Summit Point Apartments, Phase-II
504 NE Chipman Road
Lee's Summit, Missouri 64063
CFS Project No. 21-5065/19-5293

SW ¼, Section 32 Township 48 North, Range 31 West
Jackson County, Missouri
Tributary P3 to Prairie Lee Lake Watershed

Base Flood Elevation Determination in Unnumbered A Zone at Summit Point Apartments, Phase-II for Tributary P3 To Prairie Lee Lake

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May 13, 2021

Base Flood Determination in Unnumbered A Zone
for Tributary P3 To Prairie Lee Lake
Summit Point Apartments, Phase-II
504 NE Chipman Road
City of Lee's Summit, Jackson County, Missouri 64063
CFS Project #21-5065 / #19-5293
May 13, 2021

Purpose: The purpose of the study is to determine the 100-year base flood elevations in the unnumbered Zone A on the Summit Point Apartments Phase-II property. Tributary P3 to Prairie Lee Lake flows along the northern side of the proposed Summit Point site. There is a small local flow drainage channel on the proposed Summit Point site that branches off of the main Tributary P3 channel where the 100-year base flood elevations are key to setting the finish floor elevations of the proposed apartment buildings. The City of Lee's Summit requires that all new building developments have to have finish floors a minimum of 2 ft higher than the highest 100-year base flood elevation extending onto the site.

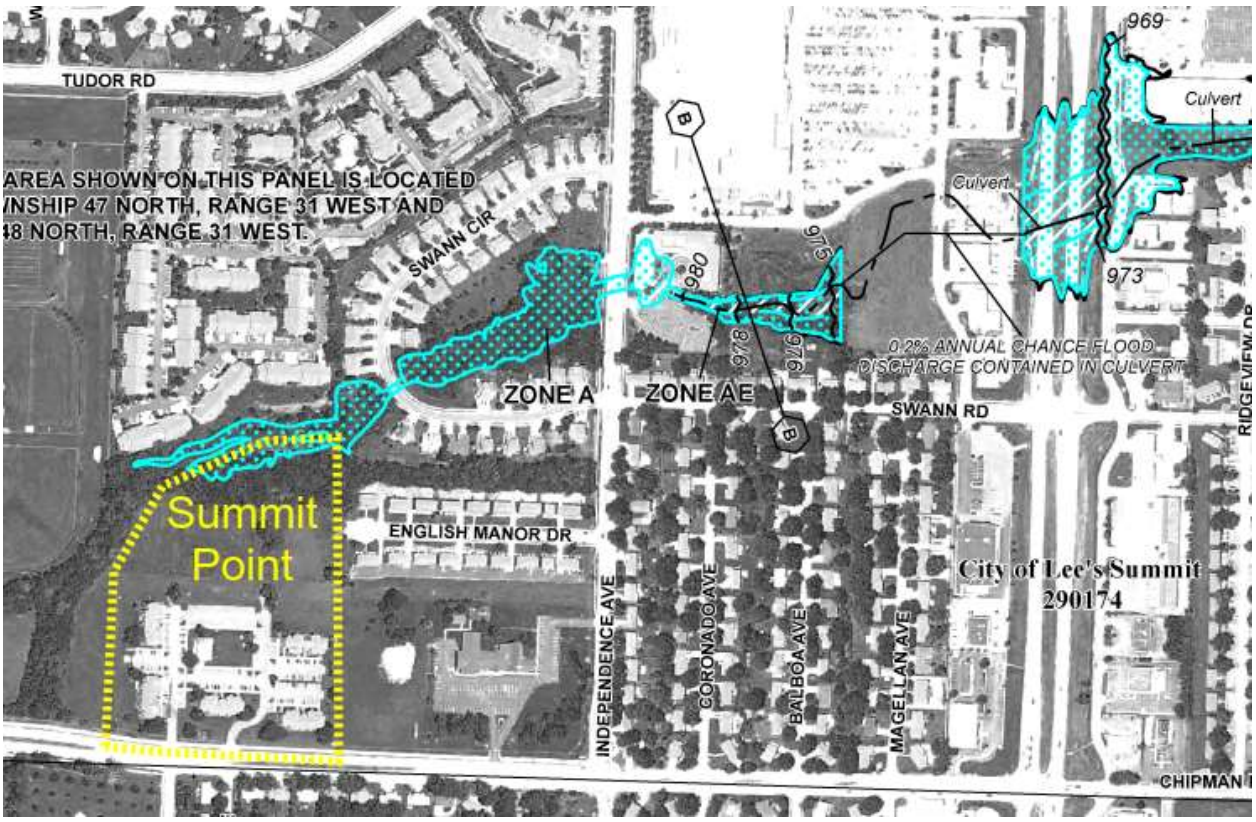
Vicinity Map of the Summit Point Apartments at 504 NE Chipman Road in Lee's Summit

General: The owners of the proposed Summit Point Apartments at 504 NE Chipman Road have proposed to develop the second phase of their property. The Phase-II addition would be constructed

directly to the north of the existing Phase-I apartments located at 504 NE Chipman Road in Lee's Summit, Missouri. Phase I included five multi-unit apartment buildings plus a swimming pool on a 6.49 acre site constructed in 1980. The proposed Phase-II addition would cover 7.21 acres and include six new multi-apartment buildings along with parking lots and service drives.

The site slopes downwards to the north where the existing Tributary P3 to Prairie Lee Lake flows eastwards along the site's northern boundary. The existing Tributary P3 creek has flowline elevations ranging between approximately 994' to 1000' along the northern side of the Summit Point Apartments, Phase II. NE Swann Circle is located directly to the east of Summit Point and NE Independence Avenue is located approximately 800 ft downstream. The creek crossing at NE Swann Circle has triple 48" HDPE culverts have upstream flowline elevations of approximately 986.91'and the top of the roadway has an overflow elevation of approximately 994'. The creek bed upstream of NE Swann Circle serves as a stormwater detention basin for the Maple Tree Manor subdivision.

A small local flow drainage channel branches off of the main Tributary P3 channel and extends onto the northern portion of the Summit Point site. The small drainage channel converges with the main channel of Tributary P3 near the northeast corner of the Summit Point site, and extends westwards approximately 420 ft. The small drainage channel has an invert elevation of approximately 987.00' at the downstream convergence point with Tributary P3, and has an upstream invert elevation of approximately 997.30'. Drainage contributing to the small drainage channel flows off of the Summit Point site to the south.



FEMA FIRM Flood Map 29095C0436G, Showing the Existing Tributary P3 to Prairie Lee Lake Flowing along the Northern Border of the Summit Point Apartments

NE Independence Avenue is located approximately 1000 ft downstream from NE Swann Circle downstream and has a single 48" RCP culvert with an upstream flowline elevation of approximately

979.25’ and an overflow elevation across the top of NE Independence Avenue of approximately 985.41’. The creek bed upstream of NE Independence Avenue serves as a stormwater detention basin for the Maple Tree Manor subdivision.

The FEMA flood map shows the defined 1% (100-year) flood elevations to the east along the creek stop short of Independence Avenue. A portion of the northern side of the site is within the FEMA 1% (100-year) floodplain, with the remaining ground above the flood limits.

HEC-RAS Model Setup: CFS Engineers created a HEC-RAS model of the study segment of Tributary P3 to Prairie Lee Lake extending from the western side of the Summit Point property downstream to Independence Avenue. The channel geometry and cross-sections were derived using the available GIS topography maps from the City of Lee’s Summit and Jackson County, and also the topographic survey of the Summit Point site performed by CFS Engineers in 2019.

Cross-sections were cut across the digital contours to set the station-elevations. The cross-sections in the river channel were stationed based on an assumed 10000 ft at the point where the centerline of NE Swann Circle crossed the Tributary P3 to Prairie Lee Lake creek. The left and right stream bank locations were set based on the apparent break in slope locations along the sides of the main creek channel. The main channel lengths were based on the digital alignment of the creek’s flowline and the left and right overbank lengths were estimated based on the general curvature of the creek alignment.

Stream flows were derived using the USGS’ StreamStats web-based hydrological software to determine flow rates at several locations along Tributary P3. The StreamStats flows calculated at the point where Tributary P3 crossed Highway 291 were compared to the values listed in the FEMA Flood Insurance Study and were summarized in the table below:

FEMA and StreamStats Channel Flow Rates on Tributary P3 to Prairie Lee Lake at Highway 291

Return Interval (Percentage)	Return Interval (Year Probability)	FEMA FIS Study Peak Annual Chance Discharge (cfs)	StreamStats Peak Flows (Peak Urban Statewide SIR 2010 5073) Discharge (cfs)
10%	10-Year	450 cfs	366 cfs
2%	50-Year	650 cfs	619 cfs
1%	100-Year	750 cfs	733 cfs
0.2%	500-Year	900 cfs	1004 cfs

Mannings Roughness Factors were determined from direct field observation of the existing channel conditions from a May 2021 site visit. Several photographs were taken at various locations along the creek in mid-spring when the foliage was nearly full grown. A photo collage including eight pictures taken at different locations along the creek have been included in the appendix of this study. After examining the photos, a Manning's Roughness Factor of n=0.045 was applied to the main channel based on the Table 3-1 recommendations for a Condition A.1.d 'Clean, winding, some pools and shoals, some weeds and stones.' CFS also used n=0.100 for the overbank flood plains based on the Table 3-1 recommendations for a Condition A.2.c.4 'Medium to dense brush in summer.'

The HEC-RAS model was setup as a 1D, steady state flow. A mixed flow regime was used to allow for changes between subcritical and supercritical flow at different locations along the channel. Divided channel sections at RS-10856.09, RS-10658.06, RS-10495.32 and RS-10280.58 were blocked-out using the stream obstruction routines in the cross-section modeler. The roadway surfaces at Swann Circle and Independence Avenue were treated as weirs with with weir-flow coefficients of 2.9 for modeling stream flows that overtopped the streets in heavy storms. Roadway surface widths were approximated from the GIS topography or from available roadway plans. The Reach Boundary conditions used the Normal Flow conditions with the approximate channel bed slopes at the upstream and downstream-most cross-sections.

Schematic Off-Site Drainage Area Map for Tributary P3 to Prairie Lee Lake

HEC-RAS Analysis: CFS Engineers created a HEC-RAS model to evaluate the water surface elevations of stormwater in the Tributary P3 to Prairie Lee Lake creek channel along the north side of the proposed Summit Point Apartments, Phase II site. Stream flows were calculated at four locations along the northern property line and where the creek crosses NE Swann Circle and NE Independence Avenue.

Drainage areas were estimated using the City GIS mapping. Channel cross-sections for the HEC-RAS models were cut across the surveyed ground surface, based on a recent topographic field survey of the site performed by CFS Engineers. The FEMA FIRM Flood Map of the region (FEMA FIRM Flood Map 29095C0436G, Panel 436 of 625, January 20, 2017), shows the Tributary P3 to Prairie Lee Lake directly to the north of the site as Zone A, defined as a Special Flood Hazard Area subject to inundation by the 1% annual chance flood where no base flood elevations have been determined. The time of

concentration for each drainage basin was determined using TR-55 methodology for overland flow, shallow concentrated flow and channelized flow segments. Estimates of flow path length and slope were estimated using Jackson County GIS topography and the USGS Quadrangle maps of the vicinity. The USGS StreamStats web-based hydrologic analysis program was used to check the contributing drainage areas to the points of interest along the creek. The StreamStat flows appeared to be overly conservative when checked against the flows calculated using the conventional TR-55 methodologies. Calculations have been included in the appendix.

The existing triple 48" HDPE culverts at NE Swann Circle and the existing 48" RCP culvert at NE Independence Avenue were also included in the HEC-RAS model to evaluate the potential back-up of flood water in the creek from the culvert crossings. Channel cross-sections were cut along the Summit Point Apartments, Phase-II site, and additional cross-sections were cut downstream to model the NE Swann Circle and NE Independence Avenue culverts. CFS surveyors measured the invert elevations of all three 48" HDPE culverts along with the top of road elevation at NE Swann Circle. Available storm sewer as-built plans were used to model the existing 48" RCP culvert at NE Independence Avenue.

Current Effective Model: The FEMA FIRM flood map showed the creek within the limits of Zone AE east of NE Independence Avenue, and within Zone A upstream of NE Independence Avenue to the Summit Point site. The flood map showed that the creek along the northern side of Summit Point, was set inside Zone A where the defined base flood elevations were not determined. This indicates that the detailed HEC-RAS model of the Tributary P3 to Prairie Lee Lake stopped short of NE Independence Avenue and did not extend upstream to cover the Summit Point site.

Duplicate Effective Model: CFS Engineers created a HEC-RAS model using the recent topographic survey and the Jackson County GIS data. The cross-sections cut along the northern side of the Summit Point site and other cross-sections cut further downstream to model the NE Swann Circle roadway crossing and the NE Independence Avenue roadway crossing. The methods for setting the left and right bank stations and overbank lengths were described above. RS 8693.92 was the furthest downstream located approximately 530 ft downstream from the centerline of NE Independence Avenue. RS 11275.44 was the furthest upstream located on the western side of the Summit Point site. The stream flows for the 2 year storm ranged from 144 cfs at the lower end of the creek by NE Independence Avenue, to 77 cfs at the upstream end. Likewise, the 10-year stream flows ranged from 273 cfs to 146 cfs, and the 100-year stream flows ranged from 485 cfs to 264 cfs. The channel slope averaged approximately 1.1%. 100-year flow depths along the Summit Point site ranged from 2.58 ft to 4.42 ft, with corresponding flow velocities ranging from 3.52 fps to 6.78 fps.

Alternate Scenario Model for Clogged Independence Avenue Culvert: Using the Duplicate Effective Model, CFS modified the model to change the 48" diameter RCP culvert at Independence Avenue to a 6" diameter pipe for the purpose of simulating a clogged culvert condition. With the dramatically reduced culvert size, the heavier stream flows would overtop the roadway and increase the backwater depth at the Swann Circle culvert crossing. The reason for performing the scenario was two-fold. The first reason was that the available record construction plans for Independence Avenue showed a 48" RCP culvert under the roadway connecting into a 54" RCP before discharging into the open creek, and the City's current digital stormwater utility data showing that two 24" diameter pipes were installed downstream from the existing 48" RCP and 54" RCP. While the configuration of installing two 24" pipes downstream from a 54" makes little hydraulic sense, it could have been done purposely to constrict the channel flow and store runoff in the channel upstream of Independence Avenue. Since the Independence Avenue channel crossing was over 1000' downstream from the Summit Point site, CFS Engineers did not survey the area.

The second reason for performing the clogged Independence Avenue culvert scenario was to model the worst-case conditions where the stream flow would be forced to overtop the roadway and possibly cause an increased tailwater backup at the Swann Circle culvert and higher WSEL's along the Summit Point site. After running the clogged Independence Avenue culvert scenario, it was found that the increased downstream tailwater depth had negligible impact on the WSEL's, and that the base flood elevations were unaffected along the Summit Point site.

On-Site Small Local Flow Drainage Channel South of Tributary P3: A HEC-RAS model was created to model the small local flow drainage channel which branches south off the main Tributary P3, and to determine the maximum 100-year WSEL on the proposed site. The small channel model re-used the same cross-sections as the Tributary P3 channel except the stream obstructions were switched so that the main channel was blocked from conveying the lower amount of runoff contributed directly from the site. The stormwater drainage and detention study for the proposed Summit Point Phase-II Apartments included pre-development and post-development runoff calculations from the 7.21 acre Phase-II site and portions of the 6.49 acre Phase-I site that drained northwards over the Phase-II site grounds. The total runoff from the Phase I and II sites was routed into the existing small channel to determine the 100-year WSEL's, which are summarized in the following table:

Cross Section	100-Year Flow	100-Year WSEL On-Site South Channel	100-Year WSEL Main Trib P3 Channel
RS 10097.67	97 cfs	994.92'	994.92'
RS 10280.58	97 cfs	994.87'	994.65'
RS 10495.32	65 cfs	996.88'	997.34'
RS 10658.06	32 cfs	998.81'	999.79'

Summary: The HEC-RAS calculations for the Tributary P3 main channel comparing the open and clogged culvert conditions at Independence Avenue showed no change in 100-WSEL's in the channel section along the proposed Summit Point Phase-II site. The HEC-RAS calculations for the small local flow drainage channel branching off of Tributary P3 showed the highest 100-year WSEL on the site at 998.81', and the lowest proposed building had a finish floor elevations of 1005.00'. Since the Summit Point Phase-II site is providing post-development detention, and since the 7.21 acre site comprises approximately six percent of the overall contributing watershed area, Tributary P3 would experience minimal changes in the overall pre and post-development flow rates.

THE SHADED AREA DEPICTS (AS PER FEMA MAP (COMMUNITY PANEL NO. 29095C0436G) DATED JANUARY 20, 2017), THE PROPERTY LOCATED IN FEMA DESIGNATED ZONE A WHERE NO BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED.

STREAM SETBACK

Pre-Development On-site Drainage Area
A = 7.21 Acres
C_N = 74.0
T_c = 8.10 minutes

Pre-Development Off-site Drainage Area
A = 4.21 Acres
C_N = 88.5
T_c = 9.00 minutes

Tract 1 unplatted

Tract 2 unplatted

Tract 4
Tract 1 of
Summit Point First Plat
Book 141, Page 60

South Line, Southeast ¼, Section 32-48-31, N88°00'27"W, 2646.66'

50' 0 50' 100'
SCALE: 1" = 50' FEET

PRE-DEVELOPMENT CONDITION
DRAINAGE AREA MAP

Sheet reference number:
DAM-1

CFS ENGINEERS
1421 E. 104th Street, Ste. 100 KCMO 64131
O 816-333-4477 F 816-333-6888
cfse.com

STATE OF MISSOURI
LANCE W. SCOTT
NUMBER E-25525
PROFESSIONAL ENGINEER
5/13/21

Mark	Description	Date	Appr.
	REVISED PER COMMENTS	05/13/21	
	REVISED PER COMMENTS	04/15/21	
	REVISED PER COMMENTS	03/22/21	
	CITY SUBMITTAL	02/18/21	

Rev. -
Date: 03-25-2105
Designed by: RP
Drawn by: RP
Ckd by: LWS
Reviewed by: ---
Submitted by: ---
Plot scale: 1:50
File name: P:\Development Drainage area Mapdgn
Plot date: 5/13/2021

SUMMIT POINT
504 NE Chipman Road
Lee's Summit, Missouri

Preliminary Development Plan

G:\Shared drives\215065\CADD\Pre Development Drainage area Mapdgn

THE SHADED AREA DEPICTS (AS PER FEMA MAP (COMMUNITY PANEL NO. 29095C0436G) DATED JANUARY 20, 2017), THE PROPERTY LOCATED IN FEMA DESIGNATED ZONE A WHERE NO BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED.

UNDETAINED DRAINAGE AREA
A = 1.68 ACRES
CN = 75.7
Tc = 5 min.

STORMWATER DETENTION BASIN CONTRIBUTING DRAINAGE AREA

ON-SITE
A = 5.53 ACRES
CN = 90.5
Tc = 5 min.

ON-SITE
A = 4.21 ACRES
CN = 88.5
Tc = 9 min.

PEAK 100 YR WATER SURFACE ELEVATION = 1000.5
30' OVERFLOW SPILLWAY CREST = 1001.00
EMERGENCY OVERFLOW = 1002.01
TOP OF DAM = 1003.25

N

50' 0 50' 100'
SCALE: 1" = 50' FEET

G:\Shared drives\215065\CADD\Post Development Drainage area Map.dgn

CFS ENGINEERS
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1421 E. 104th Street, Ste. 100 KCMO 64131
o: 816-333-4477 f: 816-333-6688

STATE OF MISSOURI LANCE W. SCOTT NUMBER E-28865 REGISTERED PROFESSIONAL ENGINEER
5/13/21

Mark	Description	Date	Appr.
	REVISED PER COMMENTS	05/13/21	
	REVISED PER COMMENTS	04/15/21	
	REVISED PER COMMENTS	03/22/21	
	CITY SUBMITTAL	02/18/21	

Designed by: RP
Date: 03-25-2015
Rev. -
Dwn by: RP
Ckd by: LWS
Reviewed by: ---
Submitted by: ---
Plot scale: 1:50
File name: Post Development Drainage area Map.dgn
Plot date: 5/14/2021 9:13:26 AM

SUMMIT POINT
504 NE Chipman Road
Lee's Summit, Missouri

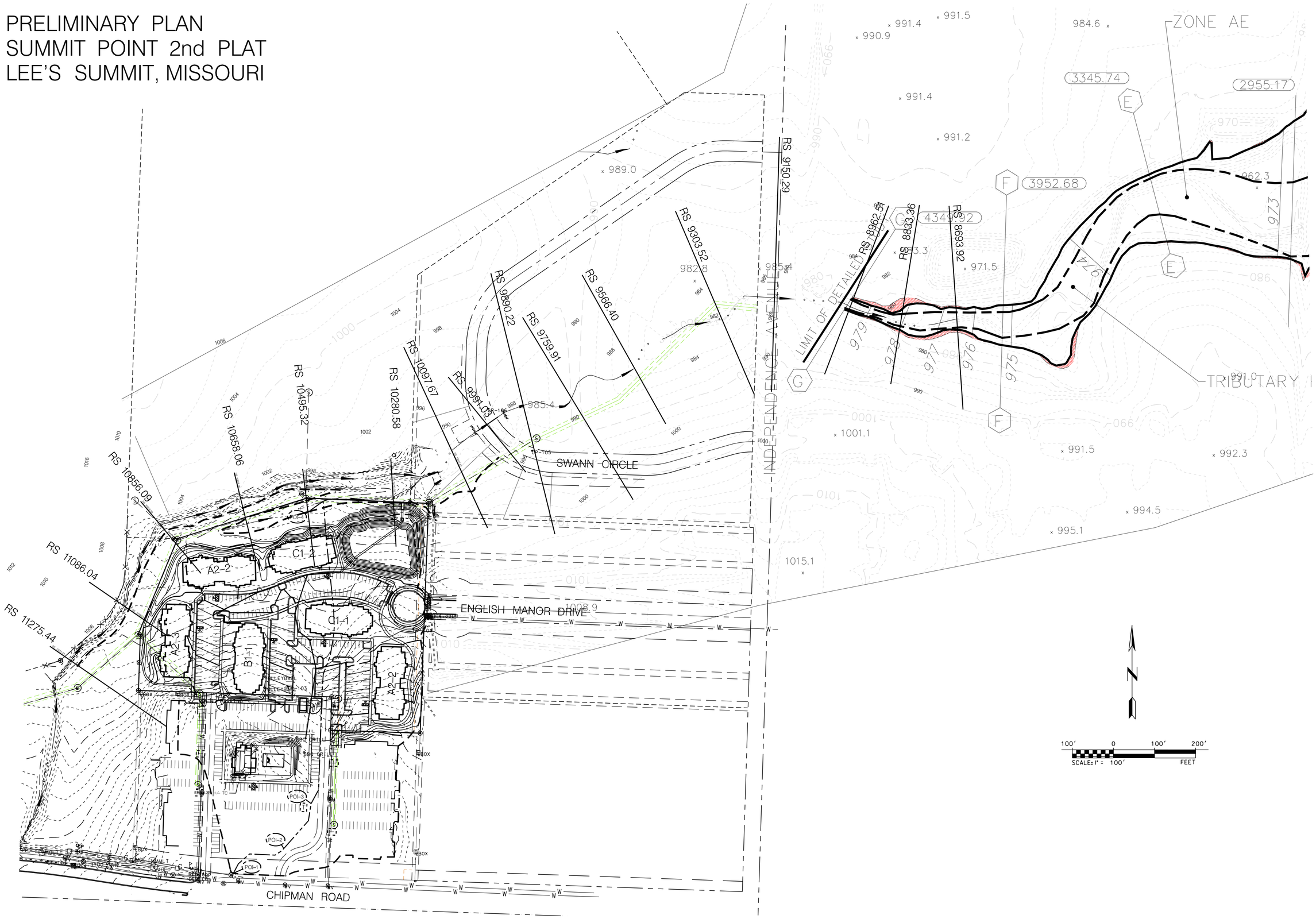
Preliminary Development Plan

POST-DEVELOPMENT CONDITION DRAINAGE AREA MAP

Sheet reference number:

DAM-2

PRELIMINARY PLAN
SUMMIT POINT 2nd PLAT
LEE'S SUMMIT, MISSOURI



CFS ENGINEERS
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cfse.com

STATE OF MISSOURI
LANCE W. SCOTT
NUMBER E-25525
PROFESSIONAL ENGINEER
5/13/21

Mark	Description	Date	Appr.
	REVISED PER COMMENTS	05/13/21	
	REVISED PER COMMENTS	04/15/21	
	REVISED PER COMMENTS	03/22/21	
	CITY SUBMITTAL	02/18/21	

Designed by: RP
Drawn by: RP
Checked by: LWS
Submitted by: ---
Date: 03-25-2105
Reviewed by: ---
Plot scale: 1:100
Rev. -
File name=G:\215065-Drainage Map and Calcs\pn 215065 DAM.dwg
Plot date=5/13/2021

SUMMIT POINT
504 NE Chipman Road
Lee's Summit, Missouri

Preliminary Development Plan

HEC-RAS Cross Section Location Map

Sheet reference number:
DAM-3

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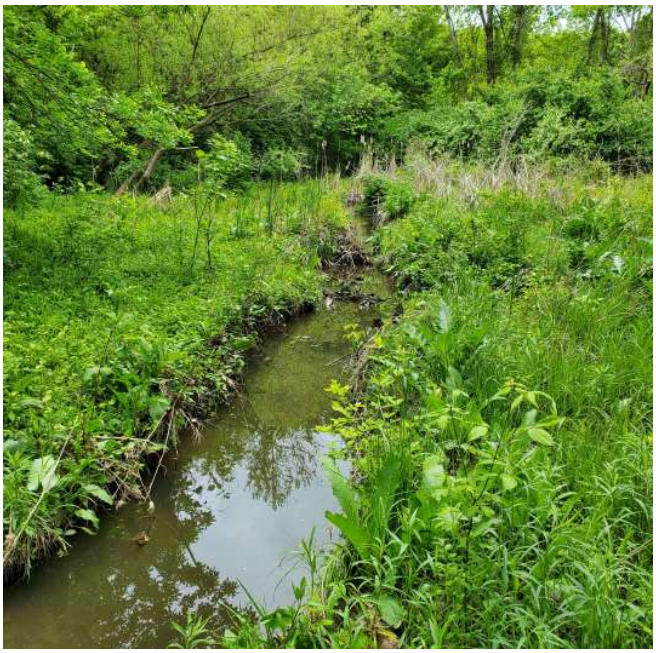
HEC-RAS Study for Summit Point-II
Tributary P3 to Prairie Lee Lake
Photographs of Main Creek Channel
May, 2021



RS-10097-Main Channel by Swann Circle Detention Basin Looking DS, 05-11-21

RS-10280-Main Channel Looking DS, 05-11-21

RS-10495-1 Main Channel Looking DS, 05-11-21

RS-10495-2 South Bank near Center of Proposed Building C1-2, 05-11-21

HEC-RAS Study for Summit Point-II
Tributary P3 to Prairie Lee Lake
Photographs of Main Creek Channel
May, 2021

RS-10658-1 Main Channel Looking DS by West End of Prop Building C1-2, 05-11-21

RS-10658-2 Side Tributary Looking US, 05-11-21

RS-10856 Main Channel Looking DS, 05-11-21

RS-11275 Main Channel Looking DS, 05-11-21

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Missouri State Plane West Zone (FIPS zone 2403). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from the U.S.D.A Farm Service National Agriculture ImageryProgram (NAIP) dated 2014. Produced at scale of 1:24,000.

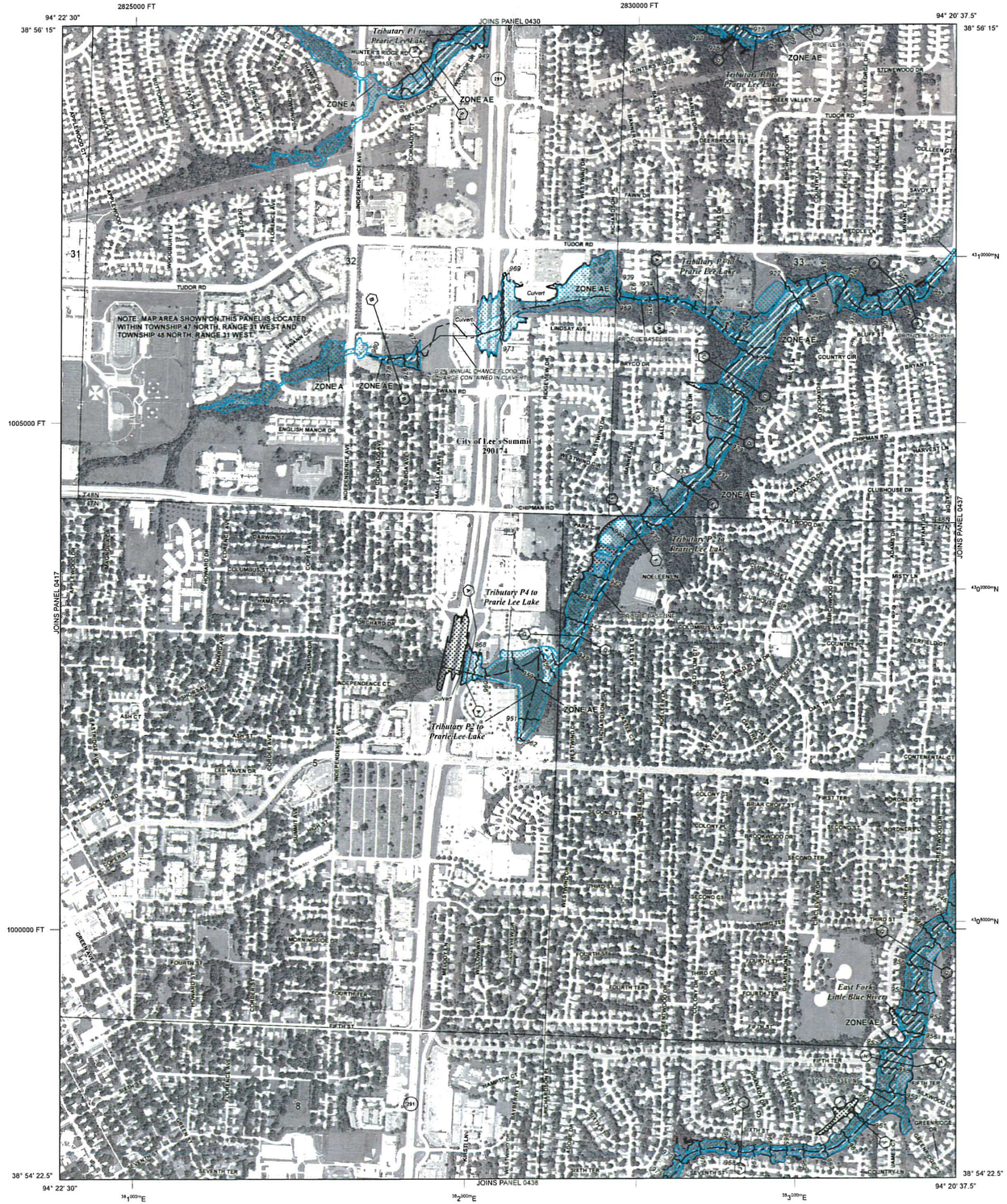
The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100 year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- Culvert
- Bridge
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 3100000 FT — 5000-foot ticks: Missouri State Plane West Zone (FIPS Zone 2403), Transverse Mercator projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 29, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
January 20, 2017 - to change Special Flood Hazard Areas

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0436G

FIRM

FLOOD INSURANCE RATE MAP

JACKSON COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 436 OF 625
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LEE'S SUMMIT, CITY OF	290174	0436	G

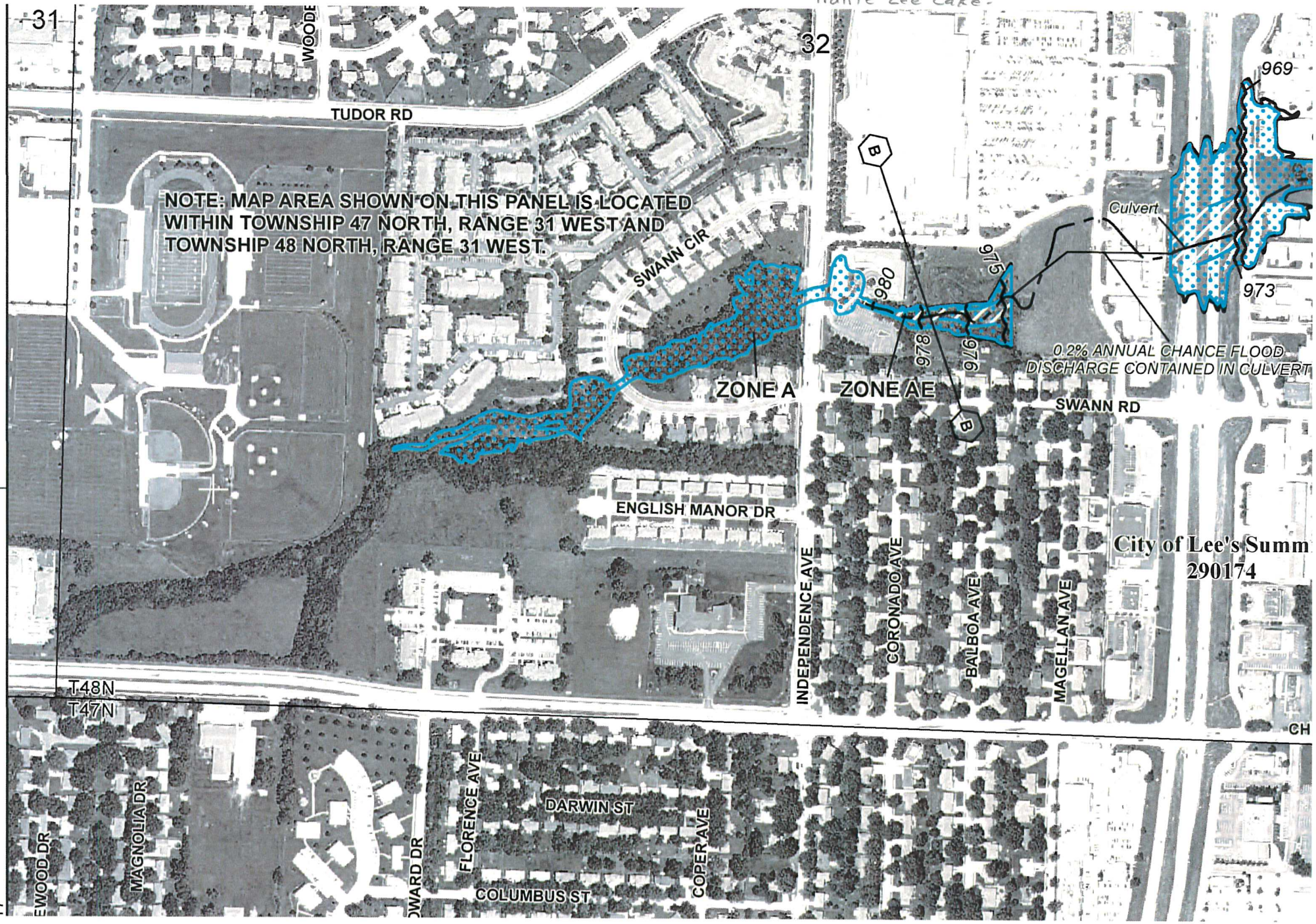
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

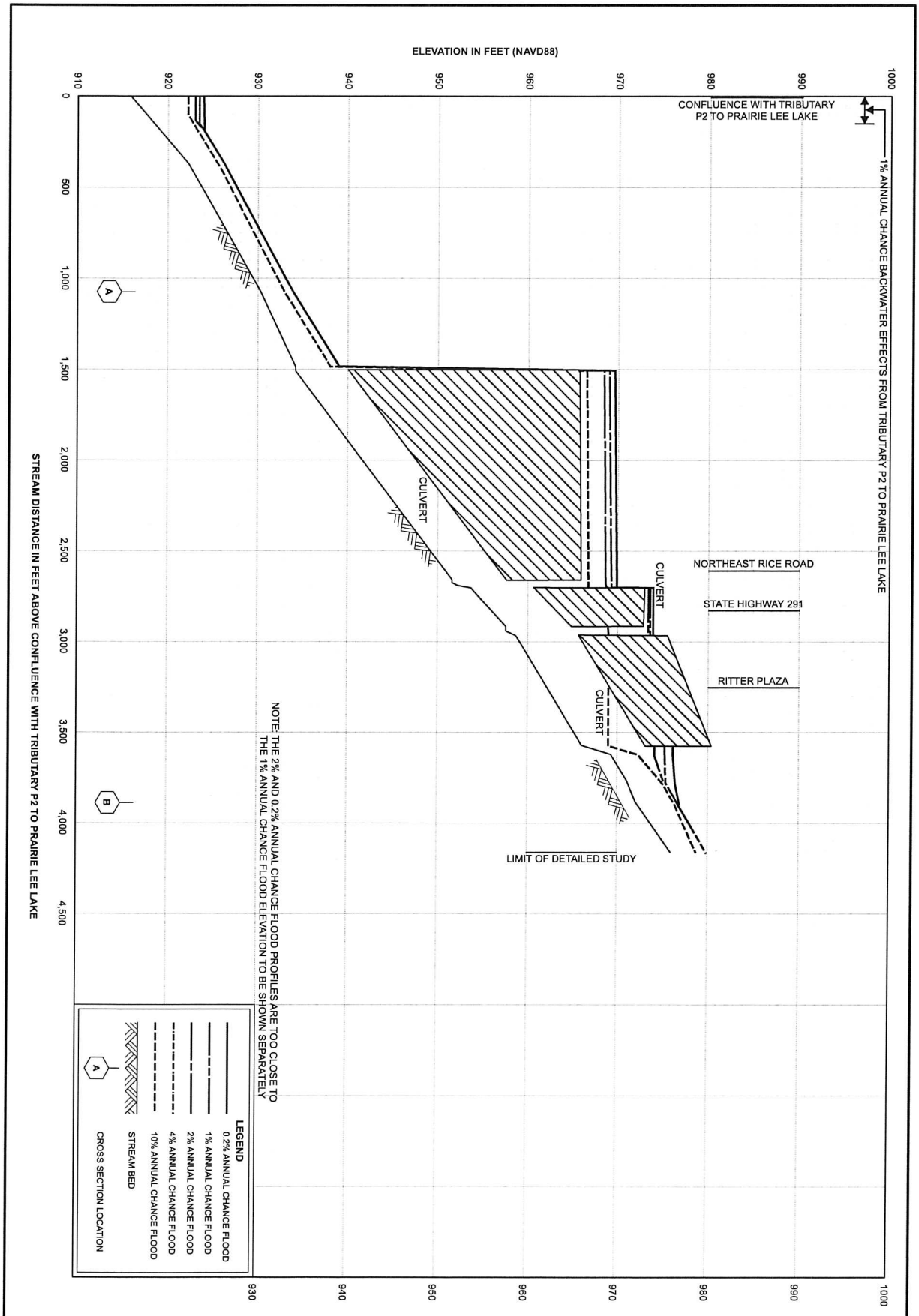
MAP NUMBER
29095C0436G
MAP REVISED
JANUARY 20, 2017

Federal Emergency Management Agency

#19-5293
~~#18-5289~~ Summit Point Apartments

Tributary P3 to Prairie Lee Lake





FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MO
AND INCORPORATED AREAS

FLOOD PROFILES

TRIBUTARY P3 TO PRAIRIE LEE LAKE

403P

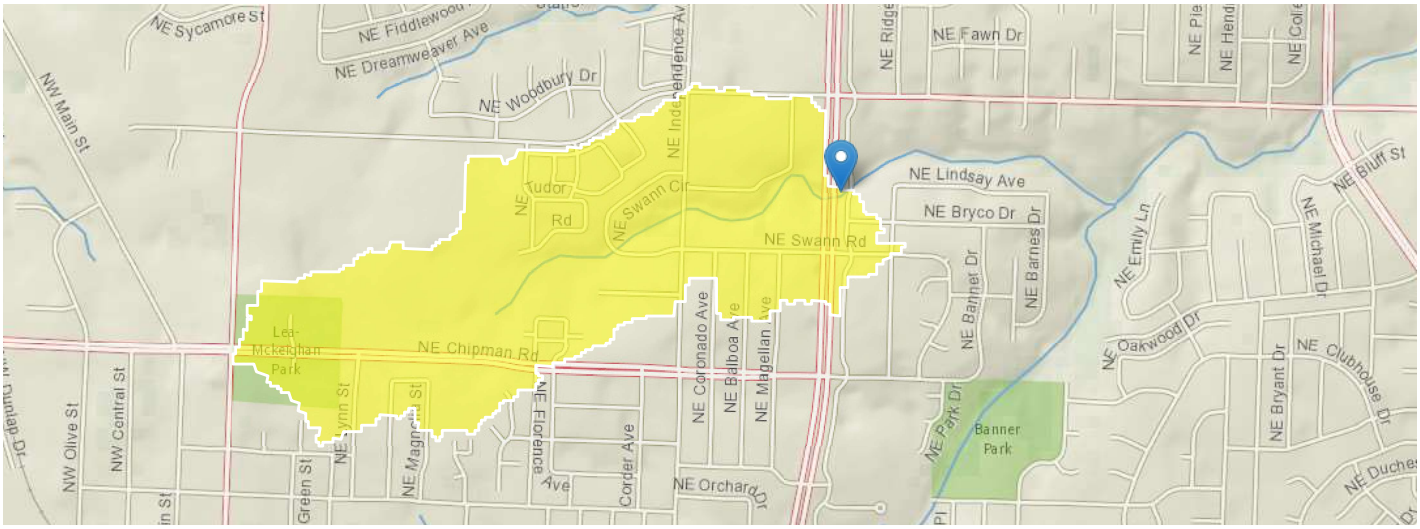
TABLE 3 – SUMMARY OF DISCHARGES (CONT'D)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK ANNUAL CHANCE DISCHARGES (CFS) 10-Percent Annual Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual-Chance
TRIBUTARY P1 TO PRAIRIE LEE LAKE (CONT'D)						
Approximately 750 feet downstream of State HWY 291	0.6	700	N/A	1,000	1,100	1,400
TRIBUTARY P2 TO PRAIRIE LEE LAKE						
At confluence with Prairie Lee Lake	2.9	2,400	N/A	3,400	3,900	1,800
Approximately 0.5 miles upstream of confluence with Prairie Lee Lake	2.7	2,200	N/A	3,200	3,700	4,400
At confluence of Tributary P3 to Prairie Lee Lake	1.9	1,900	N/A	2,800	3,200	3,800
Approximately 1,900 feet downstream of confluence of Tributary P4 to Prairie Lee Lake	1.7	1,800	N/A	2,600	3,000	3,600
At confluence of Tributary P4 to Prairie Lee Lake	0.7	1,000	N/A	1,400	1,600	1,900
TRIBUTARY P3 TO PRAIRIE LEE LAKE						
At confluence with Tributary P2 to Prairie Lee Lake	0.6	650	N/A	950	1,100	1,300
At State HWY 291	0.4	450	N/A	650	750	900
TRIBUTARY P4 TO PRAIRIE LEE LAKE						
At confluence with Triburary P2 to Prairie Lee Lake	0.8	1,100	N/A	1,500	1,700	2,100

StreamStats Report-291 Highway over Tributary P-3 to Prairie Lee Lake

Region ID: MO
Workspace ID: MO20210511145832820000
Clicked Point (Latitude, Longitude): 38.92910, -94.35968
Time: 2021-05-11 09:58:50 -0500

StreamStat-RS-04349-Hwy-291



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.37	square miles
BSHAPE	Basin Shape Factor for Area	4.83	dimensionless
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	36.8	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	62.9	feet per mi
LFPLENGTH	Length of longest flow path	1.34	miles
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.1872	percent
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.56	dimensionless

Peak-Flow Statistics Parameters [Peak Rural Statewide Region 1 SIR 2014 5165]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.37	square miles	0.11	8212.38
BSHAPE	Basin Shape Factor	4.83	dimensionless	2.25	26.59

Peak-Flow Statistics Parameters [Peak Urban Statewide SIR 2010 5073]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.37	square miles	0.28	189
IMPNLCD01	Percent Impervious NLCD2001	36.8	percent	2.3	46

Peak-Flow Statistics Flow Report [Peak Rural Statewide Region 1 SIR 2014 5165]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
50-percent AEP flood	136	ft^3/s	38.4
20-percent AEP flood	265	ft^3/s	30.8

Statistic	Value	Unit	SEp
10-percent AEP flood	366	ft^3/s	29.1
4-percent AEP flood	507	ft^3/s	28.8
2-percent AEP flood	619	ft^3/s	28.7
1-percent AEP flood	733	ft^3/s	29.8
0.5-percent AEP flood	848	ft^3/s	31
0.2-percent AEP flood	NaN	ft^3/s	33.2

Peak-Flow Statistics Flow Report [Peak Urban Statewide SIR 2010 5073]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp
50-percent AEP flood	339	ft^3/s	212	543	26.7
20-percent AEP flood	496	ft^3/s	332	741	23.3
10-percent AEP flood	626	ft^3/s	419	935	22.1
4-percent AEP flood	729	ft^3/s	494	1080	22.1
2-percent AEP flood	892	ft^3/s	584	1360	23.3
1-percent AEP flood	980	ft^3/s	625	1540	25.6
0.2-percent AEP flood	1280	ft^3/s	698	2350	35.2

Peak-Flow Statistics Citations

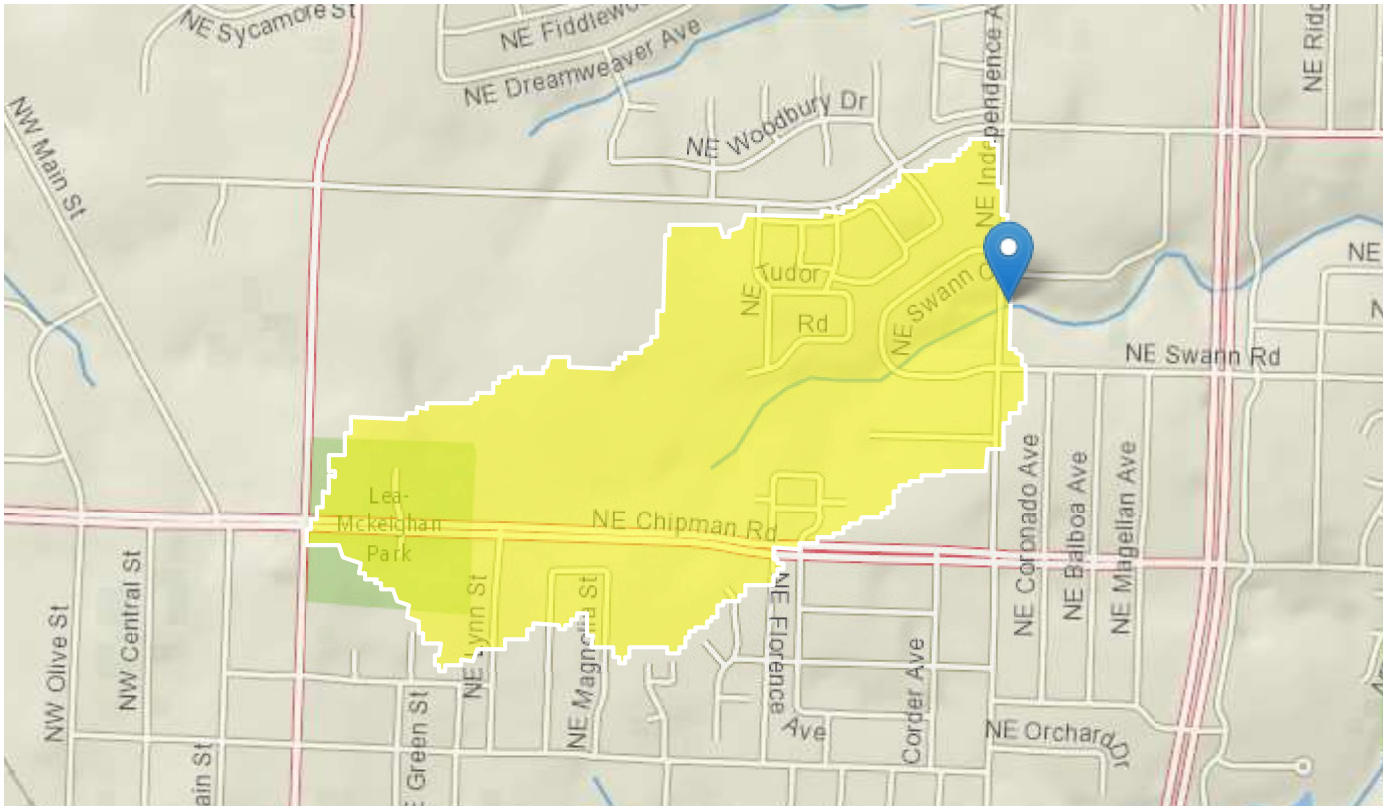
Southard, R.E.,2010, Estimation of the Magnituude and Frequency of Floods in Urban Basins in Missouri: U.S. Geological Survey Scientific Investigations Report 2010-5073, 27 p. (http://pubs.usgs.gov/sir/2010/5073/)

Southard, R.E., and Veilleux, A.G.,2014, Methods for estimating annual exceedance-probability discharges and largest recorded floods for unregulated streams in rural Missouri: U.S. Geological Survey Scientific Investigations Report 2014–5165, 39 p. (http://pubs.usgs.gov/sir/2014/5165/)

Application Version: 4.5.3
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.1

StreamStats Report - Summit Point Phase-II, RS 8962

Region ID: MO StreamStat-RS-08962-Independence Ave
Workspace ID: MO20210420164446781000
Clicked Point (Latitude, Longitude): 38.92872, -94.36473
Time: 2021-04-20 11:45:06 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.26	square miles
BSHAPE	Basin Shape Factor for Area	3.68	dimensionless
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	32	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	69.2	feet per mi
LFPLENGTH	Length of longest flow path	0.99	miles

StreamStat-RS-08962-Independence Ave

Parameter Code	Parameter Description	Value	Unit
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.1314	percent
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.56	dimensionless

Peak-Flow Statistics Parameters [Peak Rural Statewide Region 1 SIR 2014 5165]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.26	square miles	0.11	8212.38
BSHAPE	Basin Shape Factor	3.68	dimensionless	2.25	26.59

Peak-Flow Statistics Parameters [Peak Urban Statewide SIR 2010 5073]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.26	square miles	0.28	189
IMPNLCD01	Percent Impervious NLCD2001	32	percent	2.3	46

Peak-Flow Statistics Flow Report [Peak Rural Statewide Region 1 SIR 2014 5165]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
50-percent AEP flood	118	ft^3/s	38.4
20-percent AEP flood	231	ft^3/s	30.8
10-percent AEP flood	320	ft^3/s	29.1
4-percent AEP flood	444	ft^3/s	28.8
2-percent AEP flood	543	ft^3/s	28.7
1-percent AEP flood	643	ft^3/s	29.8
0.5-percent AEP flood	744	ft^3/s	31
0.2-percent AEP flood	881	ft^3/s	33.2

Peak-Flow Statistics Disclaimers [Peak Urban Statewide SIR 2010 5073]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

StreamStat-RS-08962-Independence Ave

Peak-Flow Statistics Flow Report [Peak Urban Statewide SIR 2010 5073]

Statistic	Value	Unit
50-percent AEP flood	235	ft^3/s
20-percent AEP flood	357	ft^3/s
10-percent AEP flood	454	ft^3/s
4-percent AEP flood	540	ft^3/s
2-percent AEP flood	660	ft^3/s
1-percent AEP flood	732	ft^3/s
0.2-percent AEP flood	960	ft^3/s

Peak-Flow Statistics Citations

Southard, R.E.,2010, Estimation of the Magnituude and Frequency of Floods in Urban Basins in Missouri: U.S. Geological Survey Scientific Investigations Report 2010-5073, 27 p. (http://pubs.usgs.gov/sir/2010/5073/)

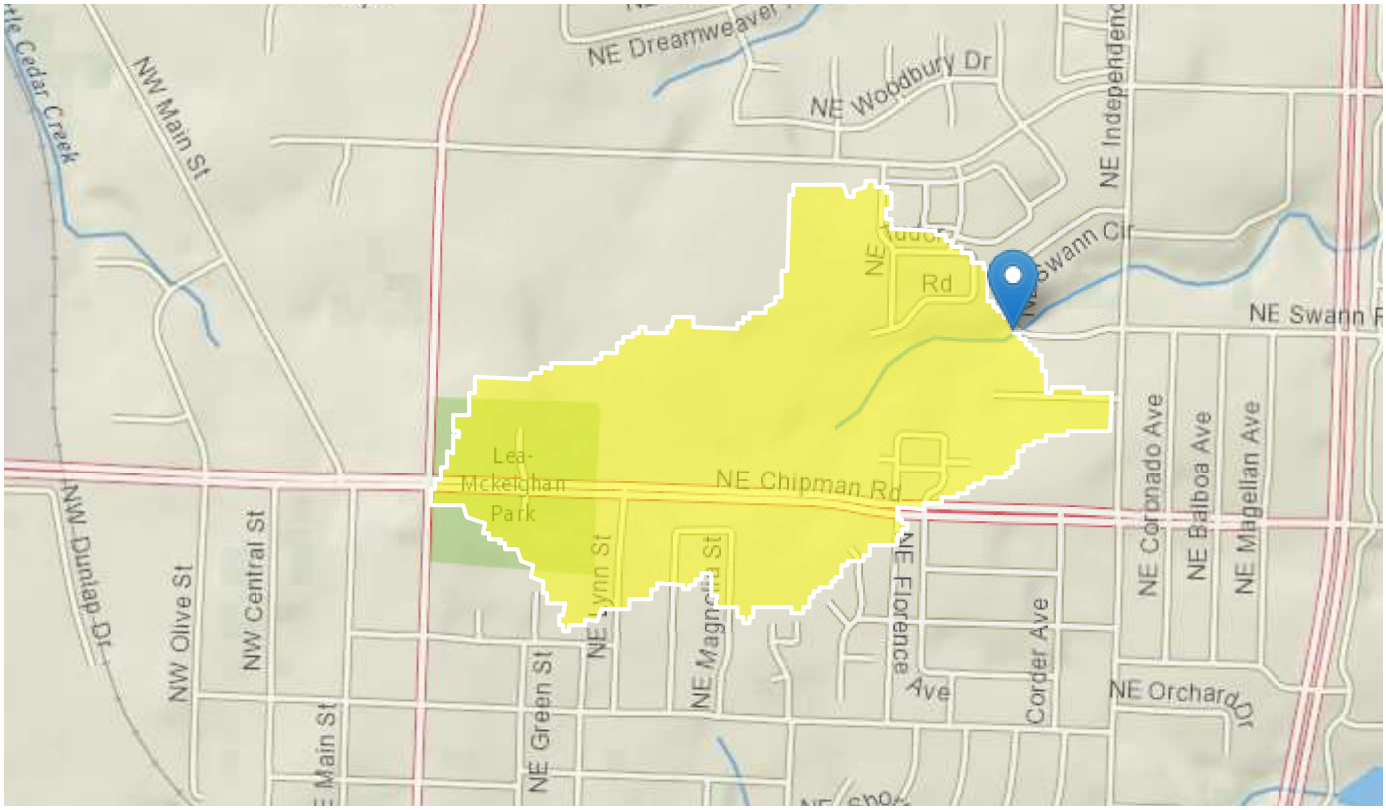
Southard, R.E., and Veilleux, A.G.,2014, Methods for estimating annual exceedance-probability discharges and largest recorded floods for unregulated streams in rural Missouri: U.S. Geological Survey Scientific Investigations Report 2014–5165, 39 p. (http://pubs.usgs.gov/sir/2014/5165/)

Application Version: 4.5.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.1

StreamStats Report

StreamStat-RS-10280-Swann Circle

Region ID: MO
Workspace ID: MO20200521225634594000
Clicked Point (Latitude, Longitude): 38.92757, -94.36734
Time: 2020-05-21 17:56:54 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.21	square miles
BSHAPE	Basin Shape Factor for Area	2.95	dimensionless
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	25.9	percent
LFPLENGTH	Length of longest flow path	0.78	miles
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.56	dimensionless

Parameter Code	Parameter Description	Value	Unit
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	75.8	feet per mi
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.1673	percent

Peak-Flow Statistics Parameters[Peak Rural Statewide Region 1 SIR 2014 5165]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.21	square miles	0.11	8212.38
BSHAPE	Basin Shape Factor	2.95	dimensionless	2.25	26.59

Peak-Flow Statistics Parameters[Peak Urban Statewide SIR 2010 5073]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.21	square miles	0.28	189
IMPNLCD01	Percent Impervious NLCD2001	25.9	percent	2.3	46

Peak-Flow Statistics Flow Report[Peak Rural Statewide Region 1 SIR 2014 5165]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
2 Year Peak Flood	110	ft^3/s	38.4
5 Year Peak Flood	216	ft^3/s	30.8
10 Year Peak Flood	299	ft^3/s	29.1
25 Year Peak Flood	415	ft^3/s	28.8
50 Year Peak Flood	508	ft^3/s	28.7
100 Year Peak Flood	602	ft^3/s	29.8
200 Year Peak Flood	696	ft^3/s	31
500 Year Peak Flood	824	ft^3/s	33.2

Peak-Flow Statistics Disclaimers[Peak Urban Statewide SIR 2010 5073]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report[Peak Urban Statewide SIR 2010 5073]

Statistic	Value	Unit
2 Year Peak Flood	170	ft^3/s
5 Year Peak Flood	269	ft^3/s
10 Year Peak Flood	348	ft^3/s
25 Year Peak Flood	425	ft^3/s
50 Year Peak Flood	519	ft^3/s
100 Year Peak Flood	582	ft^3/s
500 Year Peak Flood	773	ft^3/s

Peak-Flow Statistics Citations

Southard, R.E., and Veilleux, A.G.,2014, Methods for estimating annual exceedance-probability discharges and largest recorded floods for unregulated streams in rural Missouri: U.S. Geological Survey Scientific Investigations Report 2014–5165, 39 p. (http://pubs.usgs.gov/sir/2014/5165/)
Southard, R.E.,2010, Estimation of the Magnituude and Frequency of Floods in Urban Basins in Missouri: U.S. Geological Survey Scientific Investigations Report 2010-5073, 27 p. (http://pubs.usgs.gov/sir/2010/5073/)

Low-Flow Statistics Parameters[LowFlow Region 1 SIR 2013 5090]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.21	square miles	0.34	4320
LFPLENGTH	LFP length	0.78	miles	1.28	268
STREAM_VARG	Streamflow Variability Index from Grid	0.56	dimensionless	0.376	1.03

Low-Flow Statistics Disclaimers[LowFlow Region 1 SIR 2013 5090]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[LowFlow Region 1 SIR 2013 5090]

Statistic	Value	Unit
1 Day 10 Year Low Flow	0.0000296	ft^3/s
2 Day 10 Year Low Flow	0.0000309	ft^3/s
3 Day 10 Year Low Flow	0.0000369	ft^3/s
7 Day 10 Year Low Flow	0.0000494	ft^3/s
10 Day 10 Year Low Flow	0.0000536	ft^3/s
30 Day 10 Year Low Flow	0.000411	ft^3/s
60 Day 10 Year Low Flow	0.00065	ft^3/s

Low-Flow Statistics Citations

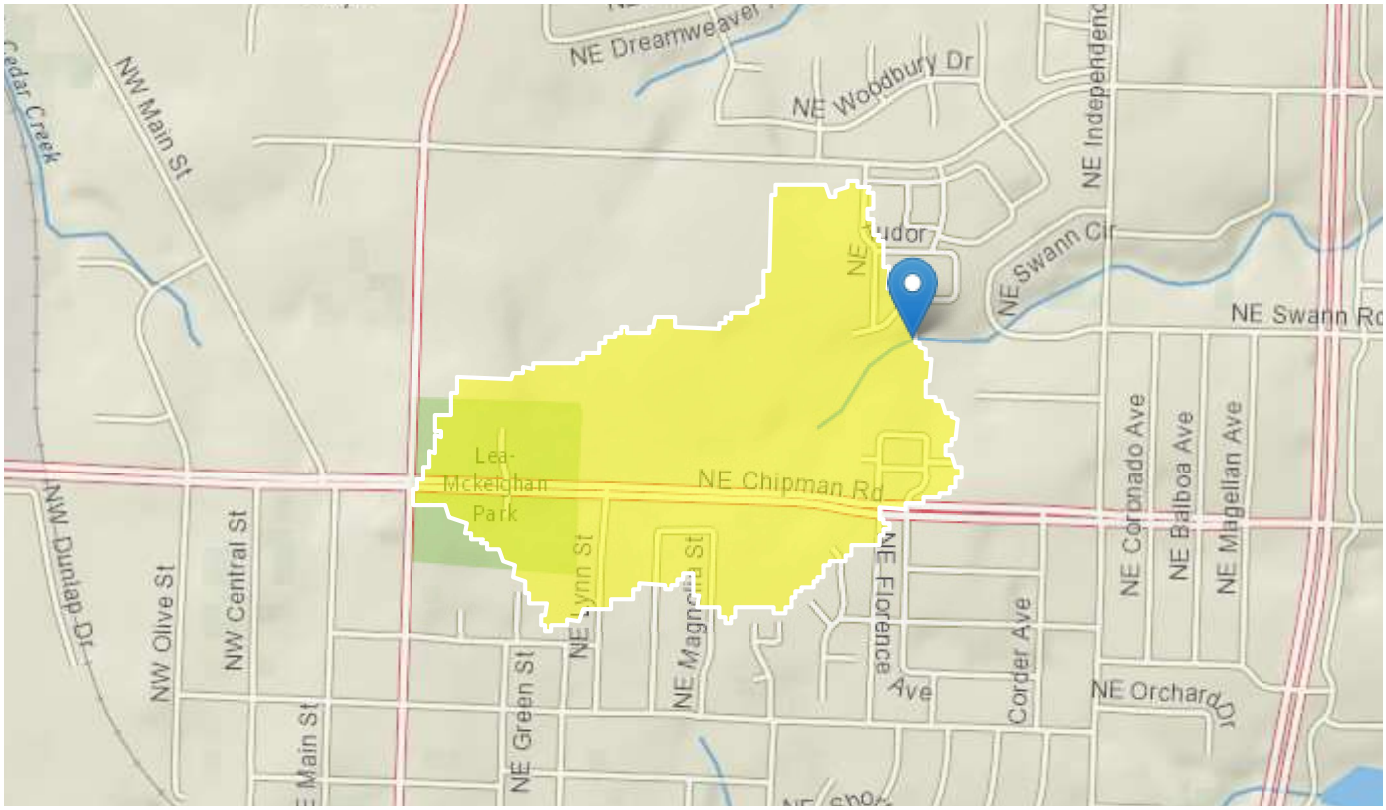
Southard, R.E.,2013, Computed statistics at streamgages, and methods for estimating low-flow frequency statistics and development of regional regression equations for estimating low-flow frequency statistics at ungaged locations in Missouri: U.S. Geological Survey Scientific Investigations Report 2013–5090, 28 p. (http://pubs.usgs.gov/sir/2013/5090/)

Application Version: 4.3.11

StreamStats Report

StreamStat-RS-10658

Region ID: MO
Workspace ID: MO20200522140912600000
Clicked Point (Latitude, Longitude): 38.92745, -94.36902
Time: 2020-05-22 09:09:30 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.18	square miles
BSHAPE	Basin Shape Factor for Area	2.52	dimensionless
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	23.6	percent
LFPLENGTH	Length of longest flow path	0.67	miles
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.56	dimensionless

Parameter Code	Parameter Description	Value	Unit
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	88.2	feet per mi
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.086	percent

Peak-Flow Statistics Parameters[Peak Rural Statewide Region 1 SIR 2014 5165]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.18	square miles	0.11	8212.38
BSHAPE	Basin Shape Factor	2.52	dimensionless	2.25	26.59

Peak-Flow Statistics Parameters[Peak Urban Statewide SIR 2010 5073]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.18	square miles	0.28	189
IMPNLCD01	Percent Impervious NLCD2001	23.6	percent	2.3	46

Peak-Flow Statistics Flow Report[Peak Rural Statewide Region 1 SIR 2014 5165]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
2 Year Peak Flood	105	ft^3/s	38.4
5 Year Peak Flood	205	ft^3/s	30.8
10 Year Peak Flood	285	ft^3/s	29.1
25 Year Peak Flood	396	ft^3/s	28.8
50 Year Peak Flood	484	ft^3/s	28.7
100 Year Peak Flood	574	ft^3/s	29.8
200 Year Peak Flood	663	ft^3/s	31
500 Year Peak Flood	786	ft^3/s	33.2

Peak-Flow Statistics Disclaimers[Peak Urban Statewide SIR 2010 5073]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report[Peak Urban Statewide SIR 2010 5073]

Statistic	Value	Unit
2 Year Peak Flood	144	ft^3/s
5 Year Peak Flood	232	ft^3/s
10 Year Peak Flood	301	ft^3/s
25 Year Peak Flood	371	ft^3/s
50 Year Peak Flood	453	ft^3/s
100 Year Peak Flood	511	ft^3/s
500 Year Peak Flood	681	ft^3/s

Peak-Flow Statistics Citations

Southard, R.E., and Veilleux, A.G.,2014, Methods for estimating annual exceedance-probability discharges and largest recorded floods for unregulated streams in rural Missouri: U.S. Geological Survey Scientific Investigations Report 2014–5165, 39 p. (http://pubs.usgs.gov/sir/2014/5165/)

Southard, R.E.,2010, Estimation of the Magnituude and Frequency of Floods in Urban Basins in Missouri: U.S. Geological Survey Scientific Investigations Report 2010-5073, 27 p. (http://pubs.usgs.gov/sir/2010/5073/)

Low-Flow Statistics Parameters[LowFlow Region 1 SIR 2013 5090]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.18	square miles	0.34	4320
LFPLENGTH	LFP length	0.67	miles	1.28	268
STREAM_VARG	Streamflow Variability Index from Grid	0.56	dimensionless	0.376	1.03

Low-Flow Statistics Disclaimers[LowFlow Region 1 SIR 2013 5090]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[LowFlow Region 1 SIR 2013 5090]

Statistic	Value	Unit
1 Day 10 Year Low Flow	0.0000265	ft^3/s
2 Day 10 Year Low Flow	0.0000278	ft^3/s
3 Day 10 Year Low Flow	0.0000331	ft^3/s
7 Day 10 Year Low Flow	0.0000434	ft^3/s
10 Day 10 Year Low Flow	0.0000482	ft^3/s
30 Day 10 Year Low Flow	0.000372	ft^3/s
60 Day 10 Year Low Flow	0.00061	ft^3/s

Low-Flow Statistics Citations

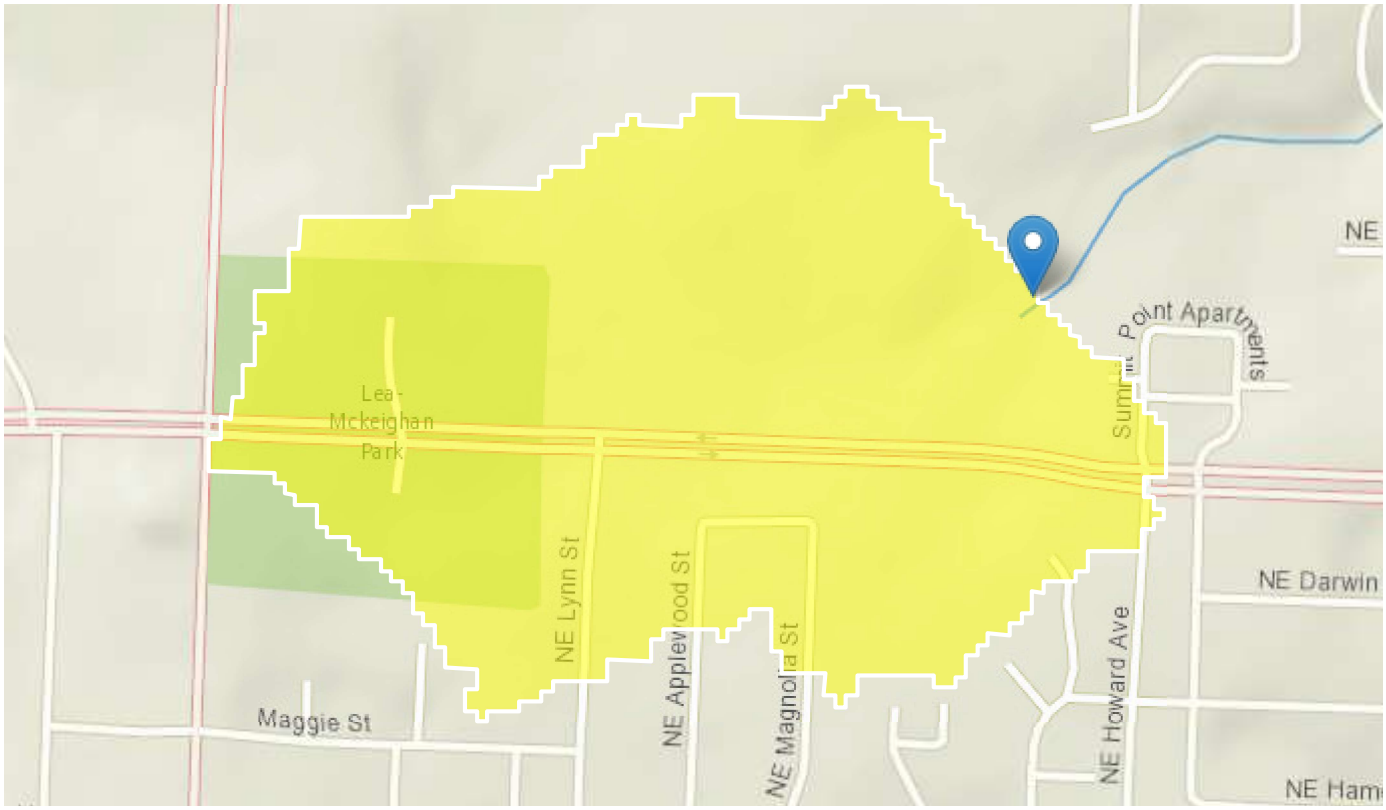
Southard, R.E.,2013, Computed statistics at streamgages, and methods for estimating low-flow frequency statistics and development of regional regression equations for estimating low-flow frequency statistics at ungaged locations in Missouri: U.S. Geological Survey Scientific Investigations Report 2013–5090, 28 p. (http://pubs.usgs.gov/sir/2013/5090/)

Application Version: 4.3.11

StreamStats Report

StreamStat-RS-11275

Region ID: MO
Workspace ID: MO20200522140203726000
Clicked Point (Latitude, Longitude): 38.92611, -94.37097
Time: 2020-05-22 09:02:21 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.13	square miles
BSHAPE	Basin Shape Factor for Area	1.89	dimensionless
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	23	percent
LFPLENGTH	Length of longest flow path	0.5	miles
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.56	dimensionless

Parameter Code	Parameter Description	Value	Unit
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	104	feet per mi
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0	percent

Peak-Flow Statistics Parameters[Peak Rural Statewide Region 1 SIR 2014 5165]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.13	square miles	0.11	8212.38
BSHAPE	Basin Shape Factor	1.89	dimensionless	2.25	26.59

Peak-Flow Statistics Parameters[Peak Urban Statewide SIR 2010 5073]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.13	square miles	0.28	189
IMPNLCD01	Percent Impervious NLCD2001	23	percent	2.3	46

Peak-Flow Statistics Disclaimers[Peak Rural Statewide Region 1 SIR 2014 5165]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report[Peak Rural Statewide Region 1 SIR 2014 5165]

Statistic	Value	Unit
2 Year Peak Flood	93	ft^3/s
5 Year Peak Flood	183	ft^3/s
10 Year Peak Flood	254	ft^3/s
25 Year Peak Flood	353	ft^3/s
50 Year Peak Flood	432	ft^3/s
100 Year Peak Flood	513	ft^3/s
200 Year Peak Flood	593	ft^3/s

Statistic	Value	Unit
500 Year Peak Flood	702	ft^3/s

Peak-Flow Statistics Disclaimers[Peak Urban Statewide SIR 2010 5073]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report[Peak Urban Statewide SIR 2010 5073]

Statistic	Value	Unit
2 Year Peak Flood	116	ft^3/s
5 Year Peak Flood	188	ft^3/s
10 Year Peak Flood	245	ft^3/s
25 Year Peak Flood	302	ft^3/s
50 Year Peak Flood	368	ft^3/s
100 Year Peak Flood	415	ft^3/s
500 Year Peak Flood	552	ft^3/s

Peak-Flow Statistics Citations

Southard, R.E., and Veilleux, A.G.,2014, Methods for estimating annual exceedance-probability discharges and largest recorded floods for unregulated streams in rural Missouri: U.S. Geological Survey Scientific Investigations Report 2014–5165, 39 p. (http://pubs.usgs.gov/sir/2014/5165/)

Southard, R.E.,2010, Estimation of the Magnituude and Frequency of Floods in Urban Basins in Missouri: U.S. Geological Survey Scientific Investigations Report 2010-5073, 27 p. (http://pubs.usgs.gov/sir/2010/5073/)

Low-Flow Statistics Parameters[LowFlow Region 1 SIR 2013 5090]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.13	square miles	0.34	4320
LFPLENGTH	LFP length	0.5	miles	1.28	268
STREAM_VARG	Streamflow Variability Index from Grid	0.56	dimensionless	0.376	1.03

Low-Flow Statistics Disclaimers[LowFlow Region 1 SIR 2013 5090]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[LowFlow Region 1 SIR 2013 5090]

Statistic	Value	Unit
1 Day 10 Year Low Flow	0.0000199	ft^3/s
2 Day 10 Year Low Flow	0.000021	ft^3/s
3 Day 10 Year Low Flow	0.0000249	ft^3/s
7 Day 10 Year Low Flow	0.0000315	ft^3/s
10 Day 10 Year Low Flow	0.0000364	ft^3/s
30 Day 10 Year Low Flow	0.000289	ft^3/s
60 Day 10 Year Low Flow	0.000503	ft^3/s

Low-Flow Statistics Citations

Southard, R.E.,2013, Computed statistics at streamgages, and methods for estimating low-flow frequency statistics and development of regional regression equations for estimating low-flow frequency statistics at ungaged locations in Missouri: U.S. Geological Survey Scientific Investigations Report 2013–5090, 28 p. (http://pubs.usgs.gov/sir/2013/5090/)

Application Version: 4.3.11

Tributary P-3 to Prairie Lee Lake
Open Channel Manning's Roughness Coefficients Sensitivity Comparison
Summit Point Apartments, Phase-II
05/12/21
CFS Project No. 19-5293 / 21-5065

	Minimum	Normal	Maximum
	n = 0.035 (MC) N = 0.070 (OB)	n = 0.045 (MC) N = 0.100 (OB)	n = 0.050 (MC) N = 0.160 (OB)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)		W.S. Elev (ft)		W.S. Elev (ft)
SummitPoint	8693.92	100yr	643	970	975.56		976.15		976.53
SummitPoint	8833.36	100yr	643	972.75	979.06		979.04		979.27
SummitPoint	8962.51	100yr	643	974.61	980.34		981.09		981.28
SummitPoint	9223.75		Culvert – Independence Avenue						
SummitPoint	9303.52	100yr	602	978.2	987.34		987.33		987.34
SummitPoint	9566.40	100yr	602	979.3	987.34		987.38		987.46
SummitPoint	9759.91	100yr	602	984	989.33		989.34		989.33
SummitPoint	9890.22	100yr	602	986	990.6		990.82		991
SummitPoint	10032.93		Culvert – Swann Circle						
SummitPoint	10097.67	100yr	602	987	994.89		994.92		994.94
SummitPoint	10280.58	100yr	602	989.9	994.59		994.65		994.69
SummitPoint	10495.32	100yr	574	993.4	997.21		997.34		997.61
SummitPoint	10658.06	100yr	574	995.9	999.35		999.79		999.88
SummitPoint	10856.09	100yr	513	997.5	1001.27		1001.68		1001.89
SummitPoint	11086.04	100yr	513	999.6	1003.44		1003.71		1003.84
SummitPoint	11275.44	100yr	513	1000.7	1004.66		1005.15		1005.35

Channel Roughness Coefficients Selection (Taken from Table 3-1, Mannings 'n' Values, from Chapter 3-Basic Data Requirements HEC-RAS River Analysis Systems, Hydraulic Reference Manual, Version 4.1, January 2010)

Main Channel – Condition-d, Clean, winding, some pools and shoals, some weeds and stones
Minimum n=0.035, Normal n=0.045, Maximum n=0.050

Flood Plains – Condition-c, Brush, No. 5, Medium to dense brush, in summer
Minimum n=0.070, Normal n=0.100, Maximum n=0.160

Table 3-1 Manning's 'n' Values

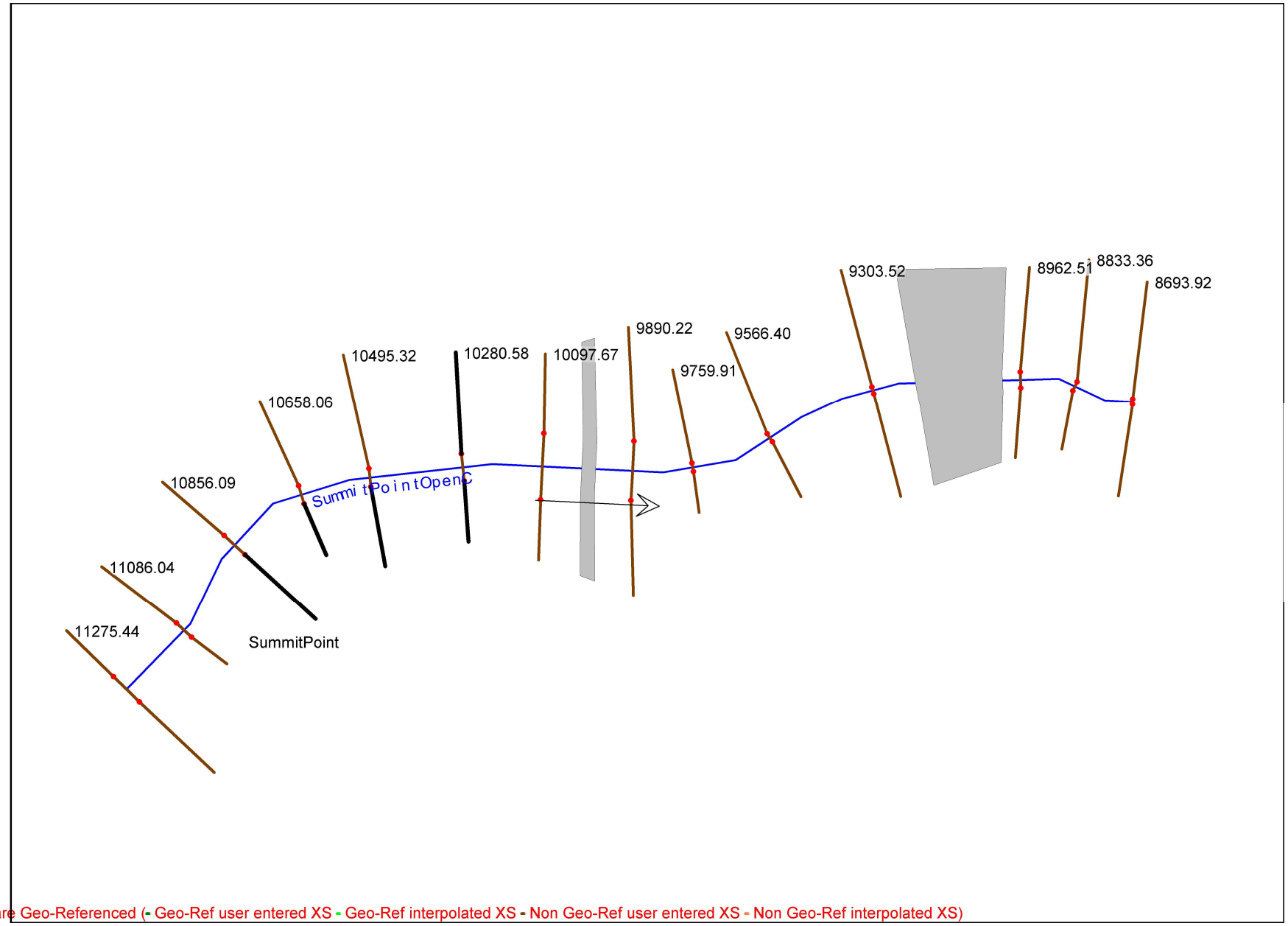
Type of Channel and Description	Minimum	Normal	Maximum
A. *Natural Streams*			
1. **Main Channels**			
a. Clean, straight, full, no rifts or deep pools	0.025	0.030	0.033
b. Same as above, but more stones and weeds	0.030	0.035	0.040
c. Clean, winding, some pools and shoals	0.033	0.040	0.045
d. Same as above, but some weeds and stones	0.035	0.045	0.050
e. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. Same as "d" but more stones	0.045	0.050	0.060
g. Sluggish reaches, weedy. deep pools	0.050	0.070	0.080
h. Very weedy reaches, deep pools, or floodways with heavy stands of timber and brush	0.070	0.100	0.150
2. **Flood Plains**			
a. Pasture no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
2. Same as above, but heavy sprouts	0.050	0.060	0.080
3. Heavy stand of timber, few down trees, little undergrowth, flow below branches	0.080	0.100	0.120
4. Same as above, but with flow into branches	0.100	0.120	0.160
5. Dense willows, summer, straight	0.110	0.150	0.200
3. **Mountain Streams, no vegetation in channel, banks usually steep, with trees and brush on banks submerged**			
a. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. Bottom: cobbles with large boulders	0.040	0.050	0.070

Tributary P3 to Prairie Lee Lake

HEC-RAS Plan: TribP3Channel River: SummitPointOpenC Reach: SummitPoint

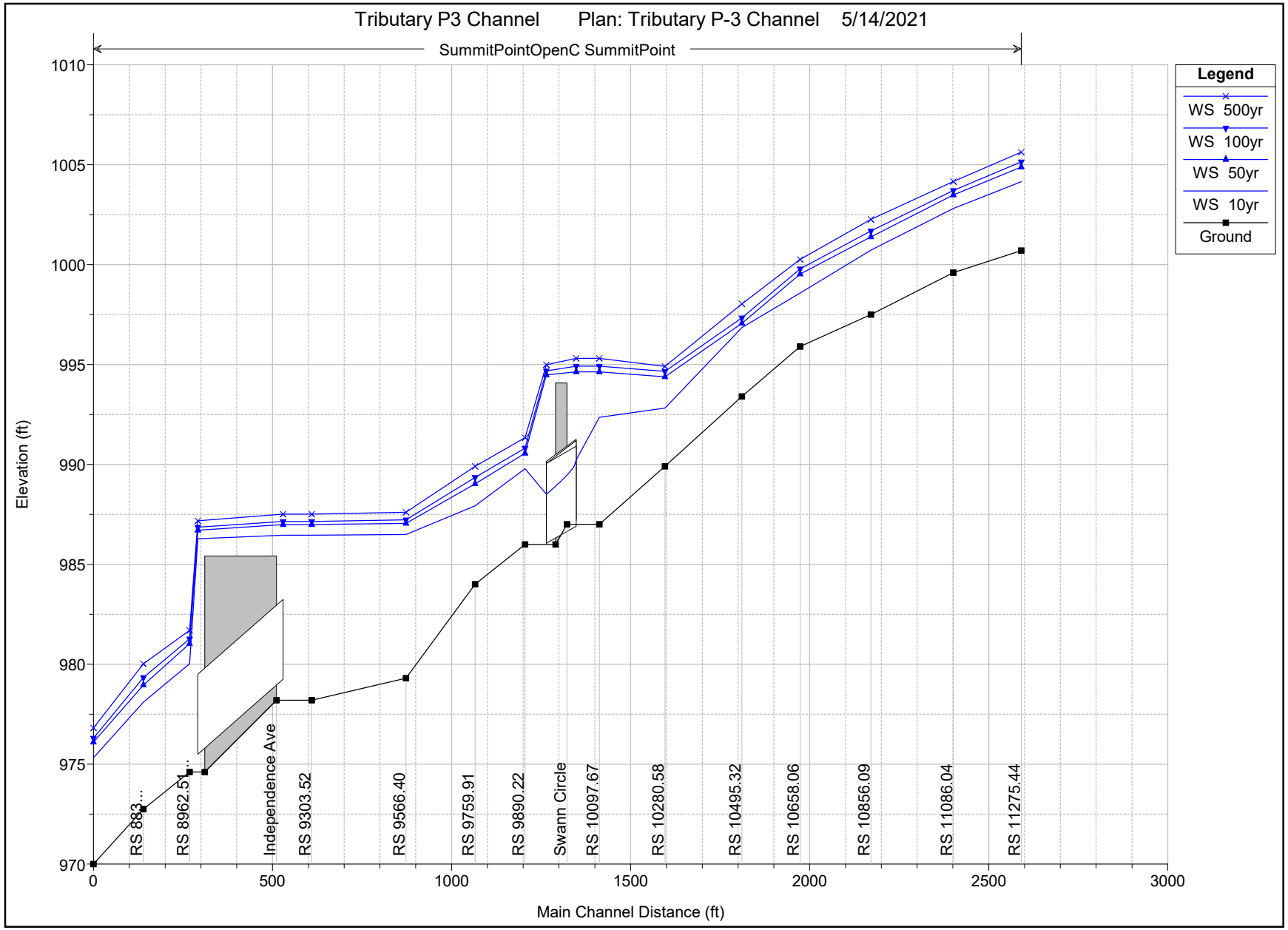
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SummitPoint	8693.92	10yr	366.00	970.00	975.32	975.32	976.34	0.017216	8.49	61.24	44.97	0.82
SummitPoint	8693.92	50yr	619.00	970.00	976.10	976.33	977.45	0.019293	10.33	103.98	64.20	0.89
SummitPoint	8693.92	100yr	733.00	970.00	976.31	976.66	977.85	0.021323	11.22	117.87	68.47	0.95
SummitPoint	8693.92	500yr	1004.00	970.00	976.81	977.30	978.62	0.023397	12.64	154.71	78.68	1.01
SummitPoint	8833.36	10yr	366.00	972.75	978.10	977.87	978.93	0.019870	7.31	50.33	27.96	0.87
SummitPoint	8833.36	50yr	619.00	972.75	978.96	978.96	980.04	0.017349	8.50	92.73	70.92	0.86
SummitPoint	8833.36	100yr	733.00	972.75	979.34	979.34	980.39	0.015130	8.58	123.09	89.84	0.82
SummitPoint	8833.36	500yr	1004.00	972.75	980.02	980.02	981.04	0.012695	8.87	196.26	123.55	0.77
SummitPoint	8962.51	10yr	366.00	974.61	980.02		980.47	0.007556	5.37	68.19	24.31	0.56
SummitPoint	8962.51	50yr	619.00	974.61	981.03		981.68	0.009276	6.44	96.04	30.56	0.64
SummitPoint	8962.51	100yr	733.00	974.61	981.27		982.05	0.010770	7.08	103.51	32.03	0.69
SummitPoint	8962.51	500yr	1004.00	974.61	981.70		982.83	0.014585	8.53	117.70	34.64	0.82
SummitPoint	9223.75		Culvert									
SummitPoint	9303.52	10yr	320.00	978.20	986.46	982.60	986.47	0.000159	1.33	678.94	282.54	0.09
SummitPoint	9303.52	50yr	543.00	978.20	986.99	983.57	987.01	0.000273	1.84	833.35	296.30	0.12
SummitPoint	9303.52	100yr	643.00	978.20	987.15	983.83	987.18	0.000332	2.06	881.14	300.43	0.14
SummitPoint	9303.52	500yr	881.00	978.20	987.51	984.35	987.55	0.000459	2.51	991.68	309.78	0.16
SummitPoint	9566.40	10yr	320.00	979.30	986.49	983.01	986.55	0.000581	2.23	273.90	148.70	0.17
SummitPoint	9566.40	50yr	543.00	979.30	987.05	983.97	987.16	0.000997	3.13	363.86	174.45	0.23
SummitPoint	9566.40	100yr	643.00	979.30	987.22	984.45	987.36	0.001198	3.50	394.63	182.43	0.25
SummitPoint	9566.40	500yr	881.00	979.30	987.61	985.38	987.80	0.001609	4.24	469.03	200.41	0.30
SummitPoint	9759.91	10yr	299.00	984.00	987.92	987.92	988.92	0.027328	8.01	37.34	19.49	1.02
SummitPoint	9759.91	50yr	508.00	984.00	989.03	989.03	989.93	0.014736	7.91	91.92	82.66	0.81
SummitPoint	9759.91	100yr	602.00	984.00	989.35	989.35	990.24	0.013368	8.05	120.89	101.73	0.78
SummitPoint	9759.91	500yr	825.00	984.00	989.91	989.91	990.79	0.012024	8.47	187.12	135.61	0.76
SummitPoint	9890.22	10yr	299.00	986.00	989.79		989.86	0.002654	2.22	134.61	89.82	0.32
SummitPoint	9890.22	50yr	508.00	986.00	990.56		990.65	0.002169	2.40	211.56	107.95	0.30
SummitPoint	9890.22	100yr	602.00	986.00	990.82		990.92	0.002112	2.50	240.55	113.07	0.30
SummitPoint	9890.22	500yr	825.00	986.00	991.33		991.45	0.002098	2.74	301.29	123.10	0.31
SummitPoint	10032.93		Culvert									
SummitPoint	10097.67	10yr	299.00	987.00	992.36	989.34	992.37	0.000224	0.89	337.48	139.75	0.10
SummitPoint	10097.67	50yr	508.00	987.00	994.63	989.93	994.64	0.000073	0.76	681.57	182.56	0.06
SummitPoint	10097.67	100yr	602.00	987.00	994.92	990.12	994.93	0.000083	0.84	736.90	196.68	0.07
SummitPoint	10097.67	500yr	825.00	987.00	995.30	990.49	995.32	0.000119	1.06	815.92	215.25	0.08
SummitPoint	10280.58	10yr	299.00	989.90	992.82	992.82	993.60	0.027697	7.10	42.14	27.79	1.02
SummitPoint	10280.58	50yr	508.00	989.90	994.38		994.81	0.009551	5.24	96.94	45.51	0.63
SummitPoint	10280.58	100yr	602.00	989.90	994.65		995.12	0.010110	5.47	110.01	50.60	0.65
SummitPoint	10280.58	500yr	825.00	989.90	994.90	994.43	995.60	0.014544	6.69	124.33	95.93	0.79
SummitPoint	10495.32	10yr	285.00	993.40	996.84	996.34	997.21	0.010847	4.86	58.70	33.98	0.65
SummitPoint	10495.32	50yr	484.00	993.40	997.06	996.97	997.89	0.022180	7.32	66.10	35.31	0.94
SummitPoint	10495.32	100yr	574.00	993.40	997.34	997.21	998.22	0.020571	7.53	76.22	36.82	0.92
SummitPoint	10495.32	500yr	786.00	993.40	998.04	997.72	998.94	0.016065	7.61	103.35	40.89	0.84
SummitPoint	10658.06	10yr	285.00	995.90	998.58		998.93	0.010327	4.78	59.60	34.37	0.64
SummitPoint	10658.06	50yr	484.00	995.90	999.53		999.93	0.007776	5.10	94.98	40.05	0.58
SummitPoint	10658.06	100yr	574.00	995.90	999.79		1000.25	0.008068	5.43	105.67	41.56	0.60
SummitPoint	10658.06	500yr	786.00	995.90	1000.26	999.41	1000.85	0.008745	6.20	142.94	154.10	0.64
SummitPoint	10856.09	10yr	254.00	997.50	1000.73		1001.07	0.011402	4.72	53.86	34.12	0.66
SummitPoint	10856.09	50yr	432.00	997.50	1001.39		1001.85	0.012439	5.44	79.43	43.47	0.71
SummitPoint	10856.09	100yr	513.00	997.50	1001.68		1002.15	0.011937	5.54	92.60	47.82	0.70
SummitPoint	10856.09	500yr	702.00	997.50	1002.26		1002.77	0.010792	5.71	122.94	56.32	0.68
SummitPoint	11086.04	10yr	254.00	999.60	1002.81		1003.01	0.006424	3.57	71.12	44.84	0.50
SummitPoint	11086.04	50yr	432.00	999.60	1003.48		1003.75	0.005823	4.16	111.96	85.82	0.50
SummitPoint	11086.04	100yr	513.00	999.60	1003.71		1004.01	0.005694	4.41	133.87	104.03	0.50
SummitPoint	11086.04	500yr	702.00	999.60	1004.16		1004.51	0.005538	4.88	188.54	137.73	0.51
SummitPoint	11275.44	10yr	254.00	1000.70	1004.15	1003.43	1004.48	0.008943	4.57	55.52	30.21	0.59
SummitPoint	11275.44	50yr	432.00	1000.70	1004.88	1004.17	1005.31	0.011619	5.22	82.82	45.49	0.68
SummitPoint	11275.44	100yr	513.00	1000.70	1005.15	1004.49	1005.59	0.012569	5.36	95.73	53.74	0.71
SummitPoint	11275.44	500yr	702.00	1000.70	1005.63	1005.07	1006.11	0.013505	5.59	125.47	70.02	0.74

Tributary P3 to Prairie Lee Lake

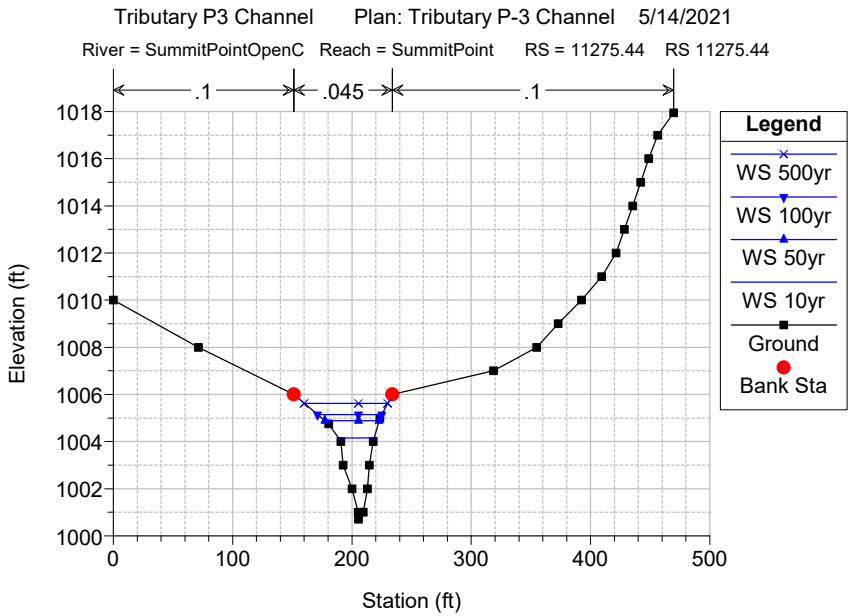


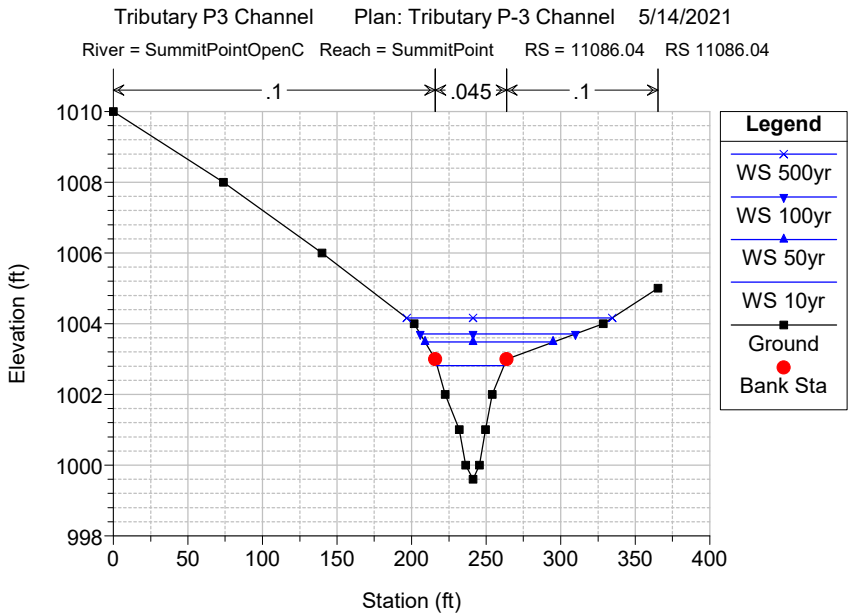
None of the XS's are Geo-Referenced (- Geo-Ref user entered XS - Geo-Ref interpolated XS - Non Geo-Ref user entered XS - Non Geo-Ref interpolated XS)

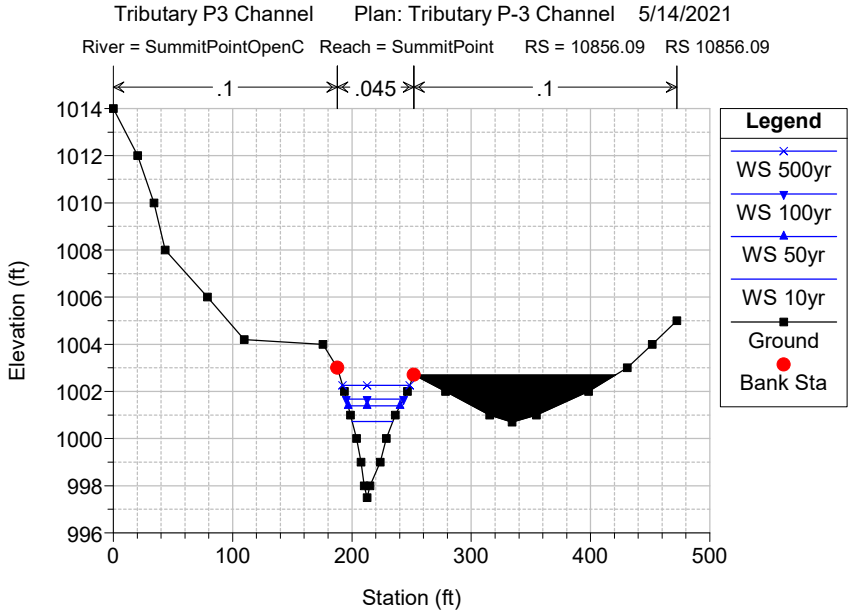
Tributary P3 to Prairie Lee Lake

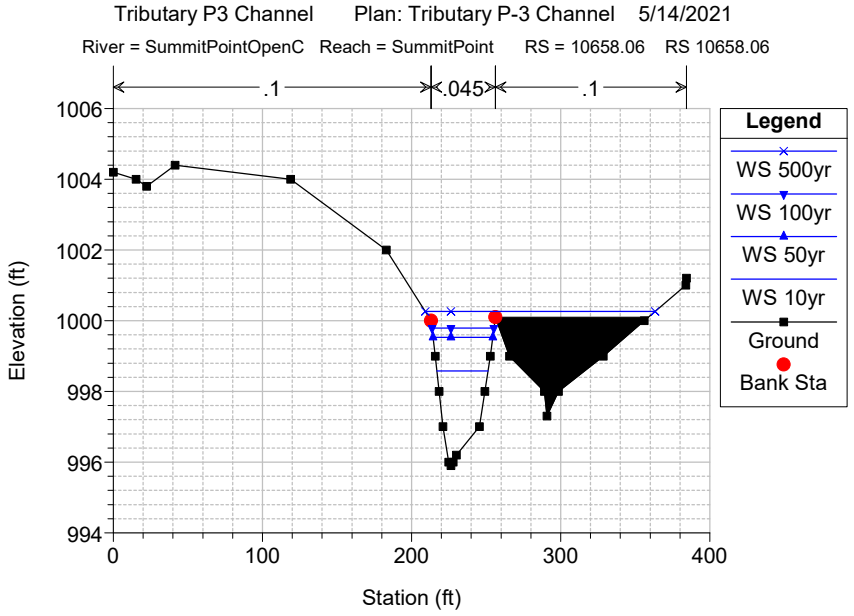


Tributary P3 to Prairie Lee Lake









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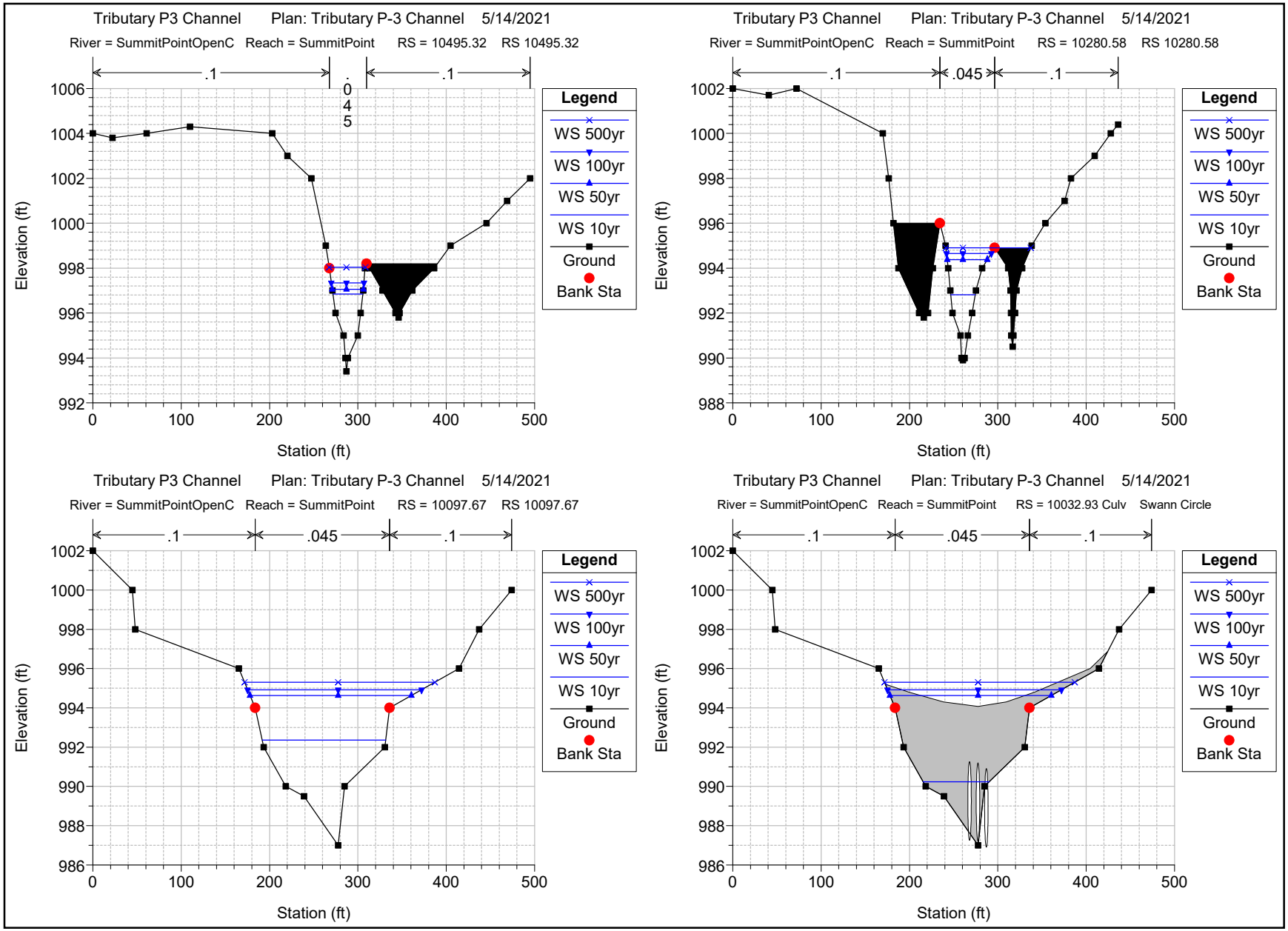


Tributary P3 to Prairie Lee Lake

Errors Warnings and Notes for Plan : TribP3Channel

Location:	River: SummitPointOpenC Reach: SummitPoint RS: 11275.44 Profile: 1yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 11086.04 Profile: 1yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10856.09 Profile: 1yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10658.06 Profile: 1yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10495.32 Profile: 1yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10280.58 Profile: 1yr
Warning:	The energy equation could not be balanced within the specified number of iterations. The program
	used critical depth for the water surface and continued on with the calculations.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10032.93 Profile: 1yr Culv: Culvert #1
Note:	During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10032.93 Profile: 1yr Culv: Culvert #2
Note:	During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10032.93 Profile: 1yr Culv: Culvert #3
Note:	During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9890.22 Profile: 1yr
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
	additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9759.91 Profile: 1yr
Warning:	The energy equation could not be balanced within the specified number of iterations. The program
	used critical depth for the water surface and continued on with the calculations.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
	additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9566.40 Profile: 1yr

Errors Warnings and Notes for Plan : TribP3Channel (Continued)

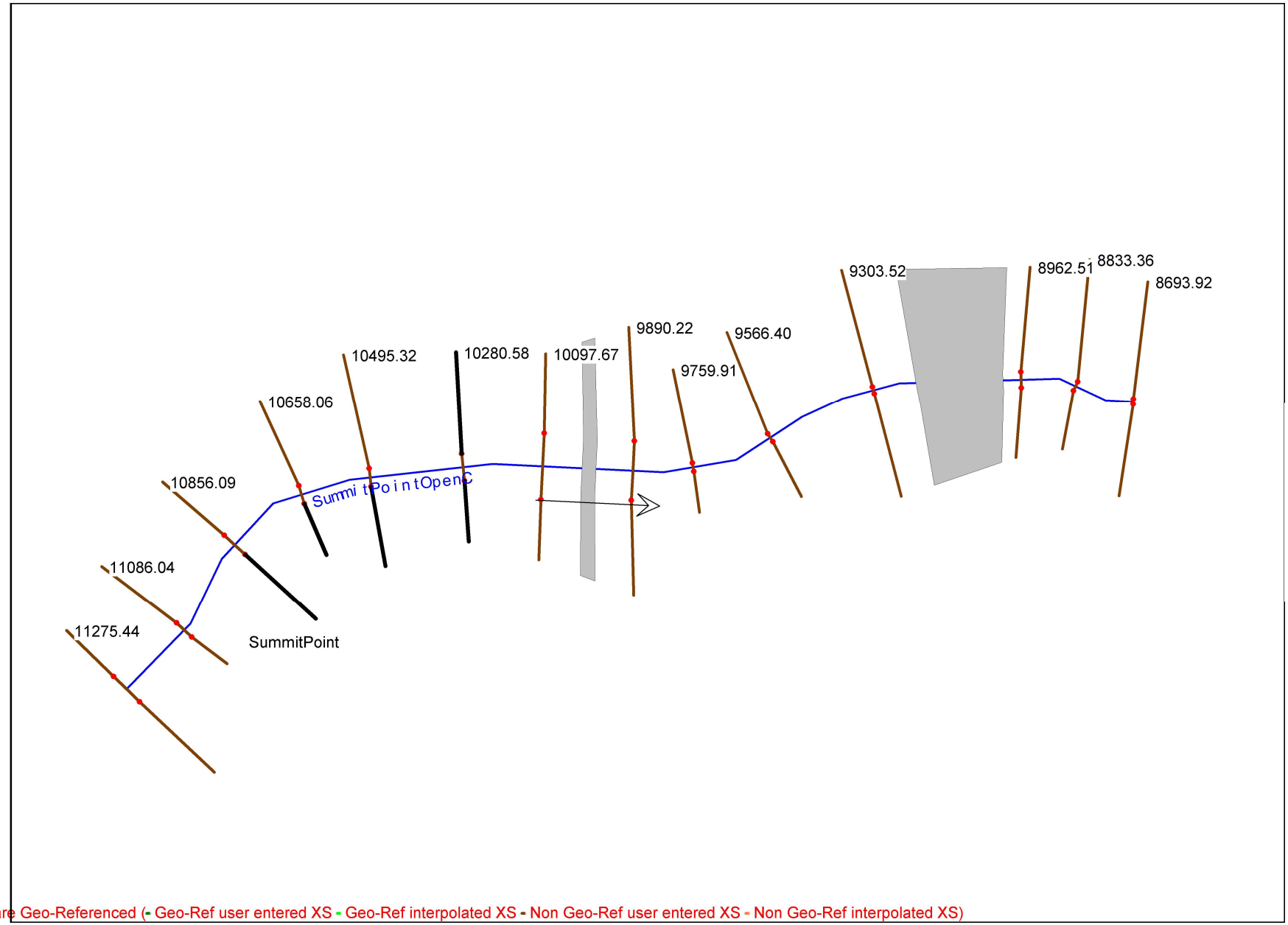
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Hydraulic jump has occurred between this cross section and the previous upstream section.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9223.75 Profile: 1yr
Note:	During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving) the culvert.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9223.75 Profile: 1yr Culv: Culvert #1
Warning:	During the supercritical analysis, the program could not converge on a supercritical answer in the
	downstream cross section. The program used the solution with the least error.
Note:	The flow in the culvert is entirely supercritical.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 8962.51 Profile: 1yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 8833.36 Profile: 1yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.

Tributary P3 to Prairie Lee Lake w/ Clogged Culvert at Independence Ave

HEC-RAS Plan: ClogIndependence River: SummitPointOpenC Reach: SummitPoint

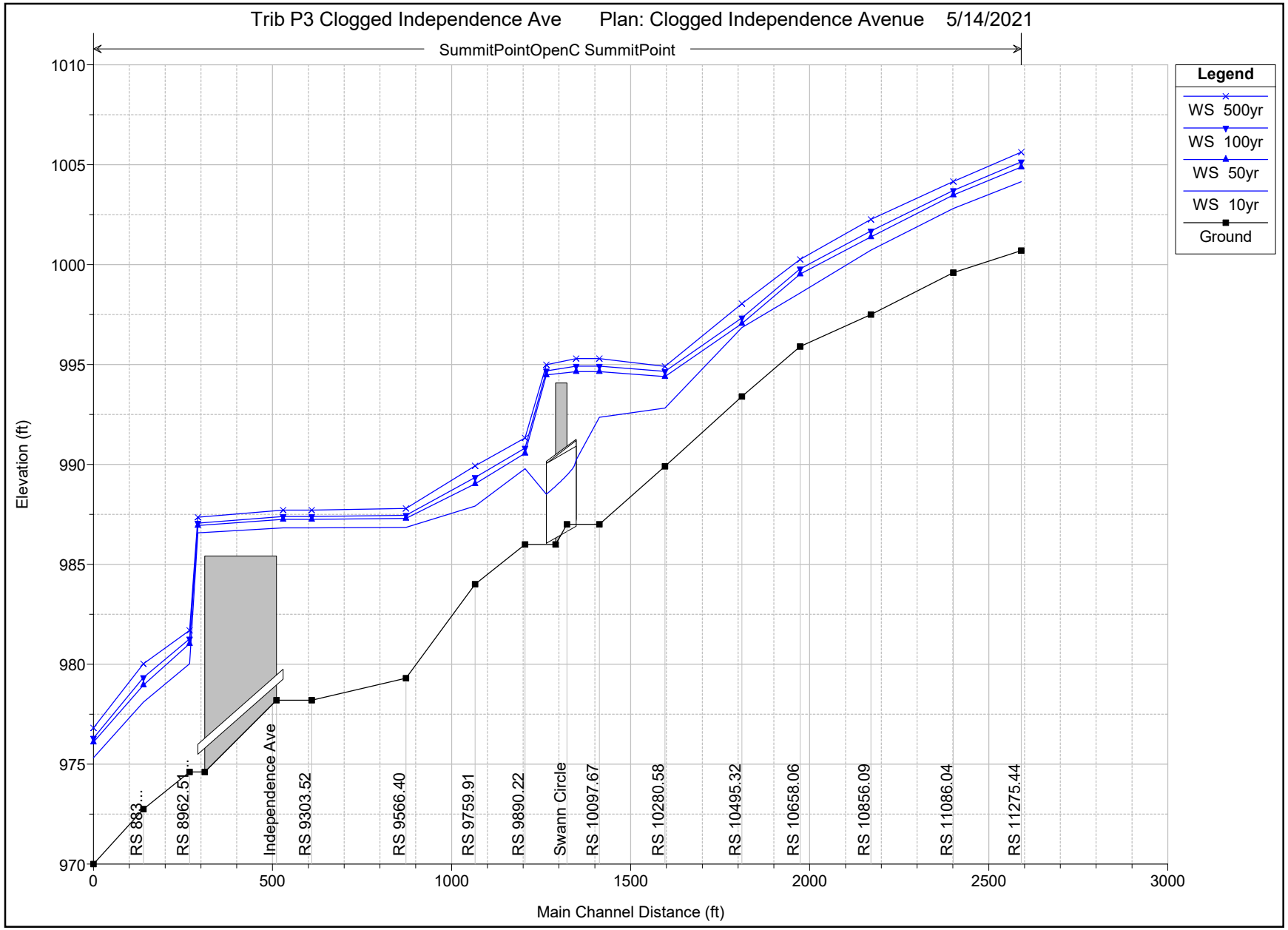
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SummitPoint	8693.92	10yr	366.00	970.00	975.32	975.32	976.34	0.017216	8.49	61.24	44.97	0.82
SummitPoint	8693.92	50yr	619.00	970.00	976.10	976.33	977.45	0.019293	10.33	103.98	64.20	0.89
SummitPoint	8693.92	100yr	733.00	970.00	976.31	976.66	977.85	0.021323	11.22	117.87	68.47	0.95
SummitPoint	8693.92	500yr	1004.00	970.00	976.81	977.30	978.62	0.023397	12.64	154.71	78.68	1.01
SummitPoint	8833.36	10yr	366.00	972.75	978.10	977.87	978.93	0.019870	7.31	50.33	27.96	0.87
SummitPoint	8833.36	50yr	619.00	972.75	978.96	978.96	980.04	0.017349	8.50	92.73	70.92	0.86
SummitPoint	8833.36	100yr	733.00	972.75	979.34	979.34	980.39	0.015130	8.58	123.09	89.84	0.82
SummitPoint	8833.36	500yr	1004.00	972.75	980.02	980.02	981.04	0.012695	8.87	196.26	123.55	0.77
SummitPoint	8962.51	10yr	366.00	974.61	980.02		980.47	0.007556	5.37	68.19	24.31	0.56
SummitPoint	8962.51	50yr	619.00	974.61	981.03		981.68	0.009276	6.44	96.04	30.56	0.64
SummitPoint	8962.51	100yr	733.00	974.61	981.27		982.05	0.010770	7.08	103.51	32.03	0.69
SummitPoint	8962.51	500yr	1004.00	974.61	981.70		982.83	0.014585	8.53	117.70	34.64	0.82
SummitPoint	9223.75		Culvert									
SummitPoint	9303.52	10yr	320.00	978.20	986.83	982.60	986.84	0.000110	1.15	786.42	292.19	0.08
SummitPoint	9303.52	50yr	543.00	978.20	987.25	983.57	987.26	0.000217	1.68	910.75	302.97	0.11
SummitPoint	9303.52	100yr	643.00	978.20	987.39	983.83	987.42	0.000269	1.90	955.87	306.79	0.12
SummitPoint	9303.52	500yr	881.00	978.20	987.72	984.35	987.75	0.000388	2.35	1056.58	315.14	0.15
SummitPoint	9566.40	10yr	320.00	979.30	986.85	983.01	986.90	0.000414	1.97	330.55	165.39	0.15
SummitPoint	9566.40	50yr	543.00	979.30	987.29	983.97	987.39	0.000802	2.89	407.84	185.75	0.21
SummitPoint	9566.40	100yr	643.00	979.30	987.45	984.45	987.57	0.000981	3.25	437.92	193.09	0.23
SummitPoint	9566.40	500yr	881.00	979.30	987.80	985.38	987.96	0.001373	3.99	508.10	209.23	0.28
SummitPoint	9759.91	10yr	299.00	984.00	987.92	987.92	988.92	0.027402	8.01	37.31	19.48	1.02
SummitPoint	9759.91	50yr	508.00	984.00	989.02	989.02	989.93	0.014933	7.94	91.15	82.09	0.81
SummitPoint	9759.91	100yr	602.00	984.00	989.35	989.35	990.24	0.013388	8.06	120.78	101.67	0.78
SummitPoint	9759.91	500yr	825.00	984.00	989.93	989.93	990.79	0.011612	8.37	190.87	137.28	0.75
SummitPoint	9890.22	10yr	299.00	986.00	989.79		989.86	0.002652	2.22	134.65	89.84	0.32
SummitPoint	9890.22	50yr	508.00	986.00	990.56		990.65	0.002160	2.40	211.87	108.01	0.30
SummitPoint	9890.22	100yr	602.00	986.00	990.82		990.92	0.002111	2.50	240.59	113.07	0.30
SummitPoint	9890.22	500yr	825.00	986.00	991.33		991.44	0.002112	2.74	300.58	122.99	0.31
SummitPoint	10032.93		Culvert									
SummitPoint	10097.67	10yr	299.00	987.00	992.36	989.34	992.37	0.000224	0.89	337.48	139.75	0.10
SummitPoint	10097.67	50yr	508.00	987.00	994.64	989.93	994.65	0.000072	0.75	683.80	183.15	0.06
SummitPoint	10097.67	100yr	602.00	987.00	994.92	990.12	994.93	0.000083	0.84	736.89	196.68	0.07
SummitPoint	10097.67	500yr	825.00	987.00	995.30	990.49	995.32	0.000119	1.06	815.78	215.22	0.08
SummitPoint	10280.58	10yr	299.00	989.90	992.82	992.82	993.60	0.027684	7.09	42.15	27.79	1.02
SummitPoint	10280.58	50yr	508.00	989.90	994.40		994.82	0.009393	5.20	97.68	45.82	0.63
SummitPoint	10280.58	100yr	602.00	989.90	994.65		995.12	0.010111	5.47	110.01	50.60	0.65
SummitPoint	10280.58	500yr	825.00	989.90	994.90	994.43	995.60	0.014570	6.69	124.22	95.91	0.79
SummitPoint	10495.32	10yr	285.00	993.40	996.84	996.34	997.21	0.010850	4.86	58.69	33.98	0.65
SummitPoint	10495.32	50yr	484.00	993.40	997.05	996.97	997.89	0.022487	7.36	65.80	35.26	0.95
SummitPoint	10495.32	100yr	574.00	993.40	997.34	997.21	998.22	0.020569	7.53	76.22	36.82	0.92
SummitPoint	10495.32	500yr	786.00	993.40	998.04	997.72	998.94	0.016045	7.60	103.40	40.91	0.84
SummitPoint	10658.06	10yr	285.00	995.90	998.58		998.93	0.010325	4.78	59.61	34.37	0.64
SummitPoint	10658.06	50yr	484.00	995.90	999.53		999.93	0.007732	5.09	95.17	40.07	0.58
SummitPoint	10658.06	100yr	574.00	995.90	999.79		1000.25	0.008068	5.43	105.66	41.56	0.60
SummitPoint	10658.06	500yr	786.00	995.90	1000.26	999.41	1000.85	0.008750	6.20	142.88	154.08	0.64
SummitPoint	10856.09	10yr	254.00	997.50	1000.73		1001.07	0.011404	4.72	53.85	34.12	0.66
SummitPoint	10856.09	50yr	432.00	997.50	1001.38		1001.85	0.012529	5.45	79.20	43.39	0.71
SummitPoint	10856.09	100yr	513.00	997.50	1001.68		1002.15	0.011937	5.54	92.60	47.82	0.70
SummitPoint	10856.09	500yr	702.00	997.50	1002.26		1002.77	0.010788	5.71	122.96	56.33	0.68
SummitPoint	11086.04	10yr	254.00	999.60	1002.81		1003.01	0.006424	3.57	71.12	44.84	0.50
SummitPoint	11086.04	50yr	432.00	999.60	1003.48		1003.75	0.005808	4.16	112.10	85.95	0.50
SummitPoint	11086.04	100yr	513.00	999.60	1003.71		1004.01	0.005694	4.41	133.87	104.03	0.50
SummitPoint	11086.04	500yr	702.00	999.60	1004.16		1004.51	0.005539	4.88	188.53	137.72	0.51
SummitPoint	11275.44	10yr	254.00	1000.70	1004.15	1003.43	1004.48	0.008943	4.57	55.52	30.21	0.59
SummitPoint	11275.44	50yr	432.00	1000.70	1004.88	1004.17	1005.31	0.011629	5.22	82.78	45.46	0.68
SummitPoint	11275.44	100yr	513.00	1000.70	1005.15	1004.49	1005.59	0.012569	5.36	95.73	53.74	0.71
SummitPoint	11275.44	500yr	702.00	1000.70	1005.63	1005.07	1006.11	0.013505	5.59	125.47	70.02	0.74

Tributary P3 to Prairie Lee Lake w/
Clogged Culvert at Independence Ave

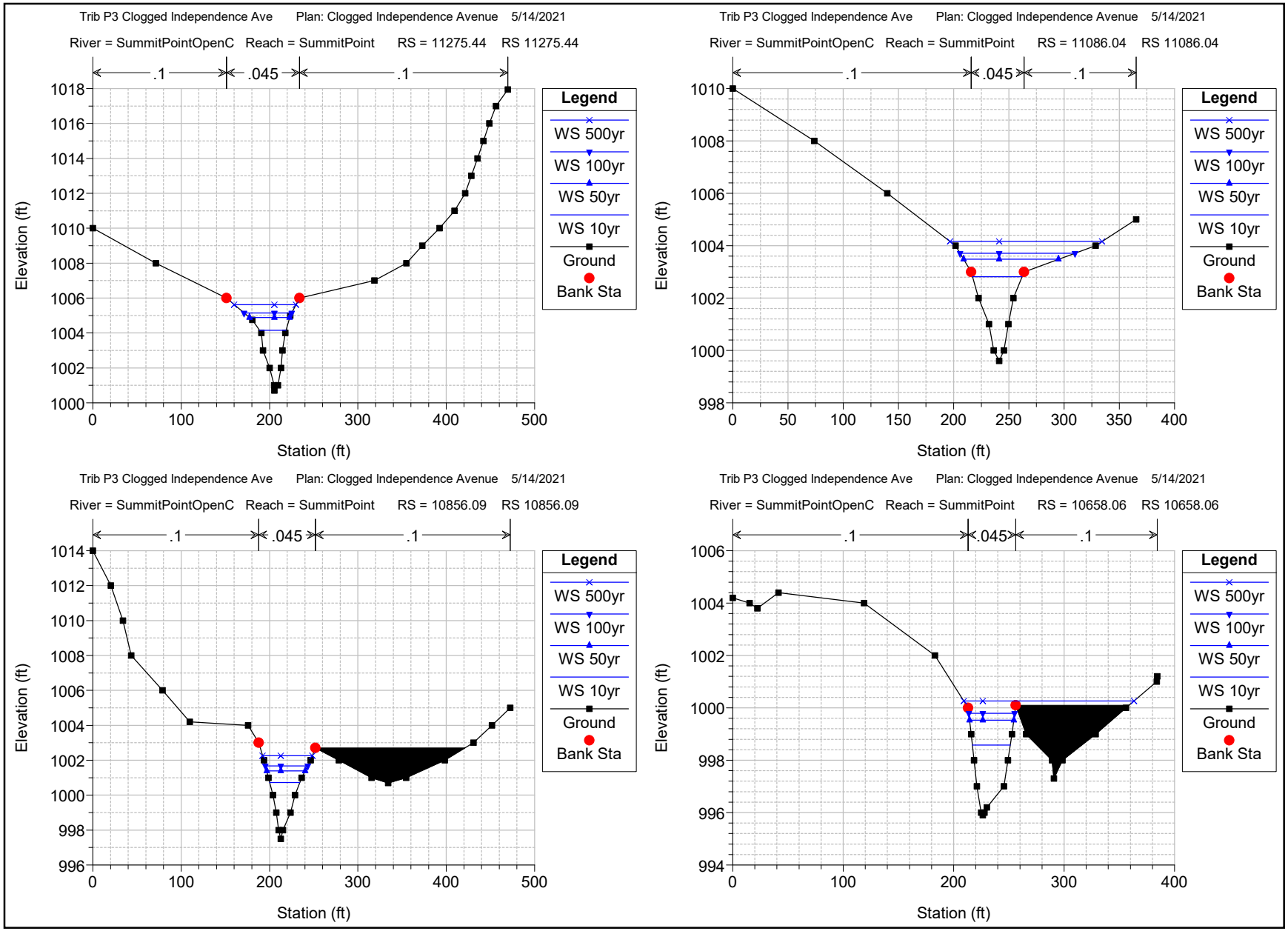


None of the XS's are Geo-Referenced (- Geo-Ref user entered XS - Geo-Ref interpolated XS - Non Geo-Ref user entered XS - Non Geo-Ref interpolated XS)

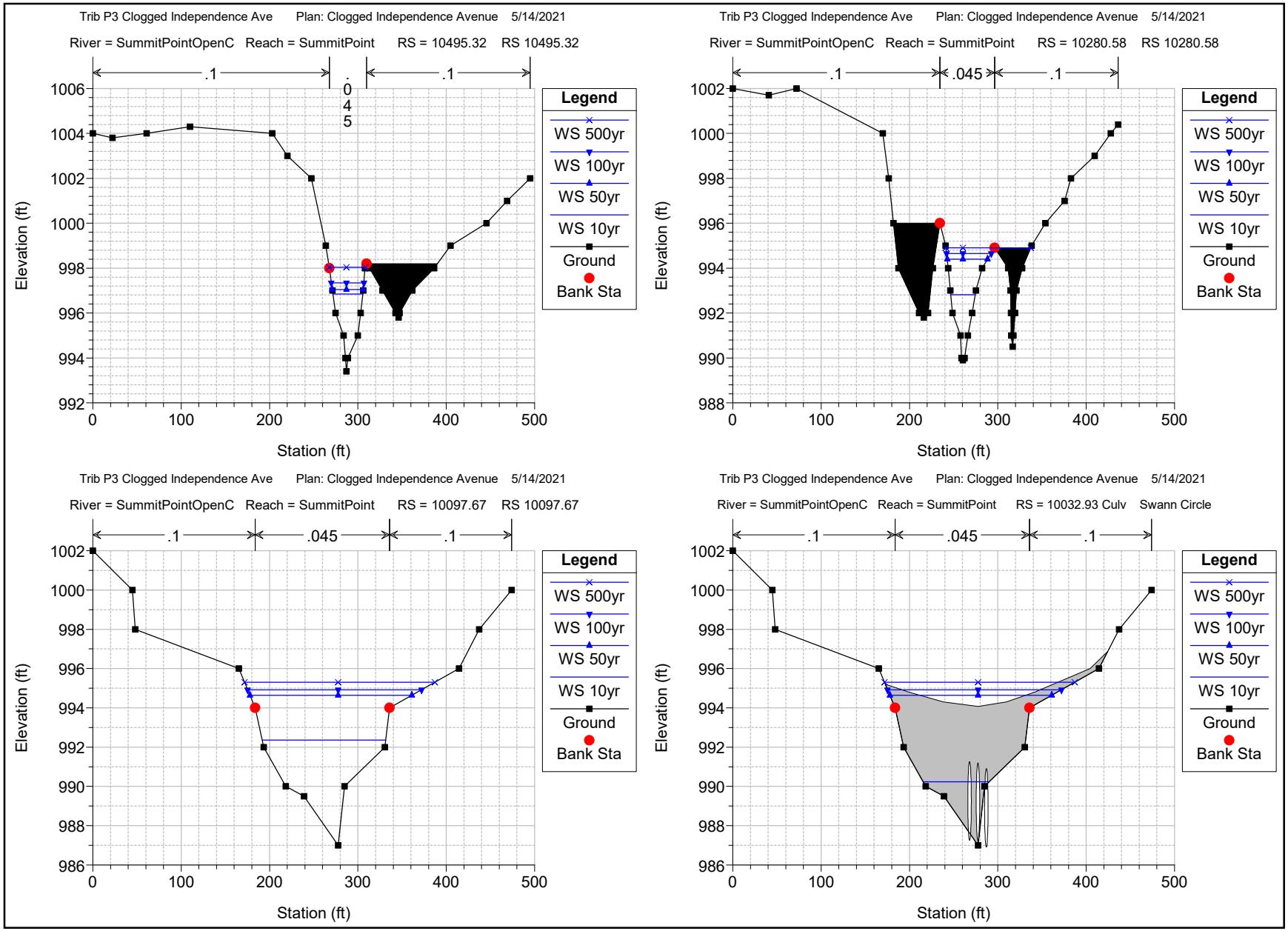
Tributary P3 to Prairie Lee Lake w/ Clogged Culvert at Independence Ave



Tributary P3 to Prairie Lee Lake w/ Clogged Culvert at Independence Ave



Tributary P3 to Prairie Lee Lake w/ Clogged Culvert at Independence Ave



Tributary P3 to Prairie Lee Lake w/ Clogged Culvert at Independence Ave

Errors Warnings and Notes for Plan : ClogIndependence

Location:	River: SummitPointOpenC Reach: SummitPoint RS: 11275.44 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 11086.04 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10856.09 Profile: 100yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10658.06 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10495.32 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10280.58 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10032.93 Profile: 100yr Culv: Culvert #1
Note:	During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:	The culvert inlet is submerged and the culvert flows full over part or all of its length. Therefore, the
	culvert inlet equations are not valid and the supercritical result has been discarded. The outlet
	answer will be used.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10032.93 Profile: 100yr Culv: Culvert #2
Note:	During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:	The culvert inlet is submerged and the culvert flows full over part or all of its length. Therefore, the
	culvert inlet equations are not valid and the supercritical result has been discarded. The outlet
	answer will be used.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 10032.93 Profile: 100yr Culv: Culvert #3
Note:	During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:	The culvert inlet is submerged and the culvert flows full over part or all of its length. Therefore, the
	culvert inlet equations are not valid and the supercritical result has been discarded. The outlet
	answer will be used.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9890.22 Profile: 100yr
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
	additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9759.91 Profile: 100yr
Warning:	The energy equation could not be balanced within the specified number of iterations. The program
	used critical depth for the water surface and continued on with the calculations.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
	additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.

Errors Warnings and Notes for Plan : ClogIndependence (Continued)

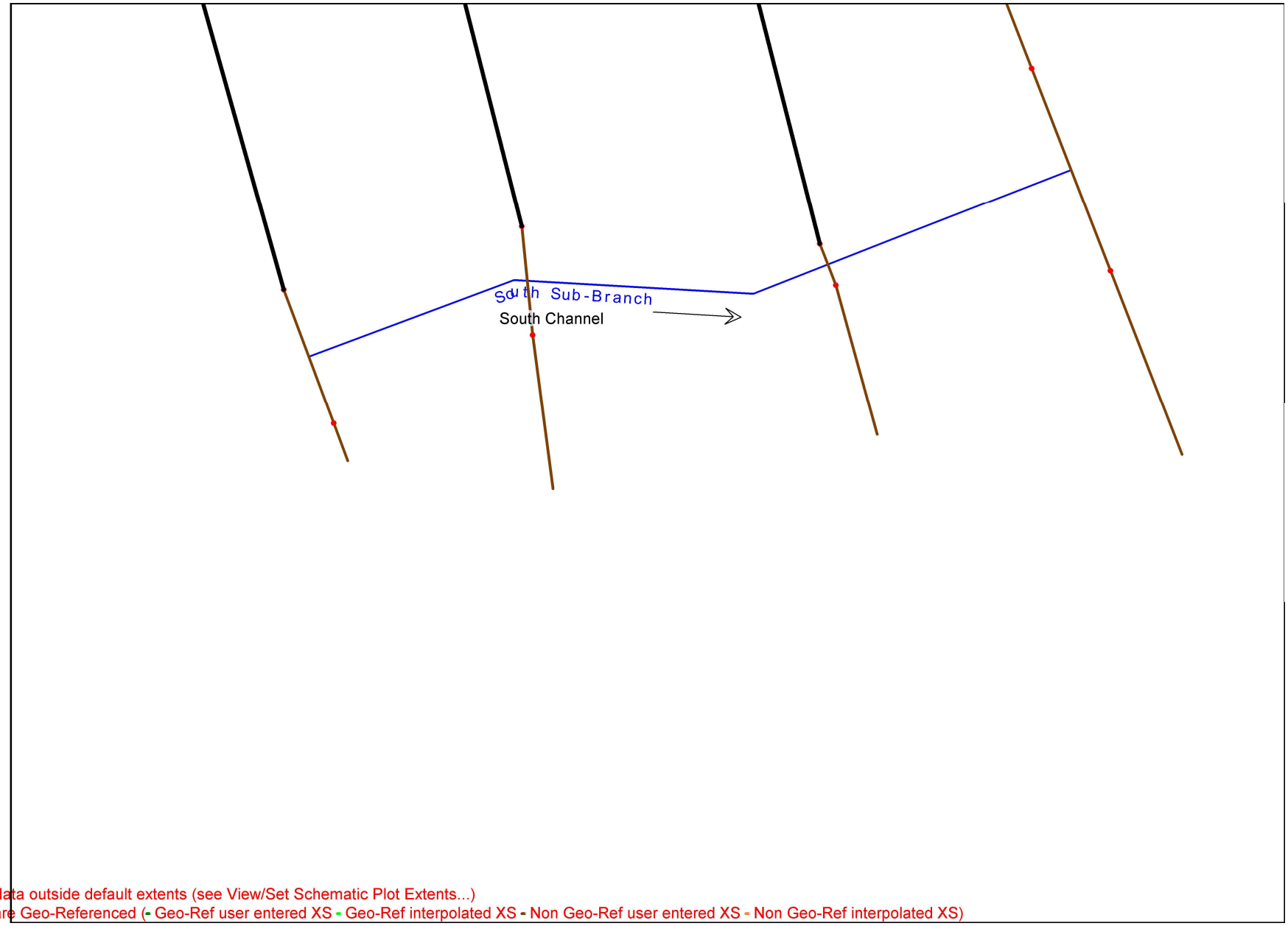
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9566.40 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Hydraulic jump has occurred between this cross section and the previous upstream section.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 9223.75 Profile: 100yr
Warning:	During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a
	balance of energy within the specified tolerance and number of trials. The program used the solution
	with the minimum error.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 8962.51 Profile: 100yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 8833.36 Profile: 100yr
Warning:	The energy equation could not be balanced within the specified number of iterations. The program
	used critical depth for the water surface and continued on with the calculations.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Location:	River: SummitPointOpenC Reach: SummitPoint RS: 8693.92 Profile: 100yr
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.

Small Local Flow Drainage Channel on Summit Point Phase-II Site

HEC-RAS Plan: OnSiteChan River: South Sub-Branch Reach: South Channel

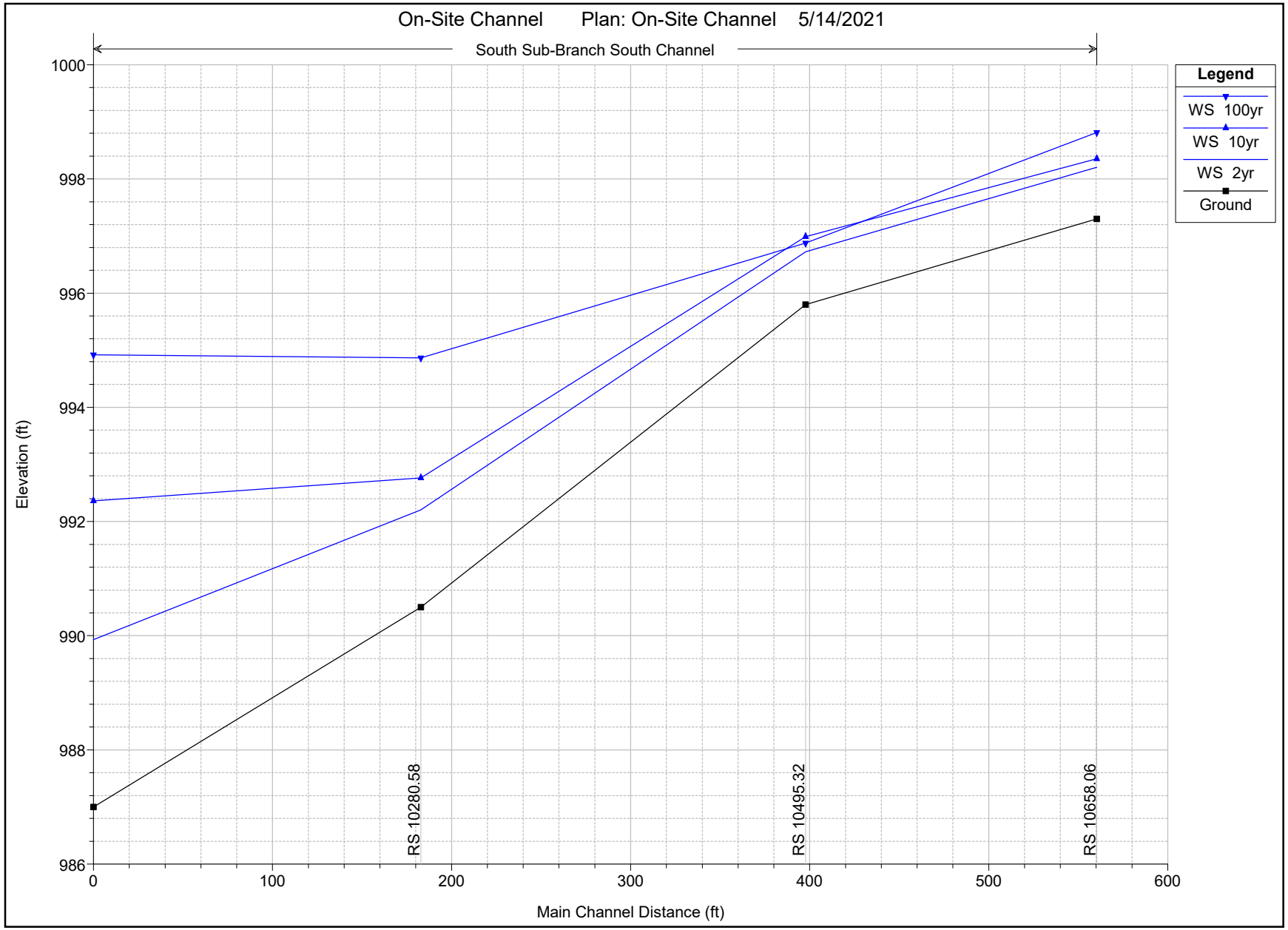
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
South Channel	10097.67	2yr	30.00	987.00	989.93	987.93	989.93	0.000099	0.38	79.22	63.54	0.06
South Channel	10097.67	10yr	55.00	987.00	992.36	988.18	992.36	0.000008	0.16	337.19	139.74	0.02
South Channel	10097.67	100yr	97.00	987.00	994.92	988.48	994.92	0.000002	0.13	737.08	196.73	0.01
South Channel	10280.58	2yr	30.00	990.50	992.21	992.21	992.73	0.041033	5.81	5.16	5.03	1.01
South Channel	10280.58	10yr	55.00	990.50	992.76	992.76	993.45	0.039018	6.64	8.29	6.20	1.01
South Channel	10280.58	100yr	97.00	990.50	994.87		994.95	0.003608	2.30	45.18	39.69	0.35
South Channel	10495.32	2yr	20.00	995.80	996.72		996.77	0.008413	1.76	11.39	25.71	0.47
South Channel	10495.32	10yr	37.00	995.80	996.99		997.05	0.007130	1.92	19.24	33.48	0.45
South Channel	10495.32	100yr	65.00	995.80	996.88	996.88	997.14	0.038070	4.15	15.66	30.19	1.02
South Channel	10658.06	2yr	10.00	997.30	998.21		998.24	0.010659	1.56	6.40	20.47	0.49
South Channel	10658.06	10yr	18.00	997.30	998.35		998.40	0.012010	1.80	10.00	28.35	0.53
South Channel	10658.06	100yr	32.00	997.30	998.81		998.83	0.002600	1.12	28.66	52.88	0.27

Small Local Flow Drainage Channel
on Summit Point Phase-II Site

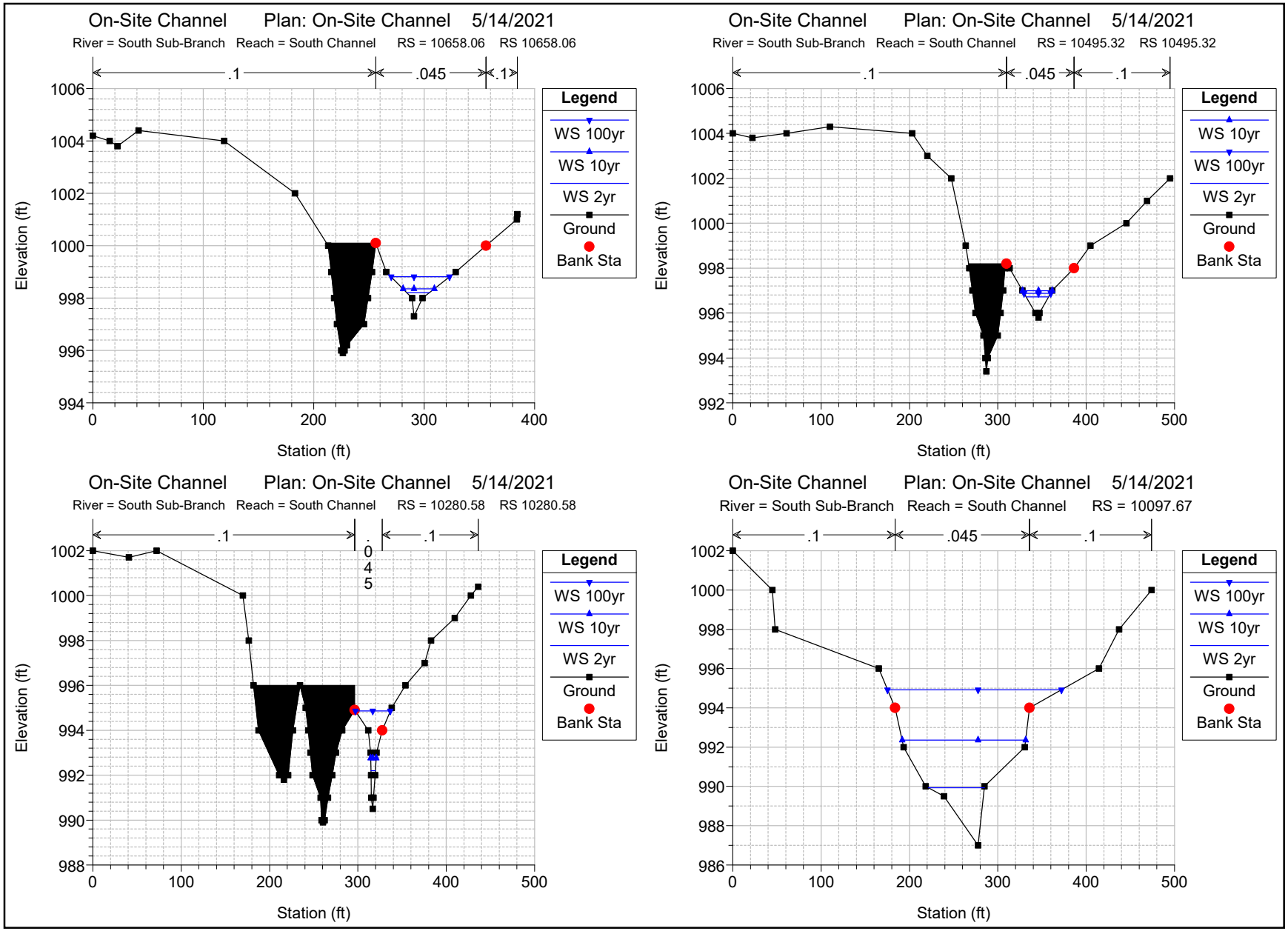


Some schematic data outside default extents (see View/Set Schematic Plot Extents...)
None of the XS's are Geo-Referenced (- Geo-Ref user entered XS - Geo-Ref interpolated XS - Non Geo-Ref user entered XS - Non Geo-Ref interpolated XS)

Small Local Flow Drainage Channel
on Summit Point Phase-II Site



Small Local Flow Drainage Channel on Summit Point Phase-II Site



Small Local Flow Drainage Channel on Summit Point Phase-II Site

Errors Warnings and Notes for Plan : OnSiteChan

Location:	River: South Sub-Branch Reach: South Channel RS: 10658.06 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: South Sub-Branch Reach: South Channel RS: 10495.32 Profile: 100yr
Warning:	The energy equation could not be balanced within the specified number of iterations. The program
	used critical depth for the water surface and continued on with the calculations.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Location:	River: South Sub-Branch Reach: South Channel RS: 10280.58 Profile: 100yr
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.