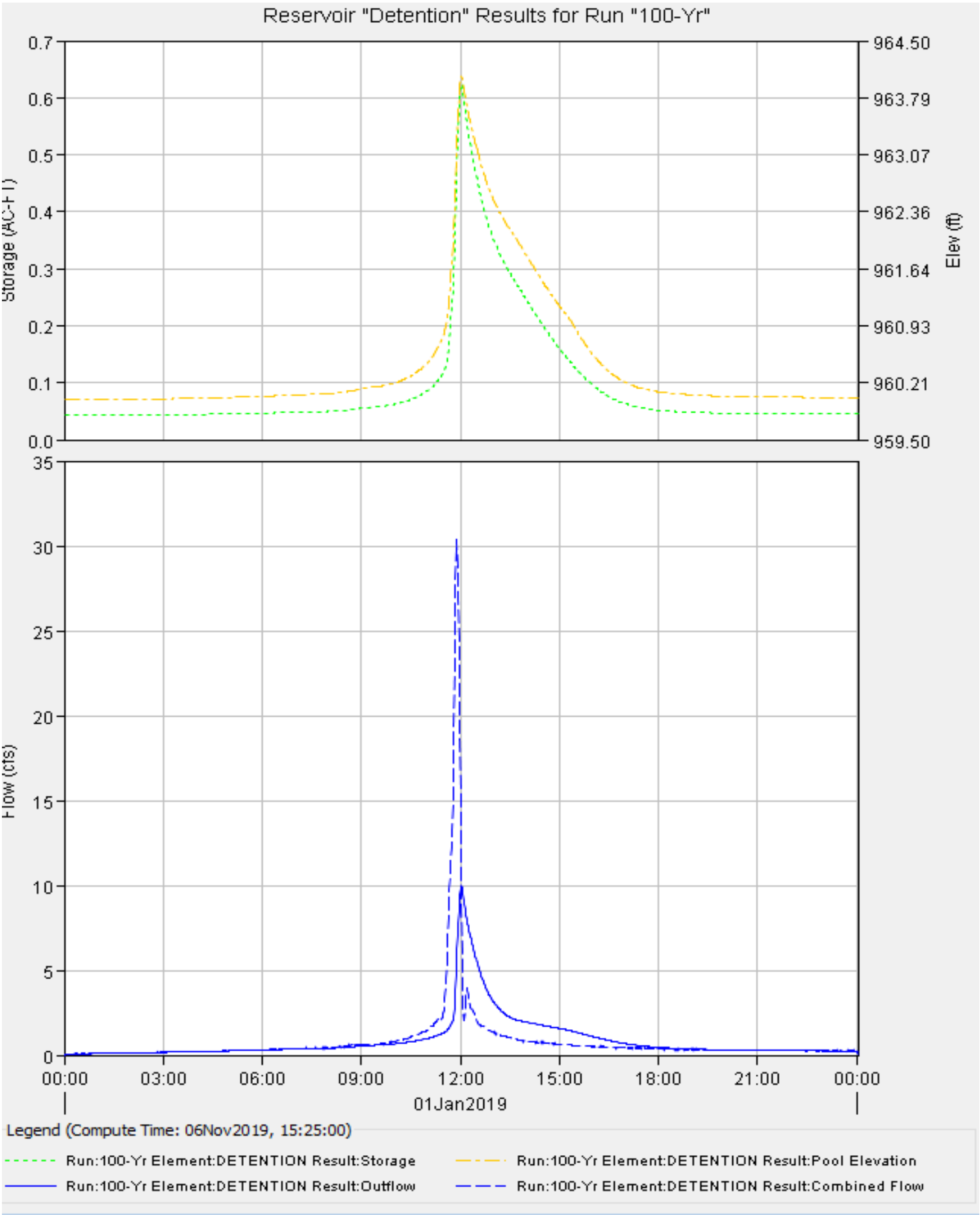
MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
STORAGE & OUTFLOW HYDROGRAPHS 1-YR



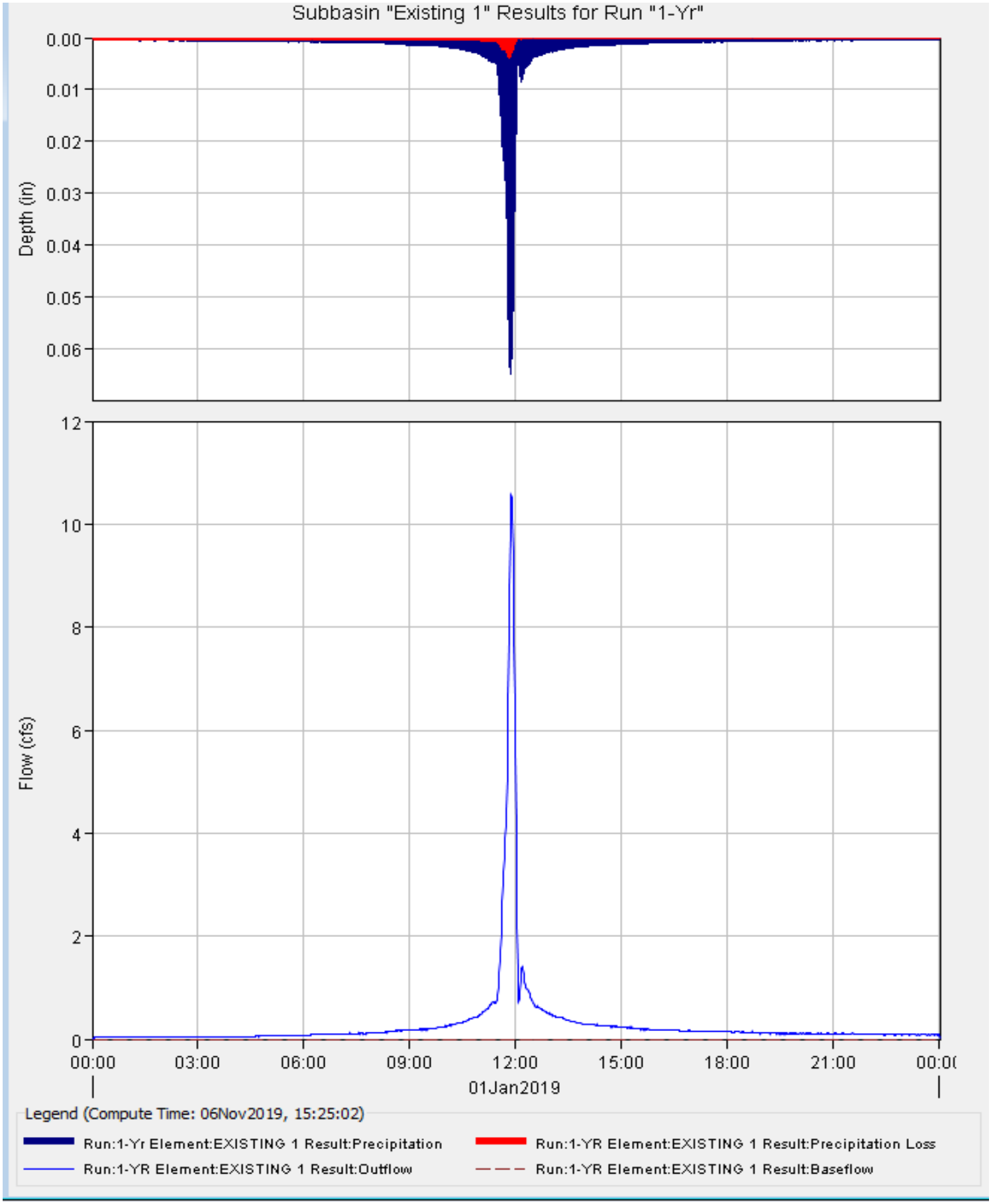
MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
STORAGE & OUTFLOW HYDROGRAPHS 10-YR



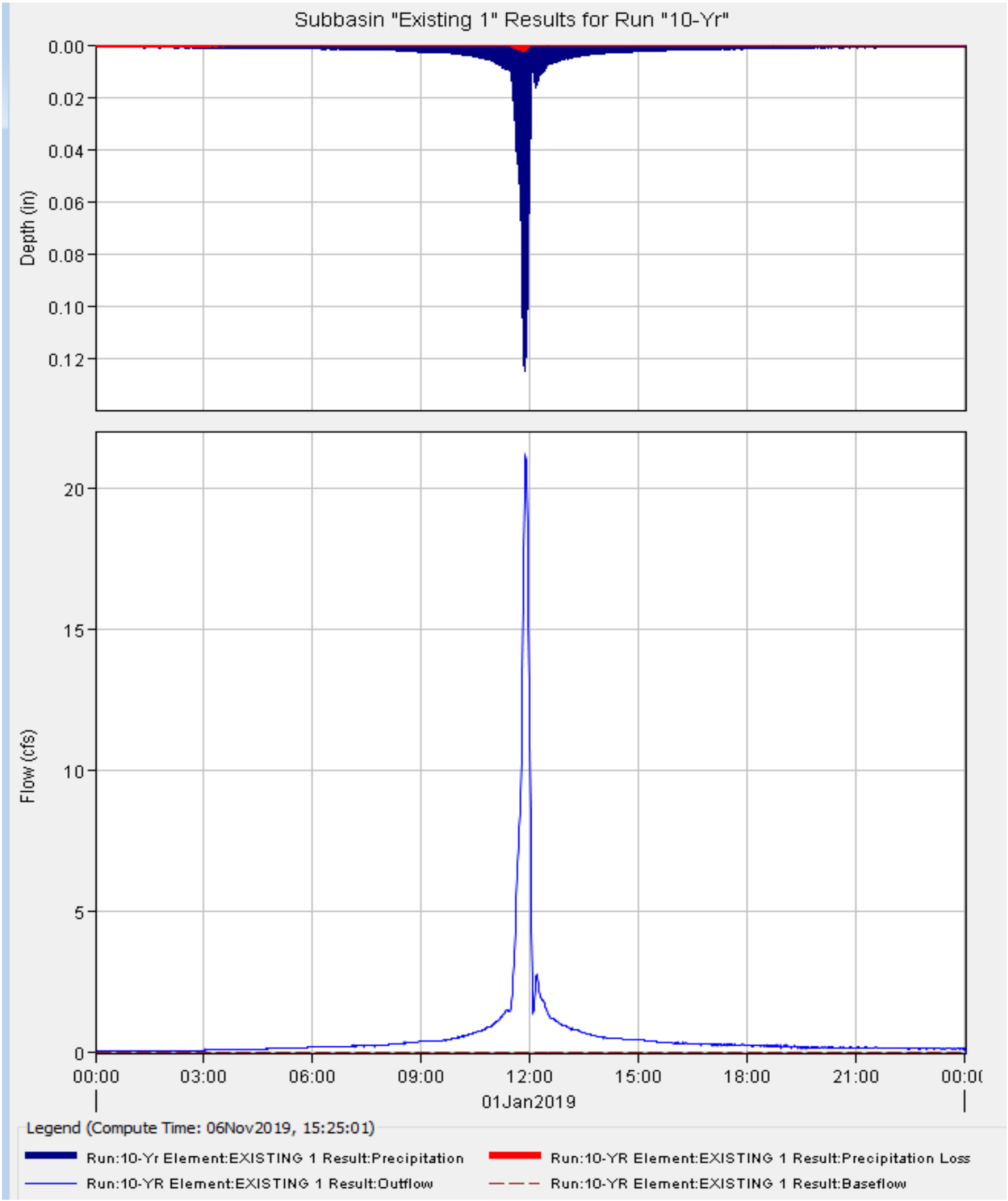
MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
STORAGE & OUTFLOW HYDROGRAPHS 100-YR



MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
INFLOW HYDROGRAPHS 1-YR



MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
INFLOW HYDROGRAPHS 10-YR



MCPL - COLBERN ROAD BRANCH
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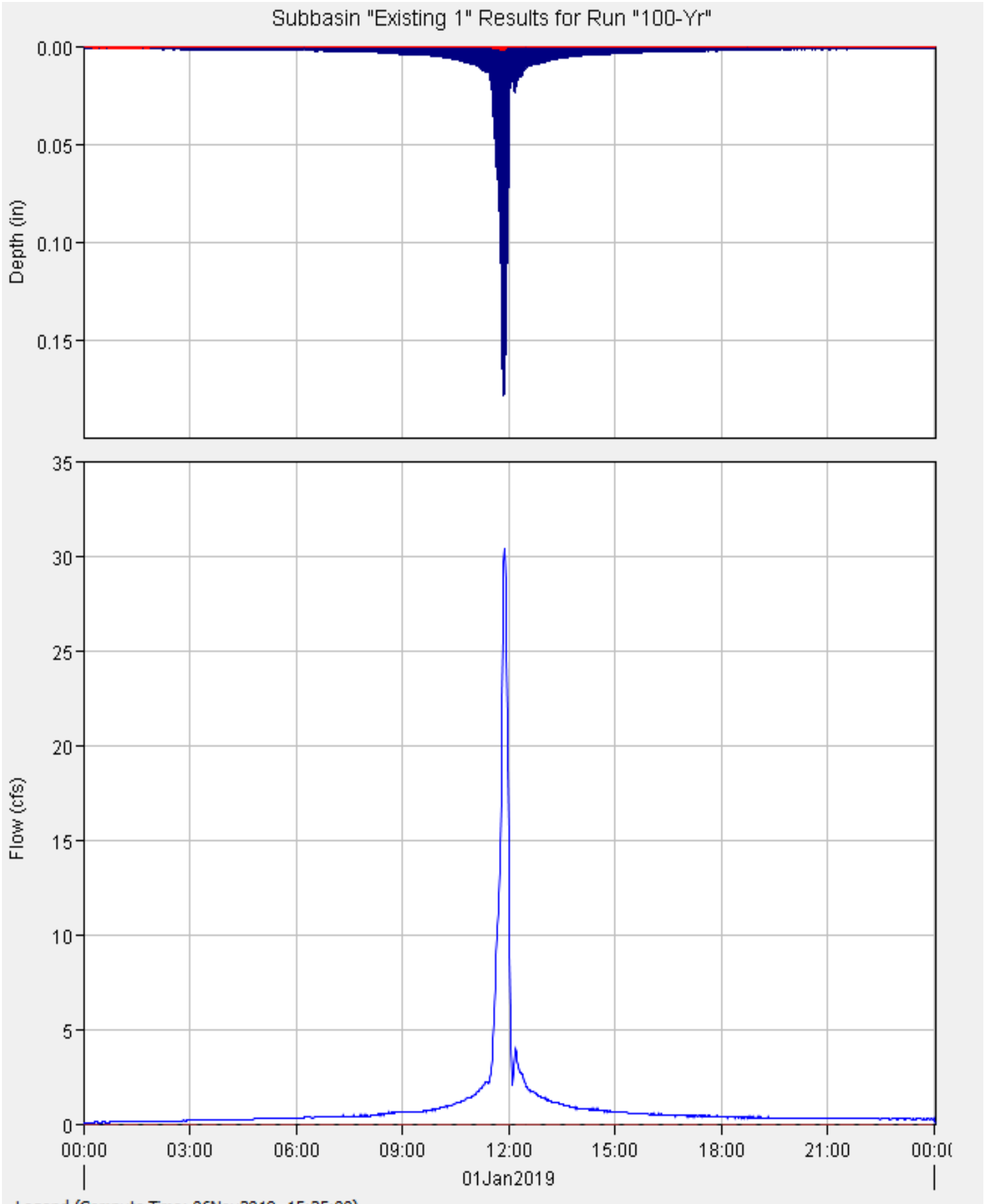
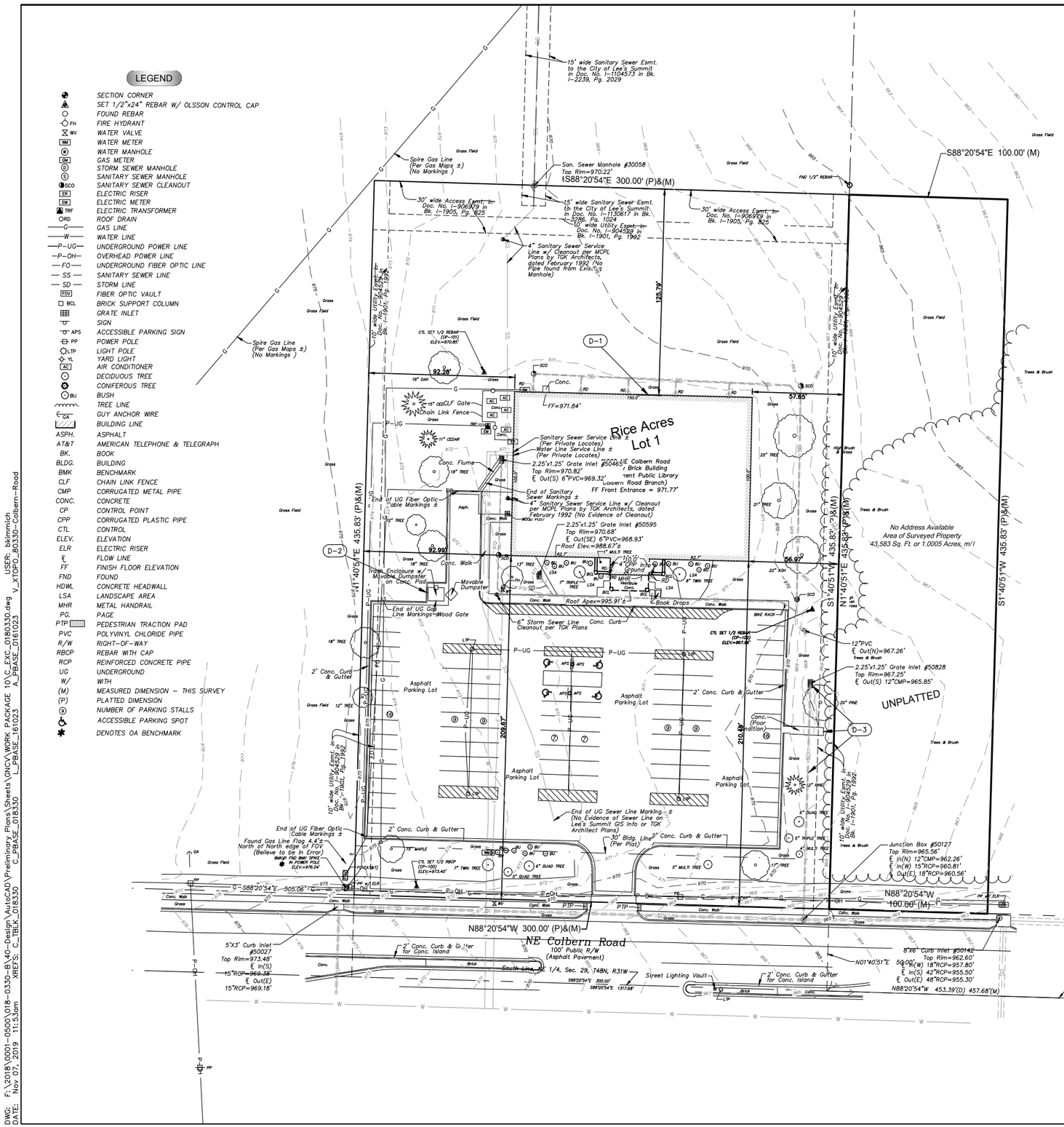
EXTENDED DRY DETENTION
INFLOW HYDROGRAPHS 100-YR





LEGEND

	SECTION CORNER
	SET 1/2"x24" REBAR W/ OLSSON CONTROL CAP
	FOUND REBAR
FH	FIRE HYDRANT
WV	WATER VALVE
WM	WATER METER
	WATER MANHOLE
GM	GAS METER
	STORM SEWER MANHOLE
SCO	SANITARY SEWER CLEANOUT
ER	ELECTRIC RISER
EM	ELECTRIC METER
TRF	ELECTRIC TRANSFORMER
ORD	ROOF DRAIN
—G—	GAS LINE
—W—	WATER LINE
—P—UG—	UNDERGROUND POWER LINE
—P—OH—	OVERHEAD POWER LINE
—FO—	UNDERGROUND FIBER OPTIC LINE
— SS —	SANITARY SEWER LINE
— SD —	STORM LINE
FOV	FIBER OPTIC VAULT
BCL	BRICK SUPPORT COLUMN
	GRATE INLET
APS	ACCESSIBLE PARKING SIGN
PP	POWER POLE
LTP	LIGHT POLE
YL	YARD LIGHT
AC	AIR CONDITIONER
	DECIDUOUS TREE
	CONIFEROUS TREE
BU	BUSH
	TREE LINE
GA	GUY ANCHOR WIRE
	BUILDING LINE
ASPH.	ASPHALT
AT&T	AMERICAN TELEPHONE & TELEGRAPH
BK.	BOOK
BLDG.	BUILDING
BMK	BENCHMARK
CLF	CHAIN LINK FENCE
CMP	CORRUGATED METAL PIPE
CONC.	CONCRETE
CP	CONTROL POINT
CPP	CORRUGATED PLASTIC PIPE
CTL	CONTROL
ELEV.	ELEVATION
ELR	ELECTRIC RISER
℄	FLOW LINE
FF	FINISH FLOOR ELEVATION
FND	FOUND
HDWL	CONCRETE HEADWALL
LSA	LANDSCAPE AREA
MHR	METAL HANDRAIL
PG.	PAGE
PTP	PEDESTRIAN TRACTION PAD
PVC	POLYVINYL CHLORIDE PIPE
R/W	RIGHT-OF-WAY
RBCP	REBAR WITH CAP
RCP	REINFORCED CONCRETE PIPE
UG	UNDERGROUND
W/	WITH
(M)	MEASURED DIMENSION - THIS SURVEY
(P)	PLATTED DIMENSION
⑨	NUMBER OF PARKING STALLS
	ACCESSIBLE PARKING SPOT
✱	DENOTES OA BENCHMARK

CONTROL NOTES

Control: Horizontal & Vertical Control is based on the MoDOT Continuously Operating GNSS Network, Missouri Coordinate System 1983, West Zone, Metro Control Points BRAUN 3.

Modified State Plane Coordinates, NAD 1983, Missouri West Zone. Using a CAF of 0.99990007 with Metro Control Point BRAUN 3 as a base point. Distances shown are Ground, US Survey Feet.

NAVD 1988 Elevation Data – Calibrated to BRAUN

BRAUN 3: (Calibration Point – 2003 Adjustment)
KC Metro GRS Control Aluminum Disk, set in concrete flush with the ground and stamped BRAUN 3 1979.
N: 310136.375 (m) N: 1017505.756 (ft)
E: 862153.323 (m) E: 2828581.358 (ft)
Elev.: 1,002.95'

QA CPT #100:
Set 1/2" Rebar w/Cap "Olsson Survey Control Point"
53'± North of the ℄ of NE Colbern Road, 600'± East of the ℄ of NE Rice Road, South of the SW corner of the asphalt parking lot to Mid-Continent Public Library Headquarters Building
N: 1012116.718
E: 2829254.651
ELEV. = 973.40'
Reference Ties:
1. 28.30' North to the South back of curb of an asphalt parking lot for library.
2. 28.50' Northwest to the center of a 15" Maple tree.
3. 44.40' West-Southwest to a benchmark spike in the South face of a power pole.
4. 7.50' North the South edge of a concrete sidewalk.

QA CPT #101:
Set 1/2" Rebar, 367'± North of the ℄ of NE Colbern Road, 640'± East of the ℄ of NE Rice Road, NW of the NW corner of Mid-Continent Public Library
N: 1012430.309
E: 2829297.287
ELEV. = 970.85'
Reference Ties:
1. 25.65' West to the center of an 18" Oak tree.
2. 11.35' South to the center of a chain link fence corner post.
3. 22.65' Southeast to the NW corner of the Mid-Continent Public Library Building.

QA CPT #102:
Set 1/2" Rebar, 229'± North of the ℄ of NE Colbern Road, 845'± East of the ℄ of NE Rice Road, SE of the SE corner of Mid-Continent Public Library
N: 1012285.799
E: 2829504.378
ELEV. = 967.96'
Reference Ties:
1. 15.00' West-Southwest to the back of curb at the NE corner of an asphalt parking lot at the South face of a concrete sidewalk.
2. 36.70' South-Southwest to the center of a 20" Pine tree.
3. 34.00' North-Northwest to the center of a 22" Ash tree.

Elevations Datum: NAVD 1988

QA Bench Mark #1: Elevation=976.04'
(NAVD'88)
Set Railroad Spike in the South face of a power pole at the SW corner of the Mid-Continent Public Library Building. 51'± North of the ℄ of NE Colbern Road, 565'± East of the ℄ of NE Rice Road.

UTILITY NOTES

Utilities shown have been located from field survey information, together with obtained records. The Surveyor makes no guarantee that the utilities shown comprise all such utilities in the area, either in-service or abandoned. The Surveyor further does not warrant that the utilities shown are in the exact location indicated. Locates are in compliance with Subsurface Utility Engineering Quality Level "B", and were through the Missouri One-Call System.
Private utilities were located by ECHO GPR Services, 24564 Lackman Road, Paola, Kansas, 66071, Phone Number 913-879-2200.

Utilities were ordered to be located through Missouri One Call per One-Call Ticket #192121471. The companies listed on the ticket are: AT&T Distribution, City of Lee's Summit Fiber, City of Lee's Summit Sewer, City of Lee's Summit Storm, City of Lee's Summit Water, Comcast Communications, Google Fiber, Kansas City Power & Light, Spectrum (Formerly Time Warner Cable) and Spire Missouri West.

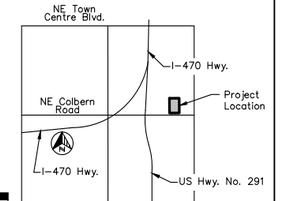
Notes:
1.) Any boundary or easement information shown is for graphical purposes only, and is not to be relied upon for exact locations.

2.) The sanitary sewer does NOT connect to the sewer manhole North of the library as per the *MCPL Plans by TGK Architects, dated February 1992 (No Pipe found from Existing Manhole). The underground storm drainage system is also per the MCPL Plans by TGK Architects, dated February 1992.*

DEMOLITION KEYNOTES: XX

D-1 EXISTING BUILDING TO BE REMOVED
D-2 EXISTING TRASH ENCLOSURE TO BE REMOVED
D-3 EXISTING STORM TO BE REMOVED AND ABANDONED

SCALE IN FEET 0' 15' 30' 60'



VICINITY MAP
Scale: 1" = 2000'

SAPP DESIGN ARCHITECTS
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Sapp Design Associates Architects, P.C.
Missouri State Certificate of Authority #000607

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Kansas City, MO 64108 816.300.0300

SPECIAL NOTICES

In the event the client consents to, allows, authorizes or approves of changes to any plans, specifications or other construction documents, and these changes are not approved in writing by the design professional, the client recognizes that such changes and the results thereof are not the responsibility of the design professional. Therefore, the client agrees to release the design professional from any liability arising from the construction, use or result of such changes. In addition, the client agrees to the fullest extent permitted by law, to indemnify and hold the design professional harmless from any damage, liability or cost (including reasonable attorney's fees and costs of defense) arising from such changes.

The personal seal of the registered Architect or Engineer shall be the legal equivalent of his signature wherever & wherever used, and the owner of the seal shall authenticate this sheet and the specification sections pertaining to this sheet. Responsibility shall be disclaimed for all other plans, specifications, estimates, reports or other documents or instruments relating to or intended to be used for any part or parts of the architectural project.

Mid-Continent Public Library
PRELIMINARY DEVELOPMENT PLANS FOR
COLBERN ROAD BRANCH
1000 N.E. COLBERN ROAD
LEE'S SUMMIT, MO 64086
JACKSON COUNTY

PACKAGE 10

Engineer of Record

PRELIMINARY
DEVELOPMENT PLAN

NOT FOR CONSTRUCTION

11.07.19

Terry M Parsons, Engineer MO PE-2018010505

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Olsson
Missouri State Certificate of Authority #001592

Revision No.	Description	Date

Project No.	Date	Drawn
B18-0330	09-18-18	KDP

Drawing No.

C1
EXISTING CONDITIONS

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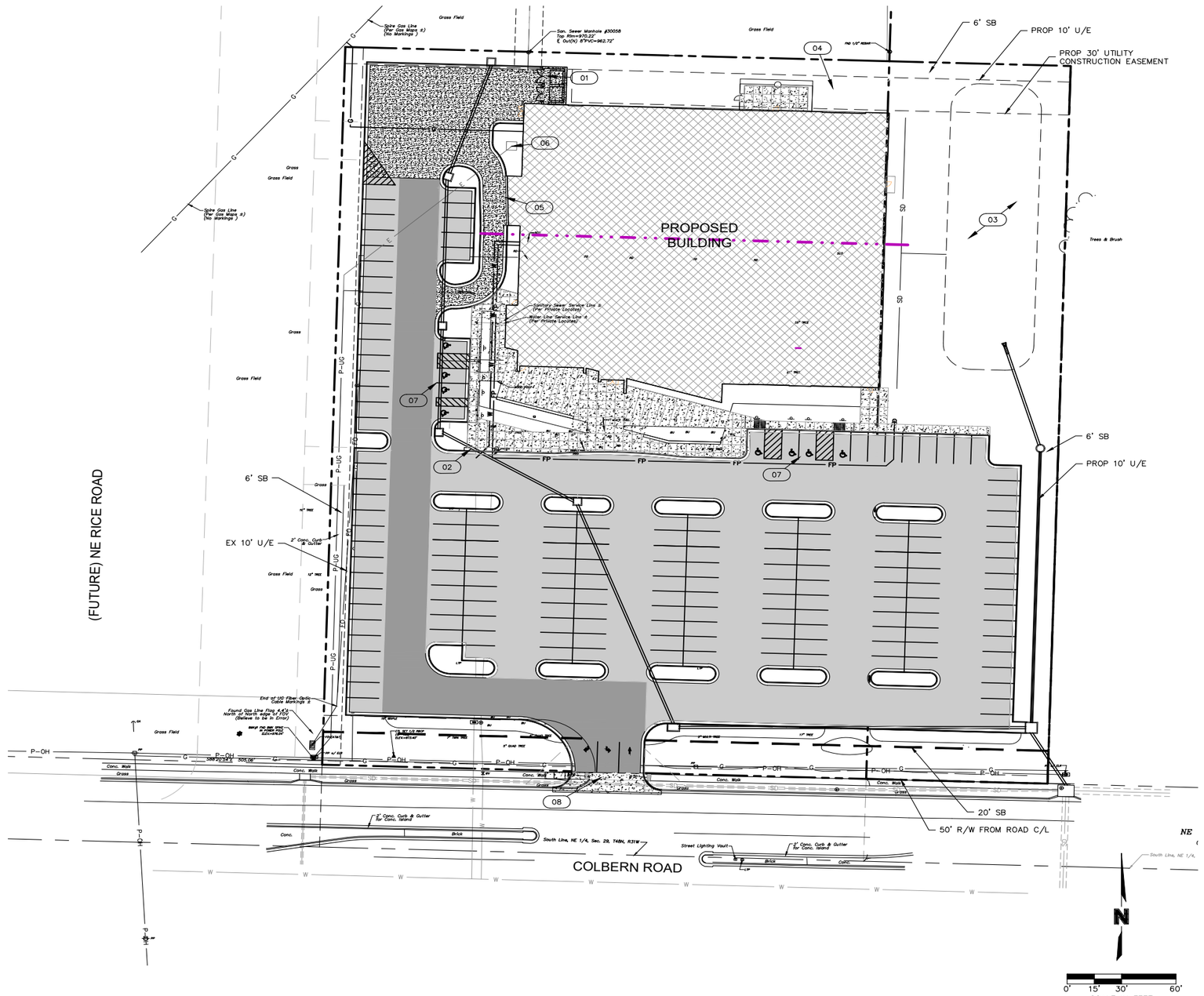

SITE DATA			
ZONING & SITE AREA			
PROPOSED USE:	PUBLIC LIBRARY		
	SITE AREA		ZONING
LOT 2 (AS DECRIBED):	4.00 ACRES (174,237 SF)		CP-2
IMPERVIOUS:	2.58 ACRES (112,384 SF) (64%)		
PERVIOUS:	1.42 ACRES (61,855 SF) (36%)		
FAR (0.55 MAX):	0.15		
BUILDING AREA			
BUILDING TYPE	# STORIES	SQUARE FOOTAGE	
BUILDING	1	34,030 SF	
PARKING			
USE	REQUIRED	PROVIDED	
LIBRARY	4 PER 1000 SF = 136	163	
ADA	4 (PER CITY TABLE)	8	
TOTAL	136	171 (INCLUDING ADA)	

NOTE:
ACCORDING TO MDNR STATE OIL & GAS COUNSEL THERE ARE NO OIL AND GAS WELLS LOCATED WITHIN OR ADJACENT TO THE PROPERTY.

THERE ARE NO FEMA DELINEATED FLOODPLAINS ON THE PROPERTY.

LEGEND

- PROPERTY LINES
- RIGHT-OF-WAY LINES
- LOT LINES
- ROAD CENTERLINE
- EASEMENT LINES
- SETBACK LINES
- EXISTING GRADE CONTOURS
- PROPOSED GRADE CONTOURS
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- UNDERGROUND FIBER OPTIC
- GAS LINE
- WATER LINE
- FIRE PROTECTION LINE
- STORM SEWER LINE
- SANITARY SEWER LINE
- ACCESSIBLE SIDEWALK RAMP
- CONCRETE CURB & GUTTER TYPE "B" RE: DETAILS
- CONCRETE CURB & GUTTER TYPE "B-DRY" RE: DETAILS
- PROPOSED CONCRETE SIDEWALK
- PROPOSED HEAVY DUTY CONCRETE PAVEMENT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED DETENTION BASIN

KEYNOTES: (XX)

01 TRASH ENCLOSURE - CMU WALLS WITH BRICK FACING AND STEEL DOORS
02 BOOK DROP
03 EXTEND DRY DETENTION BASIN
04 CONCRETE PATIO
05 DRIVE-THRU WINDOW
06 POWER TRANSFORMER
07 ADA ACCESSIBLE SIGNAGE AND STRIPING
08 WIDENED COMMERCIAL ENTRANCE (40') WITH RECONSTRUCTED ADA RAMP

LEGAL DESCRIPTION

All of Lot 1, Rice Acres, a subdivision in the City of Lee's Summit, JacksonCounty,Missouri, together with all that part of an unplatted trac t of land, all lying in the Northeast Quarter of Section 29, Township 48 North, Range 31 West, described by Timothy Blair Wiswell, MO-PLS 2009000067, as follows:

COMMENCING at the Southeast corner of the Northeast Quarter of Section 29, Township 48 North, Range 31 West; thence North 88 degrees 28 minutes 52 seconds West, on the South line of said Northeast Quarter, a distance of 755.18 feet to a point on the Southerly extension of the West line of Lot 1, Rice Acres, a subdivision in the City of Lee's Summit, Jackson County, Missouri; thence North 01 degree 23 minutes 04 seconds East, departing said South line, on said Southerly extension, a distance of 55.66 feet to the Southwest corner of said Lot 1, the POINT OF BEGINNING; thence North 01 degree 23 minutes 04 seconds East, on said West line, a distance of 436.21 feet to the Northwest corner of said Lot 1; thence South 88 degrees 38 minutes 41 seconds East, on the North line of said Lot 1 and its Easterly extension, a distance of 400.00 feet to a point; thence South 01 degree 23 minutes 04 seconds West, departing said Easterly extension, a distance of 436.21 feet to a point on the Easterly extension of the South line of said Lot 1; thence North 88 degrees 38 minutes 41 seconds West, on said Easterly extension and on said South line, a distance of 400.00 feet to the POINT OF BEGINNING, containing 174,485 Square Feet or 4.0056 Acres, more or less.

SAPP DESIGN ARCHITECTS
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Springfield, MO 65804 417.877.9600
Sapp Design Associates Architects, P.C.
Missouri State Certificate of Authority #000607

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PACKAGE 10

Engineer of Record
PRELIMINARY DEVELOPMENT PLAN
NOT FOR CONSTRUCTION
11.07.19
Terry M Parsons, Engineer MO PE-2018010505

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Revision No.	Description	Date

Project No.	Date	Drawn
B18-0330	09-18-18	KDP

Drawing No.
C2
GENERAL LAYOUT PLAN

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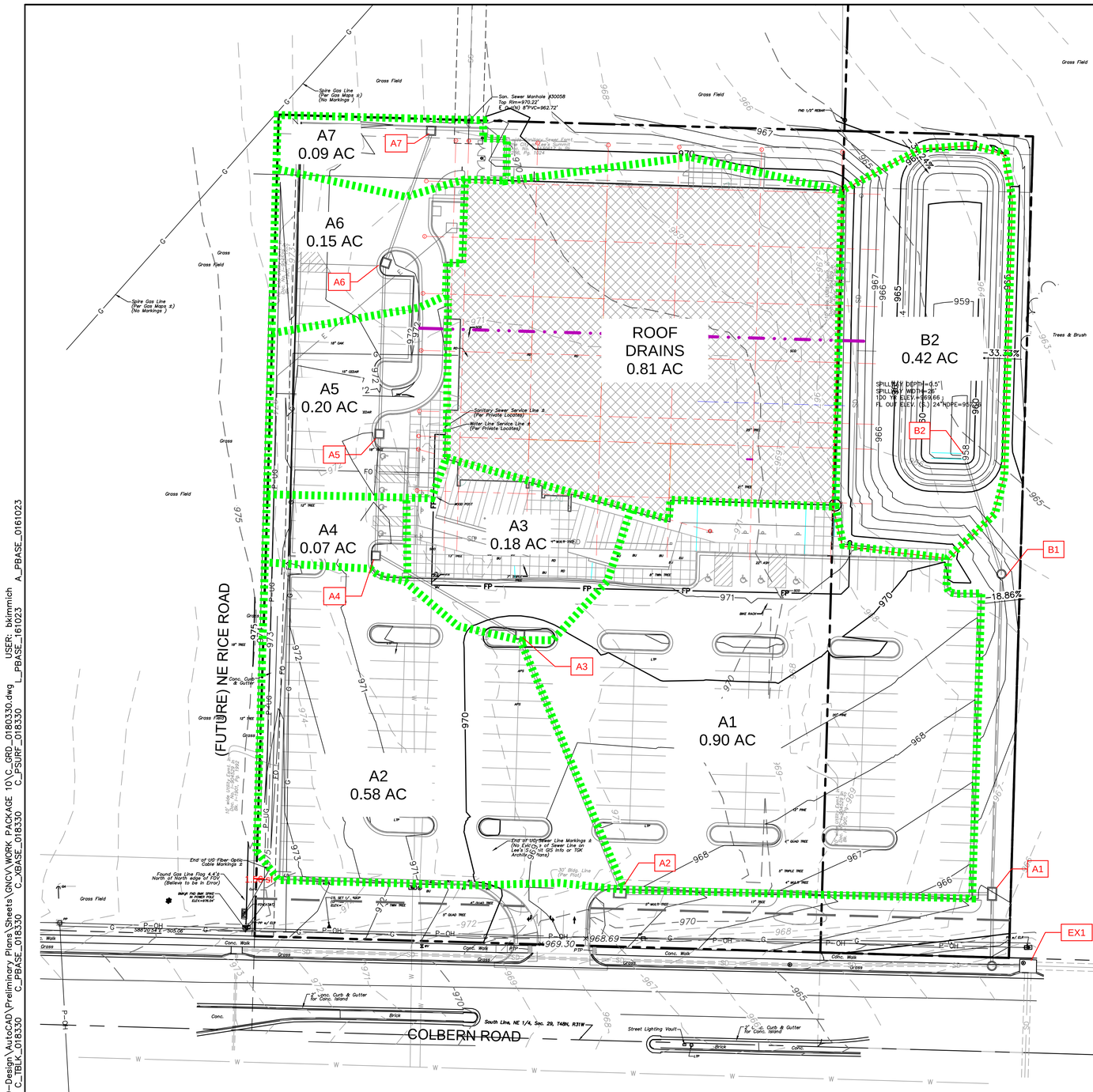

EXISTING CONDITIONS LEGEND

- PROPERTY LINES
- RIGHT-OF-WAY LINES
- EASEMENT LINES
- P-OH — OVERHEAD ELECTRIC
- P-UG — UNDERGROUND ELECTRIC
- TEL — UNDERGROUND TELEPHONE
- FO — UNDERGROUND FIBER OPTIC
- G — GAS LINE
- W — WATER LINE
- SD — STORM SEWER LINE
- SS — SANITARY SEWER LINE

PROPOSED CONDITIONS LEGEND

- E — PROPOSED UNDERGROUND ELECTRIC
- FO — PROPOSED FIBER OPTIC
- W — PROPOSED WATER LINE
- FP — PROPOSED FIRE PROTECTION LINE
- SD — PROPOSED STORM SEWER LINE
- T — PROPOSED TURF DRAIN LINE
- SS — PROPOSED SANITARY SEWER SERVICE
- CONCRETE CURB & GUTTER
- PROPOSED BUILDING

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helix.
1629 Walnut
Kansas City, MO 64108 816.300.0300

SPECIAL NOTICES

Mid-Continent Public Library

PRELIMINARY DEVELOPMENT PLANS FOR

COLBERN ROAD BRANCH

1000 N.E. COLBERN ROAD
LEE'S SUMMIT, MO 64086
JACKSON COUNTY

PACKAGE 10

Engineer of Record

PROGRESS SET

NOT FOR CONSTRUCTION

10.25.19

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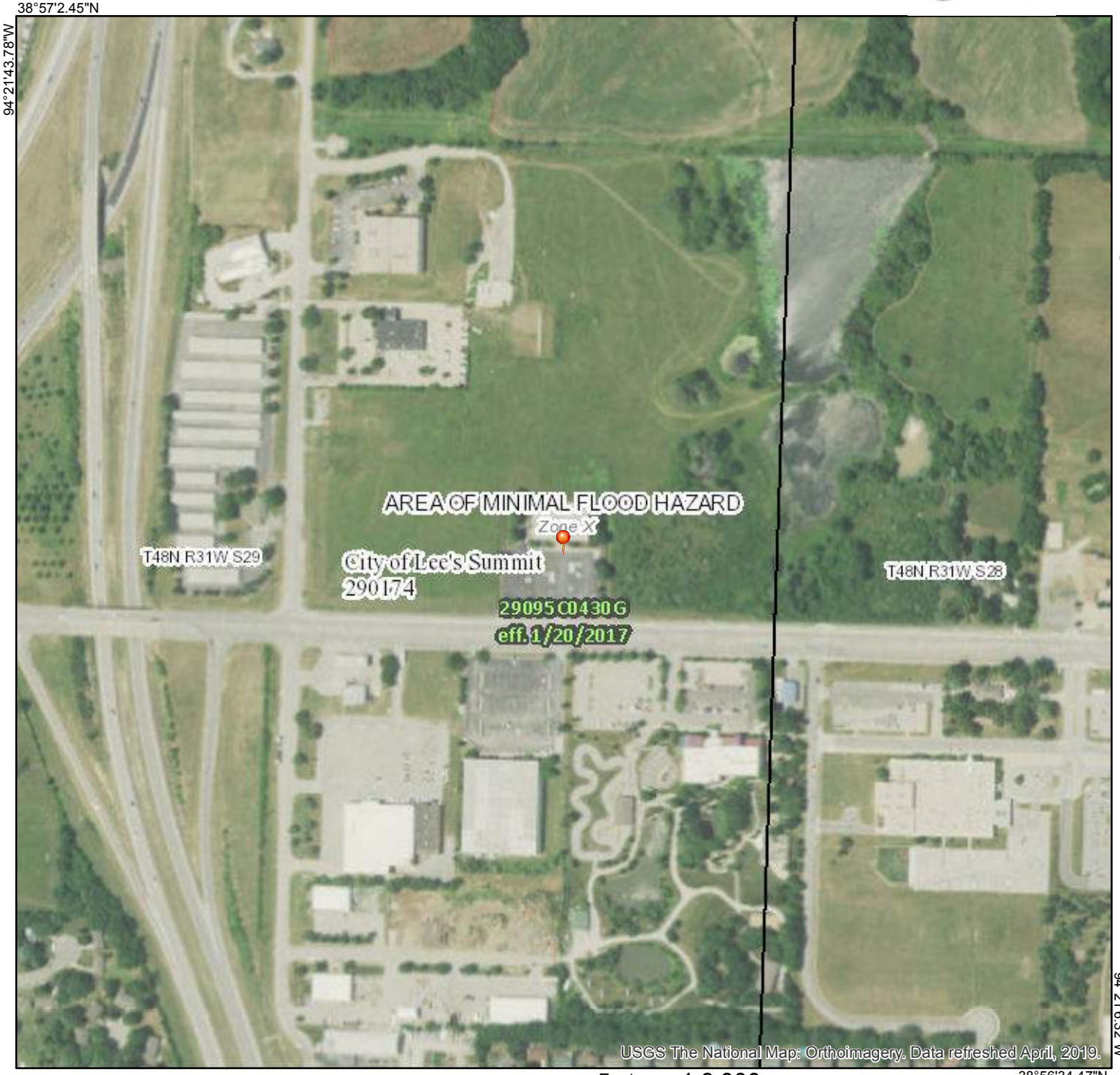
STORMWATER MANAGEMENT PLAN

Appendix B

FEMA Flood Classification Firm

National Flood Hazard Layer FIRMette

FEMA



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 10/30/2019 at 10:40:35 AM 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.

Appendix C

Soil Map

Soil Map—Jackson County, Missouri
(SOILS SURVEY)

Map Scale: 1:844 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

Jackson County, Missouri

10128—Sharpsburg-Urban land complex, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2ql09
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sharpsburg and similar soils: 60 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

A - 0 to 17 inches: silt loam
Bt - 17 to 55 inches: silty clay loam
C - 55 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D

Ecological site: Loess Upland Prairie (R109XY002MO)
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

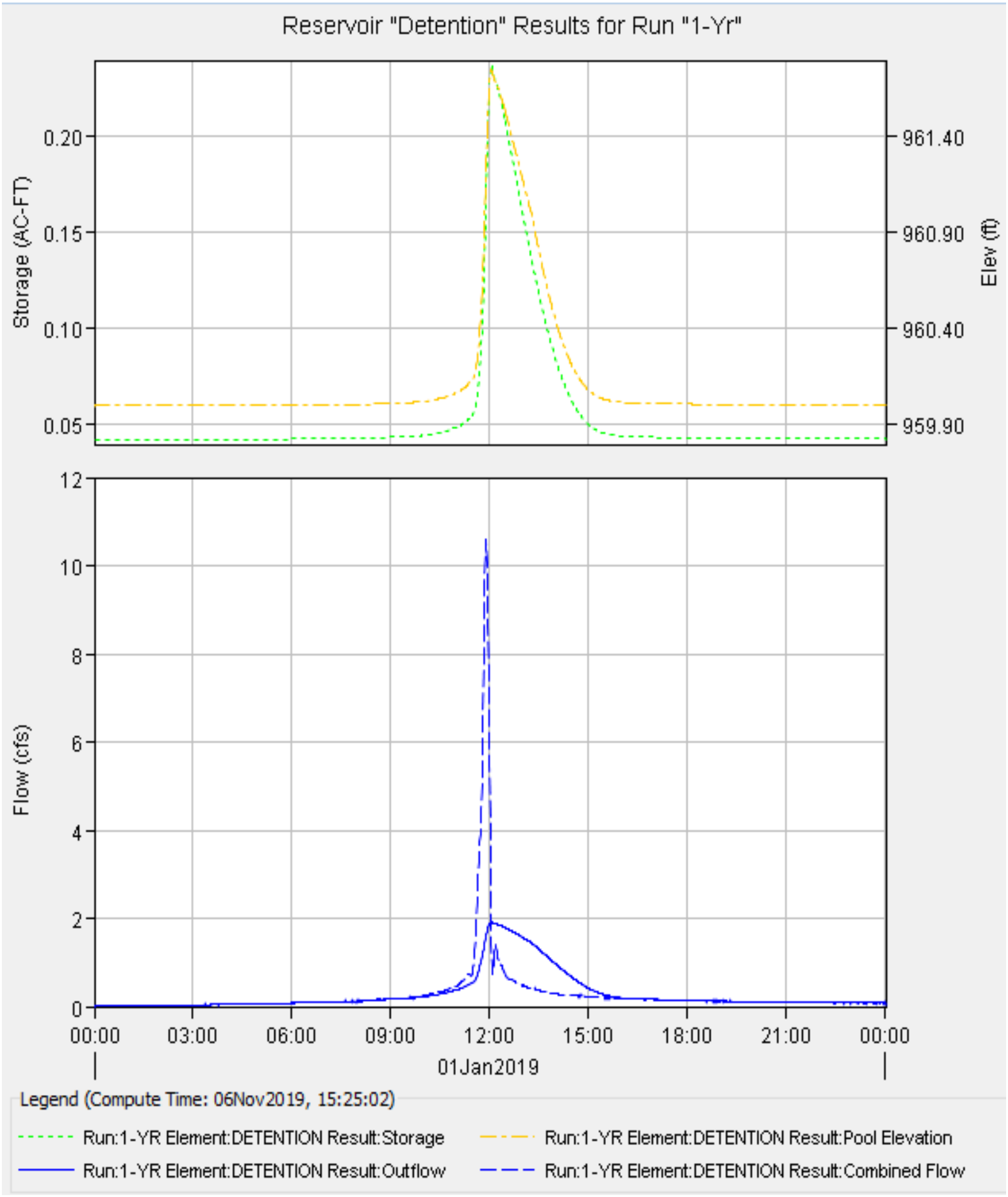
Data Source Information

Soil Survey Area: Jackson County, Missouri
Survey Area Data: Version 20, Sep 16, 2019

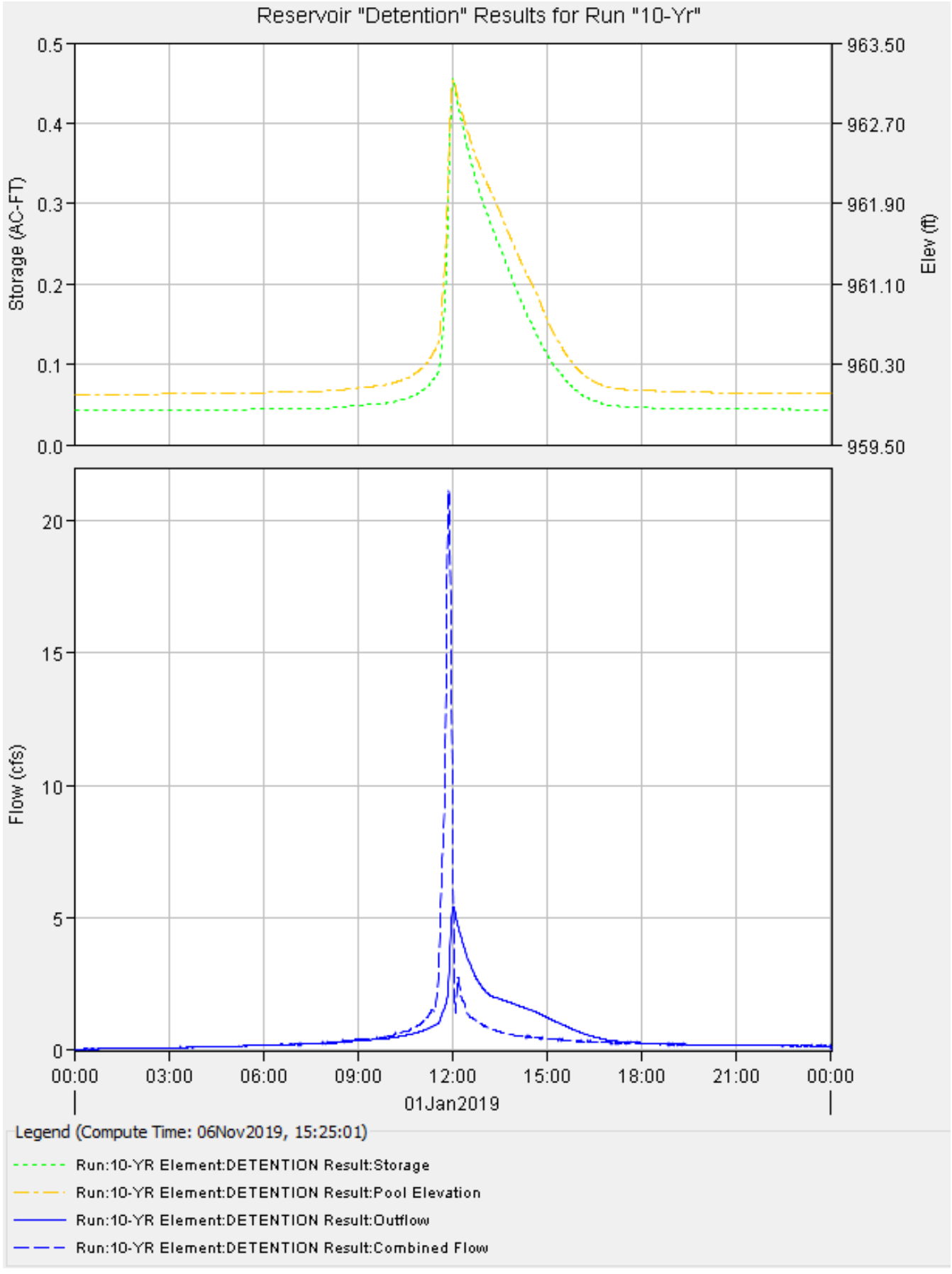
Appendix D

Drainage and Detention Calculations

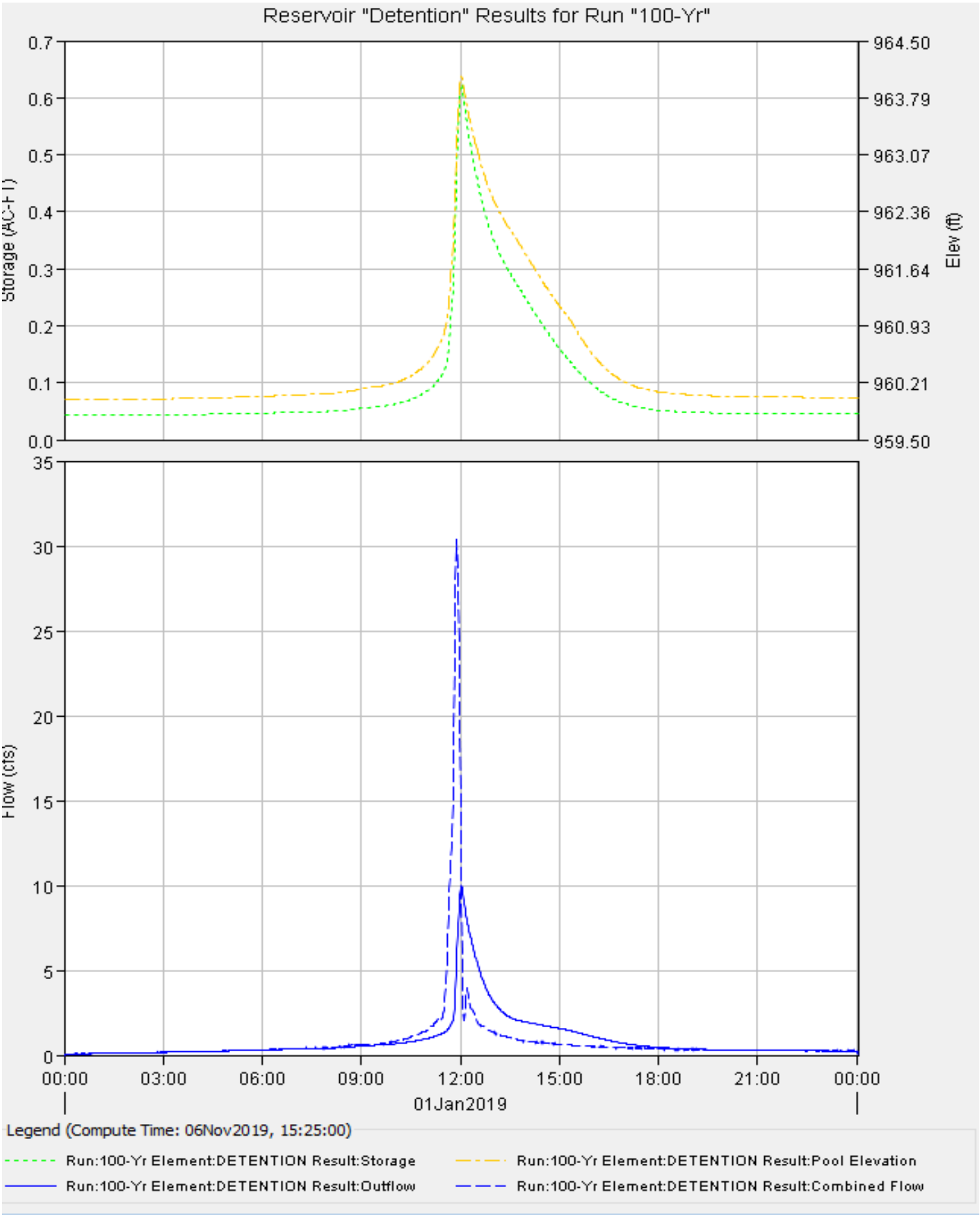
MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
STORAGE & OUTFLOW HYDROGRAPHS 1-YR



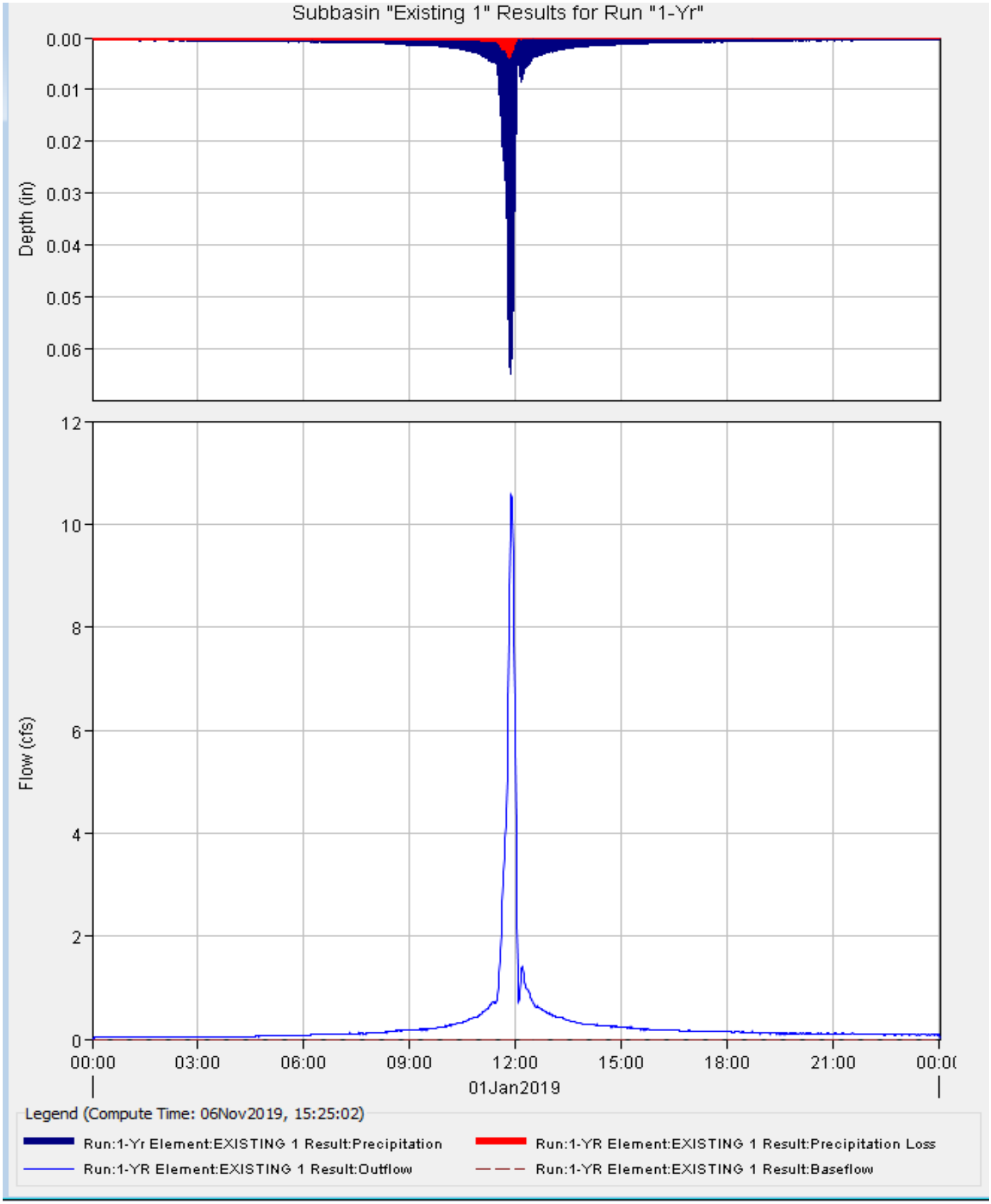
MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
STORAGE & OUTFLOW HYDROGRAPHS 10-YR



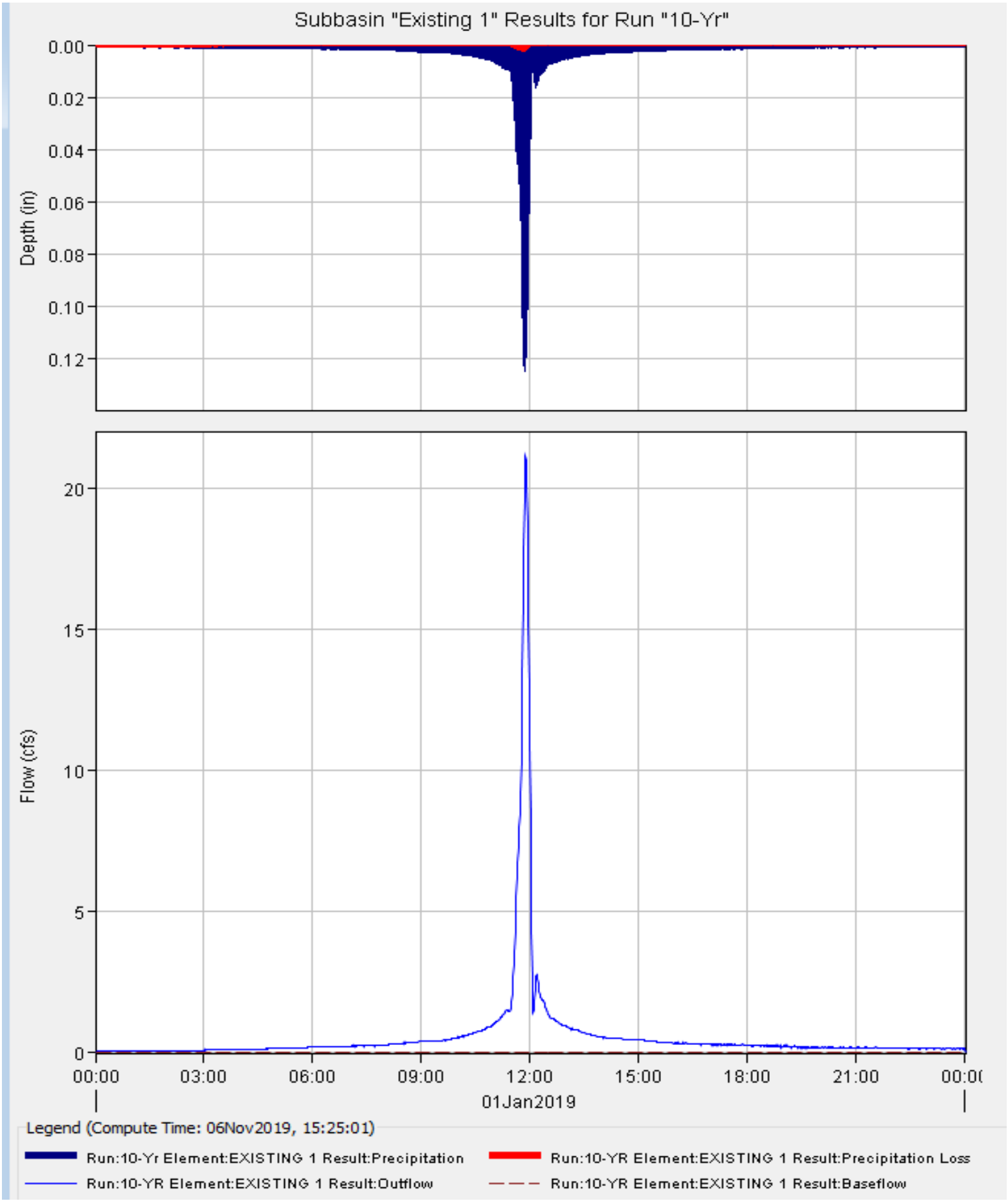
MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
STORAGE & OUTFLOW HYDROGRAPHS 100-YR



MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
INFLOW HYDROGRAPHS 1-YR



MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
INFLOW HYDROGRAPHS 10-YR



MCPL - COLBERN ROAD BRANCH
HEC-HMS DETENTION ANALYSIS
EXTENDED DRY DETENTION
INFLOW HYDROGRAPHS 100-YR