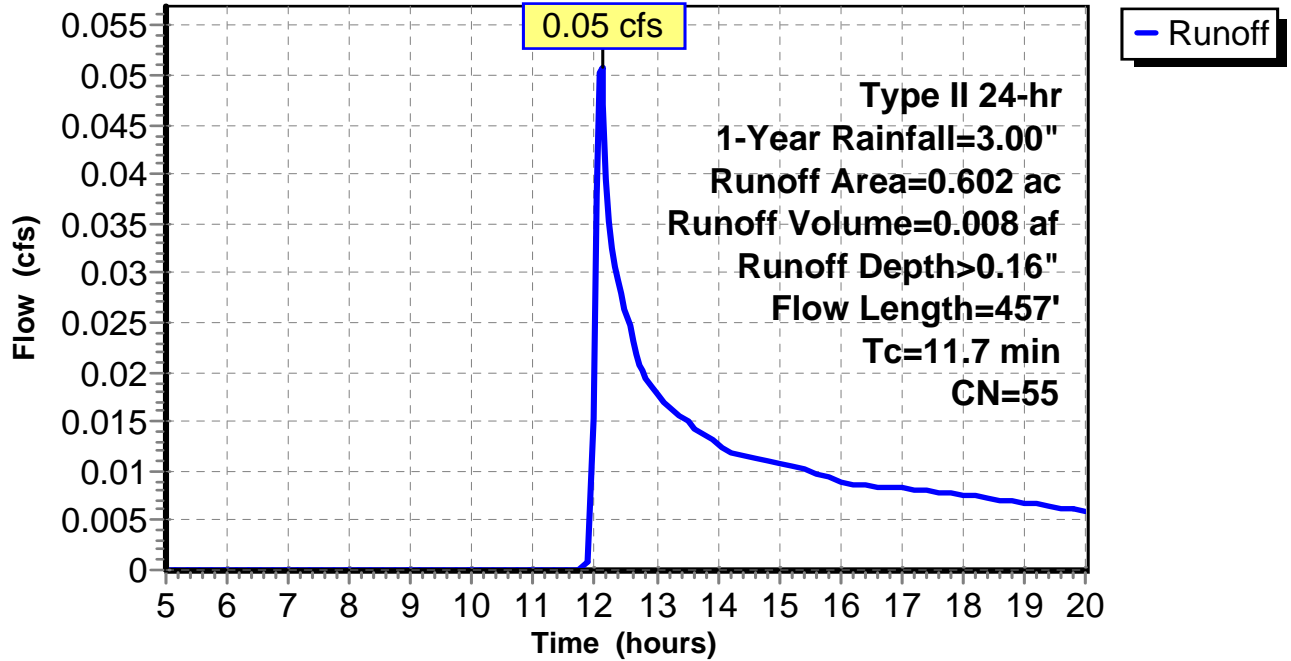


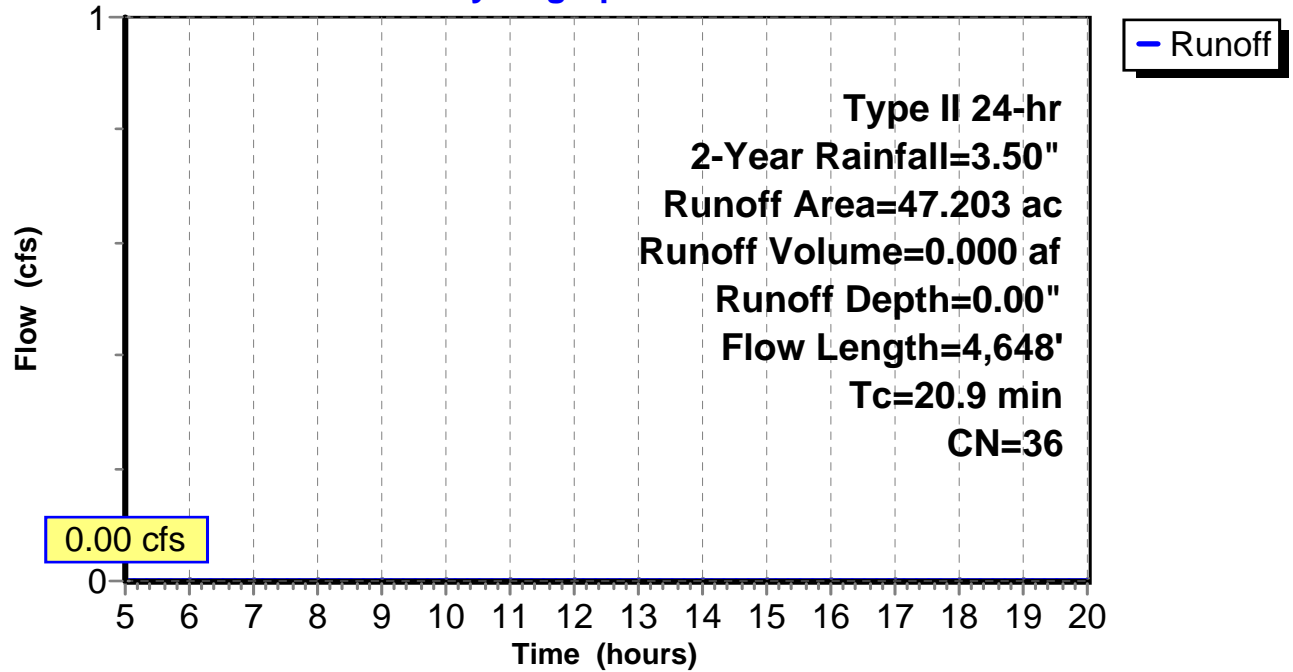
Subcatchment 3: C E147.004

Hydrograph



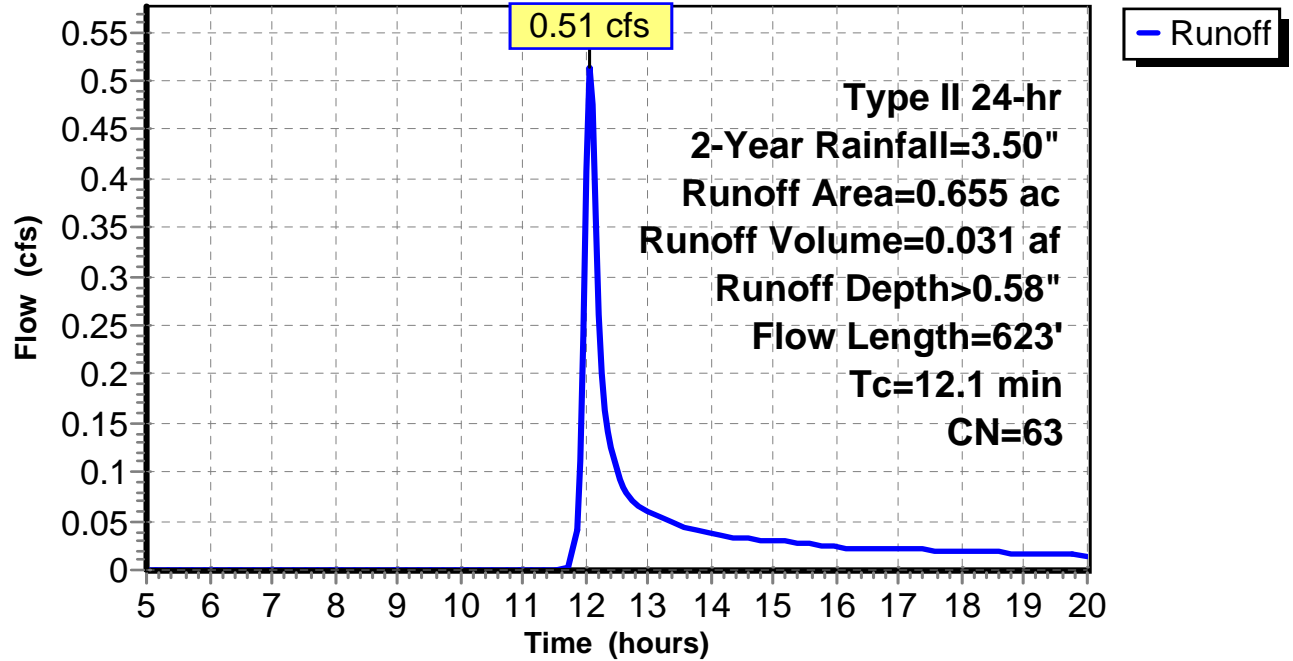
Subcatchment 1: C E147.002

Hydrograph



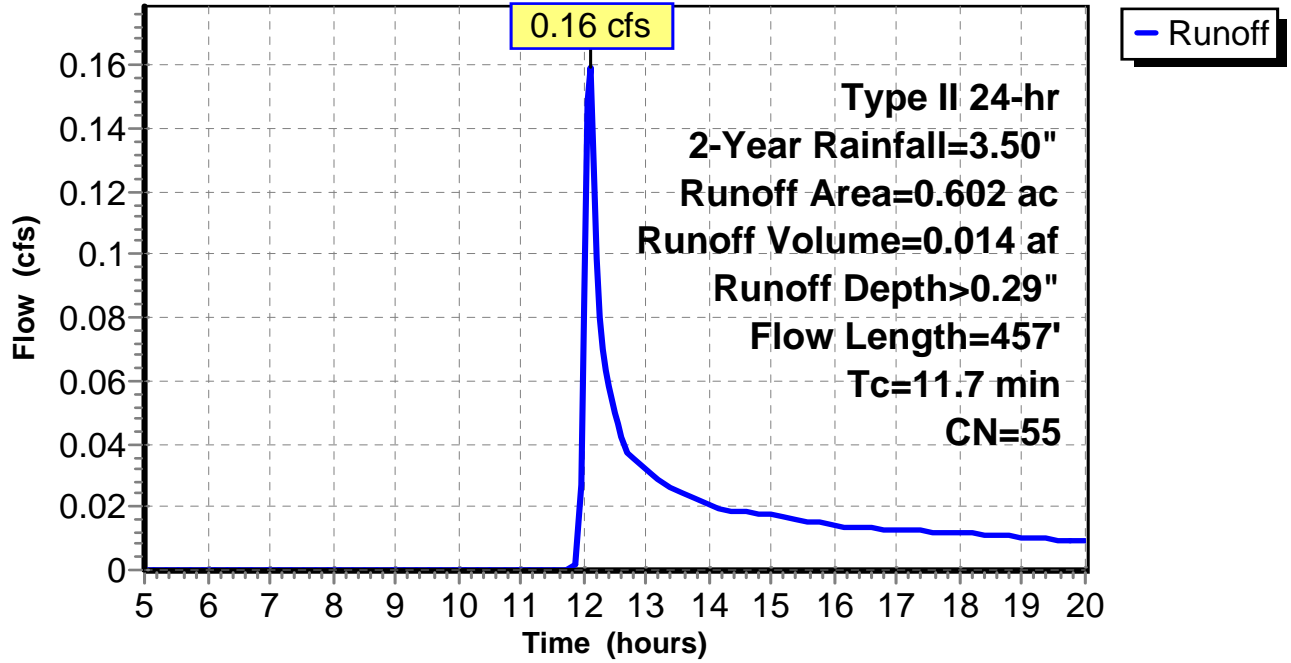
Subcatchment 2: C E147.003

Hydrograph



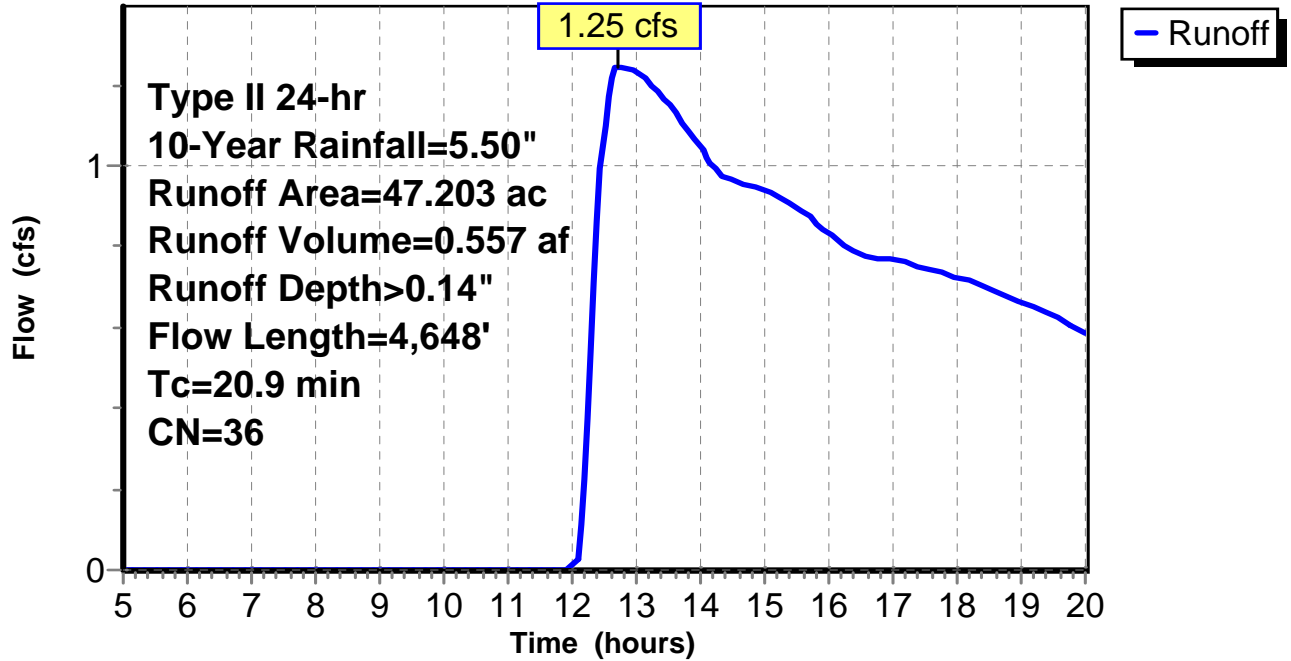
Subcatchment 3: C E147.004

Hydrograph



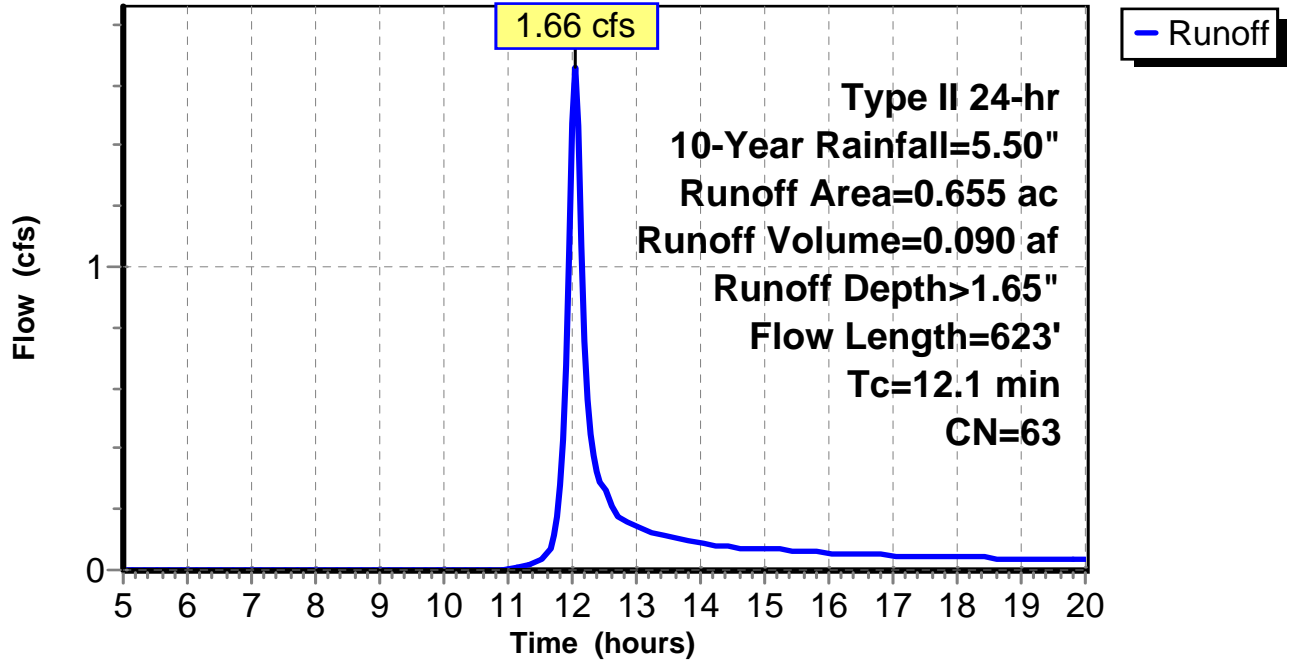
Subcatchment 1: C E147.002

Hydrograph



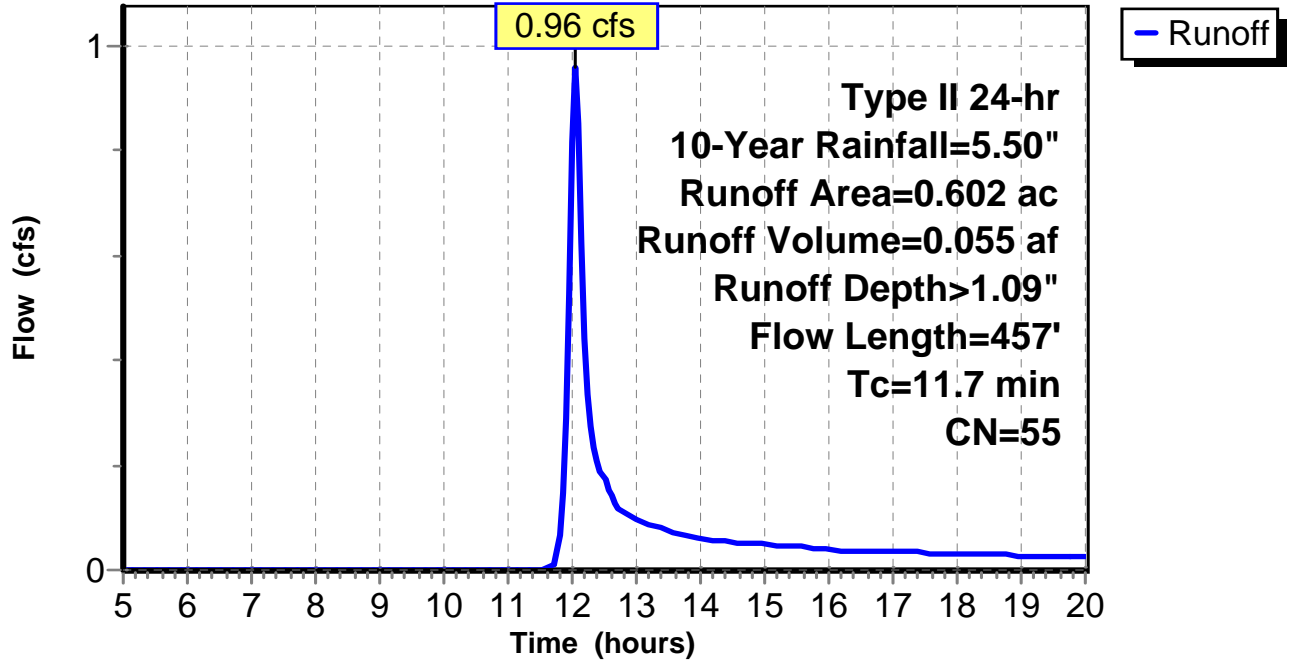
Subcatchment 2: C E147.003

Hydrograph



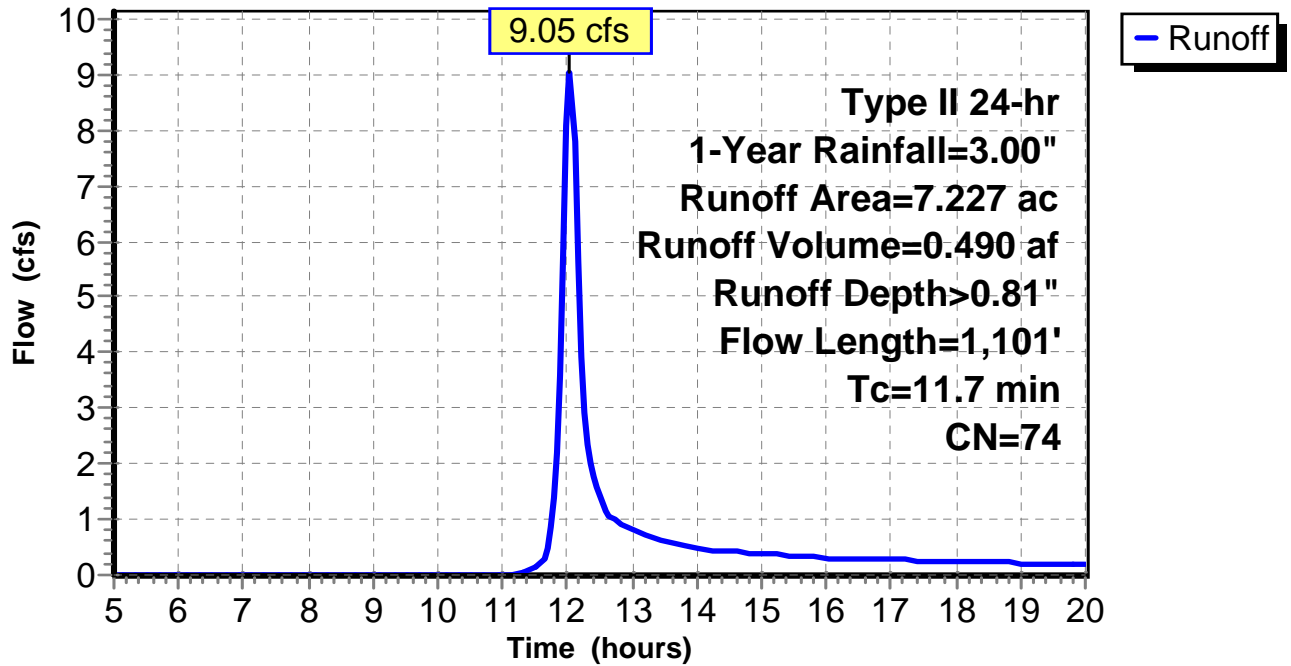
Subcatchment 3: C E147.004

Hydrograph



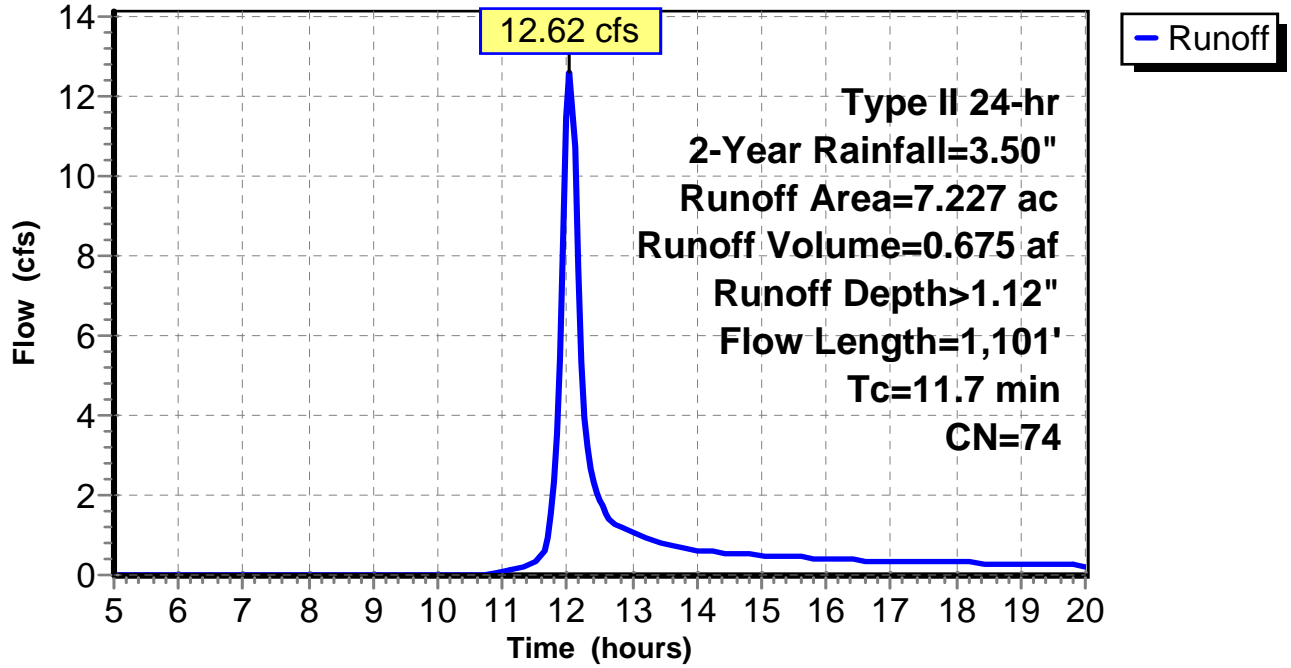
Subcatchment 1: C E-154.001

Hydrograph



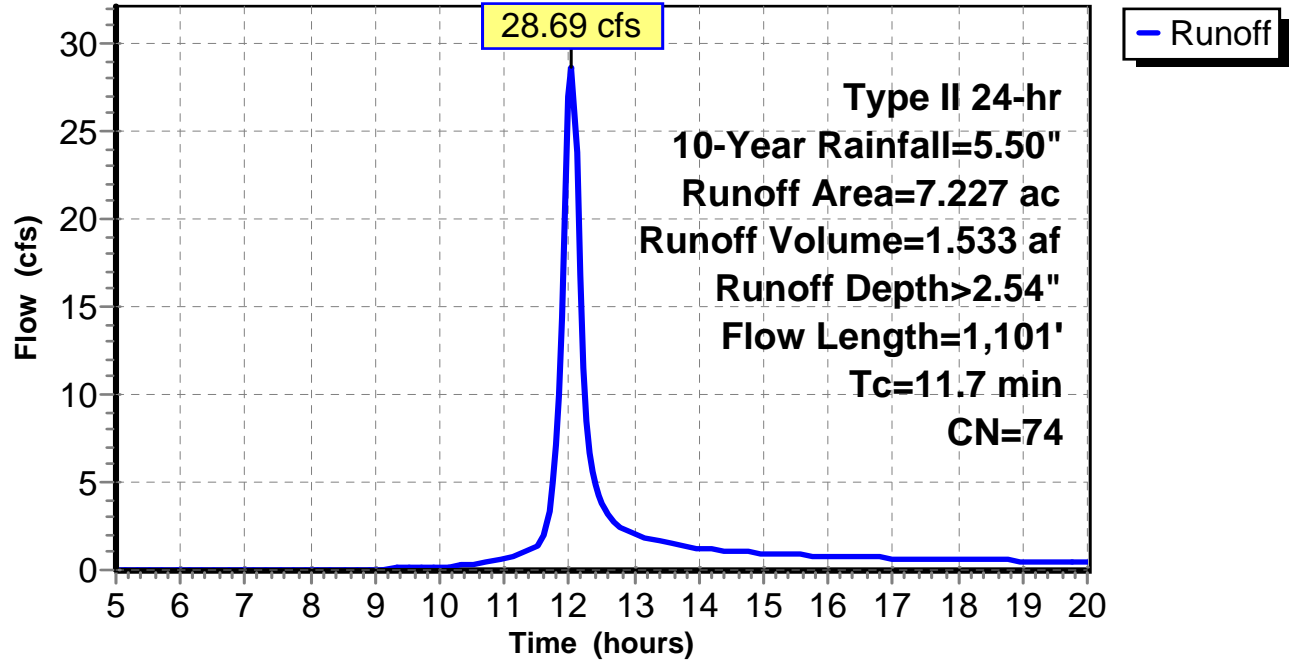
Subcatchment 1: C E-154.001

Hydrograph



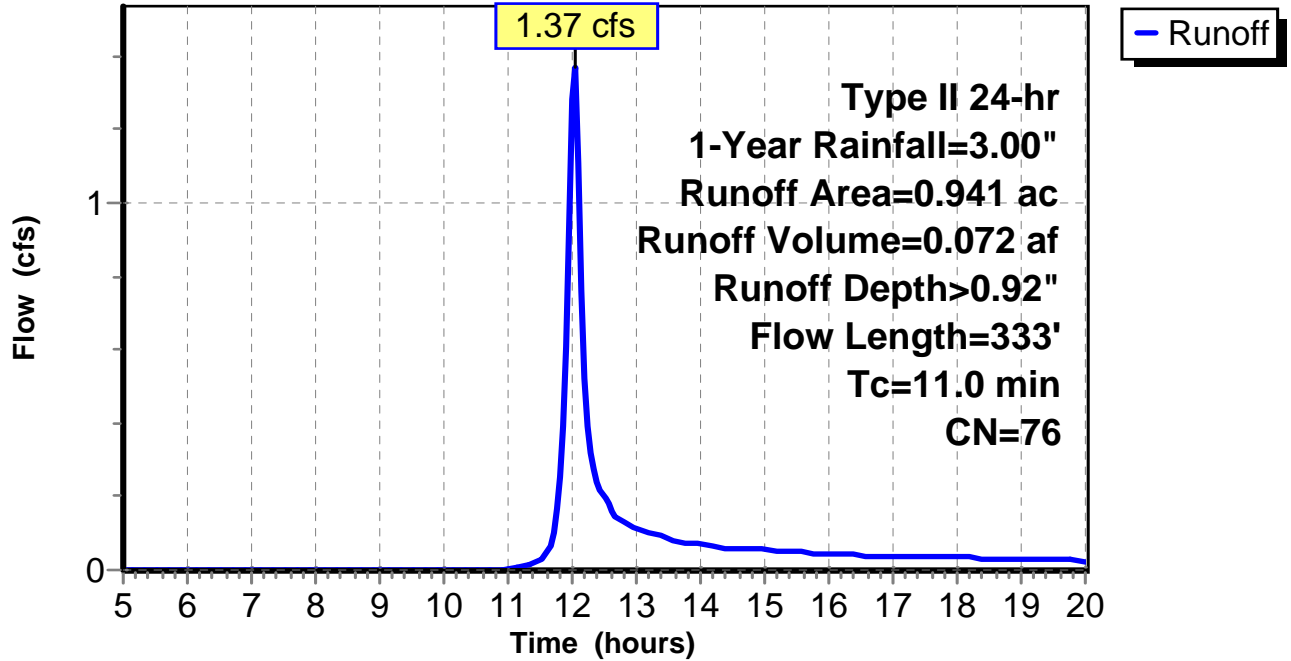
Subcatchment 1: C E-154.001

Hydrograph



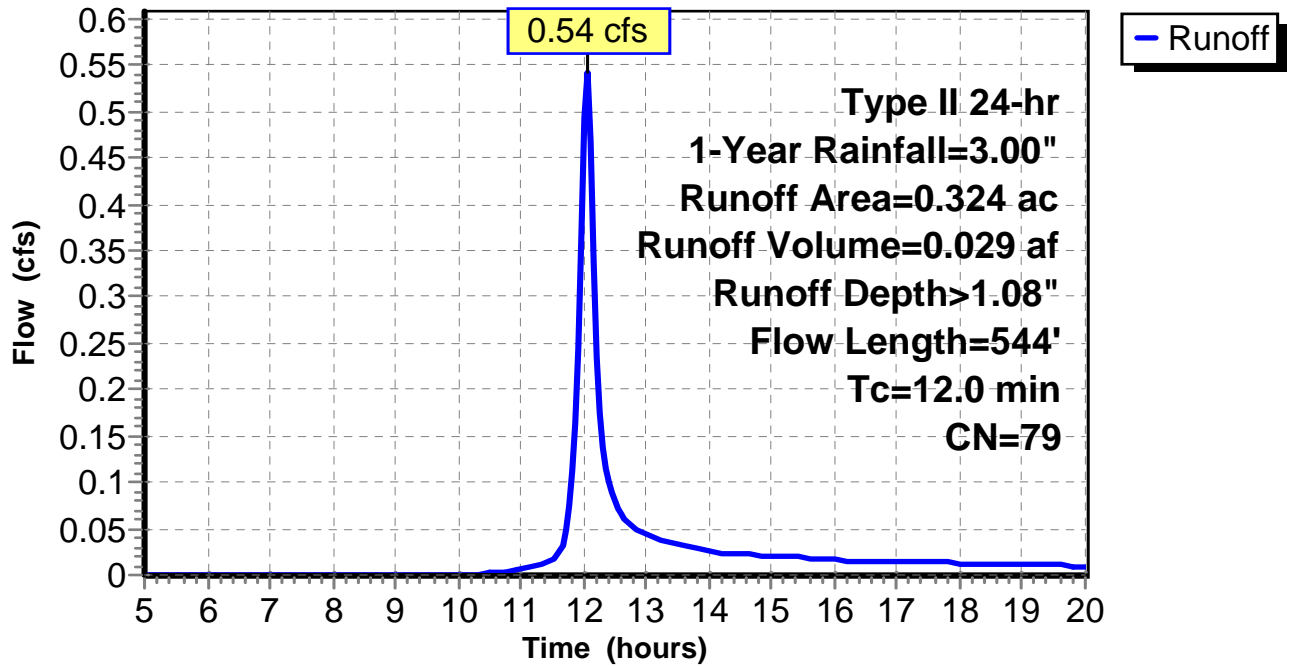
Subcatchment 1: C AR-309.001

Hydrograph



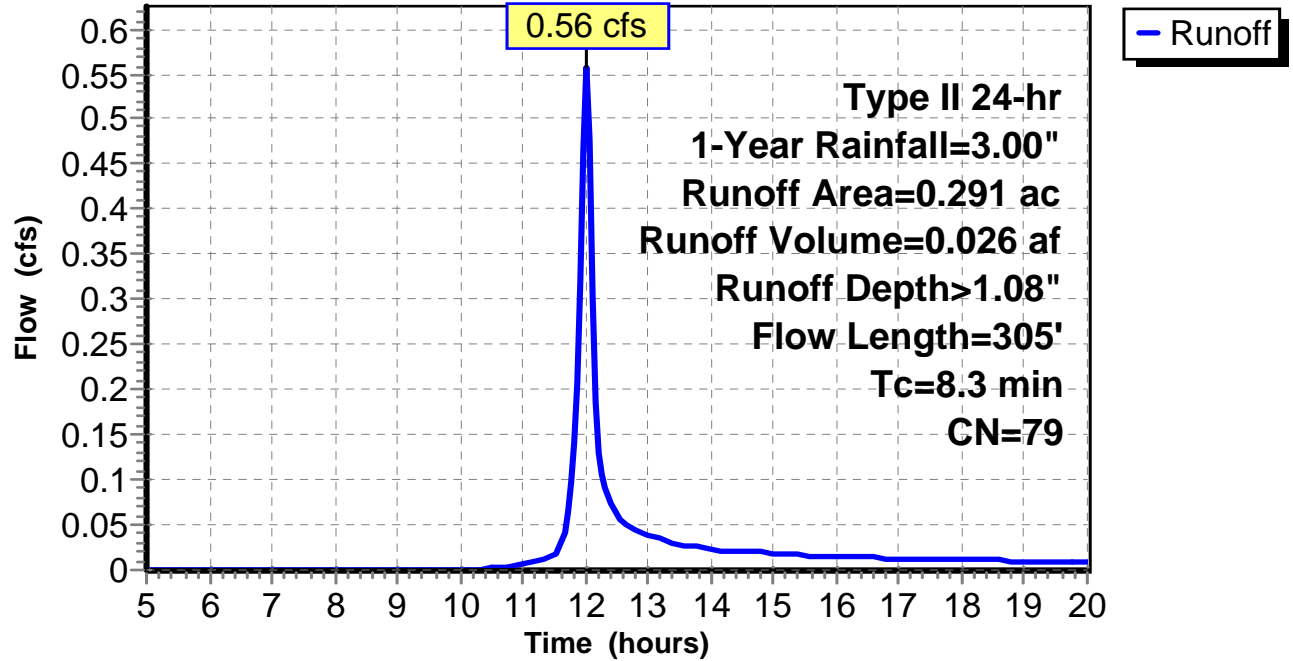
Subcatchment 2: C AR-309.002

Hydrograph



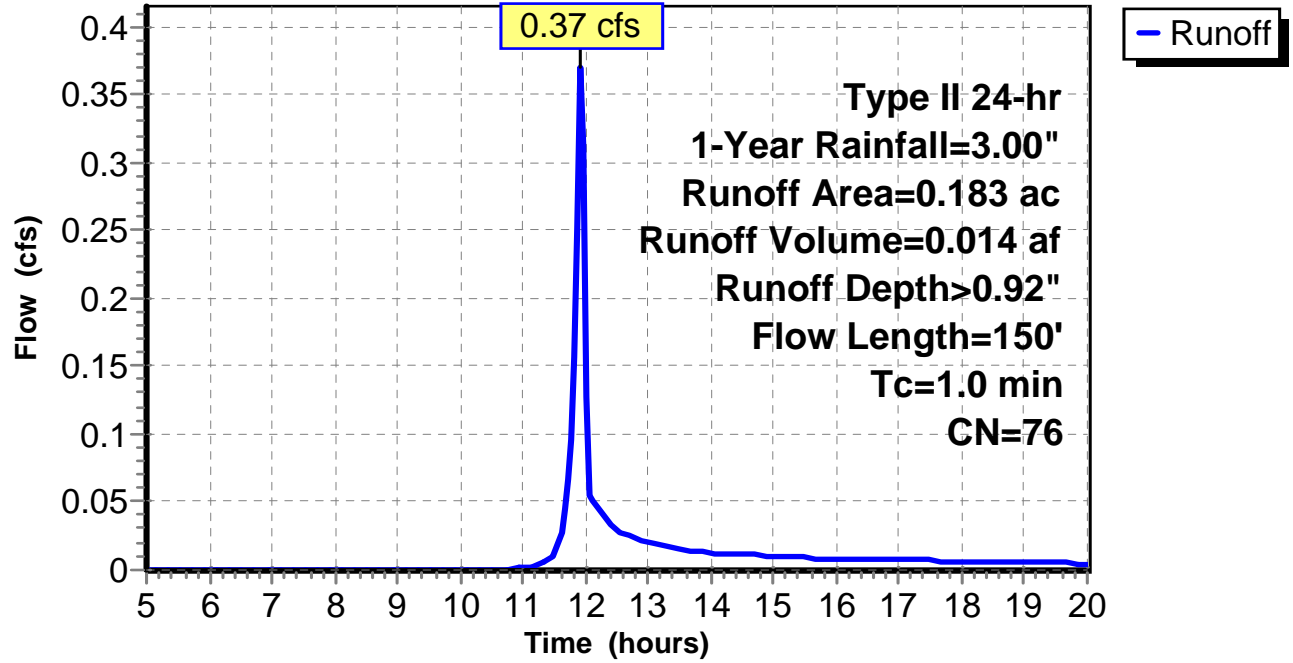
Subcatchment 3: C E150.001

Hydrograph



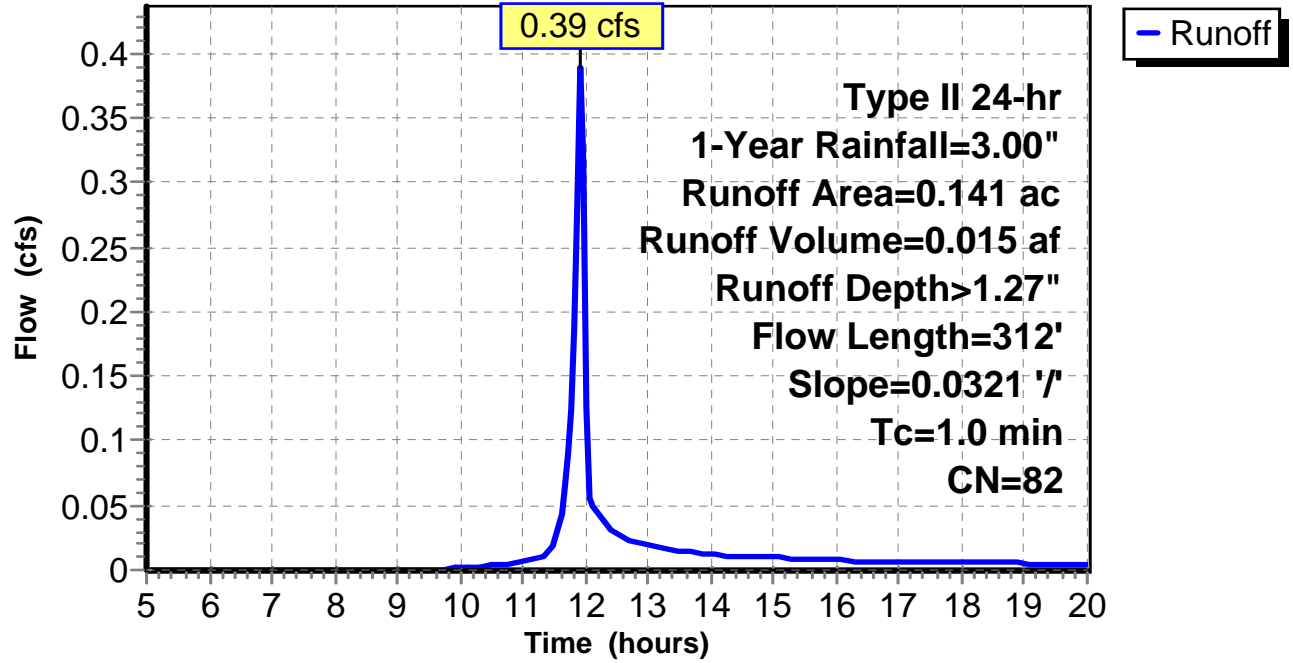
Subcatchment 4: C E150.002

Hydrograph



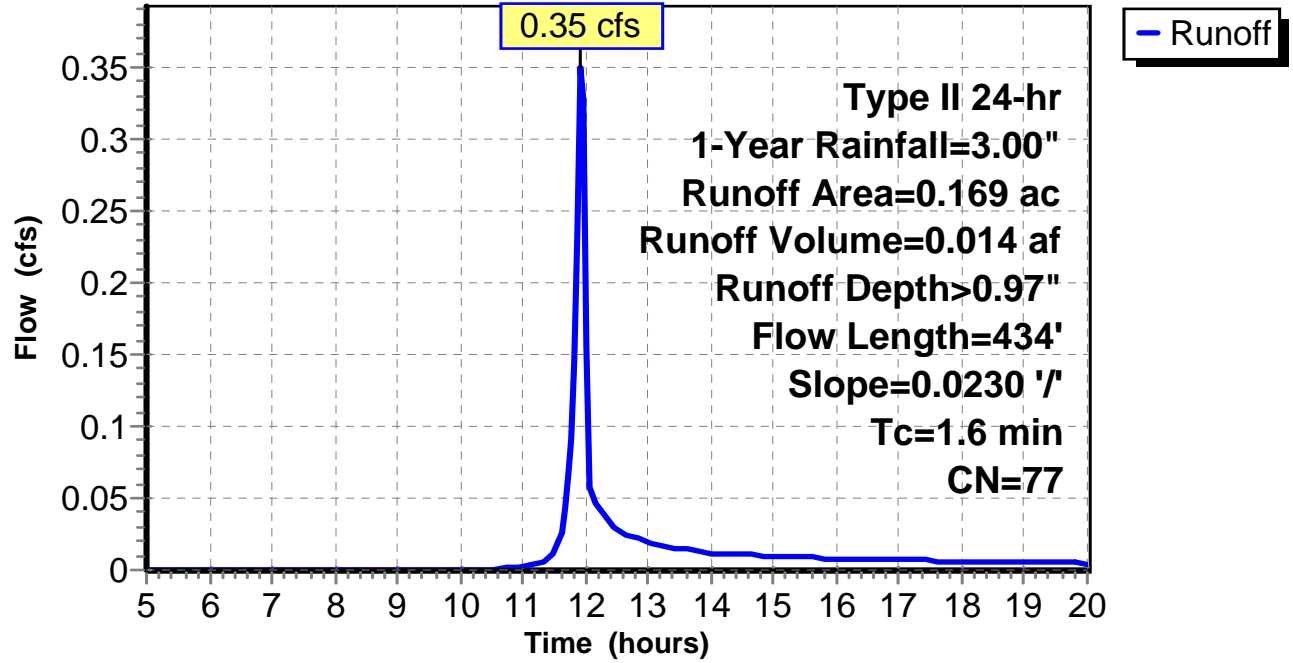
Subcatchment 5: C E150.003

Hydrograph



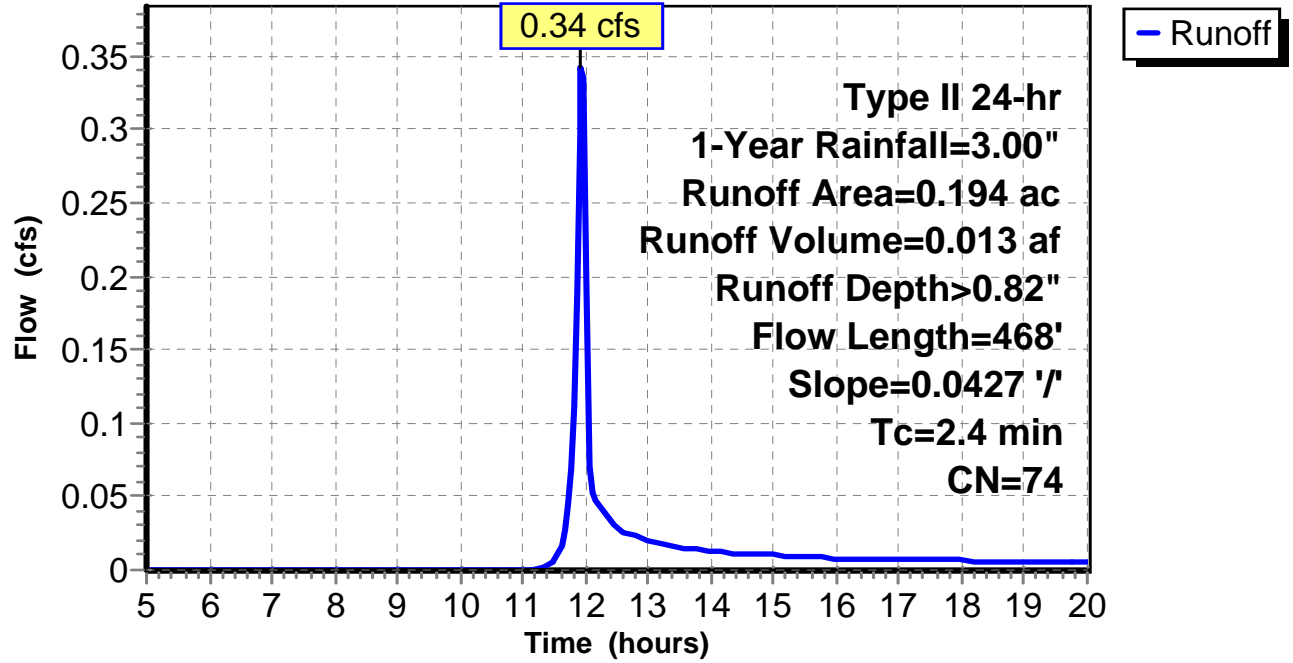
Subcatchment 6: C E150.004

Hydrograph



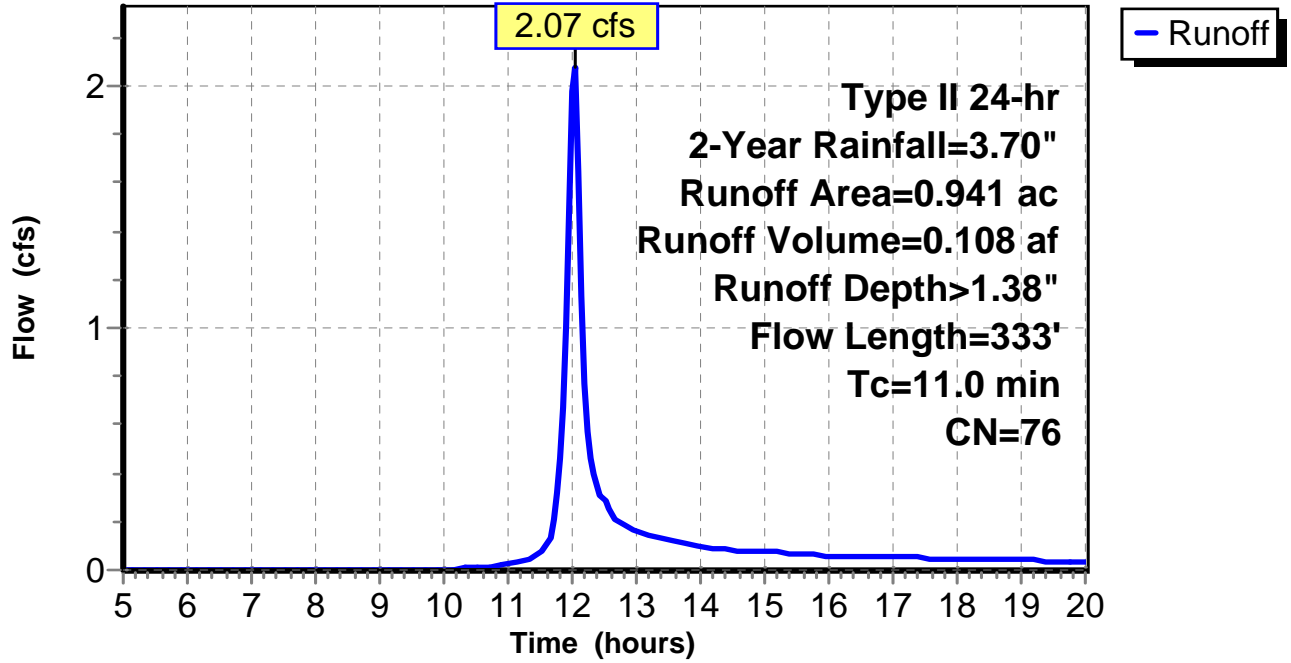
Subcatchment 7: C E150.005

Hydrograph



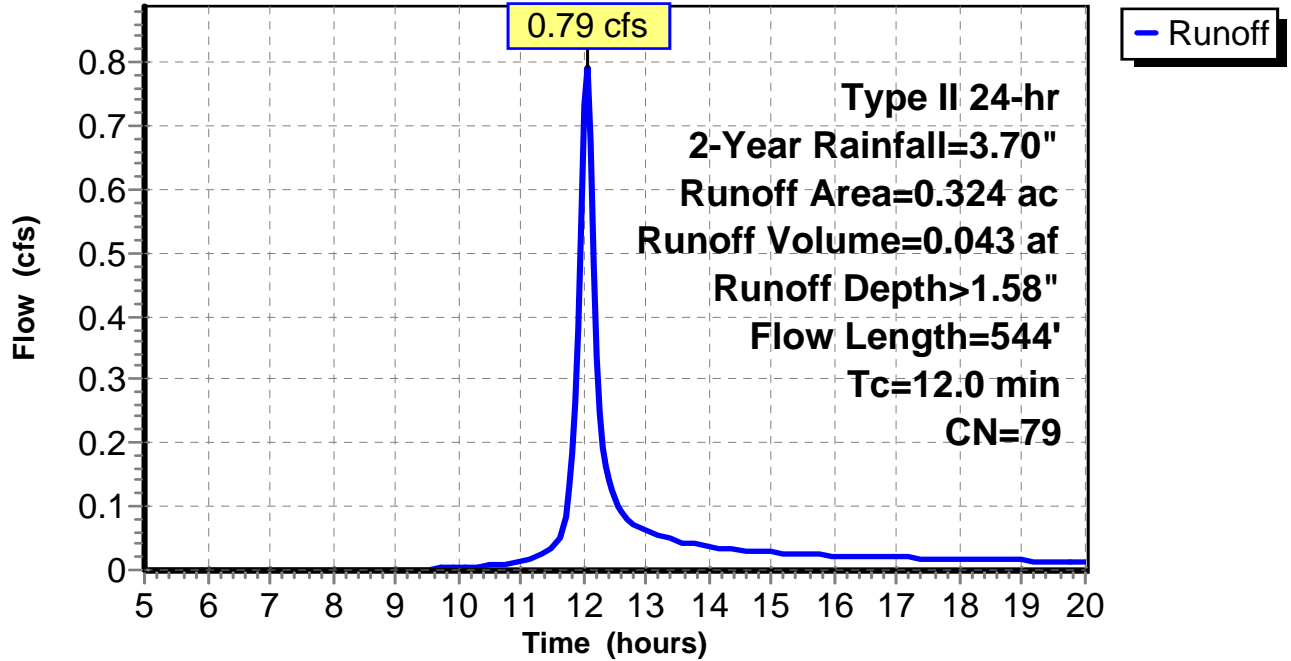
Subcatchment 1: C AR-309.001

Hydrograph



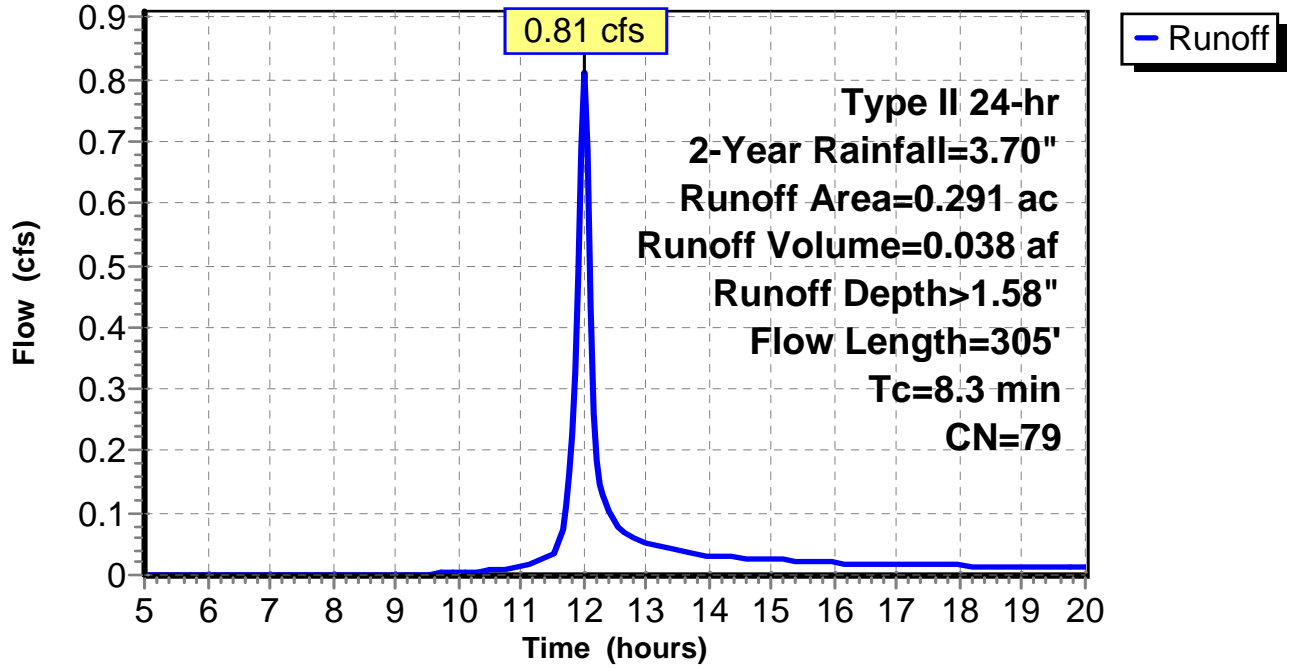
Subcatchment 2: C AR-309.002

Hydrograph



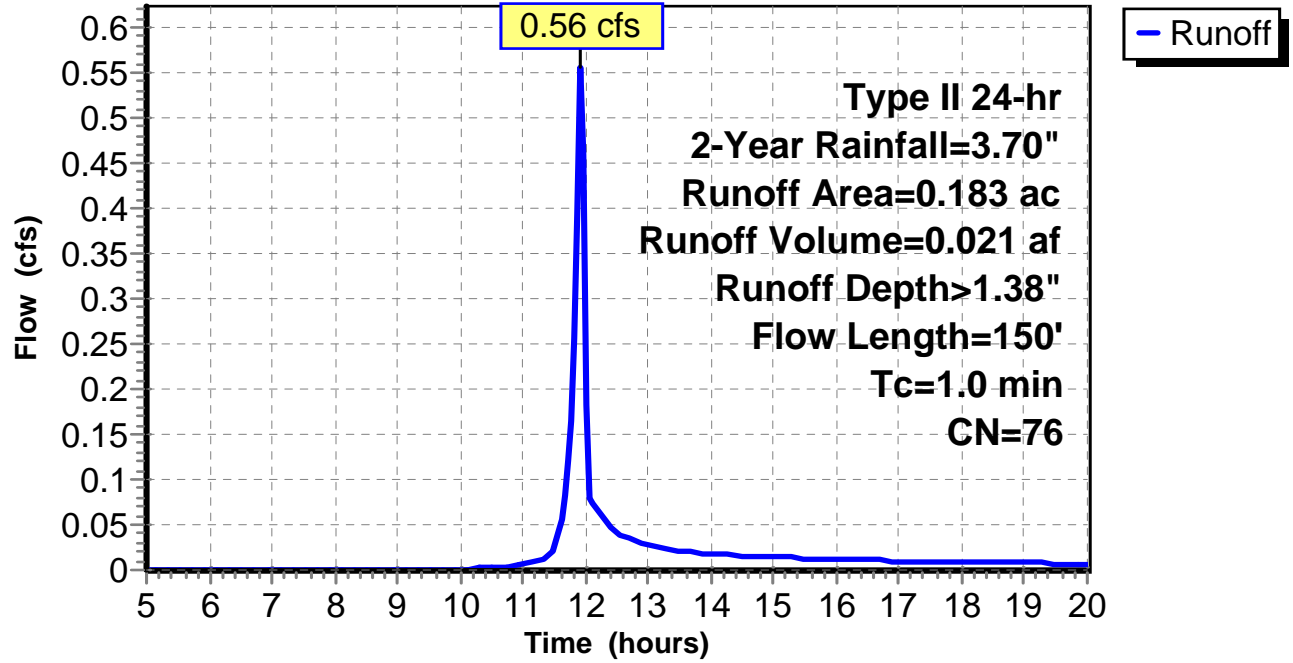
Subcatchment 3: C E150.001

Hydrograph



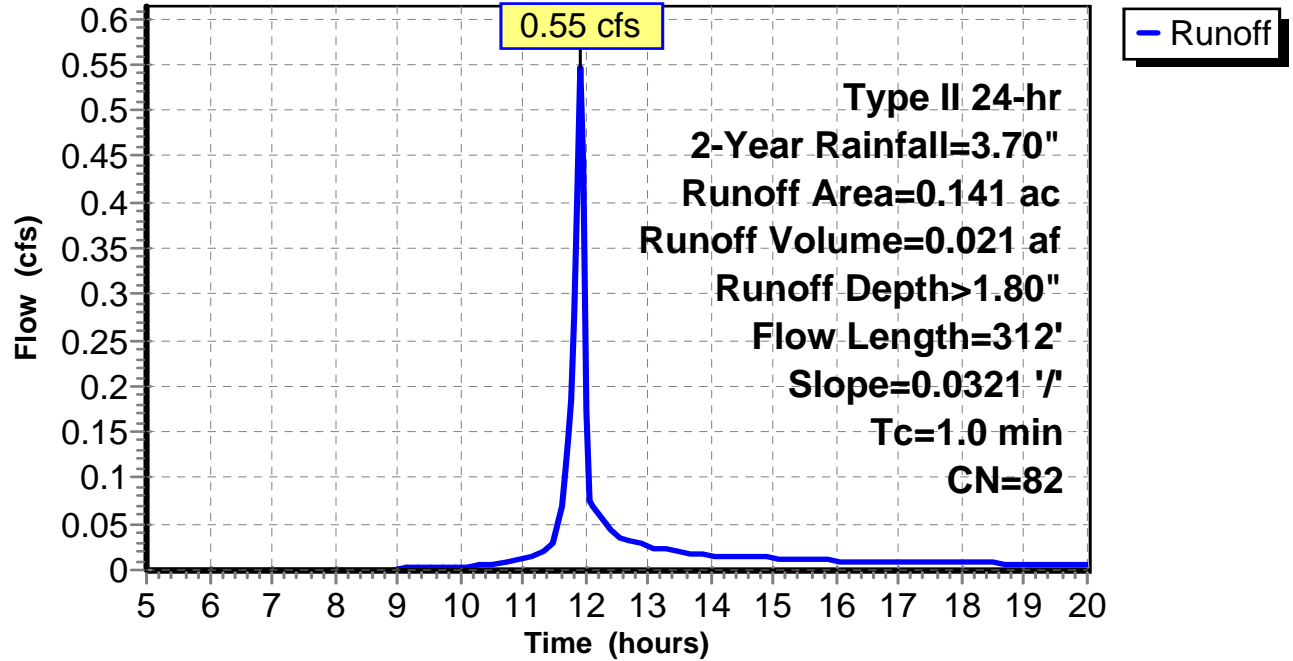
Subcatchment 4: C E150.002

Hydrograph



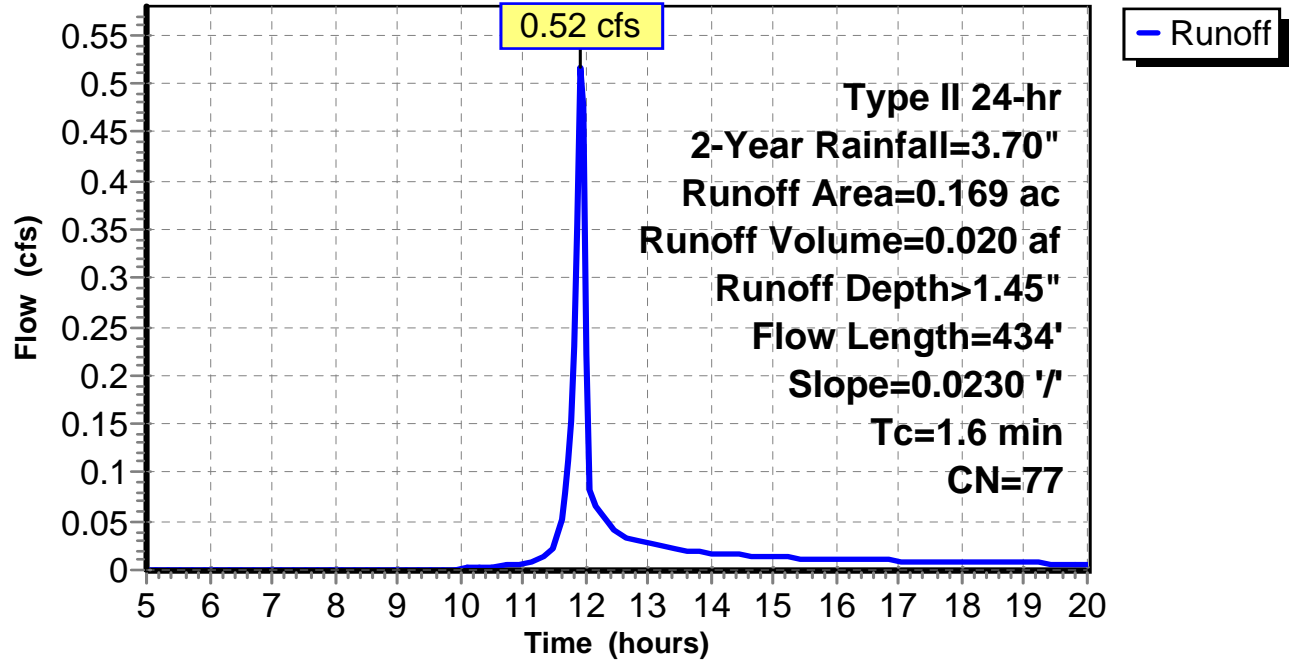
Subcatchment 5: C E150.003

Hydrograph



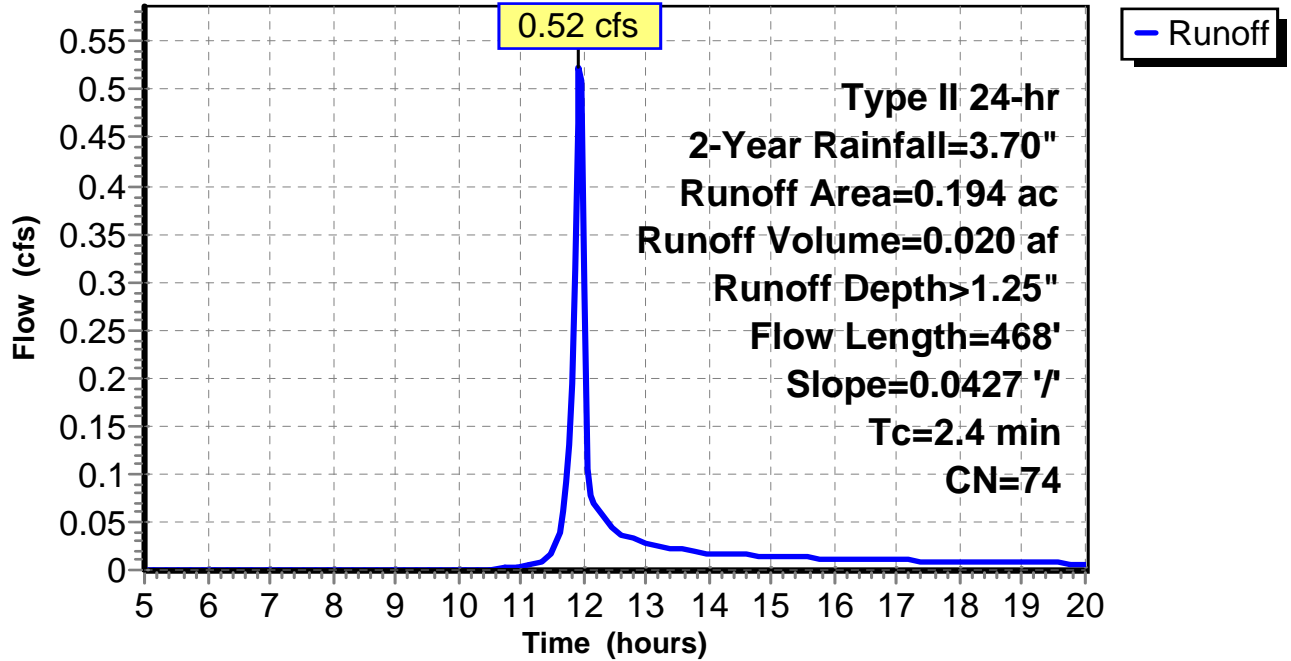
Subcatchment 6: C E150.004

Hydrograph



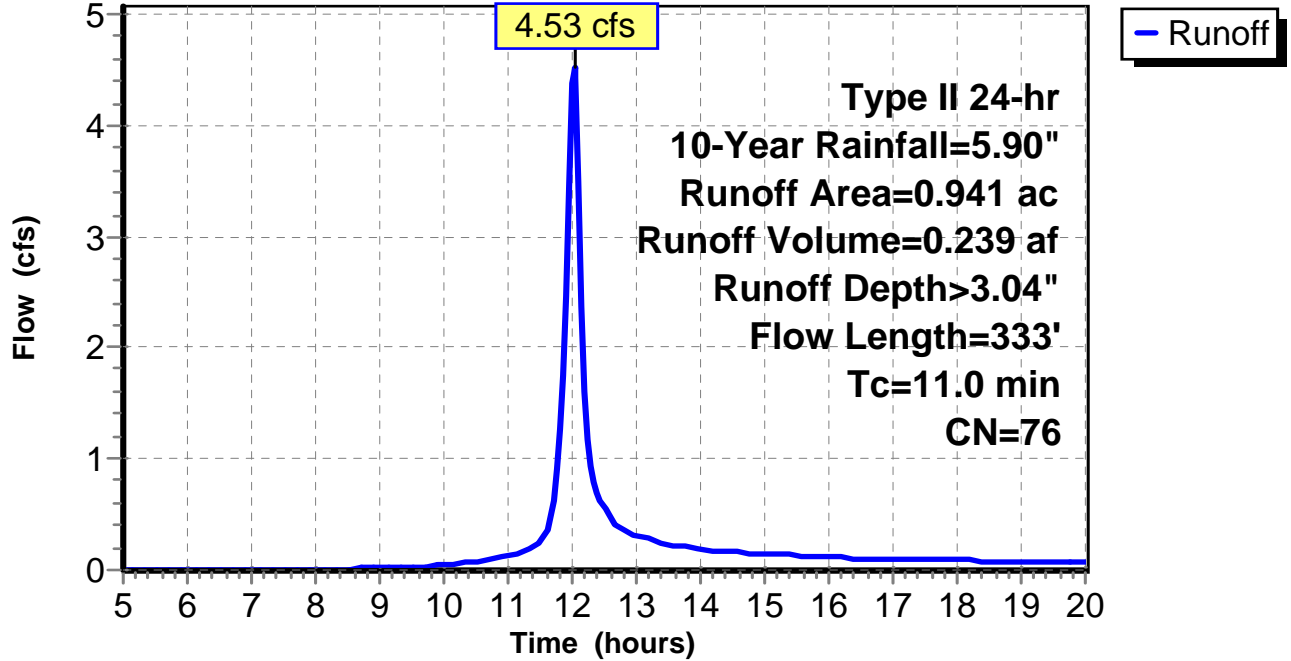
Subcatchment 7: C E150.005

Hydrograph



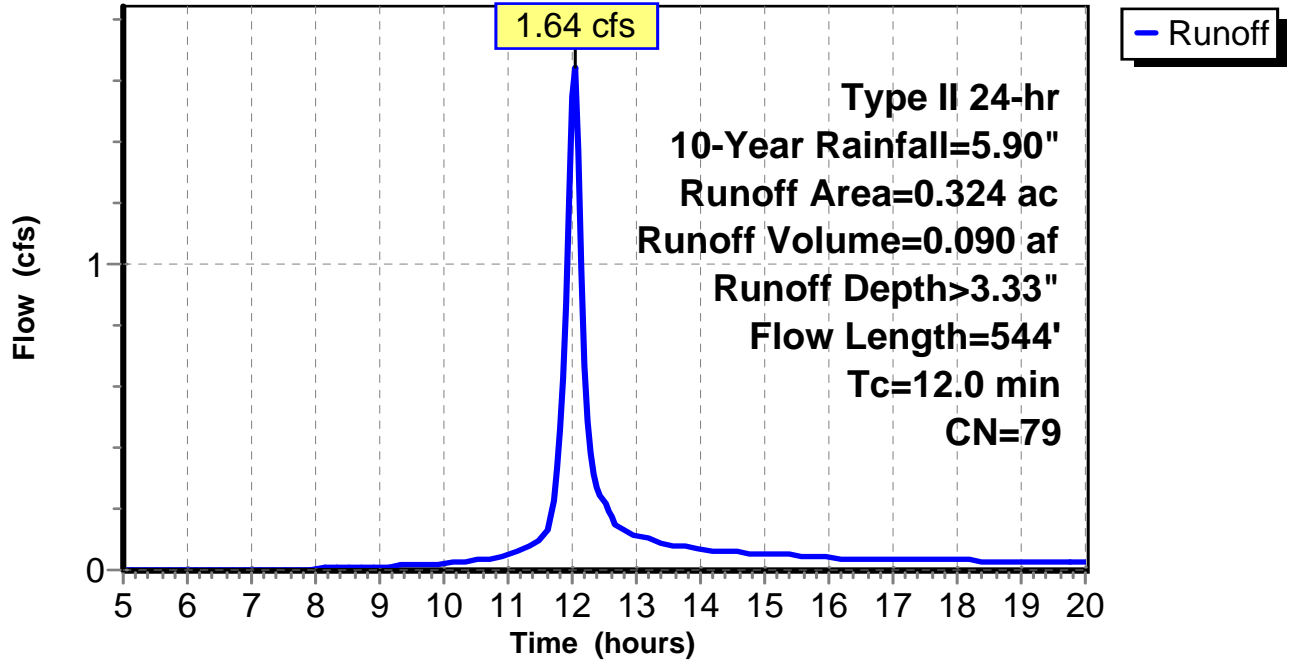
Subcatchment 1: C AR-309.001

Hydrograph



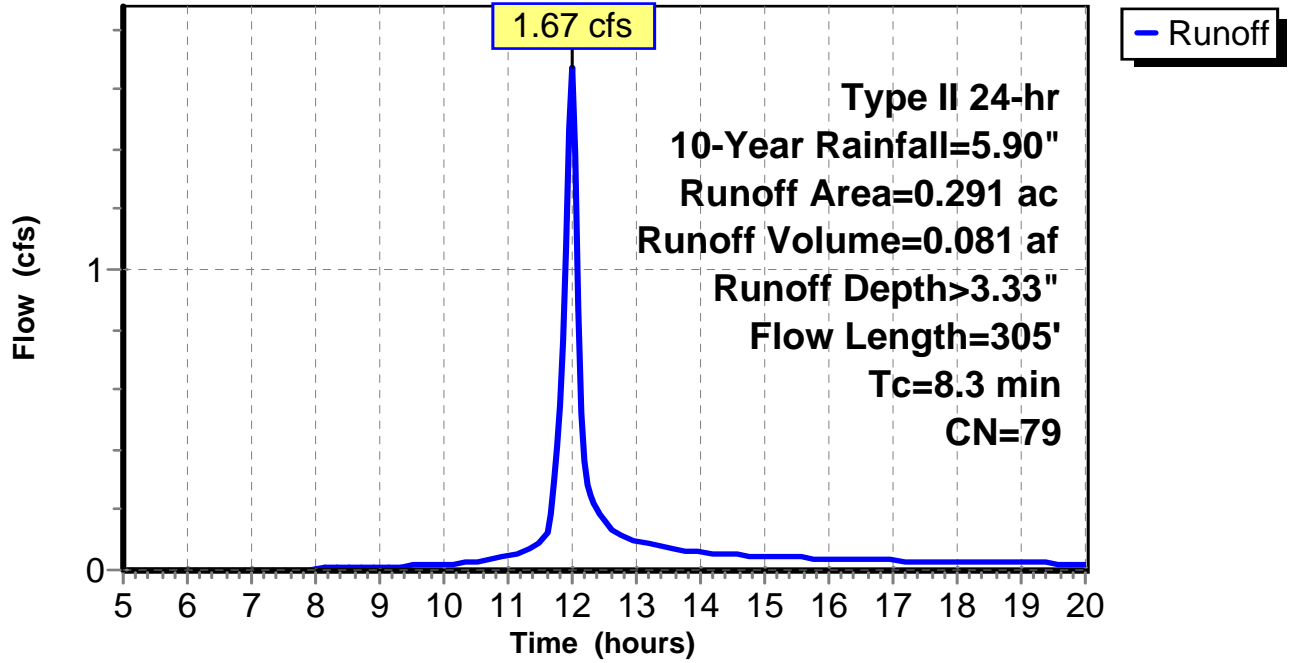
Subcatchment 2: C AR-309.002

Hydrograph



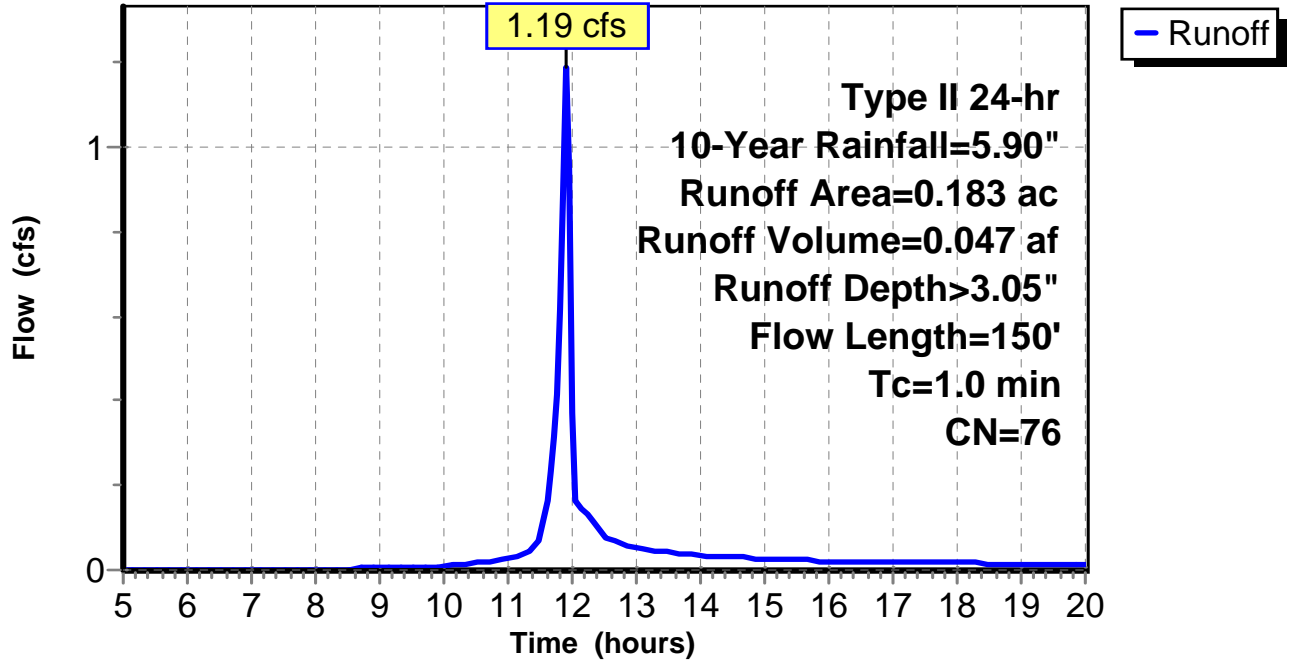
Subcatchment 3: C E150.001

Hydrograph



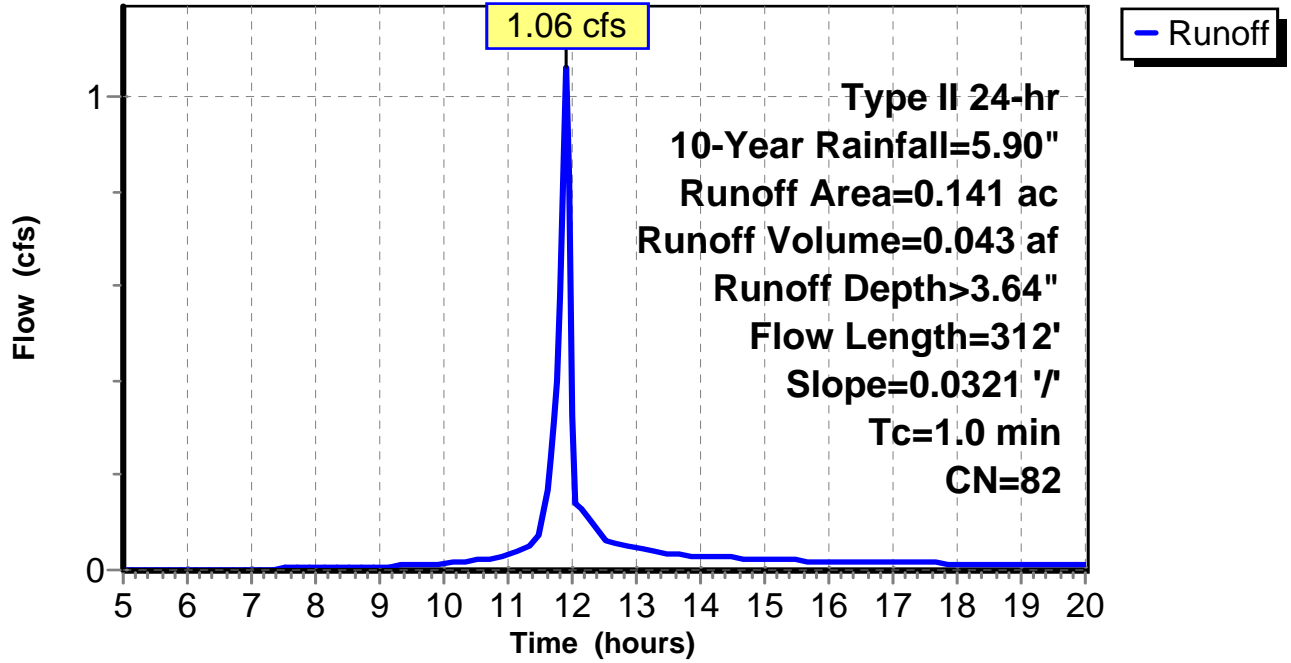
Subcatchment 4: C E150.002

Hydrograph



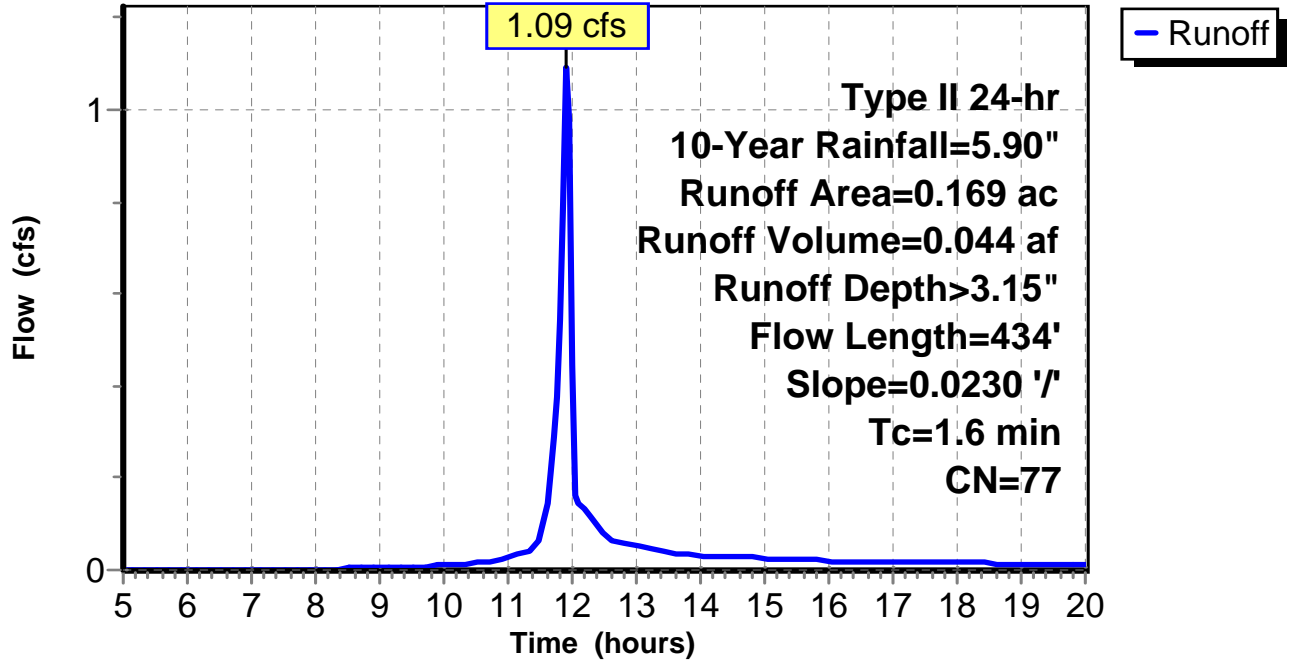
Subcatchment 5: C E150.003

Hydrograph



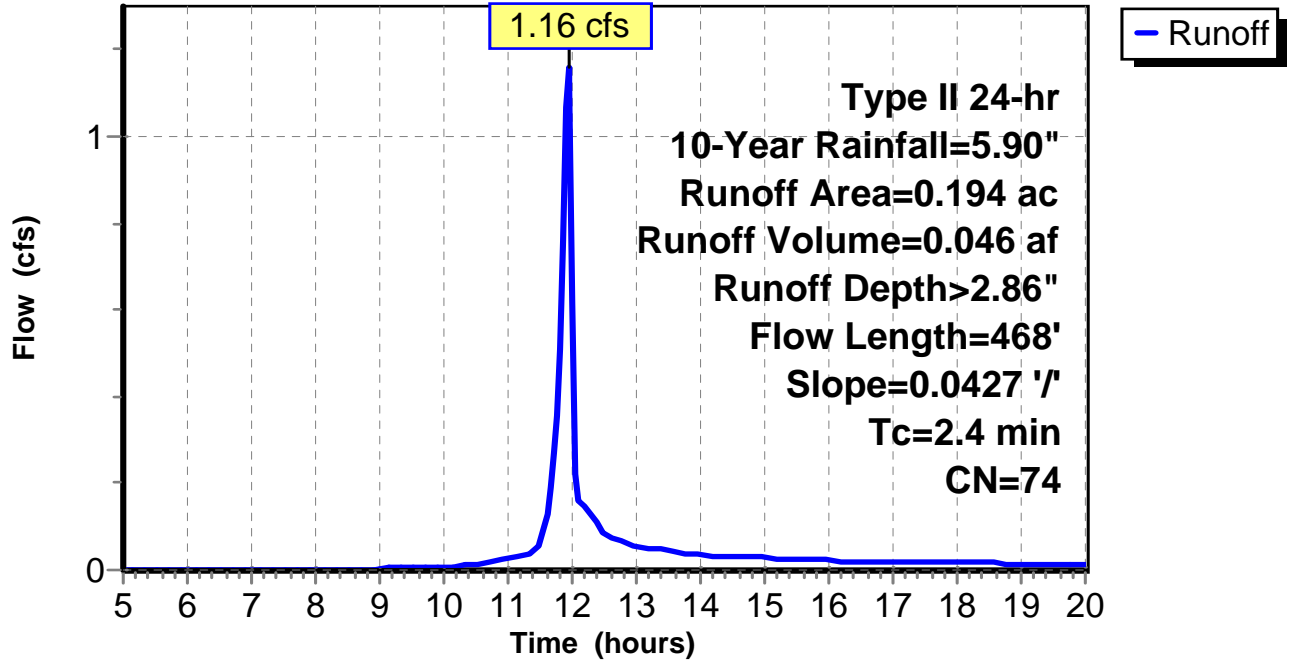
Subcatchment 6: C E150.004

Hydrograph



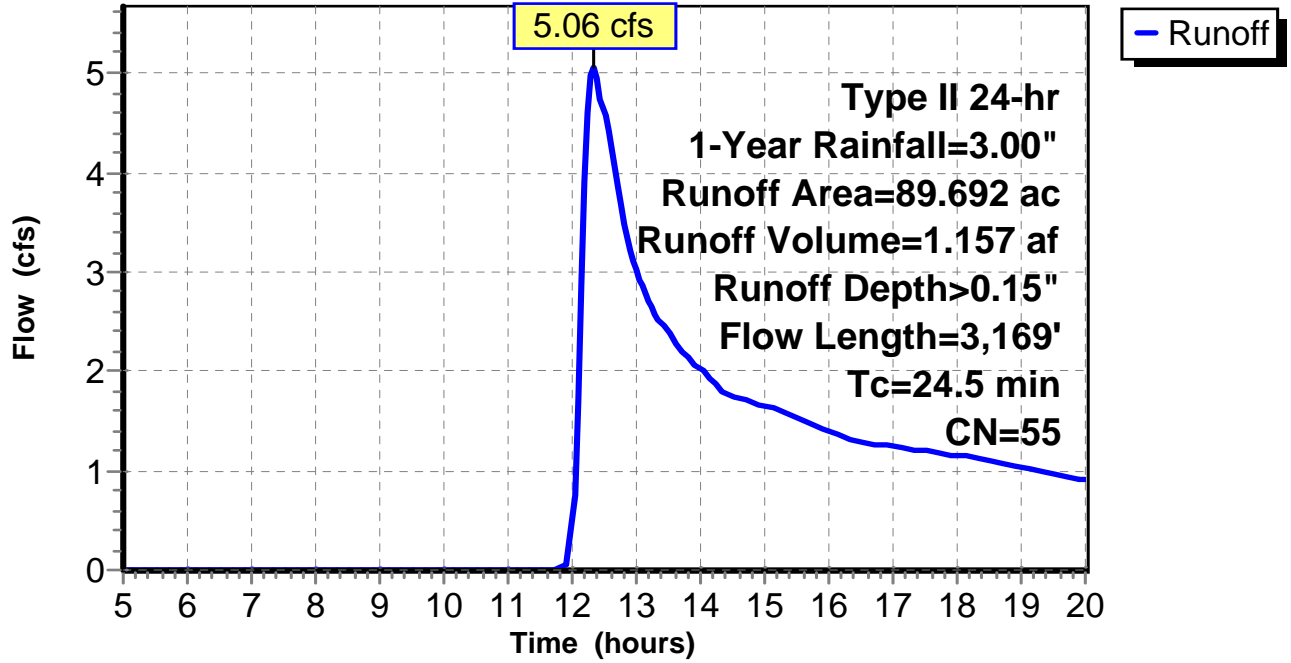
Subcatchment 7: C E150.005

Hydrograph



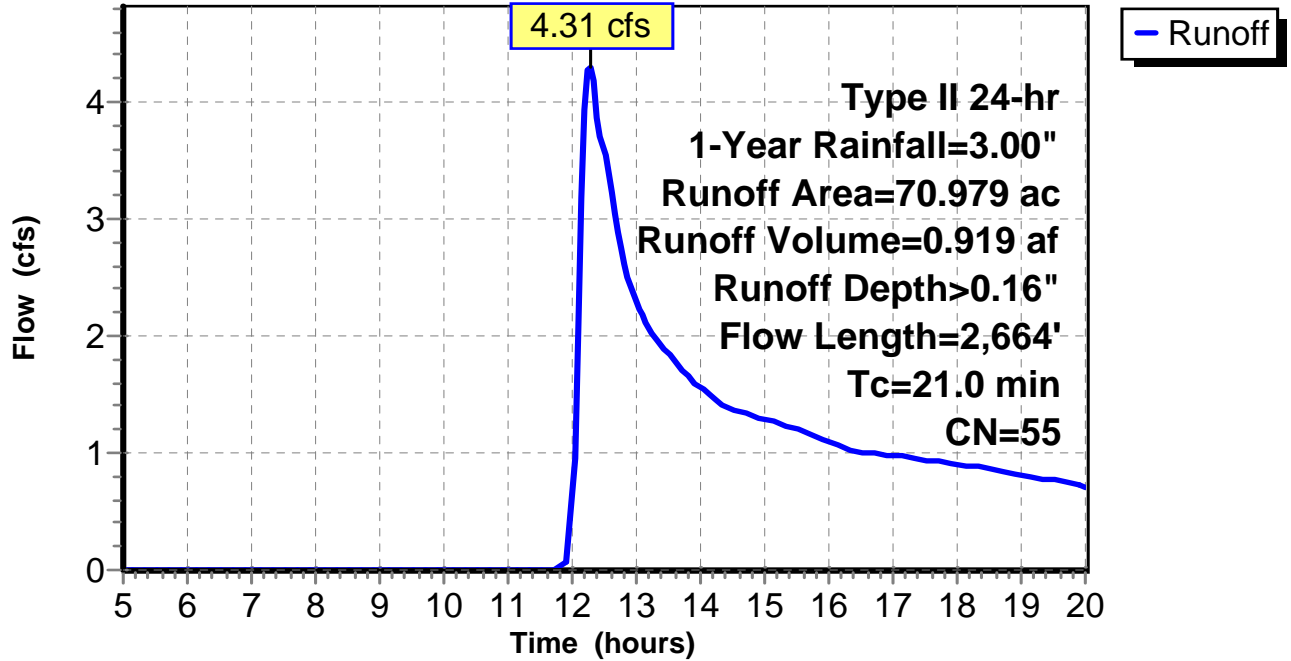
Subcatchment 1: C AR-310.001

Hydrograph



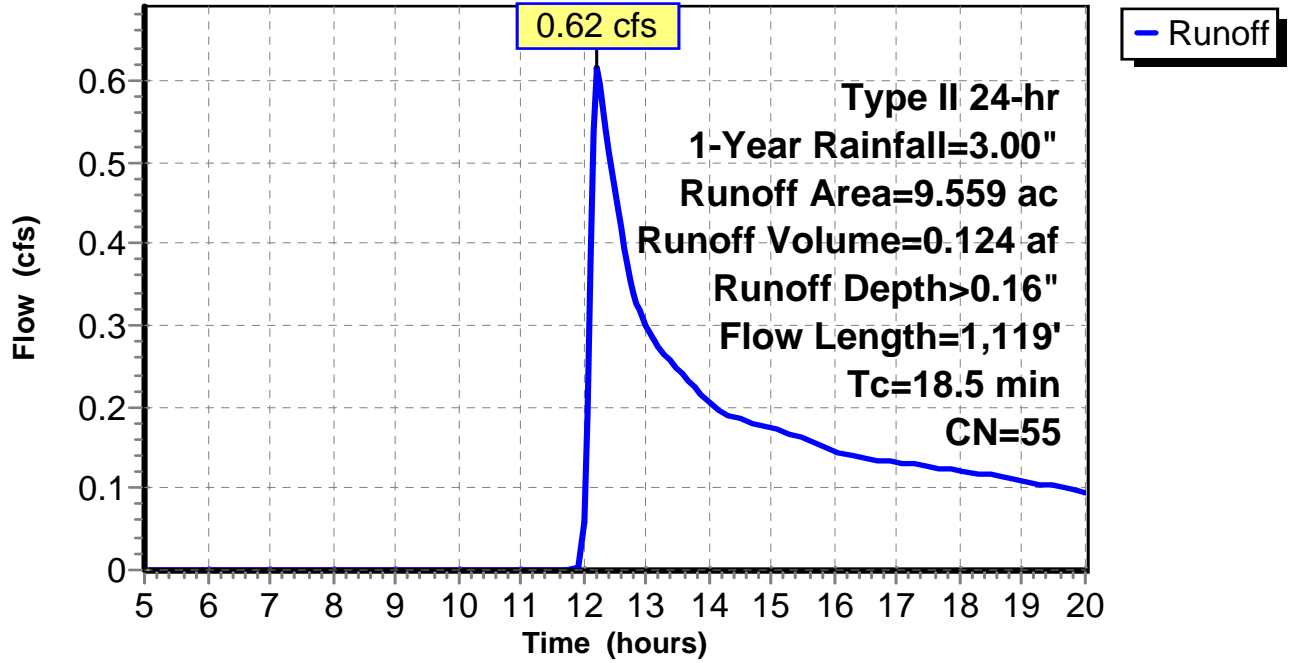
Subcatchment 2: C AR-310.002

Hydrograph



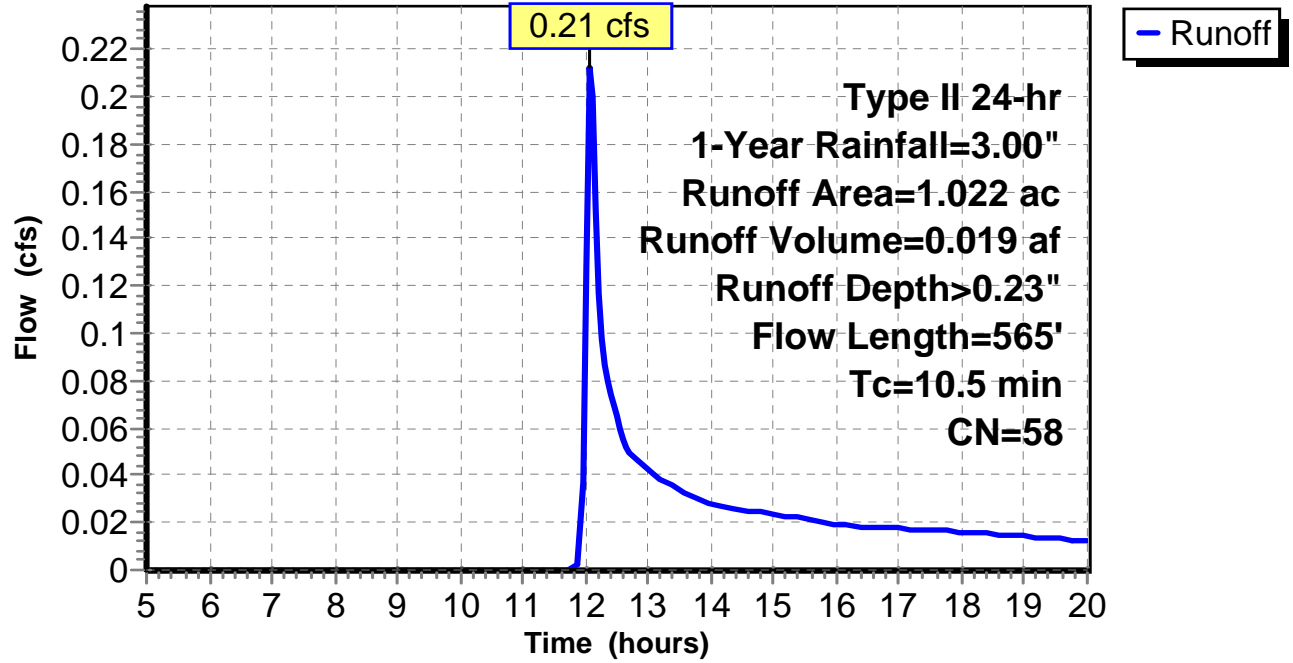
Subcatchment 3: C AR-310.003

Hydrograph



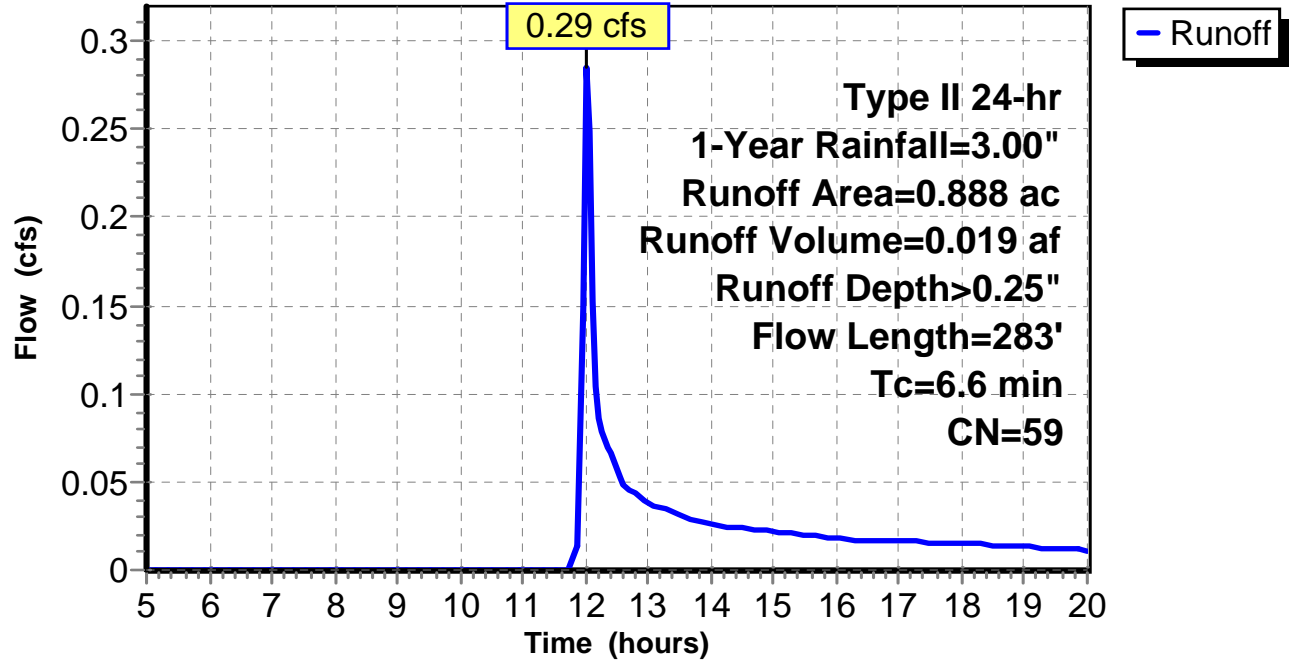
Subcatchment 4: C E-155B.001

Hydrograph



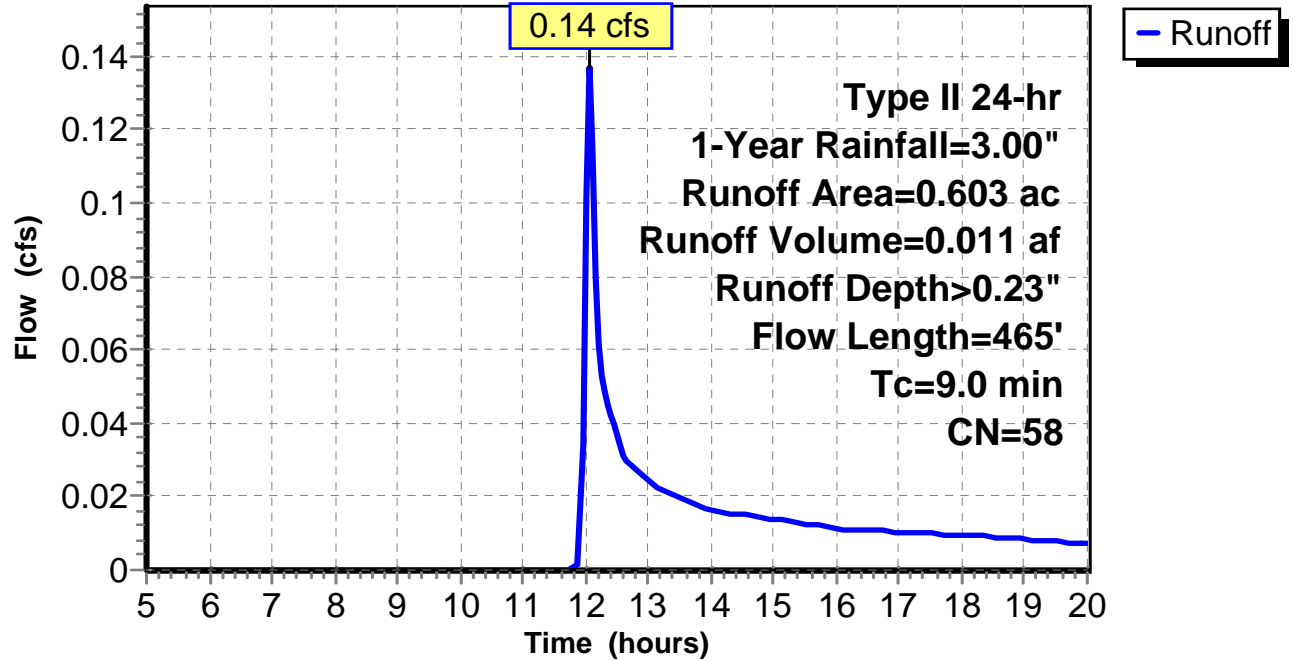
Subcatchment 5: C E-155B.002

Hydrograph



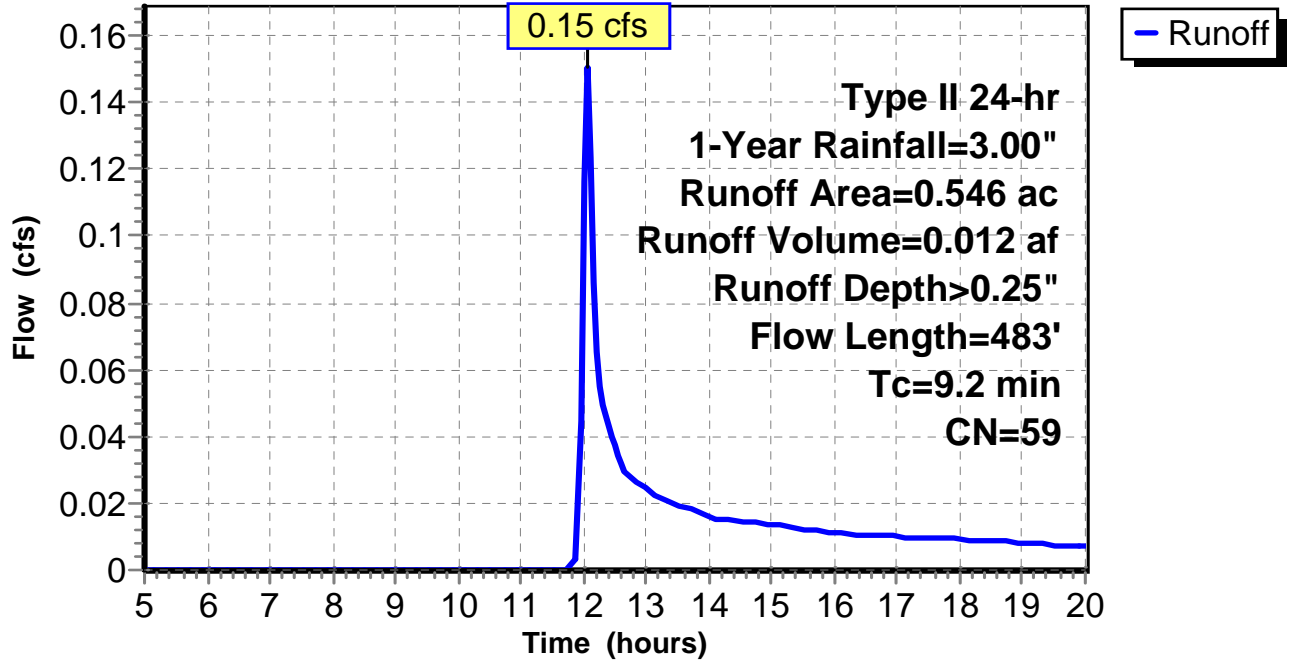
Subcatchment 6: C E-155B.003

Hydrograph



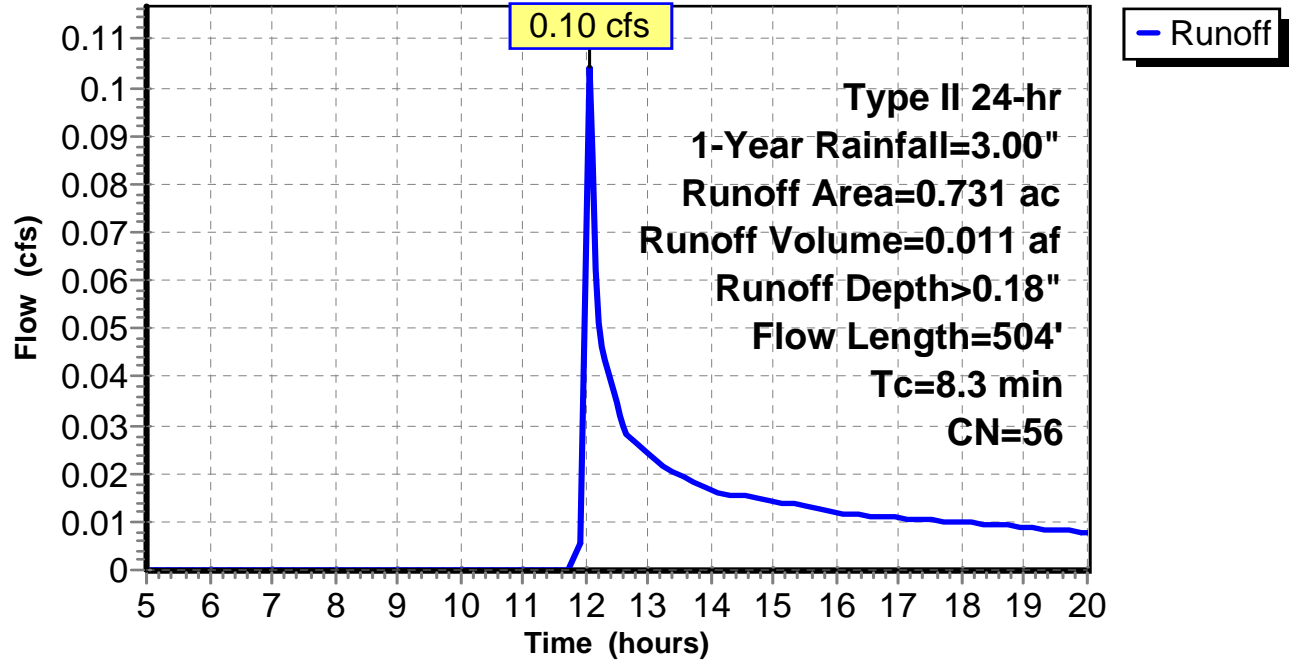
Subcatchment 7: C E-155B.004

Hydrograph



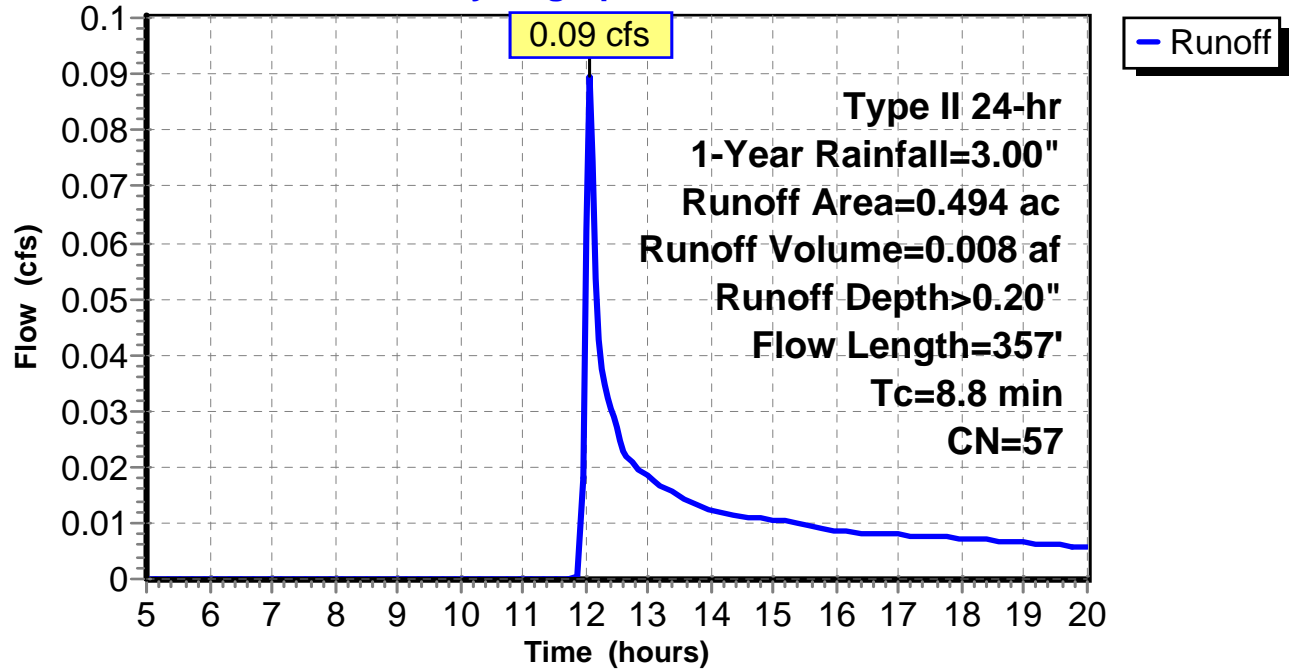
Subcatchment 8: C E-155B.005

Hydrograph



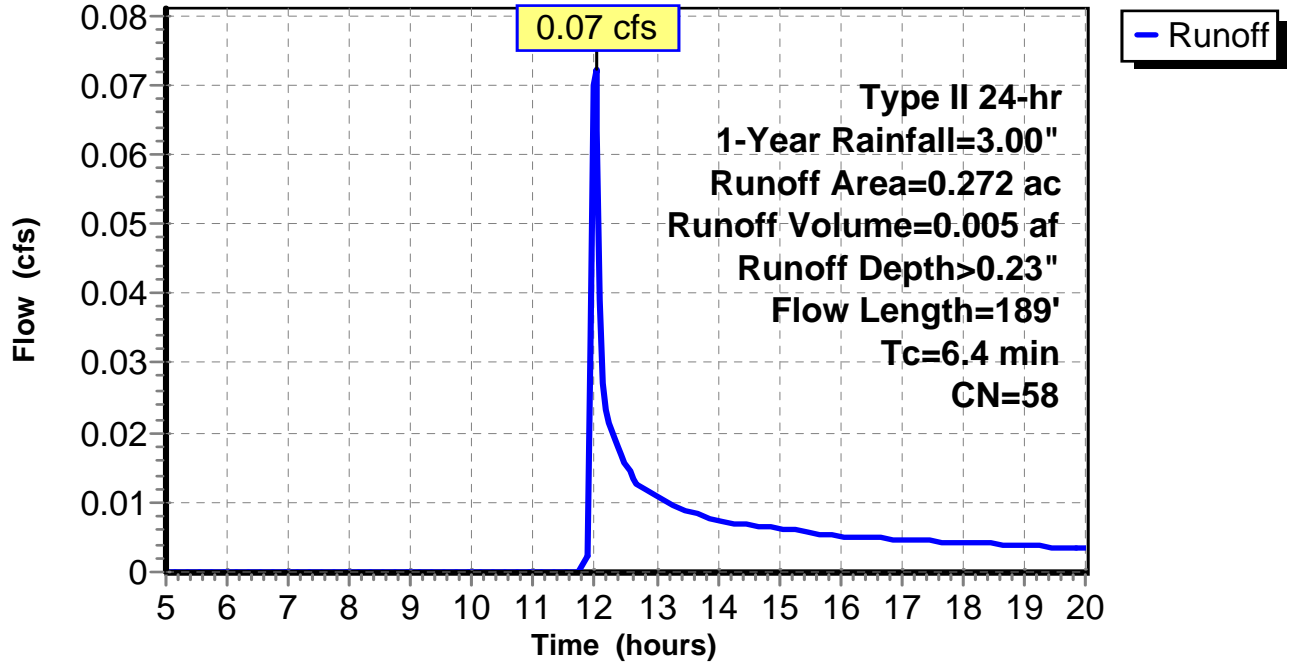
Subcatchment 9: C E-155B.006

Hydrograph



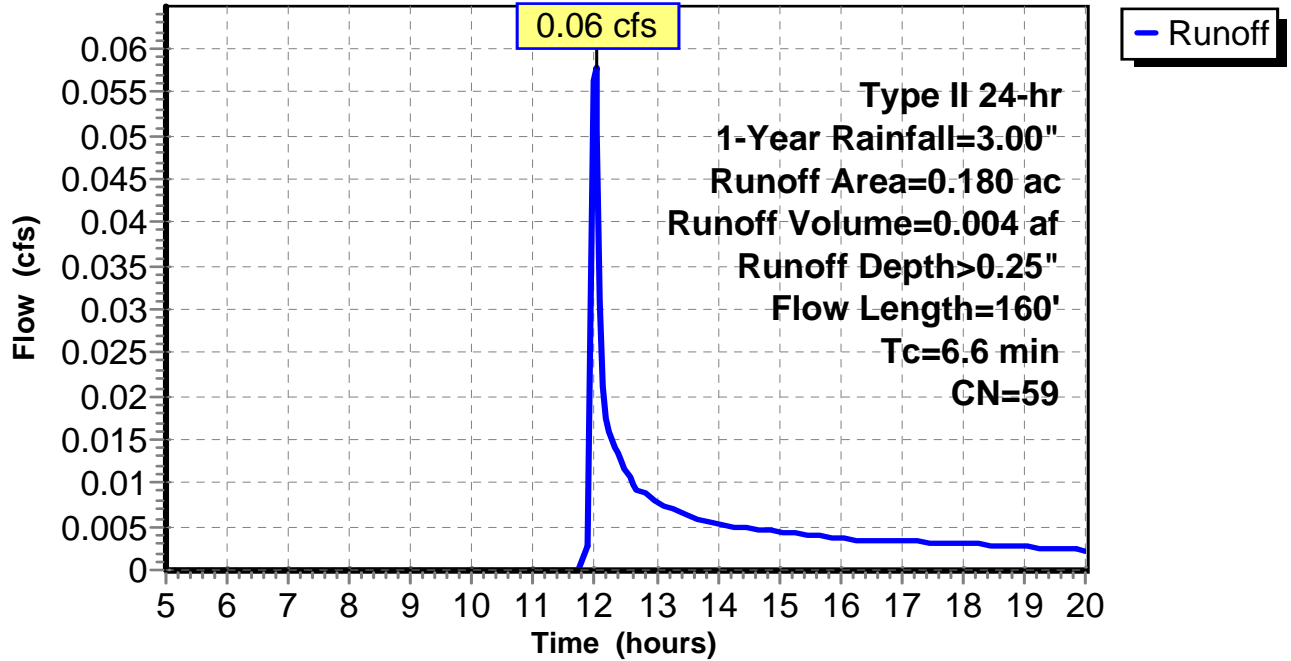
Subcatchment 10: C E-155B.007

Hydrograph



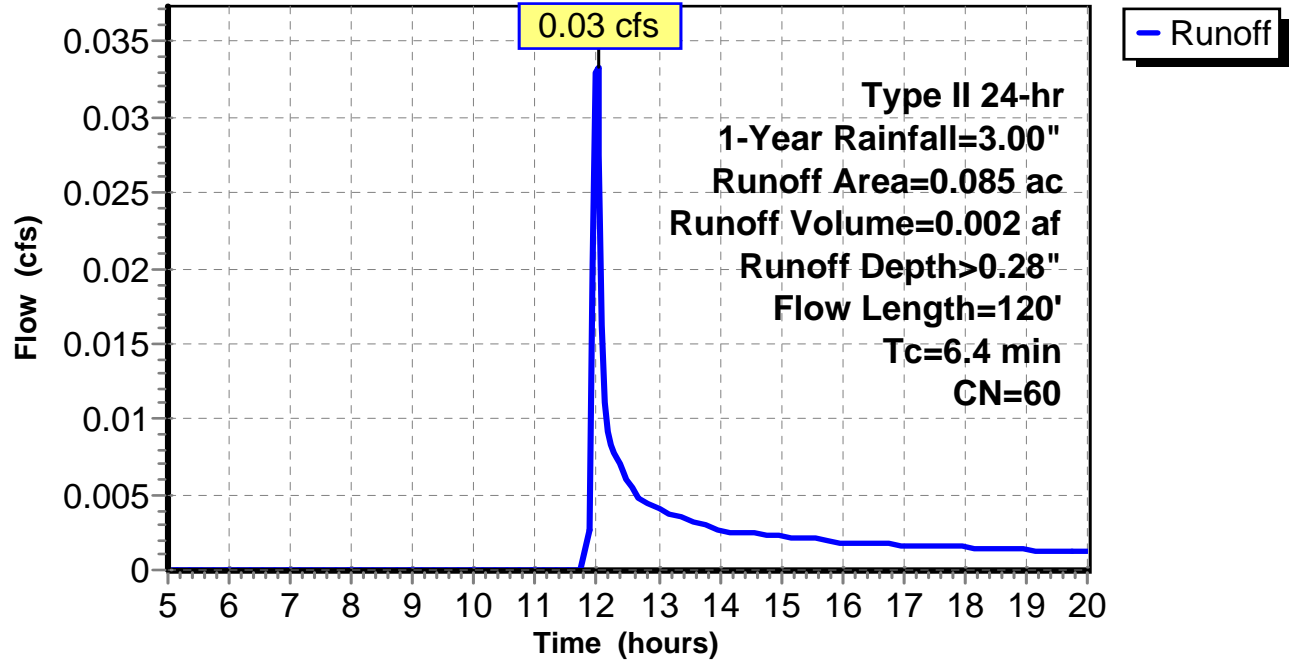
Subcatchment 11: C E-155B.008

Hydrograph



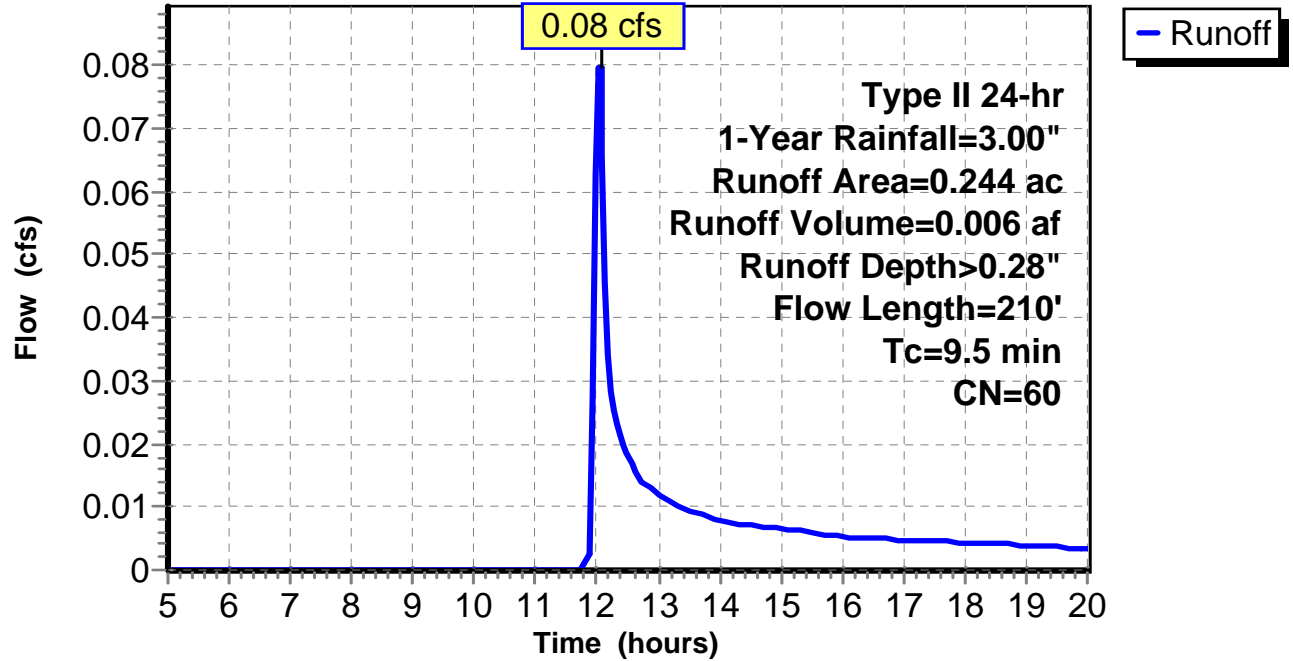
Subcatchment 12: C E-155B.009

Hydrograph



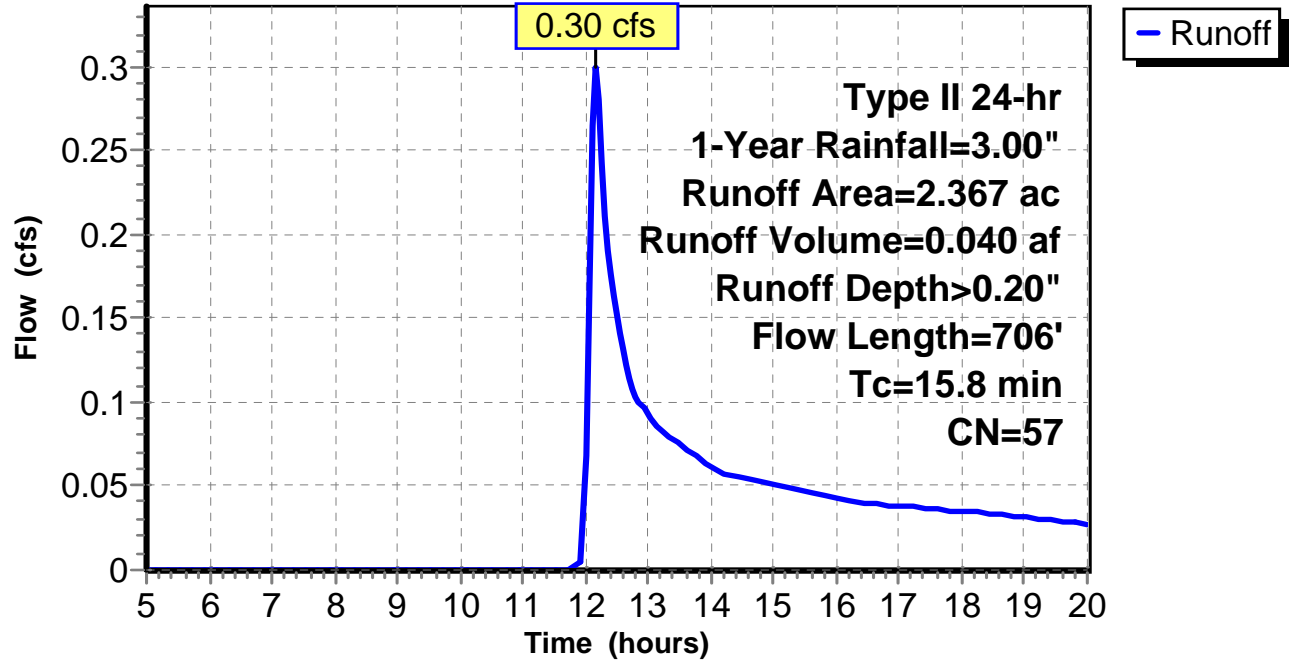
Subcatchment 13: C E-155B.010

Hydrograph



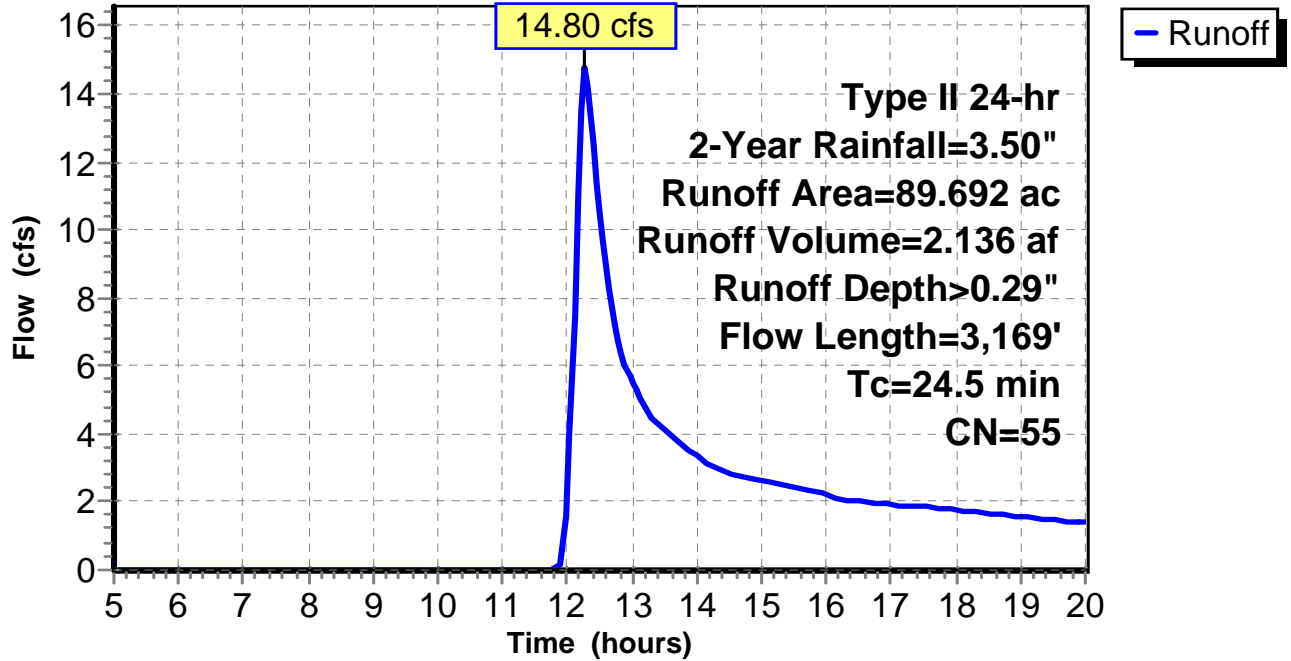
Subcatchment 14: C E-155B.011

Hydrograph



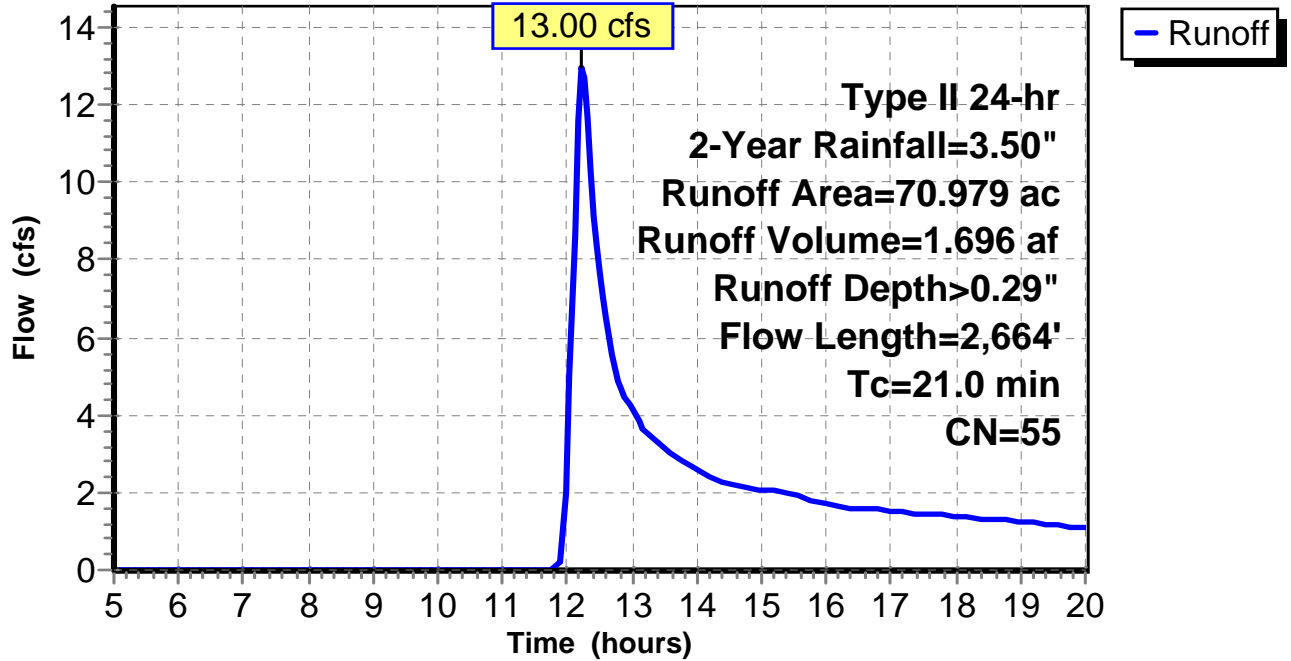
Subcatchment 1: C AR-310.001

Hydrograph



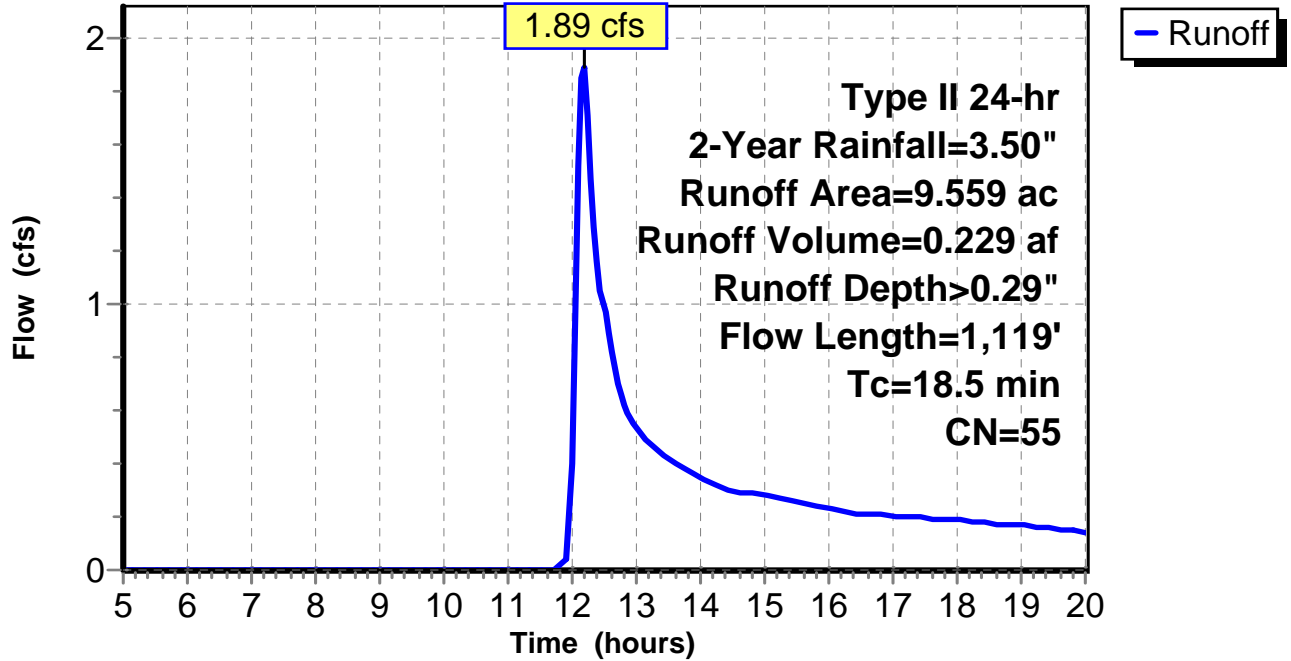
Subcatchment 2: C AR-310.002

Hydrograph



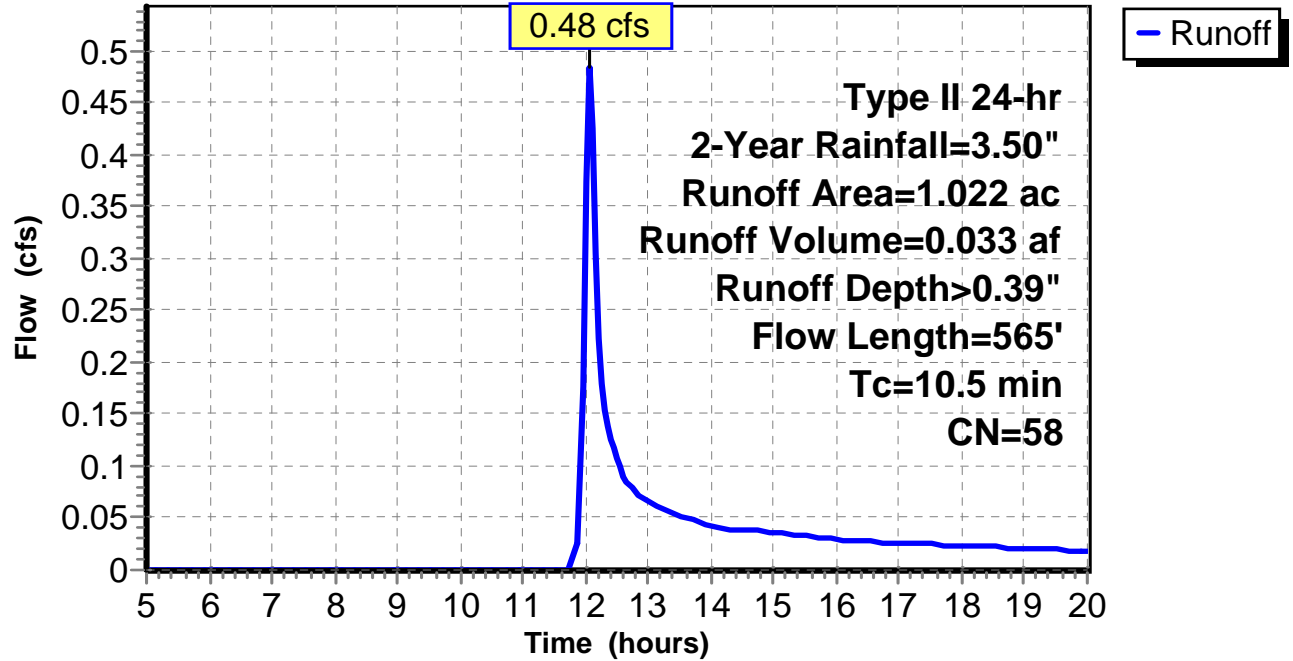
Subcatchment 3: C AR-310.003

Hydrograph



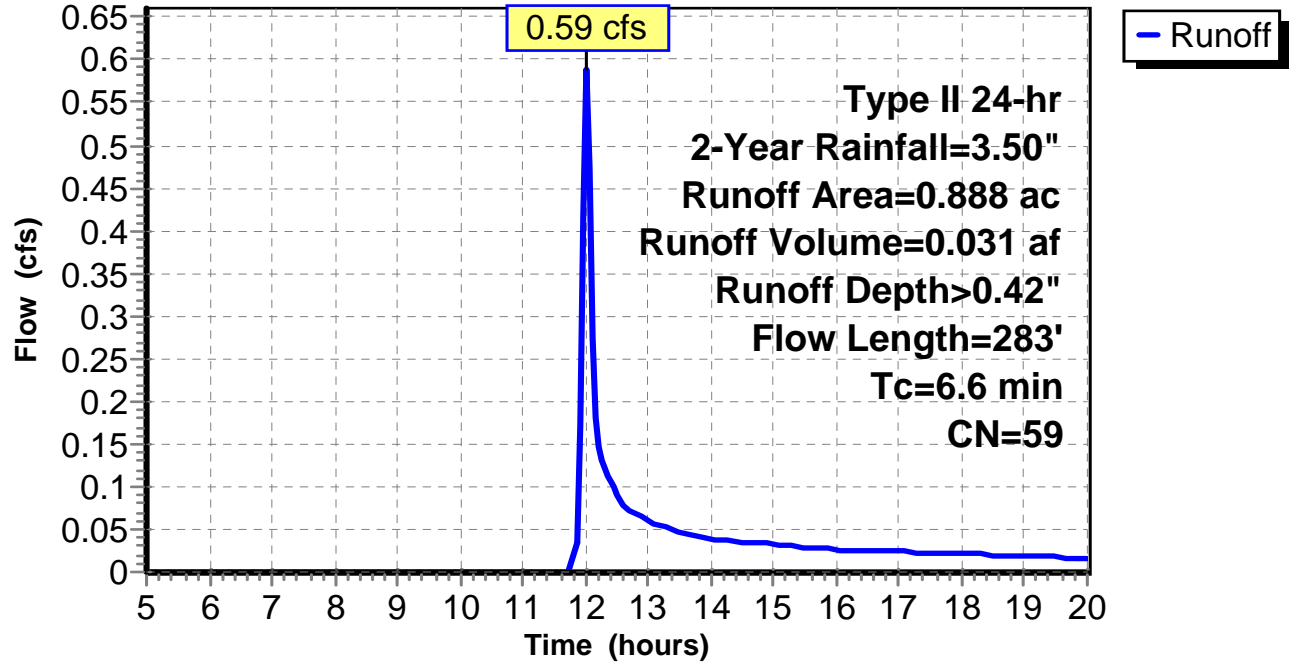
Subcatchment 4: C E-155B.001

Hydrograph



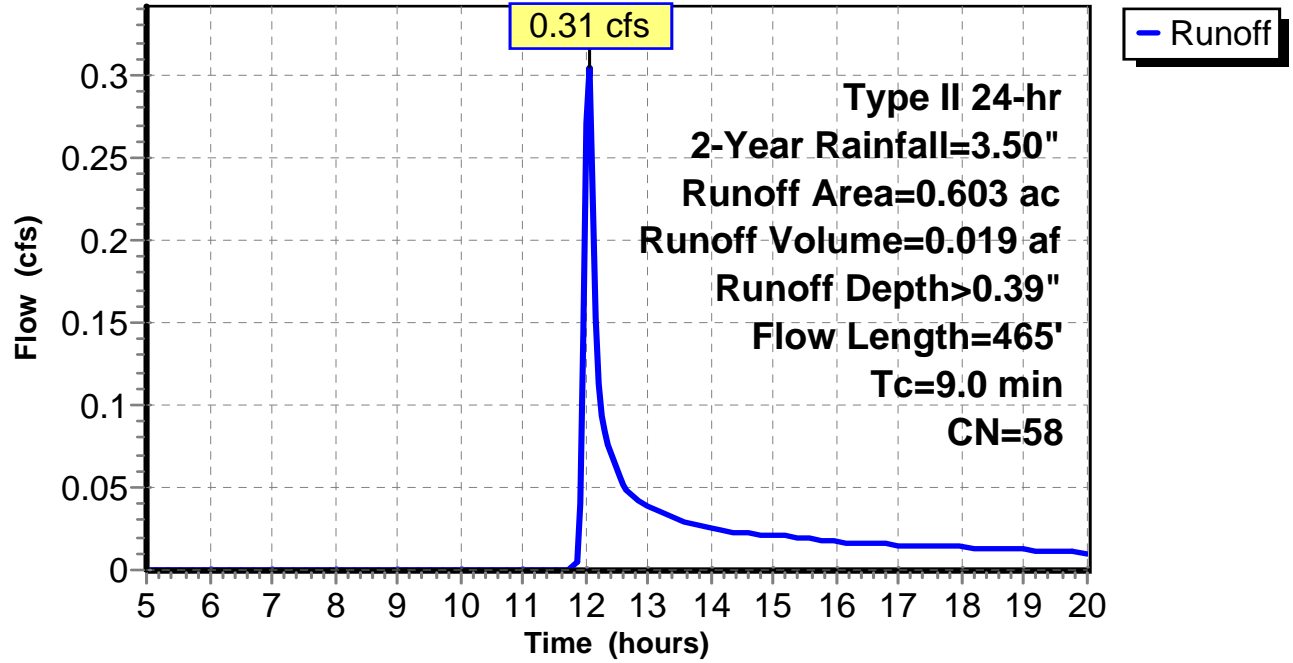
Subcatchment 5: C E-155B.002

Hydrograph



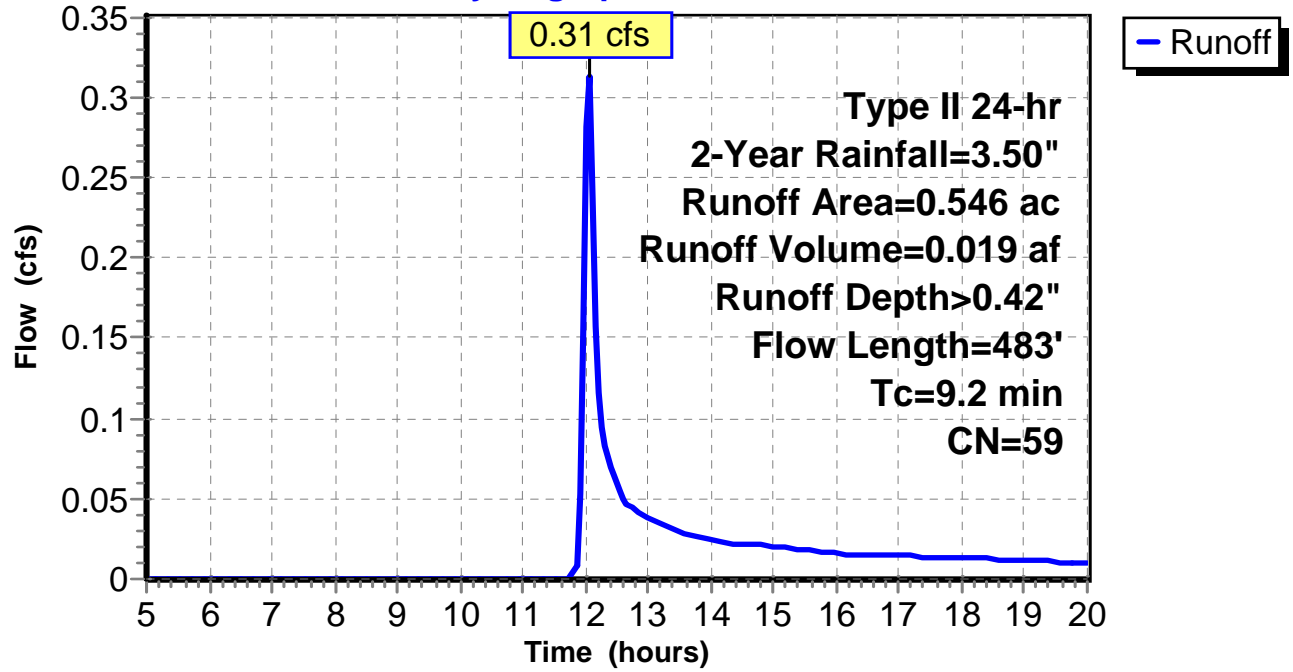
Subcatchment 6: C E-155B.003

Hydrograph



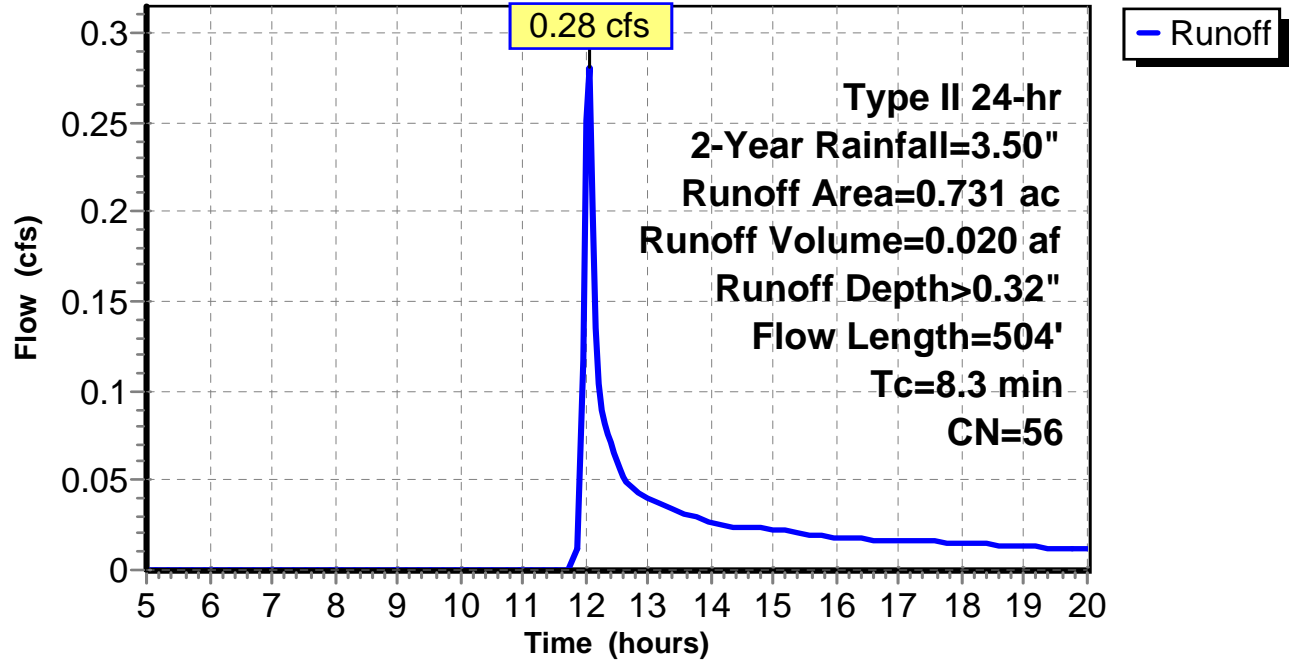
Subcatchment 7: C E-155B.004

Hydrograph



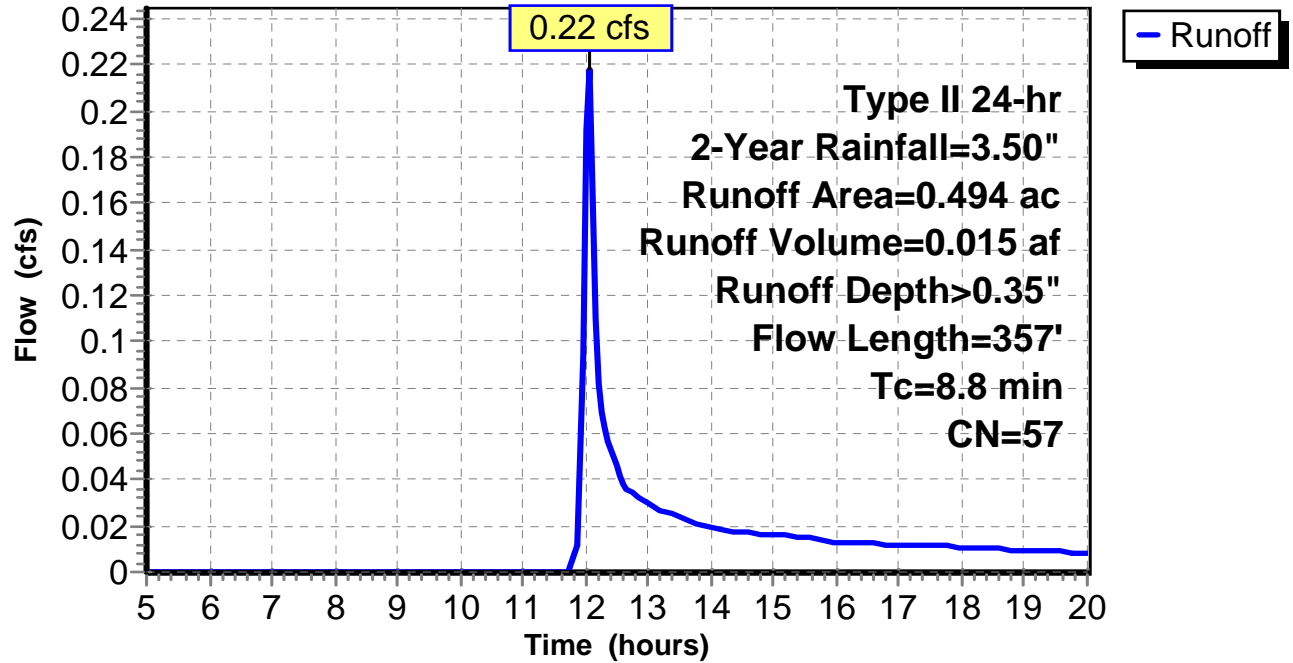
Subcatchment 8: C E-155B.005

Hydrograph



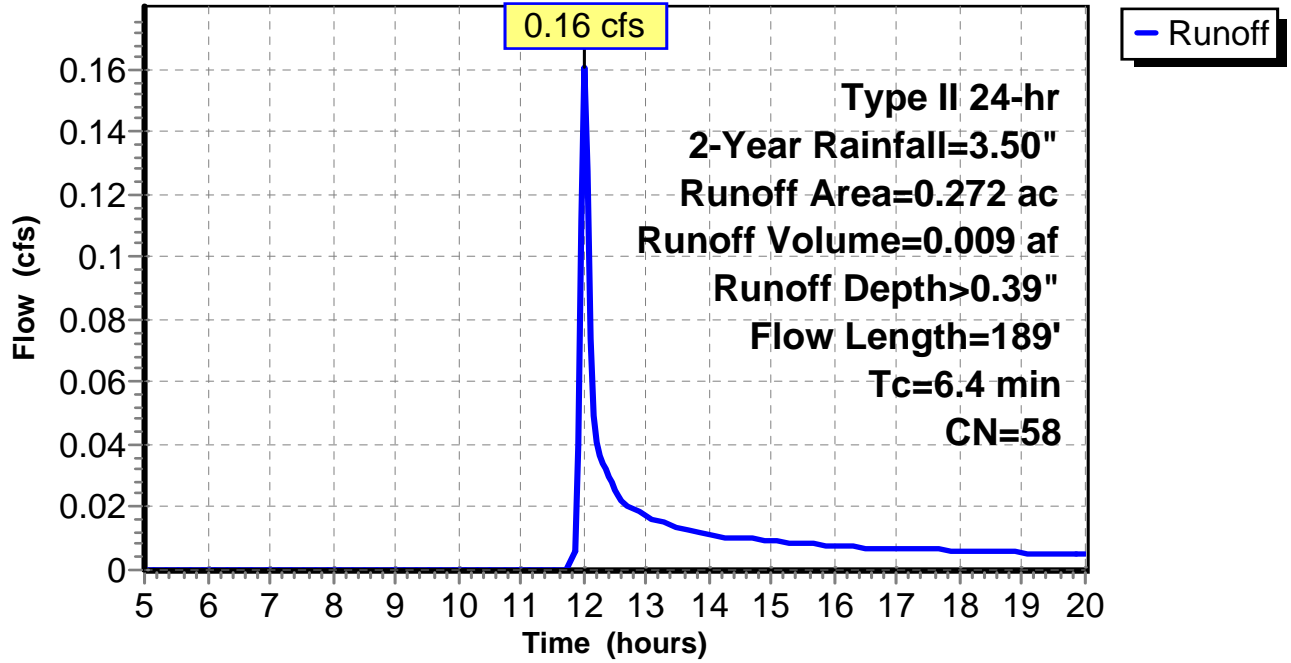
Subcatchment 9: C E-155B.006

Hydrograph



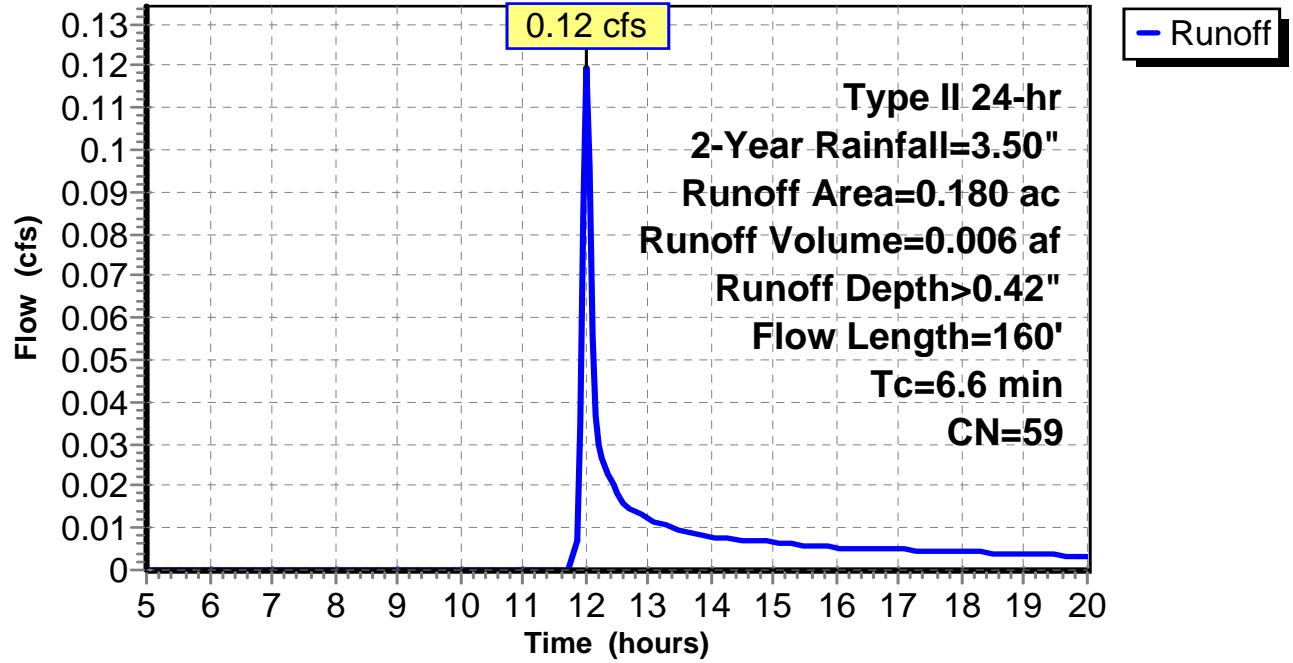
Subcatchment 10: C E-155B.007

Hydrograph



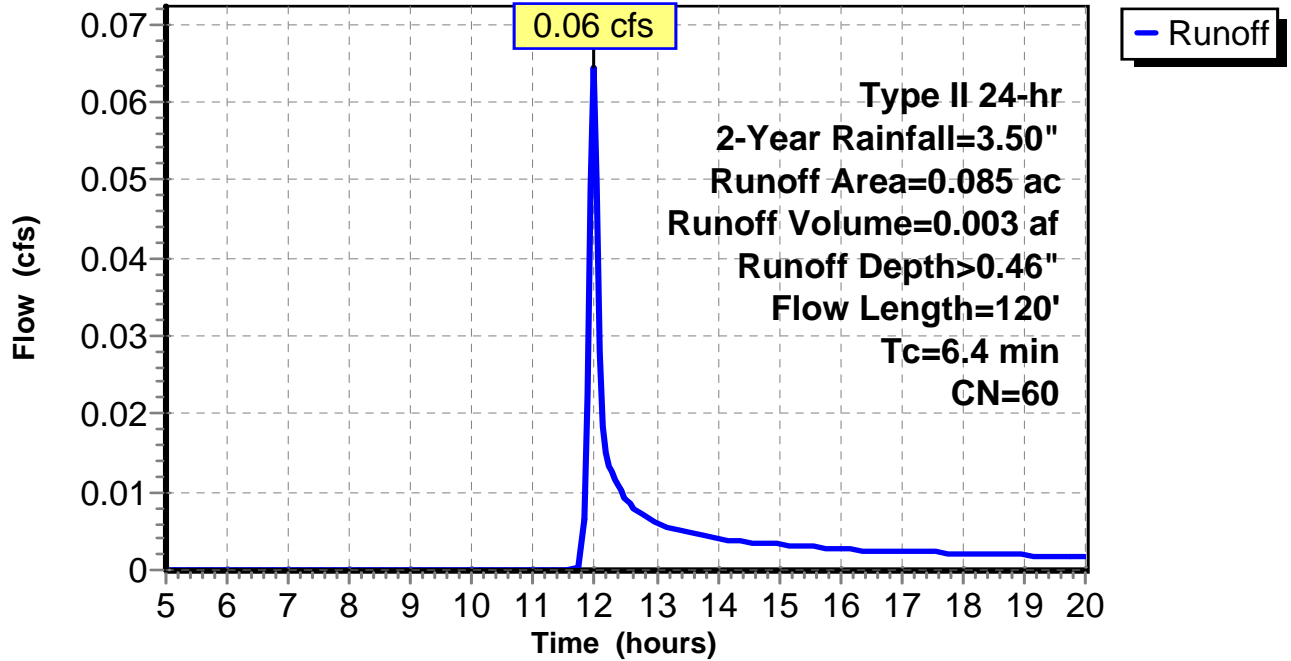
Subcatchment 11: C E-155B.008

Hydrograph



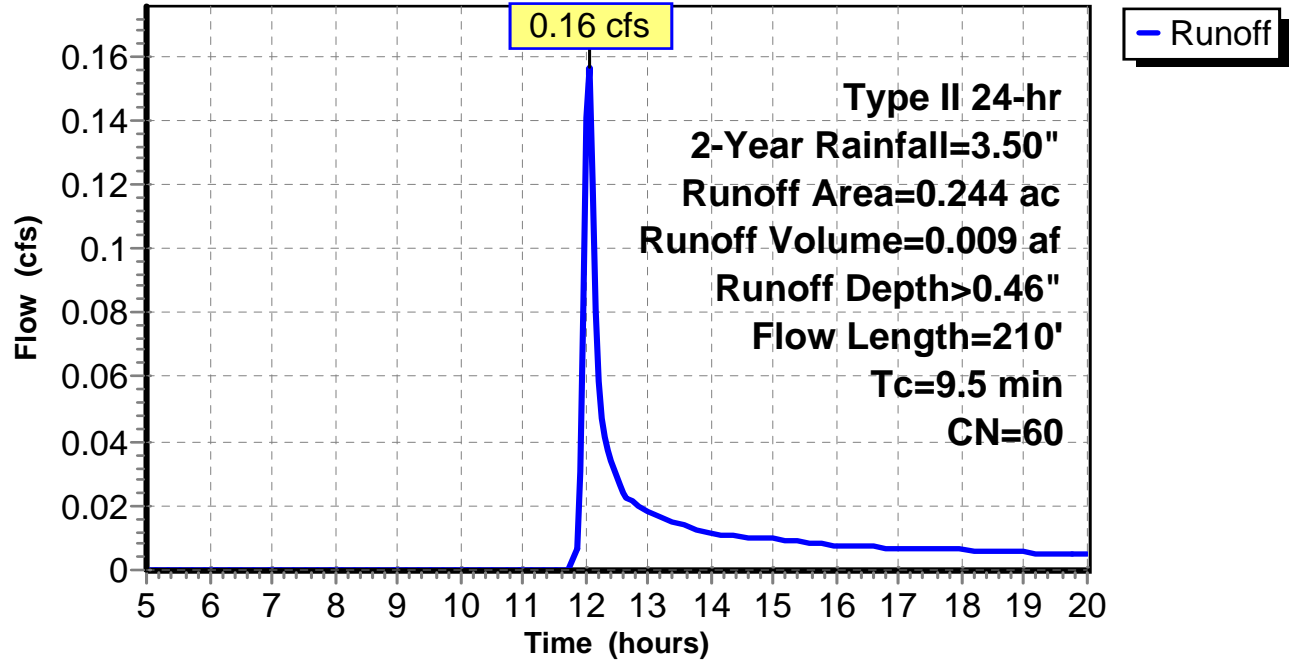
Subcatchment 12: C E-155B.009

Hydrograph



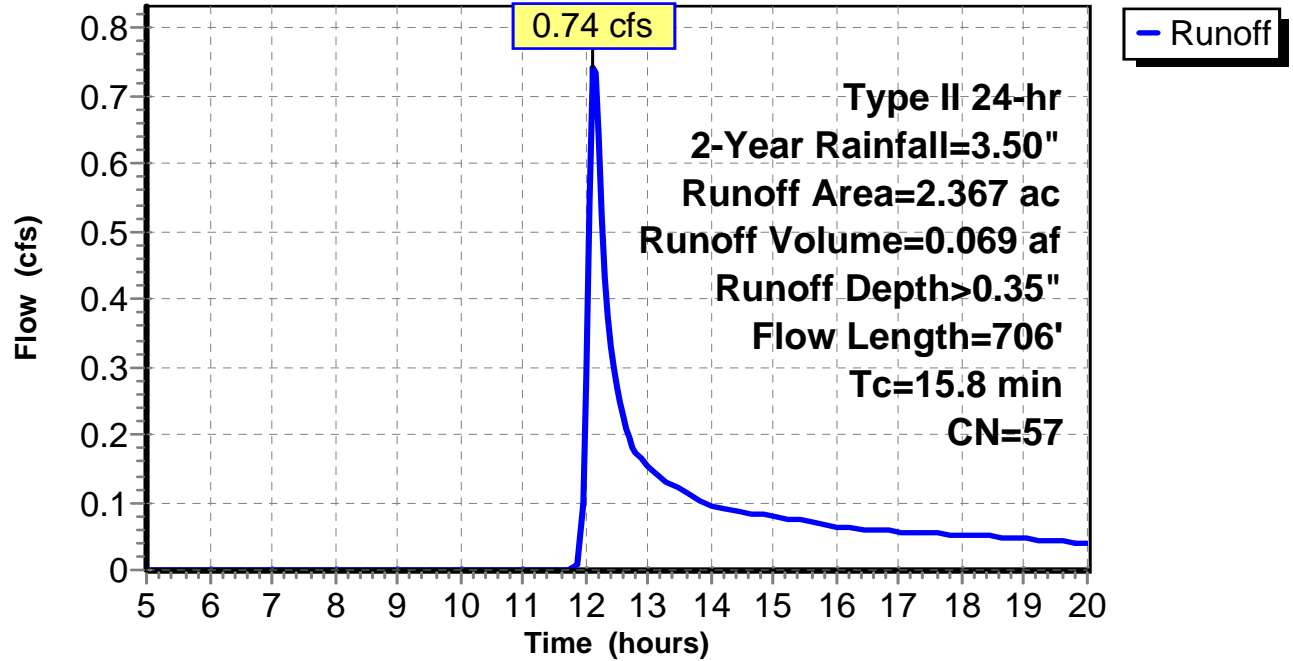
Subcatchment 13: C E-155B.010

Hydrograph



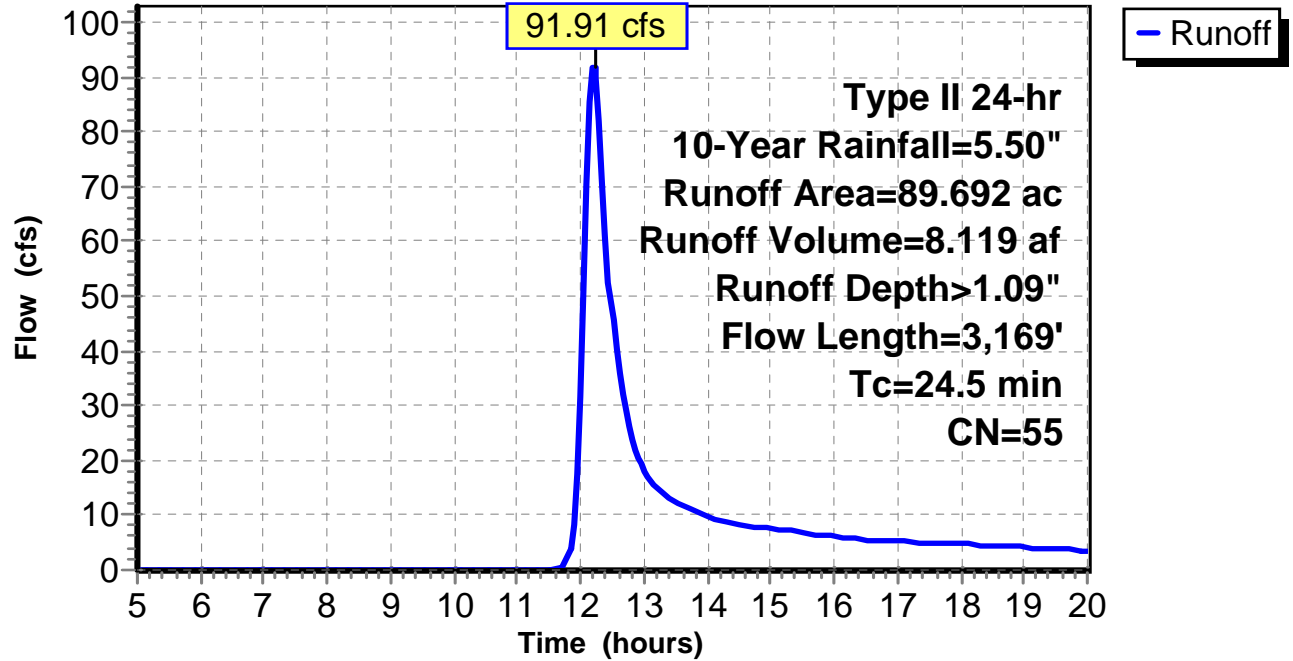
Subcatchment 14: C E-155B.011

Hydrograph



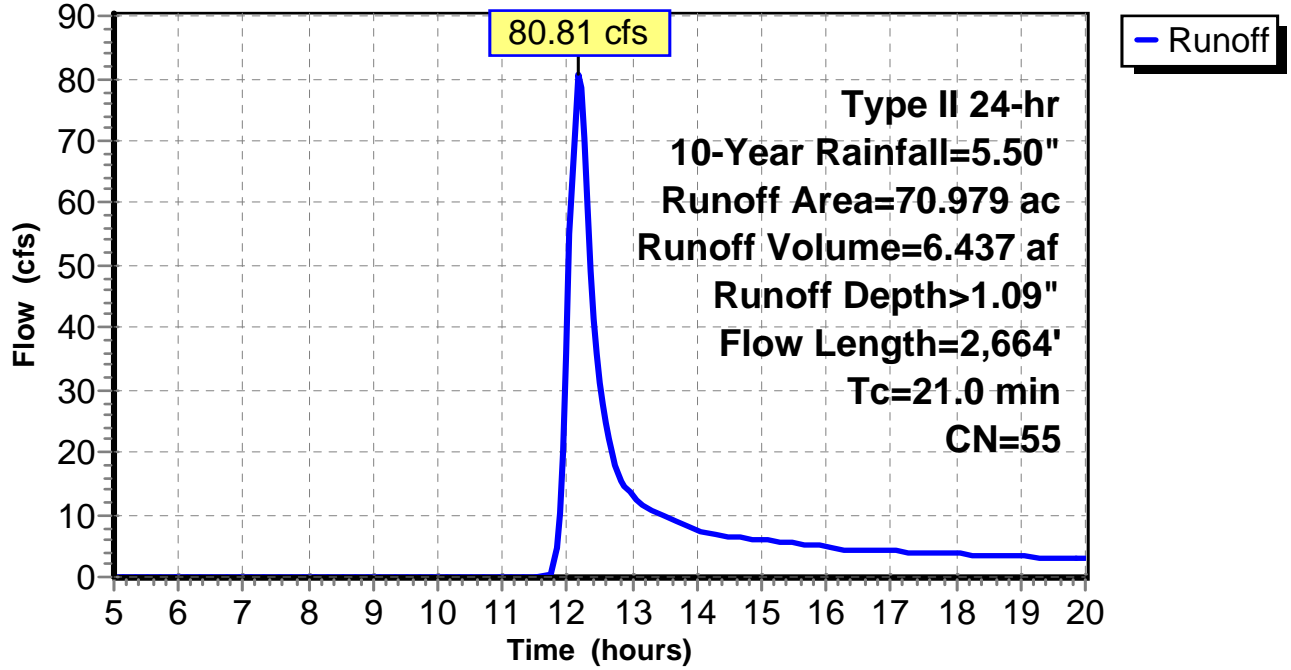
Subcatchment 1: C AR-310.001

Hydrograph



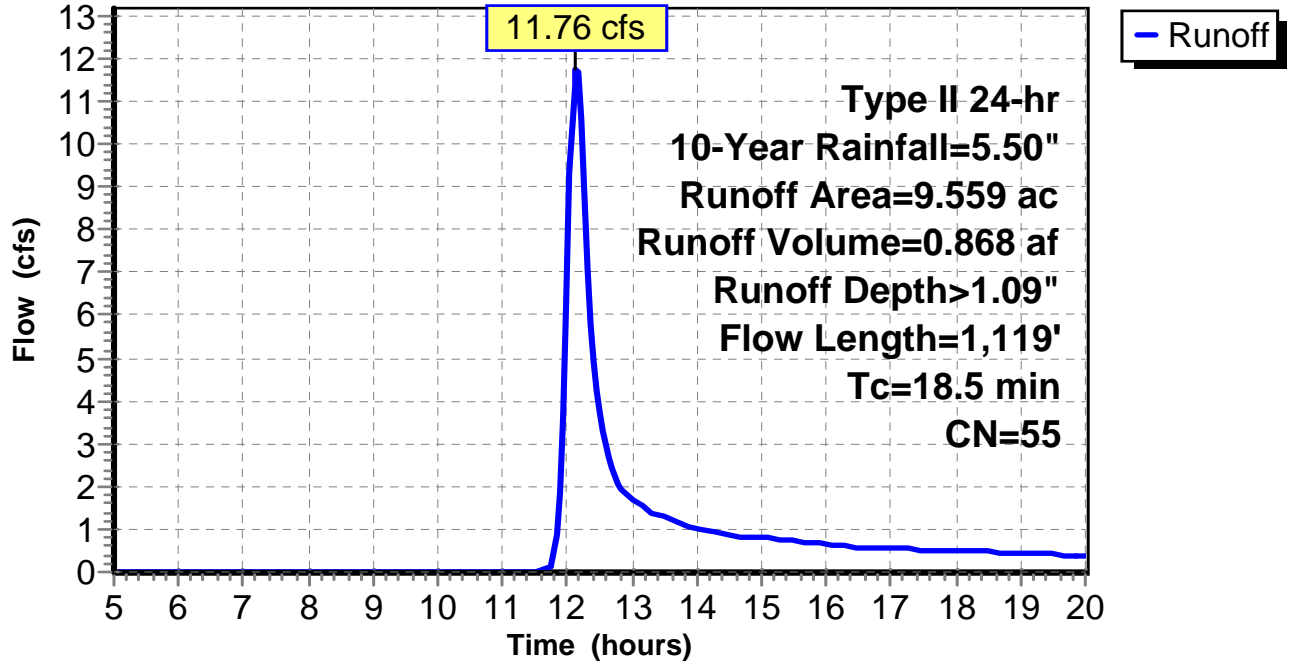
Subcatchment 2: C AR-310.002

Hydrograph



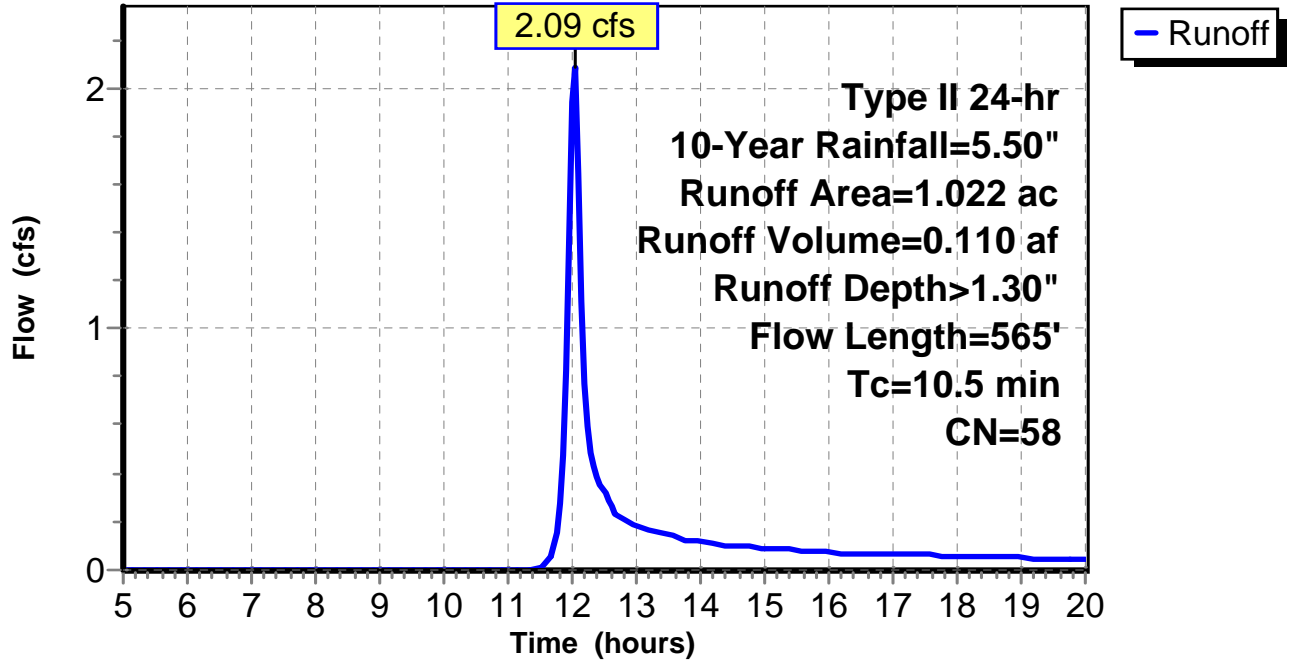
Subcatchment 3: C AR-310.003

Hydrograph



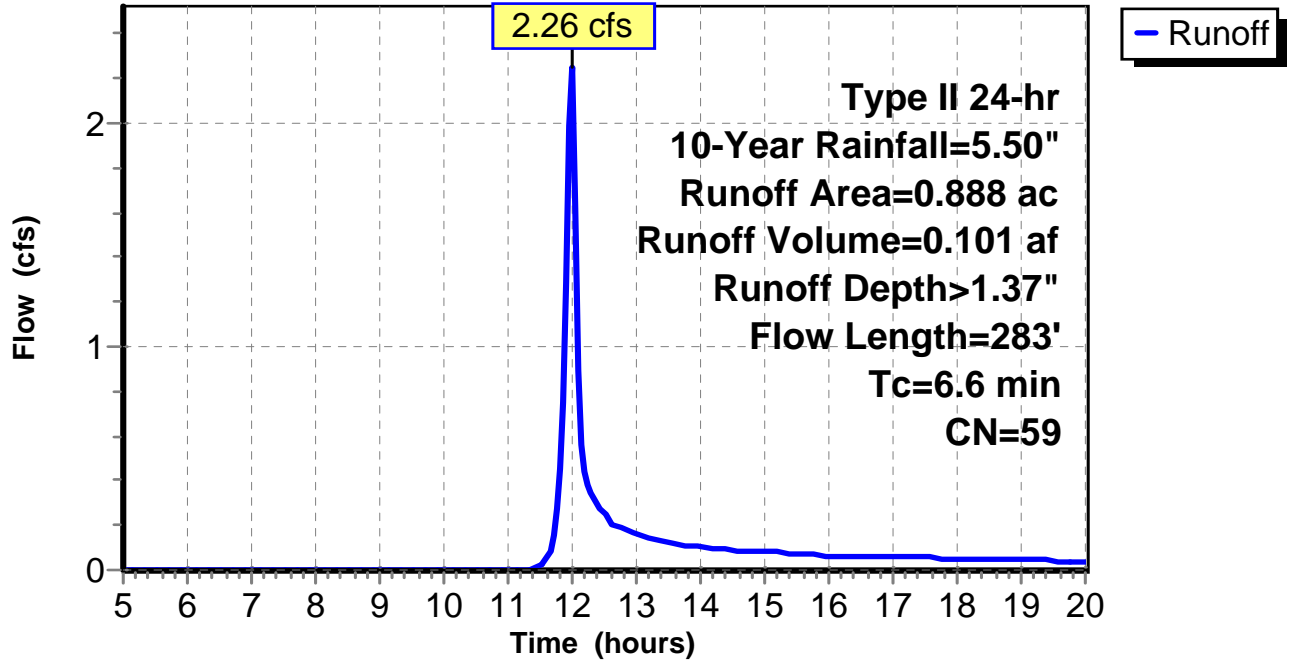
Subcatchment 4: C E-155B.001

Hydrograph



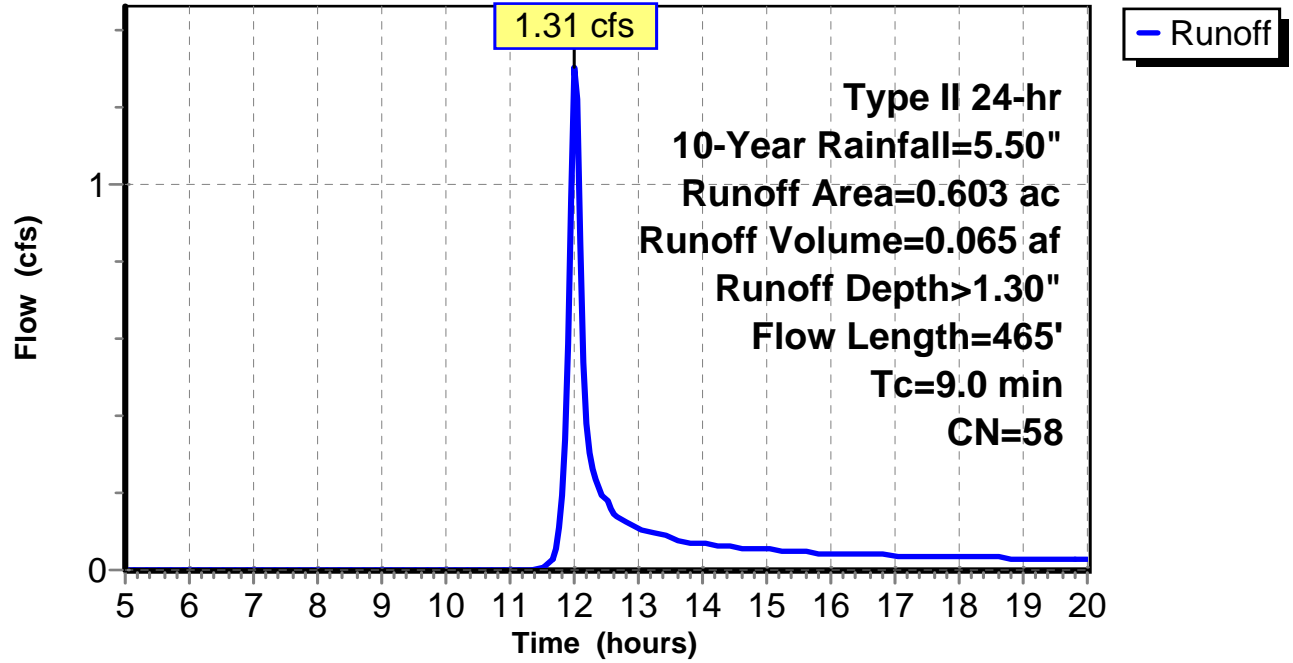
Subcatchment 5: C E-155B.002

Hydrograph



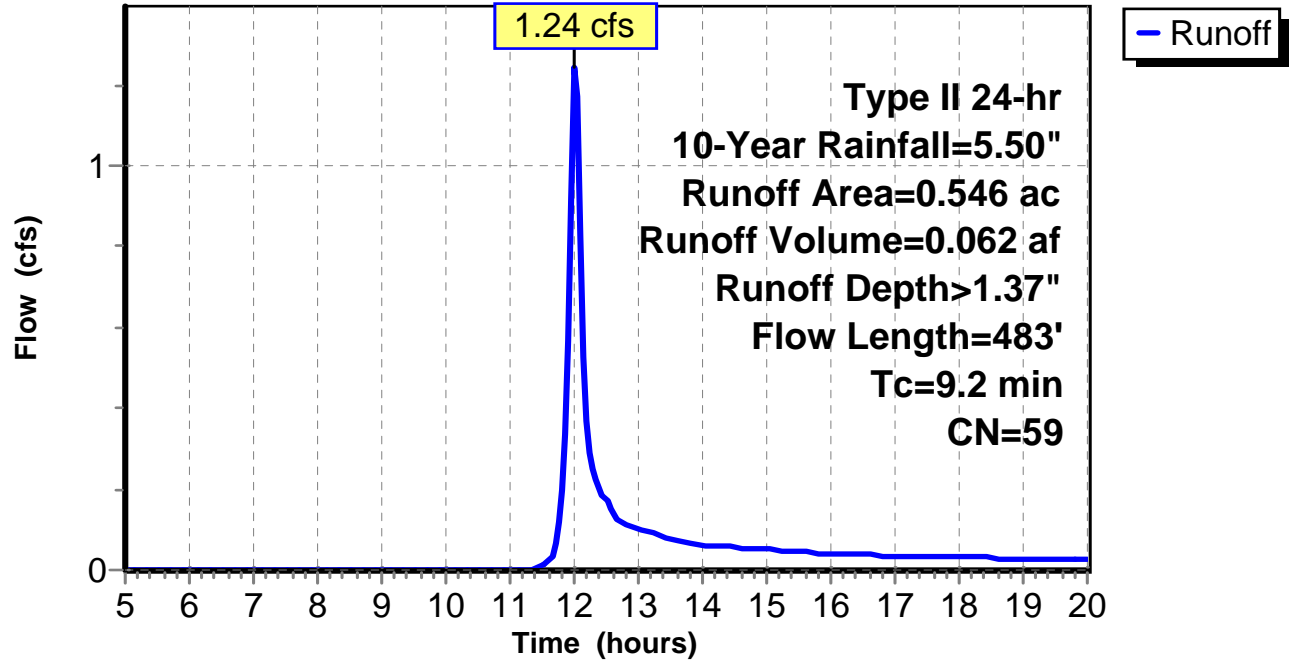
Subcatchment 6: C E-155B.003

Hydrograph



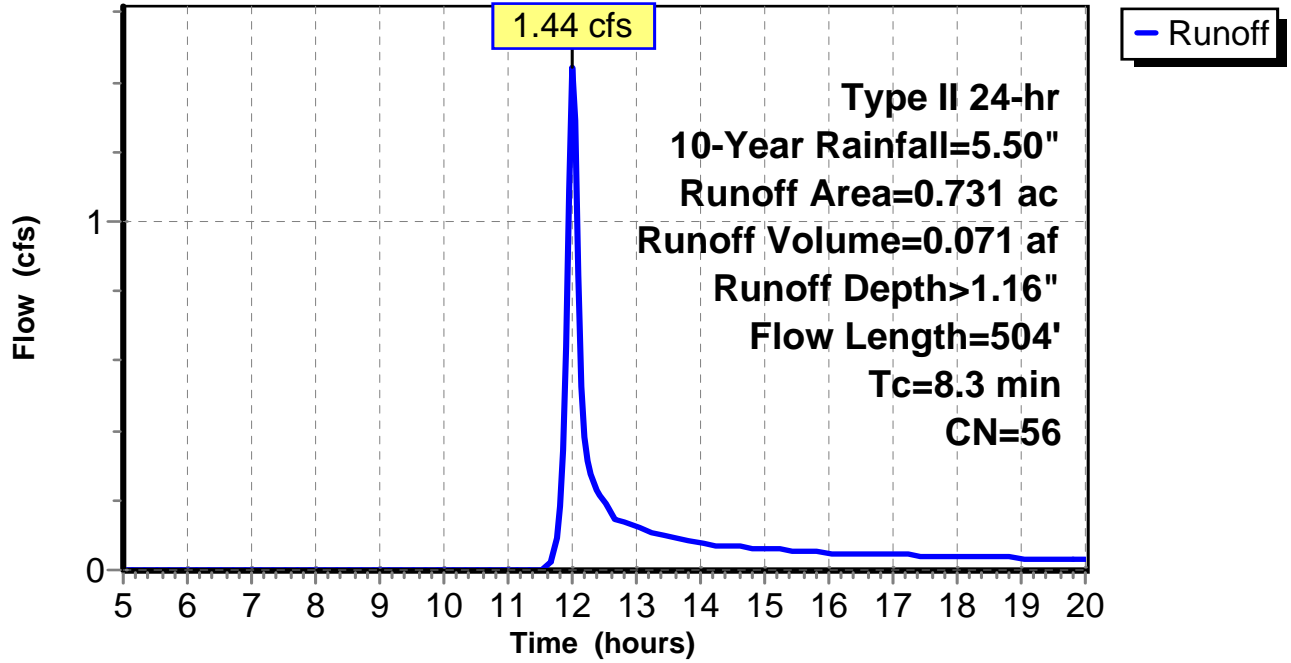
Subcatchment 7: C E-155B.004

Hydrograph



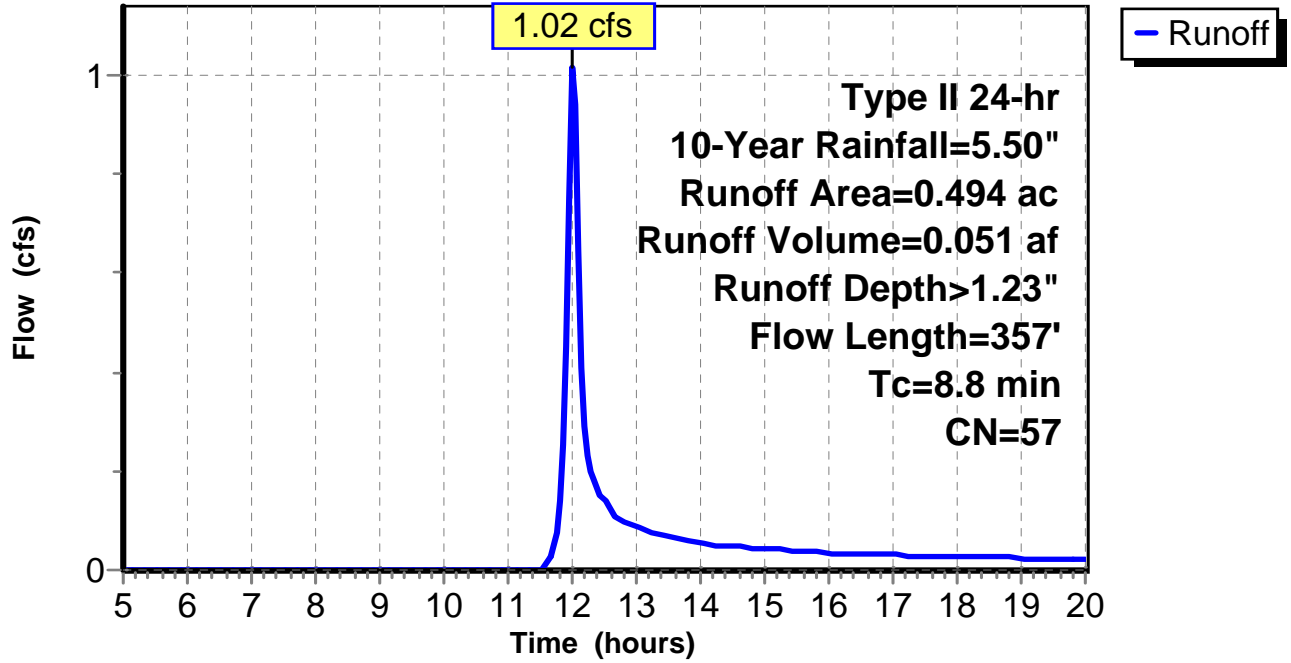
Subcatchment 8: C E-155B.005

Hydrograph



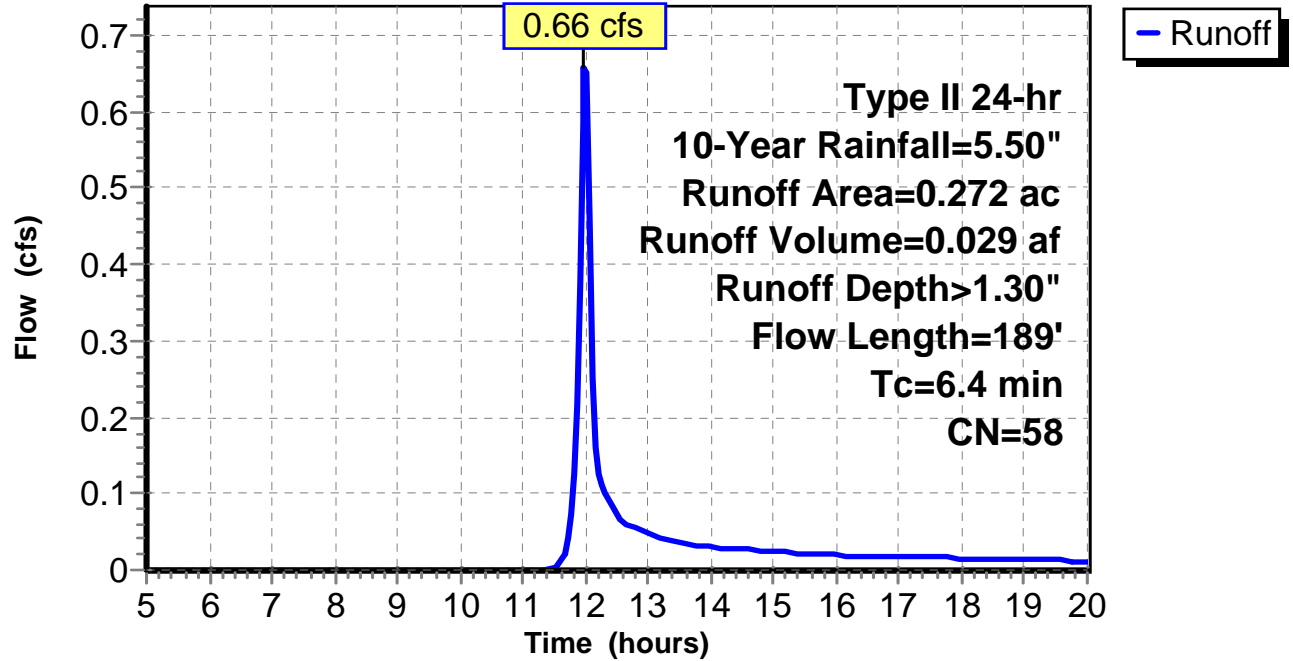
Subcatchment 9: C E-155B.006

Hydrograph



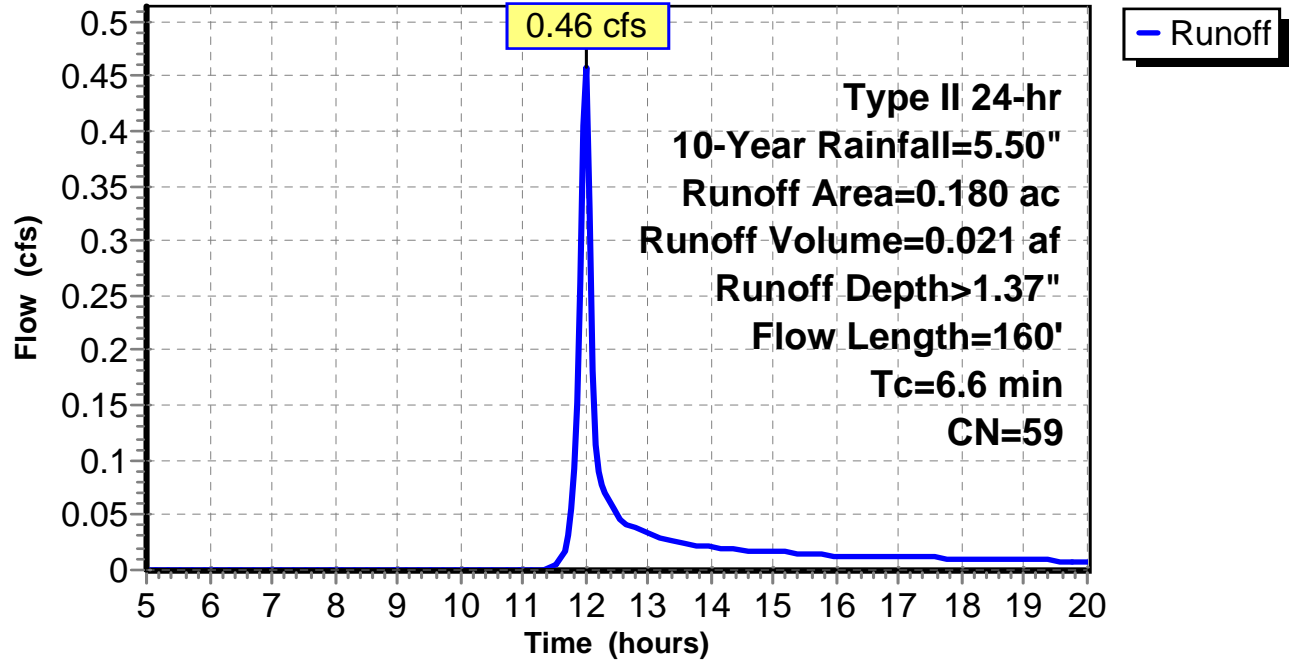
Subcatchment 10: C E-155B.007

Hydrograph



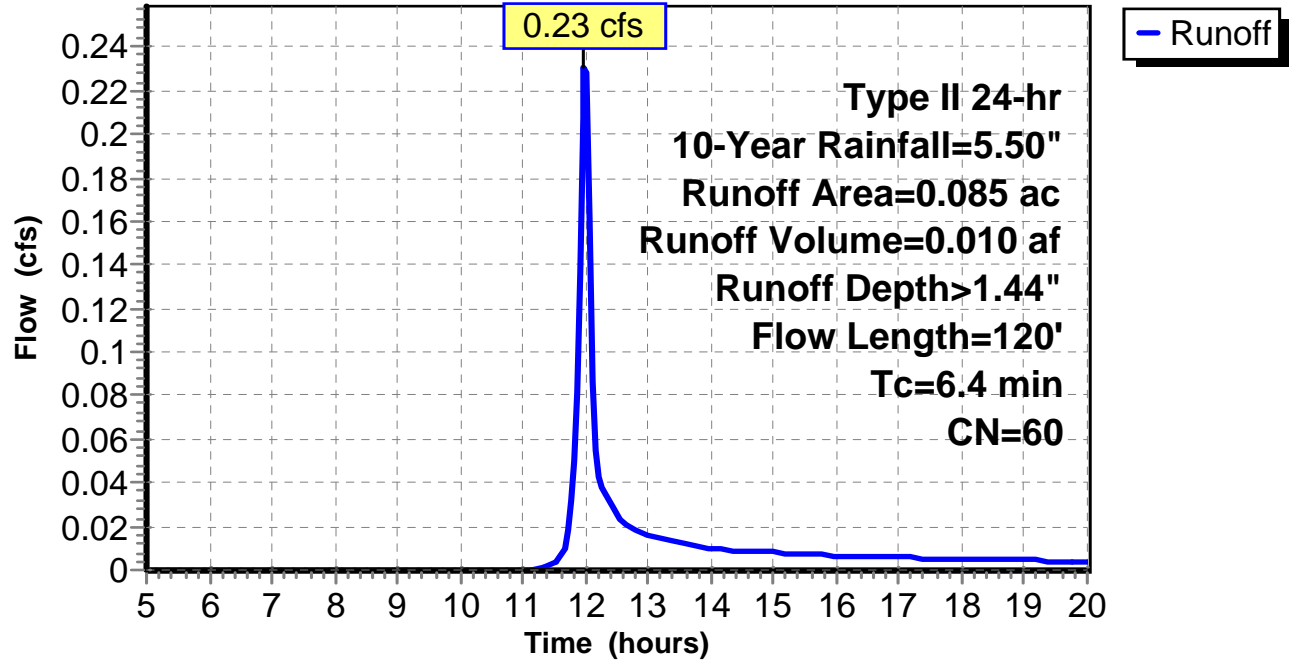
Subcatchment 11: C E-155B.008

Hydrograph



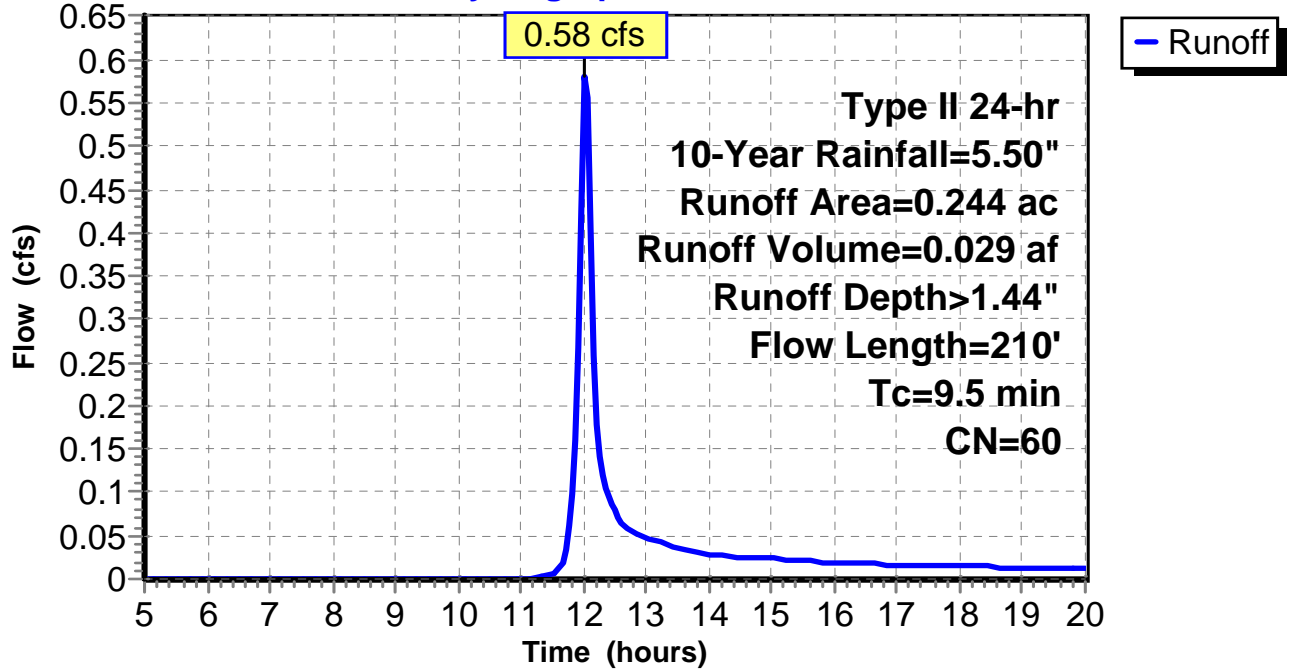
Subcatchment 12: C E-155B.009

Hydrograph



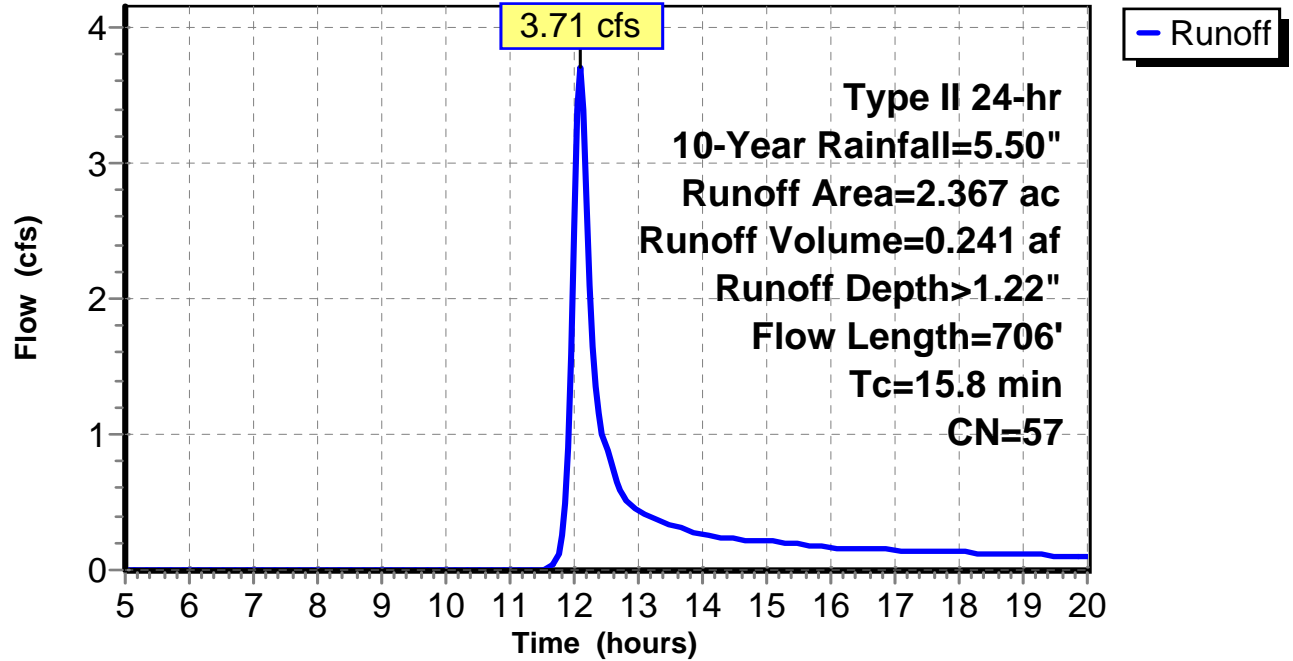
Subcatchment 13: C E-155B.010

Hydrograph



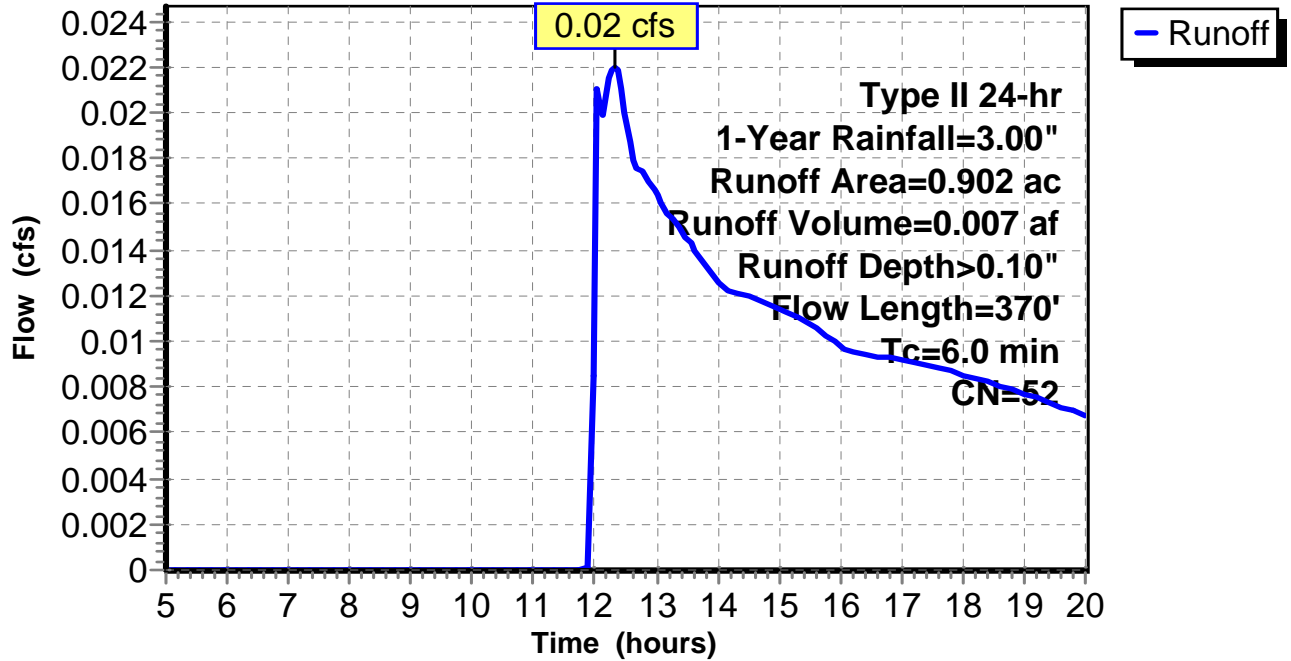
Subcatchment 14: C E-155B.011

Hydrograph



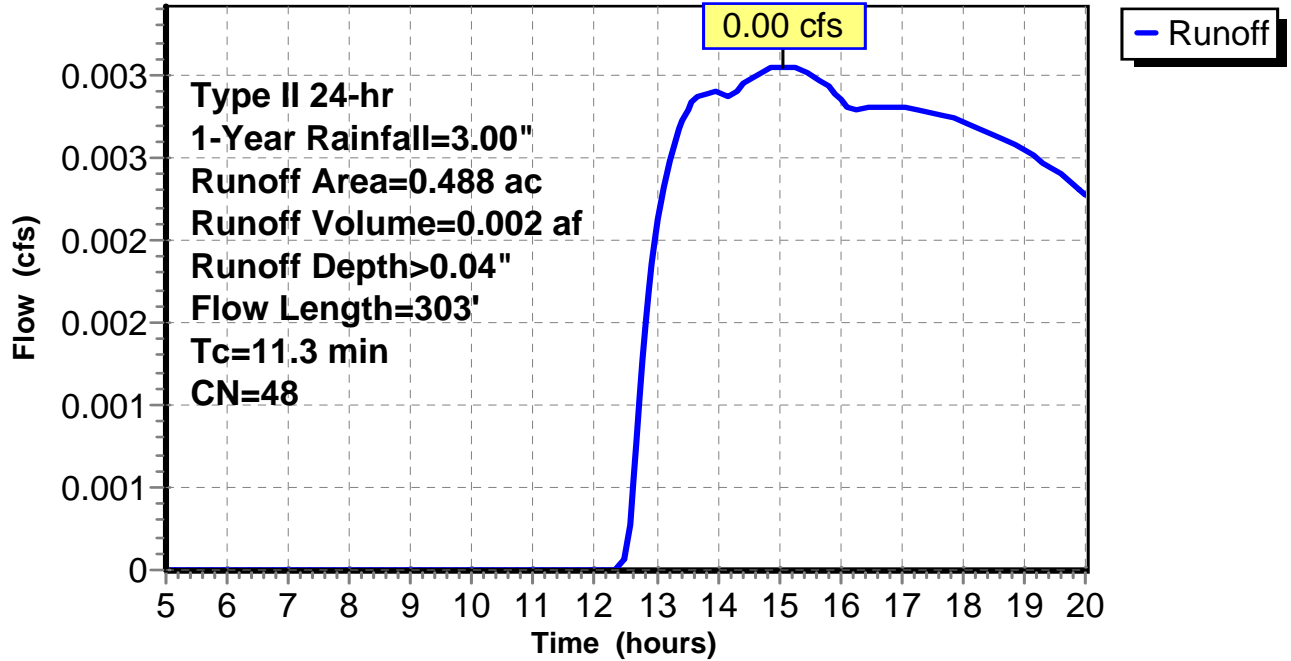
Subcatchment 1: C AR-500.001

Hydrograph



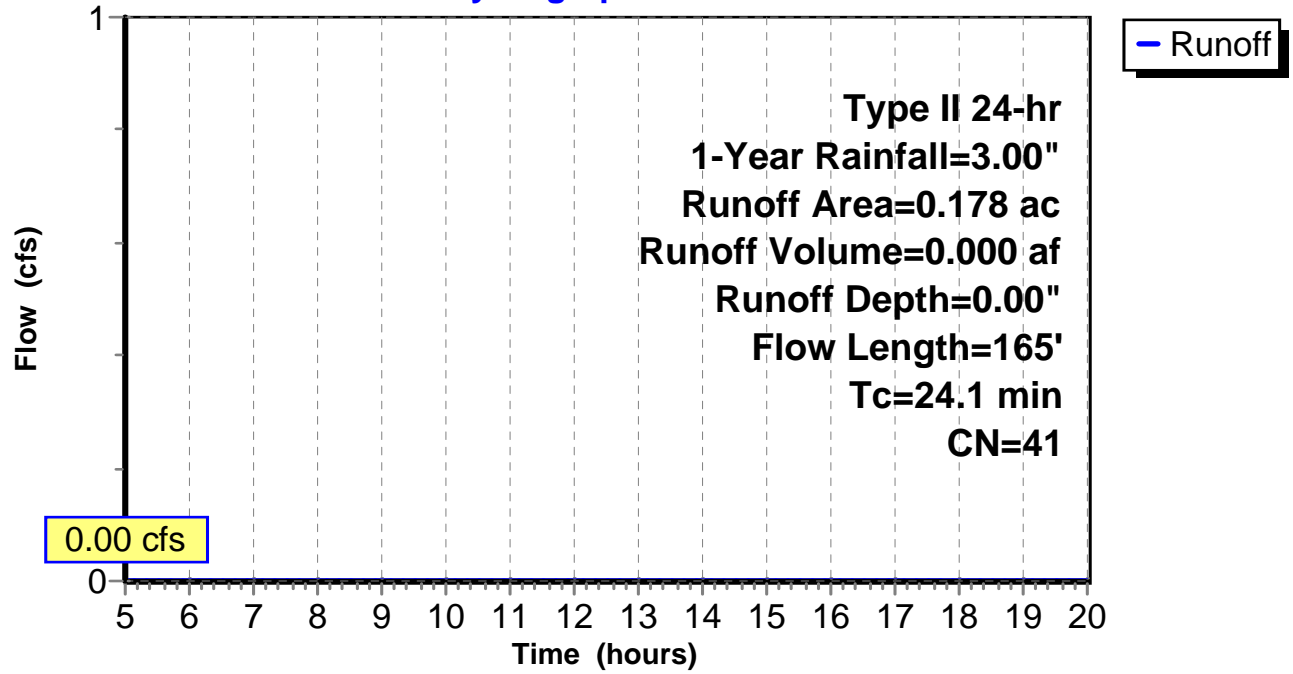
Subcatchment 2: C AR-500.002

Hydrograph



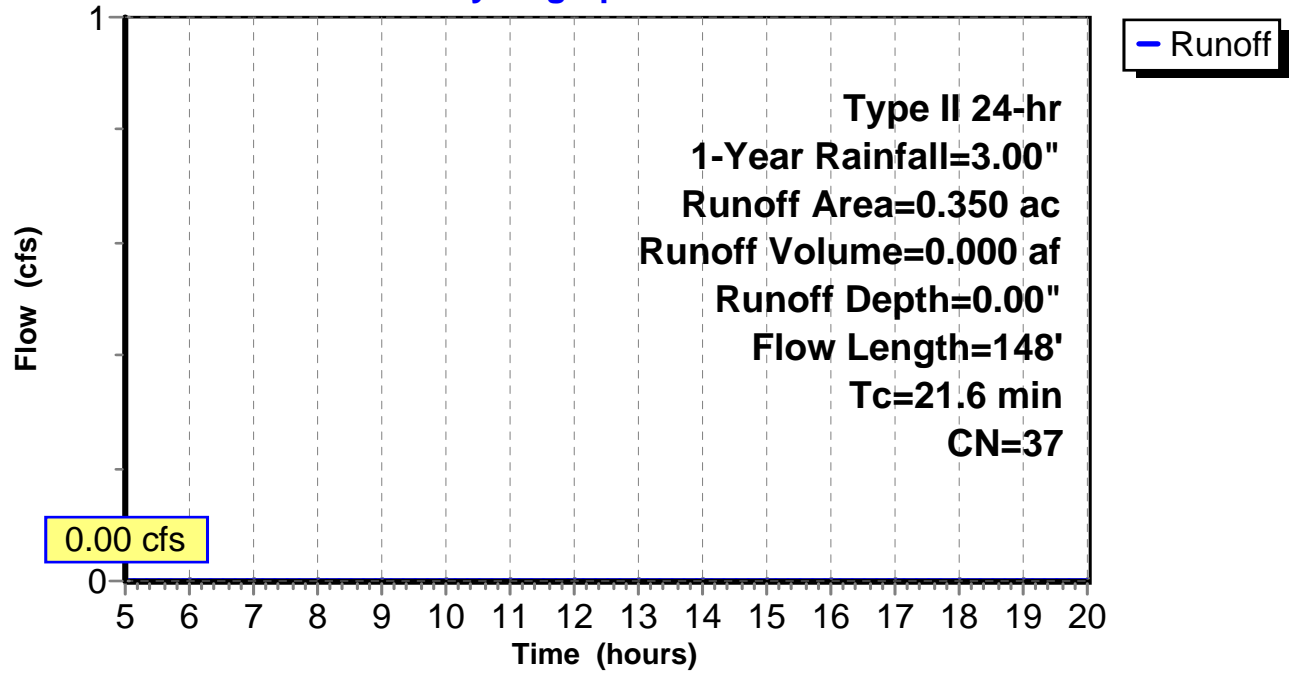
Subcatchment 3: C 157.001

Hydrograph



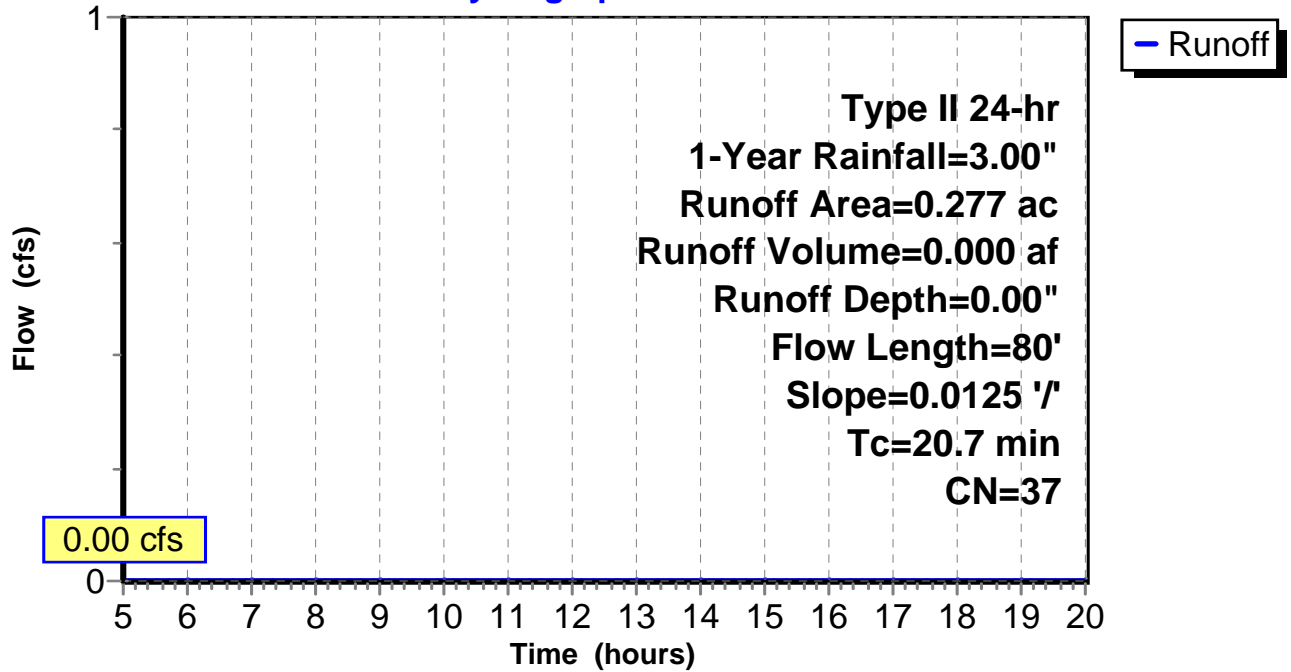
Subcatchment 4: C 157.002

Hydrograph



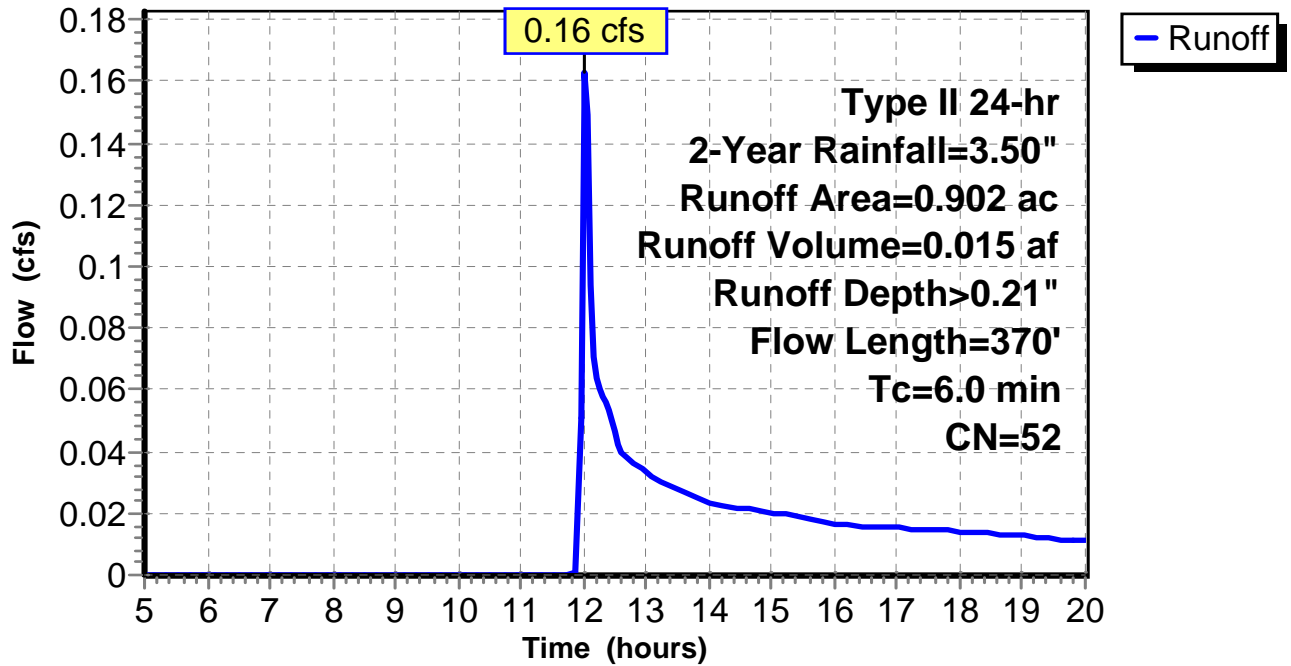
Subcatchment 5: C 157.003

Hydrograph



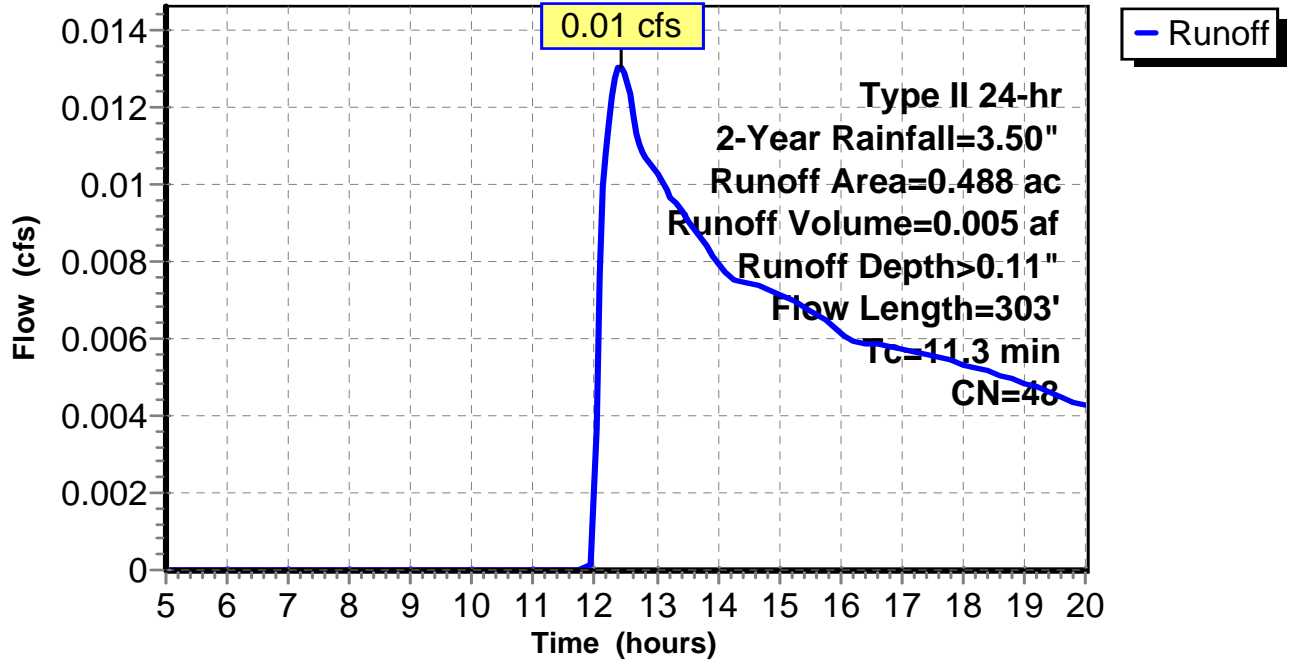
Subcatchment 1: C AR-500.001

Hydrograph



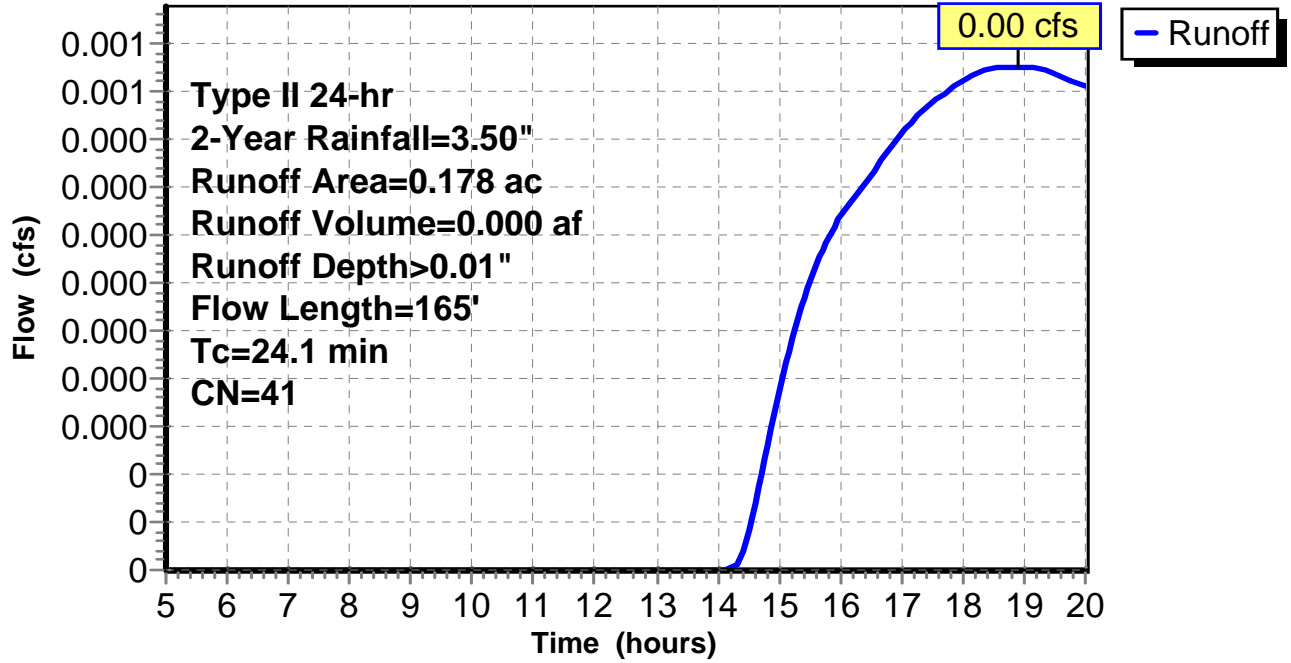
Subcatchment 2: C AR-500.002

Hydrograph



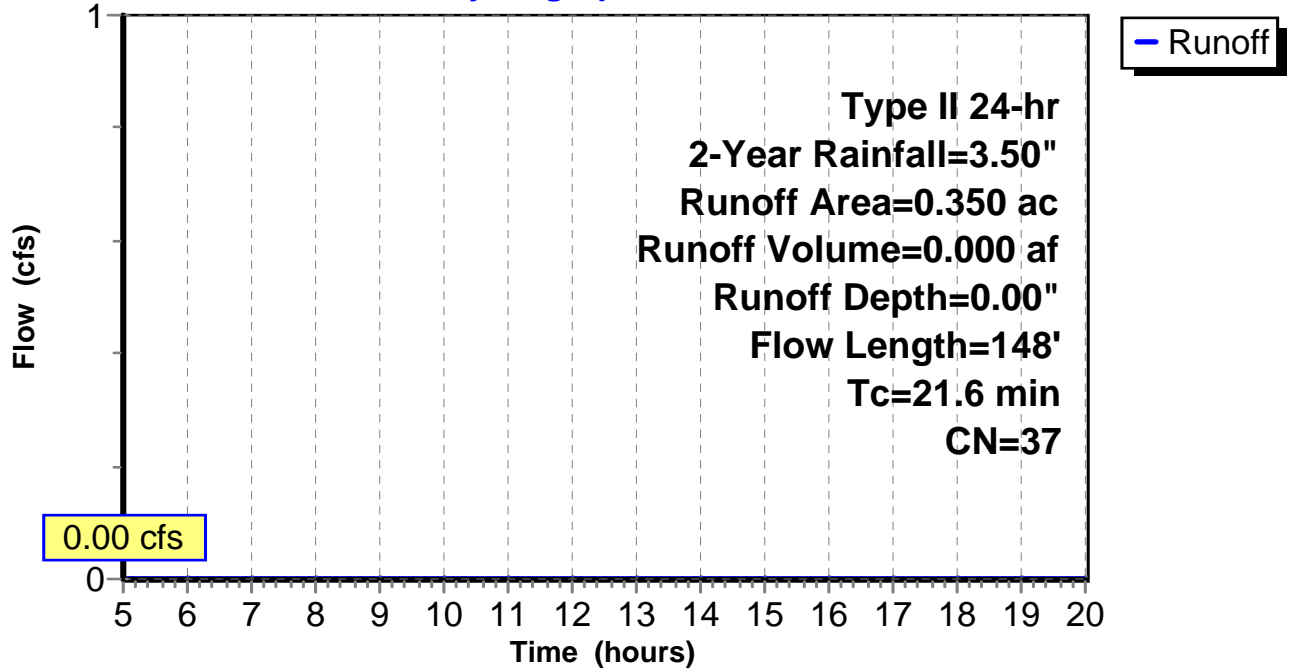
Subcatchment 3: C 157.001

Hydrograph



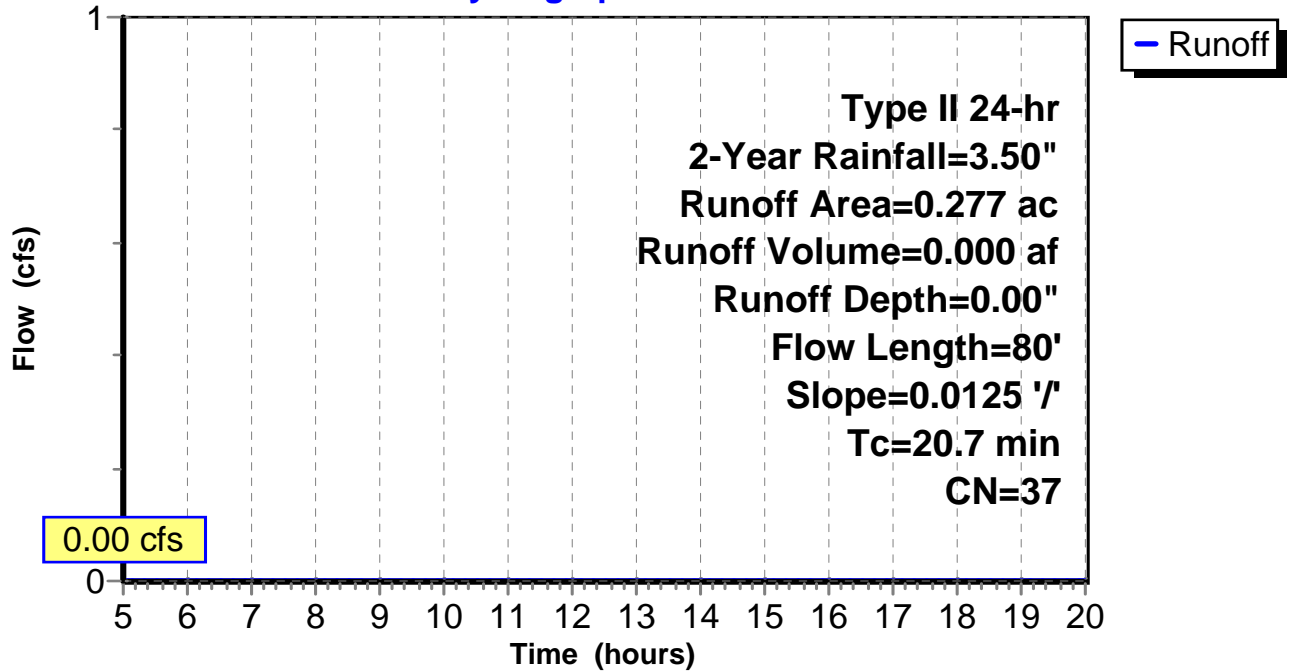
Subcatchment 4: C 157.002

Hydrograph



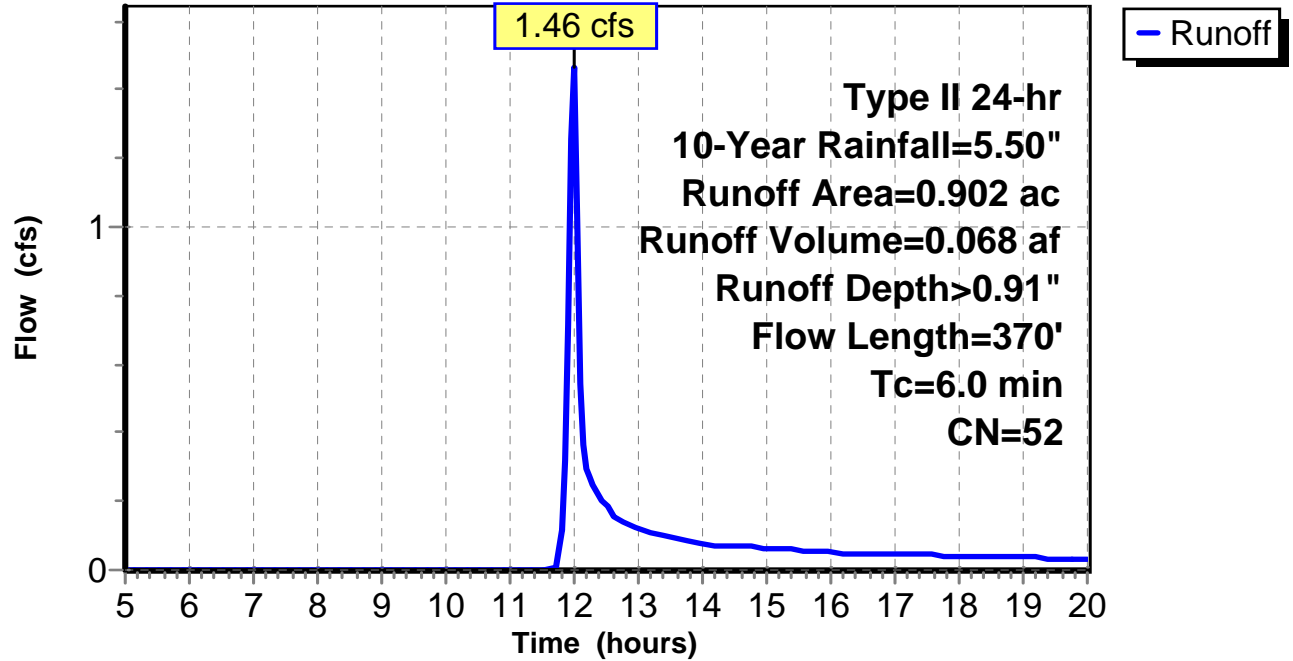
Subcatchment 5: C 157.003

Hydrograph



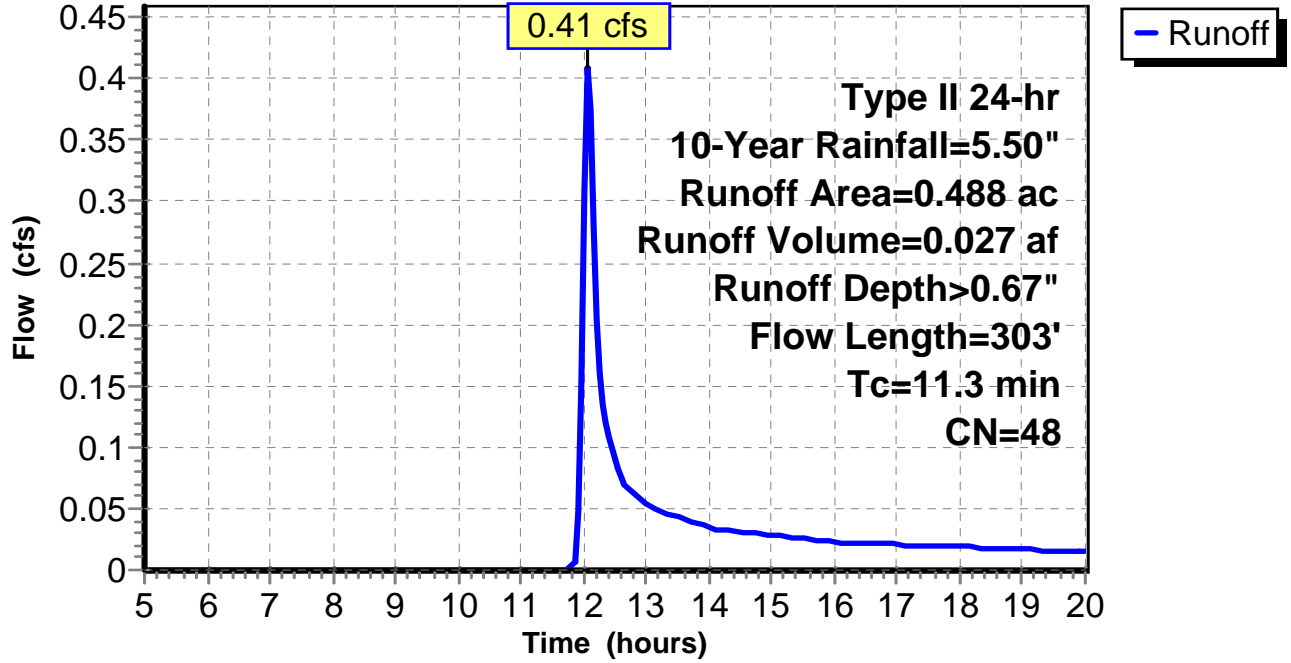
Subcatchment 1: C AR-500.001

Hydrograph



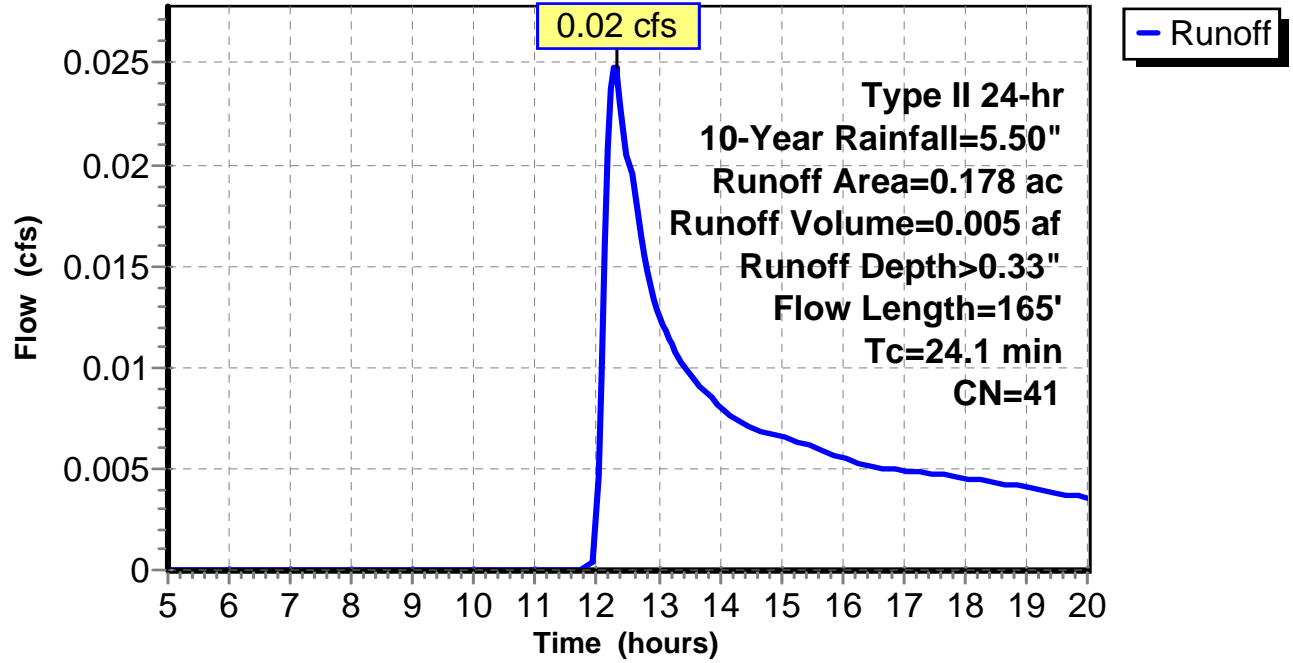
Subcatchment 2: C AR-500.002

Hydrograph



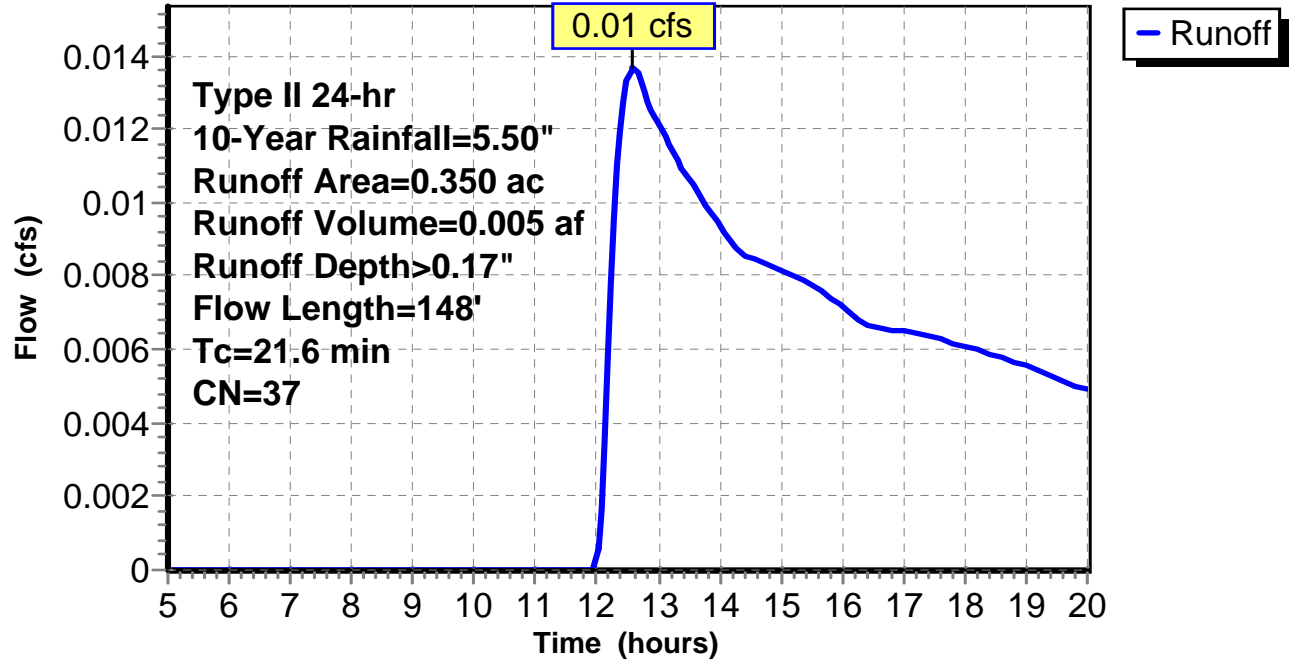
Subcatchment 3: C 157.001

Hydrograph



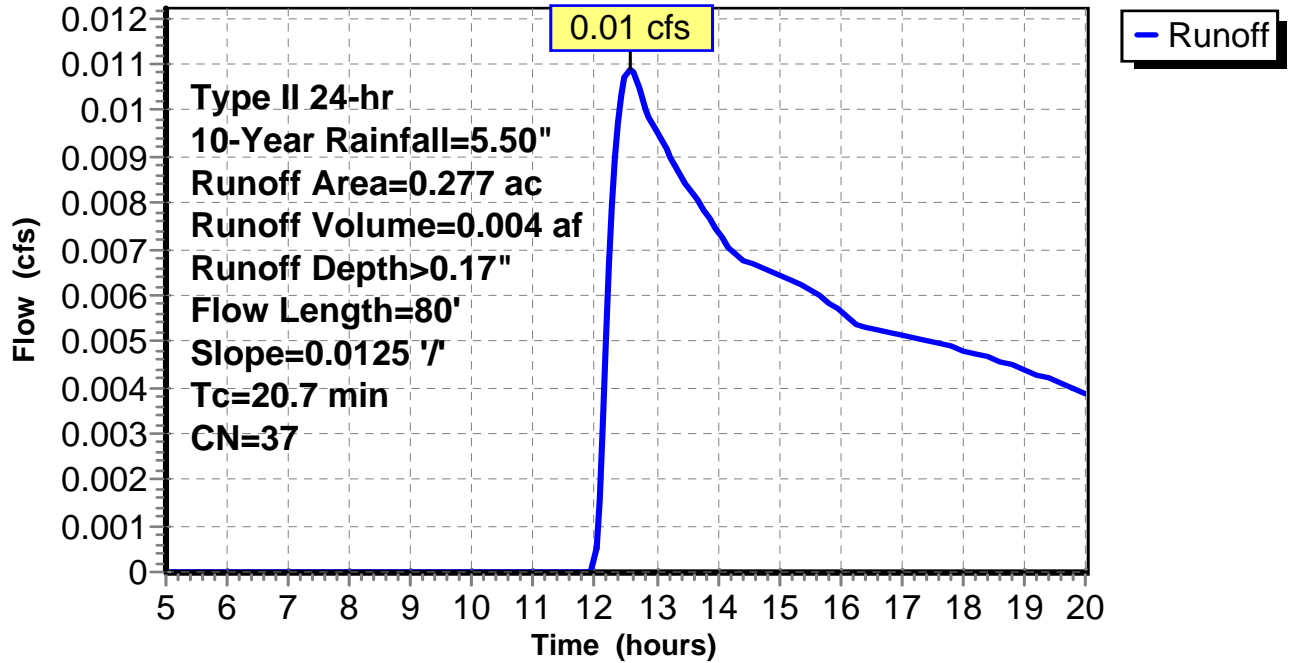
Subcatchment 4: C 157.002

Hydrograph



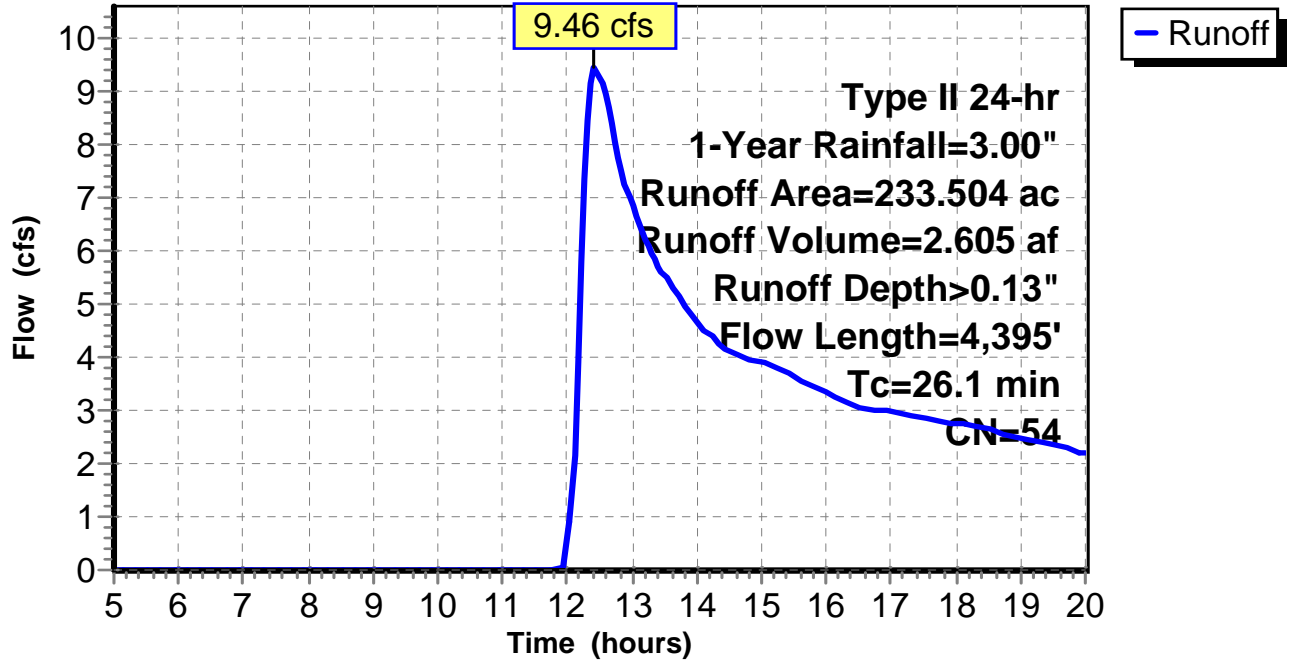
Subcatchment 5: C 157.003

Hydrograph



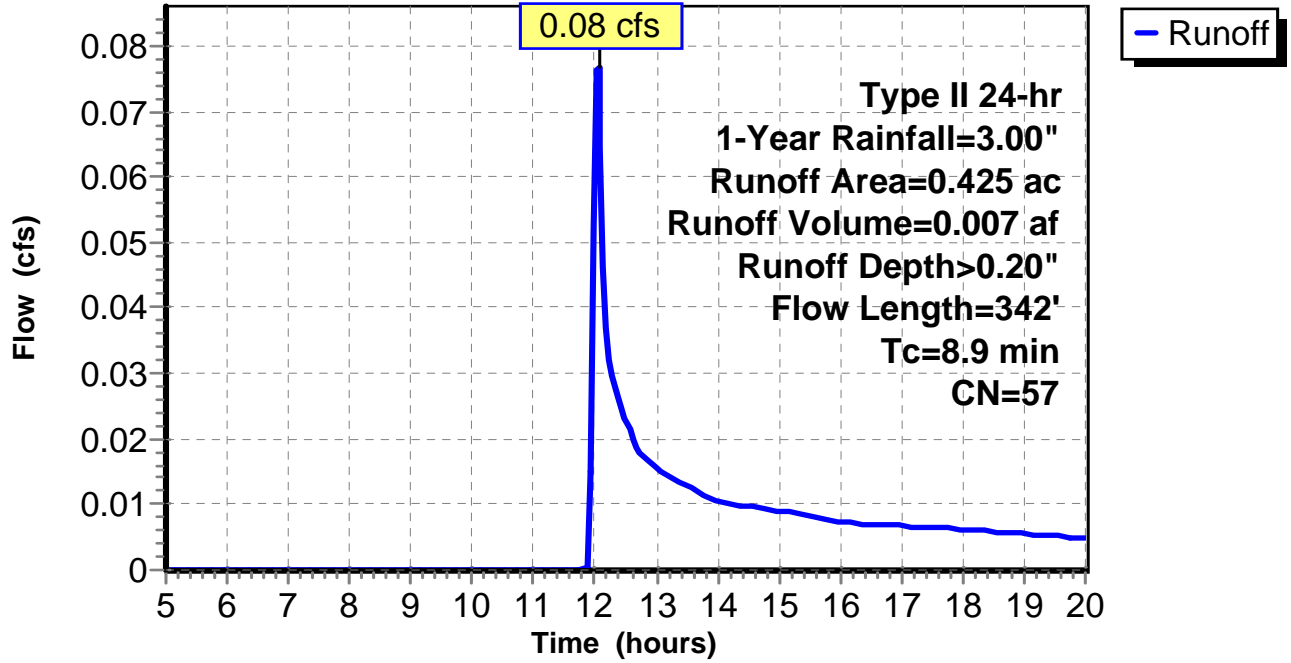
Subcatchment 1: C AR-500.003

Hydrograph



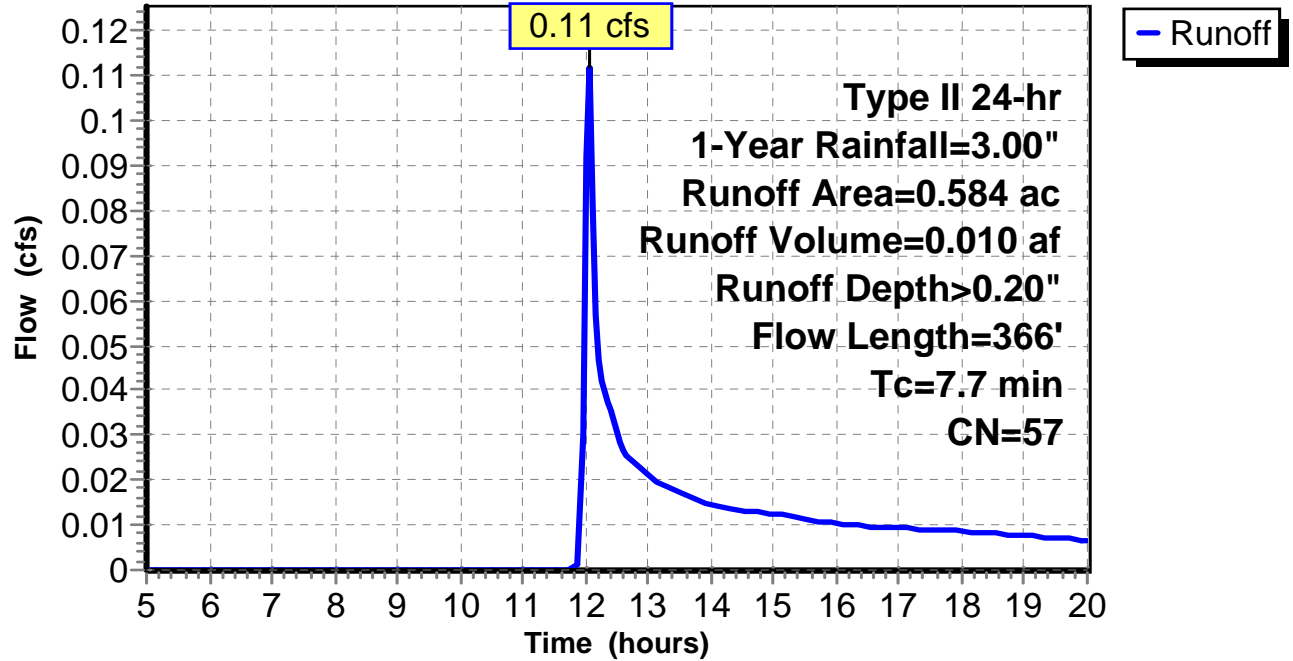
Subcatchment 2: C AR-500.004

Hydrograph



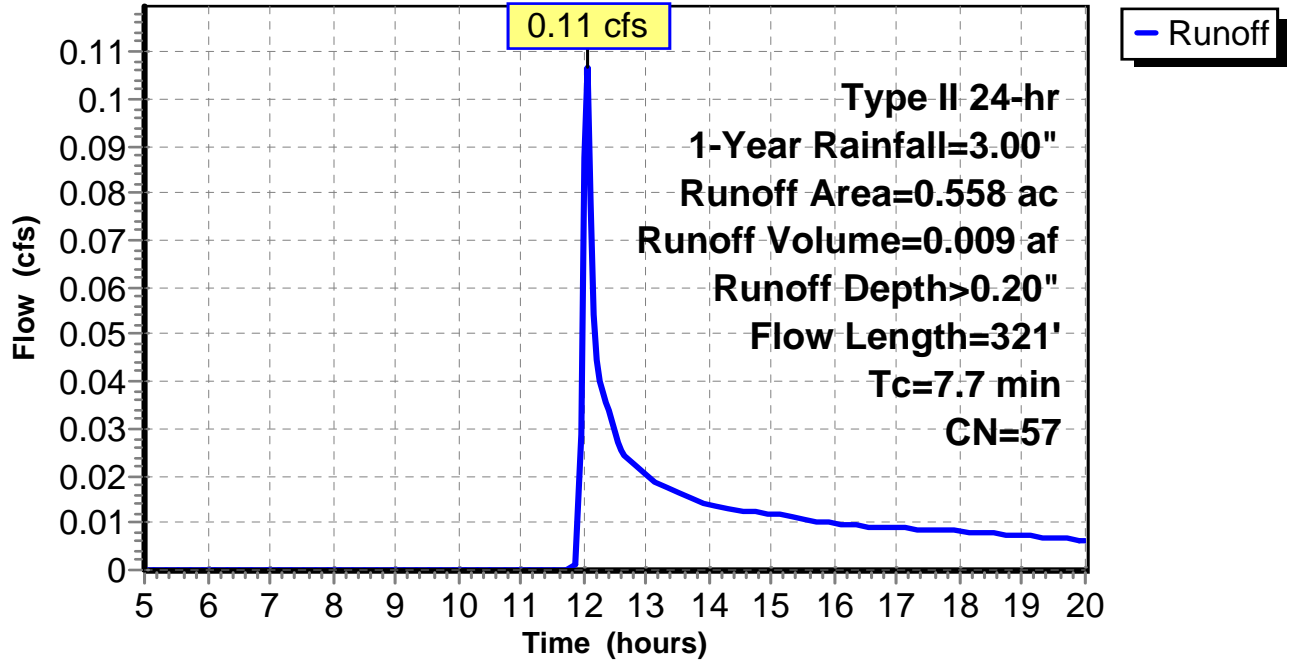
Subcatchment 3: C AR-500.005

Hydrograph



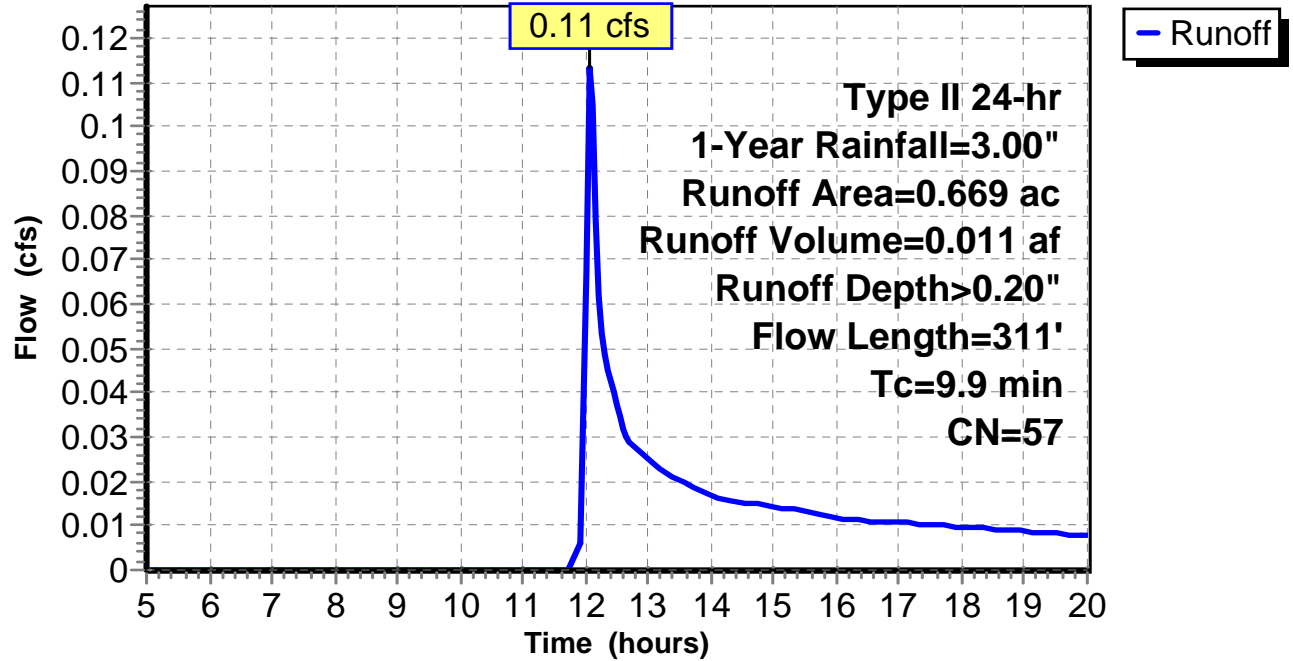
Subcatchment 4: C AR-500.006

Hydrograph



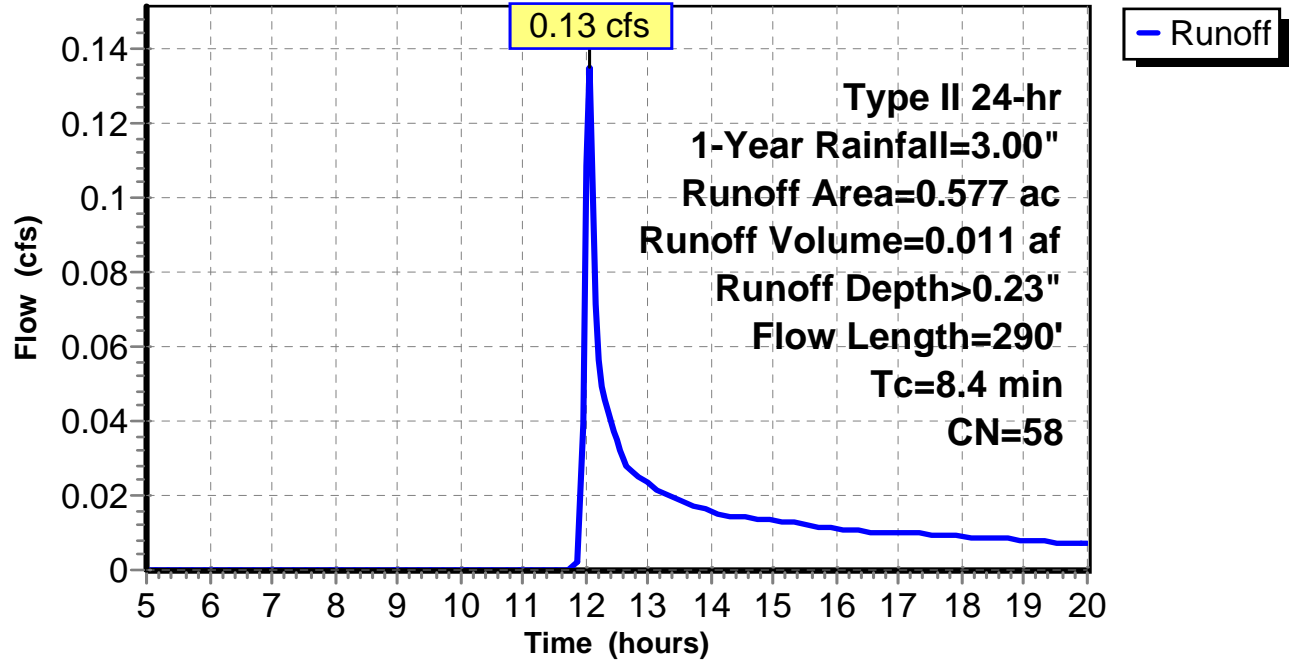
Subcatchment 5: C AR-500.007

Hydrograph



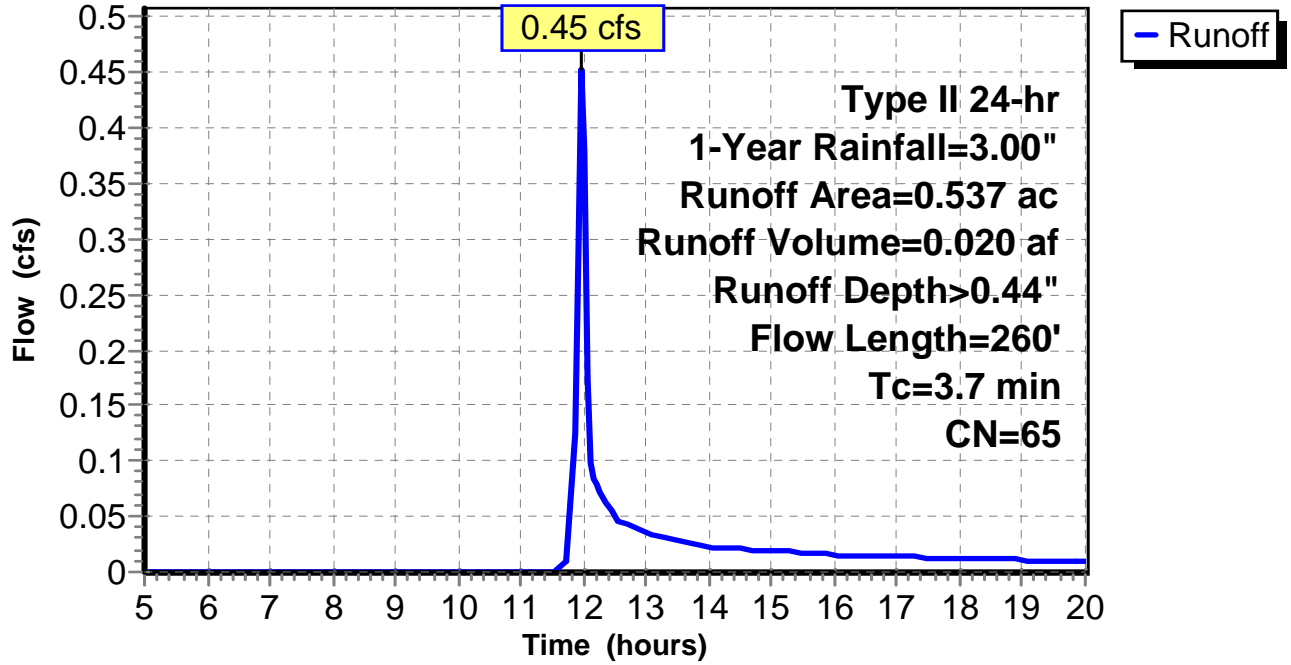
Subcatchment 6: C AR-500.008

Hydrograph



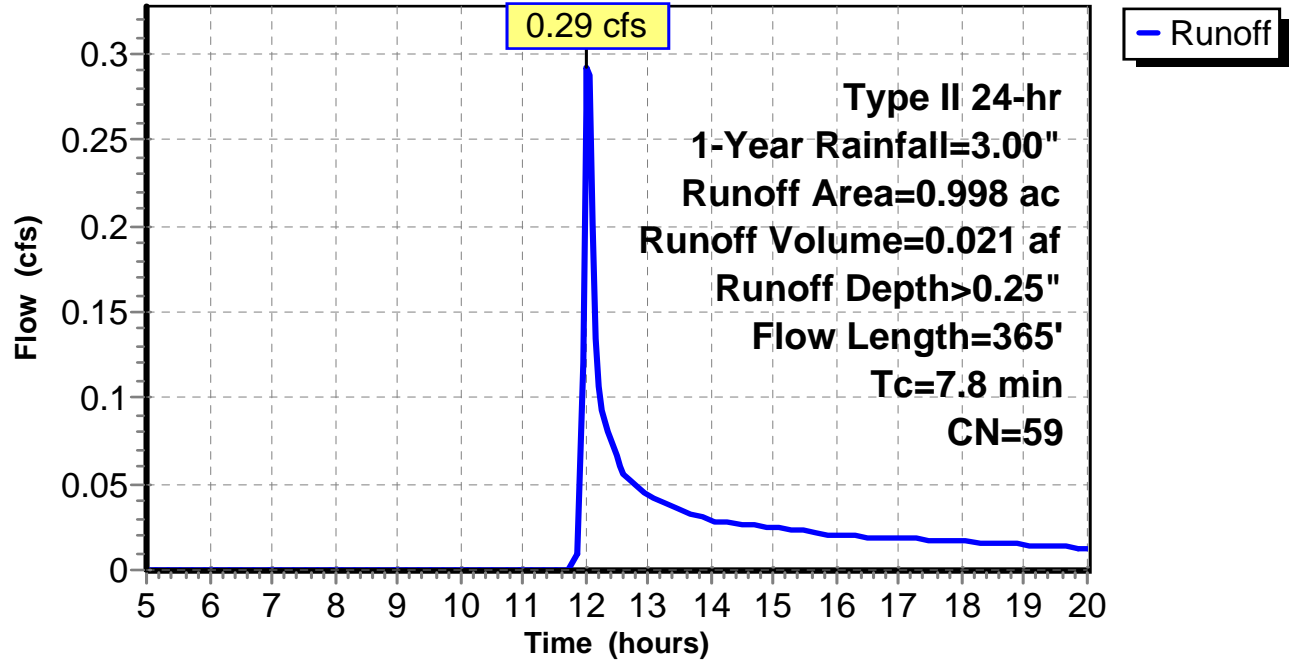
Subcatchment 7: C AR-500.009

Hydrograph



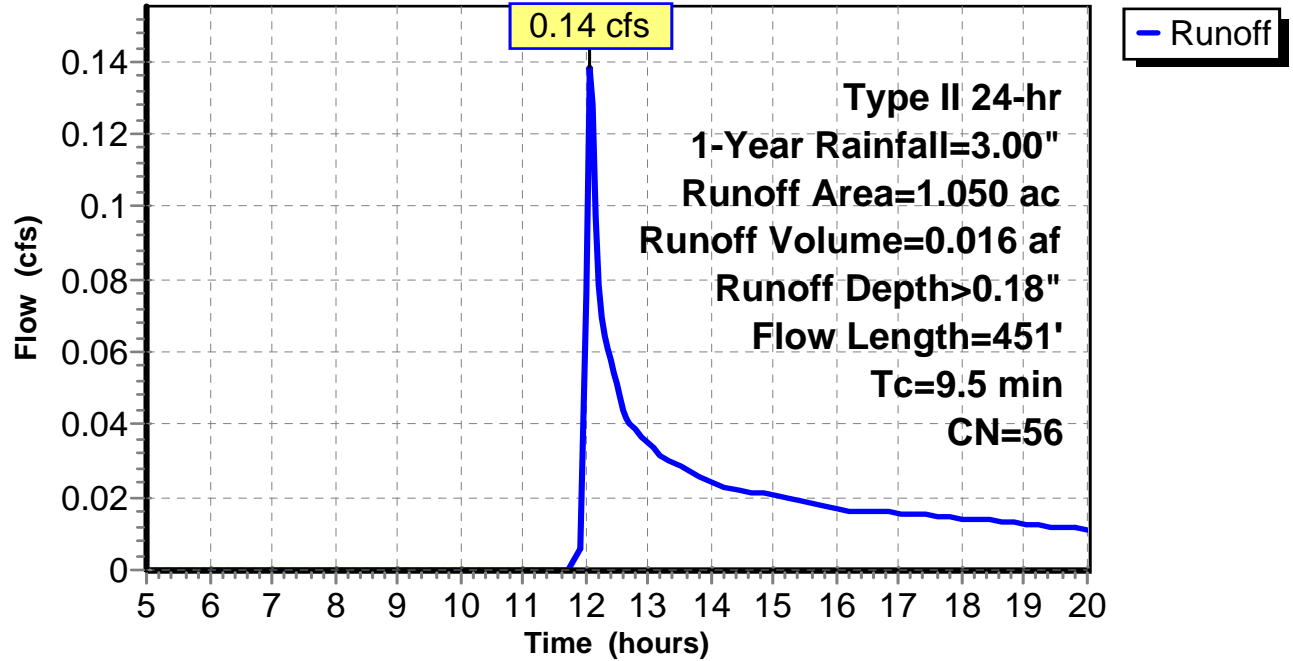
Subcatchment 8: C AR-500.010

Hydrograph



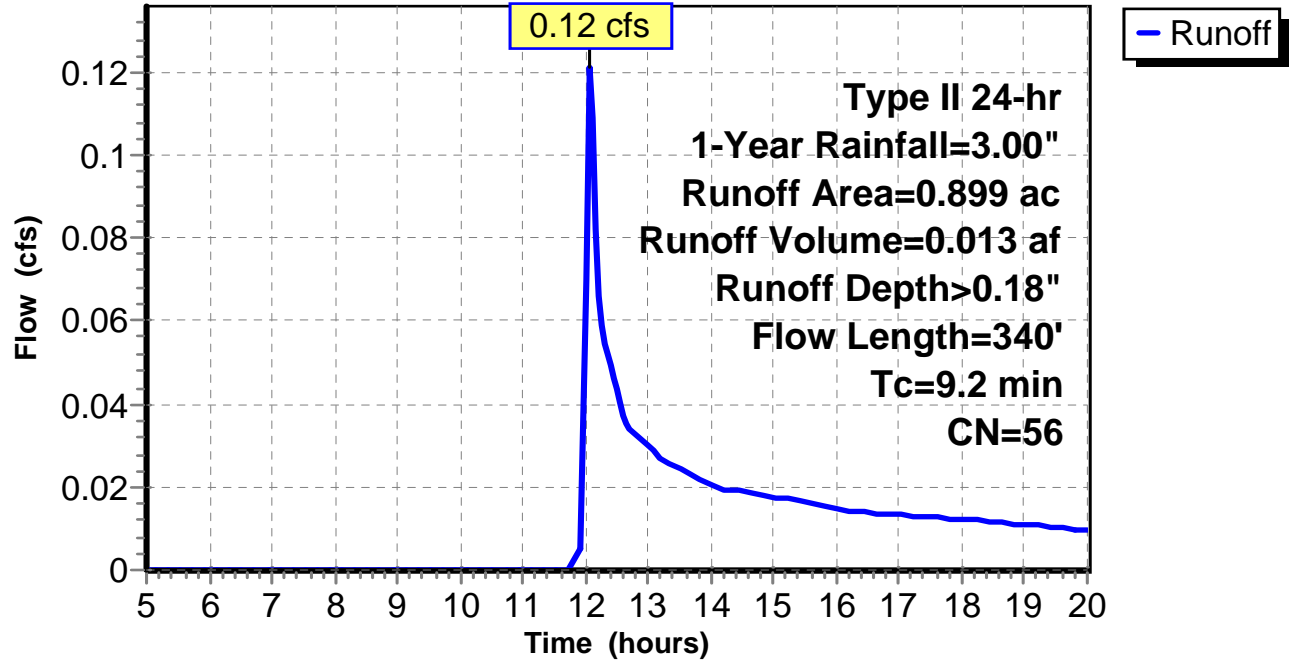
Subcatchment 9: C AR-500.011

Hydrograph



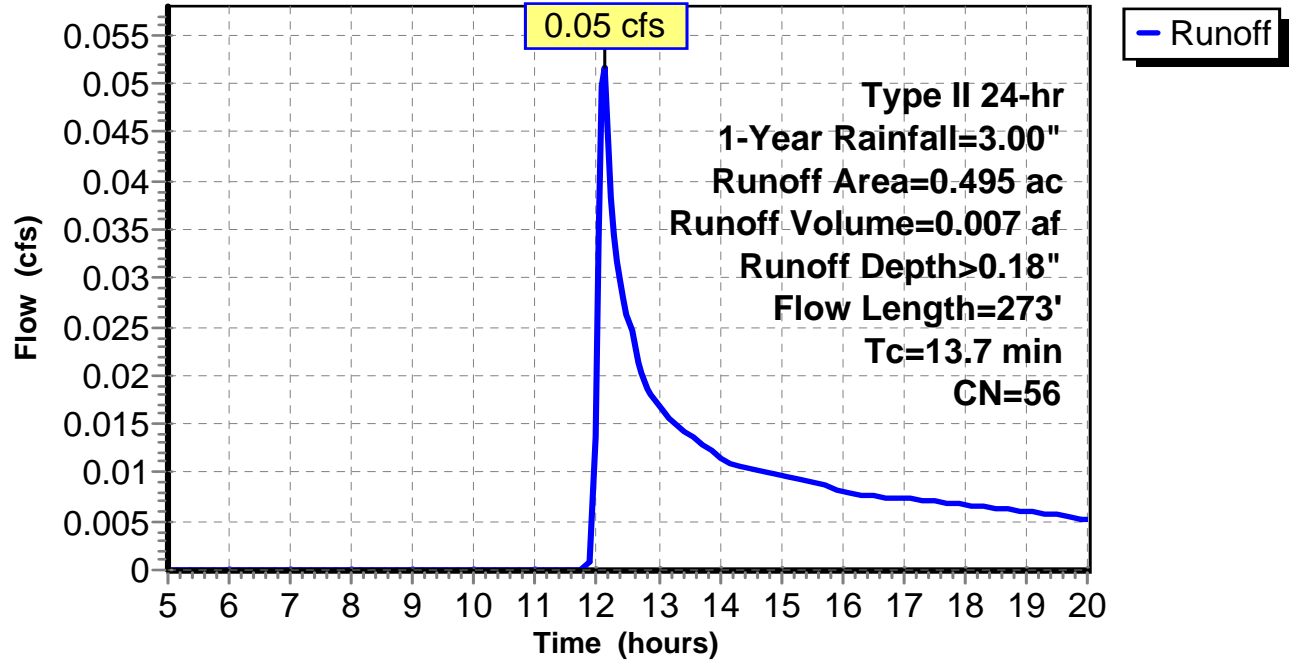
Subcatchment 10: C AR-500.012

Hydrograph



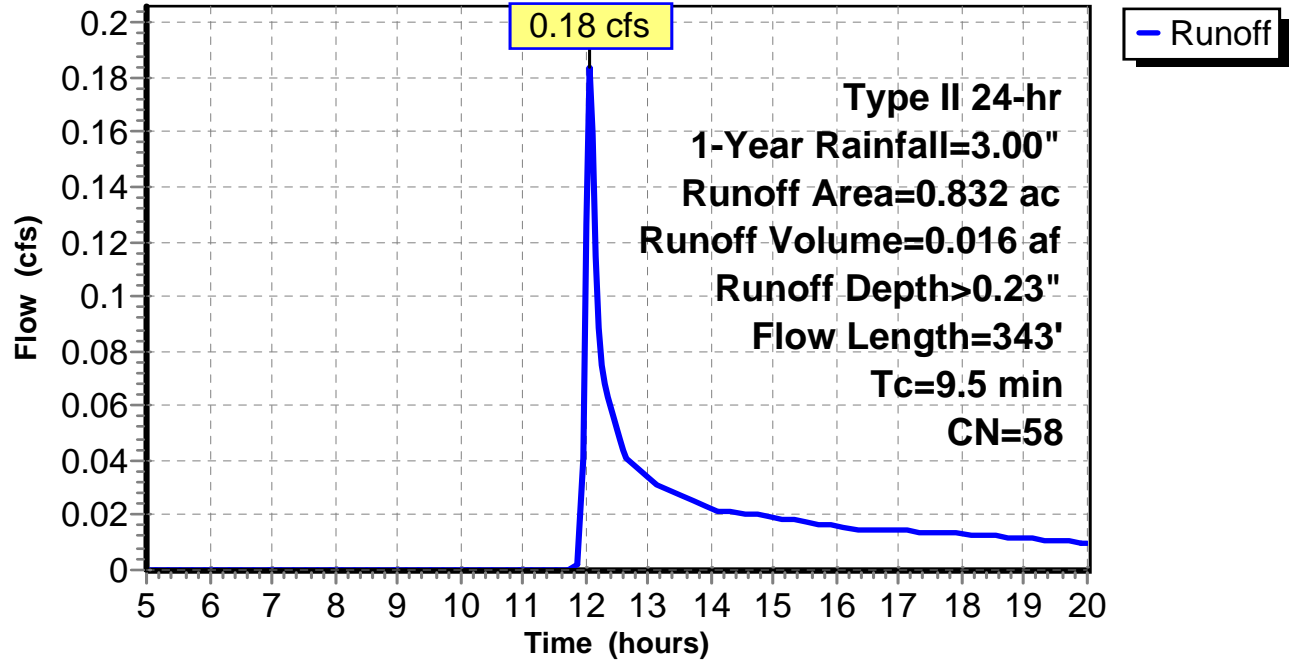
Subcatchment 11: C AR-500.013

Hydrograph



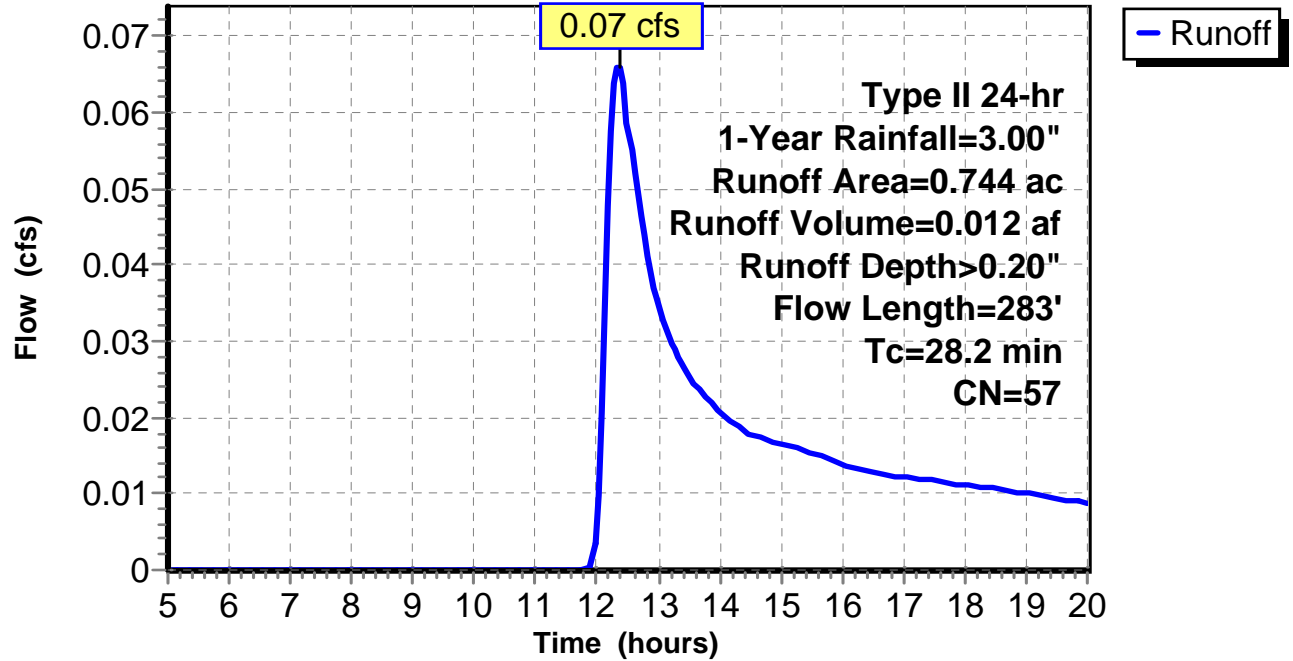
Subcatchment 12: C AR-500.014

Hydrograph



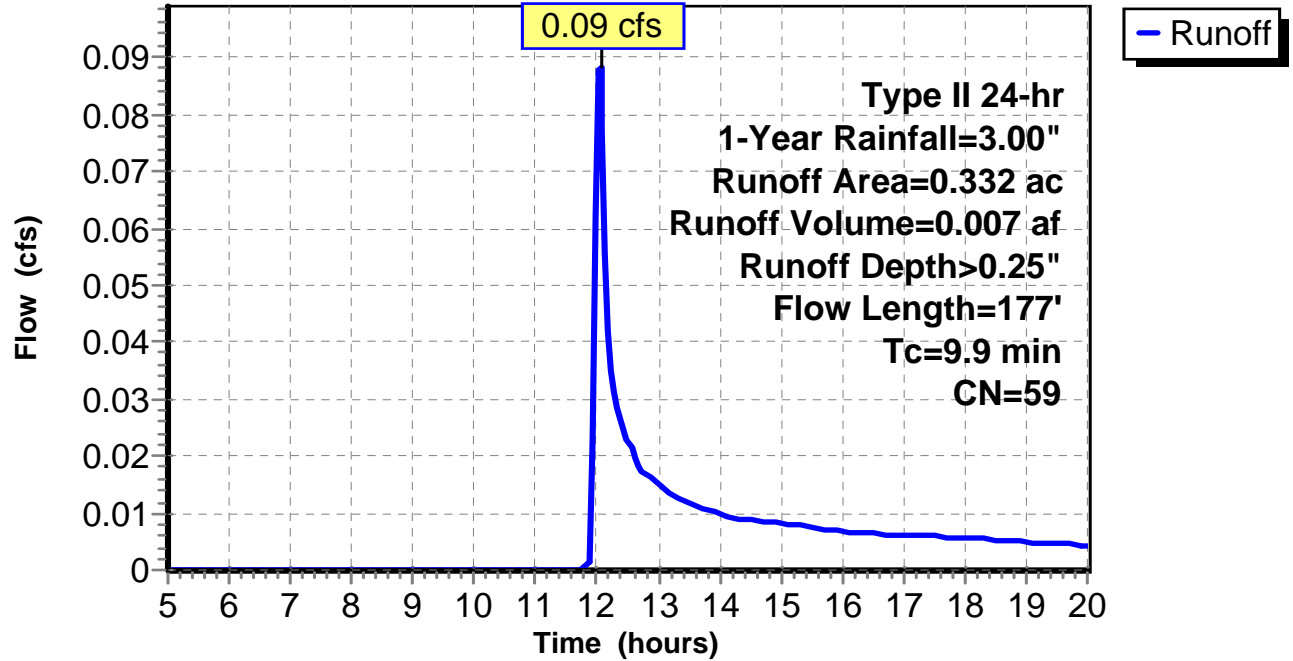
Subcatchment 13: C AR-500.015

Hydrograph



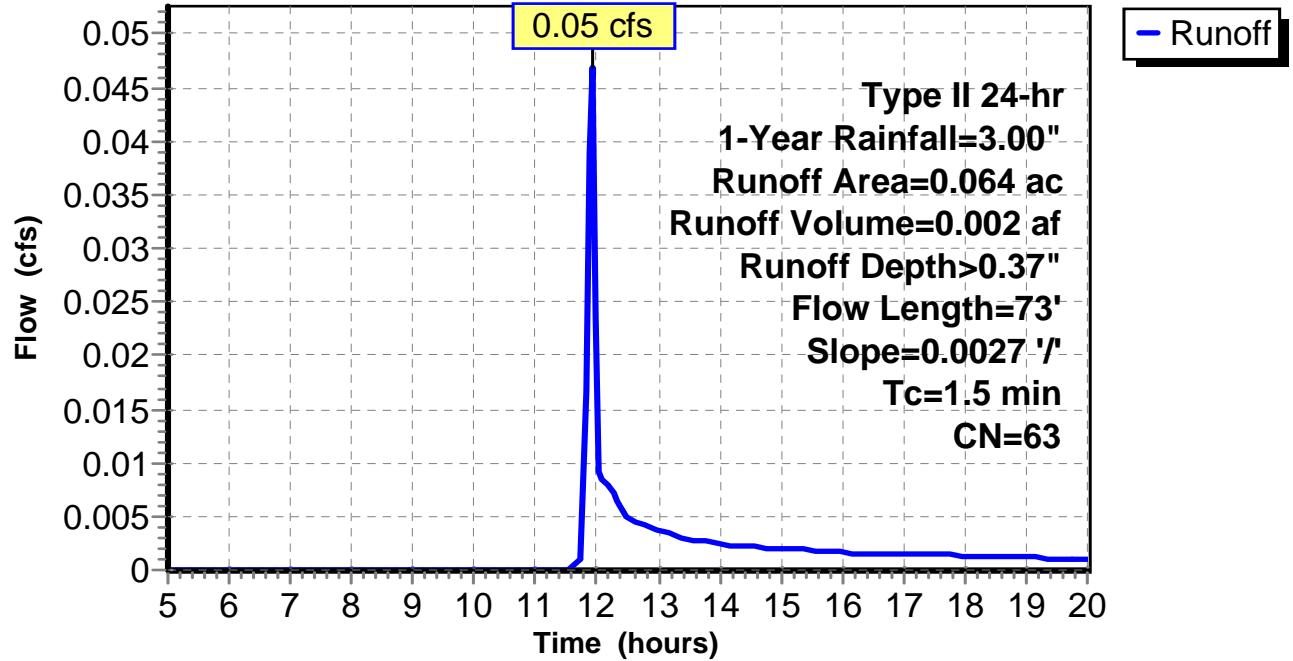
Subcatchment 14: C AR-500.016

Hydrograph



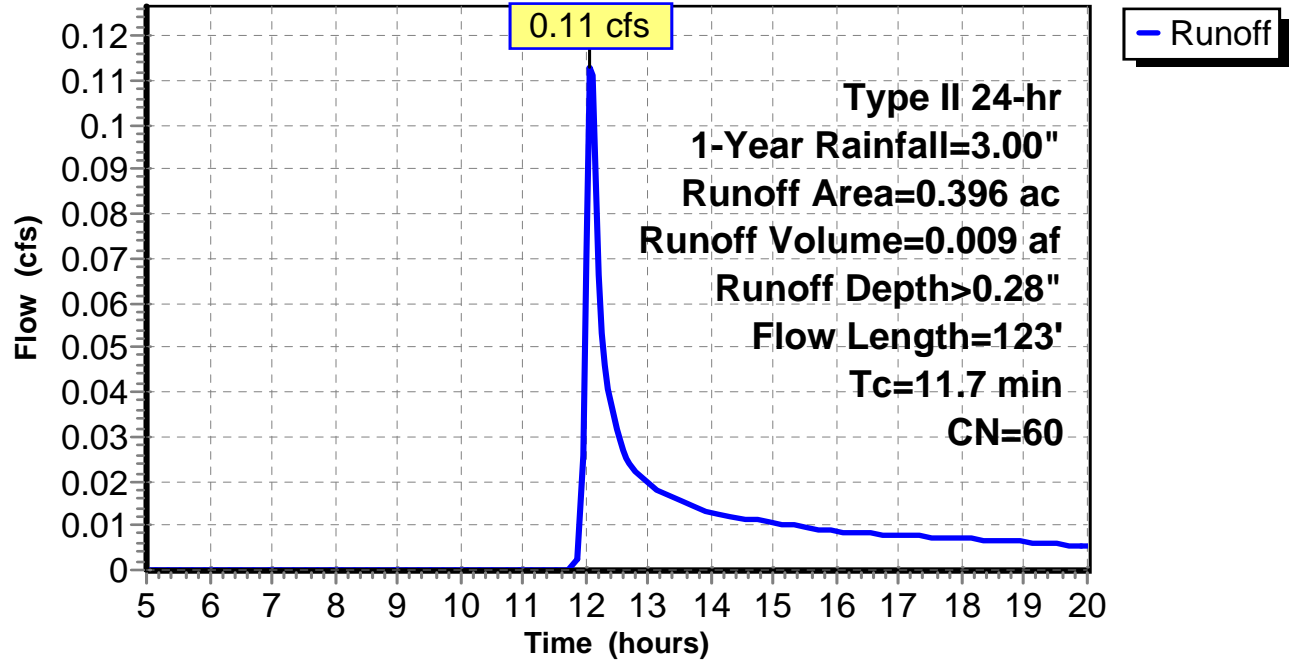
Subcatchment 15: C AR-500.017

Hydrograph



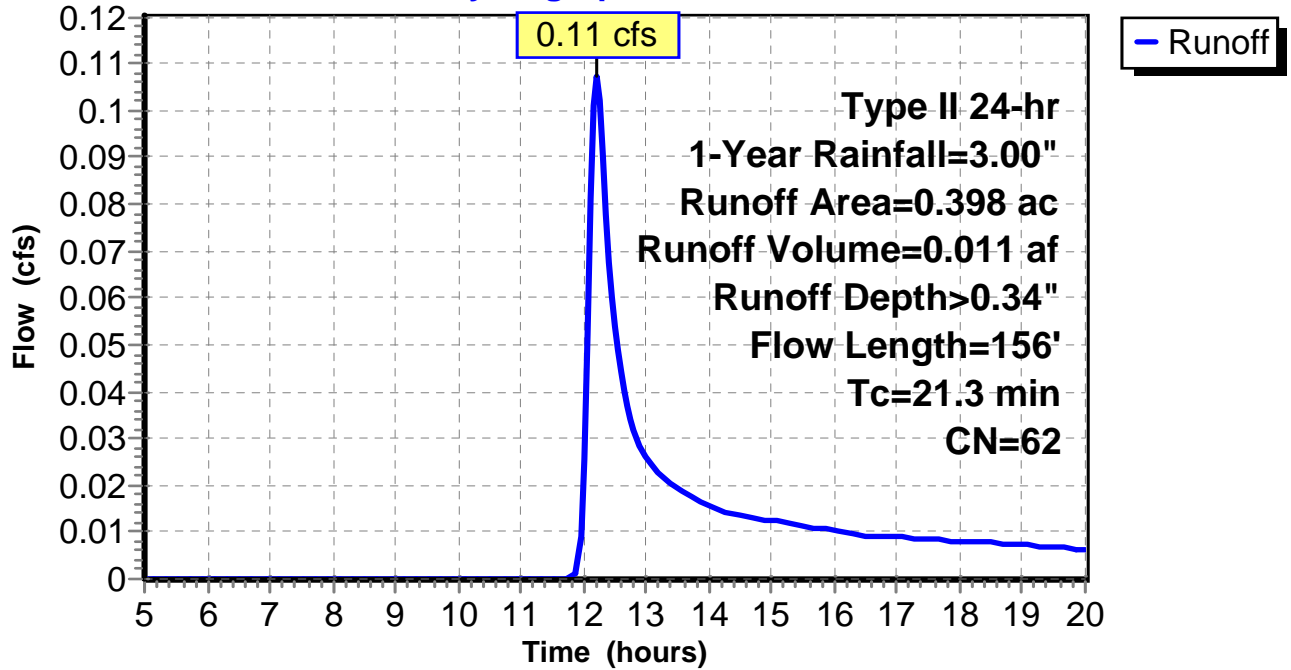
Subcatchment 16: C AR-500.018

Hydrograph



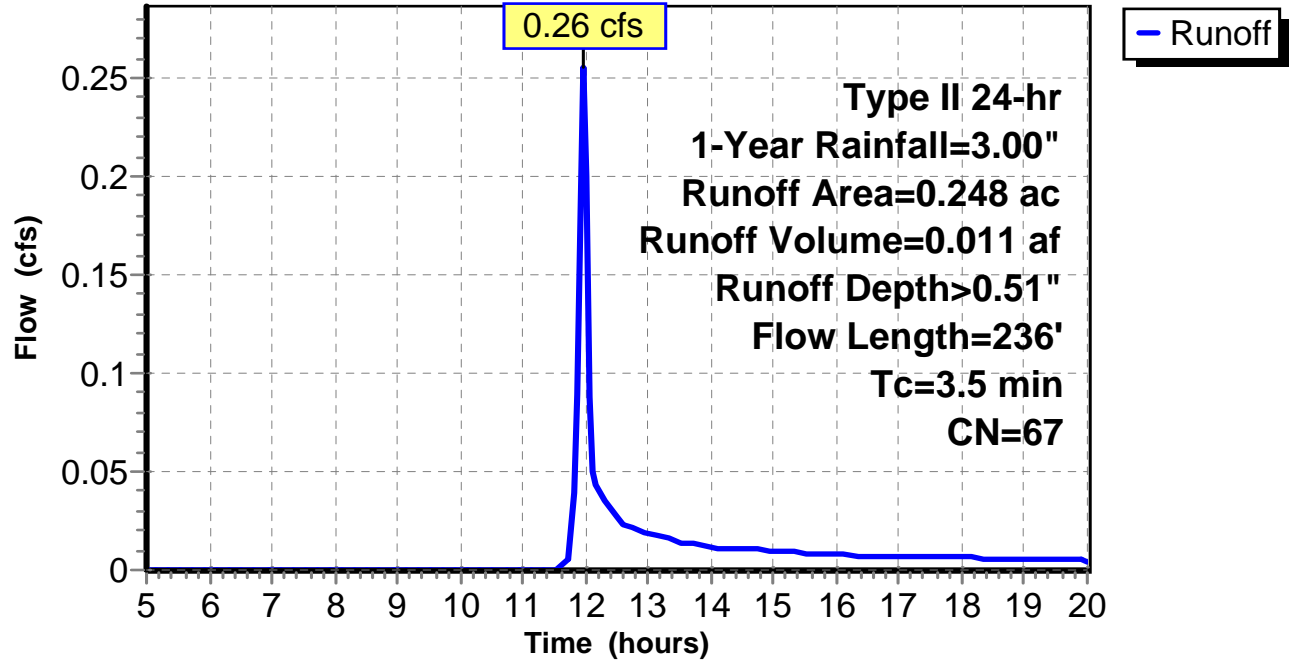
Subcatchment 17: C AR-500.019

Hydrograph



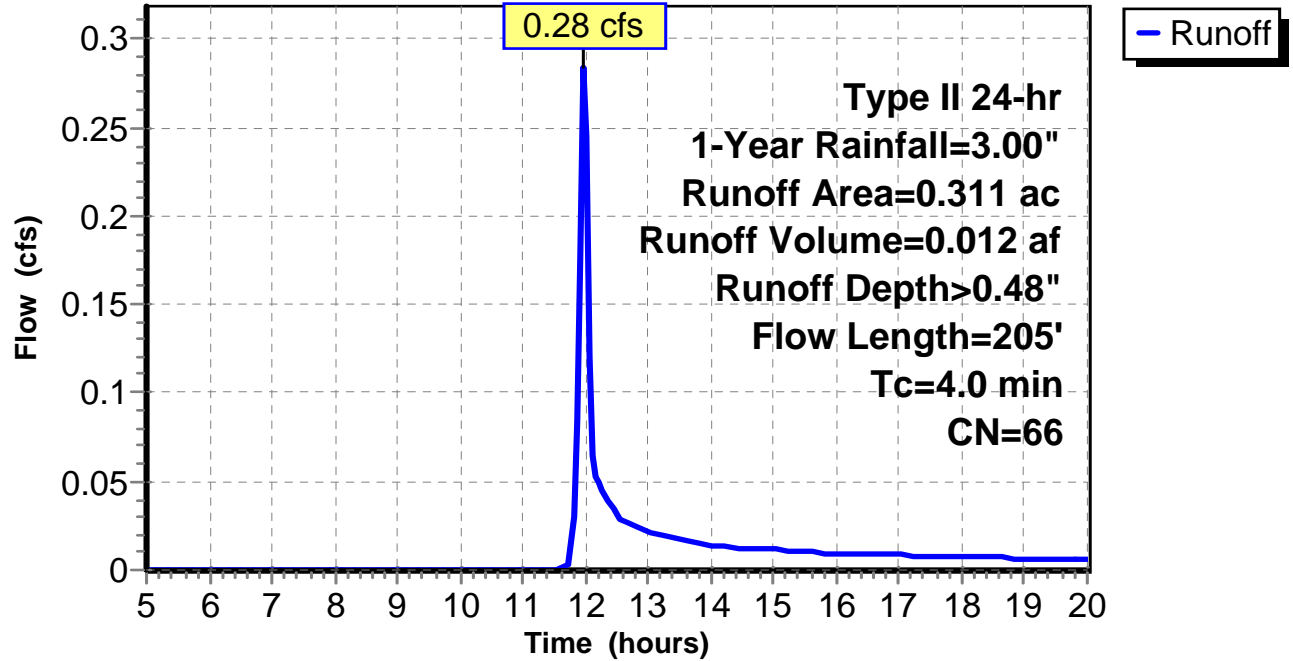
Subcatchment 18: C AR-500.020

Hydrograph



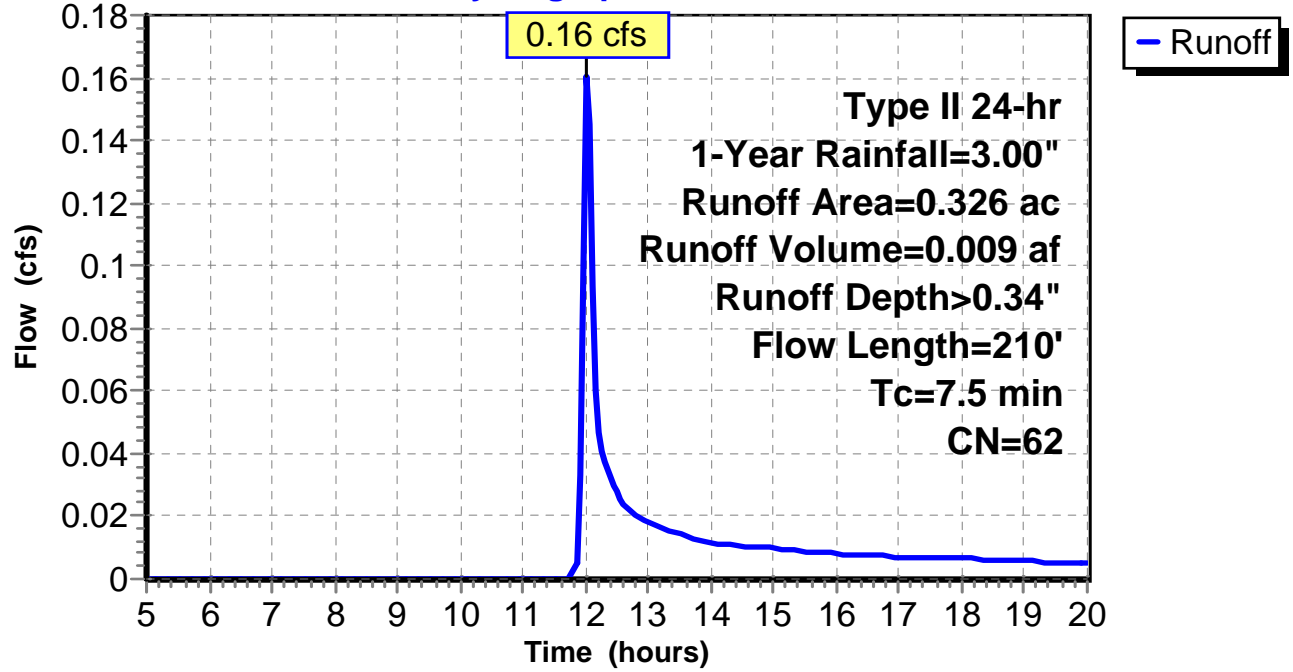
Subcatchment 19: C AR-500.021

Hydrograph



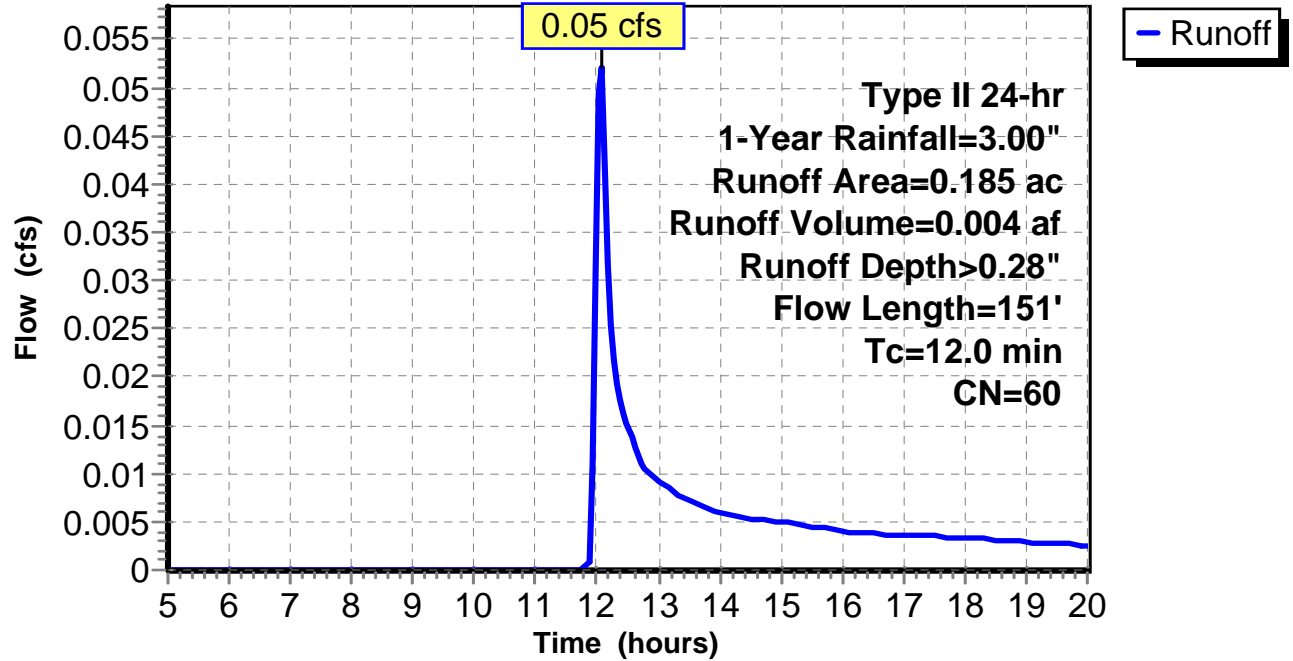
Subcatchment 20: C AR-500.022

Hydrograph



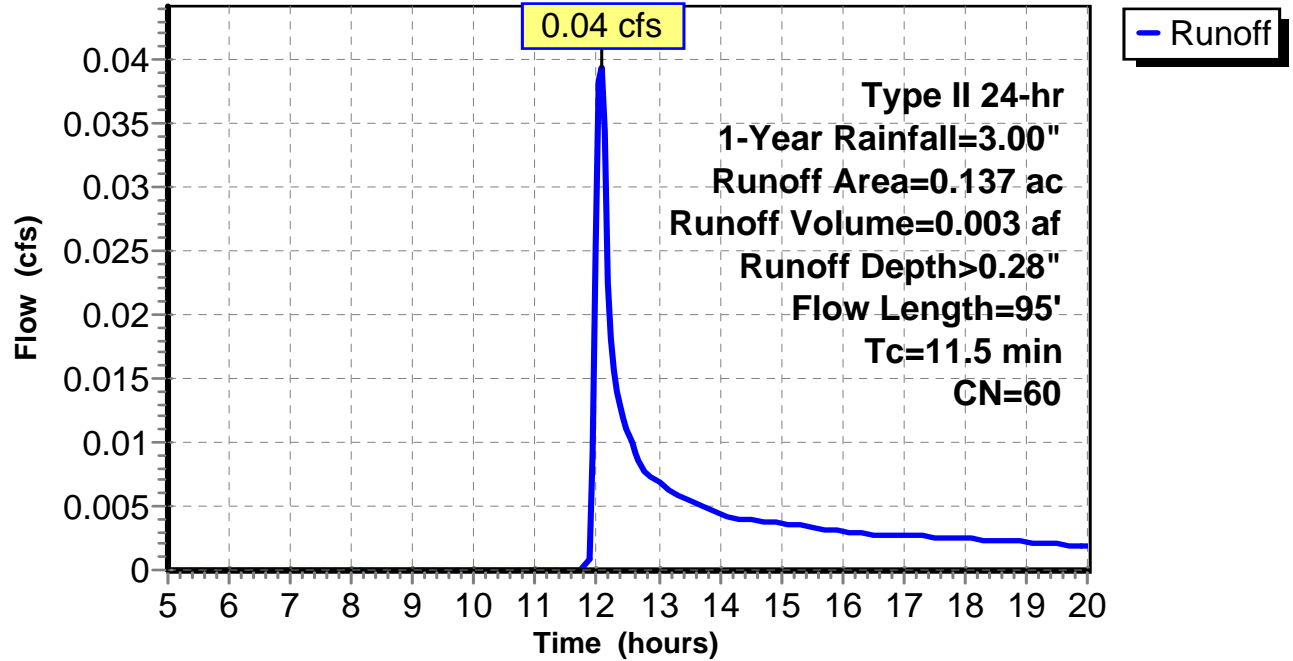
Subcatchment 21: C AR-500.023

Hydrograph



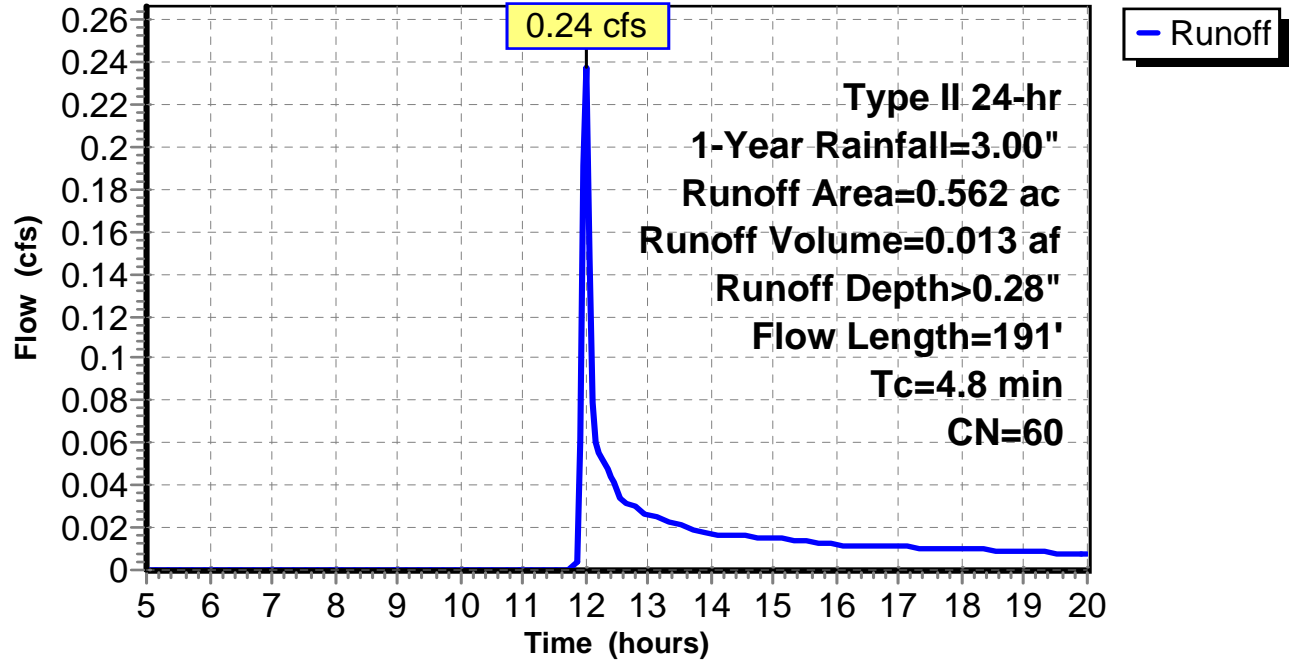
Subcatchment 22: C AR-500.024

Hydrograph



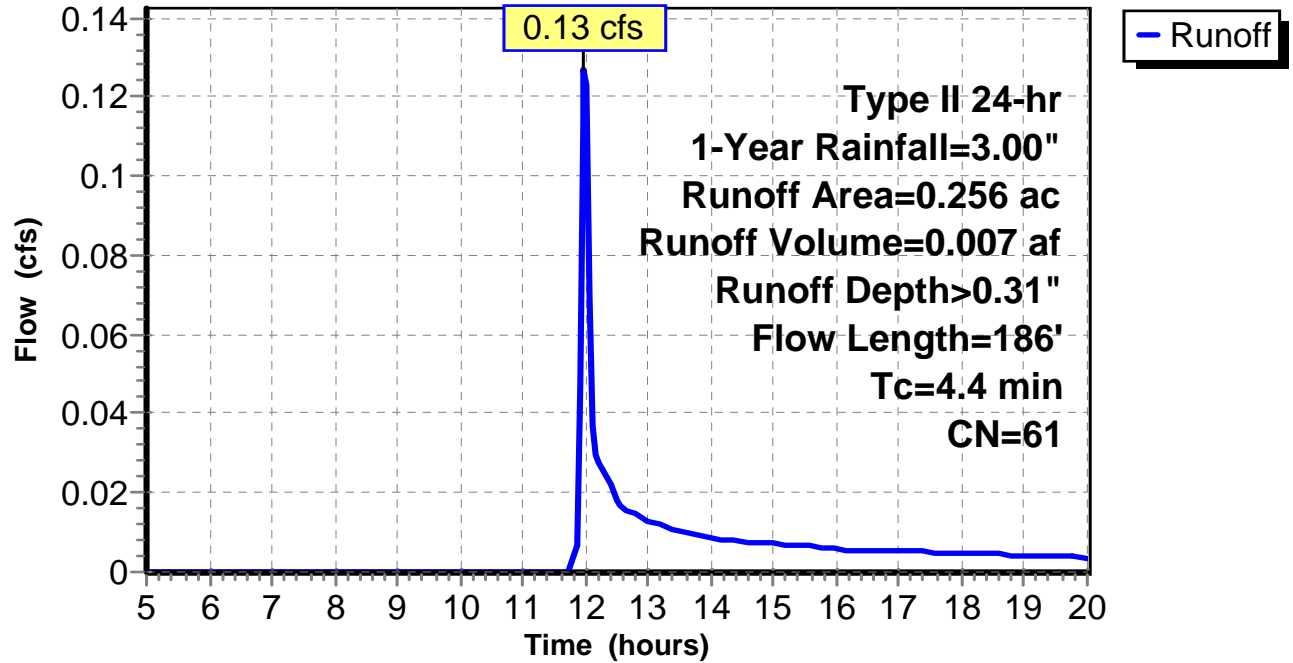
Subcatchment 23: C AR-500.025

Hydrograph



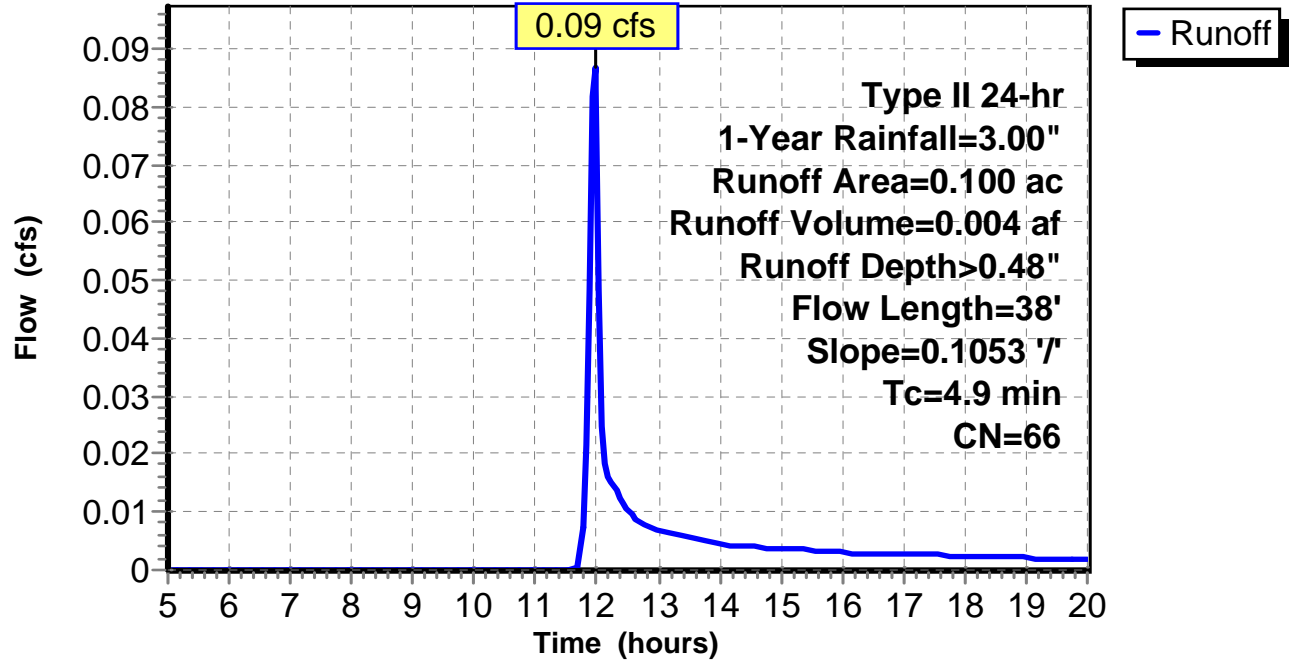
Subcatchment 24: C AR-500.026

Hydrograph



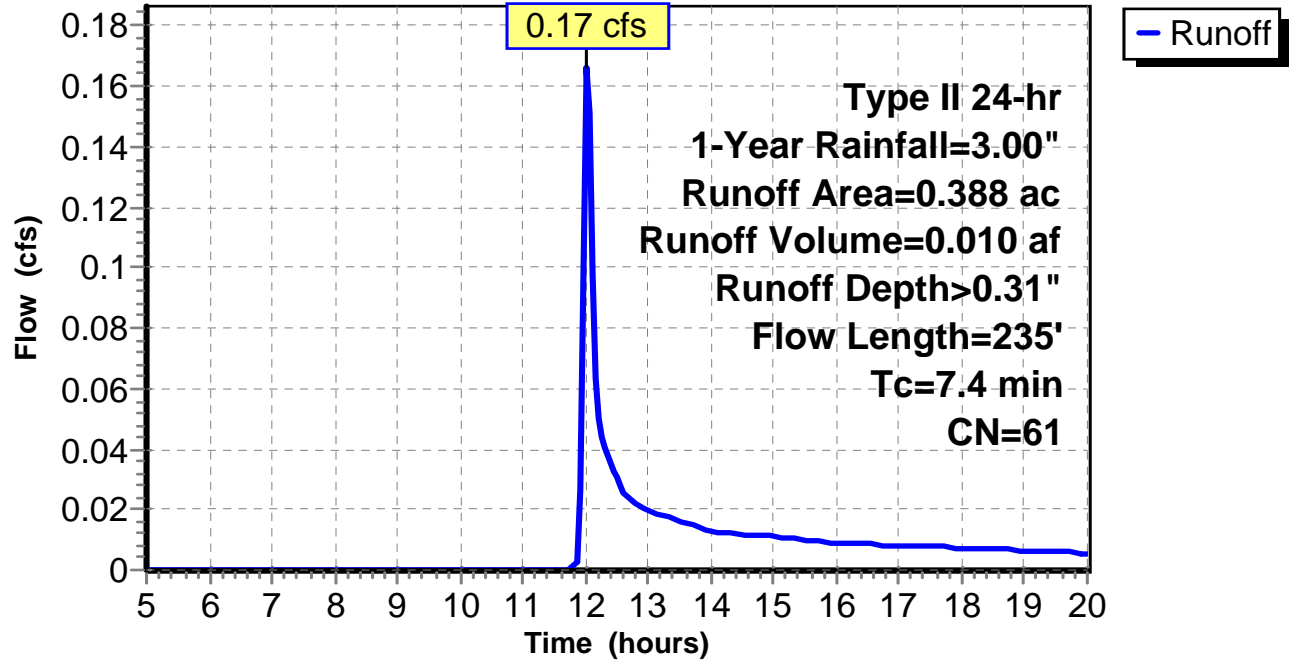
Subcatchment 25: C AR-500.027

Hydrograph



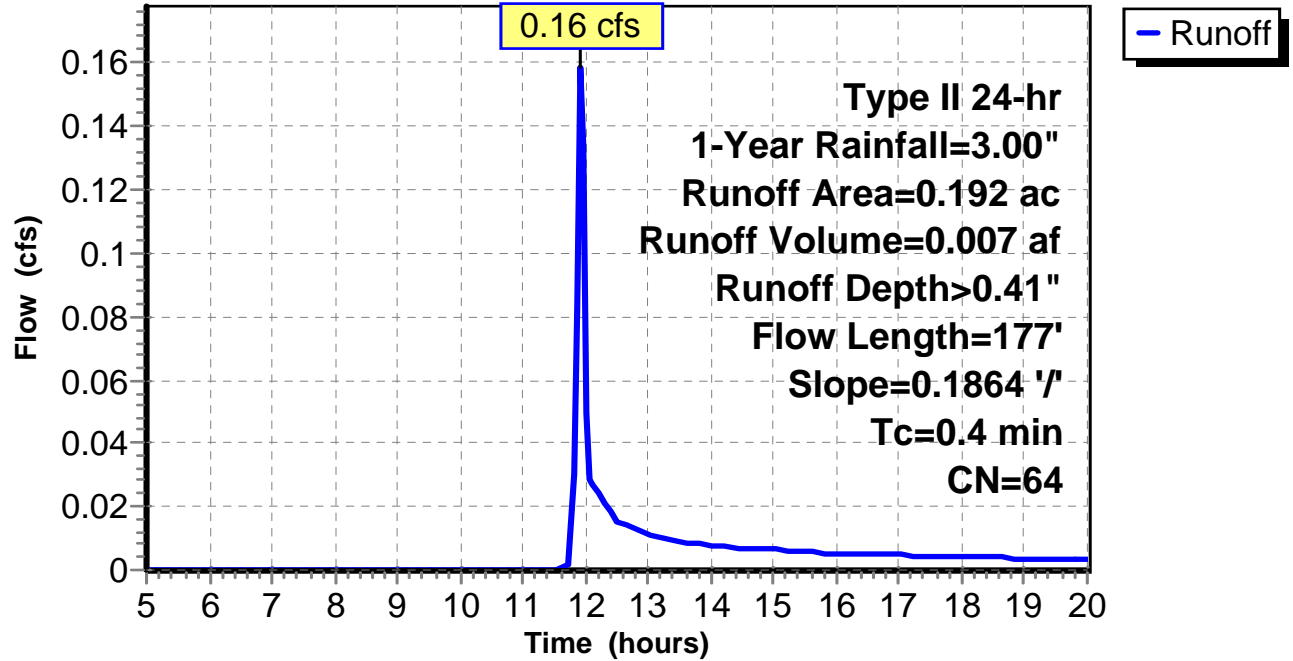
Subcatchment 26: C AR-500.028

Hydrograph



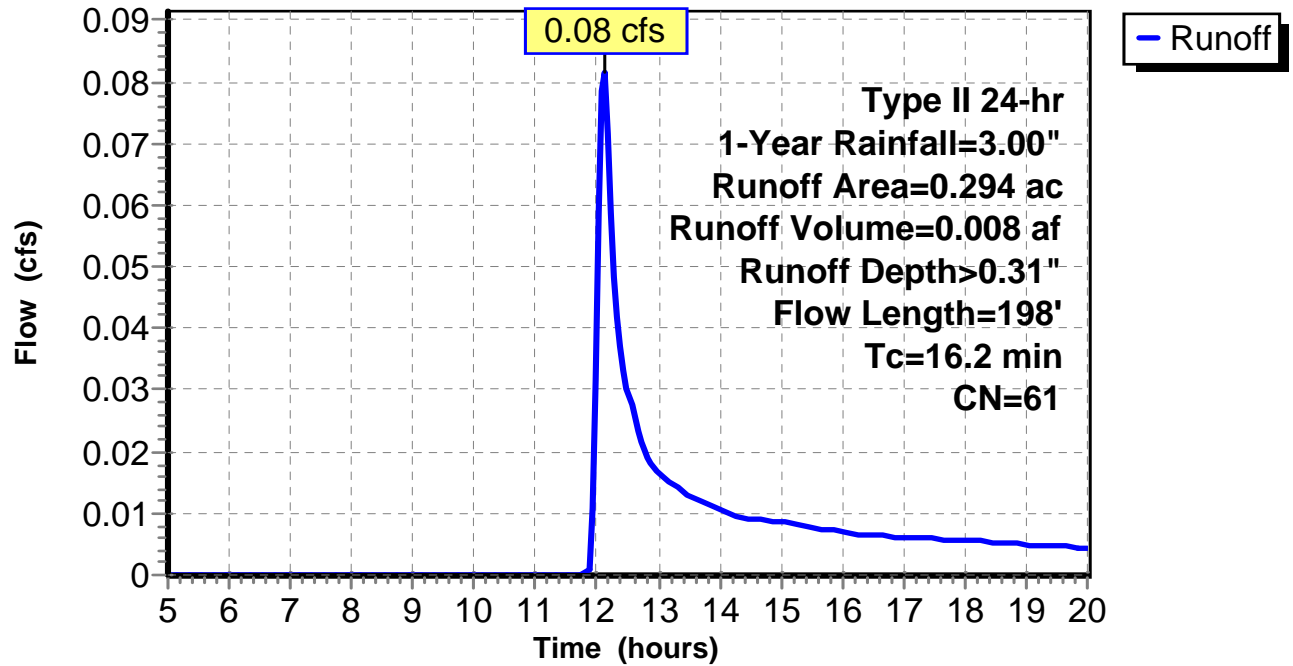
Subcatchment 27: C AR-500.029

Hydrograph



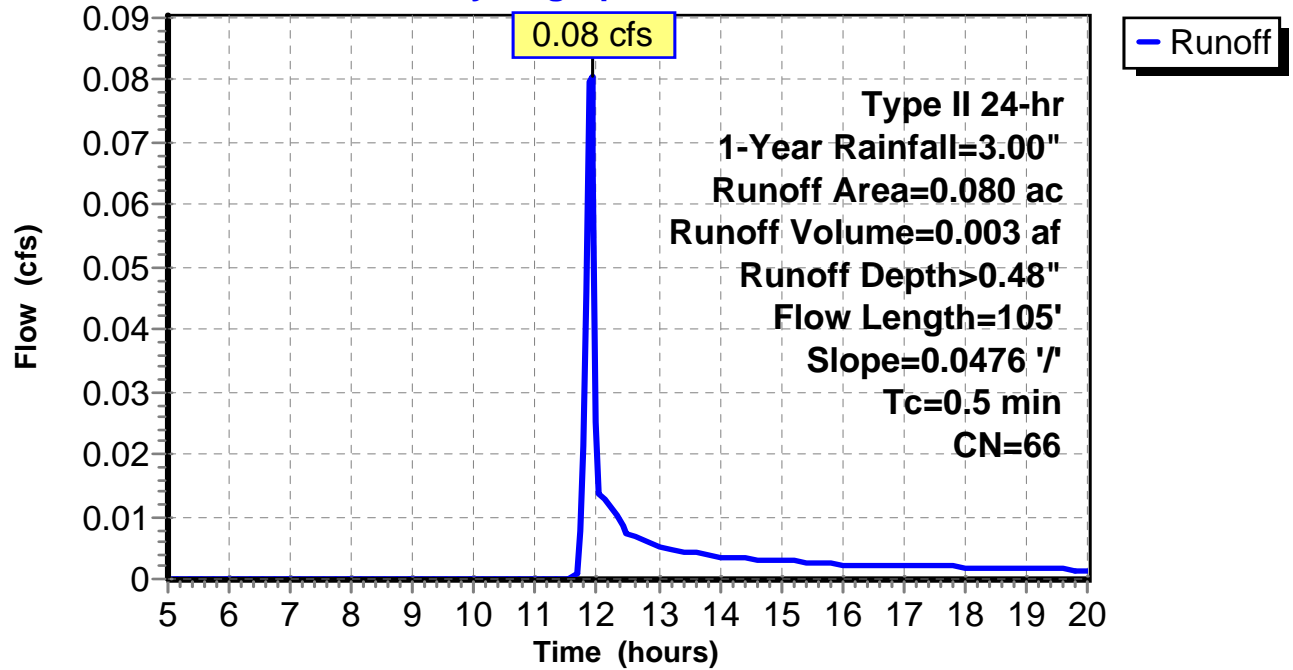
Subcatchment 28: C AR-500.030

Hydrograph



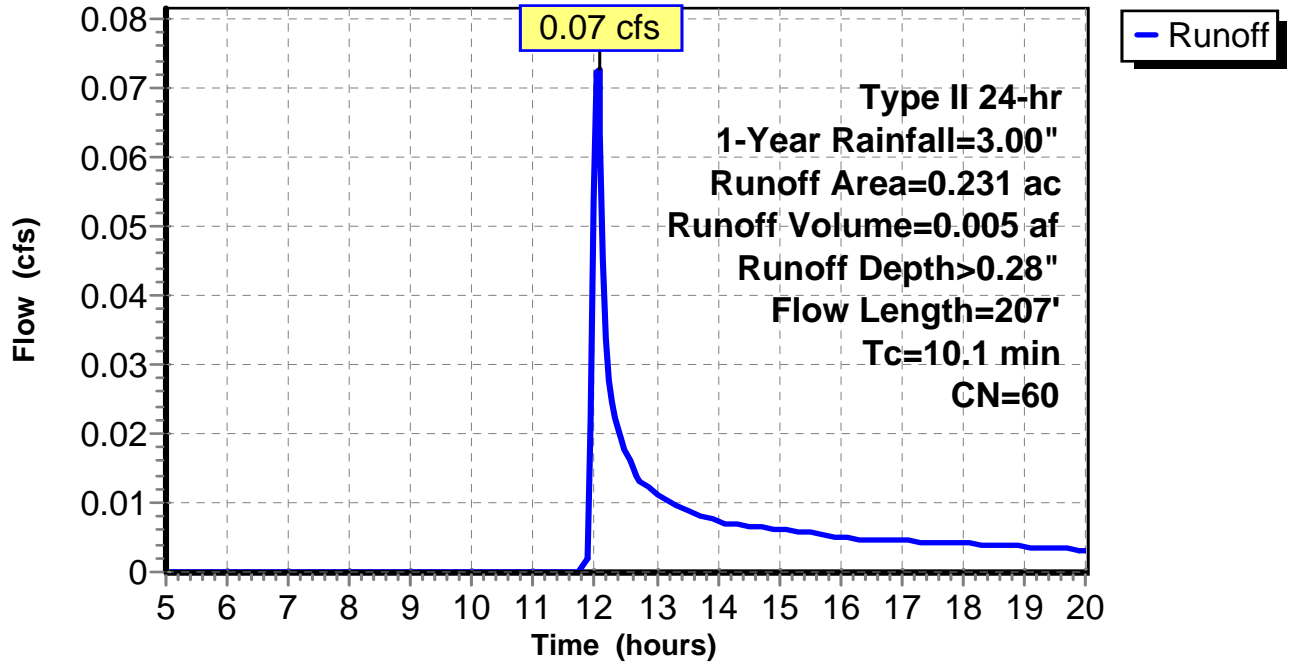
Subcatchment 29: C AR-500.031

Hydrograph



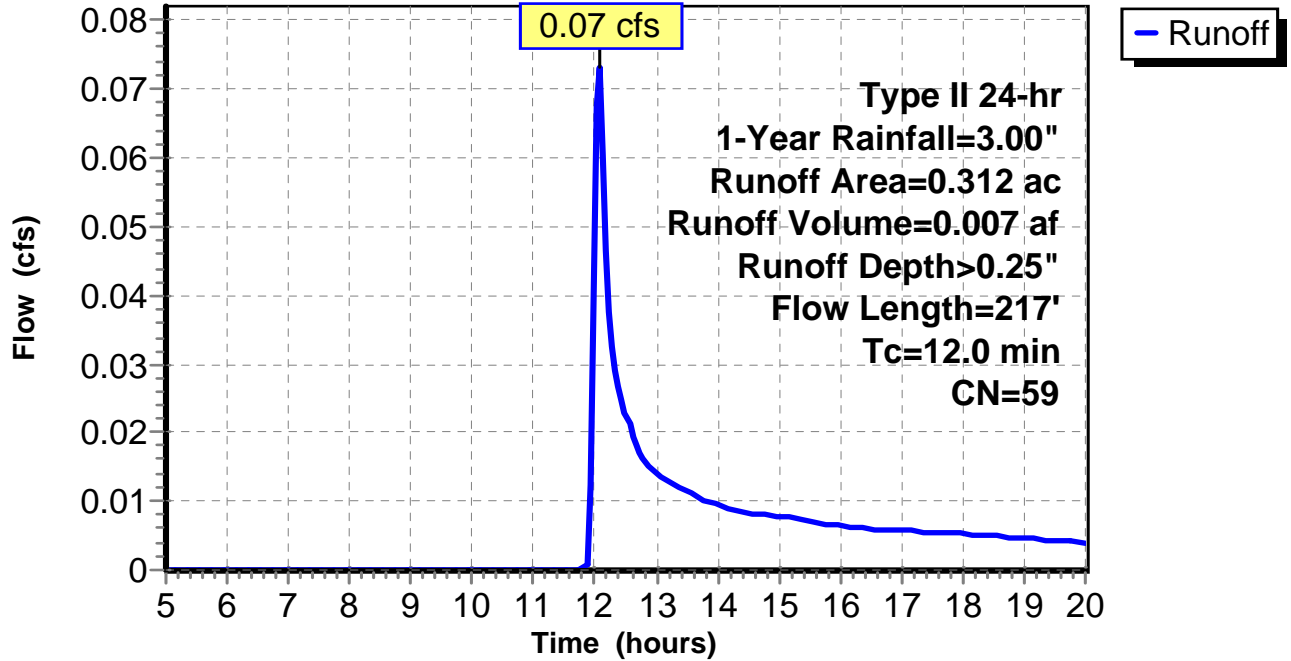
Subcatchment 30: C AR-500.032

Hydrograph



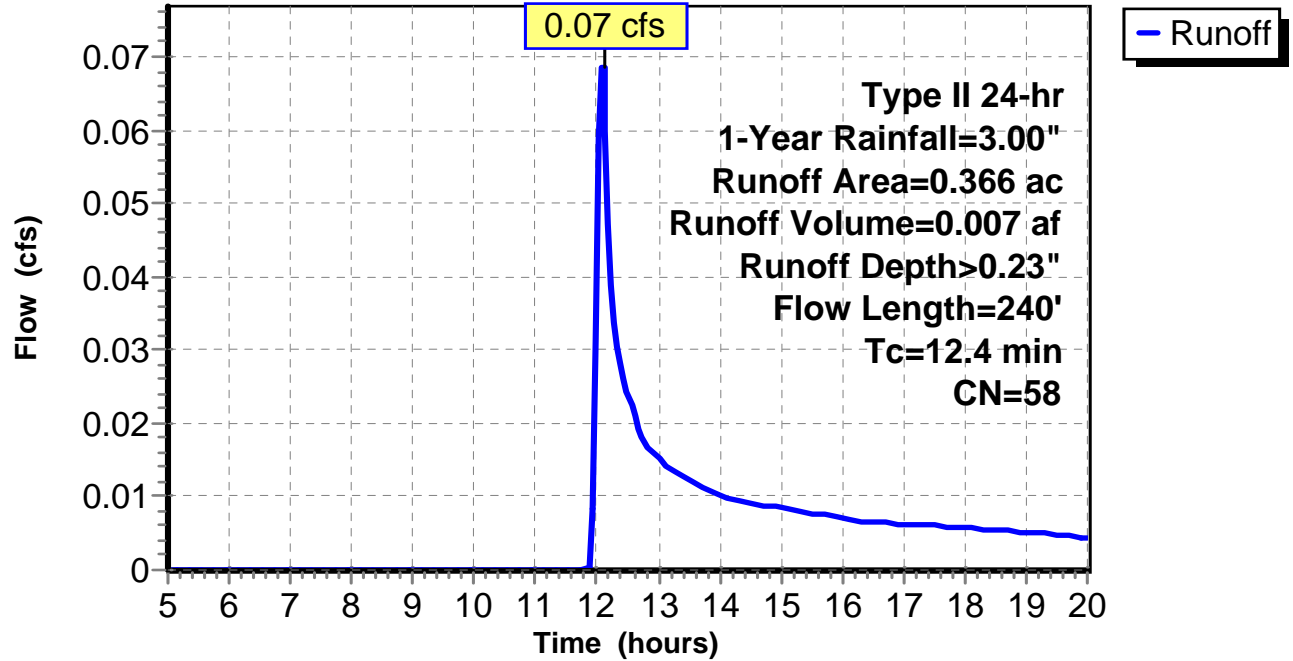
Subcatchment 31: C AR-500.033

Hydrograph



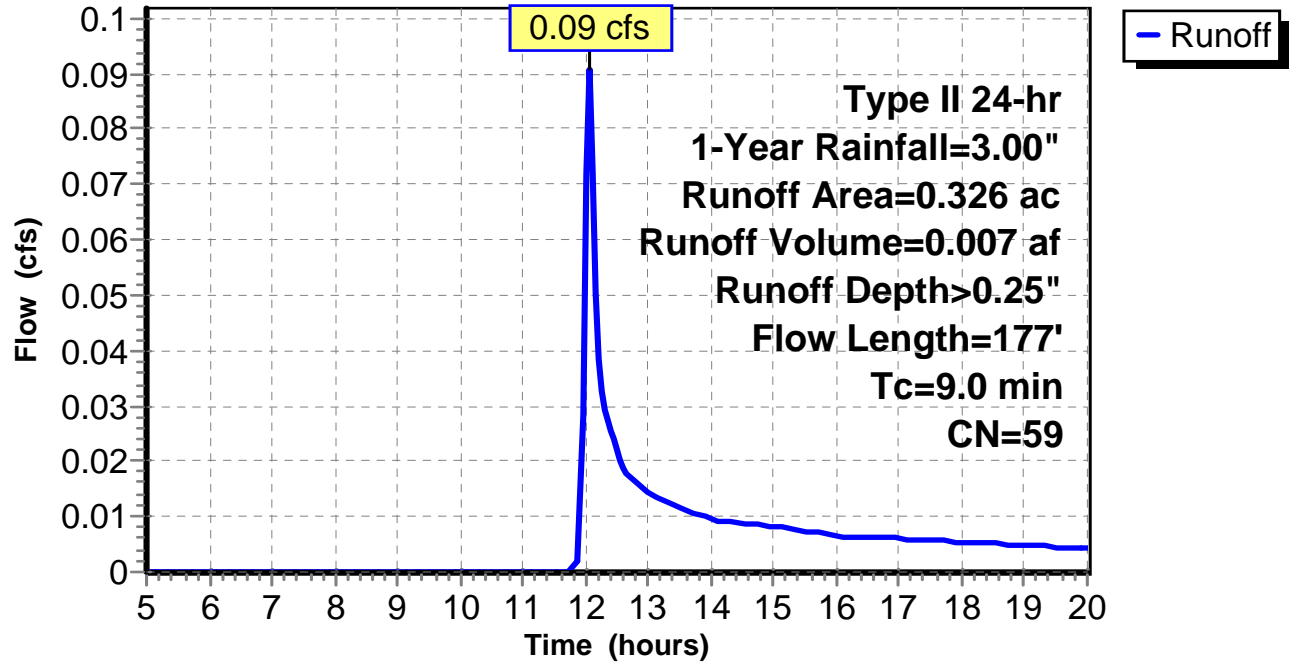
Subcatchment 32: C AR-500.034

Hydrograph



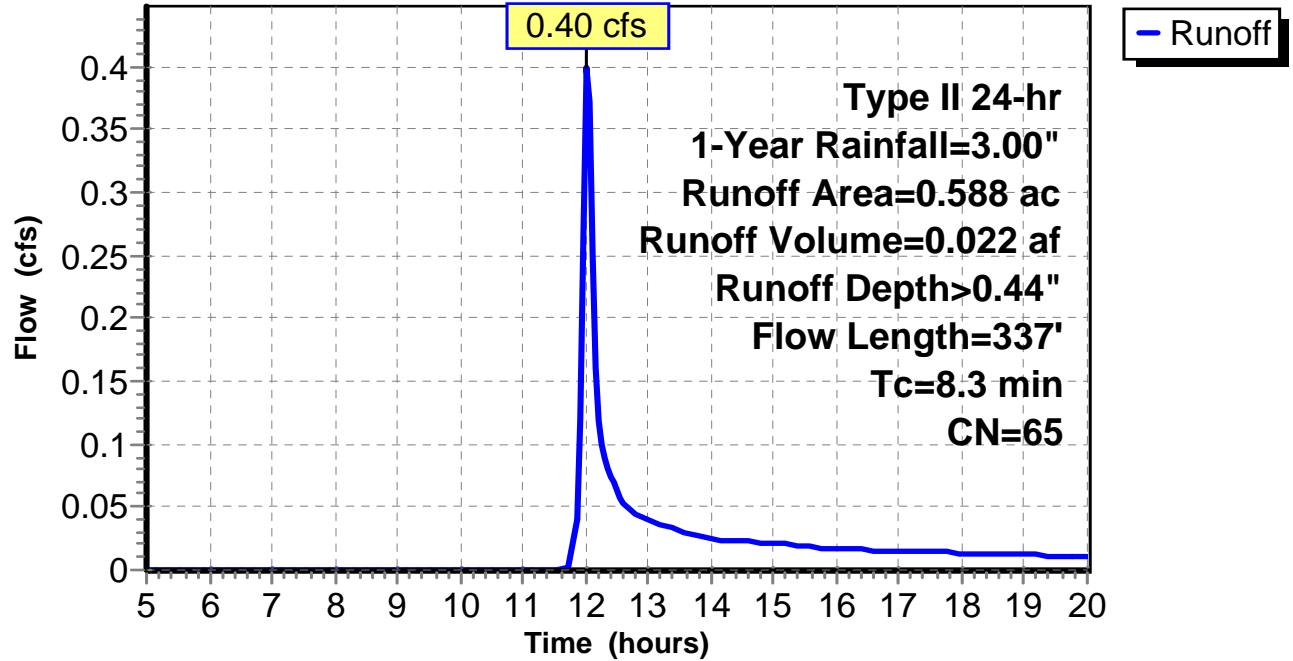
Subcatchment 33: C AR-500.035

Hydrograph



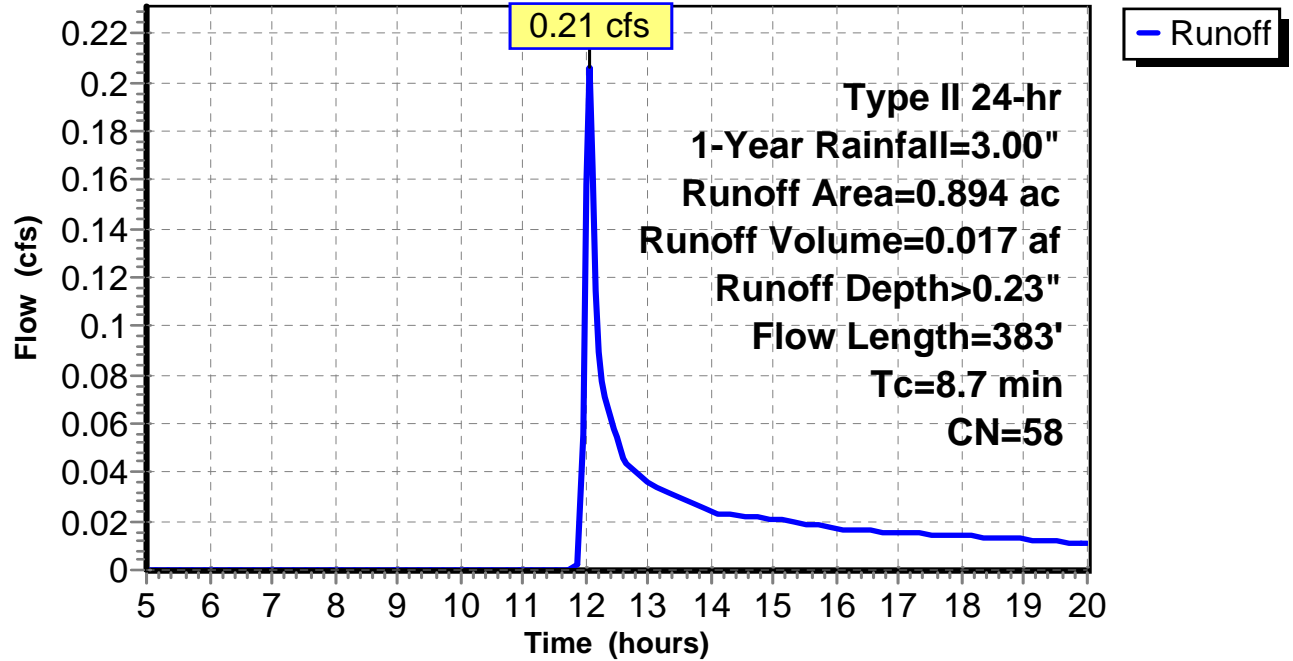
Subcatchment 34: C 158.001

Hydrograph



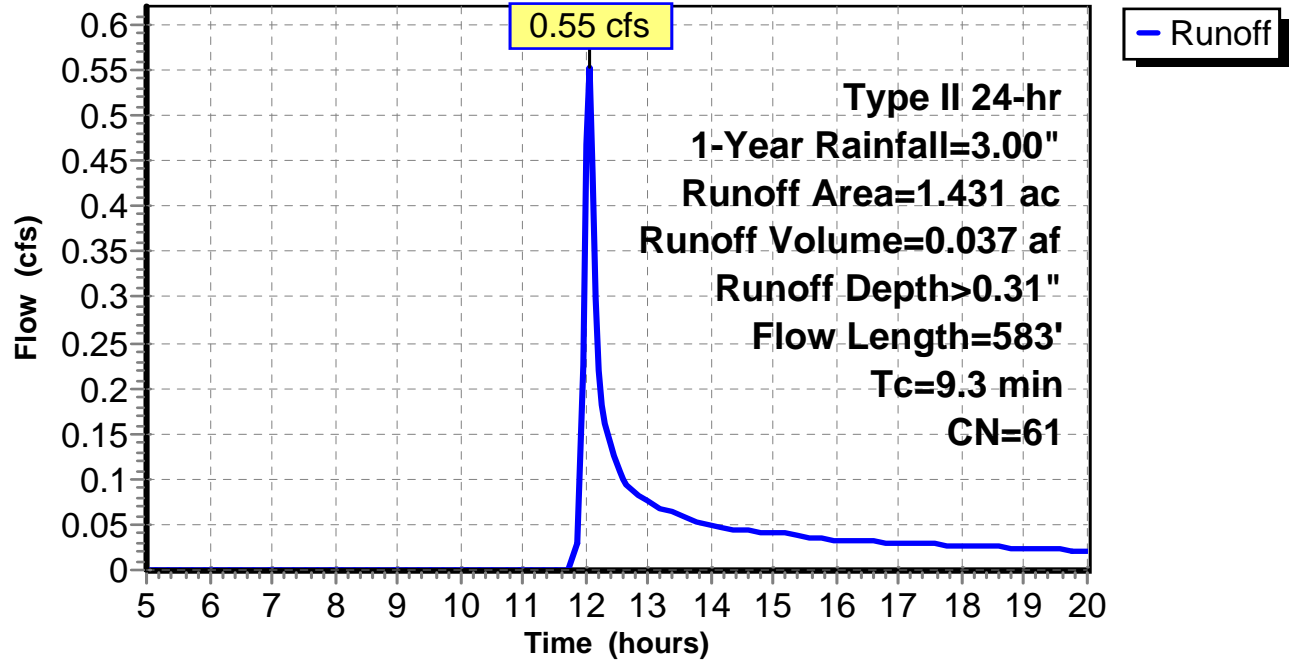
Subcatchment 35: C 158.002

Hydrograph



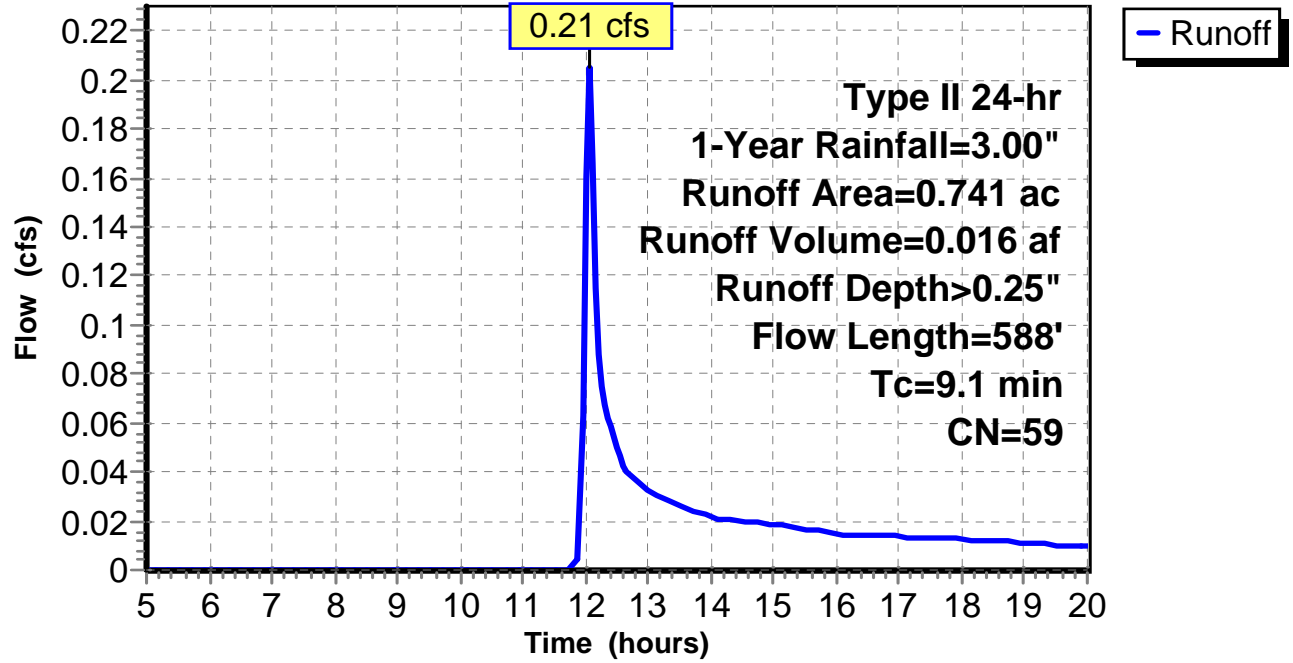
Subcatchment 36: C 158.003

Hydrograph



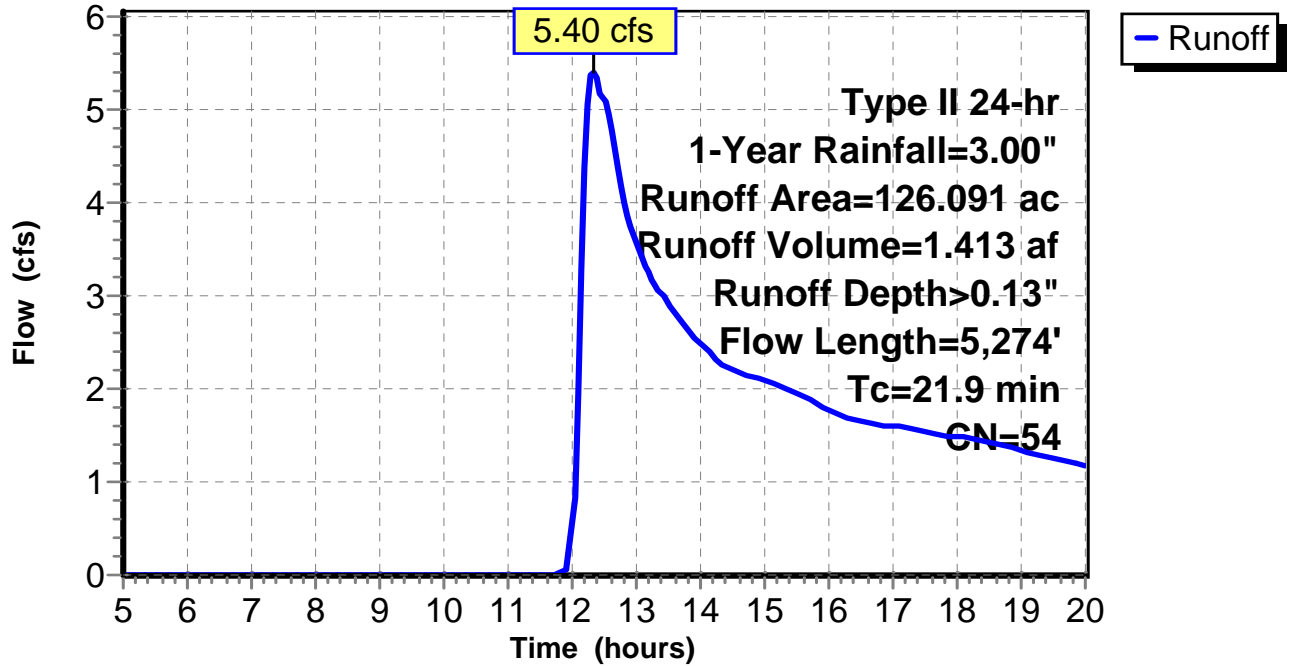
Subcatchment 37: C 158.004

Hydrograph



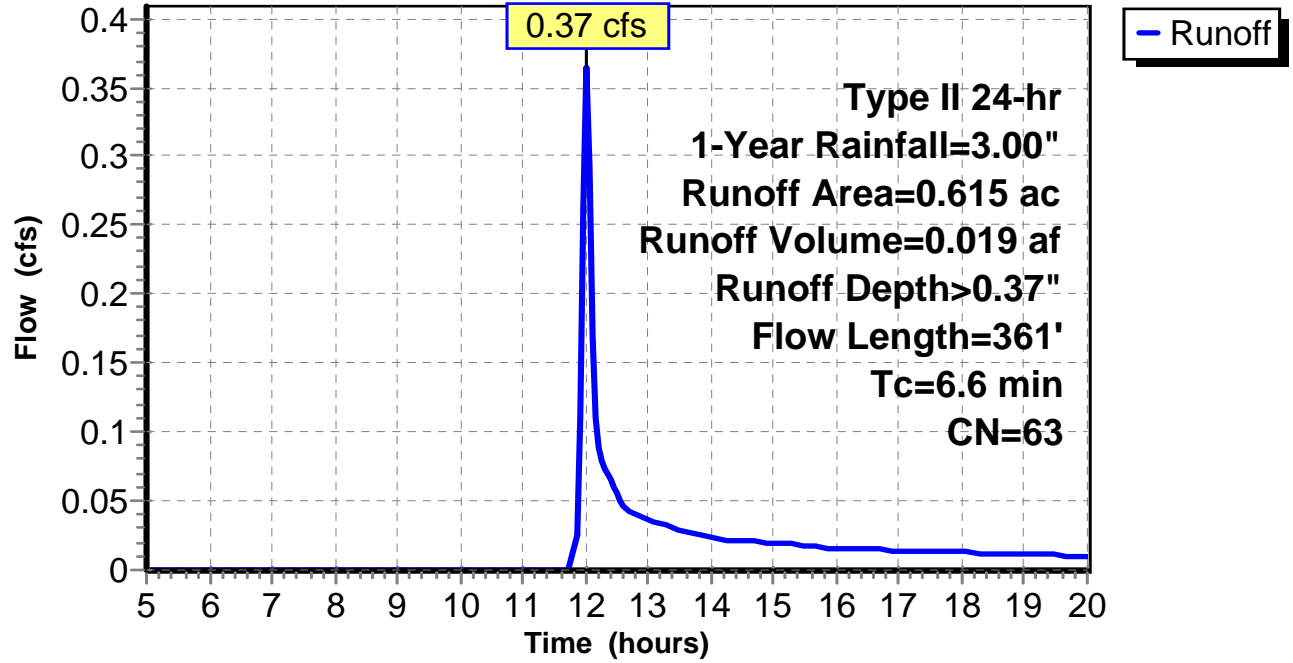
Subcatchment 38: C 158.005

Hydrograph



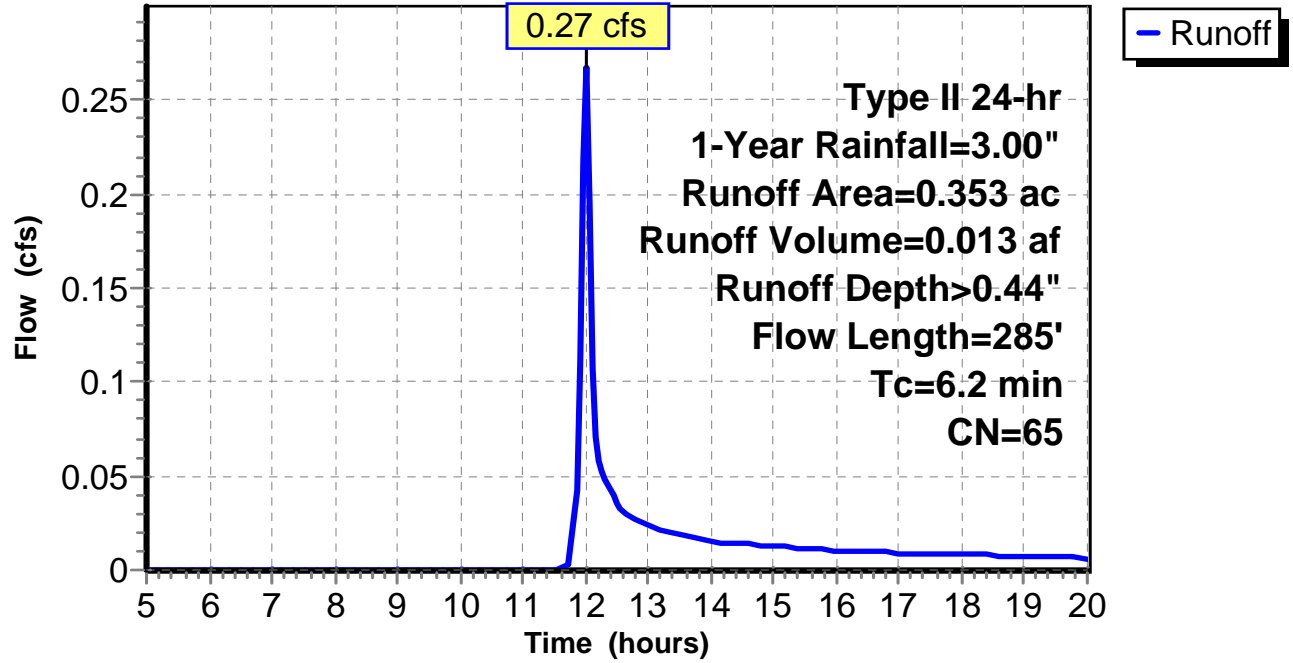
Subcatchment 39: C 158.006

Hydrograph



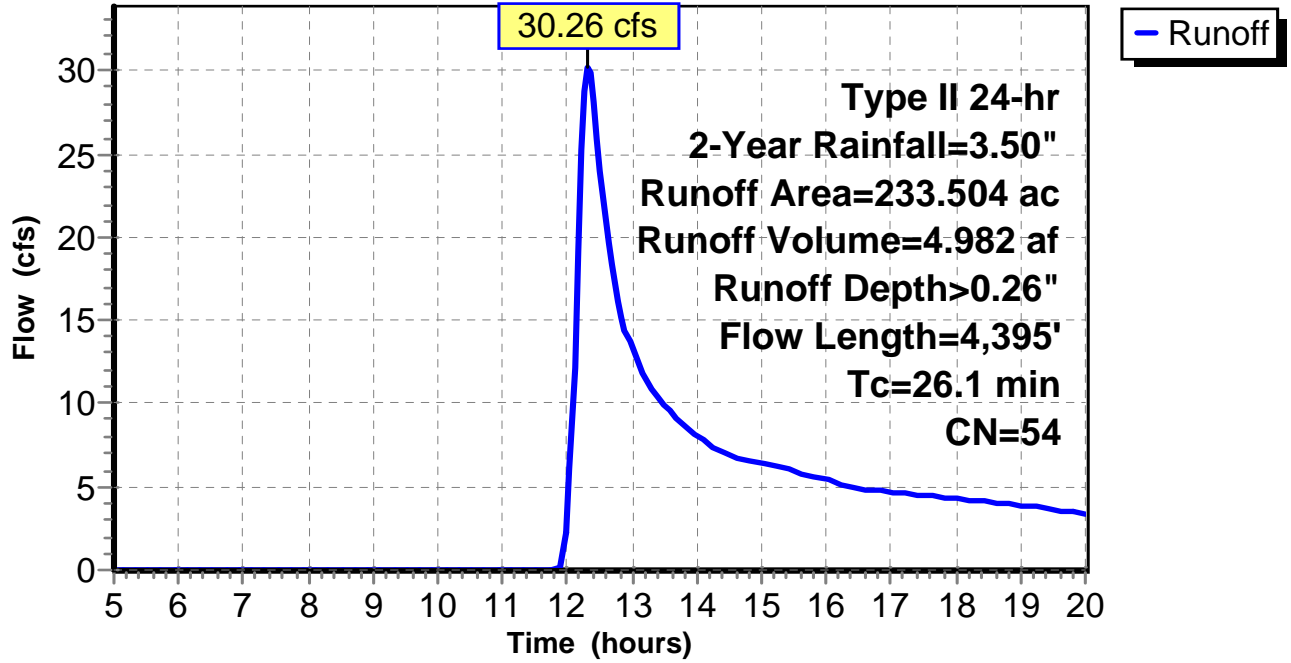
Subcatchment 40: C 158.007

Hydrograph



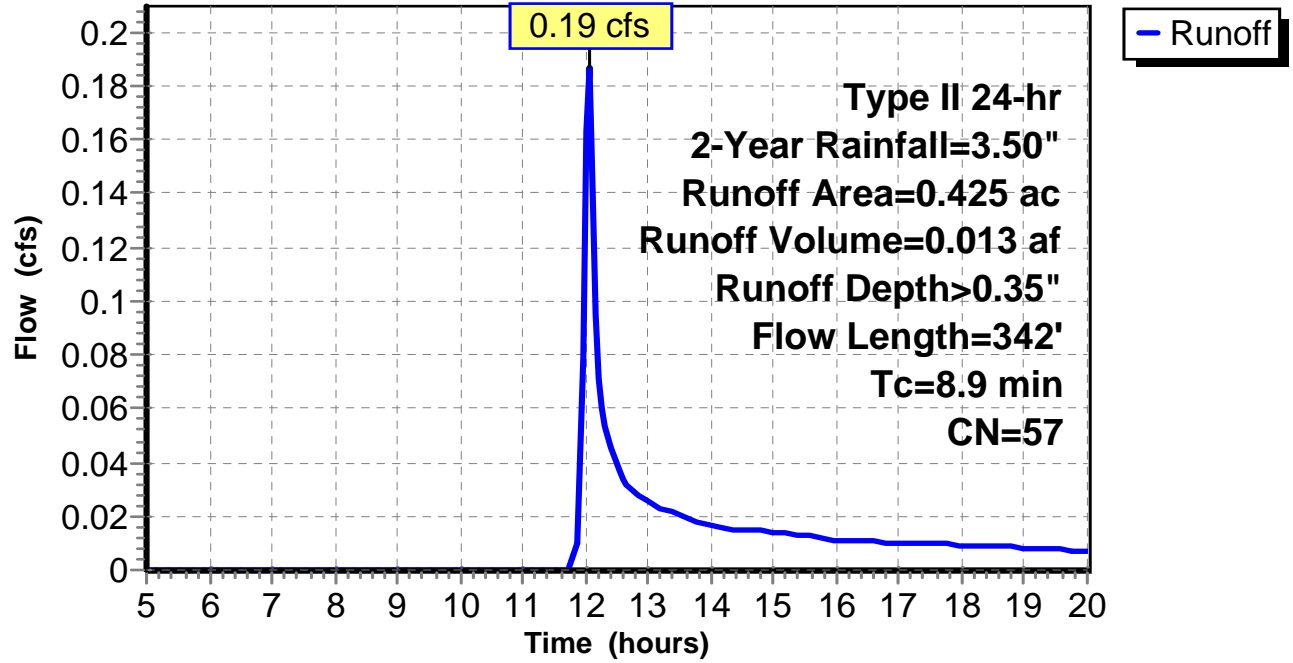
Subcatchment 1: C AR-500.003

Hydrograph



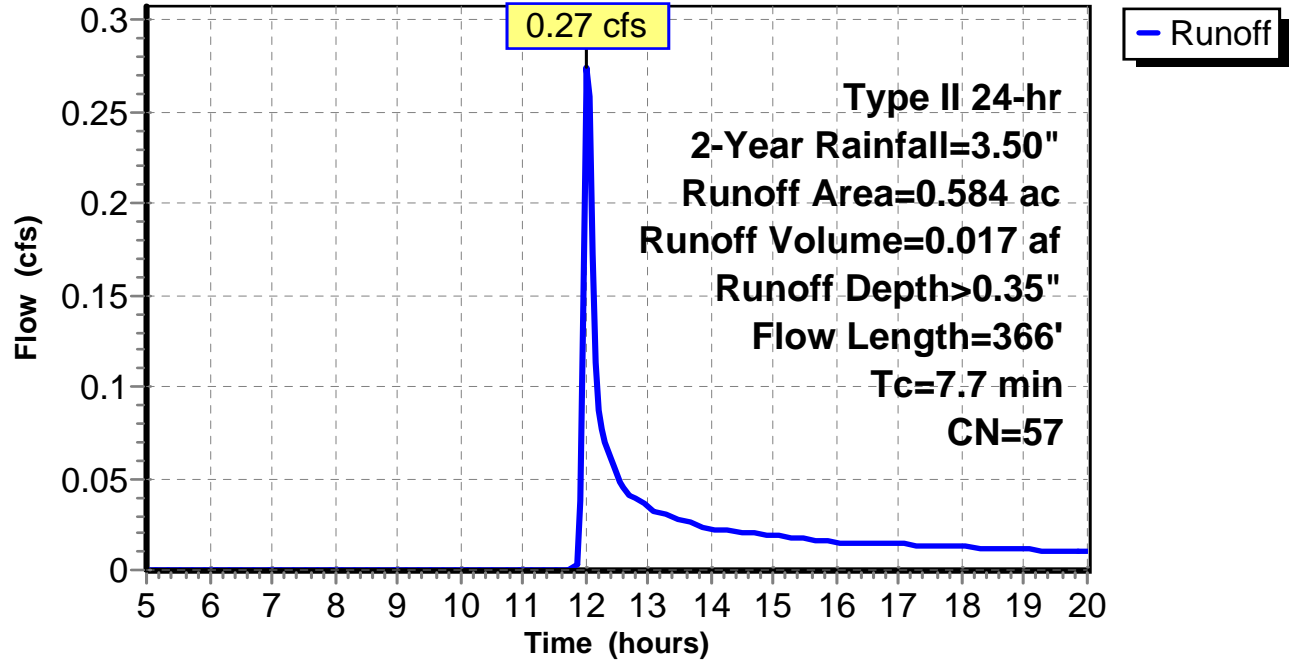
Subcatchment 2: C AR-500.004

Hydrograph



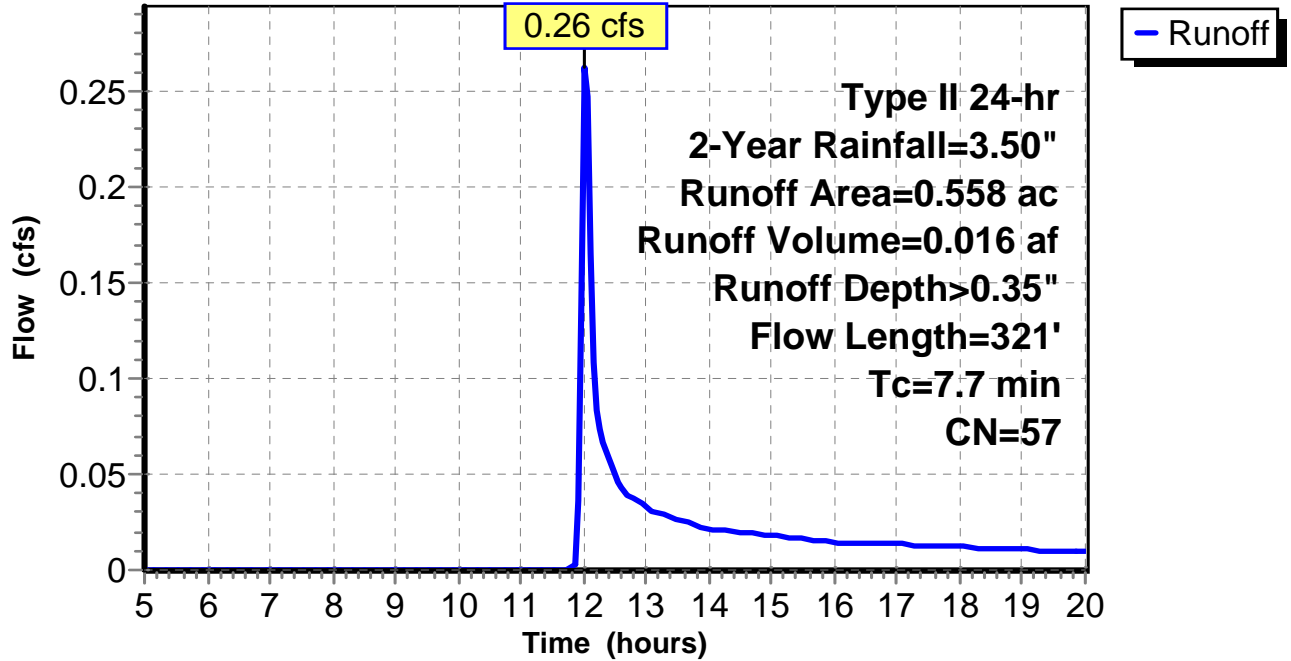
Subcatchment 3: C AR-500.005

Hydrograph



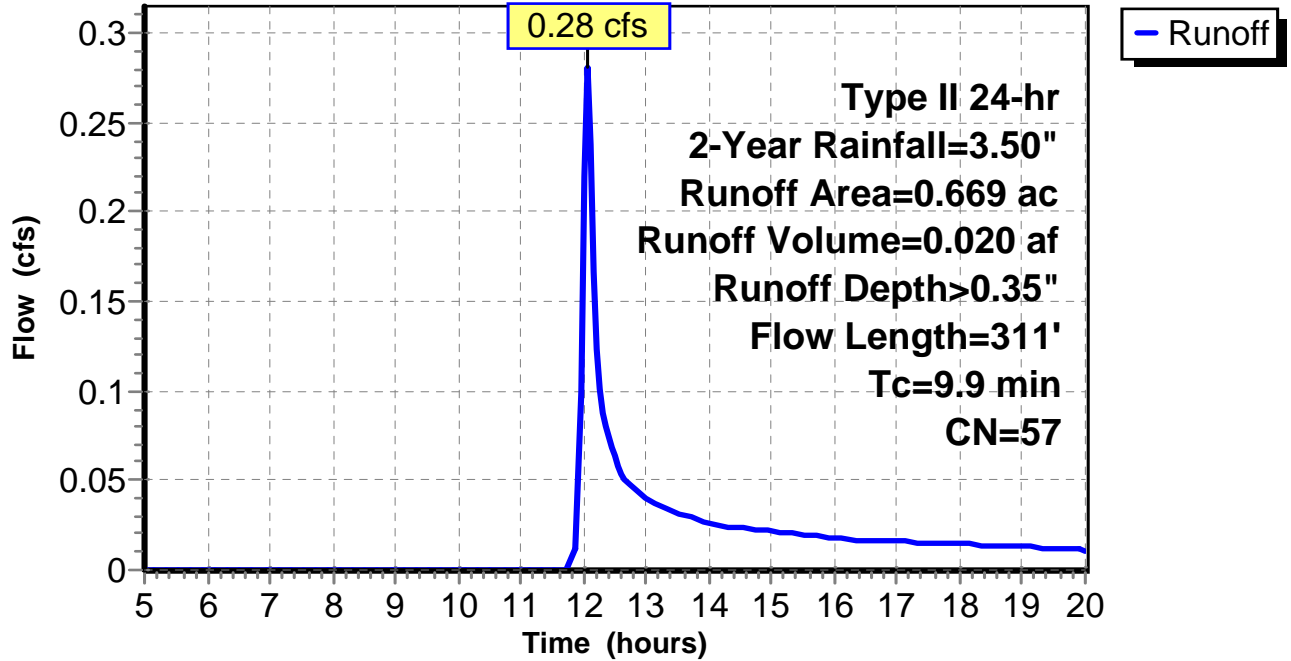
Subcatchment 4: C AR-500.006

Hydrograph



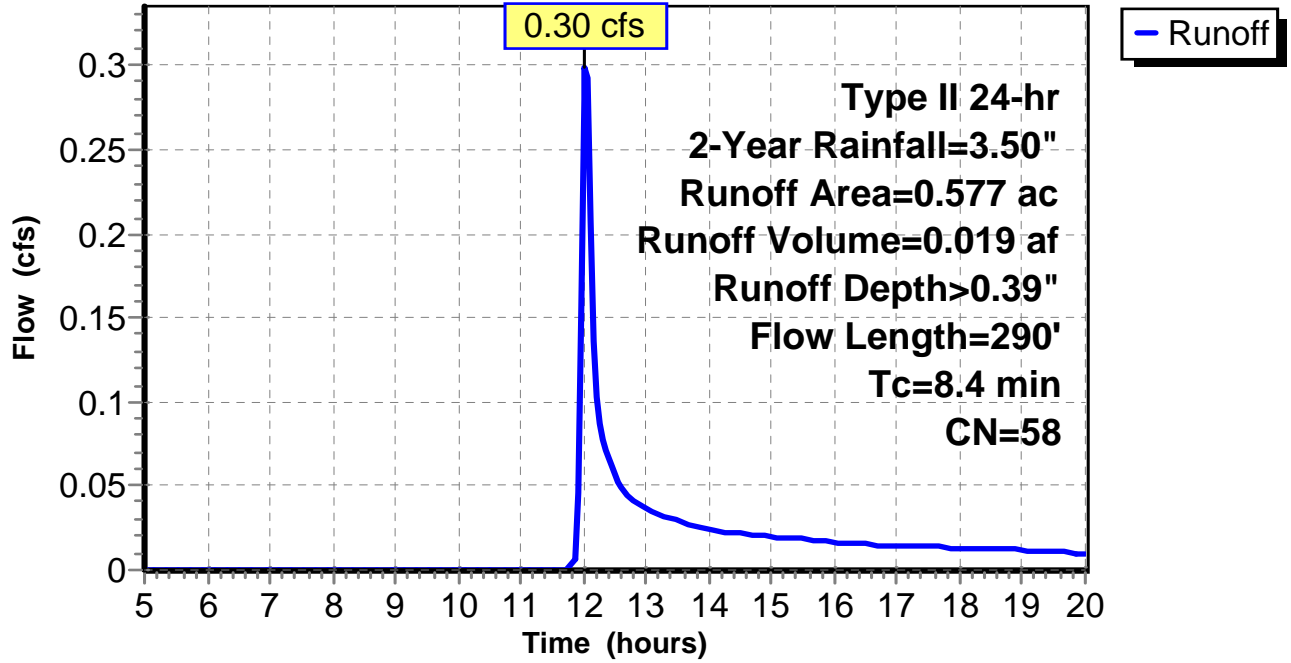
Subcatchment 5: C AR-500.007

Hydrograph



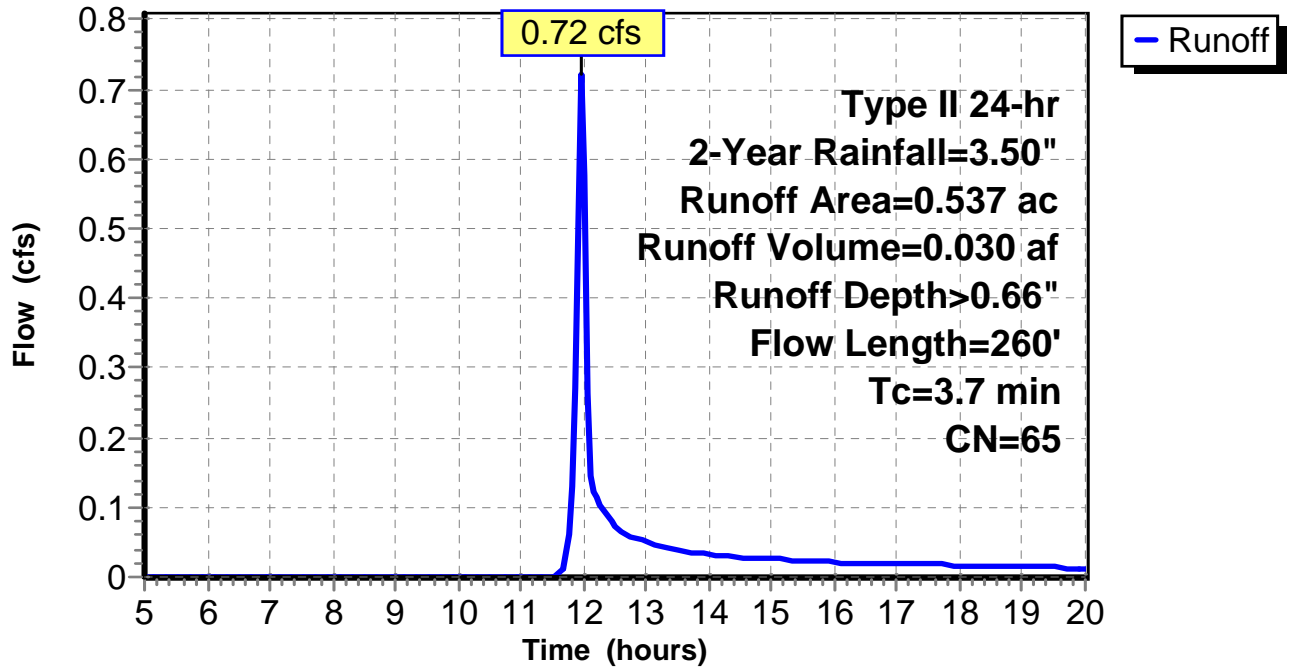
Subcatchment 6: C AR-500.008

Hydrograph



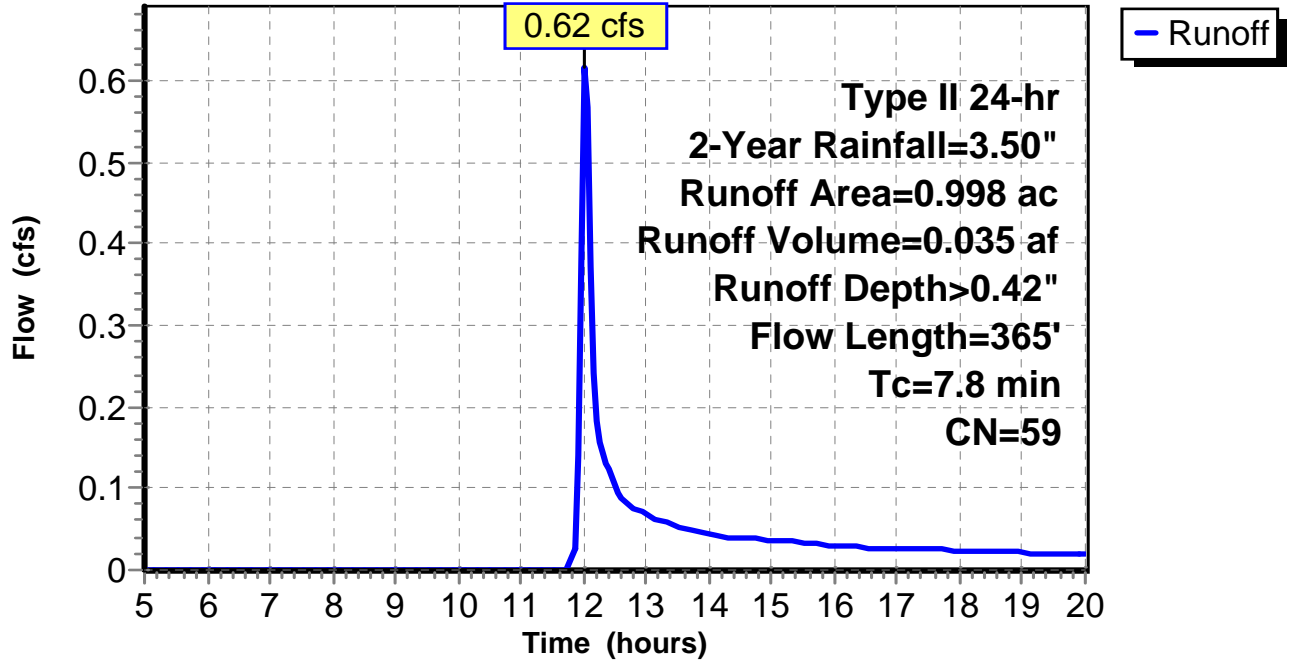
Subcatchment 7: C AR-500.009

Hydrograph



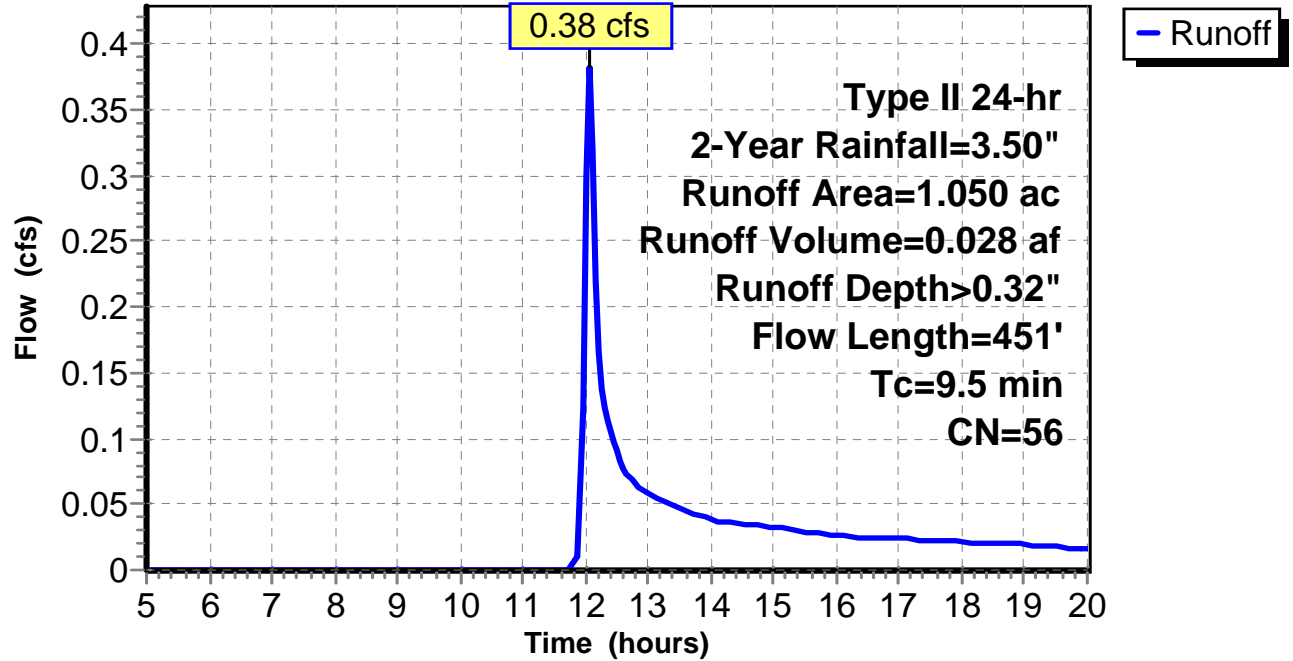
Subcatchment 8: C AR-500.010

Hydrograph



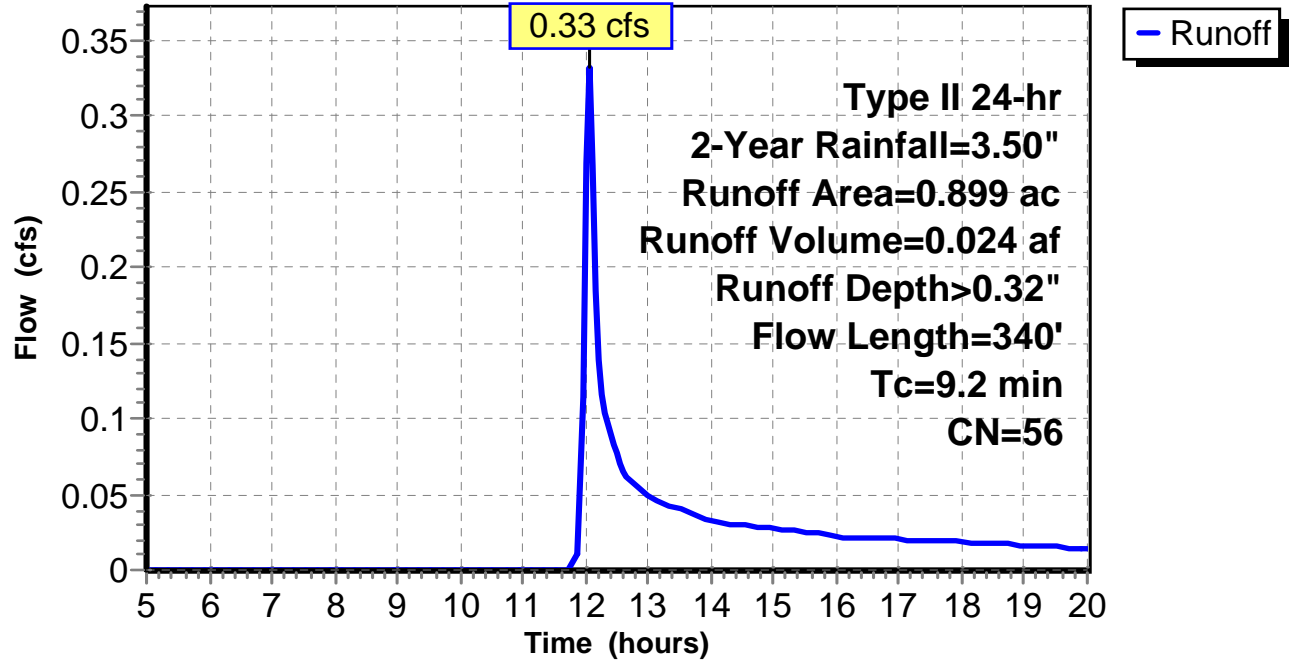
Subcatchment 9: C AR-500.011

Hydrograph



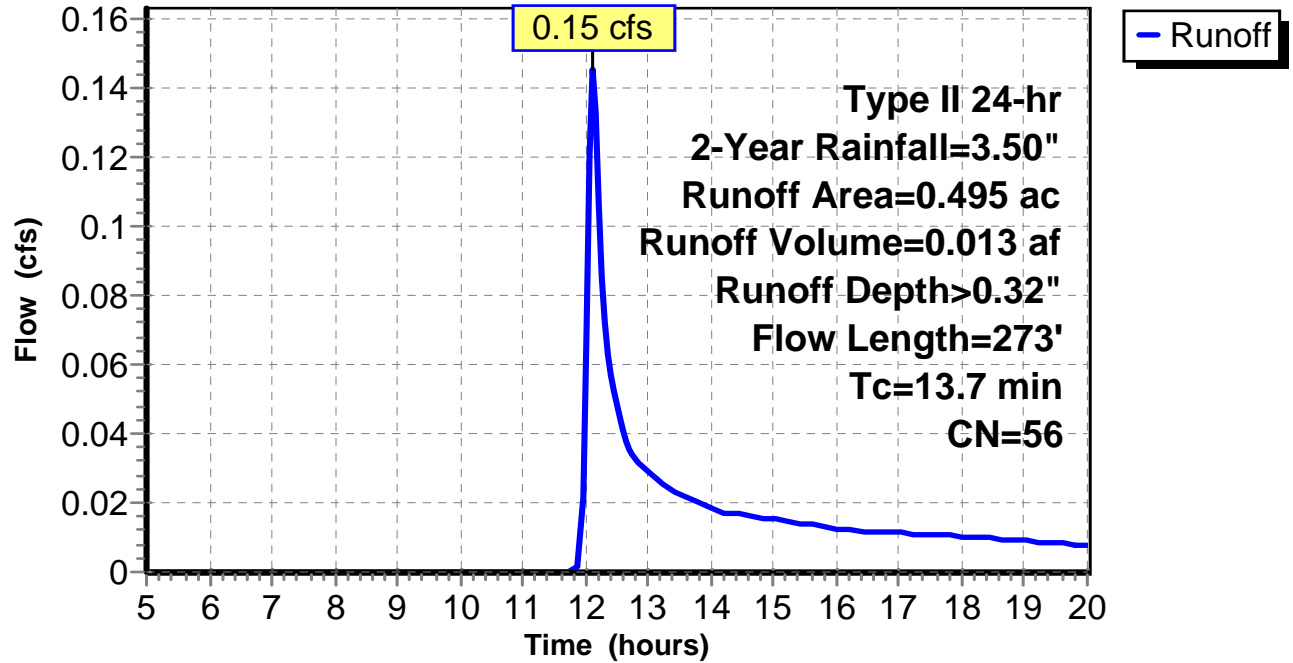
Subcatchment 10: C AR-500.012

Hydrograph



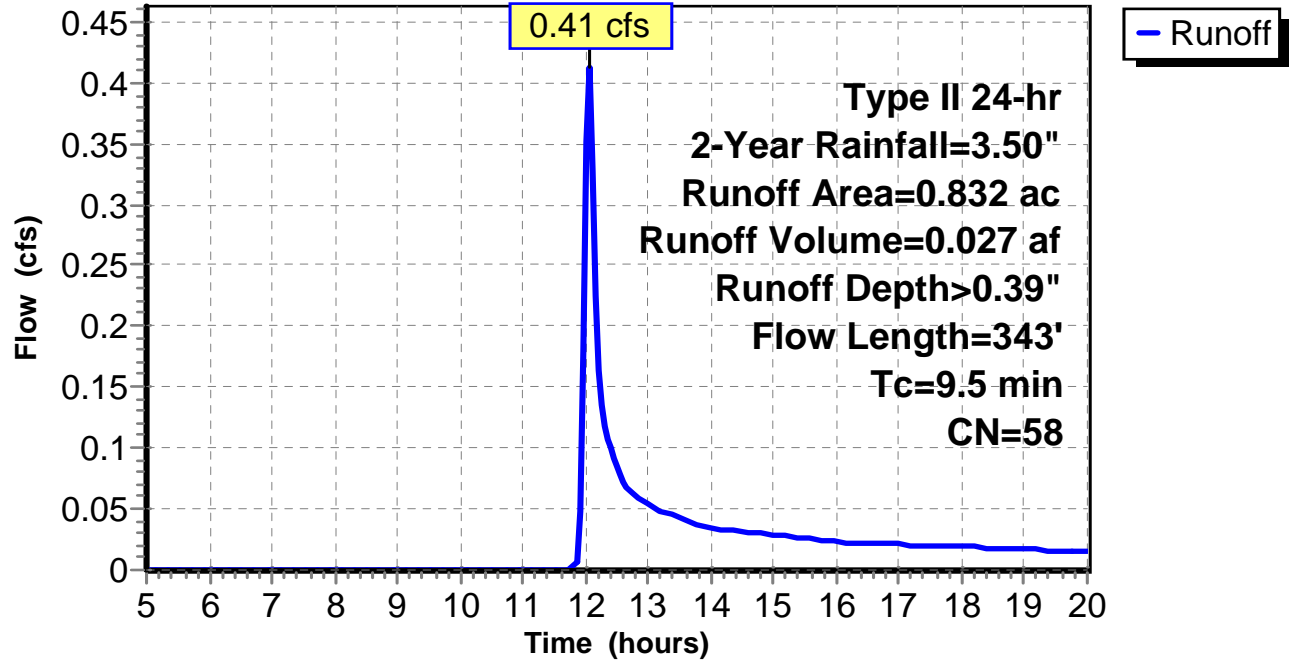
Subcatchment 11: C AR-500.013

Hydrograph



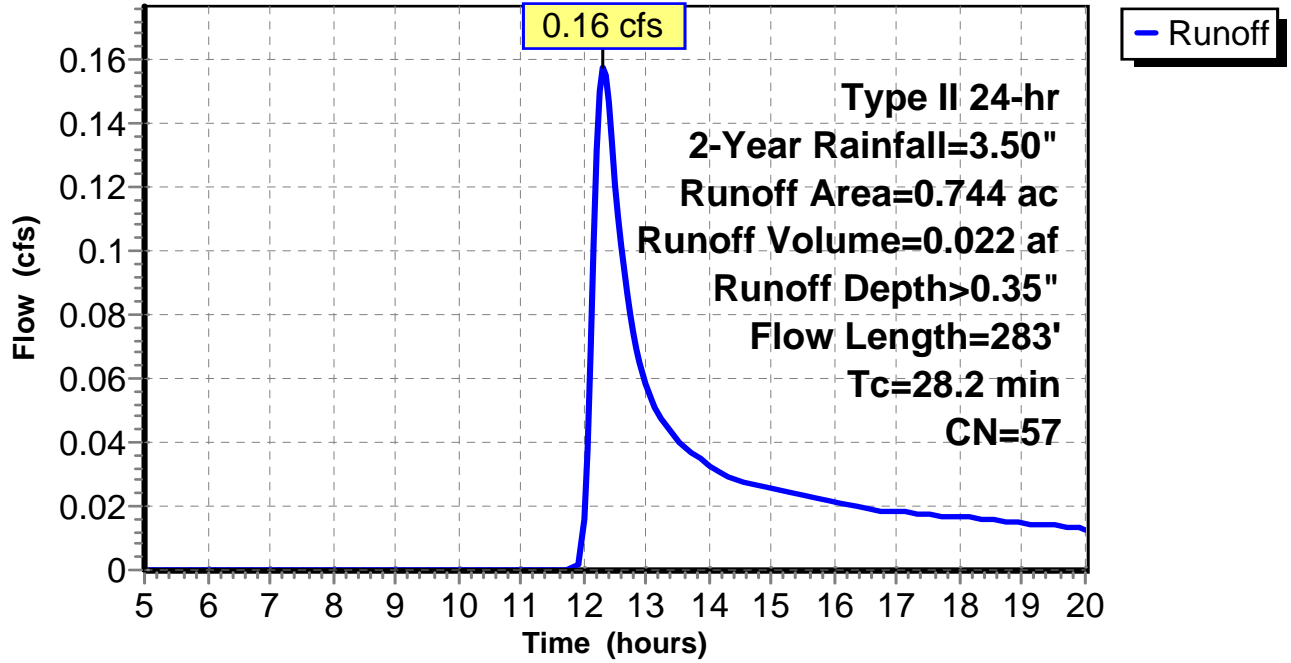
Subcatchment 12: C AR-500.014

Hydrograph



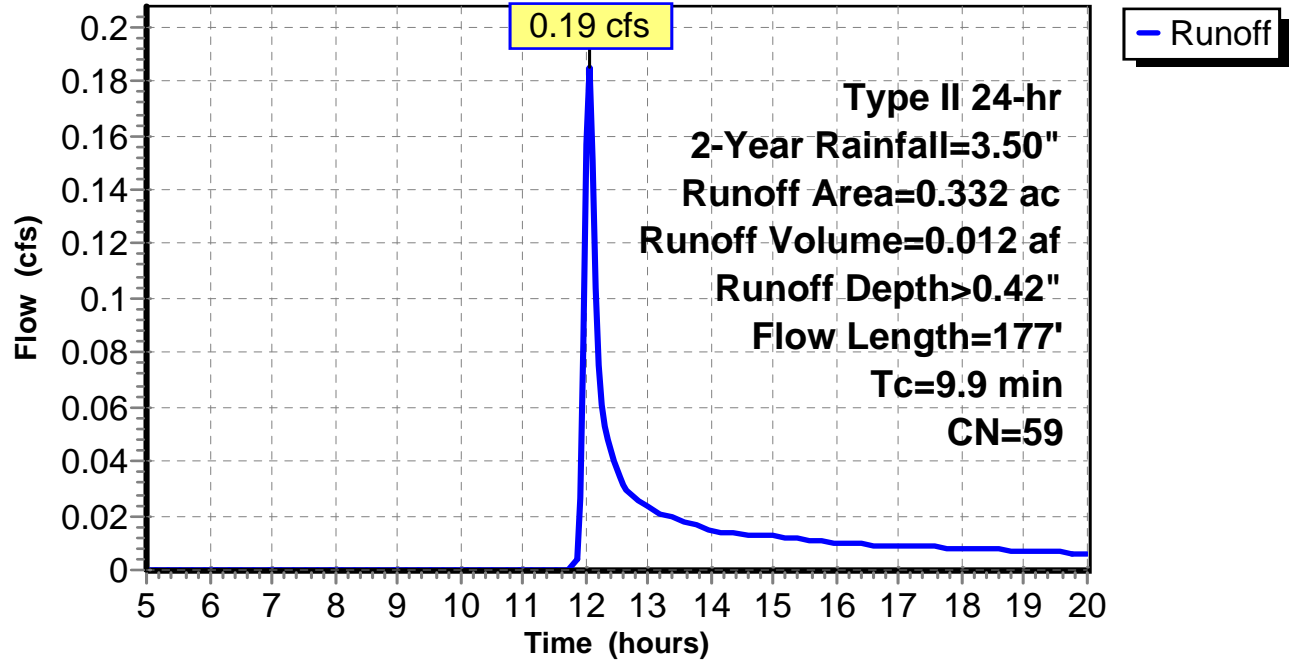
Subcatchment 13: C AR-500.015

Hydrograph



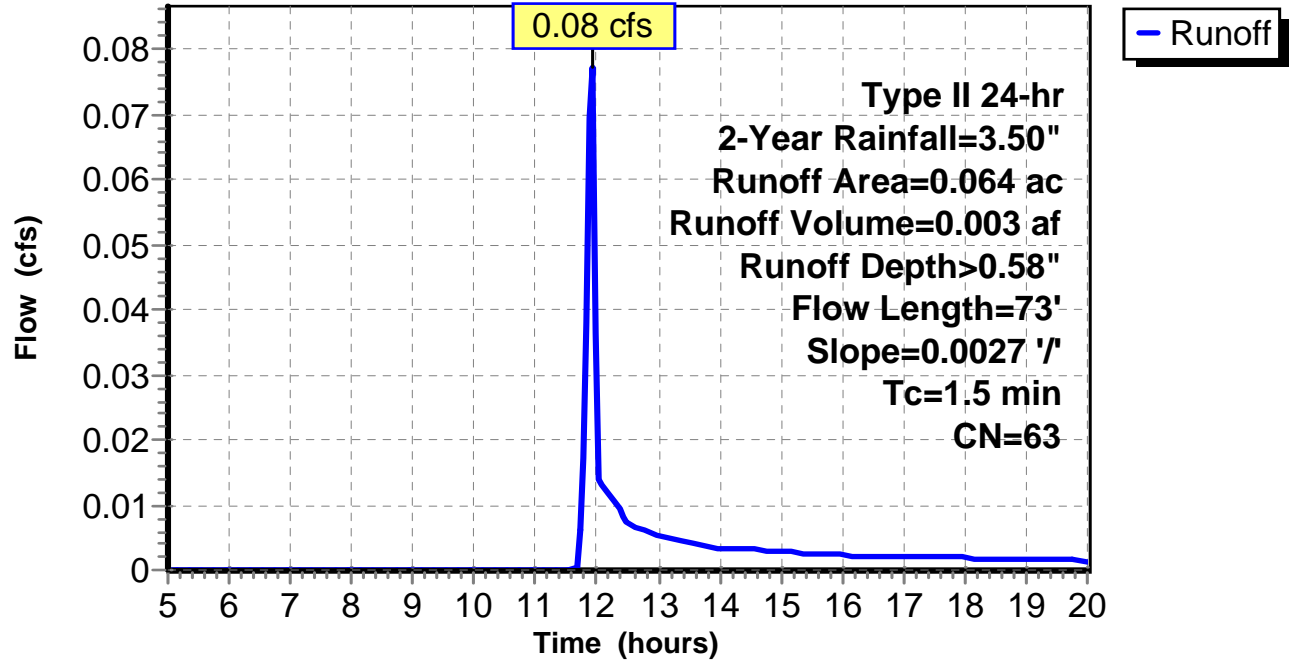
Subcatchment 14: C AR-500.016

Hydrograph



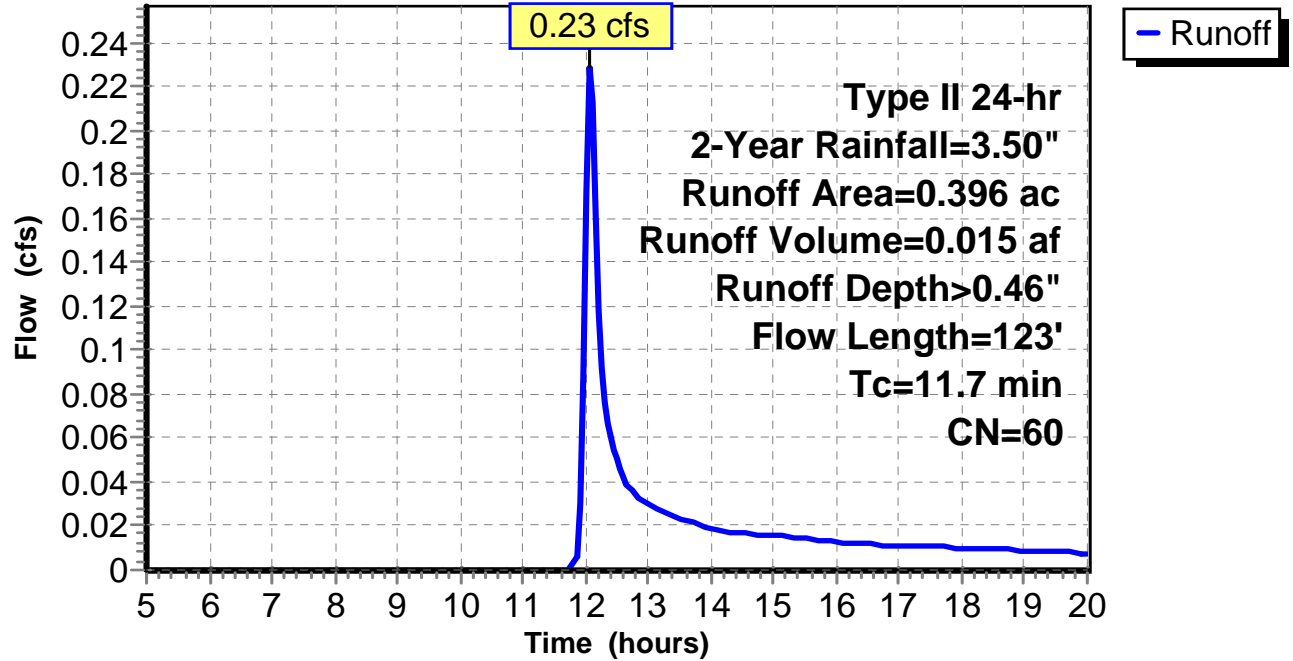
Subcatchment 15: C AR-500.017

Hydrograph



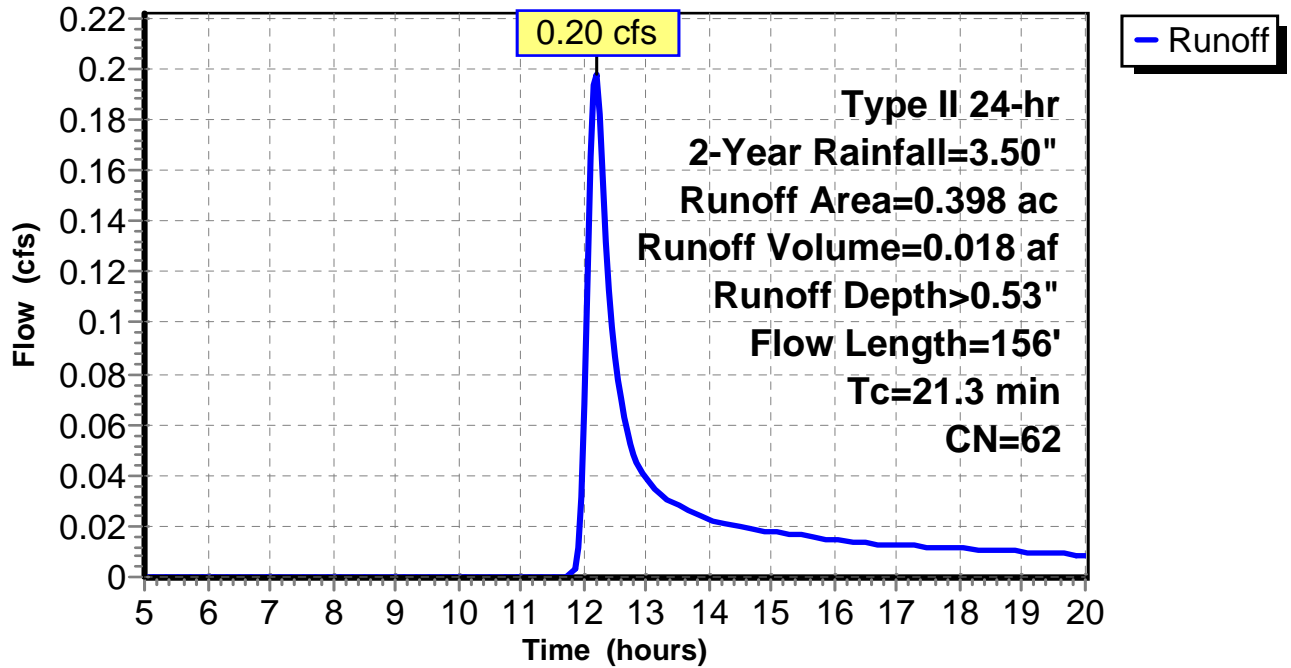
Subcatchment 16: C AR-500.018

Hydrograph



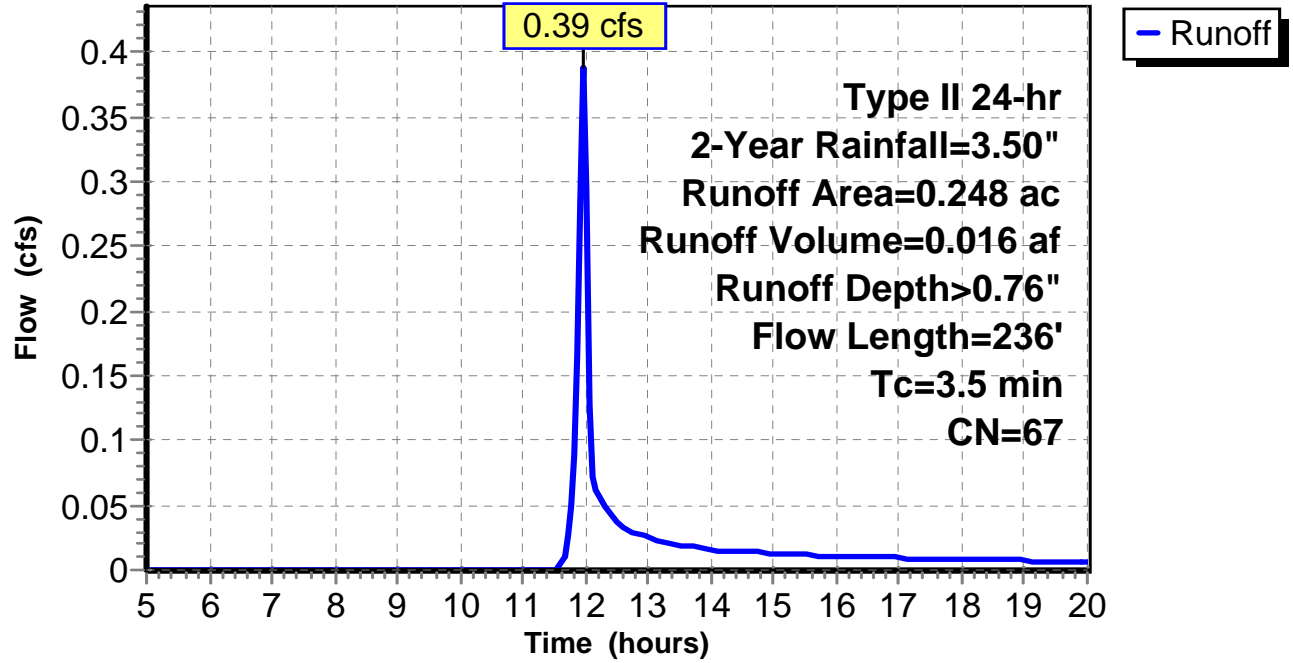
Subcatchment 17: C AR-500.019

Hydrograph



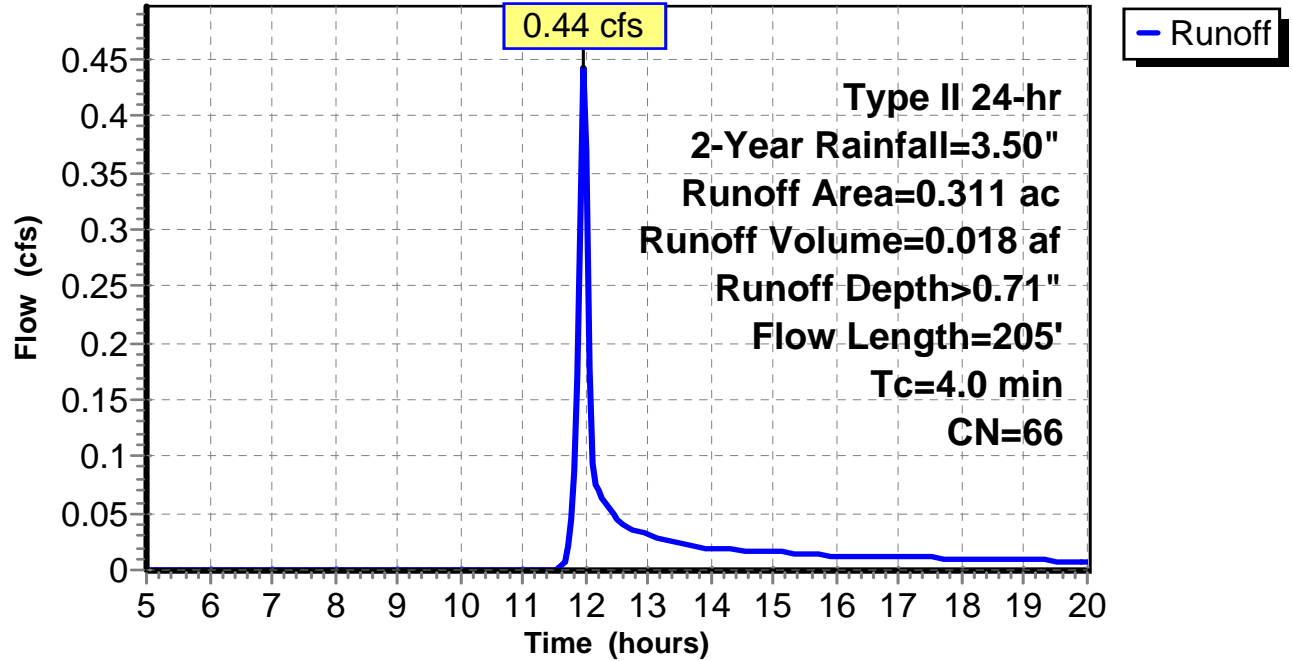
Subcatchment 18: C AR-500.020

Hydrograph



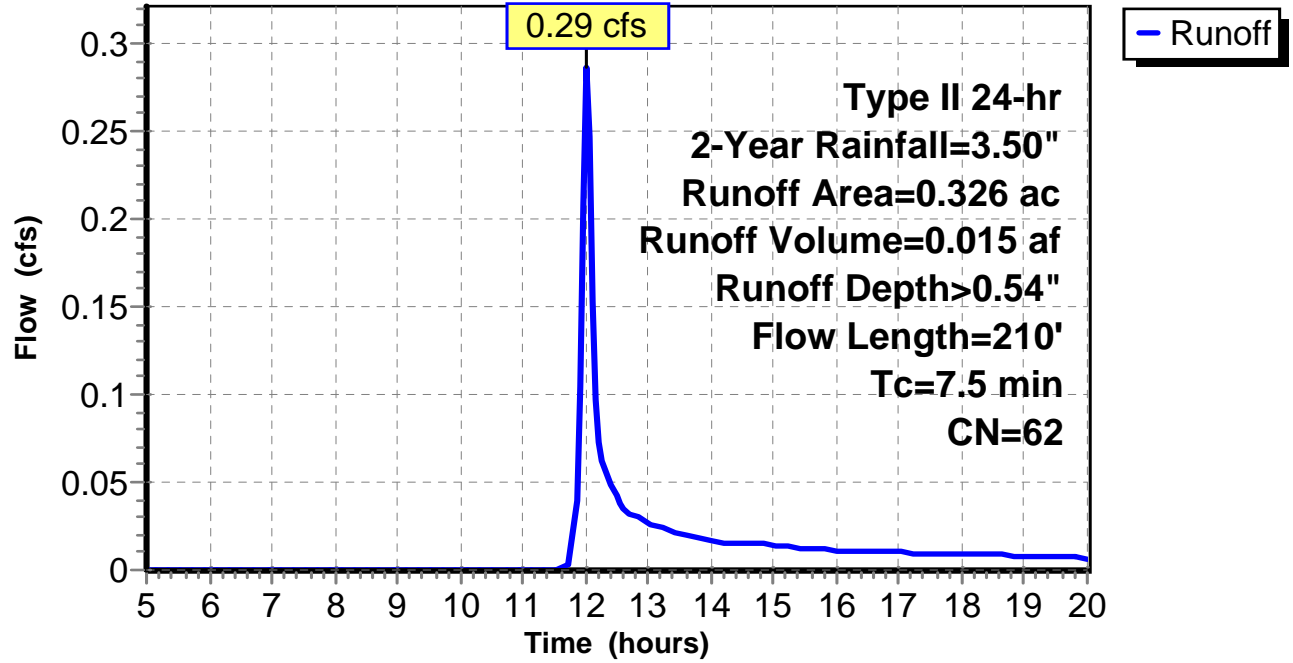
Subcatchment 19: C AR-500.021

Hydrograph



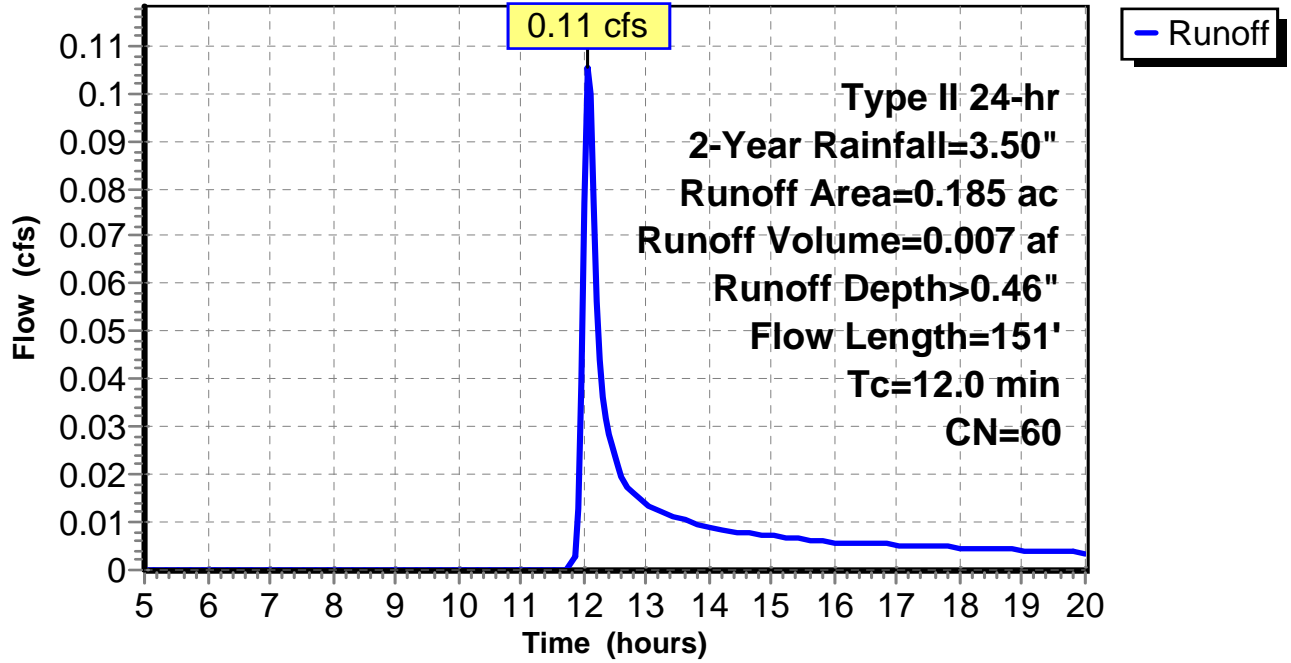
Subcatchment 20: C AR-500.022

Hydrograph



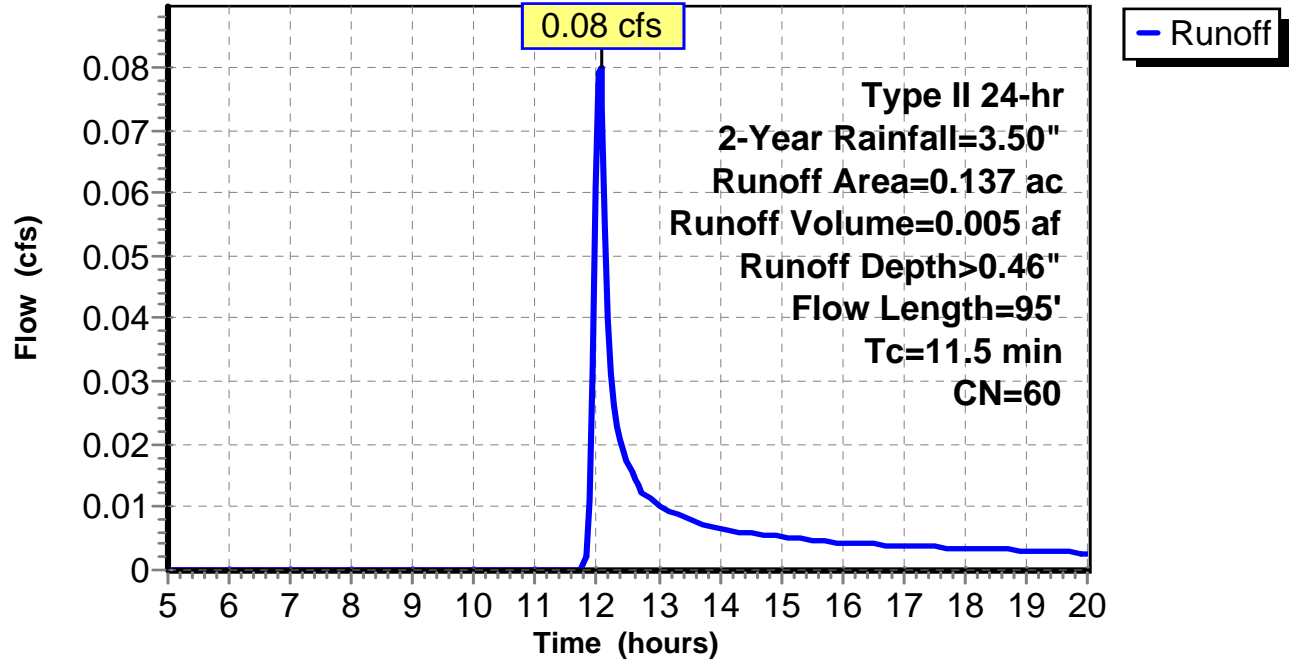
Subcatchment 21: C AR-500.023

Hydrograph



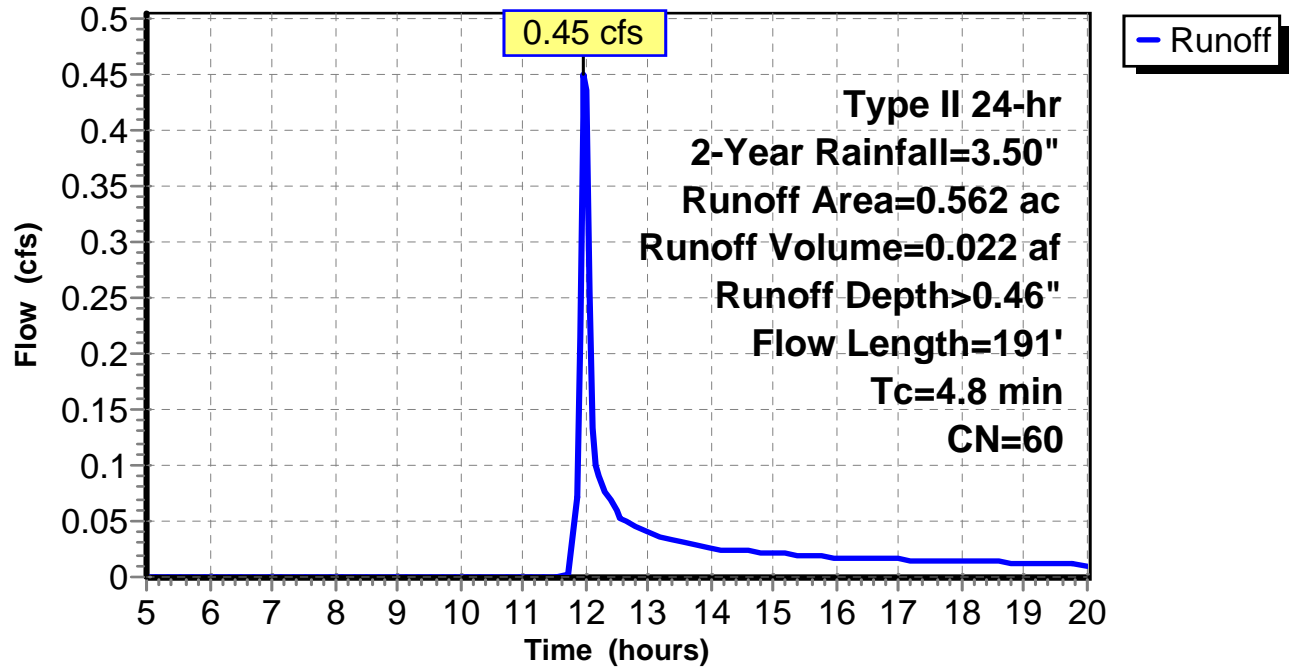
Subcatchment 22: C AR-500.024

Hydrograph



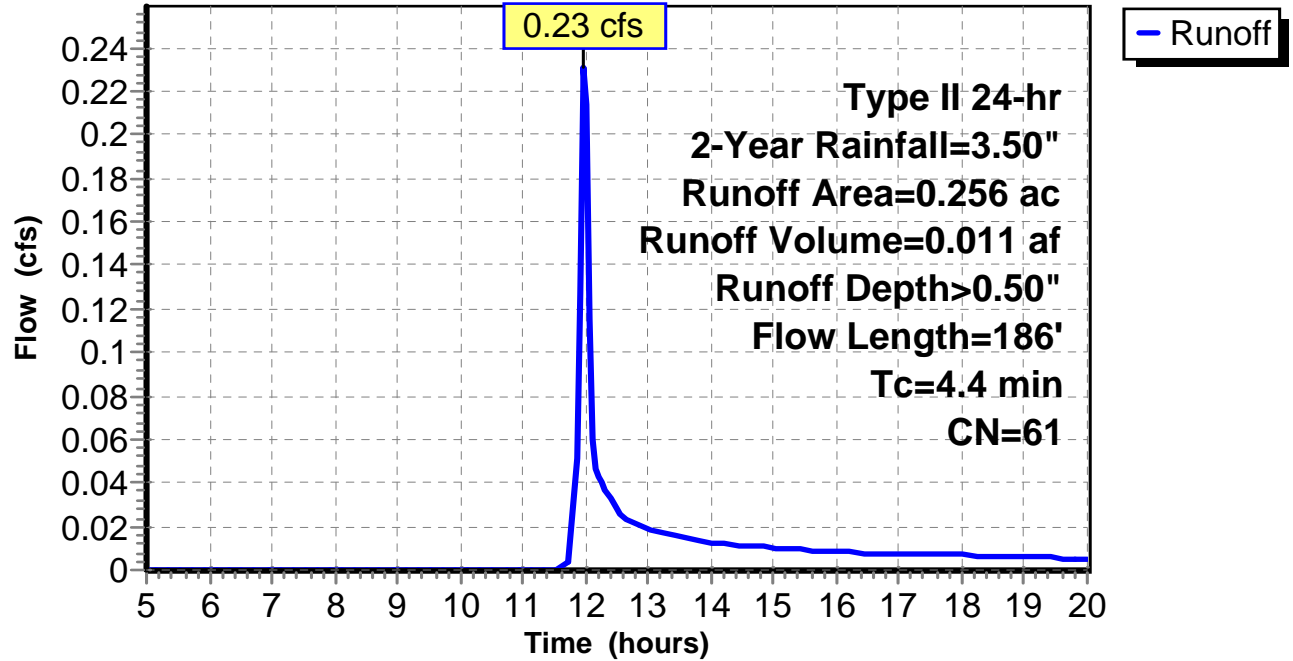
Subcatchment 23: C AR-500.025

Hydrograph



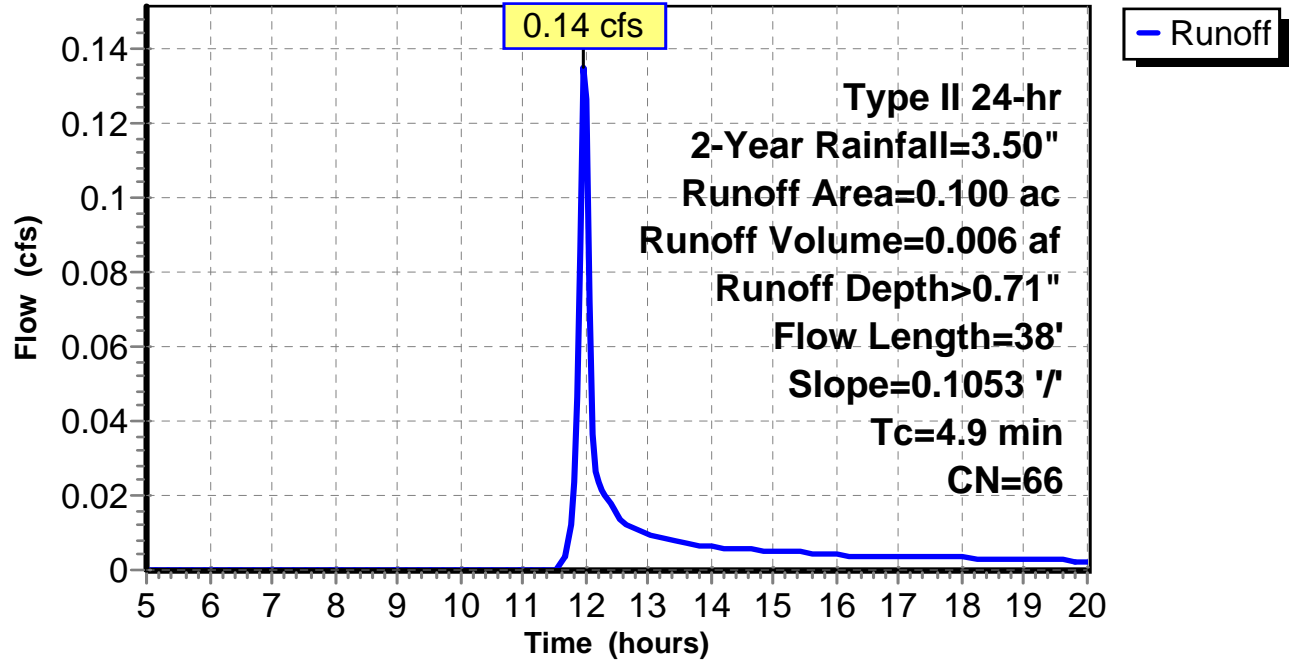
Subcatchment 24: C AR-500.026

Hydrograph



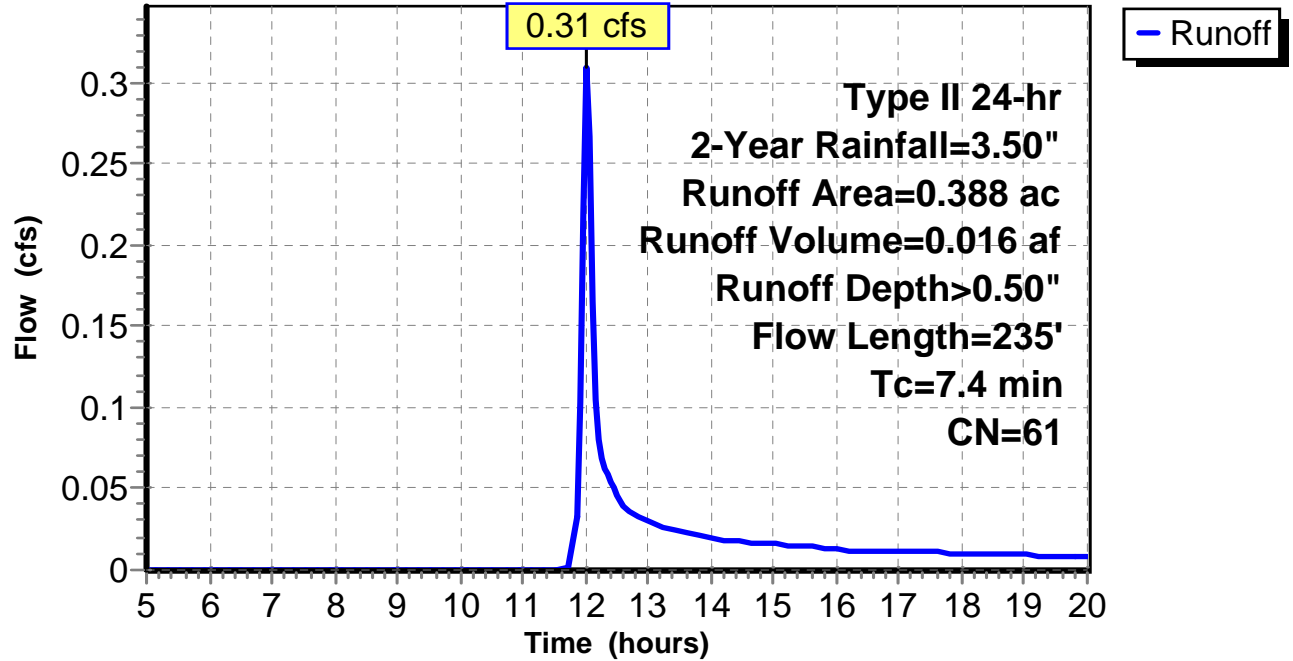
Subcatchment 25: C AR-500.027

Hydrograph



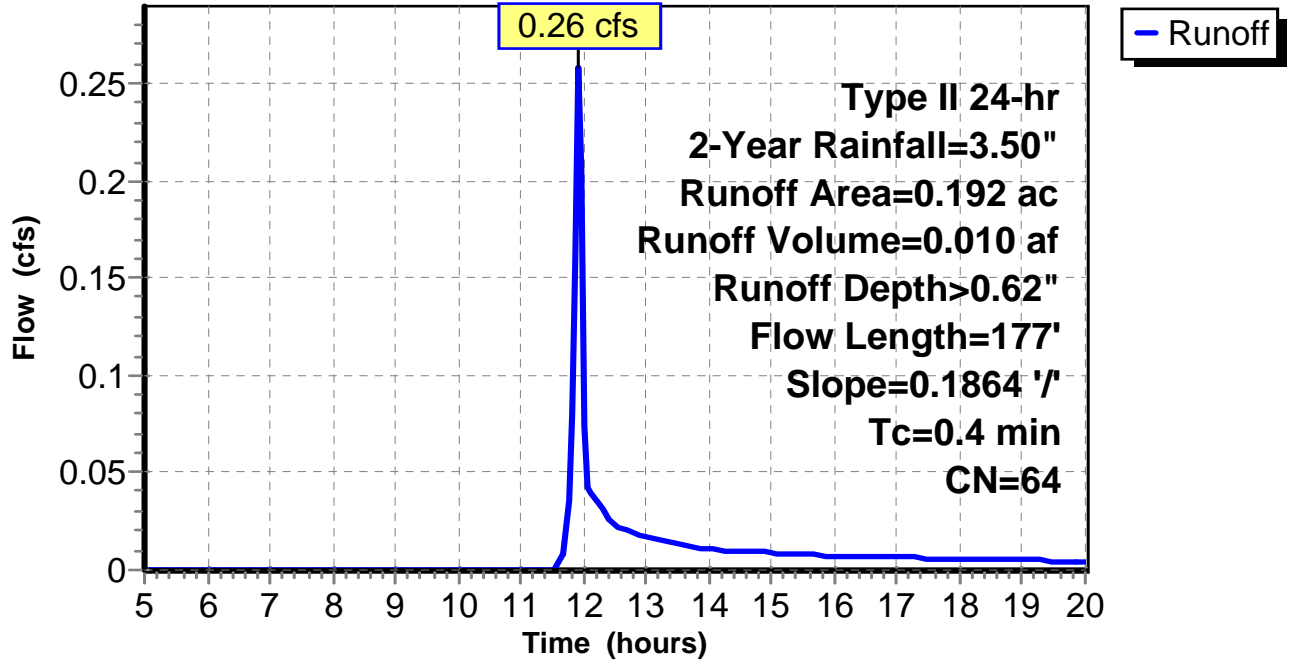
Subcatchment 26: C AR-500.028

Hydrograph



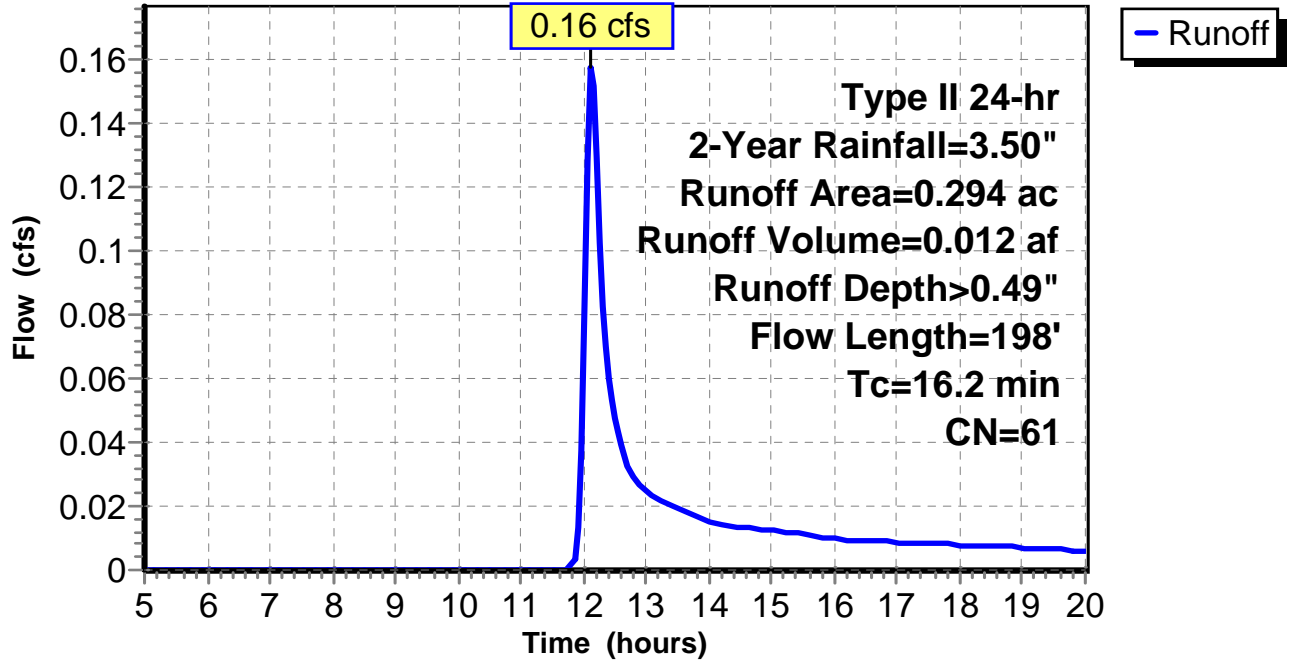
Subcatchment 27: C AR-500.029

Hydrograph



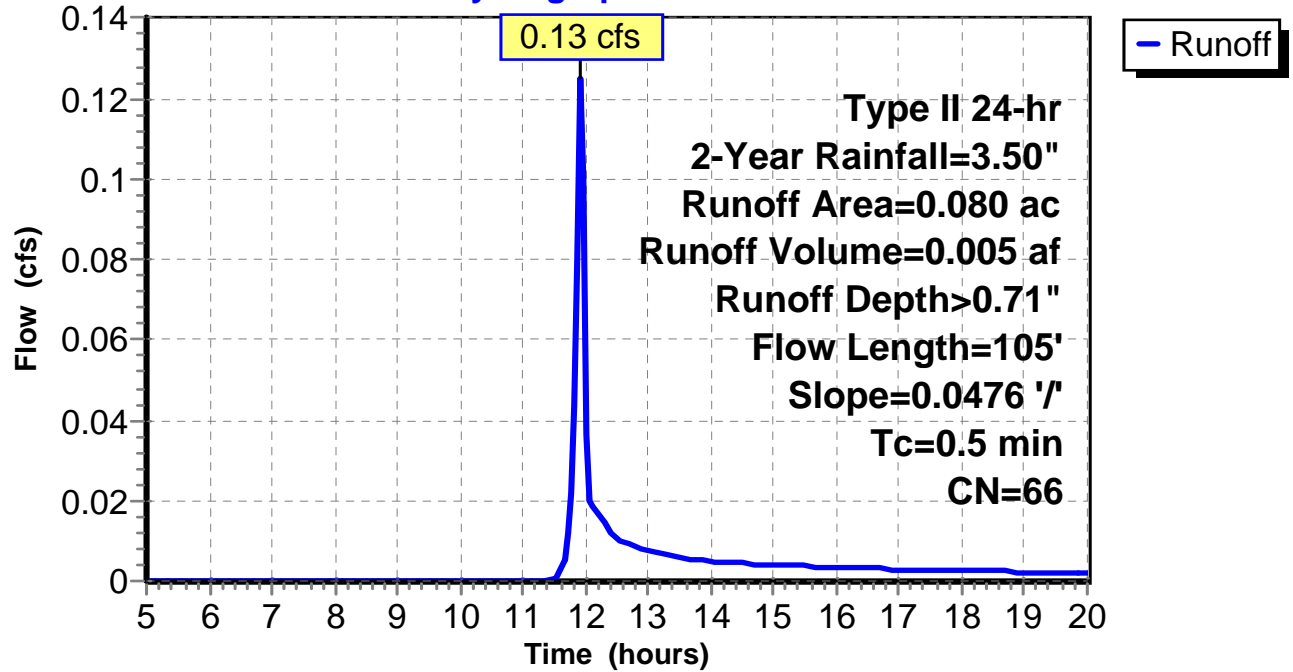
Subcatchment 28: C AR-500.030

Hydrograph



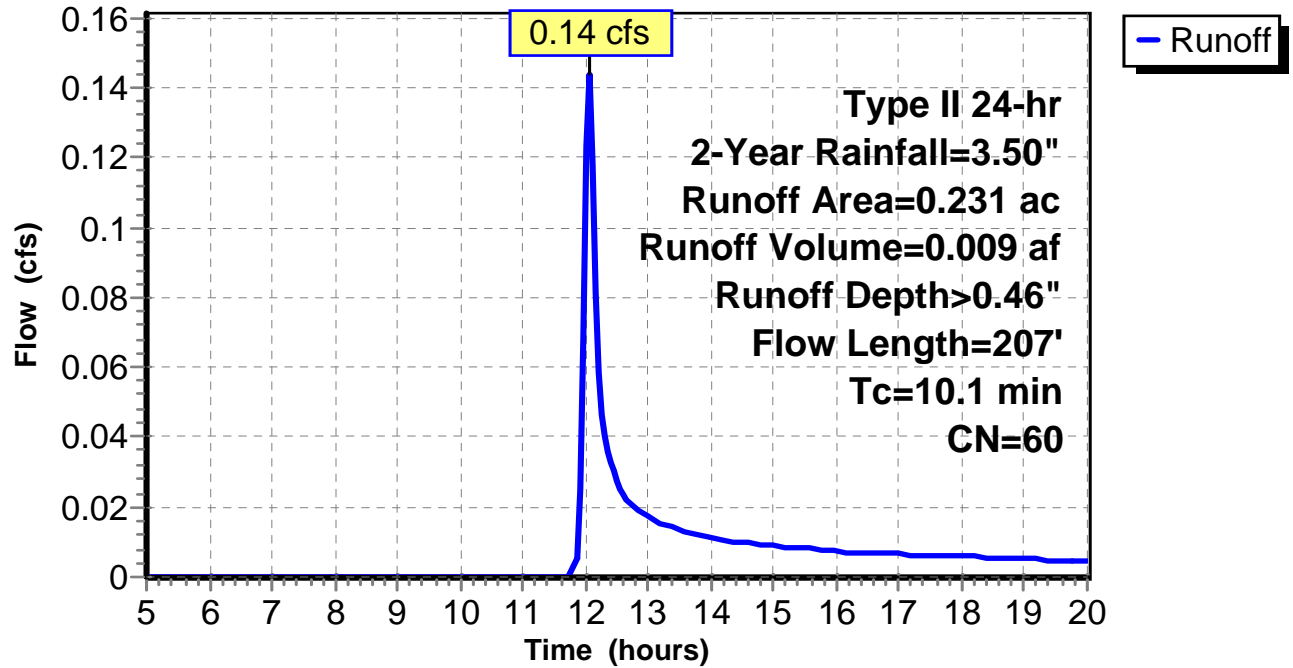
Subcatchment 29: C AR-500.031

Hydrograph



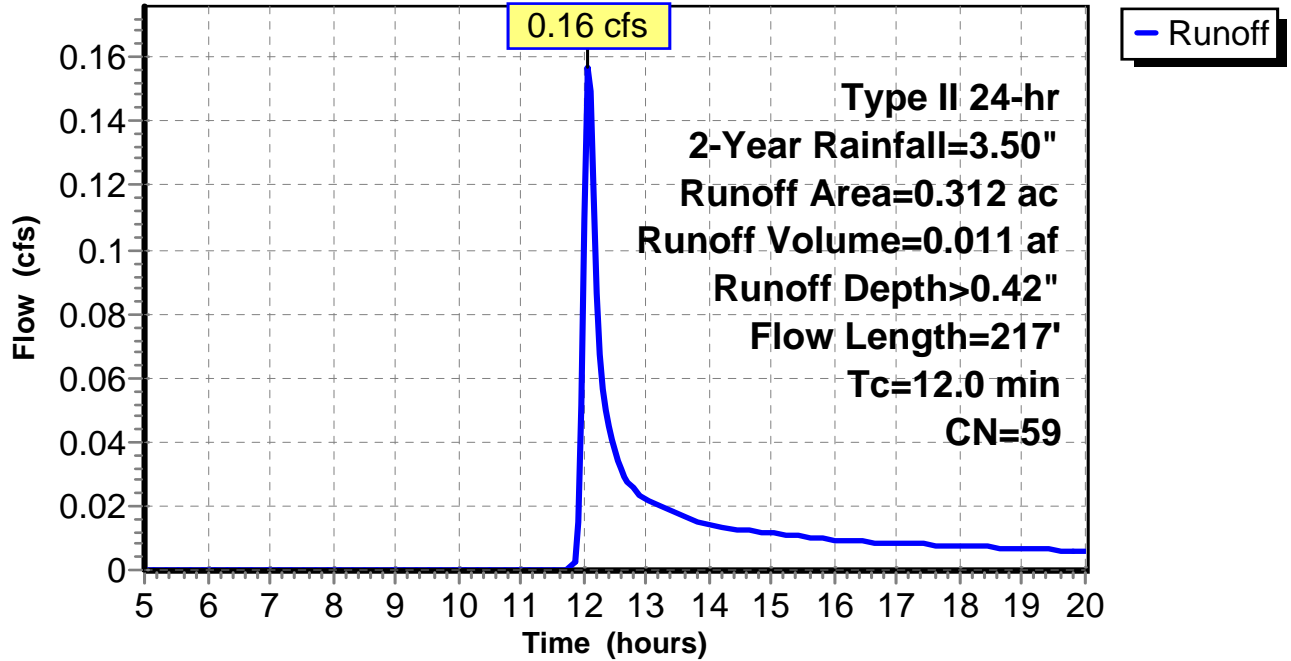
Subcatchment 30: C AR-500.032

Hydrograph



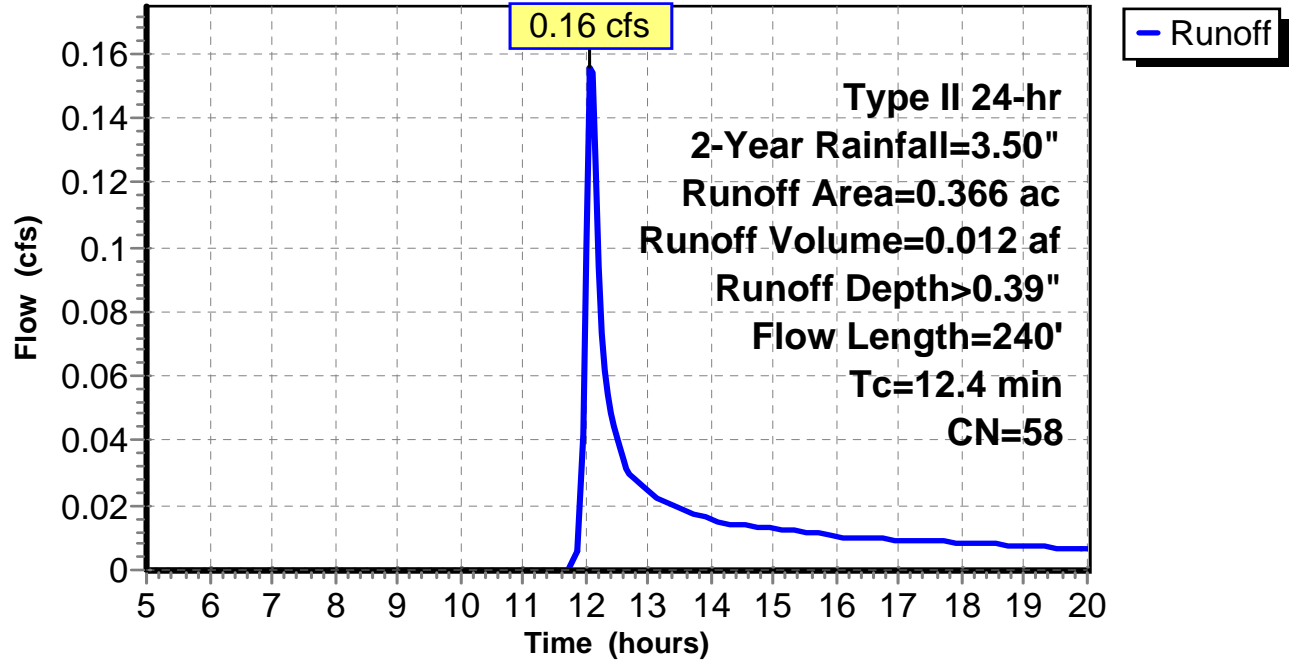
Subcatchment 31: C AR-500.033

Hydrograph



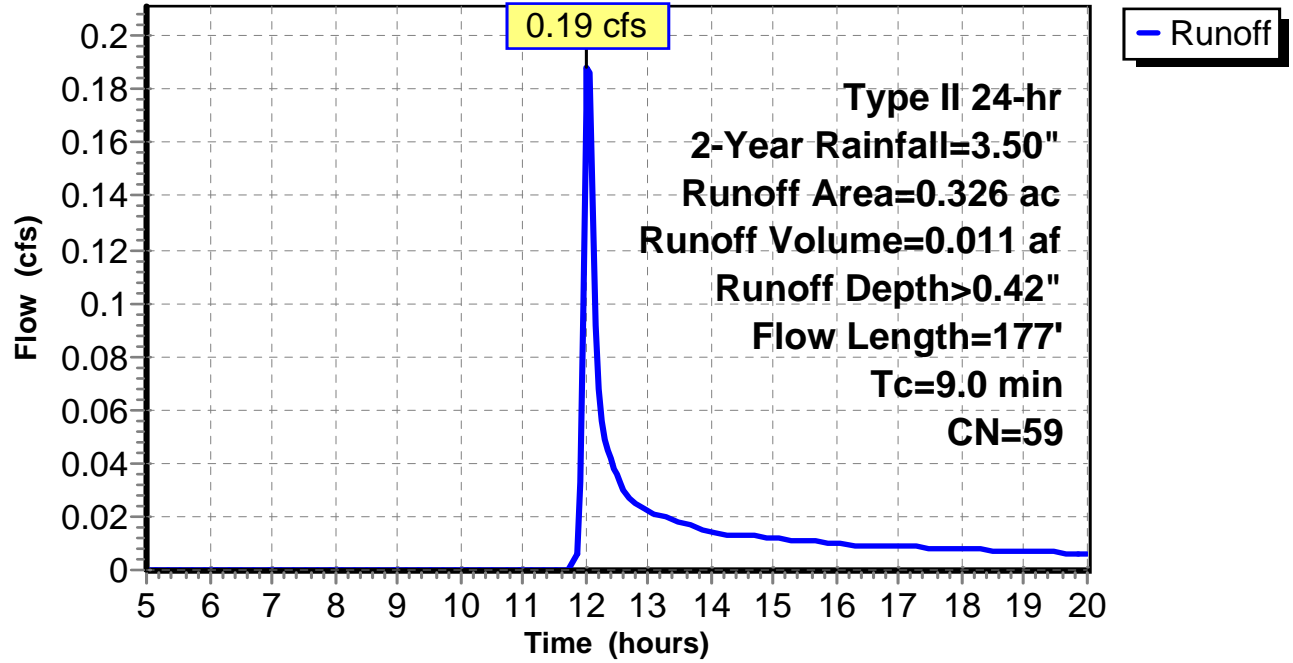
Subcatchment 32: C AR-500.034

Hydrograph



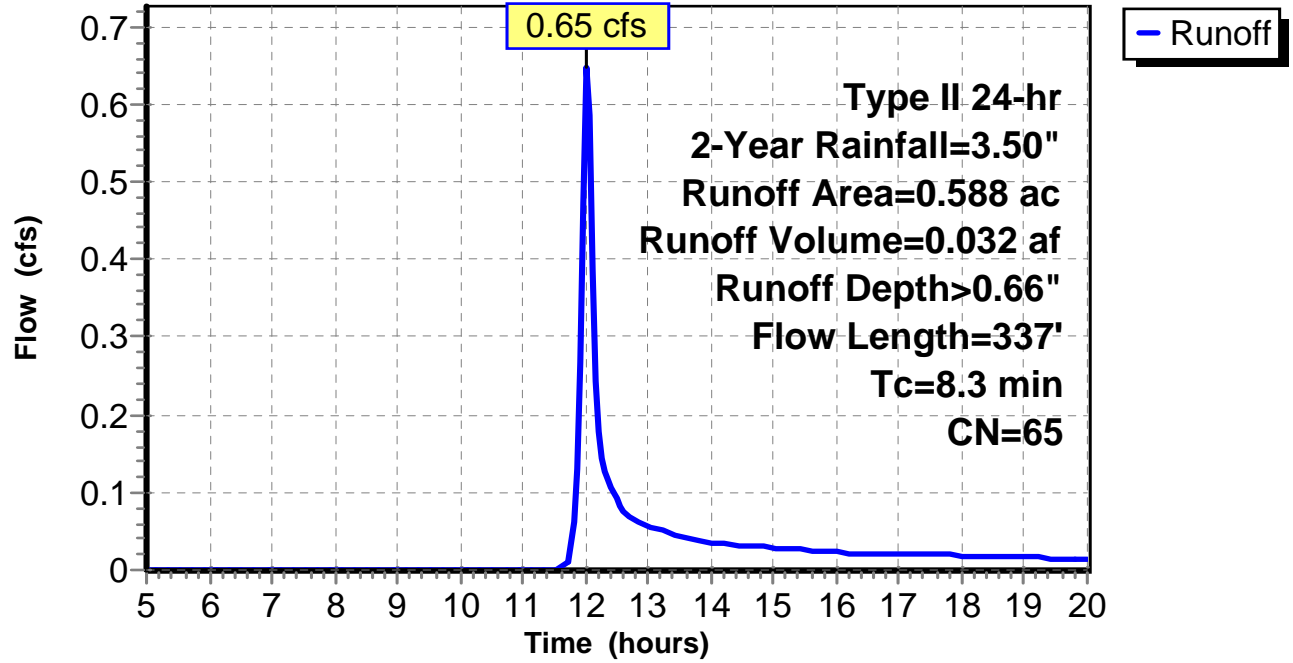
Subcatchment 33: C AR-500.035

Hydrograph



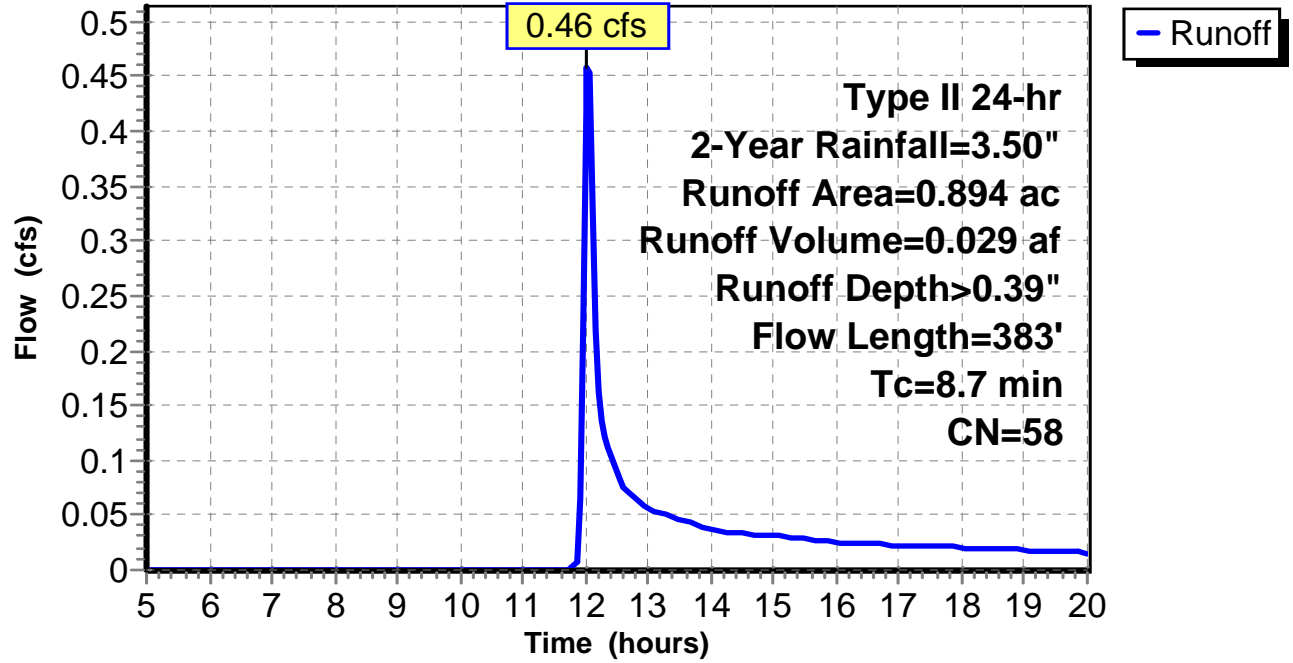
Subcatchment 34: C 158.001

Hydrograph



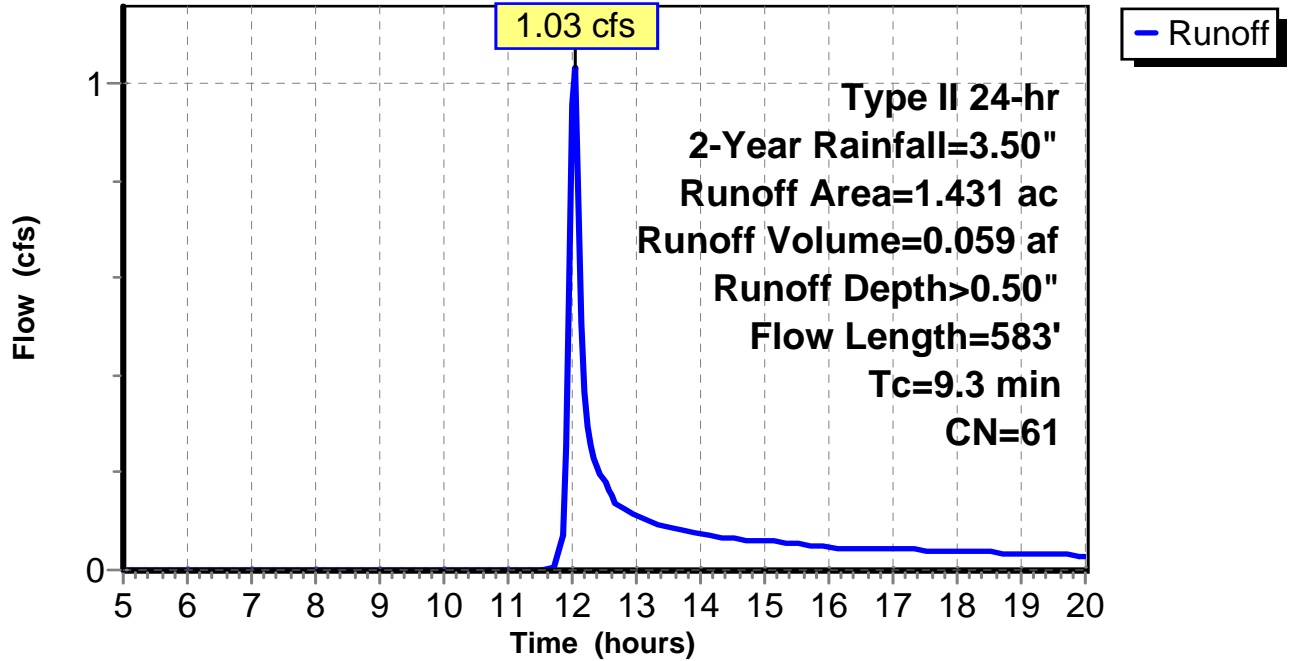
Subcatchment 35: C 158.002

Hydrograph



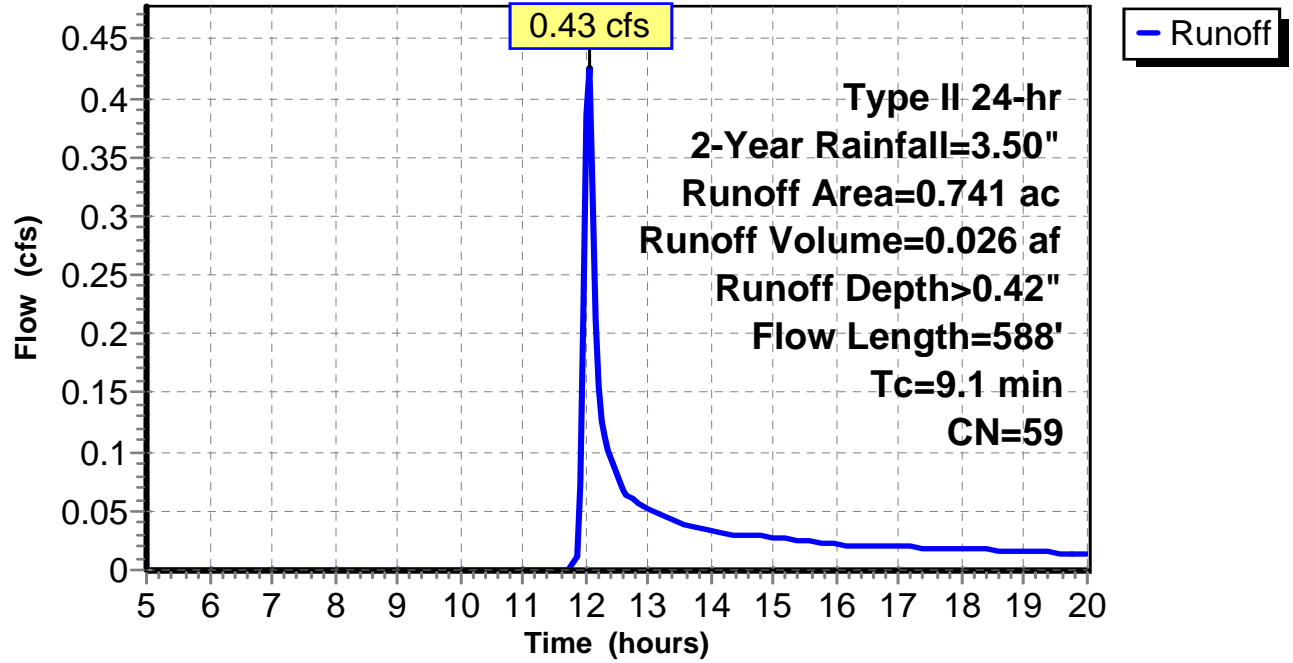
Subcatchment 36: C 158.003

Hydrograph



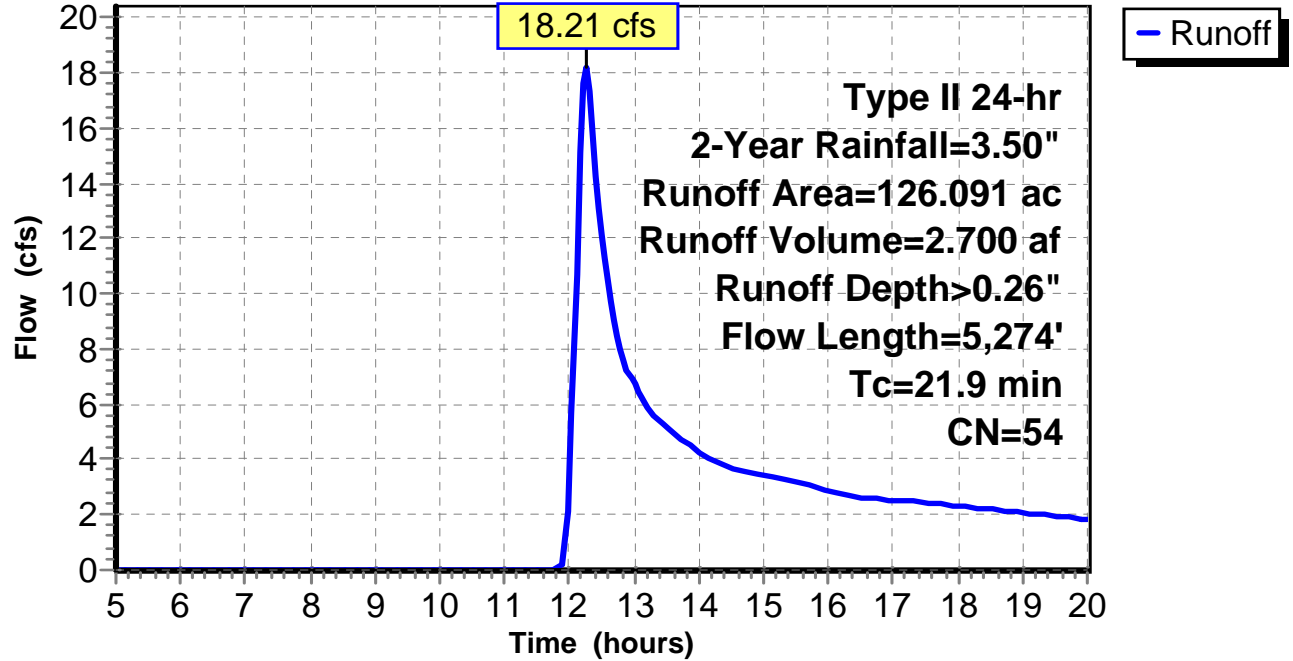
Subcatchment 37: C 158.004

Hydrograph



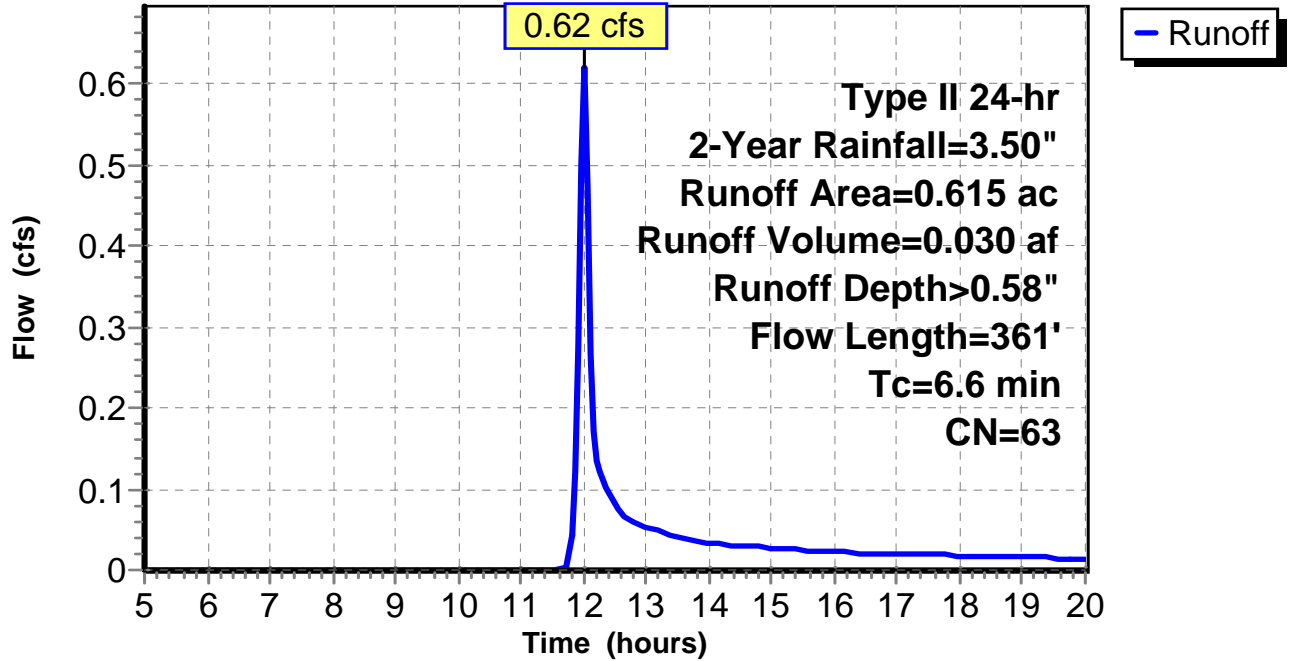
Subcatchment 38: C 158.005

Hydrograph



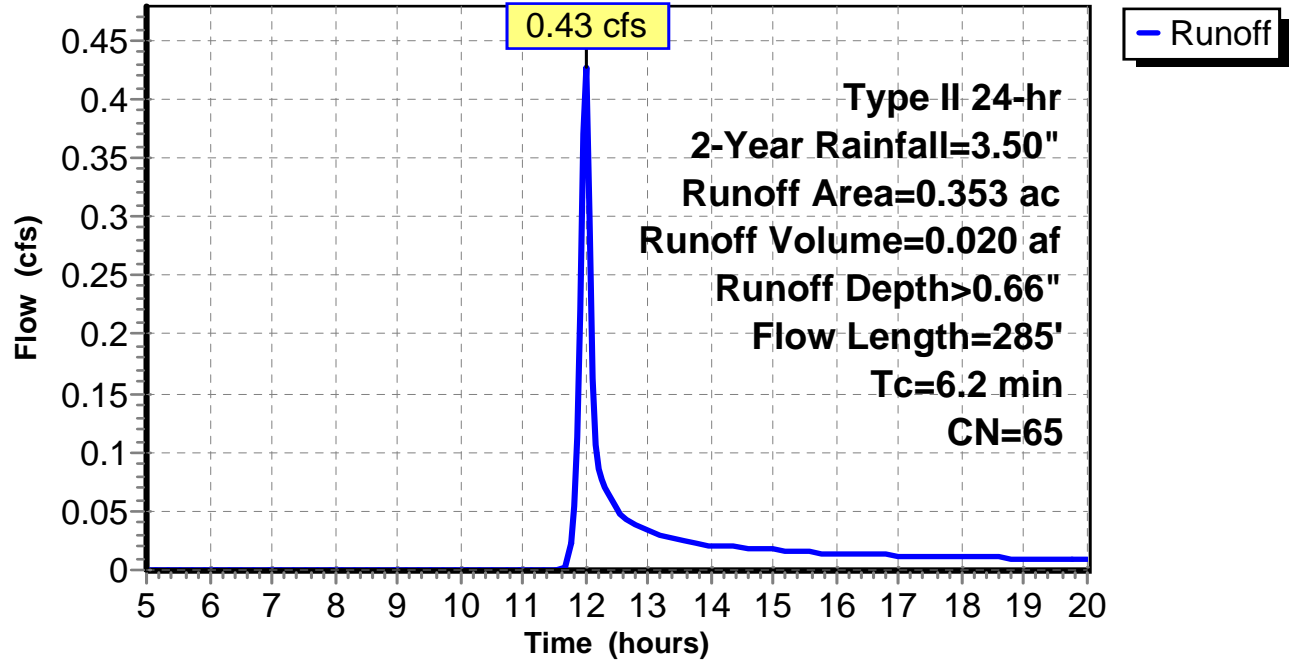
Subcatchment 39: C 158.006

Hydrograph



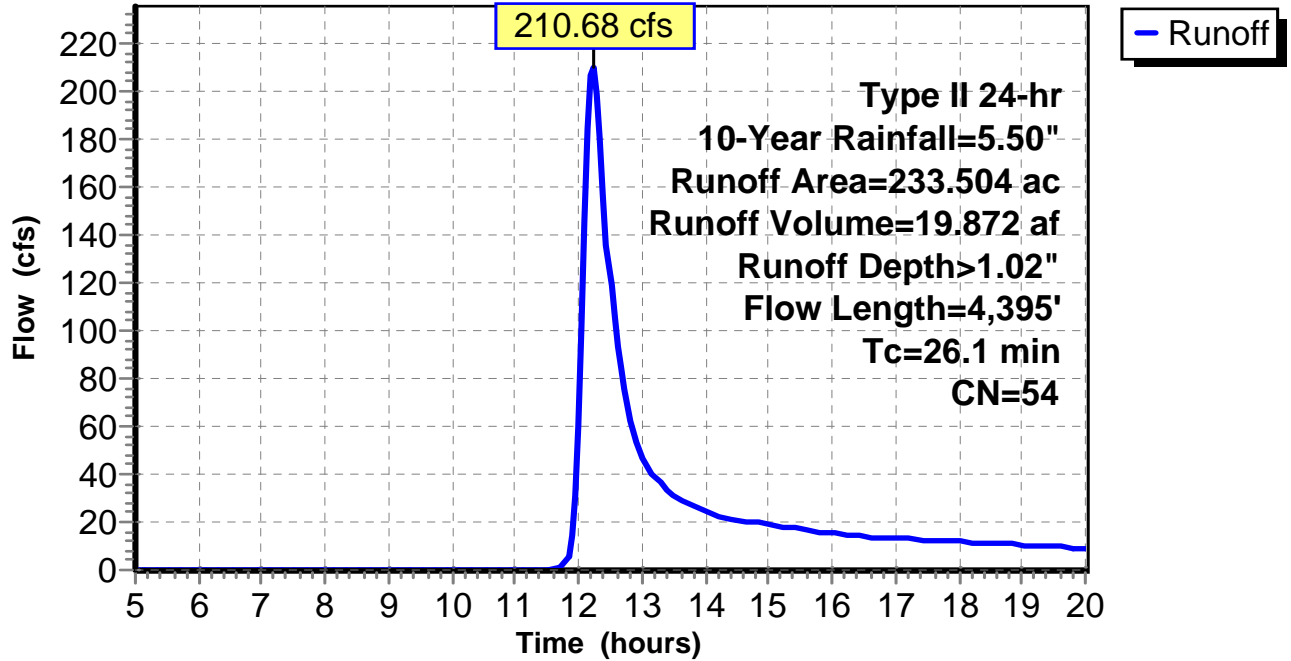
Subcatchment 40: C 158.007

Hydrograph



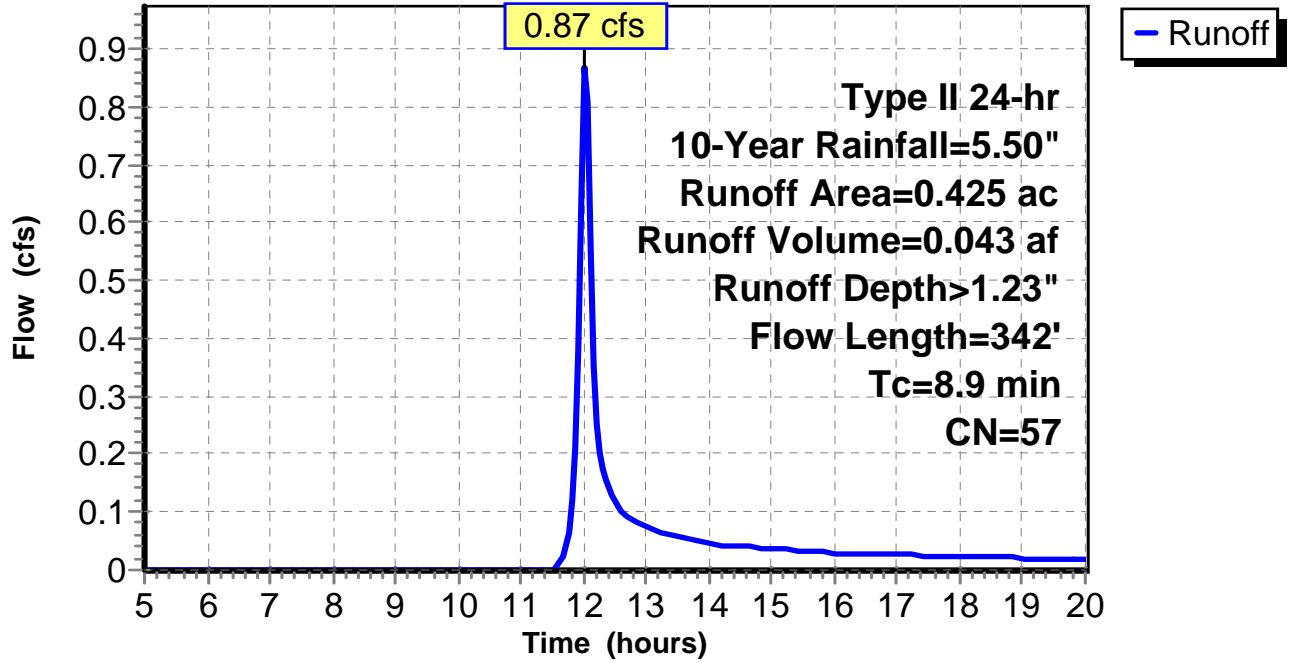
Subcatchment 1: C AR-500.003

Hydrograph



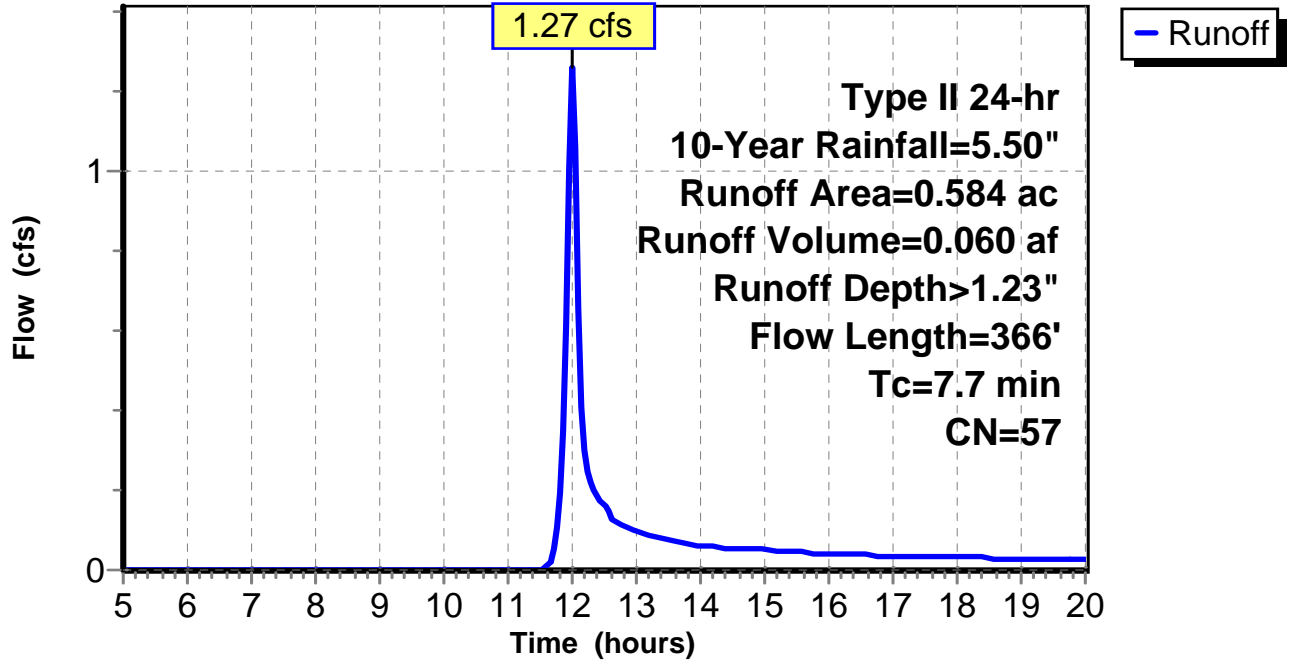
Subcatchment 2: C AR-500.004

Hydrograph



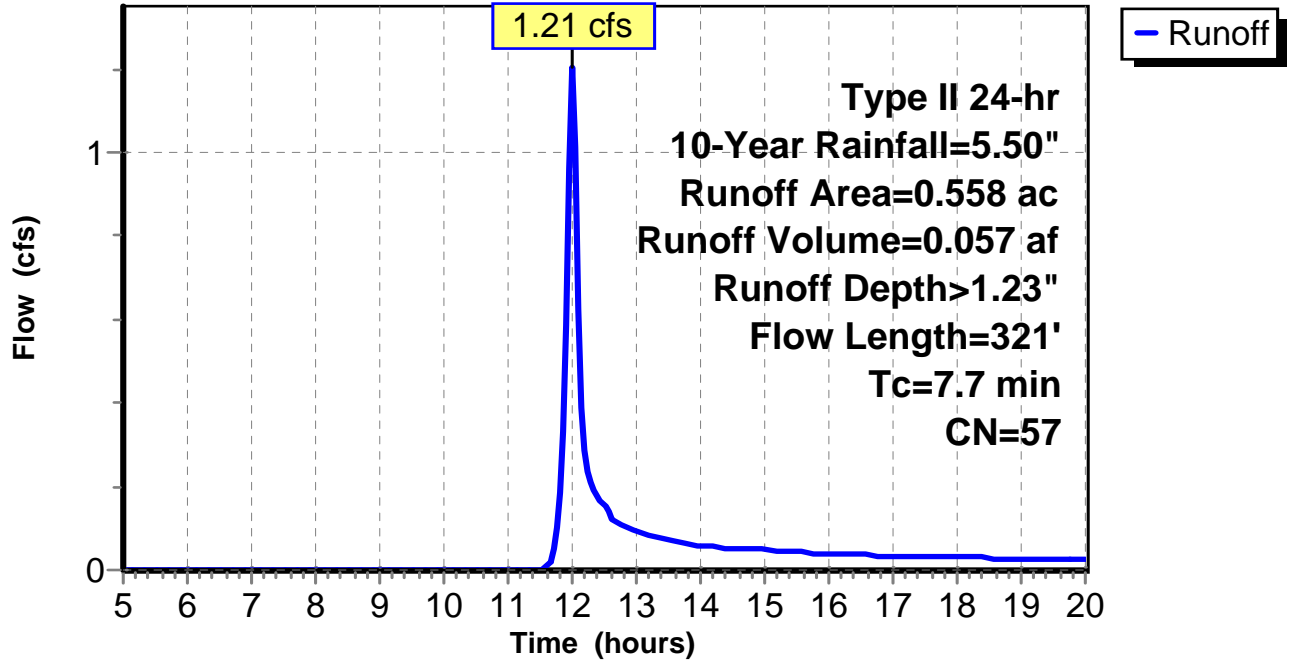
Subcatchment 3: C AR-500.005

Hydrograph



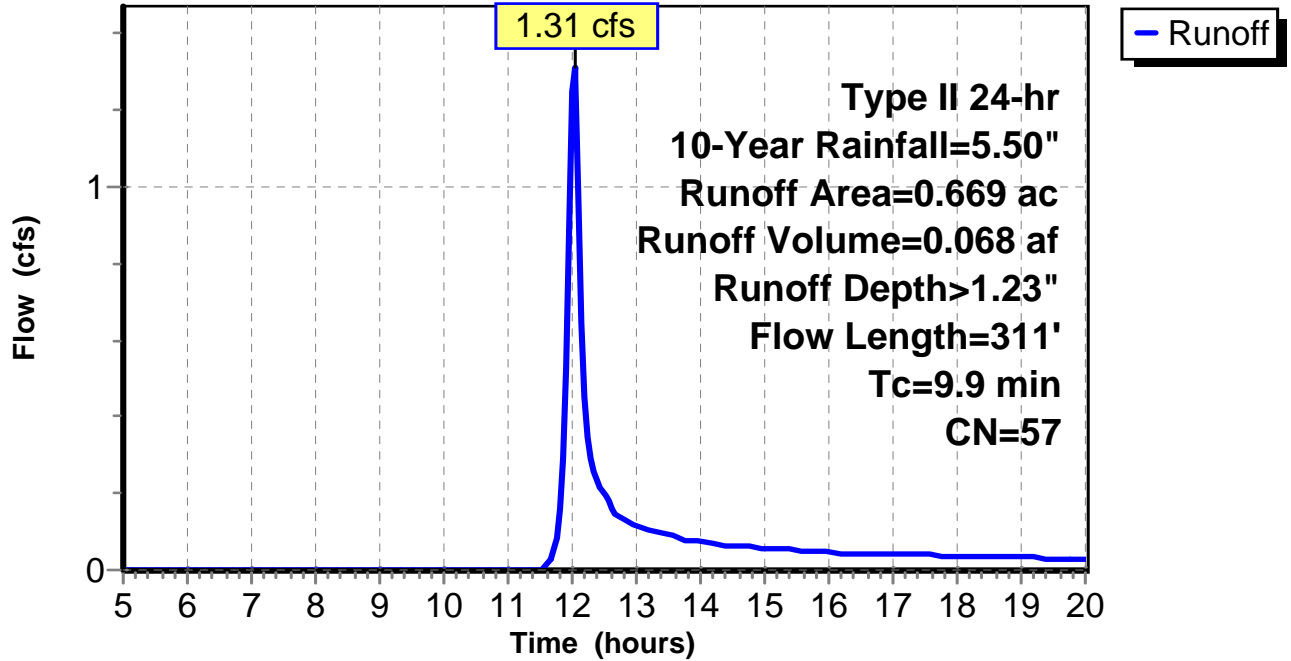
Subcatchment 4: C AR-500.006

Hydrograph



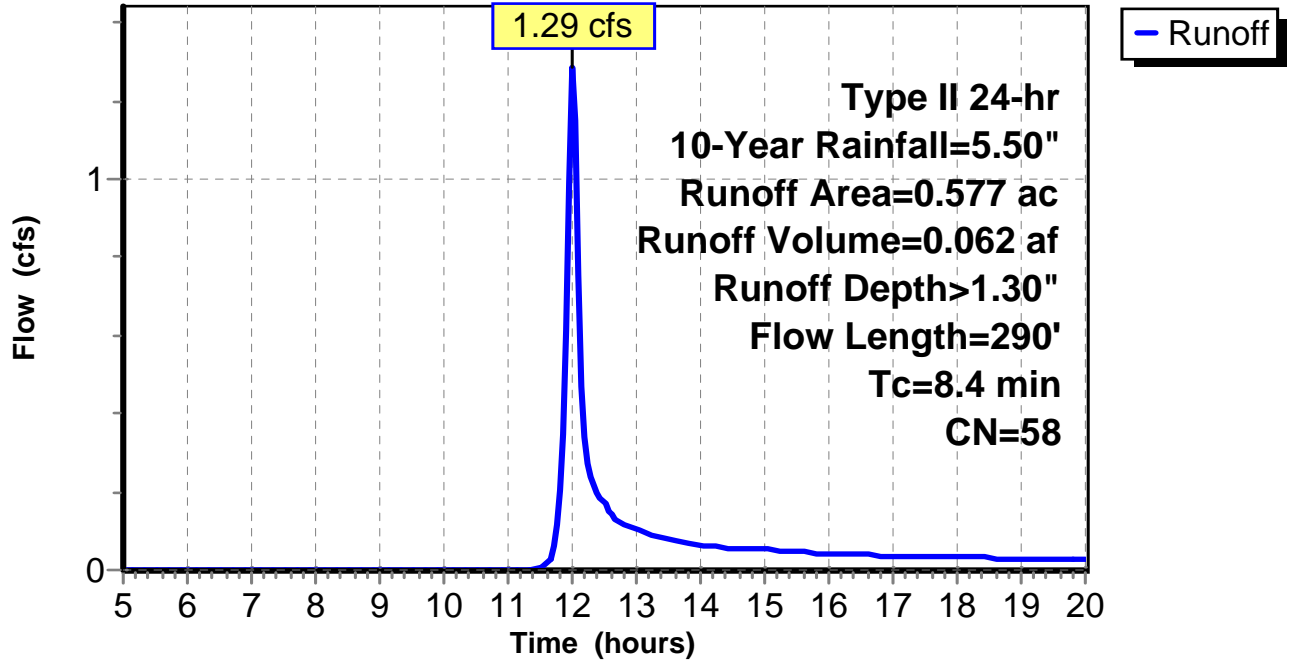
Subcatchment 5: C AR-500.007

Hydrograph



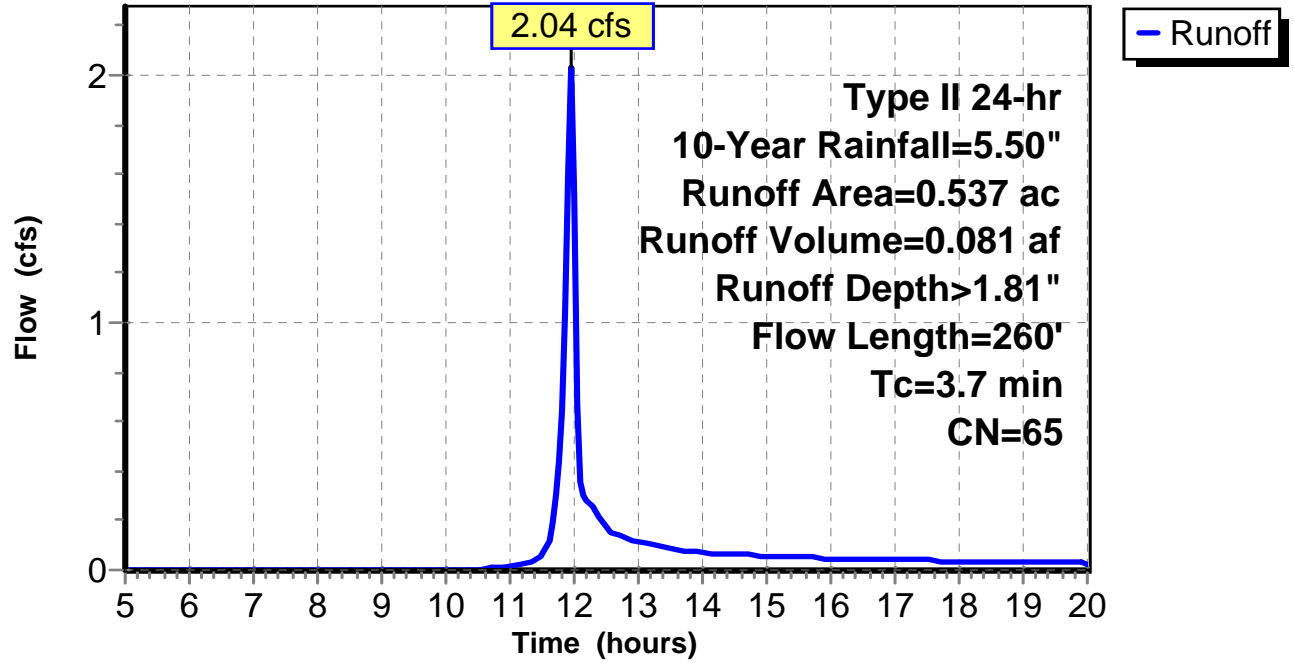
Subcatchment 6: C AR-500.008

Hydrograph



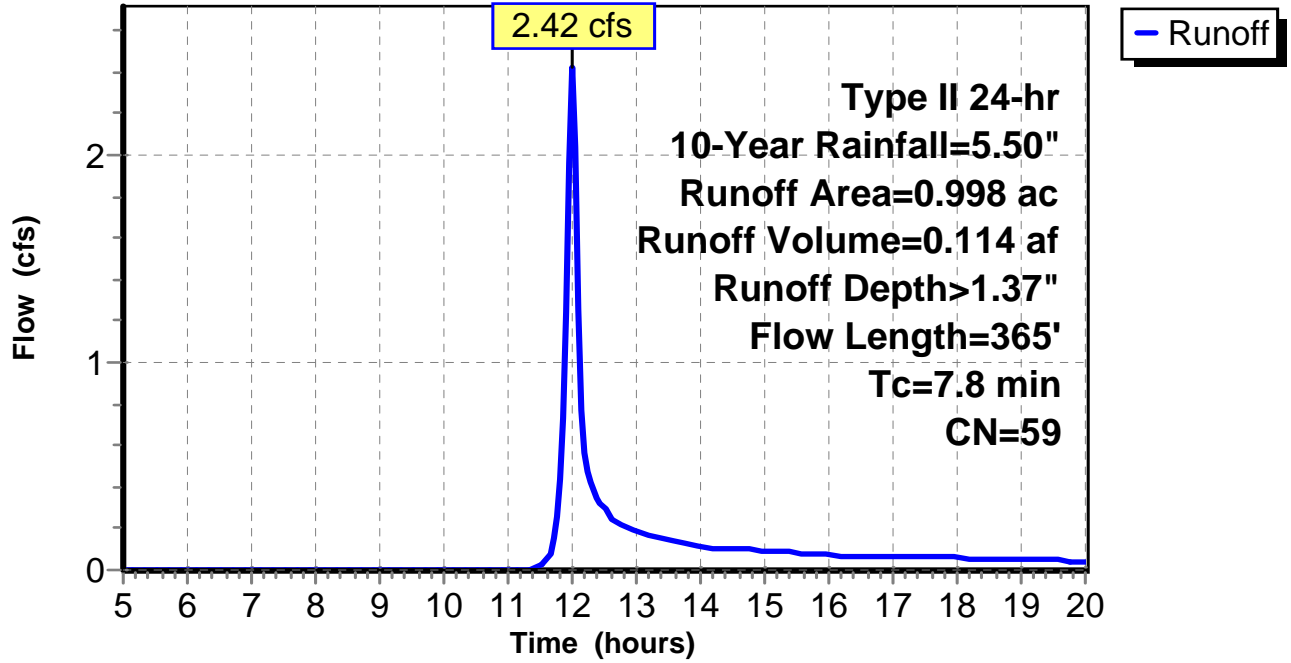
Subcatchment 7: C AR-500.009

Hydrograph



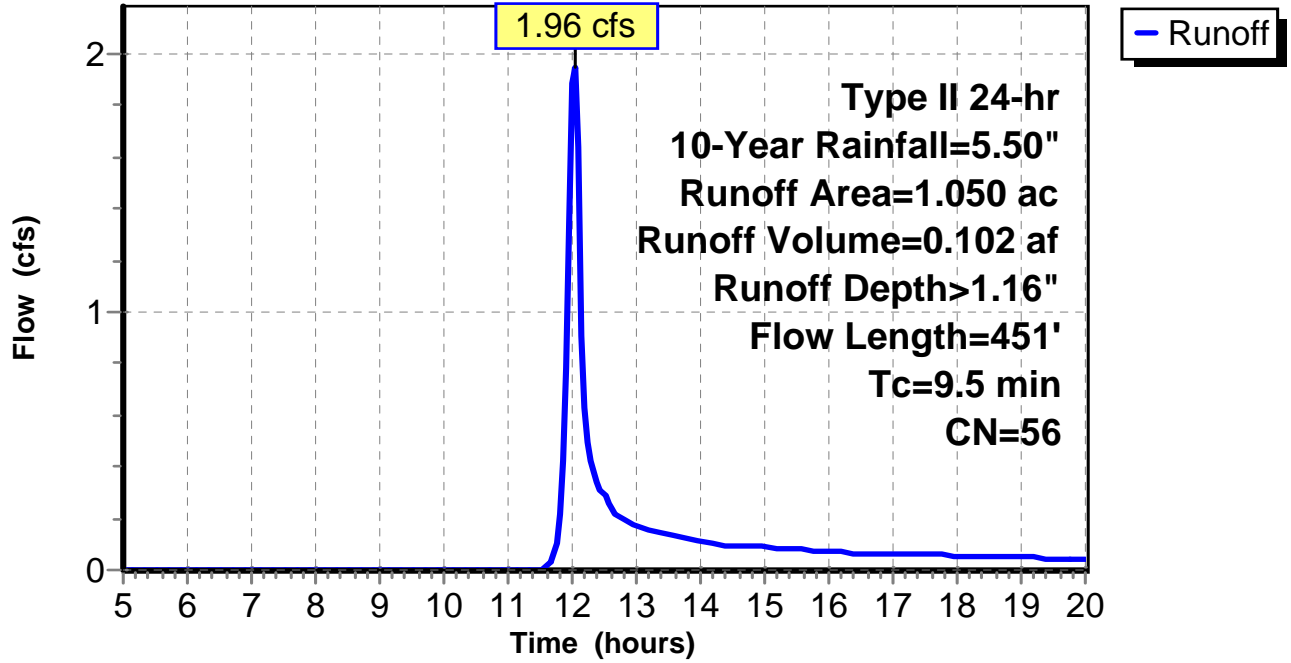
Subcatchment 8: C AR-500.010

Hydrograph



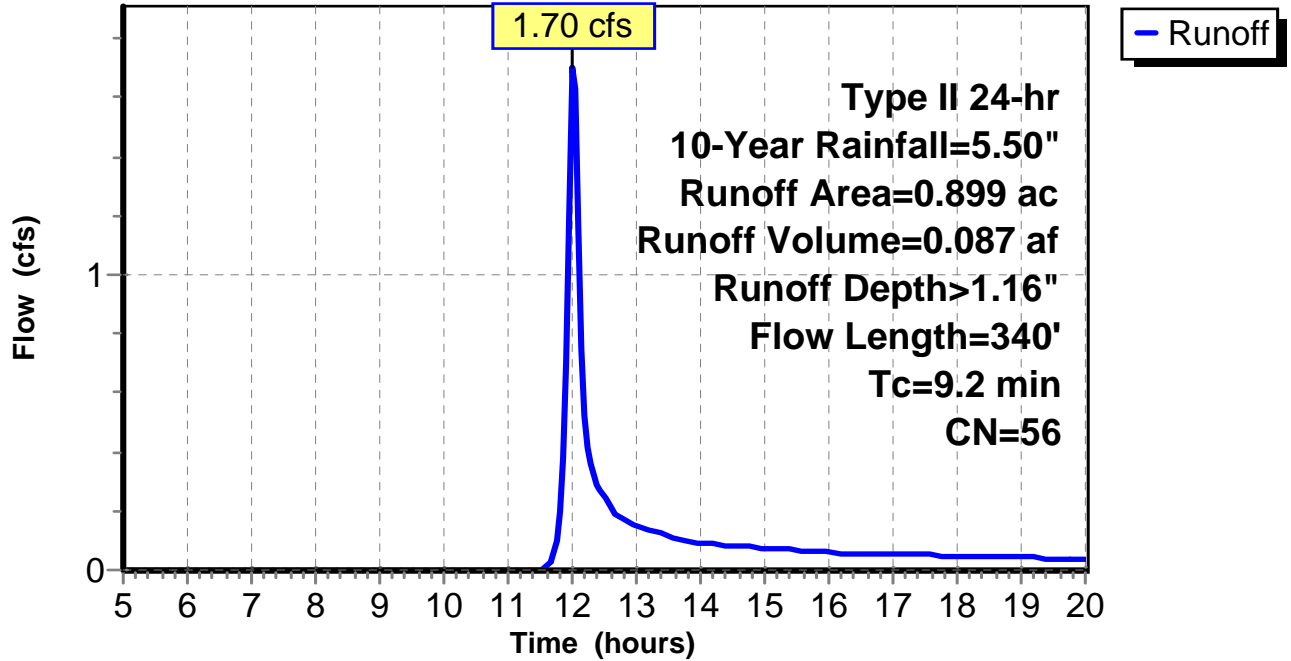
Subcatchment 9: C AR-500.011

Hydrograph



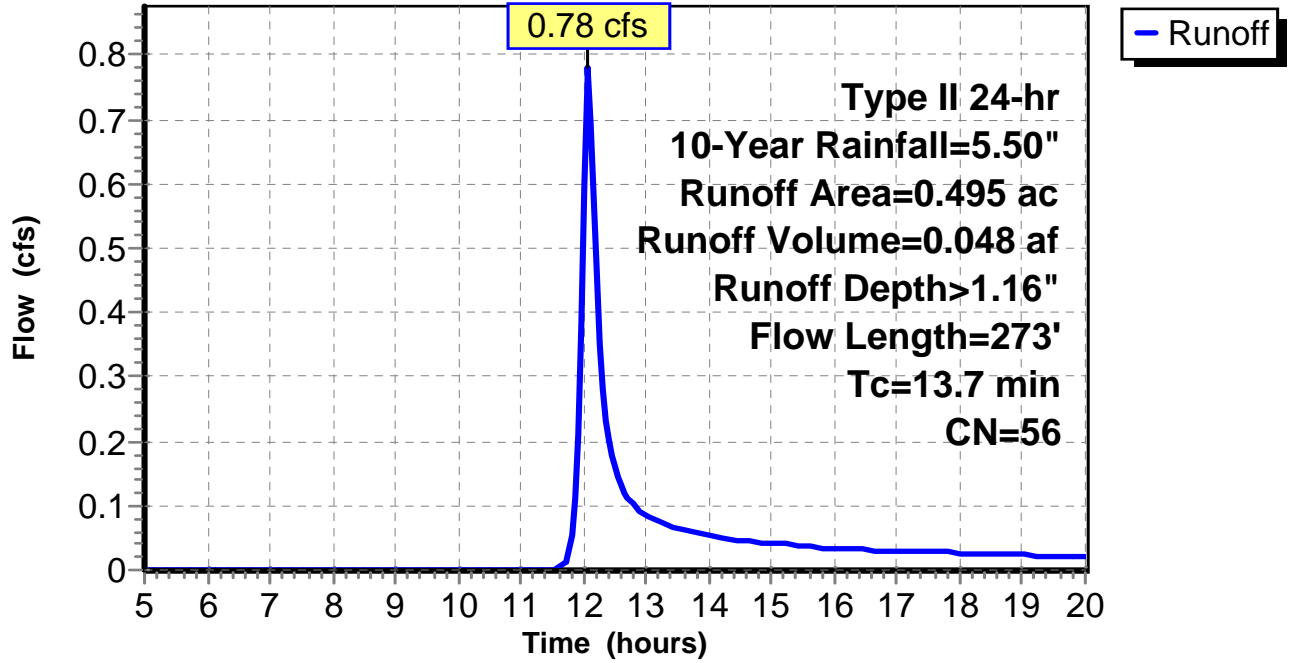
Subcatchment 10: C AR-500.012

Hydrograph



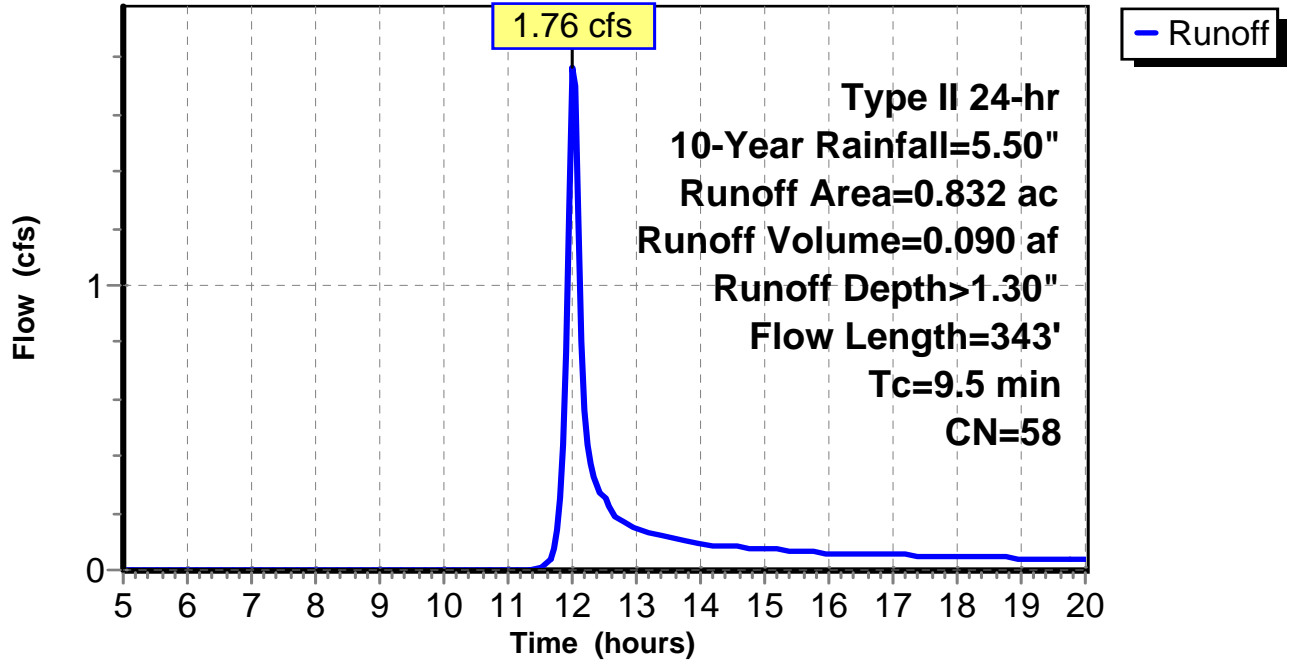
Subcatchment 11: C AR-500.013

Hydrograph



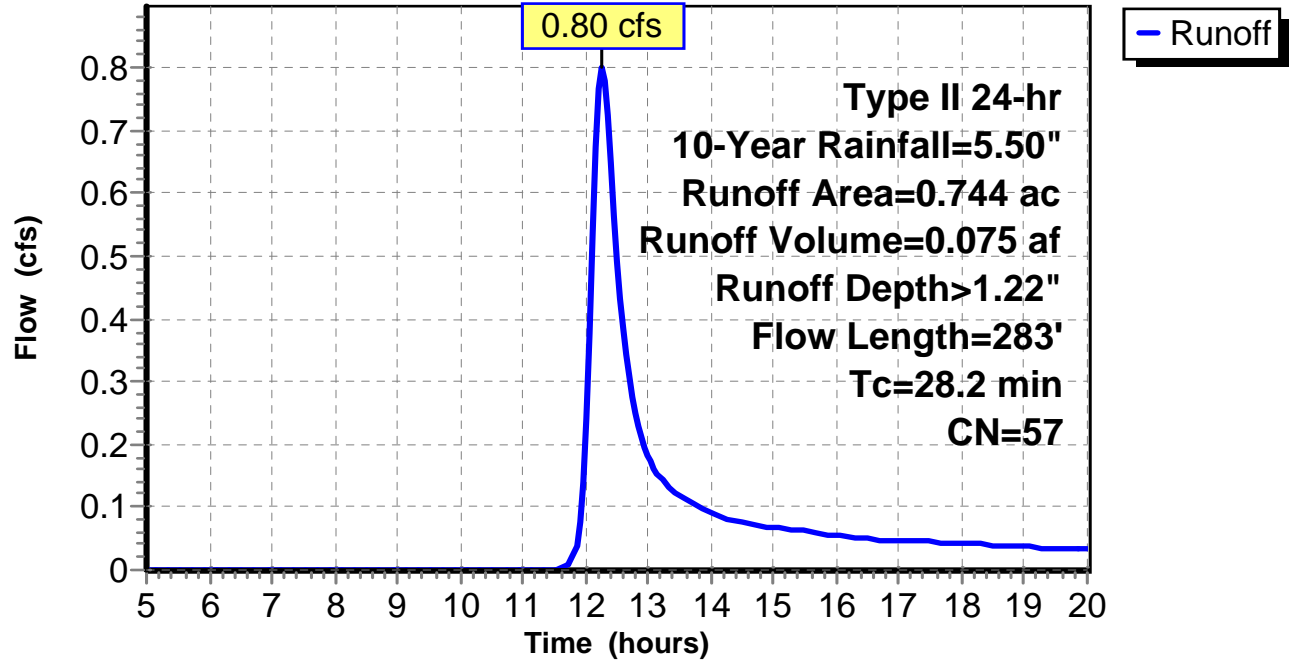
Subcatchment 12: C AR-500.014

Hydrograph



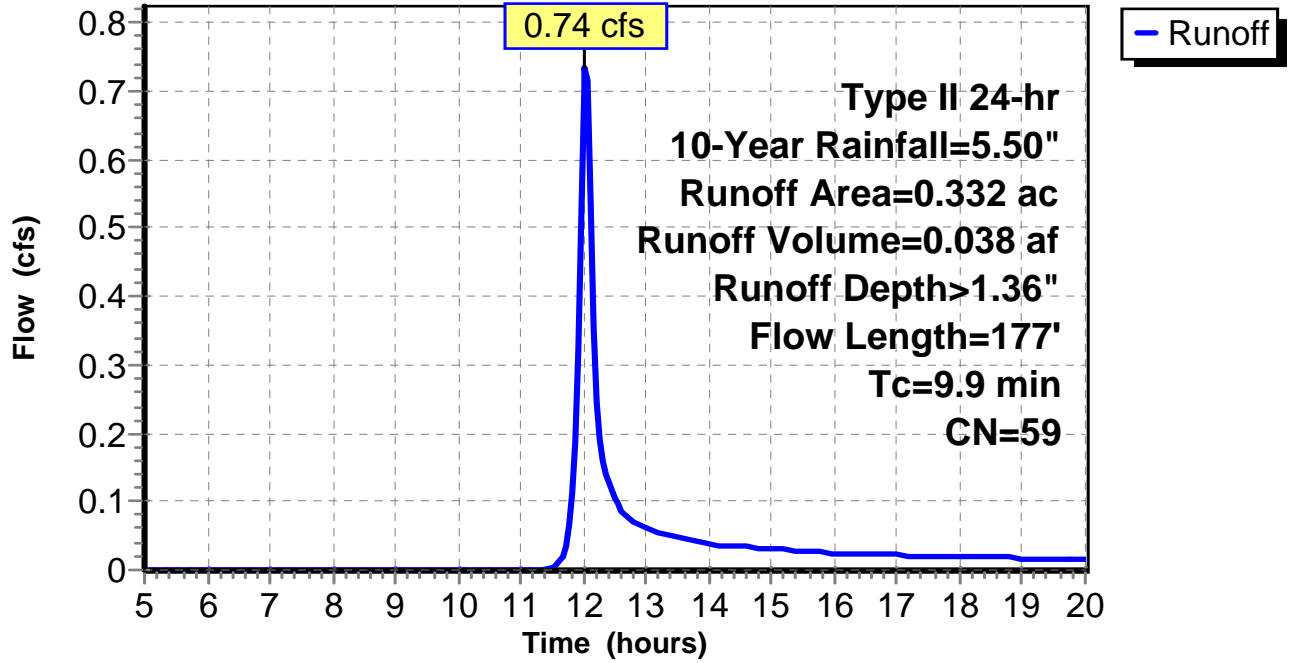
Subcatchment 13: C AR-500.015

Hydrograph



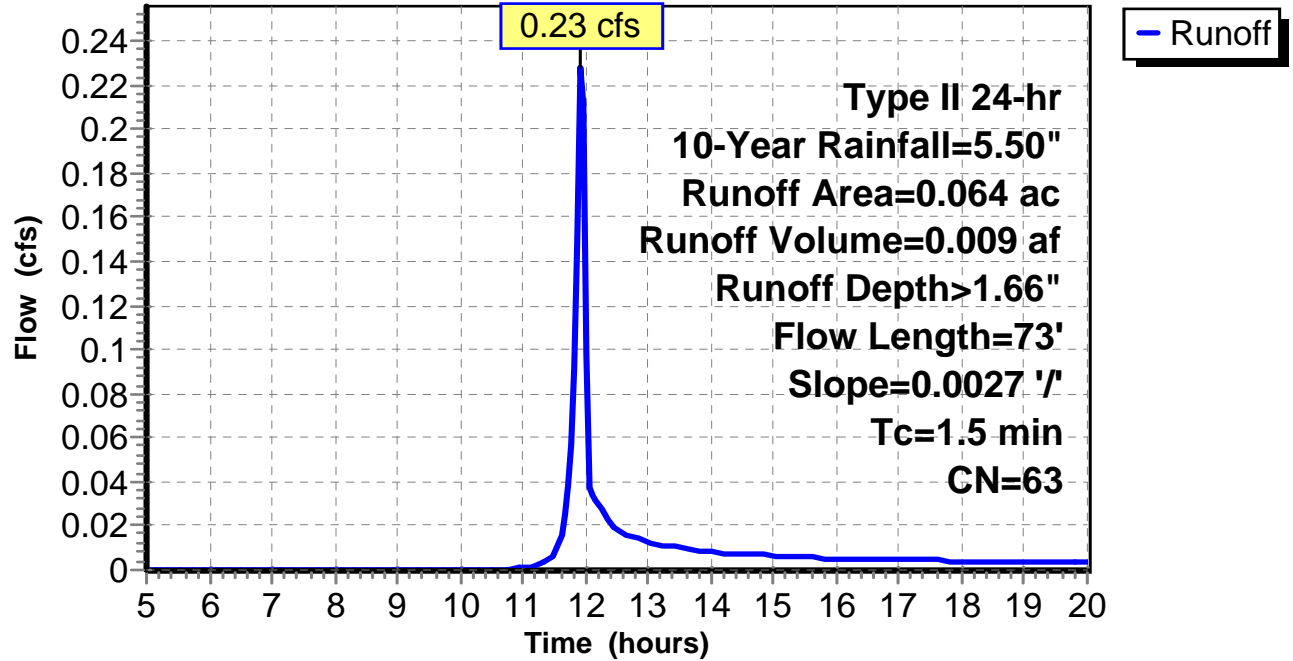
Subcatchment 14: C AR-500.016

Hydrograph



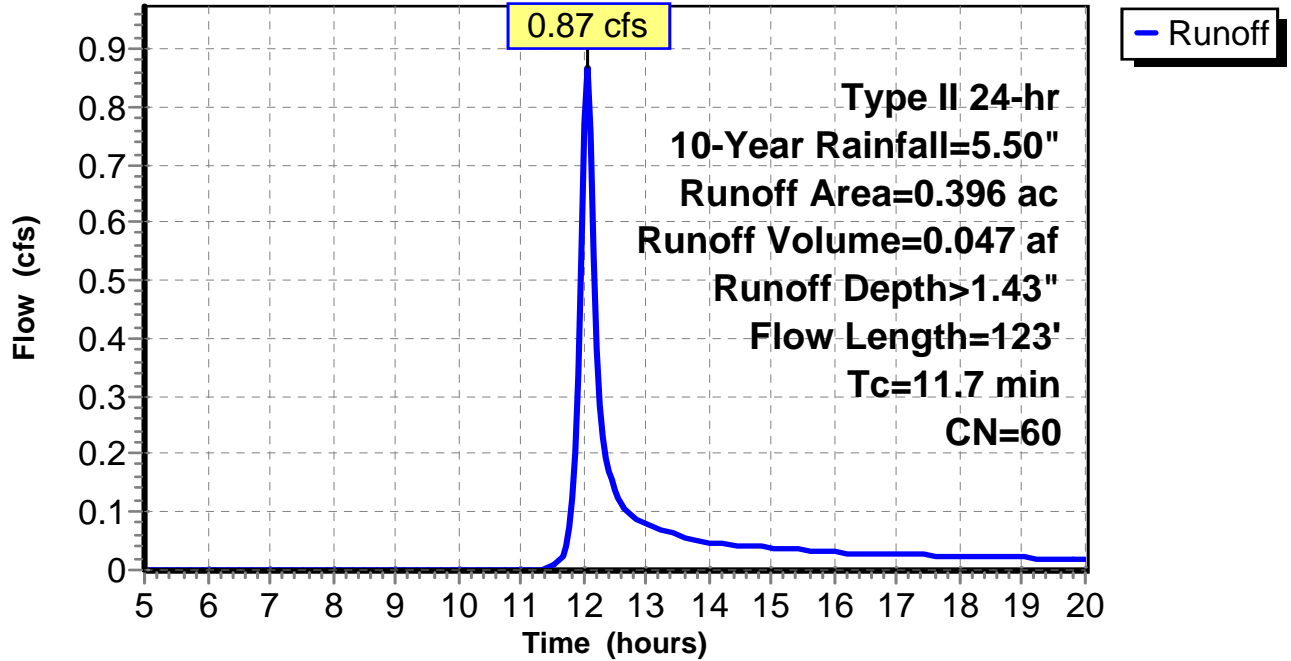
Subcatchment 15: C AR-500.017

Hydrograph



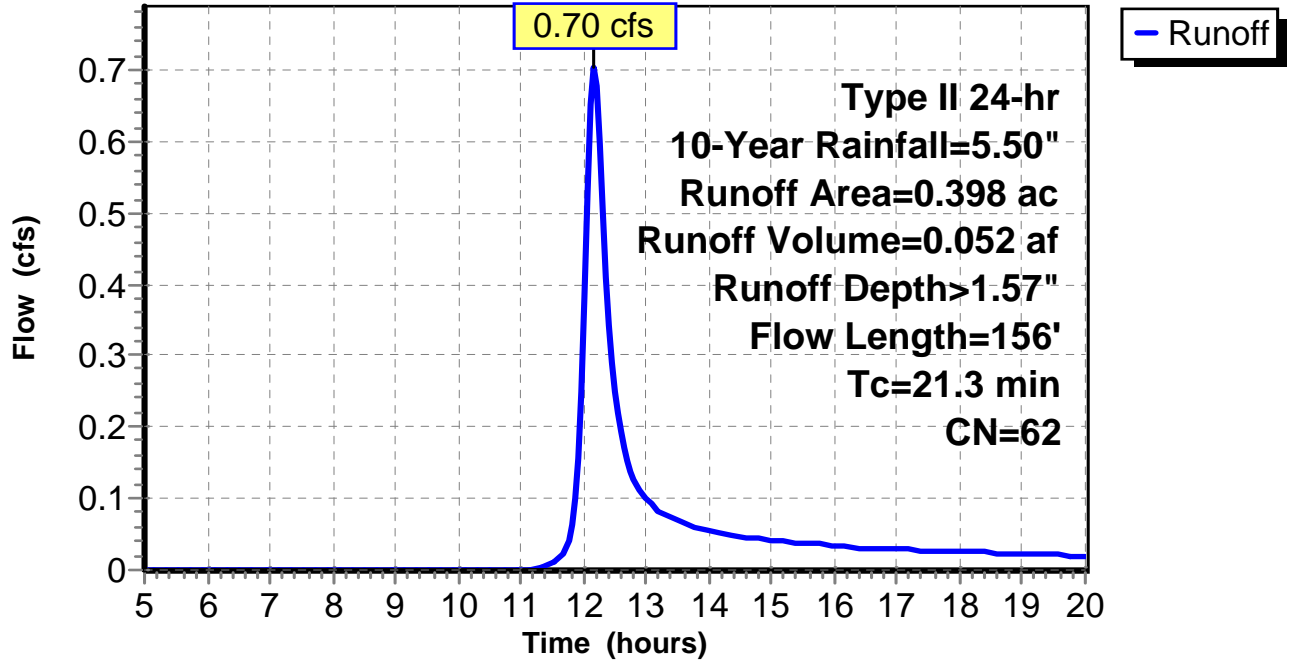
Subcatchment 16: C AR-500.018

Hydrograph



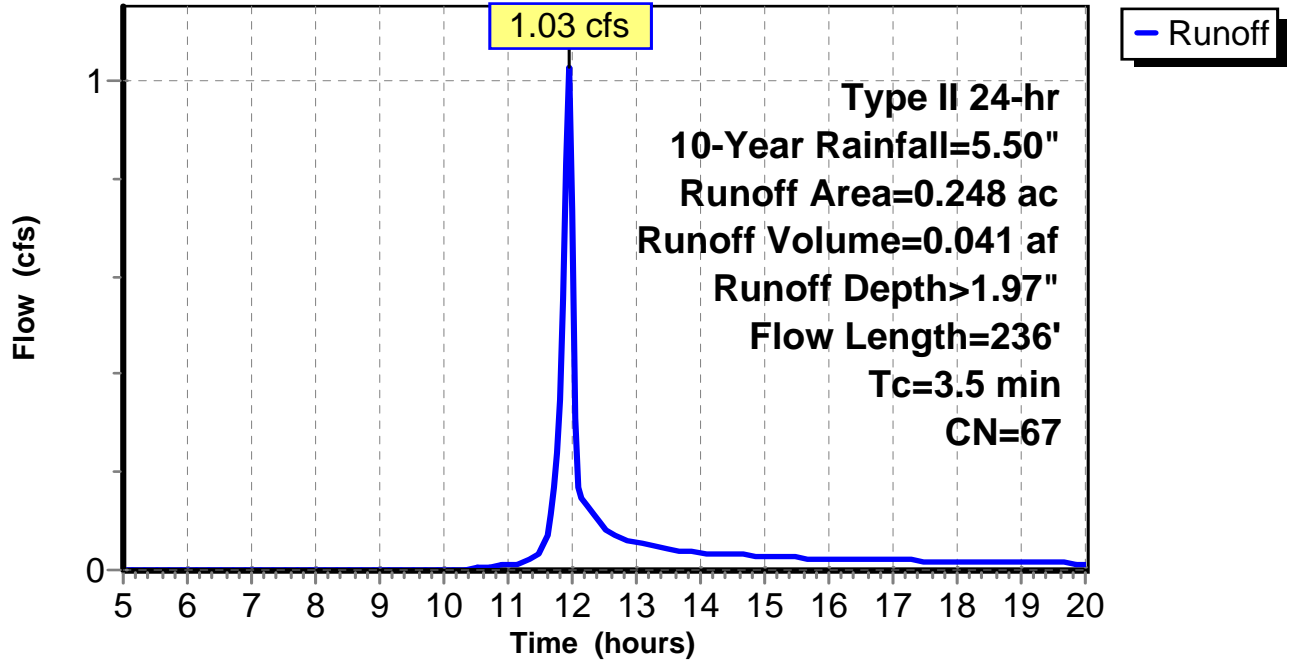
Subcatchment 17: C AR-500.019

Hydrograph



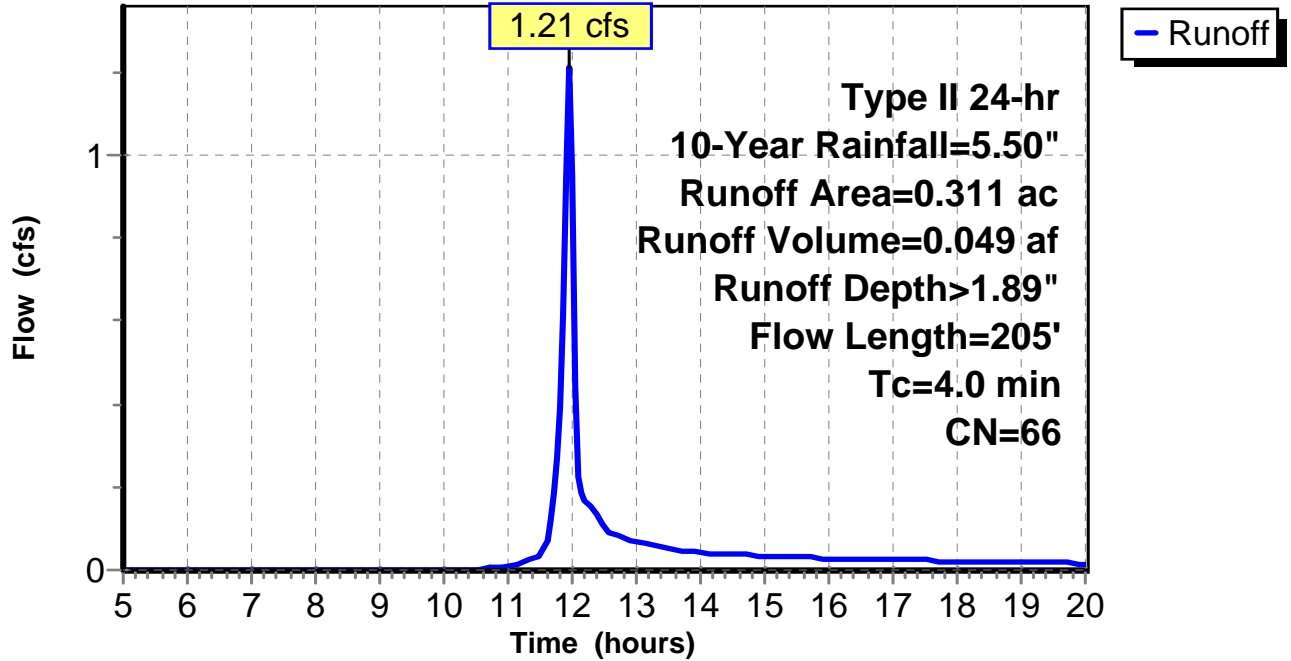
Subcatchment 18: C AR-500.020

Hydrograph



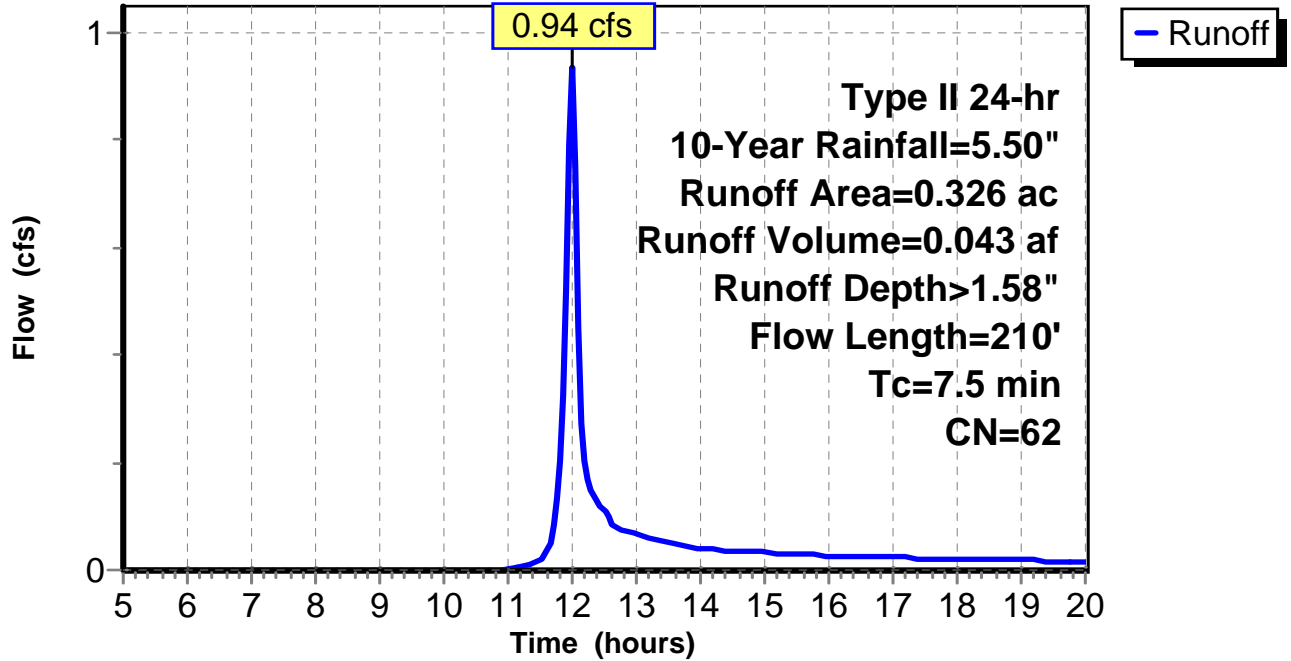
Subcatchment 19: C AR-500.021

Hydrograph



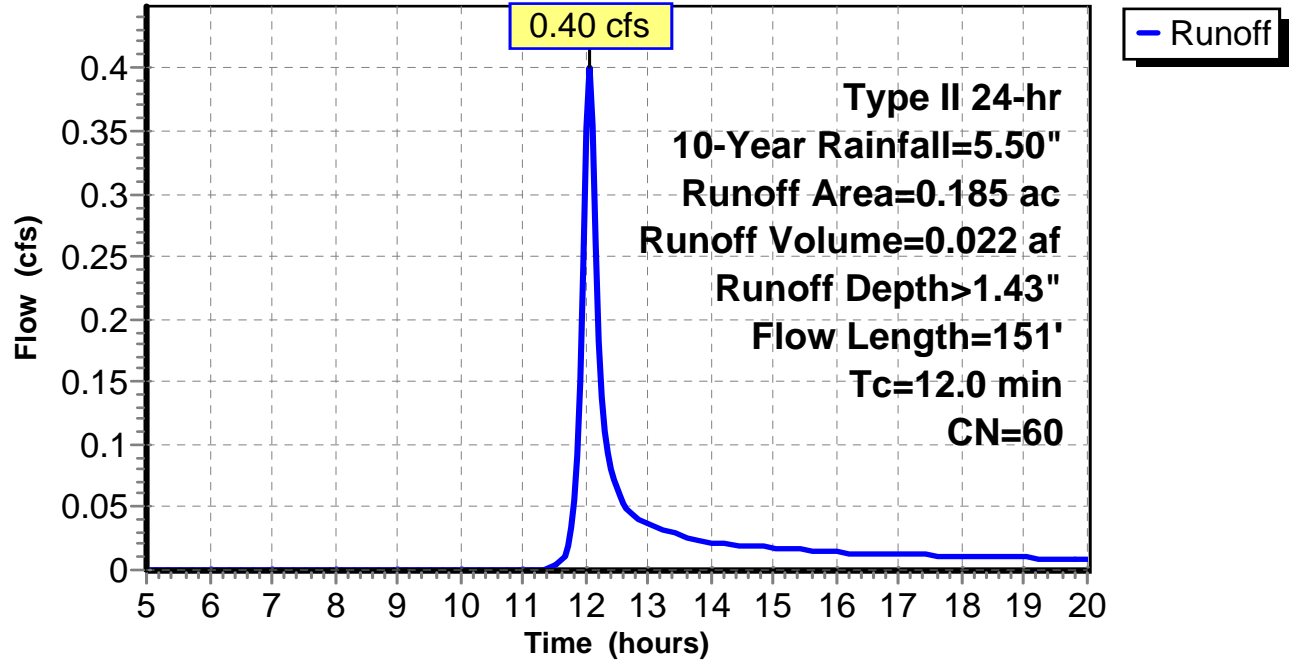
Subcatchment 20: C AR-500.022

Hydrograph



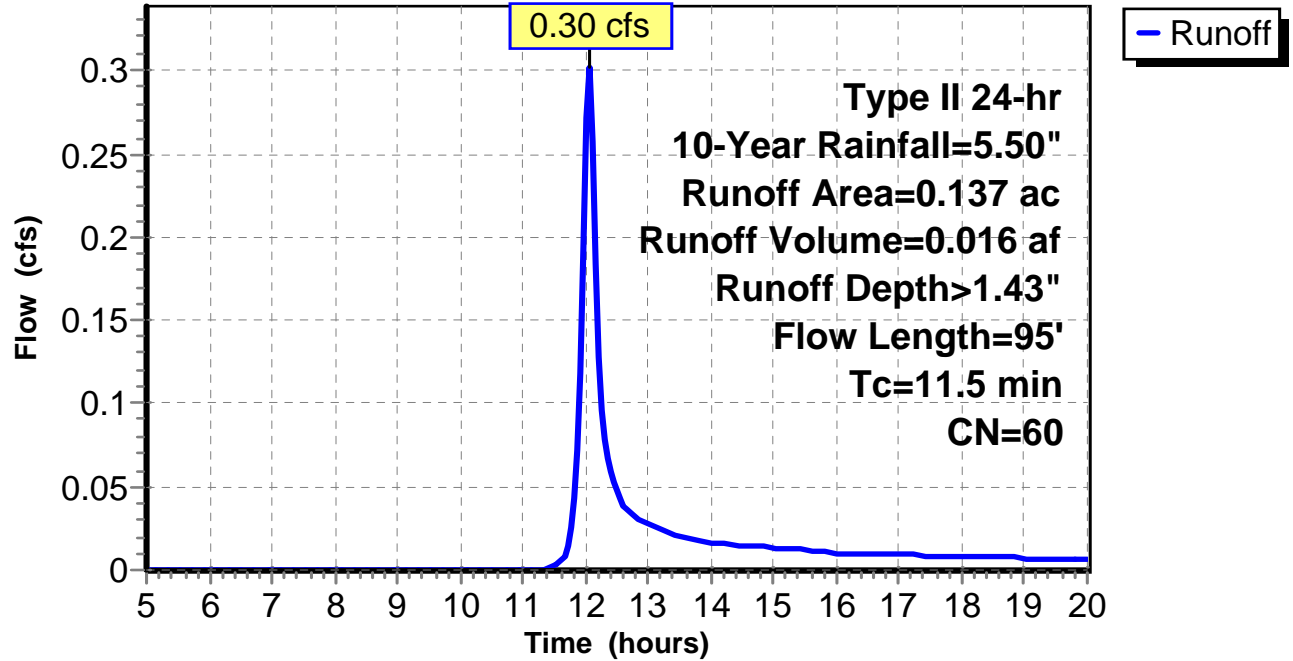
Subcatchment 21: C AR-500.023

Hydrograph



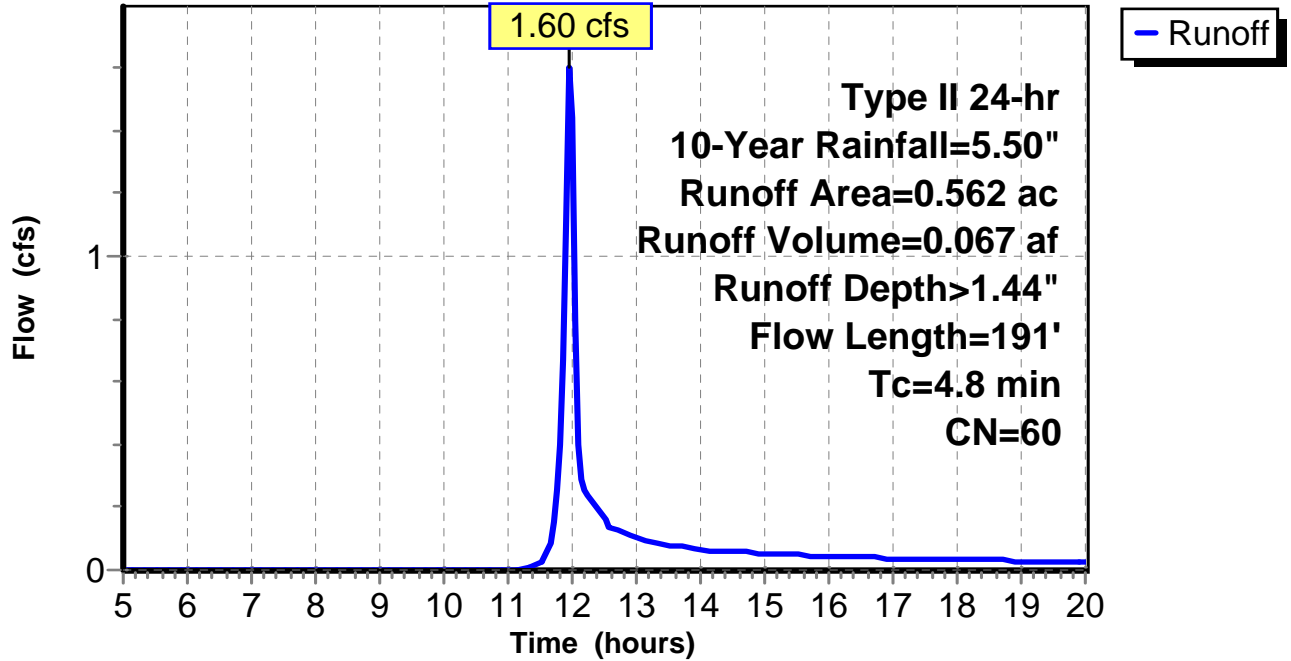
Subcatchment 22: C AR-500.024

Hydrograph



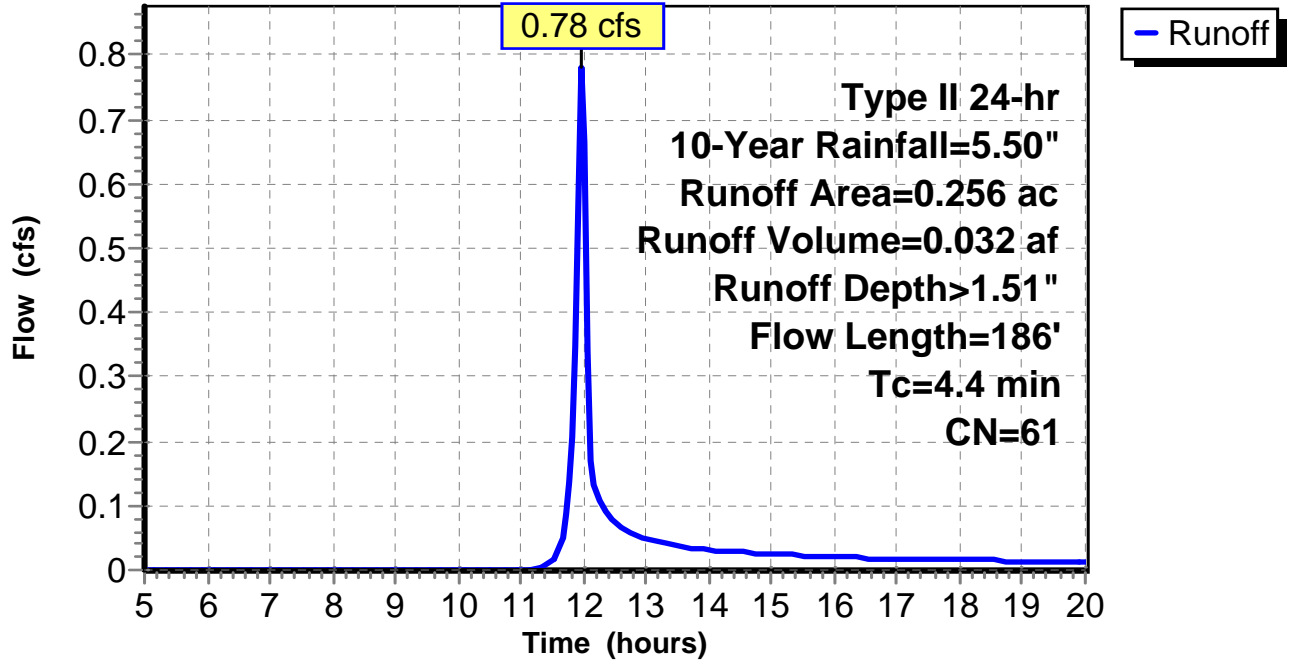
Subcatchment 23: C AR-500.025

Hydrograph



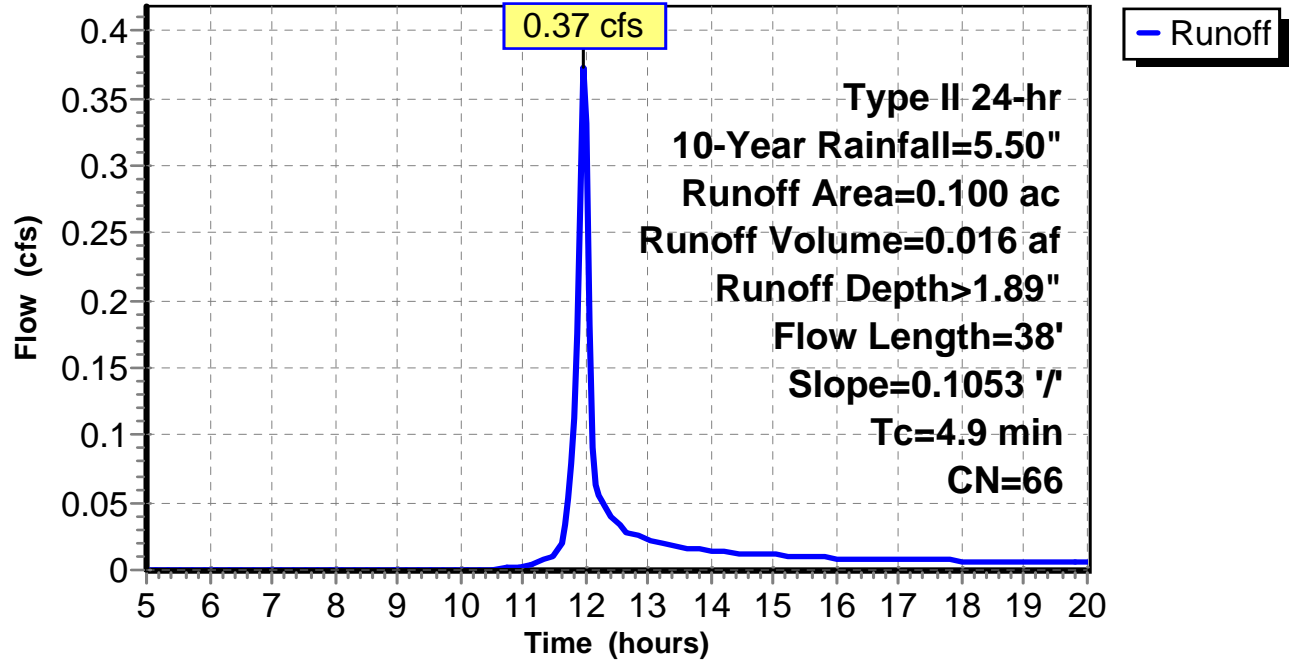
Subcatchment 24: C AR-500.026

Hydrograph



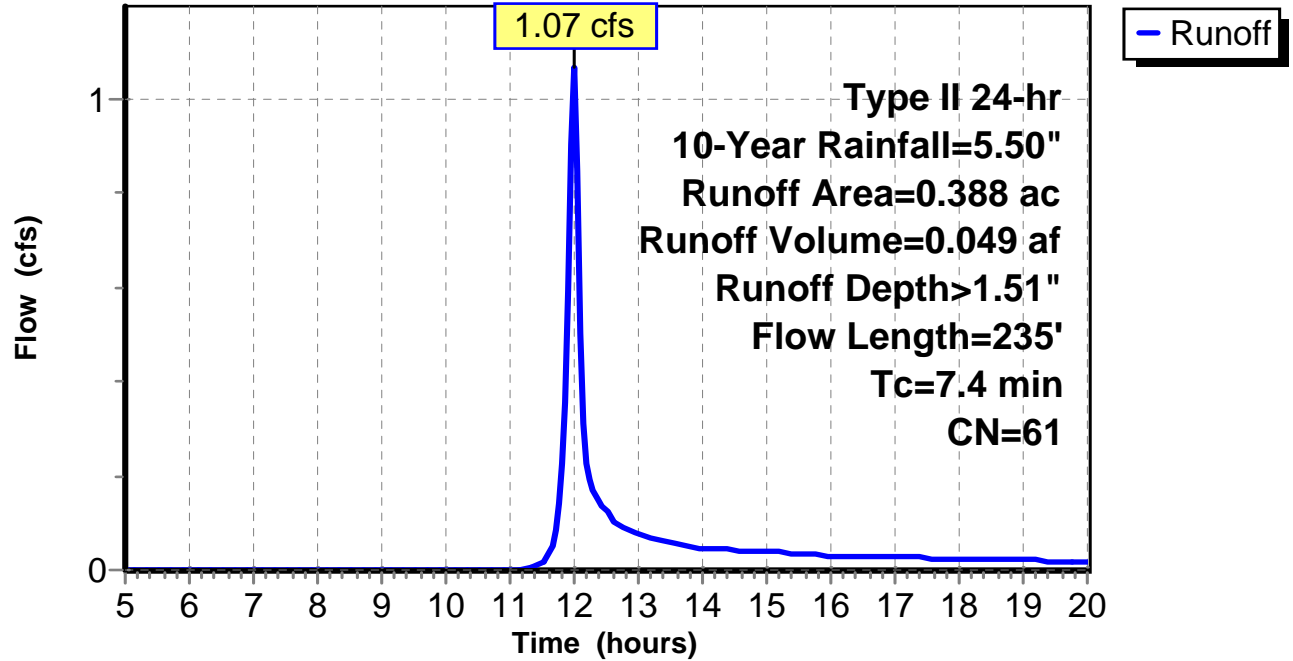
Subcatchment 25: C AR-500.027

Hydrograph



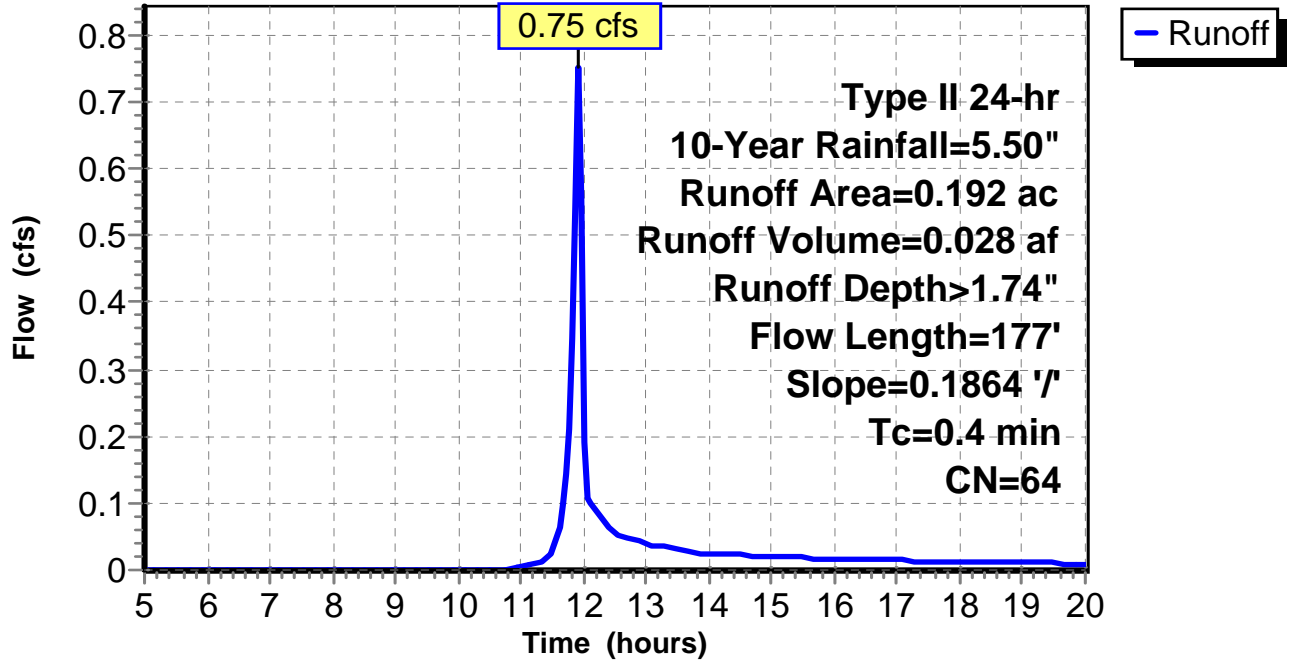
Subcatchment 26: C AR-500.028

Hydrograph



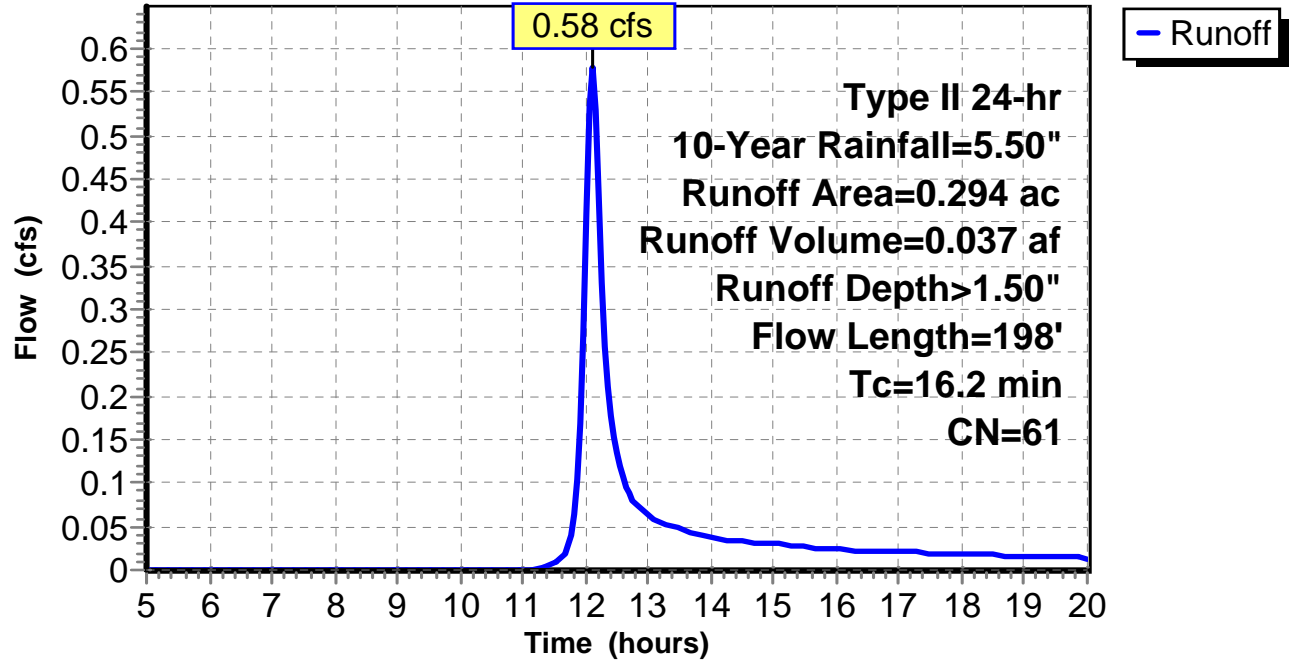
Subcatchment 27: C AR-500.029

Hydrograph



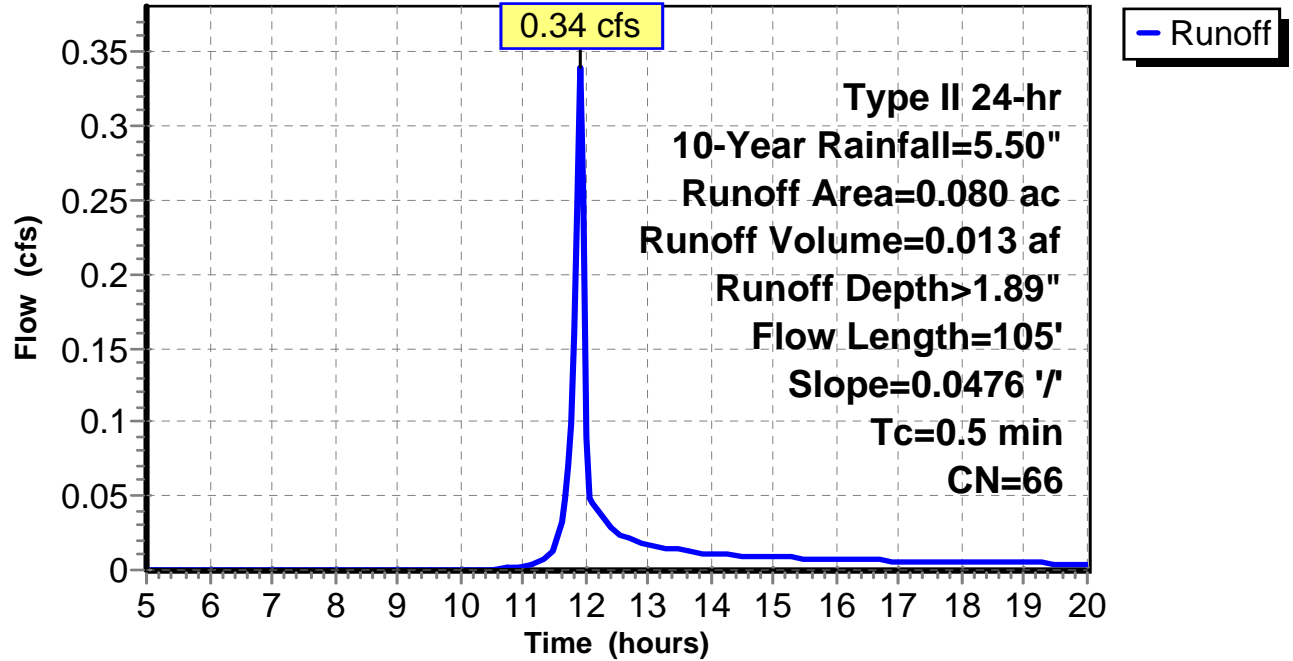
Subcatchment 28: C AR-500.030

Hydrograph



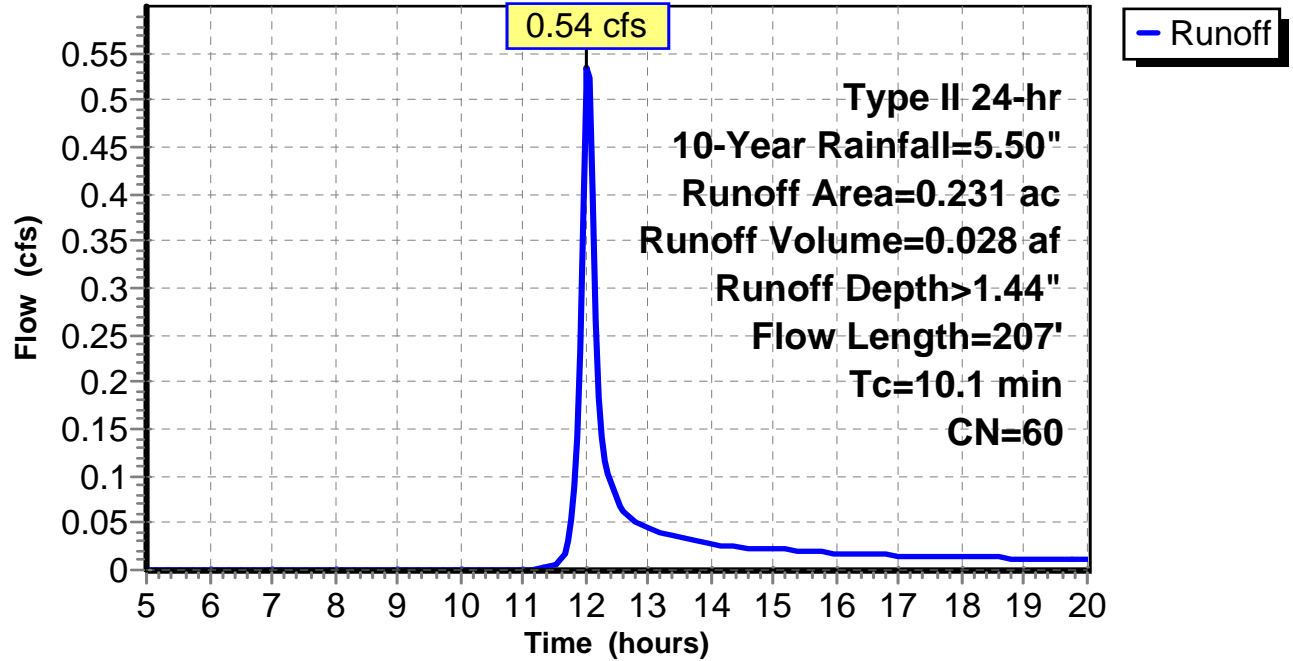
Subcatchment 29: C AR-500.031

Hydrograph



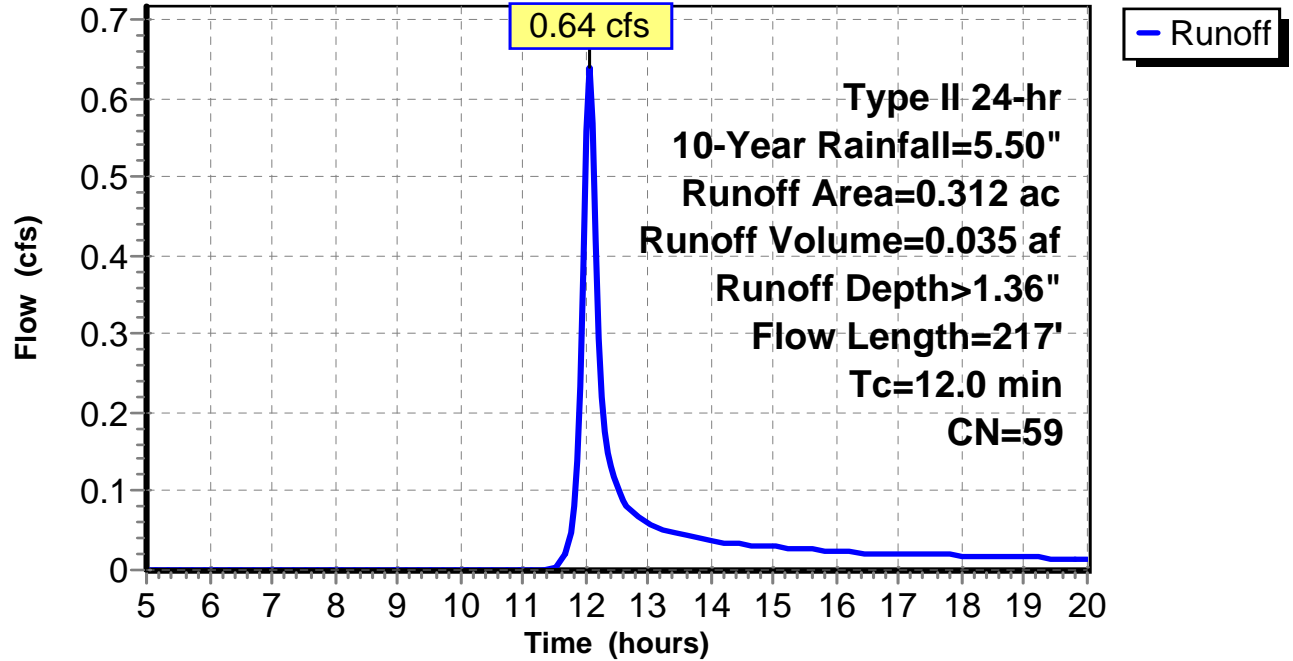
Subcatchment 30: C AR-500.032

Hydrograph



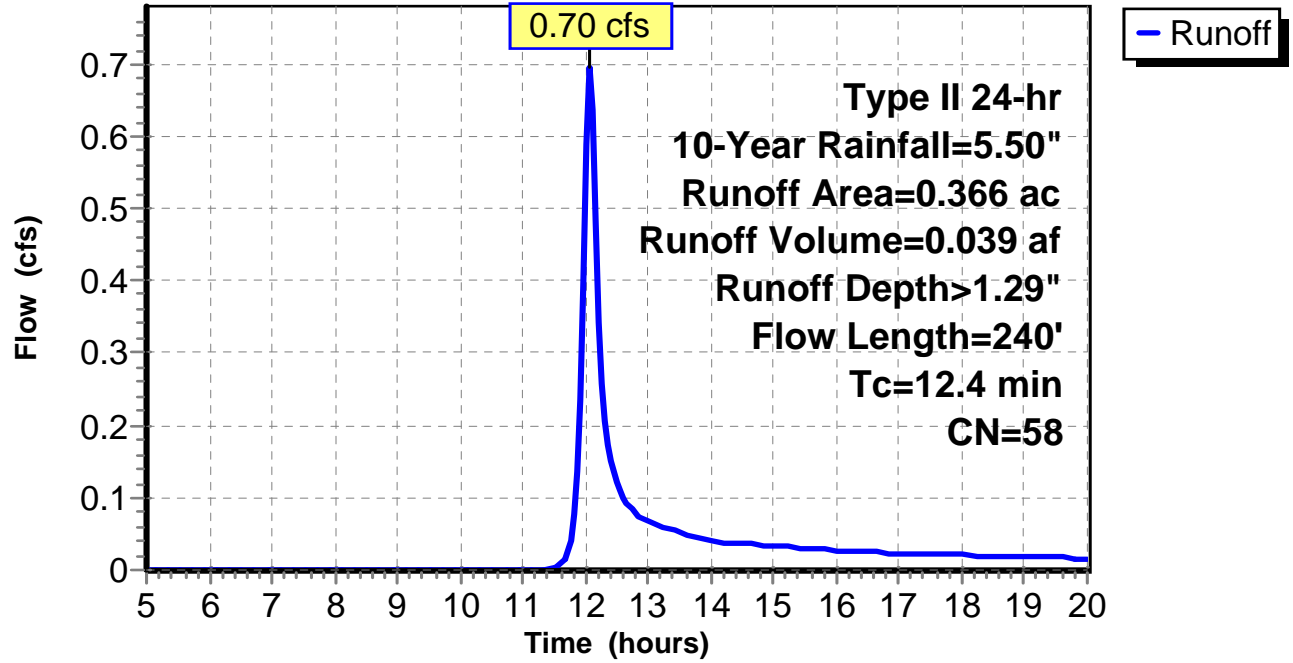
Subcatchment 31: C AR-500.033

Hydrograph



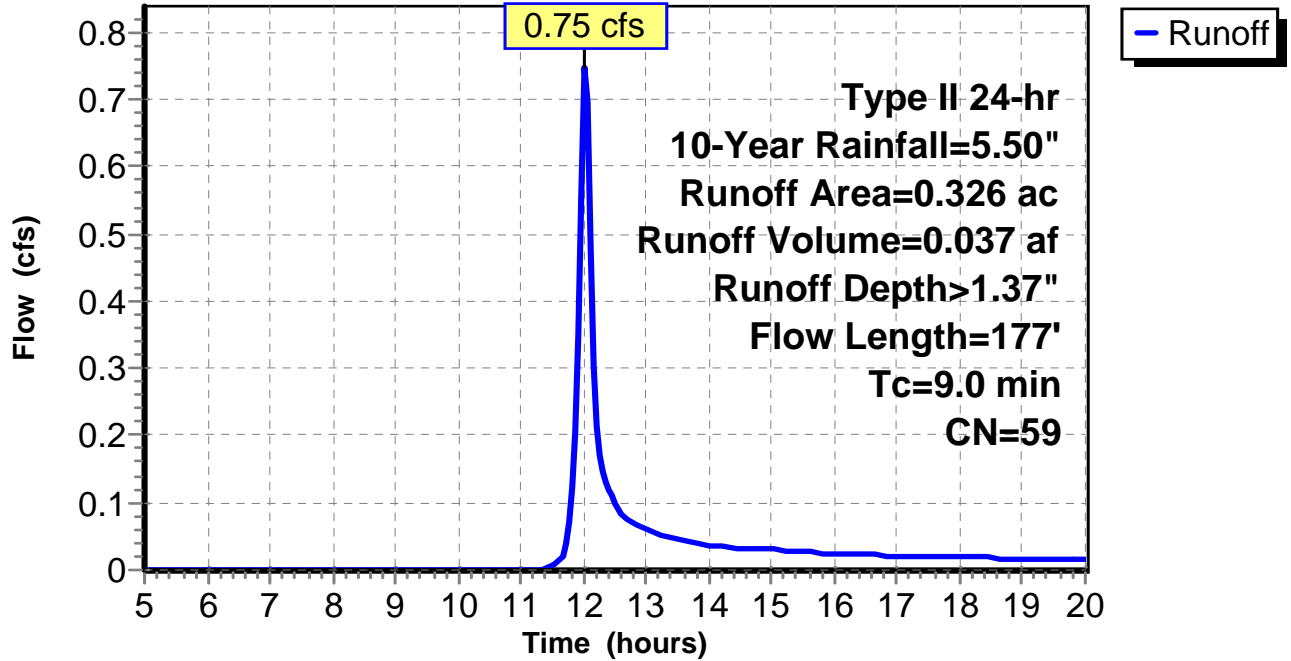
Subcatchment 32: C AR-500.034

Hydrograph



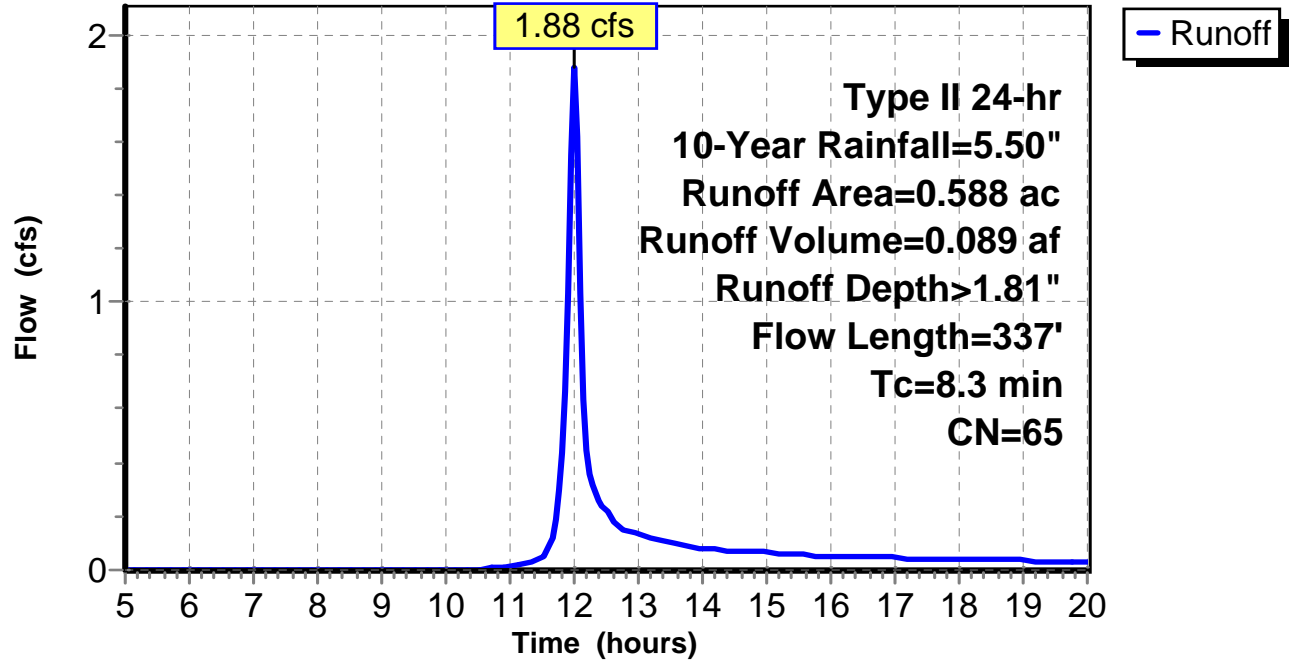
Subcatchment 33: C AR-500.035

Hydrograph



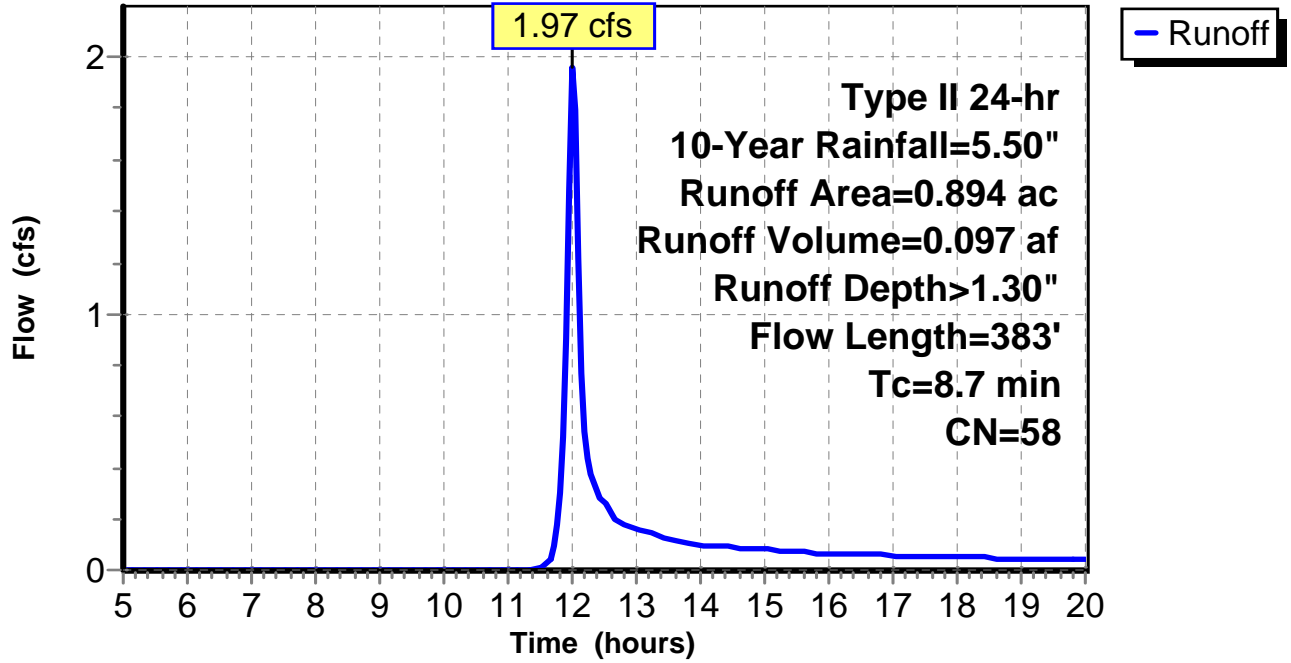
Subcatchment 34: C 158.001

Hydrograph



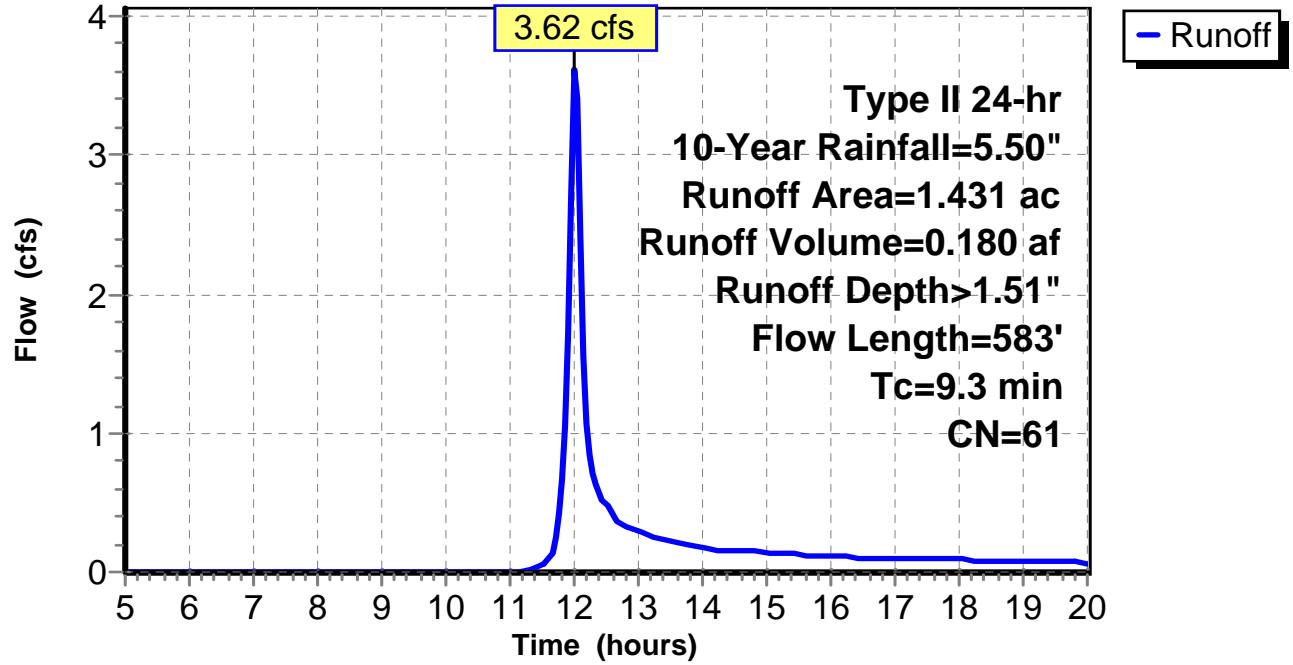
Subcatchment 35: C 158.002

Hydrograph



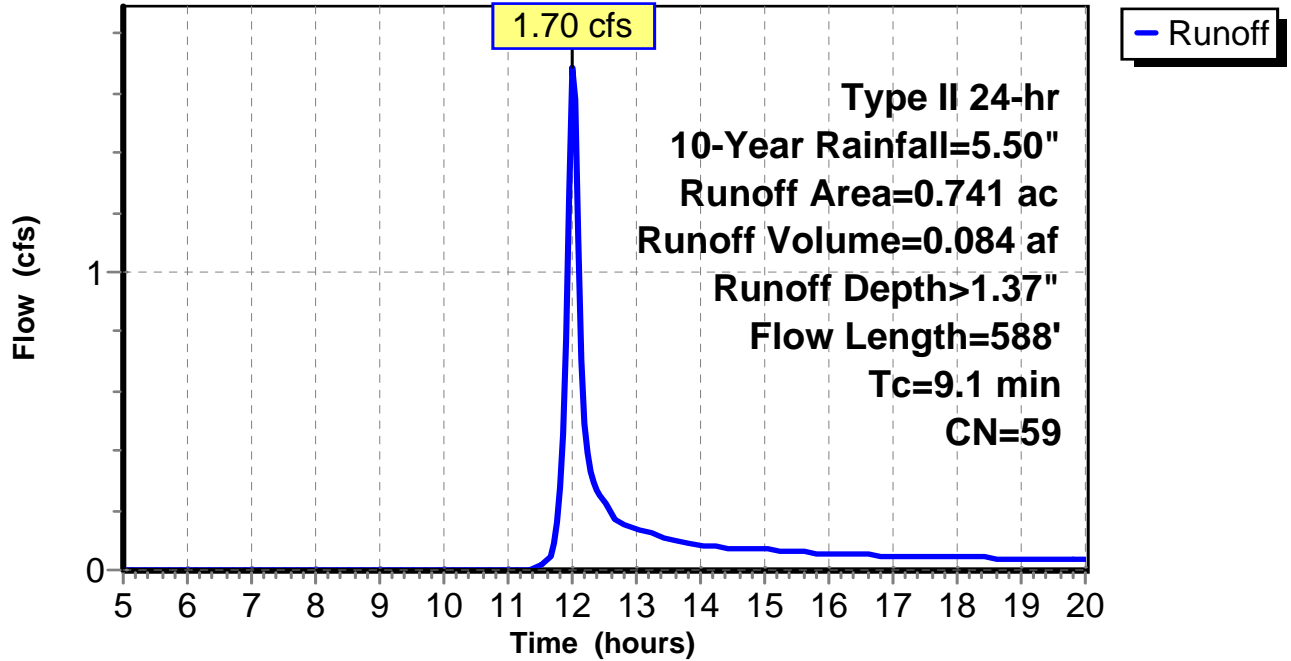
Subcatchment 36: C 158.003

Hydrograph



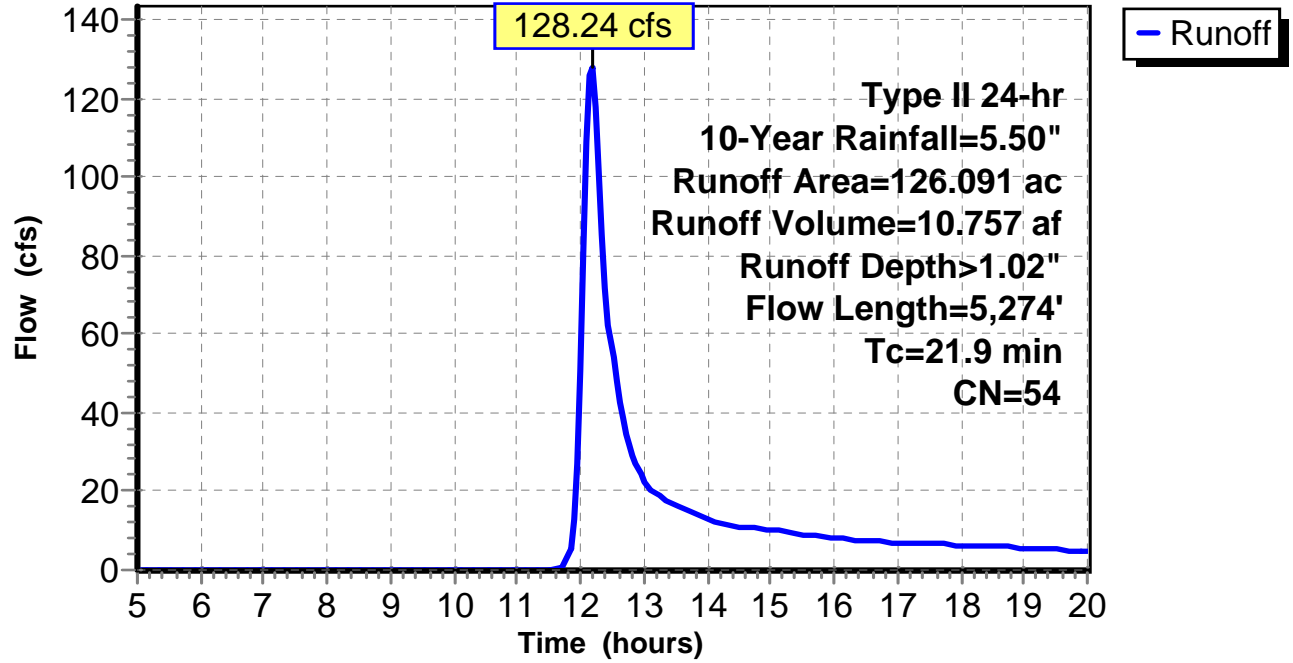
Subcatchment 37: C 158.004

Hydrograph



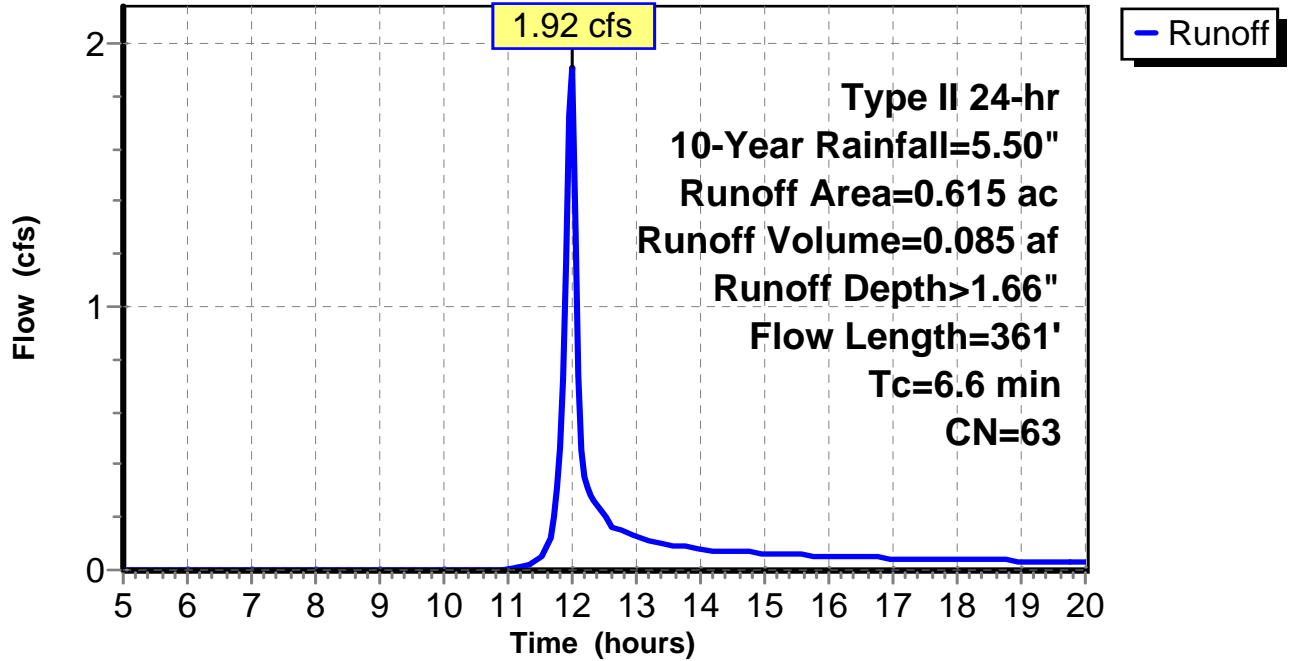
Subcatchment 38: C 158.005

Hydrograph



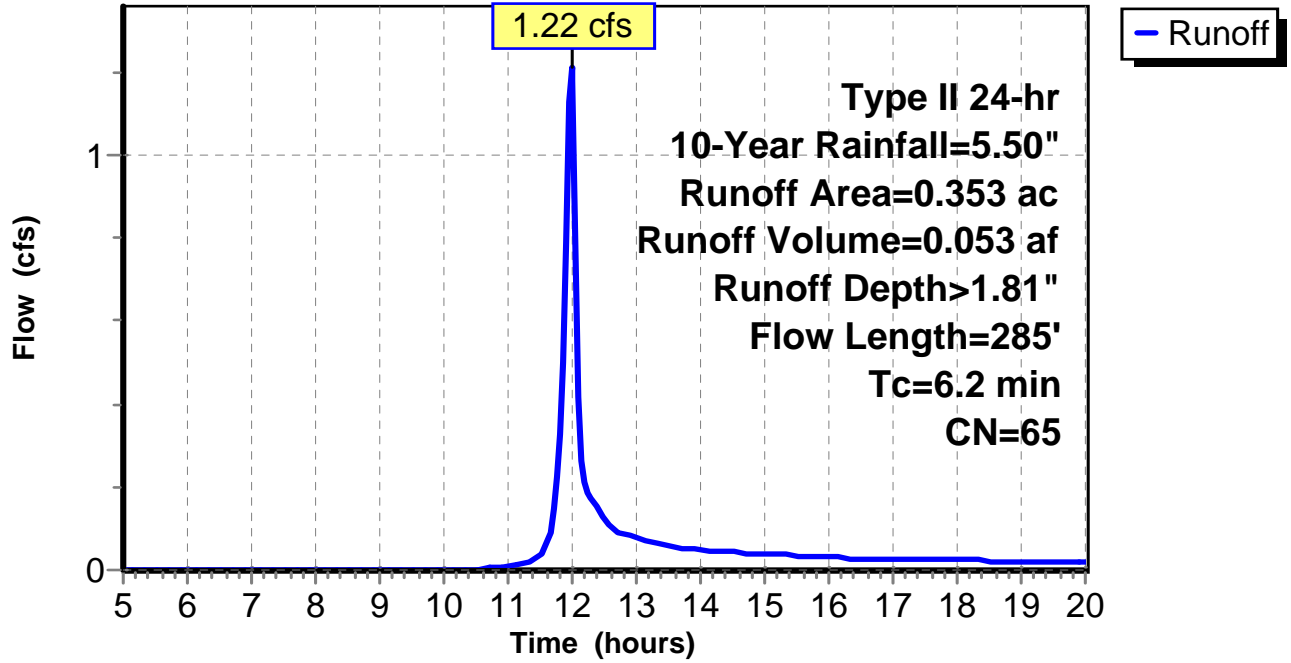
Subcatchment 39: C 158.006

Hydrograph



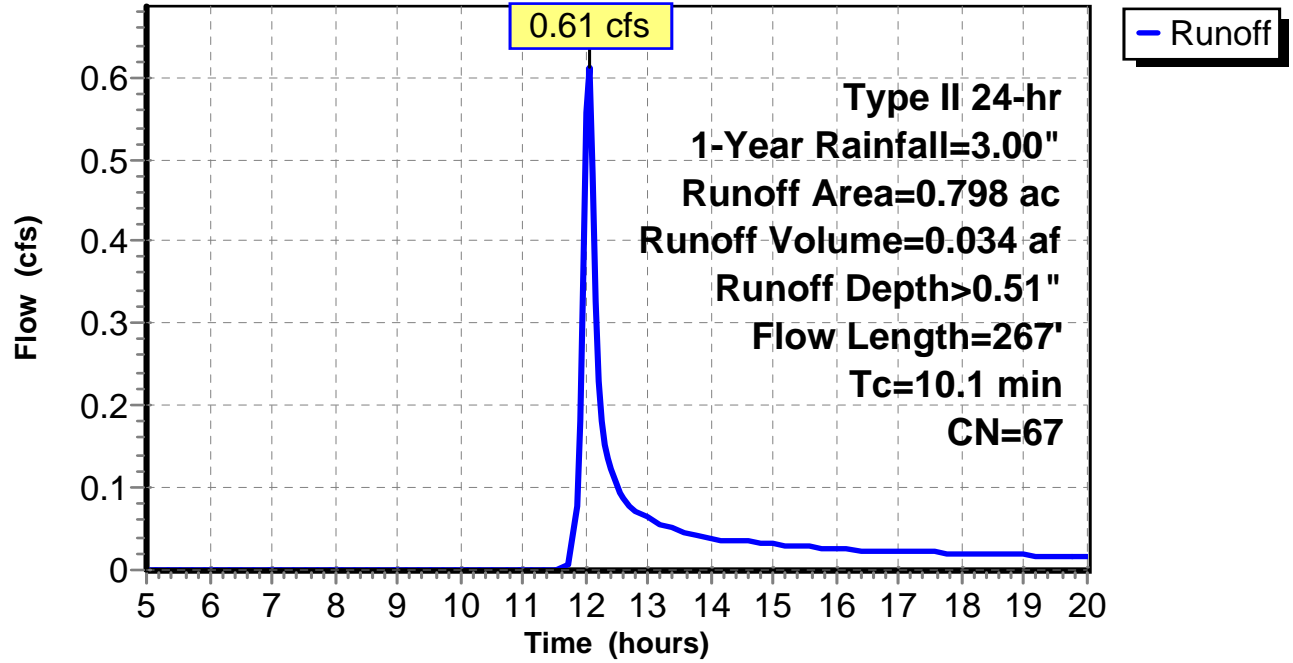
Subcatchment 40: C 158.007

Hydrograph



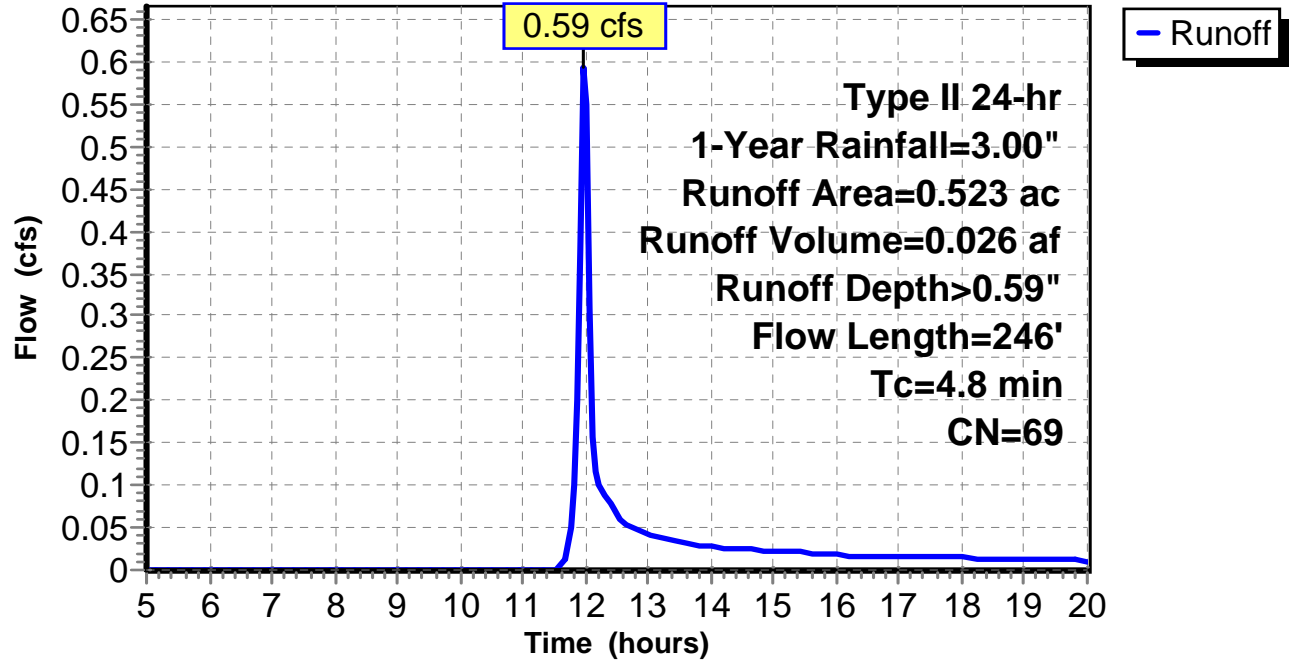
Subcatchment 1: C 158.008

Hydrograph



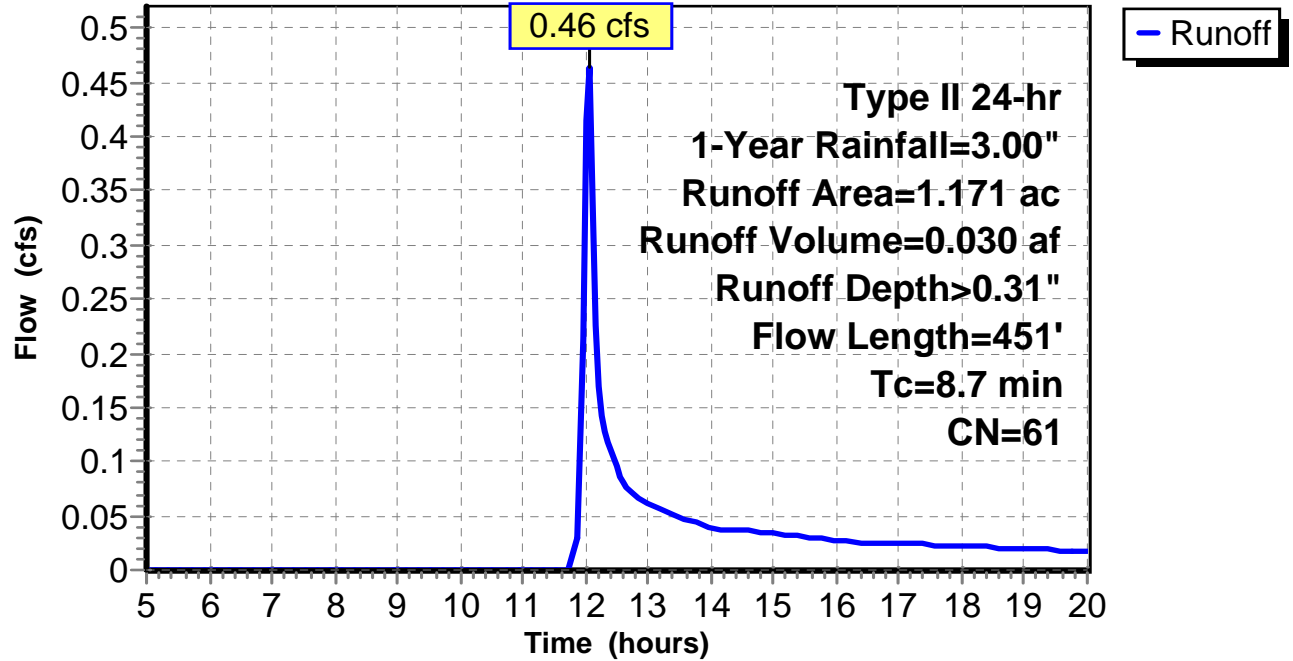
Subcatchment 2: C 158.009

Hydrograph



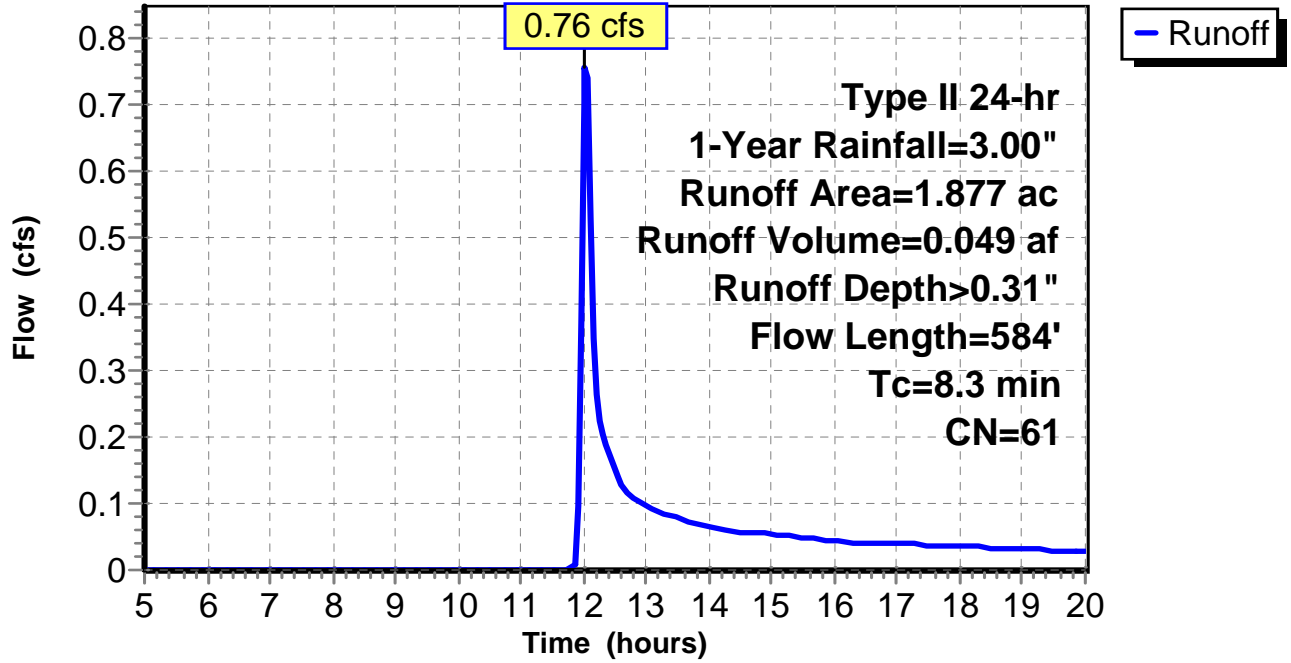
Subcatchment 3: C 158.010

Hydrograph



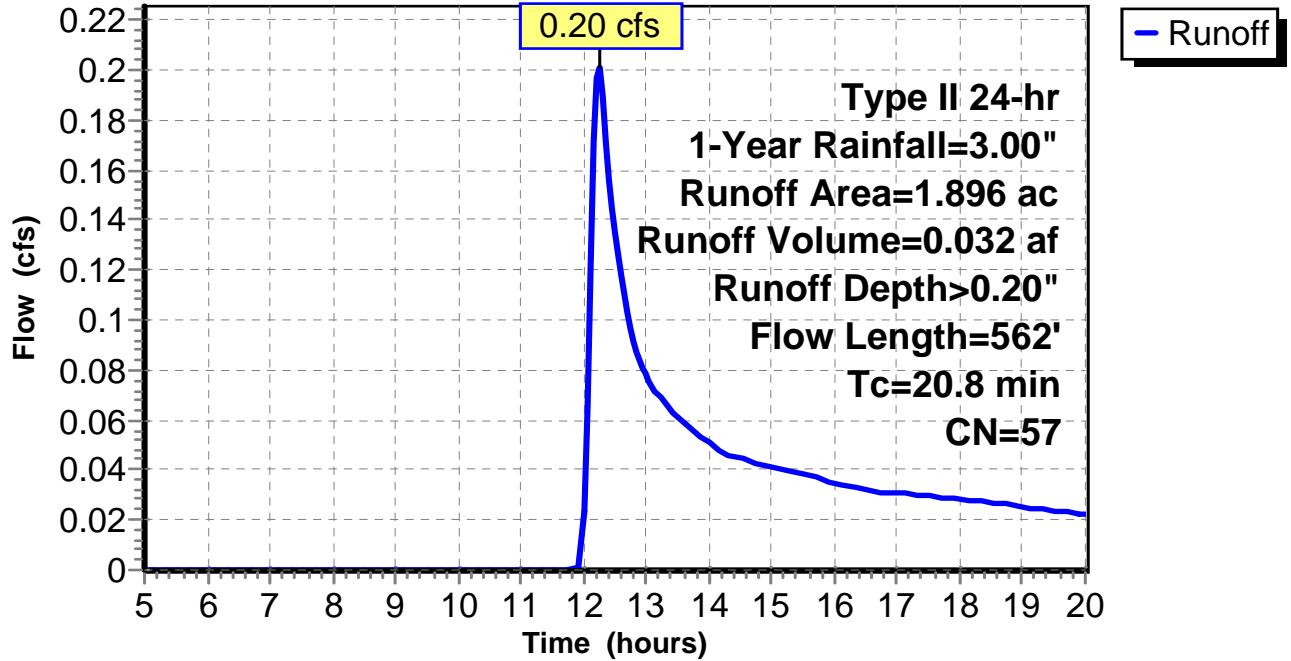
Subcatchment 4: C 158.011

Hydrograph



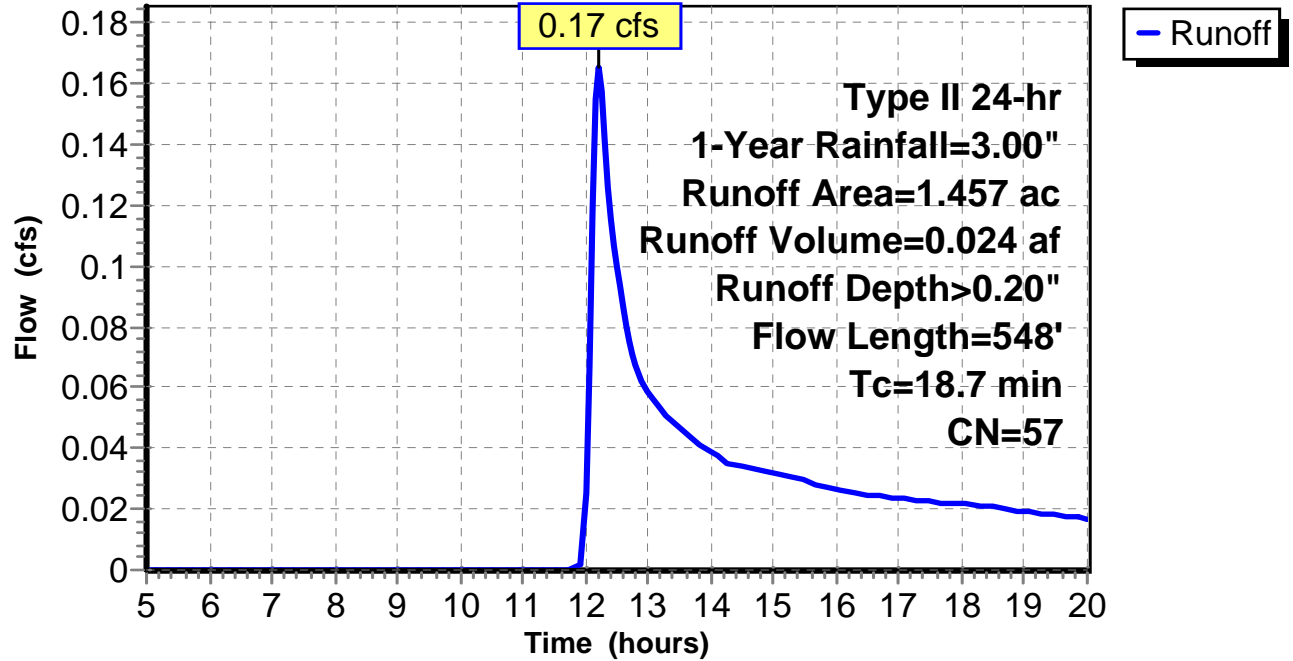
Subcatchment 5: C 158.012

Hydrograph



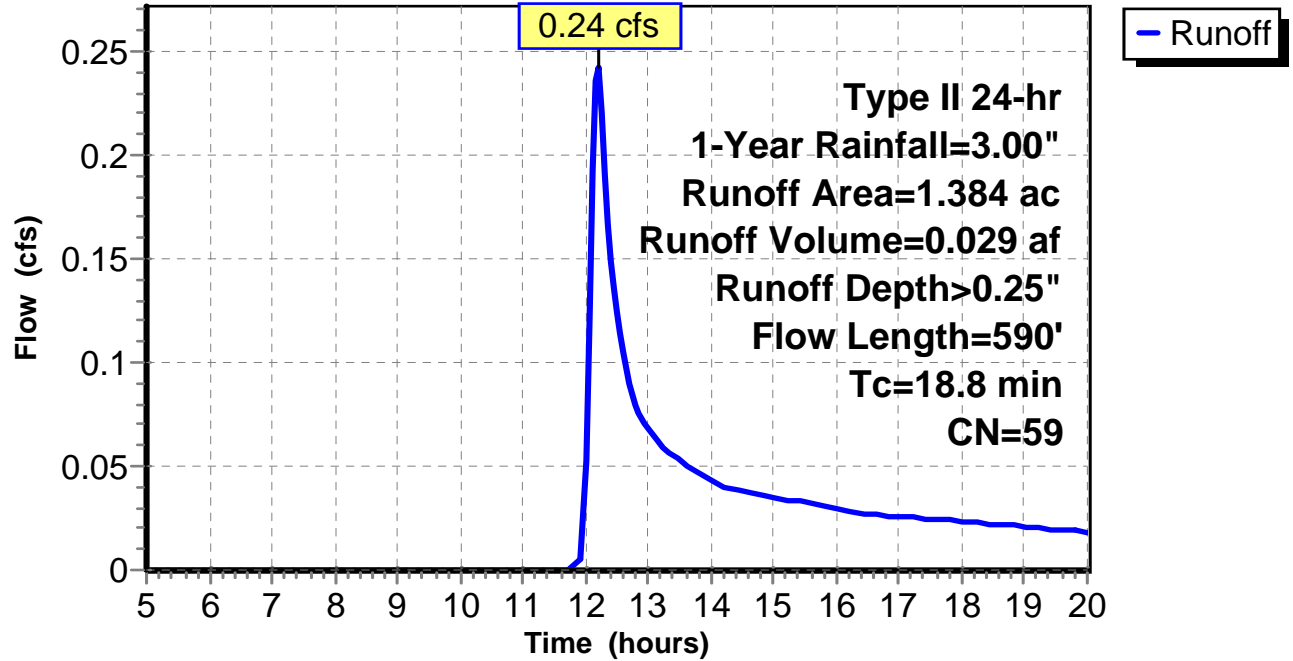
Subcatchment 6: C 158.013

Hydrograph



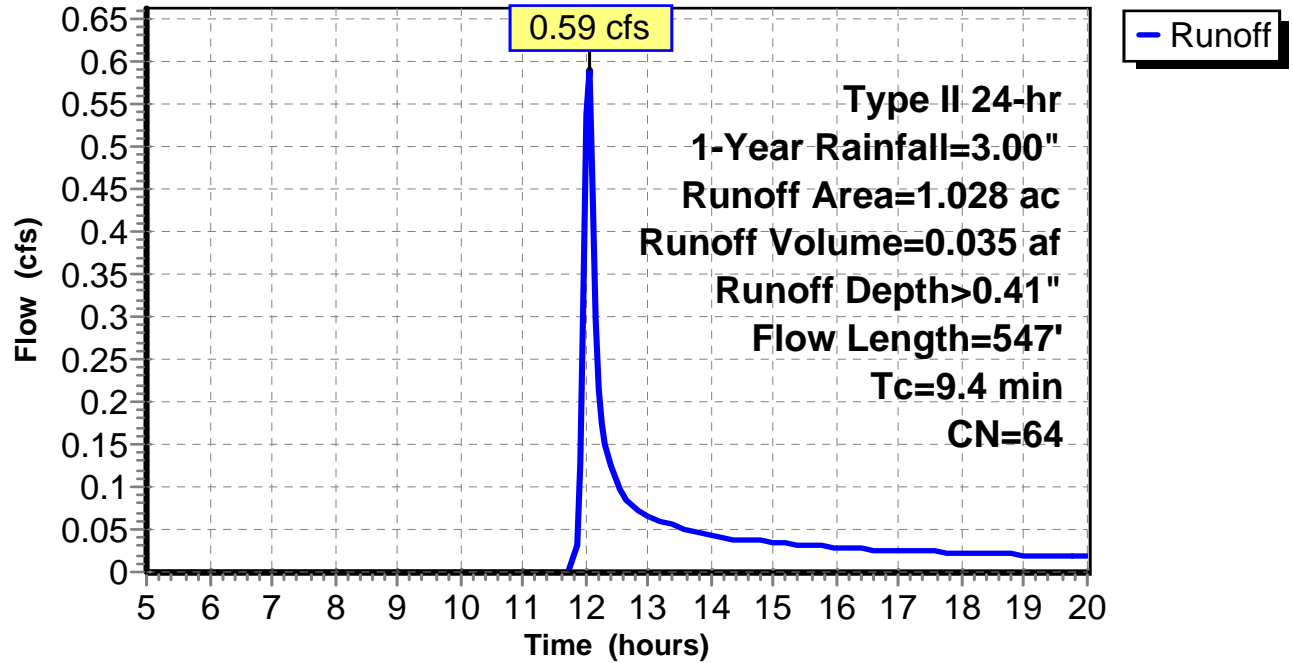
Subcatchment 7: C 158.014

Hydrograph



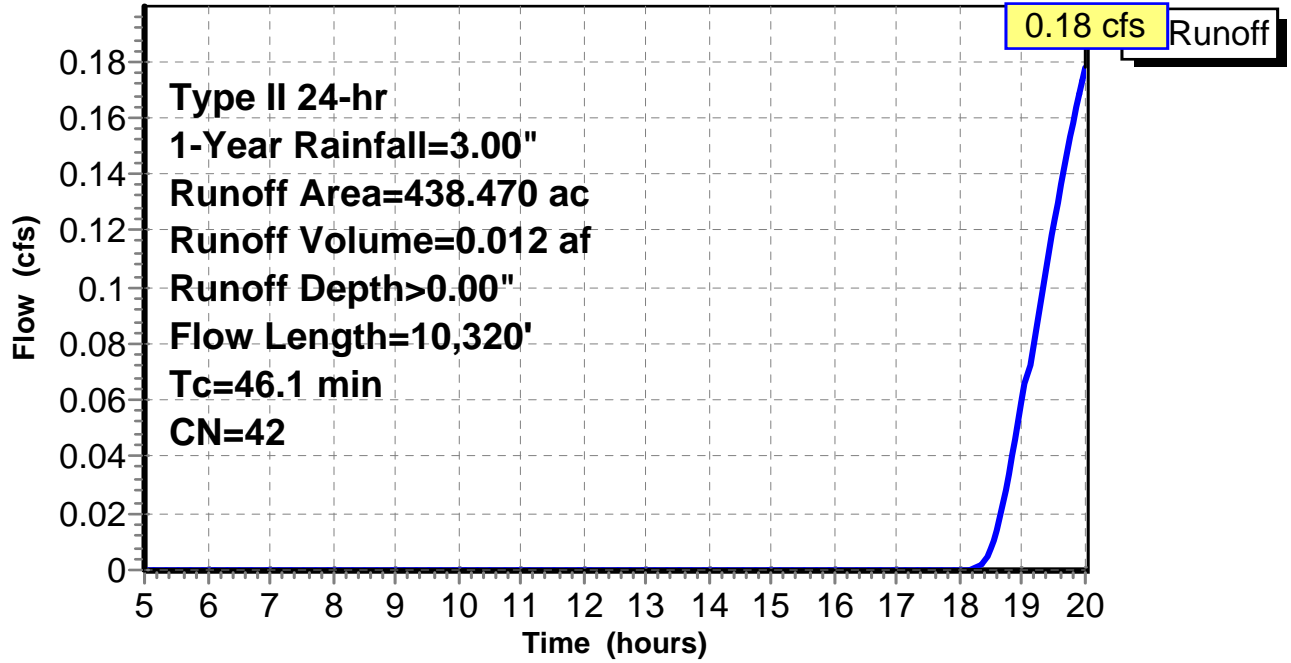
Subcatchment 8: C 158.015

Hydrograph



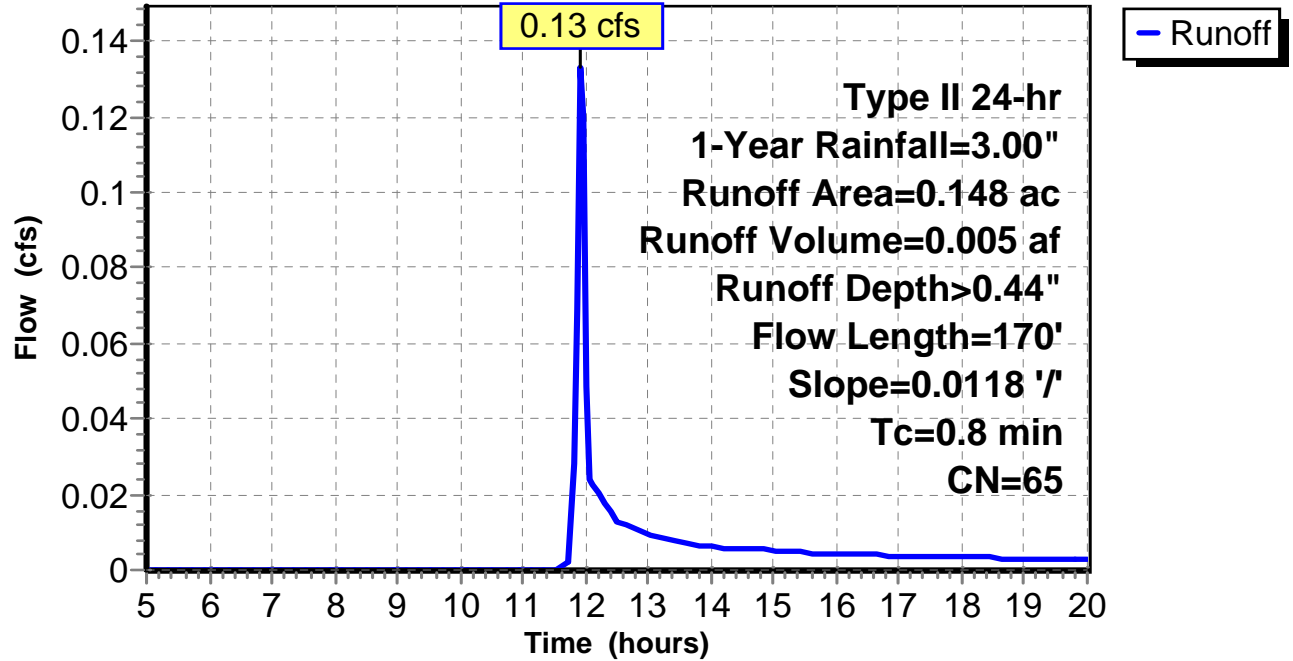
Subcatchment 9: C 158.016

Hydrograph



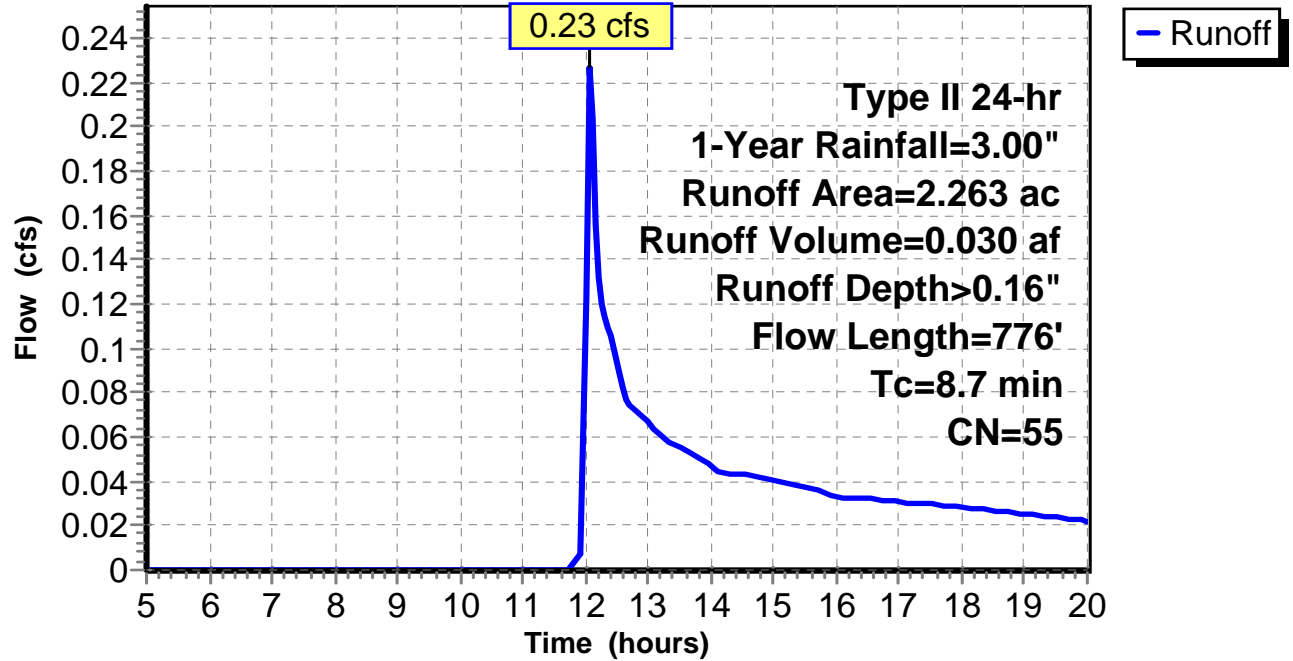
Subcatchment 10: C 159.001

Hydrograph



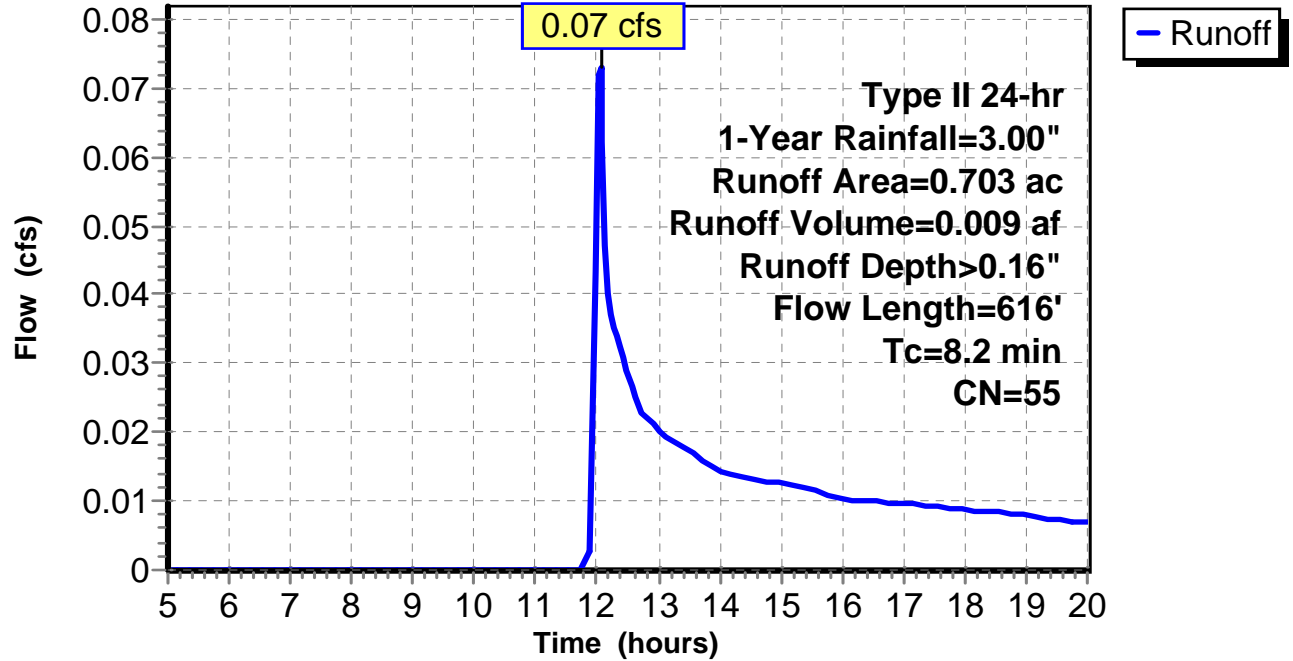
Subcatchment 11: C 159.008

Hydrograph



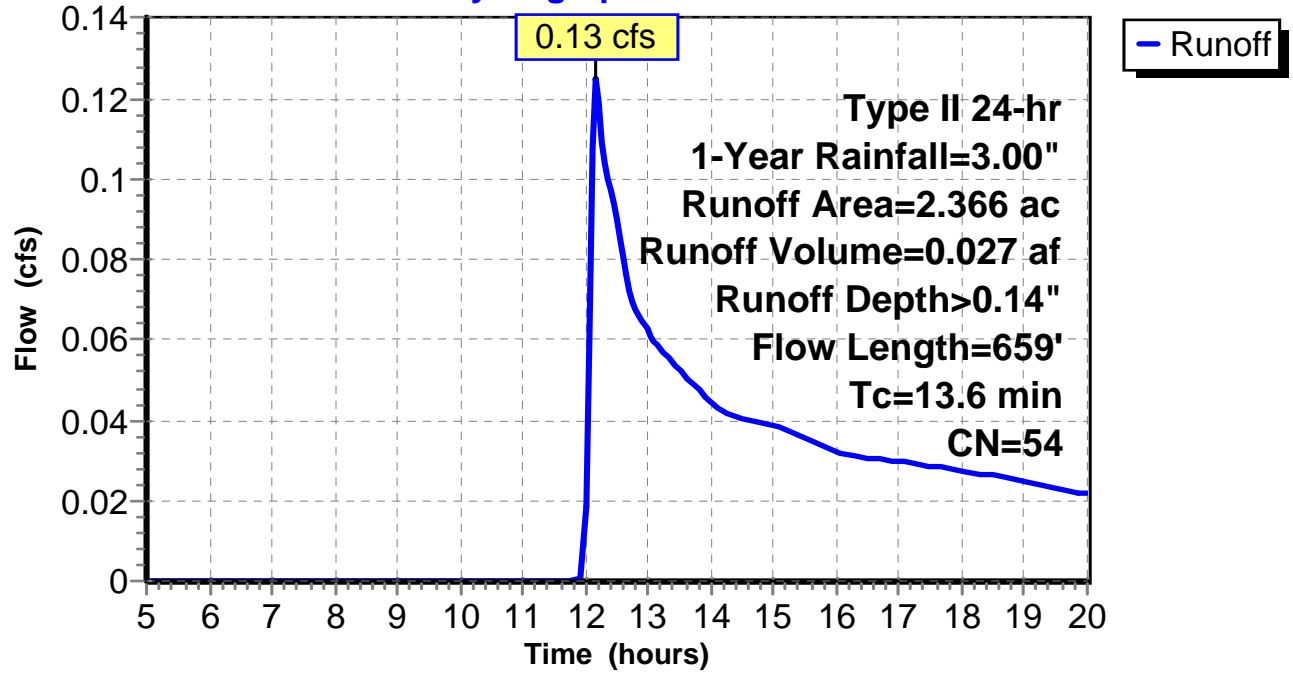
Subcatchment 12: C 159.009

Hydrograph



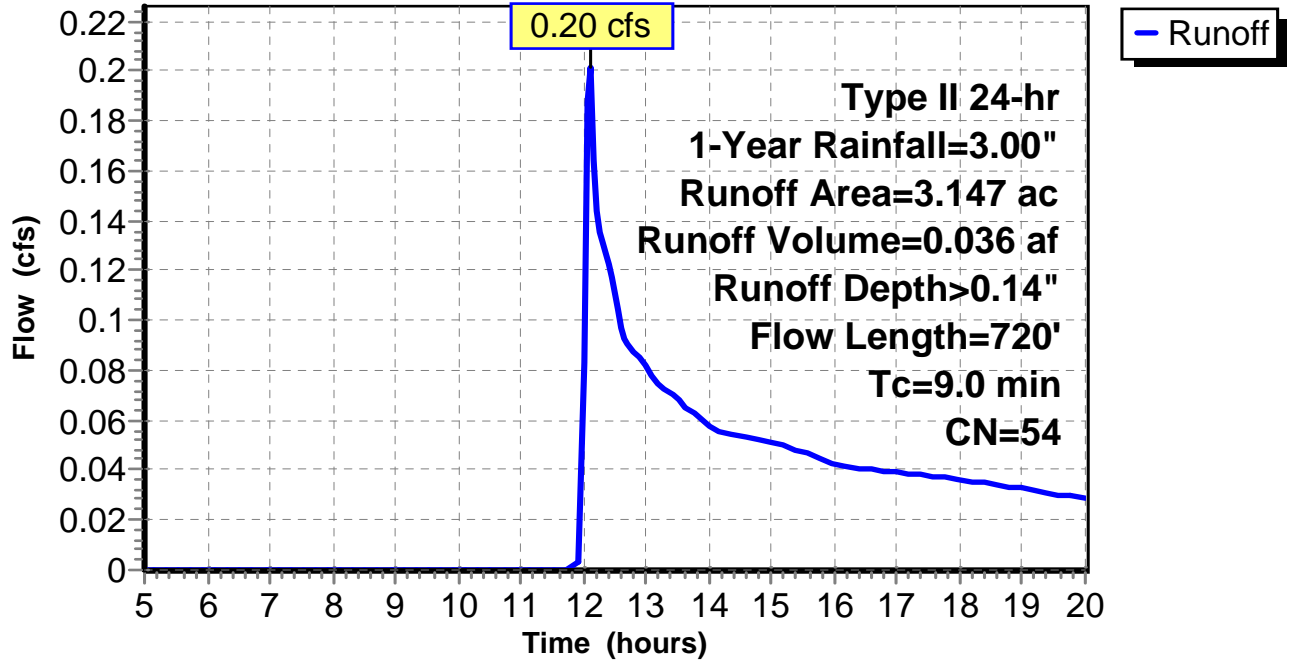
Subcatchment 13: C 159.010

Hydrograph



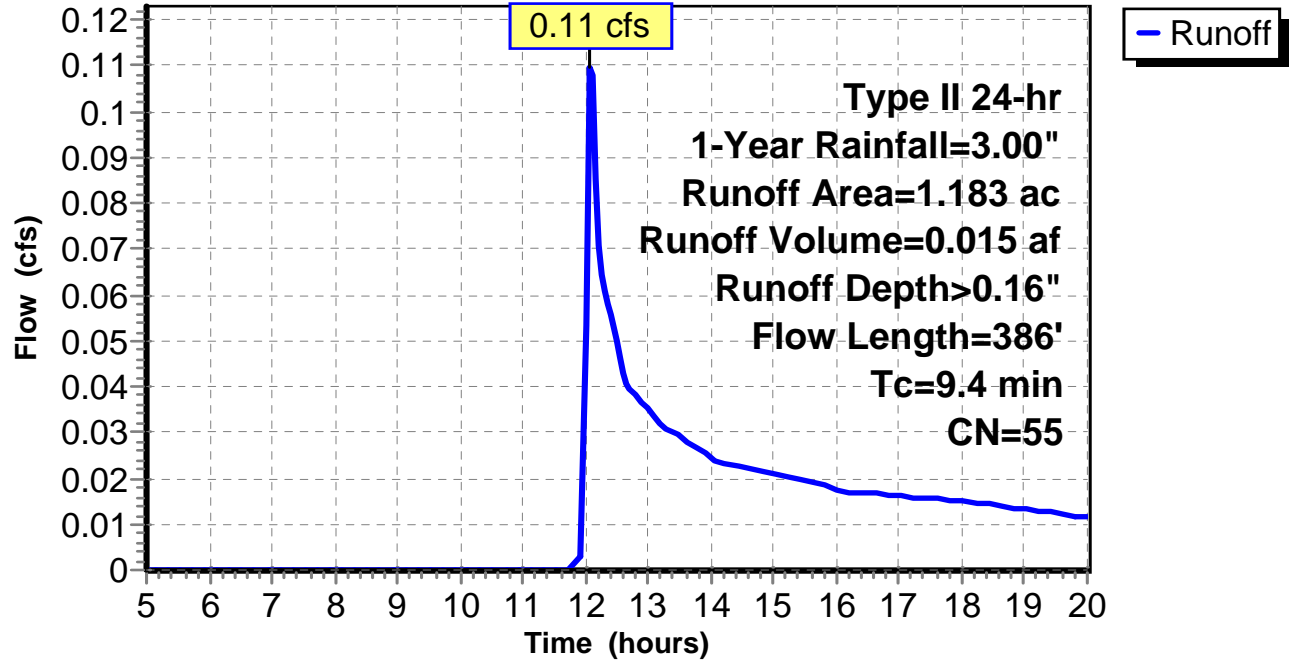
Subcatchment 14: C 159.011

Hydrograph



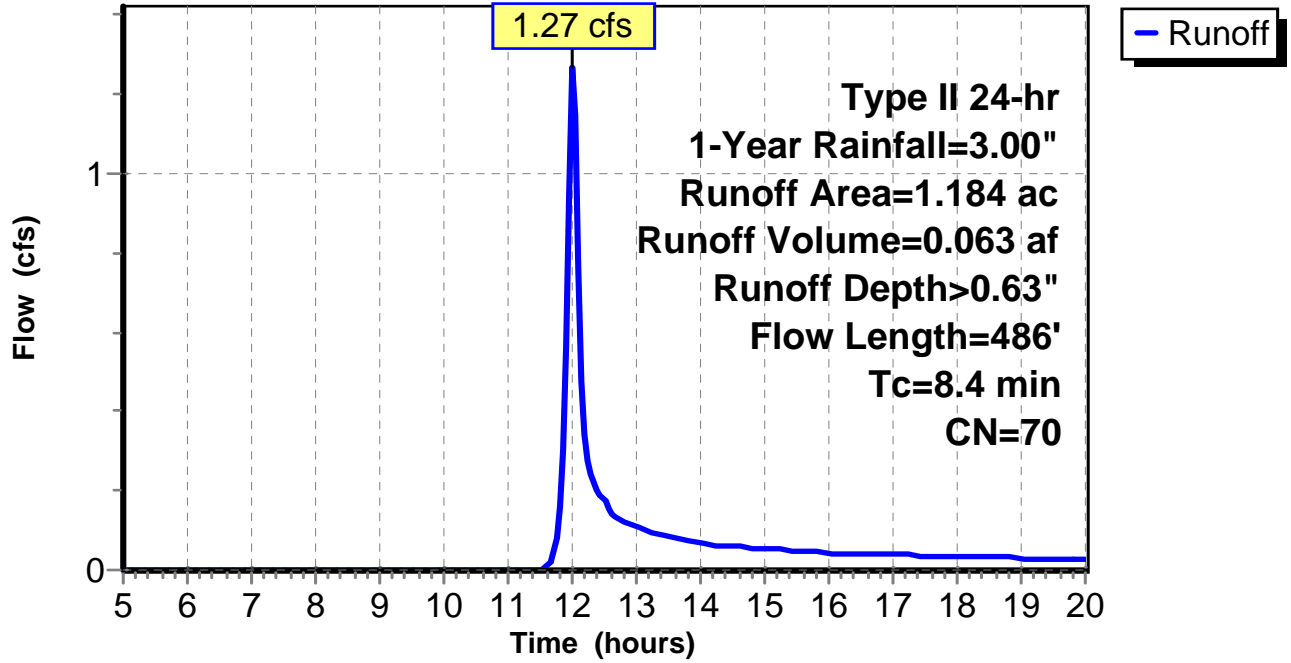
Subcatchment 15: C 159.012

Hydrograph



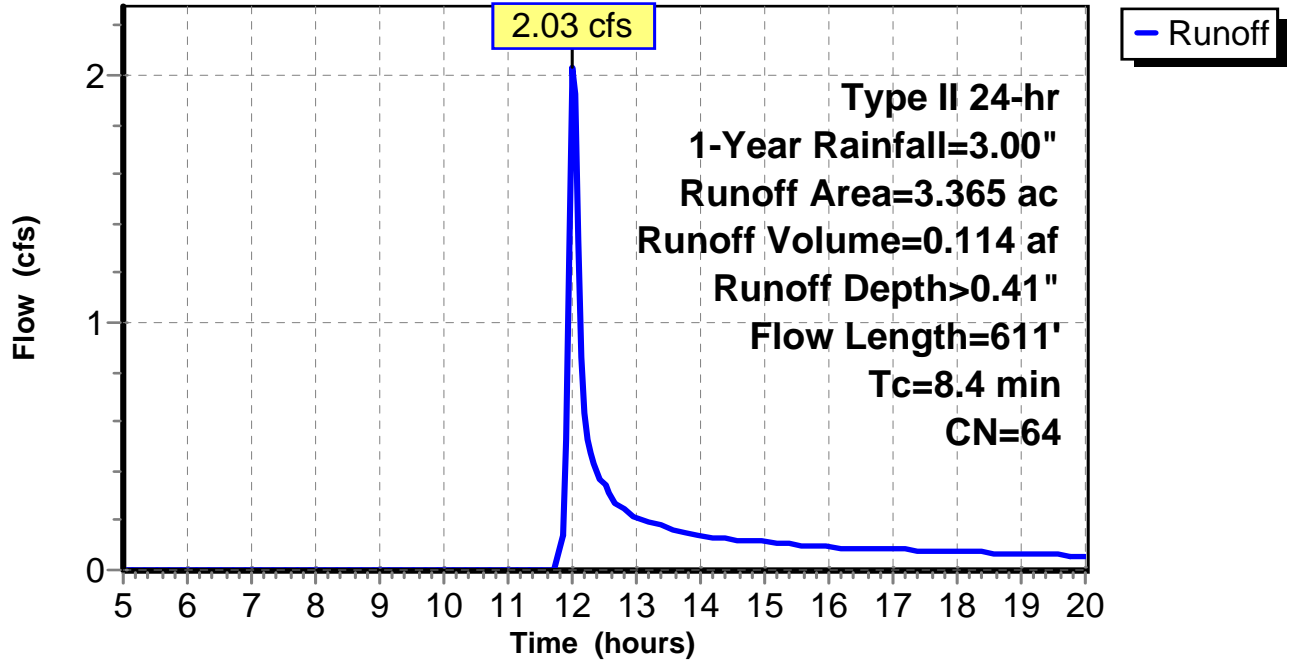
Subcatchment 16: C 159.013

Hydrograph



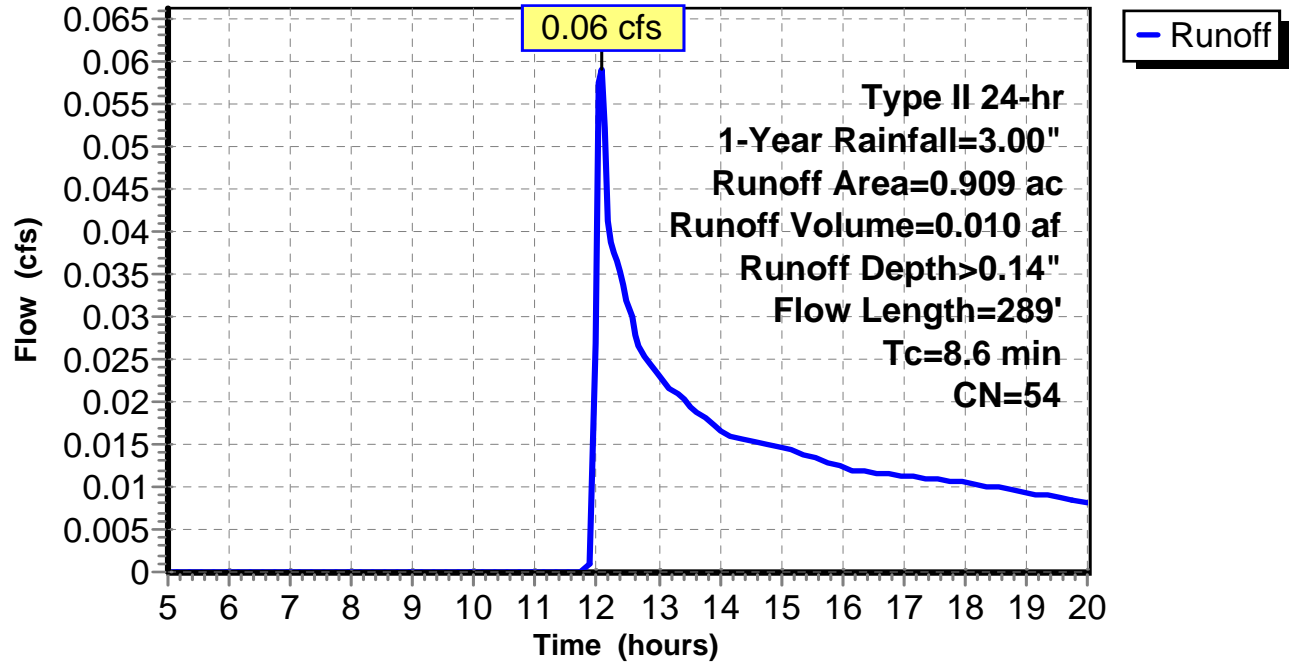
Subcatchment 17: C 159.014

Hydrograph



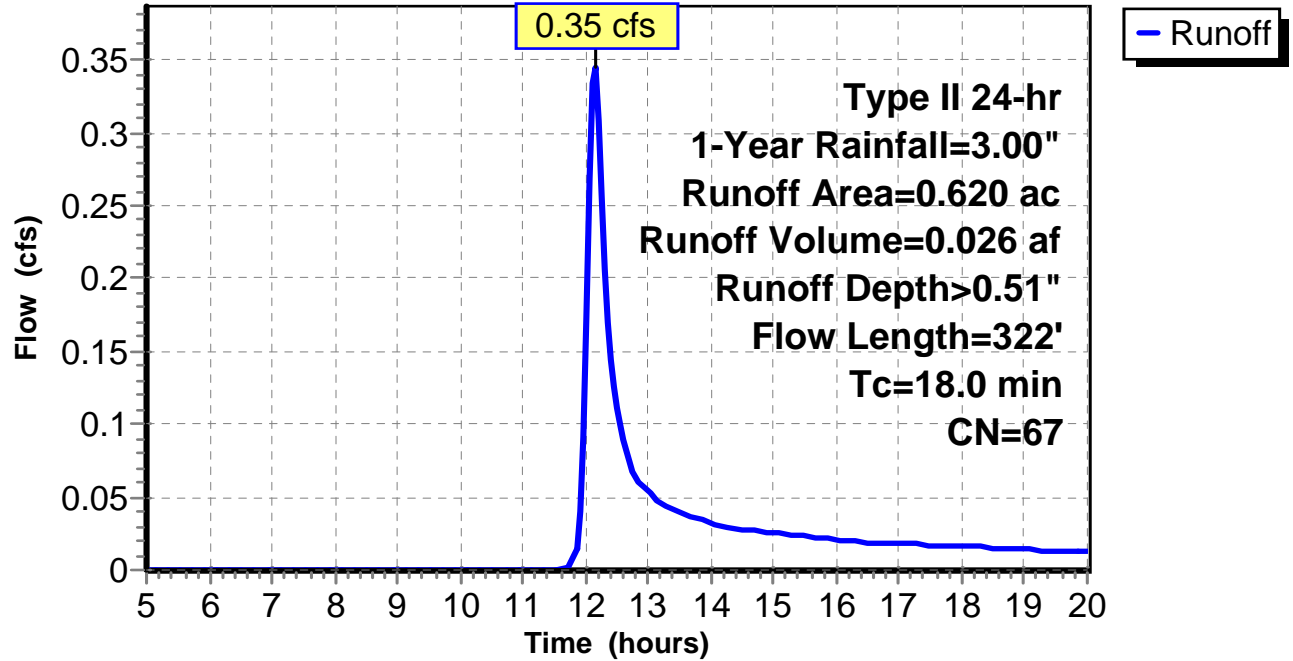
Subcatchment 18: C 159.015

Hydrograph



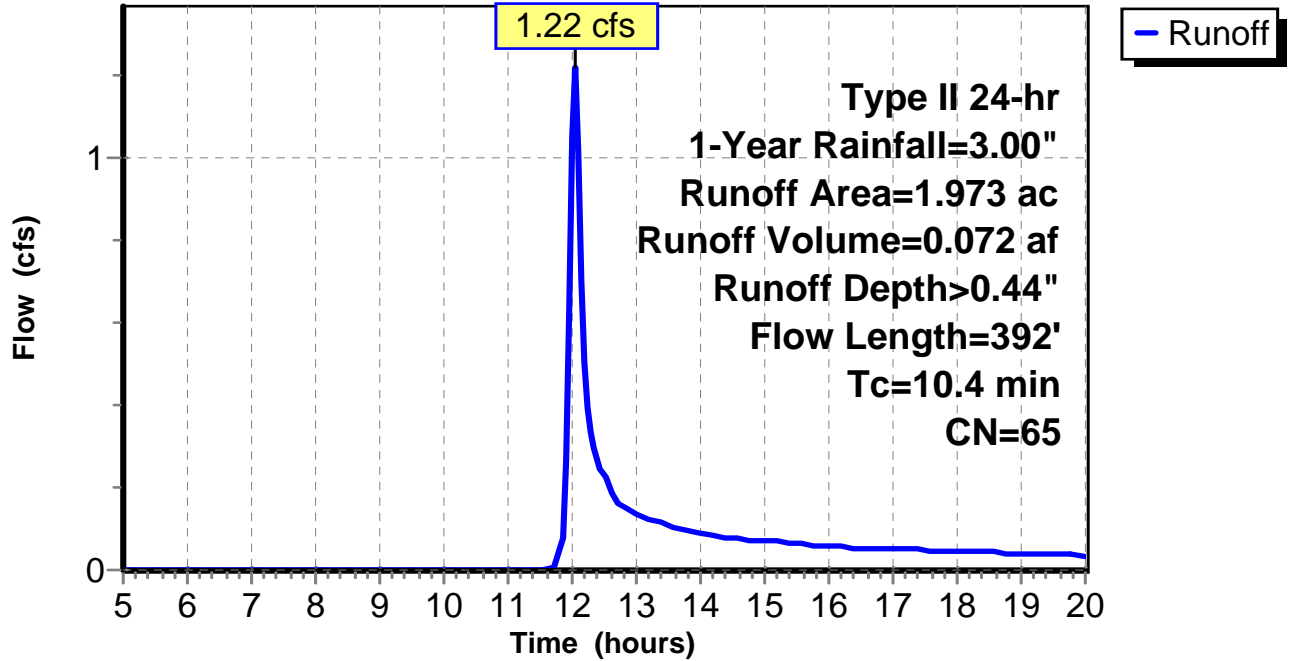
Subcatchment 19: C 159.016

Hydrograph



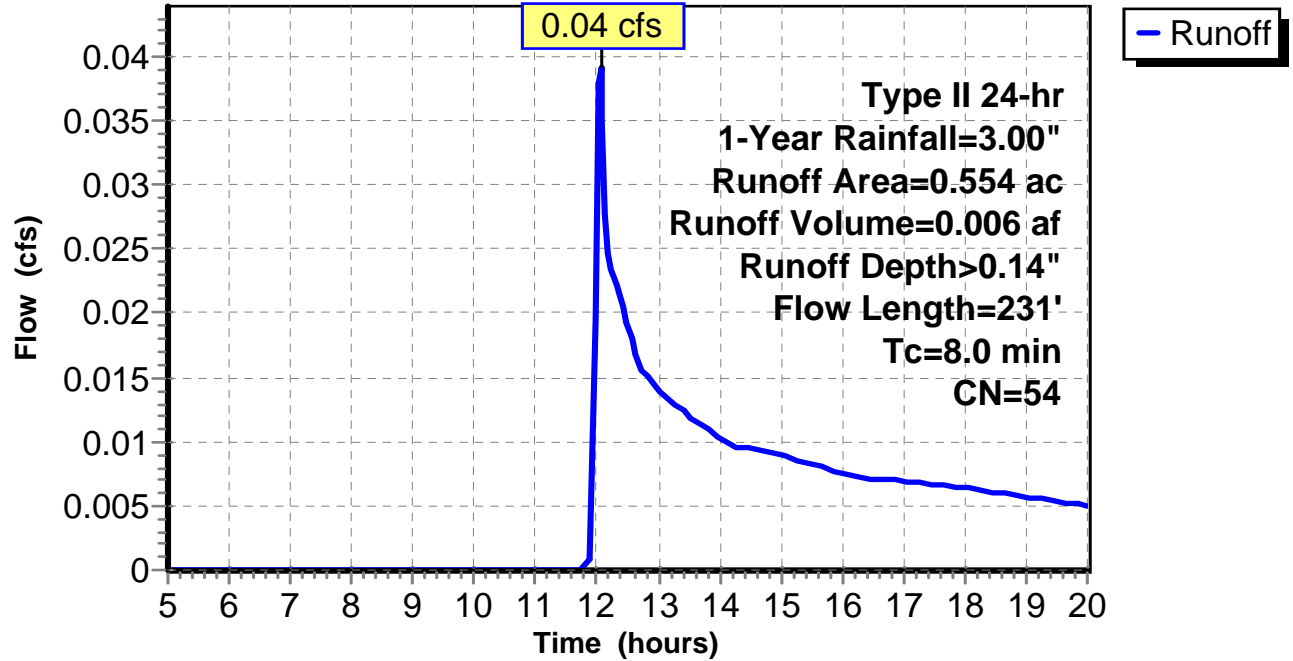
Subcatchment 20: C 159.017

Hydrograph



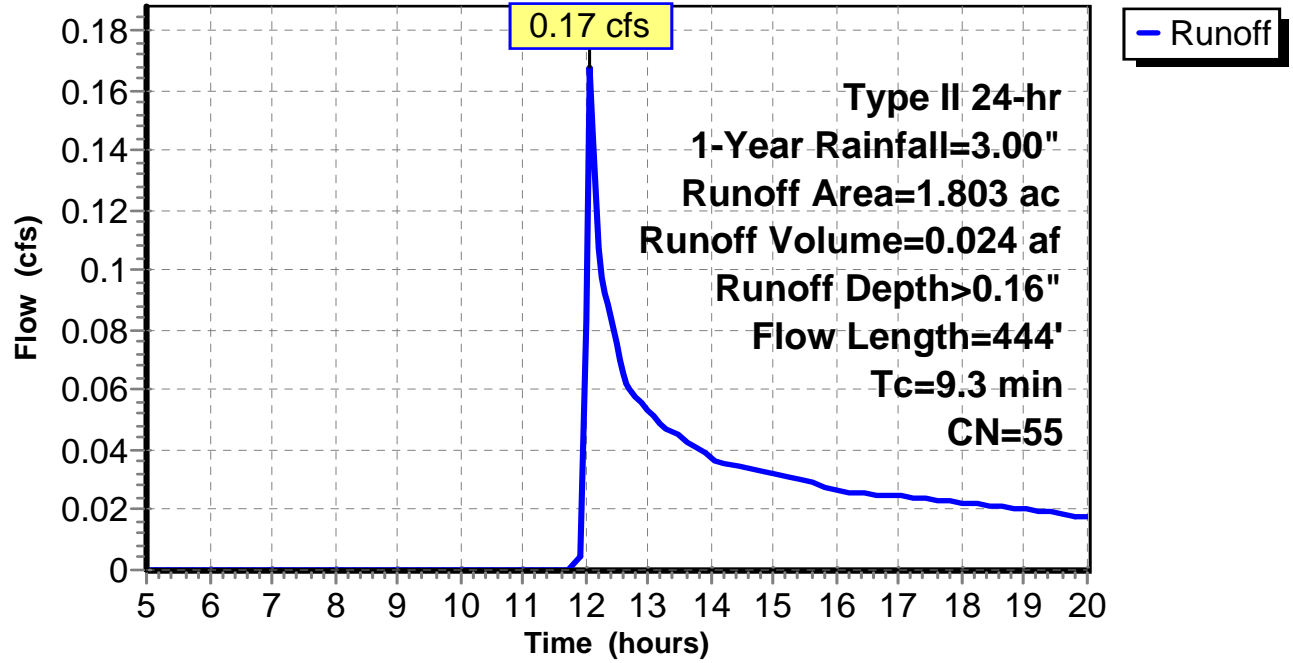
Subcatchment 21: C 159.018

Hydrograph



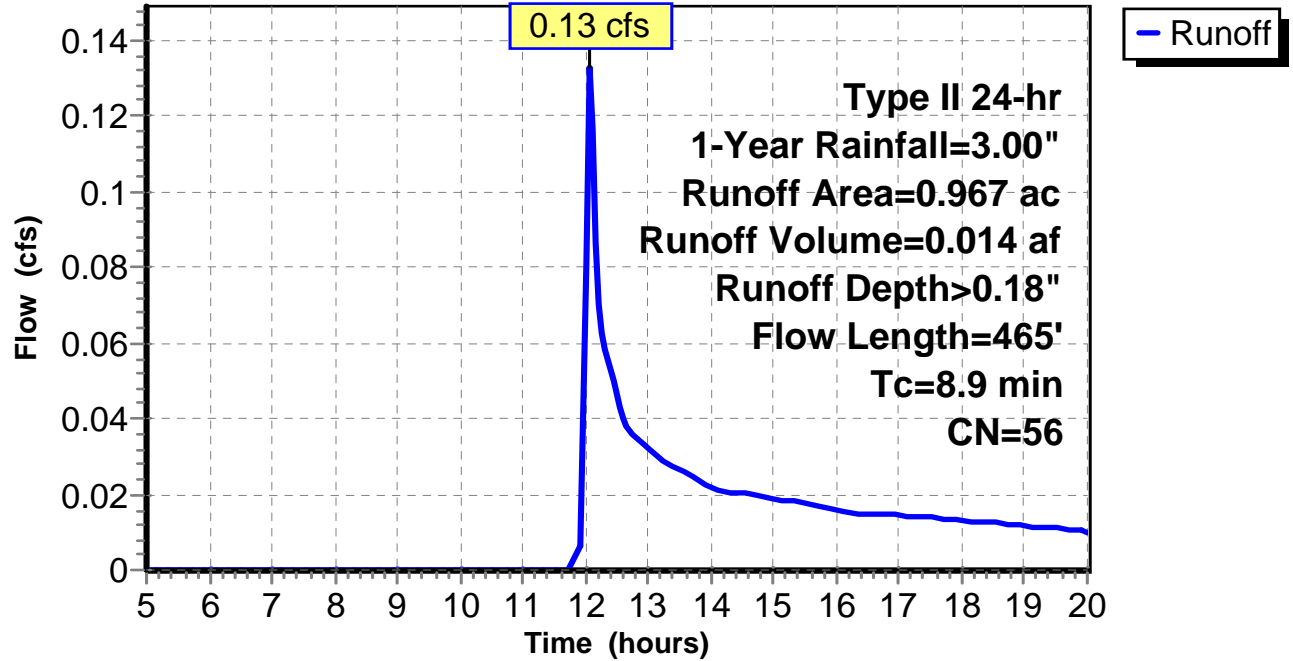
Subcatchment 22: C 159.019

Hydrograph



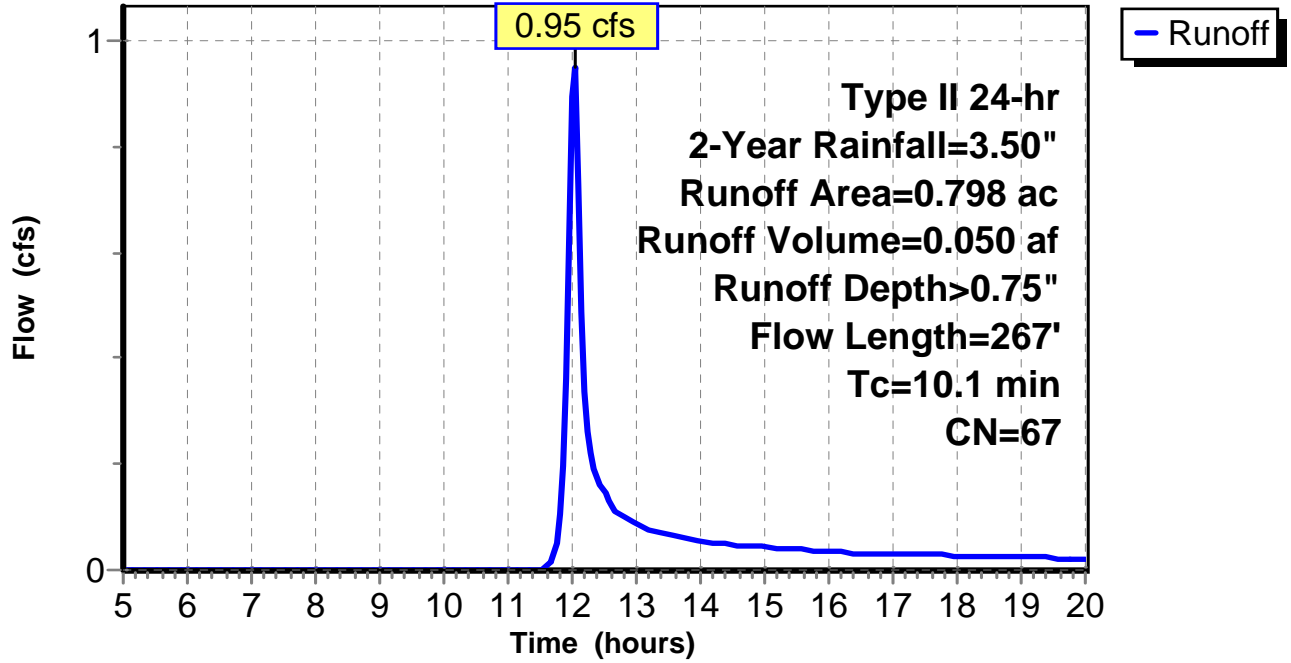
Subcatchment 23: C 159.020

Hydrograph



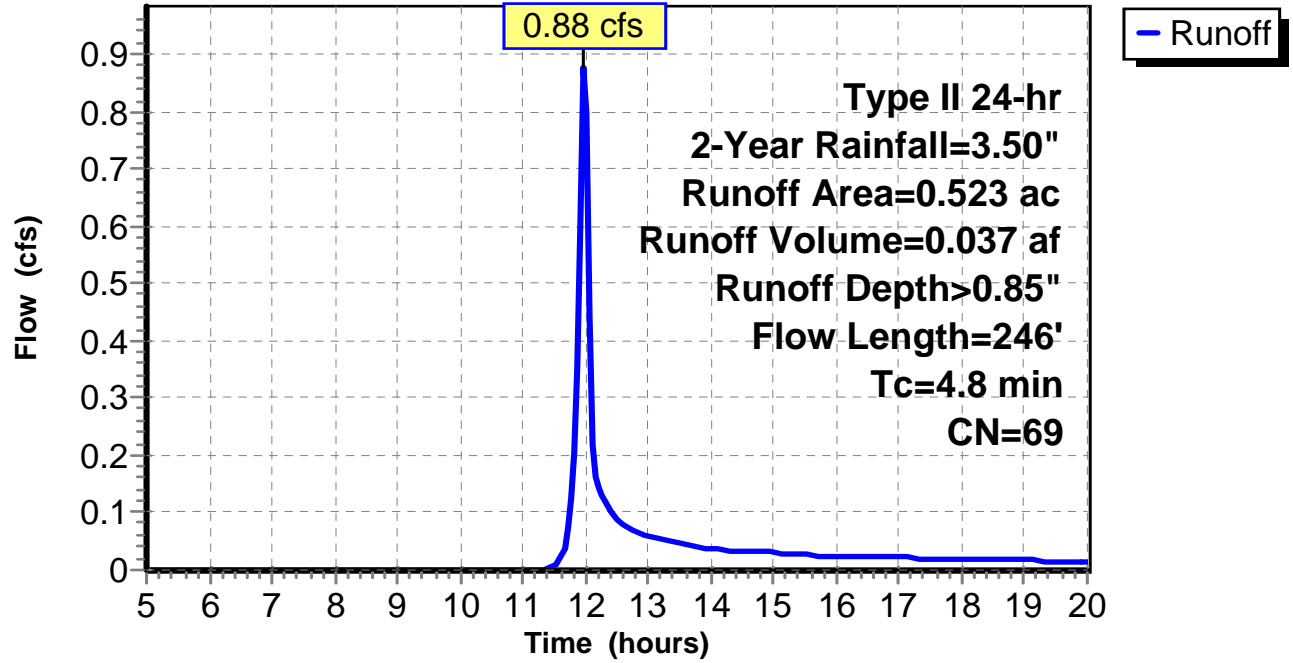
Subcatchment 1: C 158.008

Hydrograph



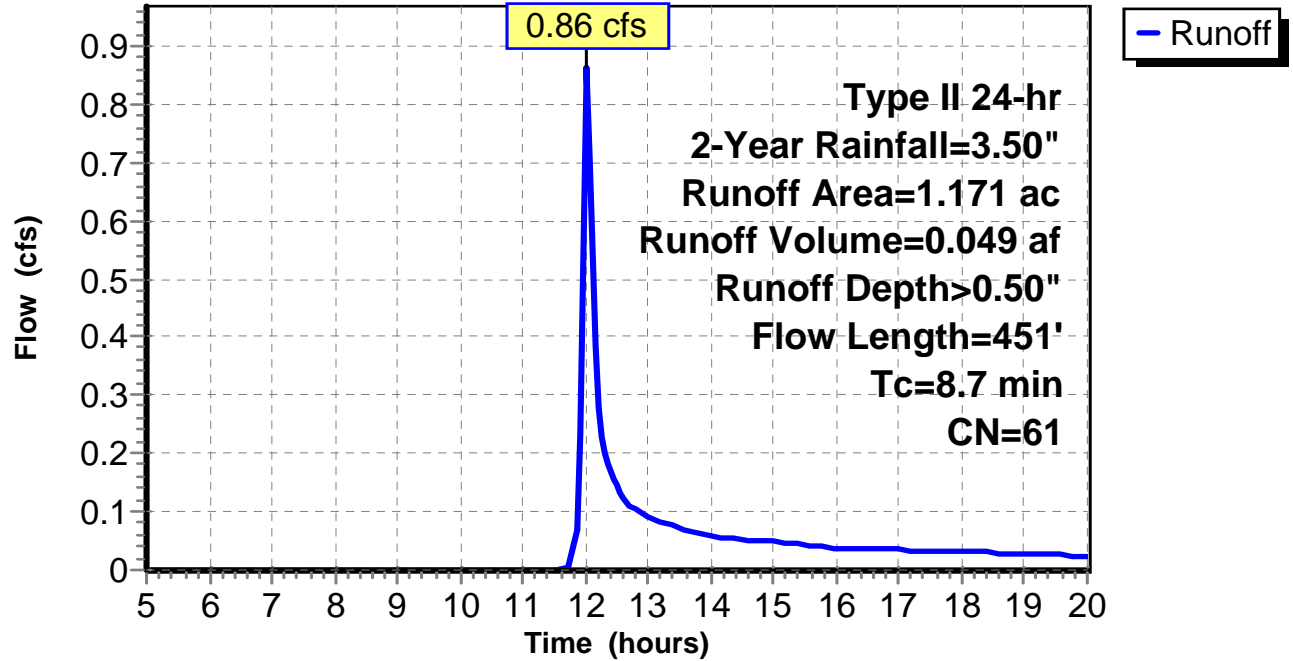
Subcatchment 2: C 158.009

Hydrograph



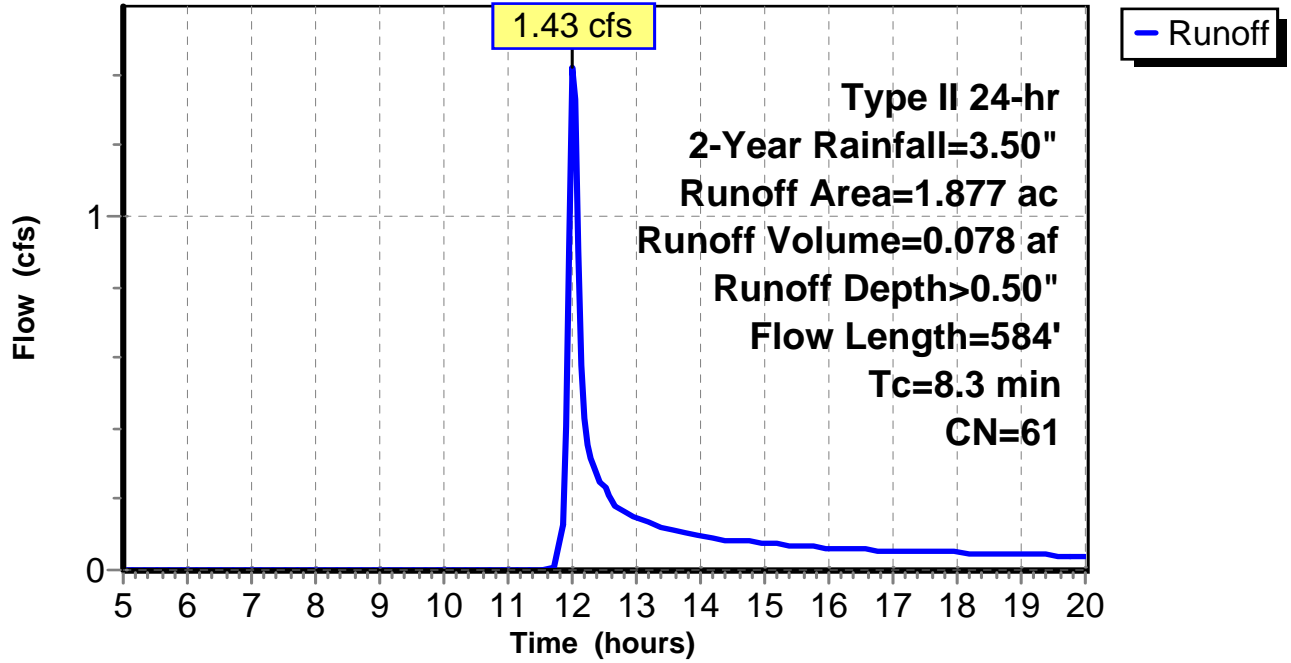
Subcatchment 3: C 158.010

Hydrograph



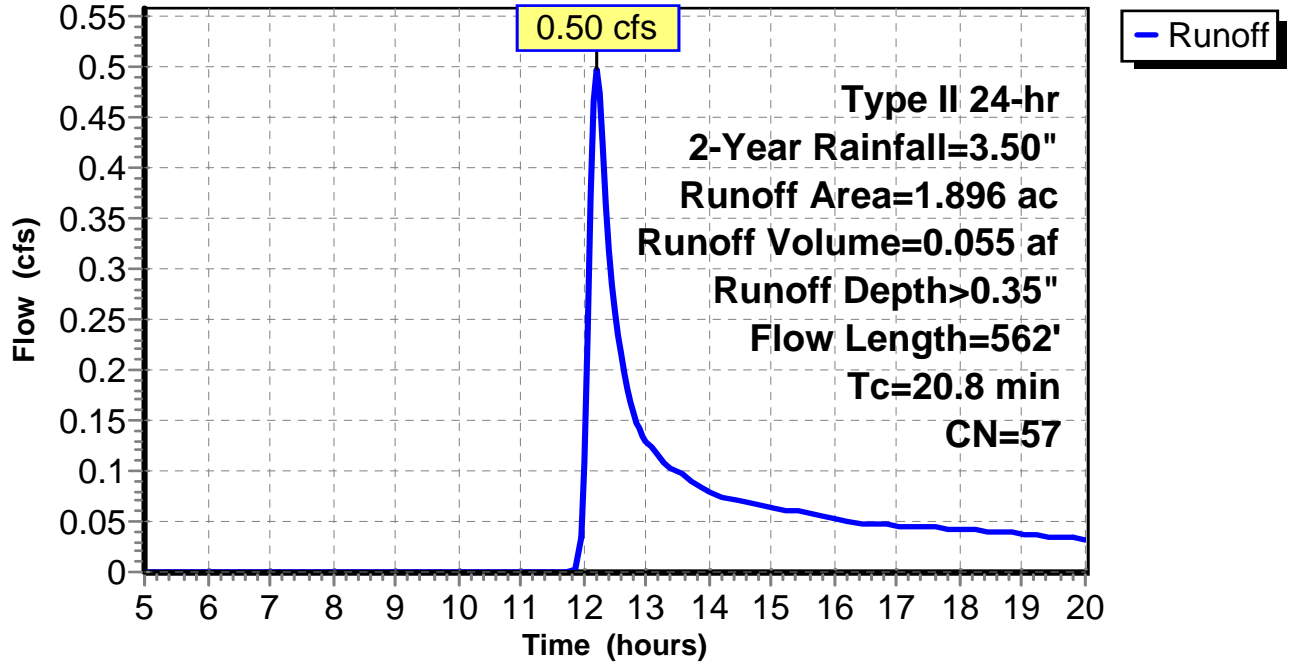
Subcatchment 4: C 158.011

Hydrograph



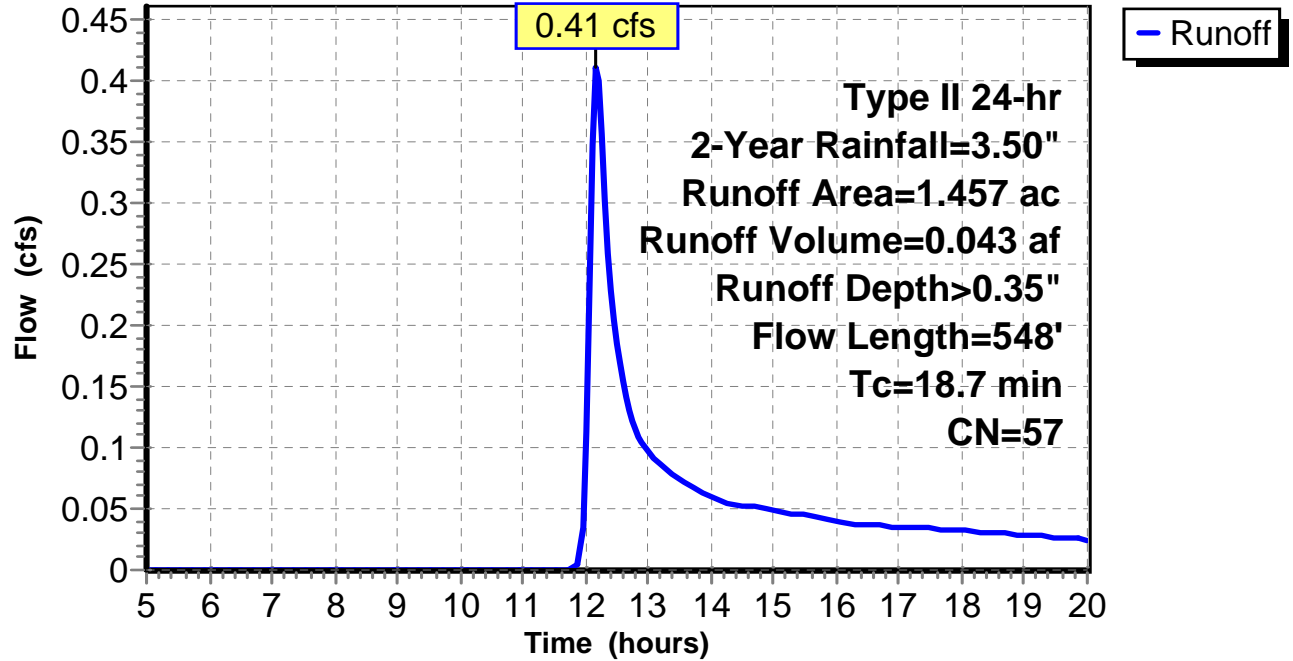
Subcatchment 5: C 158.012

Hydrograph



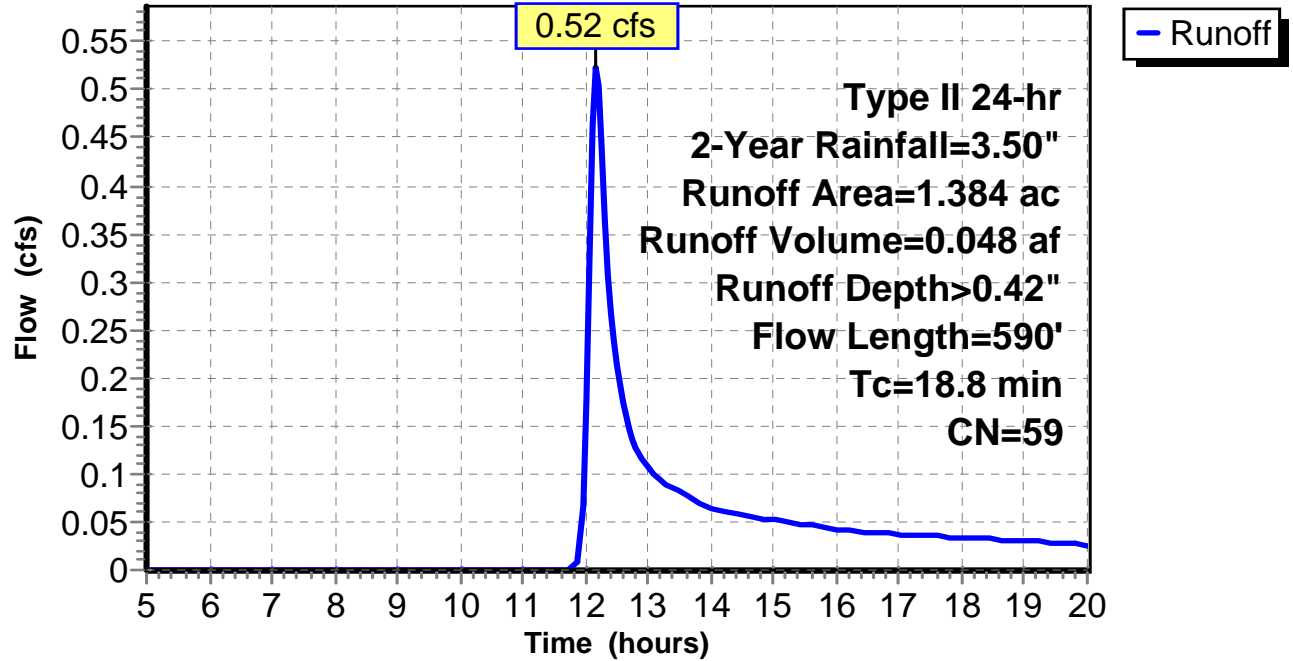
Subcatchment 6: C 158.013

Hydrograph



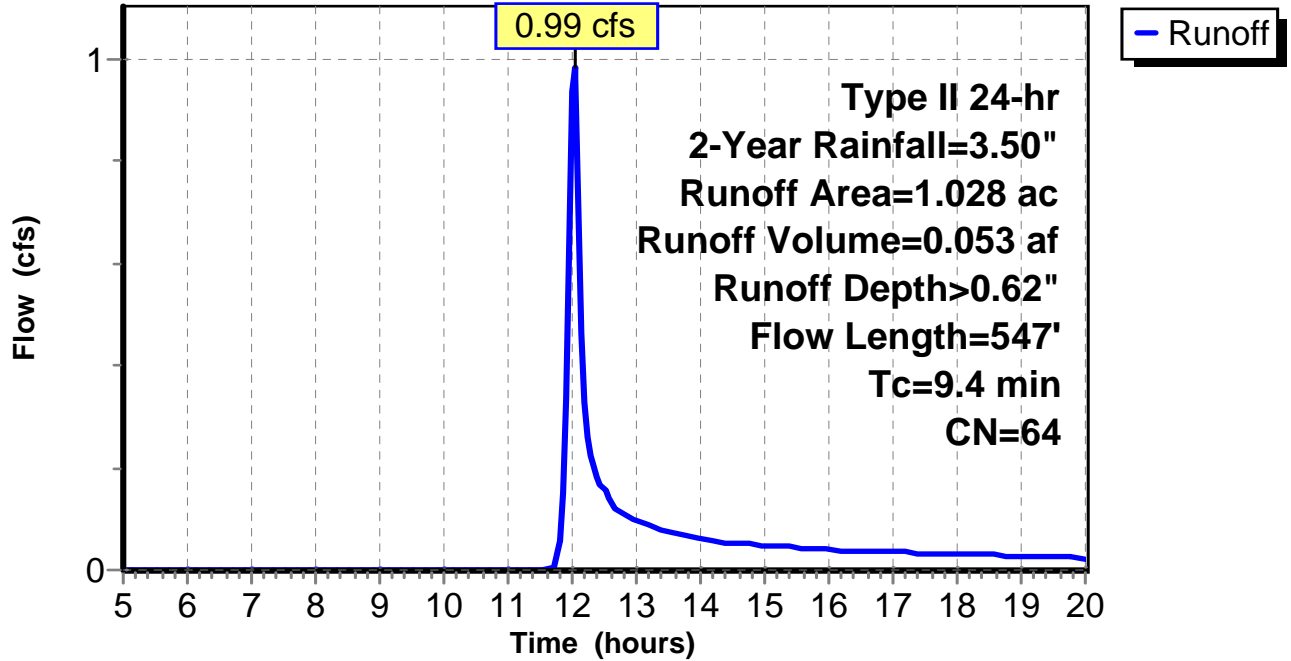
Subcatchment 7: C 158.014

Hydrograph



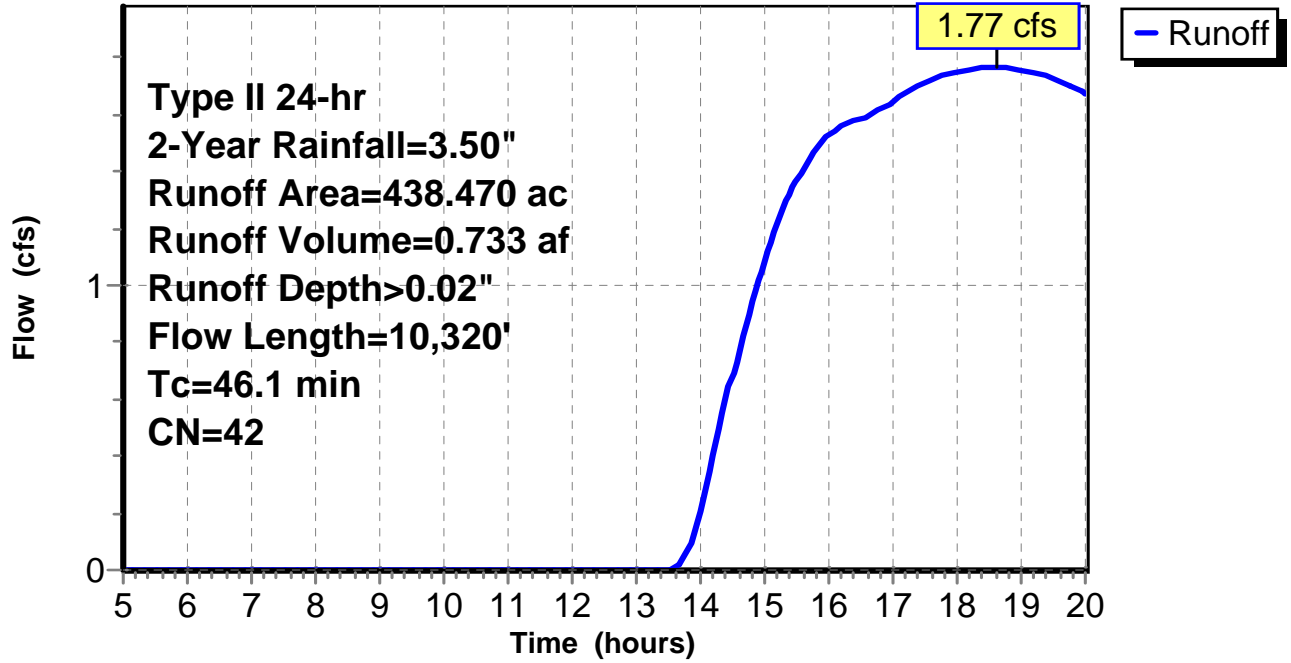
Subcatchment 8: C 158.015

Hydrograph



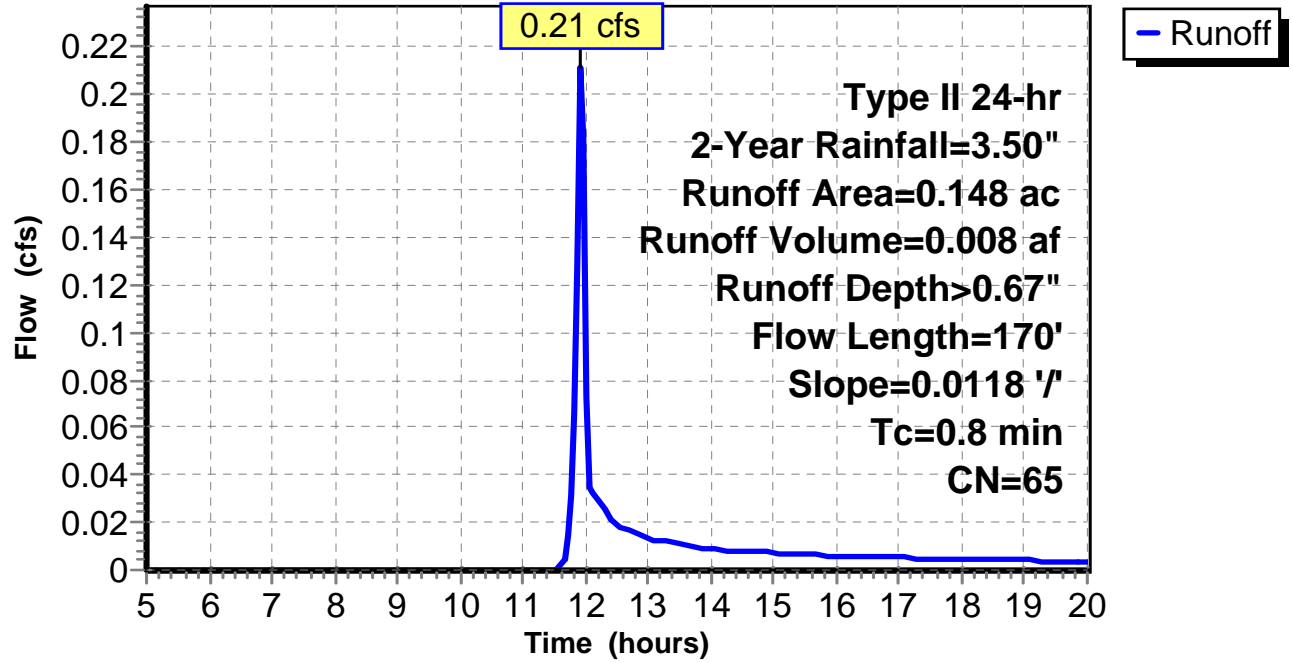
Subcatchment 9: C 158.016

Hydrograph



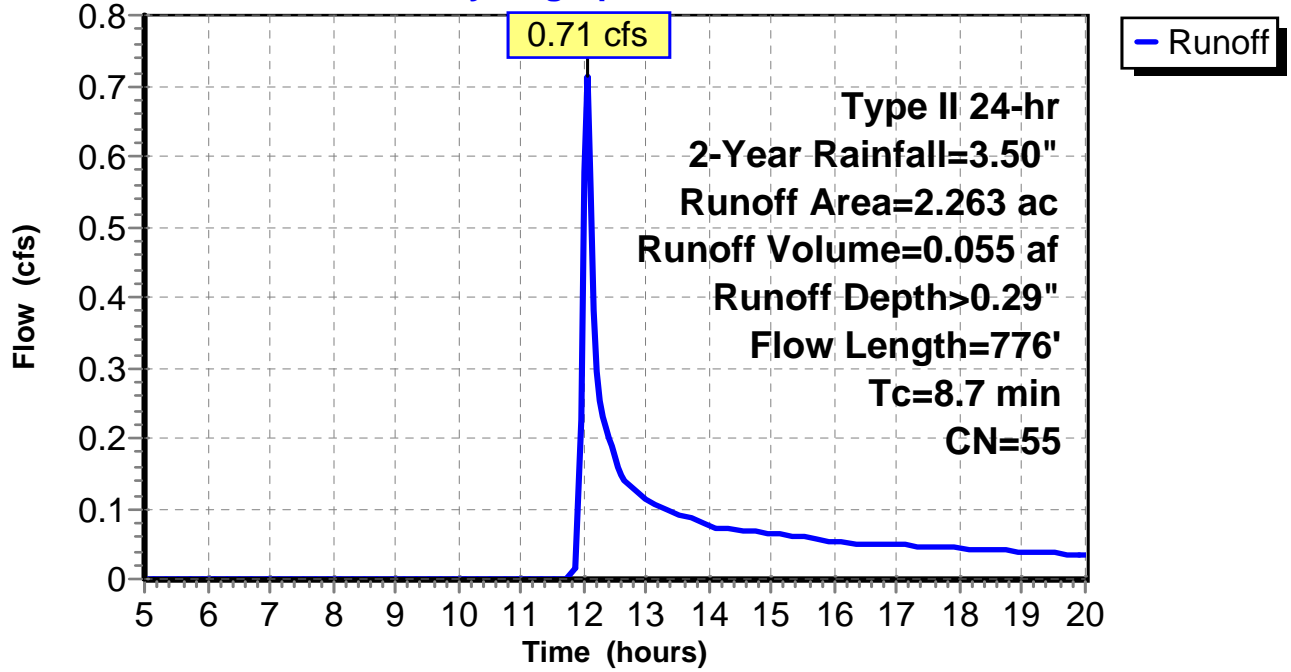
Subcatchment 10: C 159.001

Hydrograph



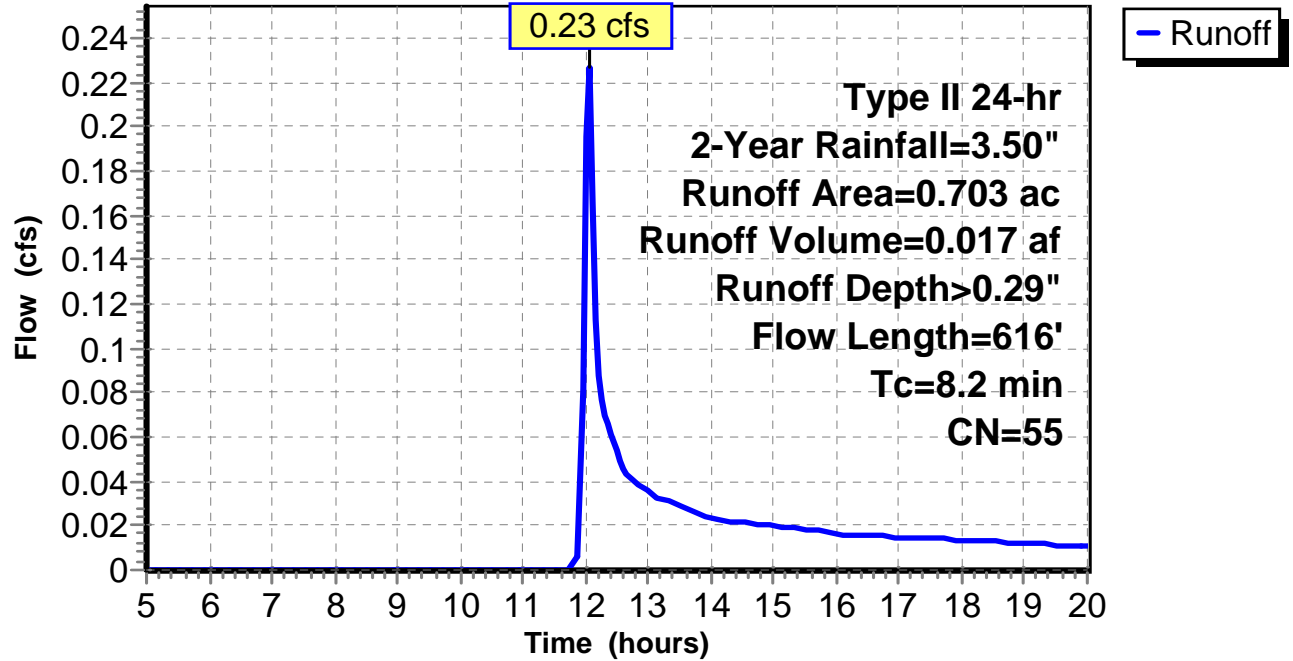
Subcatchment 11: C 159.008

Hydrograph



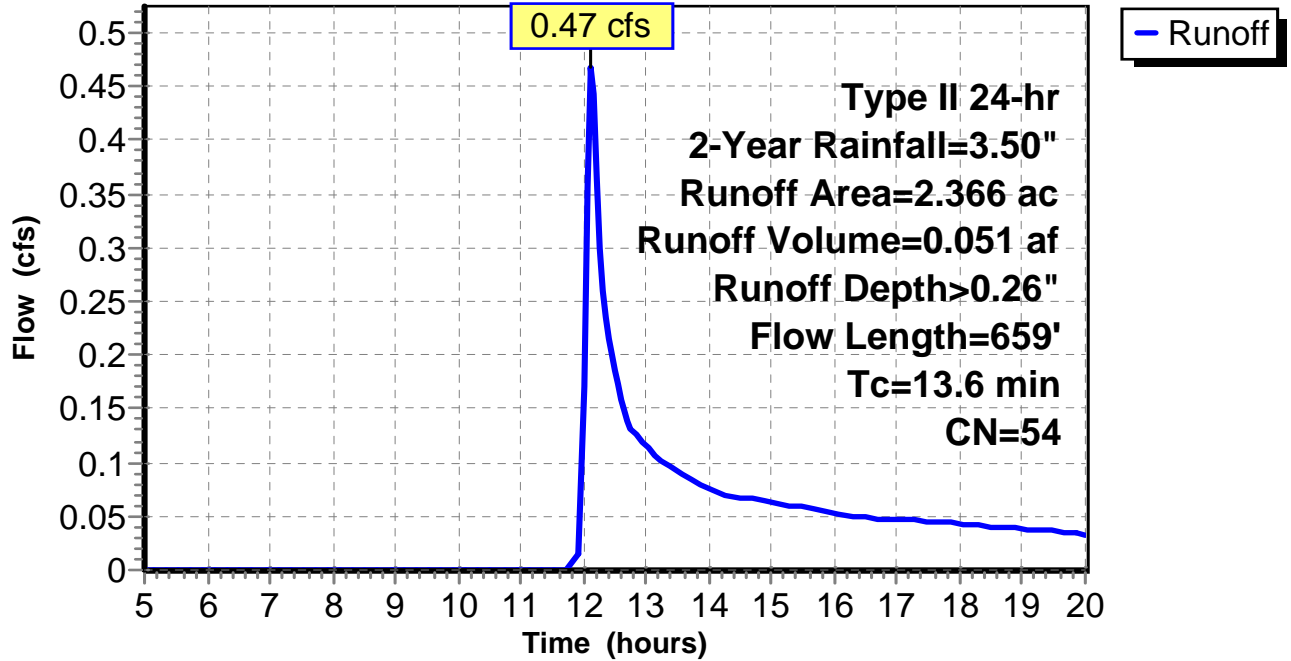
Subcatchment 12: C 159.009

Hydrograph



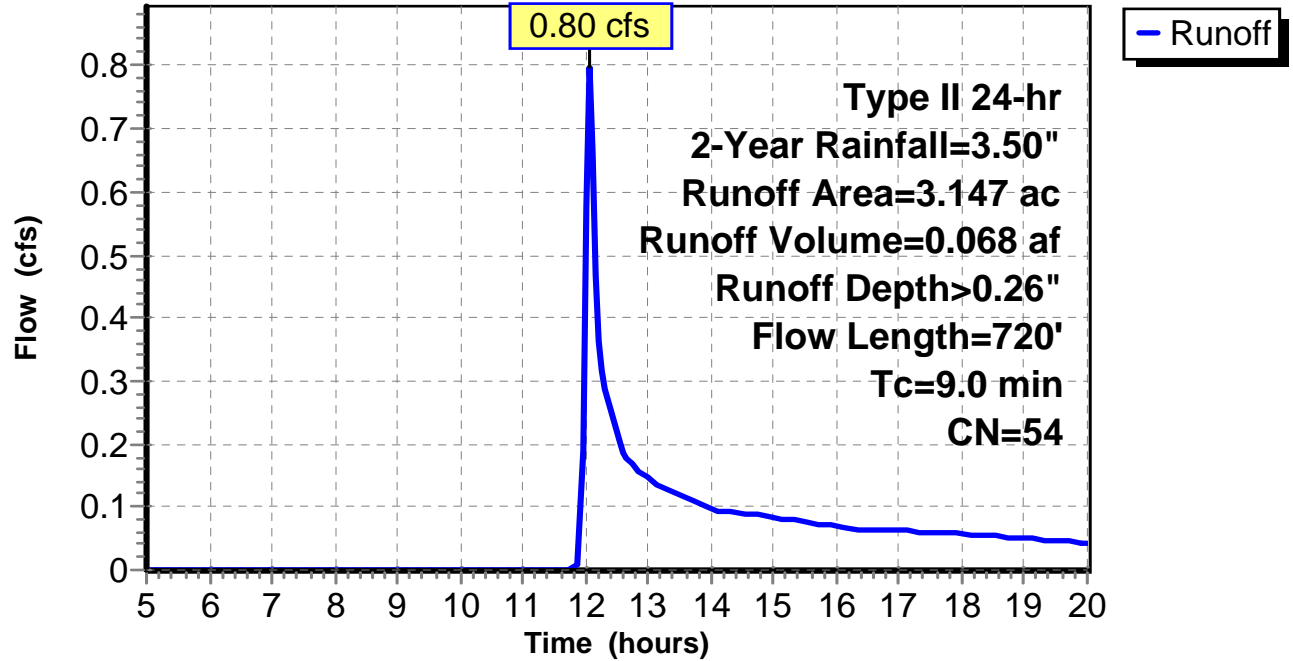
Subcatchment 13: C 159.010

Hydrograph



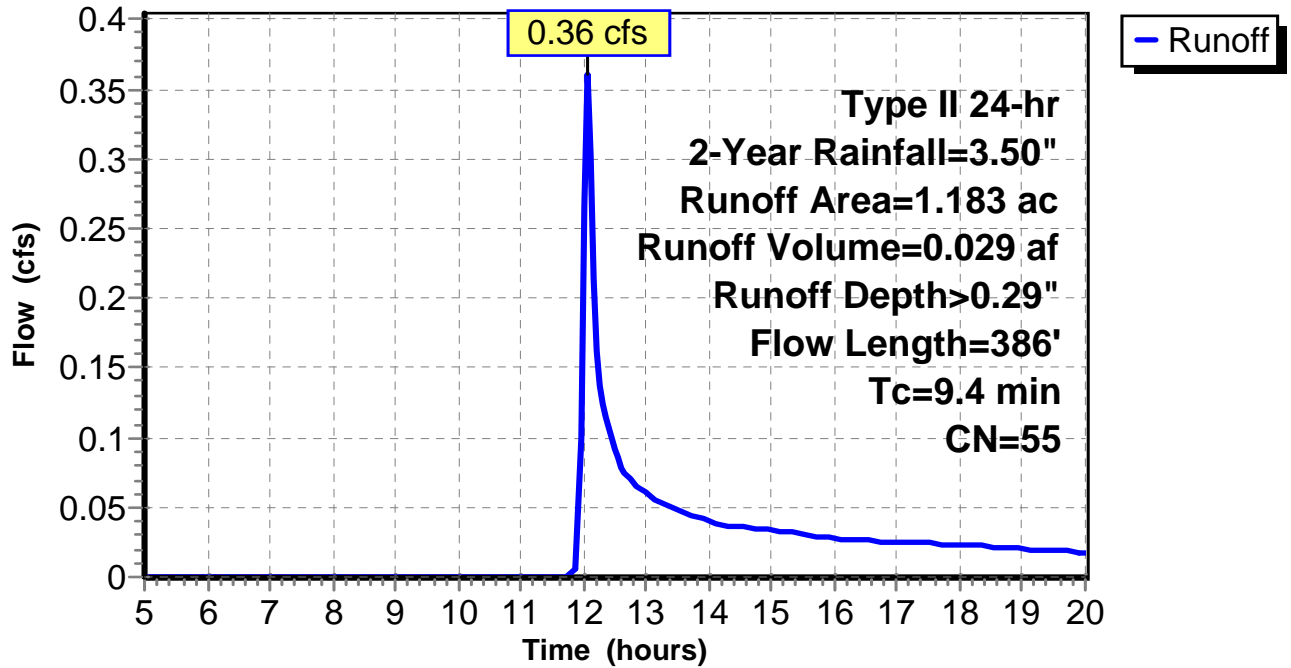
Subcatchment 14: C 159.011

Hydrograph



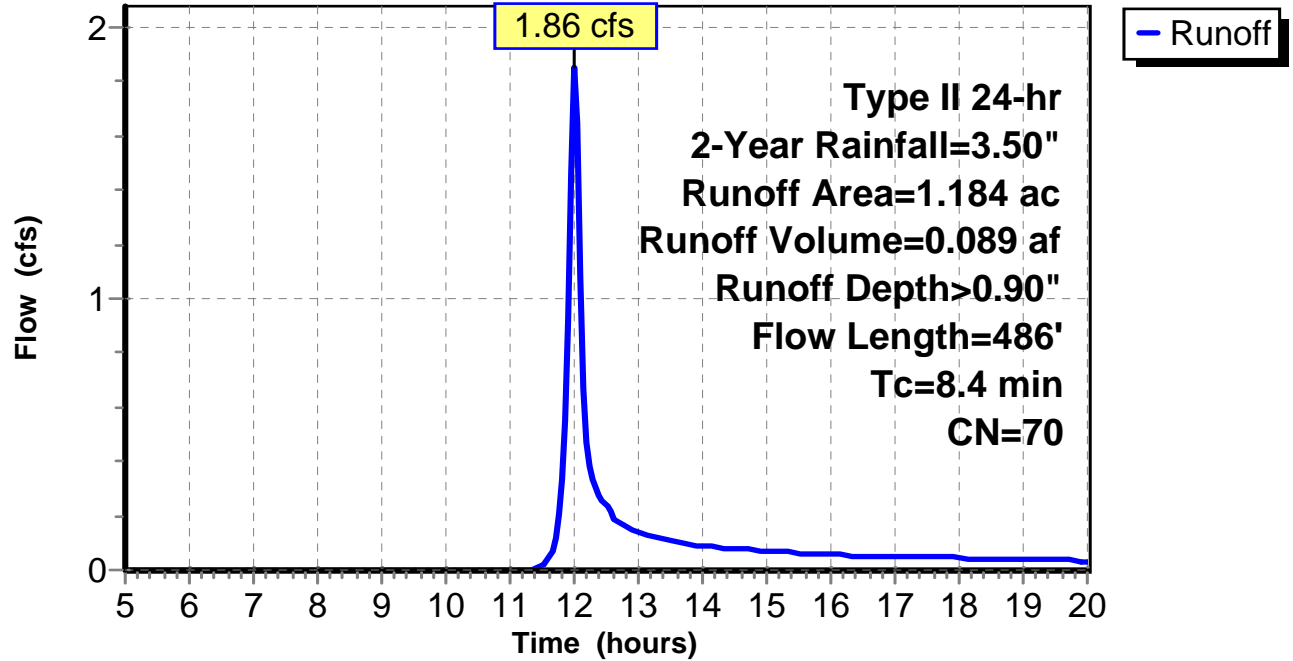
Subcatchment 15: C 159.012

Hydrograph



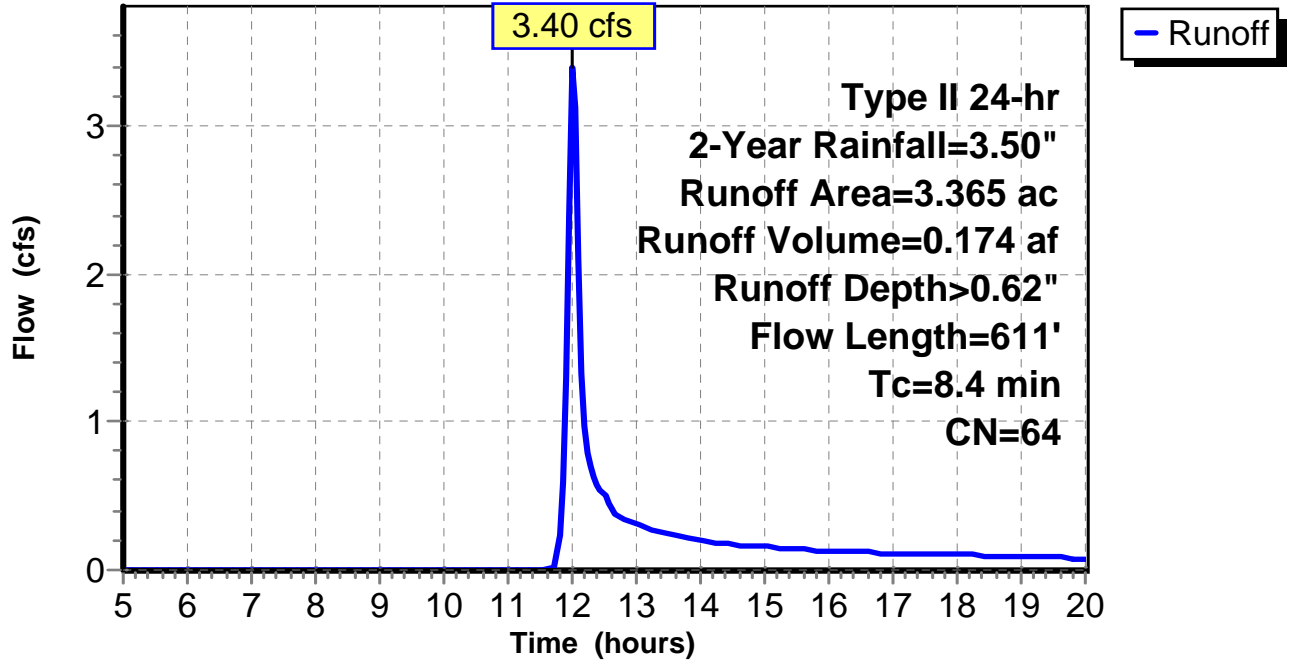
Subcatchment 16: C 159.013

Hydrograph



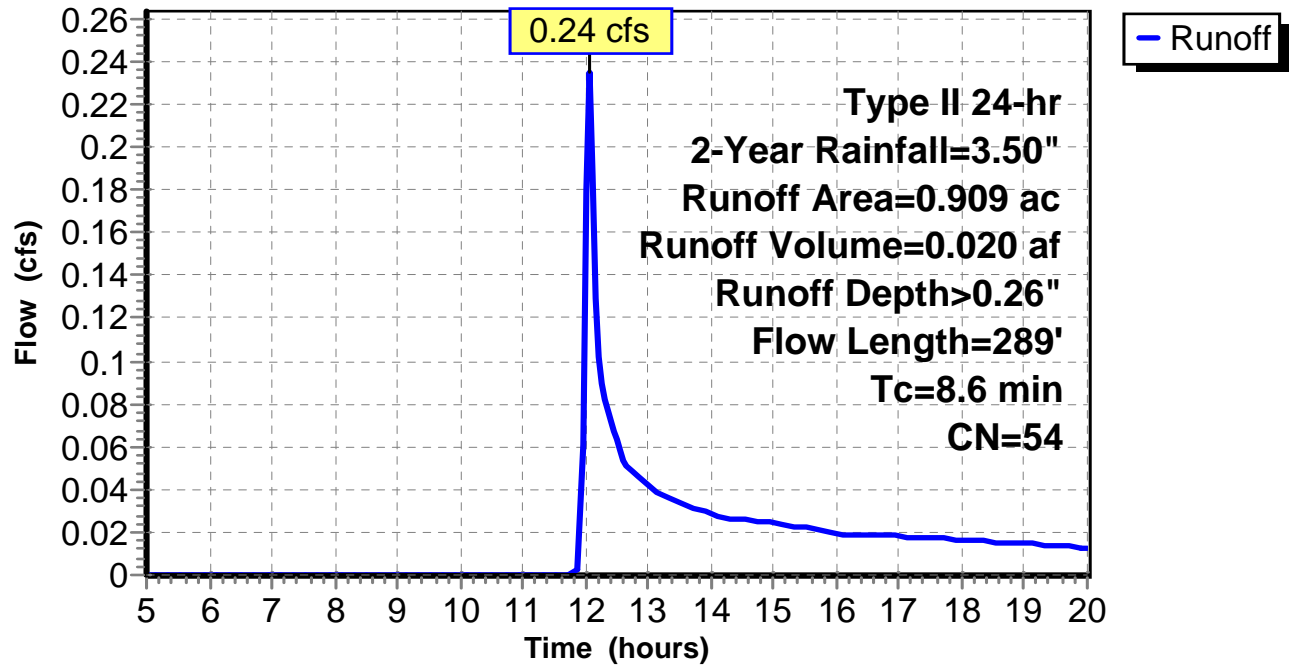
Subcatchment 17: C 159.014

Hydrograph



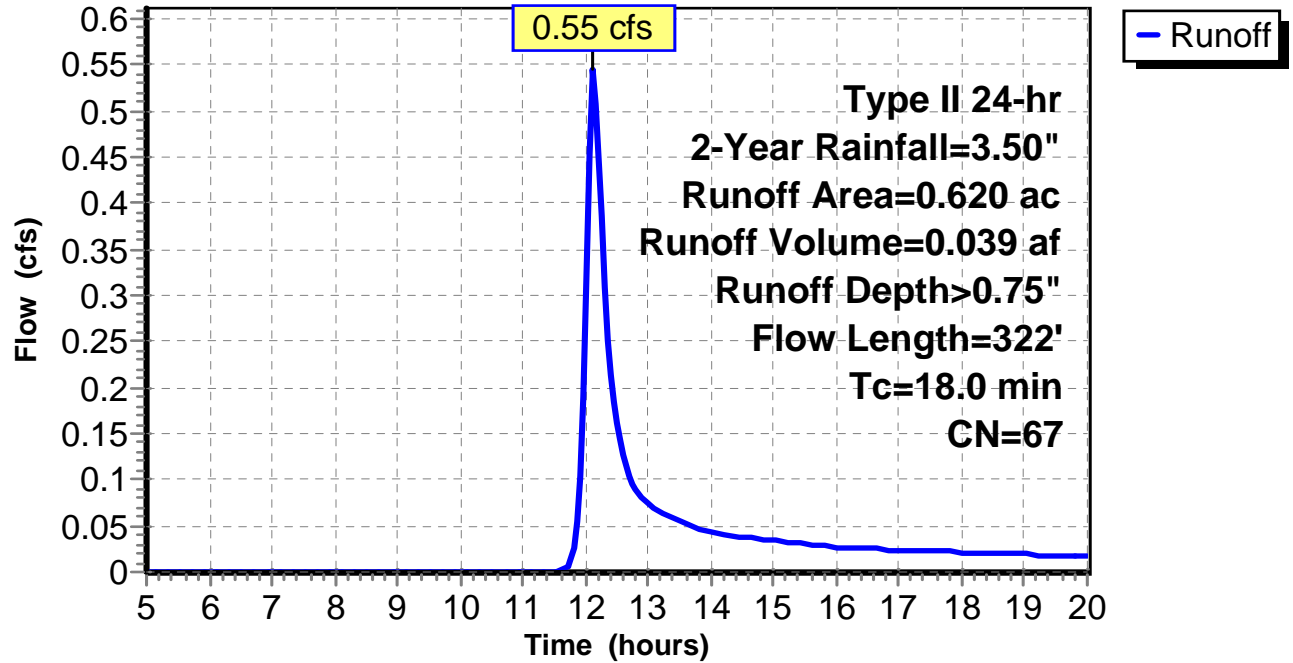
Subcatchment 18: C 159.015

Hydrograph



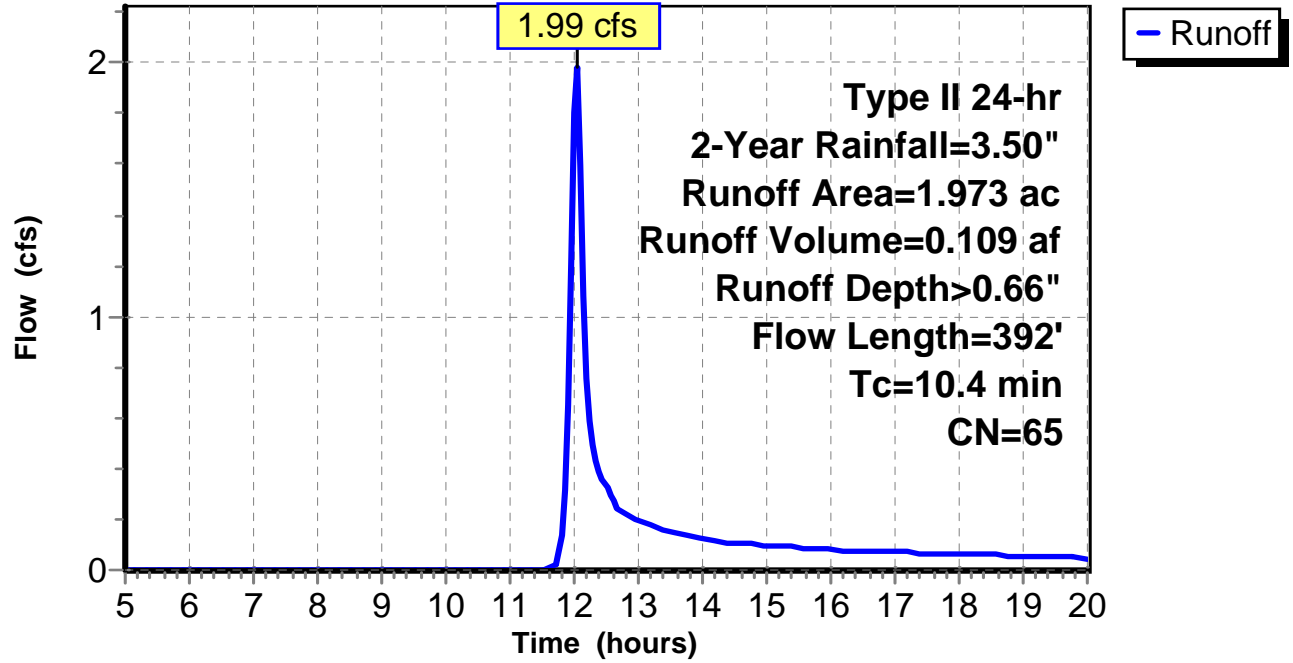
Subcatchment 19: C 159.016

Hydrograph



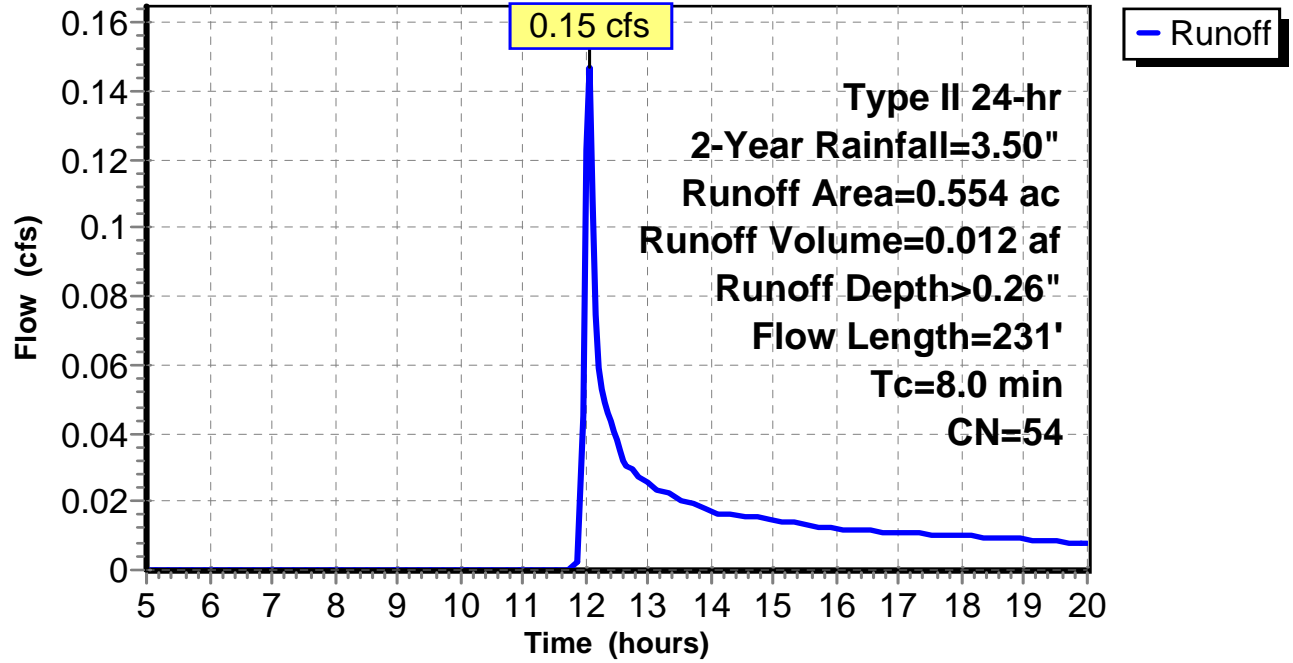
Subcatchment 20: C 159.017

Hydrograph



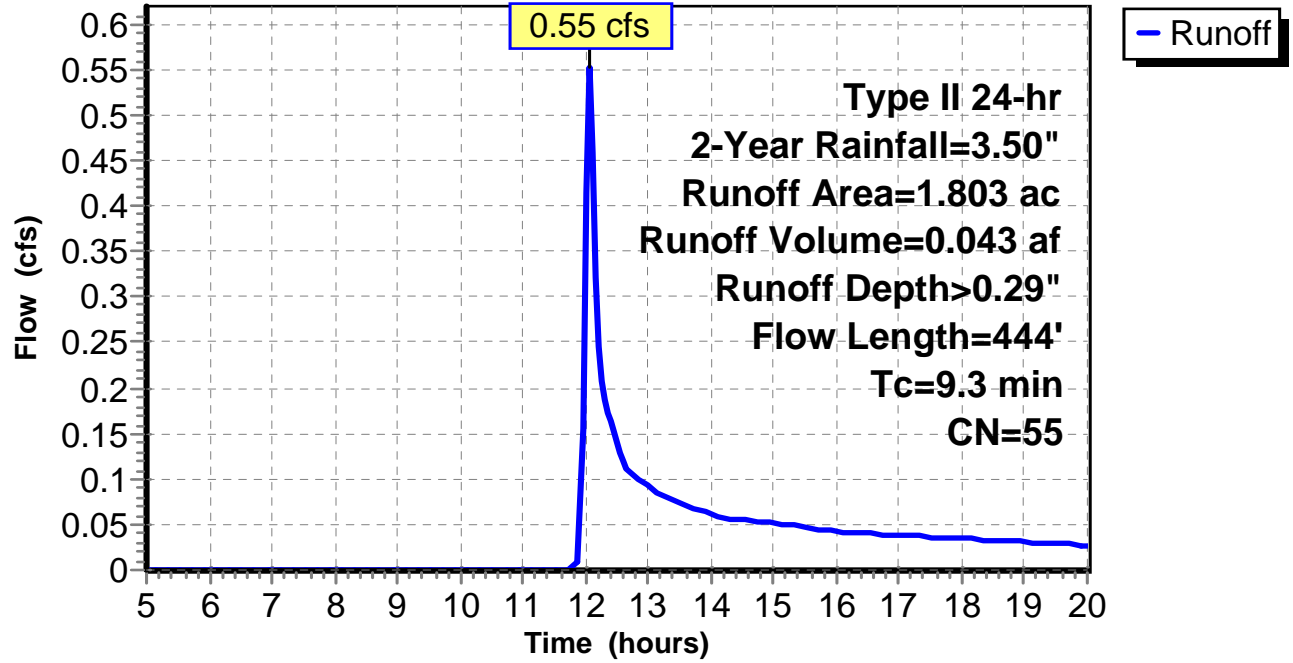
Subcatchment 21: C 159.018

Hydrograph



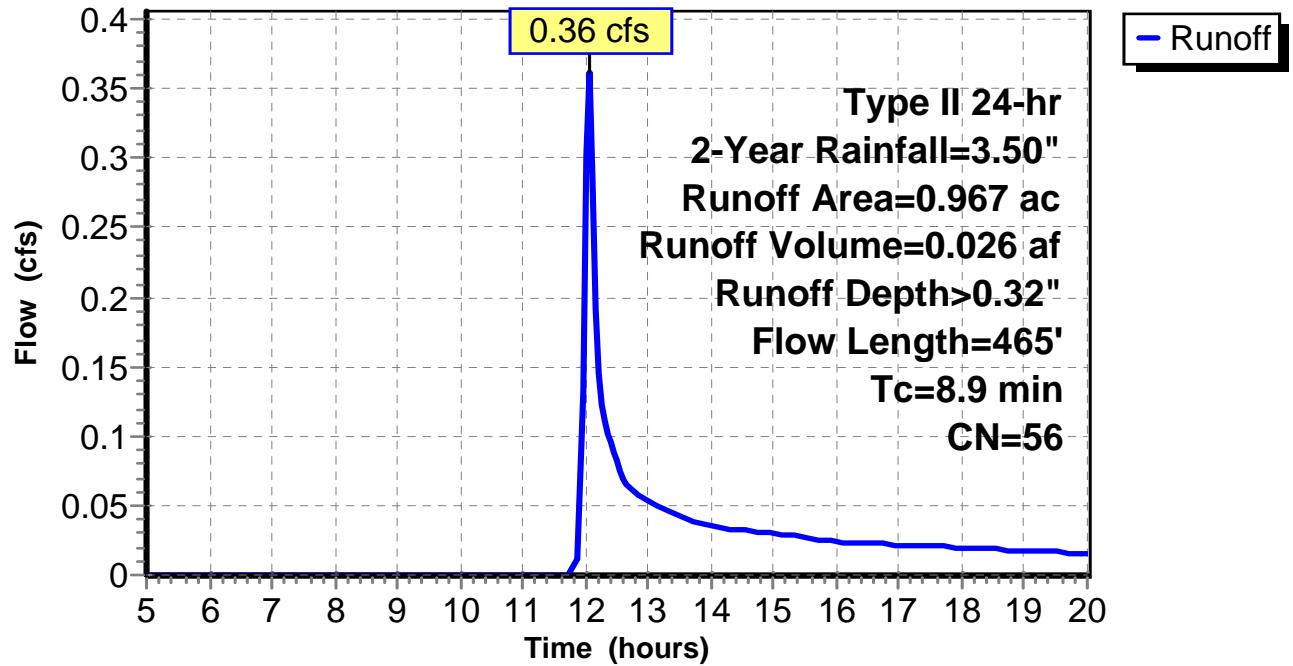
Subcatchment 22: C 159.019

Hydrograph



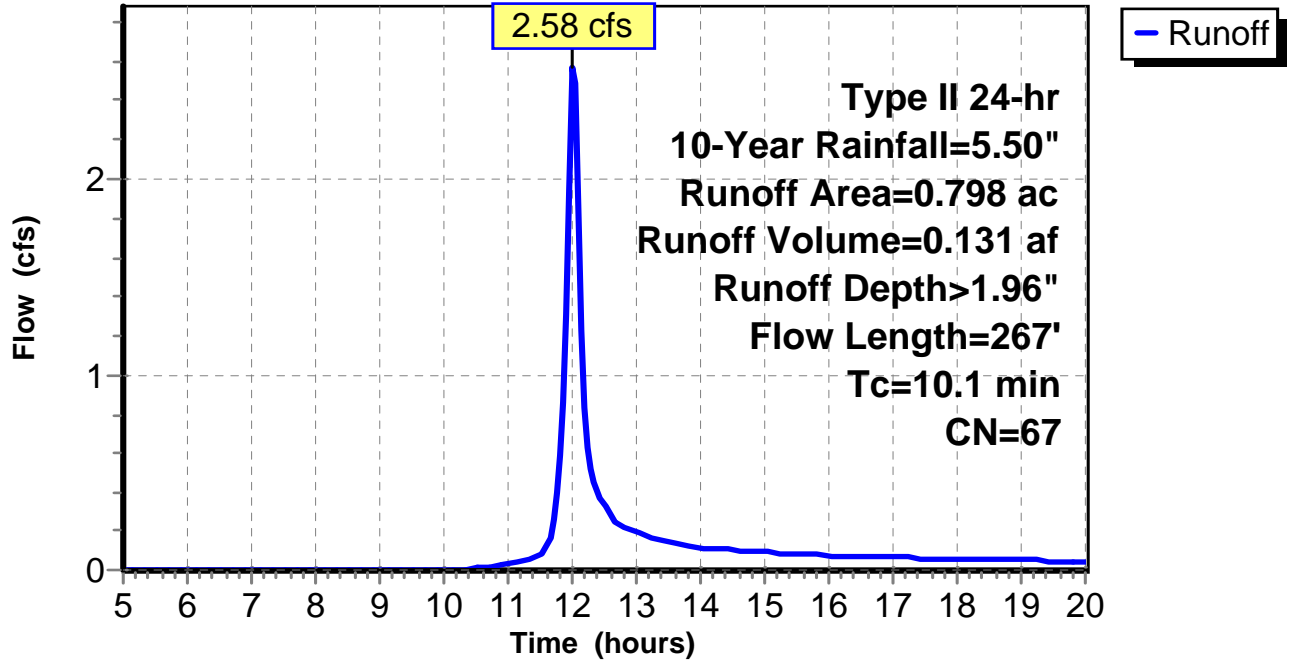
Subcatchment 23: C 159.020

Hydrograph



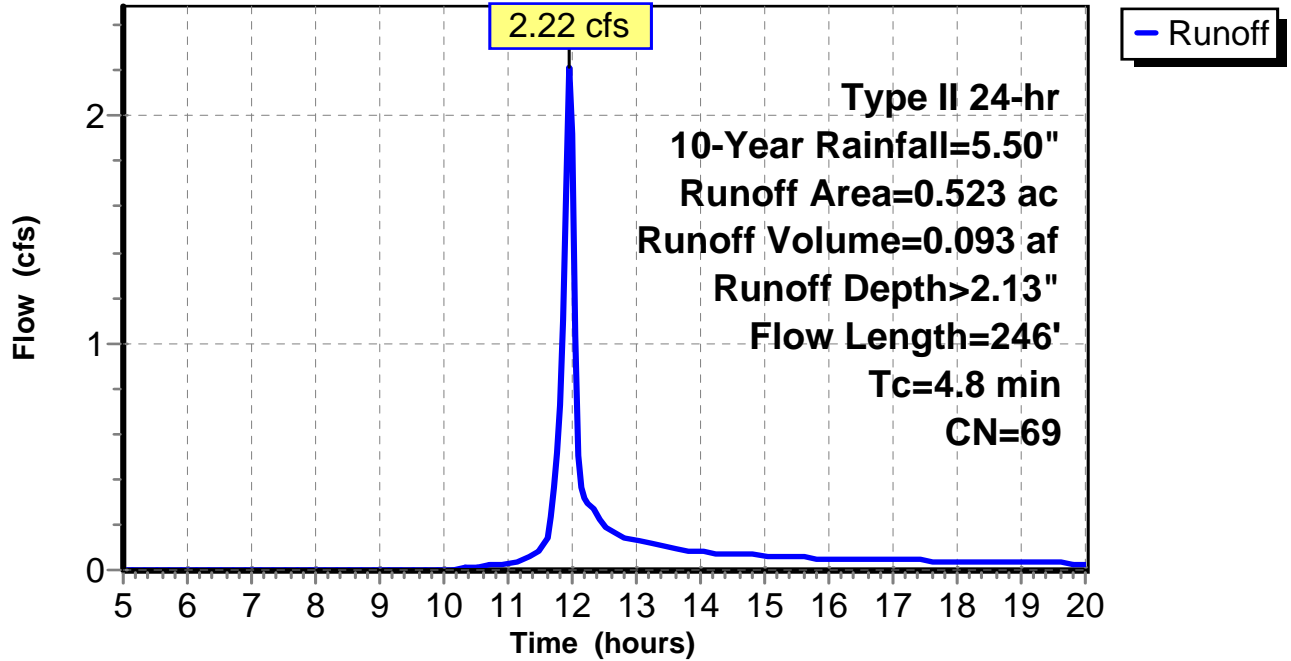
Subcatchment 1: C 158.008

Hydrograph



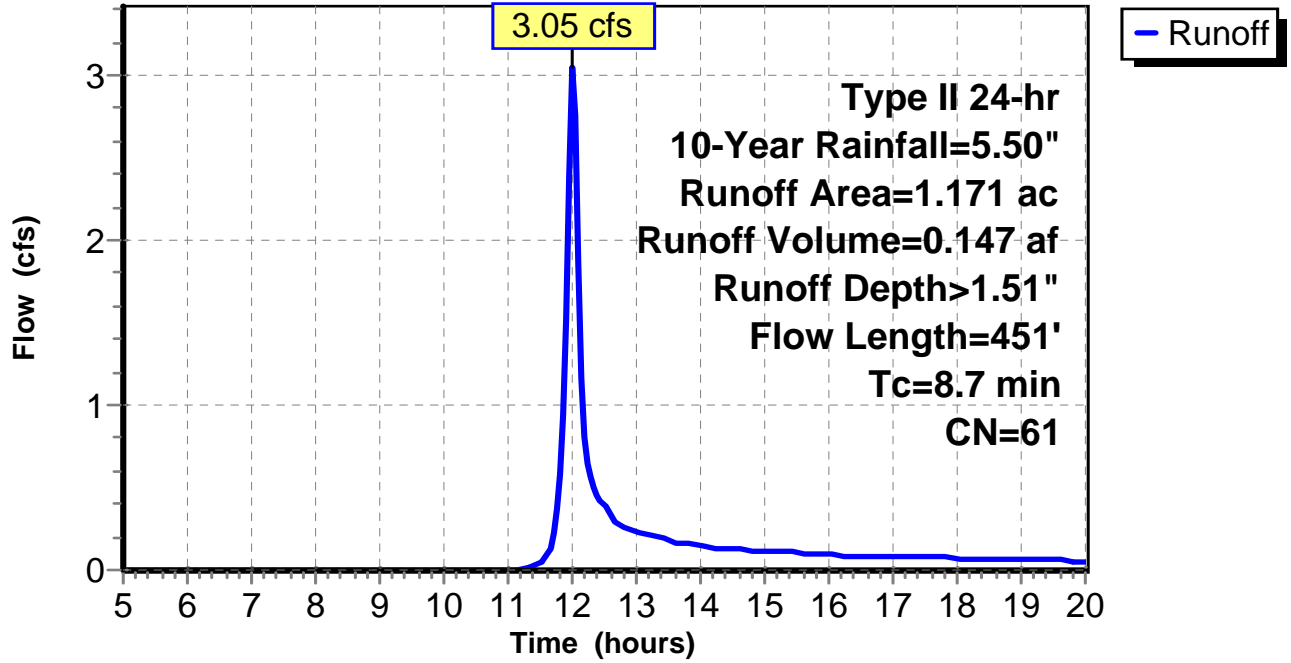
Subcatchment 2: C 158.009

Hydrograph



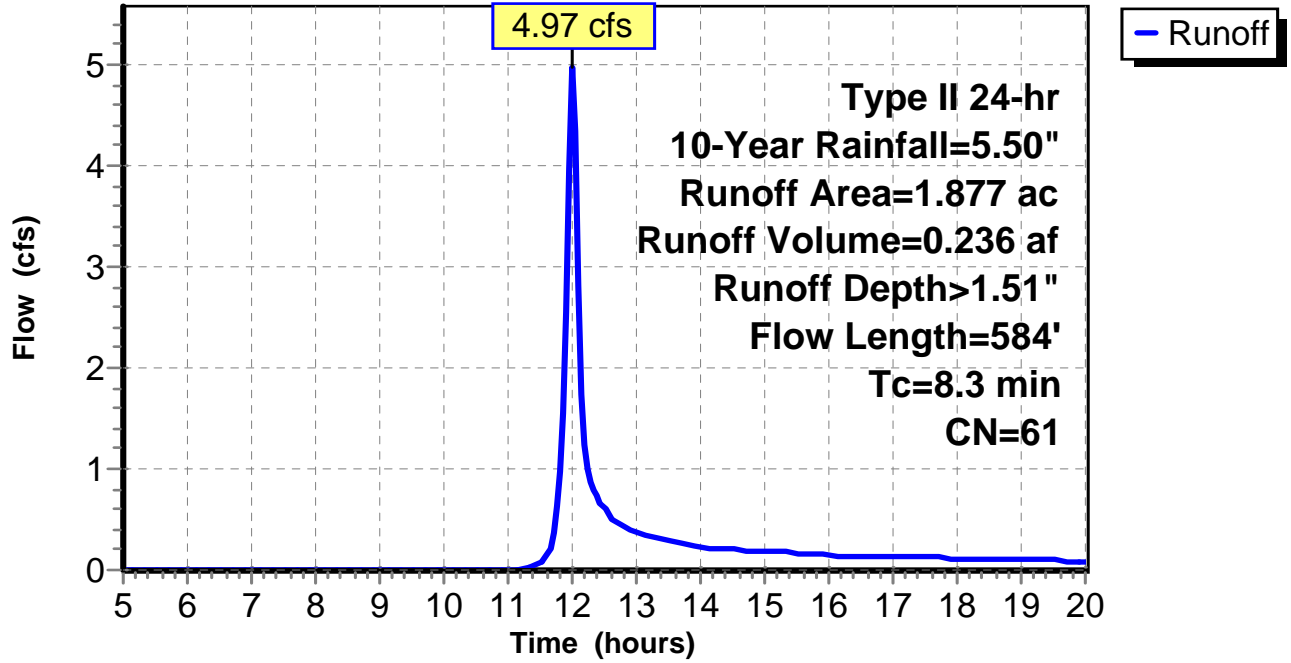
Subcatchment 3: C 158.010

Hydrograph



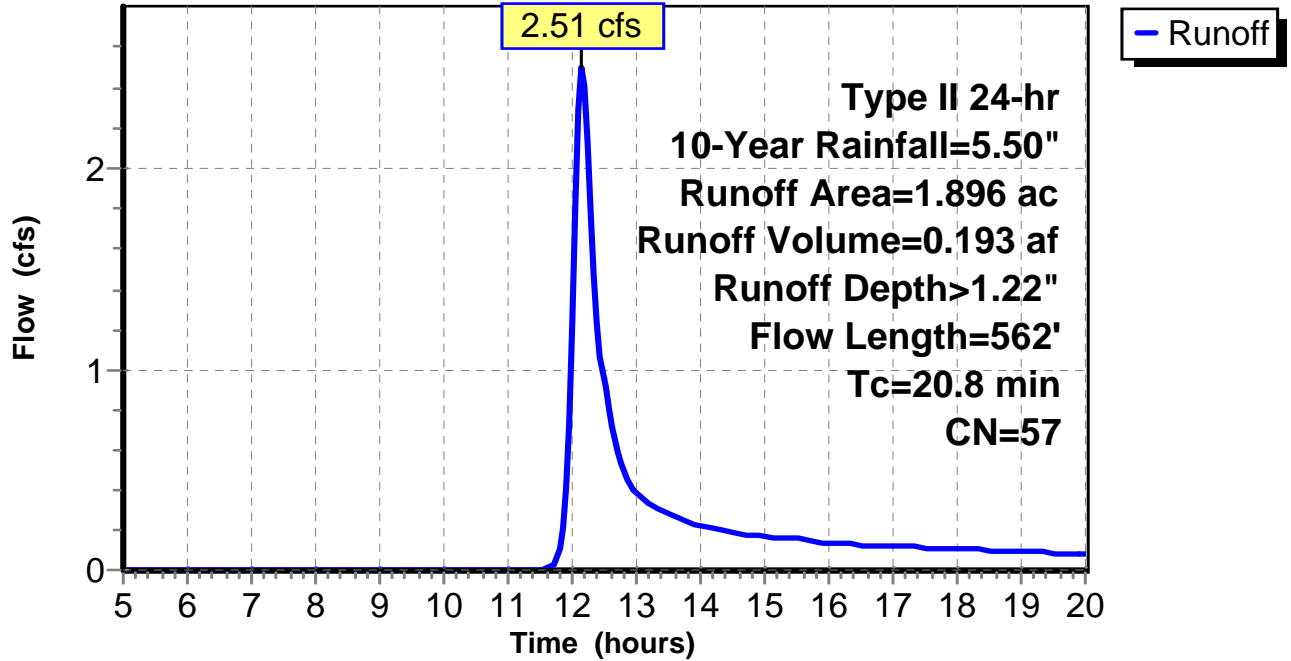
Subcatchment 4: C 158.011

Hydrograph



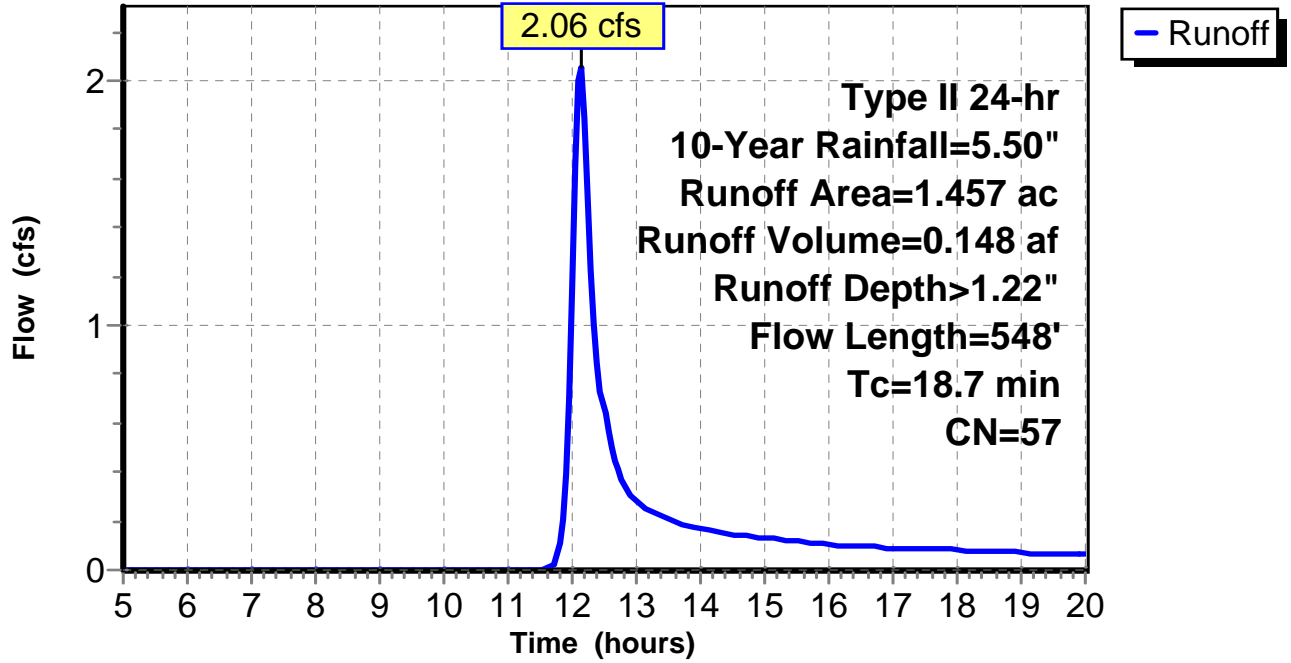
Subcatchment 5: C 158.012

Hydrograph



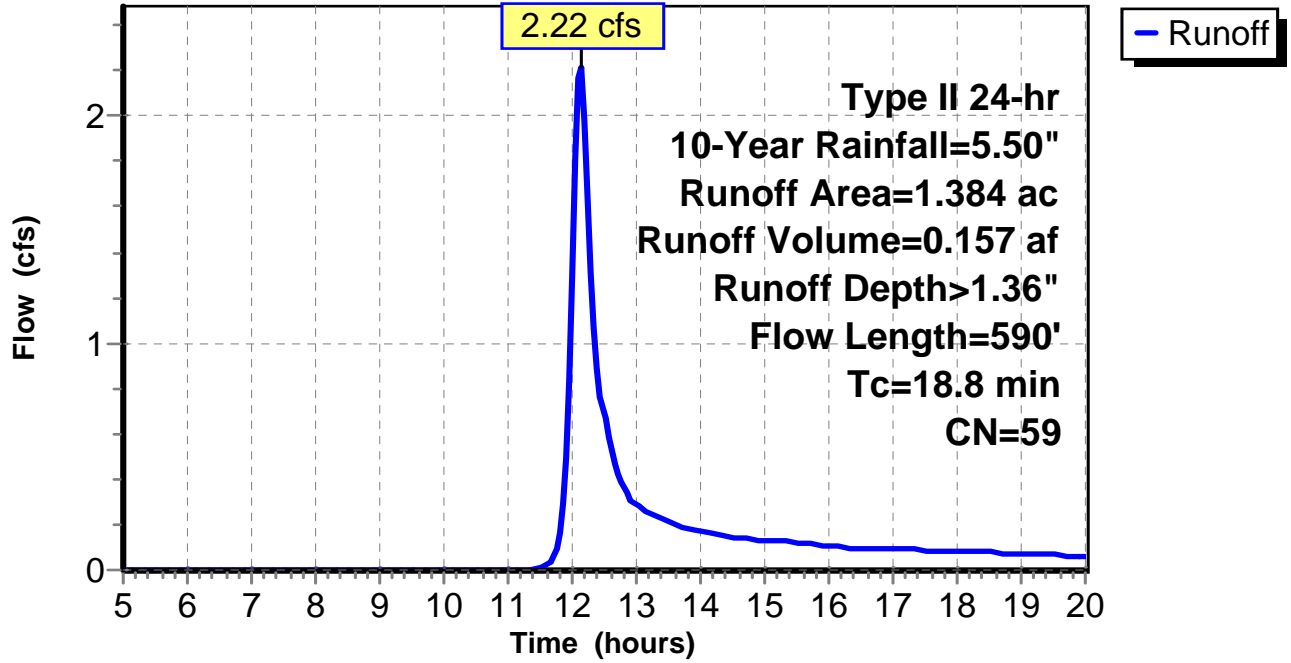
Subcatchment 6: C 158.013

Hydrograph



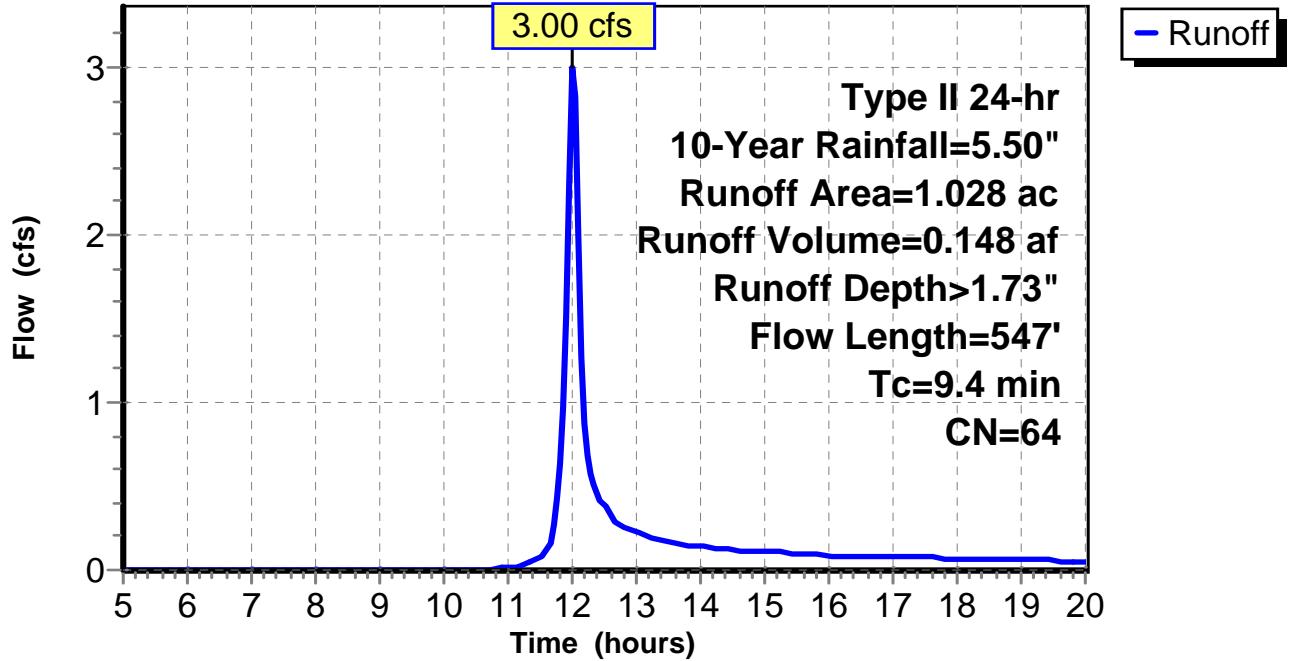
Subcatchment 7: C 158.014

Hydrograph



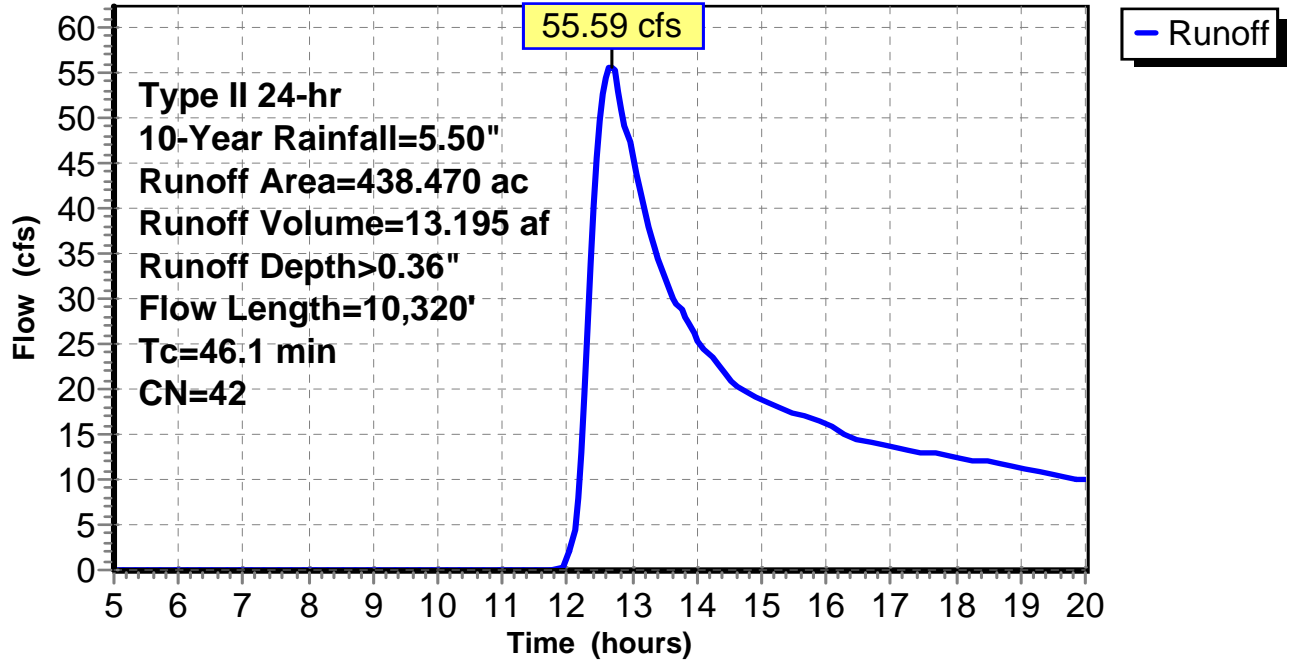
Subcatchment 8: C 158.015

Hydrograph



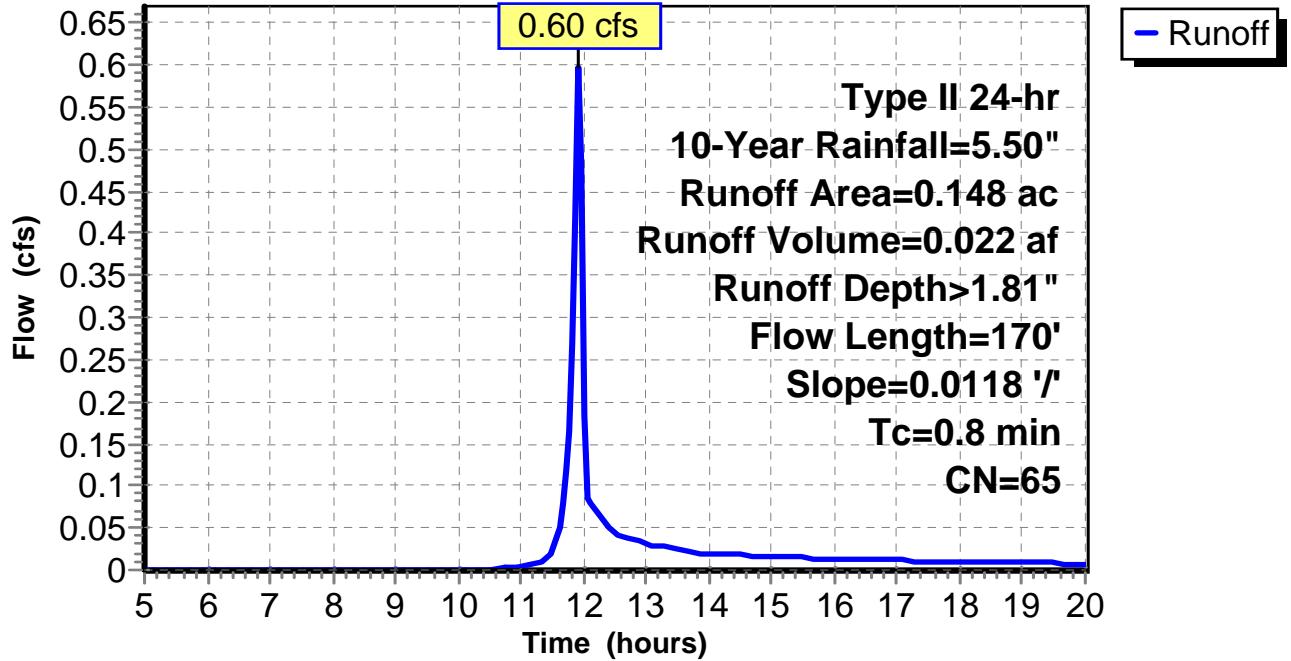
Subcatchment 9: C 158.016

Hydrograph



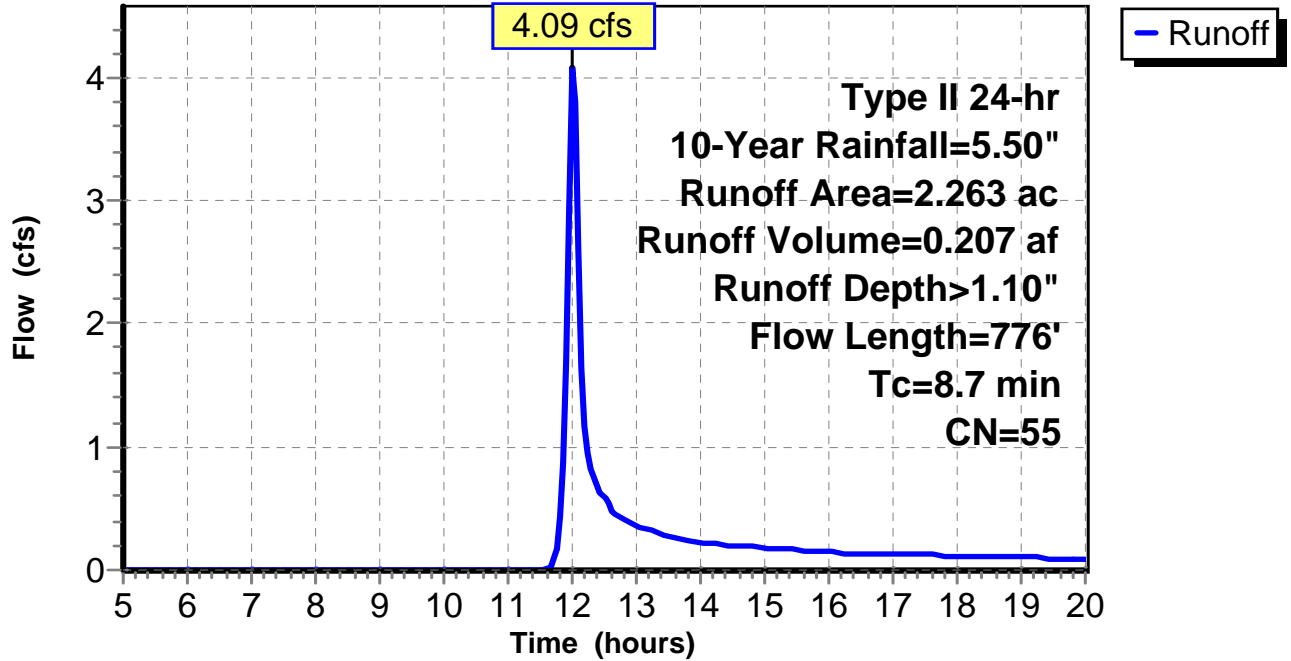
Subcatchment 10: C 159.001

Hydrograph



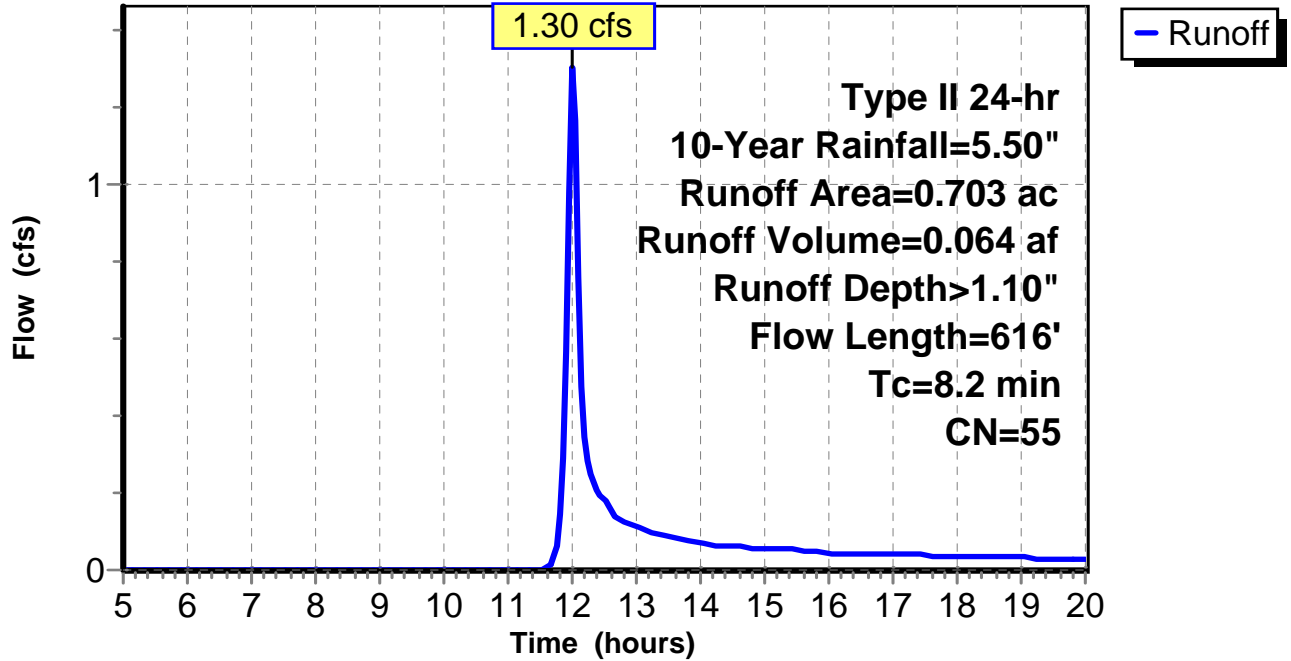
Subcatchment 11: C 159.008

Hydrograph



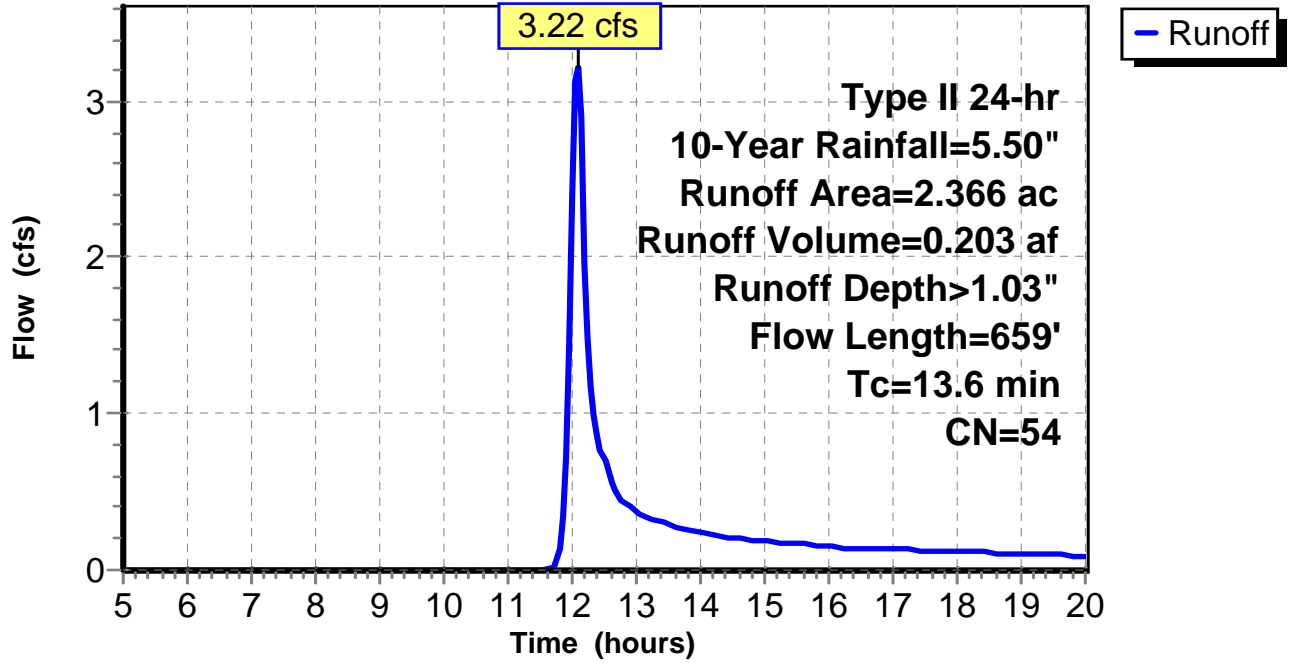
Subcatchment 12: C 159.009

Hydrograph



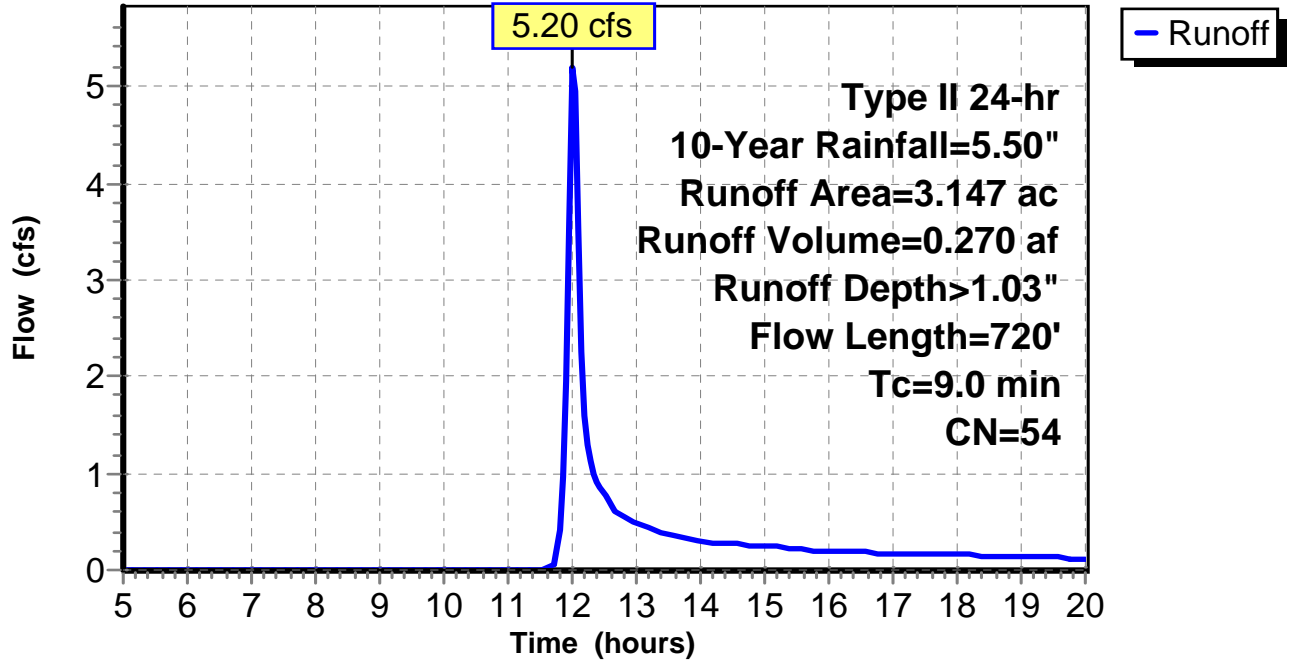
Subcatchment 13: C 159.010

Hydrograph



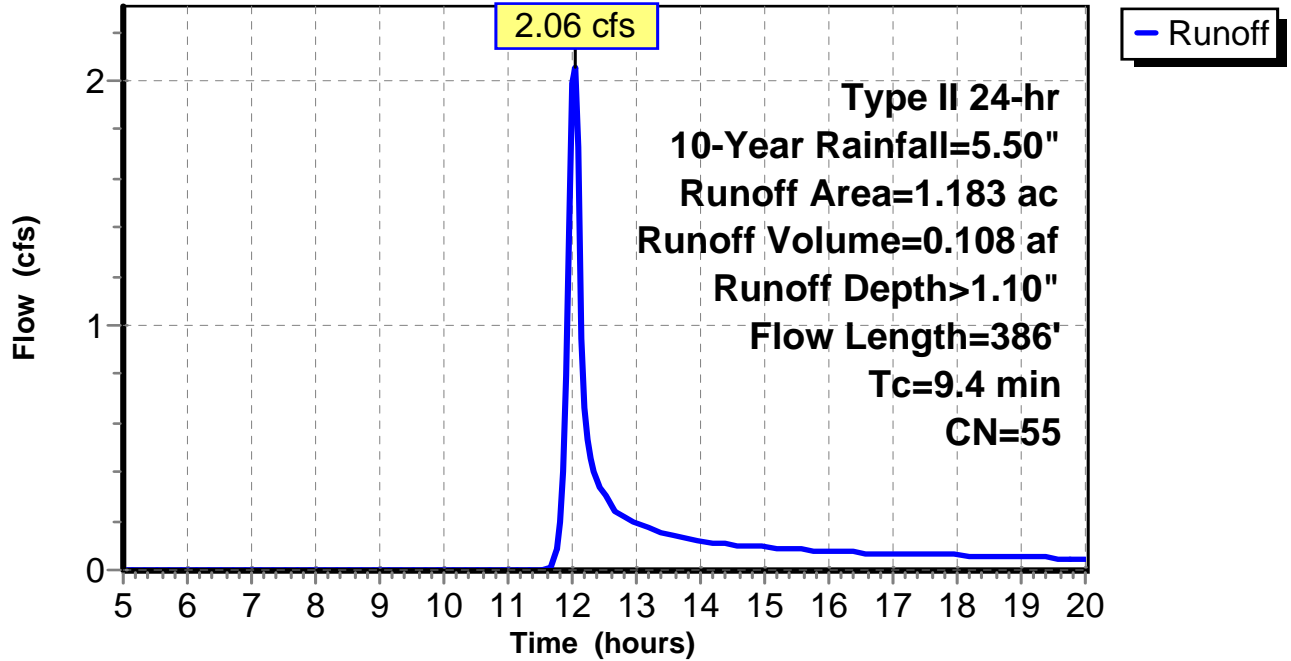
Subcatchment 14: C 159.011

Hydrograph



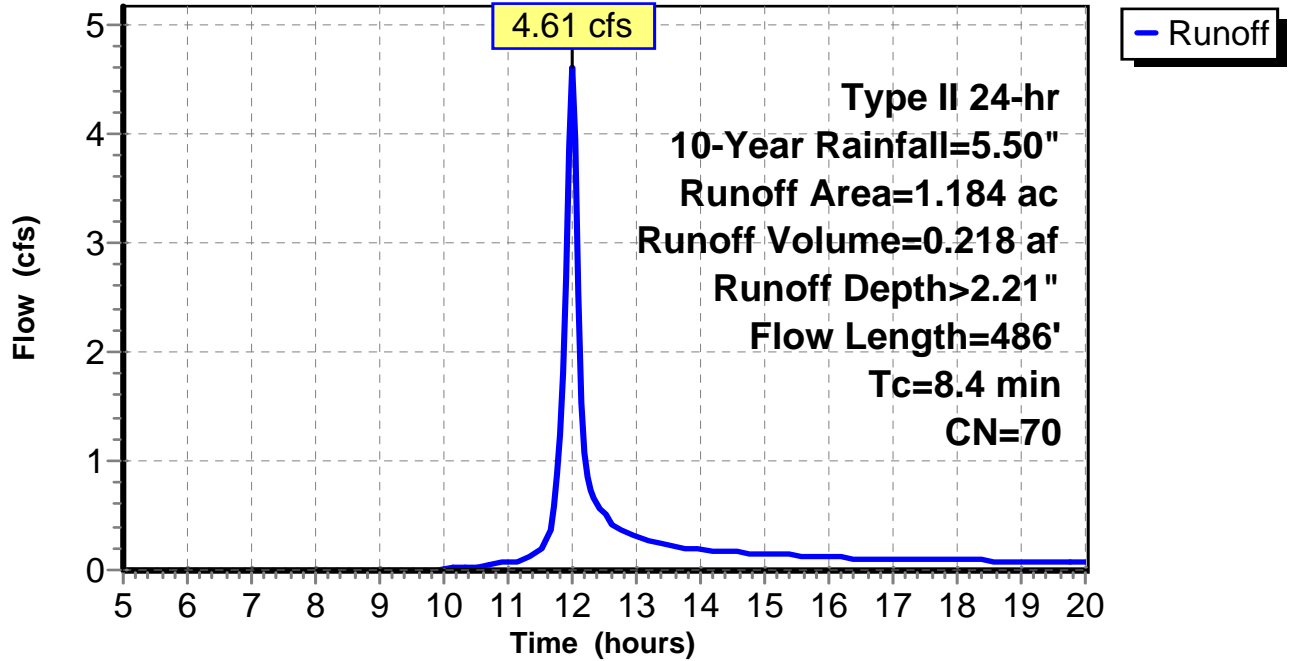
Subcatchment 15: C 159.012

Hydrograph



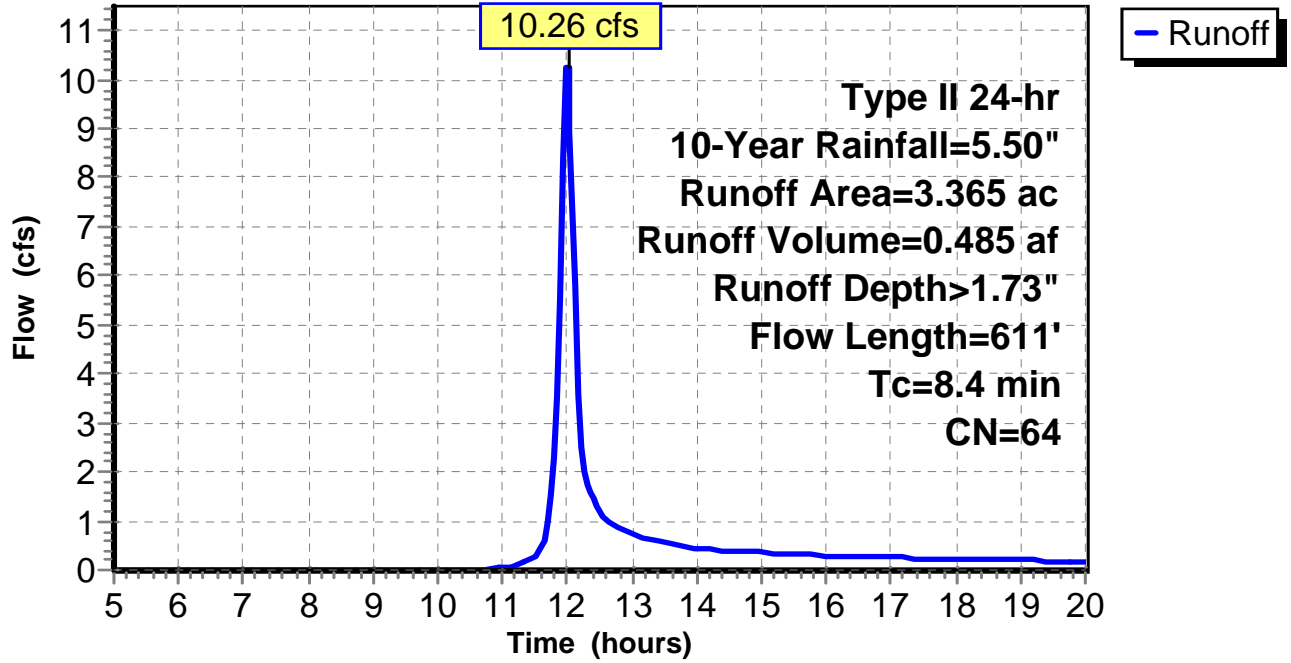
Subcatchment 16: C 159.013

Hydrograph



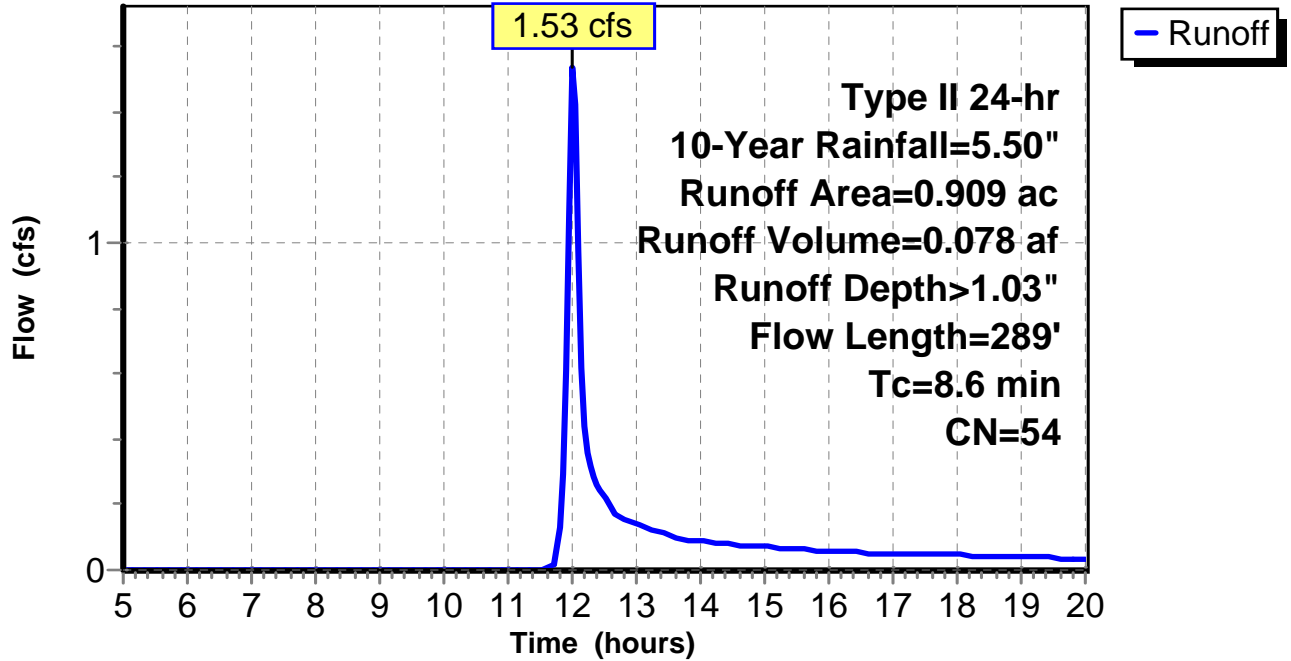
Subcatchment 17: C 159.014

Hydrograph



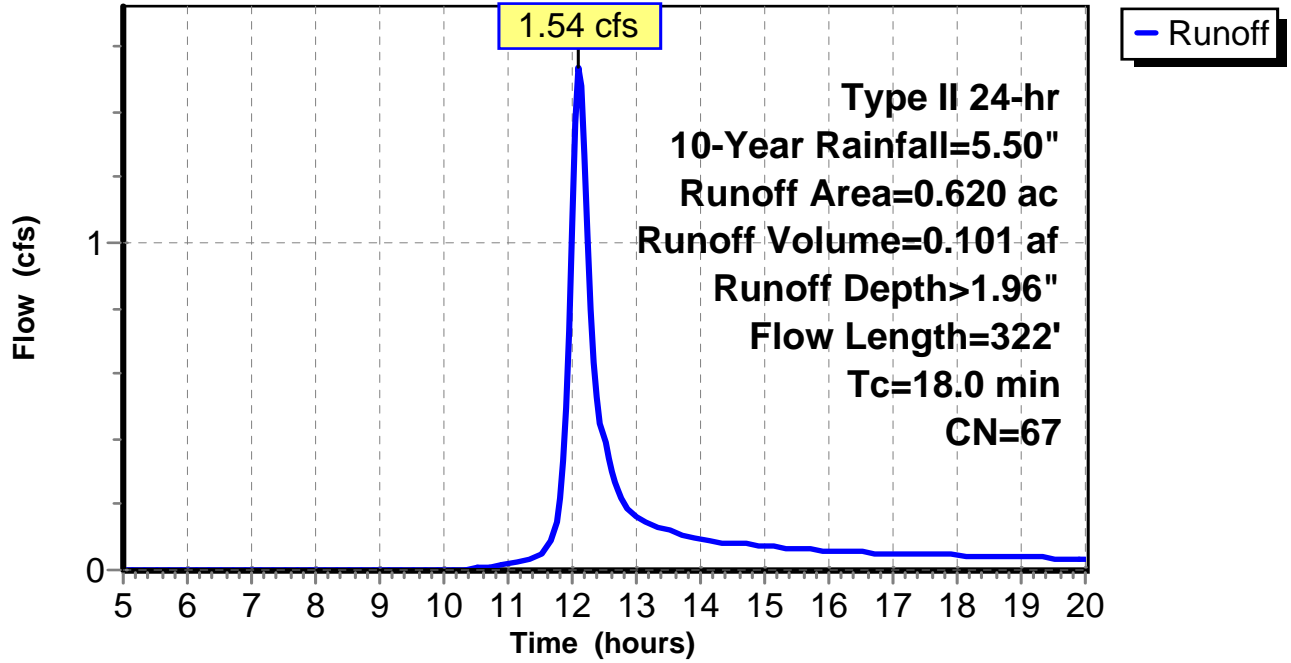
Subcatchment 18: C 159.015

Hydrograph



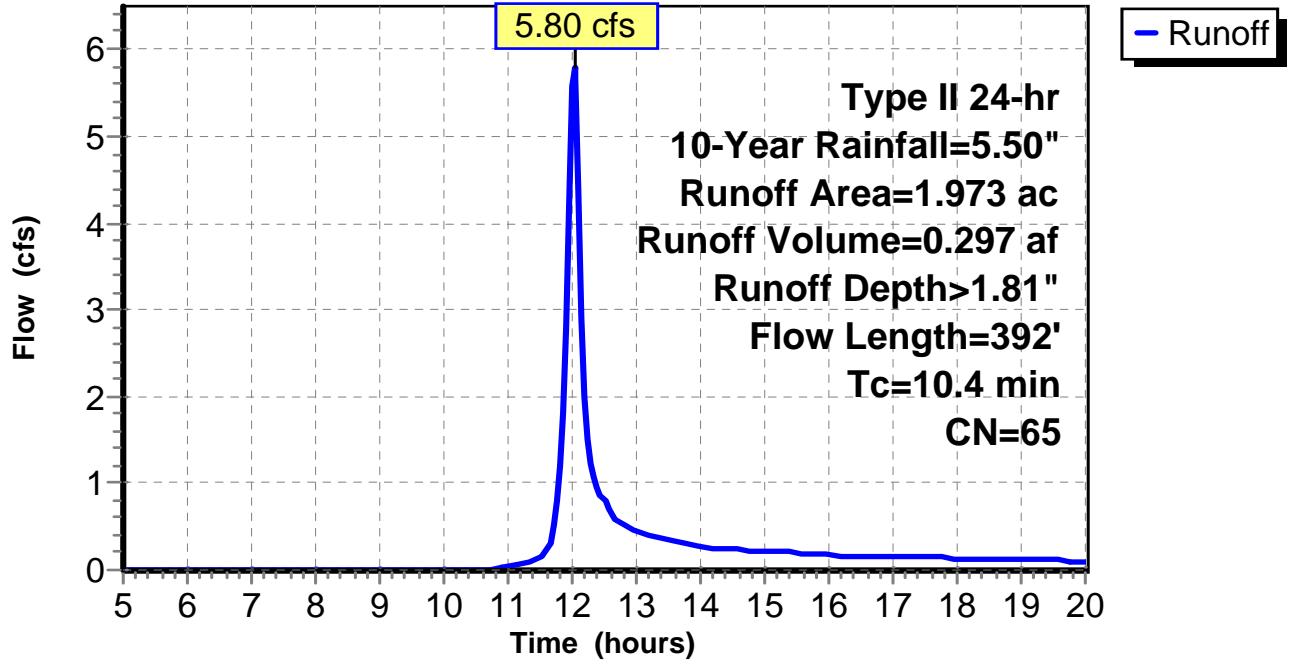
Subcatchment 19: C 159.016

Hydrograph



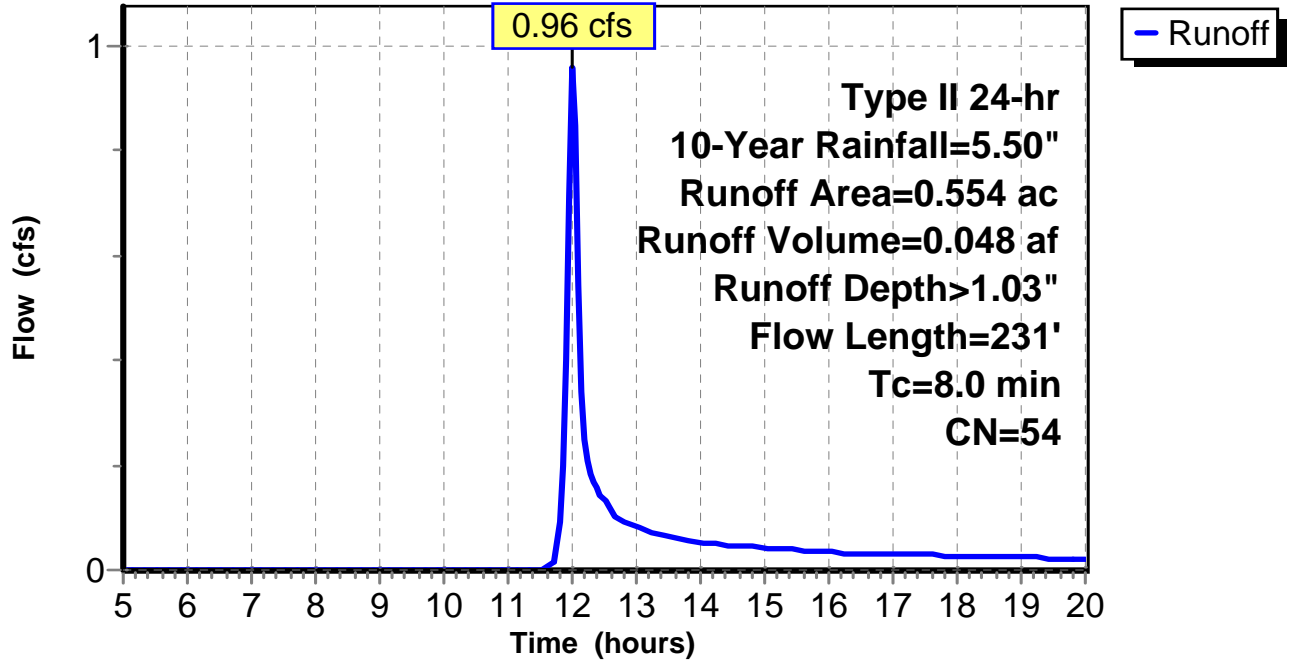
Subcatchment 20: C 159.017

Hydrograph



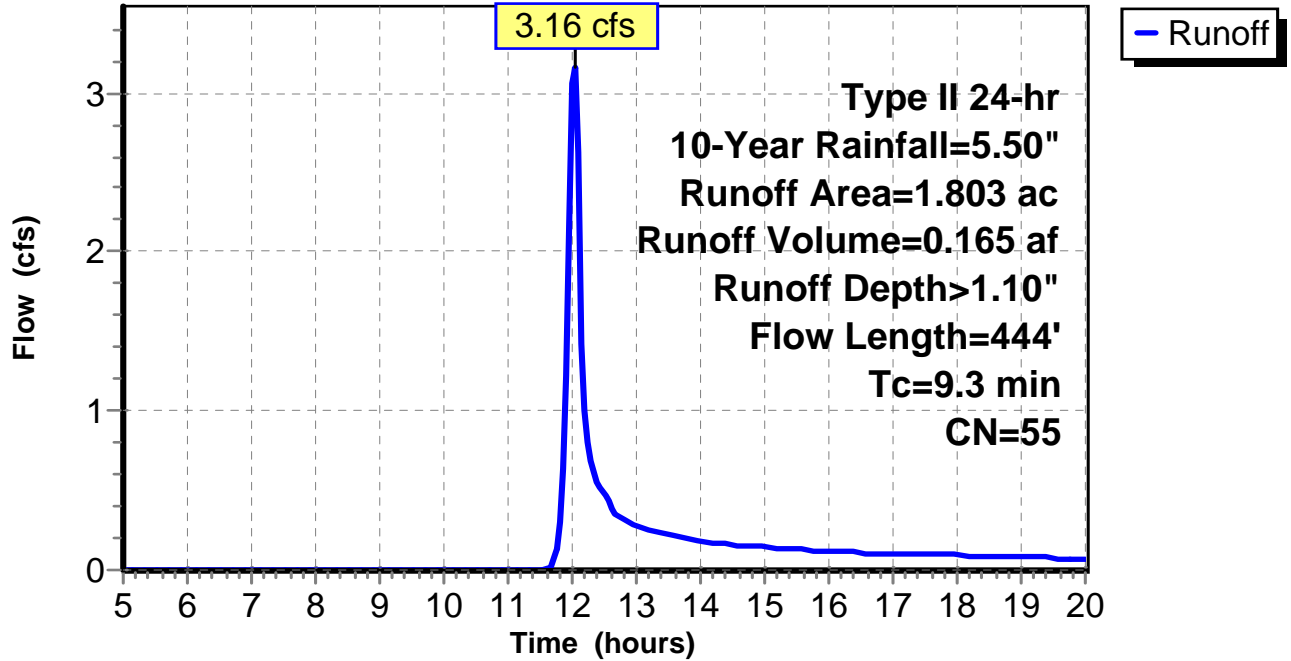
Subcatchment 21: C 159.018

Hydrograph



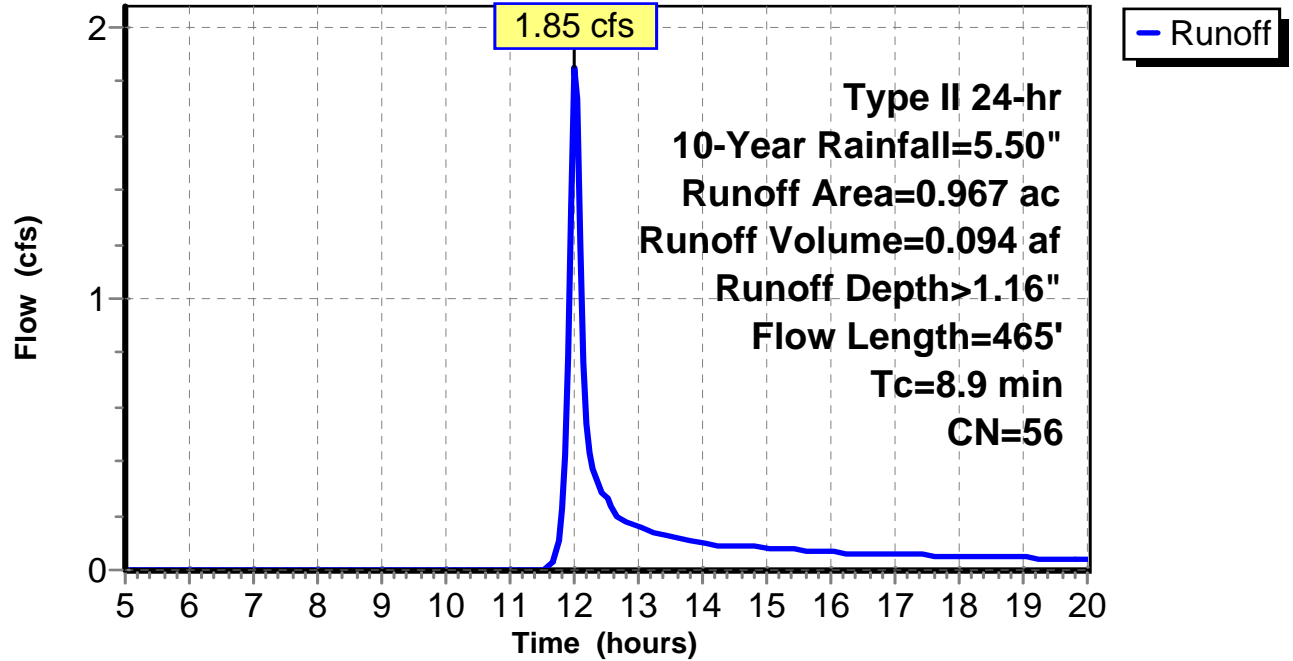
Subcatchment 22: C 159.019

Hydrograph



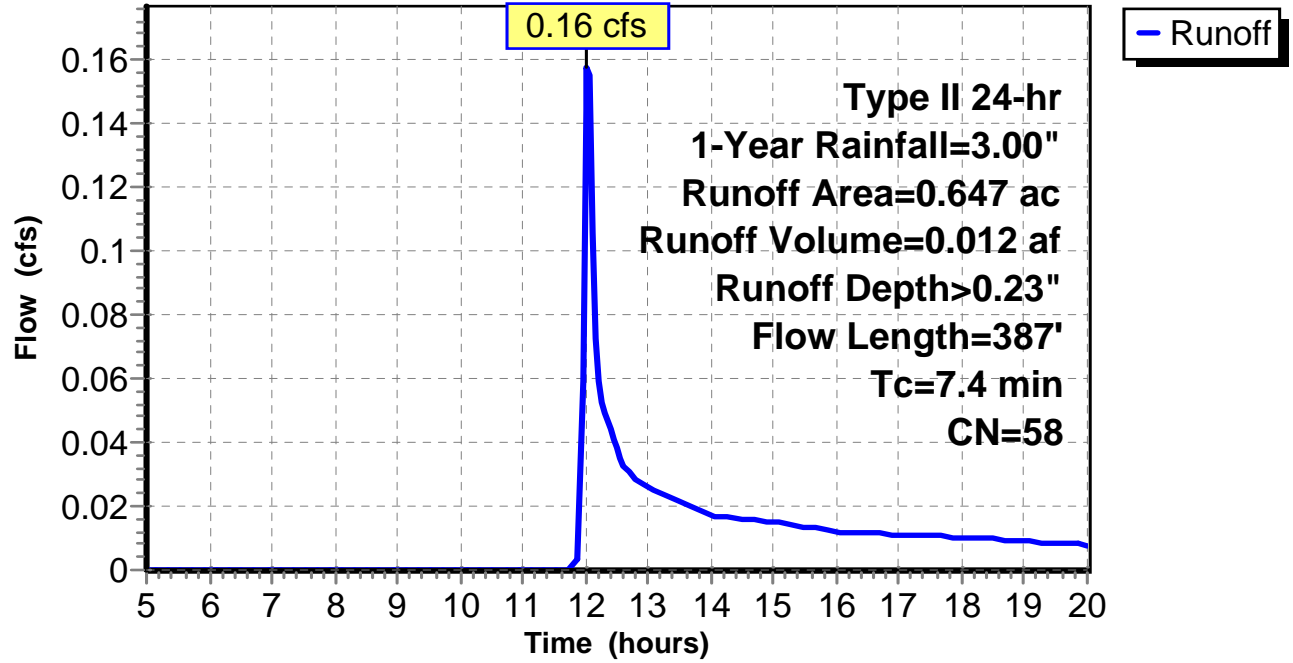
Subcatchment 23: C 159.020

Hydrograph



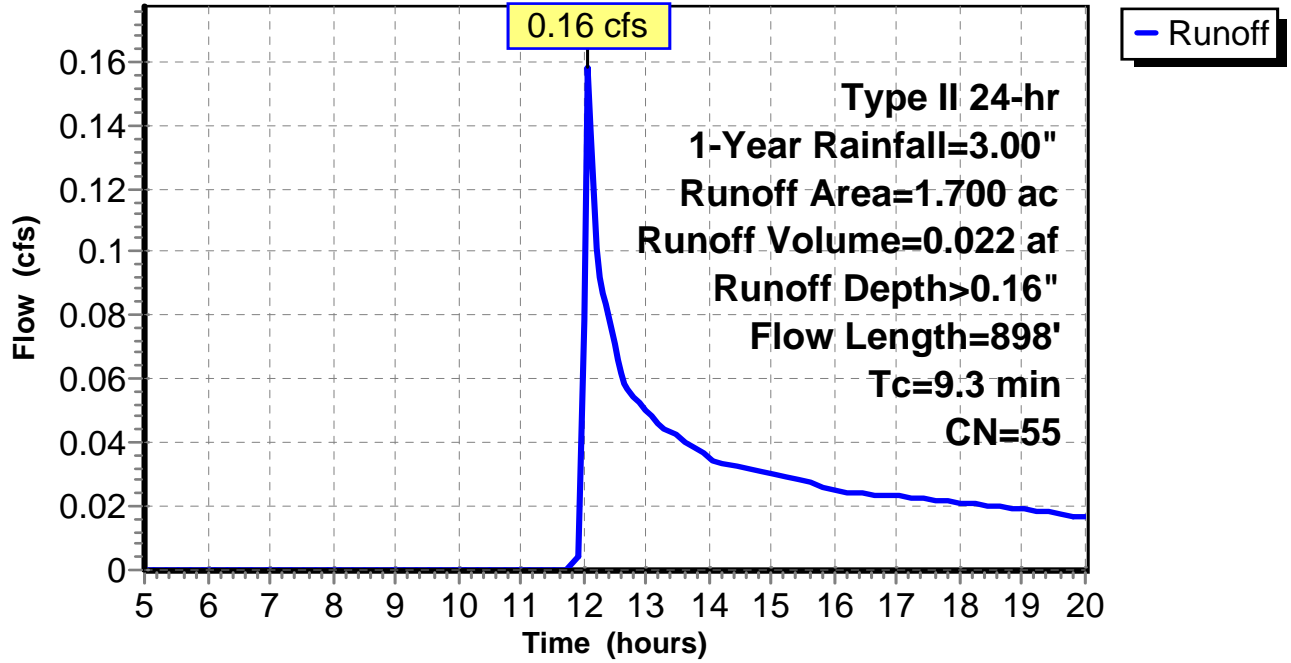
Subcatchment 1: C 159.002

Hydrograph



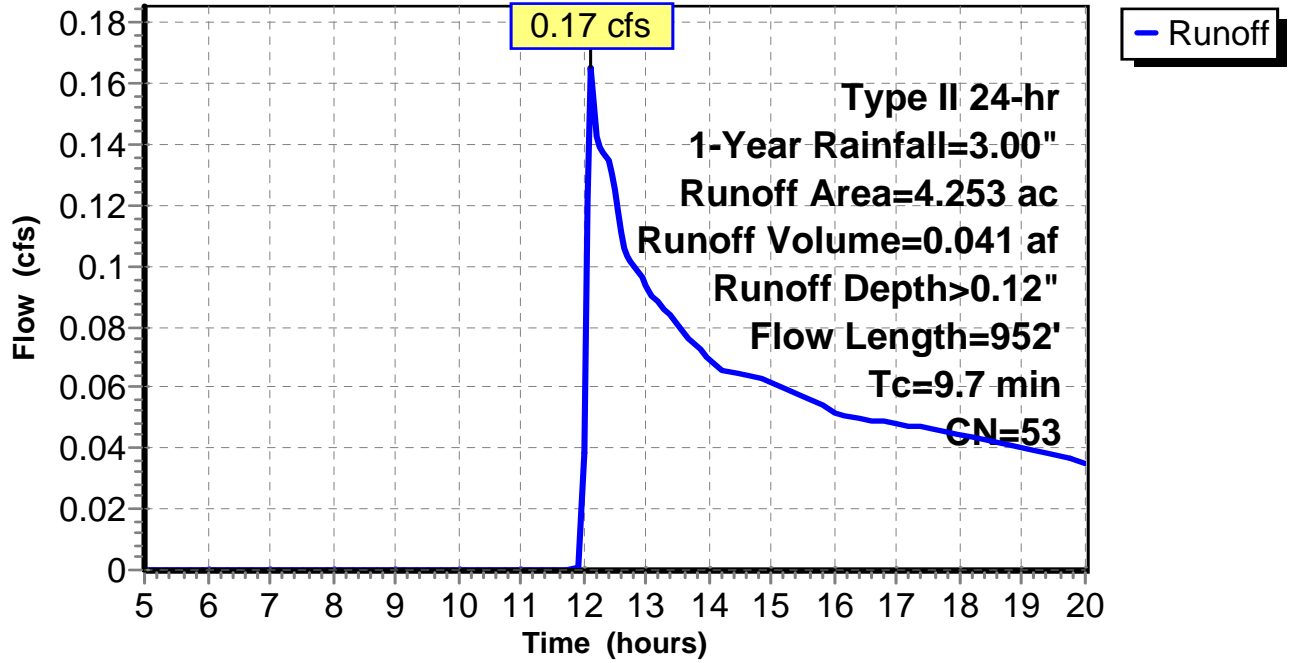
Subcatchment 2: C 159.003

Hydrograph



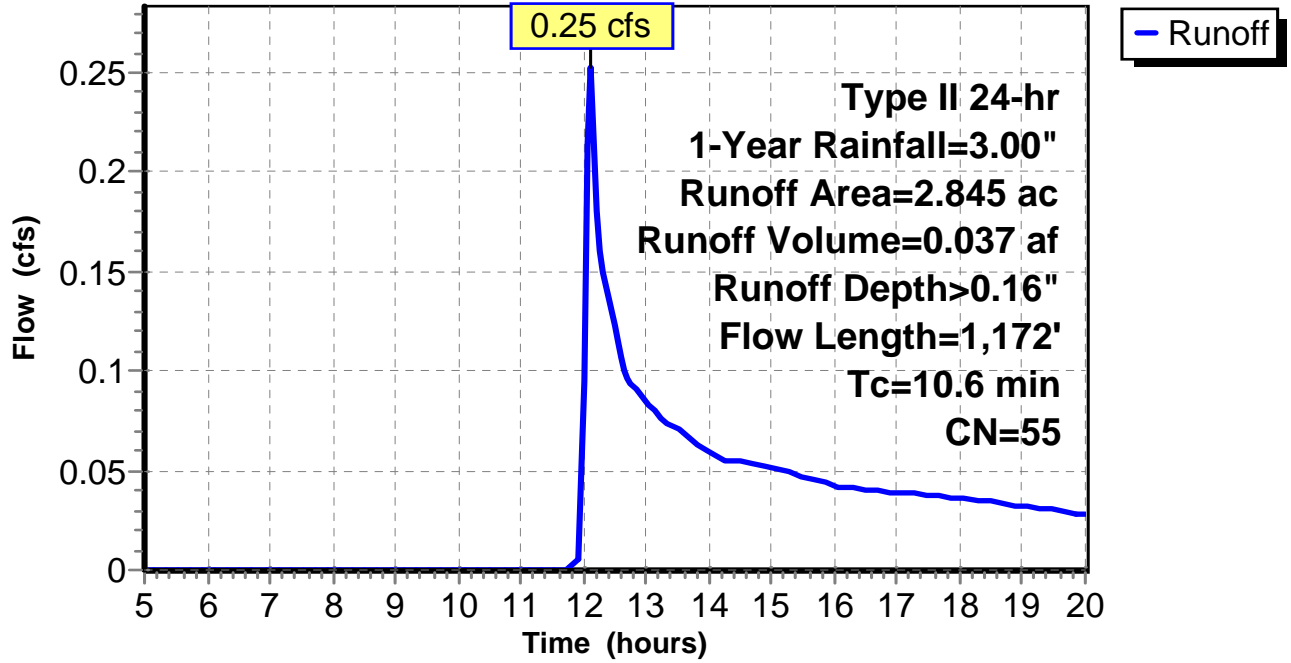
Subcatchment 3: C 159.004

Hydrograph



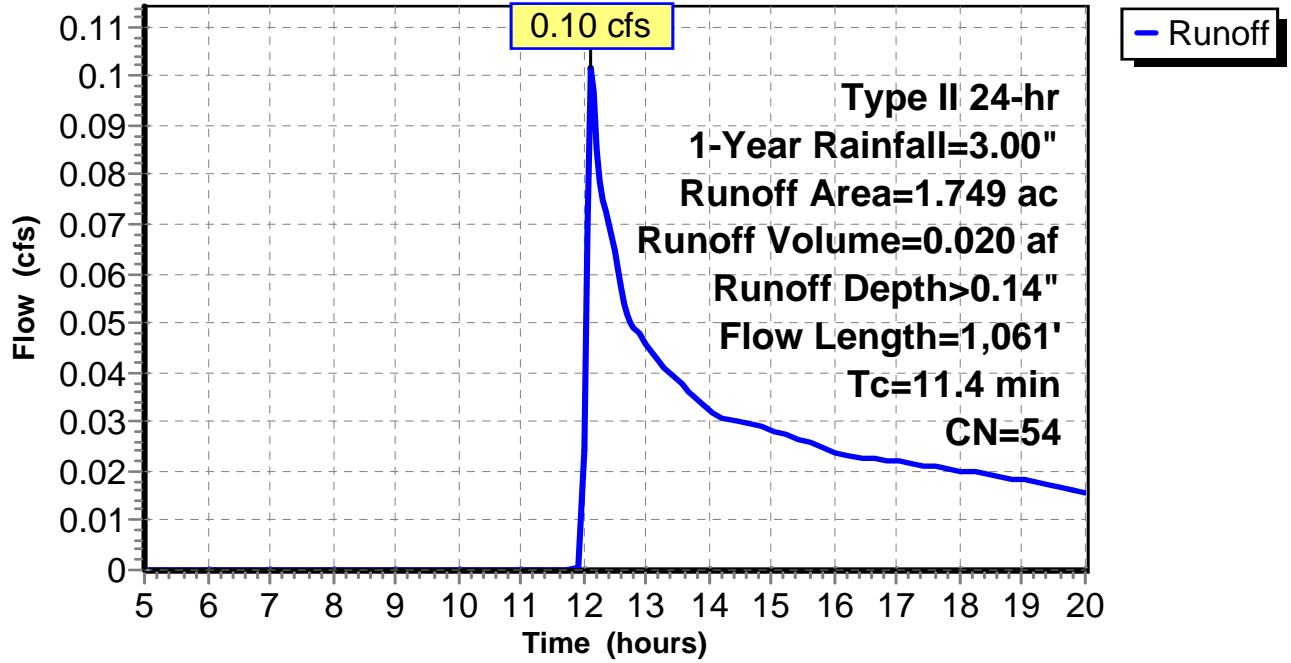
Subcatchment 4: C 159.005

Hydrograph



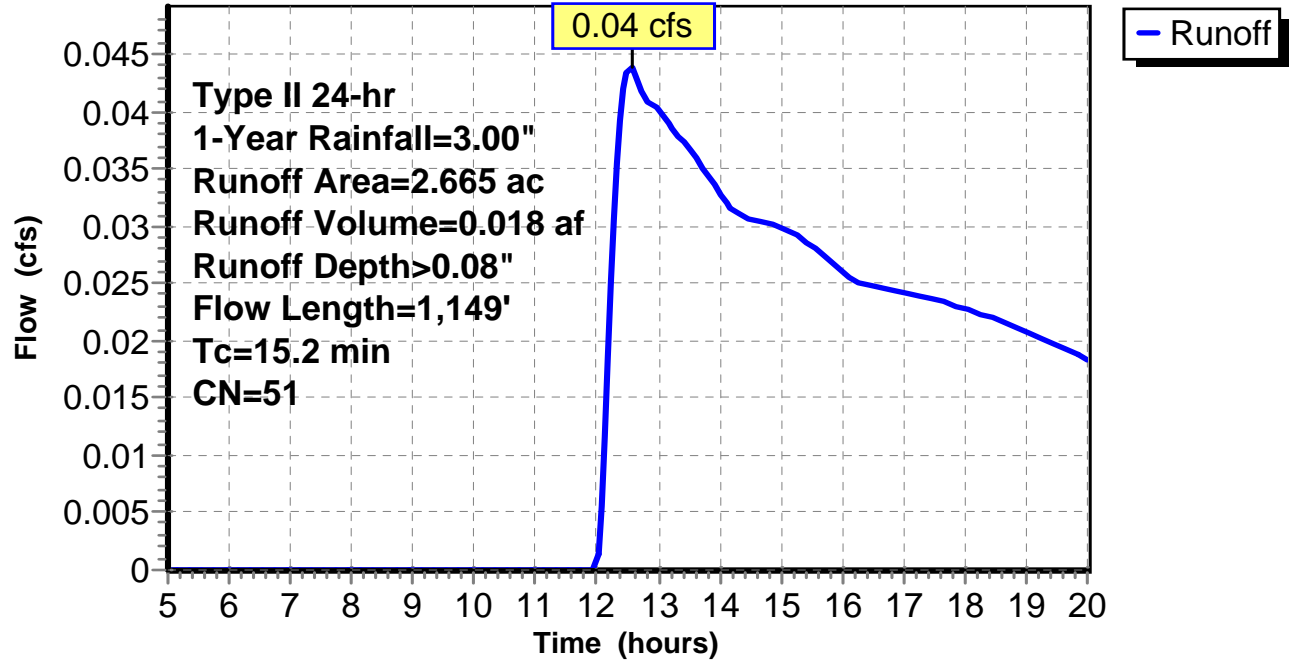
Subcatchment 5: C 159.006

Hydrograph



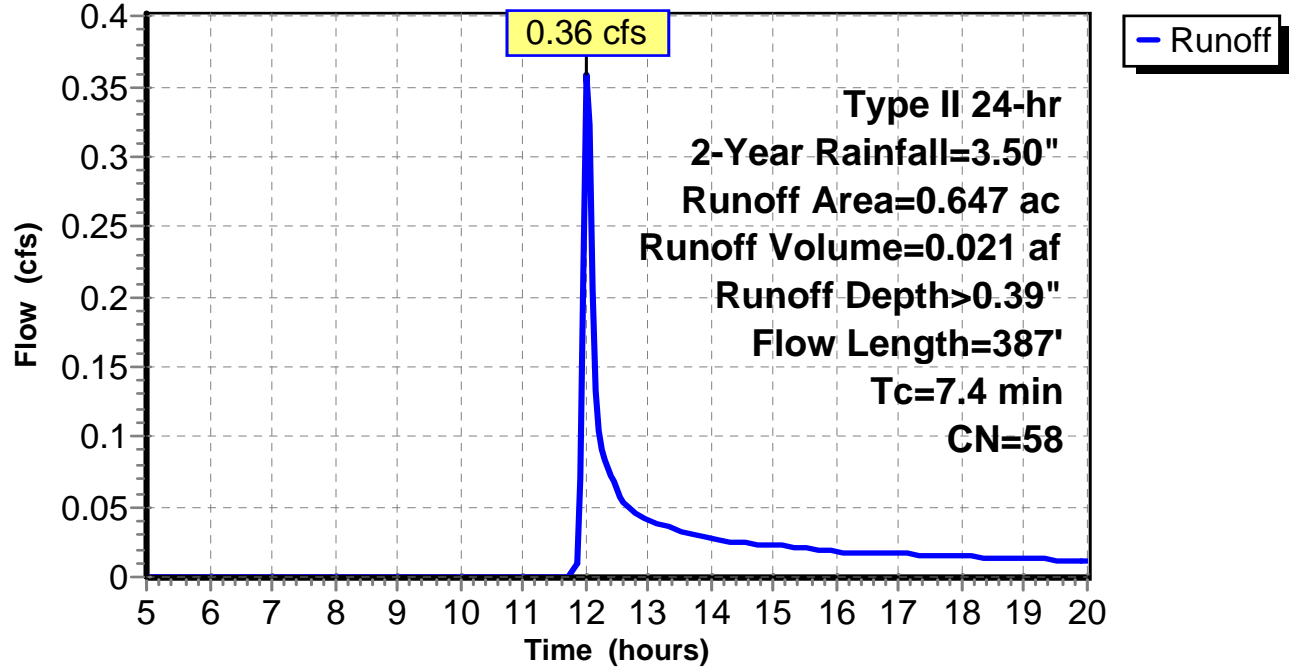
Subcatchment 6: C 159.007

Hydrograph



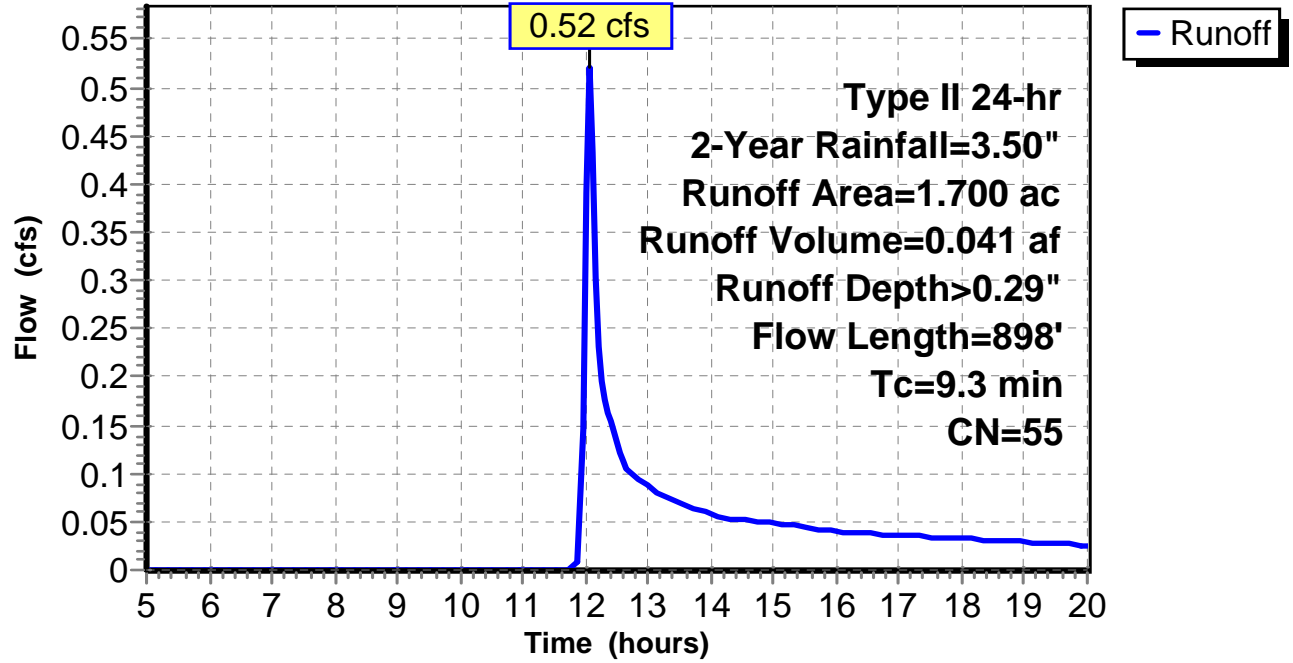
Subcatchment 1: C 159.002

Hydrograph



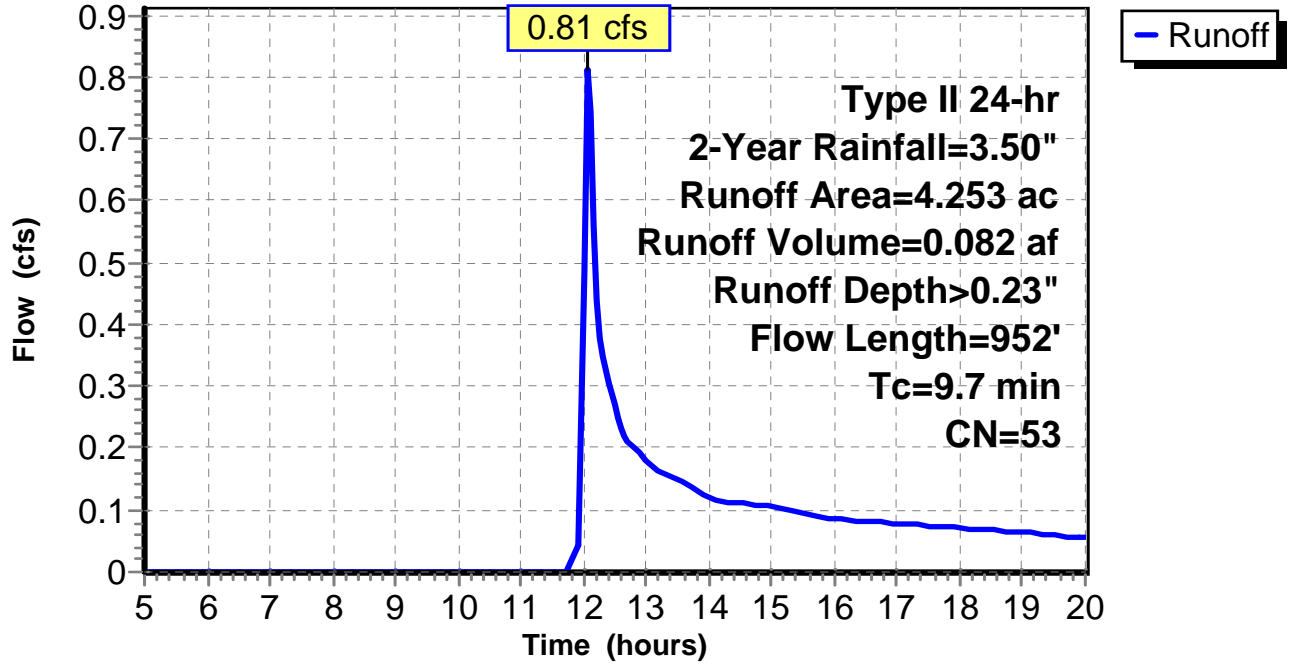
Subcatchment 2: C 159.003

Hydrograph



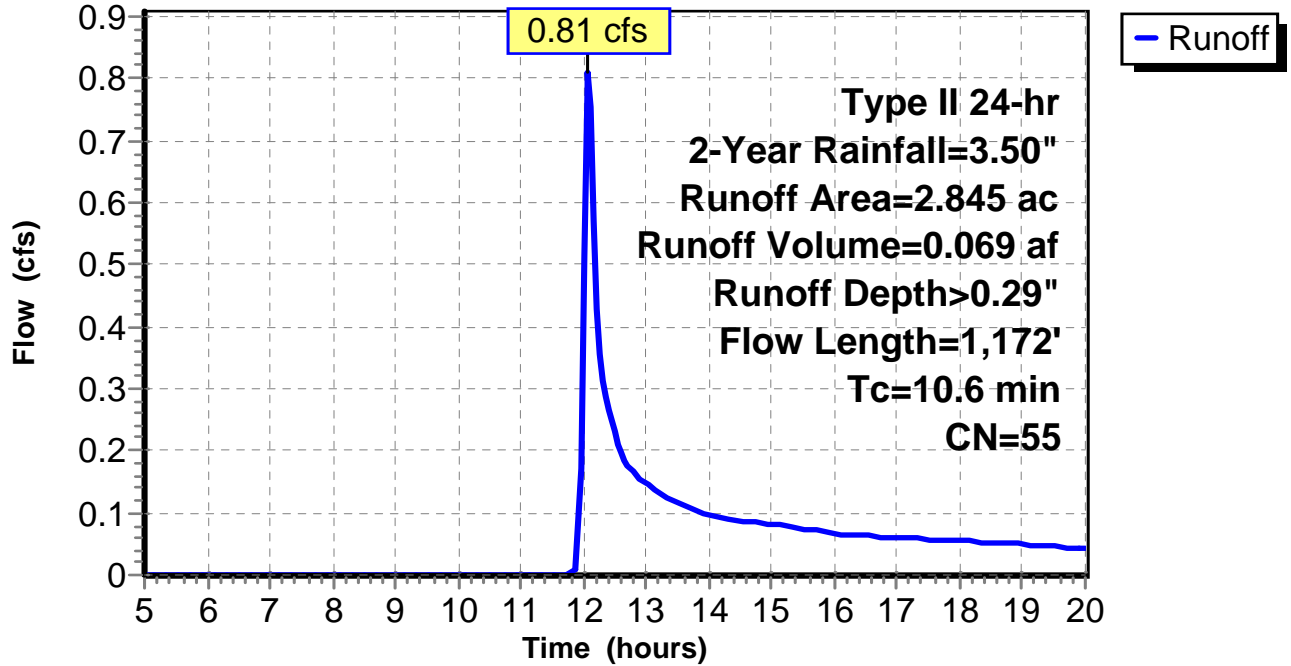
Subcatchment 3: C 159.004

Hydrograph



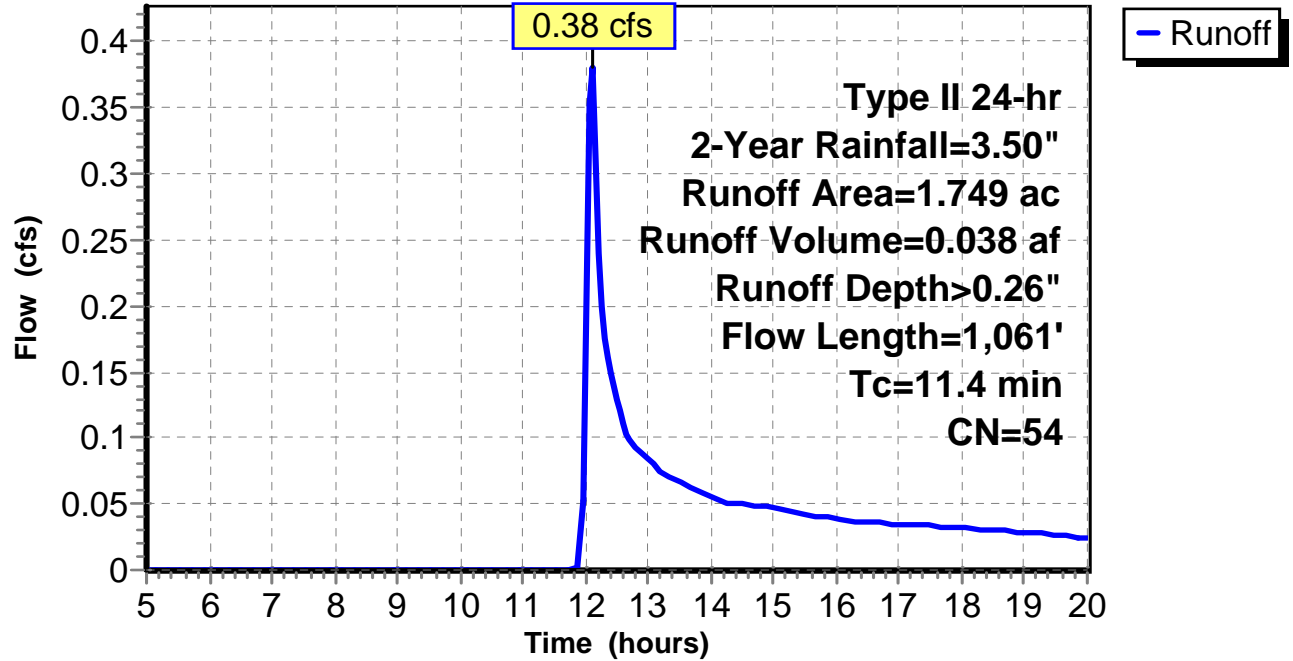
Subcatchment 4: C 159.005

Hydrograph



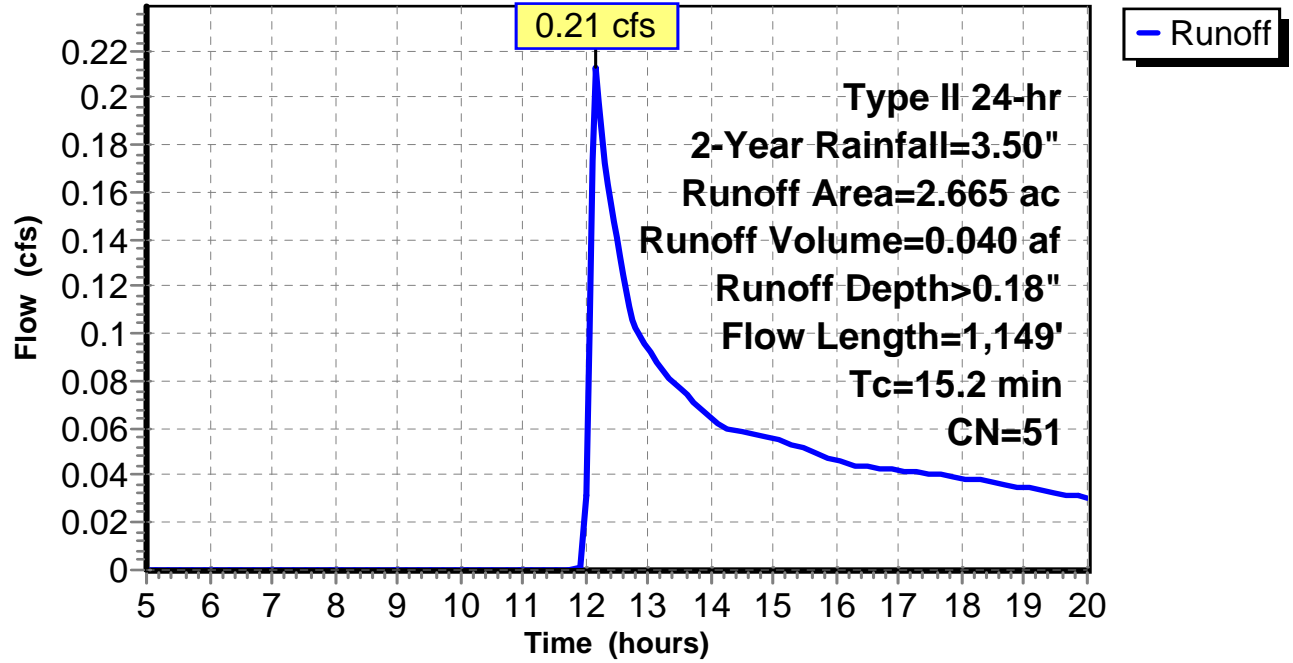
Subcatchment 5: C 159.006

Hydrograph



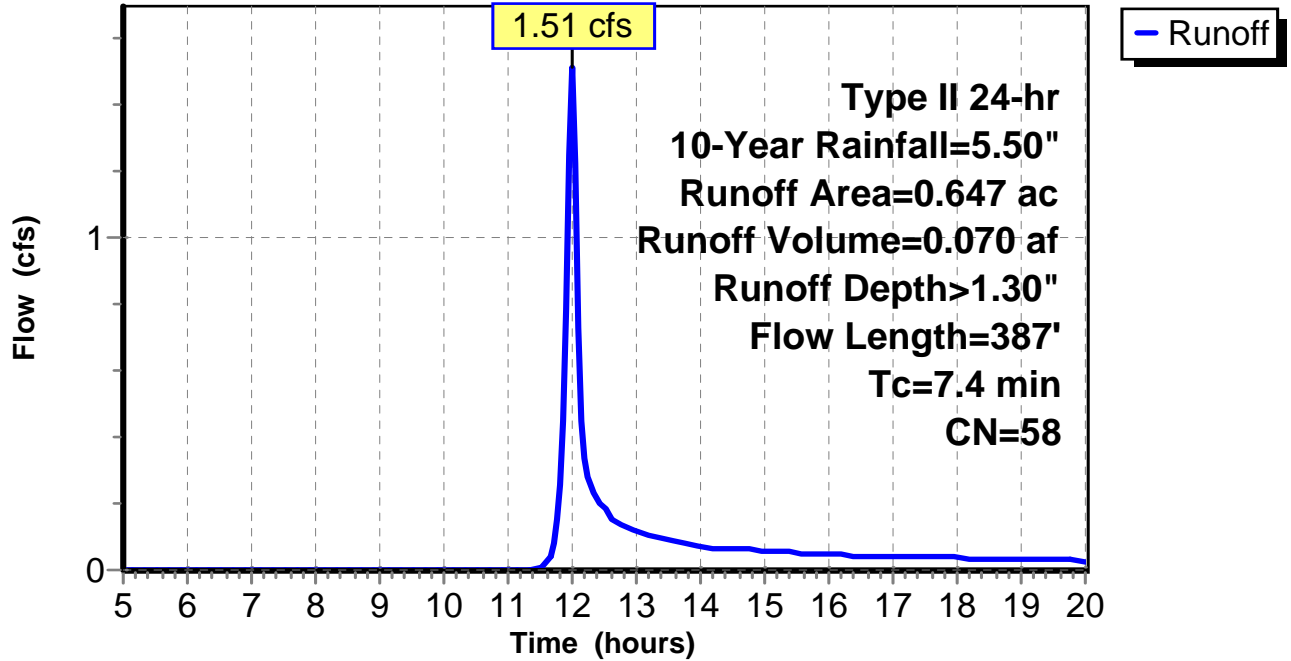
Subcatchment 6: C 159.007

Hydrograph



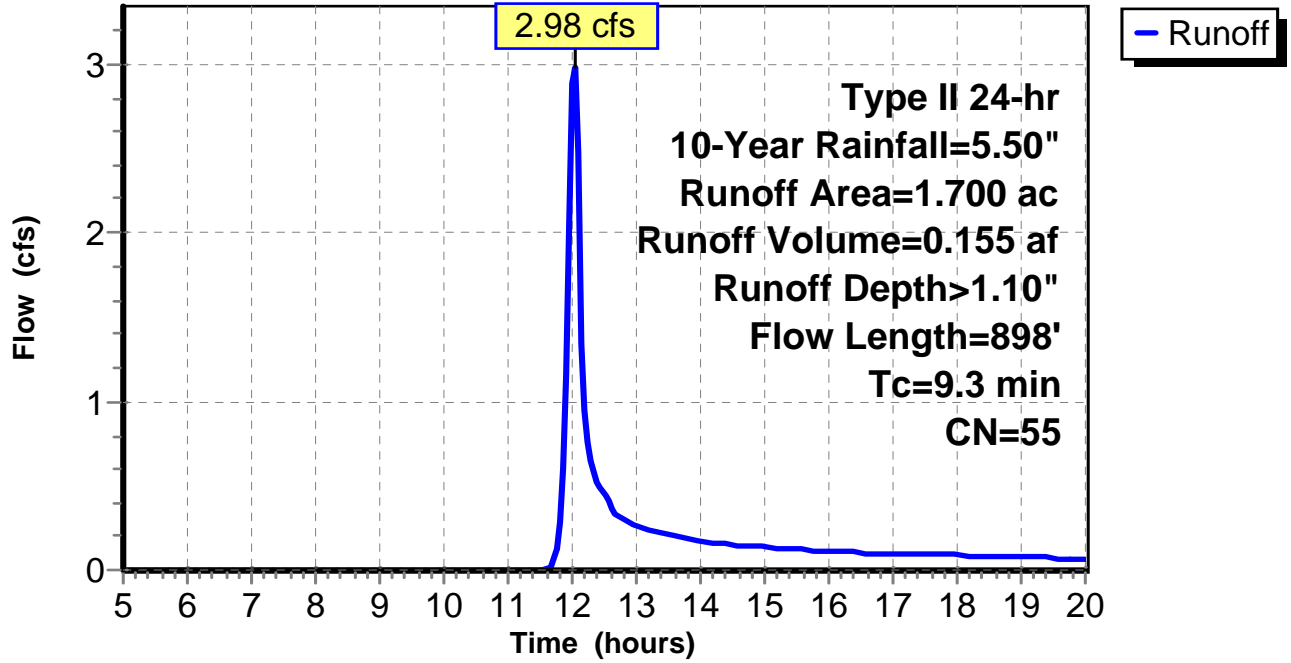
Subcatchment 1: C 159.002

Hydrograph



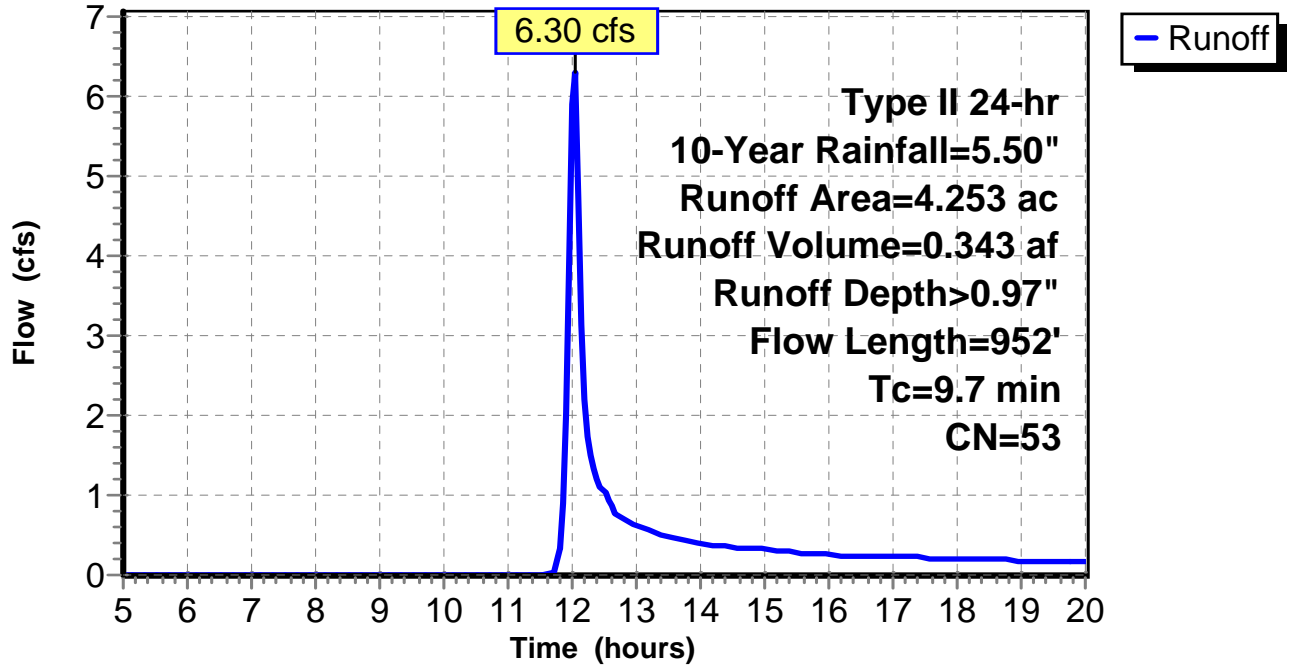
Subcatchment 2: C 159.003

Hydrograph



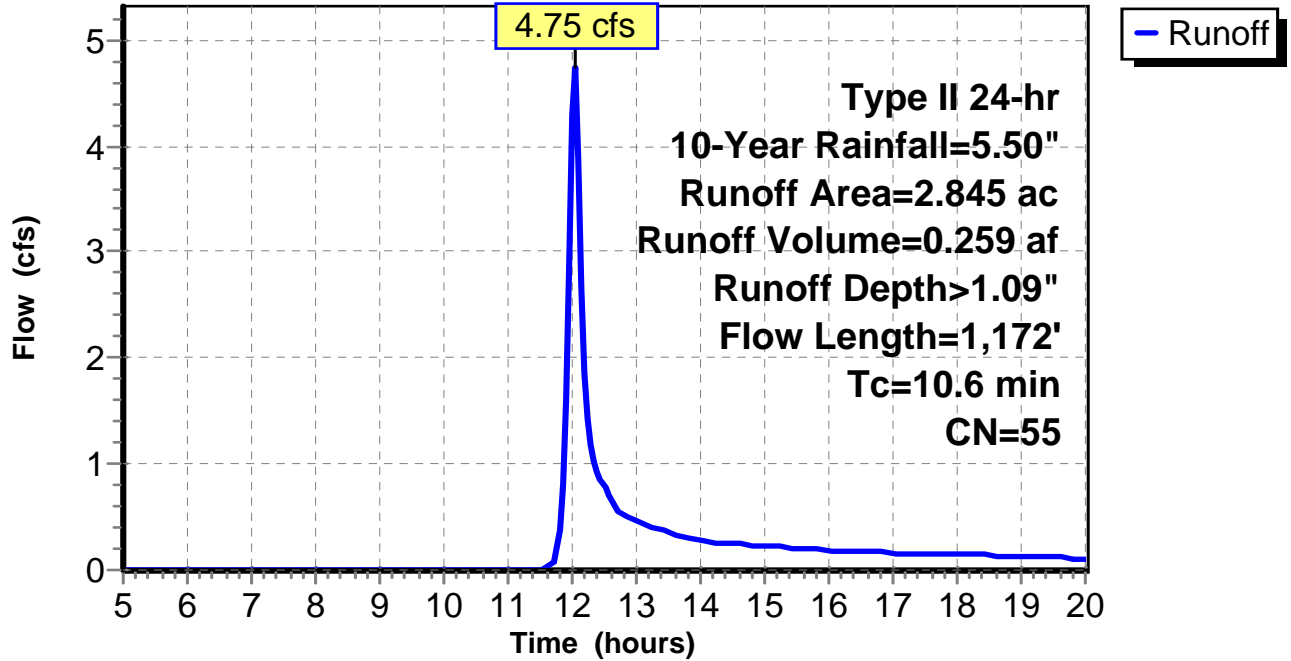
Subcatchment 3: C 159.004

Hydrograph



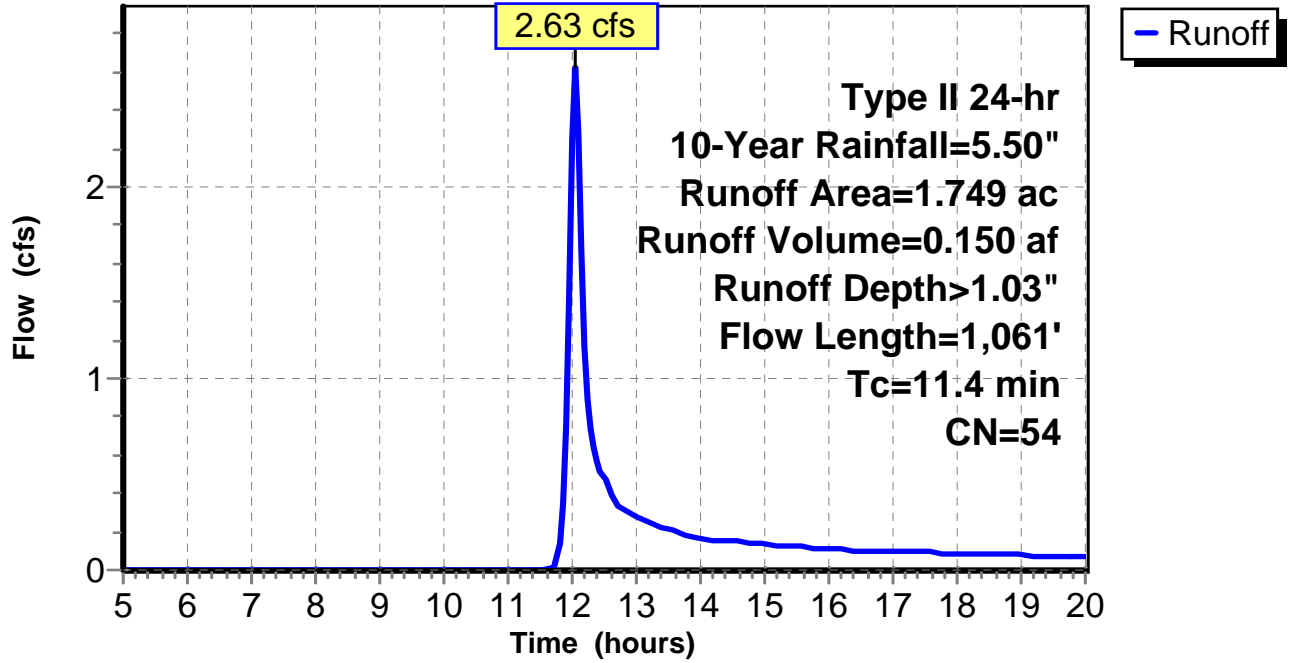
Subcatchment 4: C 159.005

Hydrograph



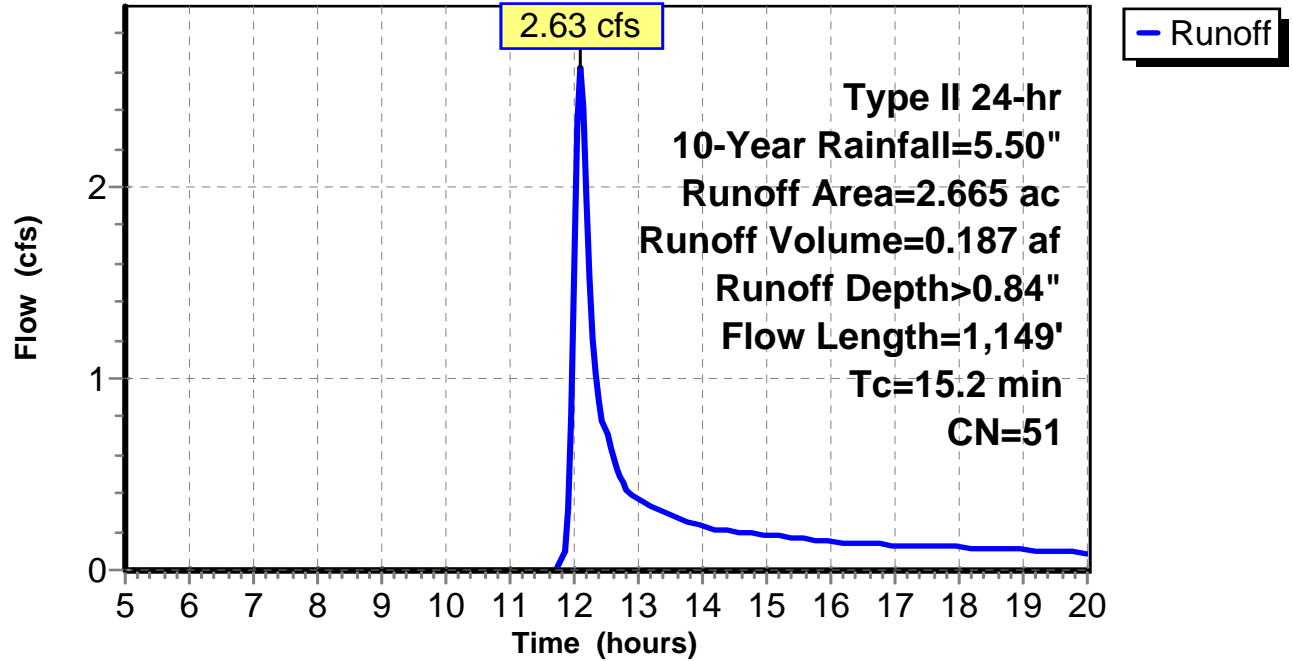
Subcatchment 5: C 159.006

Hydrograph



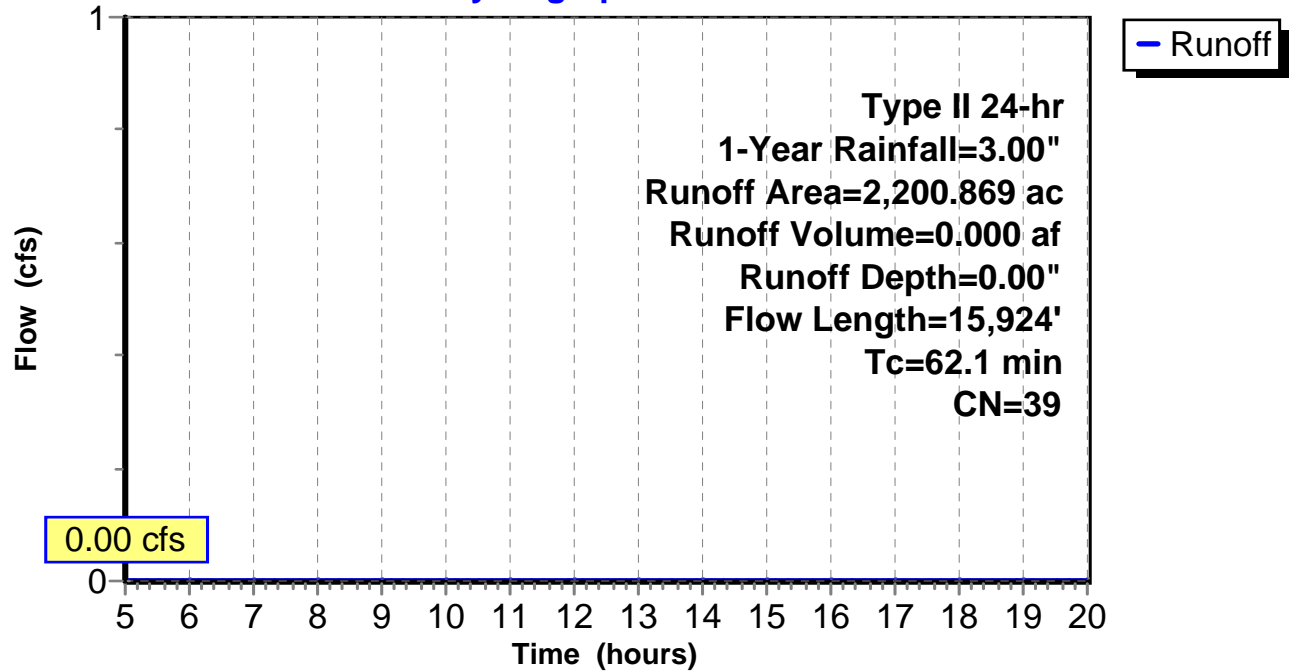
Subcatchment 6: C 159.007

Hydrograph



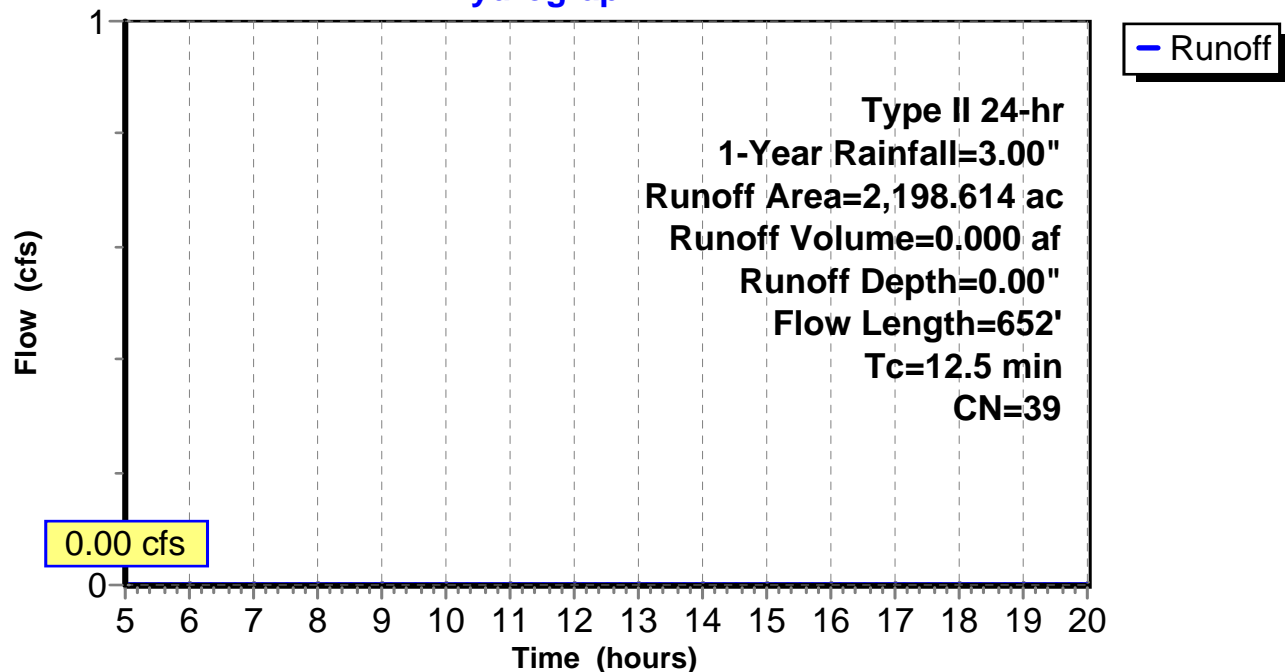
Subcatchment 1: C AR-501.001

Hydrograph



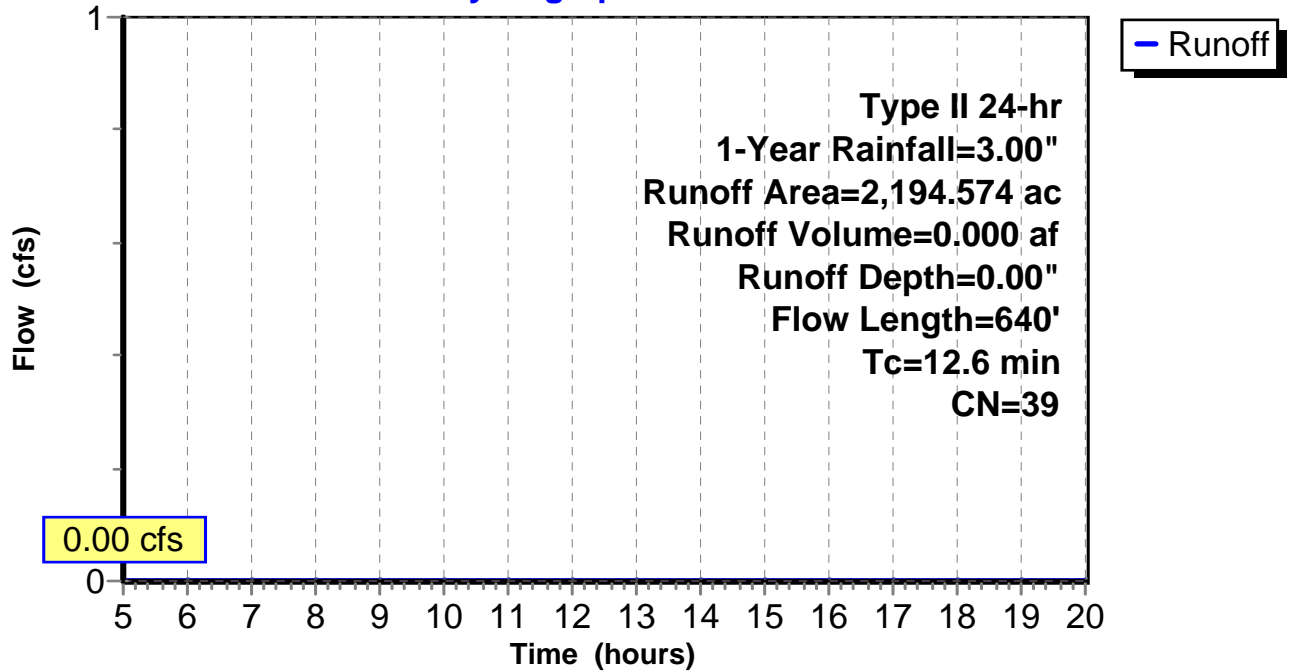
Subcatchment 2: C AR-501.002

Hydrograph



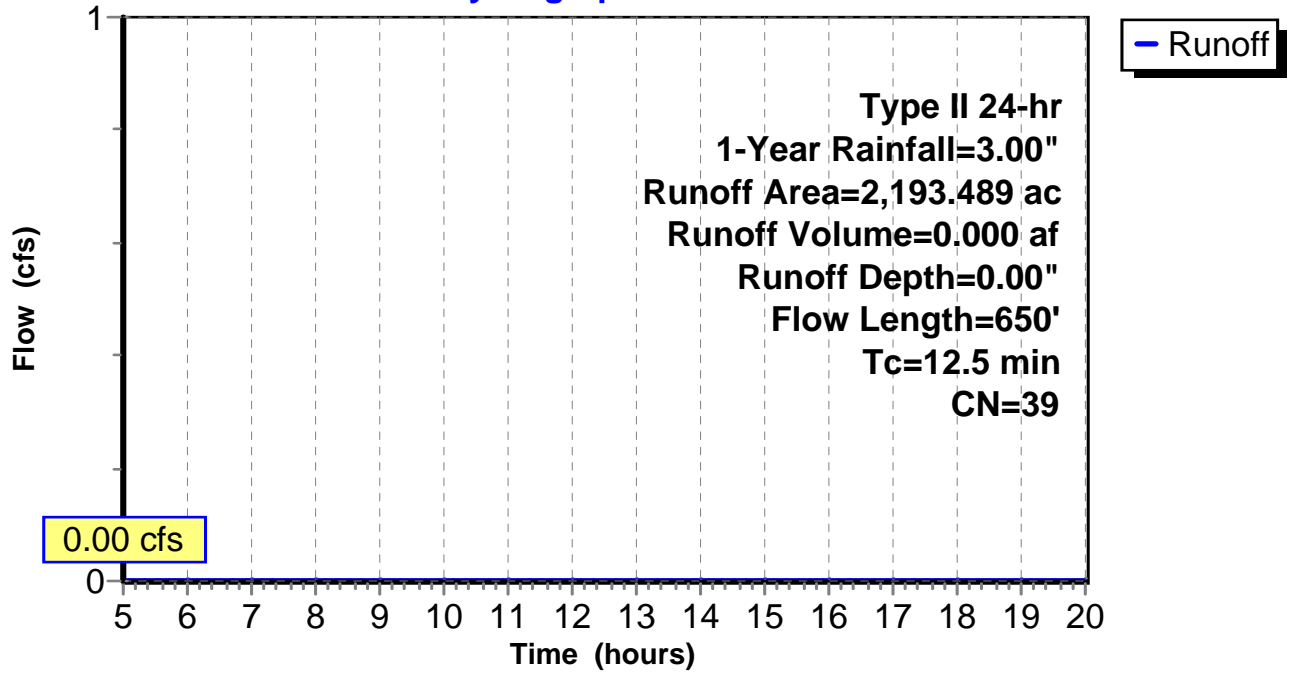
Subcatchment 3: C AR-501.003

Hydrograph



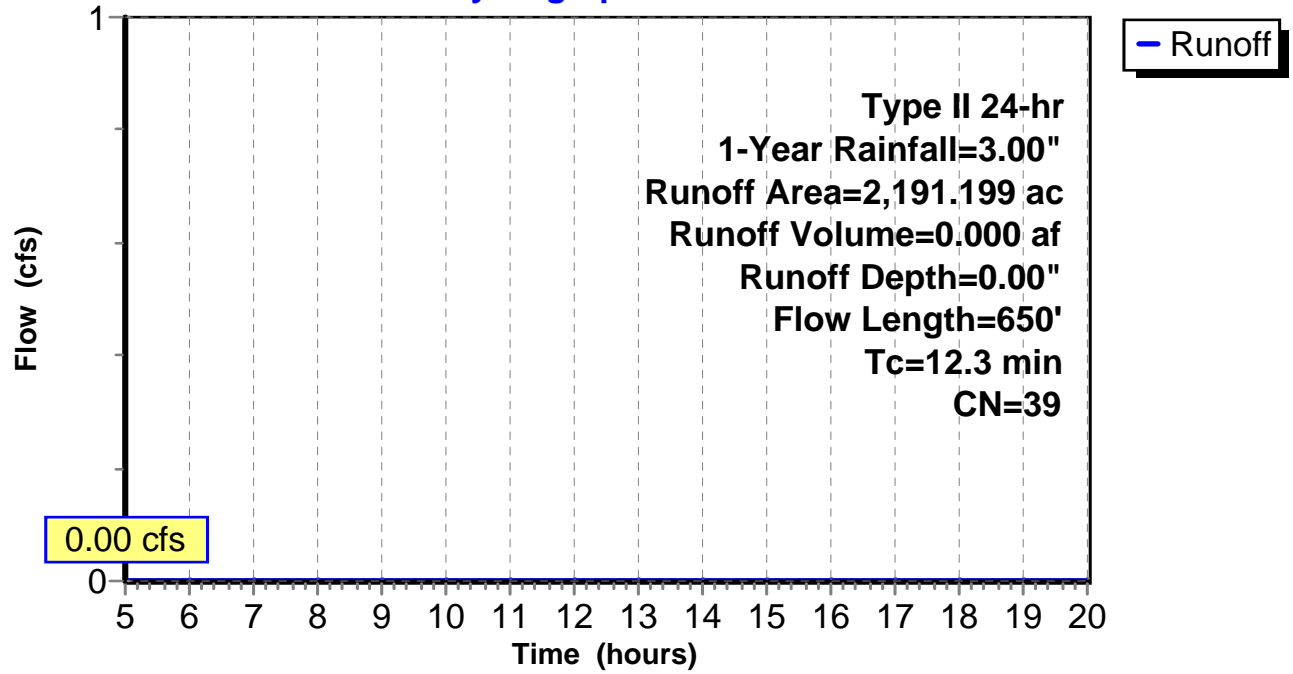
Subcatchment 4: C AR-501.004

Hydrograph



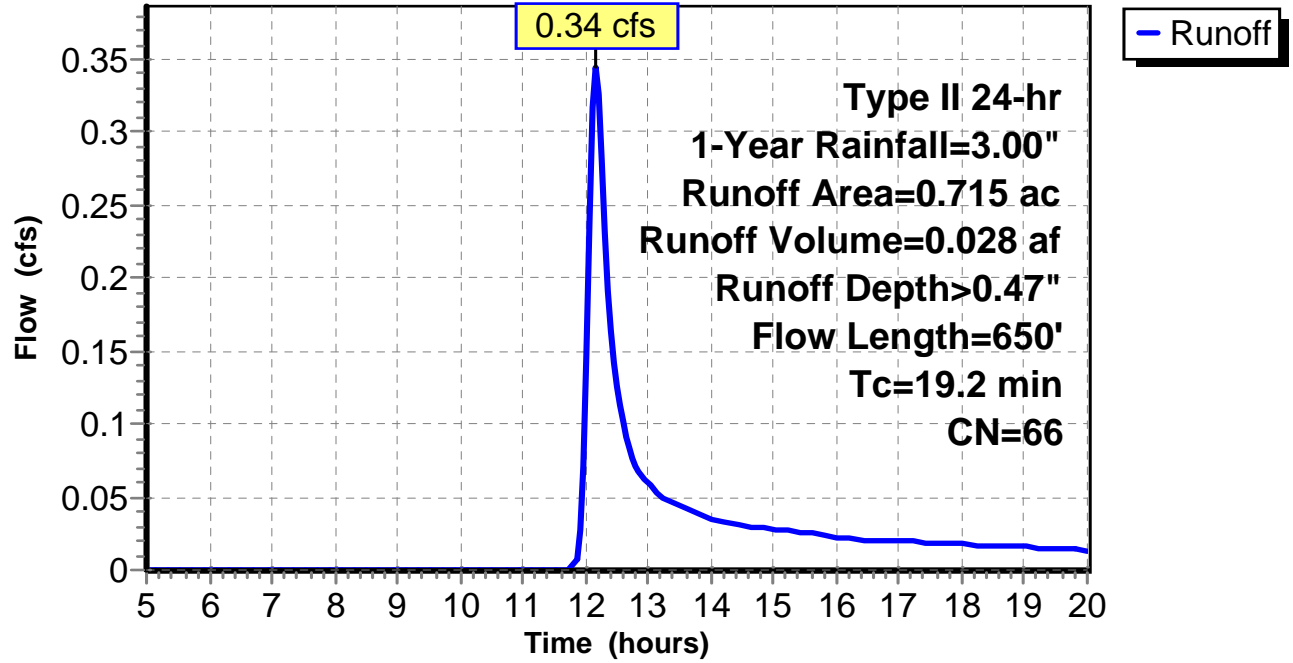
Subcatchment 5: C AR-501.005

Hydrograph



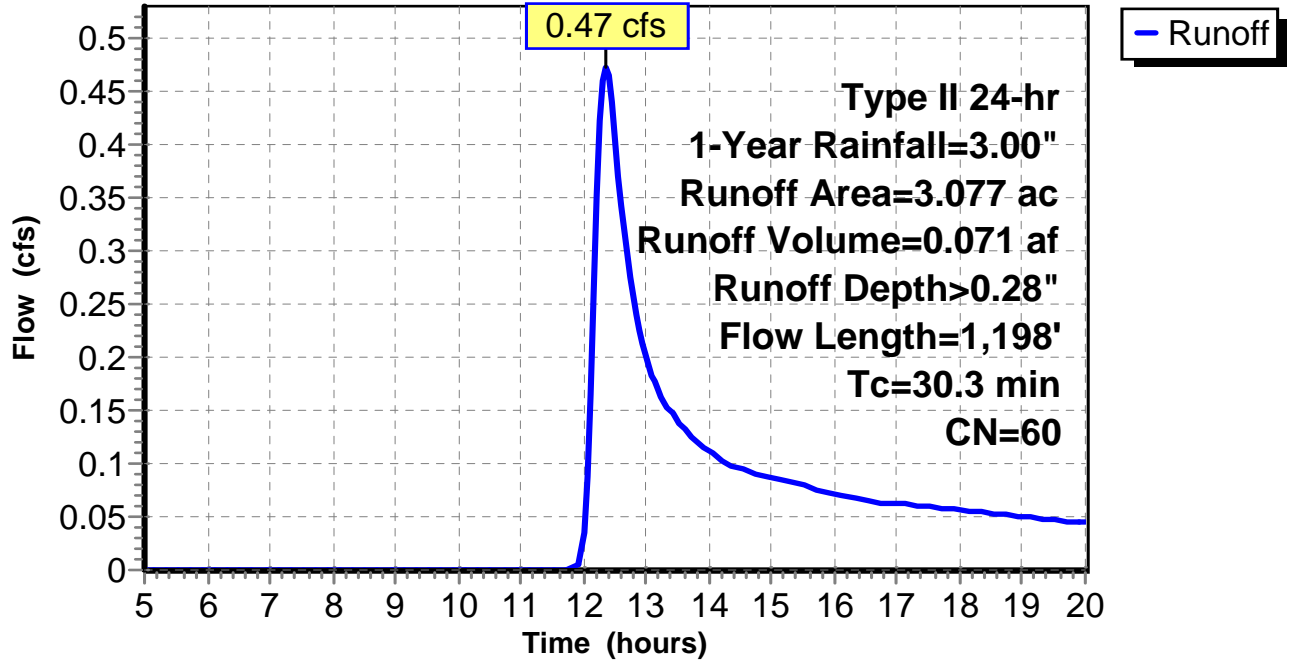
Subcatchment 6: C AR-501.006

Hydrograph



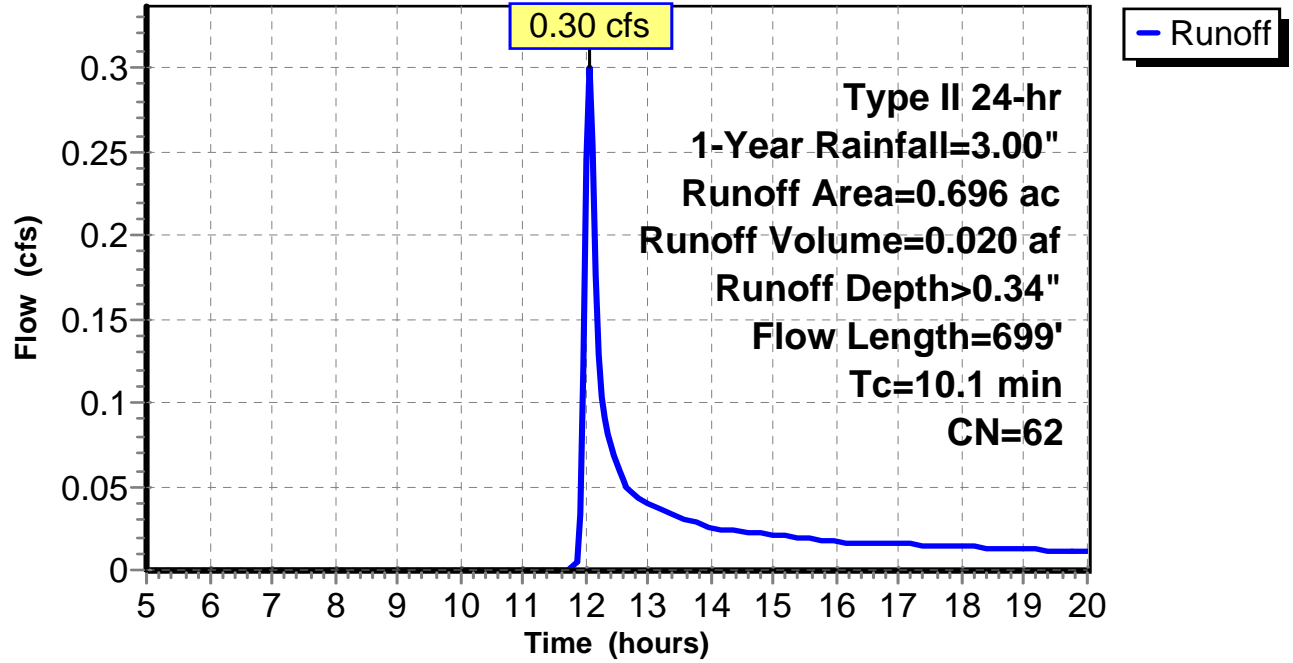
Subcatchment 7: C AR-501.007

Hydrograph



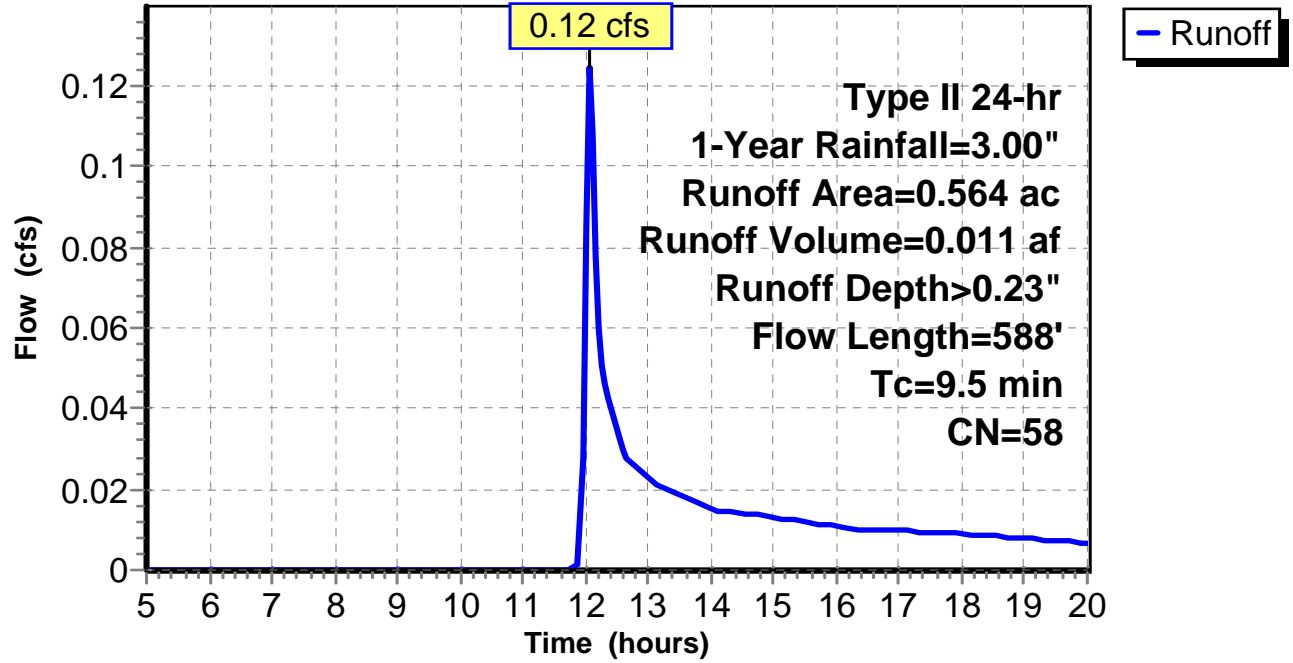
Subcatchment 8: C AR-501.008

Hydrograph



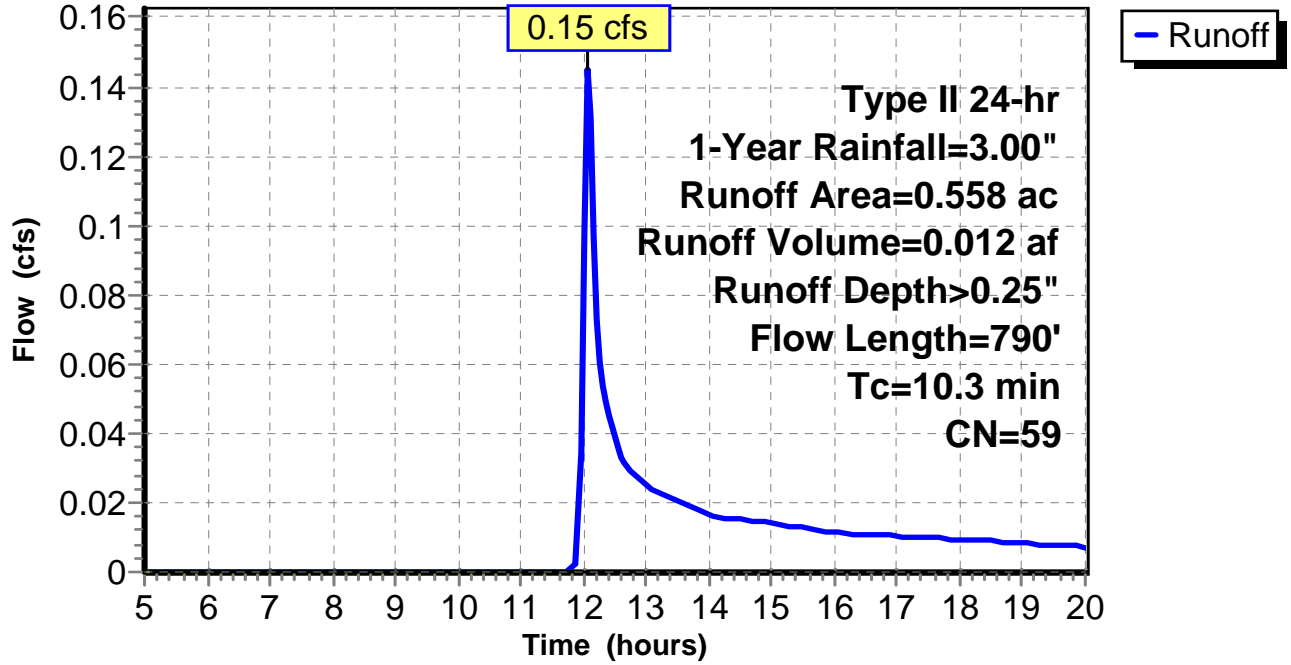
Subcatchment 9: C AR-501.009

Hydrograph



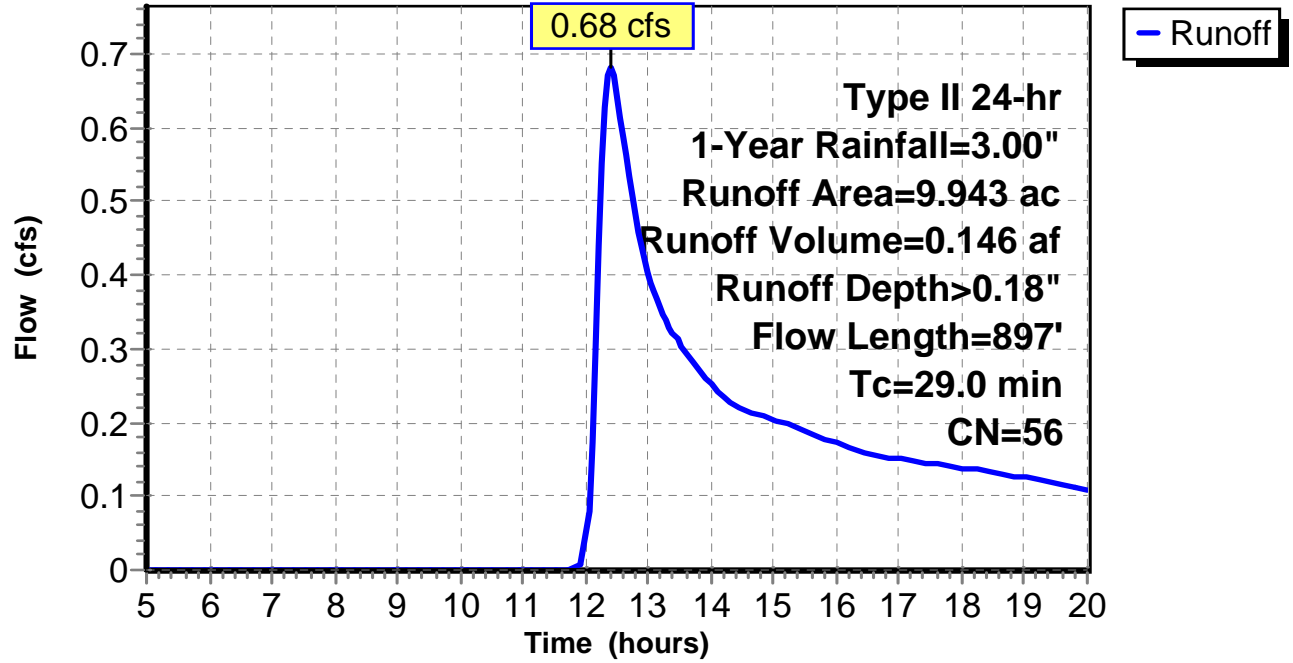
Subcatchment 10: C AR-501.010

Hydrograph



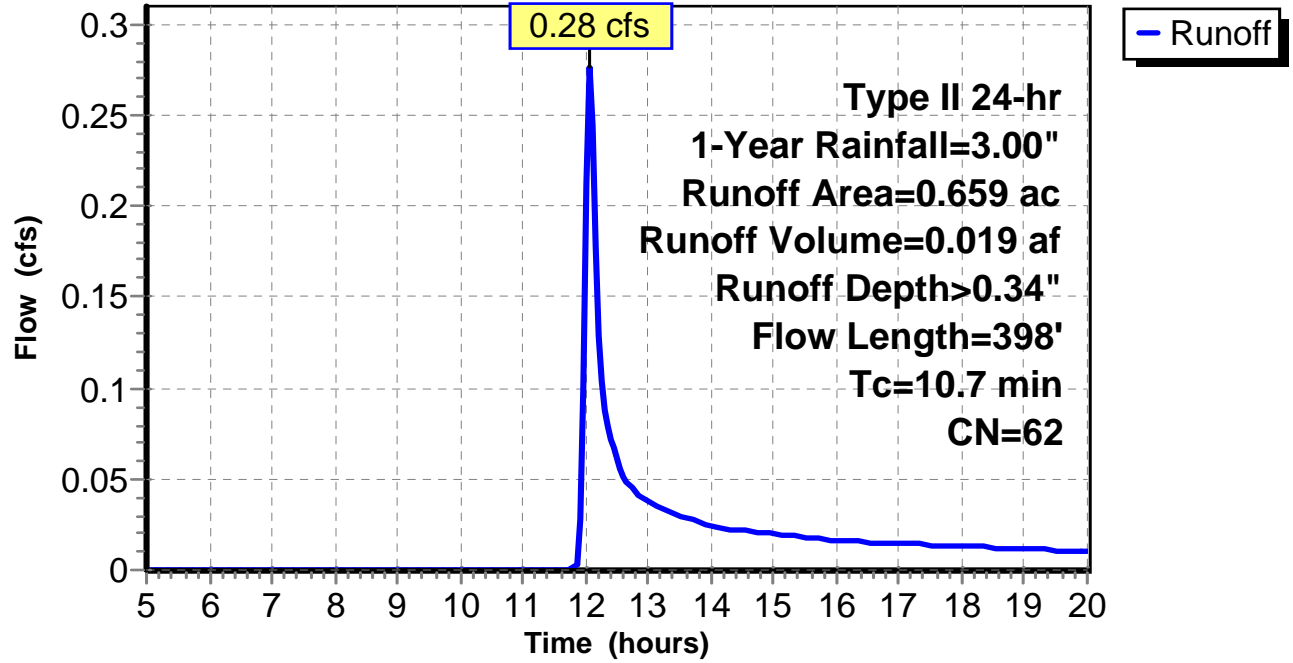
Subcatchment 11: C AR-501.011

Hydrograph



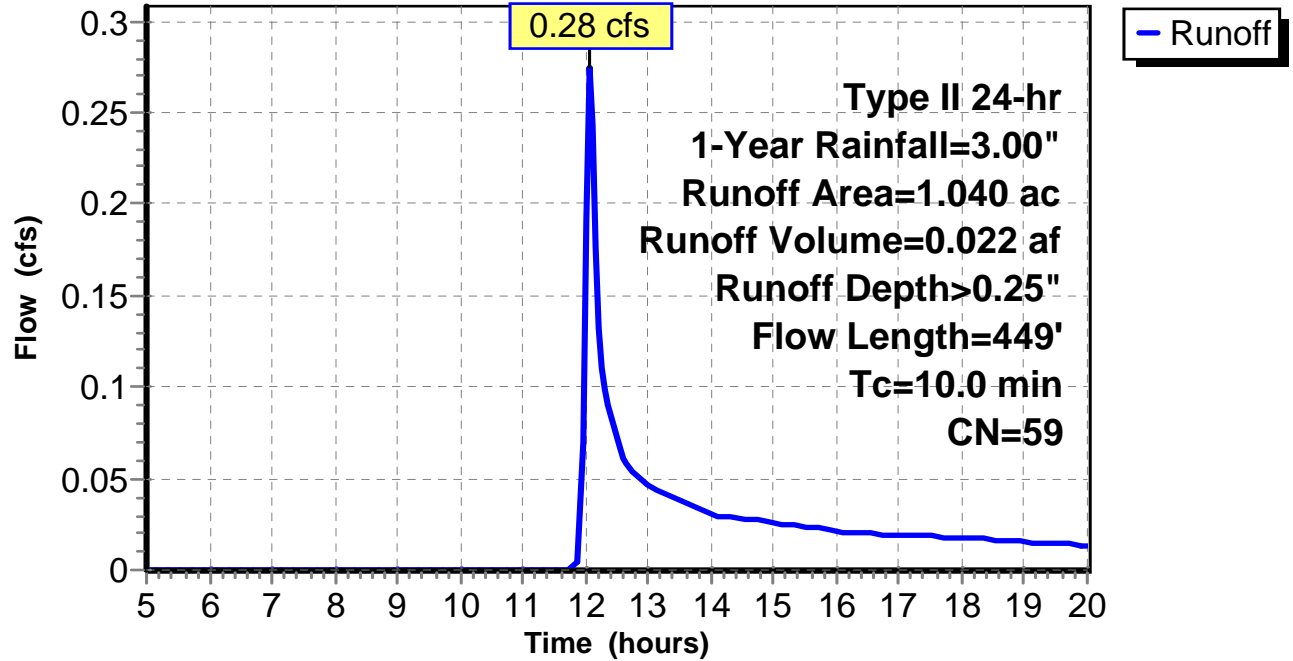
Subcatchment 12: C AR-501.012

Hydrograph



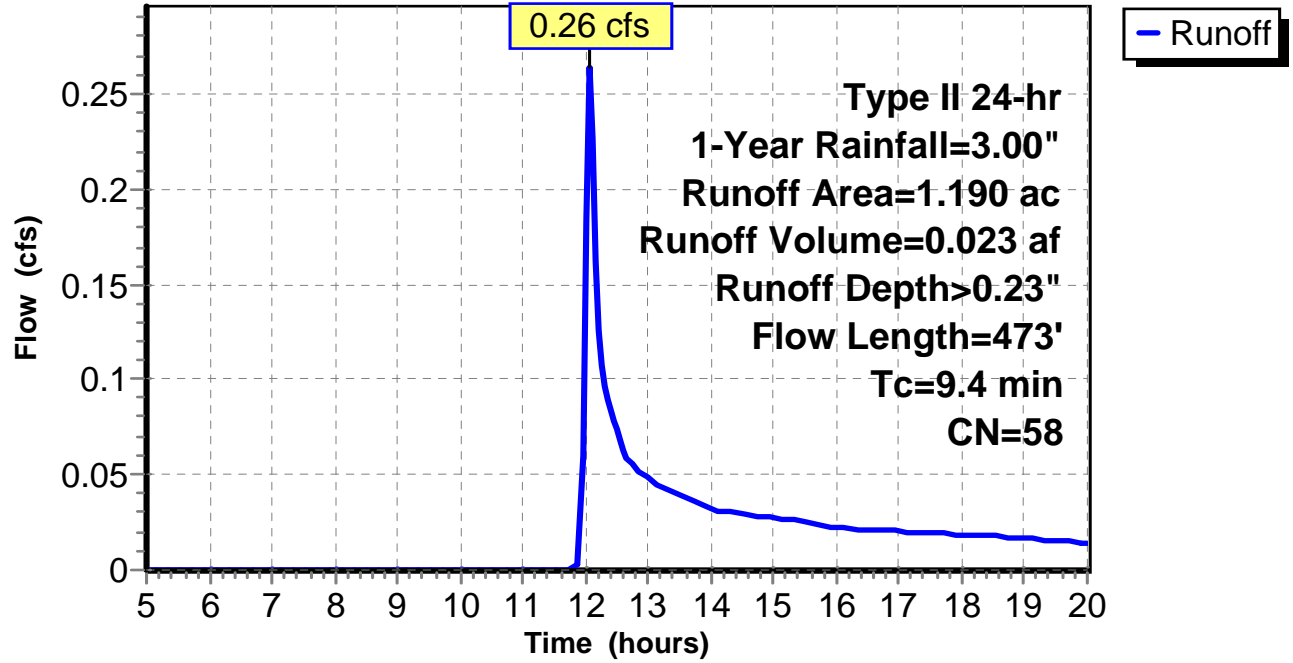
Subcatchment 13: C AR-501.013

Hydrograph



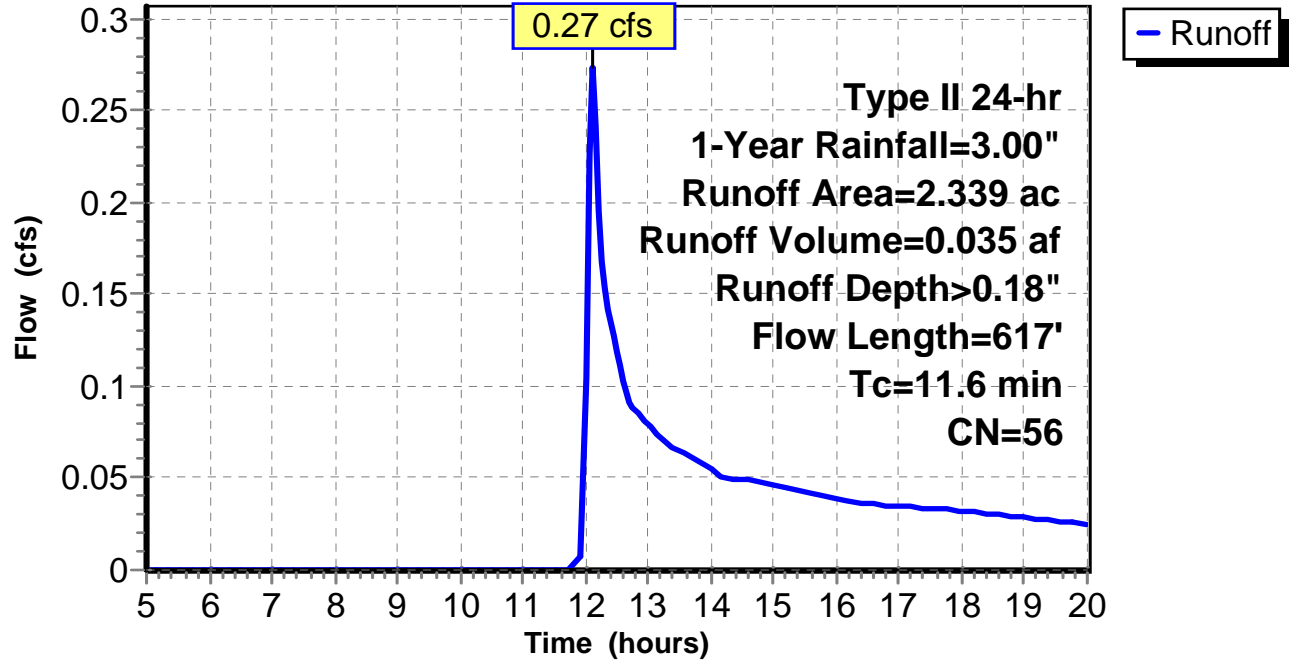
Subcatchment 14: C 161.004

Hydrograph



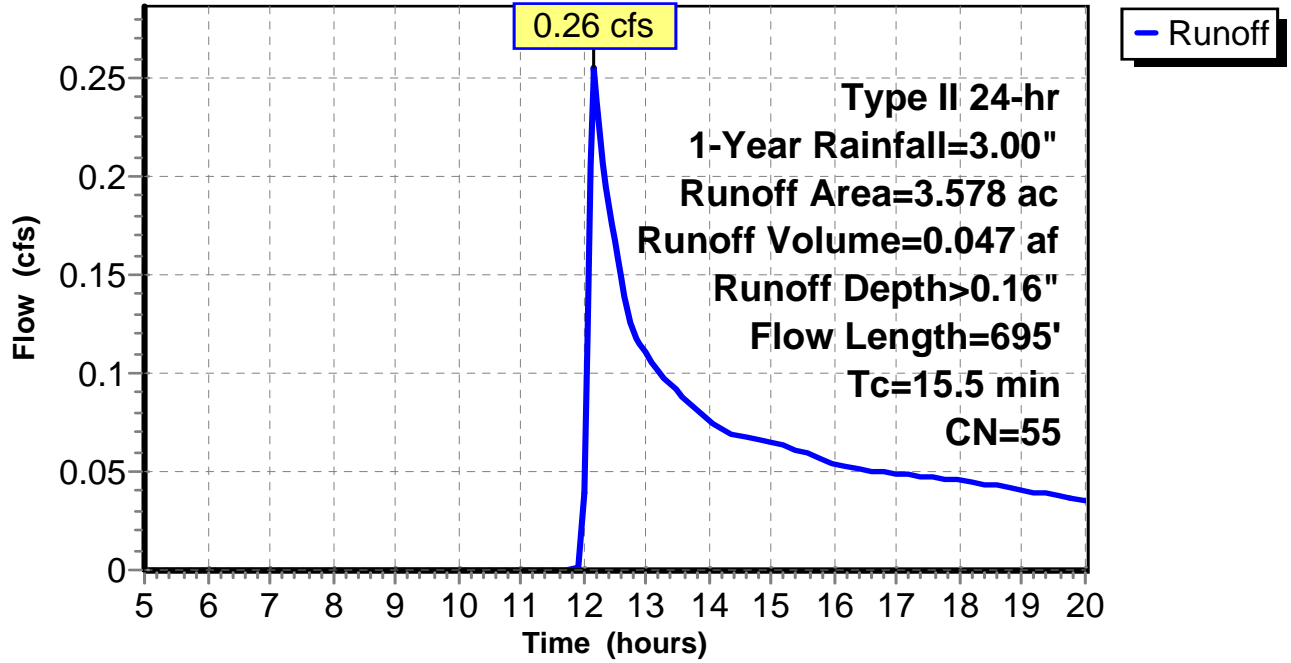
Subcatchment 15: C 161.005

Hydrograph



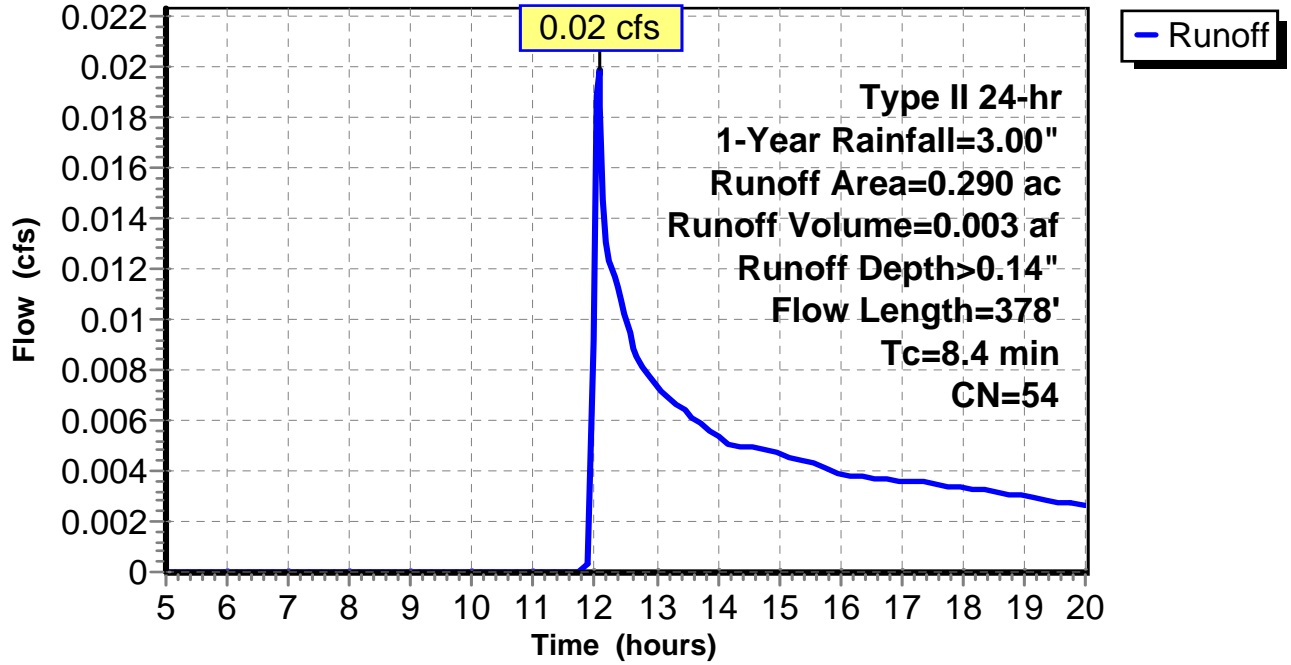
Subcatchment 16: C 161.006

Hydrograph



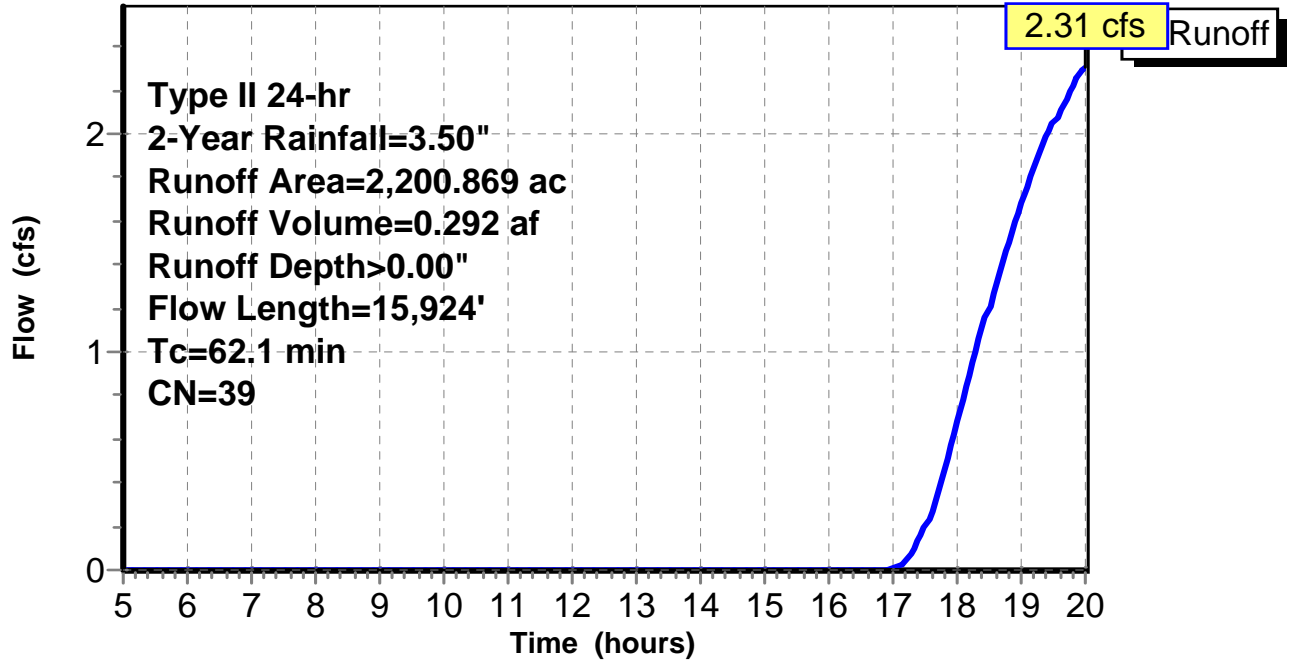
Subcatchment 17: C 161.007

Hydrograph



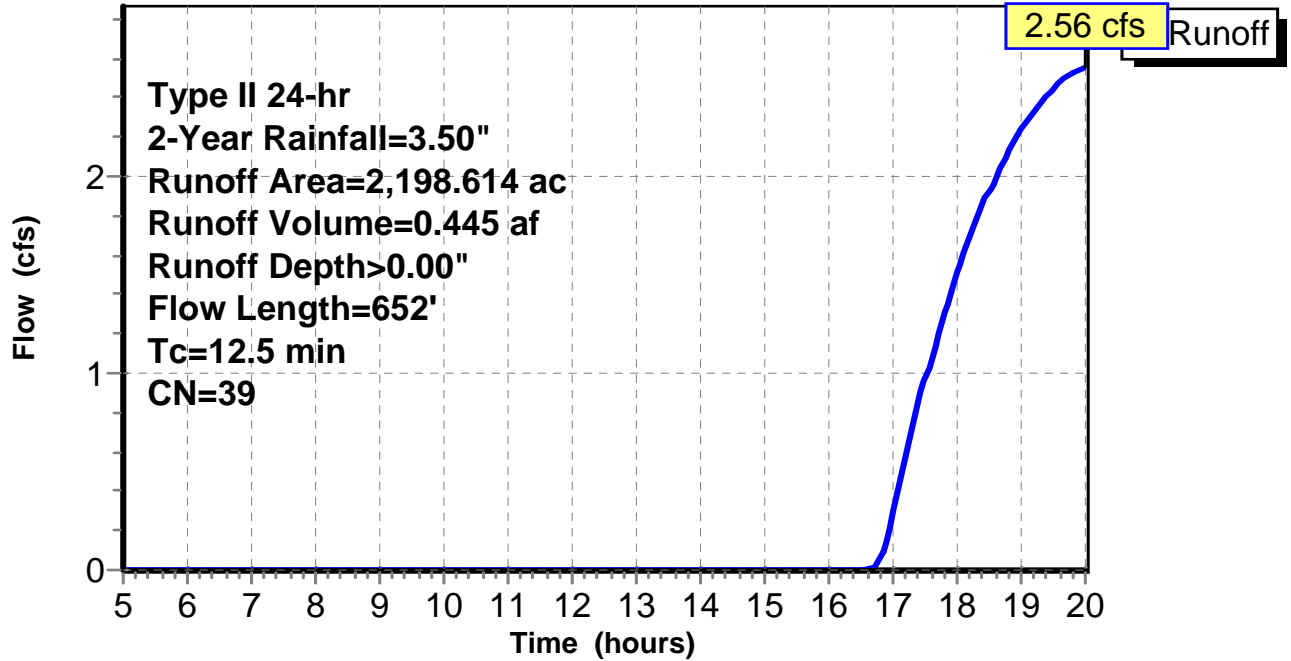
Subcatchment 1: C AR-501.001

Hydrograph



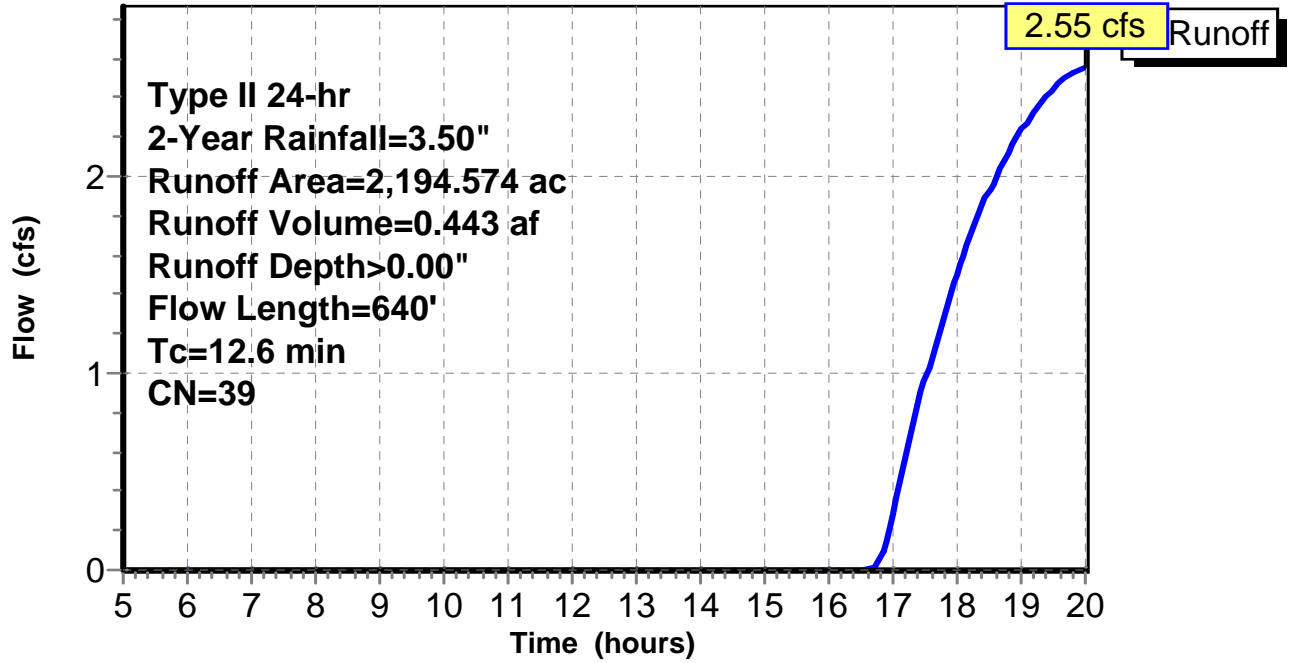
Subcatchment 2: C AR-501.002

Hydrograph



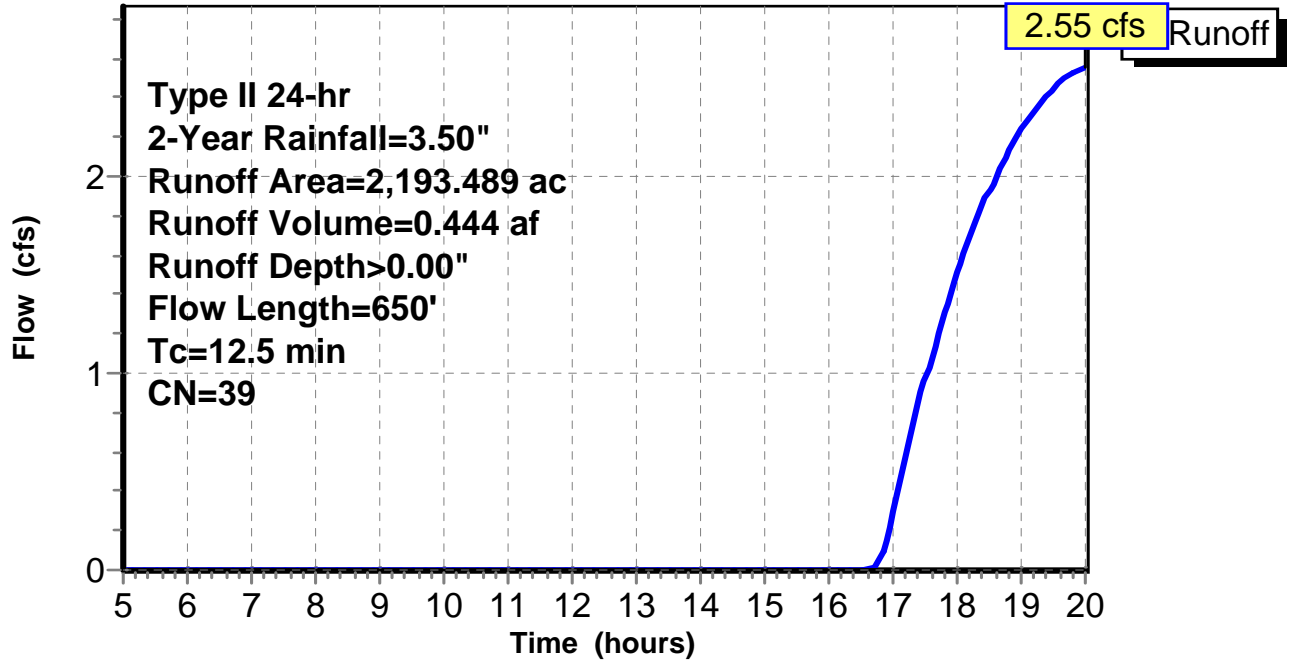
Subcatchment 3: C AR-501.003

Hydrograph



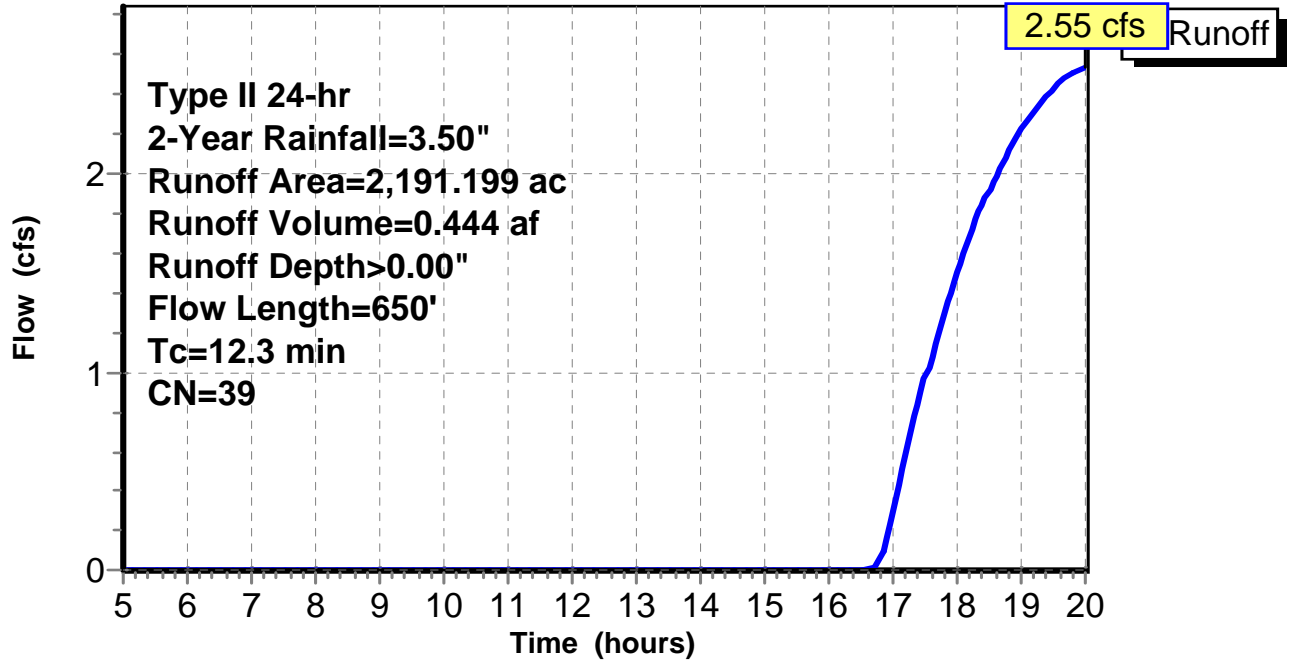
Subcatchment 4: C AR-501.004

Hydrograph



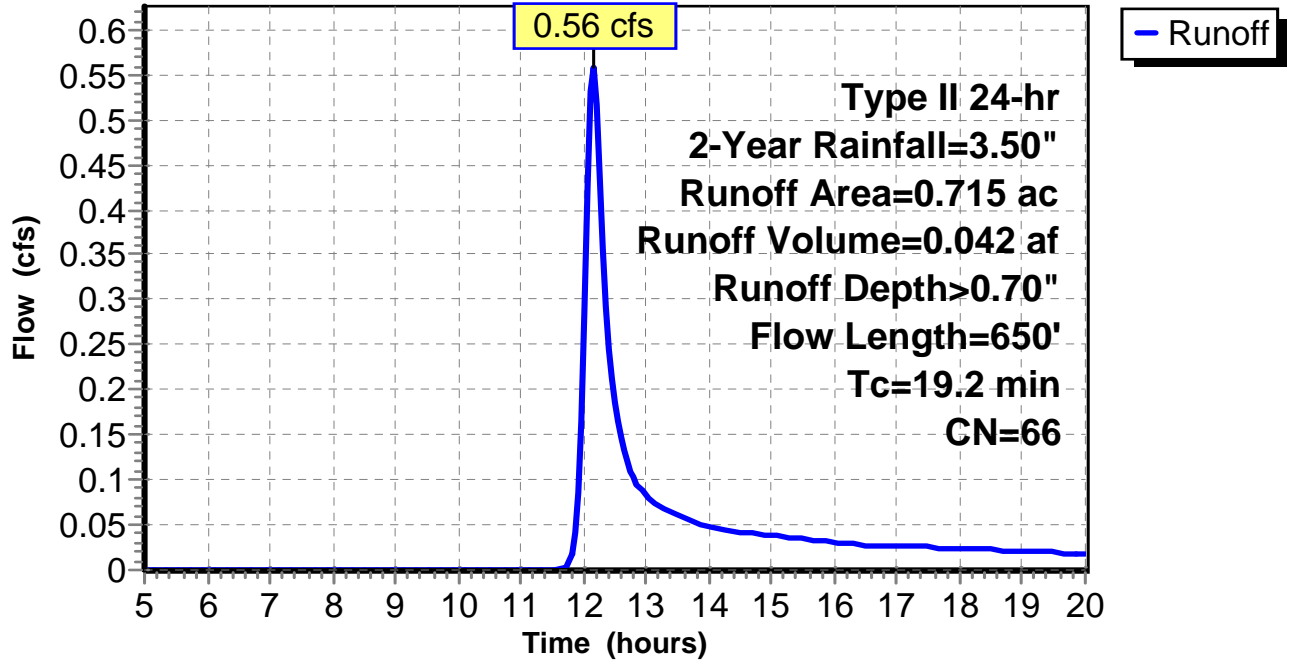
Subcatchment 5: C AR-501.005

Hydrograph



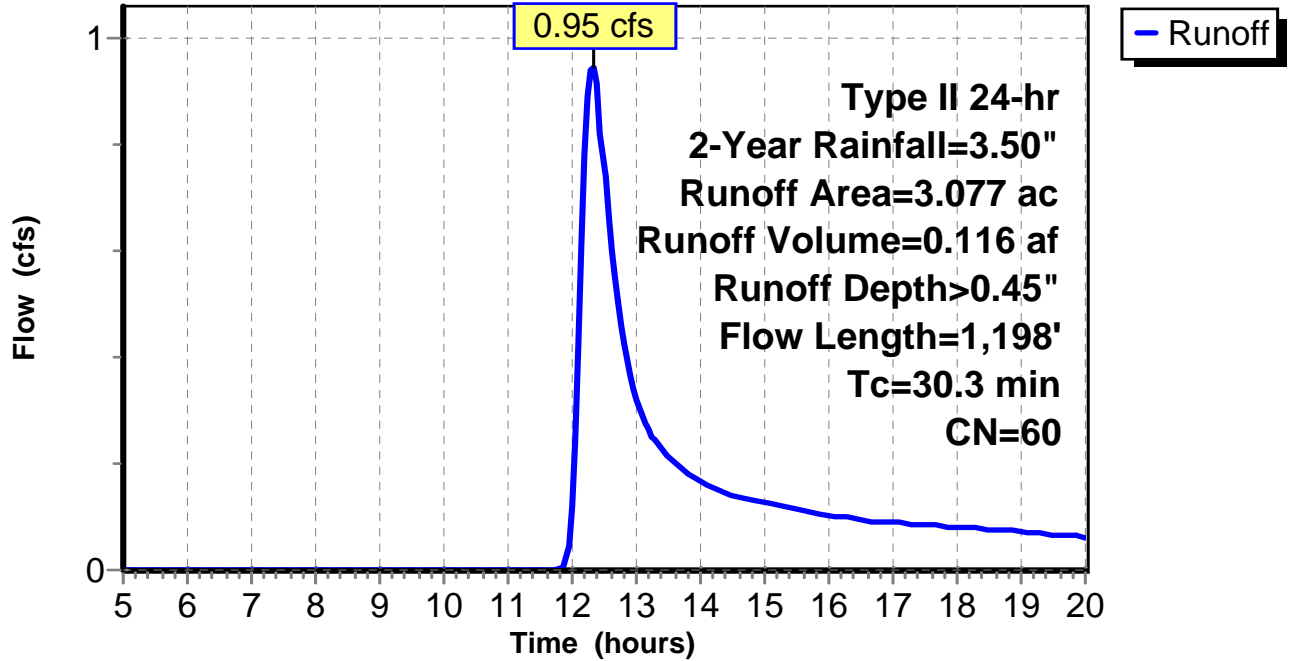
Subcatchment 6: C AR-501.006

Hydrograph



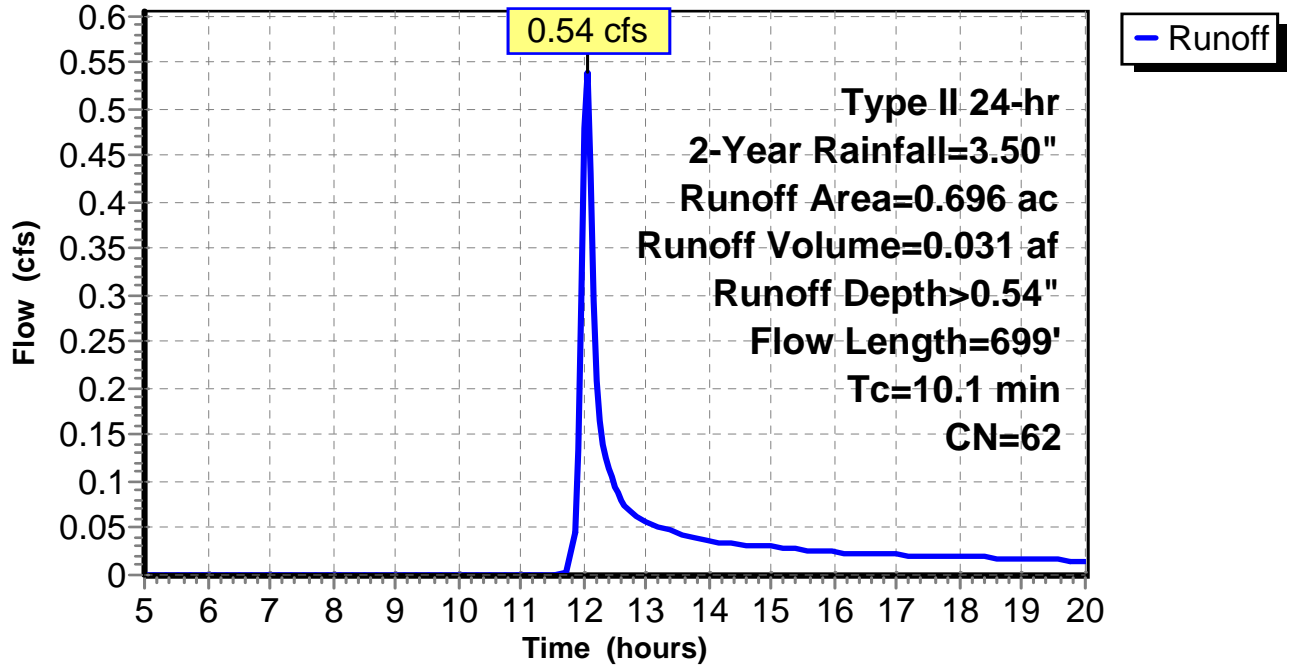
Subcatchment 7: C AR-501.007

Hydrograph



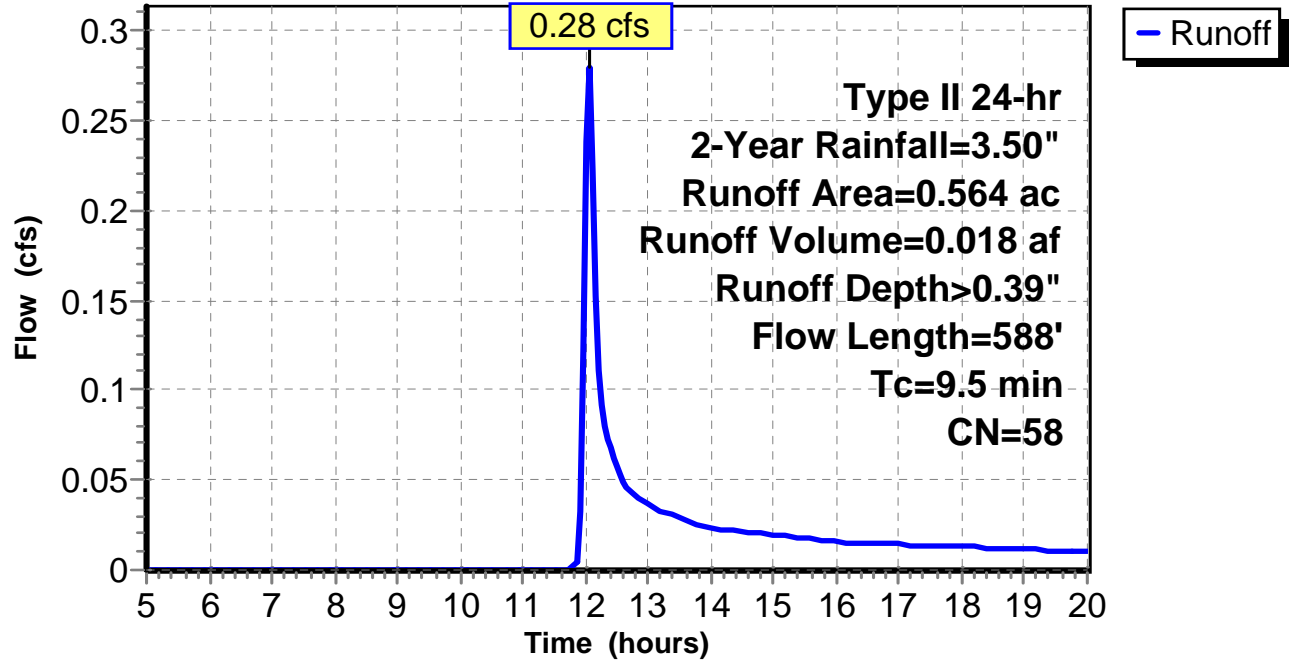
Subcatchment 8: C AR-501.008

Hydrograph



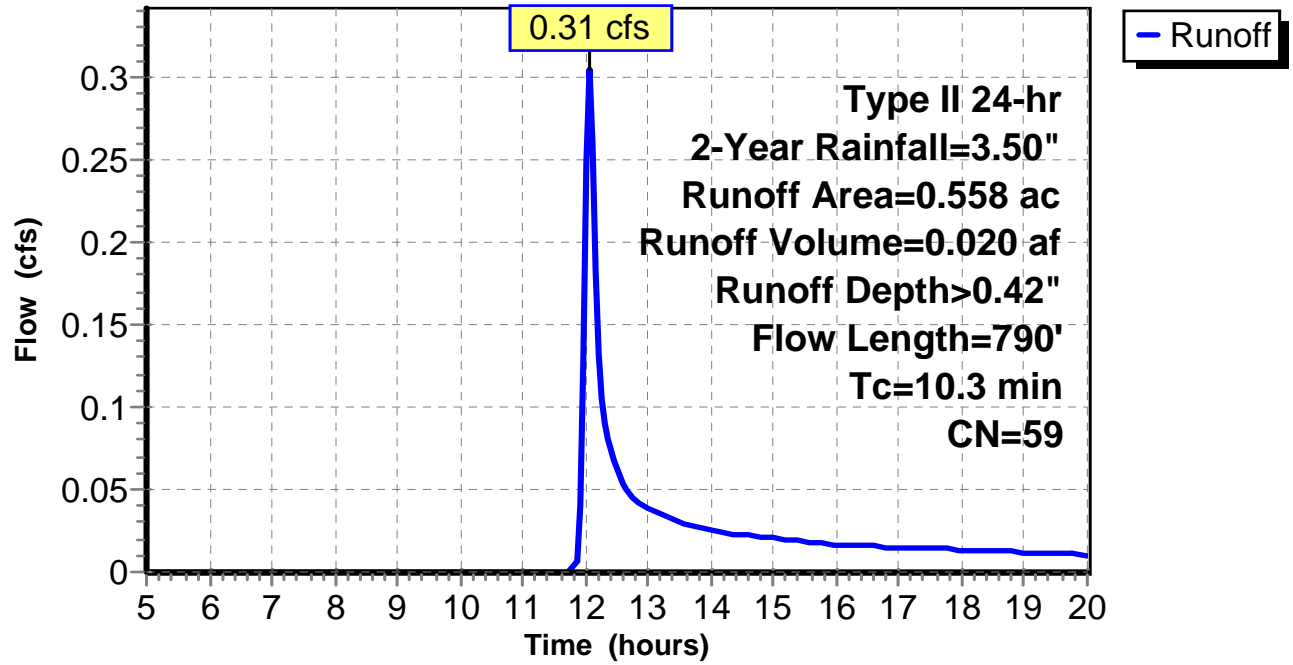
Subcatchment 9: C AR-501.009

Hydrograph



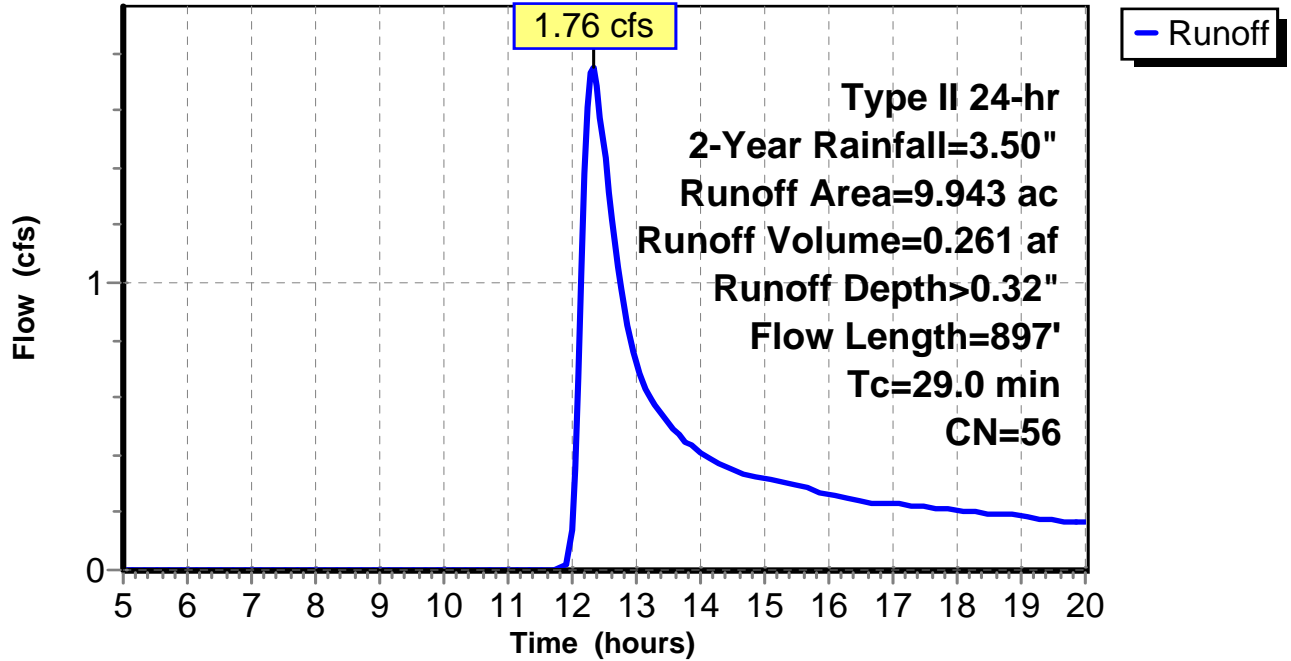
Subcatchment 10: C AR-501.010

Hydrograph



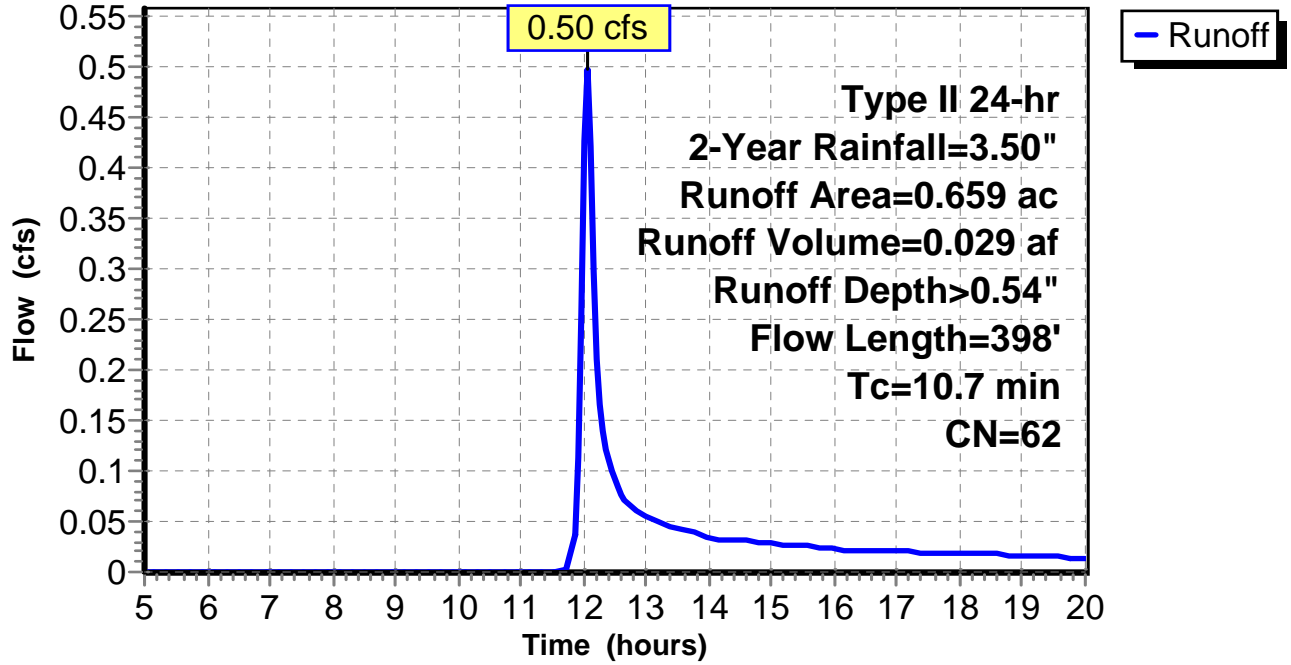
Subcatchment 11: C AR-501.011

Hydrograph



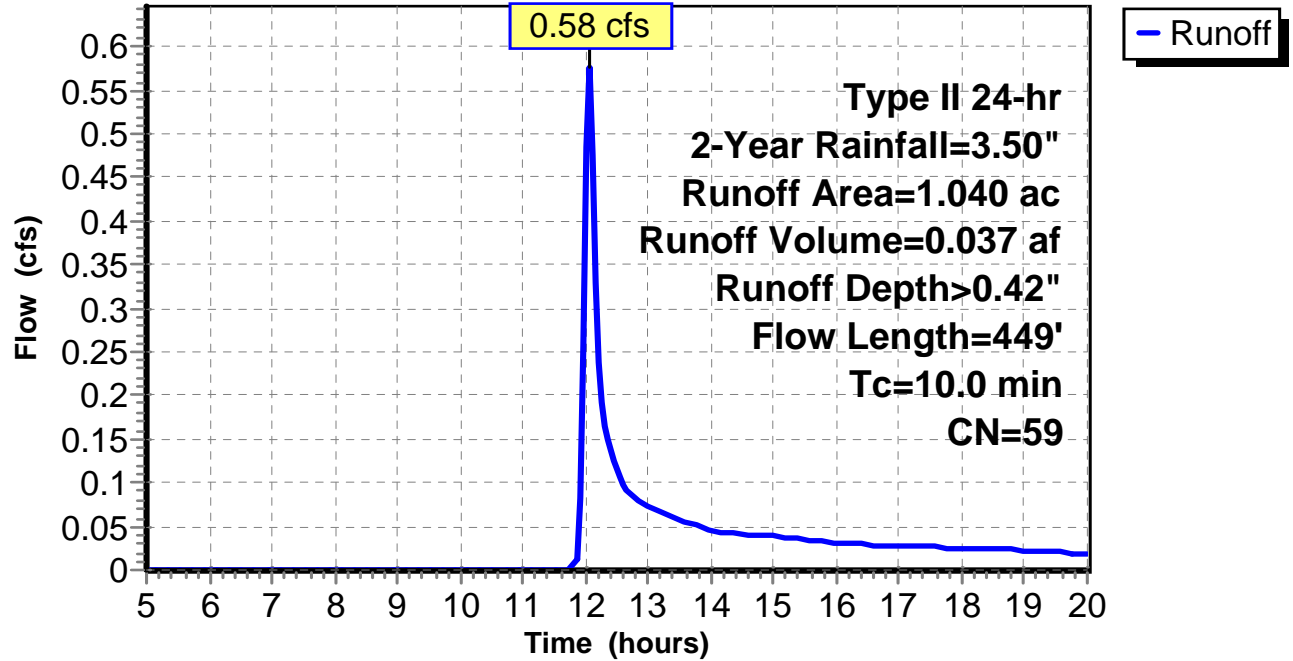
Subcatchment 12: C AR-501.012

Hydrograph



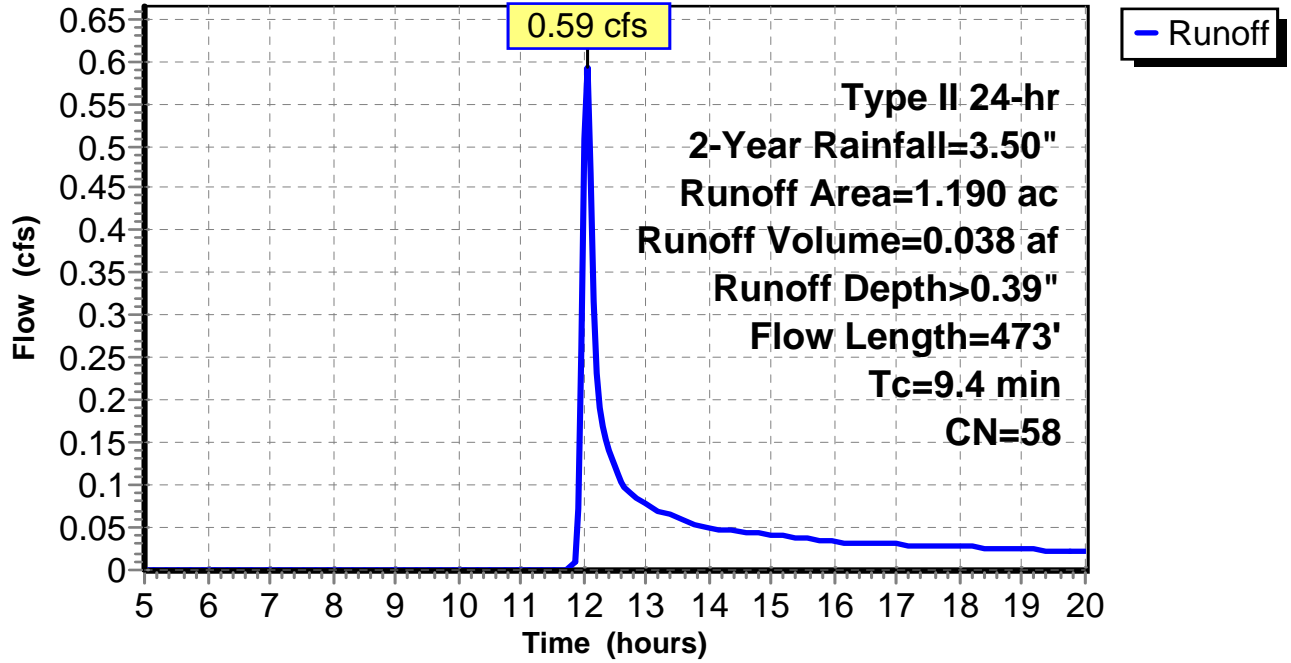
Subcatchment 13: C AR-501.013

Hydrograph



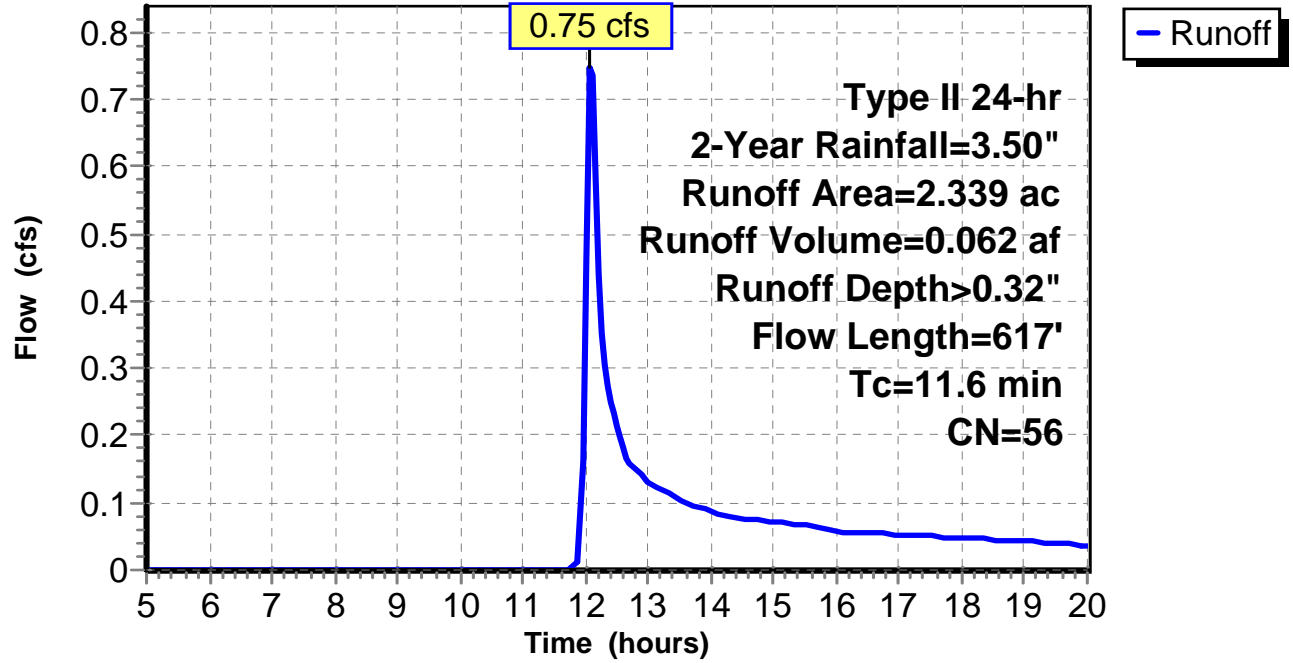
Subcatchment 14: C 161.004

Hydrograph



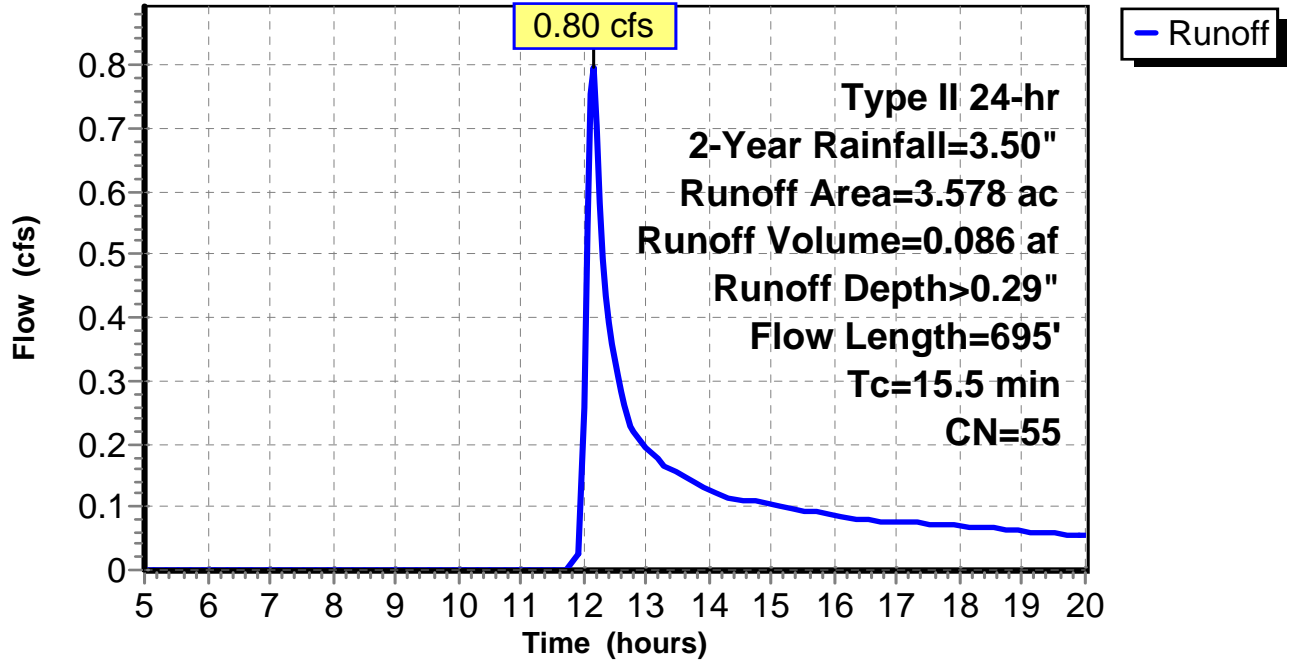
Subcatchment 15: C 161.005

Hydrograph



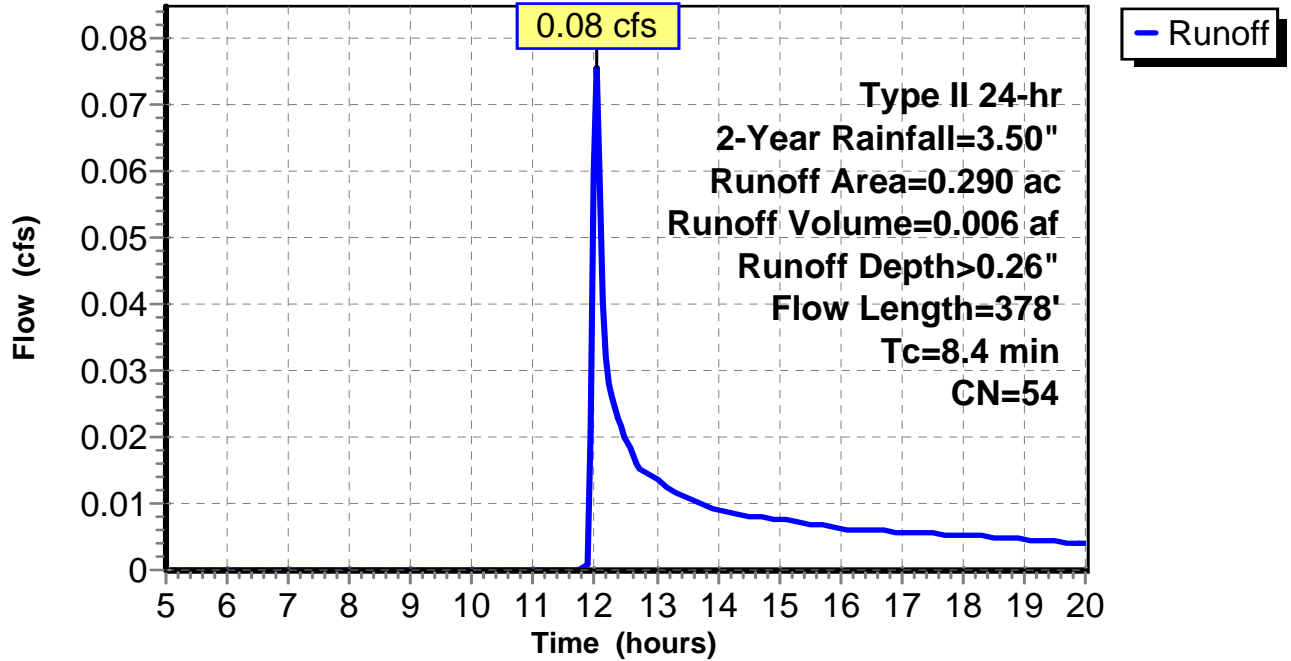
Subcatchment 16: C 161.006

Hydrograph



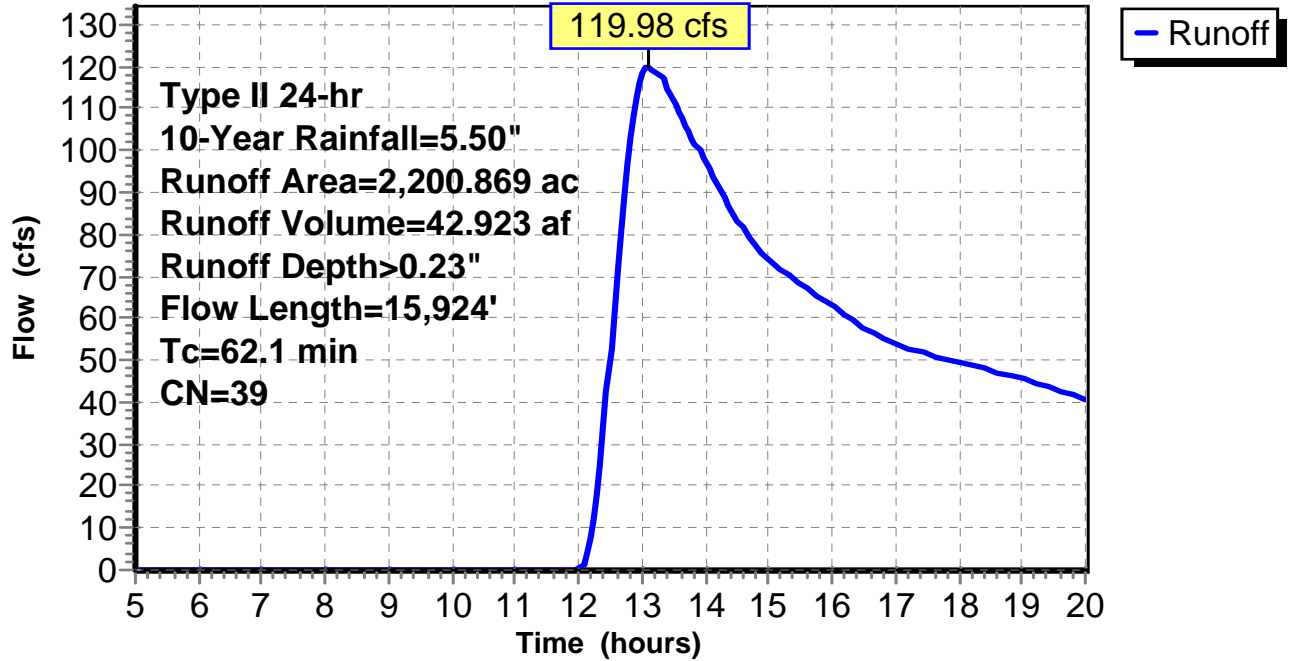
Subcatchment 17: C 161.007

Hydrograph



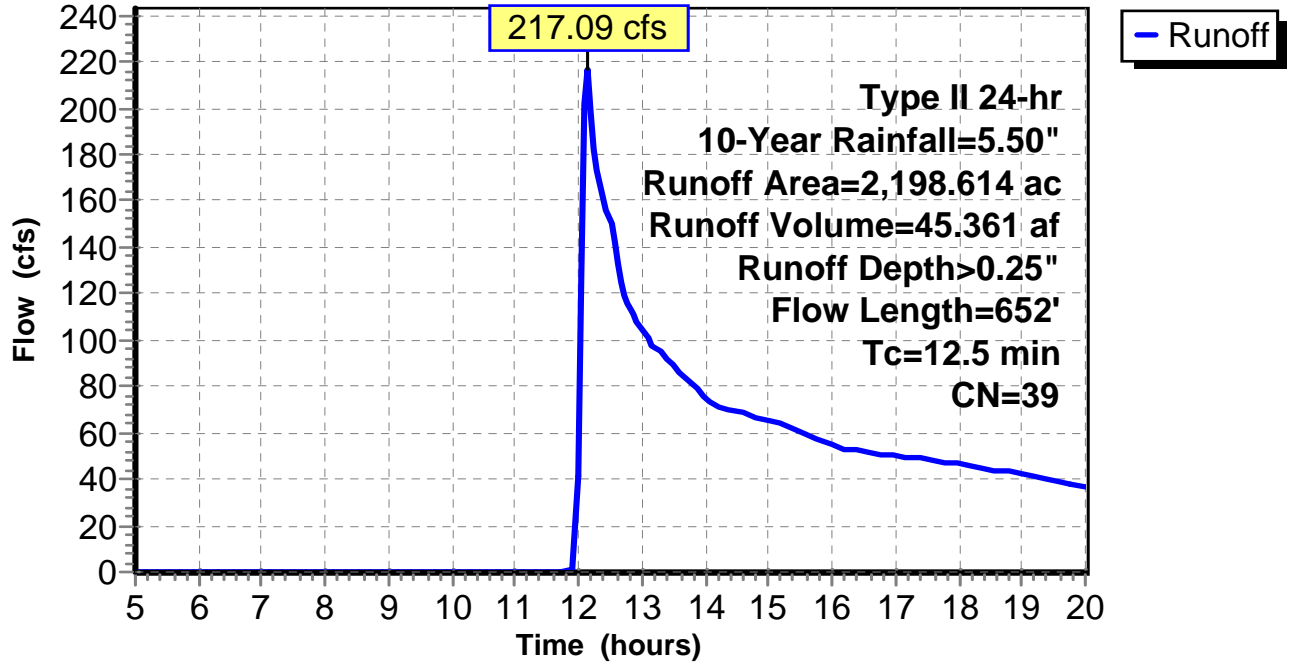
Subcatchment 1: C AR-501.001

Hydrograph



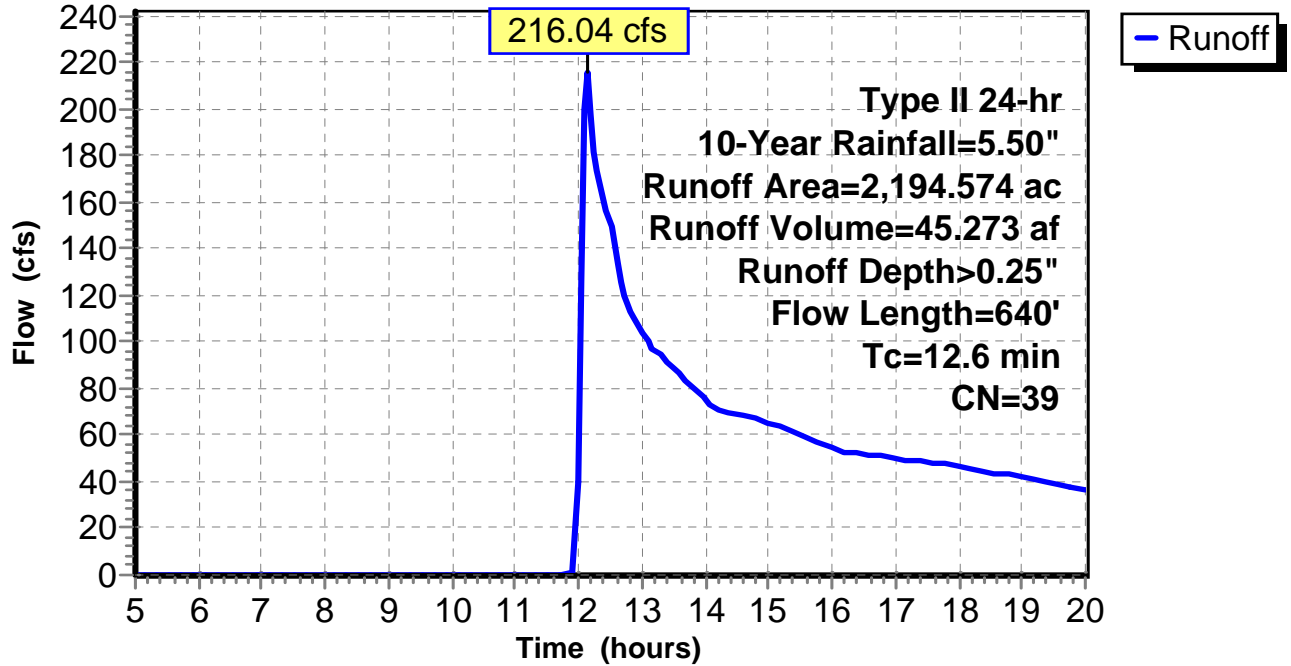
Subcatchment 2: C AR-501.002

Hydrograph



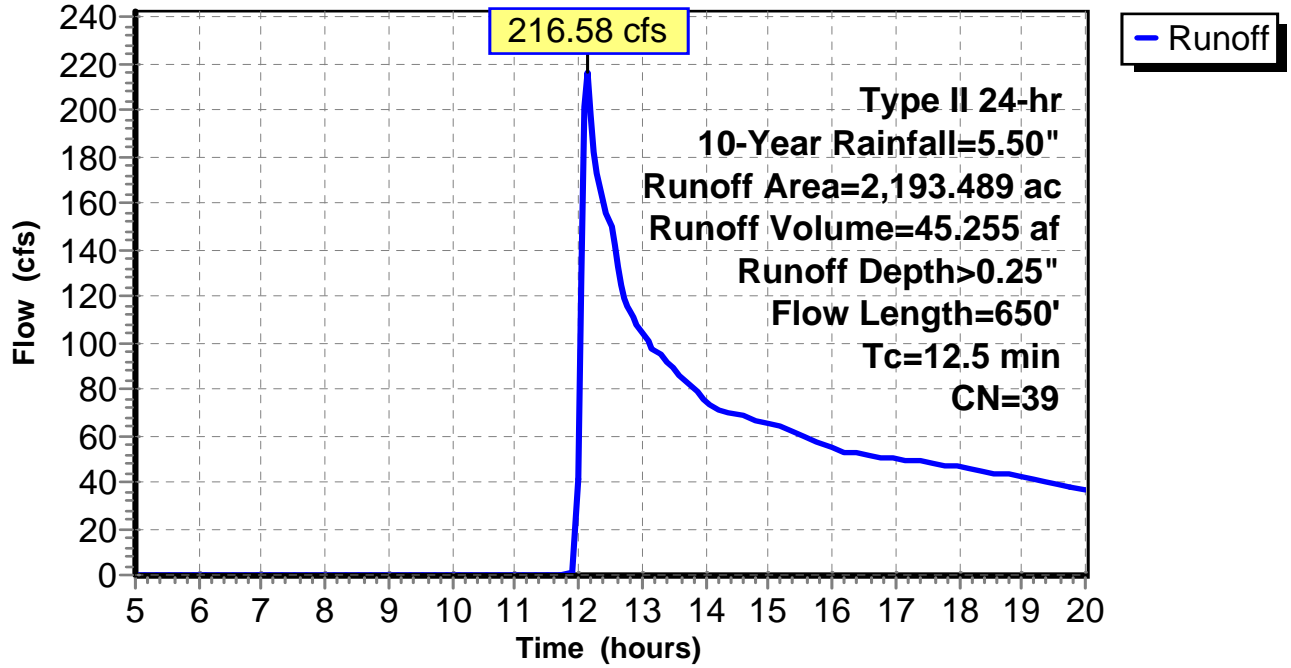
Subcatchment 3: C AR-501.003

Hydrograph



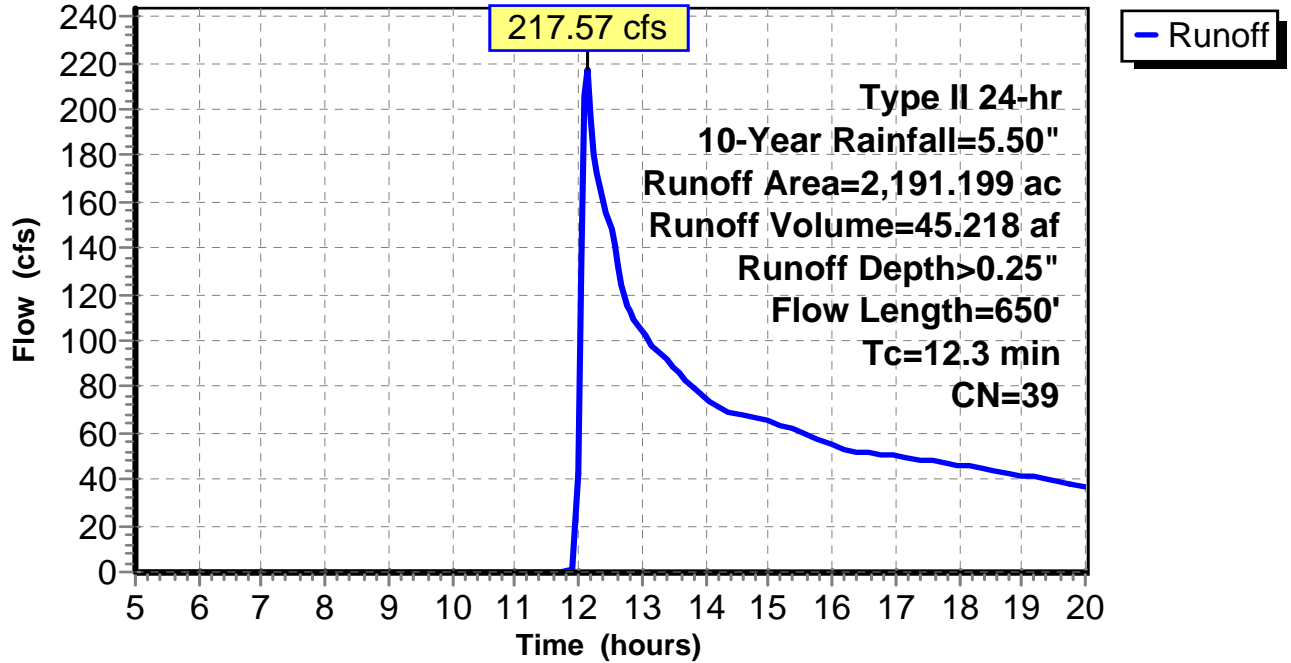
Subcatchment 4: C AR-501.004

Hydrograph



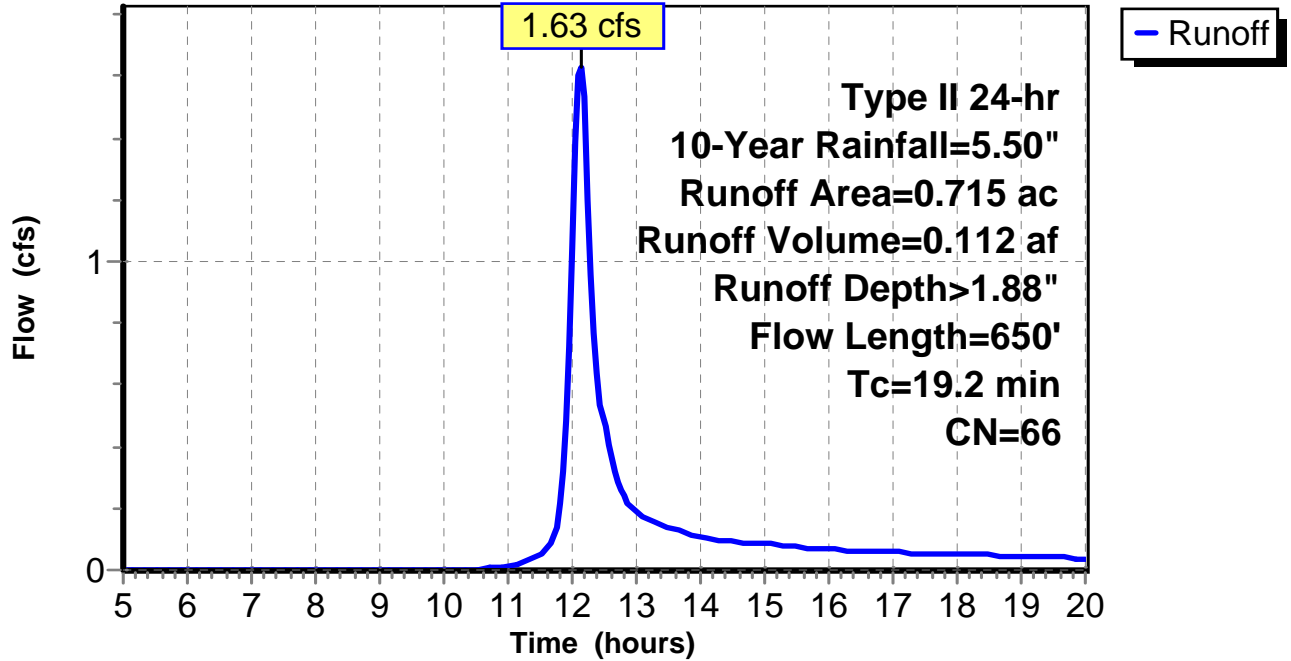
Subcatchment 5: C AR-501.005

Hydrograph



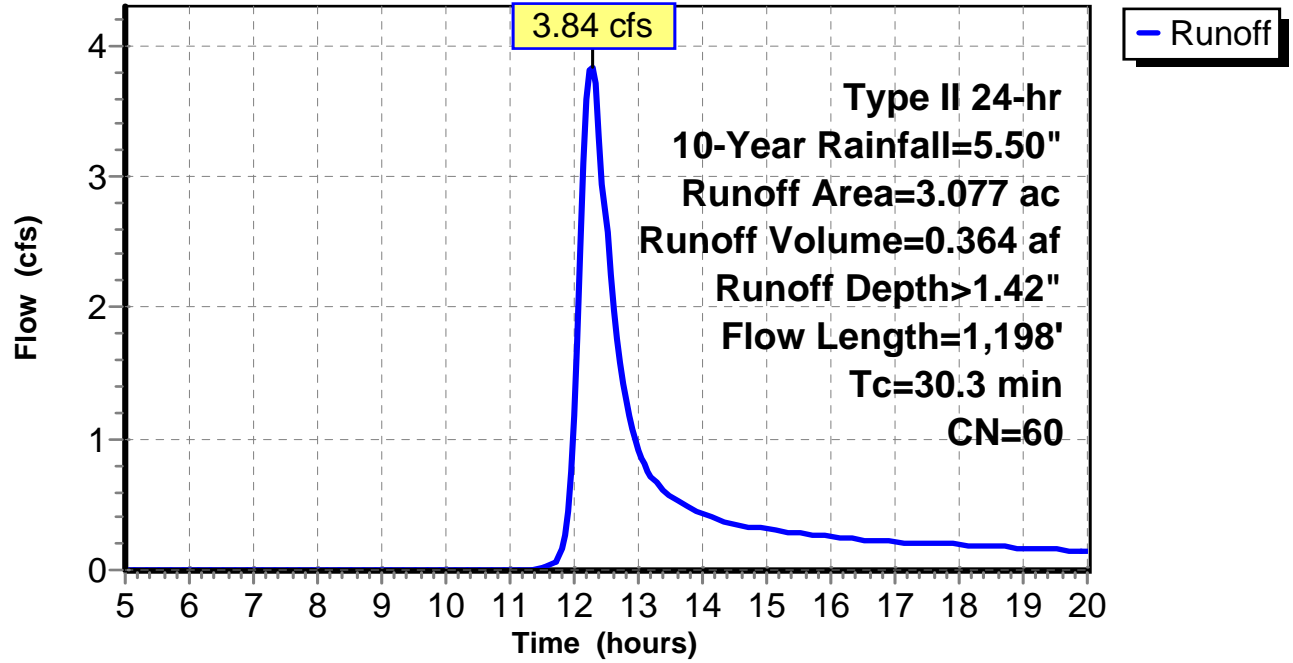
Subcatchment 6: C AR-501.006

Hydrograph



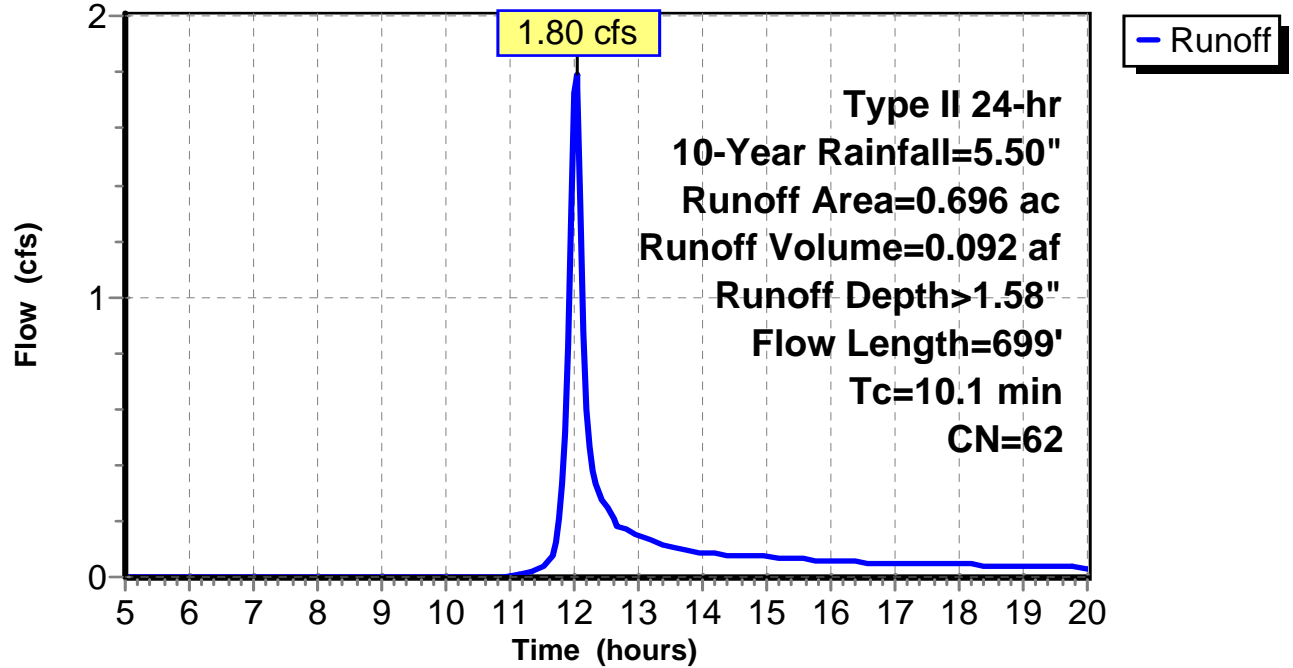
Subcatchment 7: C AR-501.007

Hydrograph



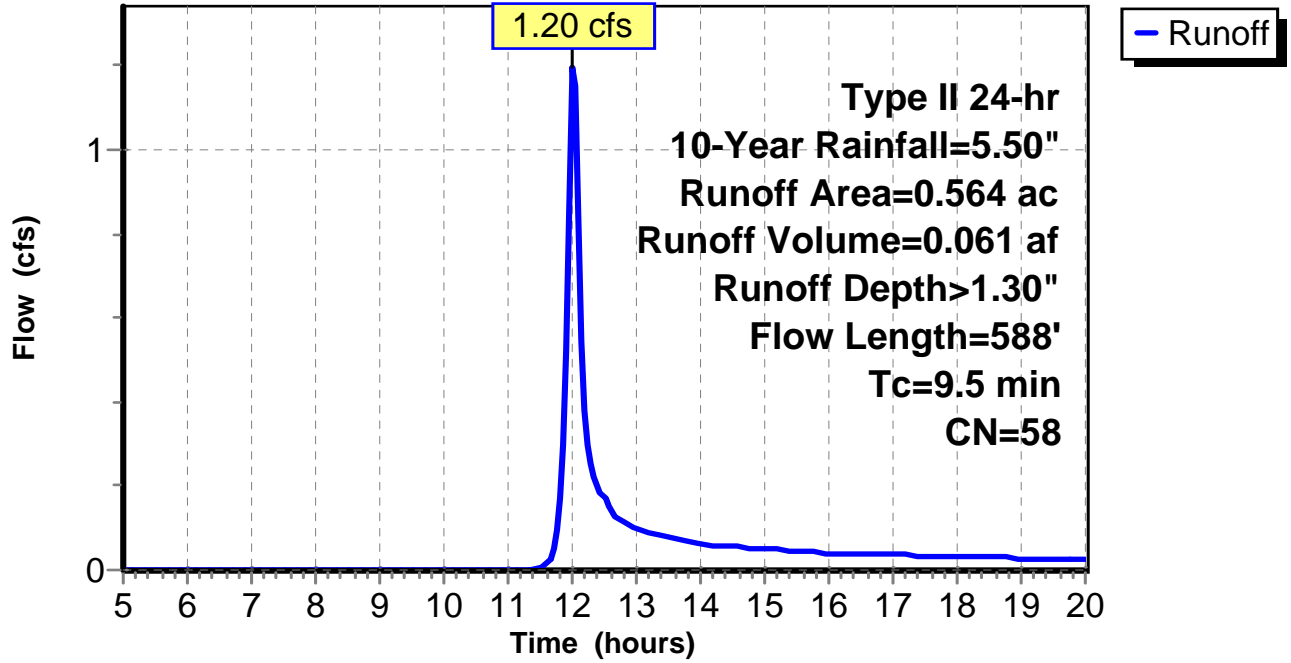
Subcatchment 8: C AR-501.008

Hydrograph



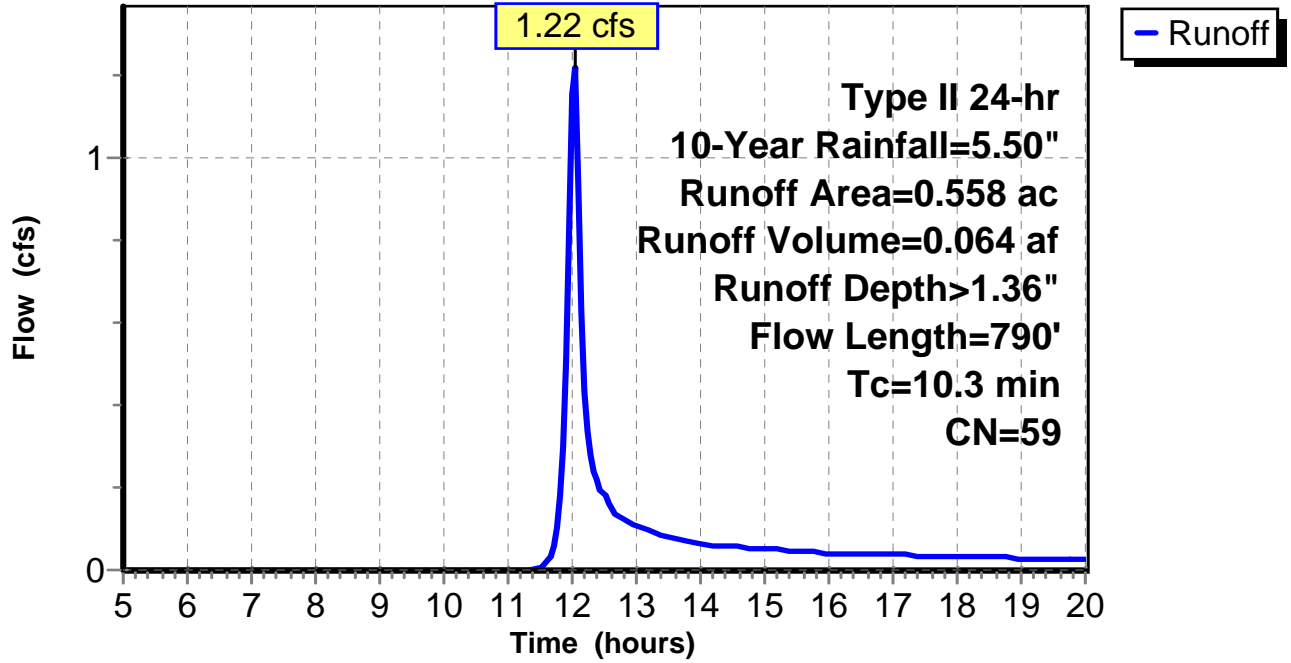
Subcatchment 9: C AR-501.009

Hydrograph



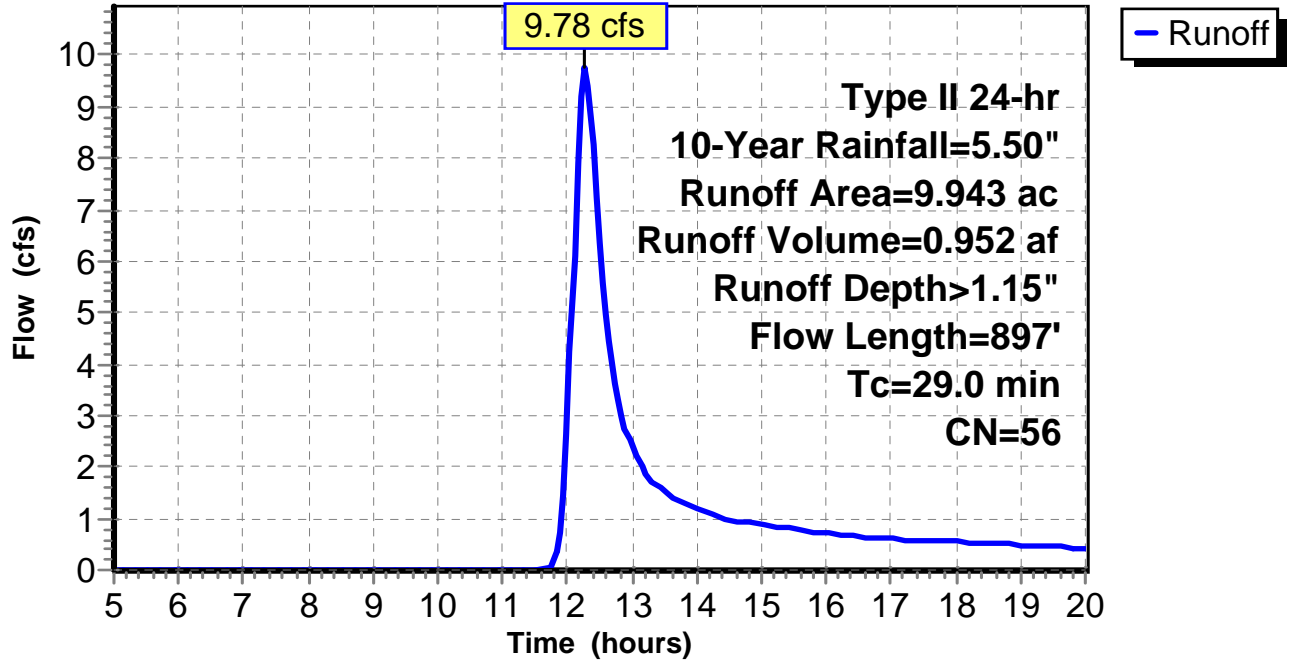
Subcatchment 10: C AR-501.010

Hydrograph



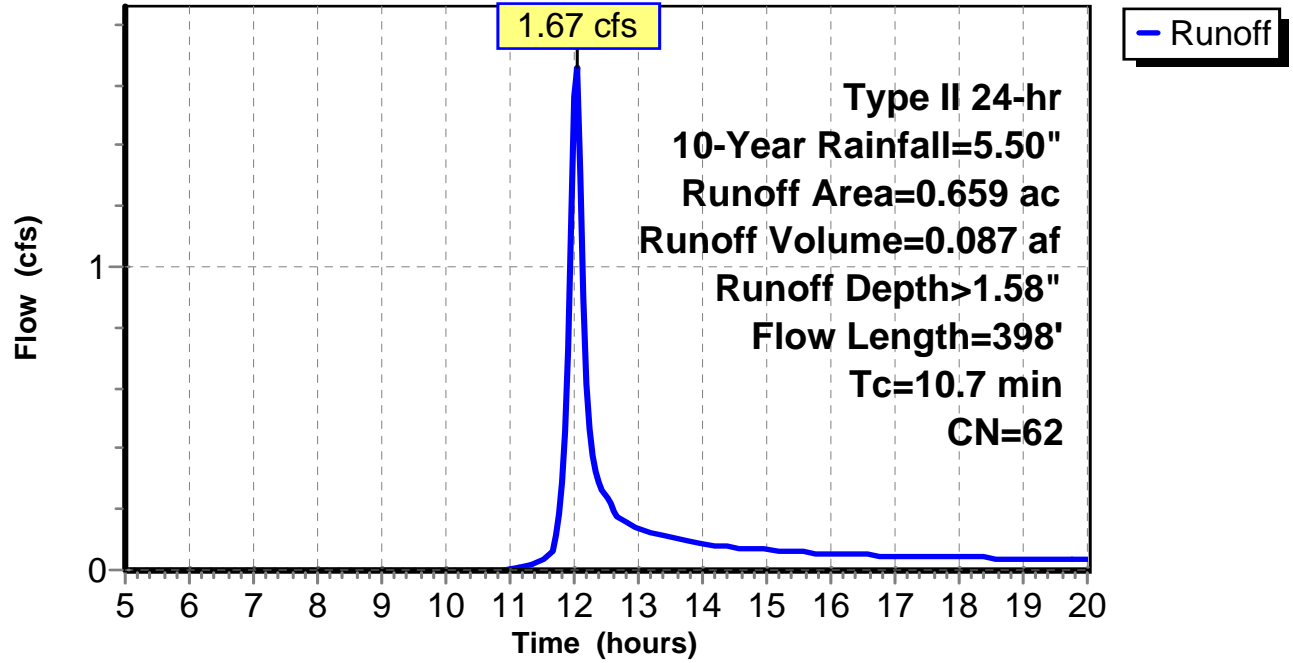
Subcatchment 11: C AR-501.011

Hydrograph



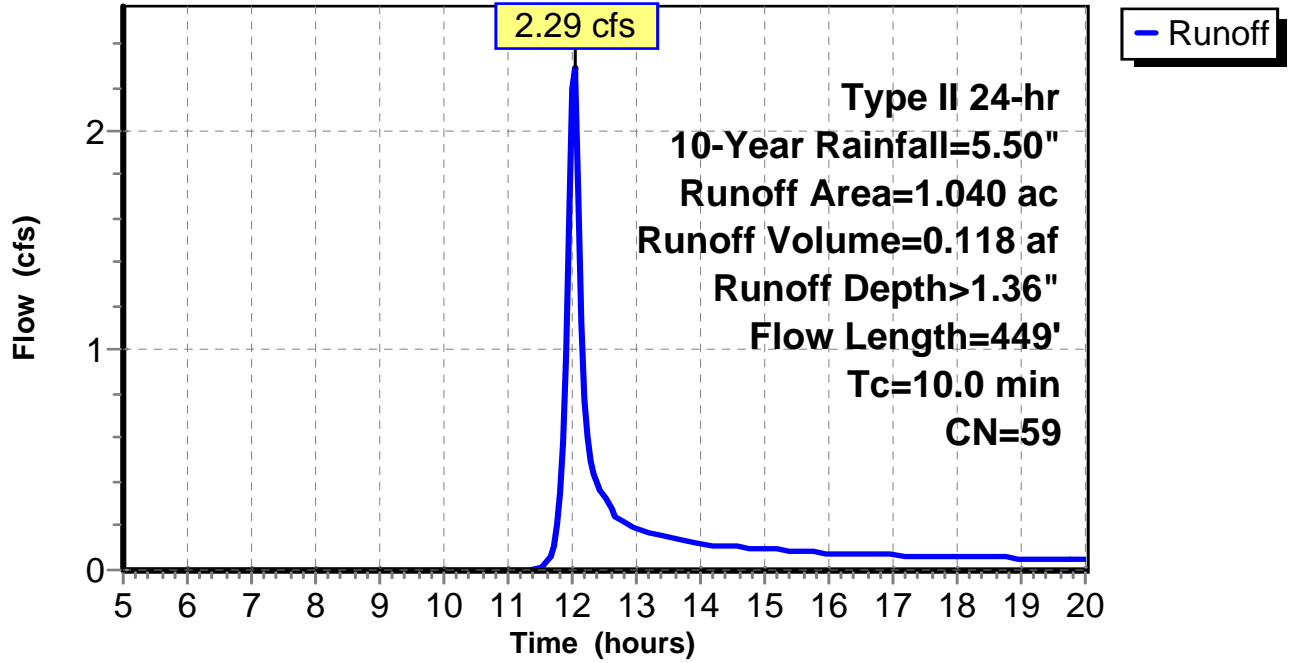
Subcatchment 12: C AR-501.012

Hydrograph



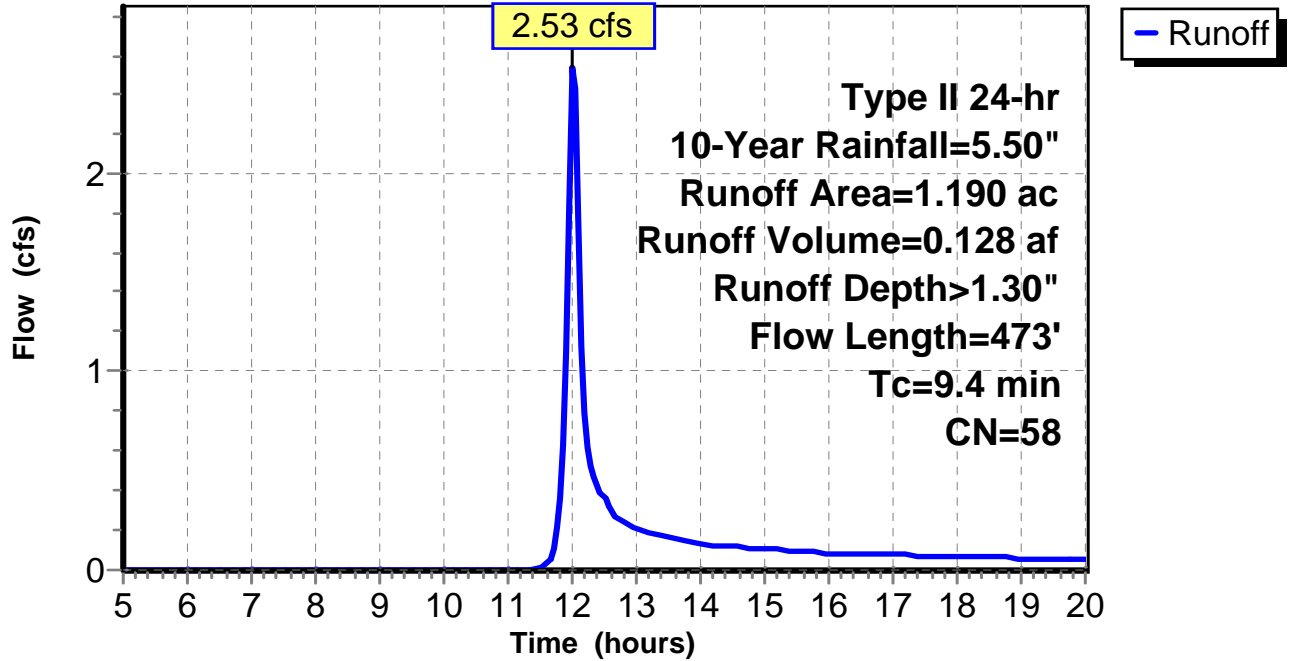
Subcatchment 13: C AR-501.013

Hydrograph



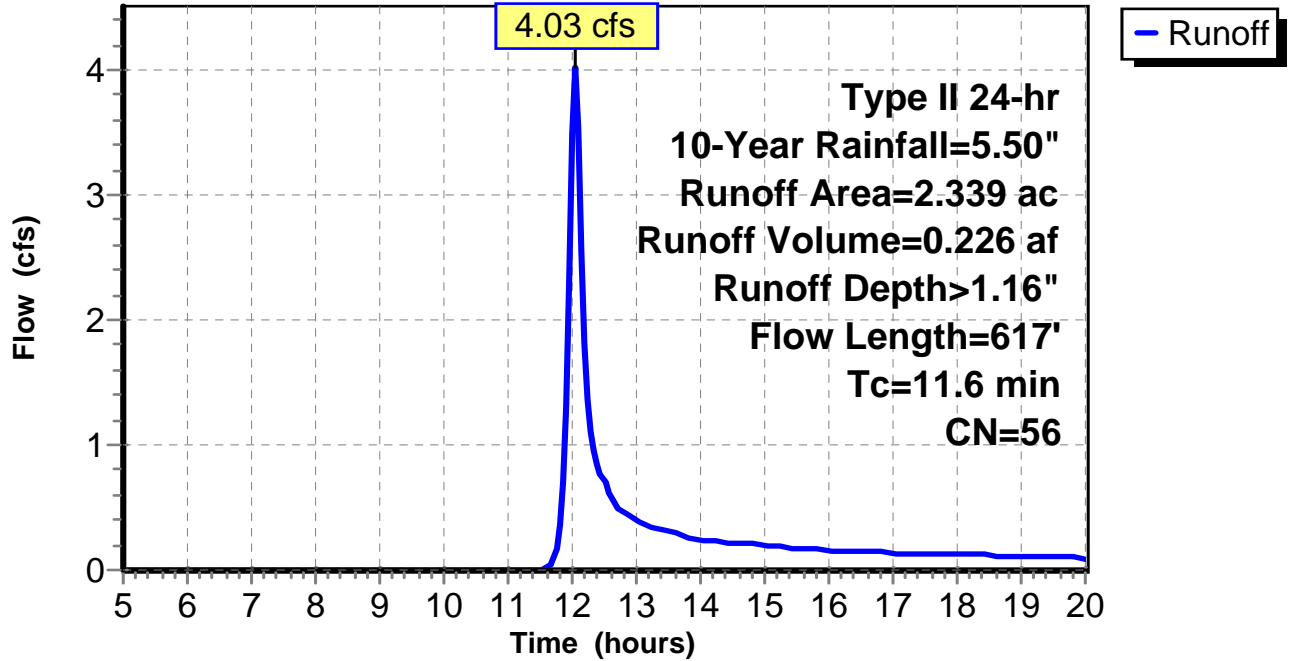
Subcatchment 14: C 161.004

Hydrograph



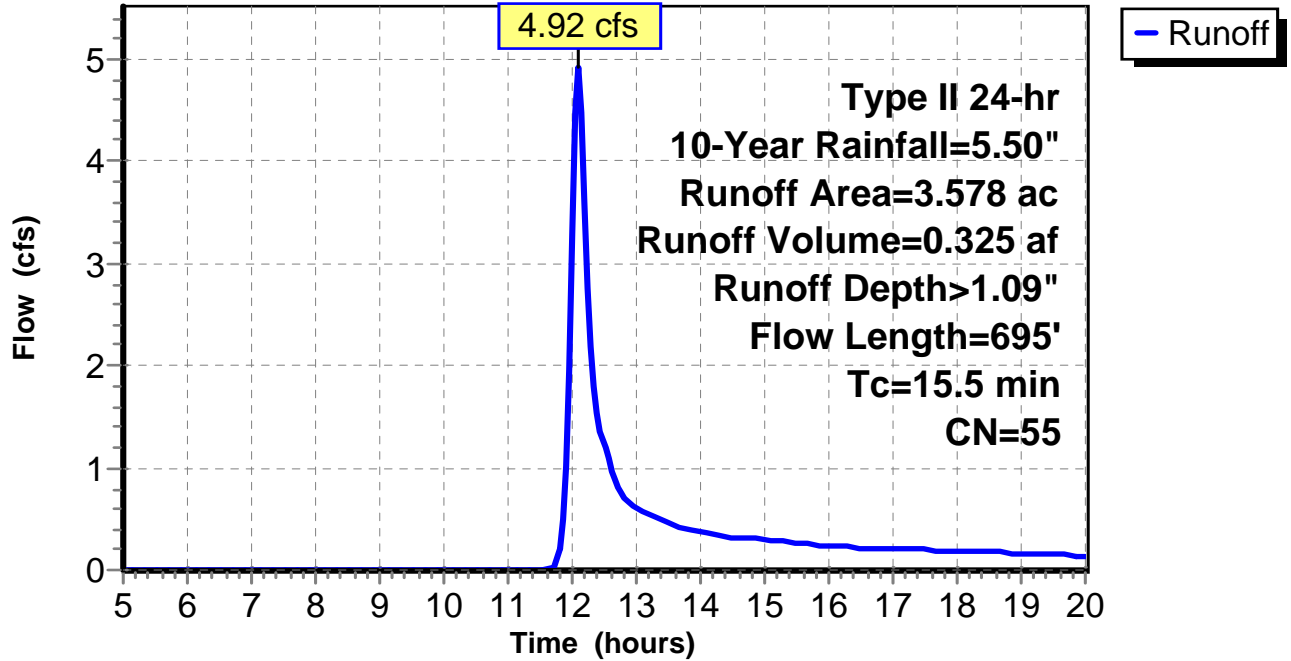
Subcatchment 15: C 161.005

Hydrograph



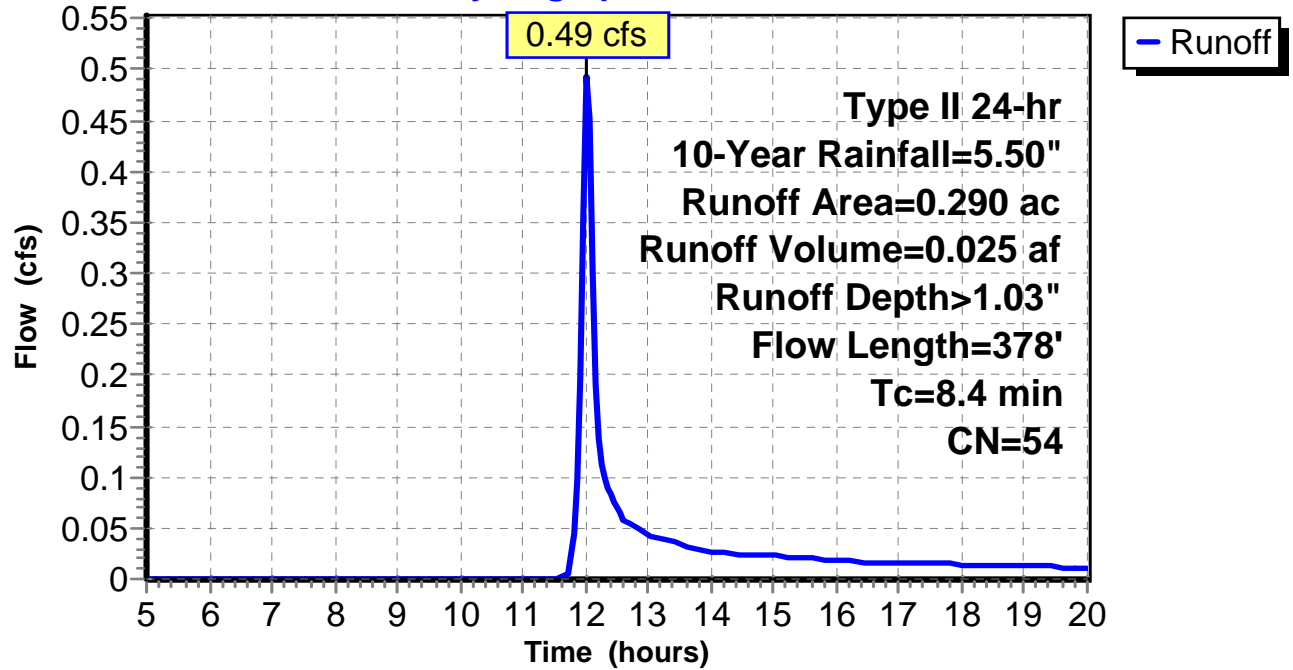
Subcatchment 16: C 161.006

Hydrograph



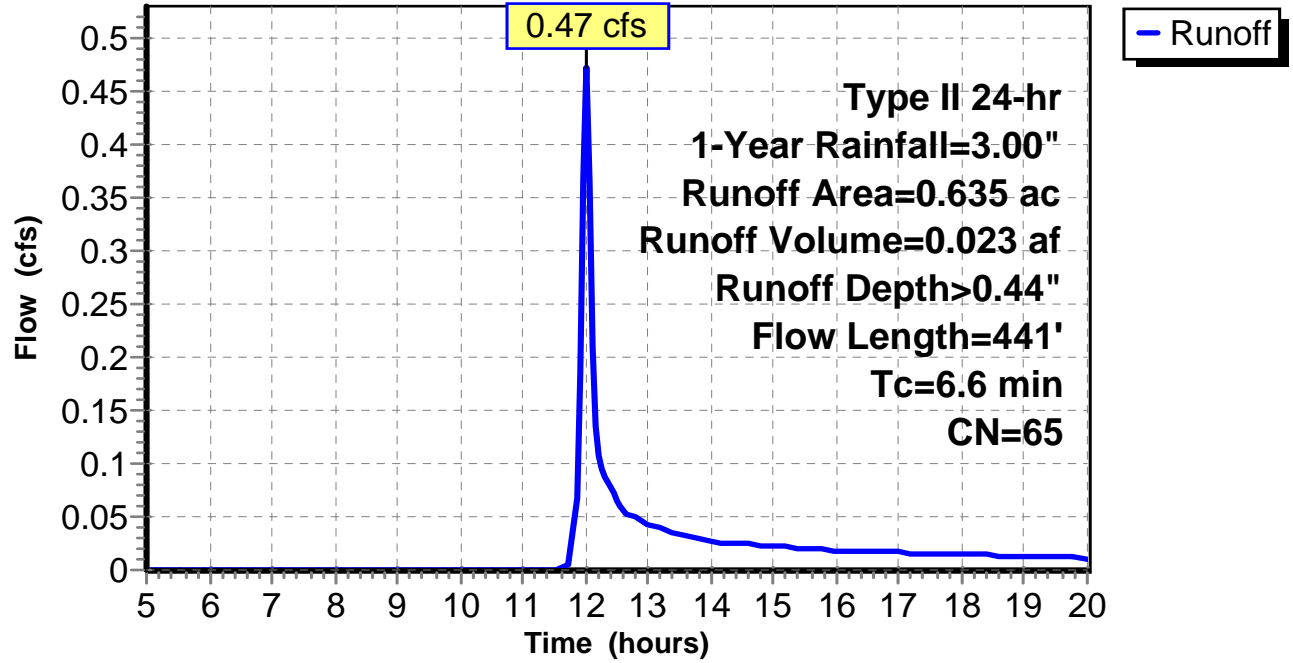
Subcatchment 17: C 161.007

Hydrograph



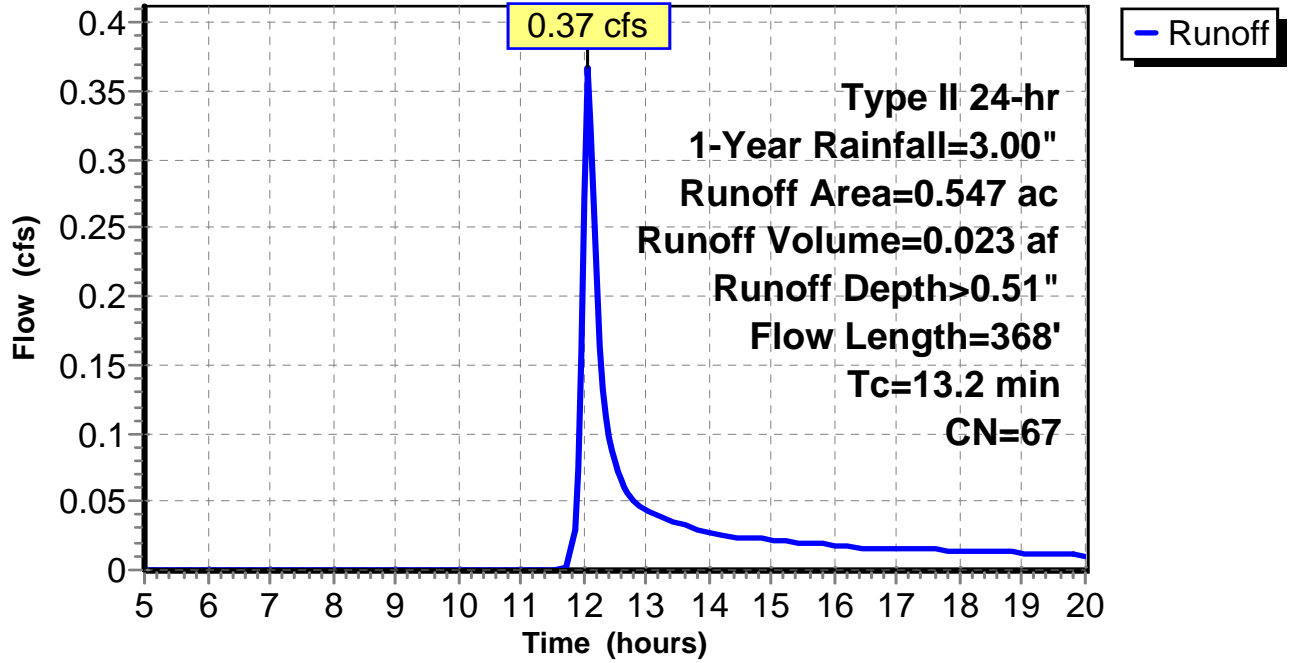
Subcatchment 1: C 162.012

Hydrograph



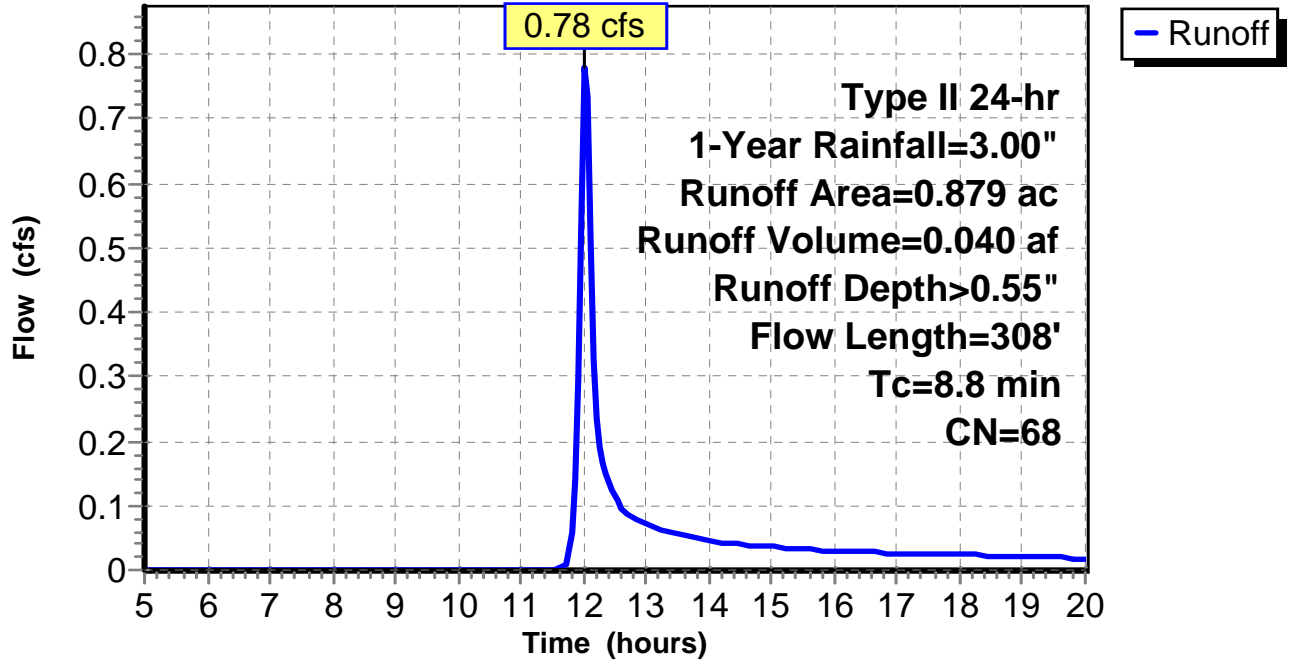
Subcatchment 2: C 162.013

Hydrograph



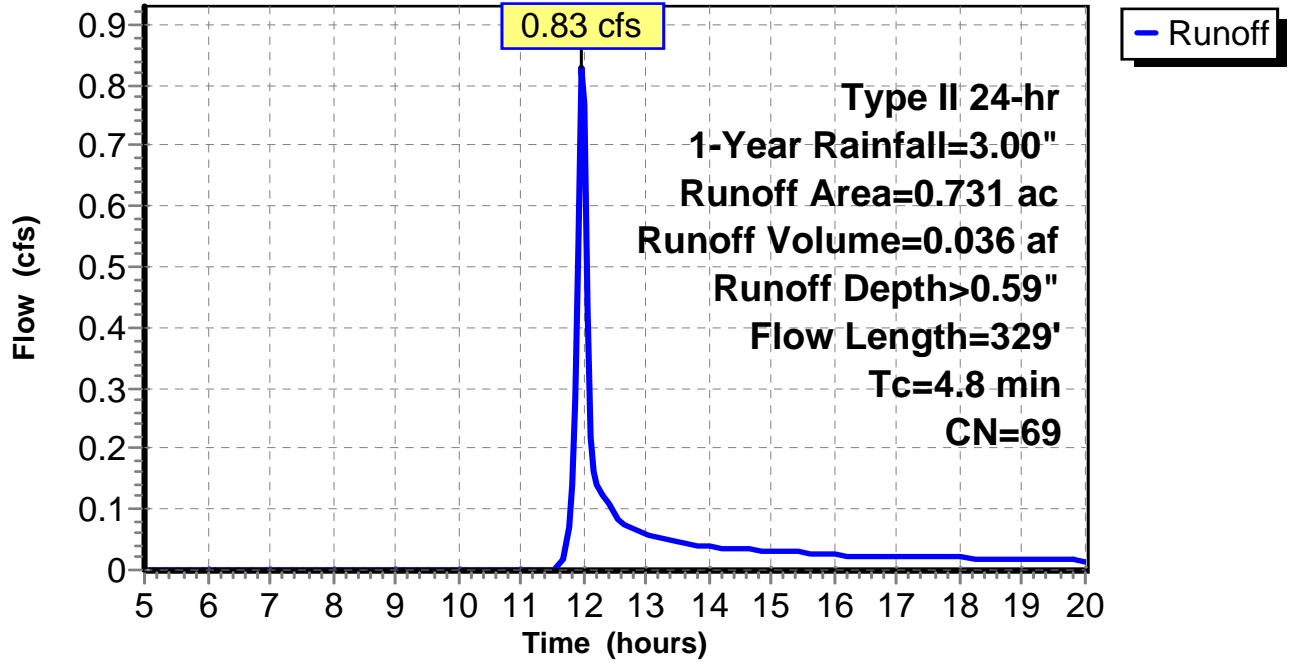
Subcatchment 3: C 162.014

Hydrograph



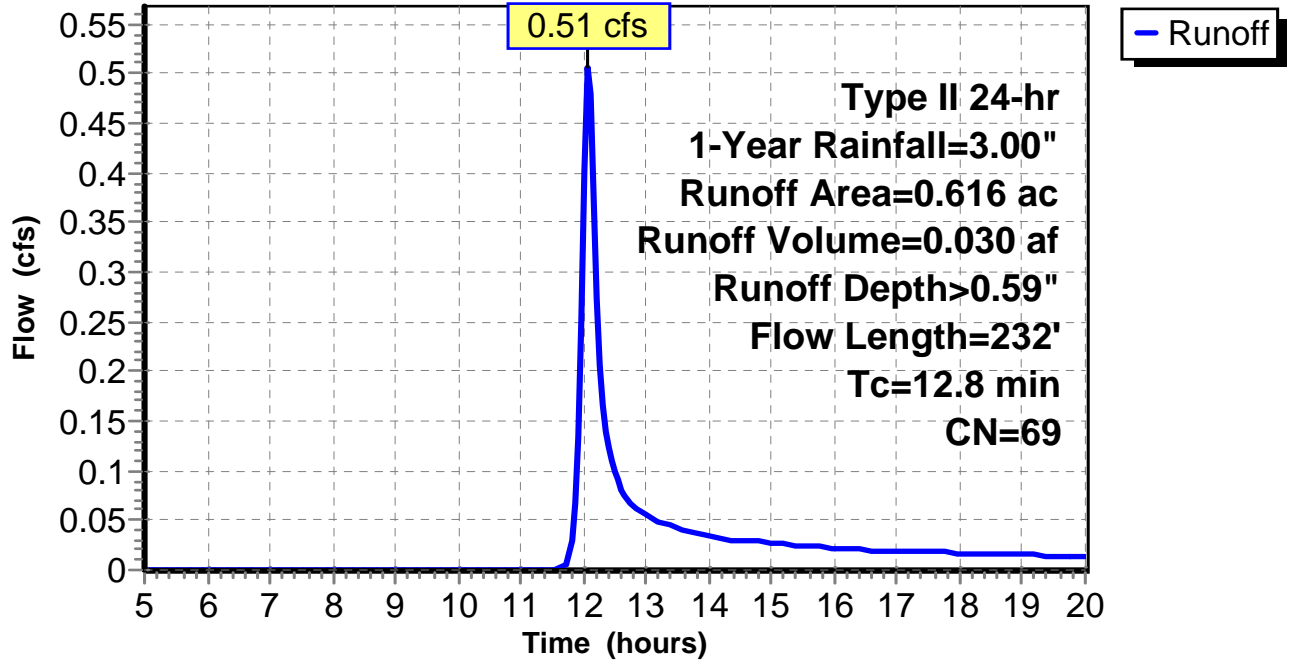
Subcatchment 4: C 162.015

Hydrograph



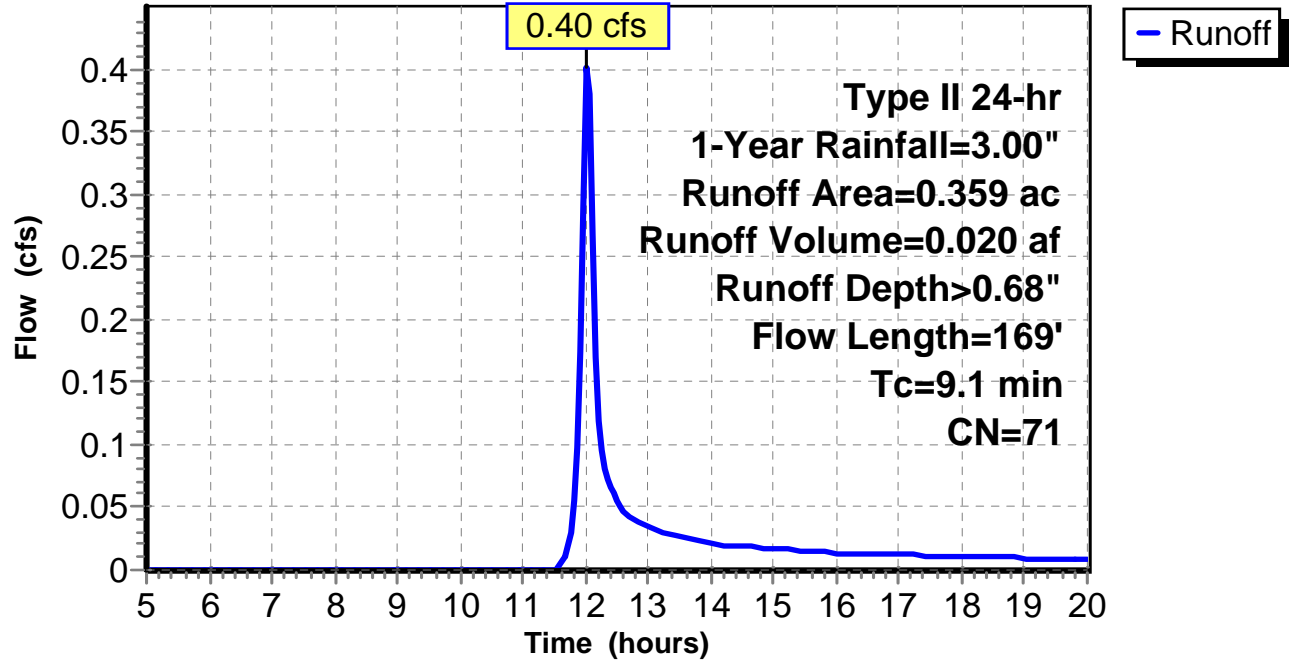
Subcatchment 5: C 162.016

Hydrograph



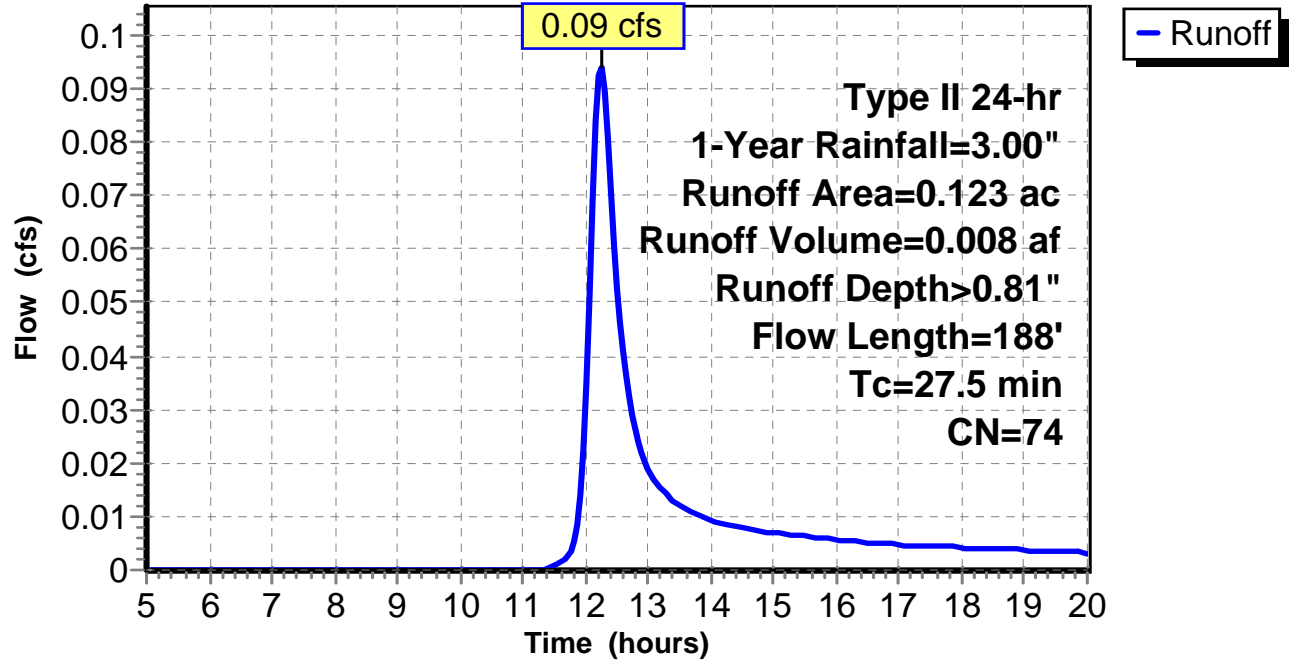
Subcatchment 6: C 162.017

Hydrograph



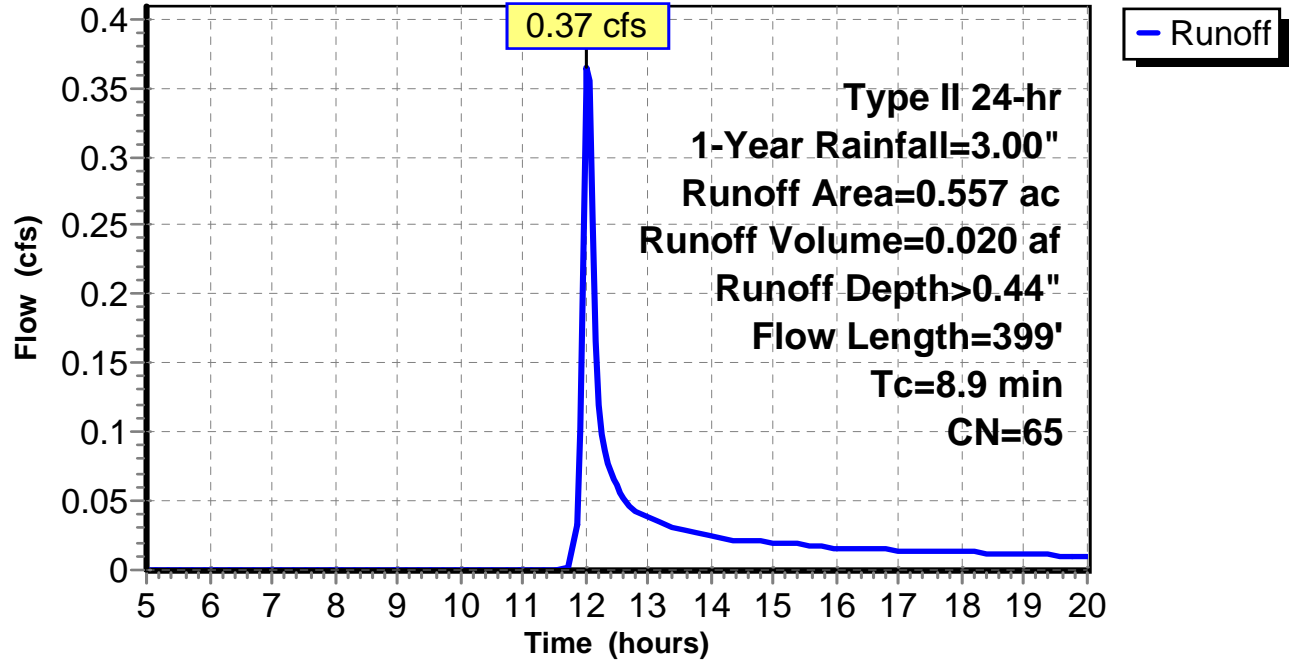
Subcatchment 7: C 162.018

Hydrograph



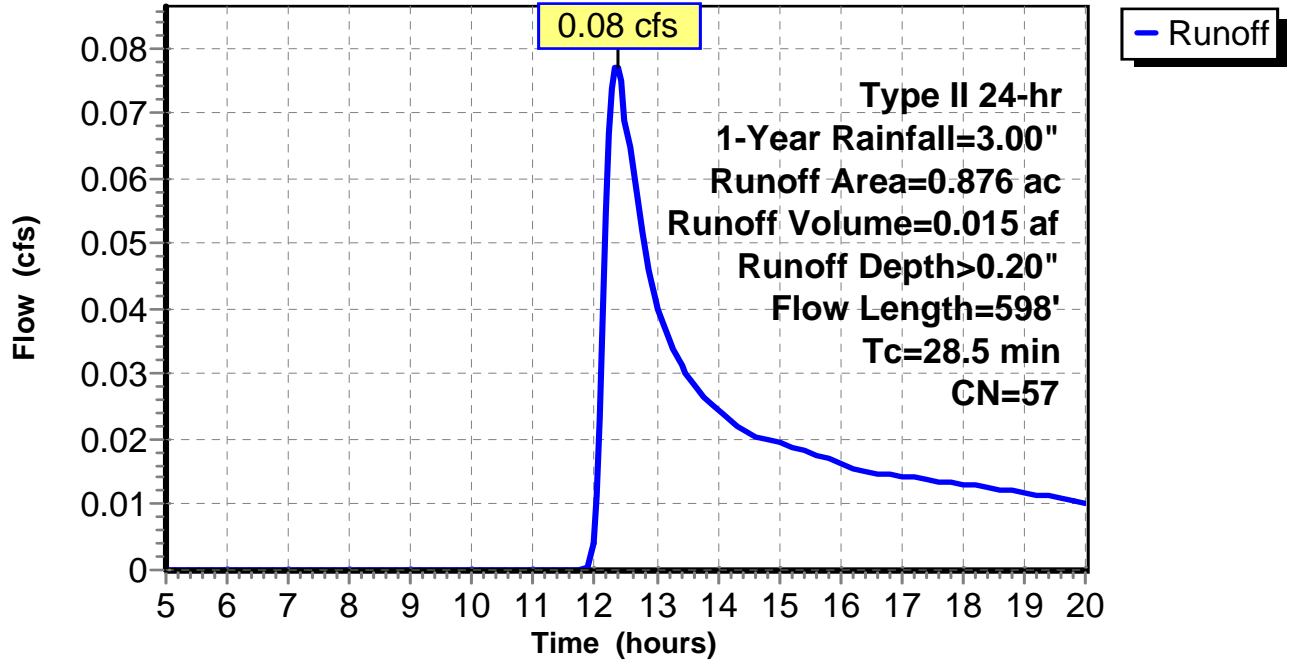
Subcatchment 8: C 162.019

Hydrograph



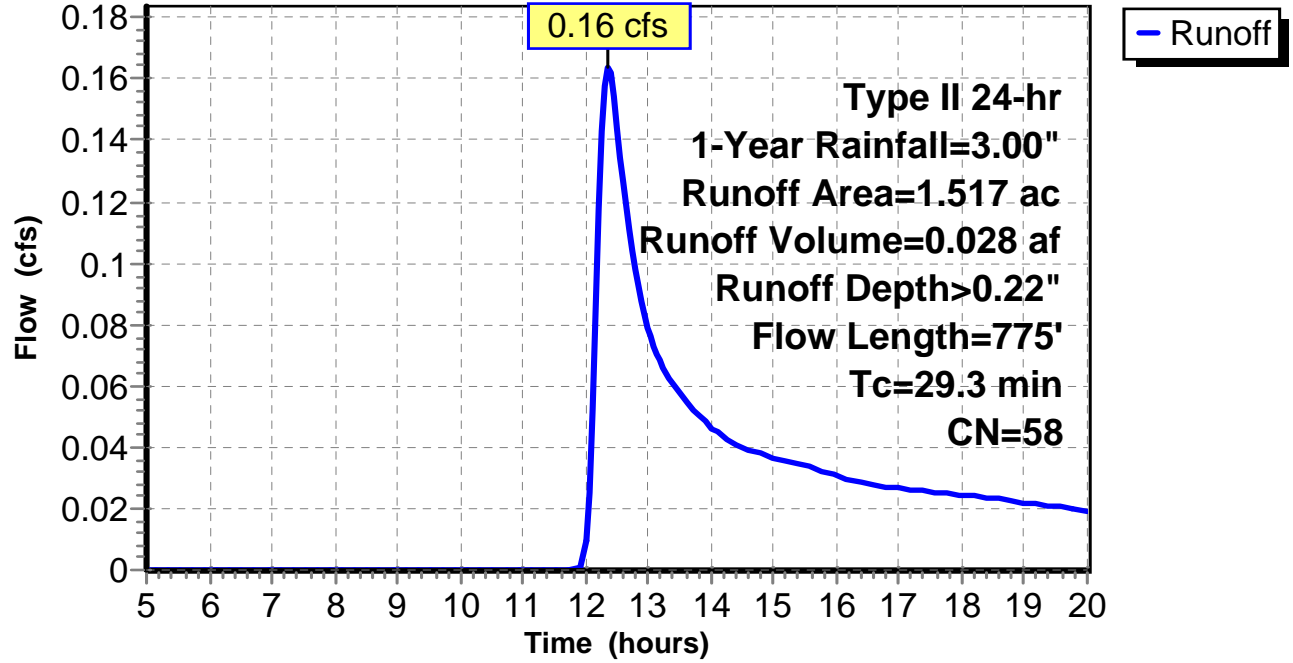
Subcatchment 9: C 162.020

Hydrograph



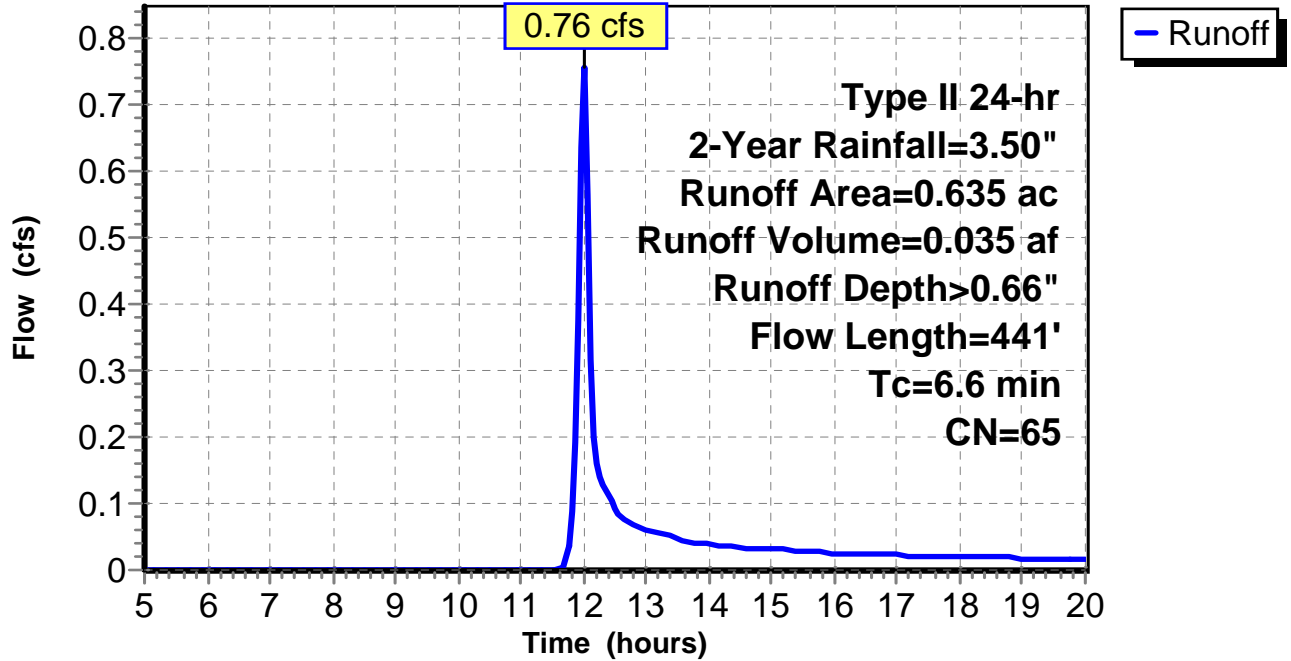
Subcatchment 10: C 162.021

Hydrograph



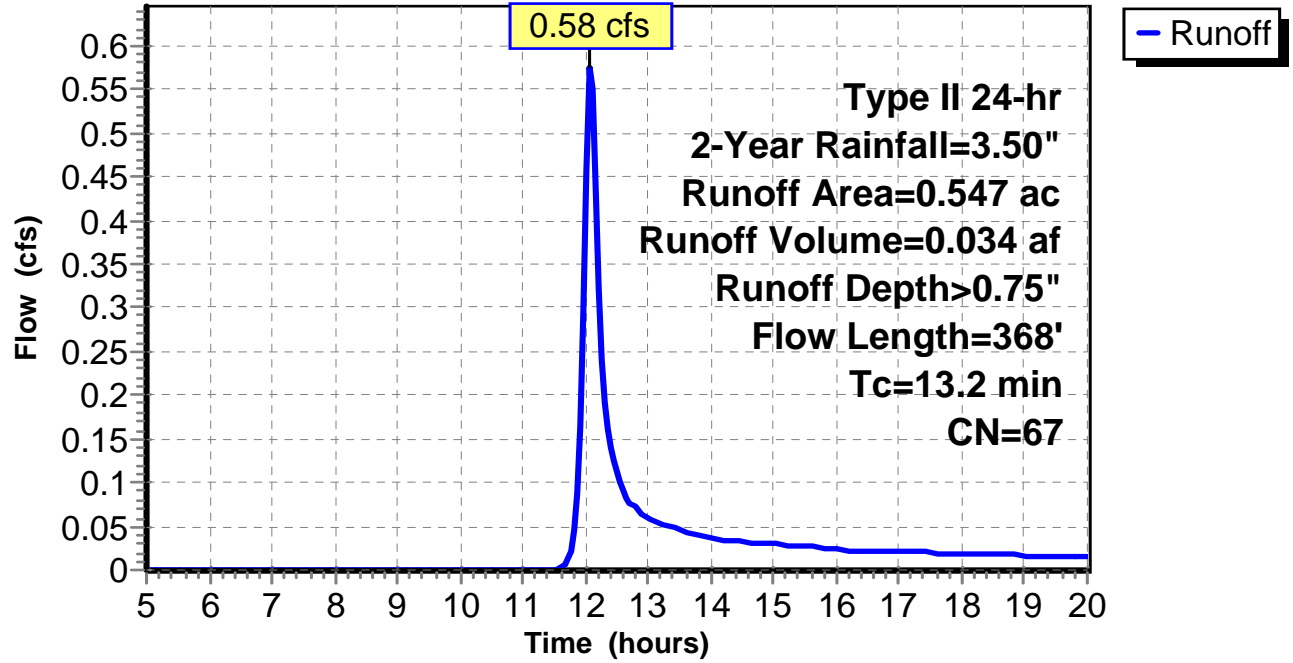
Subcatchment 1: C 162.012

Hydrograph



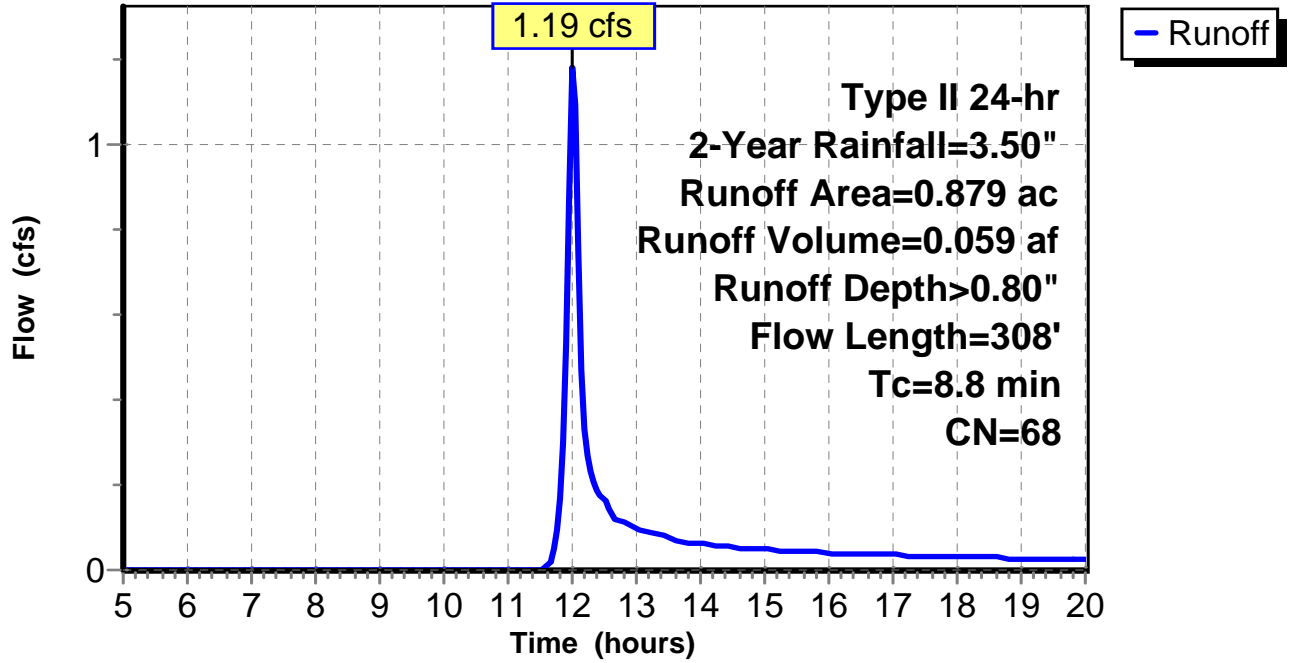
Subcatchment 2: C 162.013

Hydrograph



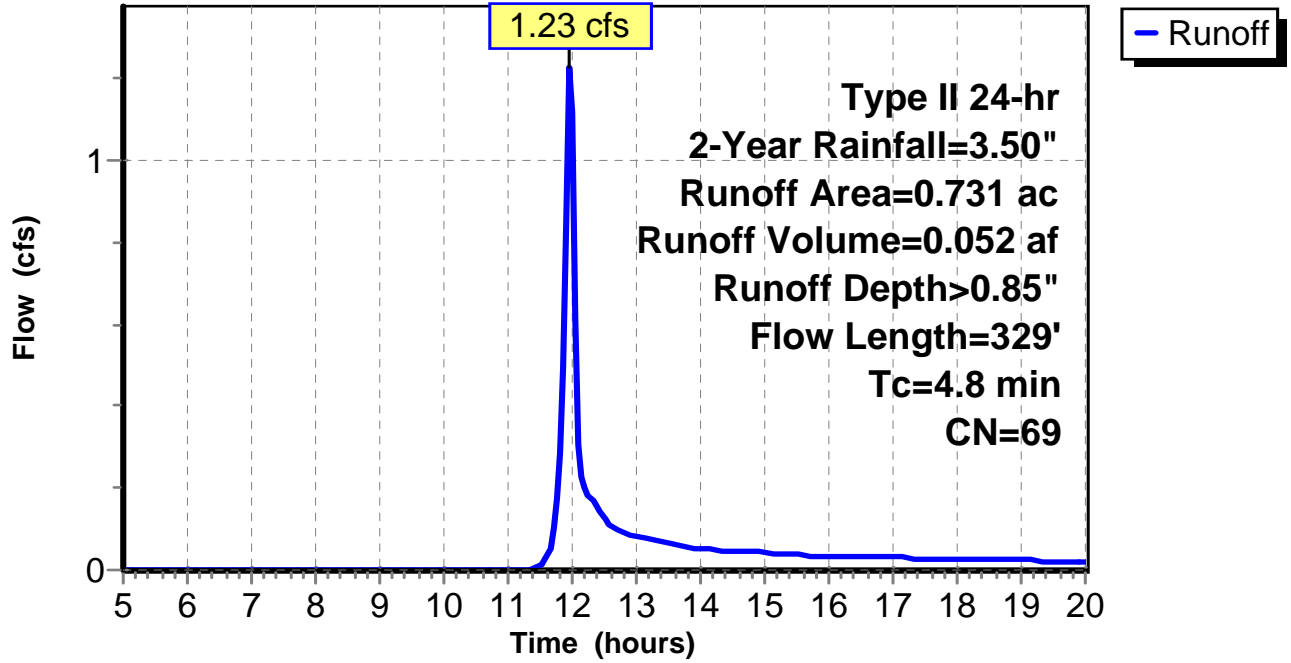
Subcatchment 3: C 162.014

Hydrograph



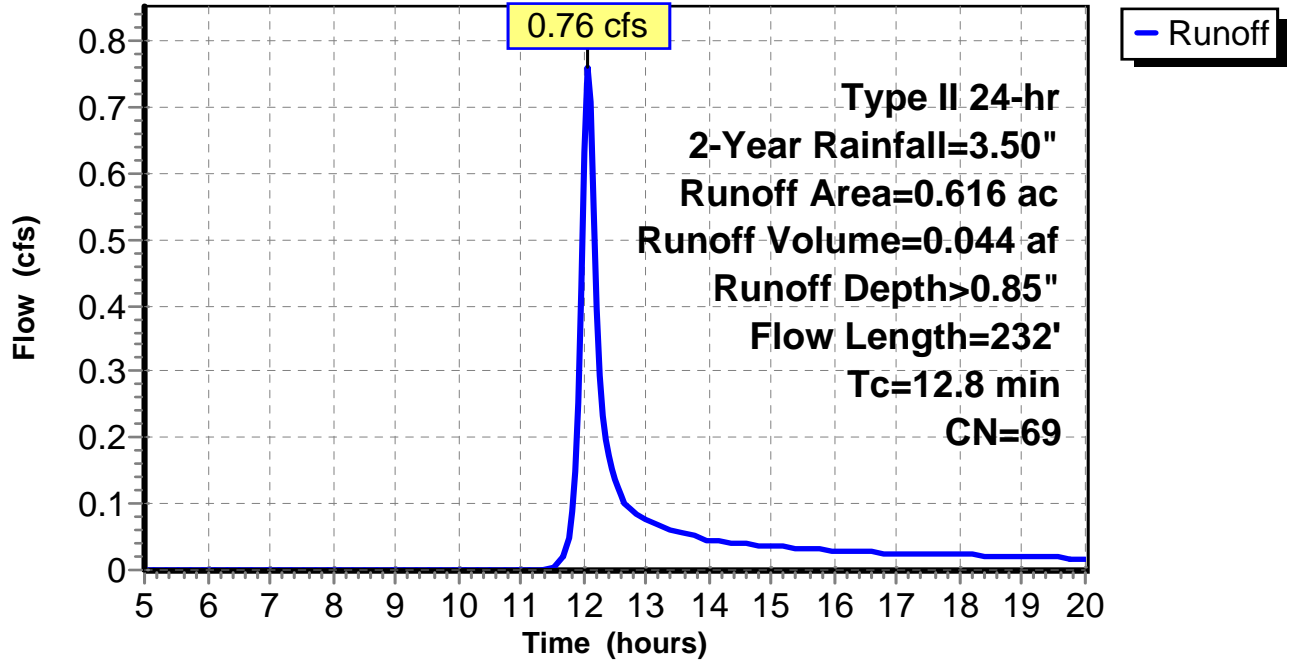
Subcatchment 4: C 162.015

Hydrograph



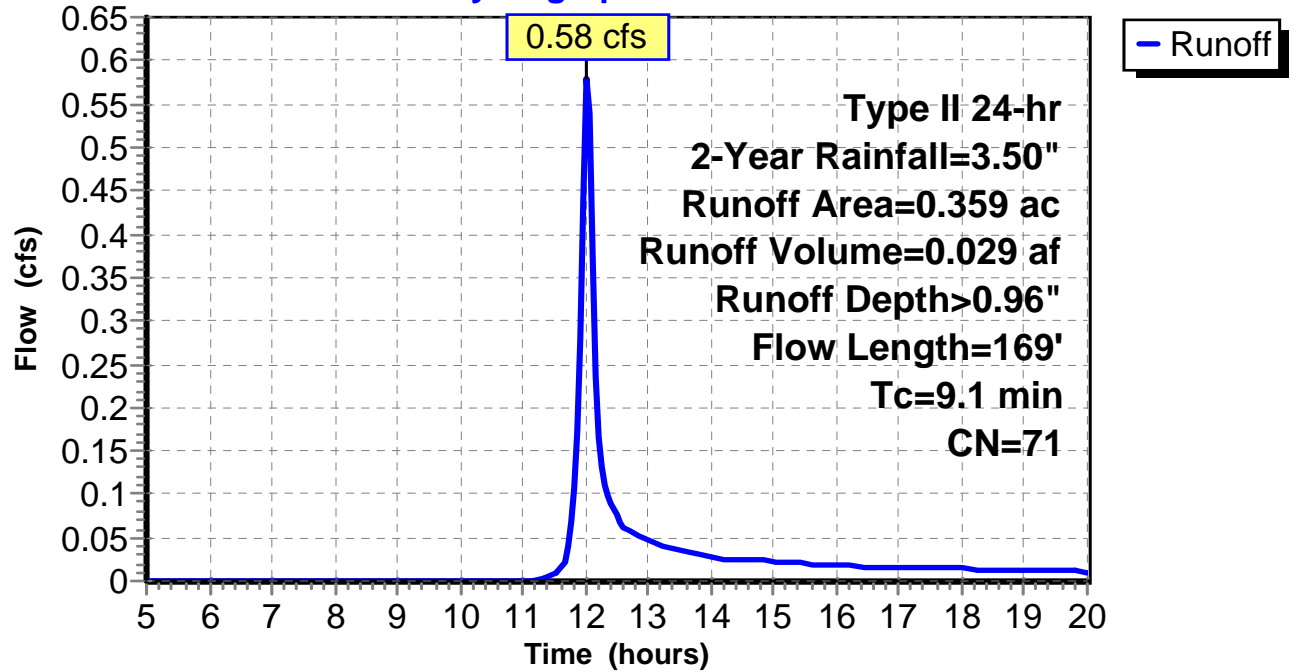
Subcatchment 5: C 162.016

Hydrograph



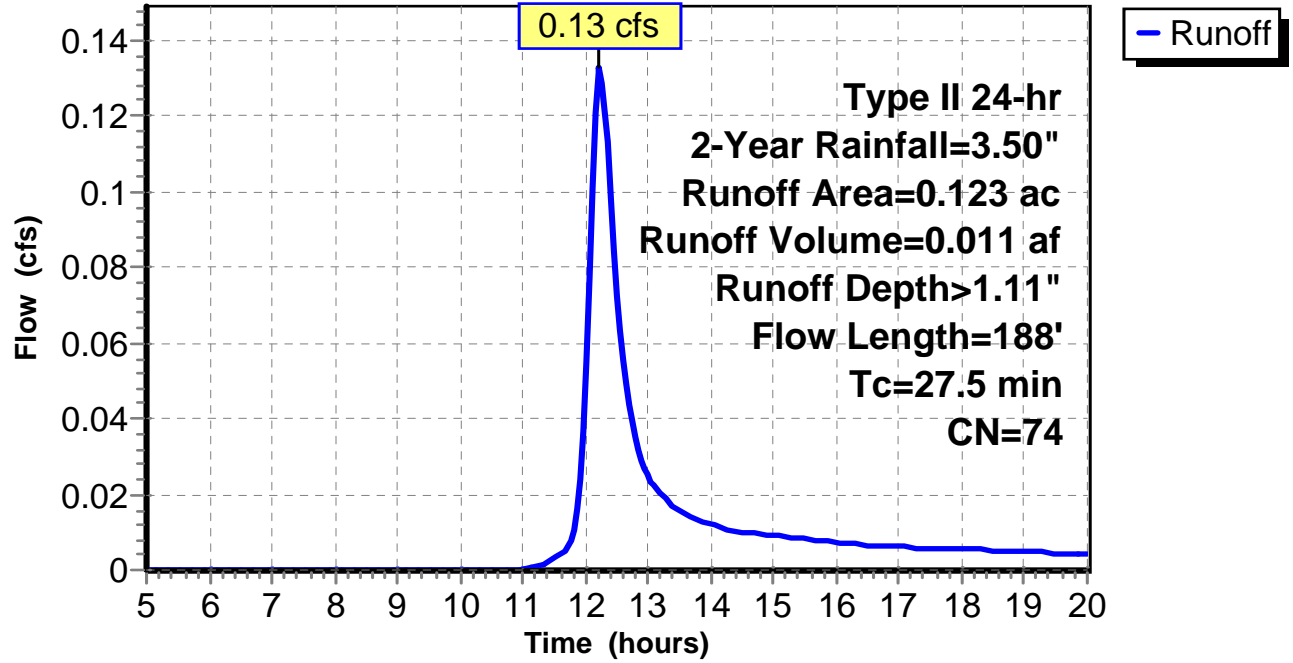
Subcatchment 6: C 162.017

Hydrograph



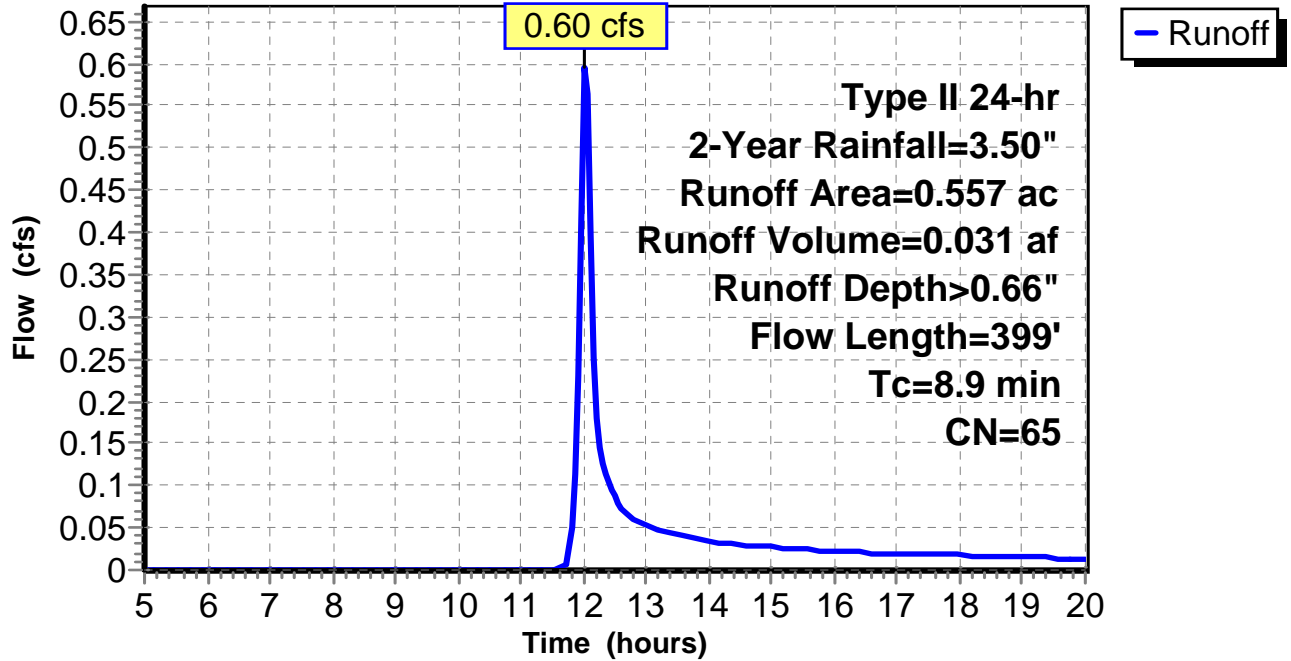
Subcatchment 7: C 162.018

Hydrograph



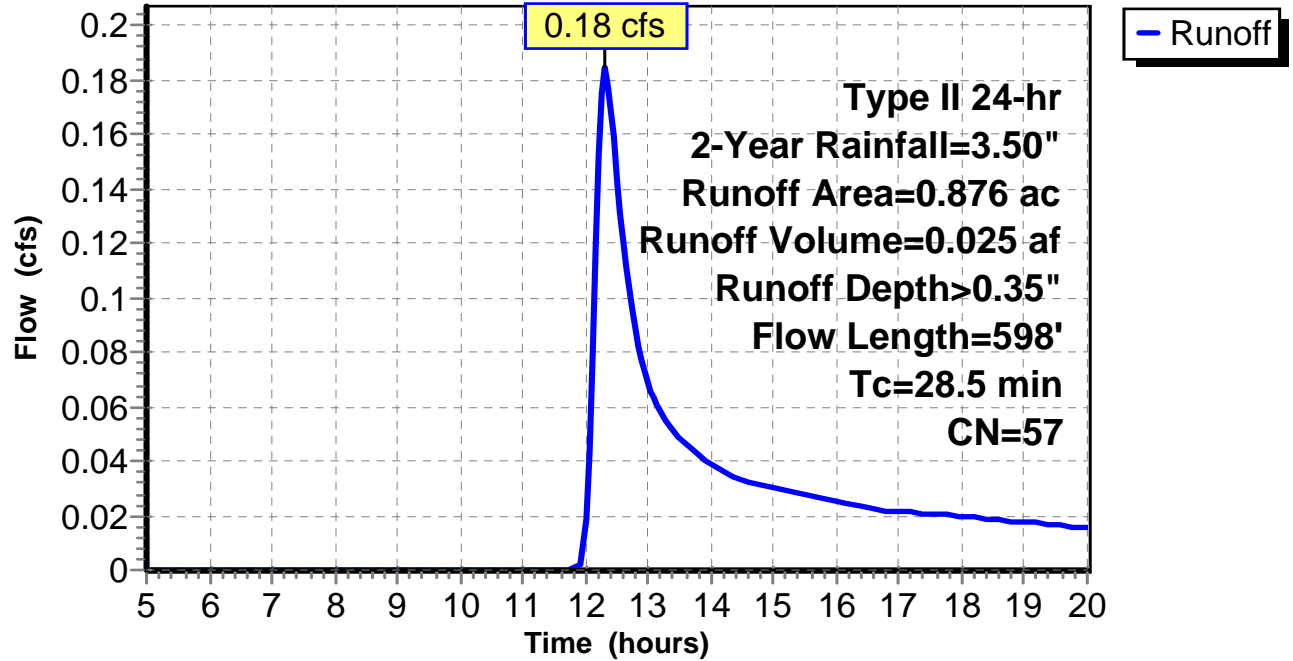
Subcatchment 8: C 162.019

Hydrograph



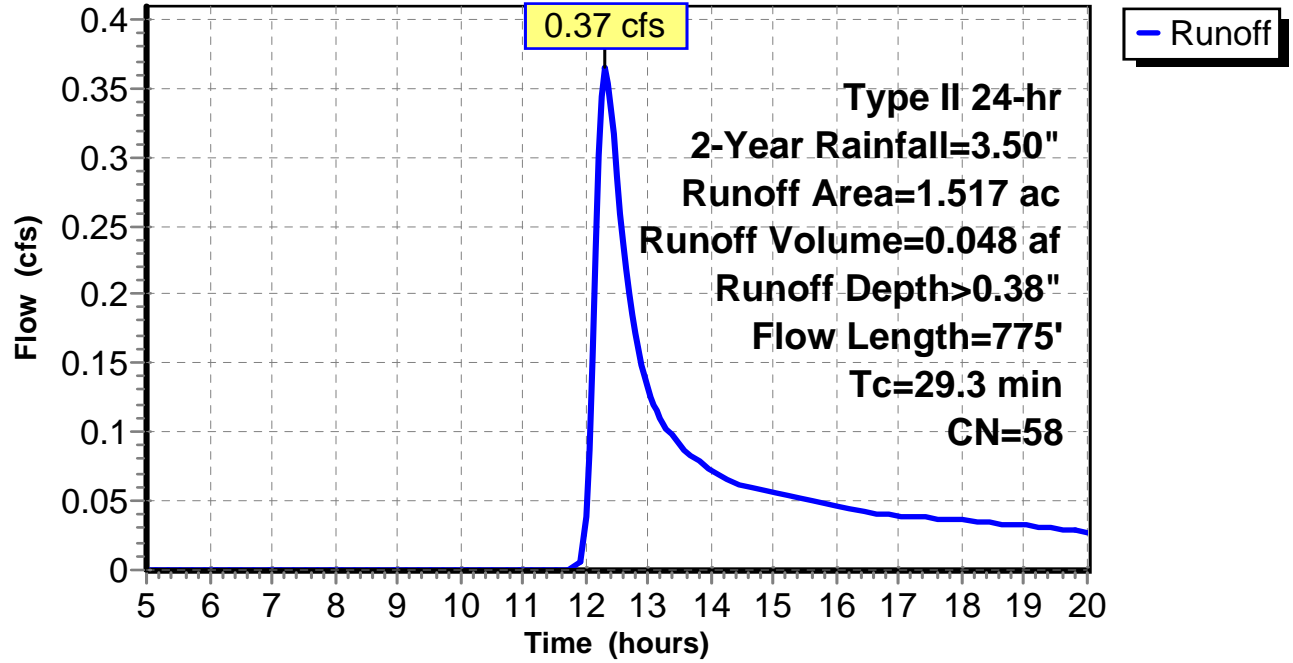
Subcatchment 9: C 162.020

Hydrograph



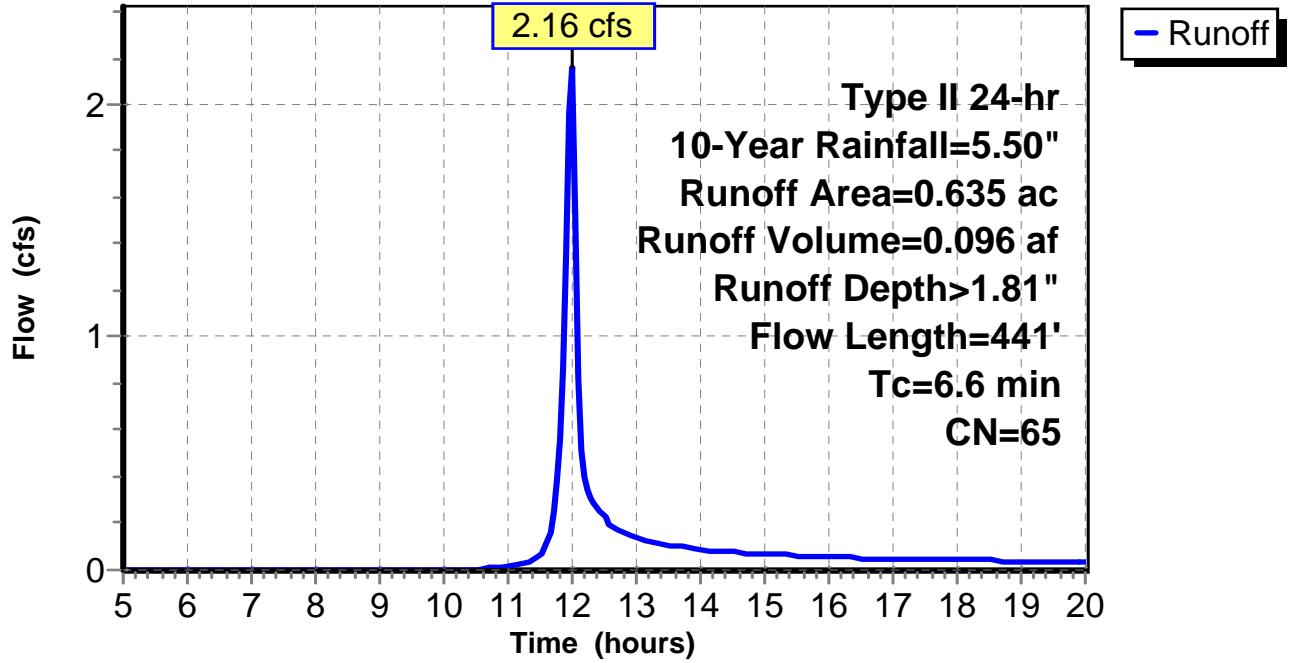
Subcatchment 10: C 162.021

Hydrograph



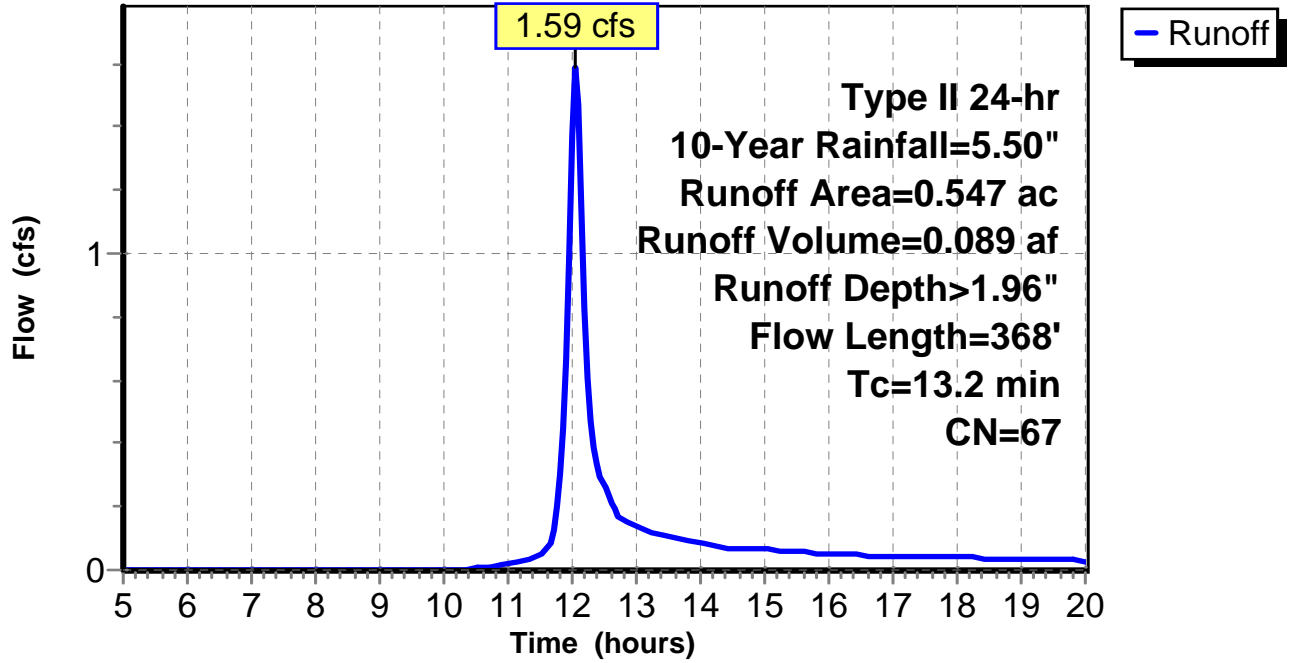
Subcatchment 1: C 162.012

Hydrograph



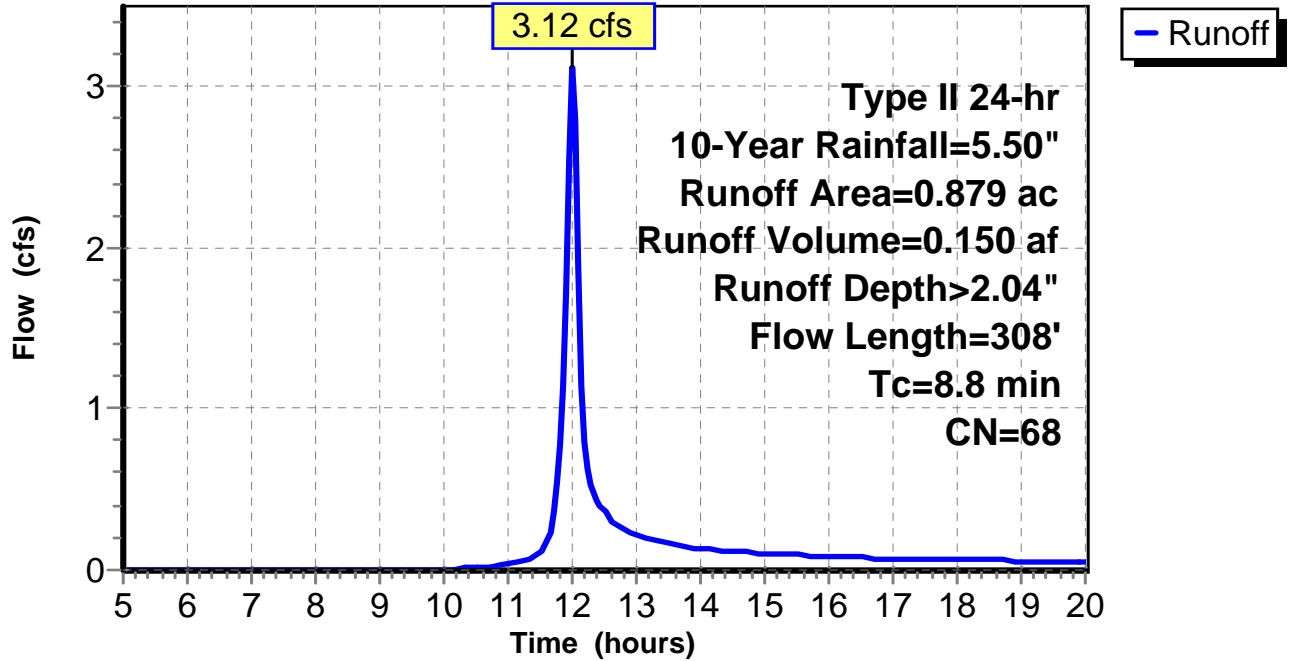
Subcatchment 2: C 162.013

Hydrograph



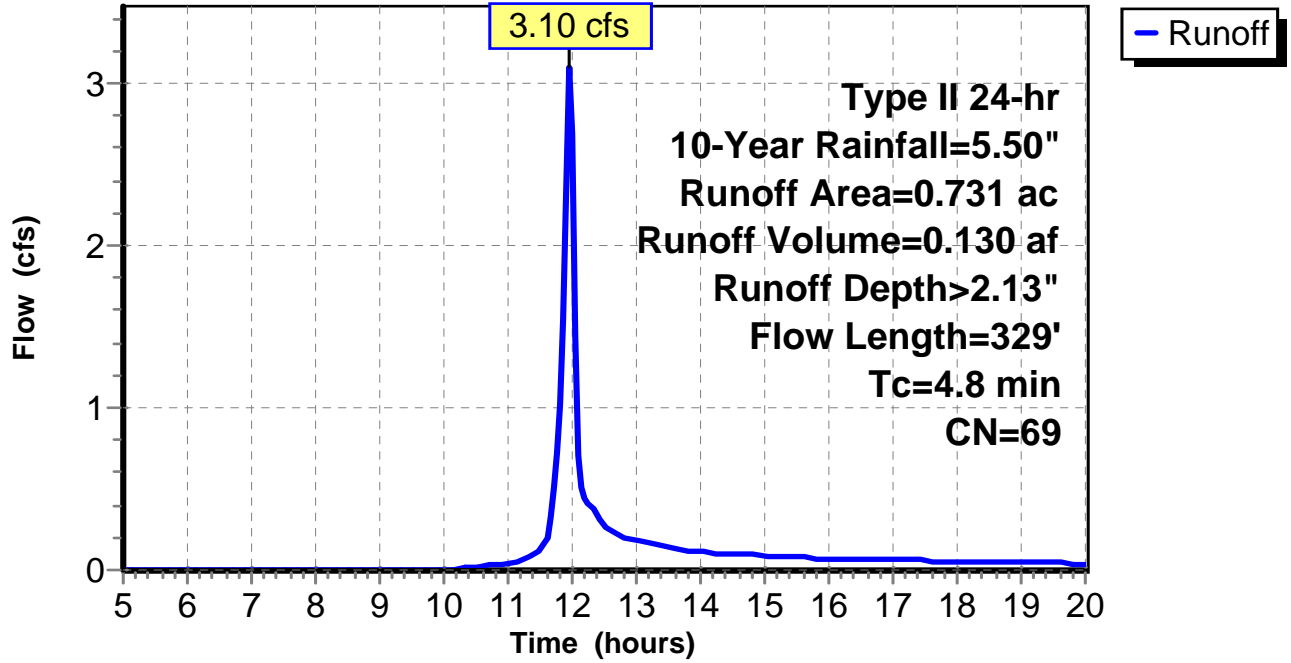
Subcatchment 3: C 162.014

Hydrograph



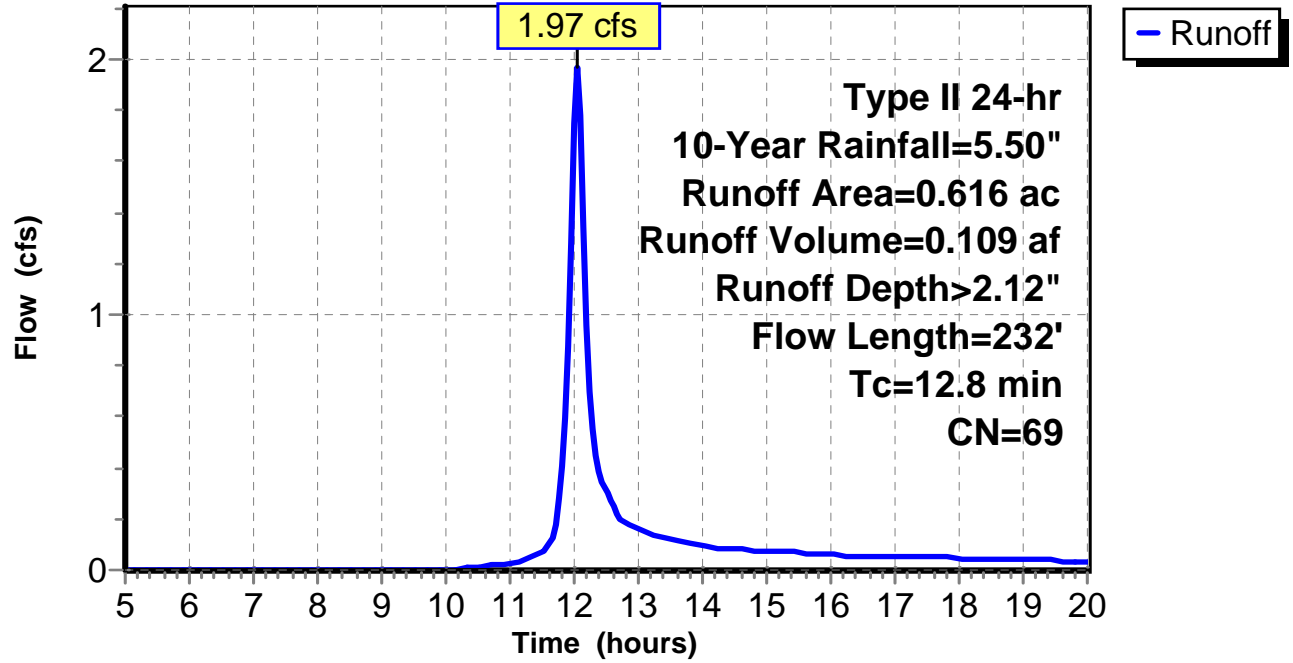
Subcatchment 4: C 162.015

Hydrograph



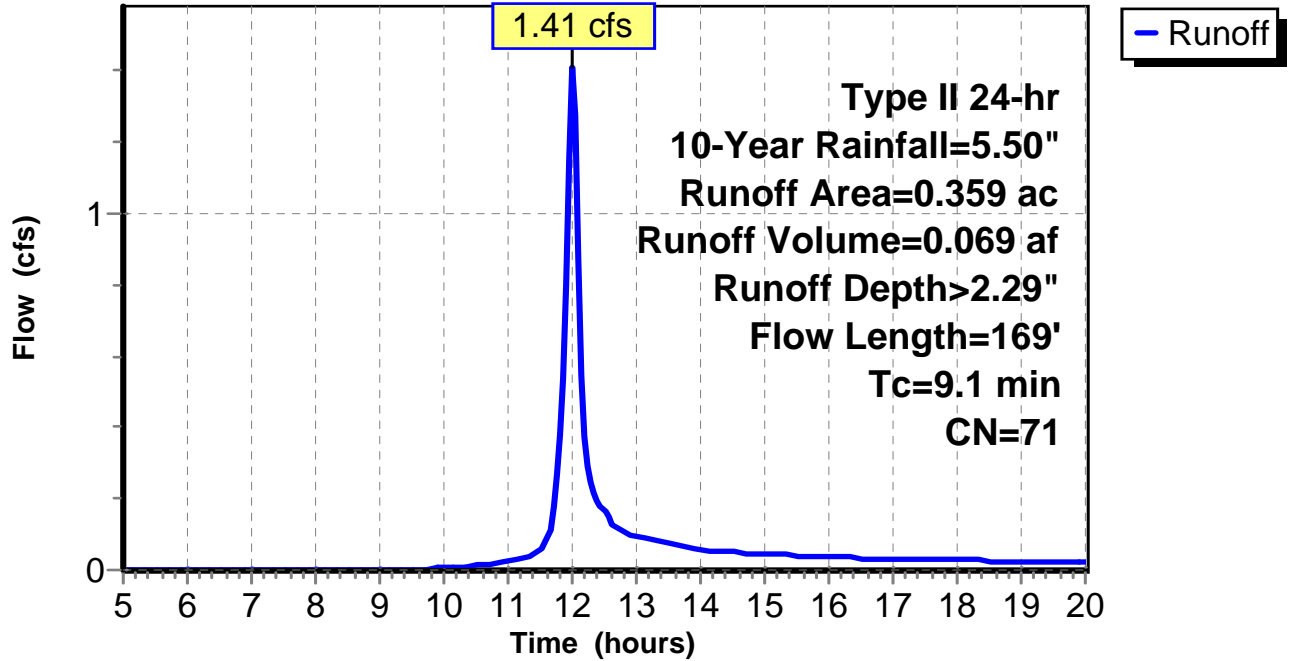
Subcatchment 5: C 162.016

Hydrograph



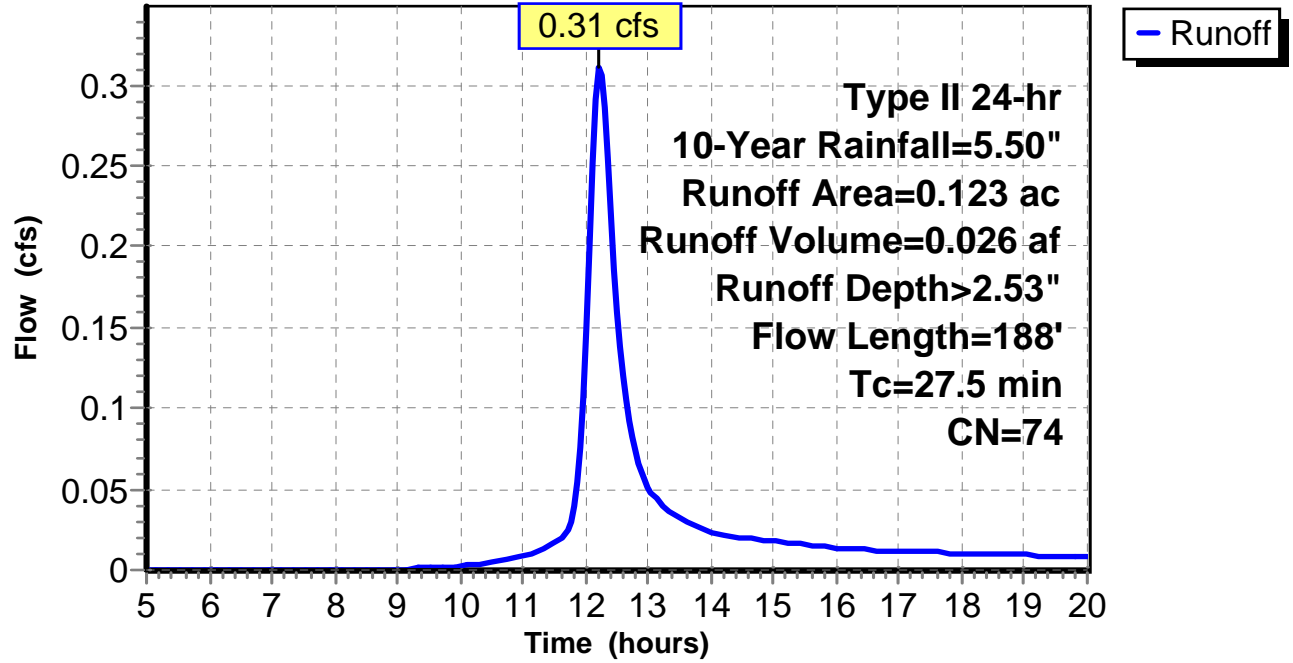
Subcatchment 6: C 162.017

Hydrograph



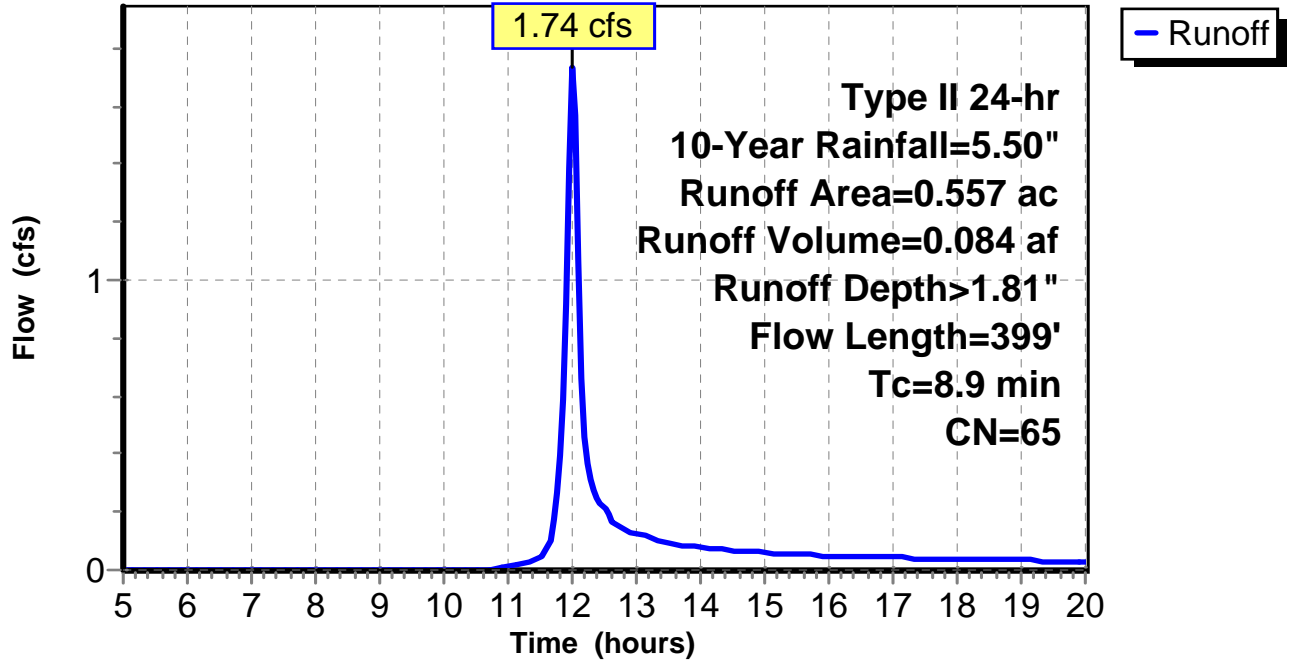
Subcatchment 7: C 162.018

Hydrograph



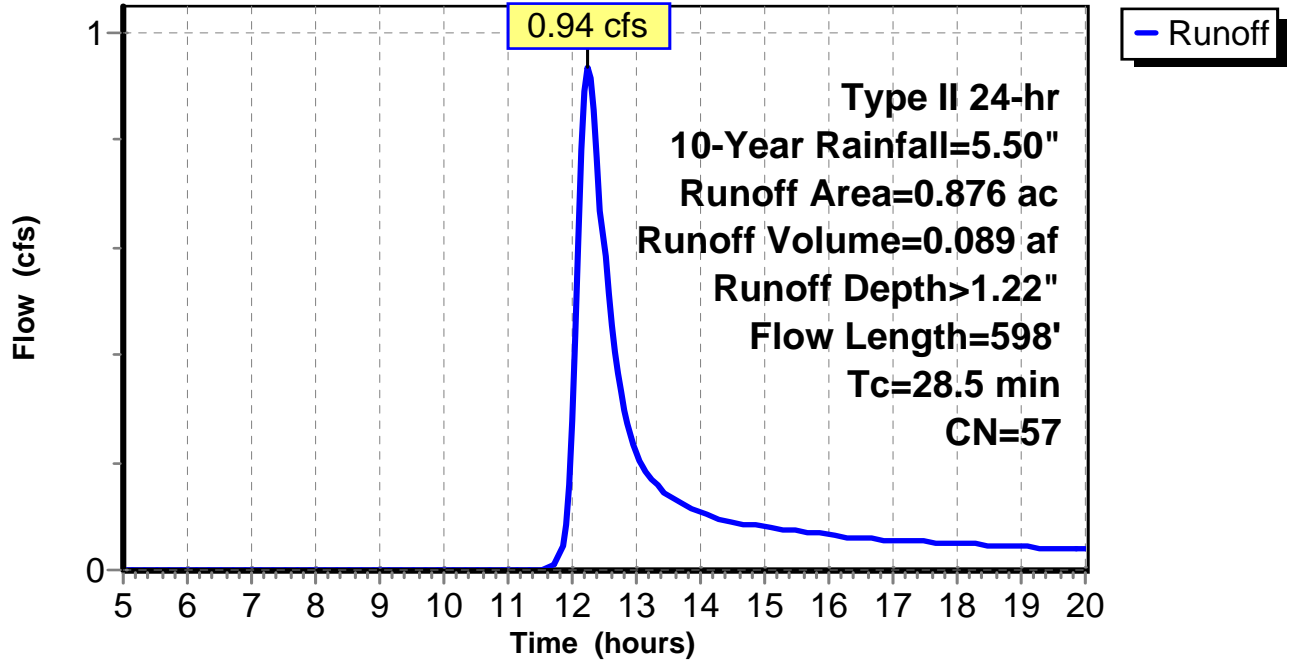
Subcatchment 8: C 162.019

Hydrograph



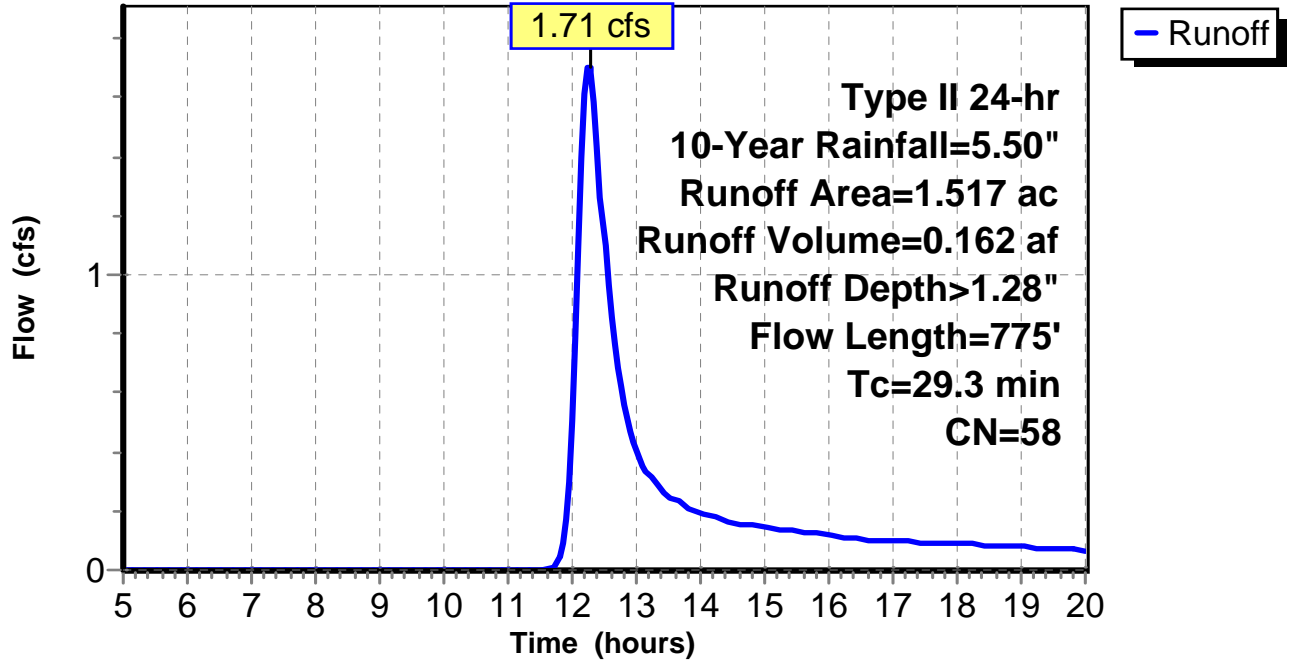
Subcatchment 9: C 162.020

Hydrograph



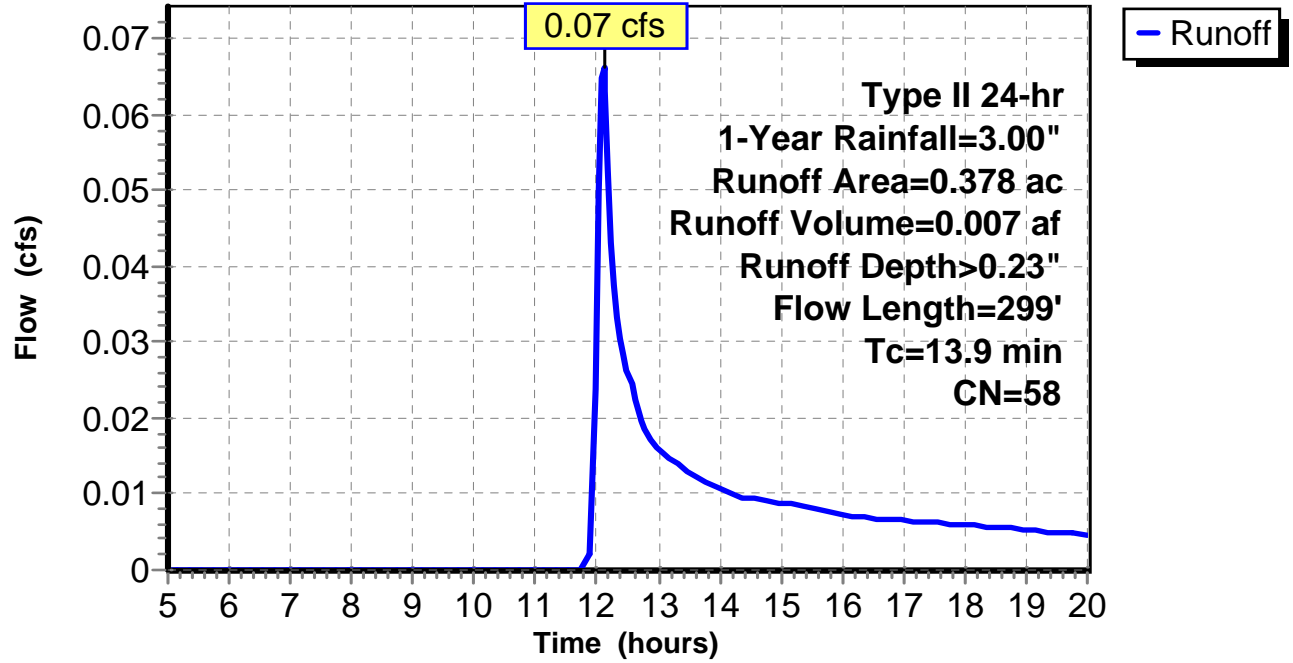
Subcatchment 10: C 162.021

Hydrograph



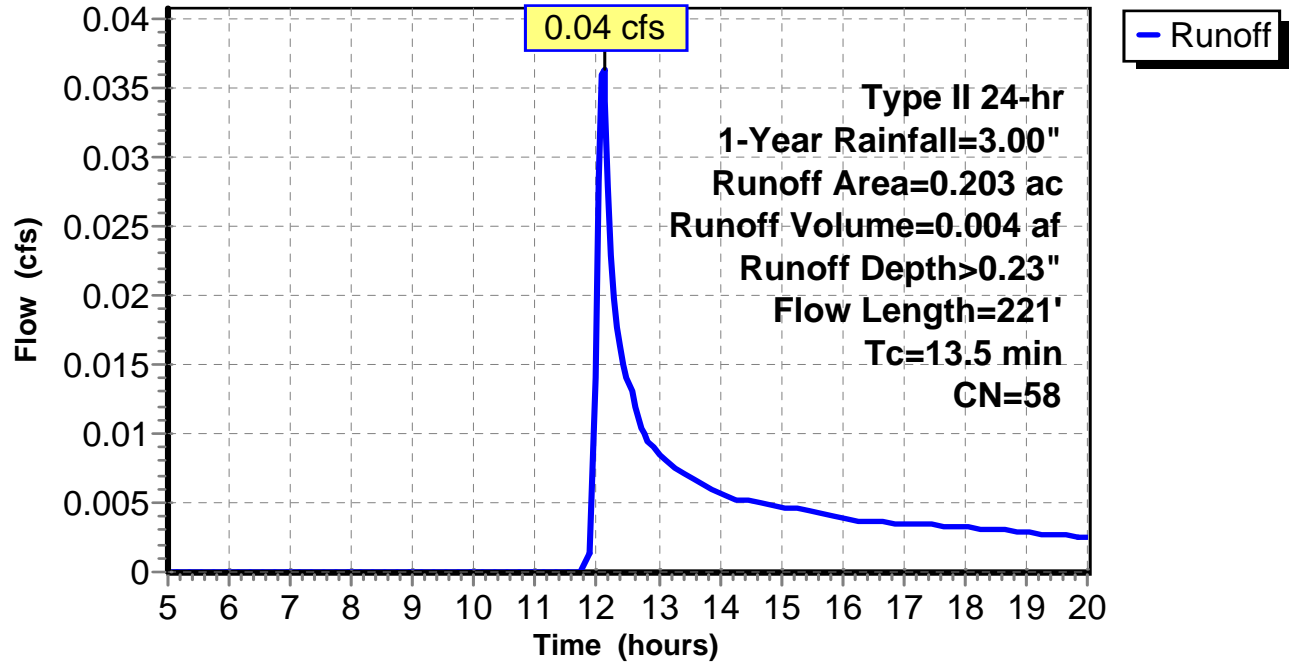
Subcatchment 1: C 162.001

Hydrograph



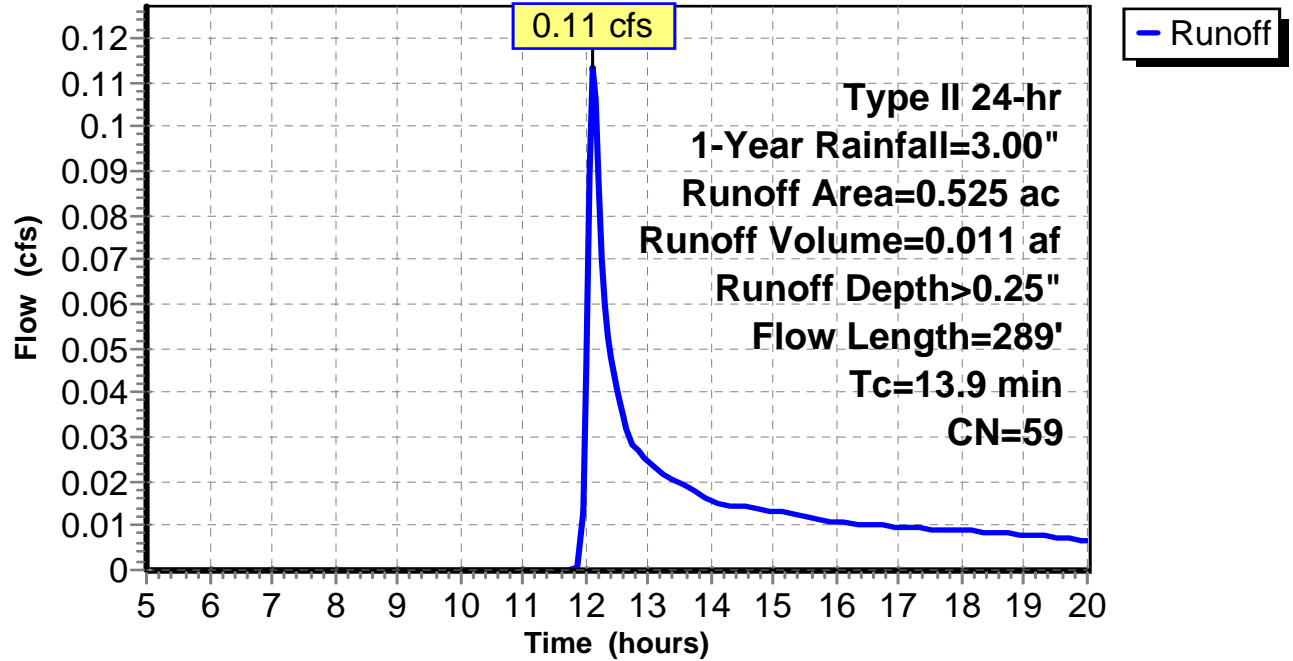
Subcatchment 2: C 162.002

Hydrograph



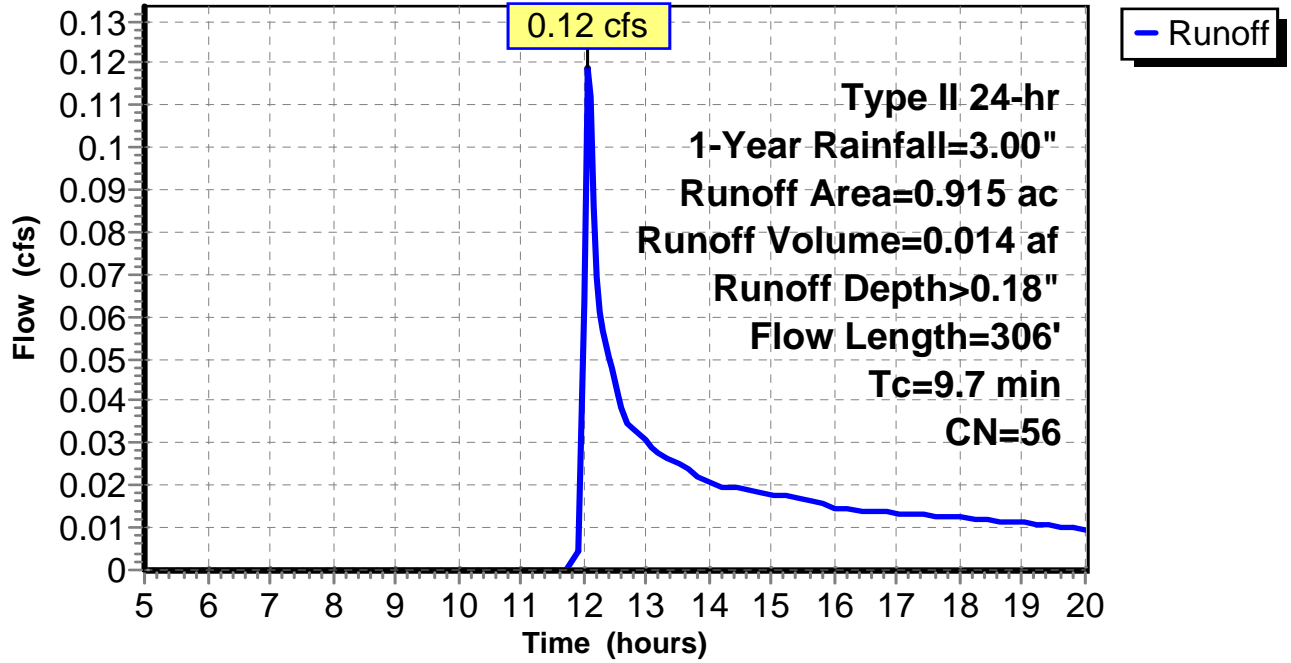
Subcatchment 3: C 162.003

Hydrograph



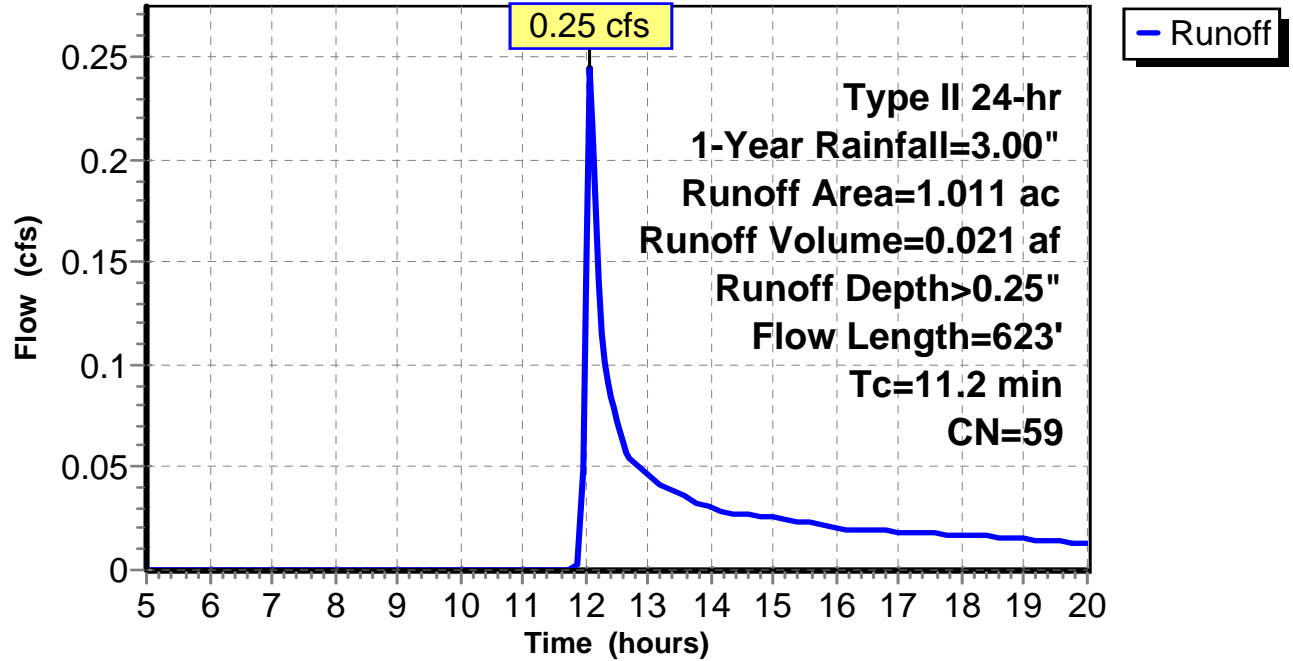
Subcatchment 4: C 162.004

Hydrograph



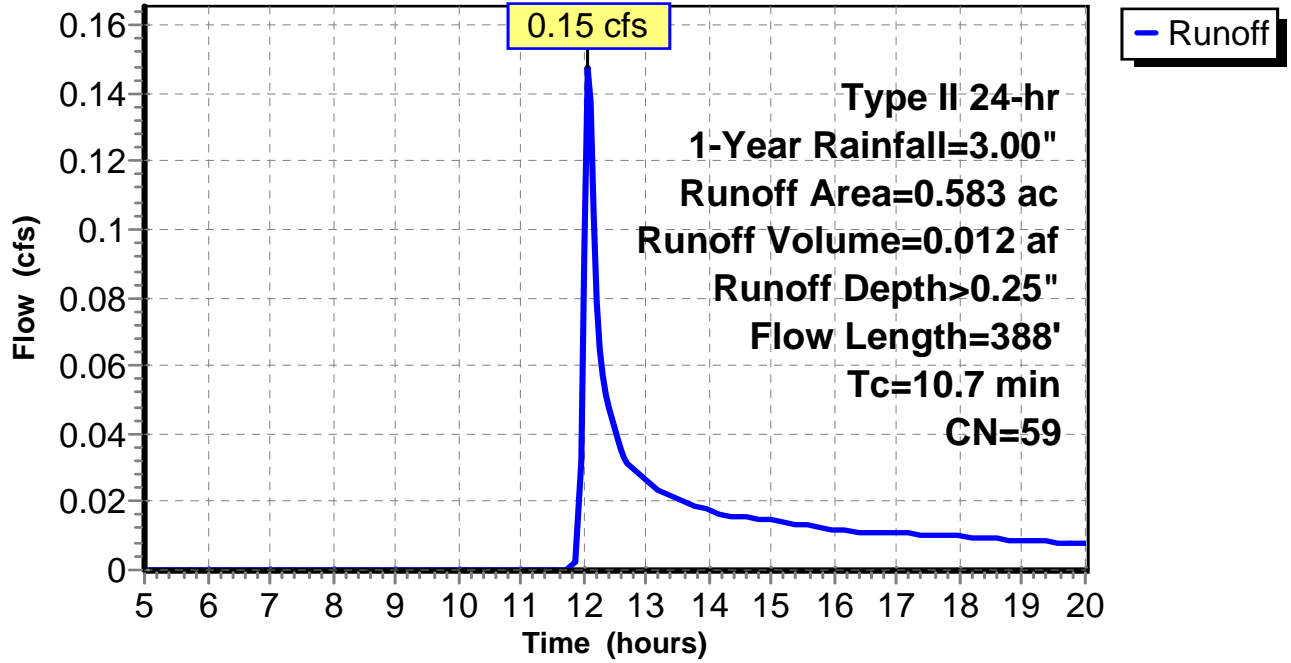
Subcatchment 5: C 162.005

Hydrograph



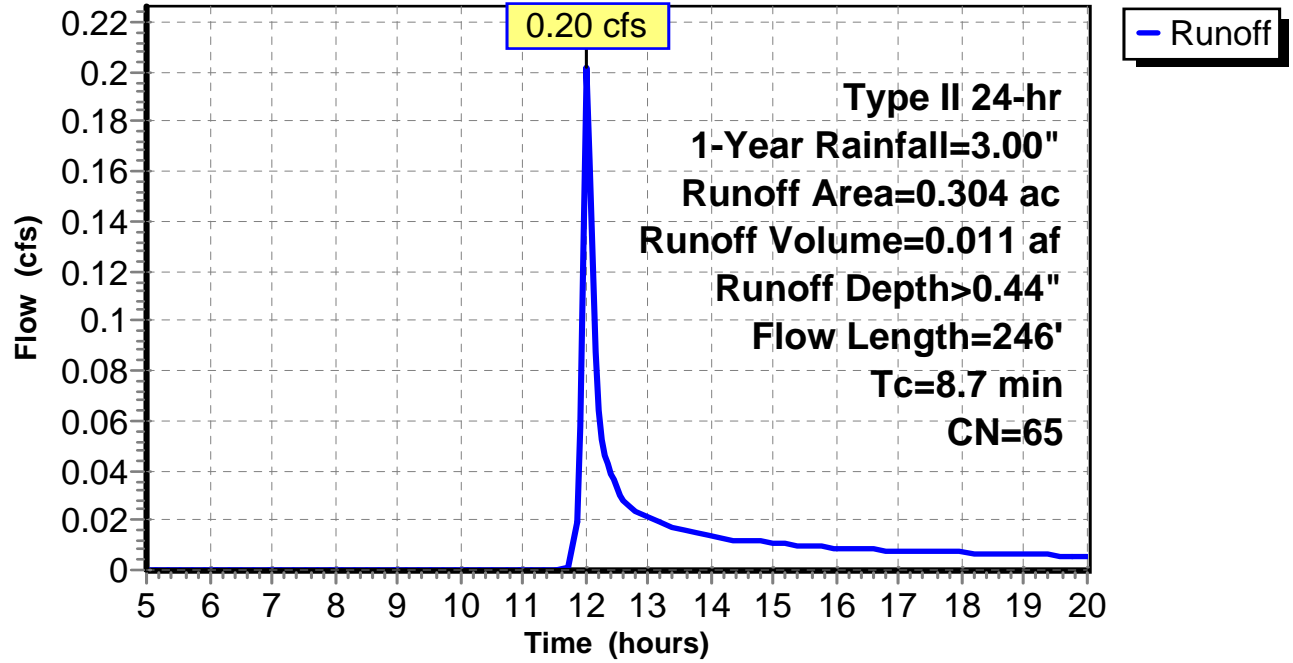
Subcatchment 6: C 162.006

Hydrograph



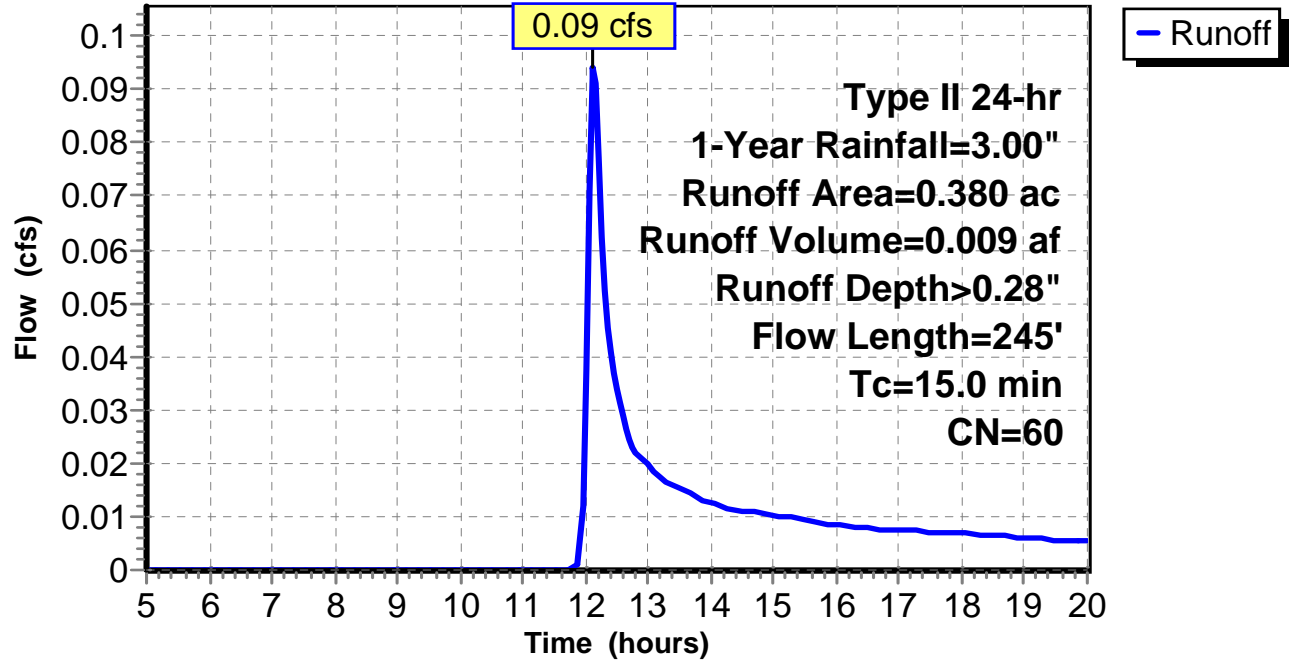
Subcatchment 7: C 162.007

Hydrograph



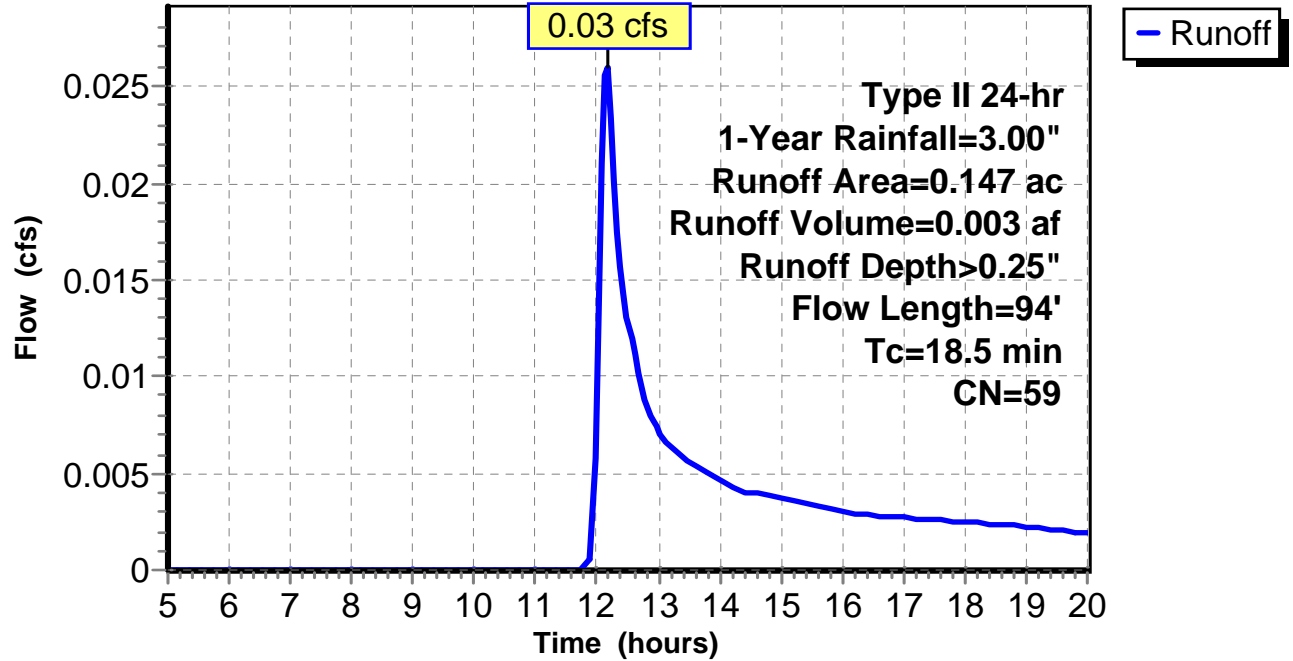
Subcatchment 8: C 162.008

Hydrograph



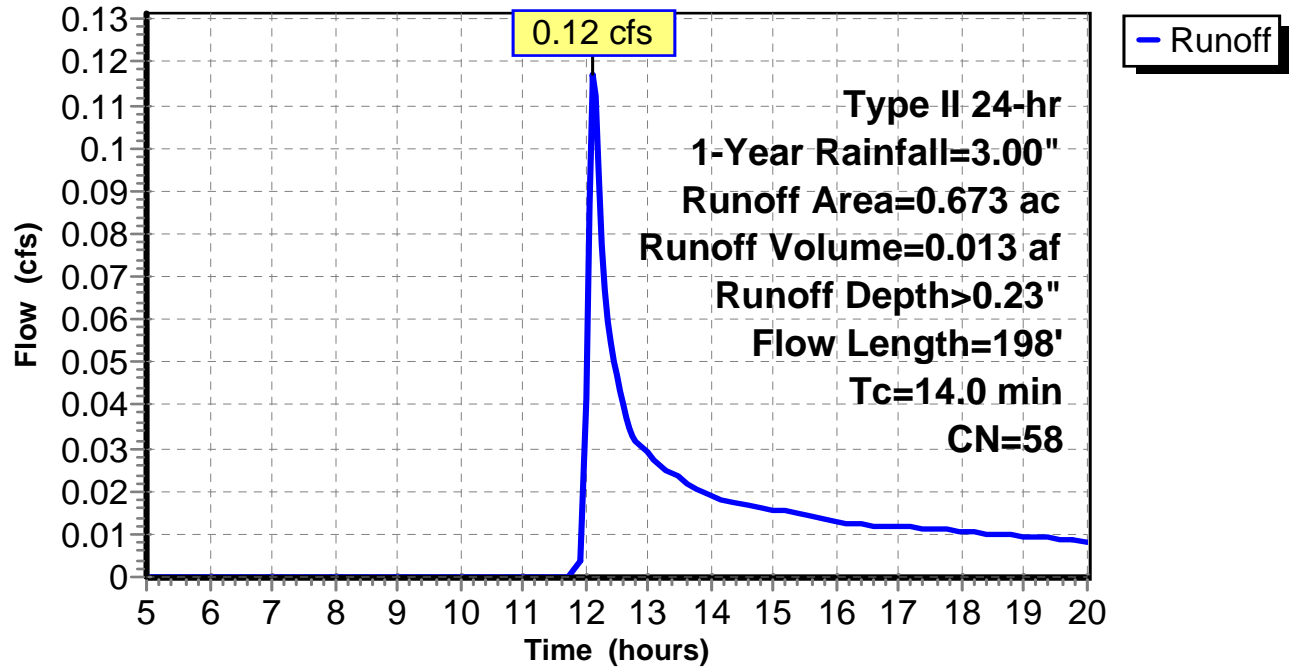
Subcatchment 9: C 162.009

Hydrograph



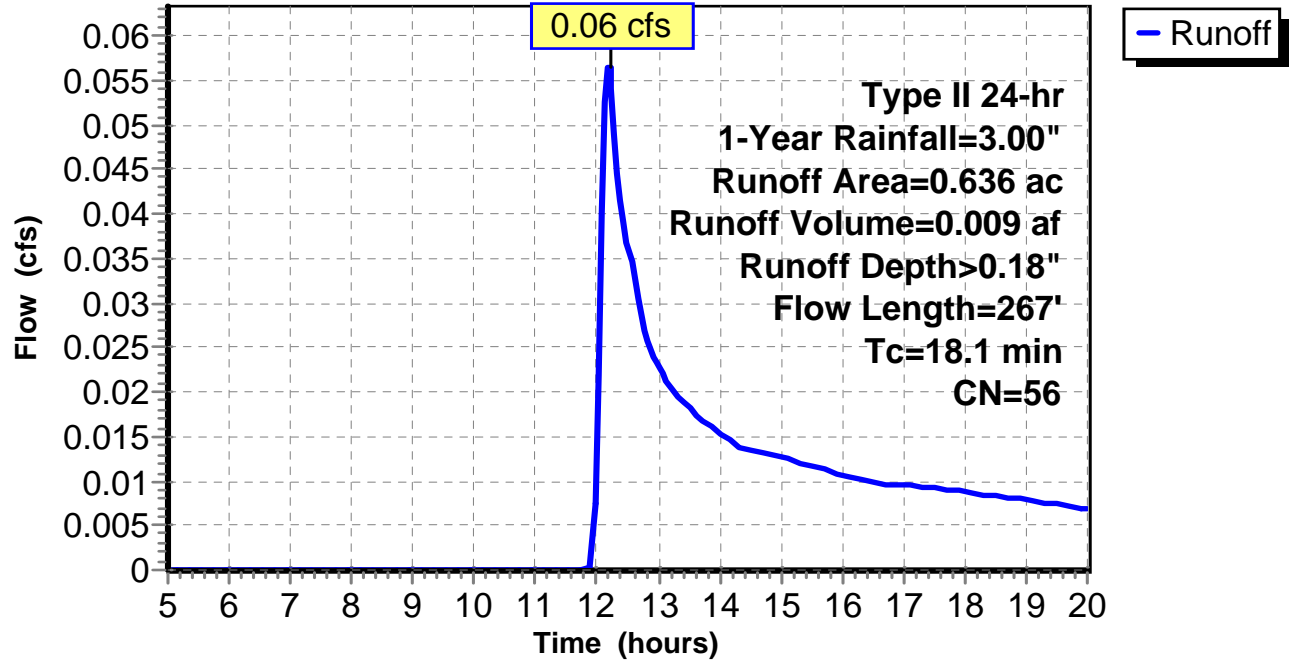
Subcatchment 10: C 162.010

Hydrograph



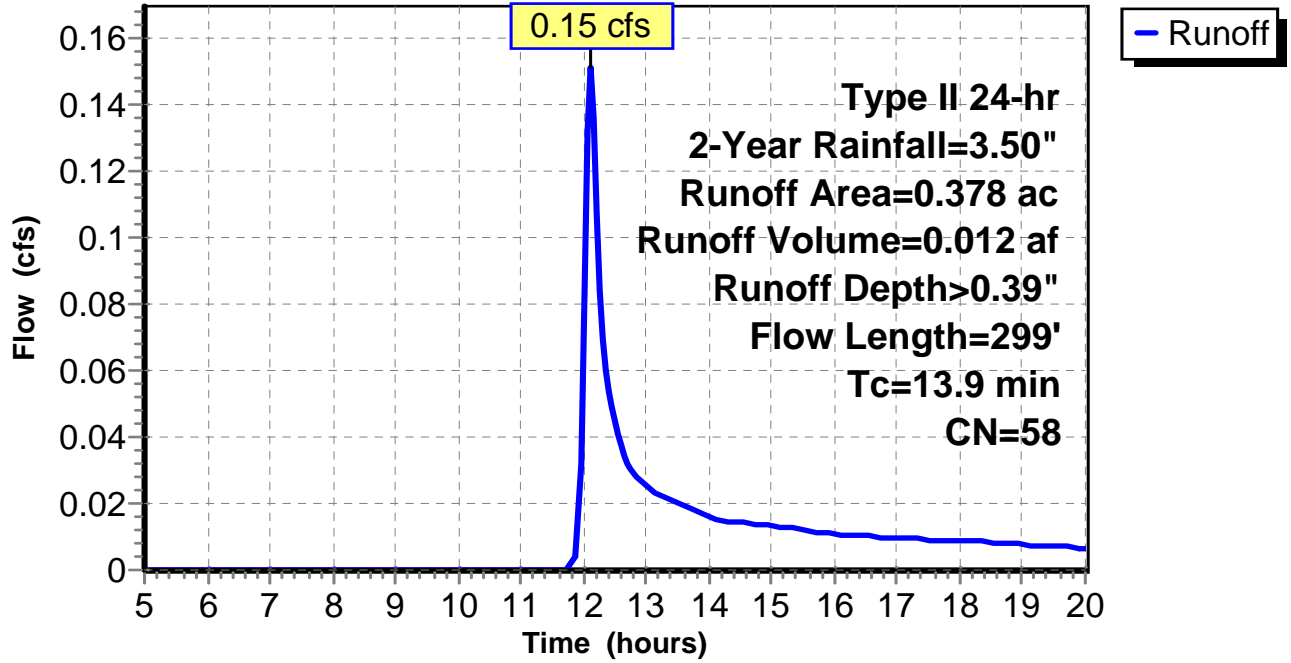
Subcatchment 11: C 162.011

Hydrograph



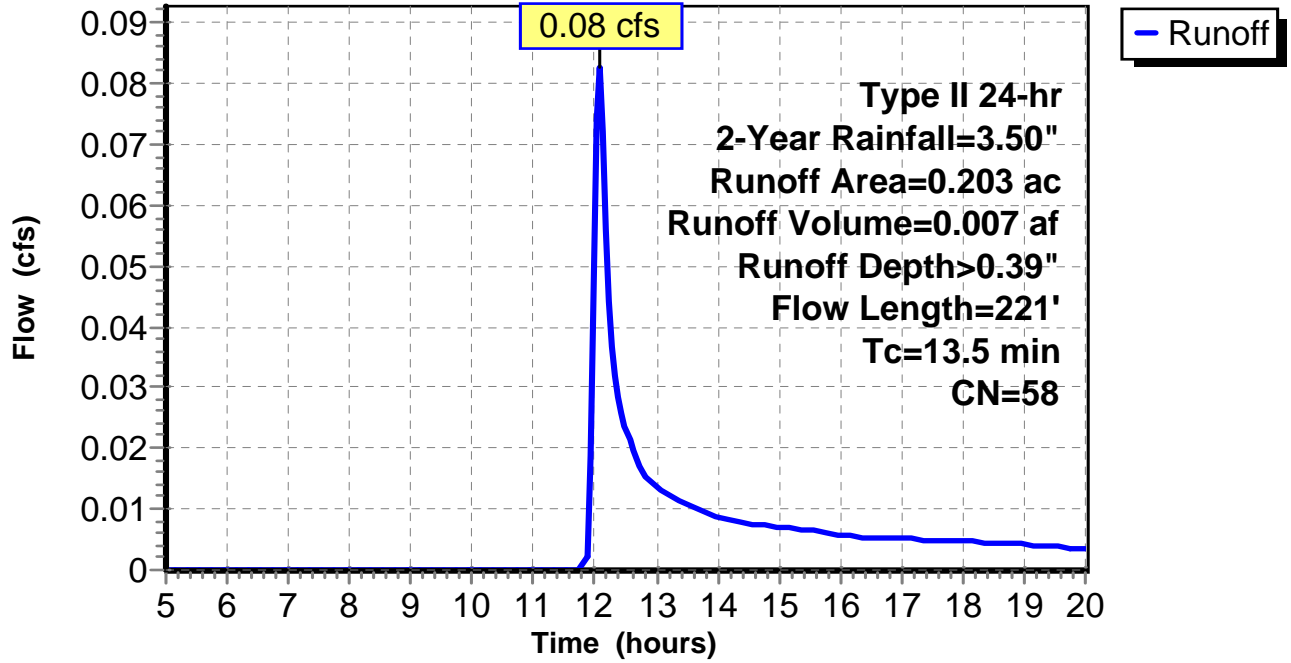
Subcatchment 1: C 162.001

Hydrograph



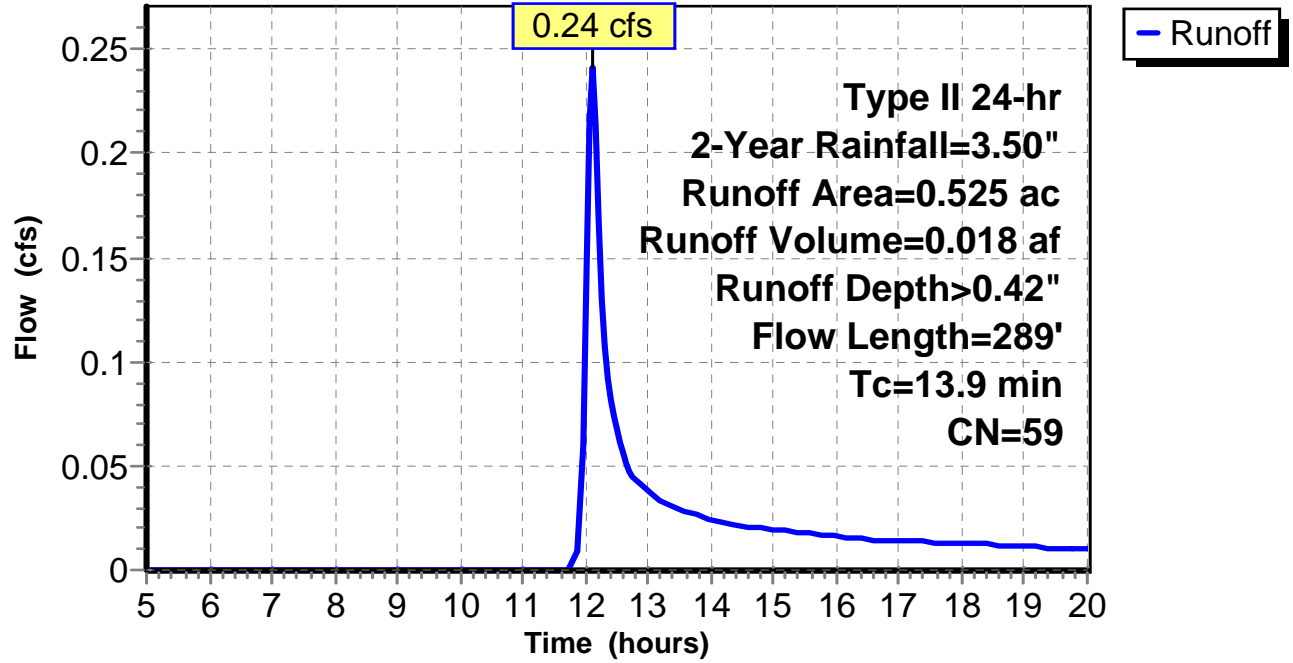
Subcatchment 2: C 162.002

Hydrograph



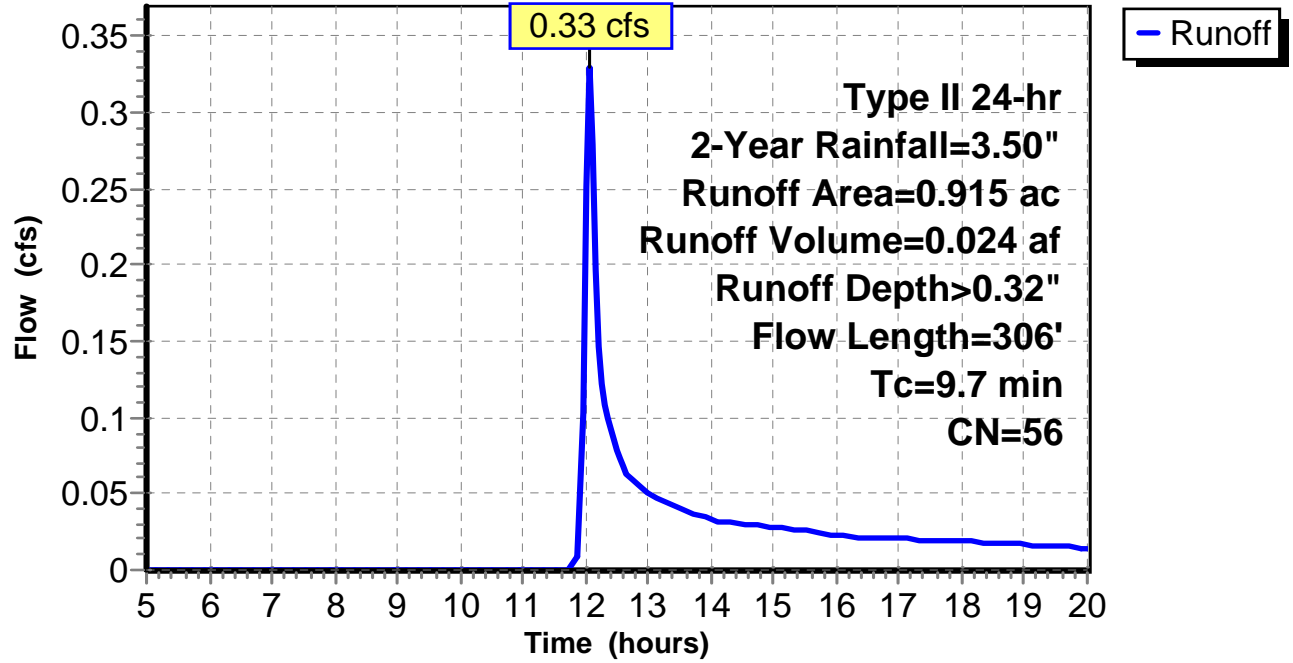
Subcatchment 3: C 162.003

Hydrograph



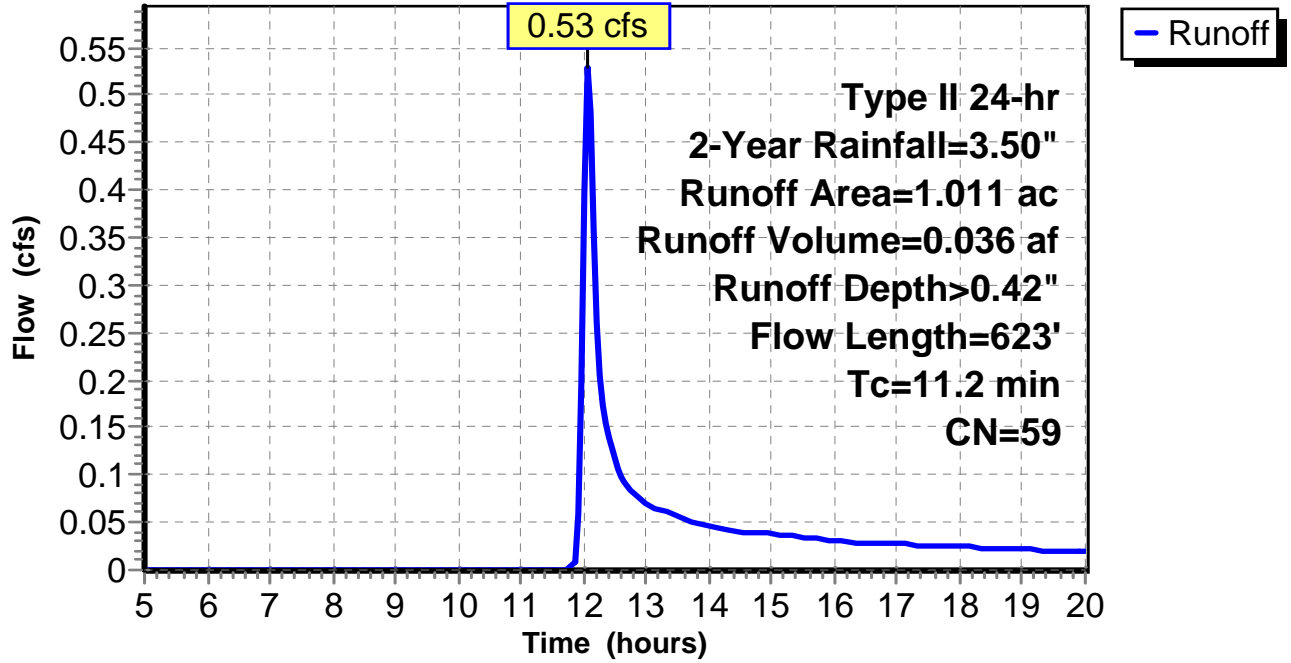
Subcatchment 4: C 162.004

Hydrograph



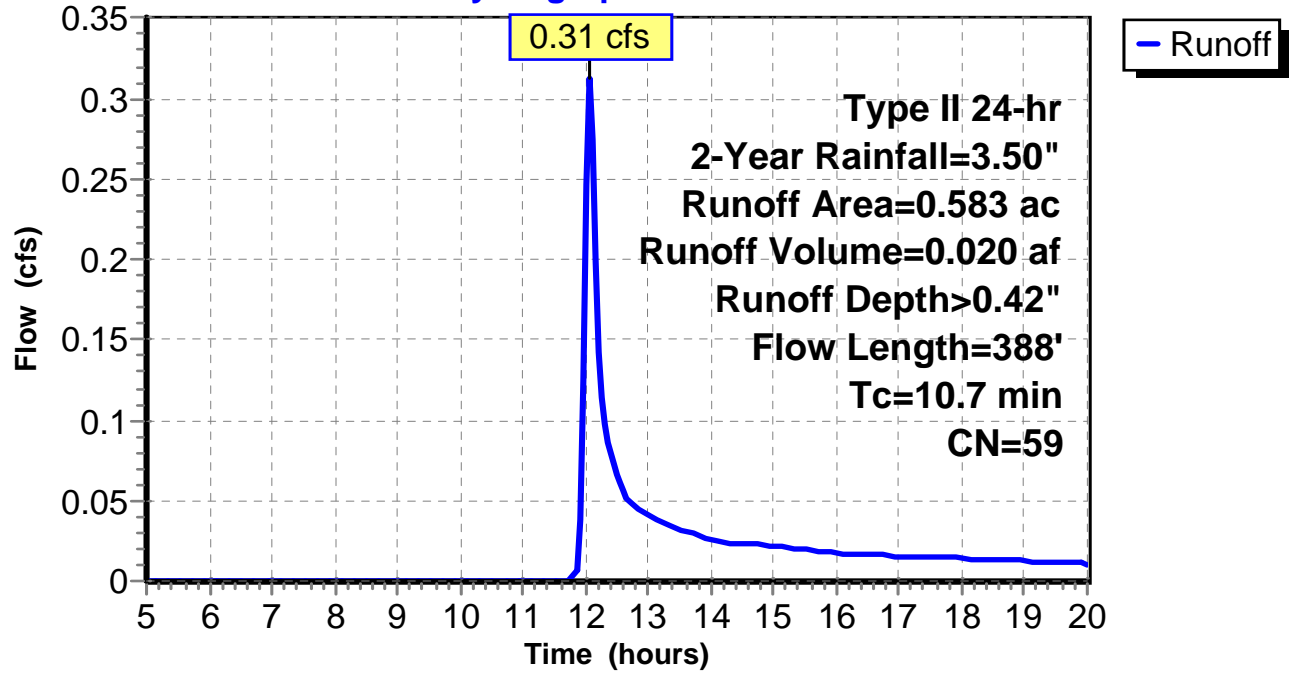
Subcatchment 5: C 162.005

Hydrograph



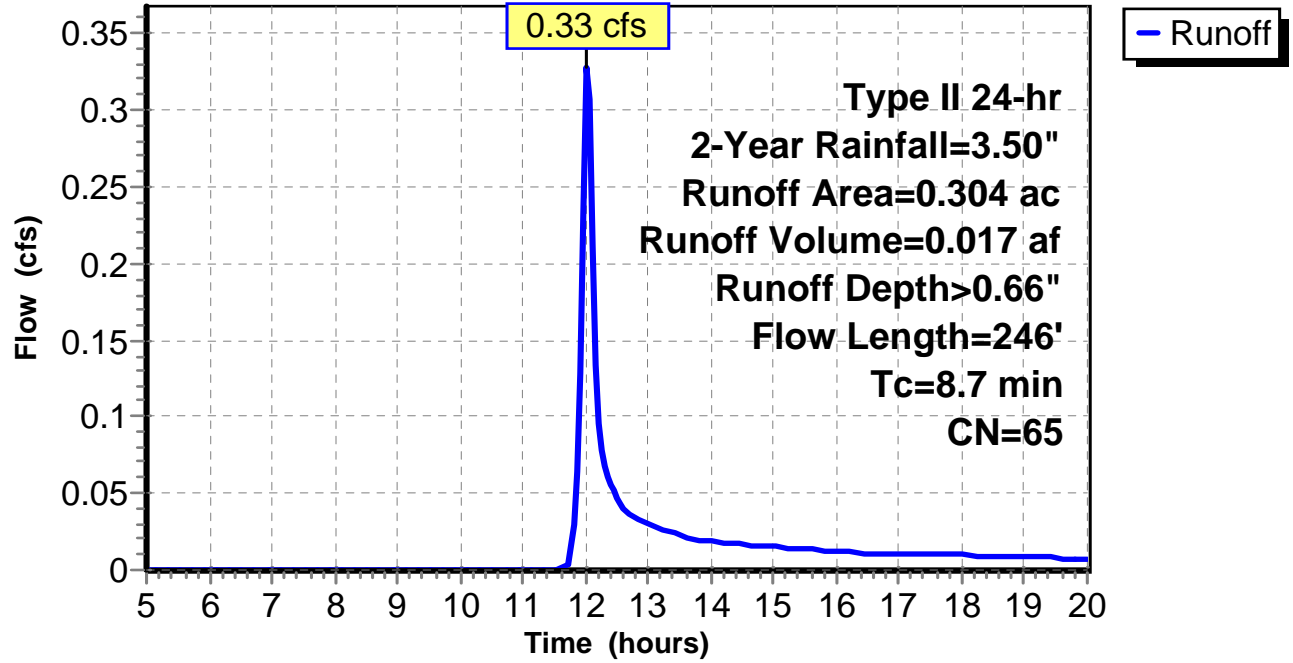
Subcatchment 6: C 162.006

Hydrograph



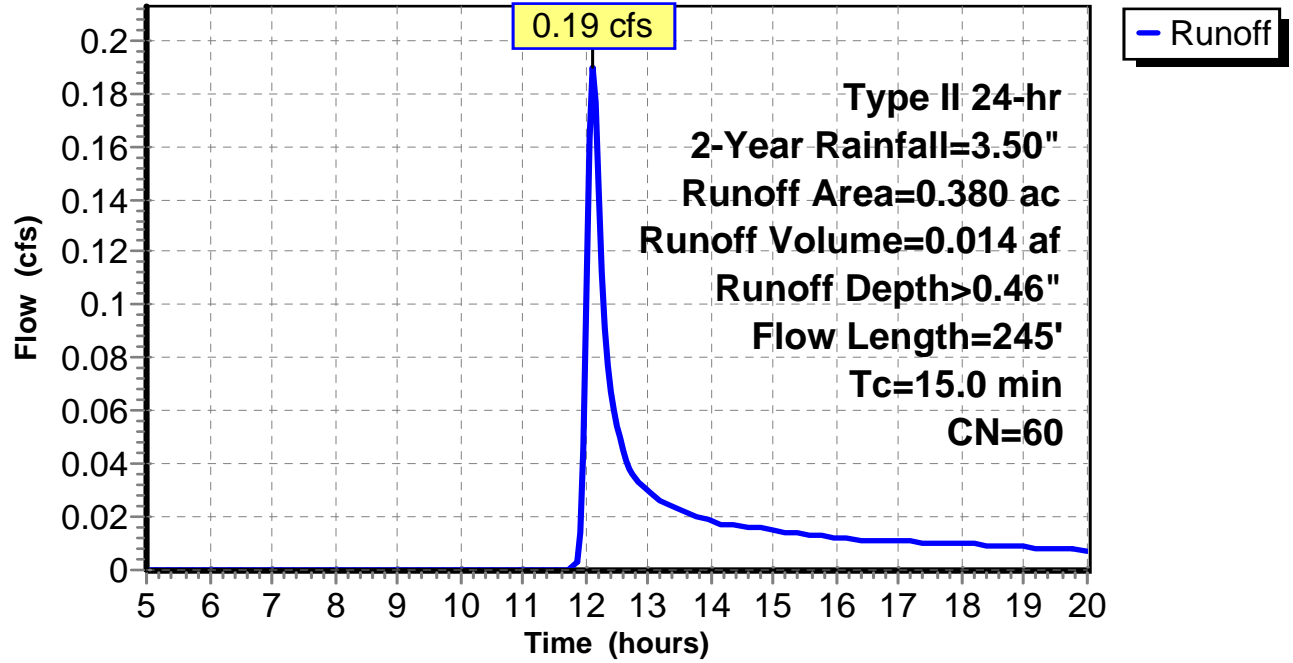
Subcatchment 7: C 162.007

Hydrograph



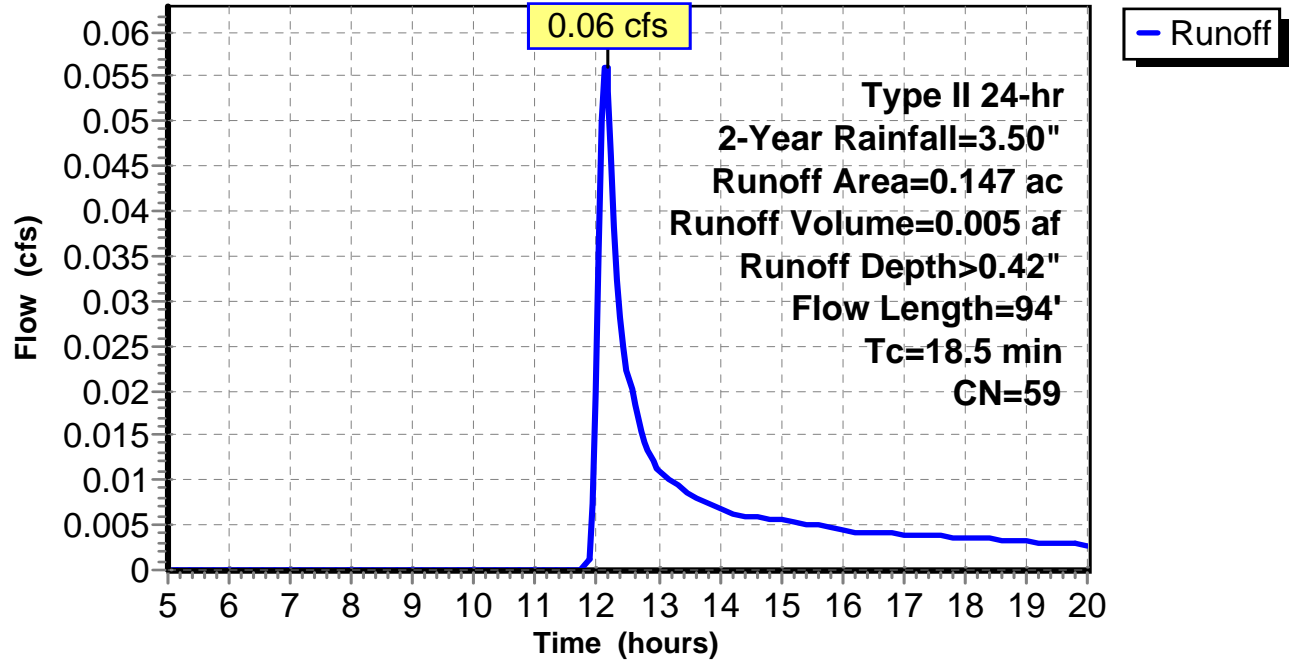
Subcatchment 8: C 162.008

Hydrograph



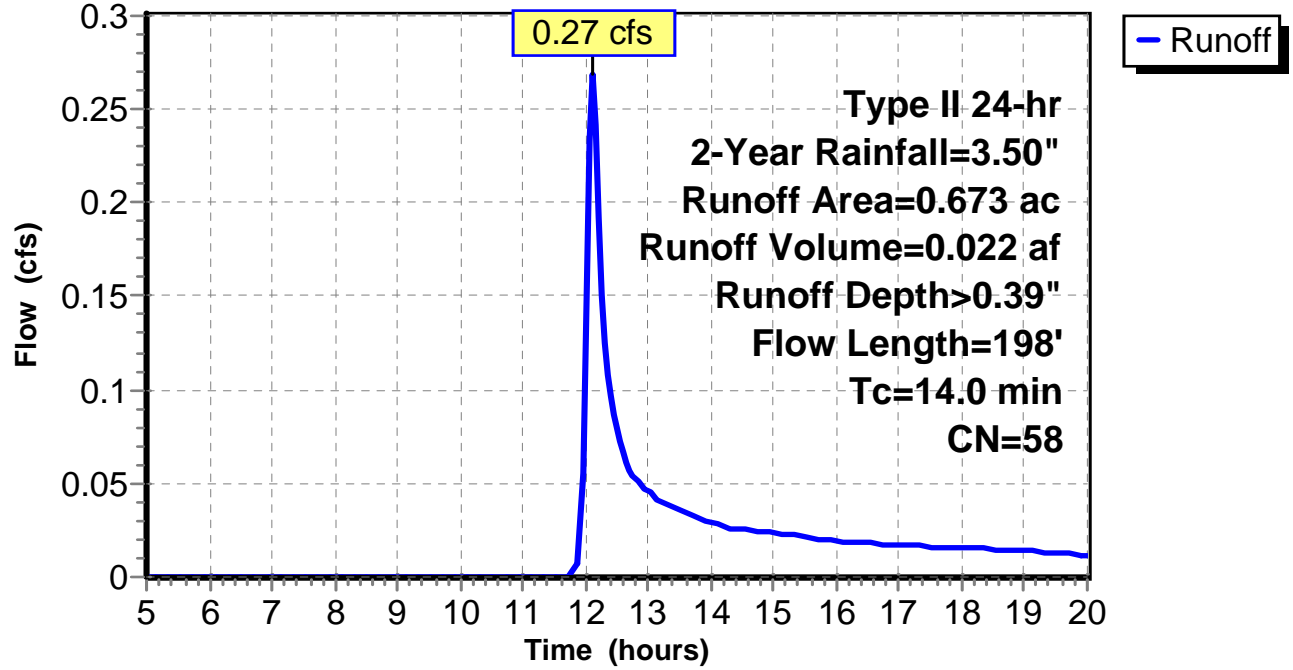
Subcatchment 9: C 162.009

Hydrograph



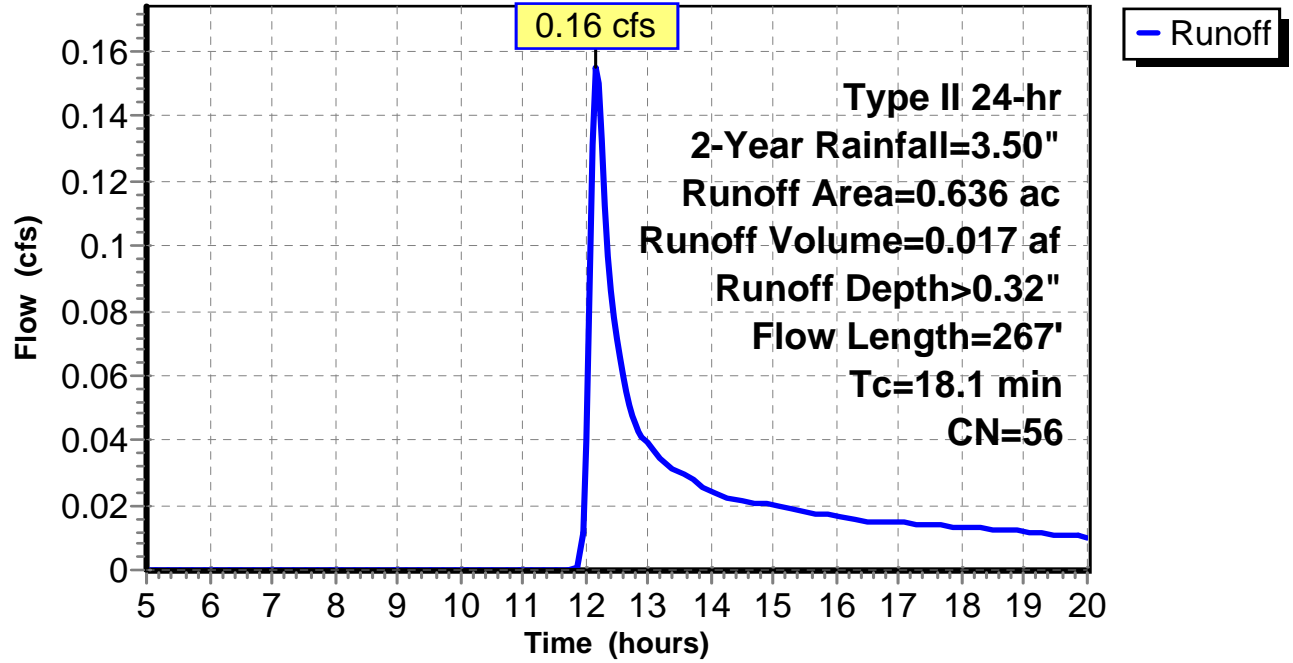
Subcatchment 10: C 162.010

Hydrograph



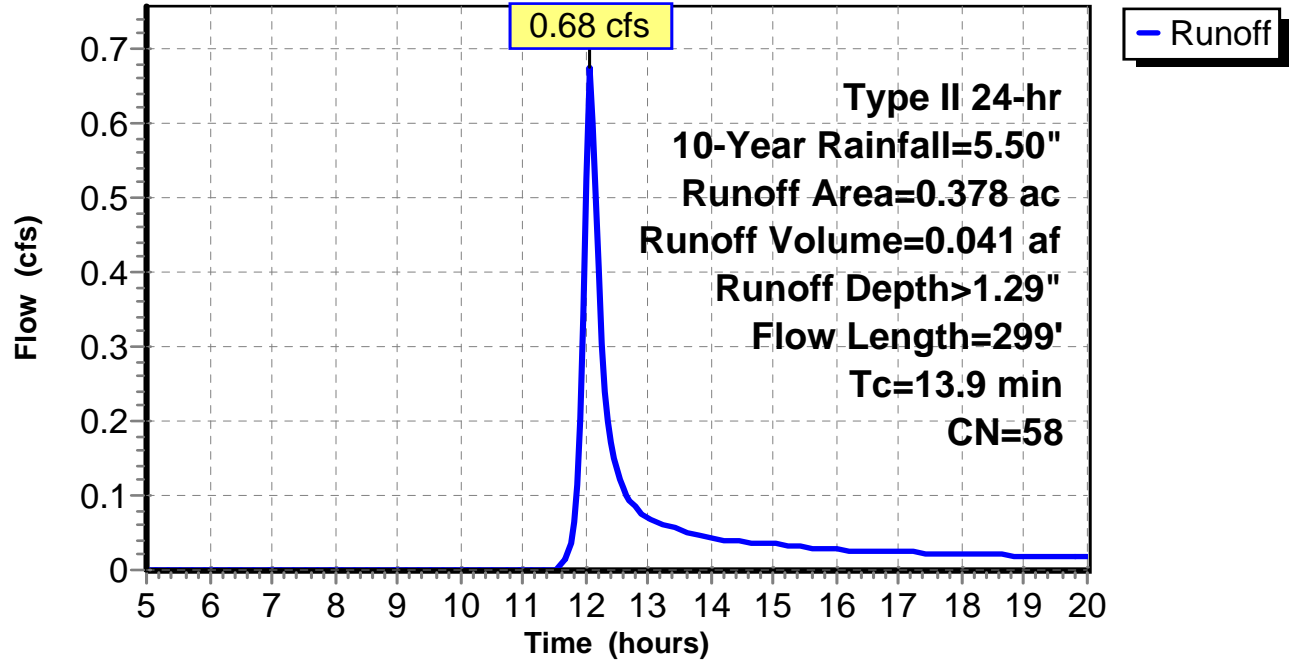
Subcatchment 11: C 162.011

Hydrograph



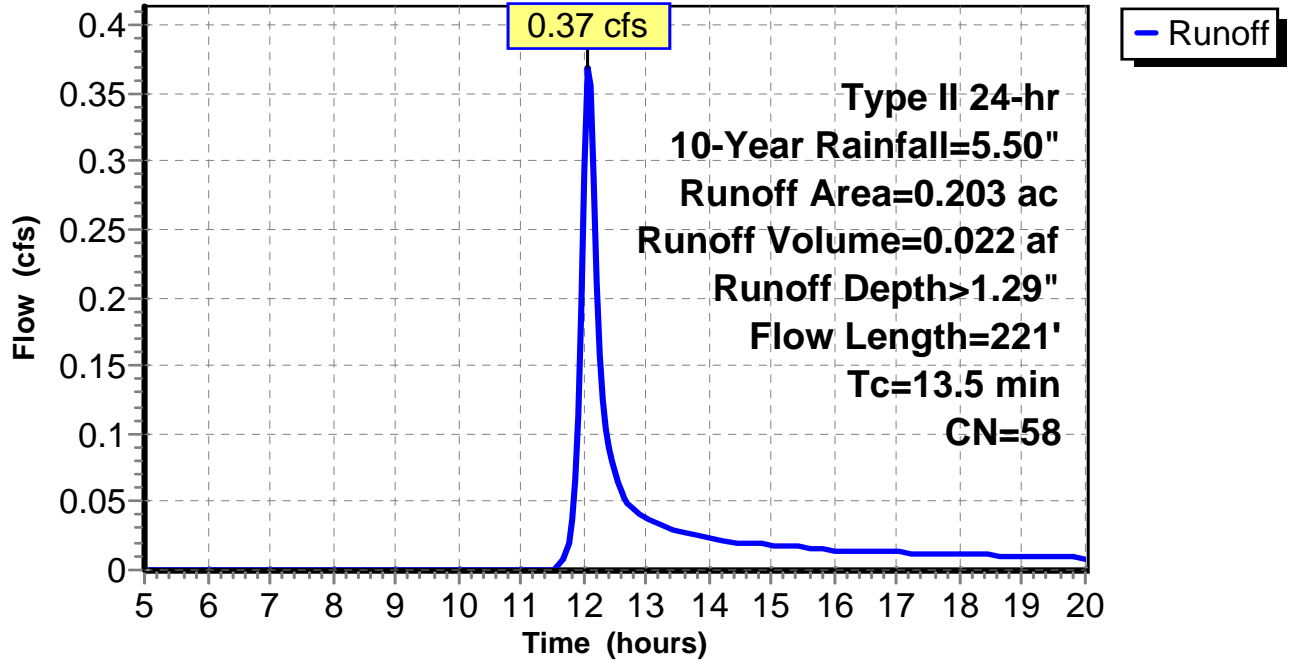
Subcatchment 1: C 162.001

Hydrograph



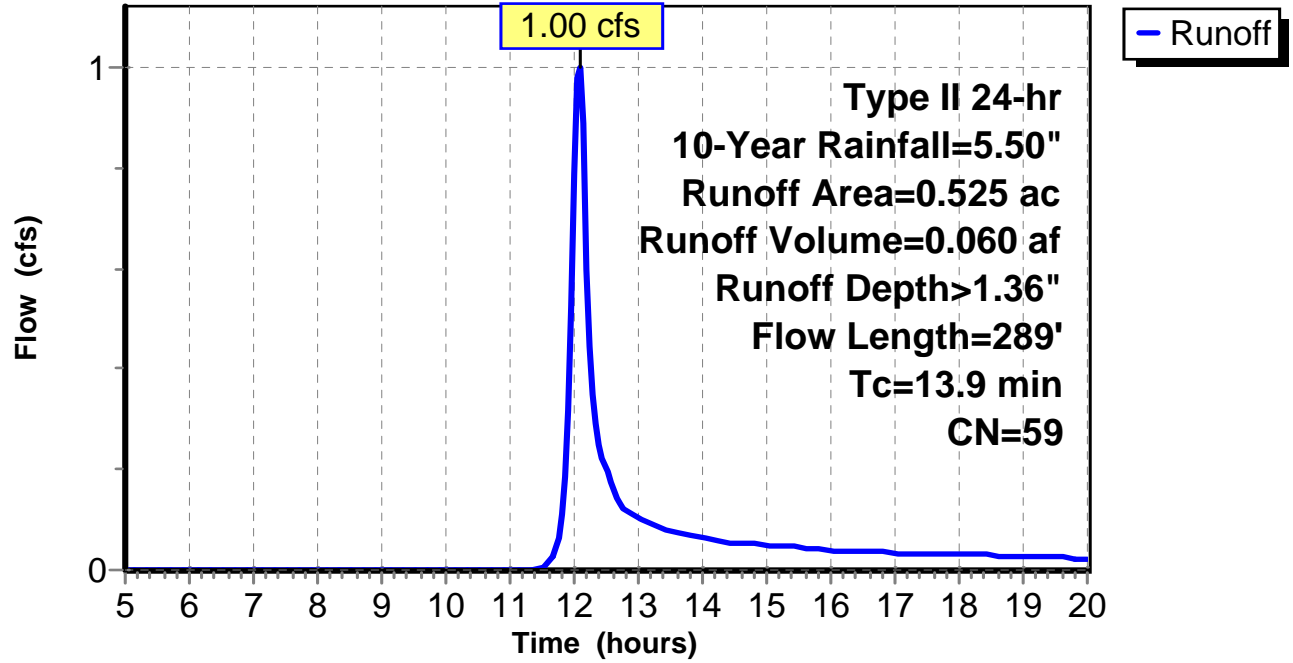
Subcatchment 2: C 162.002

Hydrograph



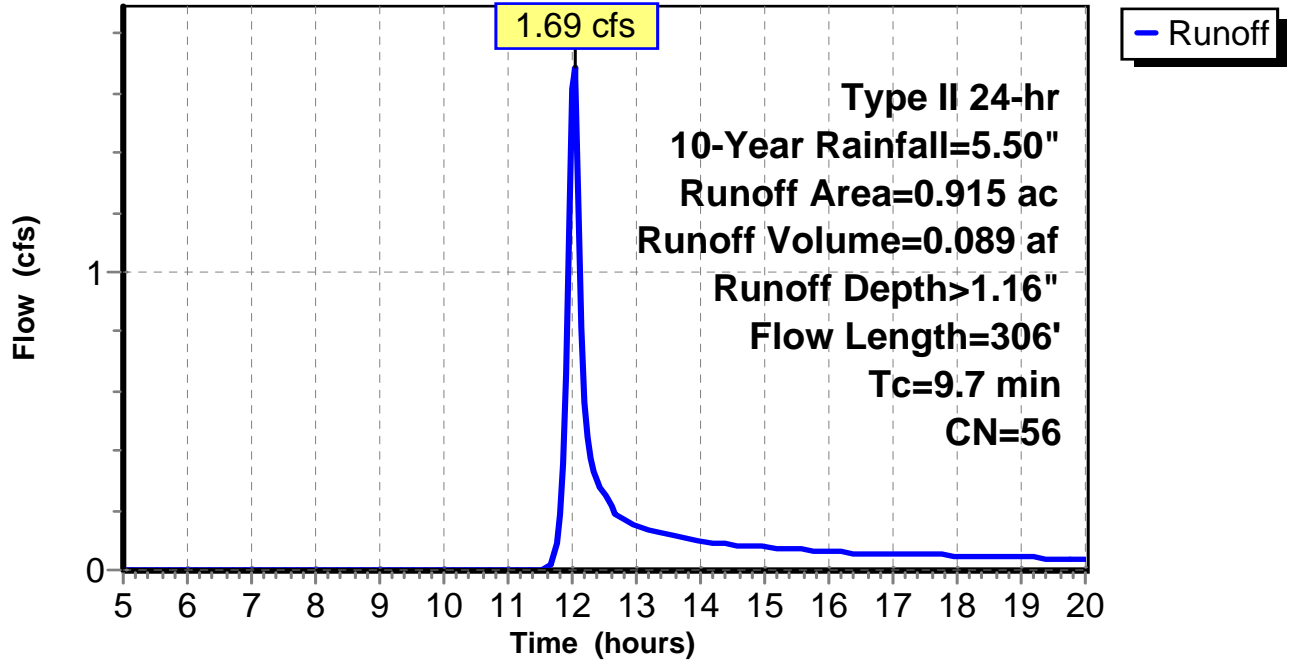
Subcatchment 3: C 162.003

Hydrograph



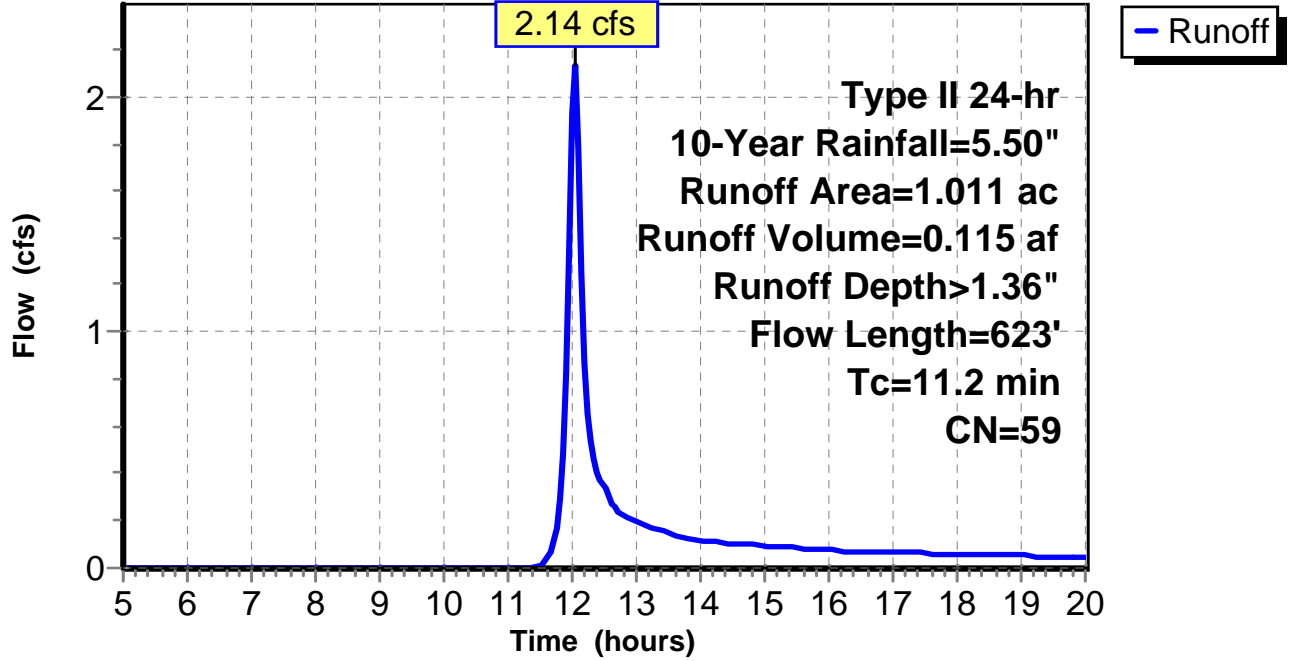
Subcatchment 4: C 162.004

Hydrograph



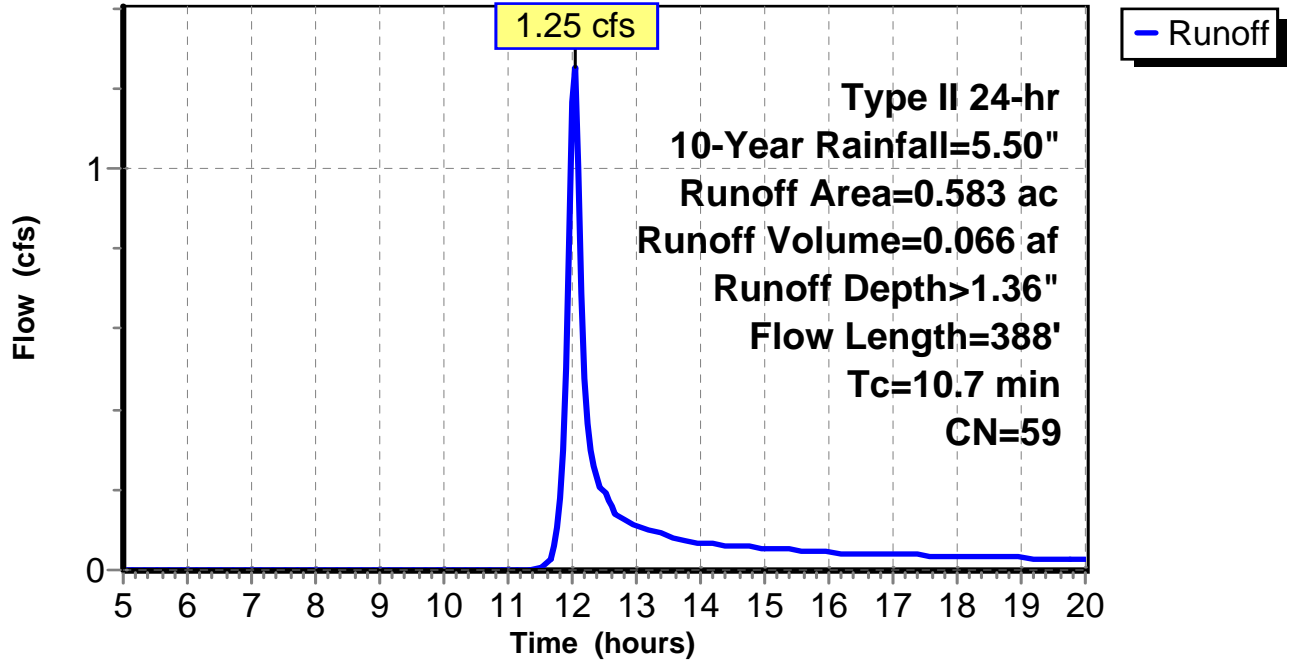
Subcatchment 5: C 162.005

Hydrograph



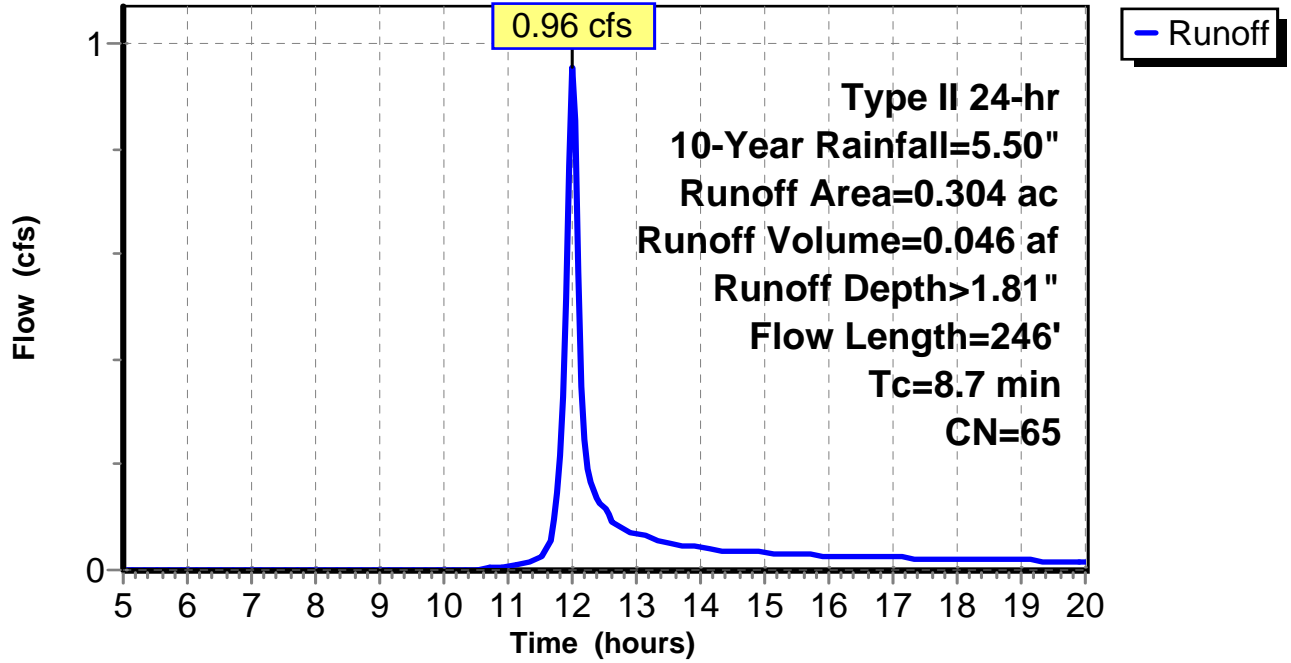
Subcatchment 6: C 162.006

Hydrograph



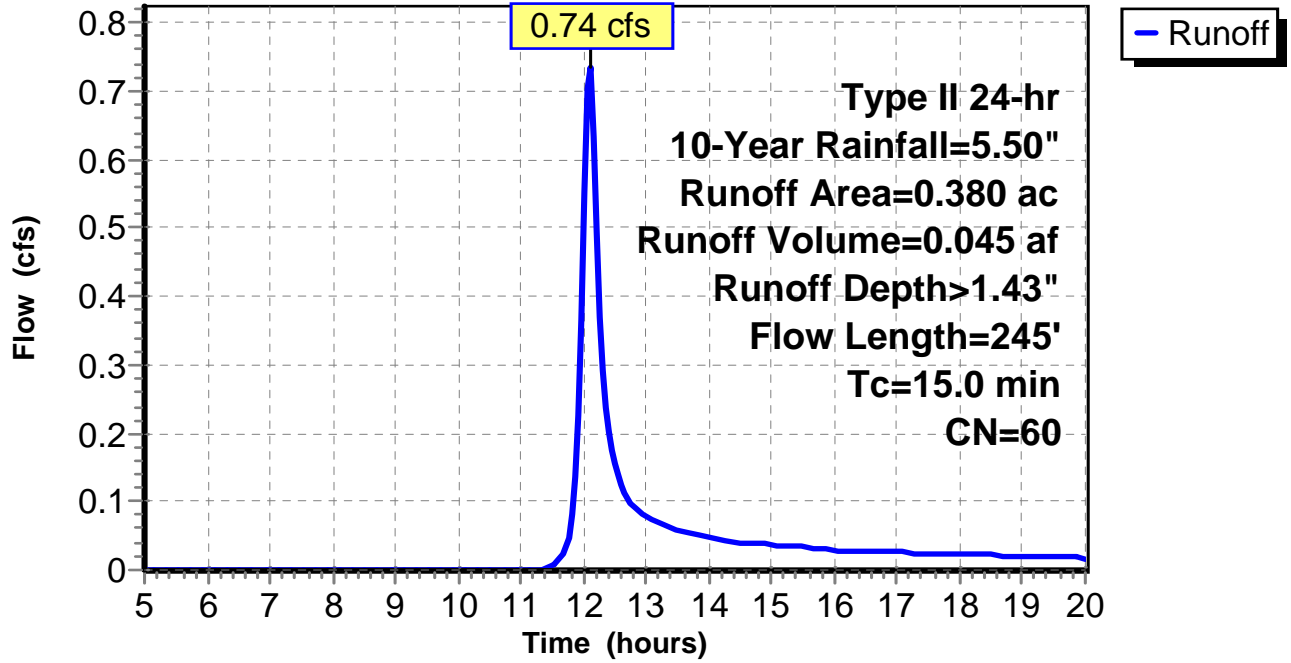
Subcatchment 7: C 162.007

Hydrograph



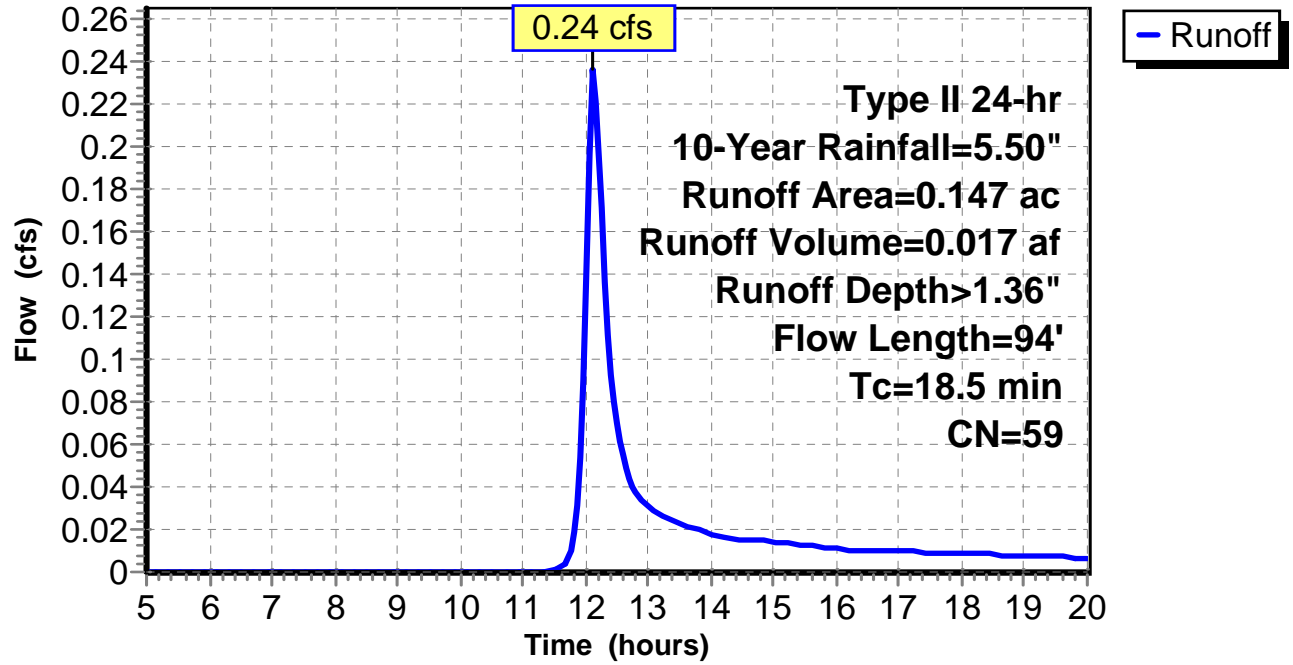
Subcatchment 8: C 162.008

Hydrograph



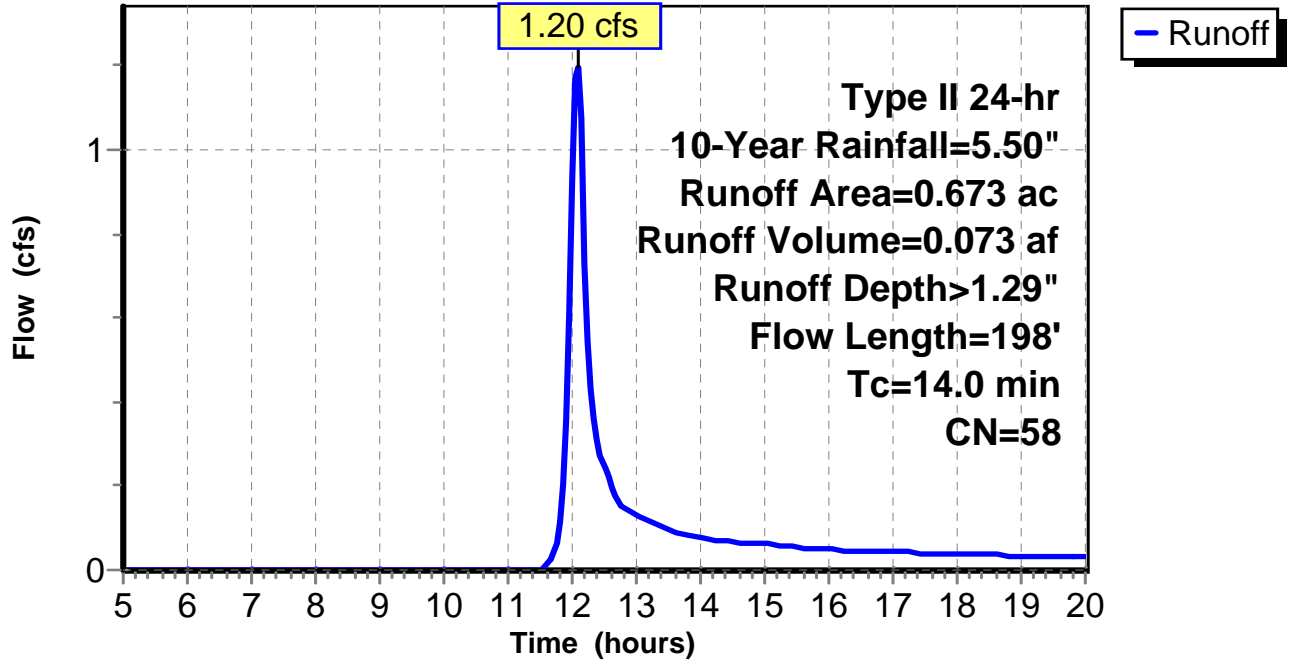
Subcatchment 9: C 162.009

Hydrograph



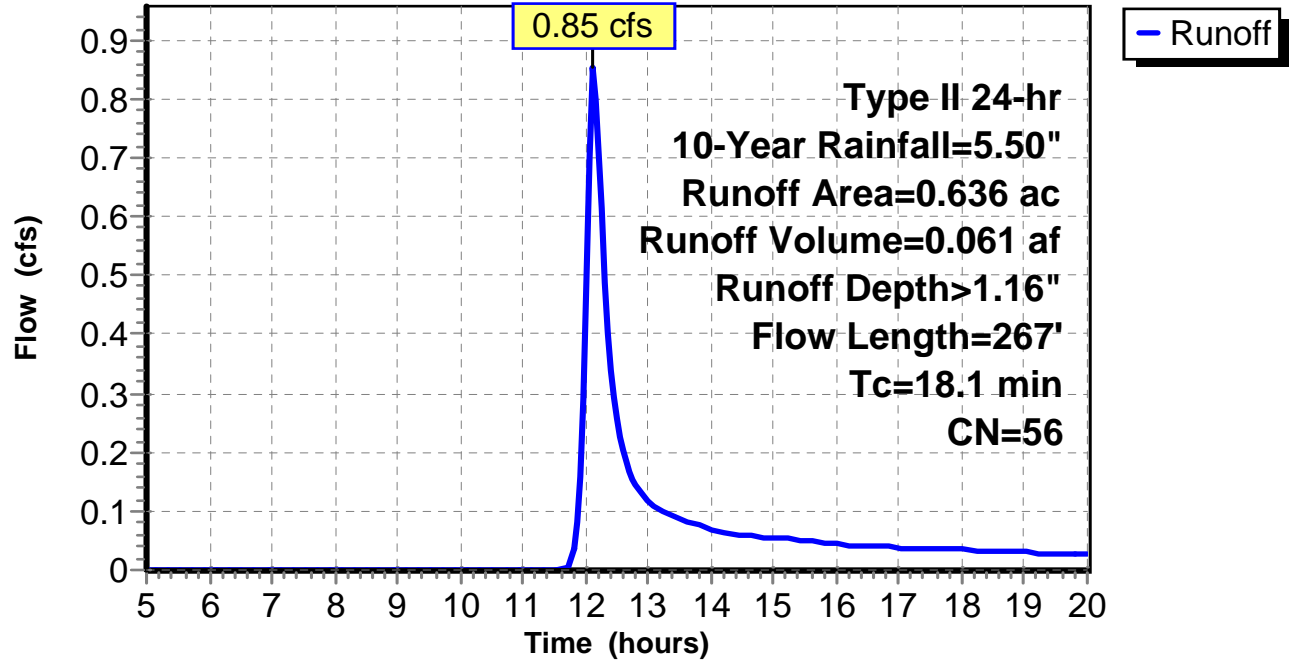
Subcatchment 10: C 162.010

Hydrograph



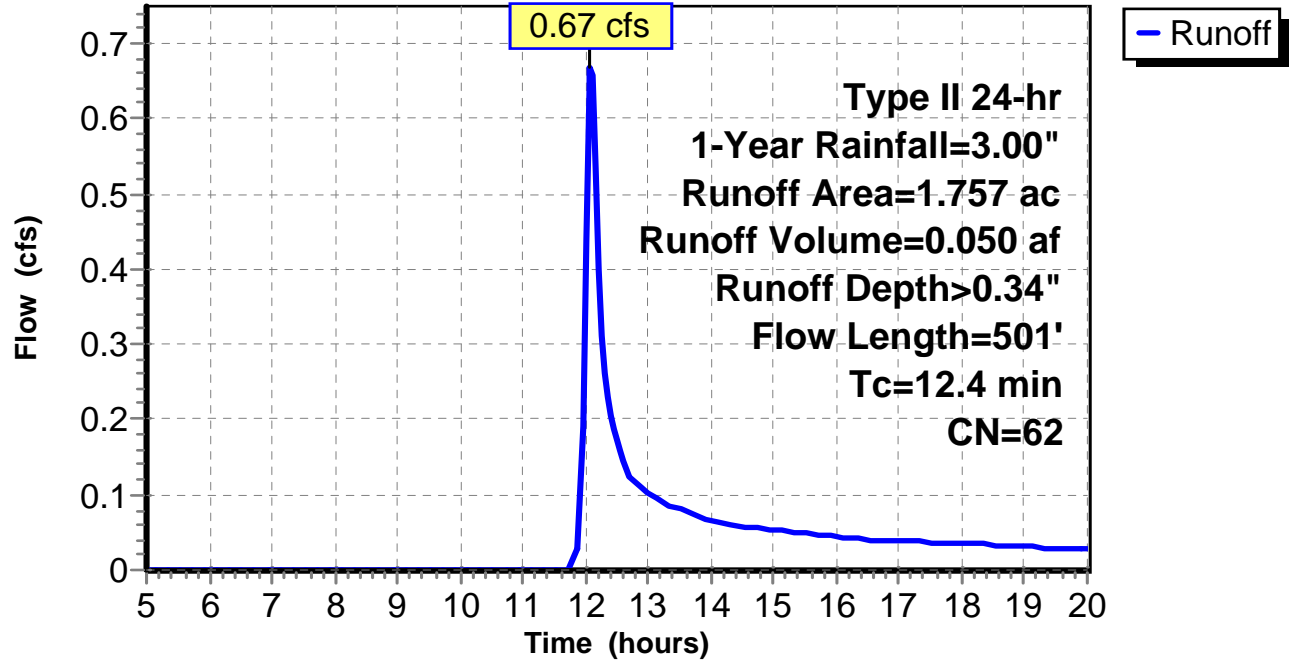
Subcatchment 11: C 162.011

Hydrograph



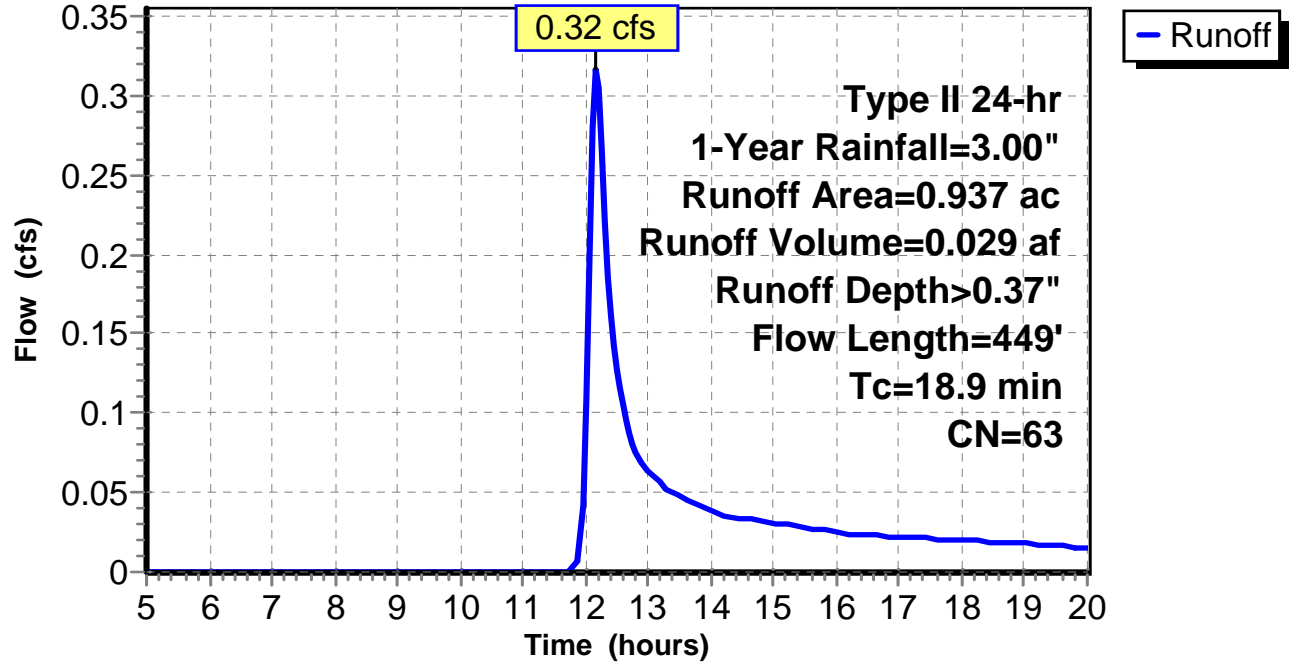
Subcatchment 1: C 166.001

Hydrograph



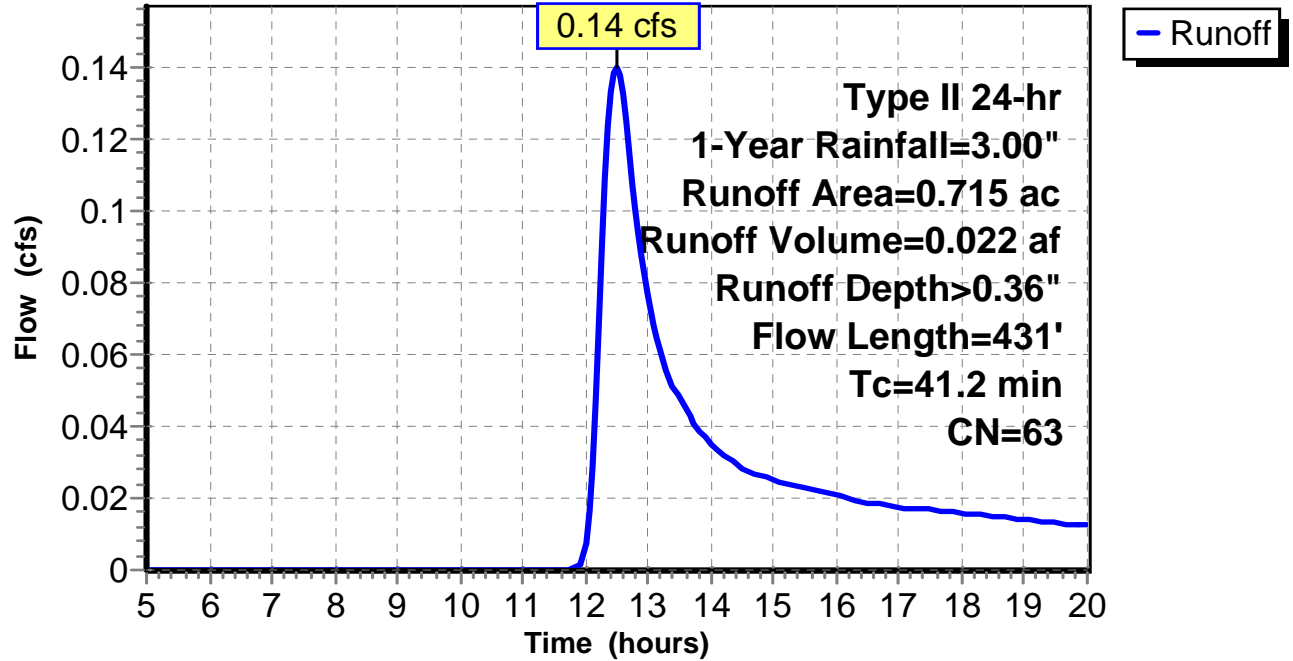
Subcatchment 2: C 166.002

Hydrograph



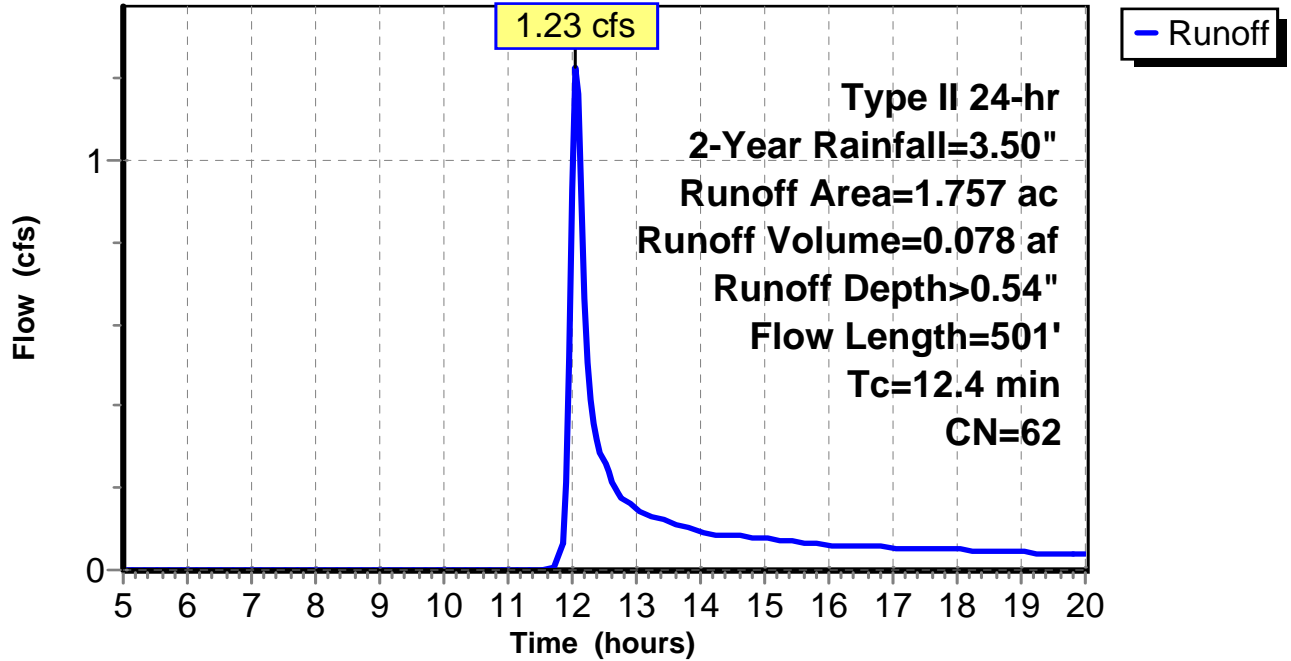
Subcatchment 3: C 166.003

Hydrograph



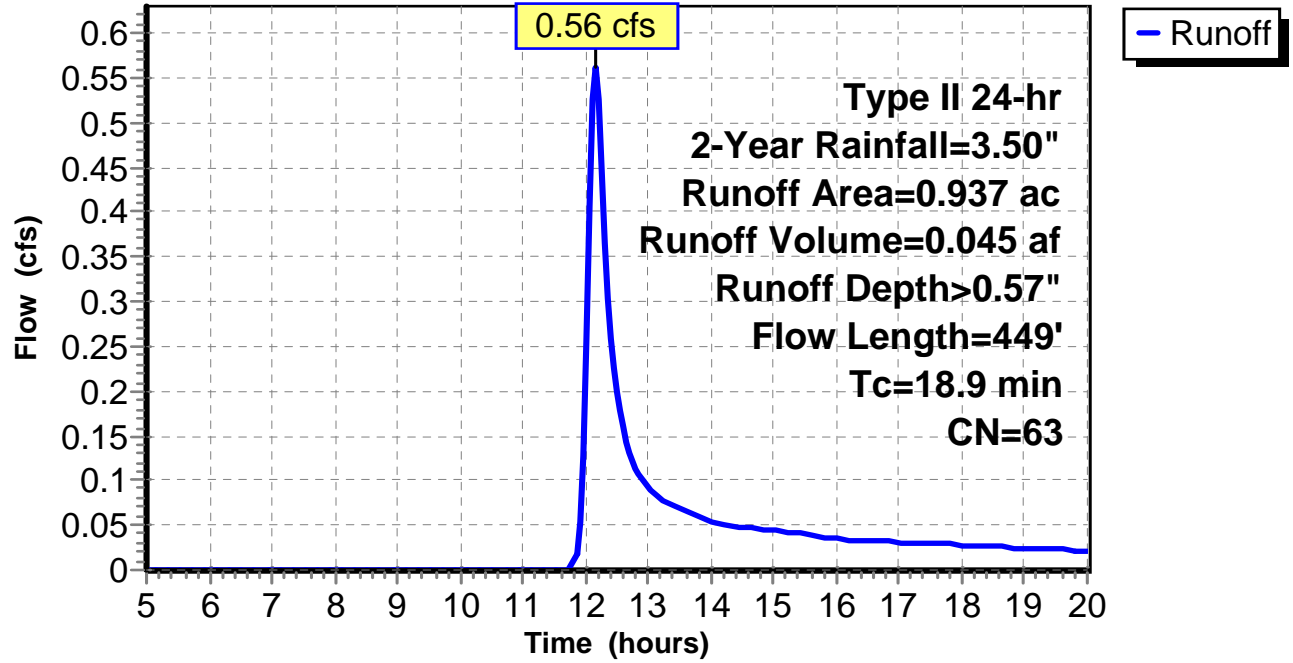
Subcatchment 1: C 166.001

Hydrograph



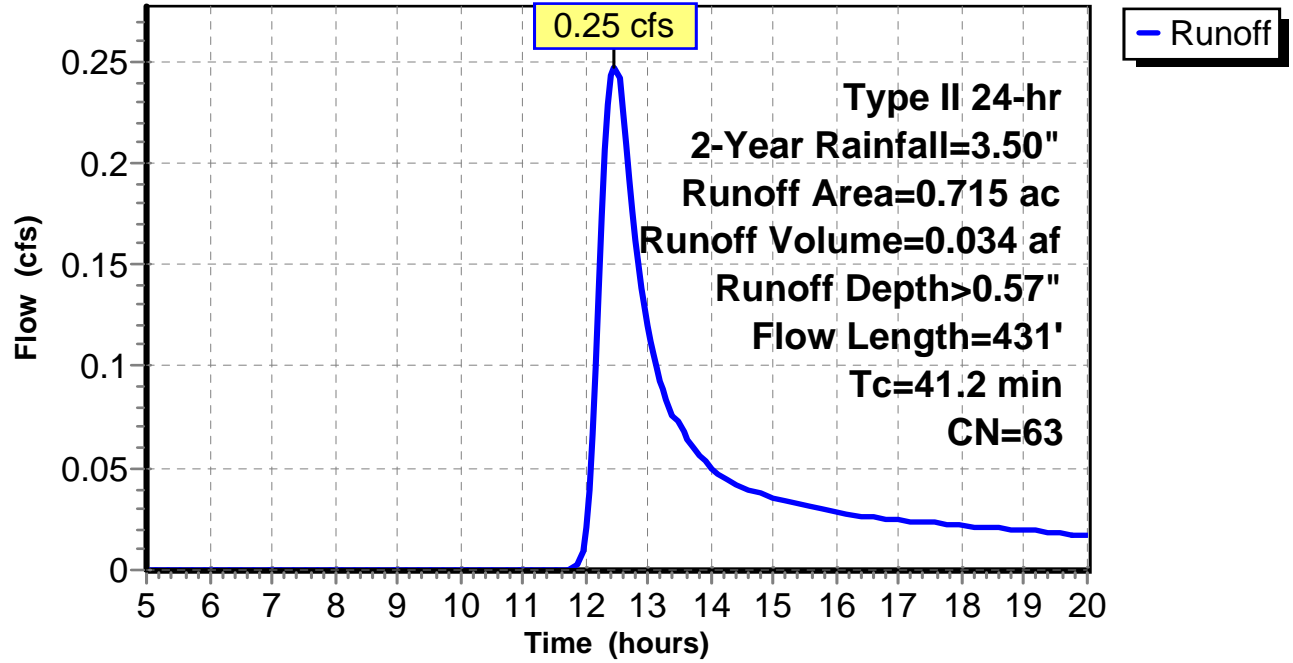
Subcatchment 2: C 166.002

Hydrograph



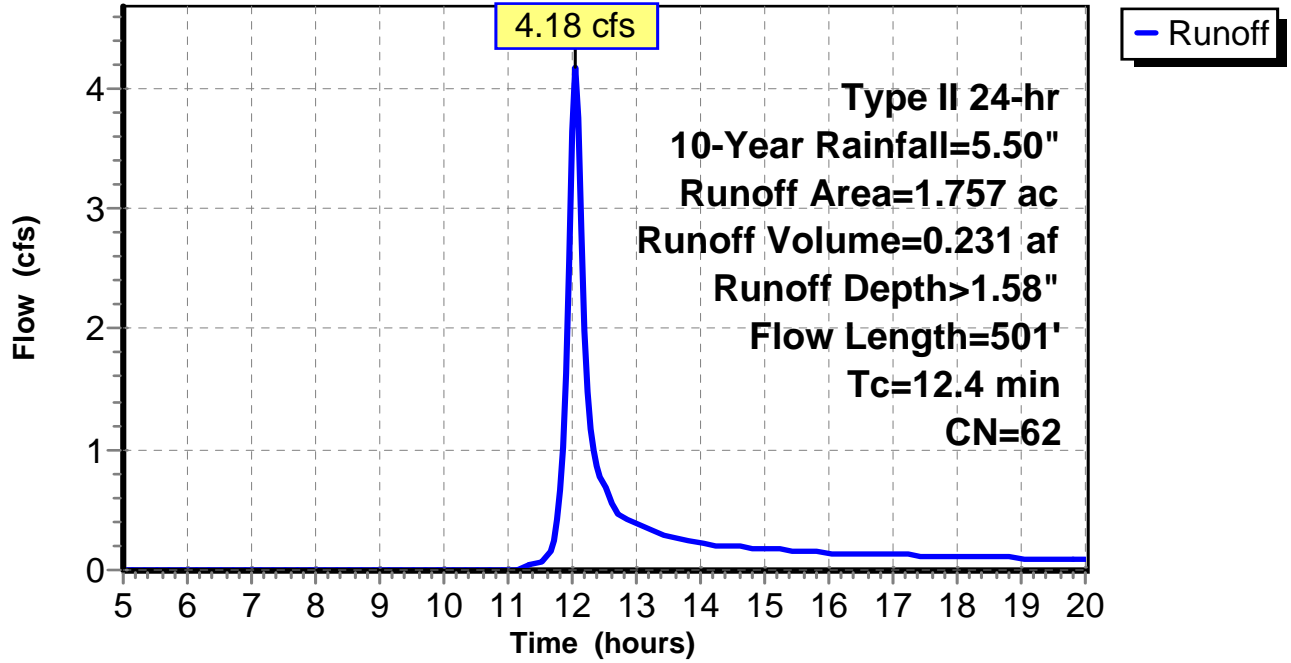
Subcatchment 3: C 166.003

Hydrograph



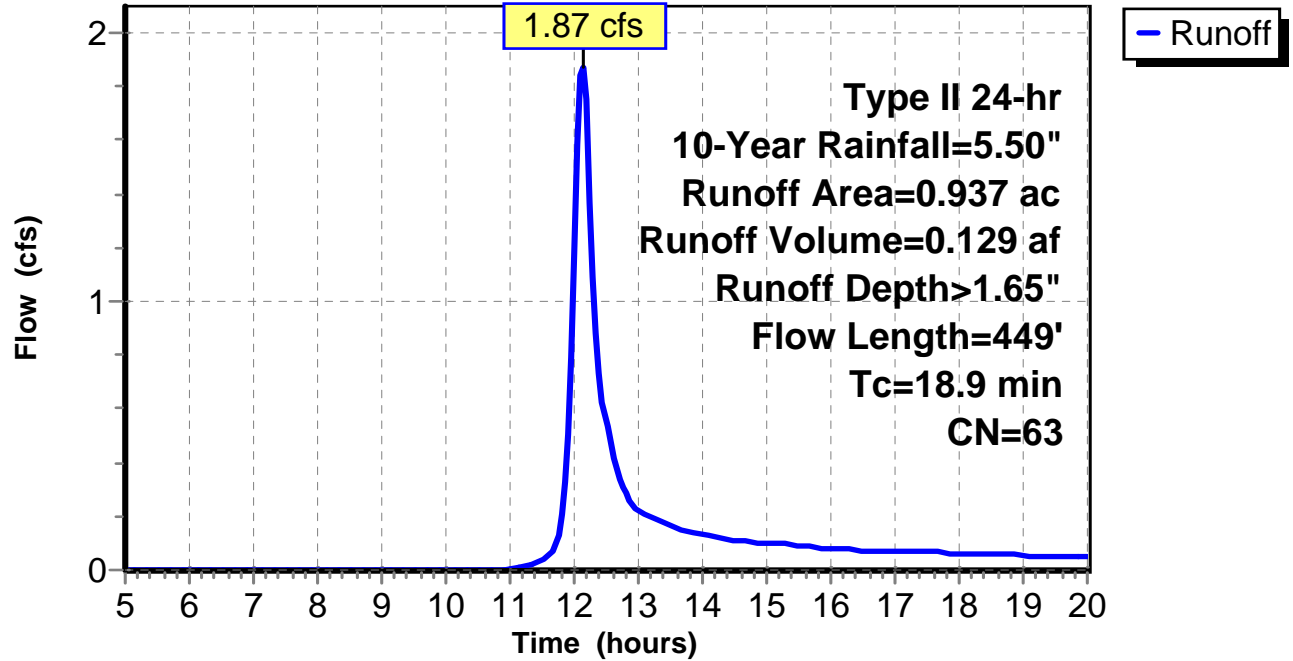
Subcatchment 1: C 166.001

Hydrograph



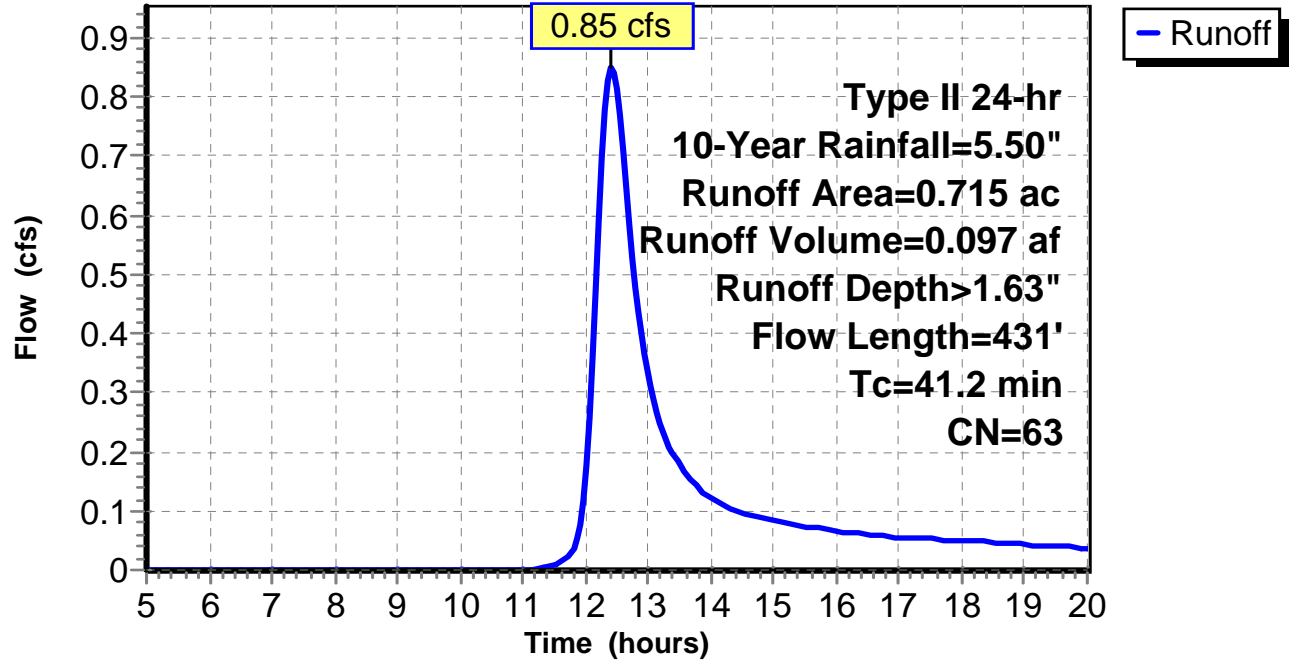
Subcatchment 2: C 166.002

Hydrograph



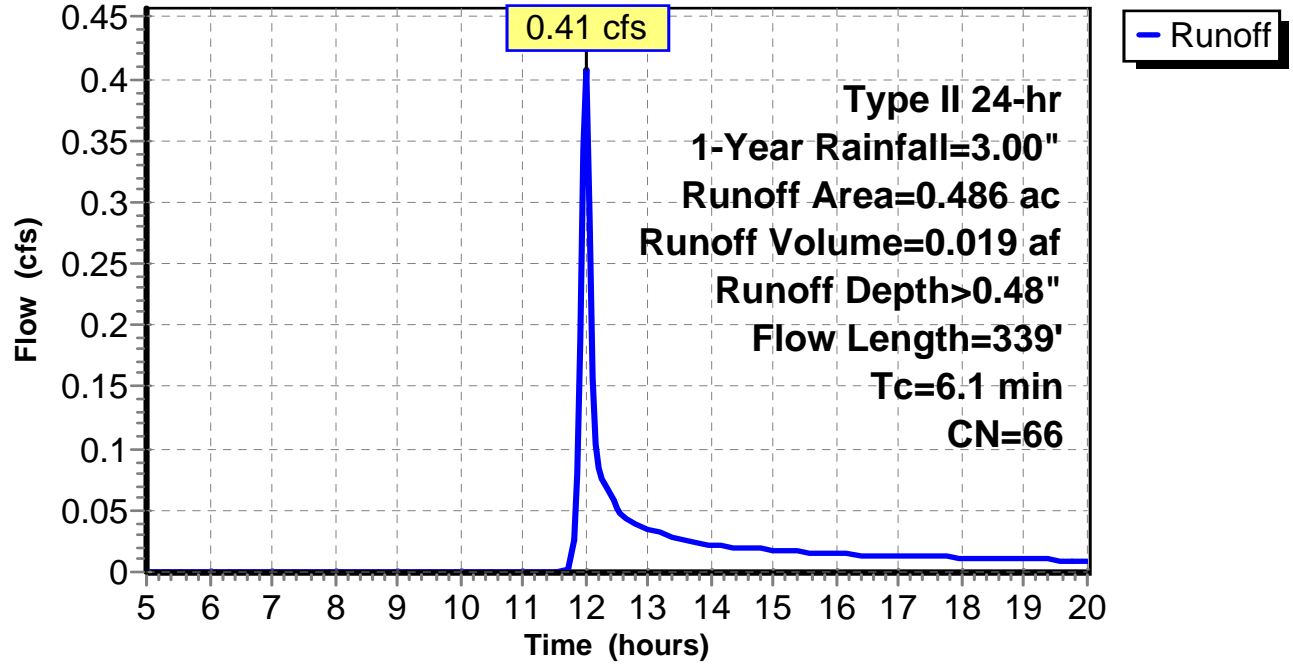
Subcatchment 3: C 166.003

Hydrograph



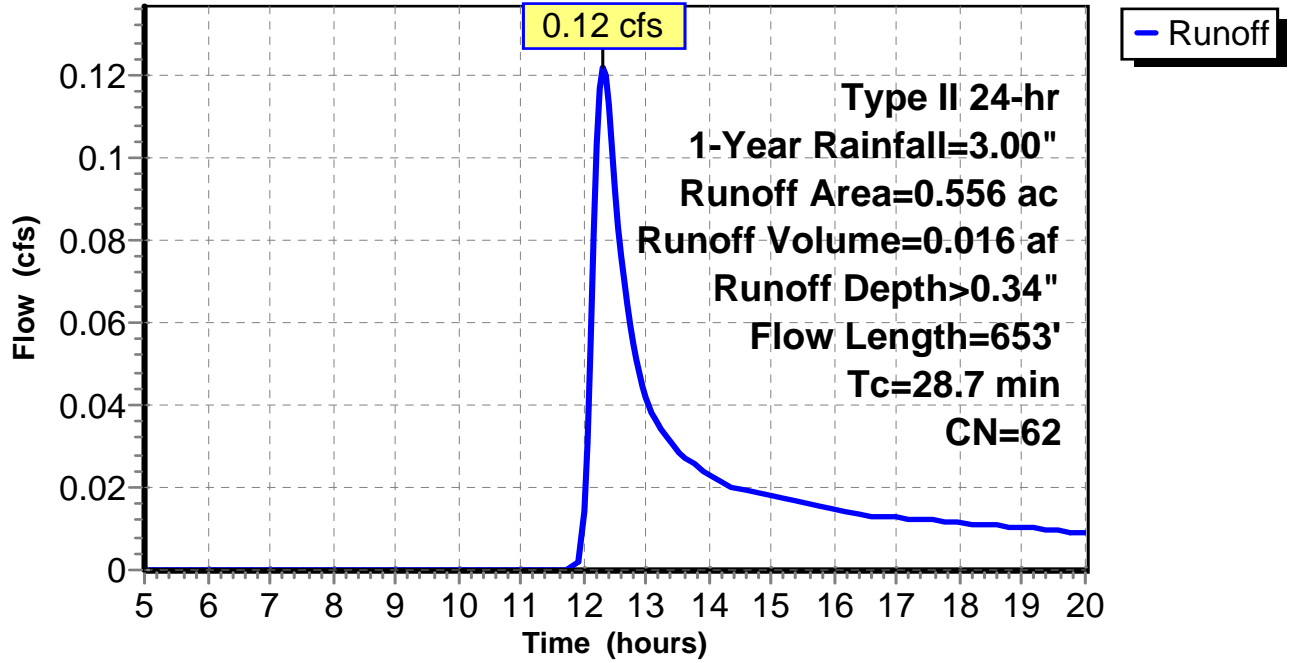
Subcatchment 1: C 166.004

Hydrograph



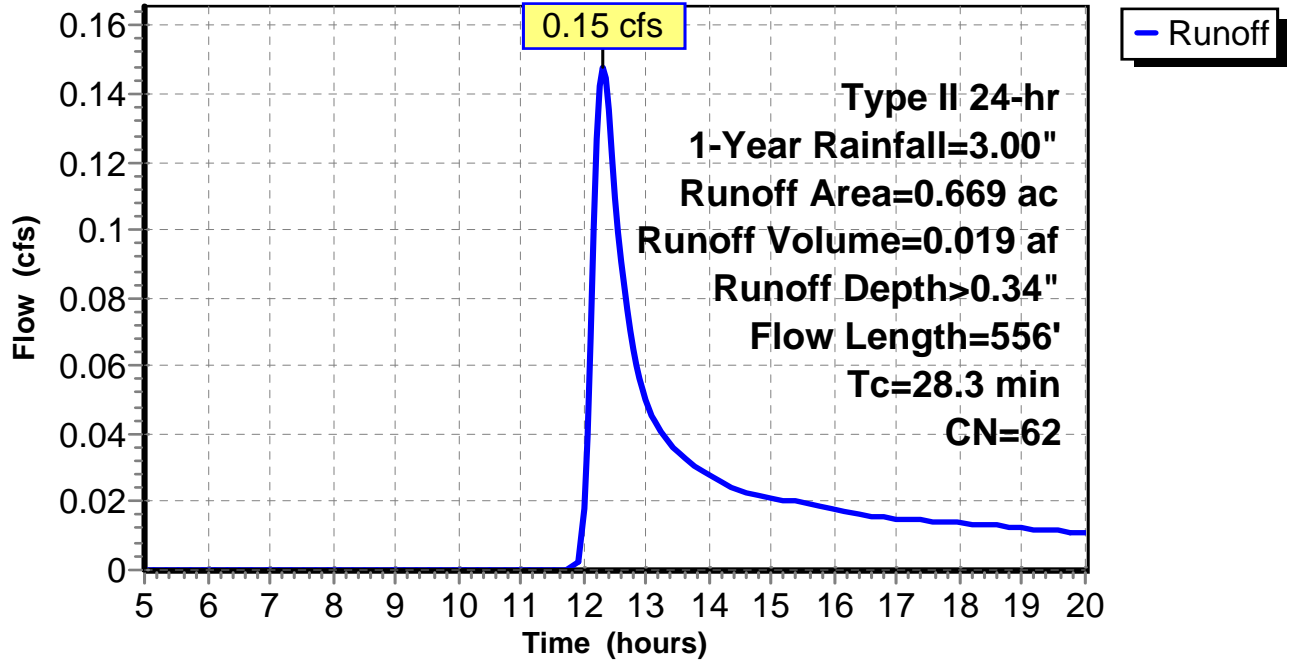
Subcatchment 2: C 166.005

Hydrograph



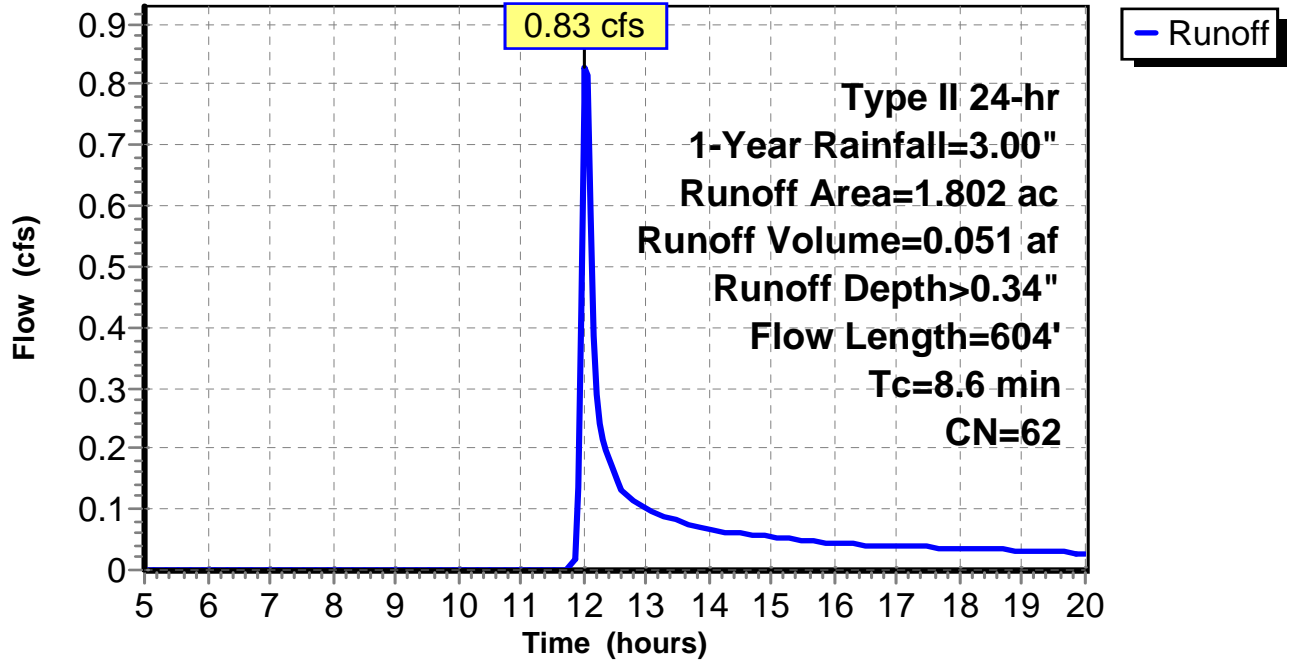
Subcatchment 3: C 166.006

Hydrograph



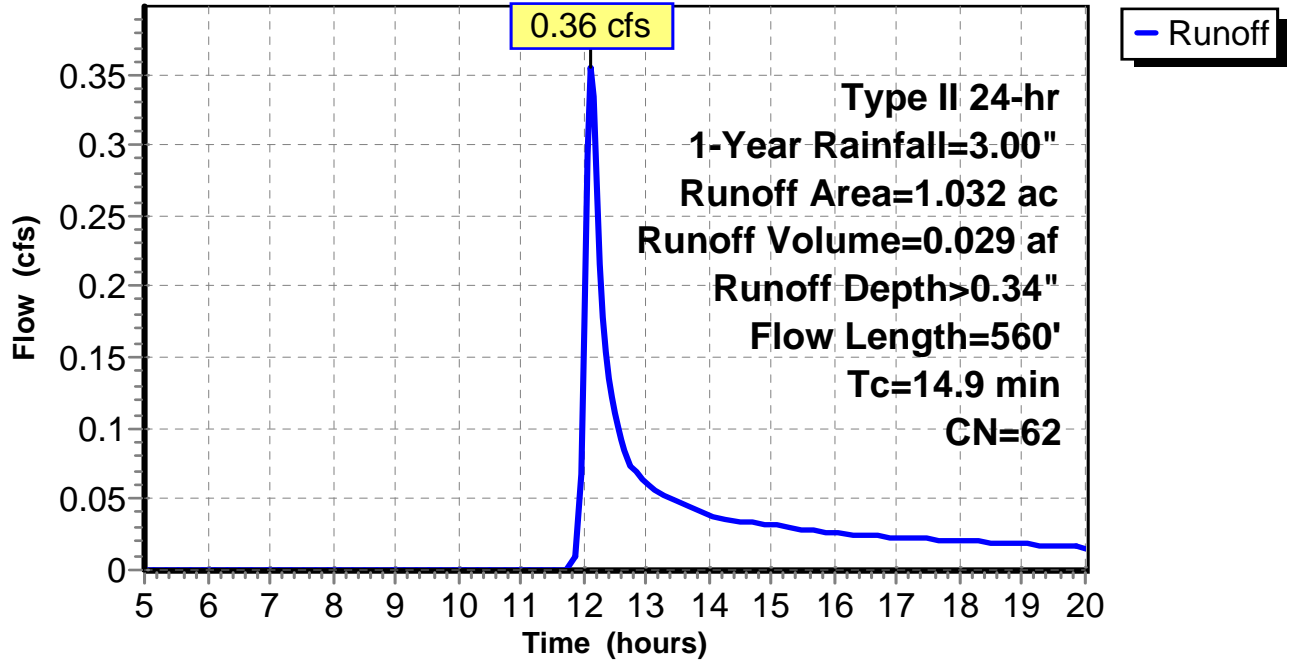
Subcatchment 4: C 166.007

Hydrograph



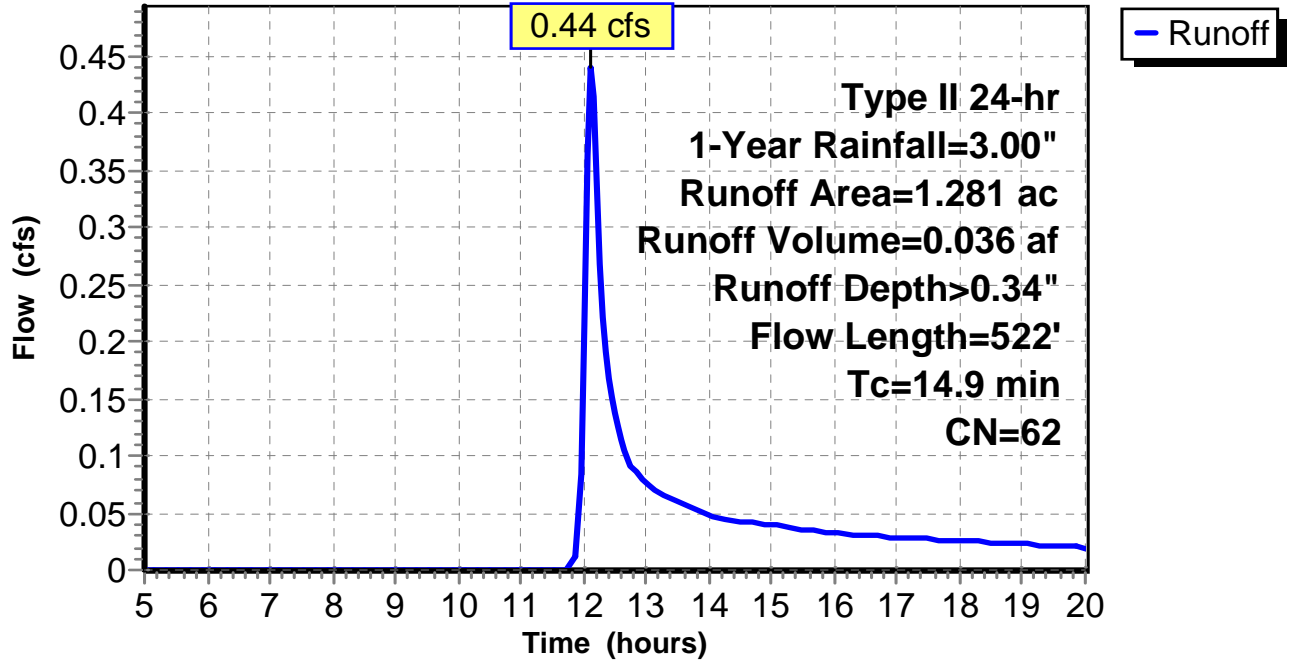
Subcatchment 5: C 167.001

Hydrograph



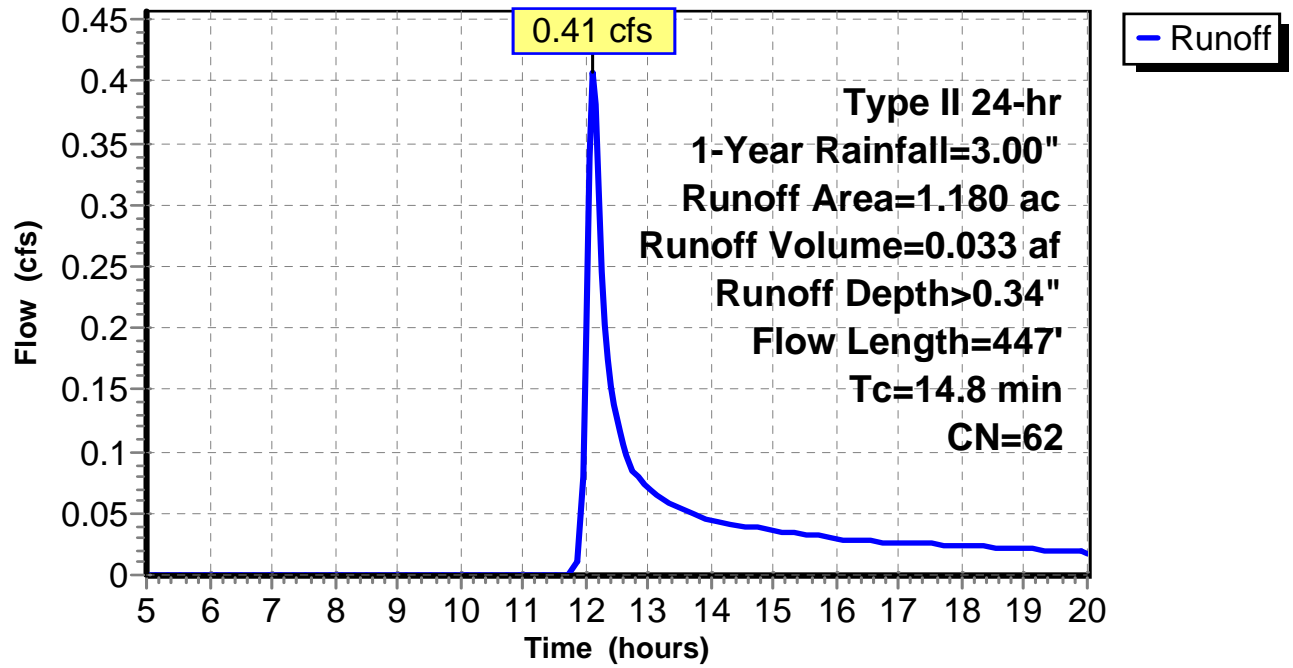
Subcatchment 6: C 167.002

Hydrograph



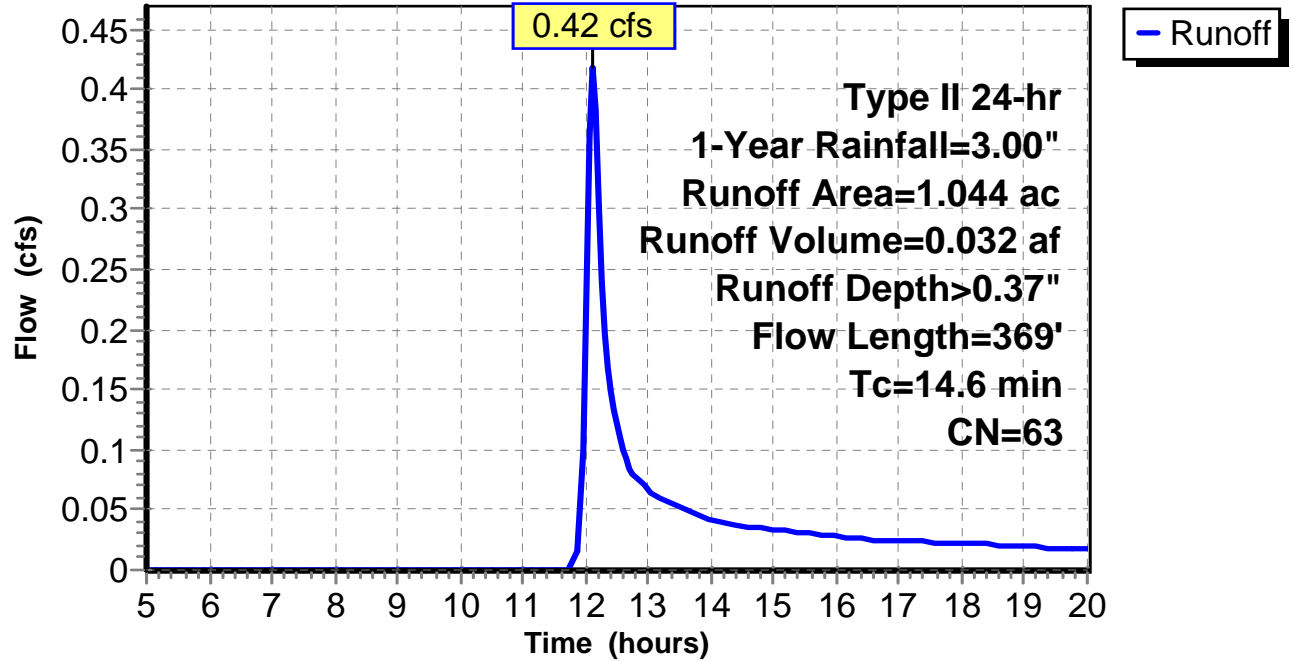
Subcatchment 7: C 167.003

Hydrograph



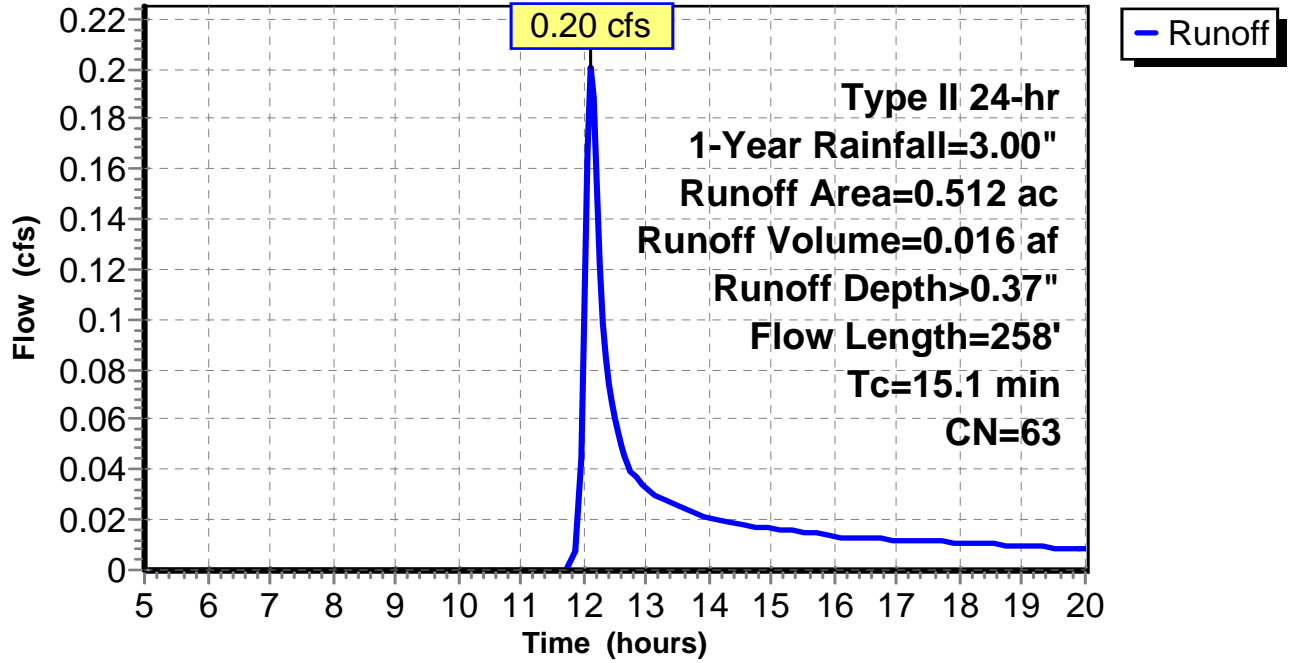
Subcatchment 8: C 167.004

Hydrograph



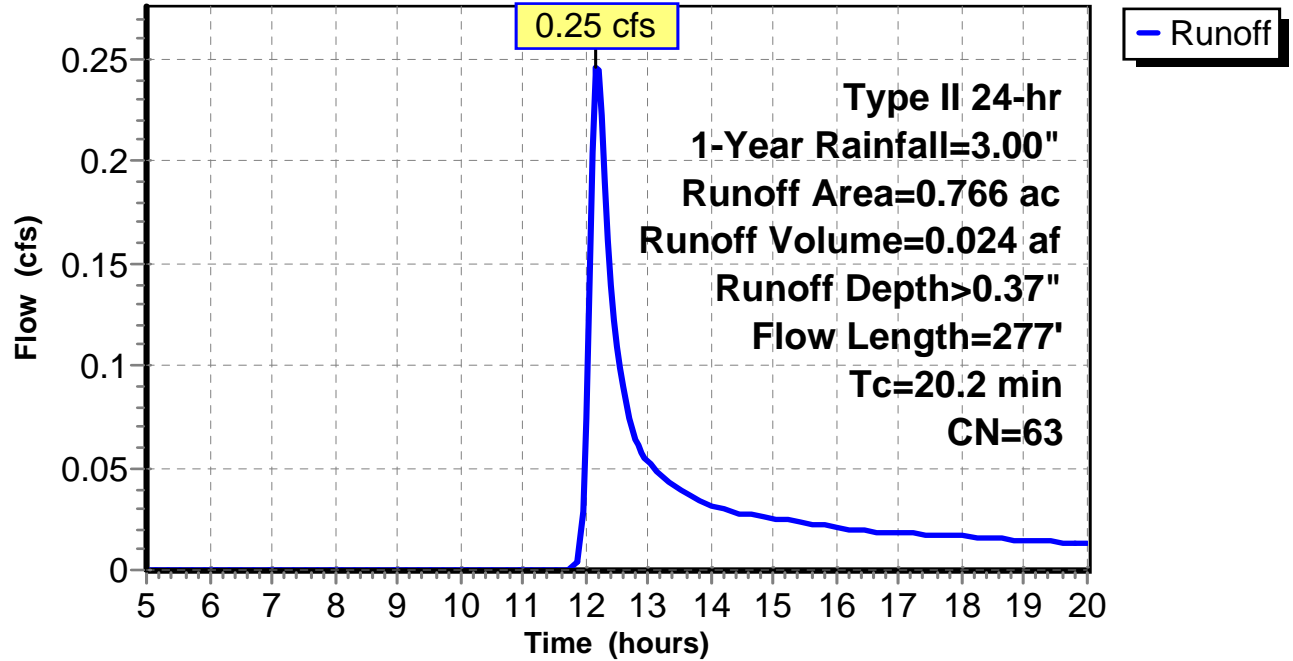
Subcatchment 9: C 167.005

Hydrograph



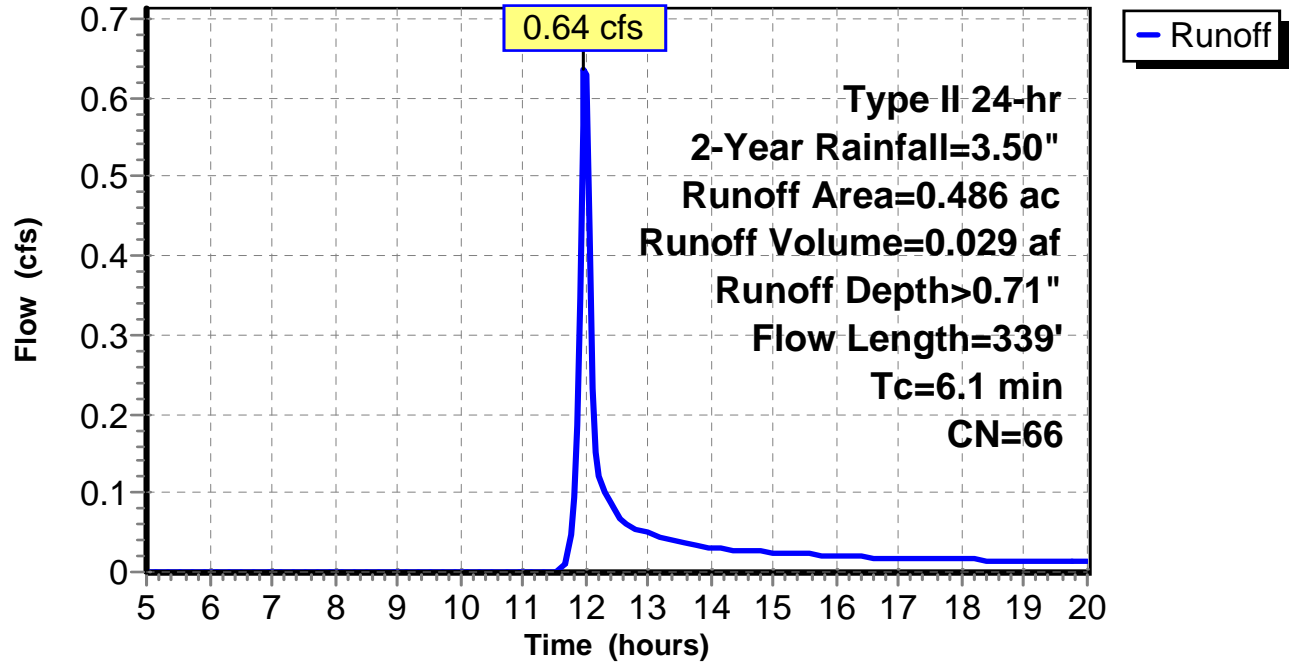
Subcatchment 10: C 167.006

Hydrograph



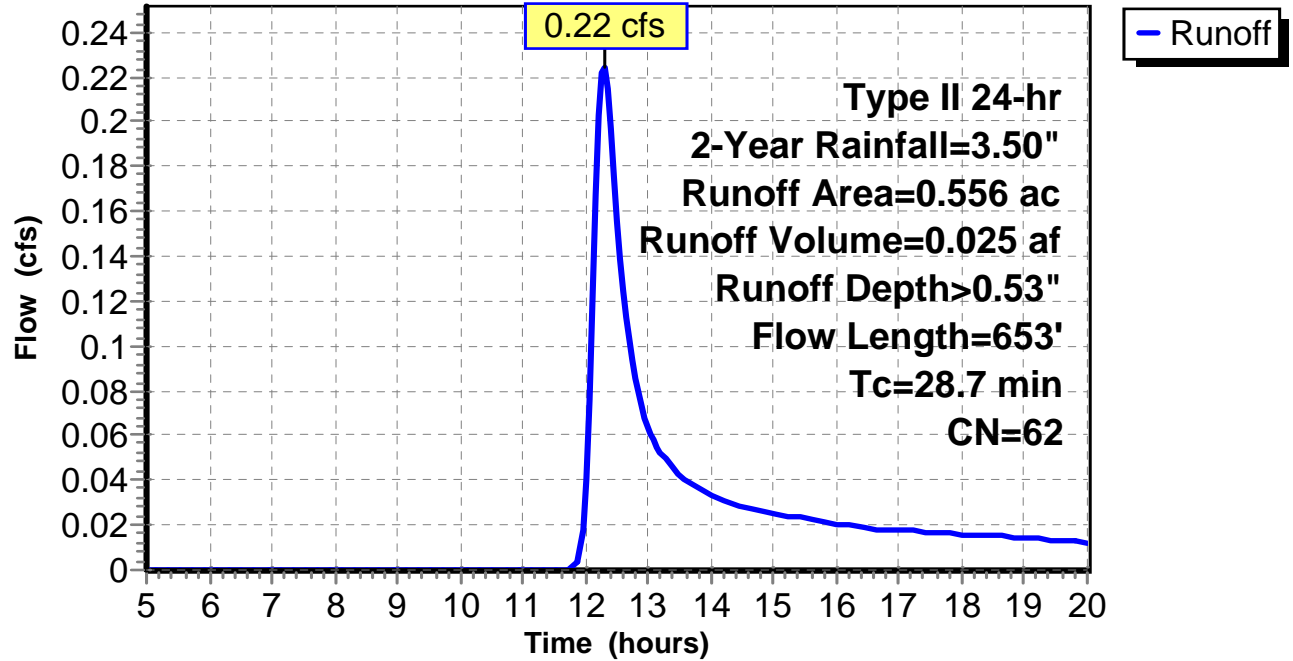
Subcatchment 1: C 166.004

Hydrograph



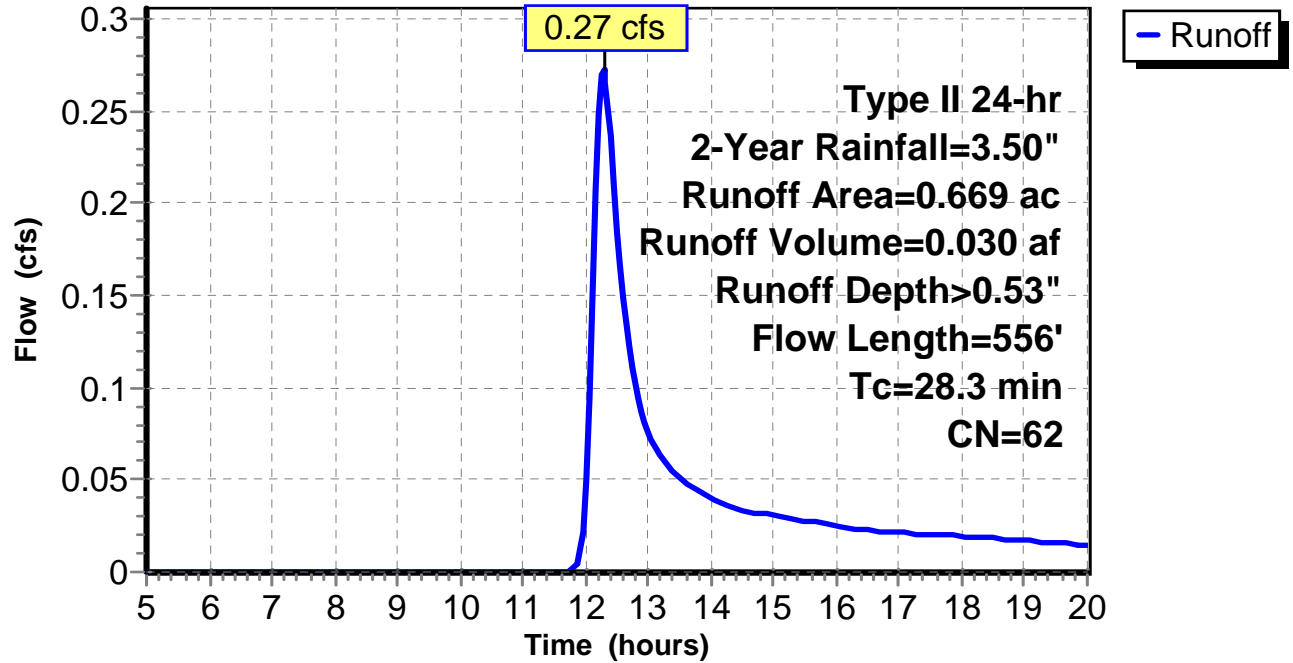
Subcatchment 2: C 166.005

Hydrograph



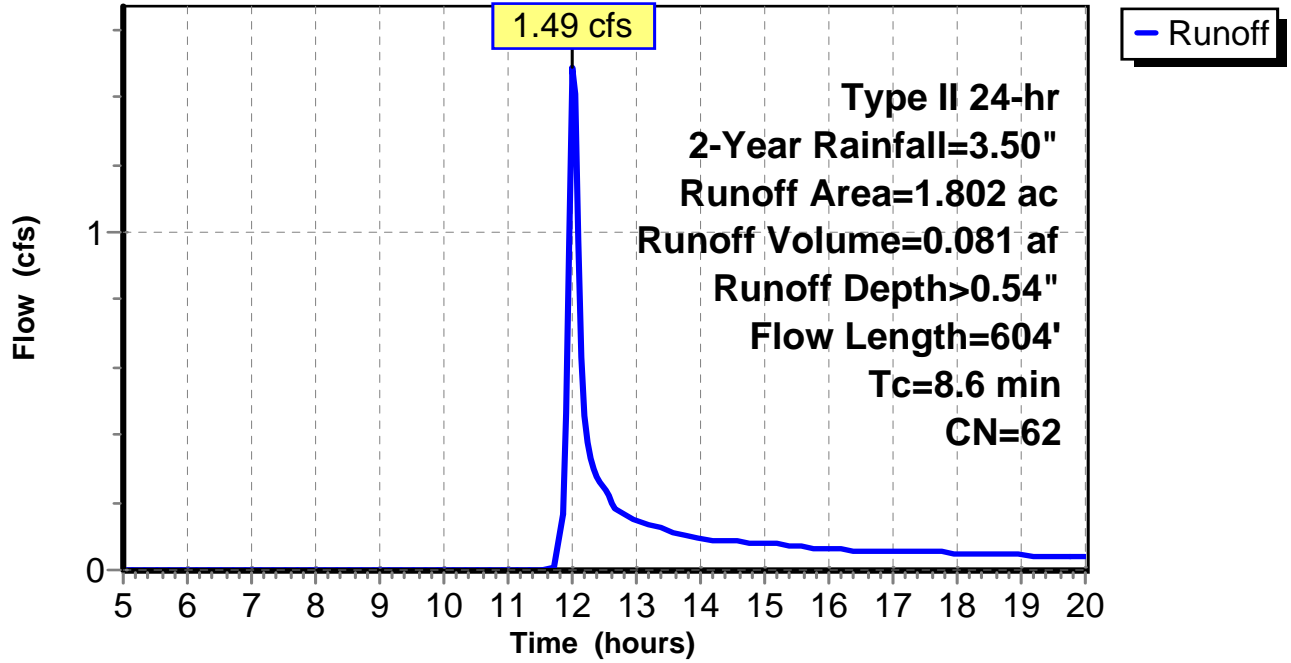
Subcatchment 3: C 166.006

Hydrograph



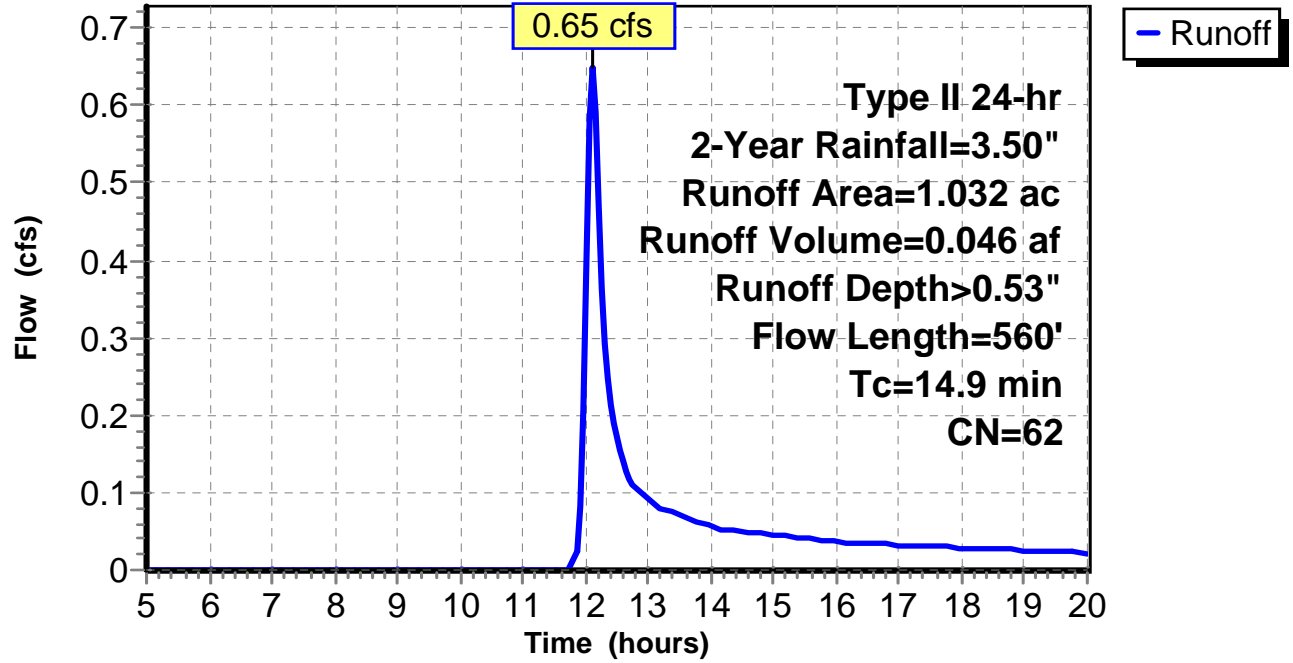
Subcatchment 4: C 166.007

Hydrograph



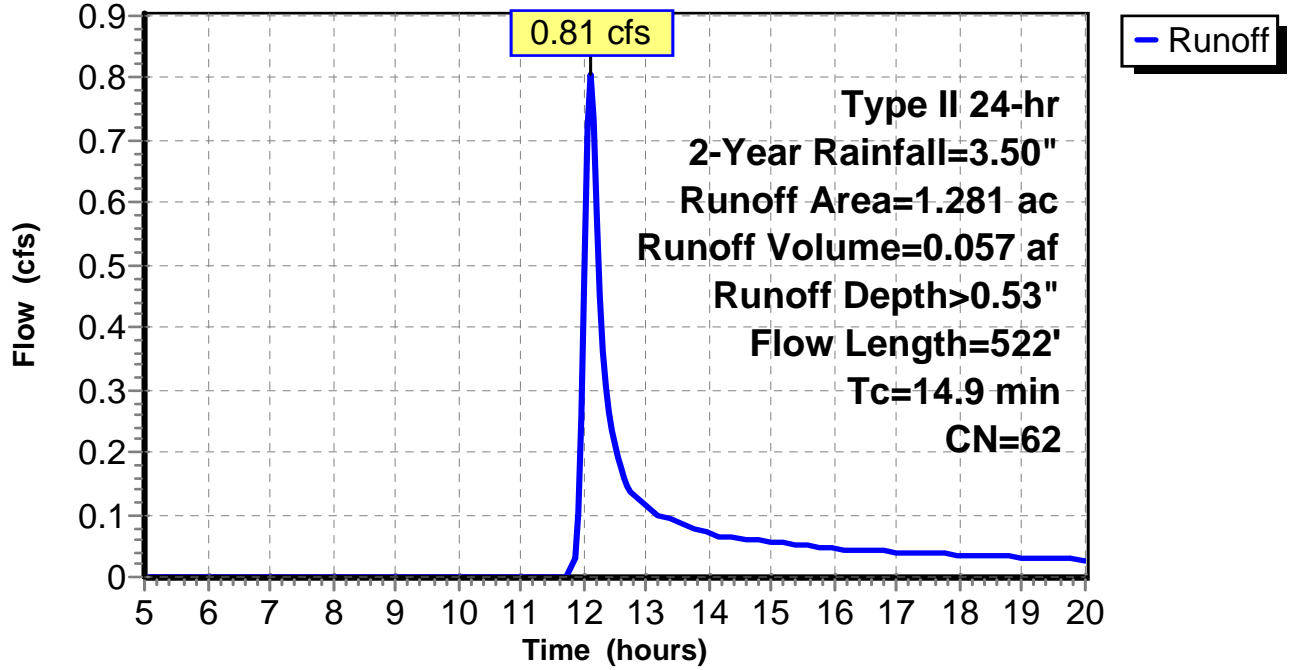
Subcatchment 5: C 167.001

Hydrograph



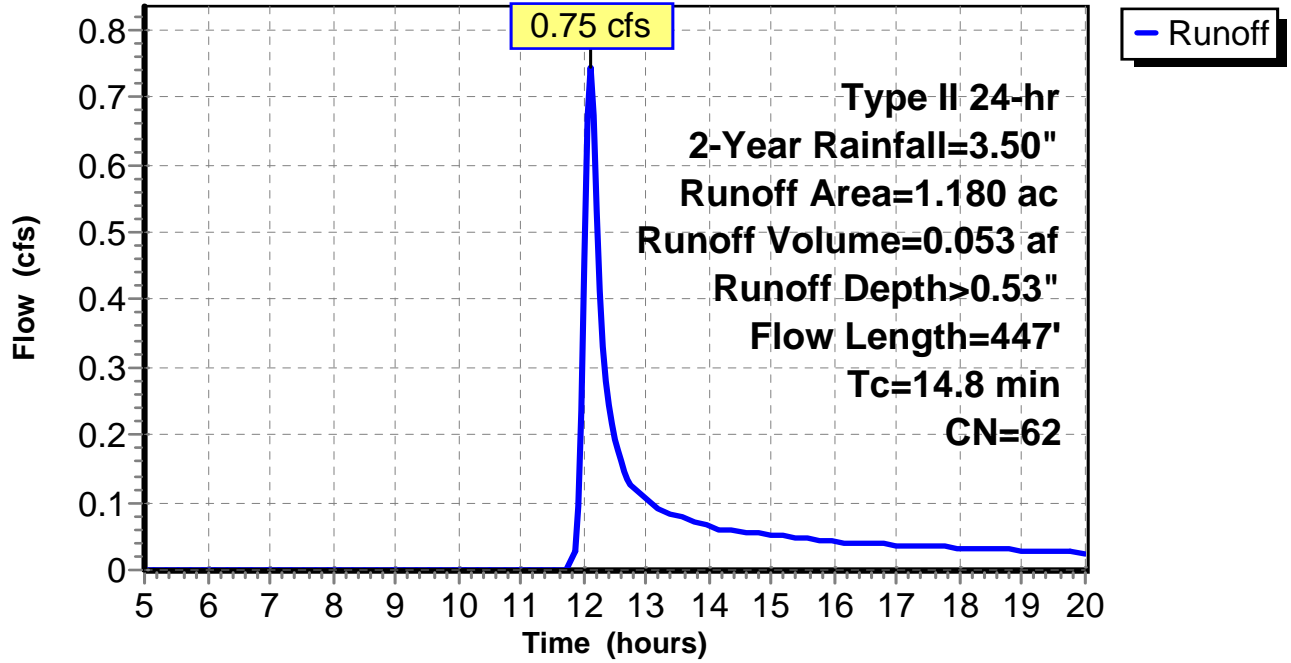
Subcatchment 6: C 167.002

Hydrograph



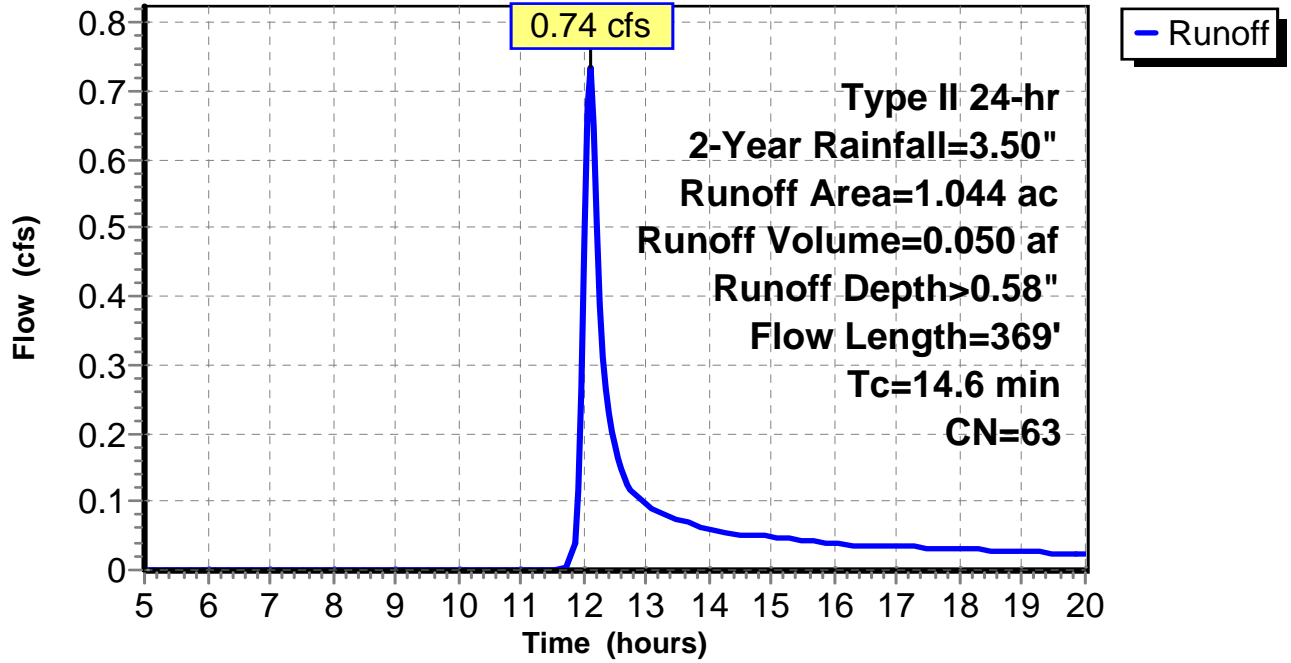
Subcatchment 7: C 167.003

Hydrograph



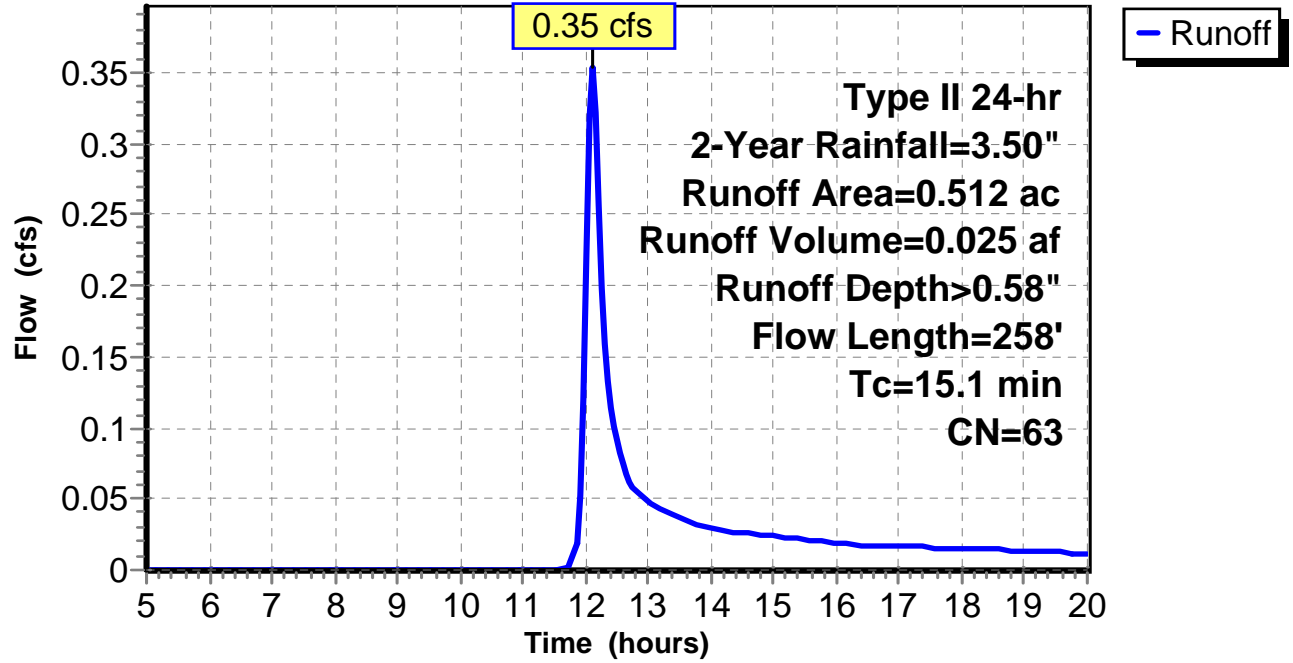
Subcatchment 8: C 167.004

Hydrograph



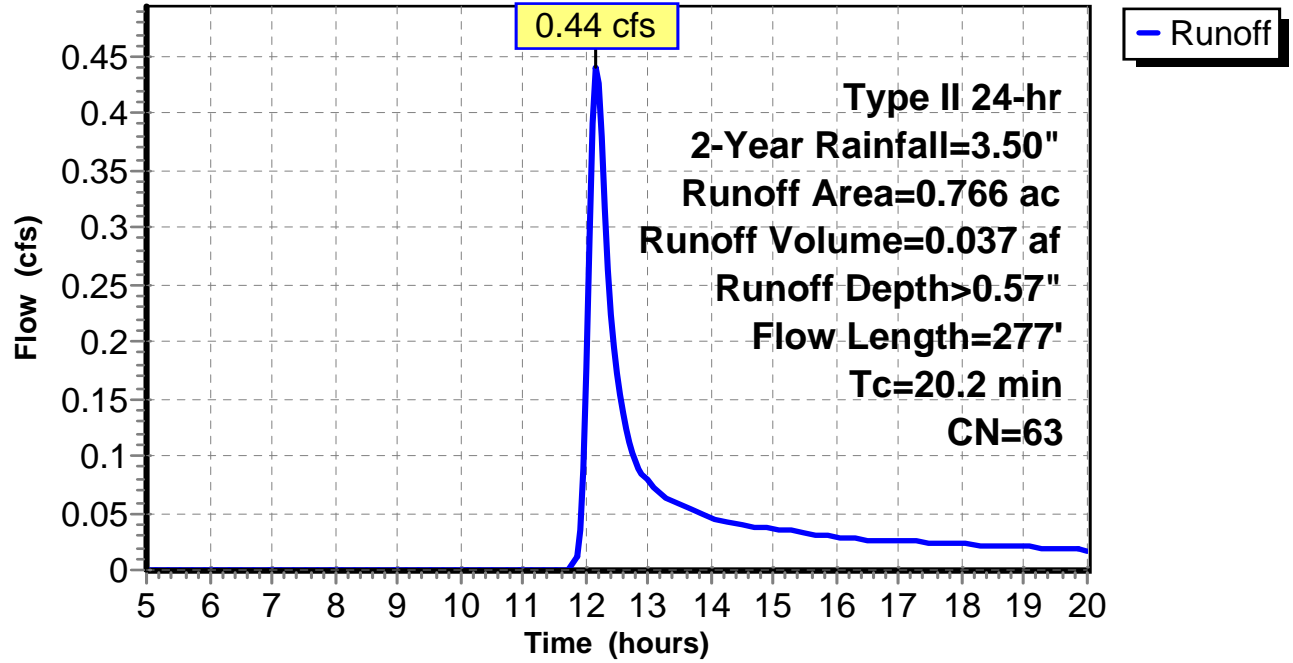
Subcatchment 9: C 167.005

Hydrograph



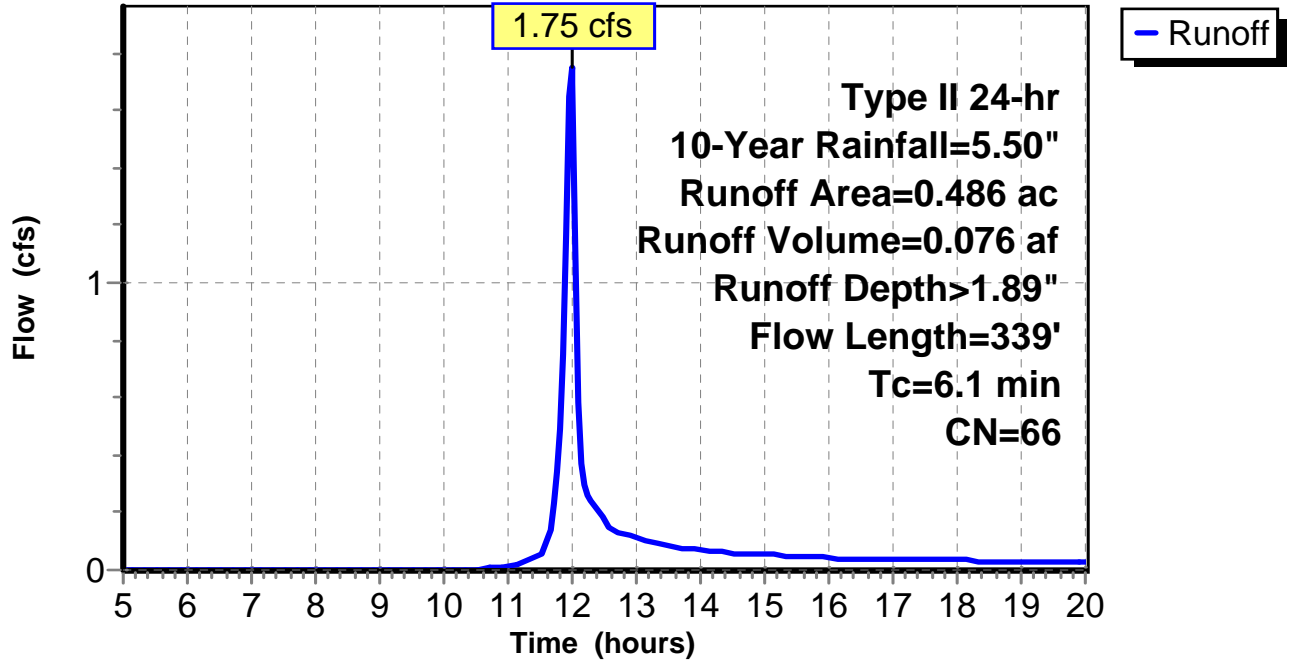
Subcatchment 10: C 167.006

Hydrograph



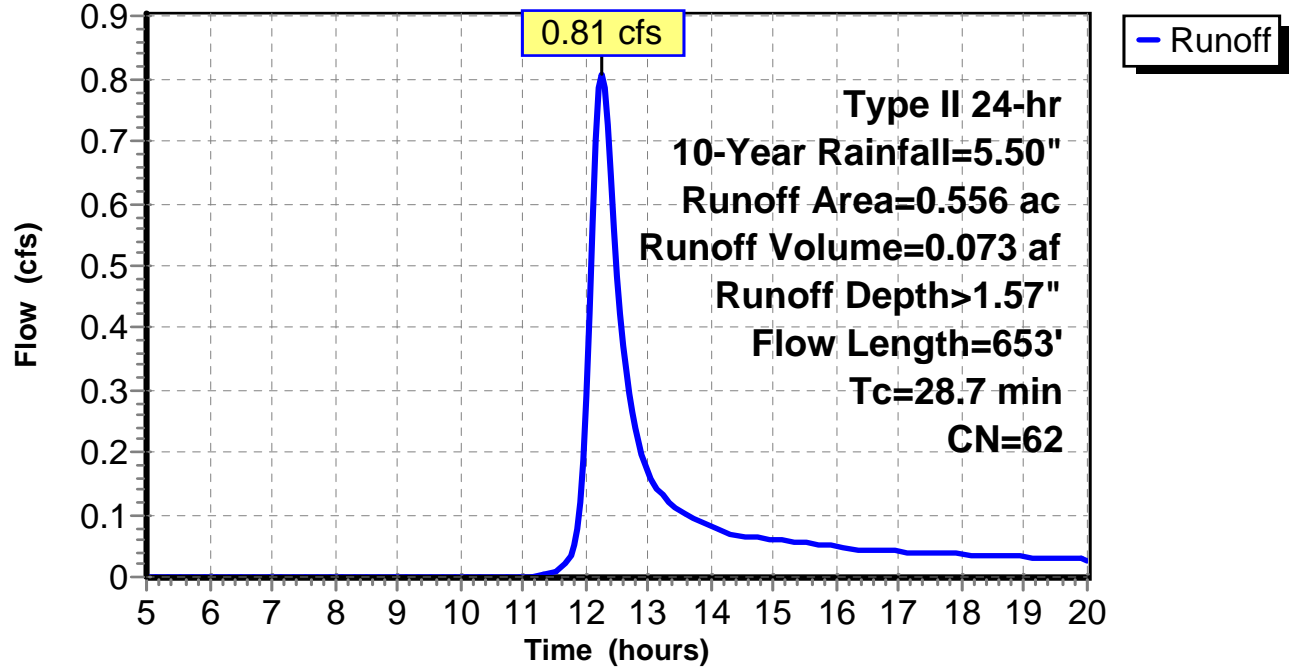
Subcatchment 1: C 166.004

Hydrograph



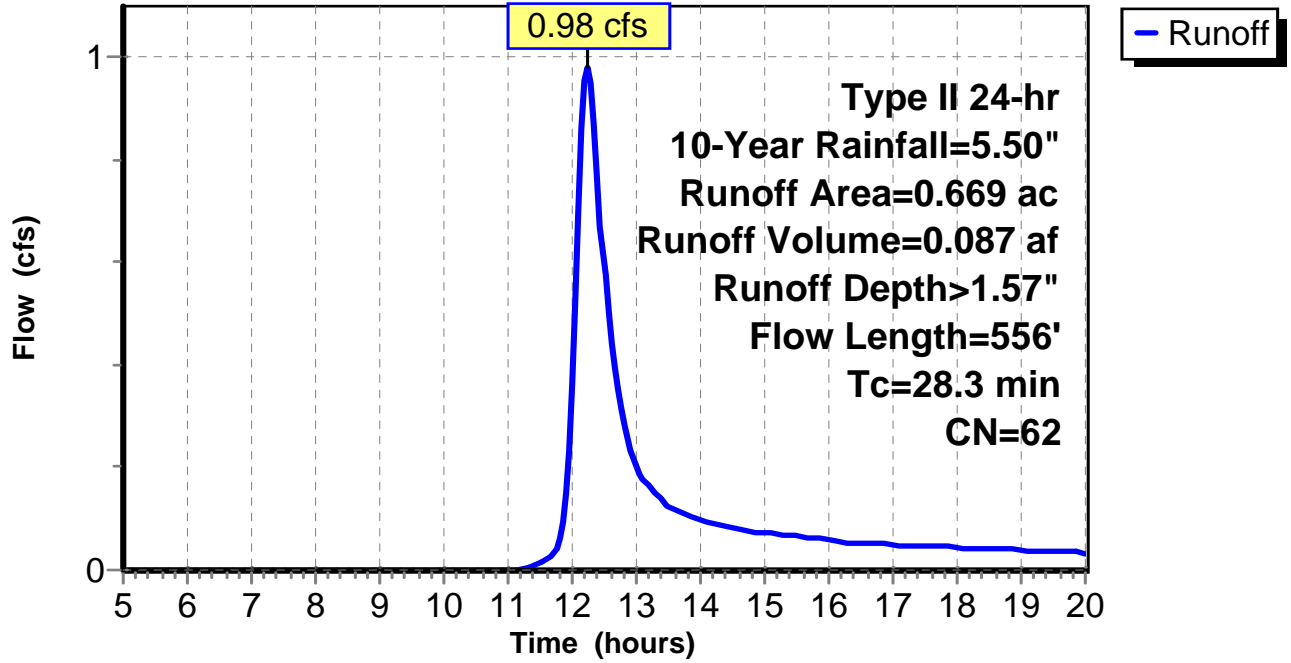
Subcatchment 2: C 166.005

Hydrograph



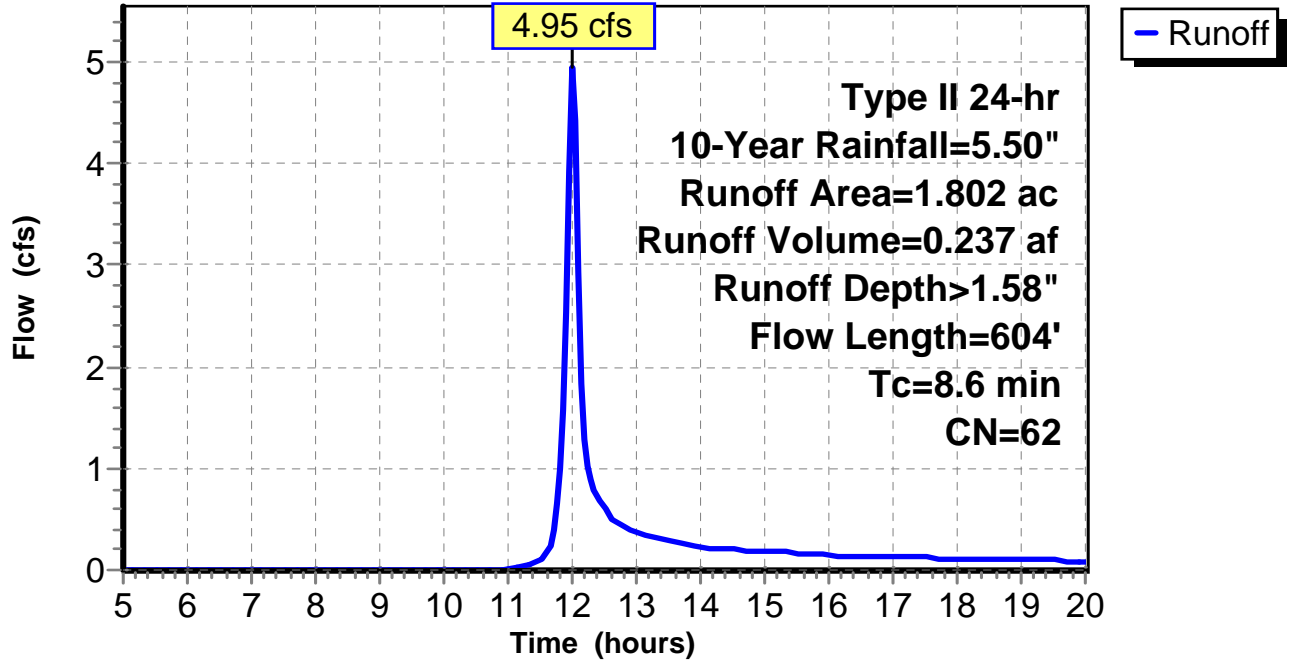
Subcatchment 3: C 166.006

Hydrograph



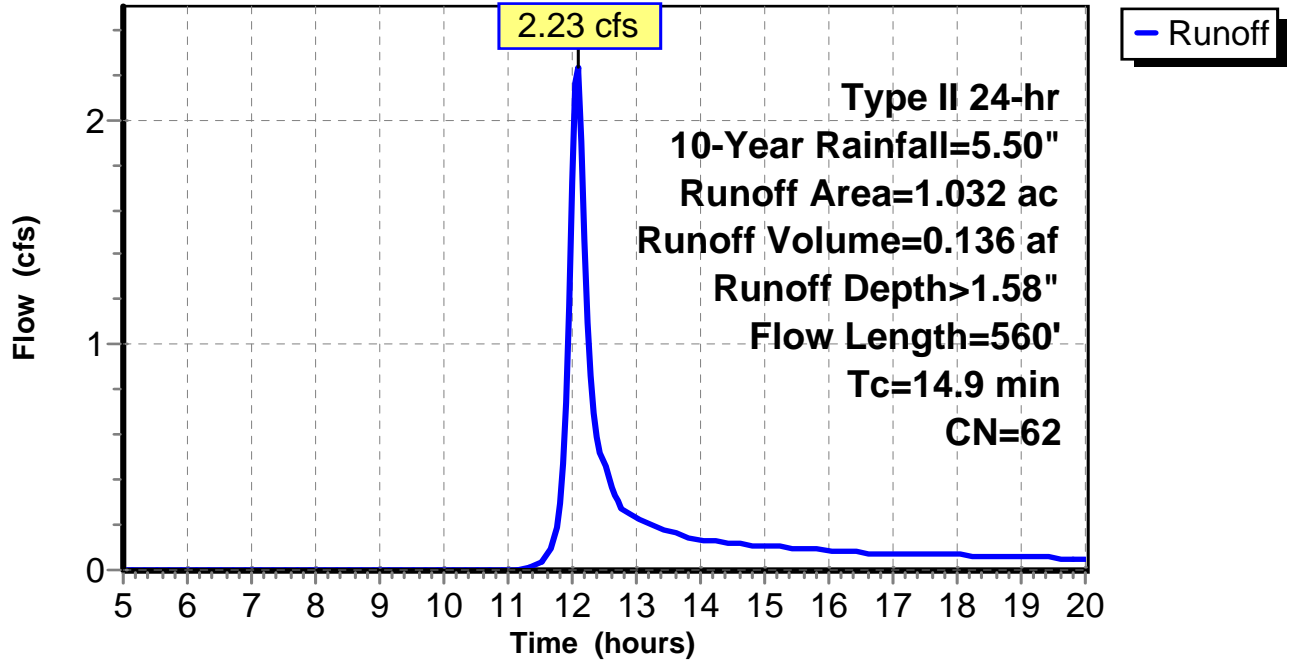
Subcatchment 4: C 166.007

Hydrograph



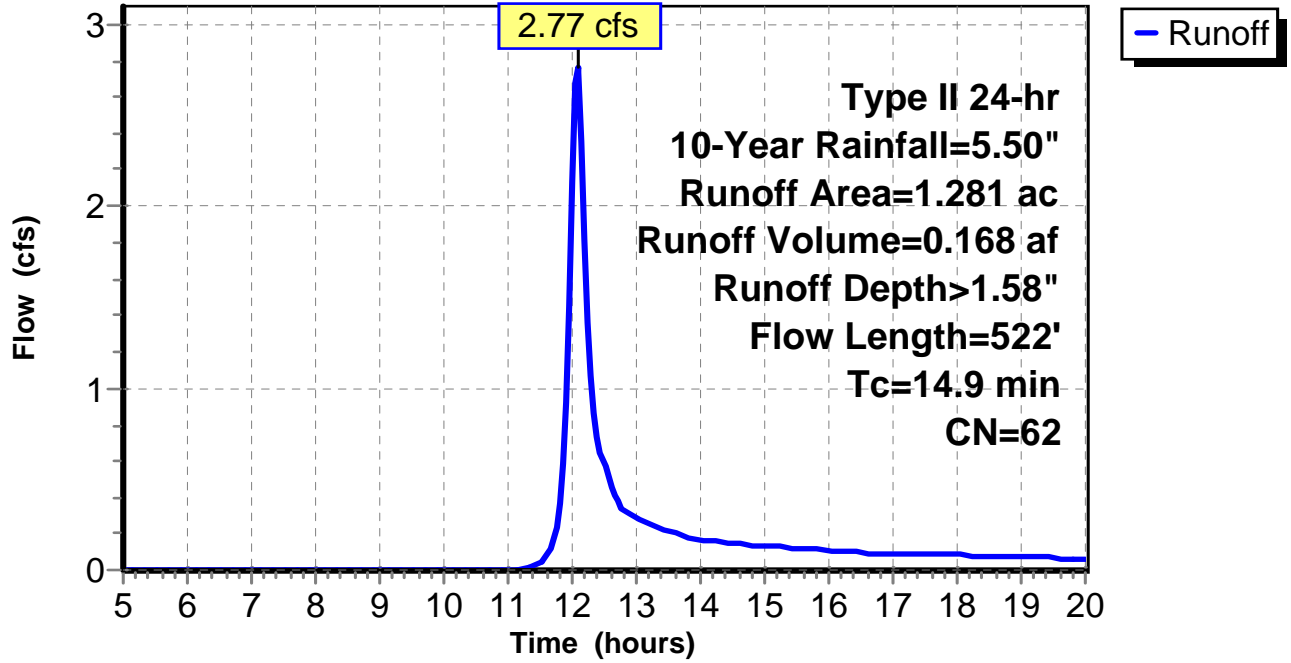
Subcatchment 5: C 167.001

Hydrograph



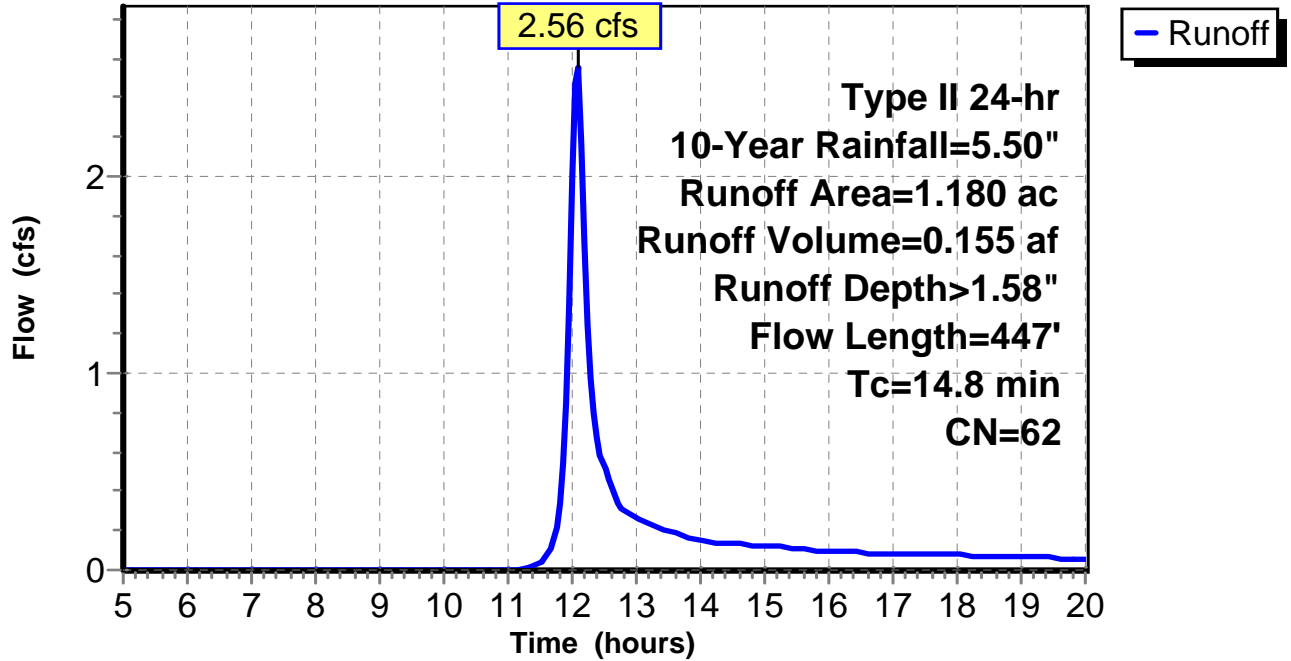
Subcatchment 6: C 167.002

Hydrograph



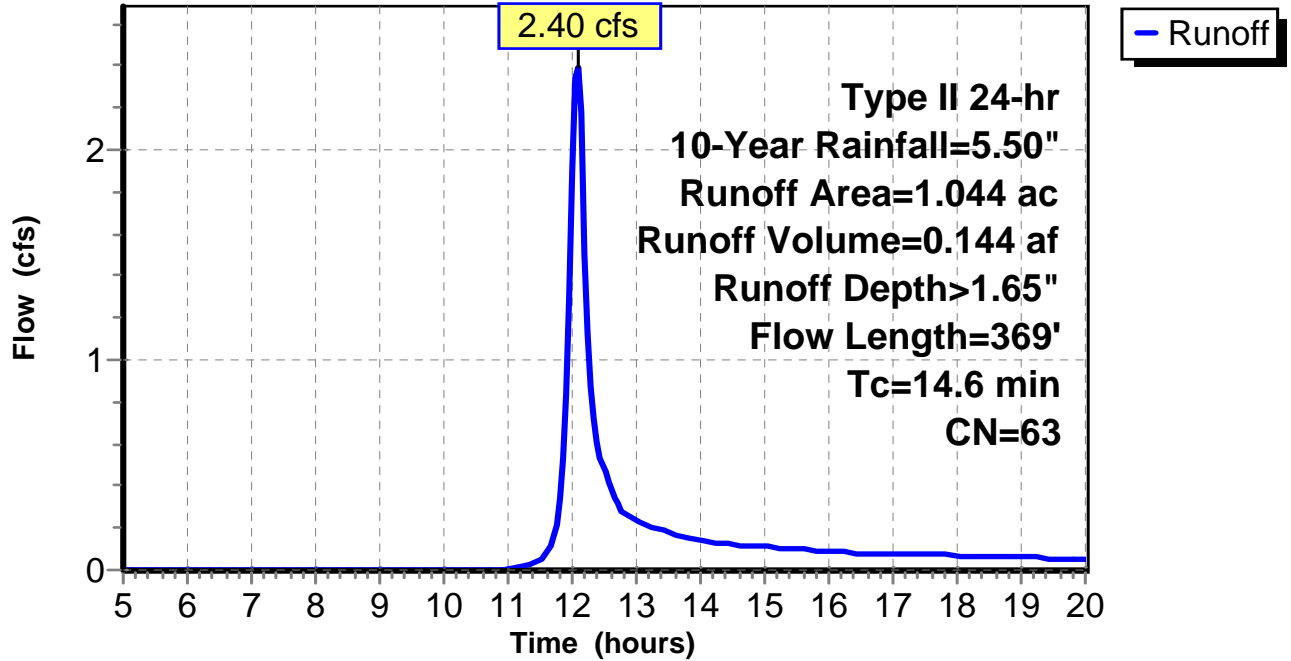
Subcatchment 7: C 167.003

Hydrograph



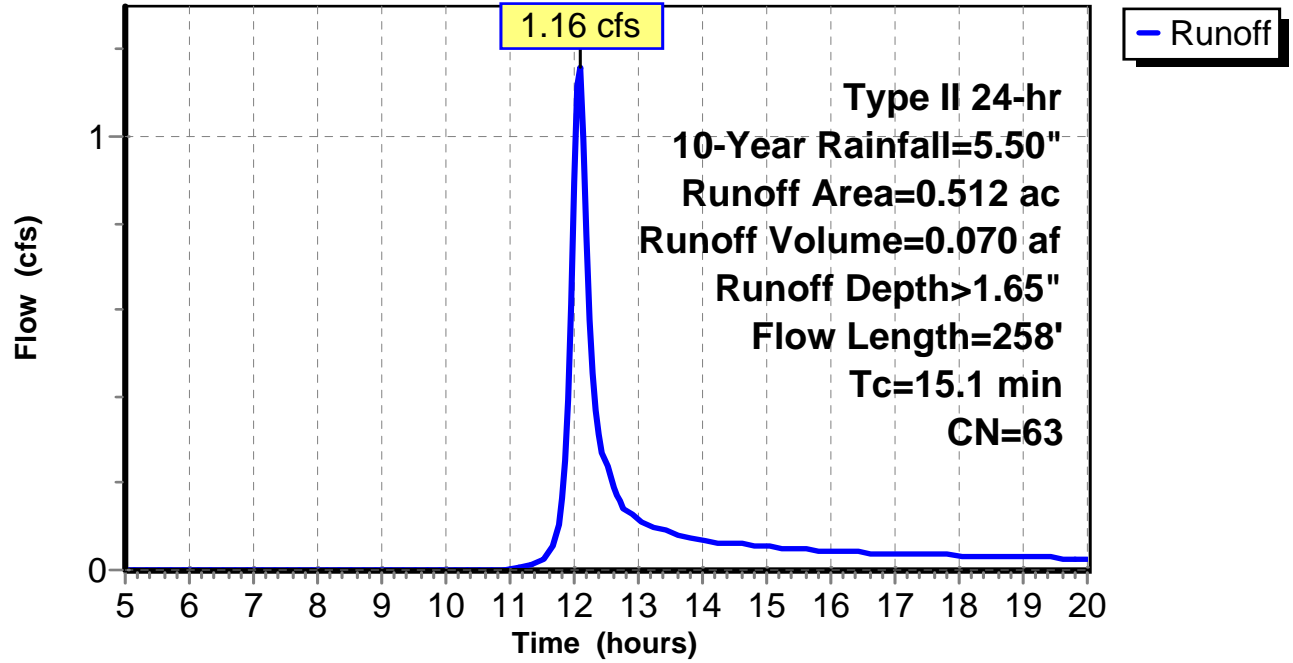
Subcatchment 8: C 167.004

Hydrograph



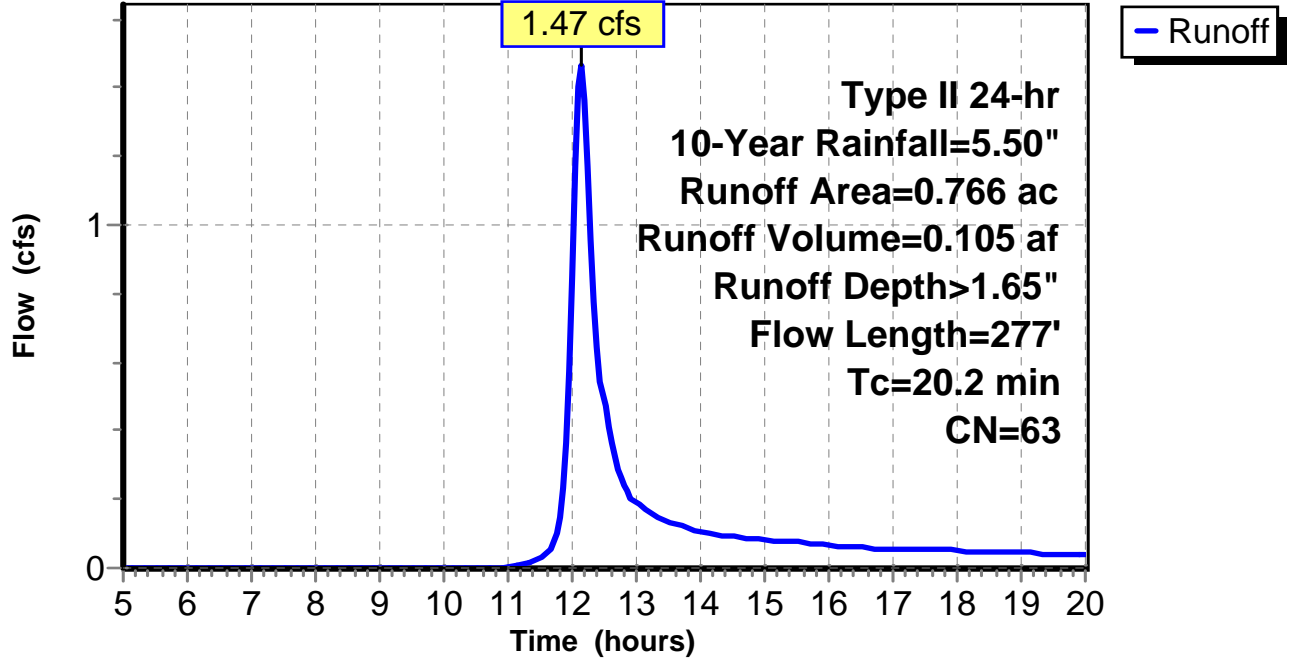
Subcatchment 9: C 167.005

Hydrograph



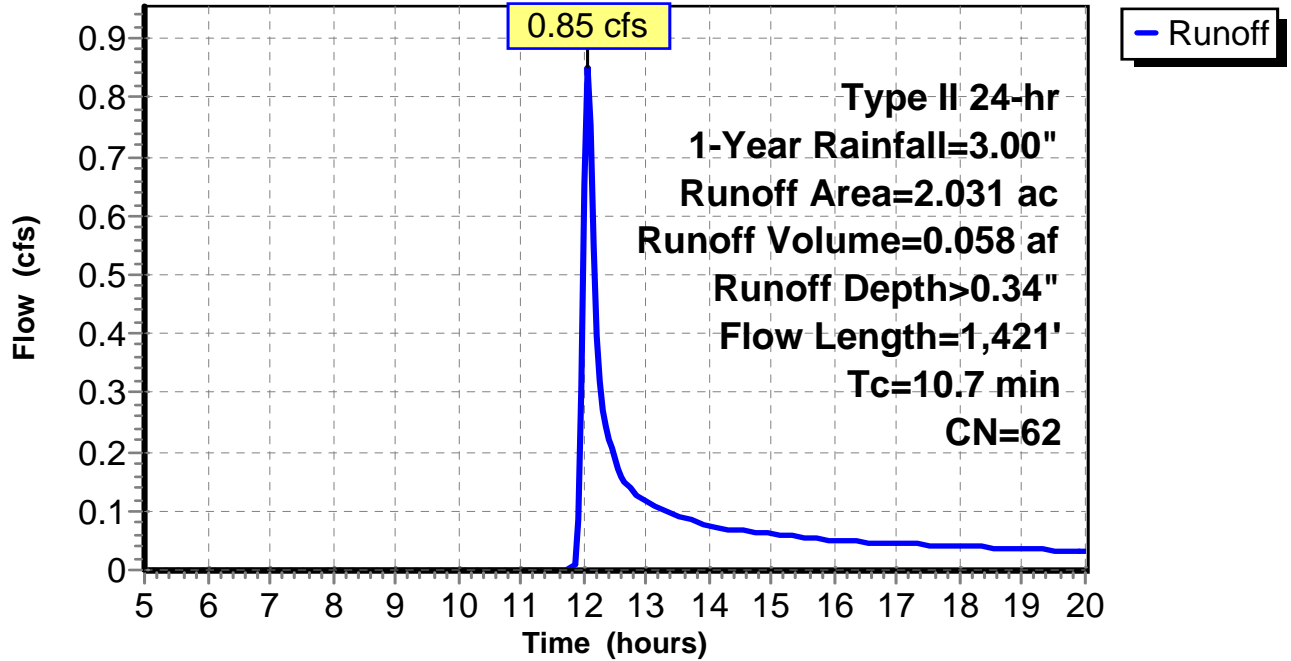
Subcatchment 10: C 167.006

Hydrograph



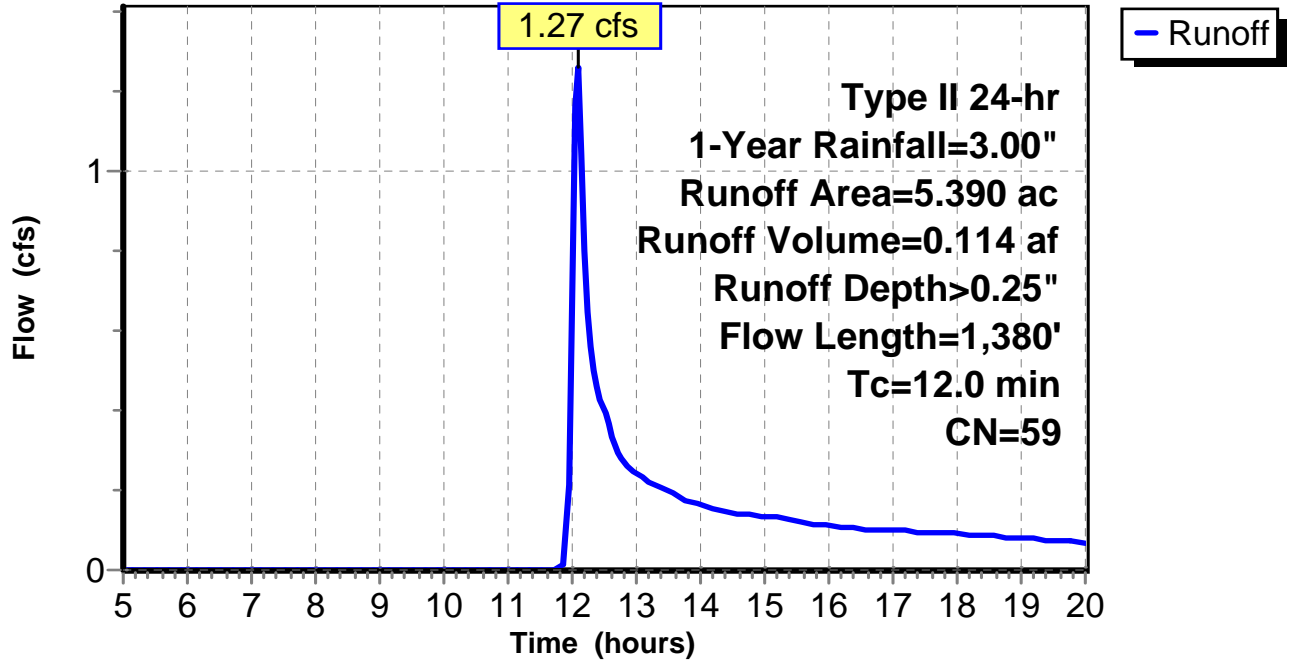
Subcatchment 1: C AR-502.001

Hydrograph



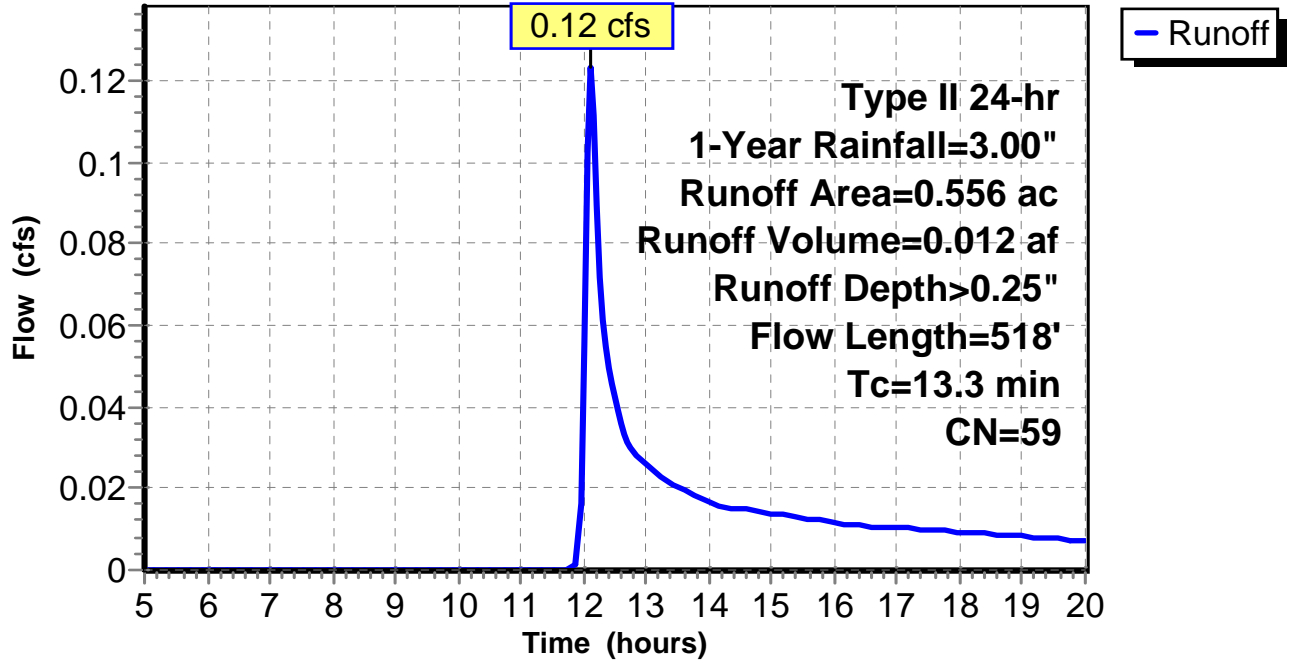
Subcatchment 2: C AR-502.002

Hydrograph



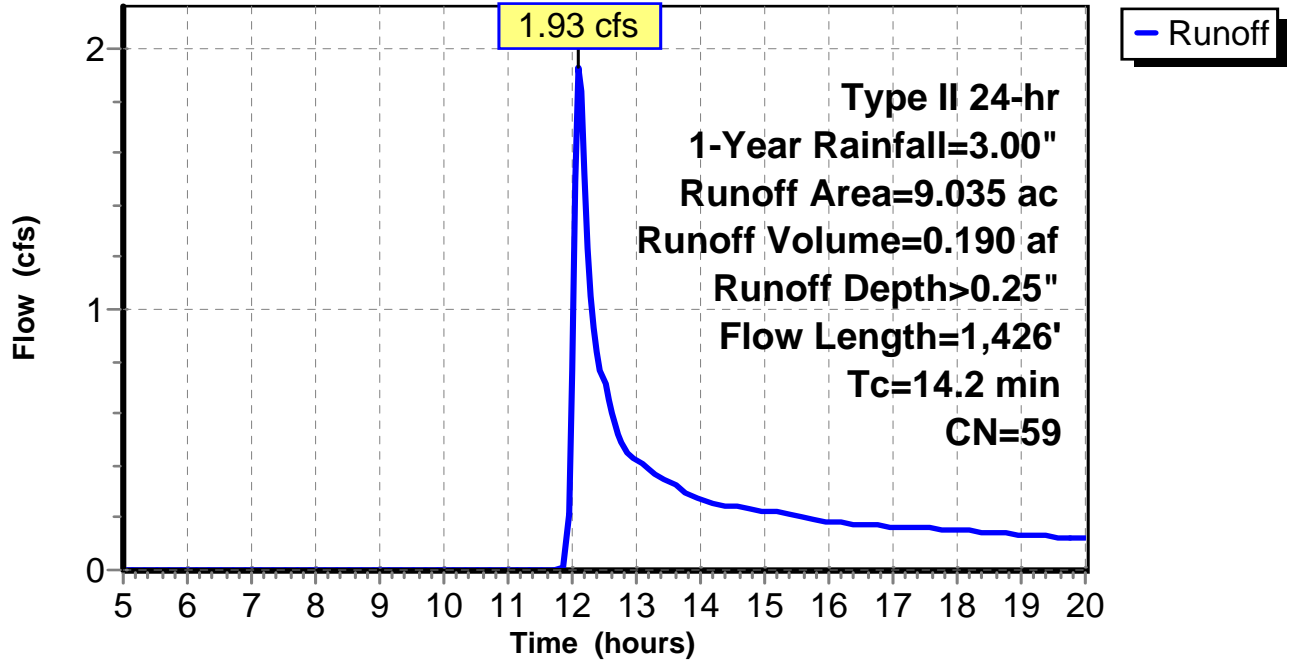
Subcatchment 3: C AR-502.003

Hydrograph



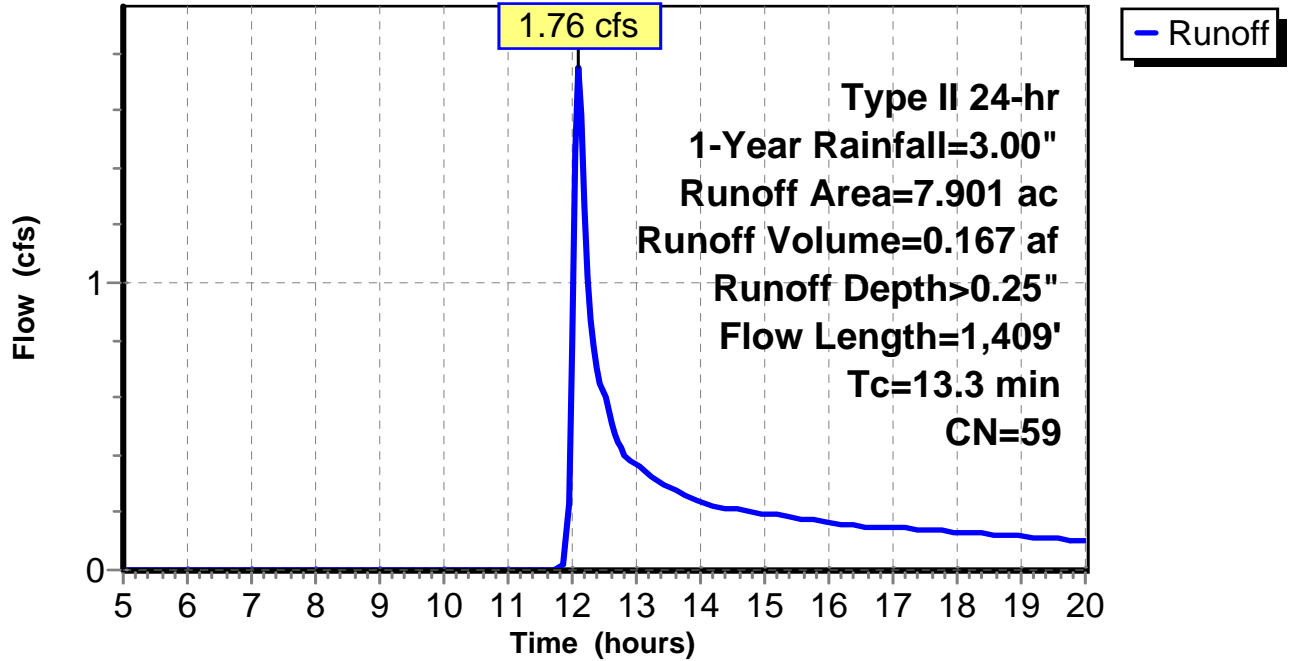
Subcatchment 4: C AR-502.004

Hydrograph



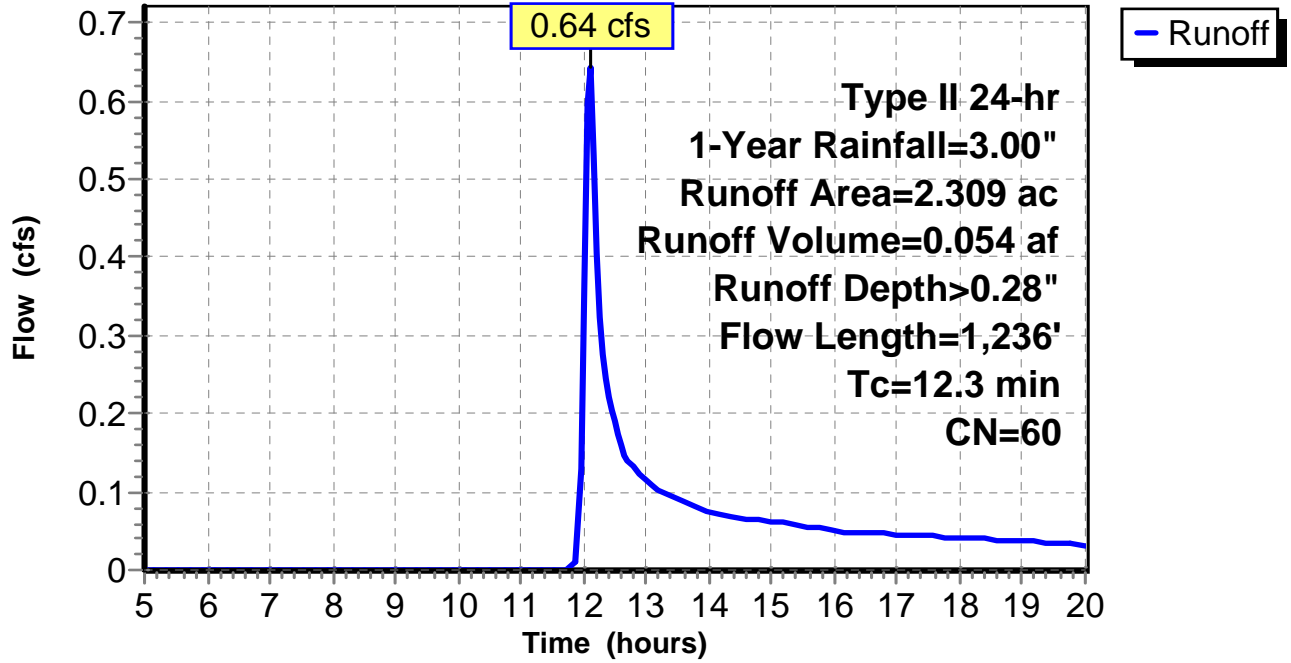
Subcatchment 5: C AR-502.005

Hydrograph



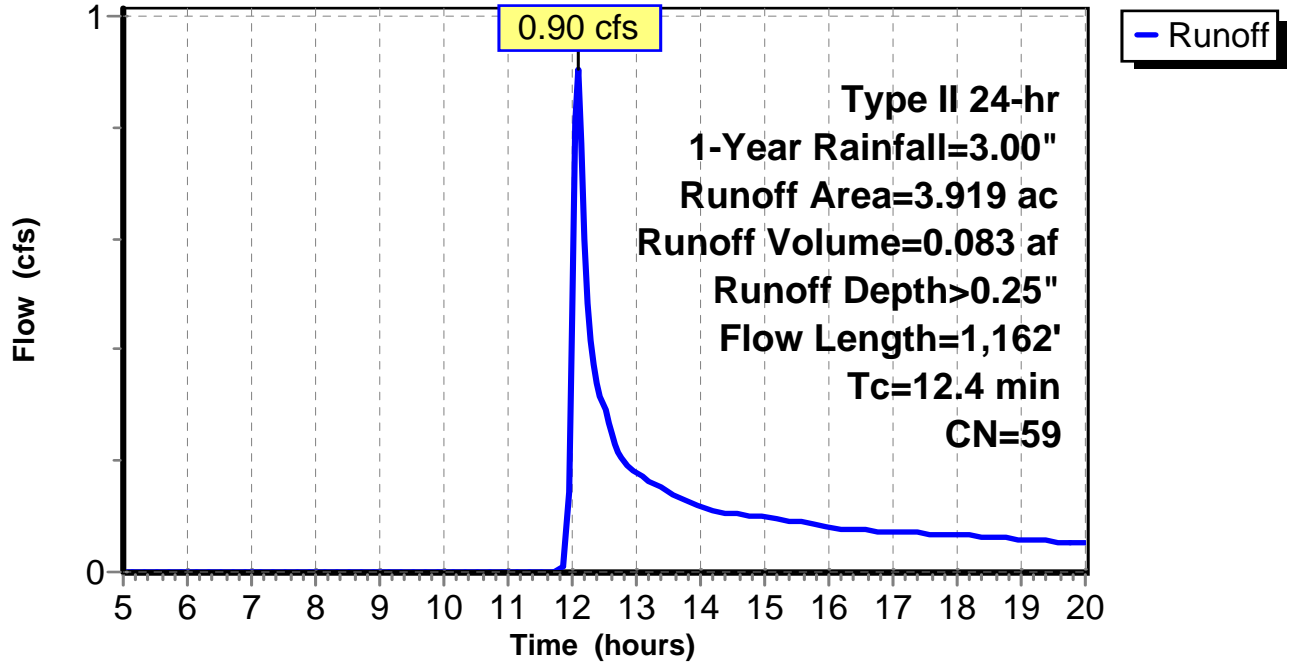
Subcatchment 6: C 180.001

Hydrograph



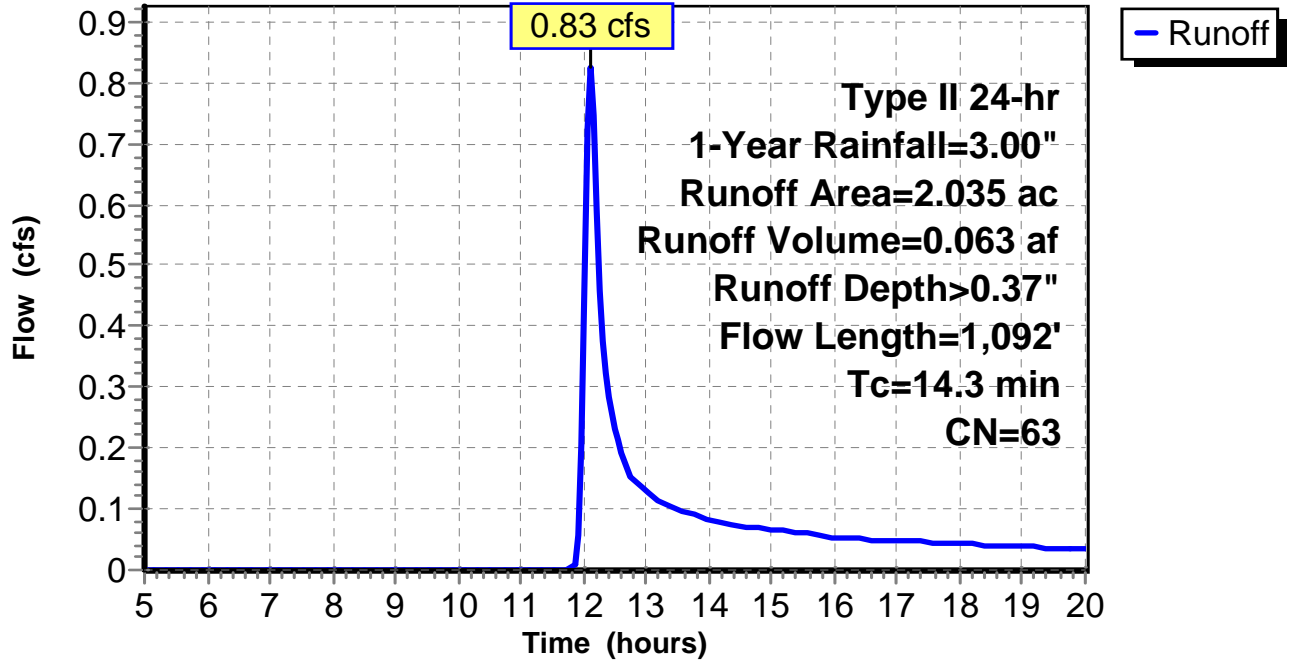
Subcatchment 7: C 180.002

Hydrograph



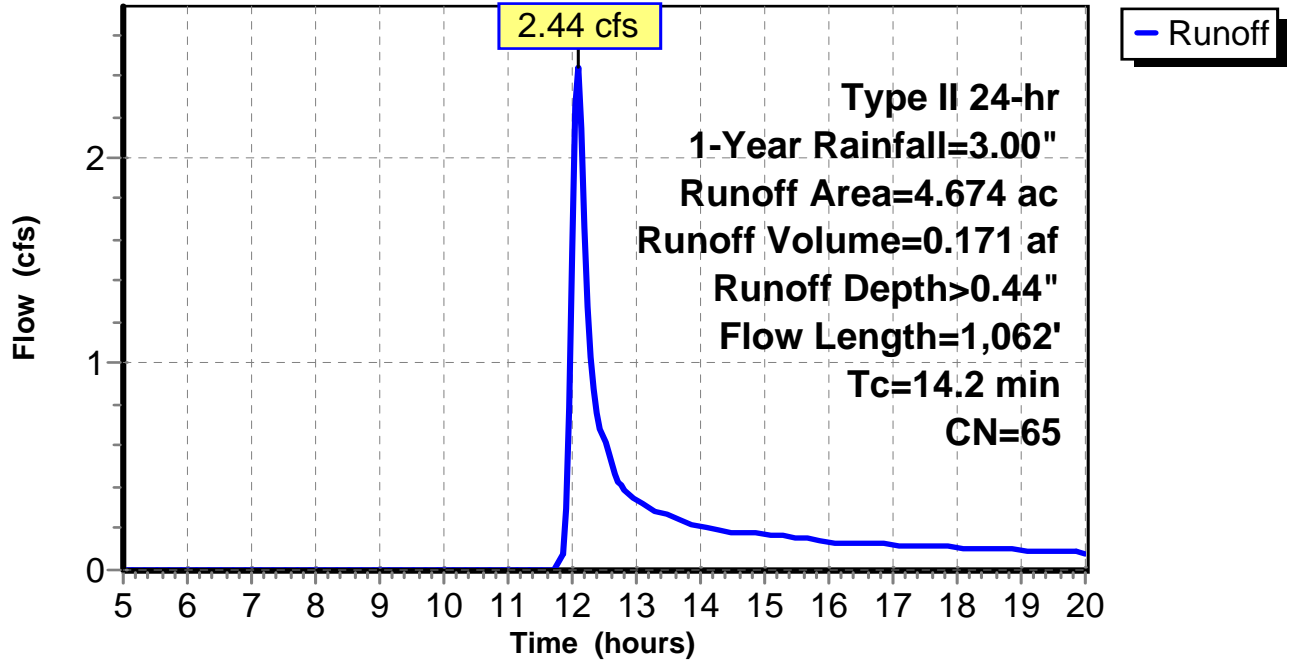
Subcatchment 8: C 180.003

Hydrograph



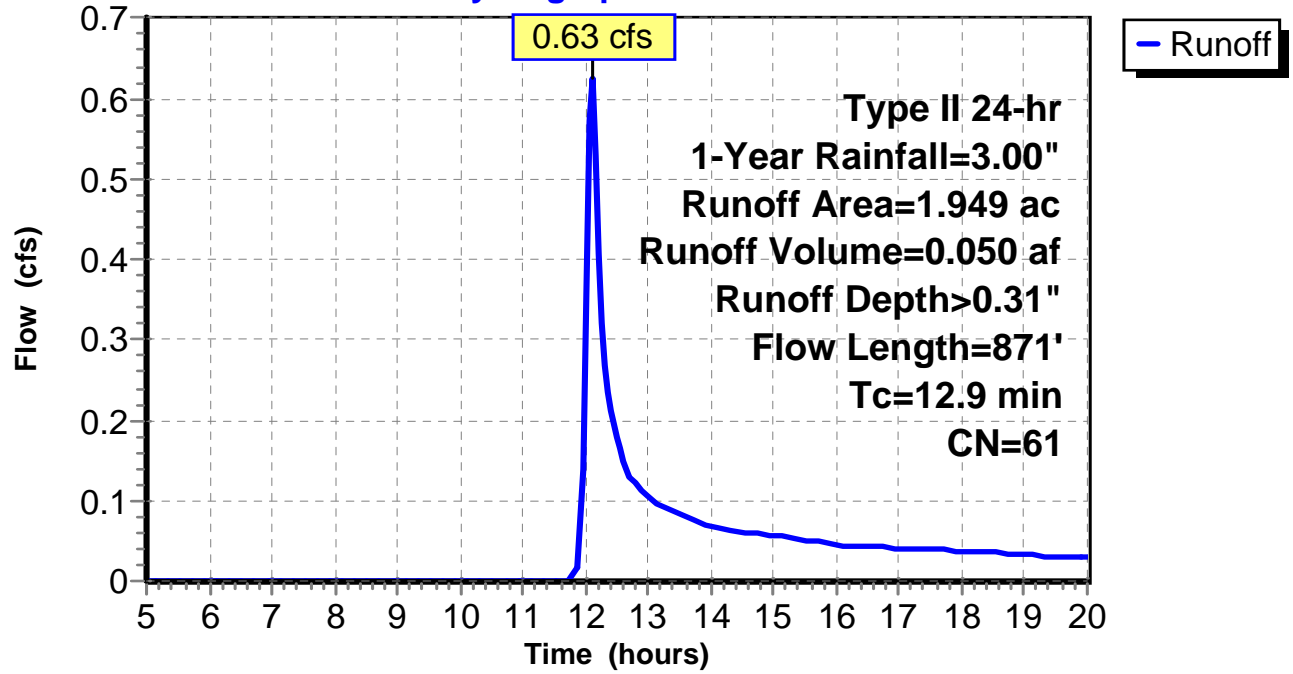
Subcatchment 9: C 180.004

Hydrograph



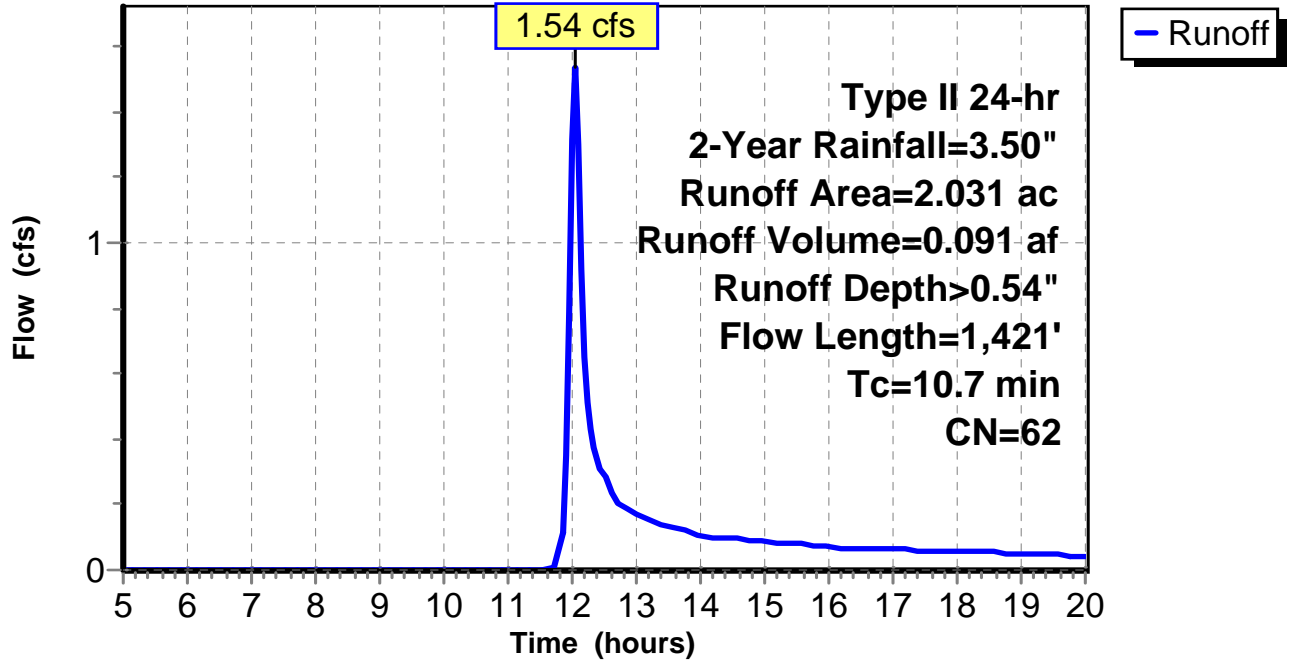
Subcatchment 10: C 180.005

Hydrograph



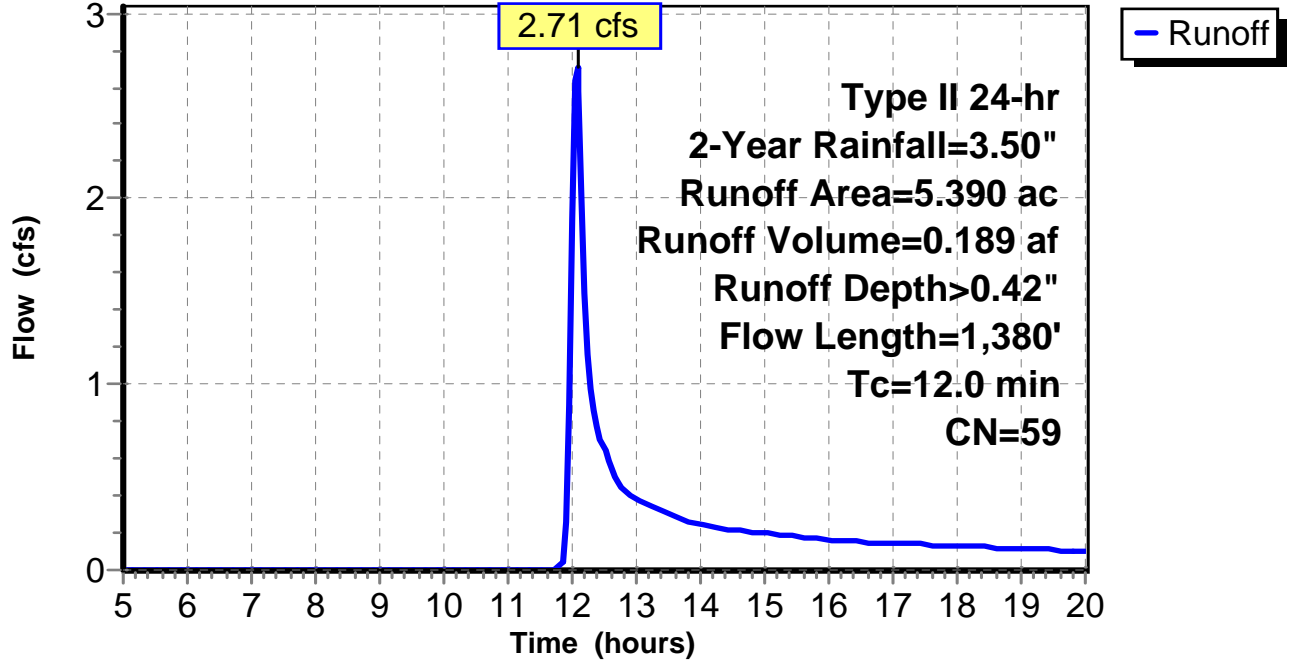
Subcatchment 1: C AR-502.001

Hydrograph



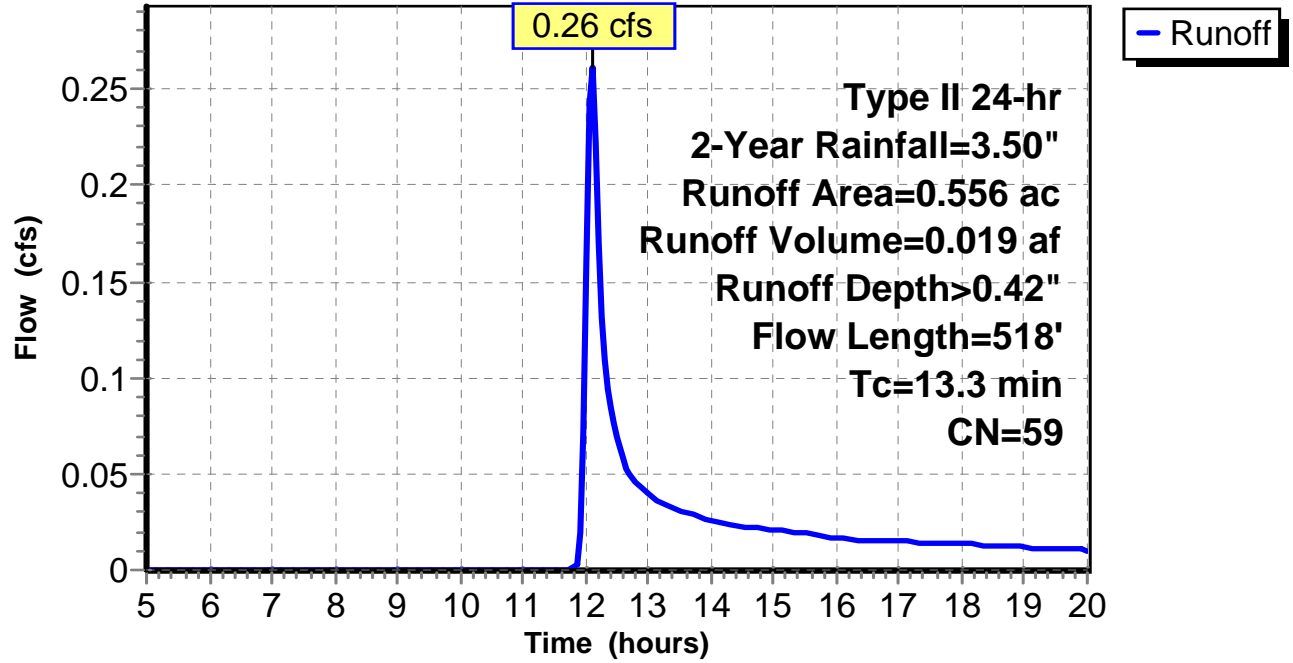
Subcatchment 2: C AR-502.002

Hydrograph



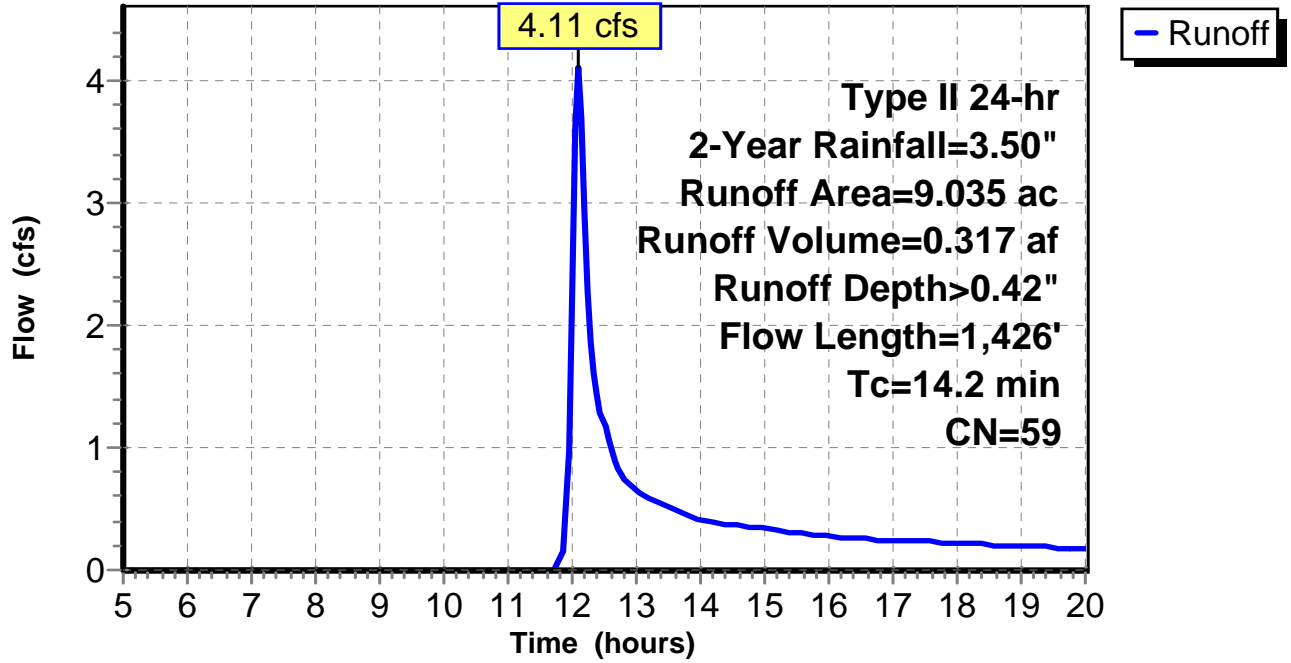
Subcatchment 3: C AR-502.003

Hydrograph



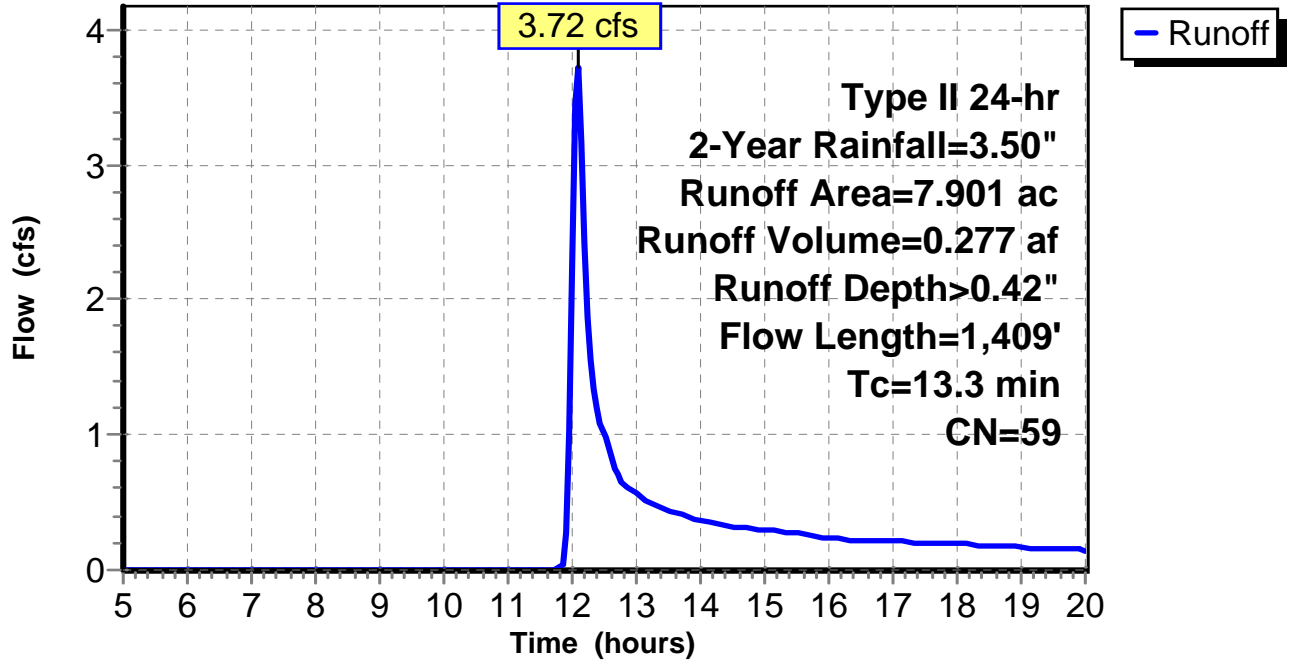
Subcatchment 4: C AR-502.004

Hydrograph



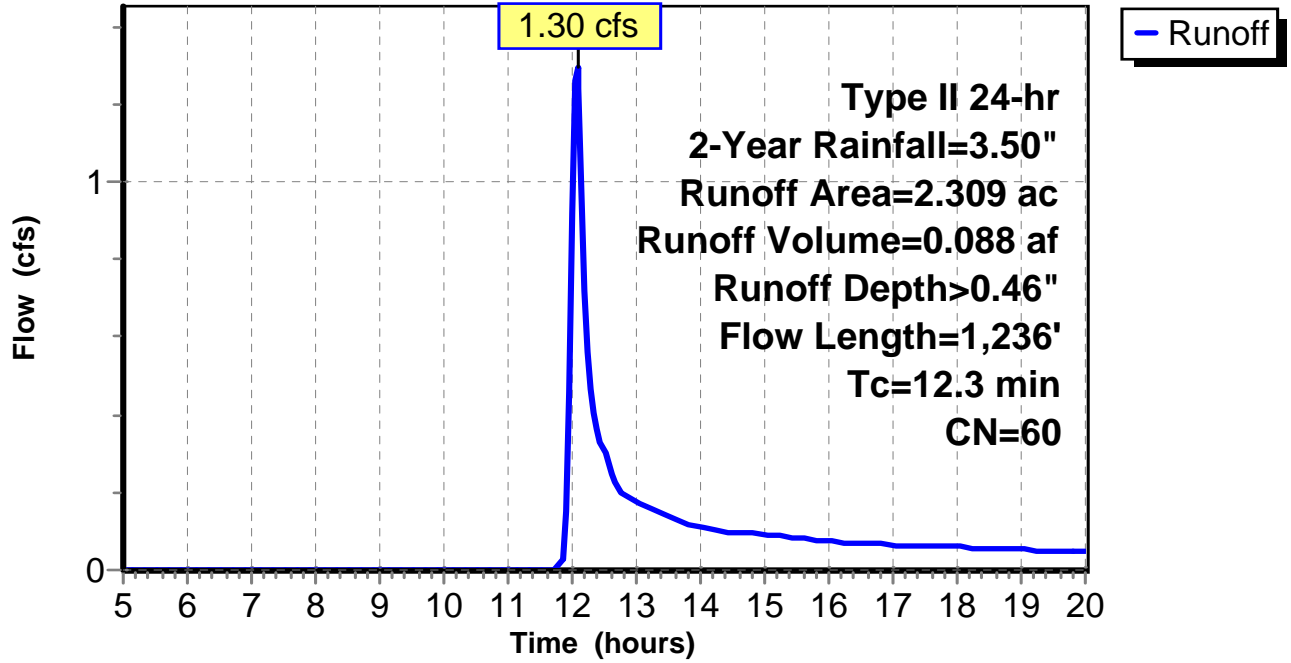
Subcatchment 5: C AR-502.005

Hydrograph



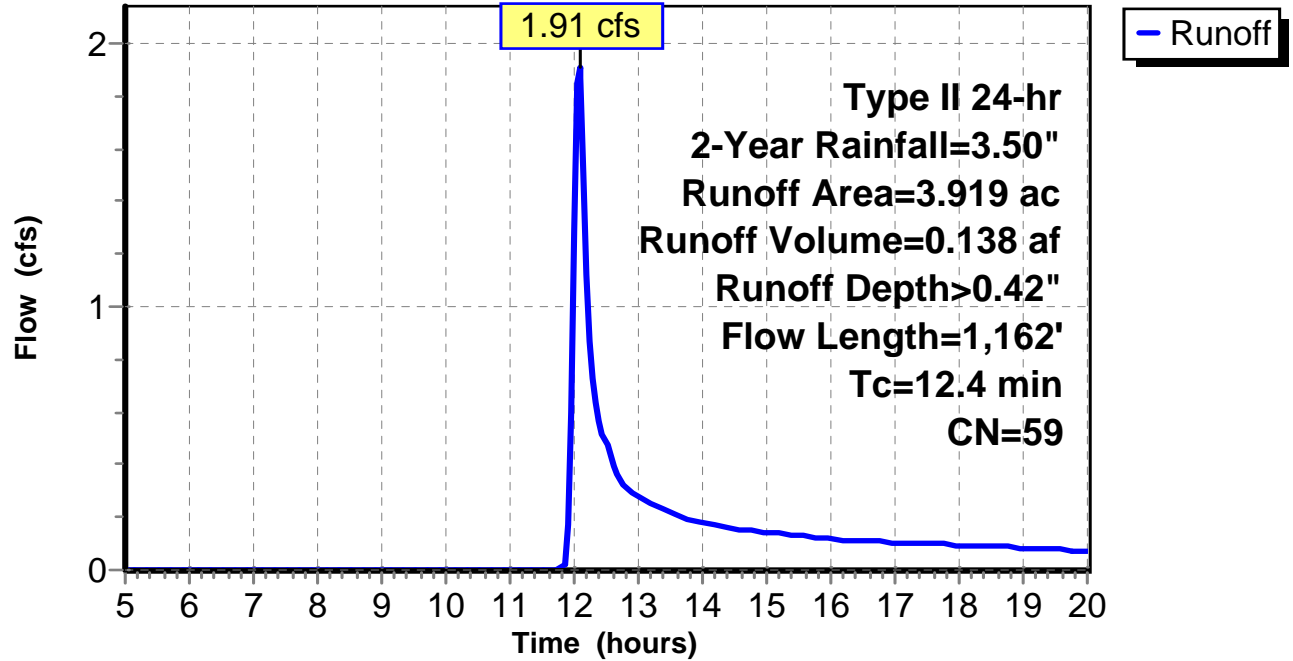
Subcatchment 6: C 180.001

Hydrograph



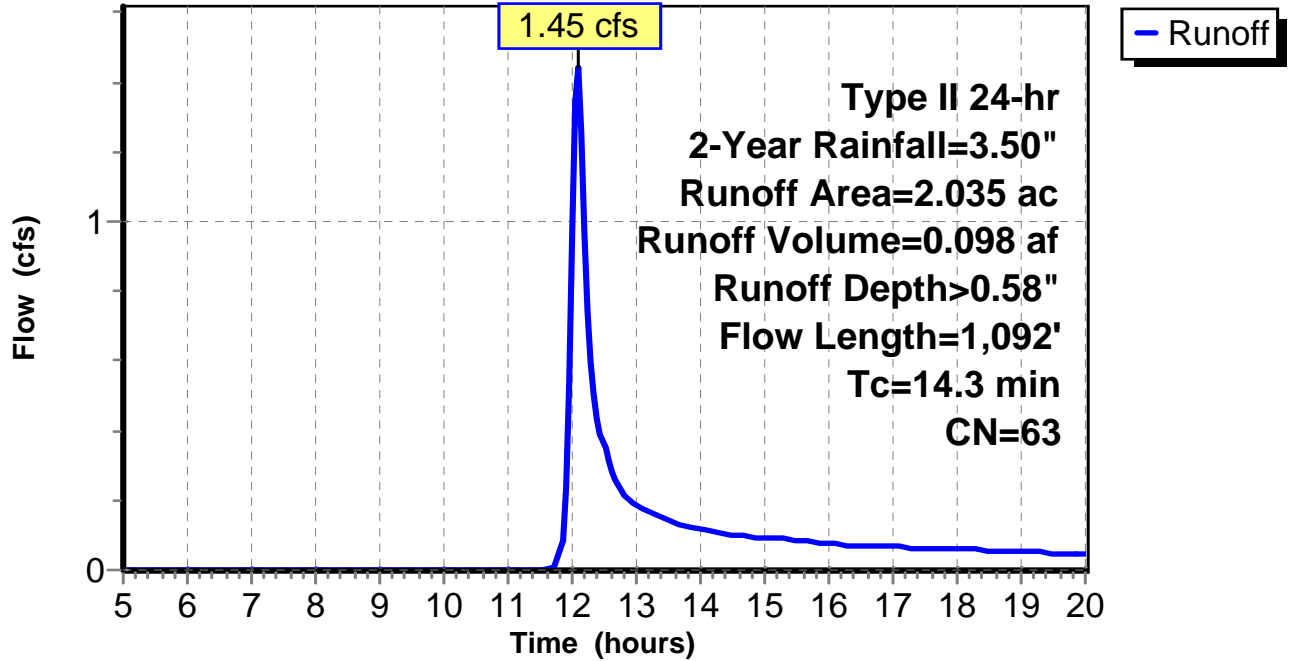
Subcatchment 7: C 180.002

Hydrograph



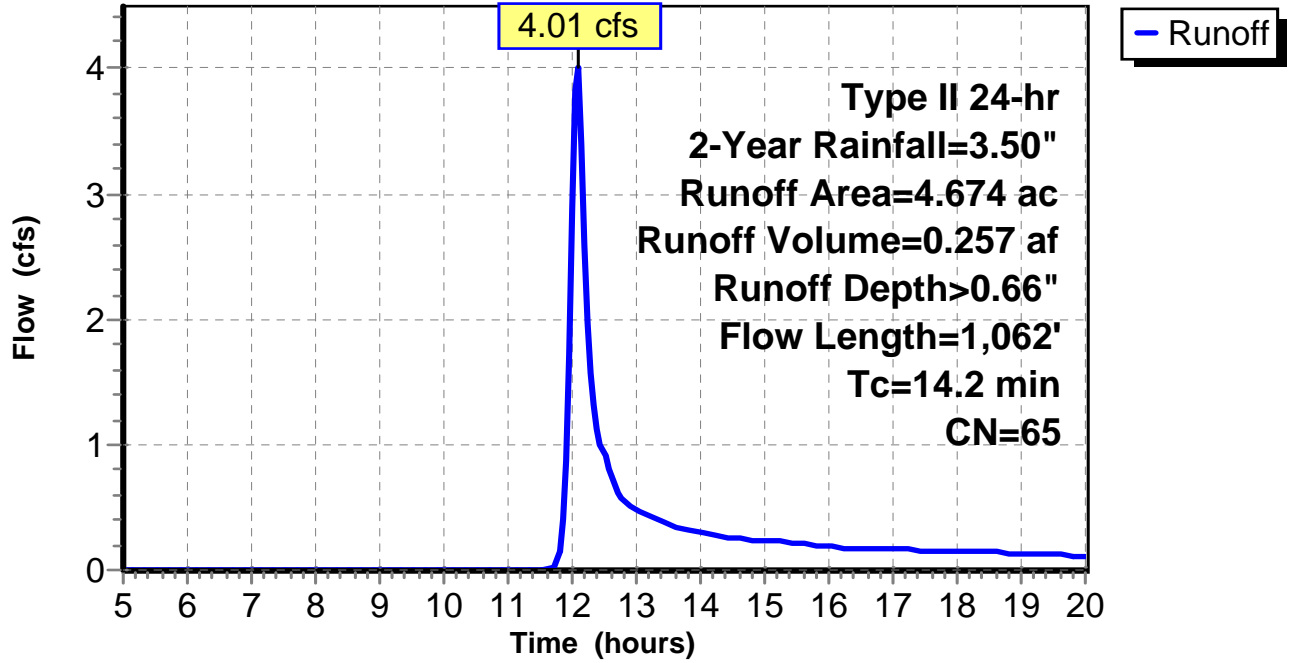
Subcatchment 8: C 180.003

Hydrograph



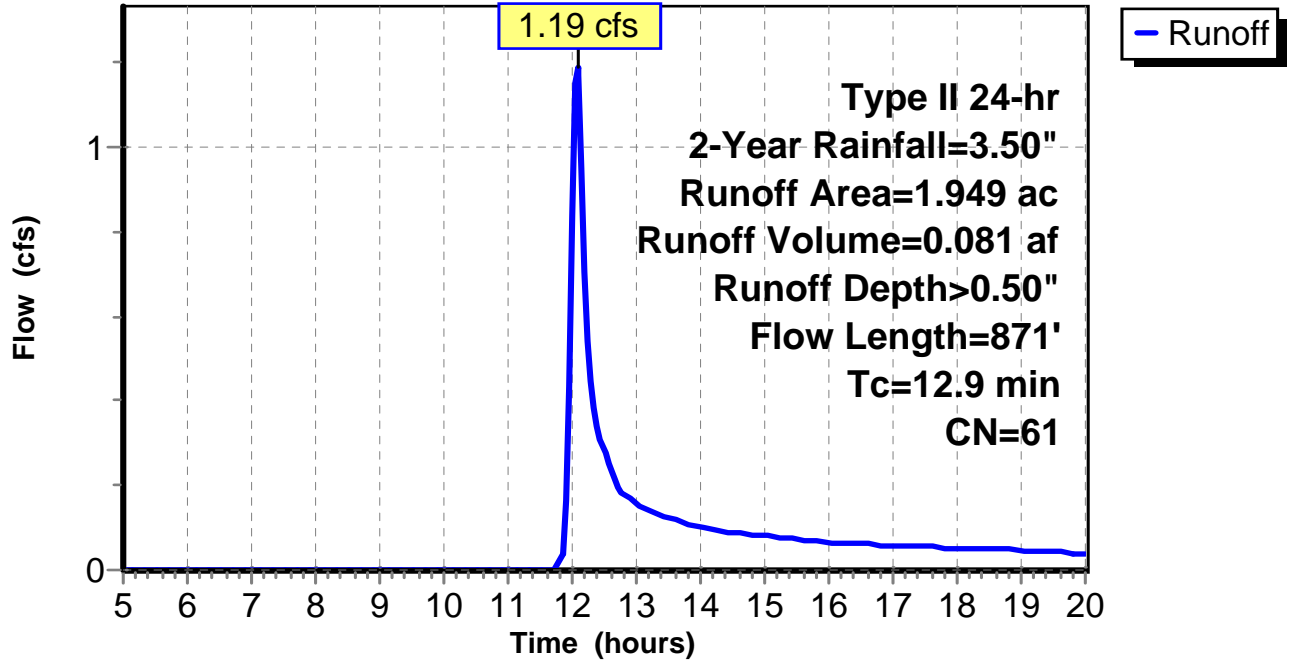
Subcatchment 9: C 180.004

Hydrograph



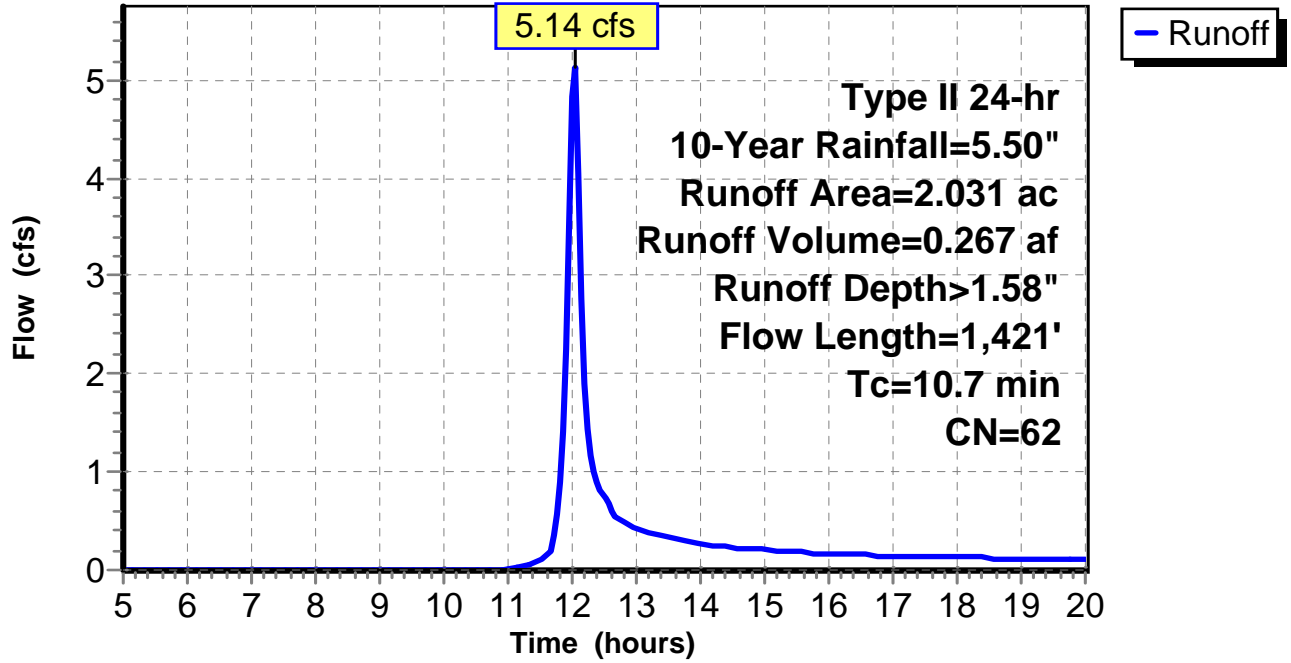
Subcatchment 10: C 180.005

Hydrograph



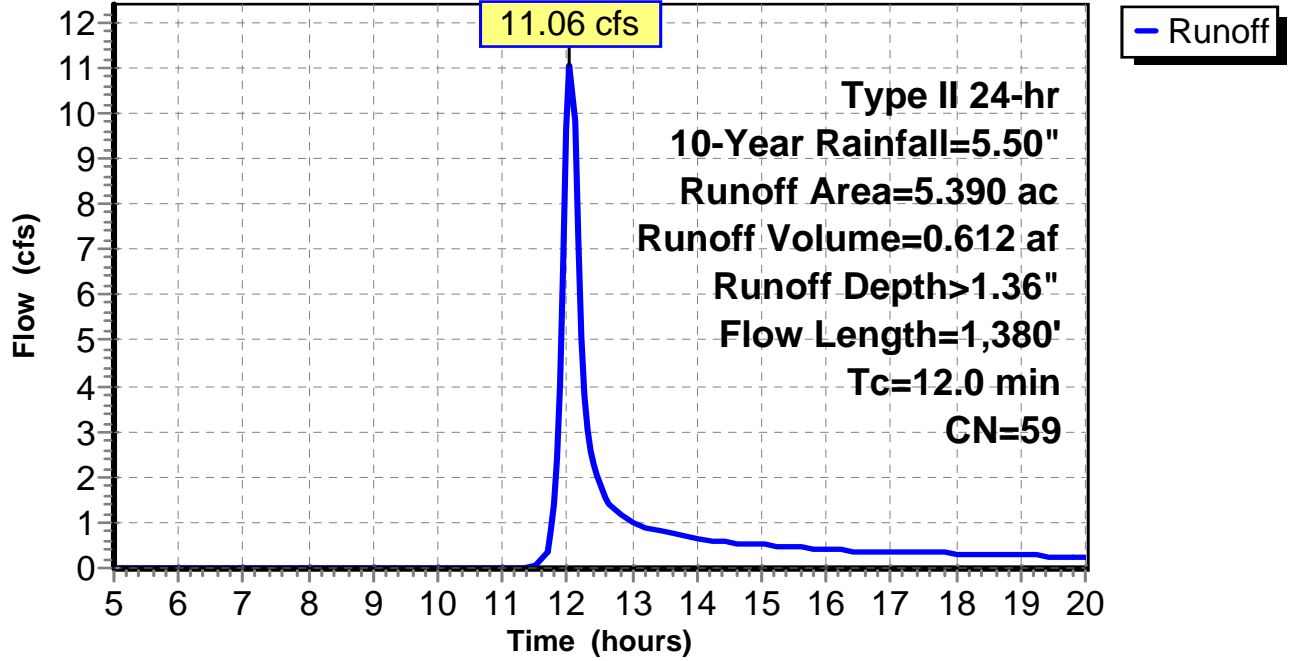
Subcatchment 1: C AR-502.001

Hydrograph



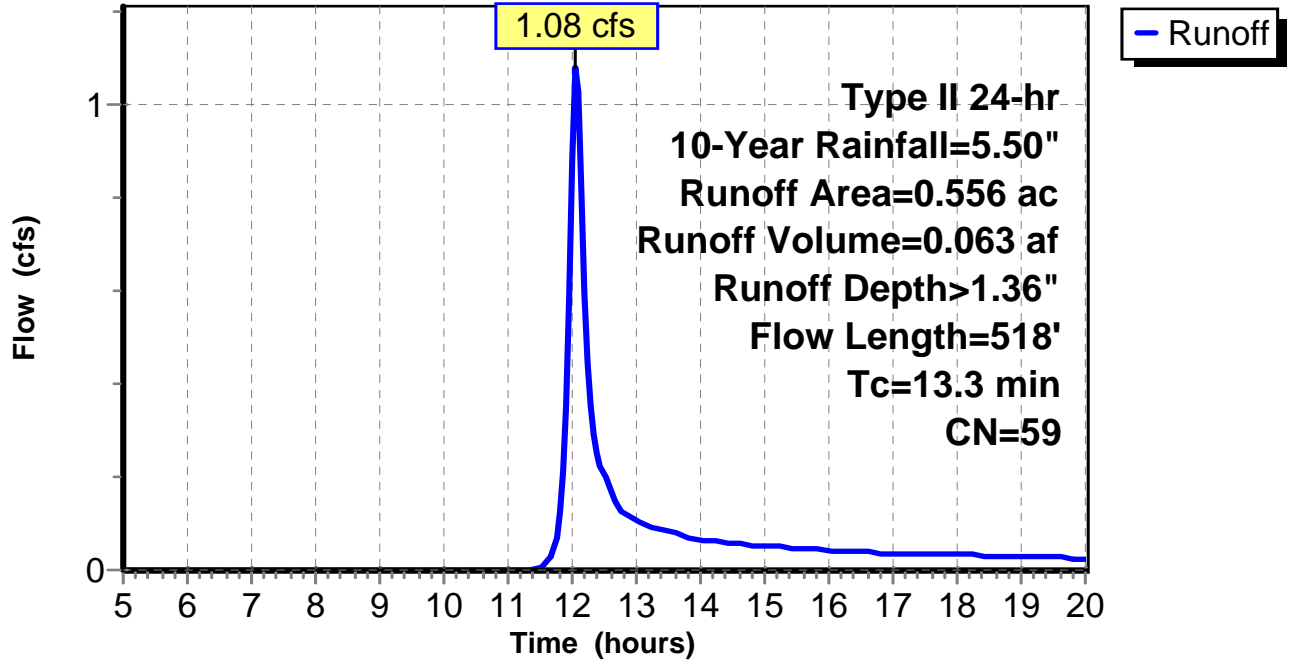
Subcatchment 2: C AR-502.002

Hydrograph



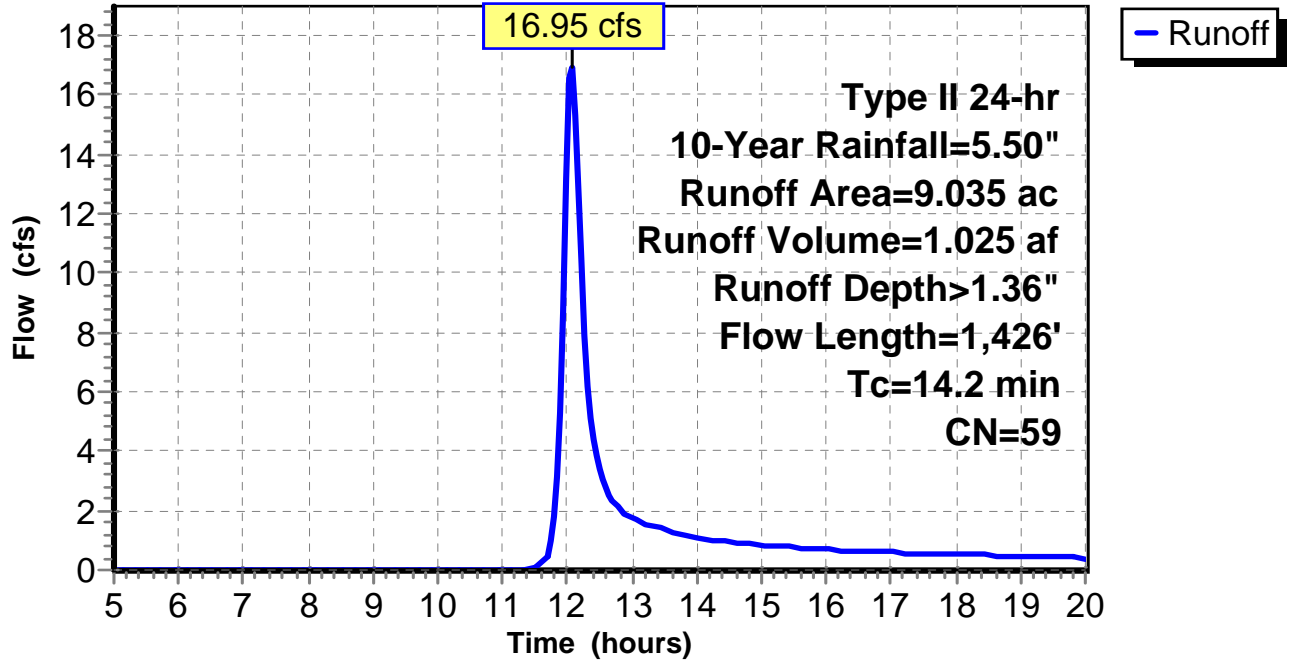
Subcatchment 3: C AR-502.003

Hydrograph



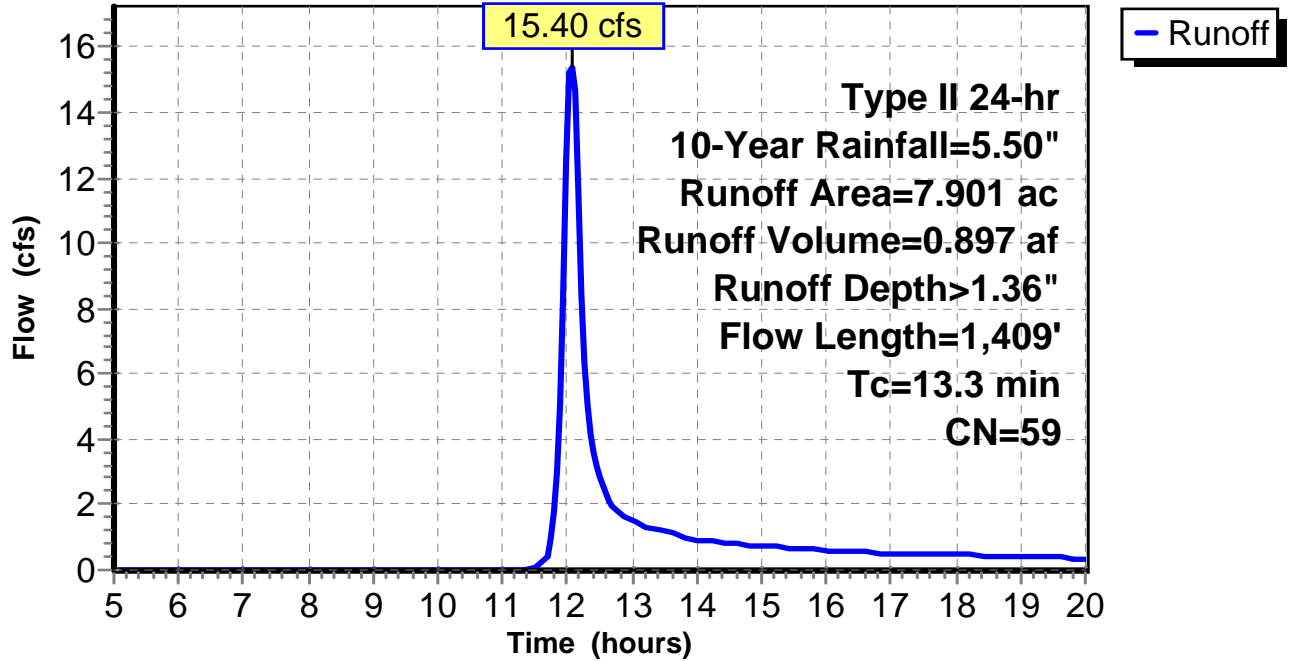
Subcatchment 4: C AR-502.004

Hydrograph



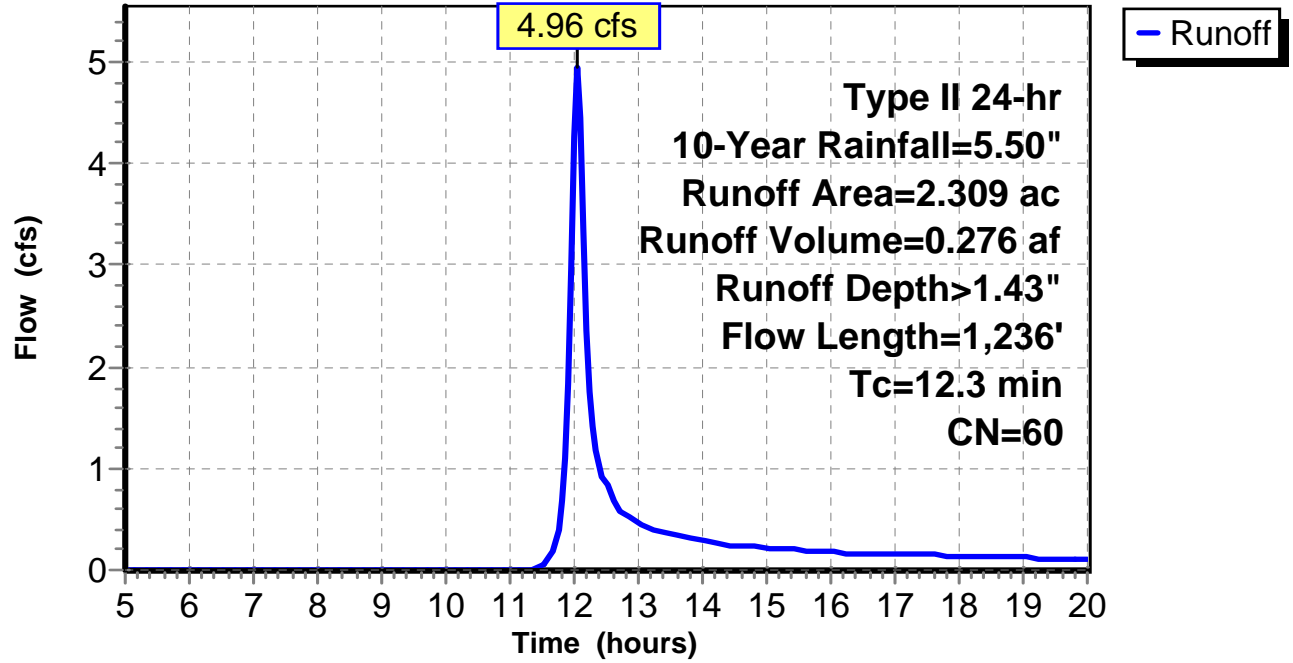
Subcatchment 5: C AR-502.005

Hydrograph



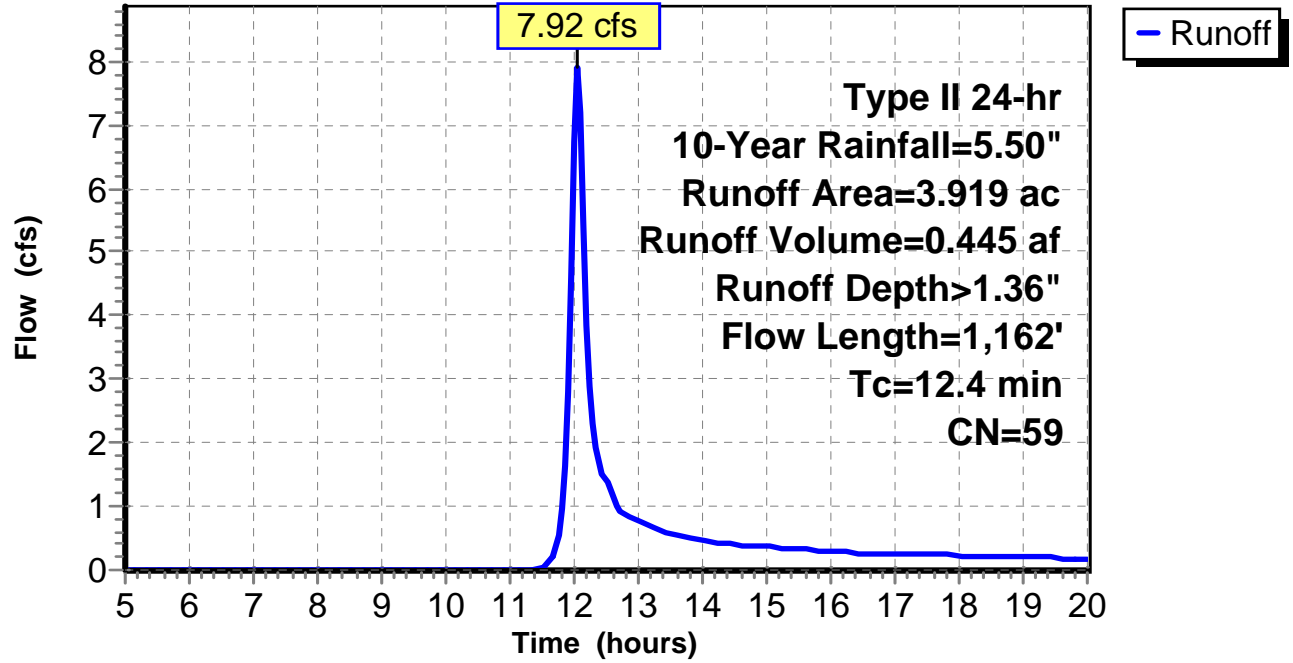
Subcatchment 6: C 180.001

Hydrograph



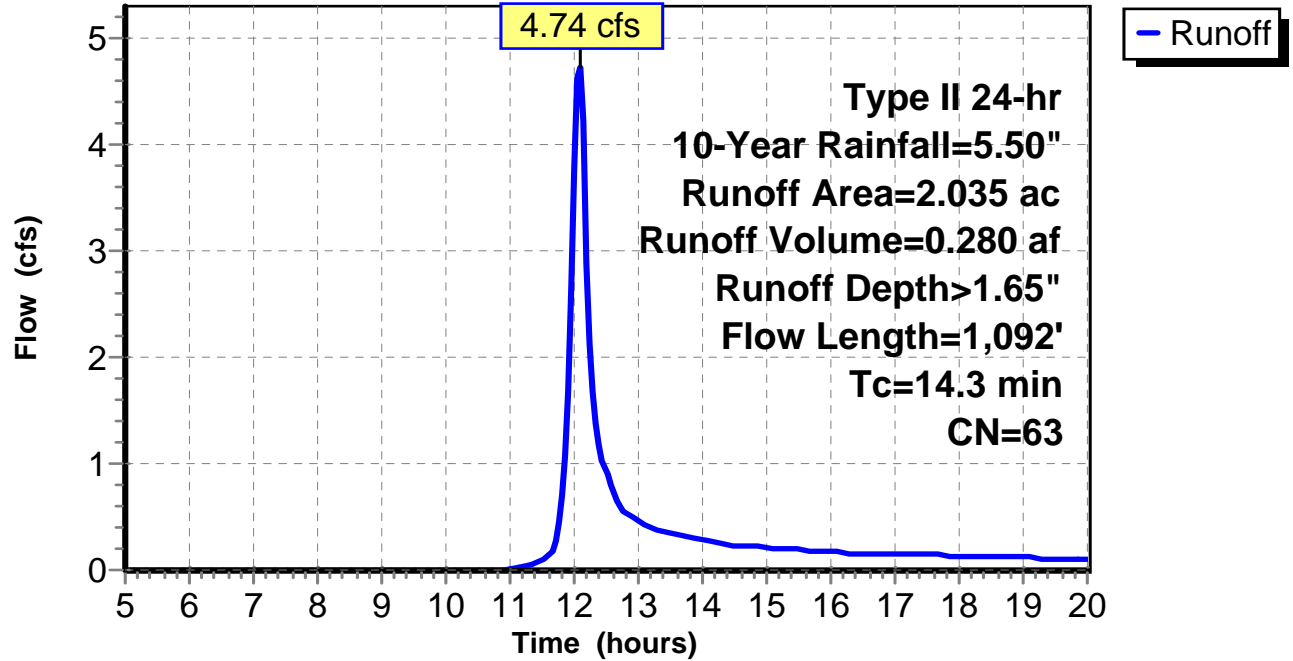
Subcatchment 7: C 180.002

Hydrograph



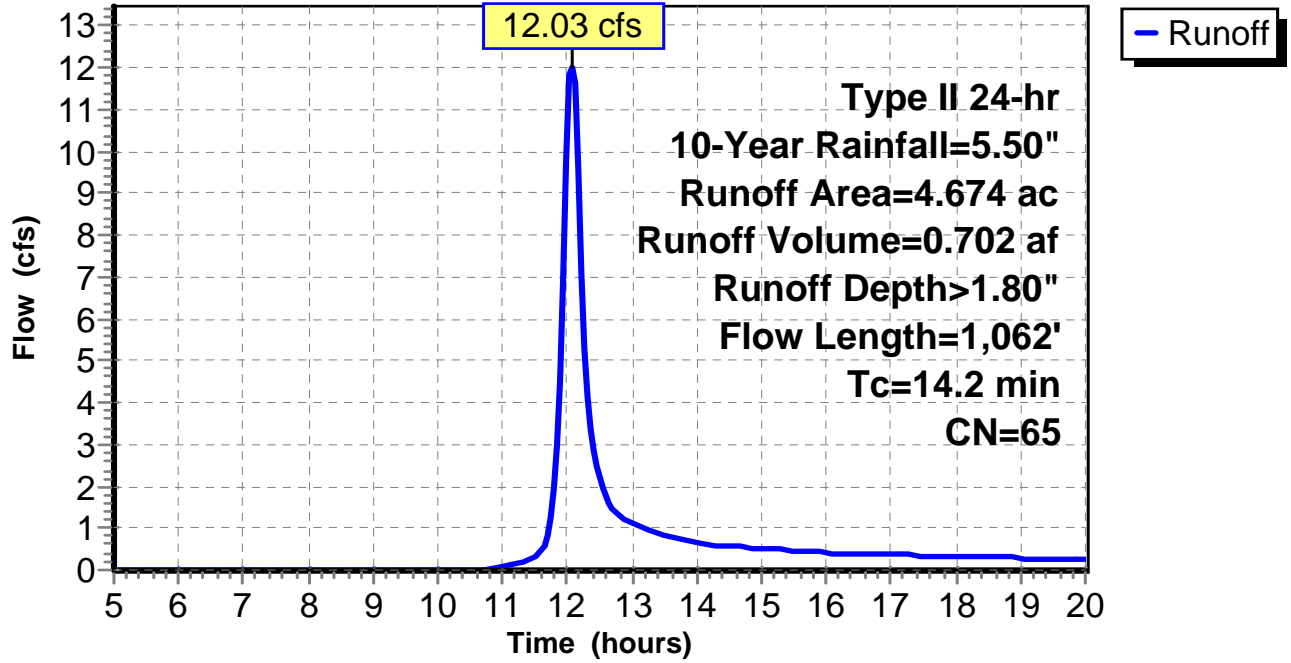
Subcatchment 8: C 180.003

Hydrograph



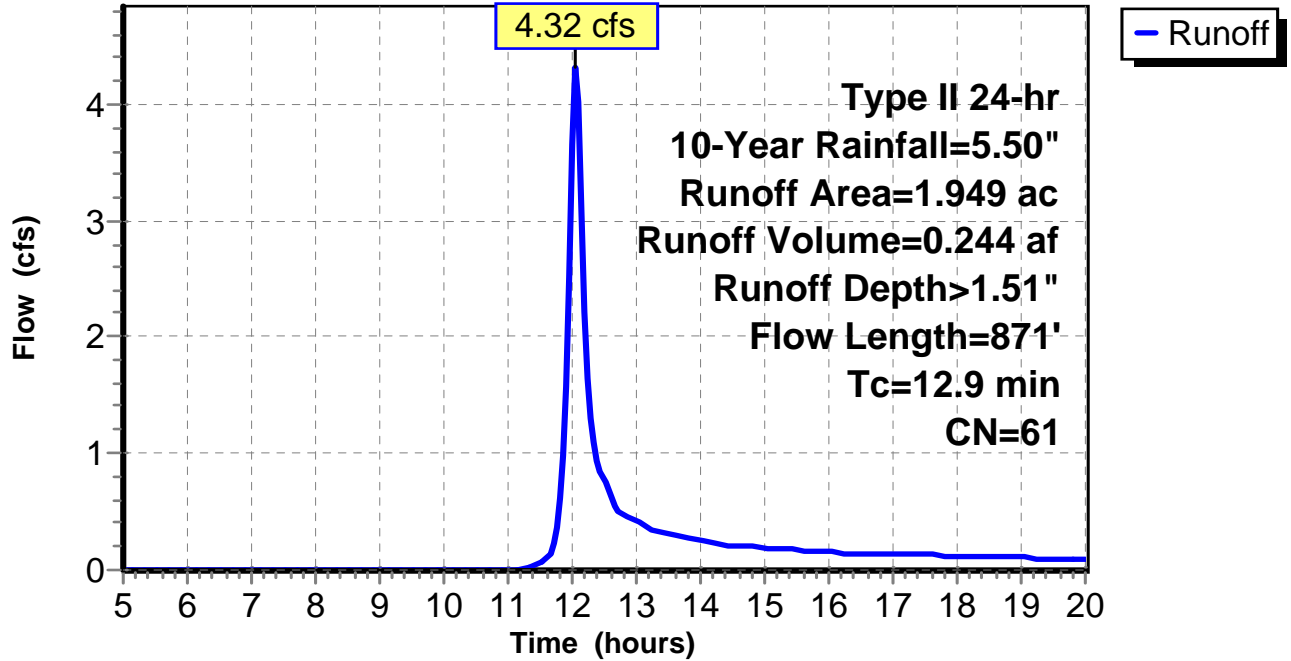
Subcatchment 9: C 180.004

Hydrograph



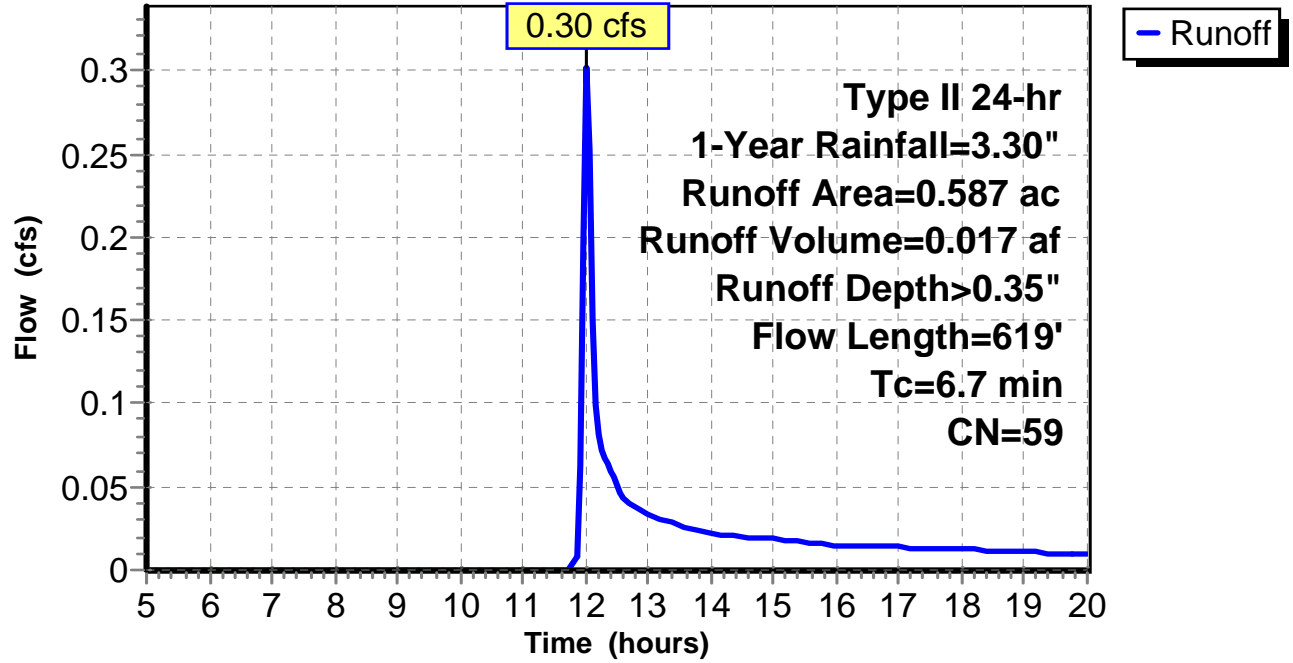
Subcatchment 10: C 180.005

Hydrograph



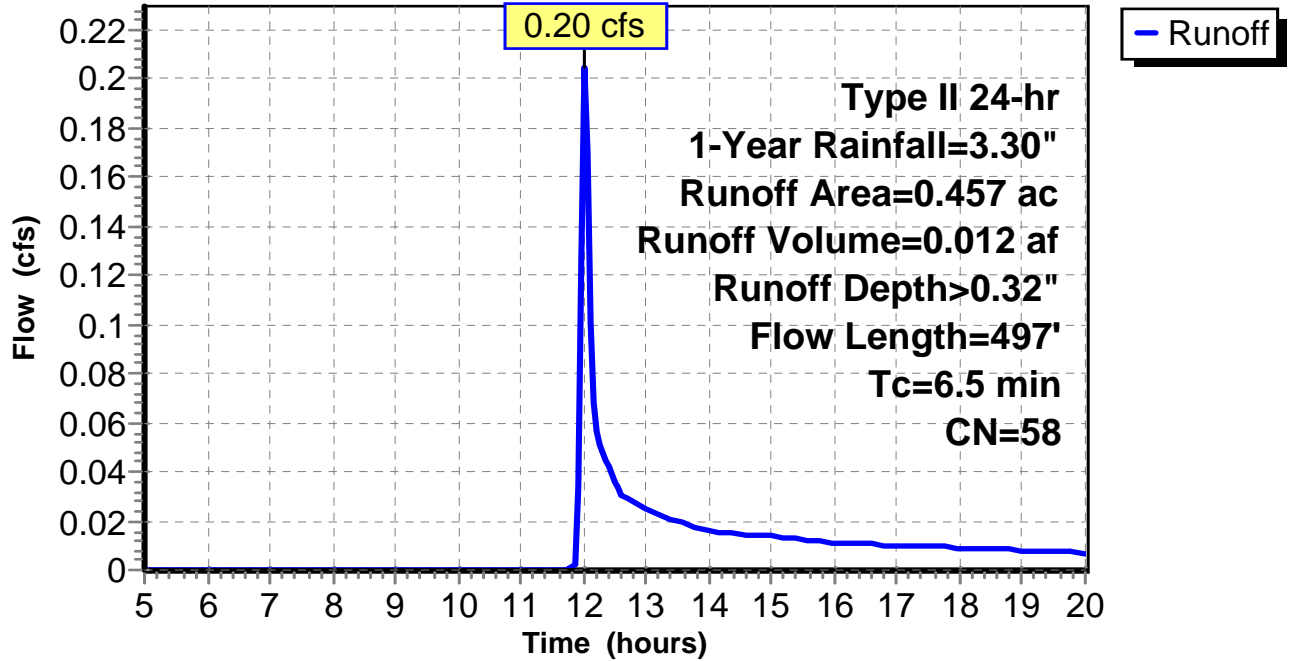
Subcatchment 1: C AR-506.001

Hydrograph



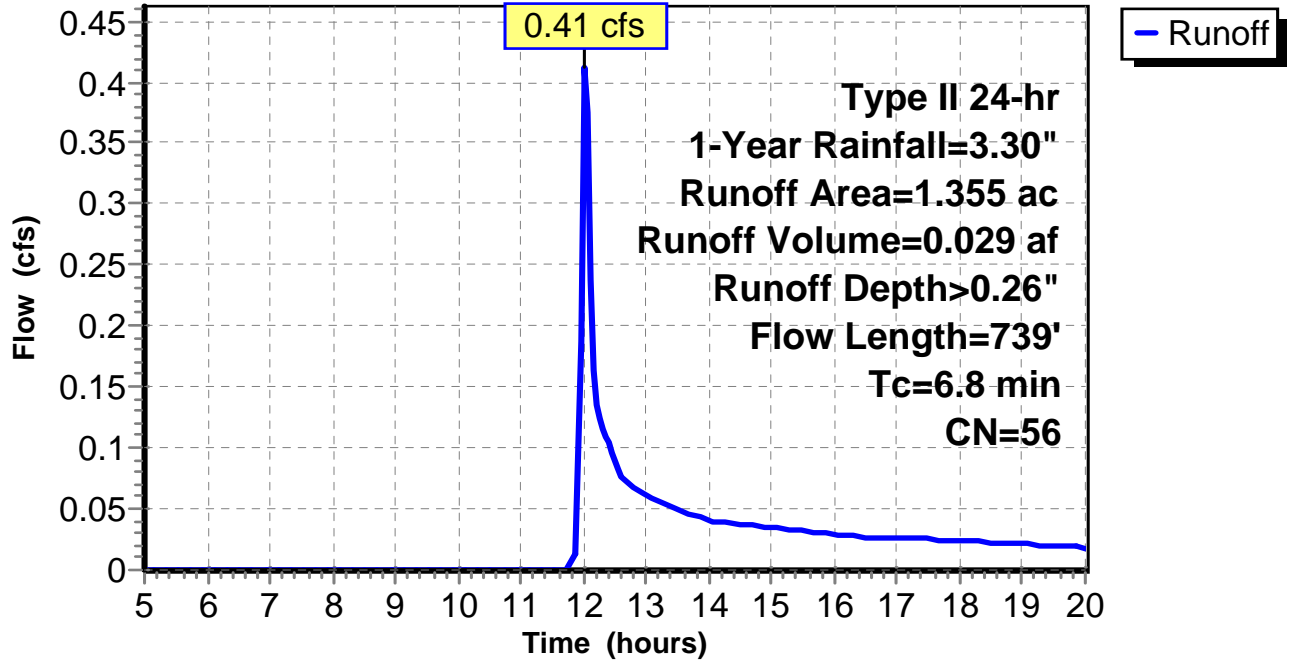
Subcatchment 2: C AR-506.002

Hydrograph



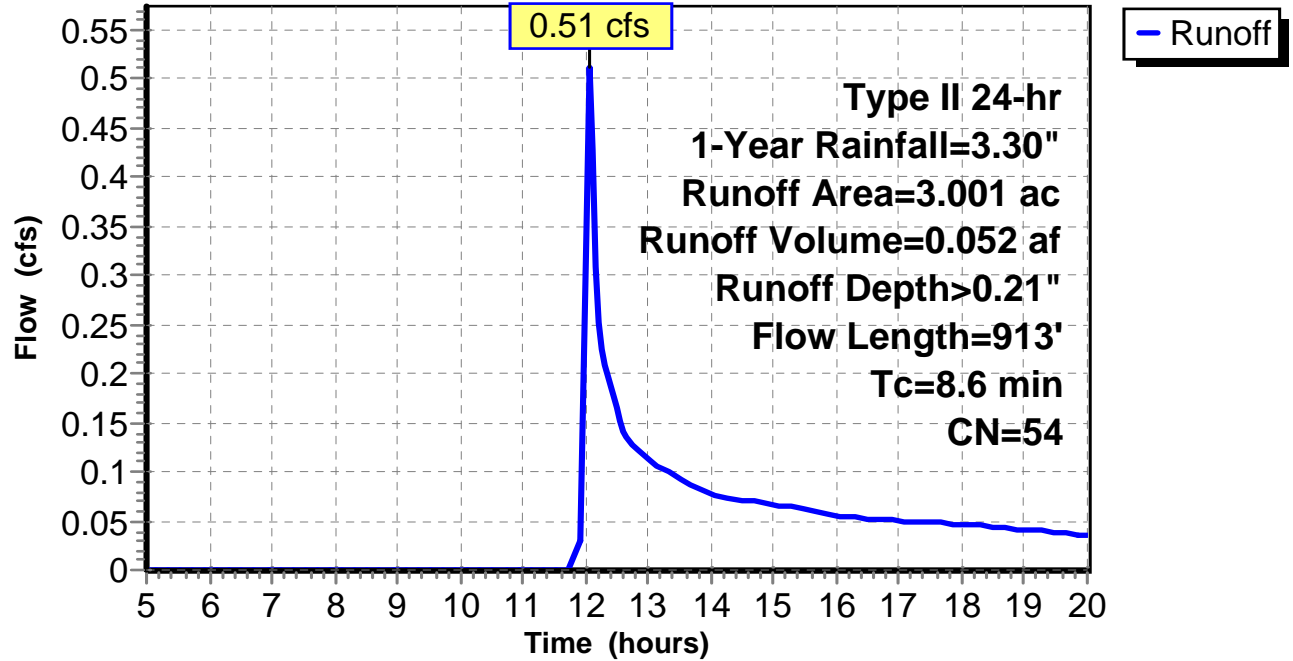
Subcatchment 3: C AR-506.003

Hydrograph



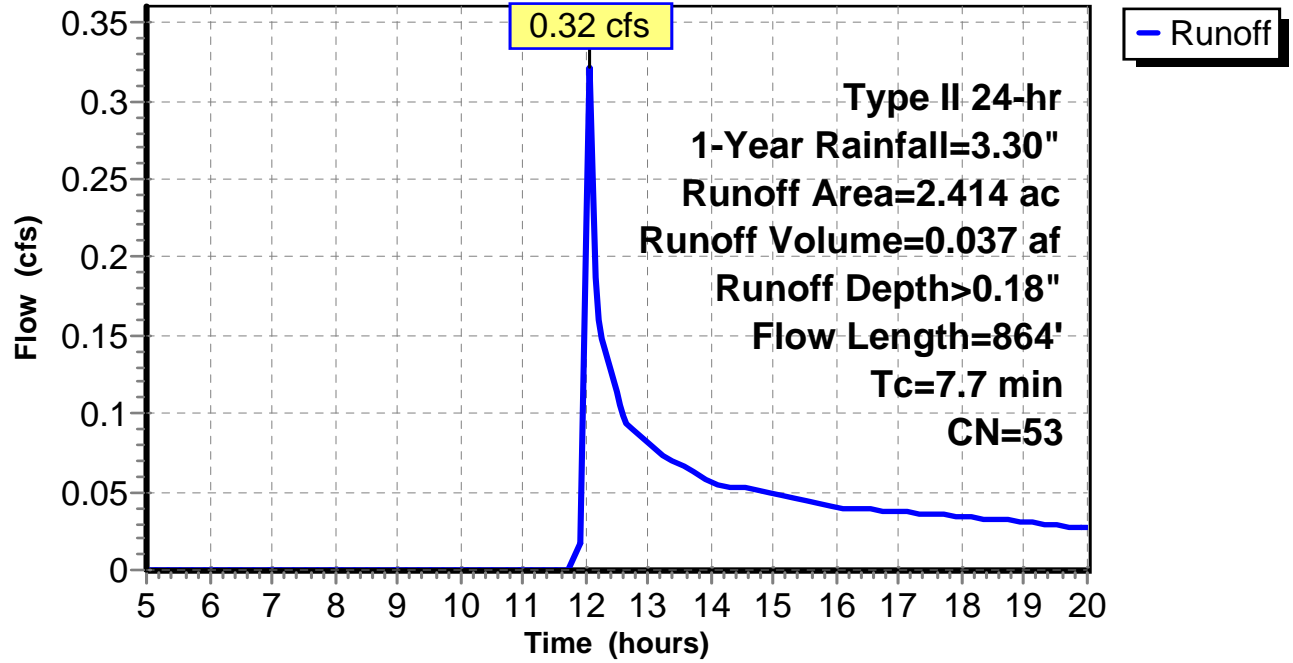
Subcatchment 4: C 202.001

Hydrograph



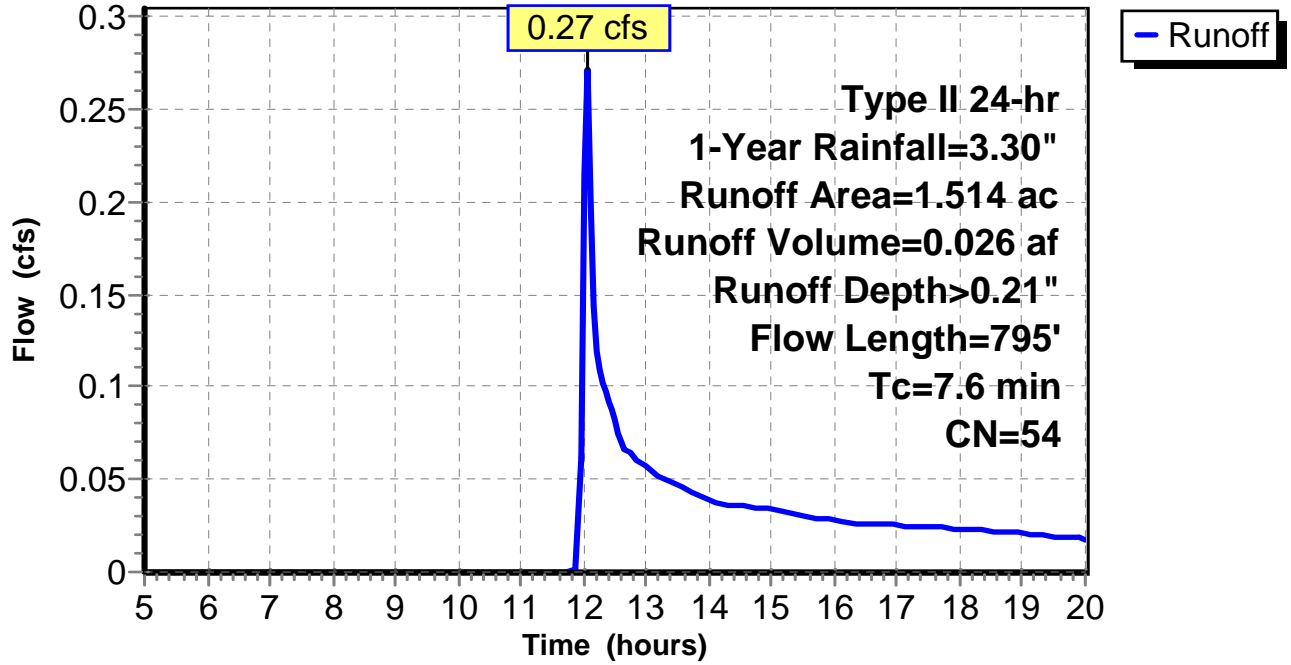
Subcatchment 5: C 202.002

Hydrograph



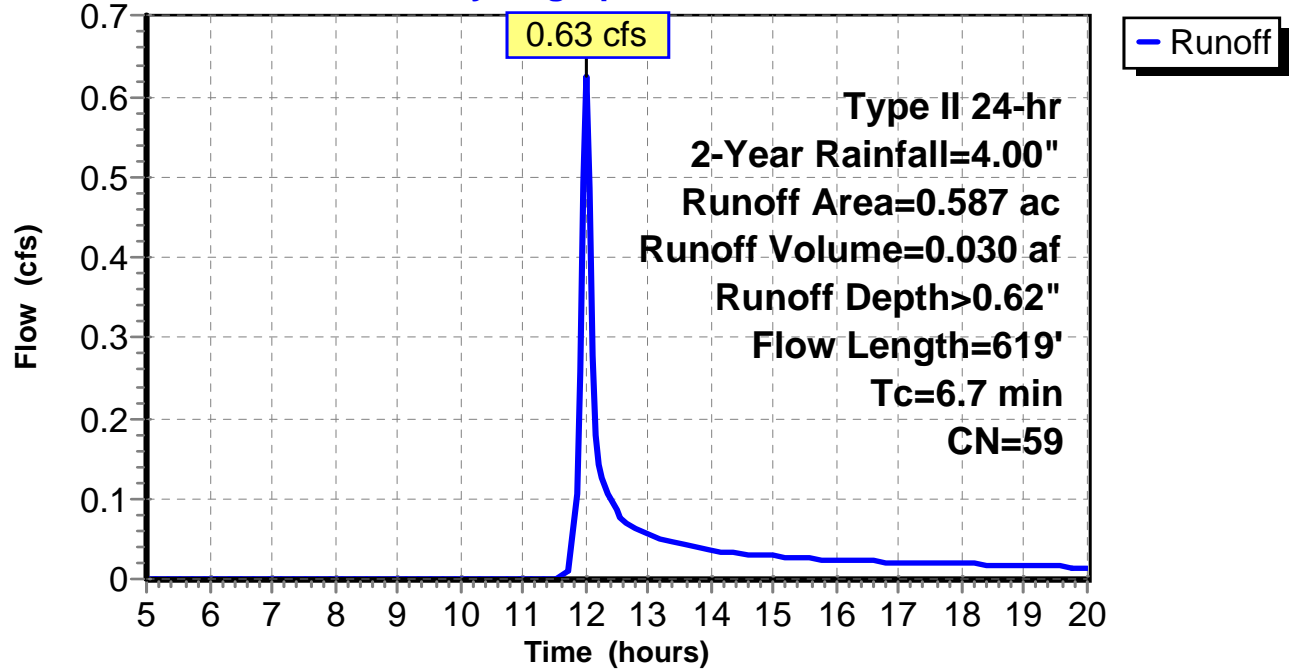
Subcatchment 6: C 202.003

Hydrograph



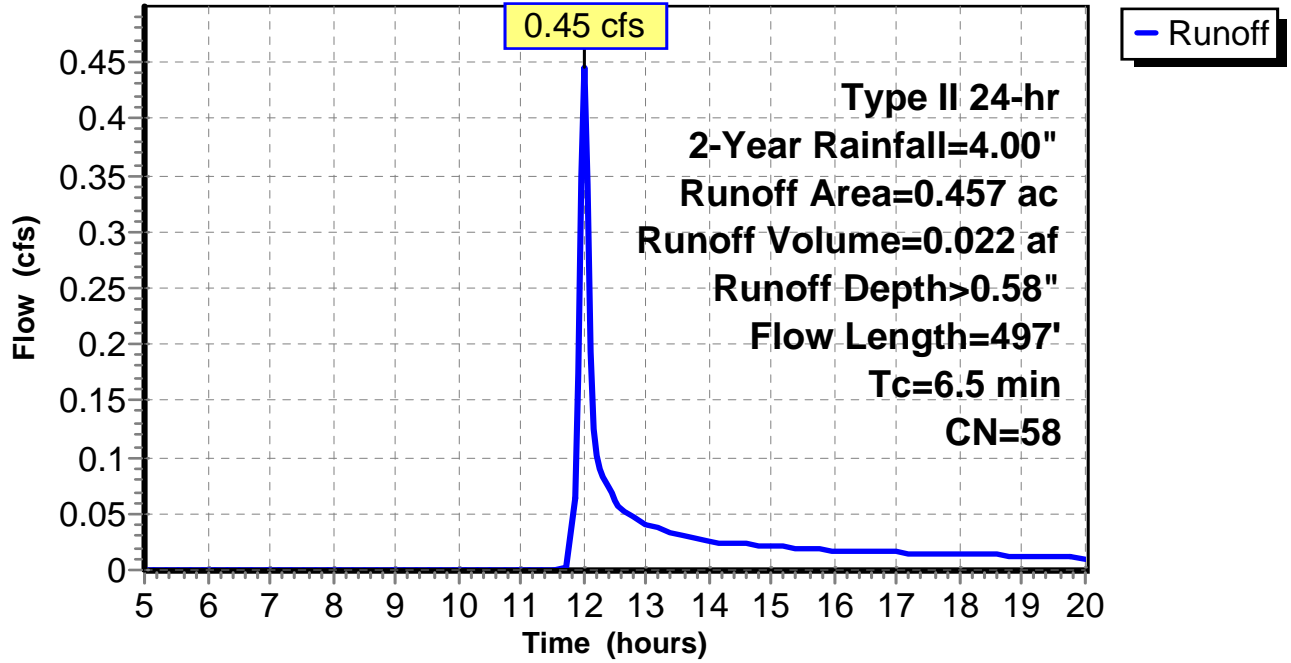
Subcatchment 1: C AR-506.001

Hydrograph



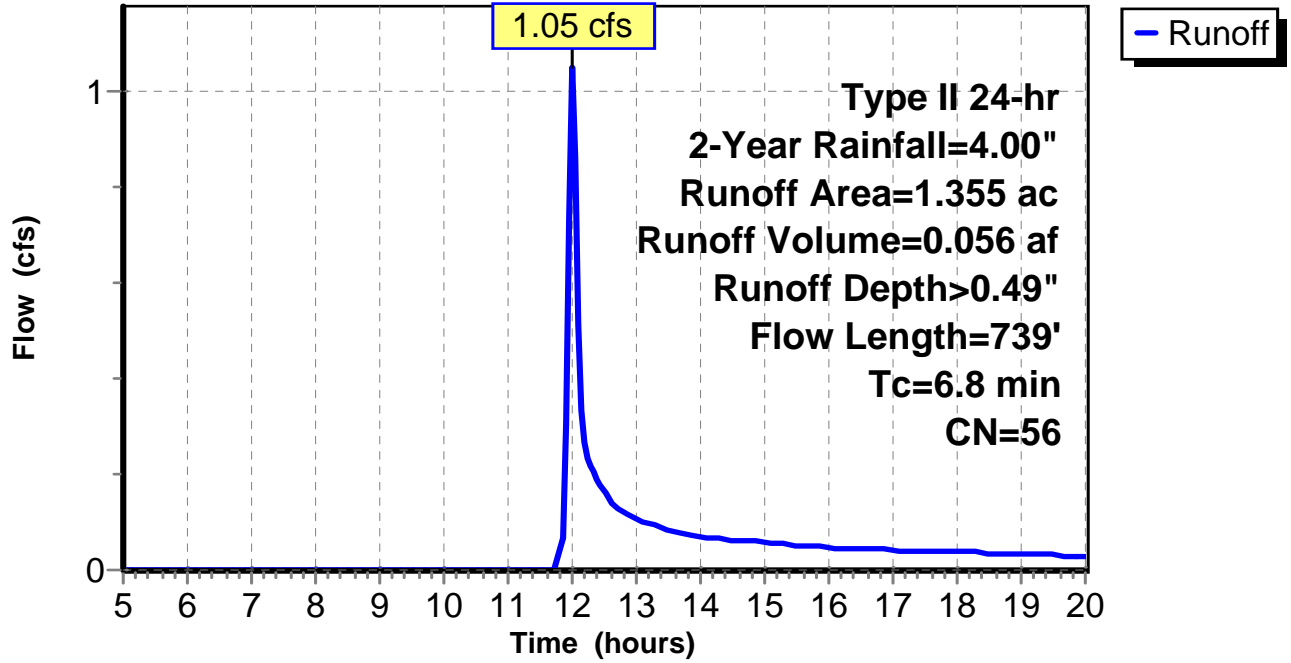
Subcatchment 2: C AR-506.002

Hydrograph



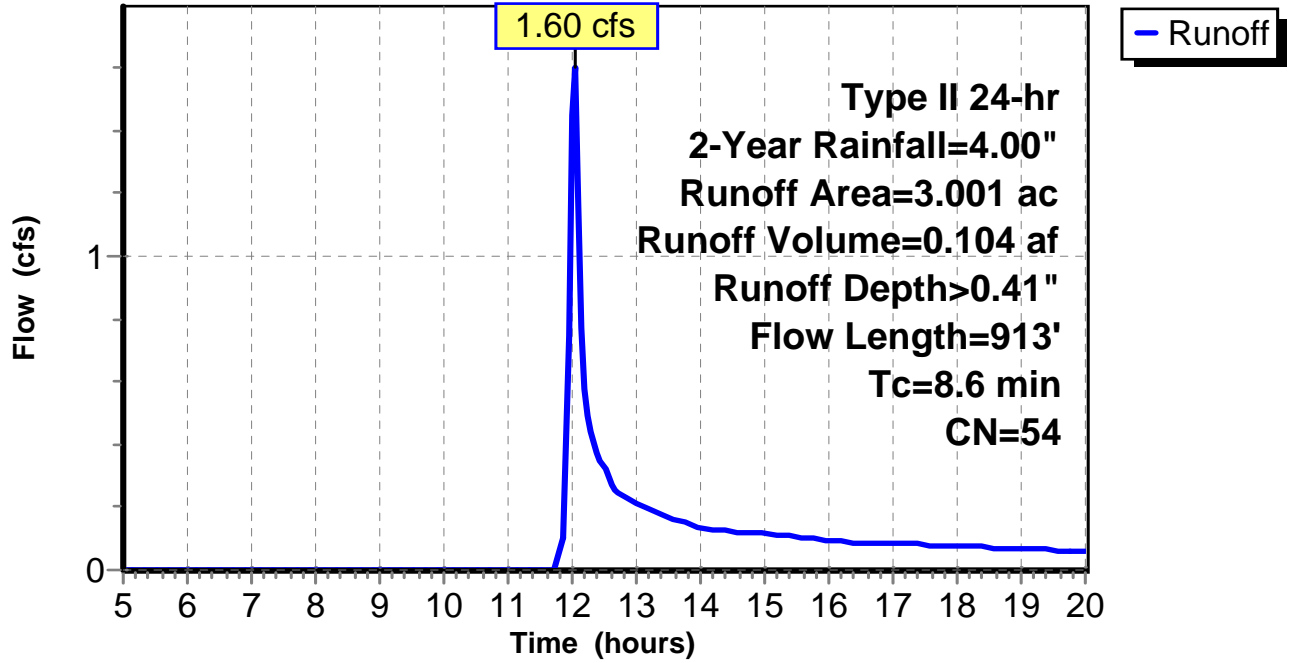
Subcatchment 3: C AR-506.003

Hydrograph



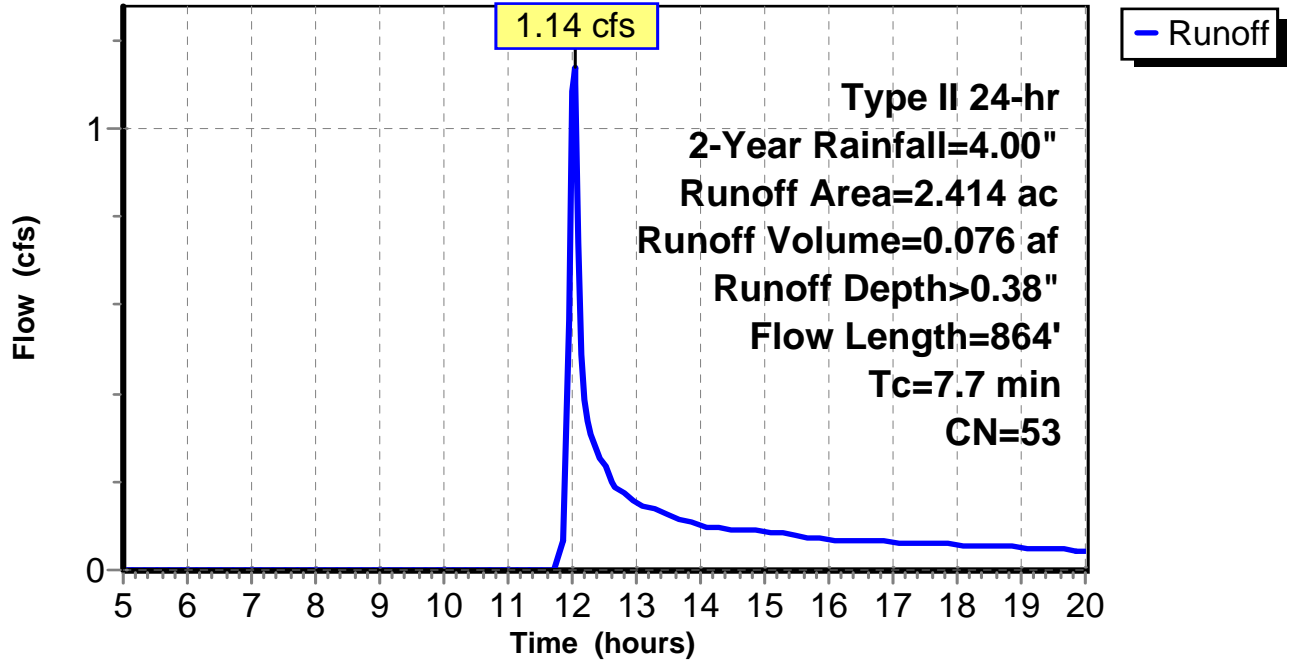
Subcatchment 4: C 202.001

Hydrograph



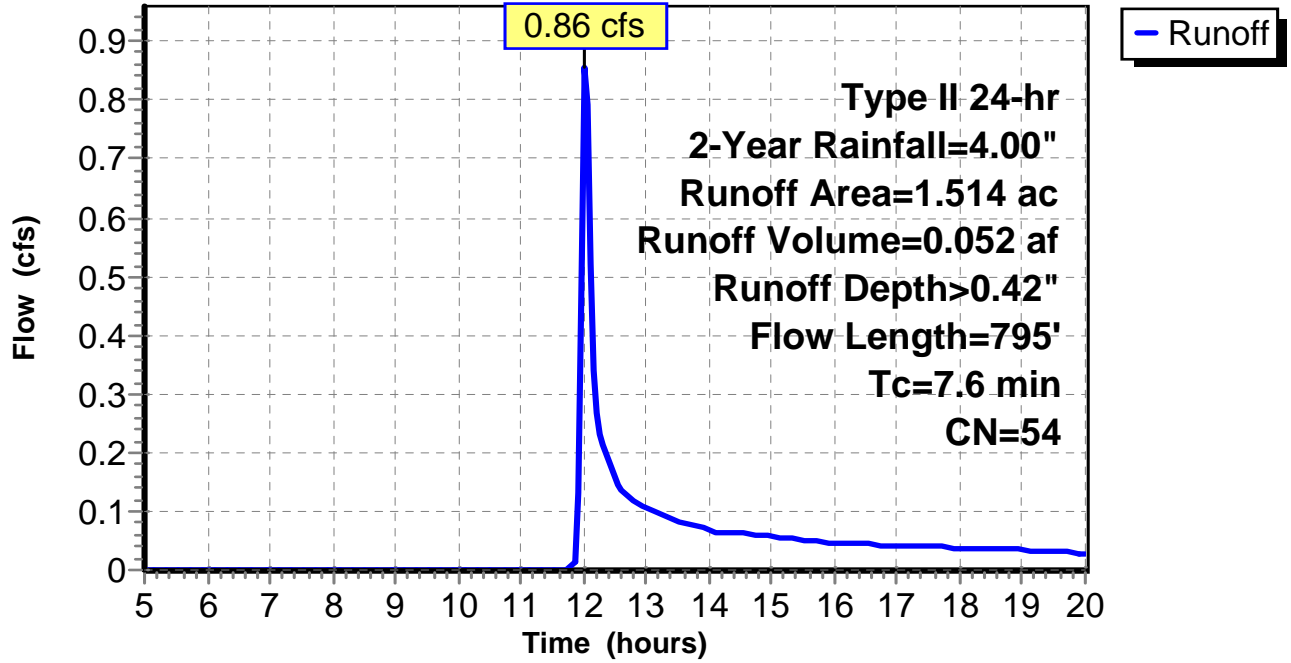
Subcatchment 5: C 202.002

Hydrograph



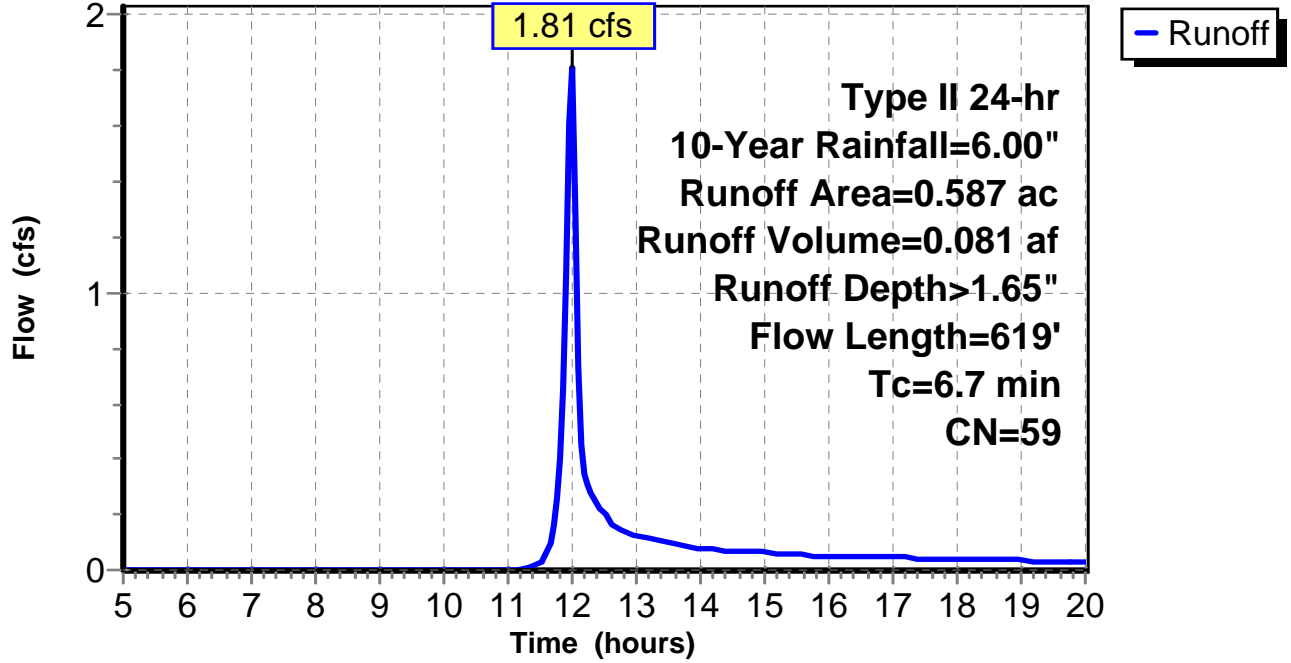
Subcatchment 6: C 202.003

Hydrograph



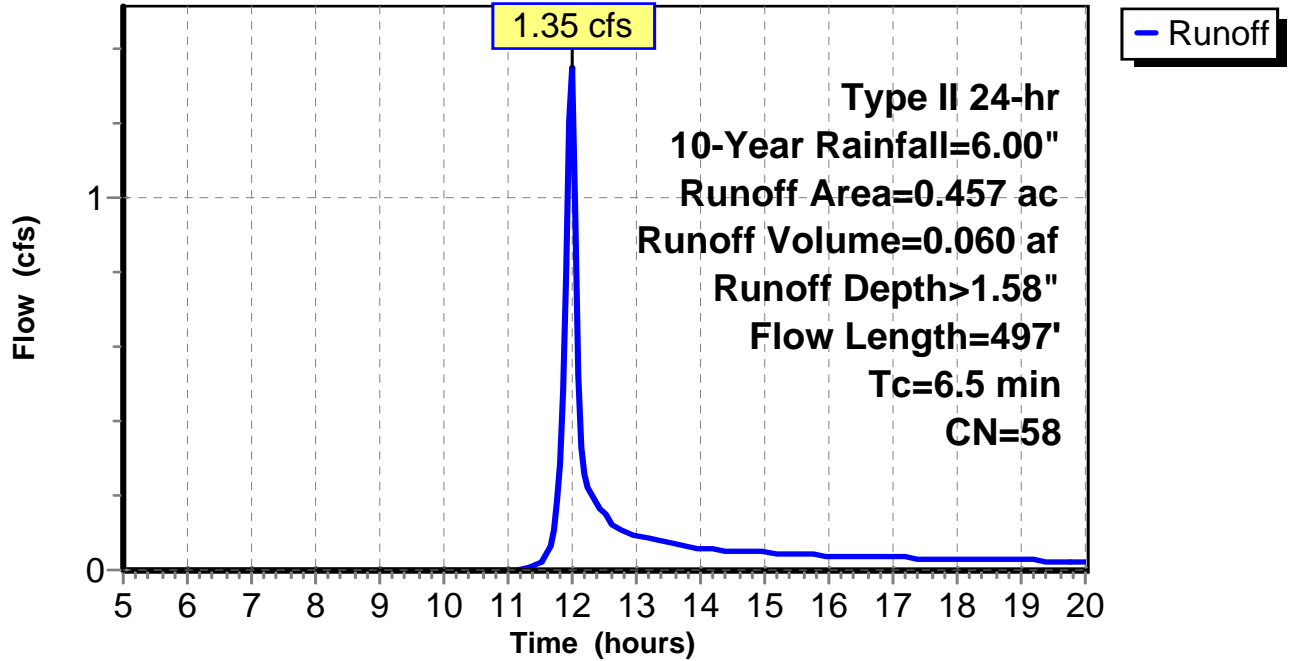
Subcatchment 1: C AR-506.001

Hydrograph



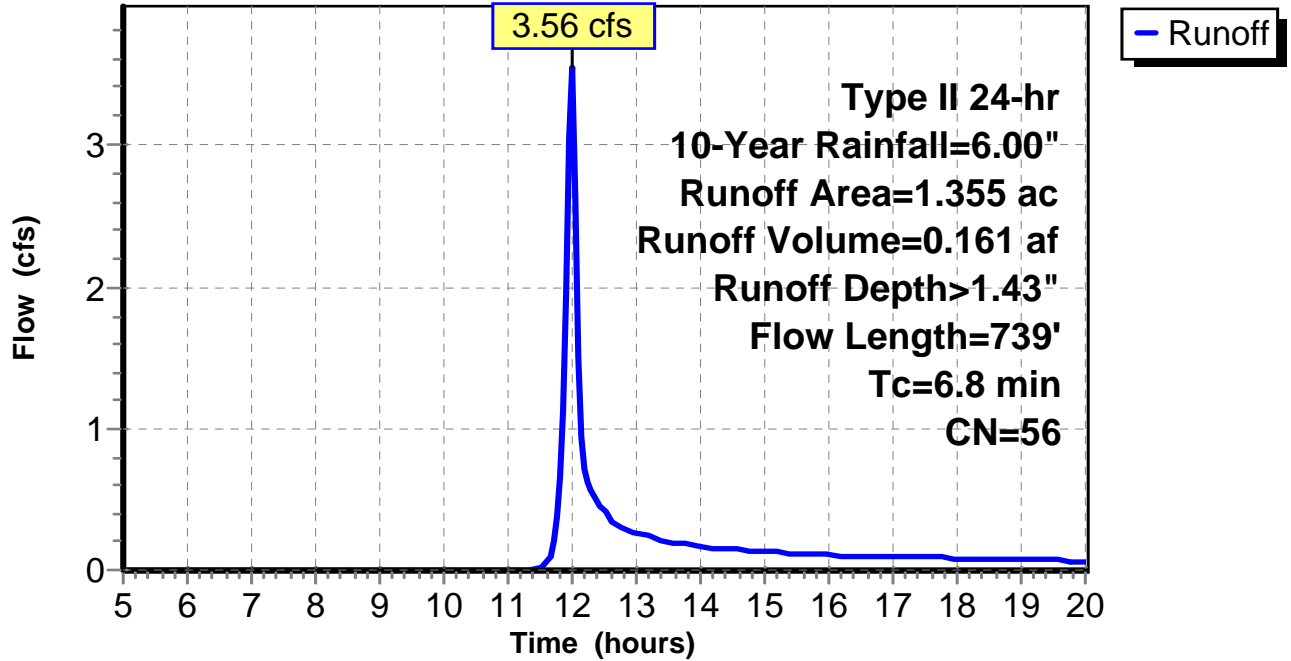
Subcatchment 2: C AR-506.002

Hydrograph



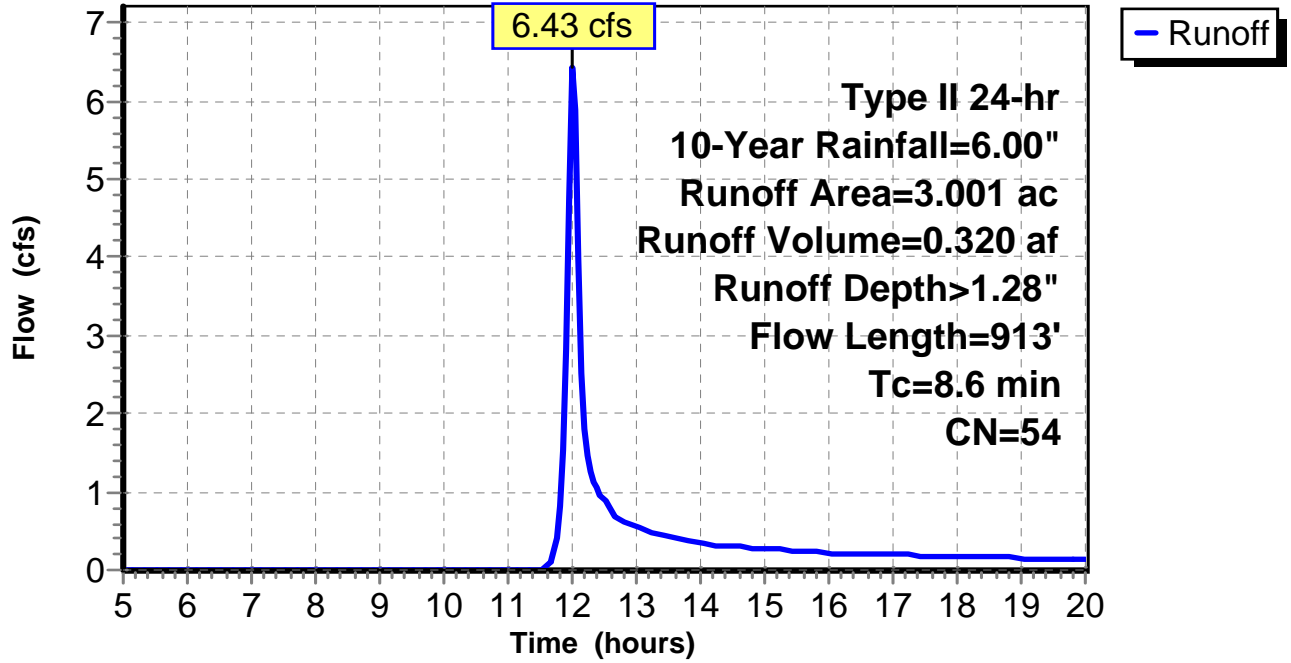
Subcatchment 3: C AR-506.003

Hydrograph



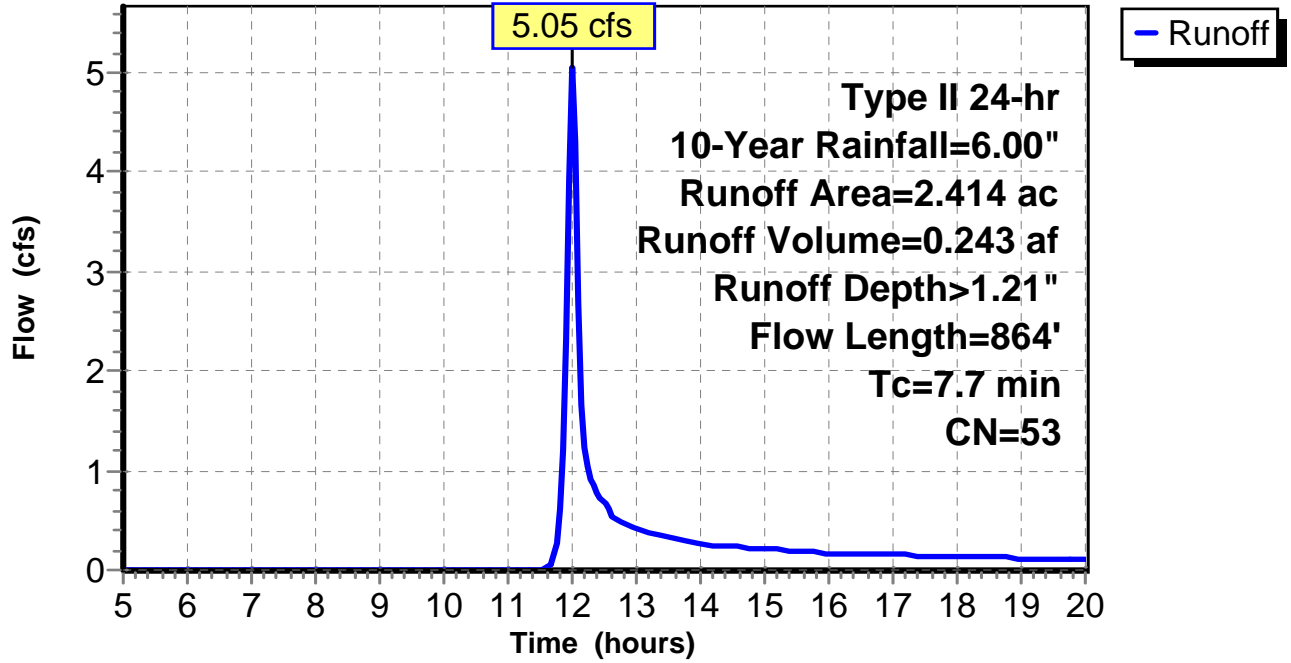
Subcatchment 4: C 202.001

Hydrograph



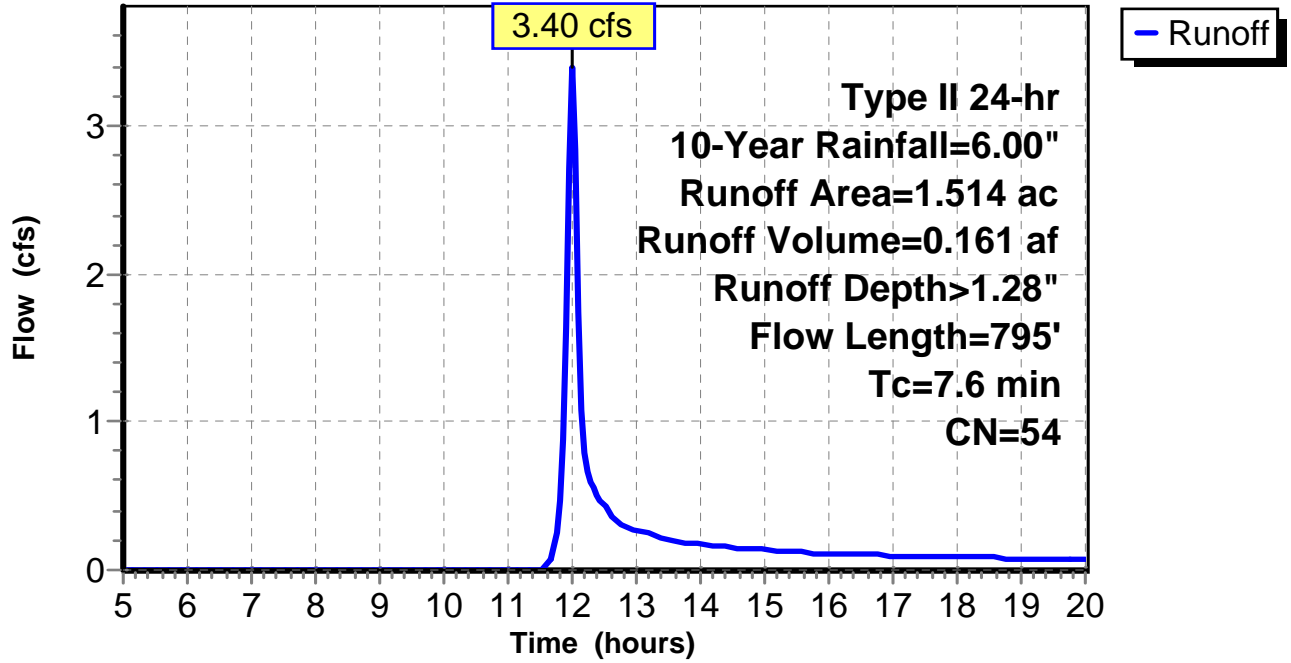
Subcatchment 5: C 202.002

Hydrograph



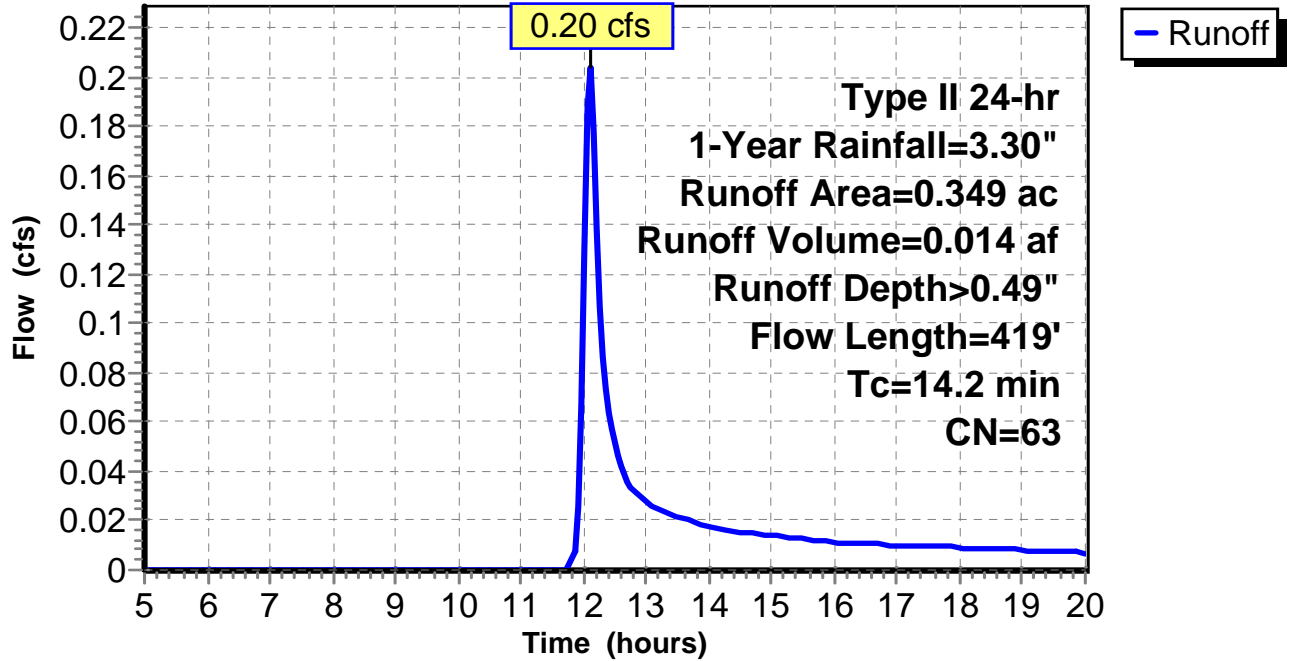
Subcatchment 6: C 202.003

Hydrograph



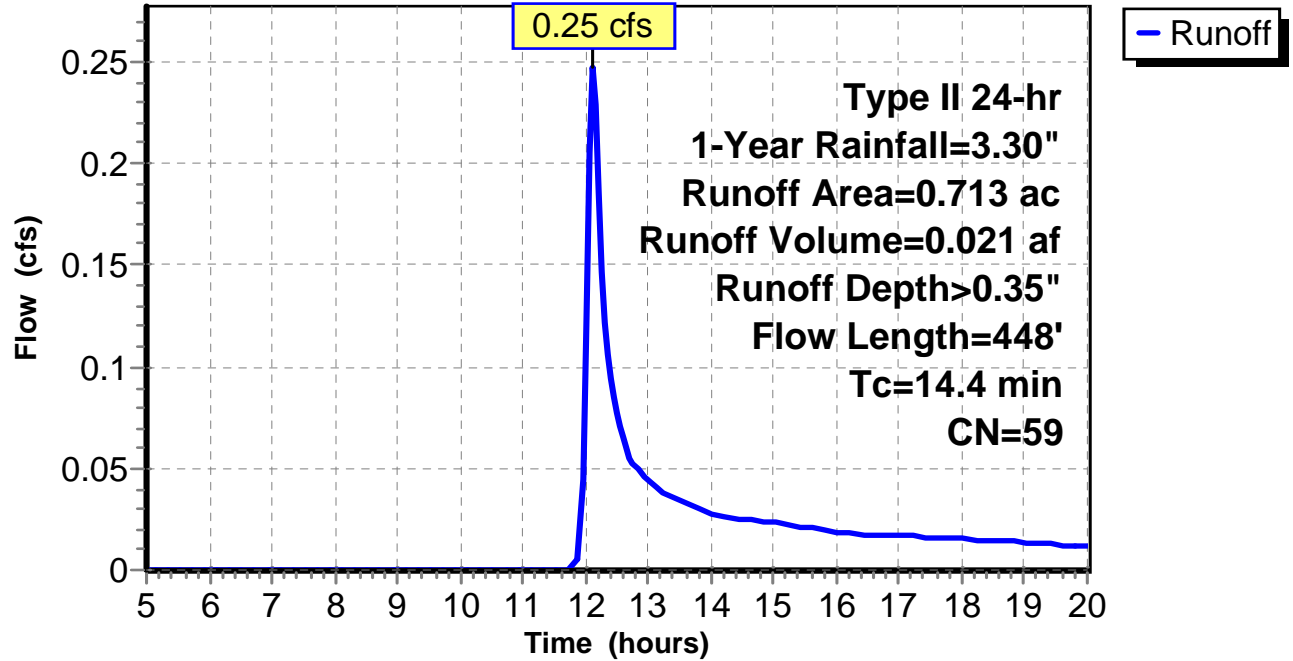
Subcatchment 1: C AR-508.001

Hydrograph



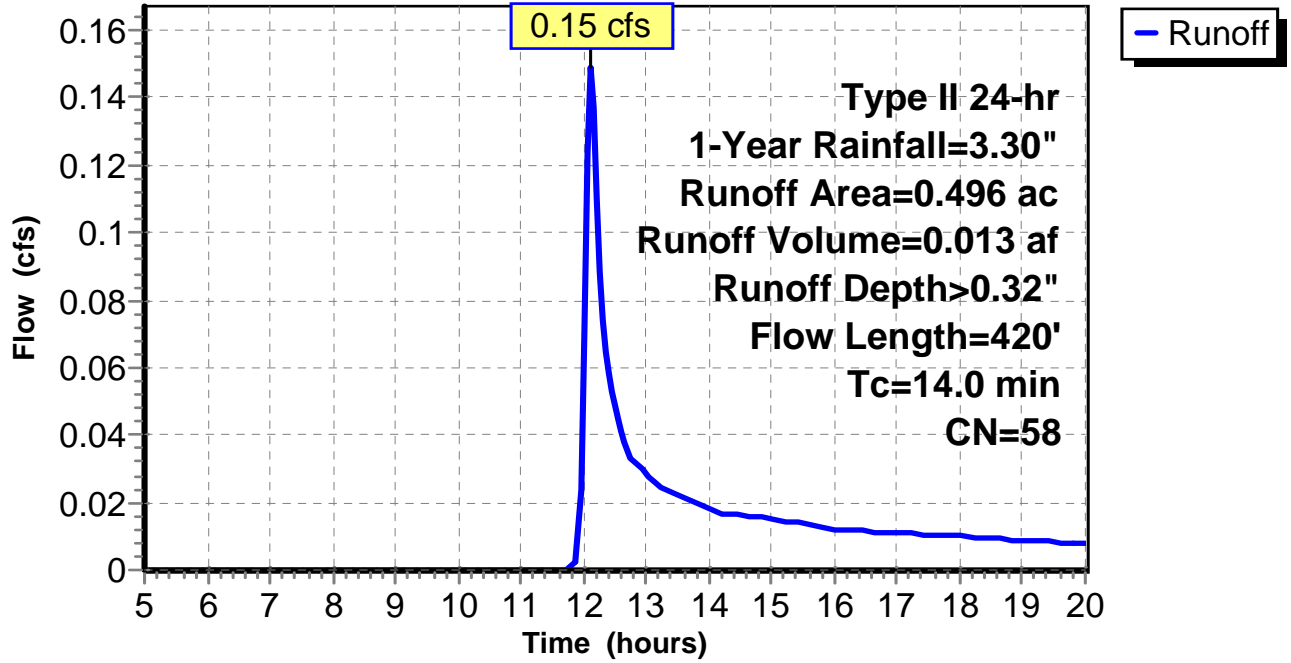
Subcatchment 2: C AR-508.002

Hydrograph



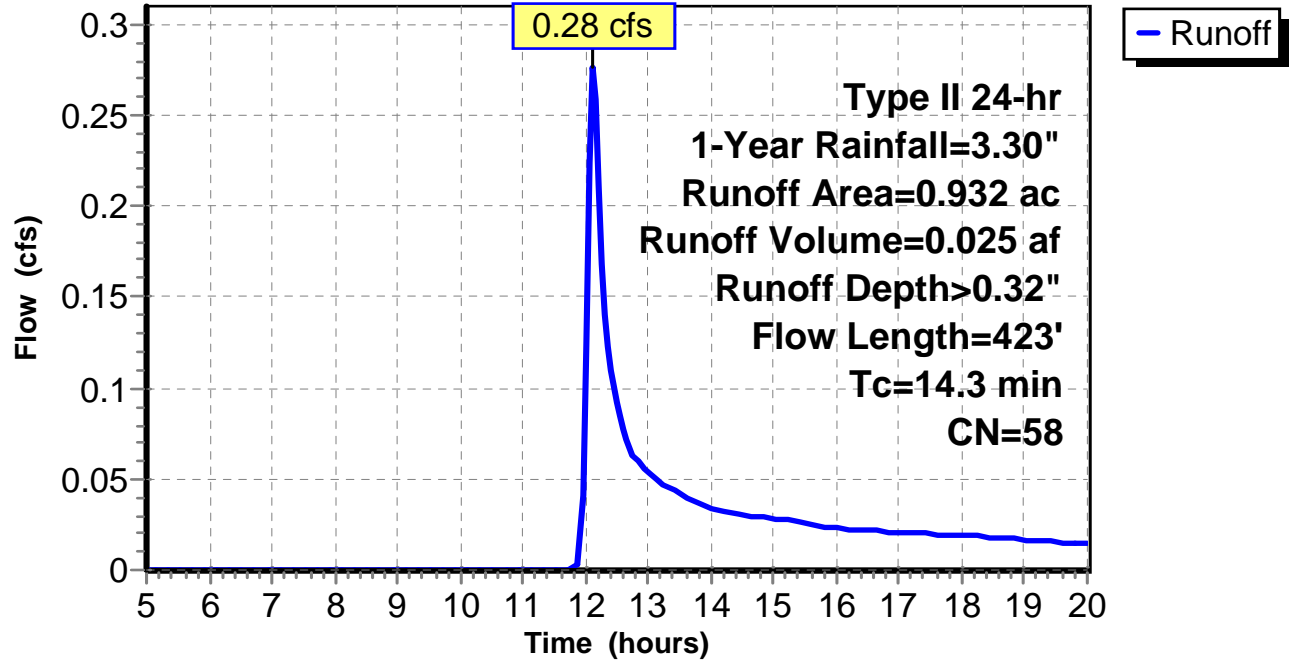
Subcatchment 3: C AR-508.003

Hydrograph



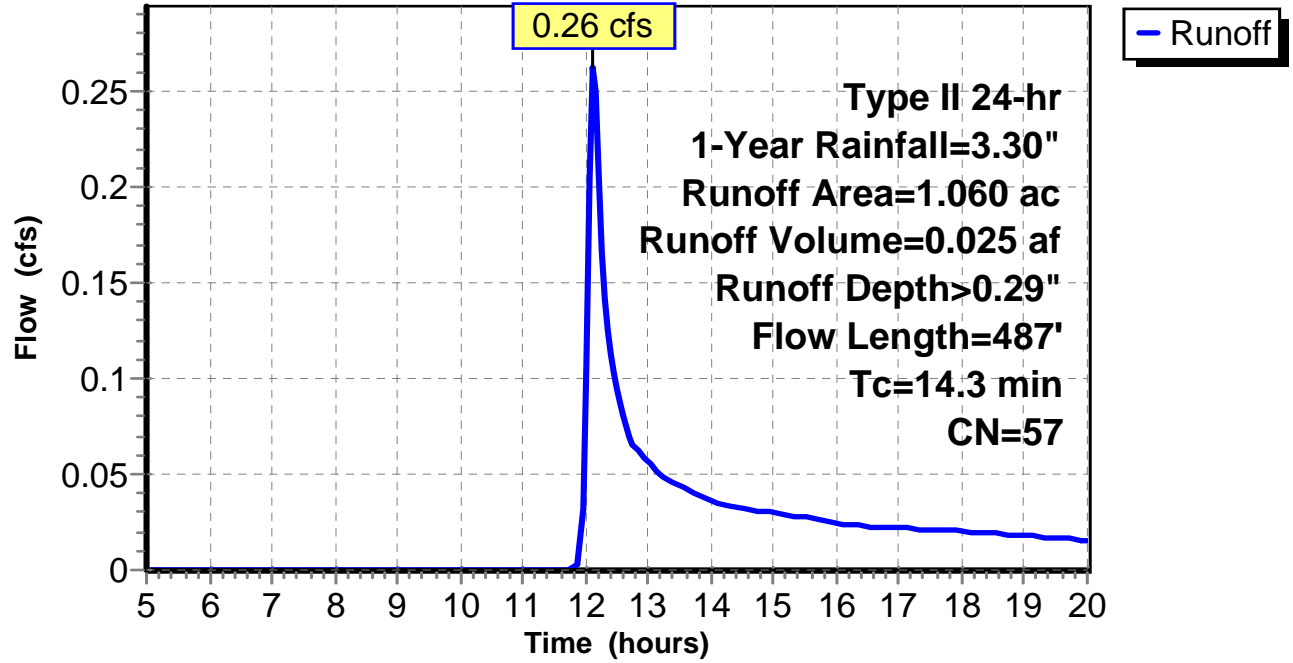
Subcatchment 4: C 206.001

Hydrograph



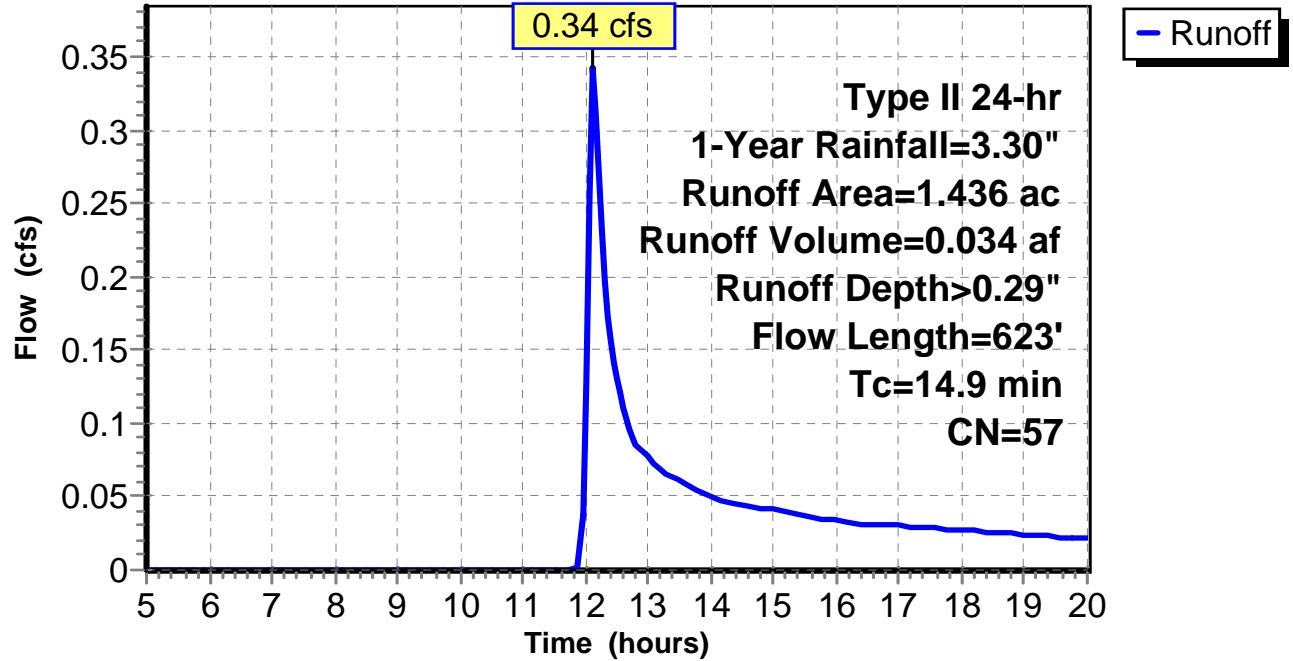
Subcatchment 5: C 206.002

Hydrograph



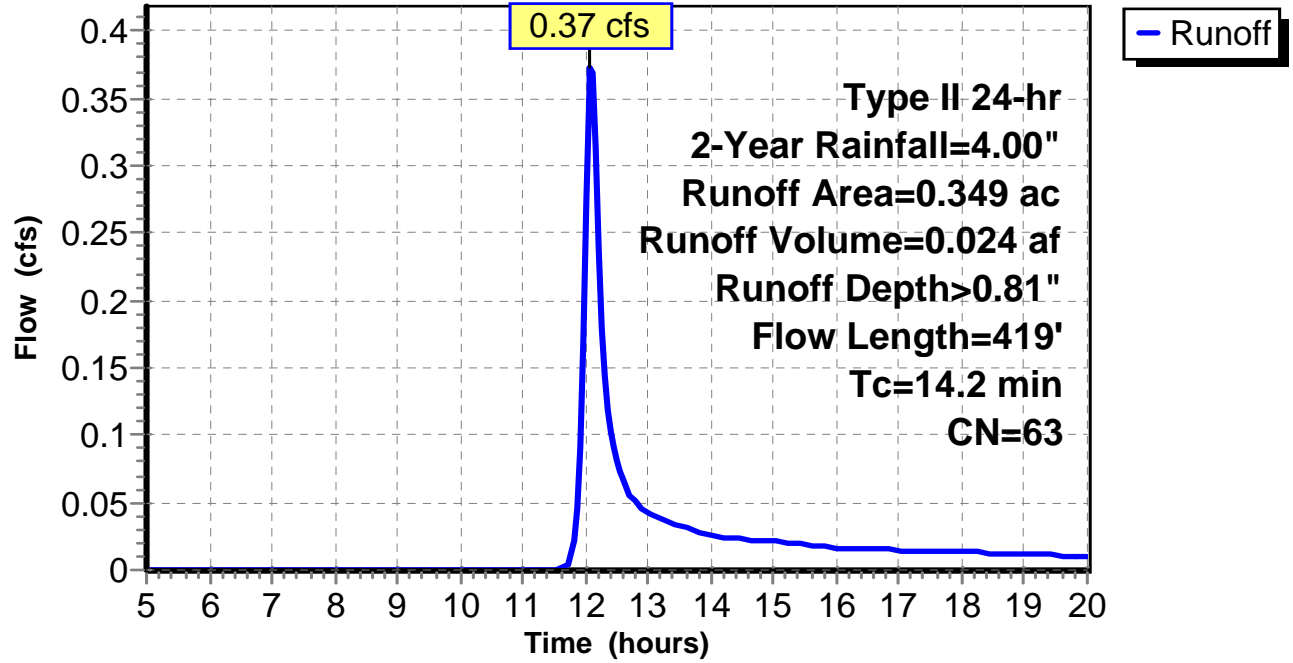
Subcatchment 6: C 206.003

Hydrograph



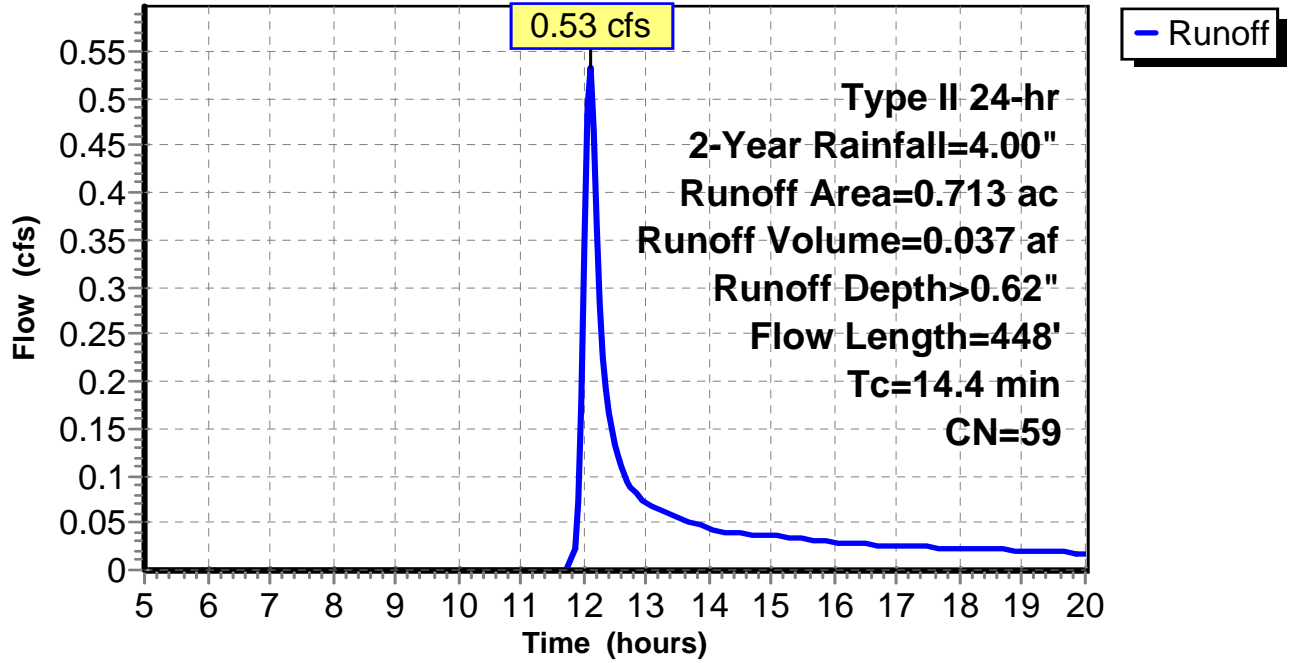
Subcatchment 1: C AR-508.001

Hydrograph



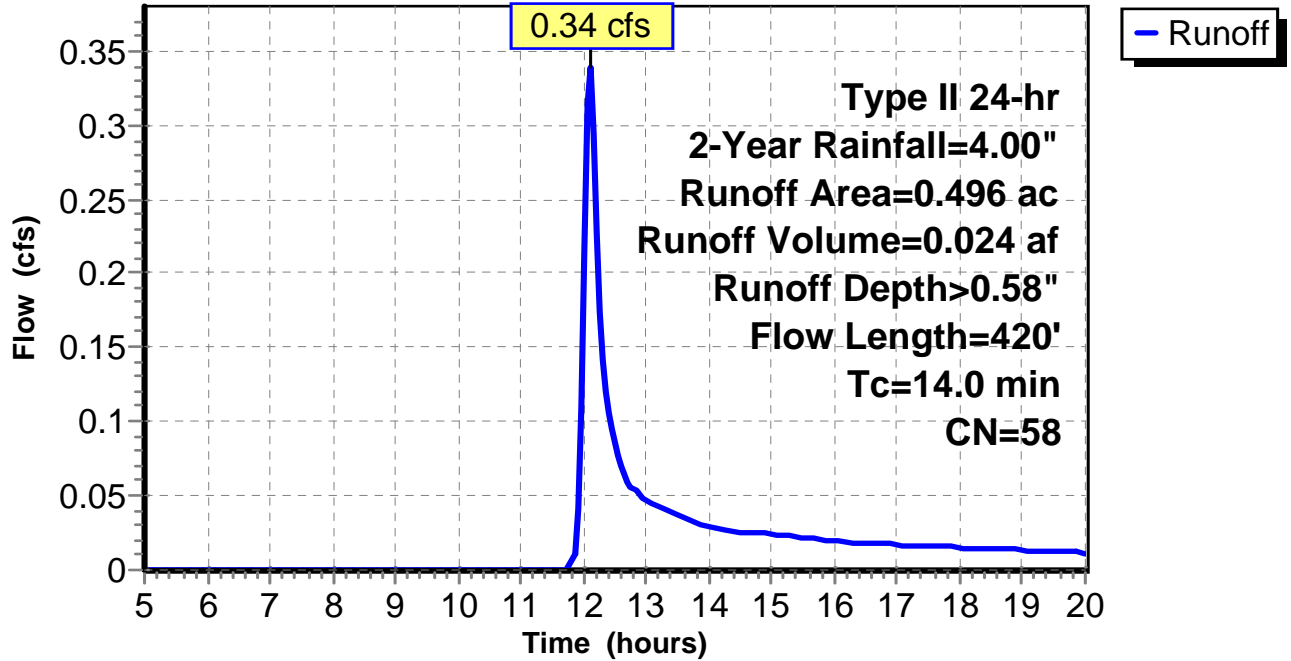
Subcatchment 2: C AR-508.002

Hydrograph



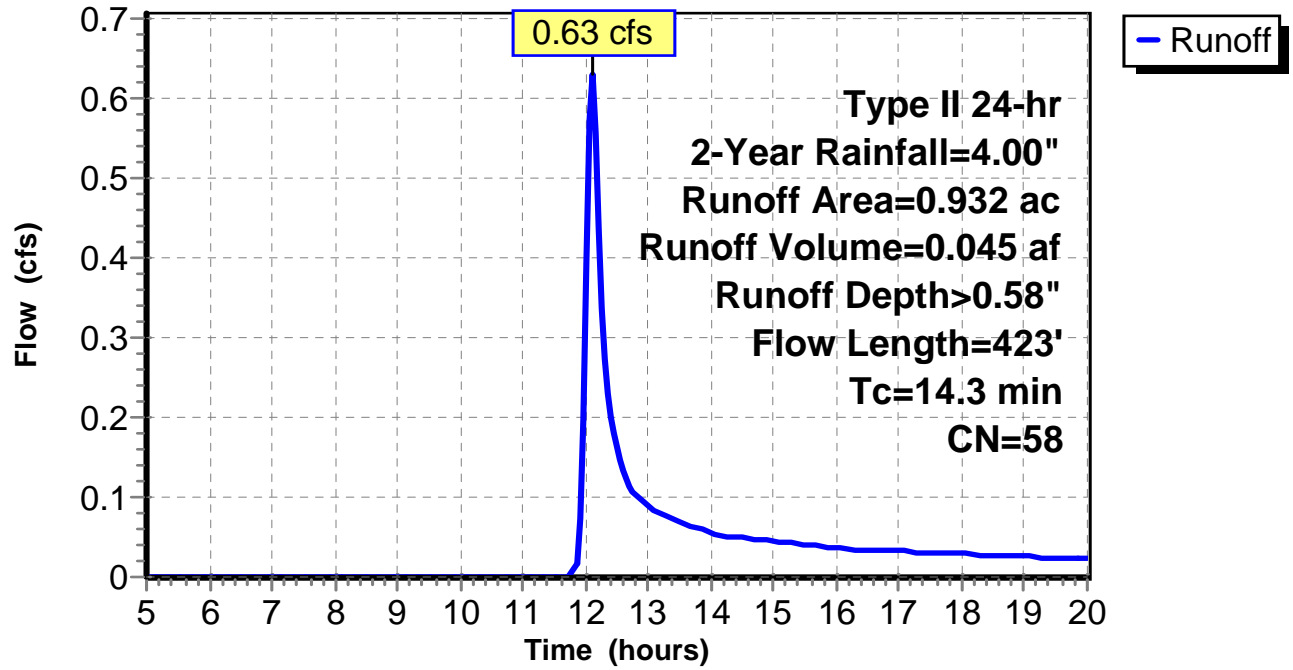
Subcatchment 3: C AR-508.003

Hydrograph



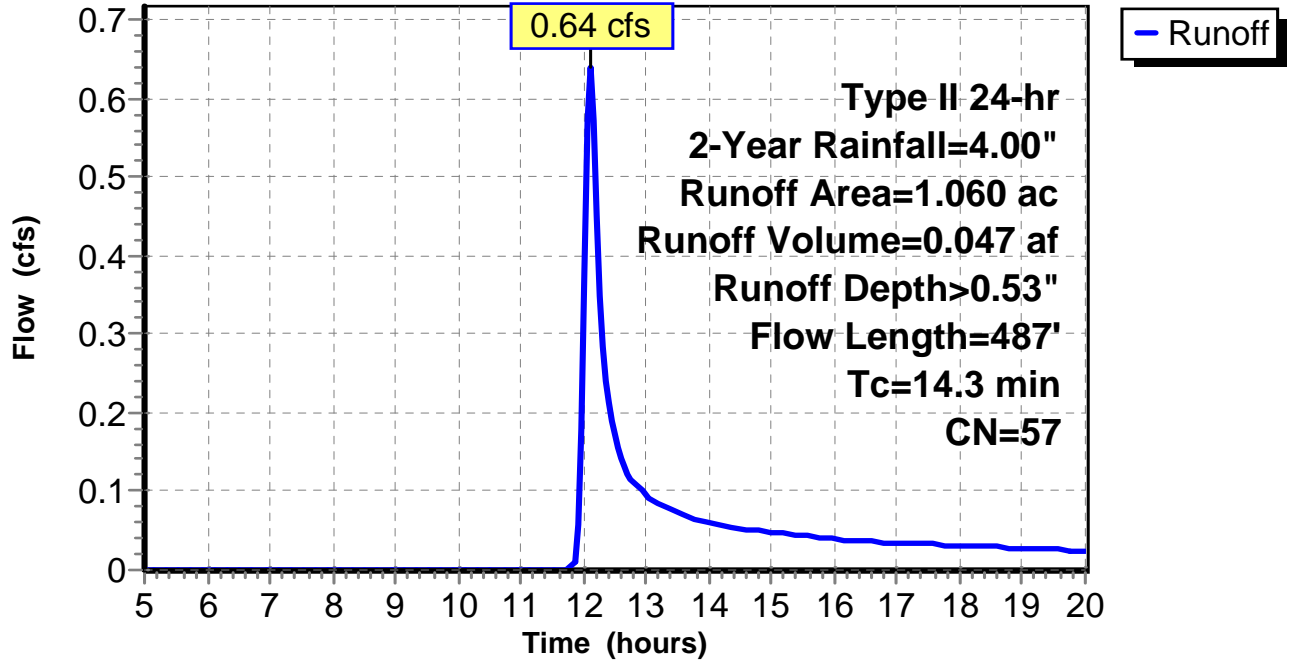
Subcatchment 4: C 206.001

Hydrograph



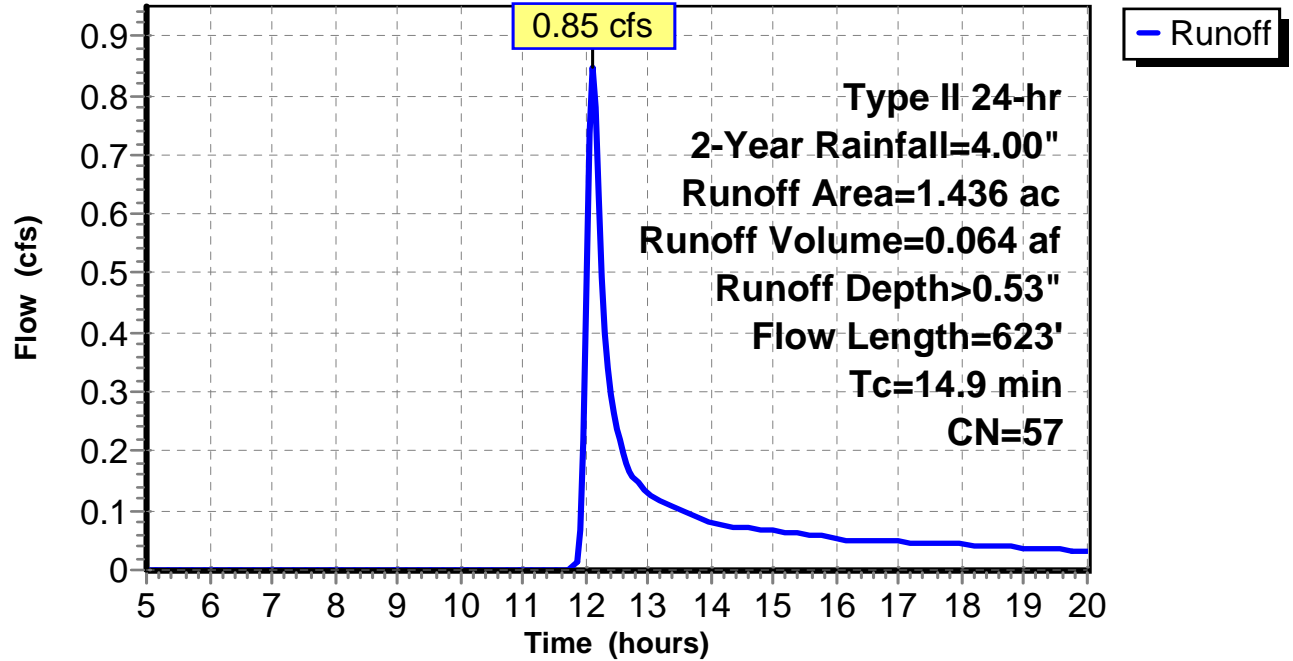
Subcatchment 5: C 206.002

Hydrograph



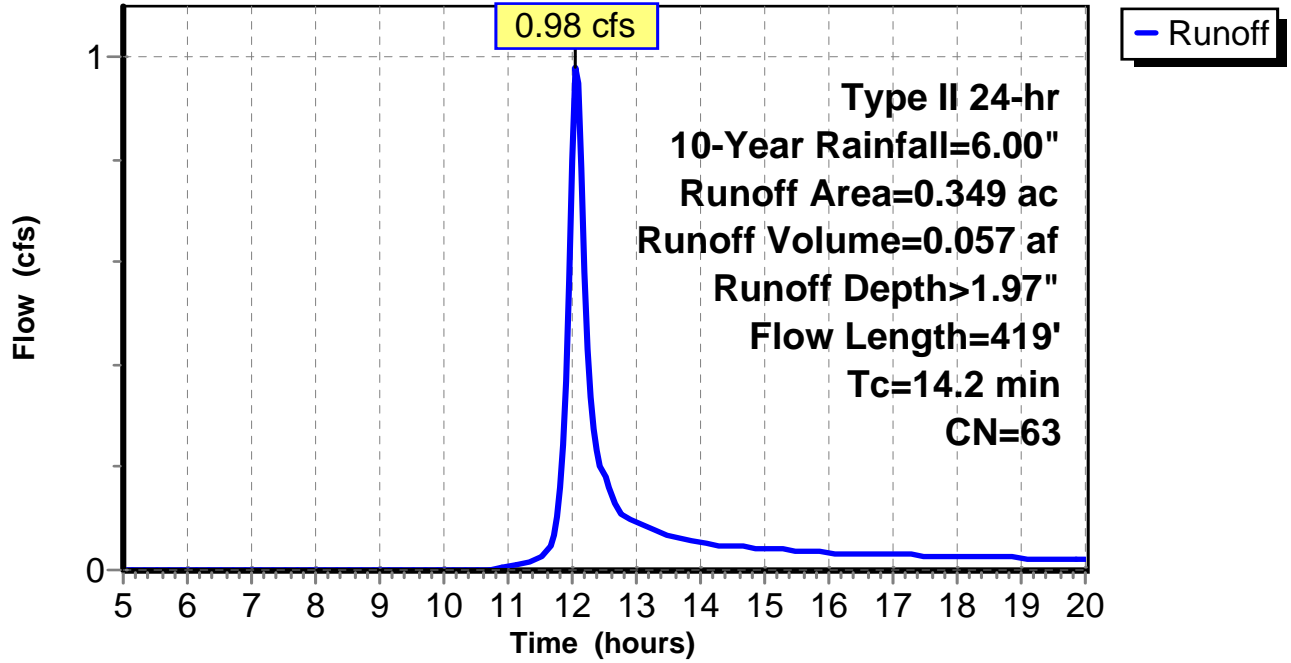
Subcatchment 6: C 206.003

Hydrograph



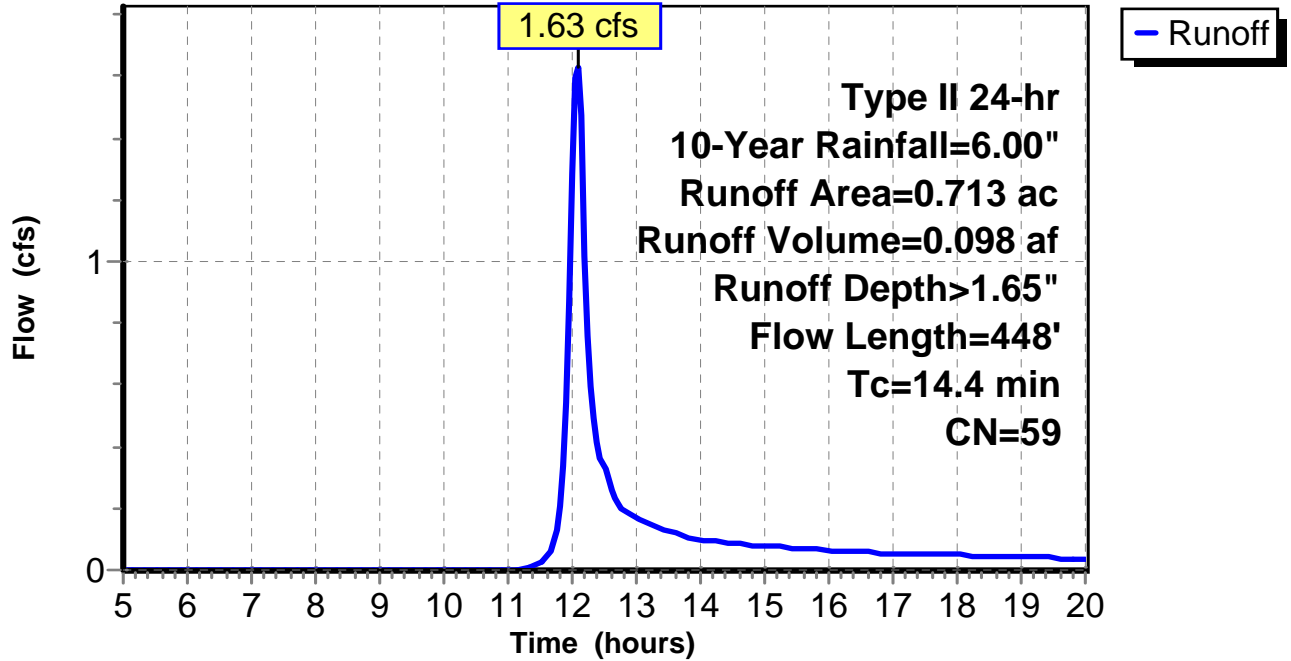
Subcatchment 1: C AR-508.001

Hydrograph



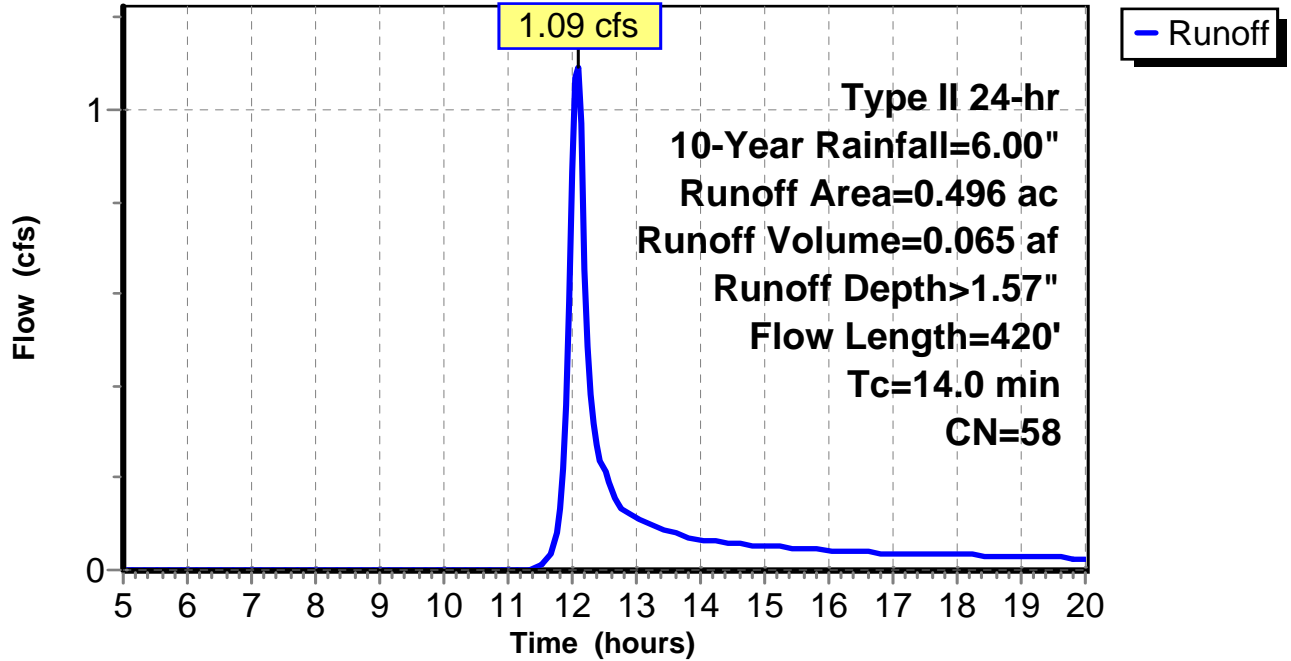
Subcatchment 2: C AR-508.002

Hydrograph



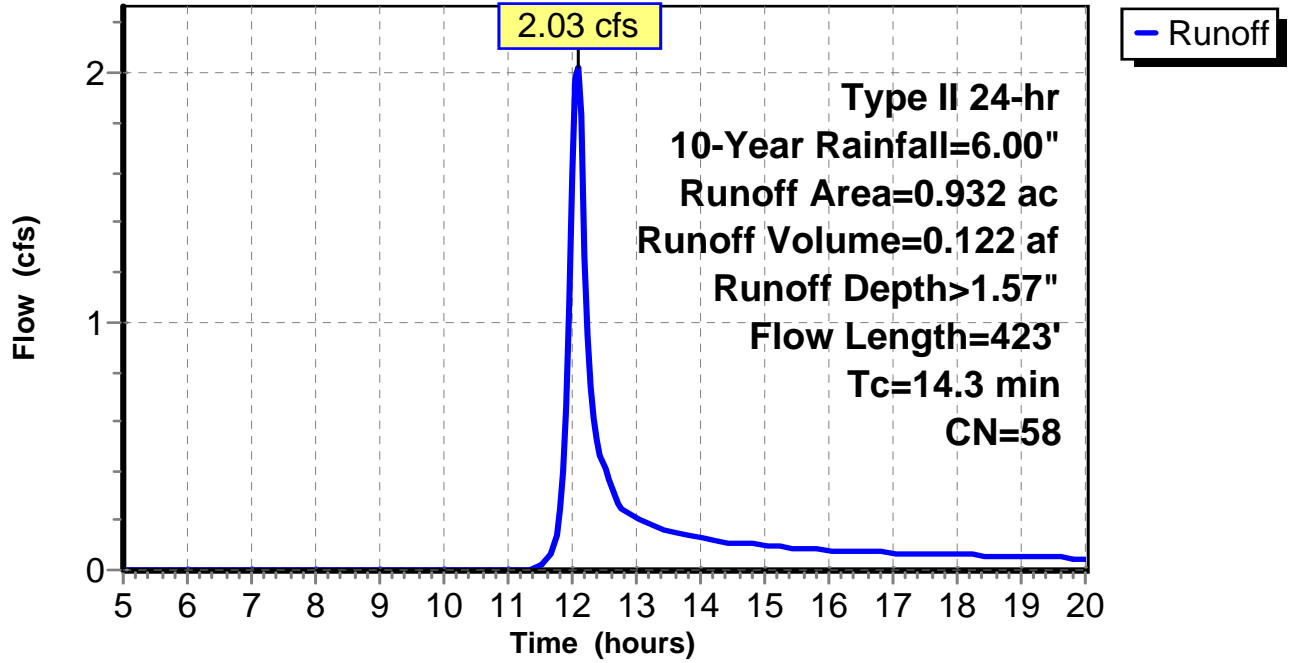
Subcatchment 3: C AR-508.003

Hydrograph



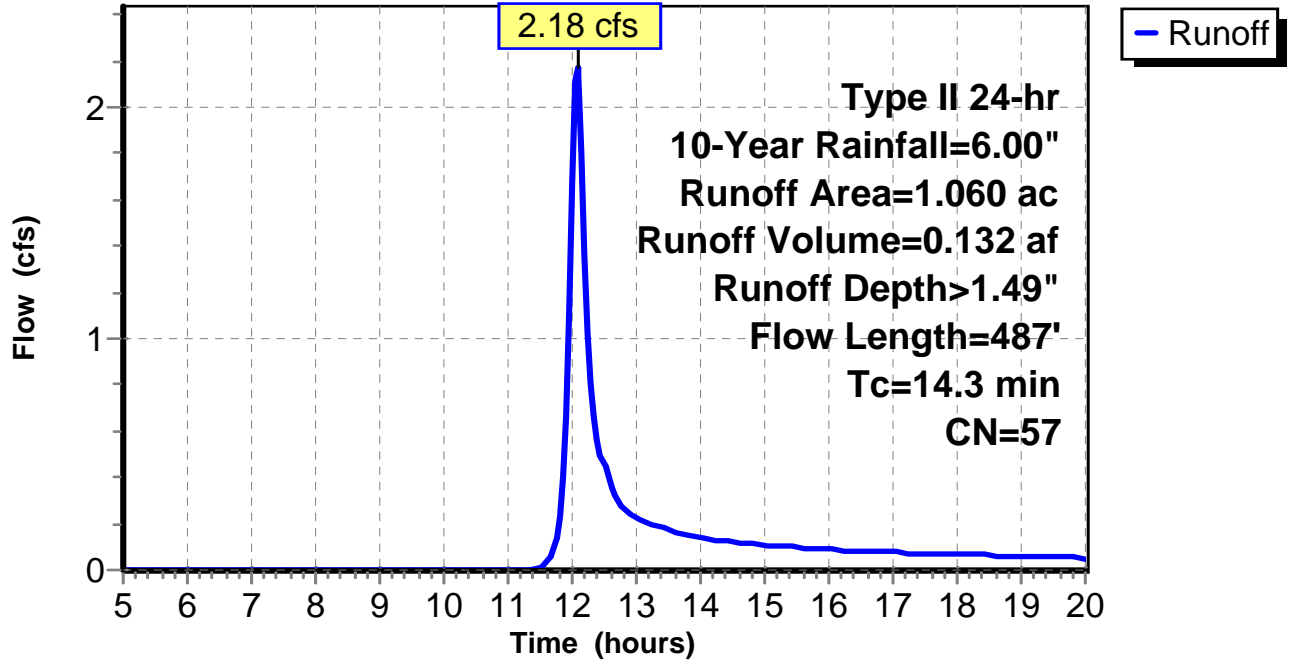
Subcatchment 4: C 206.001

Hydrograph



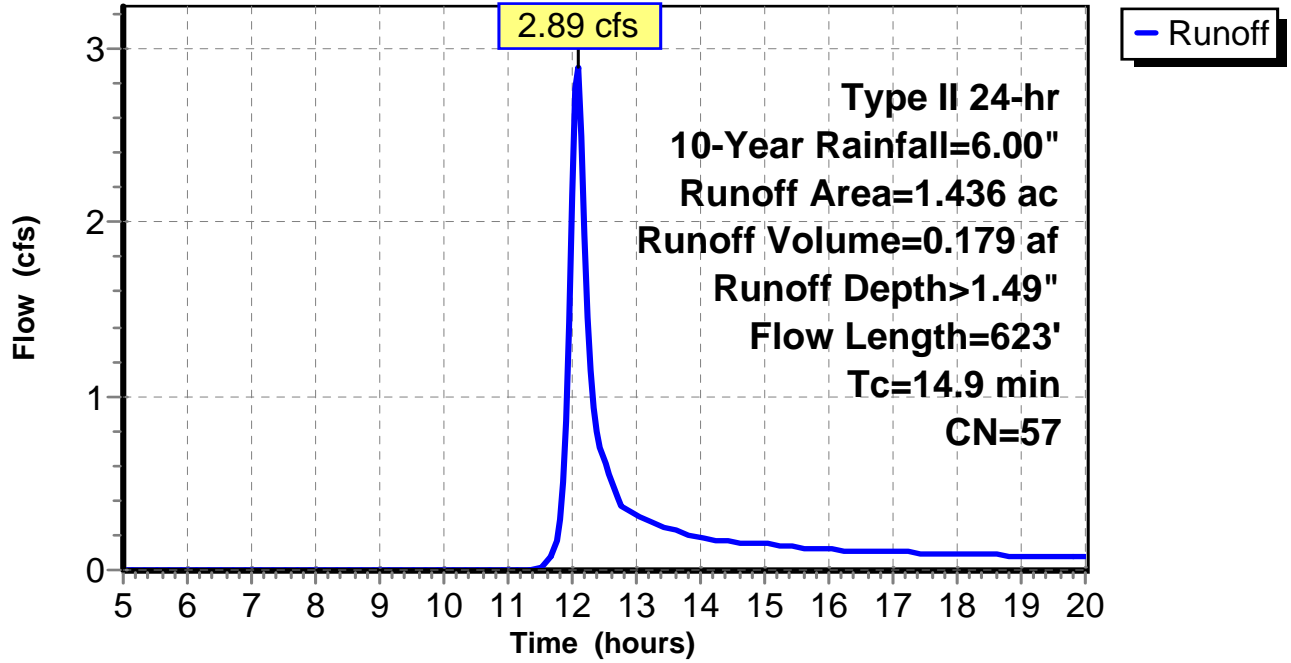
Subcatchment 5: C 206.002

Hydrograph



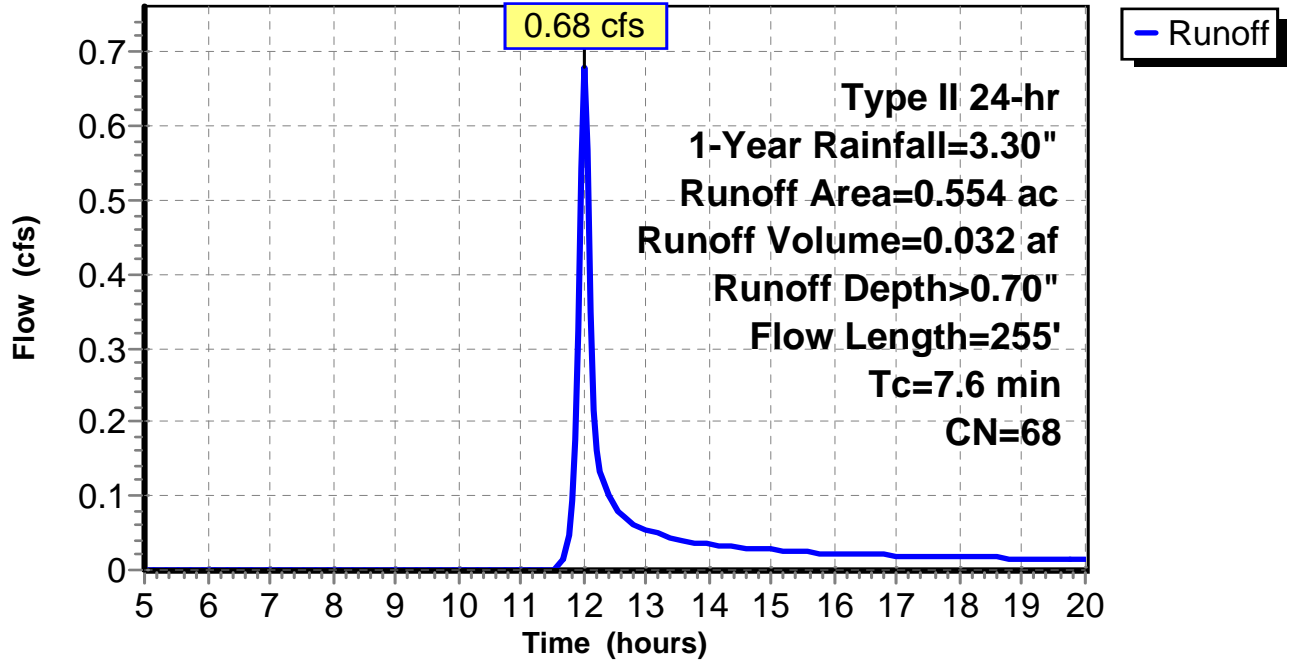
Subcatchment 6: C 206.003

Hydrograph



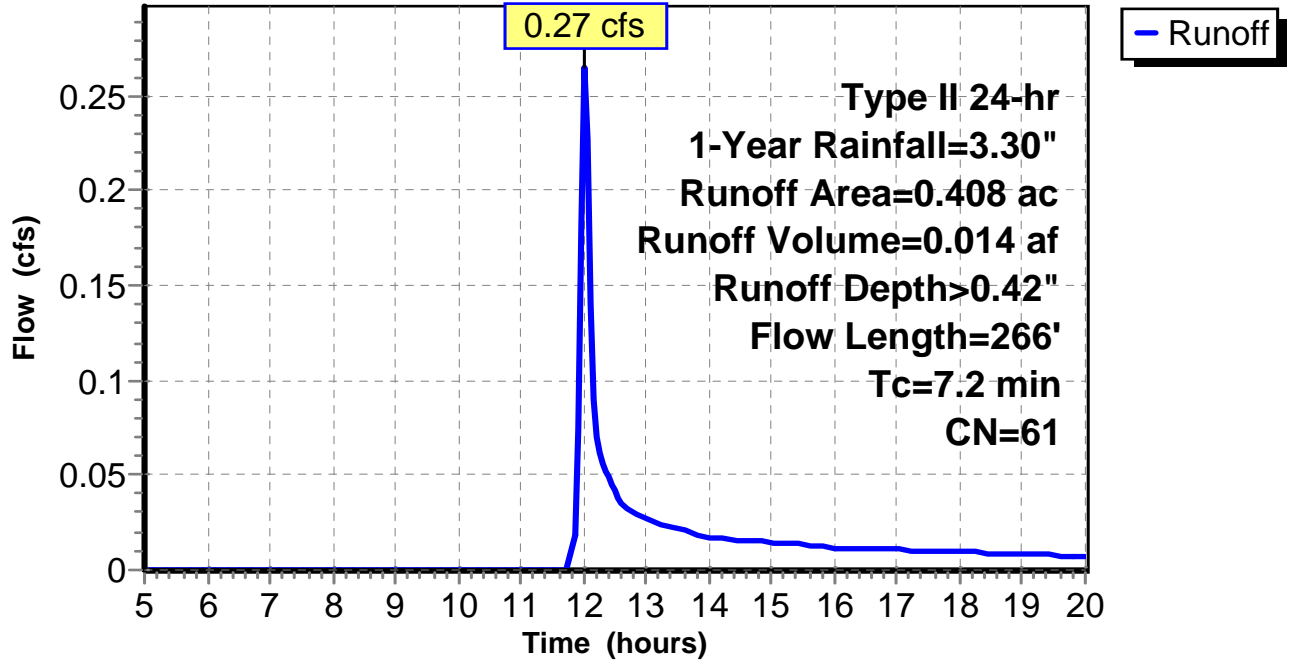
Subcatchment 1: C AR-508.004

Hydrograph



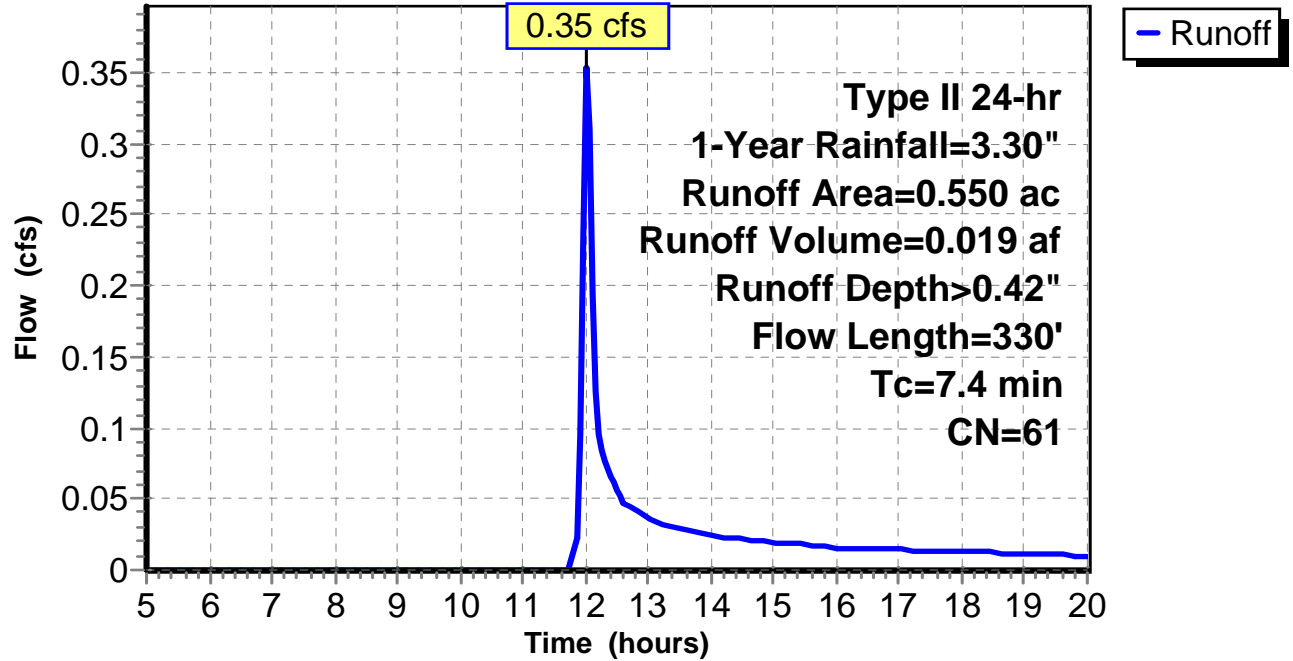
Subcatchment 2: C AR-508.005

Hydrograph



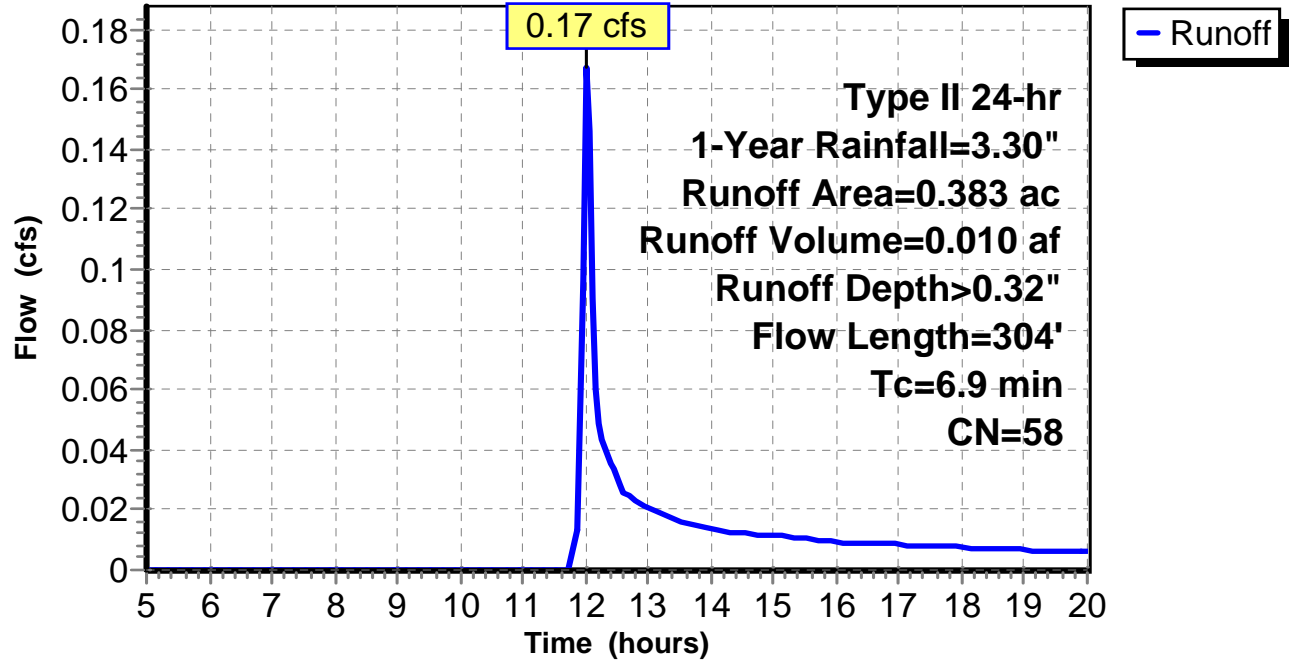
Subcatchment 3: C AR-508.006

Hydrograph



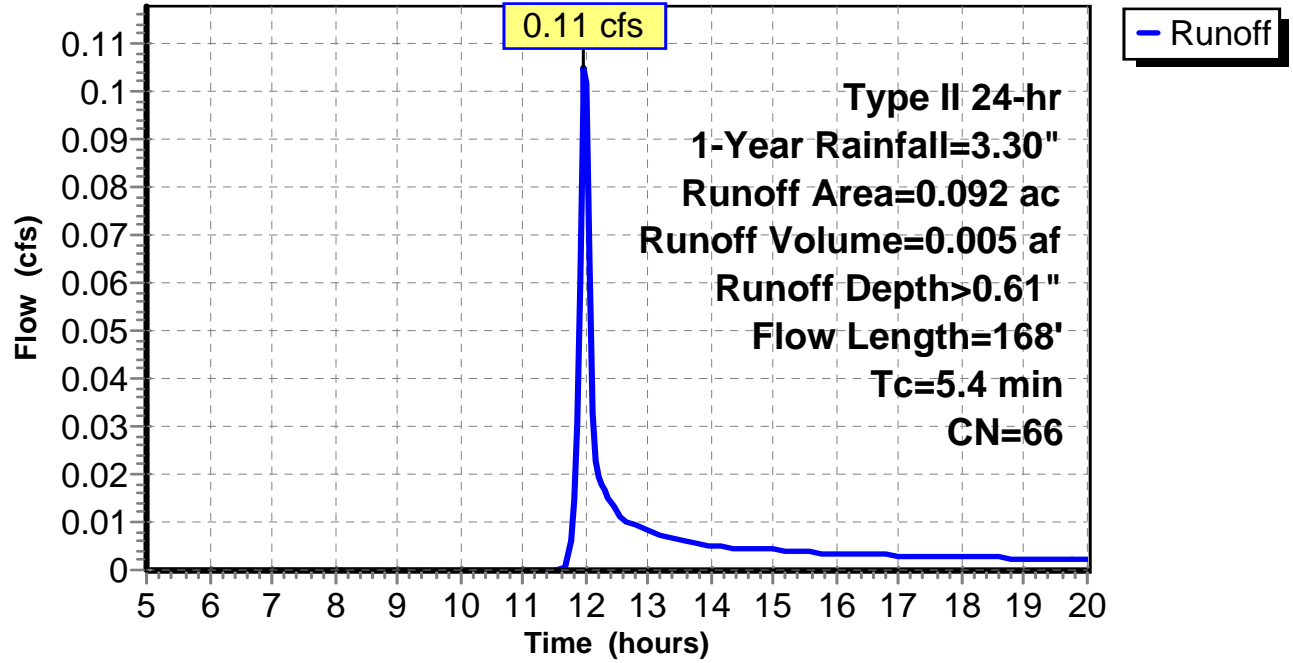
Subcatchment 4: C 209.001

Hydrograph



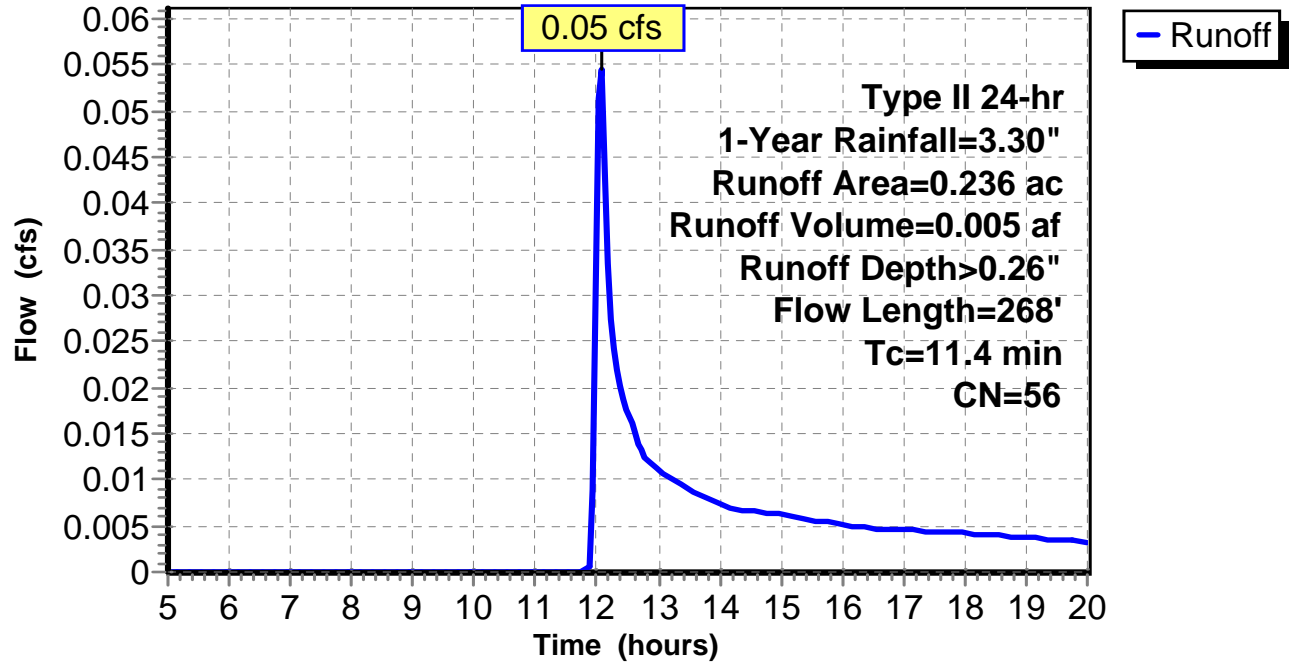
Subcatchment 5: C 209.002

Hydrograph



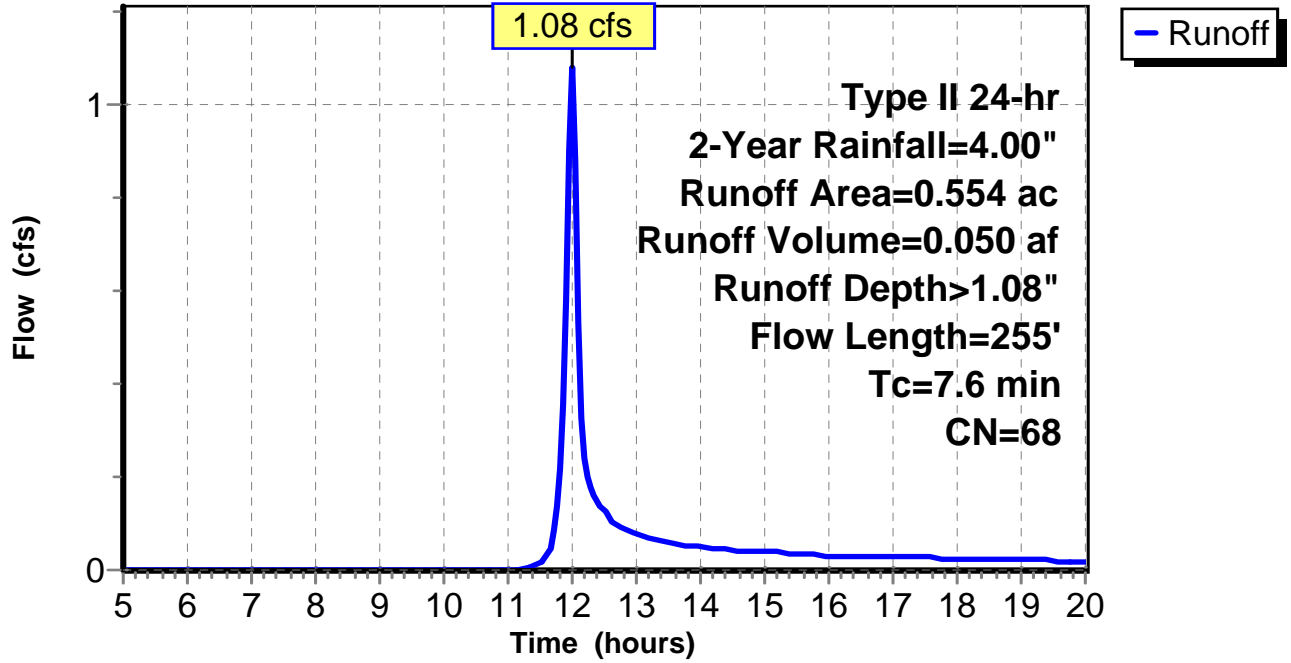
Subcatchment 6: C 209.003

Hydrograph



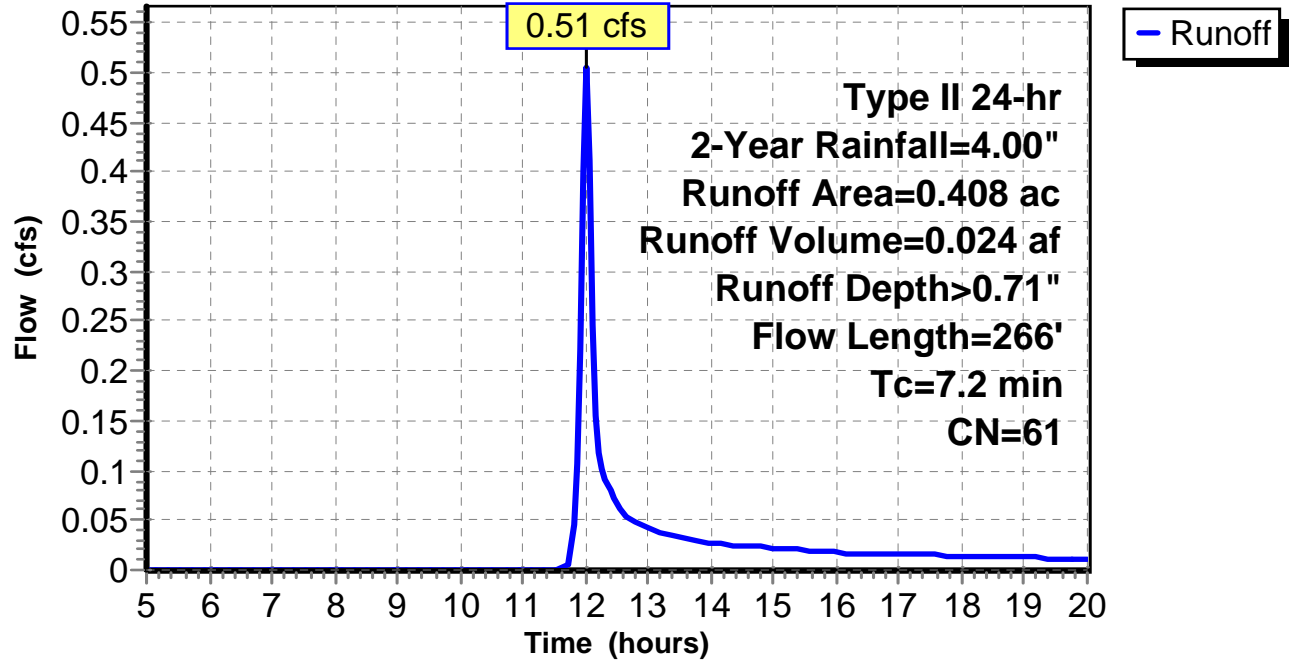
Subcatchment 1: C AR-508.004

Hydrograph



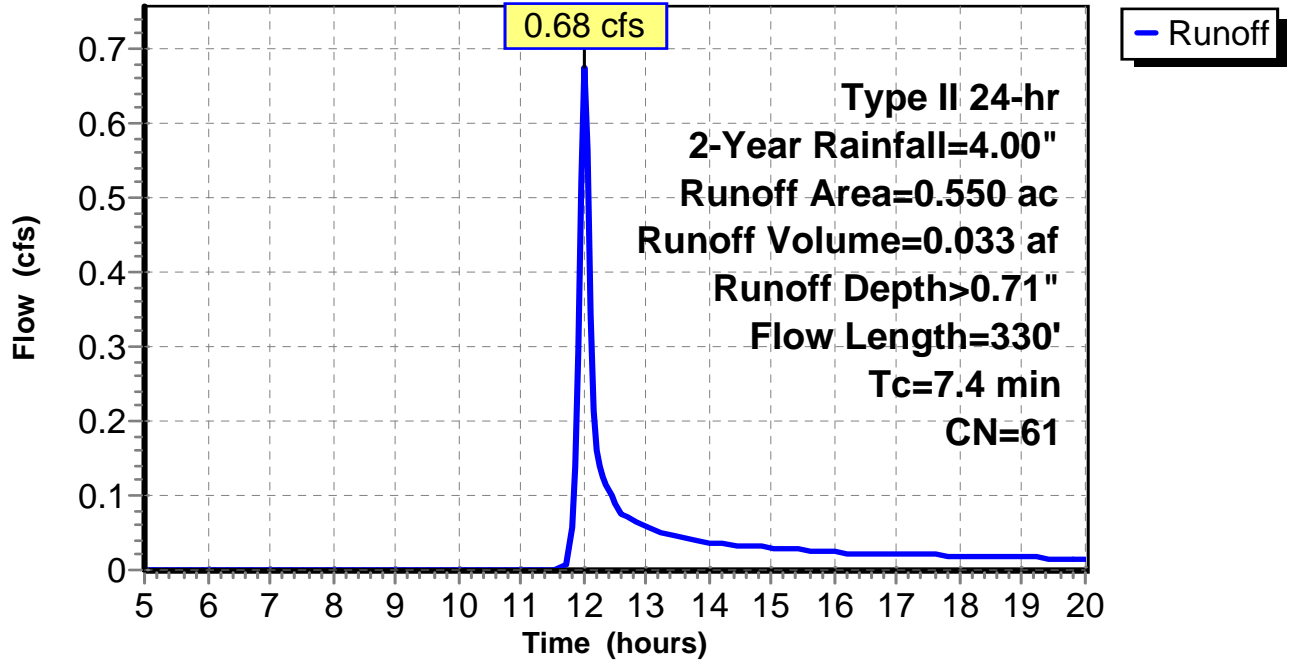
Subcatchment 2: C AR-508.005

Hydrograph



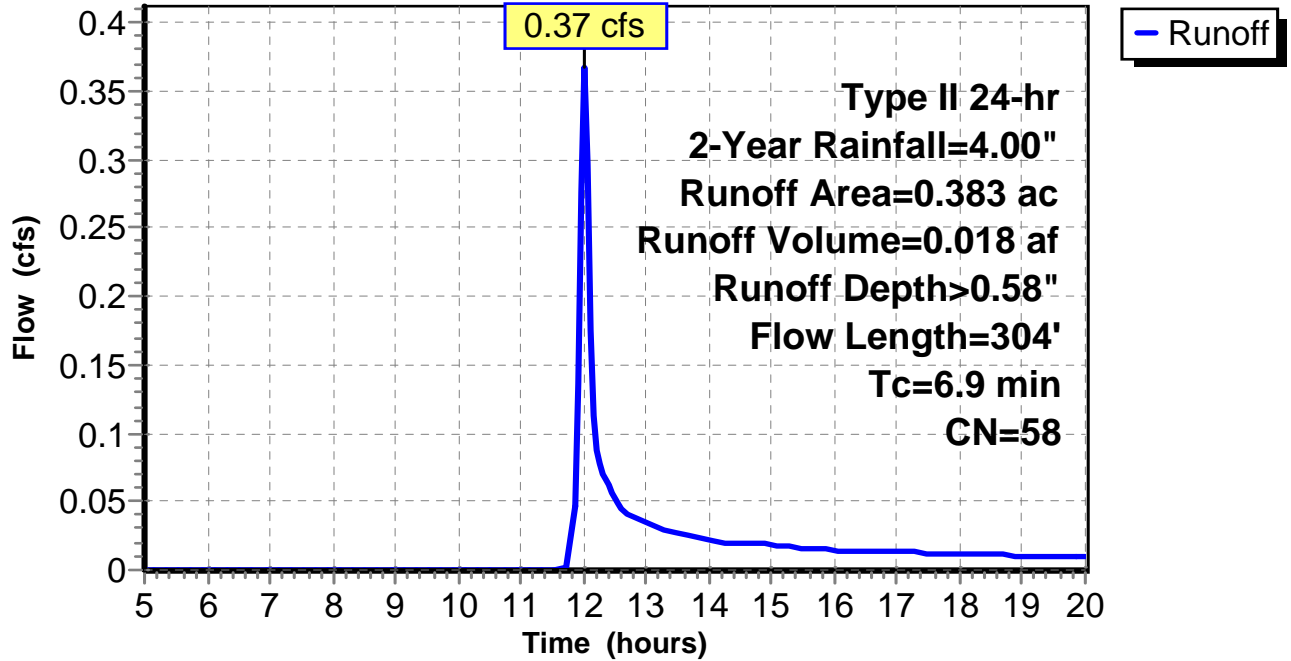
Subcatchment 3: C AR-508.006

Hydrograph



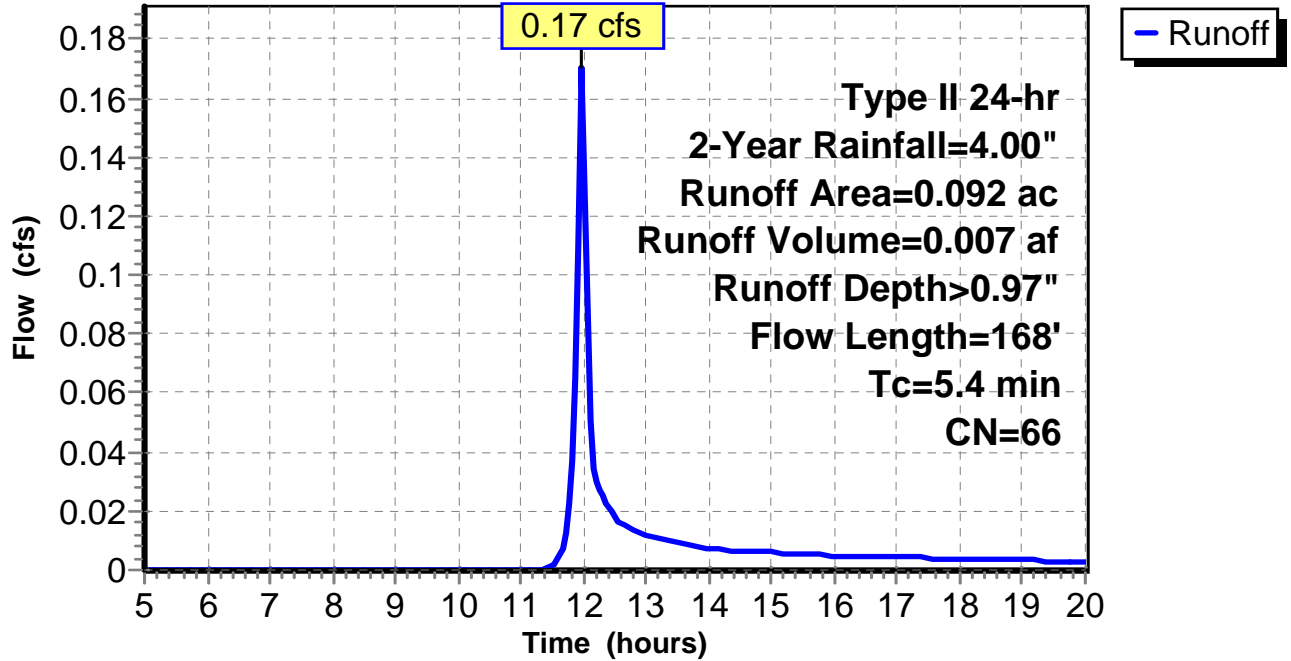
Subcatchment 4: C 209.001

Hydrograph



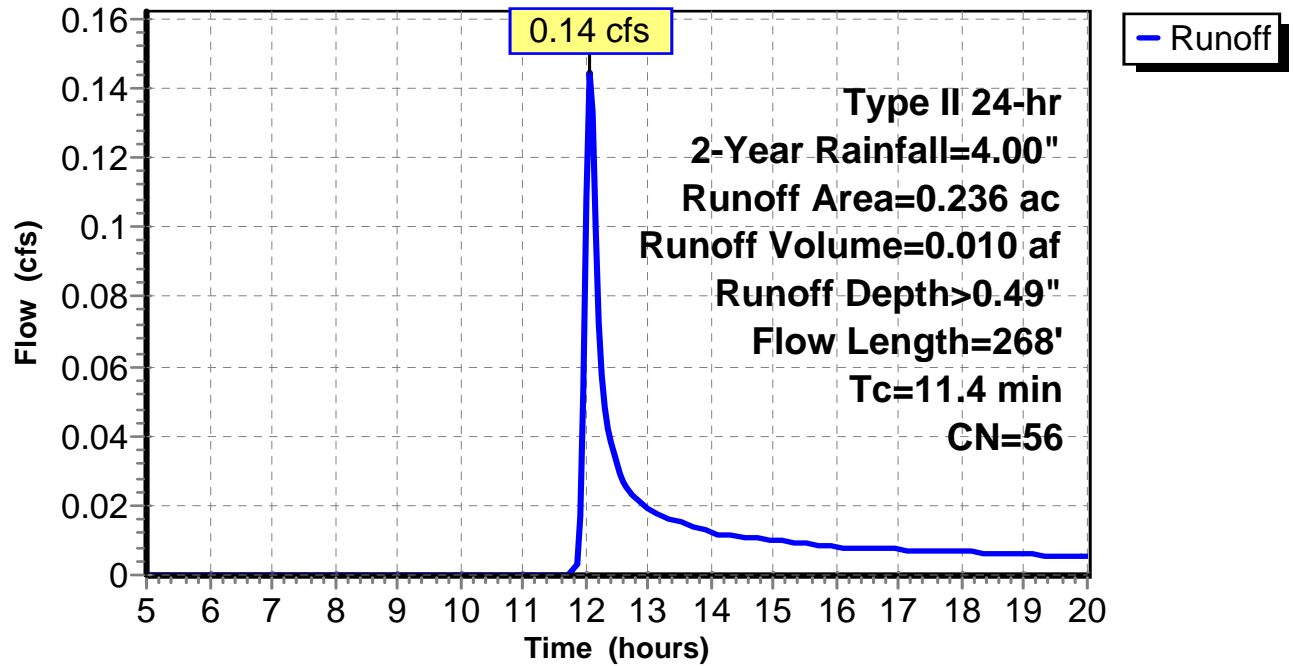
Subcatchment 5: C 209.002

Hydrograph



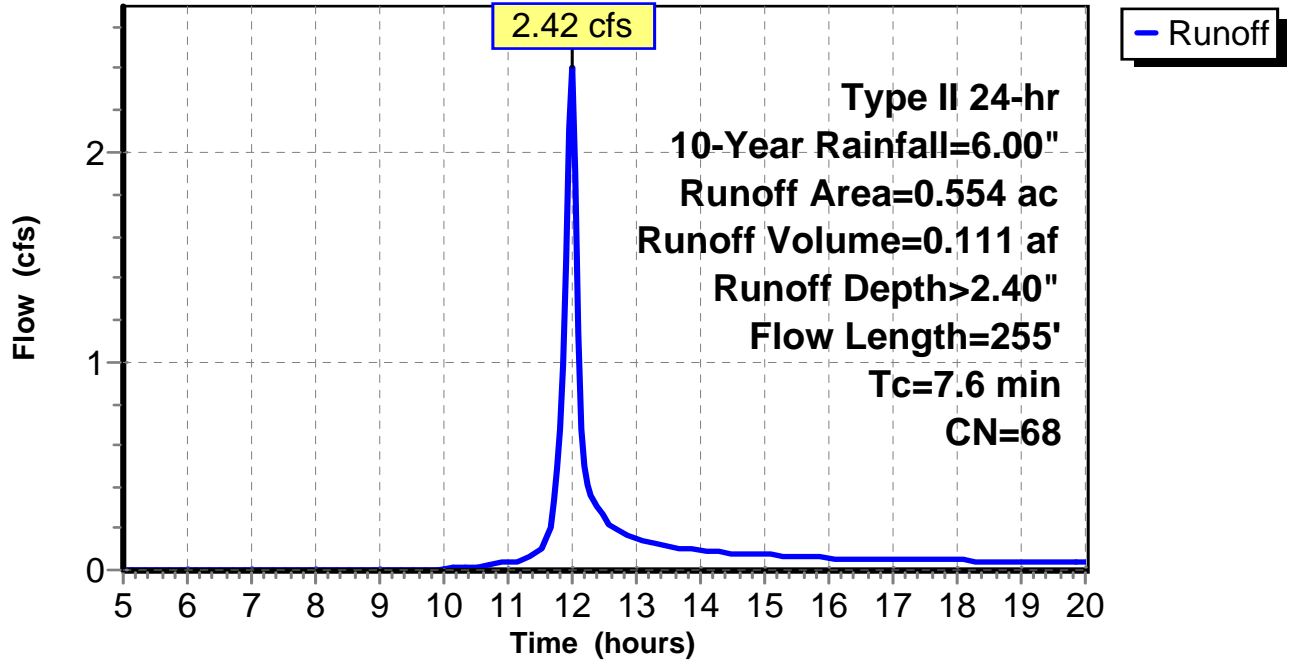
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Hydrograph



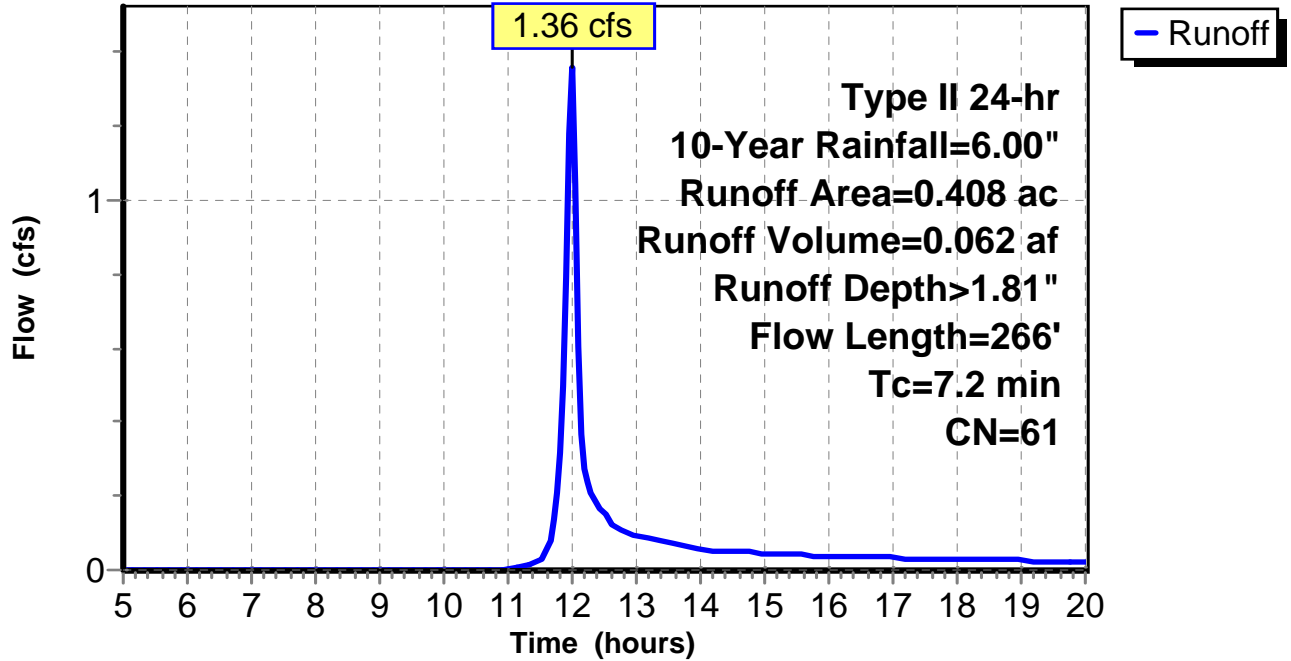
Subcatchment 1: C AR-508.004

Hydrograph



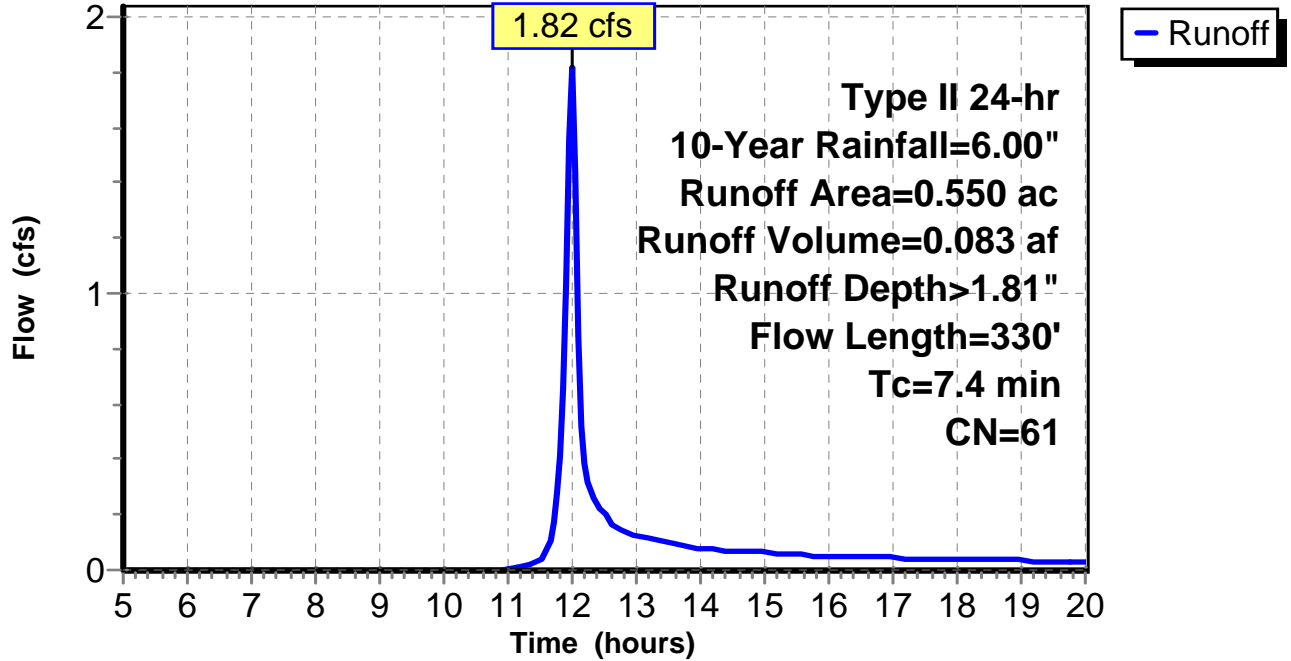
Subcatchment 2: C AR-508.005

Hydrograph



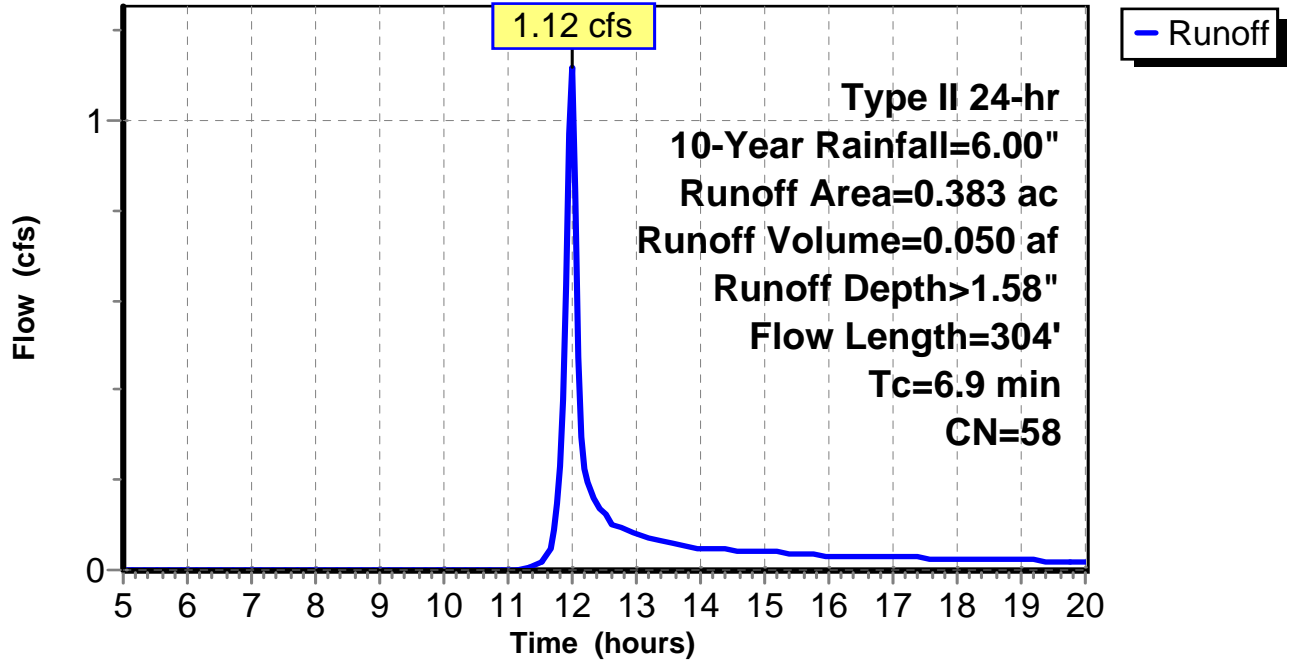
Subcatchment 3: C AR-508.006

Hydrograph



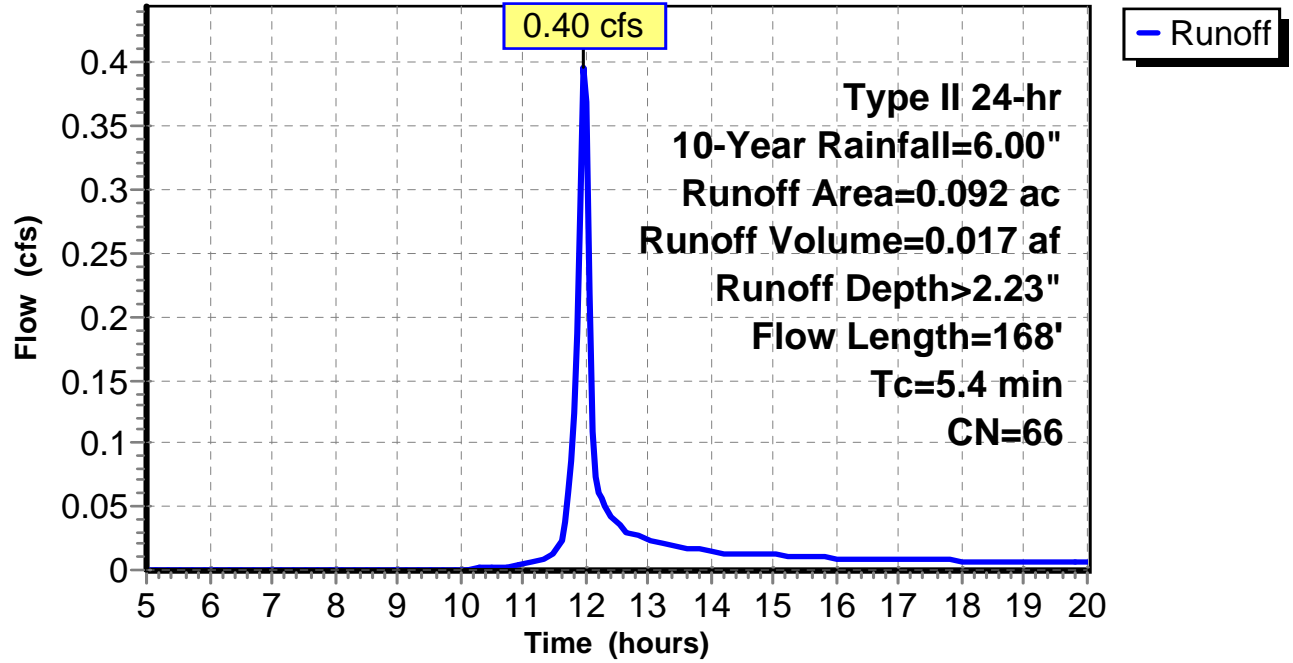
Subcatchment 4: C 209.001

Hydrograph



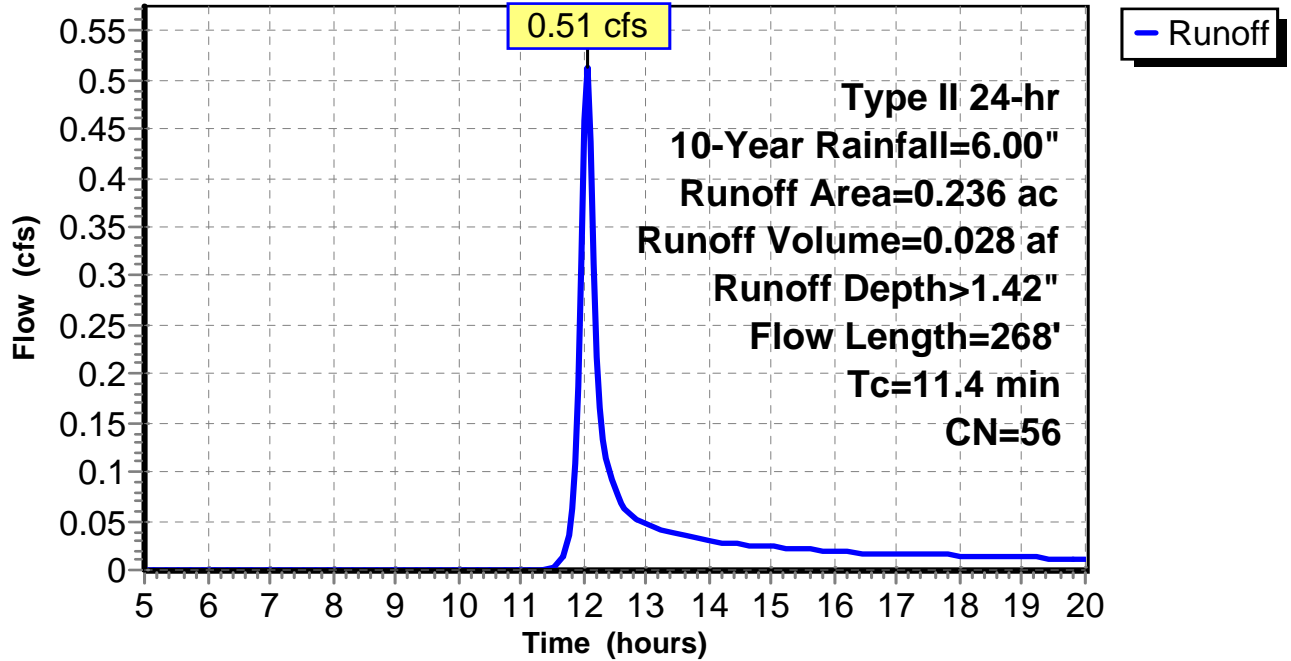
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Hydrograph



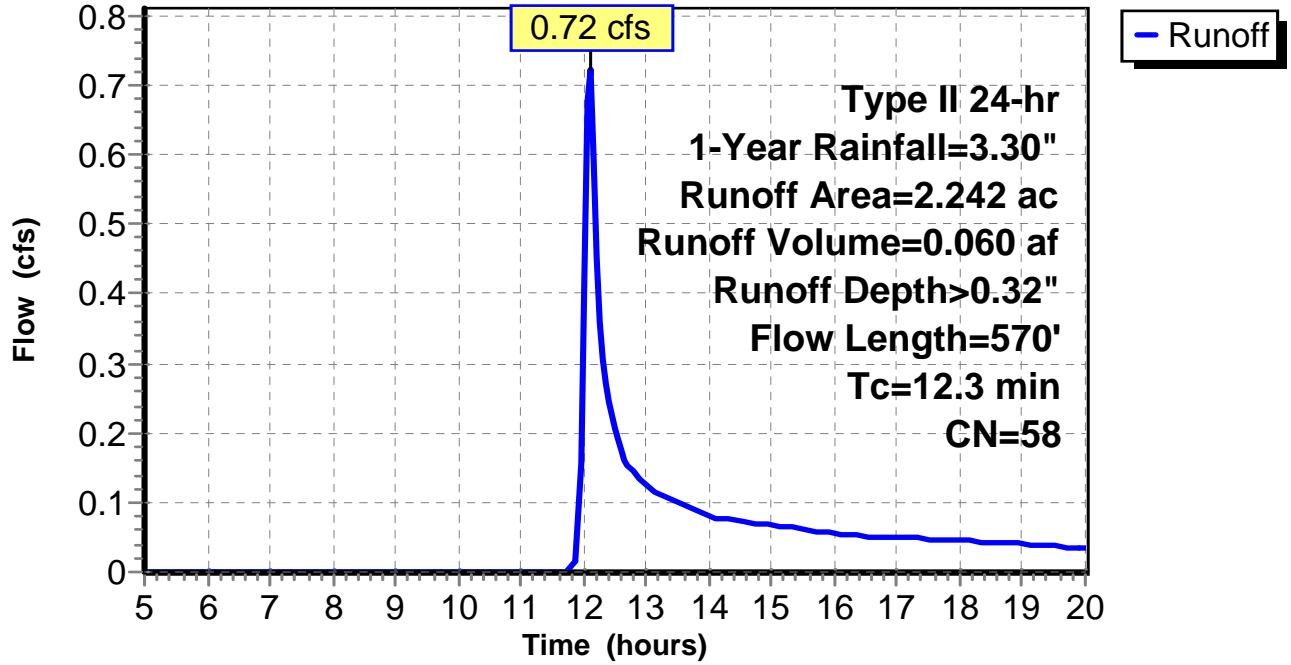
Subcatchment 6: C 209.003

Hydrograph



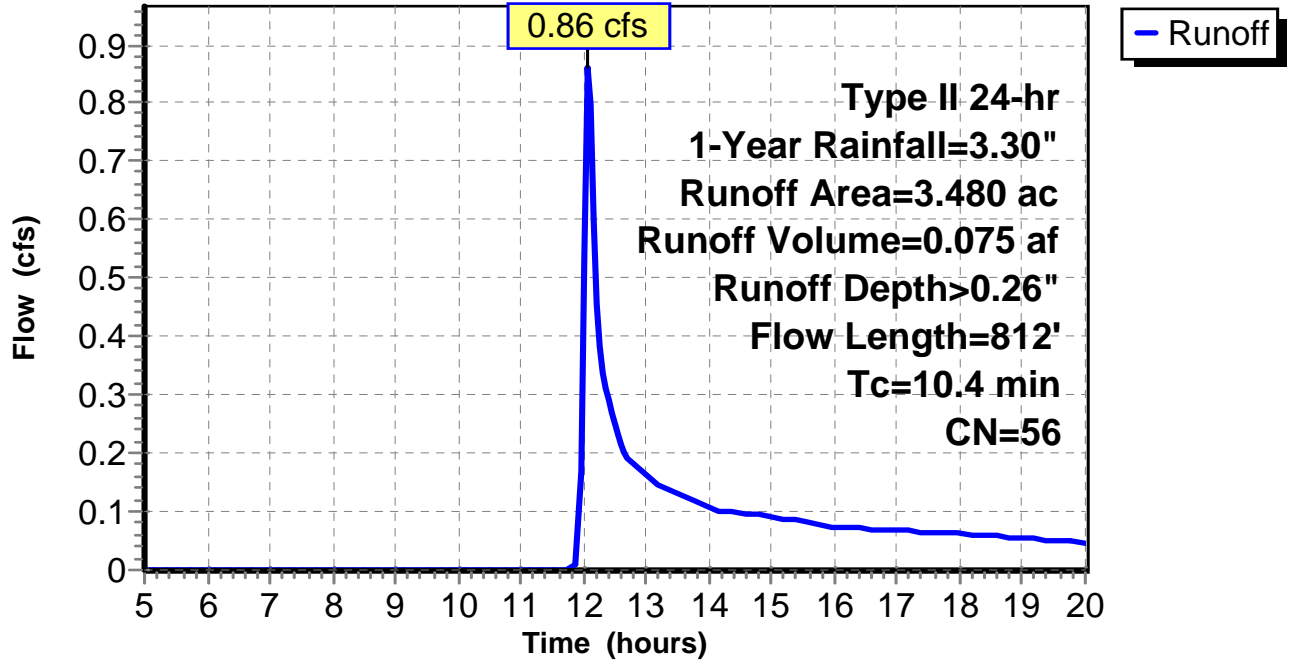
Subcatchment 1: C AR-509.001

Hydrograph



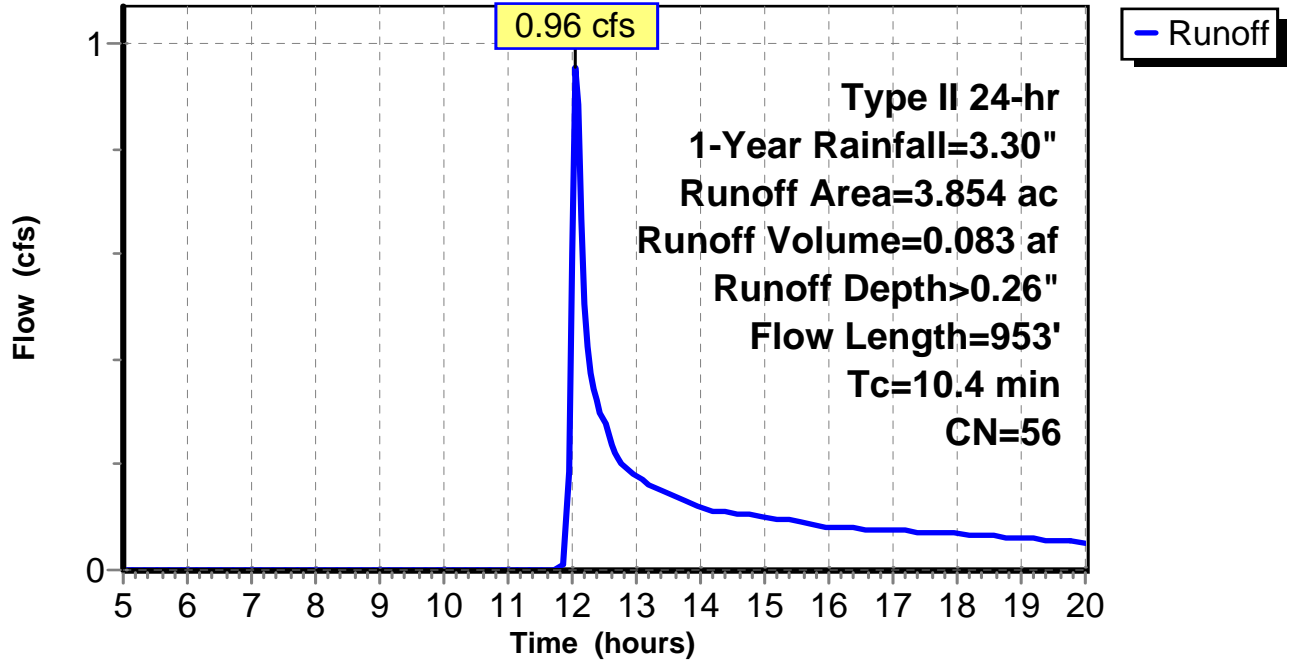
Subcatchment 2: C AR-509.002

Hydrograph



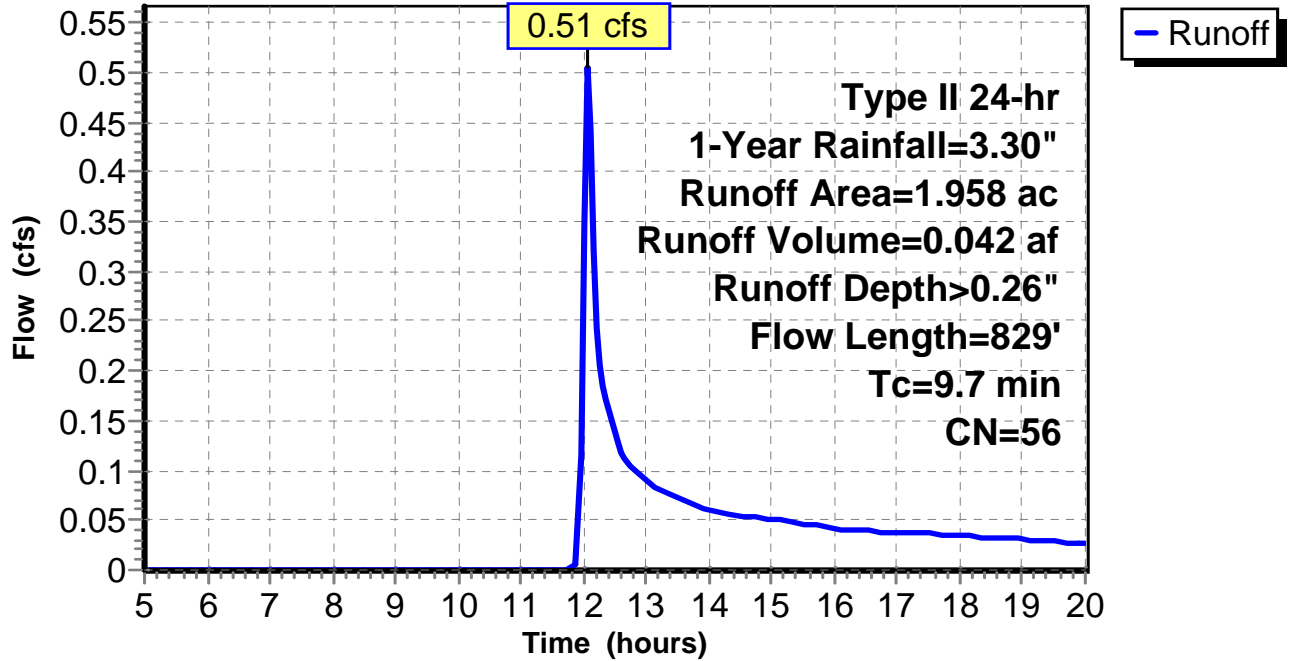
Subcatchment 3: C AR-509.003

Hydrograph



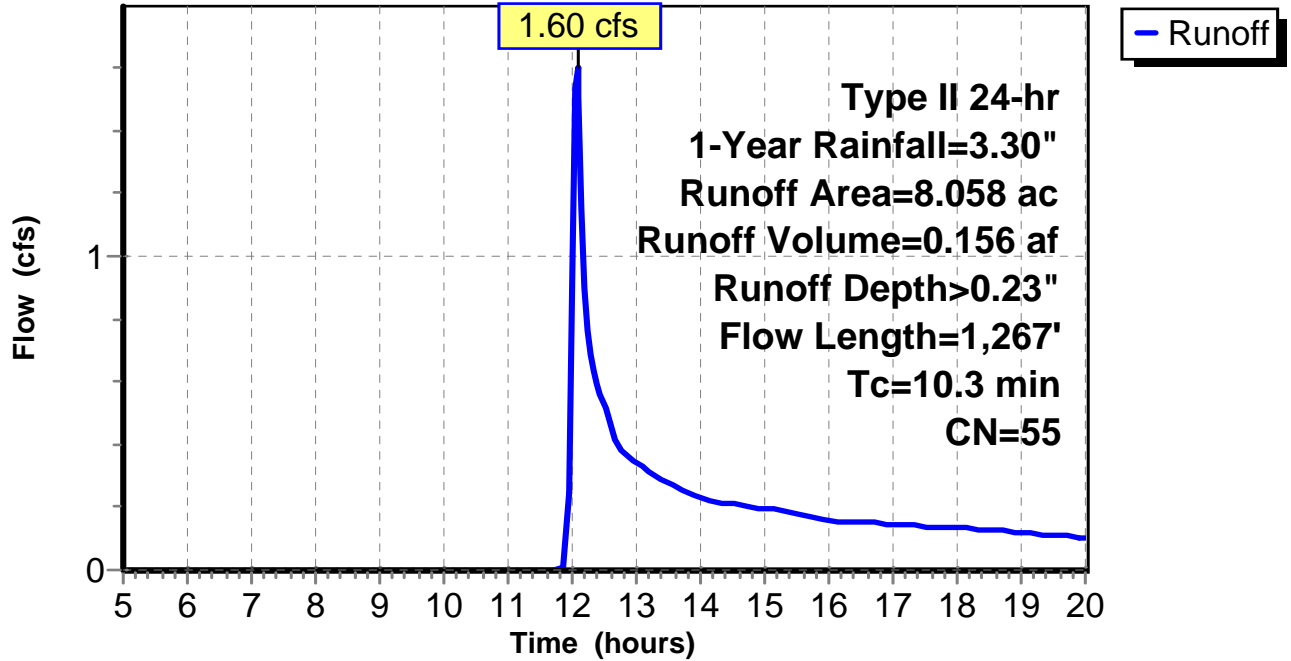
Subcatchment 4: C AR-509.004

Hydrograph



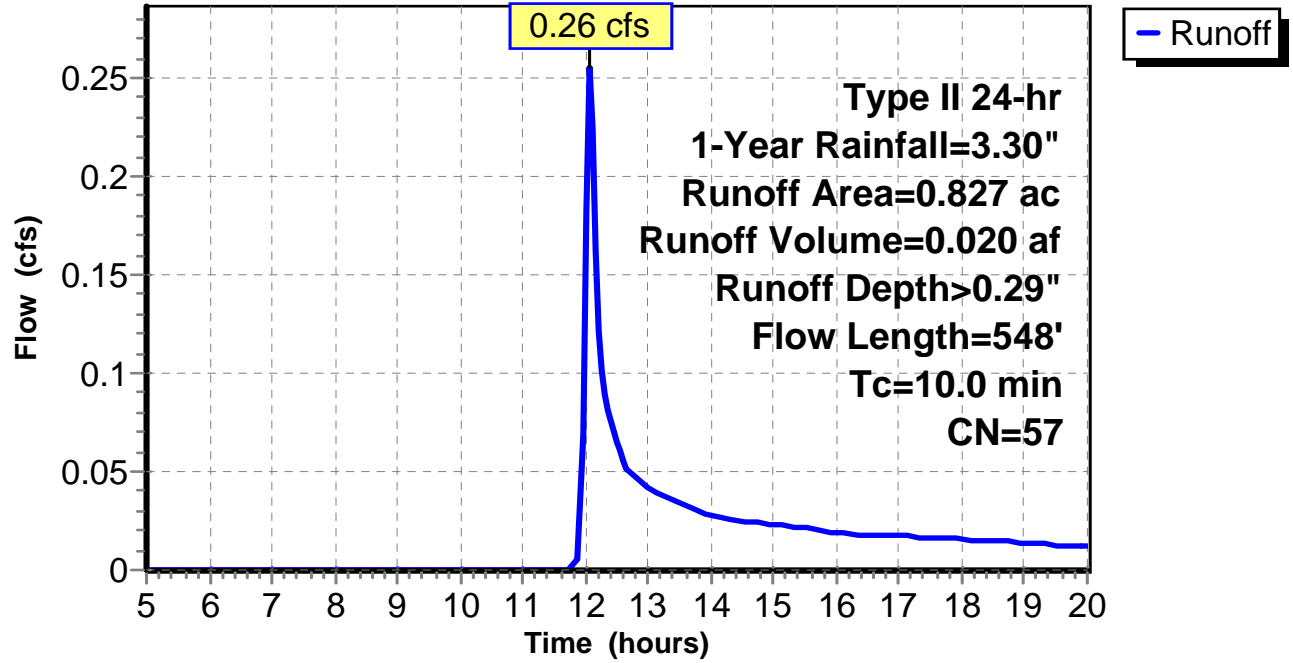
Subcatchment 5: C AR-509.005

Hydrograph



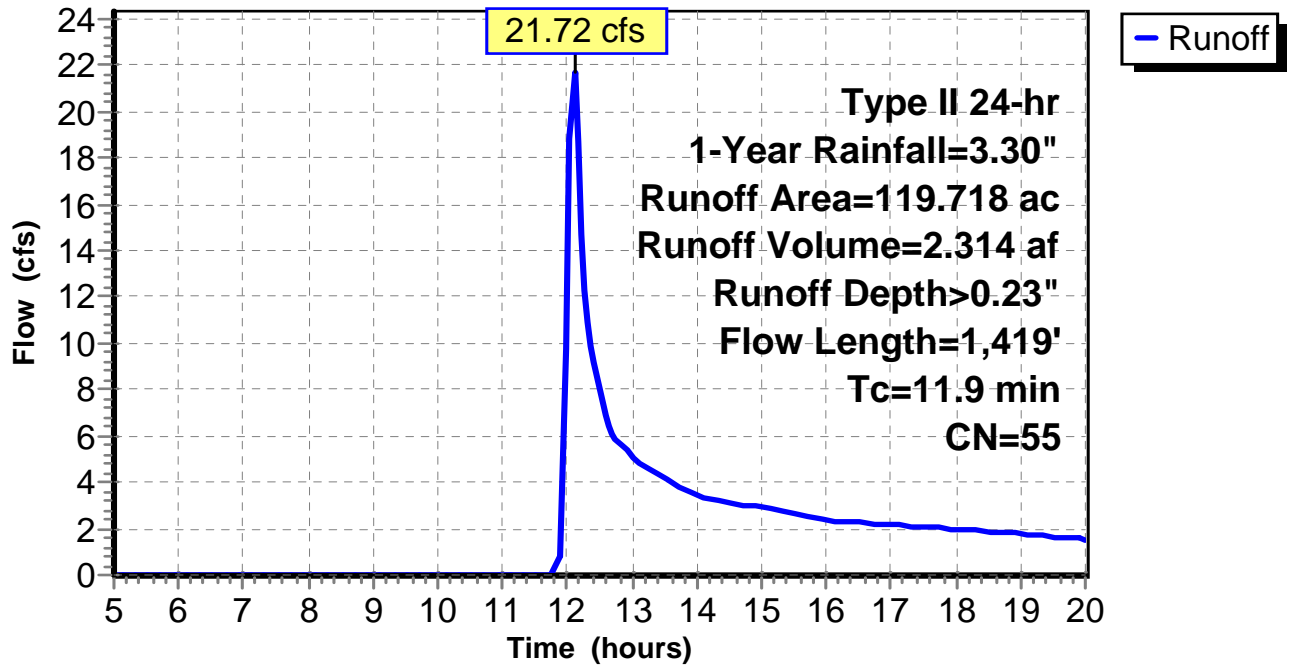
Subcatchment 6: C AR-509.006

Hydrograph



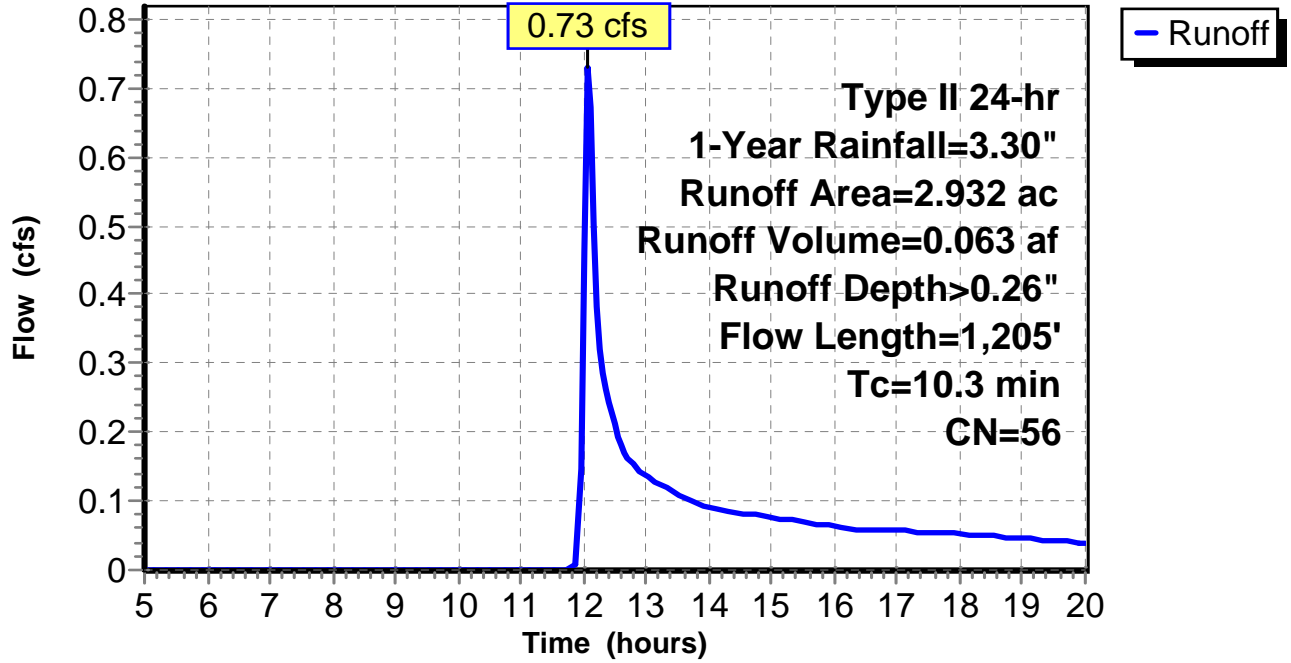
Subcatchment 7: C AR-509.007

Hydrograph



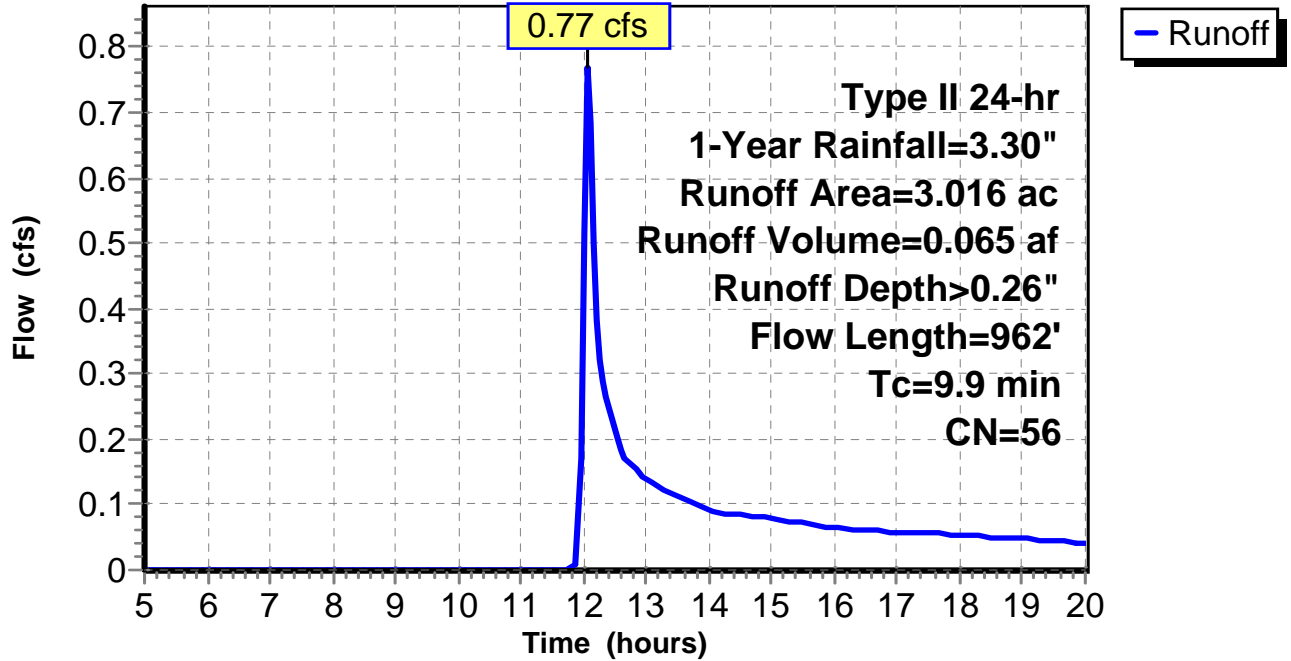
Subcatchment 8: C AR-509.008

Hydrograph



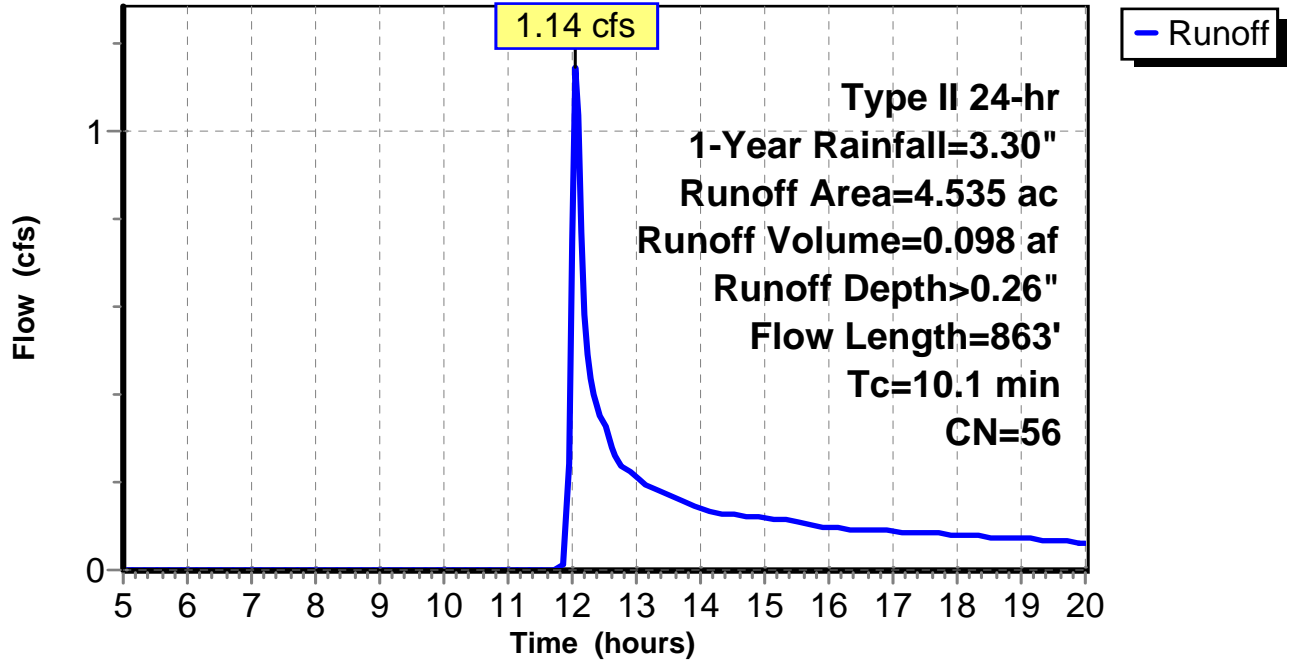
Subcatchment 9: C AR-509.009

Hydrograph



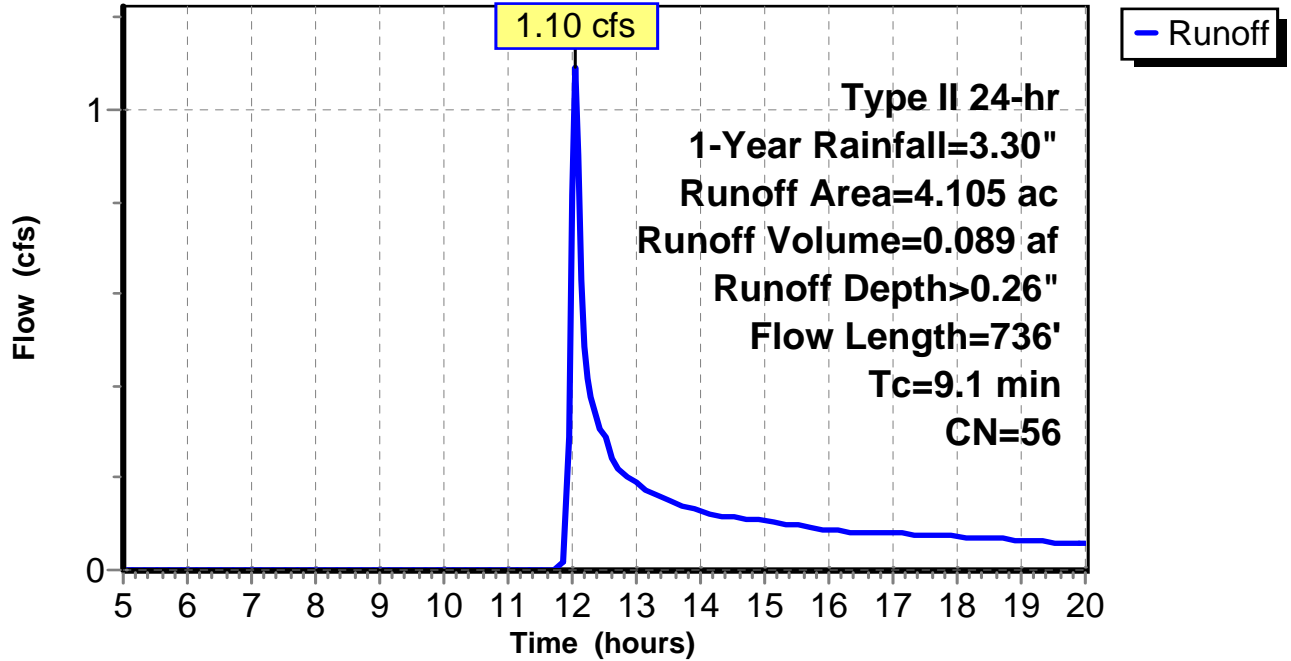
Subcatchment 10: C AR-509.010

Hydrograph



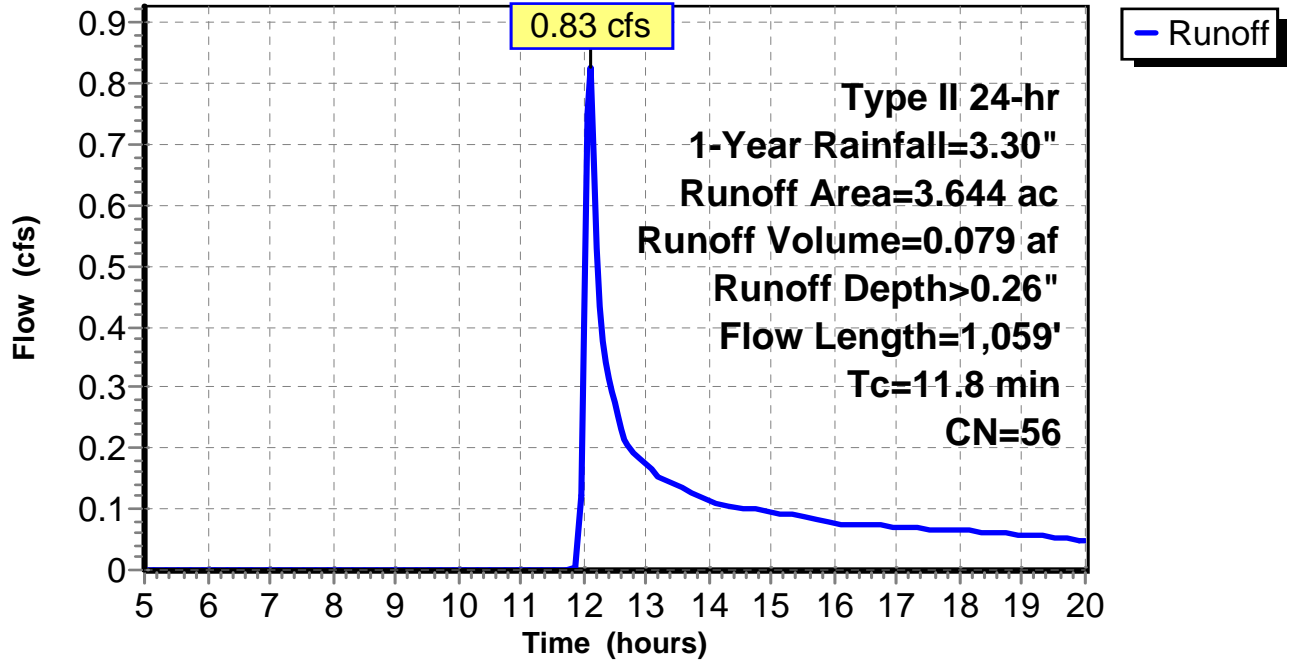
Subcatchment 11: C AR-509.011

Hydrograph



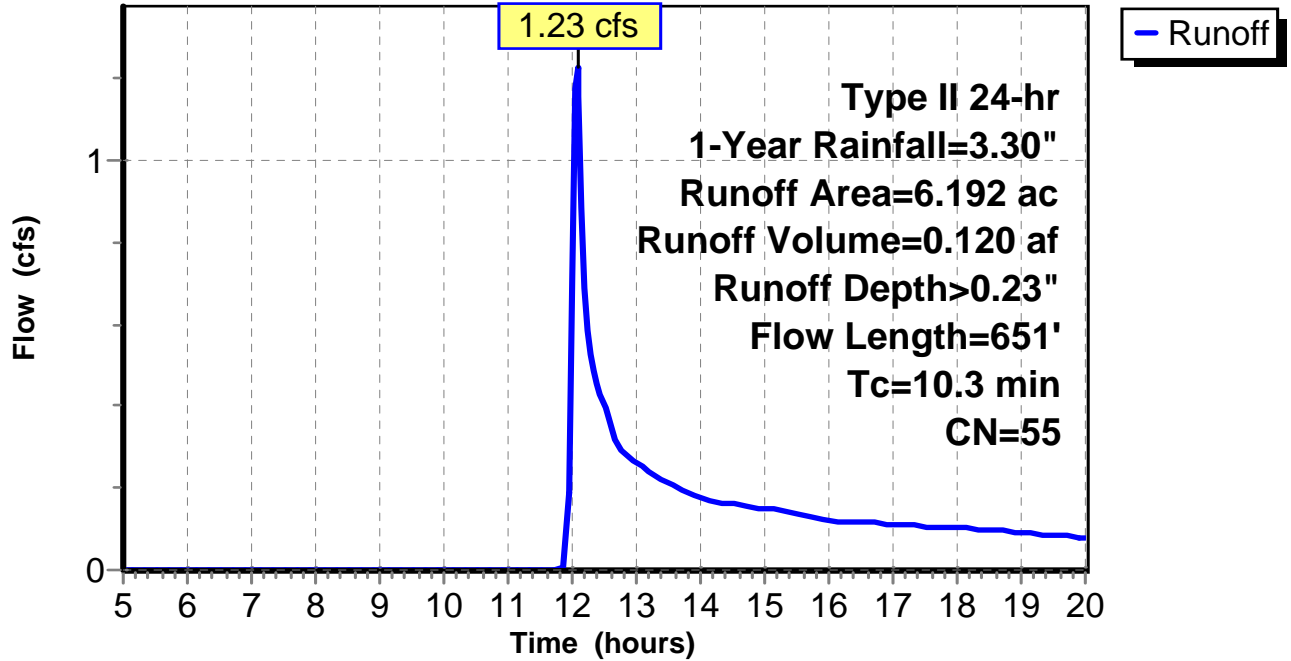
Subcatchment 12: C AR-509.012

Hydrograph



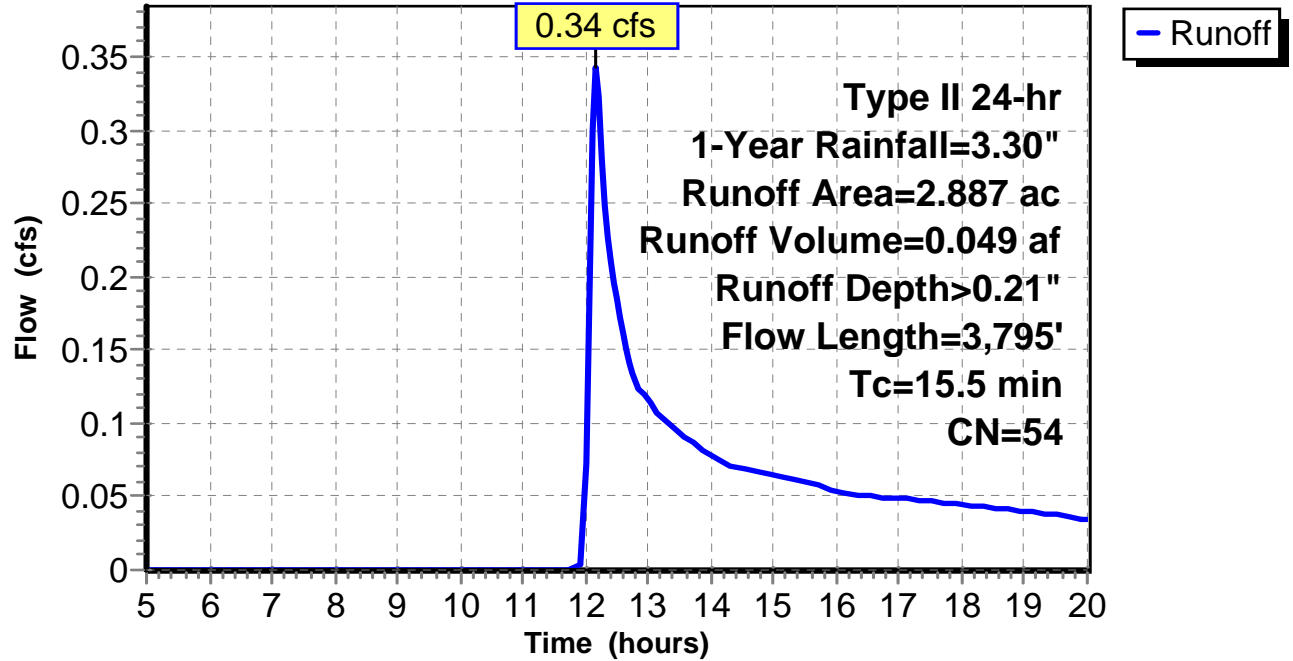
Subcatchment 13: C AR-509.013

Hydrograph



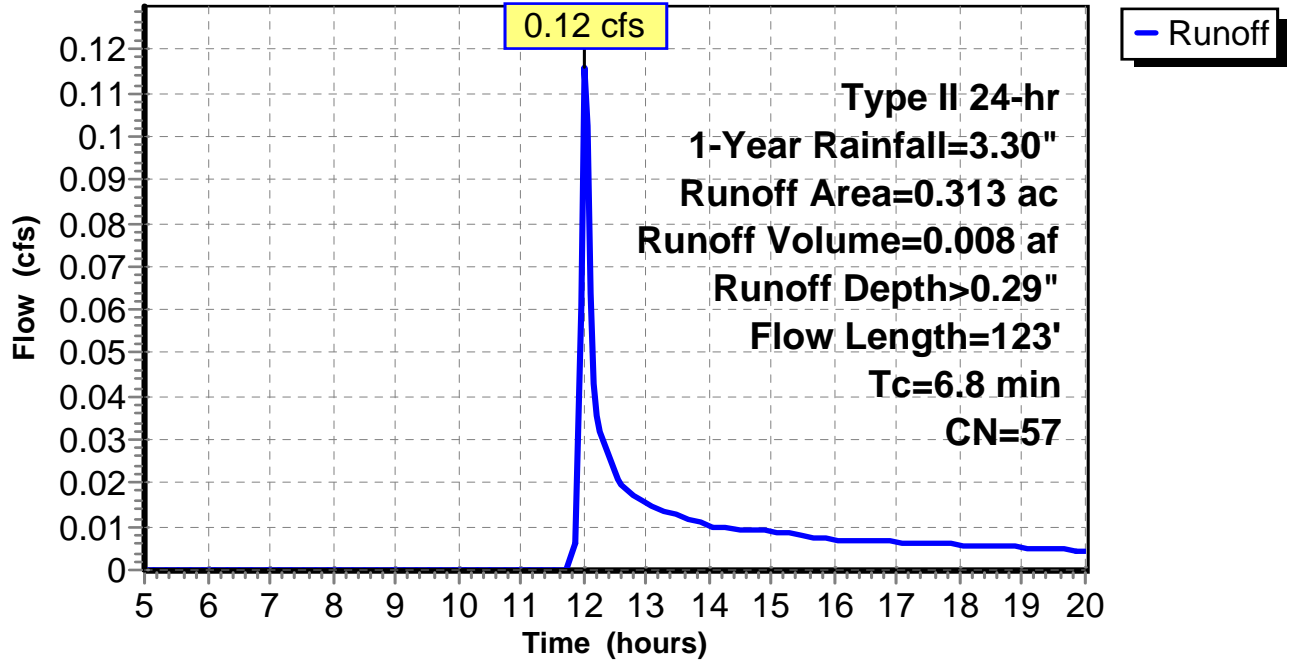
Subcatchment 14: C AR-509.014

Hydrograph



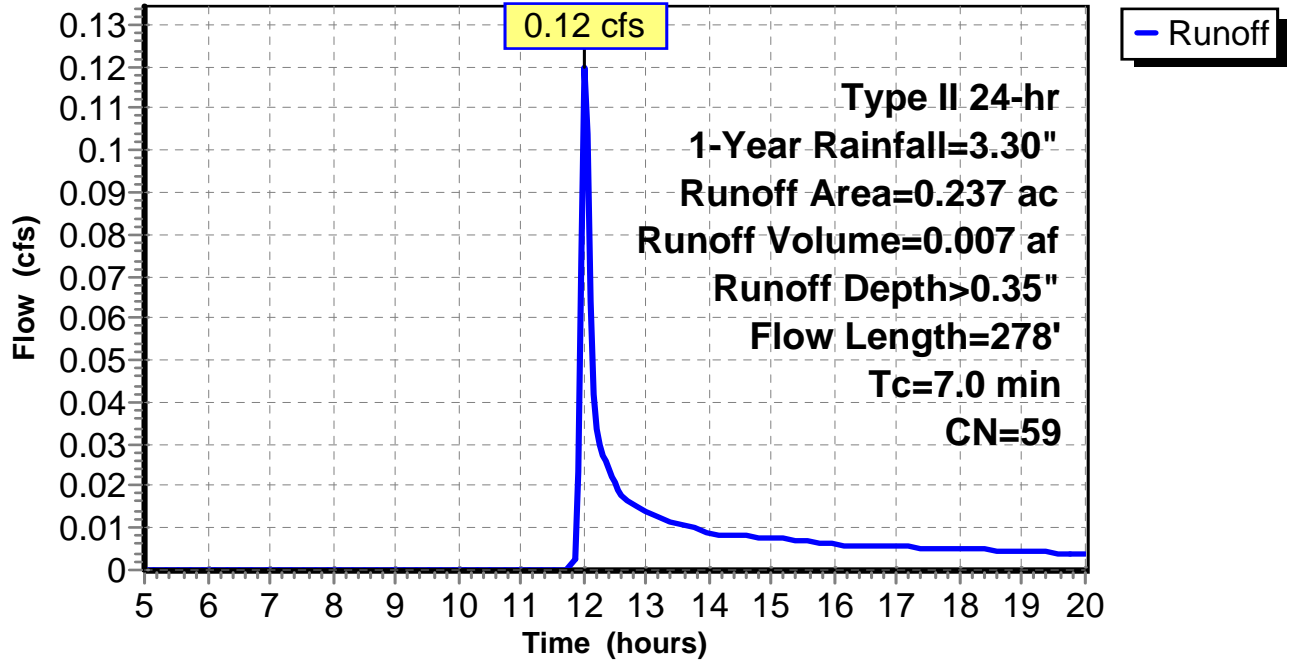
Subcatchment 15: C 210.001

Hydrograph



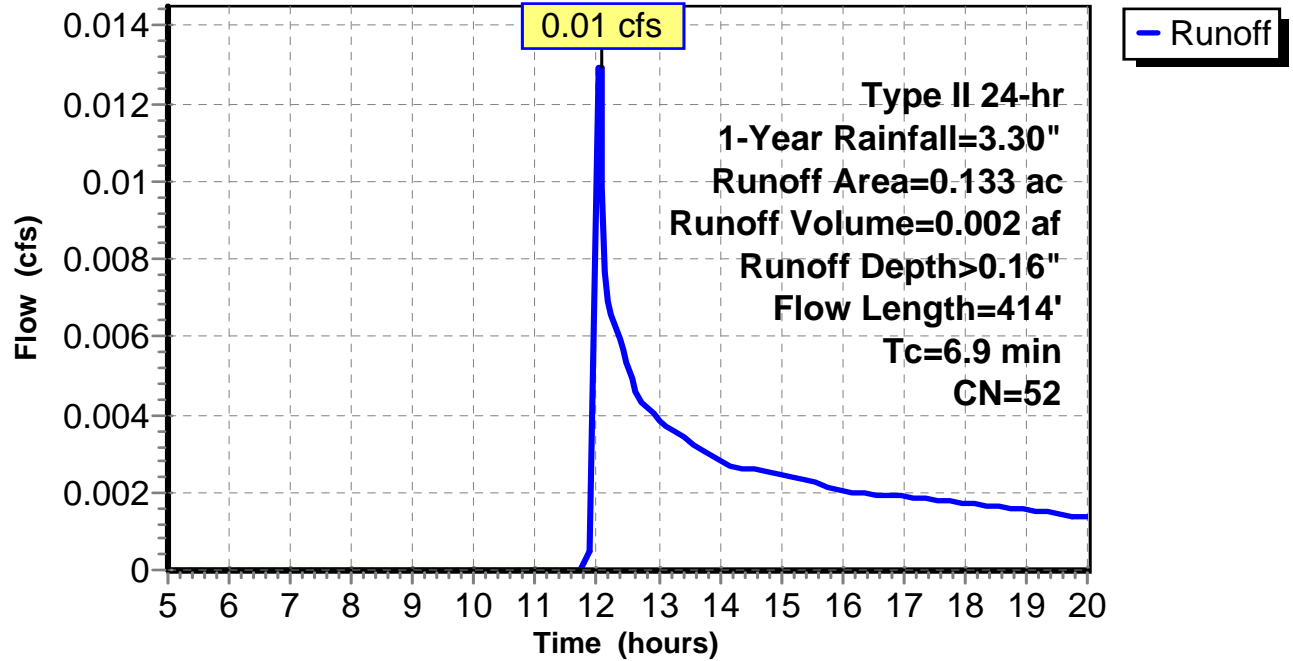
Subcatchment 16: C 210.002

Hydrograph



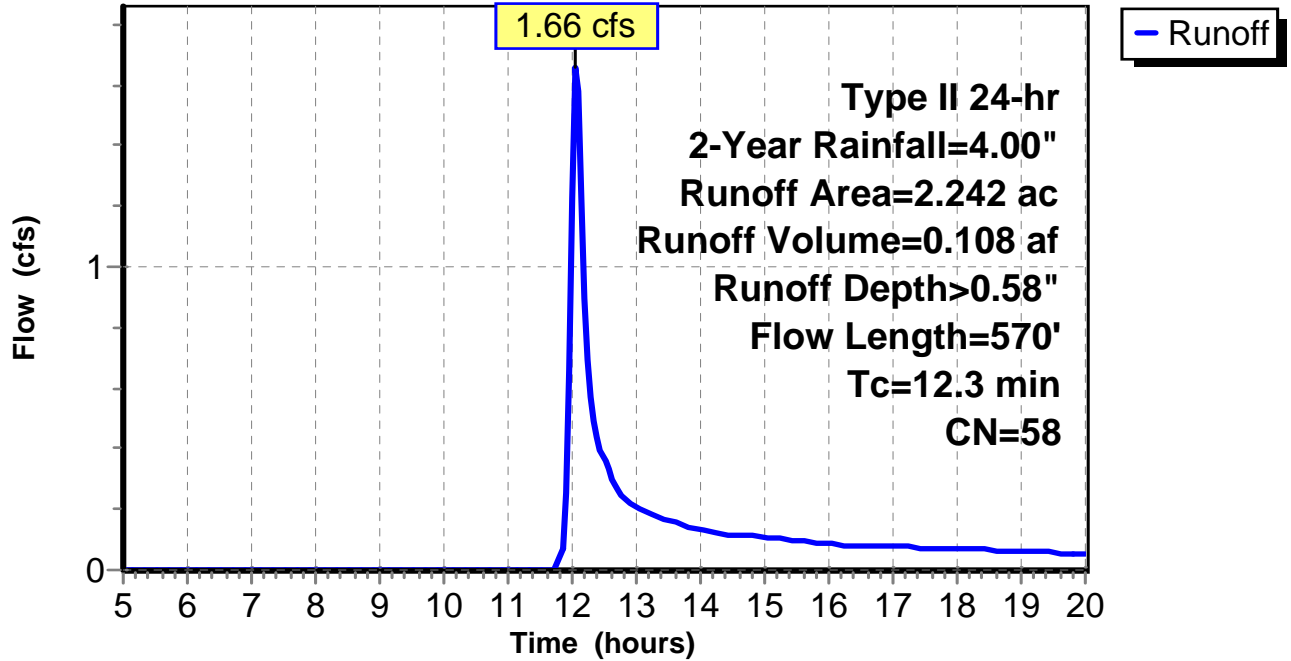
Subcatchment 17: C 210.003

Hydrograph



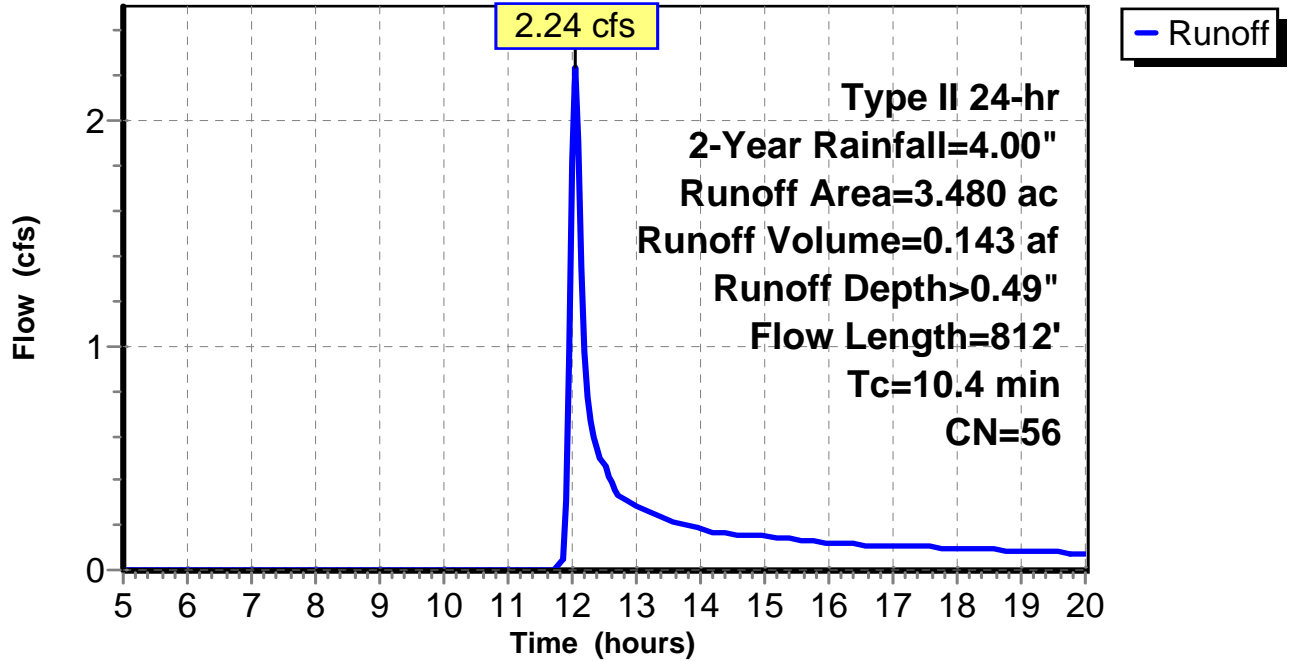
Subcatchment 1: C AR-509.001

Hydrograph



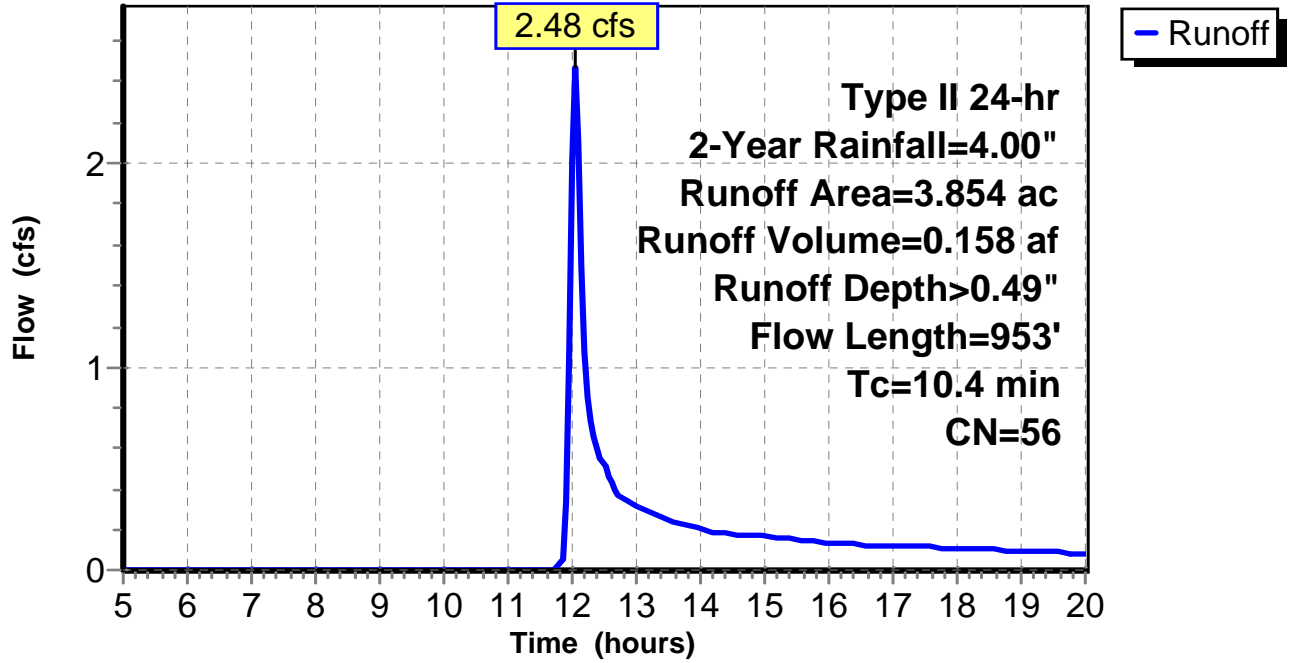
Subcatchment 2: C AR-509.002

Hydrograph



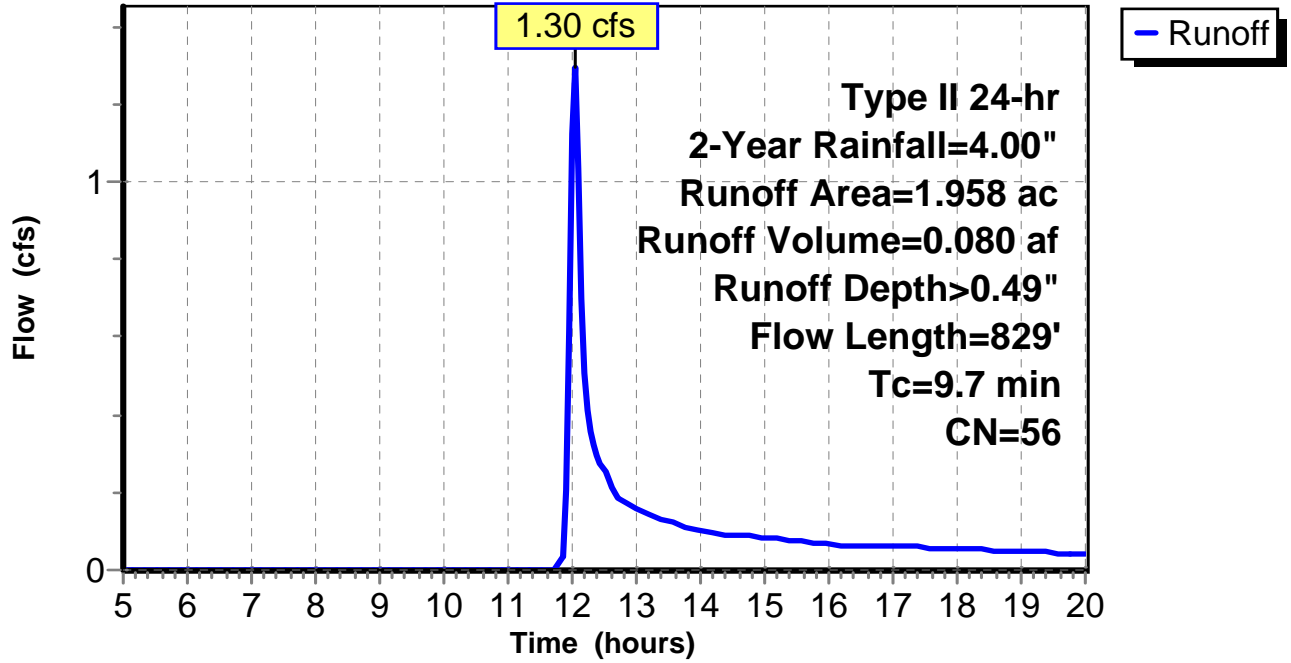
Subcatchment 3: C AR-509.003

Hydrograph



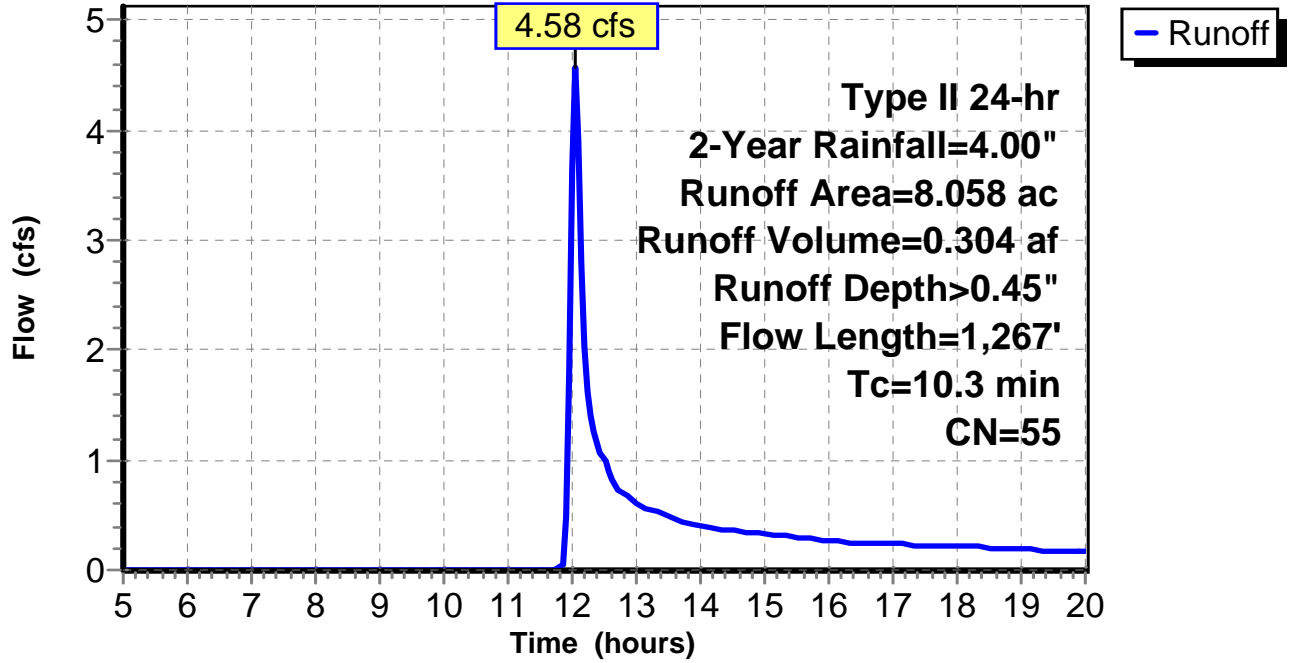
Subcatchment 4: C AR-509.004

Hydrograph



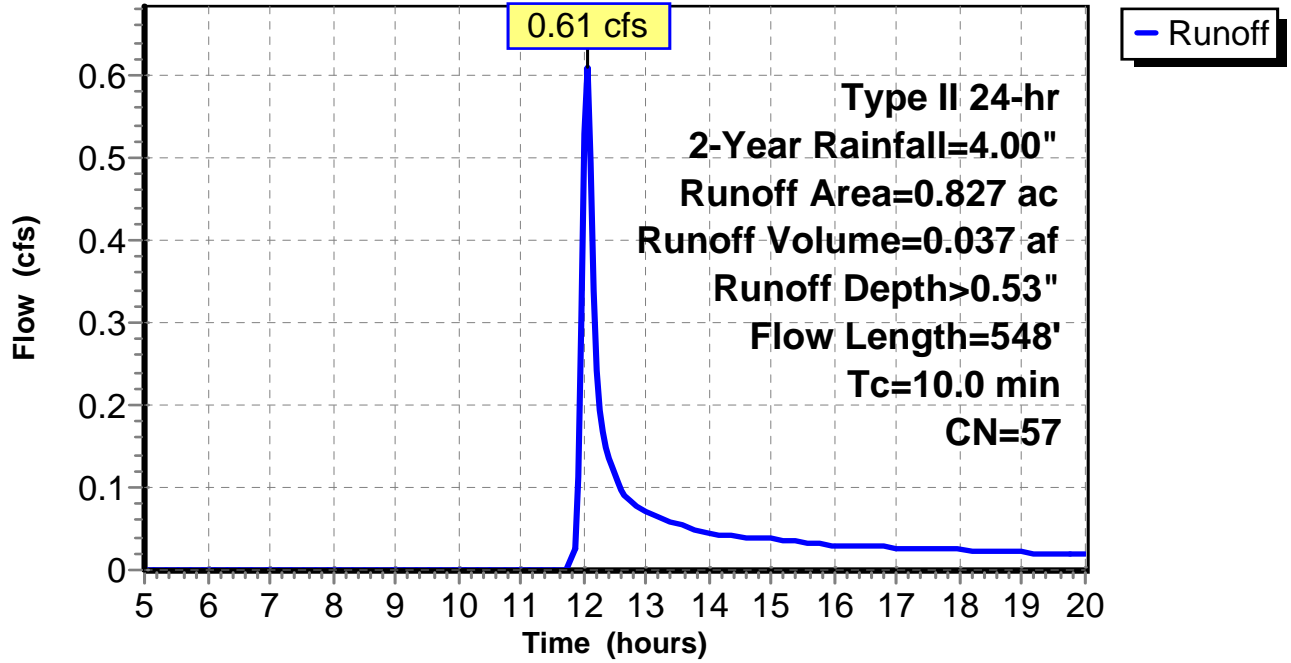
Subcatchment 5: C AR-509.005

Hydrograph



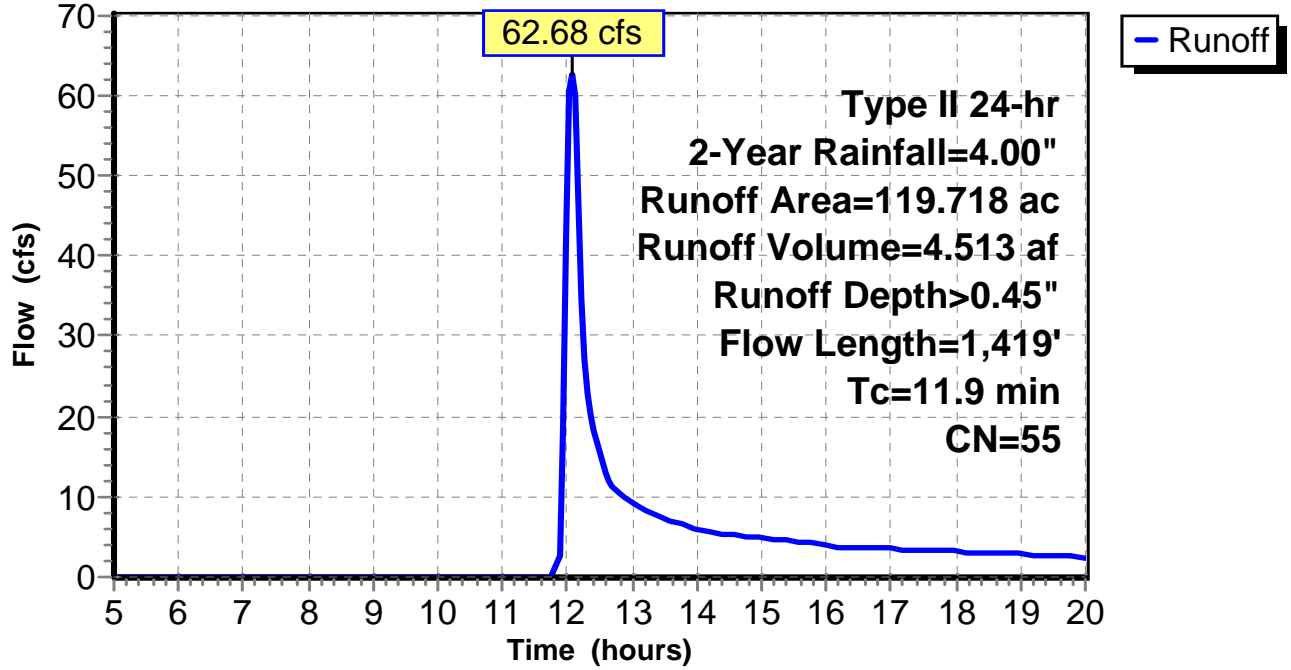
Subcatchment 6: C AR-509.006

Hydrograph



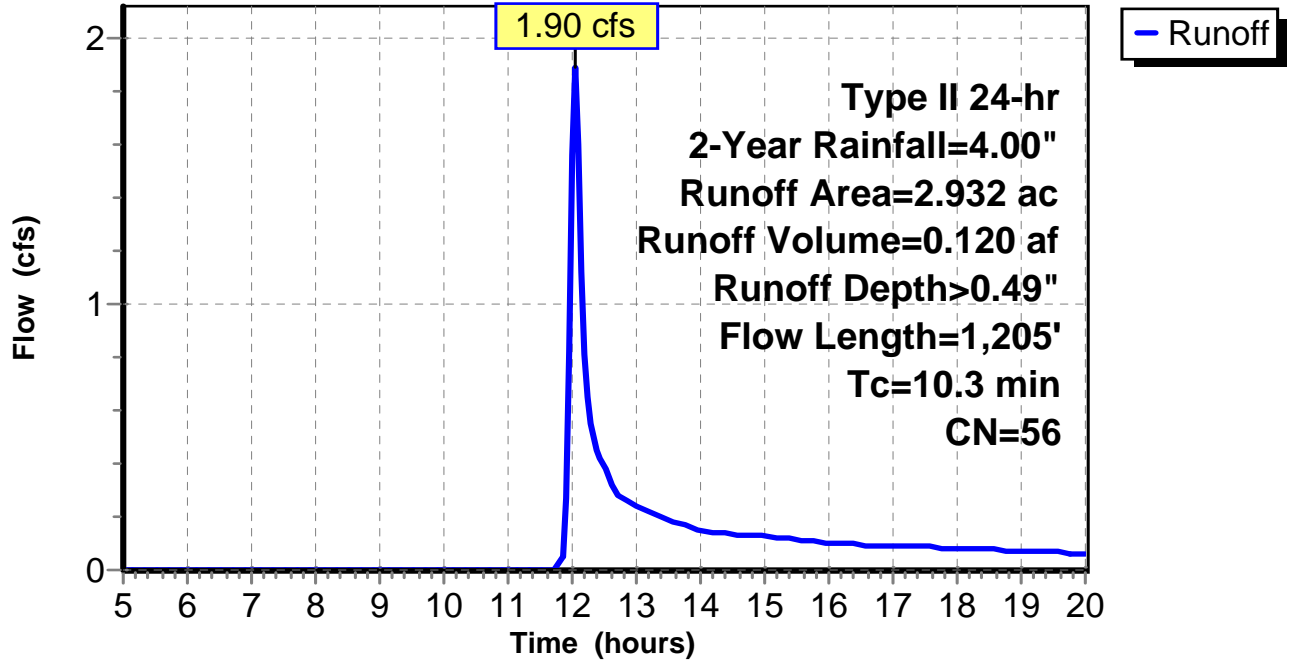
Subcatchment 7: C AR-509.007

Hydrograph



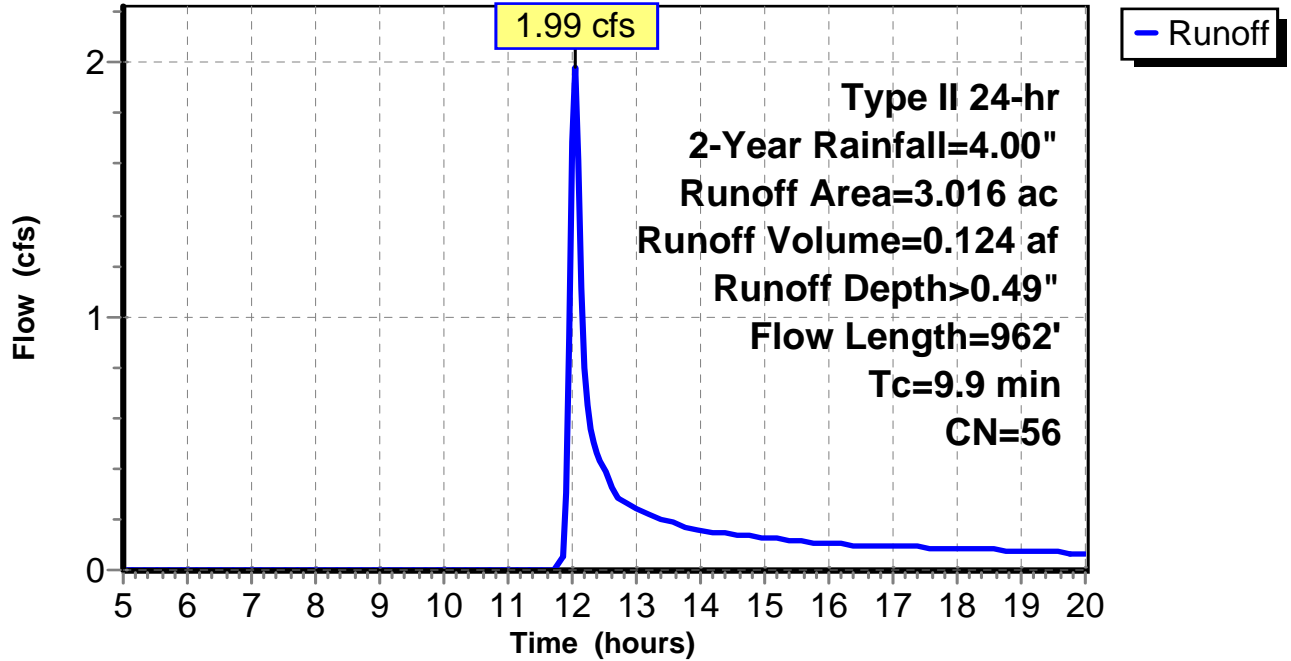
Subcatchment 8: C AR-509.008

Hydrograph



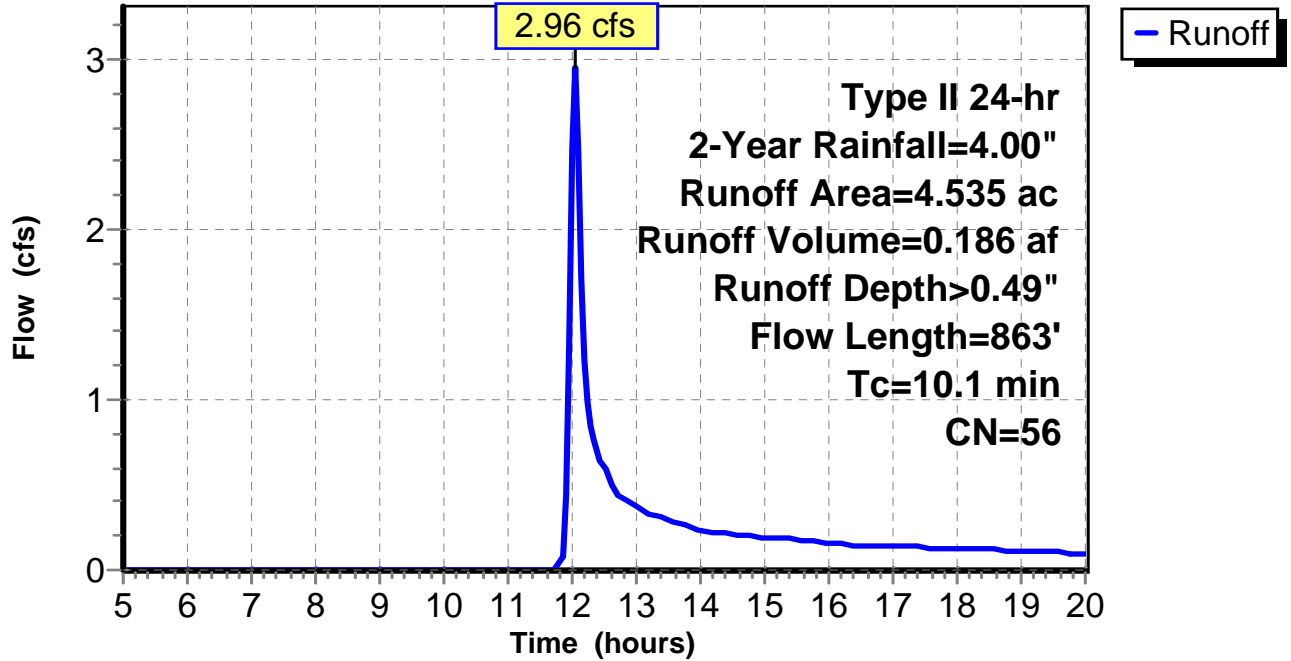
Subcatchment 9: C AR-509.009

Hydrograph



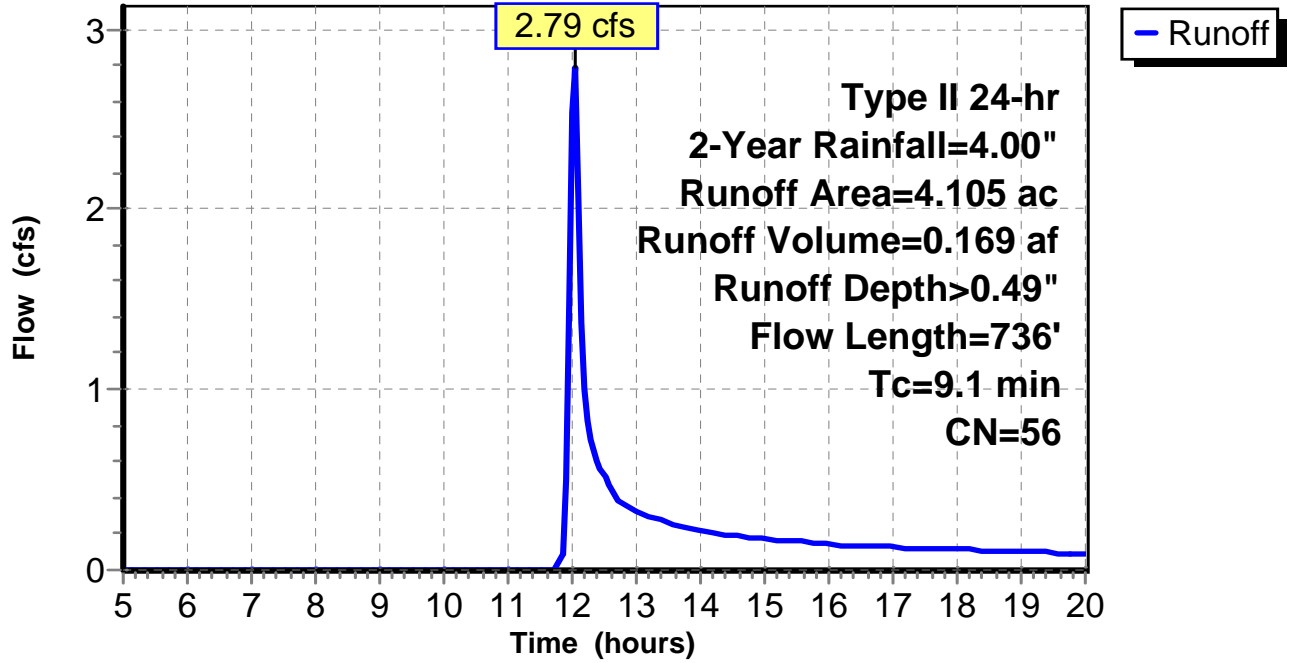
Subcatchment 10: C AR-509.010

Hydrograph



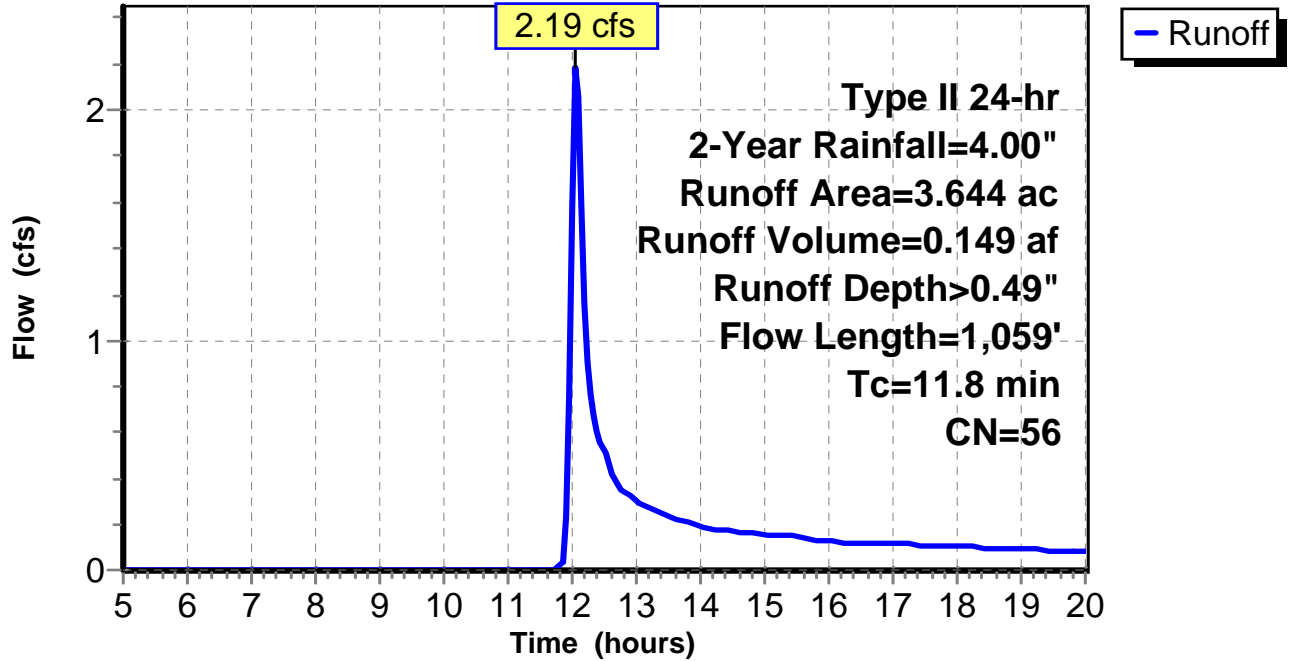
Subcatchment 11: C AR-509.011

Hydrograph



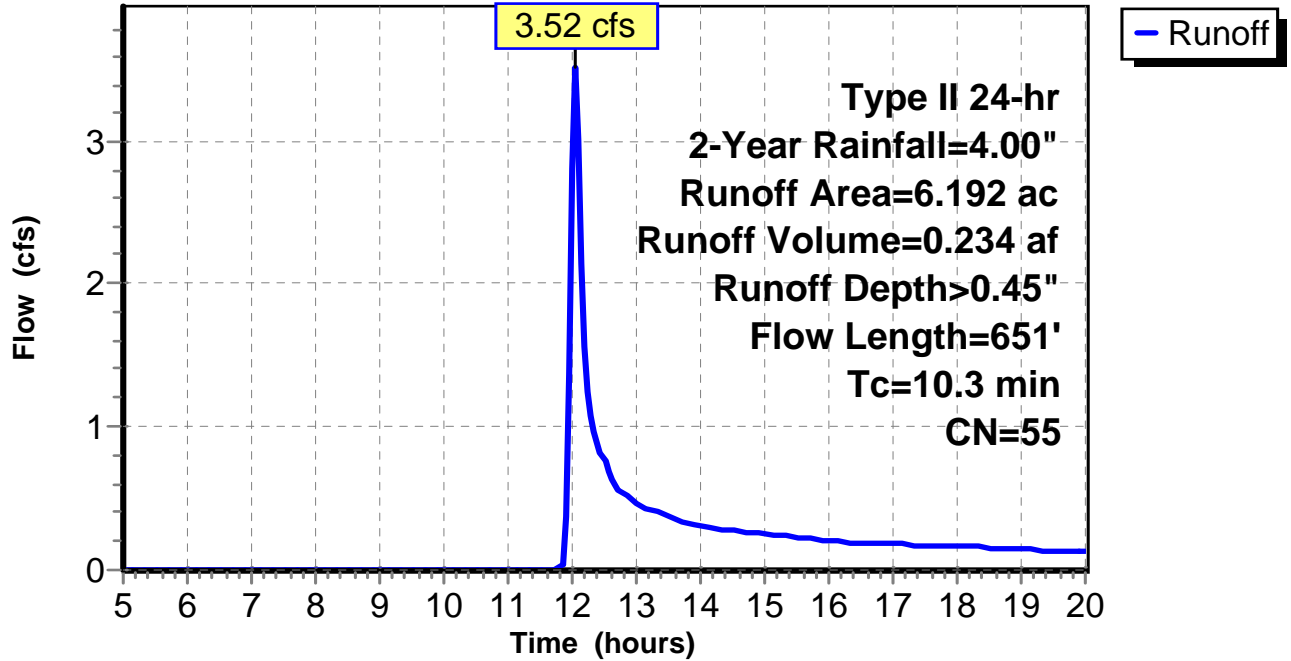
Subcatchment 12: C AR-509.012

Hydrograph



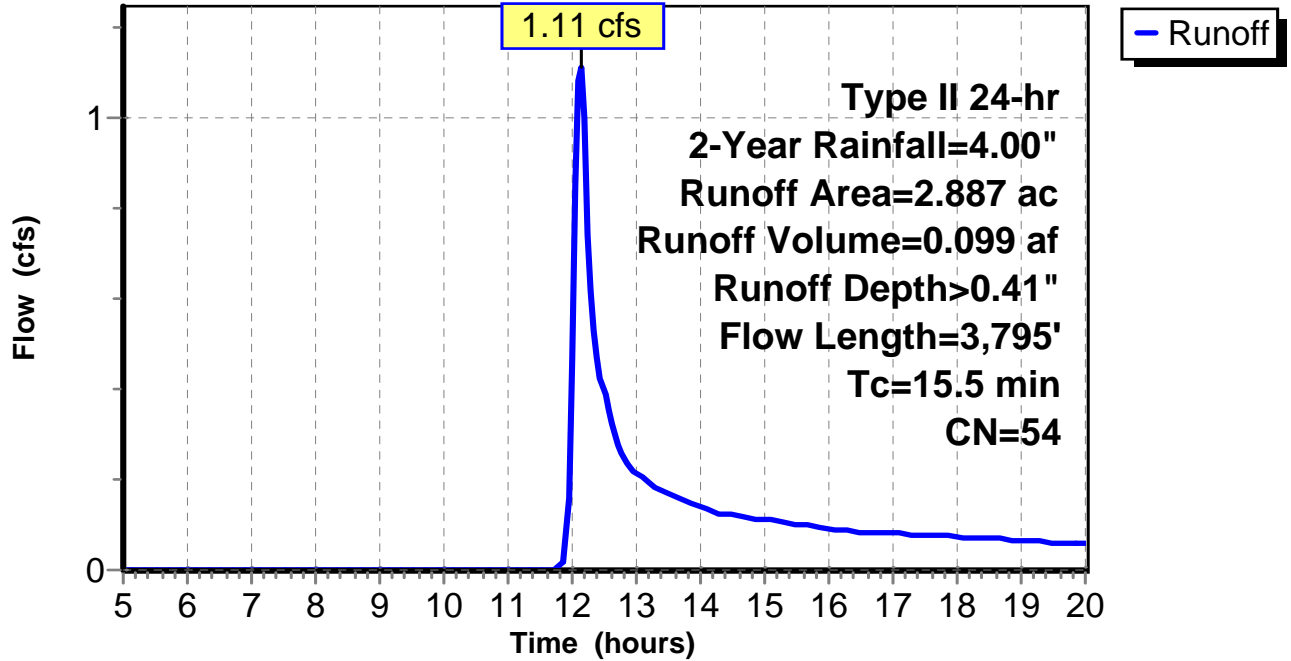
Subcatchment 13: C AR-509.013

Hydrograph



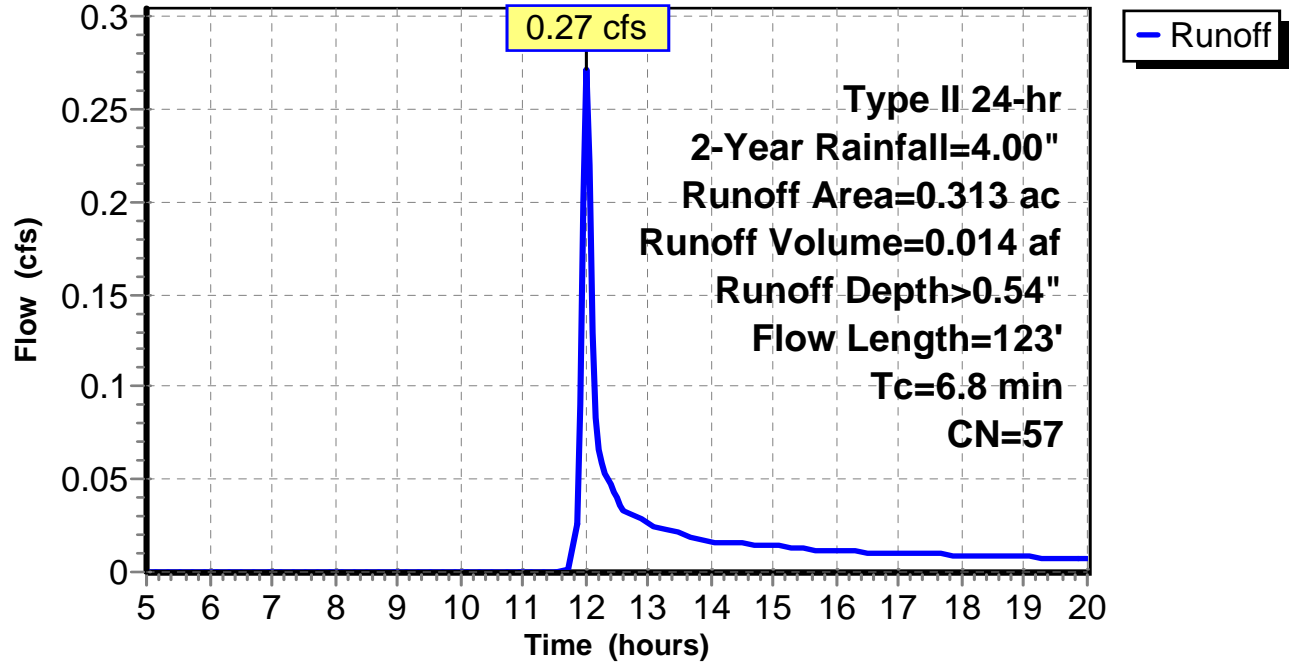
Subcatchment 14: C AR-509.014

Hydrograph



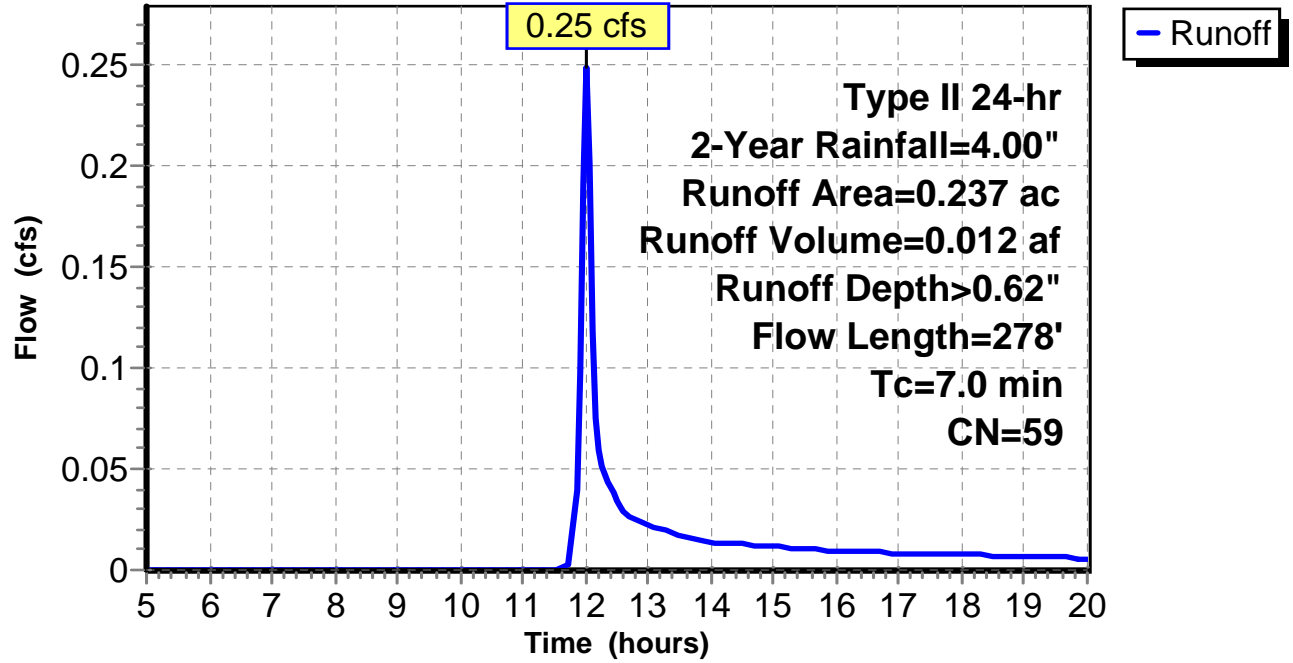
Subcatchment 15: C 210.001

Hydrograph



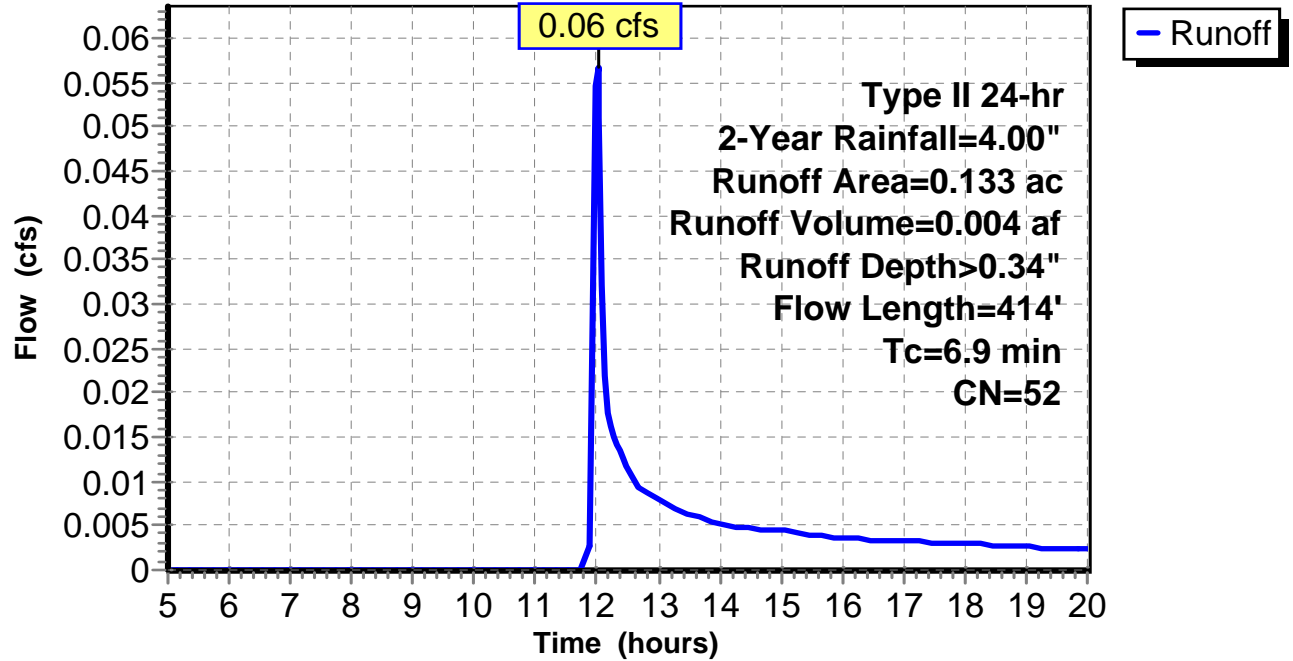
Subcatchment 16: C 210.002

Hydrograph



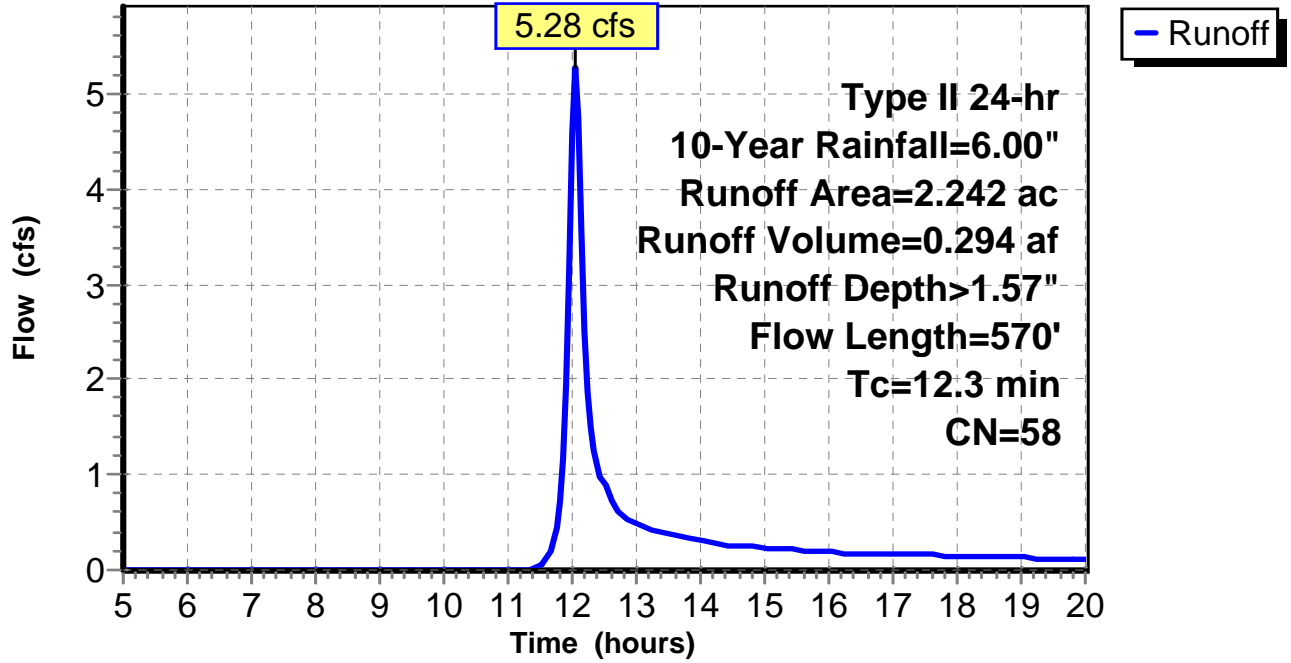
Subcatchment 17: C 210.003

Hydrograph



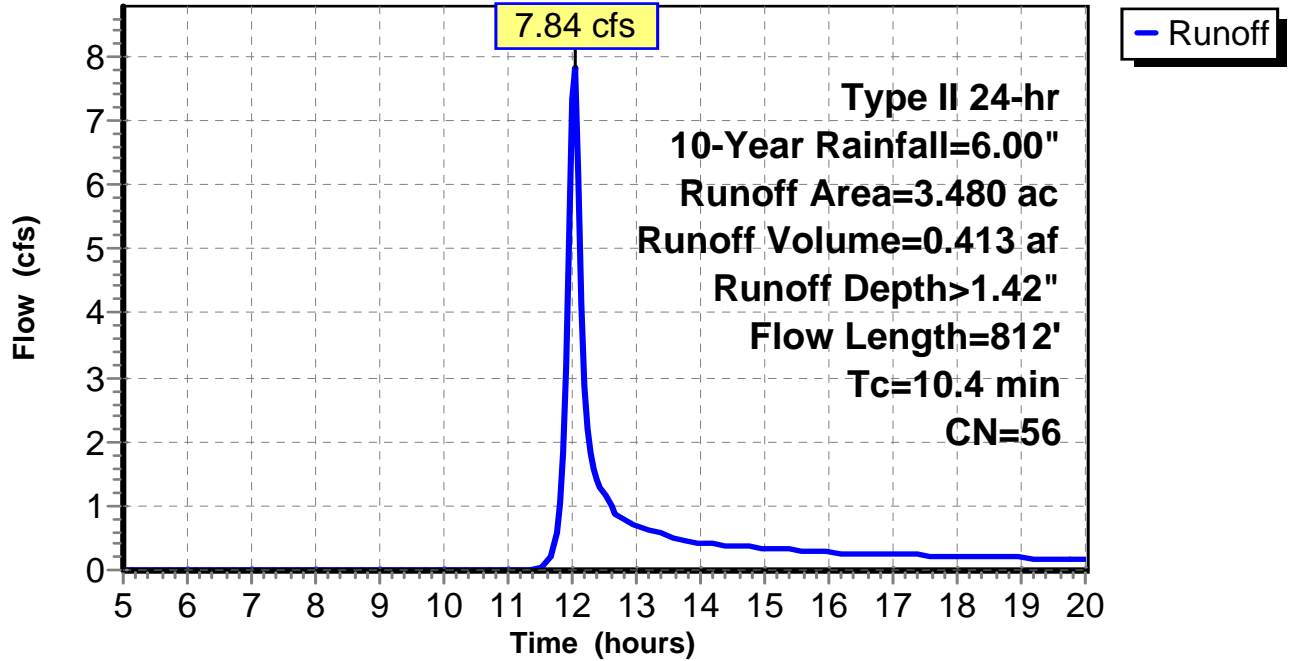
Subcatchment 1: C AR-509.001

Hydrograph



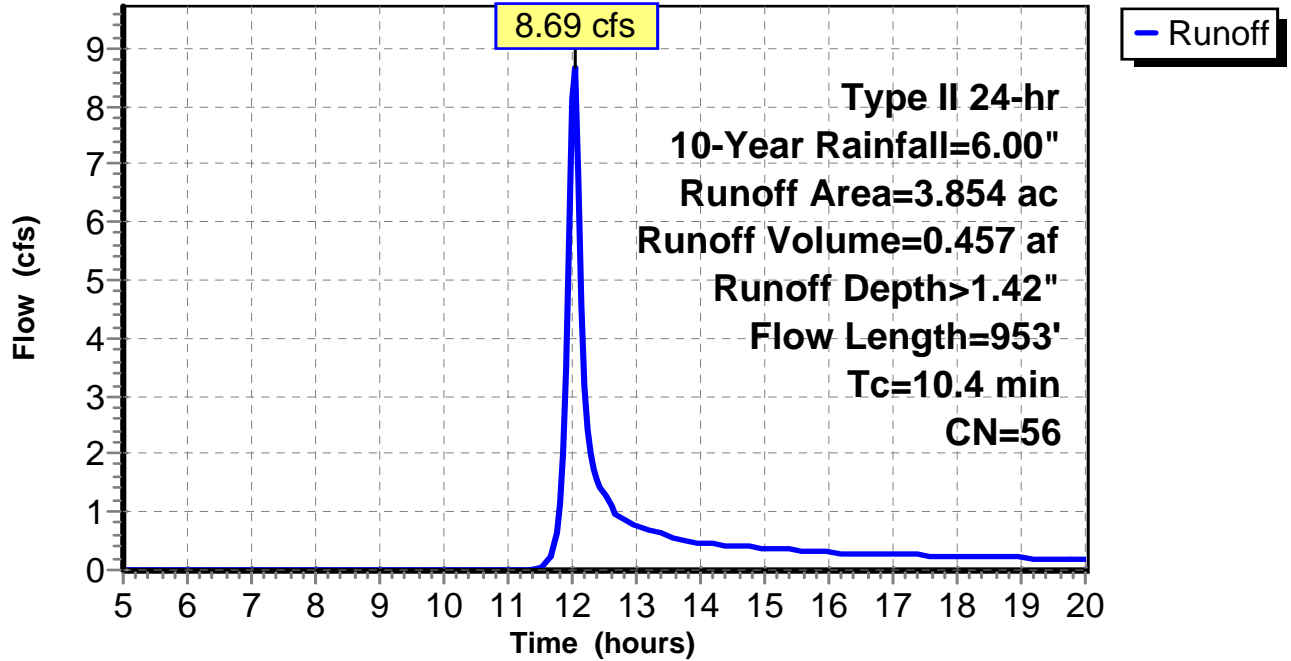
Subcatchment 2: C AR-509.002

Hydrograph



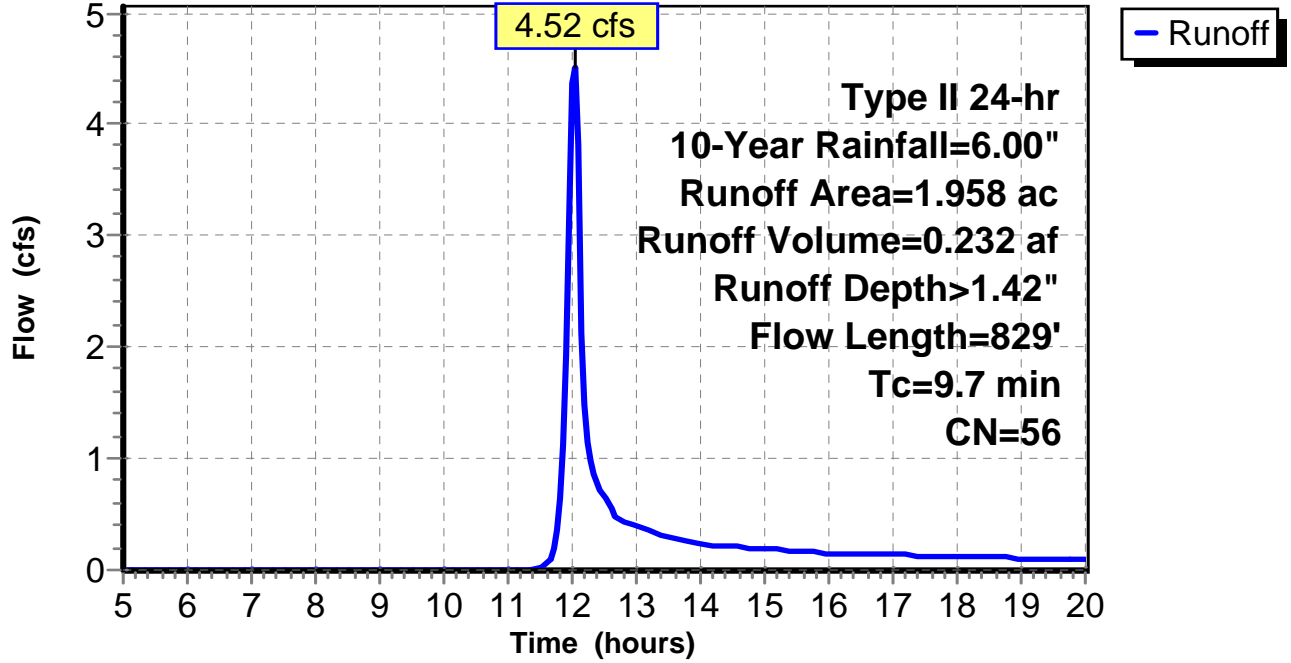
Subcatchment 3: C AR-509.003

Hydrograph



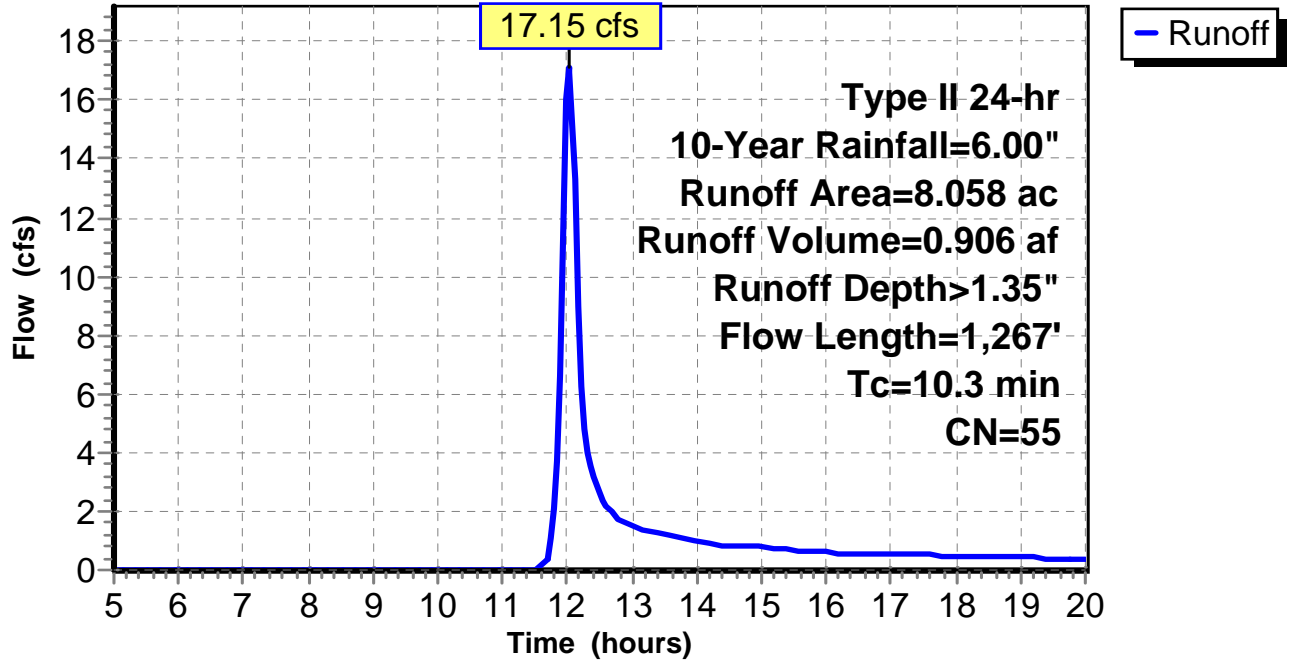
Subcatchment 4: C AR-509.004

Hydrograph



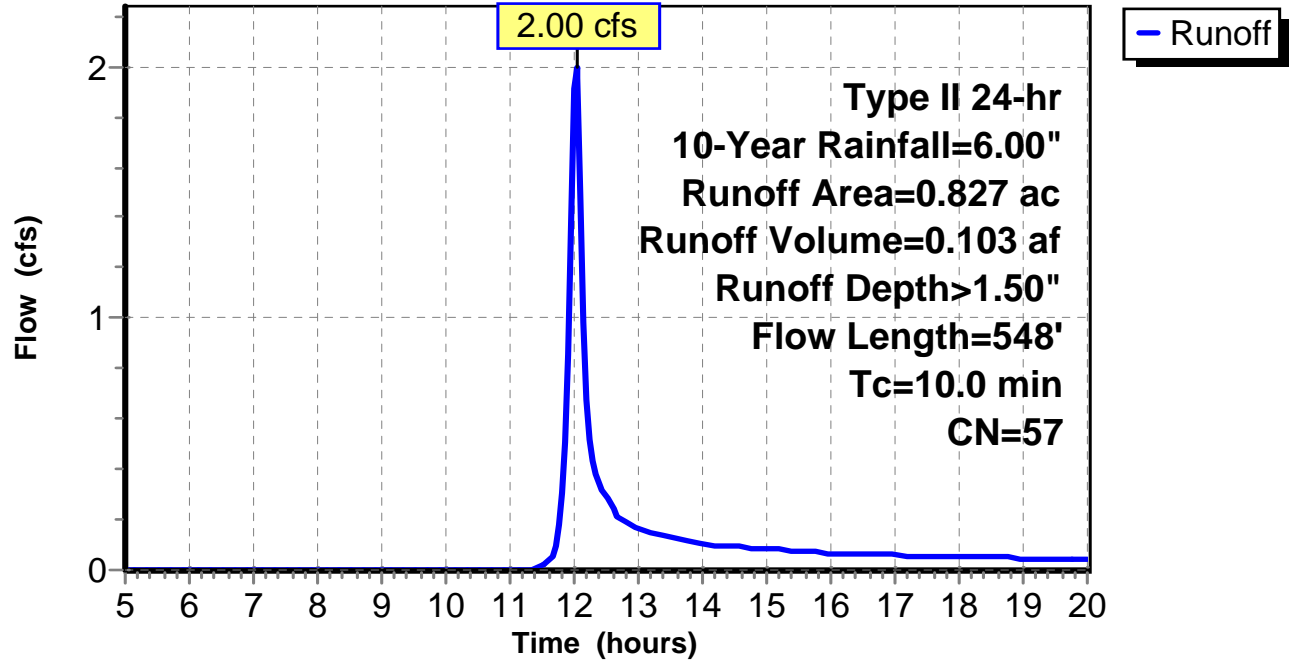
Subcatchment 5: C AR-509.005

Hydrograph



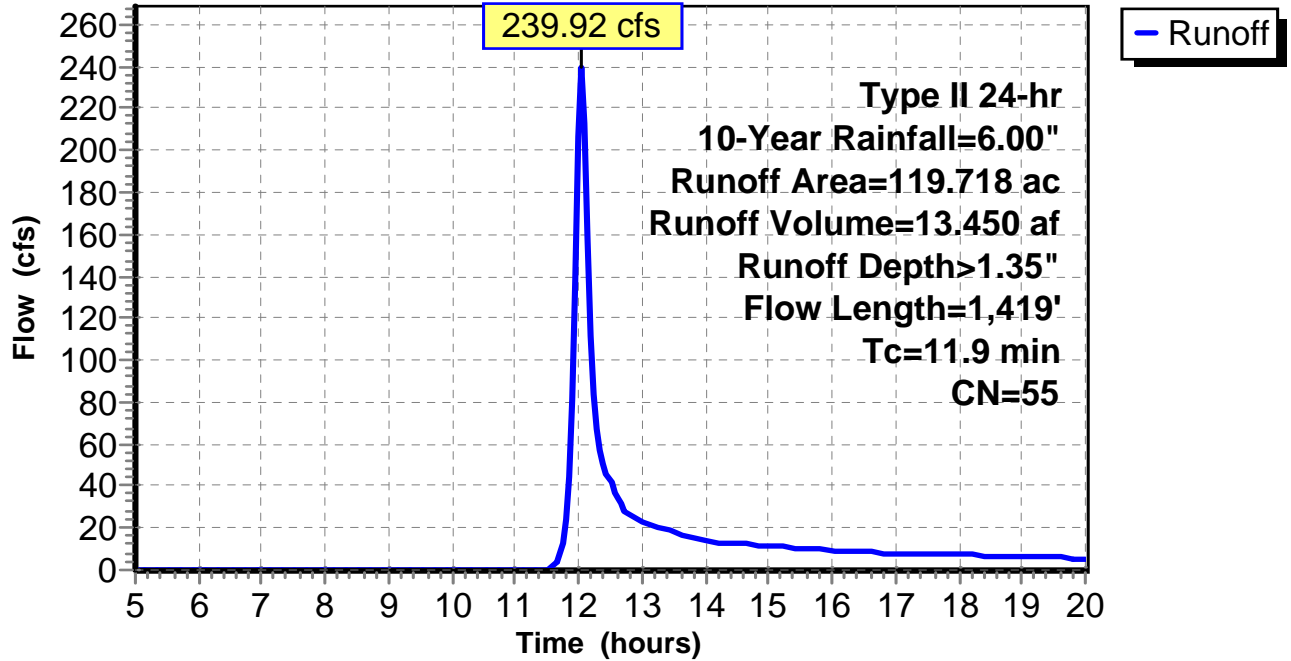
Subcatchment 6: C AR-509.006

Hydrograph



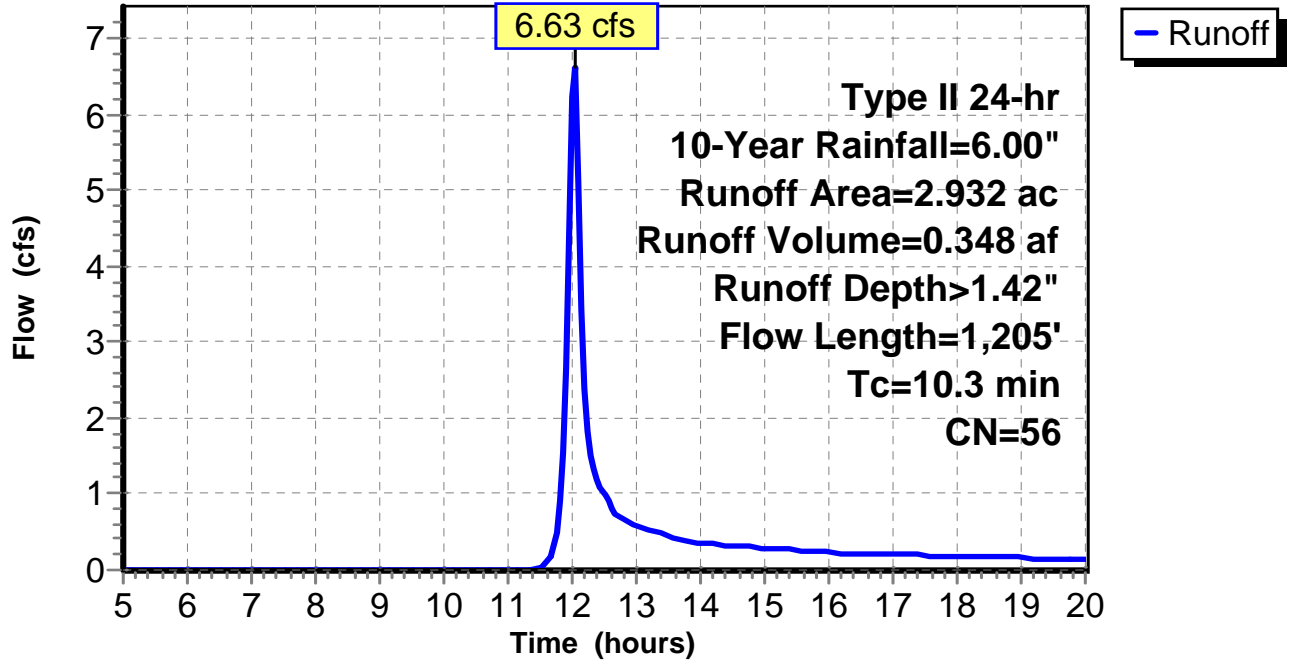
Subcatchment 7: C AR-509.007

Hydrograph



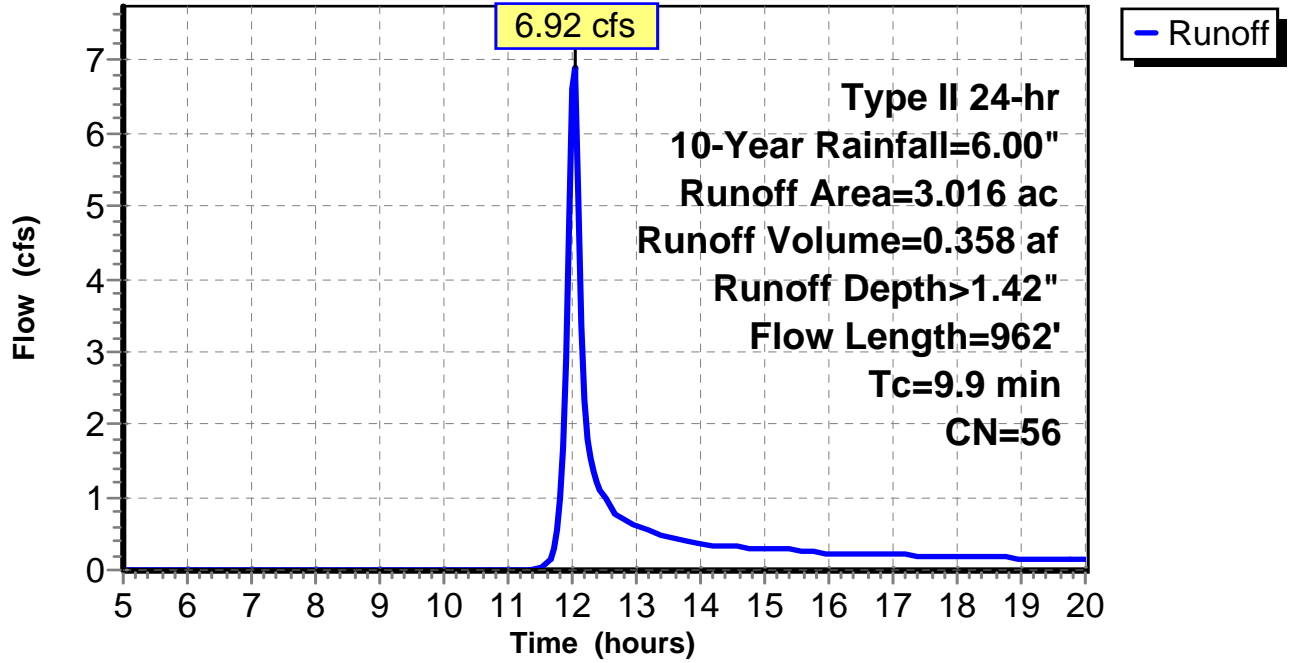
Subcatchment 8: C AR-509.008

Hydrograph



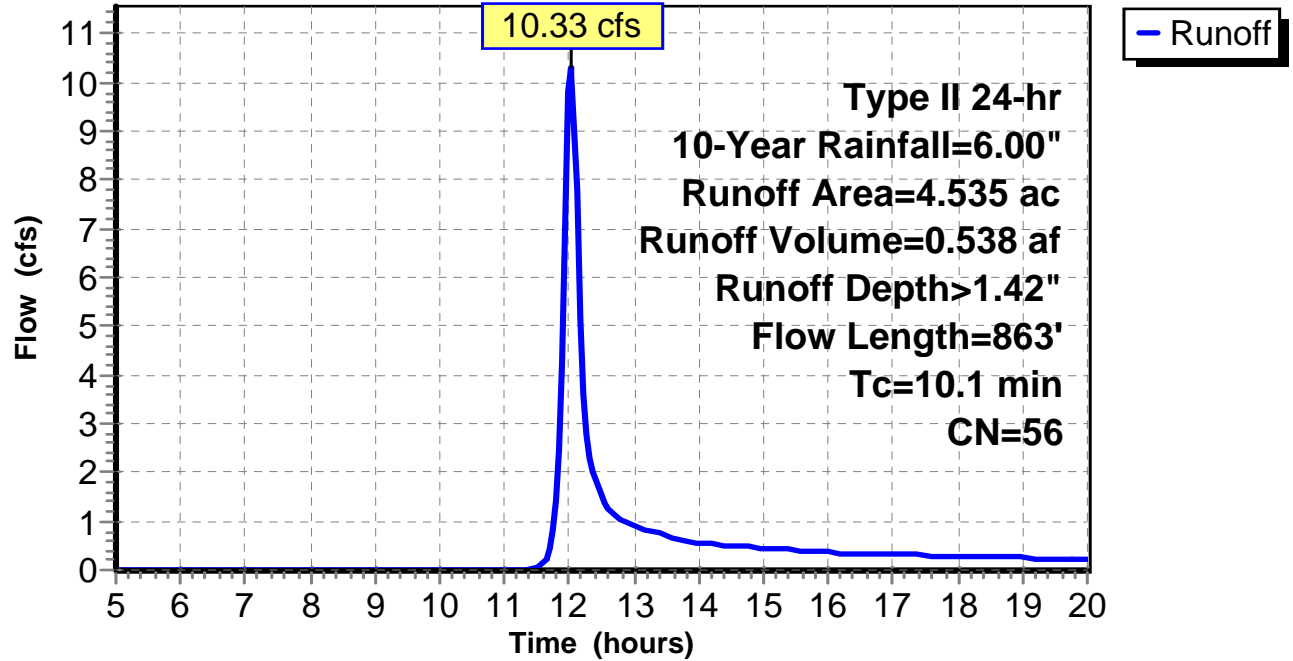
Subcatchment 9: C AR-509.009

Hydrograph



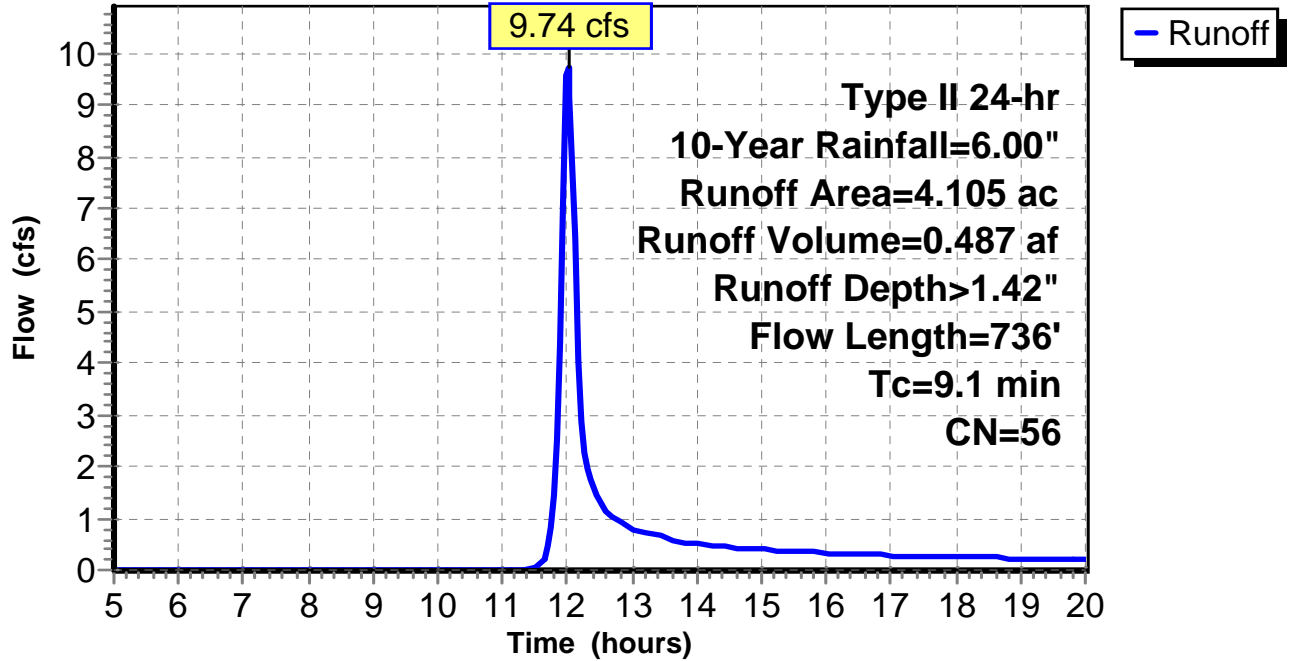
Subcatchment 10: C AR-509.010

Hydrograph



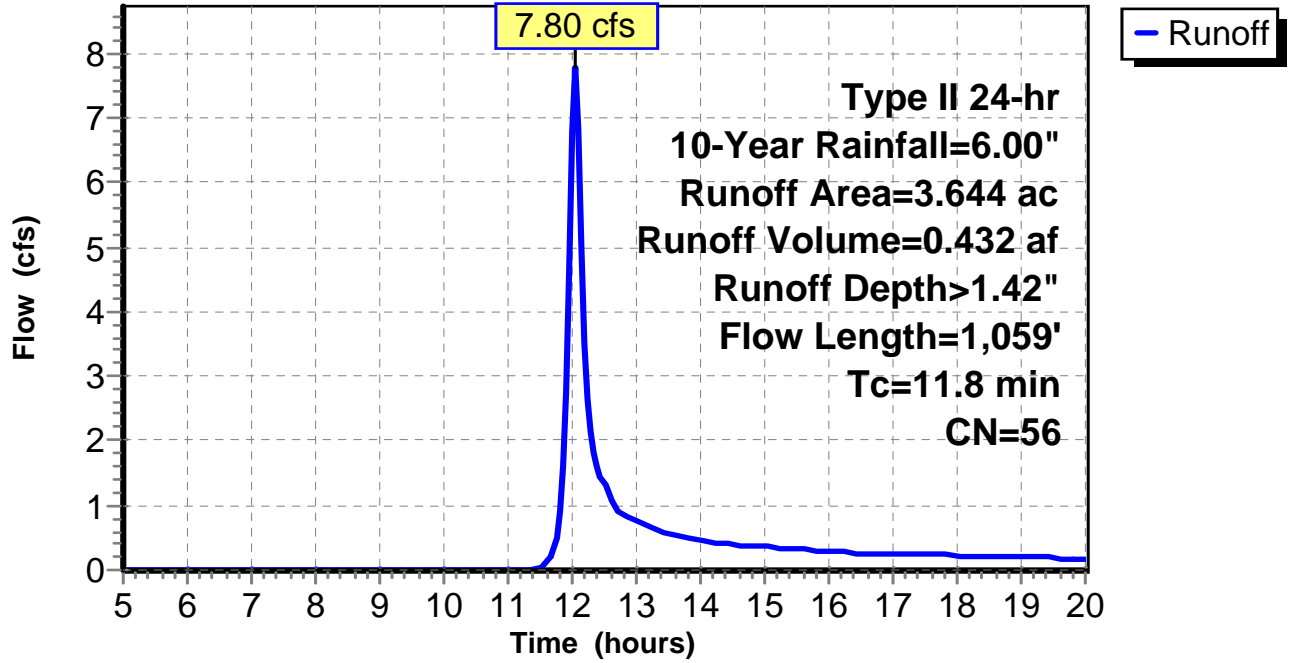
Subcatchment 11: C AR-509.011

Hydrograph



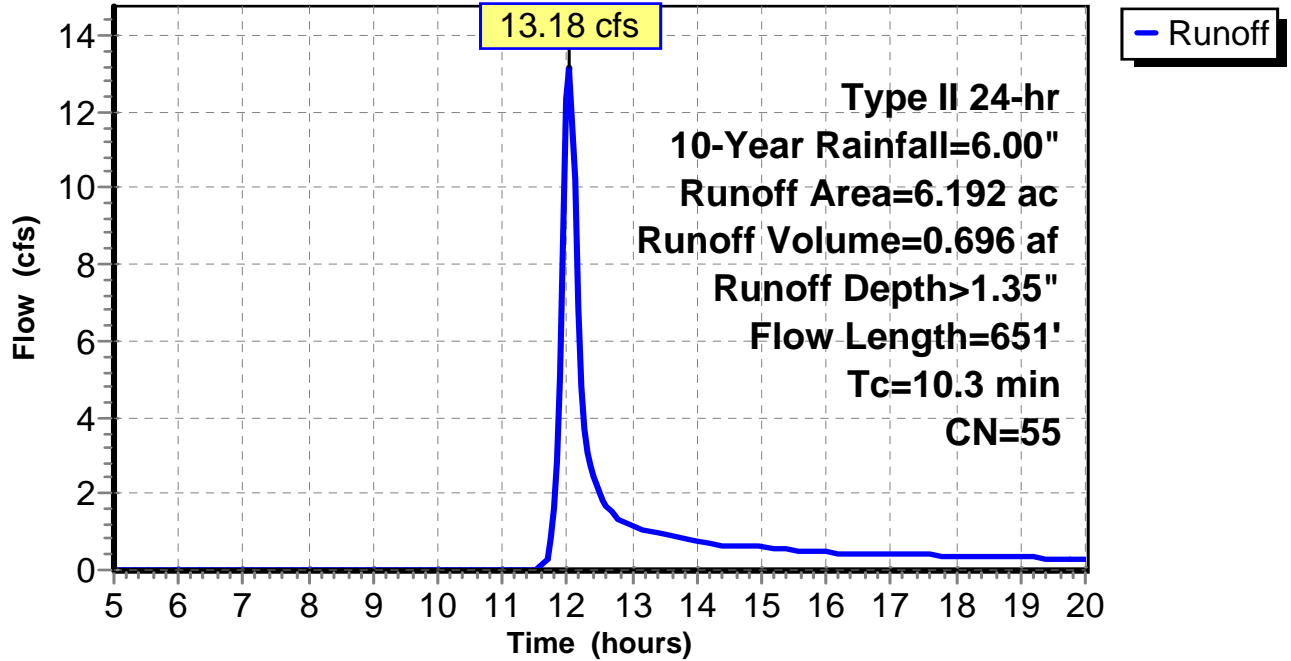
Subcatchment 12: C AR-509.012

Hydrograph



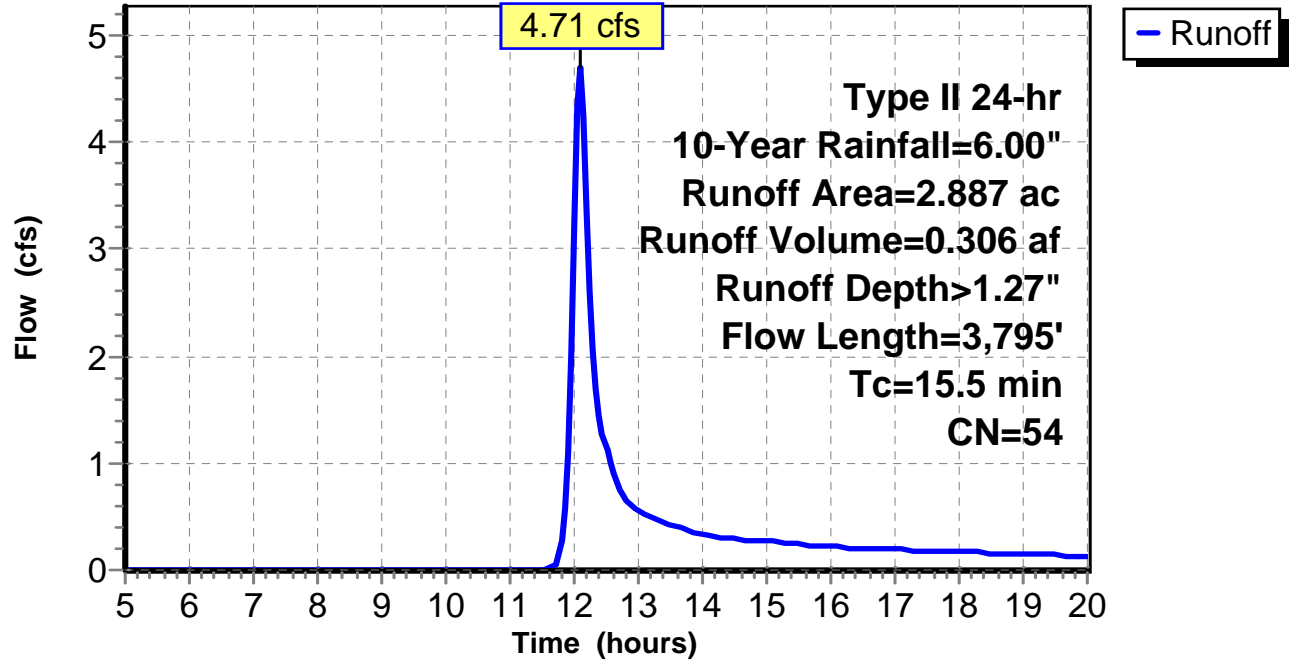
Subcatchment 13: C AR-509.013

Hydrograph



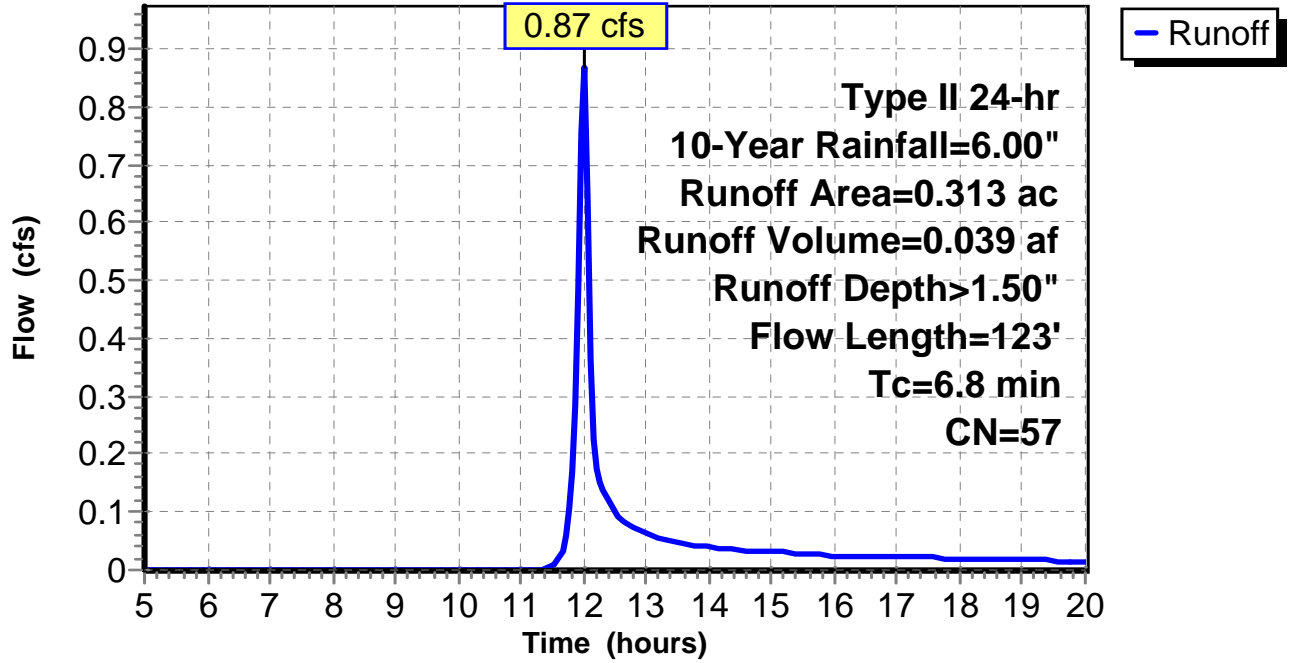
Subcatchment 14: C AR-509.014

Hydrograph



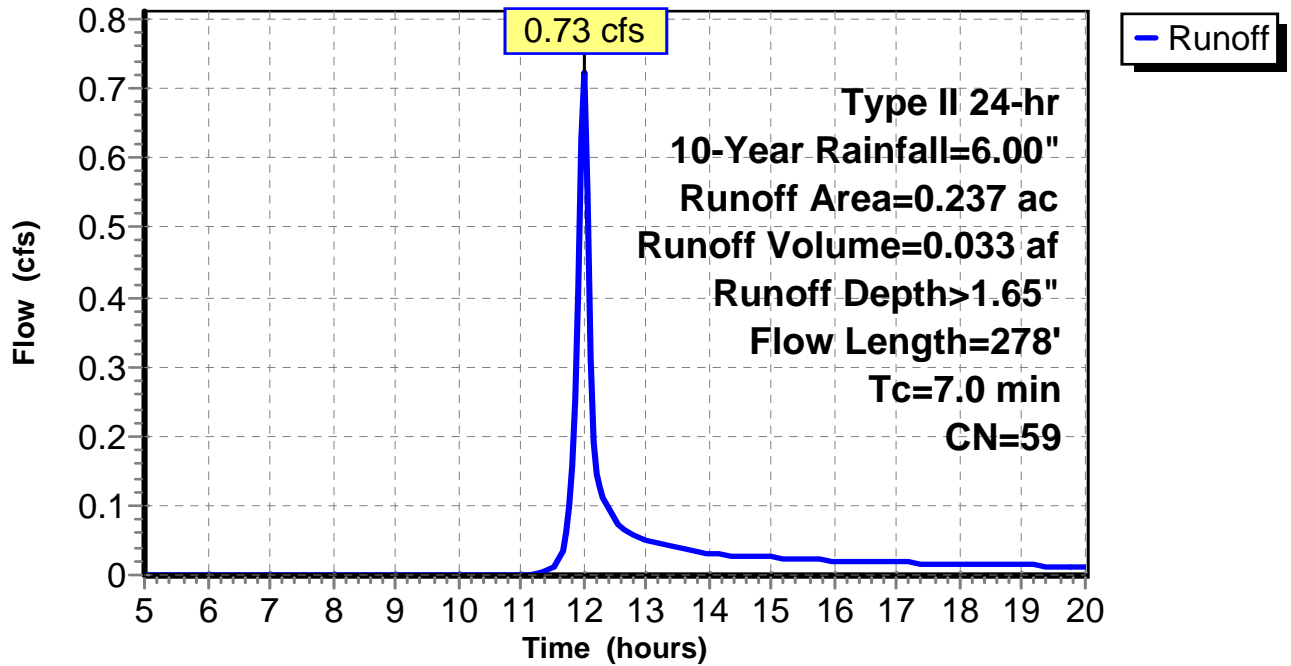
Subcatchment 15: C 210.001

Hydrograph



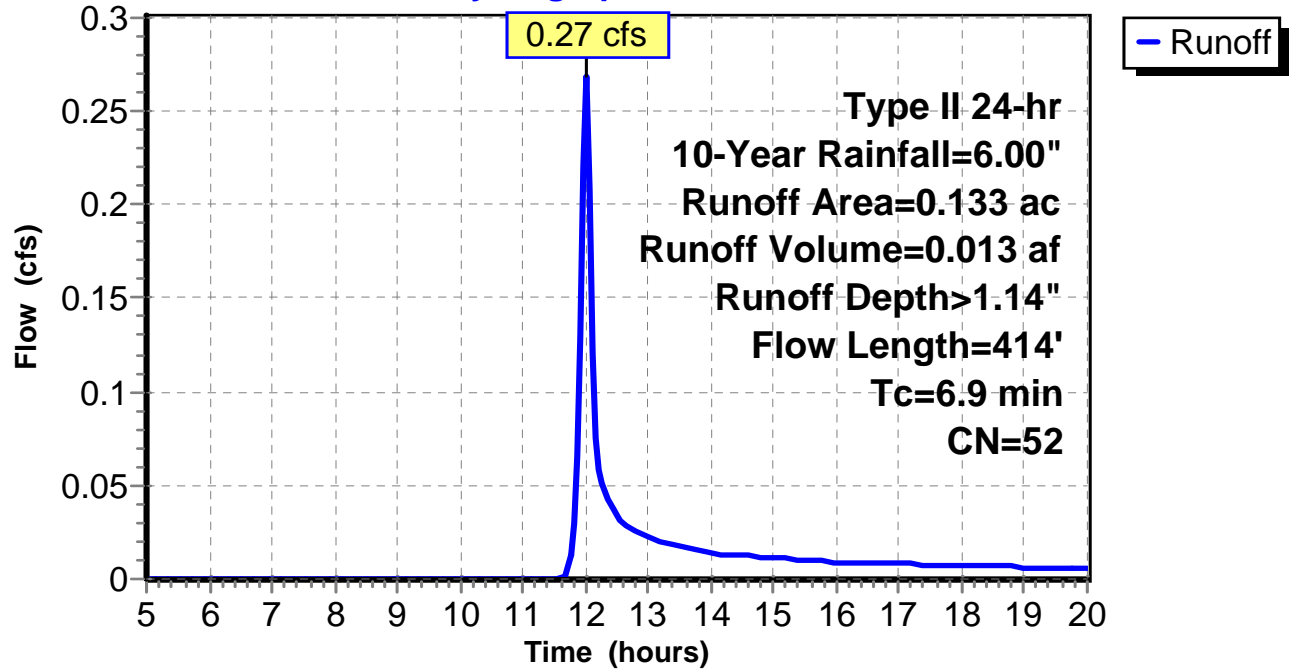
Subcatchment 16: C 210.002

Hydrograph



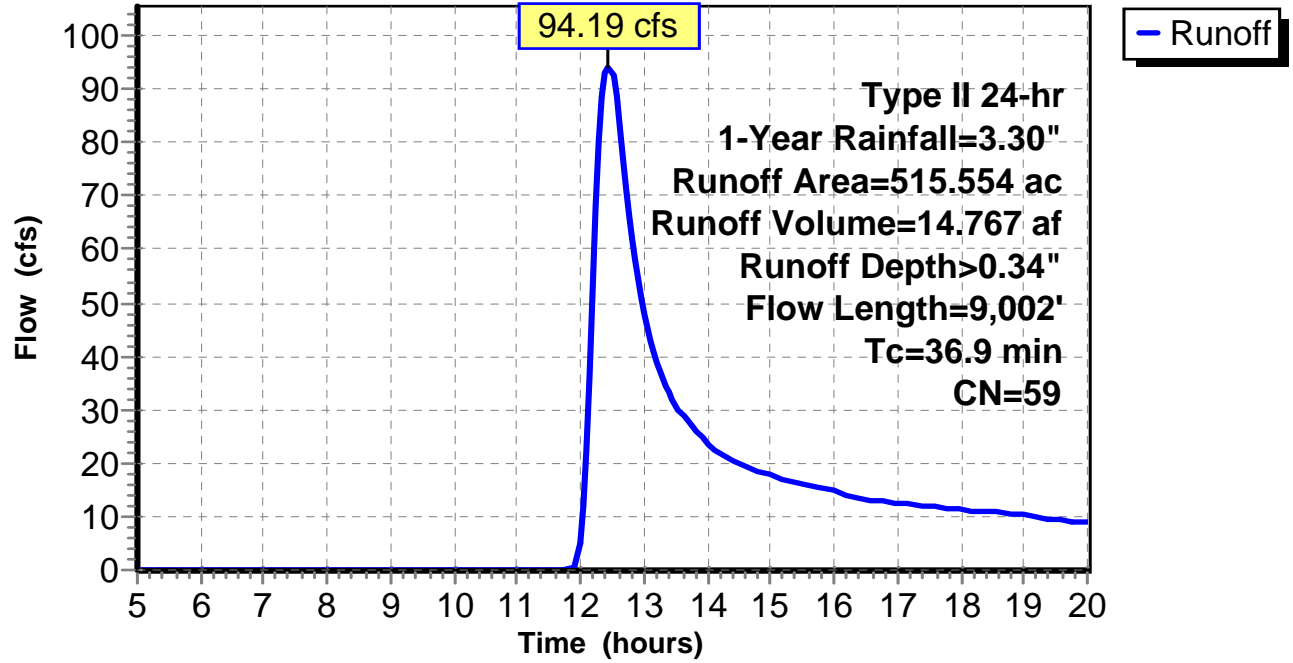
Subcatchment 17: C 210.003

Hydrograph



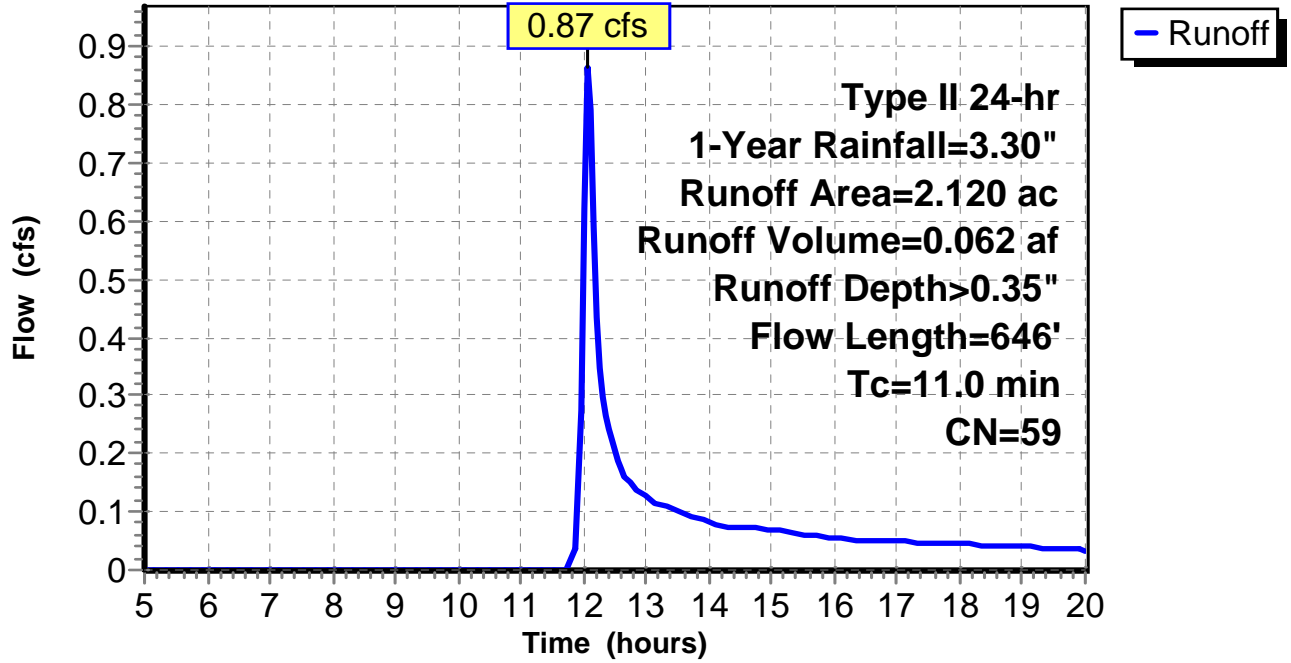
Subcatchment 1: C 214.001

Hydrograph



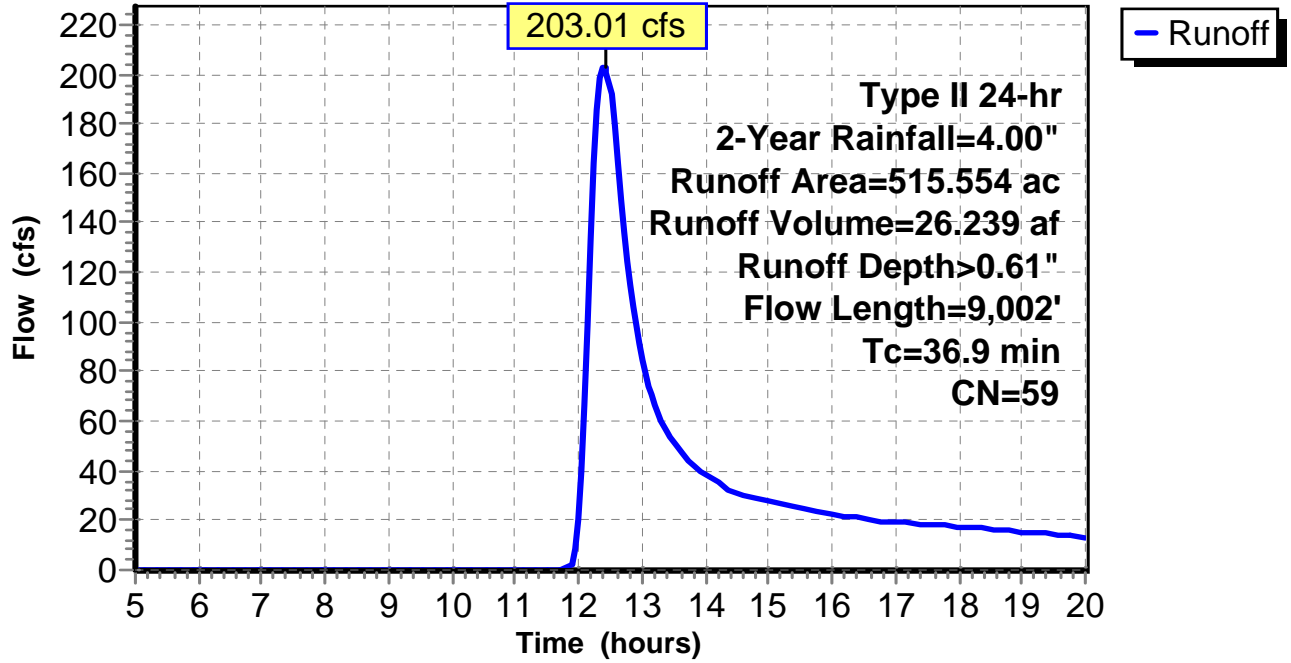
Subcatchment 2: C 214.002

Hydrograph



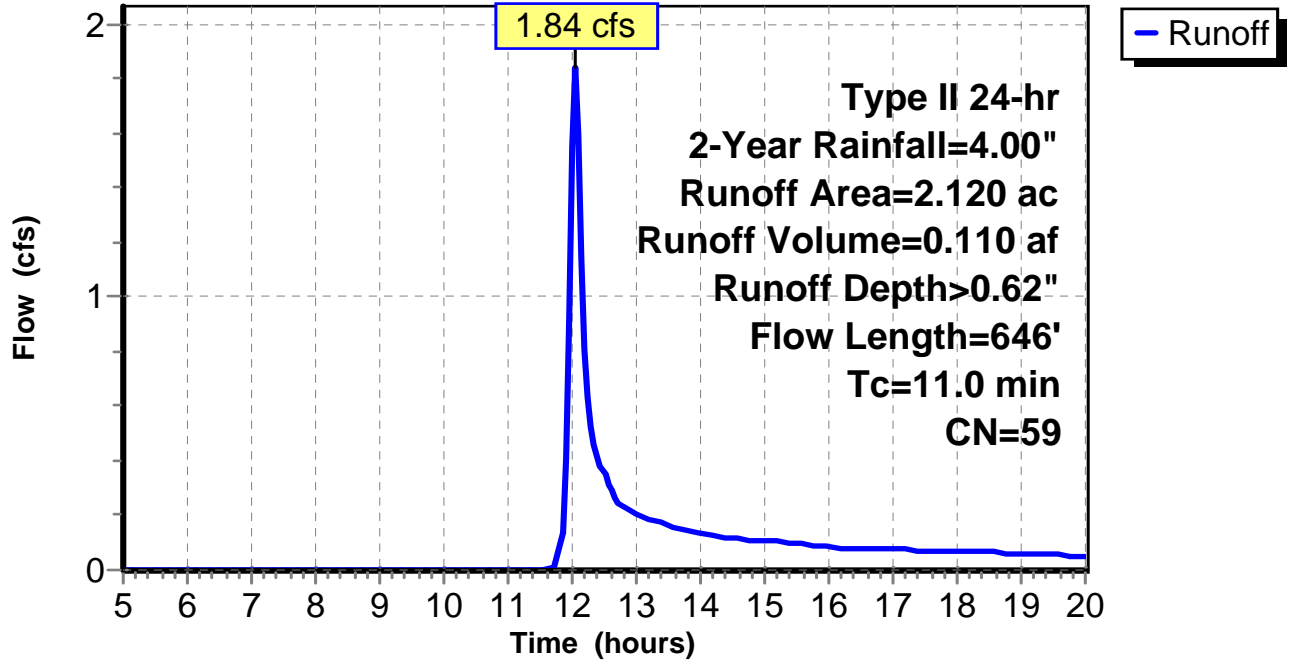
Subcatchment 1: C 214.001

Hydrograph



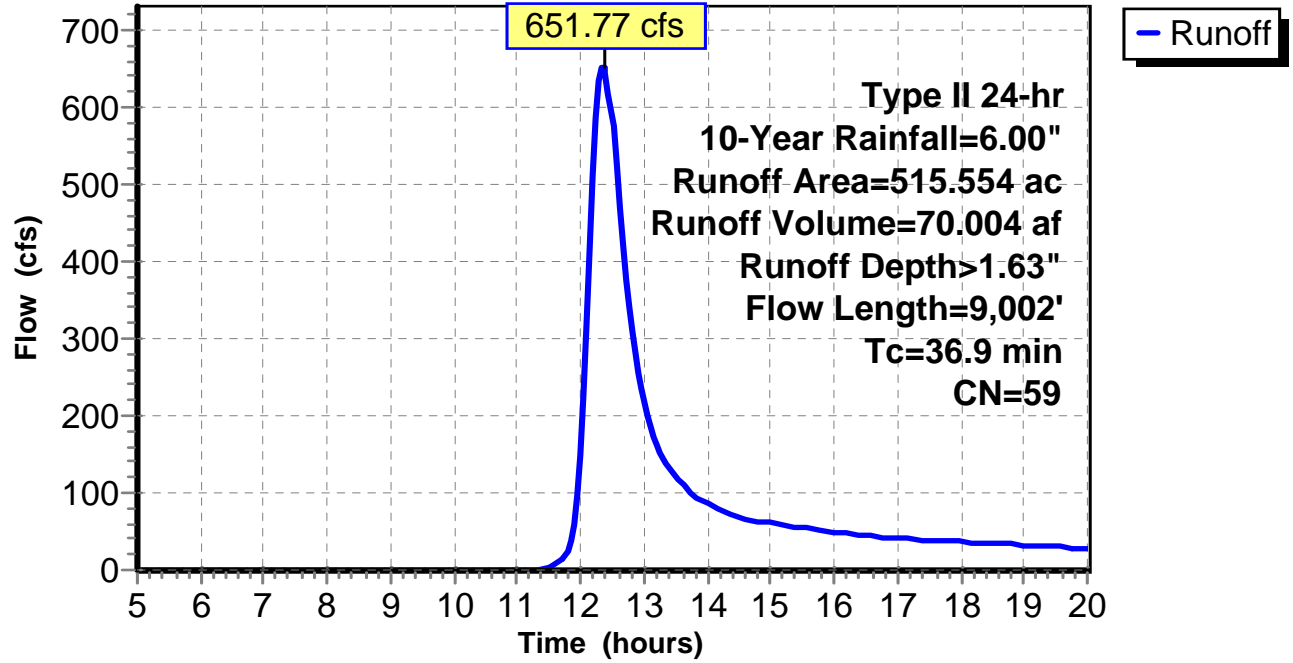
Subcatchment 2: C 214.002

Hydrograph



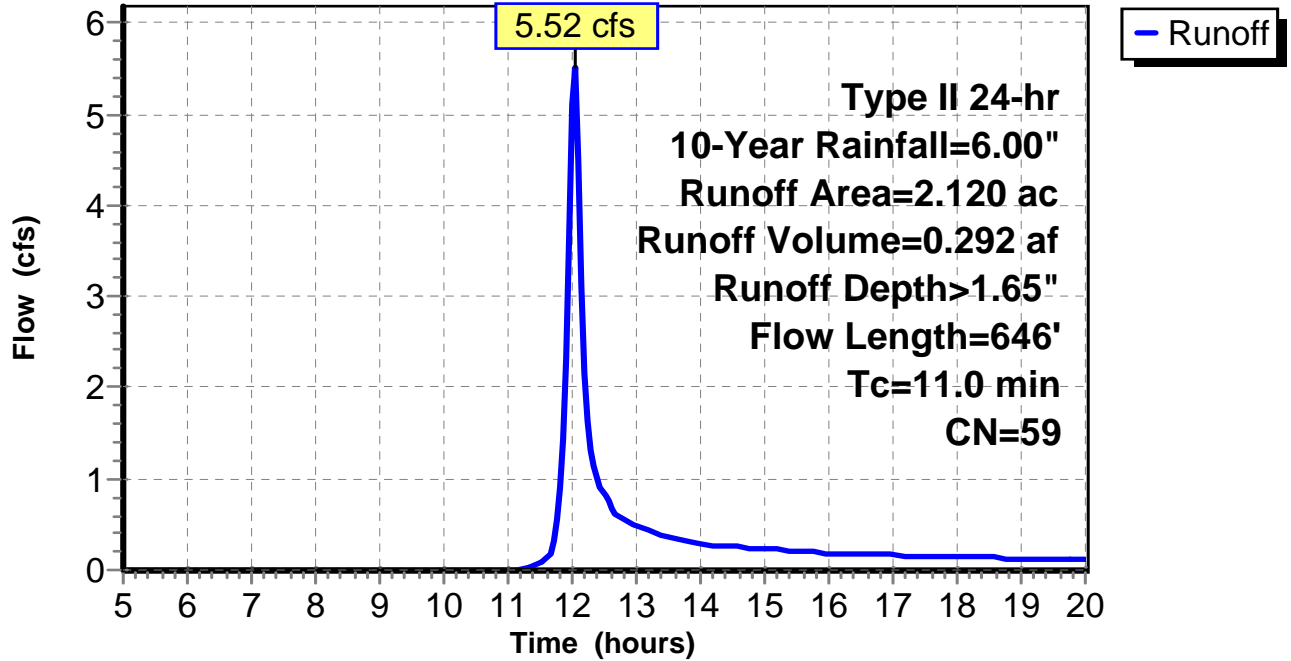
Subcatchment 1: C 214.001

Hydrograph



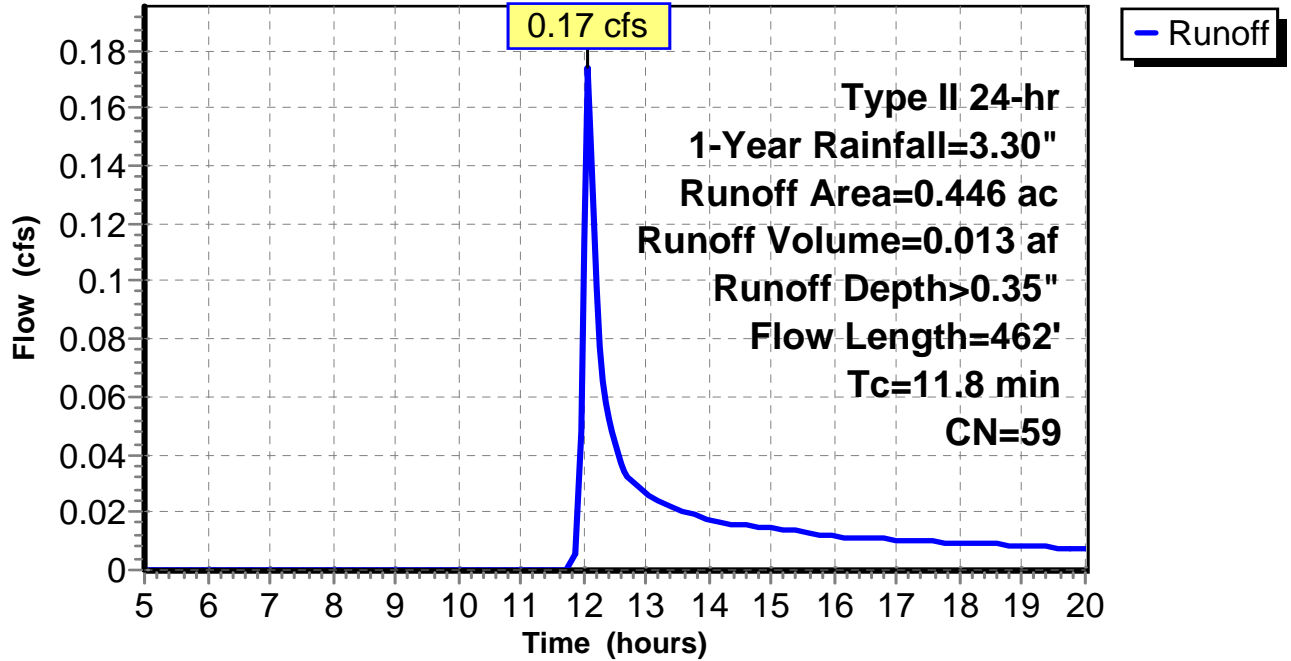
Subcatchment 2: C 214.002

Hydrograph



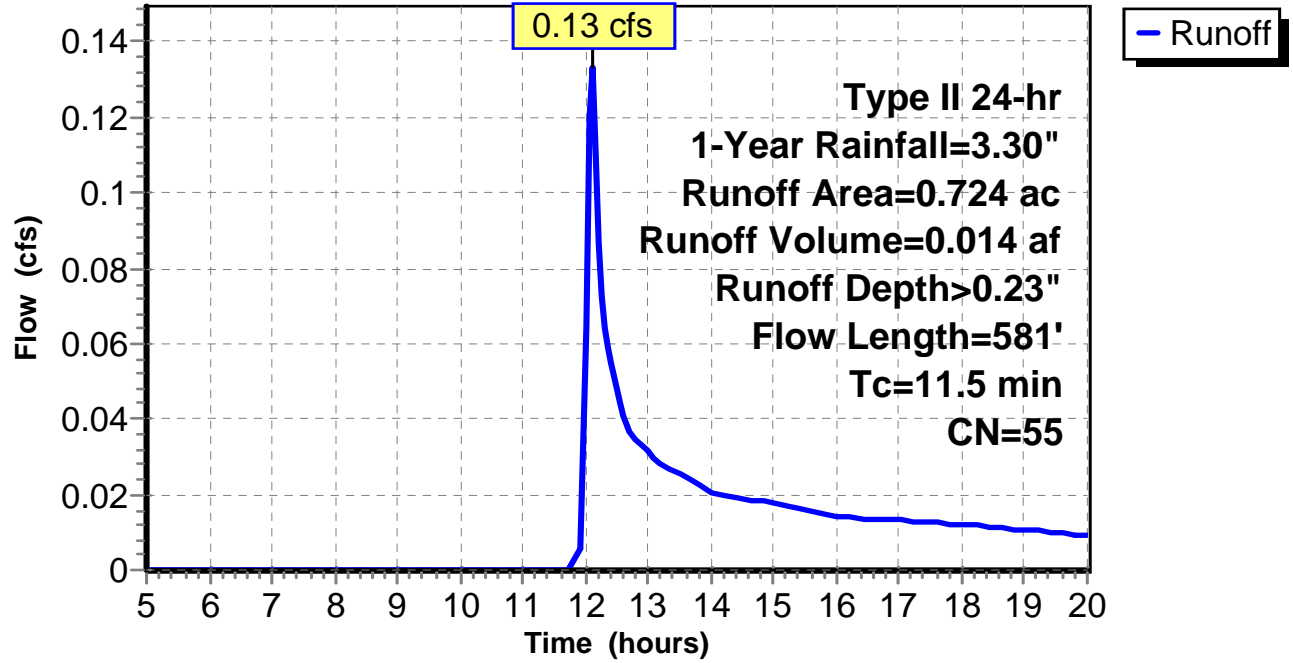
Subcatchment 1: C 215.001

Hydrograph



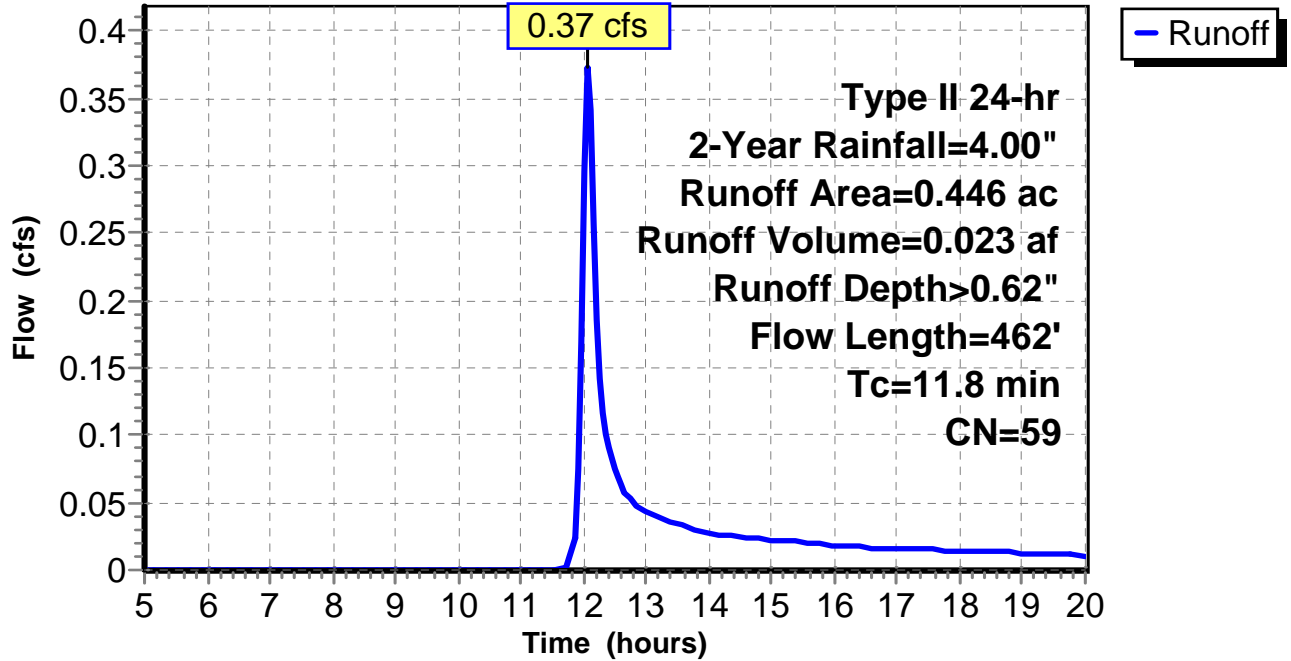
Subcatchment 2: C 215.002

Hydrograph



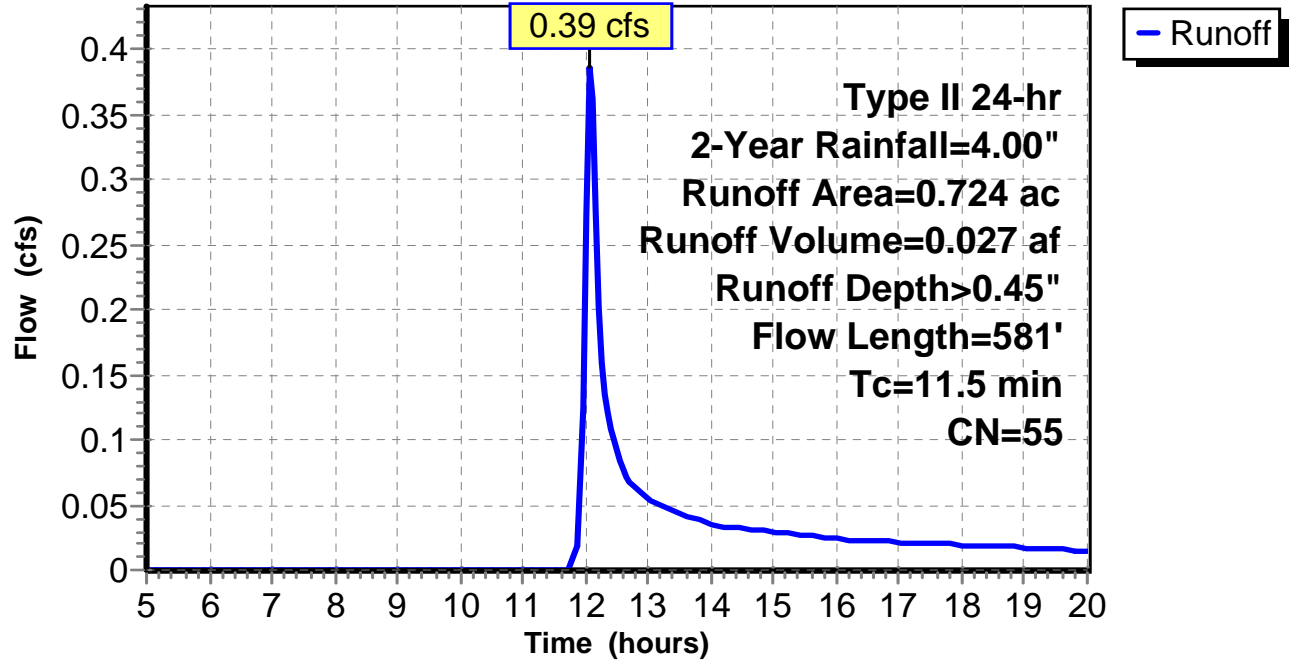
Subcatchment 1: C 215.001

Hydrograph



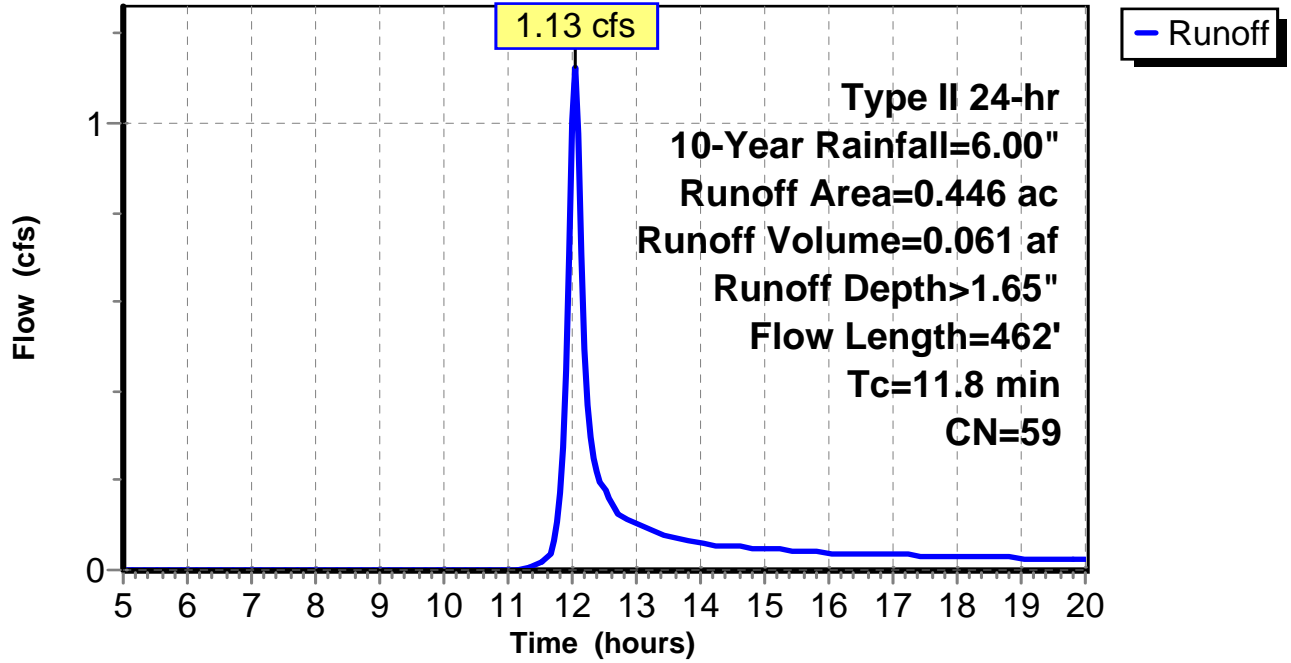
Subcatchment 2: C 215.002

Hydrograph



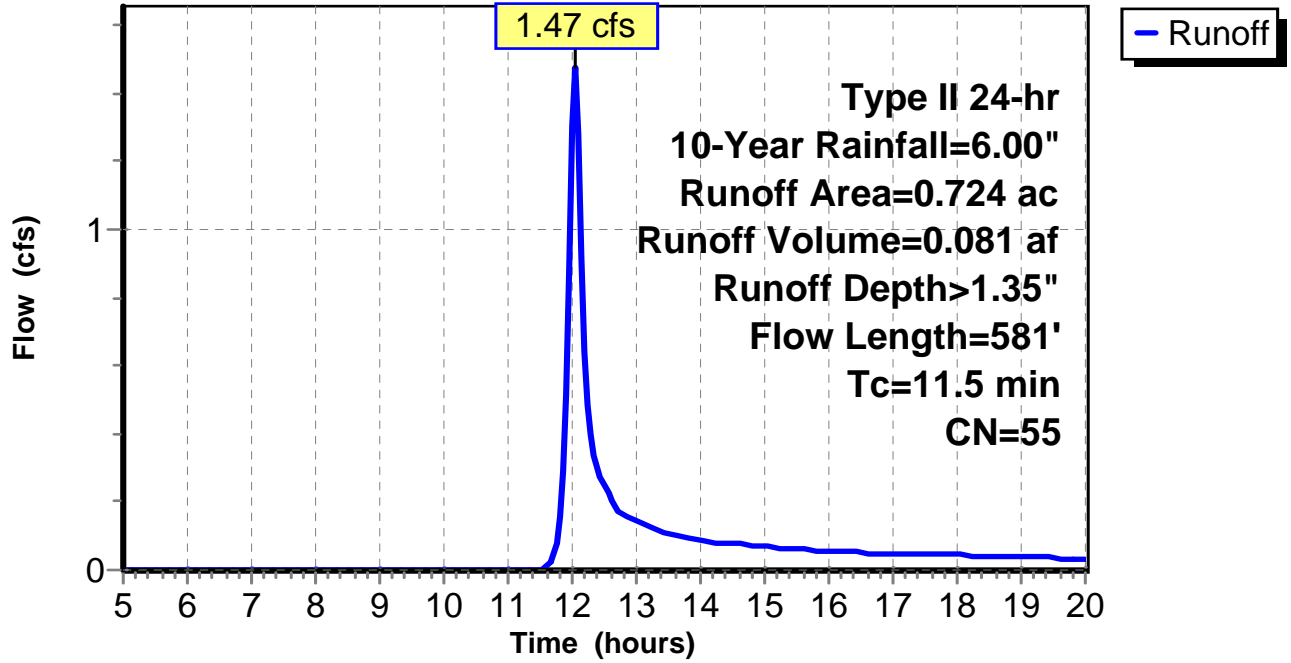
Subcatchment 1: C 215.001

Hydrograph



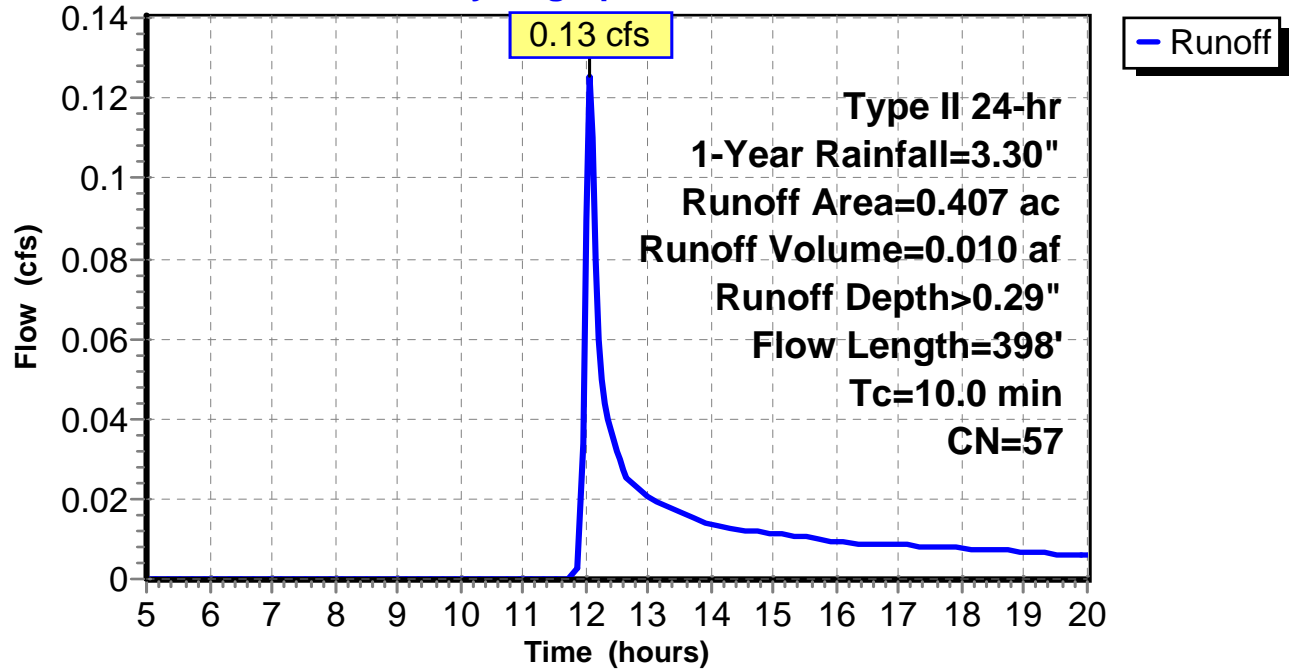
Subcatchment 2: C 215.002

Hydrograph



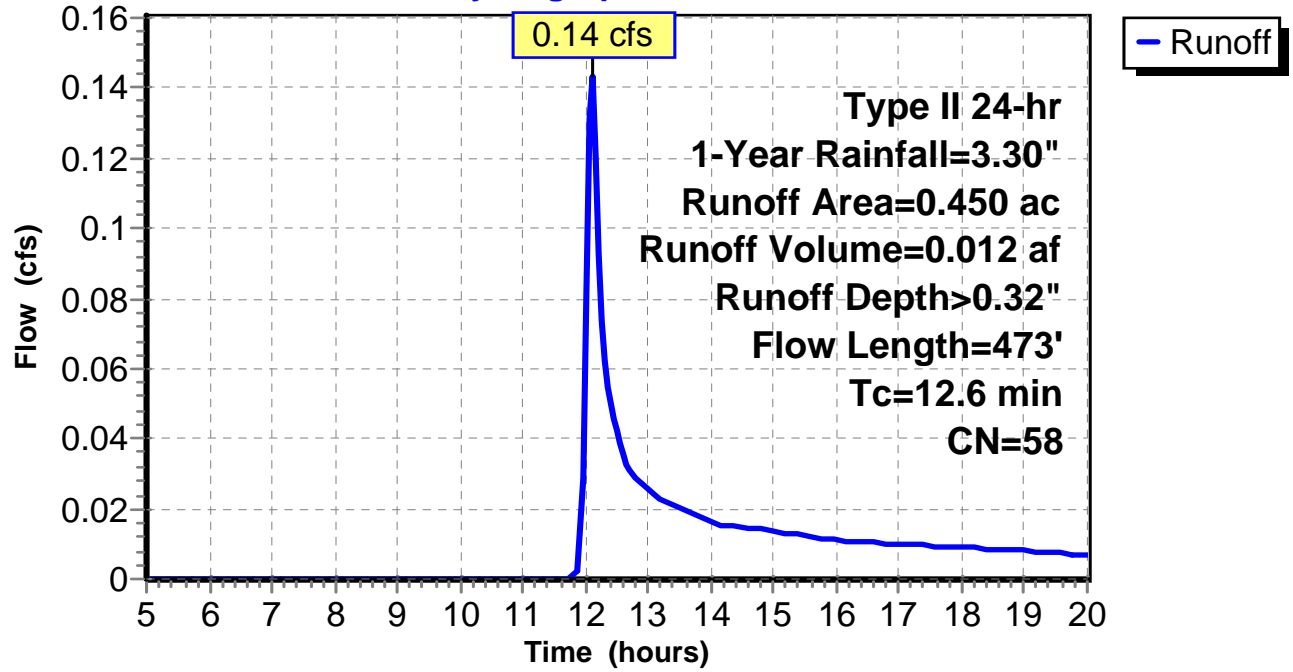
Subcatchment 1: C 215.003

Hydrograph



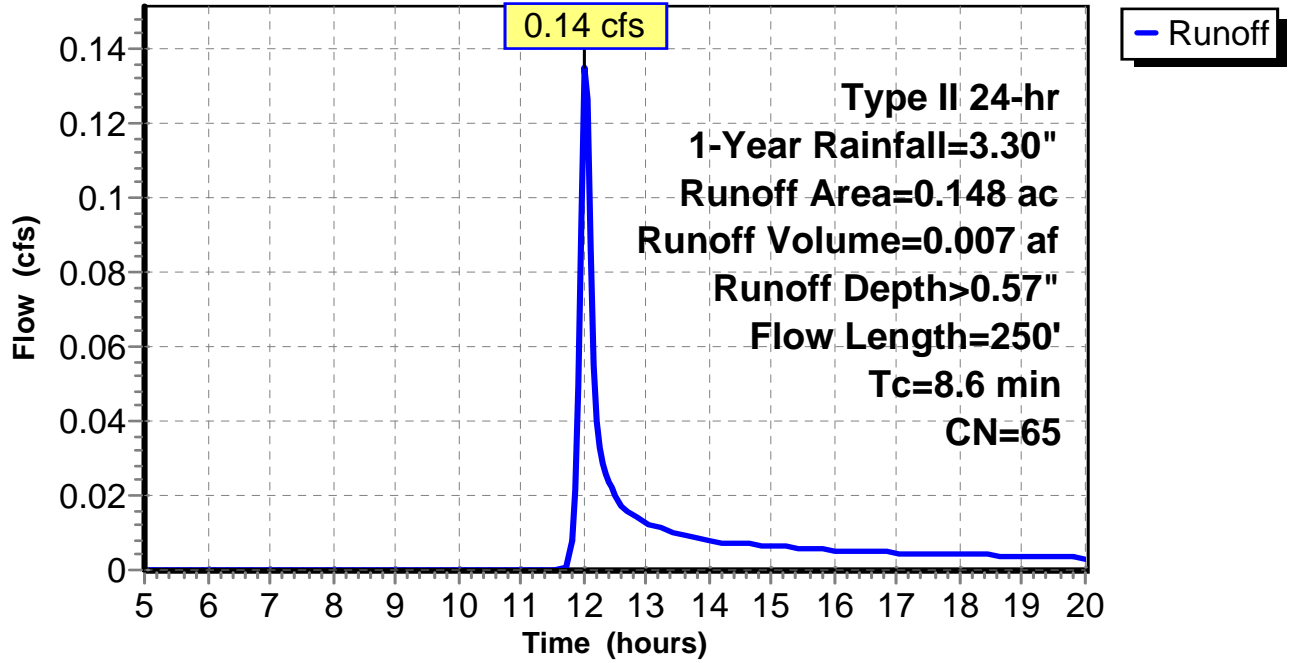
Subcatchment 2: C 215.004

Hydrograph



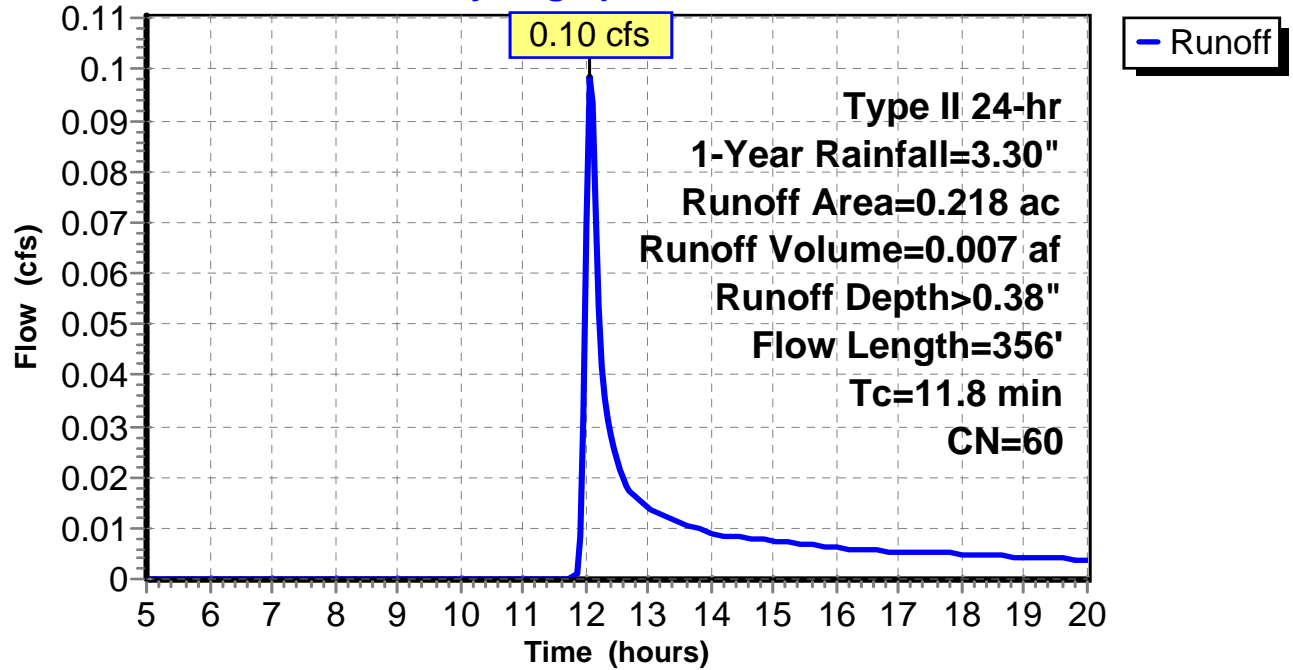
Subcatchment 3: C 215.005

Hydrograph



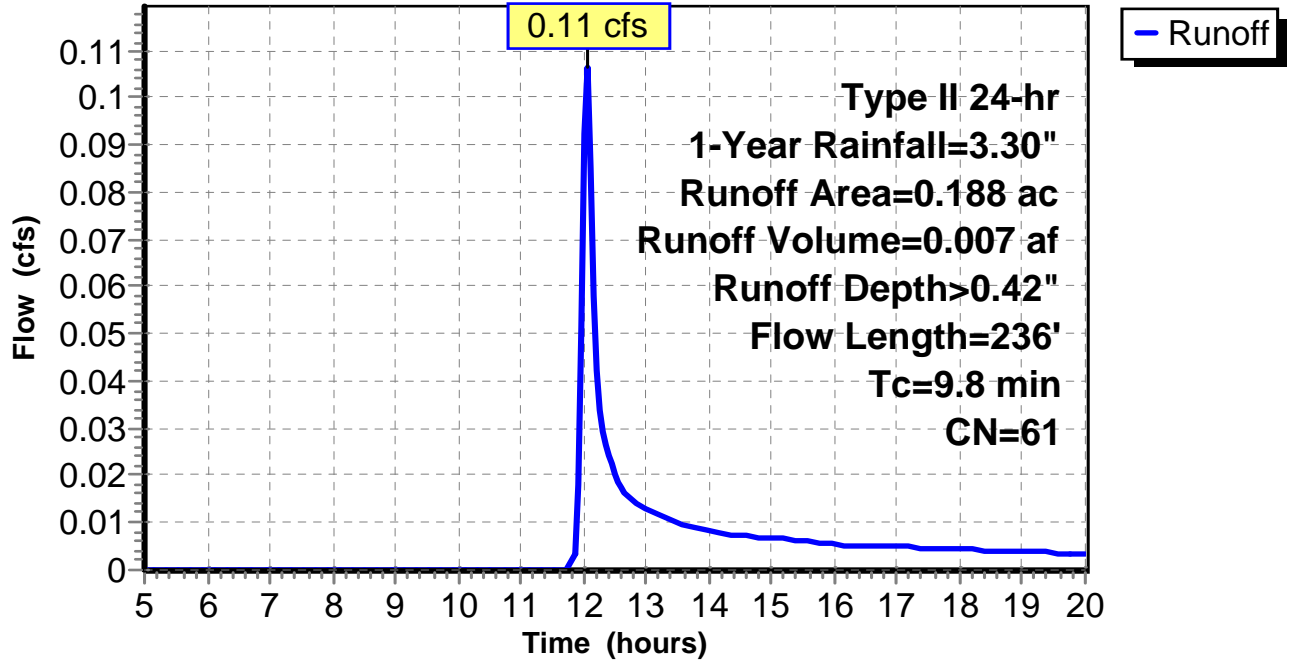
Subcatchment 4: C 215.006

Hydrograph



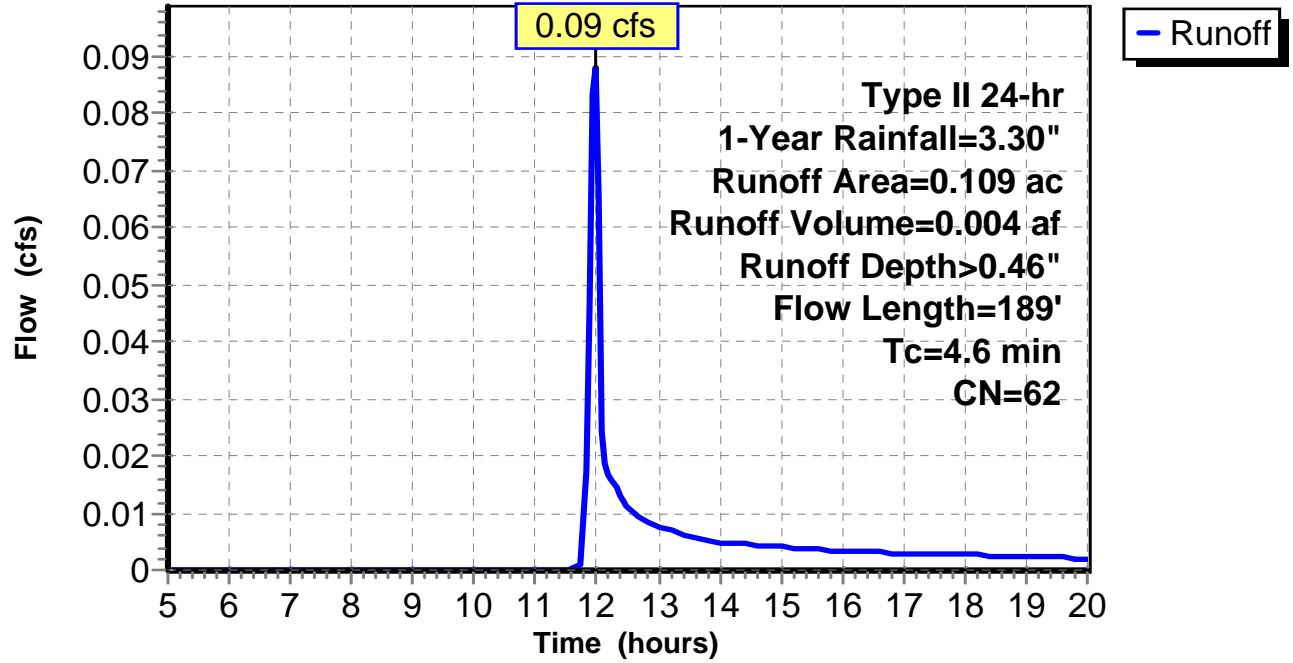
Subcatchment 5: C 215.007

Hydrograph



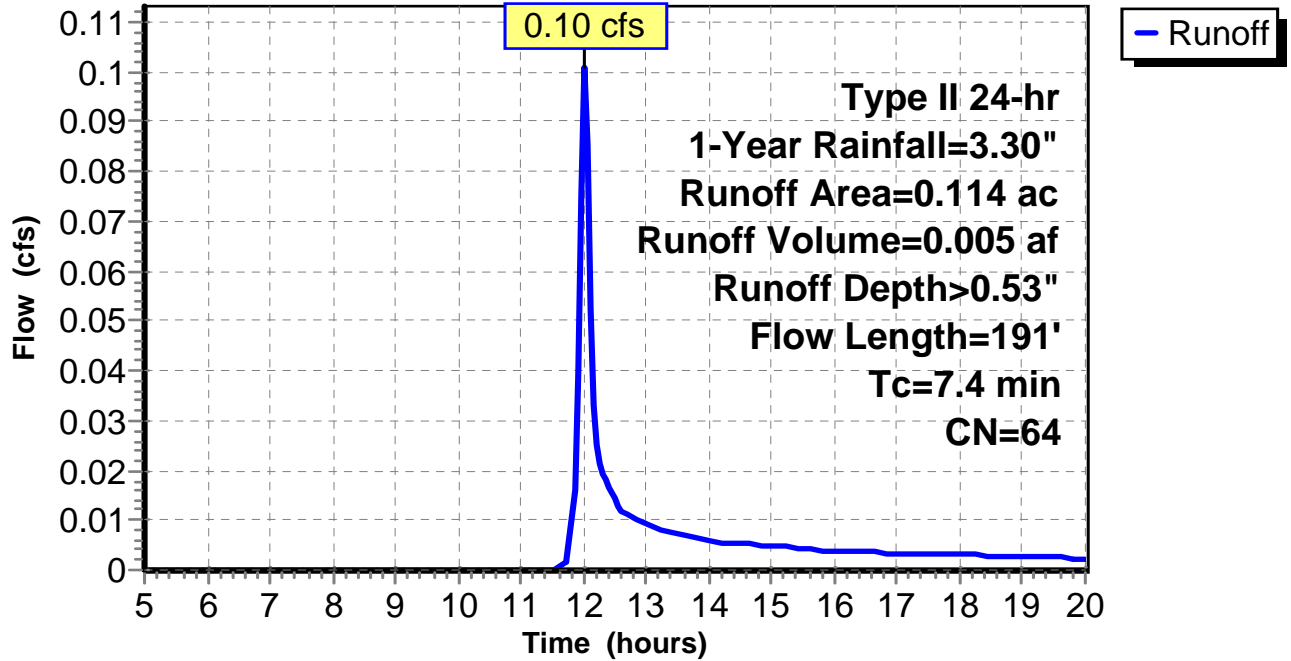
Subcatchment 6: C 215.008

Hydrograph



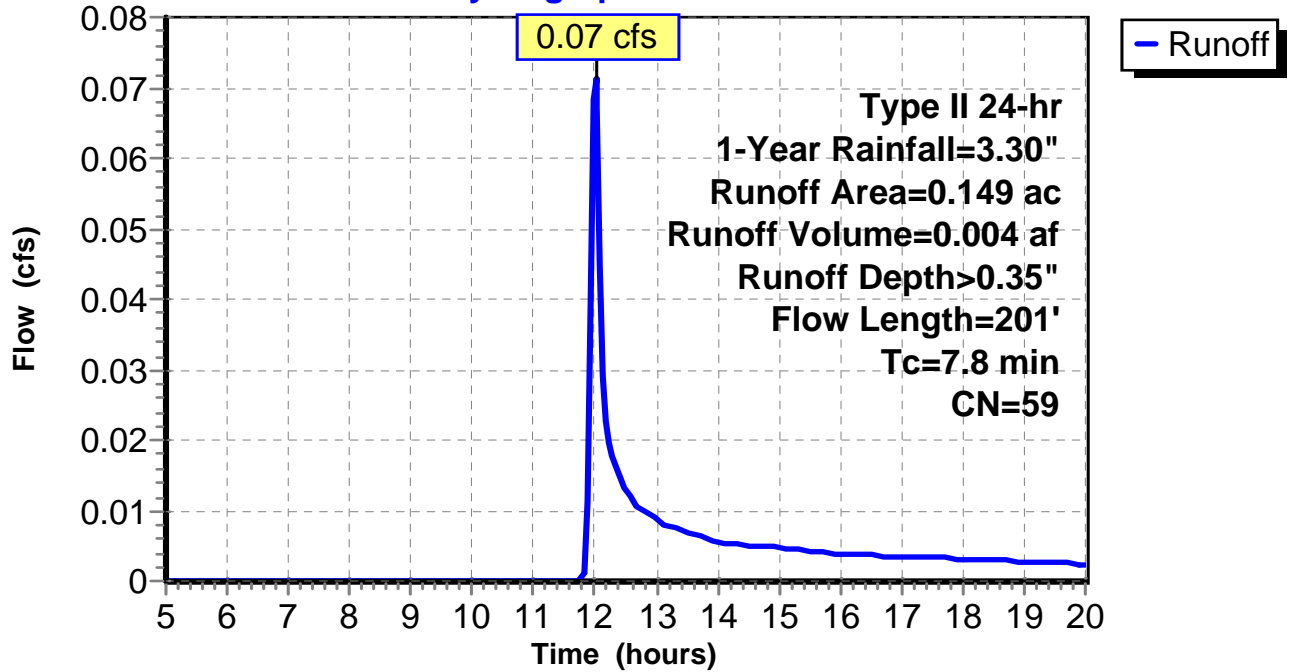
Subcatchment 7: C 215.009

Hydrograph



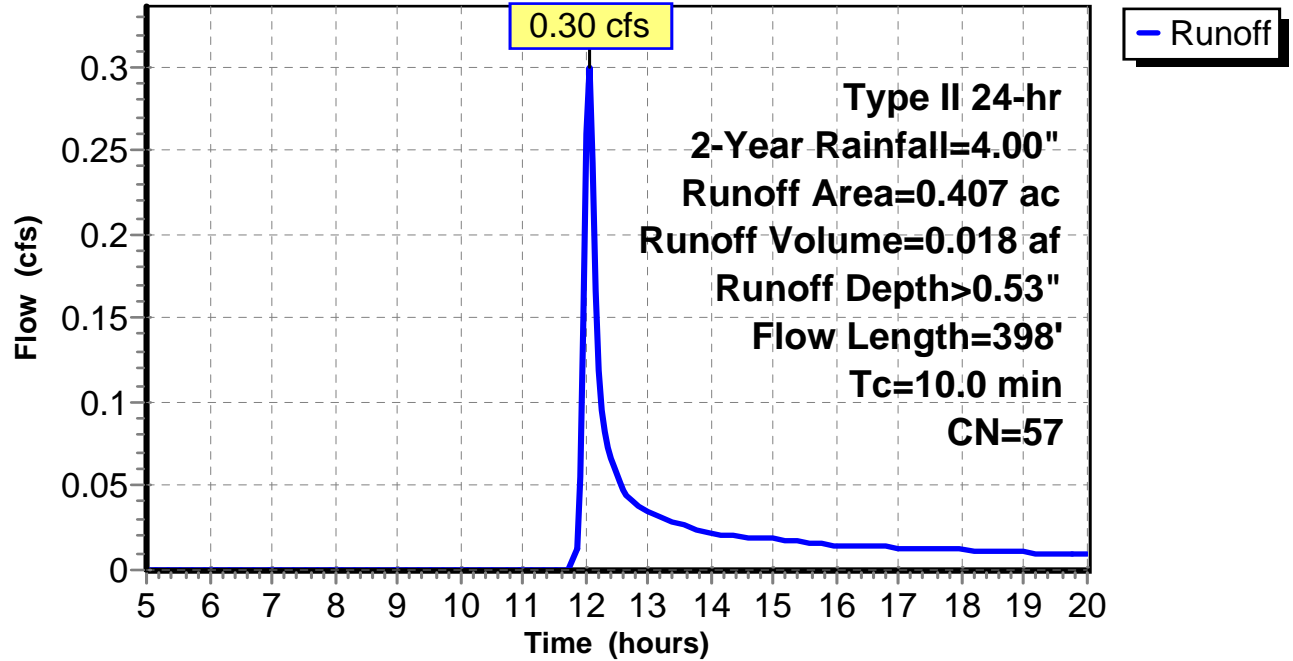
Subcatchment 8: C 215.010

Hydrograph



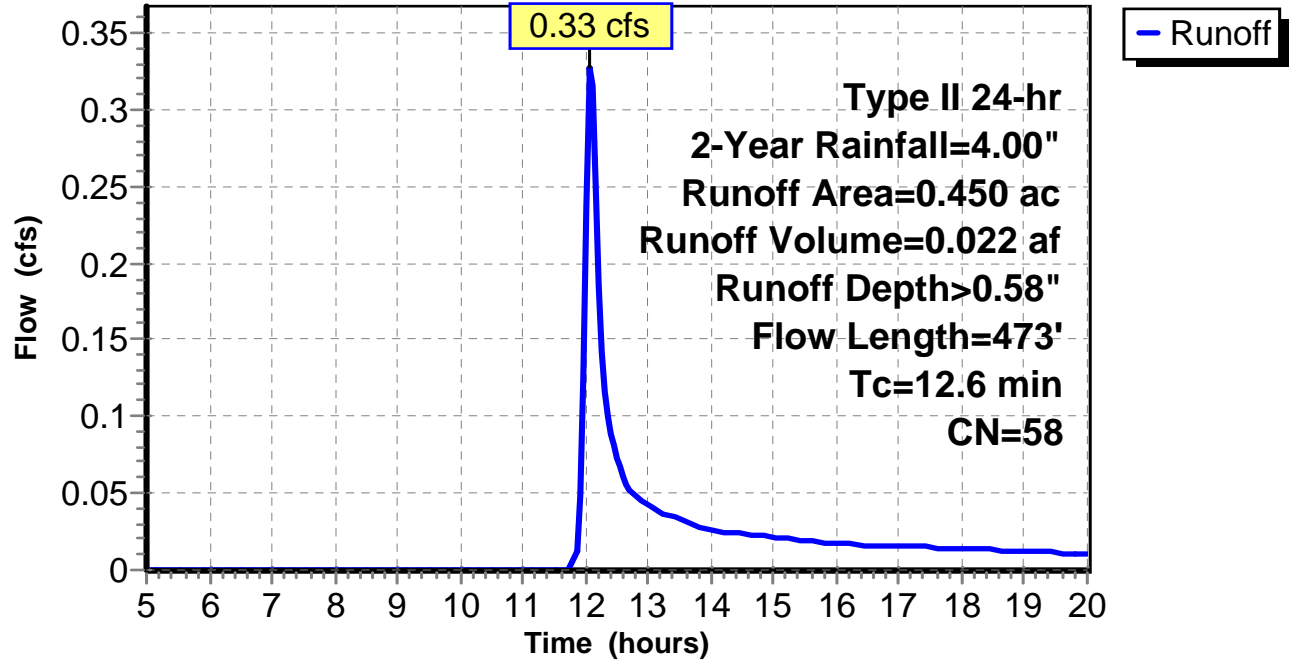
Subcatchment 1: C 215.003

Hydrograph



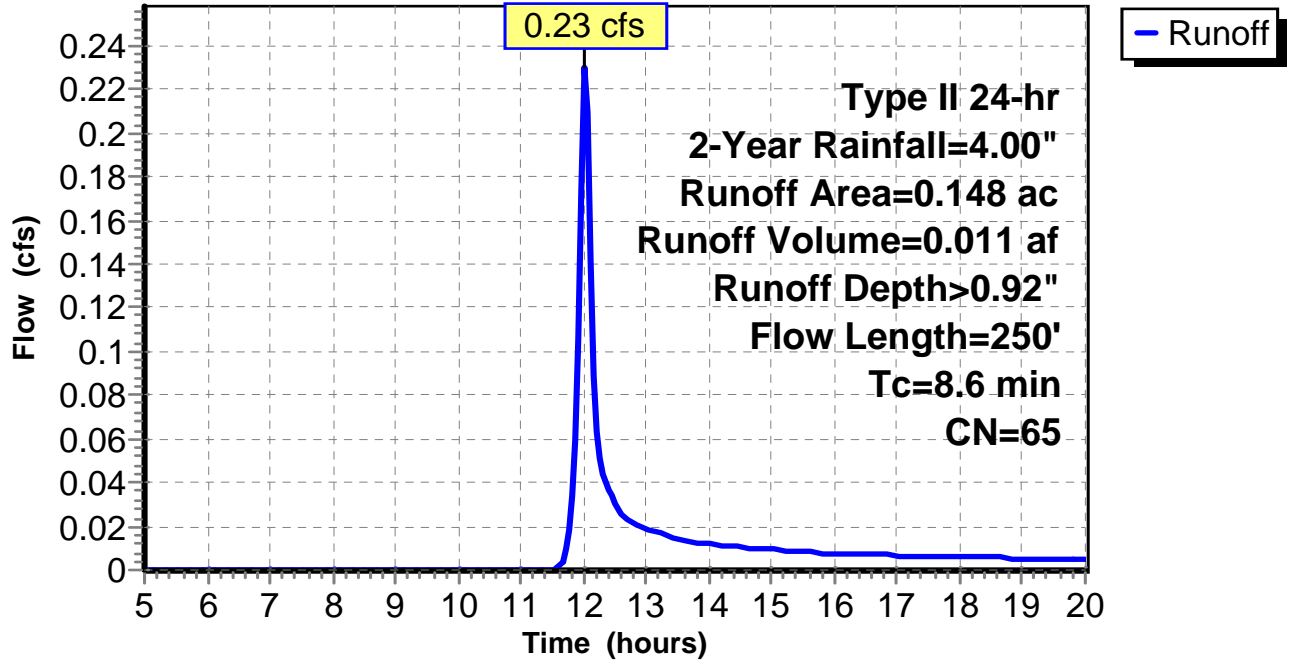
Subcatchment 2: C 215.004

Hydrograph



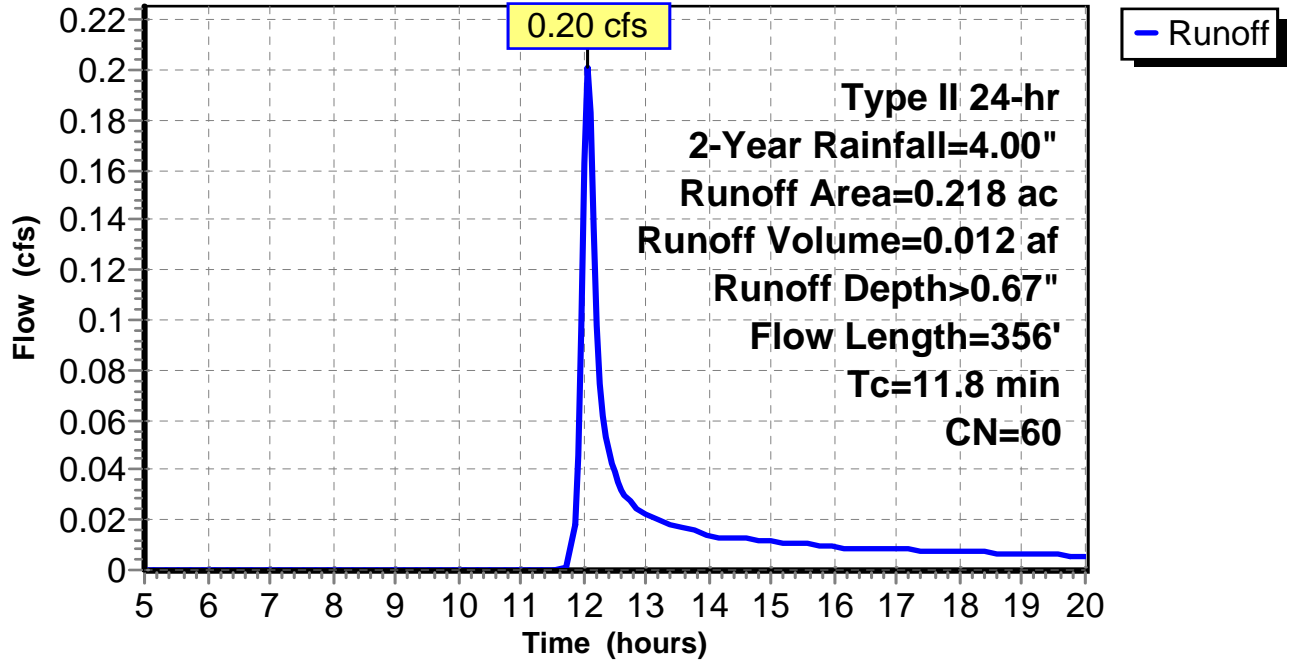
Subcatchment 3: C 215.005

Hydrograph



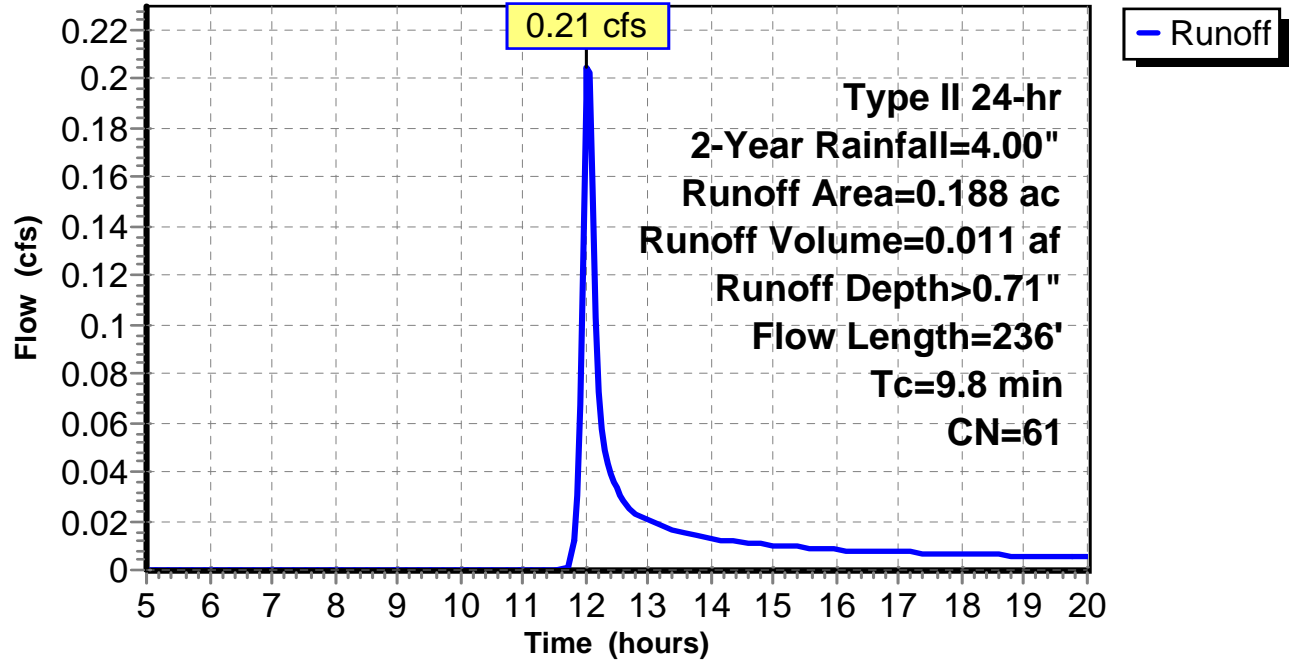
Subcatchment 4: C 215.006

Hydrograph



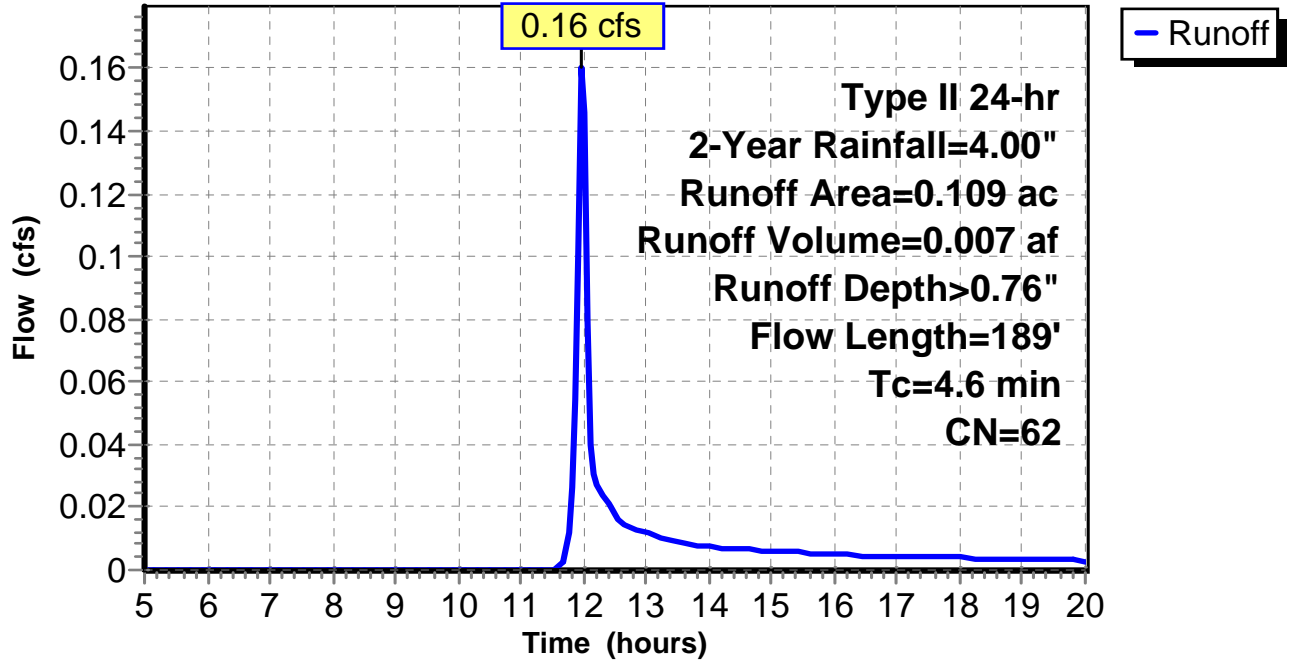
Subcatchment 5: C 215.007

Hydrograph



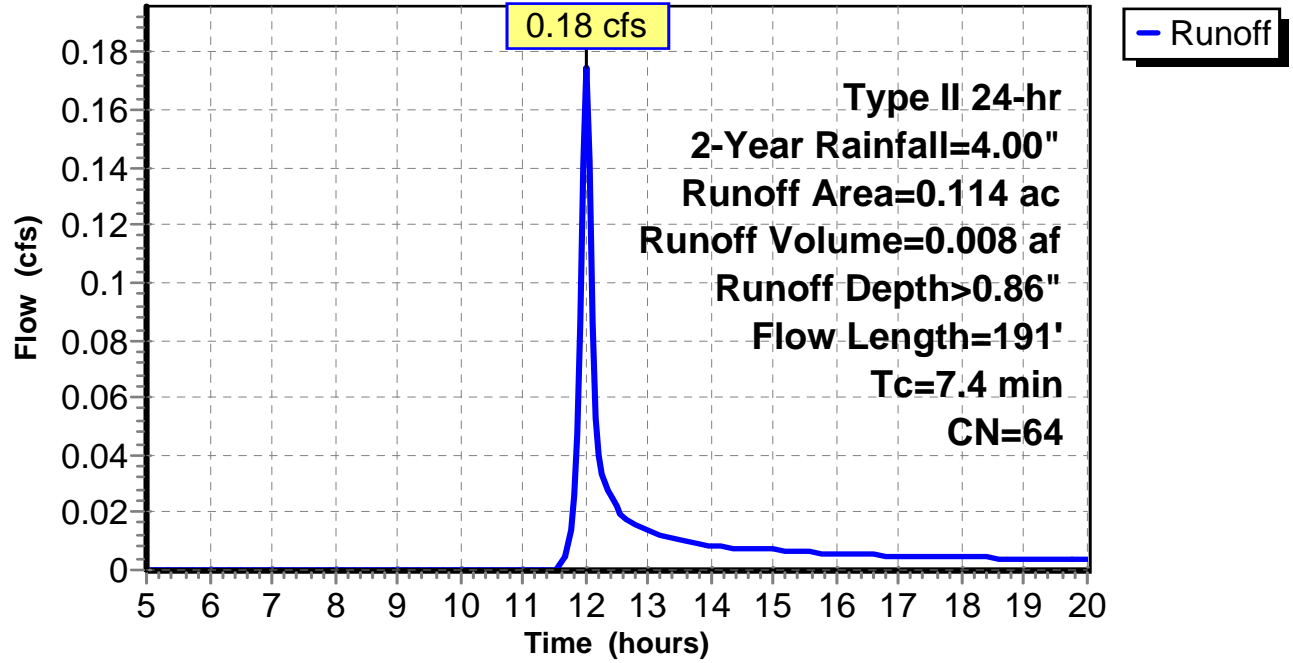
Subcatchment 6: C 215.008

Hydrograph



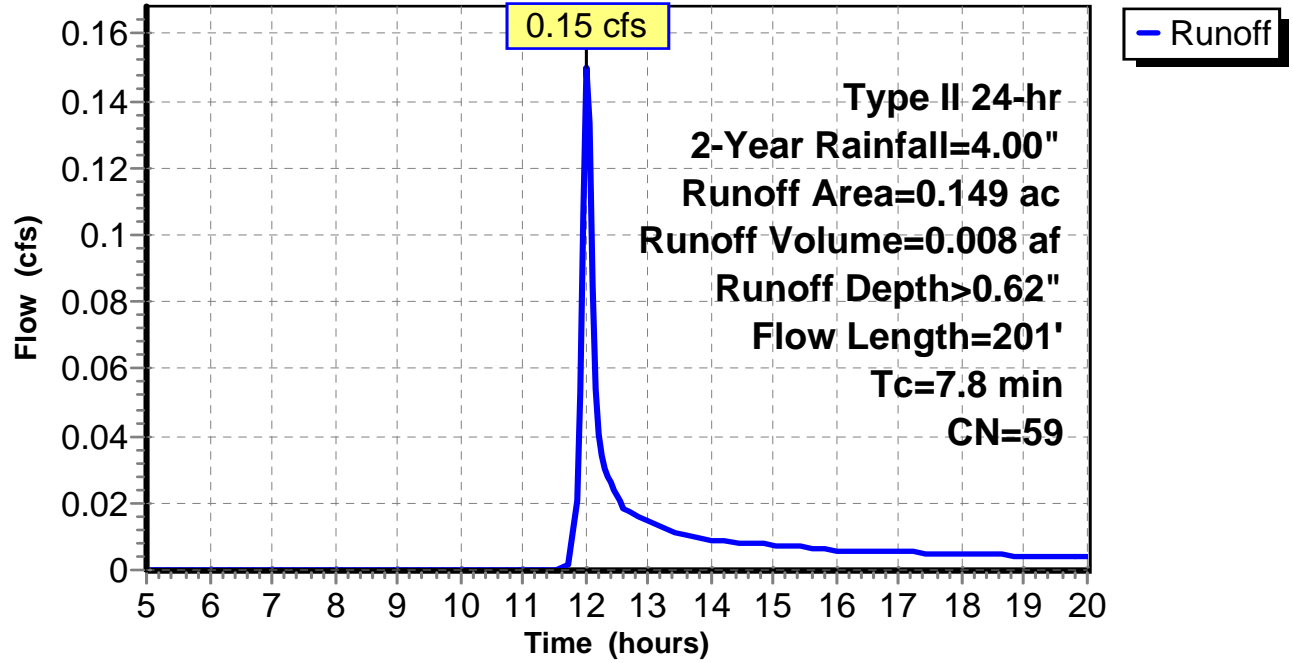
Subcatchment 7: C 215.009

Hydrograph



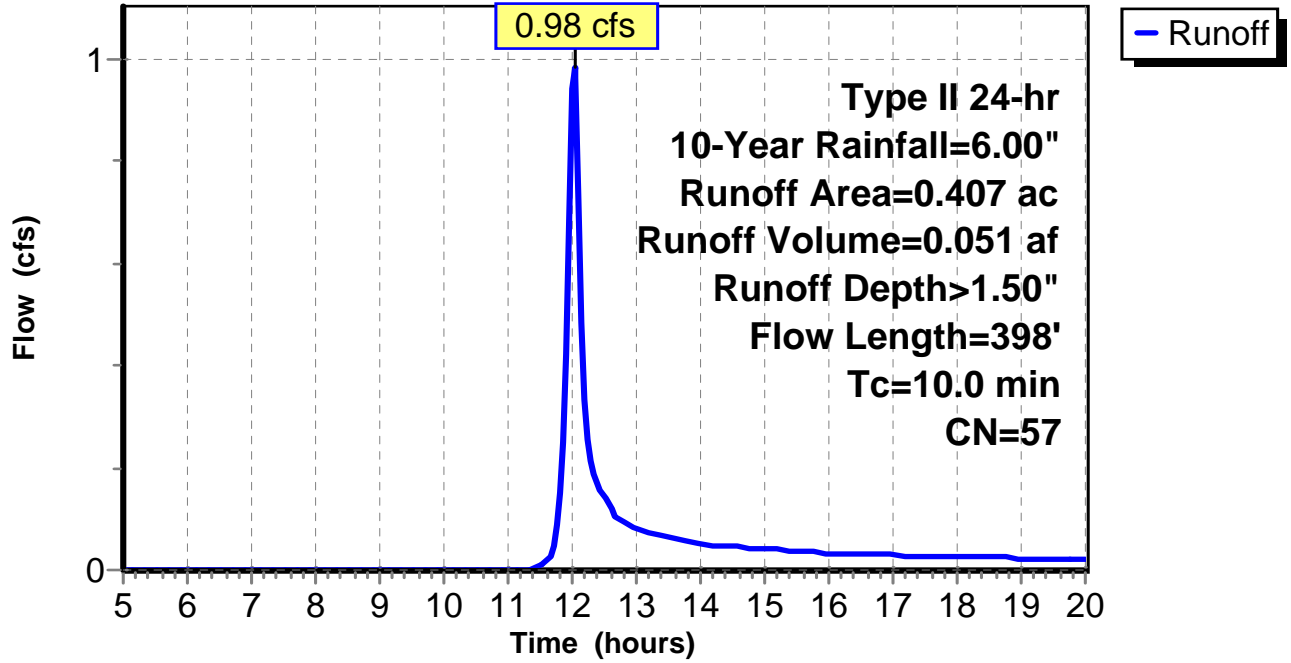
Subcatchment 8: C 215.010

Hydrograph



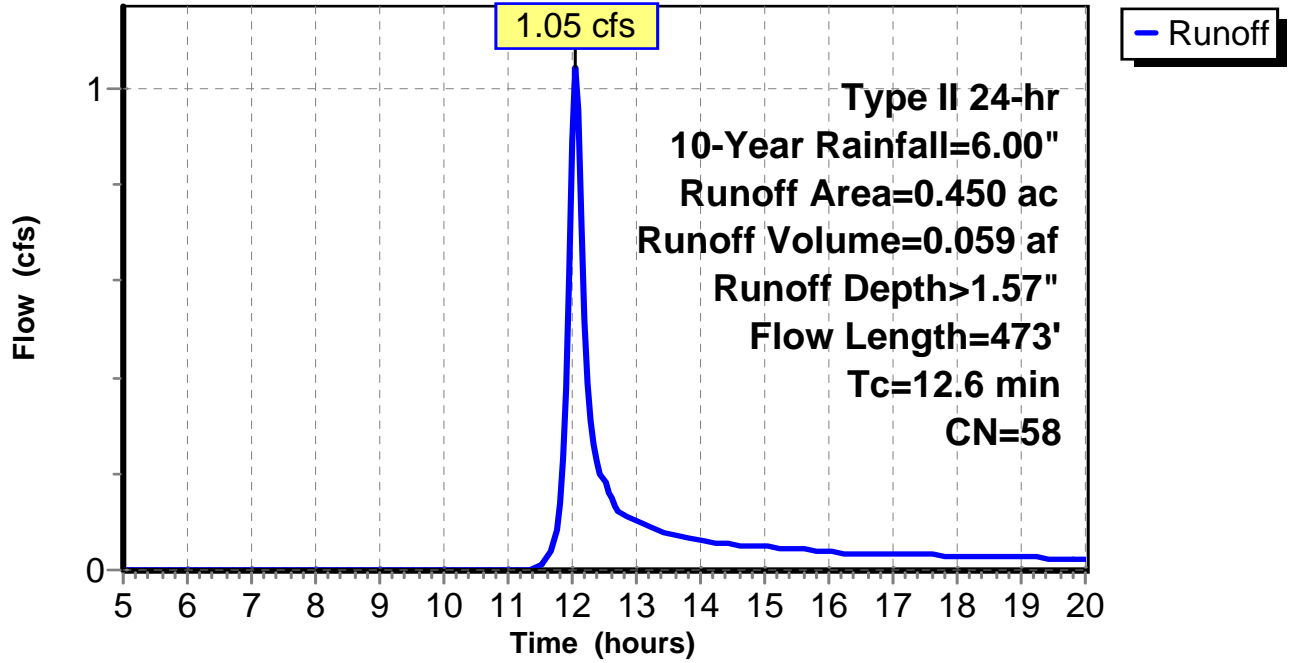
Subcatchment 1: C 215.003

Hydrograph



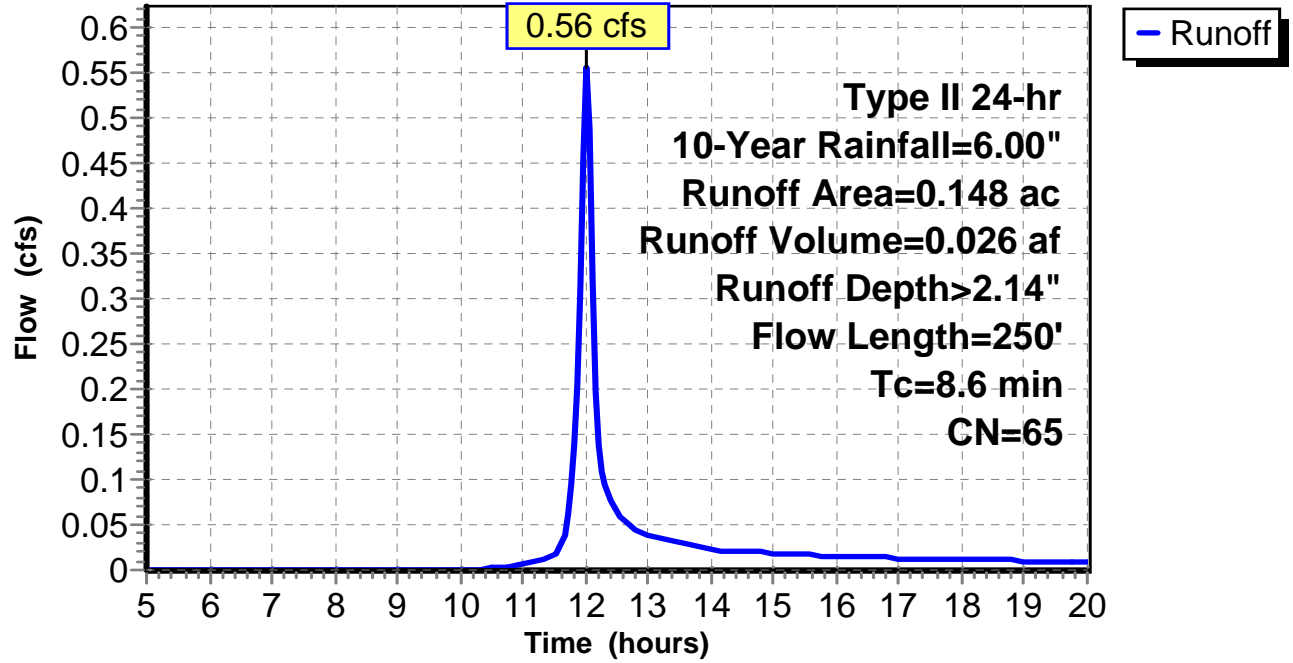
Subcatchment 2: C 215.004

Hydrograph



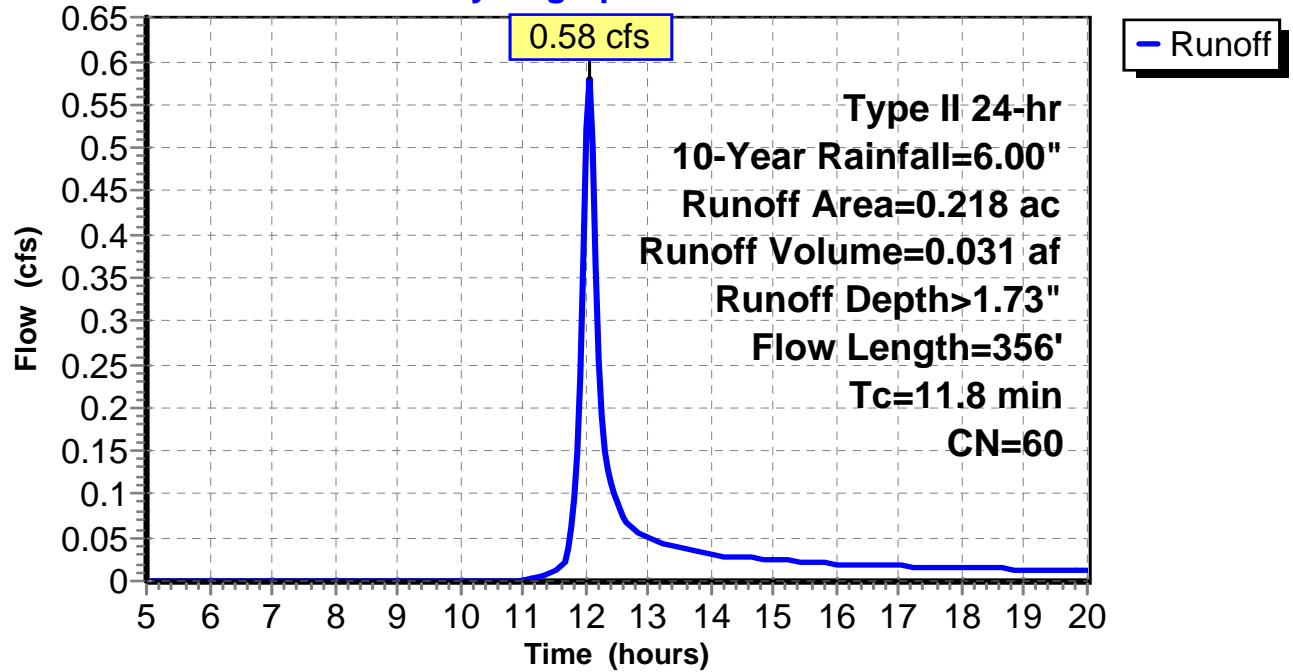
Subcatchment 3: C 215.005

Hydrograph



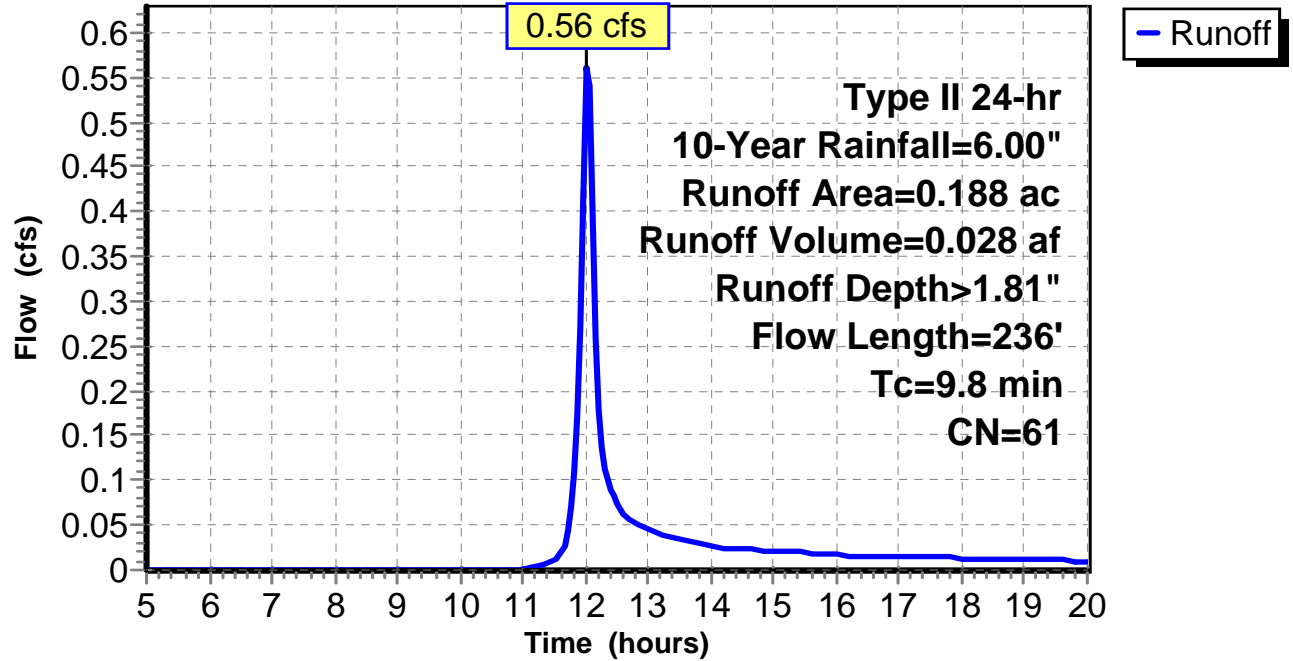
Subcatchment 4: C 215.006

Hydrograph



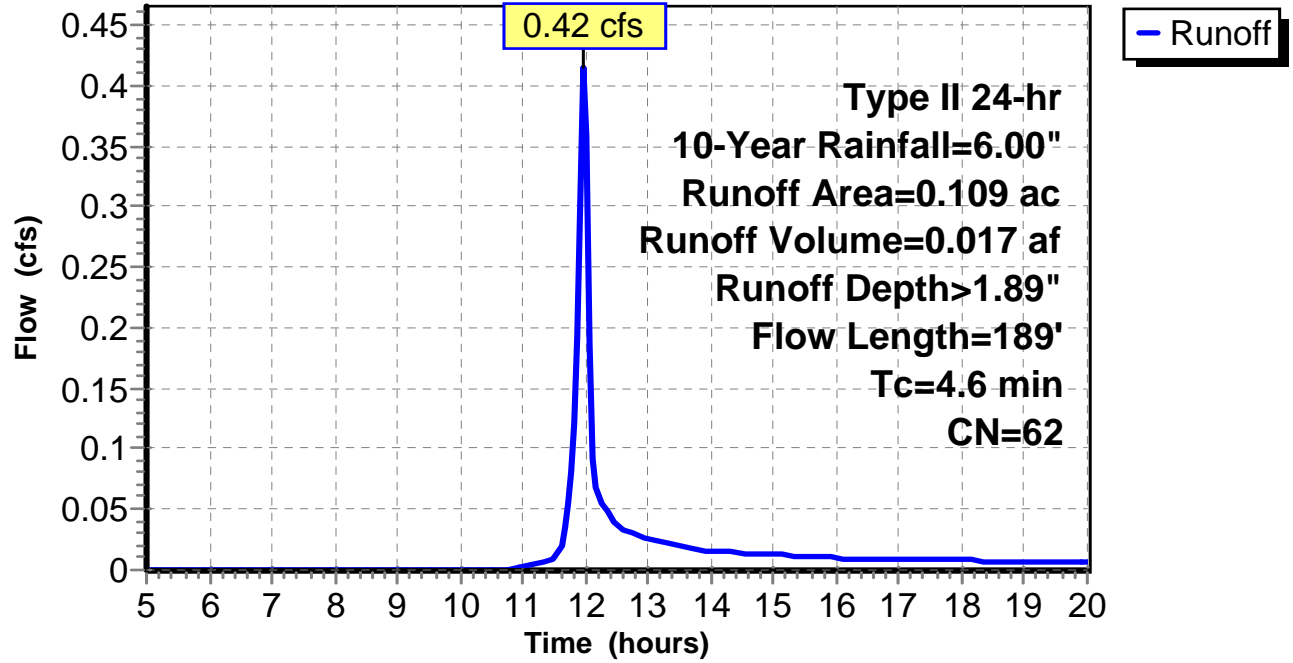
Subcatchment 5: C 215.007

Hydrograph



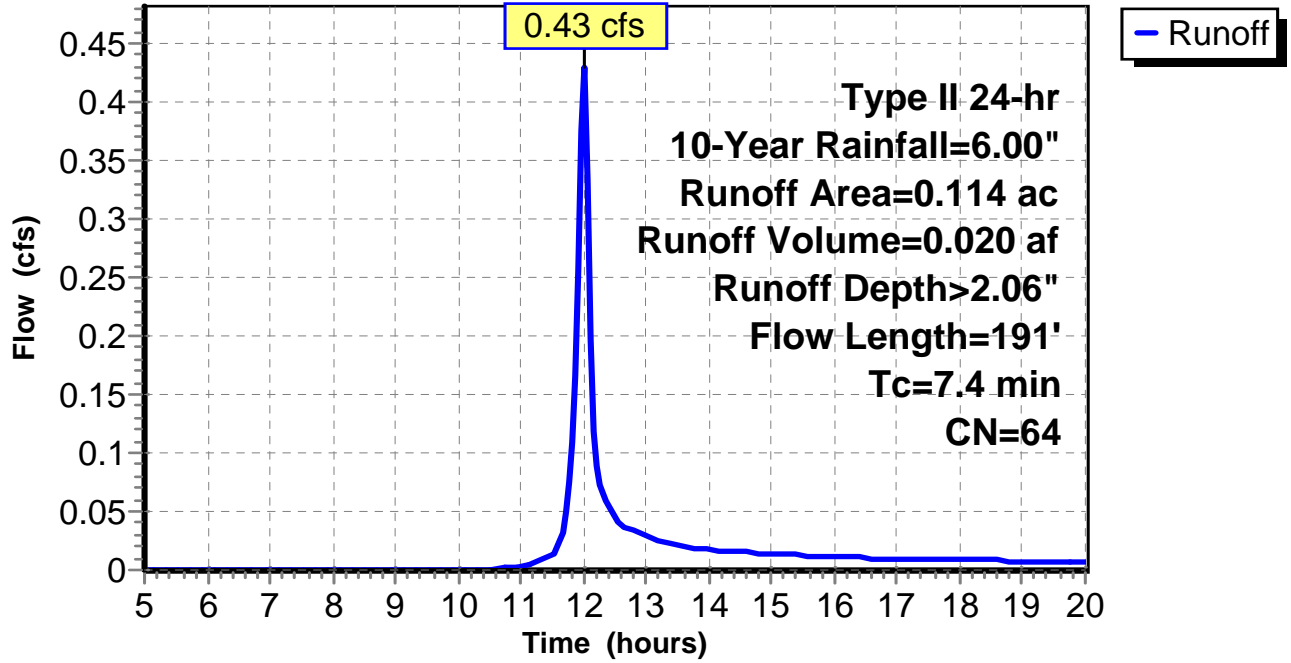
Subcatchment 6: C 215.008

Hydrograph



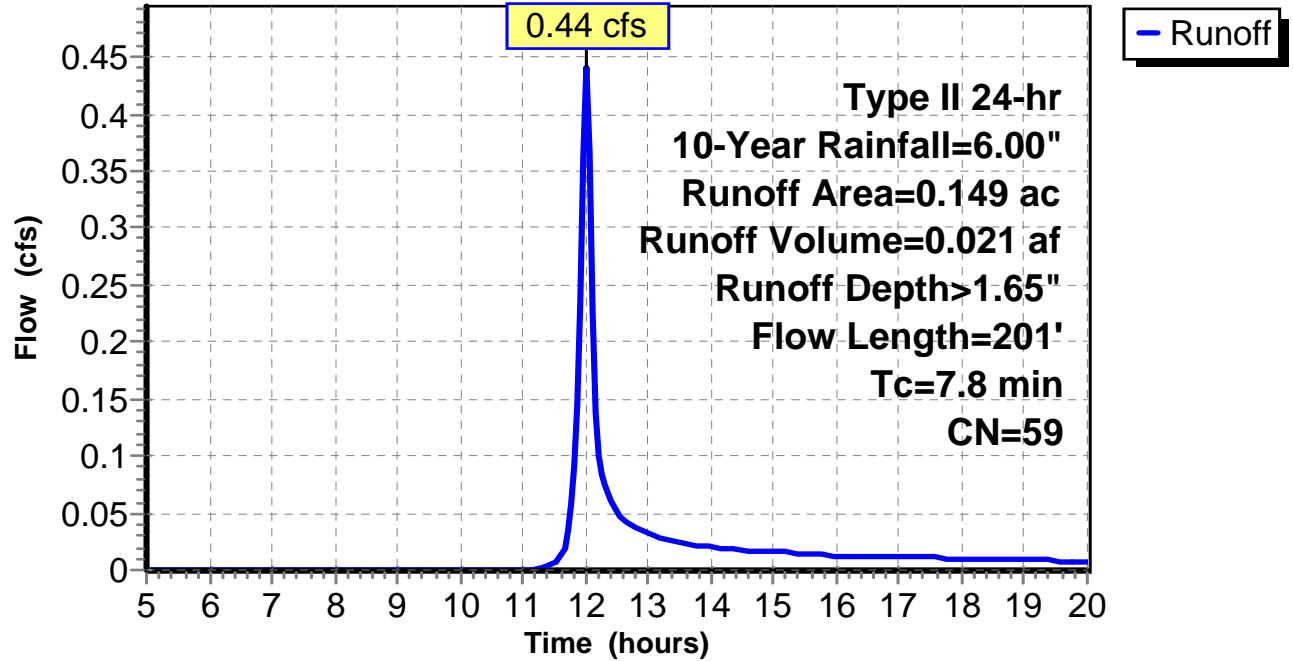
Subcatchment 7: C 215.009

Hydrograph



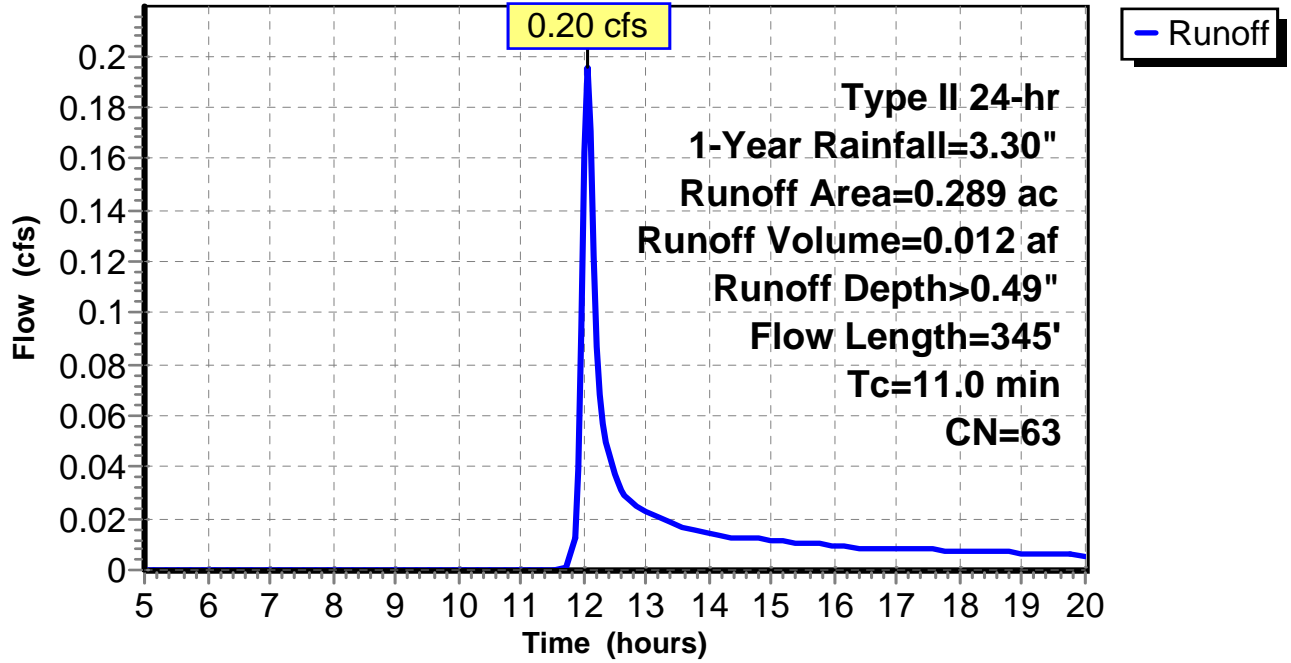
Subcatchment 8: C 215.010

Hydrograph



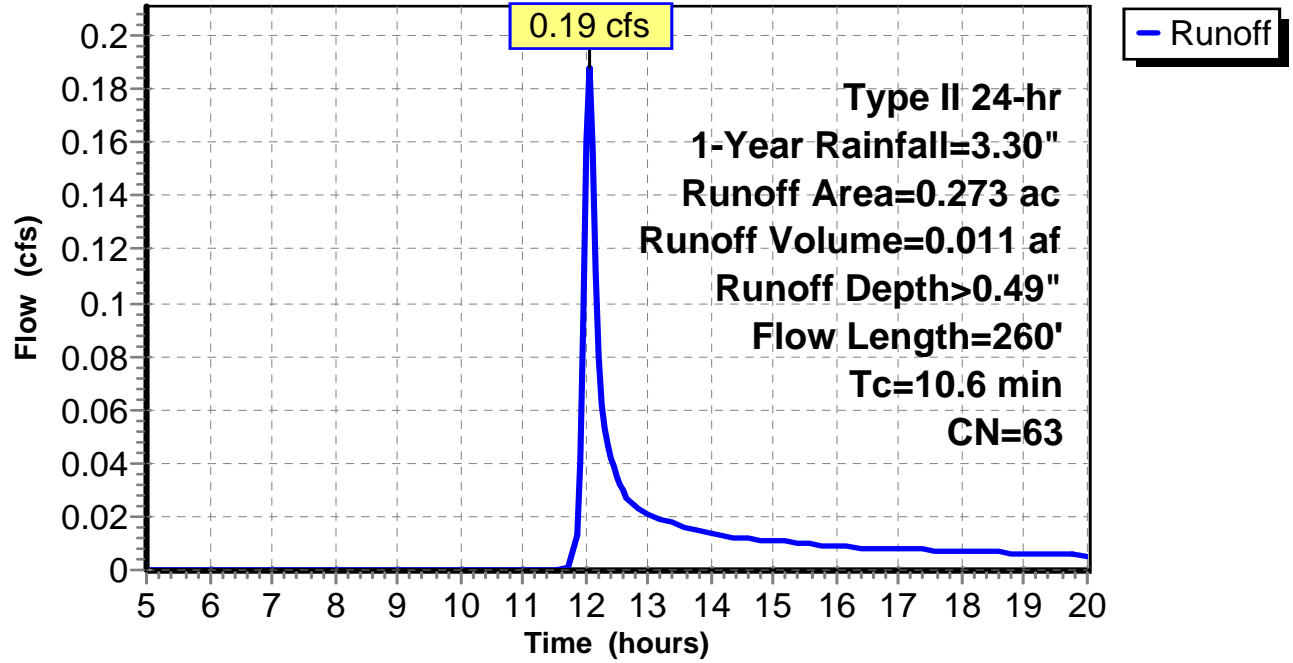
Subcatchment 1: C AR-510.001

Hydrograph



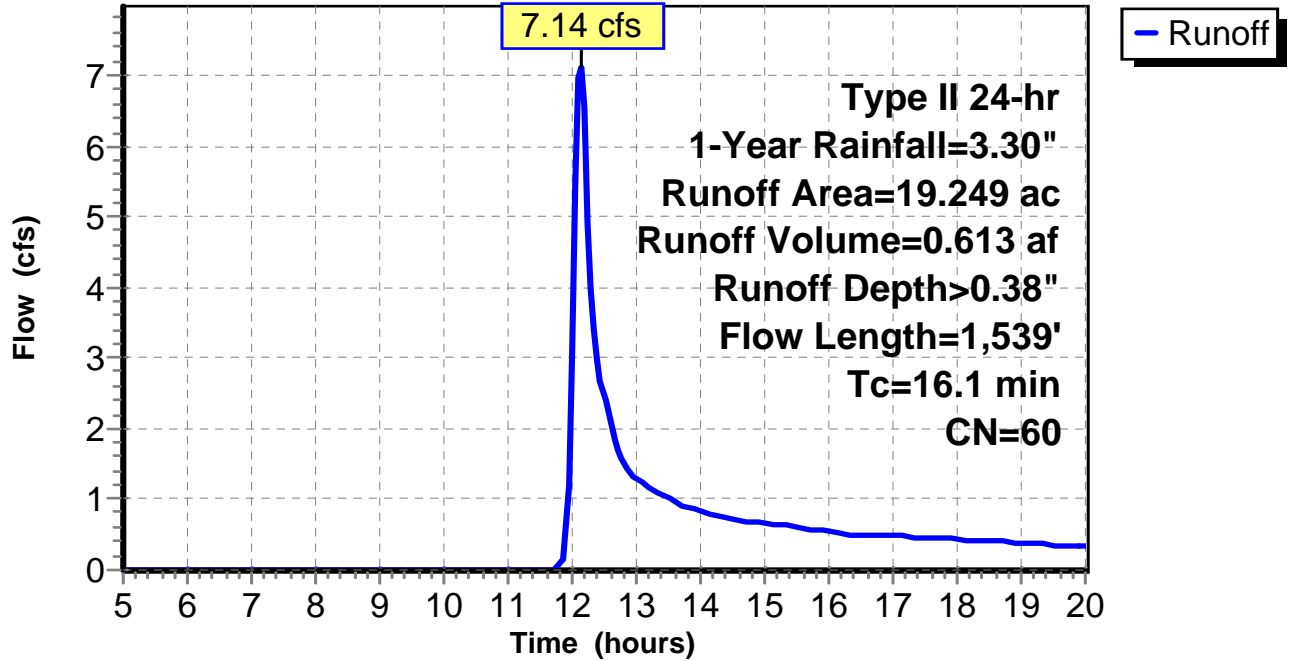
Subcatchment 2: C AR-510.002

Hydrograph



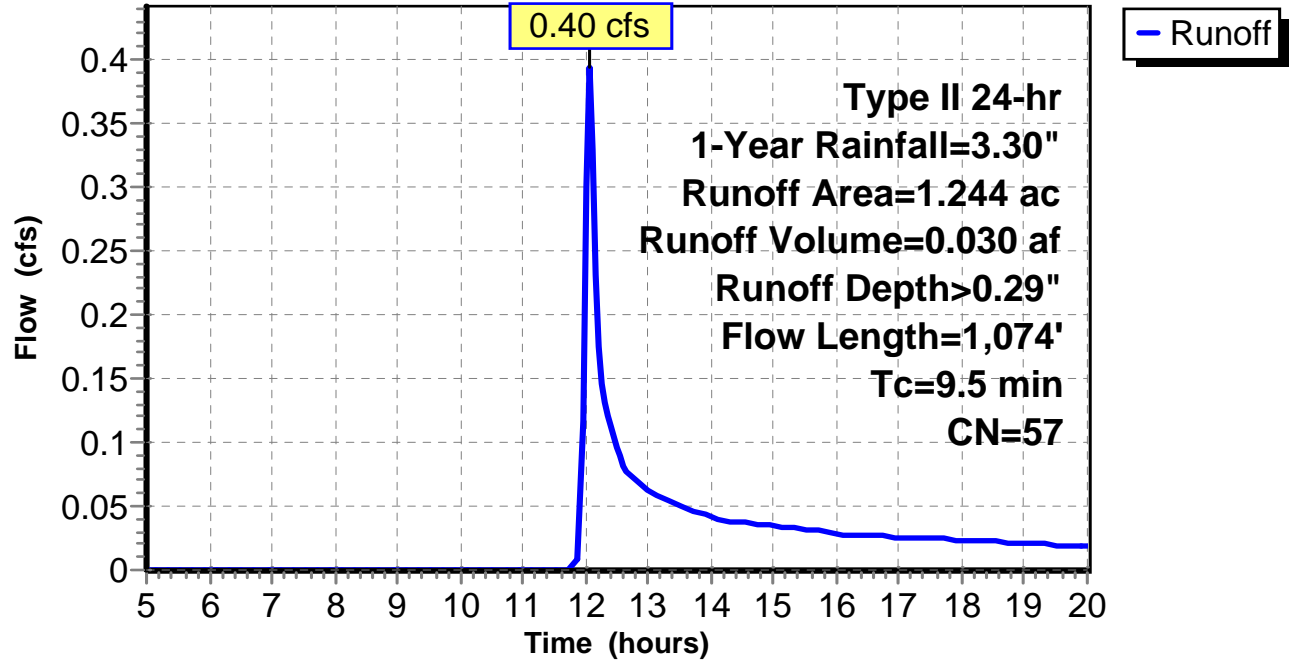
Subcatchment 3: C AR-510.003

Hydrograph



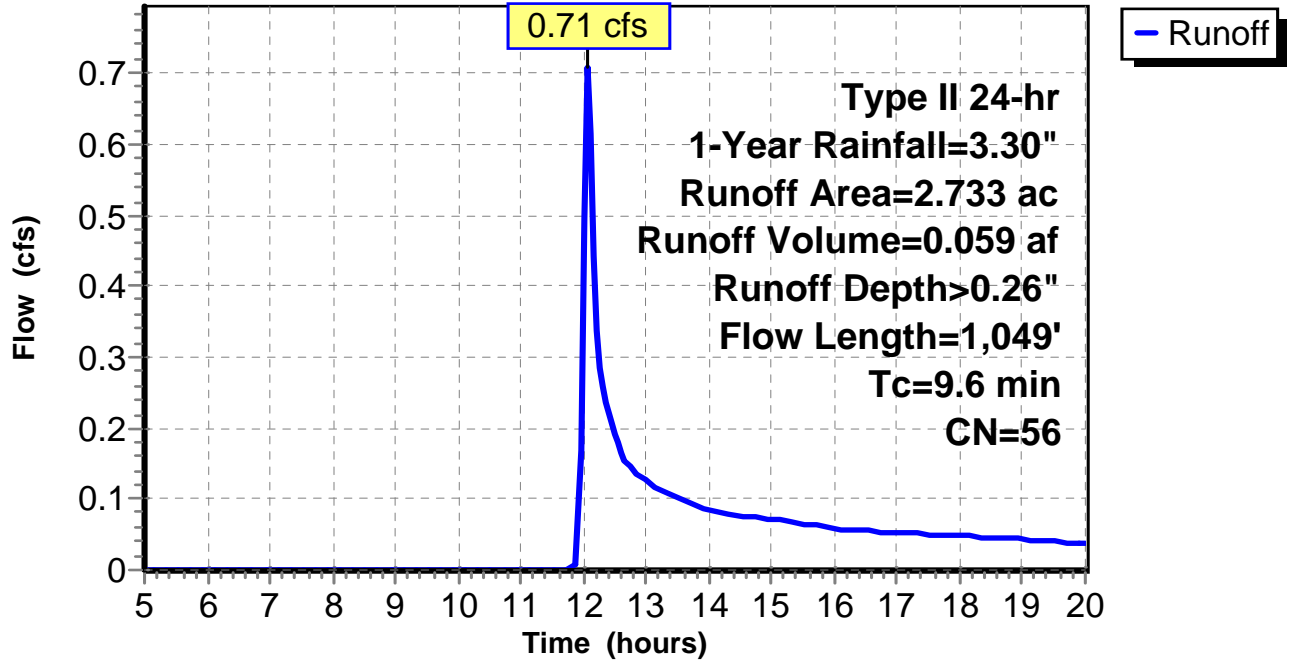
Subcatchment 4: C 217.001

Hydrograph



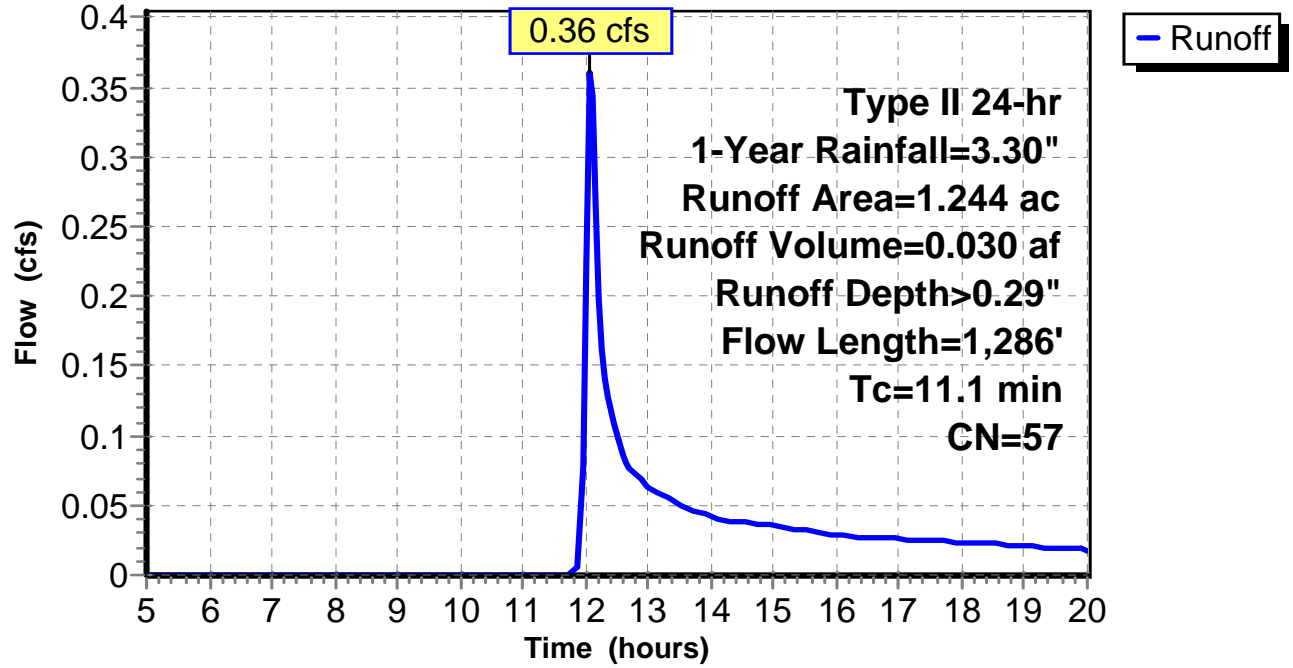
Subcatchment 5: C 217.002

Hydrograph



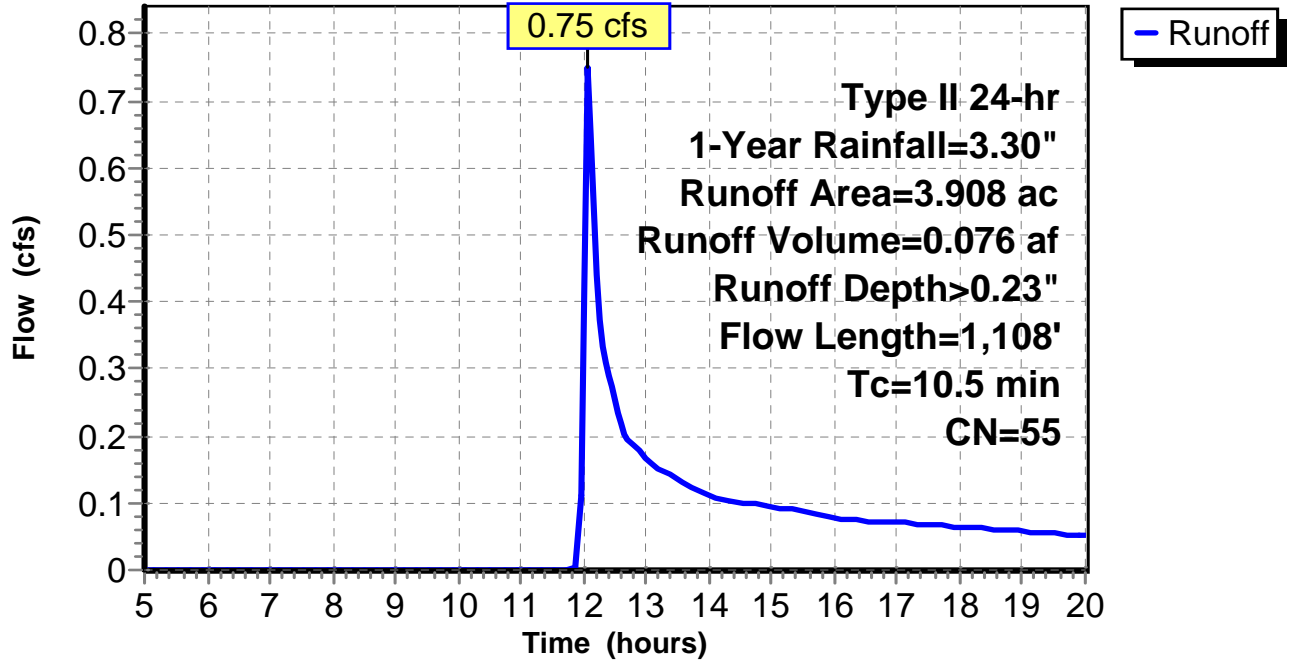
Subcatchment 6: C 217.003

Hydrograph



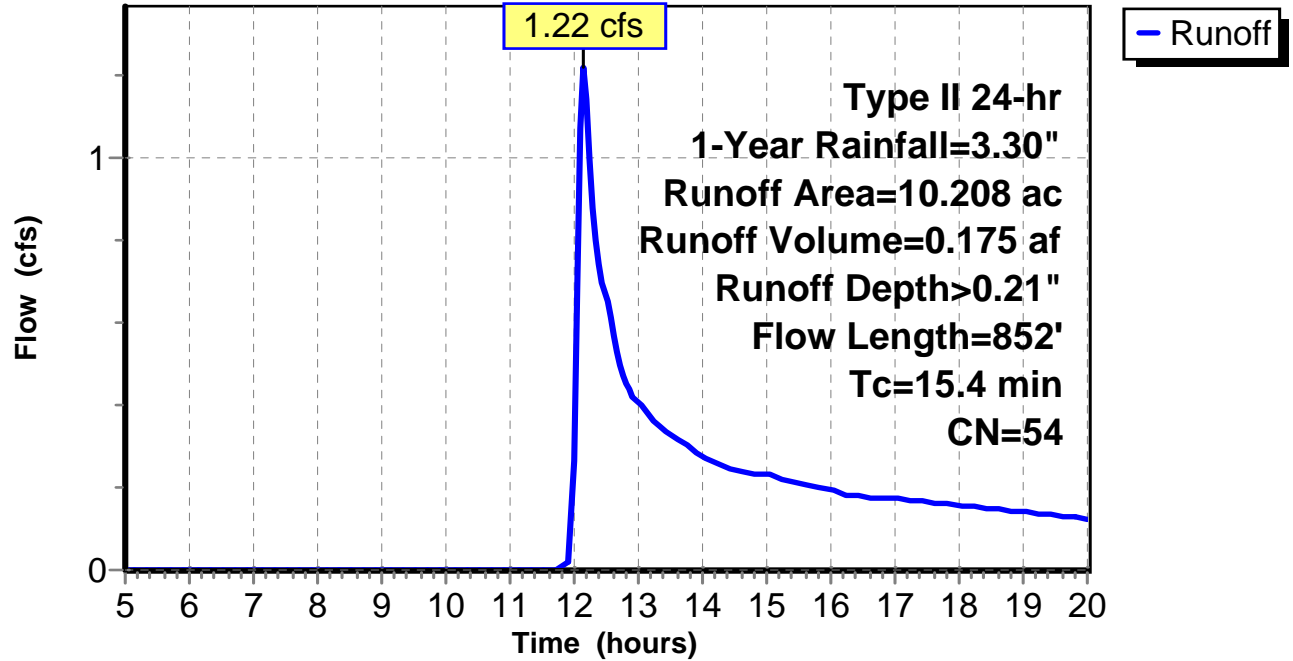
Subcatchment 7: C 217.004

Hydrograph



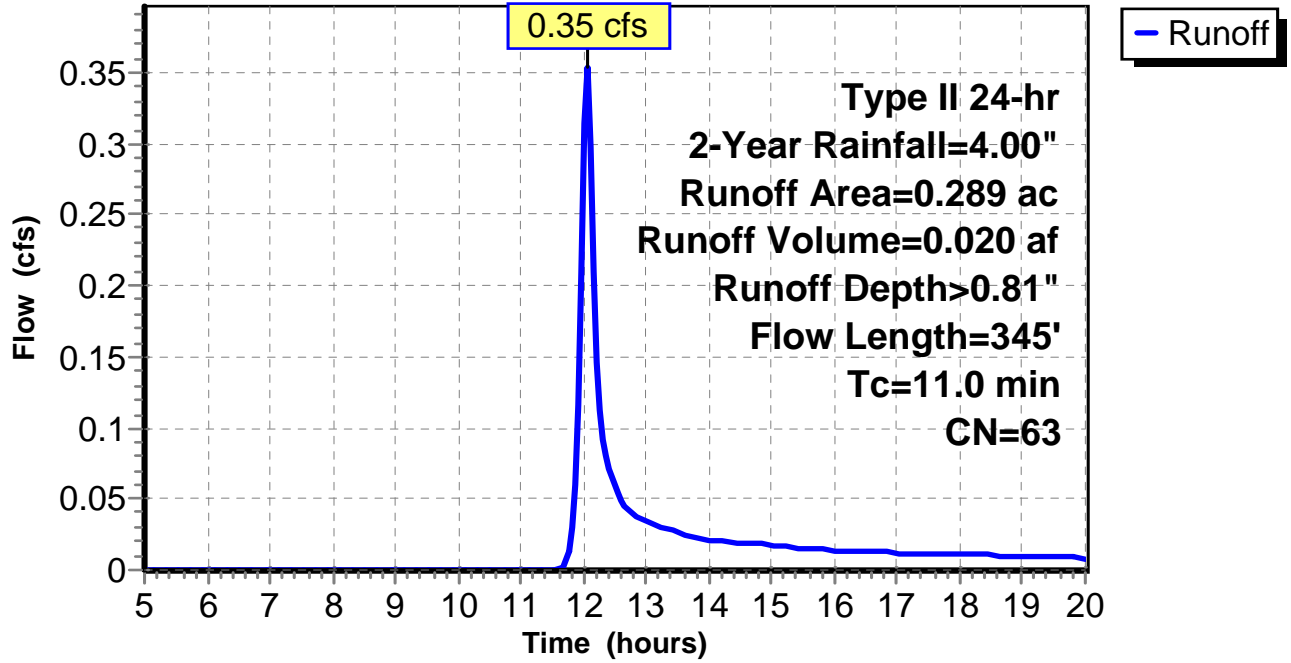
Subcatchment 8: C 217.005

Hydrograph



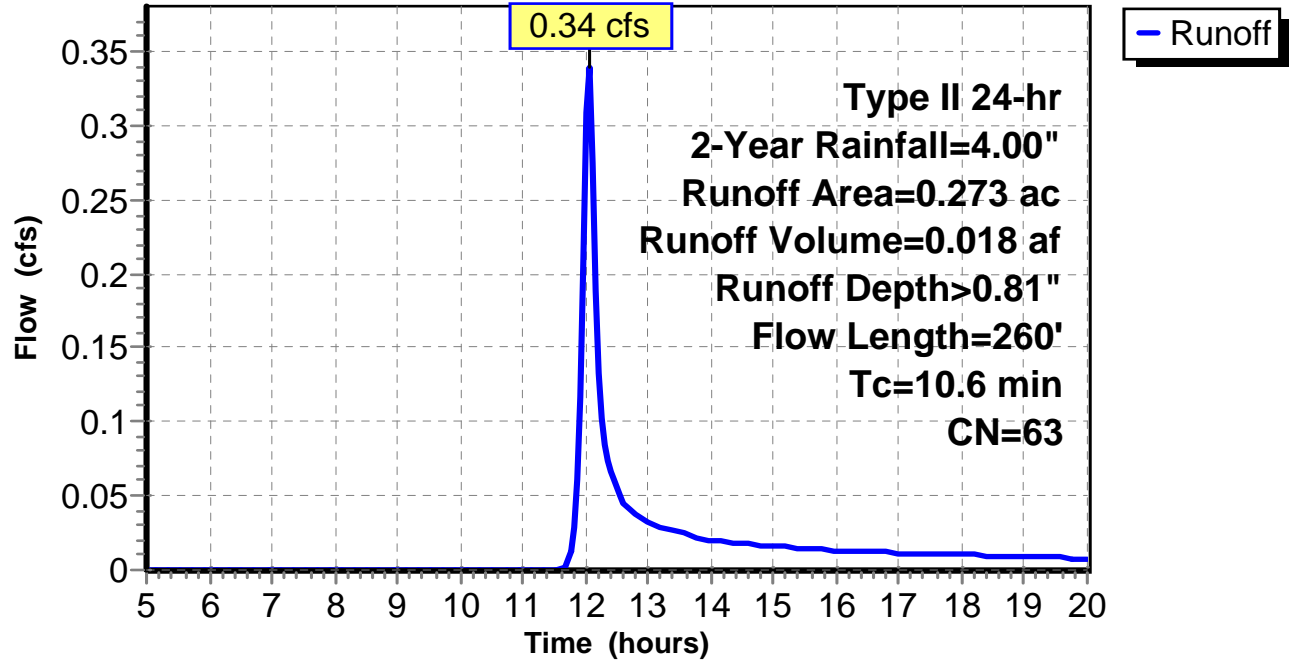
Subcatchment 1: C AR-510.001

Hydrograph



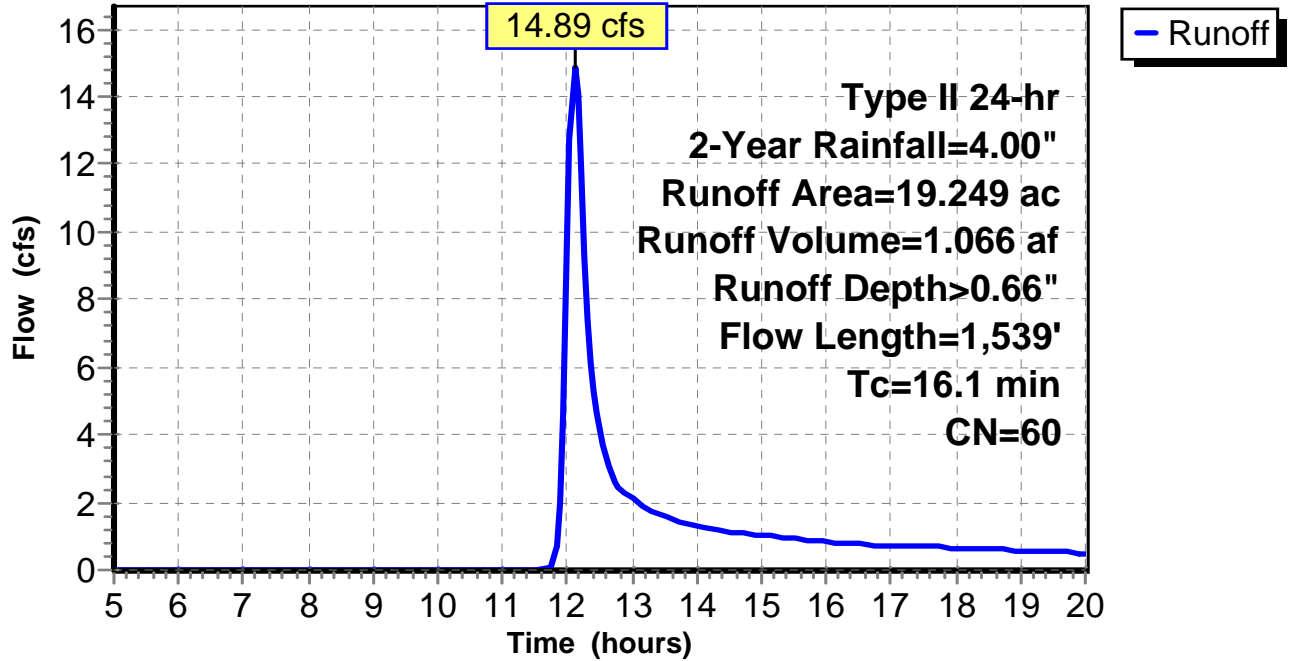
Subcatchment 2: C AR-510.002

Hydrograph



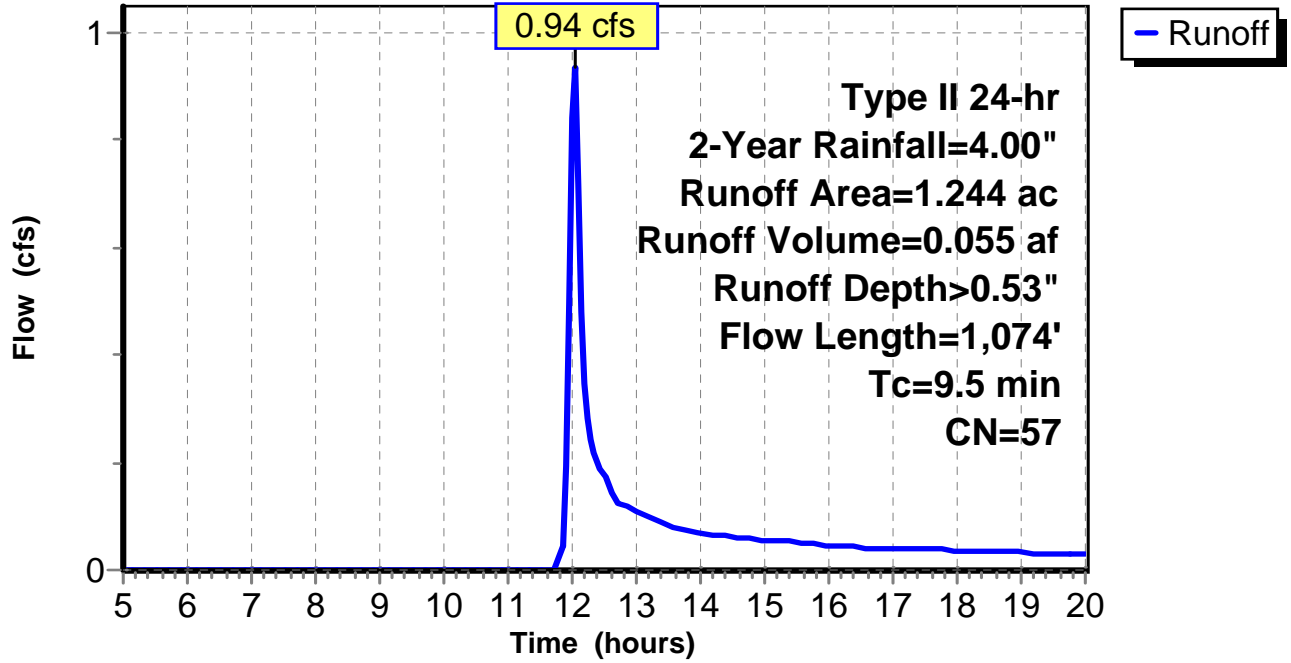
Subcatchment 3: C AR-510.003

Hydrograph



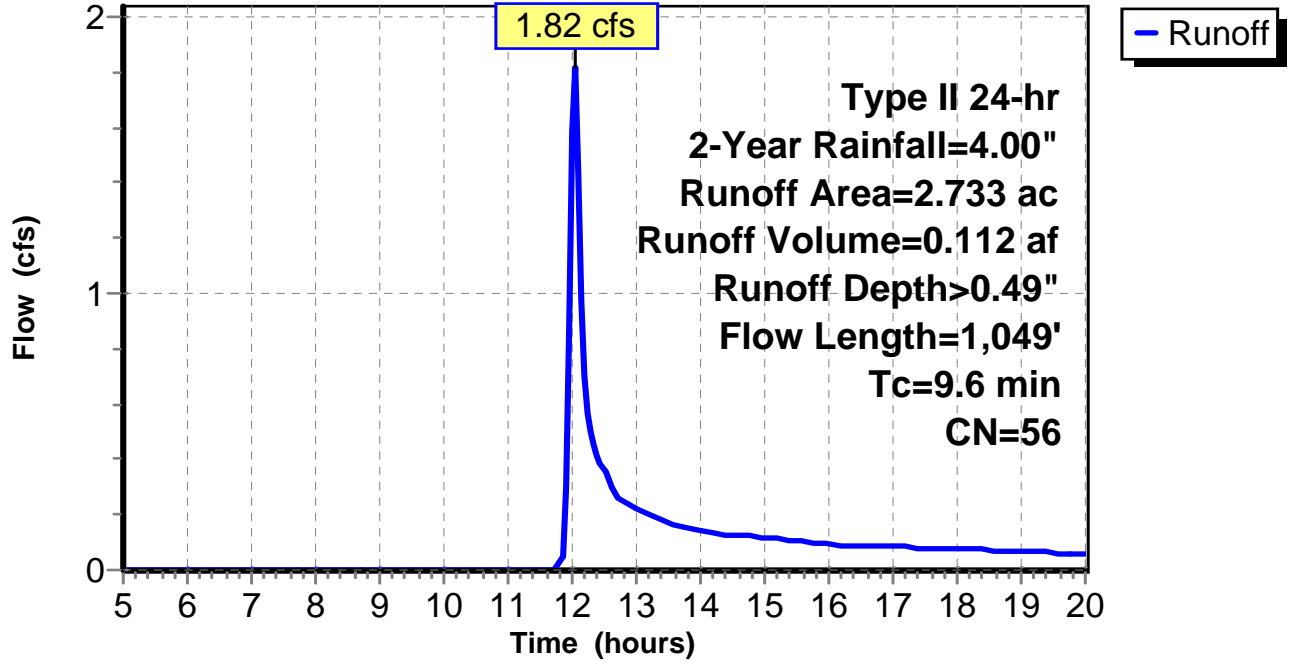
Subcatchment 4: C 217.001

Hydrograph



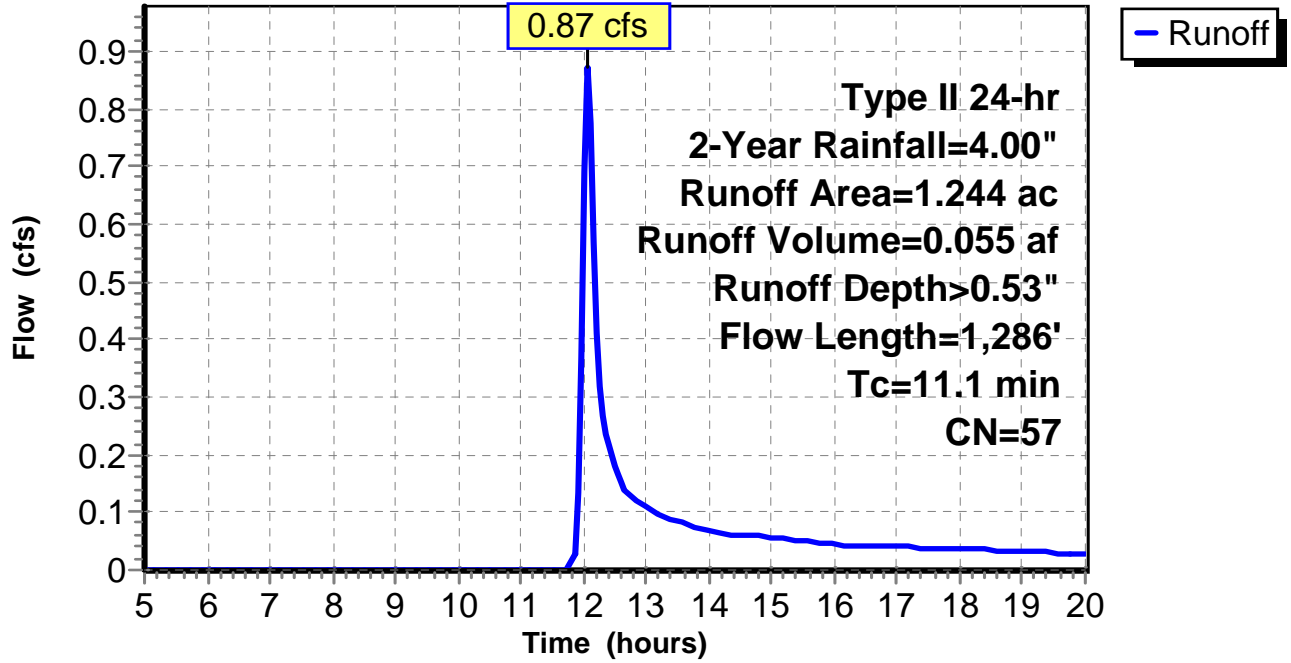
Subcatchment 5: C 217.002

Hydrograph



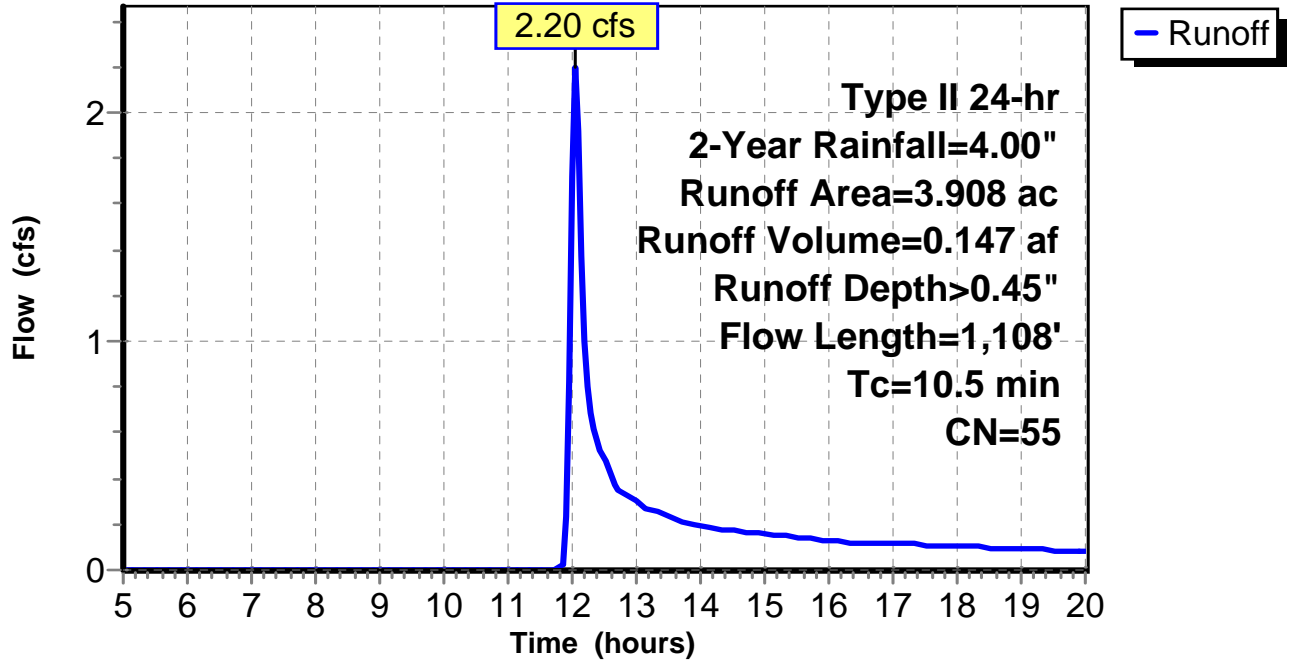
Subcatchment 6: C 217.003

Hydrograph



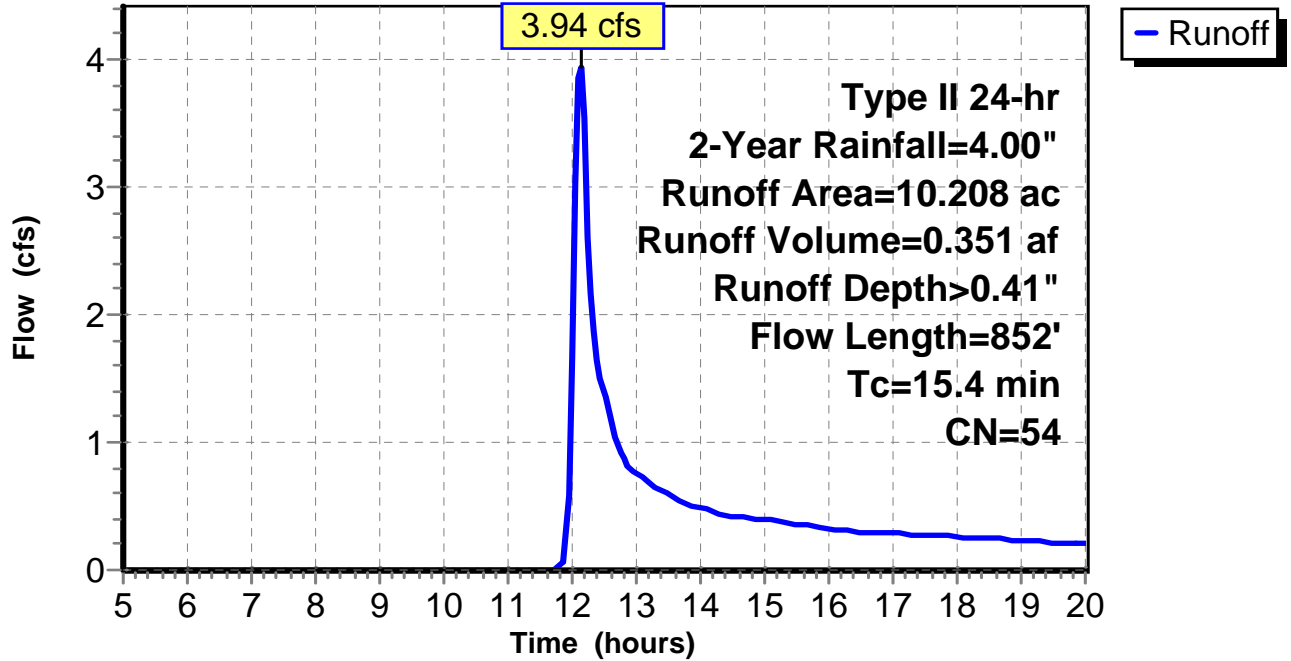
Subcatchment 7: C 217.004

Hydrograph



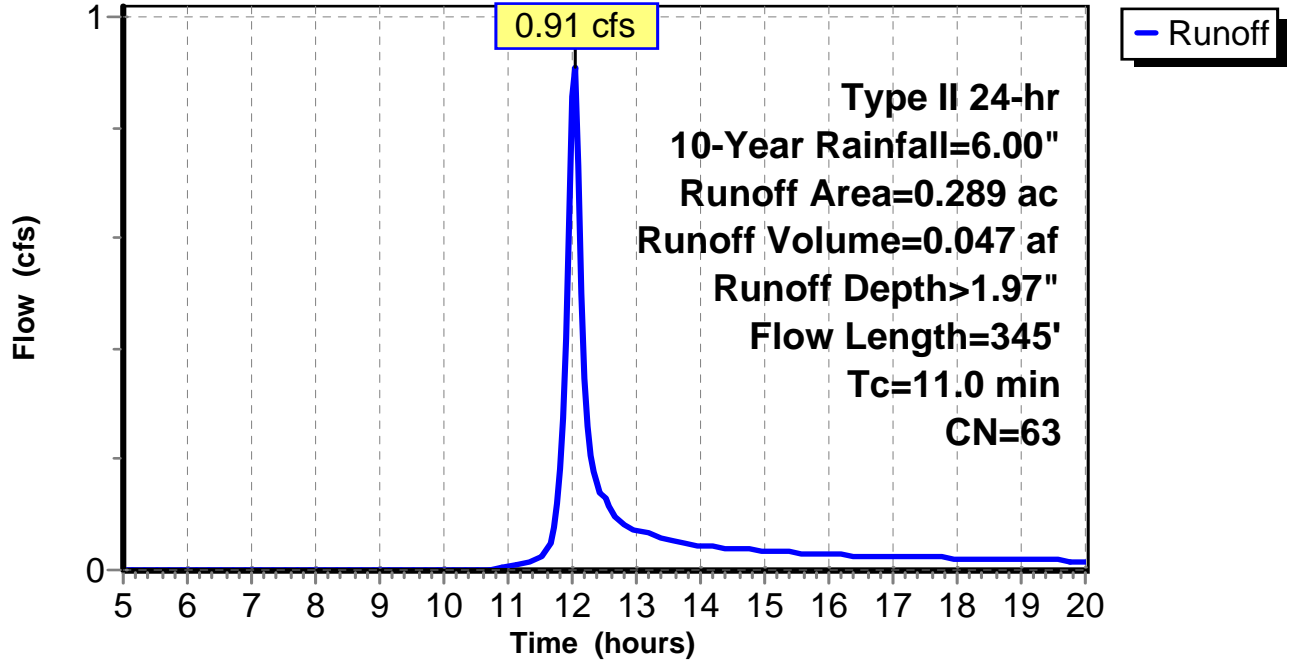
Subcatchment 8: C 217.005

Hydrograph



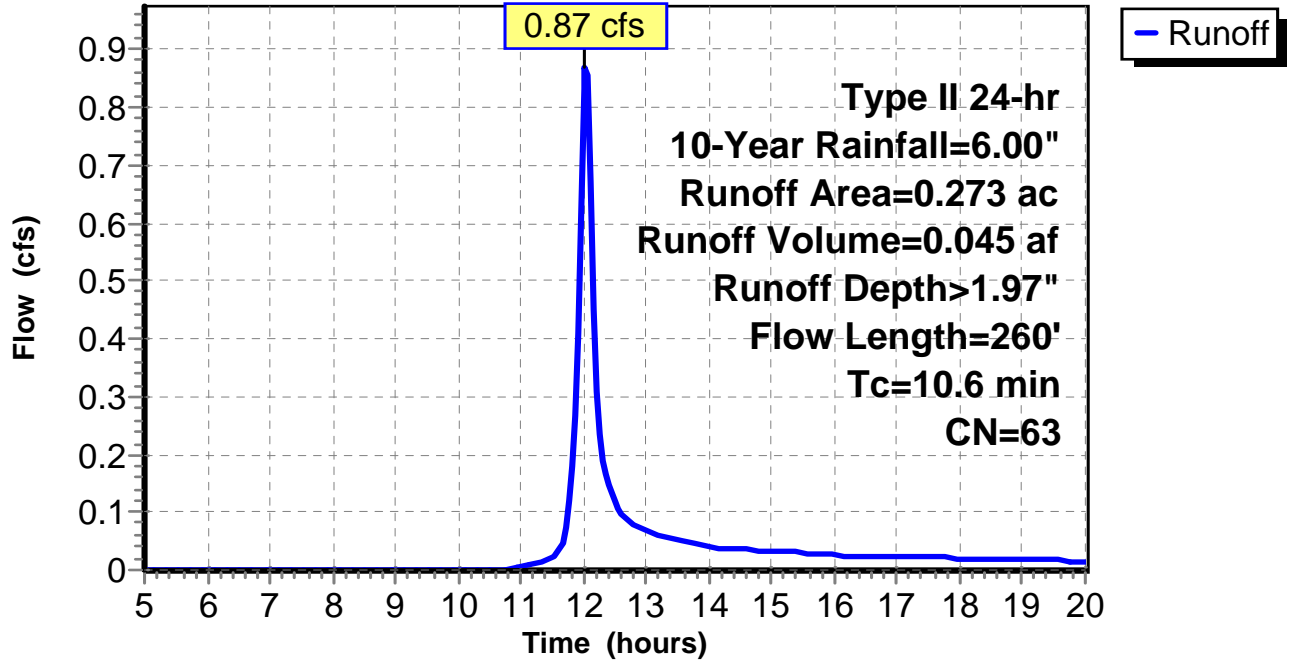
Subcatchment 1: C AR-510.001

Hydrograph



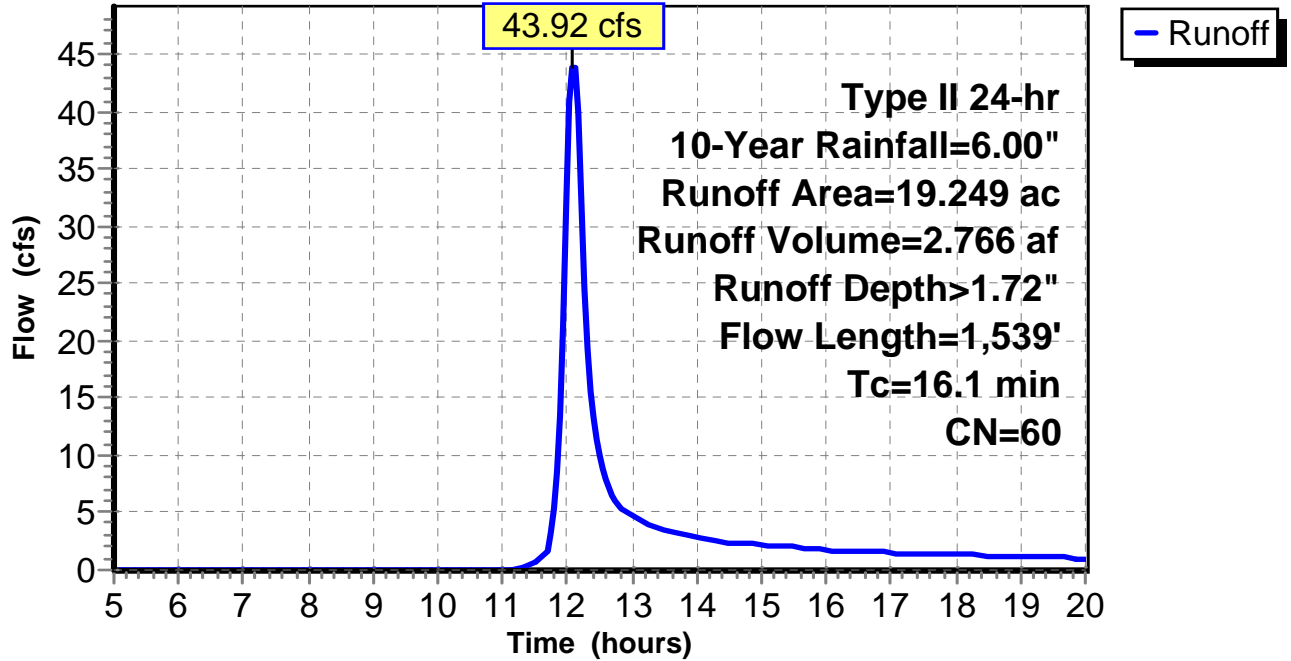
Subcatchment 2: C AR-510.002

Hydrograph



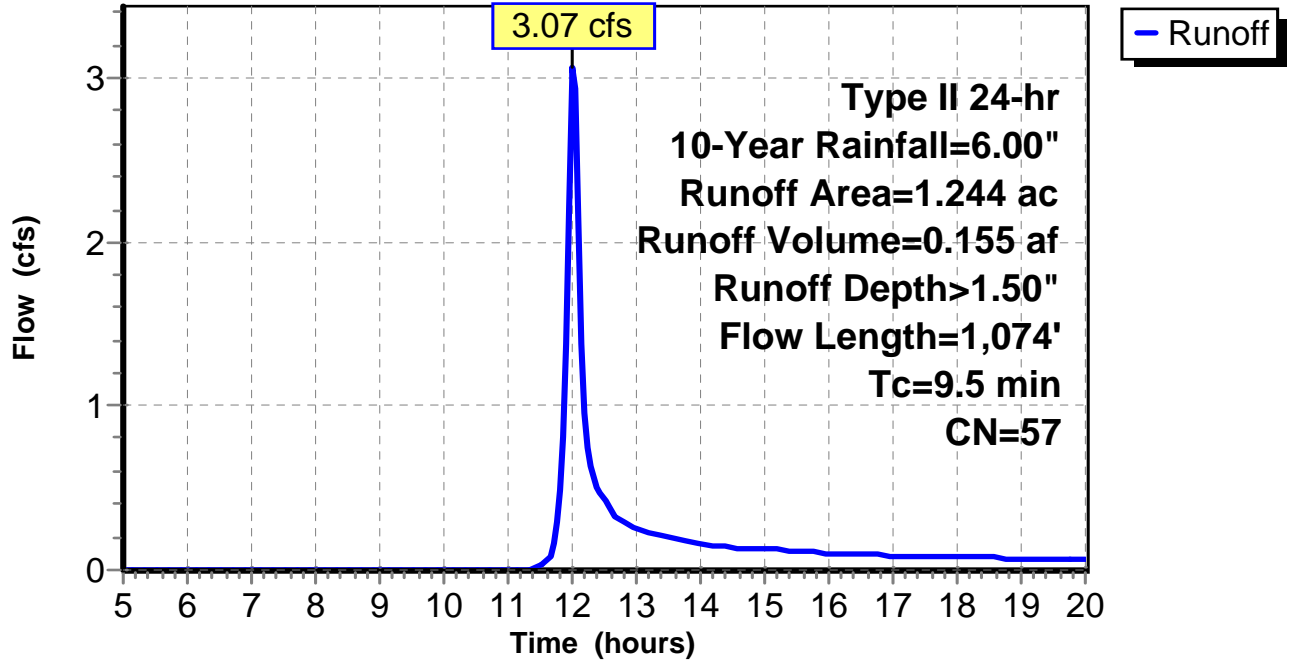
Subcatchment 3: C AR-510.003

Hydrograph



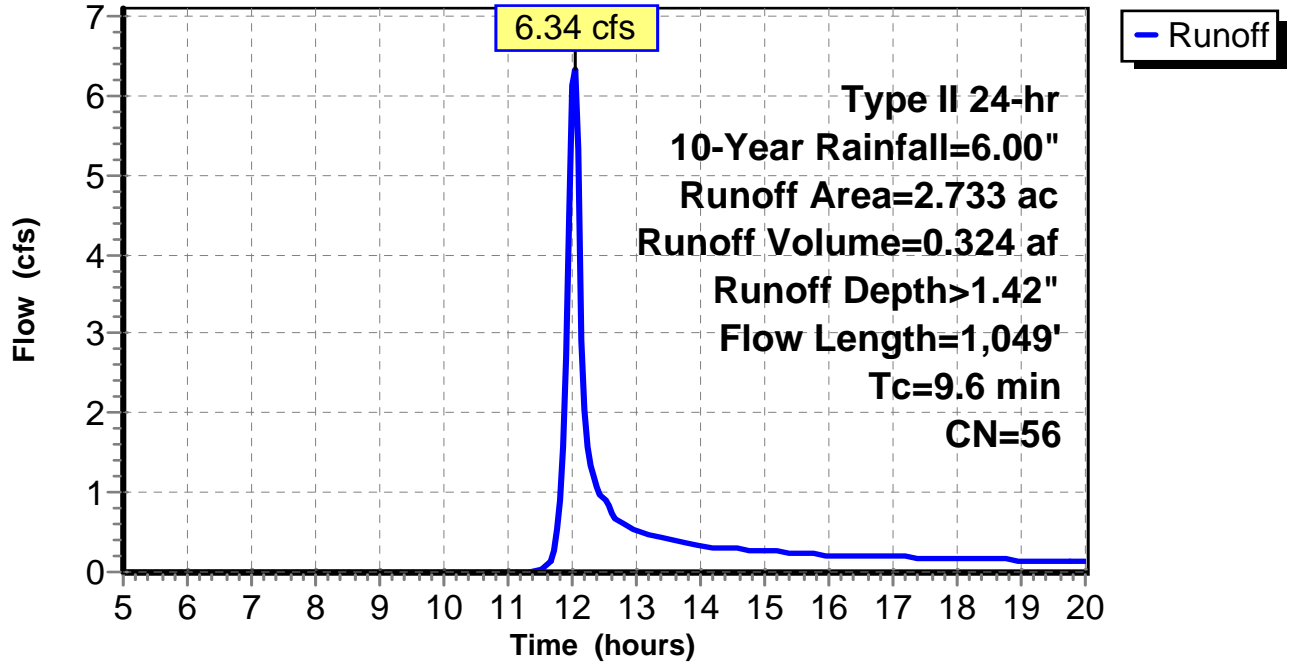
Subcatchment 4: C 217.001

Hydrograph



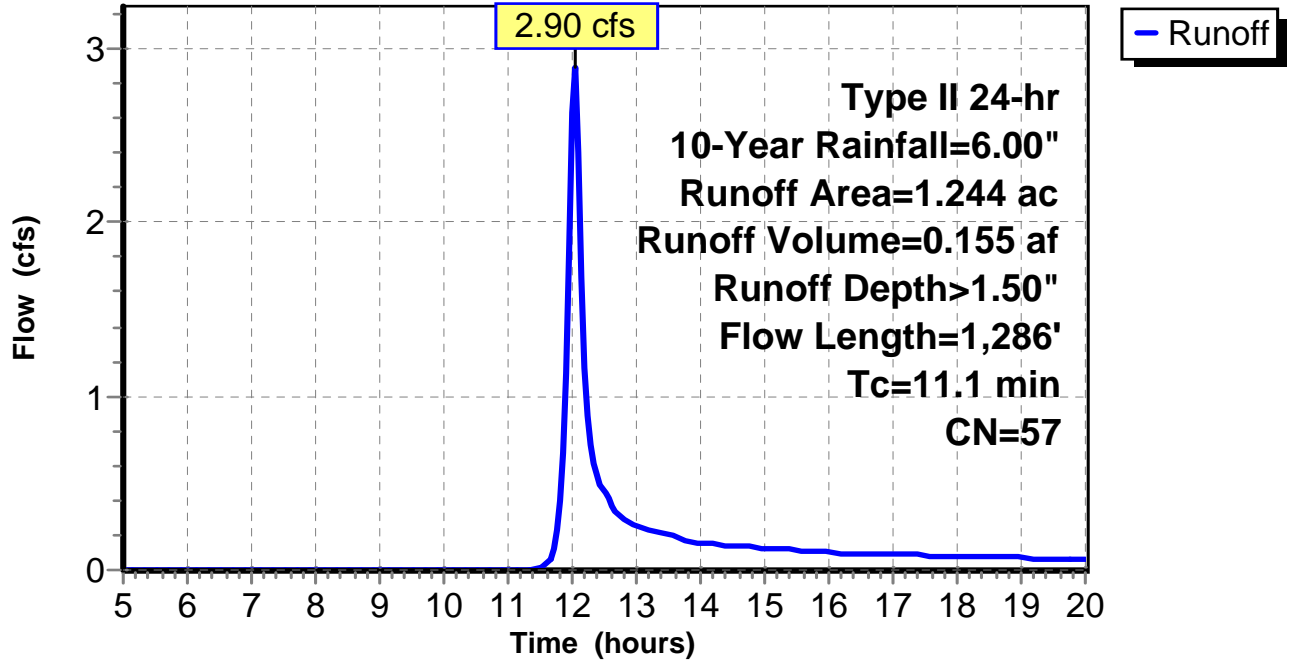
Subcatchment 5: C 217.002

Hydrograph



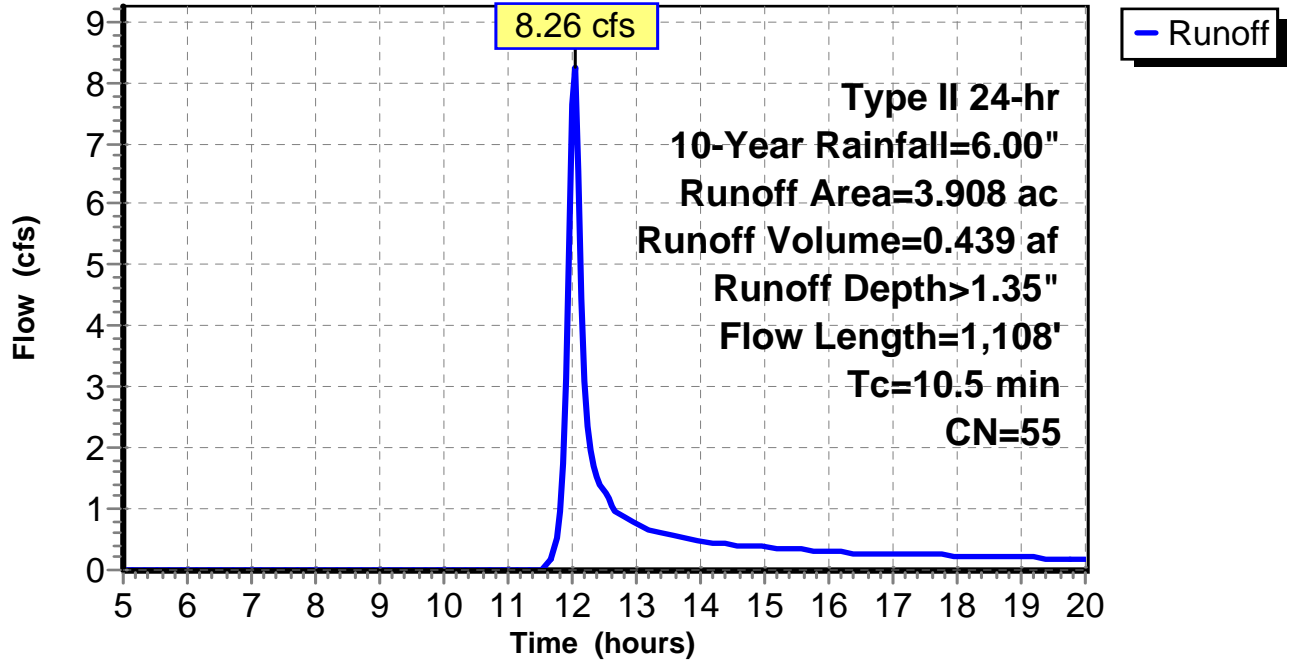
Subcatchment 6: C 217.003

Hydrograph



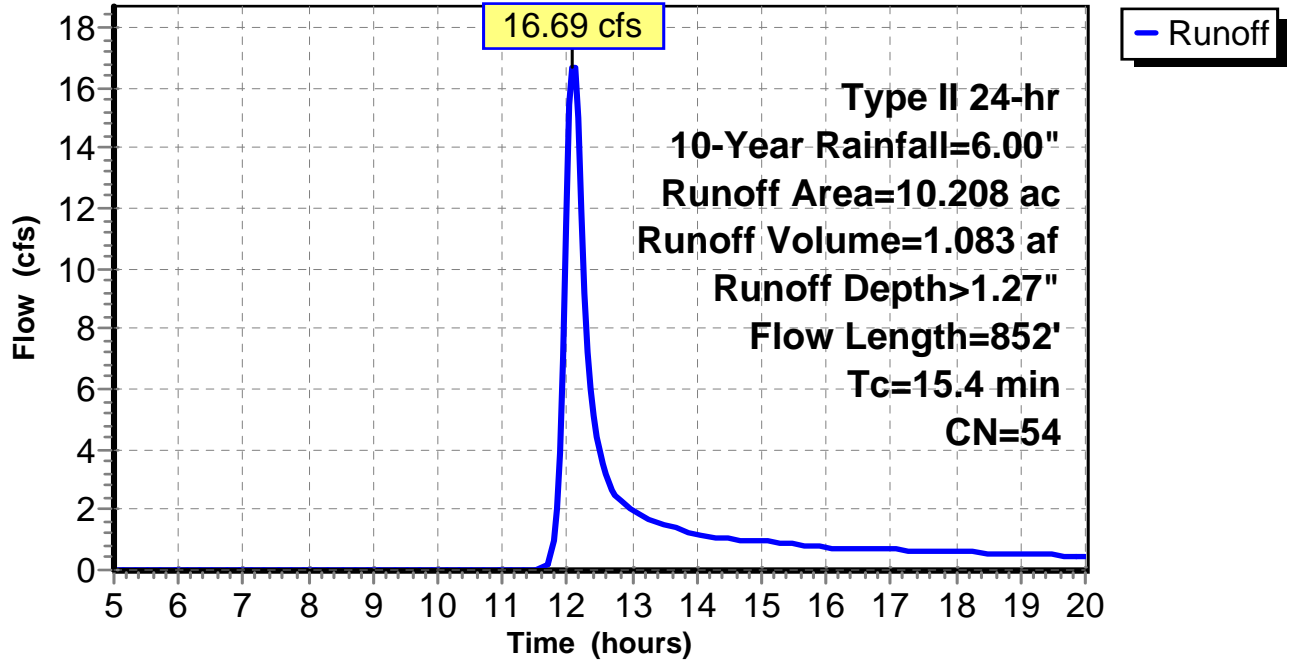
Subcatchment 7: C 217.004

Hydrograph



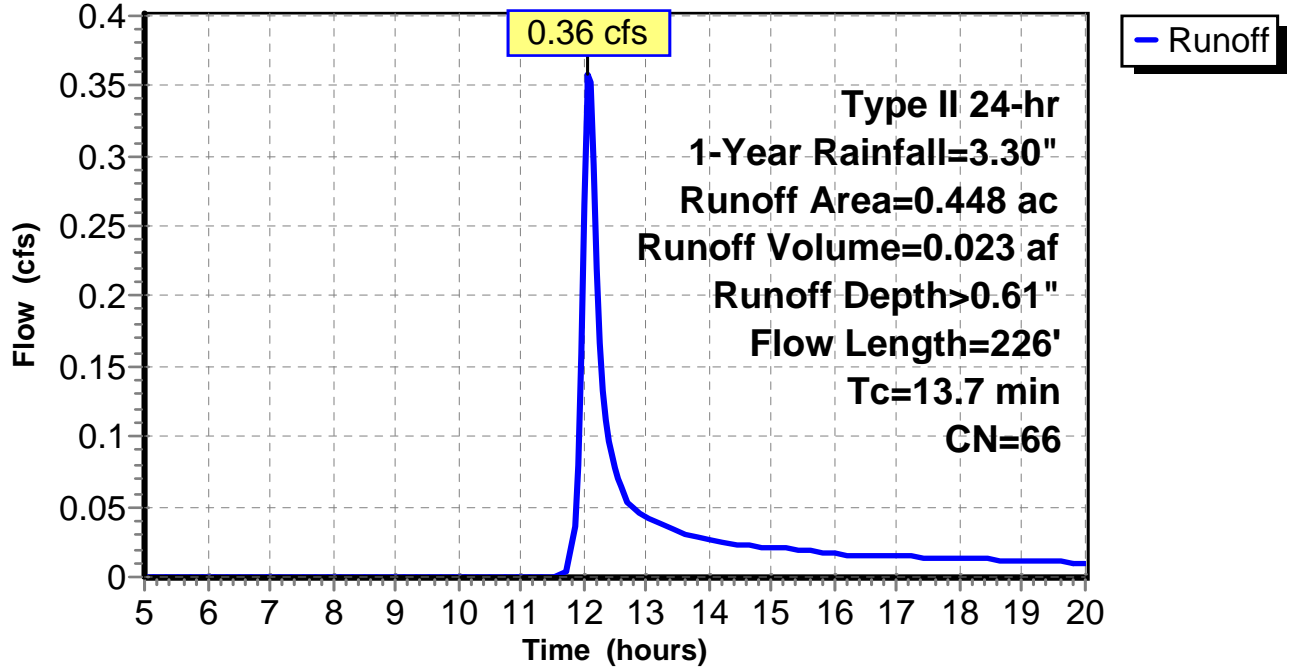
Subcatchment 8: C 217.005

Hydrograph



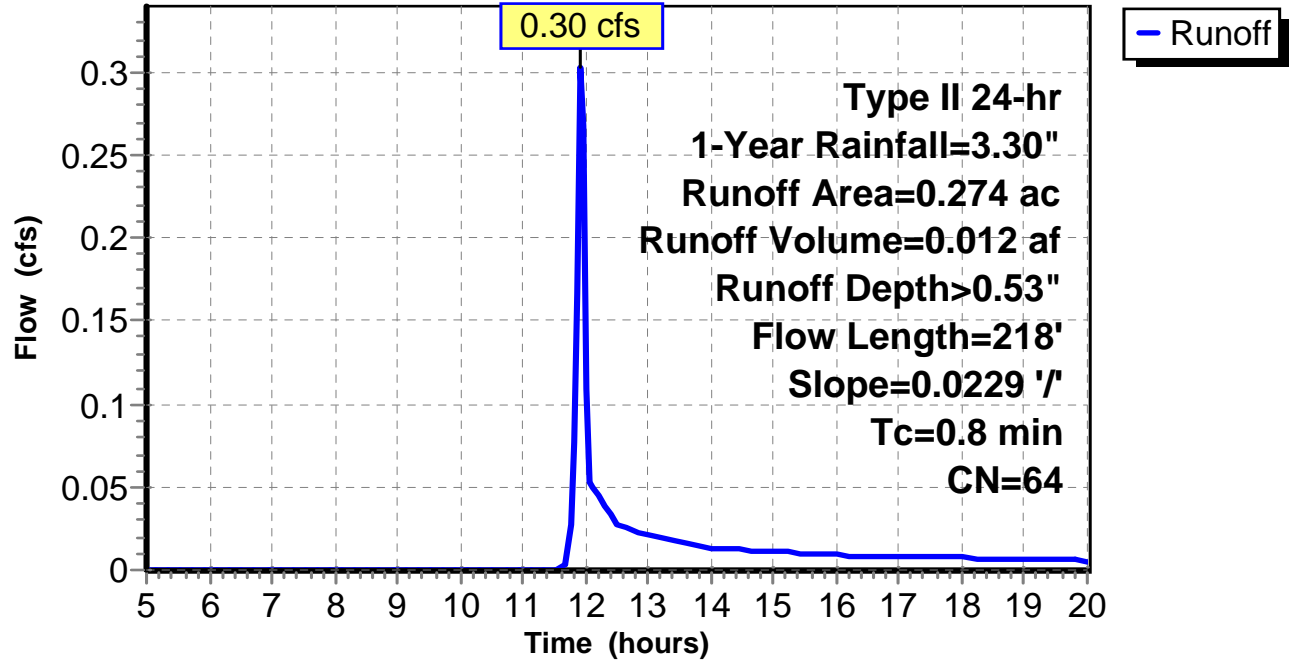
Subcatchment 1: C AR-510.004

Hydrograph



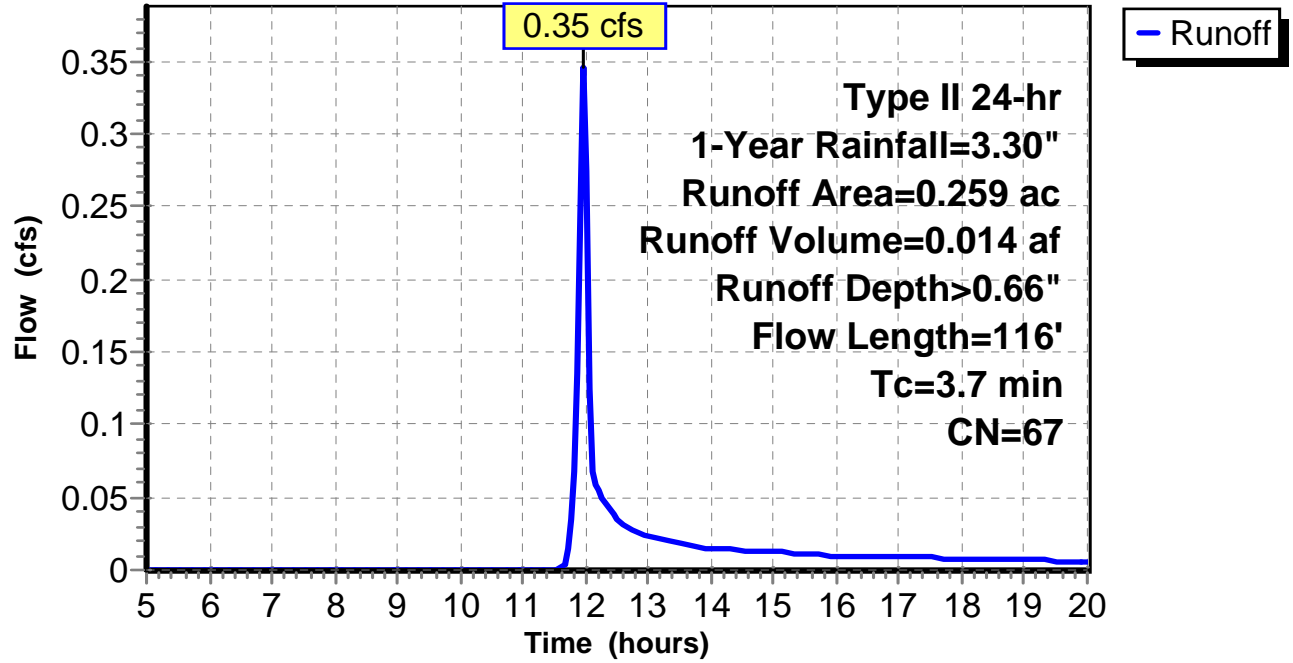
Subcatchment 2: C 218.001

Hydrograph



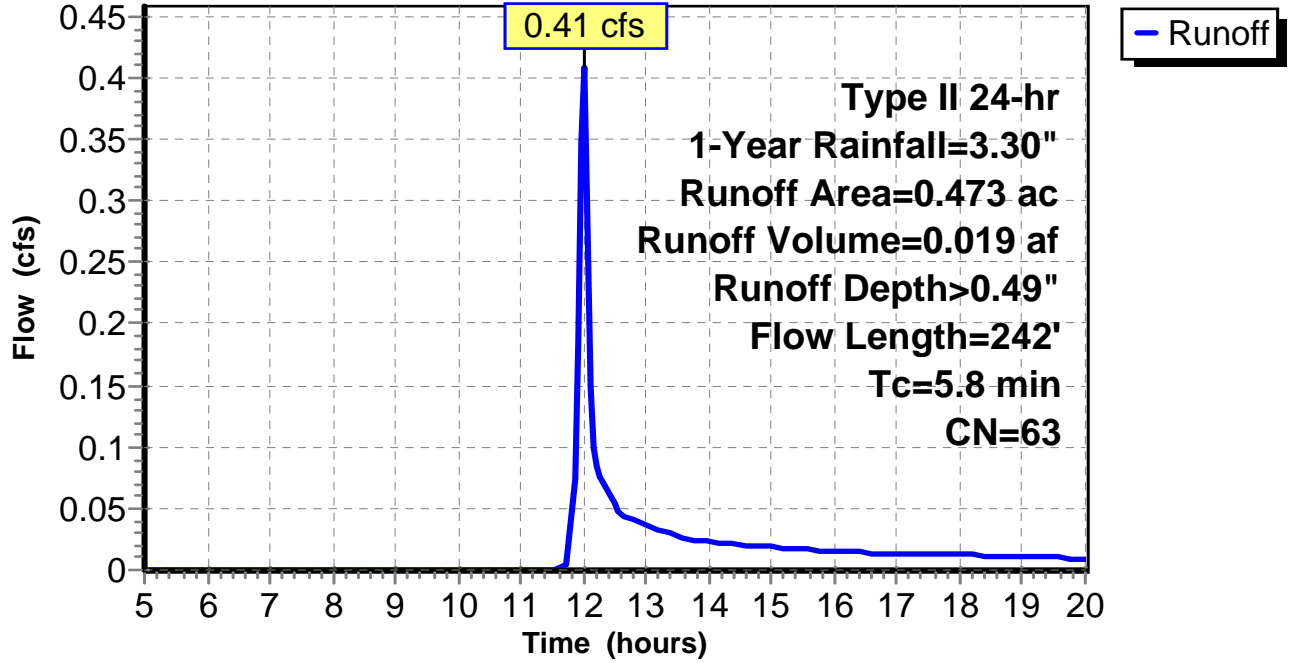
Subcatchment 3: C 218.002

Hydrograph



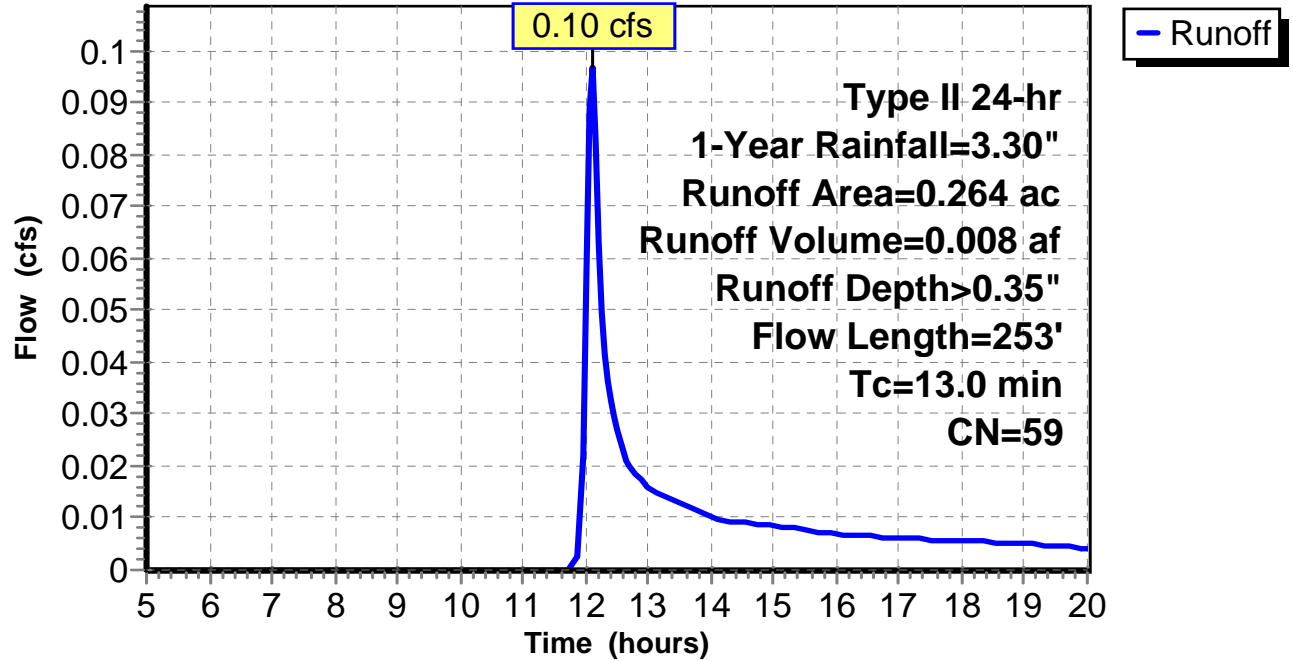
Subcatchment 4: C 218.003

Hydrograph



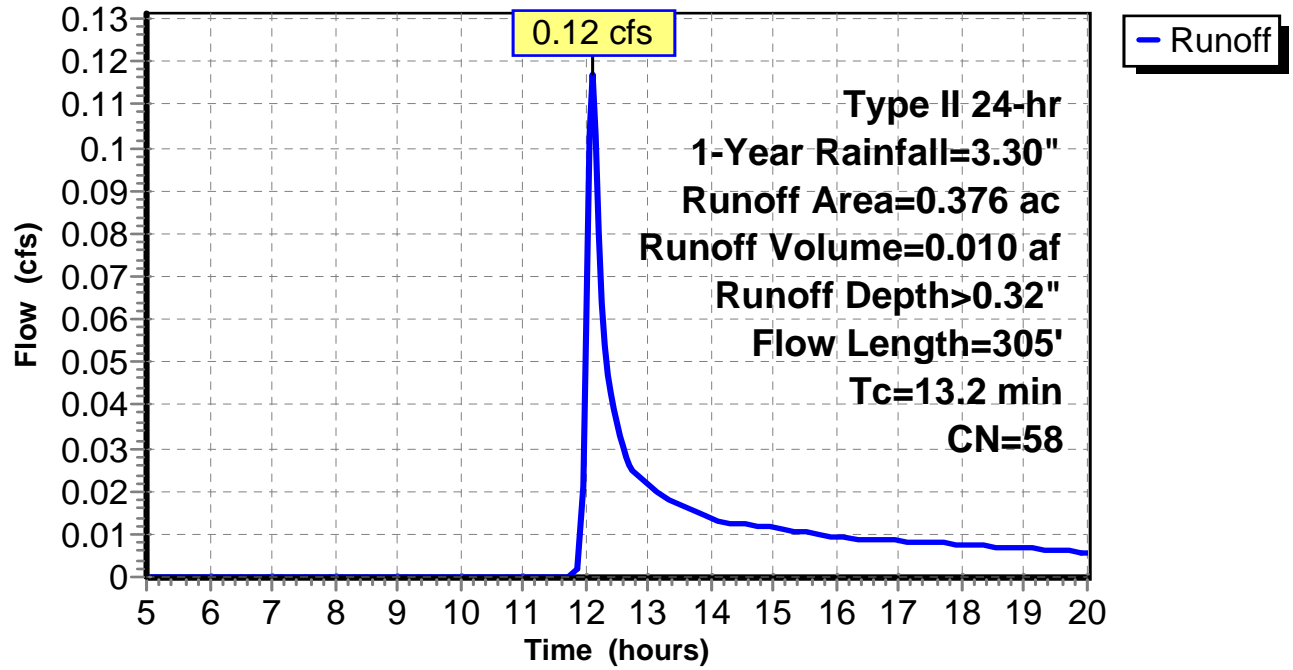
Subcatchment 5: C 218.004

Hydrograph



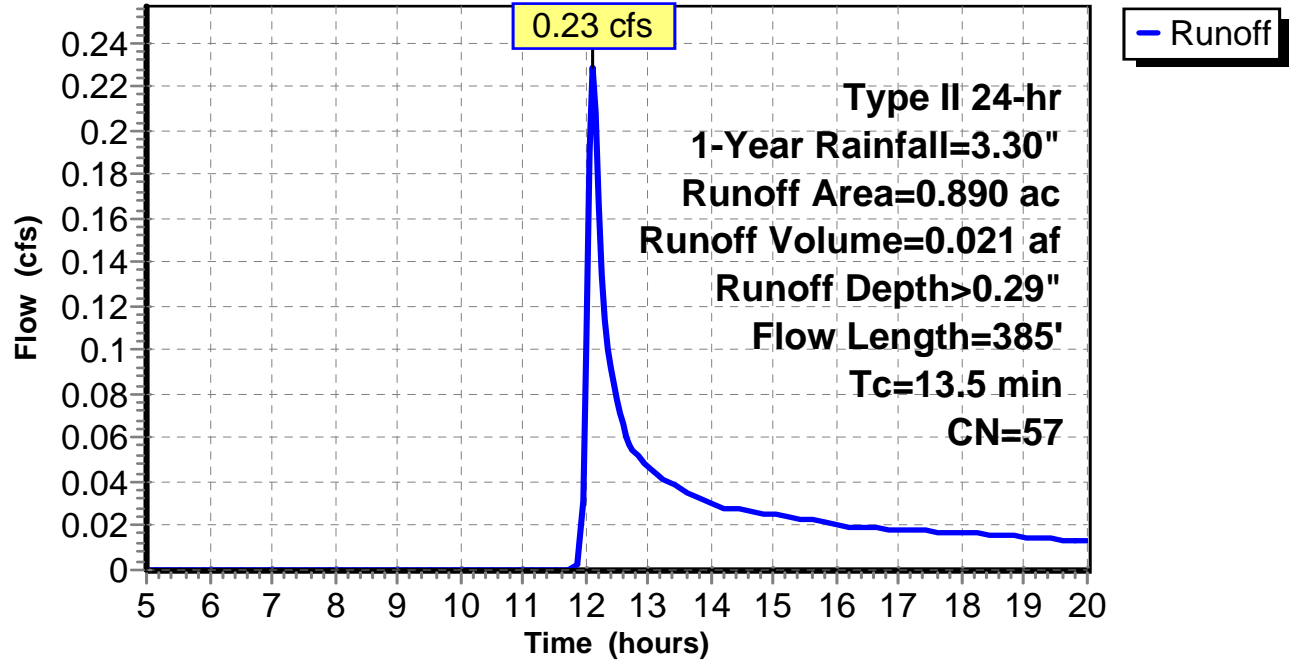
Subcatchment 6: C 218.005

Hydrograph



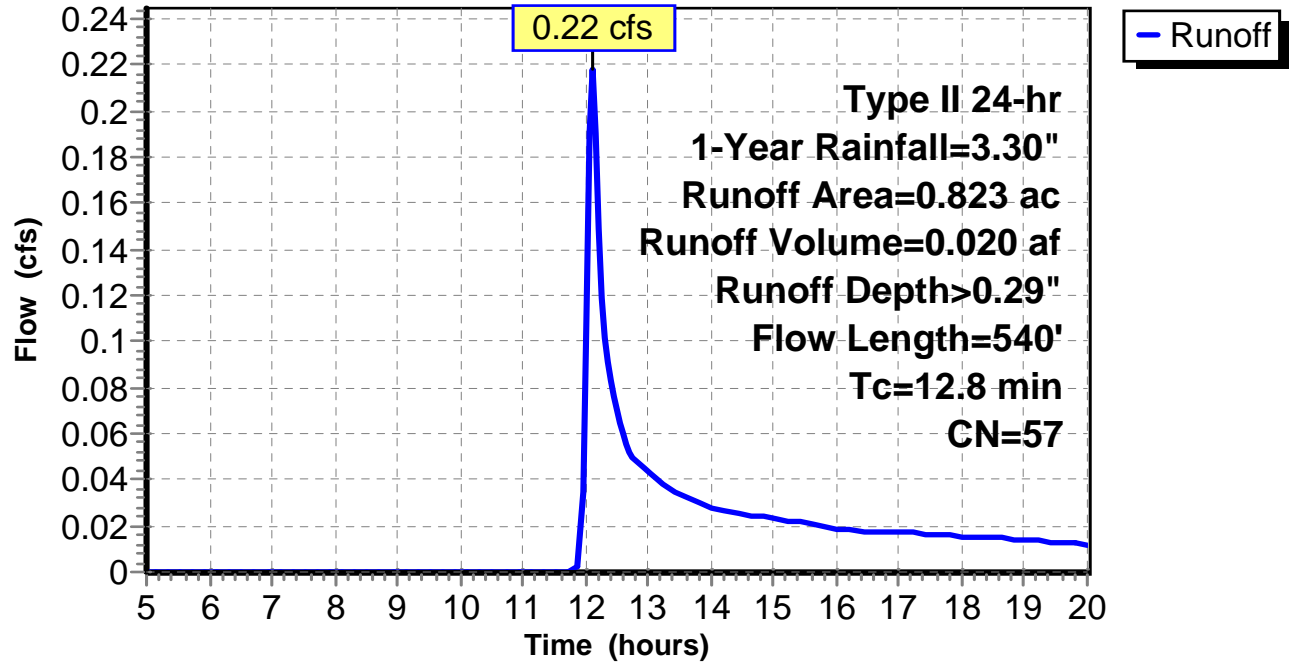
Subcatchment 7: C 218.006

Hydrograph



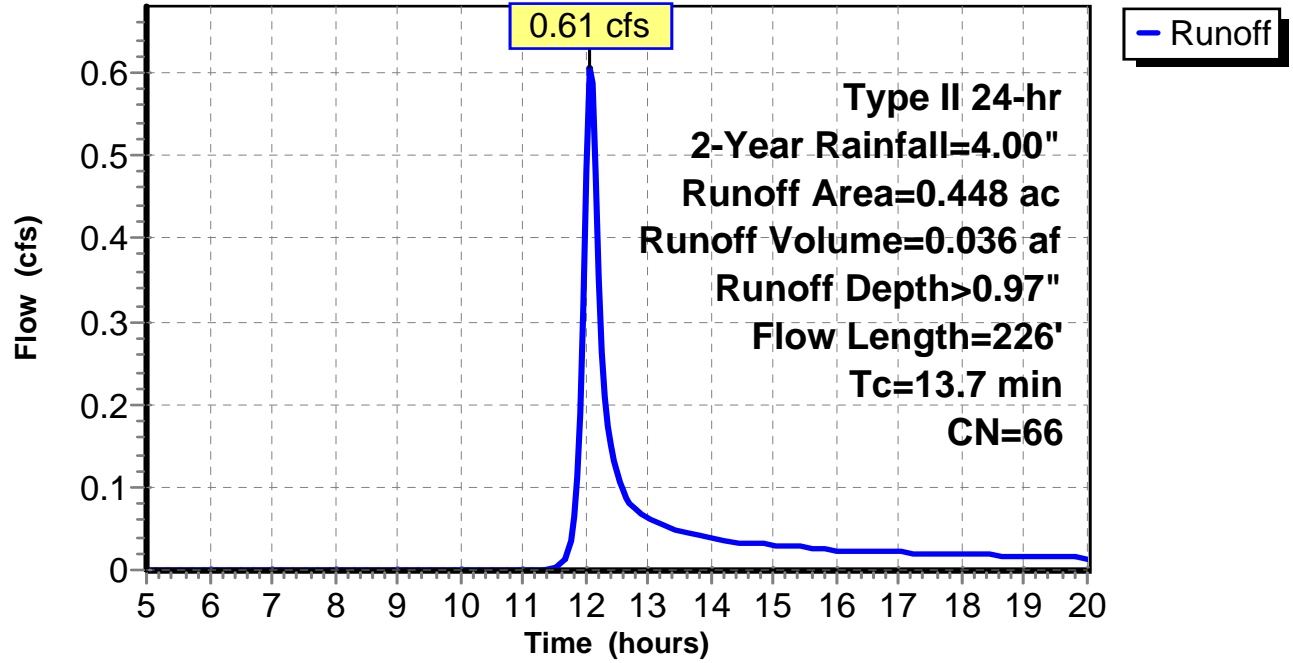
Subcatchment 8: C 218.007

Hydrograph



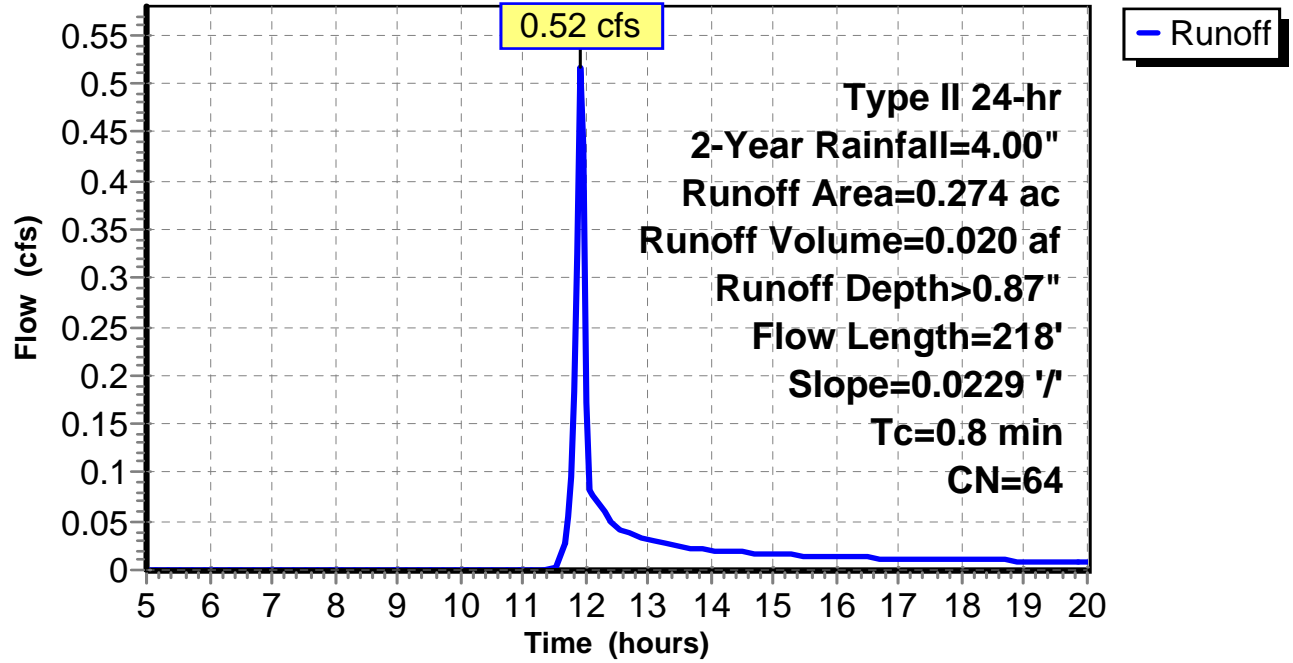
Subcatchment 1: C AR-510.004

Hydrograph



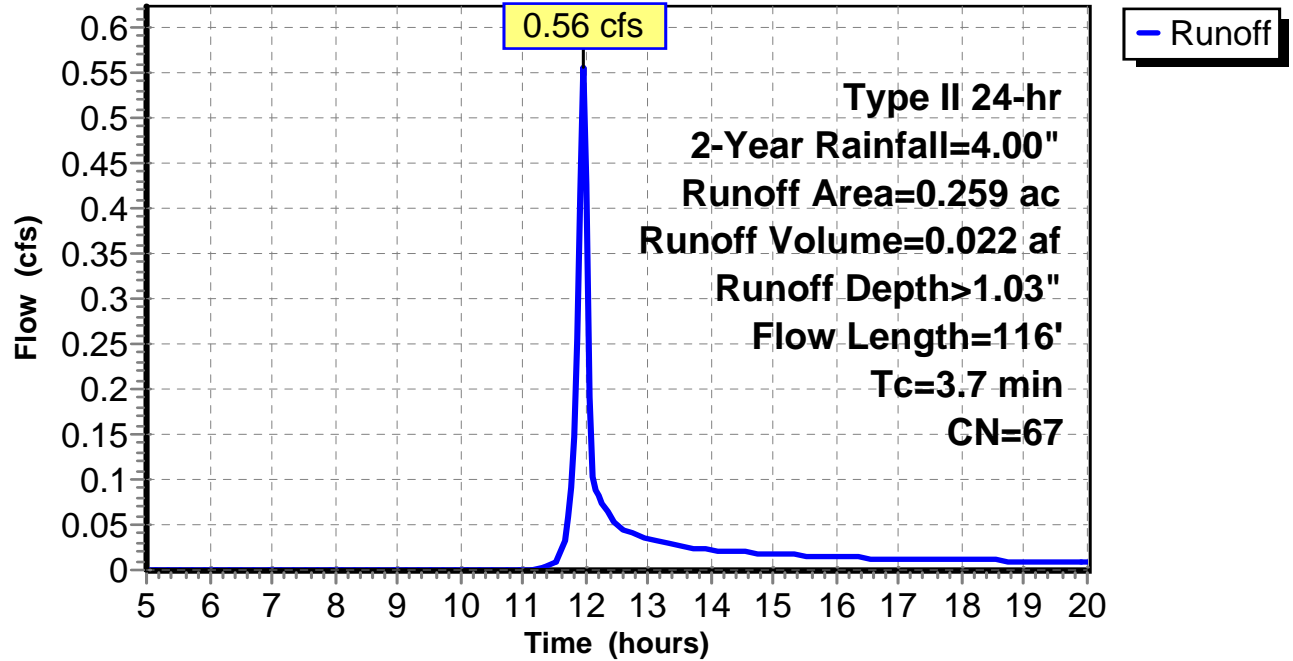
Subcatchment 2: C 218.001

Hydrograph



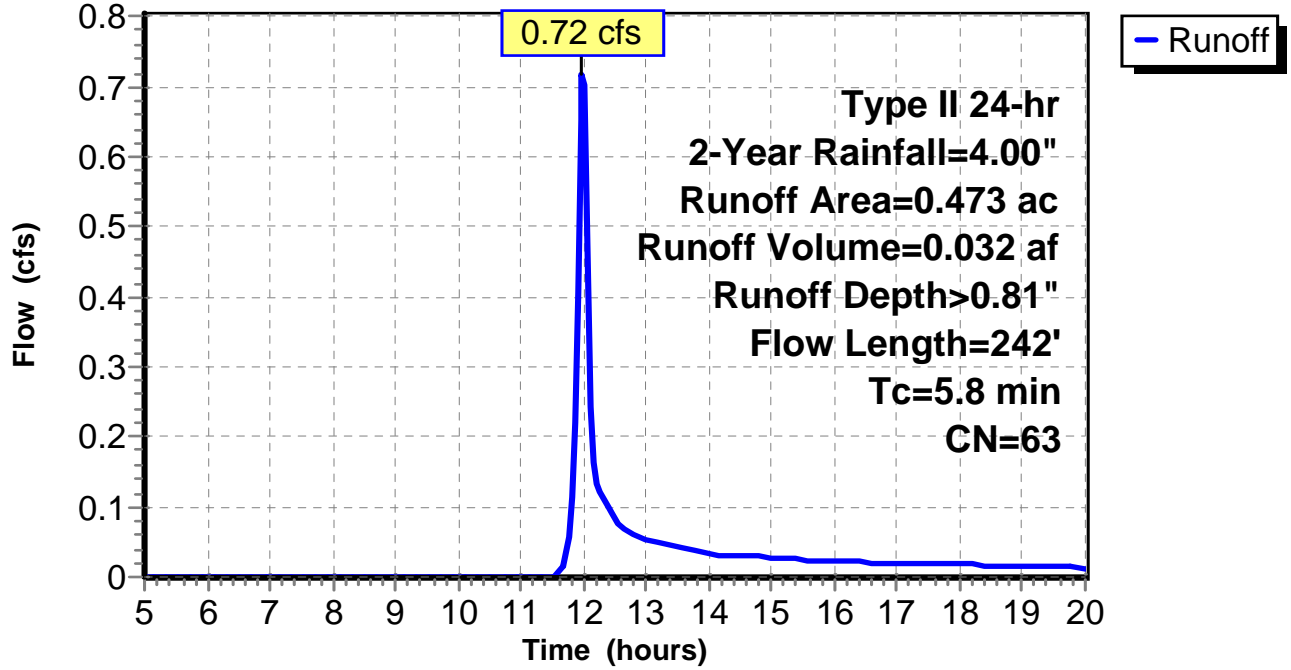
Subcatchment 3: C 218.002

Hydrograph



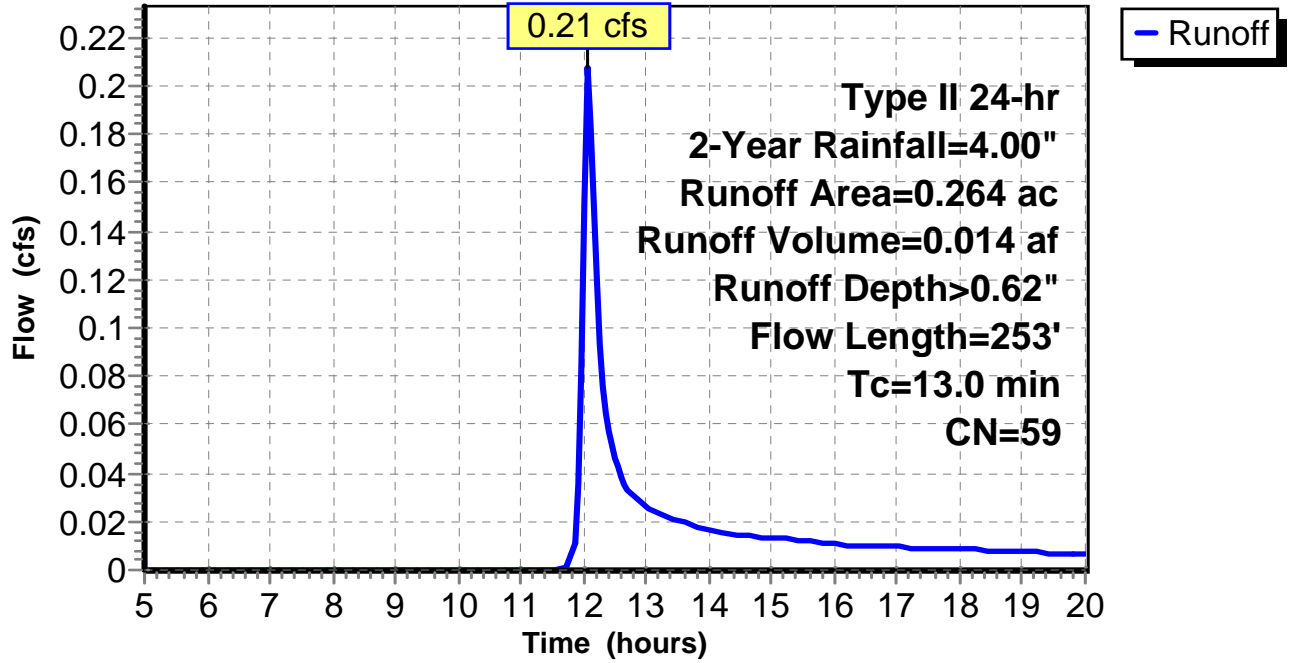
Subcatchment 4: C 218.003

Hydrograph



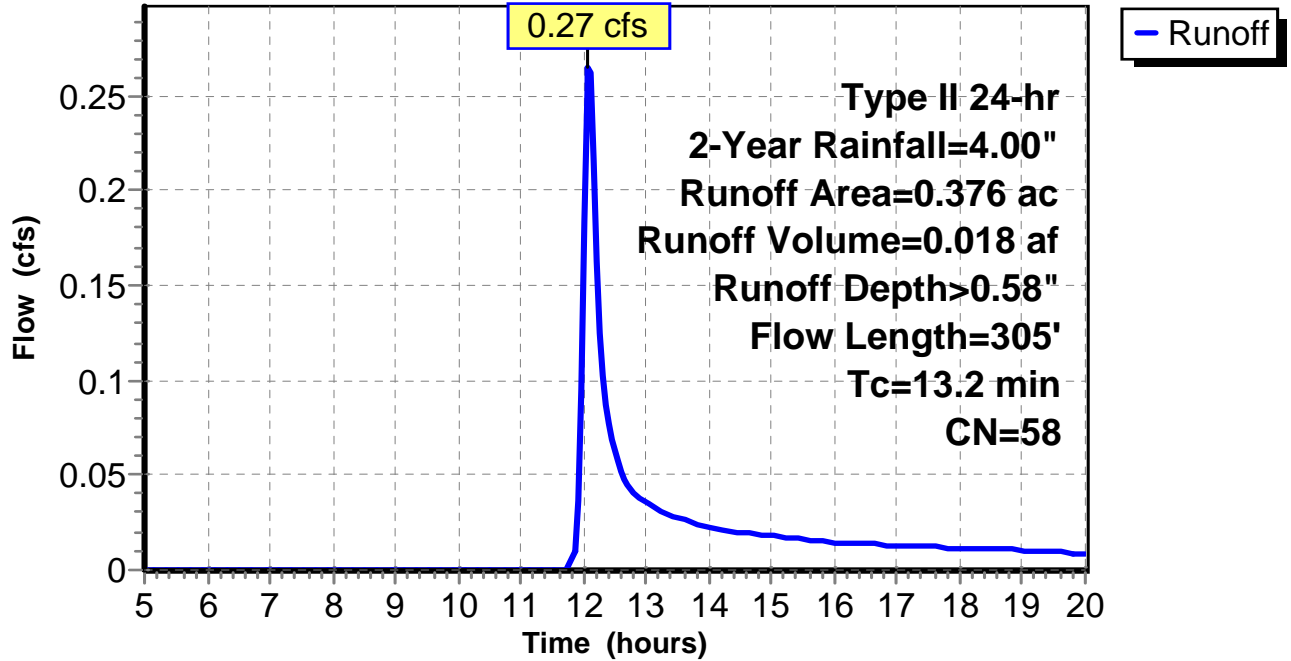
Subcatchment 5: C 218.004

Hydrograph



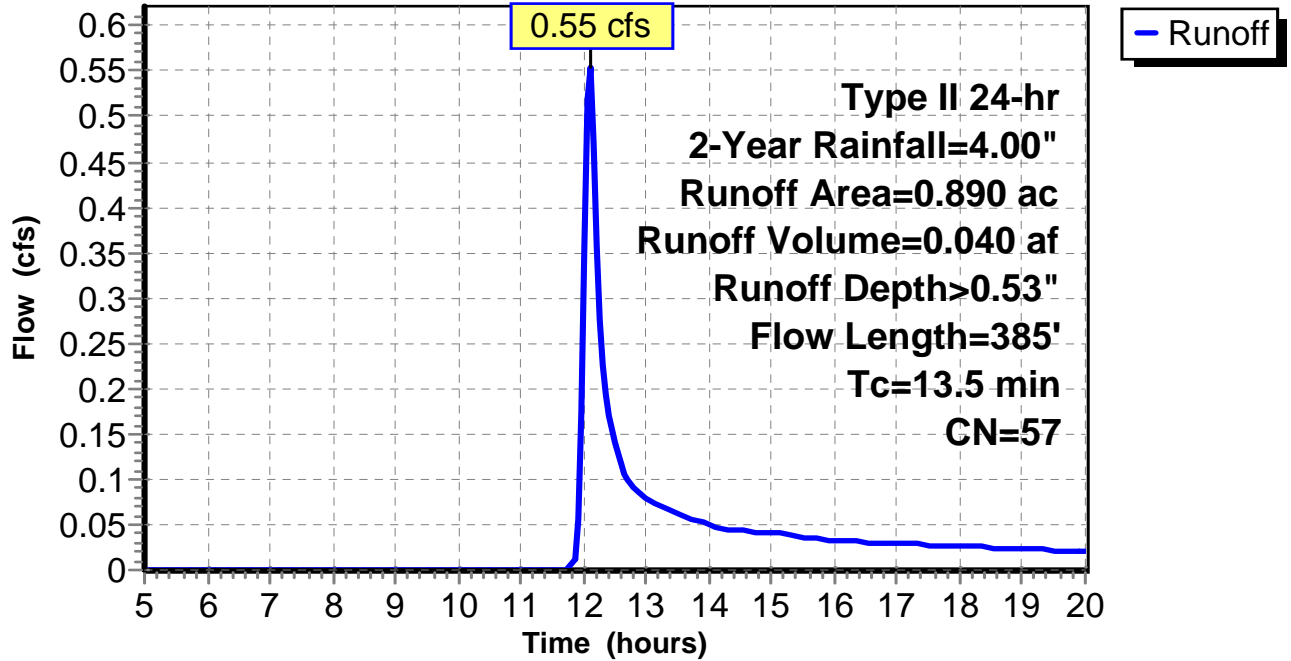
Subcatchment 6: C 218.005

Hydrograph



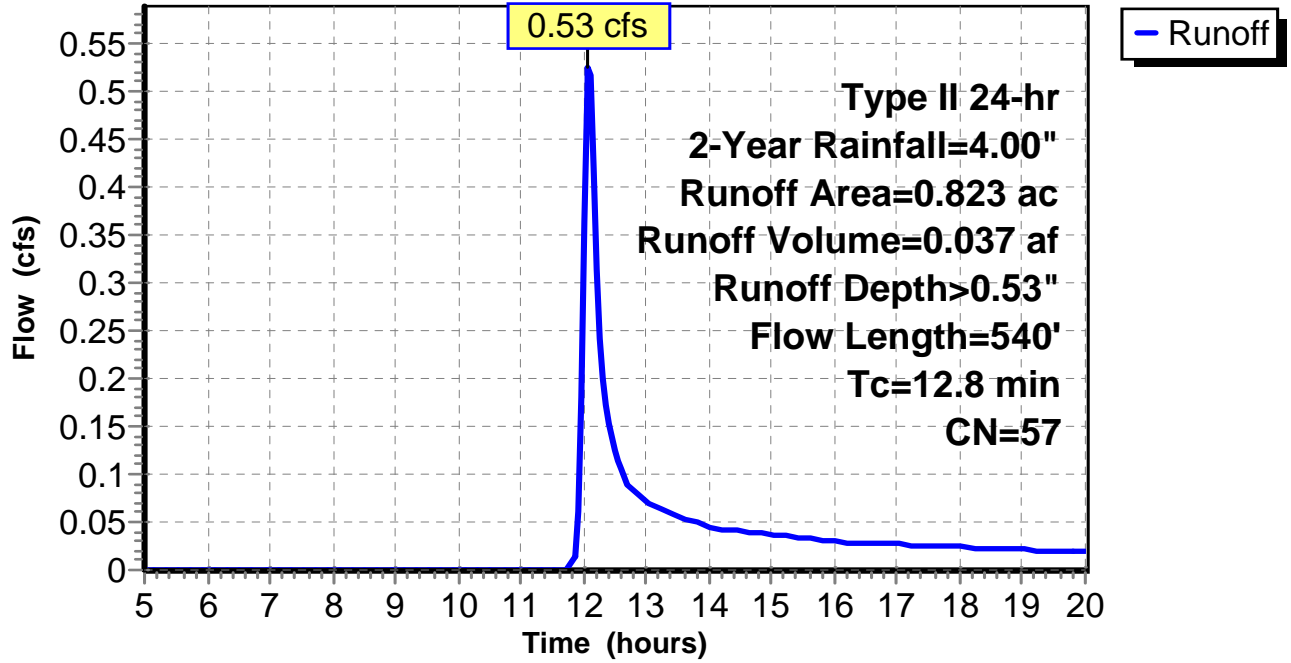
Subcatchment 7: C 218.006

Hydrograph



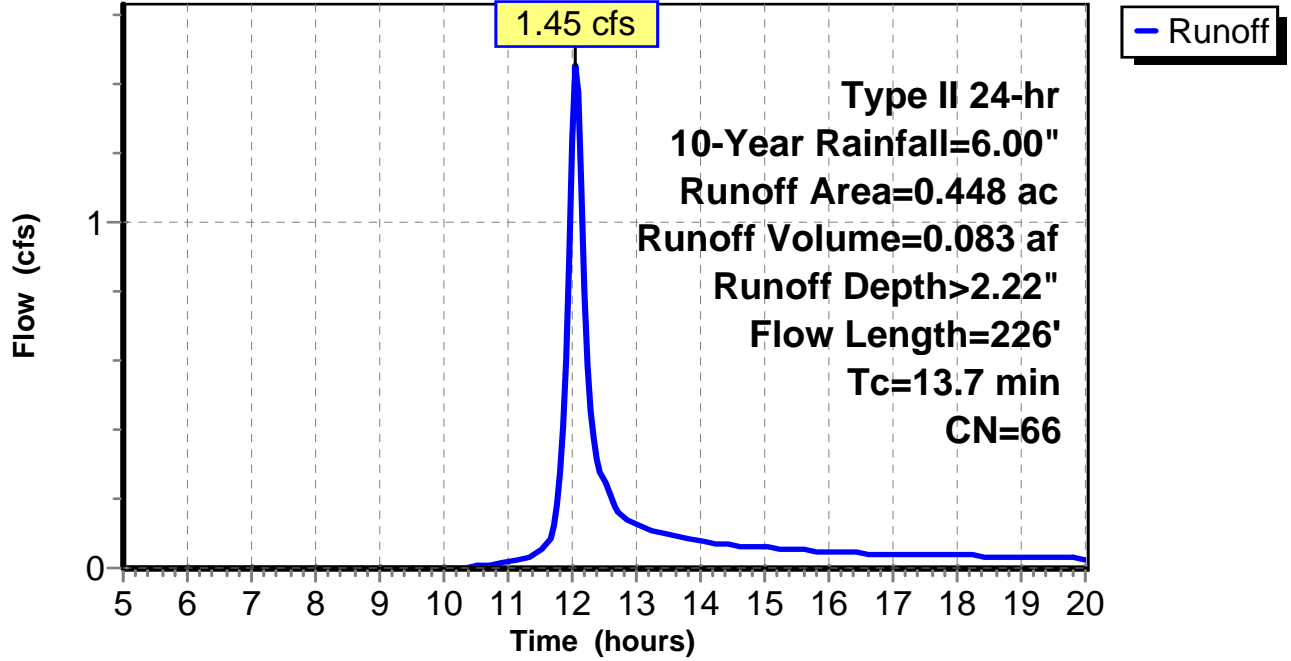
Subcatchment 8: C 218.007

Hydrograph



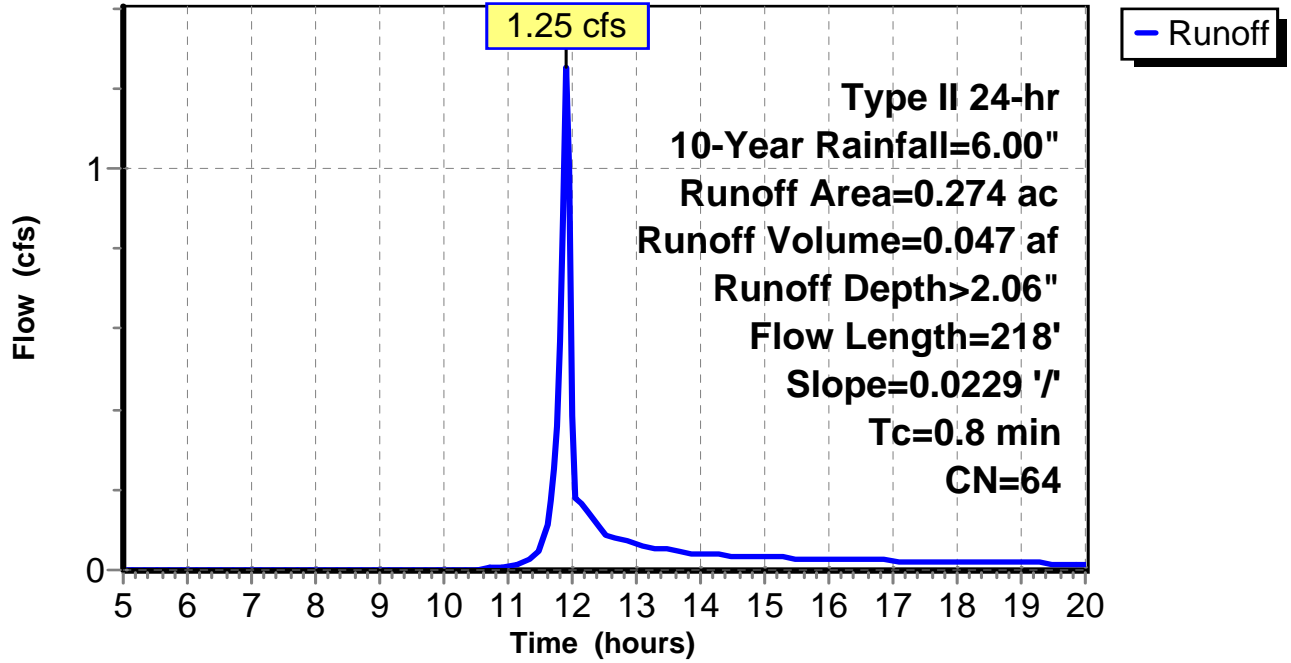
Subcatchment 1: C AR-510.004

Hydrograph



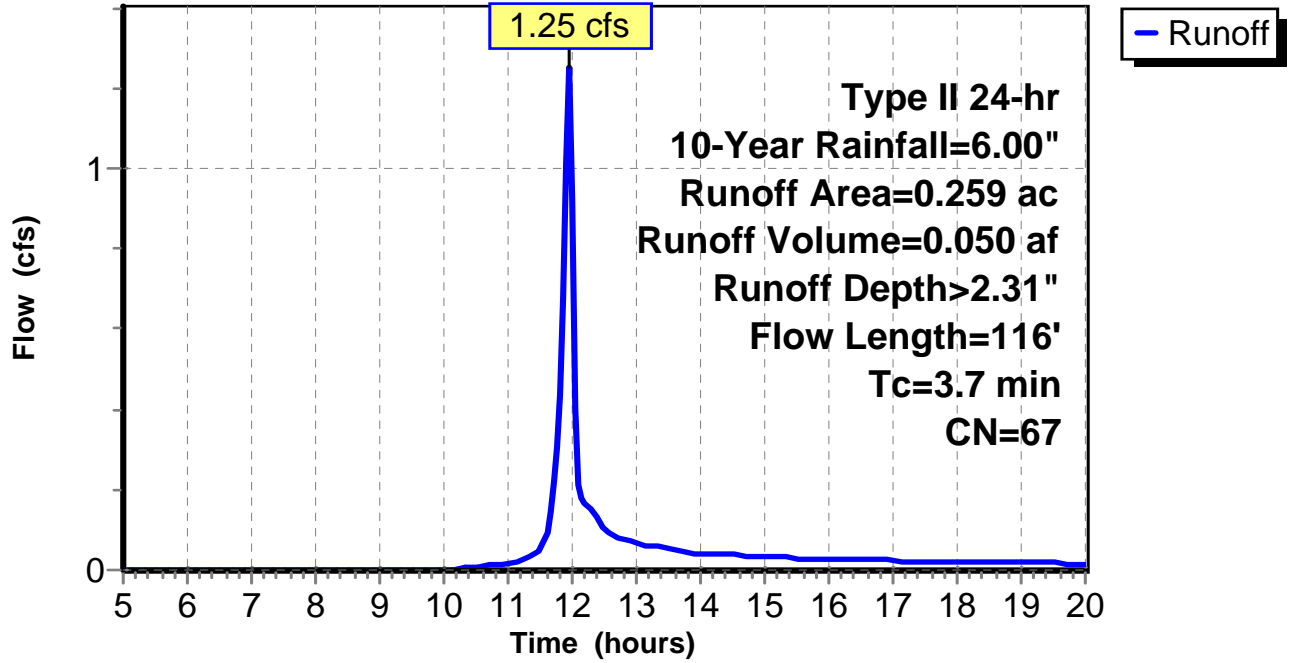
Subcatchment 2: C 218.001

Hydrograph



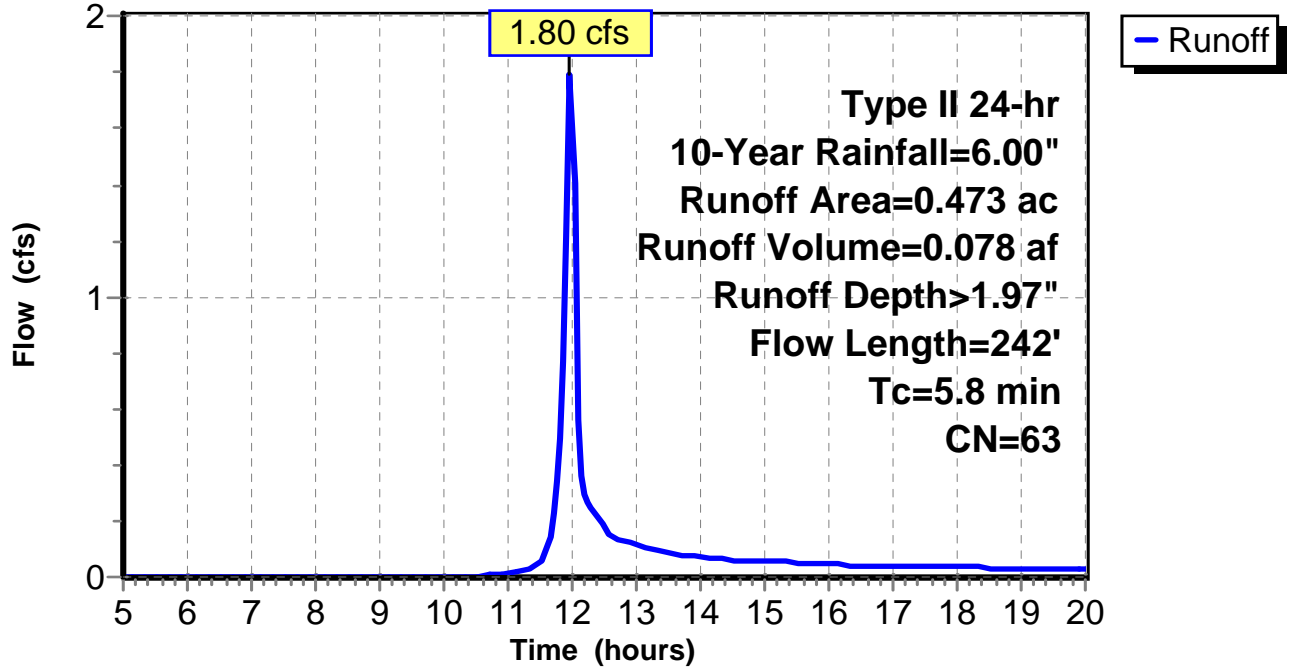
Subcatchment 3: C 218.002

Hydrograph



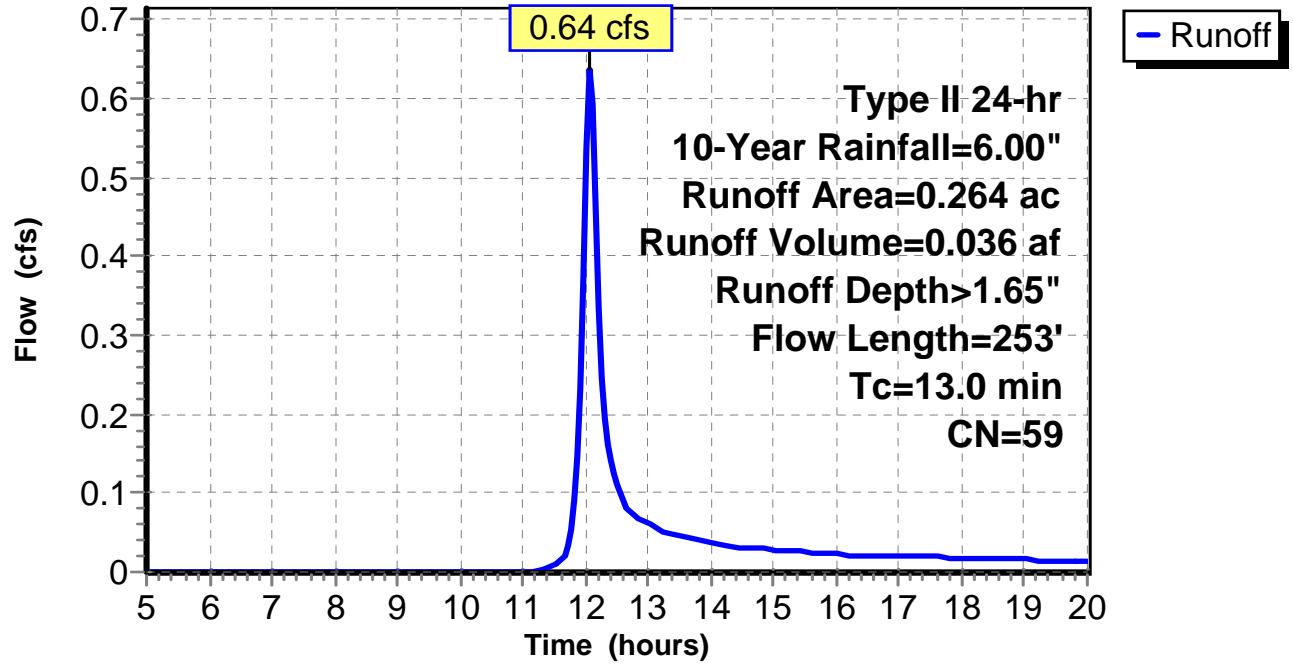
Subcatchment 4: C 218.003

Hydrograph



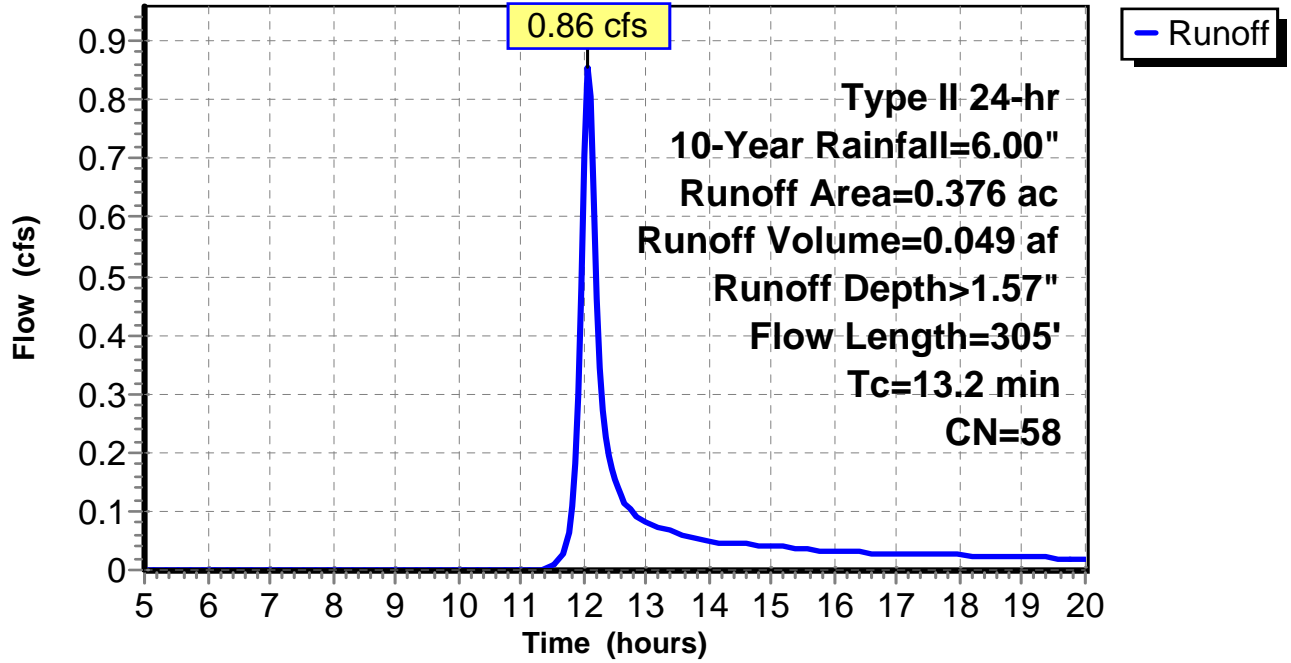
Subcatchment 5: C 218.004

Hydrograph



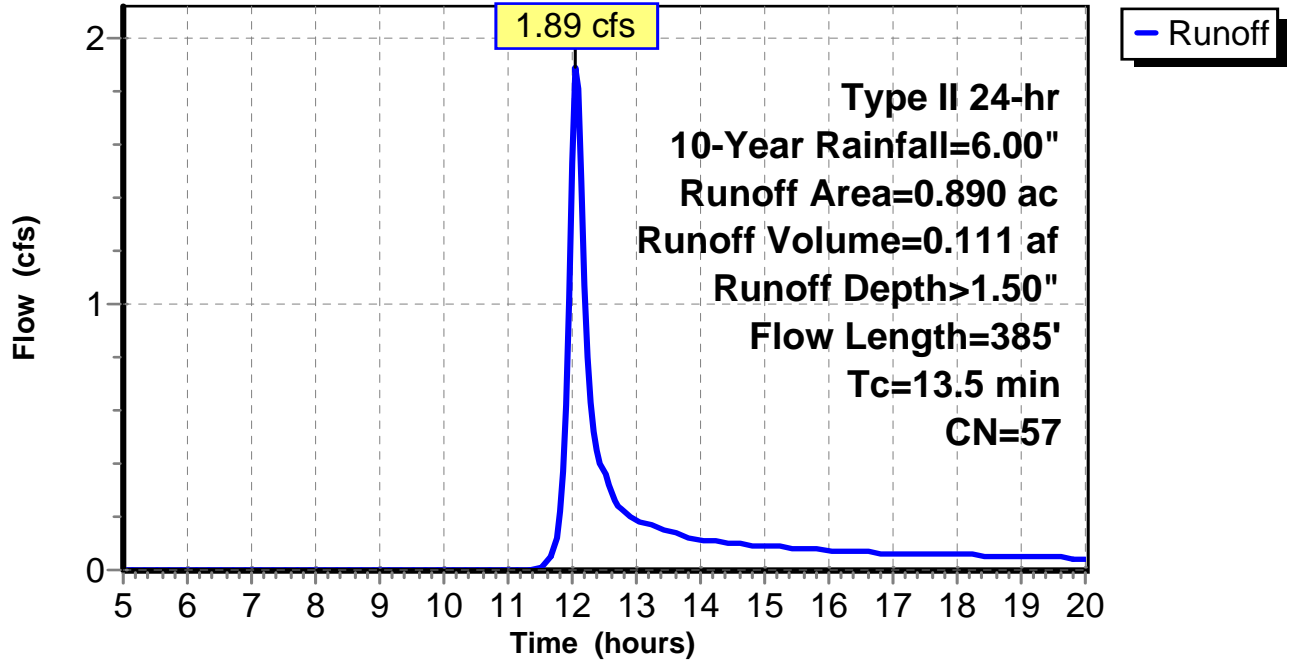
Subcatchment 6: C 218.005

Hydrograph



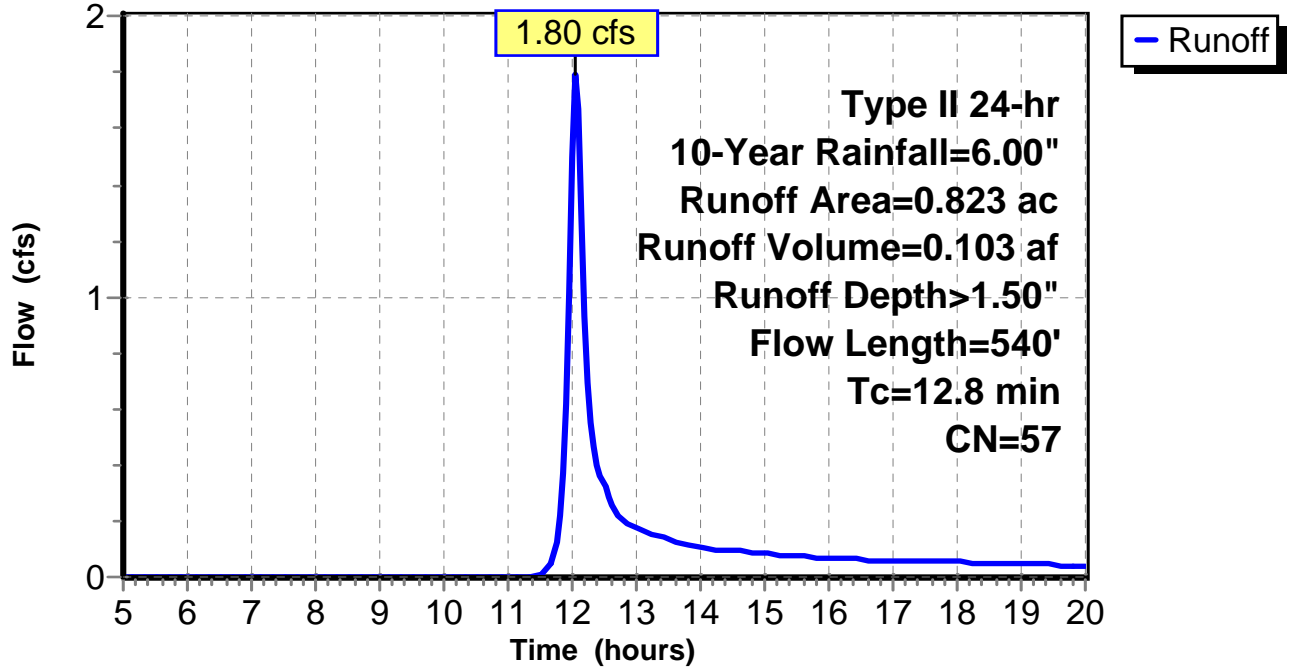
Subcatchment 7: C 218.006

Hydrograph



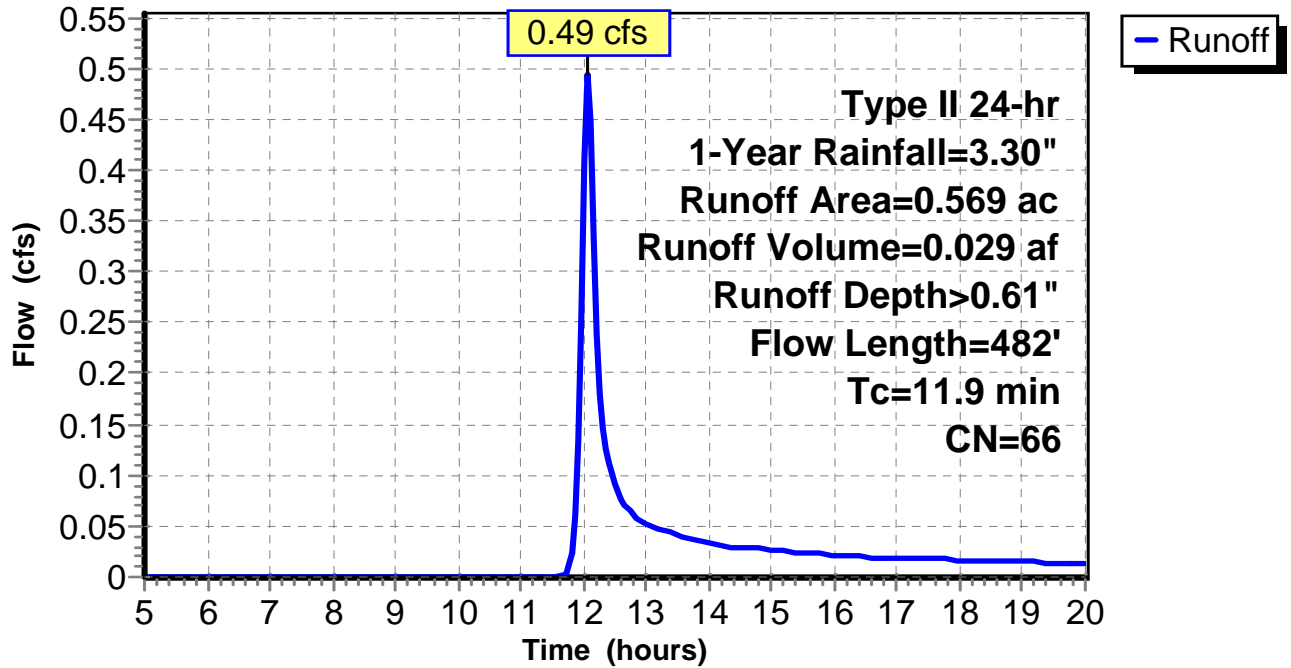
Subcatchment 8: C 218.007

Hydrograph



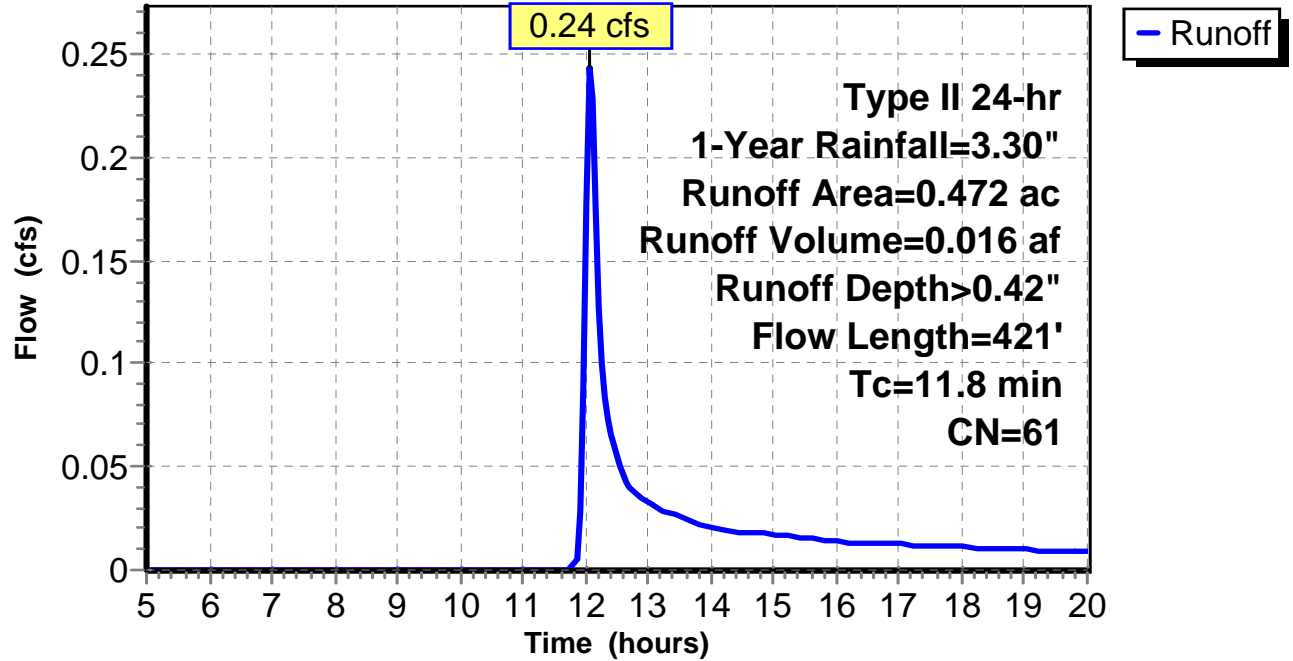
Subcatchment 1: C 219.001

Hydrograph



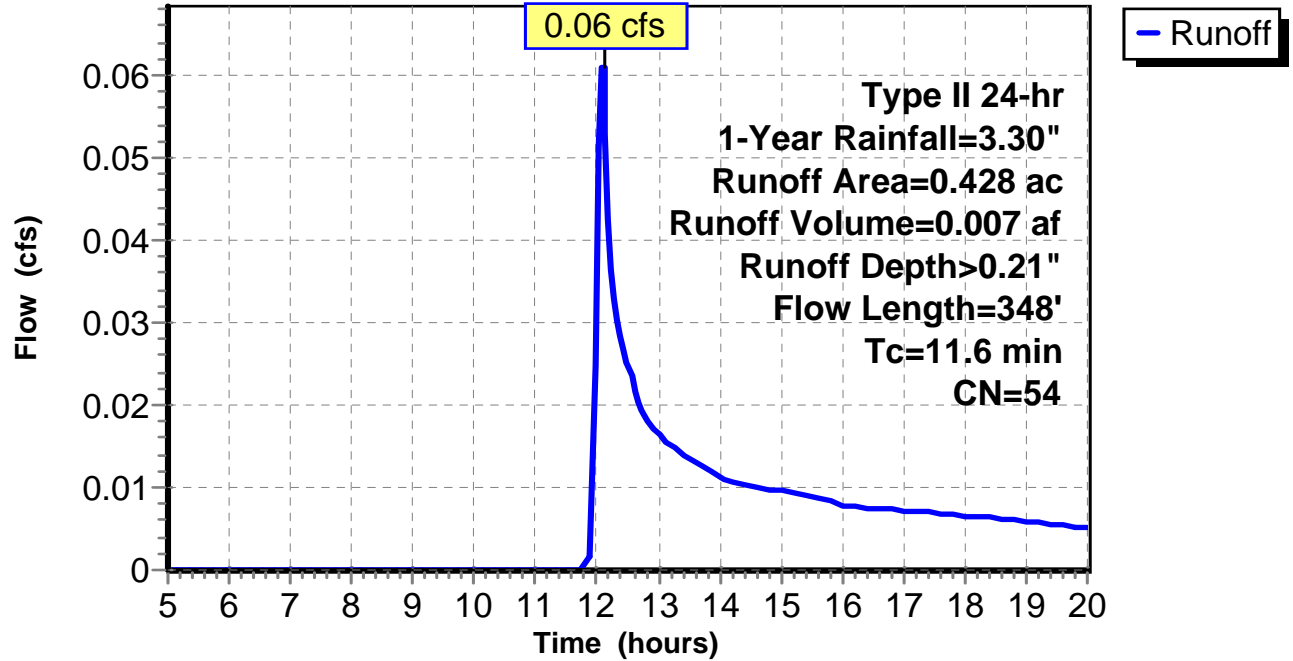
Subcatchment 2: C 219.002

Hydrograph



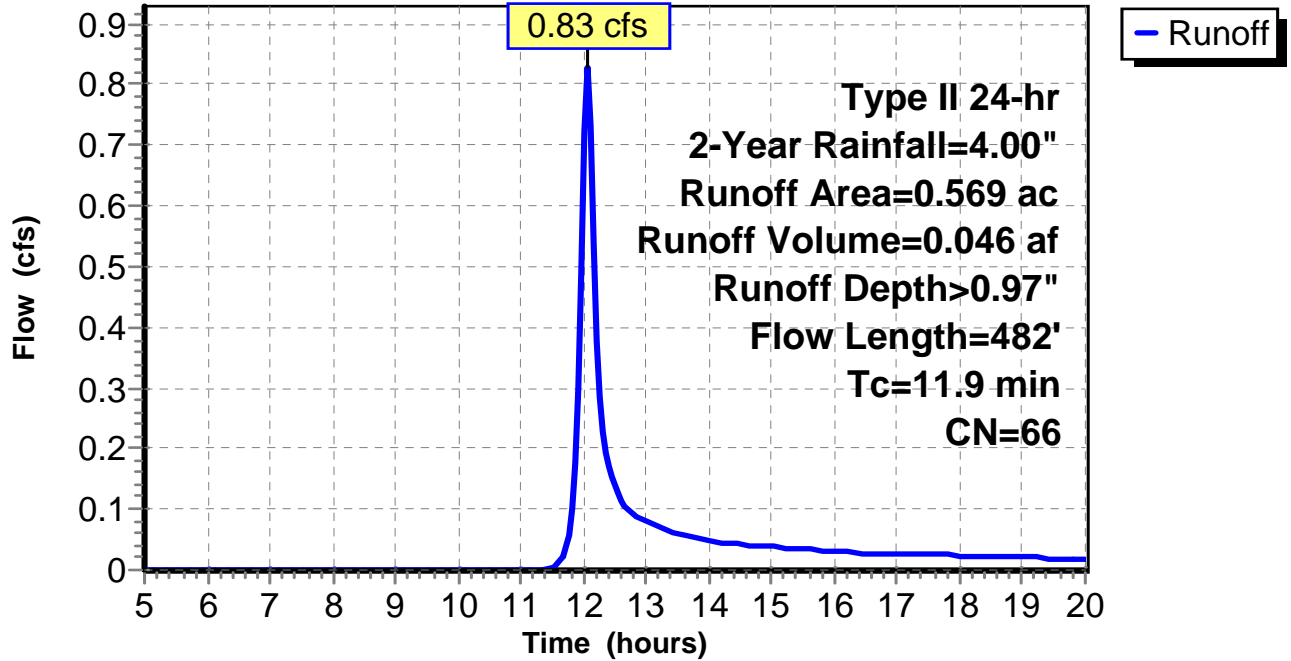
Subcatchment 3: C 219.003

Hydrograph



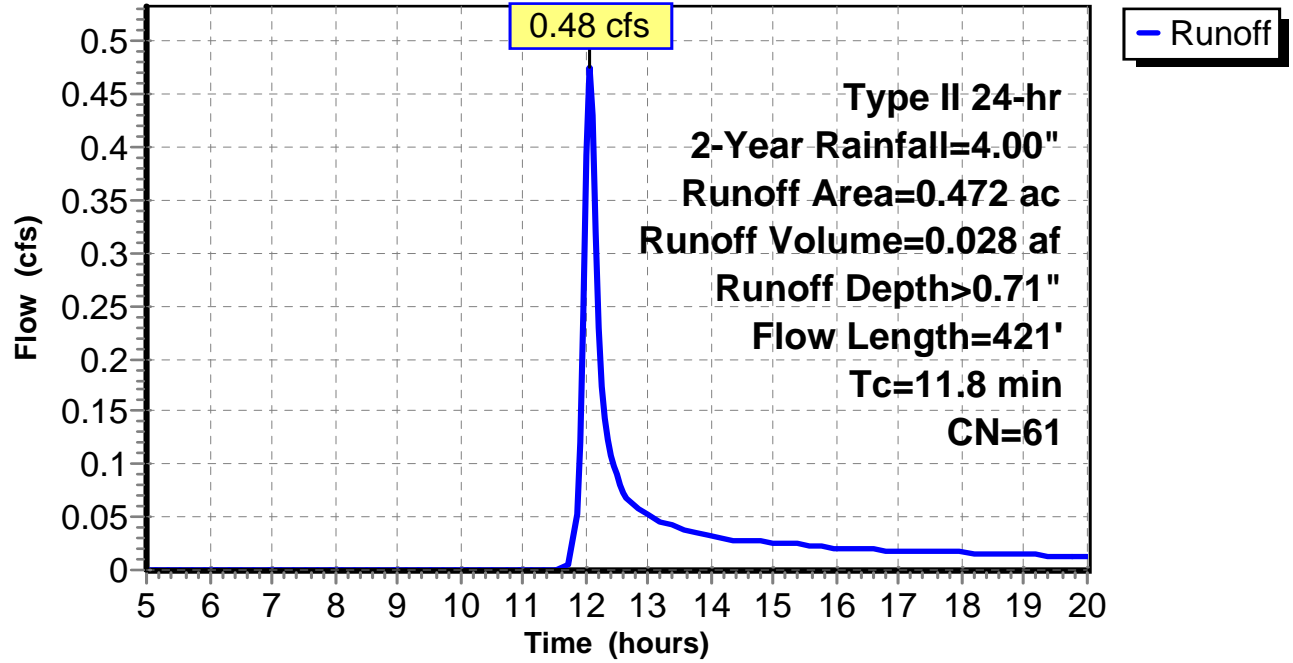
Subcatchment 1: C 219.001

Hydrograph



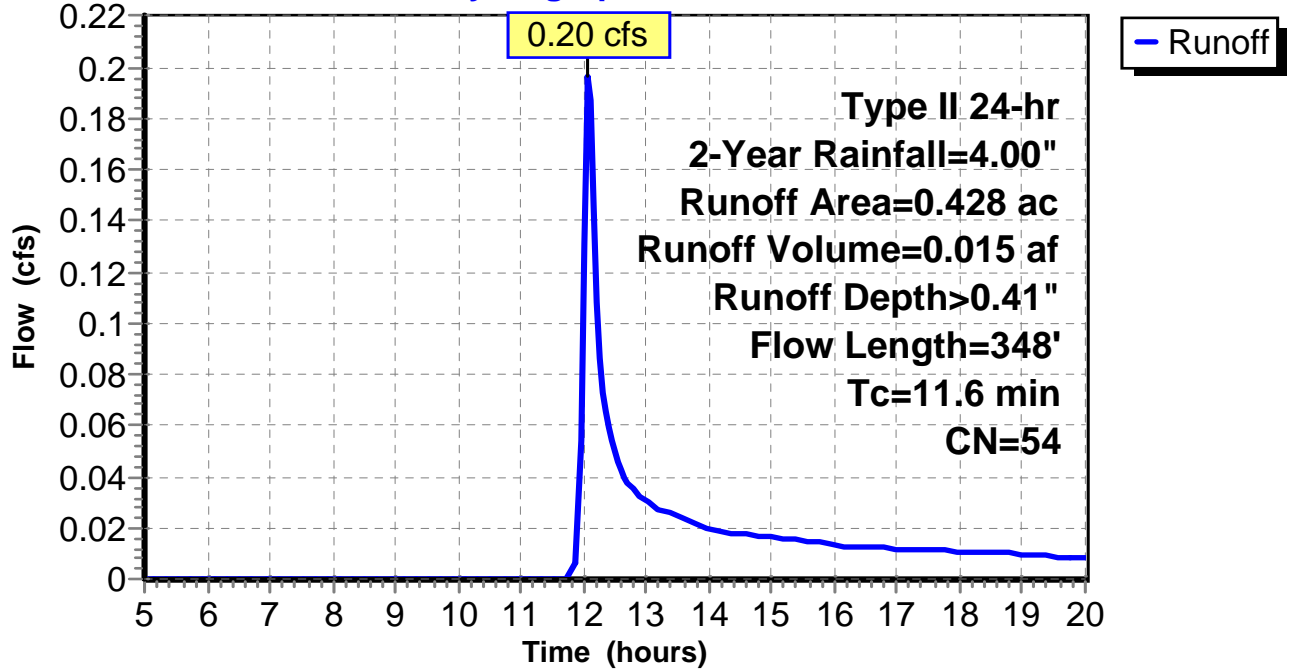
Subcatchment 2: C 219.002

Hydrograph



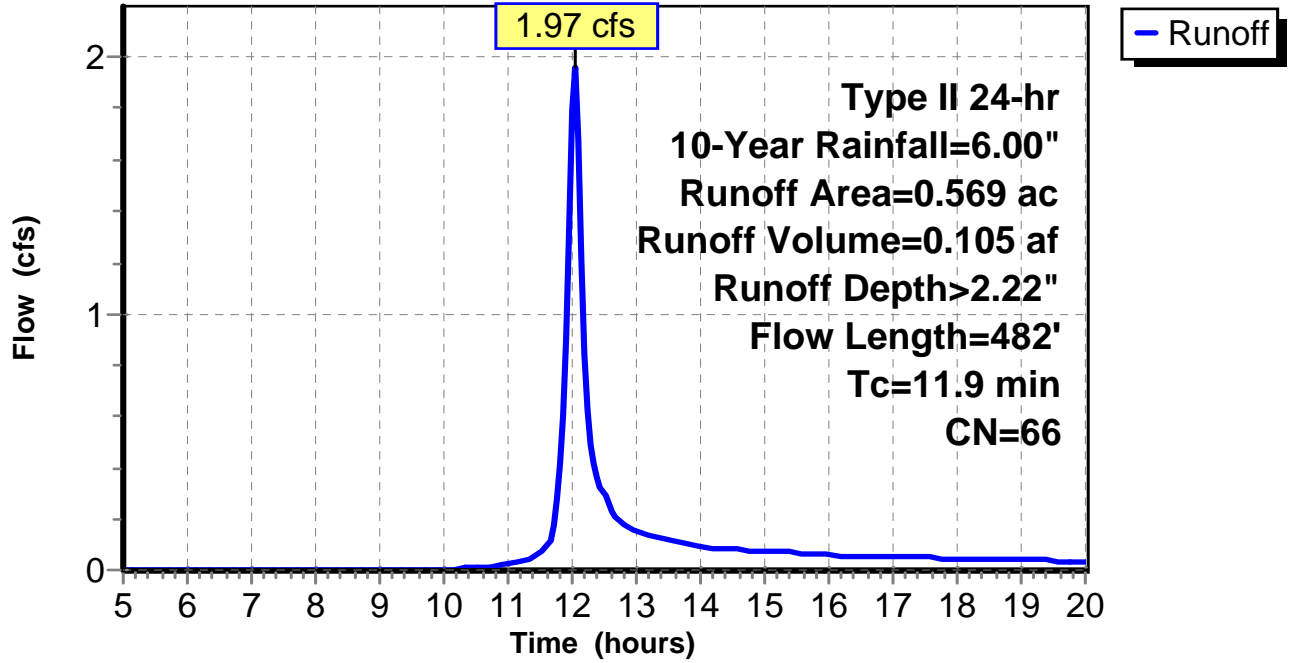
Subcatchment 3: C 219.003

Hydrograph



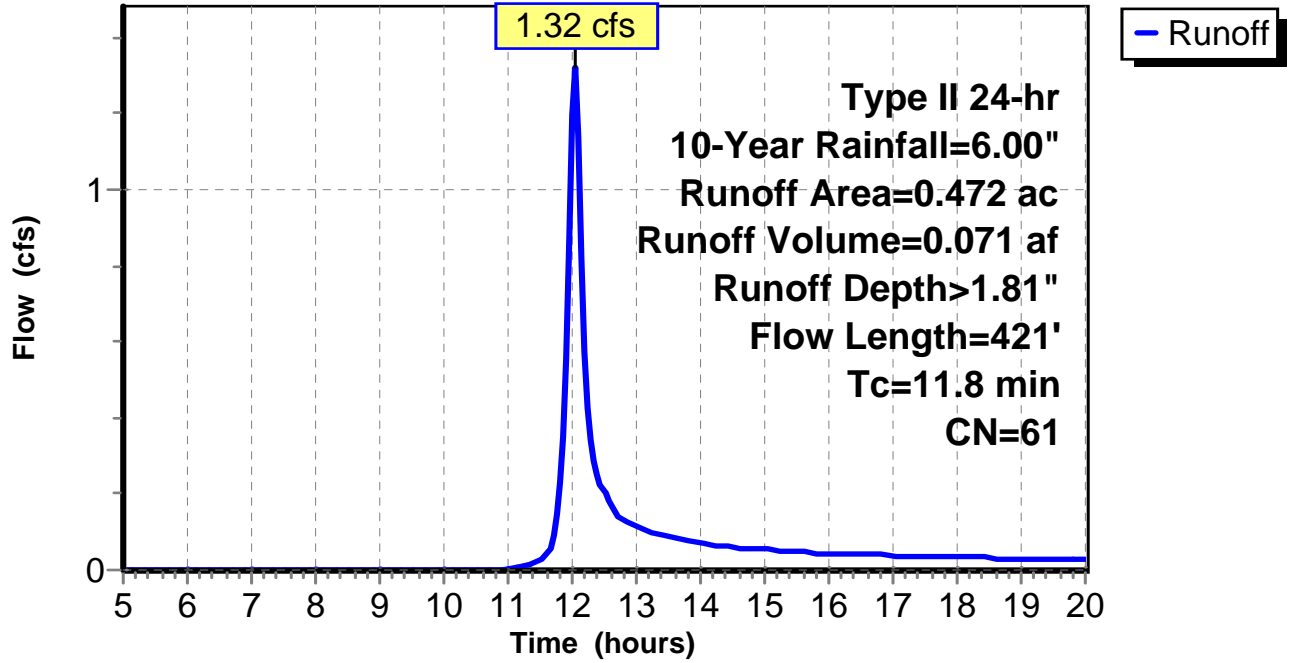
Subcatchment 1: C 219.001

Hydrograph



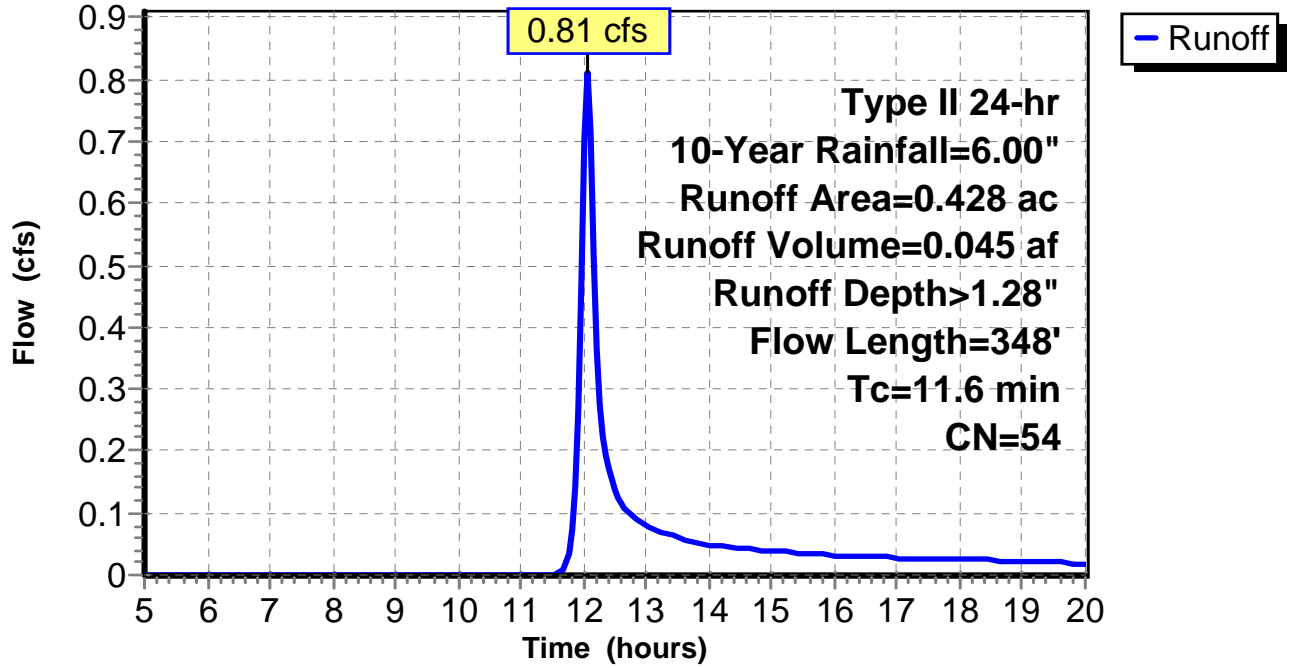
Subcatchment 2: C 219.002

Hydrograph



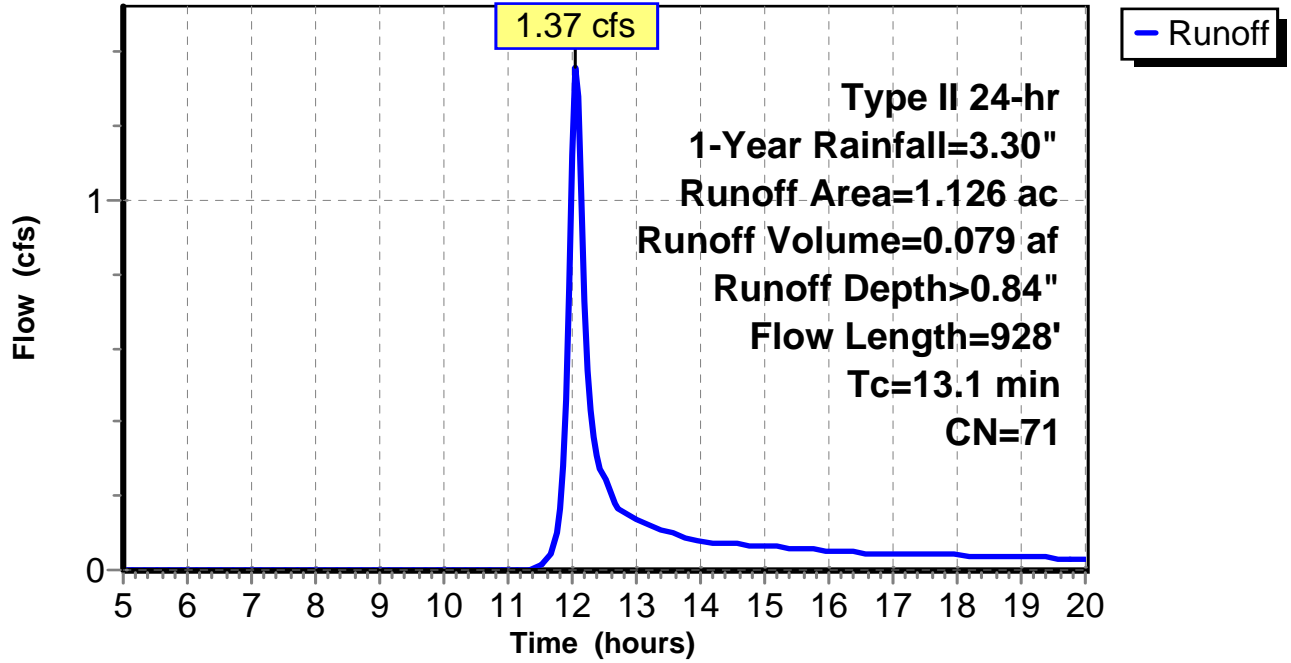
Subcatchment 3: C 219.003

Hydrograph



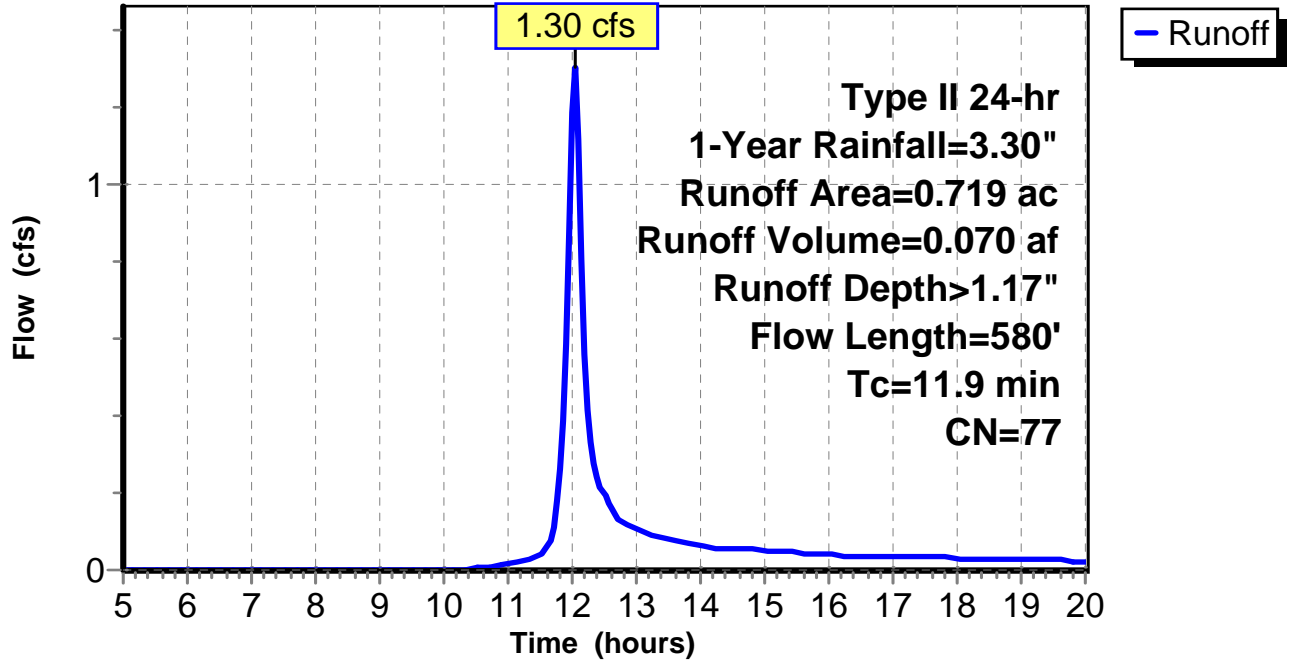
Subcatchment 1: C AR-513.001

Hydrograph



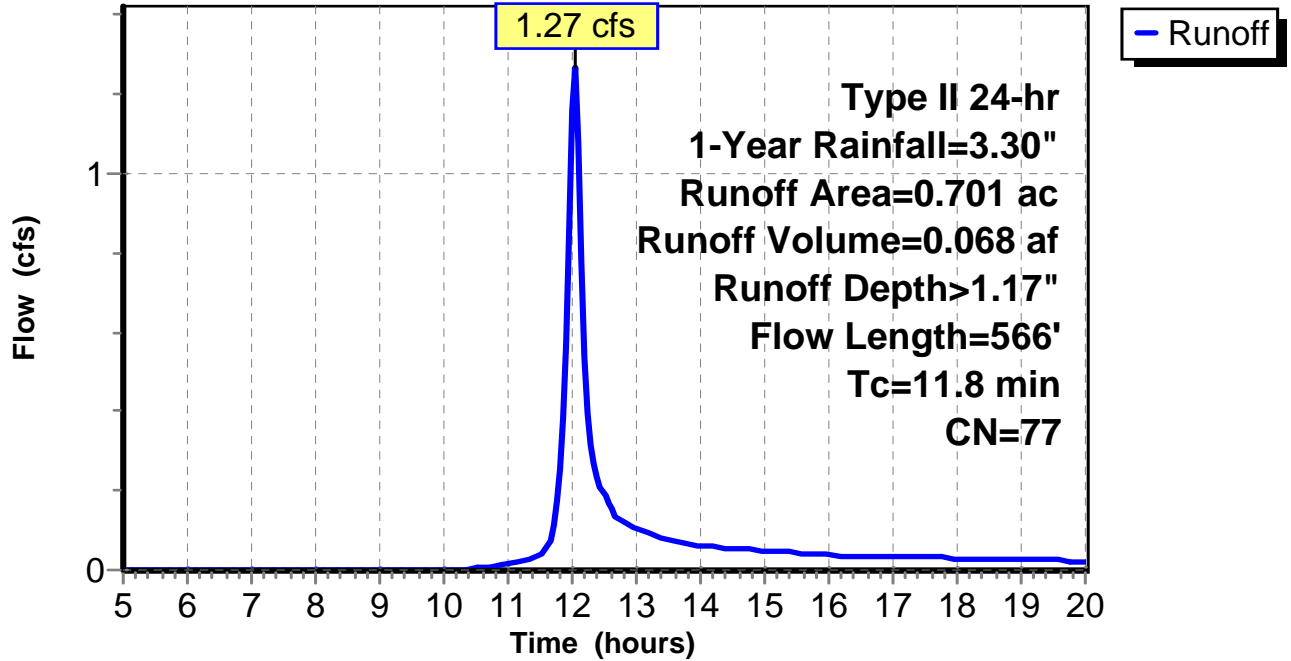
Subcatchment 2: C AR-513.002

Hydrograph



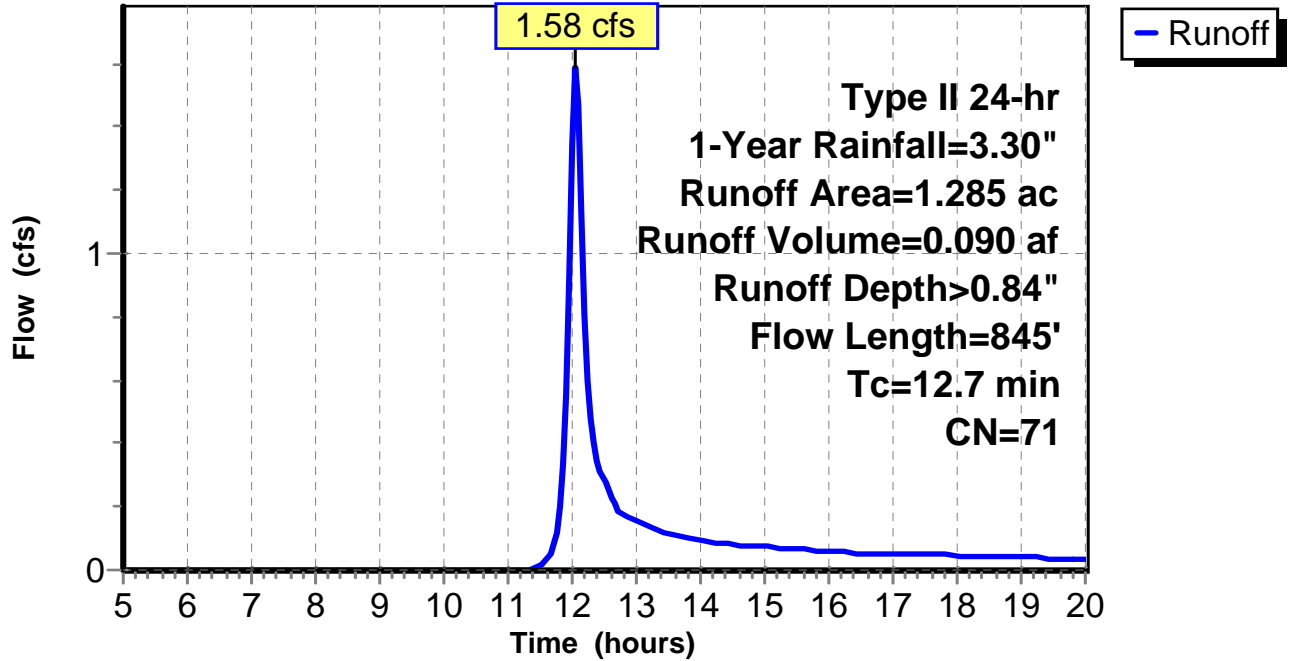
Subcatchment 3: C AR-513.003

Hydrograph



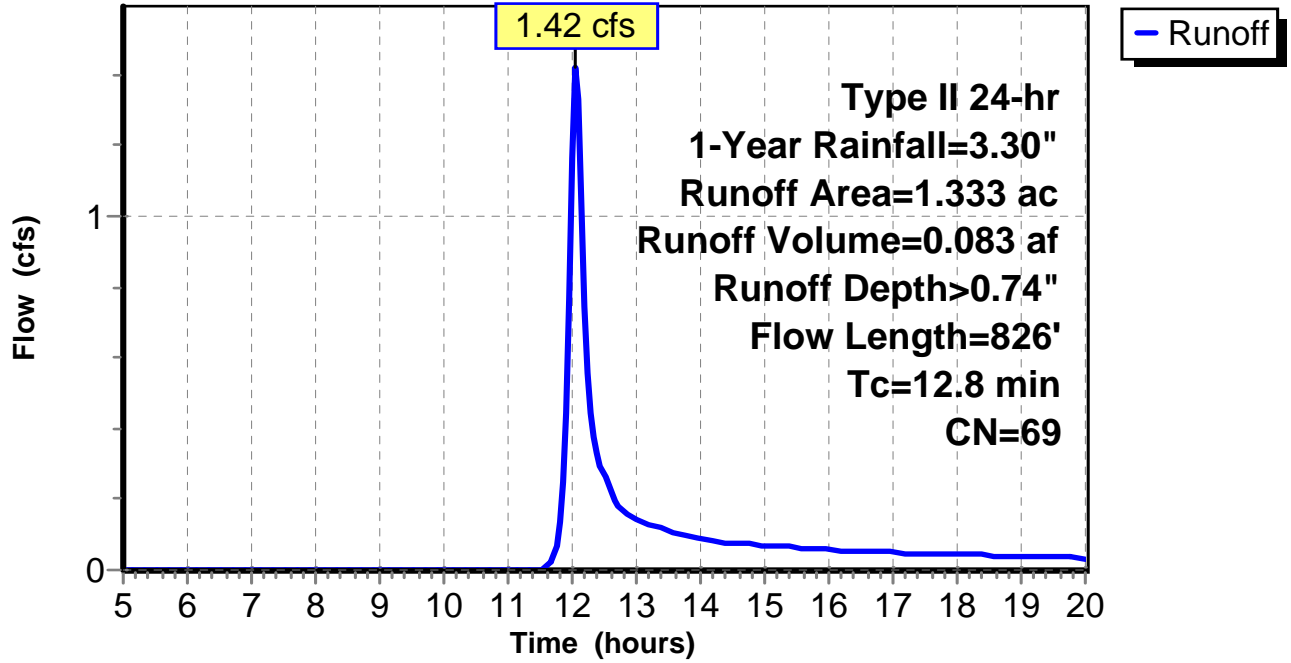
Subcatchment 4: C AR-513.004

Hydrograph



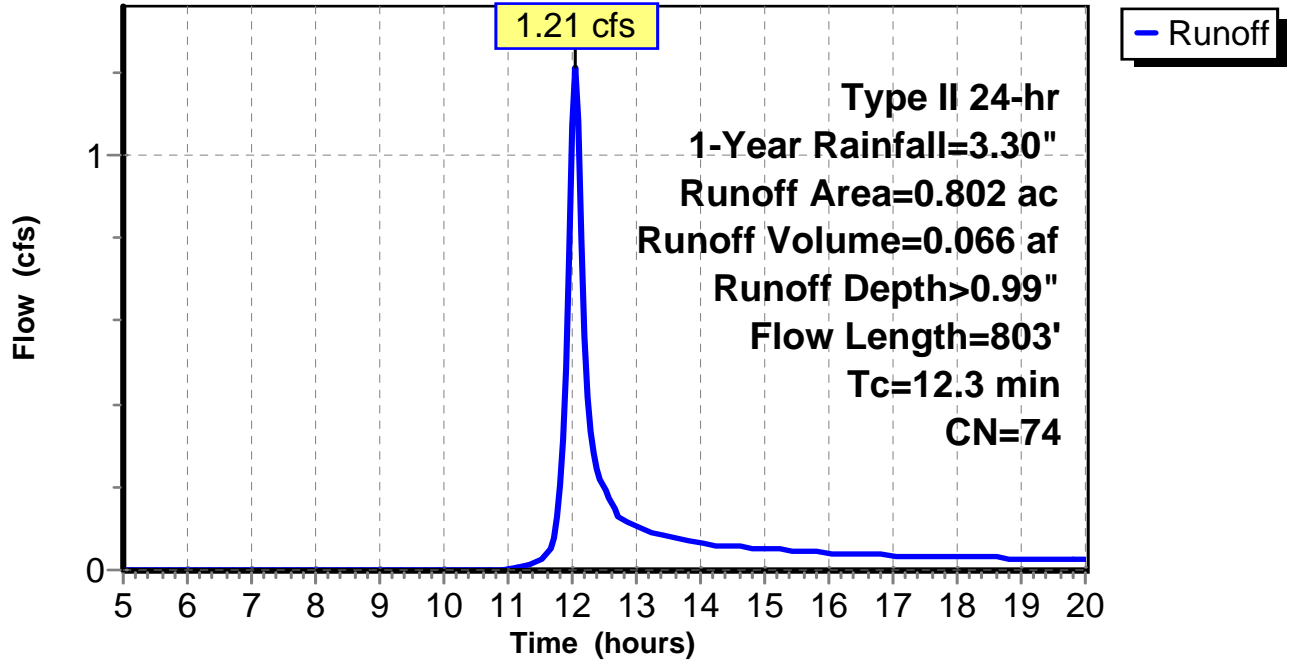
Subcatchment 5: C AR-513.005

Hydrograph



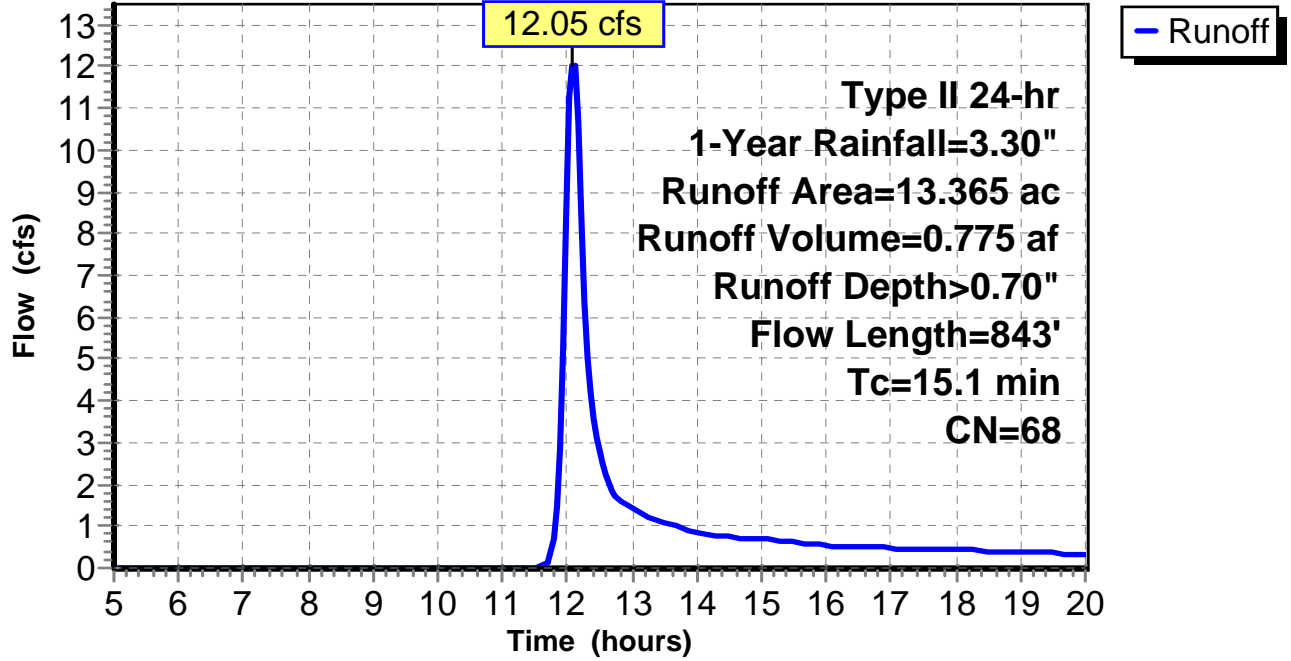
Subcatchment 6: C AR-513.006

Hydrograph



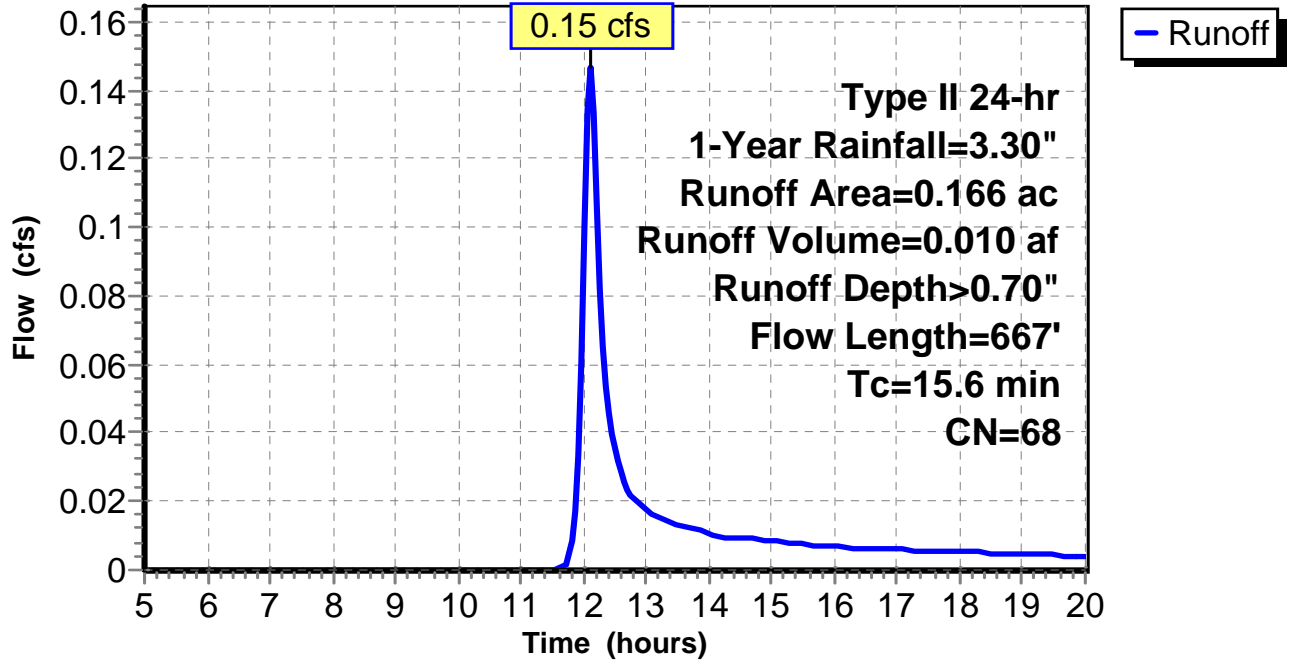
Subcatchment 7: C AR-513.007

Hydrograph



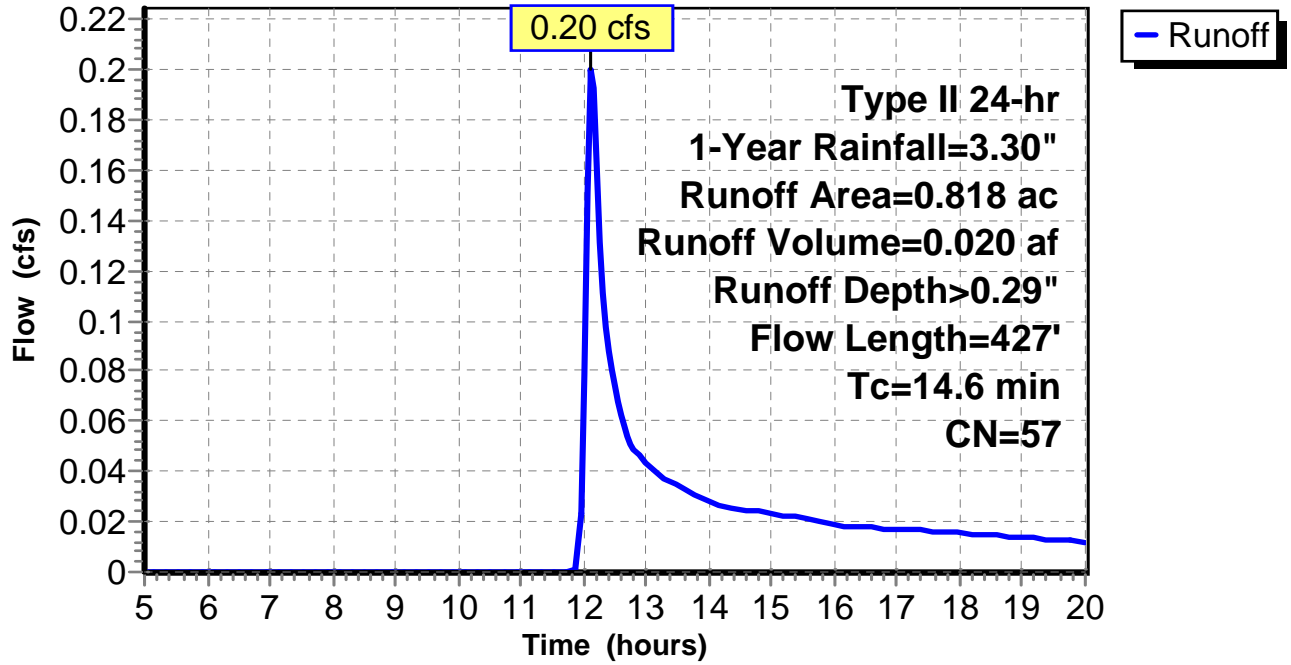
Subcatchment 8: C AR-513.008

Hydrograph



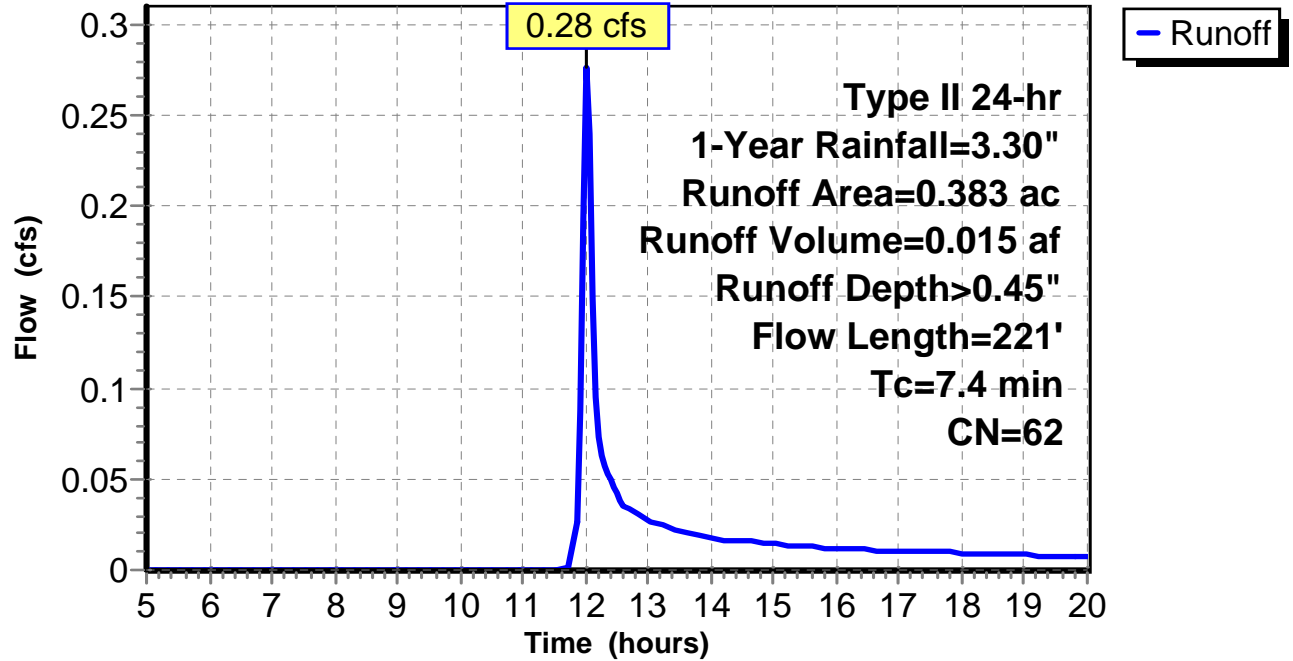
Subcatchment 9: C AR-513.009

Hydrograph



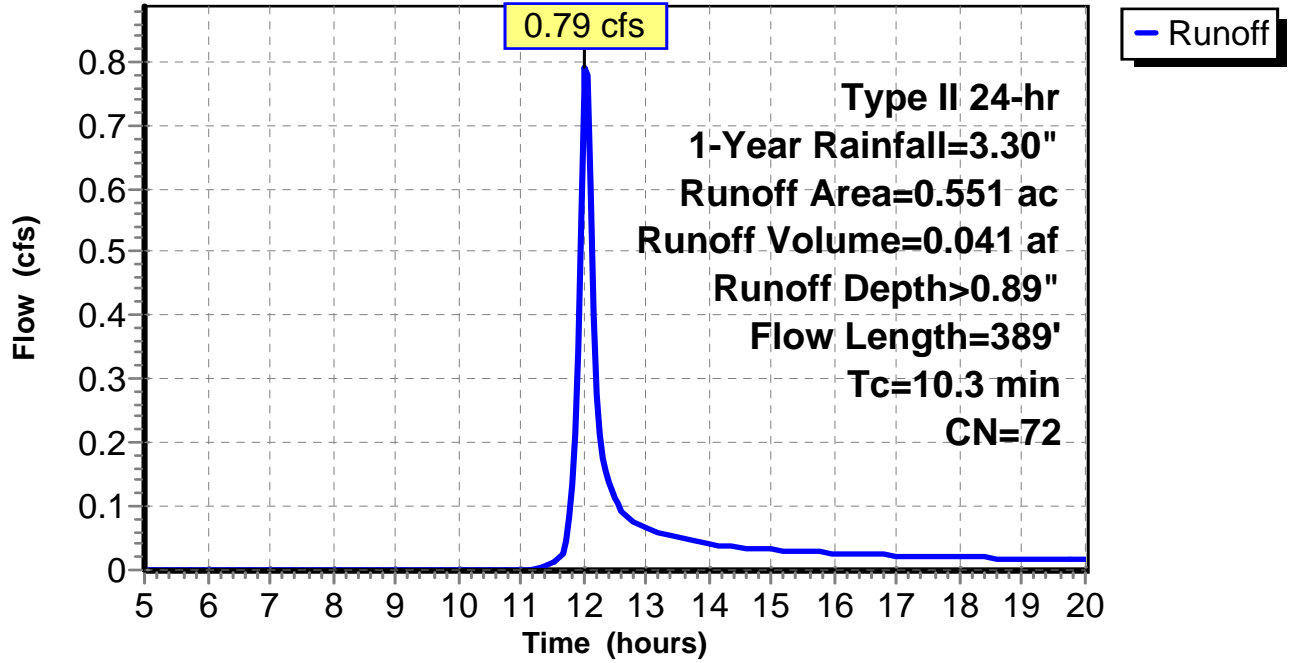
Subcatchment 10: C AR-513.010

Hydrograph



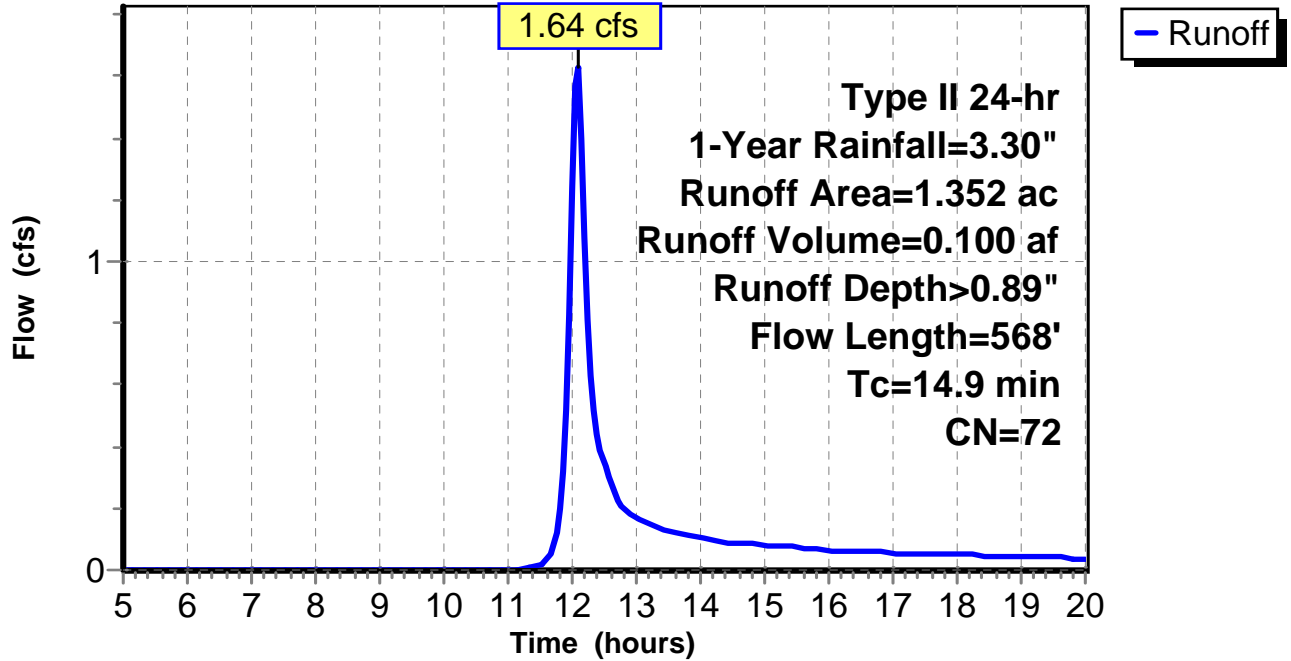
Subcatchment 11: C 227.001

Hydrograph



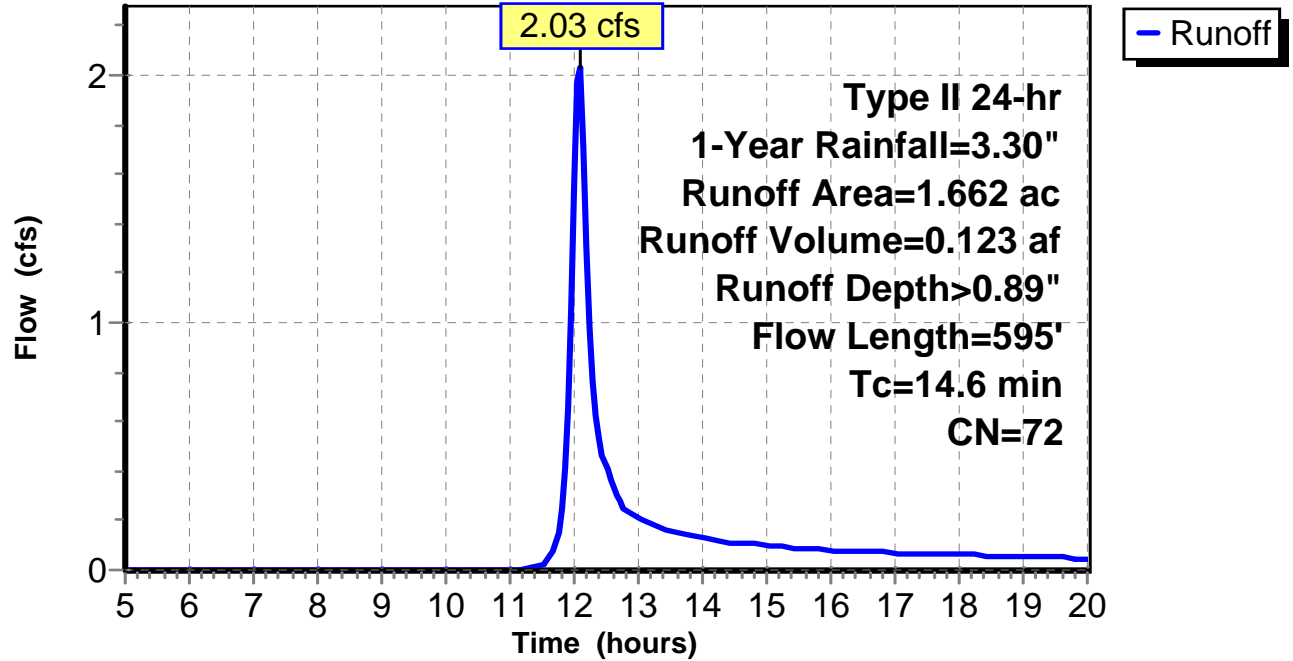
Subcatchment 12: C 227.002

Hydrograph



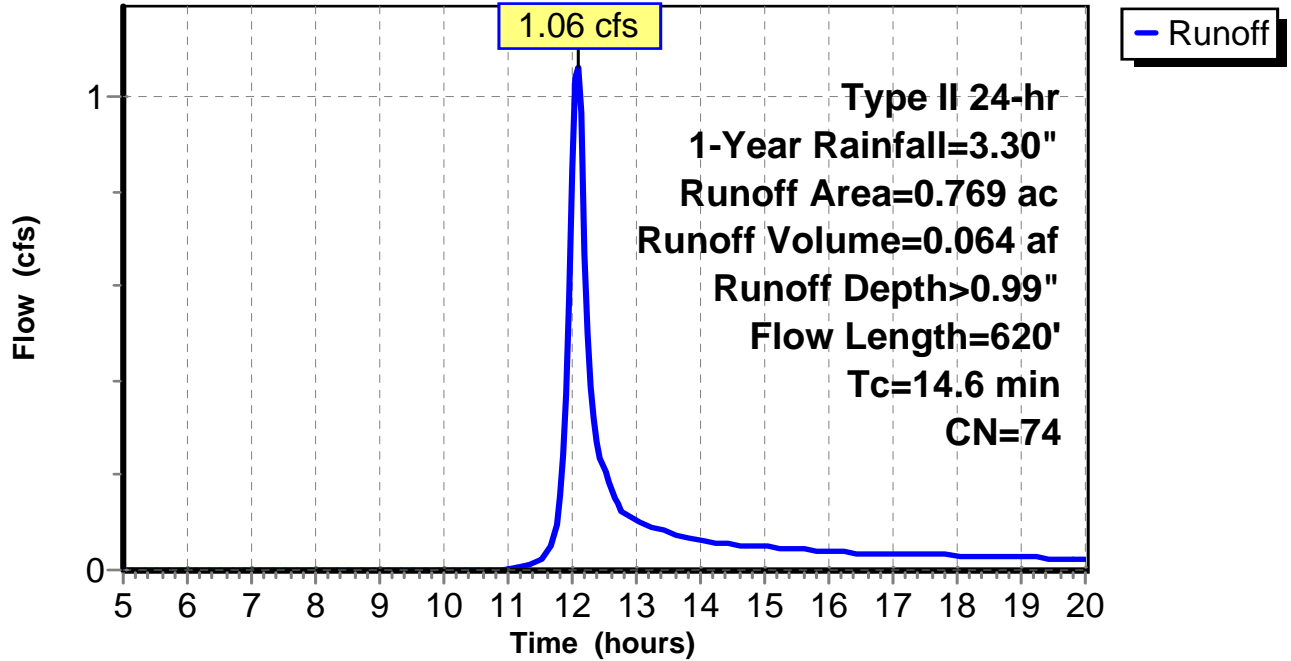
Subcatchment 13: C 227.003

Hydrograph



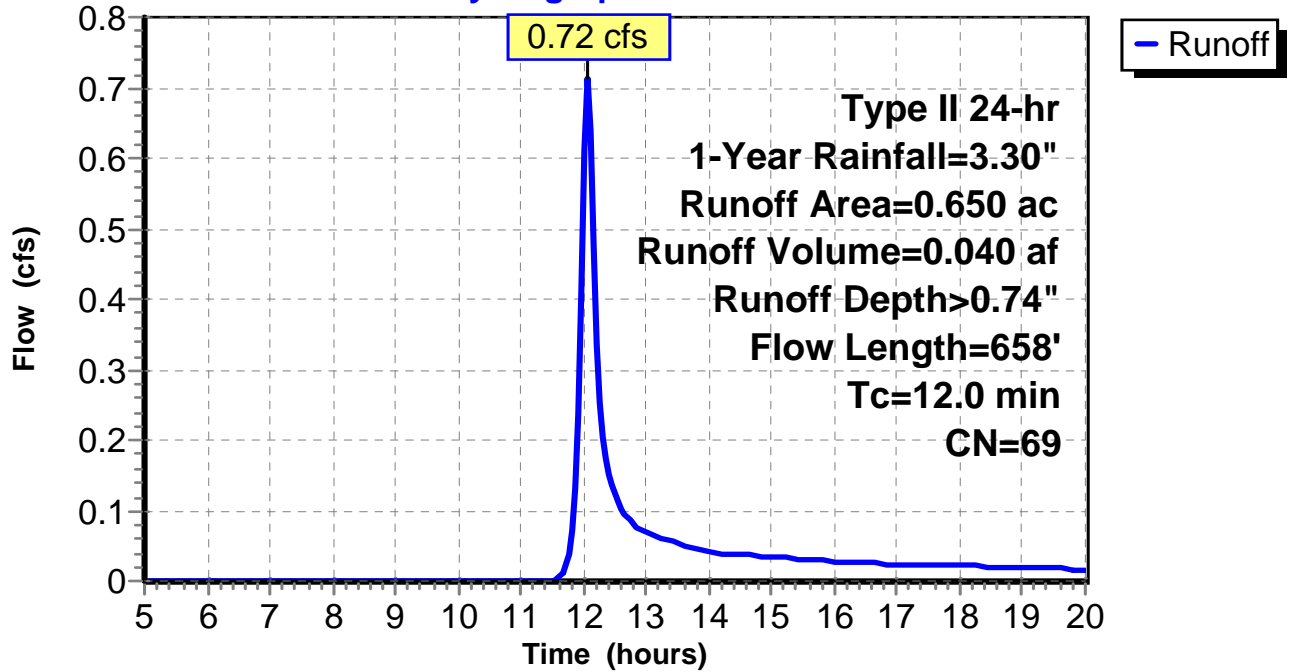
Subcatchment 14: C 227.004

Hydrograph



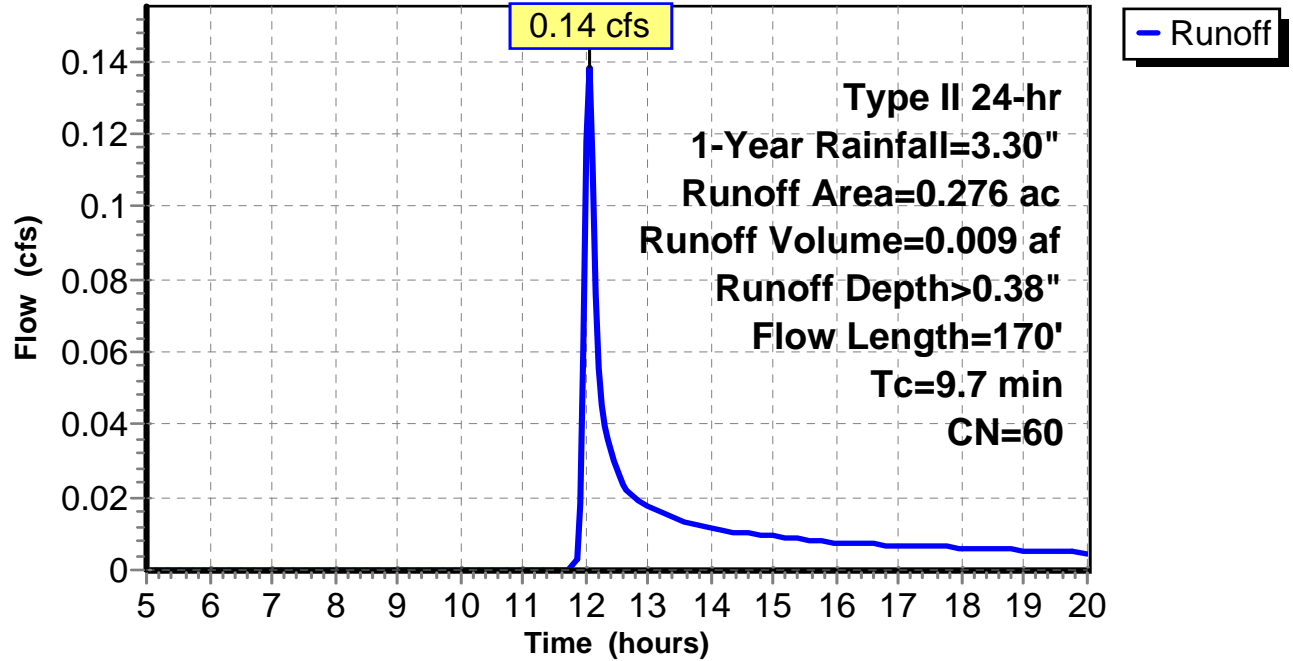
Subcatchment 15: C 227.005

Hydrograph



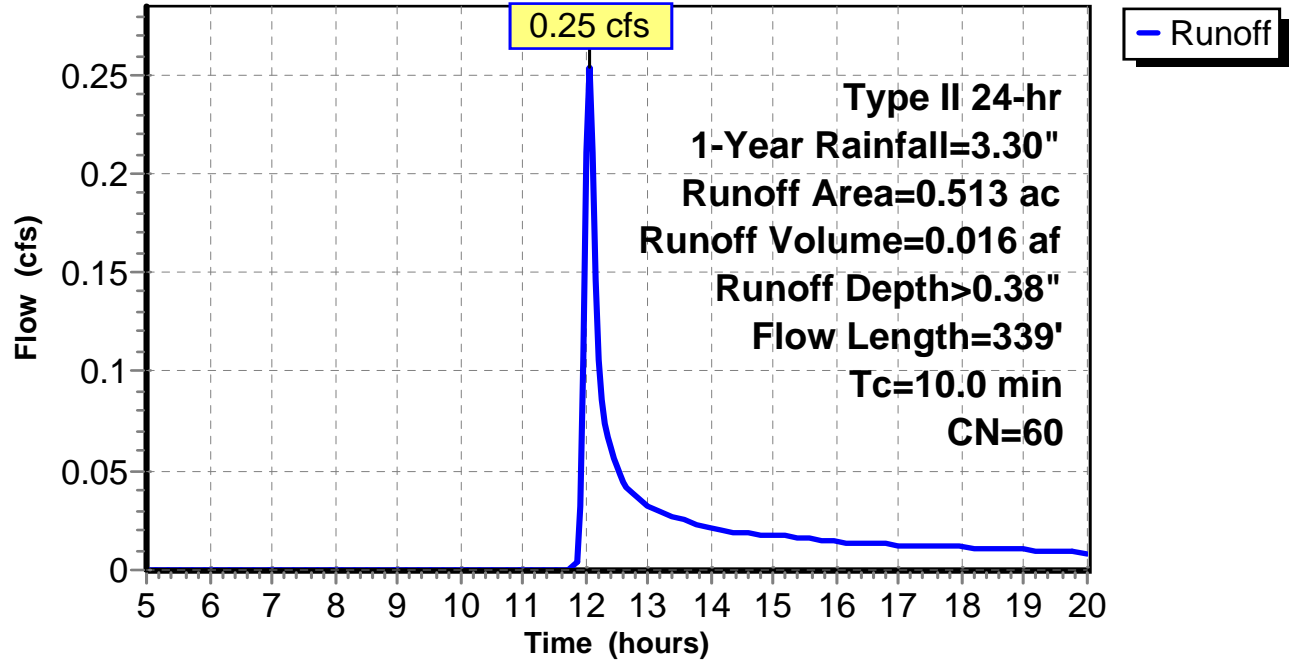
Subcatchment 16: C 227.006

Hydrograph



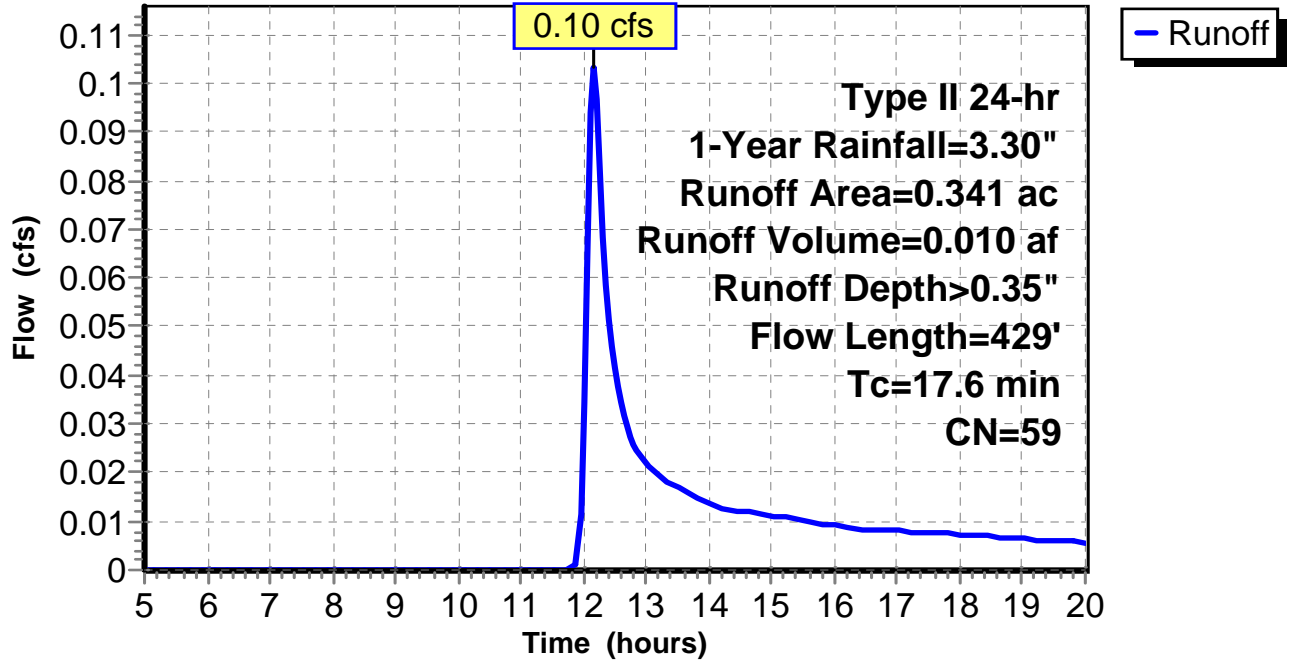
Subcatchment 17: C 227.007

Hydrograph



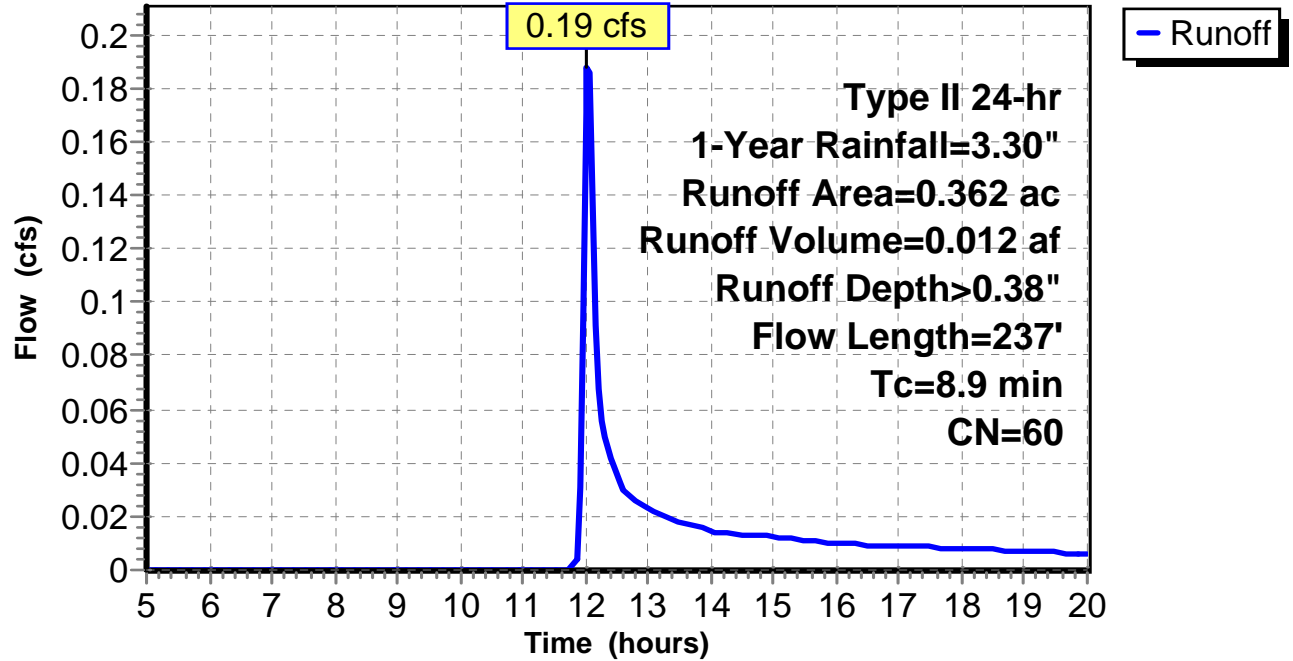
Subcatchment 18: C 227.008

Hydrograph



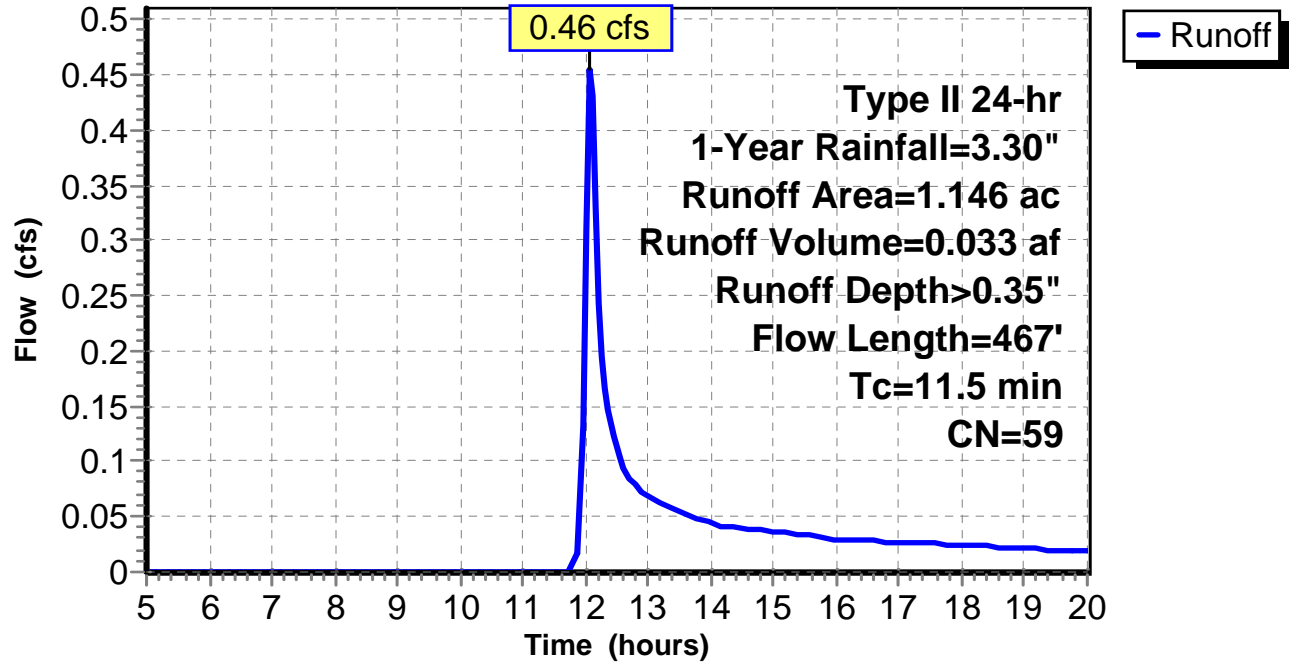
Subcatchment 19: C 227.009

Hydrograph



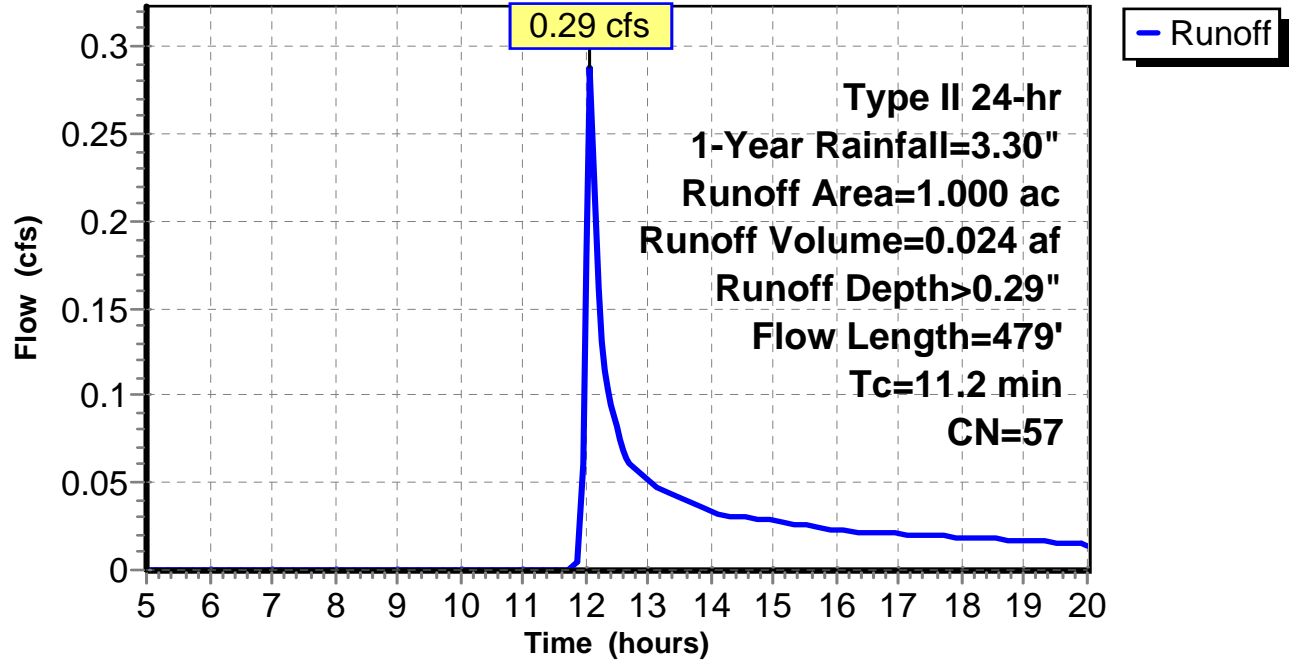
Subcatchment 20: C 227.010

Hydrograph



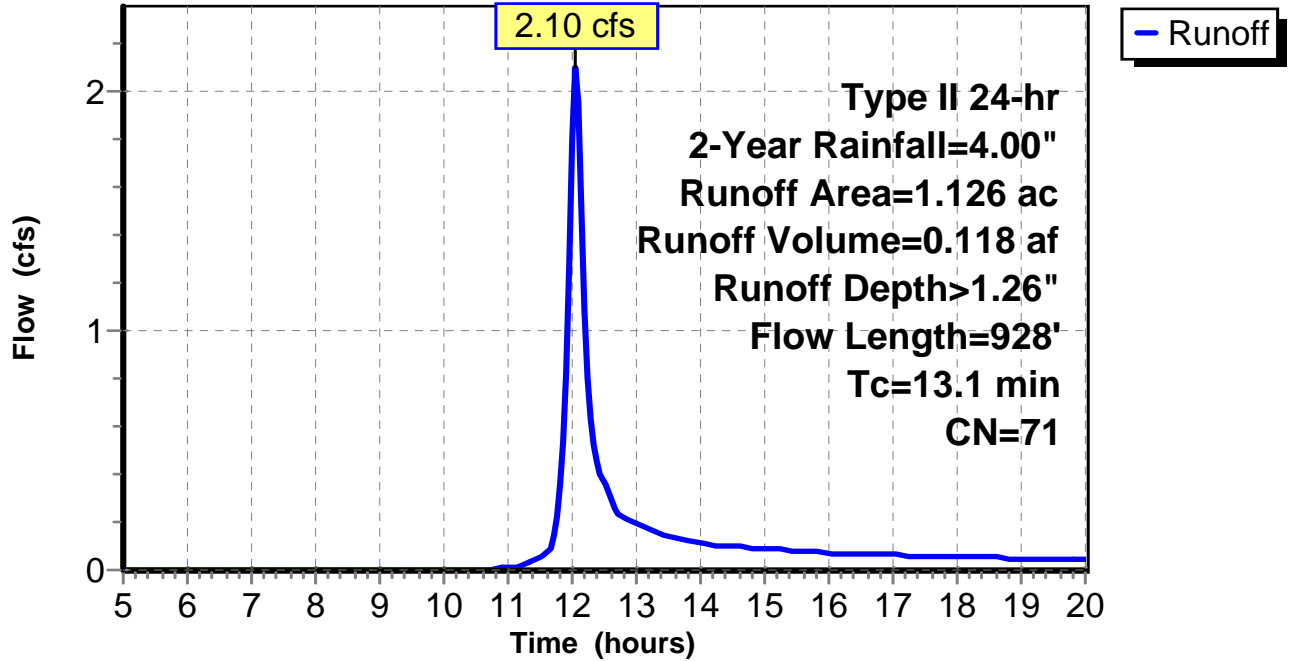
Subcatchment 21: C 227.013

Hydrograph



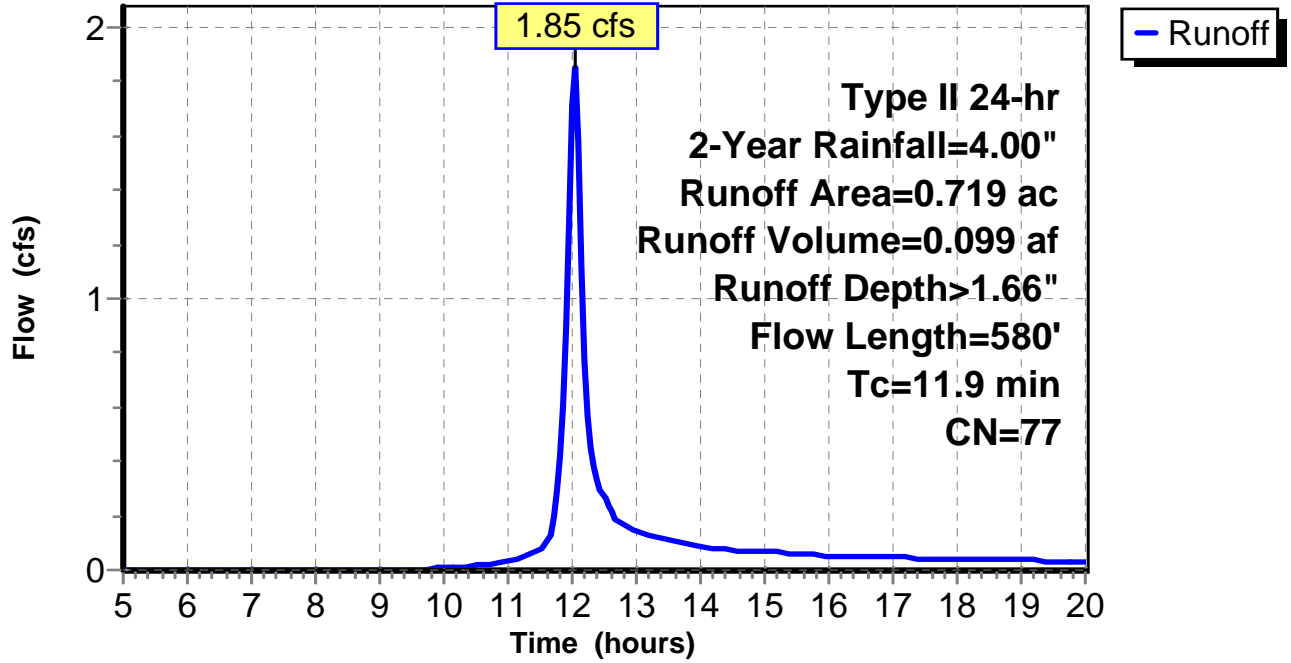
Subcatchment 1: C AR-513.001

Hydrograph



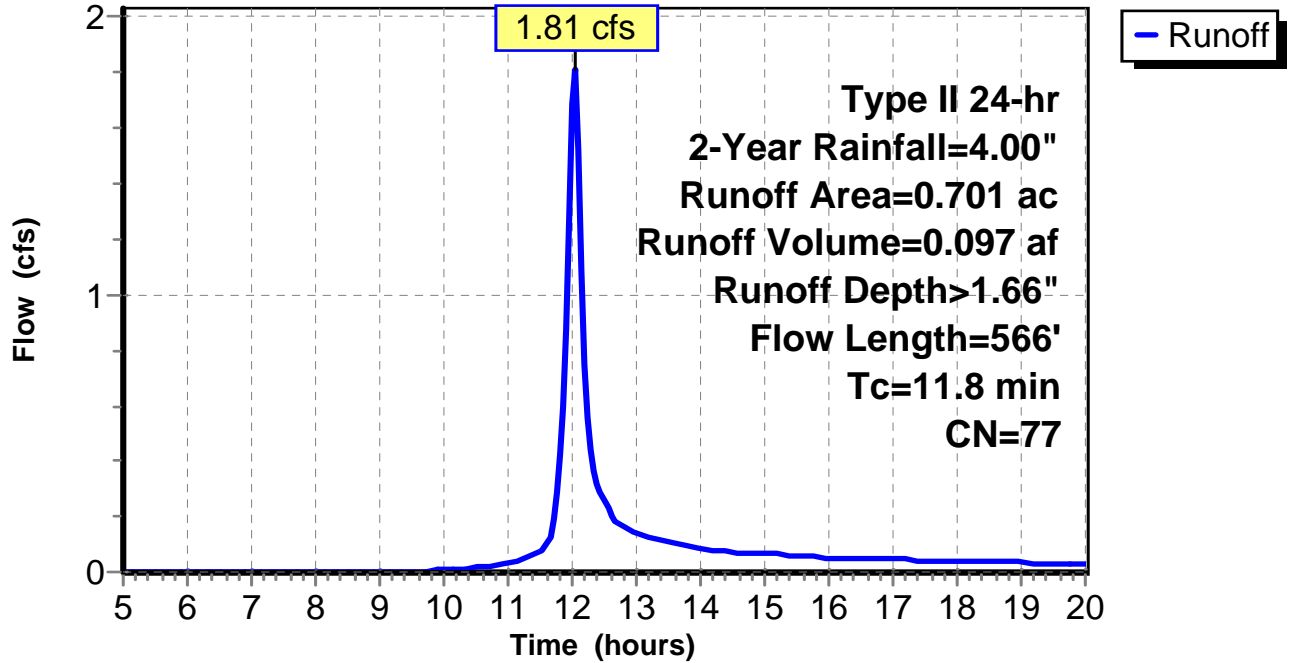
Subcatchment 2: C AR-513.002

Hydrograph



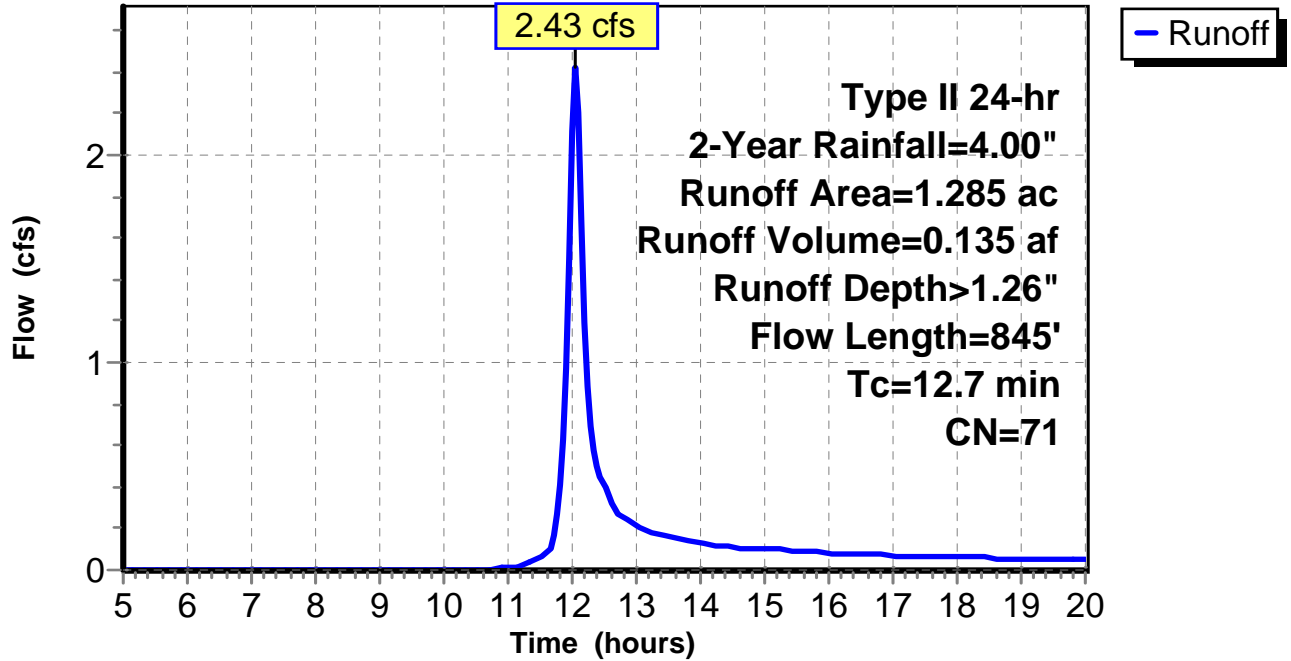
Subcatchment 3: C AR-513.003

Hydrograph



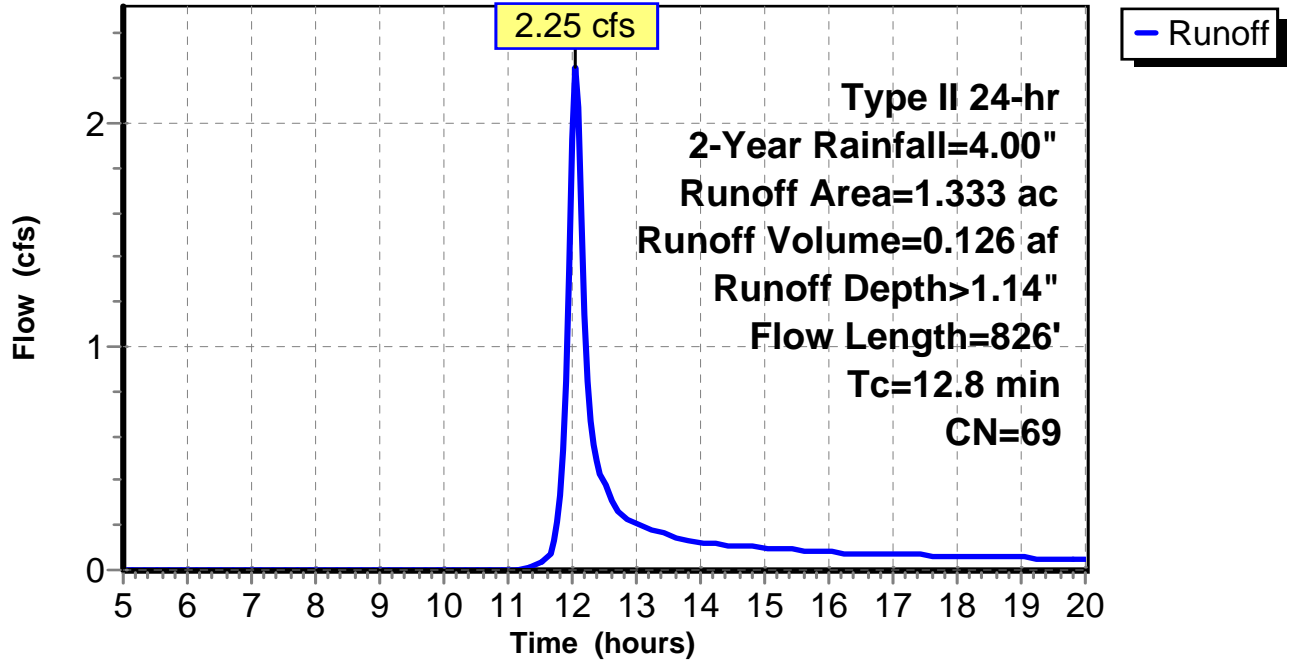
Subcatchment 4: C AR-513.004

Hydrograph



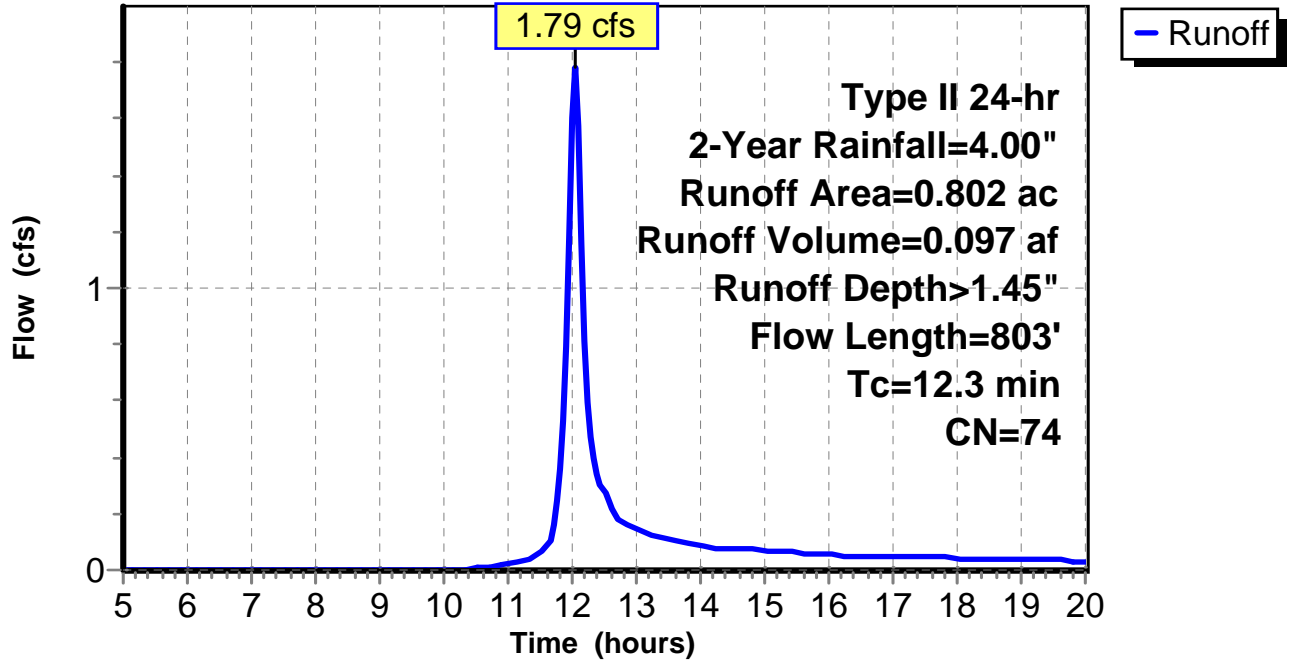
Subcatchment 5: C AR-513.005

Hydrograph



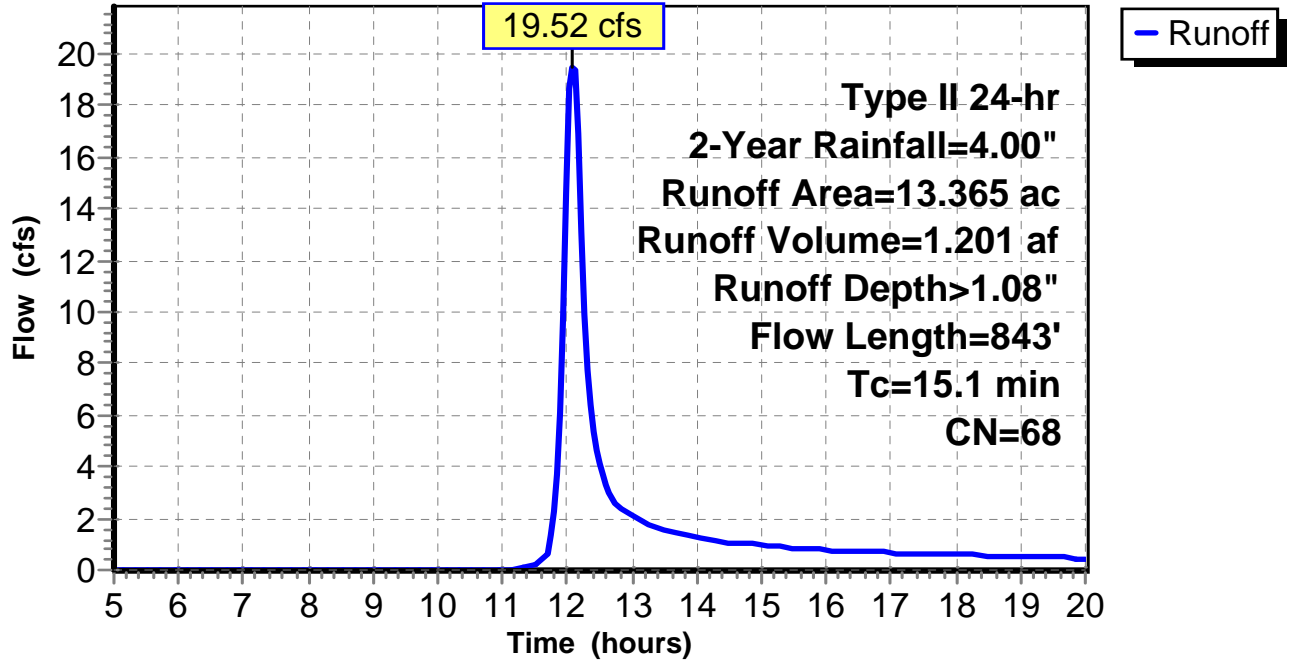
Subcatchment 6: C AR-513.006

Hydrograph



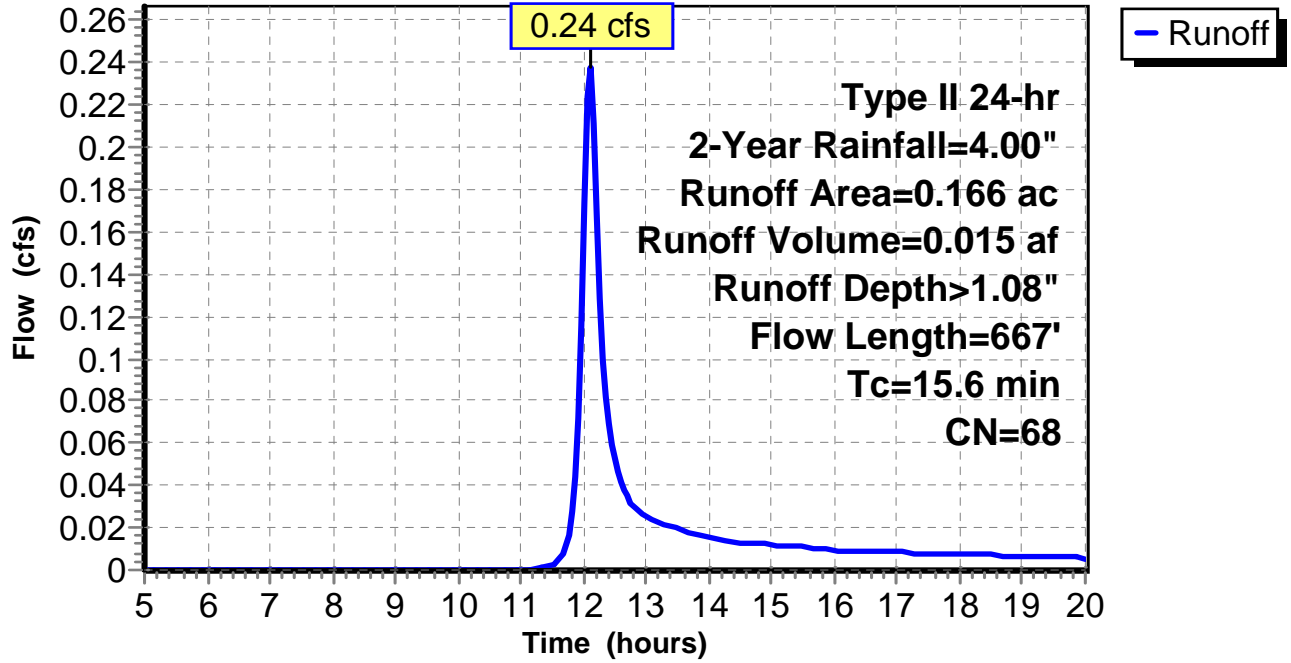
Subcatchment 7: C AR-513.007

Hydrograph



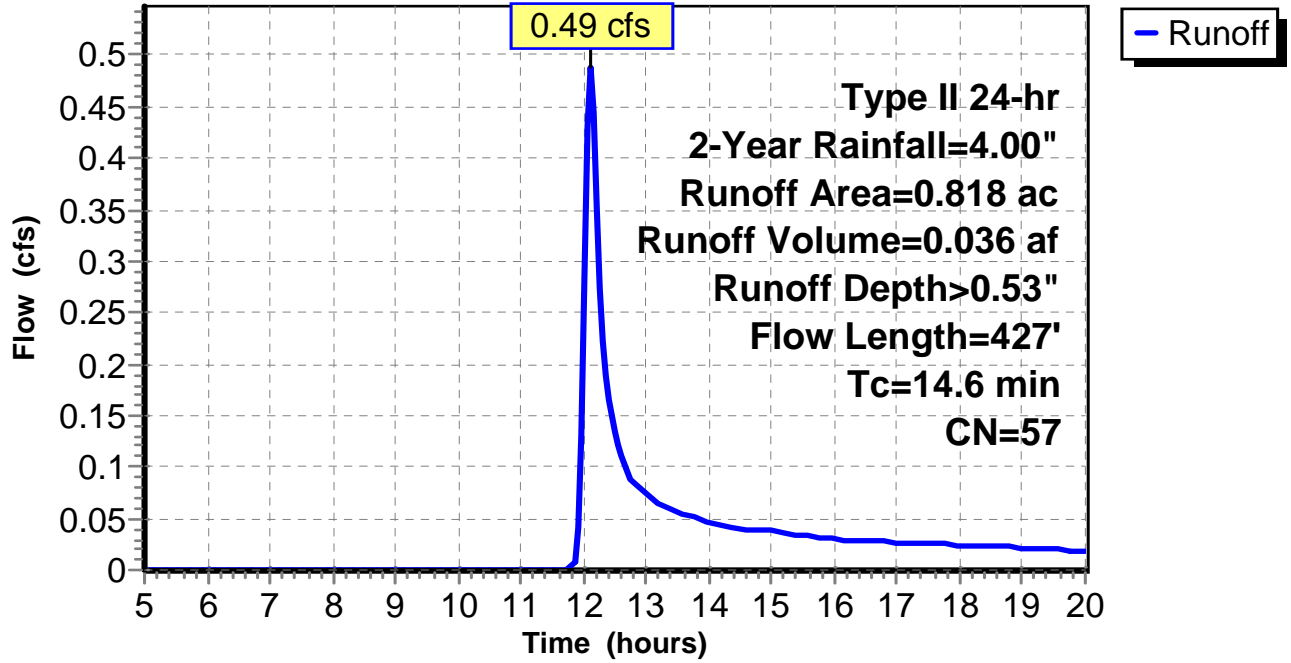
Subcatchment 8: C AR-513.008

Hydrograph



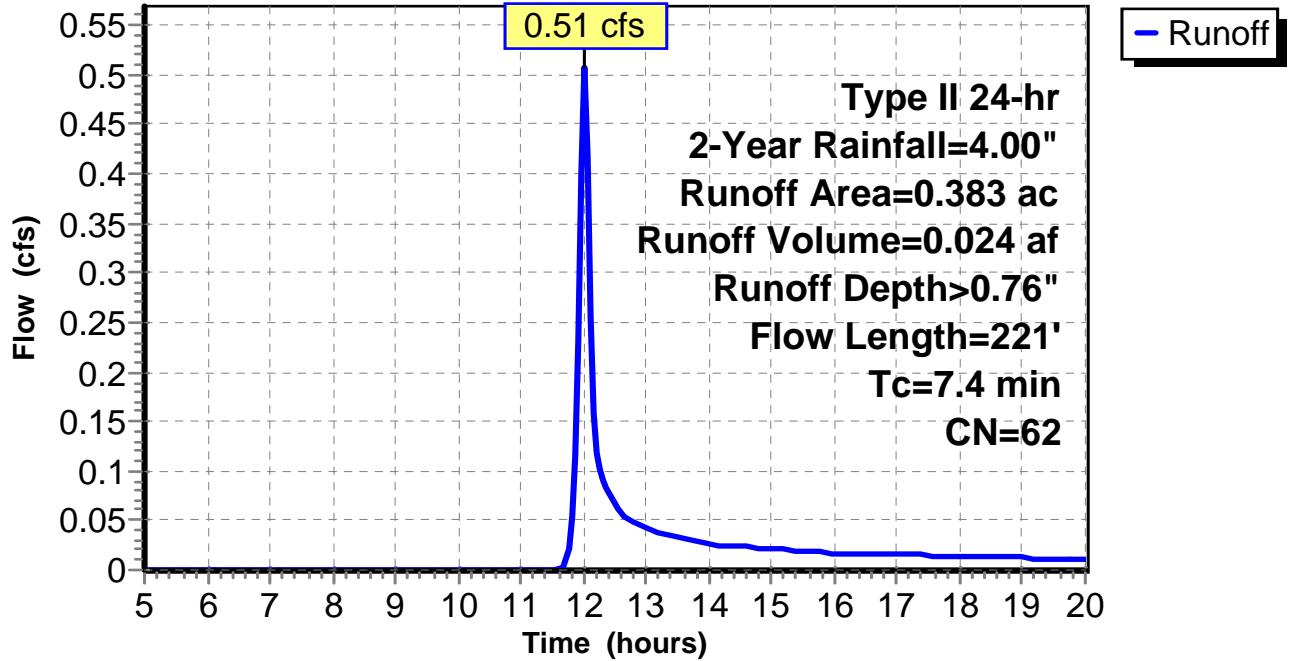
Subcatchment 9: C AR-513.009

Hydrograph



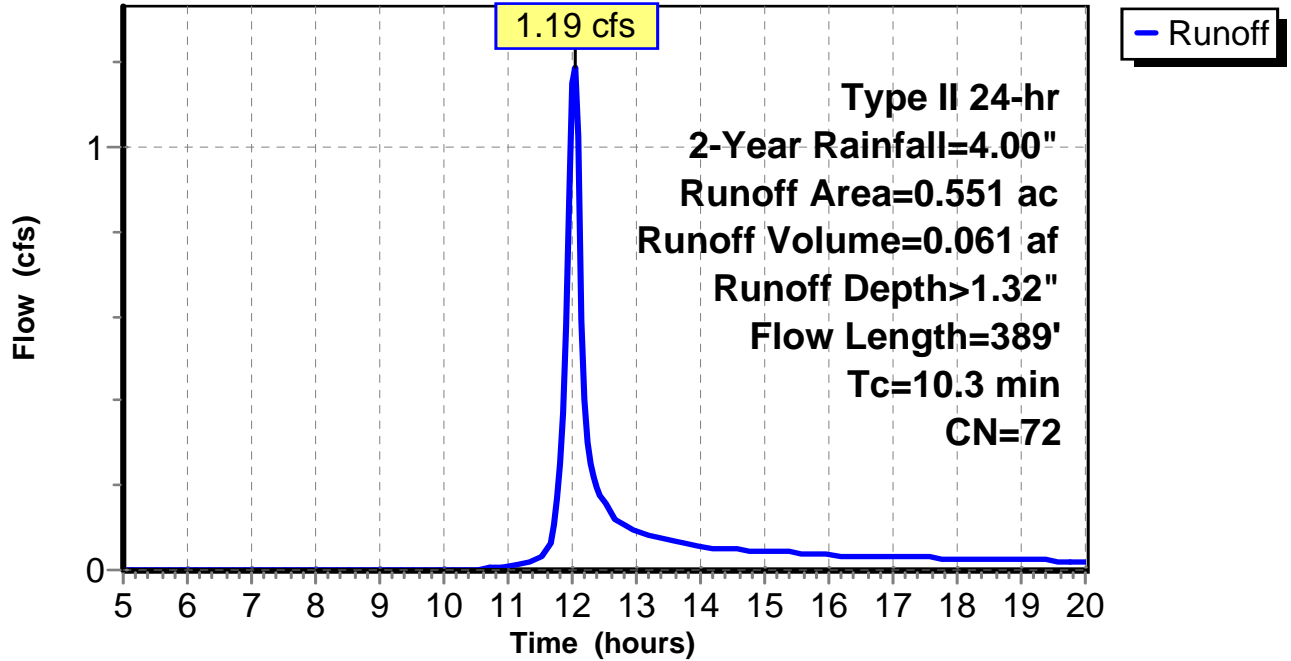
Subcatchment 10: C AR-513.010

Hydrograph



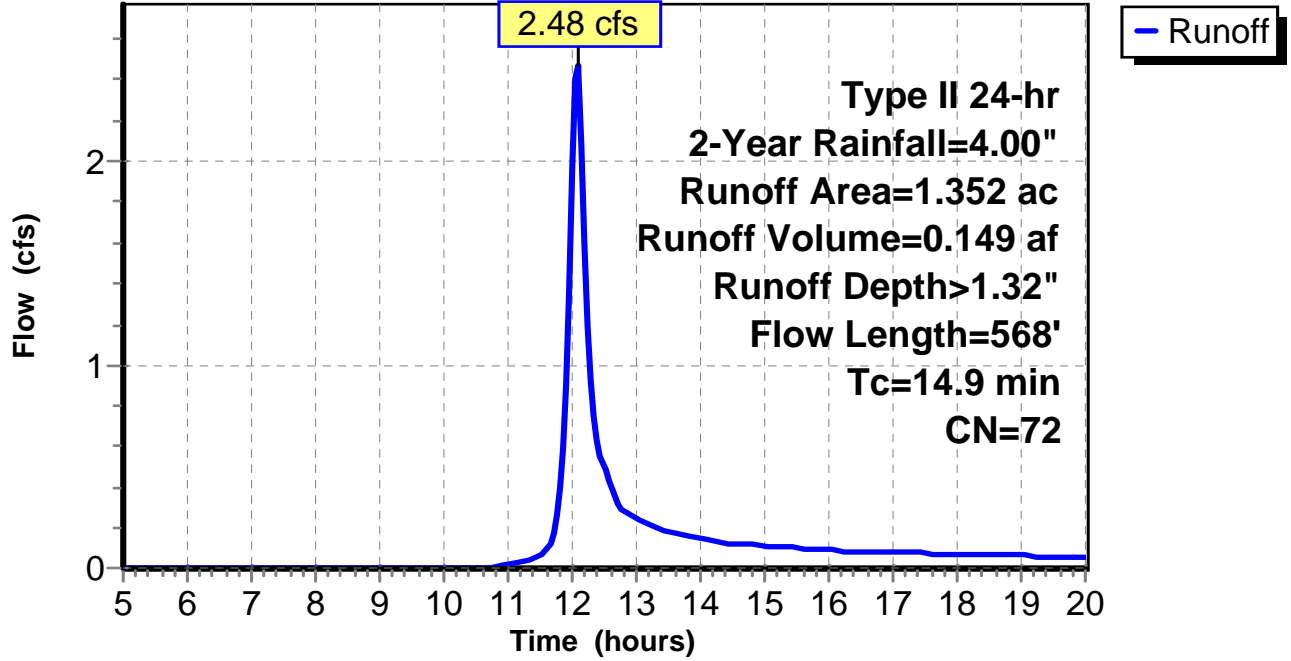
Subcatchment 11: C 227.001

Hydrograph



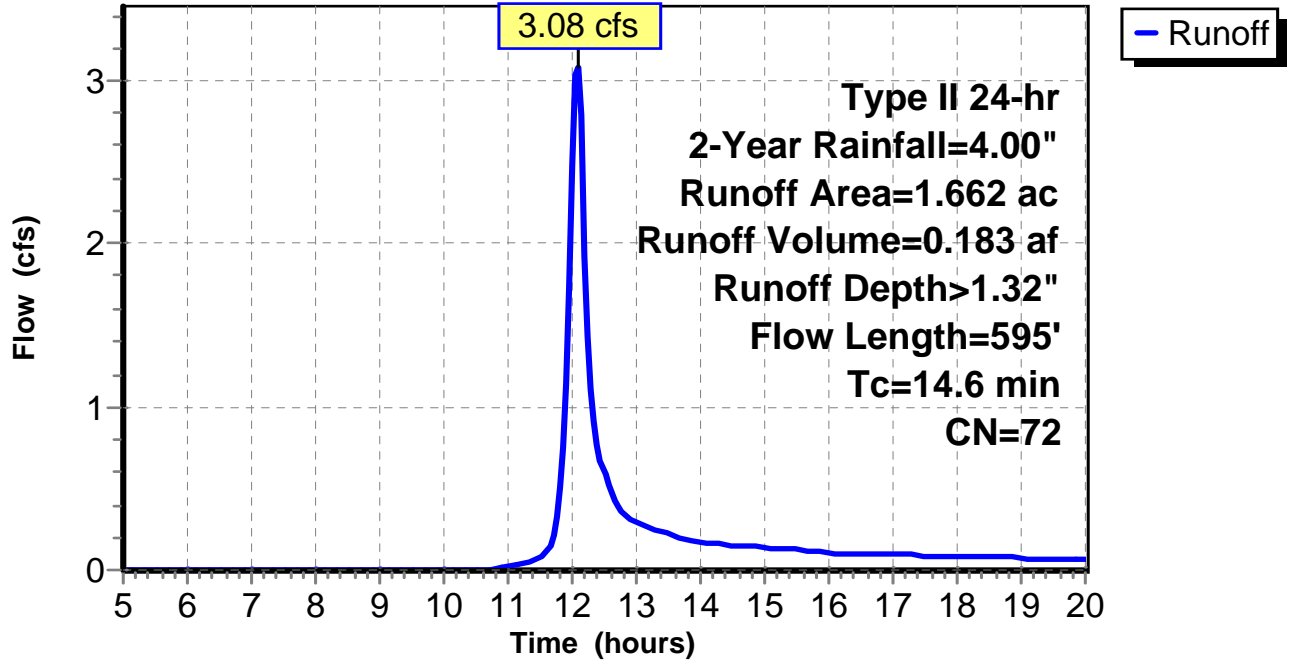
Subcatchment 12: C 227.002

Hydrograph



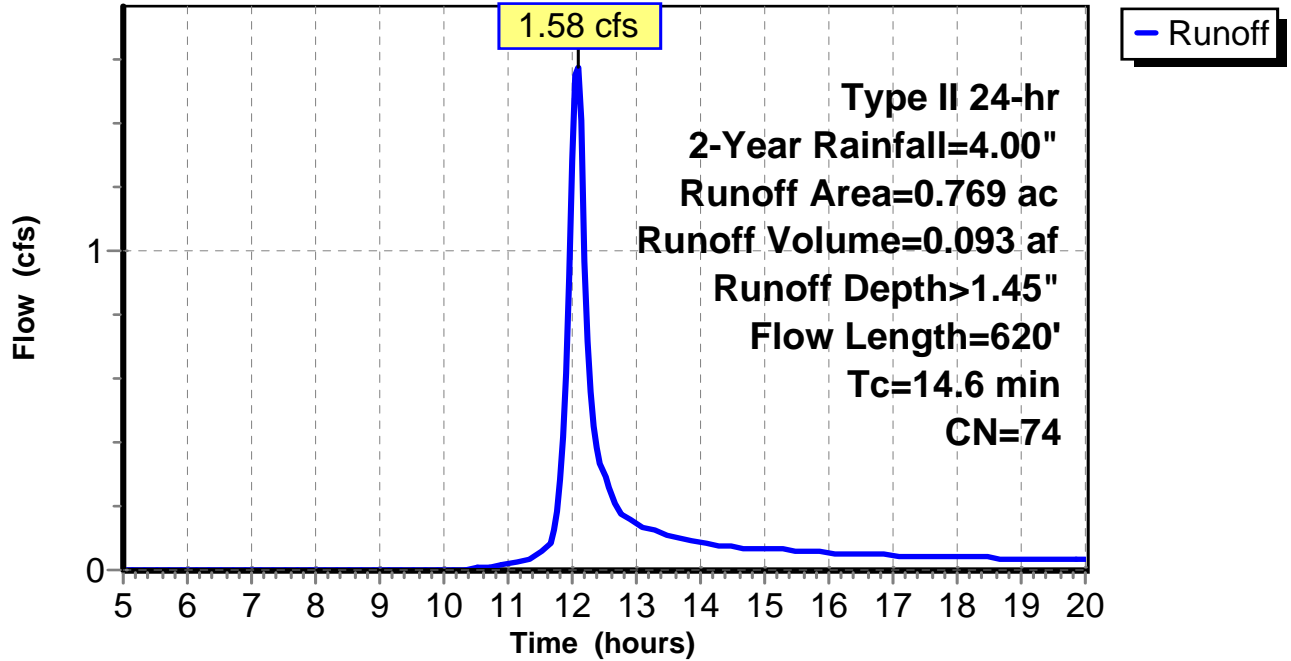
Subcatchment 13: C 227.003

Hydrograph



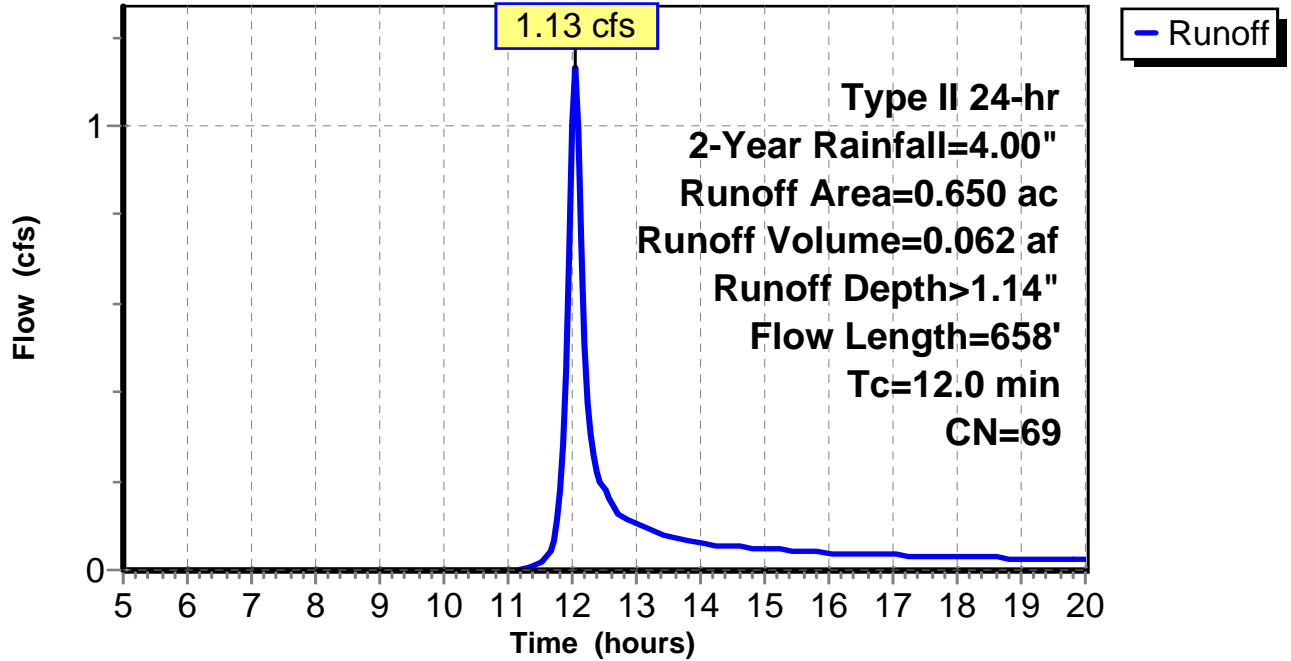
Subcatchment 14: C 227.004

Hydrograph



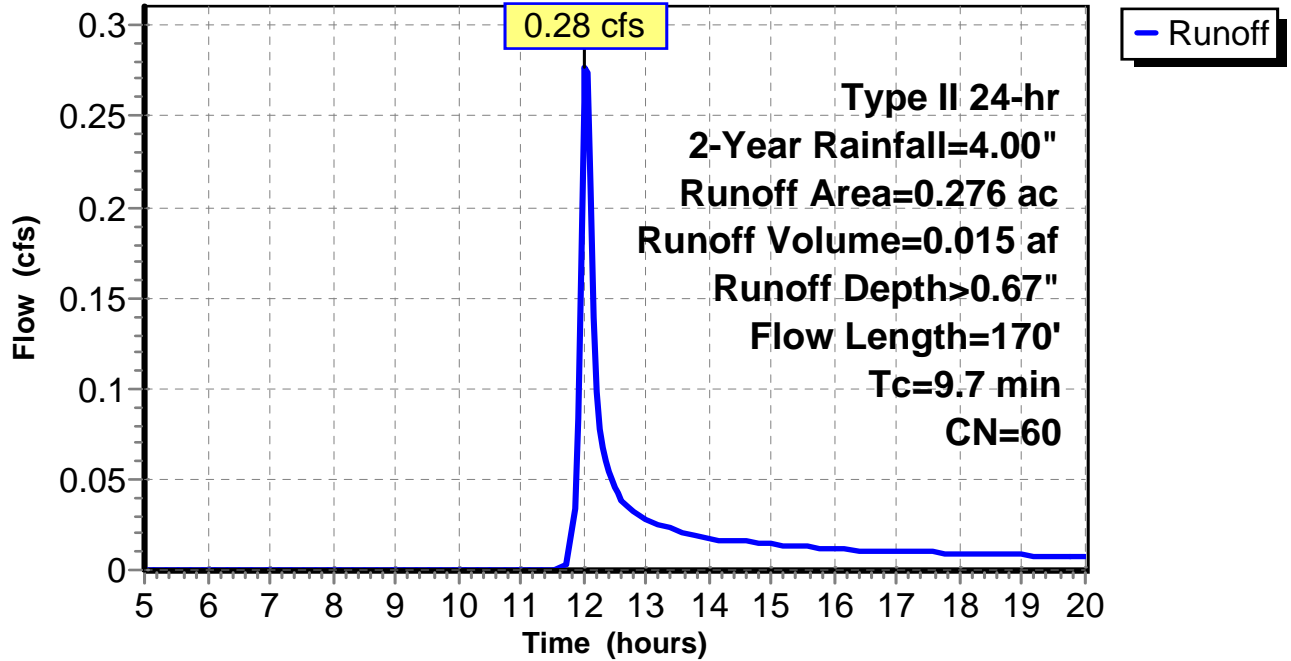
Subcatchment 15: C 227.005

Hydrograph



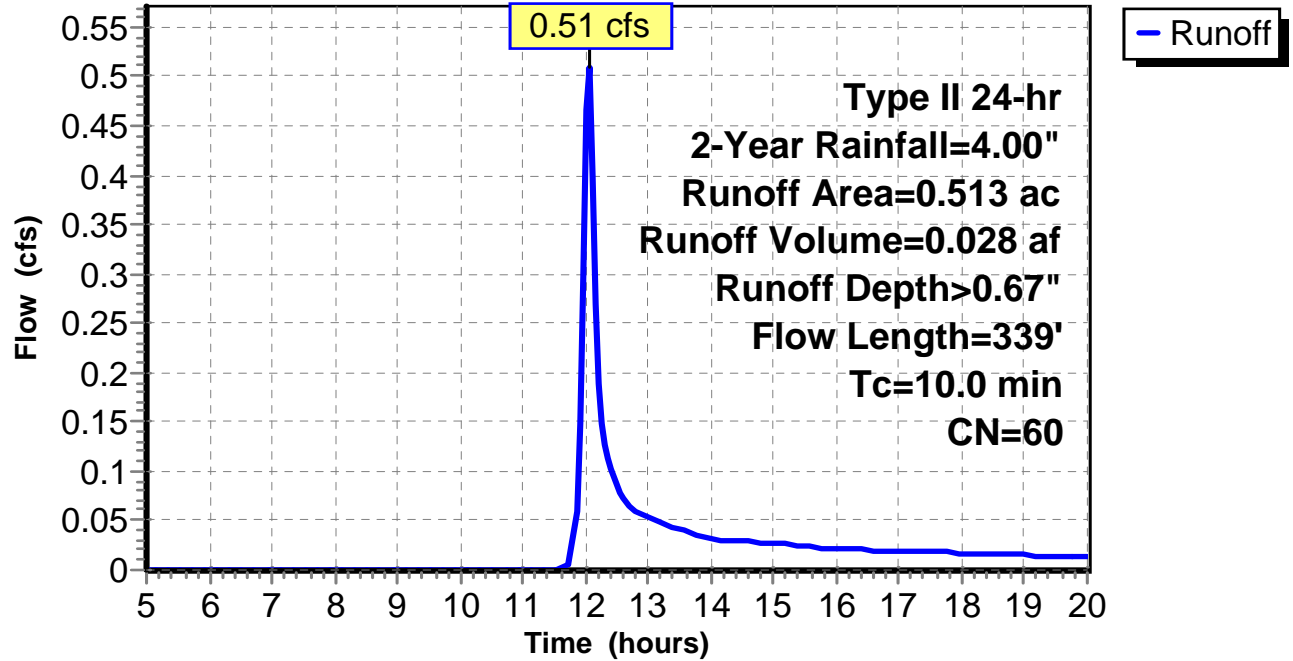
Subcatchment 16: C 227.006

Hydrograph



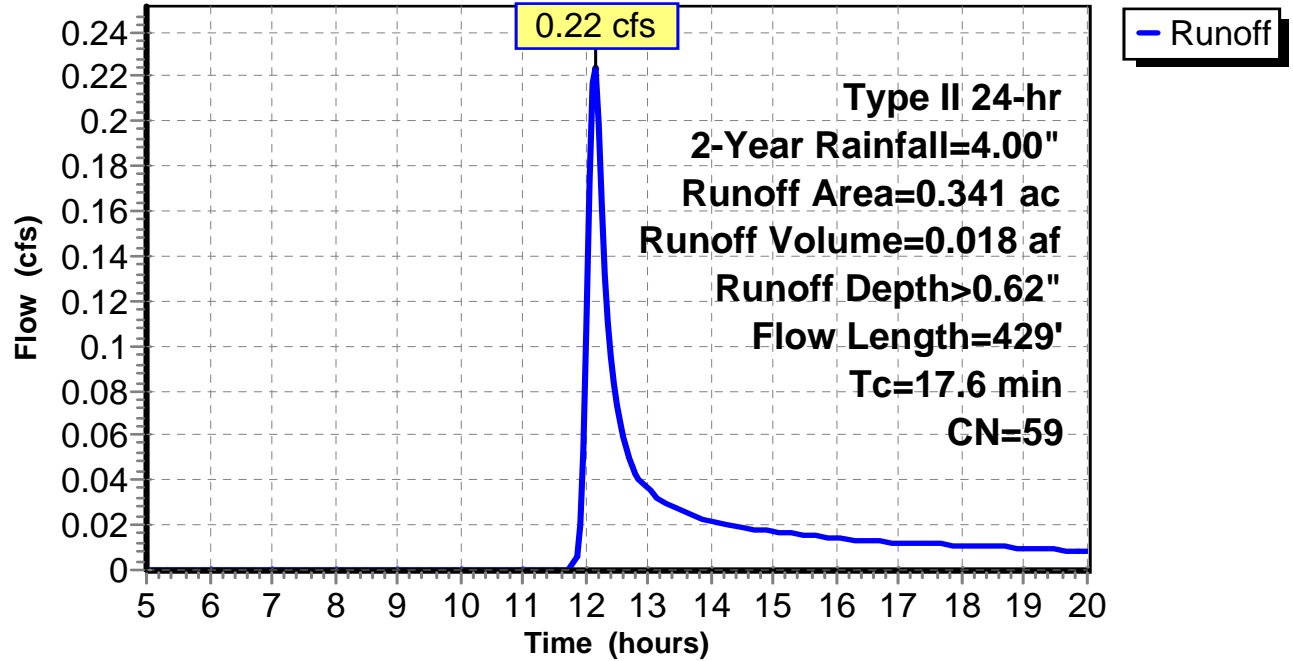
Subcatchment 17: C 227.007

Hydrograph



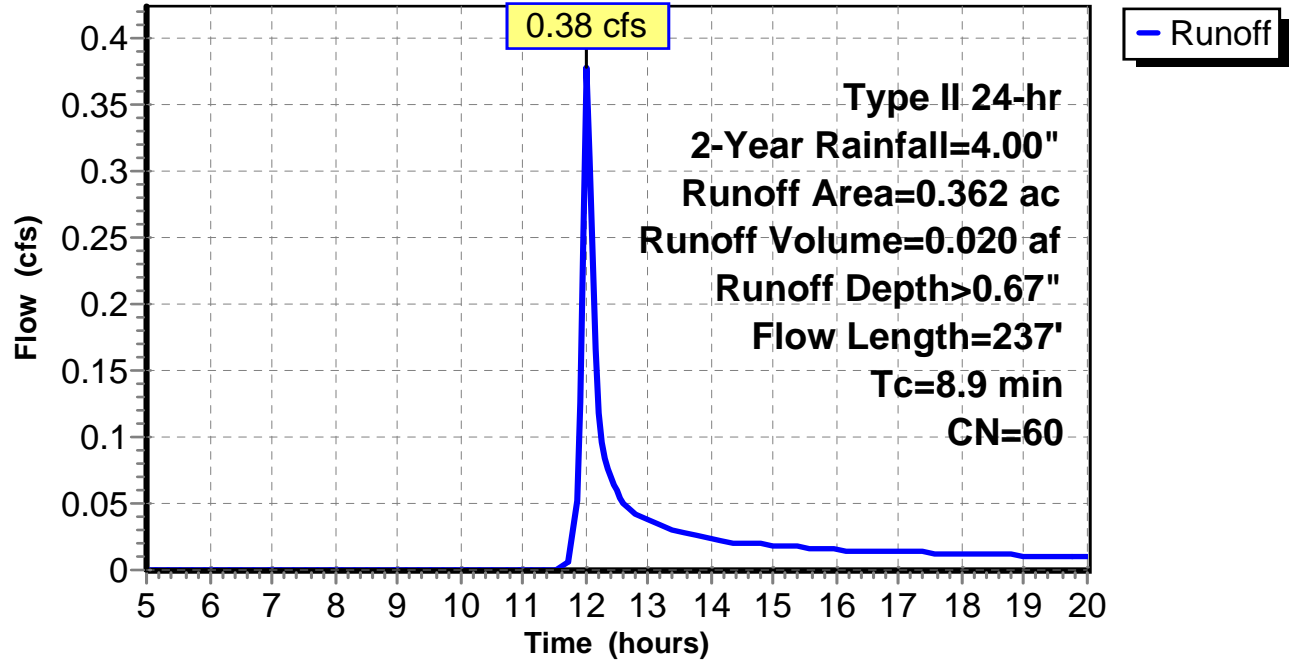
Subcatchment 18: C 227.008

Hydrograph



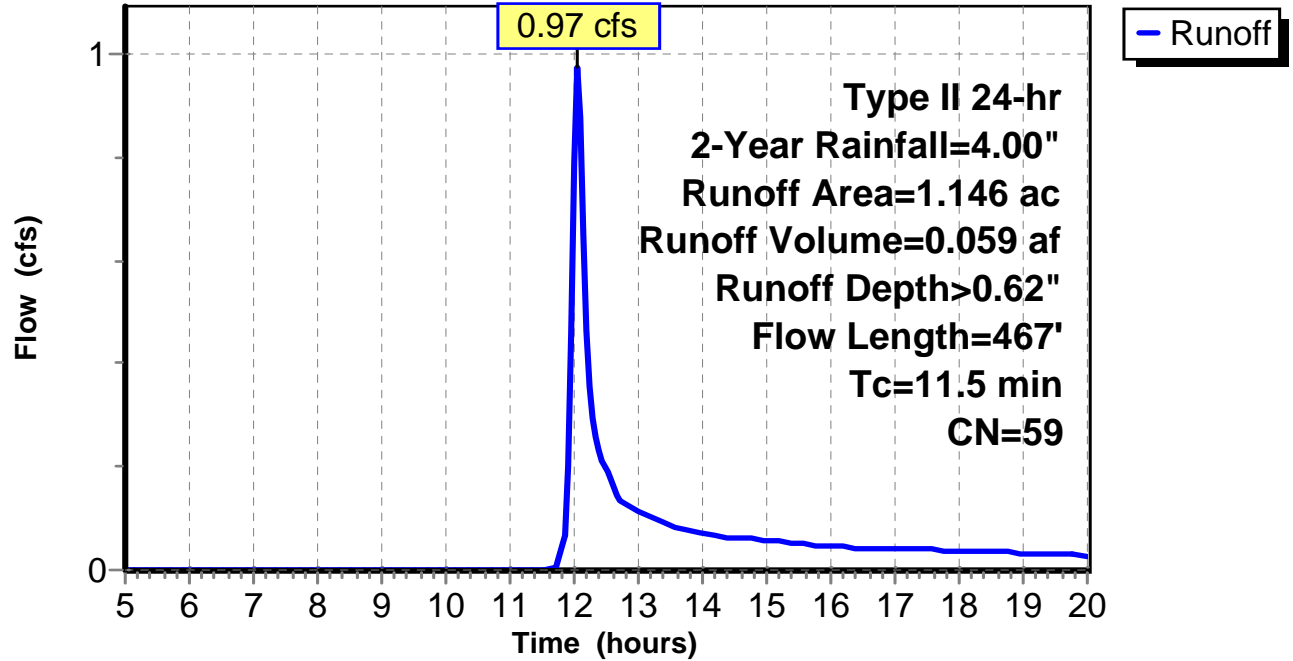
Subcatchment 19: C 227.009

Hydrograph



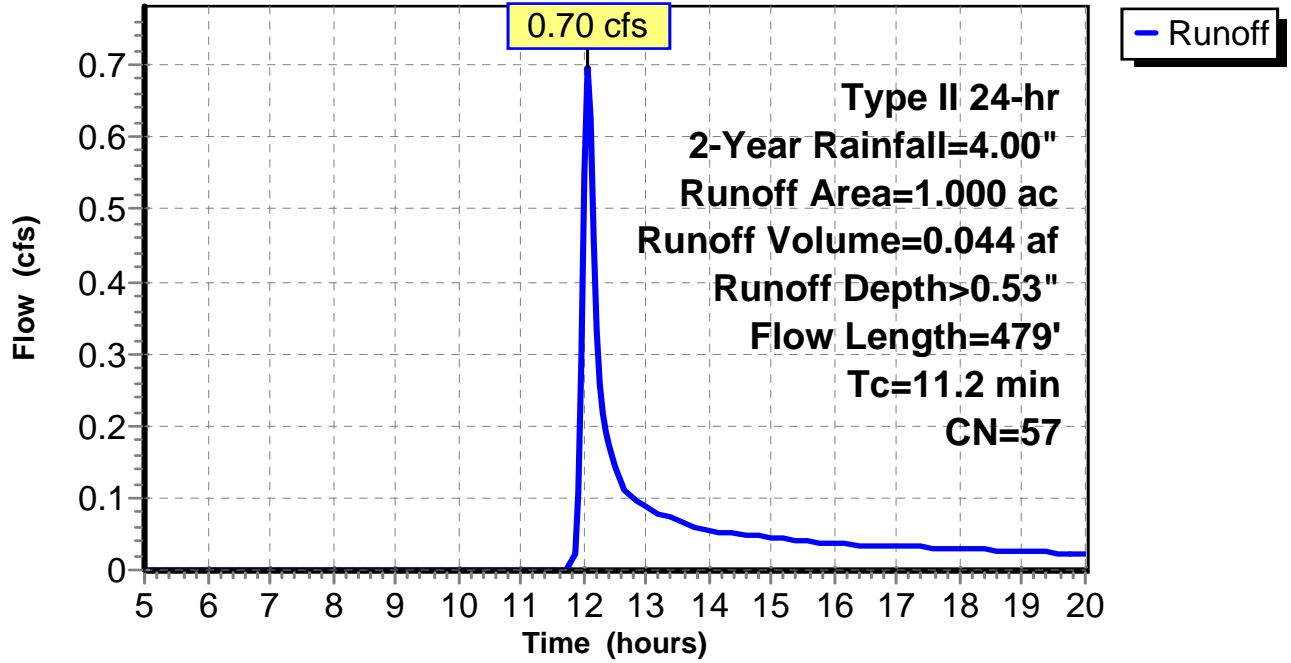
Subcatchment 20: C 227.010

Hydrograph



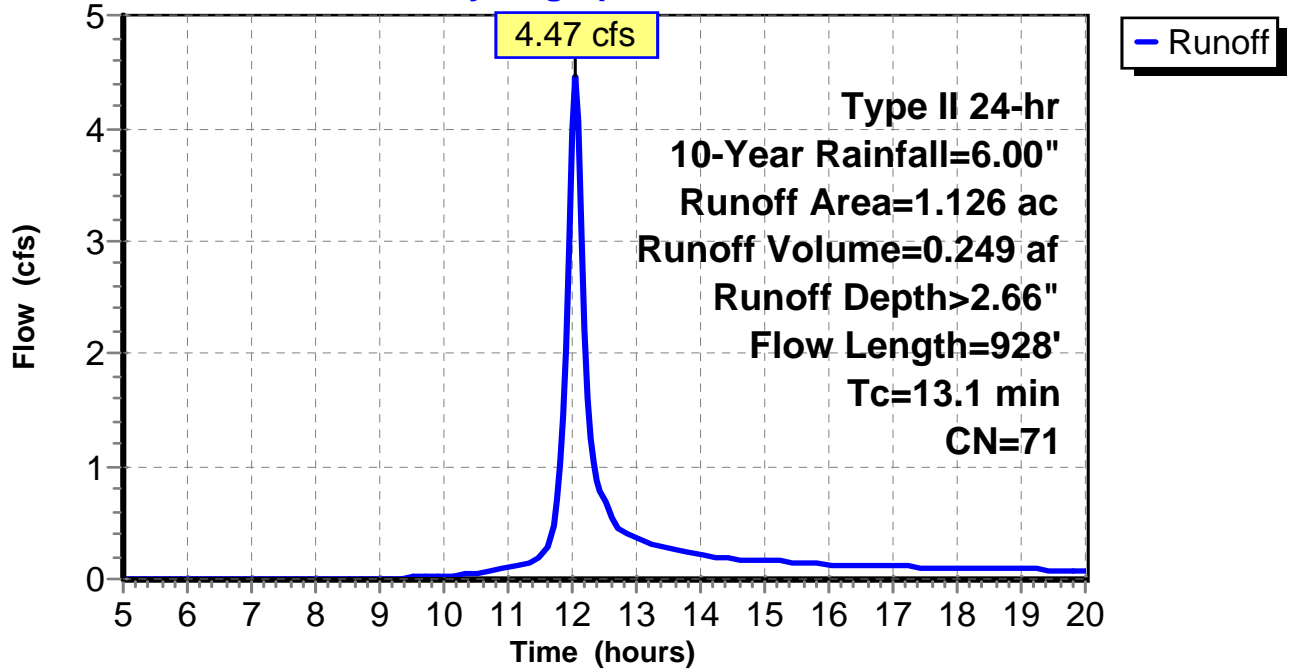
Subcatchment 21: C 227.013

Hydrograph



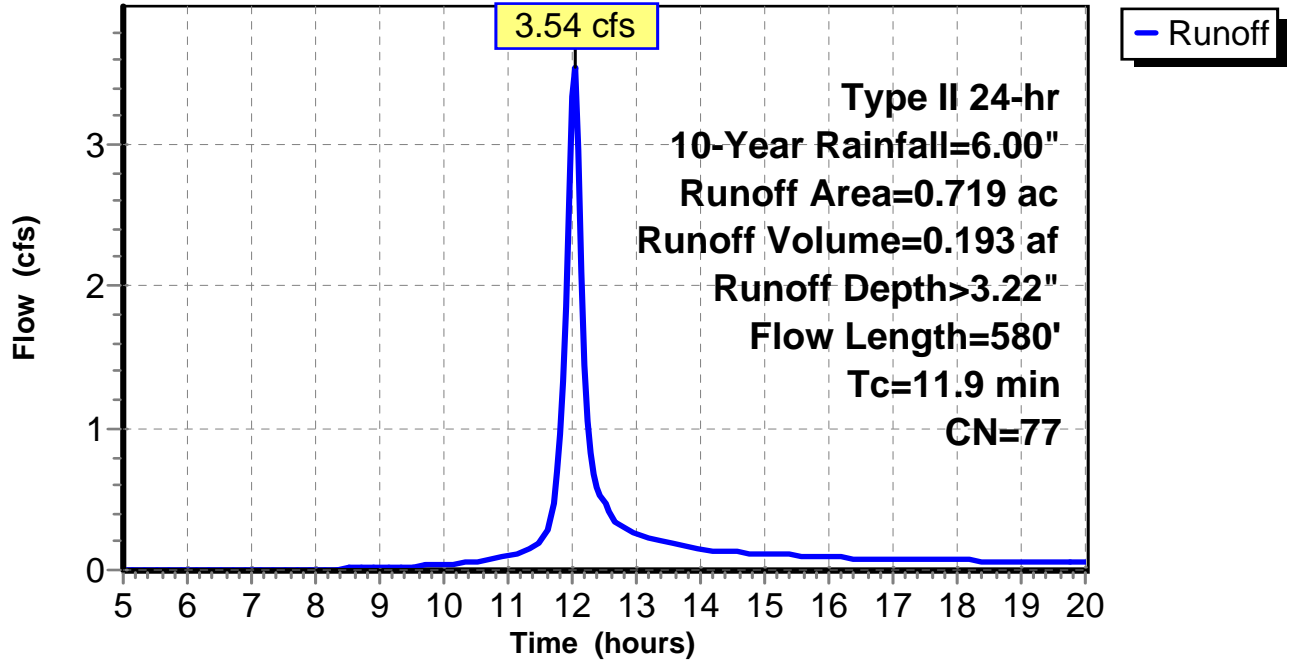
Subcatchment 1: C AR-513.001

Hydrograph



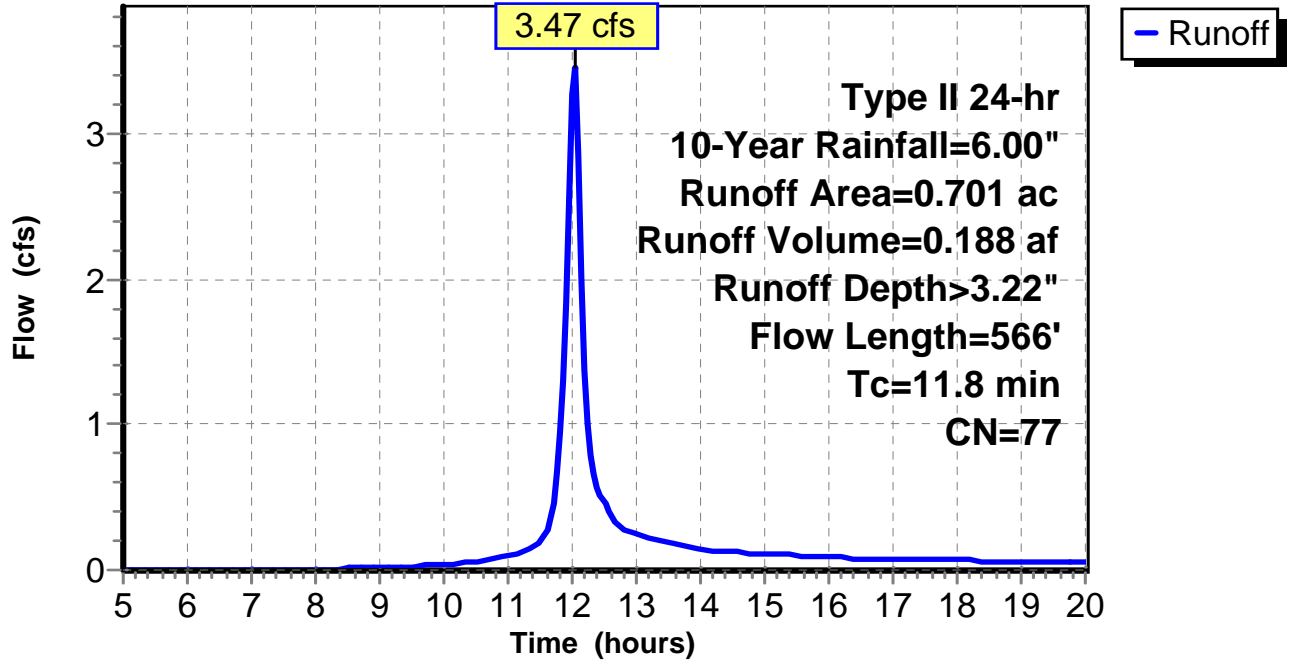
Subcatchment 2: C AR-513.002

Hydrograph



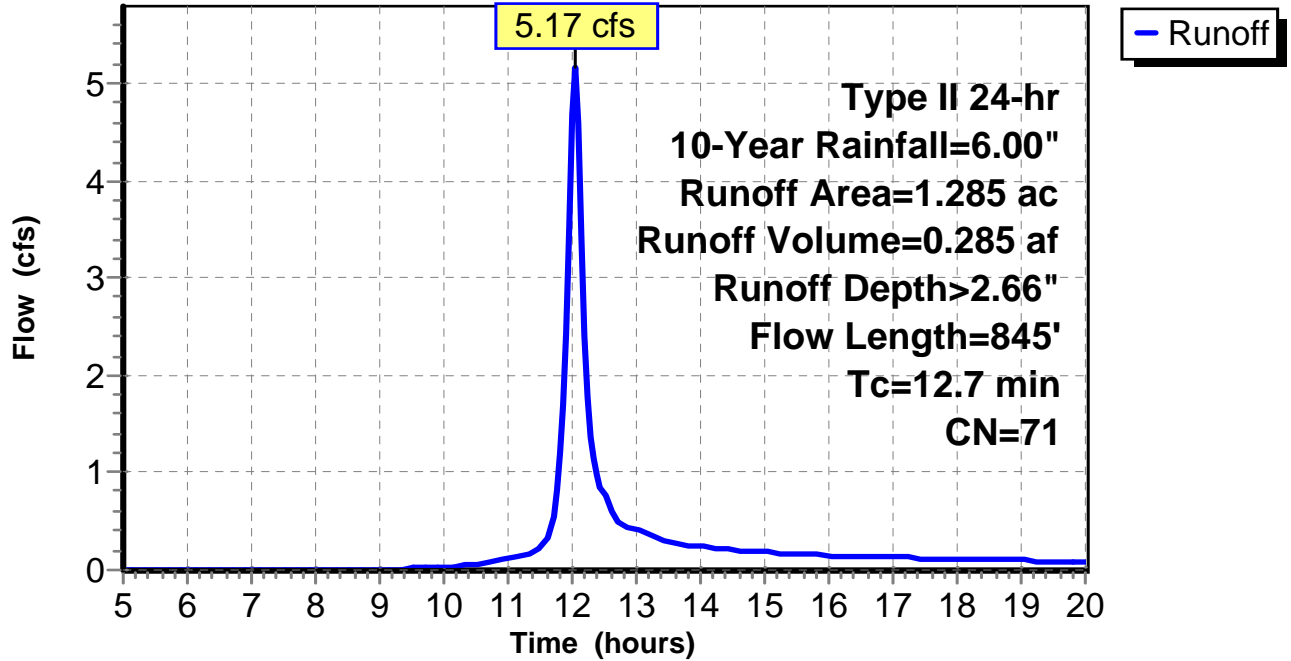
Subcatchment 3: C AR-513.003

Hydrograph



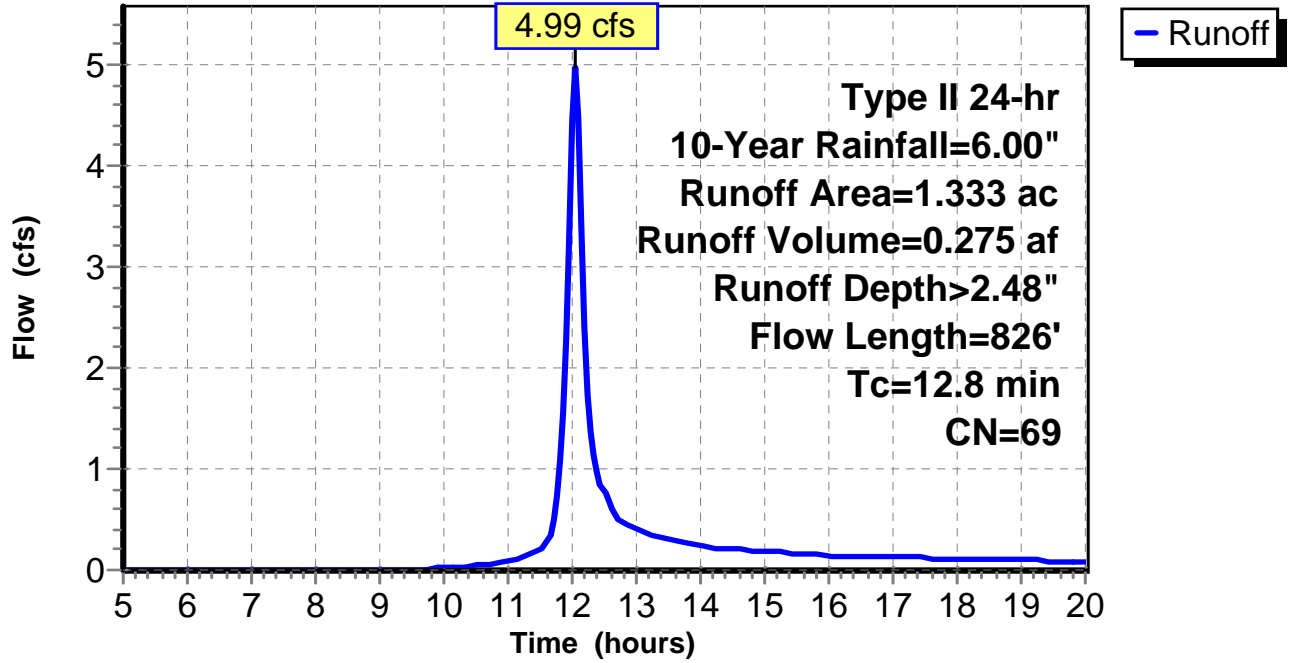
Subcatchment 4: C AR-513.004

Hydrograph



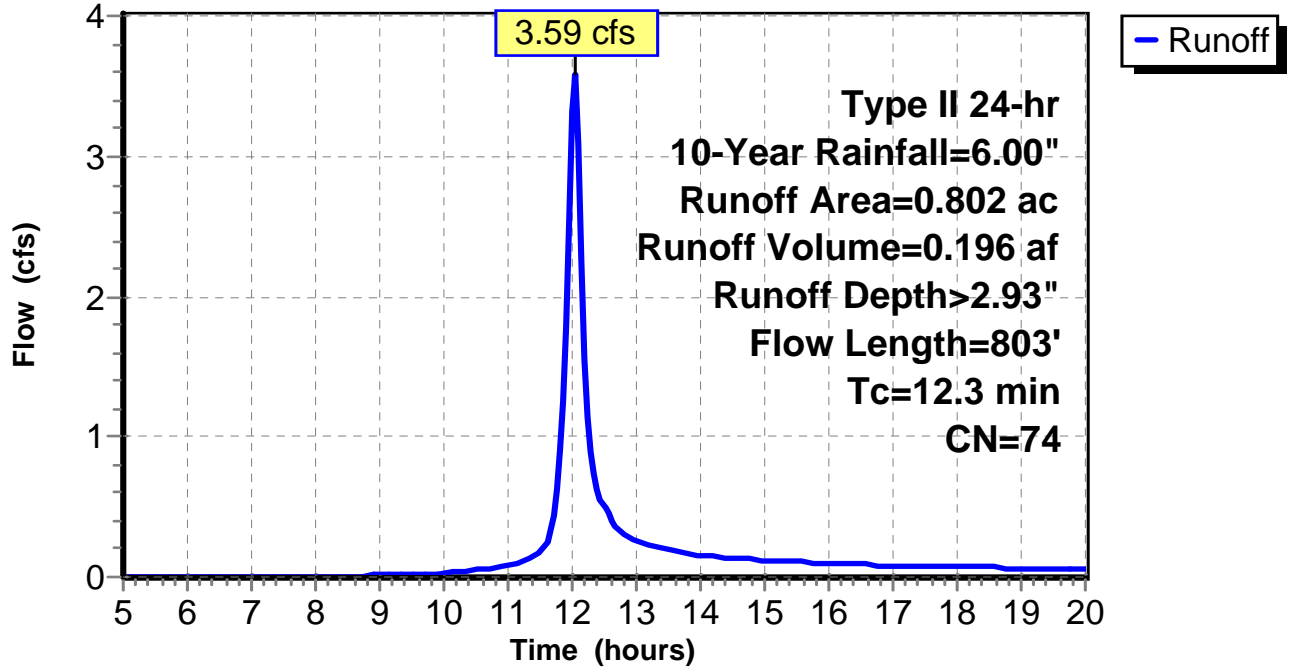
Subcatchment 5: C AR-513.005

Hydrograph



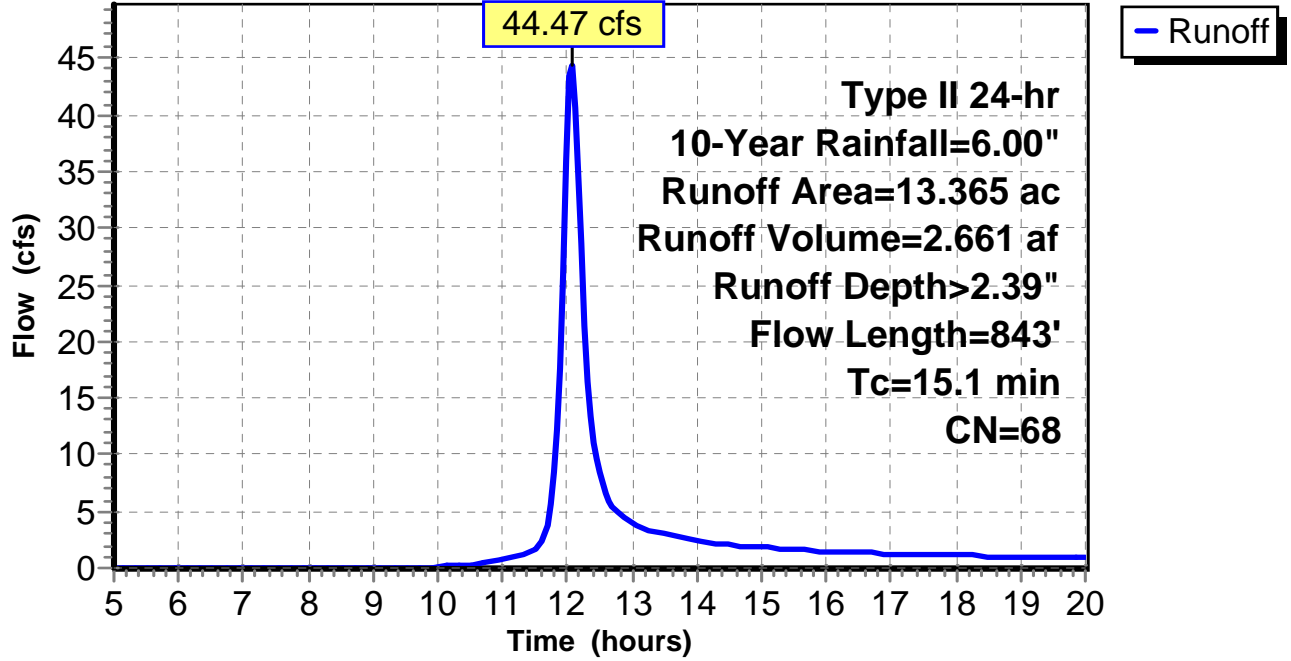
Subcatchment 6: C AR-513.006

Hydrograph



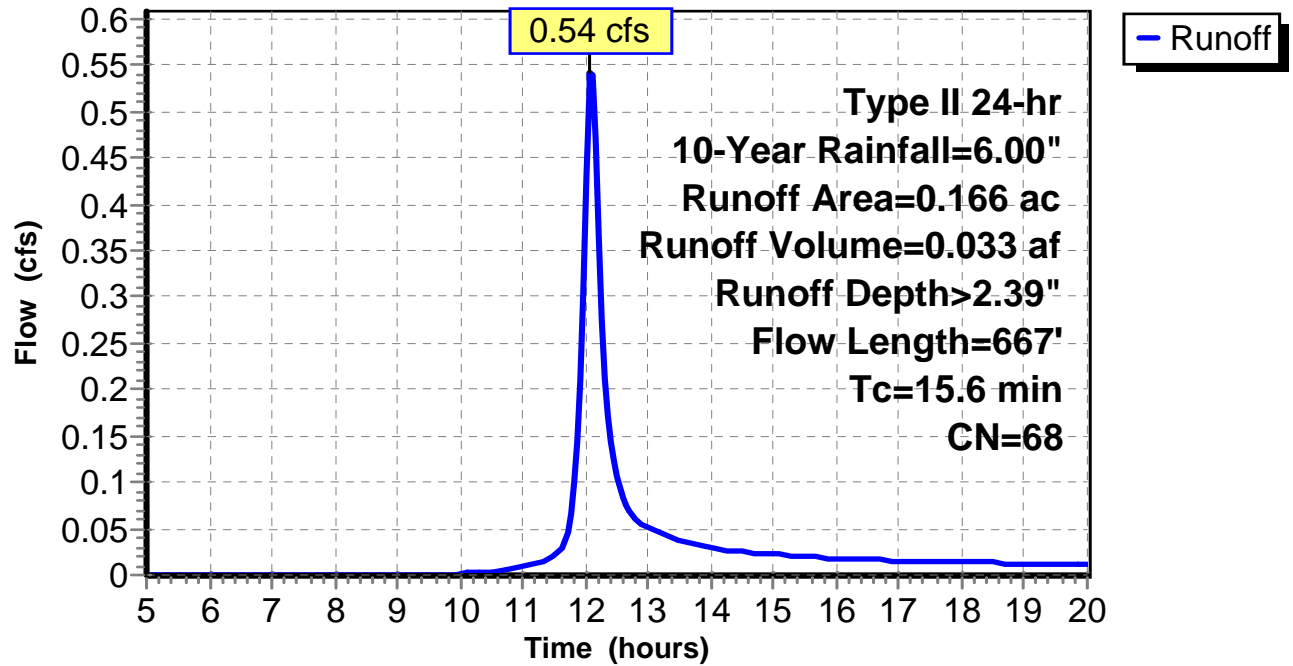
Subcatchment 7: C AR-513.007

Hydrograph



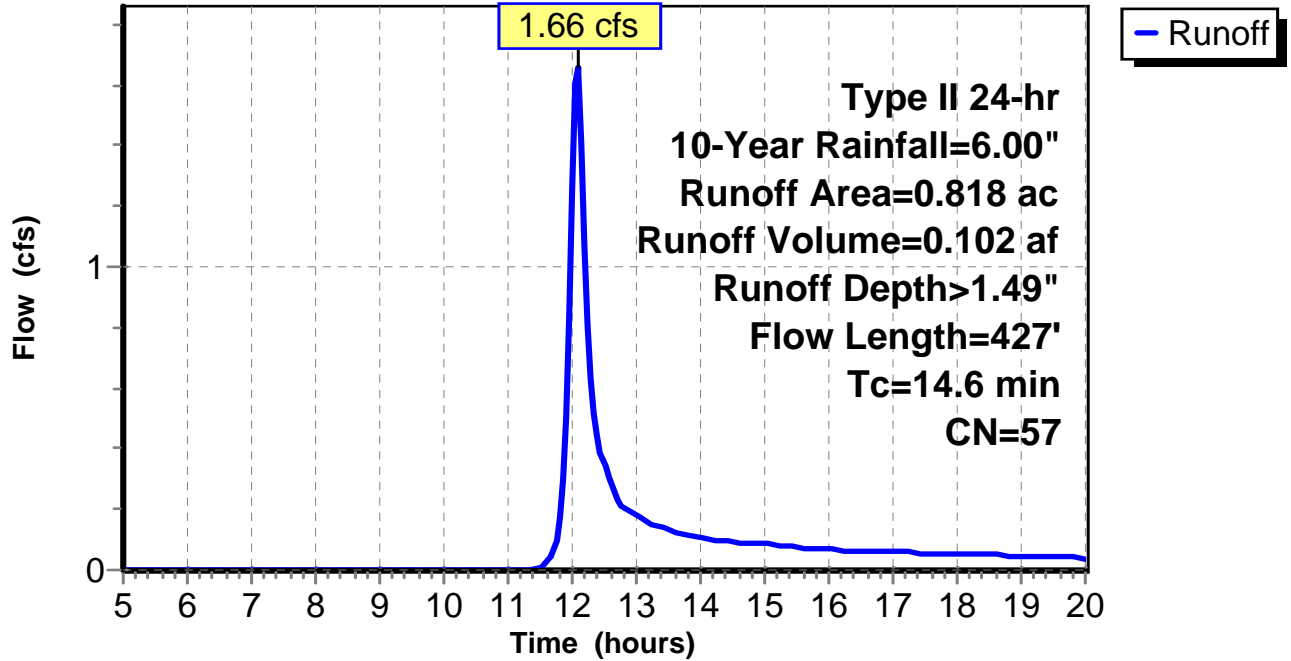
Subcatchment 8: C AR-513.008

Hydrograph



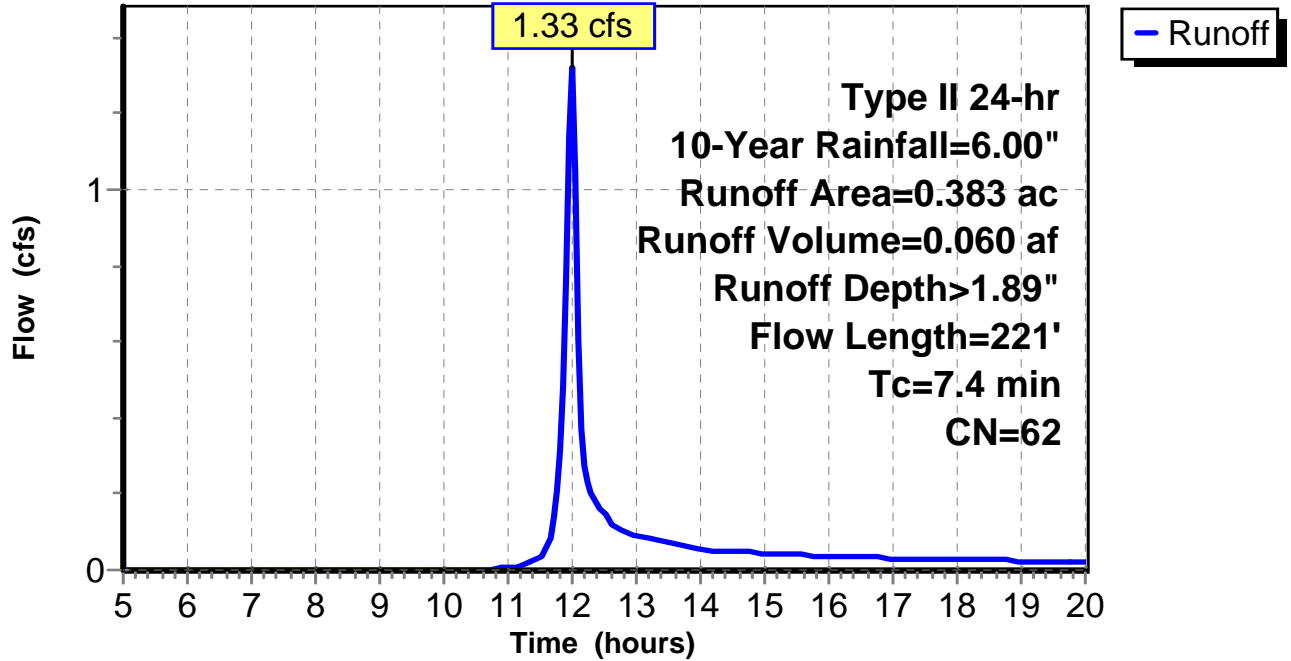
Subcatchment 9: C AR-513.009

Hydrograph



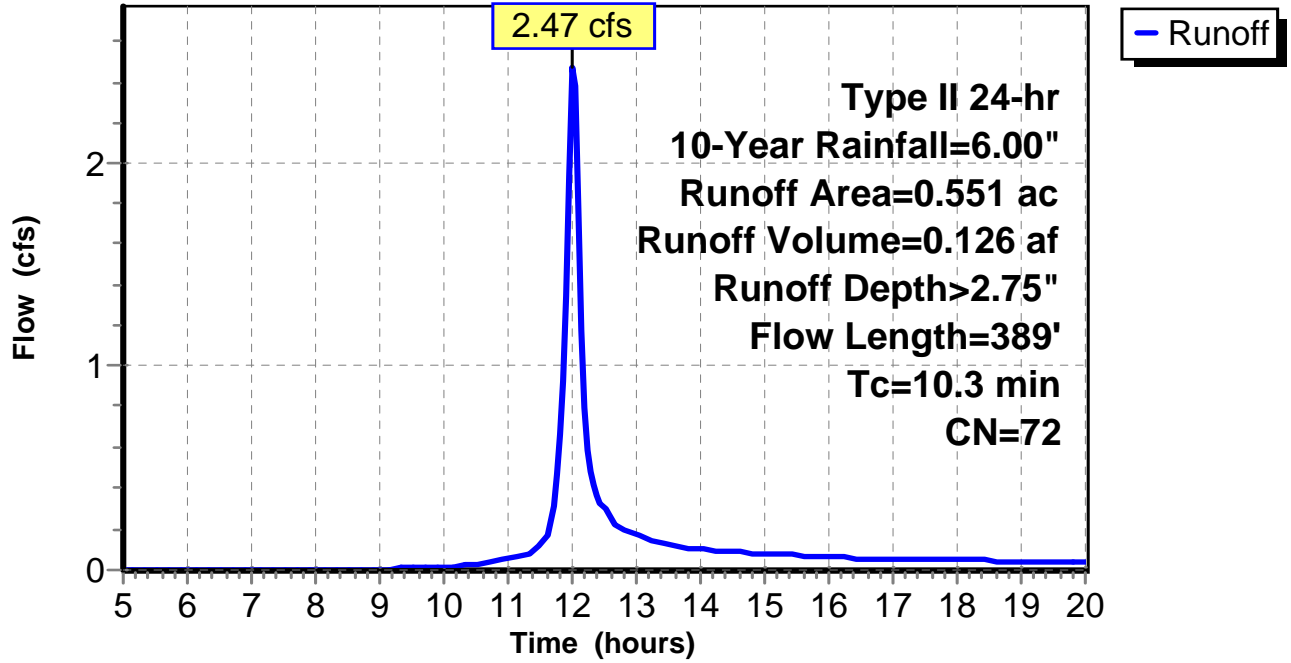
Subcatchment 10: C AR-513.010

Hydrograph



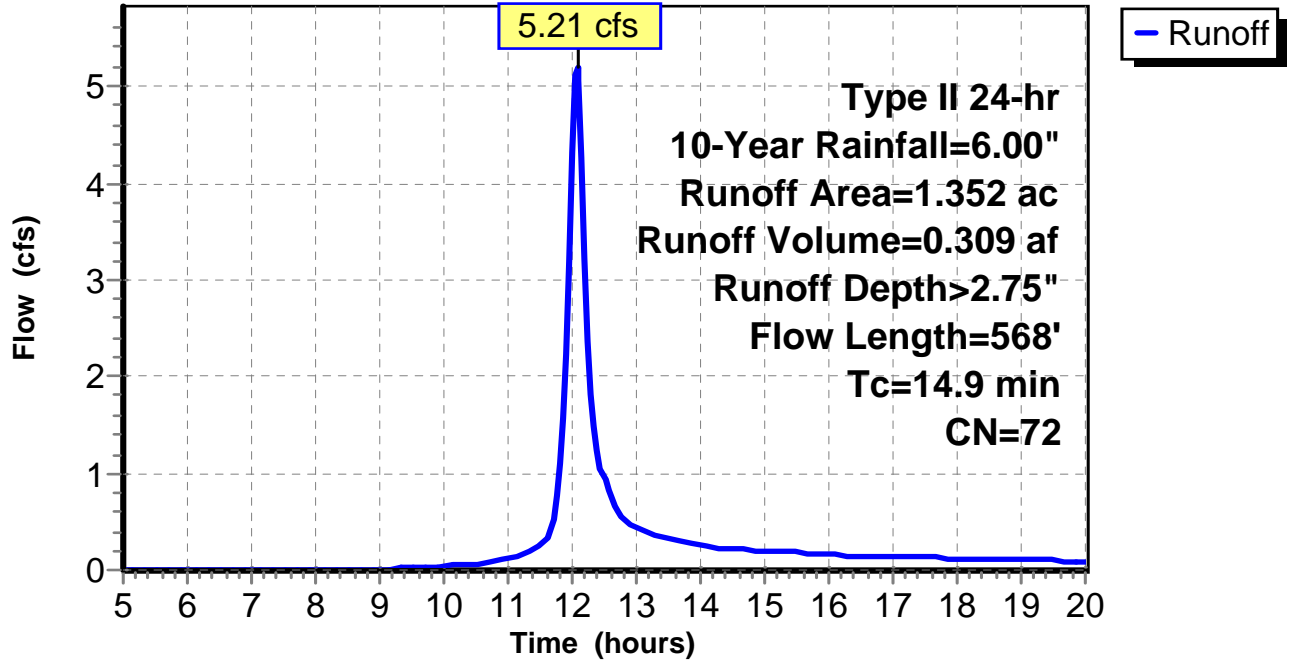
Subcatchment 11: C 227.001

Hydrograph



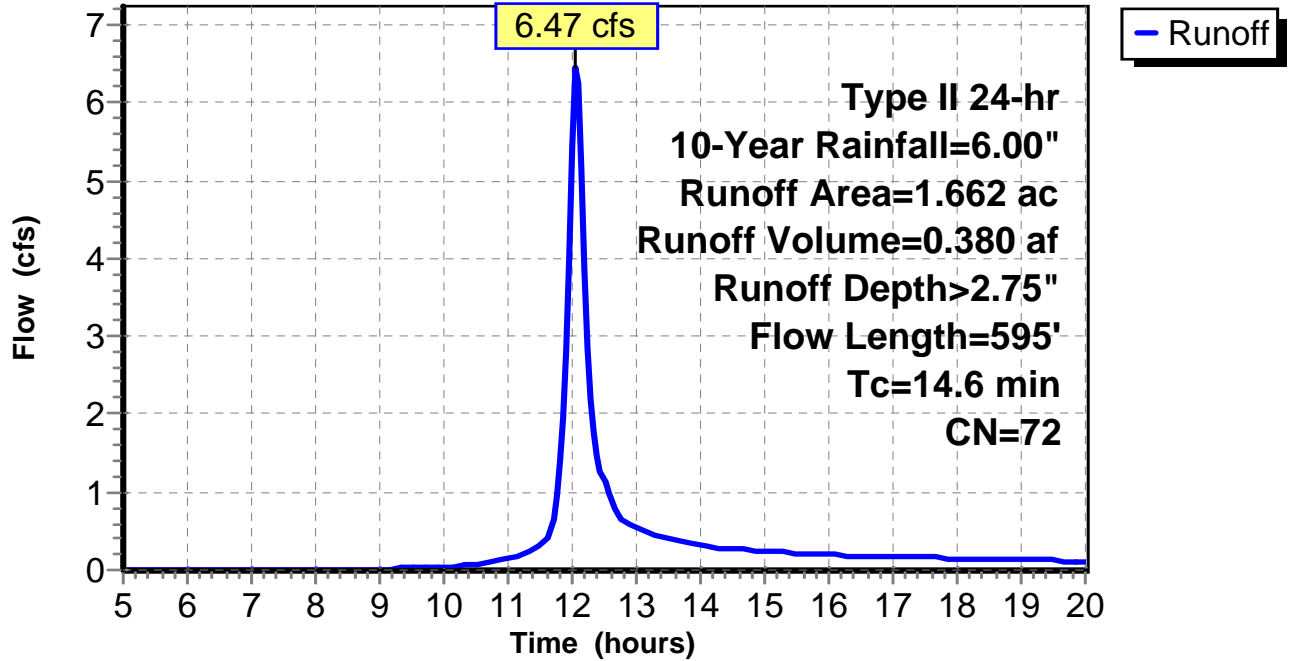
Subcatchment 12: C 227.002

Hydrograph



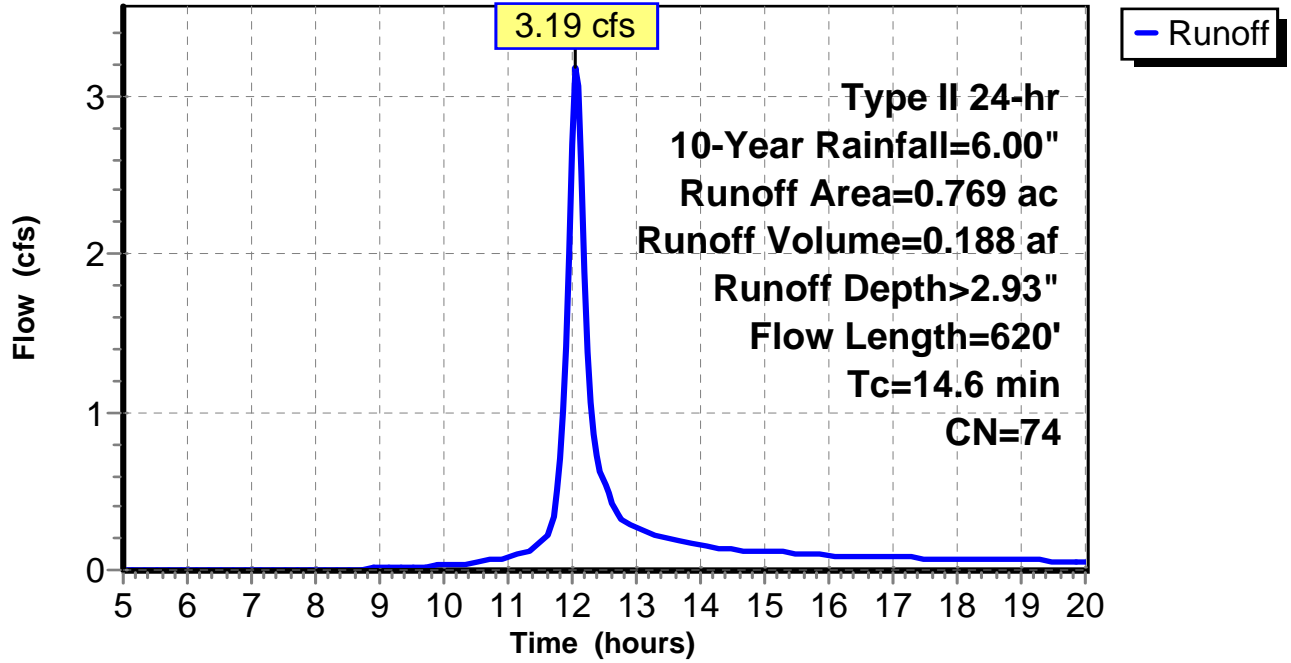
Subcatchment 13: C 227.003

Hydrograph



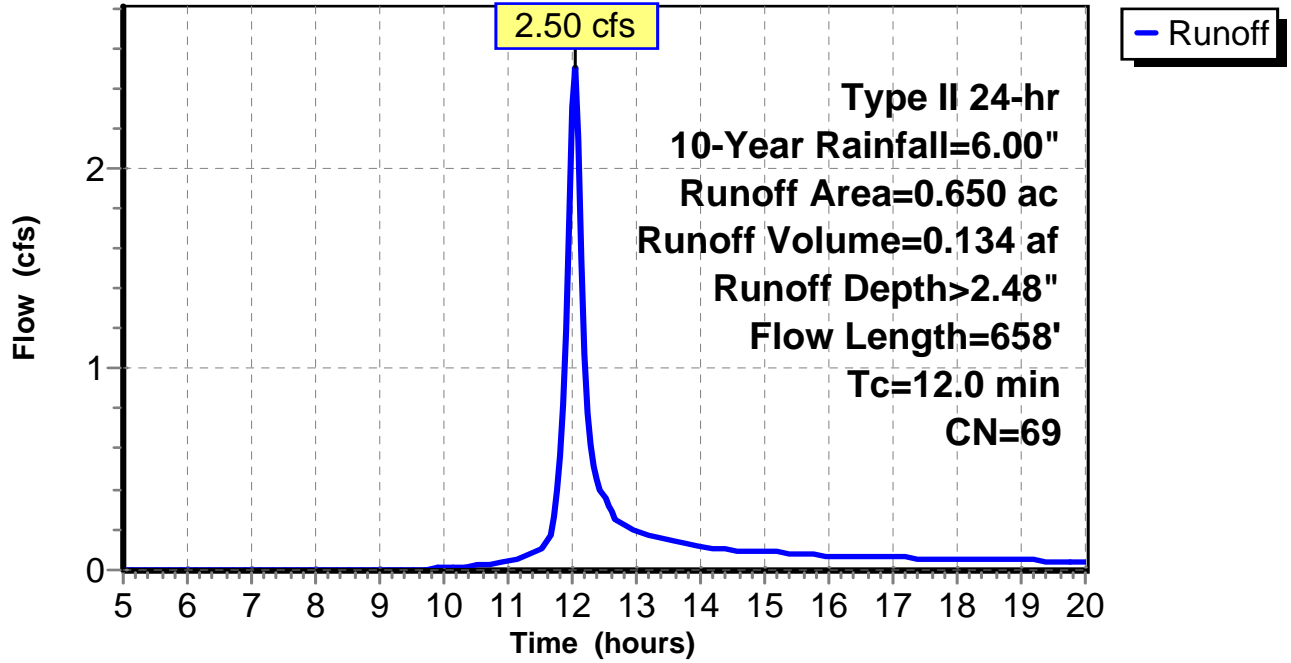
Subcatchment 14: C 227.004

Hydrograph



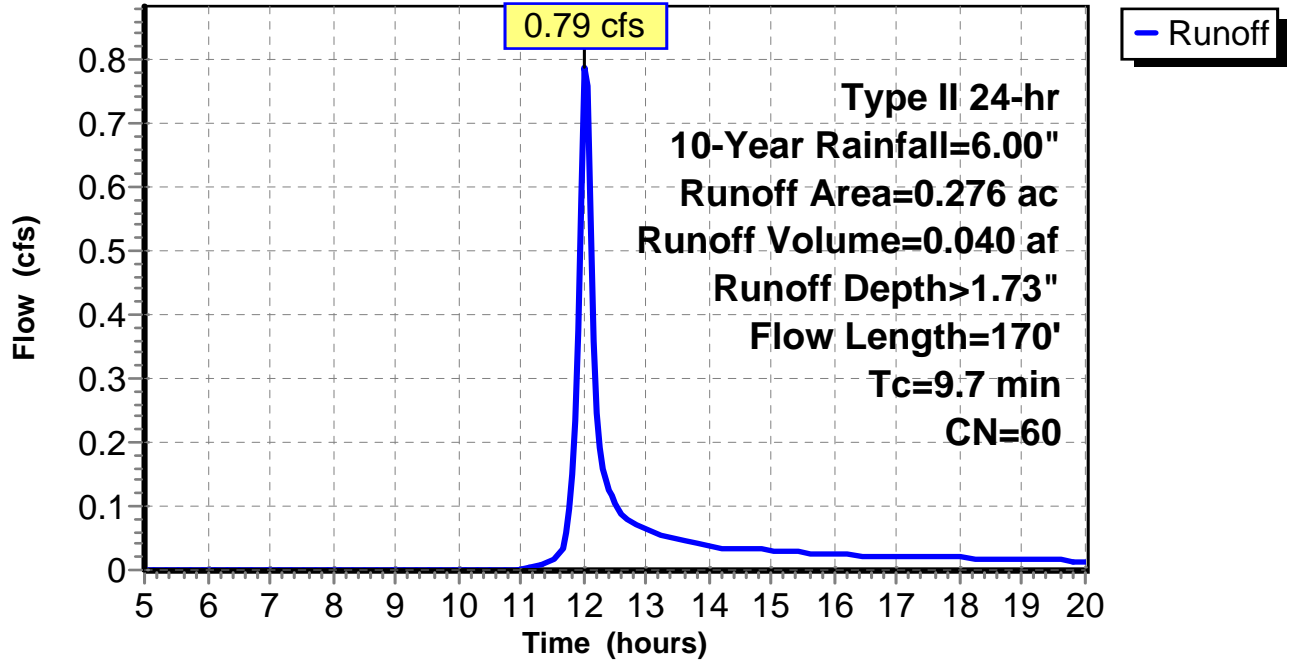
Subcatchment 15: C 227.005

Hydrograph



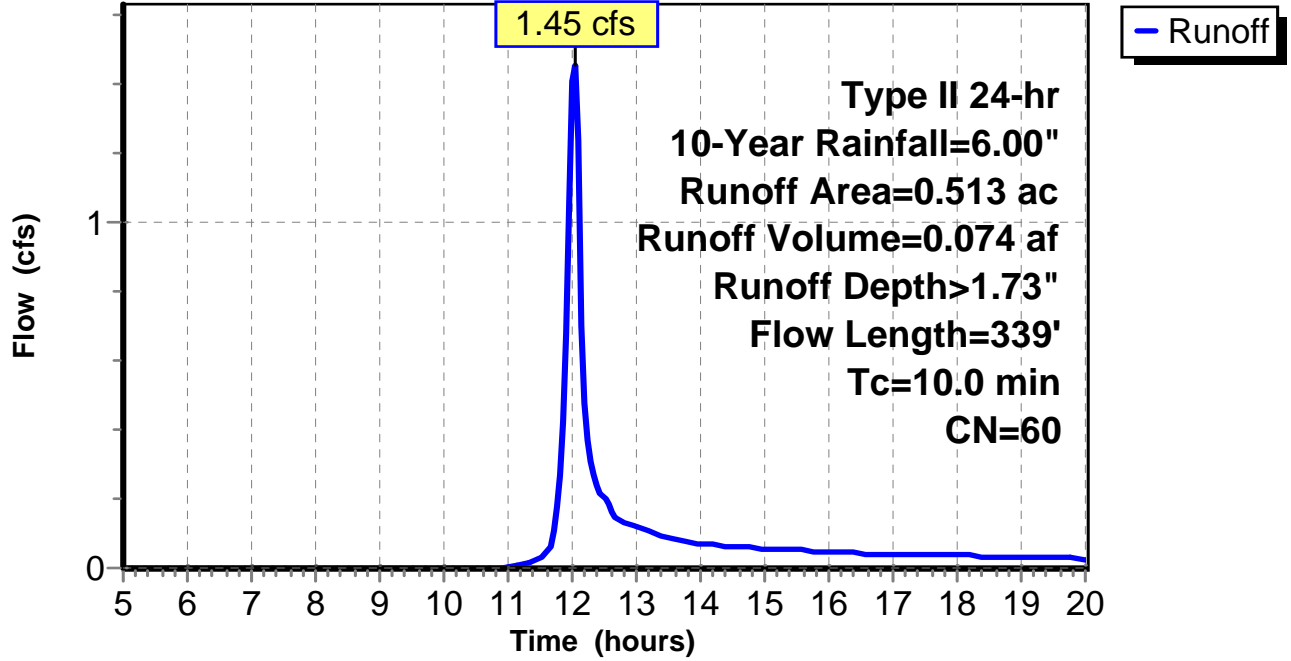
Subcatchment 16: C 227.006

Hydrograph



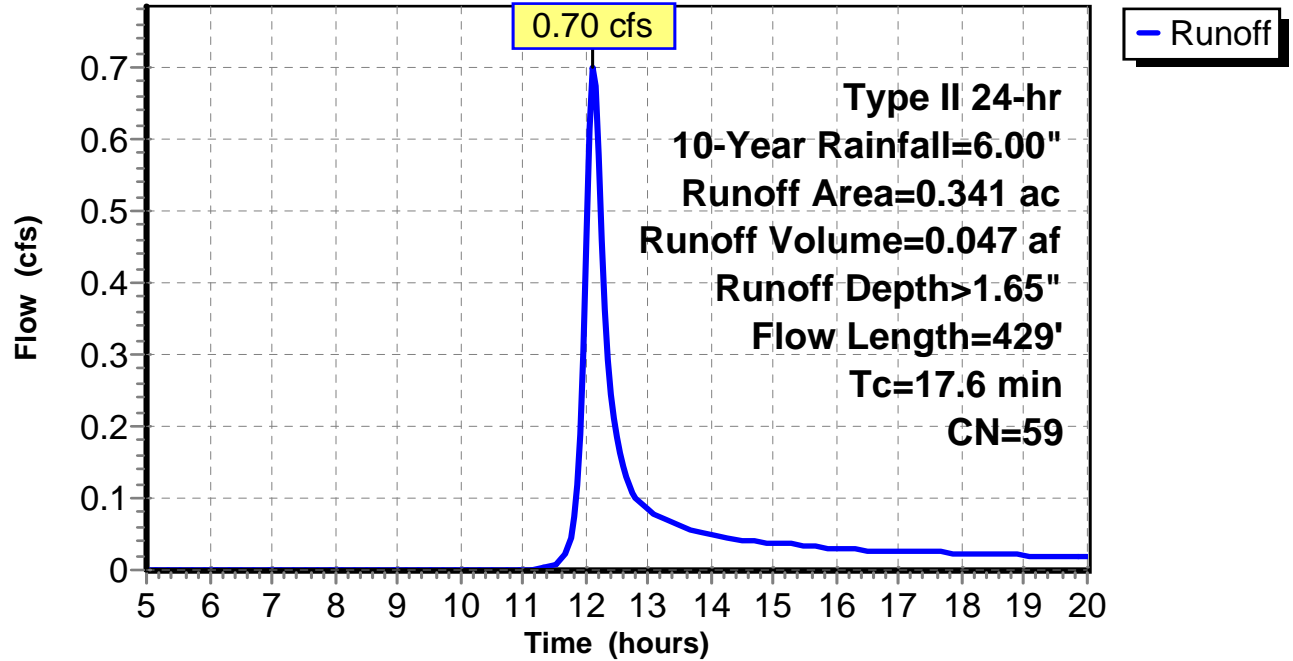
Subcatchment 17: C 227.007

Hydrograph



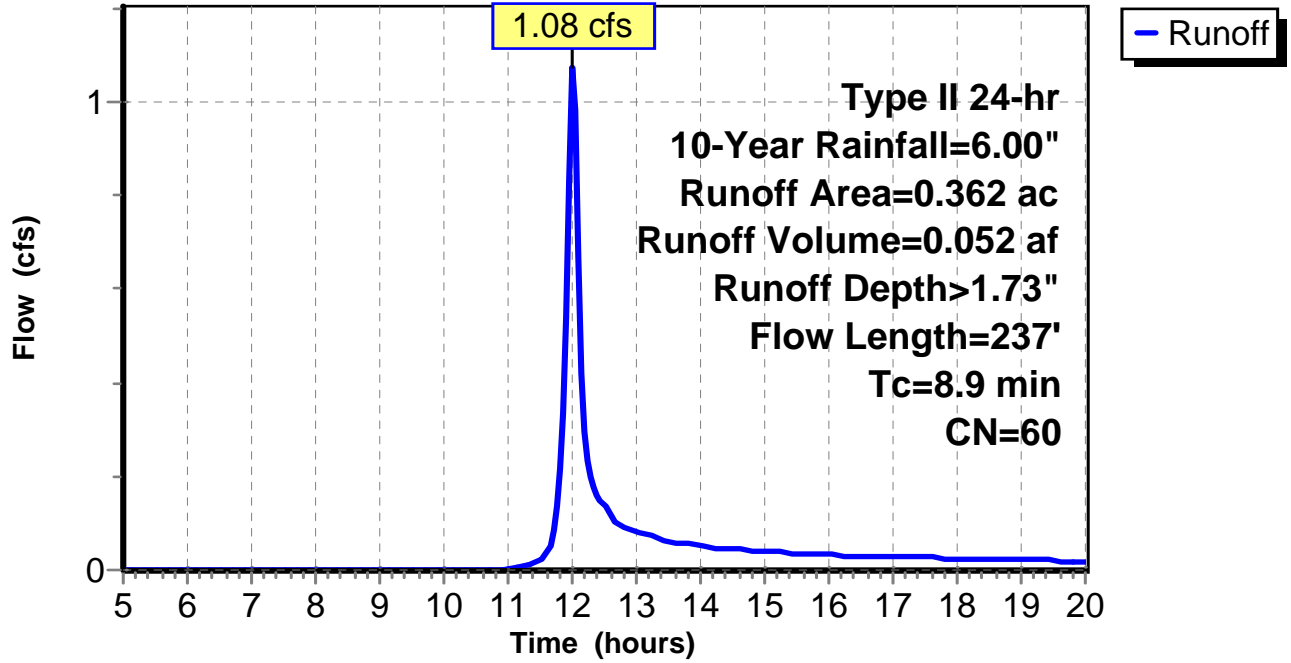
Subcatchment 18: C 227.008

Hydrograph



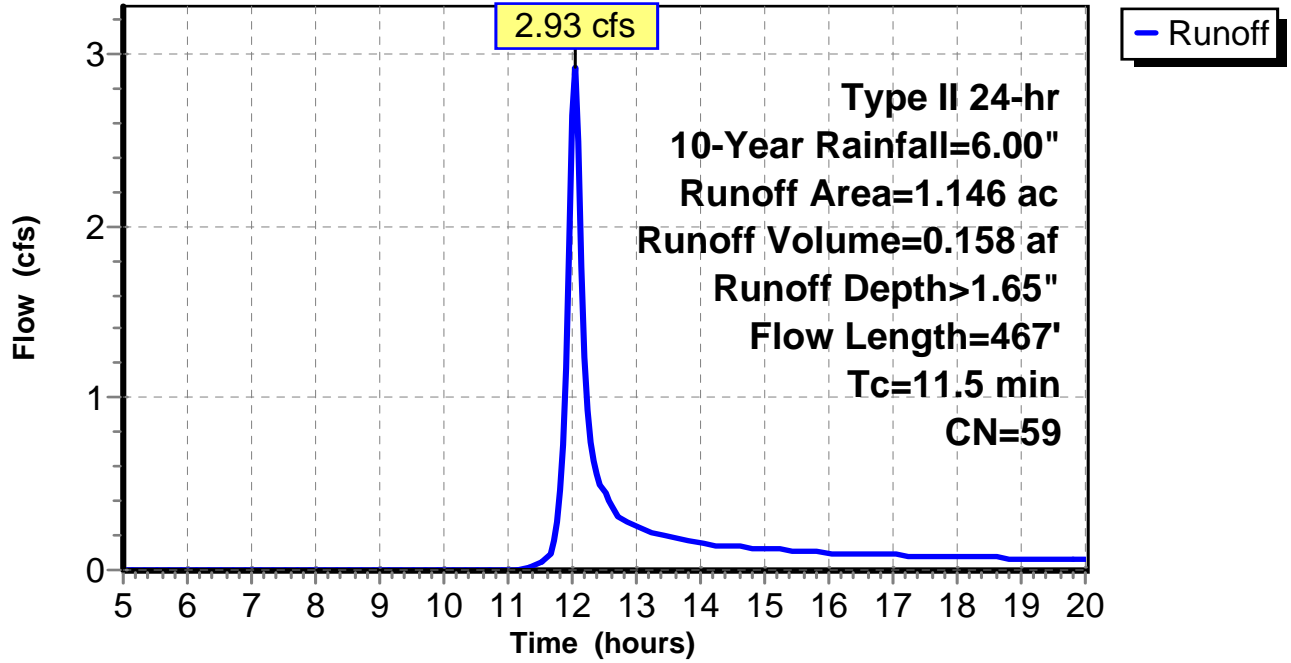
Subcatchment 19: C 227.009

Hydrograph



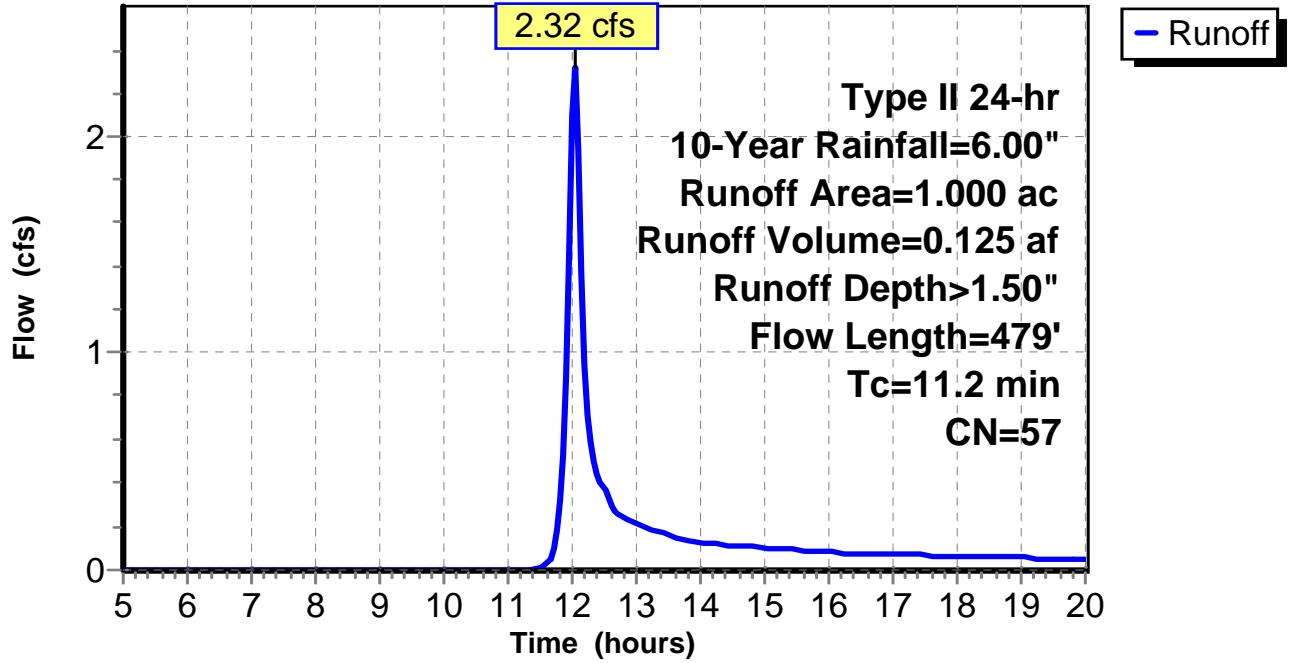
Subcatchment 20: C 227.010

Hydrograph



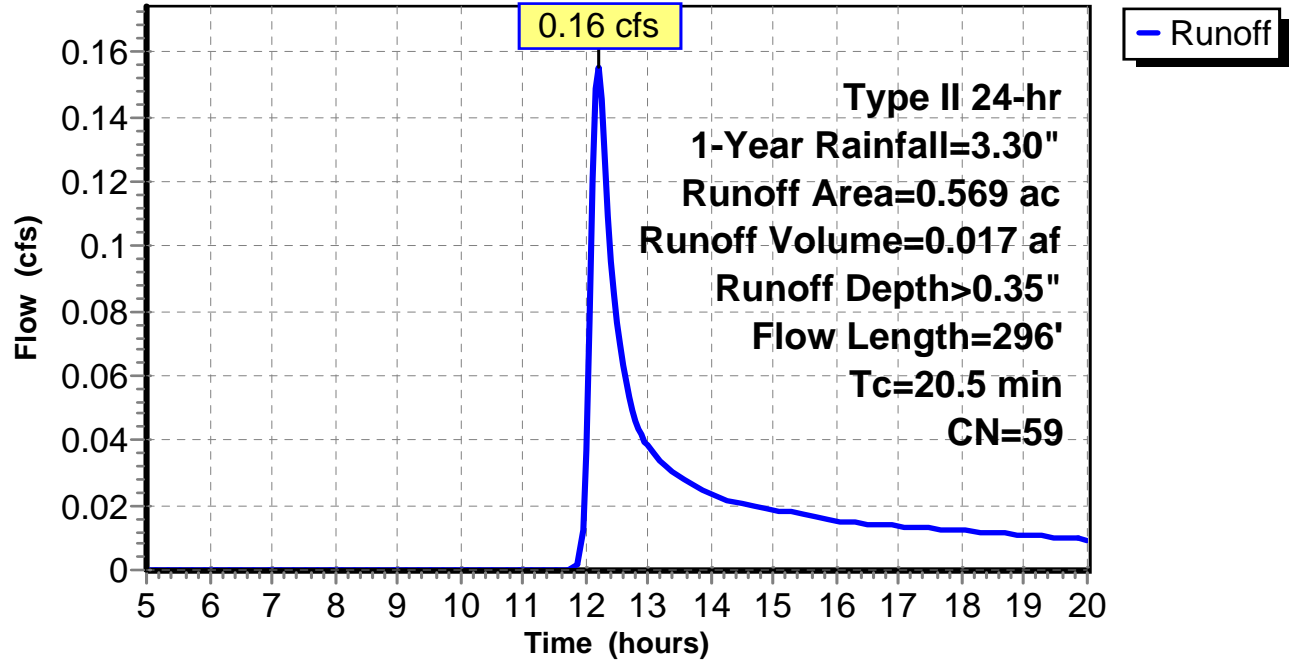
Subcatchment 21: C 227.013

Hydrograph



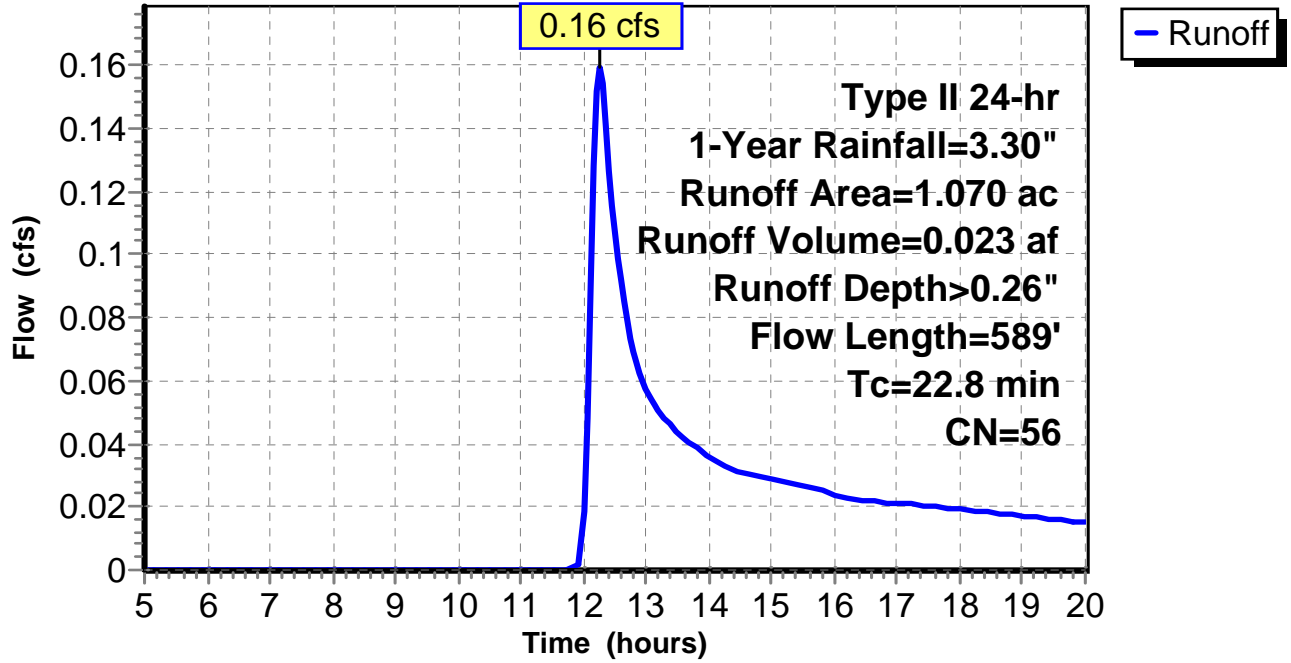
Subcatchment 1: C 227.011

Hydrograph



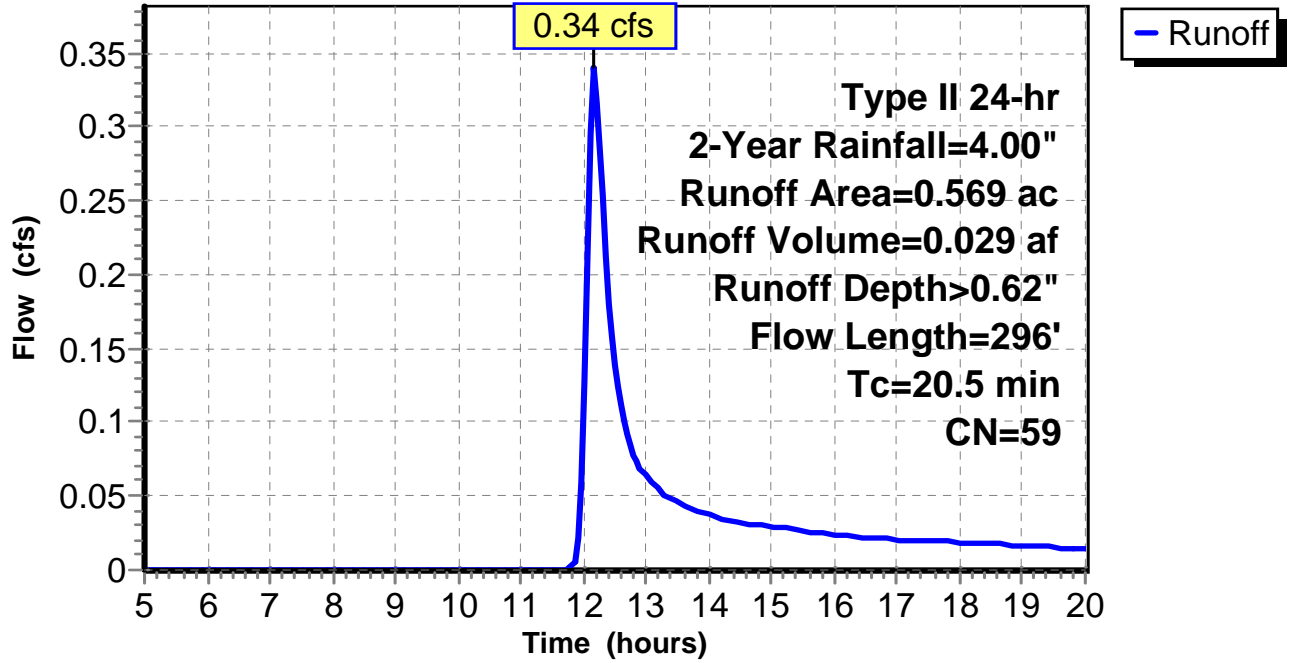
Subcatchment 2: C 227.012

Hydrograph



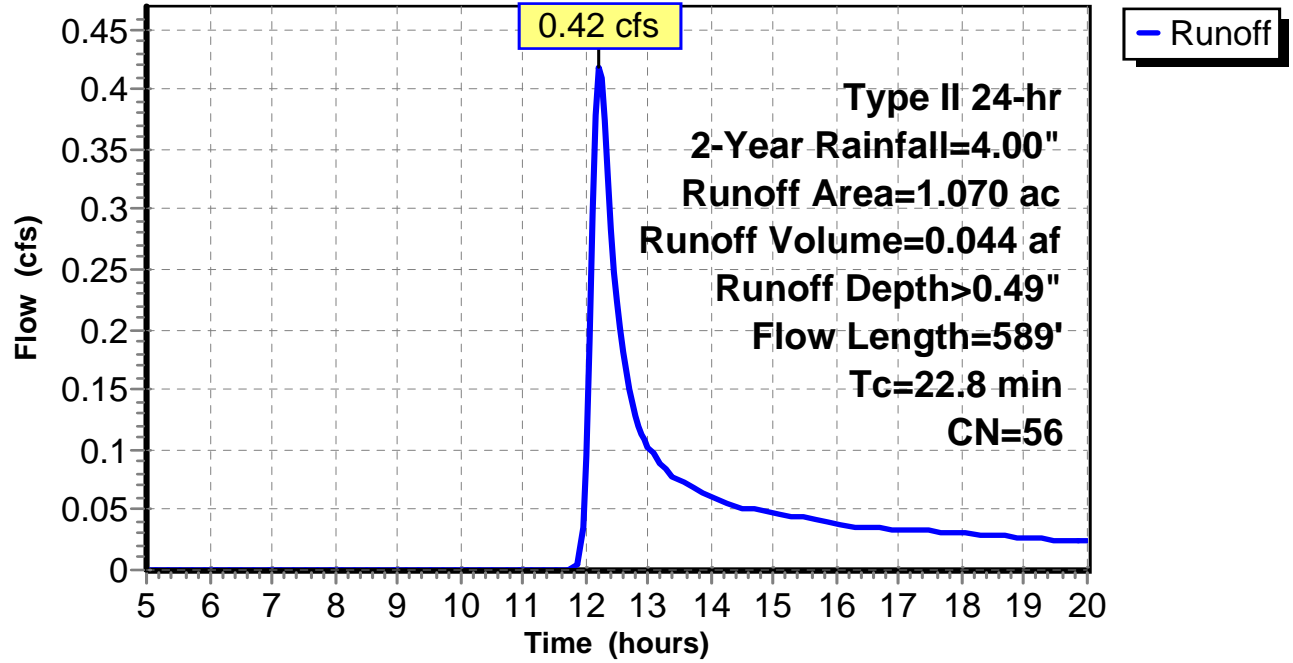
Subcatchment 1: C 227.011

Hydrograph



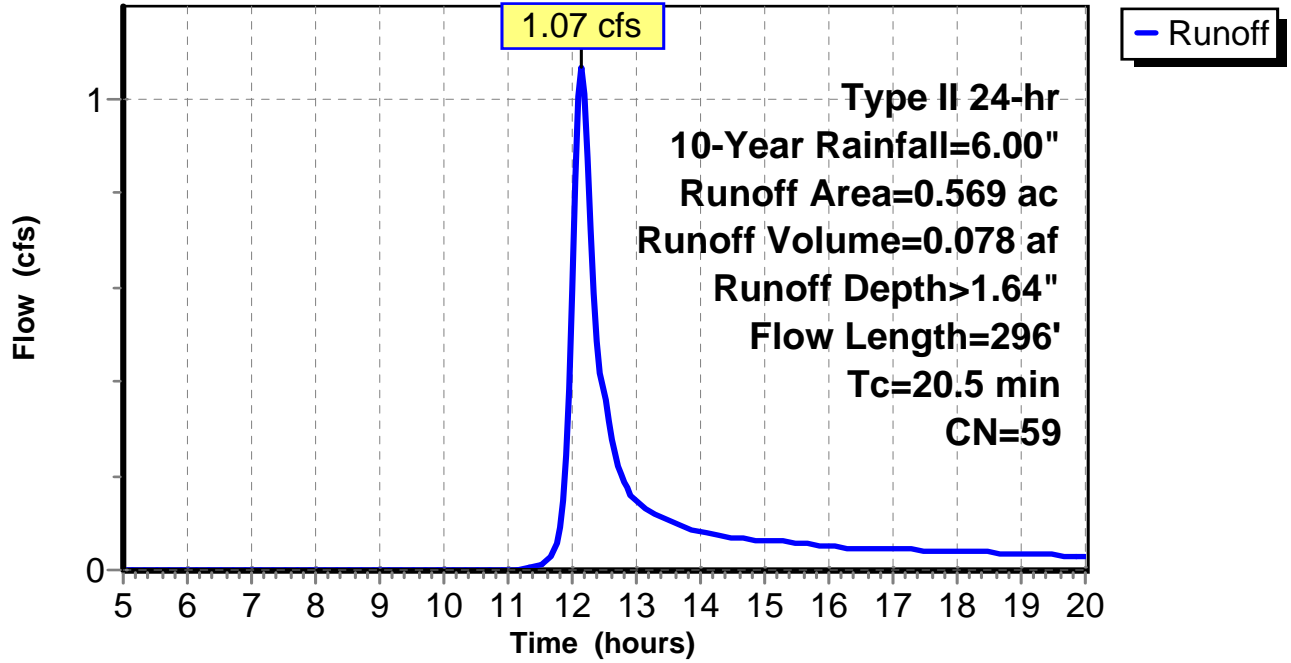
Subcatchment 2: C 227.012

Hydrograph



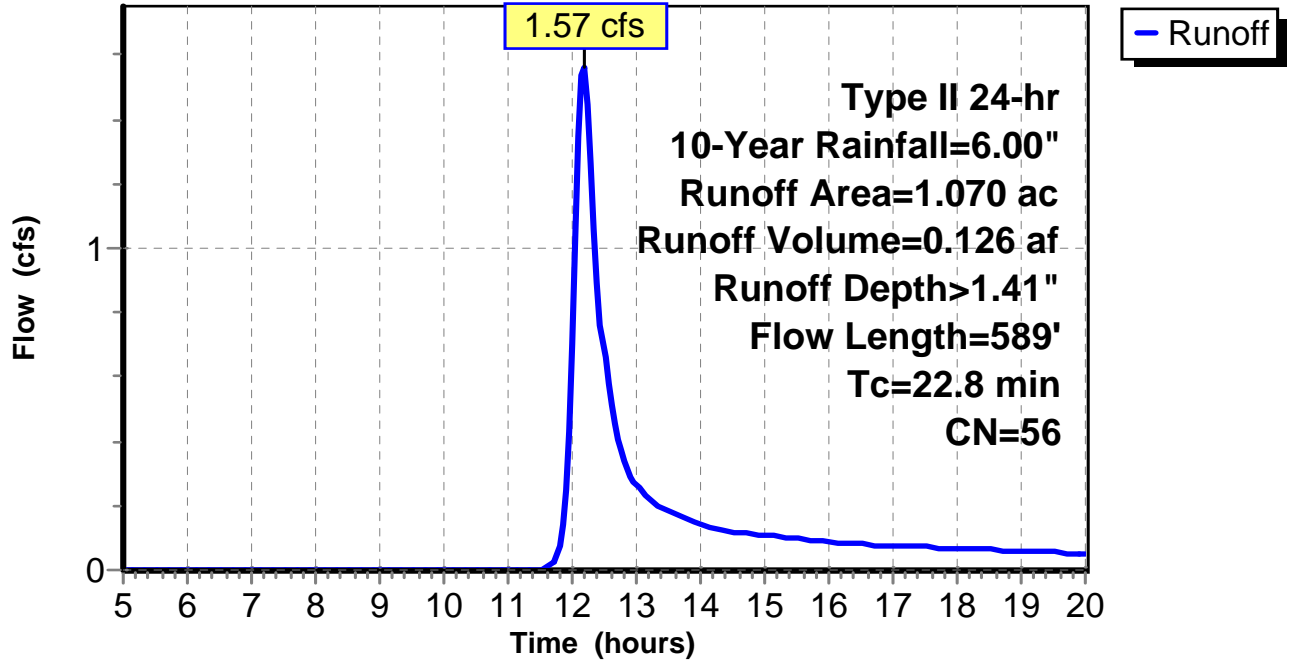
Subcatchment 1: C 227.011

Hydrograph



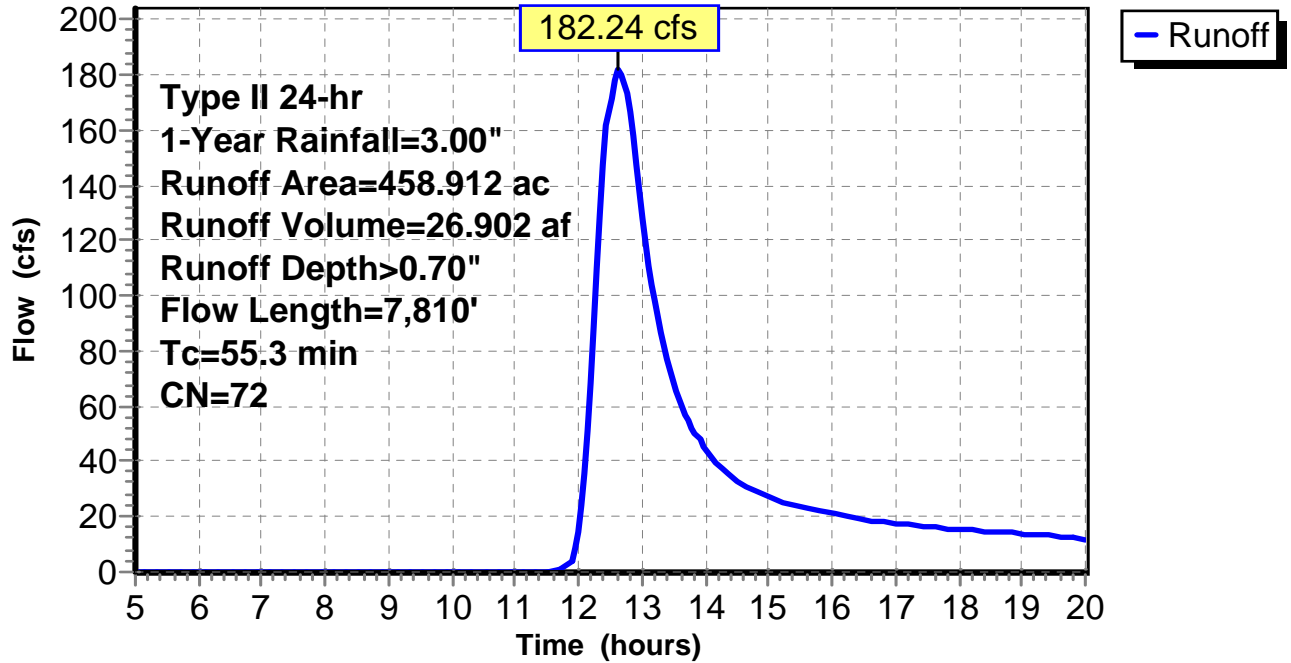
Subcatchment 2: C 227.012

Hydrograph



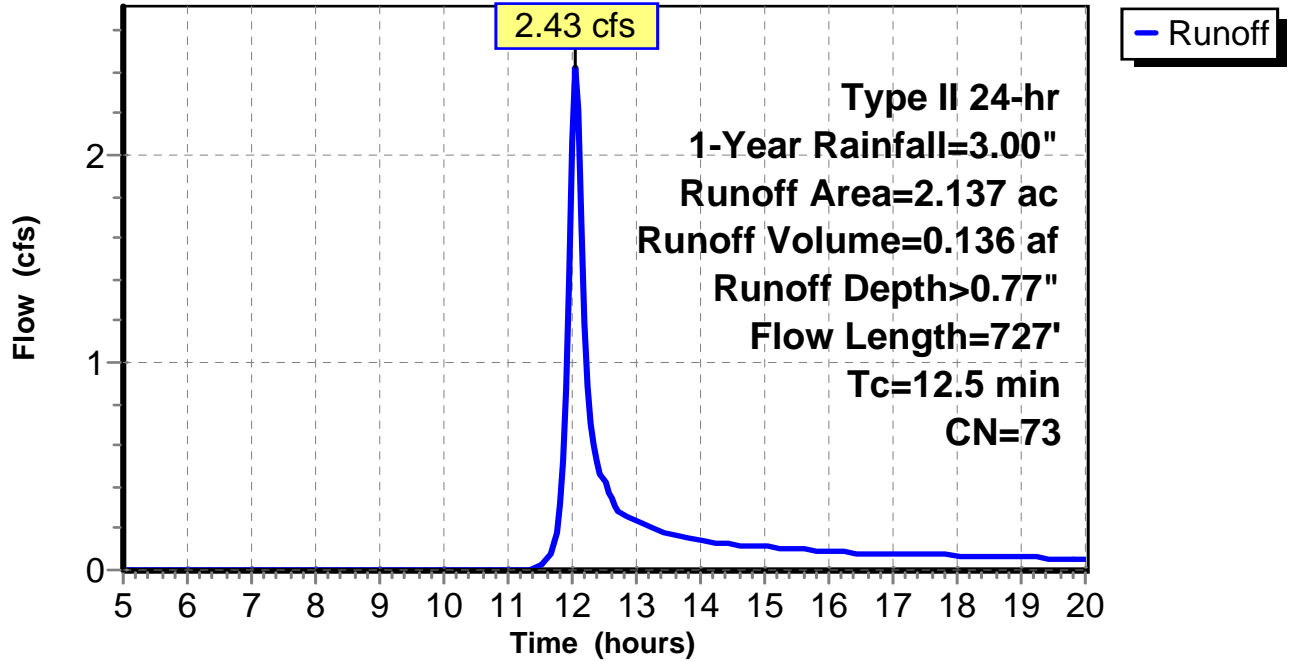
Subcatchment 1: C AR-514.001

Hydrograph



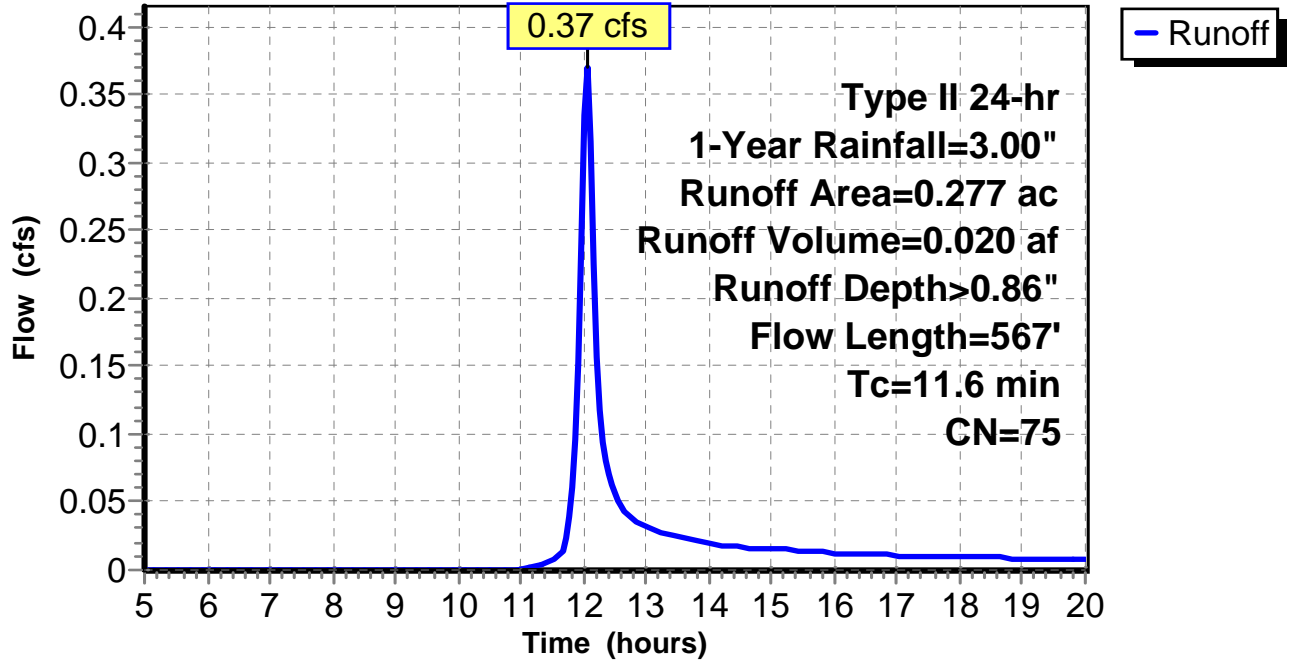
Subcatchment 2: C AR-514.002

Hydrograph



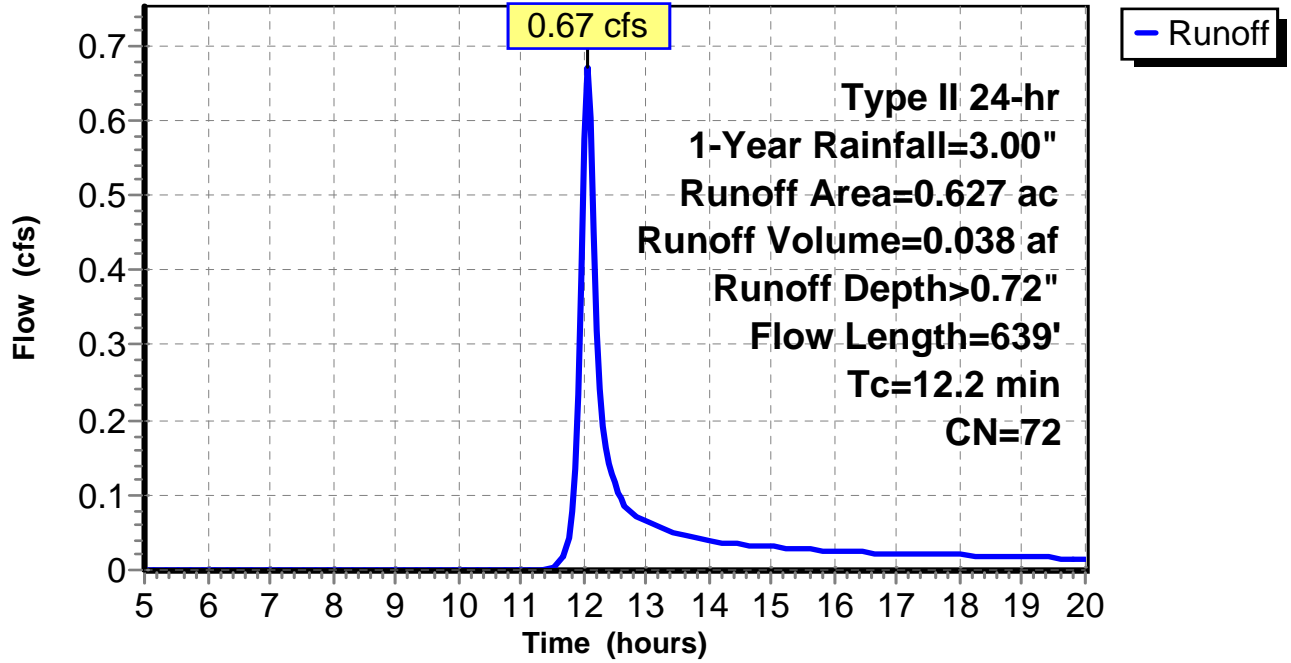
Subcatchment 3: C AR-514.003

Hydrograph



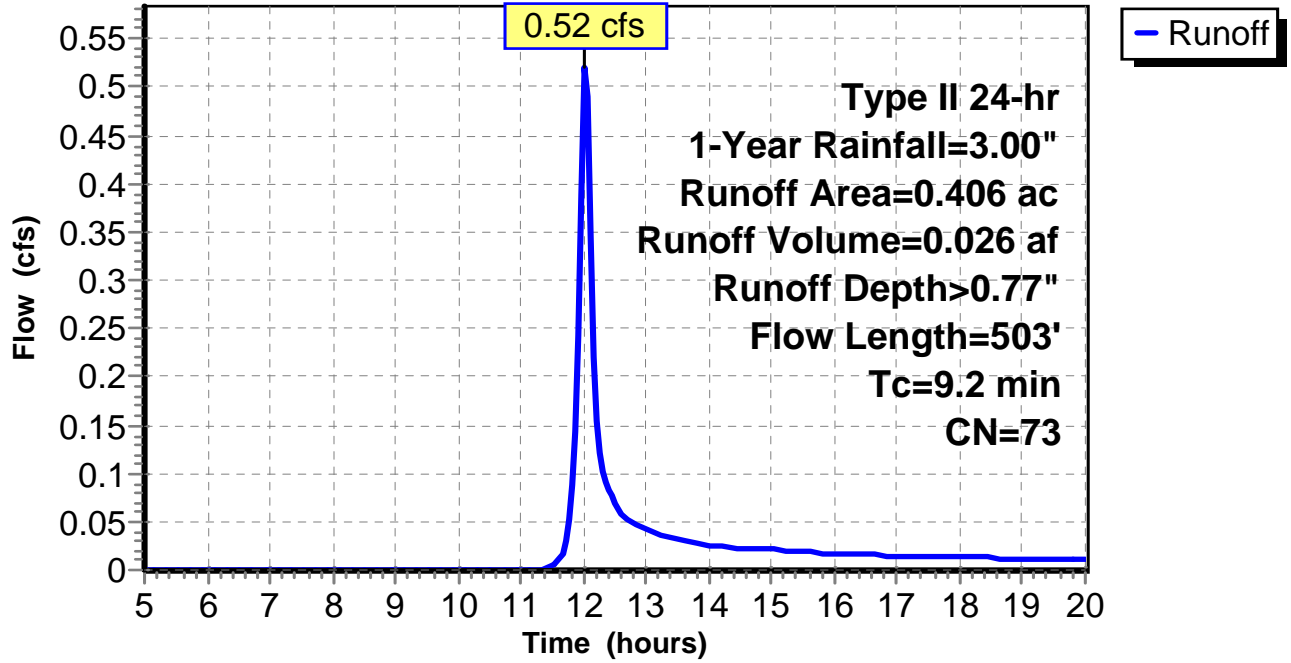
Subcatchment 4: C AR-514.004

Hydrograph



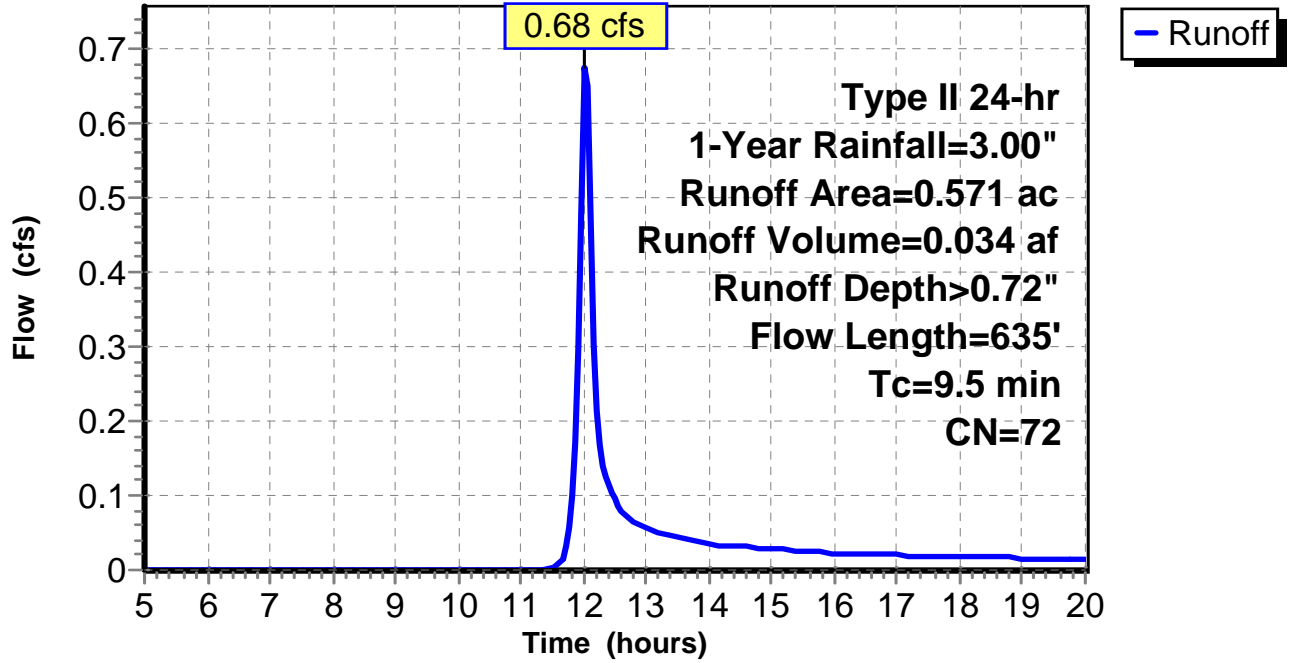
Subcatchment 5: C AR-514.005

Hydrograph



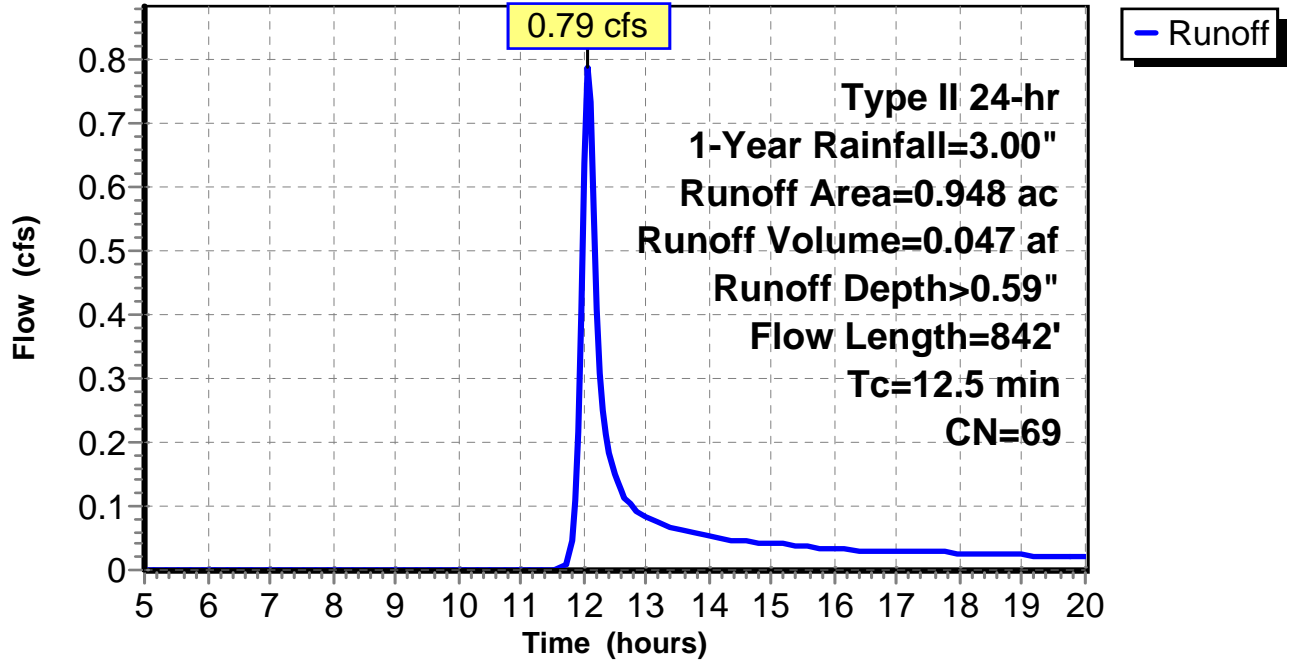
Subcatchment 6: C AR-514.006

Hydrograph



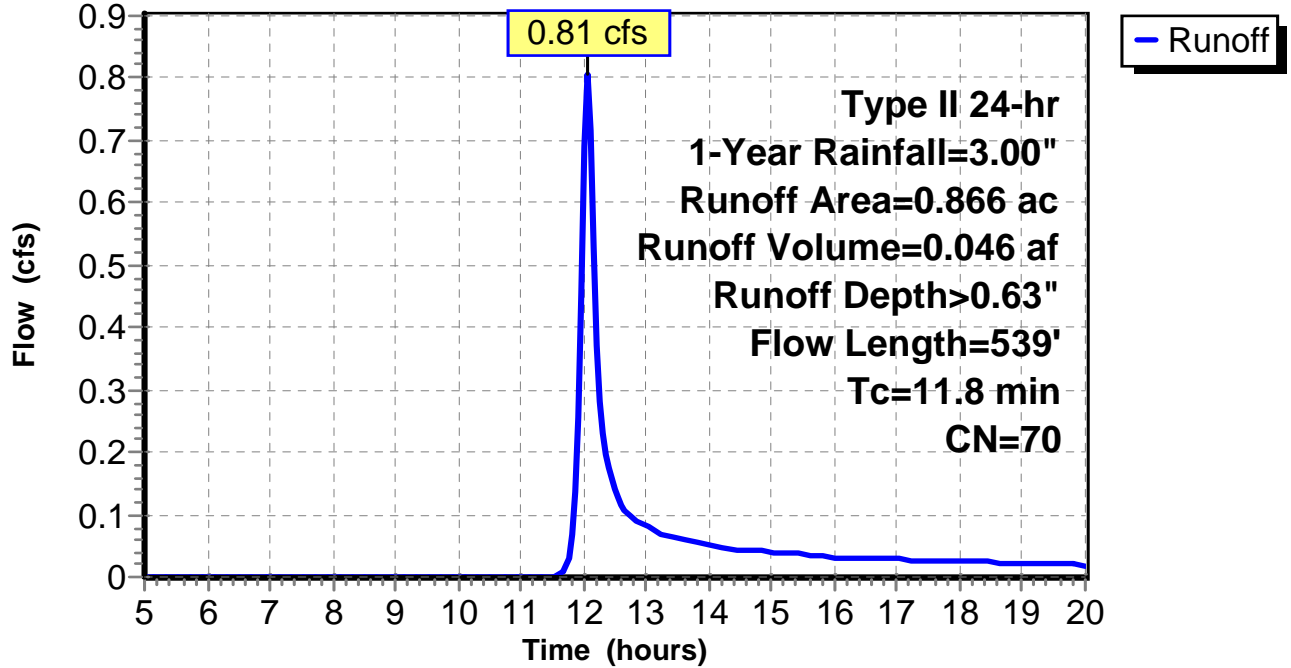
Subcatchment 7: C AR-514.007

Hydrograph



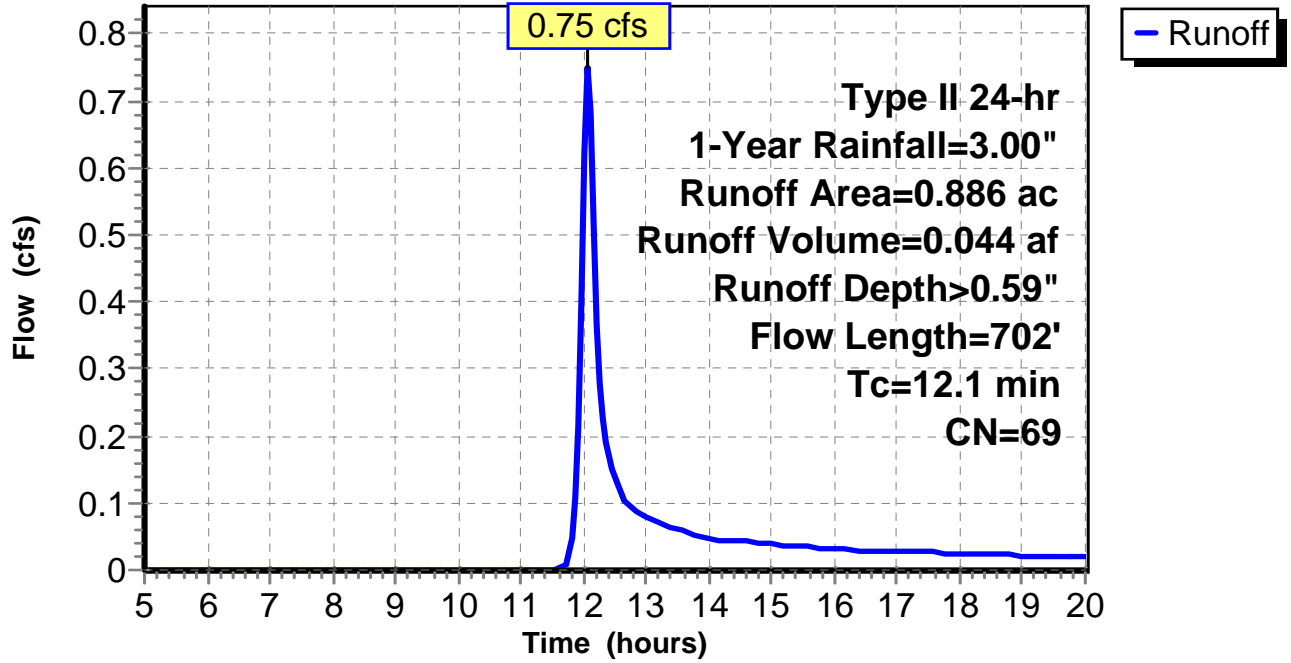
Subcatchment 8: C AR-514.008

Hydrograph



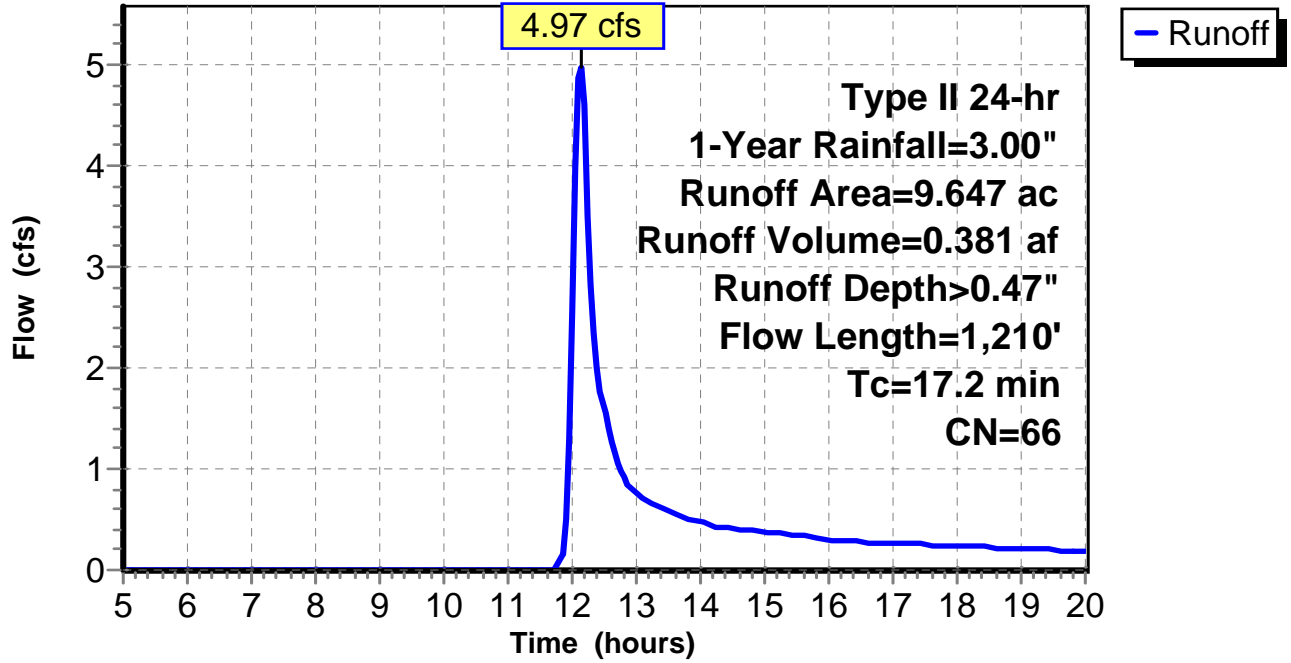
Subcatchment 9: C AR-514.009

Hydrograph



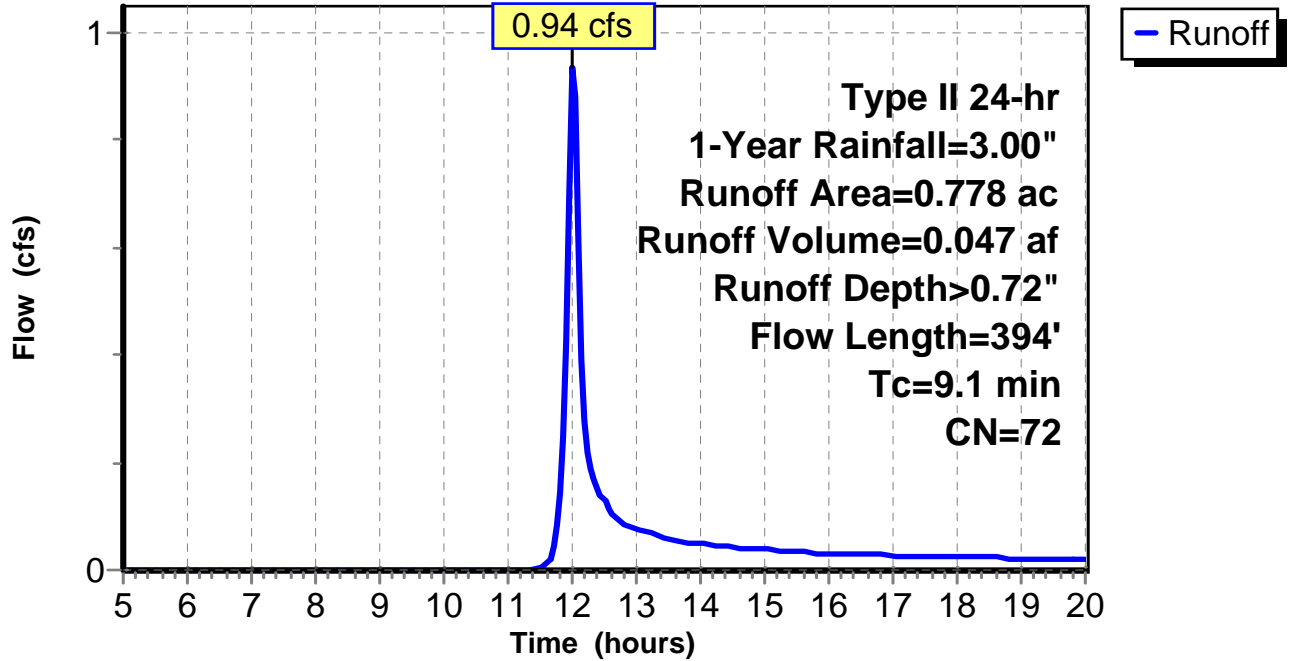
Subcatchment 10: C AR-514.010

Hydrograph



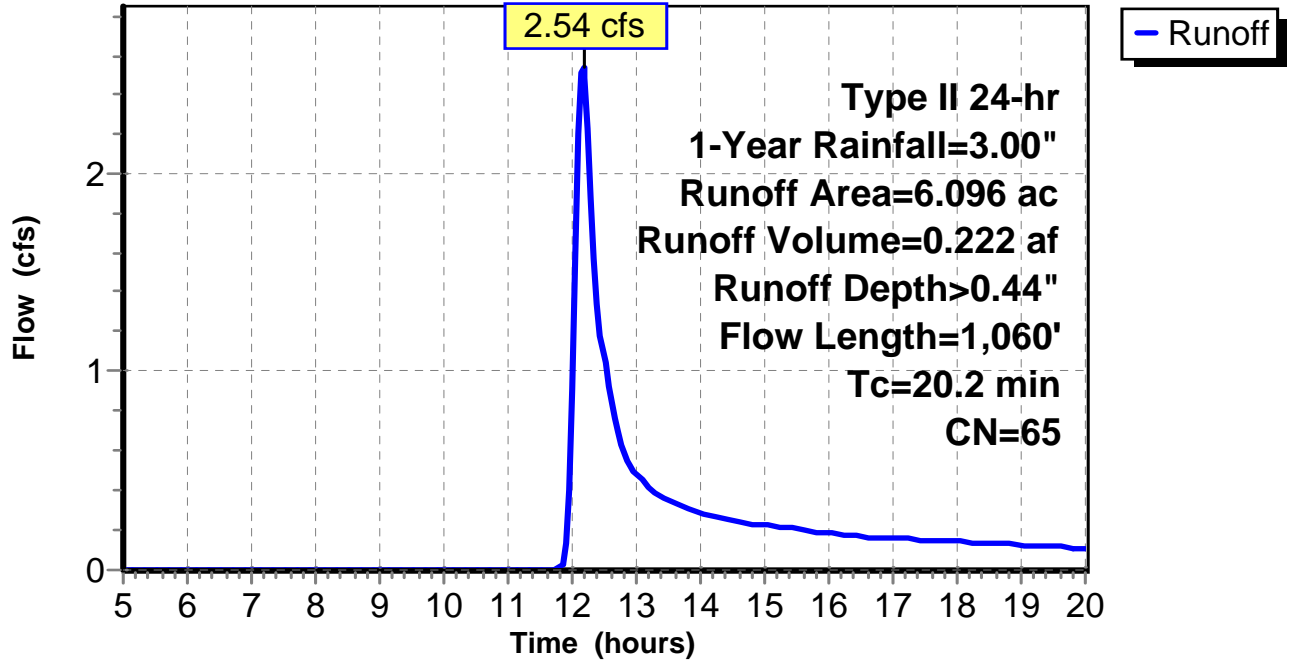
Subcatchment 11: C 228.001

Hydrograph



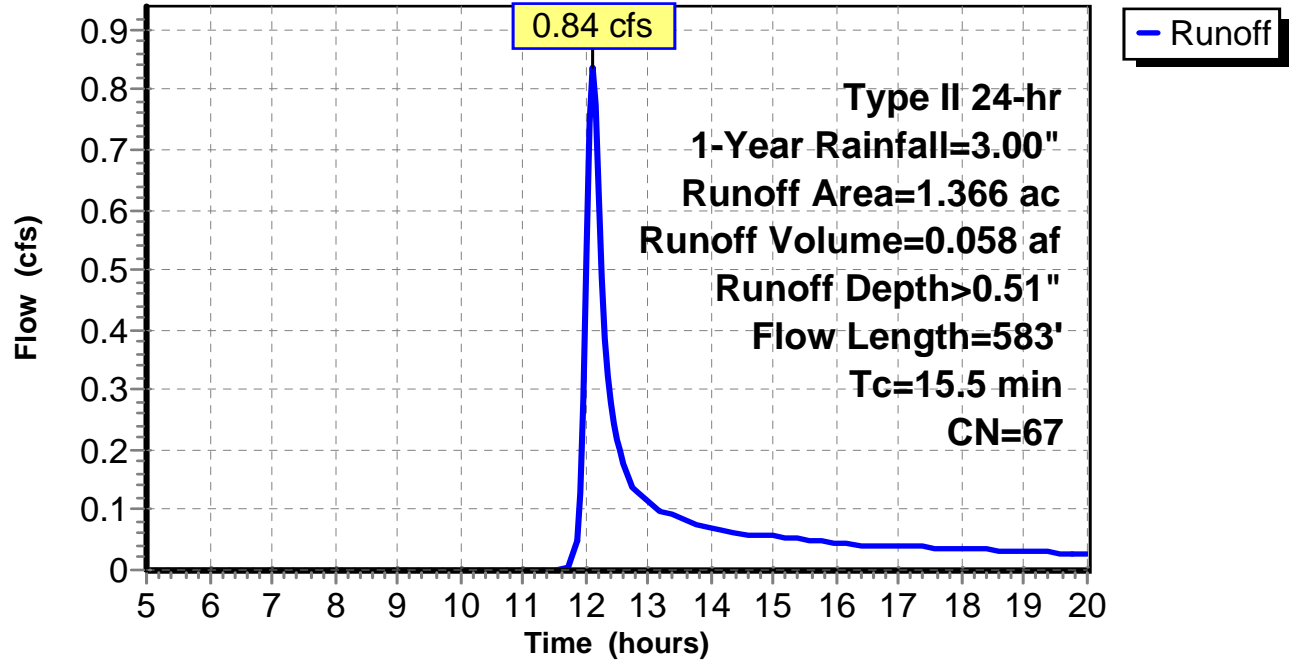
Subcatchment 12: C 228.002

Hydrograph



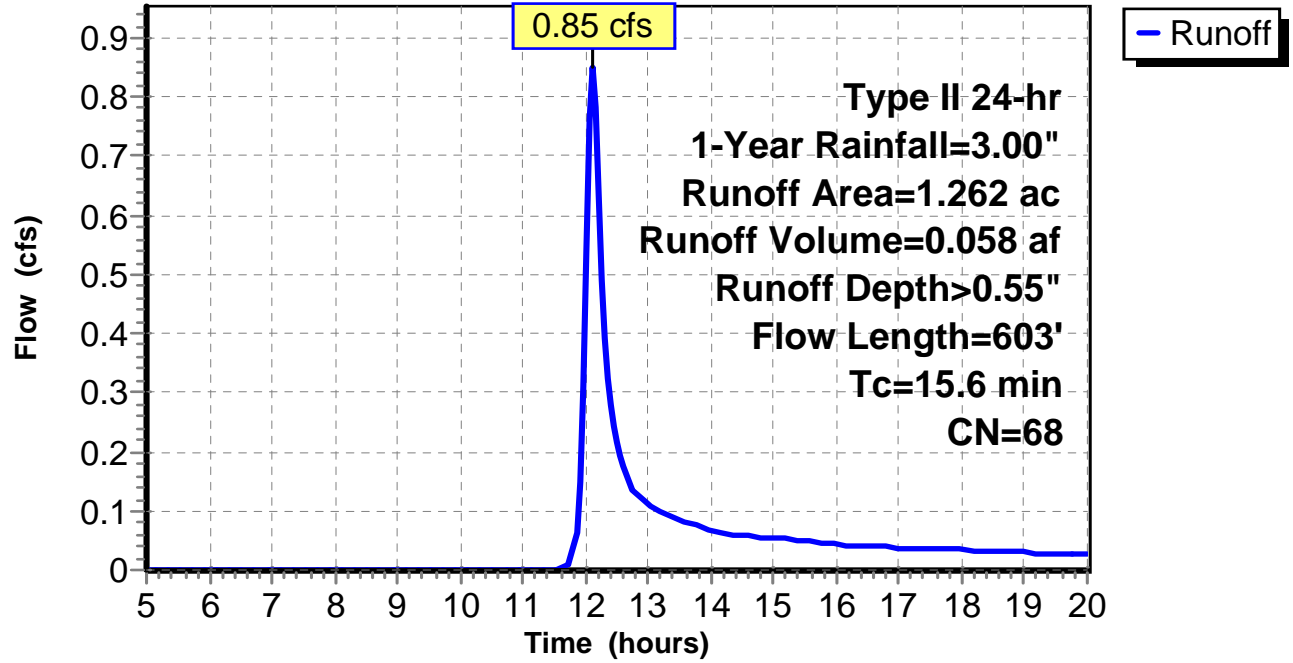
Subcatchment 13: C 228.003

Hydrograph



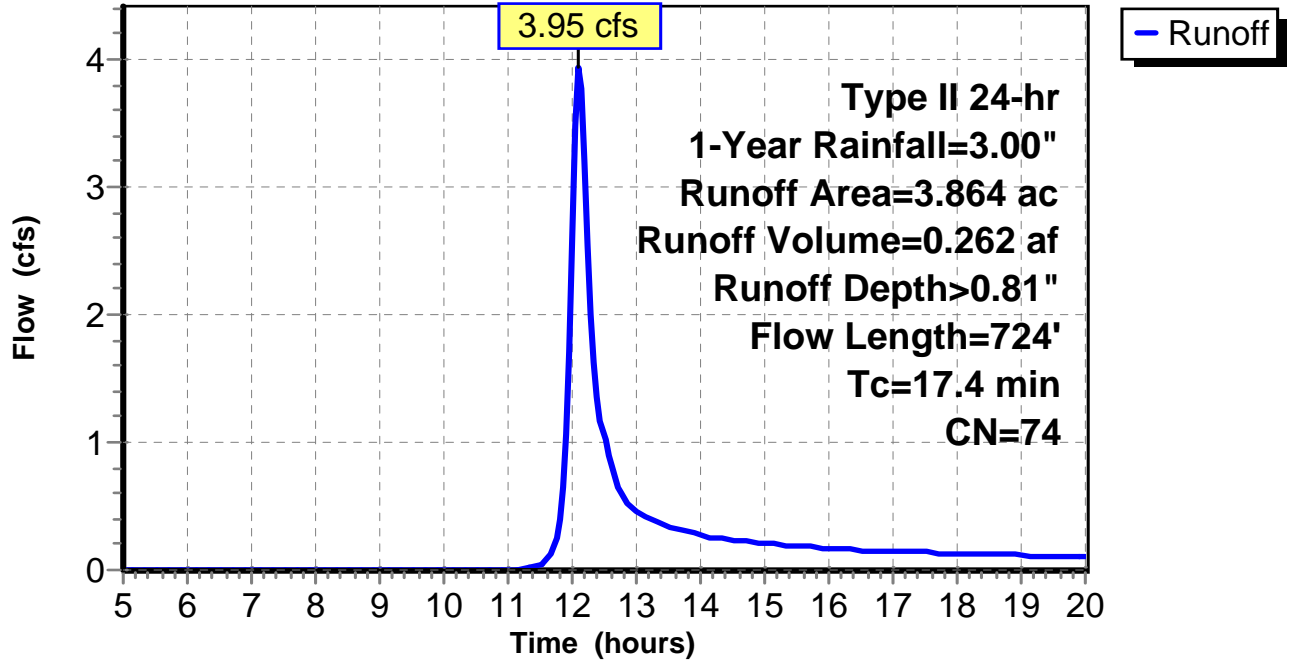
Subcatchment 14: C 228.004

Hydrograph



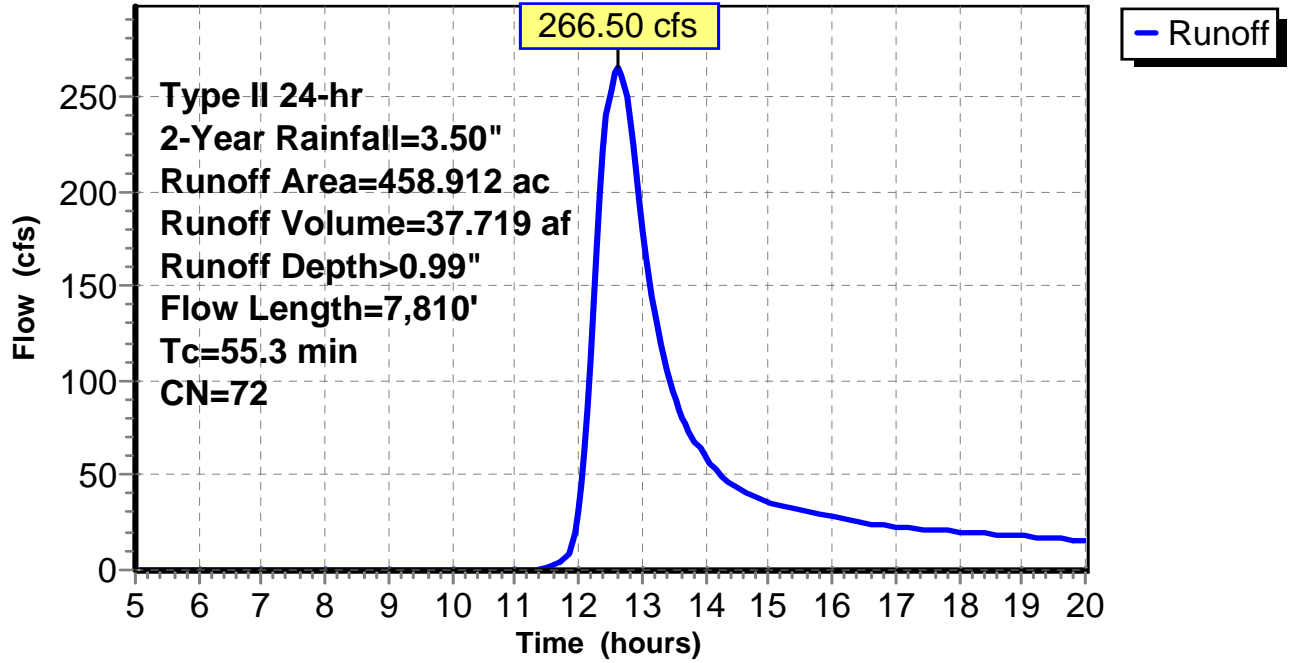
Subcatchment 15: C 228.005

Hydrograph



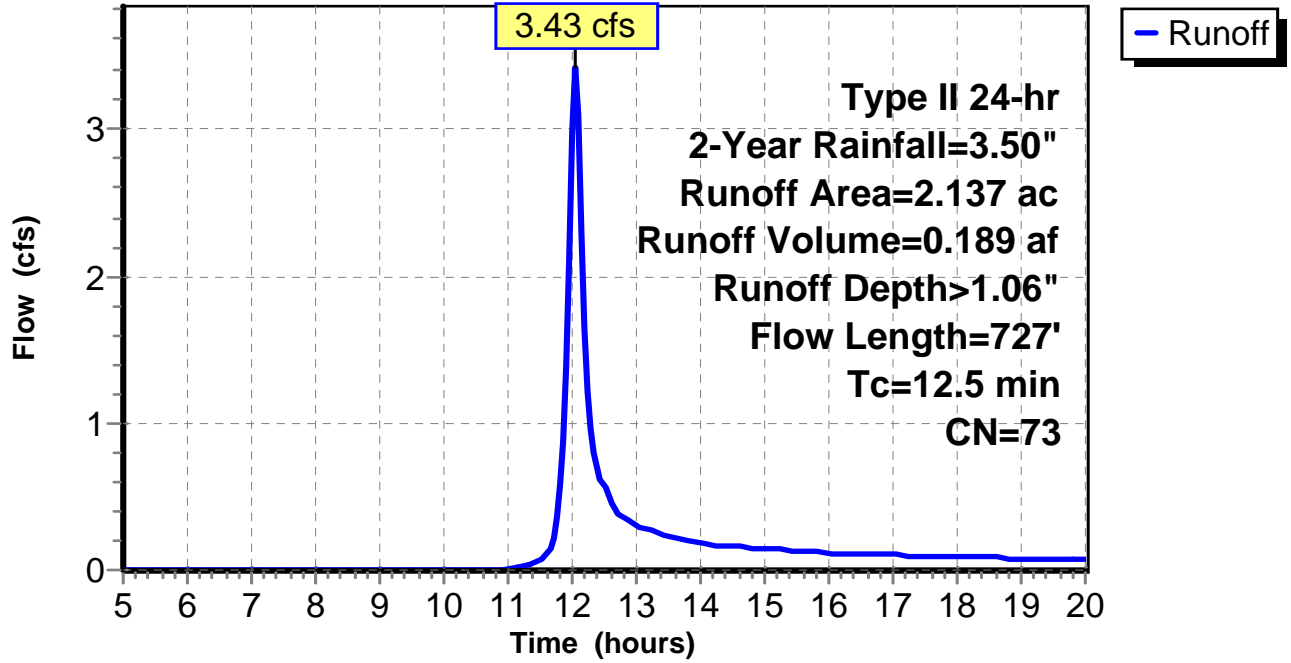
Subcatchment 1: C AR-514.001

Hydrograph



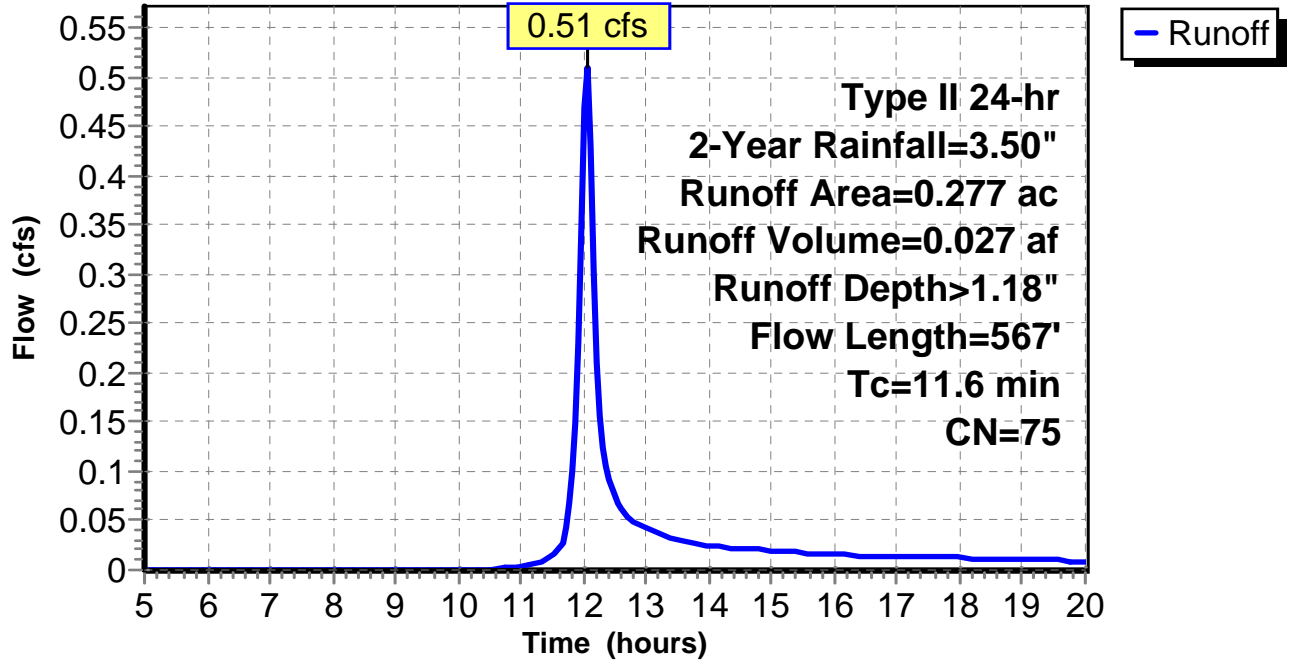
Subcatchment 2: C AR-514.002

Hydrograph



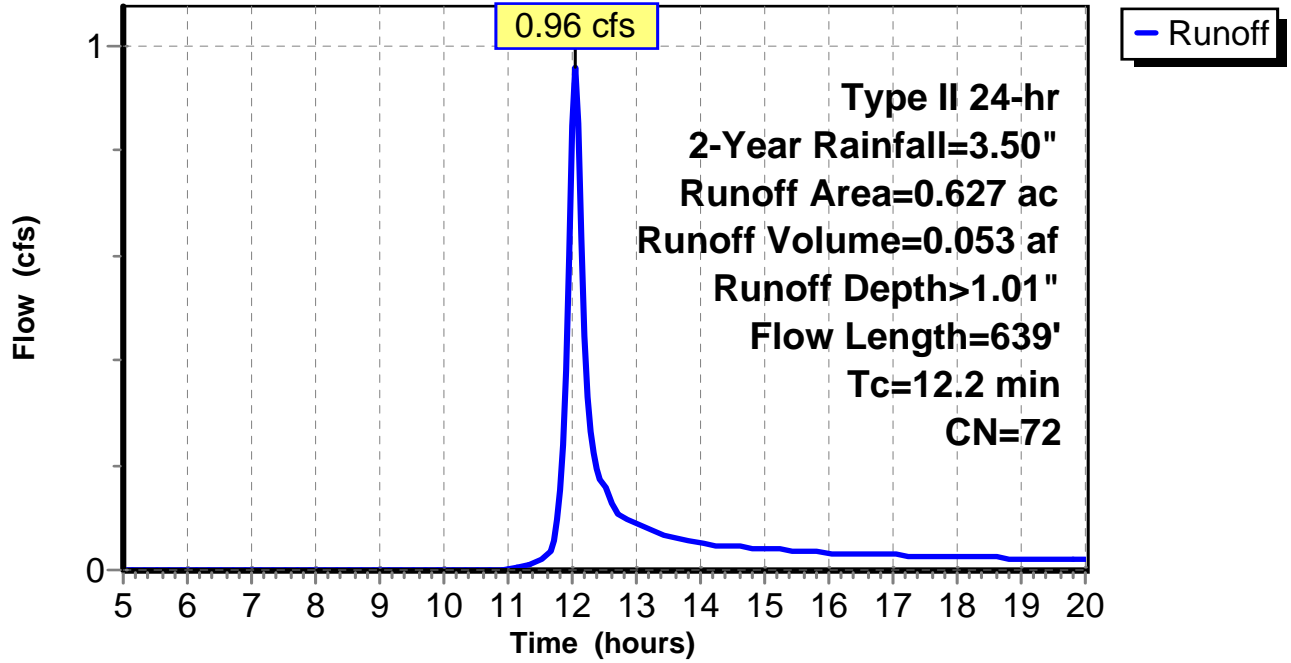
Subcatchment 3: C AR-514.003

Hydrograph



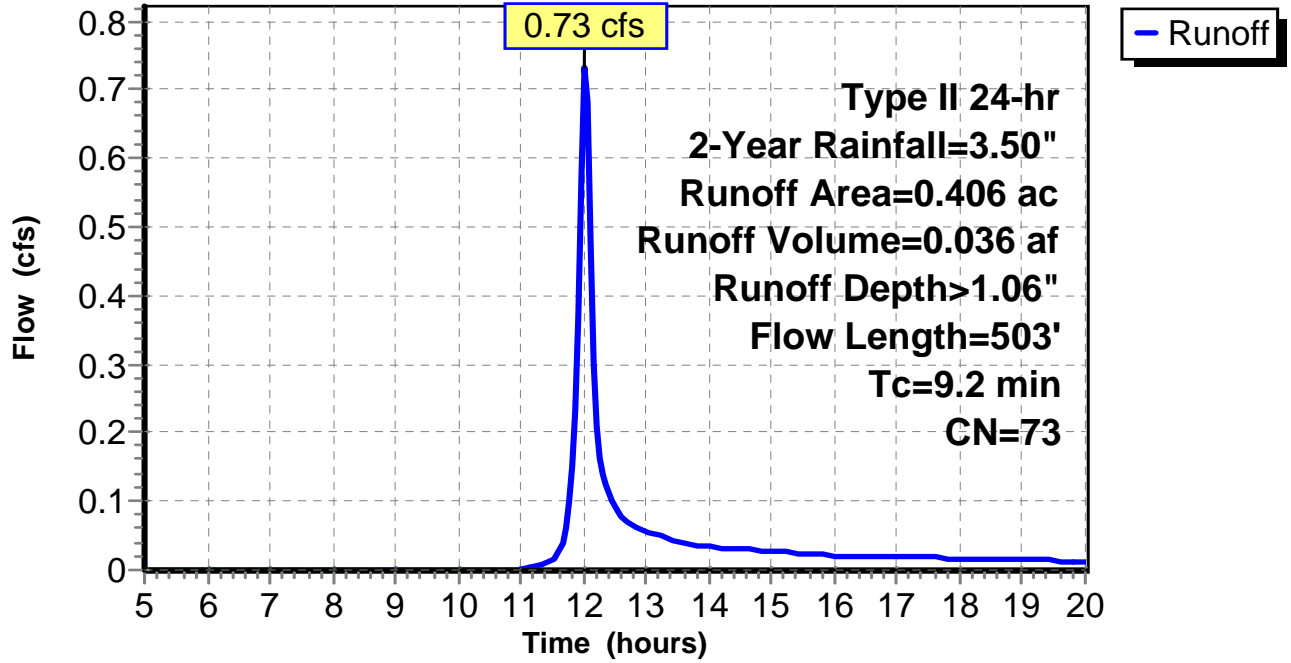
Subcatchment 4: C AR-514.004

Hydrograph



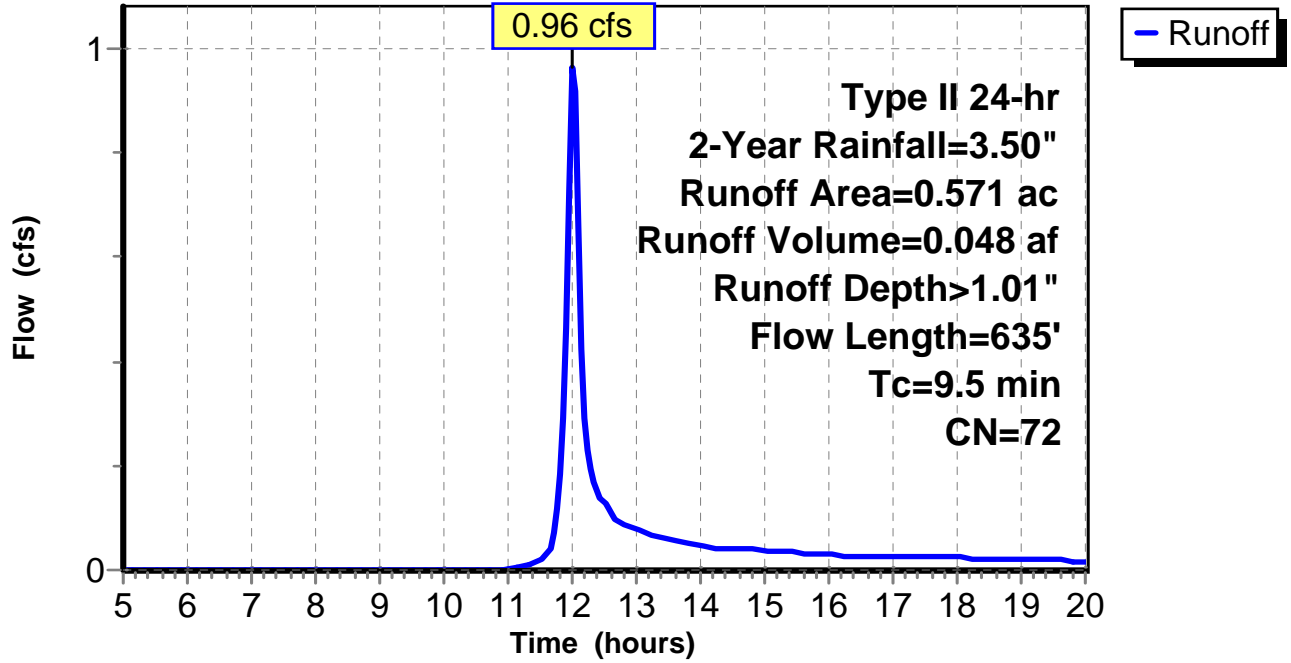
Subcatchment 5: C AR-514.005

Hydrograph



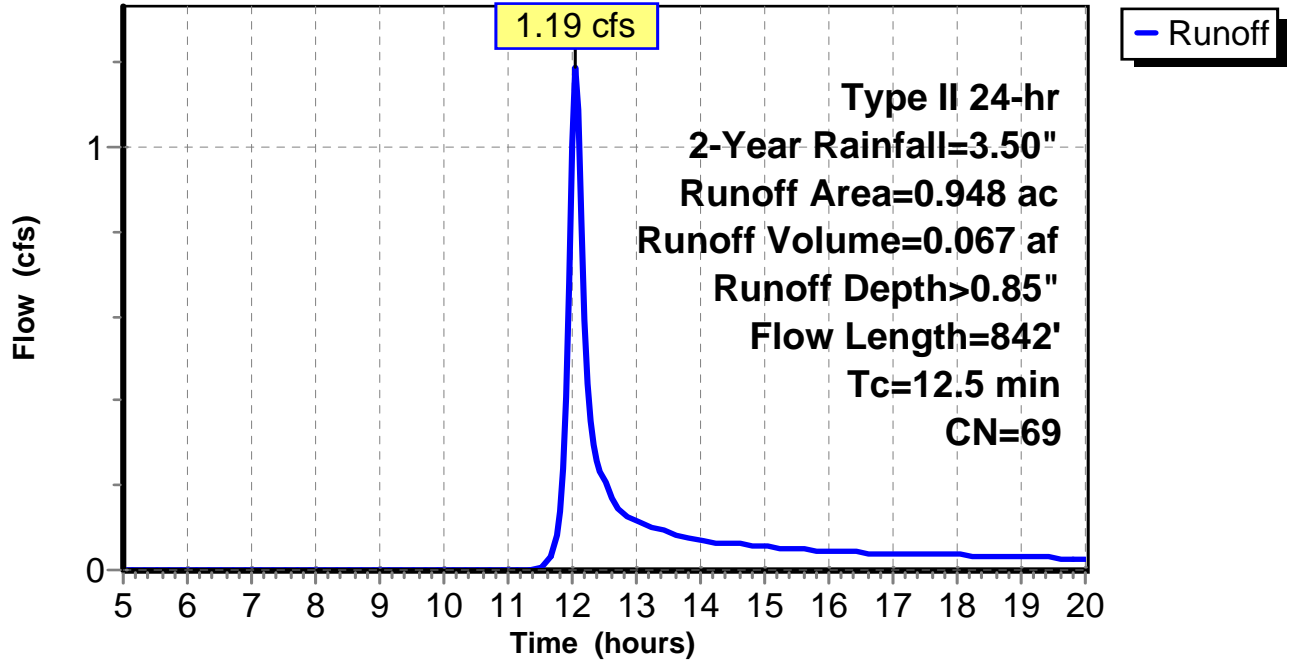
Subcatchment 6: C AR-514.006

Hydrograph



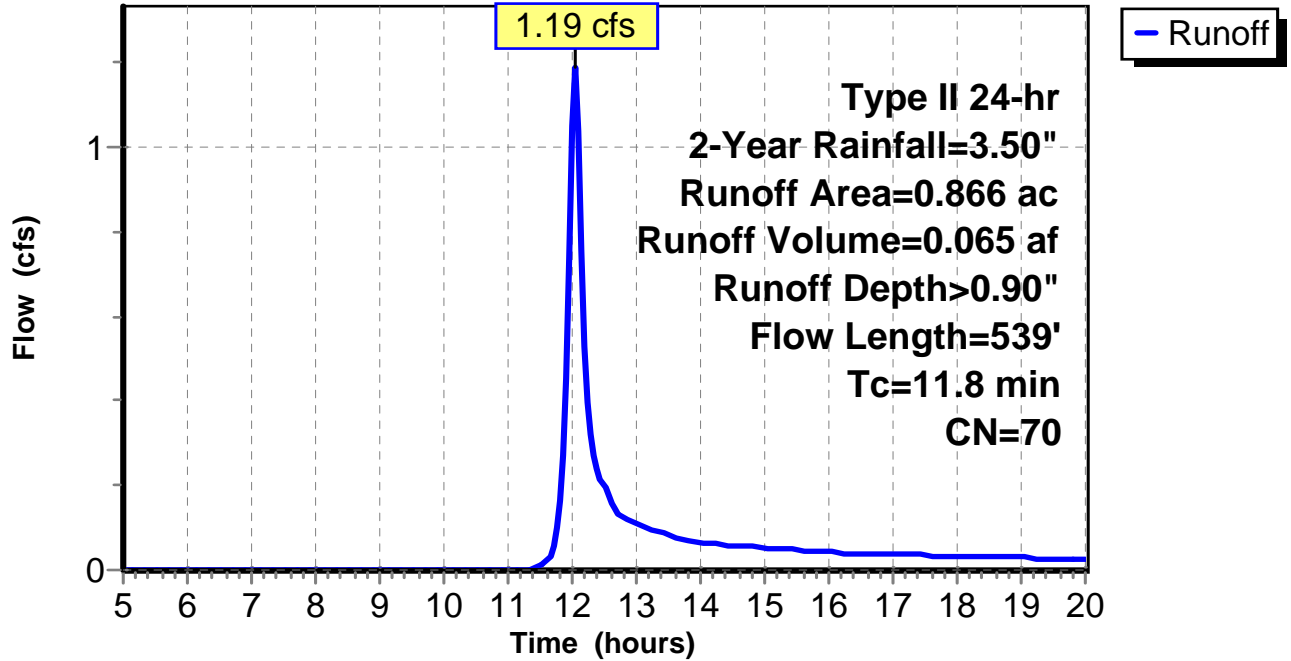
Subcatchment 7: C AR-514.007

Hydrograph



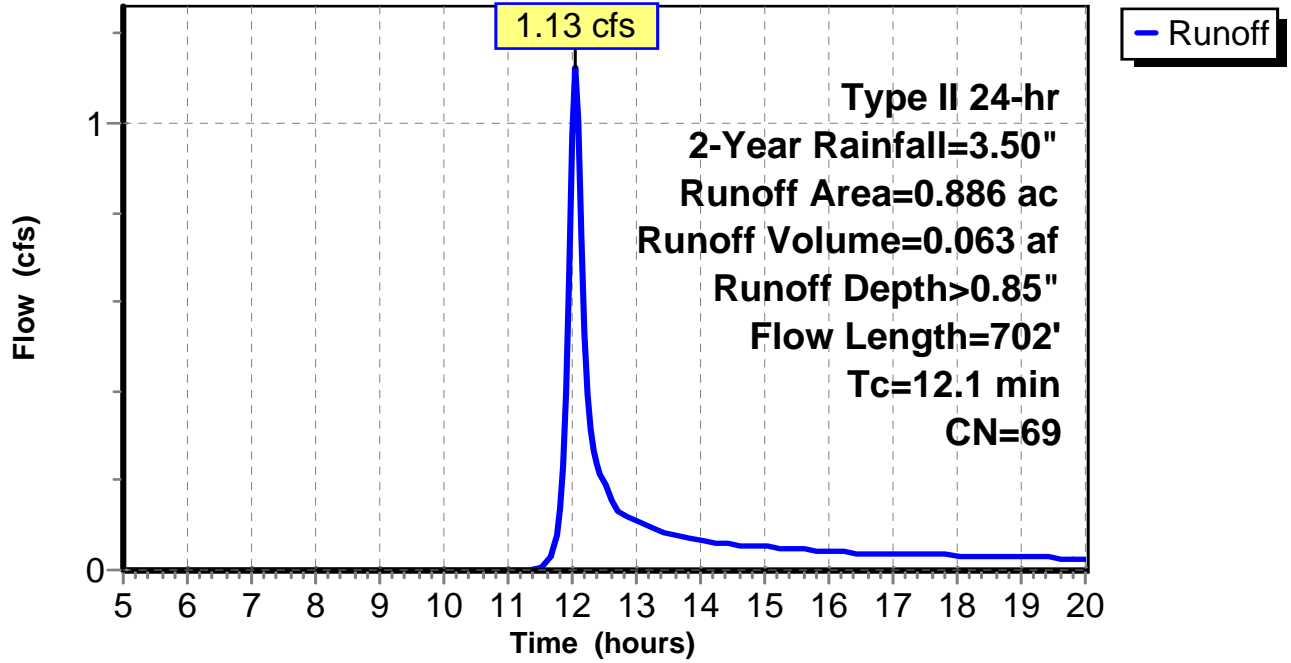
Subcatchment 8: C AR-514.008

Hydrograph



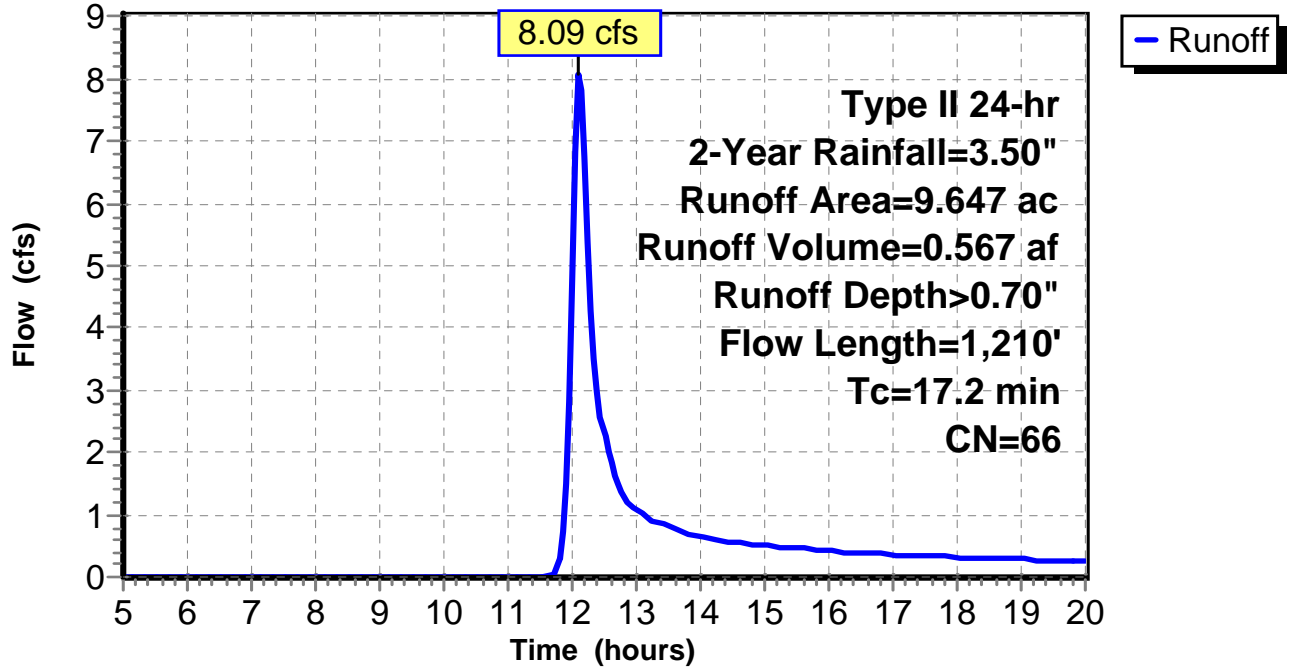
Subcatchment 9: C AR-514.009

Hydrograph



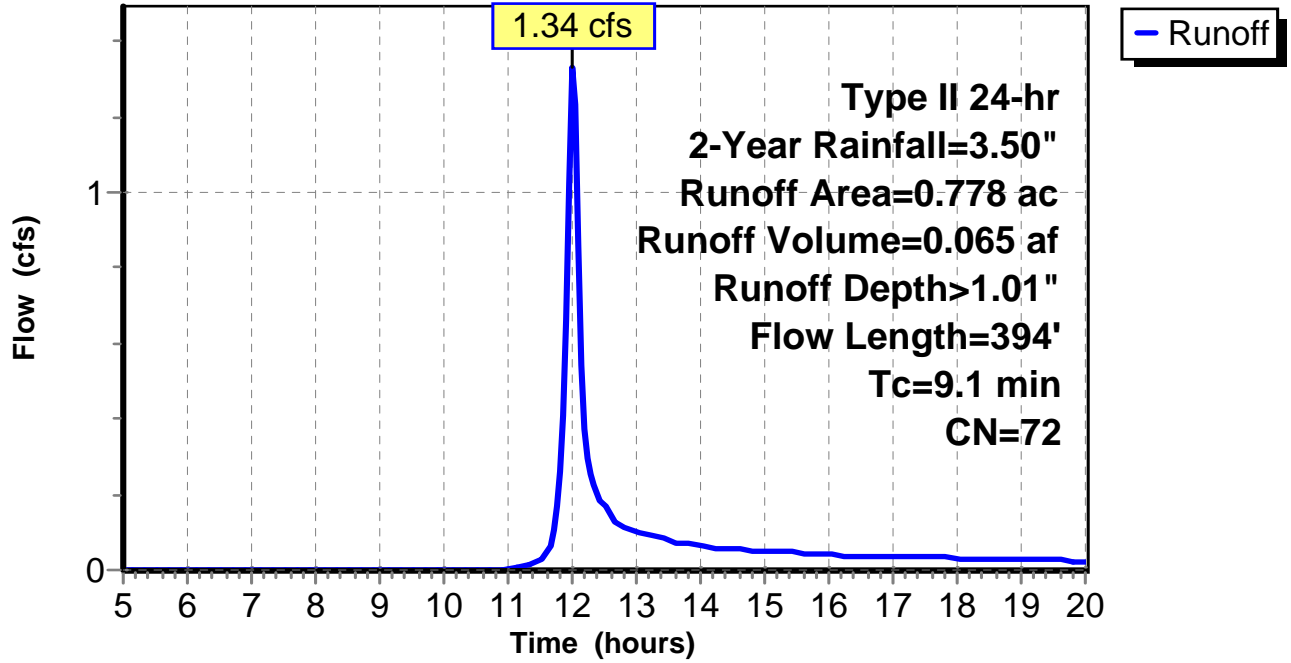
Subcatchment 10: C AR-514.010

Hydrograph



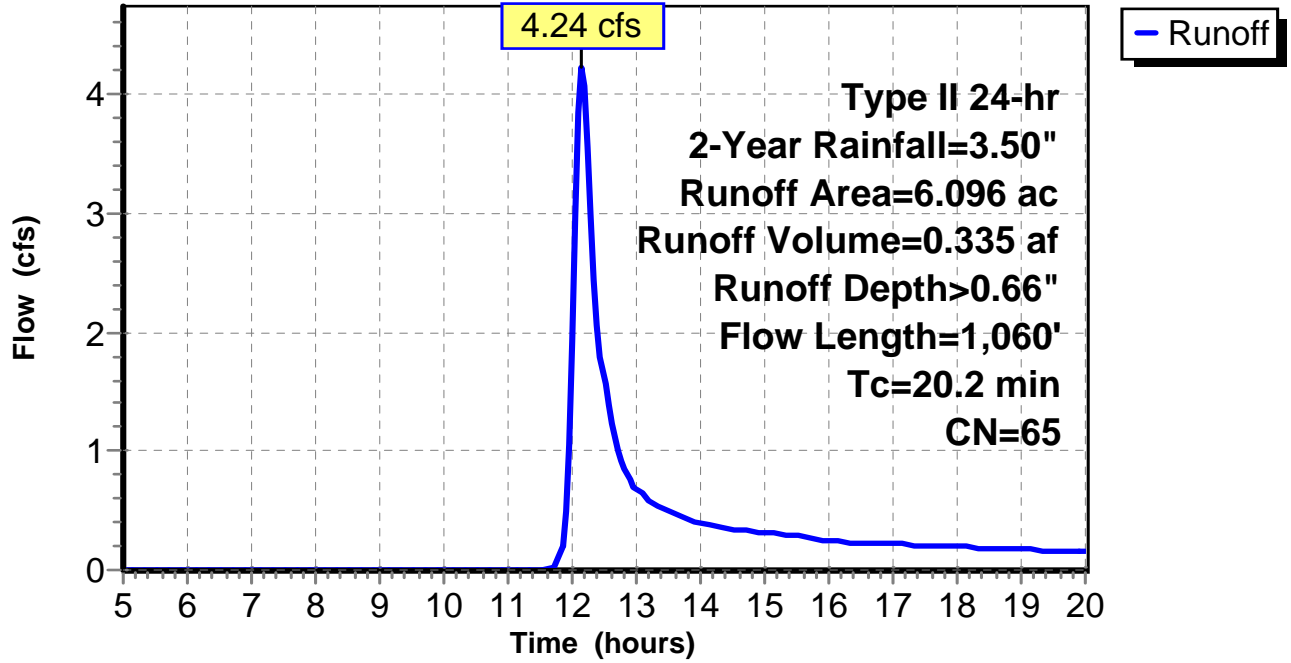
Subcatchment 11: C 228.001

Hydrograph



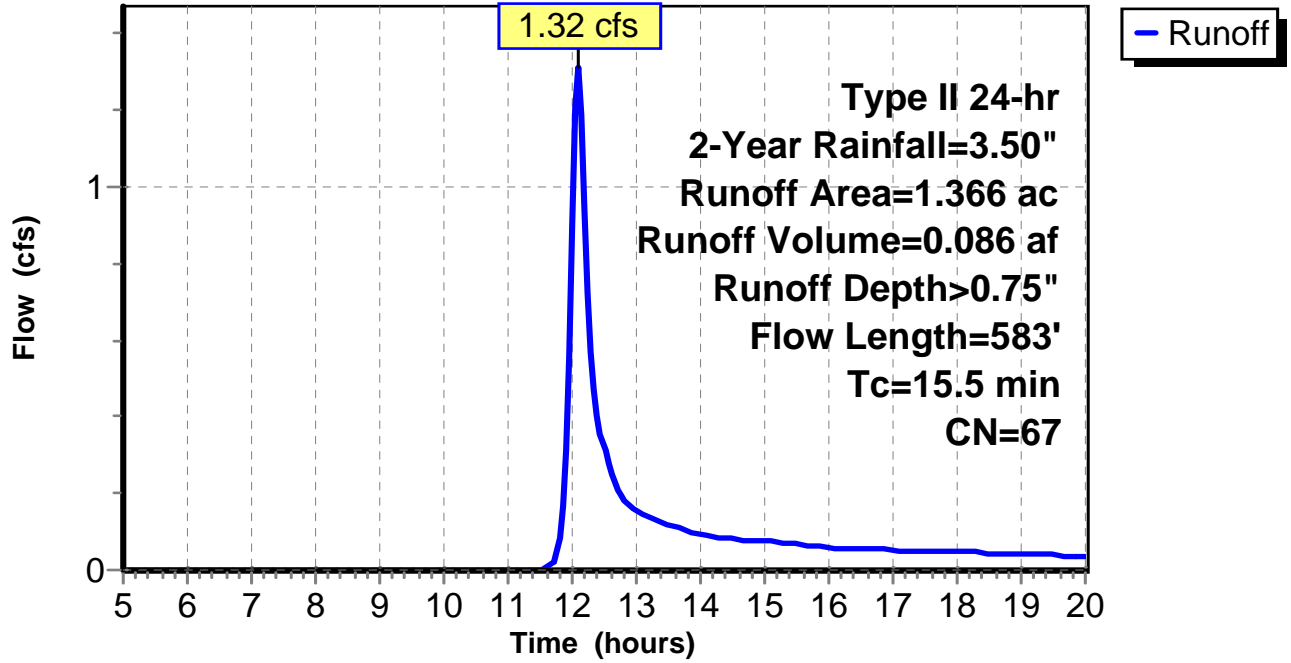
Subcatchment 12: C 228.002

Hydrograph



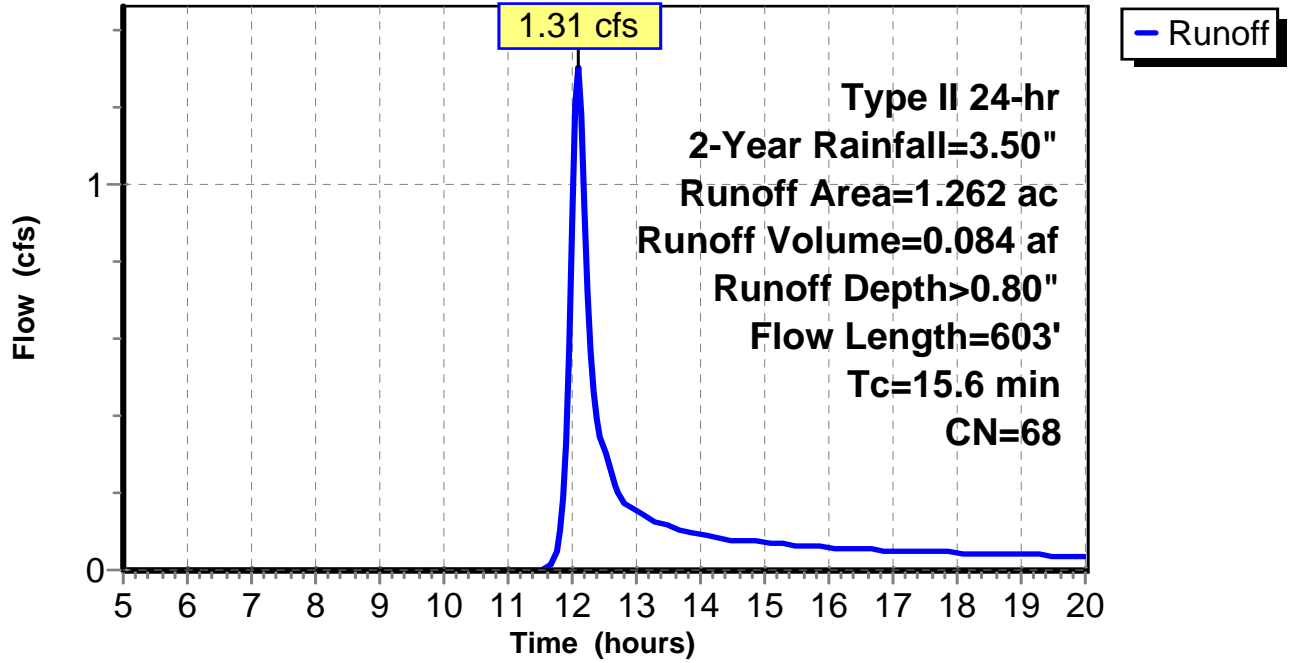
Subcatchment 13: C 228.003

Hydrograph



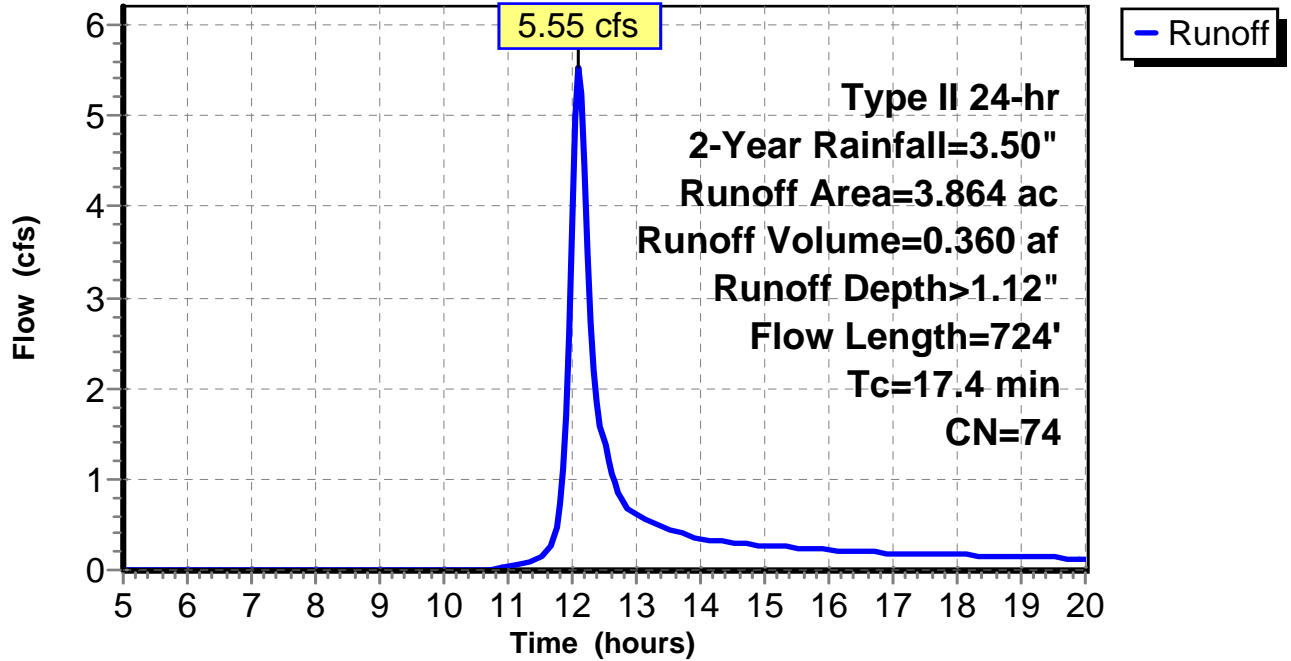
Subcatchment 14: C 228.004

Hydrograph



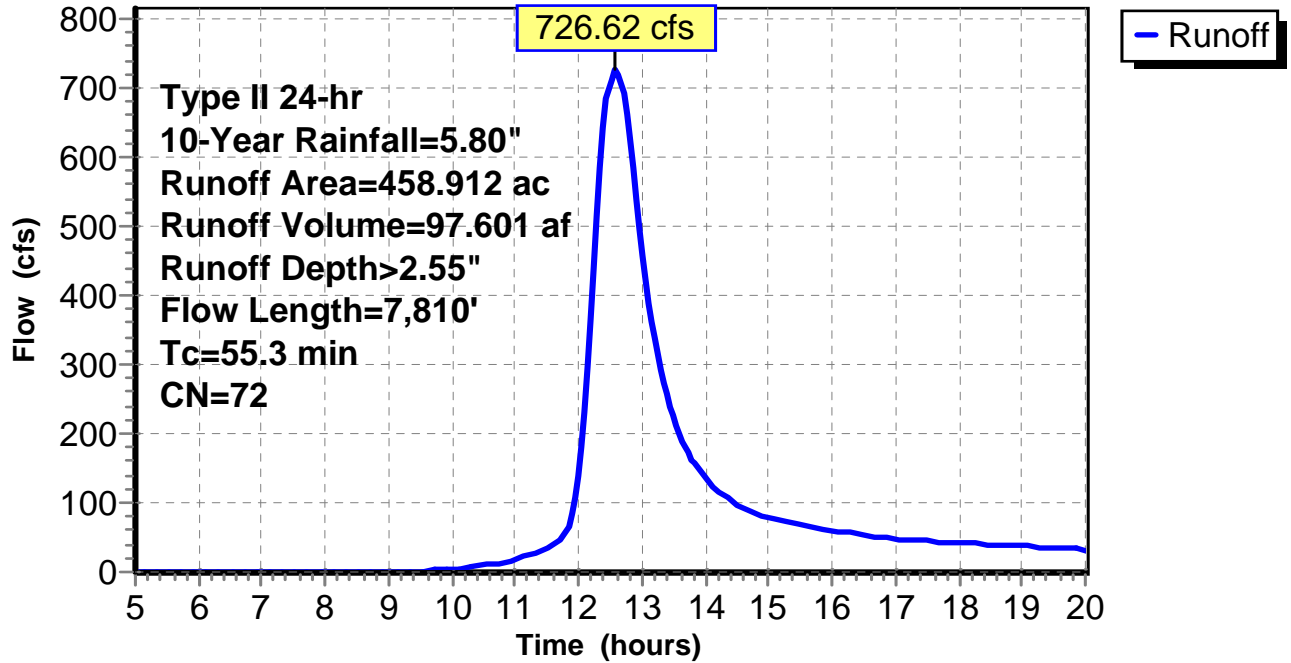
Subcatchment 15: C 228.005

Hydrograph



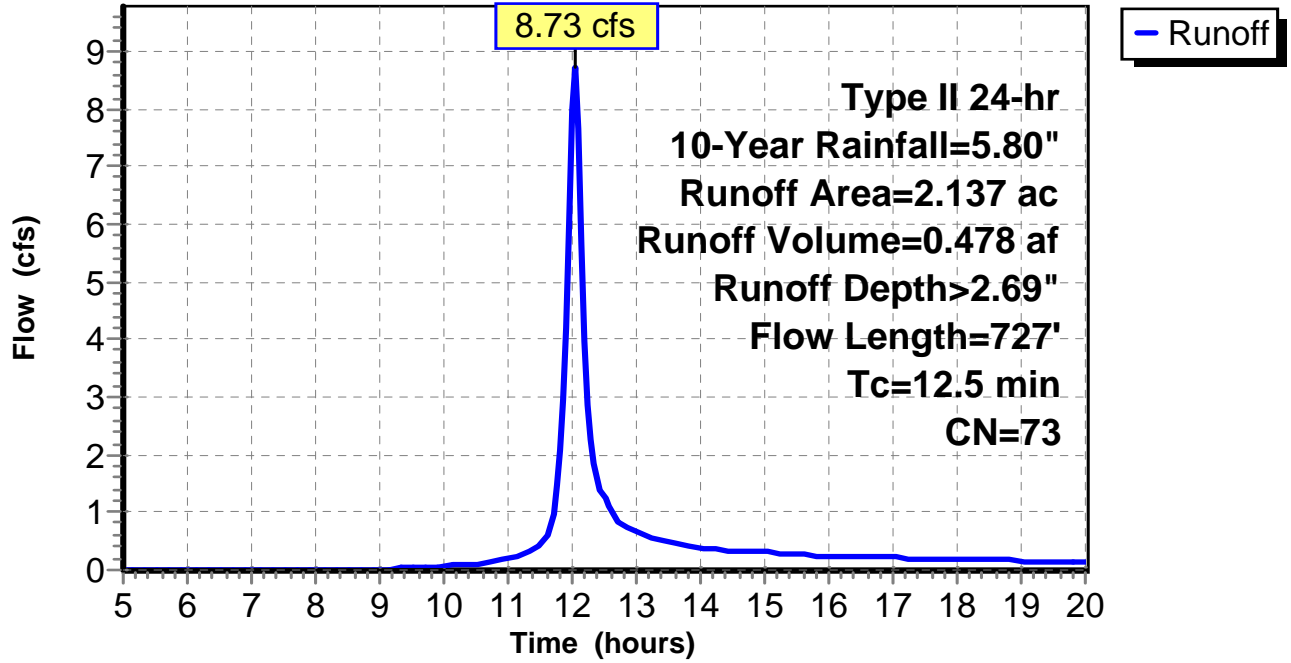
Subcatchment 1: C AR-514.001

Hydrograph



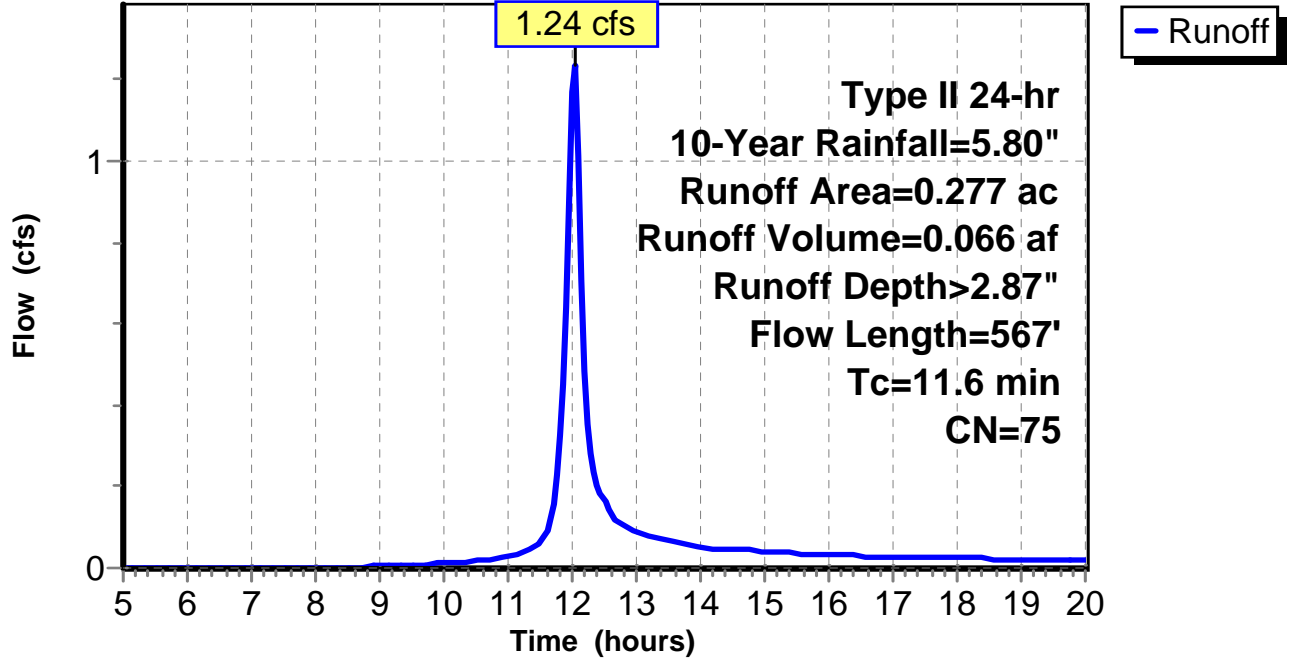
Subcatchment 2: C AR-514.002

Hydrograph



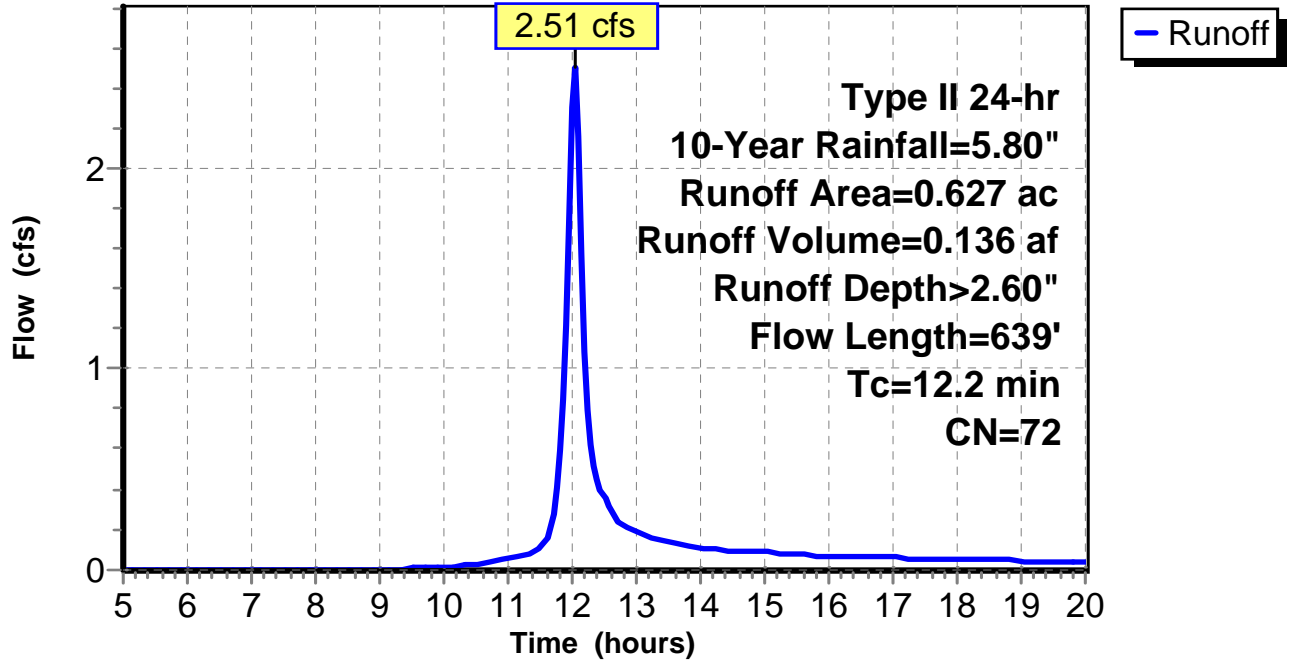
Subcatchment 3: C AR-514.003

Hydrograph



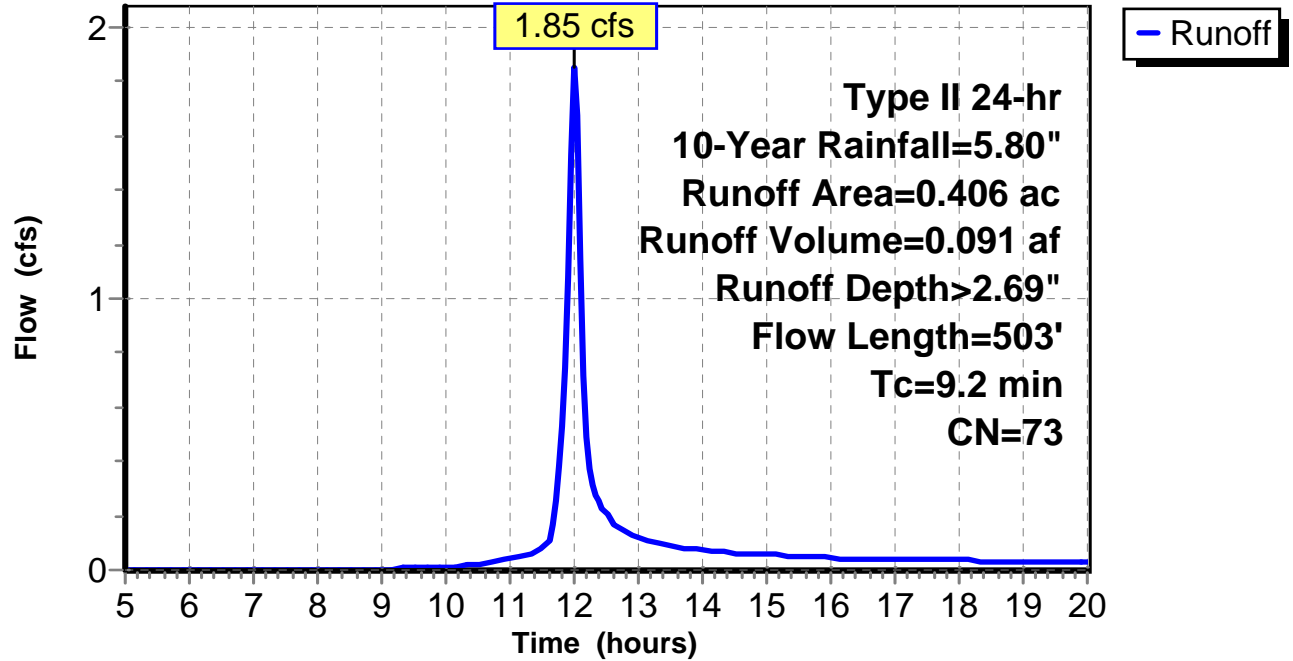
Subcatchment 4: C AR-514.004

Hydrograph



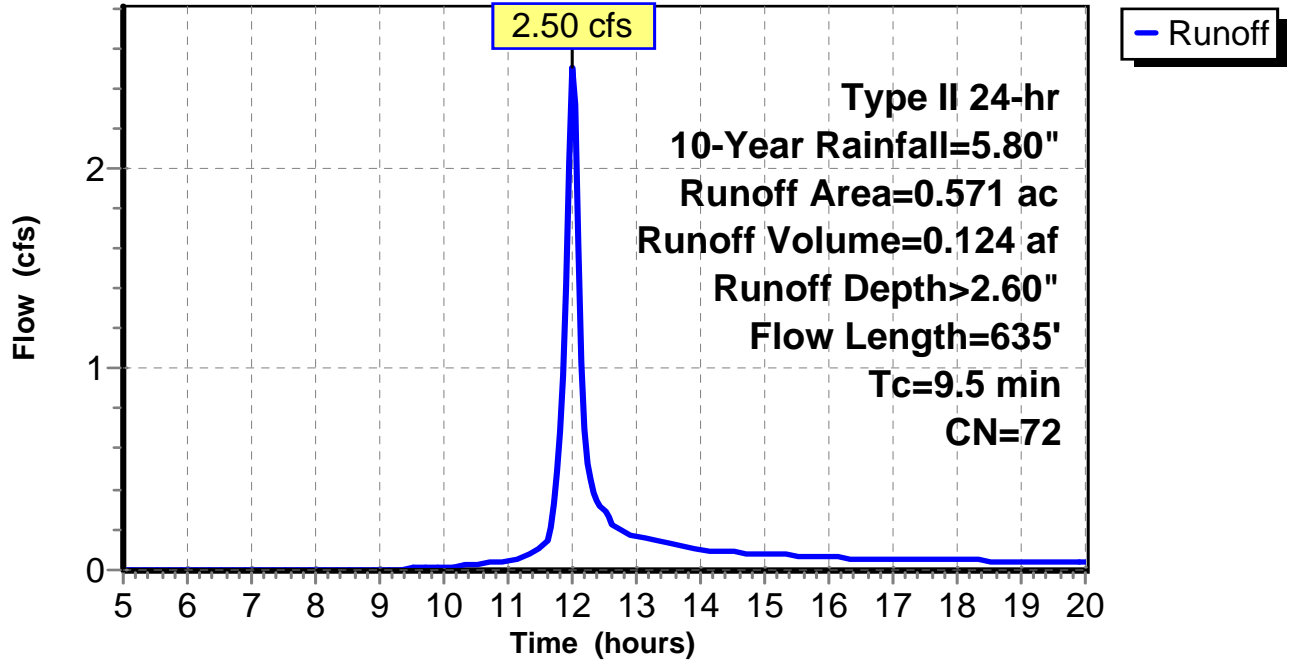
Subcatchment 5: C AR-514.005

Hydrograph



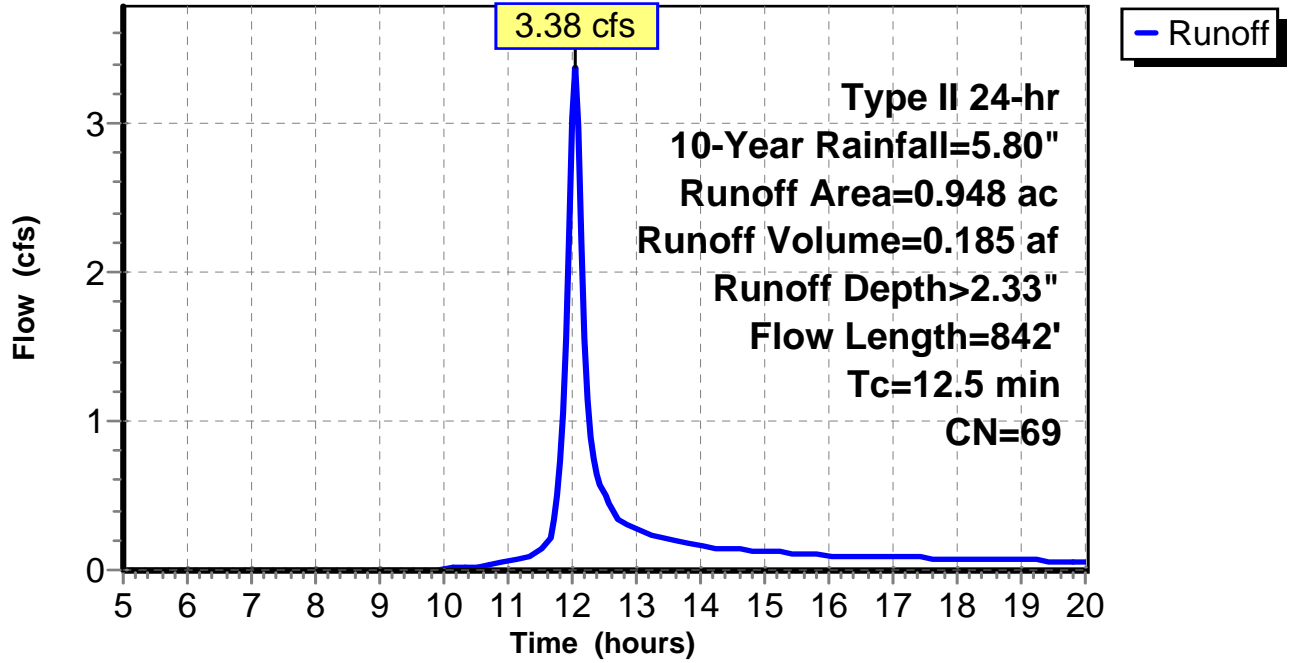
Subcatchment 6: C AR-514.006

Hydrograph



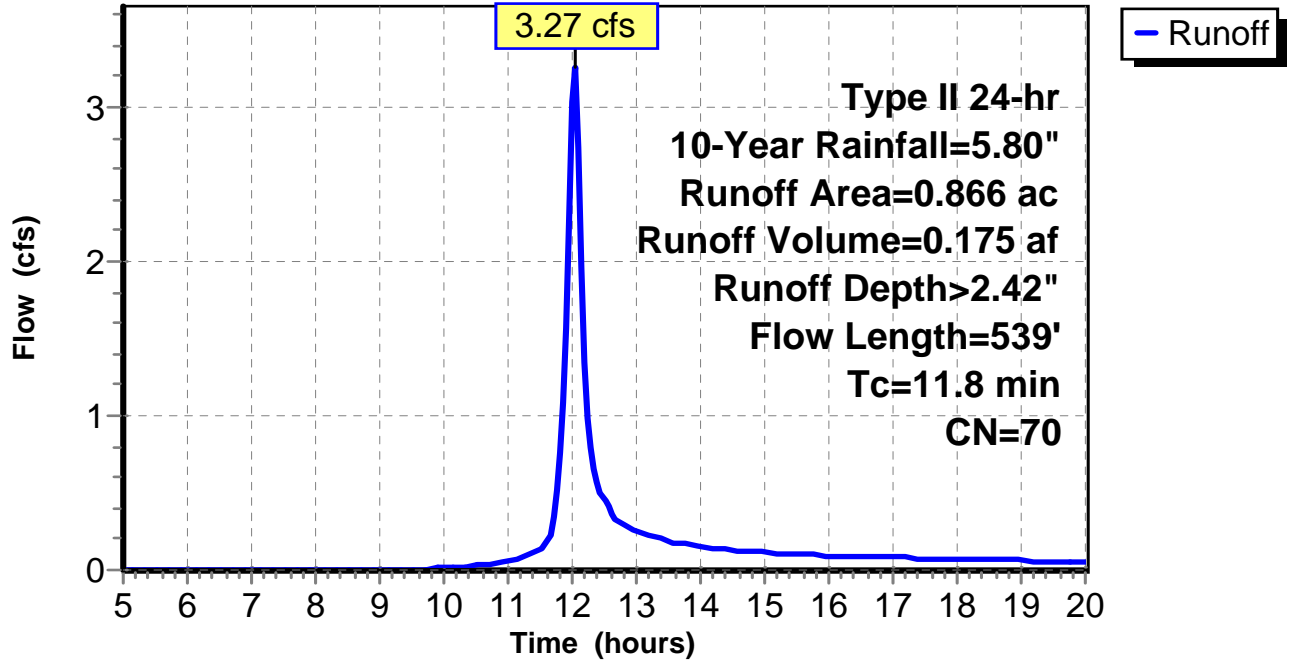
Subcatchment 7: C AR-514.007

Hydrograph



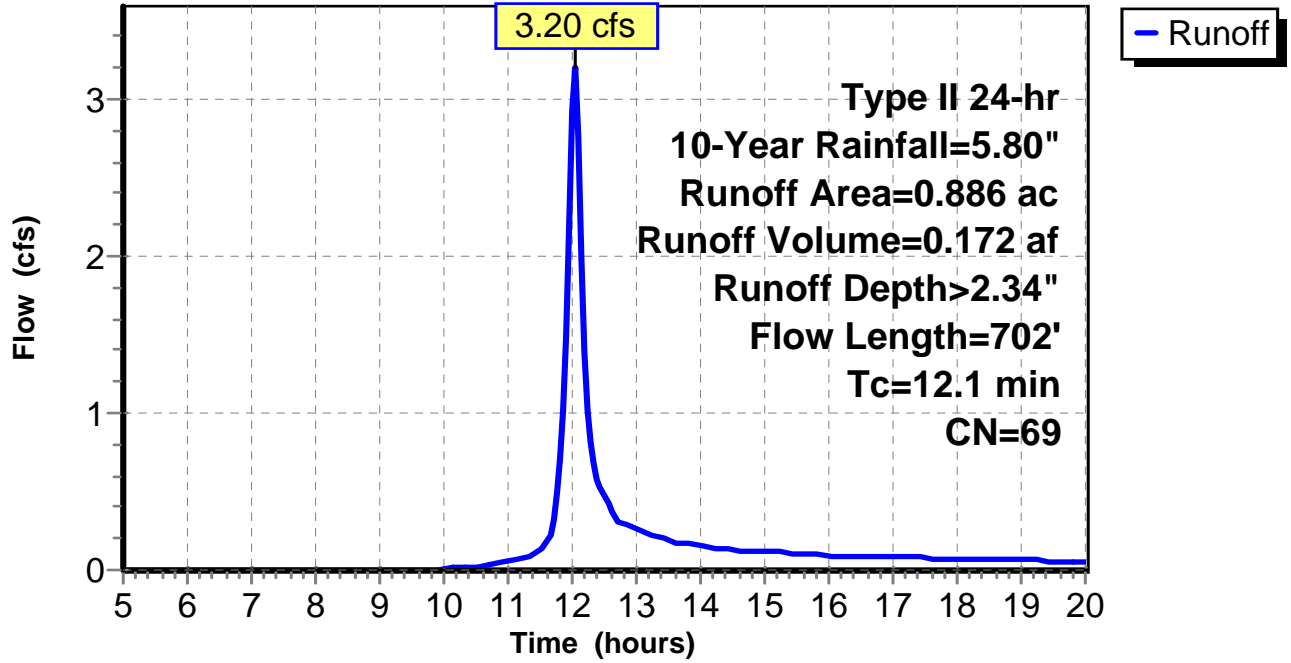
Subcatchment 8: C AR-514.008

Hydrograph



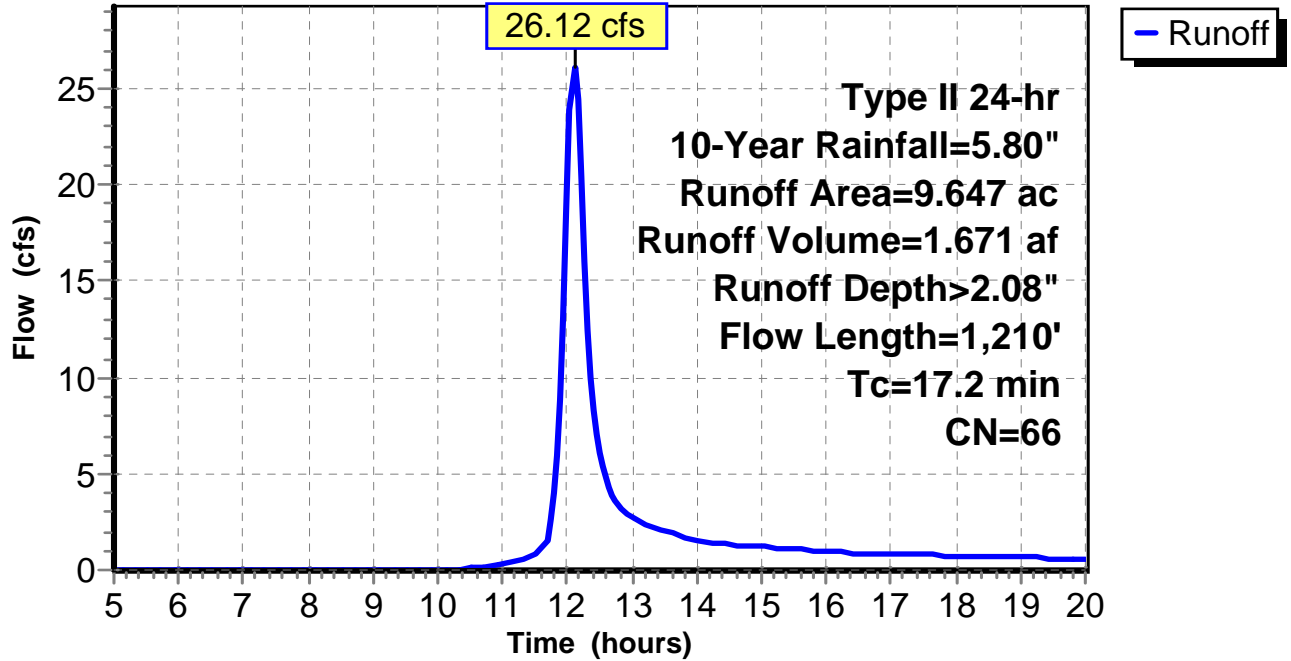
Subcatchment 9: C AR-514.009

Hydrograph



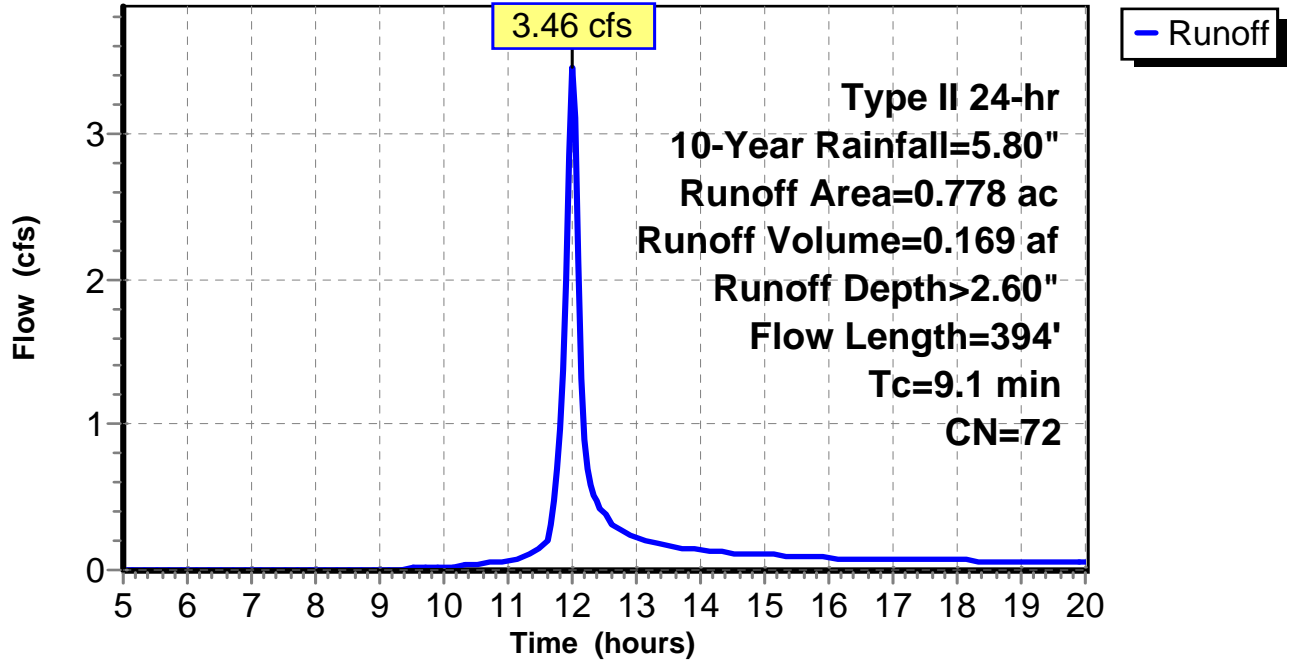
Subcatchment 10: C AR-514.010

Hydrograph



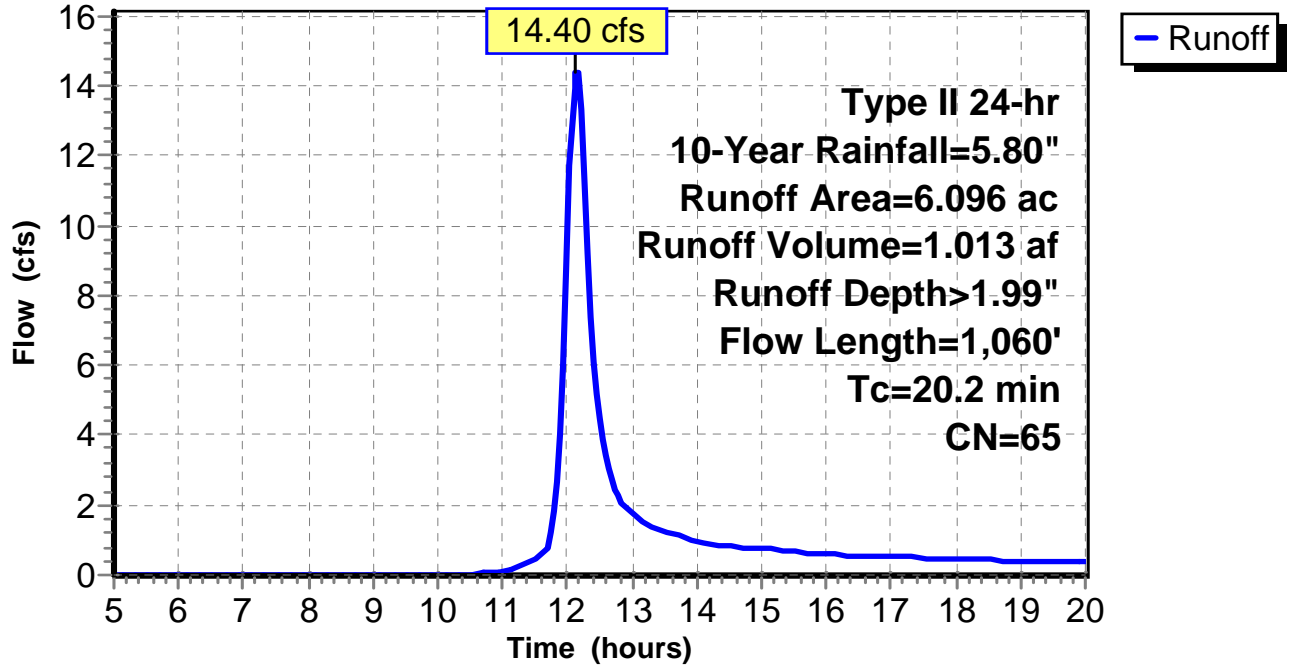
Subcatchment 11: C 228.001

Hydrograph



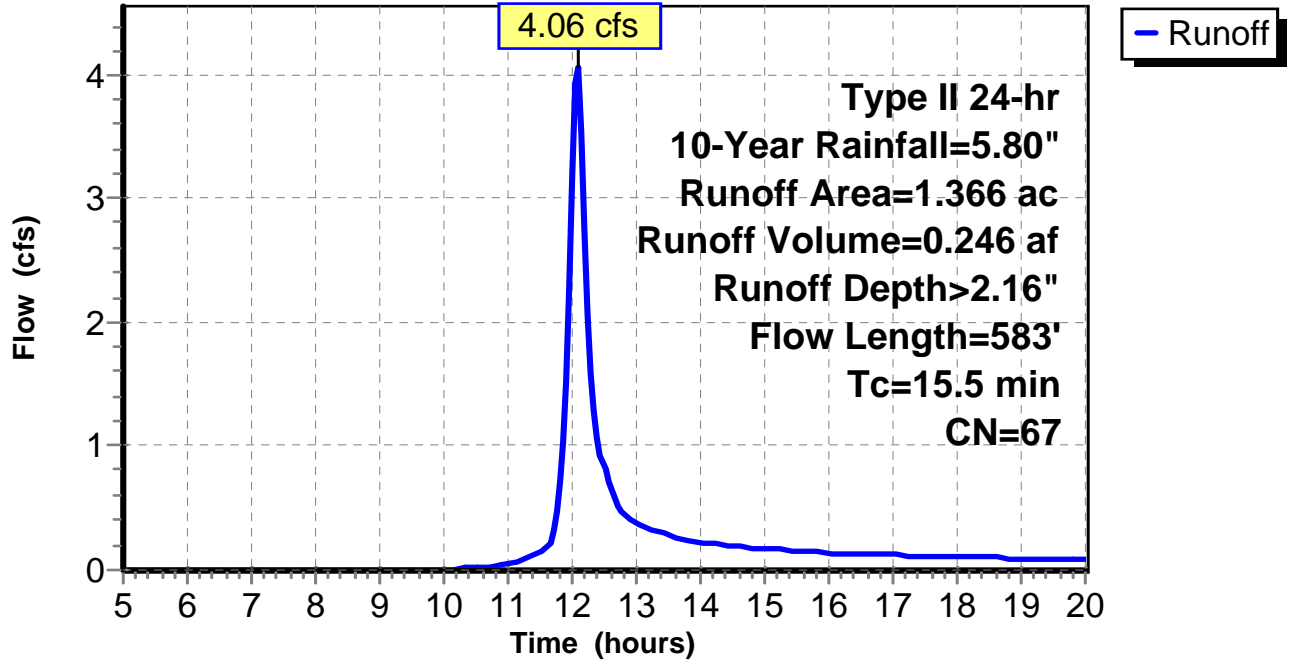
Subcatchment 12: C 228.002

Hydrograph



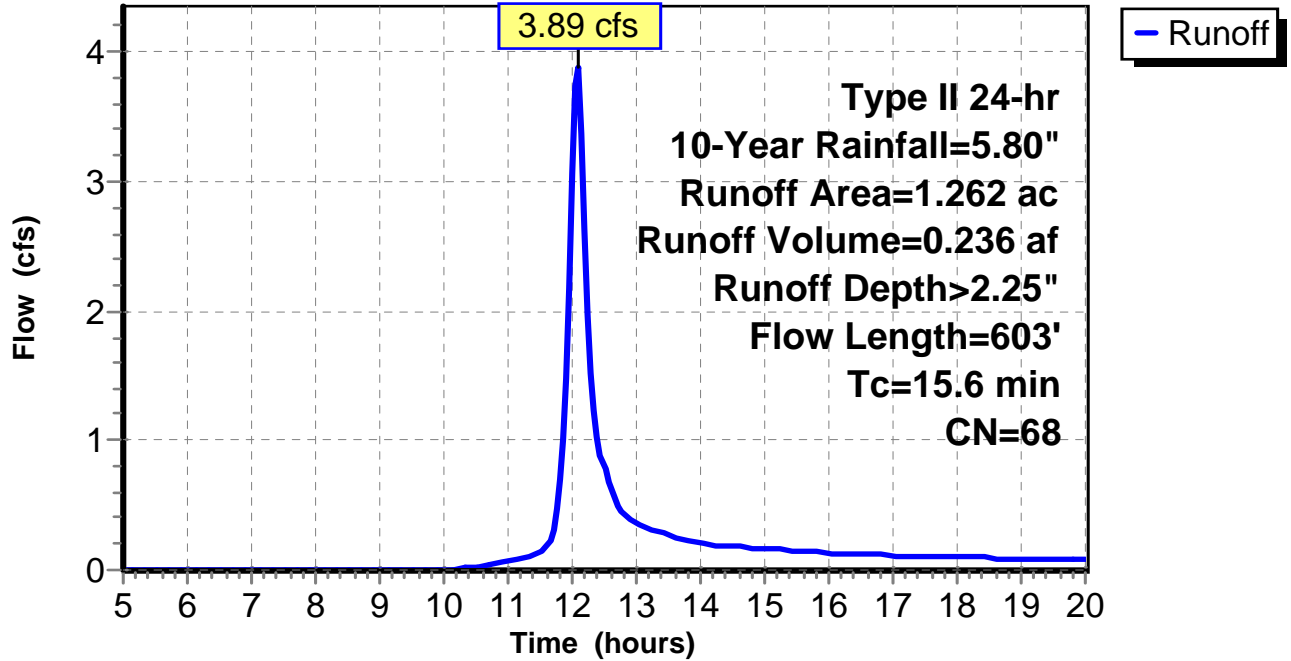
Subcatchment 13: C 228.003

Hydrograph



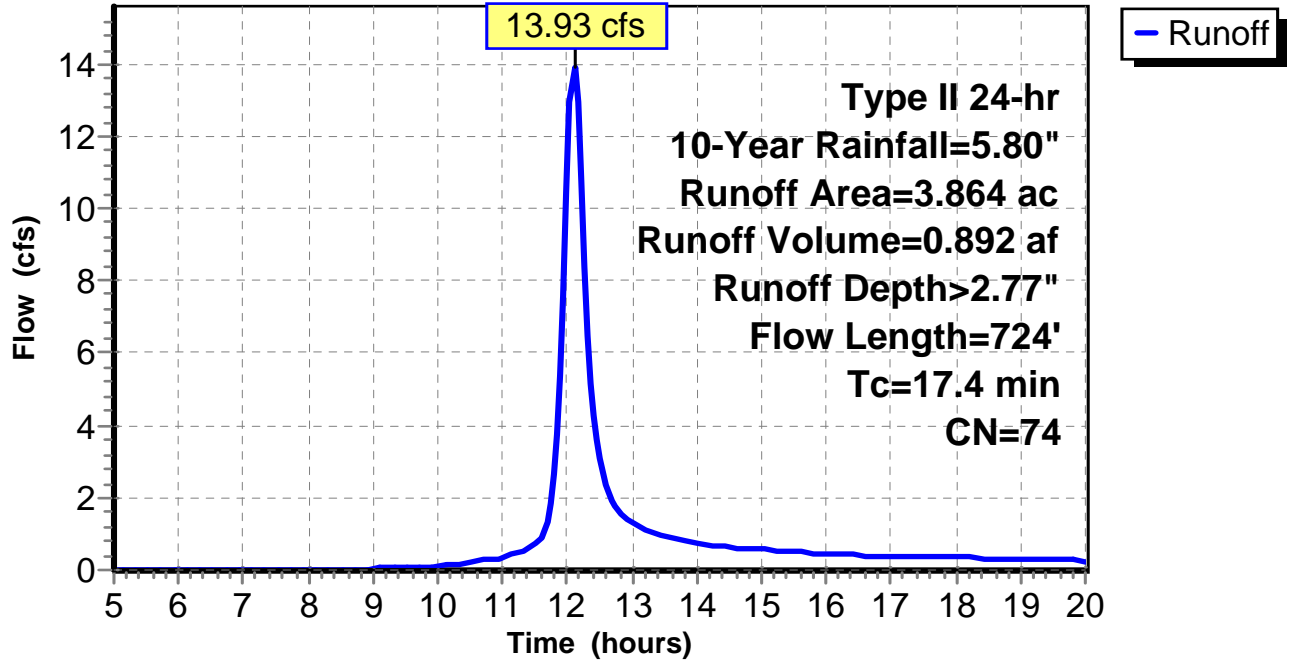
Subcatchment 14: C 228.004

Hydrograph



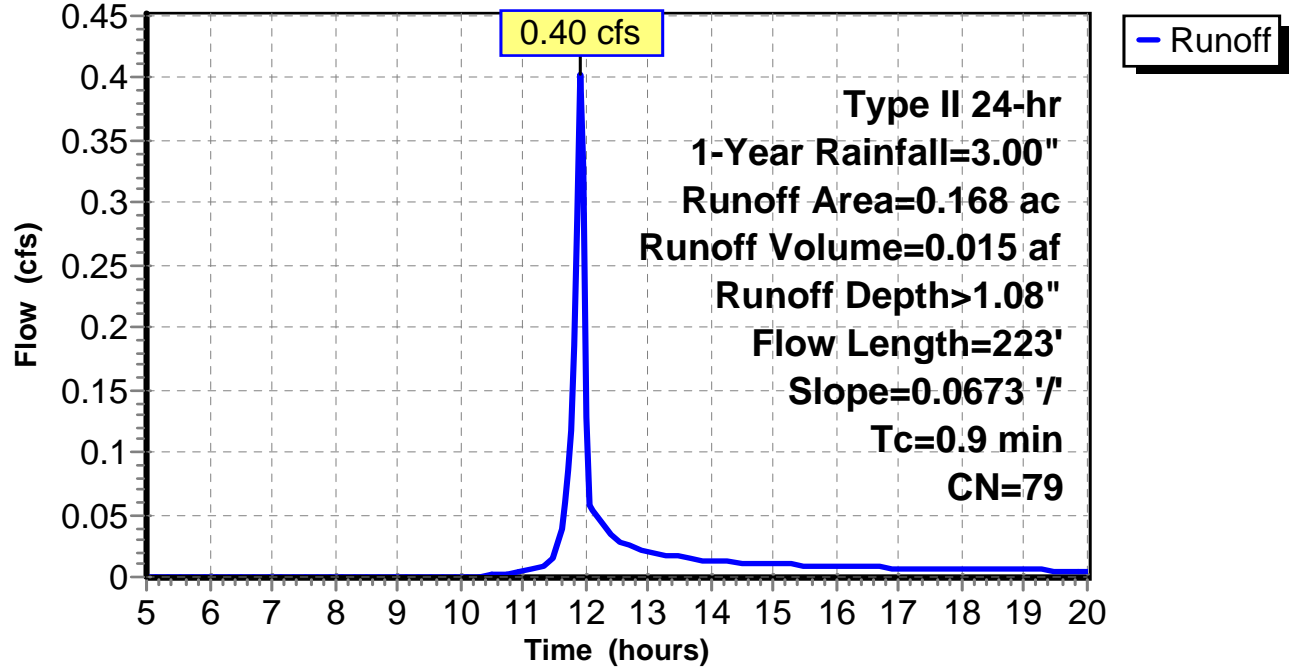
Subcatchment 15: C 228.005

Hydrograph



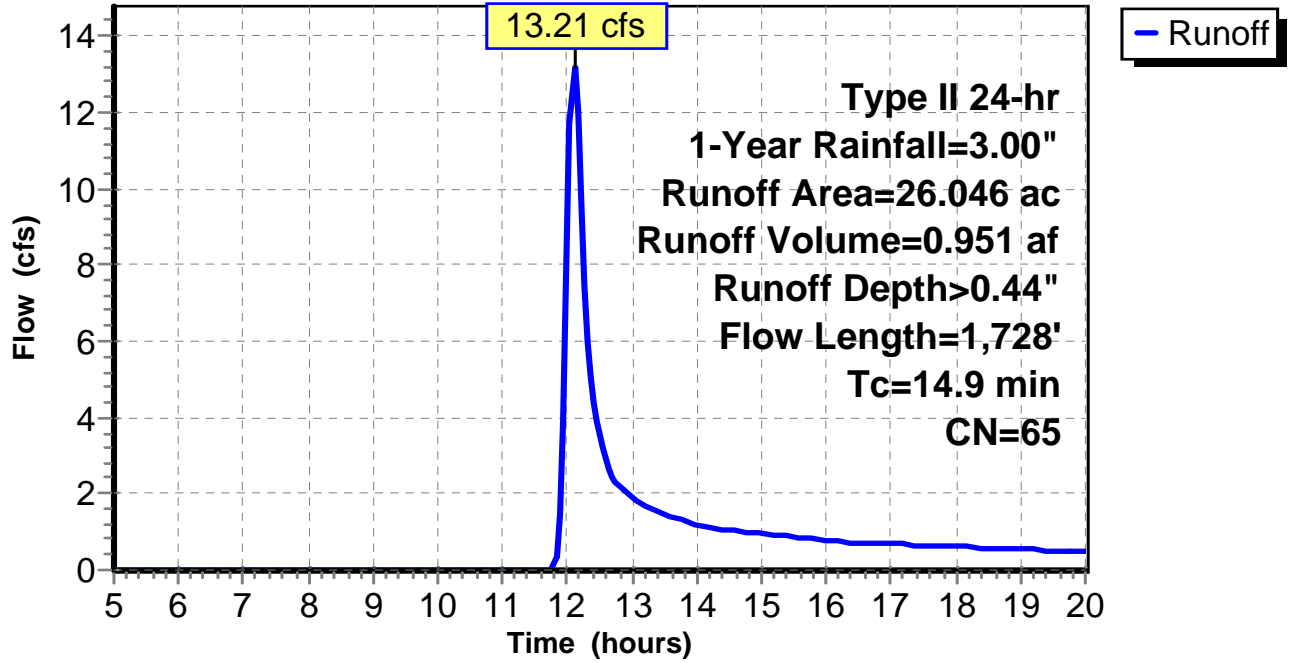
Subcatchment 1: C AR-514.011

Hydrograph



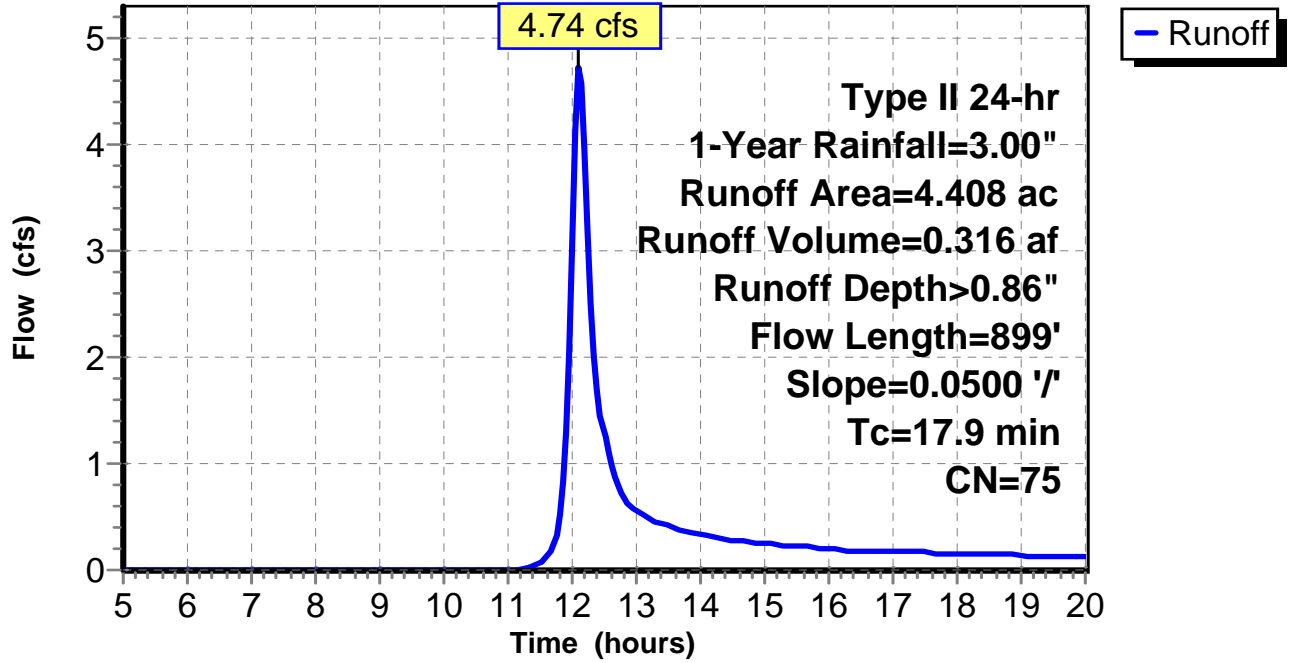
Subcatchment 2: C AR-514.012

Hydrograph



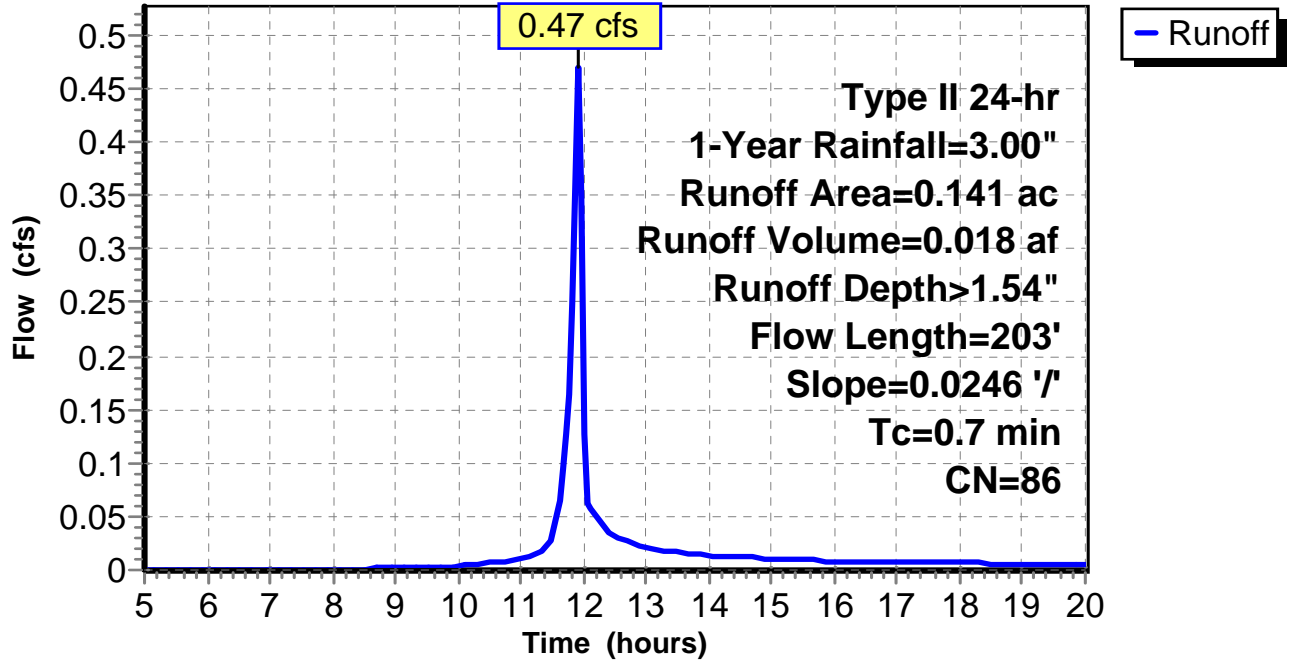
Subcatchment 3: C AR-514.013

Hydrograph



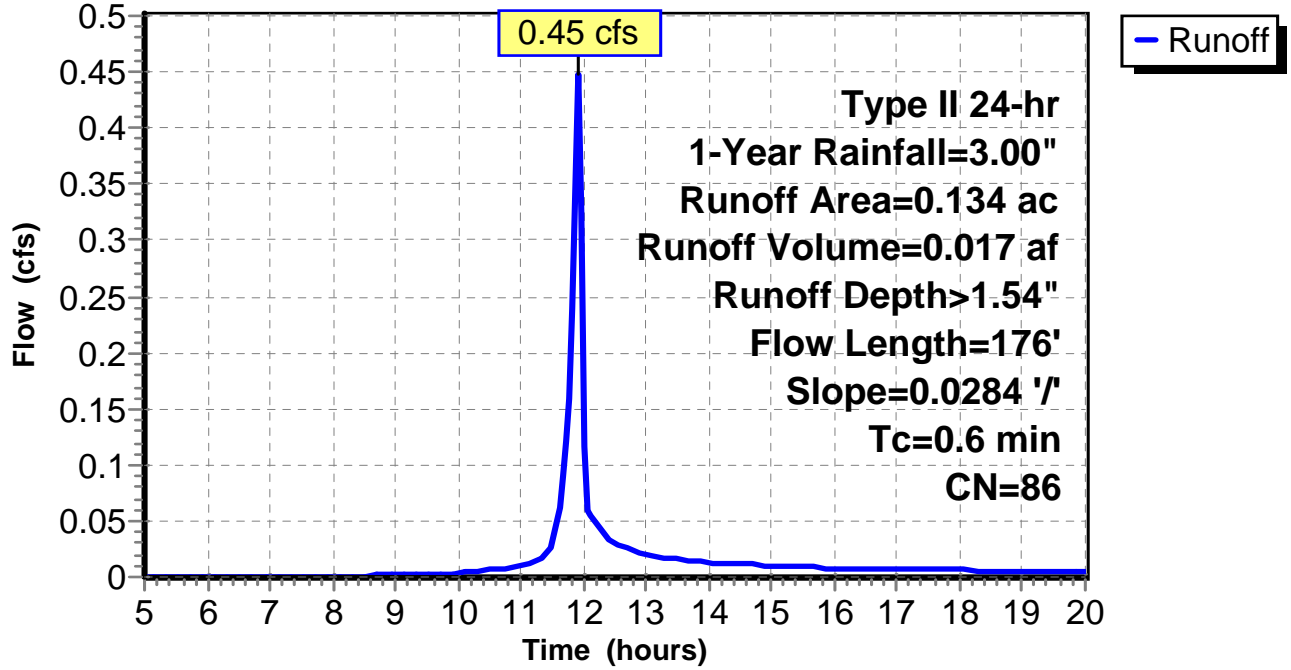
Subcatchment 4: C AR-514.014

Hydrograph



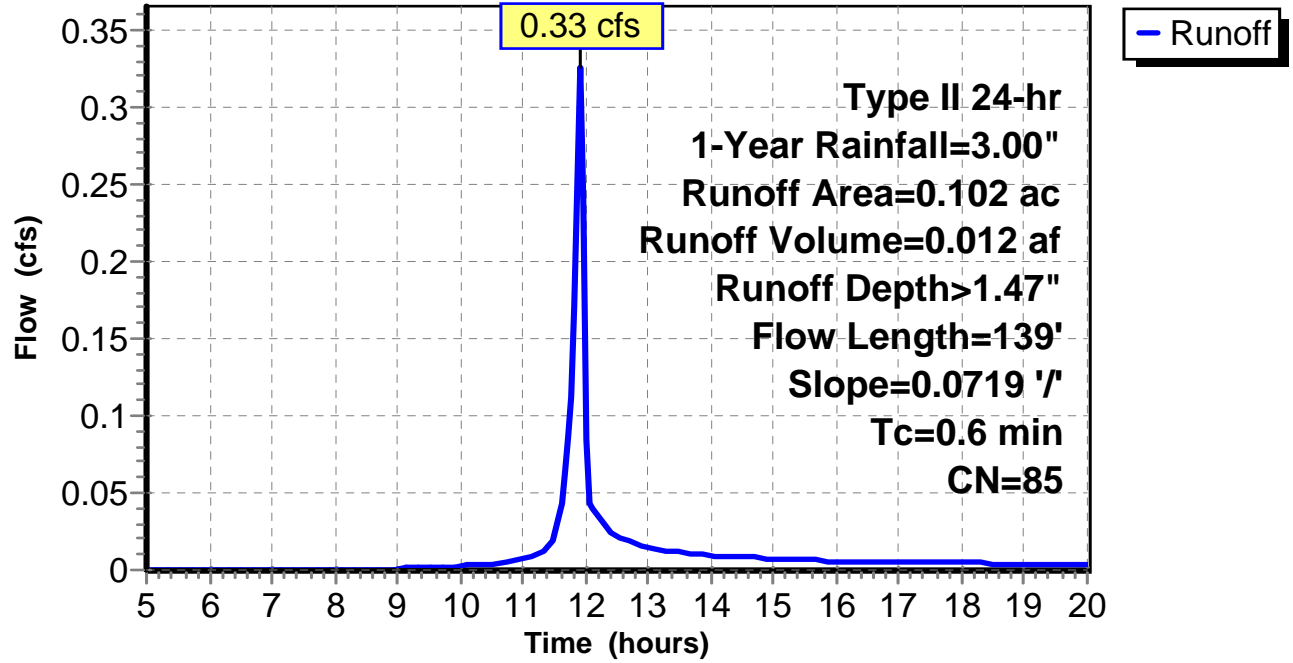
Subcatchment 5: C AR-514.015

Hydrograph



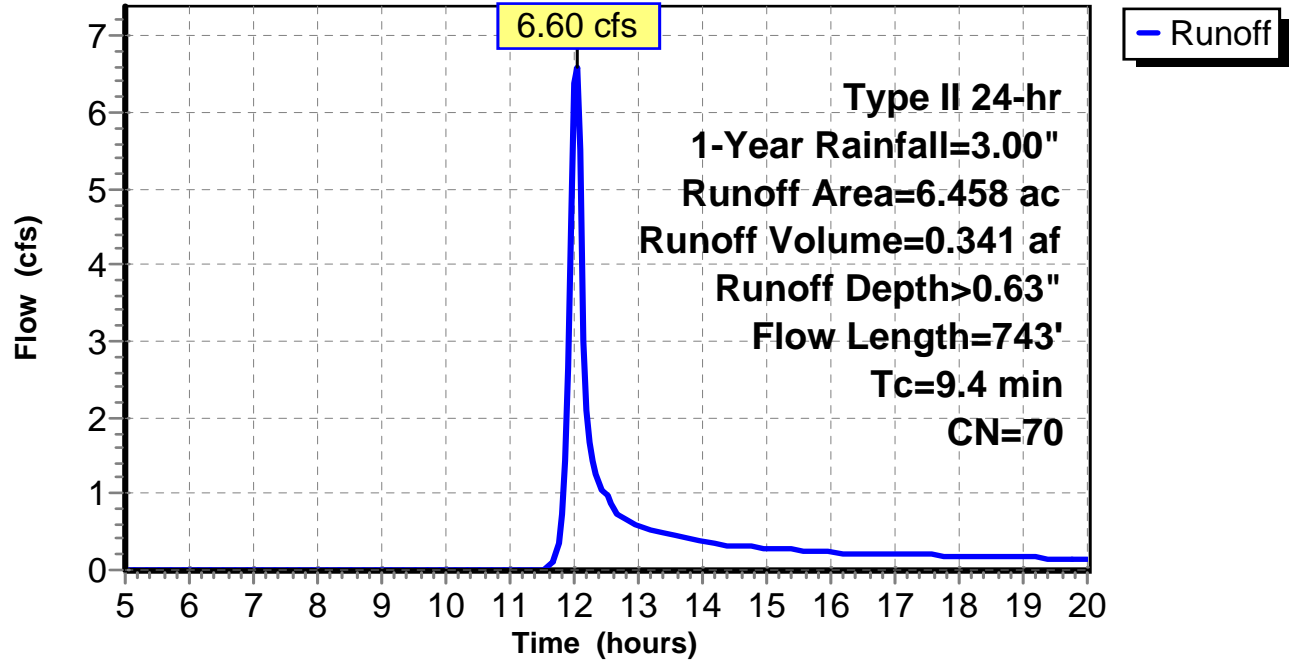
Subcatchment 6: C AR-514.016

Hydrograph



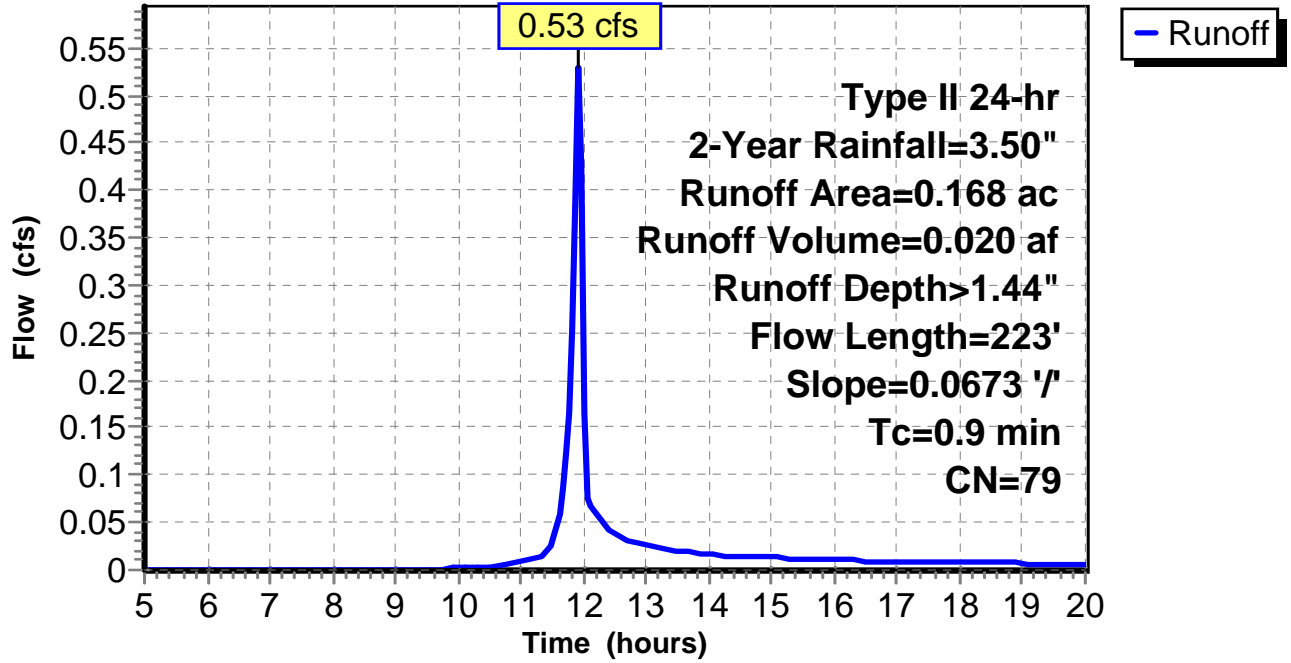
Subcatchment 7: C 231.001

Hydrograph



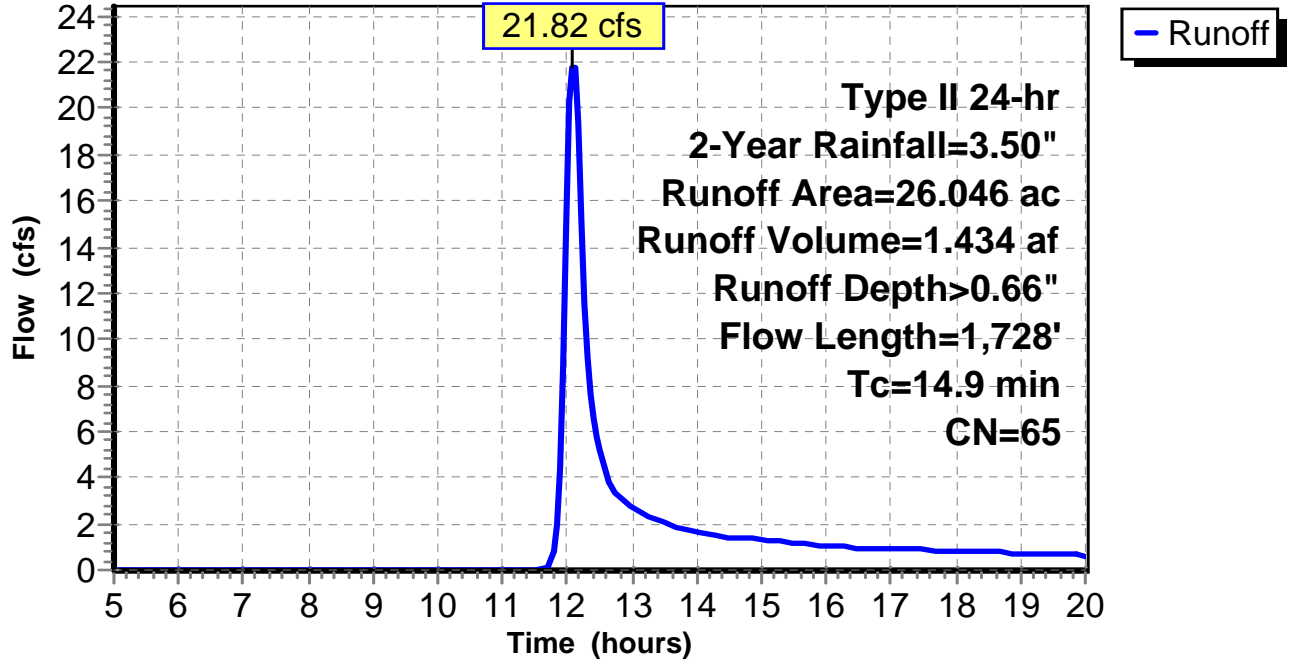
Subcatchment 1: C AR-514.011

Hydrograph



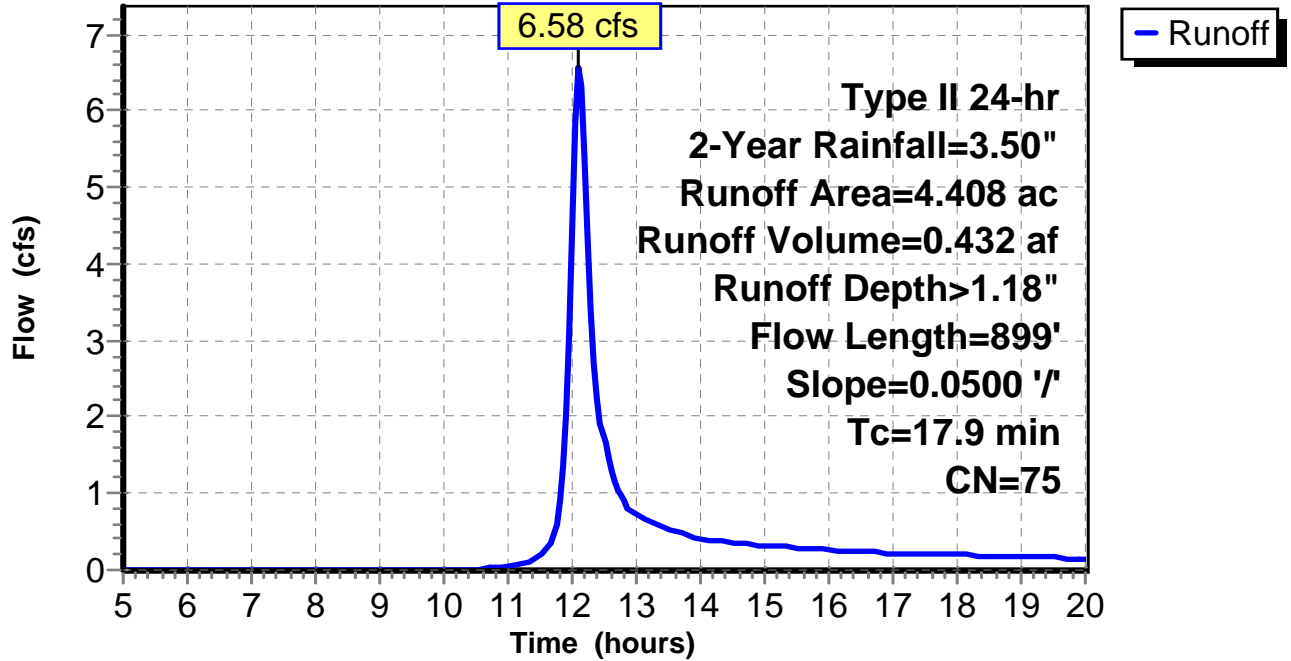
Subcatchment 2: C AR-514.012

Hydrograph



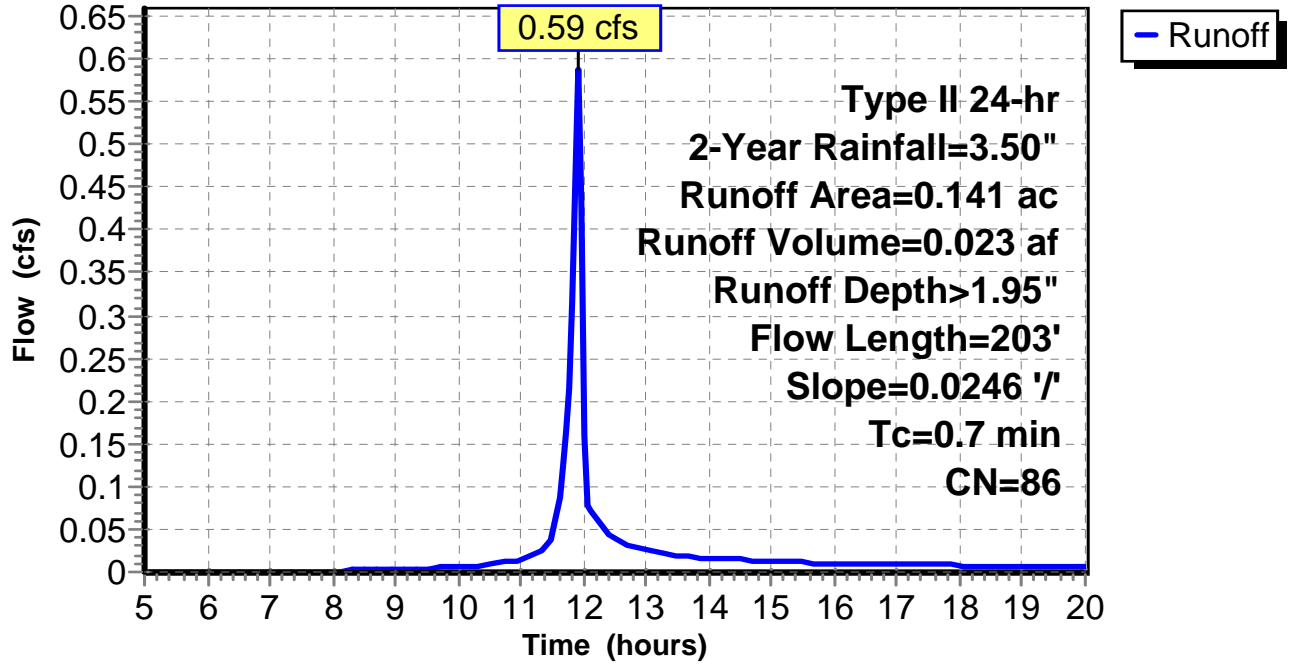
Subcatchment 3: C AR-514.013

Hydrograph



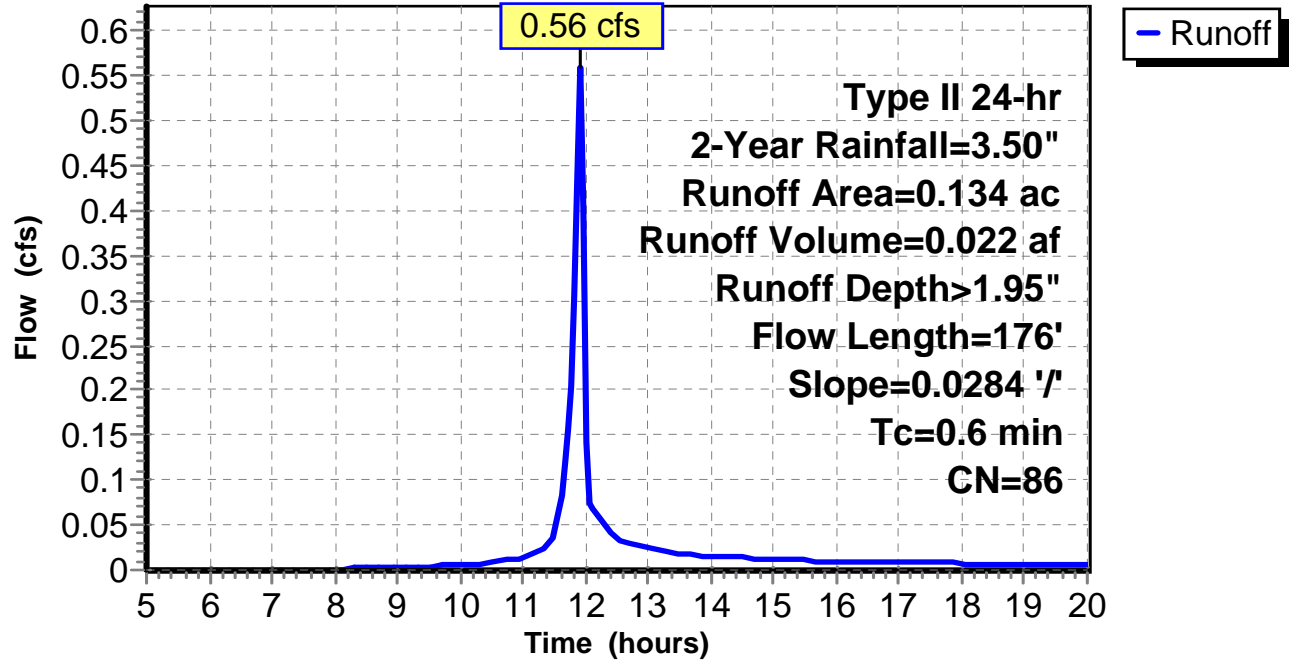
Subcatchment 4: C AR-514.014

Hydrograph



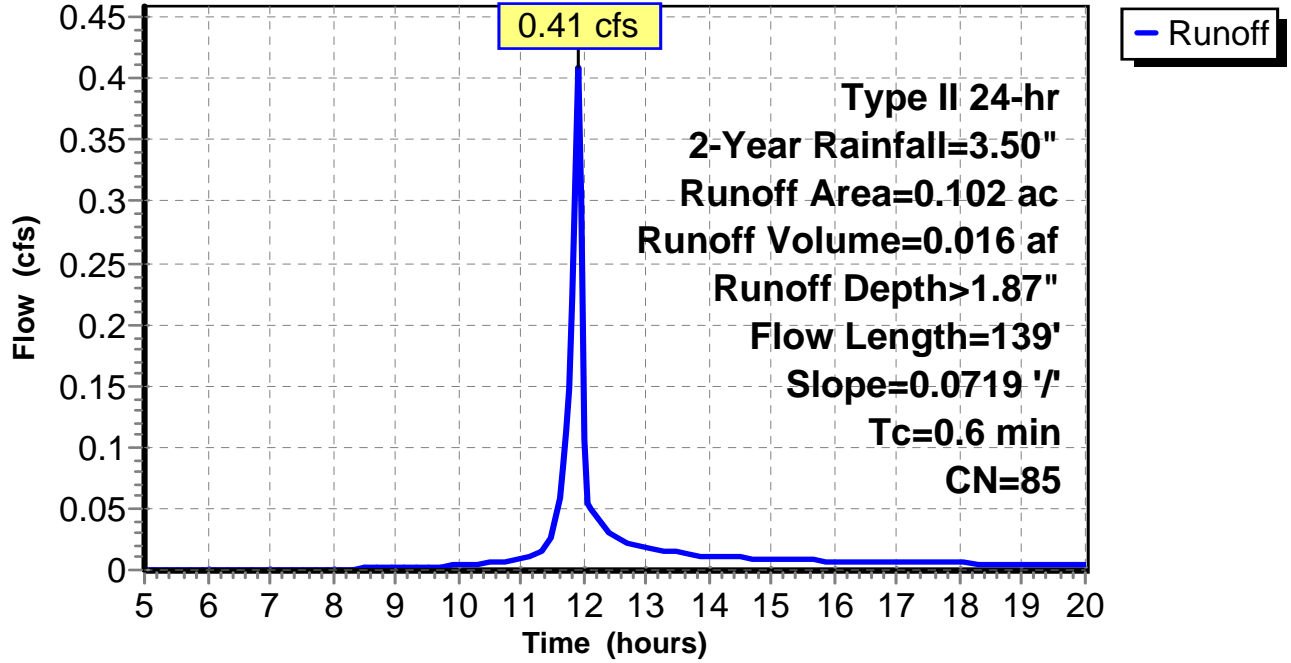
Subcatchment 5: C AR-514.015

Hydrograph



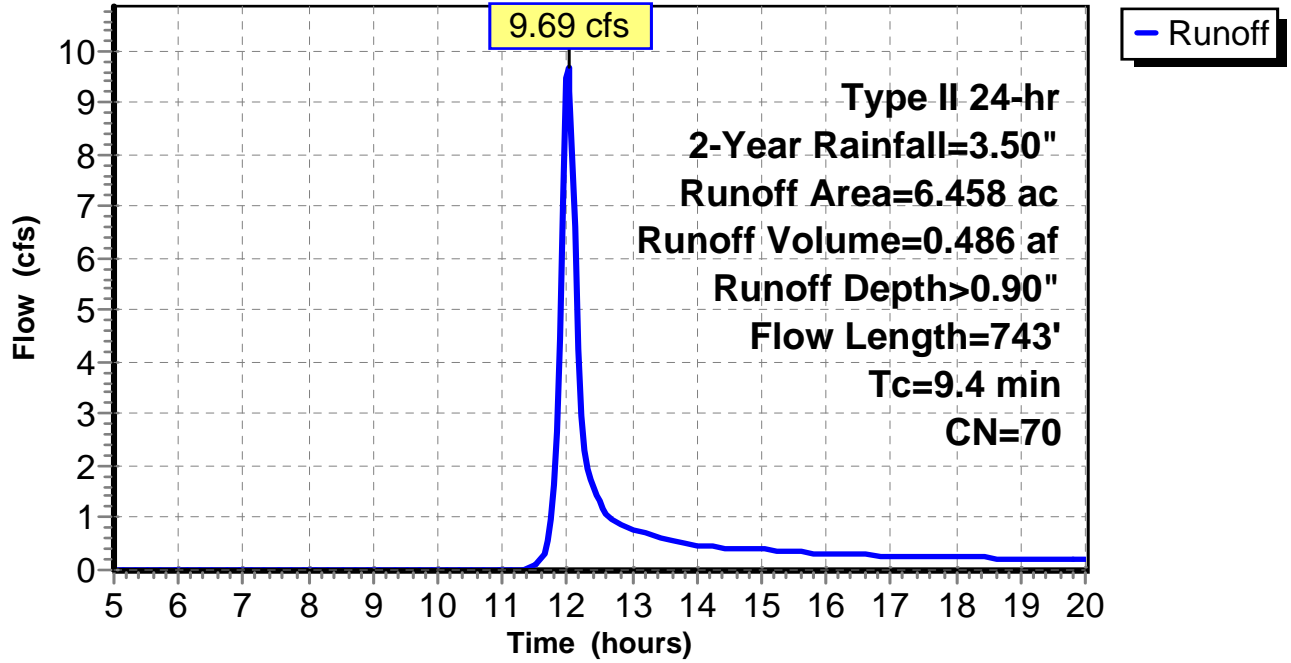
Subcatchment 6: C AR-514.016

Hydrograph



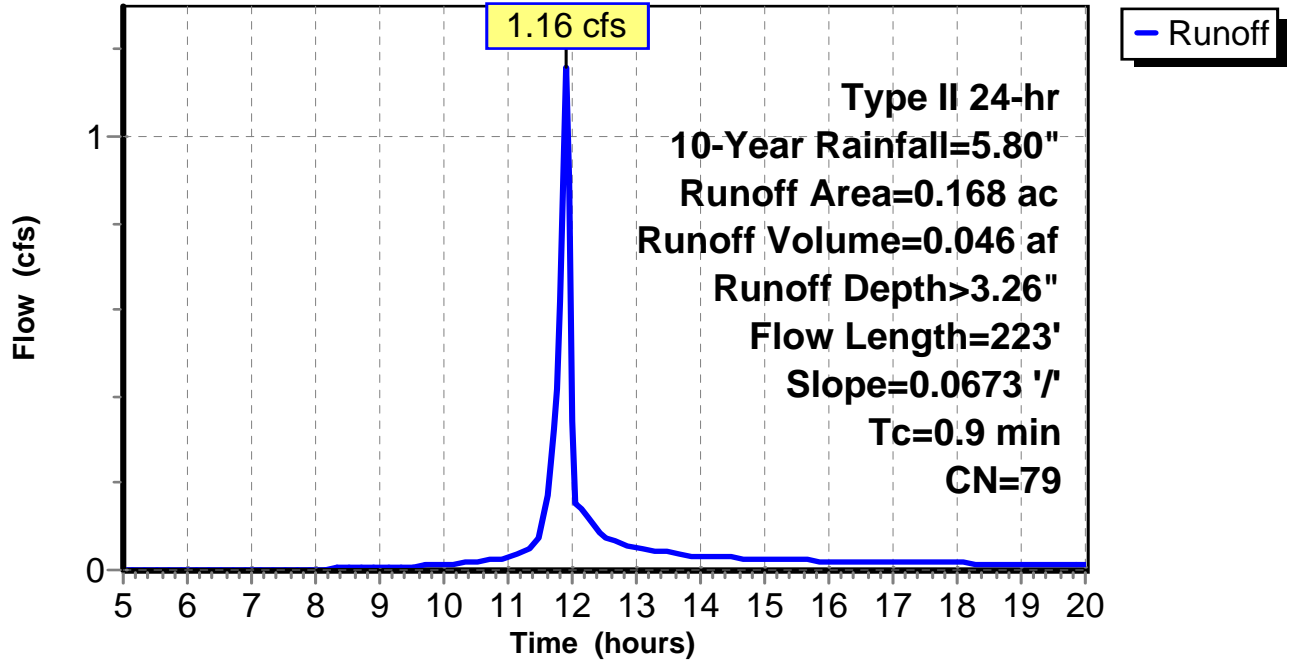
Subcatchment 7: C 231.001

Hydrograph



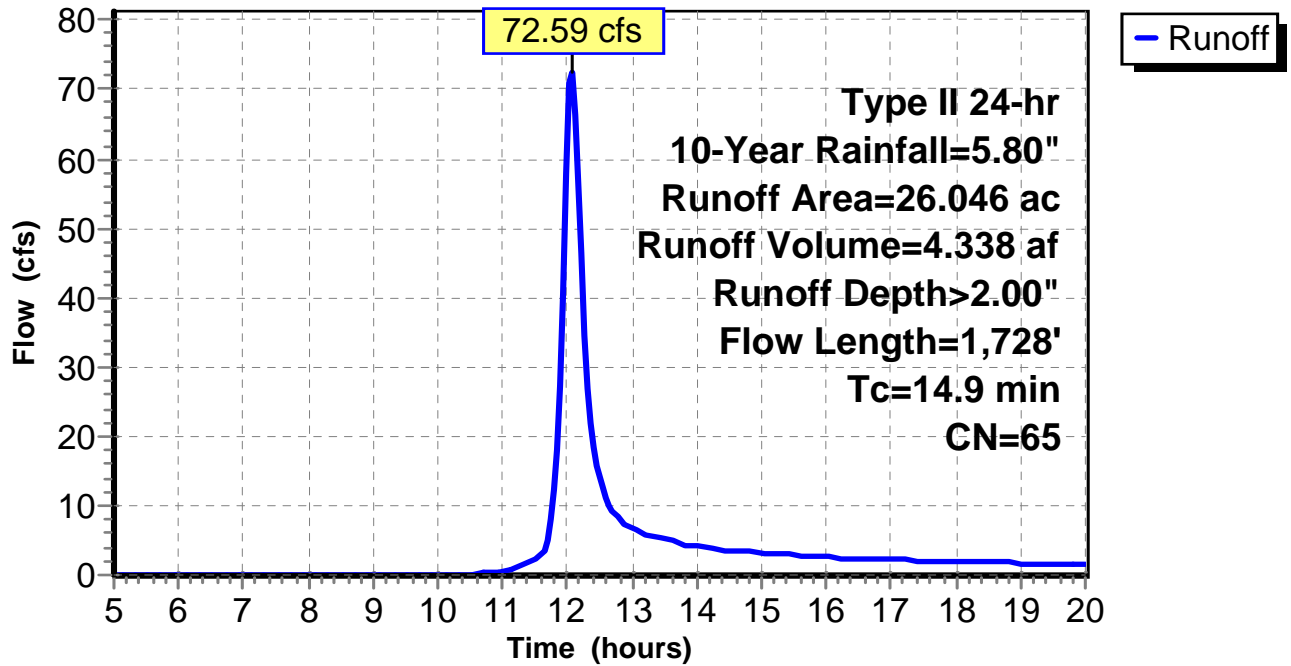
Subcatchment 1: C AR-514.011

Hydrograph



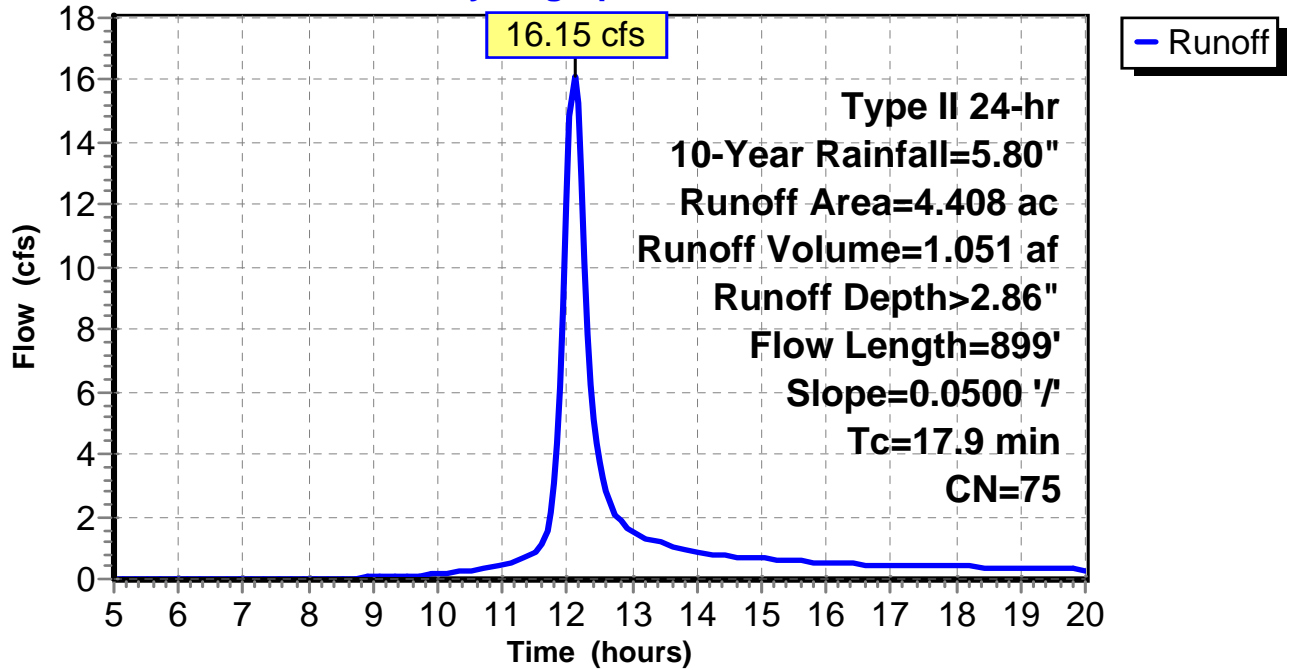
Subcatchment 2: C AR-514.012

Hydrograph



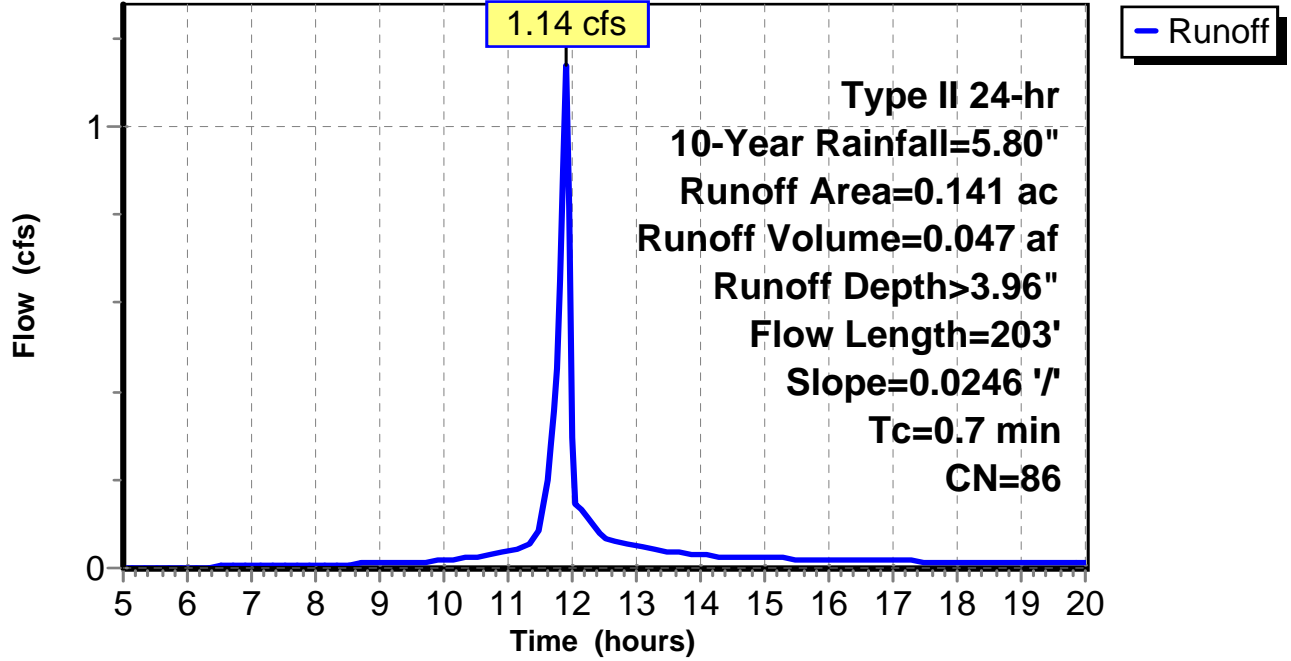
Subcatchment 3: C AR-514.013

Hydrograph



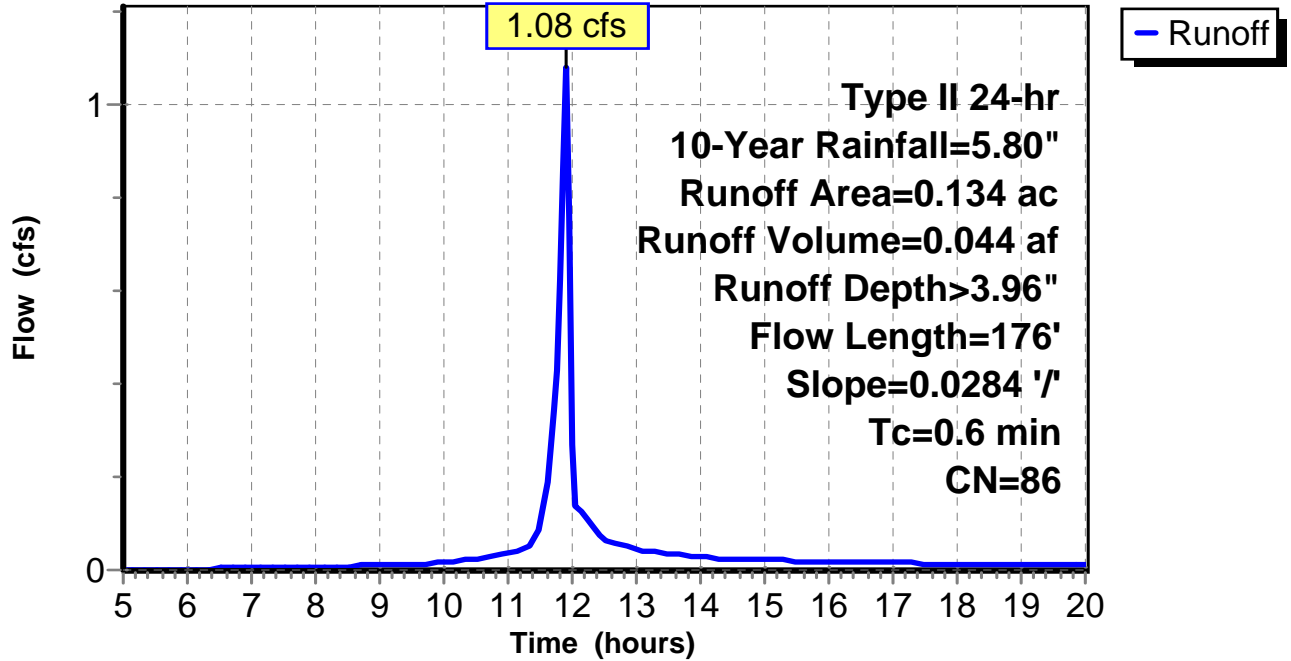
Subcatchment 4: C AR-514.014

Hydrograph



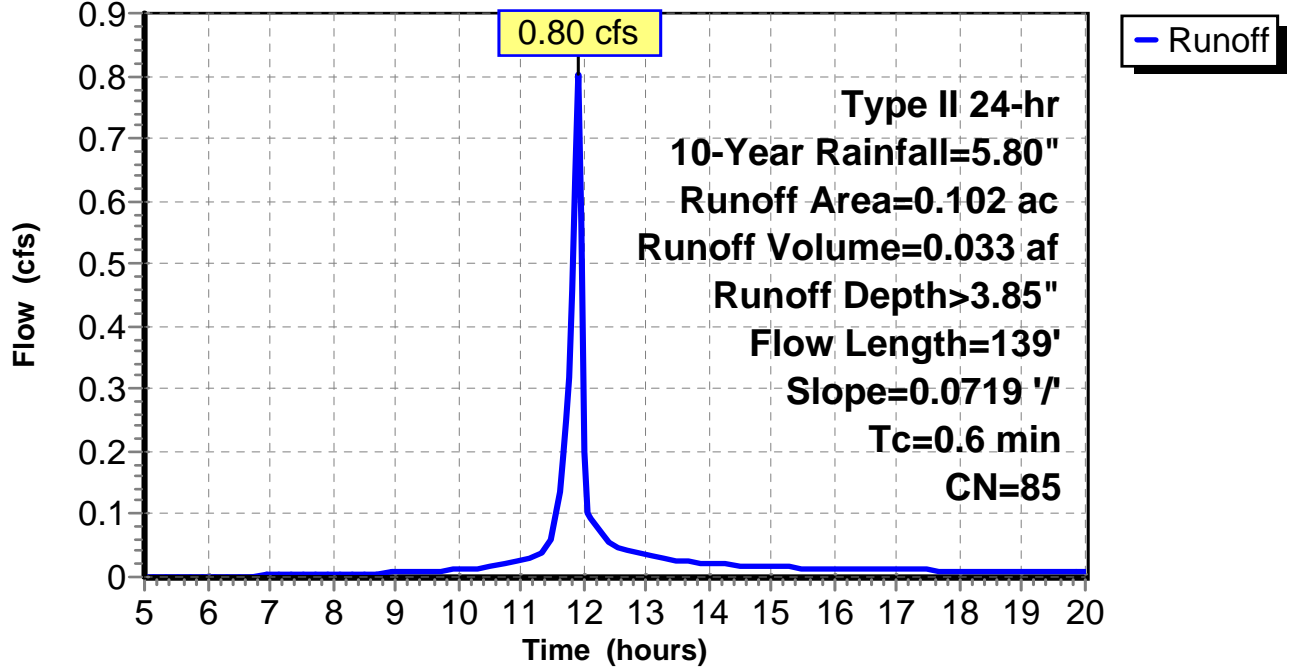
Subcatchment 5: C AR-514.015

Hydrograph



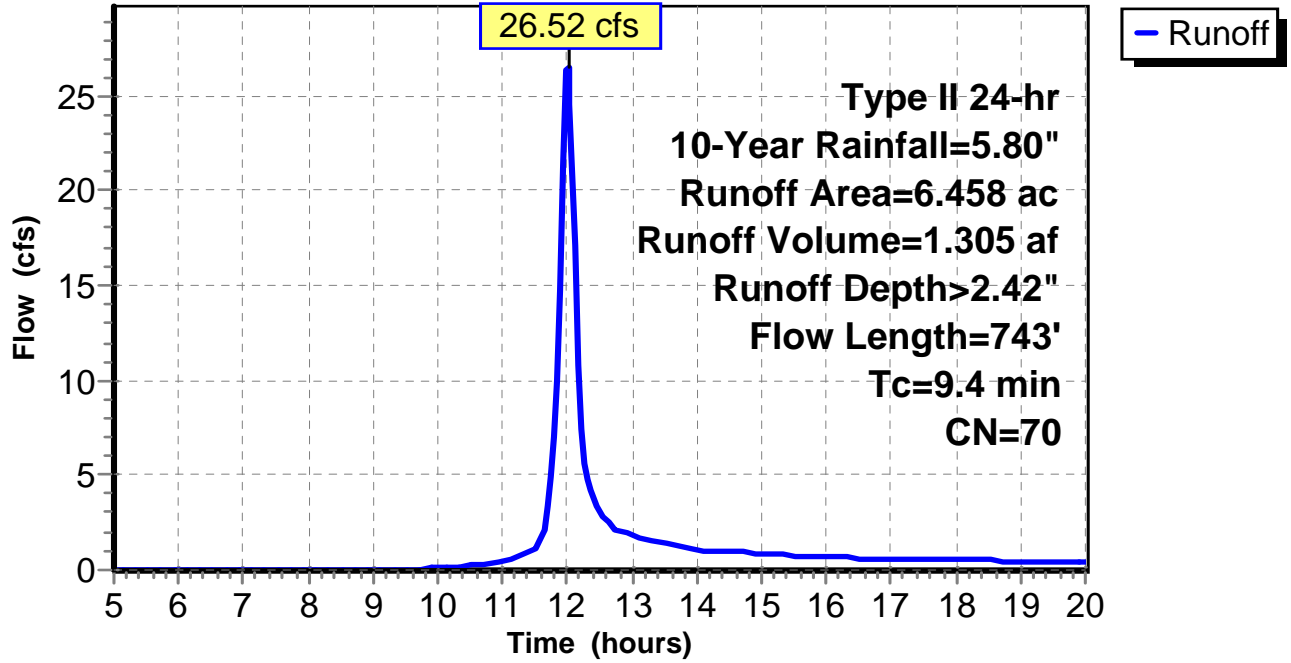
Subcatchment 6: C AR-514.016

Hydrograph



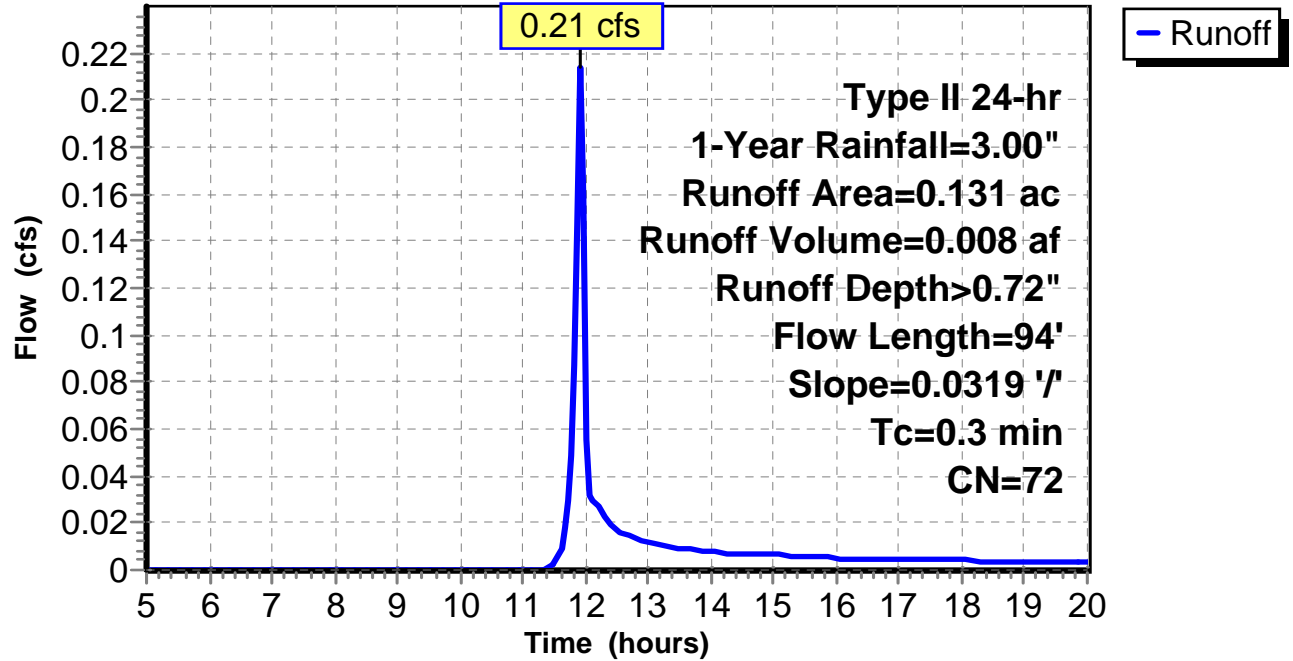
Subcatchment 7: C 231.001

Hydrograph



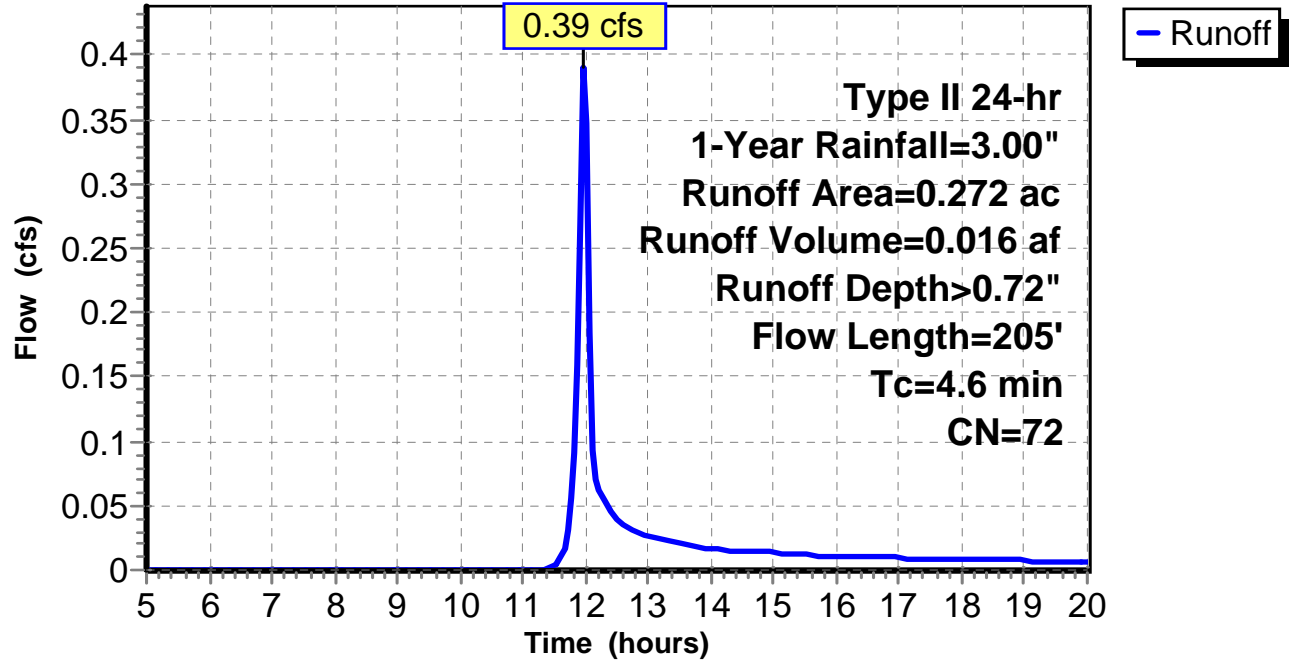
Subcatchment 1: C 232.001

Hydrograph



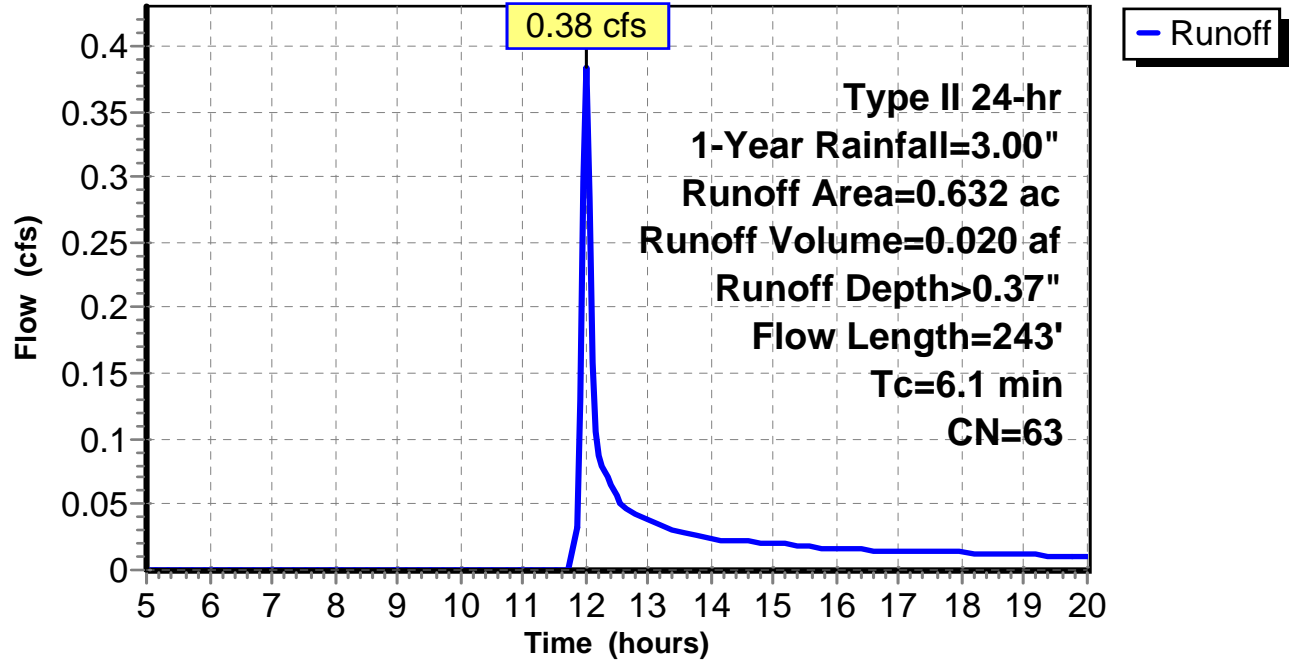
Subcatchment 2: C 232.002

Hydrograph



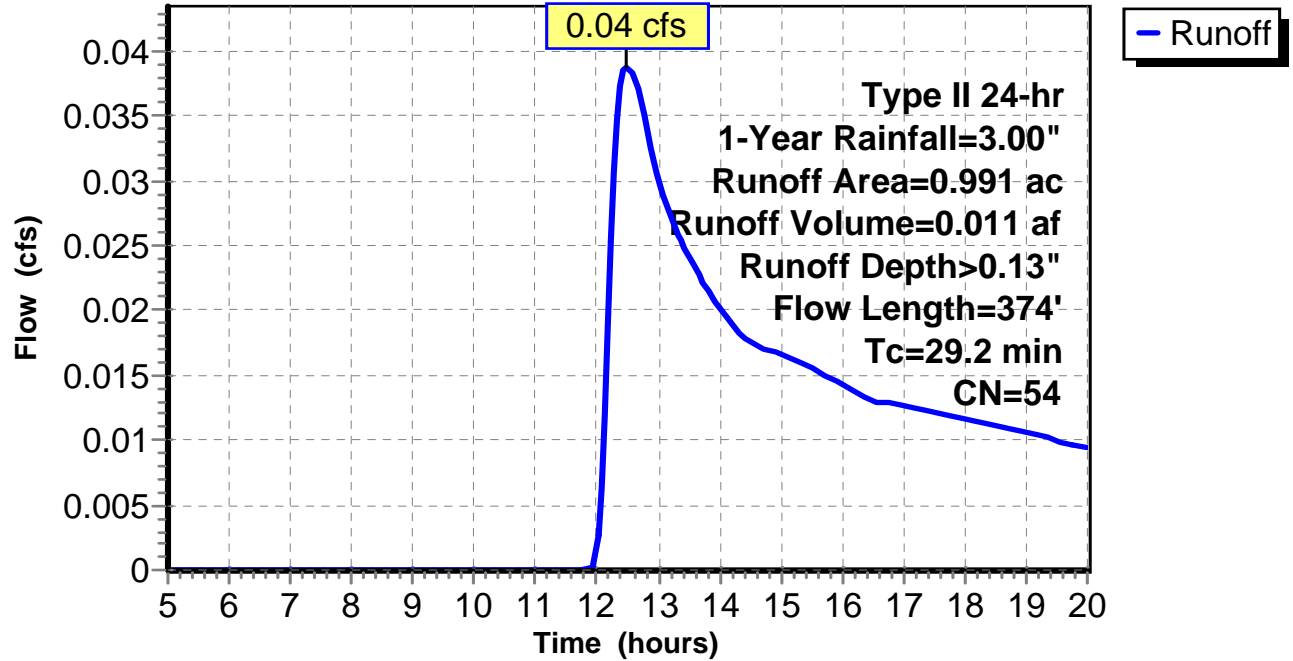
Subcatchment 3: C 232.003

Hydrograph



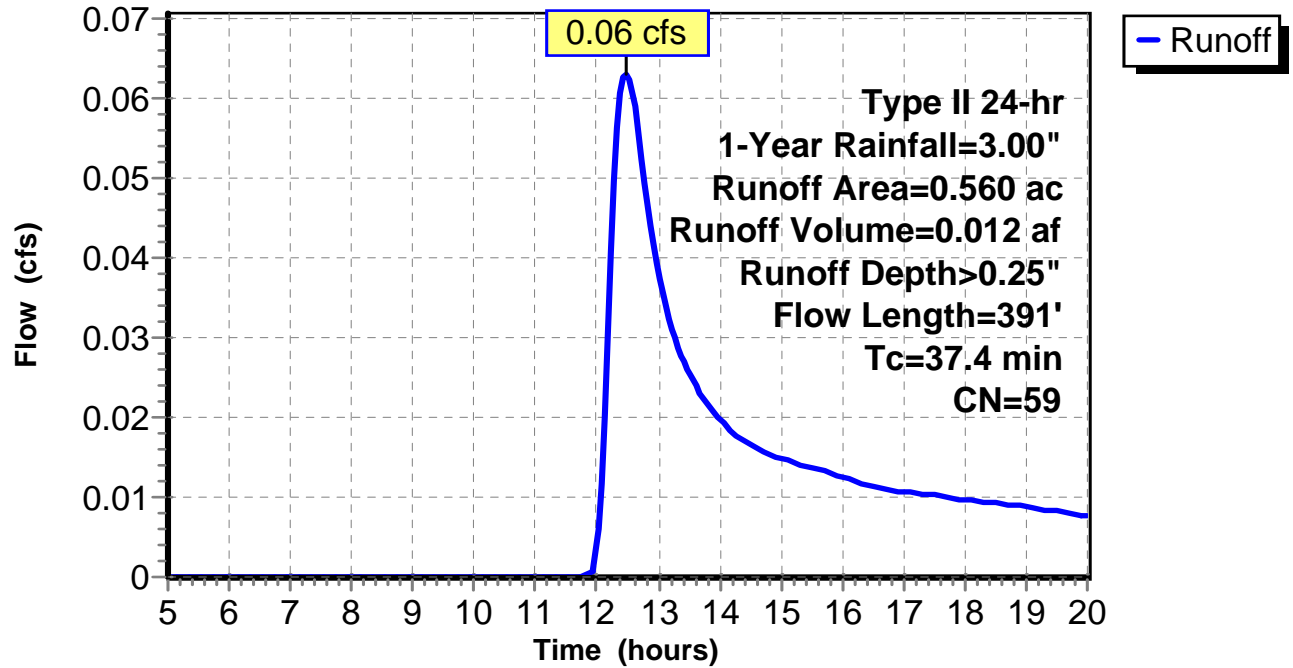
Subcatchment 4: C 232.004

Hydrograph



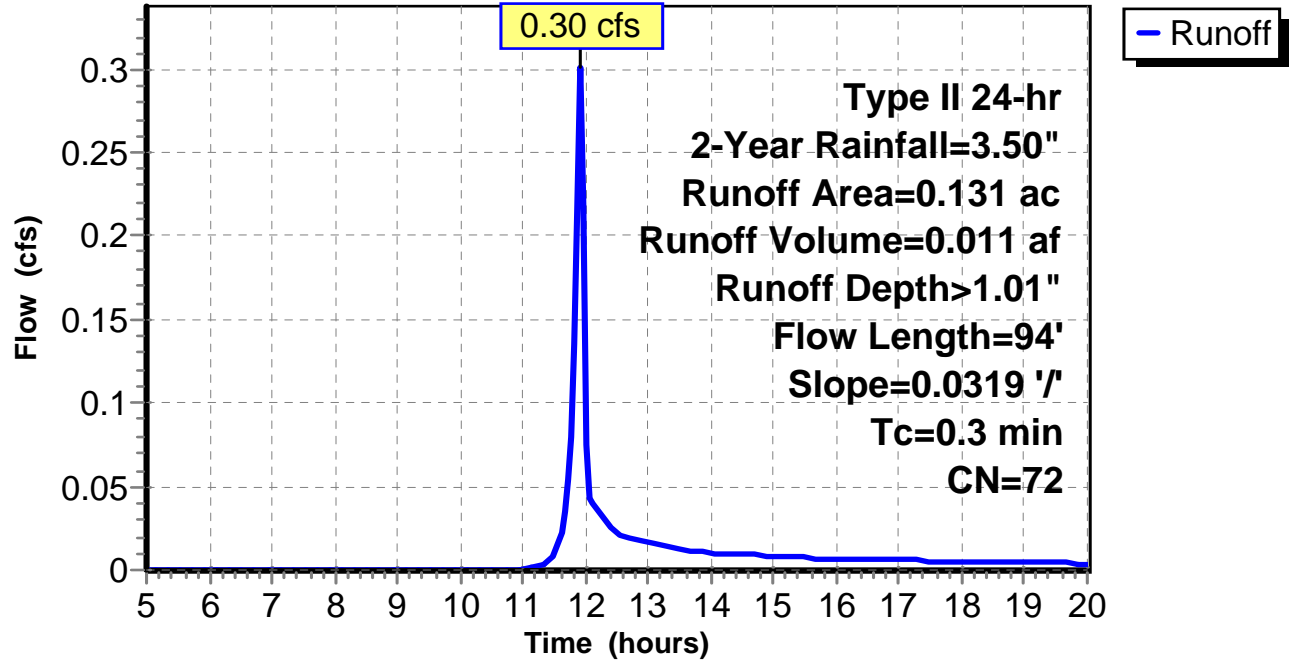
Subcatchment 5: C 232.005

Hydrograph



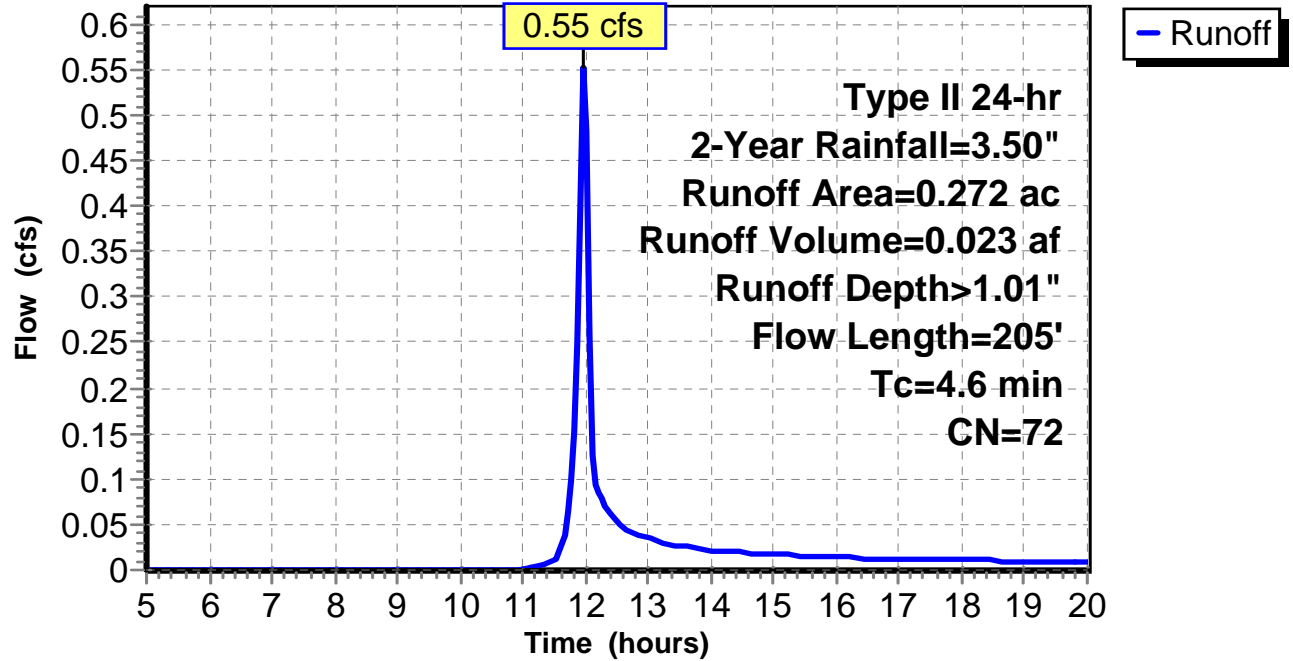
Subcatchment 1: C 232.001

Hydrograph



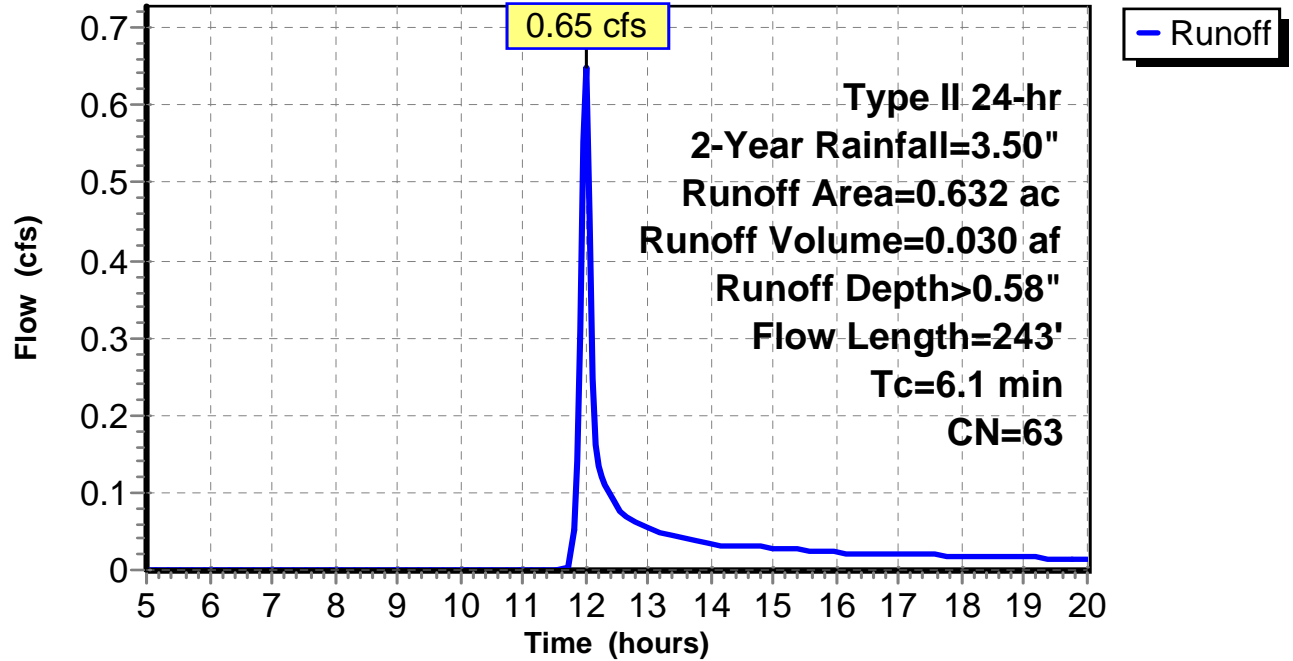
Subcatchment 2: C 232.002

Hydrograph



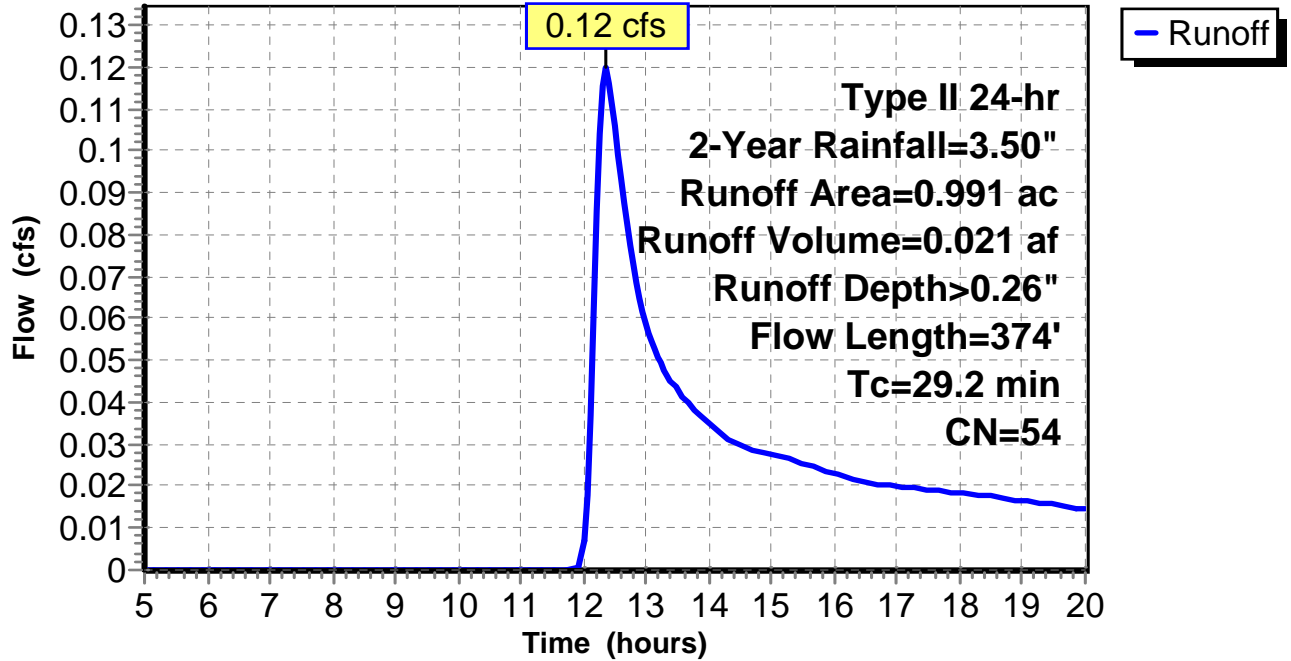
Subcatchment 3: C 232.003

Hydrograph



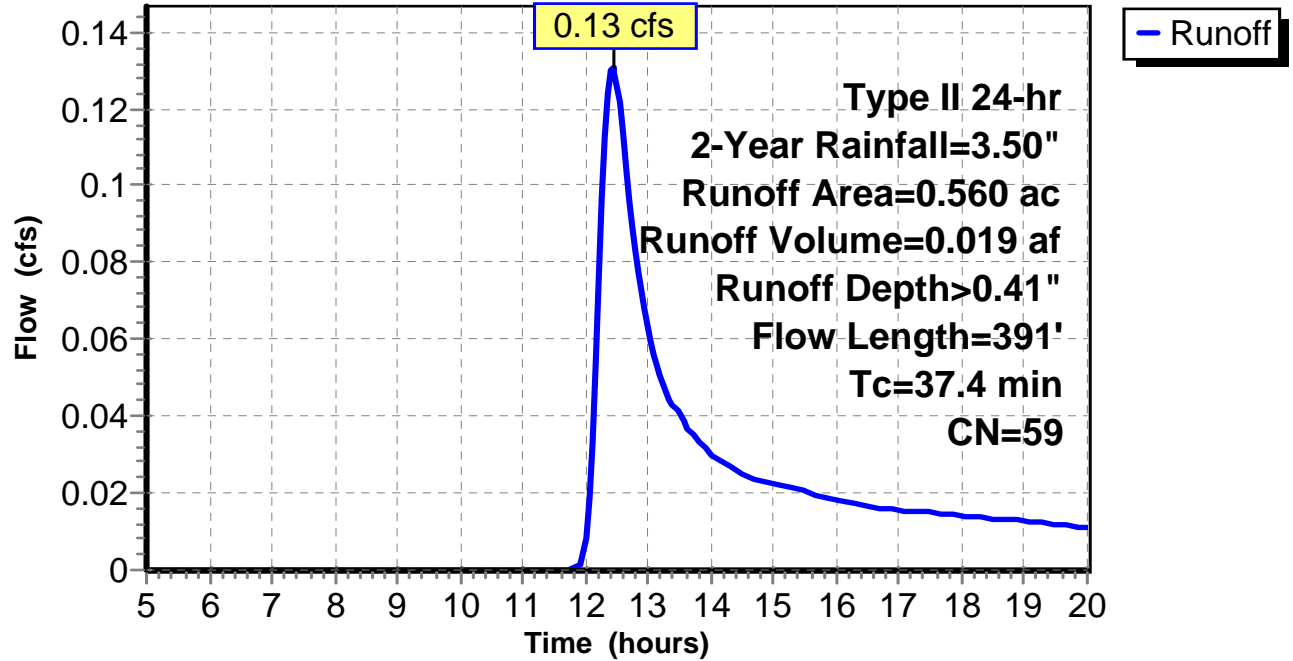
Subcatchment 4: C 232.004

Hydrograph



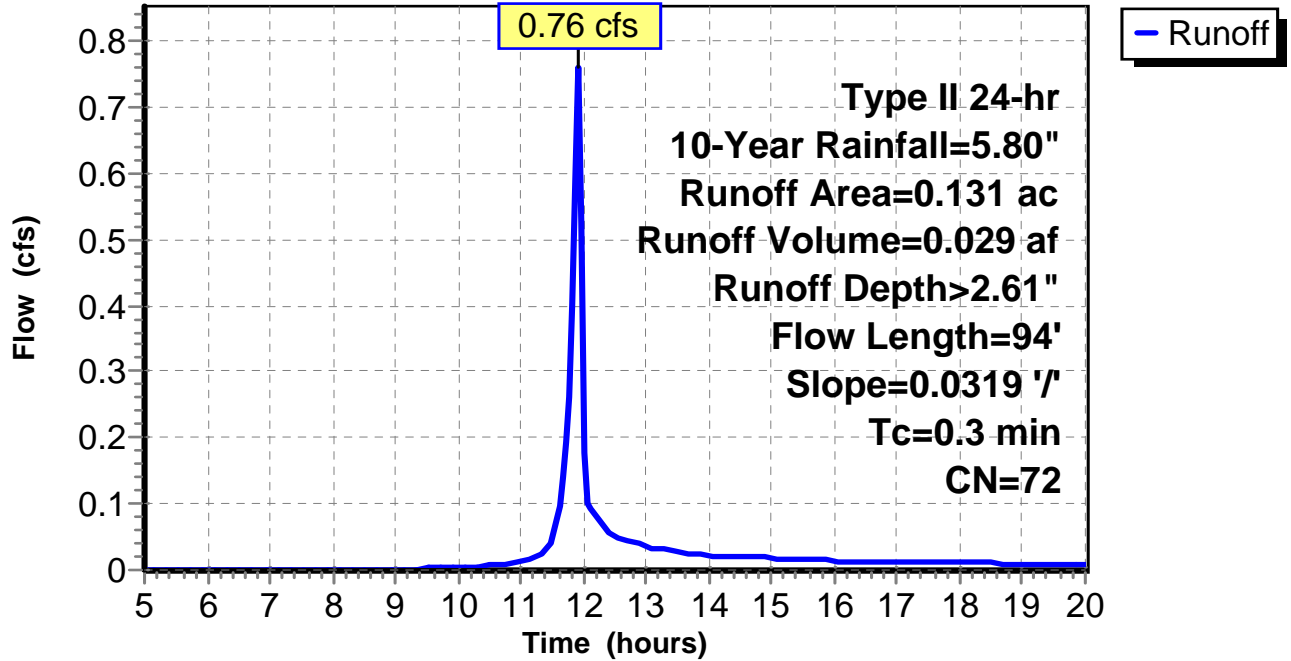
Subcatchment 5: C 232.005

Hydrograph



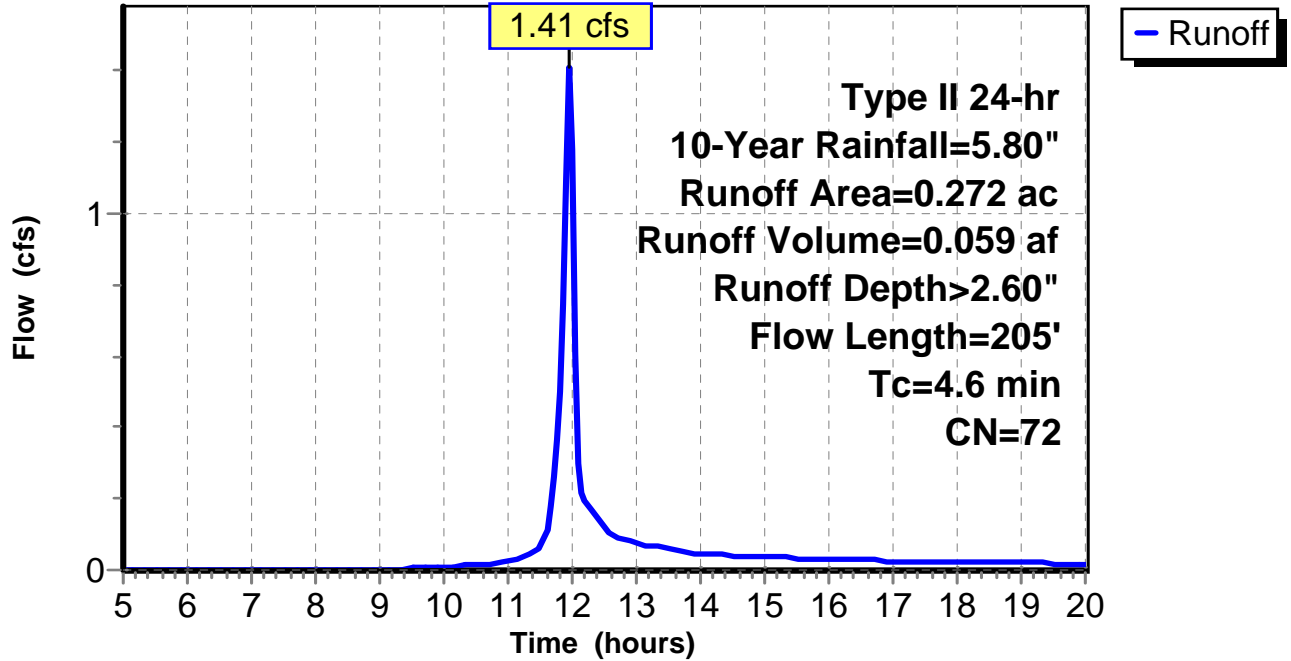
Subcatchment 1: C 232.001

Hydrograph



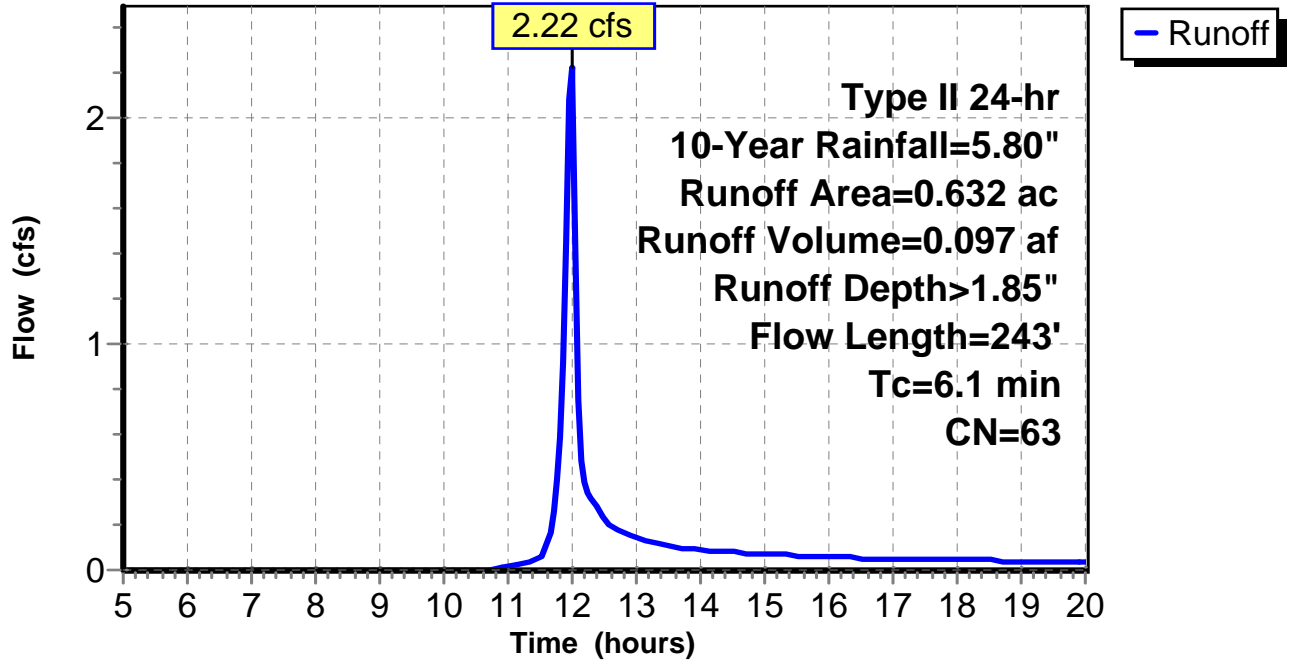
Subcatchment 2: C 232.002

Hydrograph



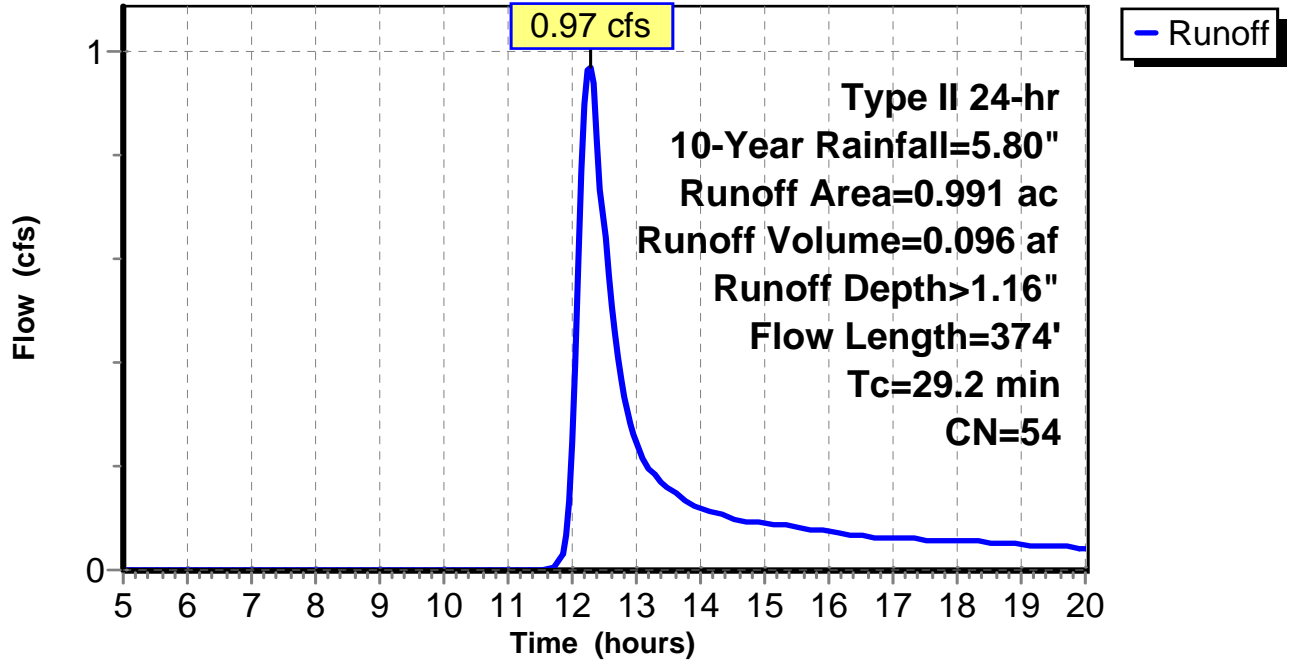
Subcatchment 3: C 232.003

Hydrograph



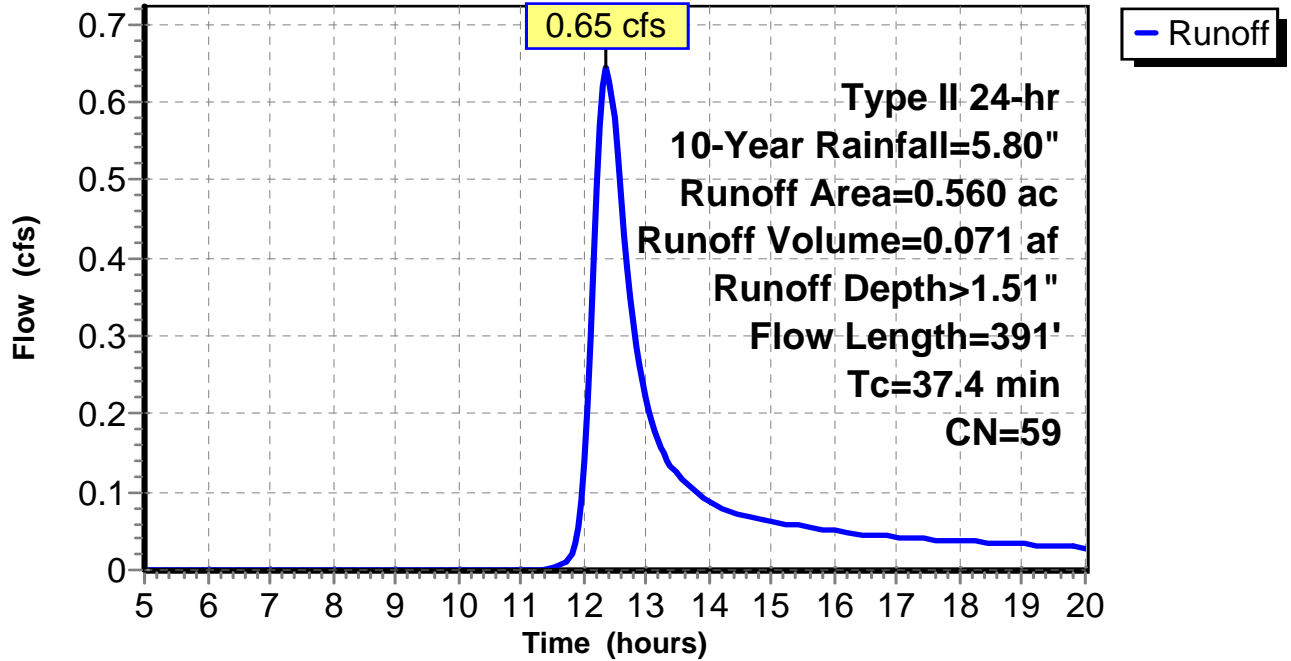
Subcatchment 4: C 232.004

Hydrograph



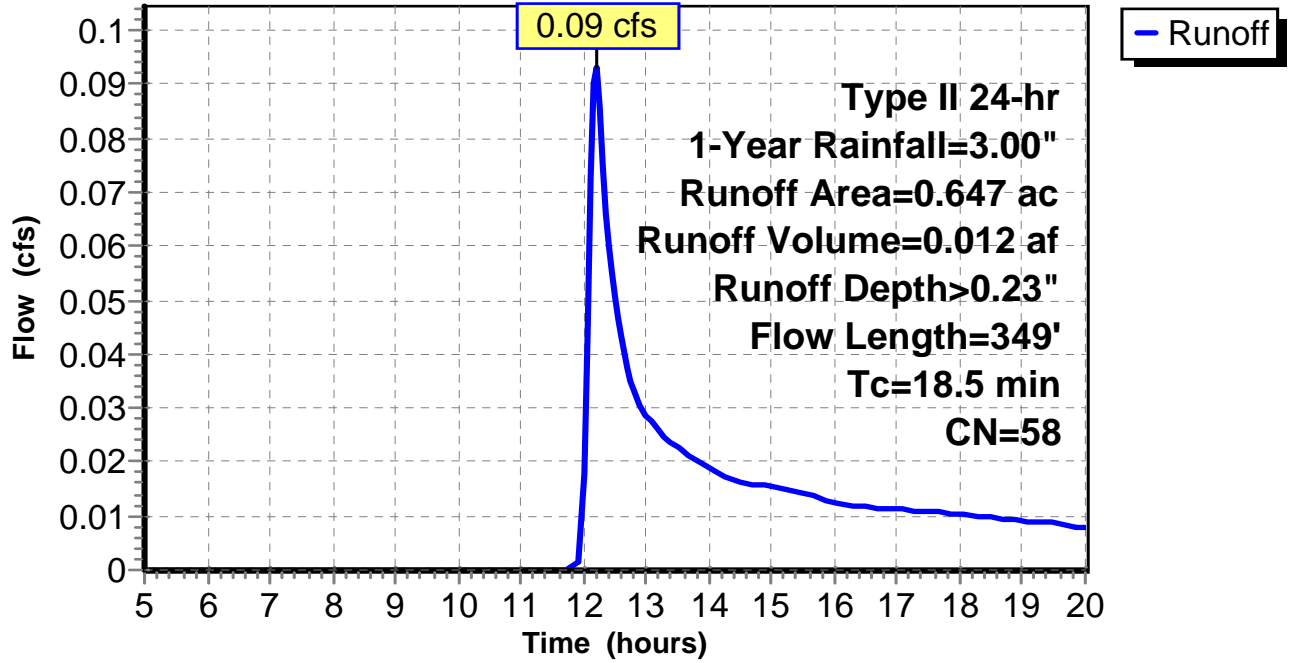
Subcatchment 5: C 232.005

Hydrograph



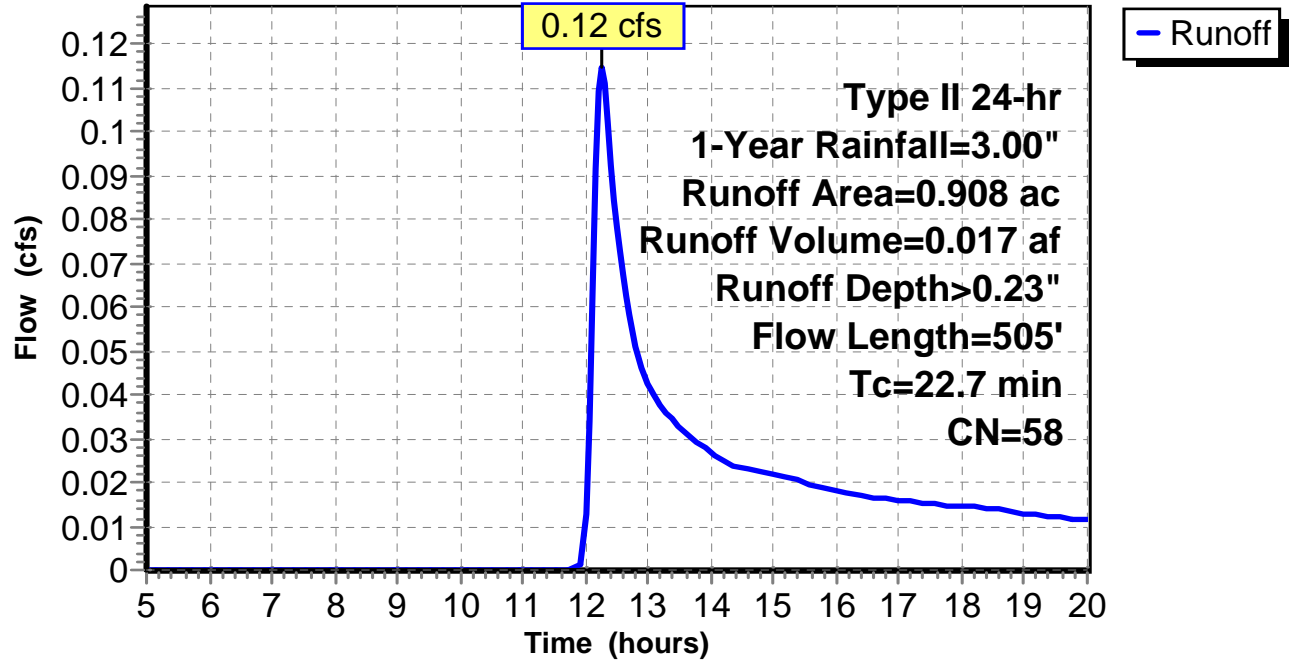
Subcatchment 1: C 237.001

Hydrograph



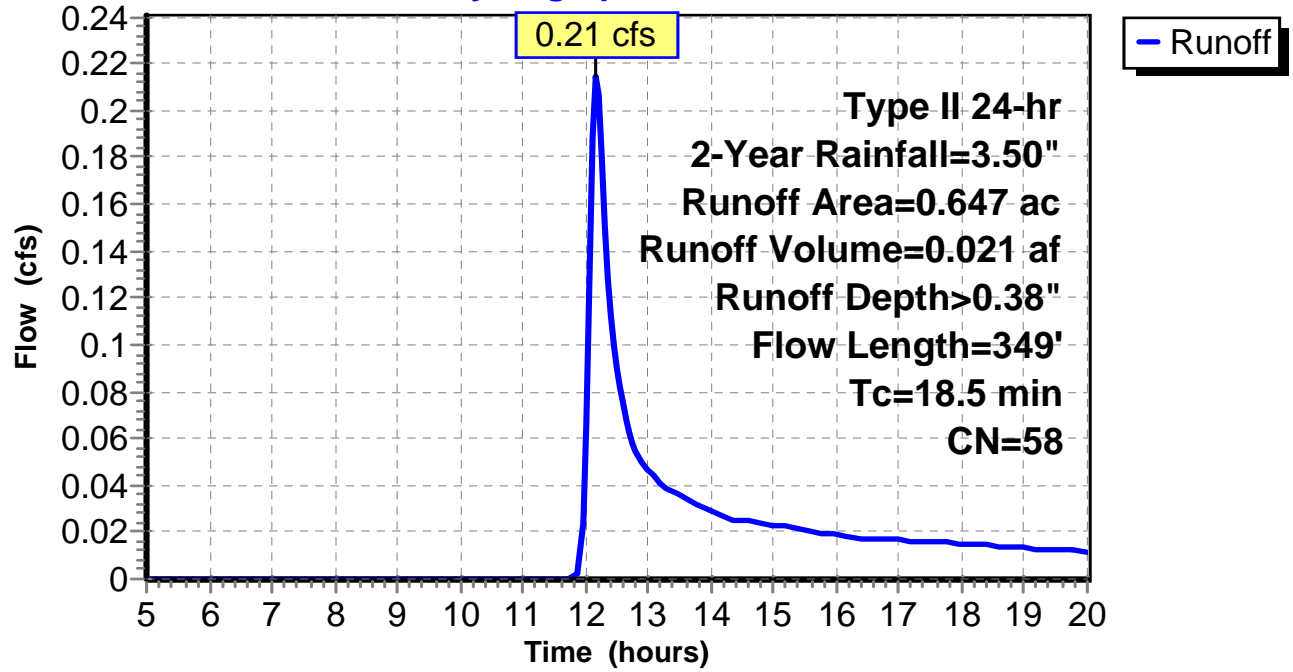
Subcatchment 2: C 237.002

Hydrograph



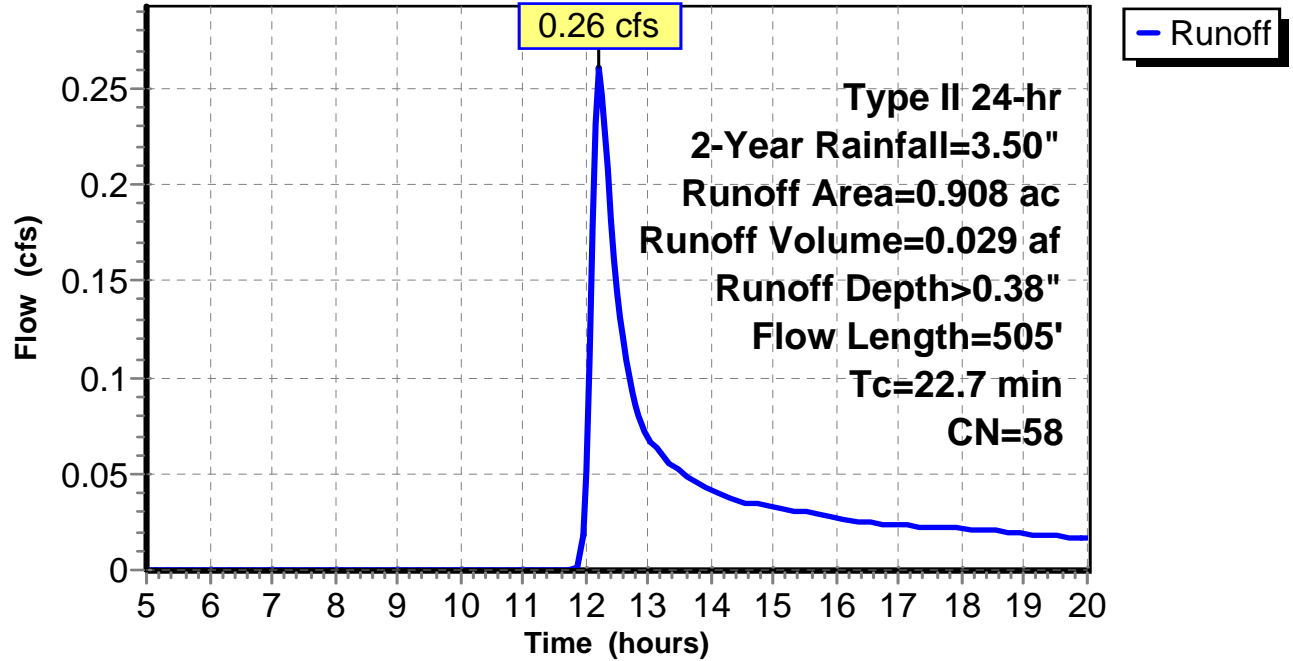
Subcatchment 1: C 237.001

Hydrograph



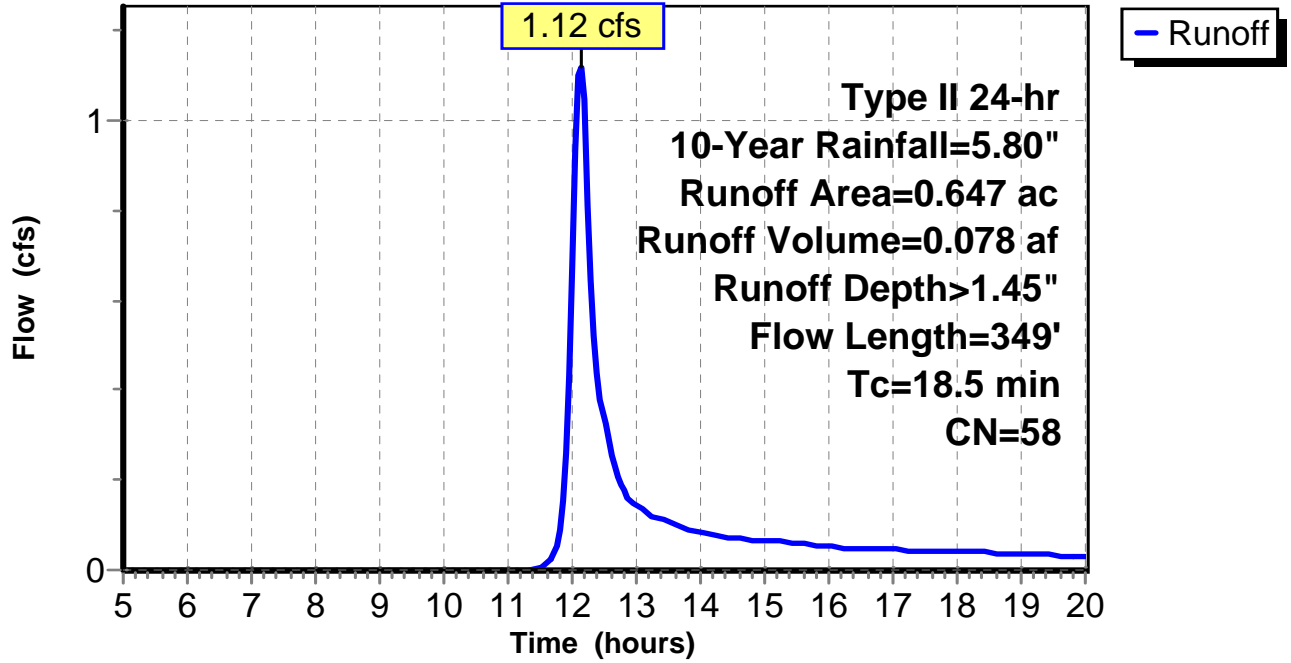
Subcatchment 2: C 237.002

Hydrograph



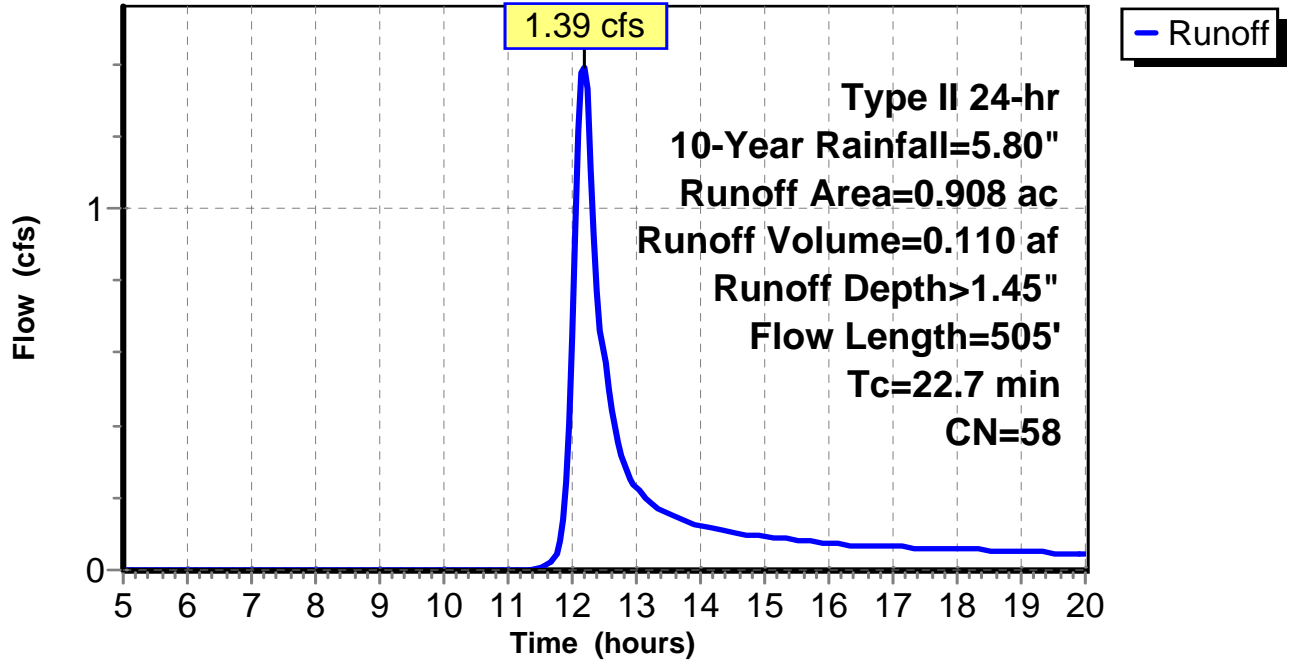
Subcatchment 1: C 237.001

Hydrograph



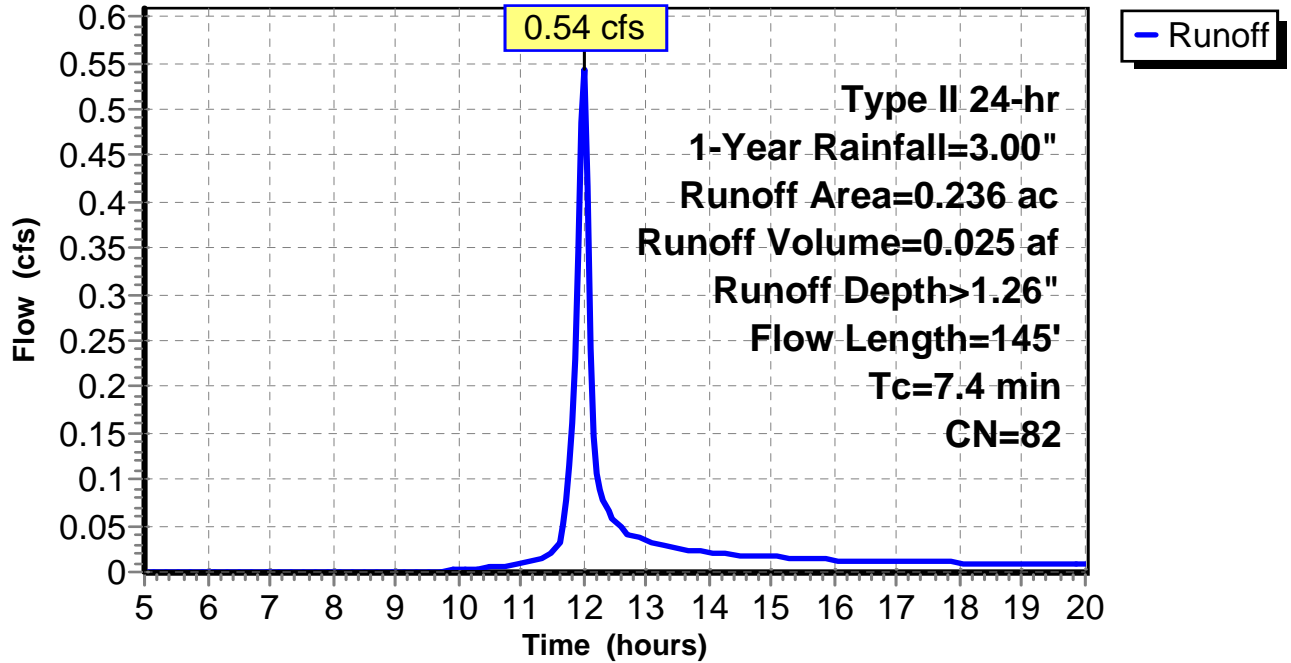
Subcatchment 2: C 237.002

Hydrograph



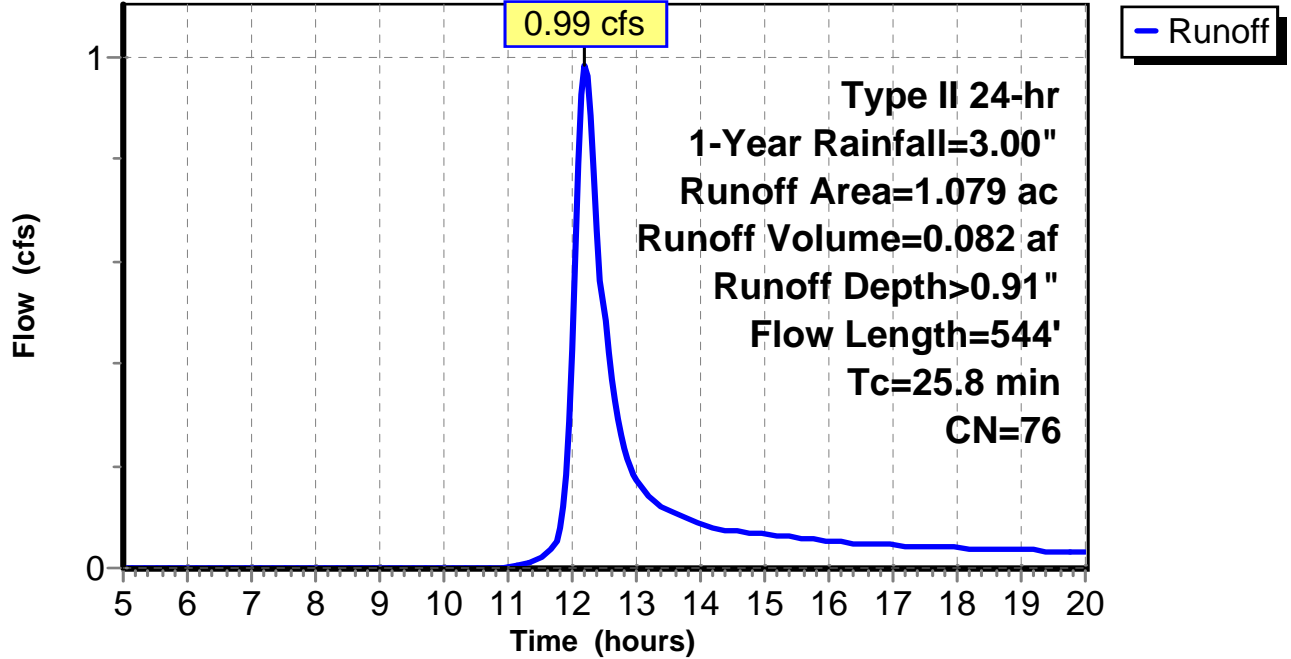
Subcatchment 1: C AR-518.001

Hydrograph



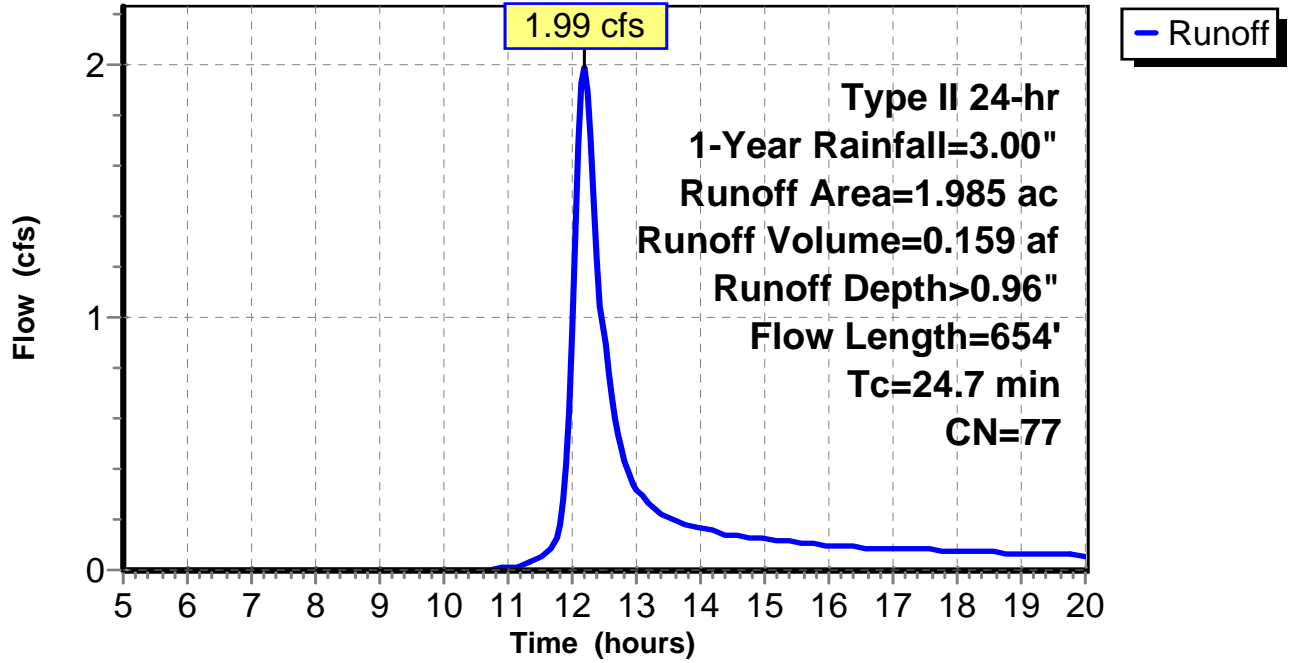
Subcatchment 2: C AR-518.002

Hydrograph



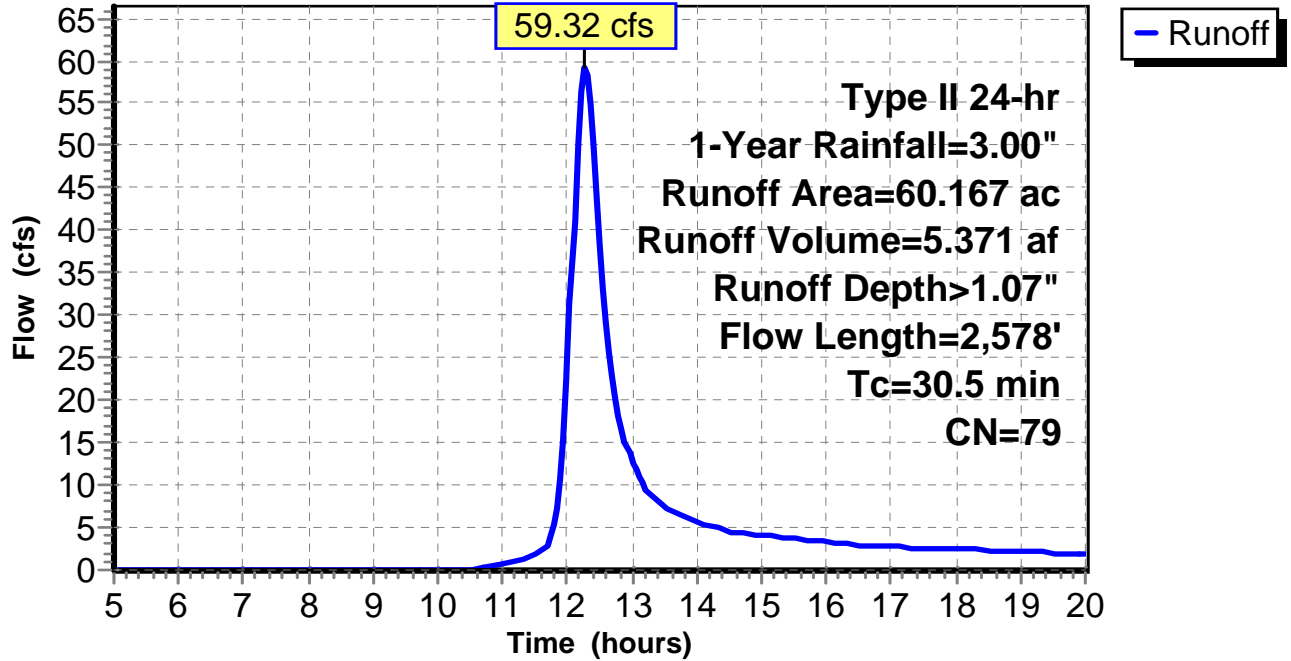
Subcatchment 3: C 240.001

Hydrograph



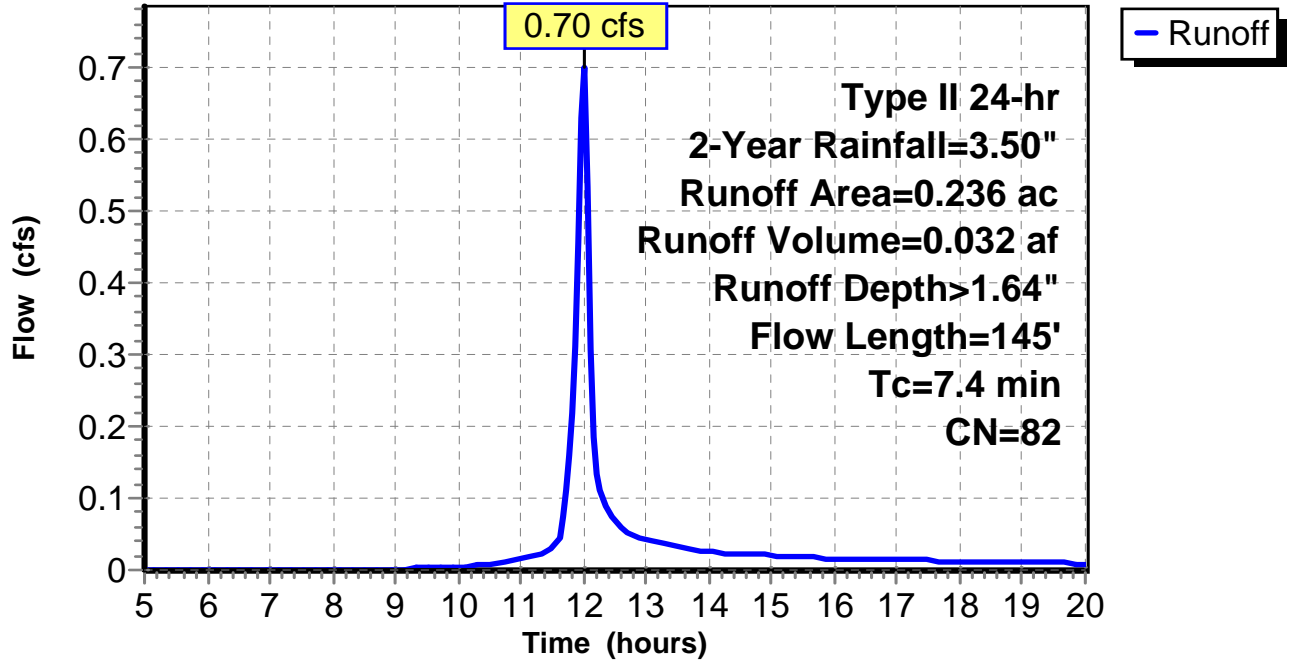
Subcatchment 4: C 240.002

Hydrograph



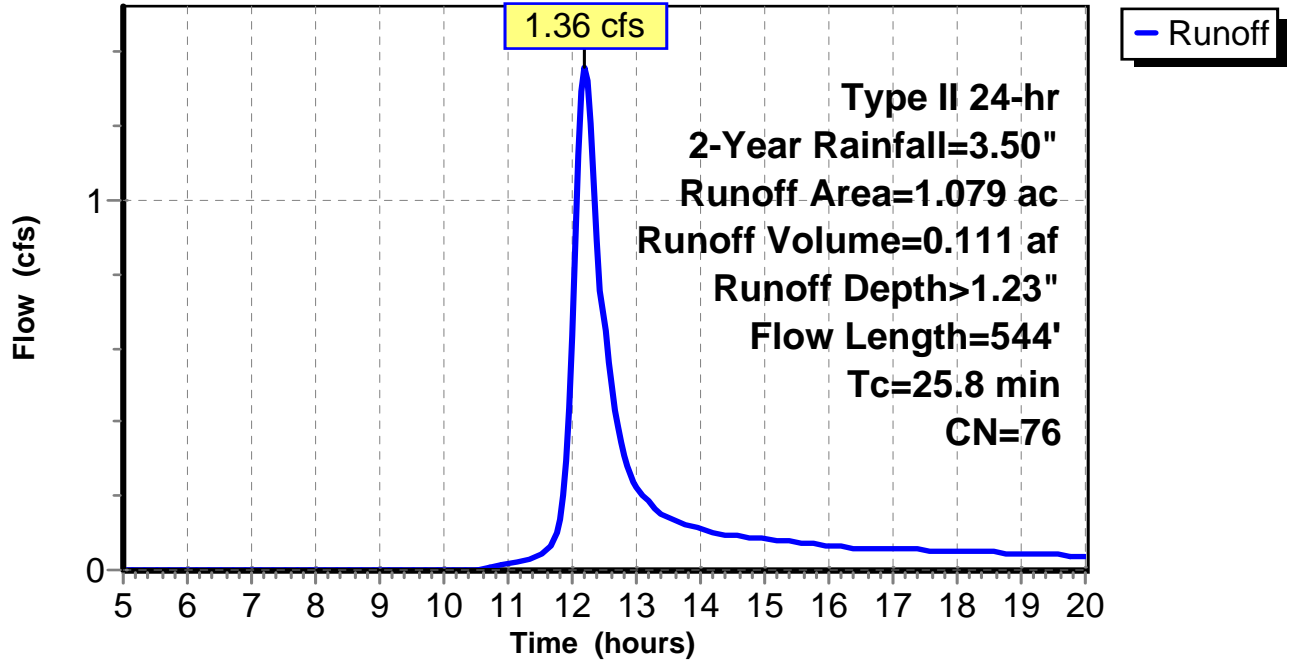
Subcatchment 1: C AR-518.001

Hydrograph



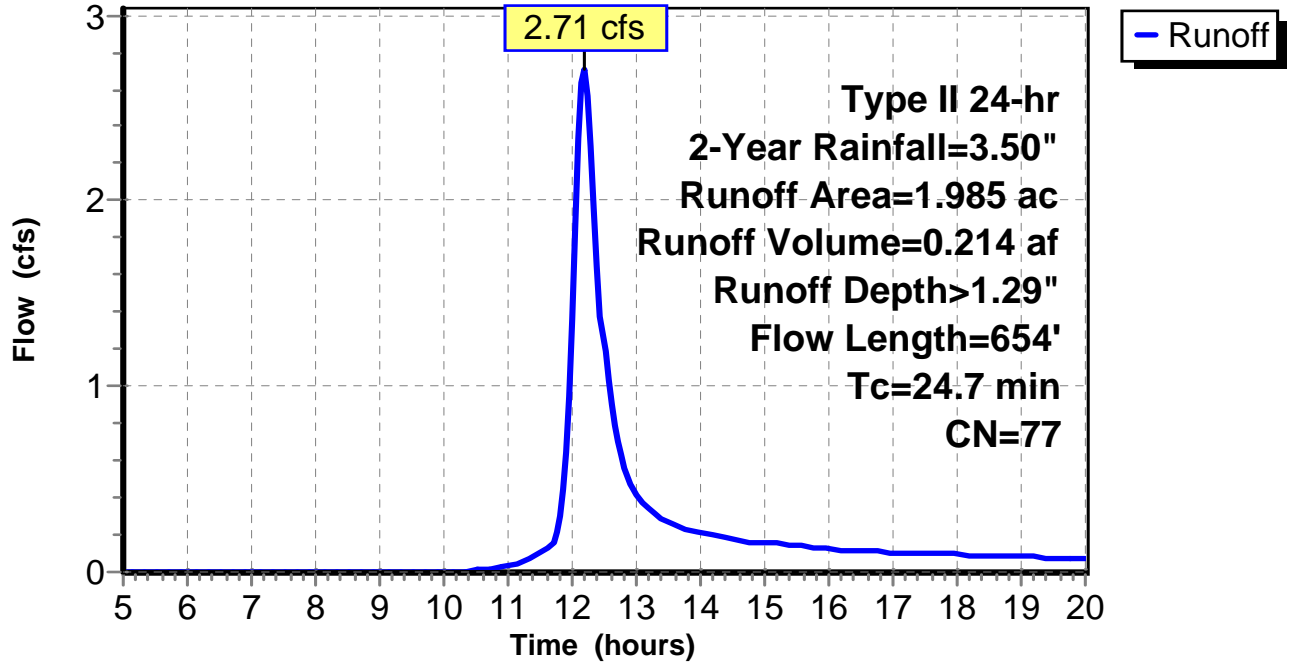
Subcatchment 2: C AR-518.002

Hydrograph



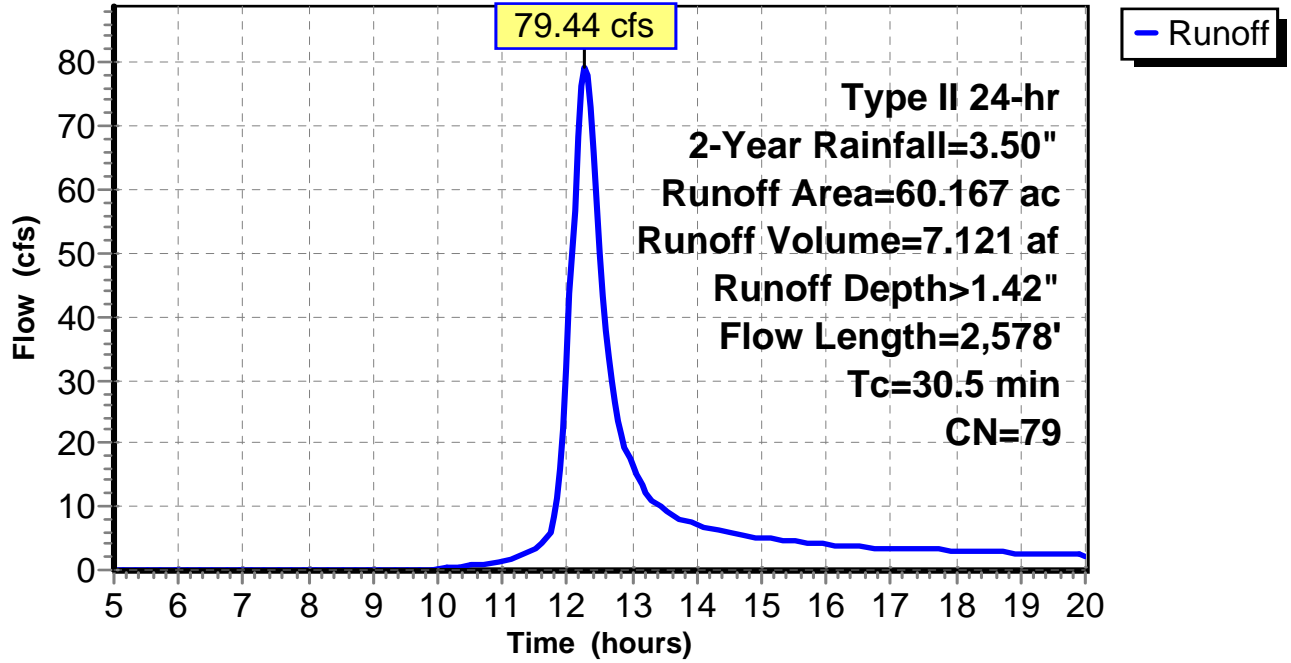
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Hydrograph



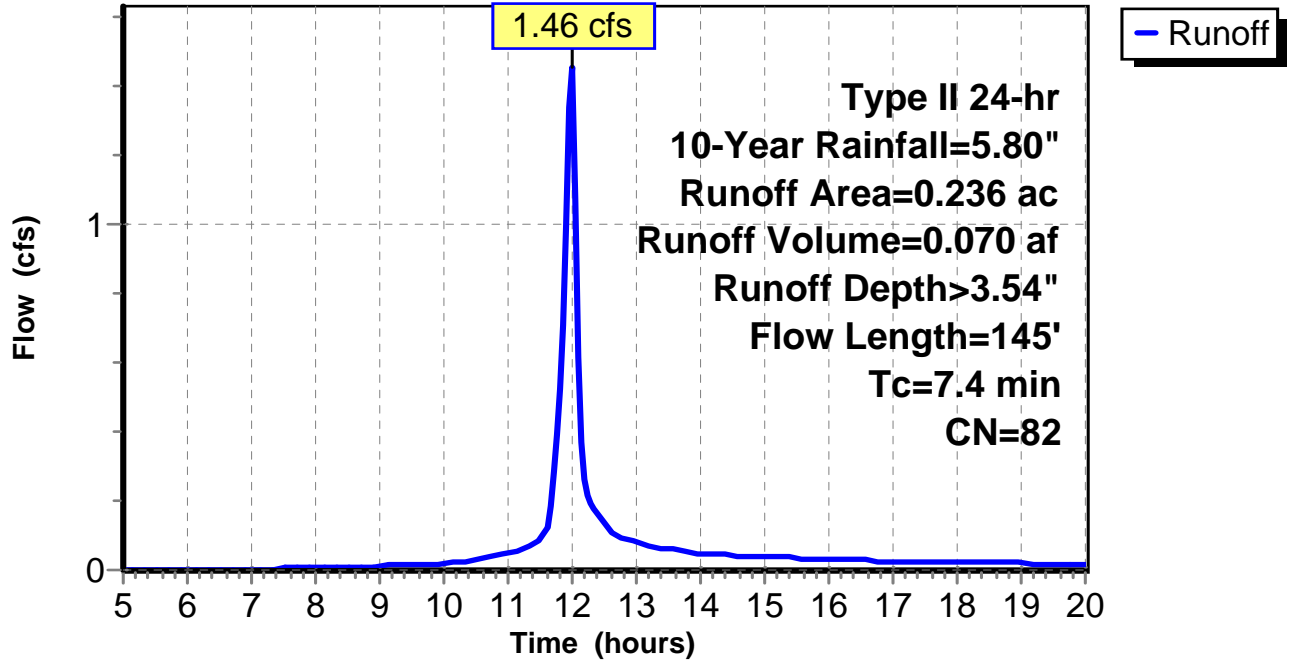
Subcatchment 4: C 240.002

Hydrograph



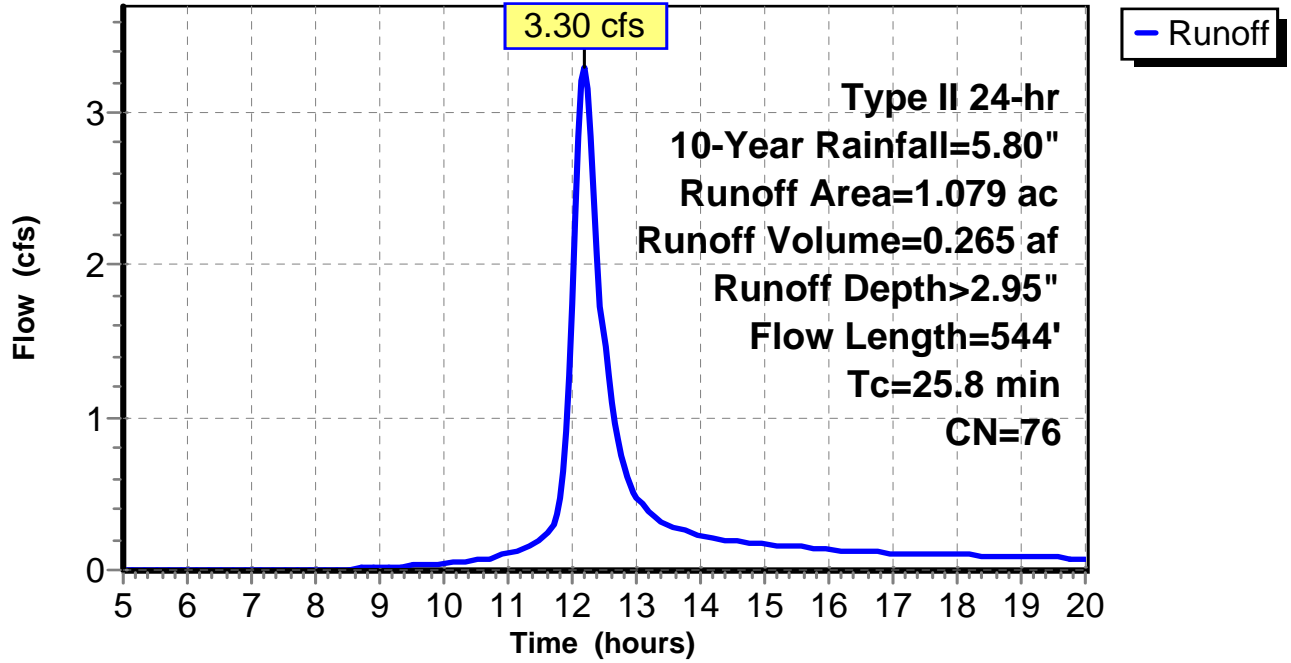
Subcatchment 1: C AR-518.001

Hydrograph



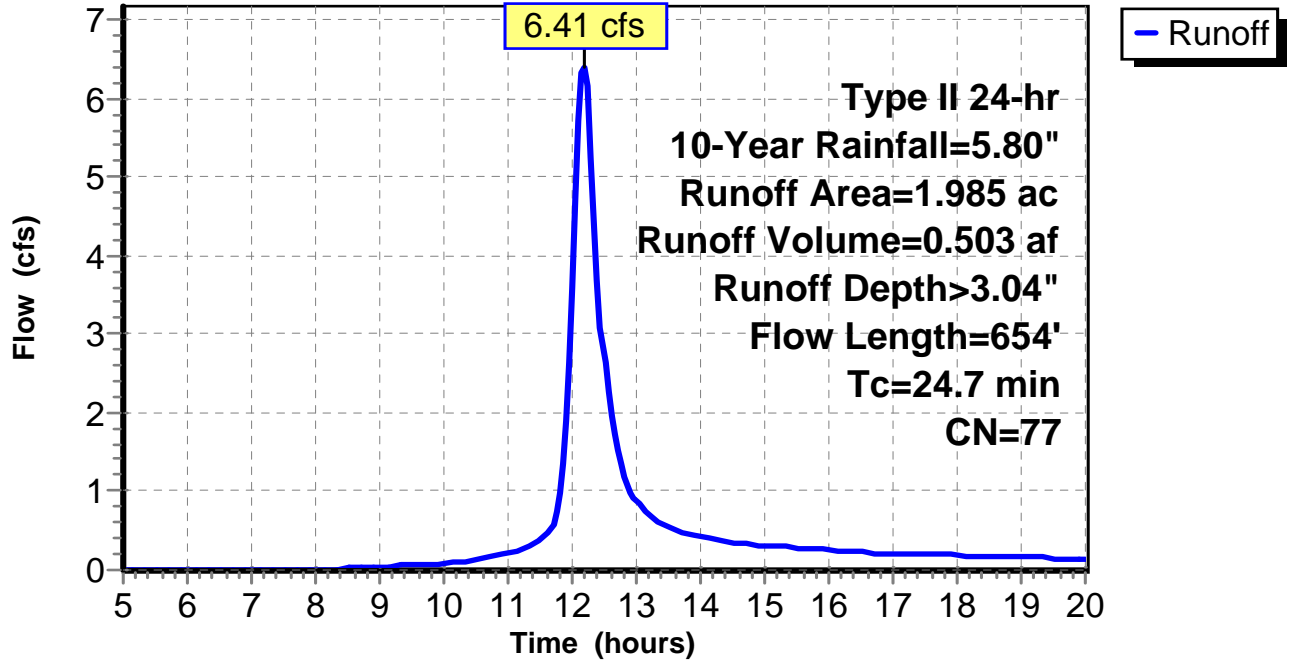
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Hydrograph



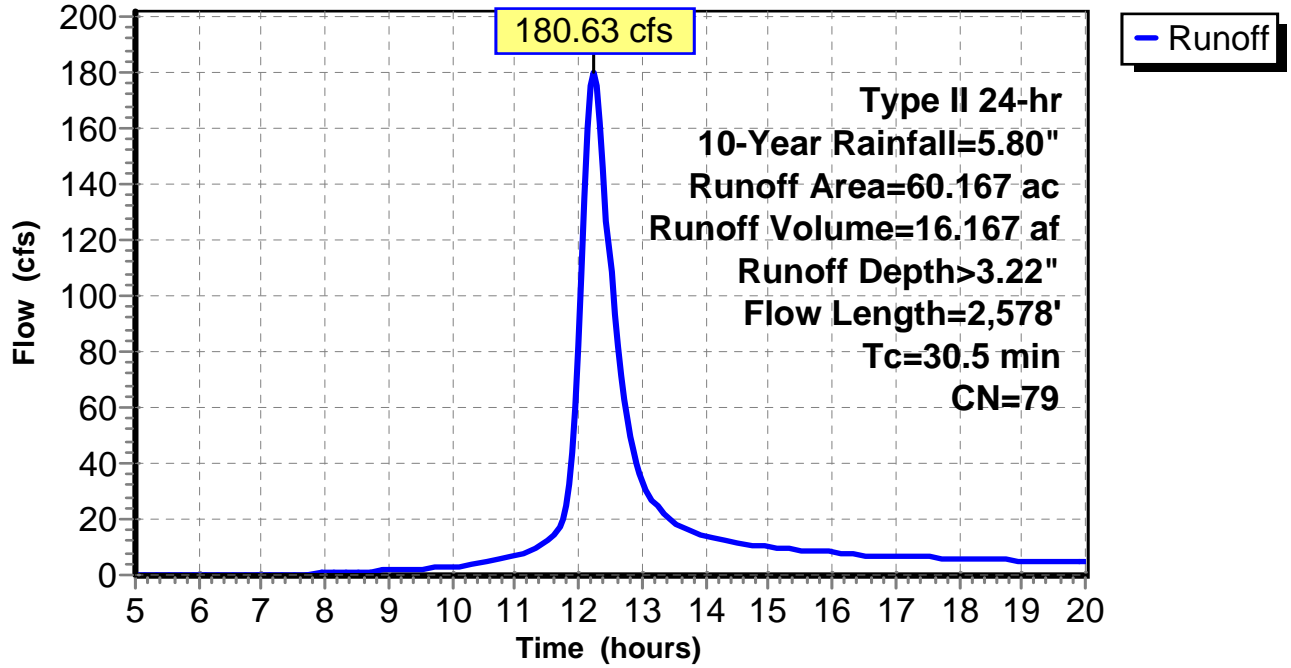
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Hydrograph



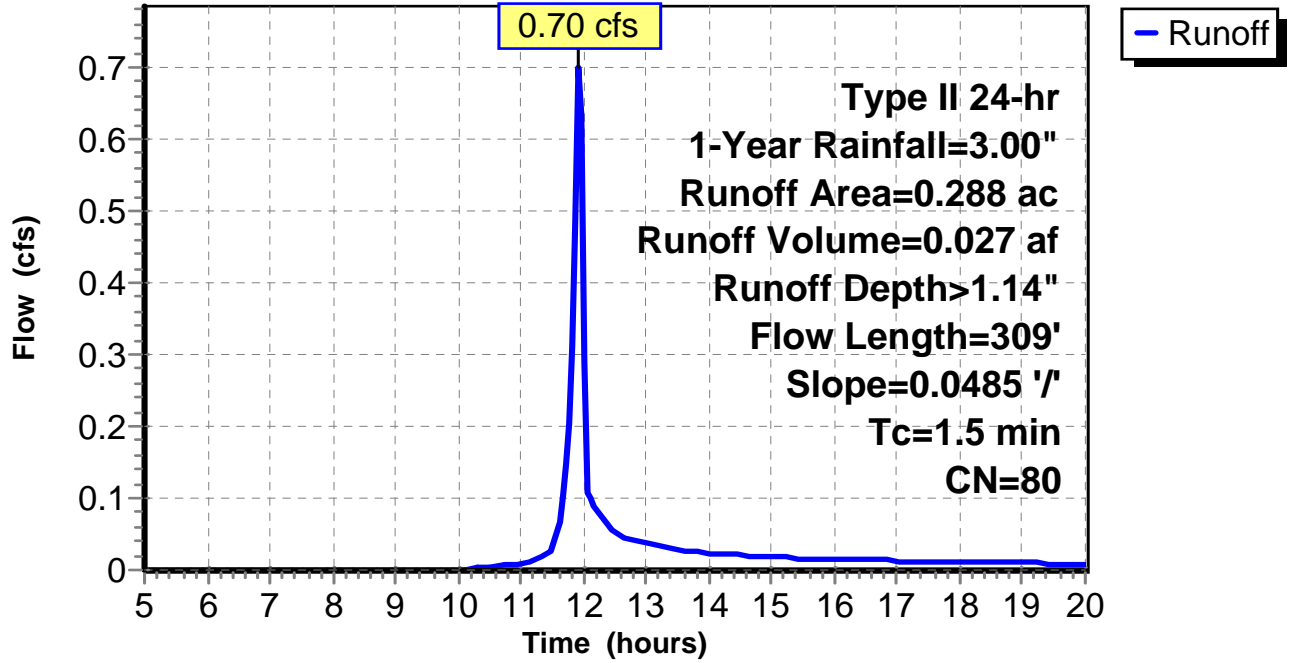
Subcatchment 4: C 240.002

Hydrograph



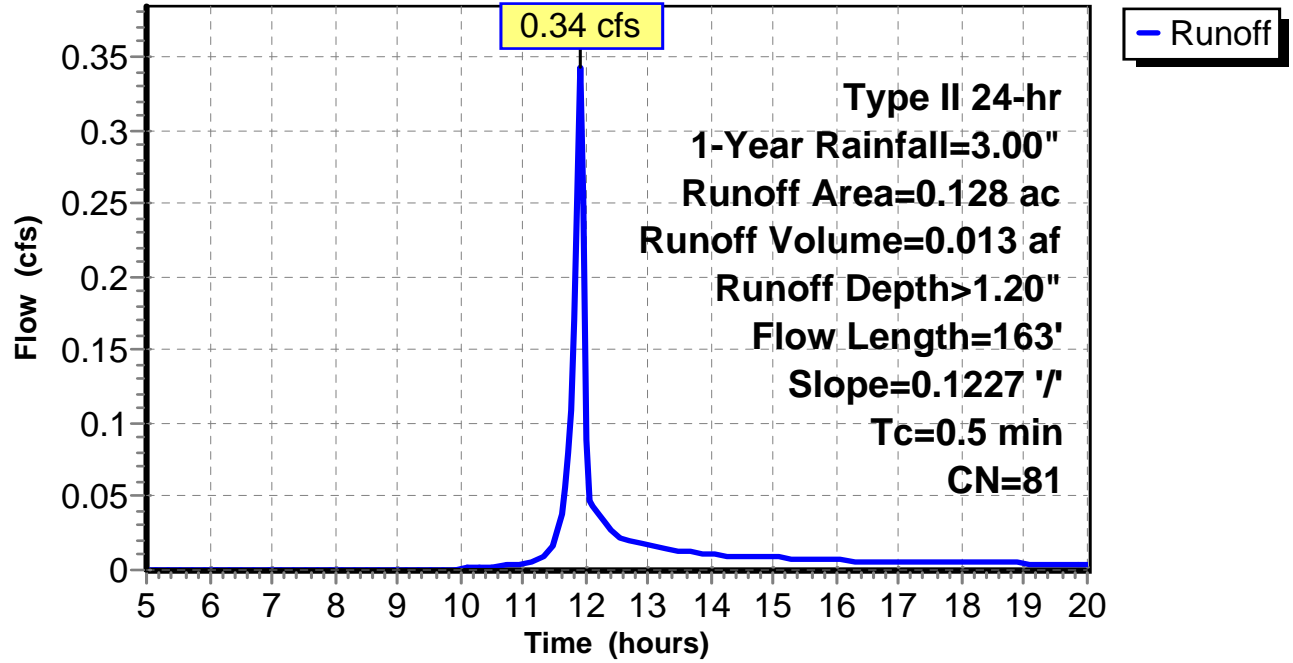
Subcatchment 1: C AR-519.001

Hydrograph



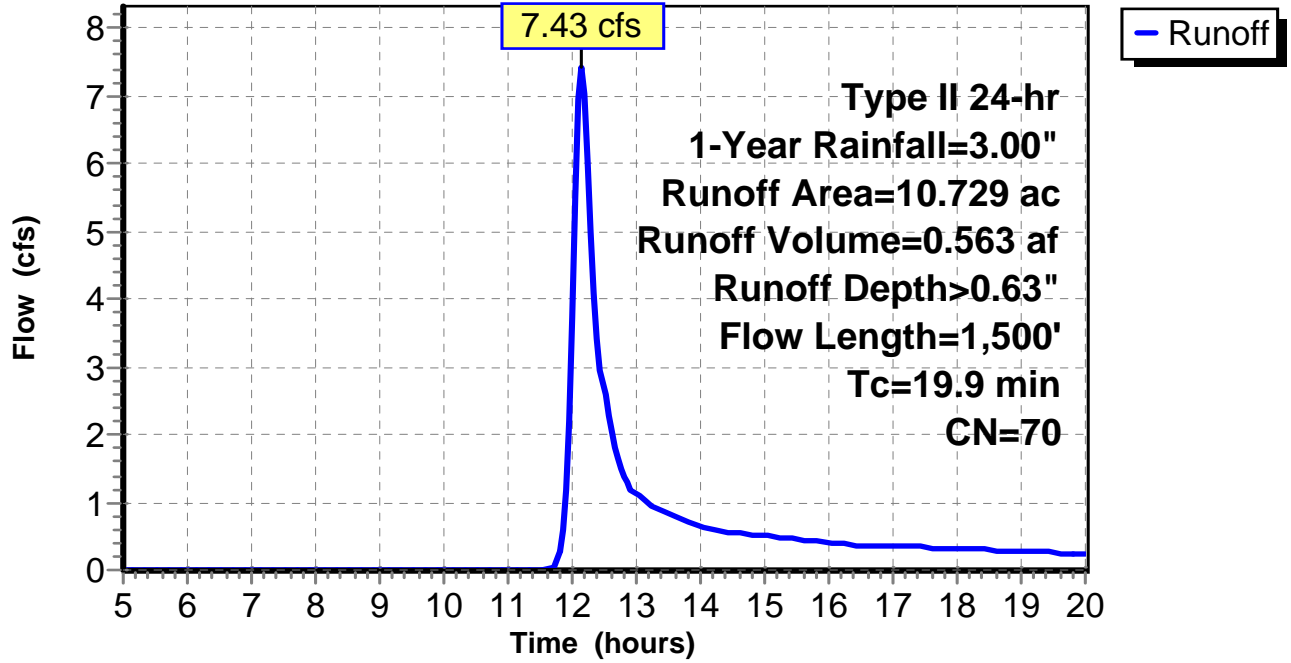
Subcatchment 2: C AR-519.002

Hydrograph



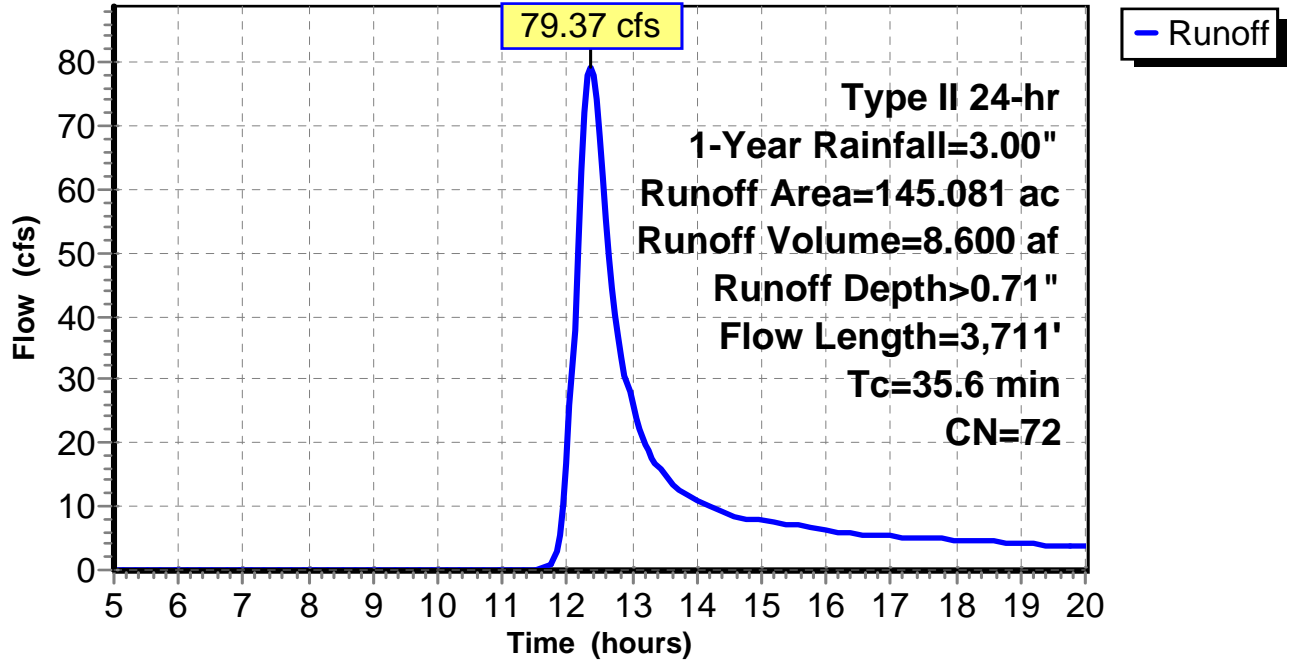
Subcatchment 3: C AR-519.003

Hydrograph



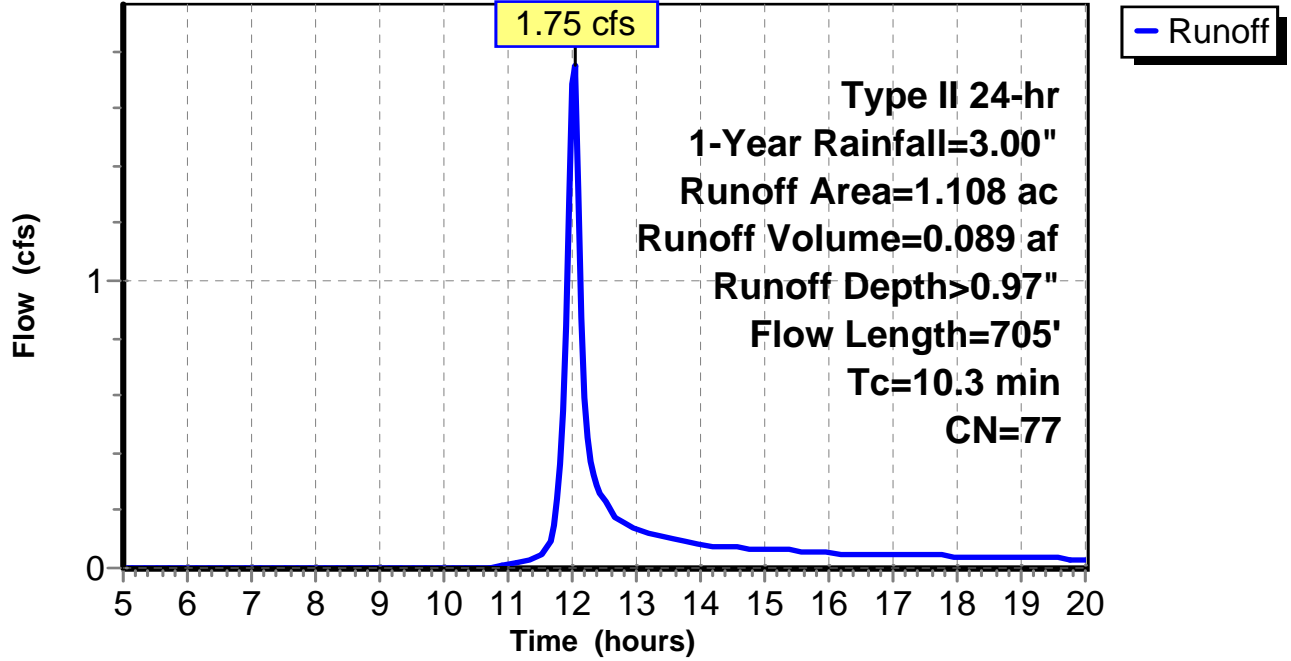
Subcatchment 4: C AR-519.004

Hydrograph



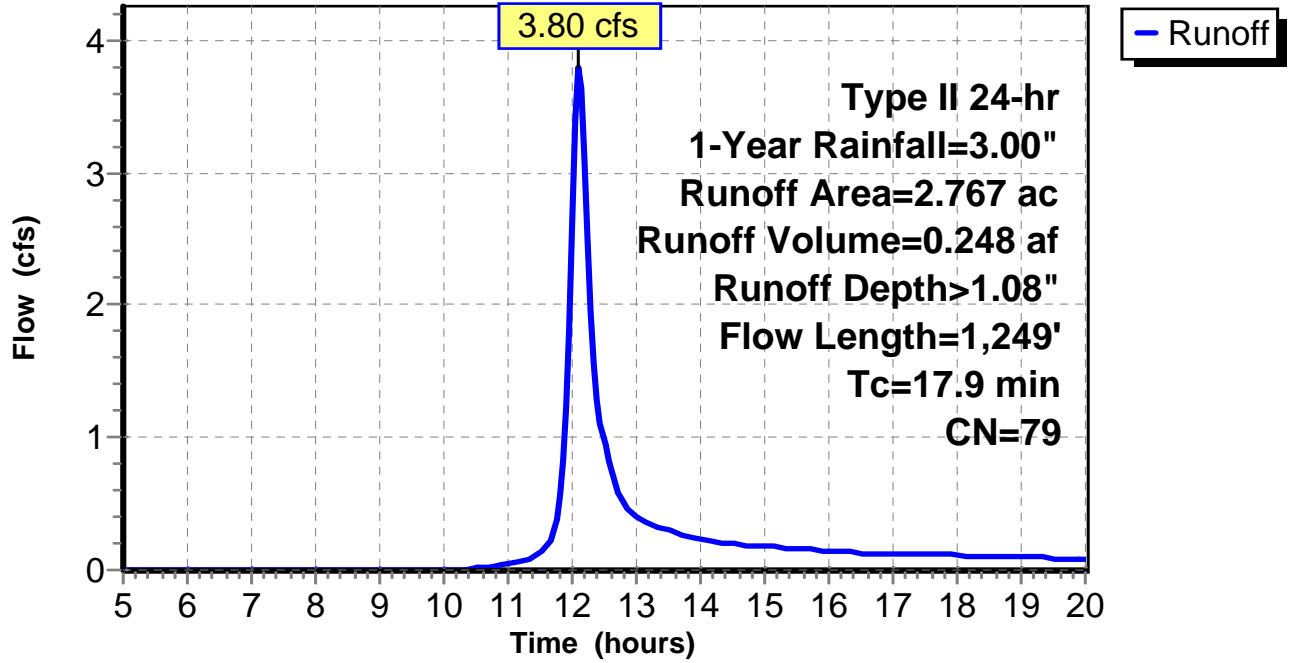
Subcatchment 5: C AR-519.005

Hydrograph



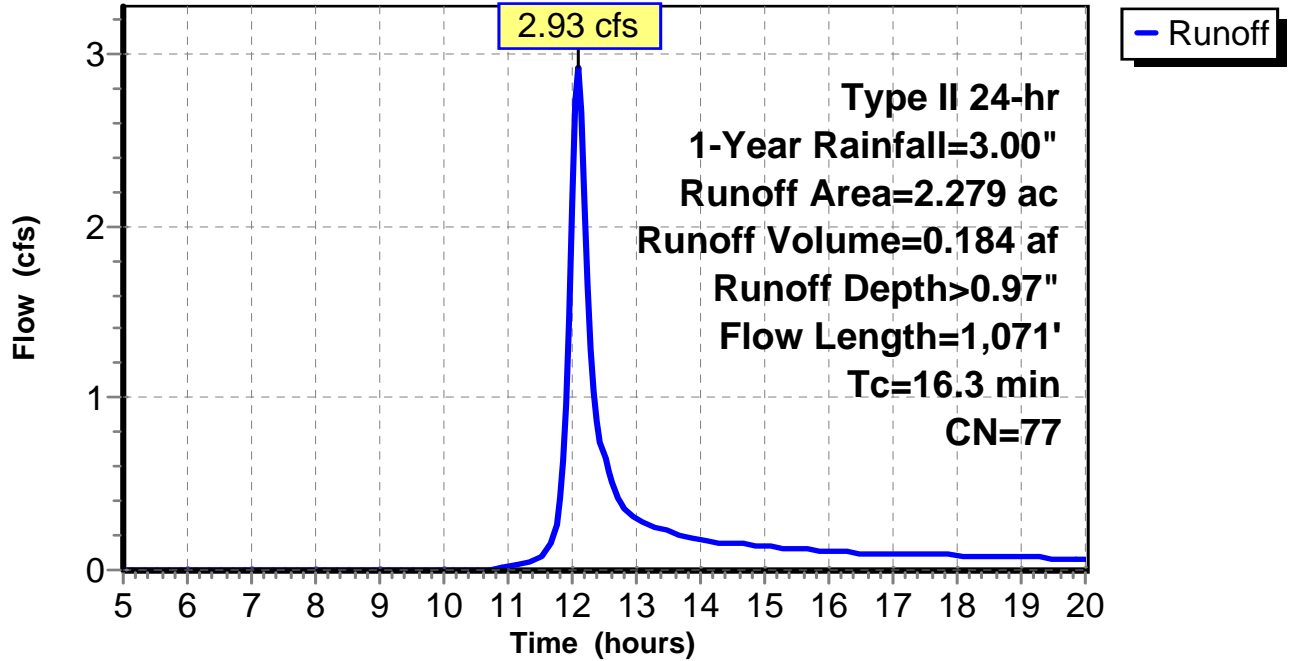
Subcatchment 6: C AR-519.006

Hydrograph



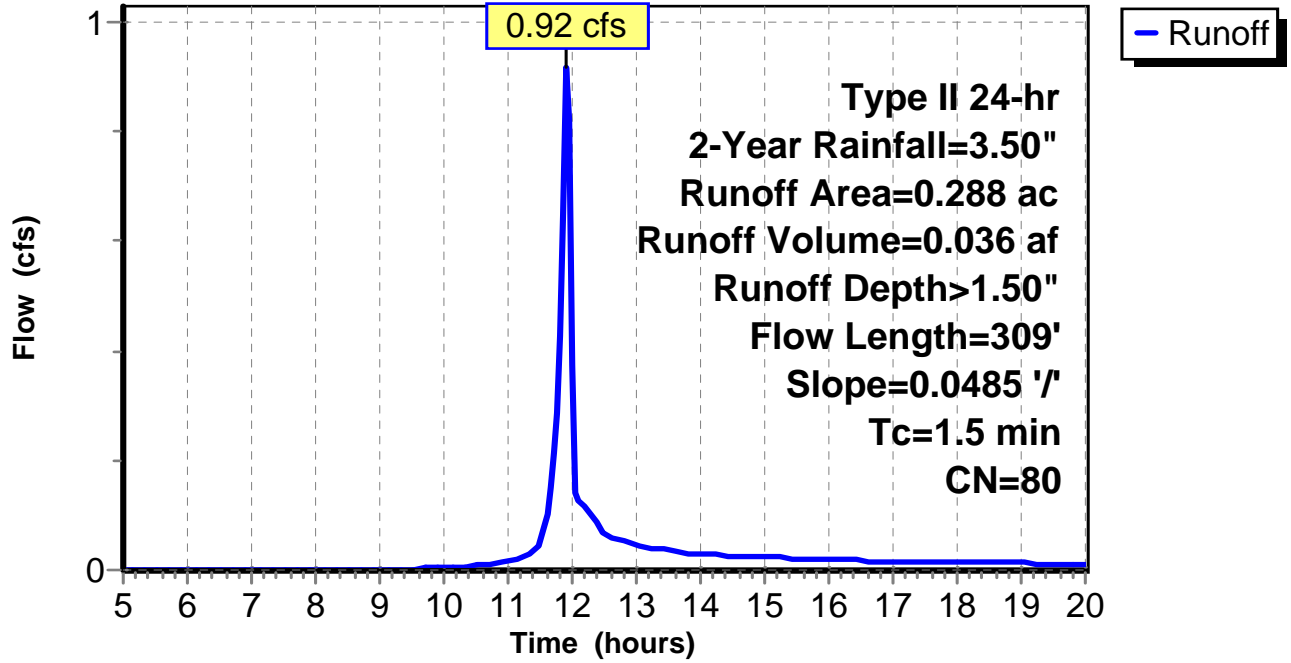
Subcatchment 7: C AR-519.007

Hydrograph



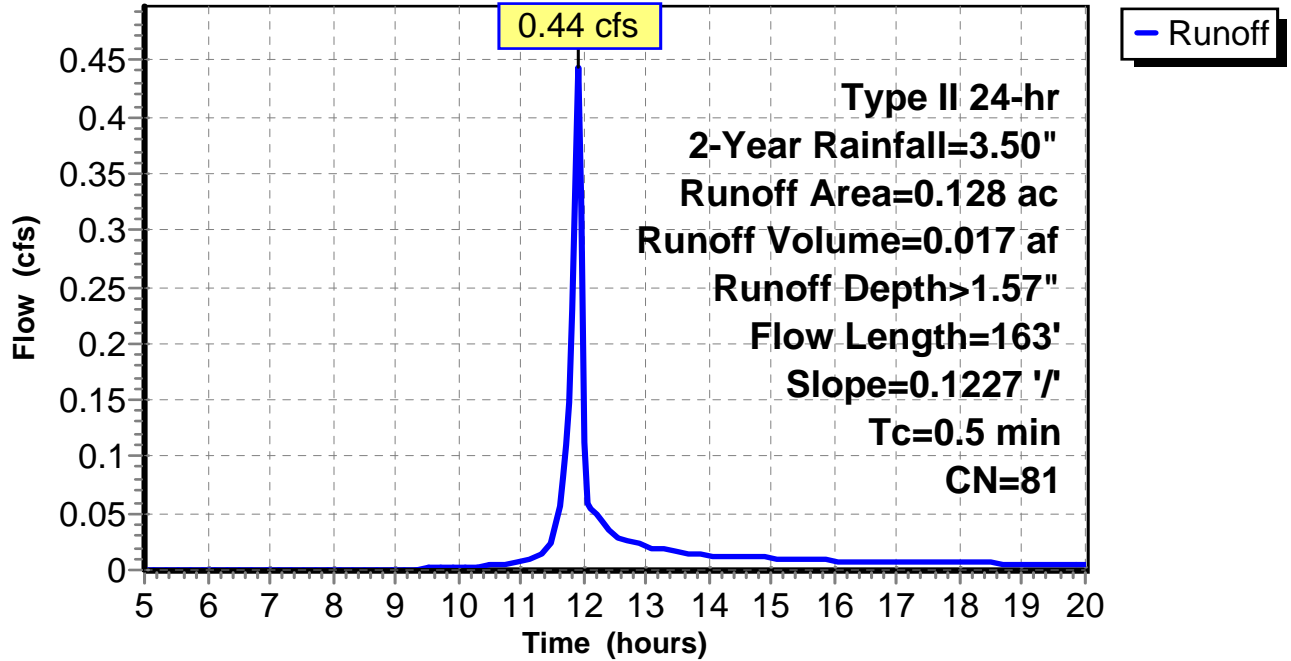
Subcatchment 1: C AR-519.001

Hydrograph



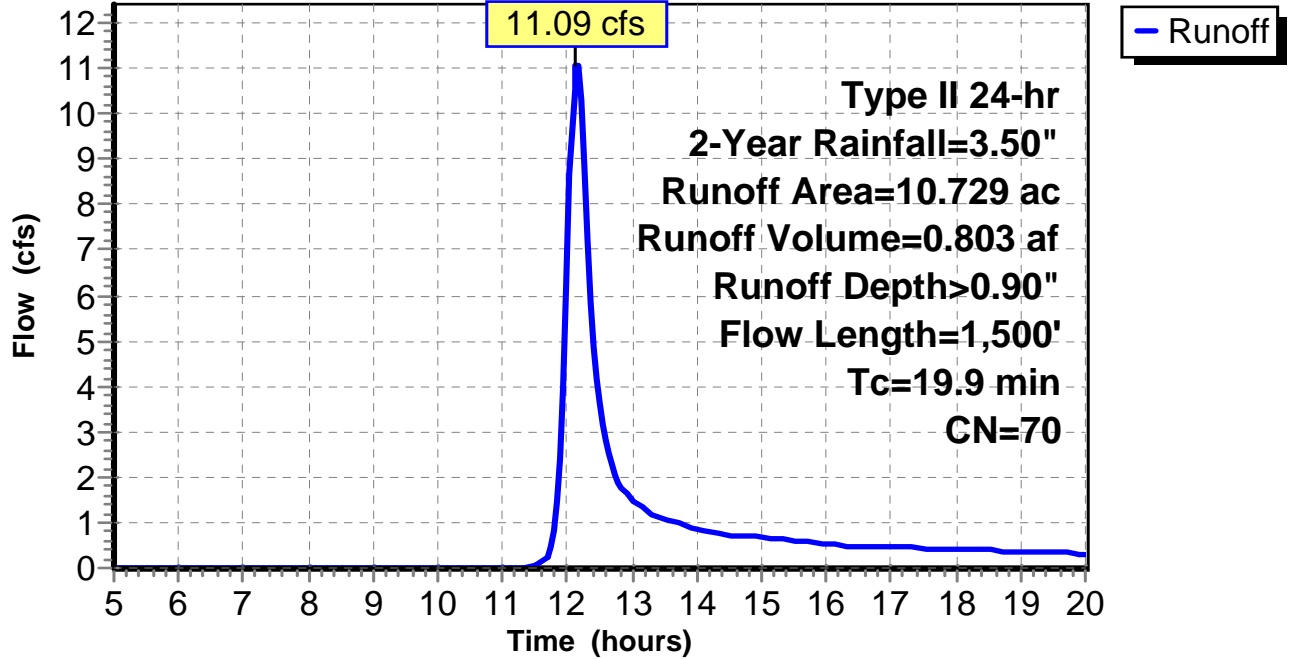
Subcatchment 2: C AR-519.002

Hydrograph



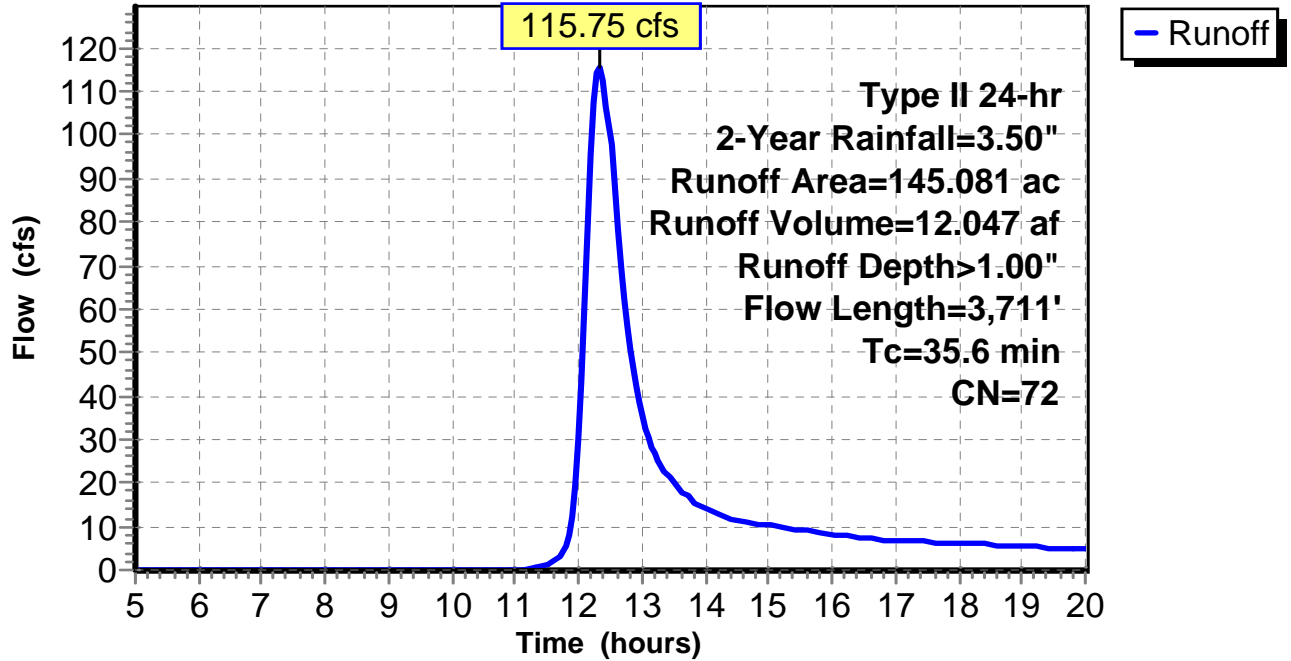
Subcatchment 3: C AR-519.003

Hydrograph



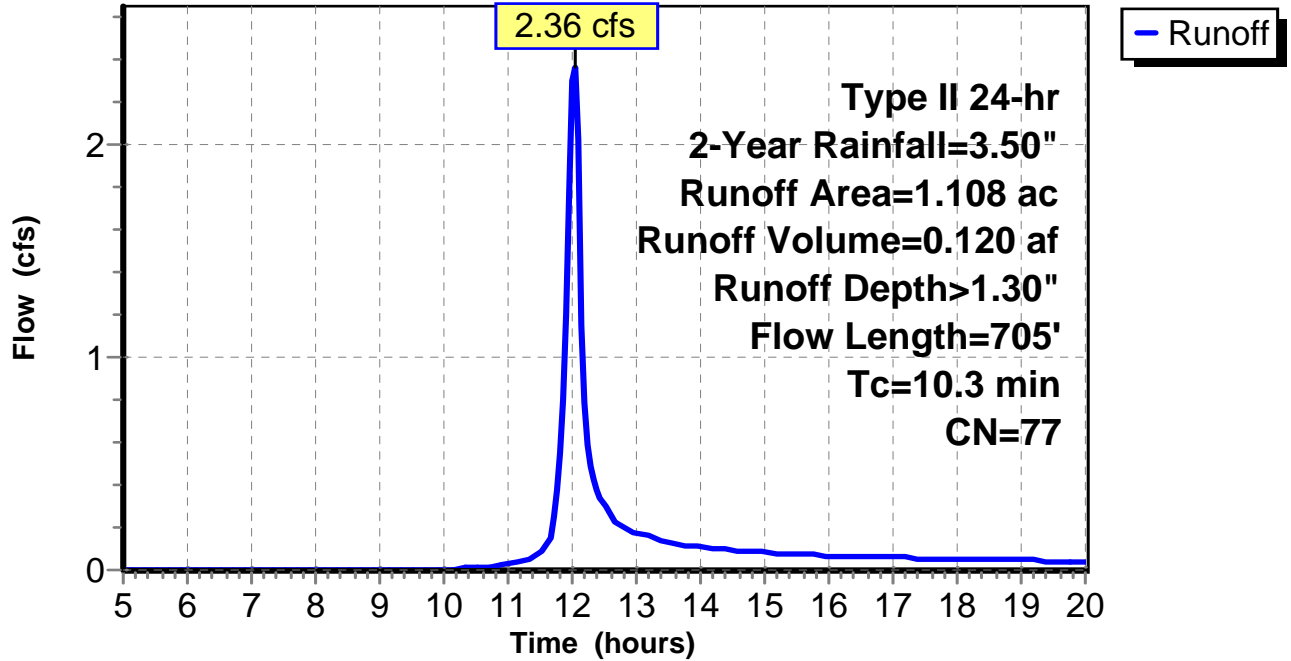
Subcatchment 4: C AR-519.004

Hydrograph



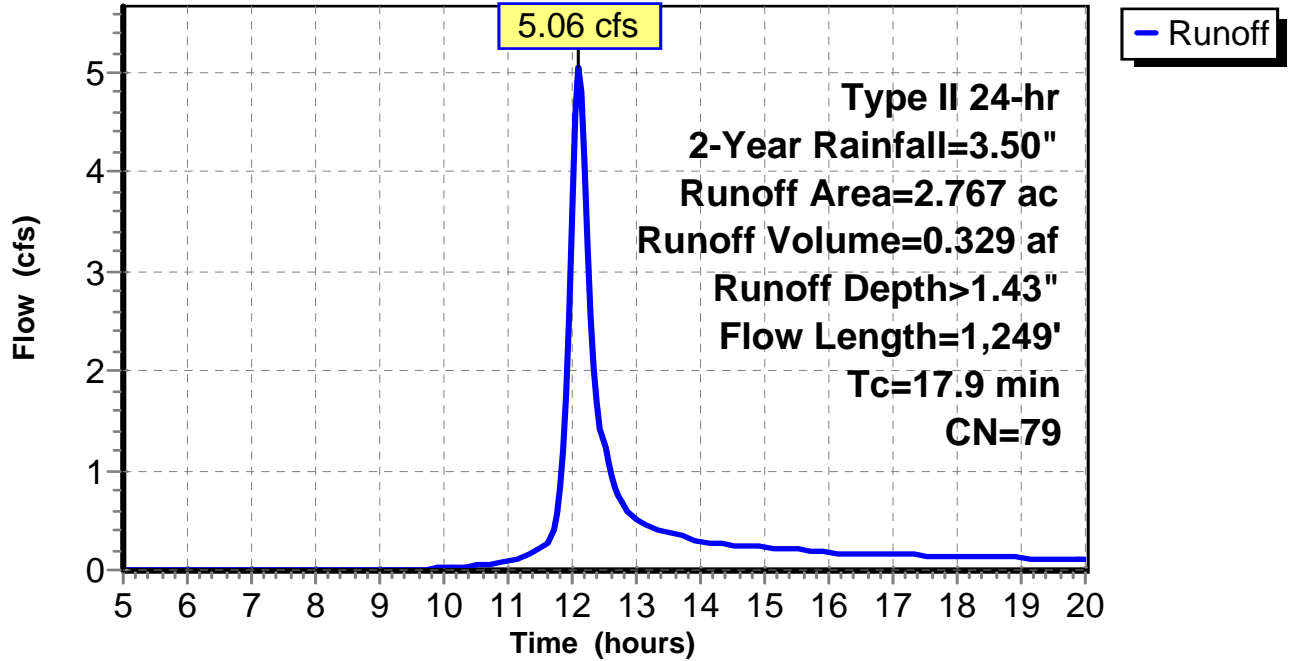
Subcatchment 5: C AR-519.005

Hydrograph



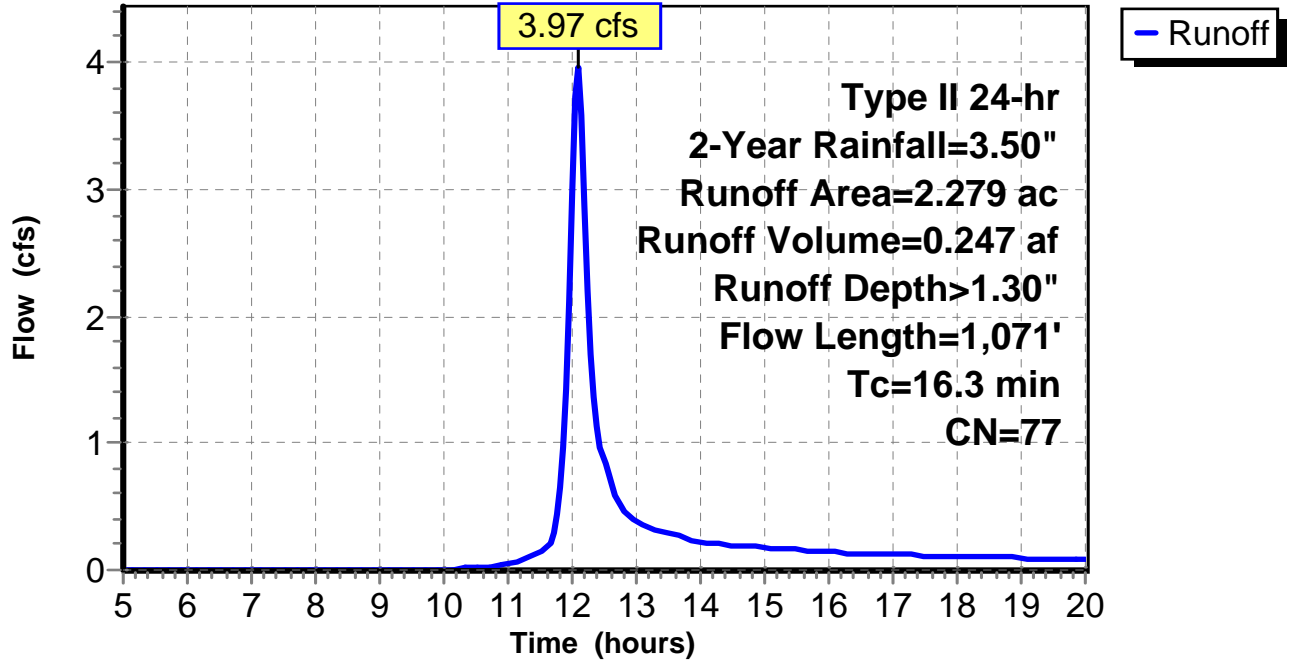
Subcatchment 6: C AR-519.006

Hydrograph



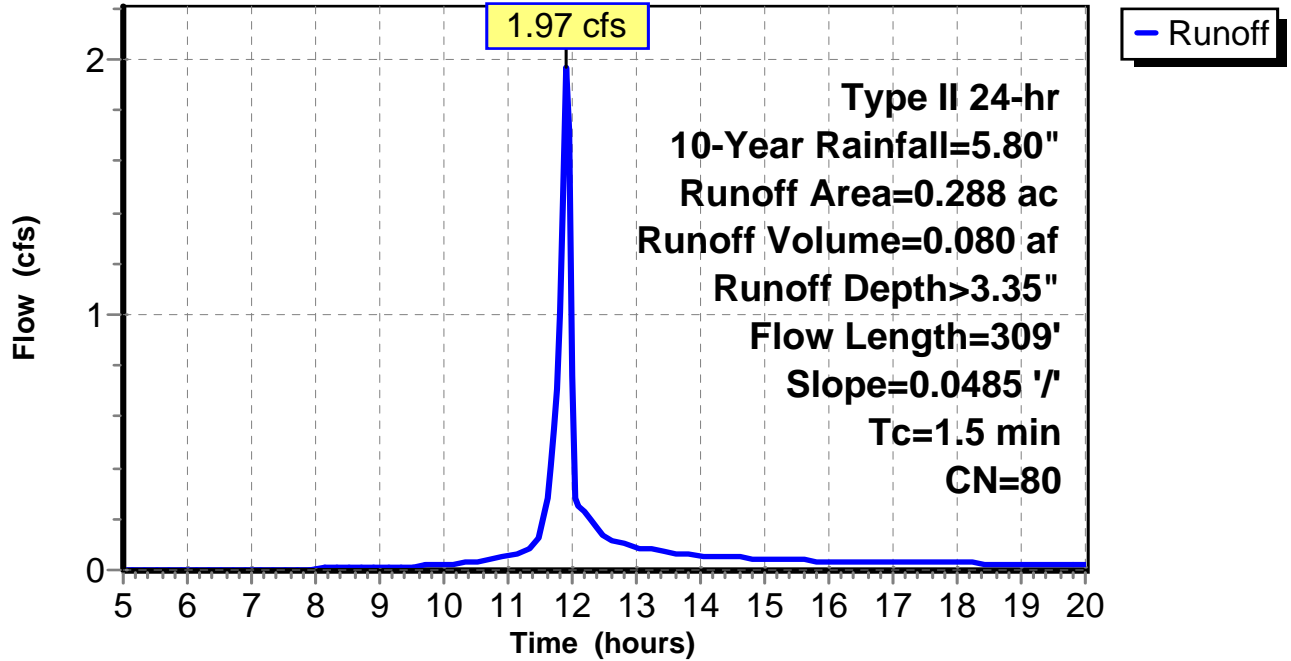
Subcatchment 7: C AR-519.007

Hydrograph



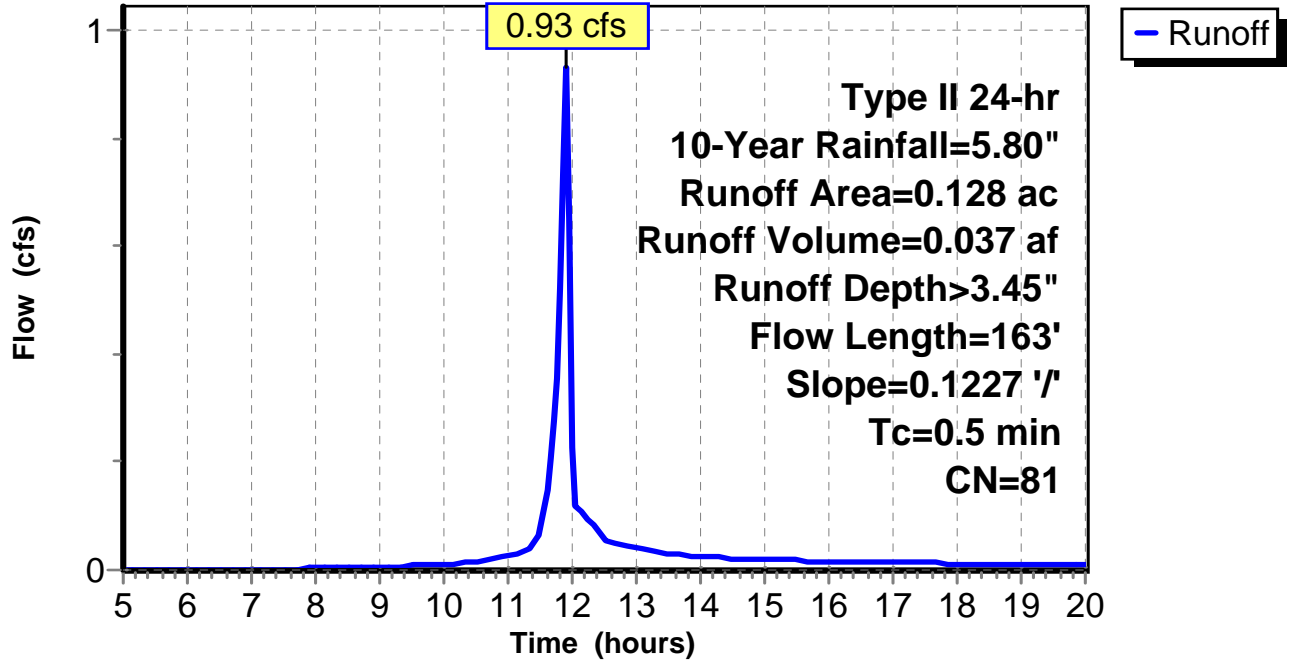
Subcatchment 1: C AR-519.001

Hydrograph



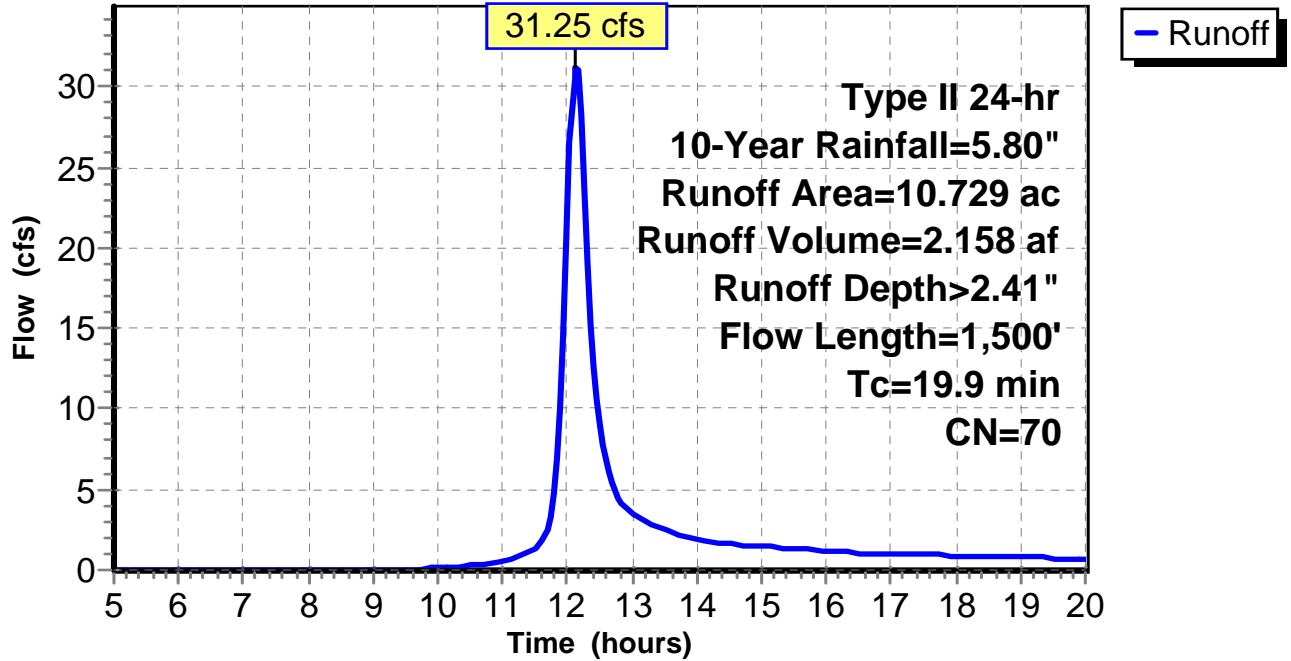
Subcatchment 2: C AR-519.002

Hydrograph



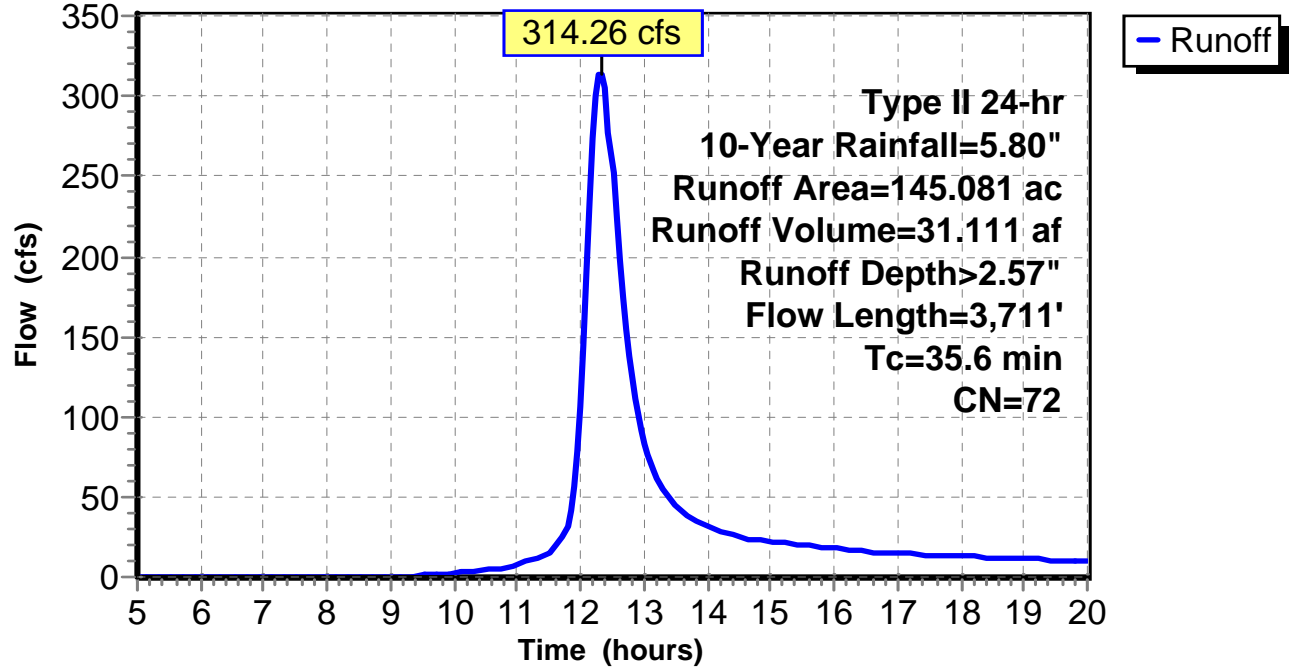
Subcatchment 3: C AR-519.003

Hydrograph



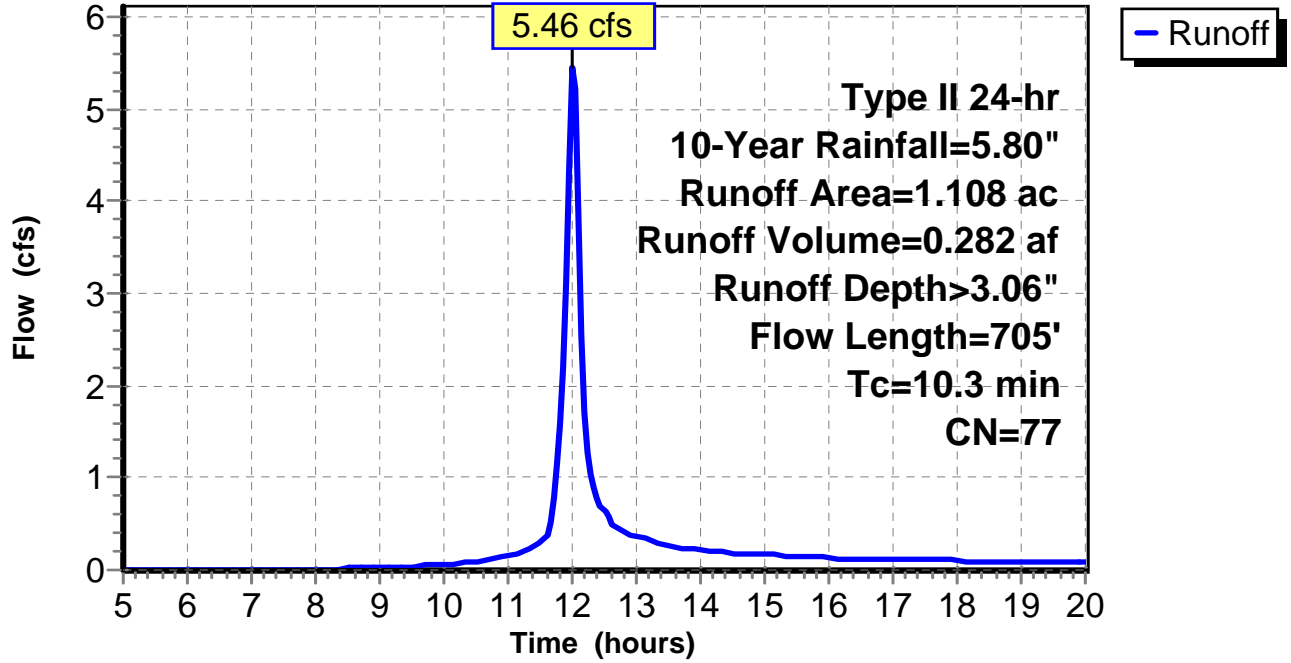
Subcatchment 4: C AR-519.004

Hydrograph



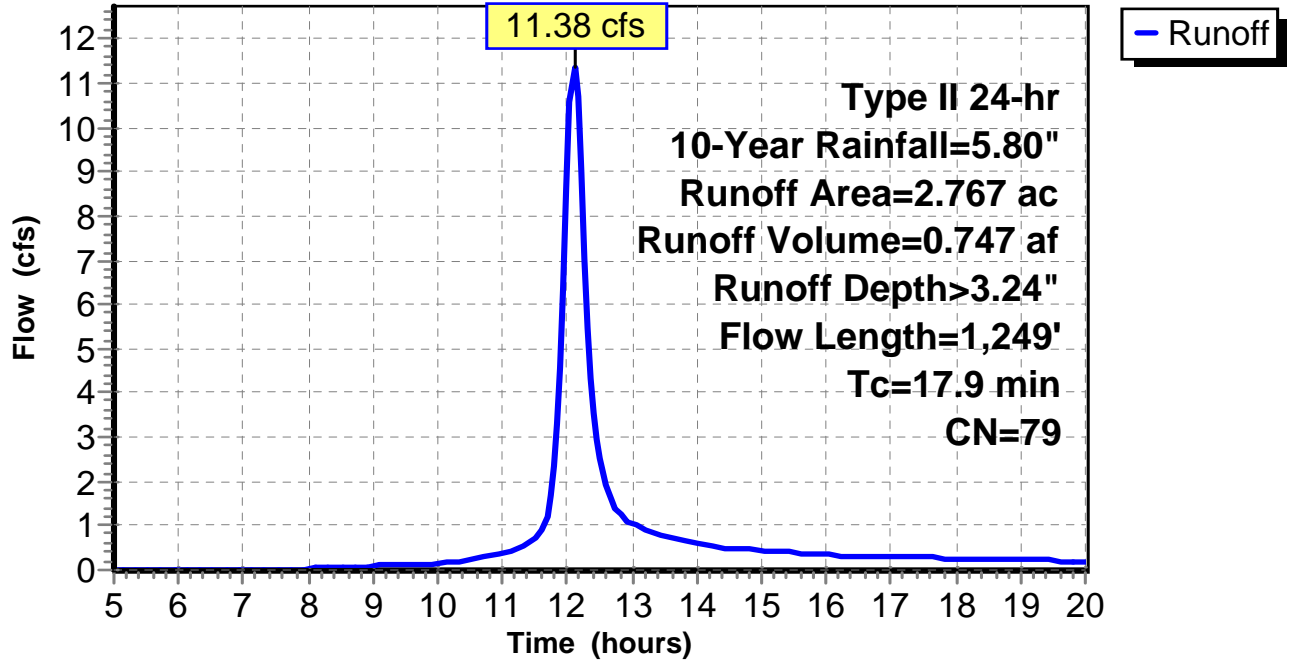
Subcatchment 5: C AR-519.005

Hydrograph



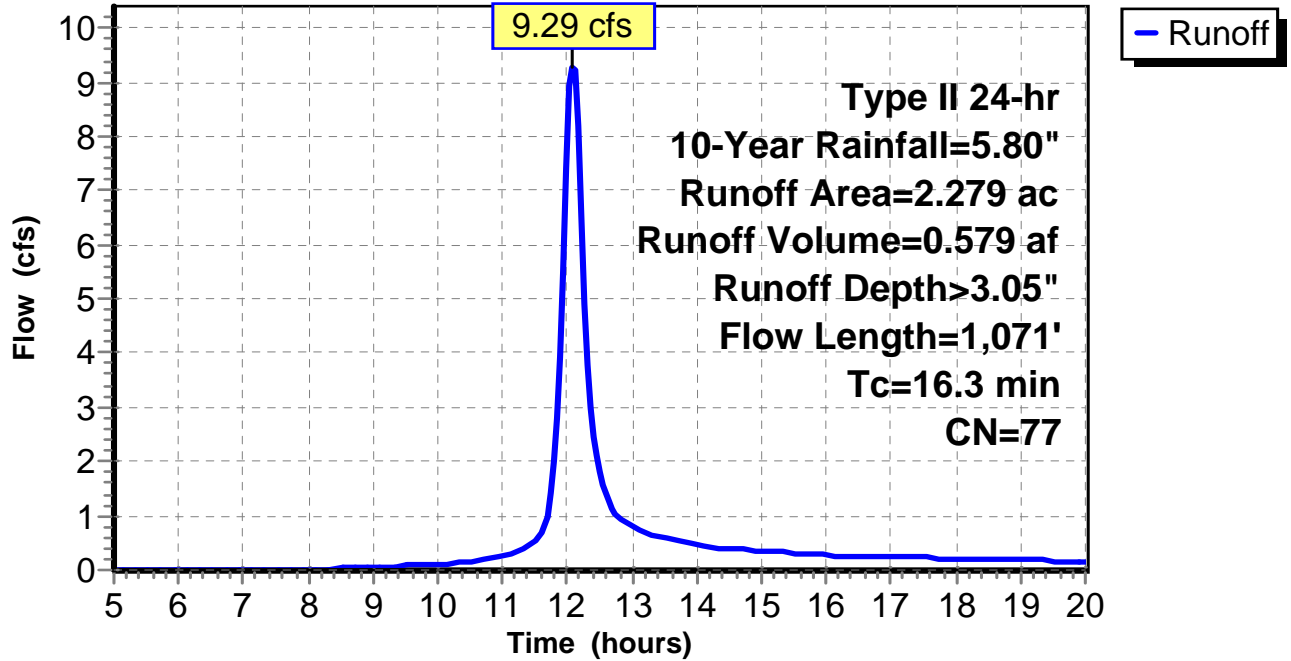
Subcatchment 6: C AR-519.006

Hydrograph



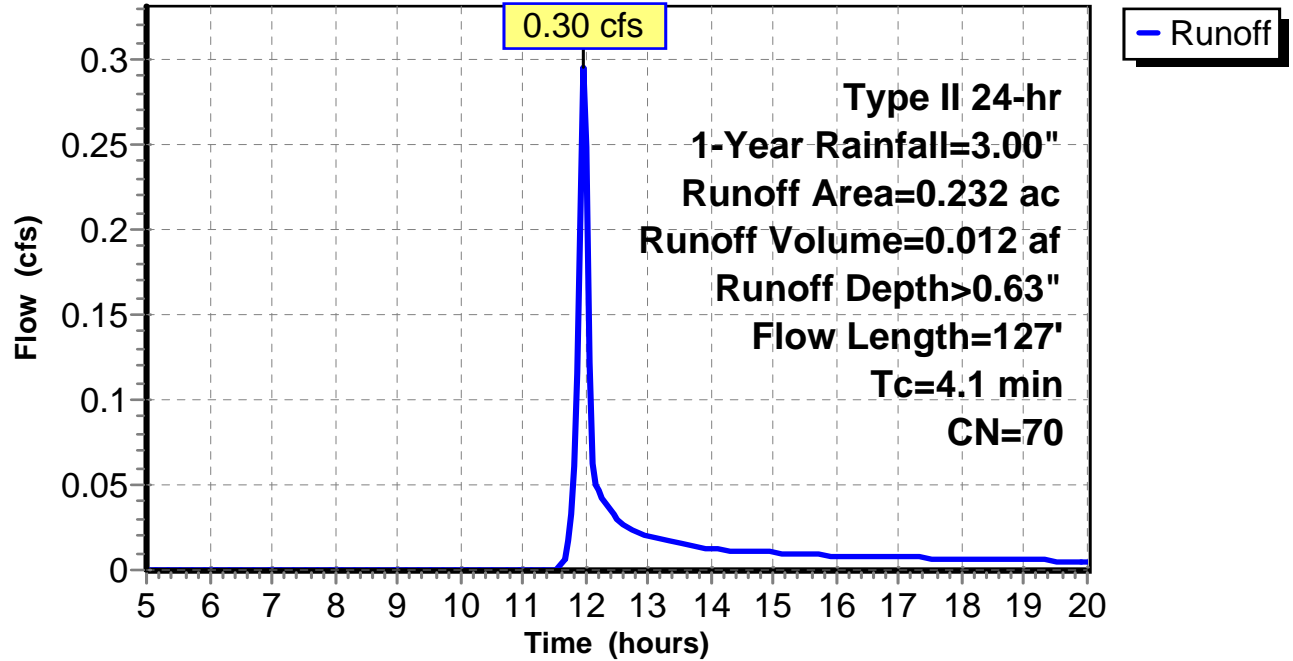
Subcatchment 7: C AR-519.007

Hydrograph



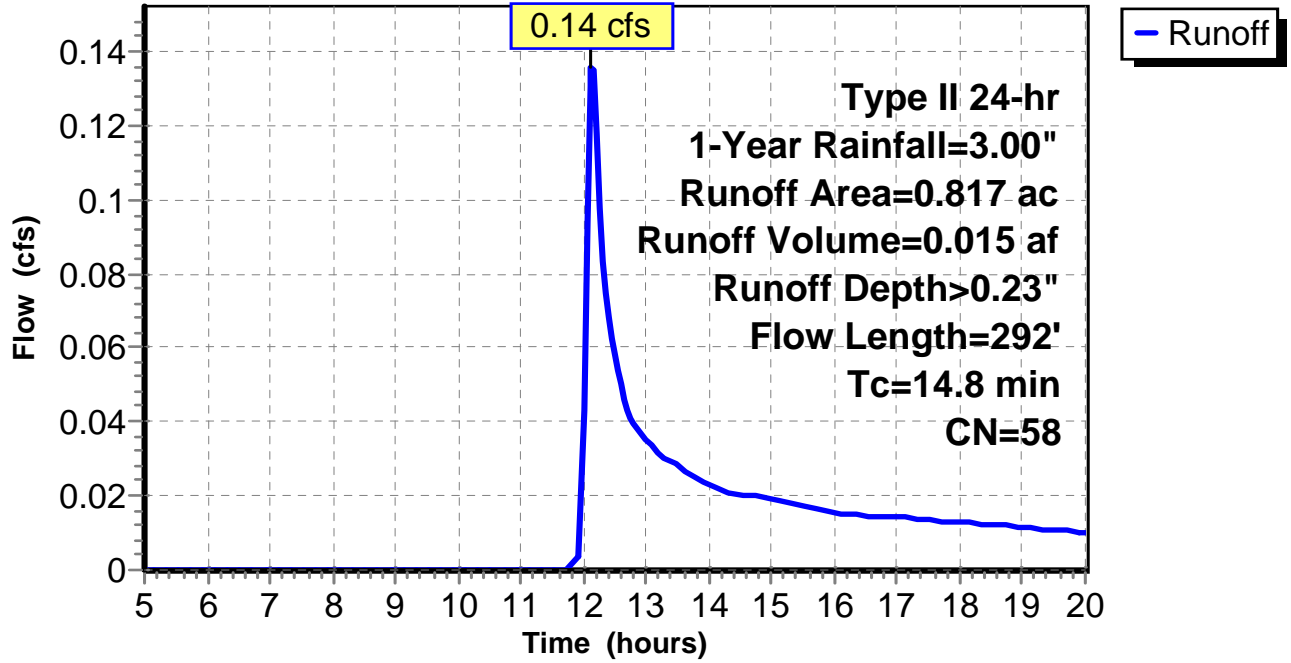
Subcatchment 1: C 247.001

Hydrograph



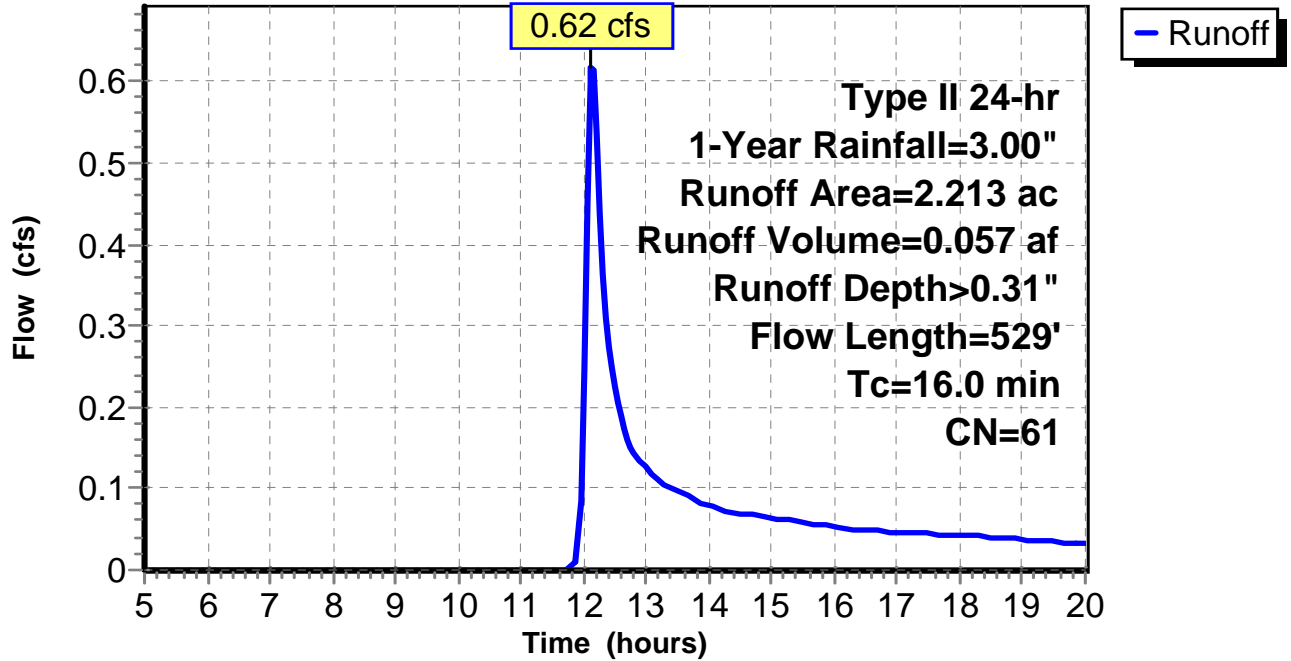
Subcatchment 2: C 247.002

Hydrograph



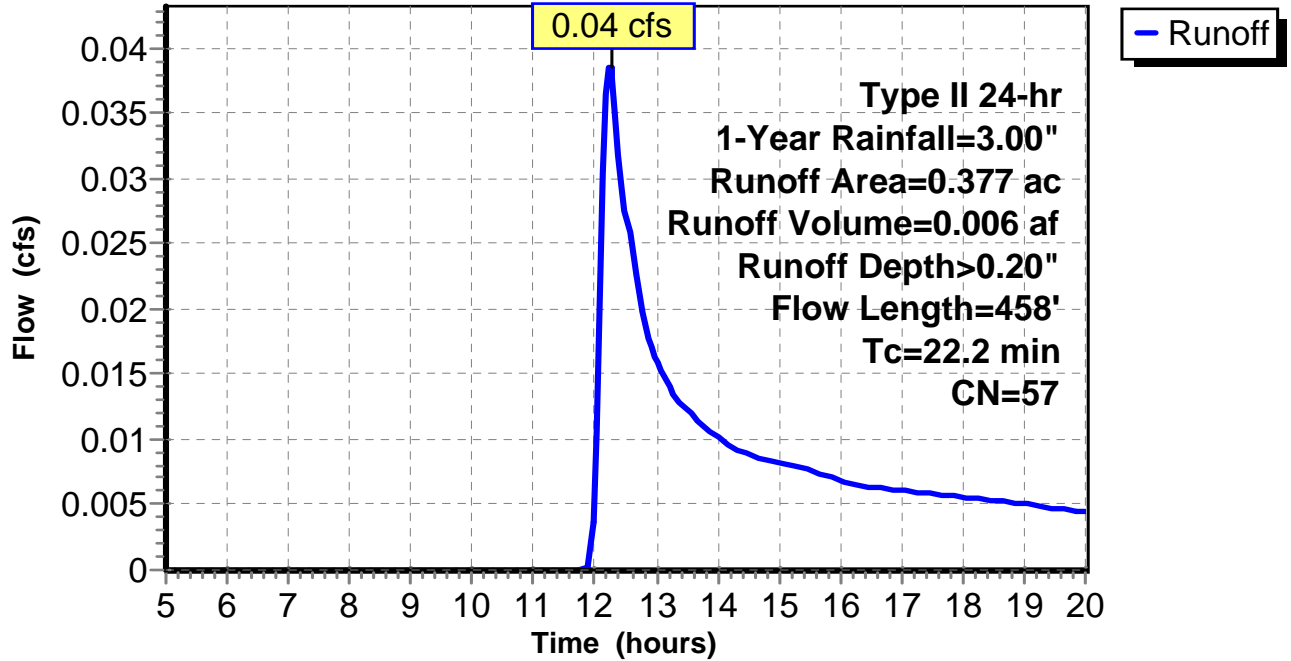
Subcatchment 3: C 247.003

Hydrograph



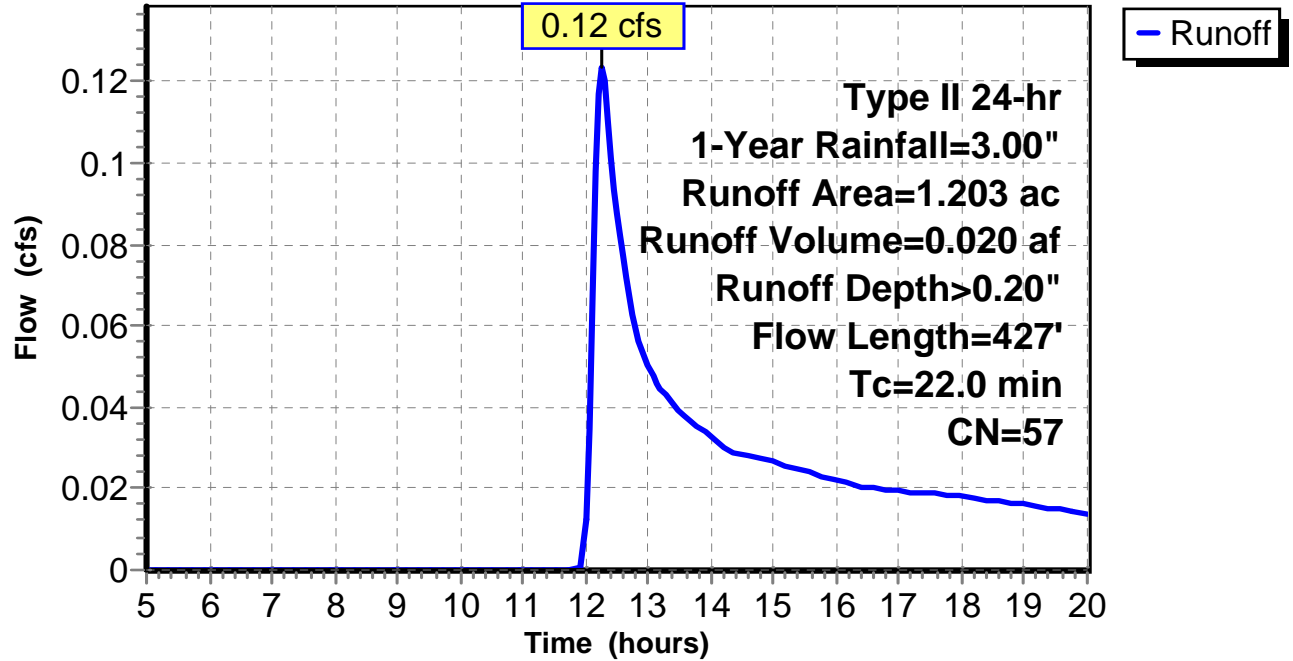
Subcatchment 4: C 247.004

Hydrograph



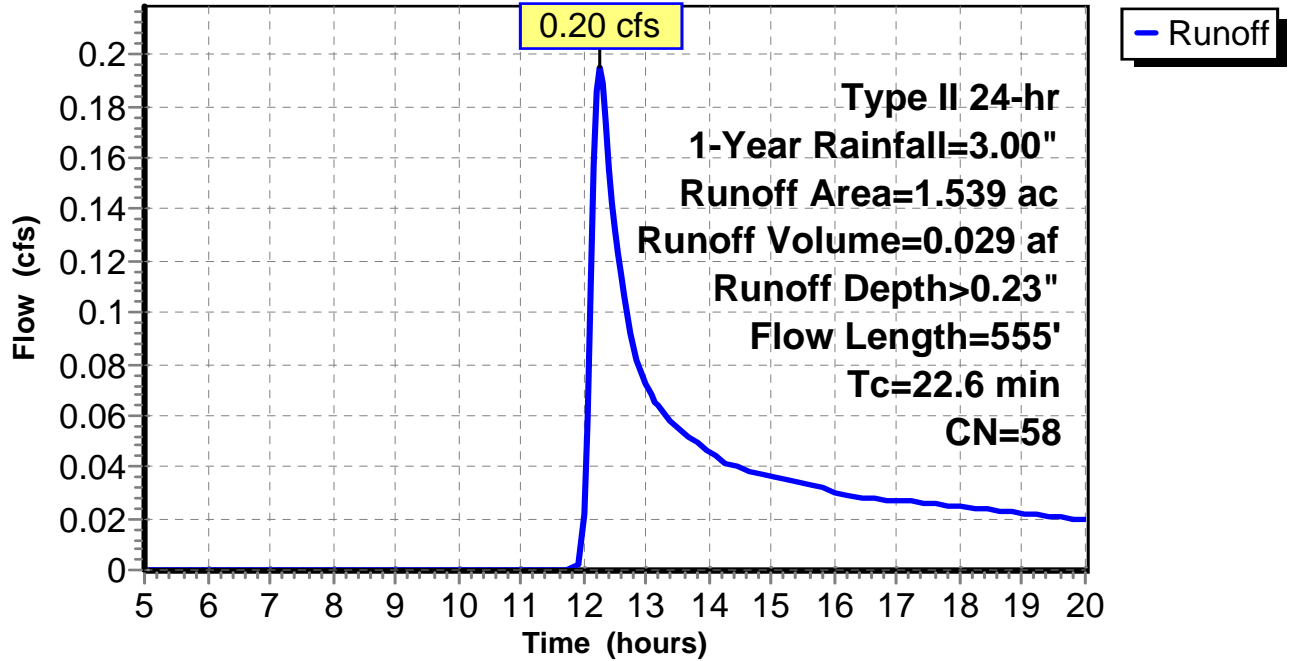
Subcatchment 5: C 247.005

Hydrograph



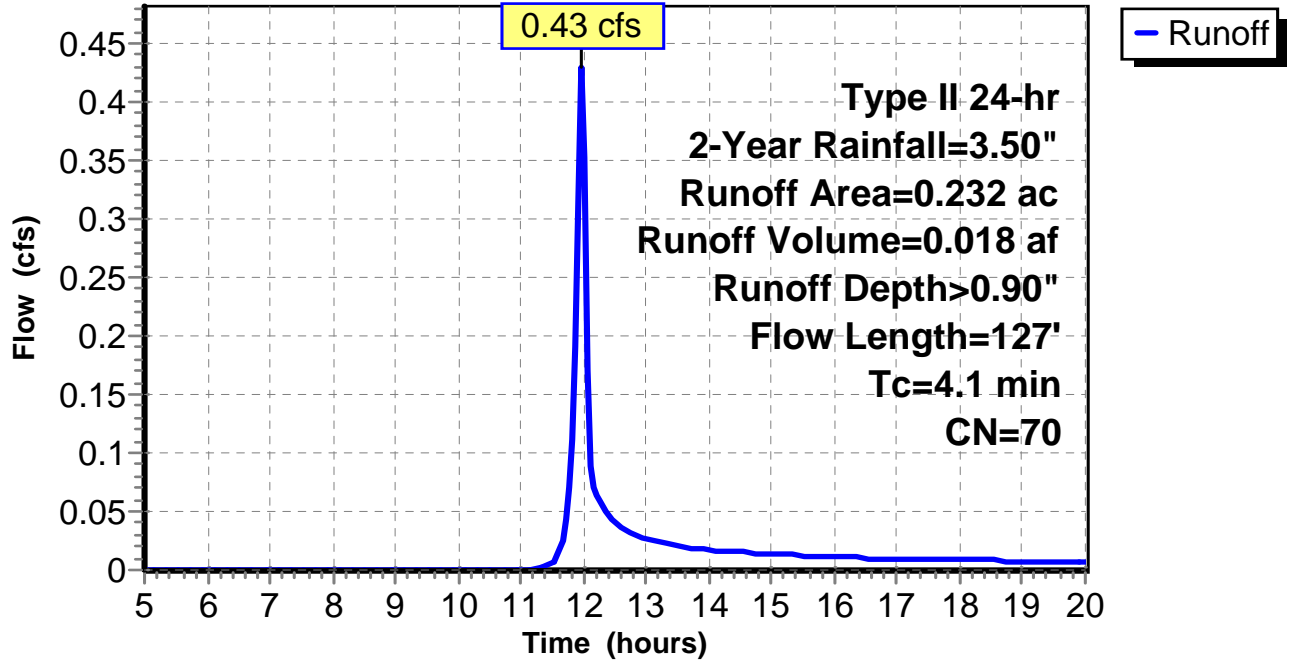
Subcatchment 6: C 247.006

Hydrograph



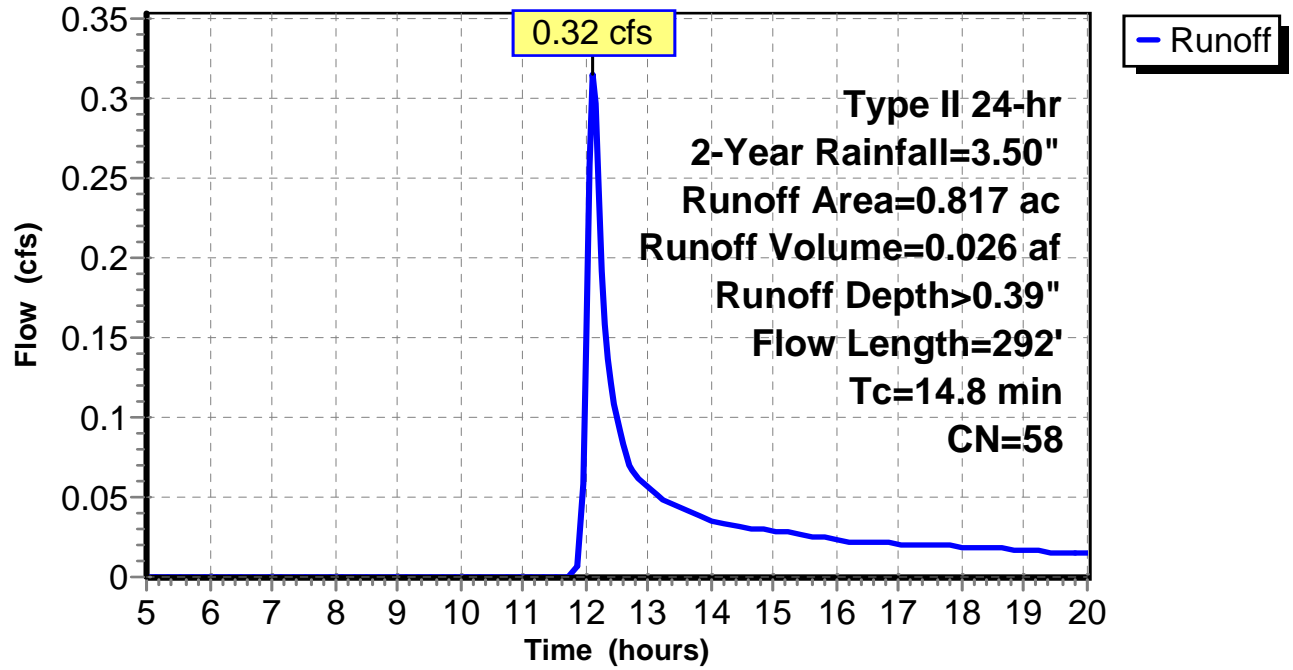
Subcatchment 1: C 247.001

Hydrograph



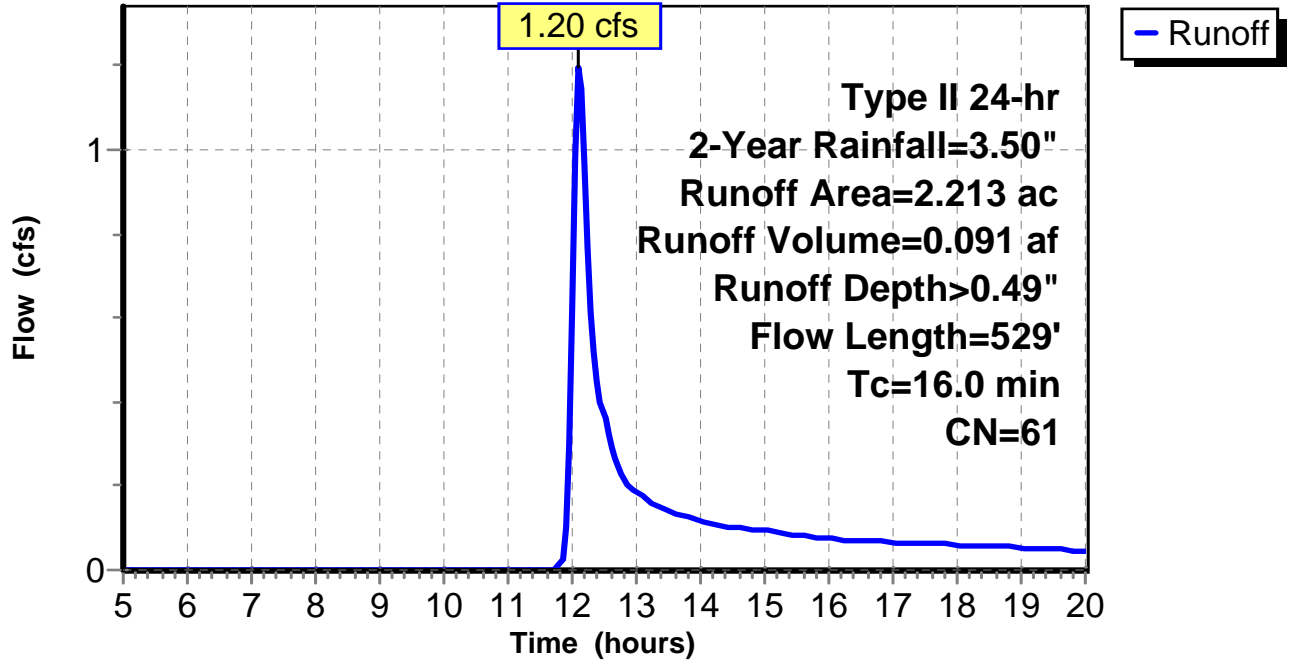
Subcatchment 2: C 247.002

Hydrograph



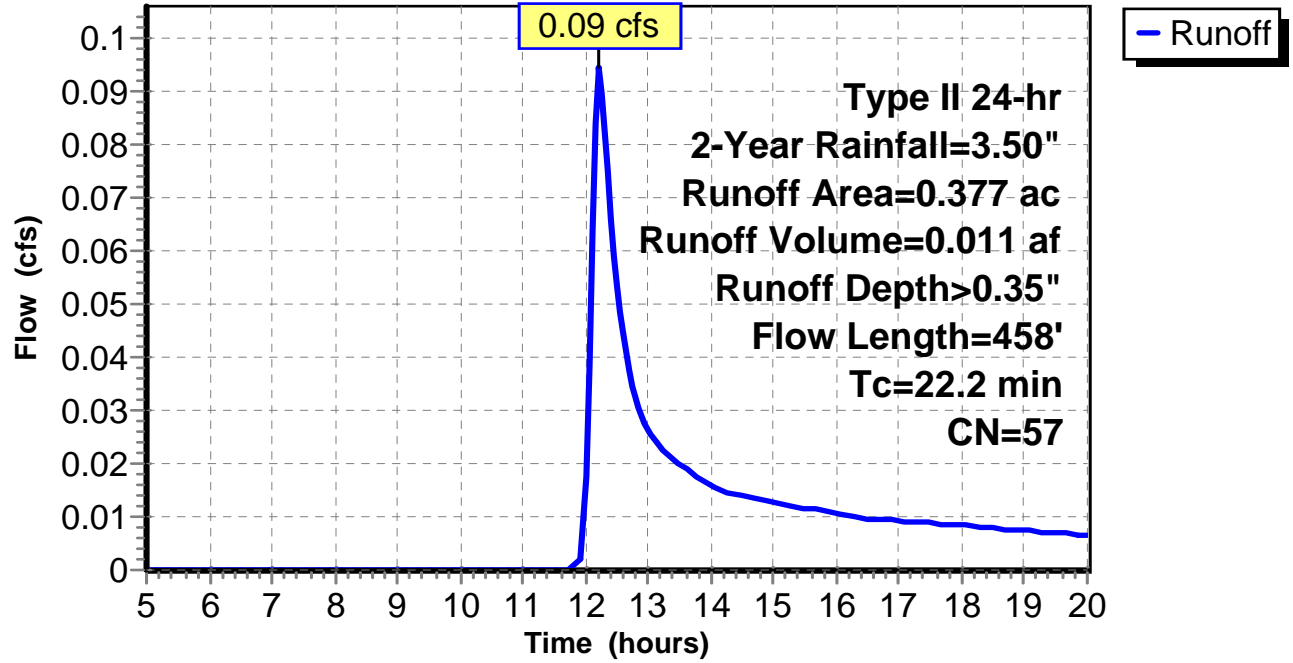
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Hydrograph



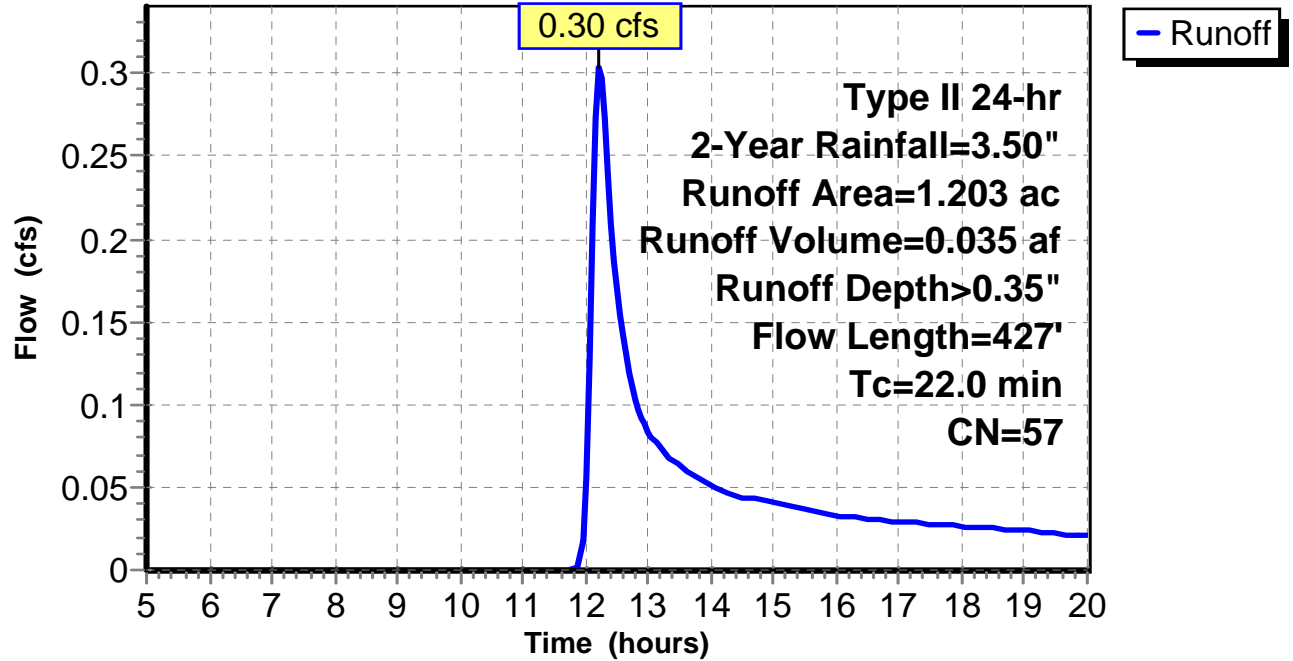
Subcatchment 4: C 247.004

Hydrograph



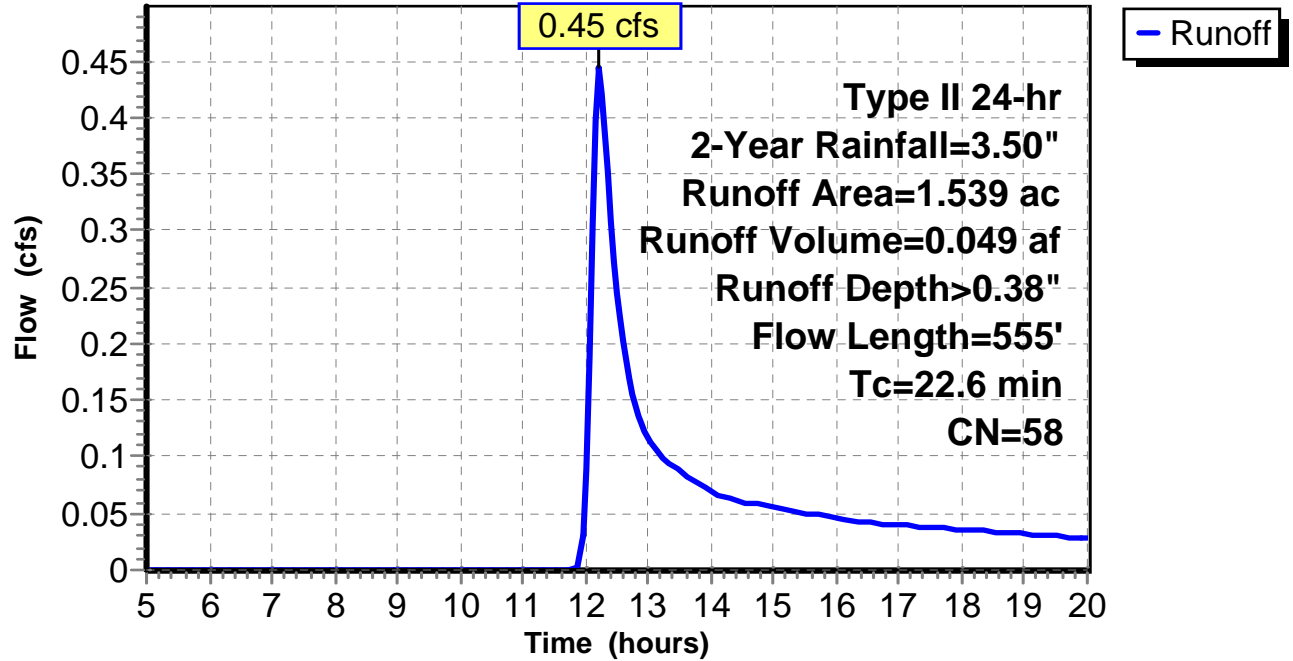
Subcatchment 5: C 247.005

Hydrograph



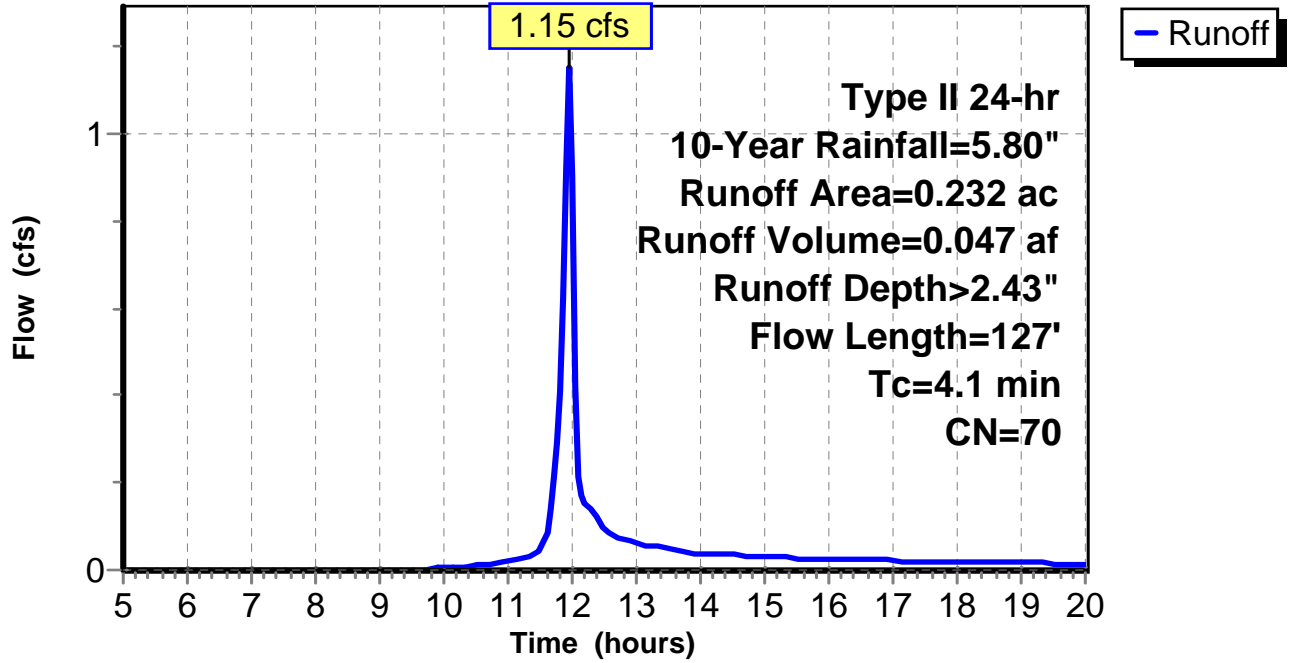
Subcatchment 6: C 247.006

Hydrograph



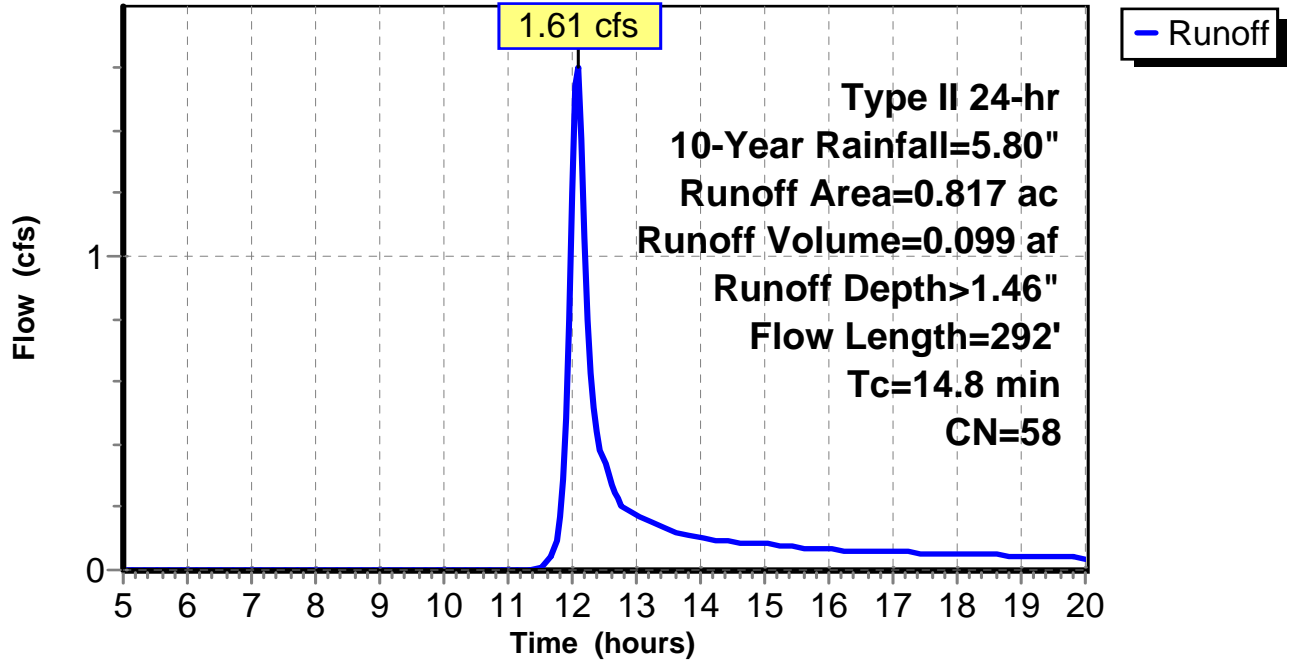
Subcatchment 1: C 247.001

Hydrograph



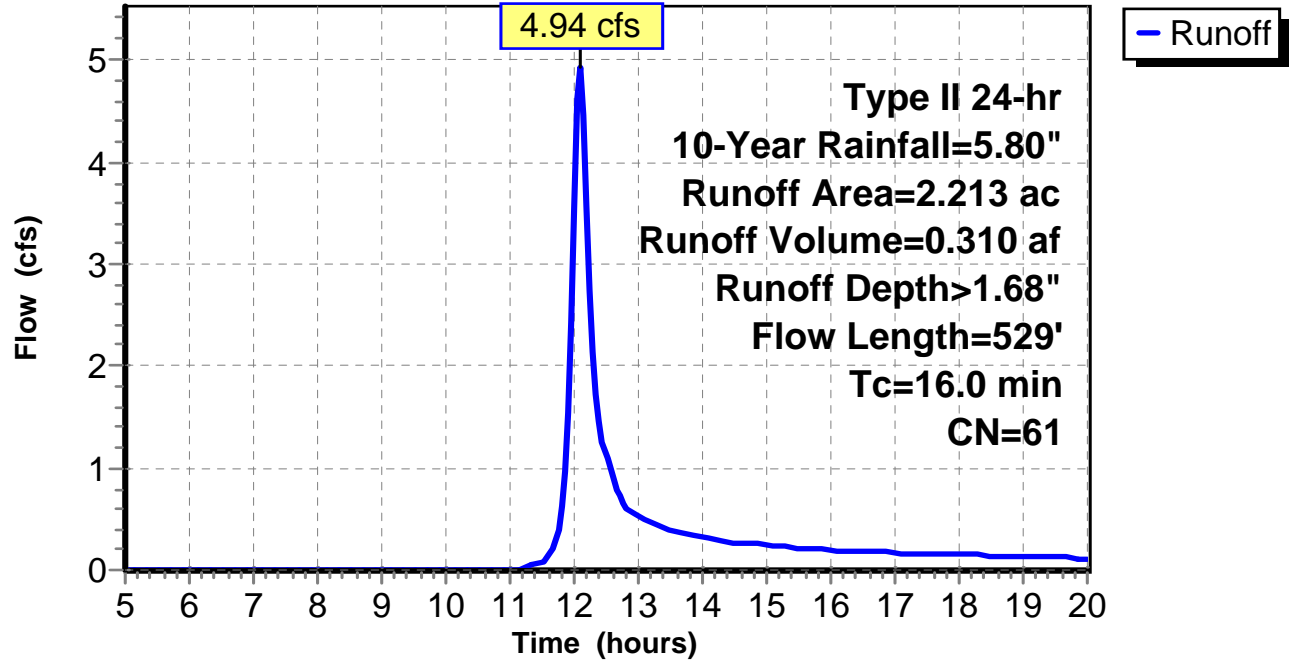
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Hydrograph



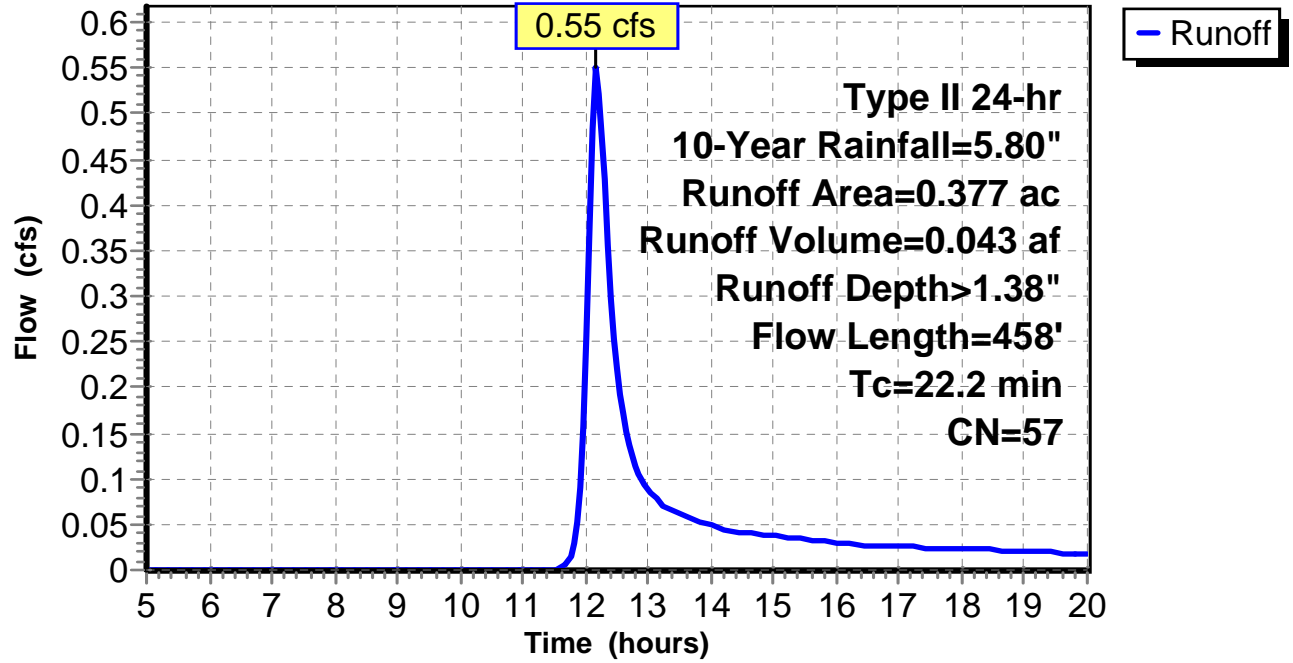
Subcatchment 3: C 247.003

Hydrograph



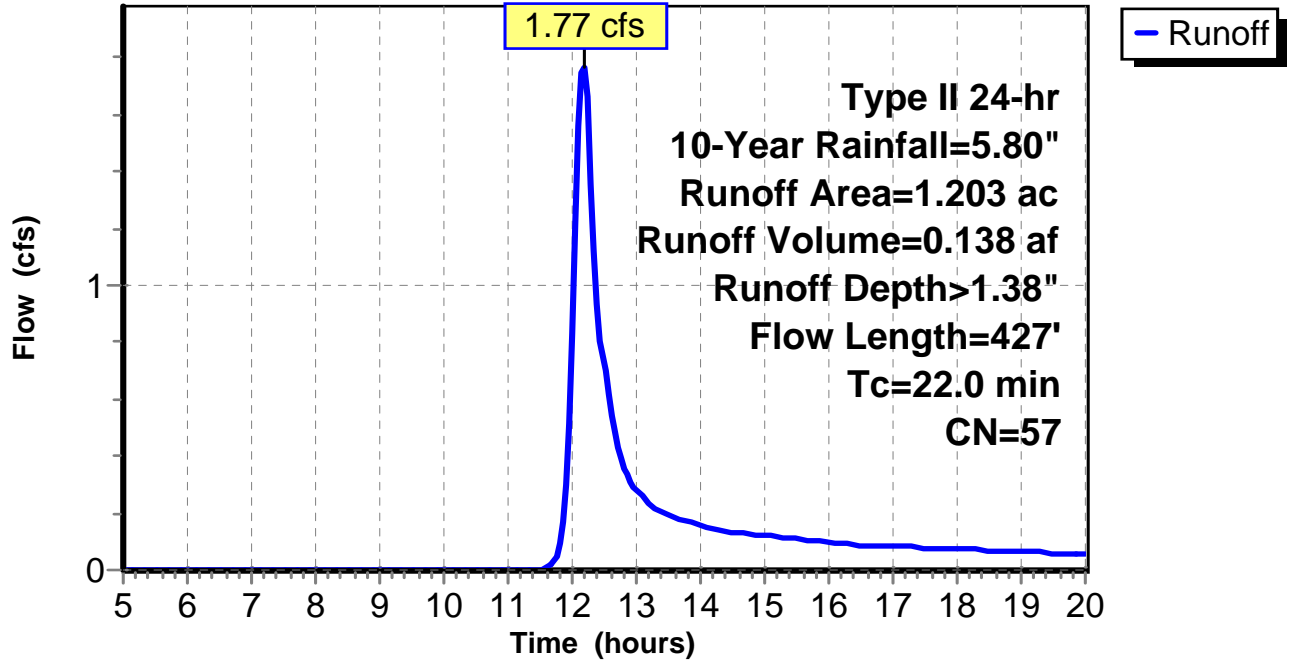
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Hydrograph



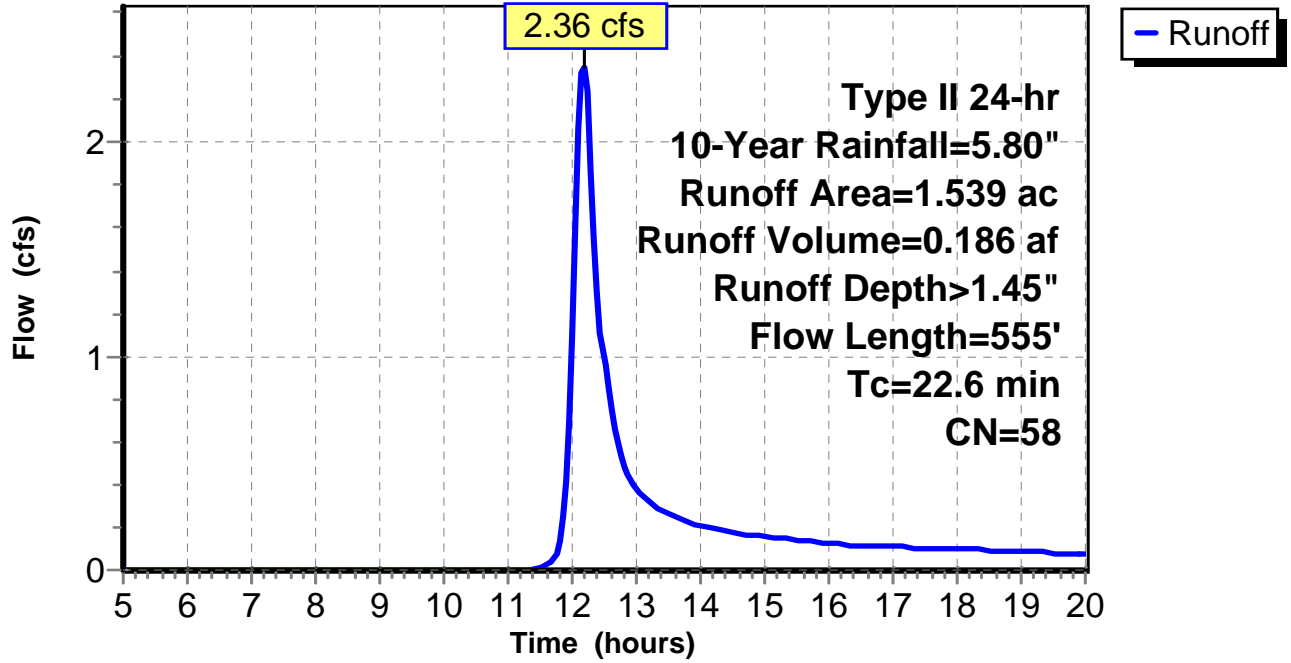
Subcatchment 5: C 247.005

Hydrograph



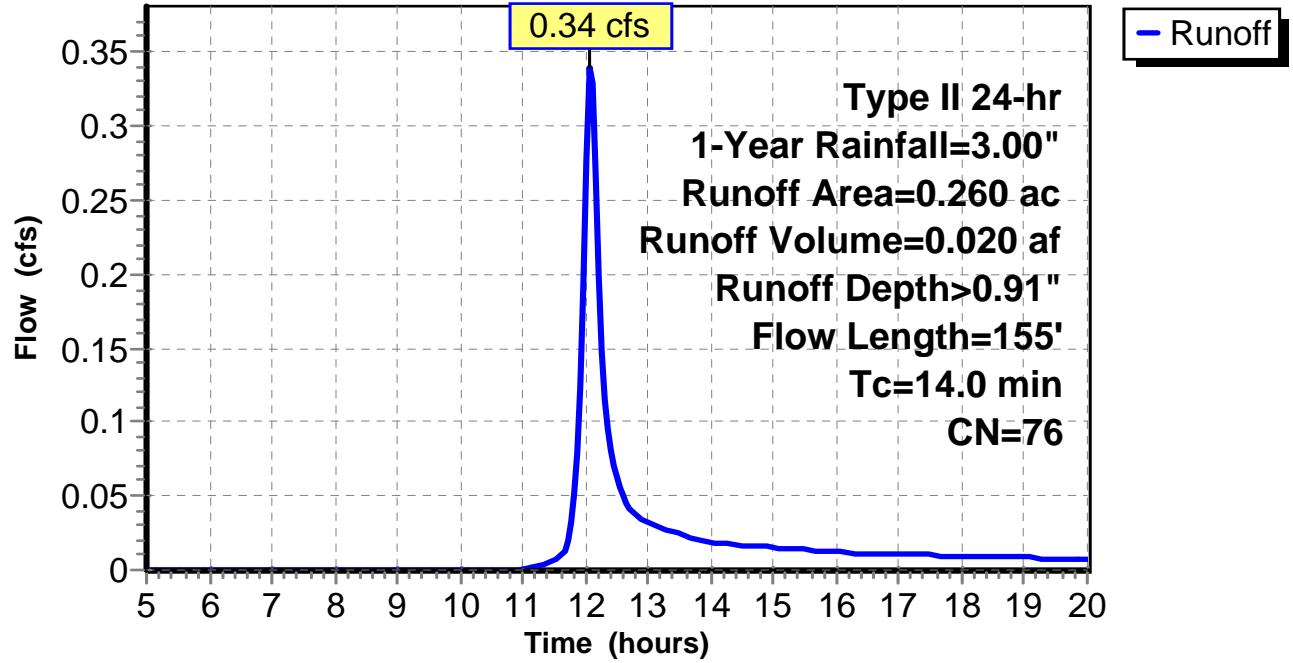
Subcatchment 6: C 247.006

Hydrograph



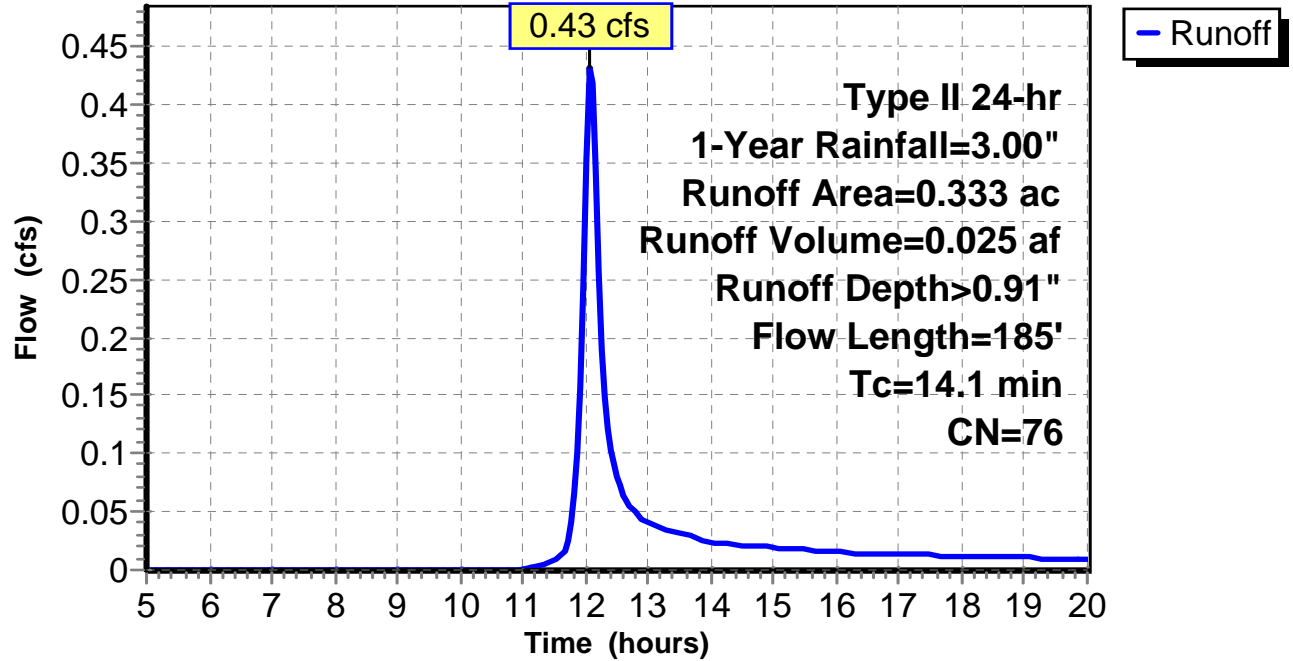
Subcatchment 1: C AR-700.012

Hydrograph



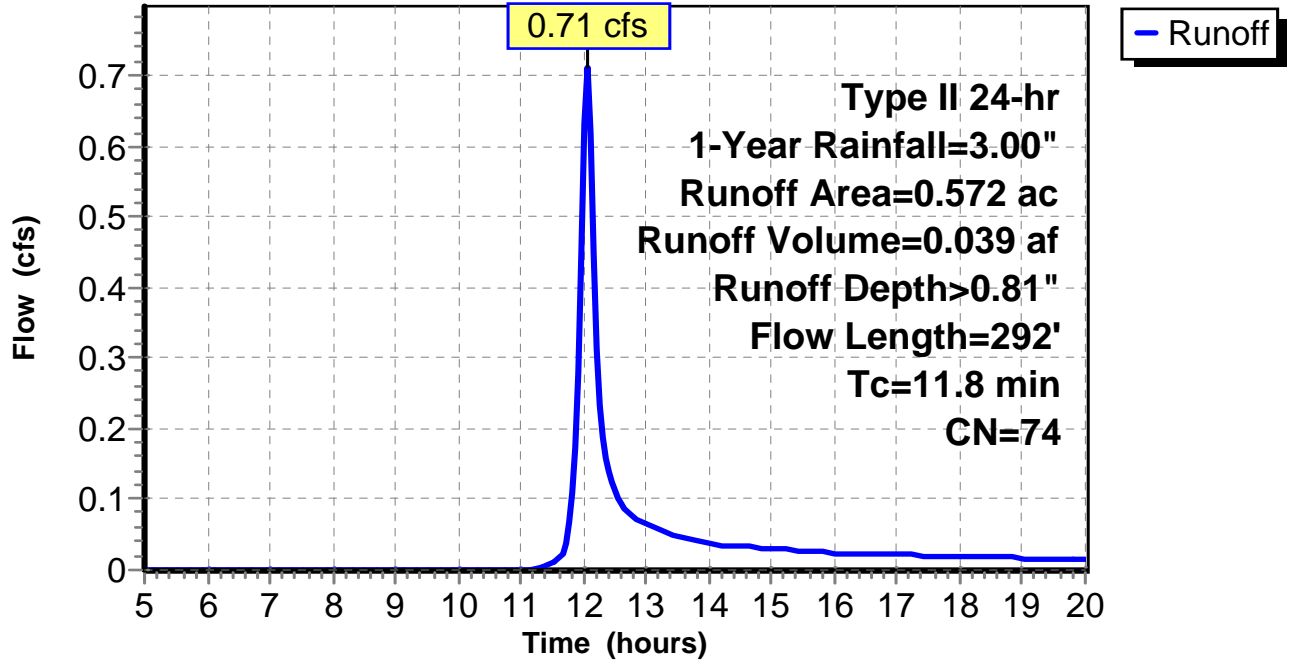
Subcatchment 2: C AR-700.013

Hydrograph



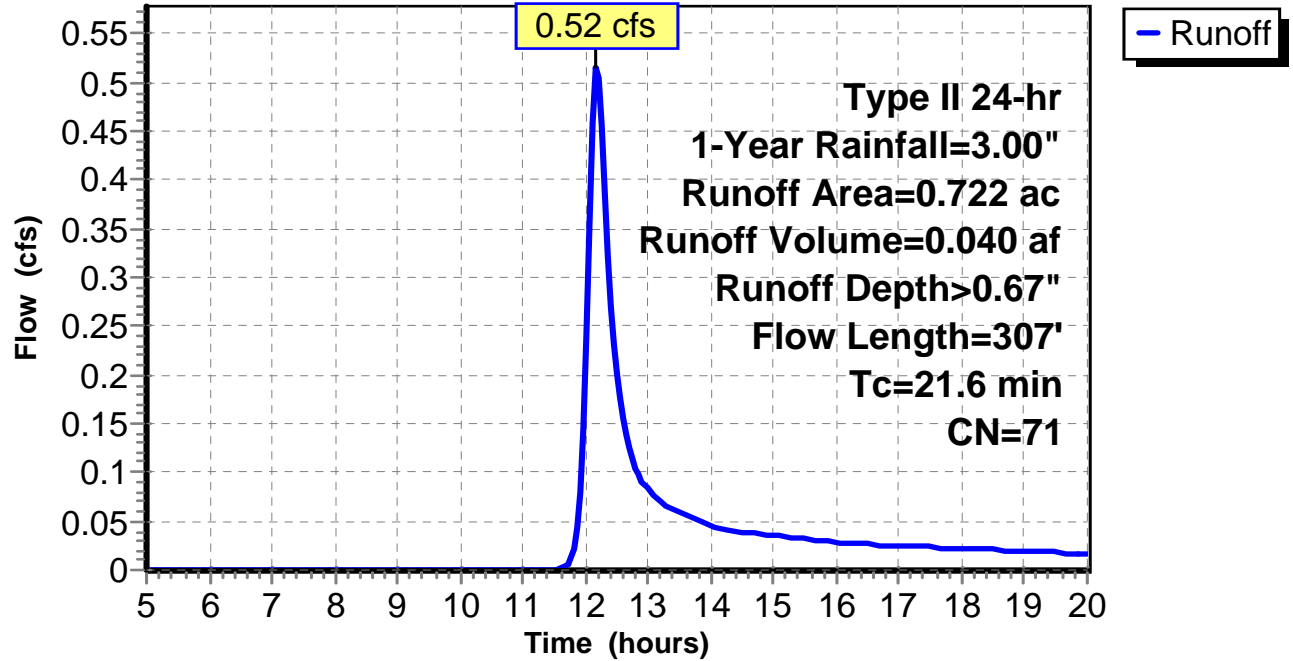
Subcatchment 3: C AR-700.014

Hydrograph



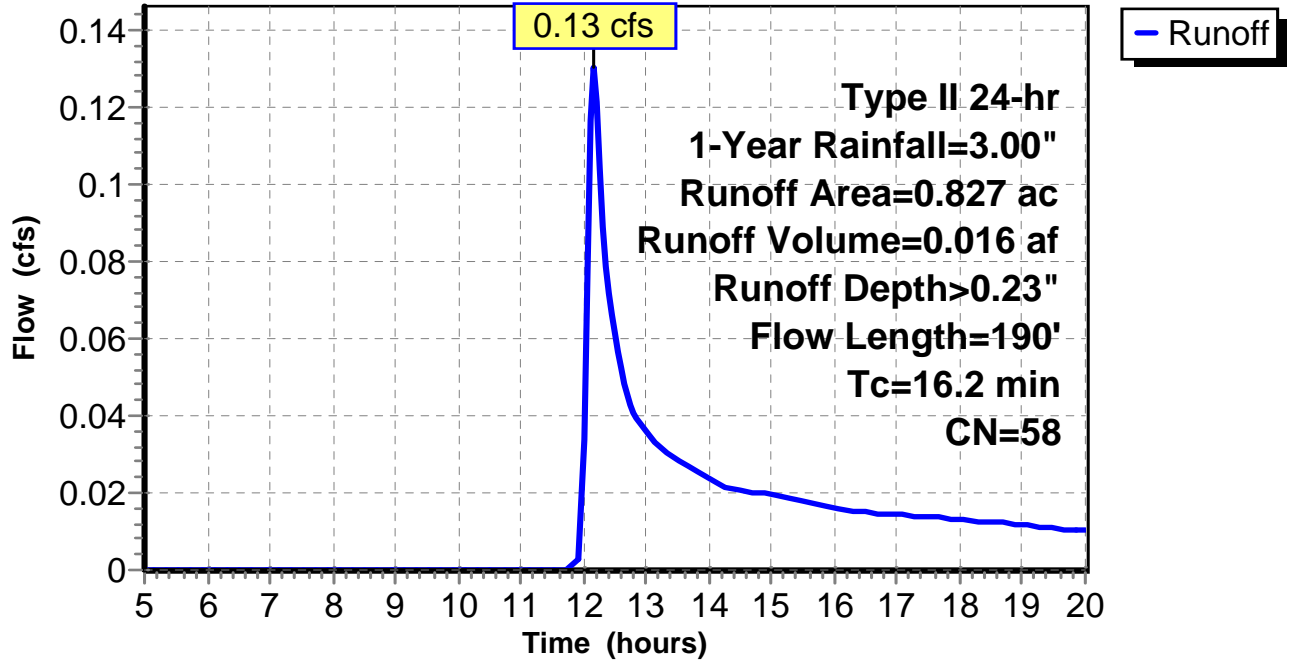
Subcatchment 4: C AR-700.015

Hydrograph



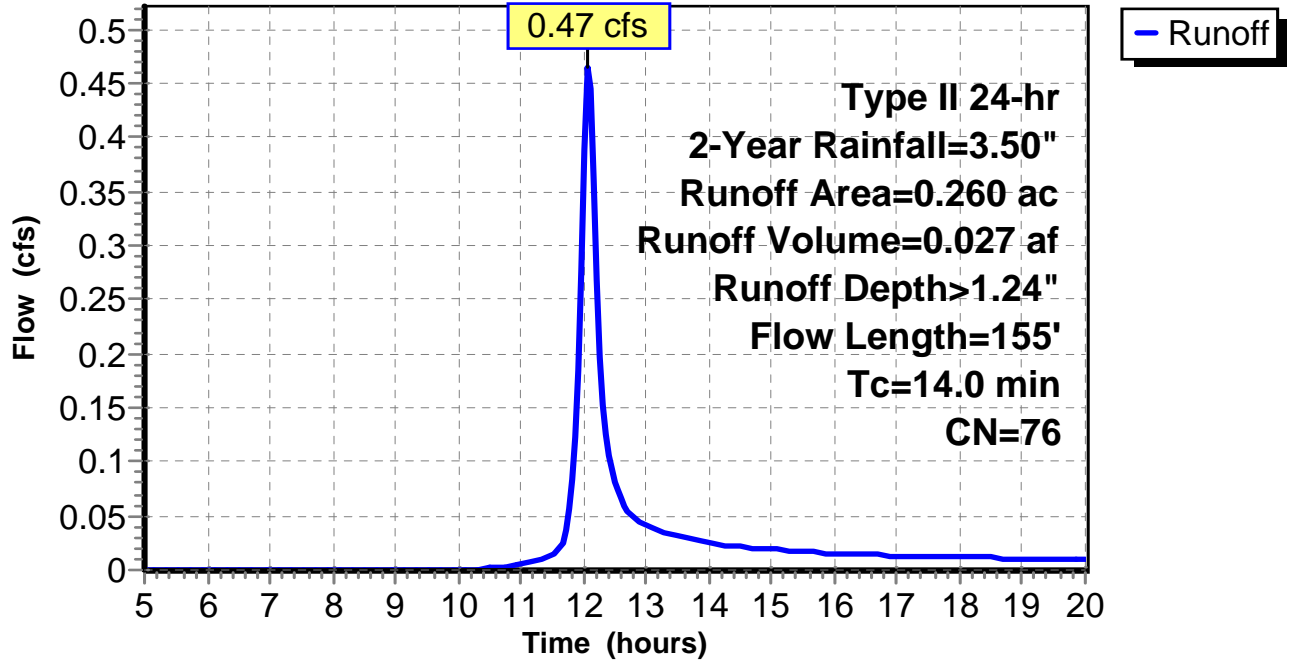
Subcatchment 5: C AR-700.016

Hydrograph



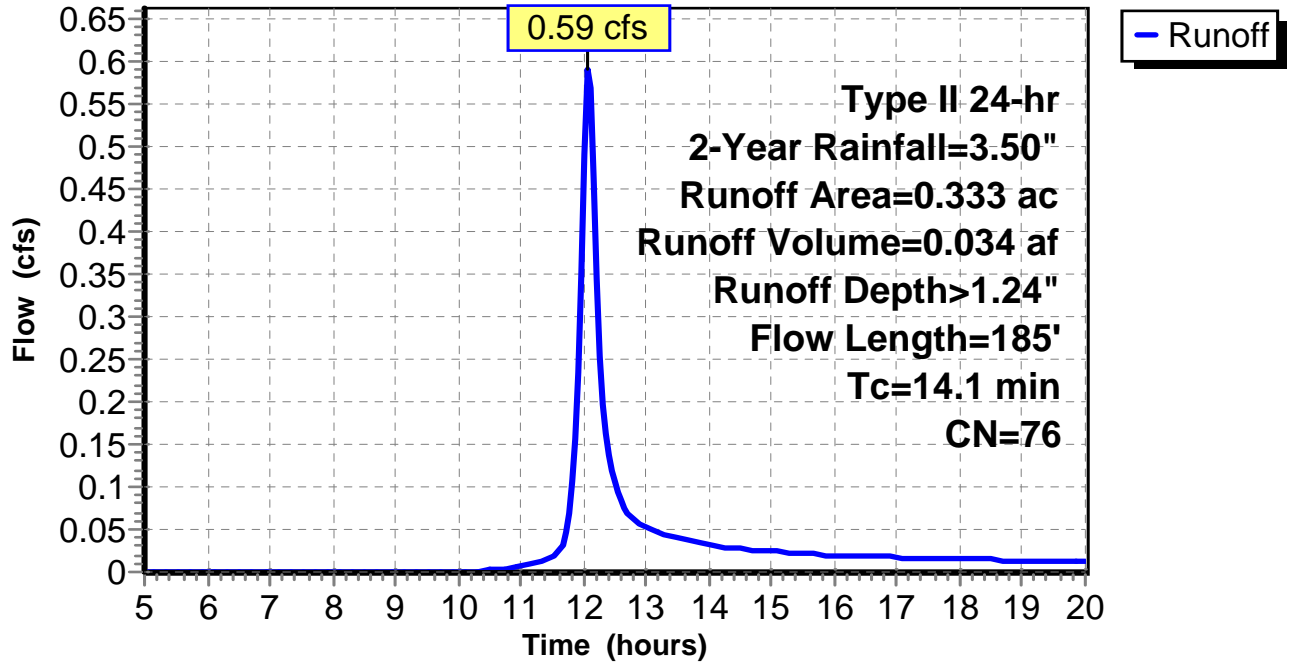
Subcatchment 1: C AR-700.012

Hydrograph



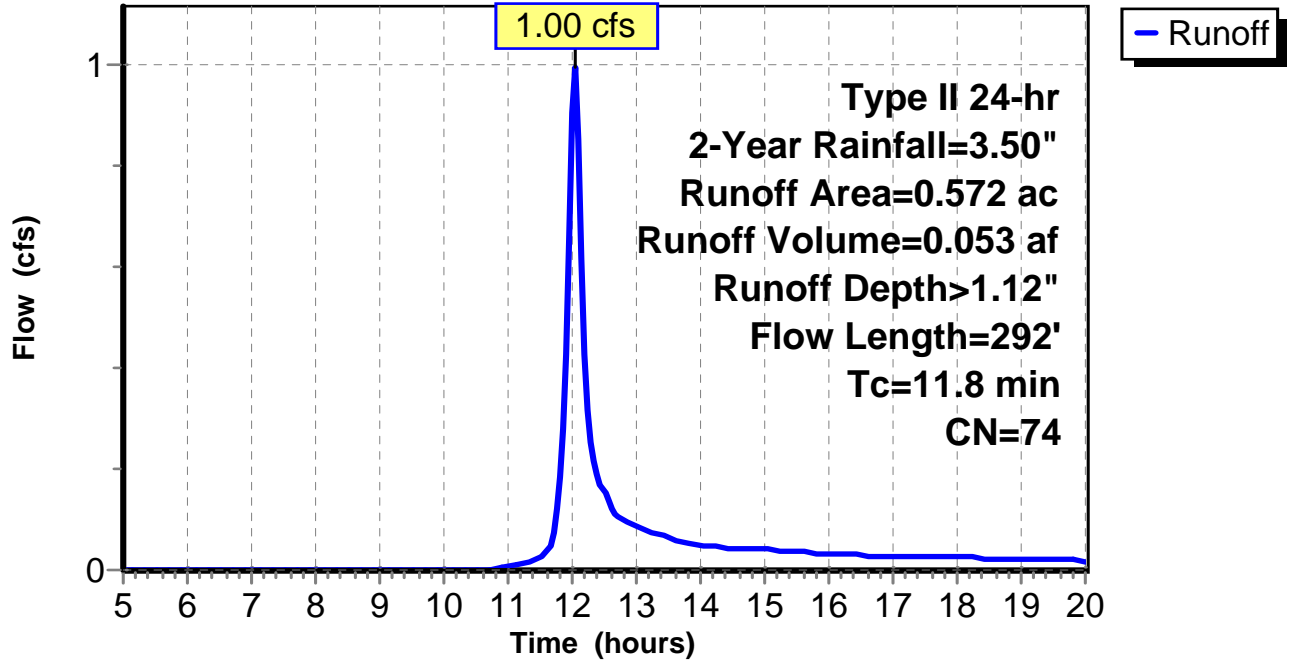
Subcatchment 2: C AR-700.013

Hydrograph



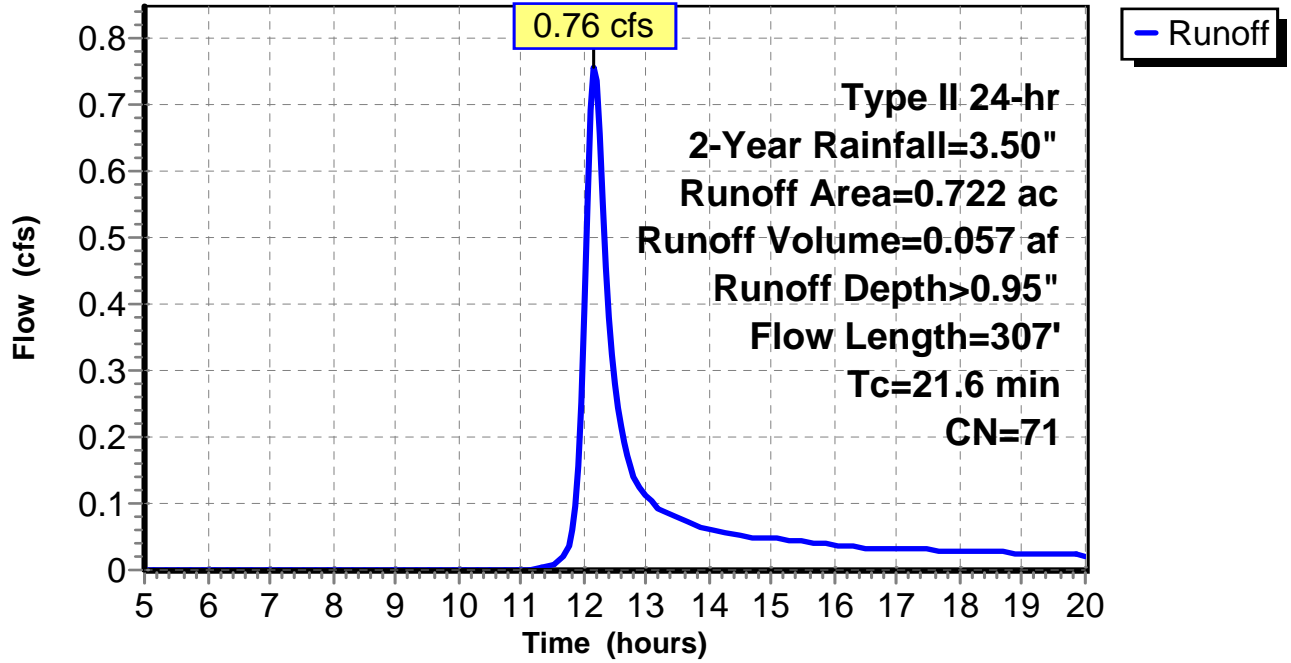
Subcatchment 3: C AR-700.014

Hydrograph



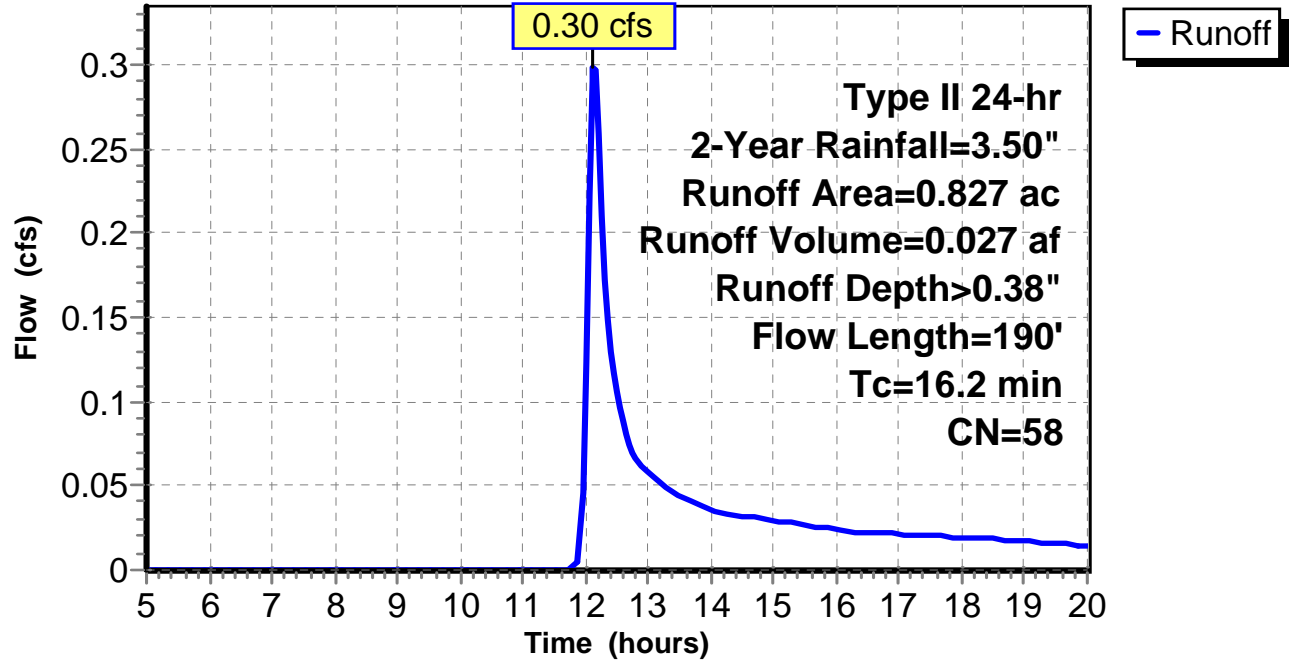
Subcatchment 4: C AR-700.015

Hydrograph



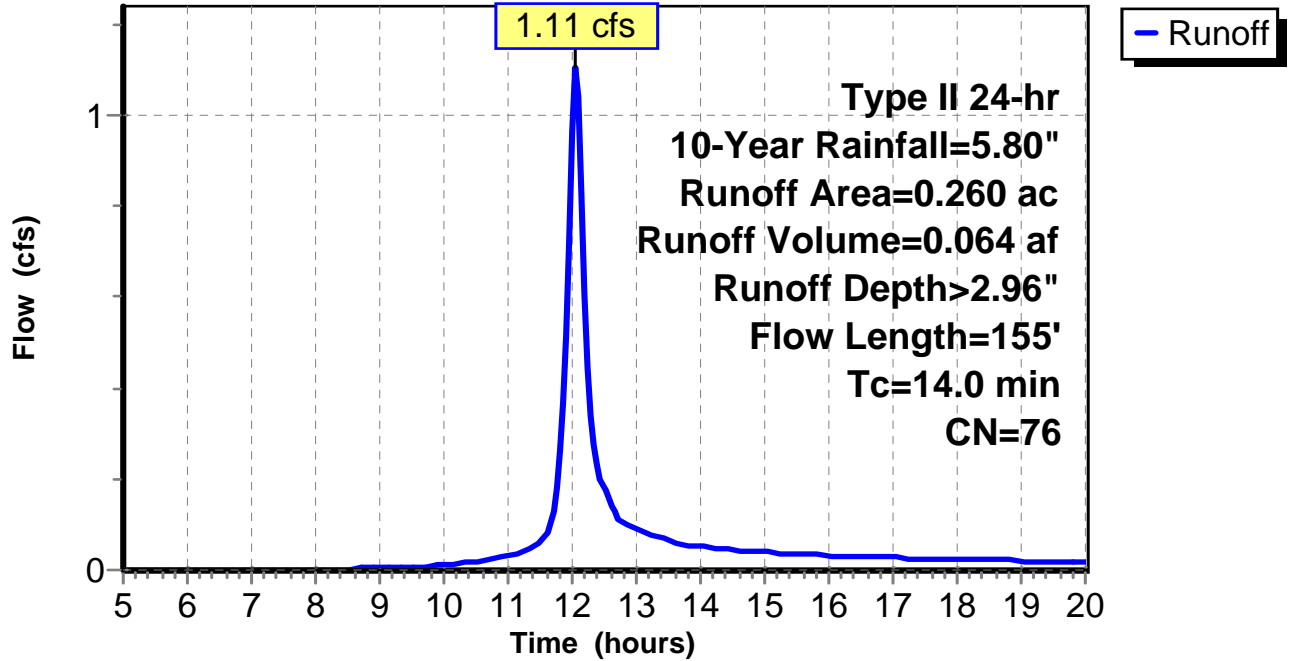
Subcatchment 5: C AR-700.016

Hydrograph



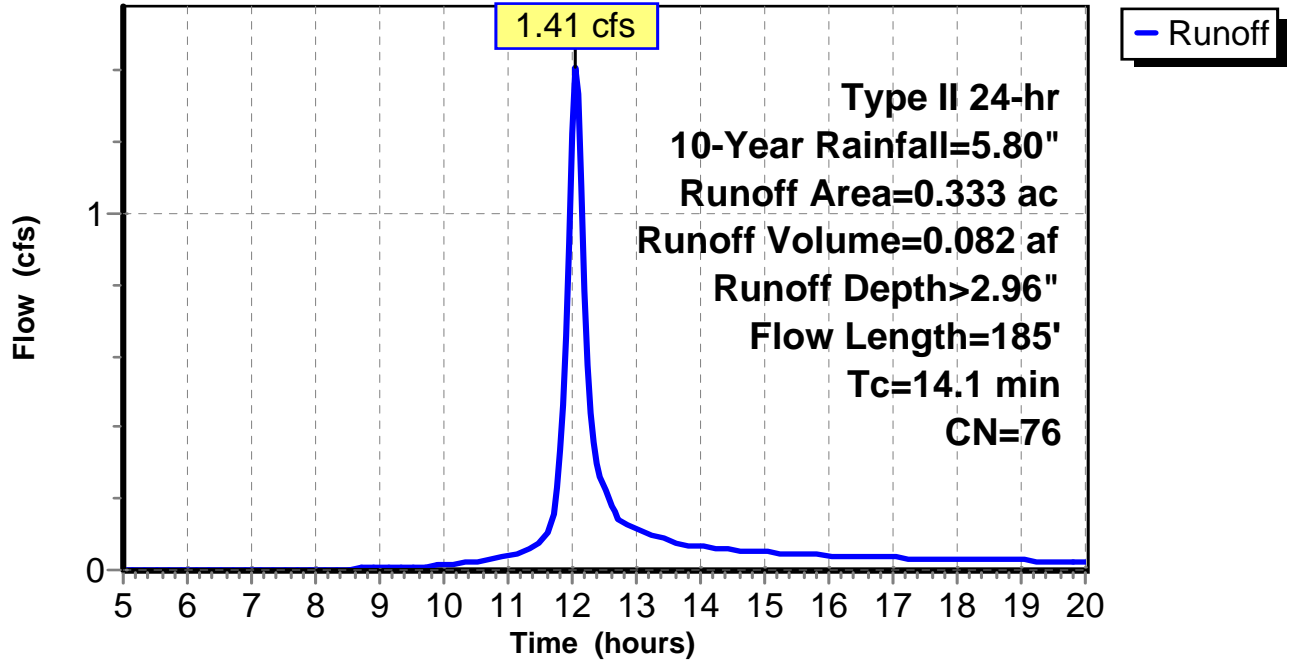
Subcatchment 1: C AR-700.012

Hydrograph



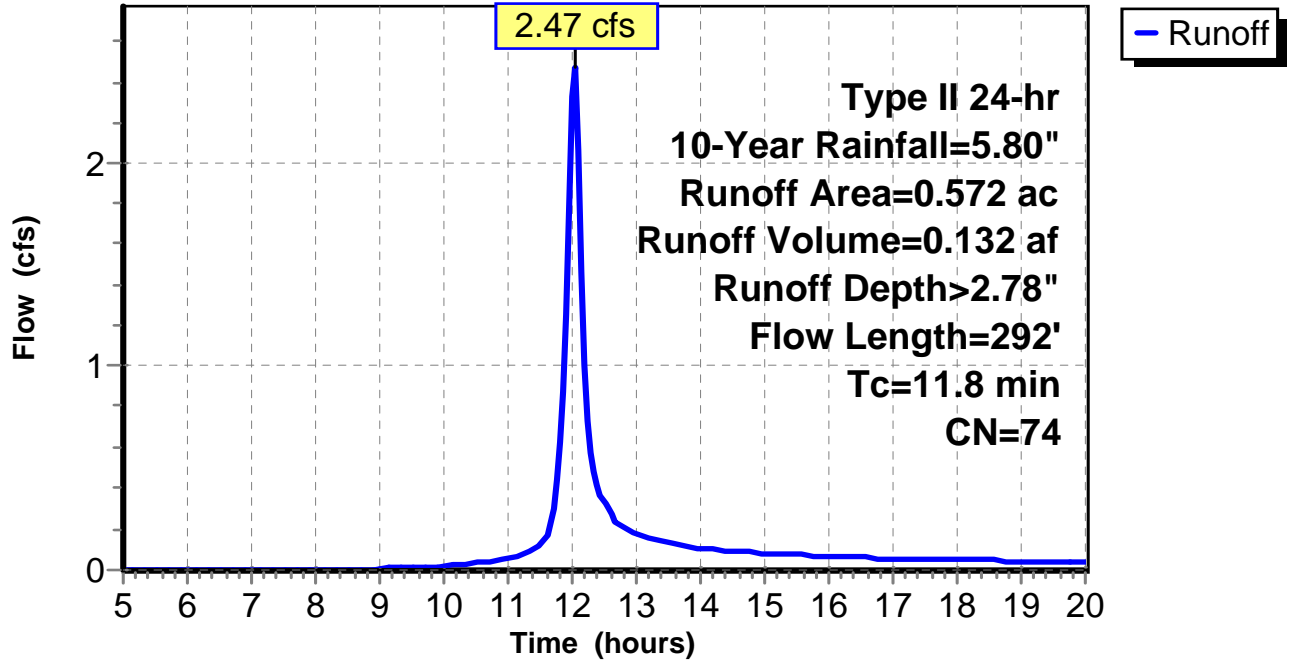
Subcatchment 2: C AR-700.013

Hydrograph



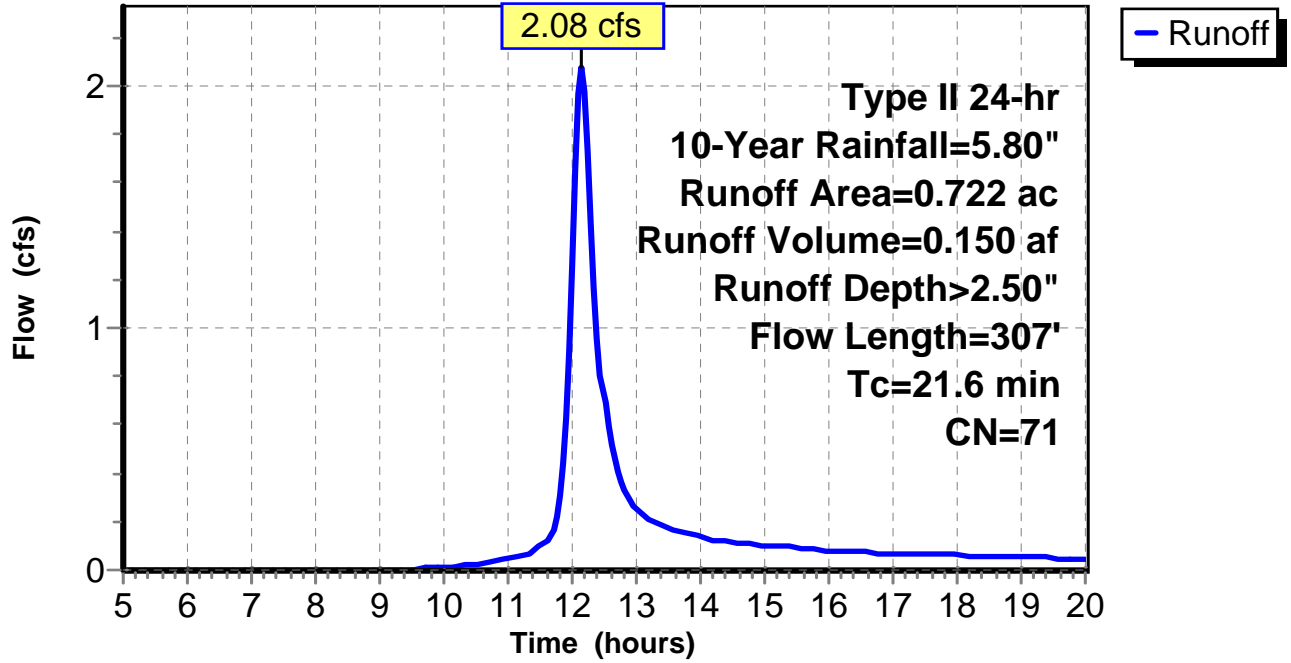
Subcatchment 3: C AR-700.014

Hydrograph



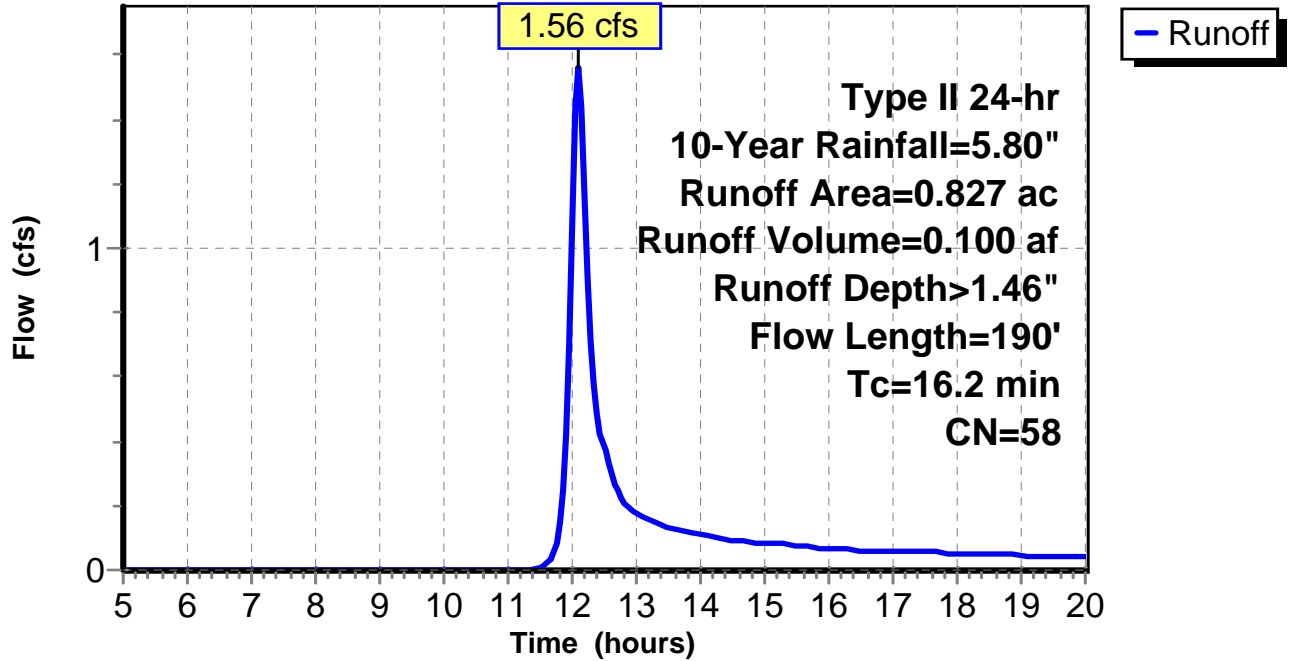
Subcatchment 4: C AR-700.015

Hydrograph



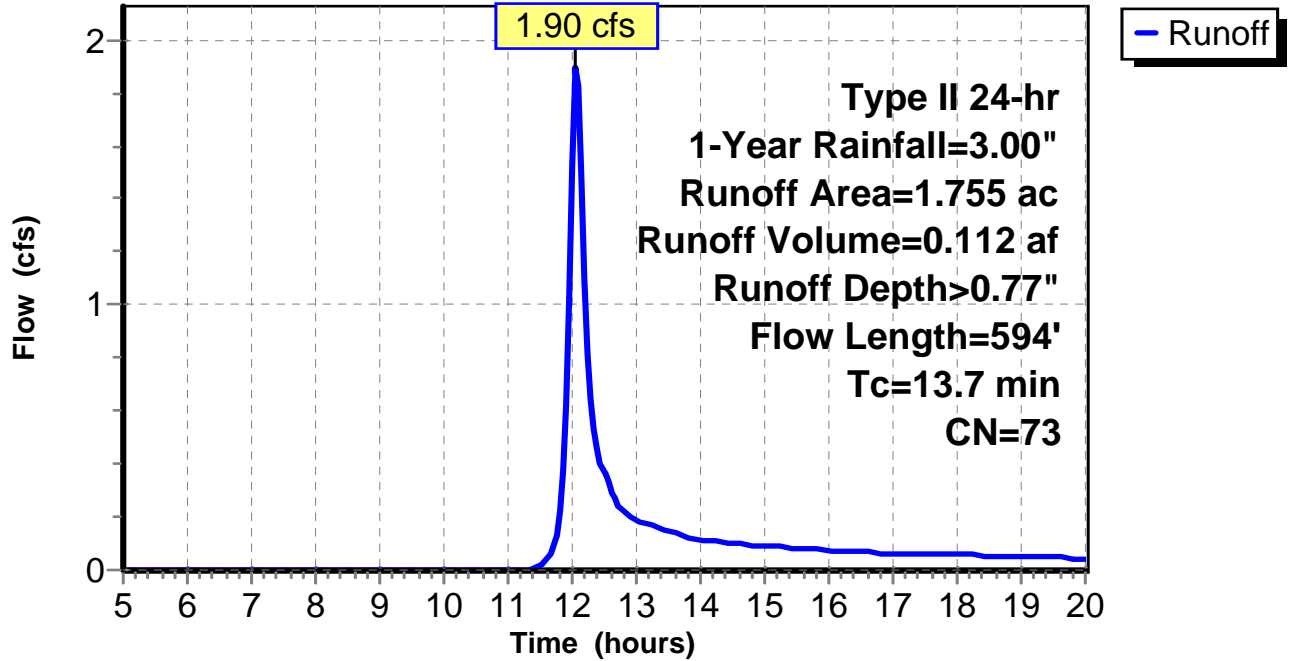
Subcatchment 5: C AR-700.016

Hydrograph



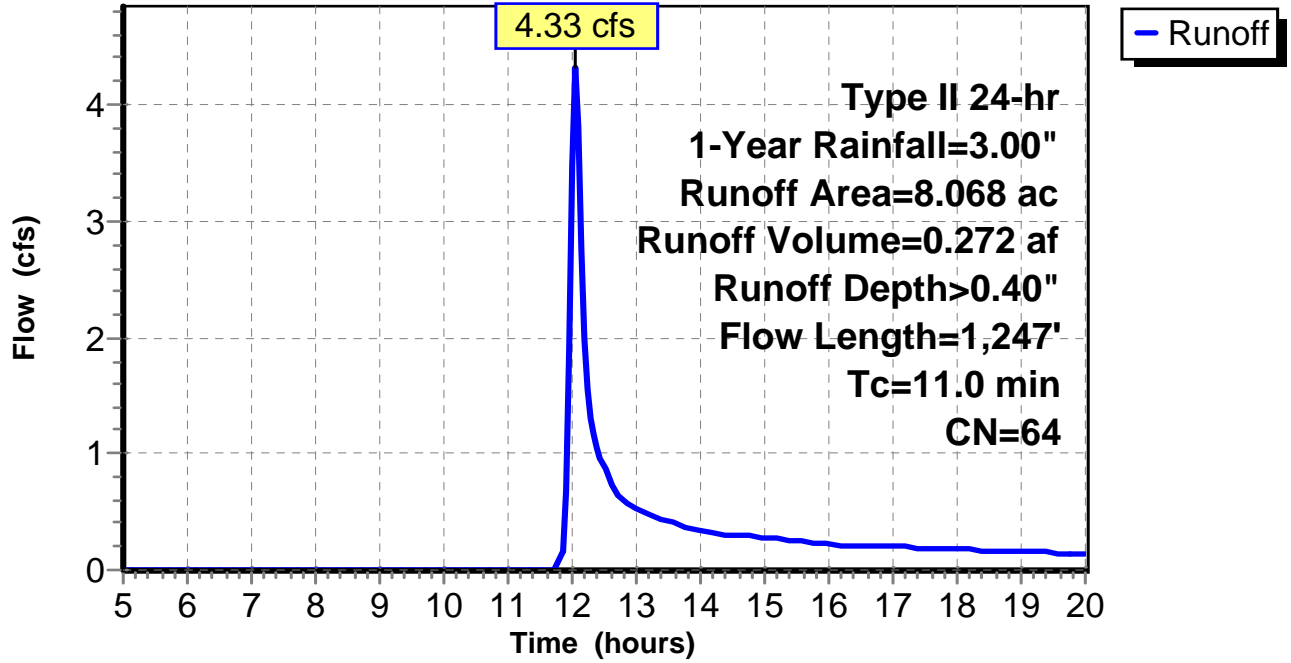
Subcatchment 1: C AR-700.017

Hydrograph



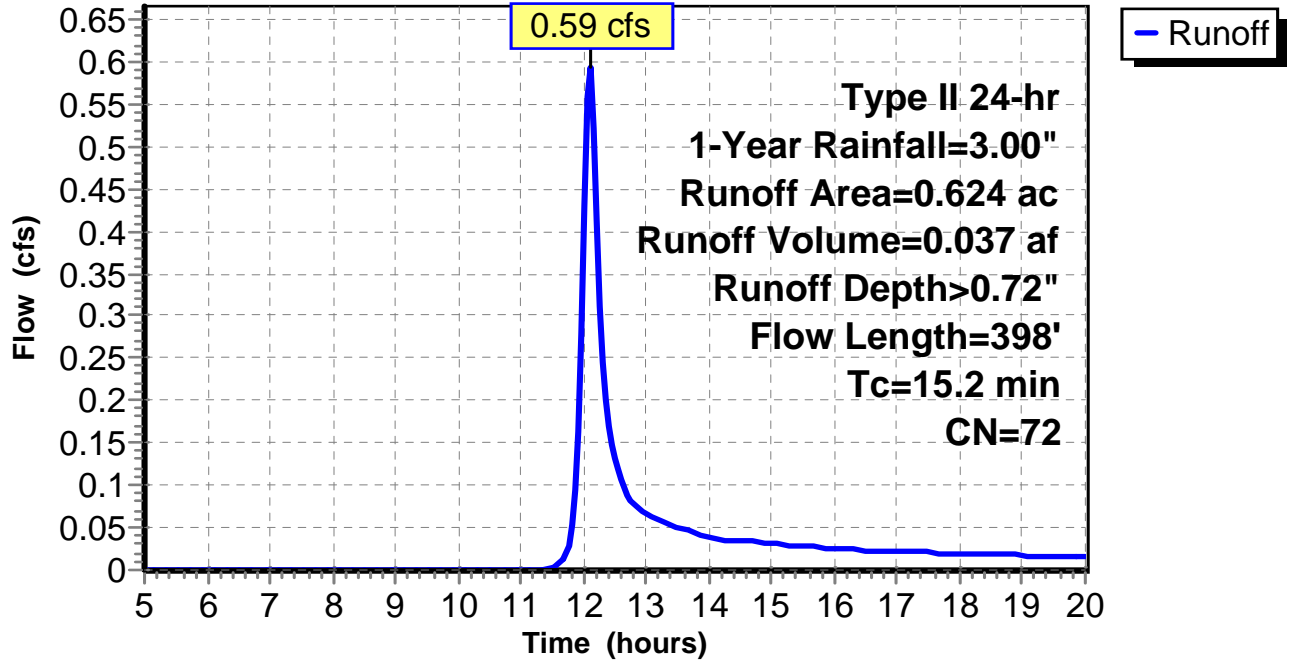
Subcatchment 2: C AR-700.018

Hydrograph



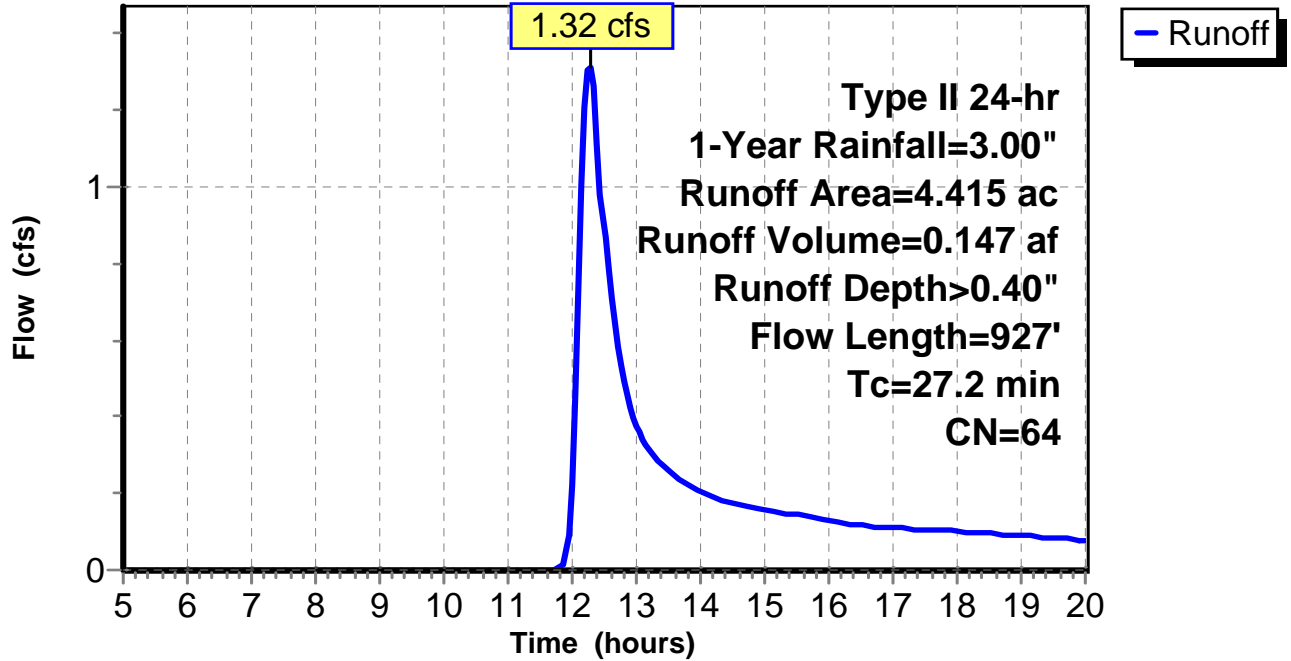
Subcatchment 3: C AR-700.019

Hydrograph



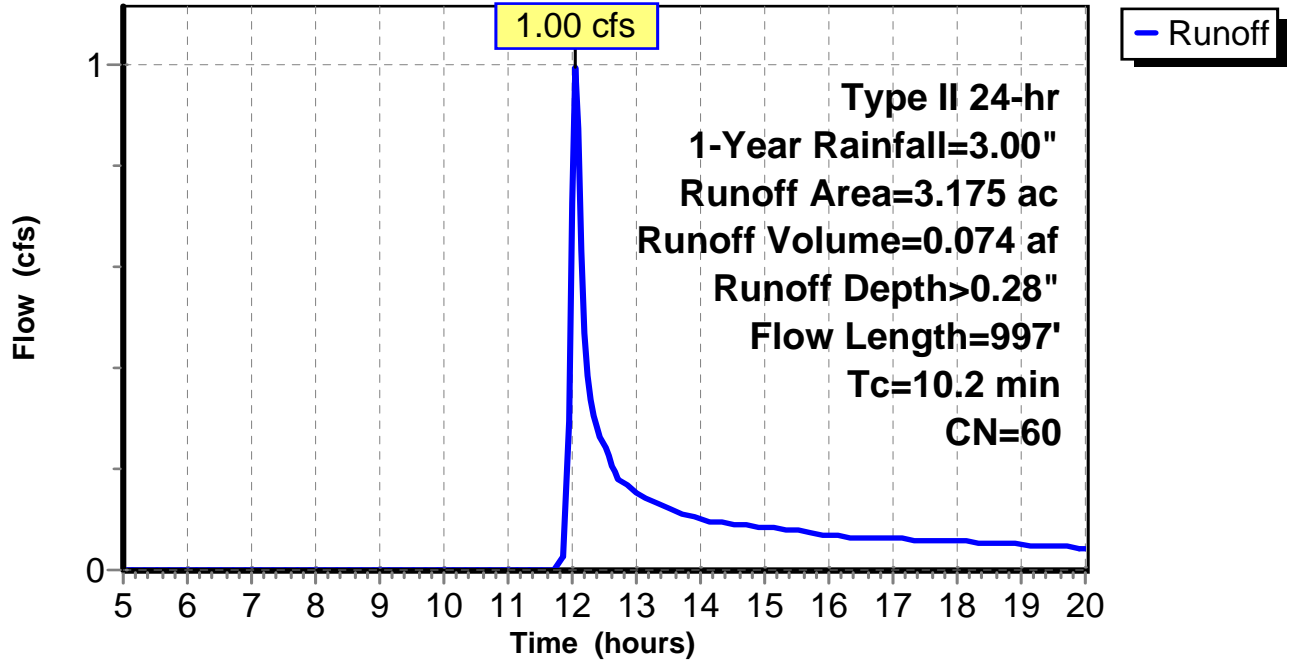
Subcatchment 4: C AR-700.020

Hydrograph



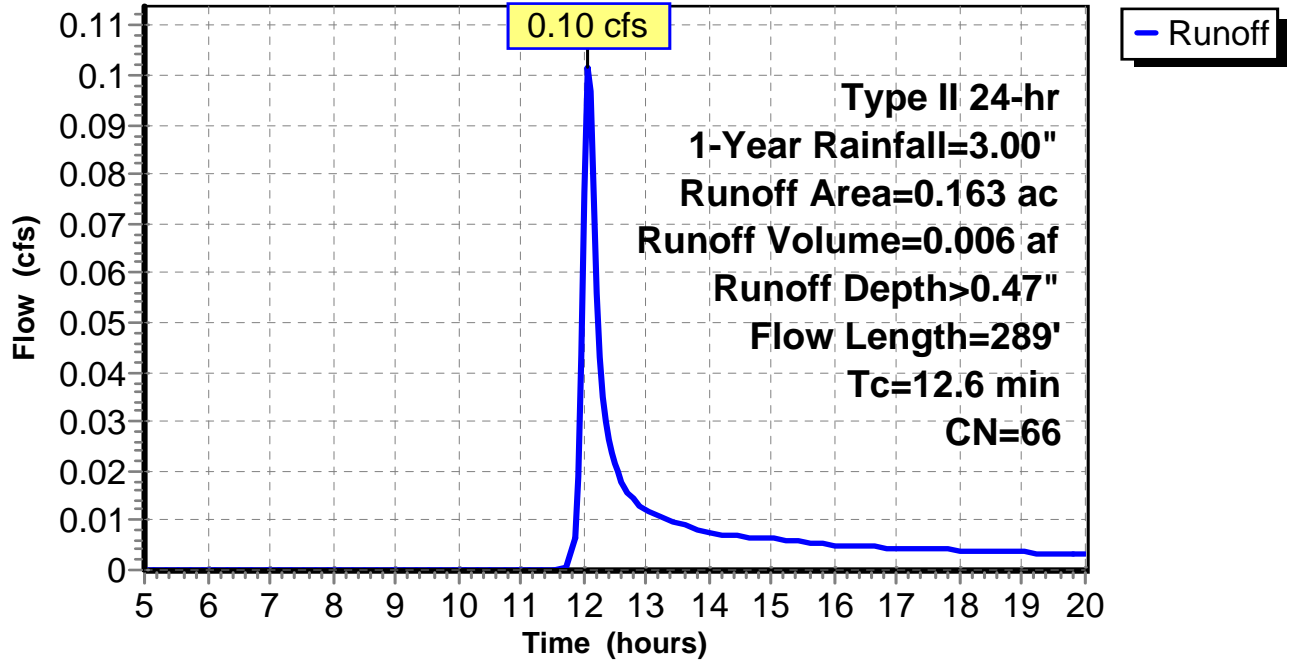
Subcatchment 5: C 252.001

Hydrograph



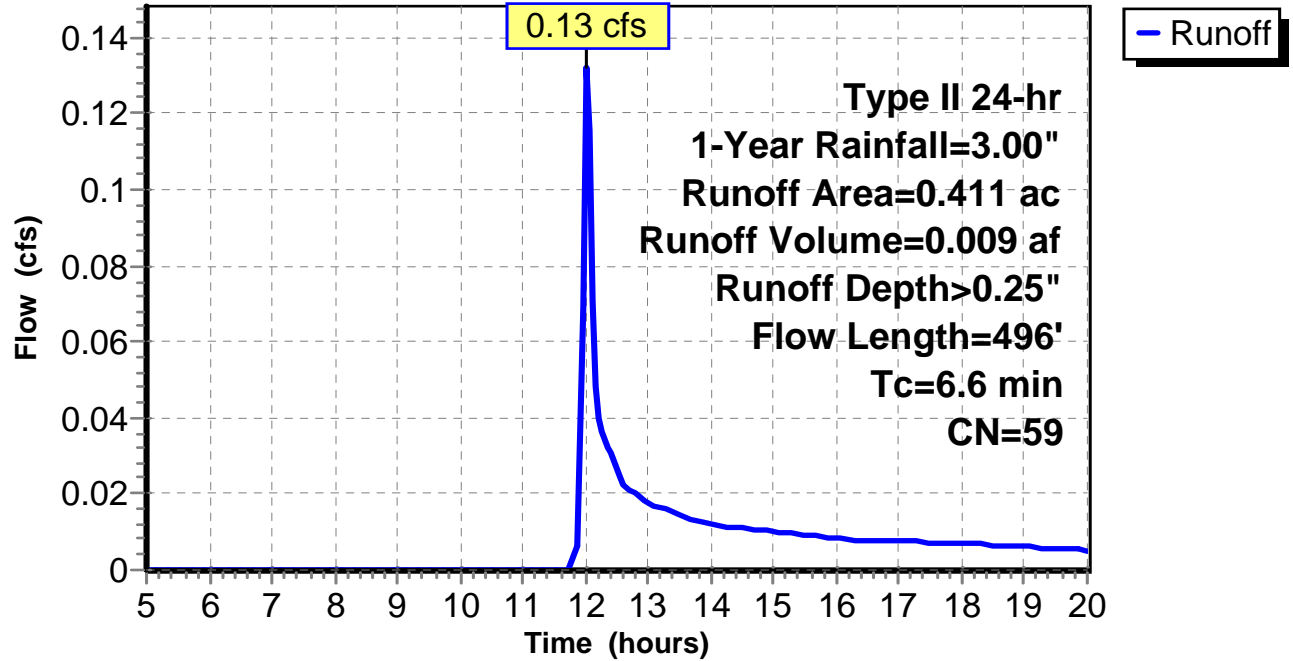
Subcatchment 6: C 252.002

Hydrograph



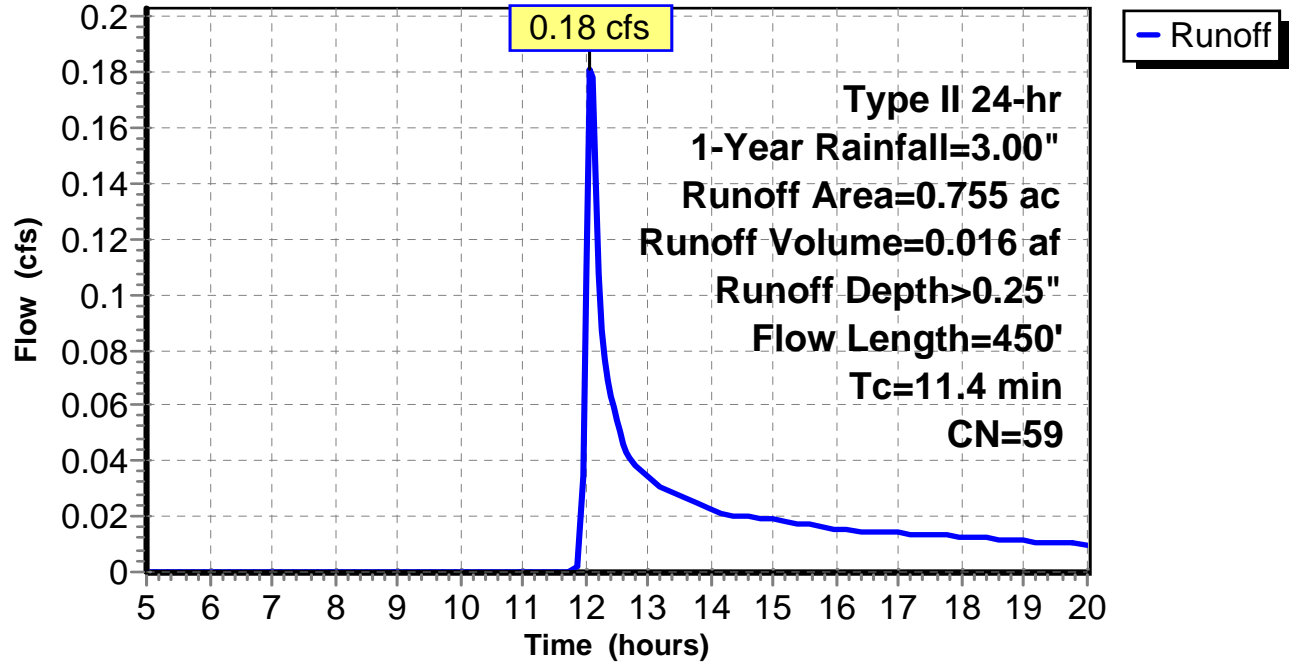
Subcatchment 7: C 252.003

Hydrograph



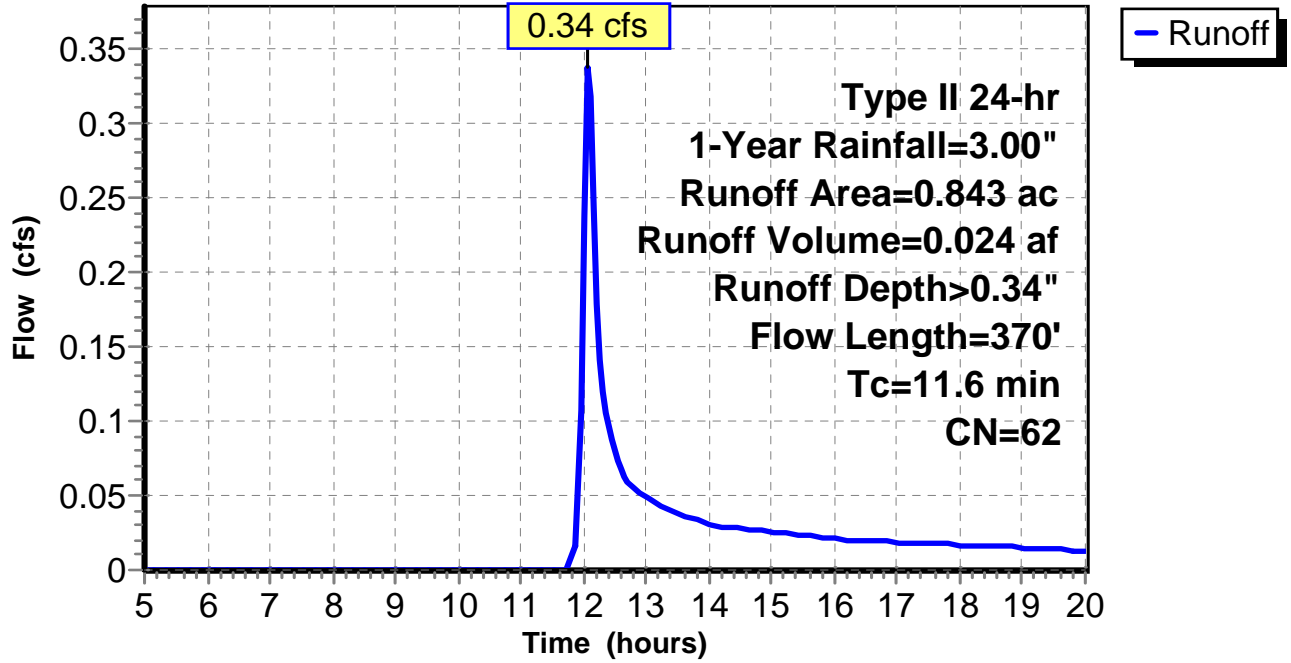
Subcatchment 8: C 252.004

Hydrograph



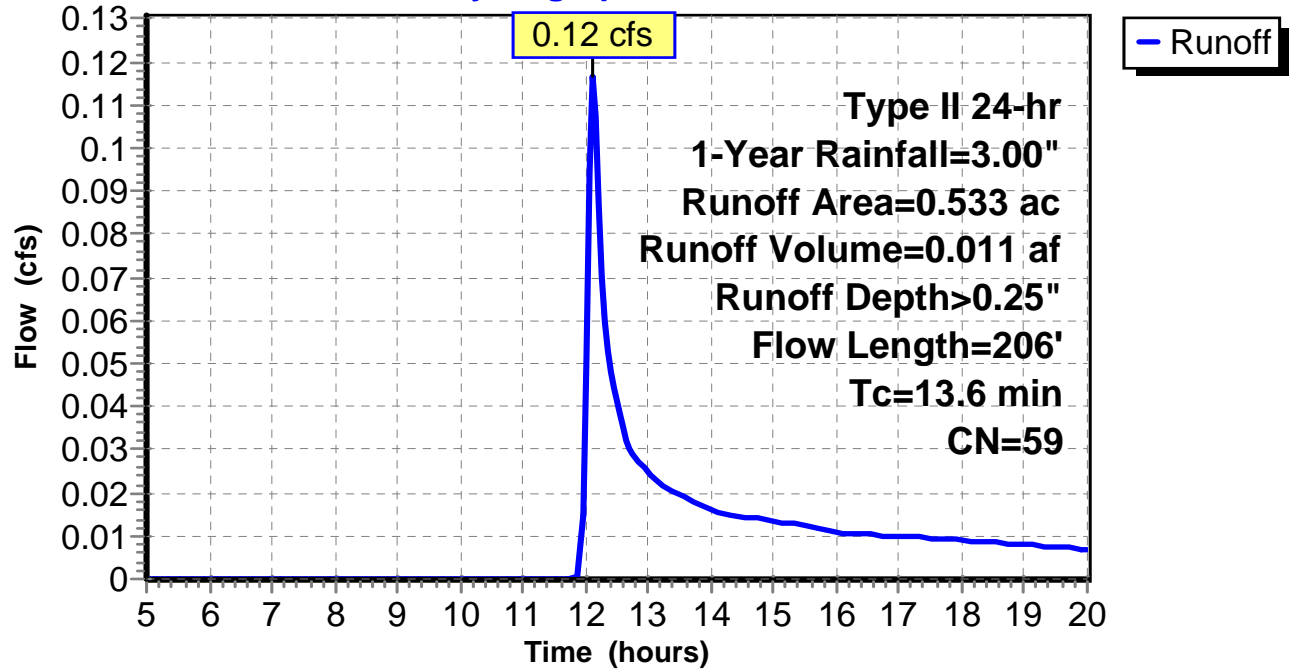
Subcatchment 9: C 252.005

Hydrograph



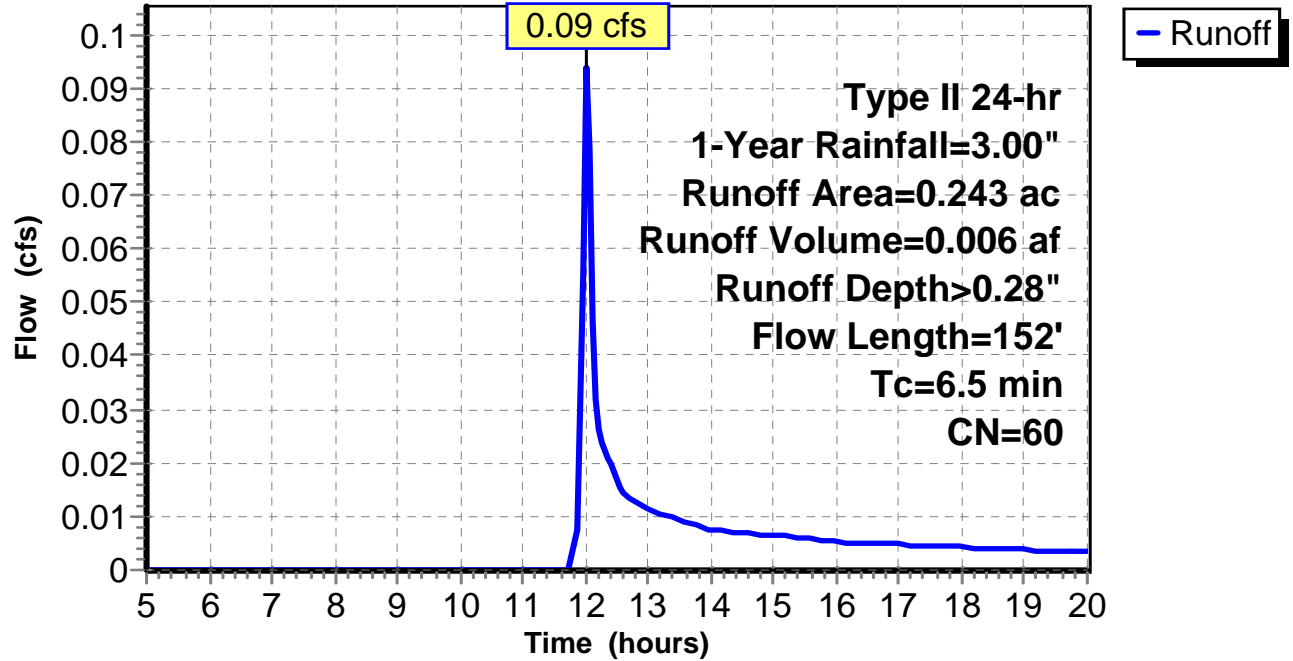
Subcatchment 10: C 252.006

Hydrograph



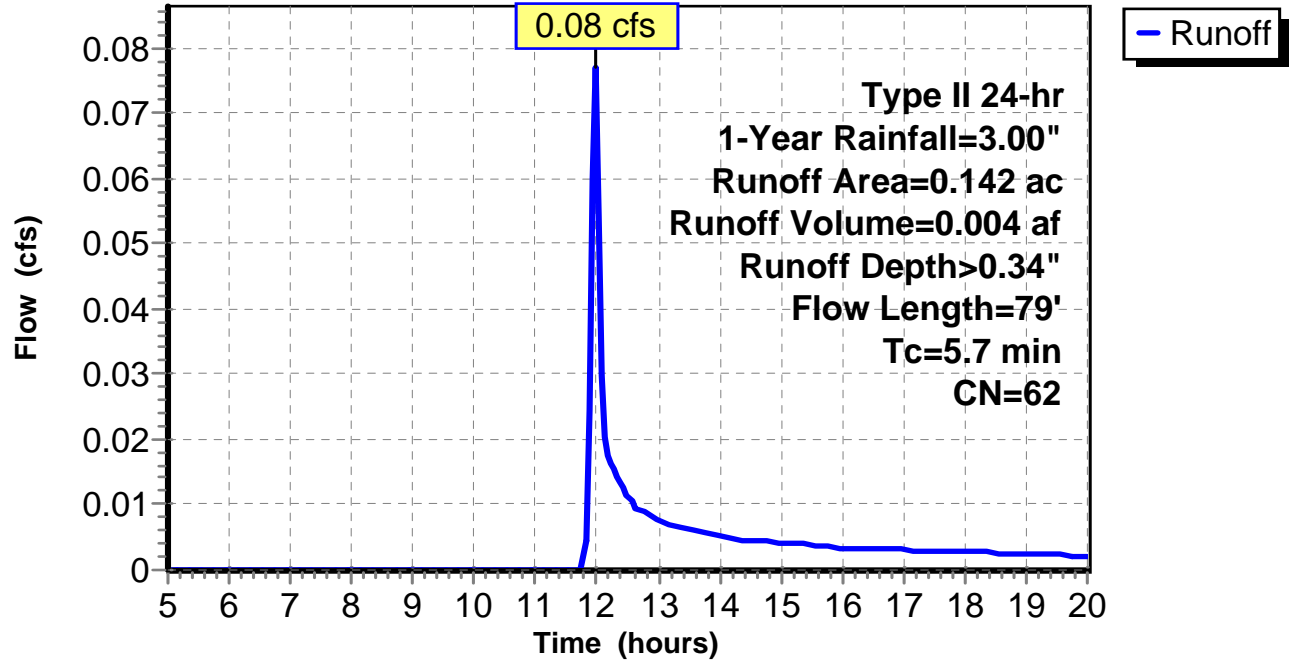
Subcatchment 11: C 252.007

Hydrograph



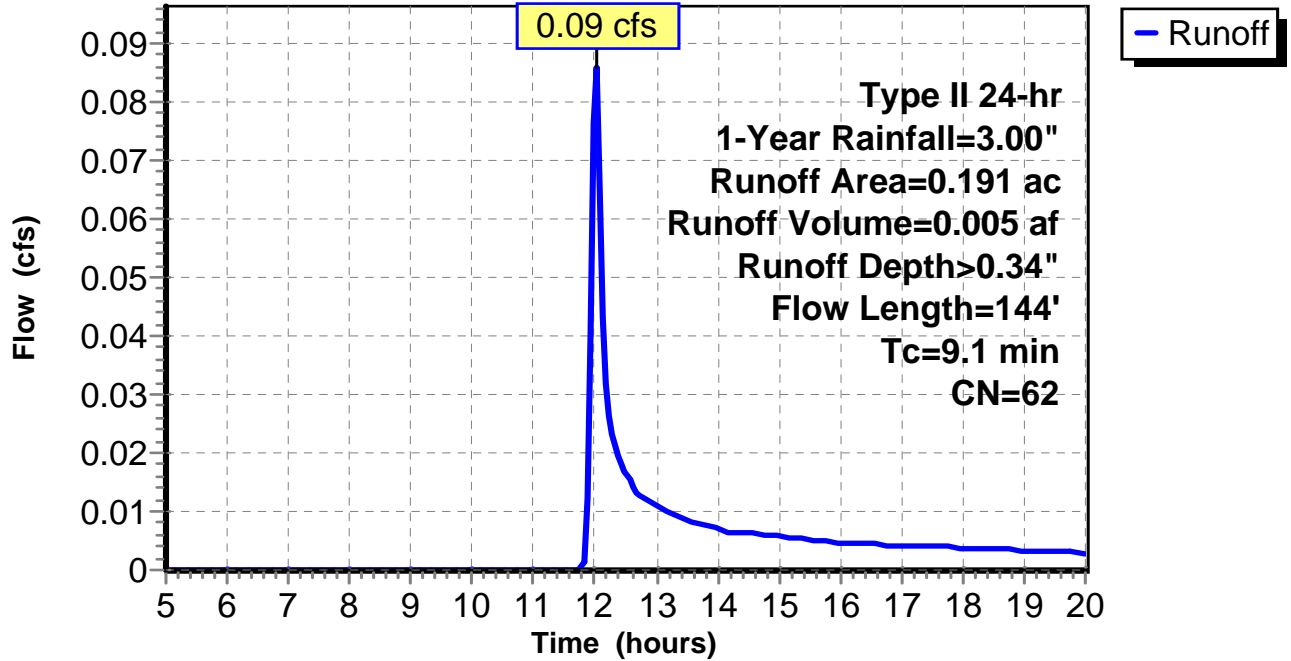
Subcatchment 12: C 252.008

Hydrograph



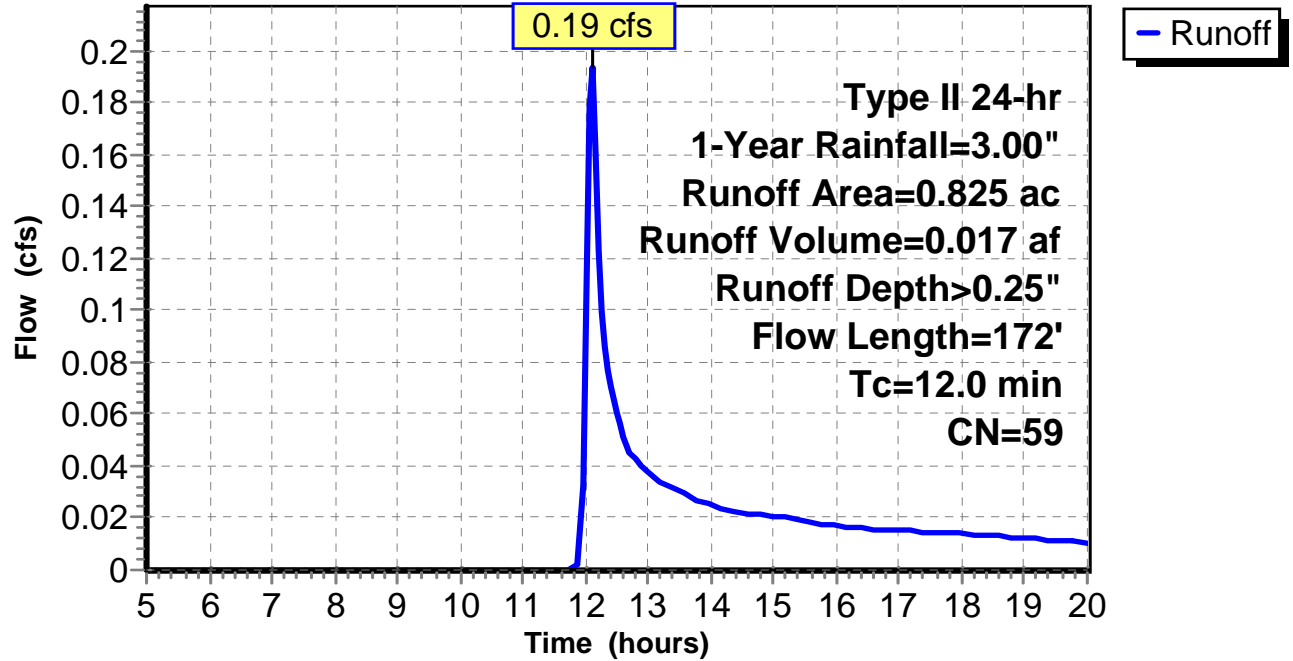
Subcatchment 13: C 252.009

Hydrograph



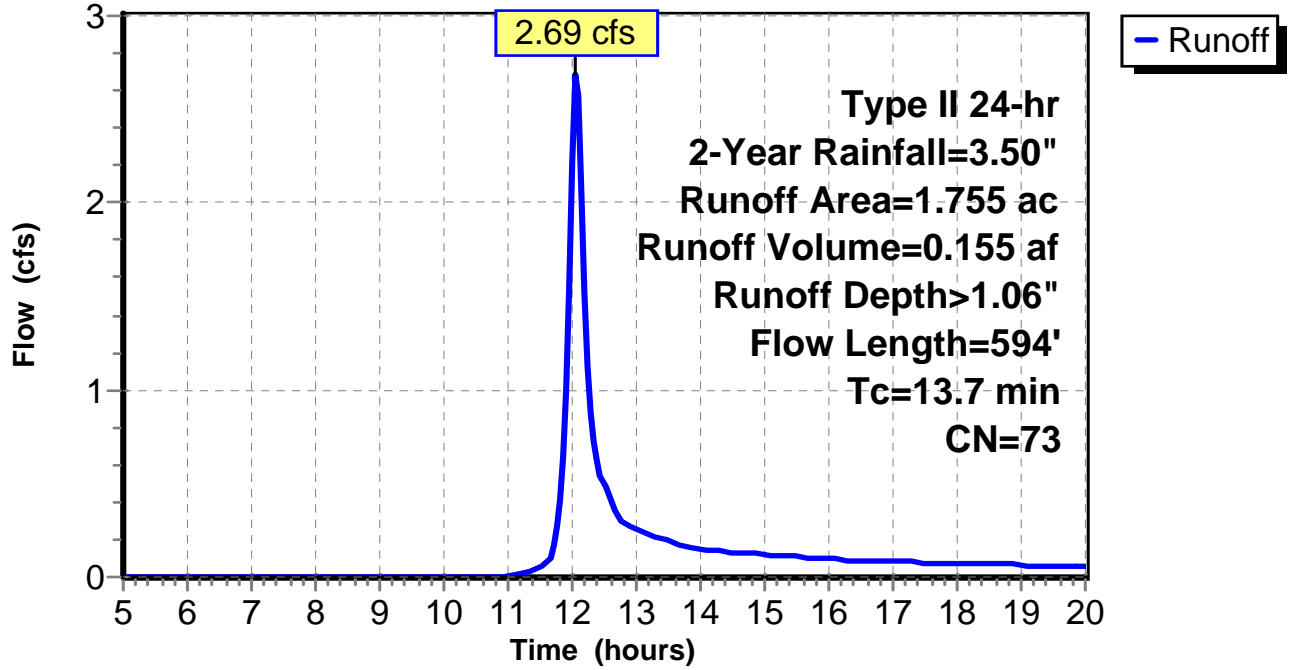
Subcatchment 14: C 252.010

Hydrograph



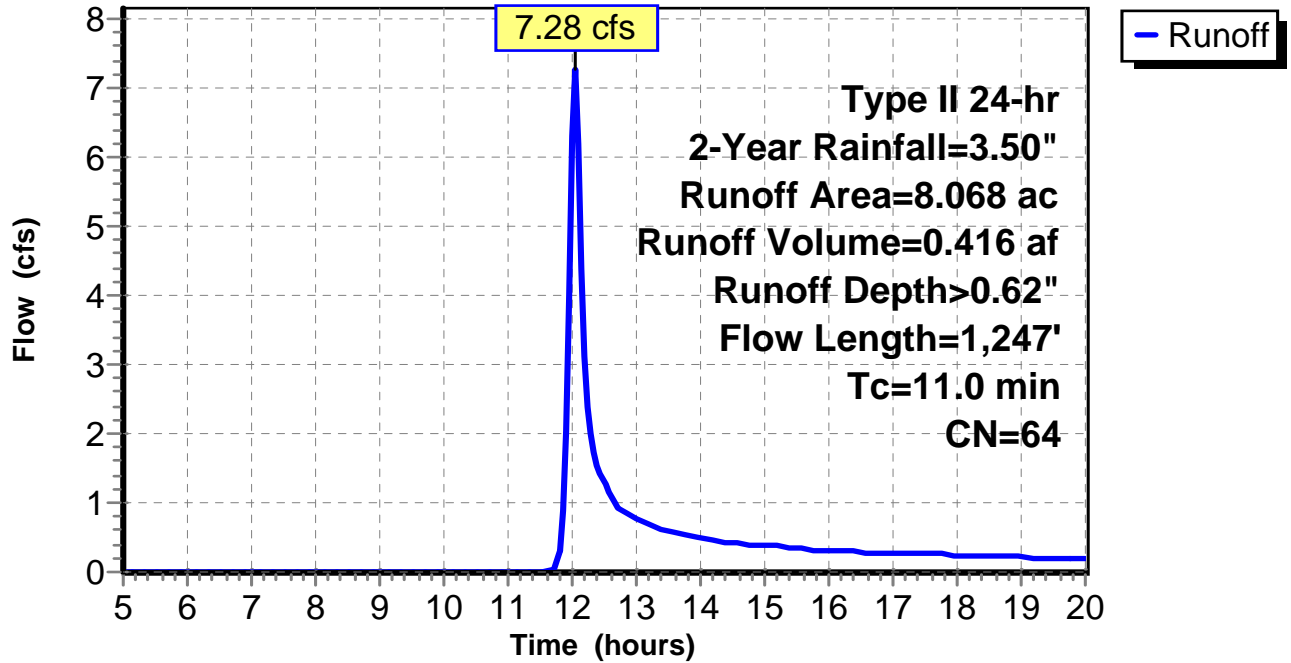
Subcatchment 1: C AR-700.017

Hydrograph



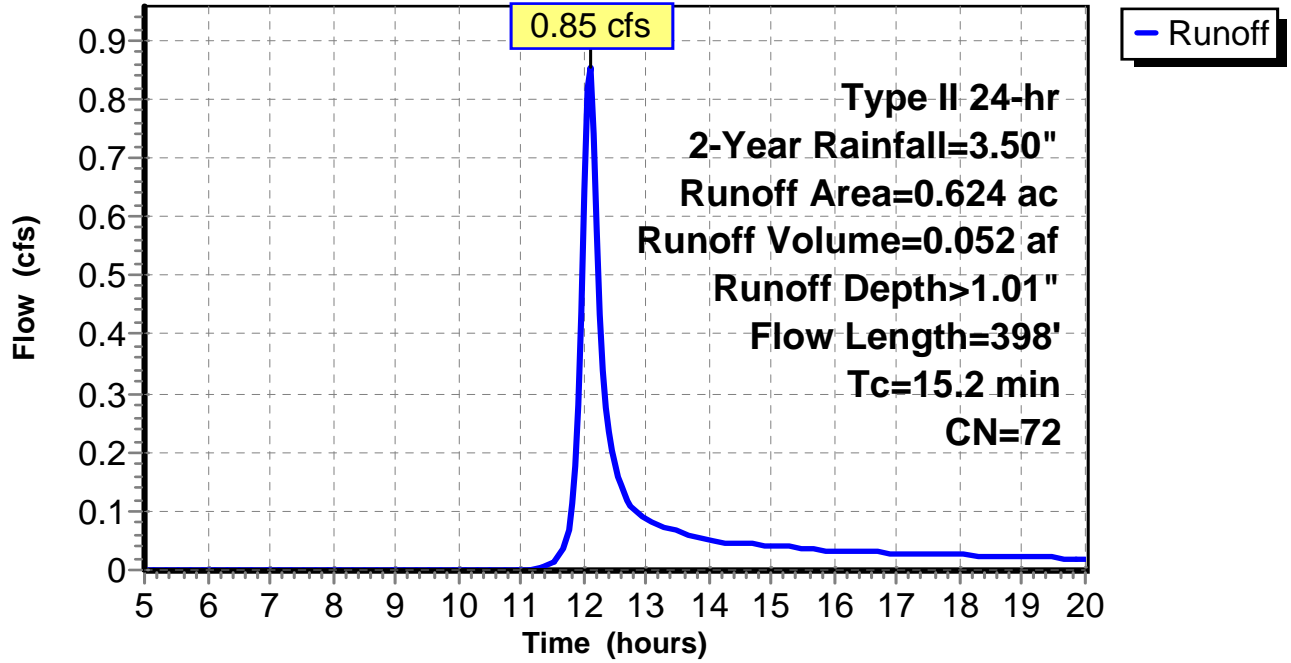
Subcatchment 2: C AR-700.018

Hydrograph



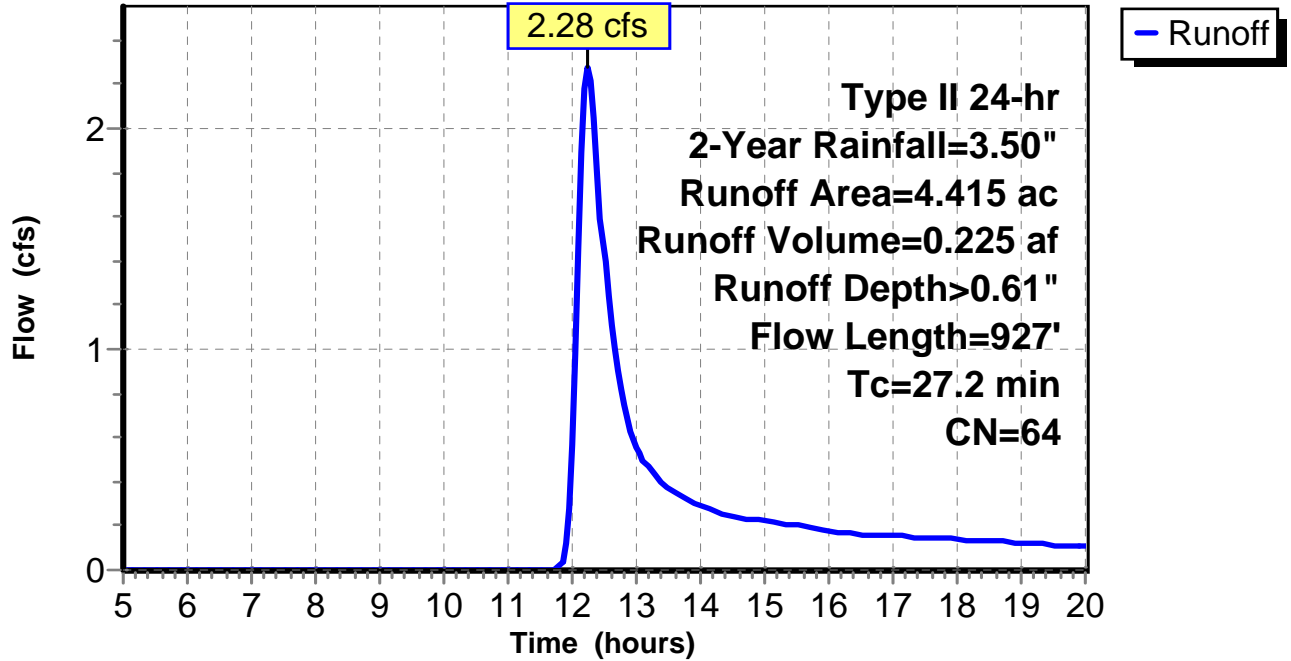
Subcatchment 3: C AR-700.019

Hydrograph



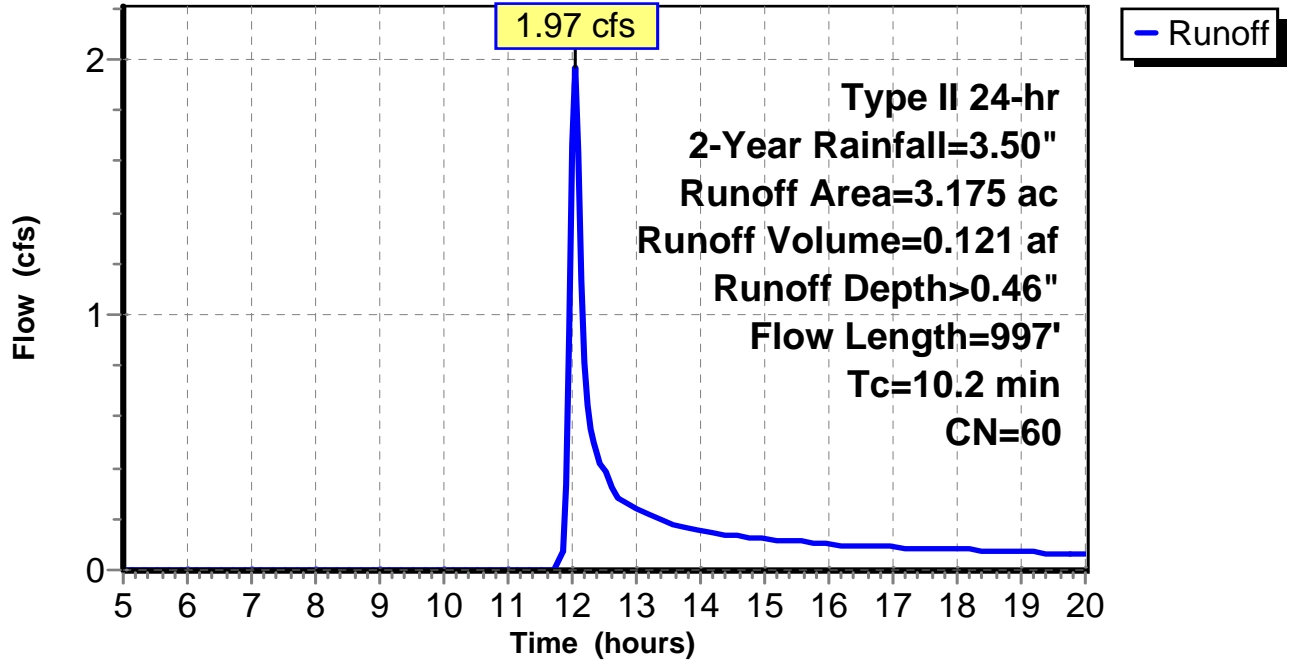
Subcatchment 4: C AR-700.020

Hydrograph



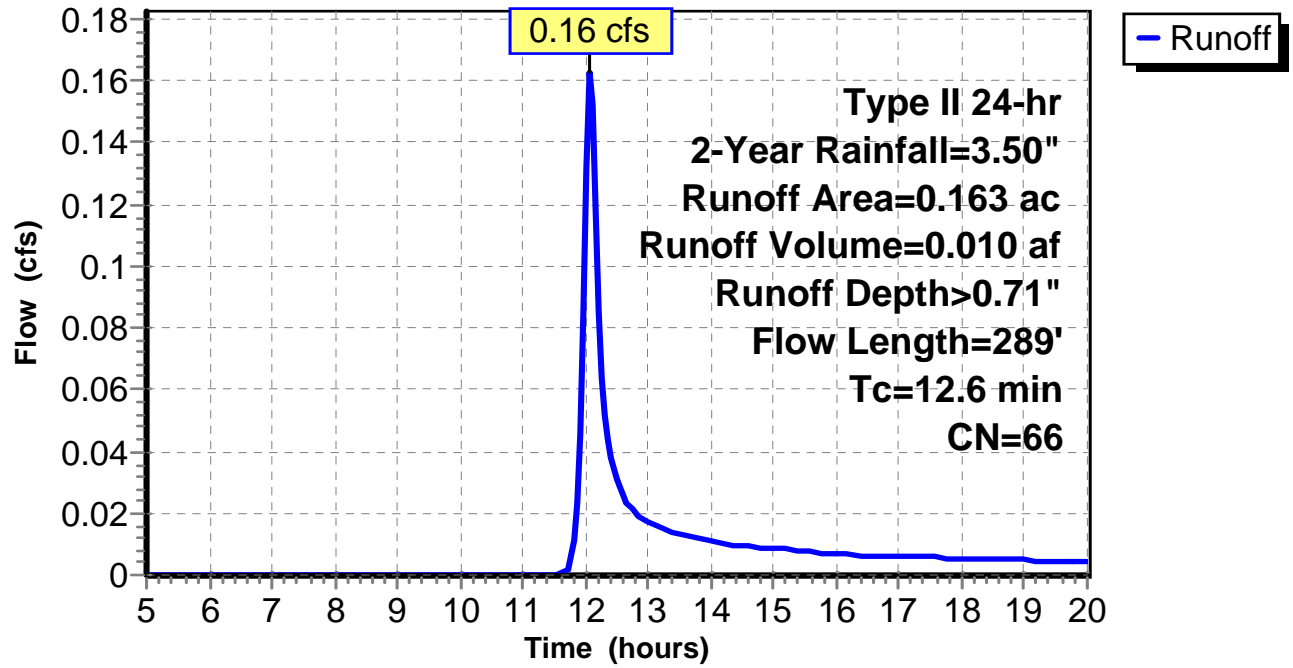
Subcatchment 5: C 252.001

Hydrograph



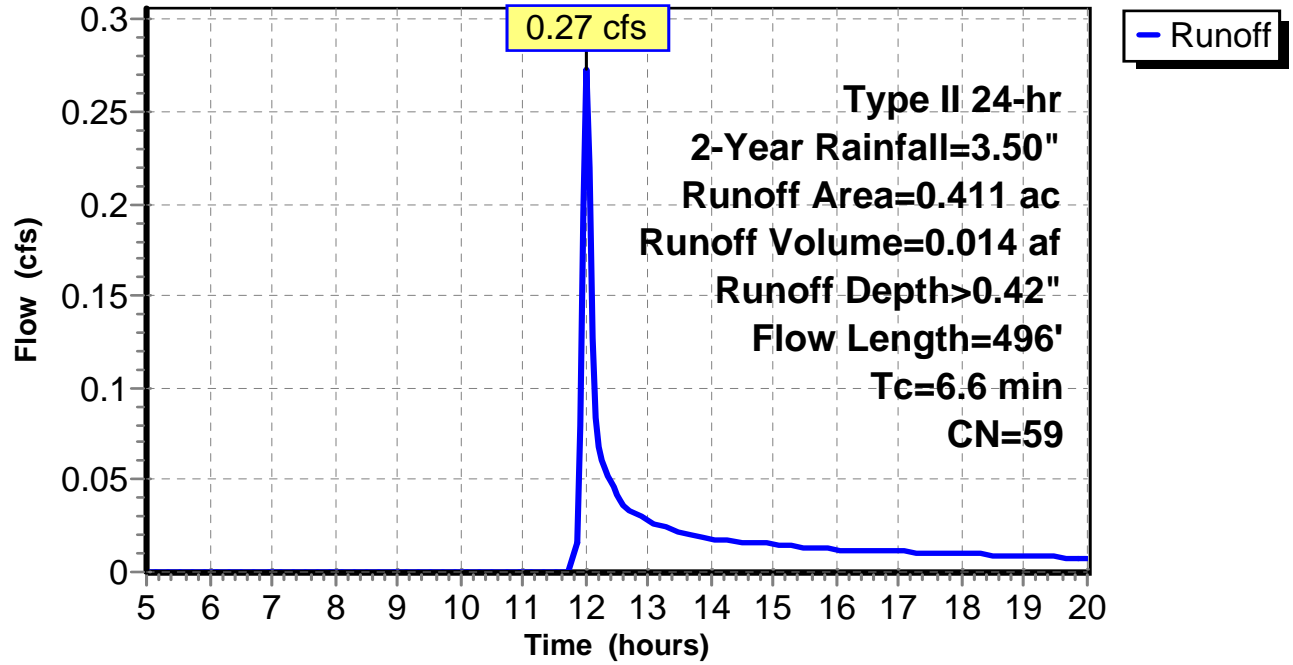
Subcatchment 6: C 252.002

Hydrograph



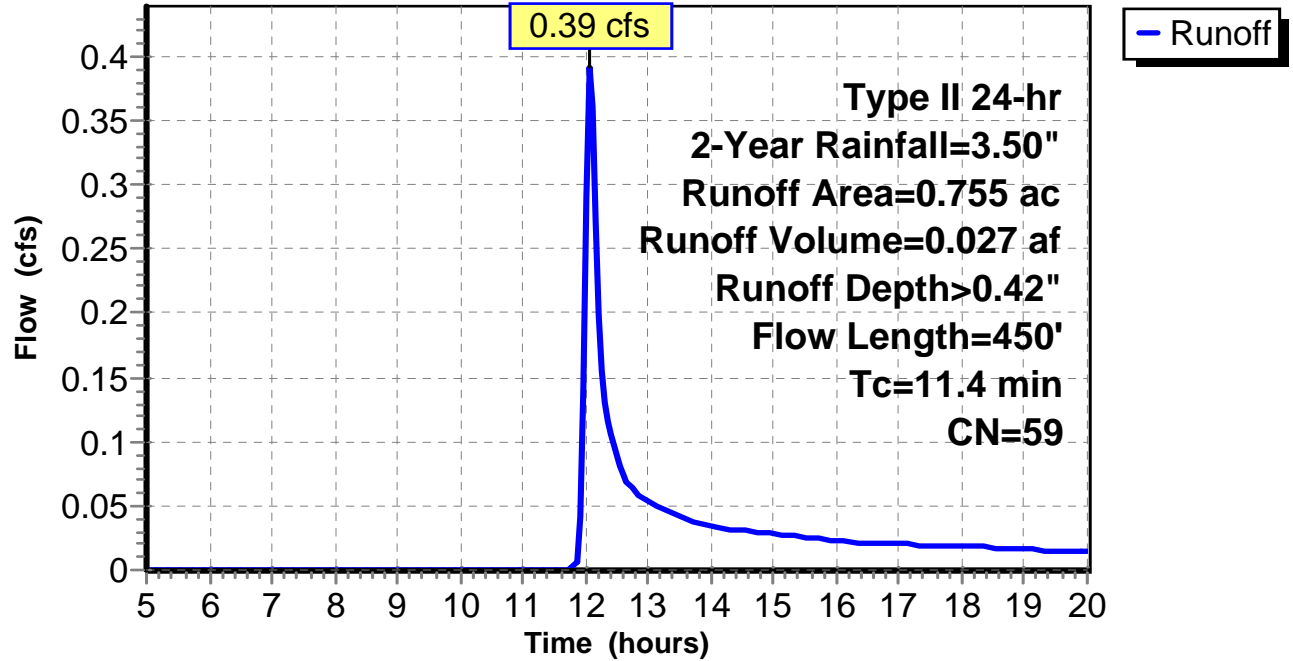
Subcatchment 7: C 252.003

Hydrograph



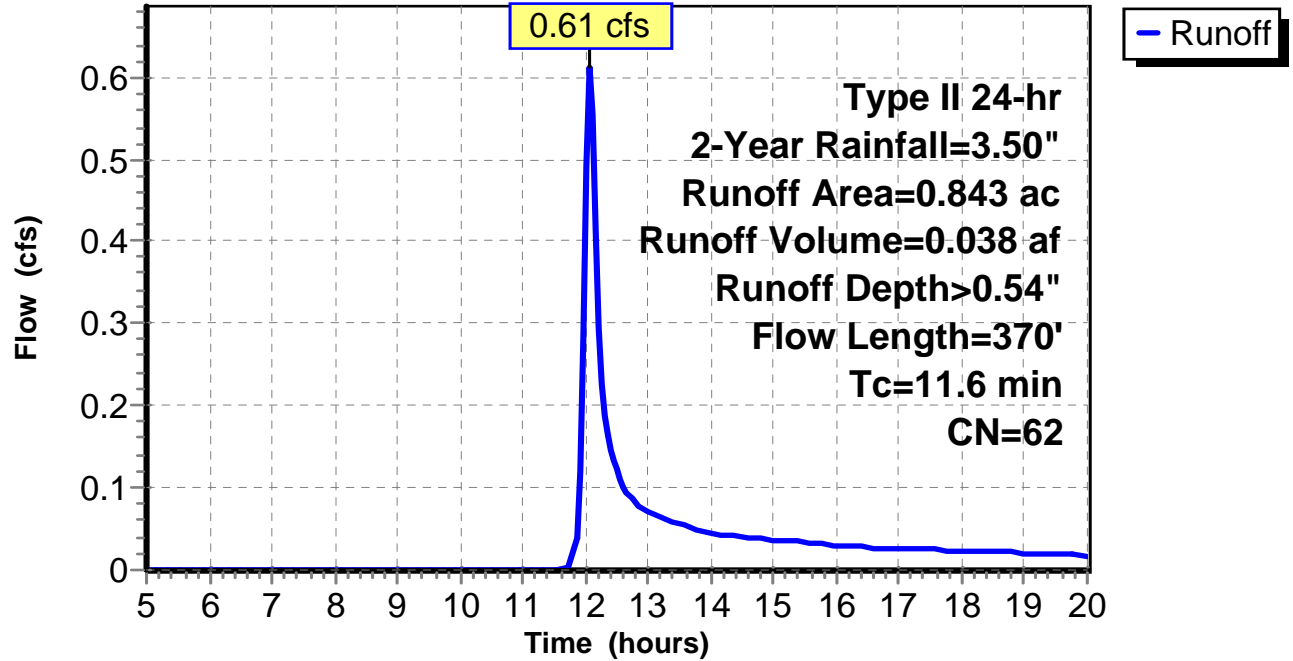
Subcatchment 8: C 252.004

Hydrograph



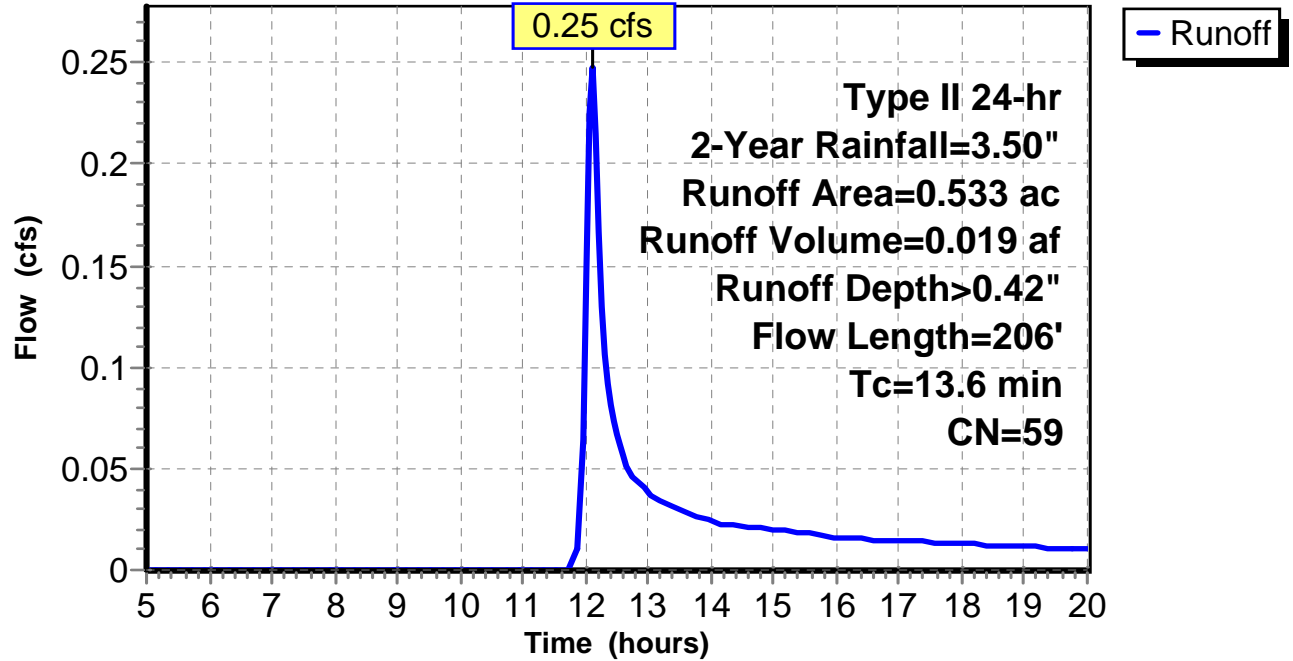
Subcatchment 9: C 252.005

Hydrograph



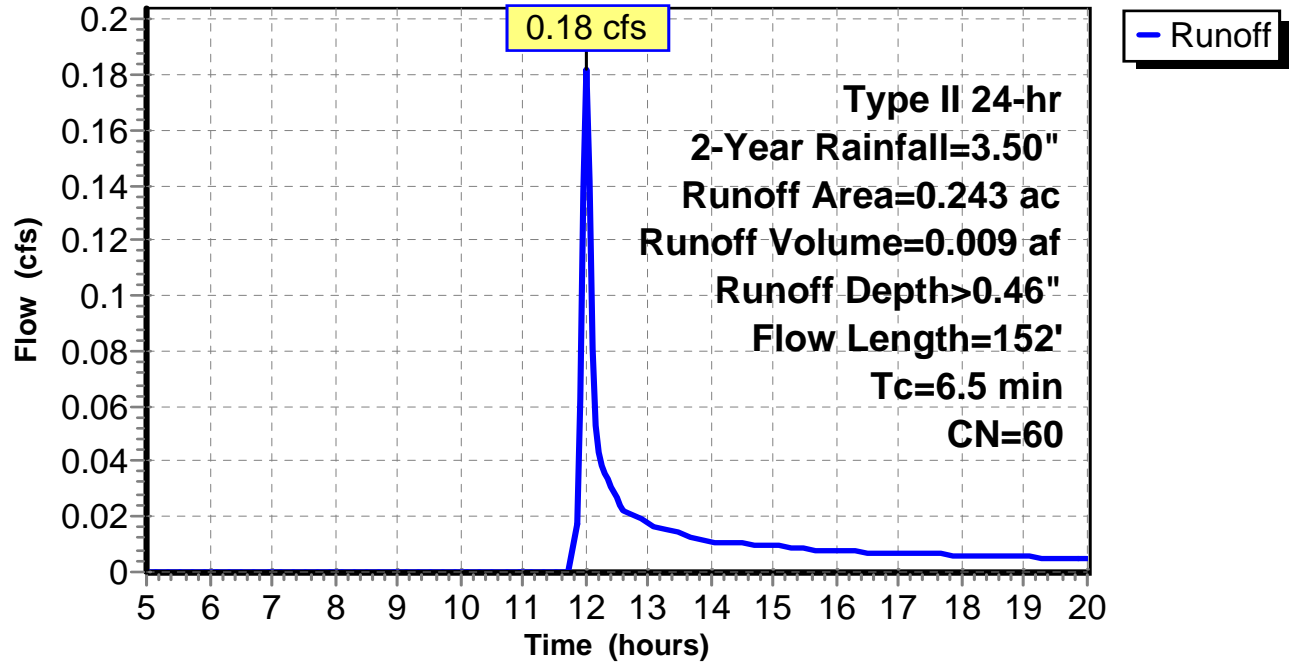
Subcatchment 10: C 252.006

Hydrograph



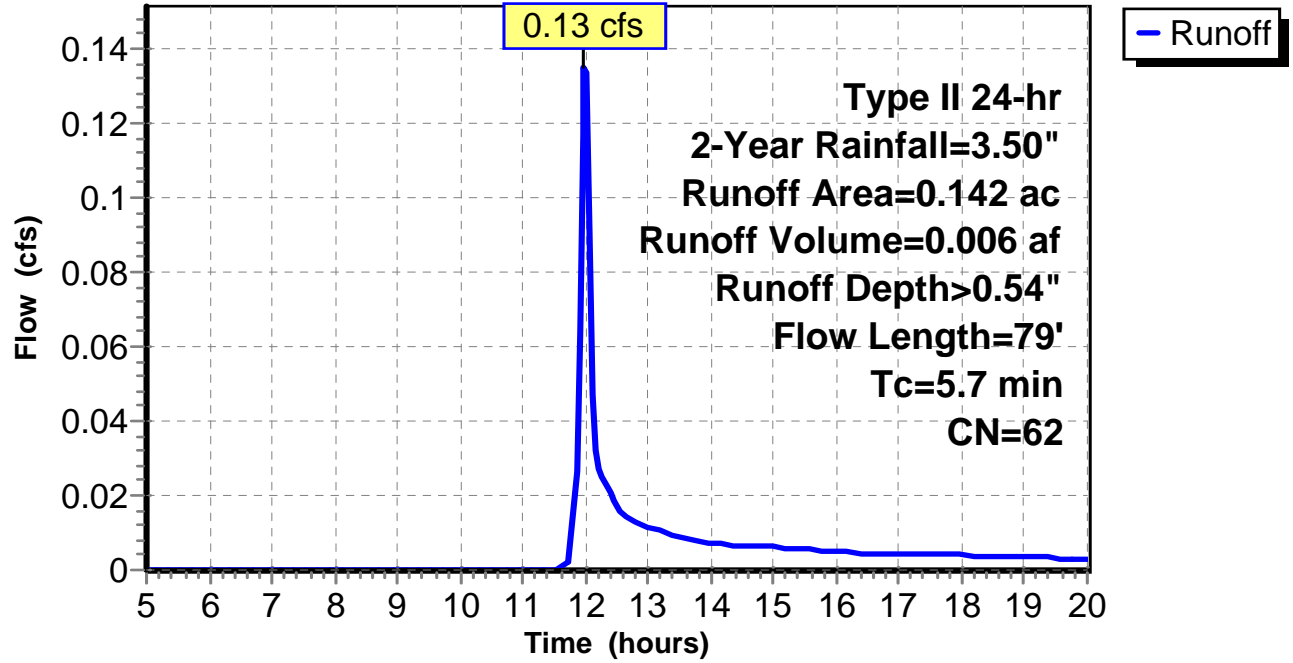
Subcatchment 11: C 252.007

Hydrograph



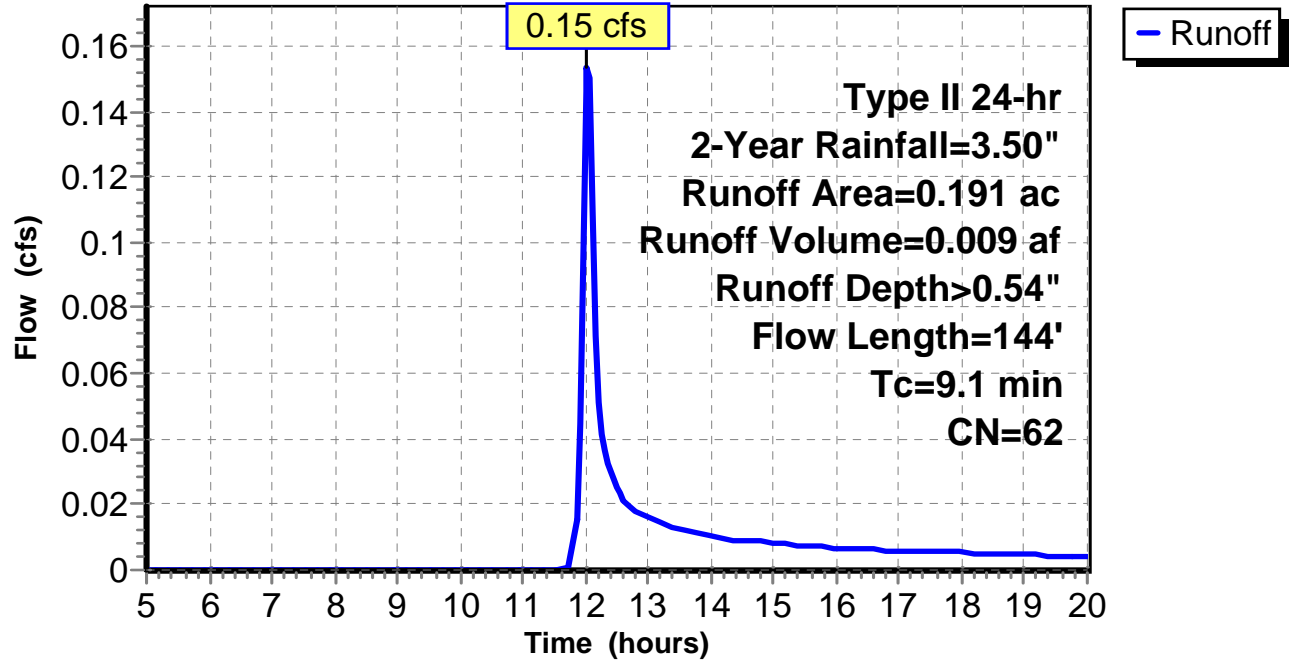
Subcatchment 12: C 252.008

Hydrograph



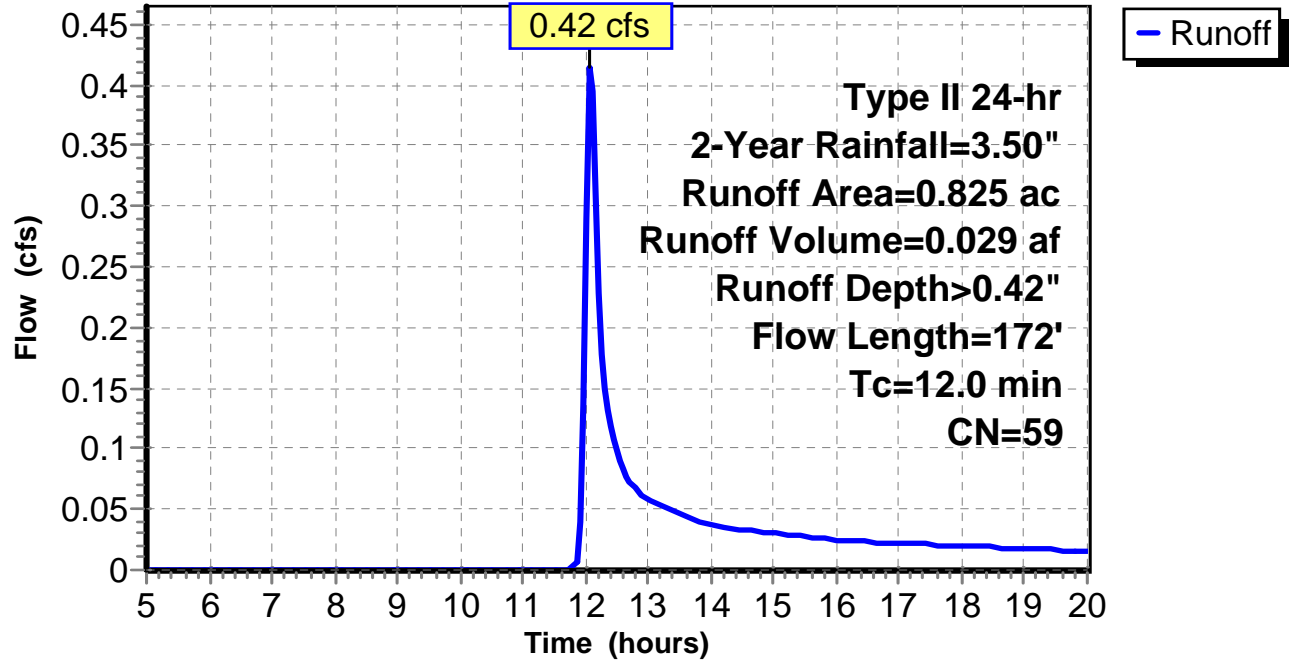
Subcatchment 13: C 252.009

Hydrograph



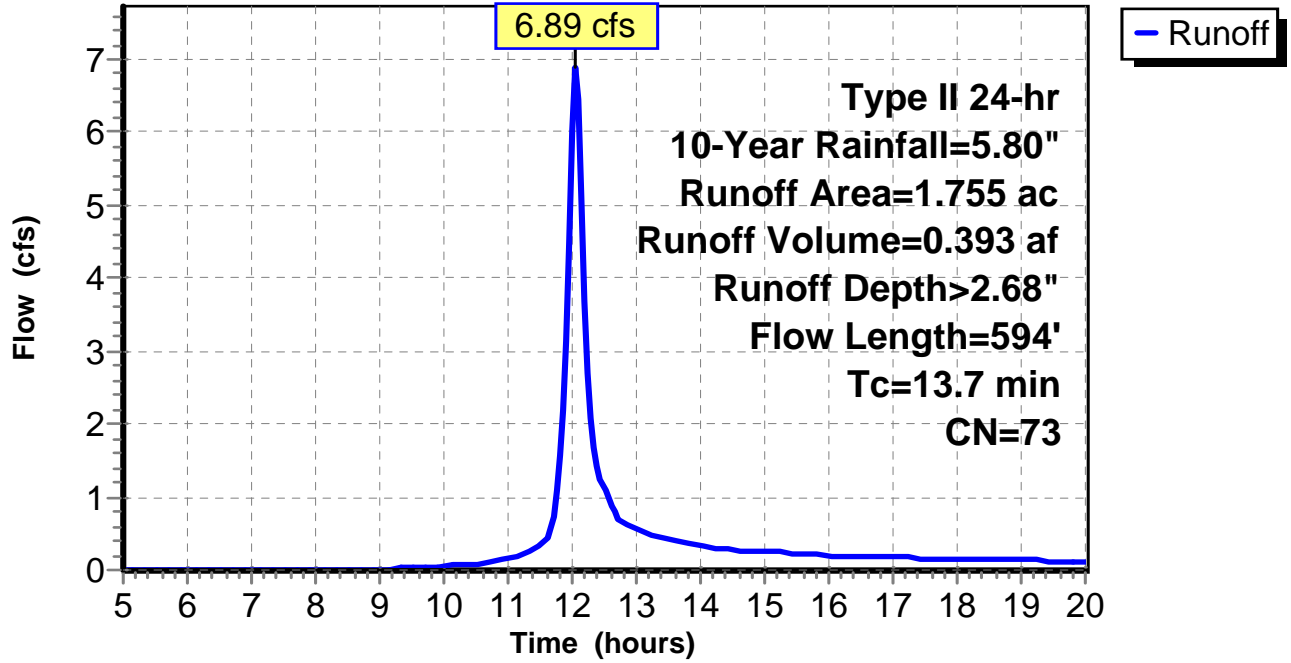
Subcatchment 14: C 252.010

Hydrograph



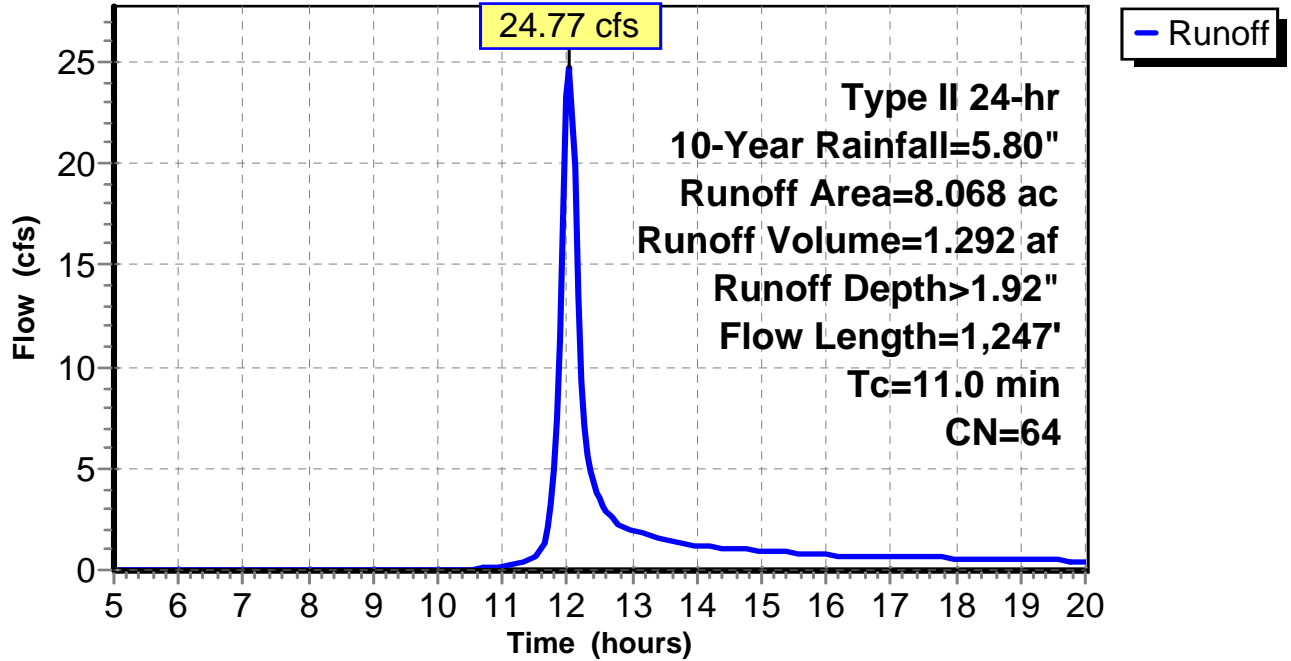
Subcatchment 1: C AR-700.017

Hydrograph



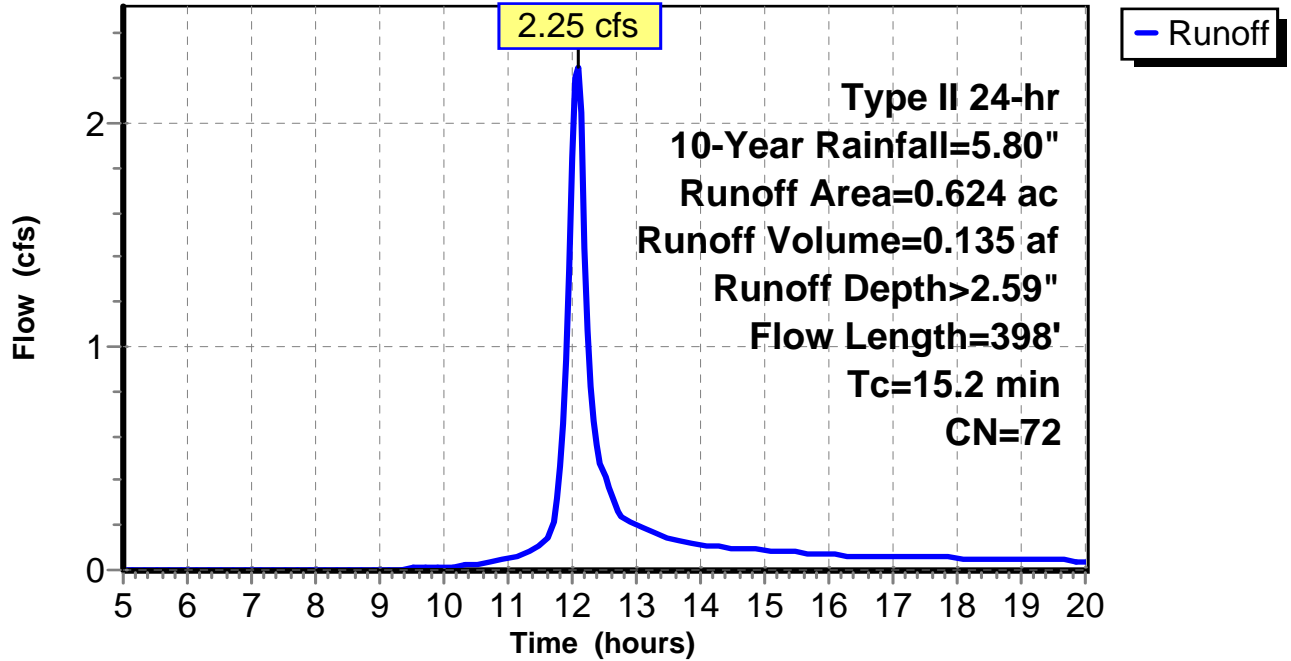
Subcatchment 2: C AR-700.018

Hydrograph



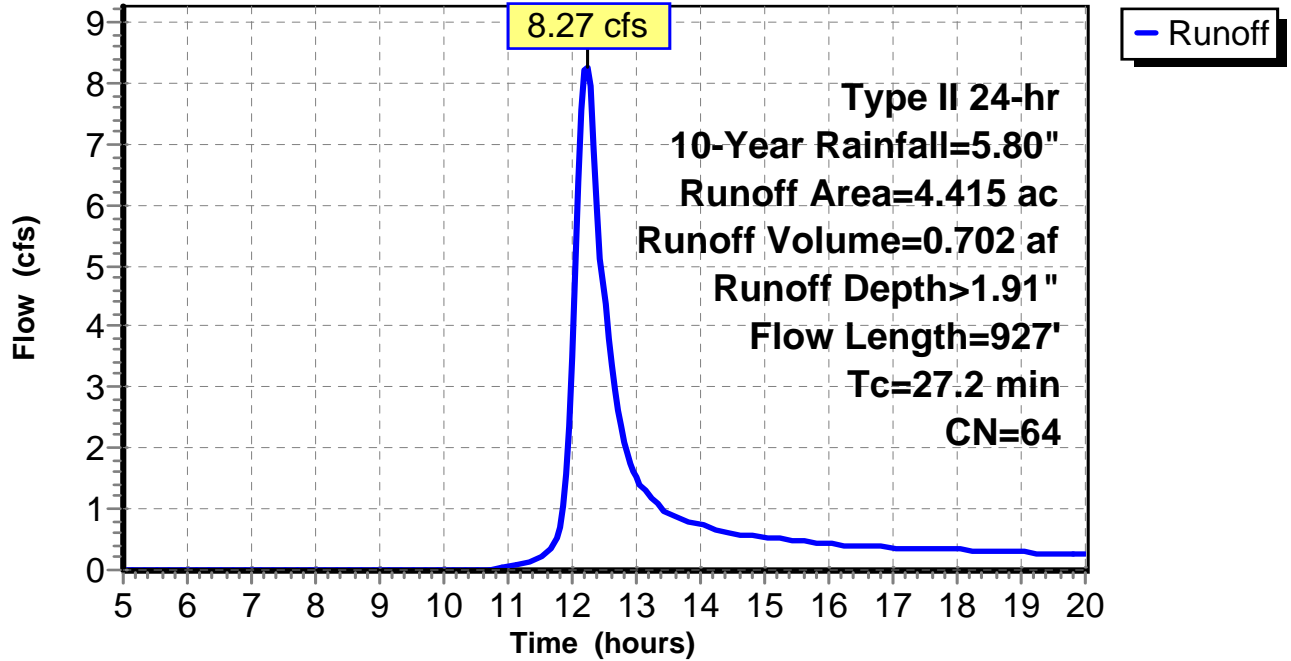
Subcatchment 3: C AR-700.019

Hydrograph



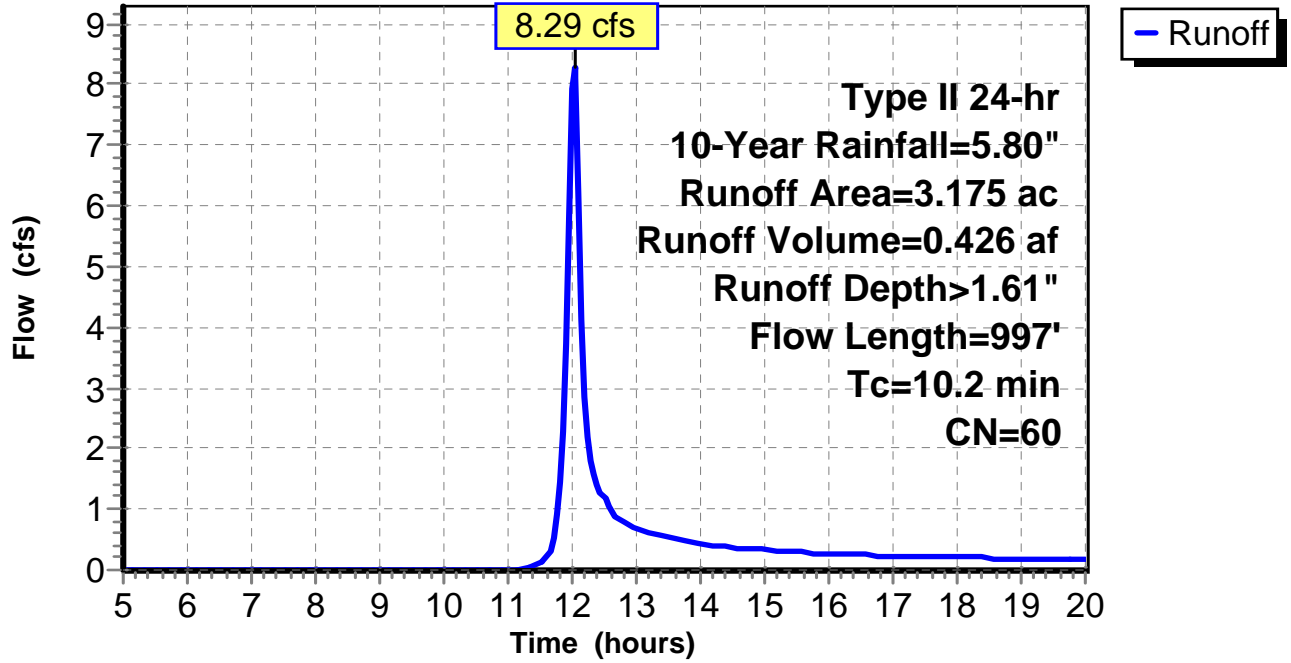
Subcatchment 4: C AR-700.020

Hydrograph



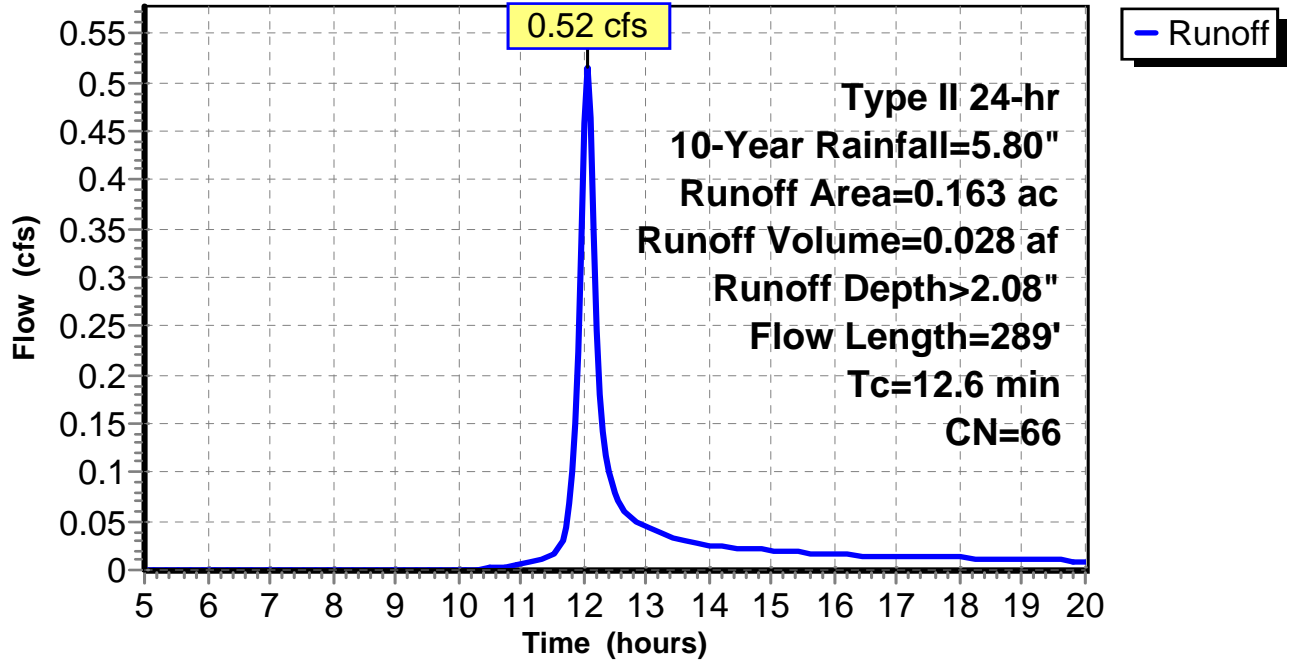
Subcatchment 5: C 252.001

Hydrograph



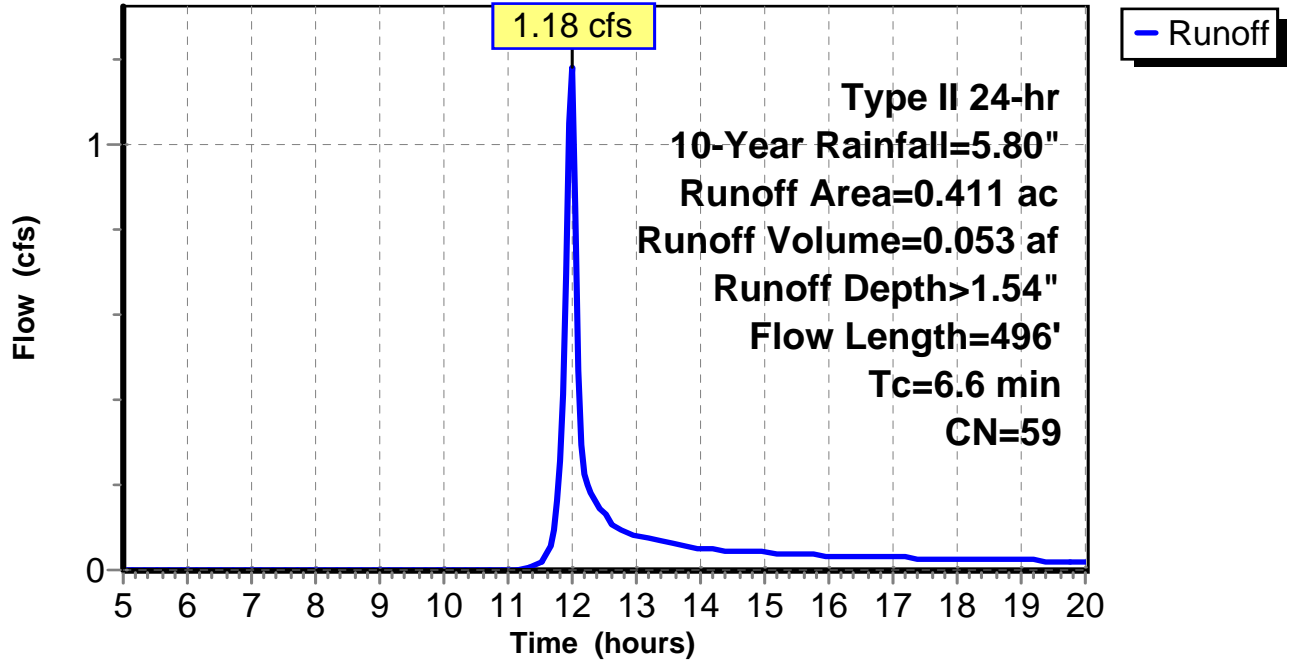
Subcatchment 6: C 252.002

Hydrograph



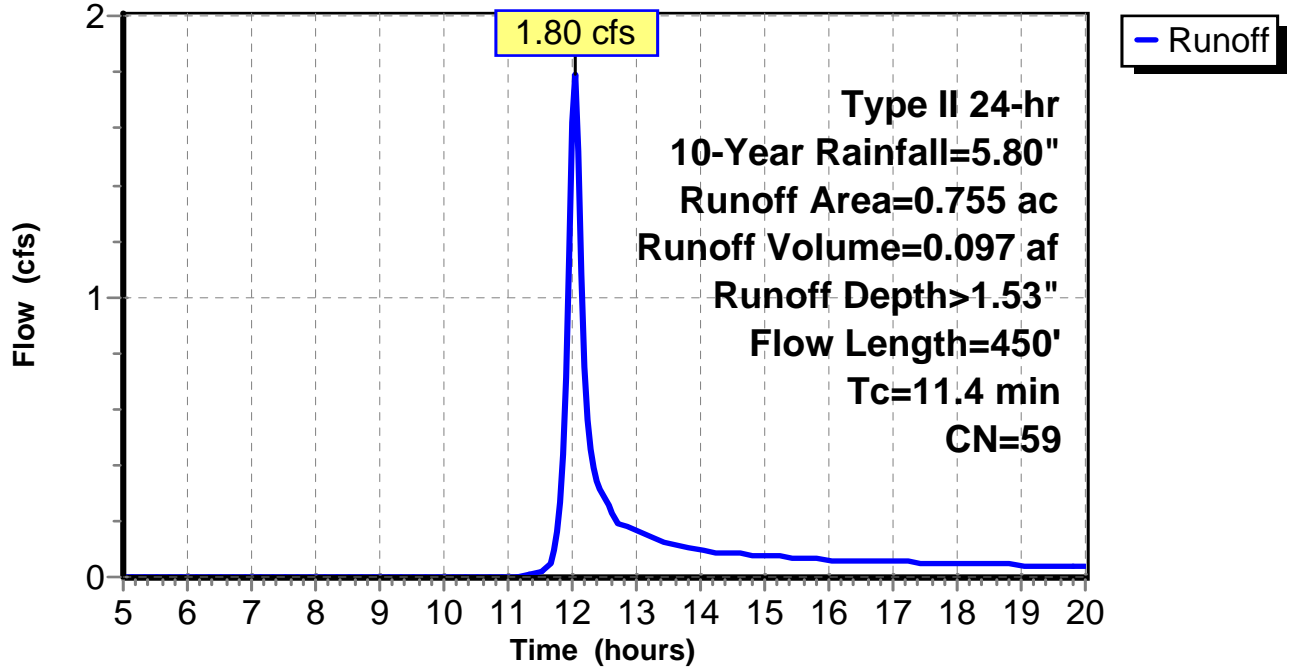
Subcatchment 7: C 252.003

Hydrograph



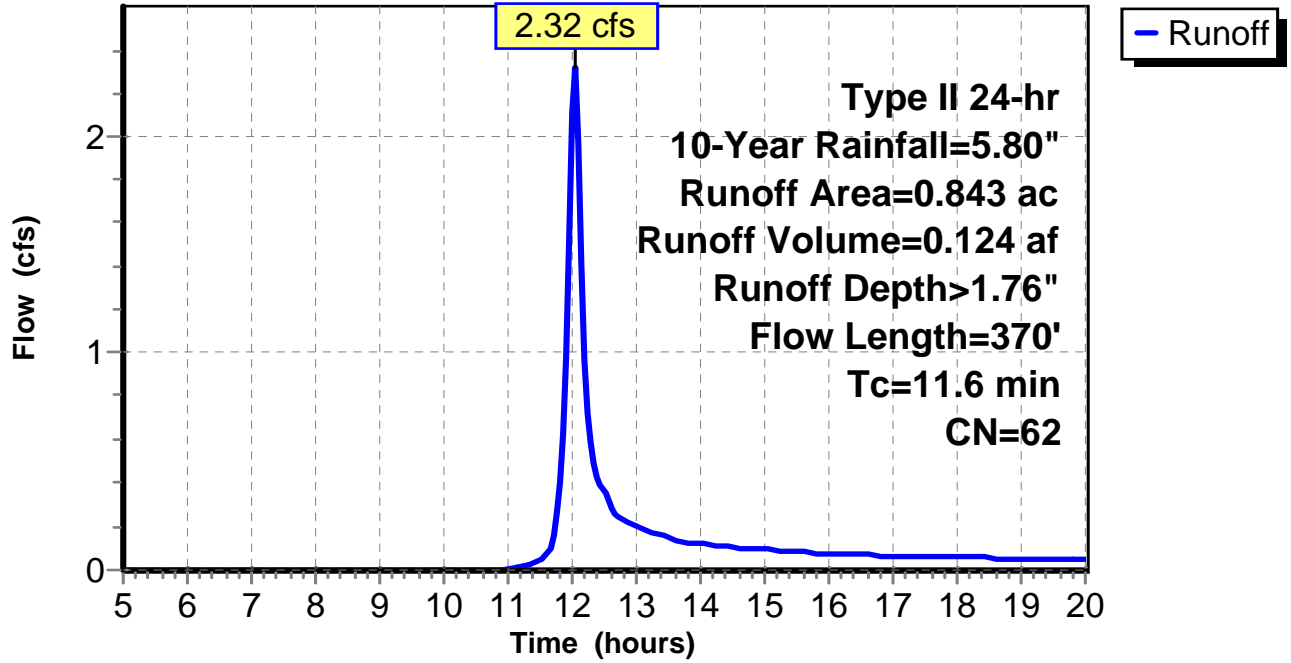
Subcatchment 8: C 252.004

Hydrograph



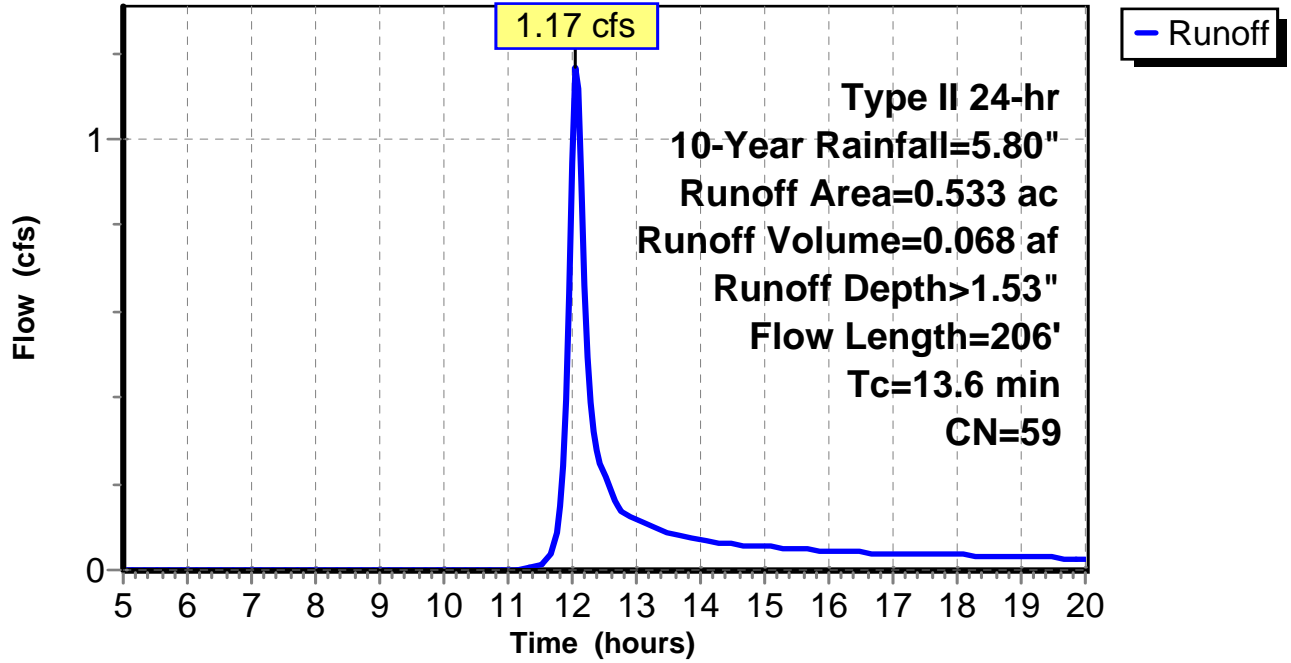
Subcatchment 9: C 252.005

Hydrograph



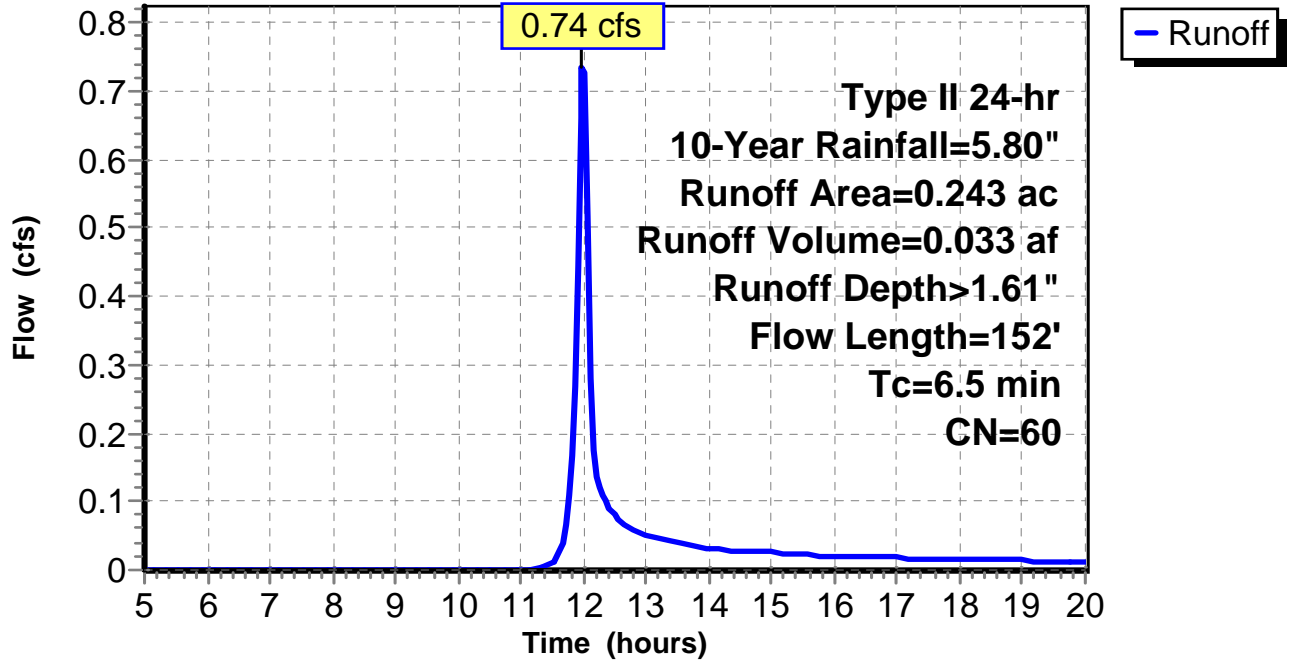
Subcatchment 10: C 252.006

Hydrograph



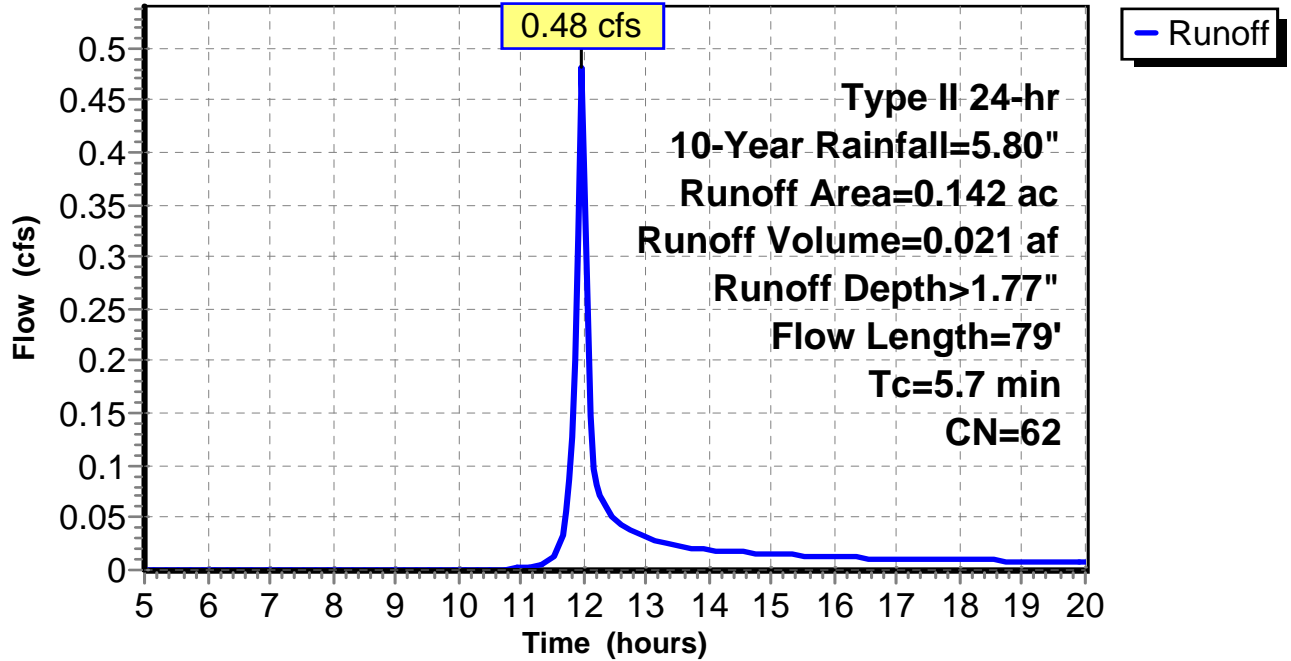
Subcatchment 11: C 252.007

Hydrograph



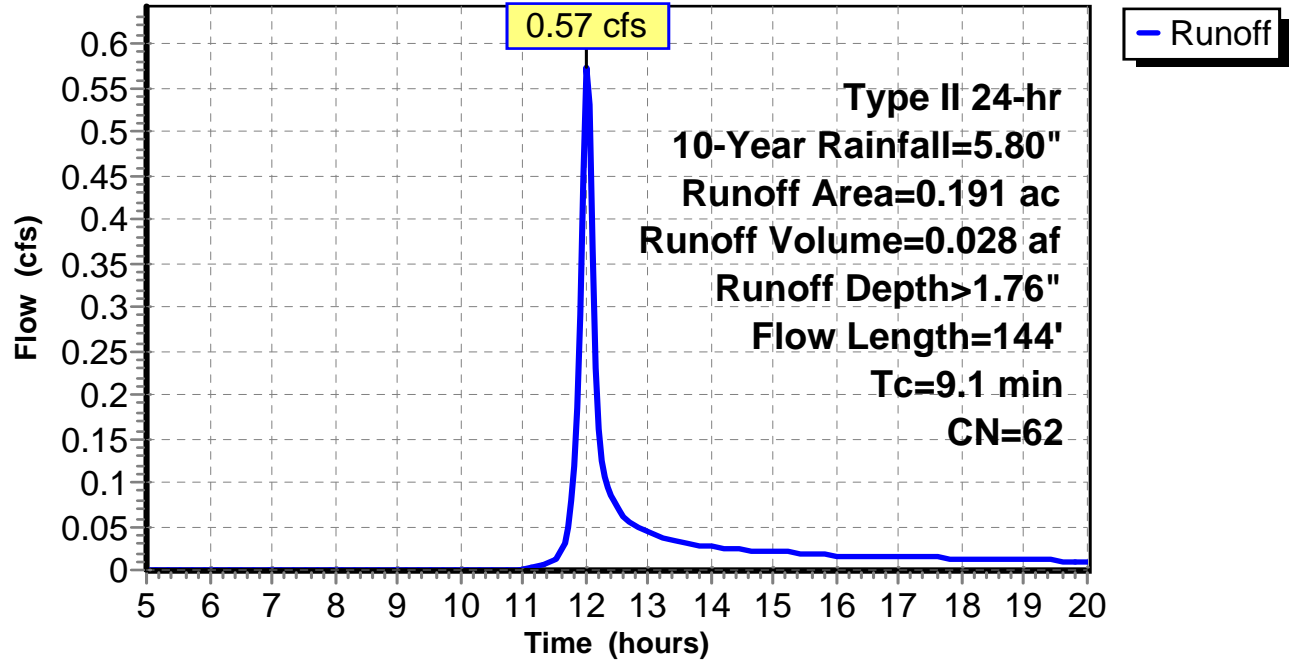
Subcatchment 12: C 252.008

Hydrograph



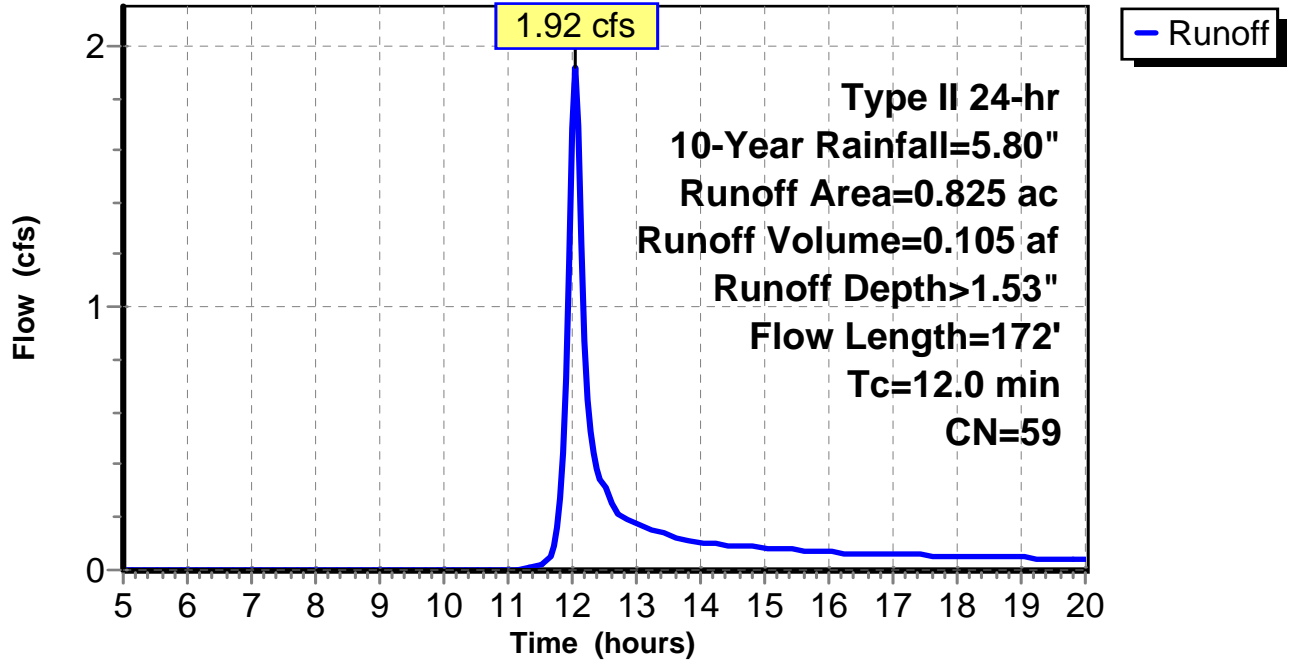
Subcatchment 13: C 252.009

Hydrograph



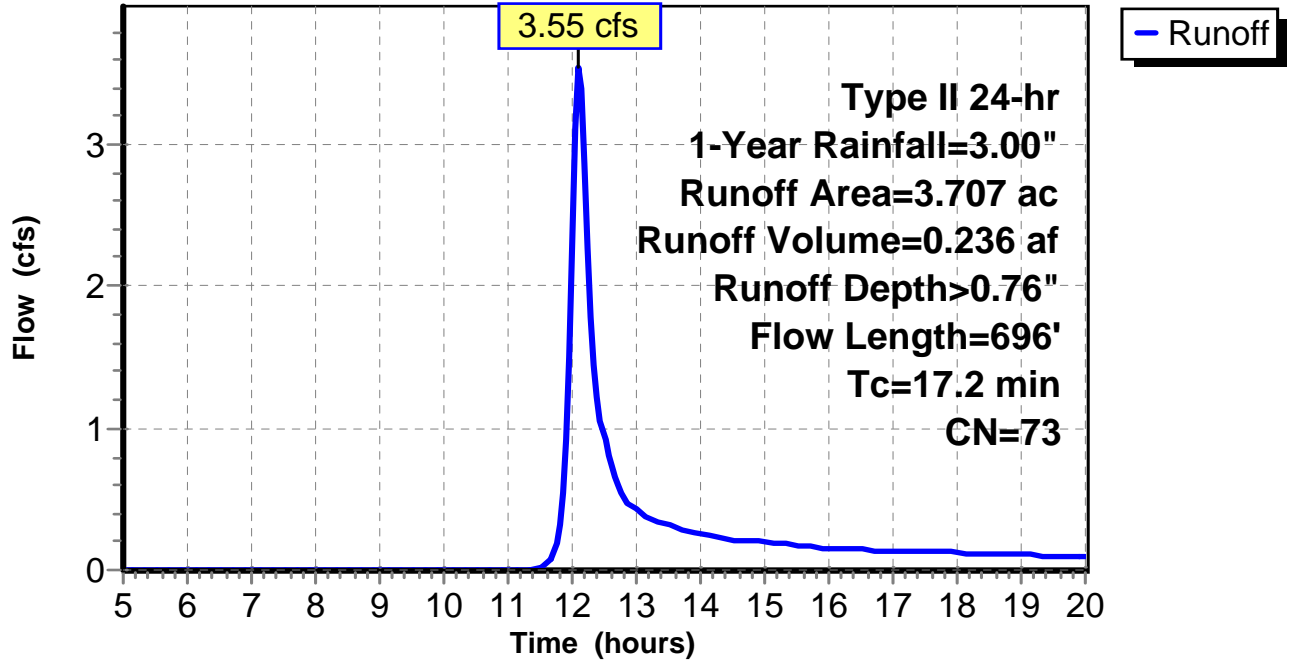
Subcatchment 14: C 252.010

Hydrograph



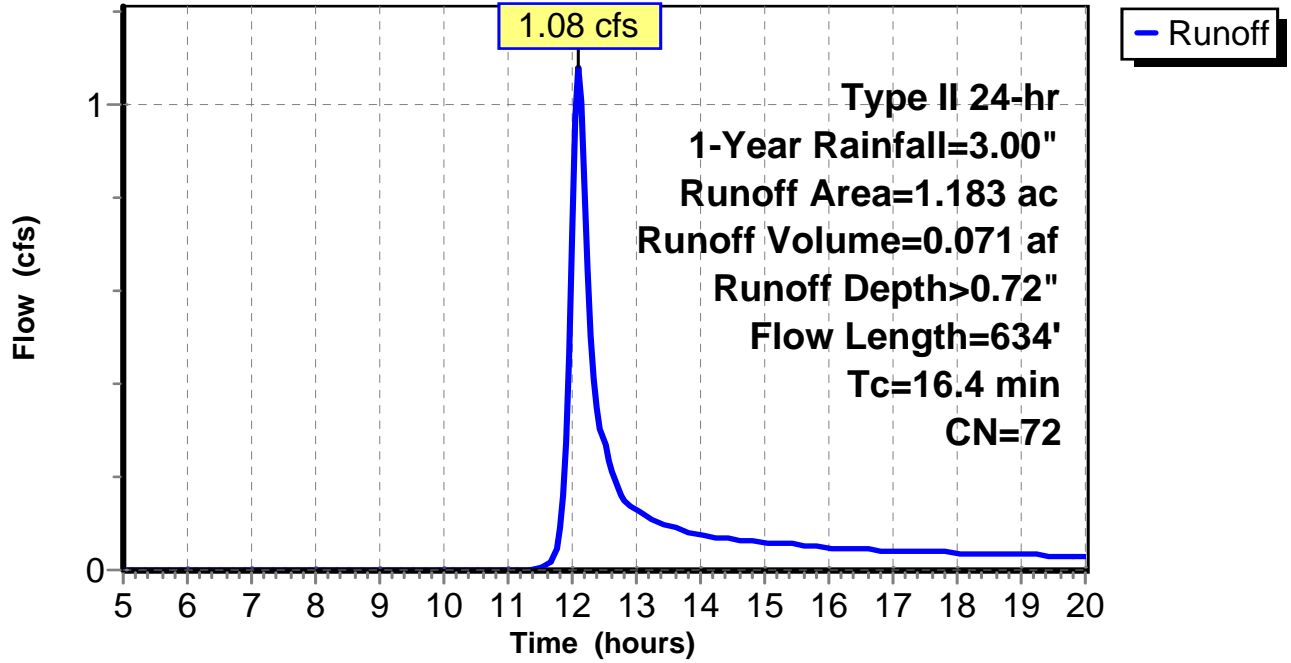
Subcatchment 1: C AR-701.001

Hydrograph



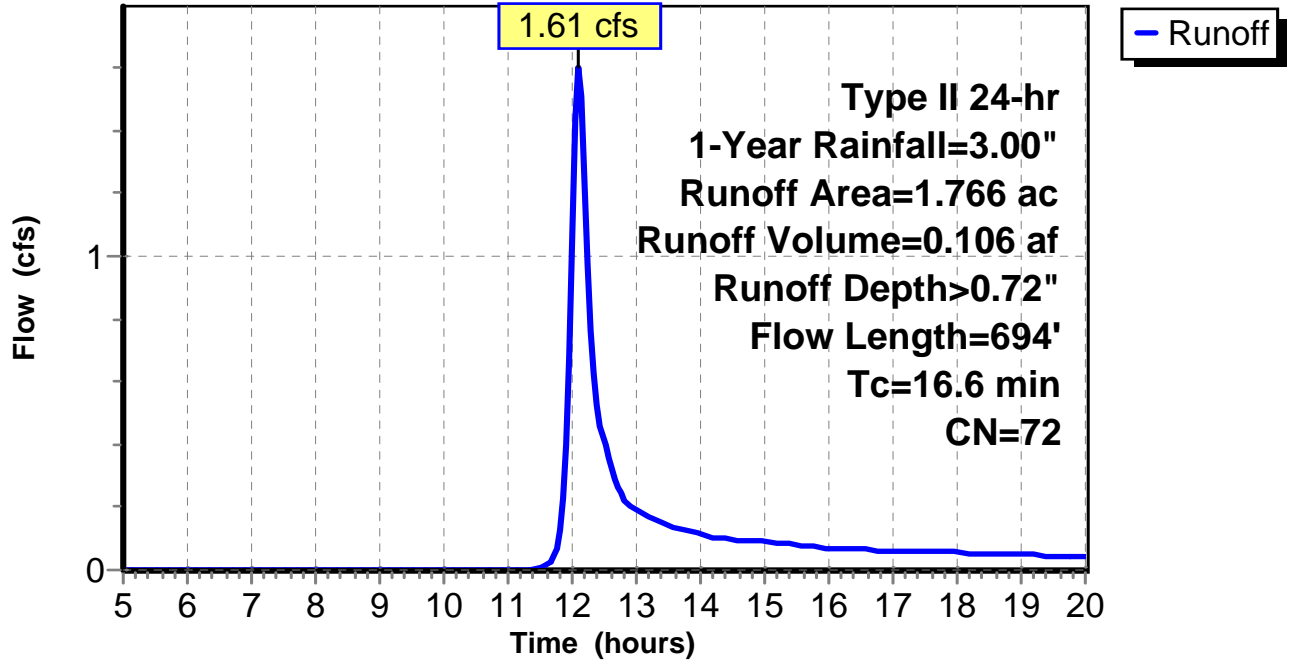
Subcatchment 2: C AR-701.002

Hydrograph



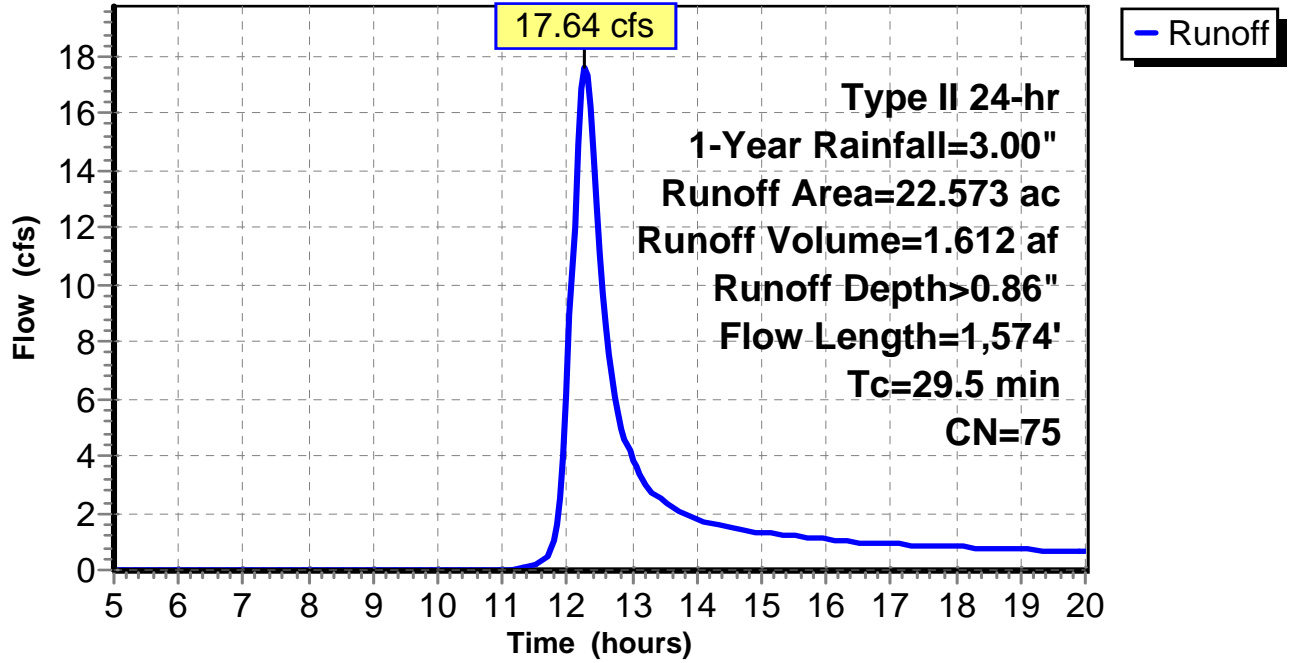
Subcatchment 3: C AR-701.003

Hydrograph



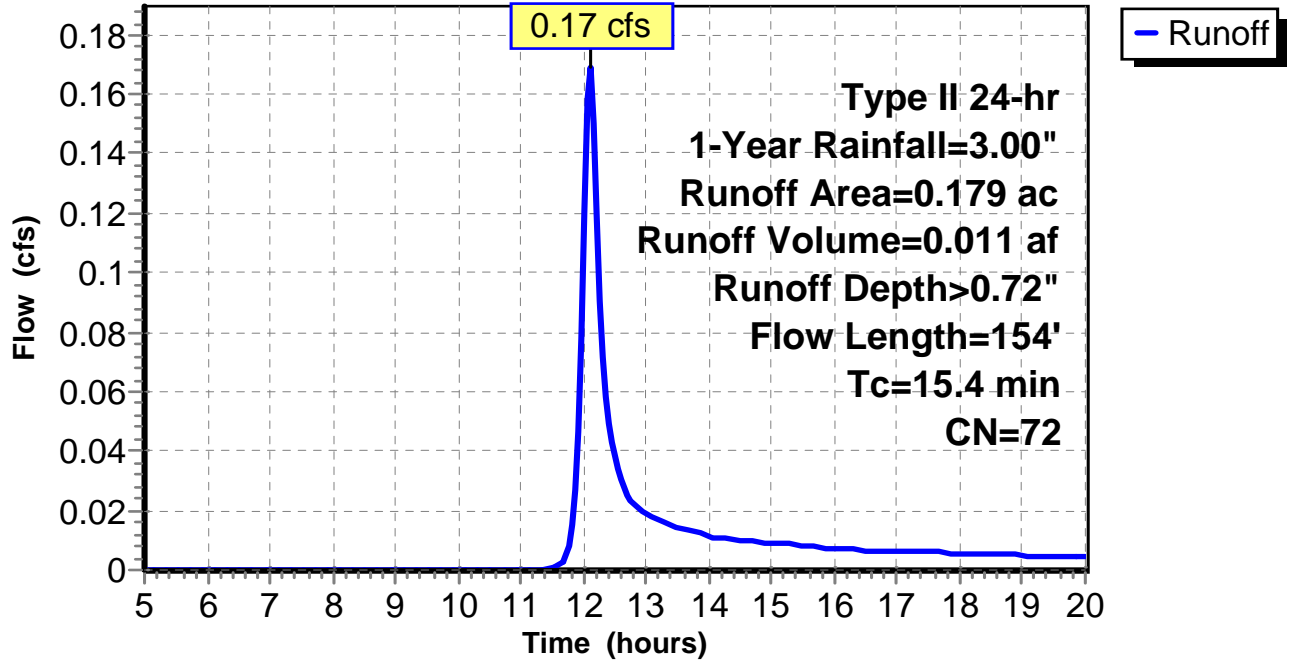
Subcatchment 4: C AR-701.004

Hydrograph



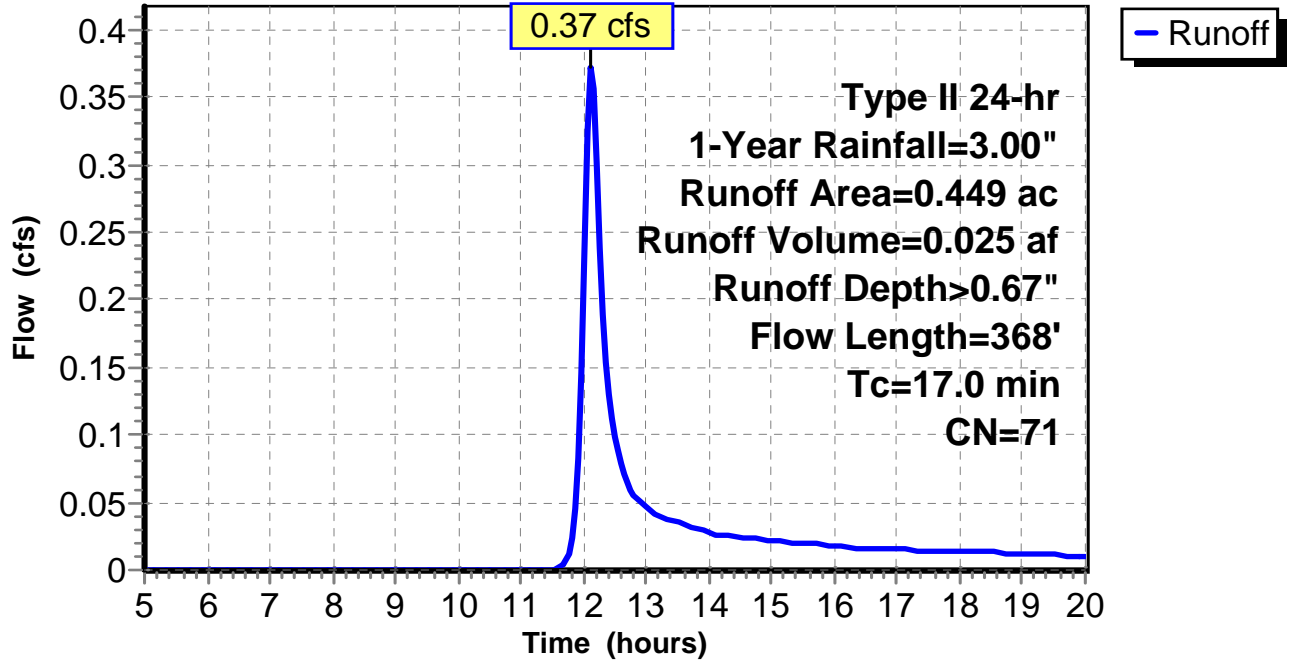
Subcatchment 5: C AR-701.005

Hydrograph



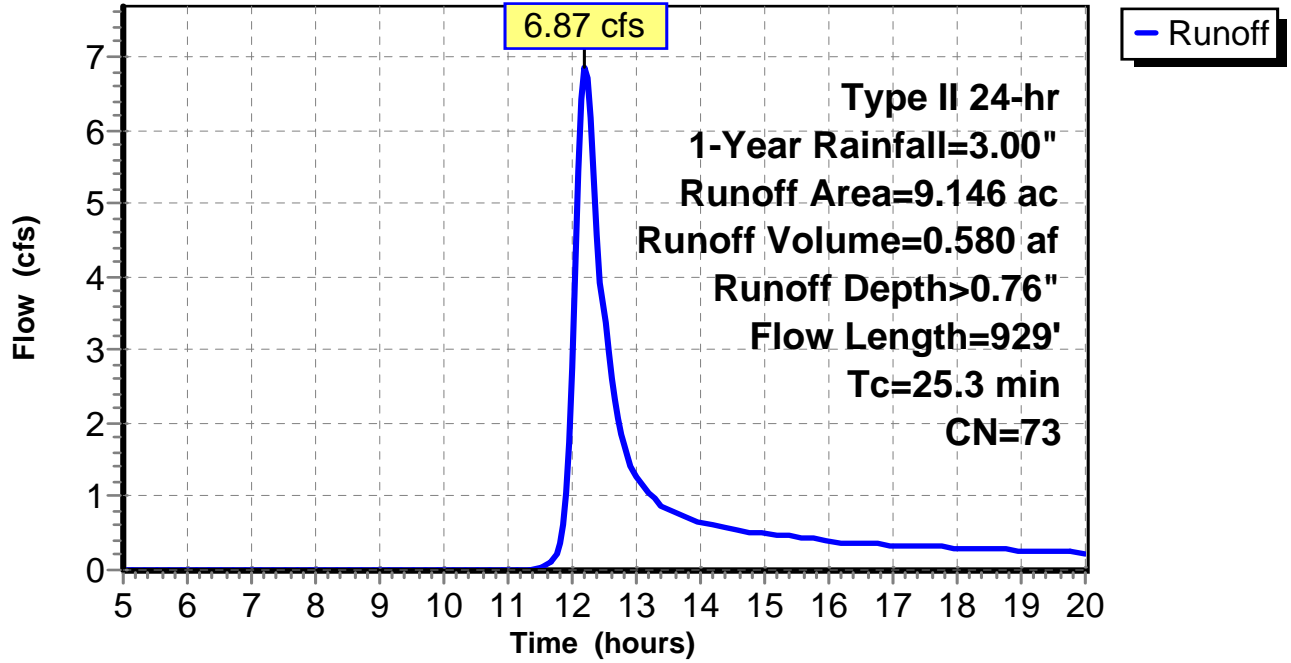
Subcatchment 6: C AR-701.006

Hydrograph



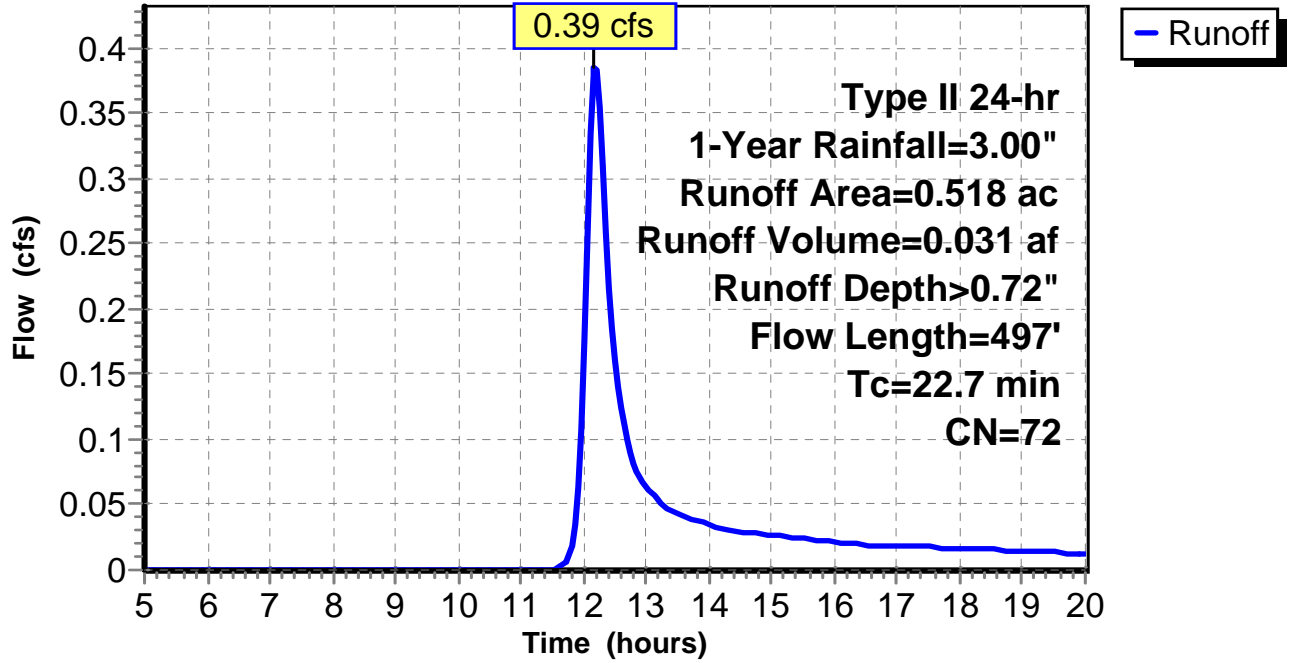
Subcatchment 7: C AR-701.007

Hydrograph



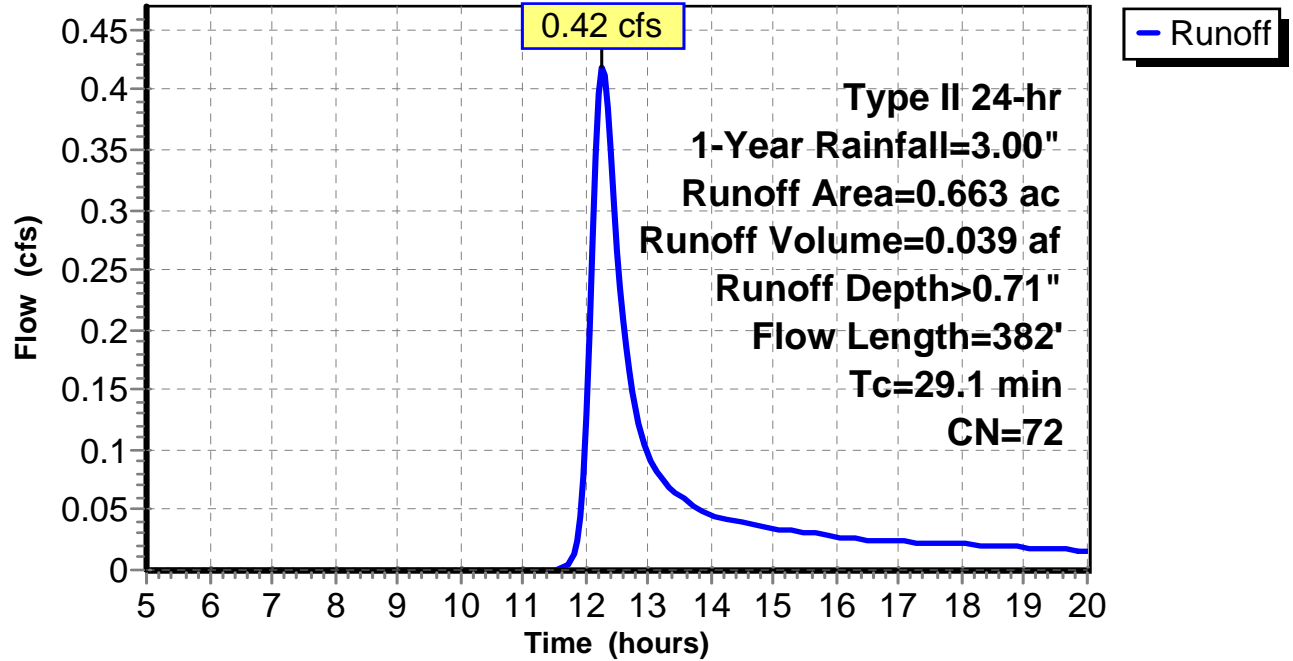
Subcatchment 8: C AR-701.008

Hydrograph



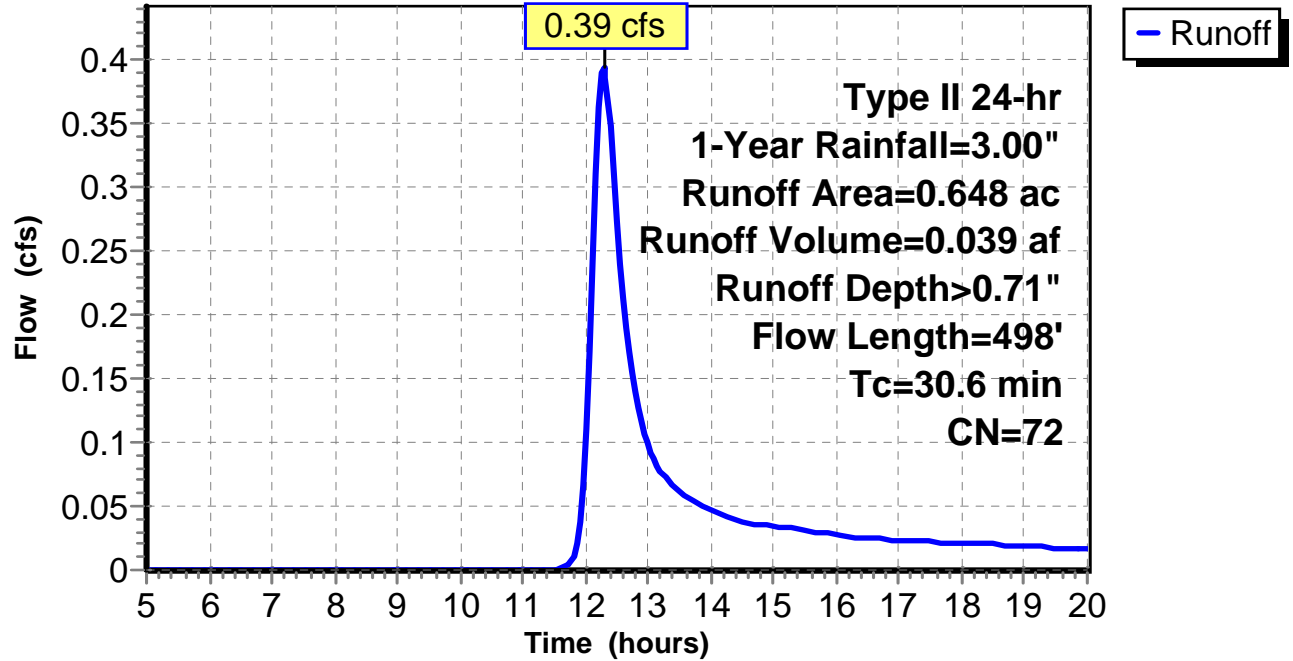
Subcatchment 9: C AR-701.009

Hydrograph



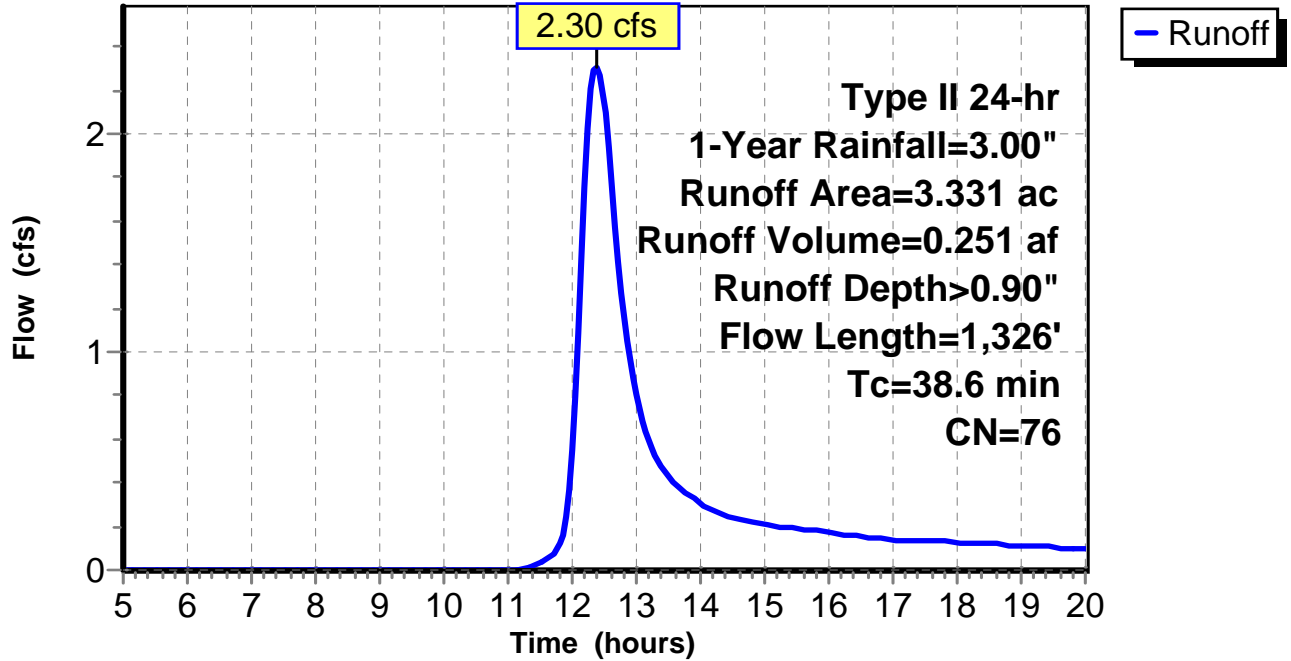
Subcatchment 10: C 255.001

Hydrograph



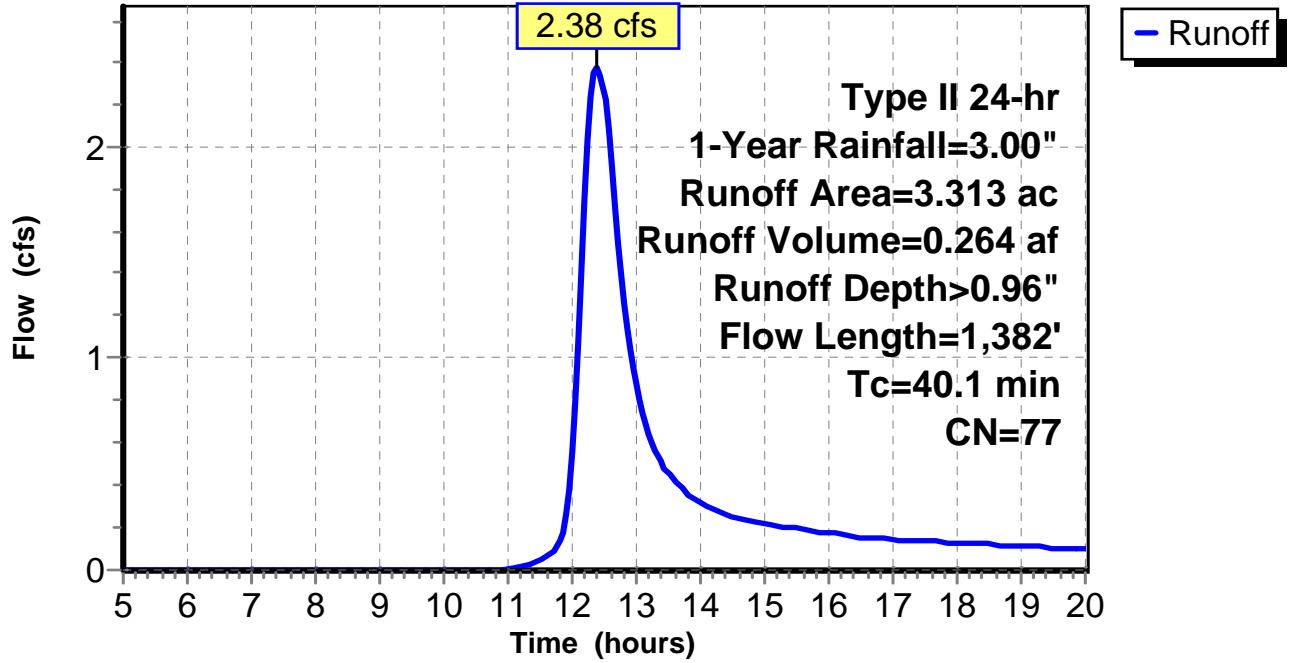
Subcatchment 11: C 255.002

Hydrograph



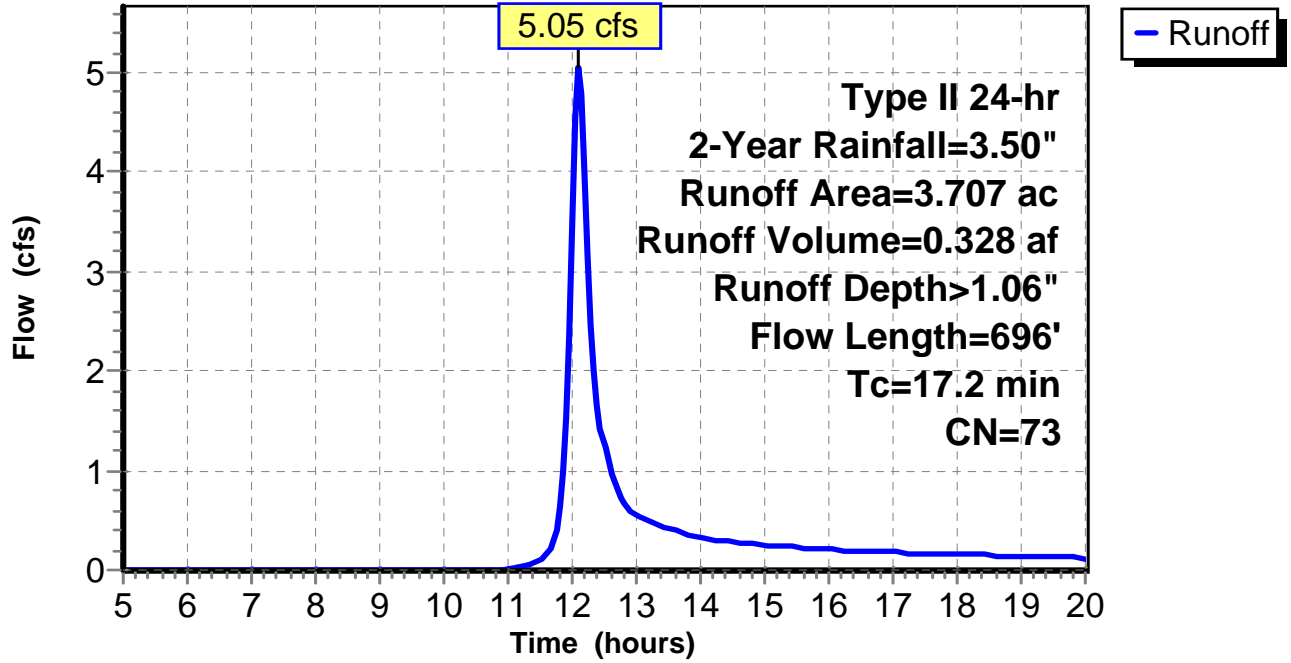
Subcatchment 12: C 255.003

Hydrograph



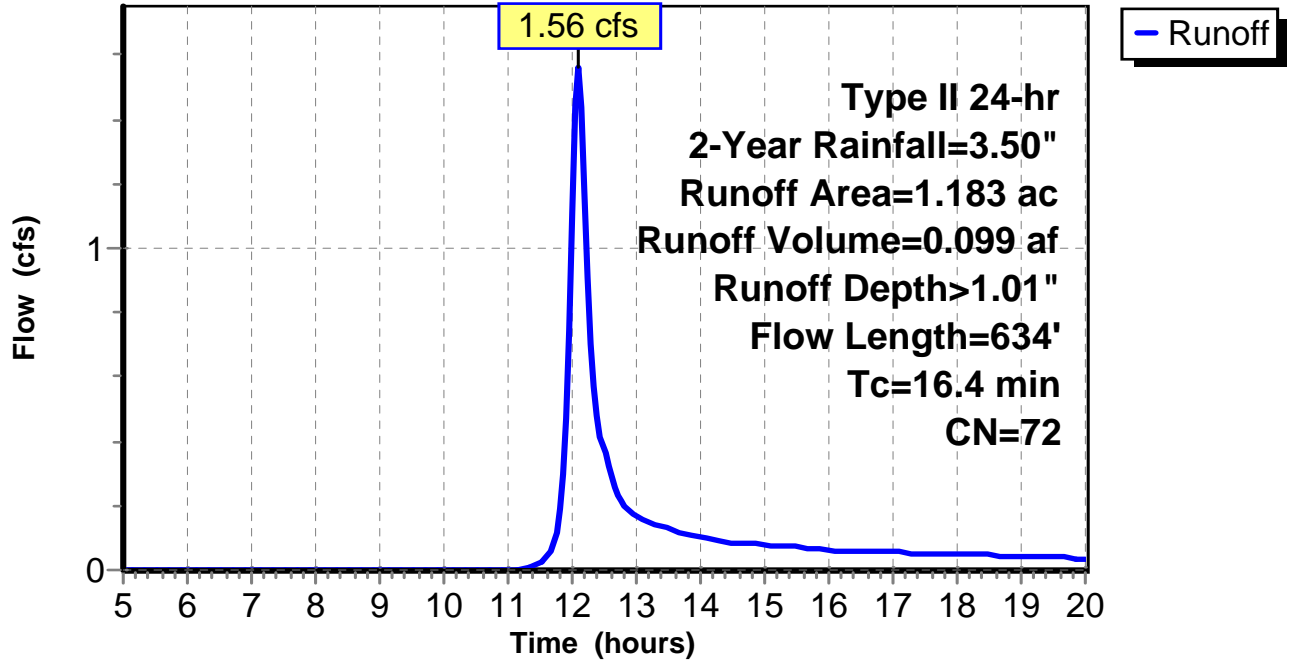
Subcatchment 1: C AR-701.001

Hydrograph



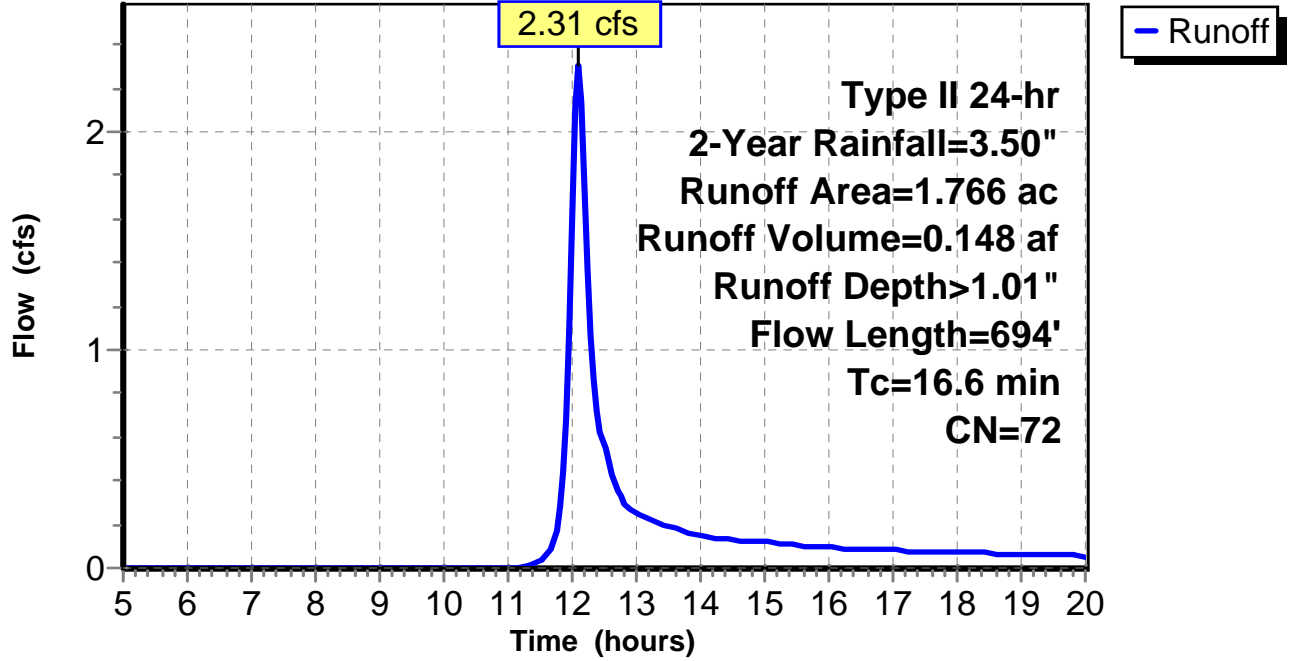
Subcatchment 2: C AR-701.002

Hydrograph



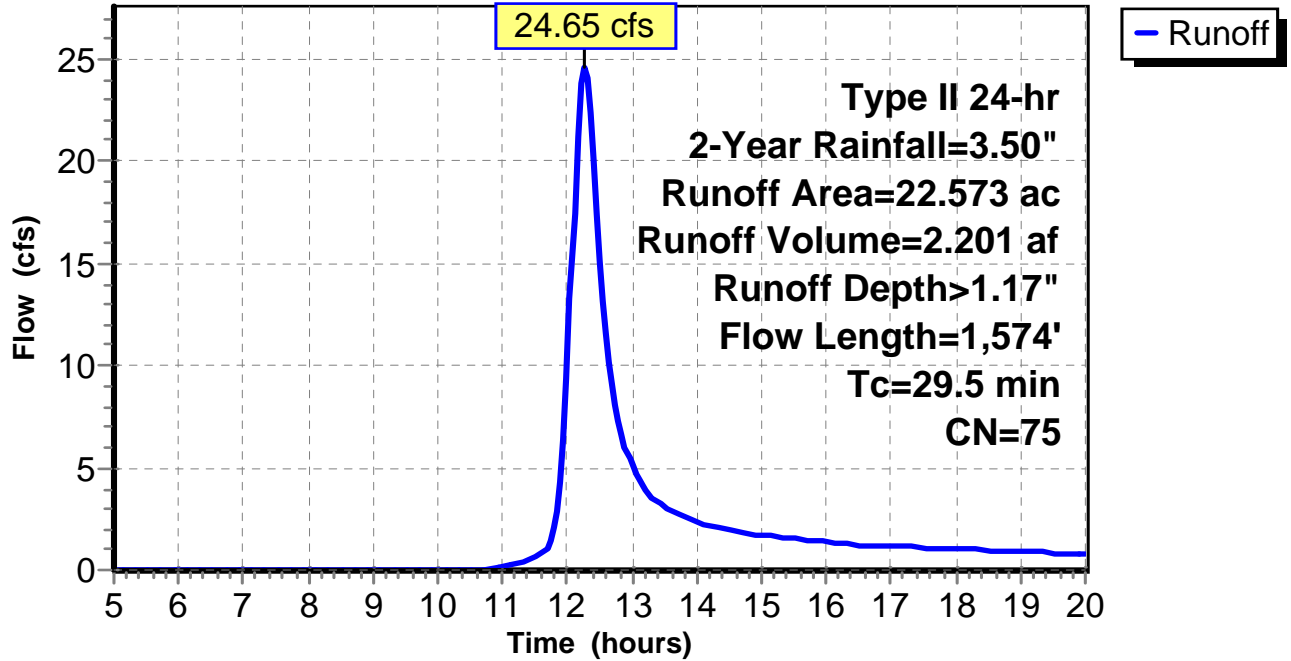
Subcatchment 3: C AR-701.003

Hydrograph



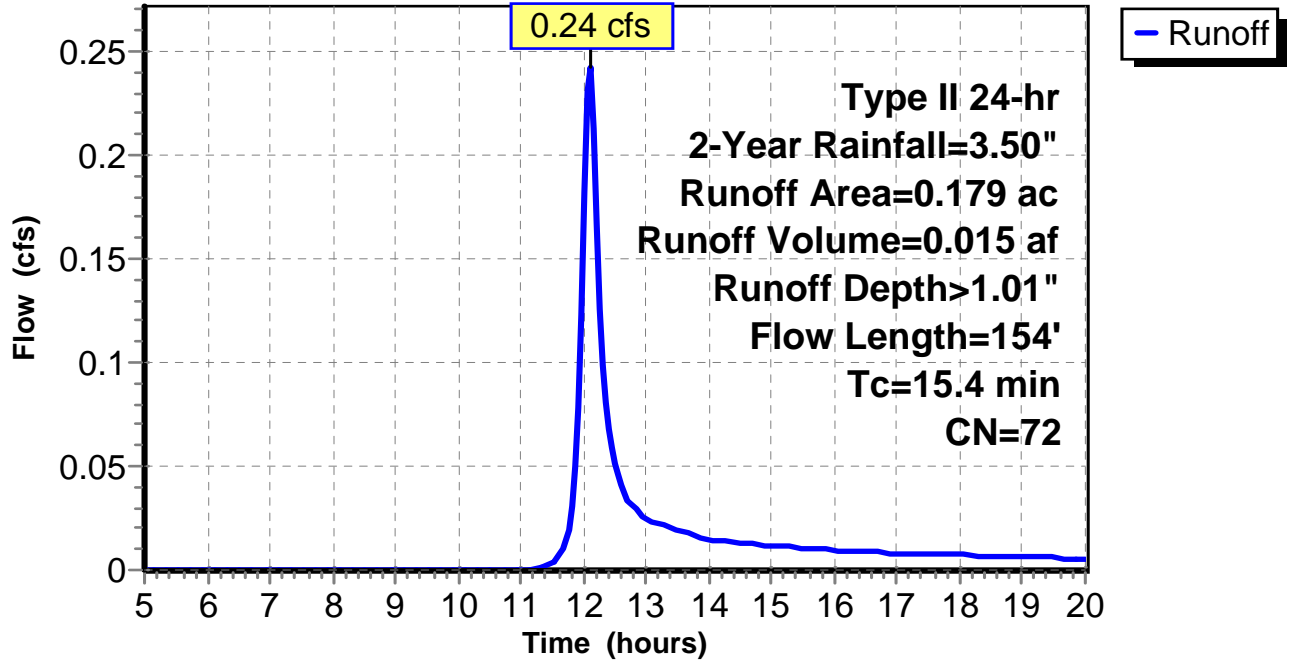
Subcatchment 4: C AR-701.004

Hydrograph



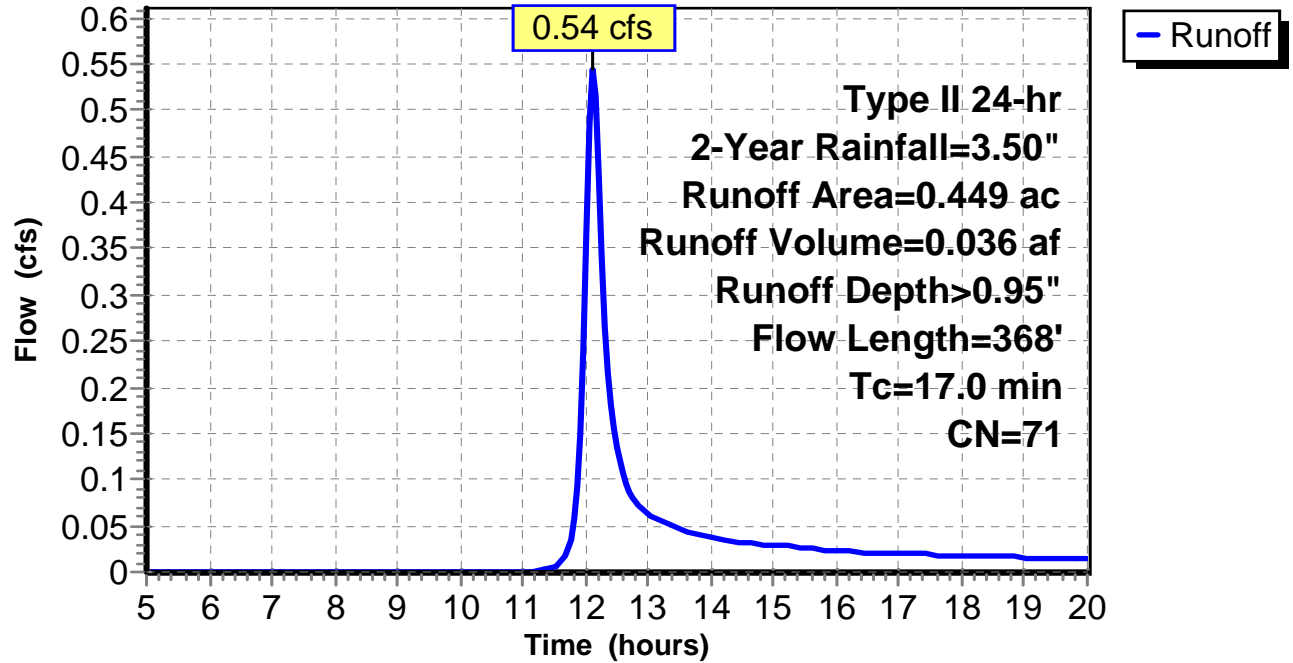
Subcatchment 5: C AR-701.005

Hydrograph



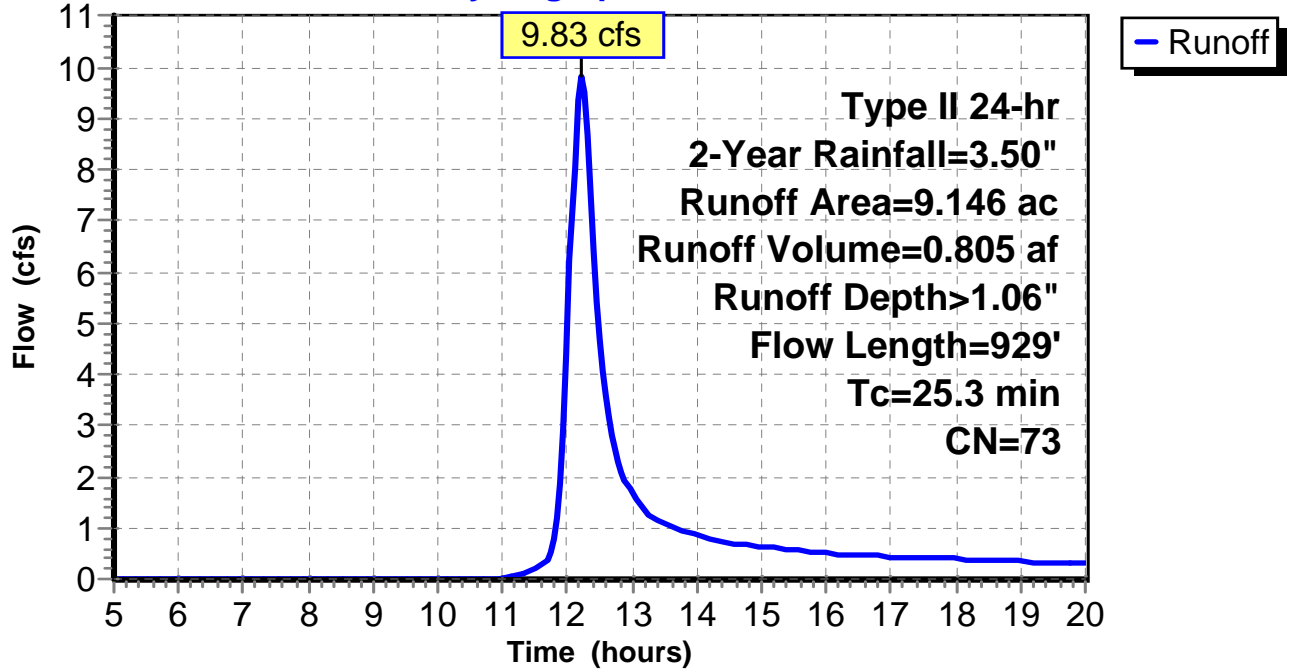
Subcatchment 6: C AR-701.006

Hydrograph



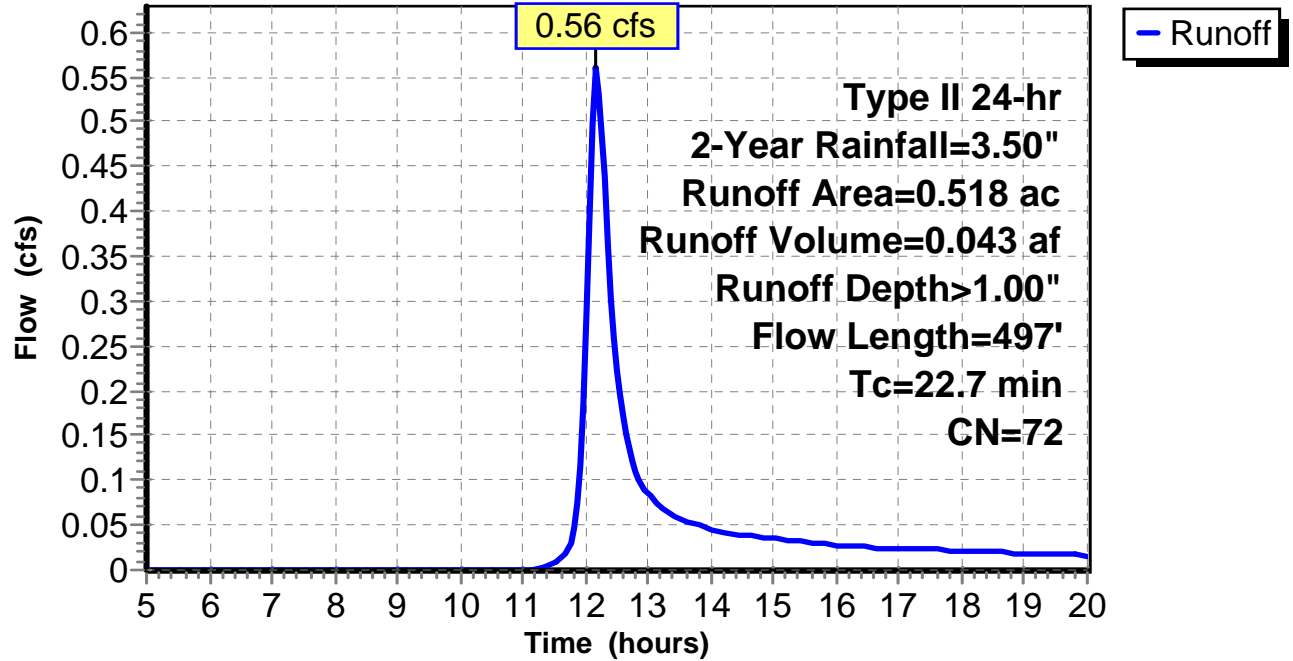
Subcatchment 7: C AR-701.007

Hydrograph



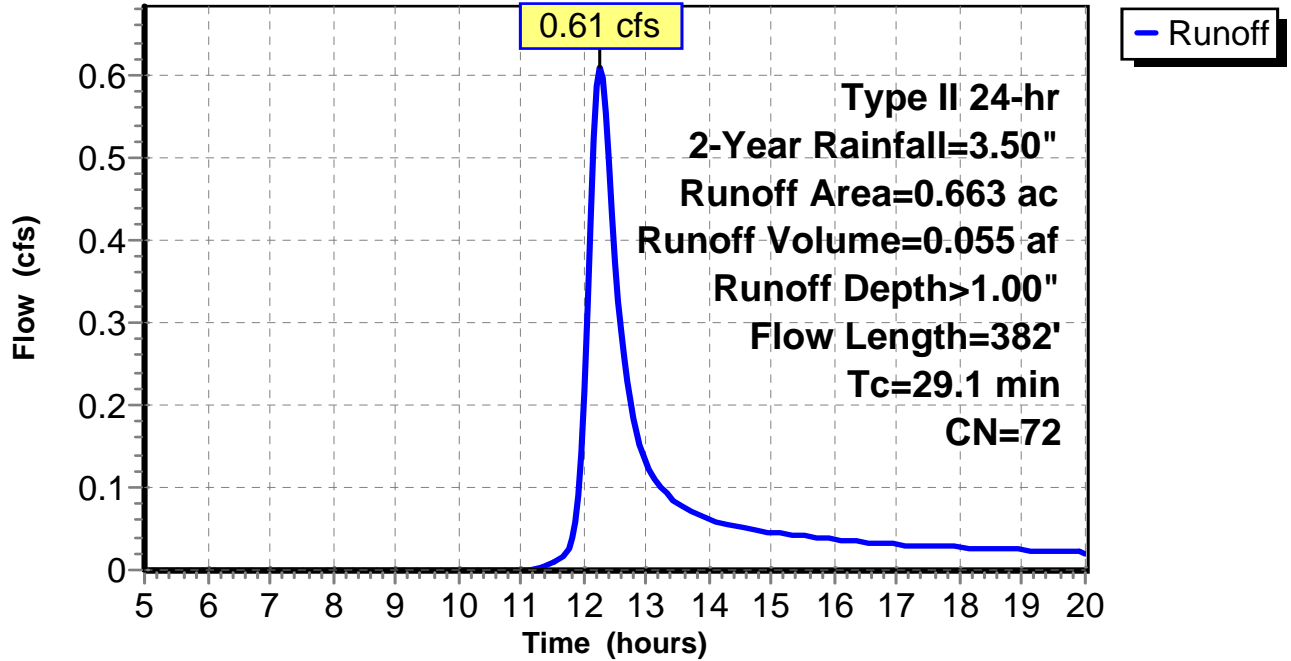
Subcatchment 8: C AR-701.008

Hydrograph



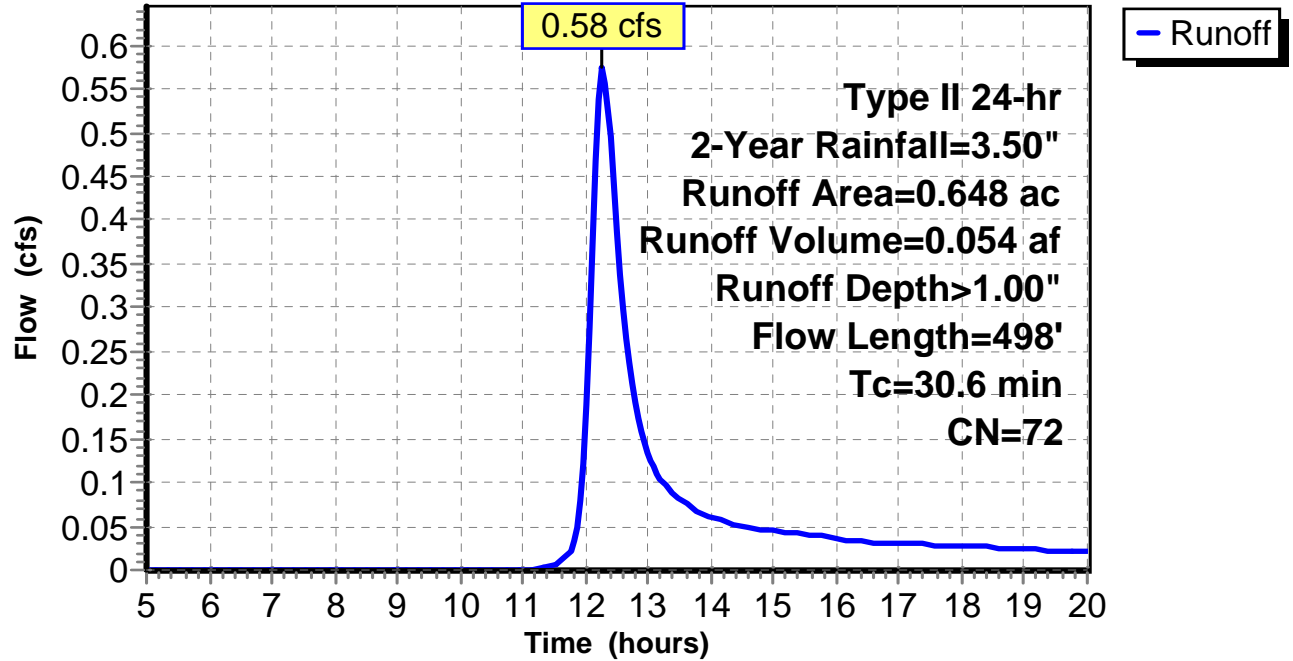
Subcatchment 9: C AR-701.009

Hydrograph



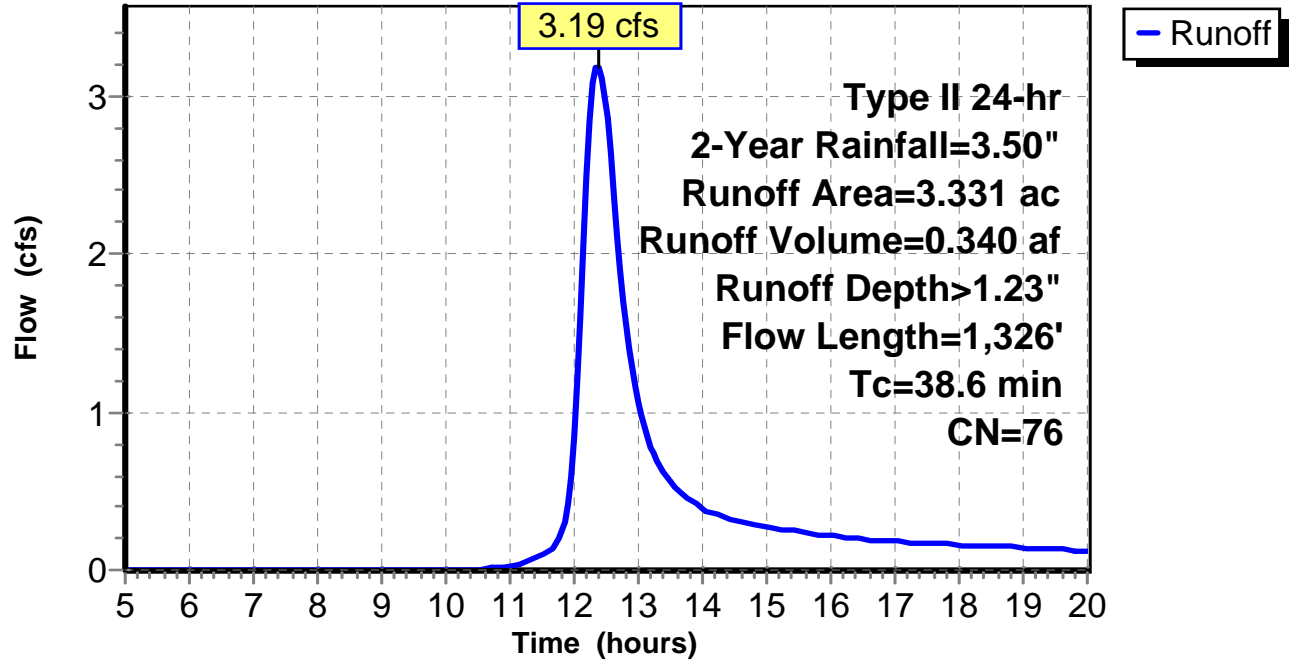
Subcatchment 10: C 255.001

Hydrograph



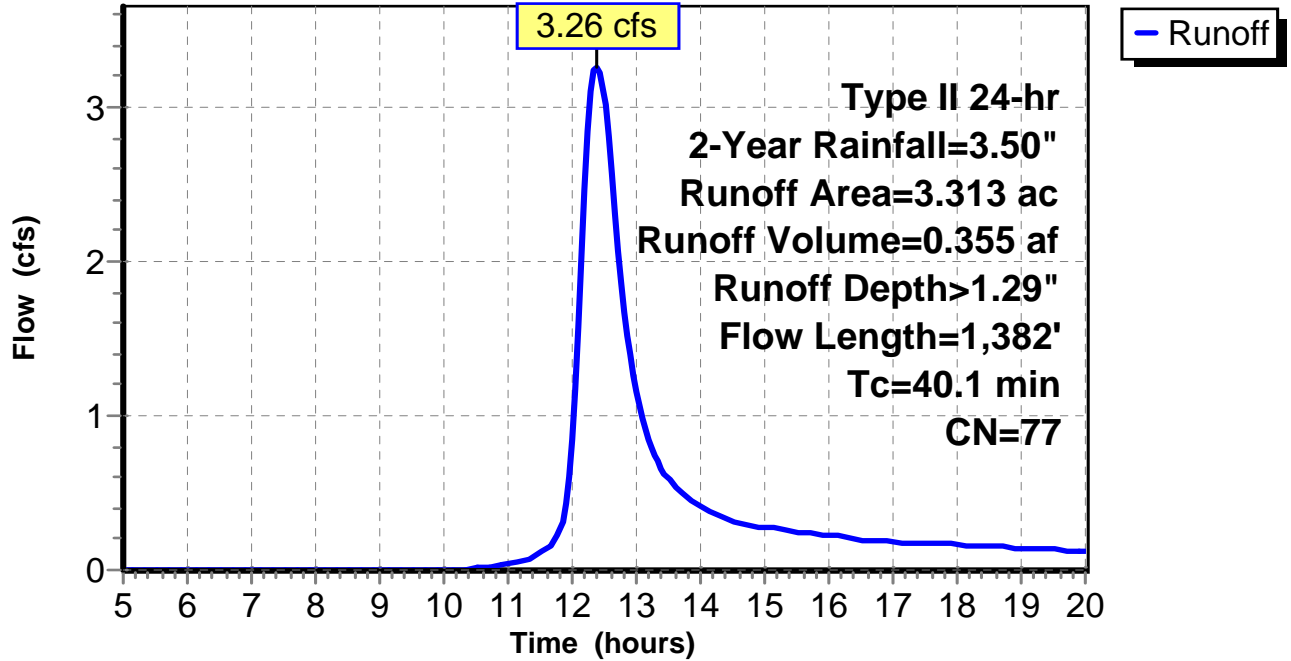
Subcatchment 11: C 255.002

Hydrograph



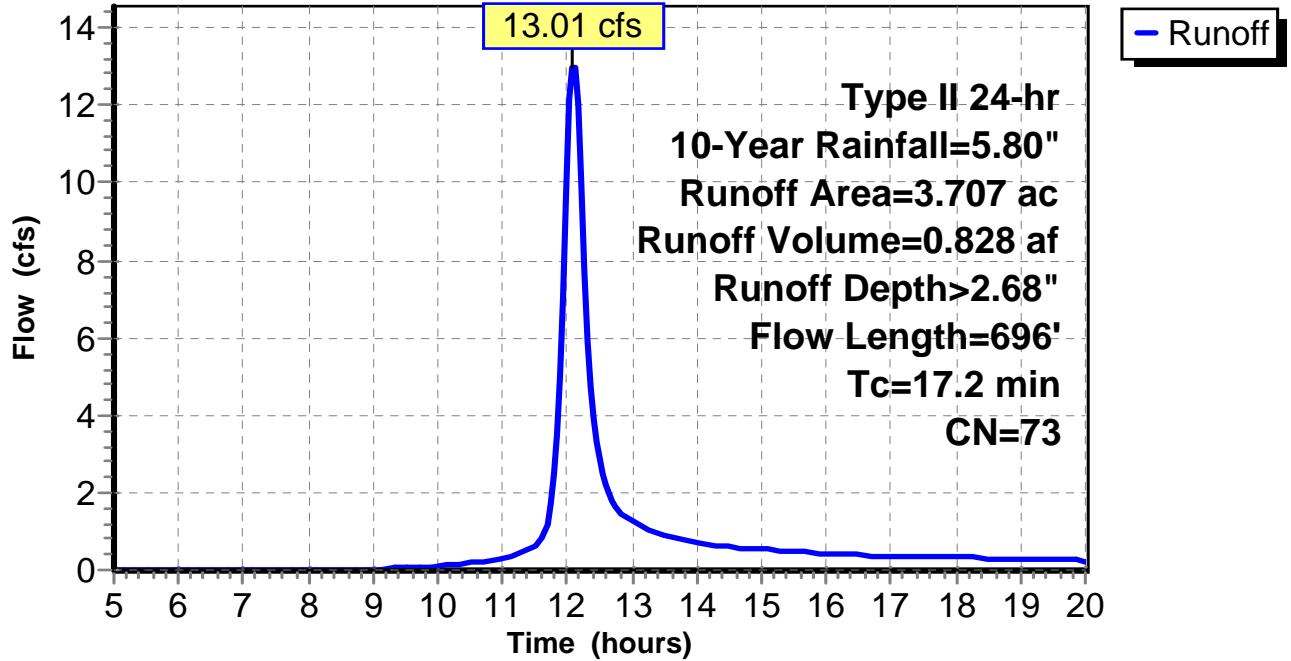
Subcatchment 12: C 255.003

Hydrograph



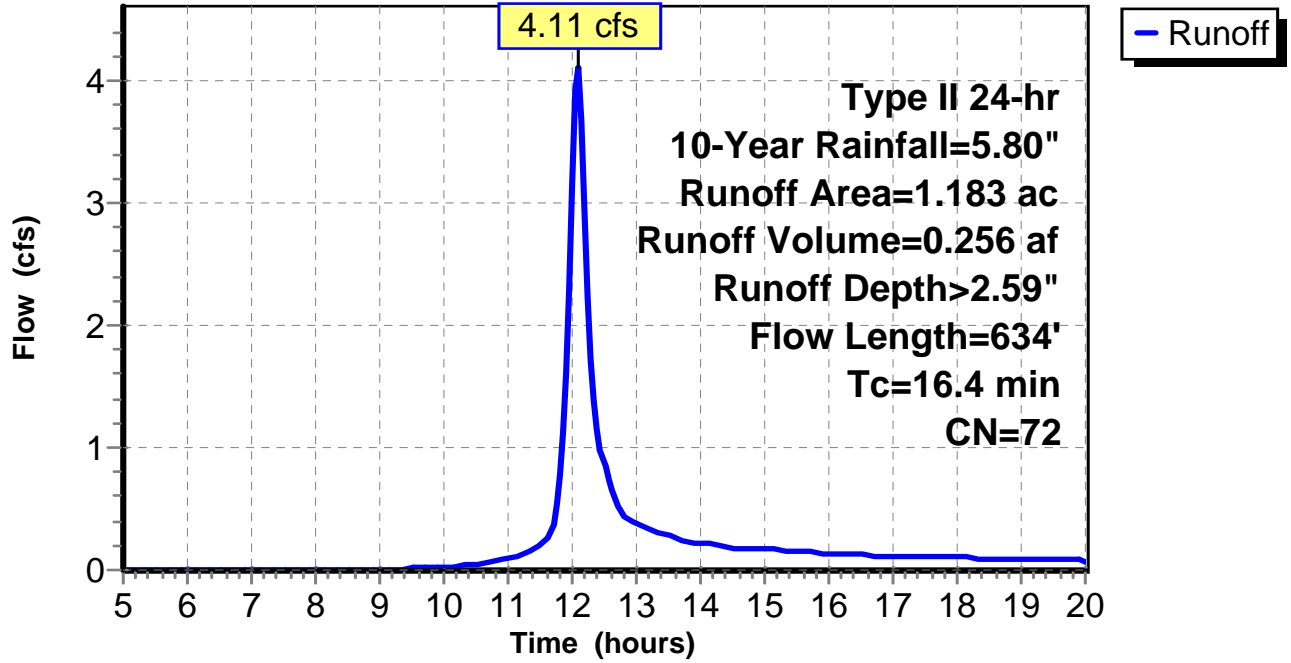
Subcatchment 1: C AR-701.001

Hydrograph



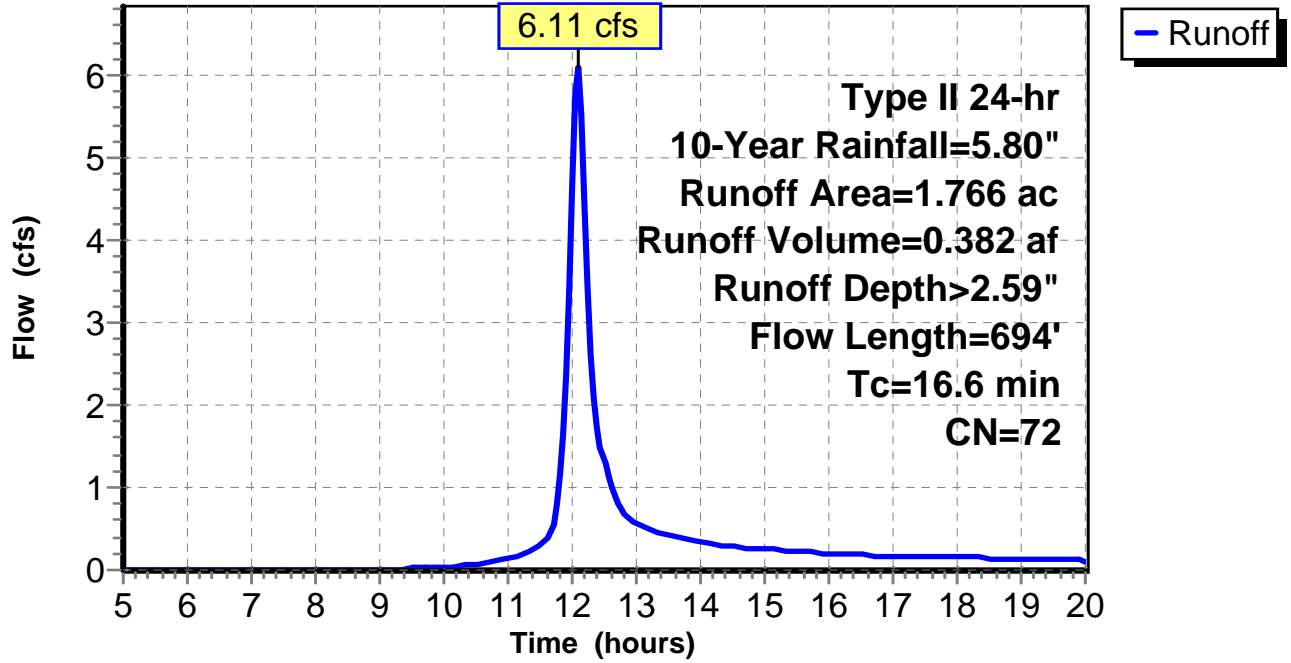
Subcatchment 2: C AR-701.002

Hydrograph



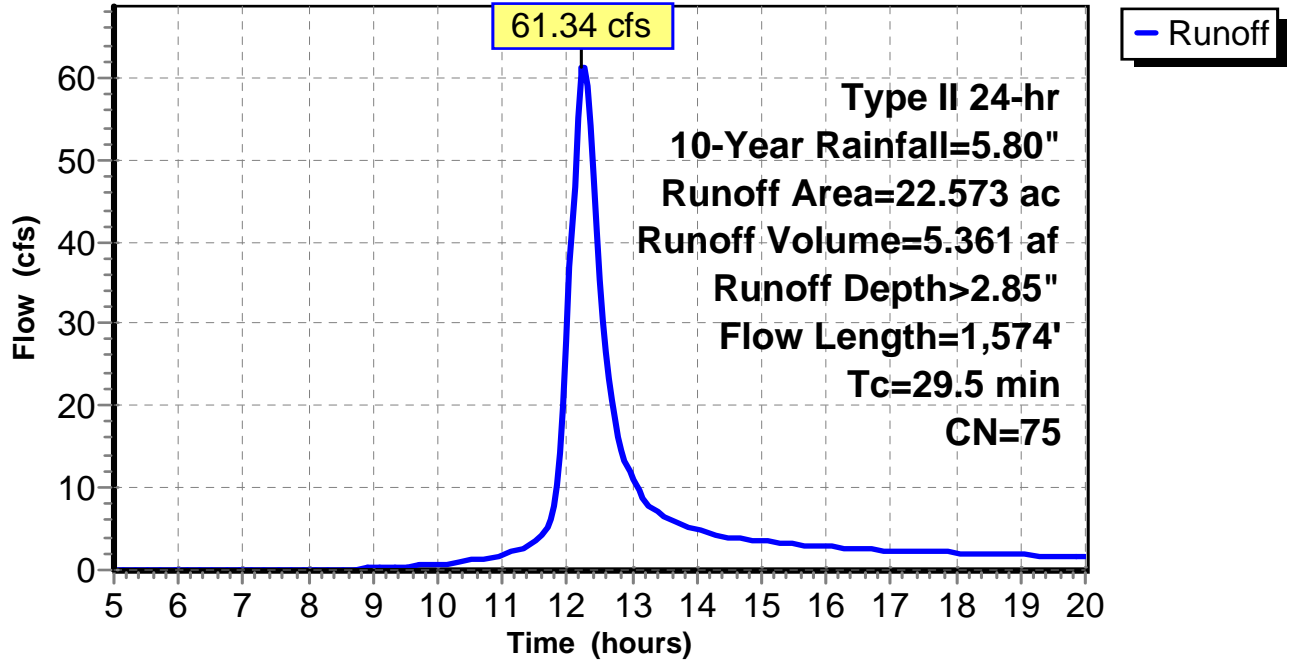
Subcatchment 3: C AR-701.003

Hydrograph



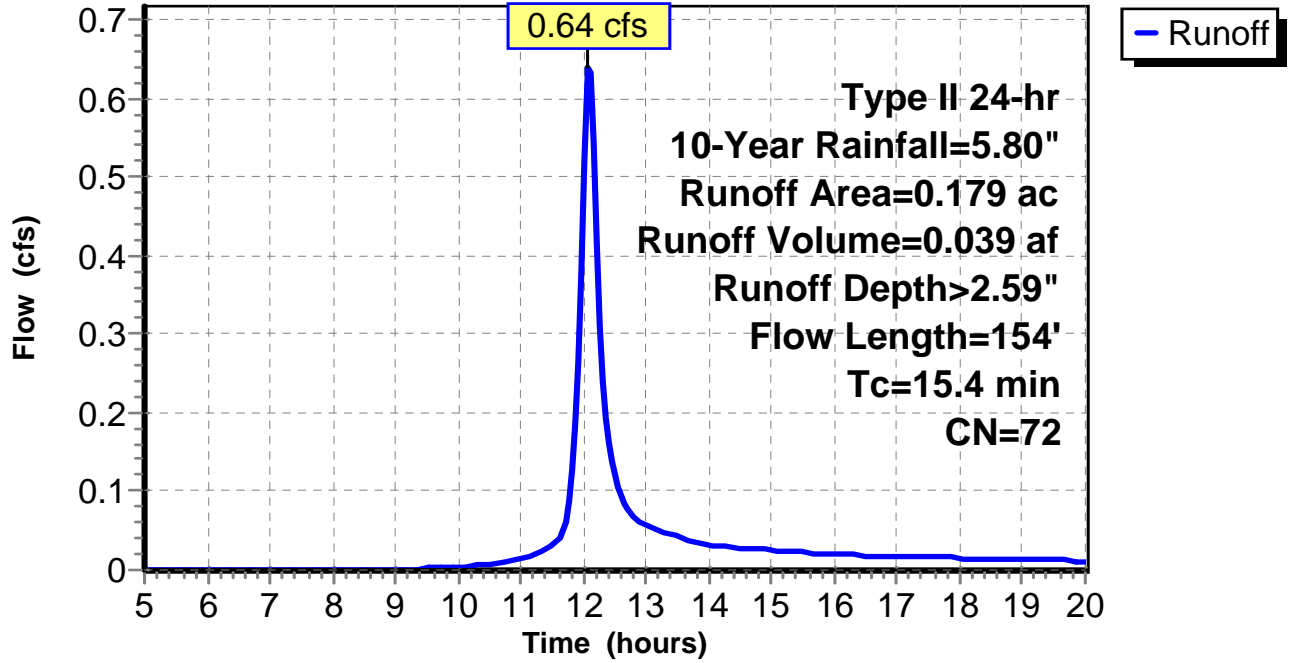
Subcatchment 4: C AR-701.004

Hydrograph



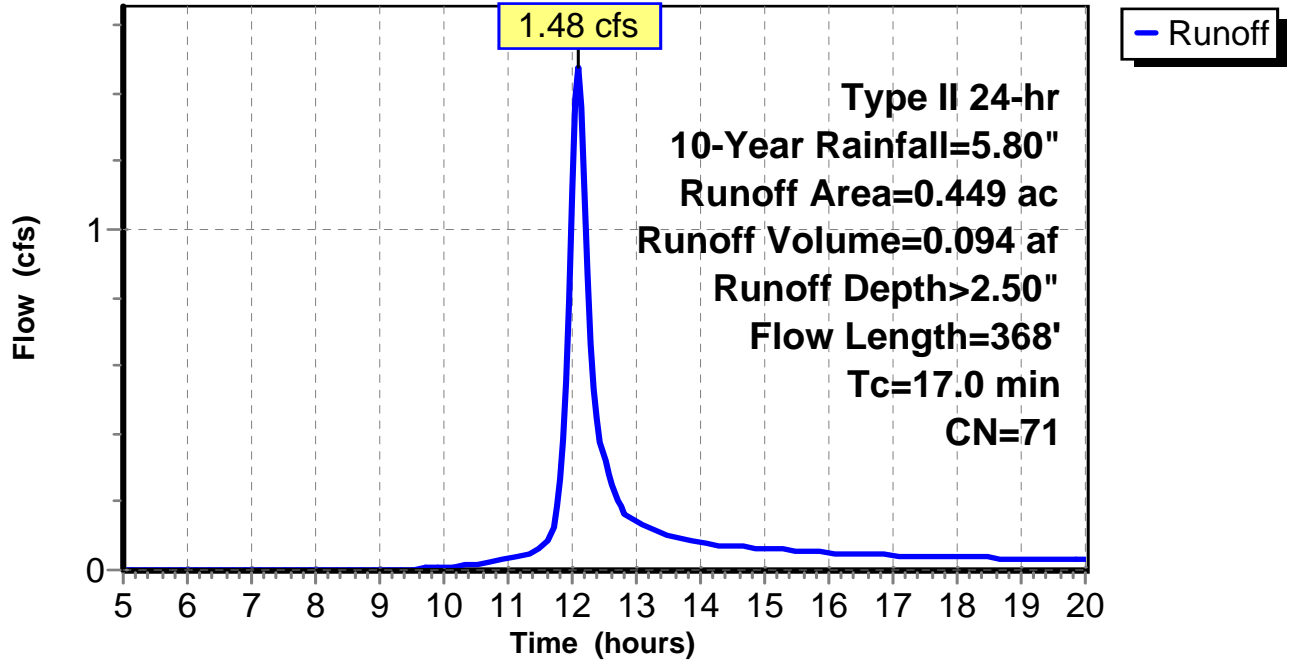
Subcatchment 5: C AR-701.005

Hydrograph



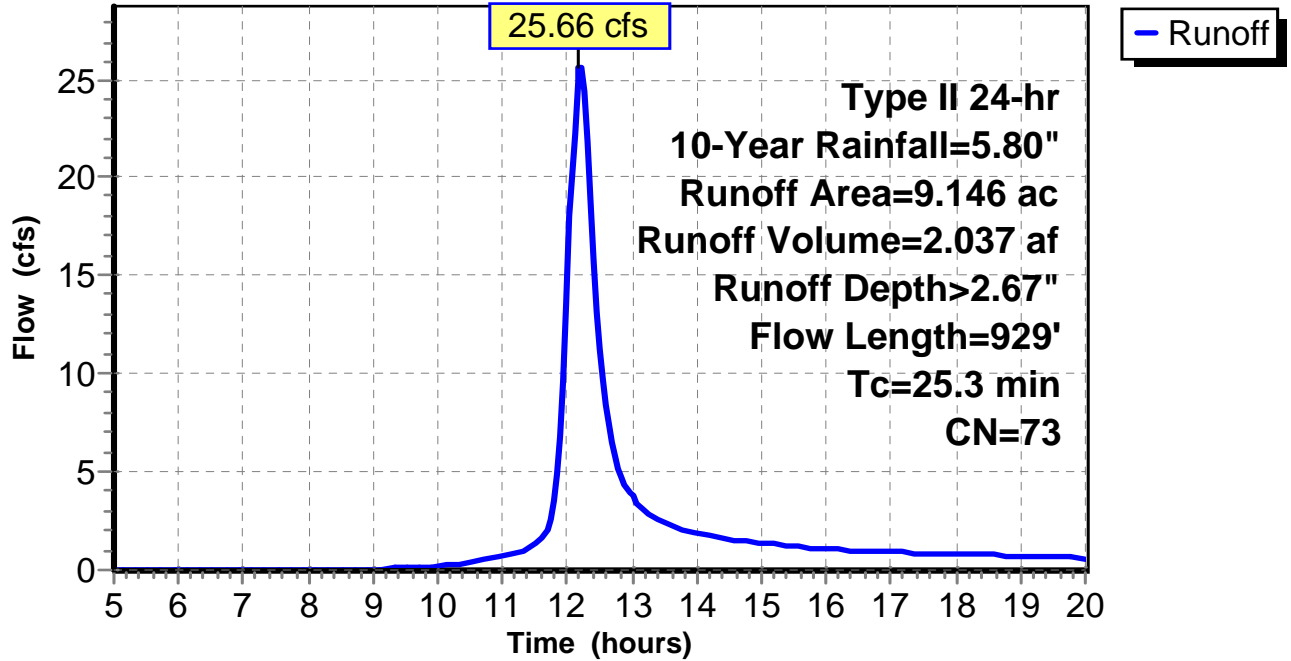
Subcatchment 6: C AR-701.006

Hydrograph



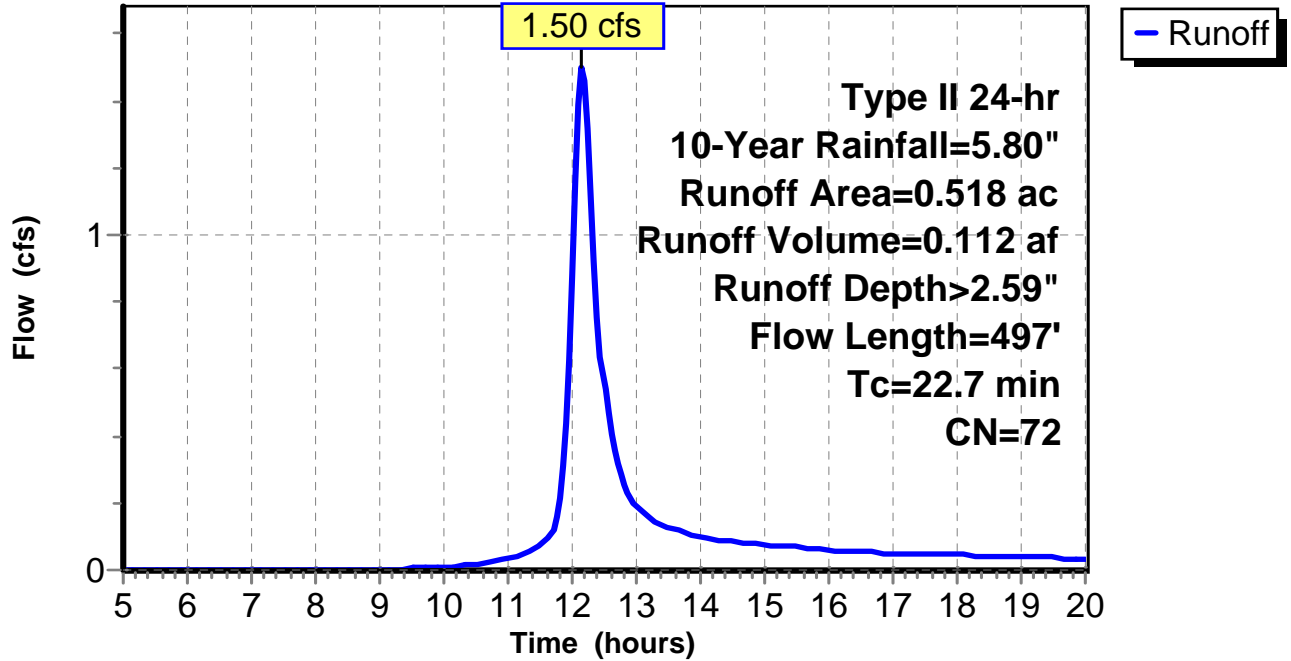
Subcatchment 7: C AR-701.007

Hydrograph



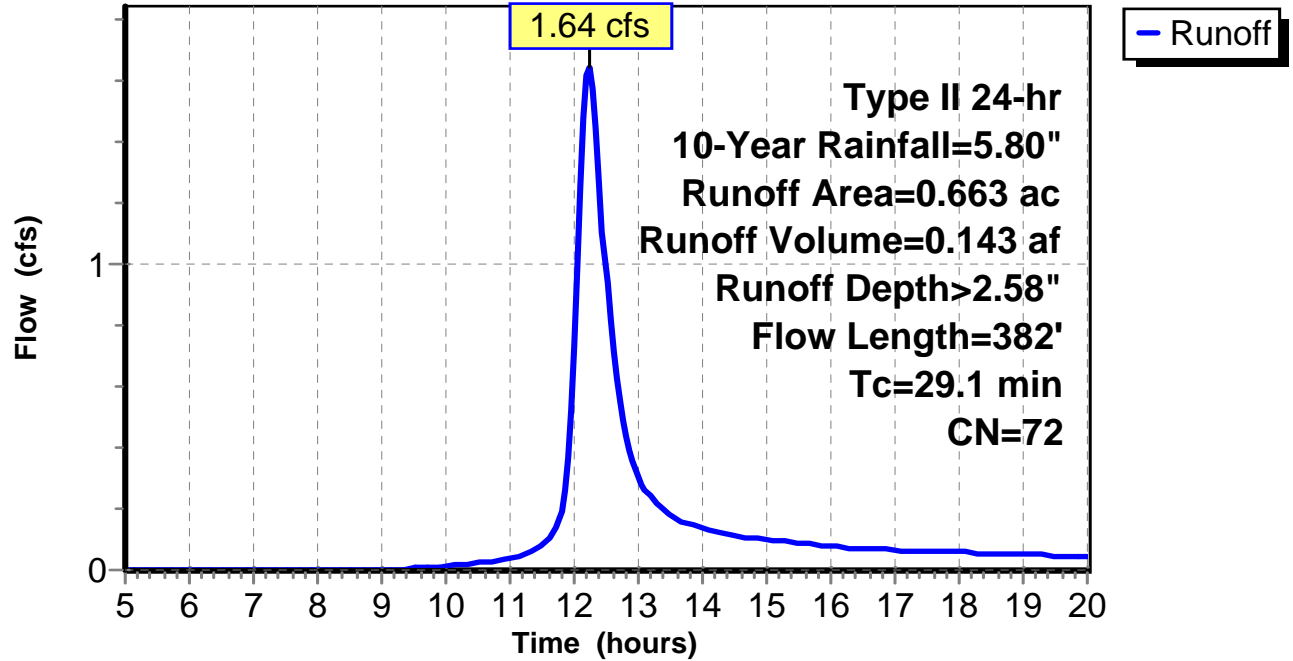
Subcatchment 8: C AR-701.008

Hydrograph



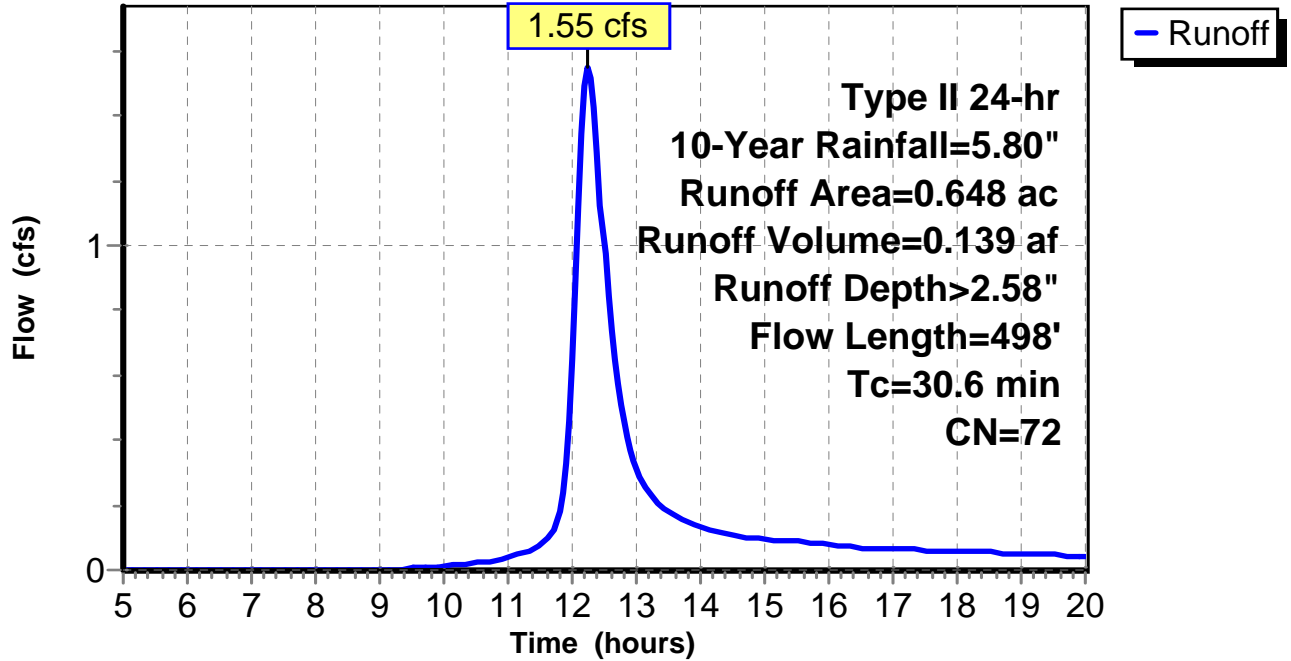
Subcatchment 9: C AR-701.009

Hydrograph



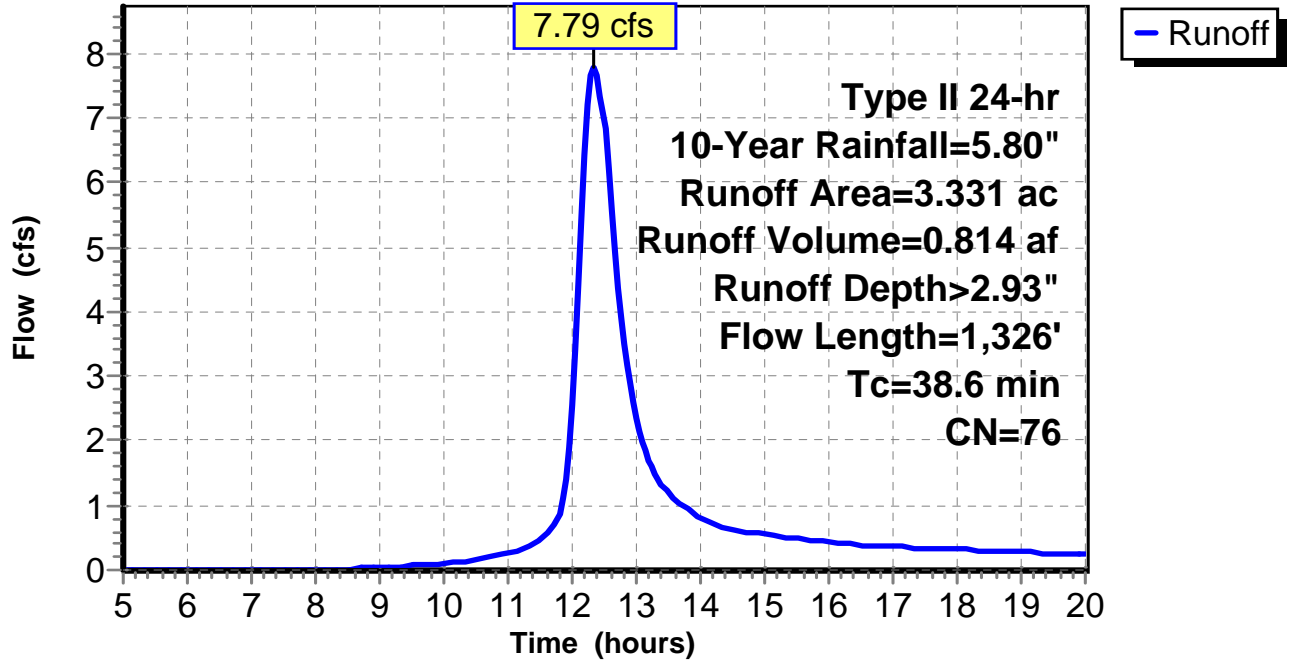
Subcatchment 10: C 255.001

Hydrograph



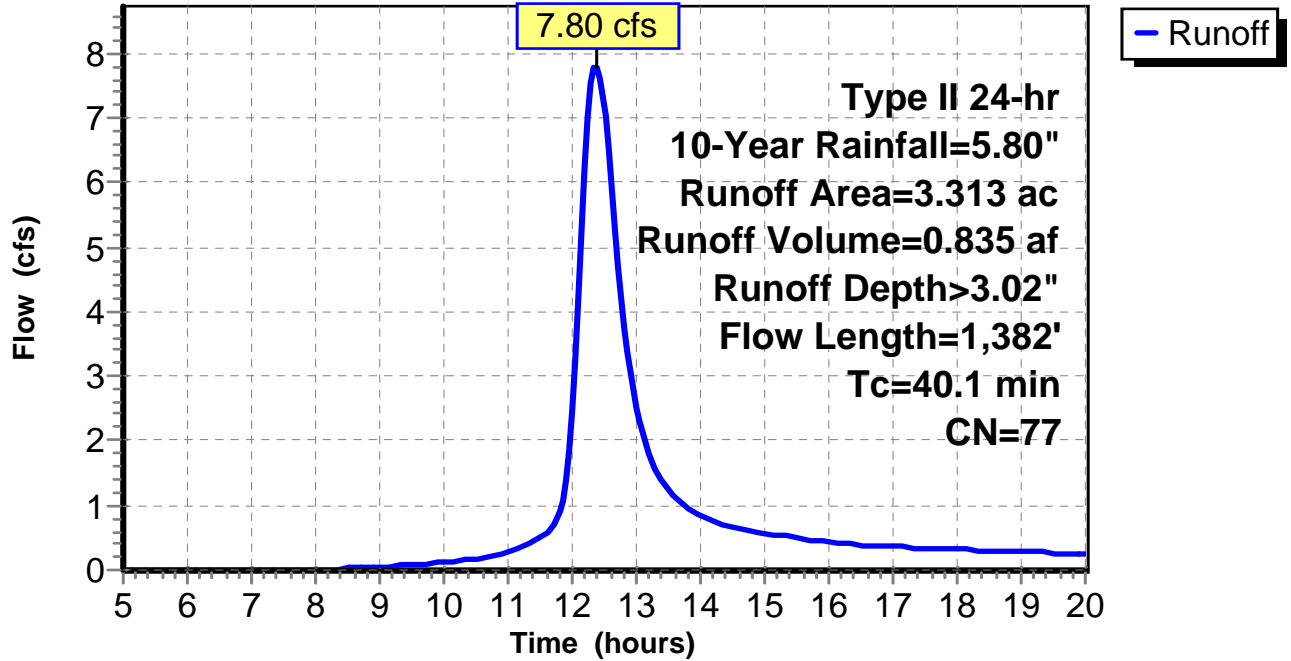
Subcatchment 11: C 255.002

Hydrograph



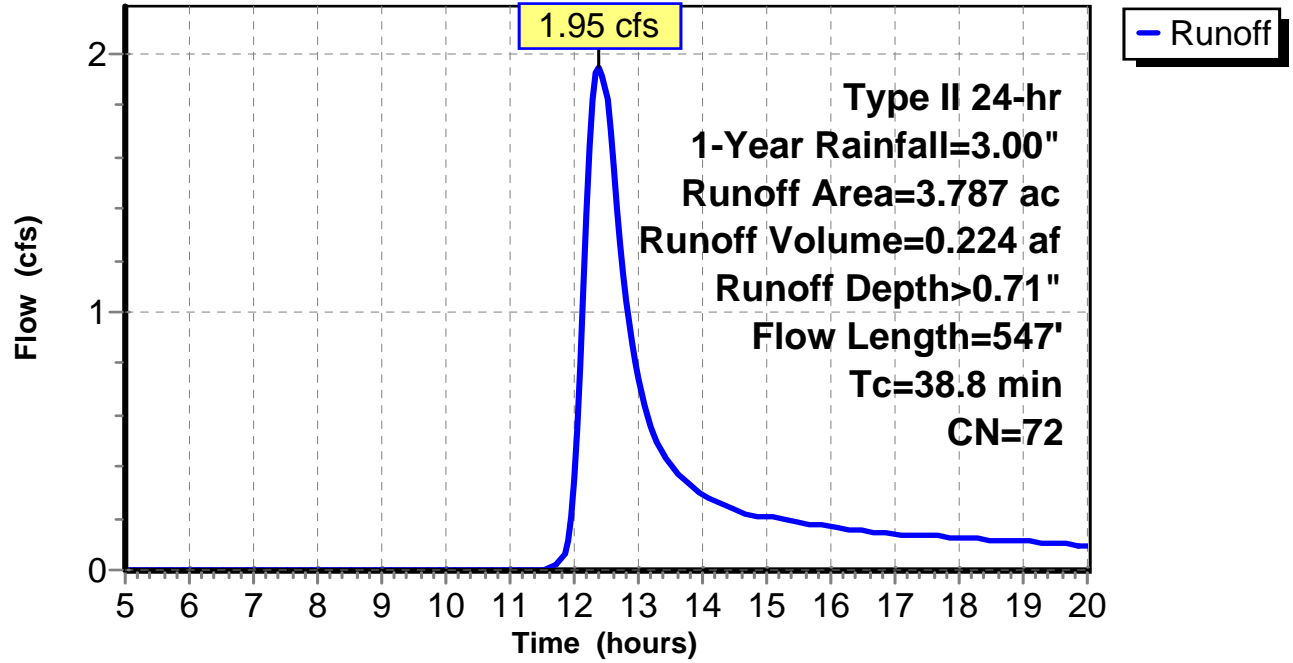
Subcatchment 12: C 255.003

Hydrograph



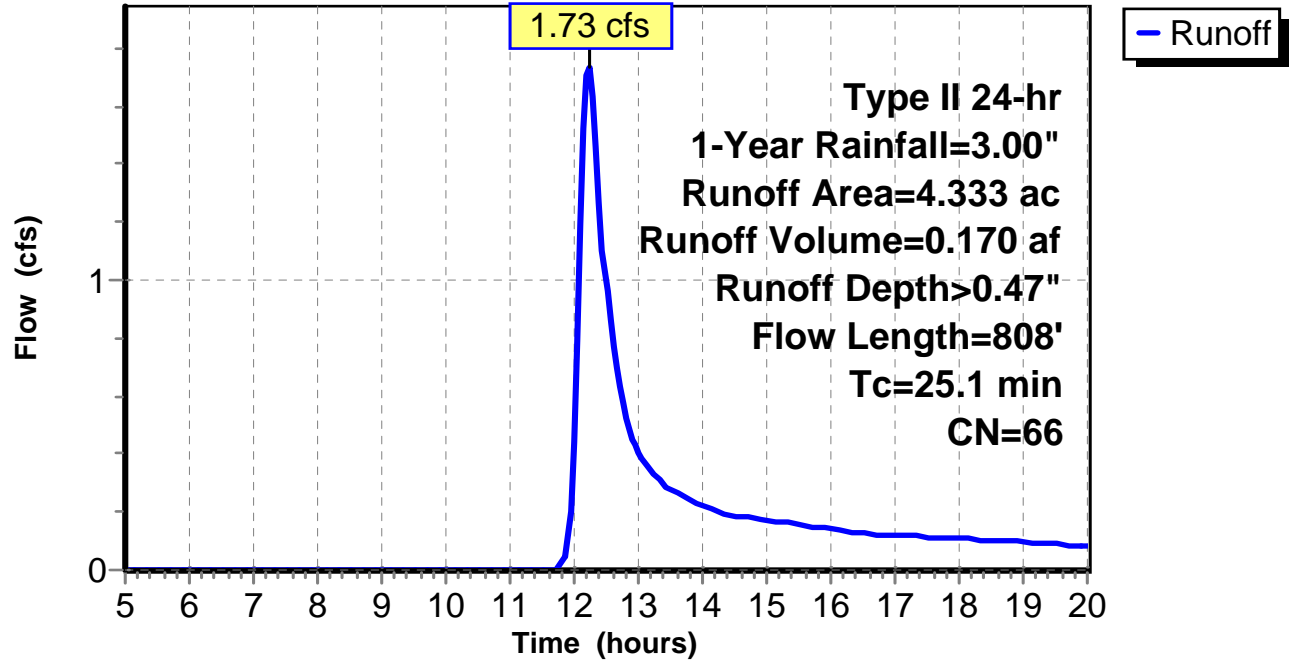
Subcatchment 1: C 256.001

Hydrograph



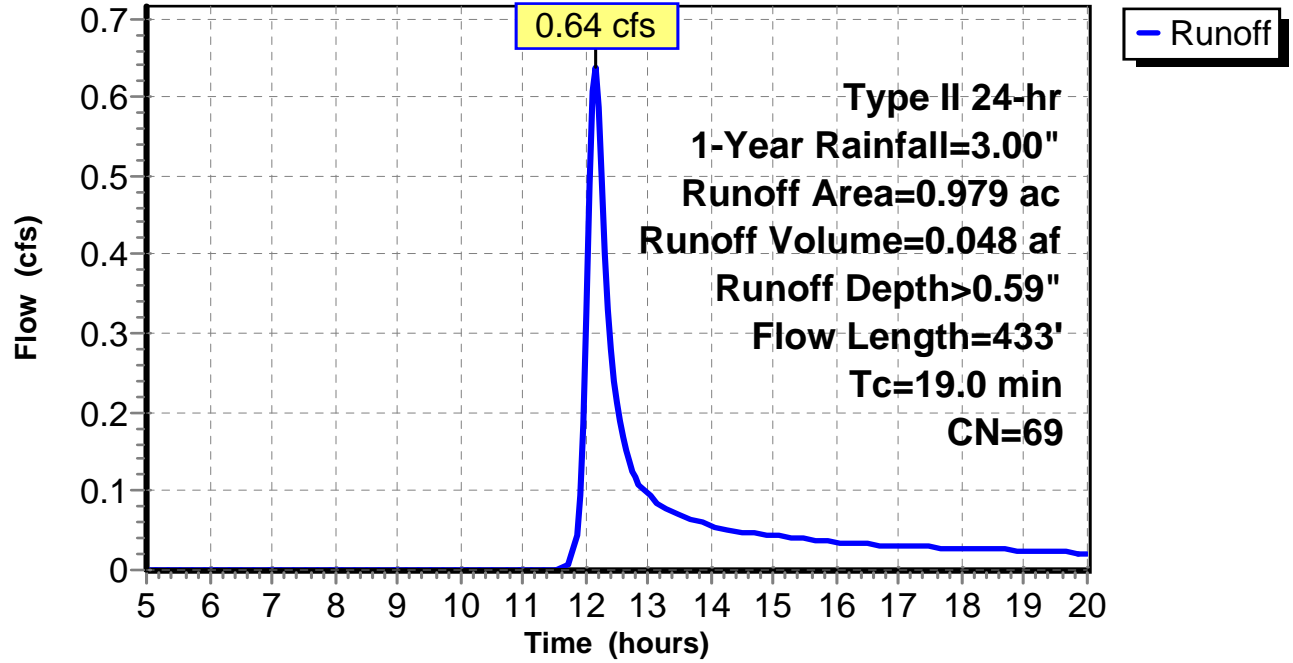
Subcatchment 2: C 256.002

Hydrograph



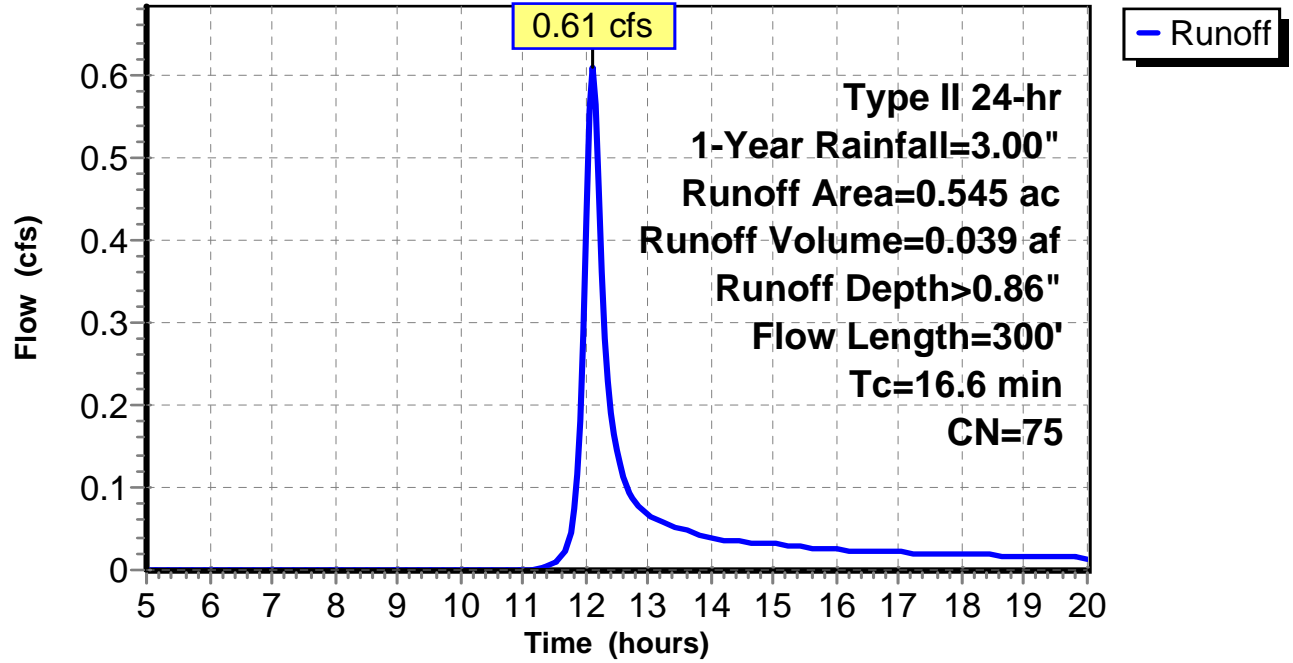
Subcatchment 3: C 256.003

Hydrograph



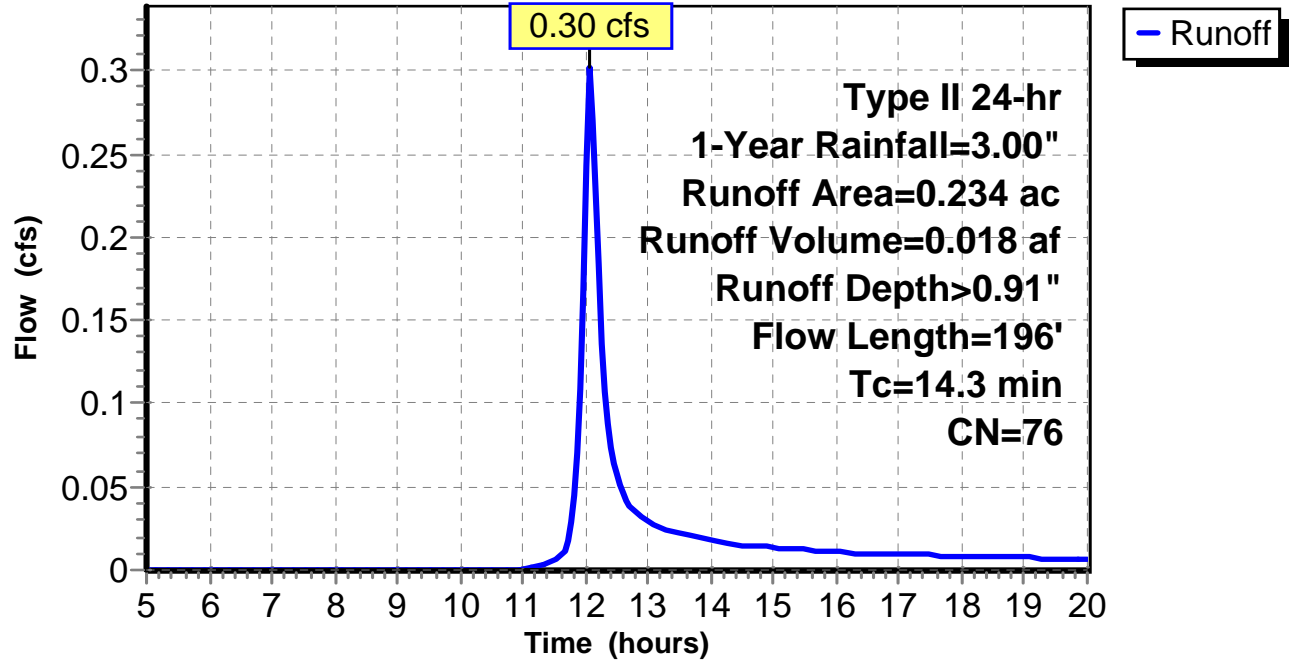
Subcatchment 4: C 256.004

Hydrograph



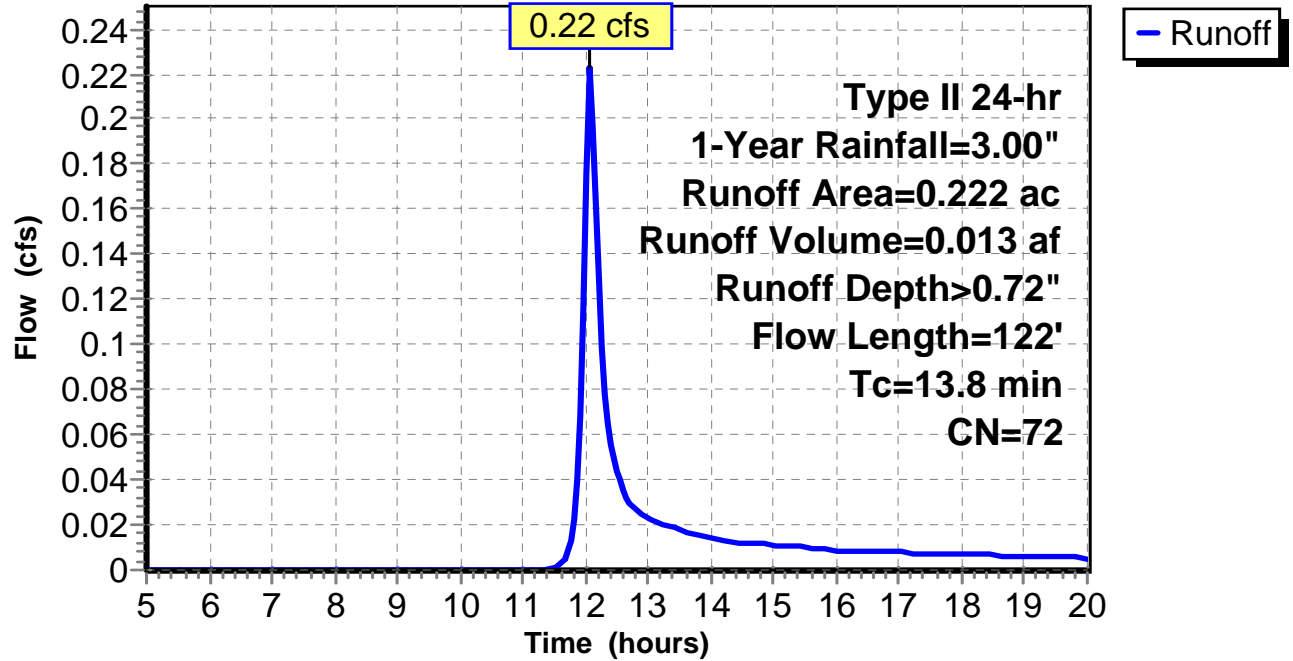
Subcatchment 5: C 256.005

Hydrograph



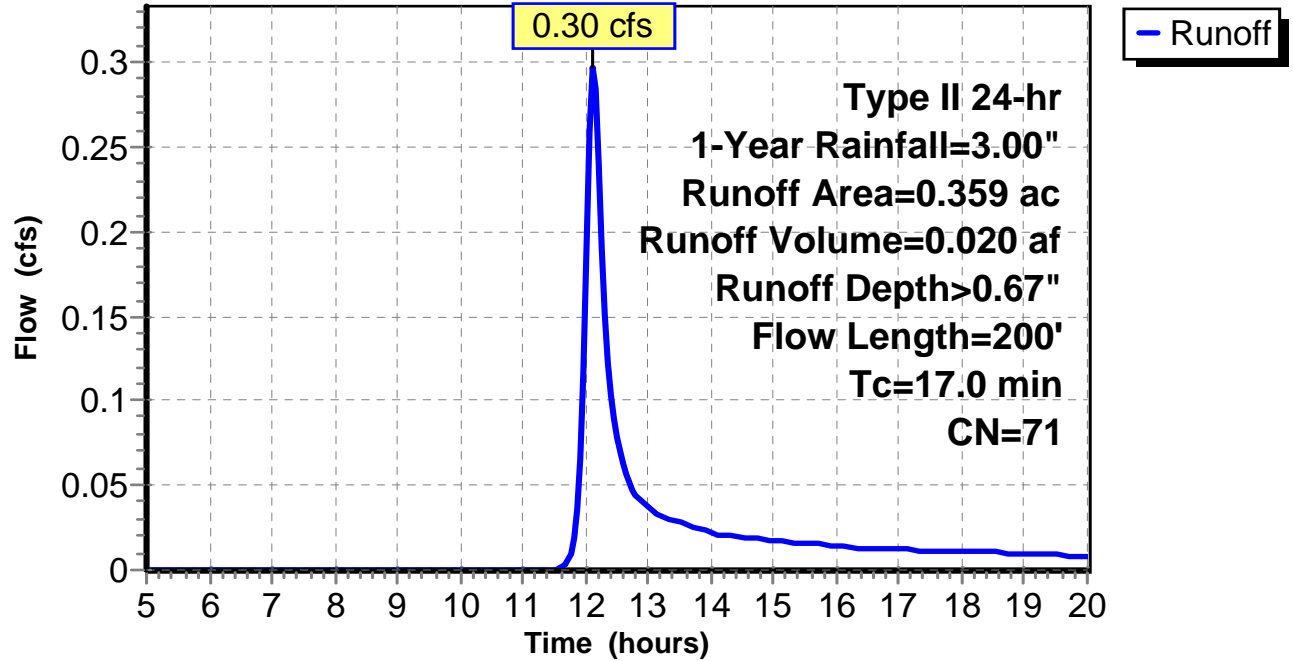
Subcatchment 6: C 256.006

Hydrograph



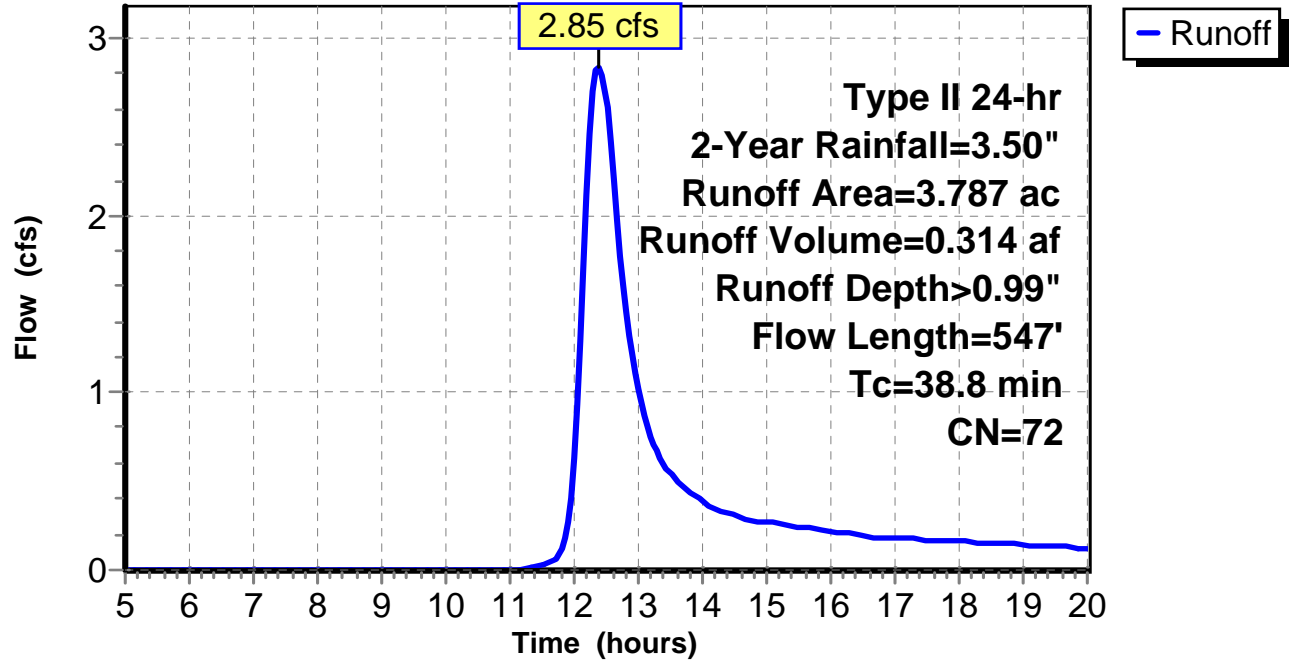
Subcatchment 7: C 256.007

Hydrograph



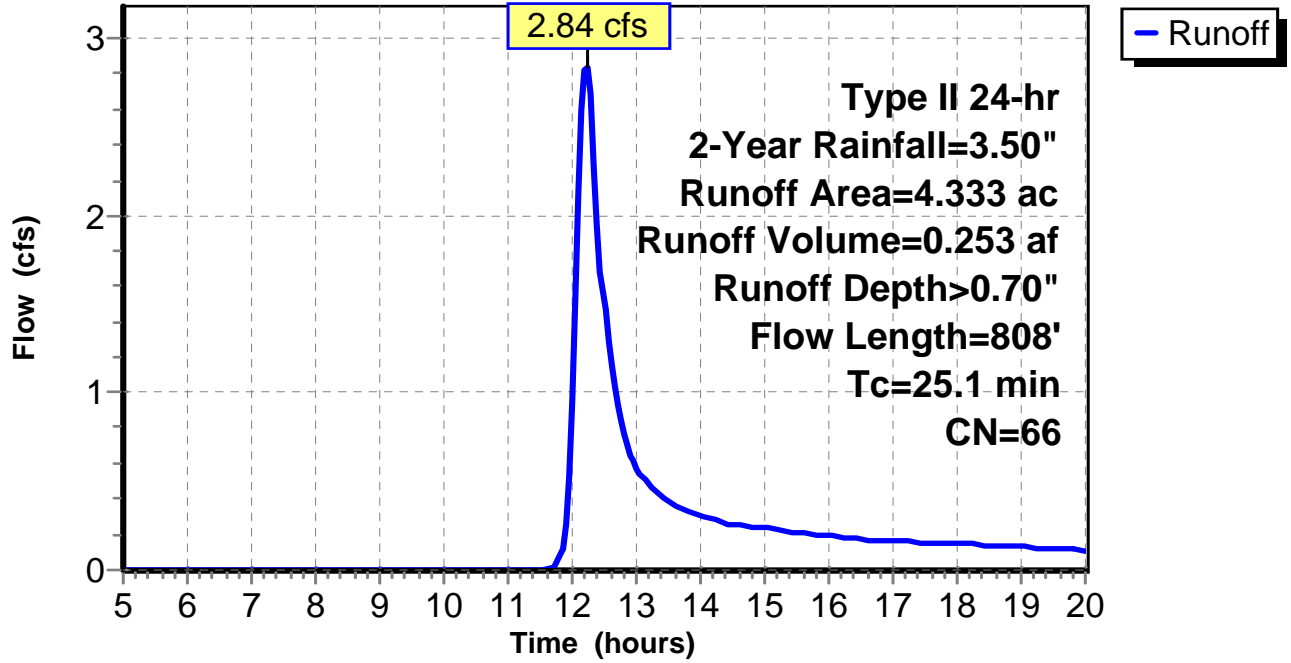
Subcatchment 1: C 256.001

Hydrograph



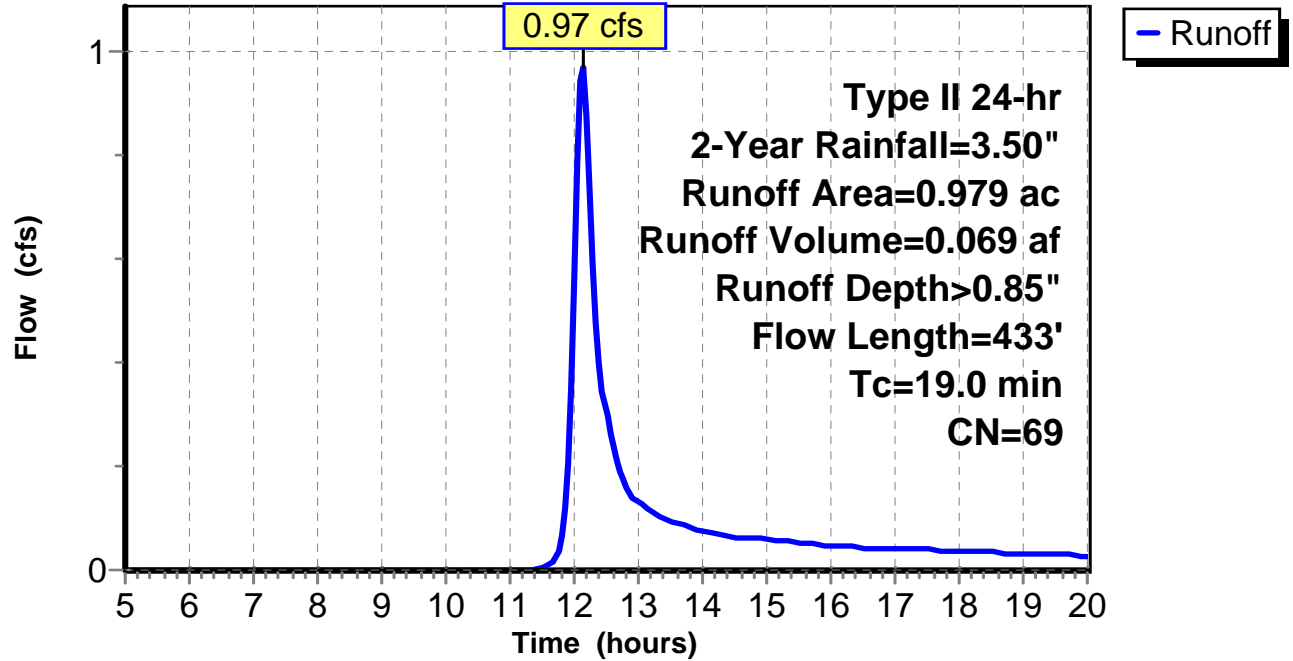
Subcatchment 2: C 256.002

Hydrograph



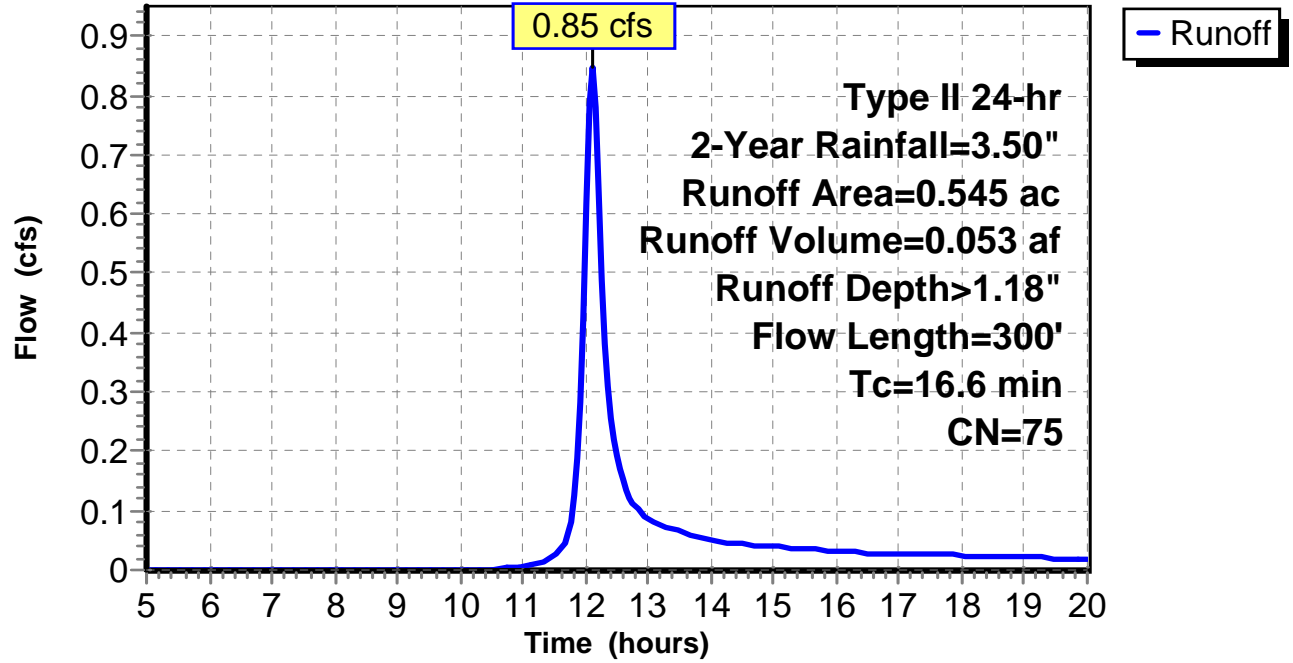
Subcatchment 3: C 256.003

Hydrograph



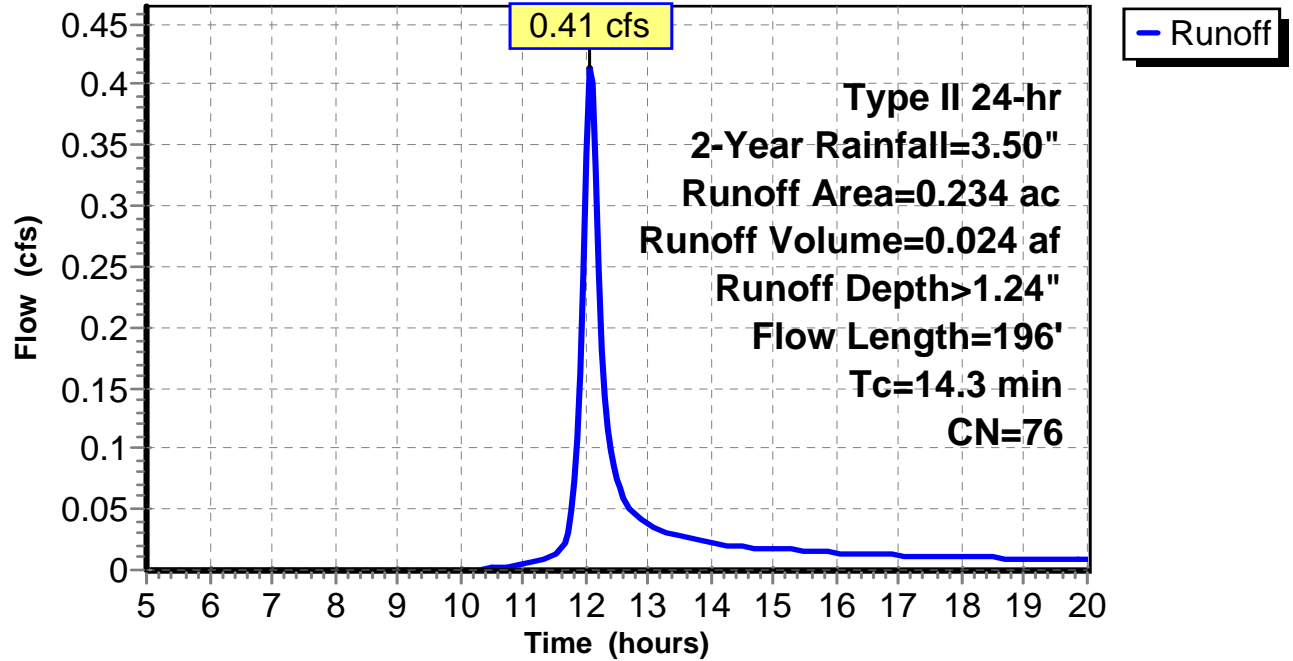
Subcatchment 4: C 256.004

Hydrograph



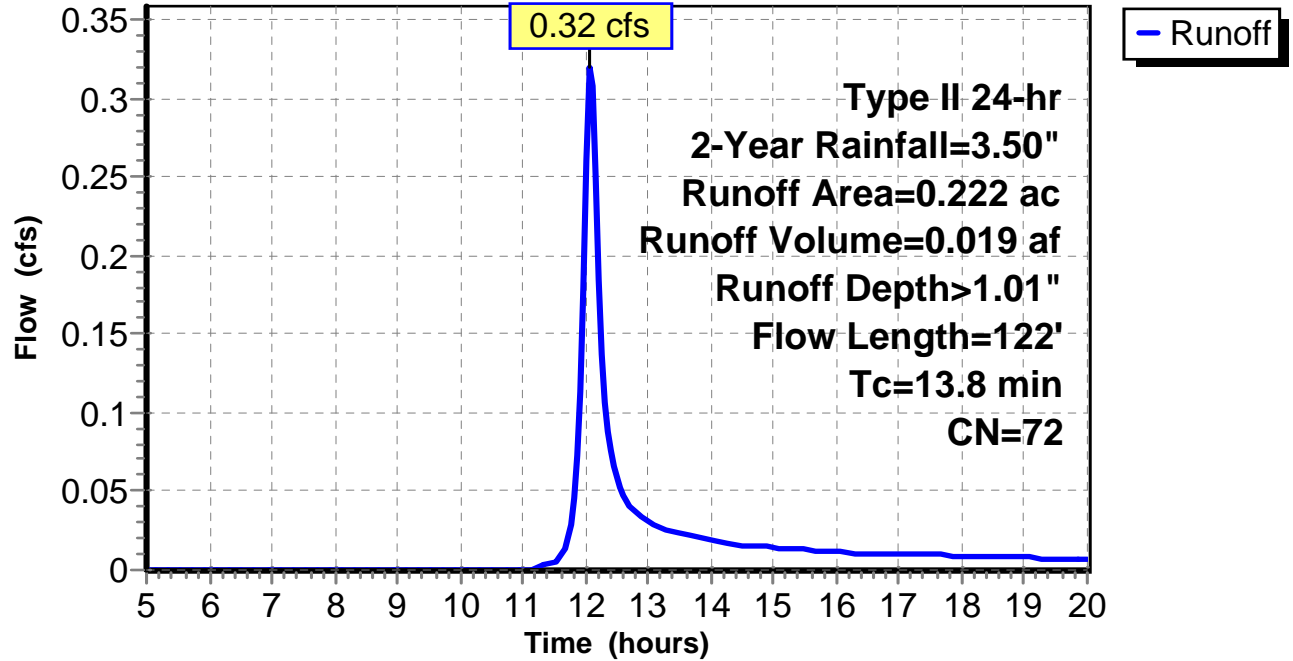
Subcatchment 5: C 256.005

Hydrograph



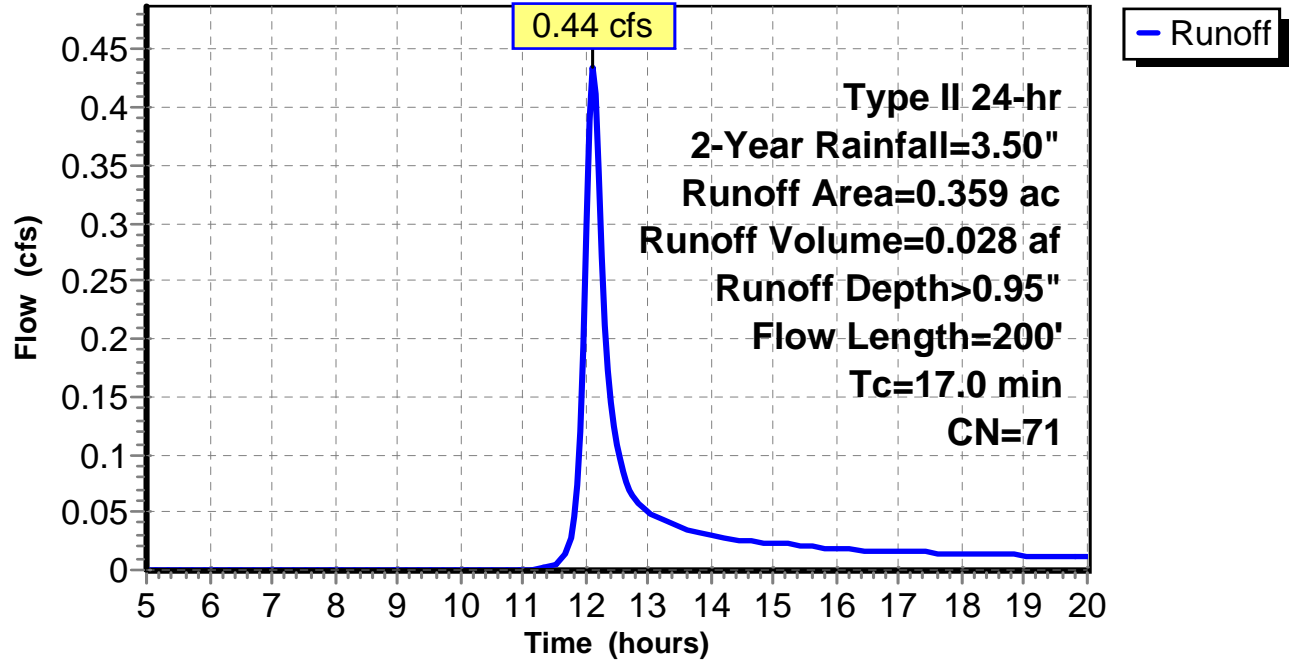
Subcatchment 6: C 256.006

Hydrograph



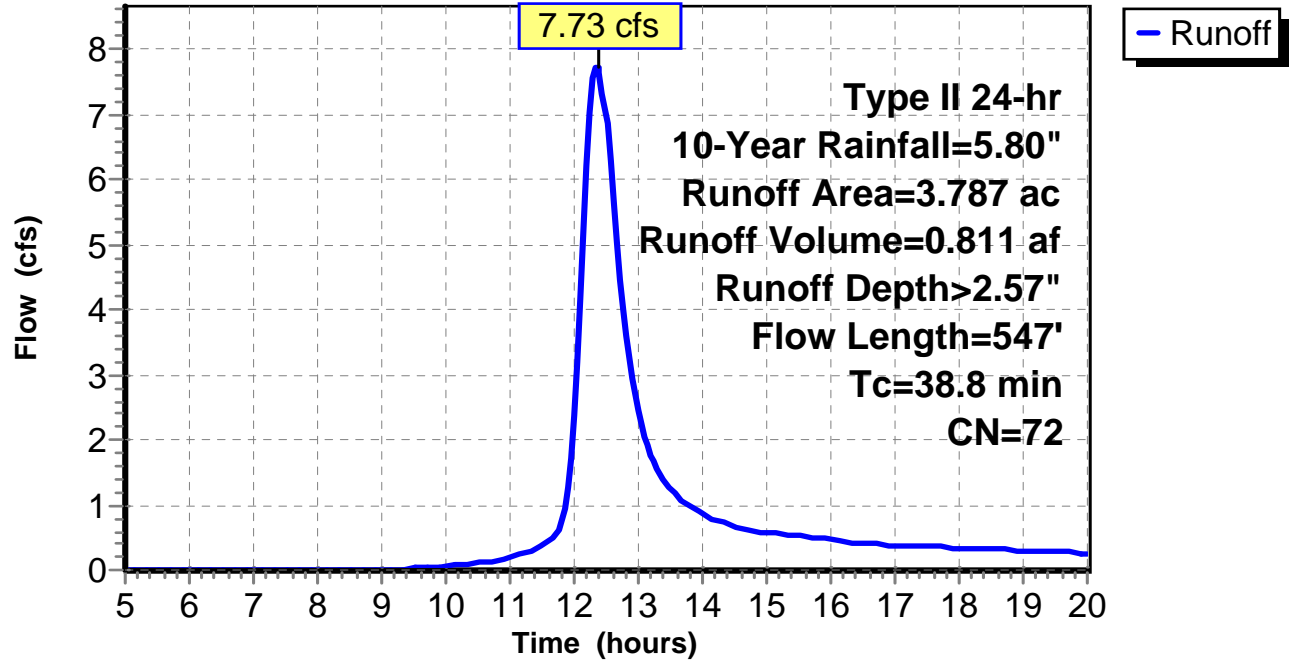
Subcatchment 7: C 256.007

Hydrograph



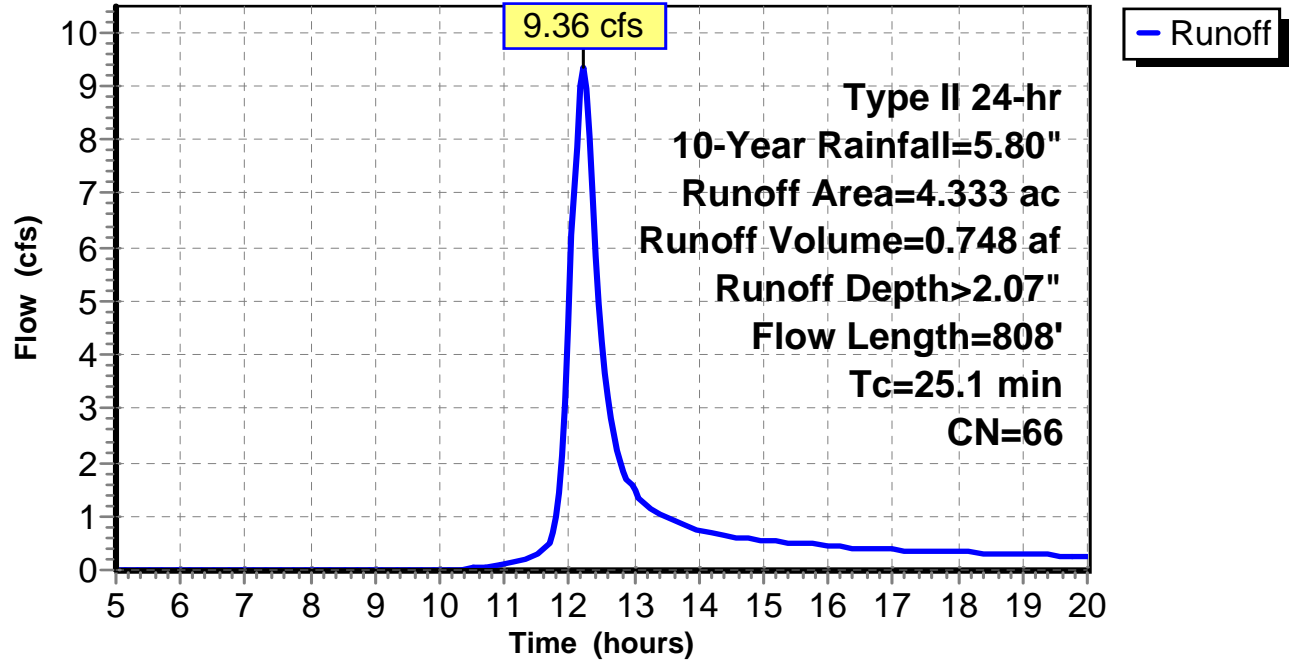
Subcatchment 1: C 256.001

Hydrograph



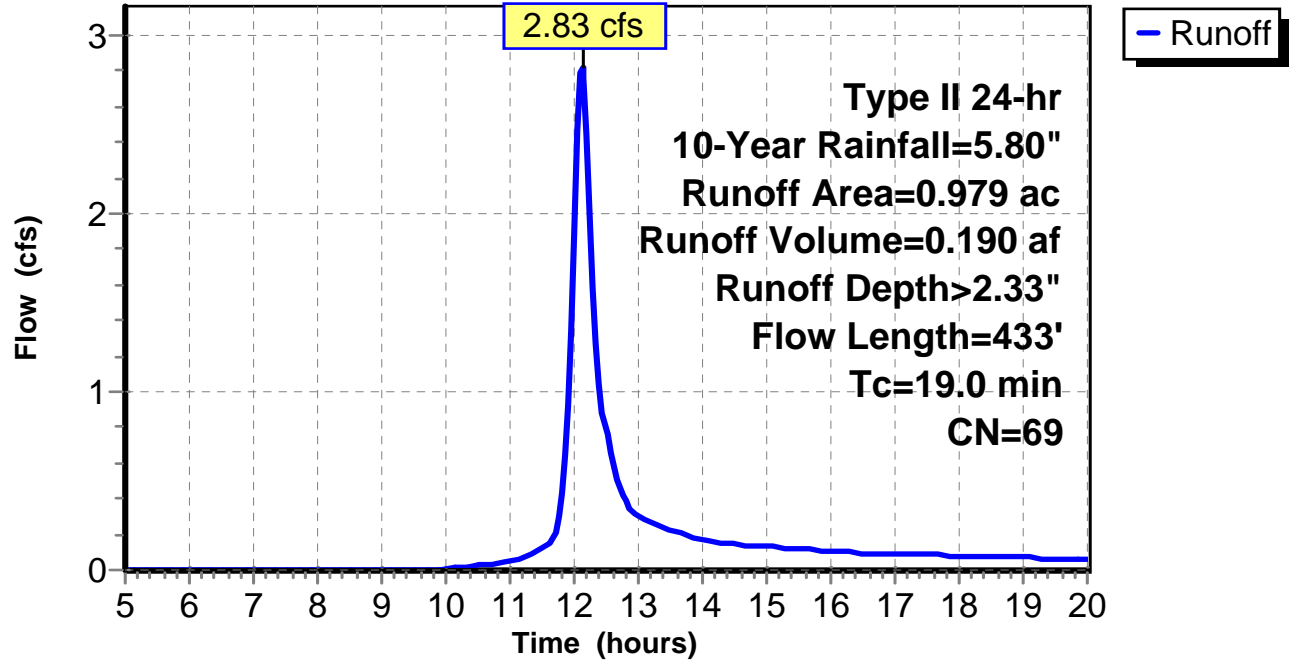
Subcatchment 2: C 256.002

Hydrograph



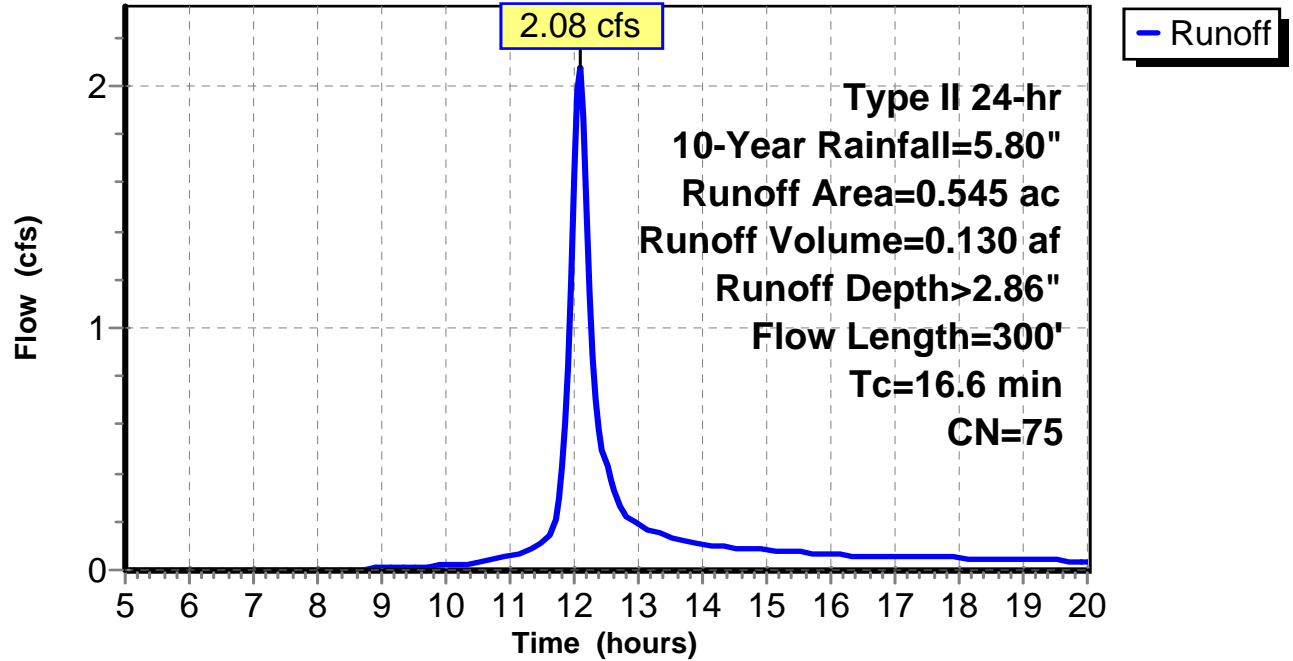
Subcatchment 3: C 256.003

Hydrograph



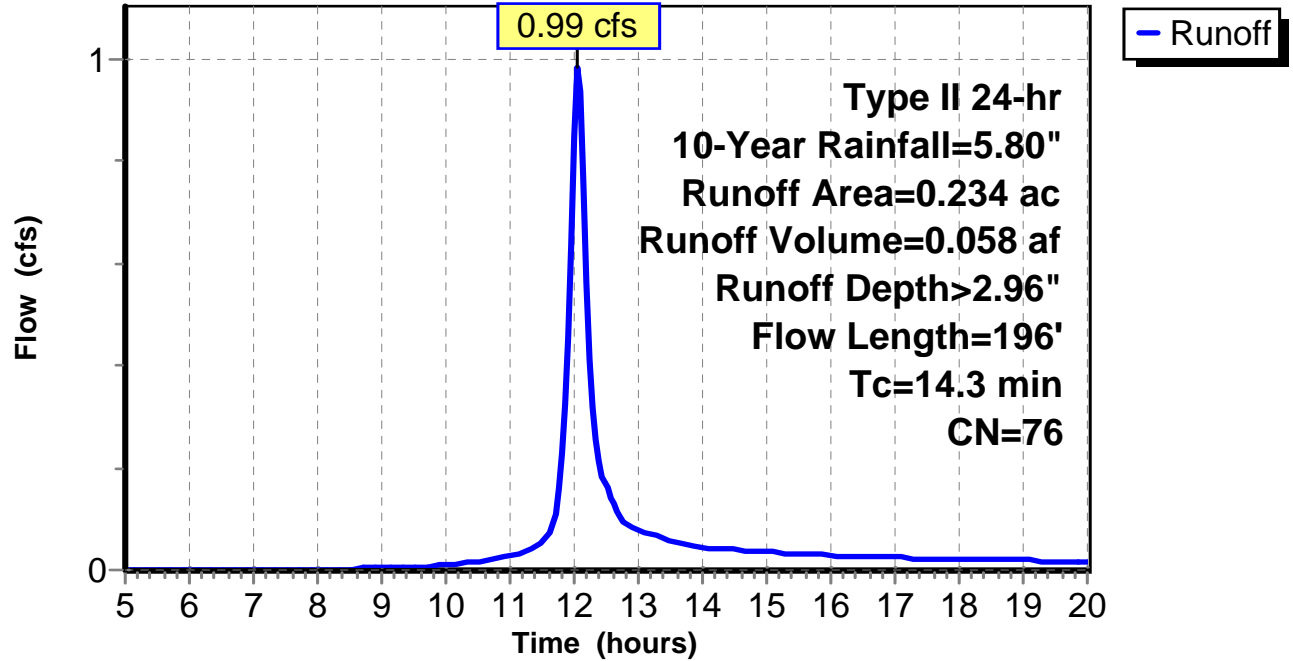
Subcatchment 4: C 256.004

Hydrograph



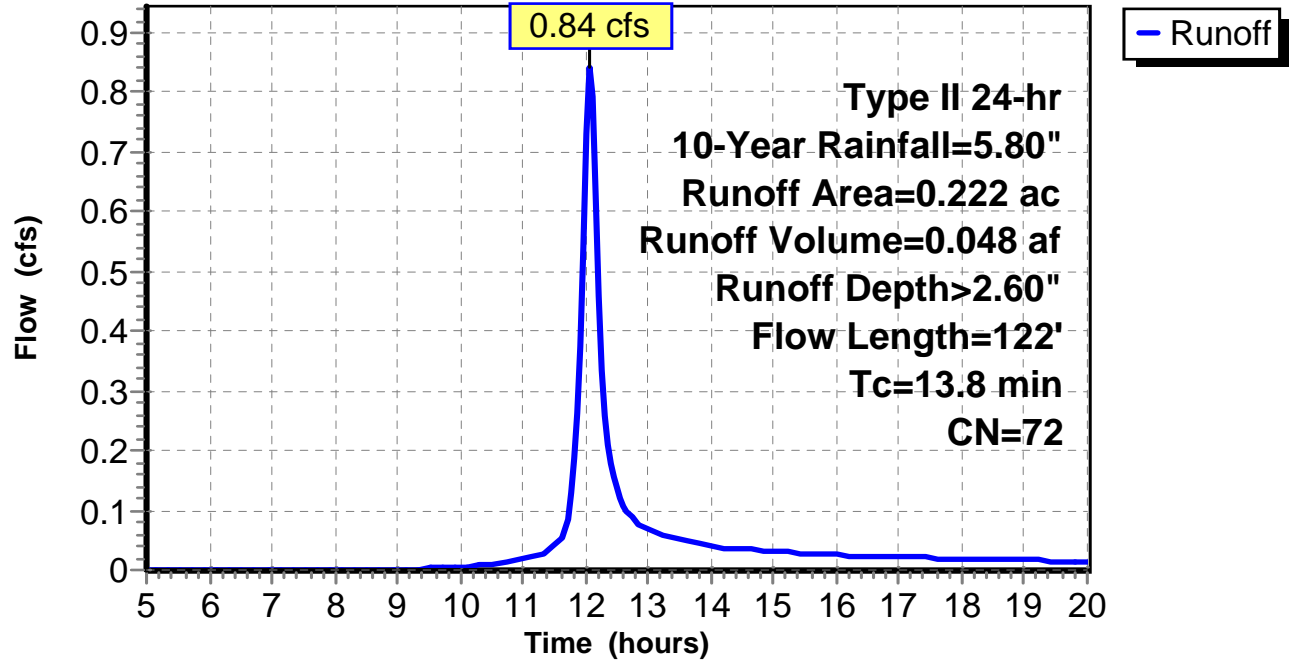
Subcatchment 5: C 256.005

Hydrograph



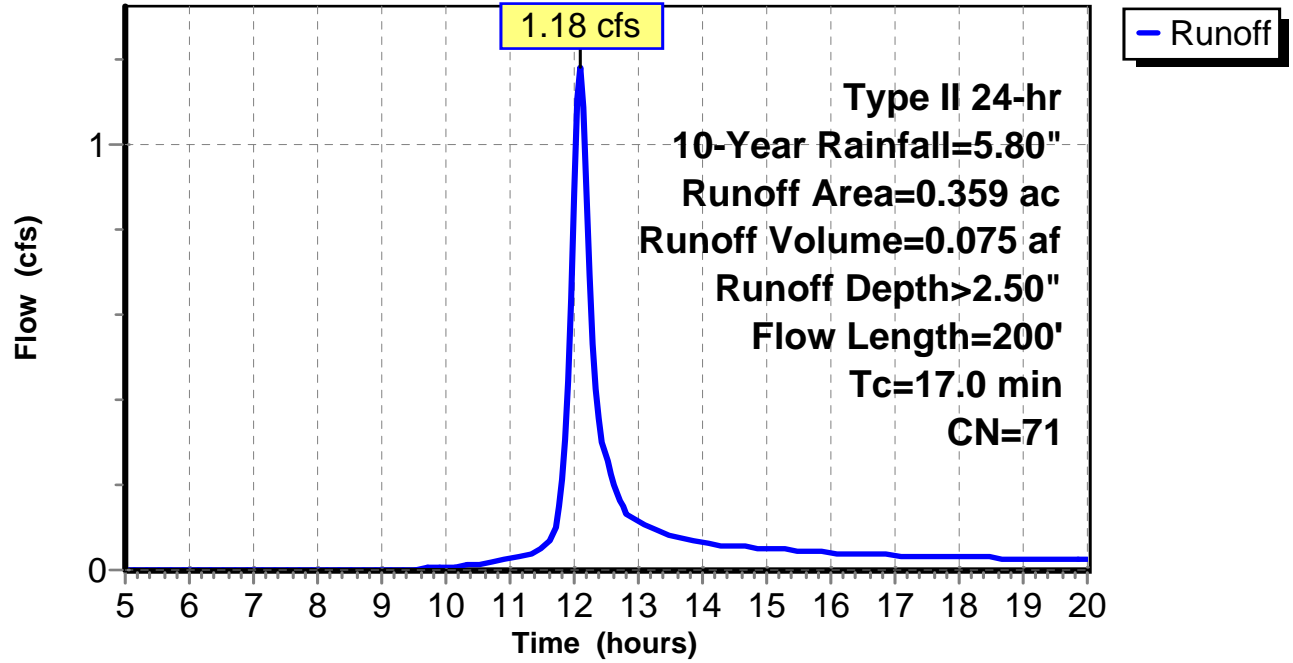
Subcatchment 6: C 256.006

Hydrograph



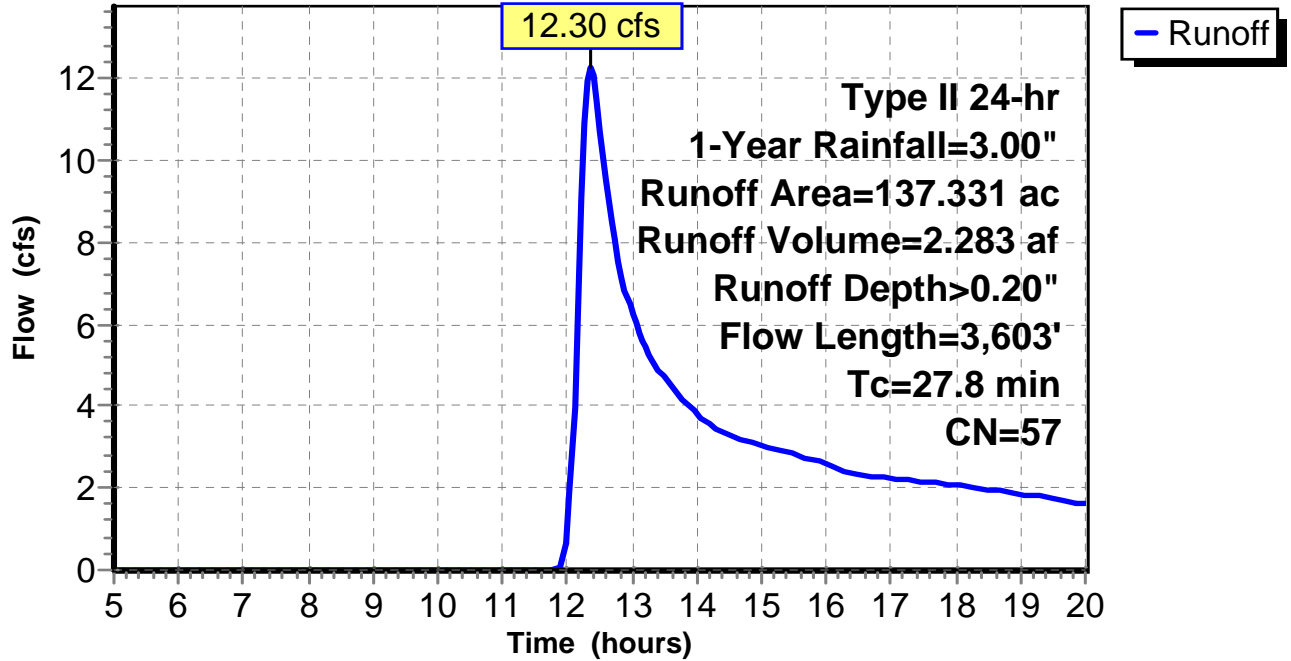
Subcatchment 7: C 256.007

Hydrograph



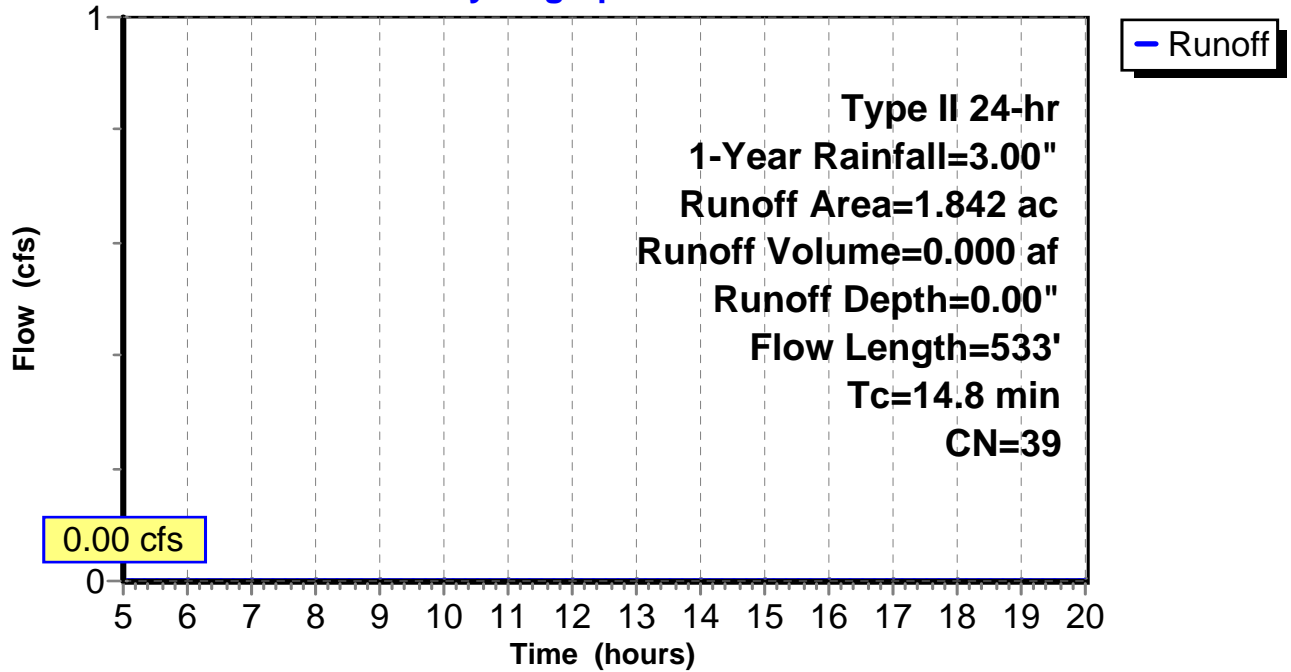
Subcatchment 1: C AR-703.001

Hydrograph



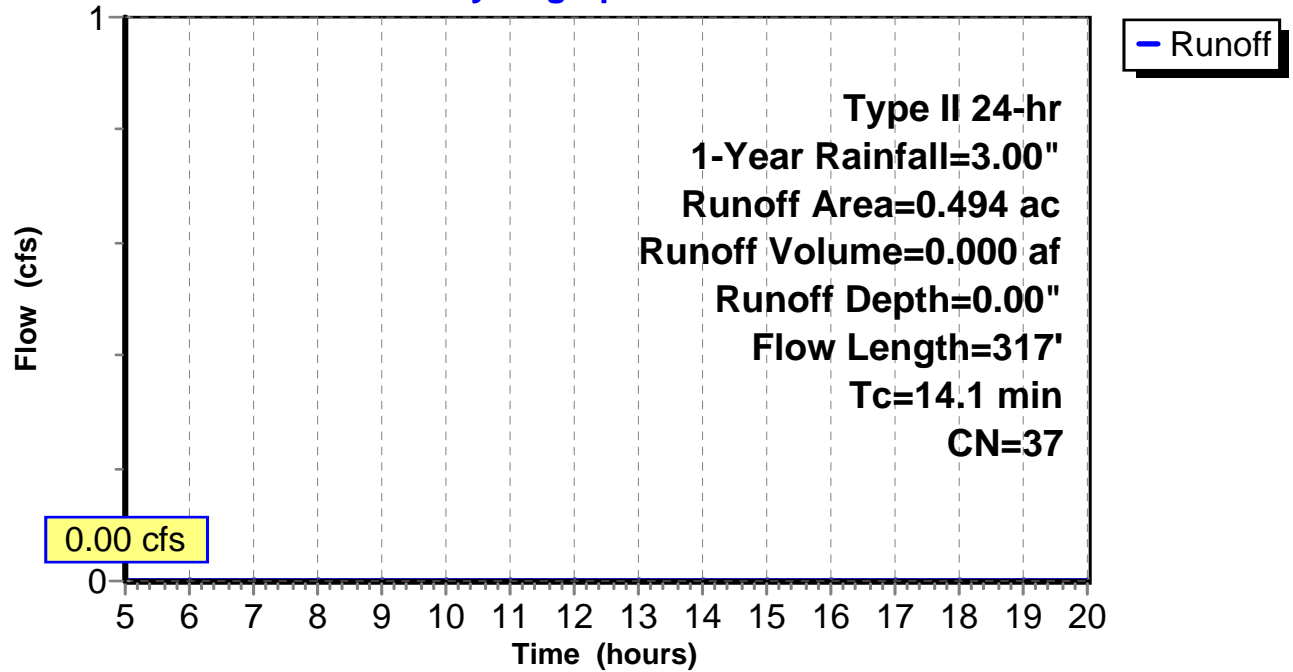
Subcatchment 2: C AR-703.002

Hydrograph



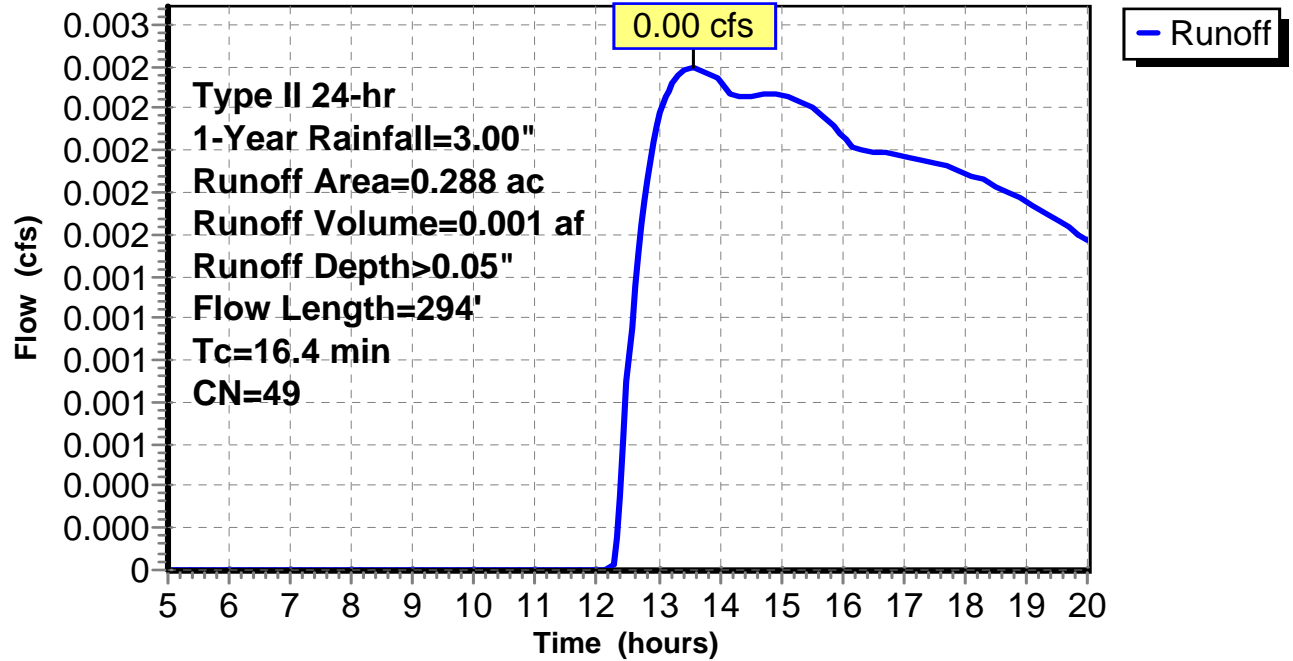
Subcatchment 3: C AR-703.003

Hydrograph



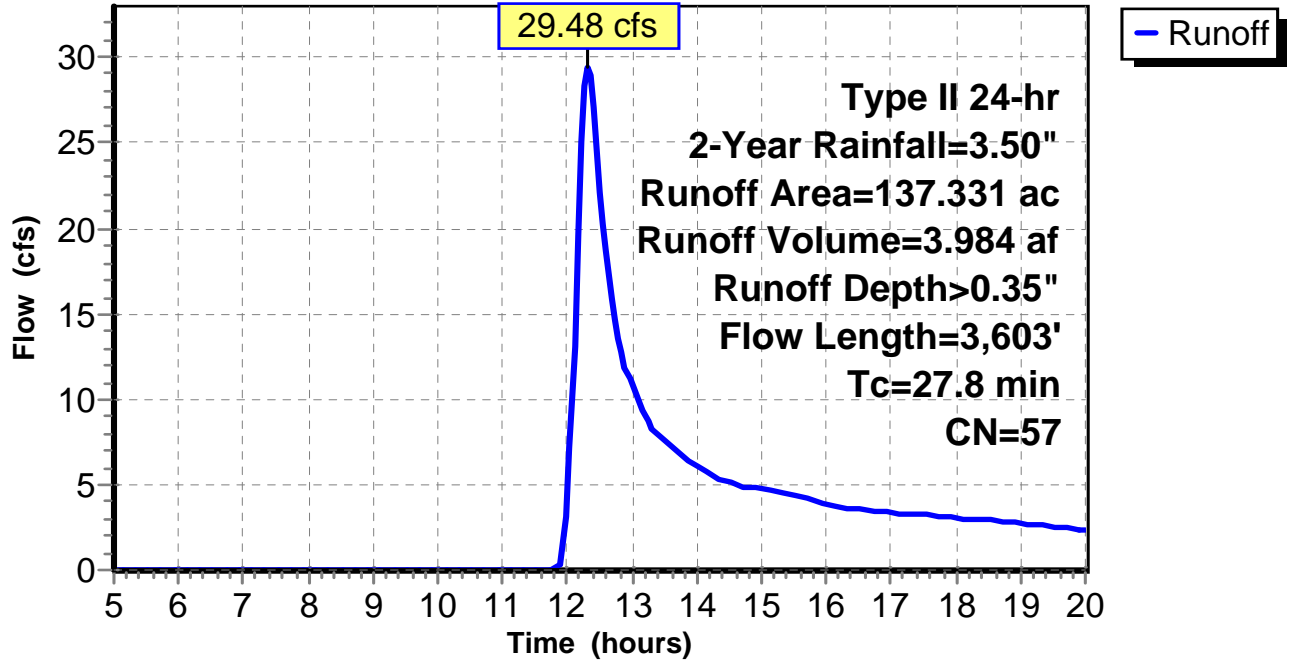
Subcatchment 4: C AR-703.004

Hydrograph



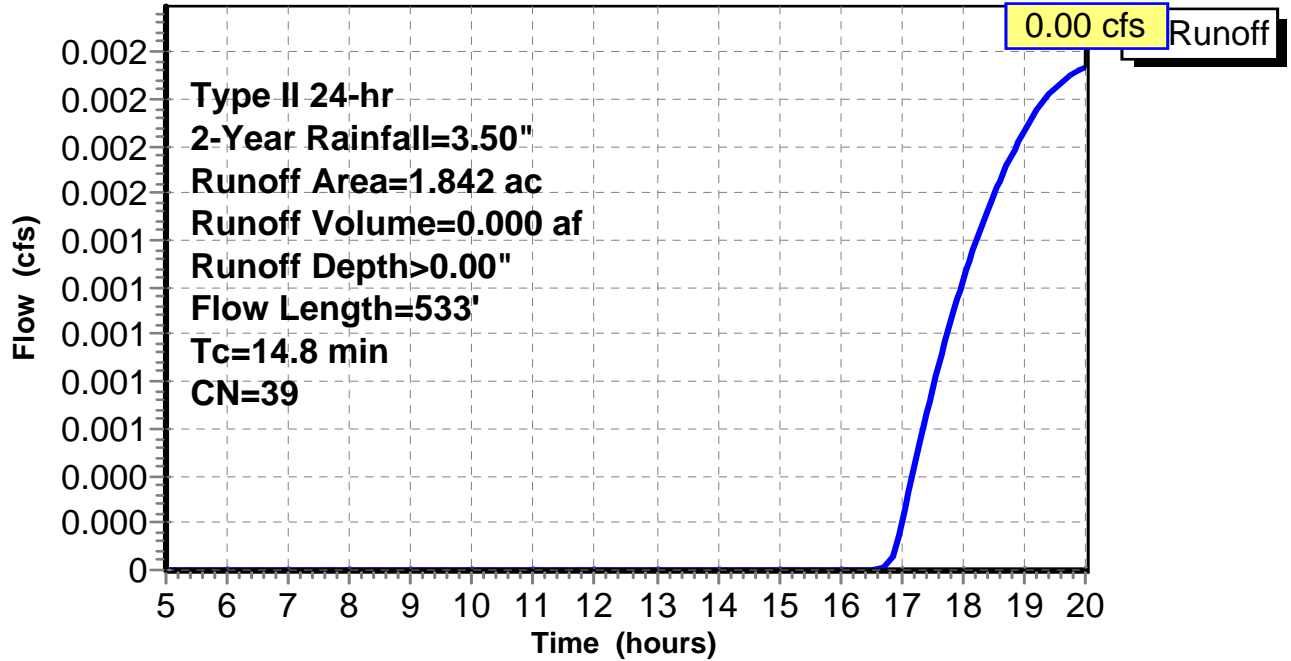
Subcatchment 1: C AR-703.001

Hydrograph



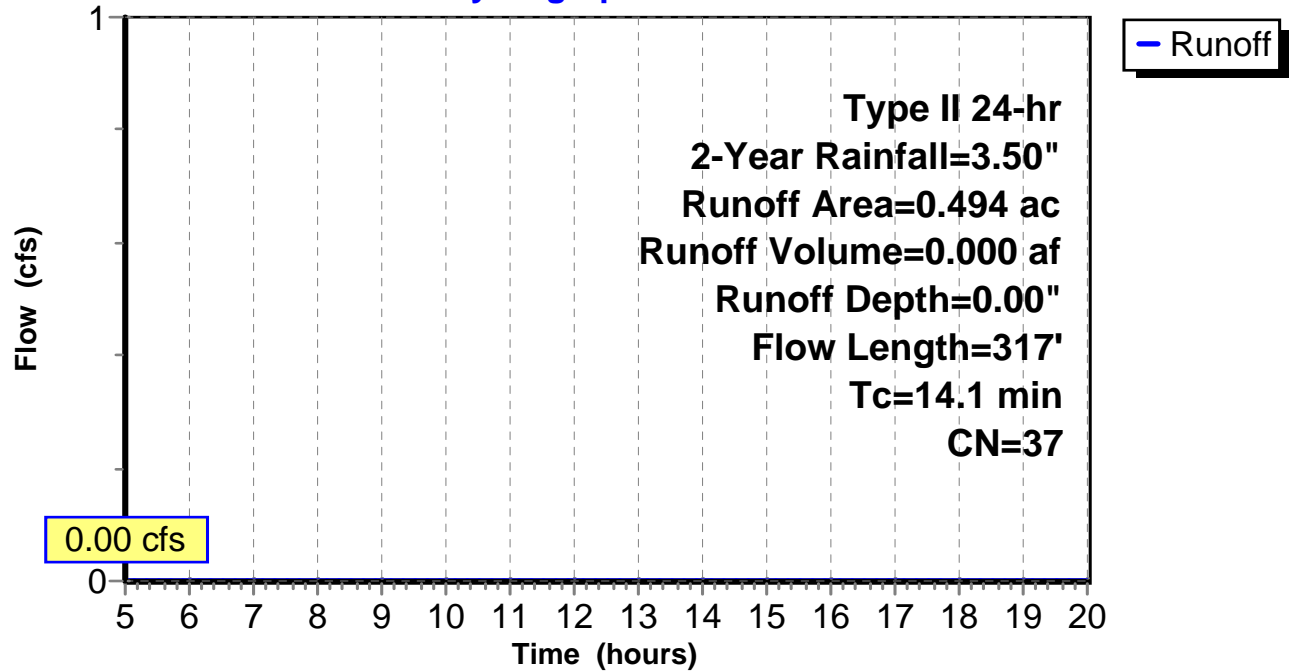
Subcatchment 2: C AR-703.002

Hydrograph



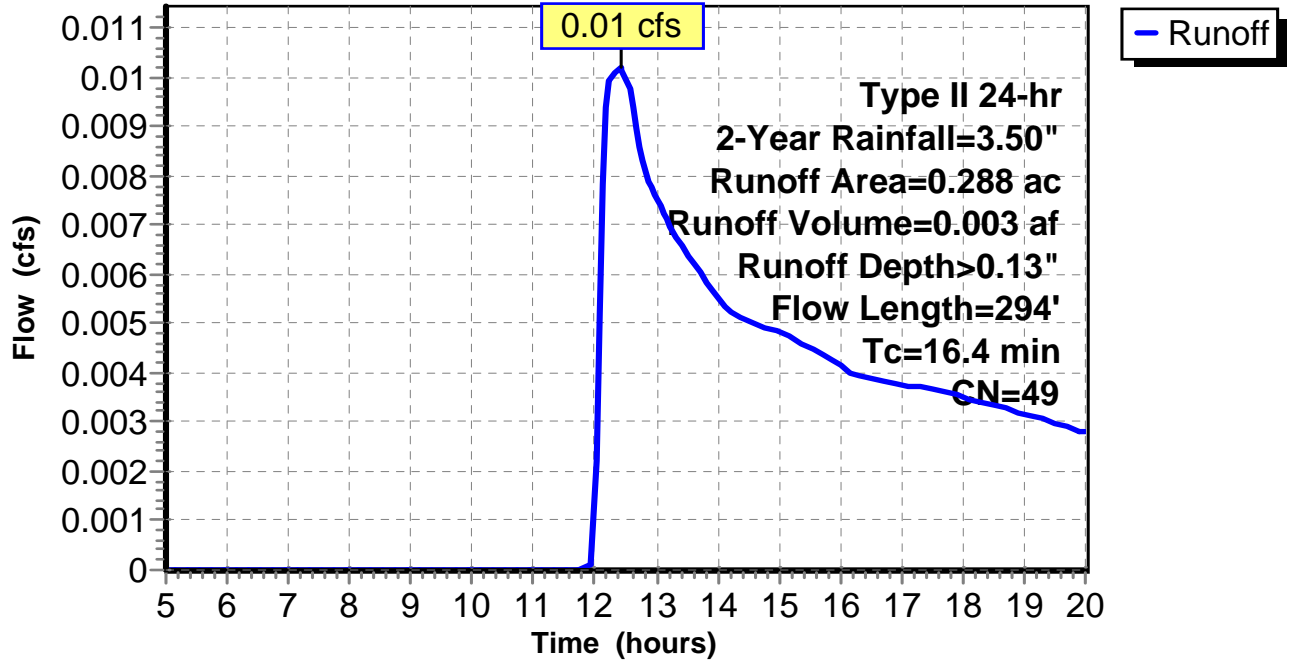
Subcatchment 3: C AR-703.003

Hydrograph



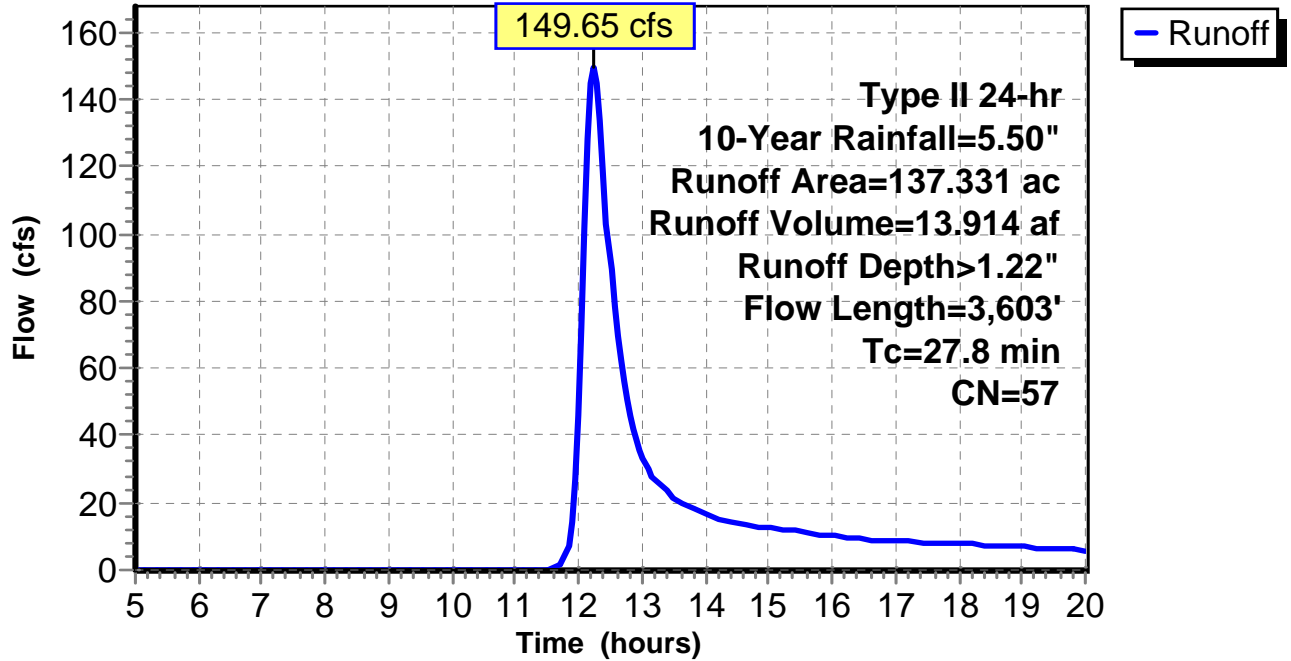
Subcatchment 4: C AR-703.004

Hydrograph



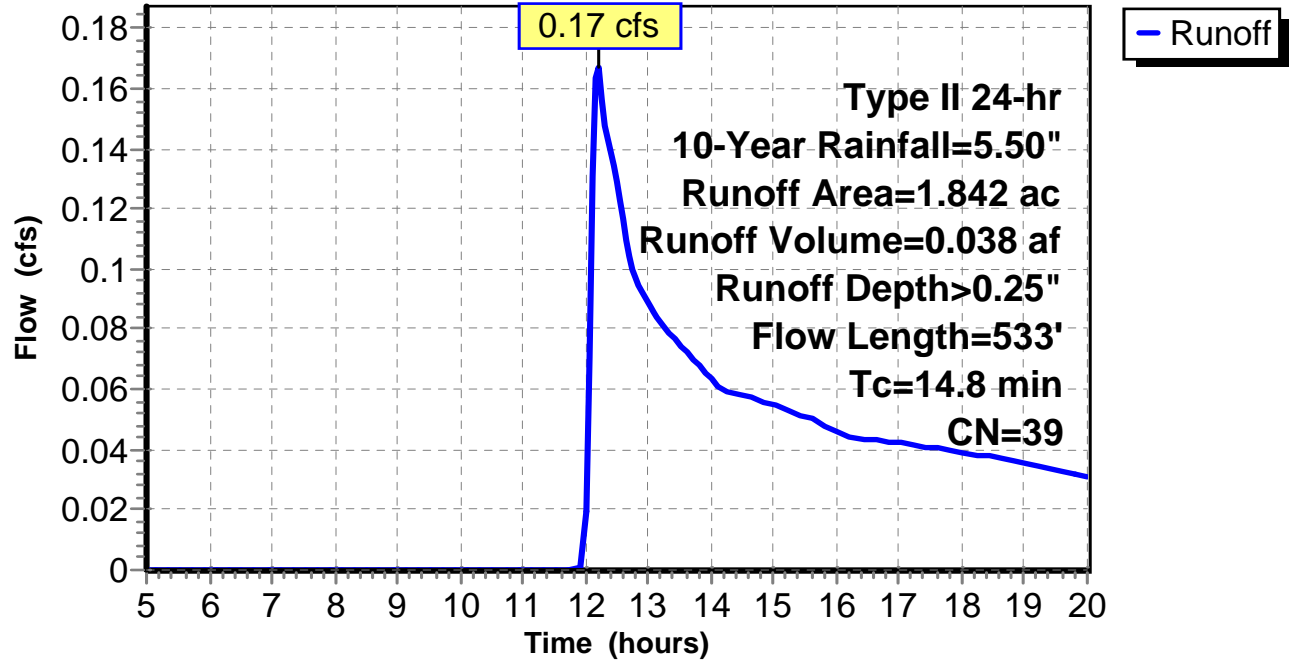
Subcatchment 1: C AR-703.001

Hydrograph



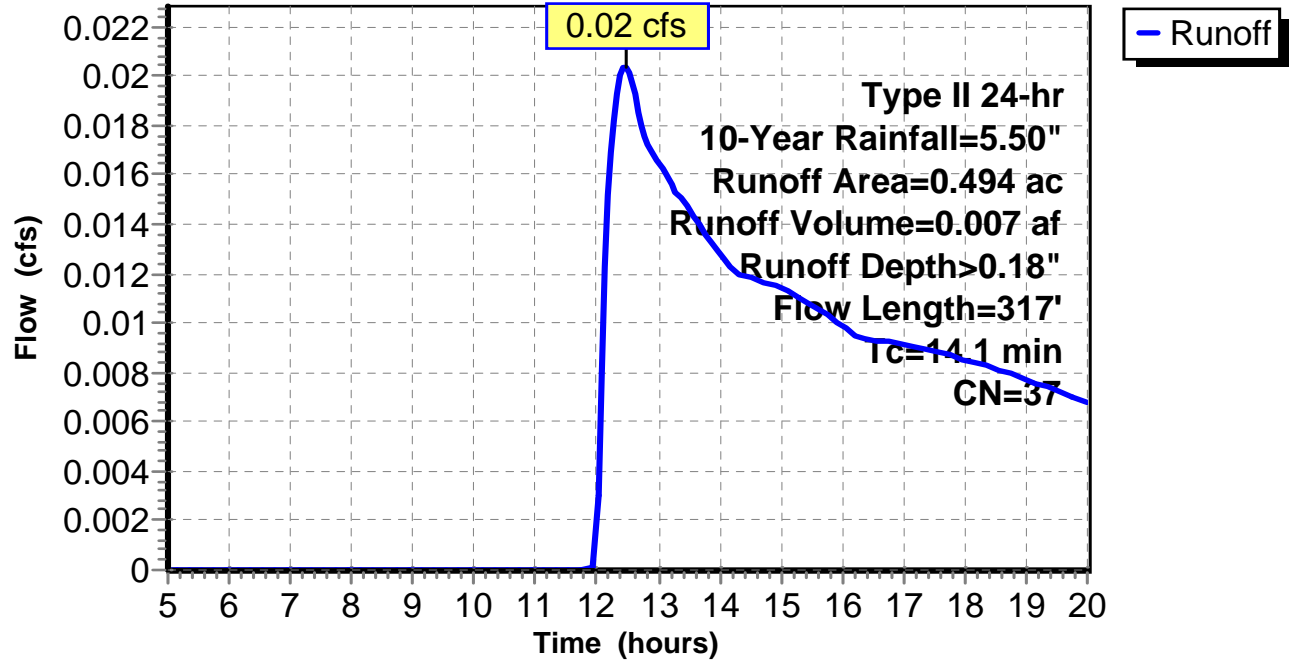
Subcatchment 2: C AR-703.002

Hydrograph



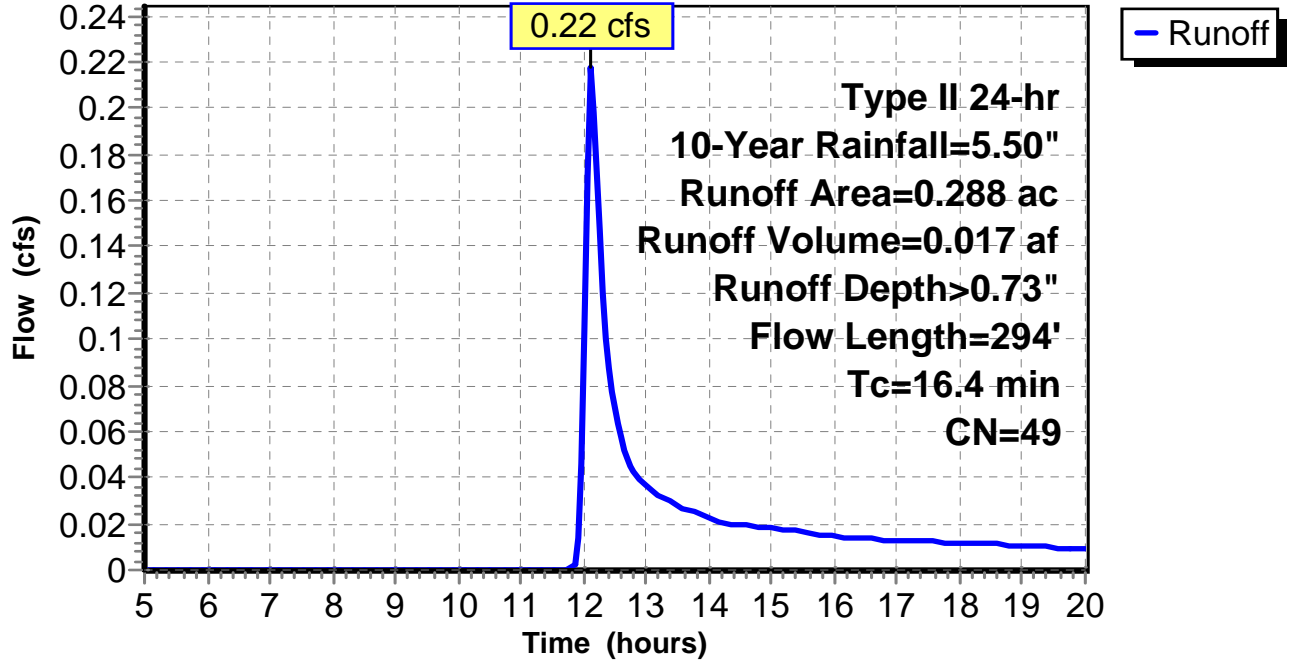
Subcatchment 3: C AR-703.003

Hydrograph



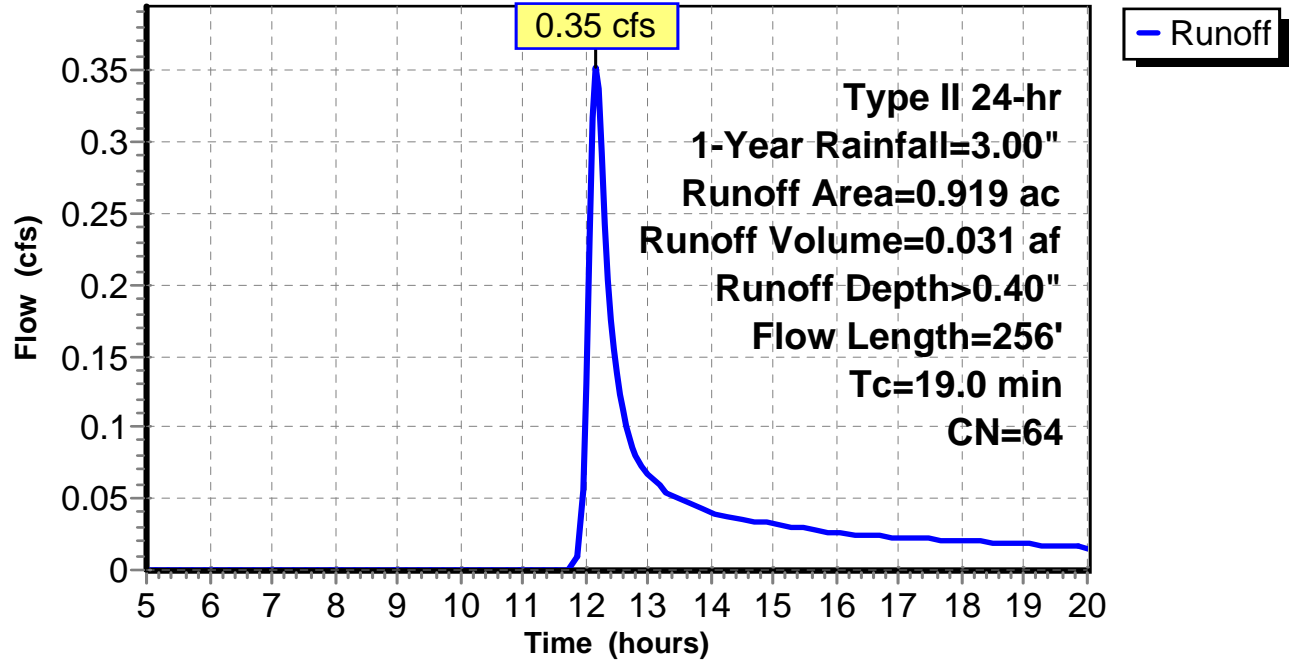
Subcatchment 4: C AR-703.004

Hydrograph



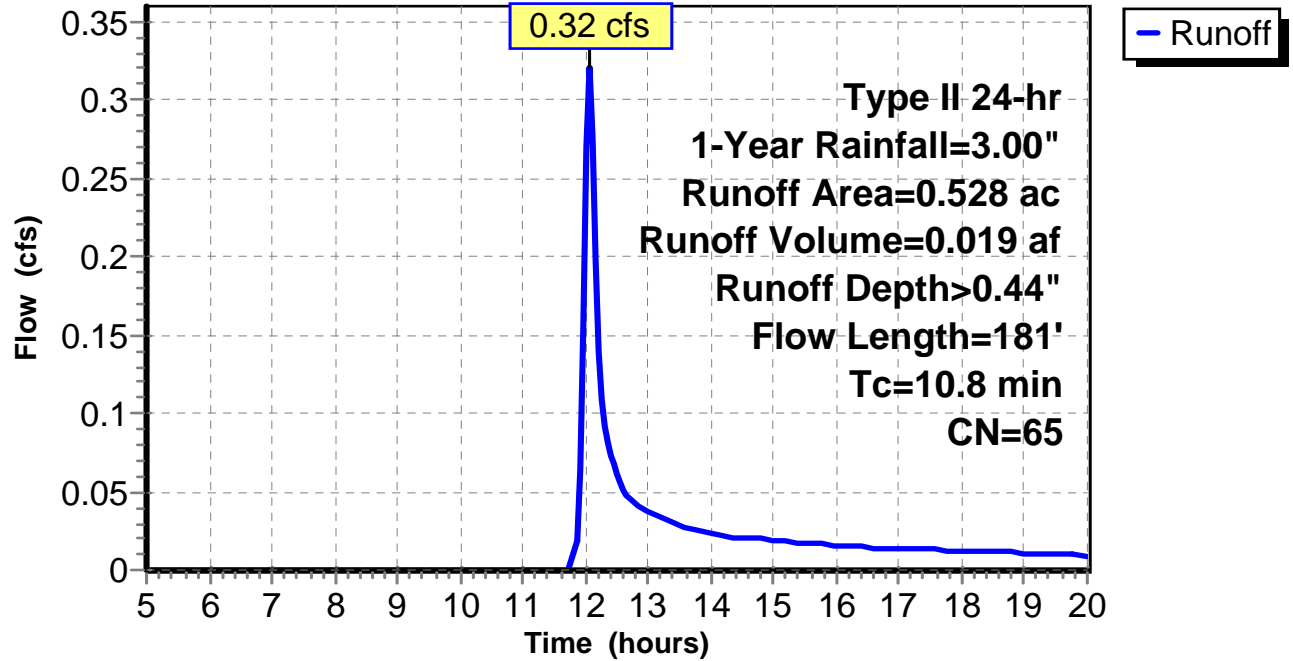
Subcatchment 1: C AR-704.001

Hydrograph



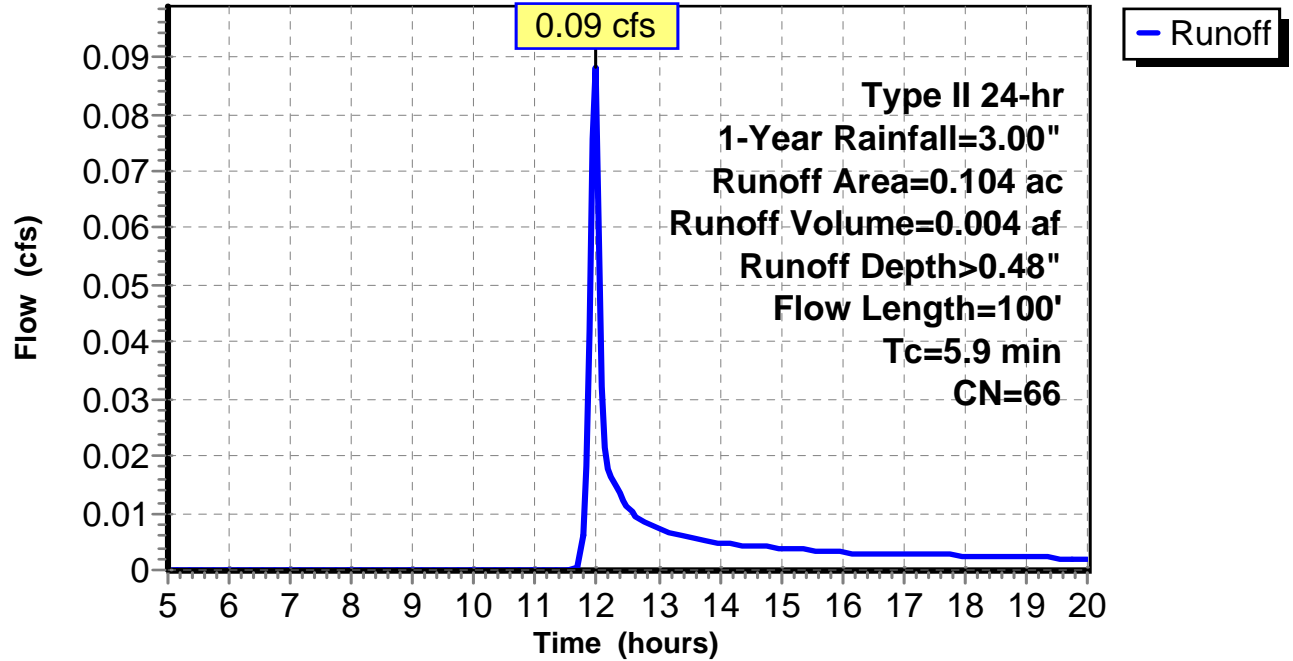
Subcatchment 2: C AR-704.002

Hydrograph



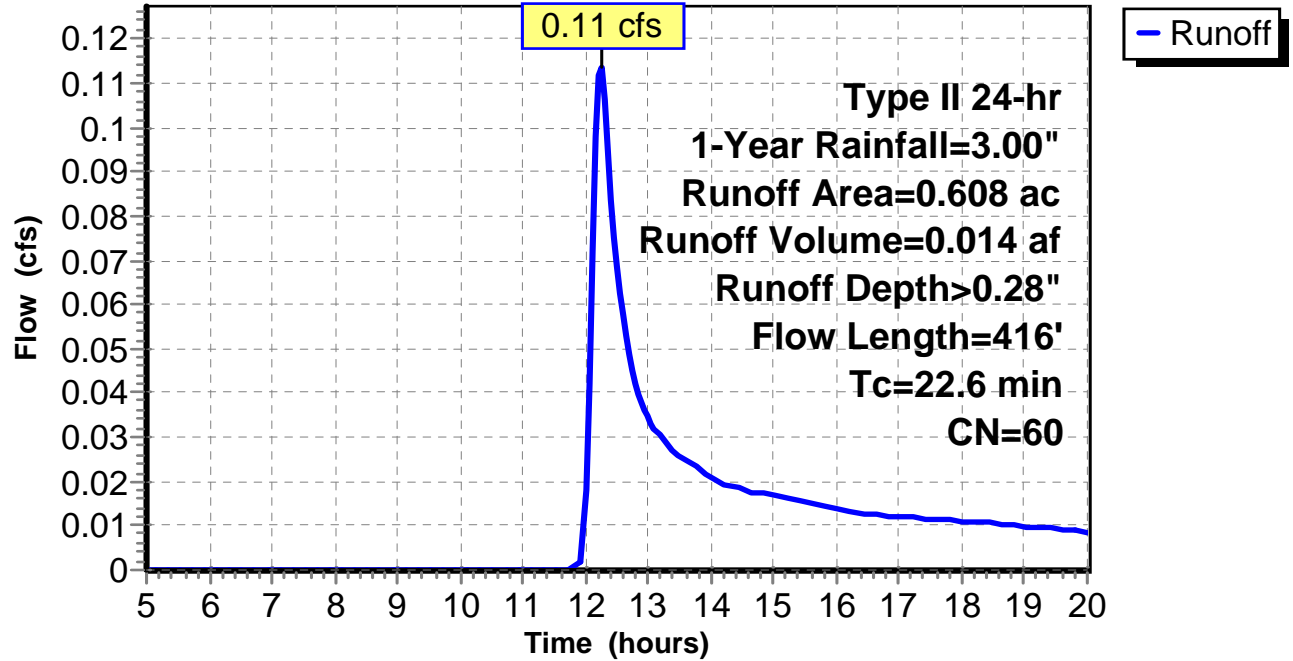
Subcatchment 3: C 277.003

Hydrograph



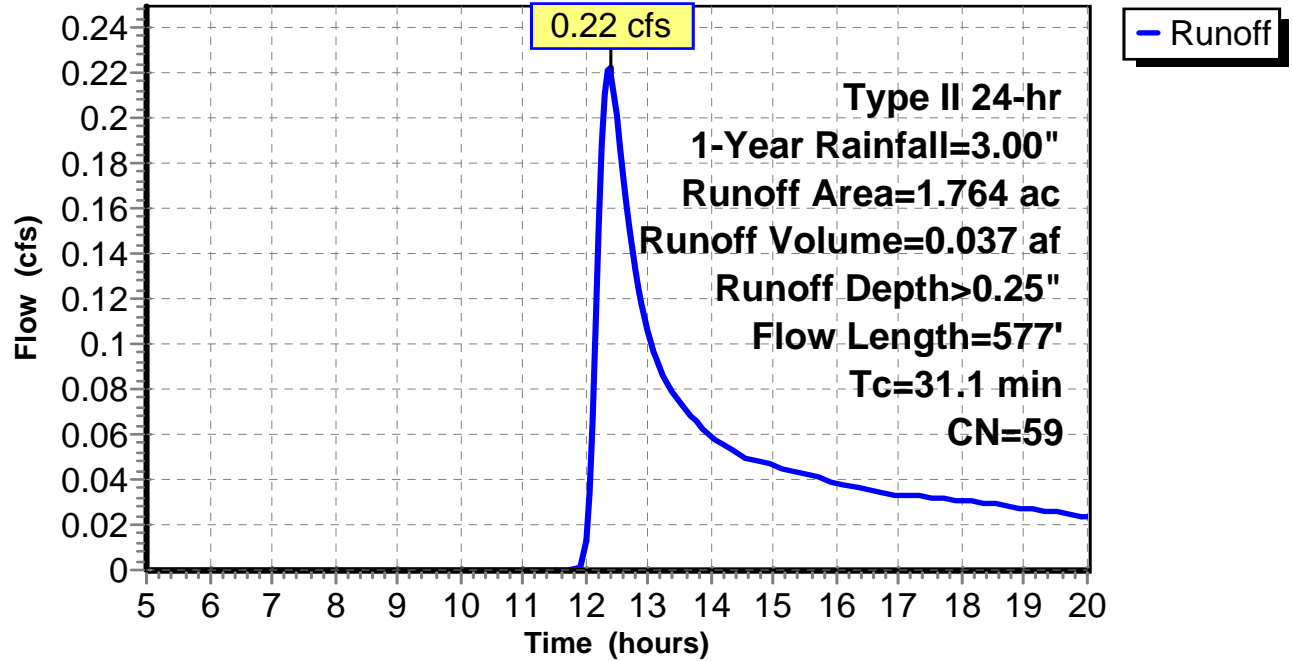
Subcatchment 4: C 277.004

Hydrograph



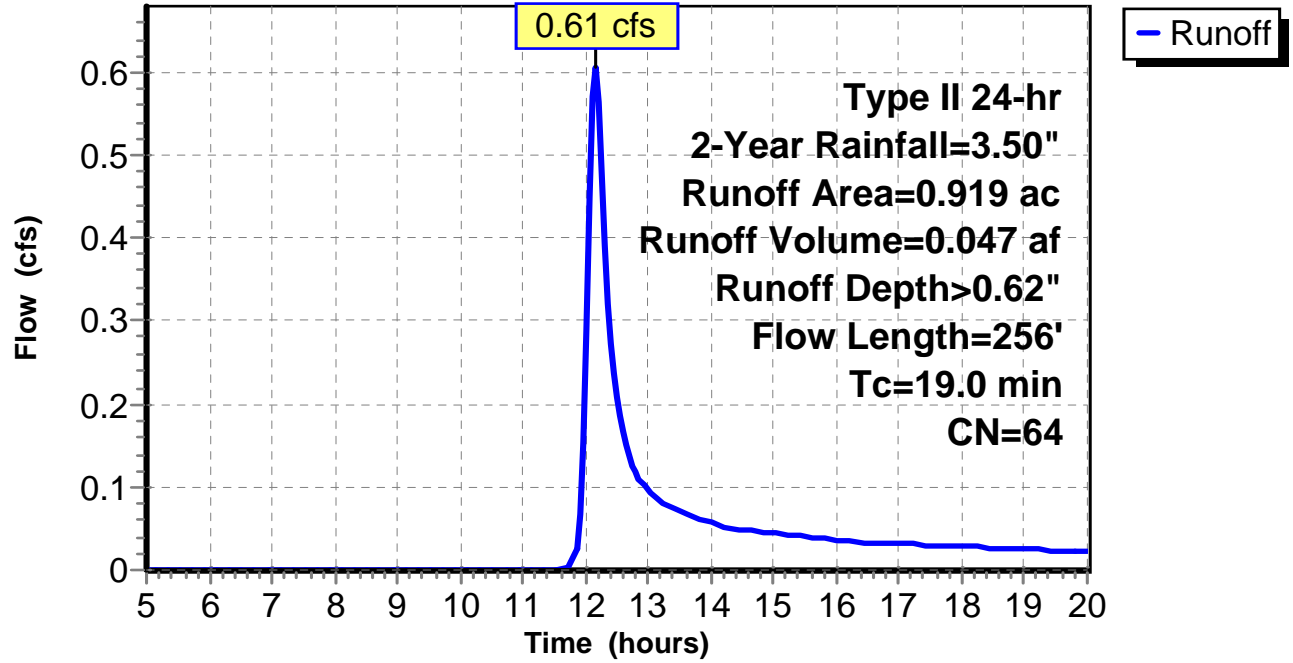
Subcatchment 5: C 277.005

Hydrograph



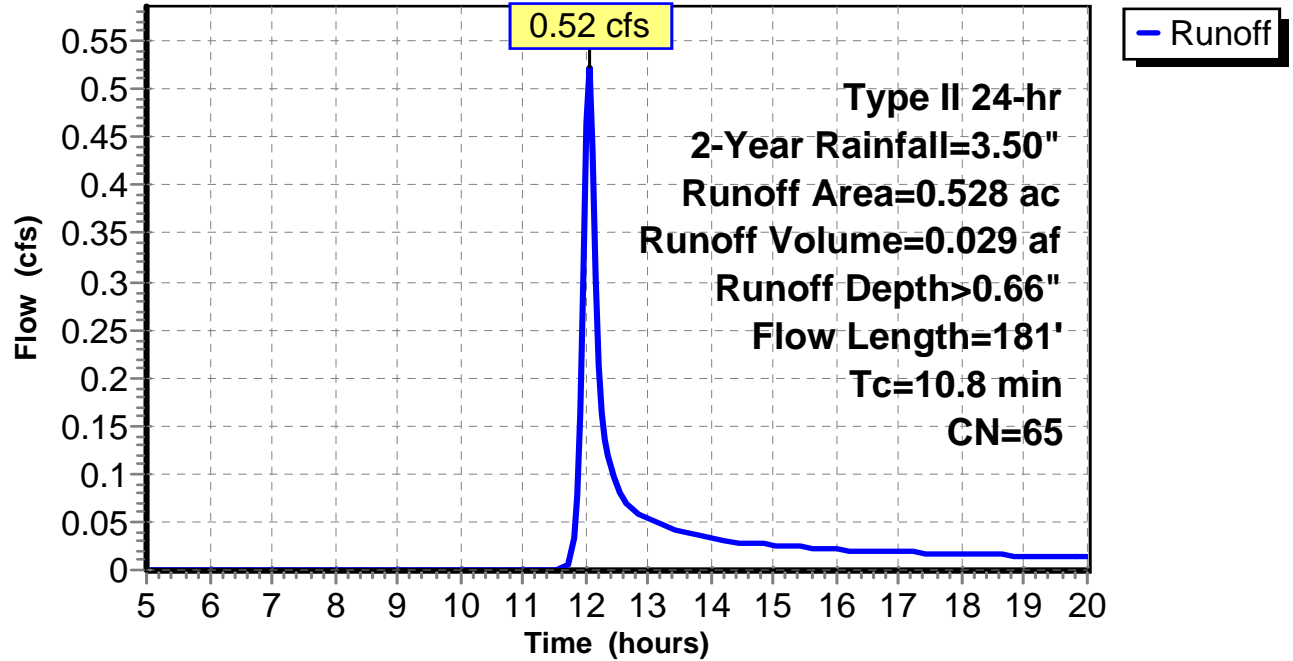
Subcatchment 1: C AR-704.001

Hydrograph



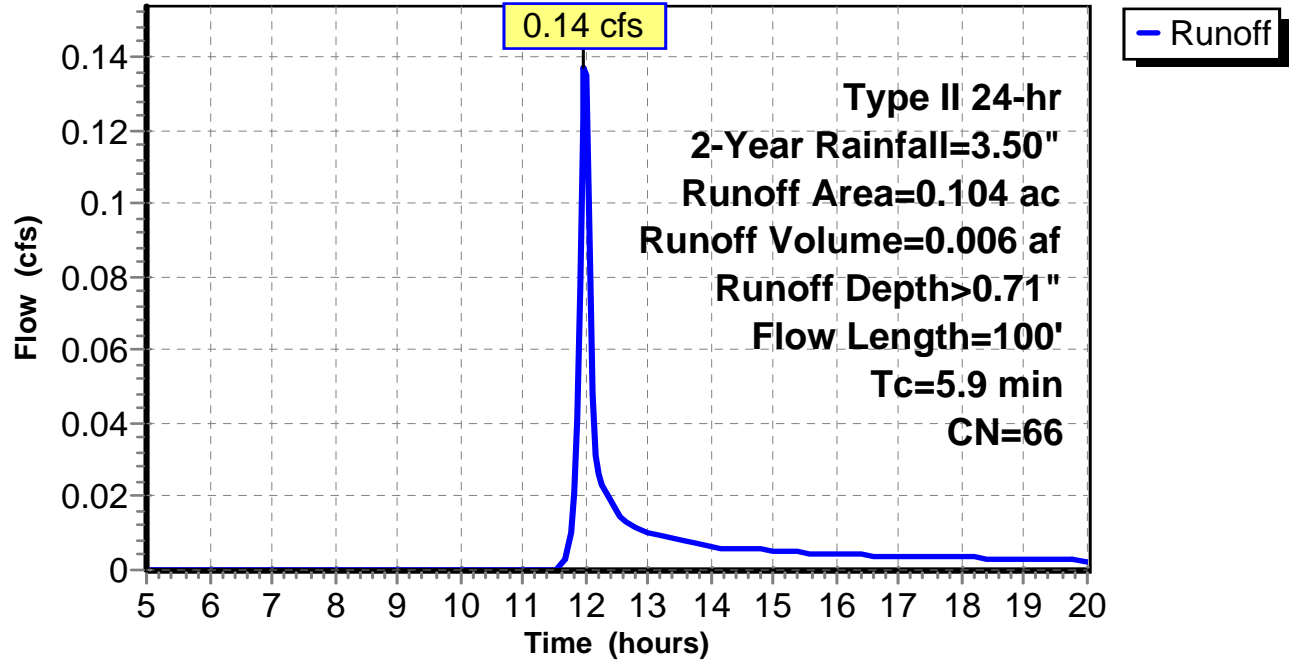
Subcatchment 2: C AR-704.002

Hydrograph



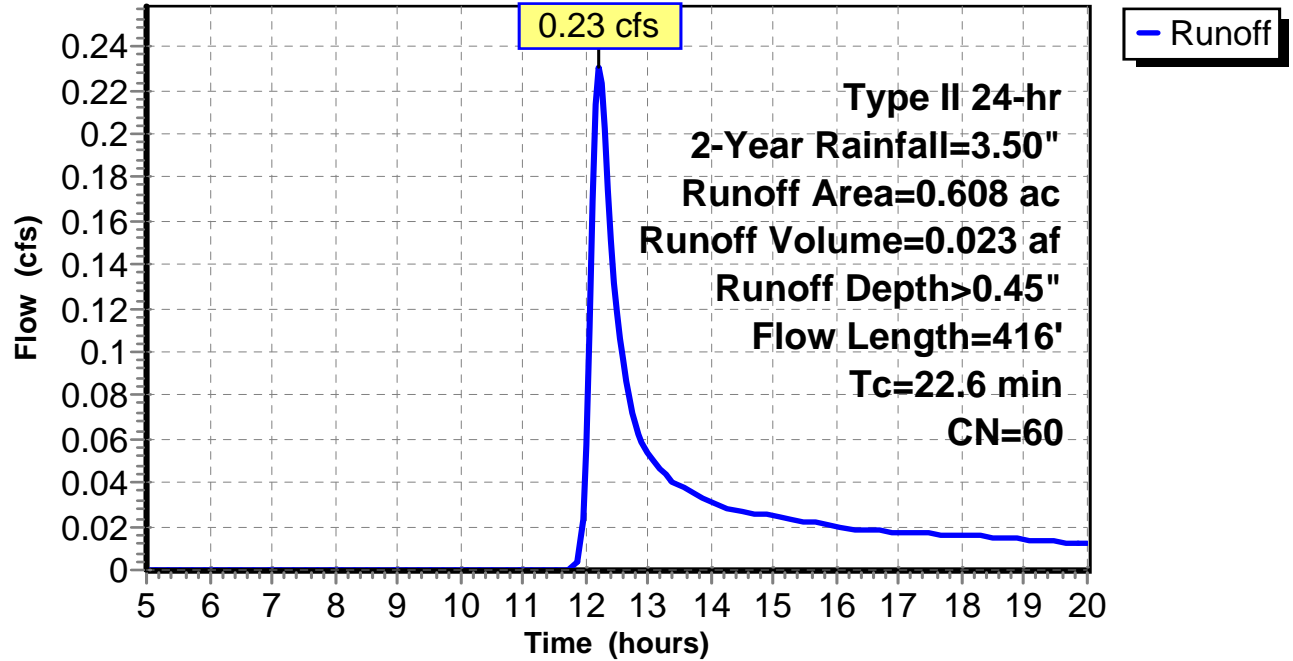
Subcatchment 3: C 277.003

Hydrograph



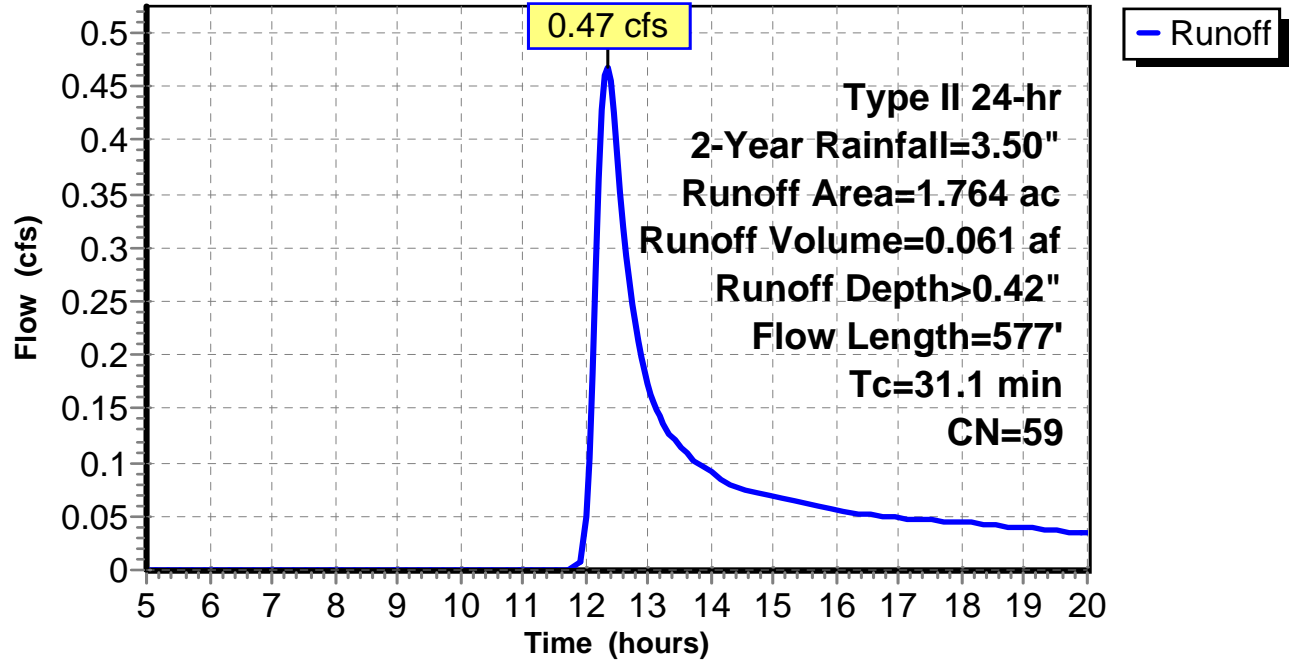
Subcatchment 4: C 277.004

Hydrograph



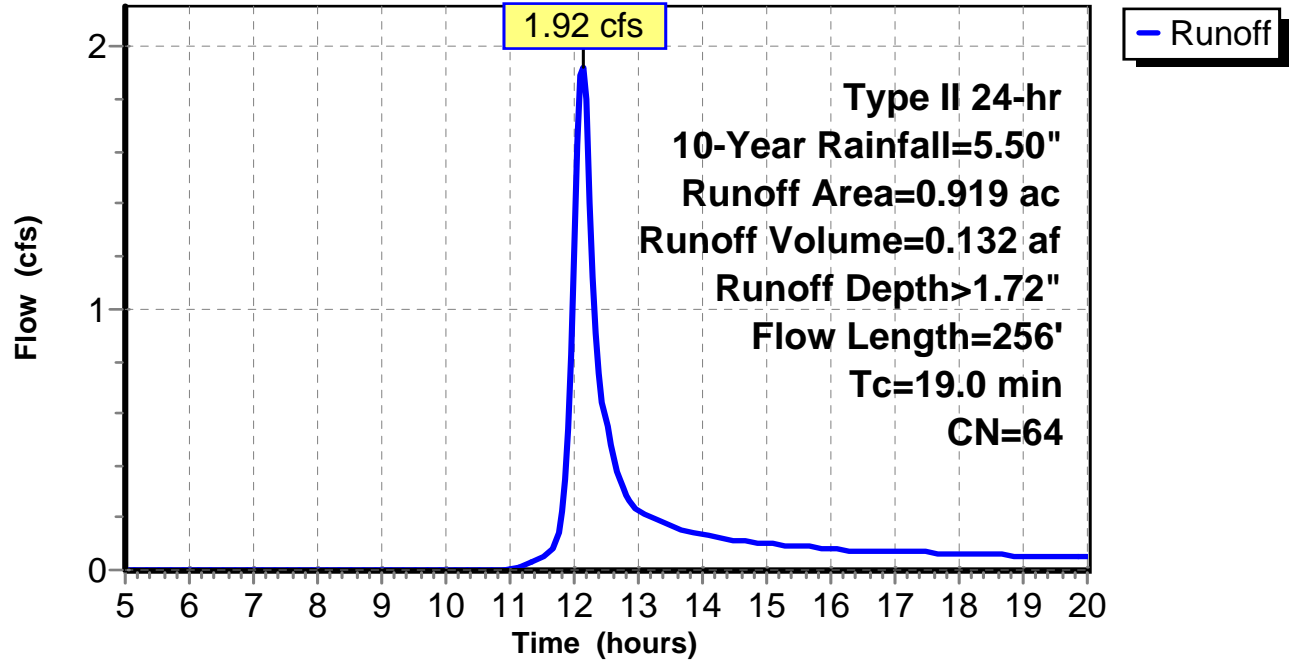
Subcatchment 5: C 277.005

Hydrograph



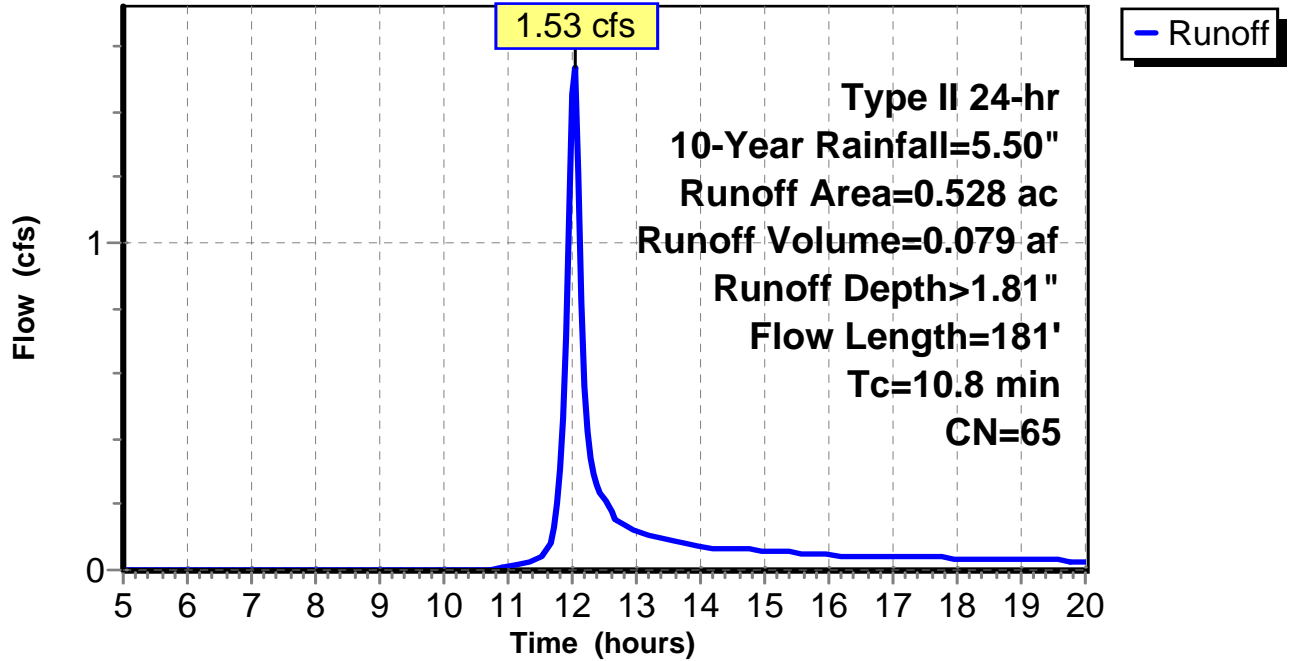
Subcatchment 1: C AR-704.001

Hydrograph



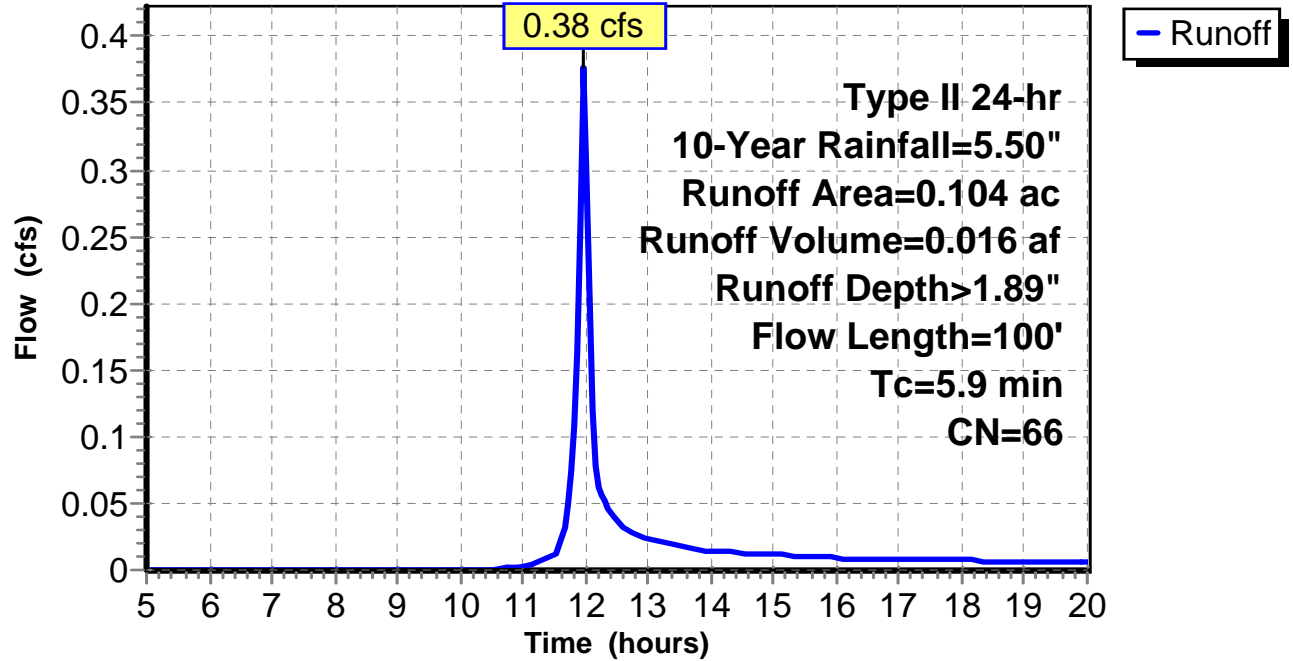
Subcatchment 2: C AR-704.002

Hydrograph



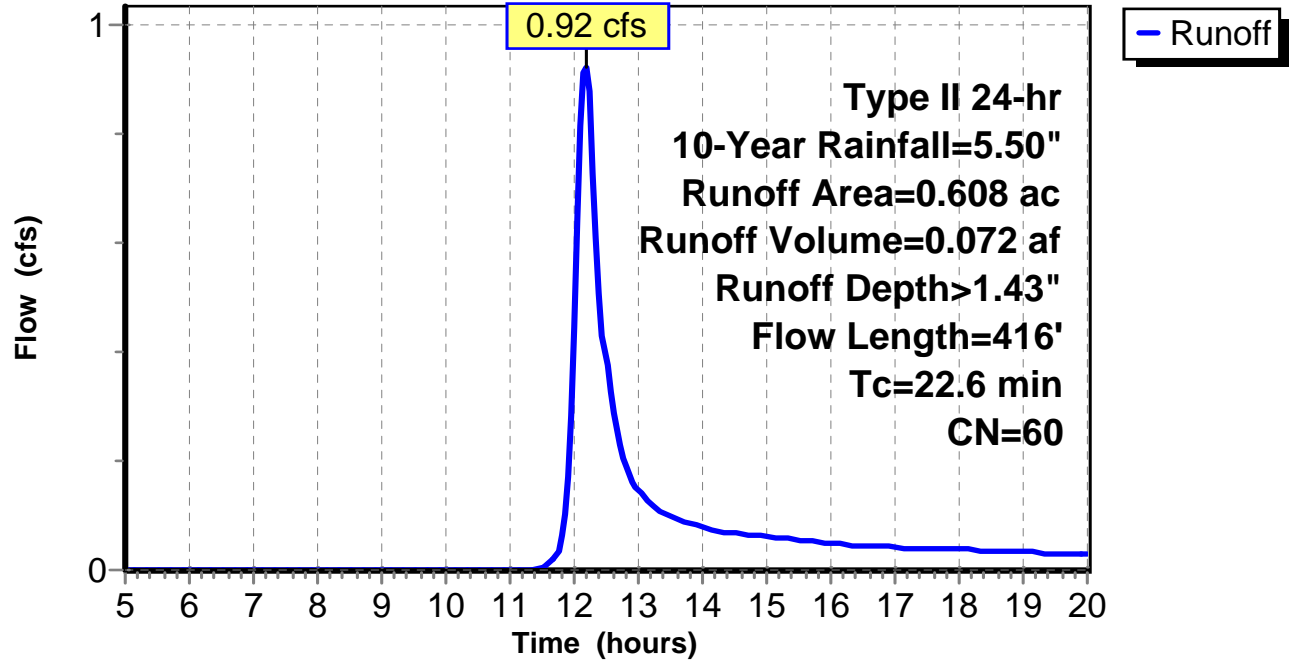
Subcatchment 3: C 277.003

Hydrograph



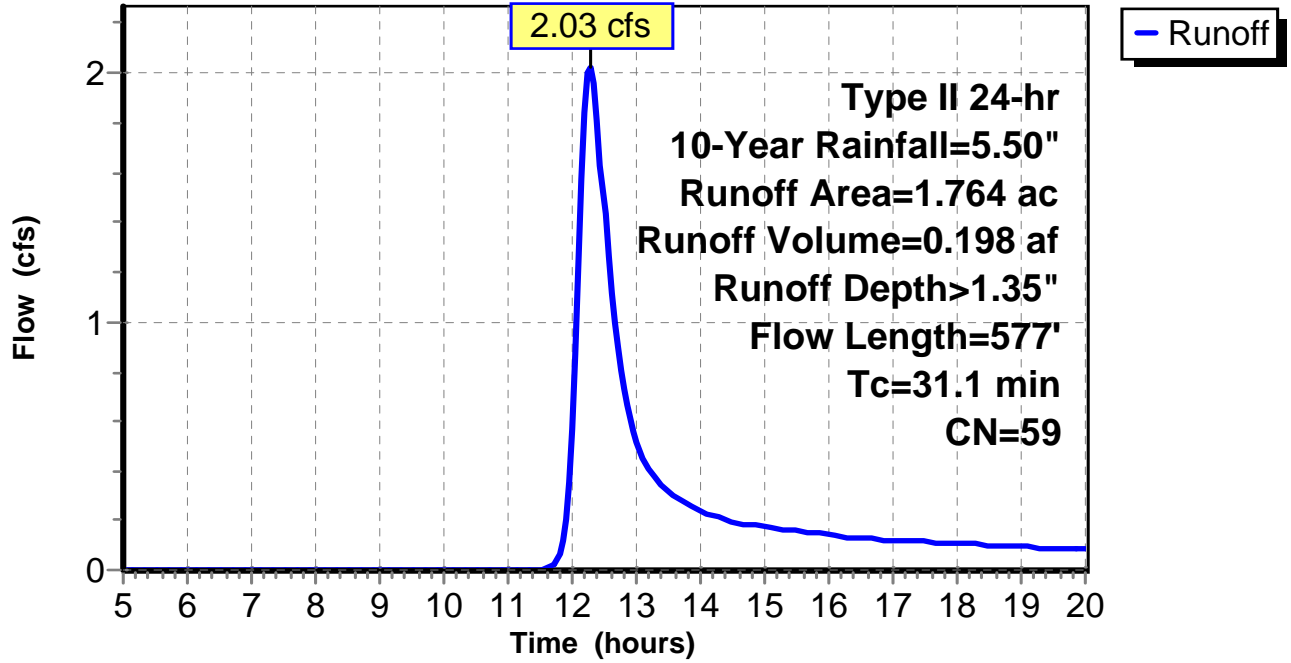
Subcatchment 4: C 277.004

Hydrograph



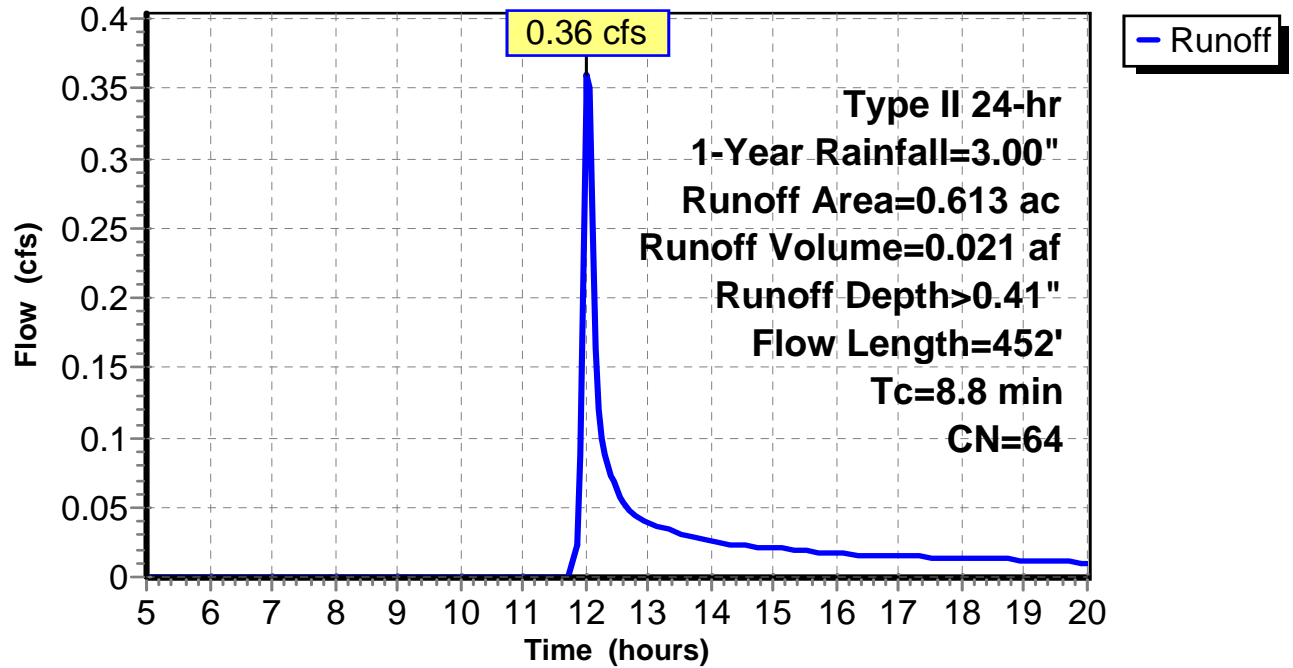
Subcatchment 5: C 277.005

Hydrograph



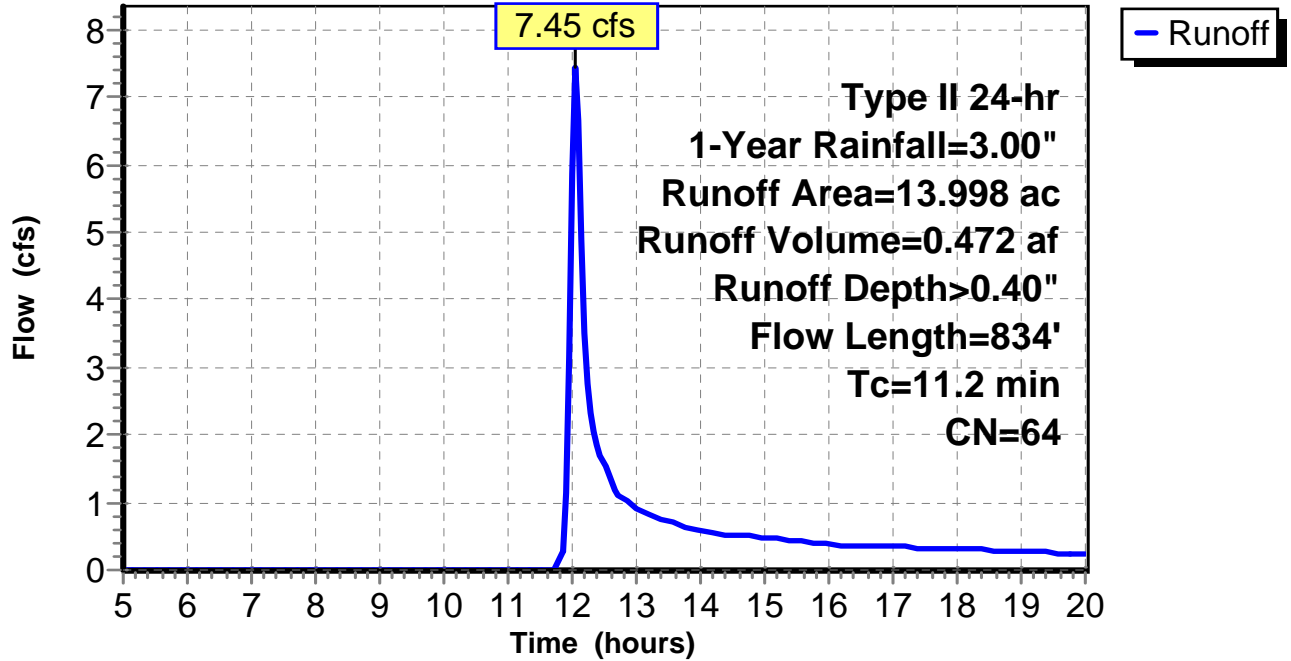
Subcatchment 1: C AR-704.003

Hydrograph



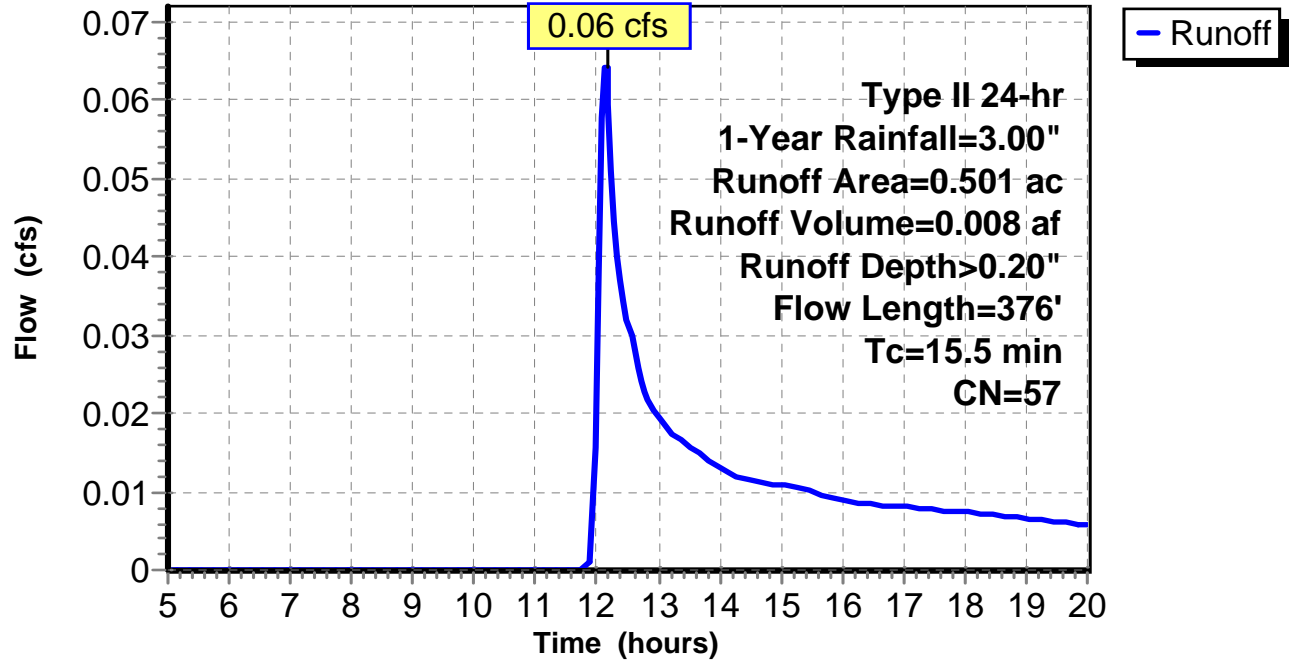
Subcatchment 2: C AR-704.004

Hydrograph



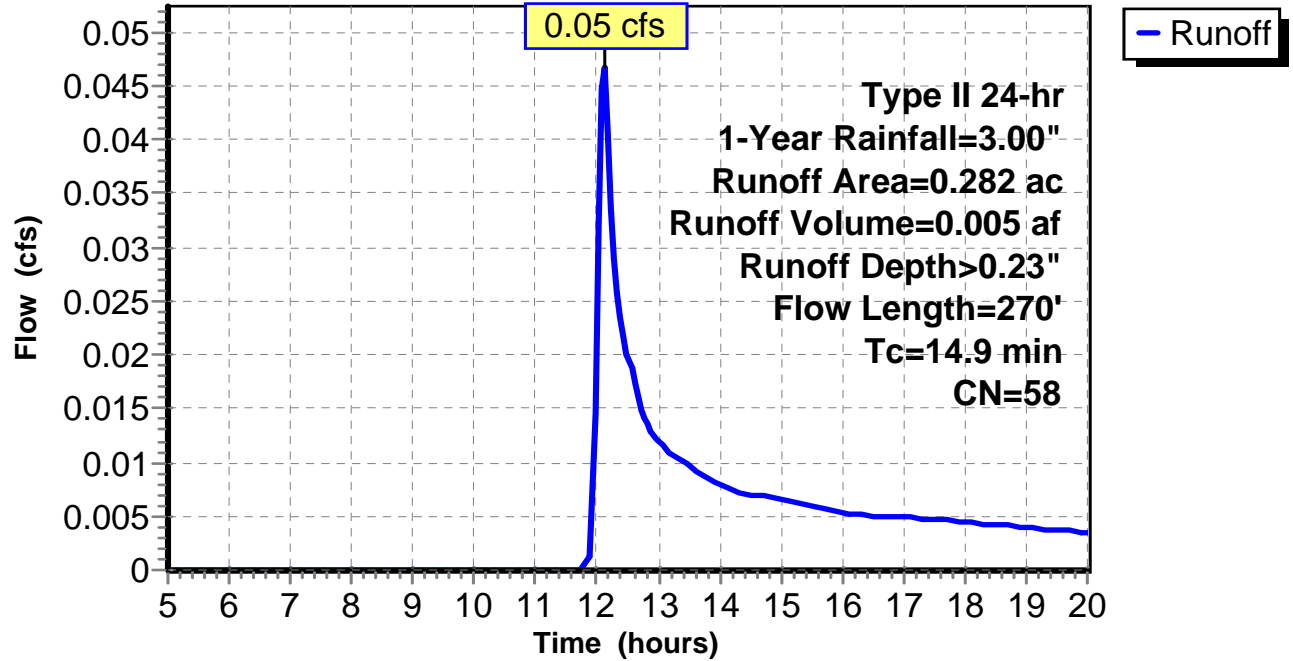
Subcatchment 3: C AR-704.005

Hydrograph



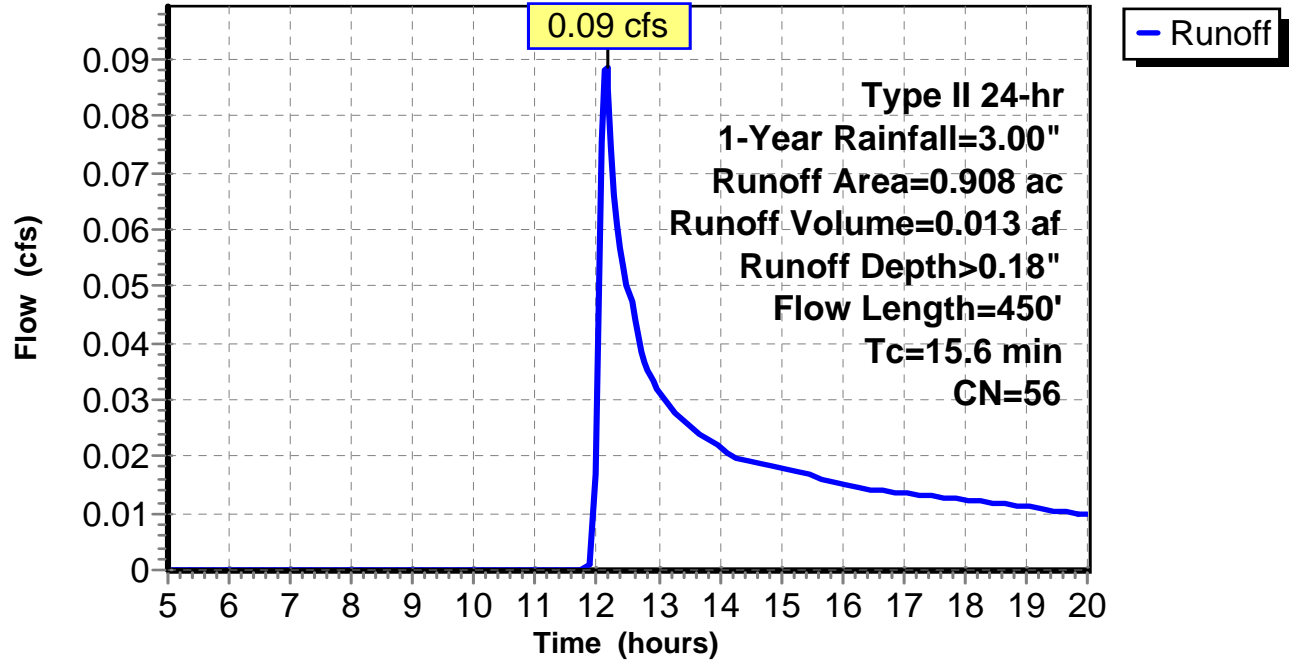
Subcatchment 4: C AR-704.006

Hydrograph



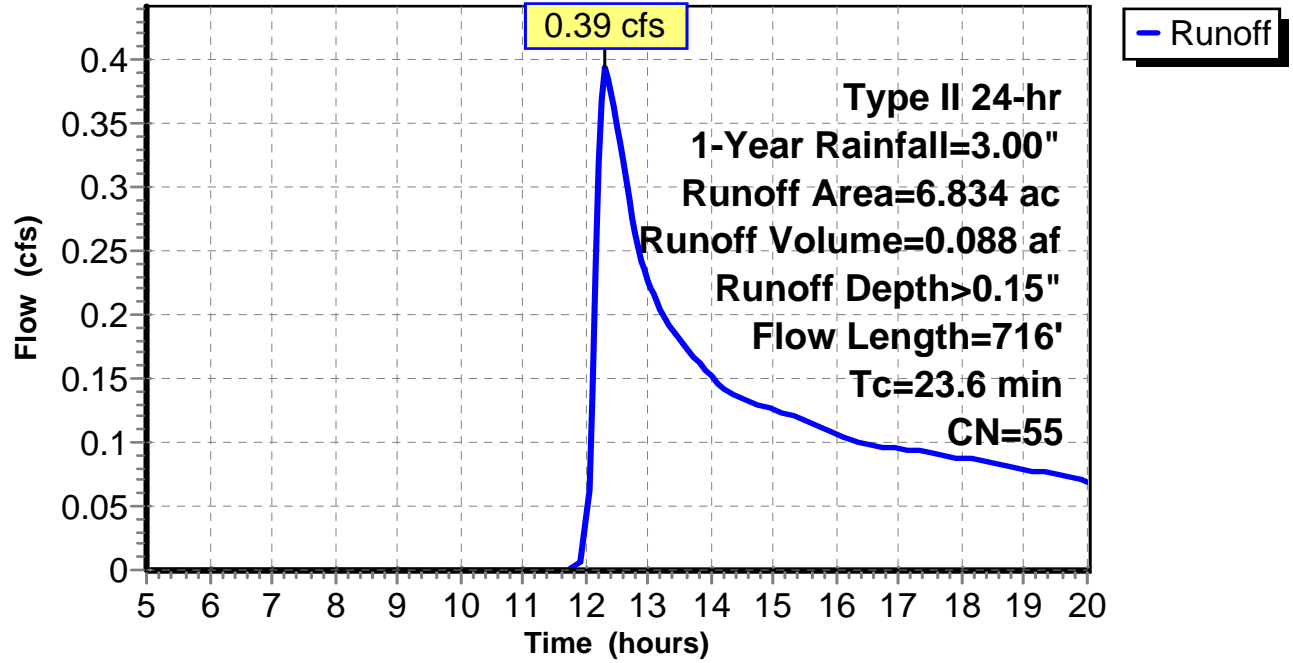
Subcatchment 5: C AR-704.007

Hydrograph



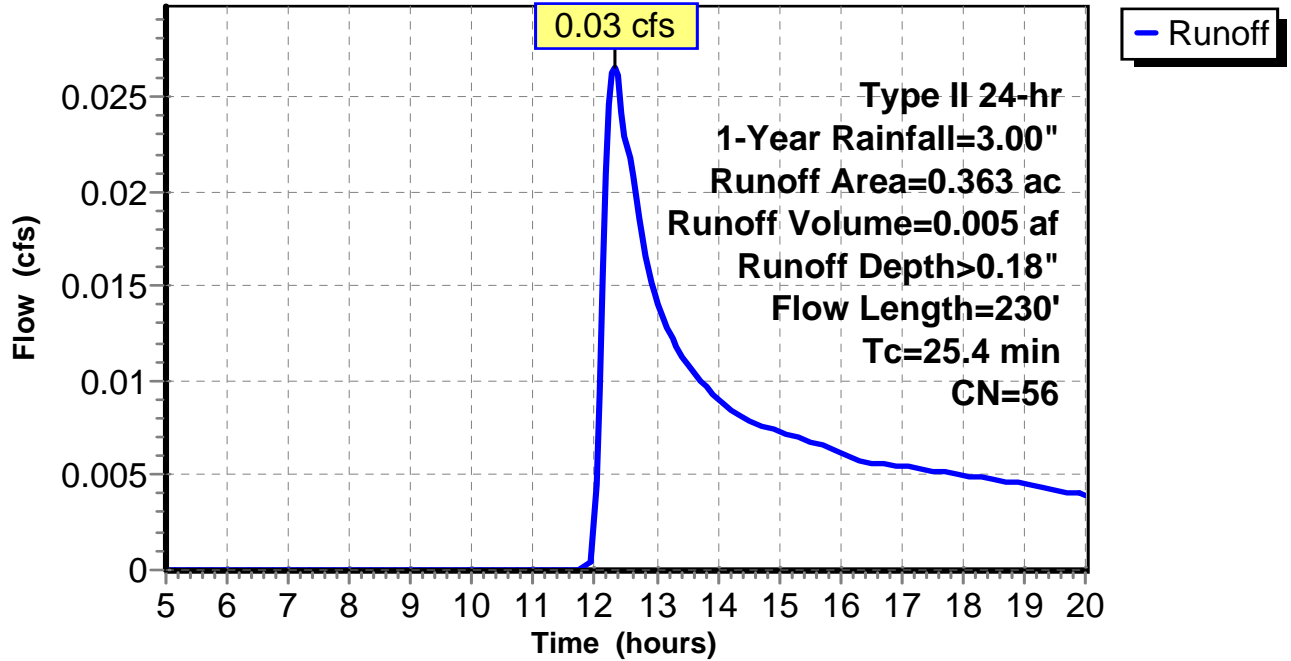
Subcatchment 6: C AR-704.008

Hydrograph



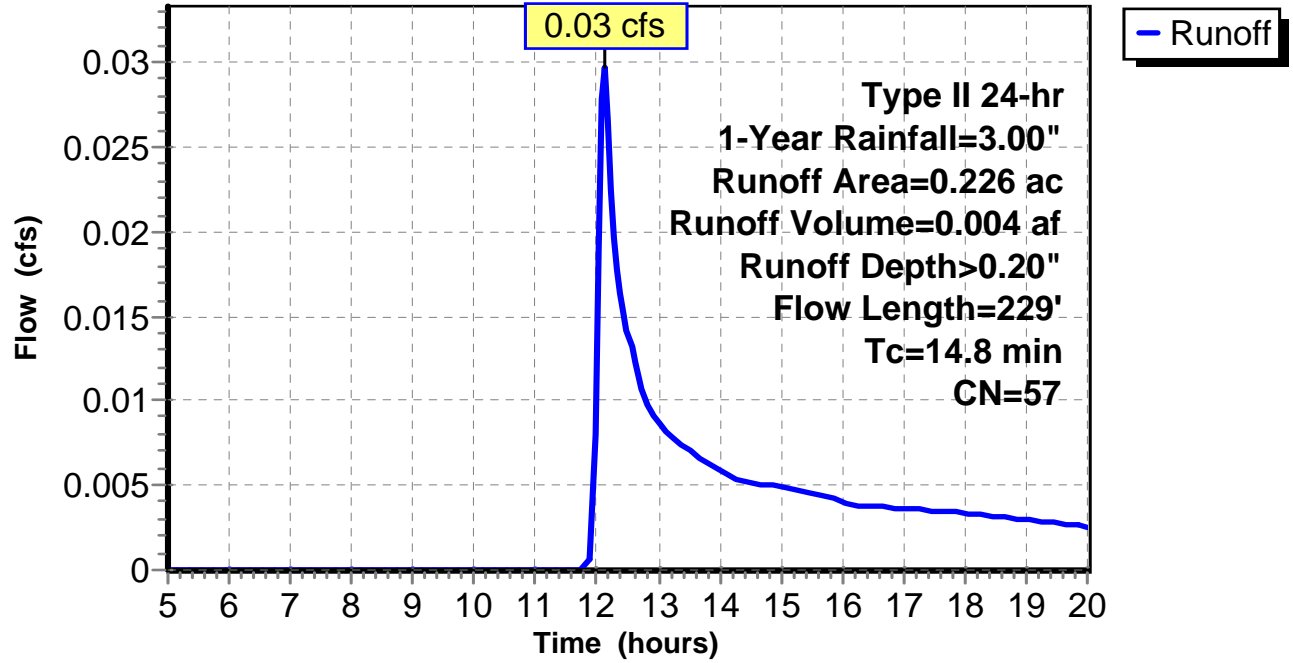
Subcatchment 7: C AR-704.009

Hydrograph



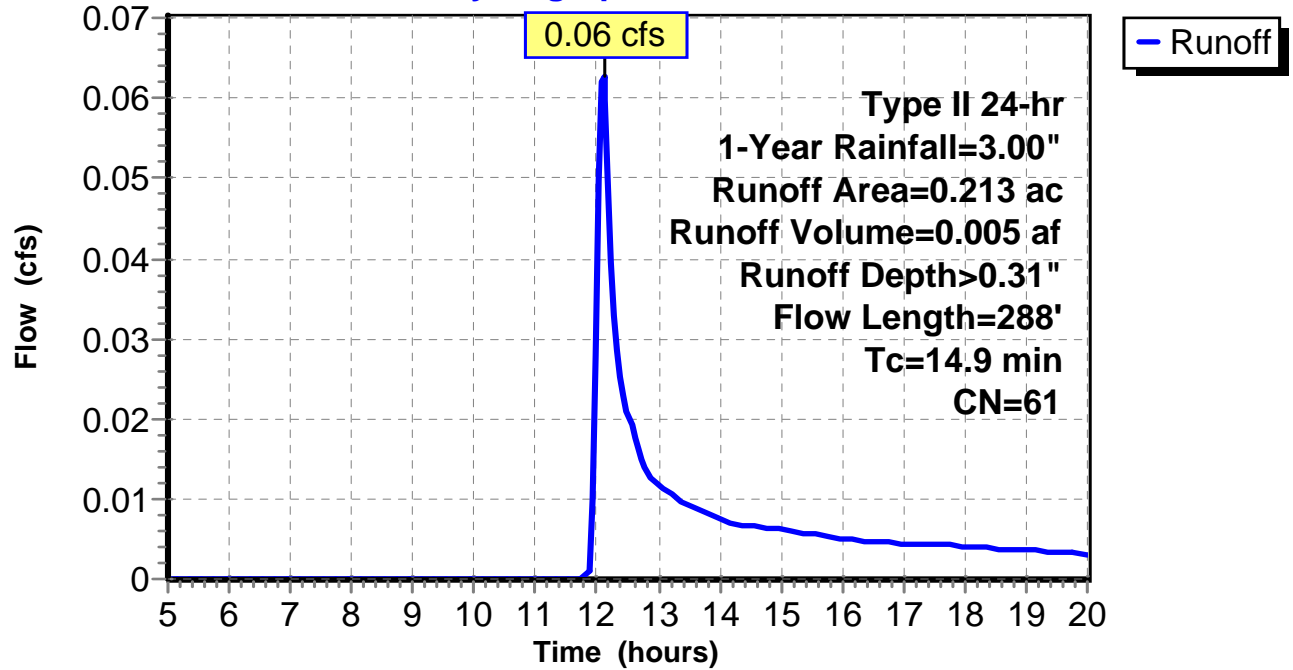
Subcatchment 8: C AR-704.010

Hydrograph



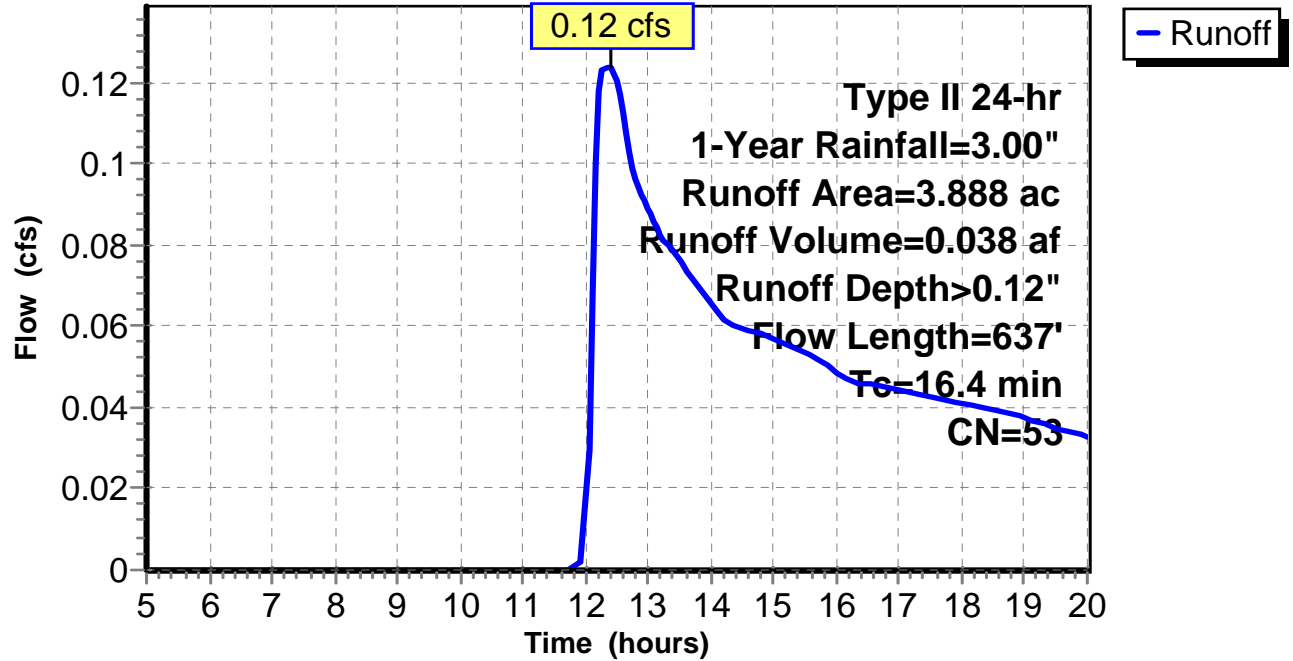
Subcatchment 9: C AR-704.011

Hydrograph



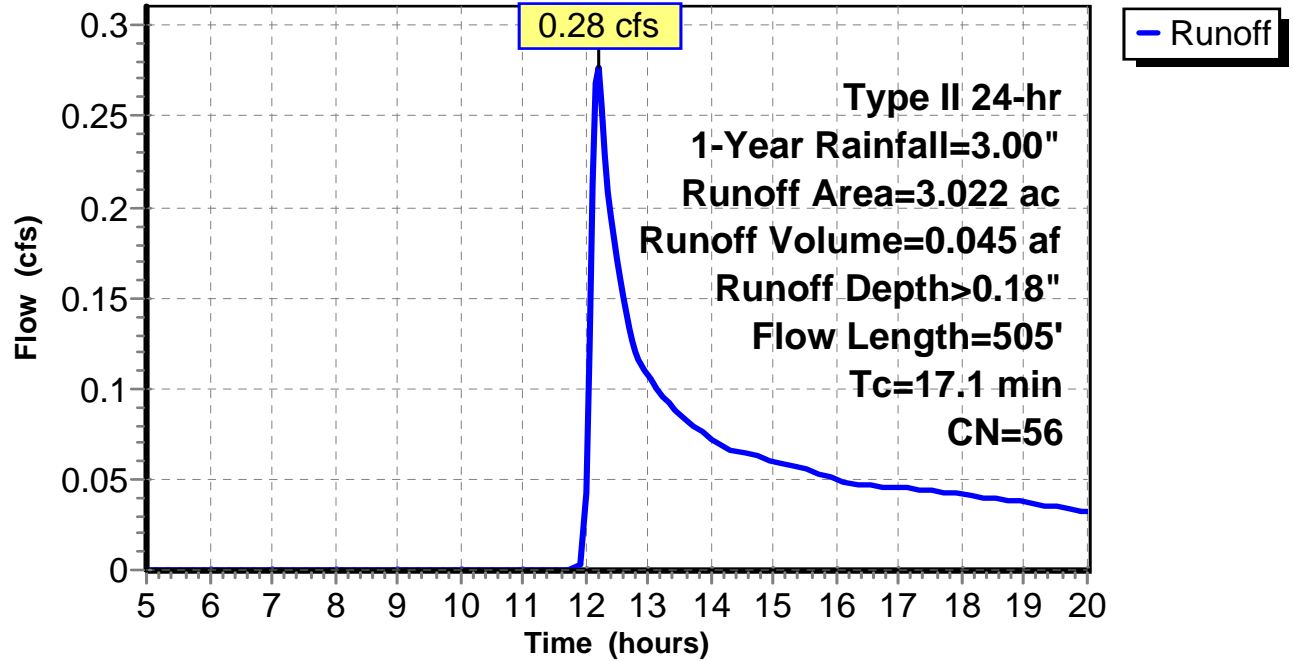
Subcatchment 10: C 280.001

Hydrograph



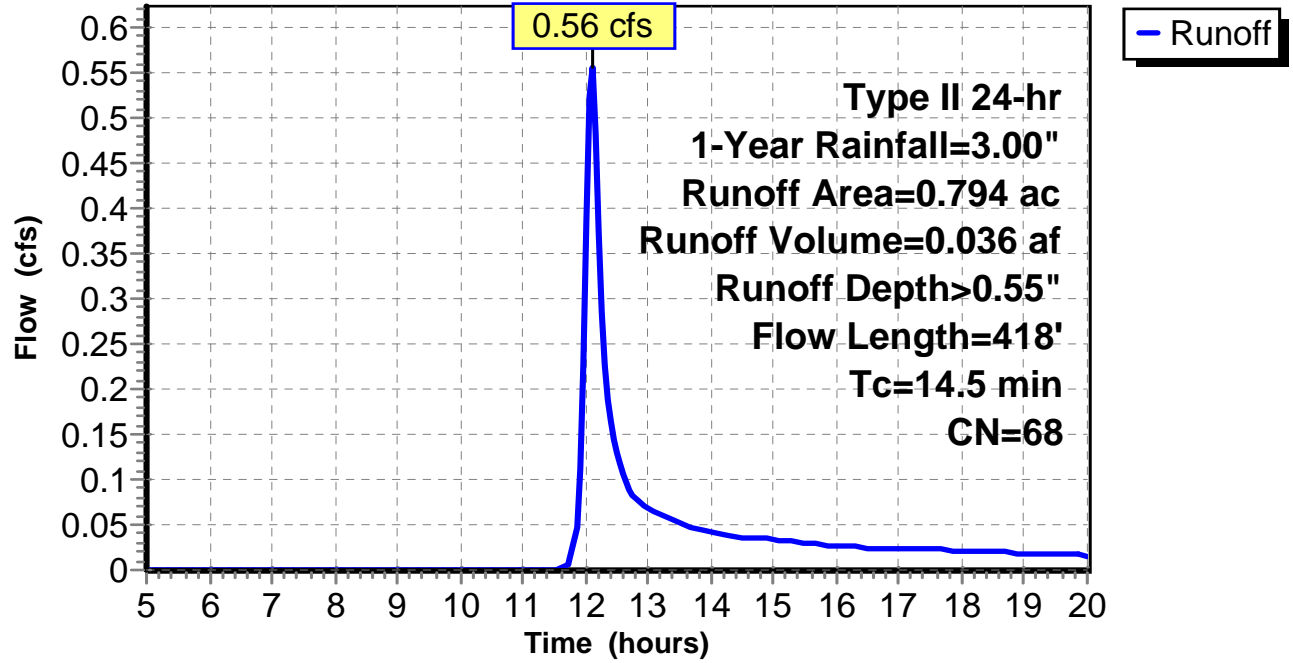
Subcatchment 11: C 280.002

Hydrograph



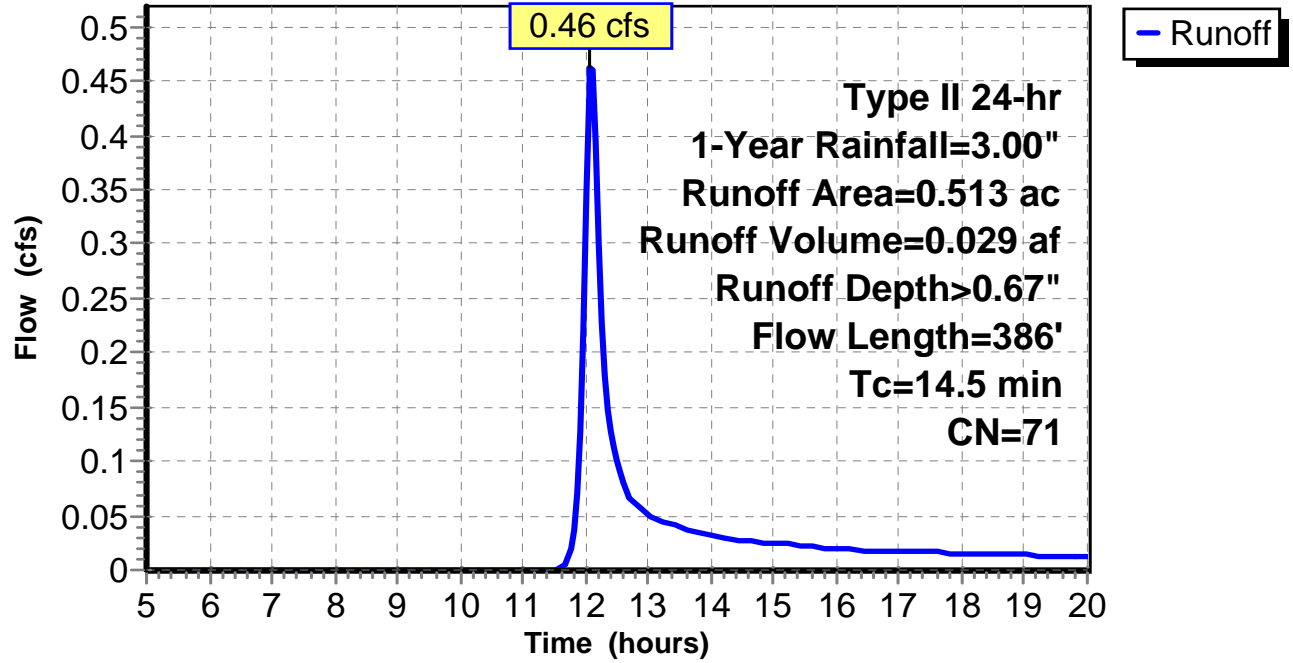
Subcatchment 12: C 280.003

Hydrograph



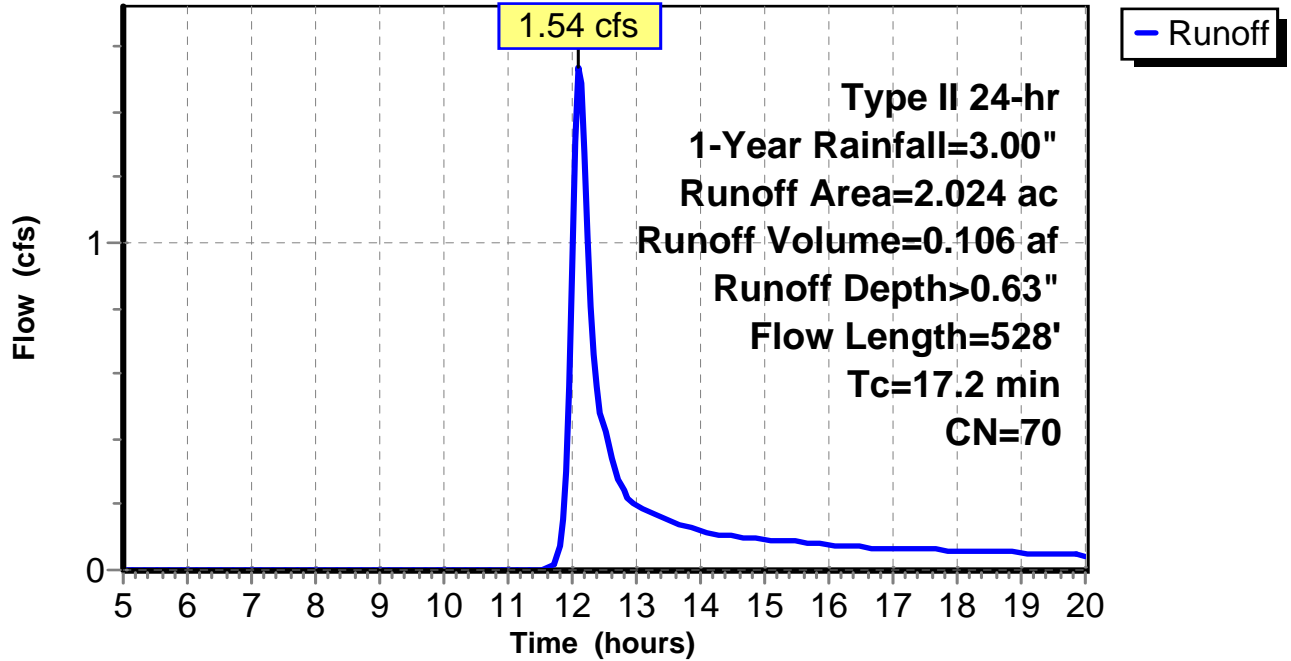
Subcatchment 13: C 280.004

Hydrograph



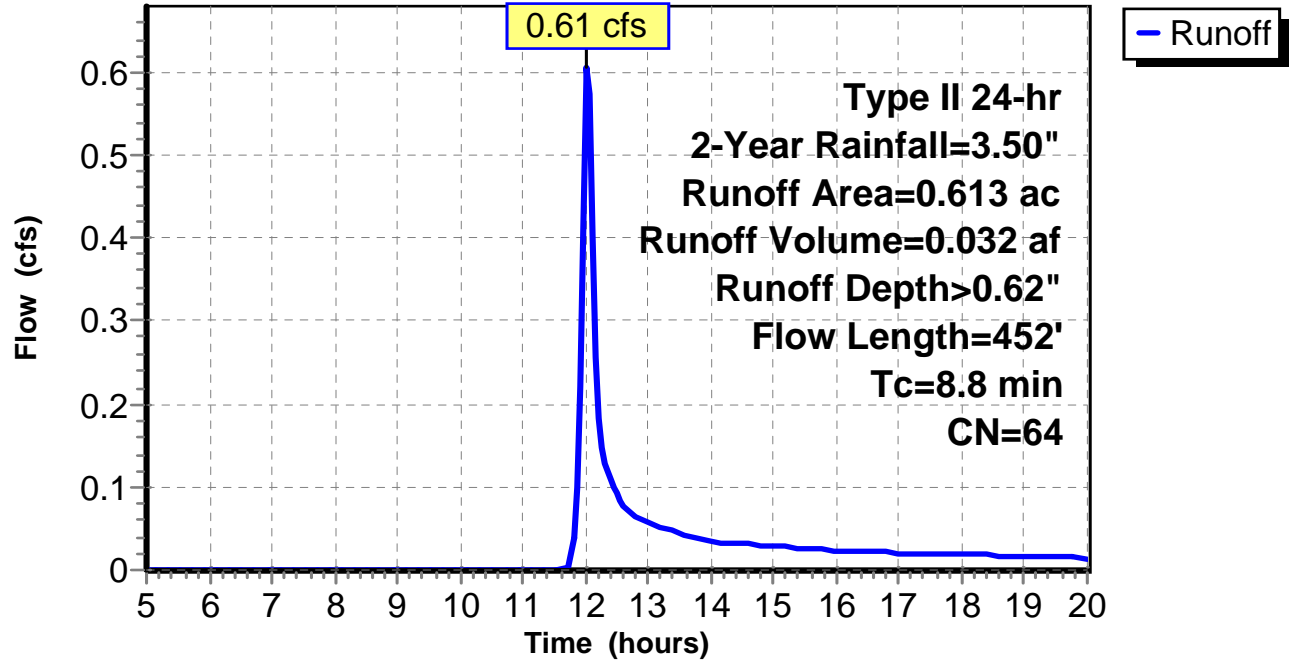
Subcatchment 14: C 280.005

Hydrograph



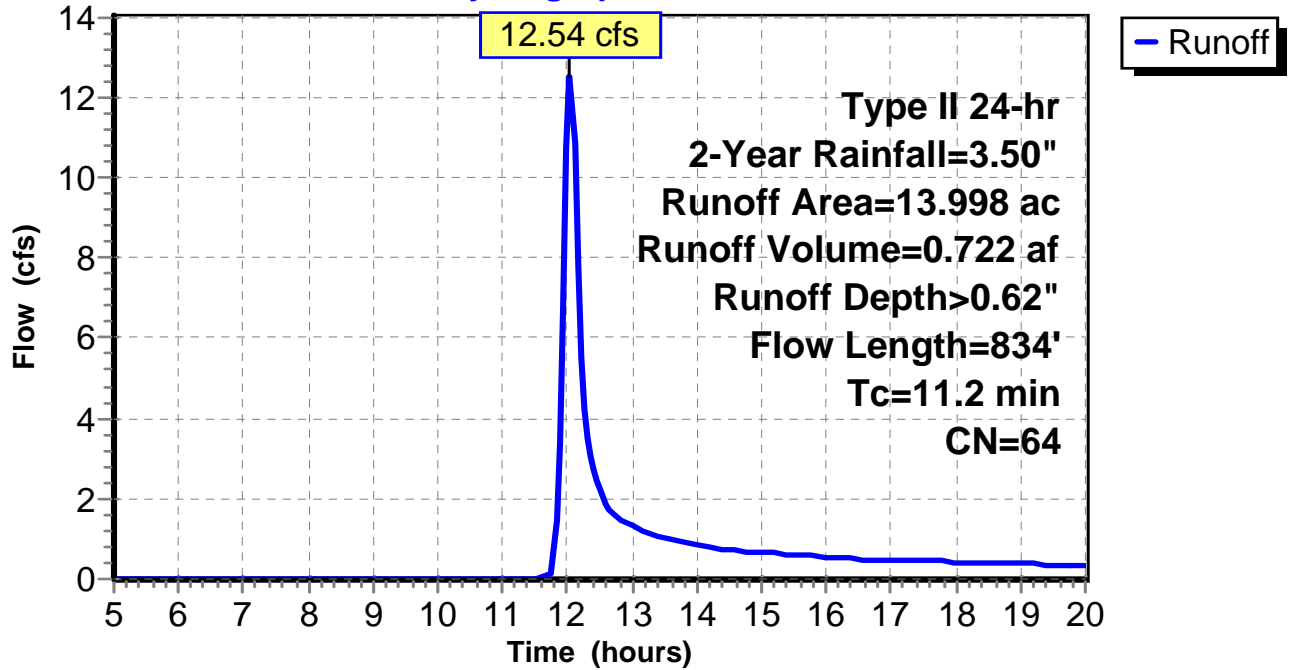
Subcatchment 1: C AR-704.003

Hydrograph



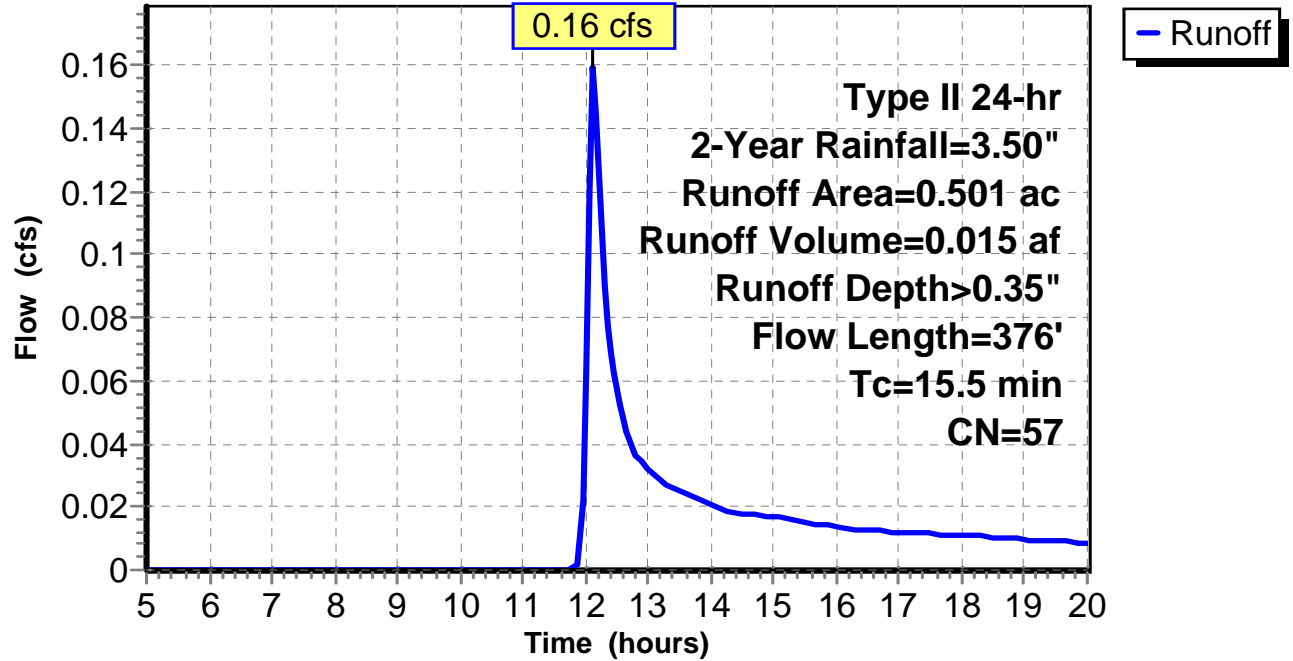
Subcatchment 2: C AR-704.004

Hydrograph



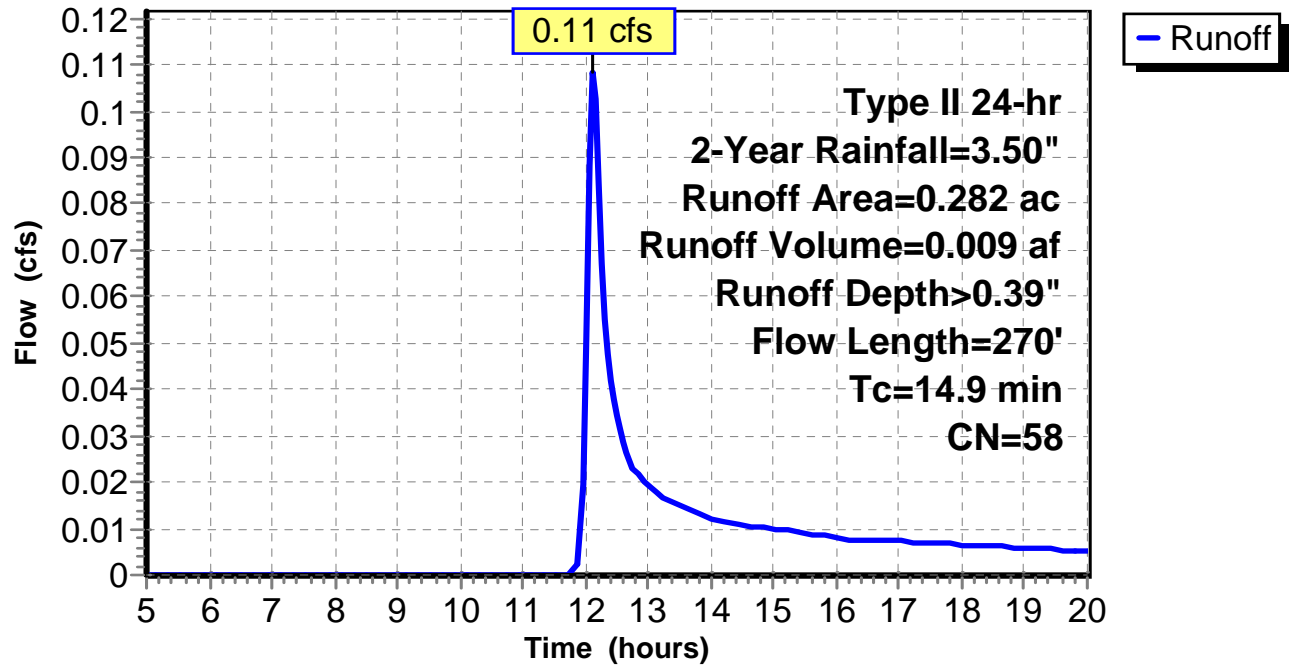
Subcatchment 3: C AR-704.005

Hydrograph



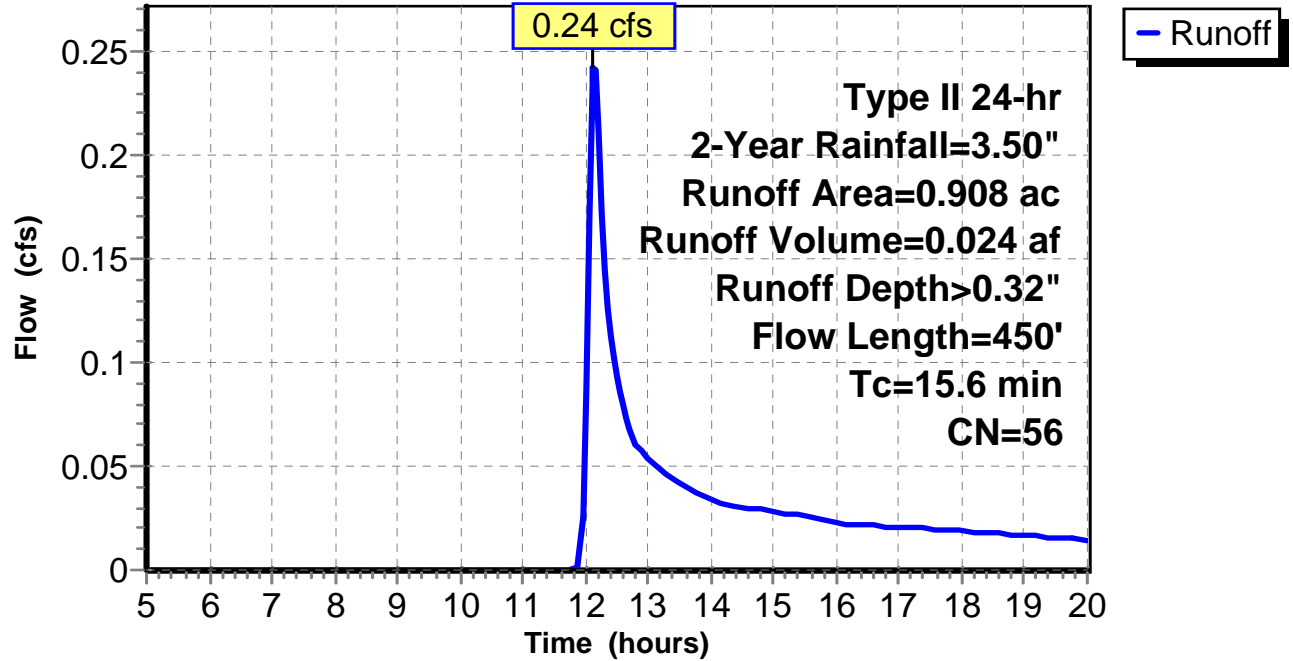
Subcatchment 4: C AR-704.006

Hydrograph



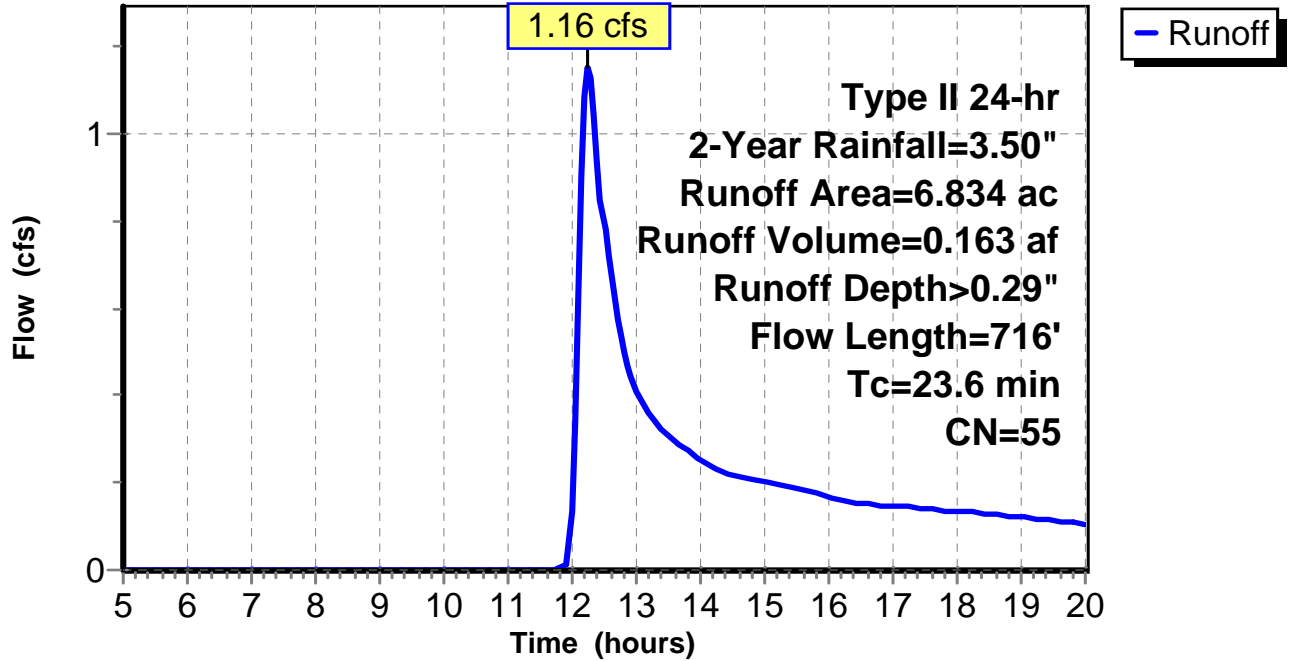
Subcatchment 5: C AR-704.007

Hydrograph



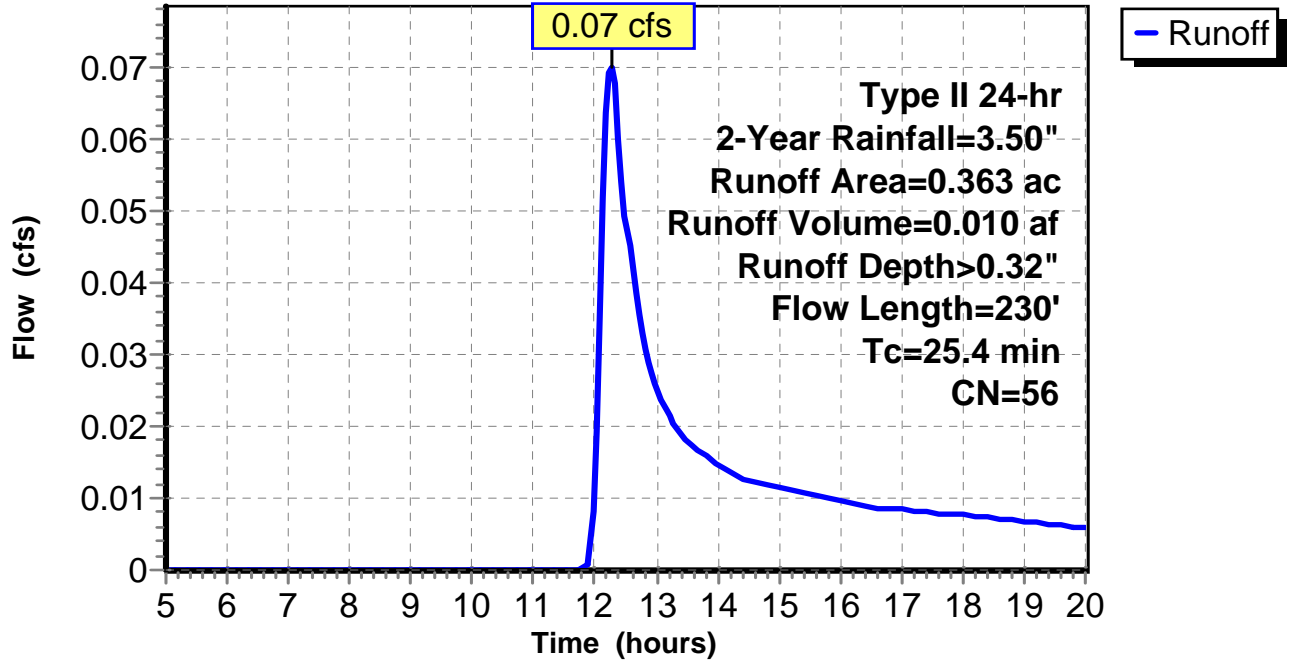
Subcatchment 6: C AR-704.008

Hydrograph



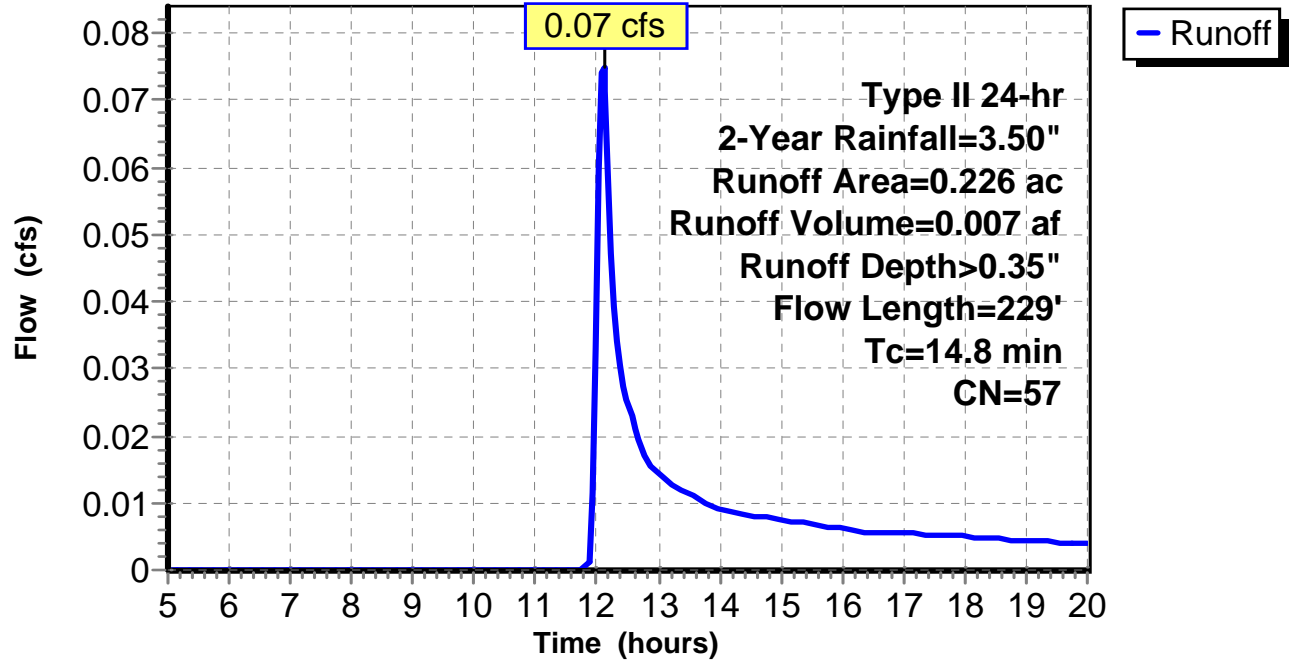
Subcatchment 7: C AR-704.009

Hydrograph



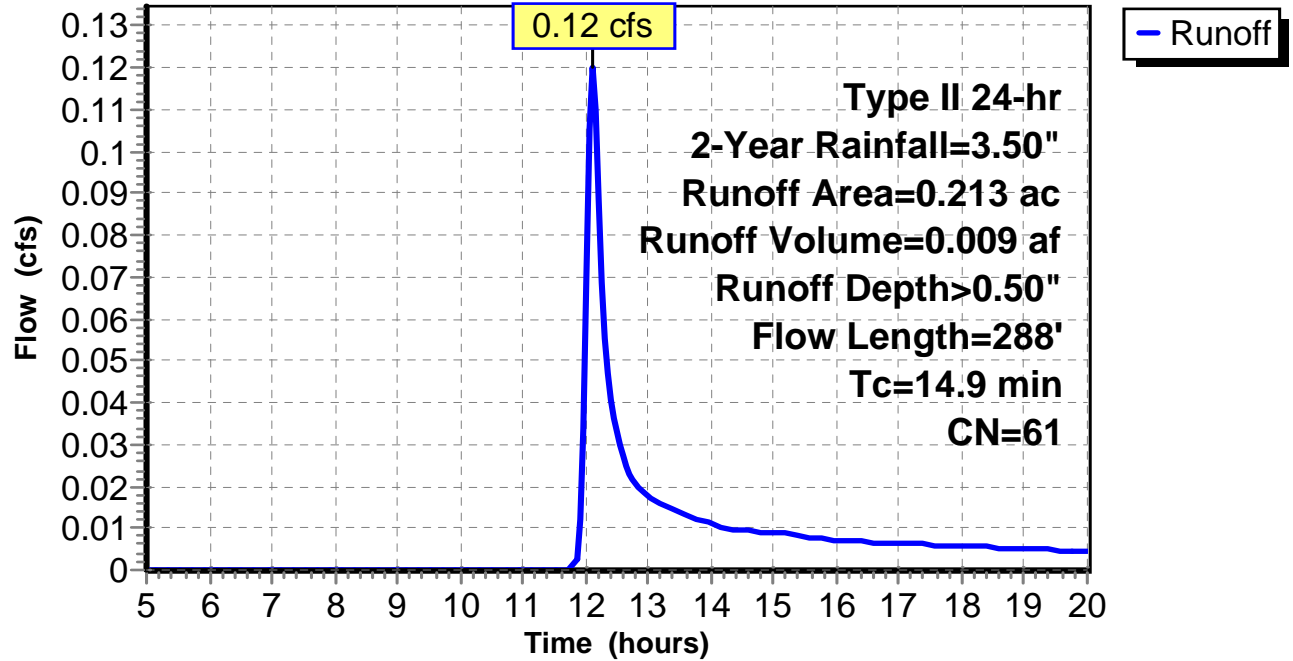
Subcatchment 8: C AR-704.010

Hydrograph



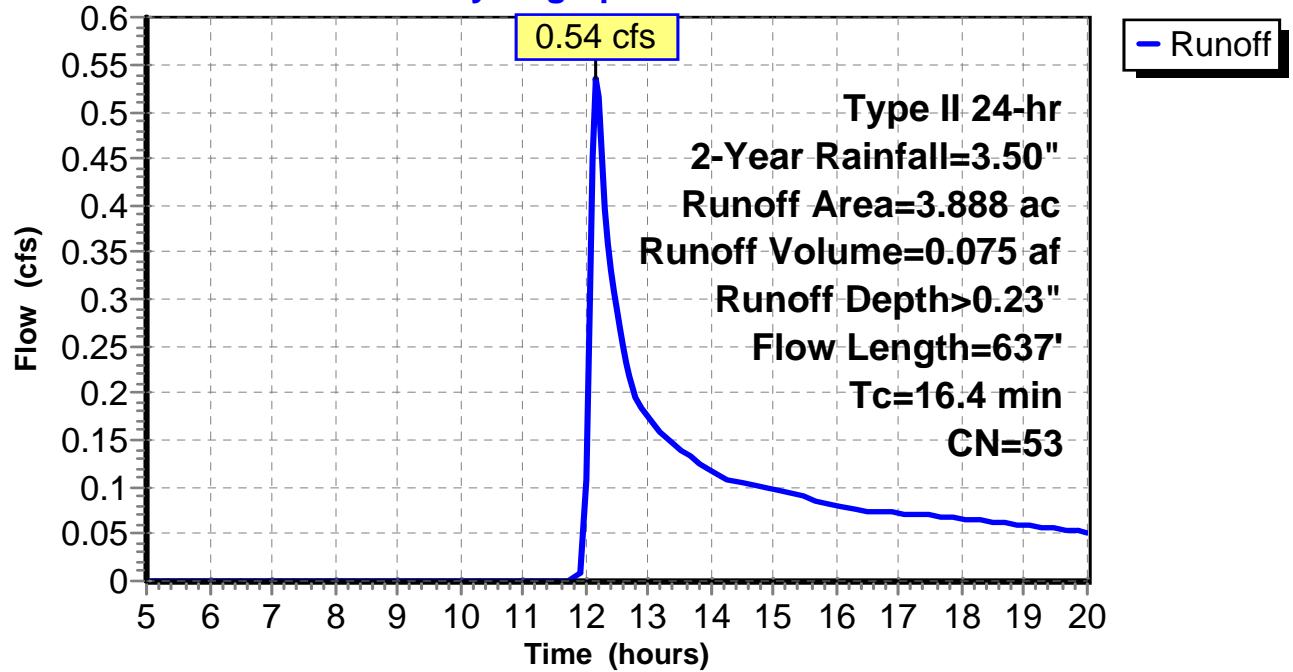
Subcatchment 9: C AR-704.011

Hydrograph



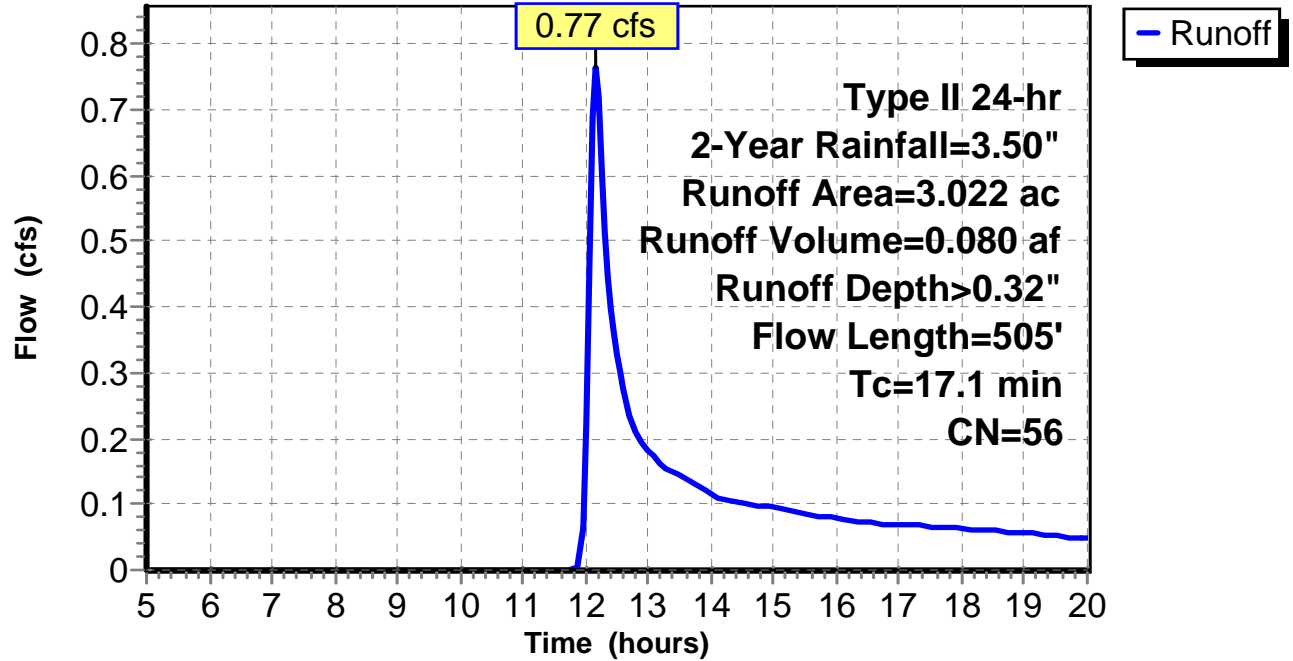
Subcatchment 10: C 280.001

Hydrograph



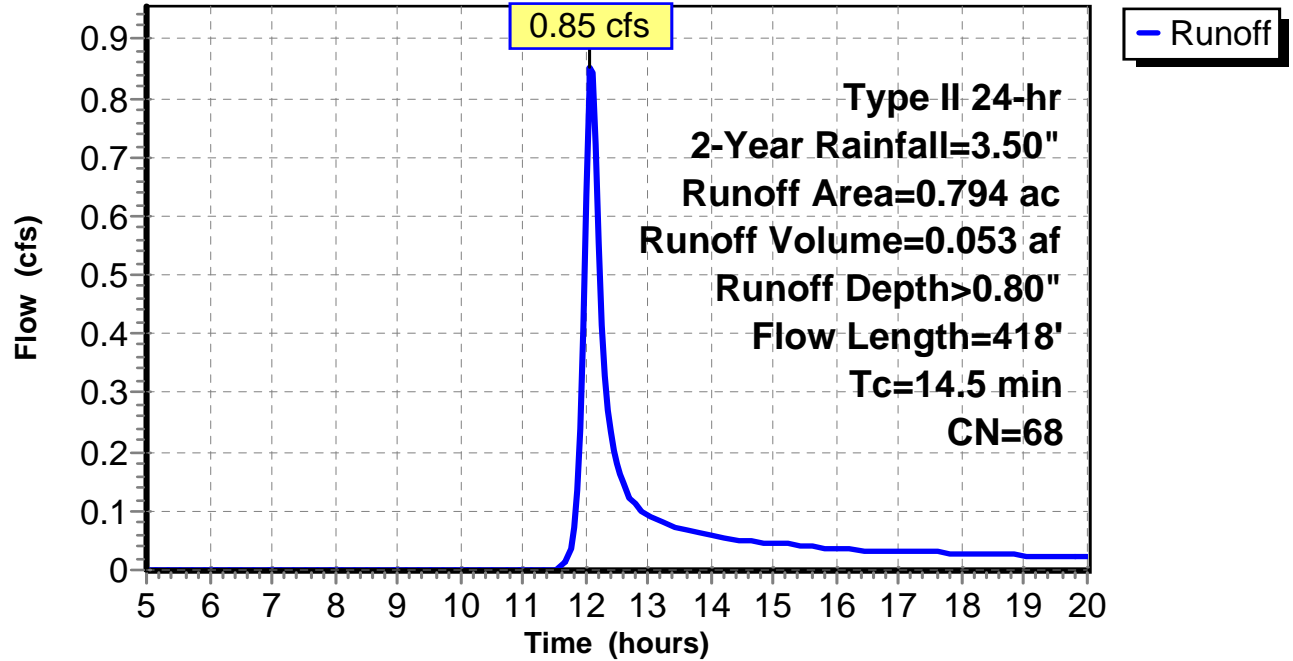
Subcatchment 11: C 280.002

Hydrograph



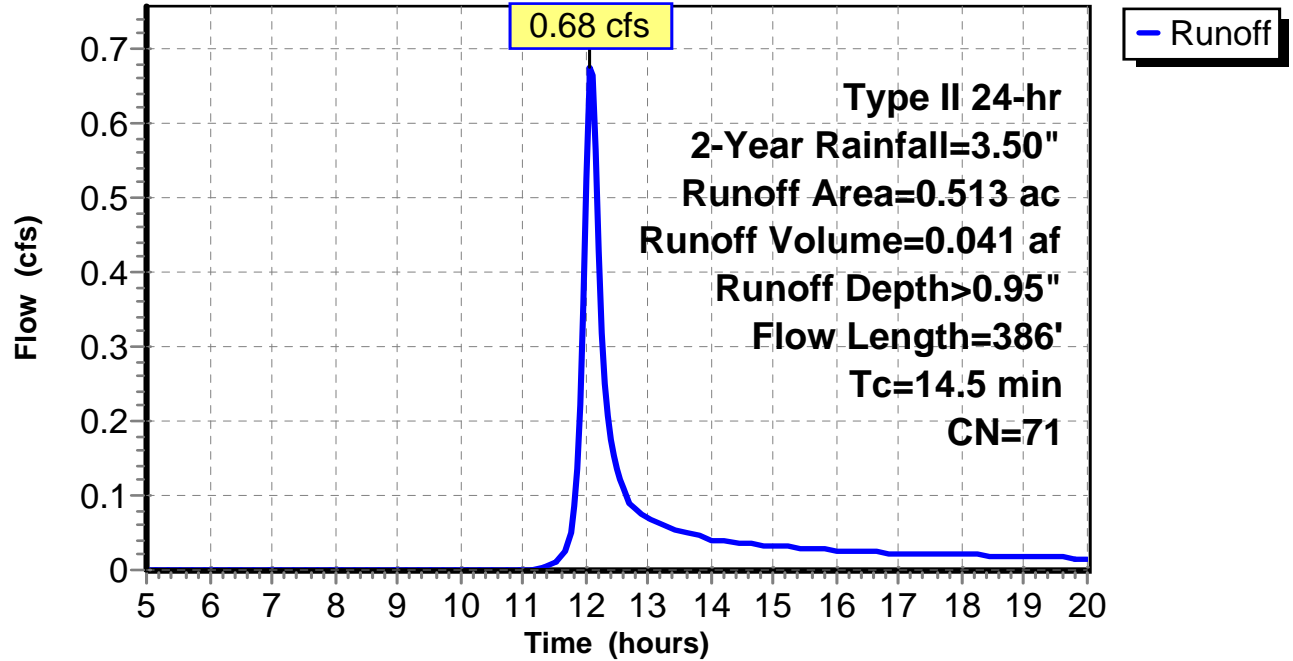
Subcatchment 12: C 280.003

Hydrograph



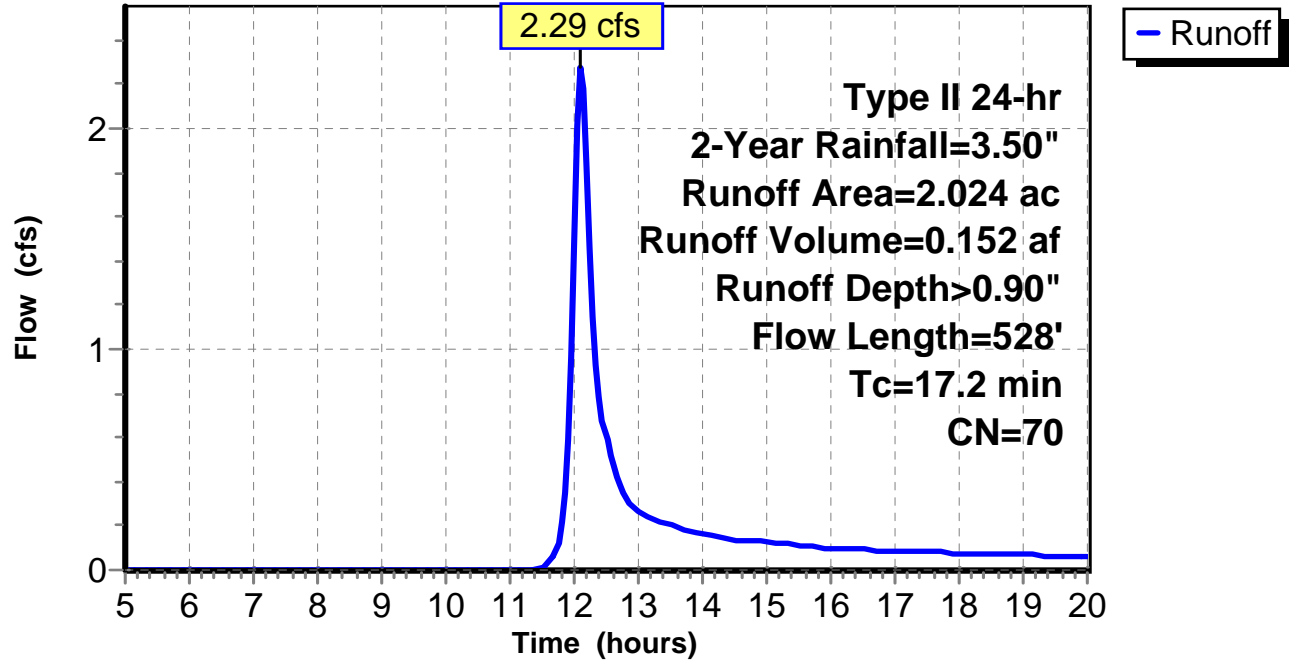
Subcatchment 13: C 280.004

Hydrograph



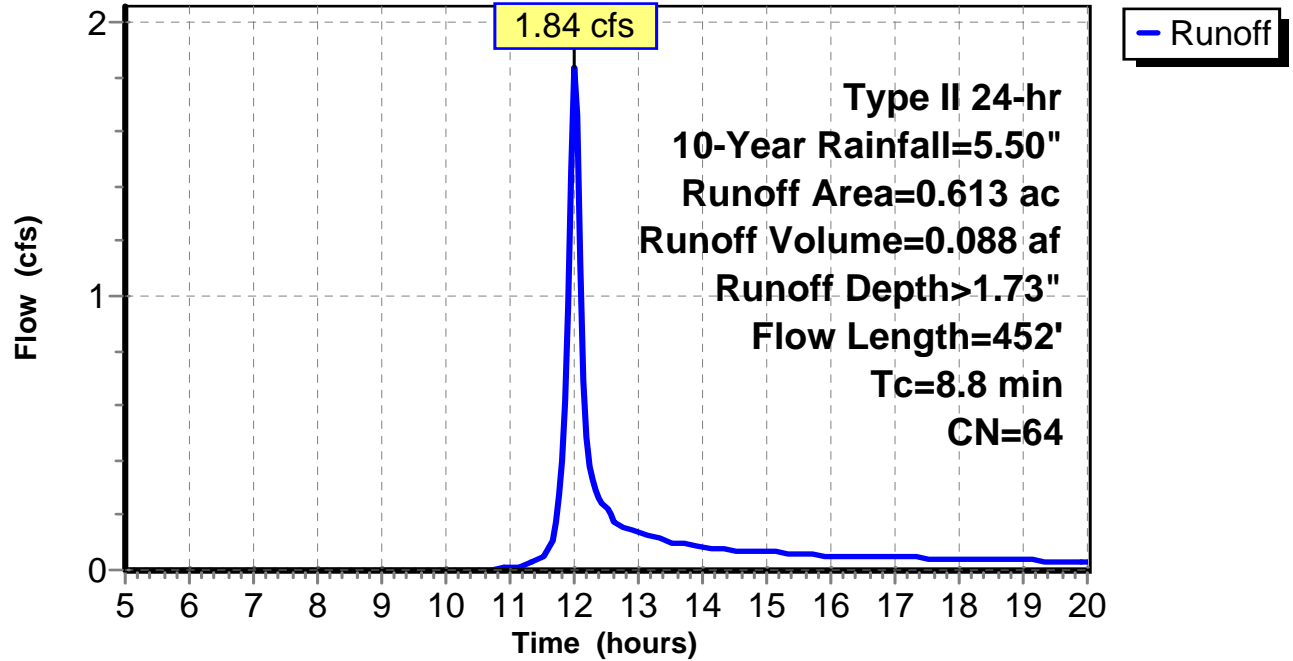
Subcatchment 14: C 280.005

Hydrograph



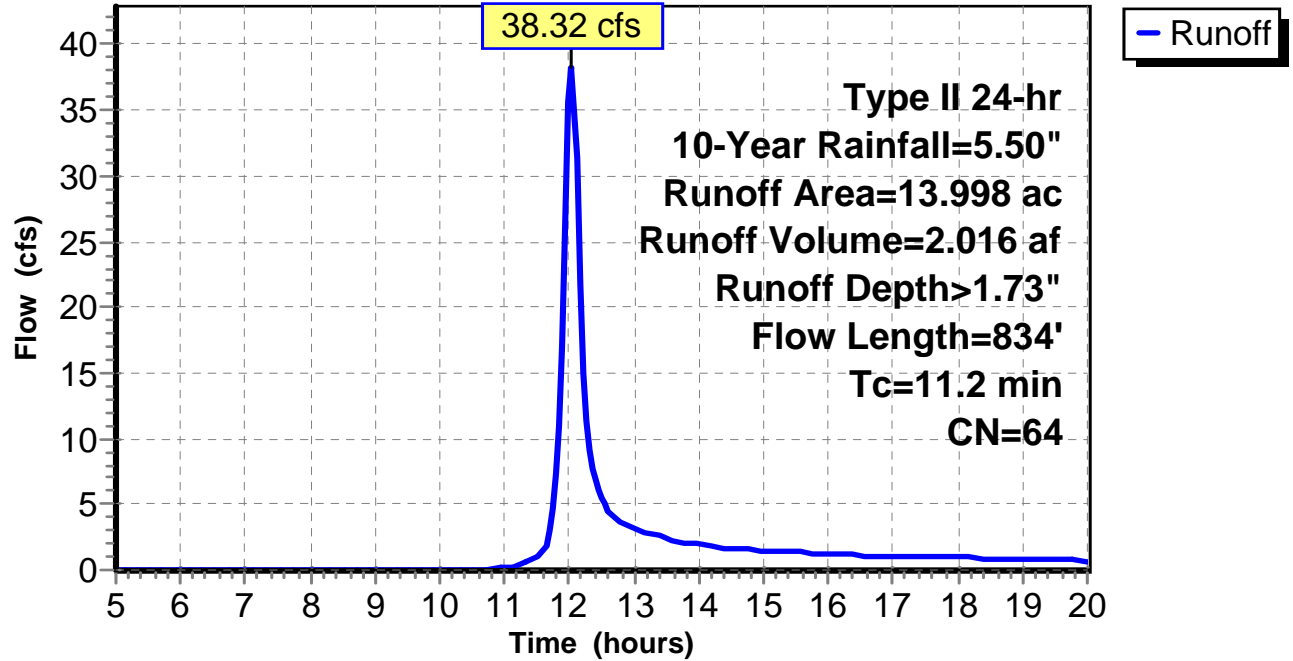
Subcatchment 1: C AR-704.003

Hydrograph



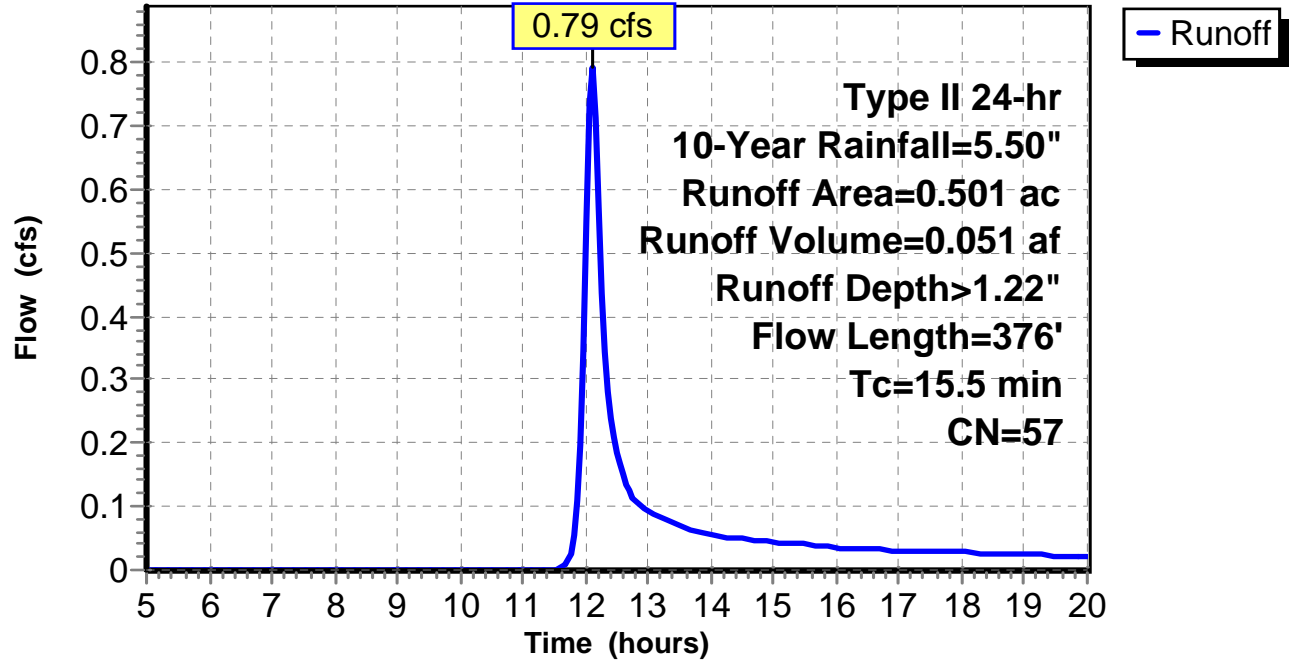
Subcatchment 2: C AR-704.004

Hydrograph



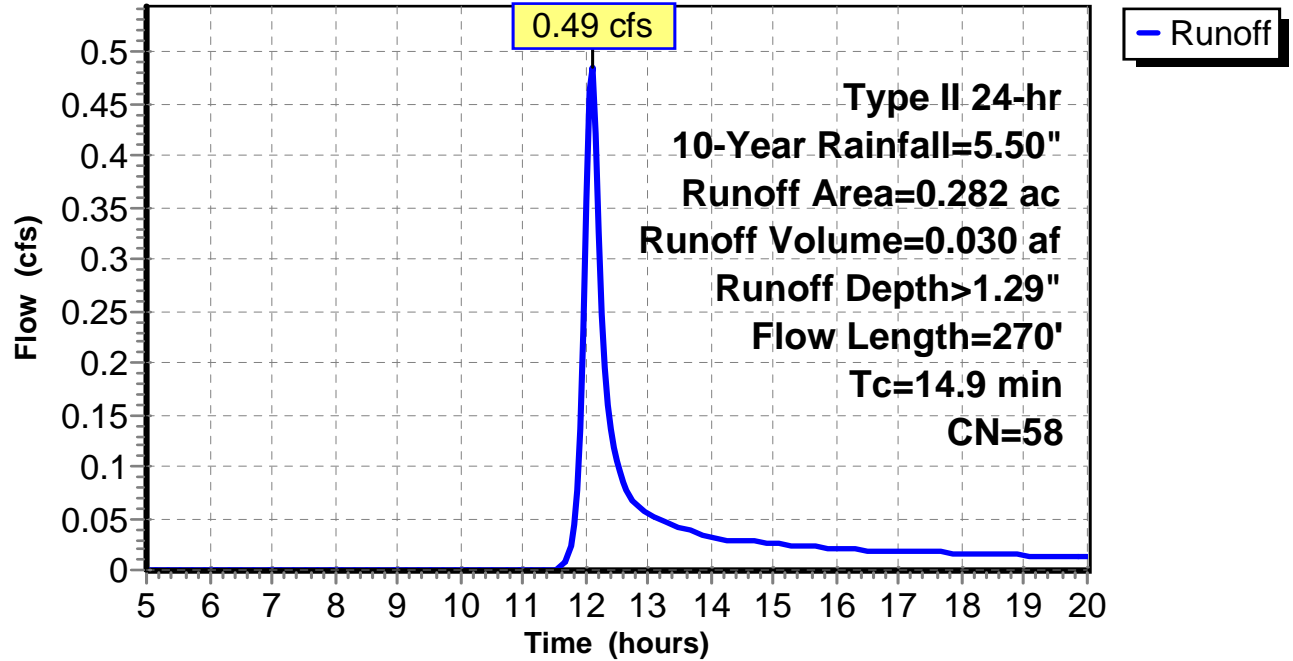
Subcatchment 3: C AR-704.005

Hydrograph



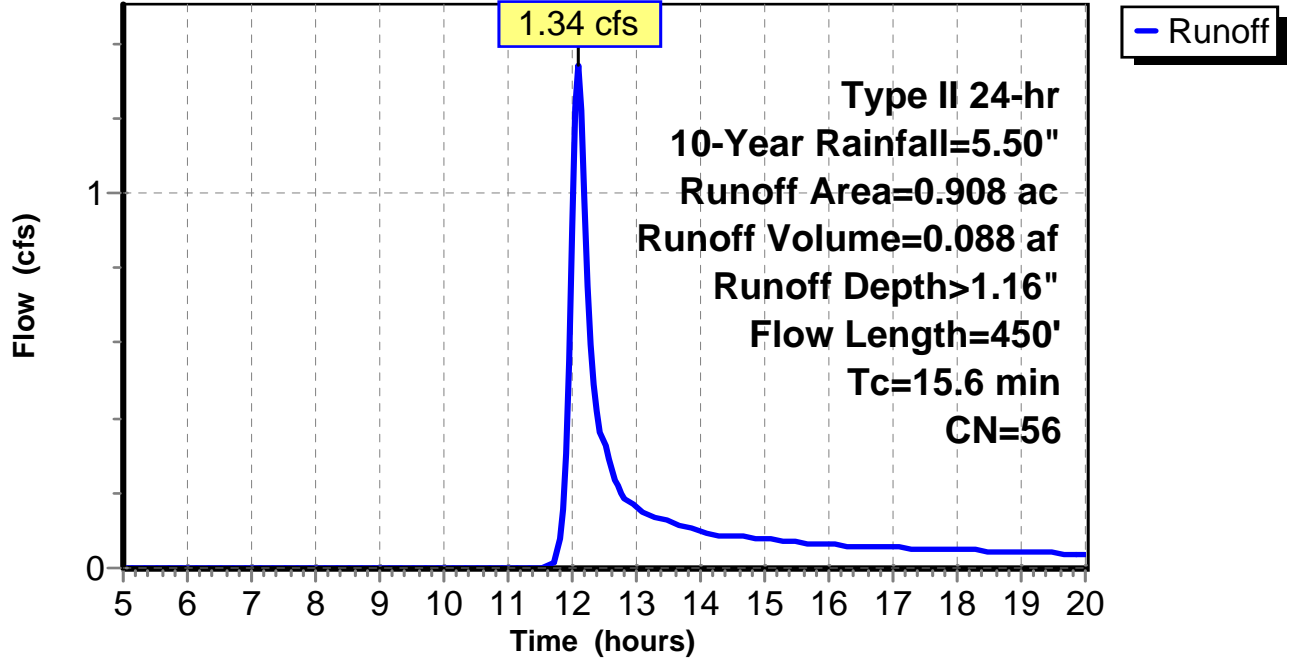
Subcatchment 4: C AR-704.006

Hydrograph



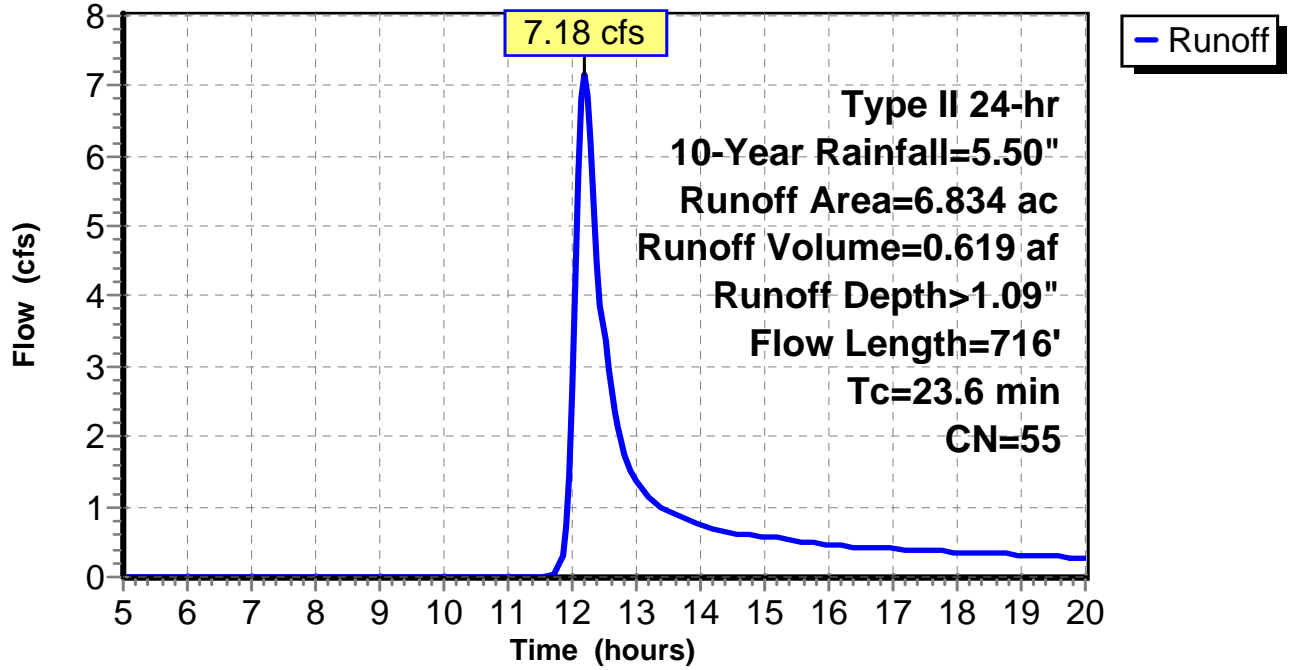
Subcatchment 5: C AR-704.007

Hydrograph



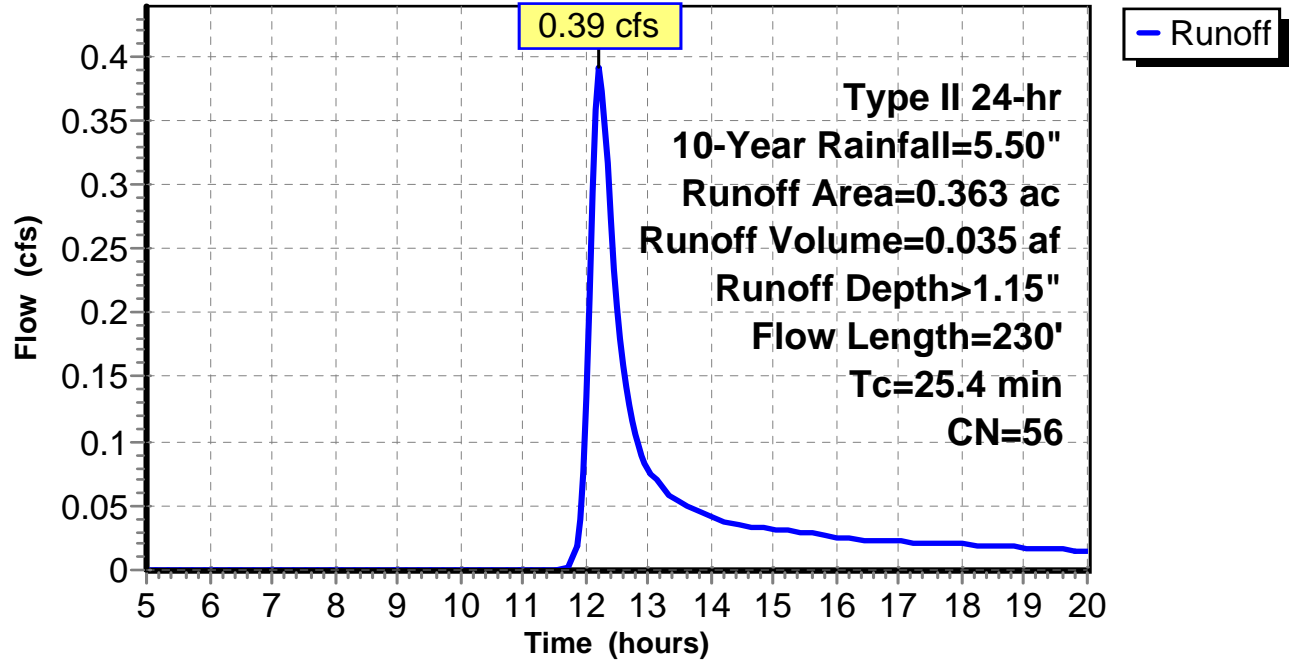
Subcatchment 6: C AR-704.008

Hydrograph



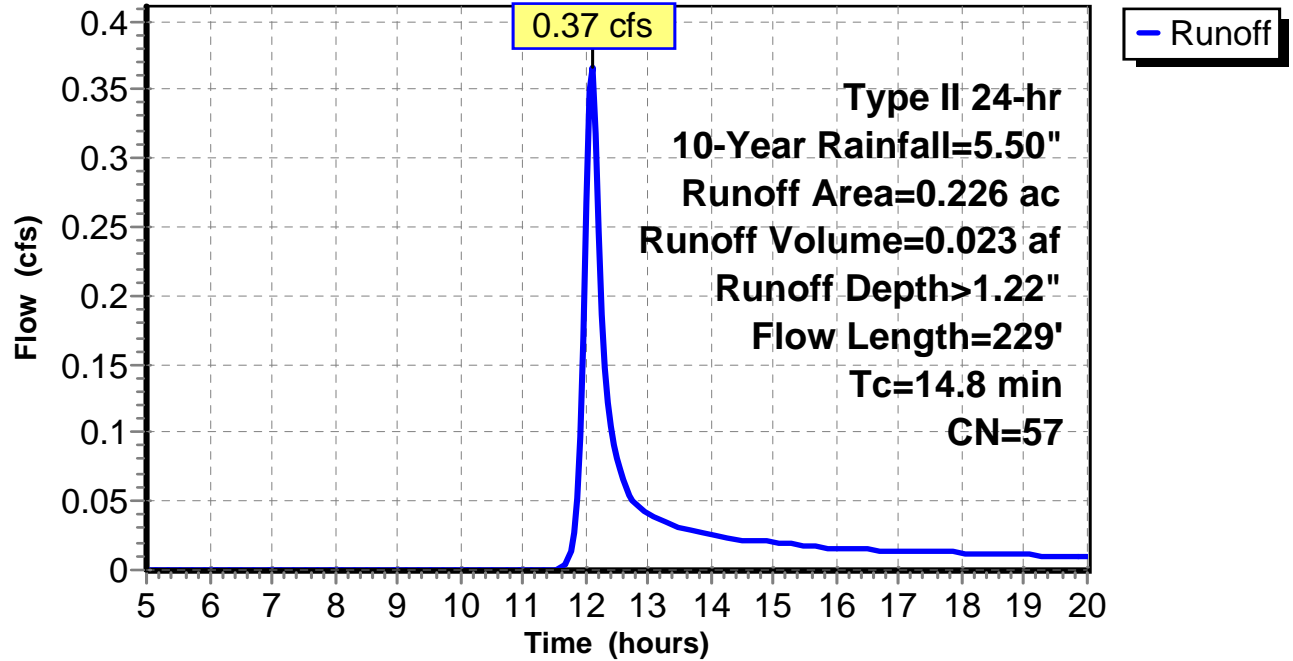
Subcatchment 7: C AR-704.009

Hydrograph



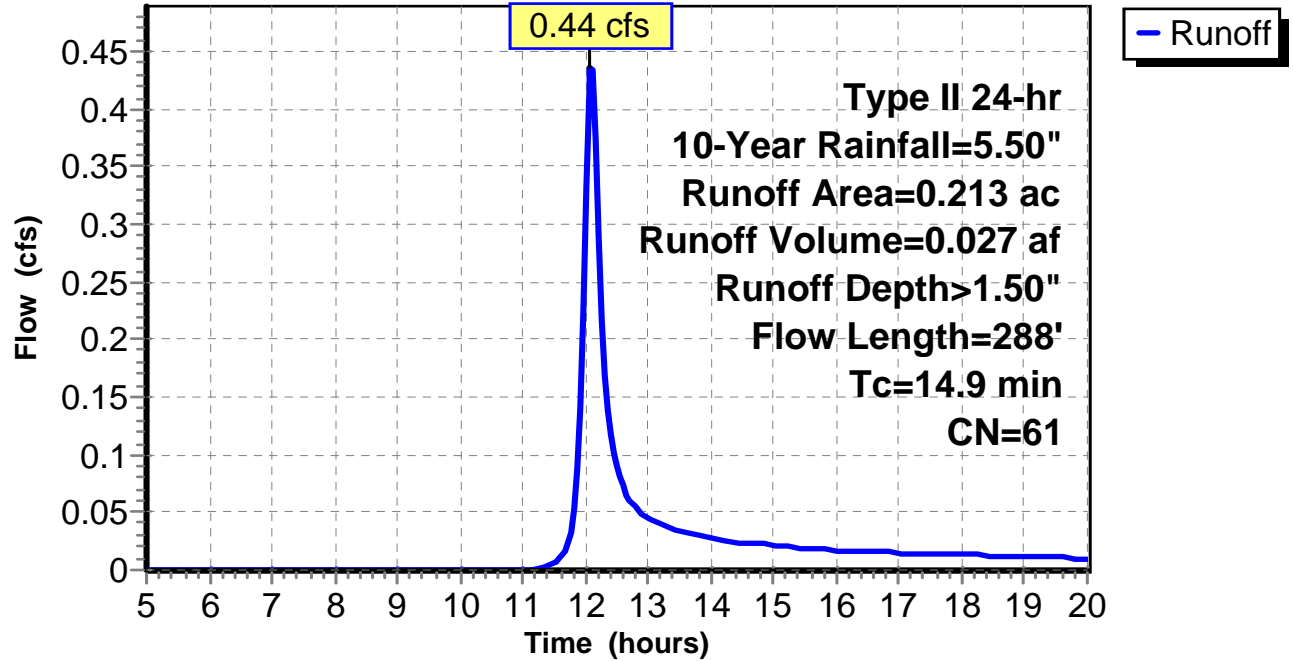
Subcatchment 8: C AR-704.010

Hydrograph



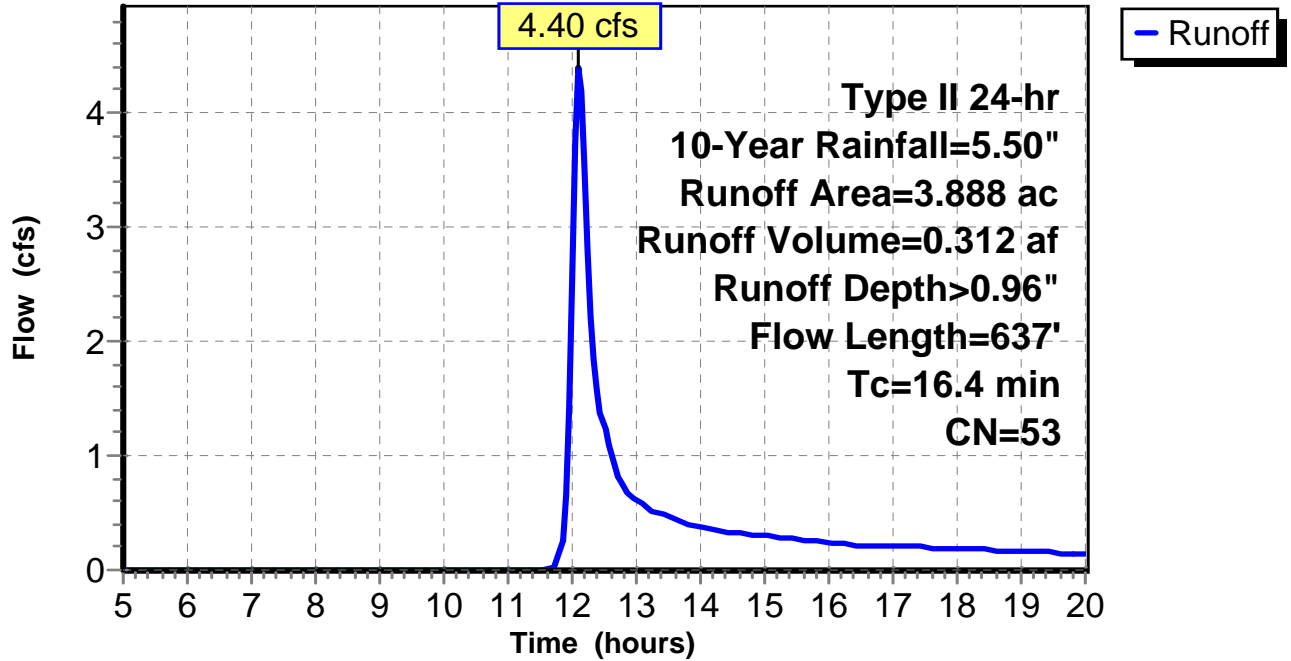
Subcatchment 9: C AR-704.011

Hydrograph



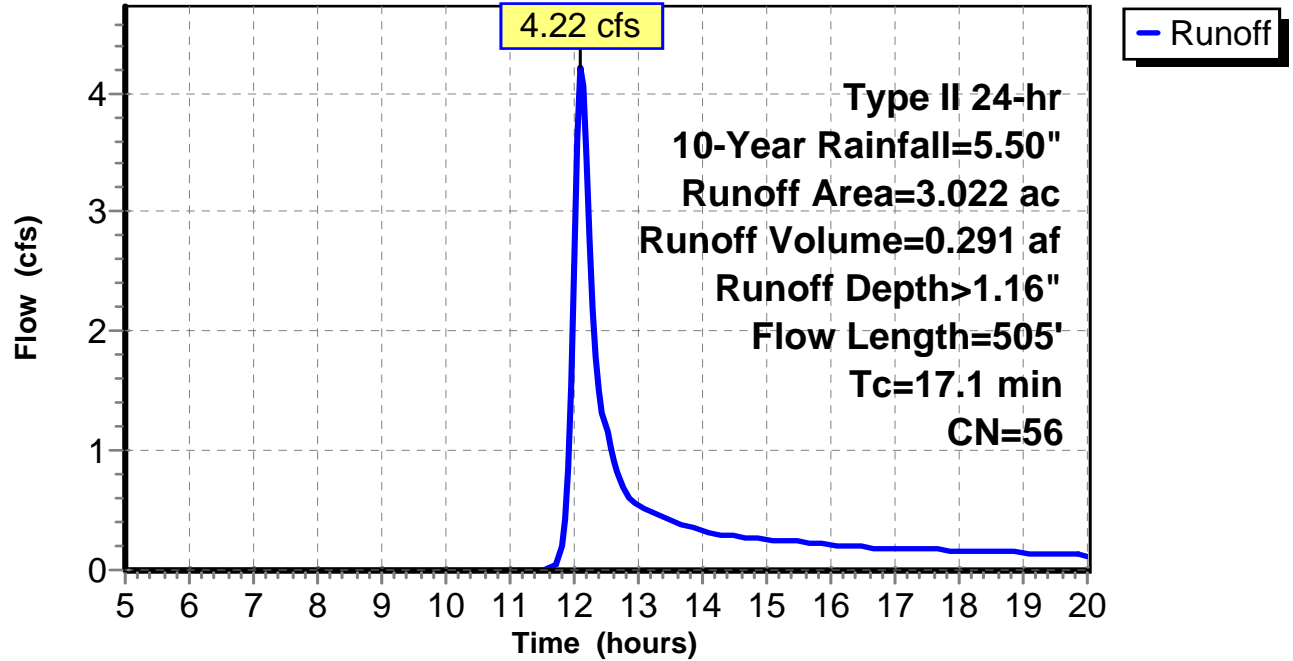
Subcatchment 10: C 280.001

Hydrograph



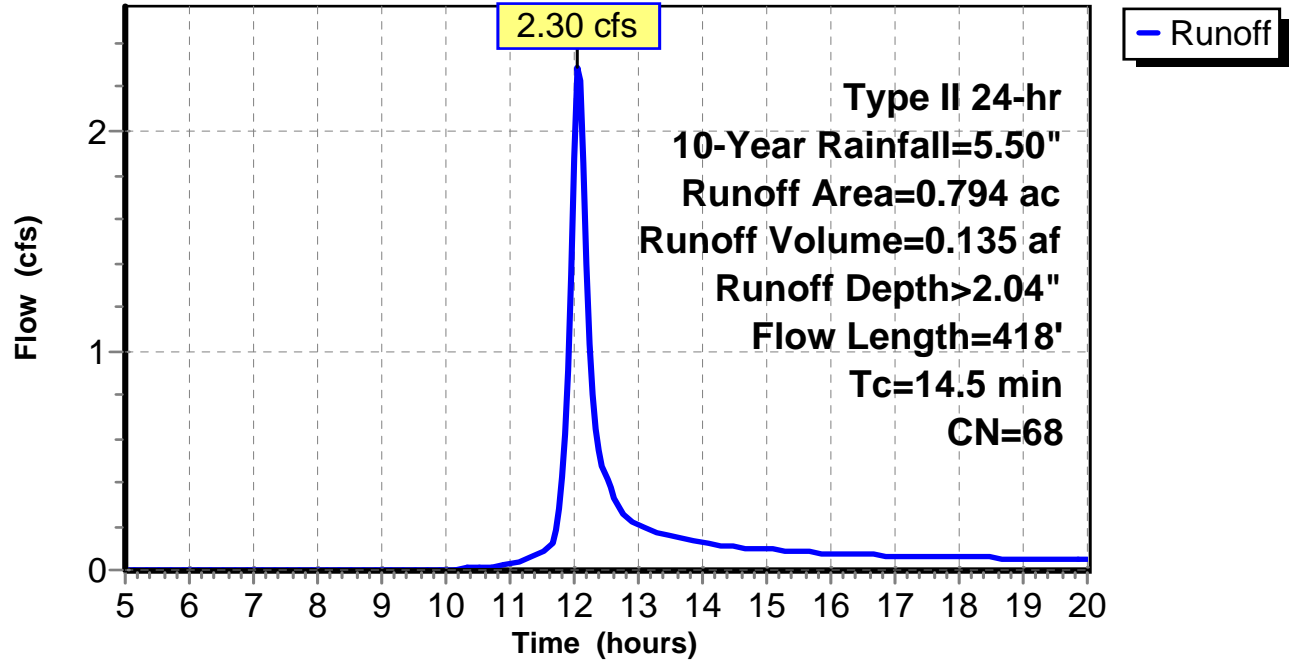
Subcatchment 11: C 280.002

Hydrograph



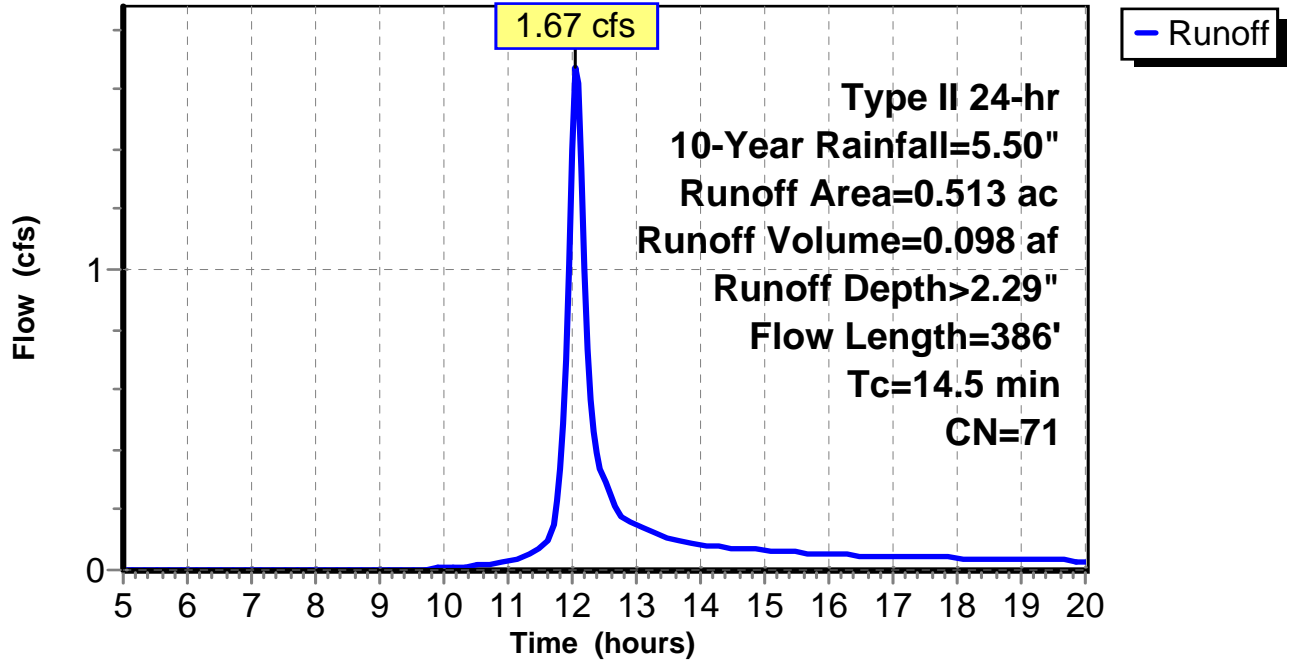
Subcatchment 12: C 280.003

Hydrograph



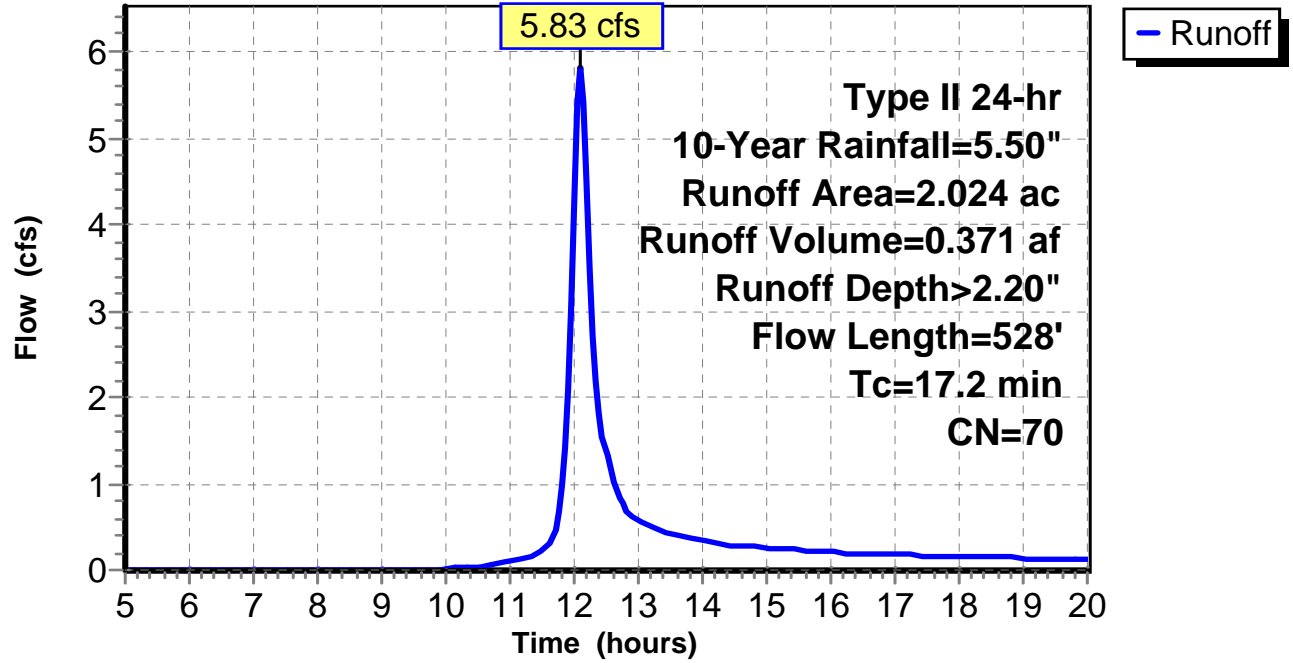
Subcatchment 13: C 280.004

Hydrograph



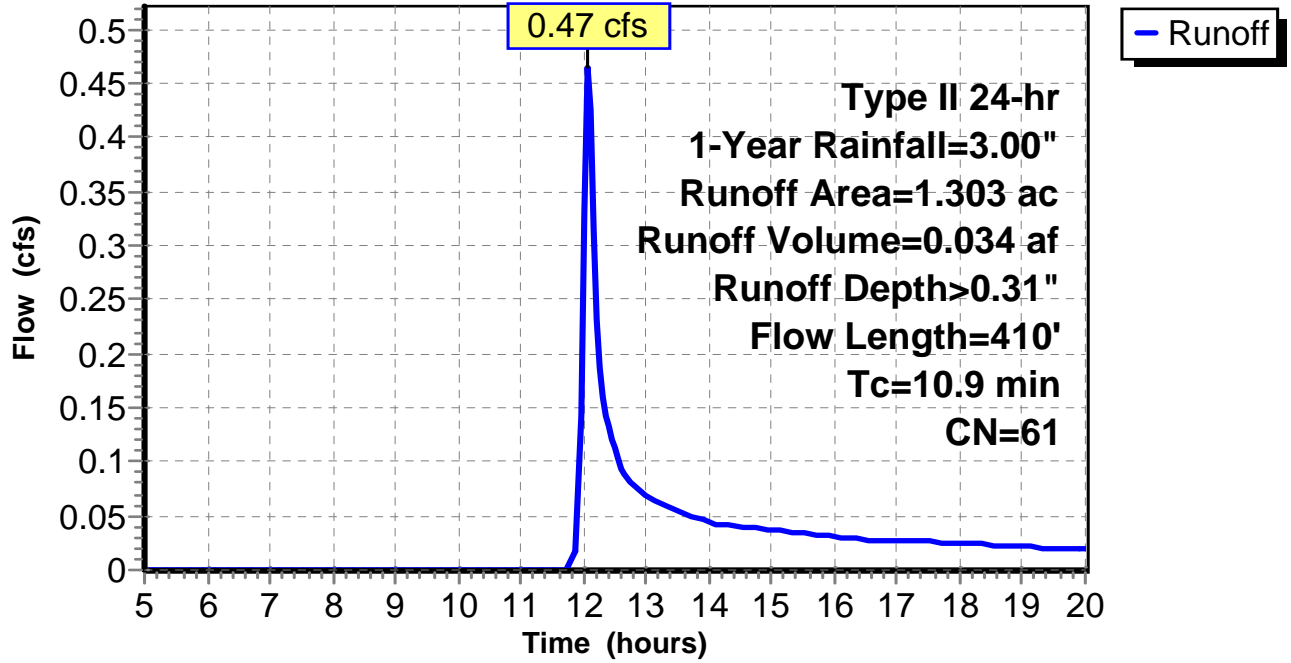
Subcatchment 14: C 280.005

Hydrograph



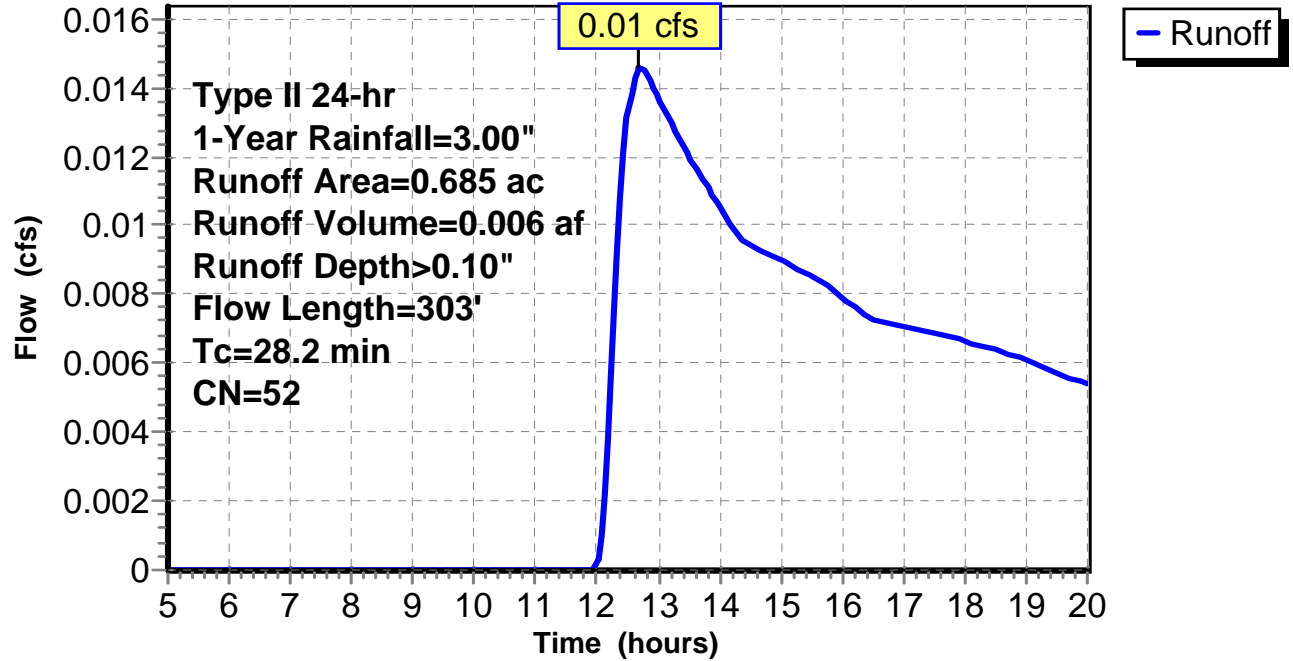
Subcatchment 1: C AR-704.012

Hydrograph



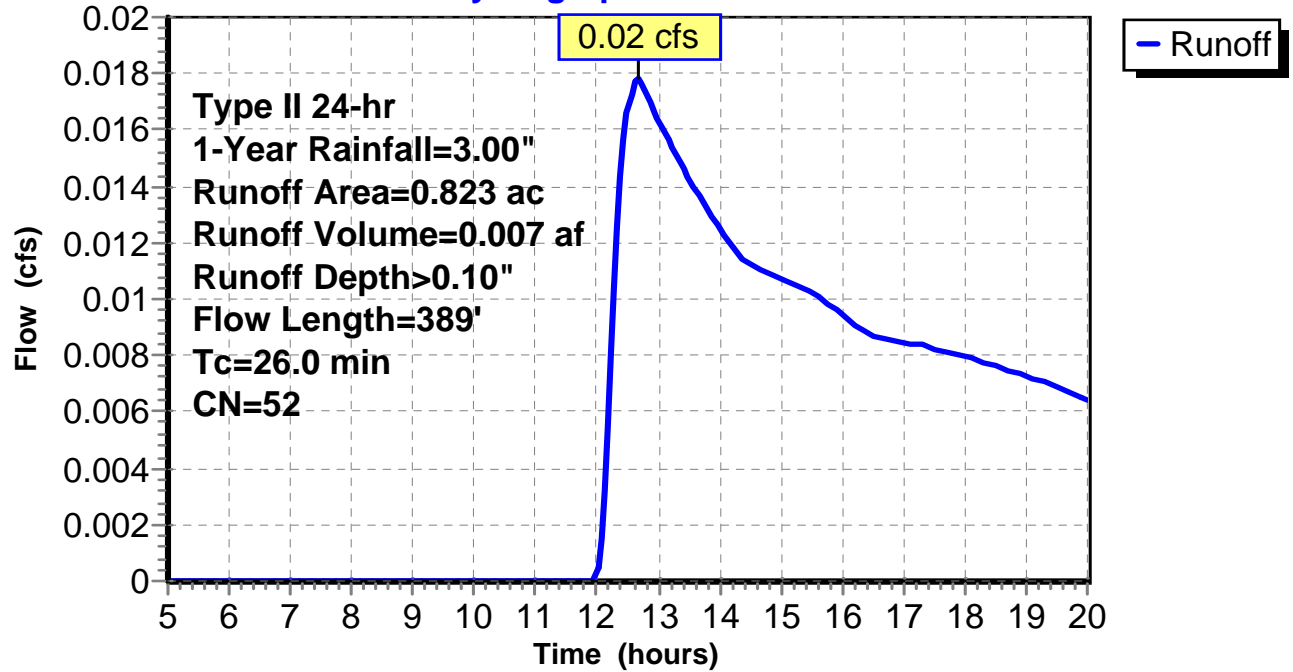
Subcatchment 2: C AR-704.013

Hydrograph



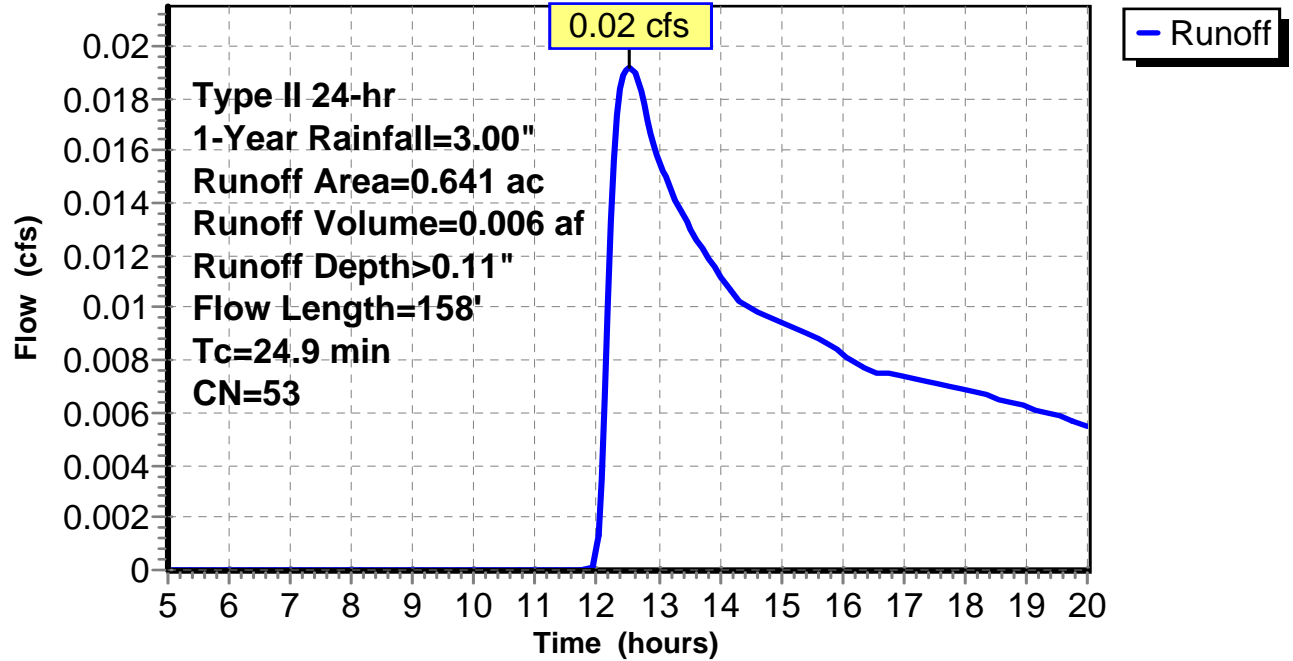
Subcatchment 3: C AR-704.014

Hydrograph



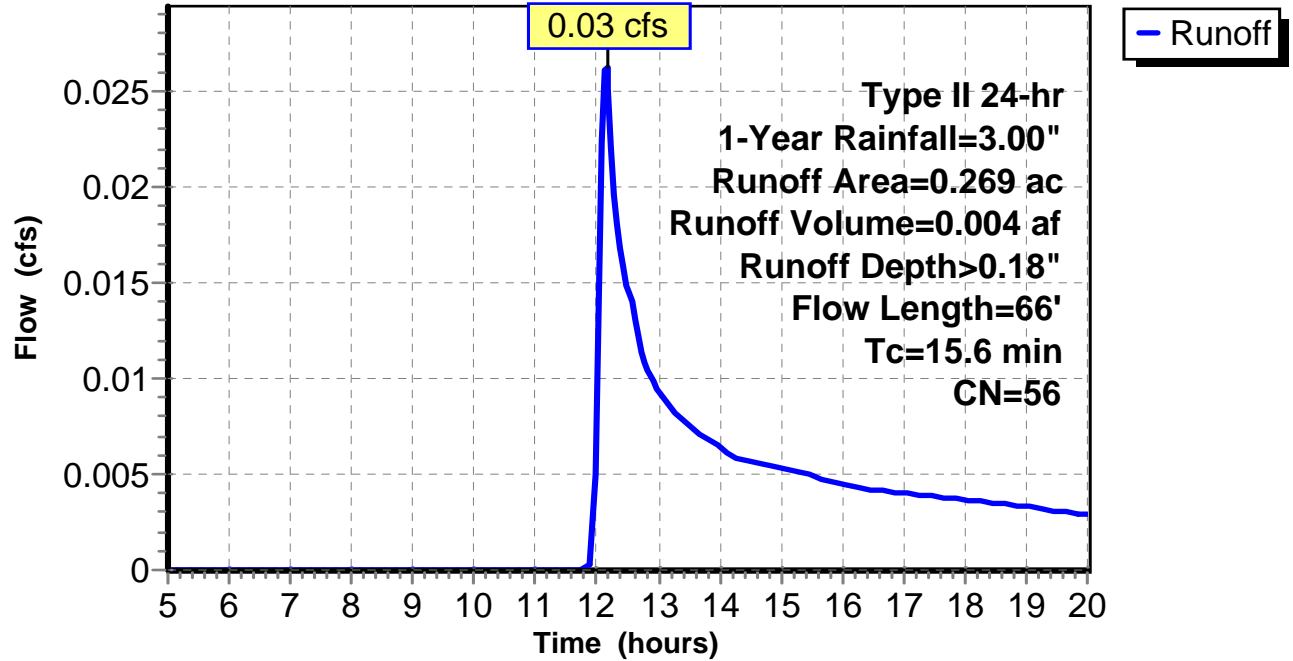
Subcatchment 4: C AR-704.015

Hydrograph



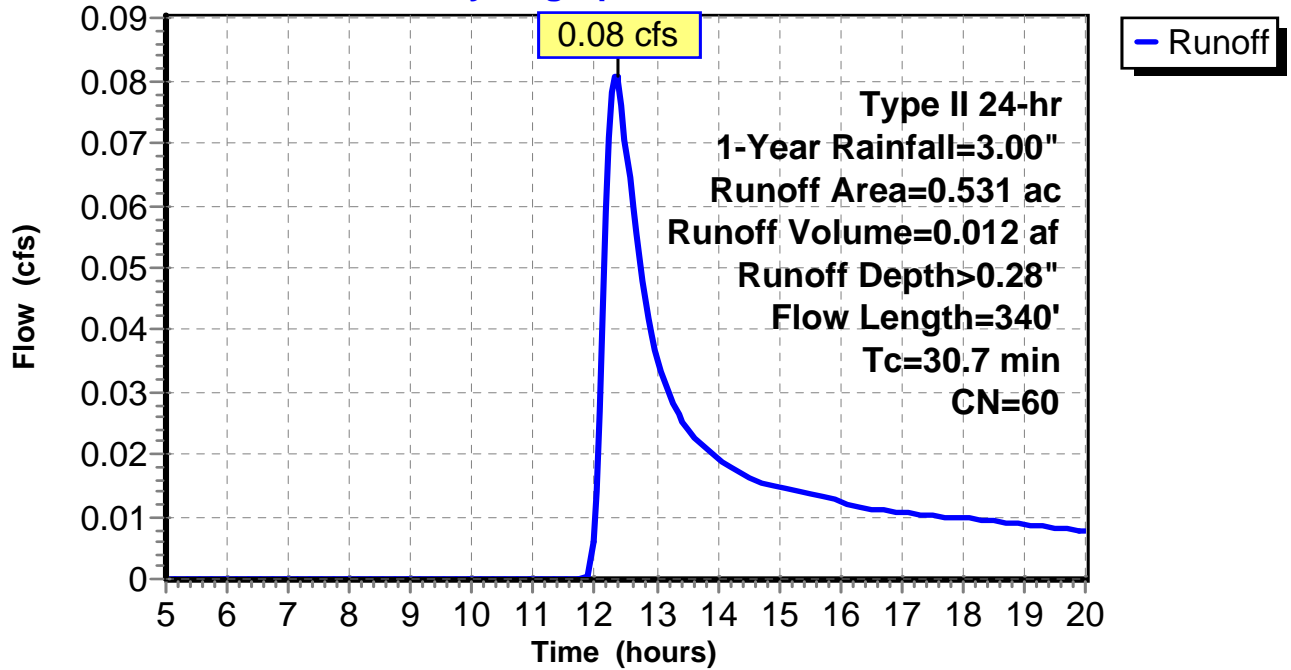
Subcatchment 5: C AR-704.016

Hydrograph



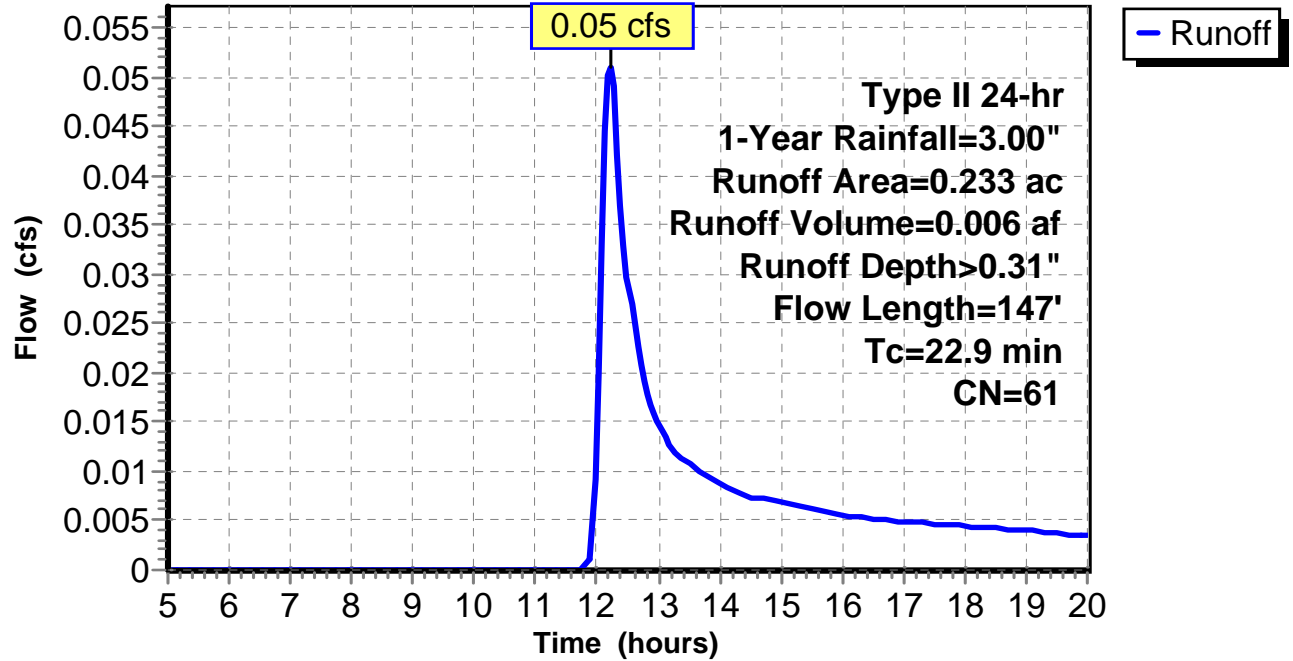
Subcatchment 6: C 288.001

Hydrograph



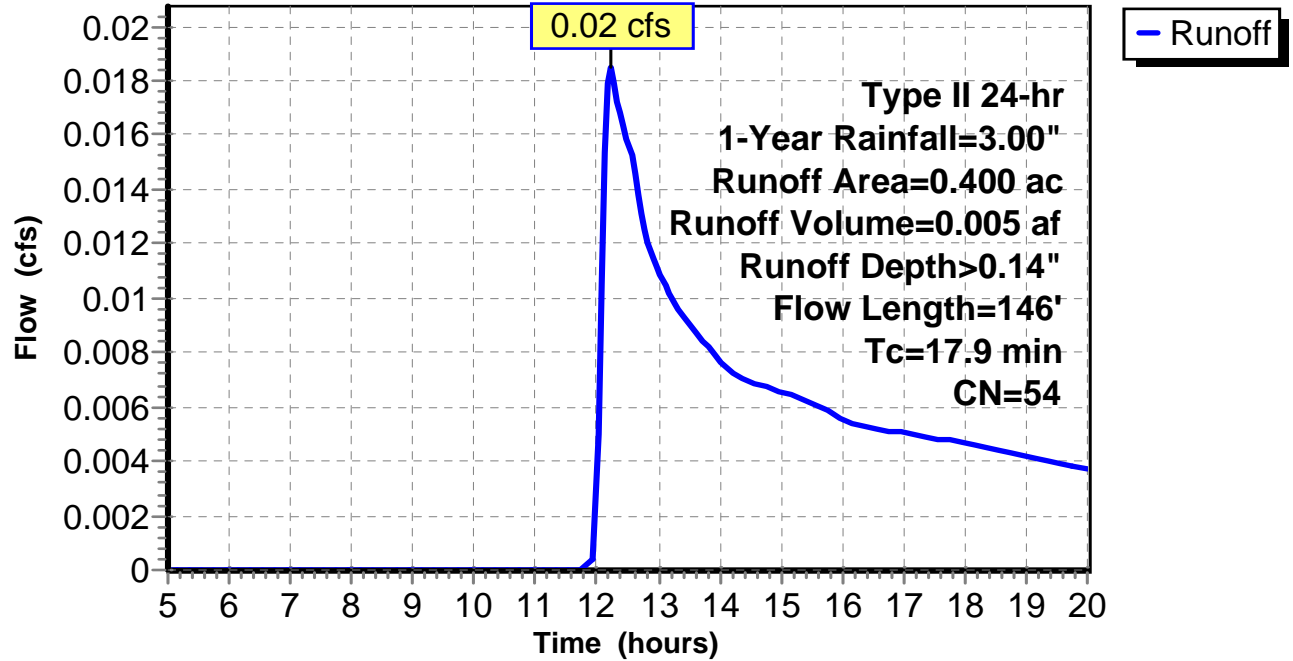
Subcatchment 7: C 288.002

Hydrograph



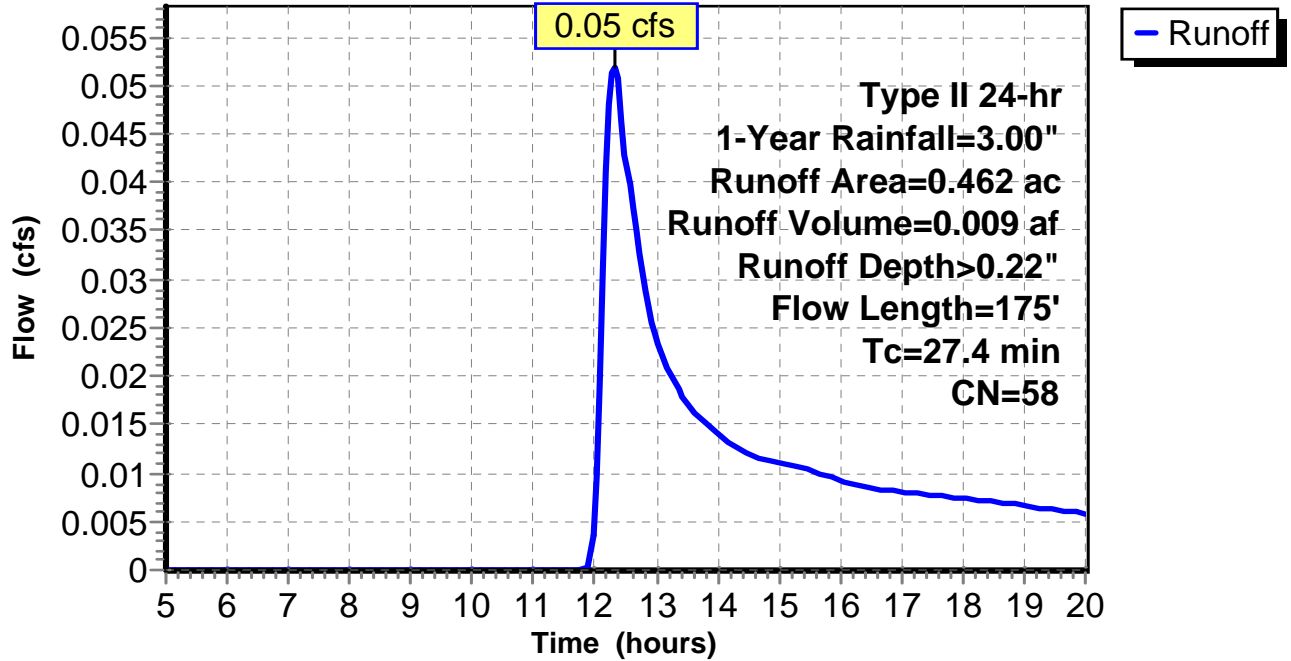
Subcatchment 8: C 288.003

Hydrograph



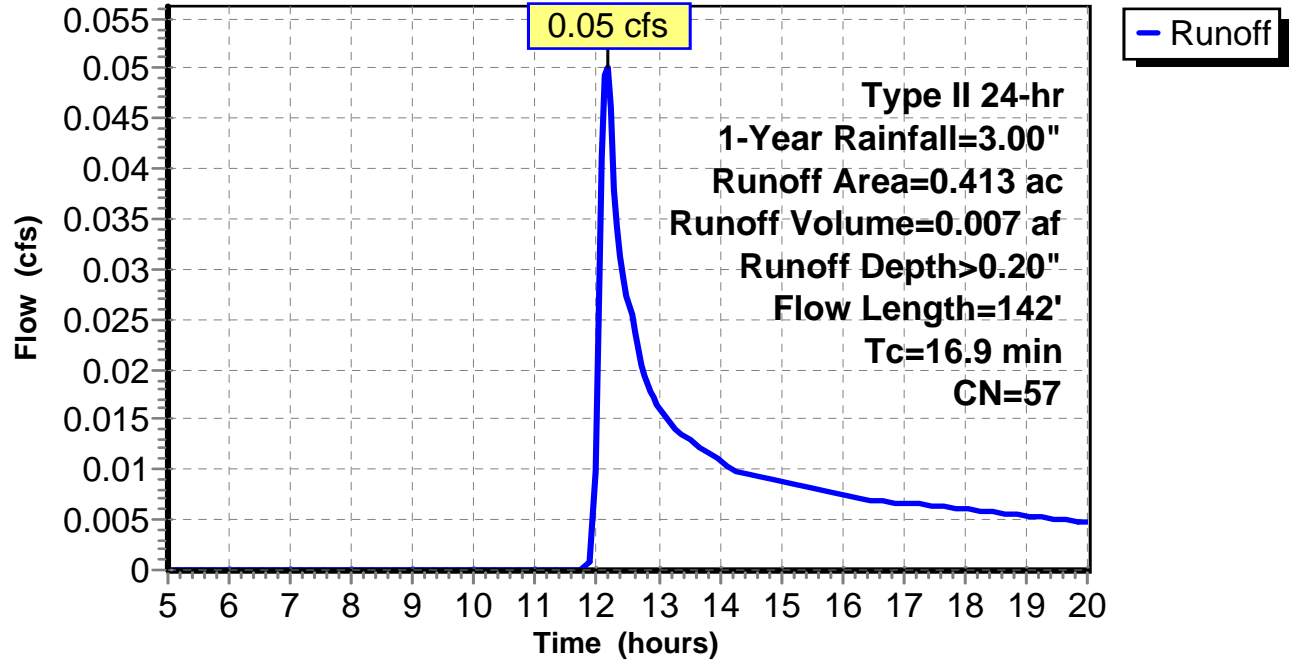
Subcatchment 9: C 288.004

Hydrograph



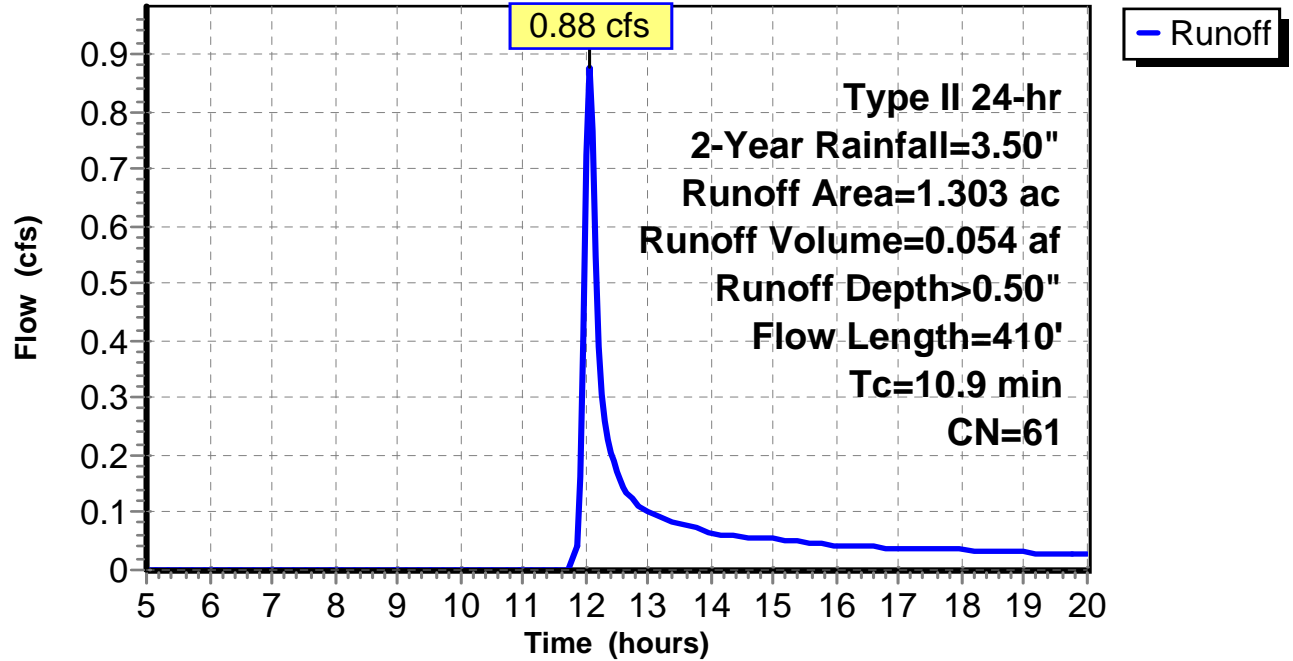
Subcatchment 10: C 288.005

Hydrograph



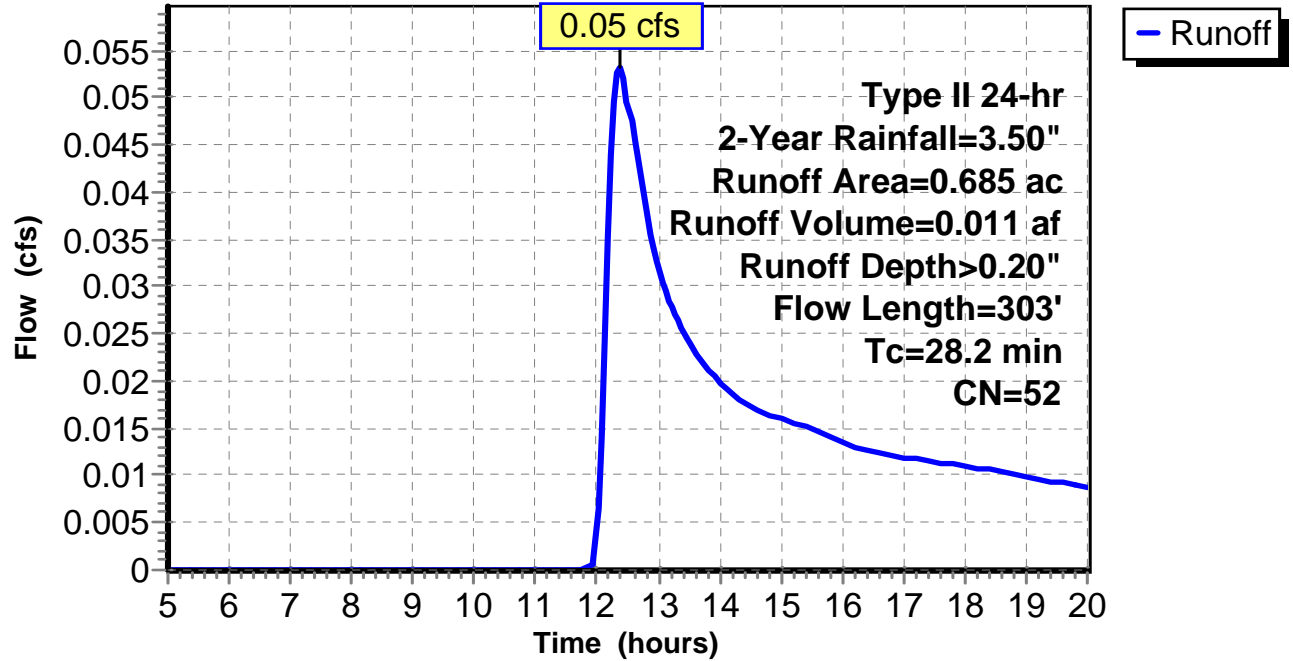
Subcatchment 1: C AR-704.012

Hydrograph



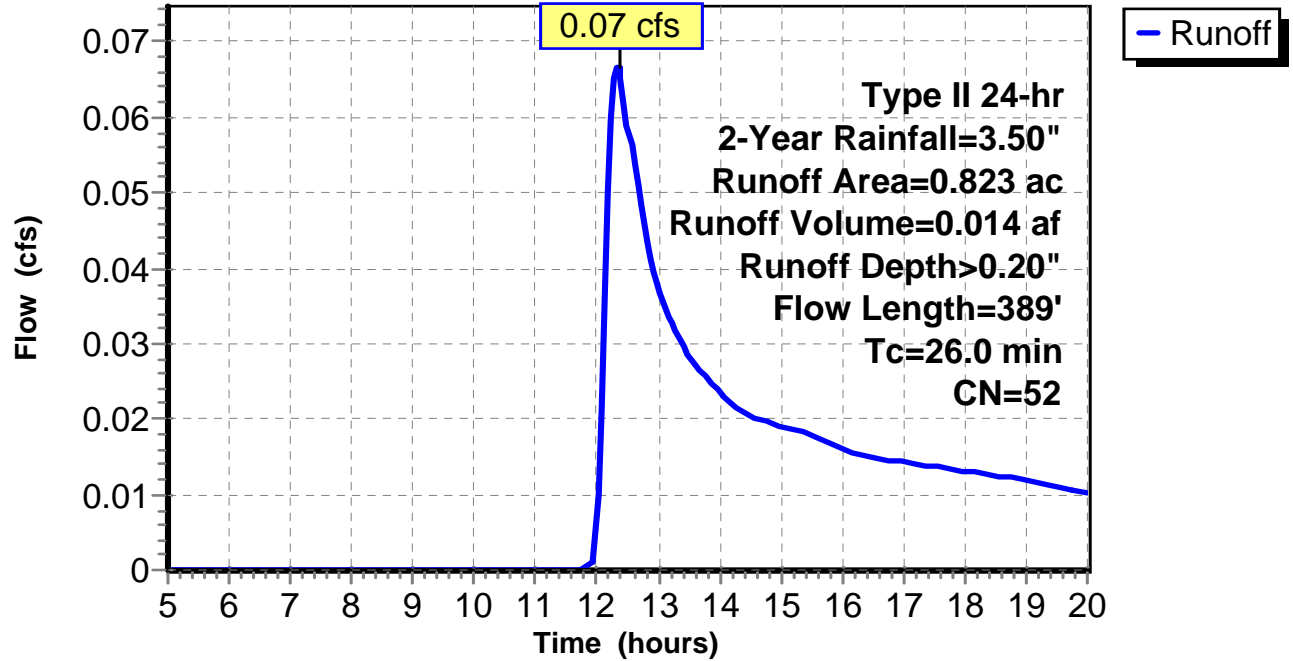
Subcatchment 2: C AR-704.013

Hydrograph



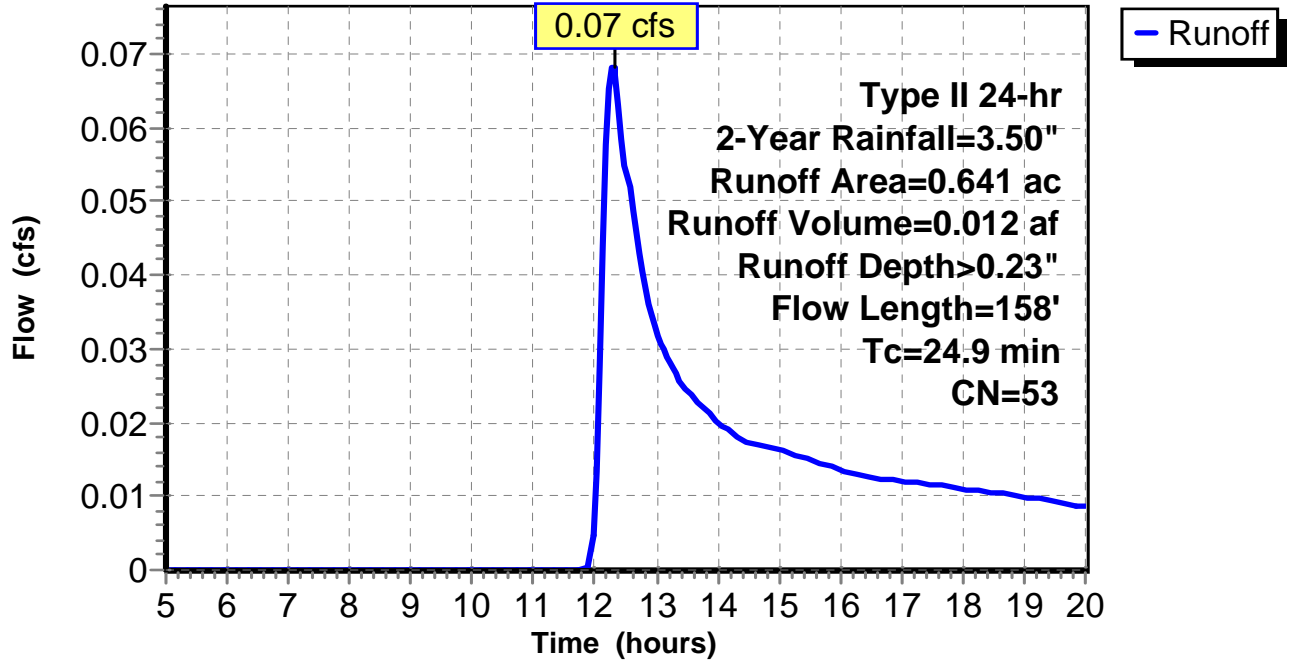
Subcatchment 3: C AR-704.014

Hydrograph



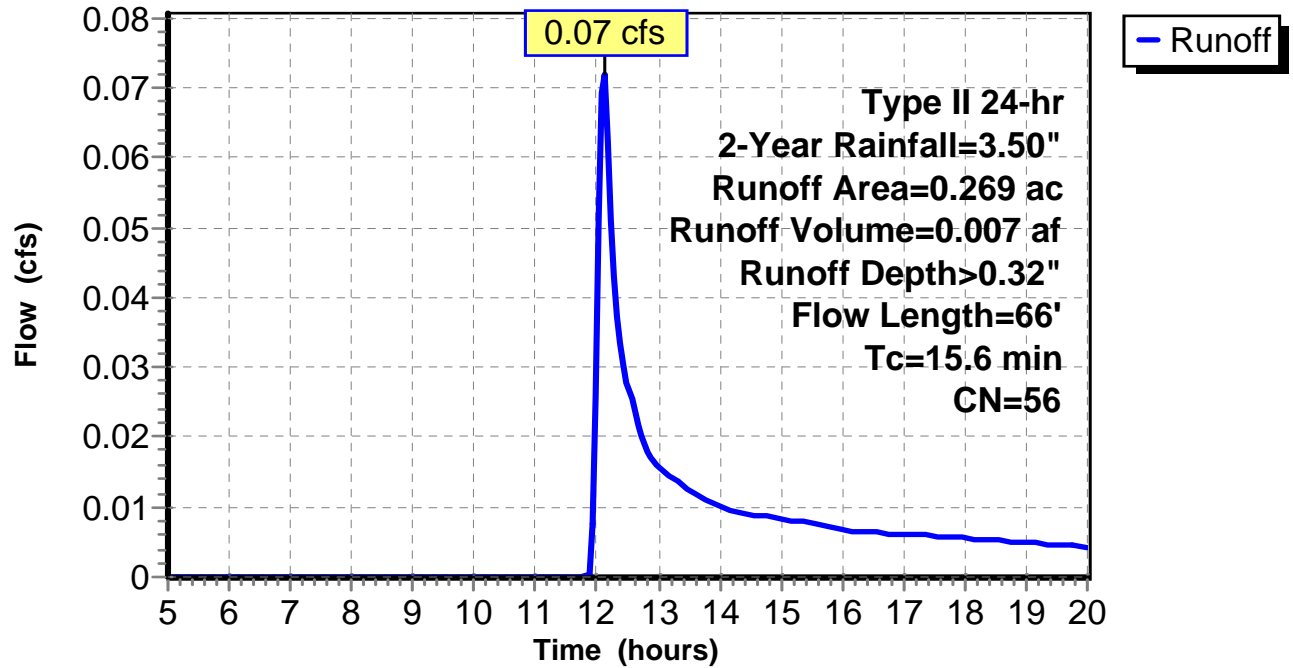
Subcatchment 4: C AR-704.015

Hydrograph



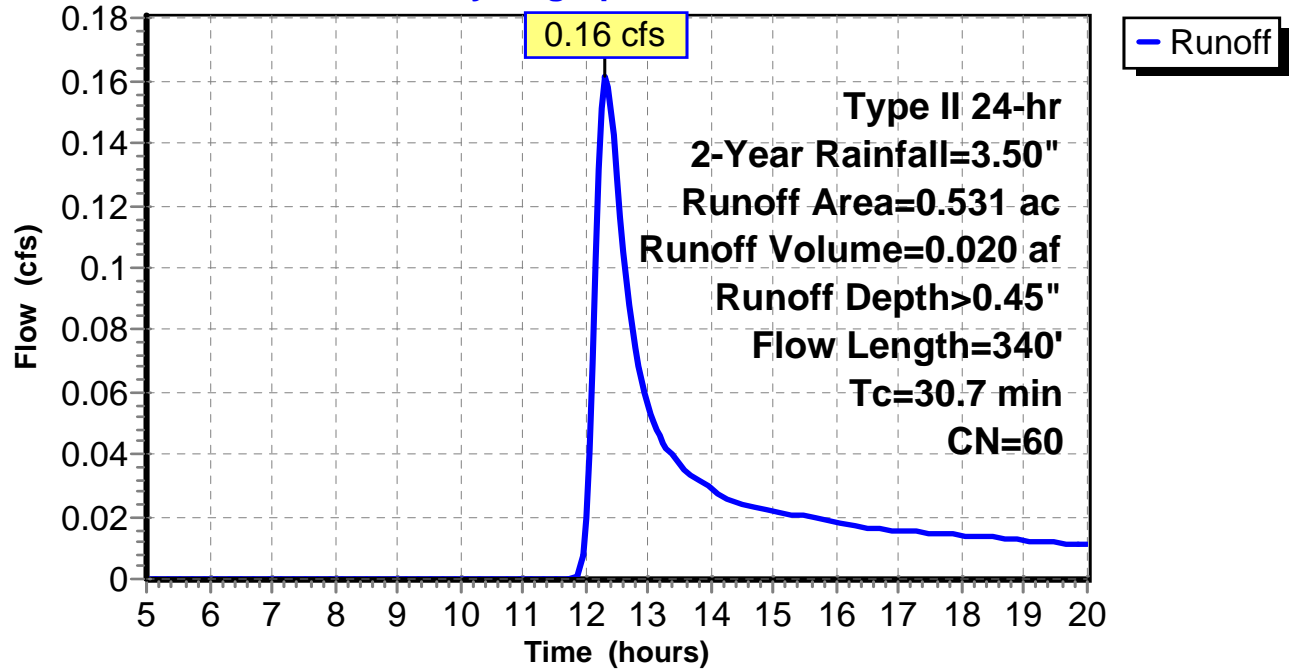
Subcatchment 5: C AR-704.016

Hydrograph



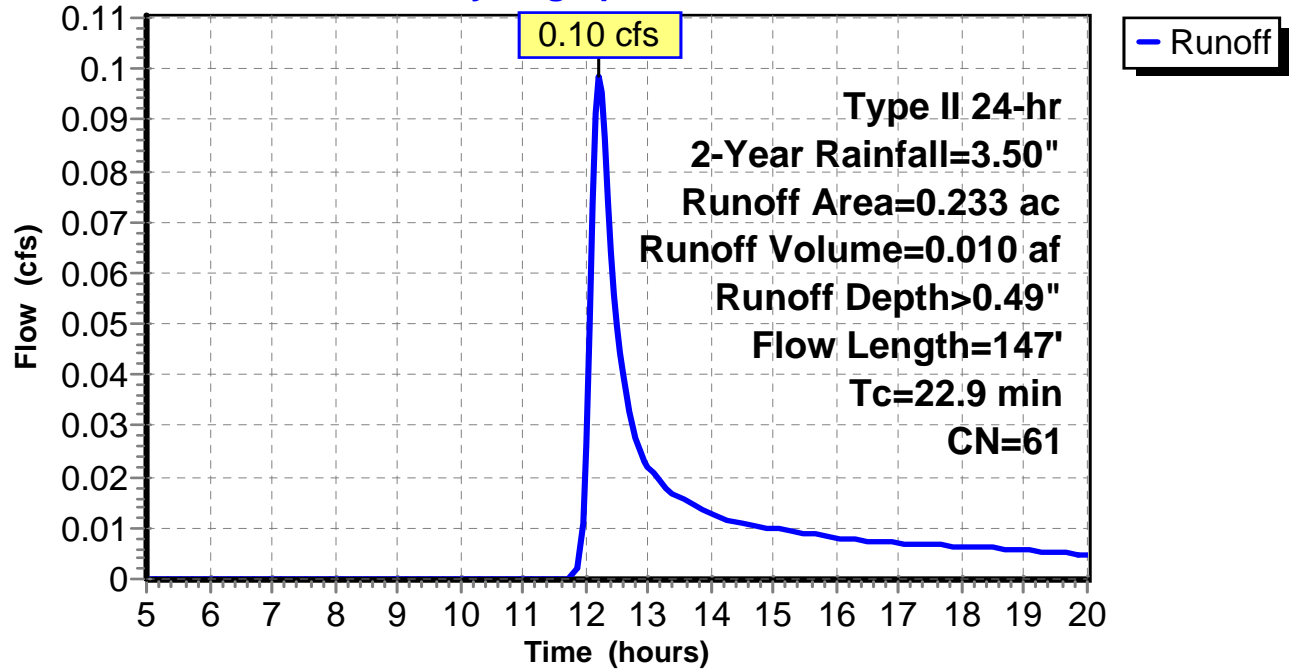
Subcatchment 6: C 288.001

Hydrograph



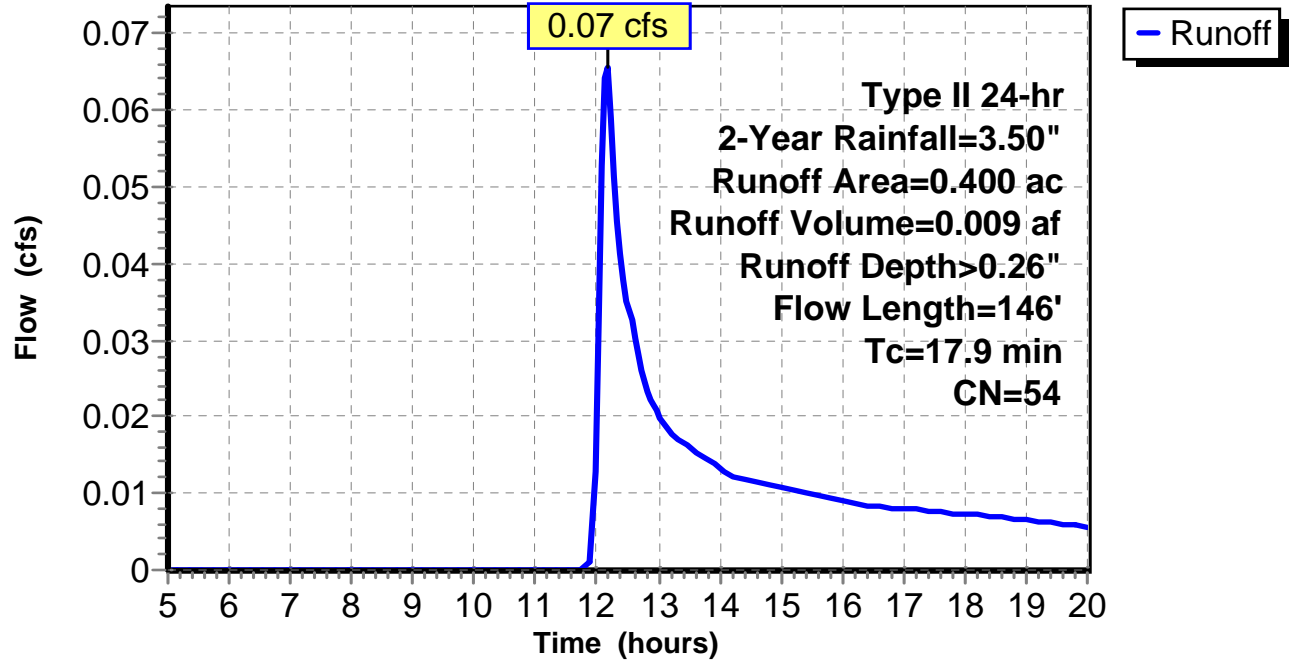
Subcatchment 7: C 288.002

Hydrograph



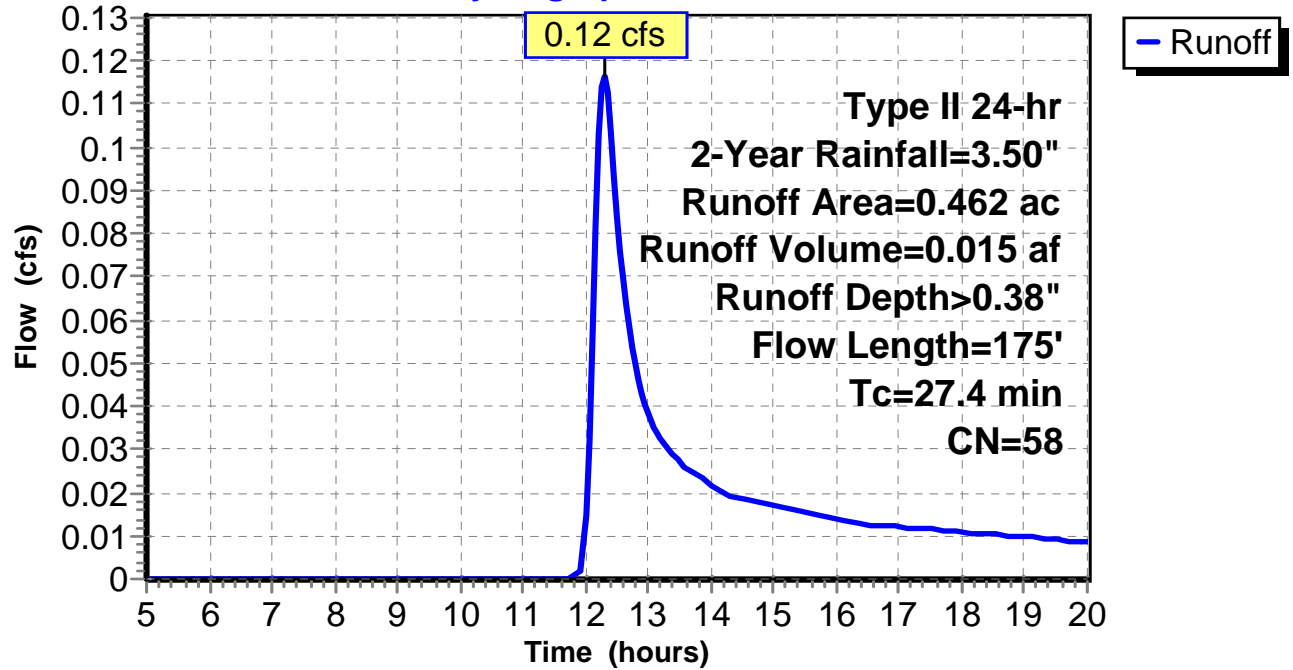
Subcatchment 8: C 288.003

Hydrograph



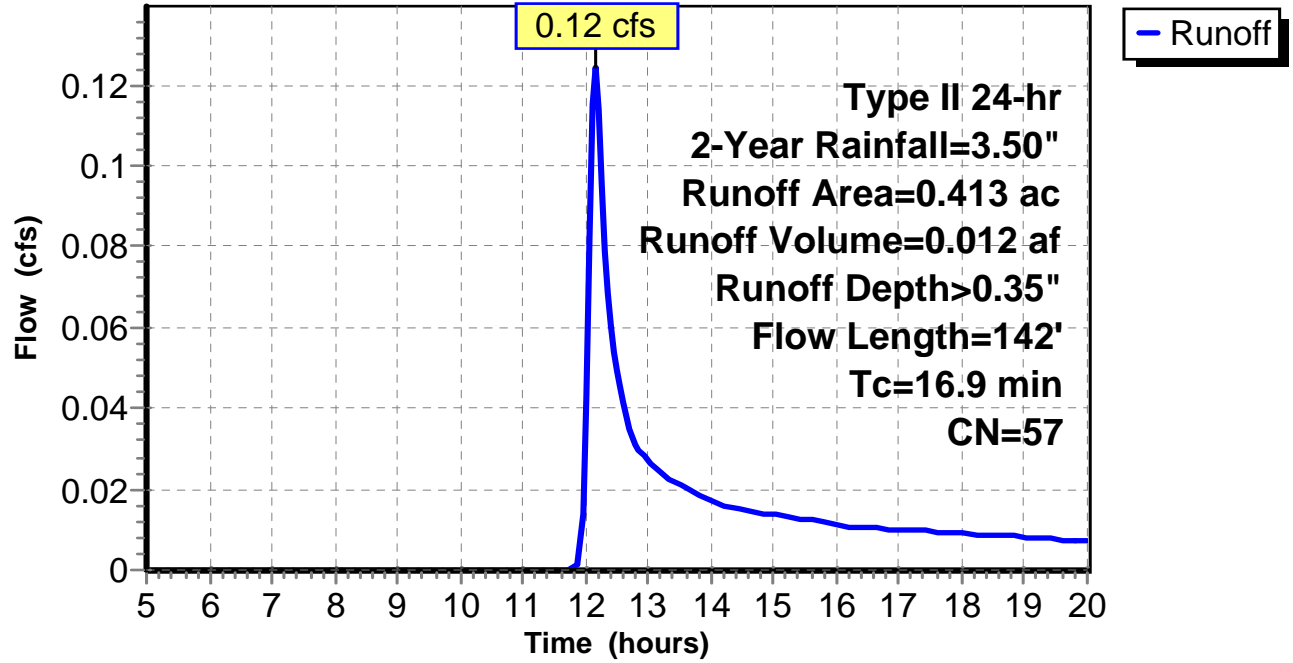
Subcatchment 9: C 288.004

Hydrograph



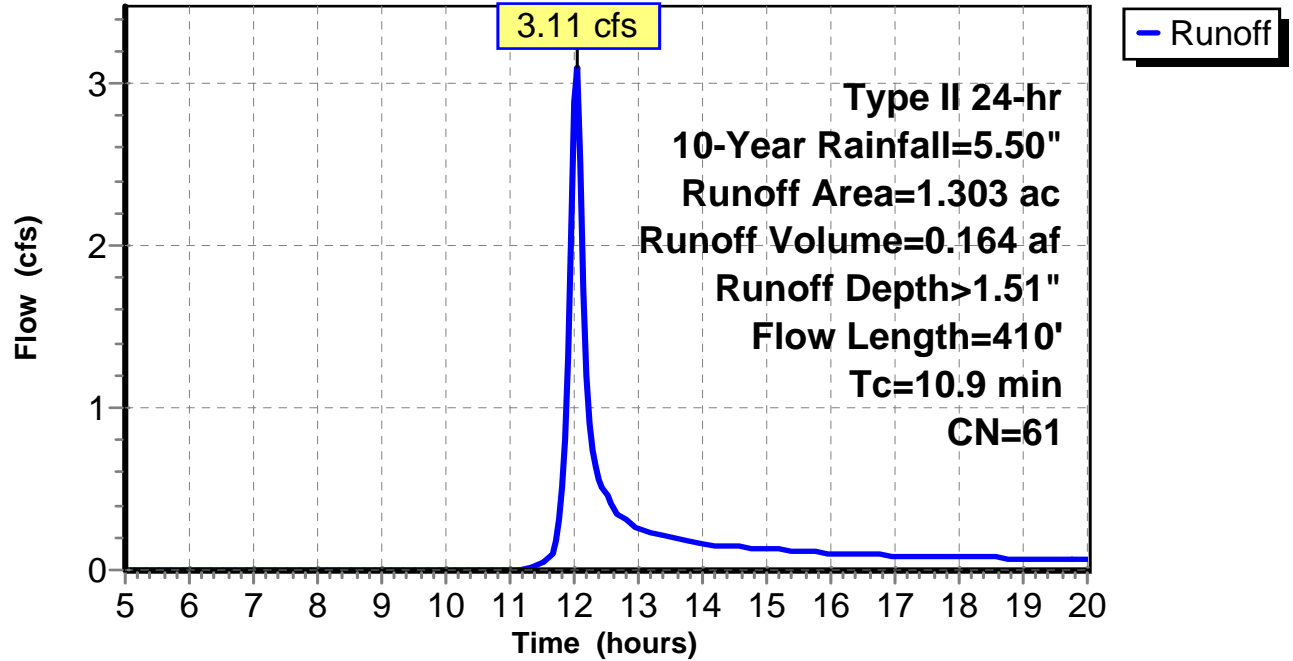
Subcatchment 10: C 288.005

Hydrograph



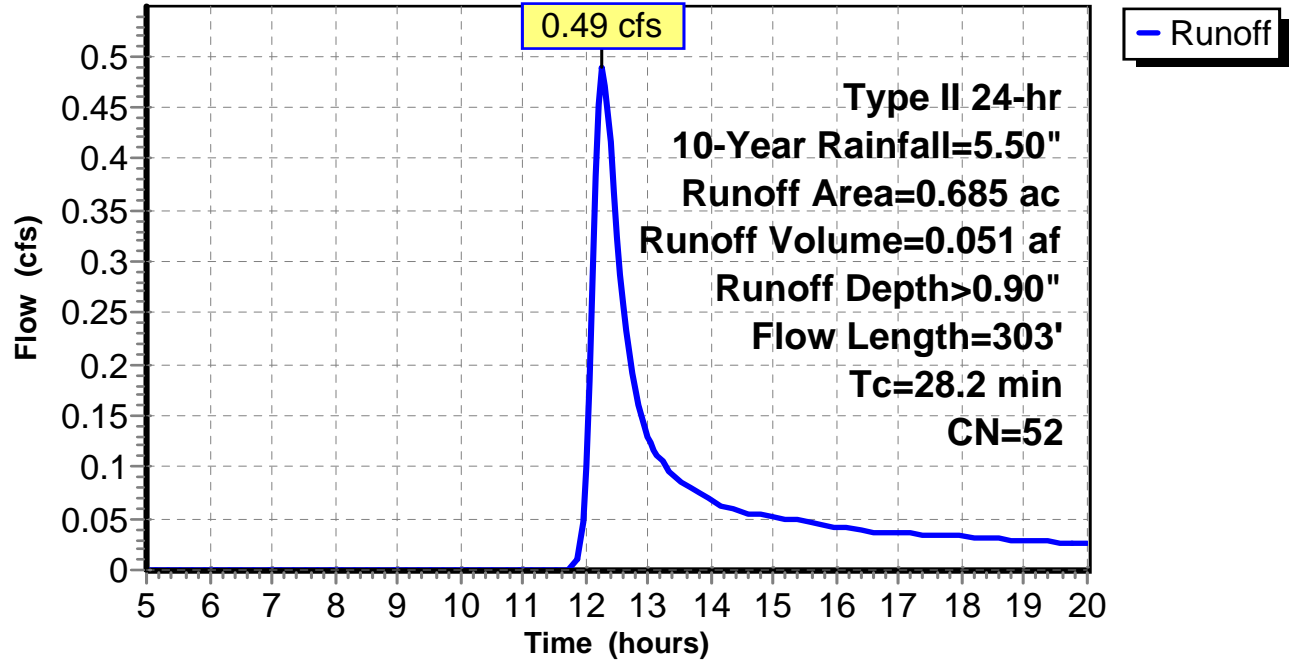
Subcatchment 1: C AR-704.012

Hydrograph



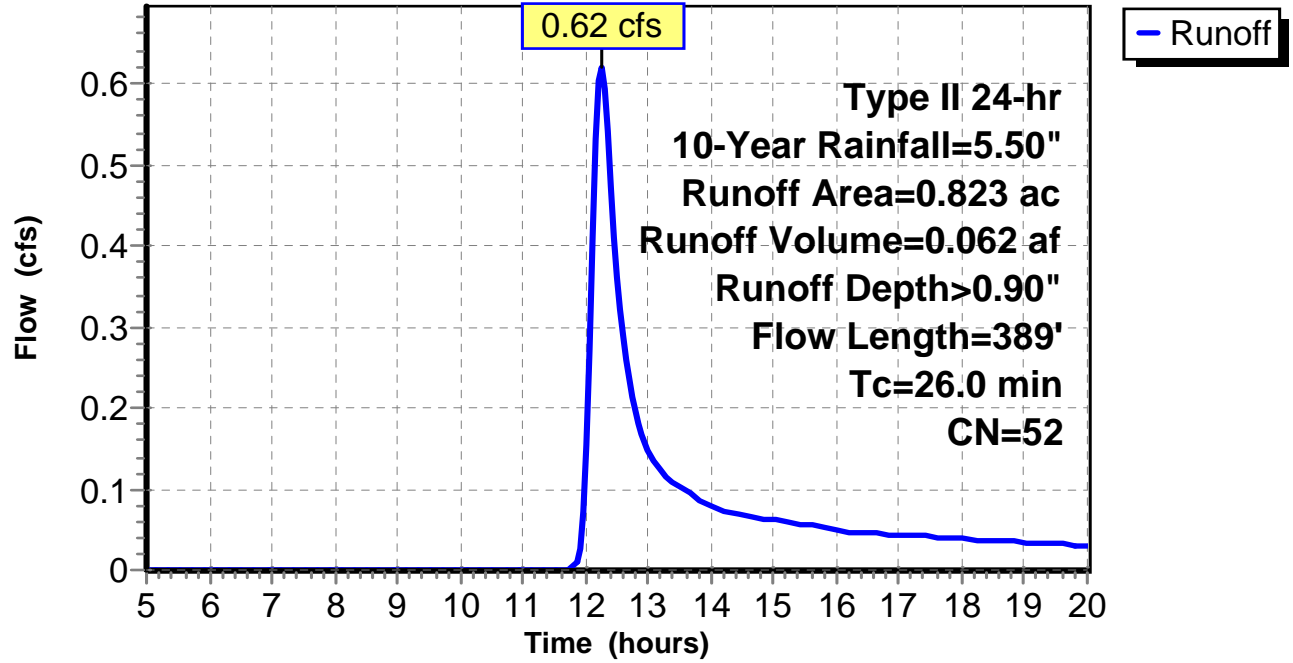
Subcatchment 2: C AR-704.013

Hydrograph



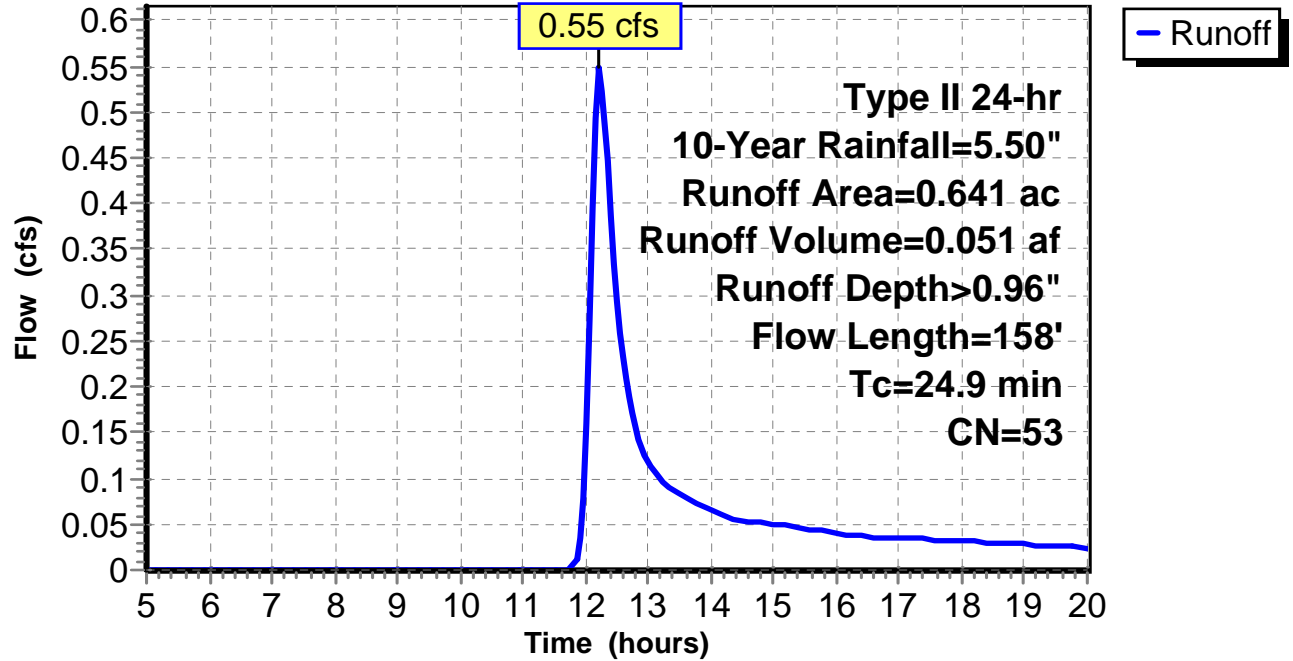
Subcatchment 3: C AR-704.014

Hydrograph



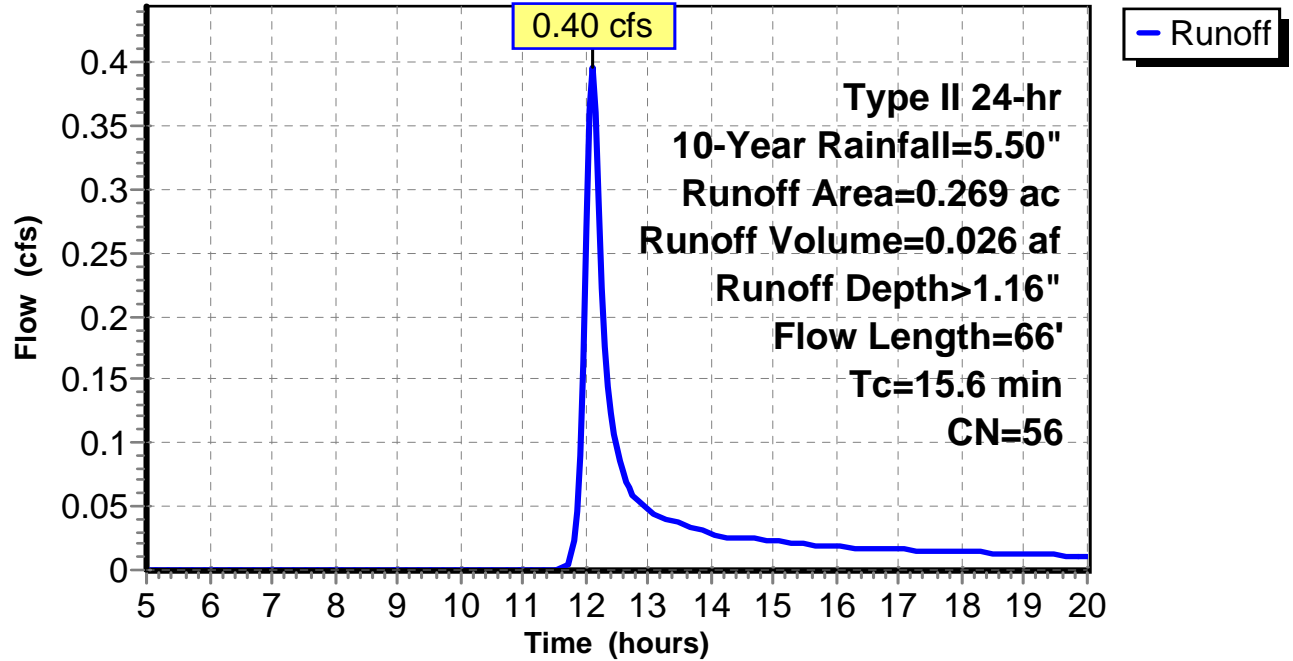
Subcatchment 4: C AR-704.015

Hydrograph



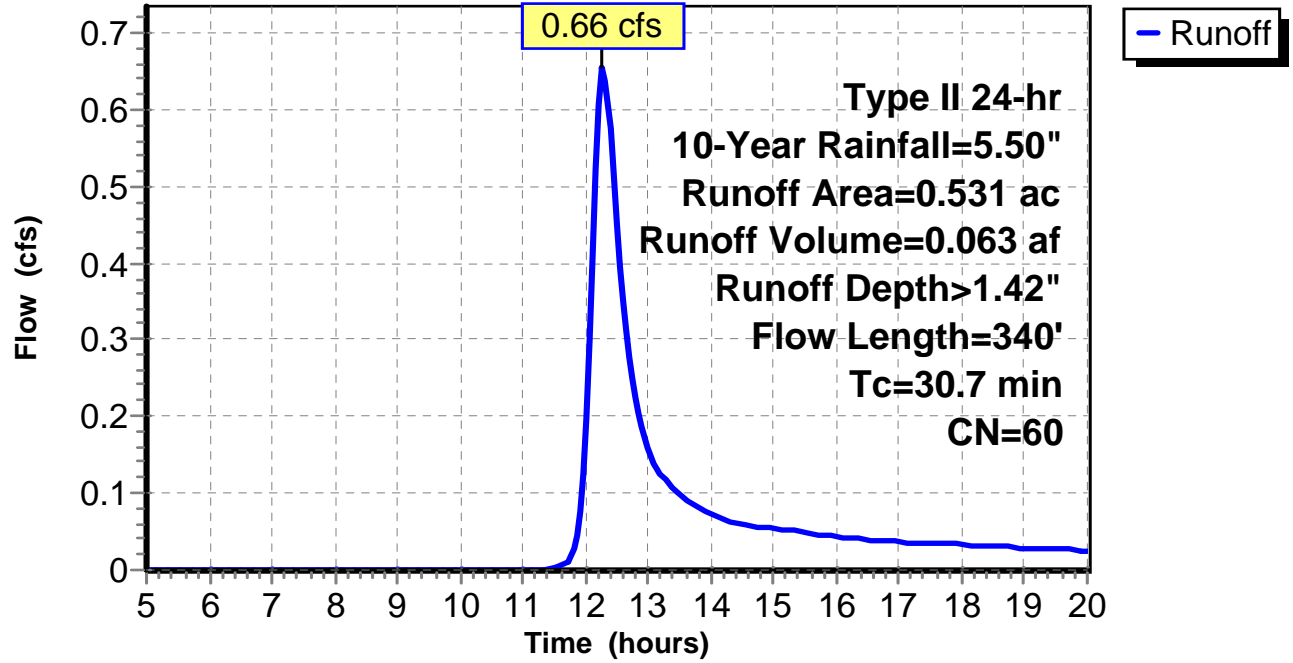
Subcatchment 5: C AR-704.016

Hydrograph



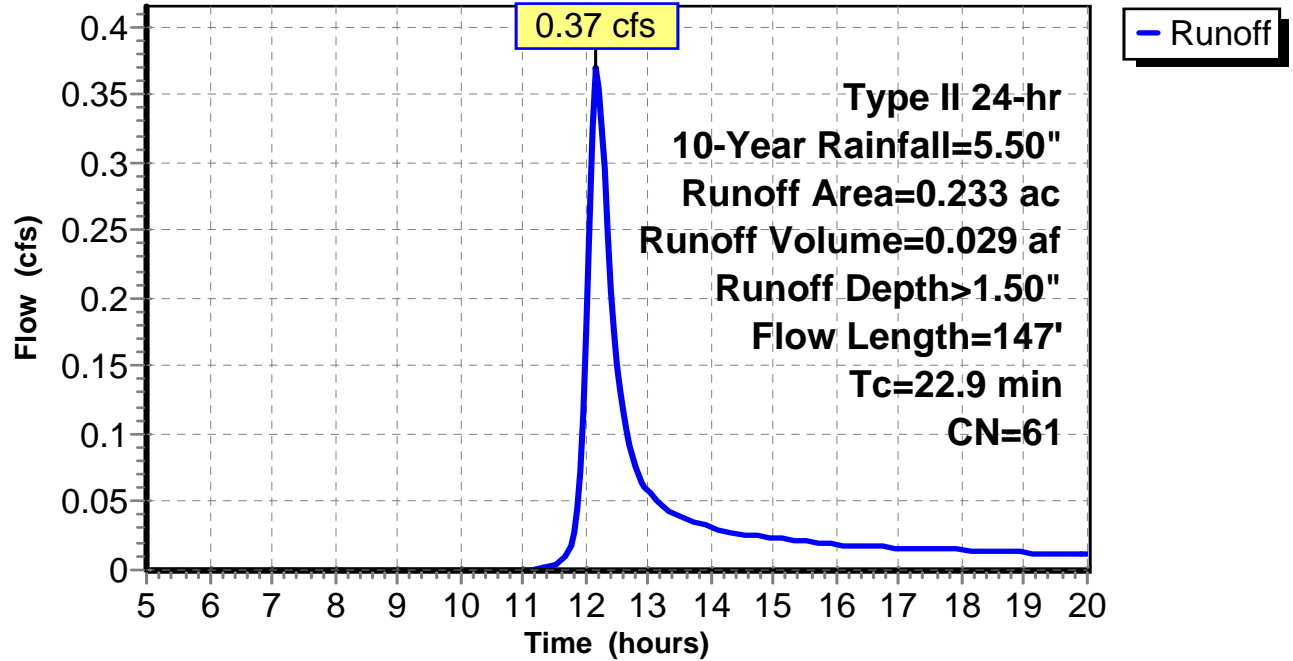
Subcatchment 6: C 288.001

Hydrograph



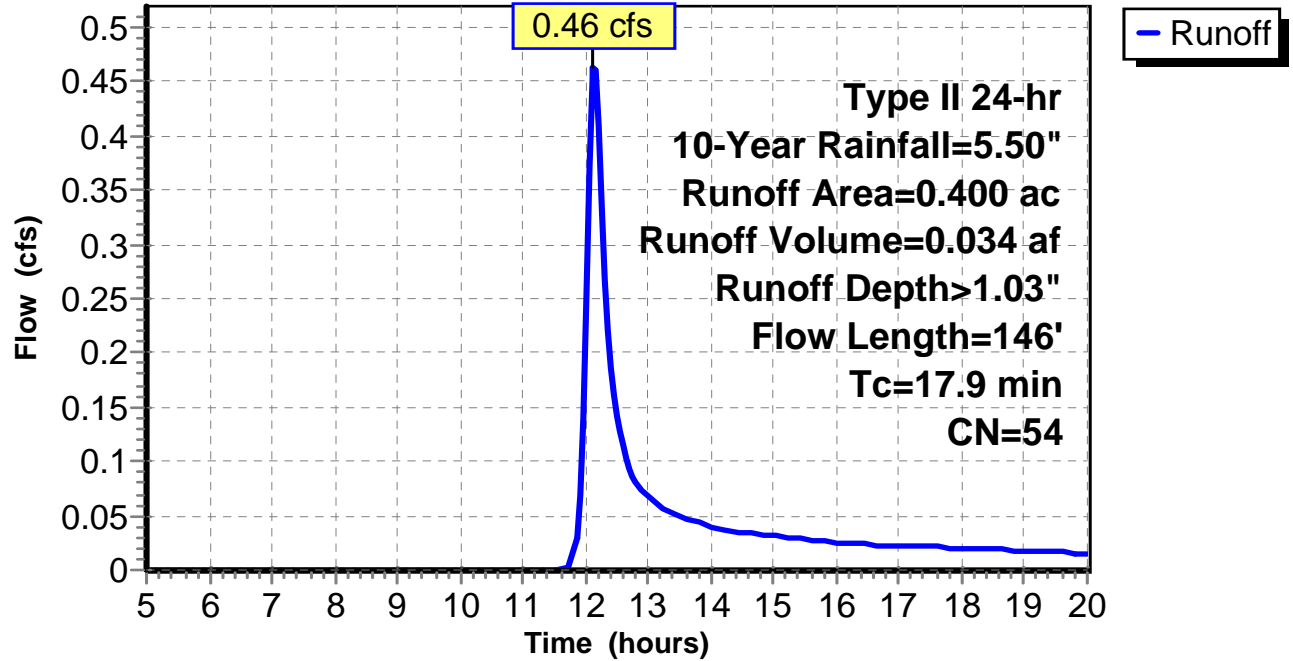
Subcatchment 7: C 288.002

Hydrograph



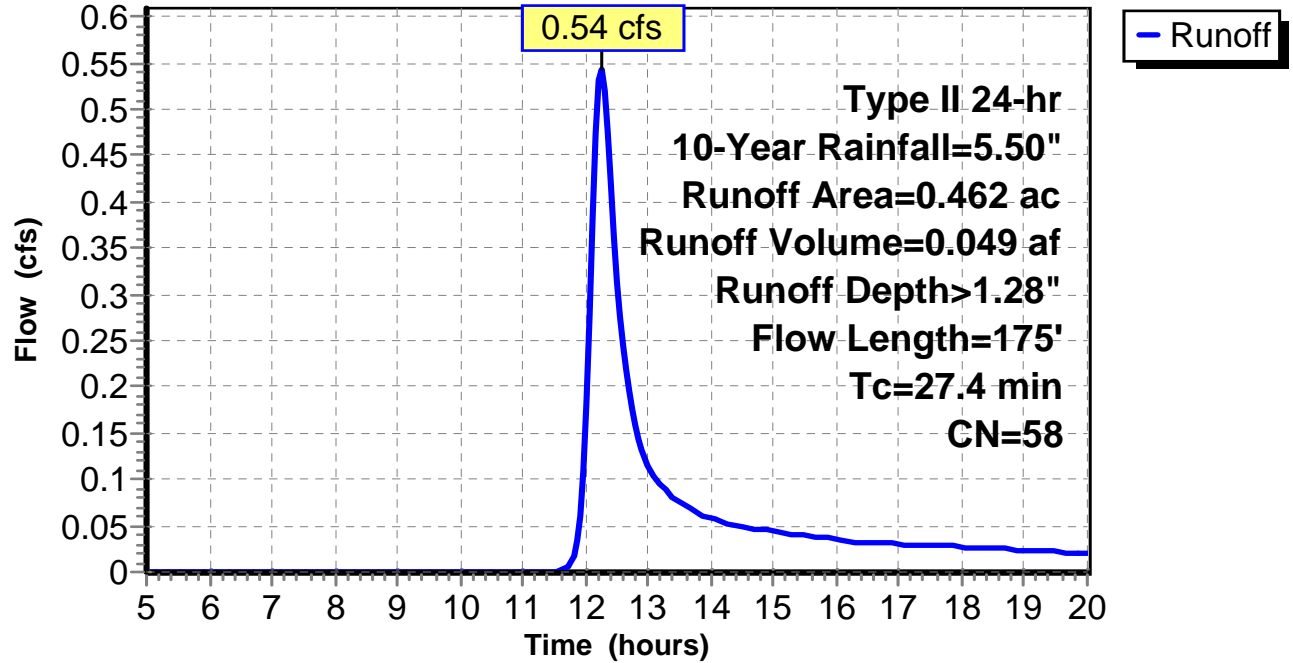
Subcatchment 8: C 288.003

Hydrograph



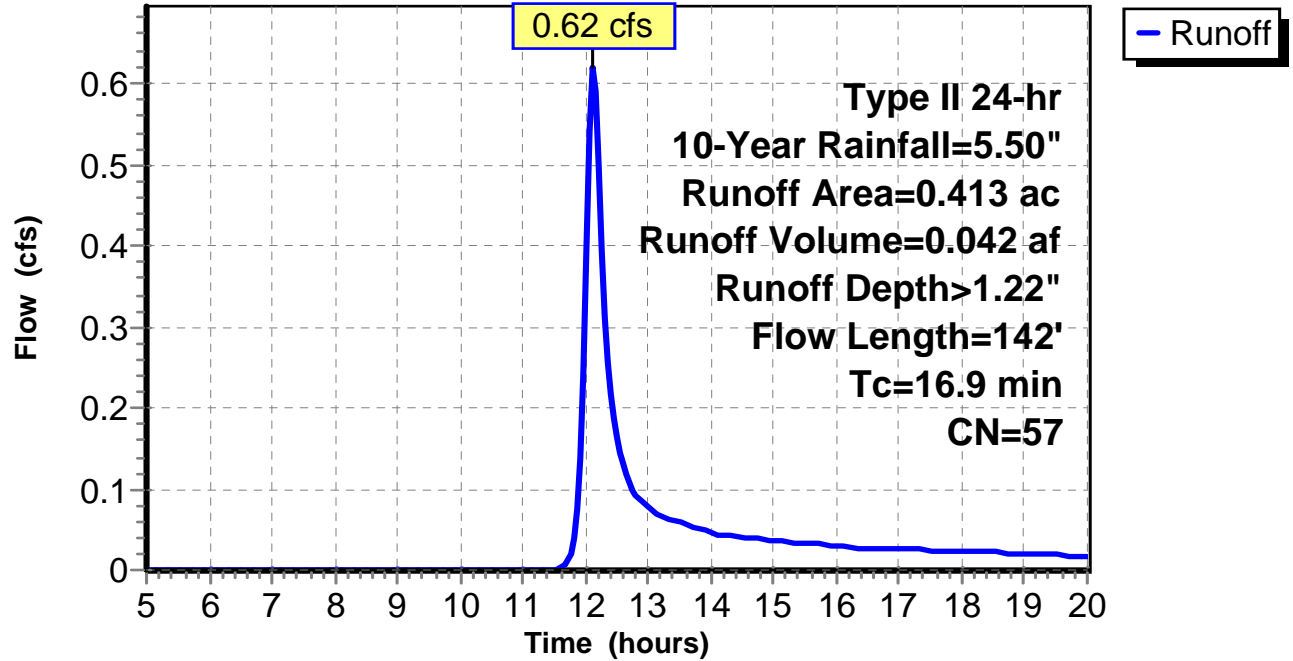
Subcatchment 9: C 288.004

Hydrograph



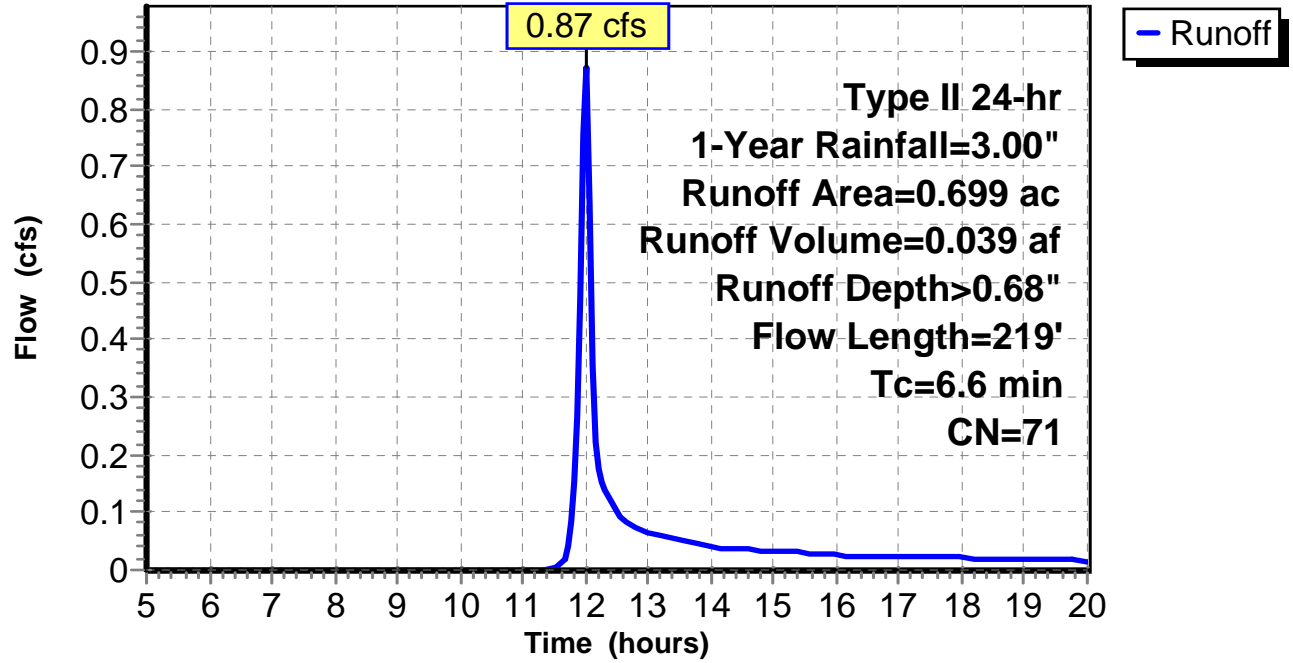
Subcatchment 10: C 288.005

Hydrograph



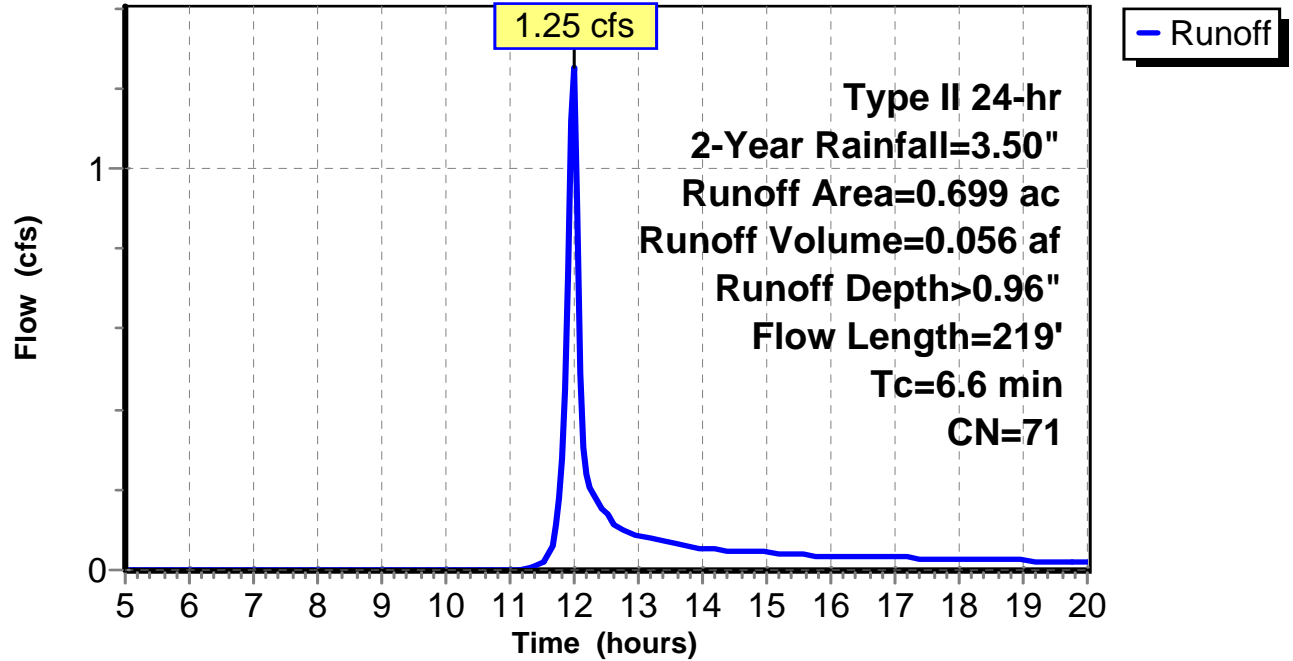
Subcatchment 1: C 290.001

Hydrograph



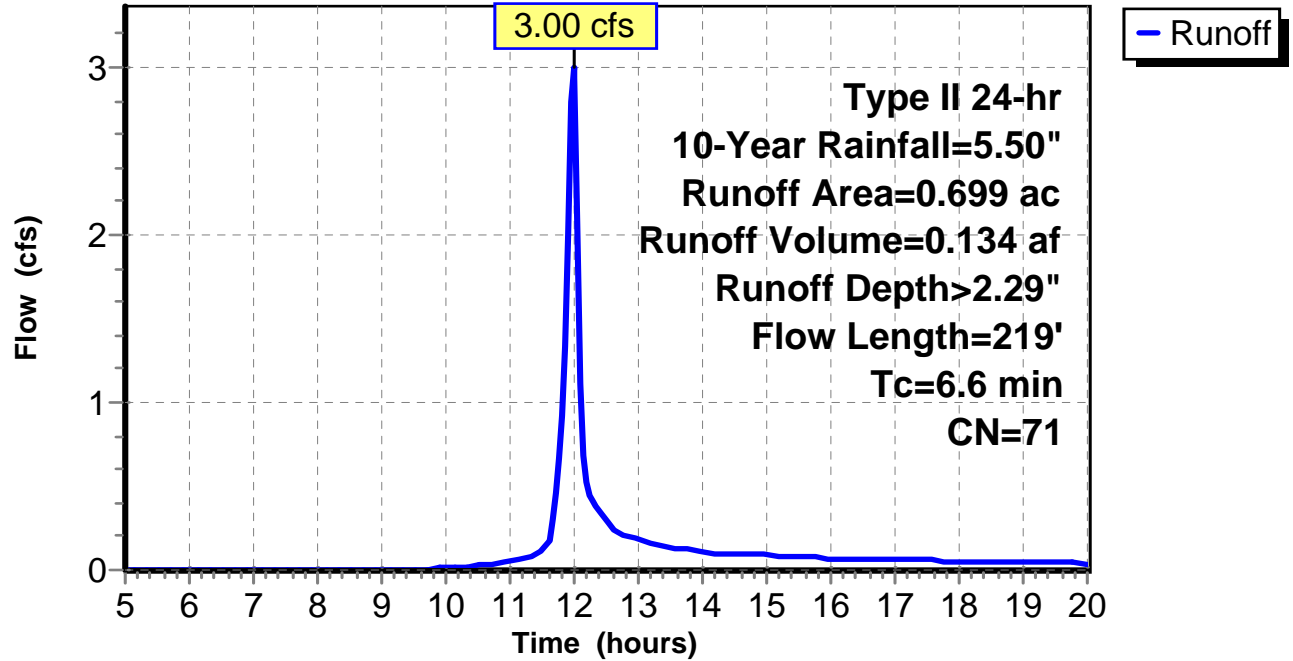
Subcatchment 1: C 290.001

Hydrograph



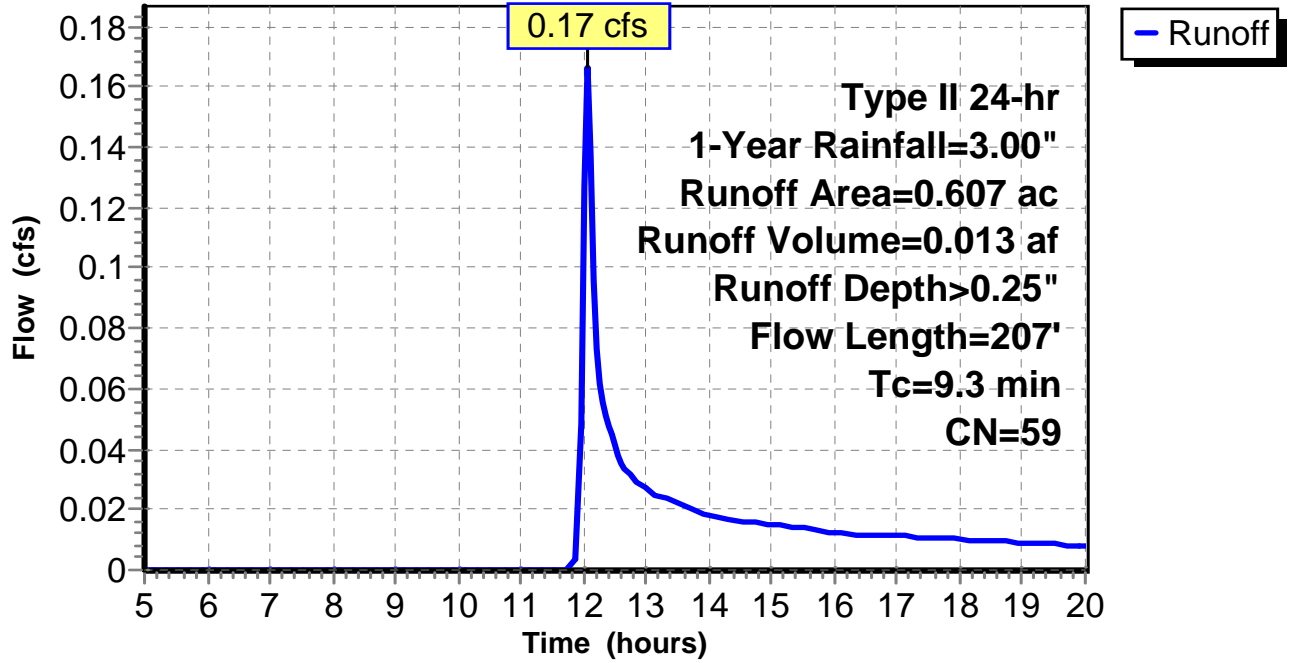
Subcatchment 1: C 290.001

Hydrograph



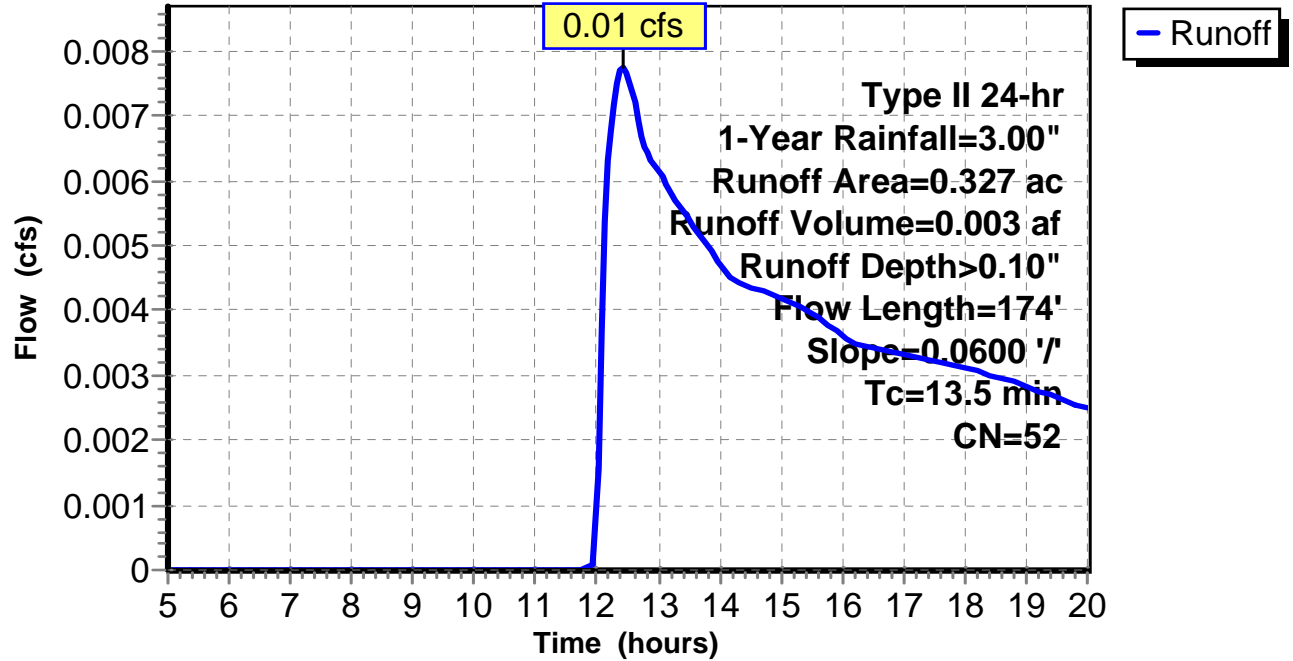
Subcatchment 1: C E-293.001

Hydrograph



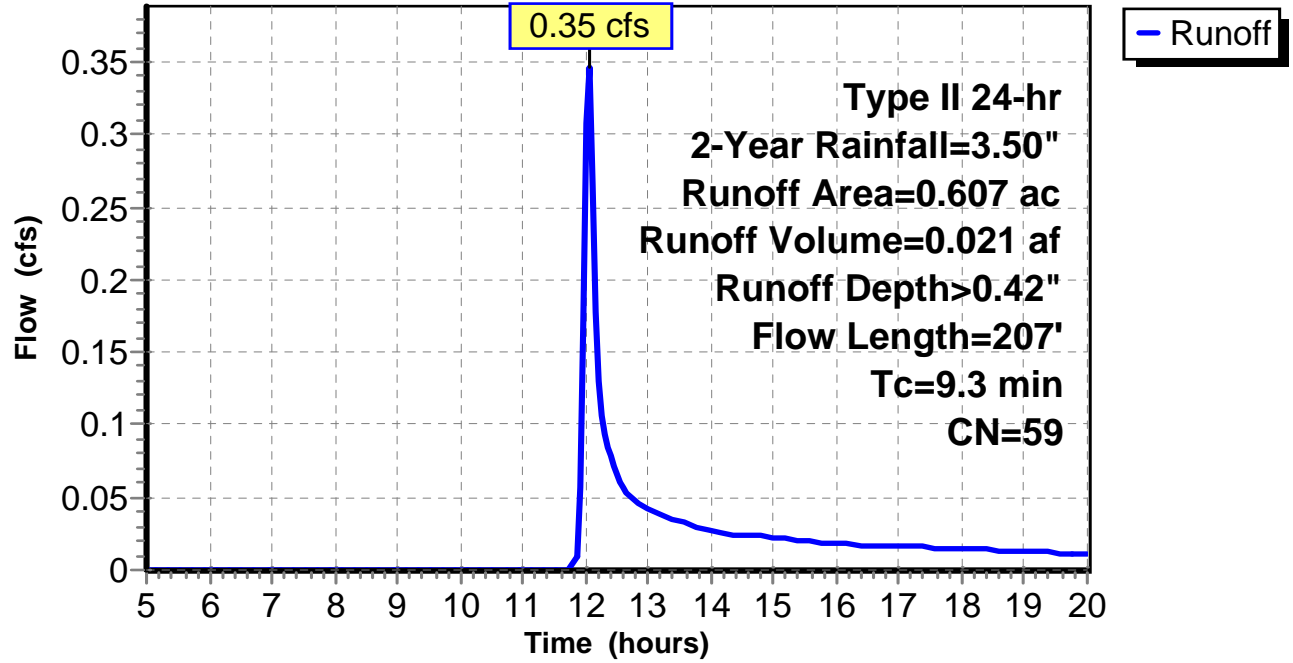
Subcatchment 2: C E-293.002

Hydrograph



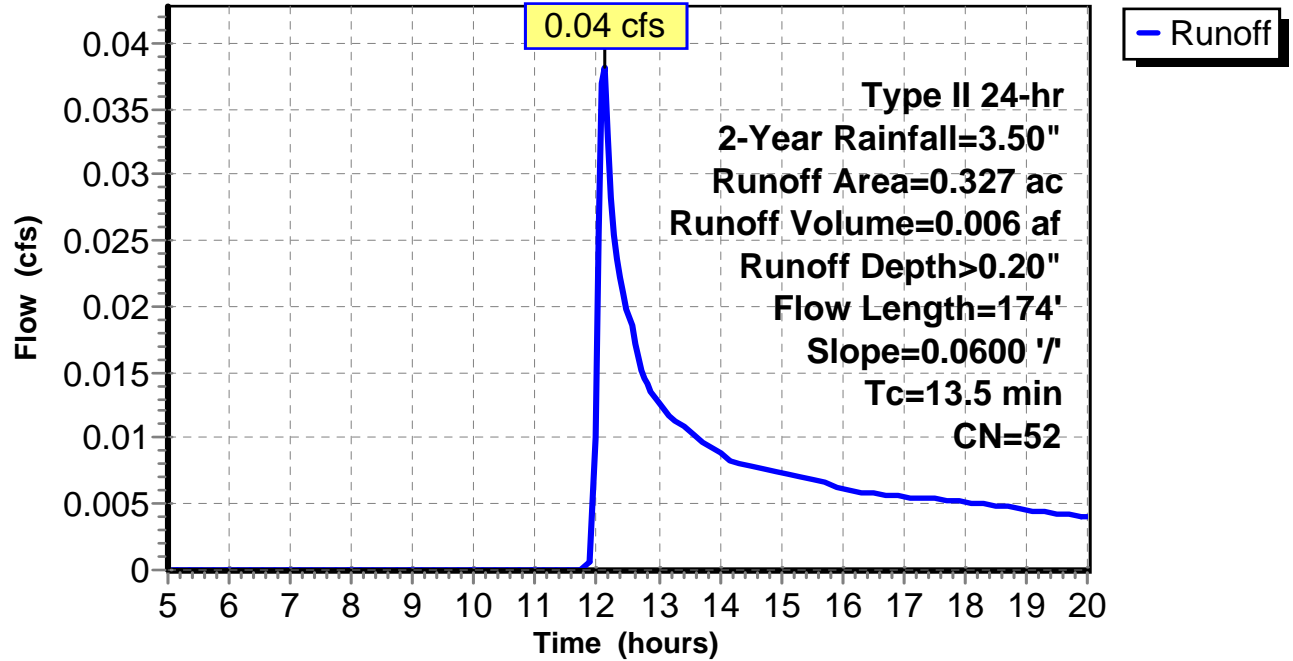
Subcatchment 1: C E-293.001

Hydrograph



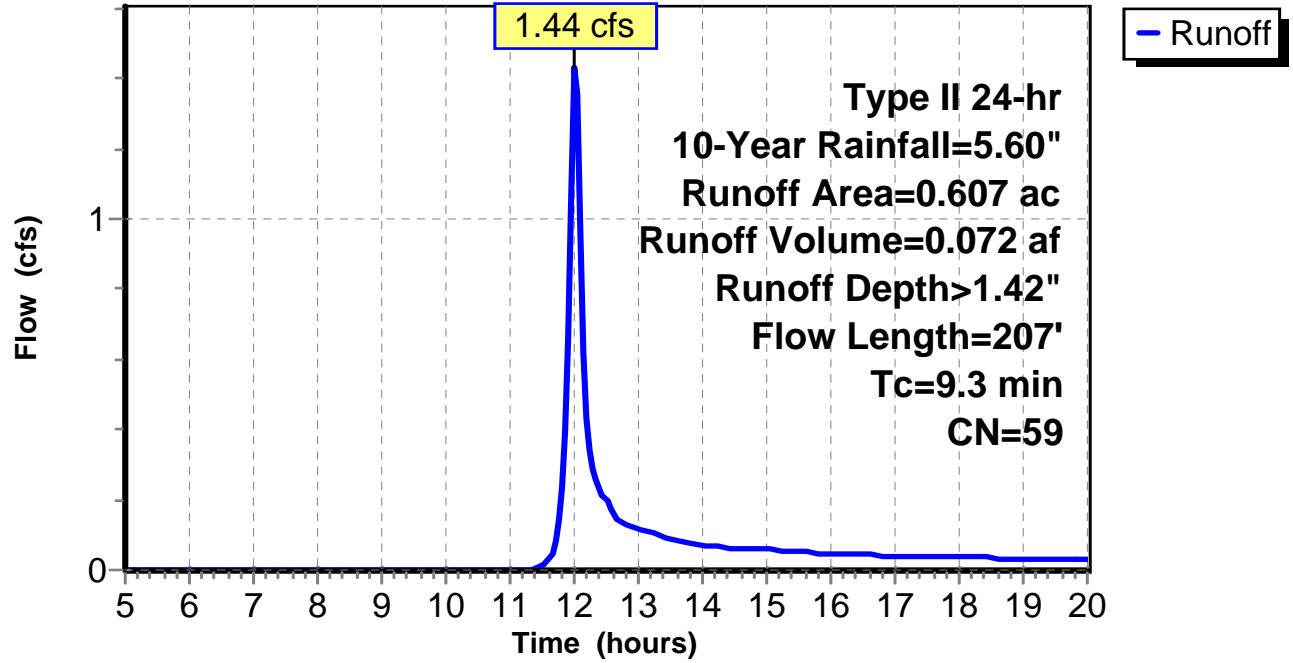
Subcatchment 2: C E-293.002

Hydrograph



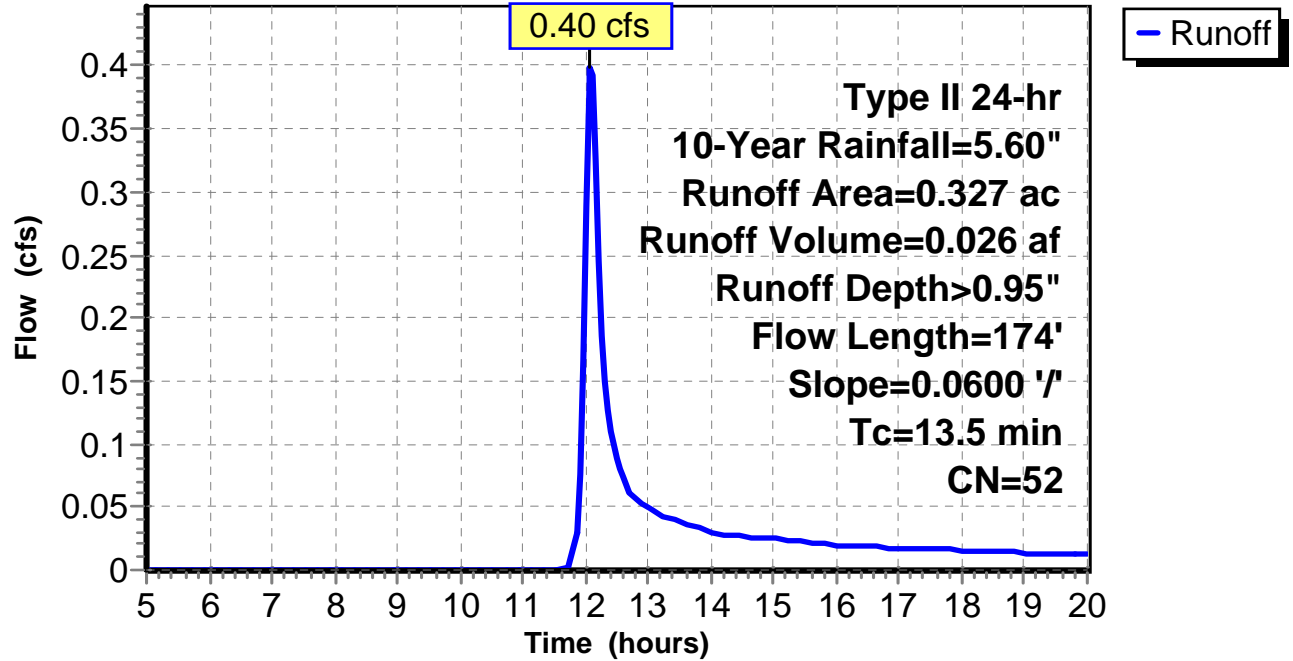
Subcatchment 1: C E-293.001

Hydrograph



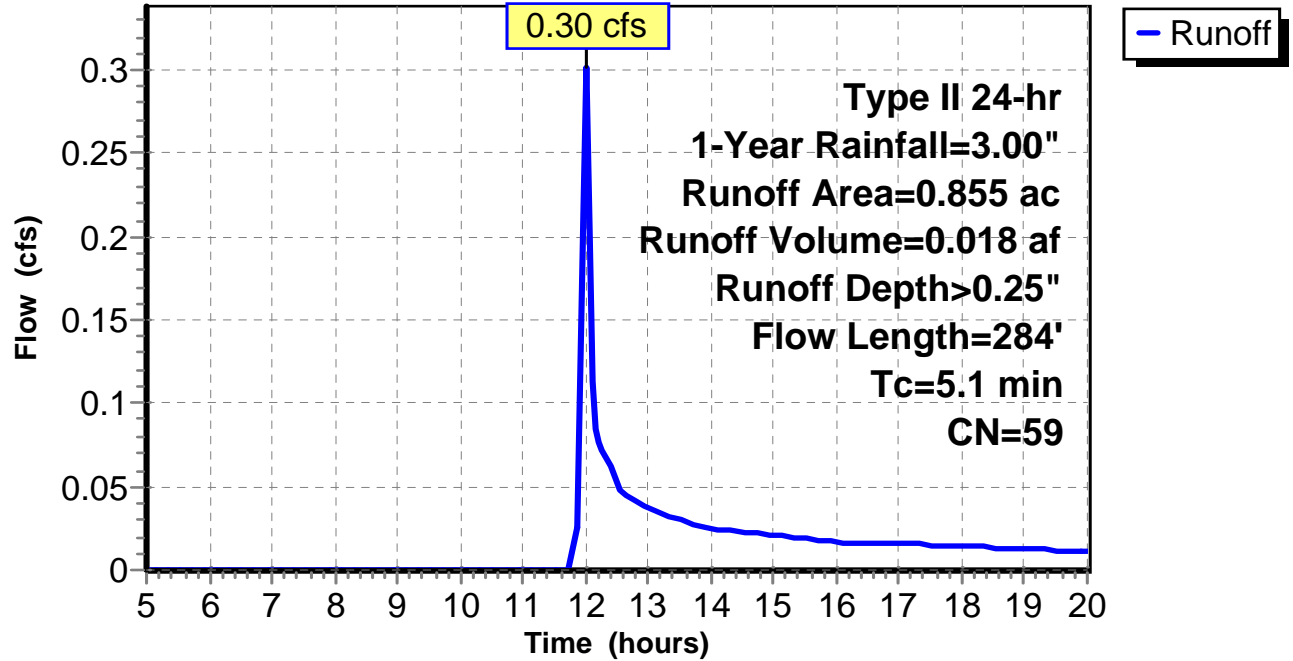
Subcatchment 2: C E-293.002

Hydrograph



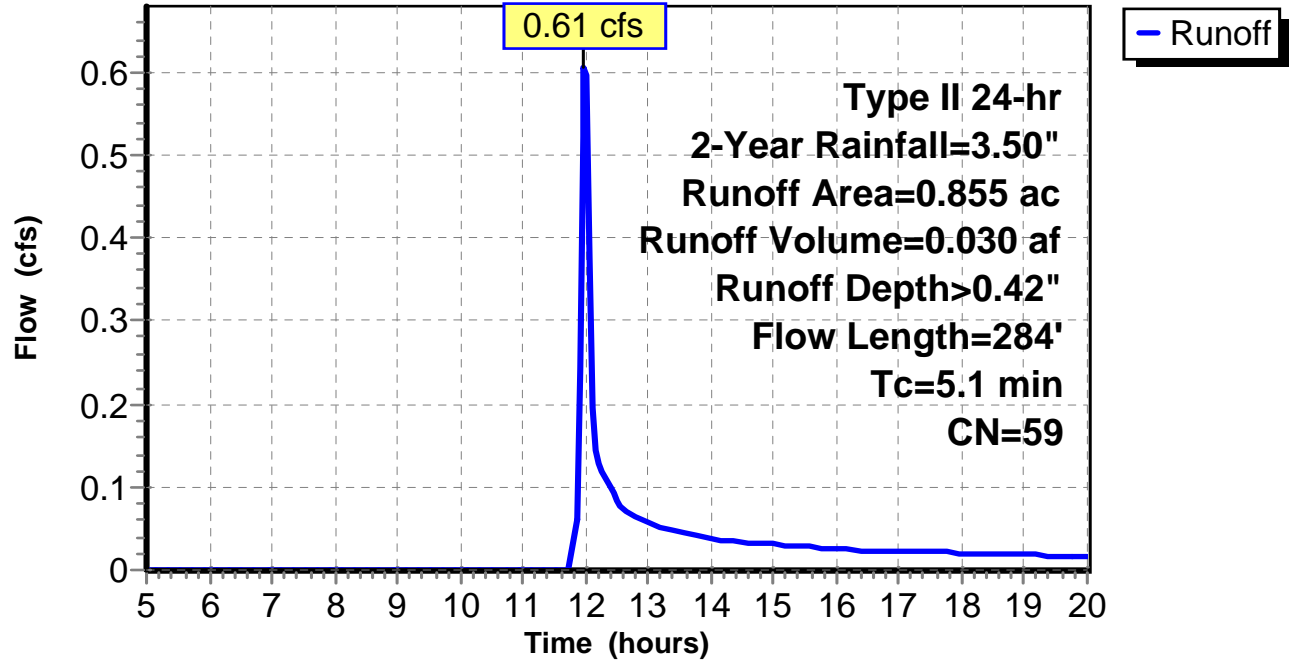
Subcatchment 1: C E-293.003

Hydrograph



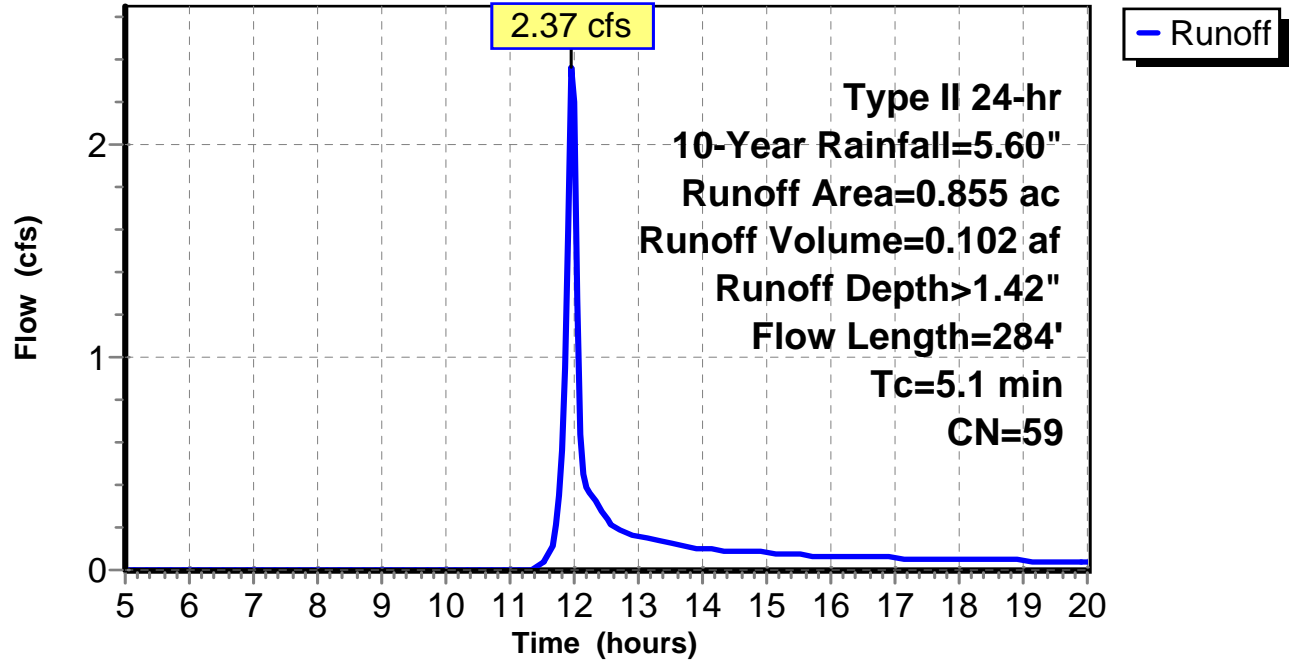
Subcatchment 1: C E-293.003

Hydrograph



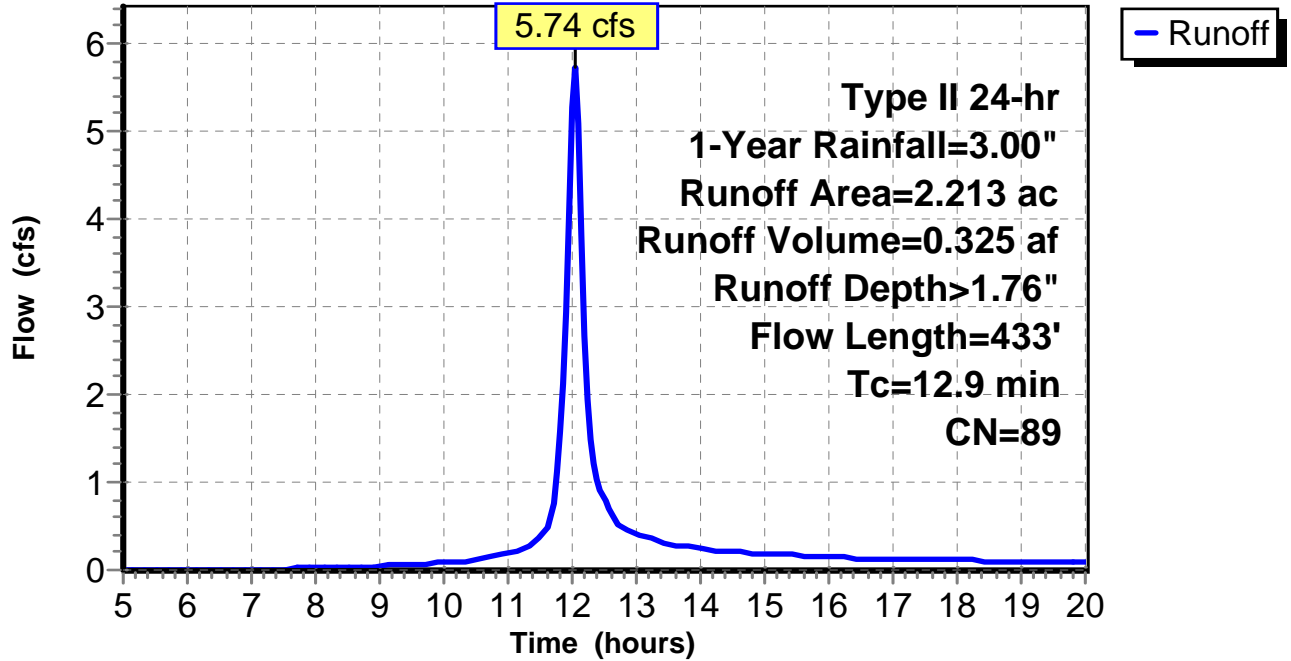
Subcatchment 1: C E-293.003

Hydrograph



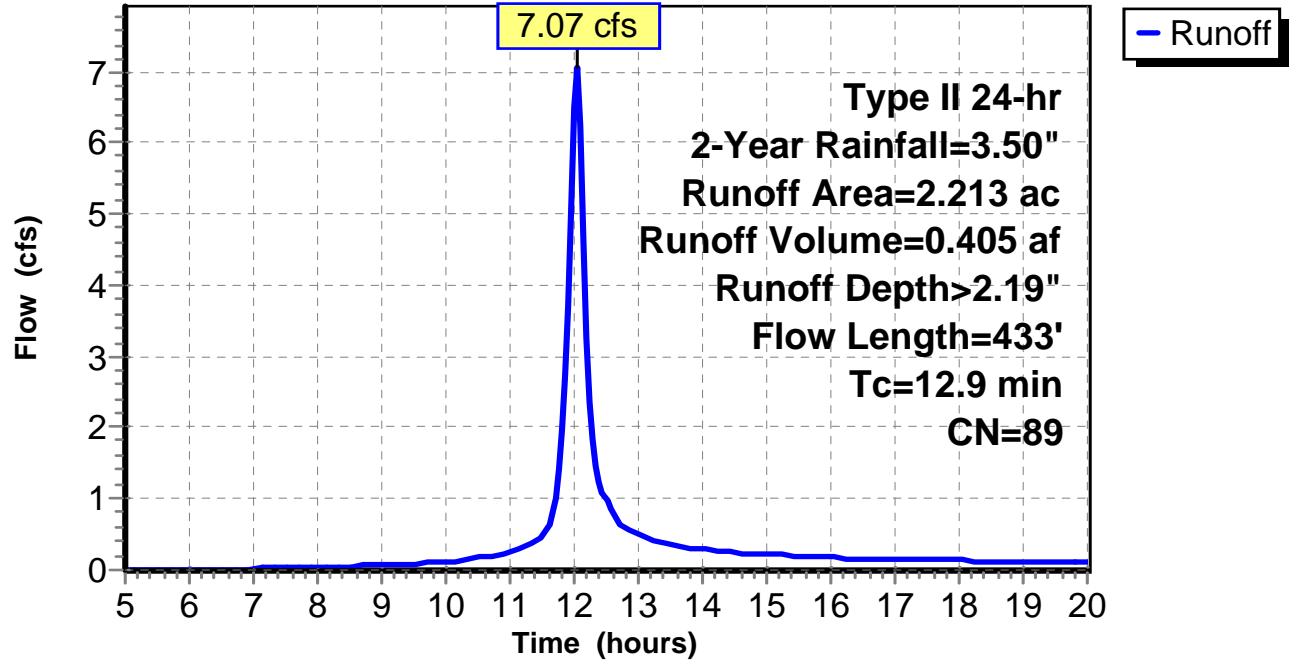
Subcatchment 1: C E-303.001

Hydrograph



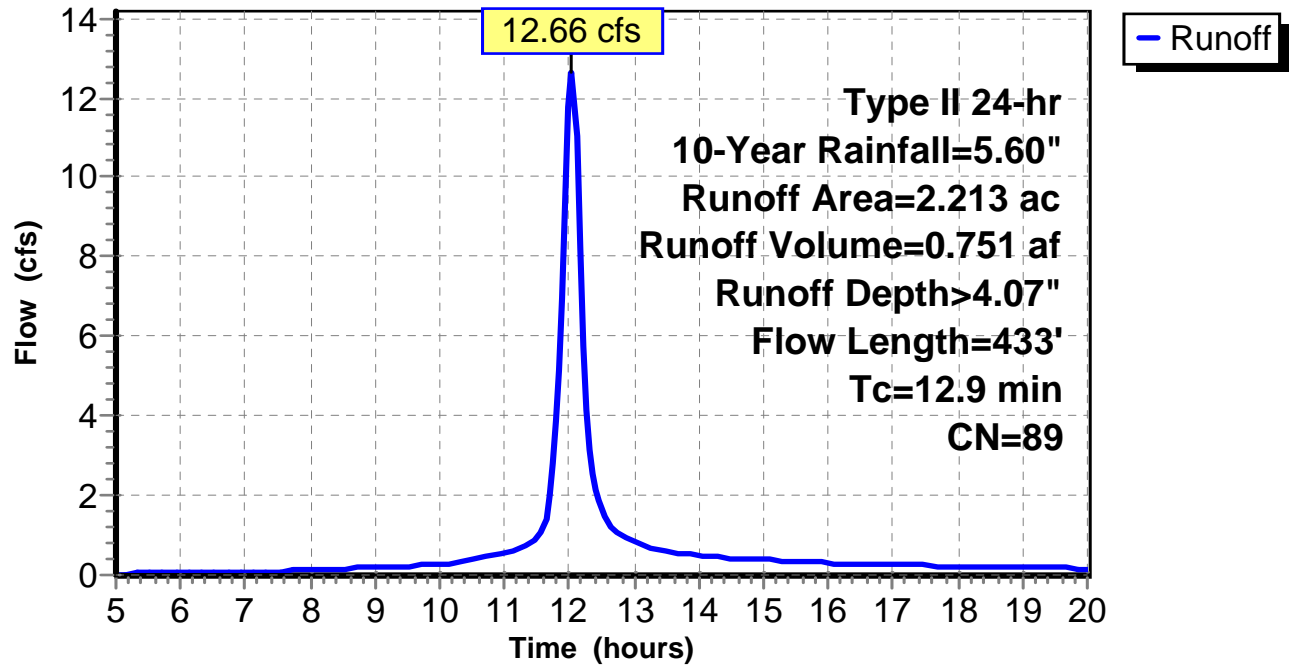
Subcatchment 1: C E-303.001

Hydrograph



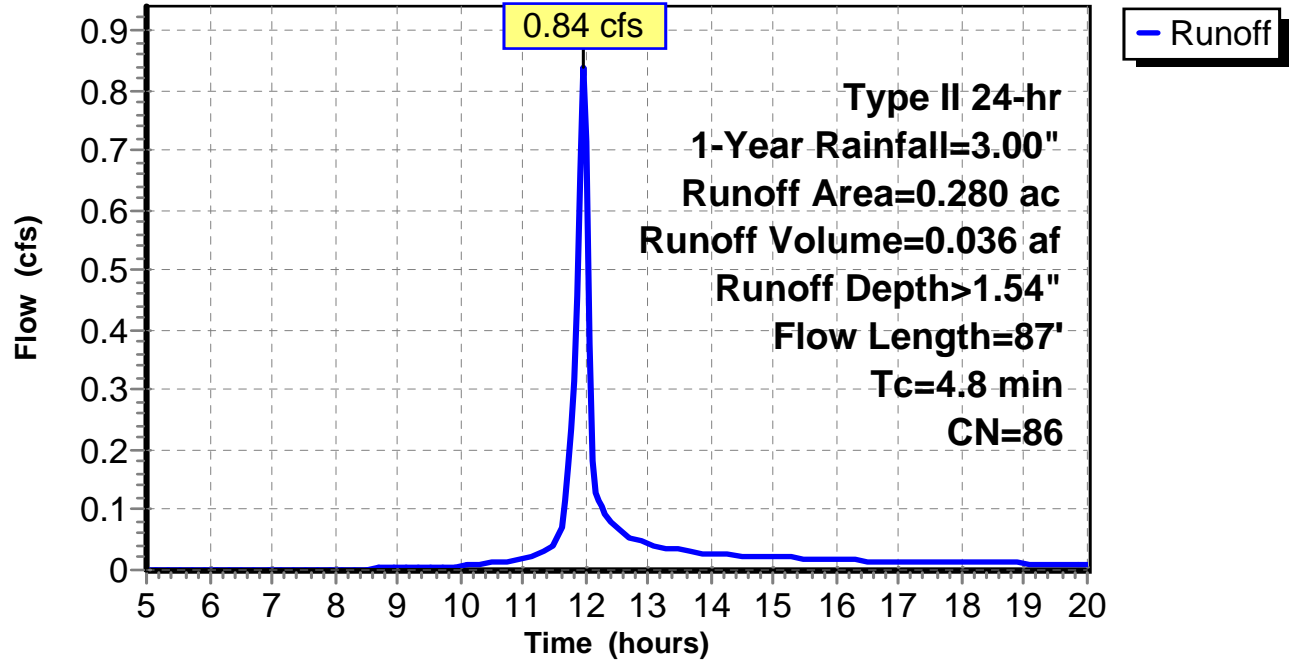
Subcatchment 1: C E-303.001

Hydrograph



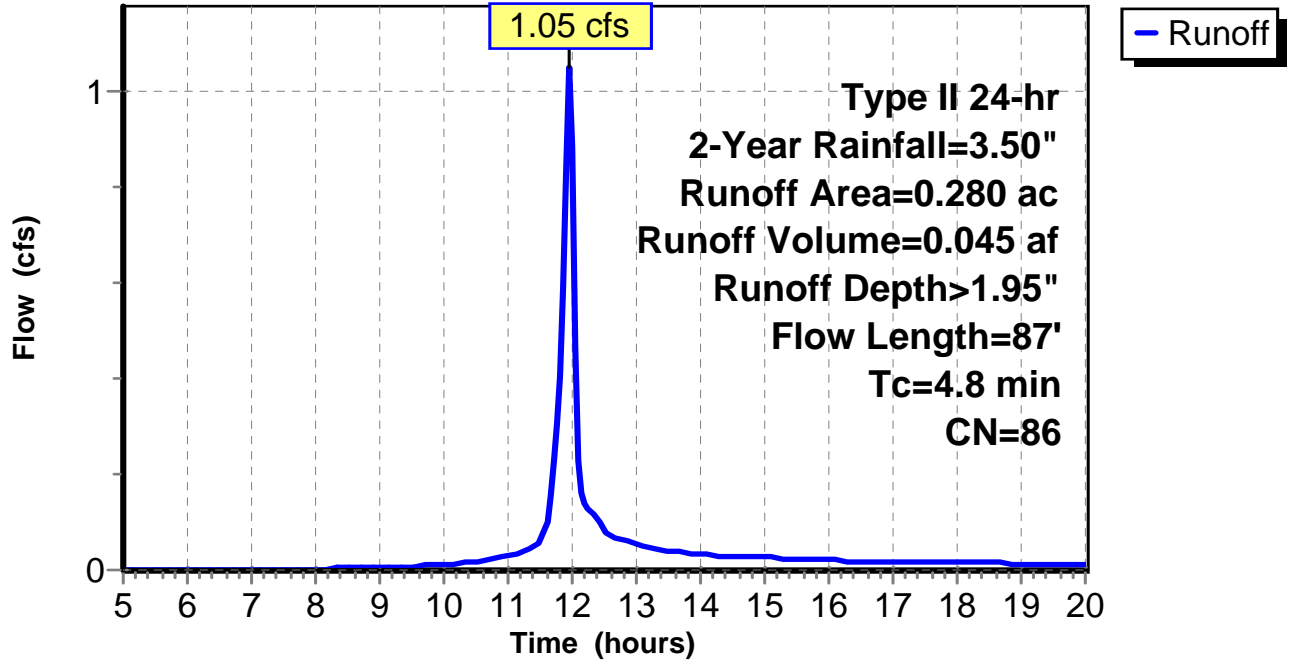
Subcatchment 1: C E-303.002

Hydrograph



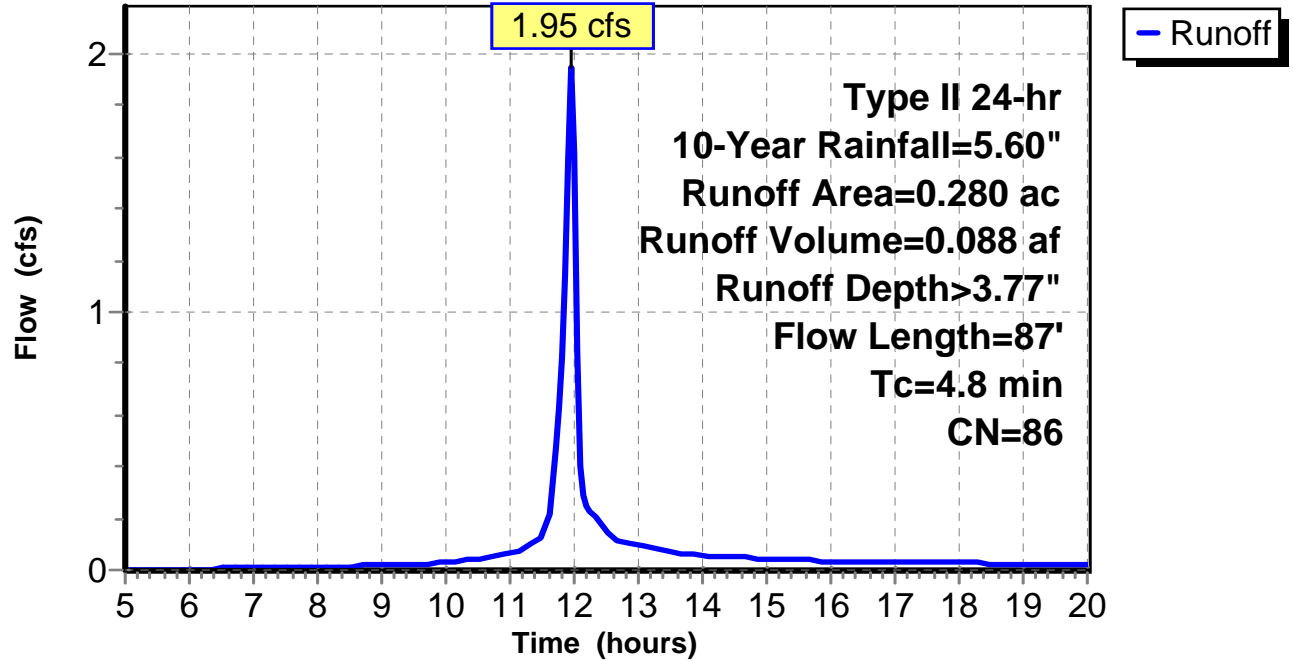
Subcatchment 1: C E-303.002

Hydrograph



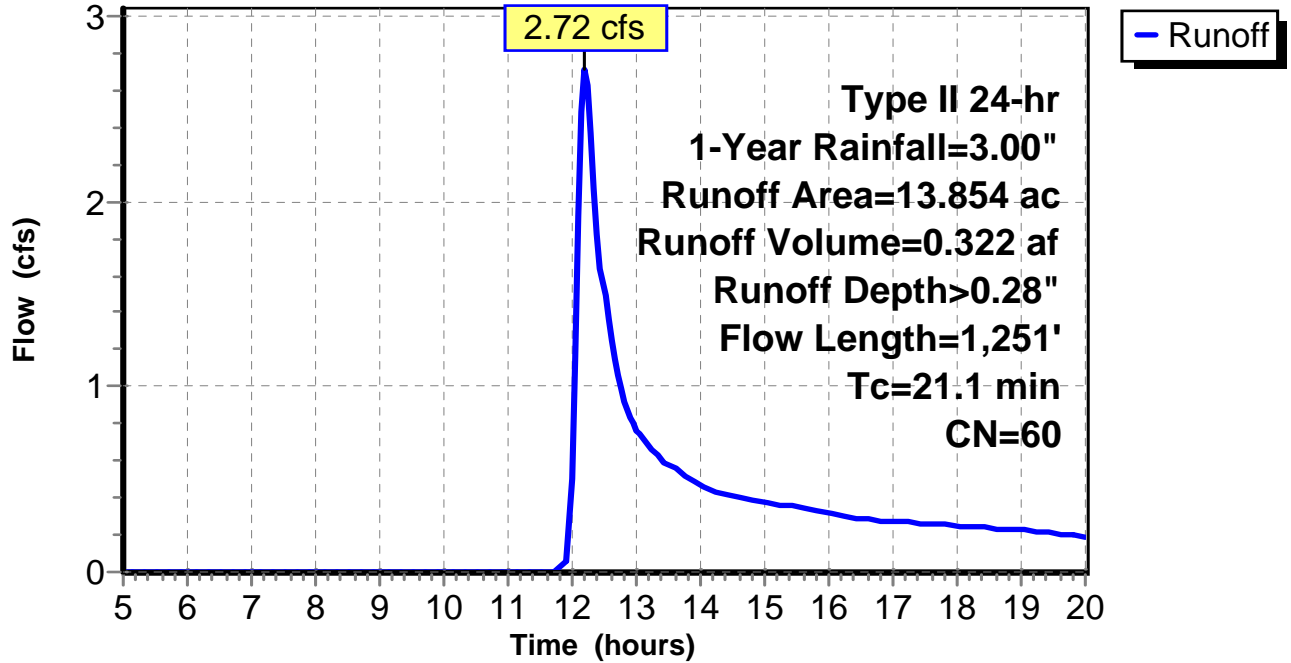
Subcatchment 1: C E-303.002

Hydrograph



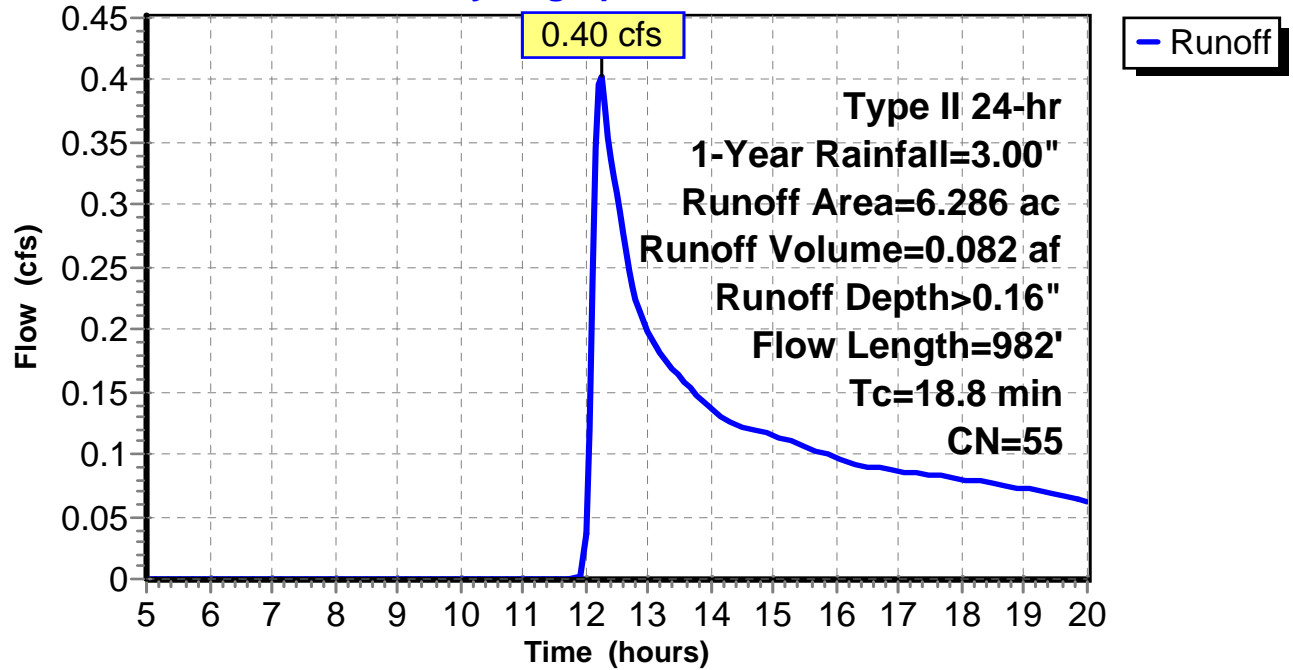
Subcatchment 1: C AR-705.001

Hydrograph



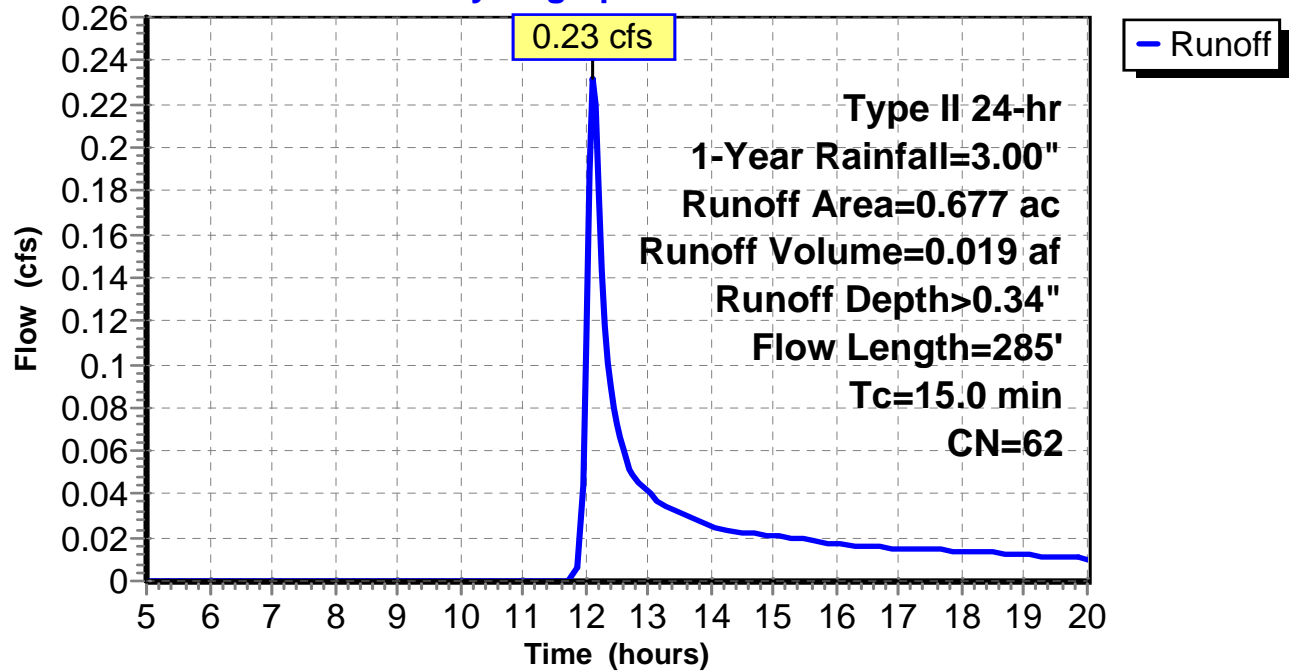
Subcatchment 2: C AR-705.002

Hydrograph



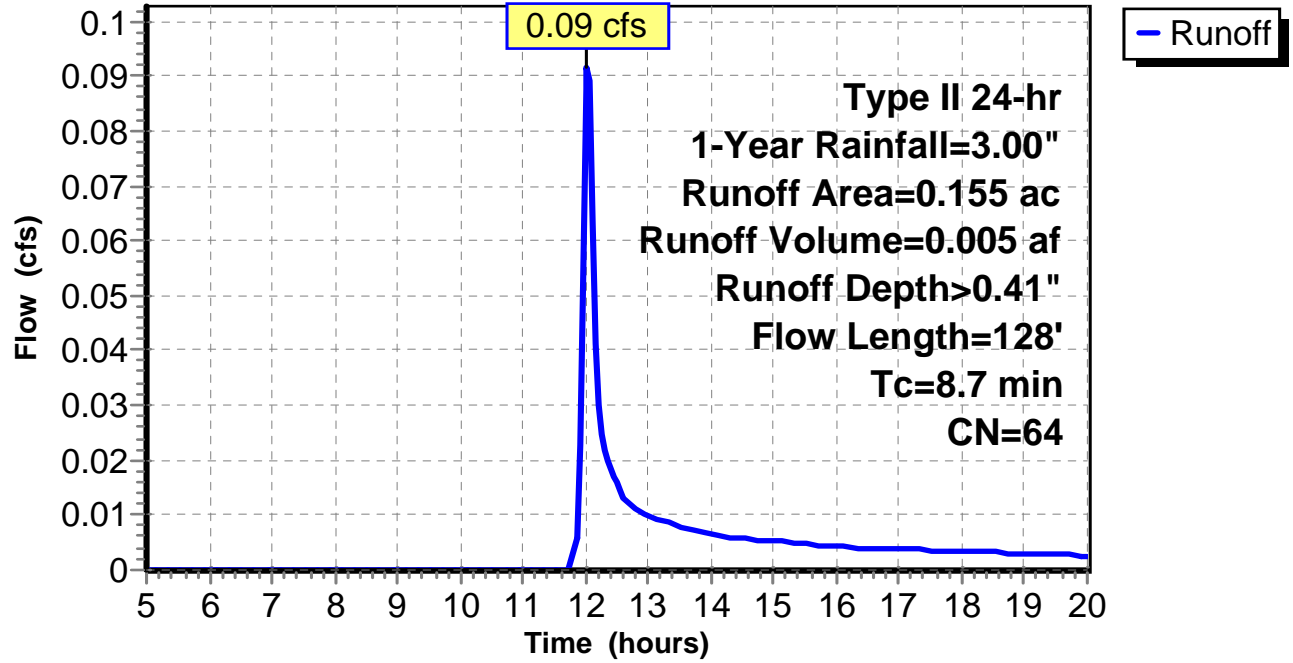
Subcatchment 3: C AR-705.003

Hydrograph



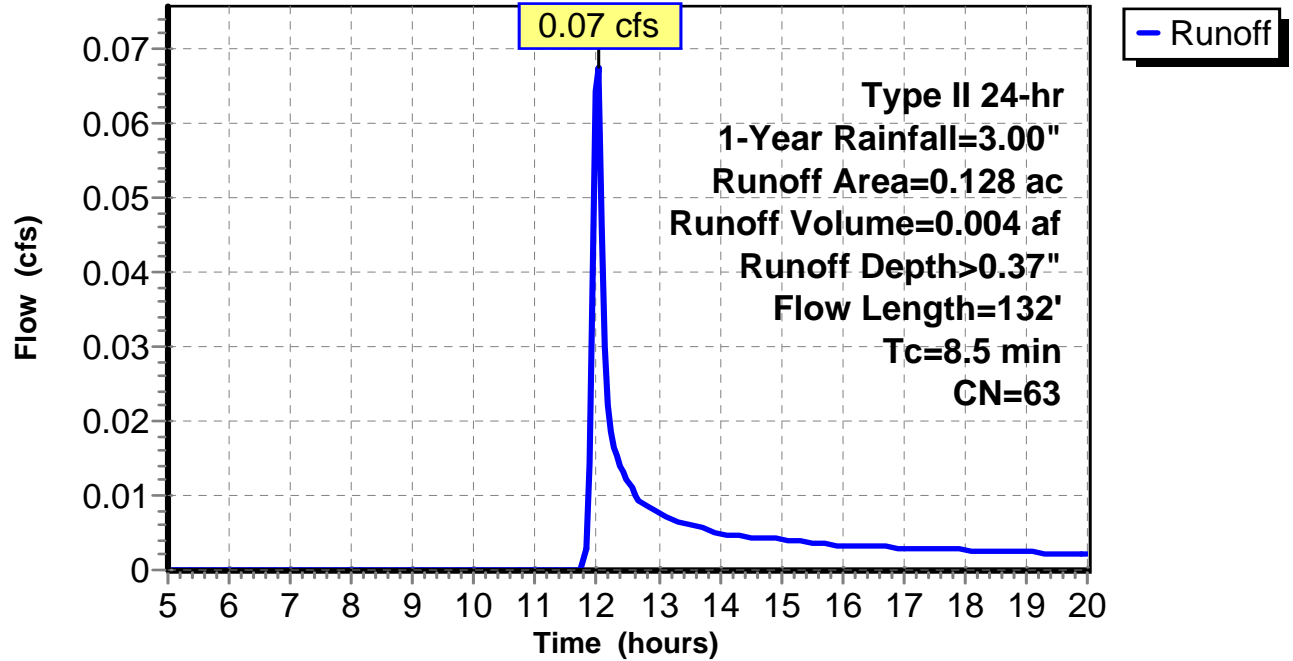
Subcatchment 4: C AR-705.004

Hydrograph



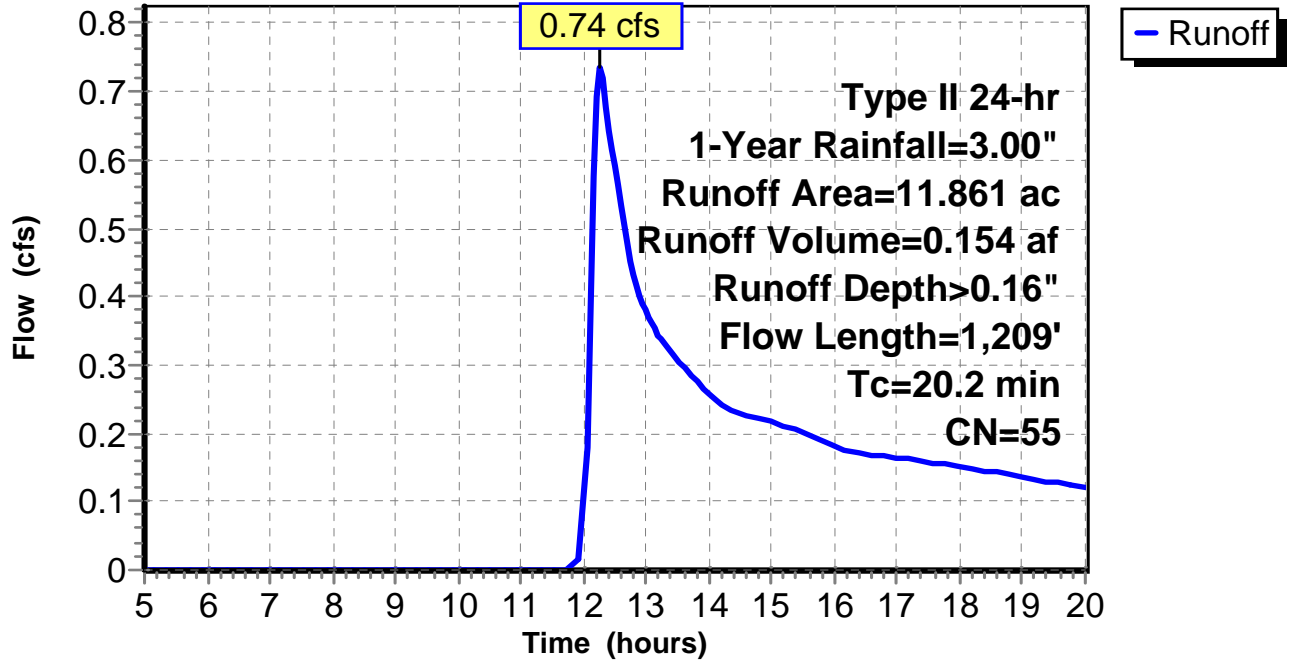
Subcatchment 5: C AR-705.005

Hydrograph



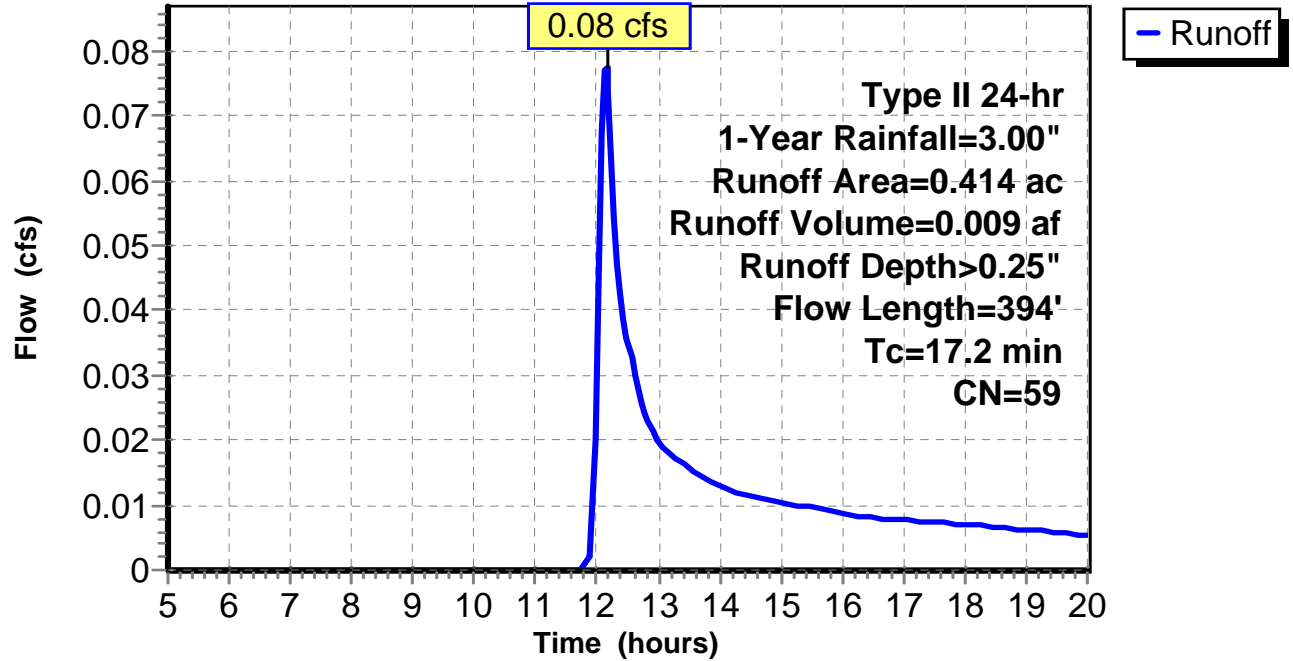
Subcatchment 6: C AR-705.006

Hydrograph



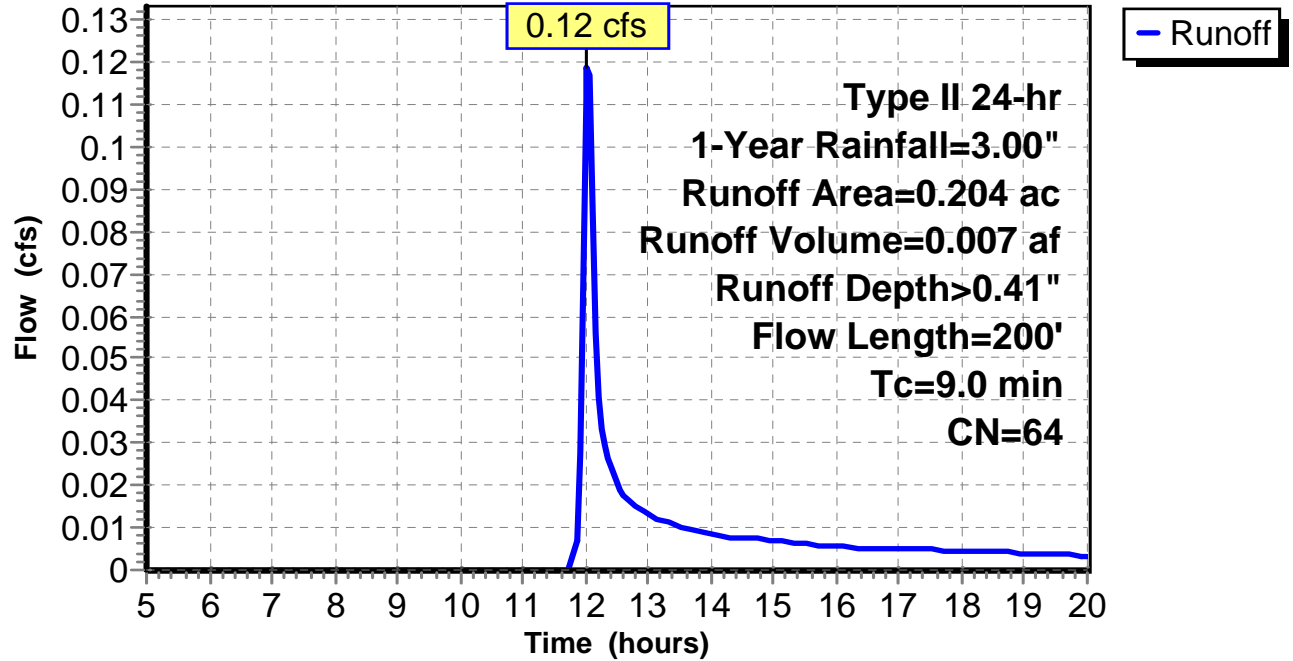
Subcatchment 7: C AR-705.007

Hydrograph



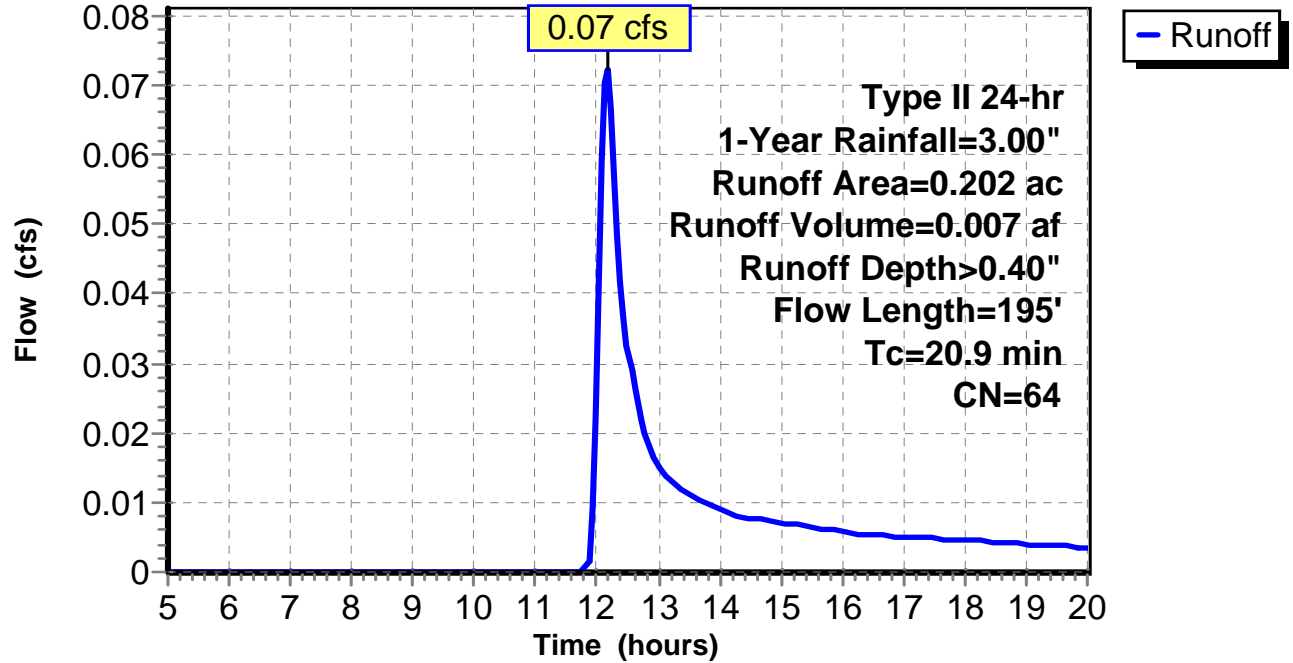
Subcatchment 8: C 307.001

Hydrograph



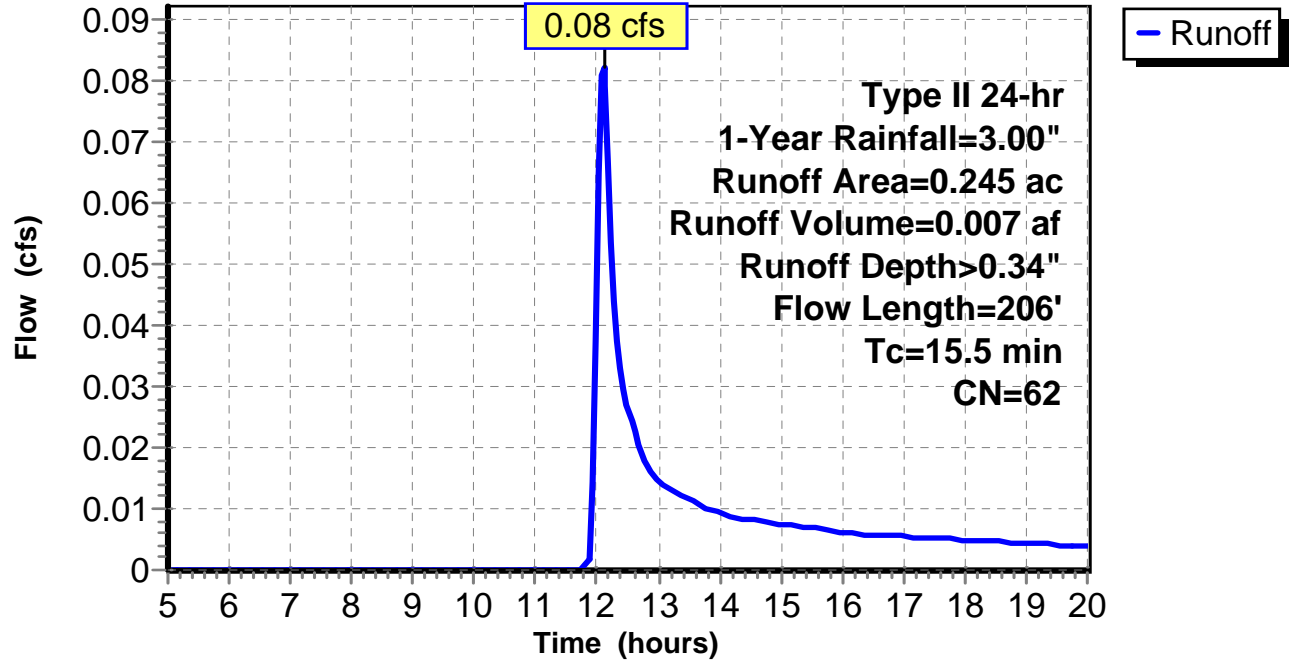
Subcatchment 9: C 307.002

Hydrograph



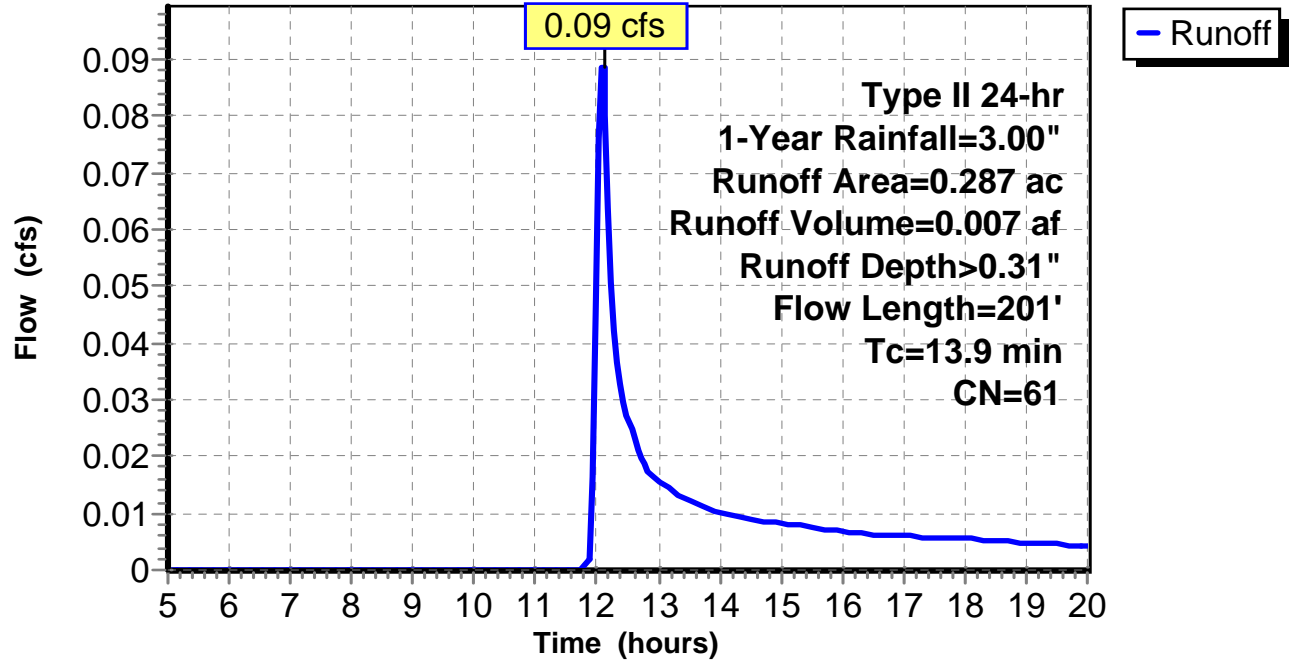
Subcatchment 10: C 307.003

Hydrograph



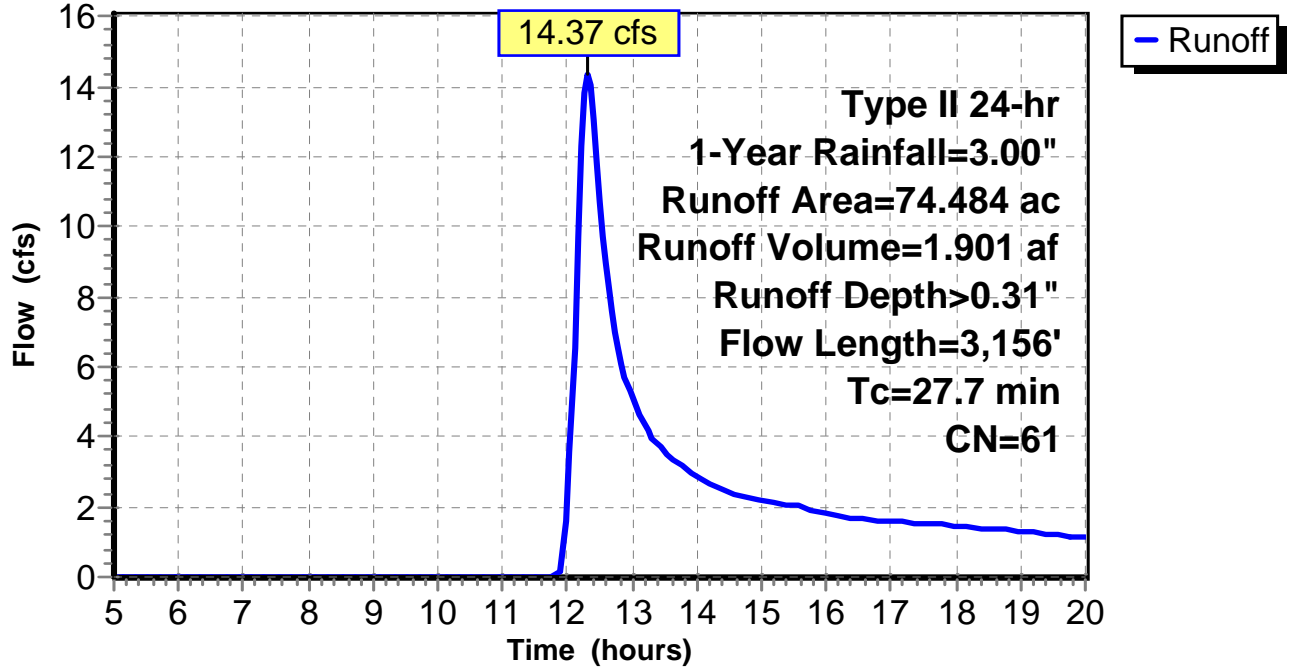
Subcatchment 11: C 307.004

Hydrograph



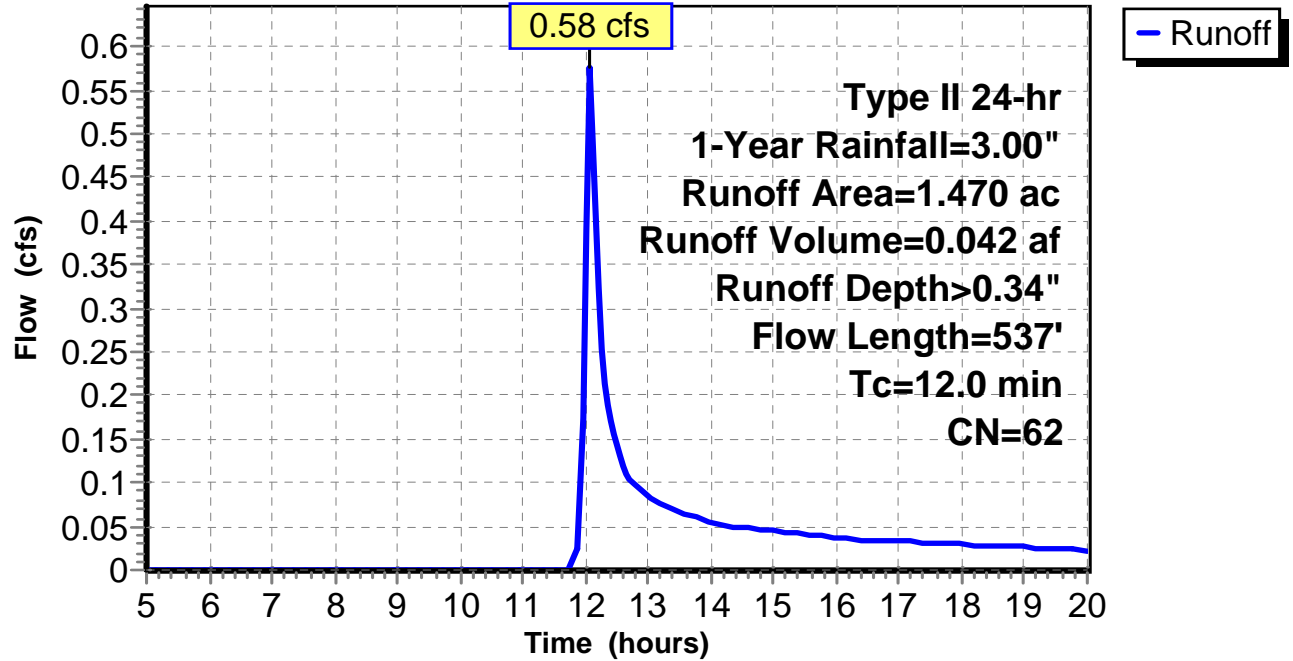
Subcatchment 12: C 307.005

Hydrograph



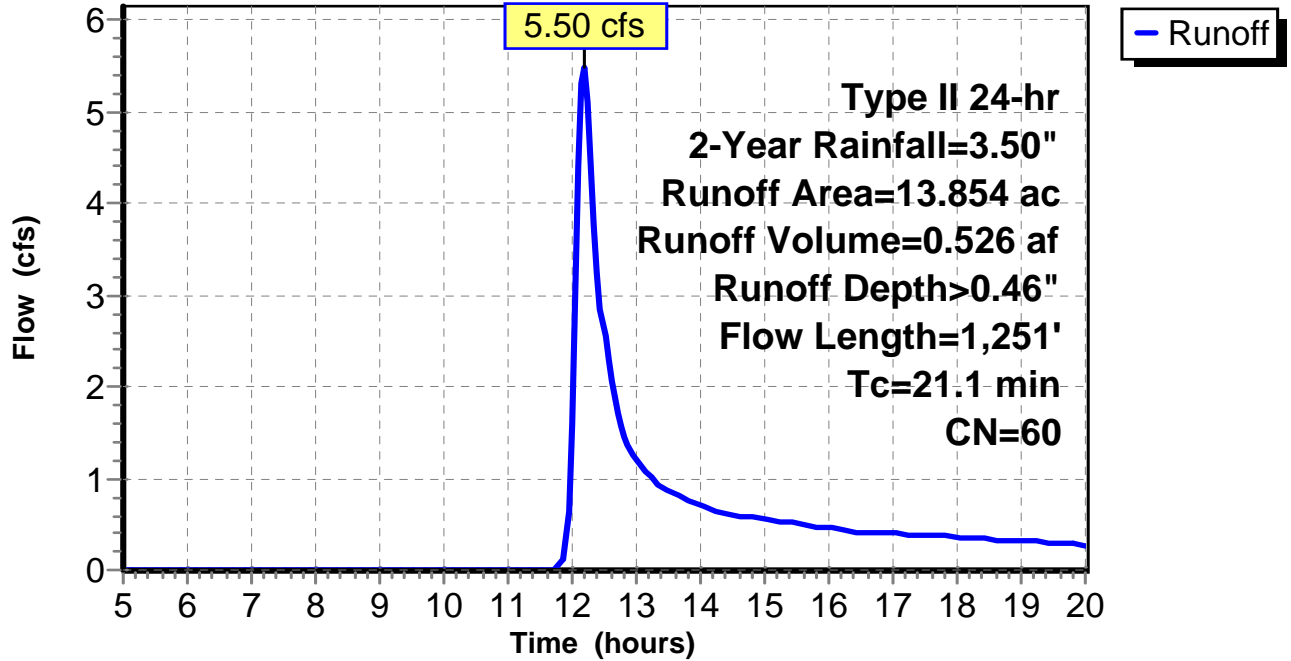
Subcatchment 13: C 307.006

Hydrograph



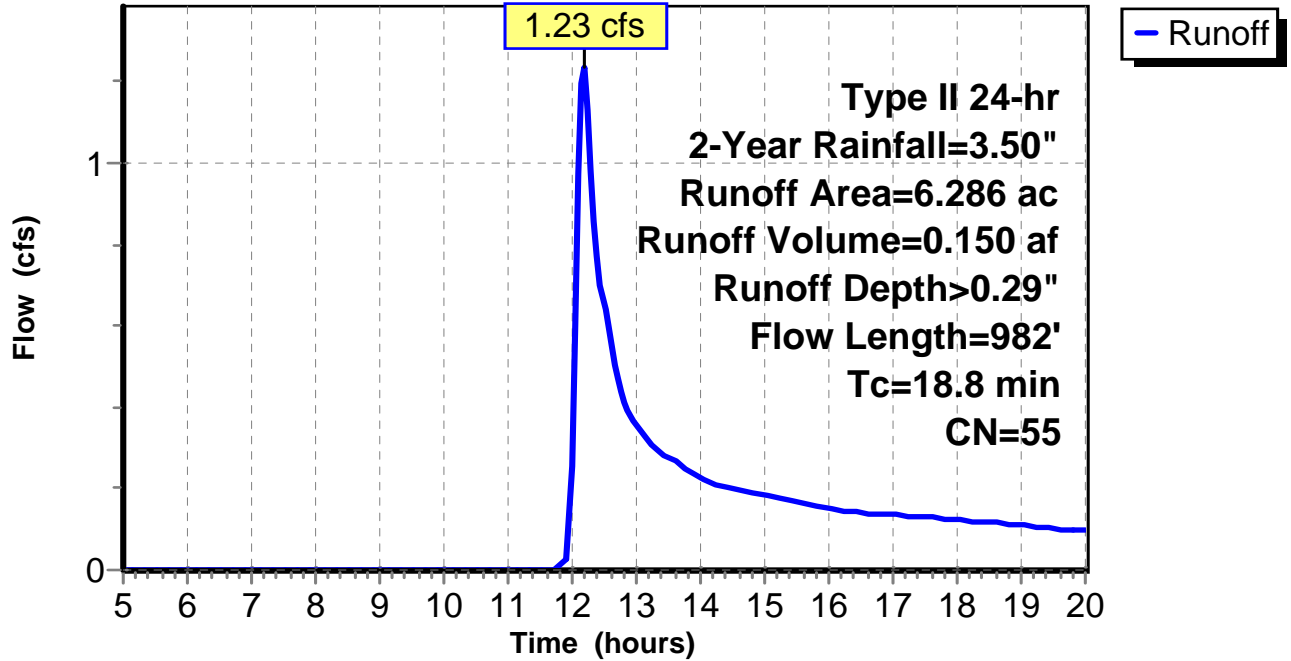
Subcatchment 1: C AR-705.001

Hydrograph



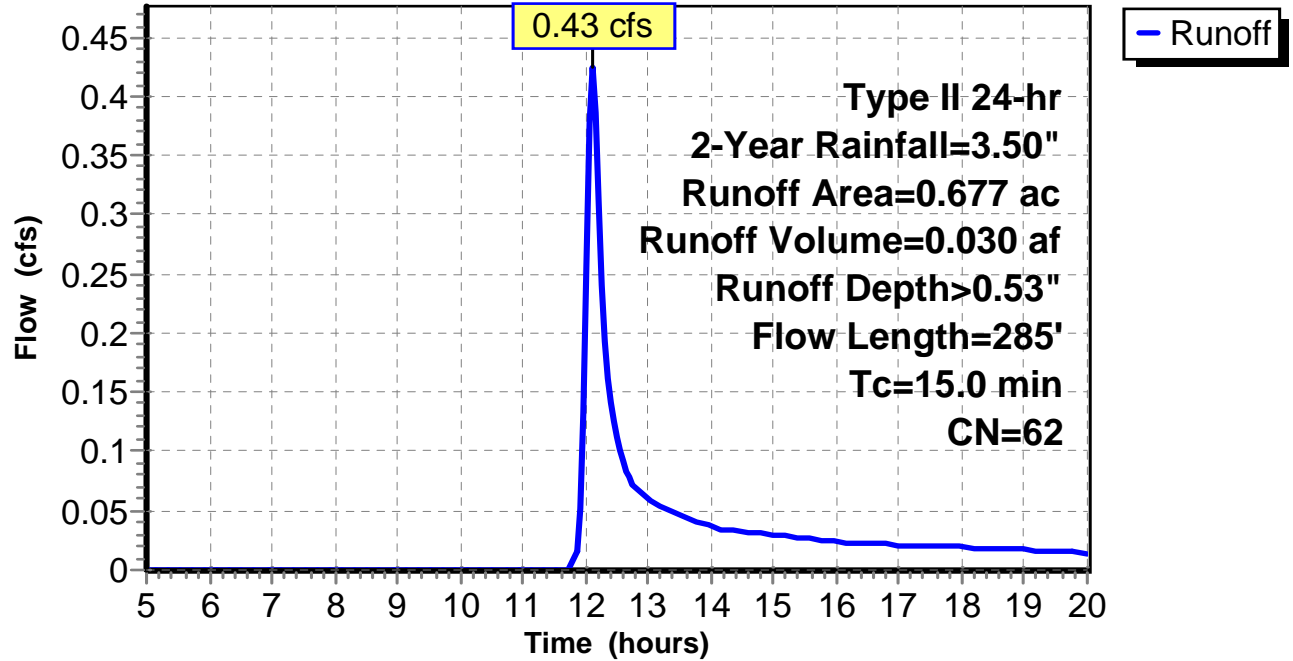
Subcatchment 2: C AR-705.002

Hydrograph



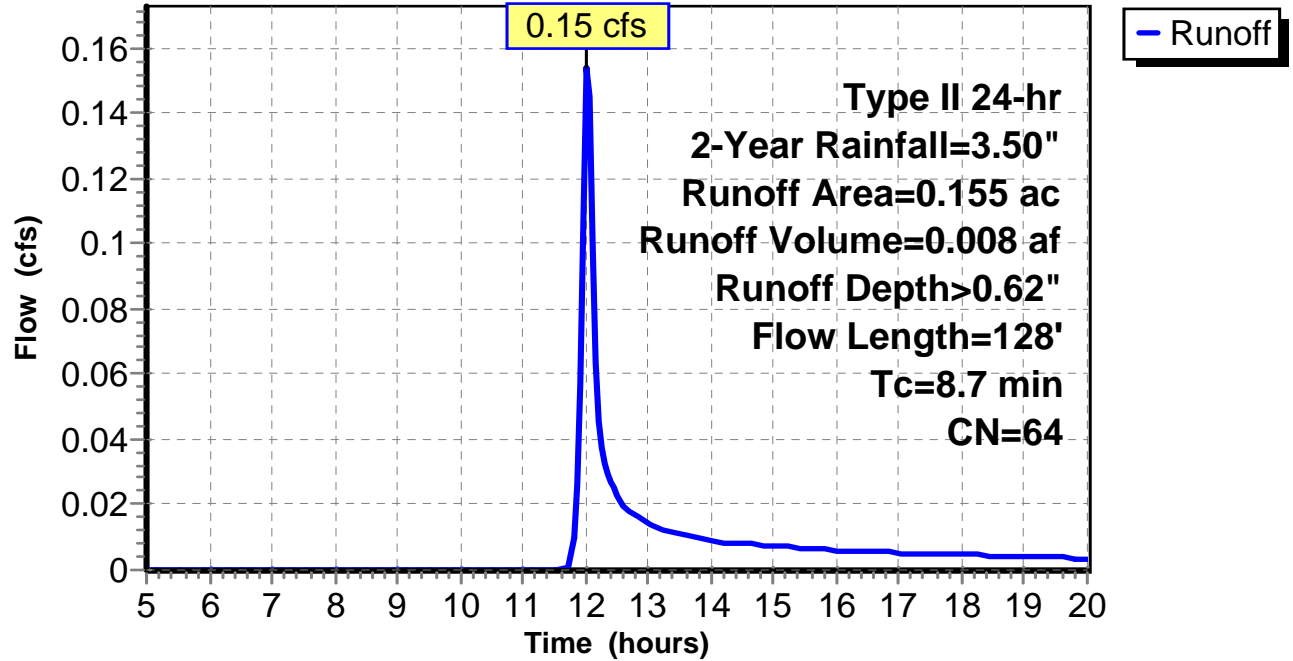
Subcatchment 3: C AR-705.003

Hydrograph



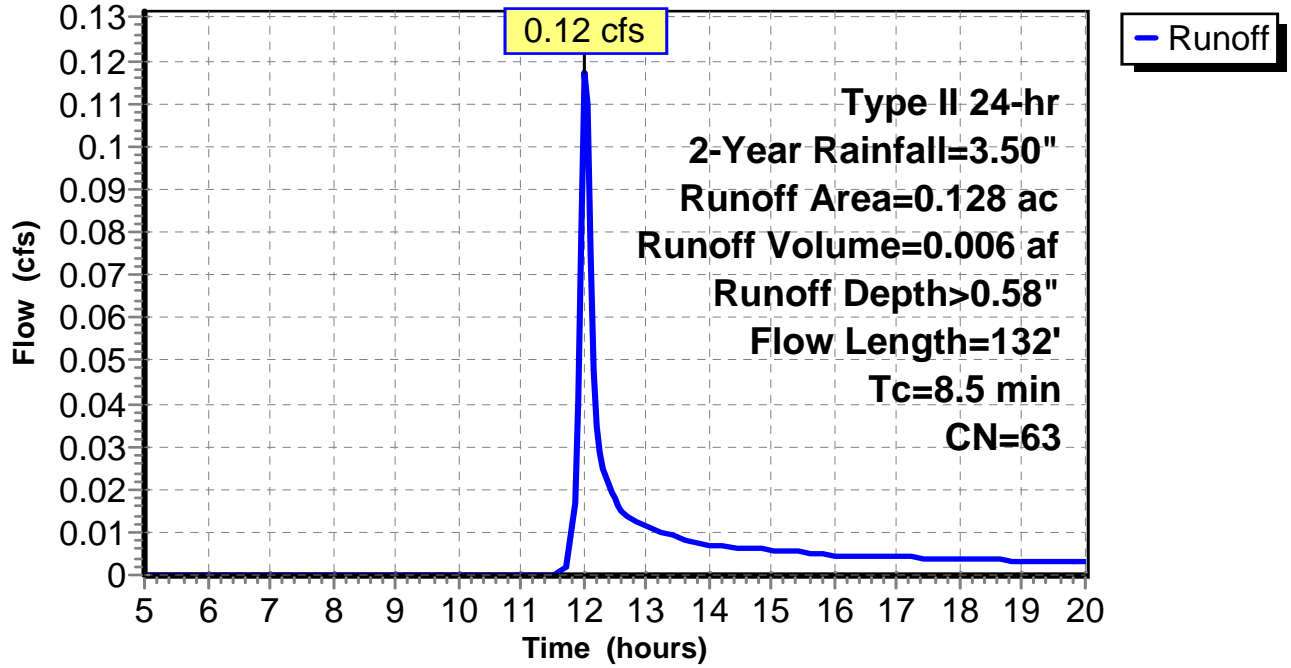
Subcatchment 4: C AR-705.004

Hydrograph



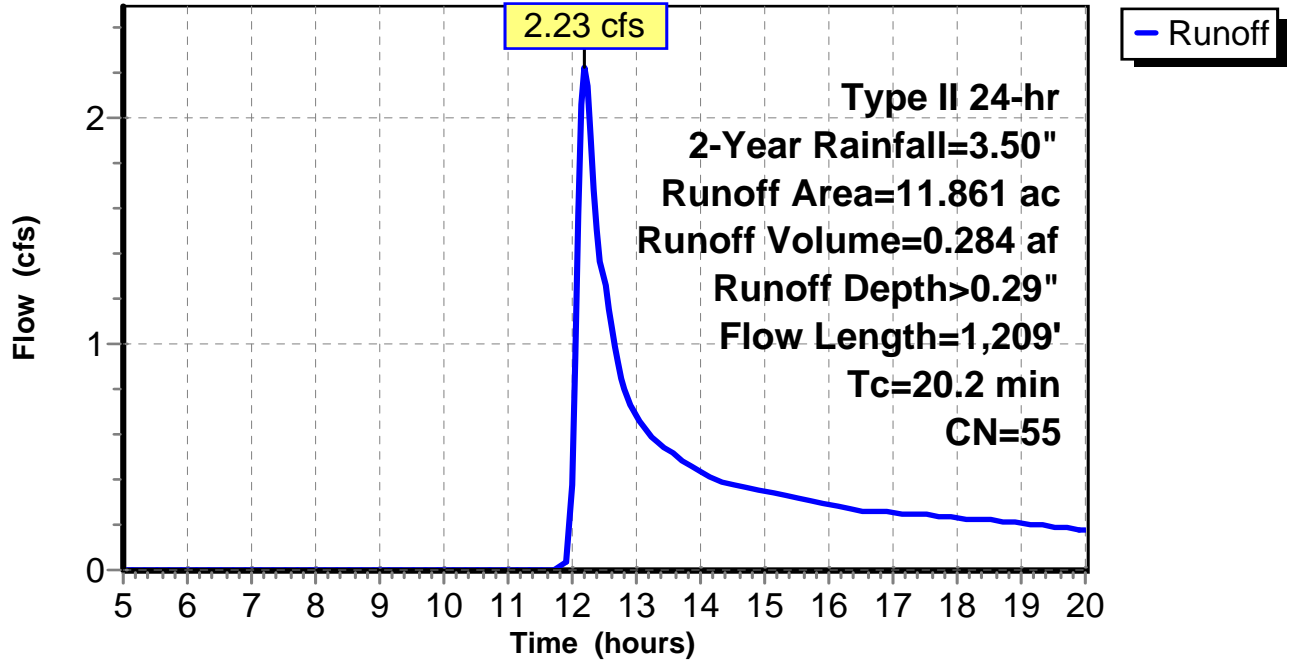
Subcatchment 5: C AR-705.005

Hydrograph



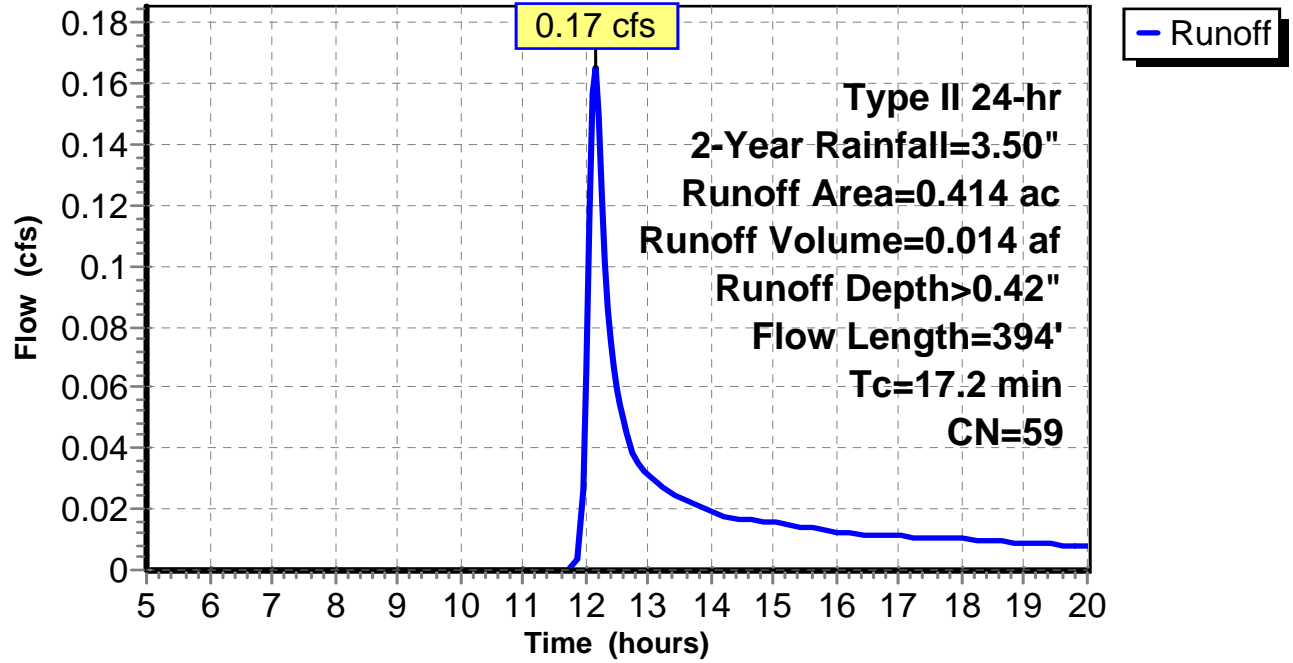
Subcatchment 6: C AR-705.006

Hydrograph



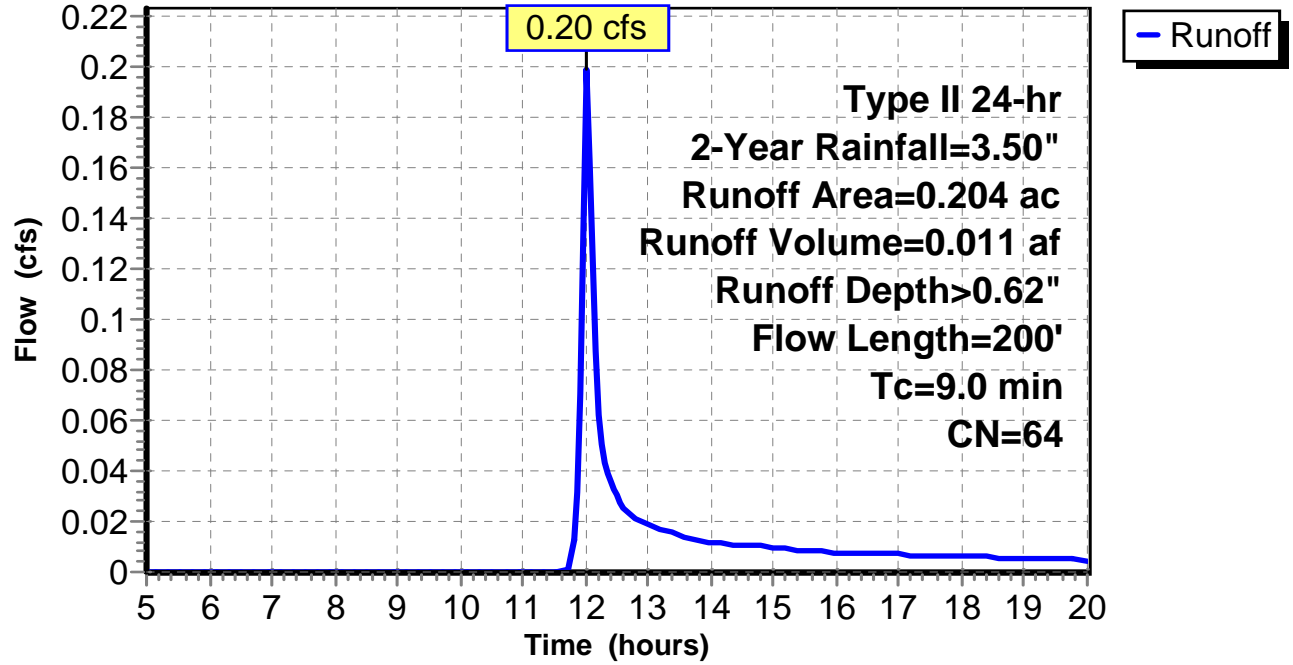
Subcatchment 7: C AR-705.007

Hydrograph



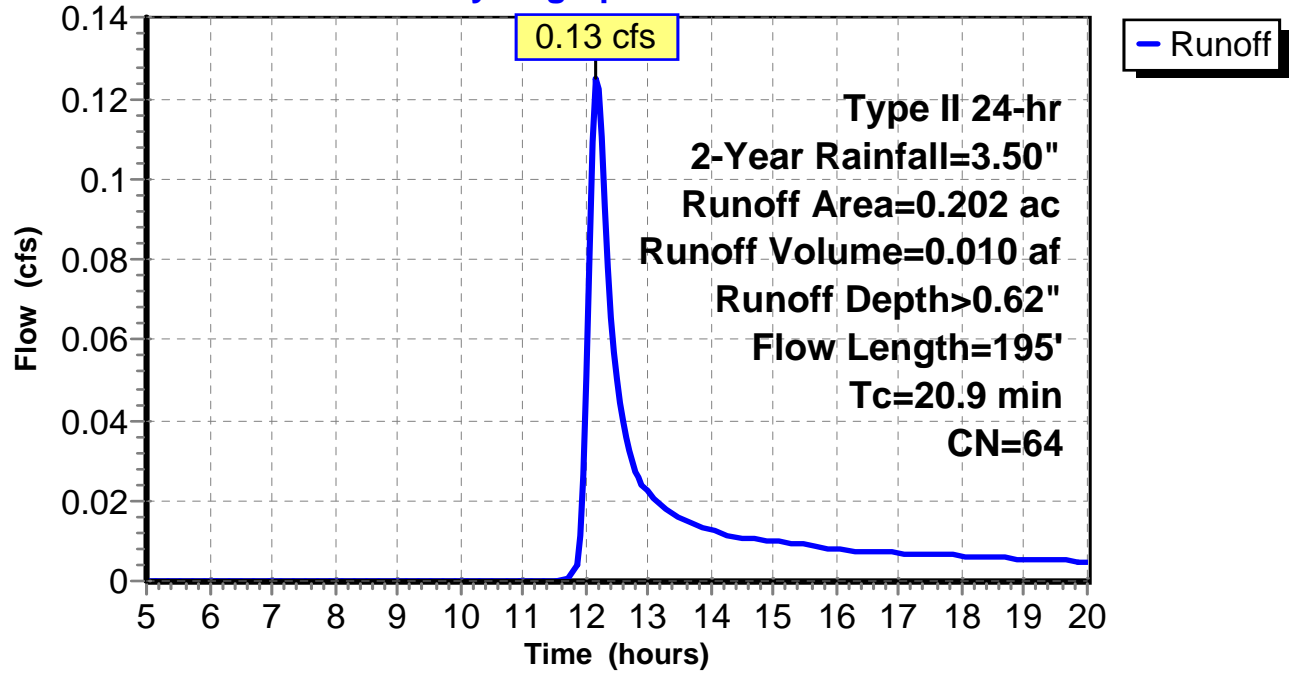
Subcatchment 8: C 307.001

Hydrograph



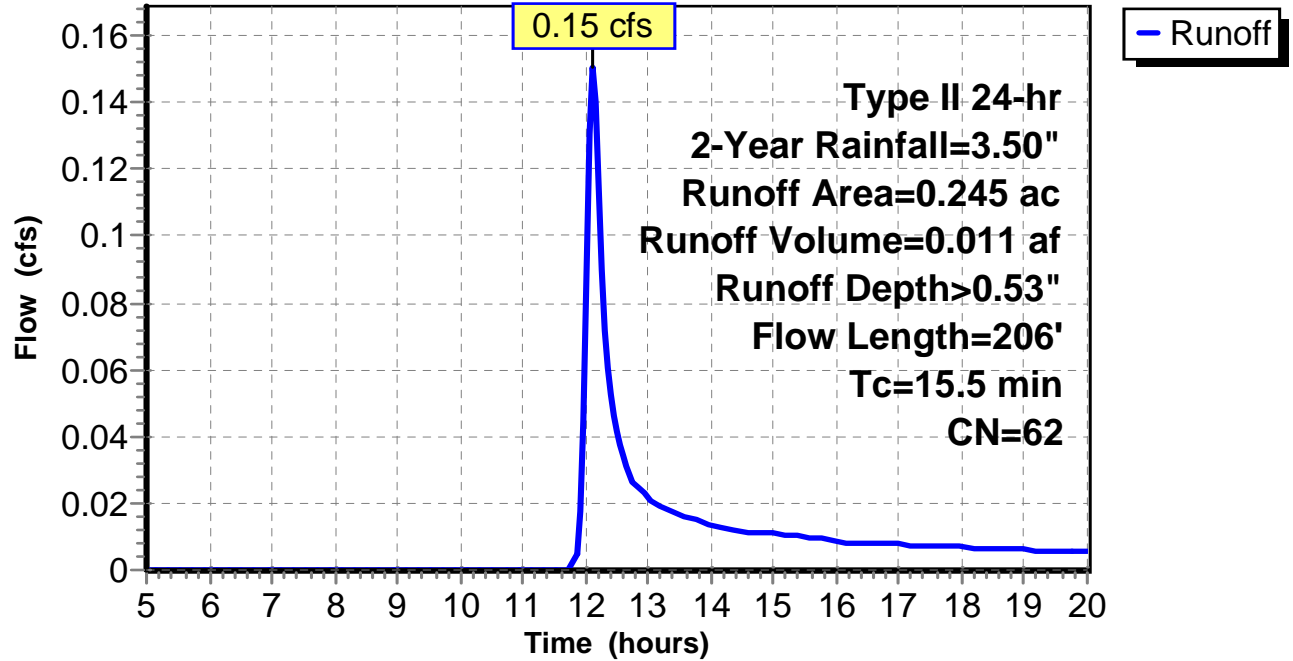
Subcatchment 9: C 307.002

Hydrograph



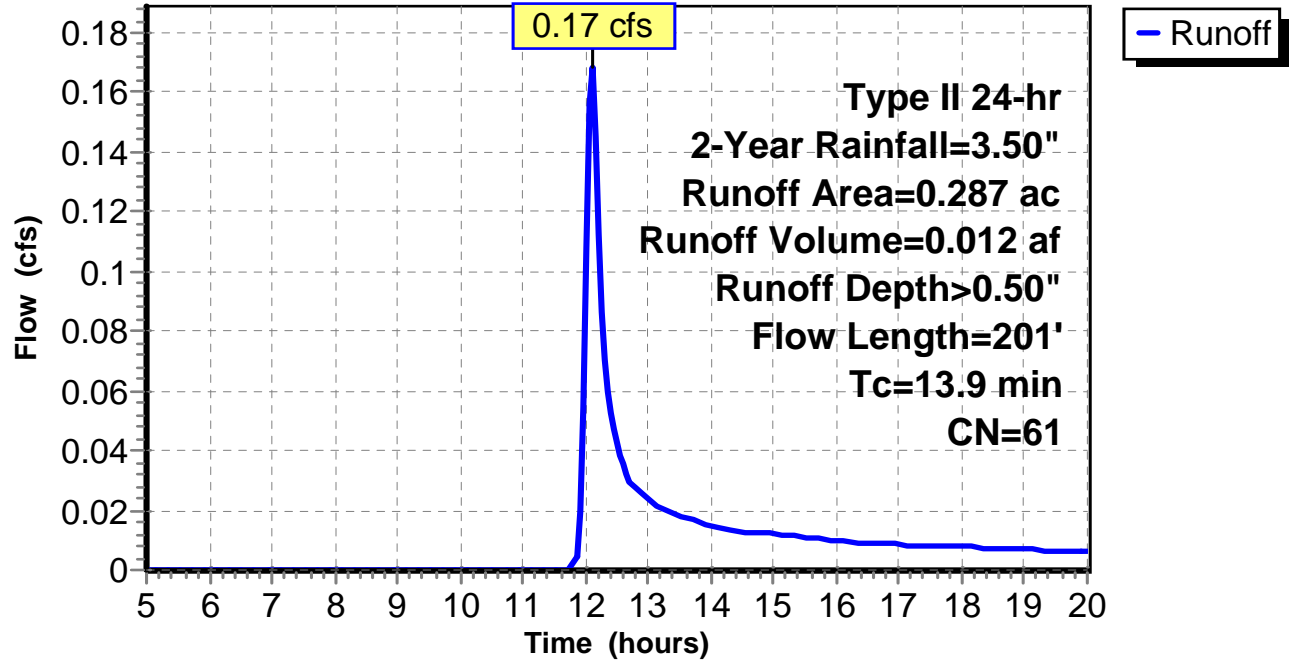
Subcatchment 10: C 307.003

Hydrograph



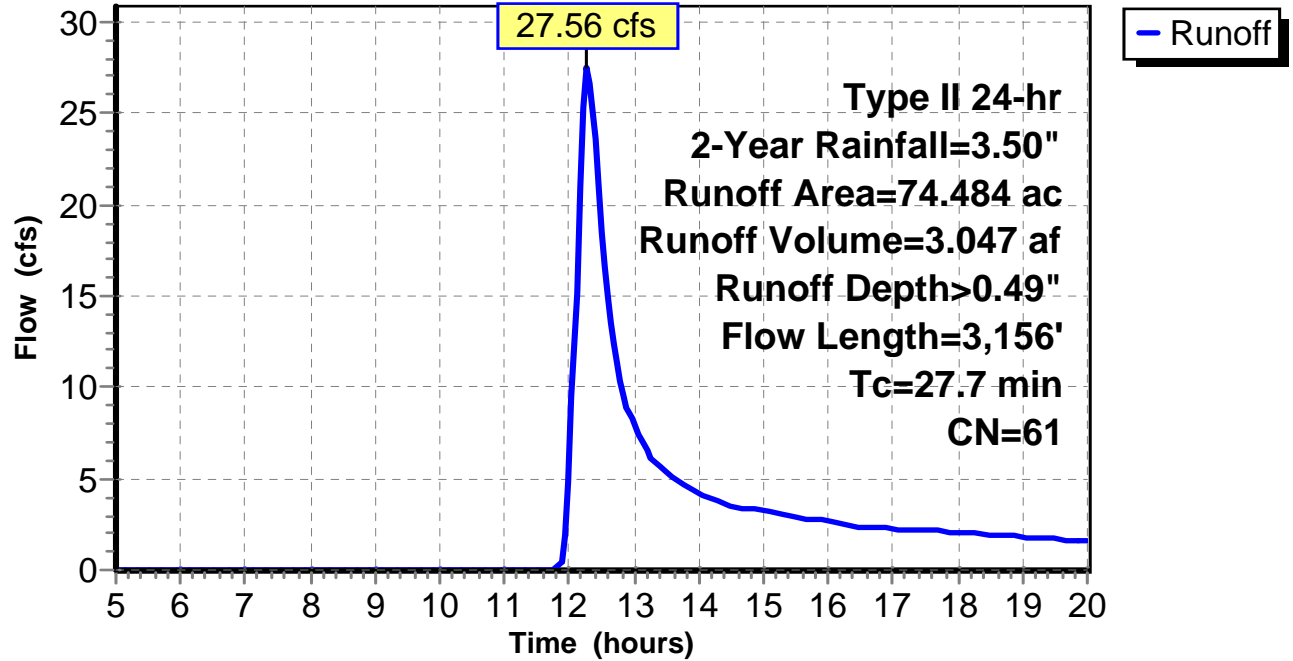
Subcatchment 11: C 307.004

Hydrograph



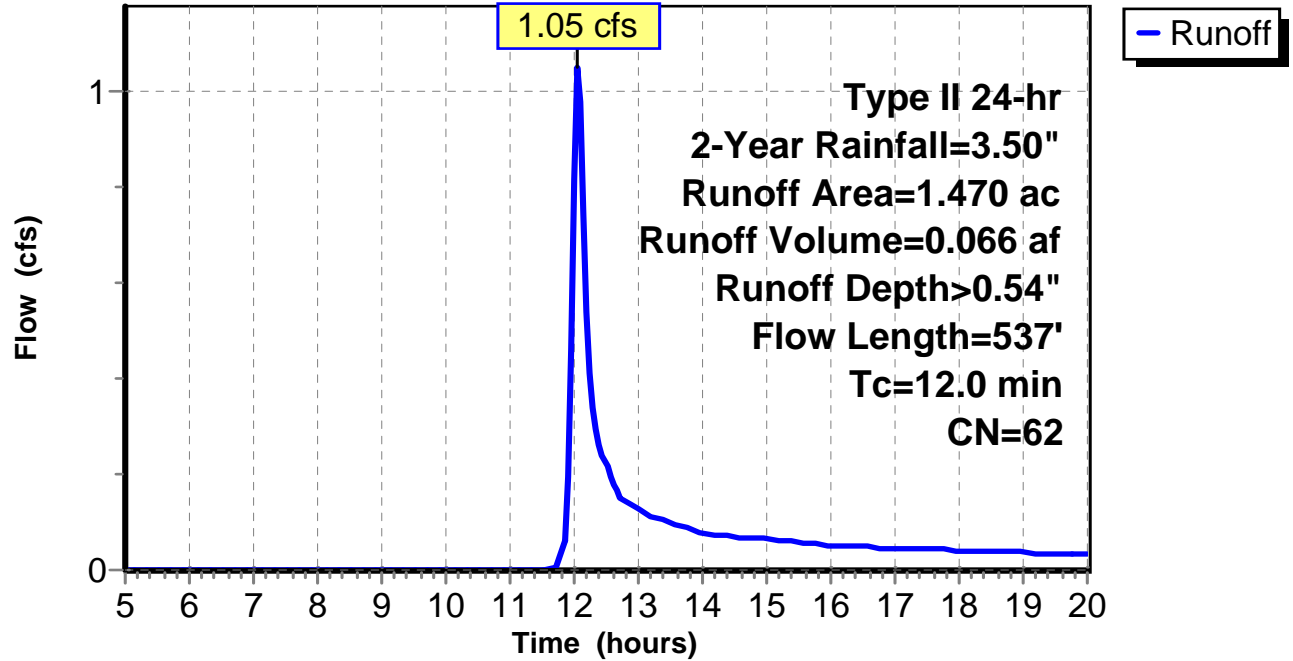
Subcatchment 12: C 307.005

Hydrograph



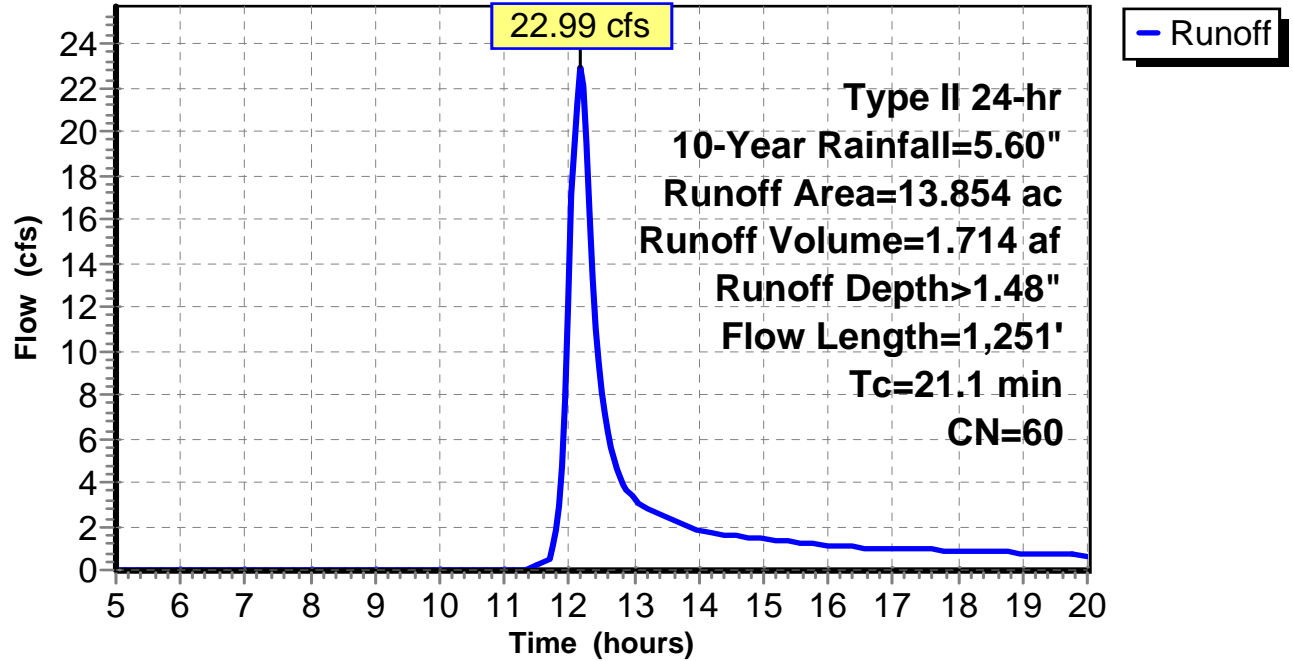
Subcatchment 13: C 307.006

Hydrograph



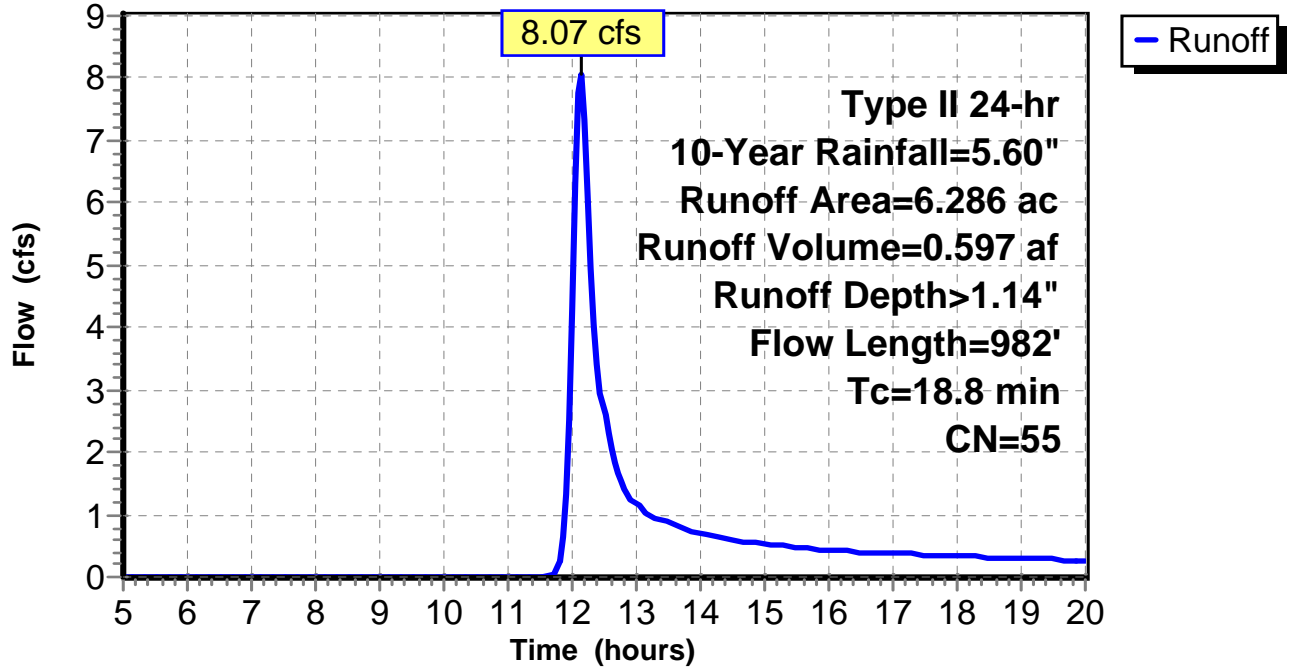
Subcatchment 1: C AR-705.001

Hydrograph



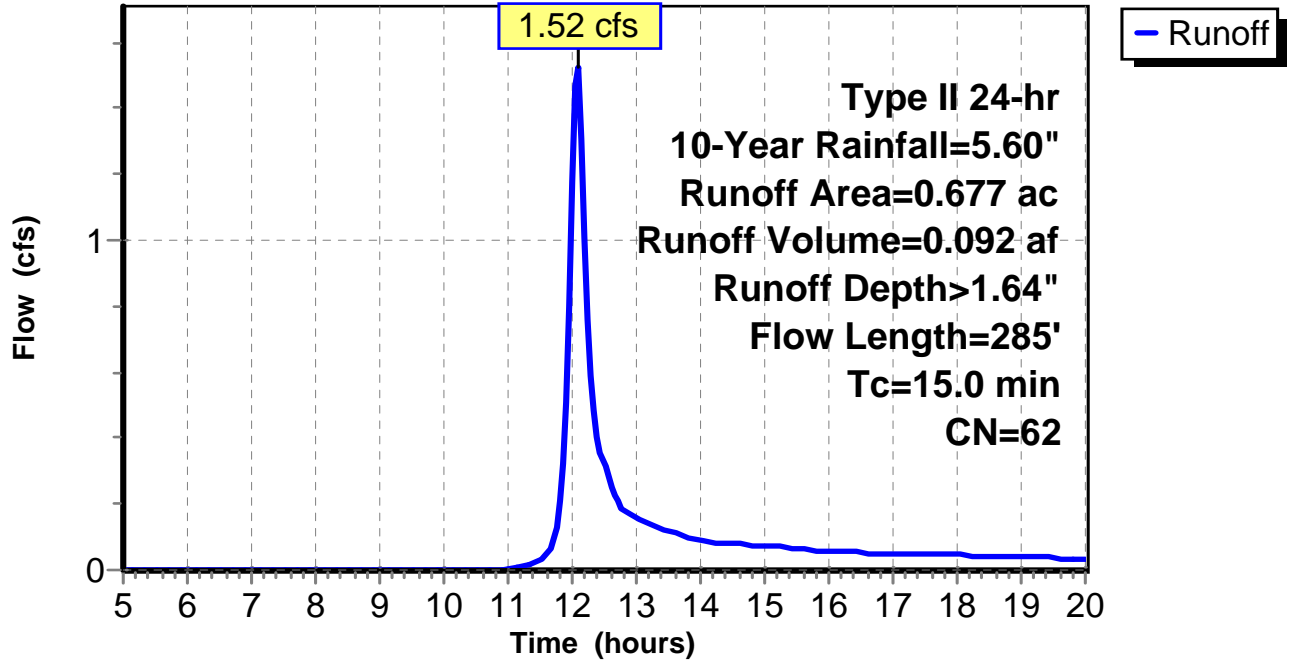
Subcatchment 2: C AR-705.002

Hydrograph



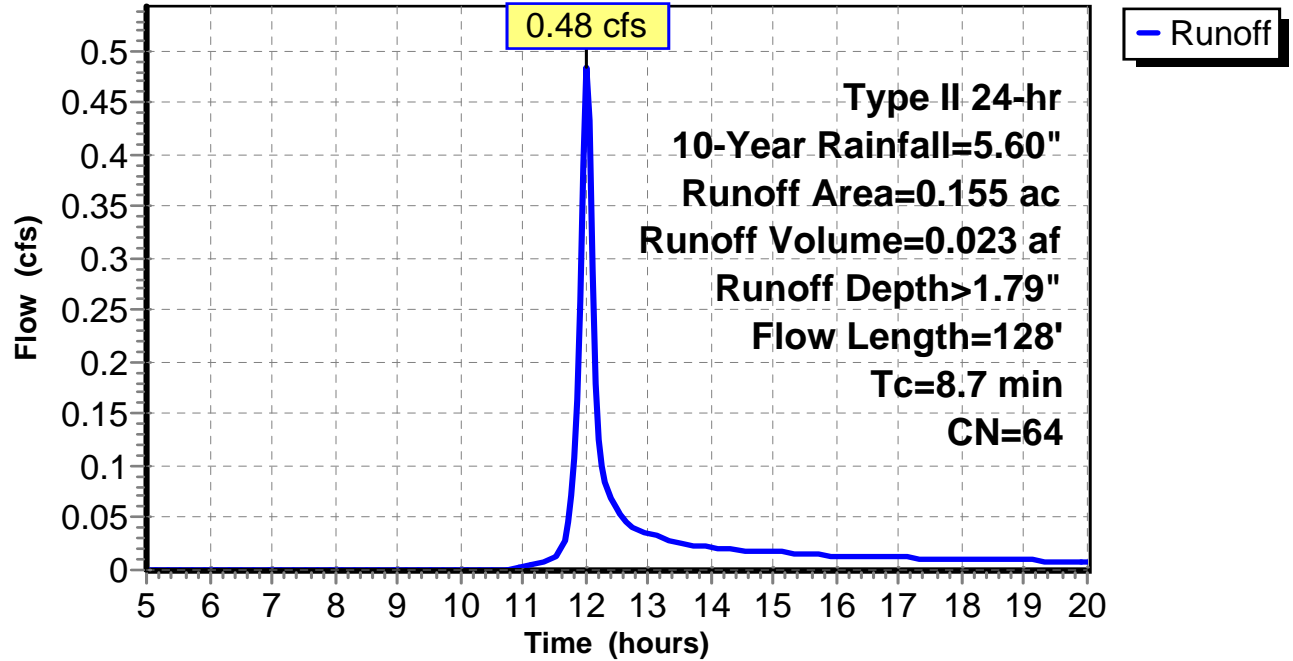
Subcatchment 3: C AR-705.003

Hydrograph



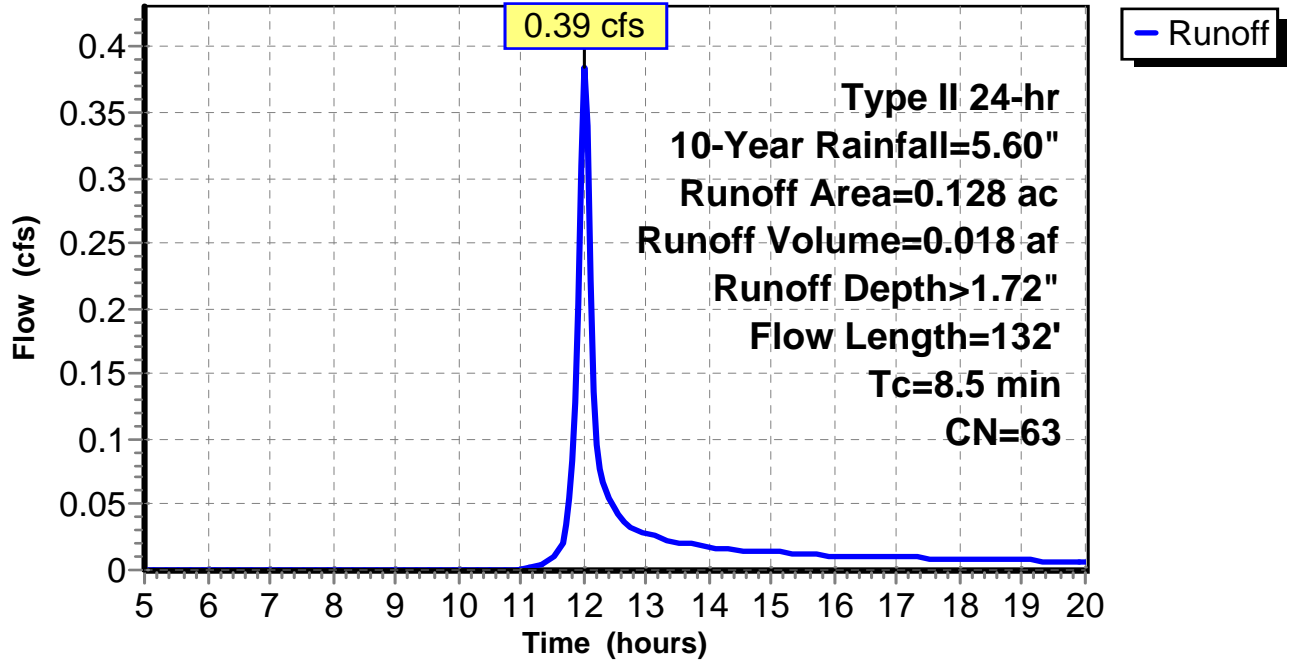
Subcatchment 4: C AR-705.004

Hydrograph



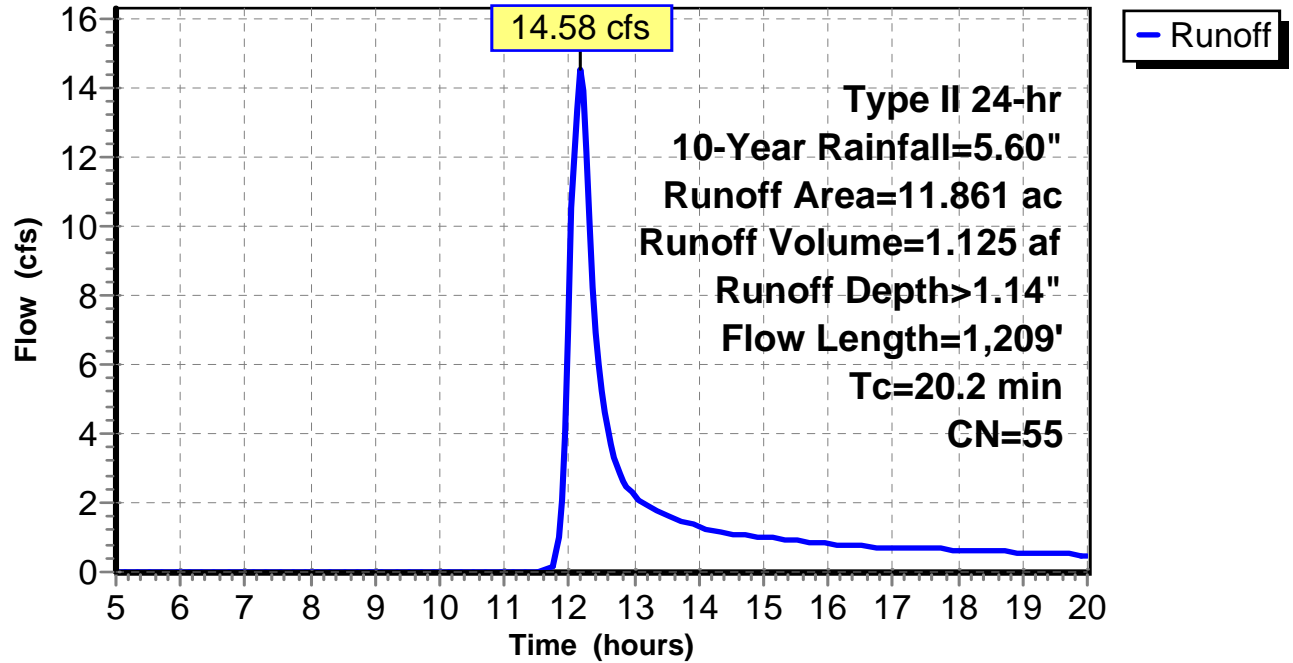
Subcatchment 5: C AR-705.005

Hydrograph



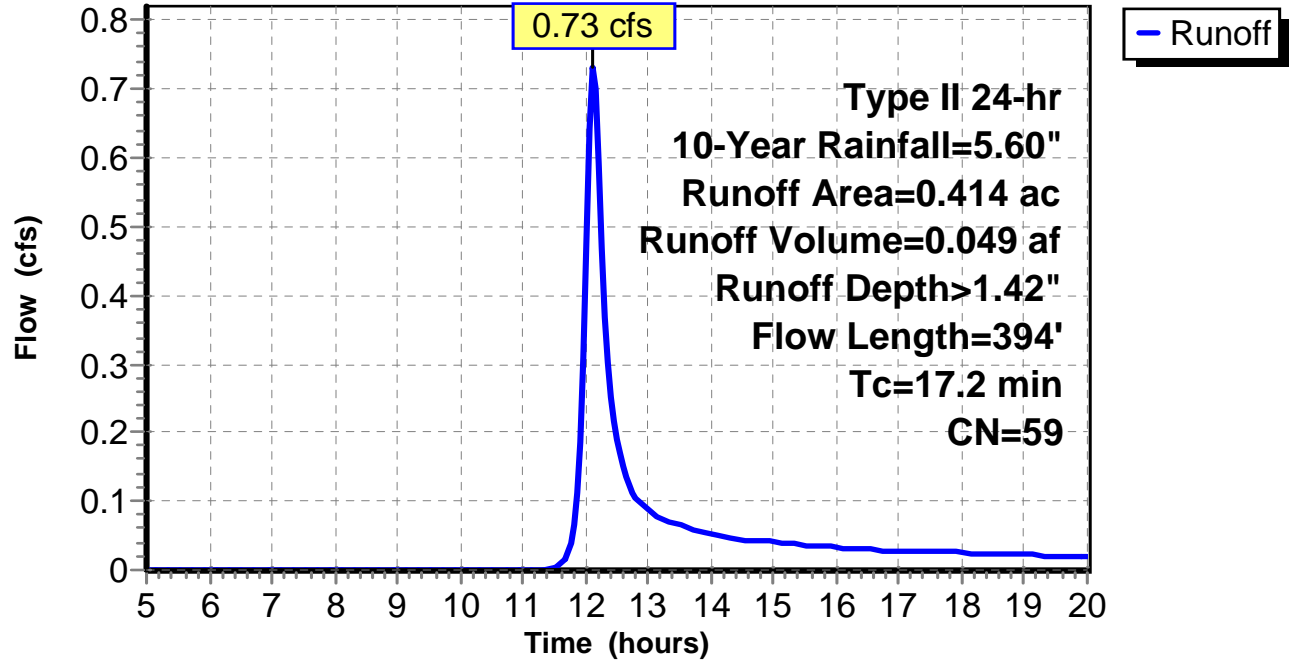
Subcatchment 6: C AR-705.006

Hydrograph



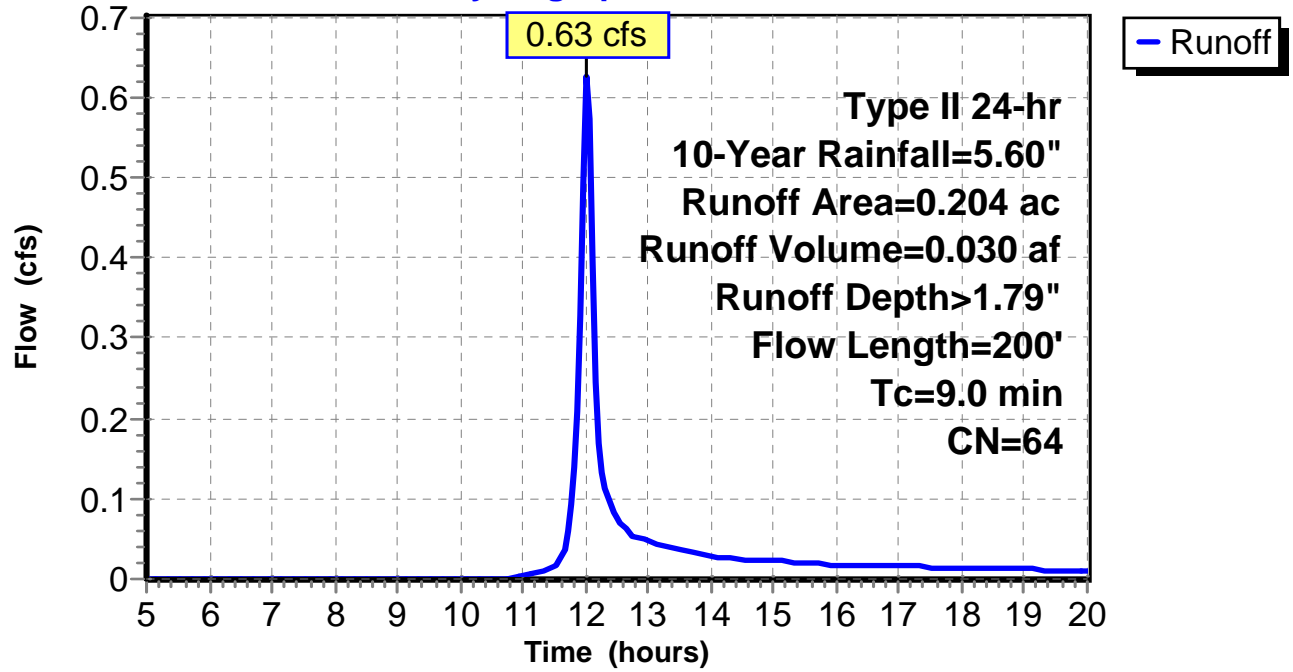
Subcatchment 7: C AR-705.007

Hydrograph



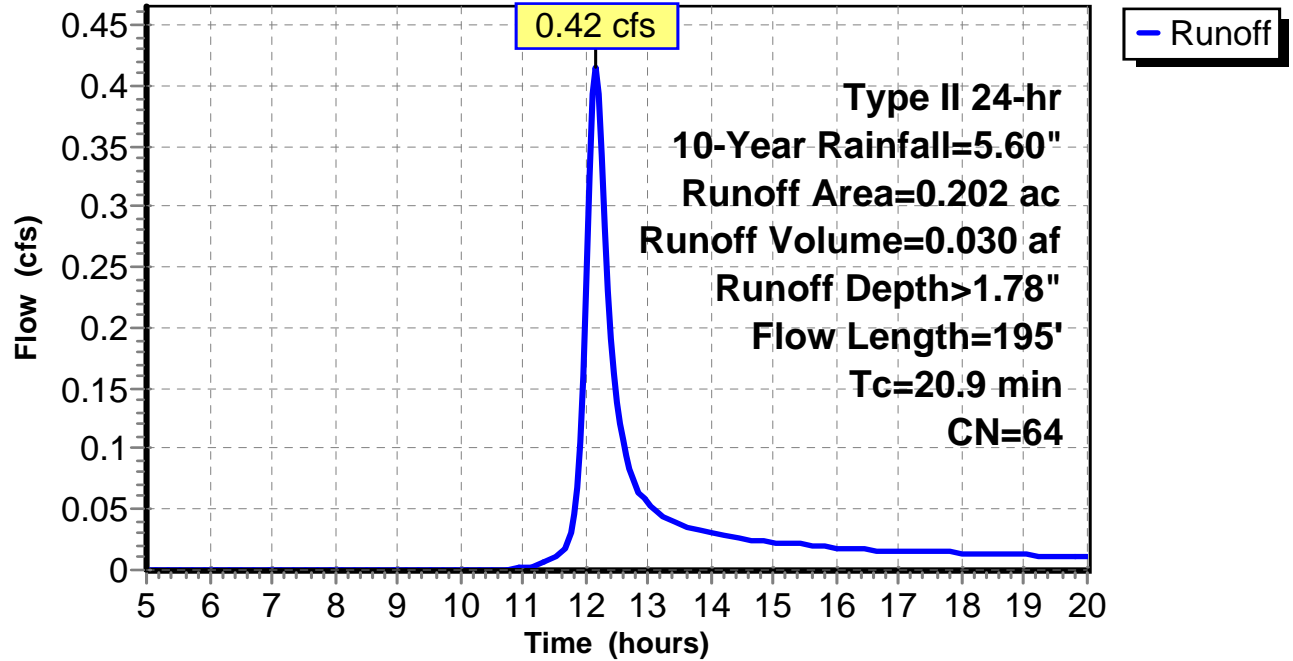
Subcatchment 8: C 307.001

Hydrograph



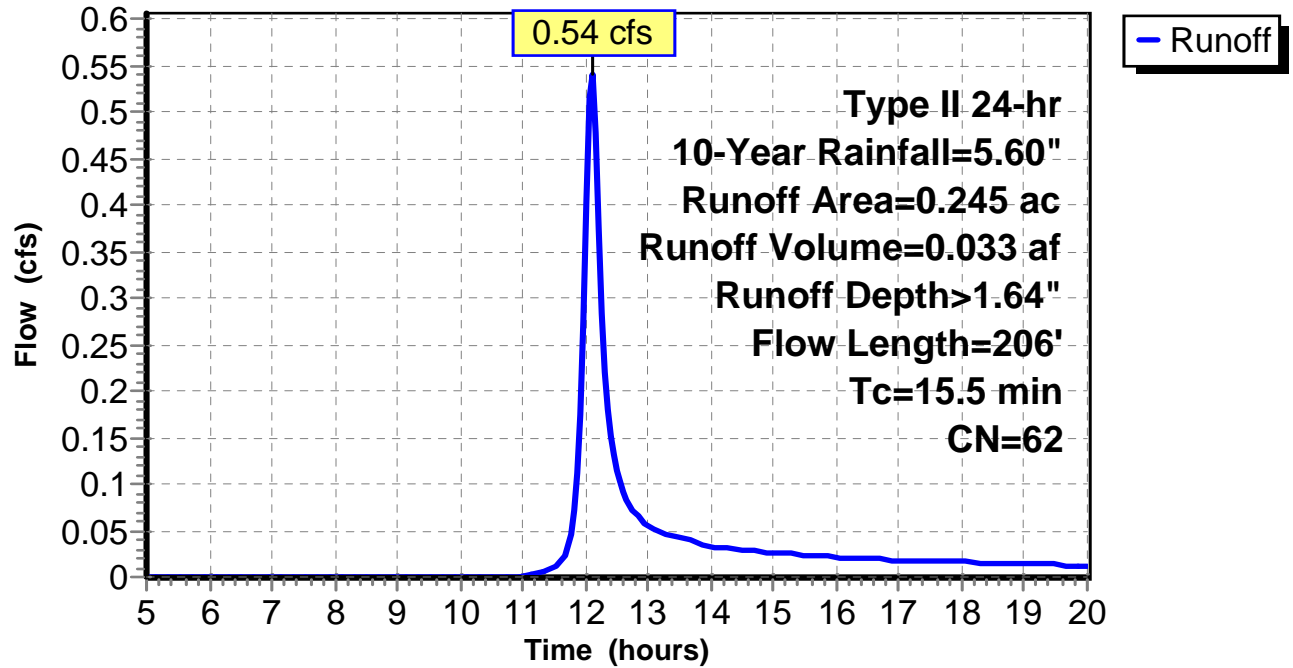
Subcatchment 9: C 307.002

Hydrograph



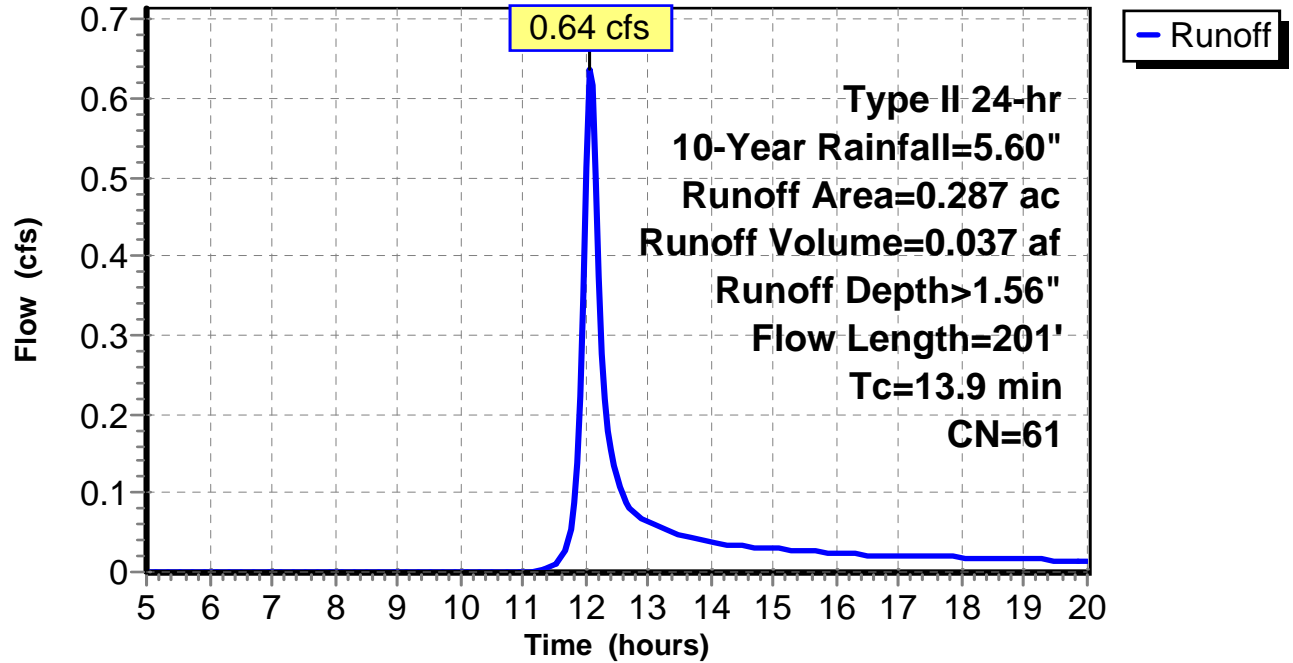
Subcatchment 10: C 307.003

Hydrograph



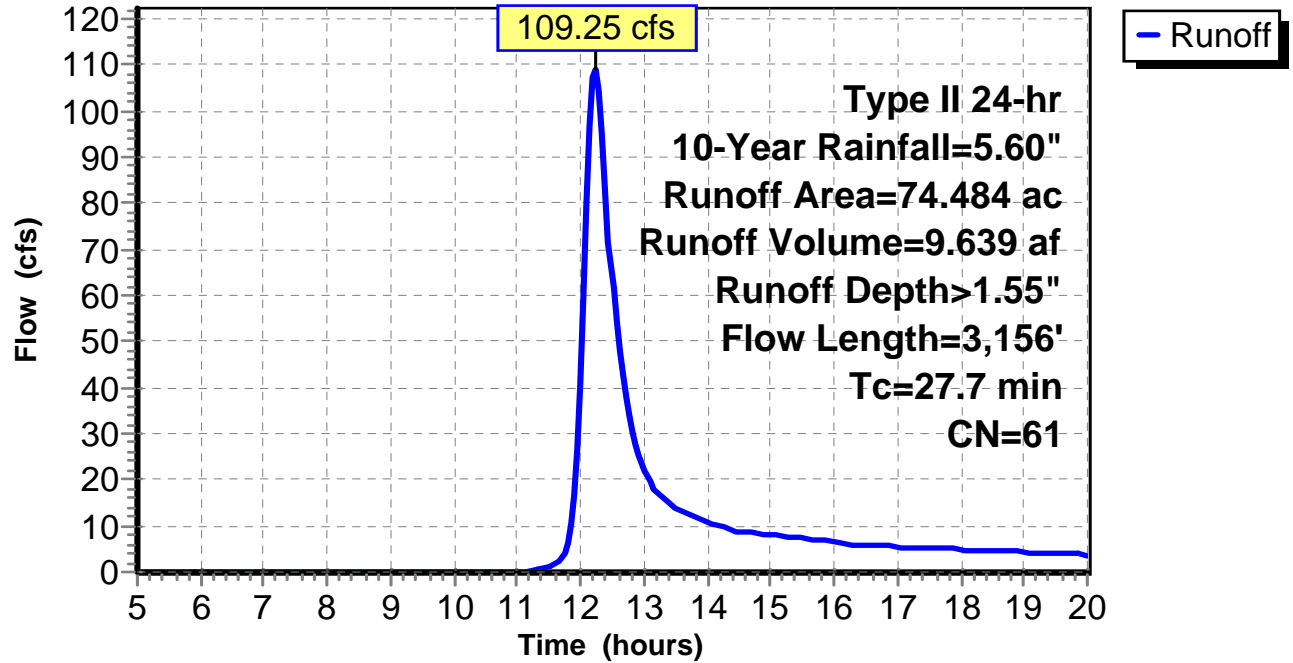
Subcatchment 11: C 307.004

Hydrograph



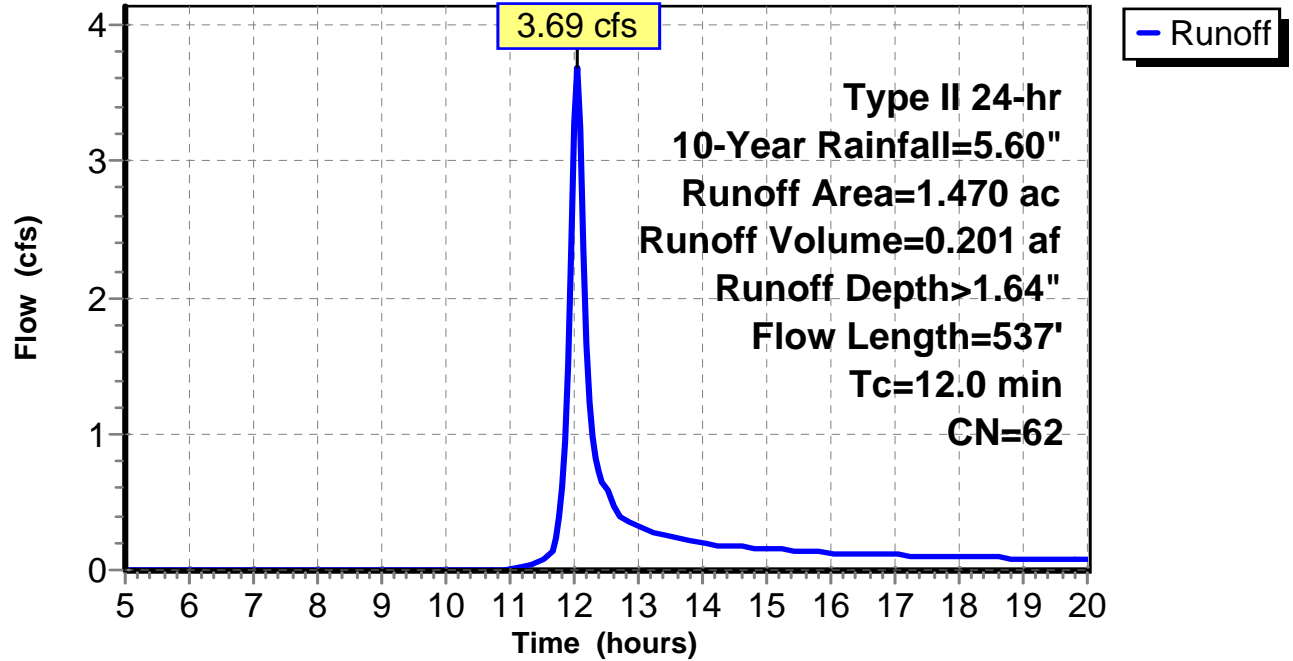
Subcatchment 12: C 307.005

Hydrograph



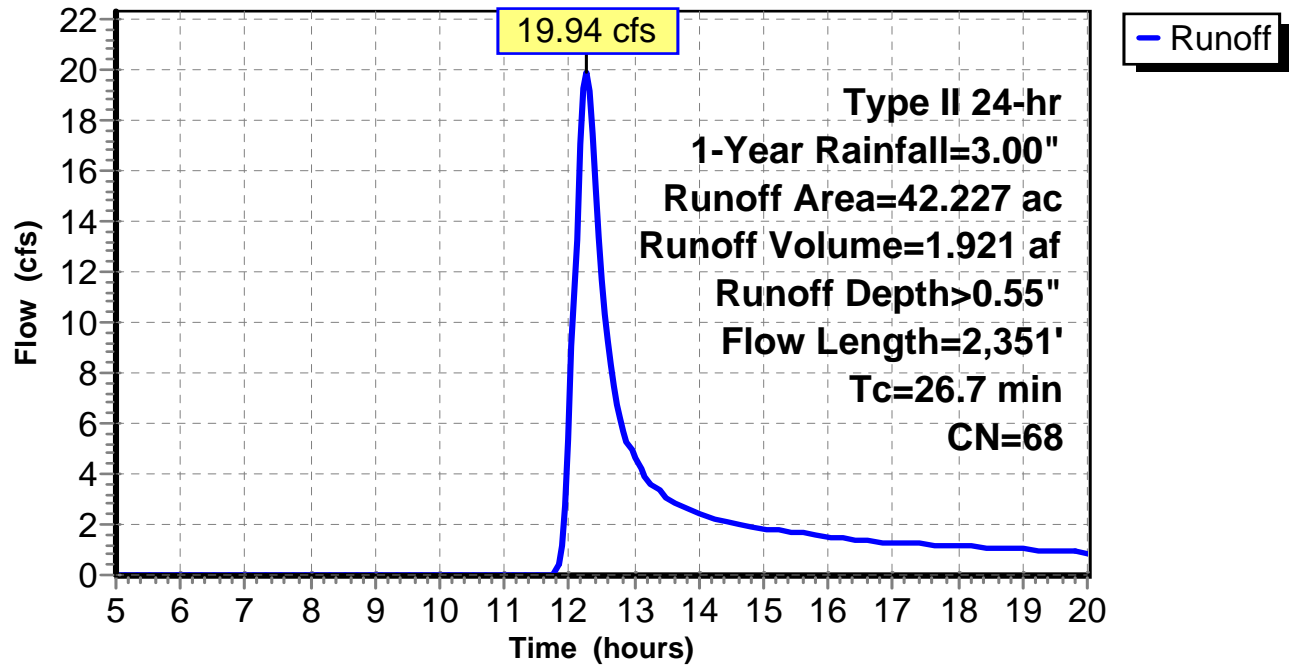
Subcatchment 13: C 307.006

Hydrograph



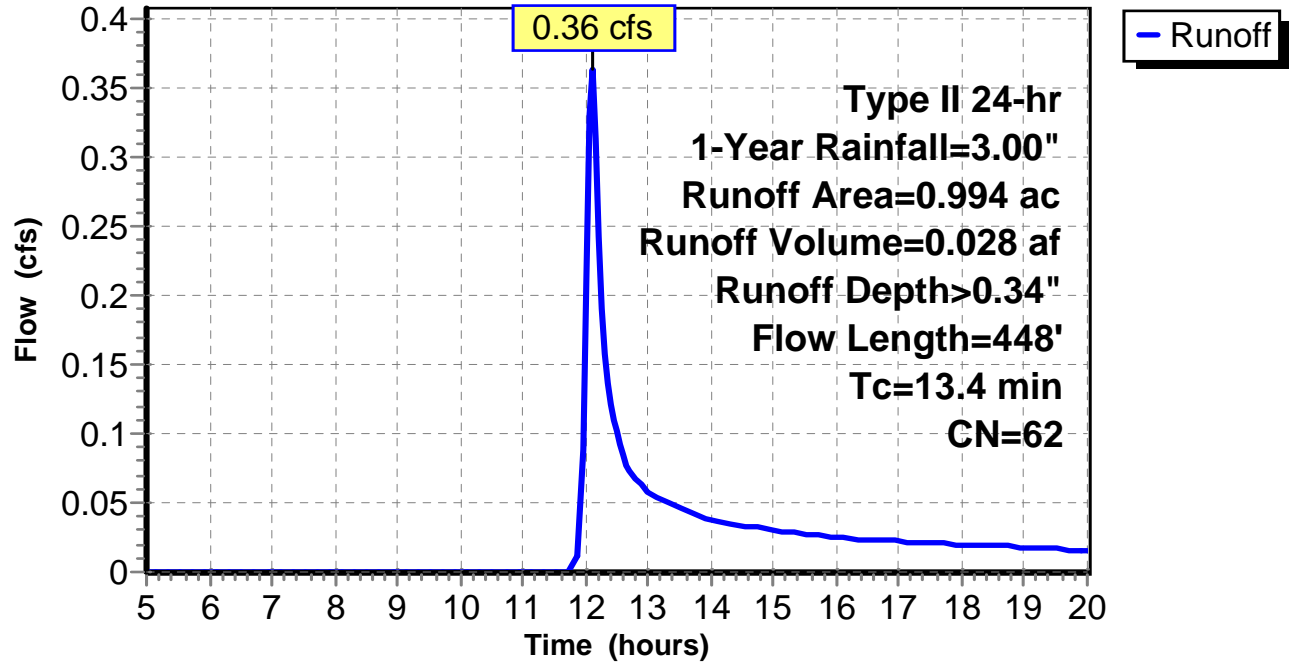
Subcatchment 1: C 323.010

Hydrograph



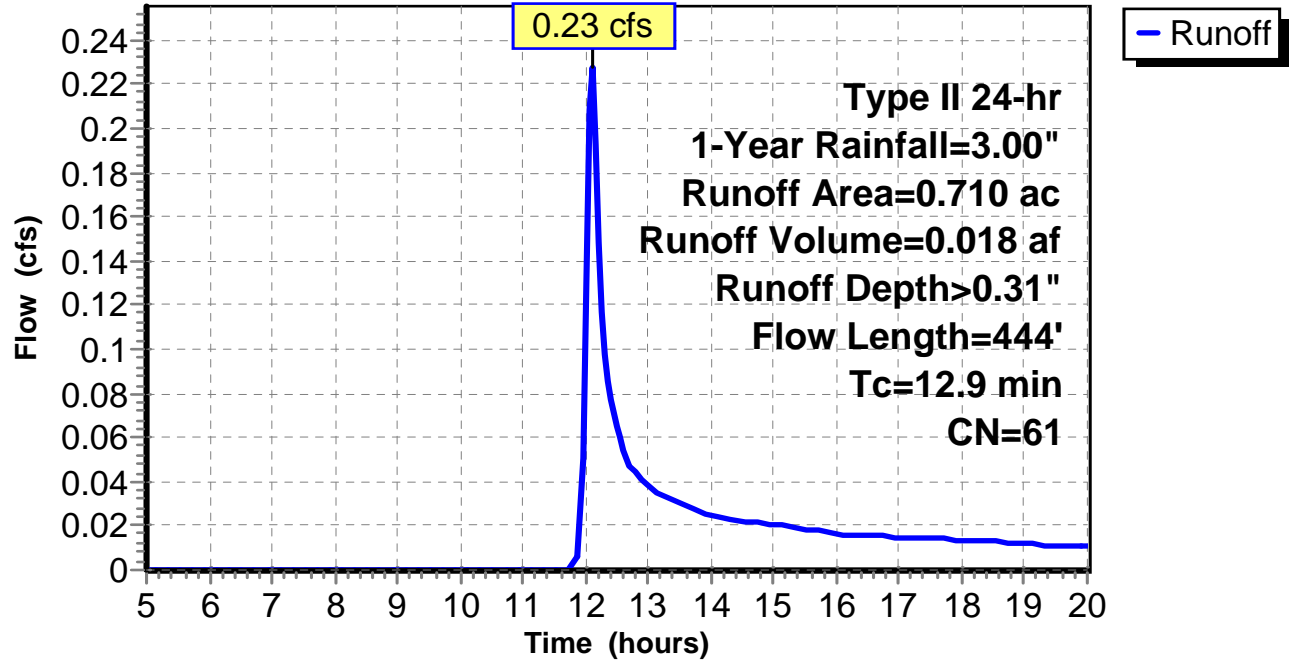
Subcatchment 2: C 324.001

Hydrograph



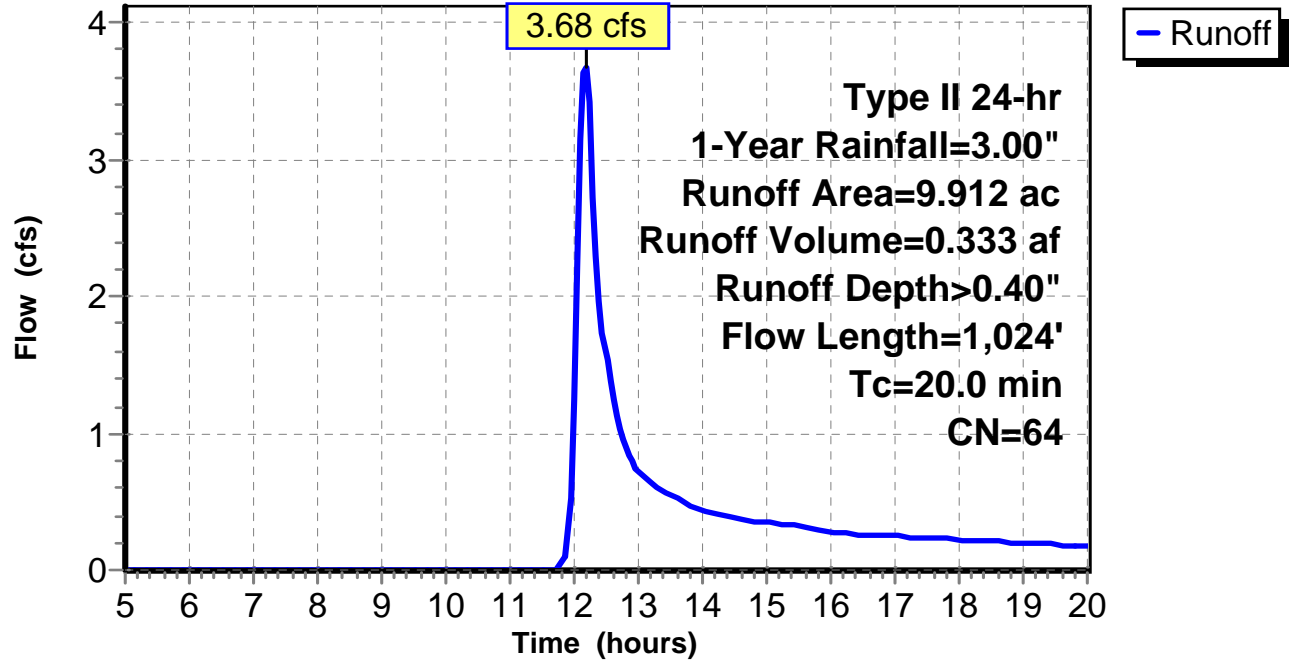
Subcatchment 3: C 324.002

Hydrograph



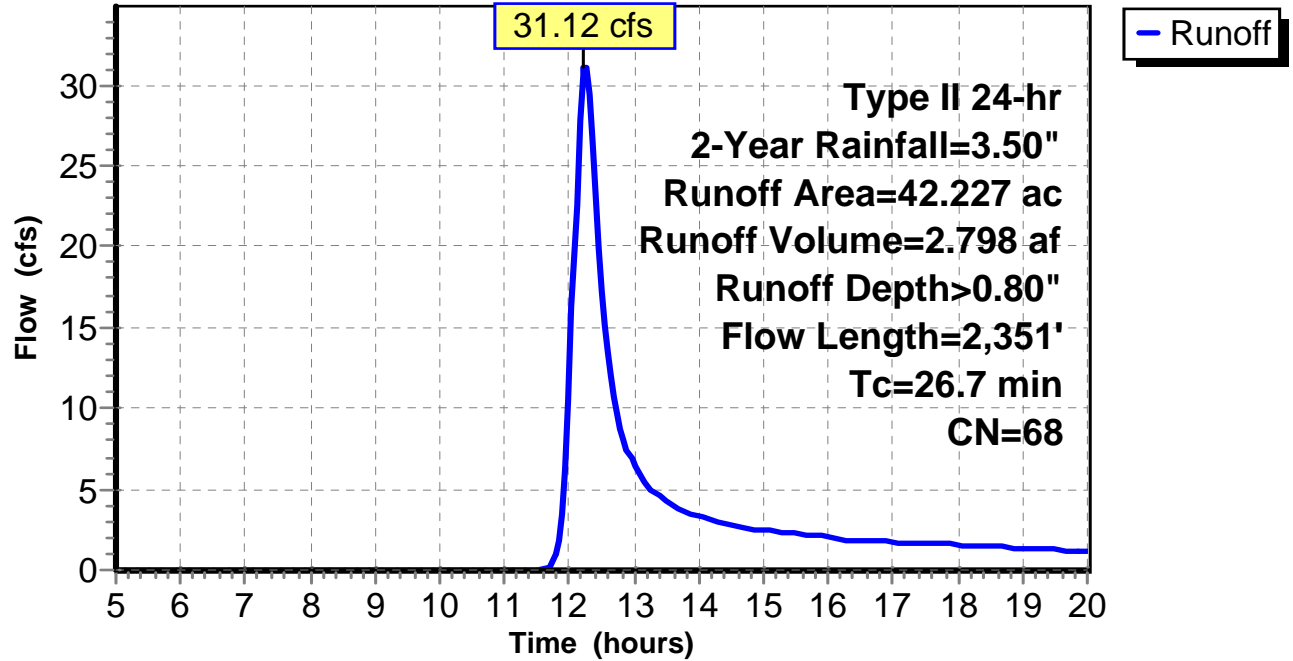
Subcatchment 4: C 324.003

Hydrograph



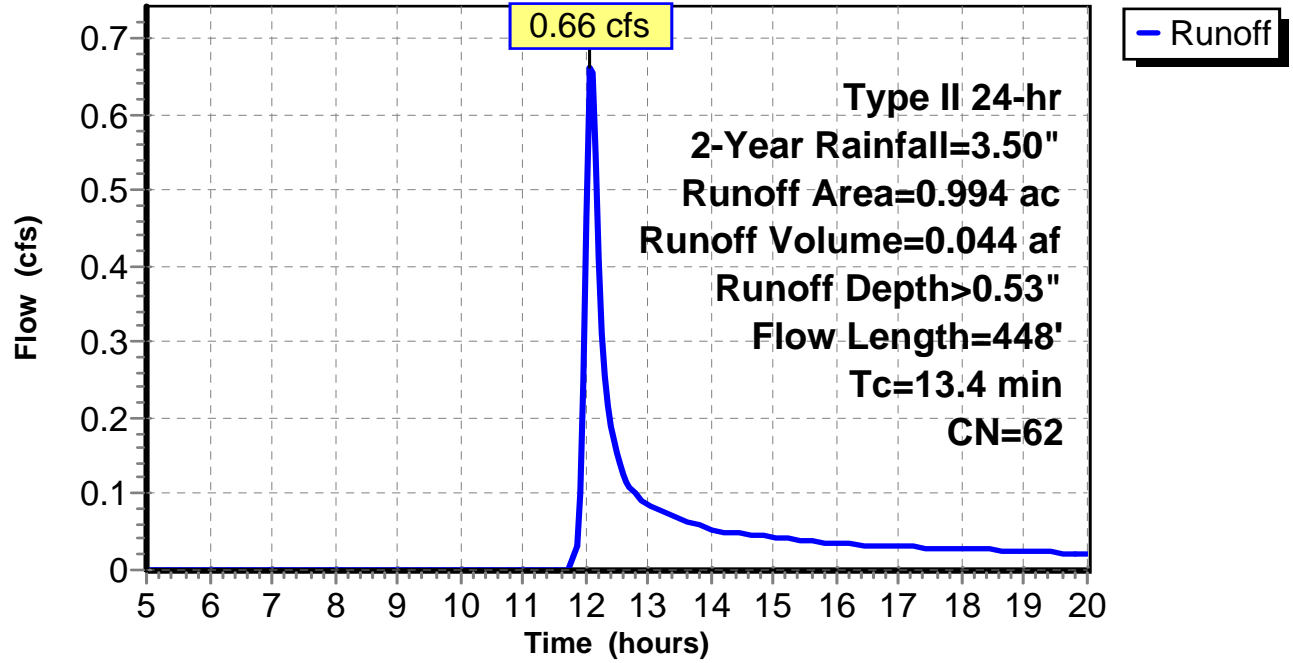
Subcatchment 1: C 323.010

Hydrograph



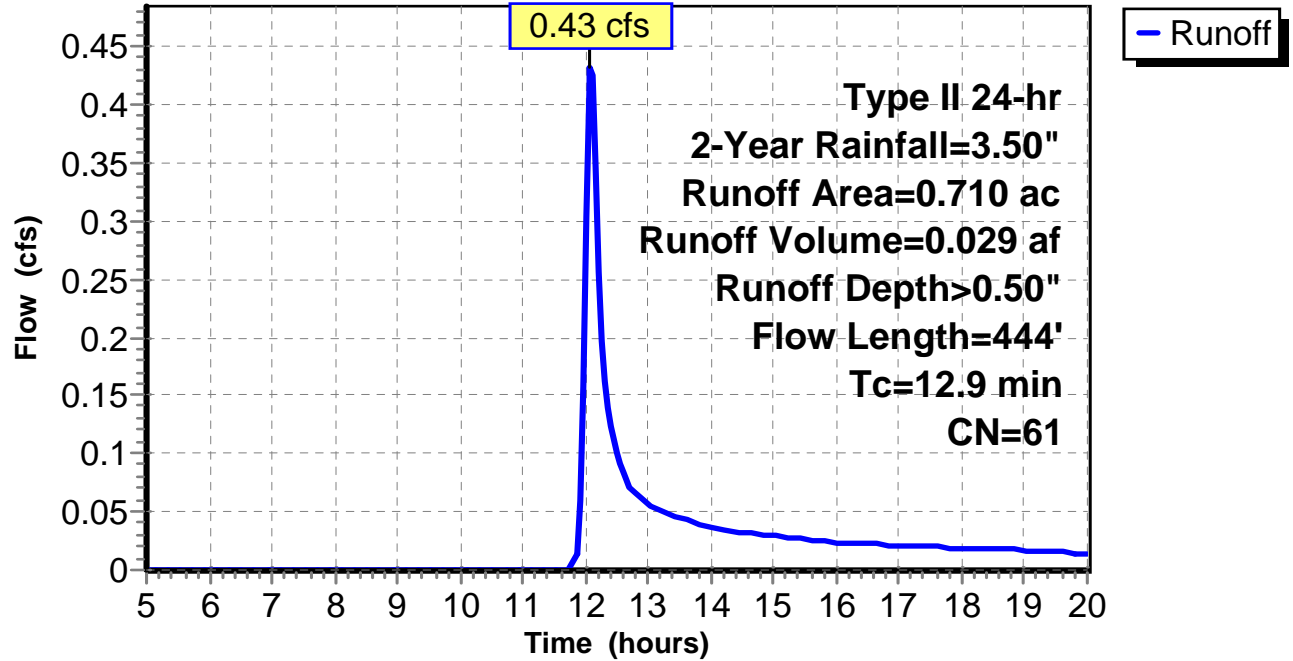
Subcatchment 2: C 324.001

Hydrograph



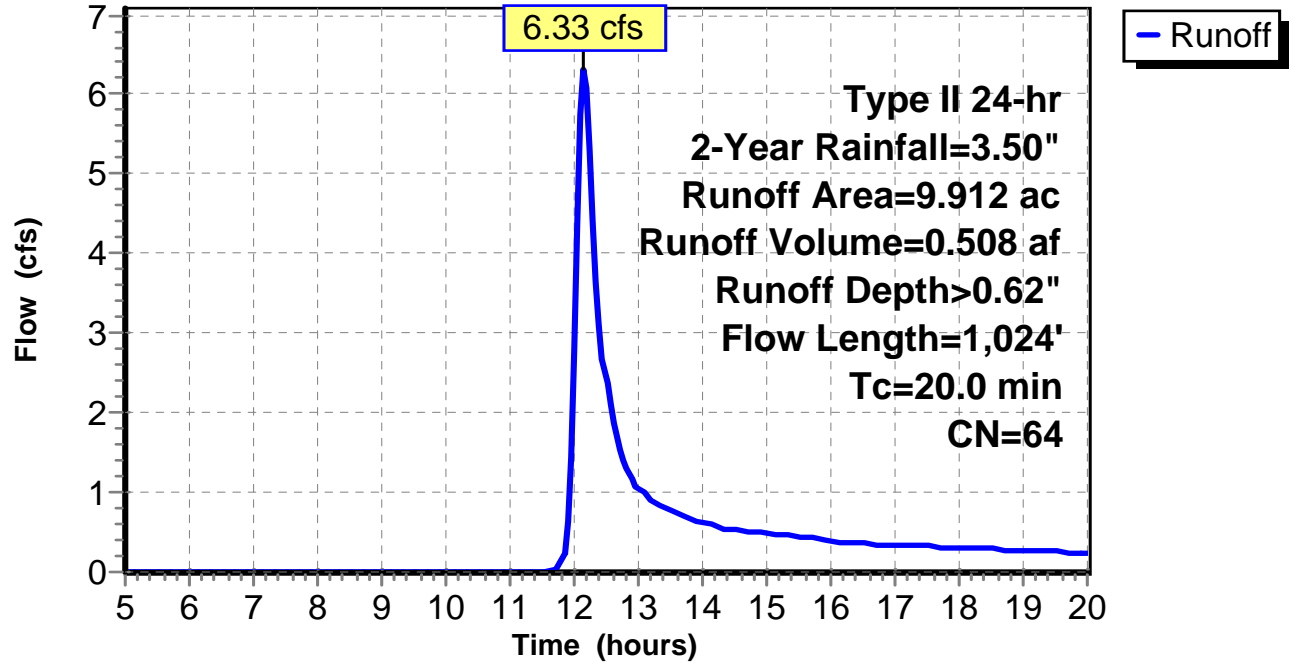
Subcatchment 3: C 324.002

Hydrograph



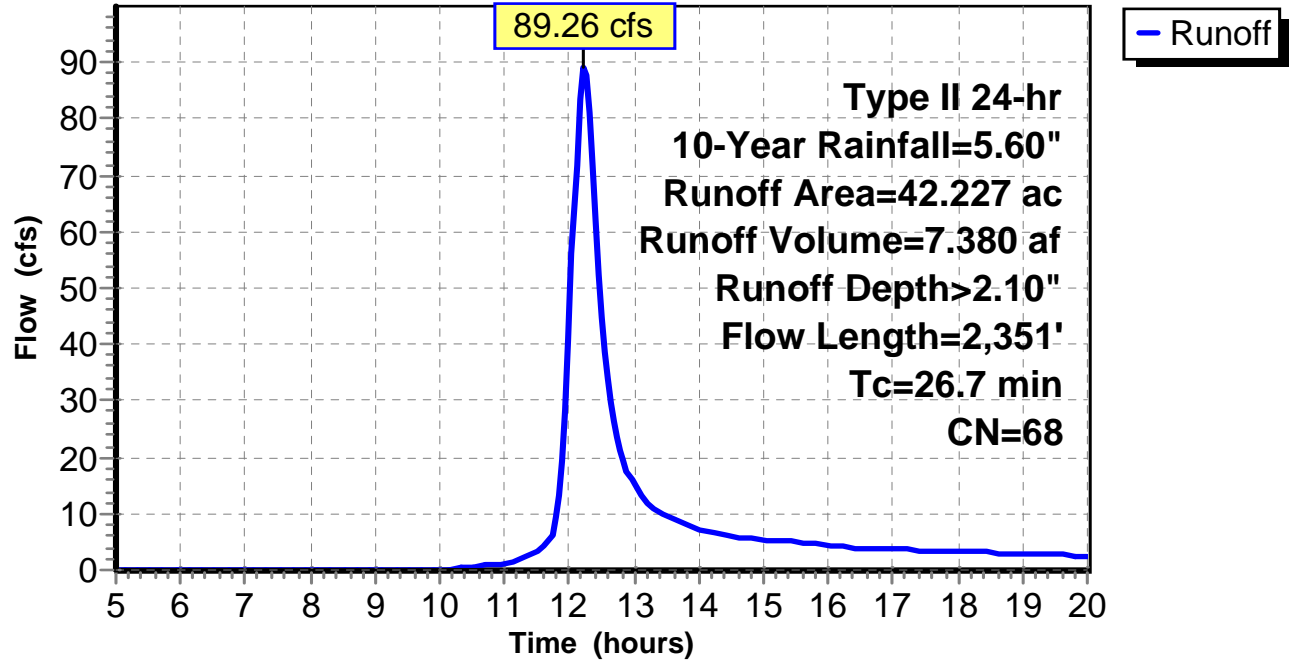
Subcatchment 4: C 324.003

Hydrograph



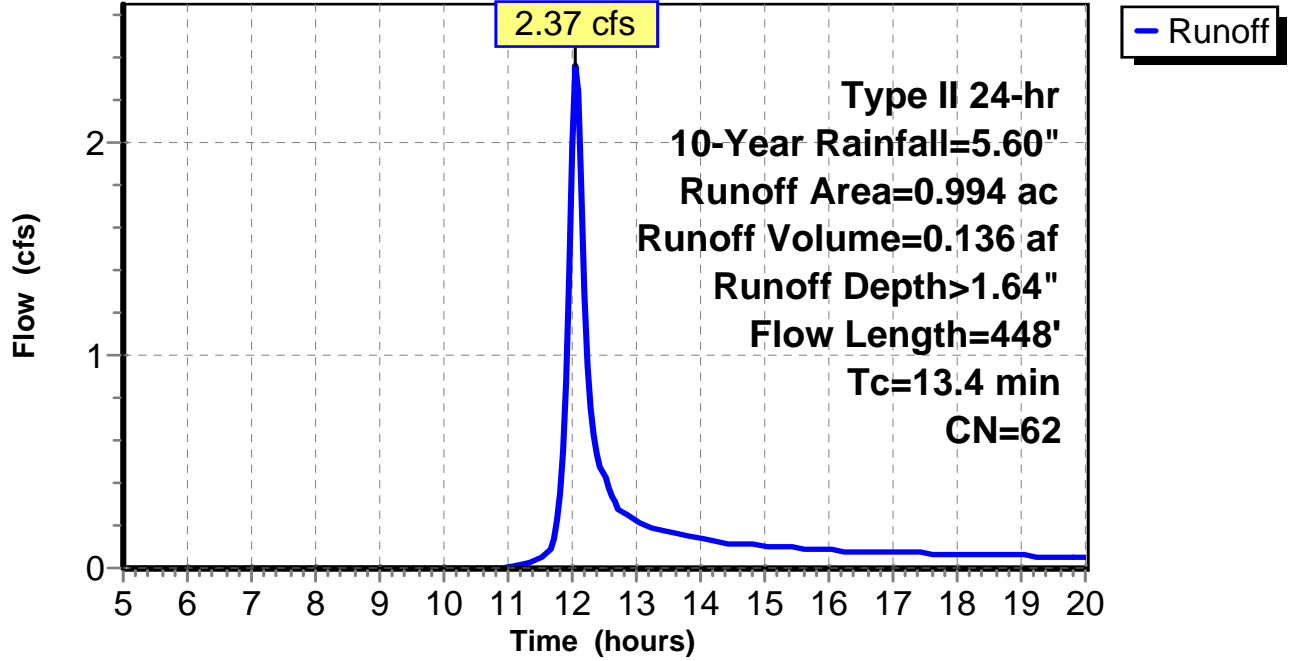
Subcatchment 1: C 323.010

Hydrograph



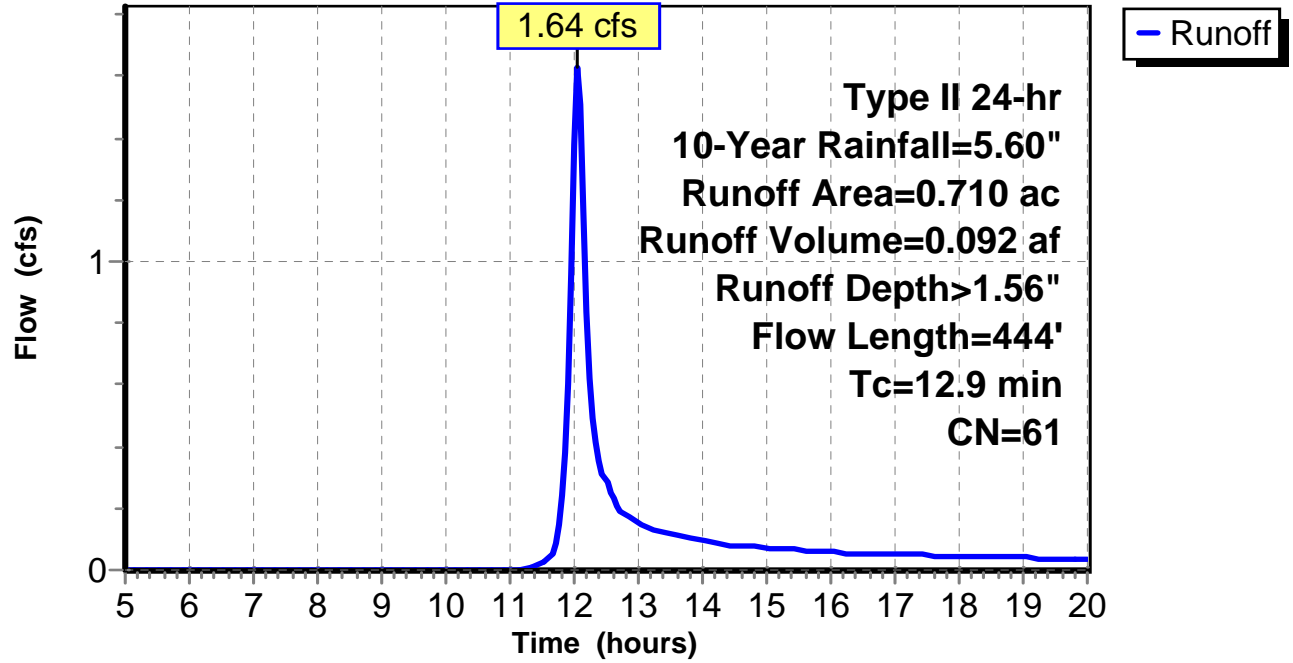
Subcatchment 2: C 324.001

Hydrograph



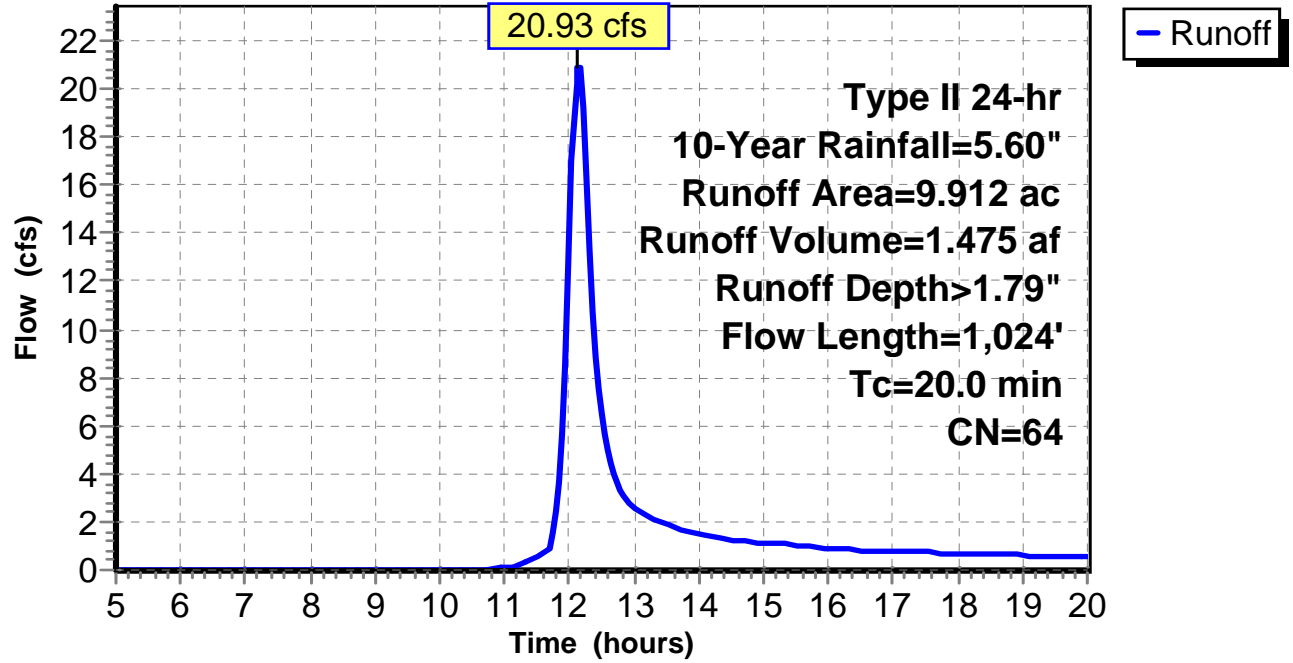
Subcatchment 3: C 324.002

Hydrograph



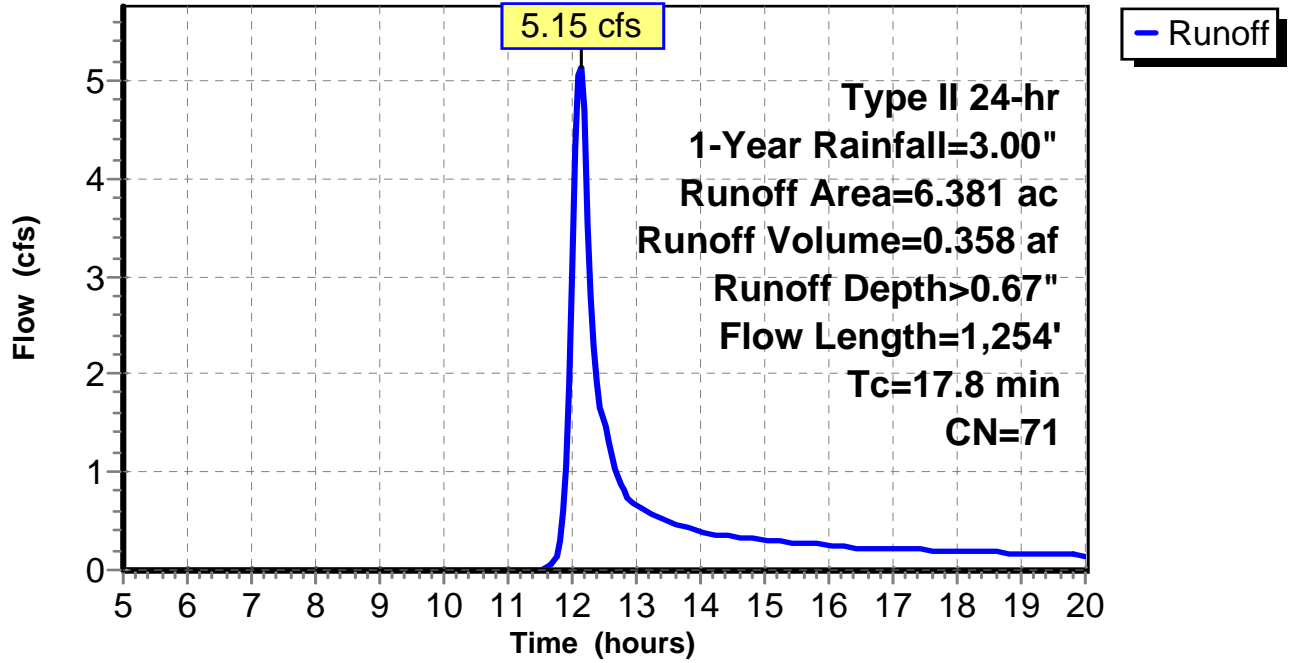
Subcatchment 4: C 324.003

Hydrograph



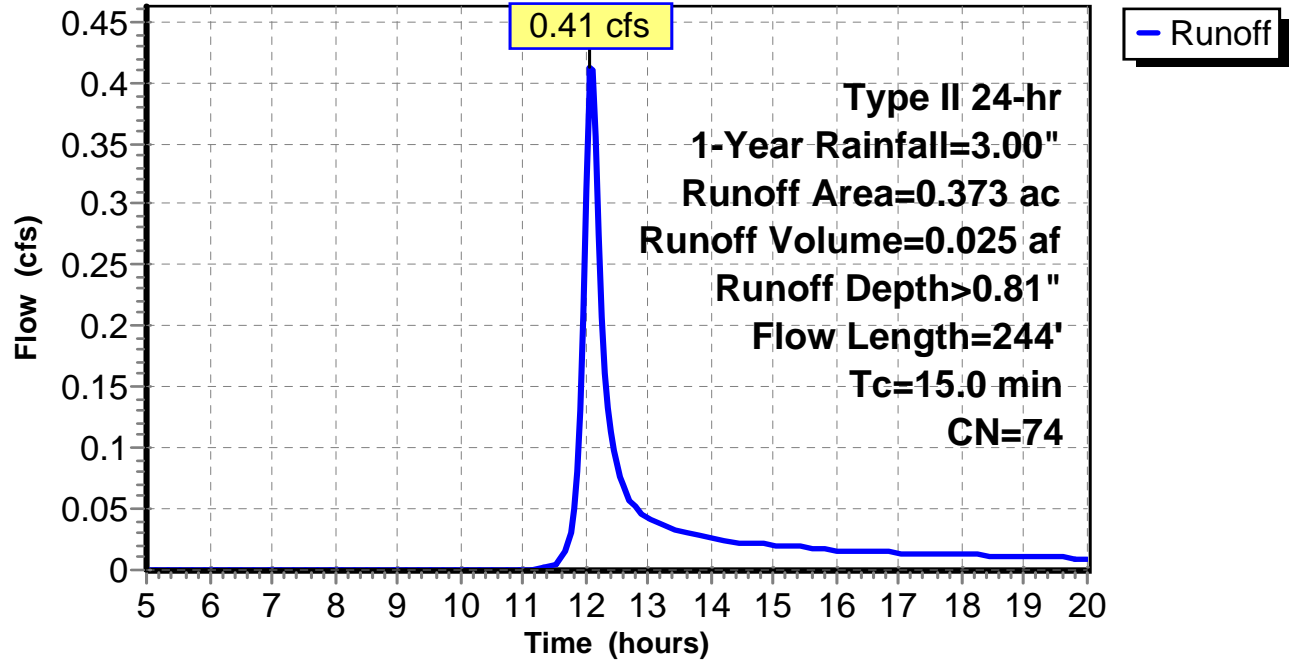
Subcatchment 1: C AR-706.001

Hydrograph



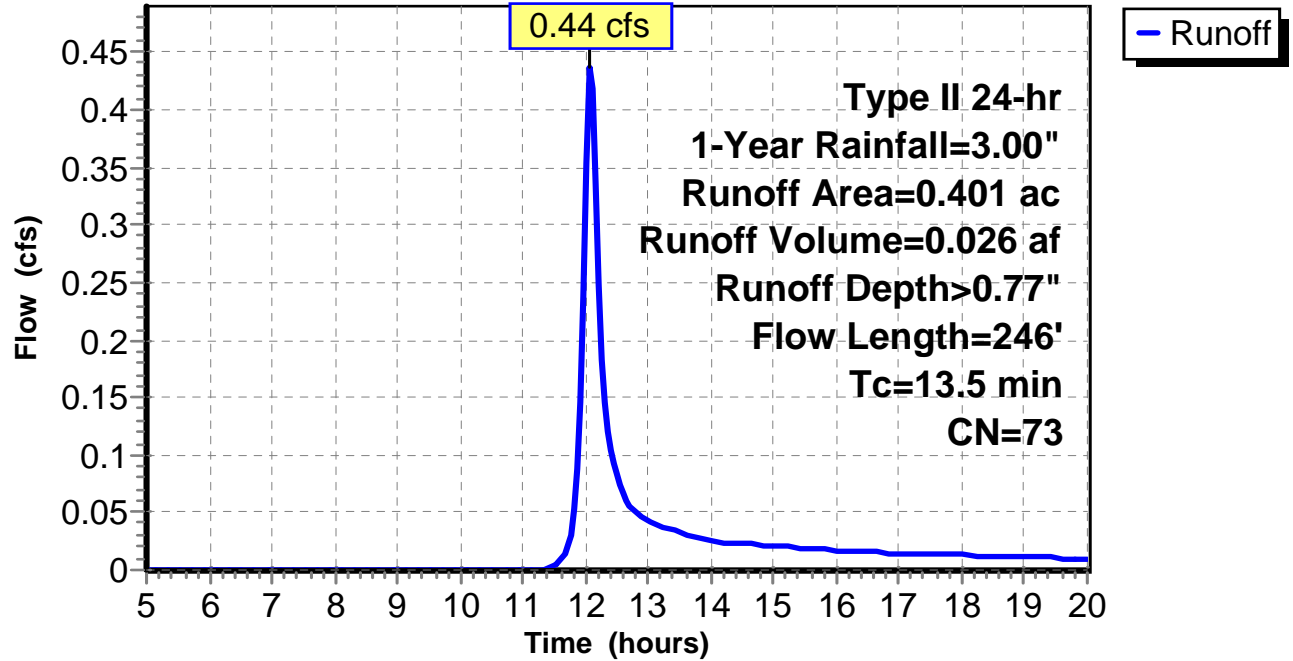
Subcatchment 2: C AR-706.002

Hydrograph



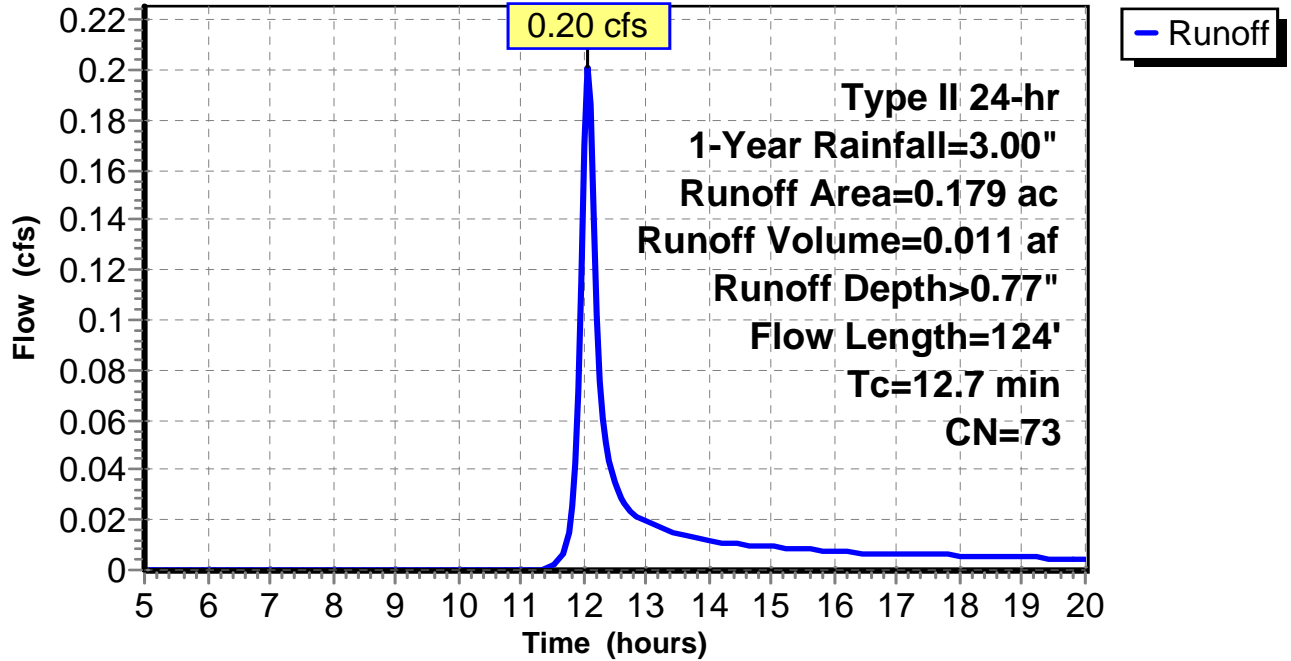
Subcatchment 3: C AR-706.003

Hydrograph



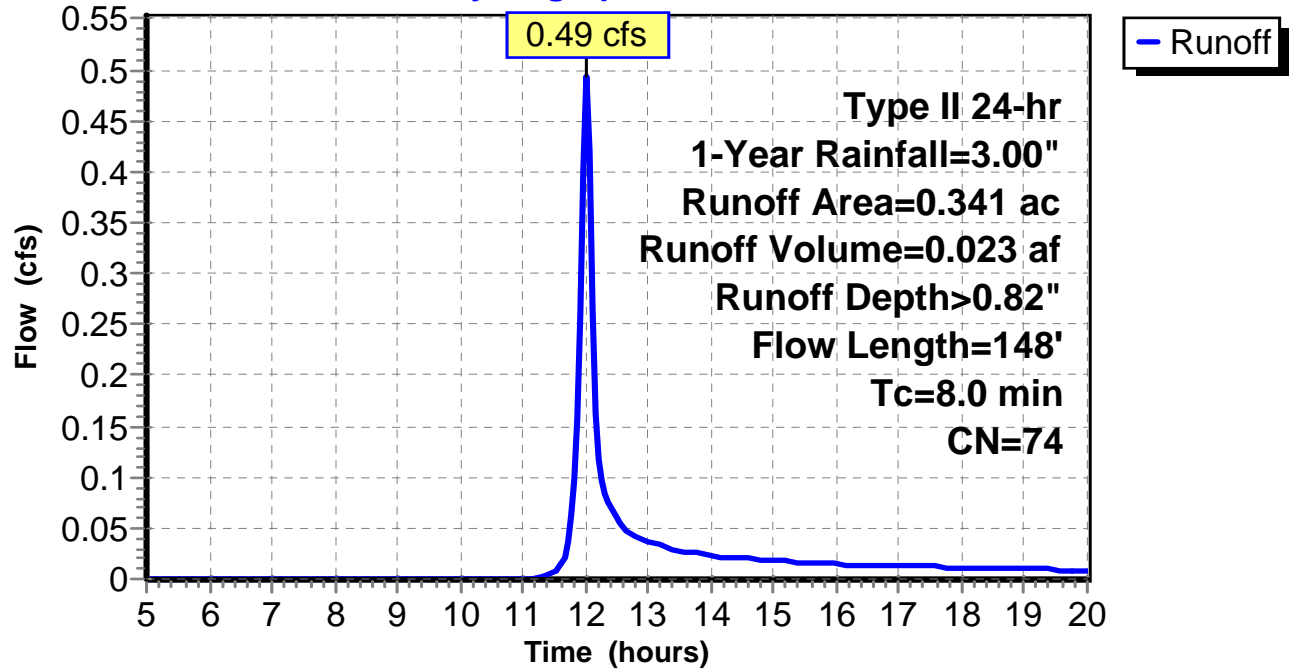
Subcatchment 4: C AR-706.004

Hydrograph



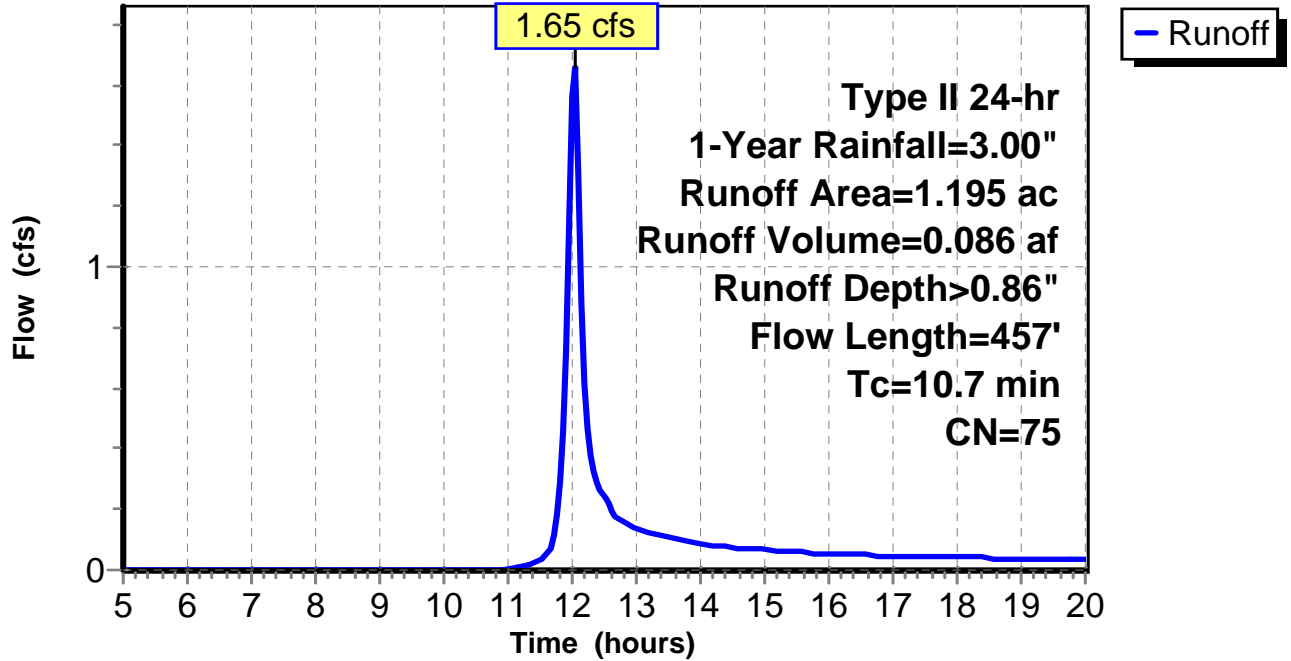
Subcatchment 5: C AR-706.005

Hydrograph



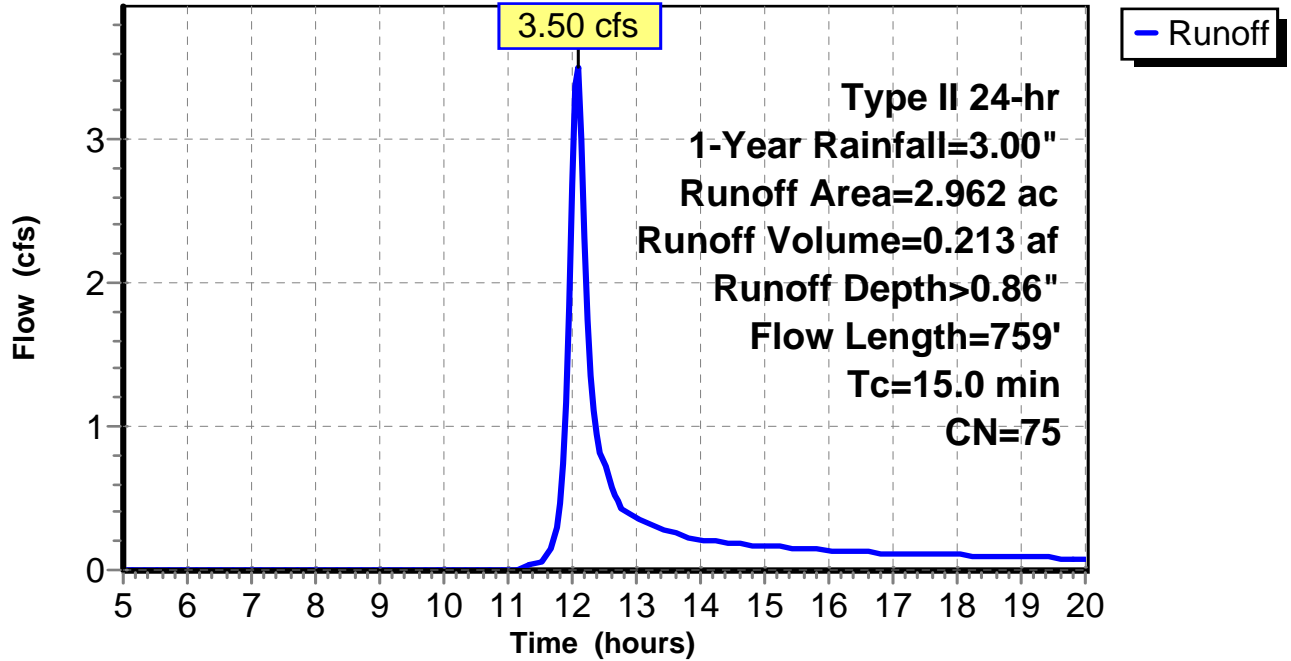
Subcatchment 6: C AR-706.006

Hydrograph



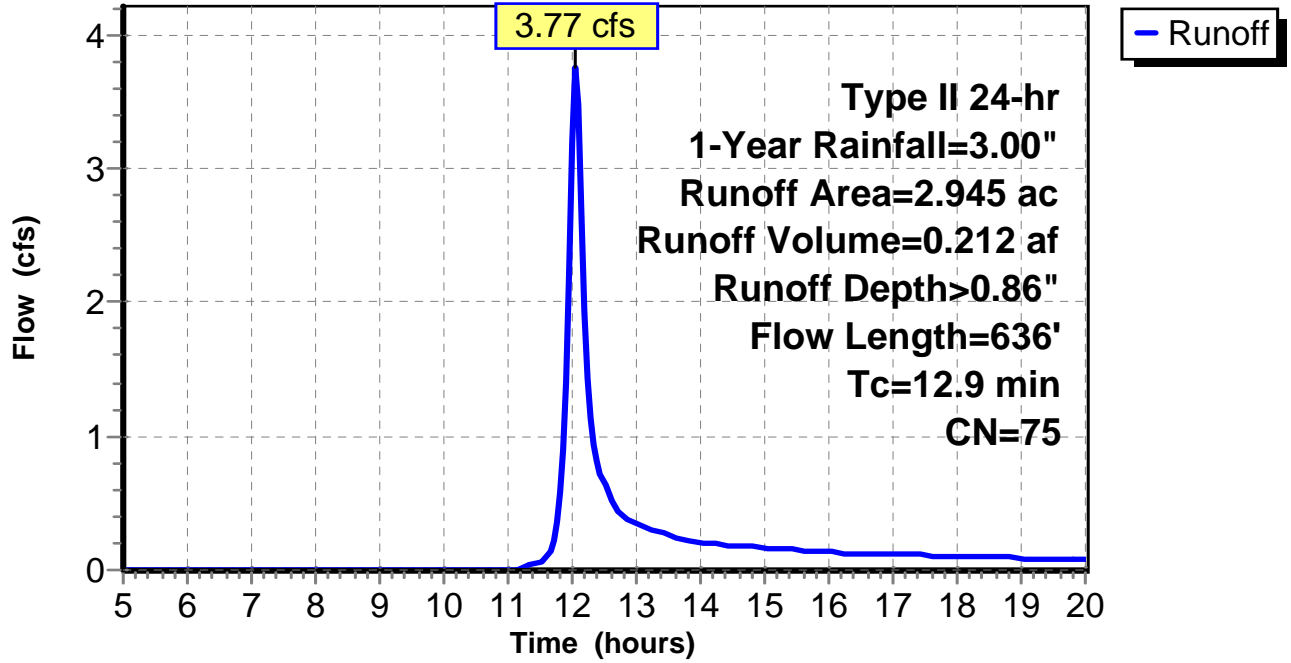
Subcatchment 7: C AR-706.007

Hydrograph



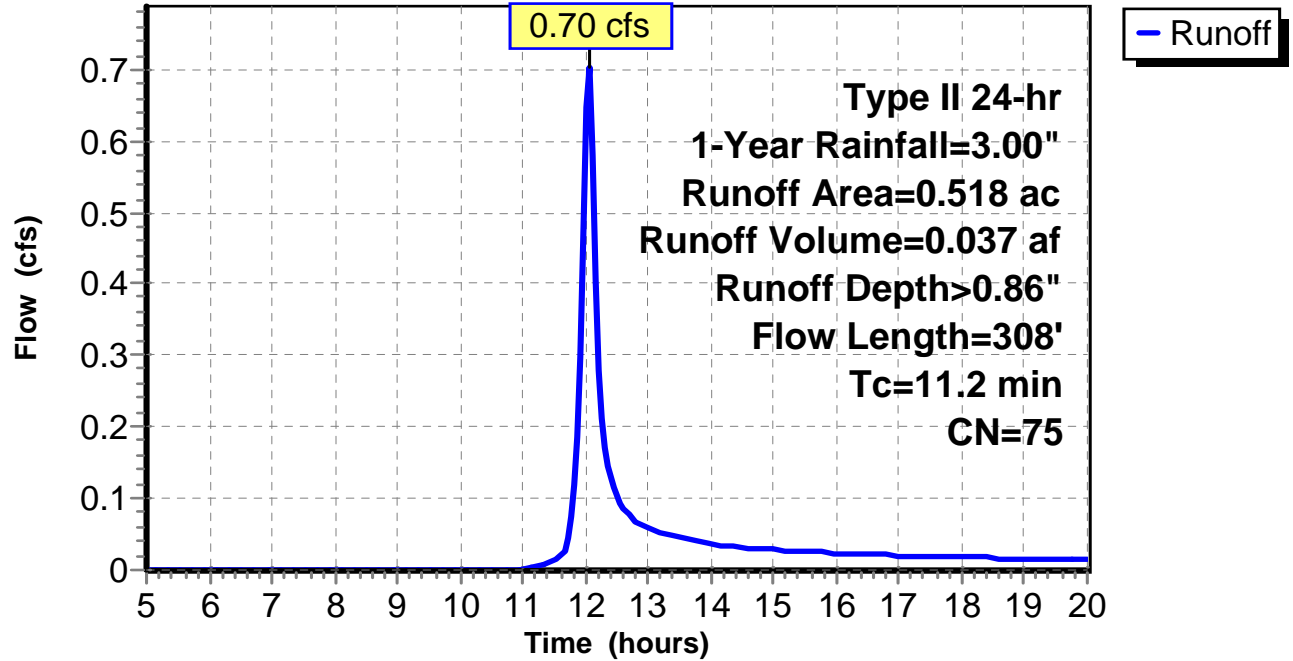
Subcatchment 8: C AR-706.008

Hydrograph



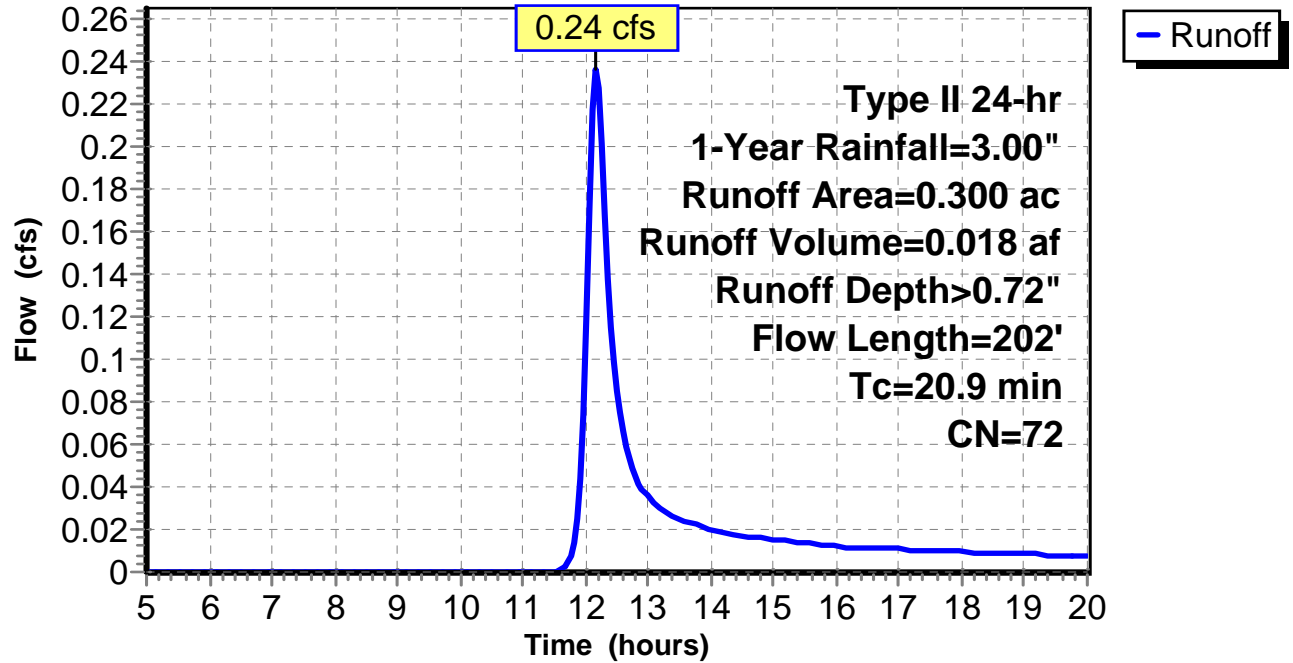
Subcatchment 9: C AR-706.009

Hydrograph



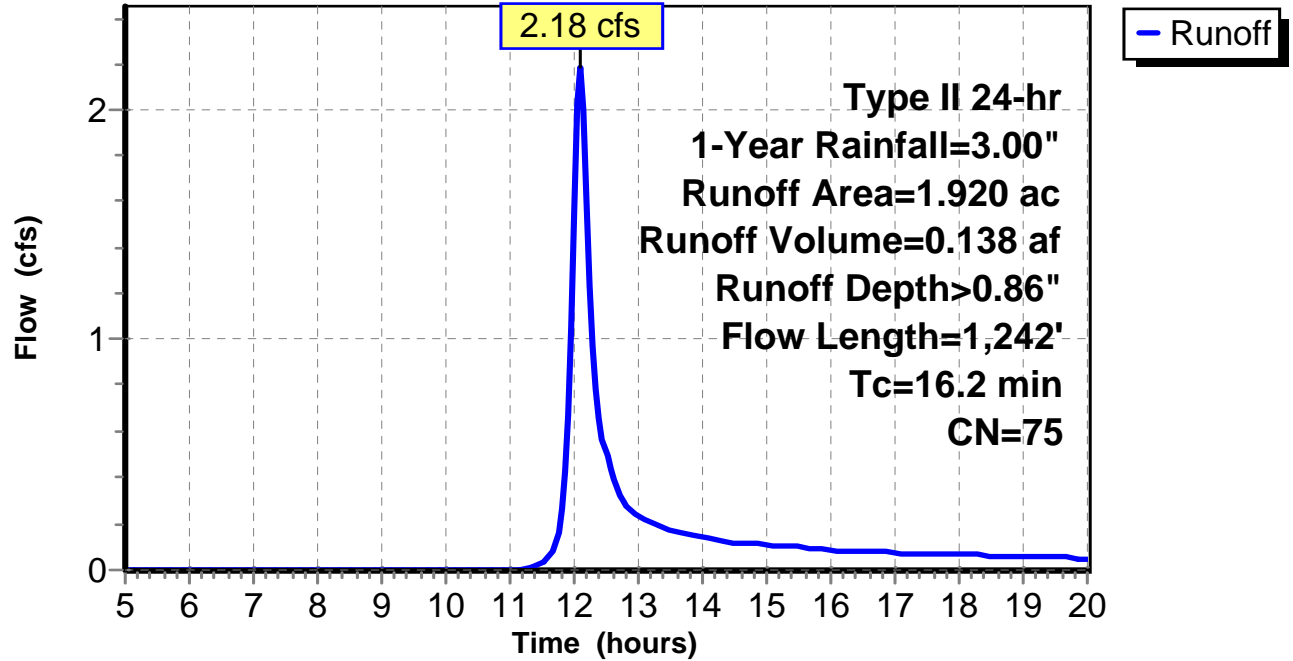
Subcatchment 10: C AR-706.010

Hydrograph



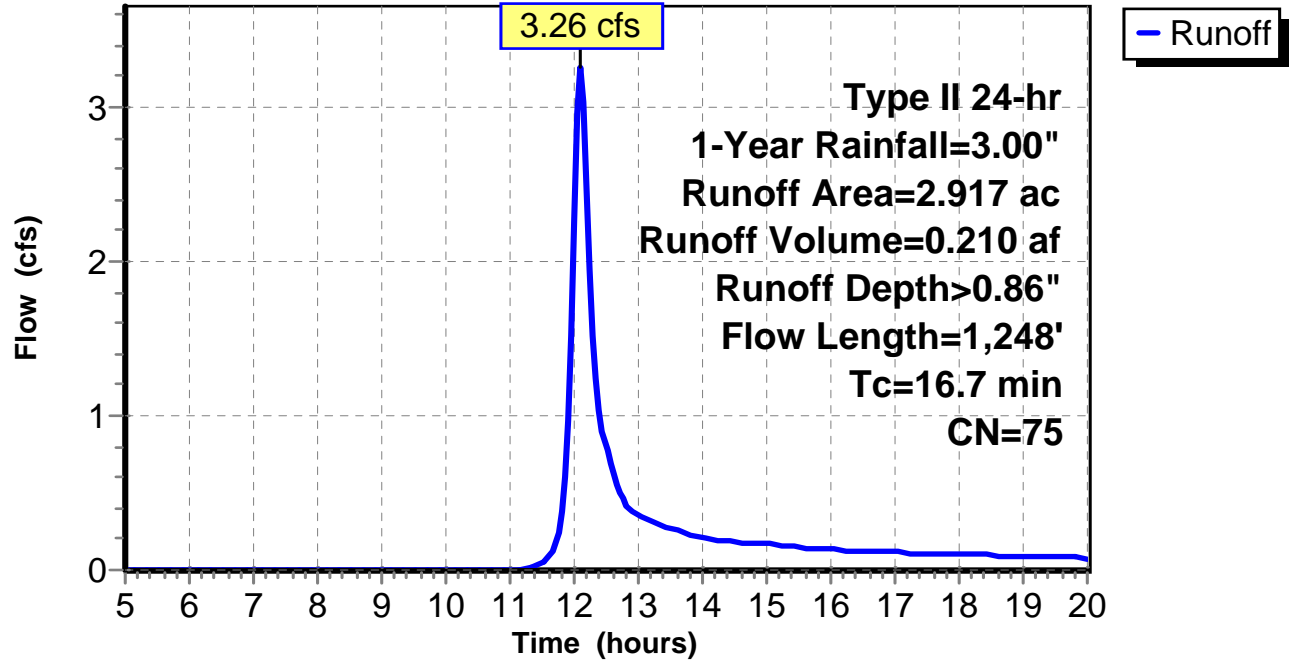
Subcatchment 11: C AR-706.011

Hydrograph



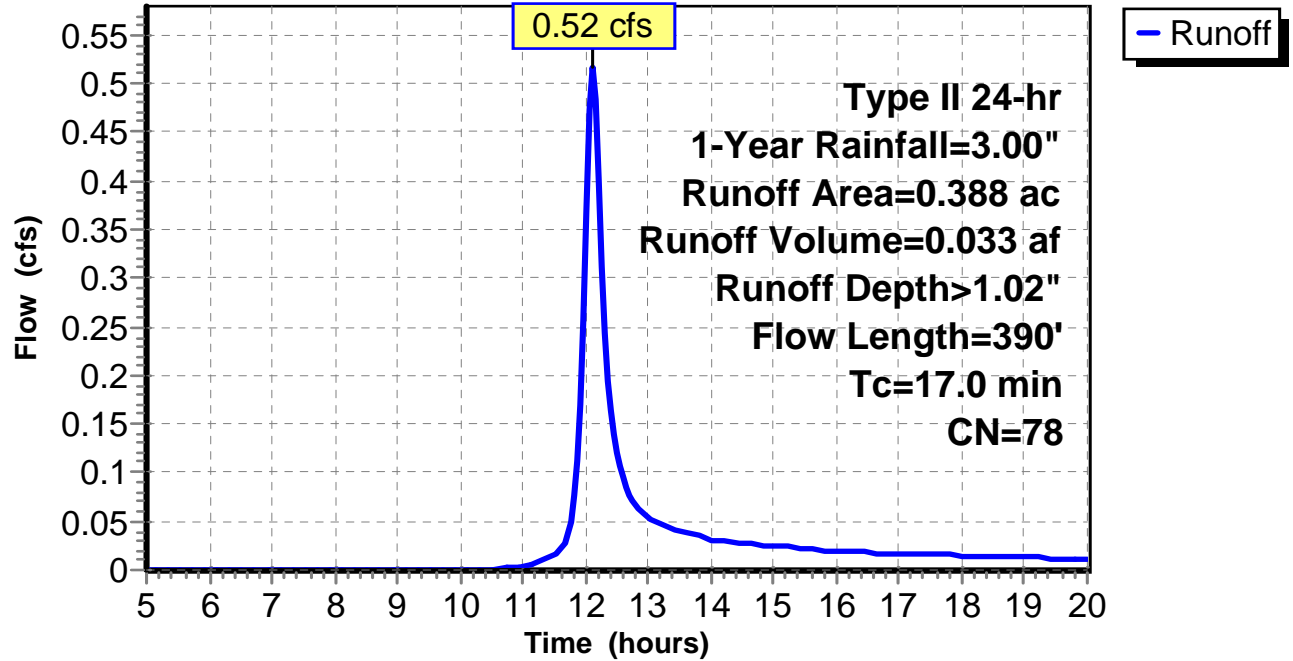
Subcatchment 12: C AR-706.012

Hydrograph



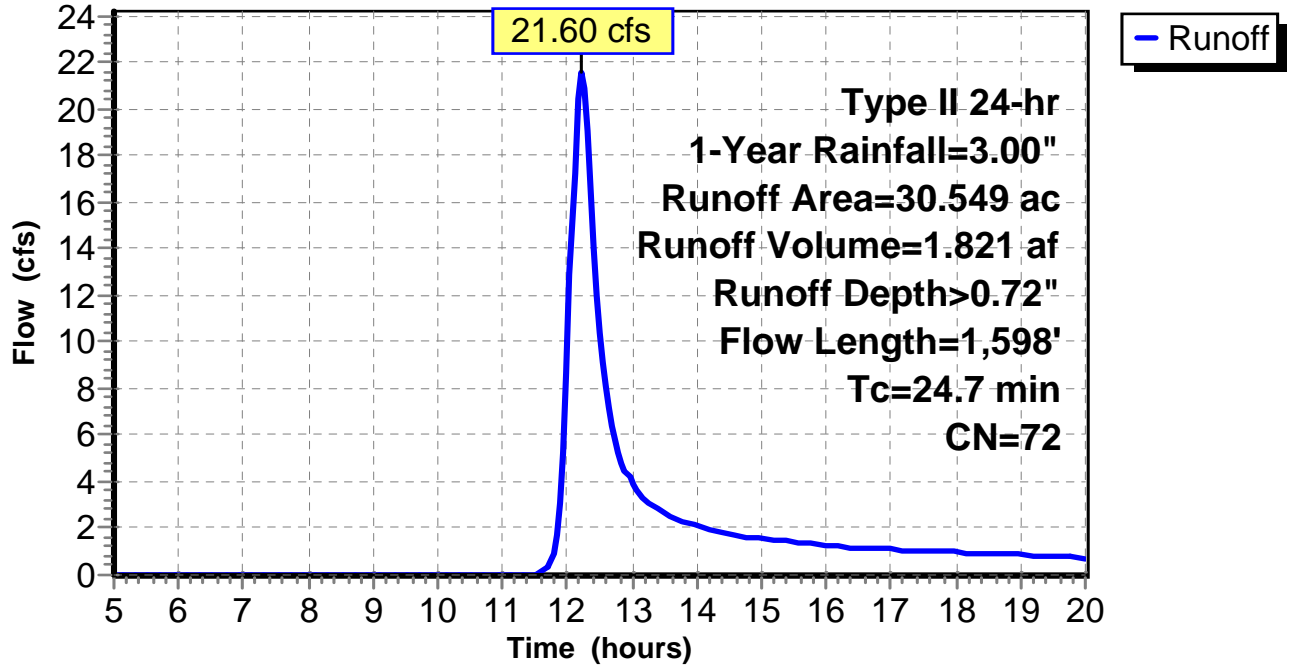
Subcatchment 13: C AR-706.013

Hydrograph



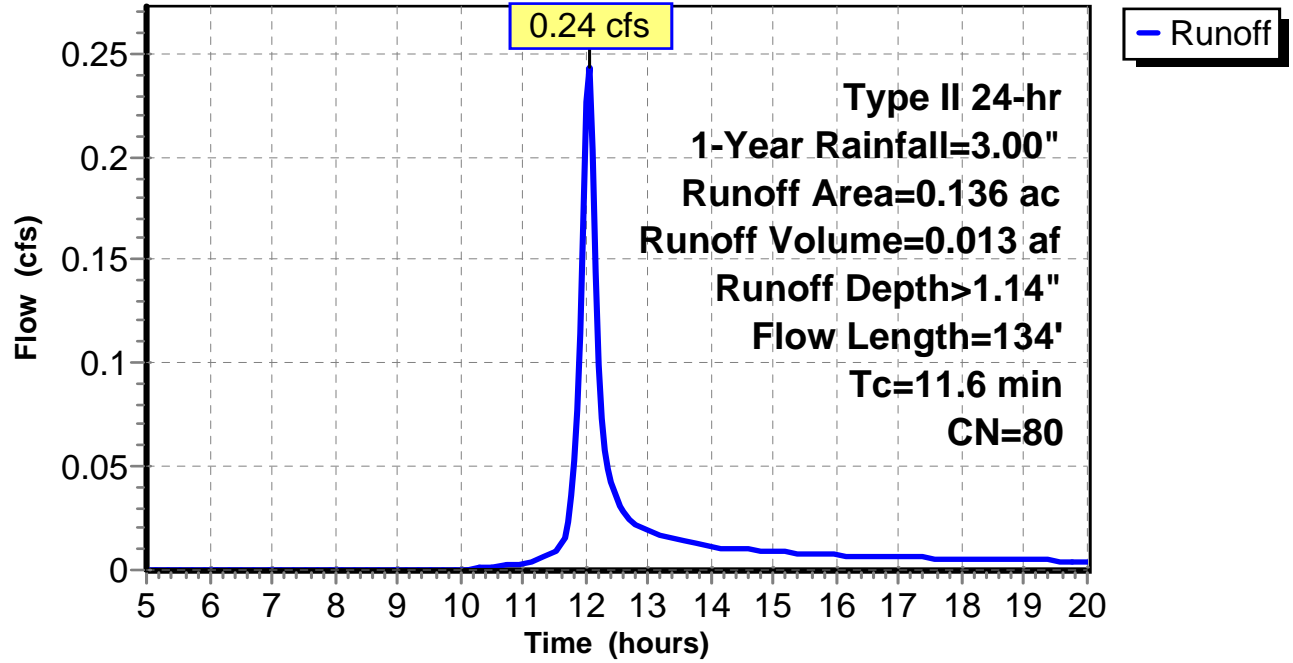
Subcatchment 14: C AR-706.014

Hydrograph



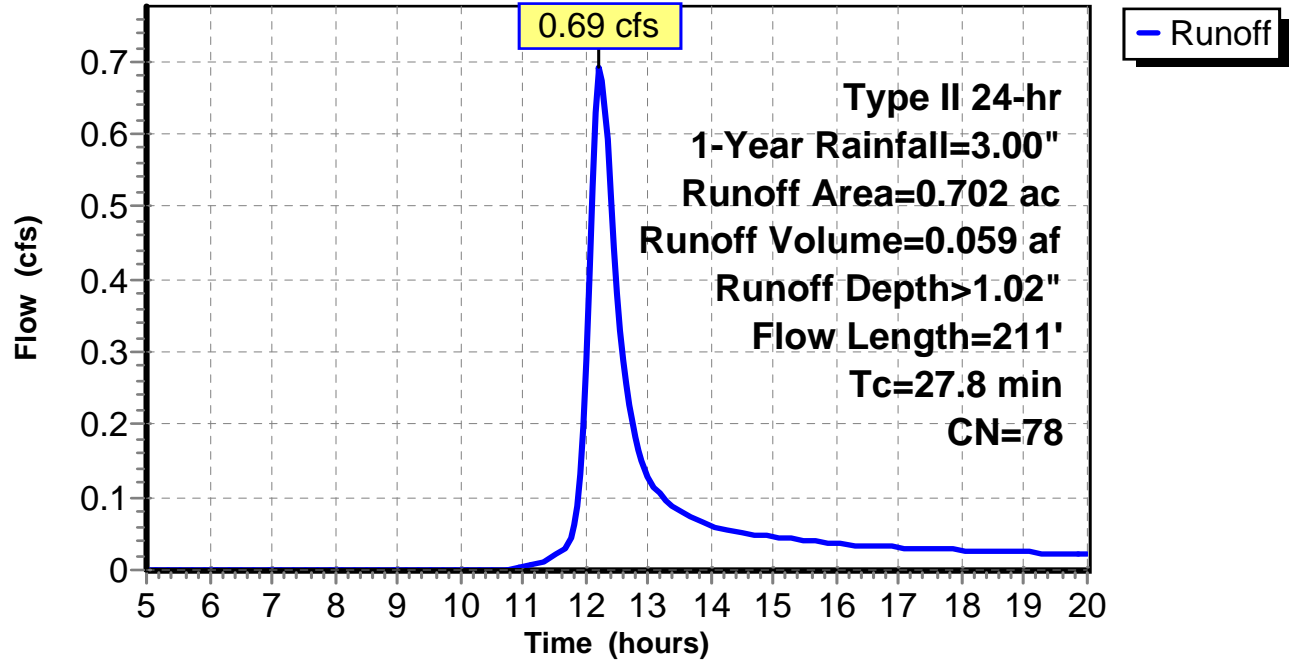
Subcatchment 15: C AR-706.015

Hydrograph



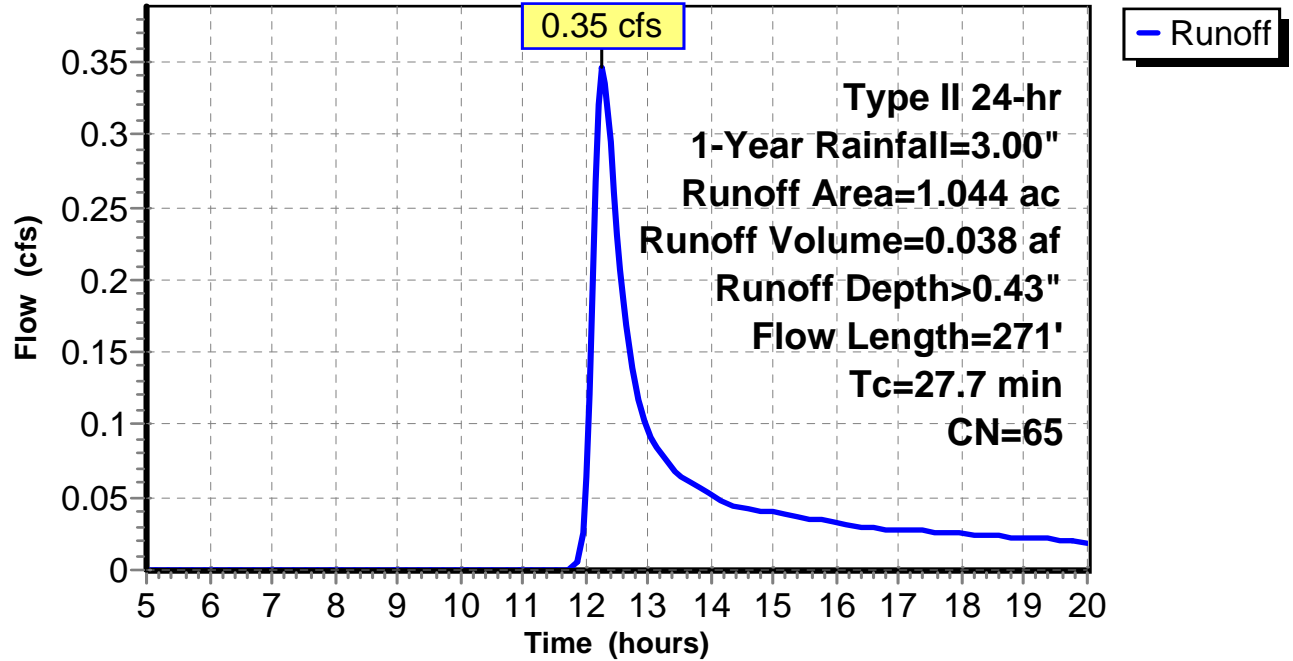
Subcatchment 16: C AR-706.016

Hydrograph



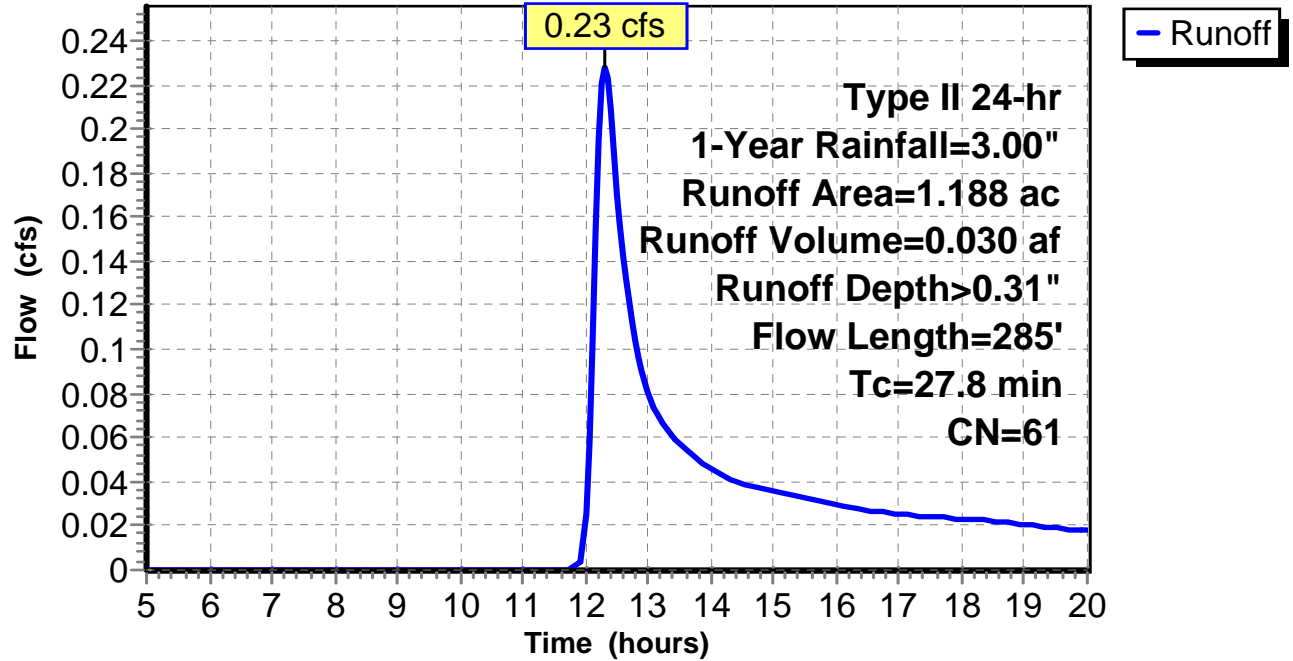
Subcatchment 17: C AR-706.017

Hydrograph



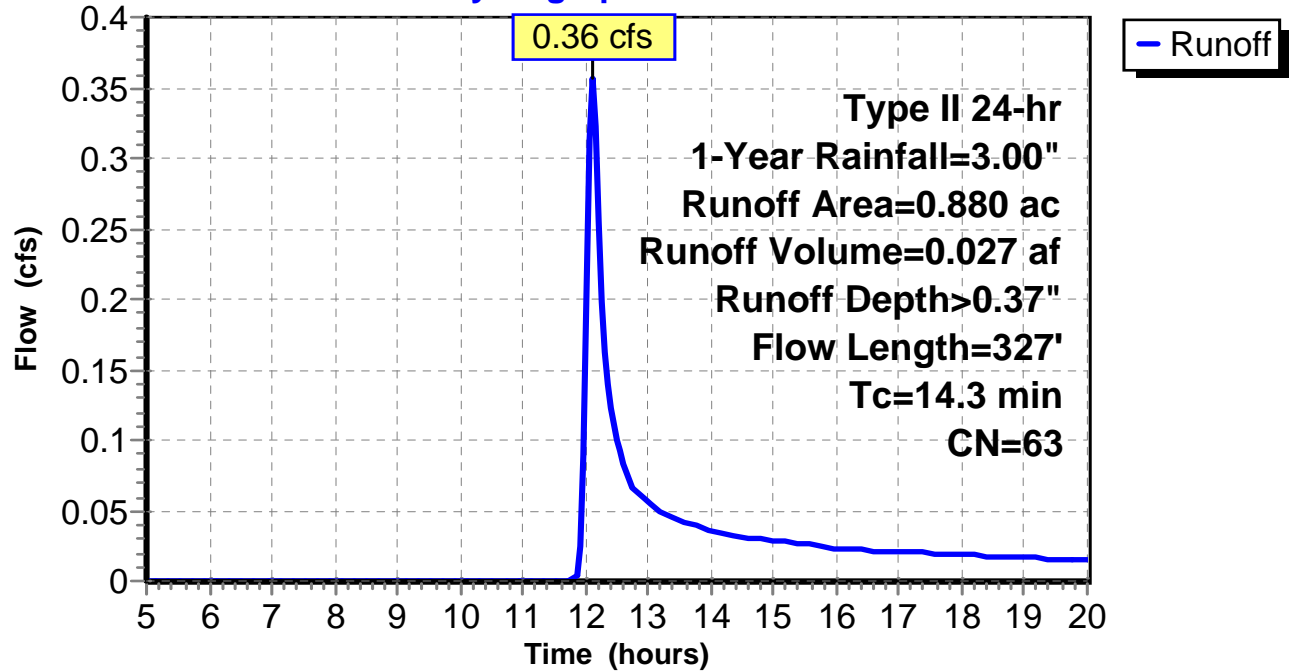
Subcatchment 18: C AR-706.018

Hydrograph



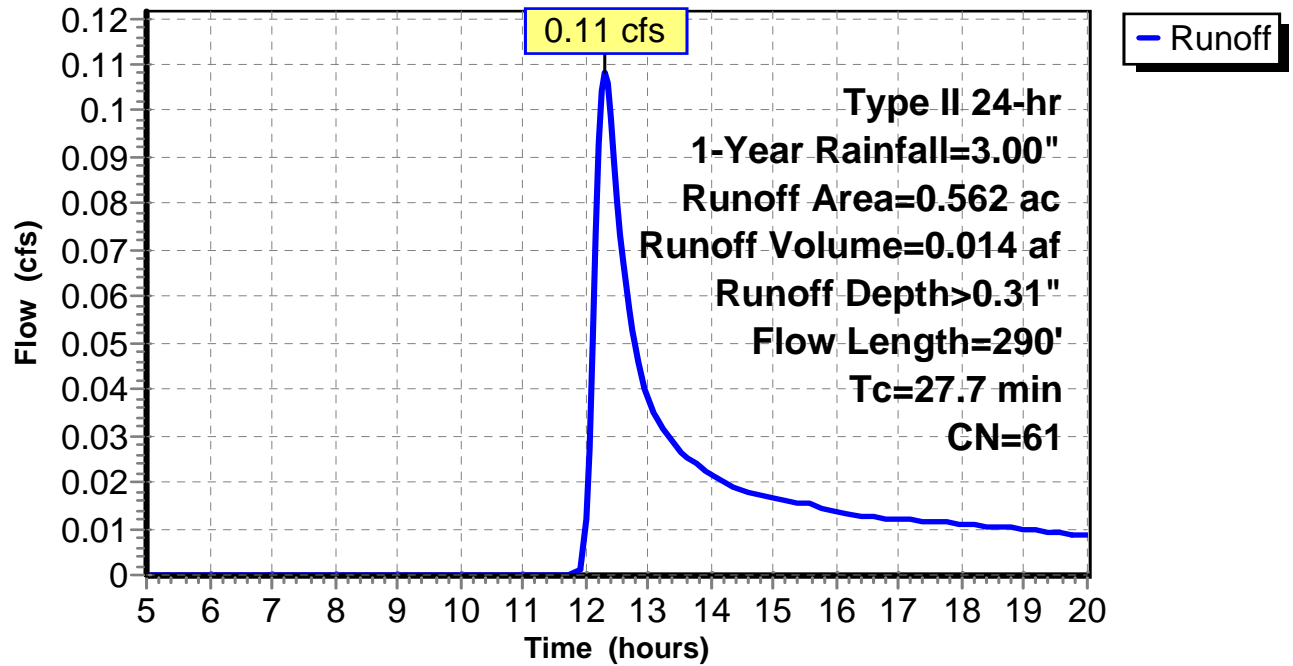
Subcatchment 19: C 323.003

Hydrograph



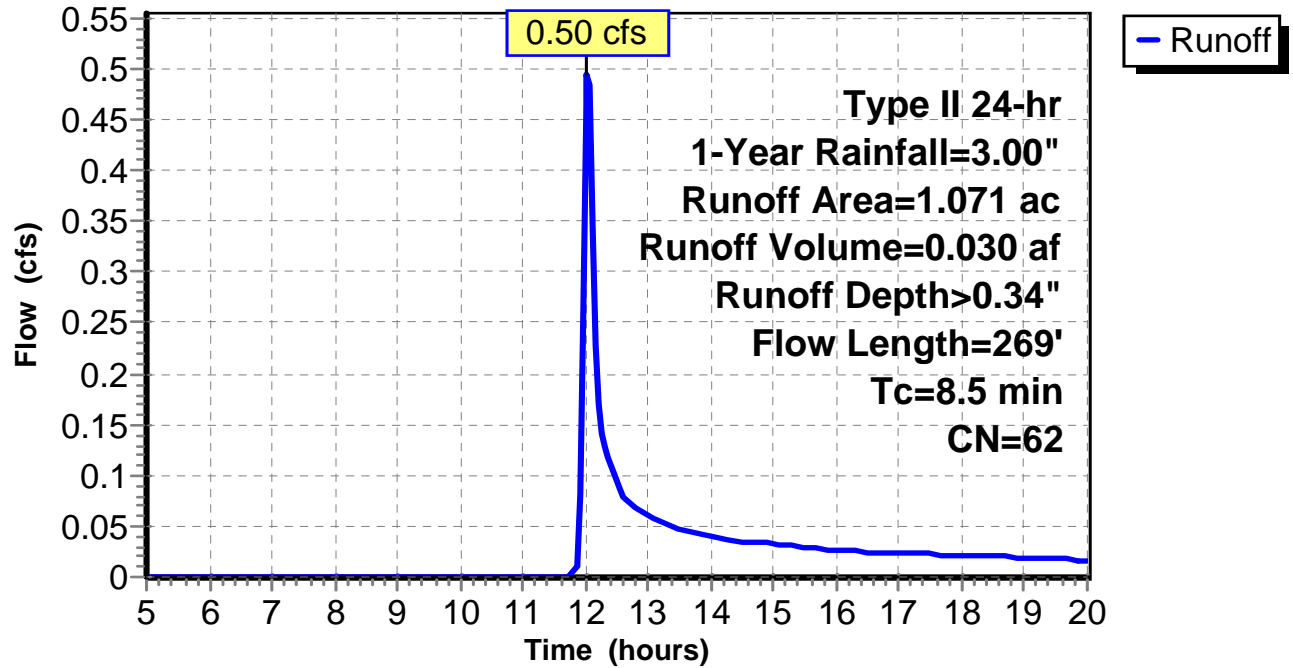
Subcatchment 20: C 323.004

Hydrograph



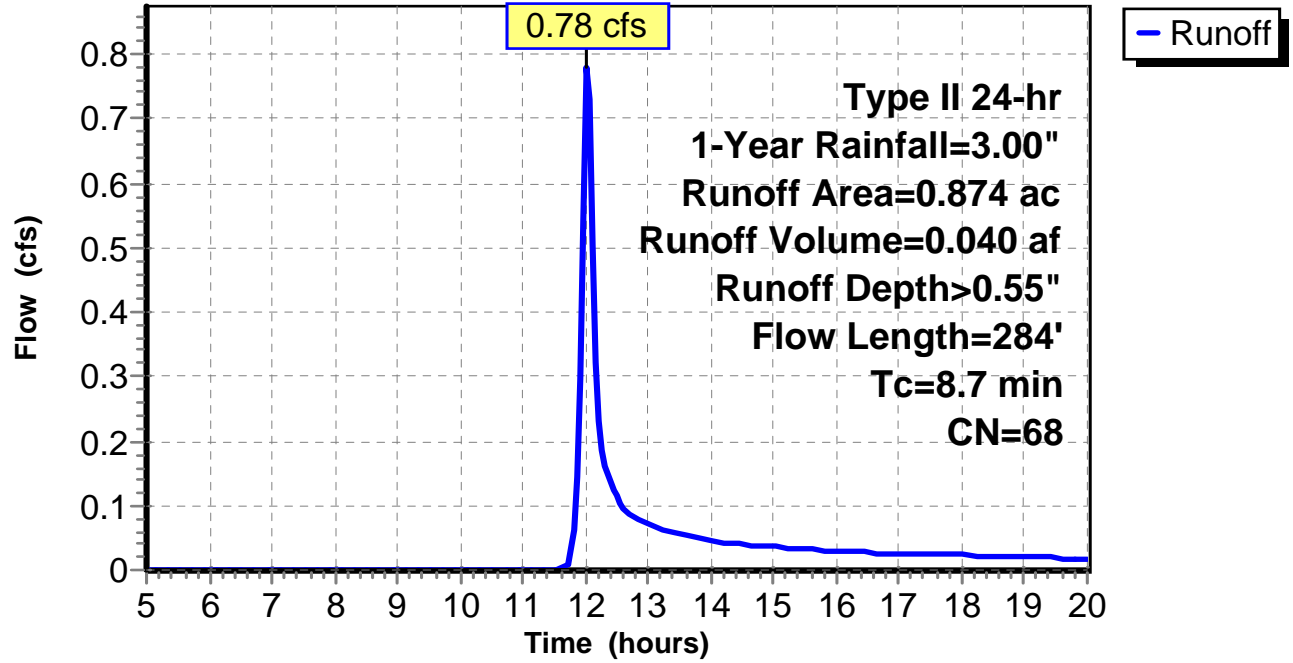
Subcatchment 21: C 323.005

Hydrograph



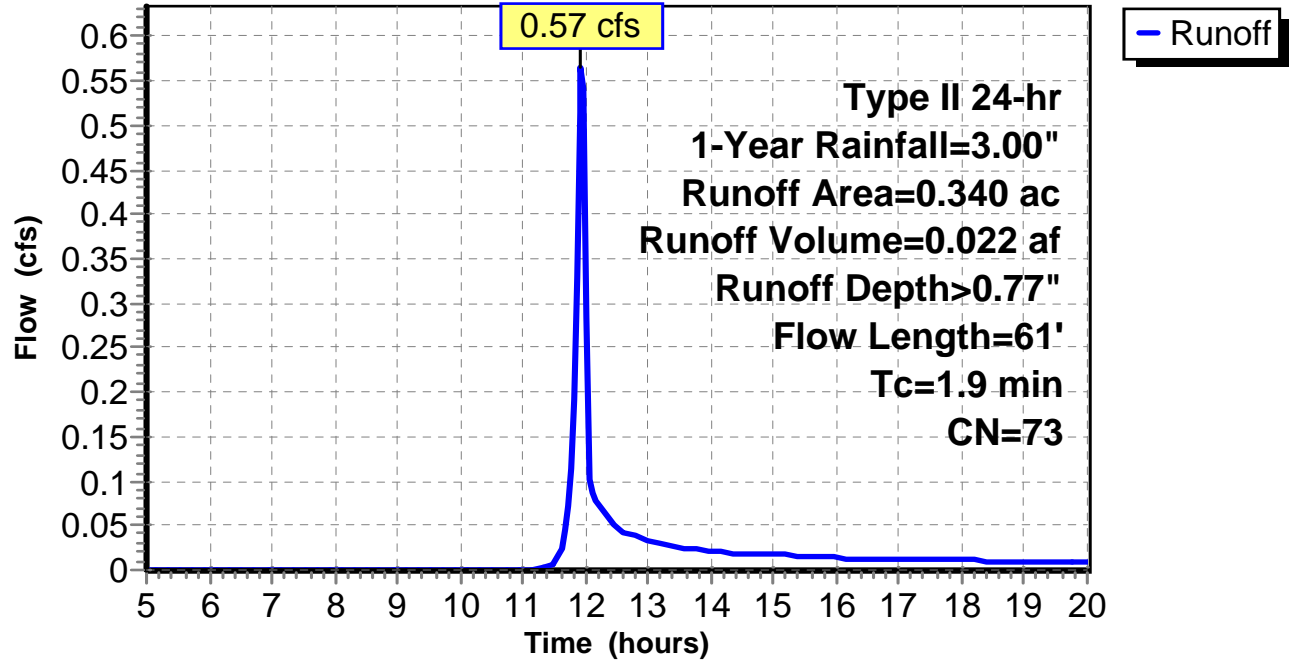
Subcatchment 22: C 323.006

Hydrograph



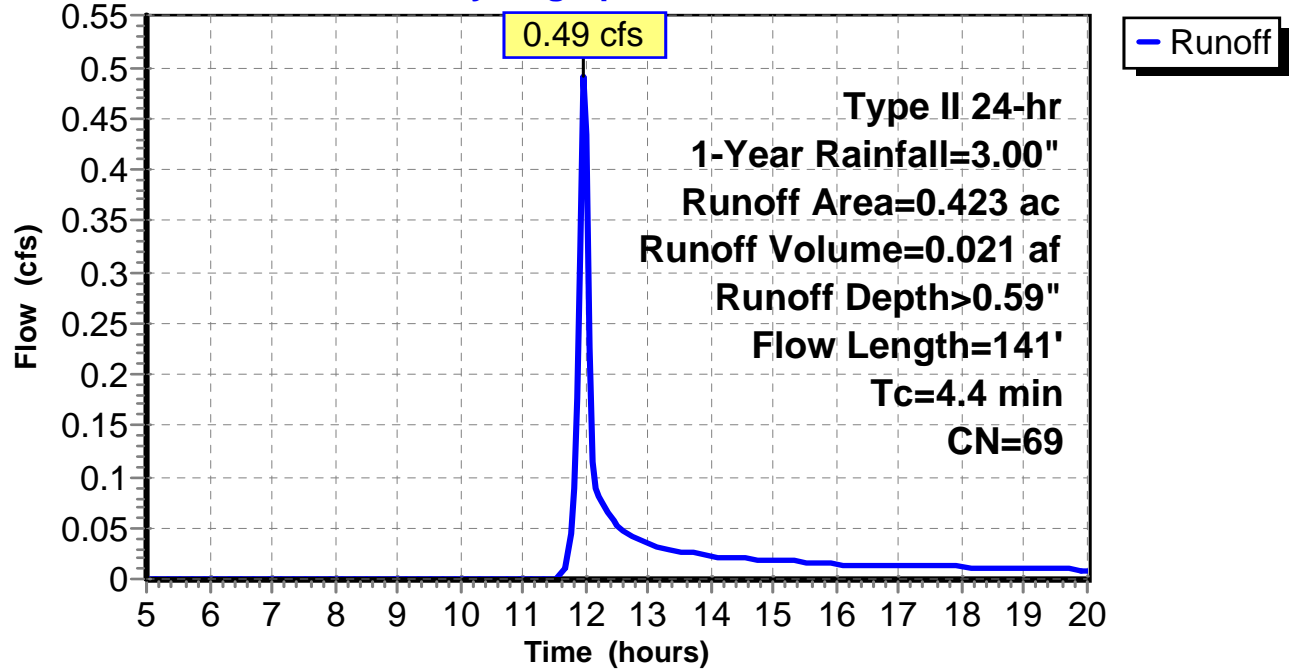
Subcatchment 23: C 323.007

Hydrograph



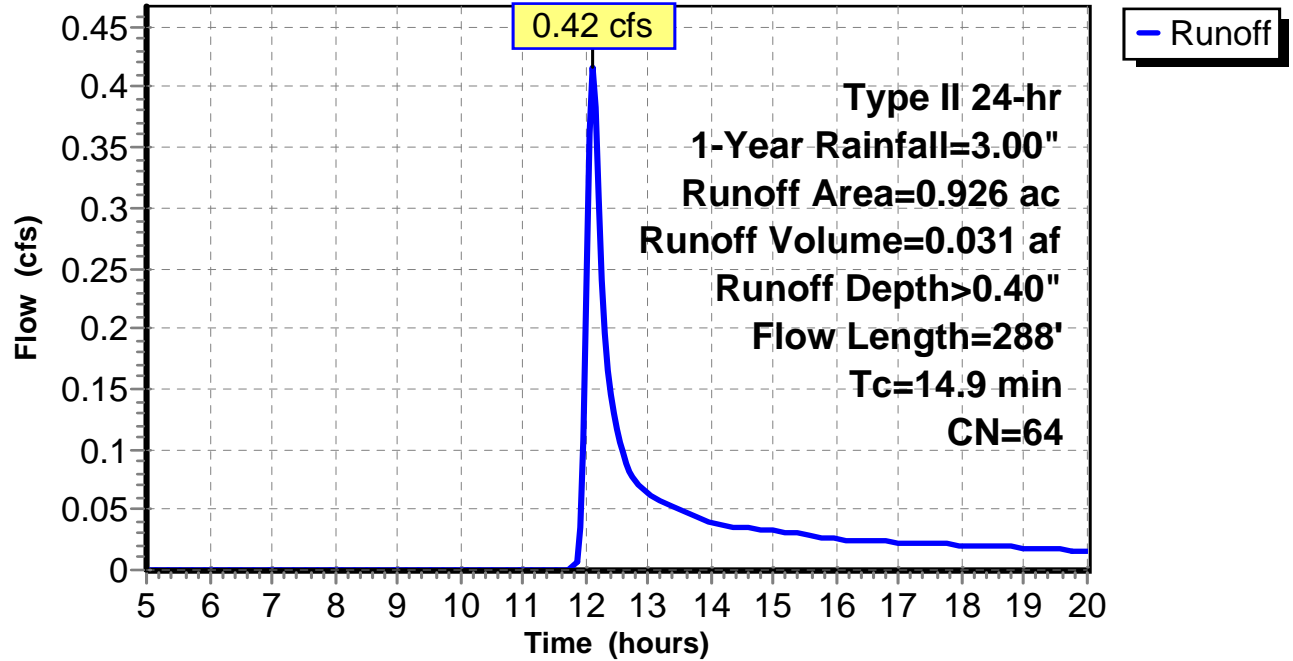
Subcatchment 24: C 323.008

Hydrograph



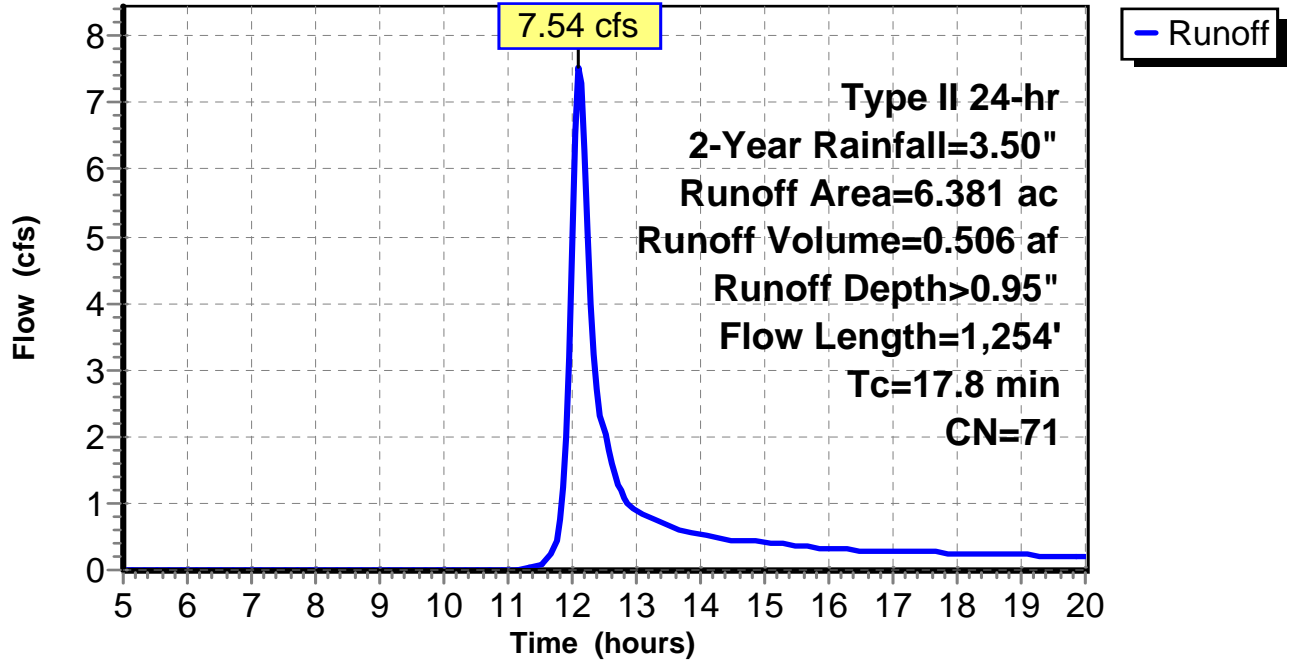
Subcatchment 25: C 323.009

Hydrograph



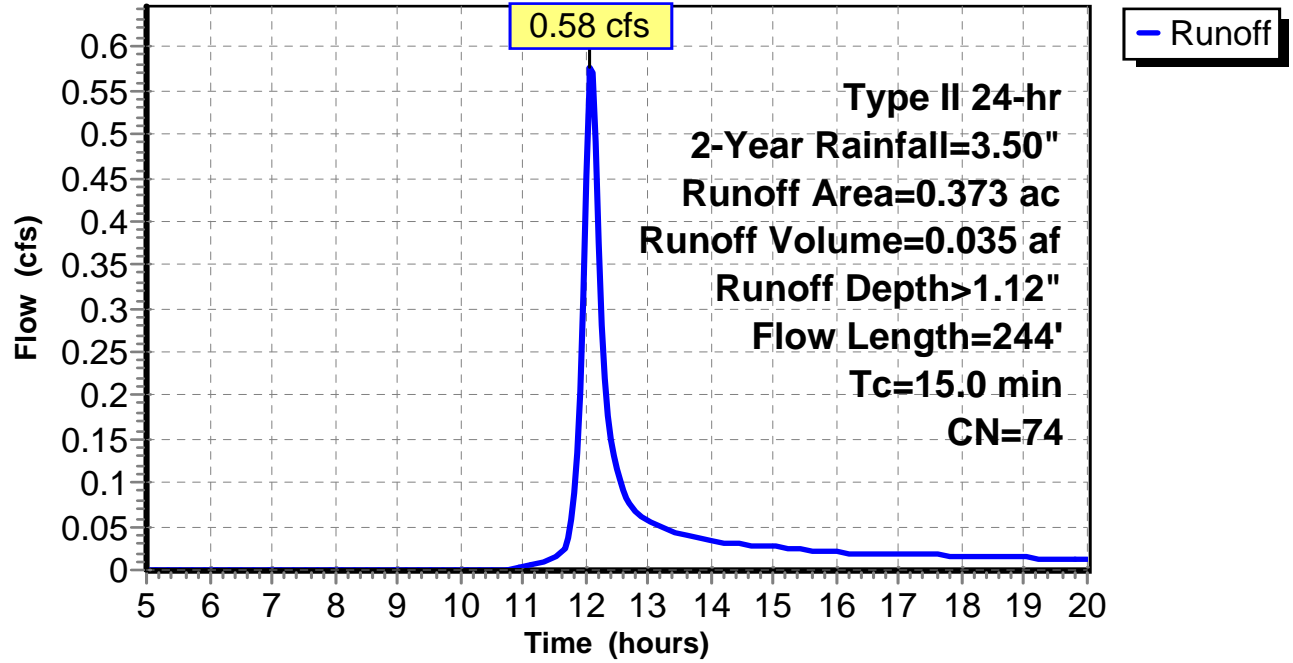
Subcatchment 1: C AR-706.001

Hydrograph



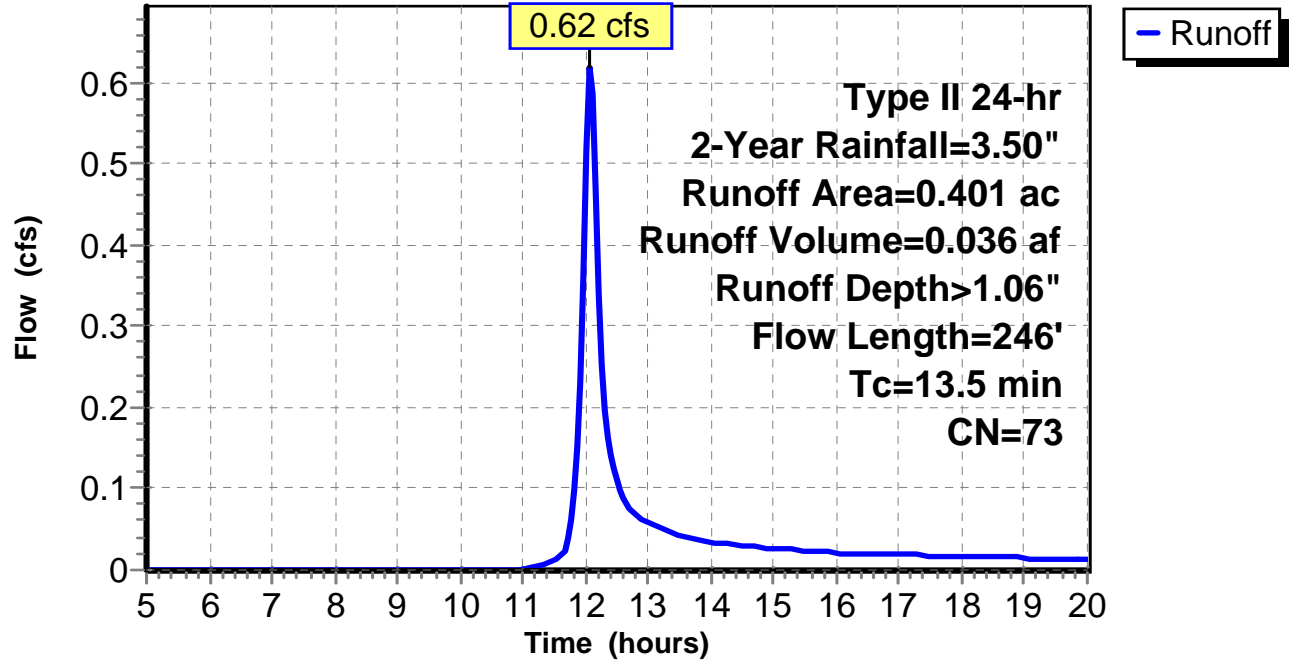
Subcatchment 2: C AR-706.002

Hydrograph



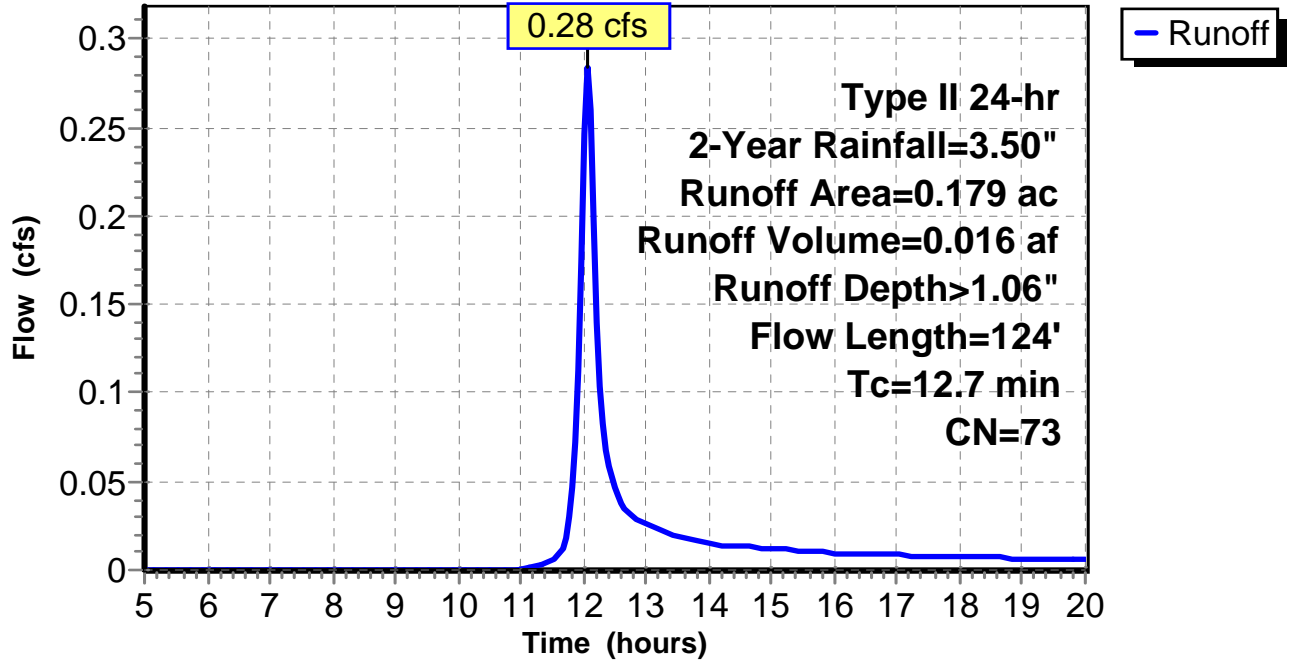
Subcatchment 3: C AR-706.003

Hydrograph



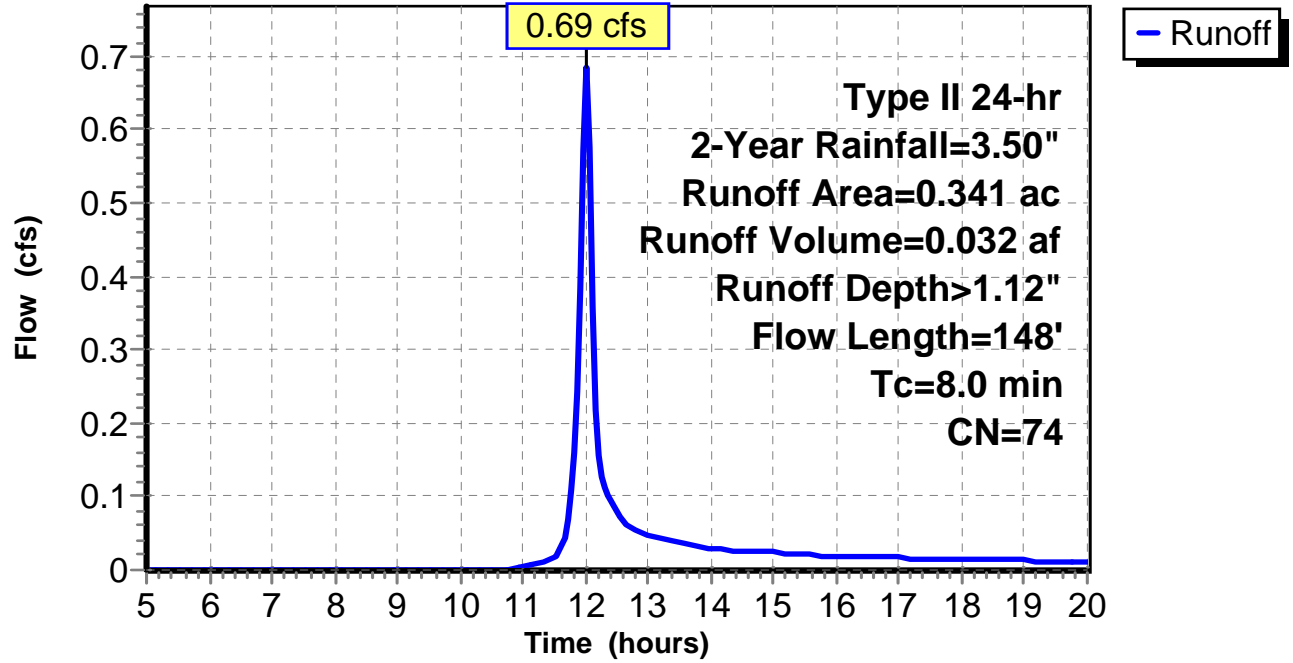
Subcatchment 4: C AR-706.004

Hydrograph



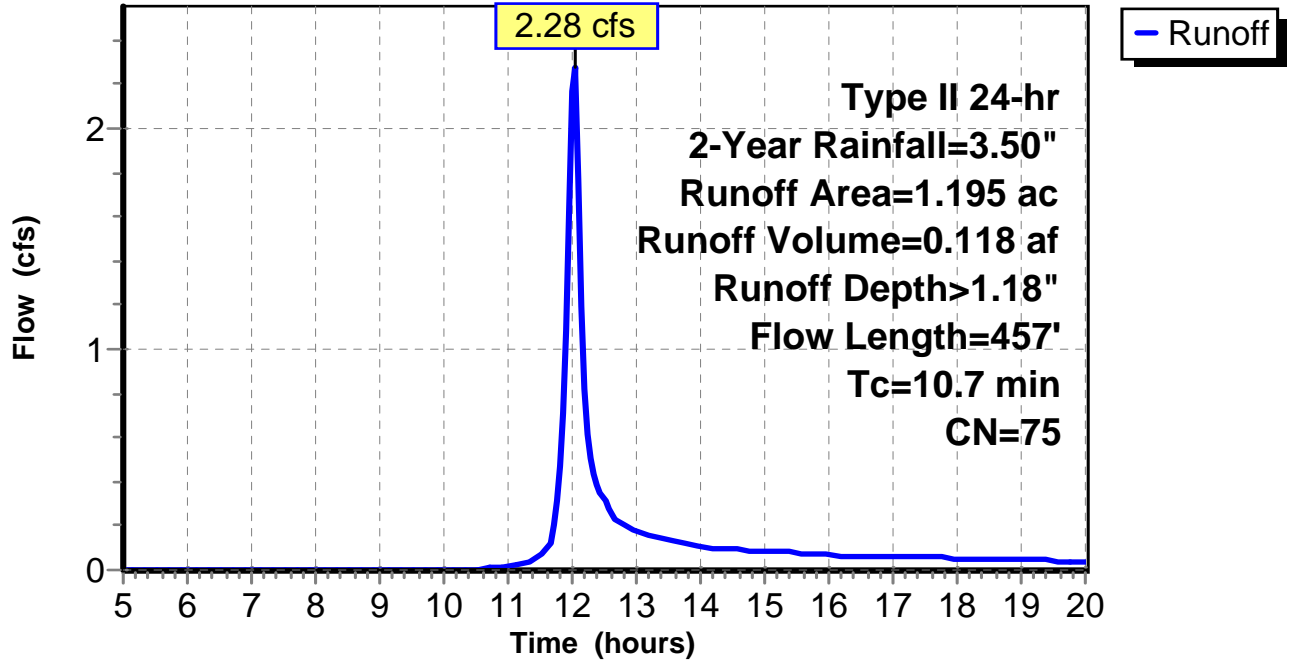
Subcatchment 5: C AR-706.005

Hydrograph



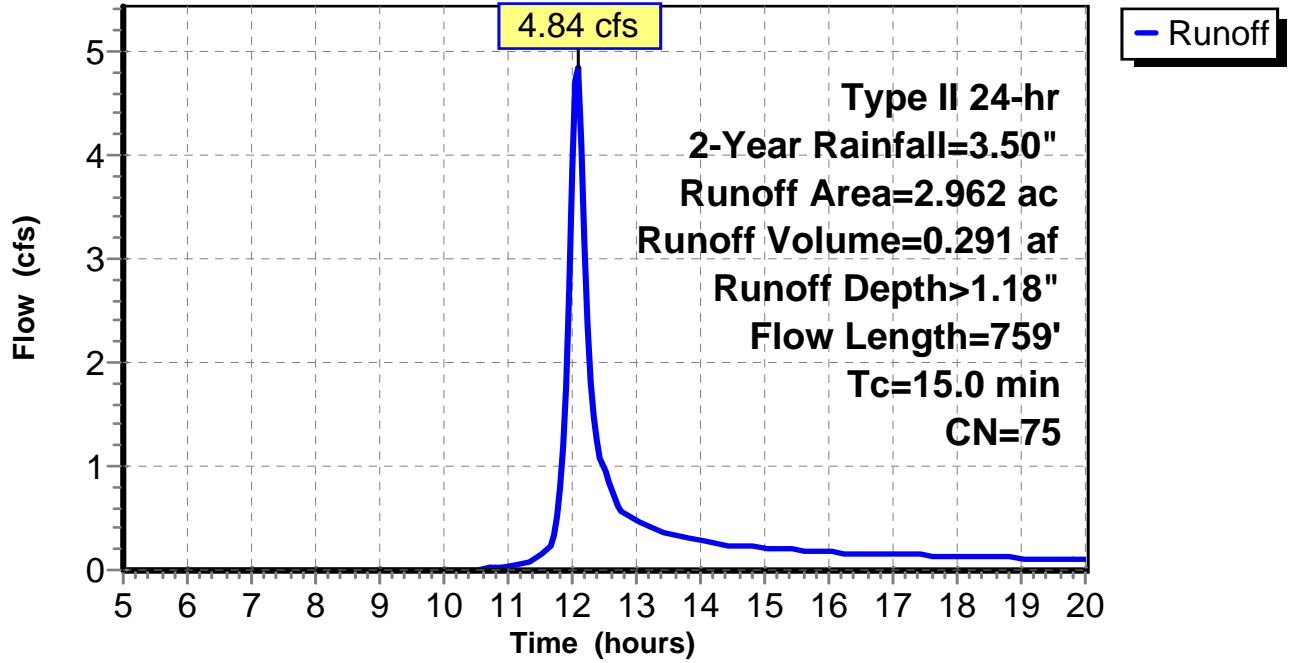
Subcatchment 6: C AR-706.006

Hydrograph



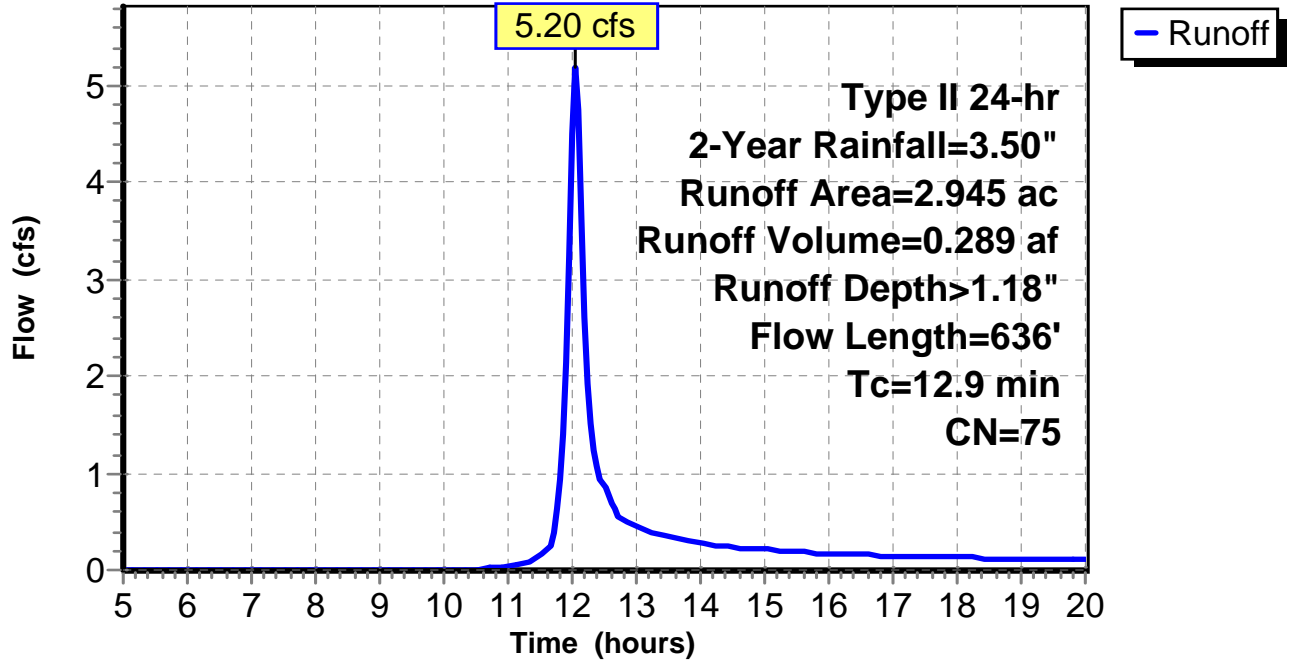
Subcatchment 7: C AR-706.007

Hydrograph



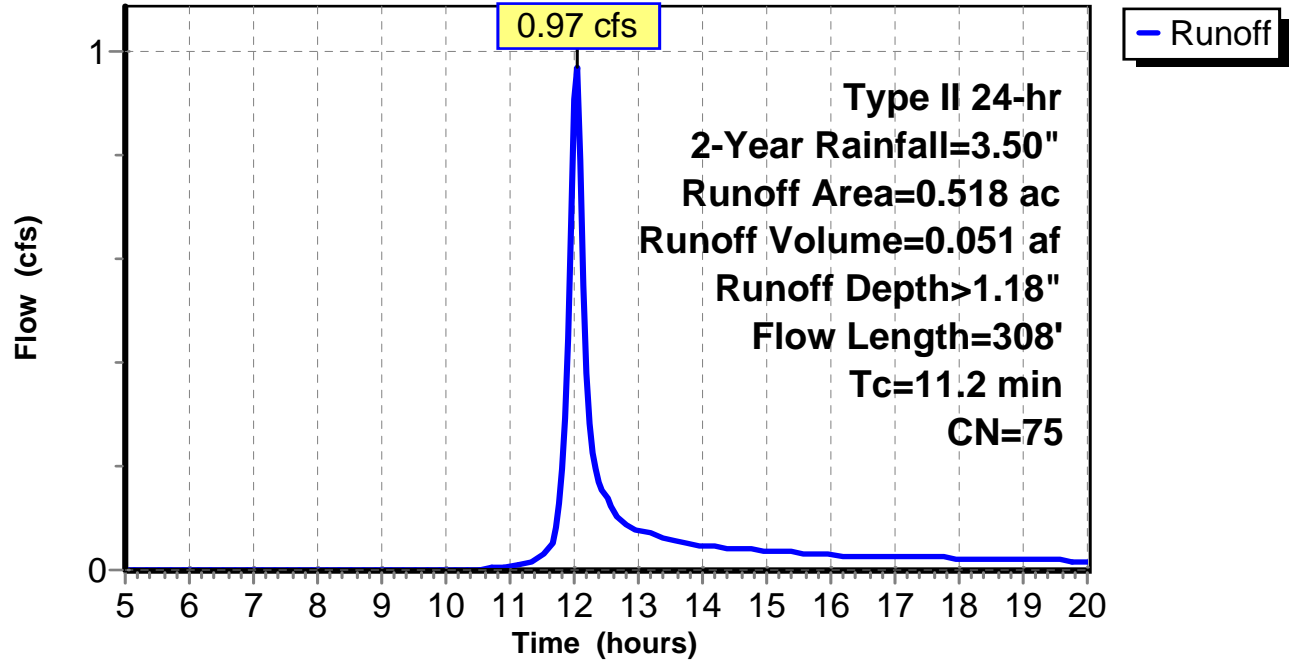
Subcatchment 8: C AR-706.008

Hydrograph



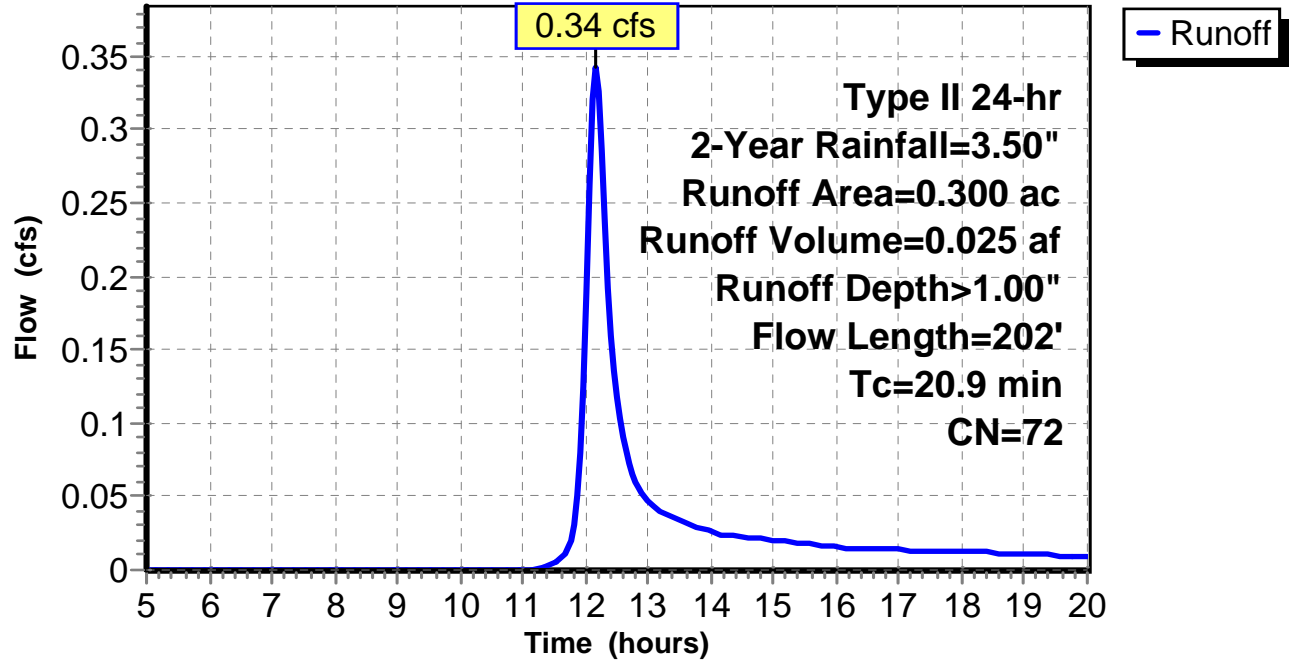
Subcatchment 9: C AR-706.009

Hydrograph



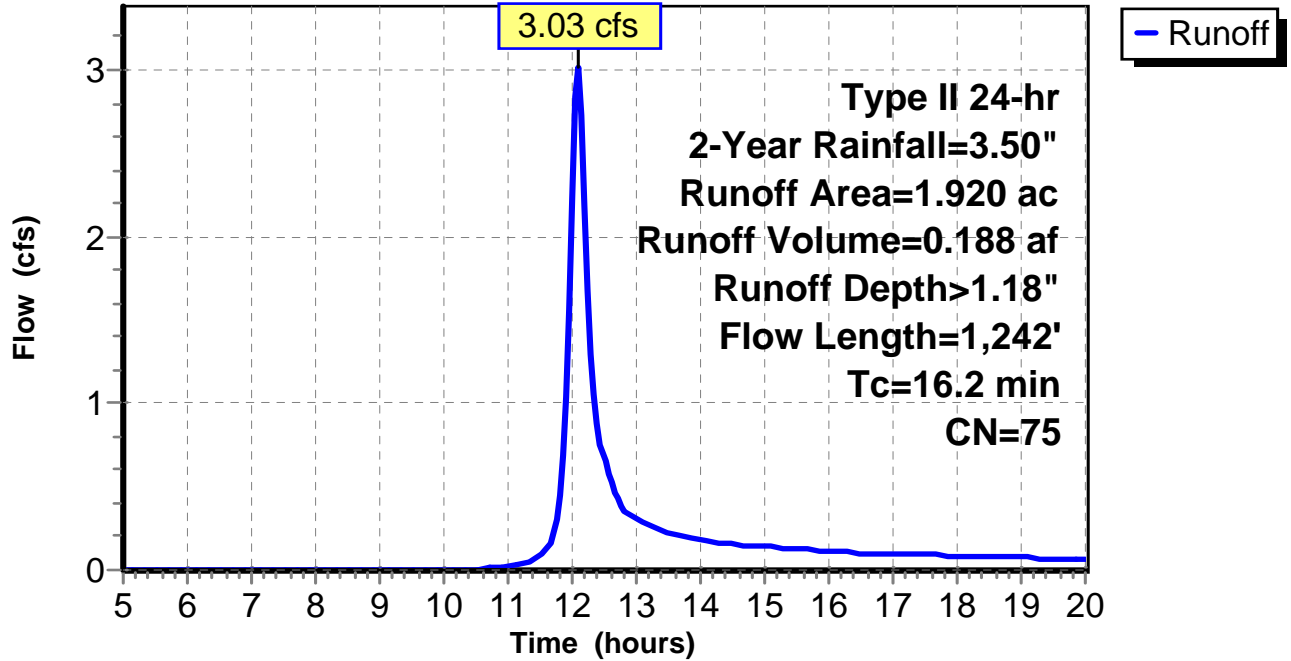
Subcatchment 10: C AR-706.010

Hydrograph



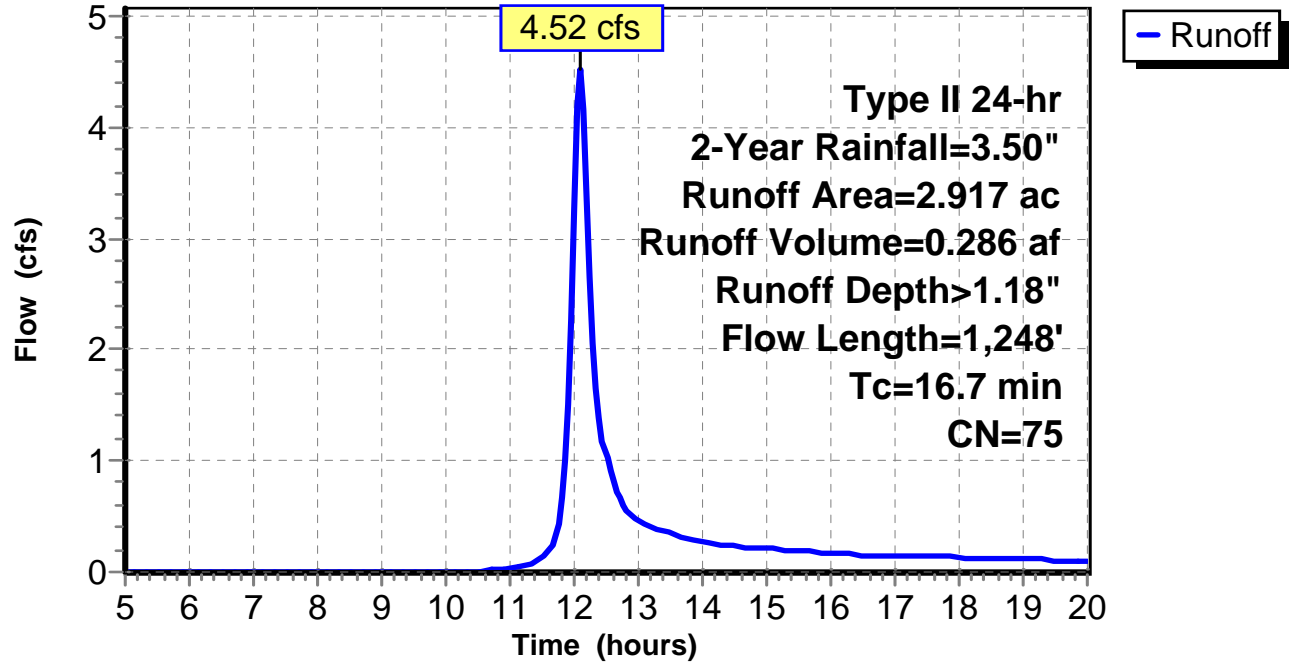
Subcatchment 11: C AR-706.011

Hydrograph



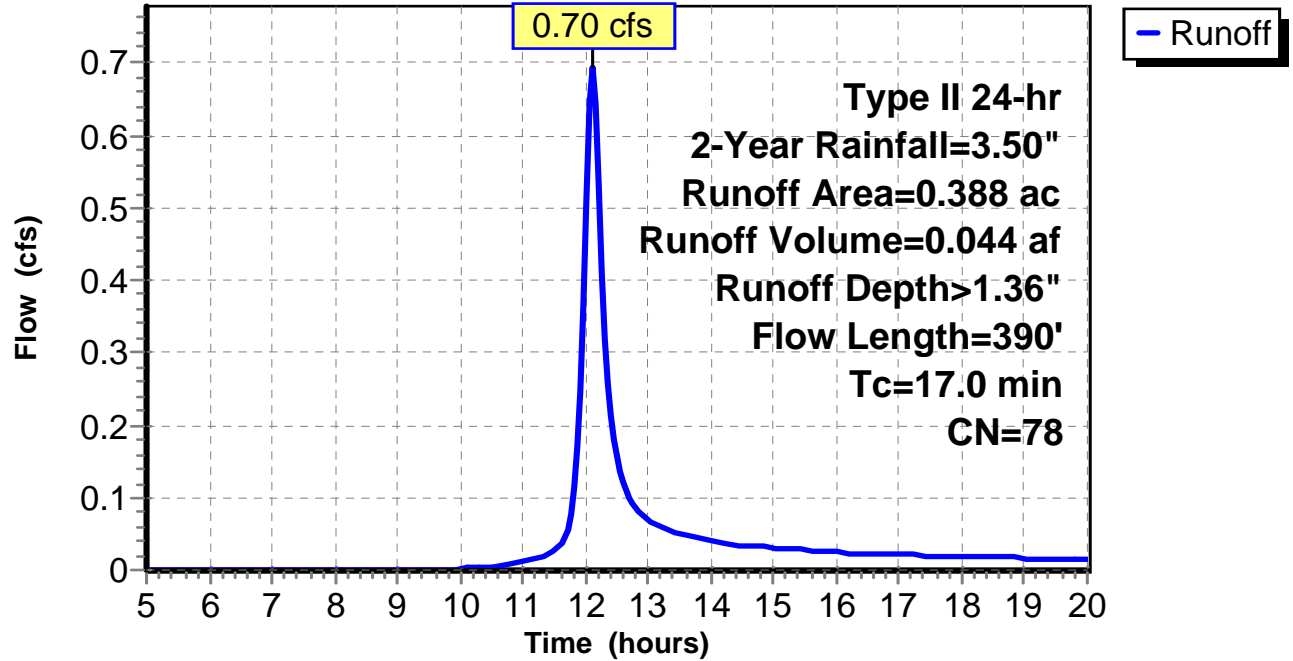
Subcatchment 12: C AR-706.012

Hydrograph



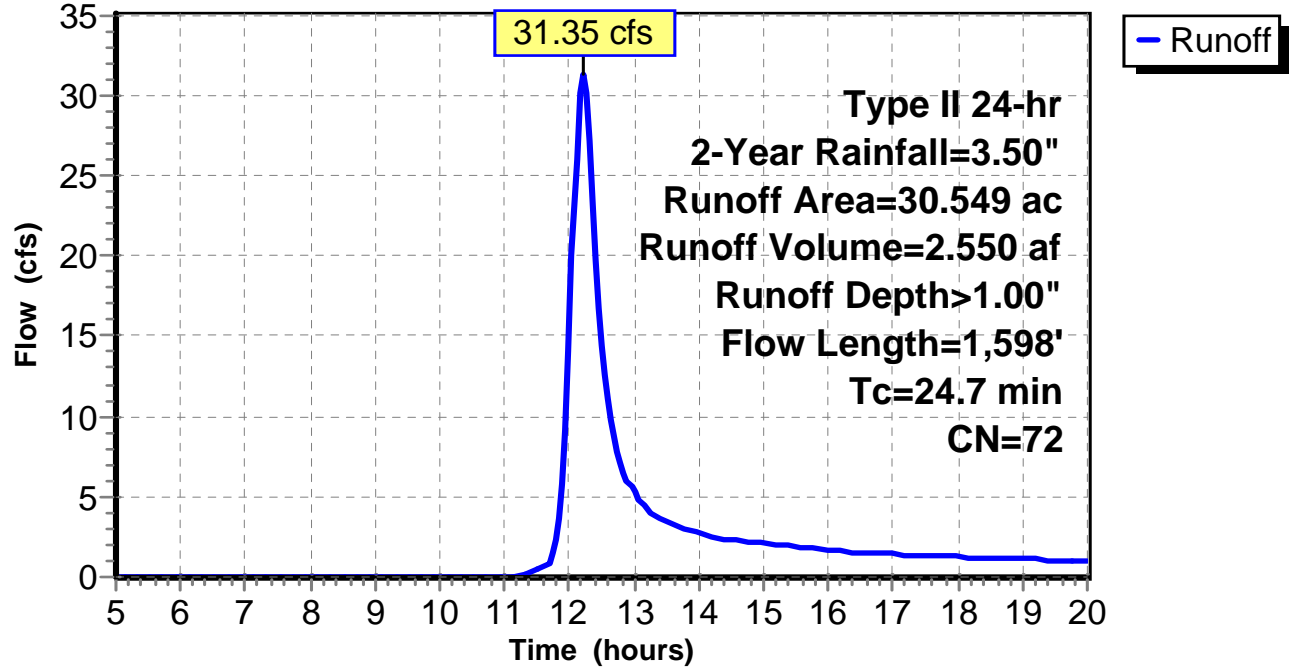
Subcatchment 13: C AR-706.013

Hydrograph



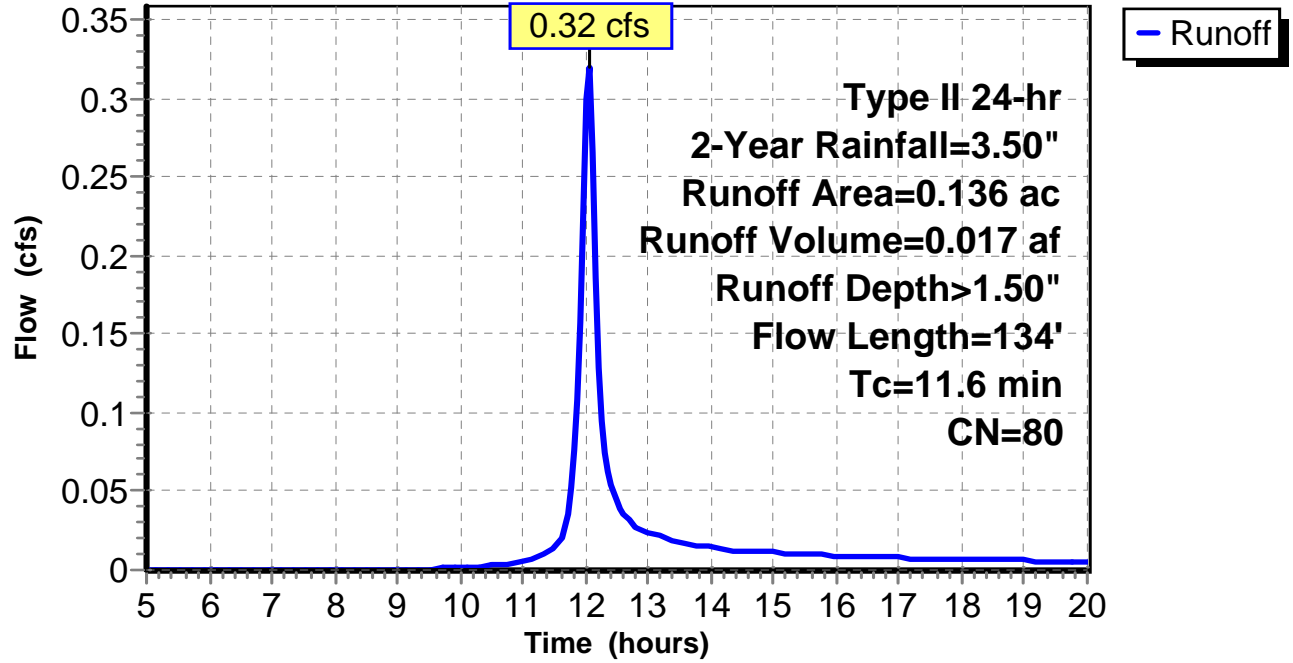
Subcatchment 14: C AR-706.014

Hydrograph



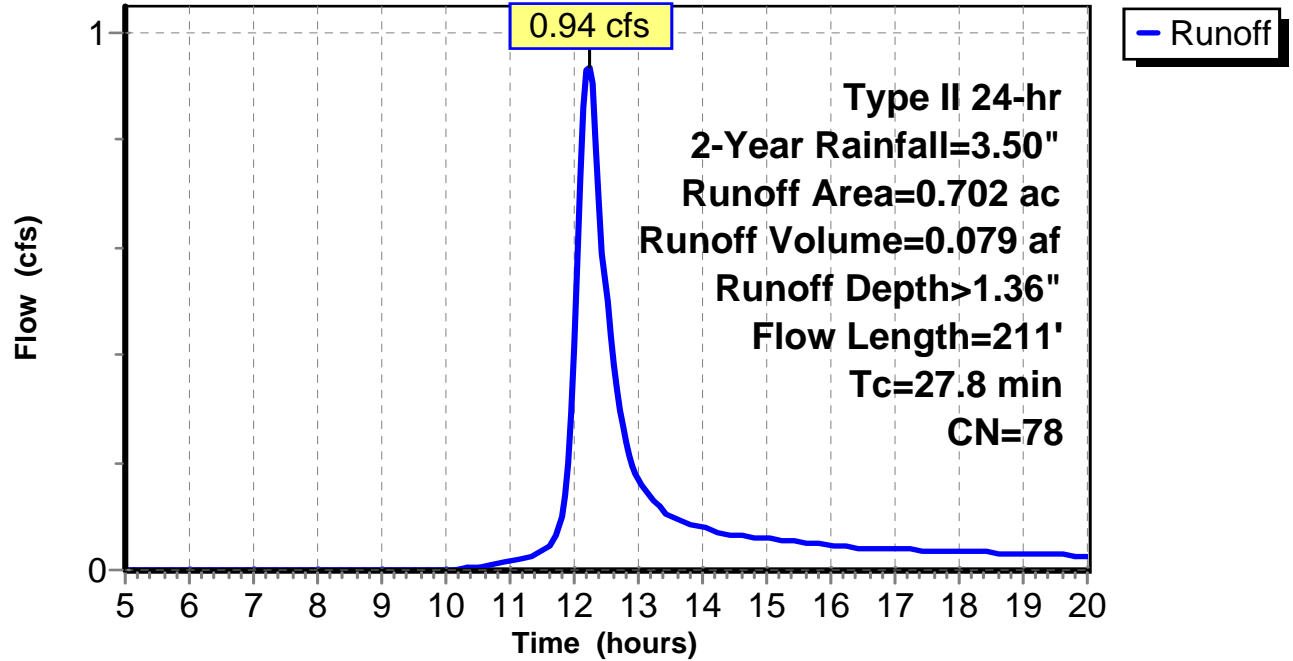
Subcatchment 15: C AR-706.015

Hydrograph



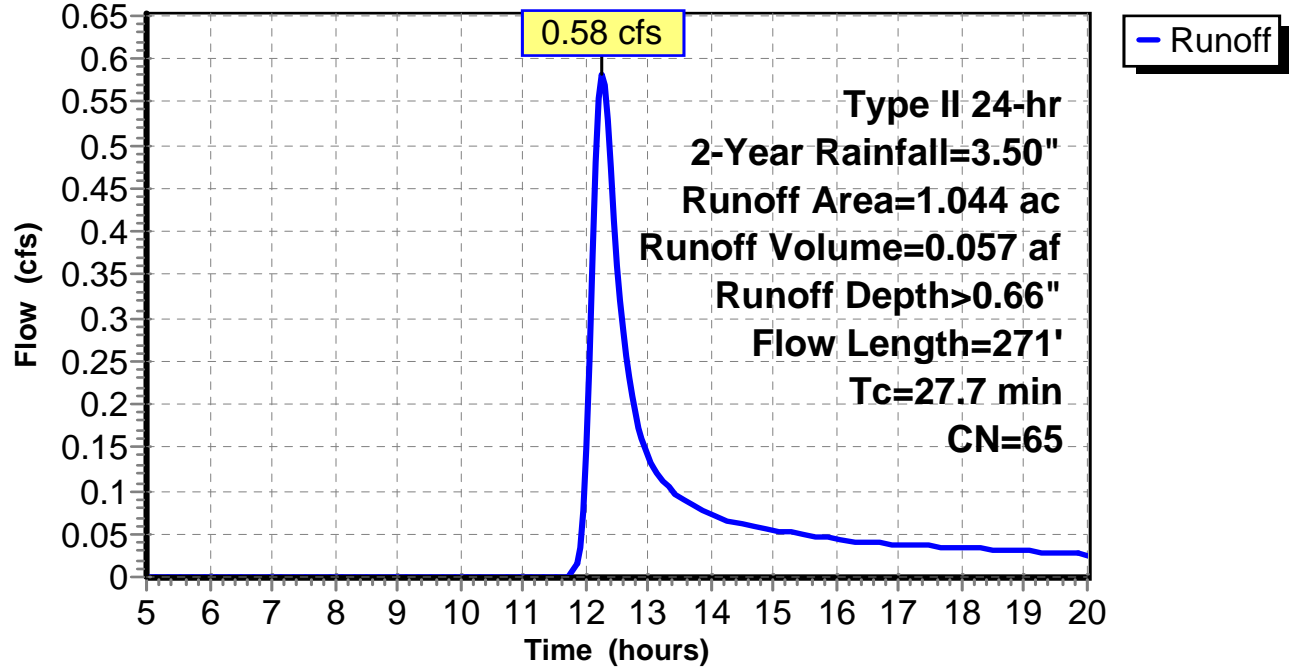
Subcatchment 16: C AR-706.016

Hydrograph



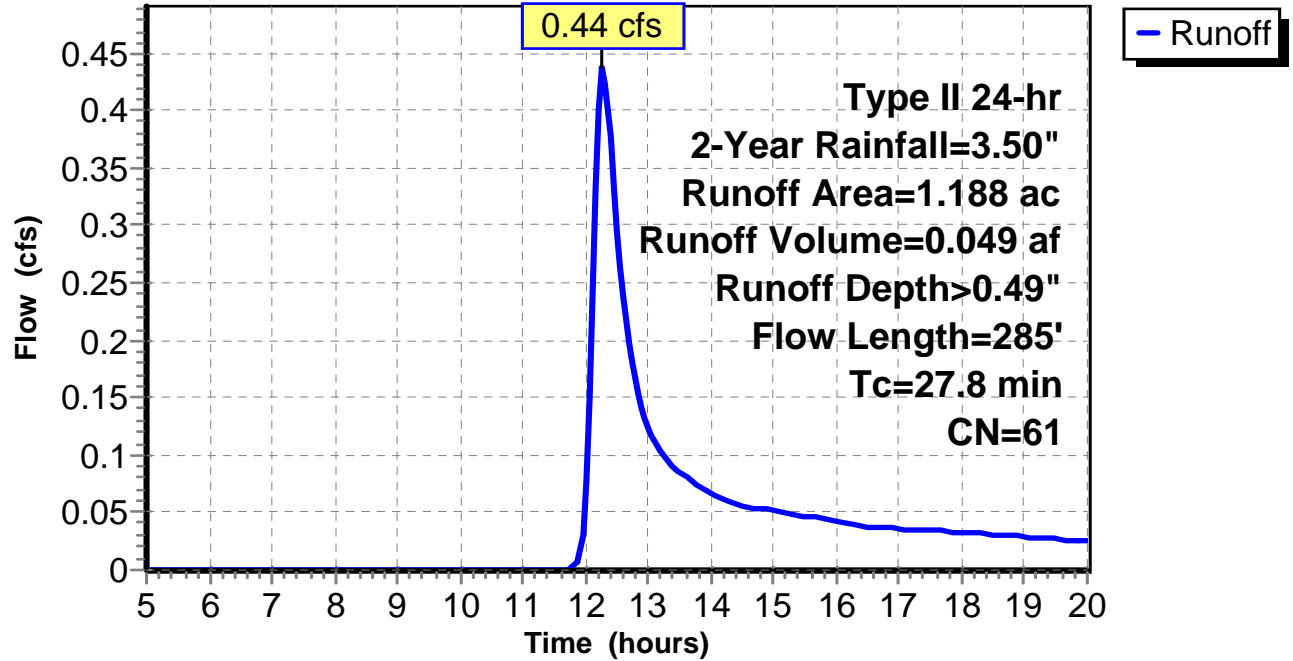
Subcatchment 17: C AR-706.017

Hydrograph



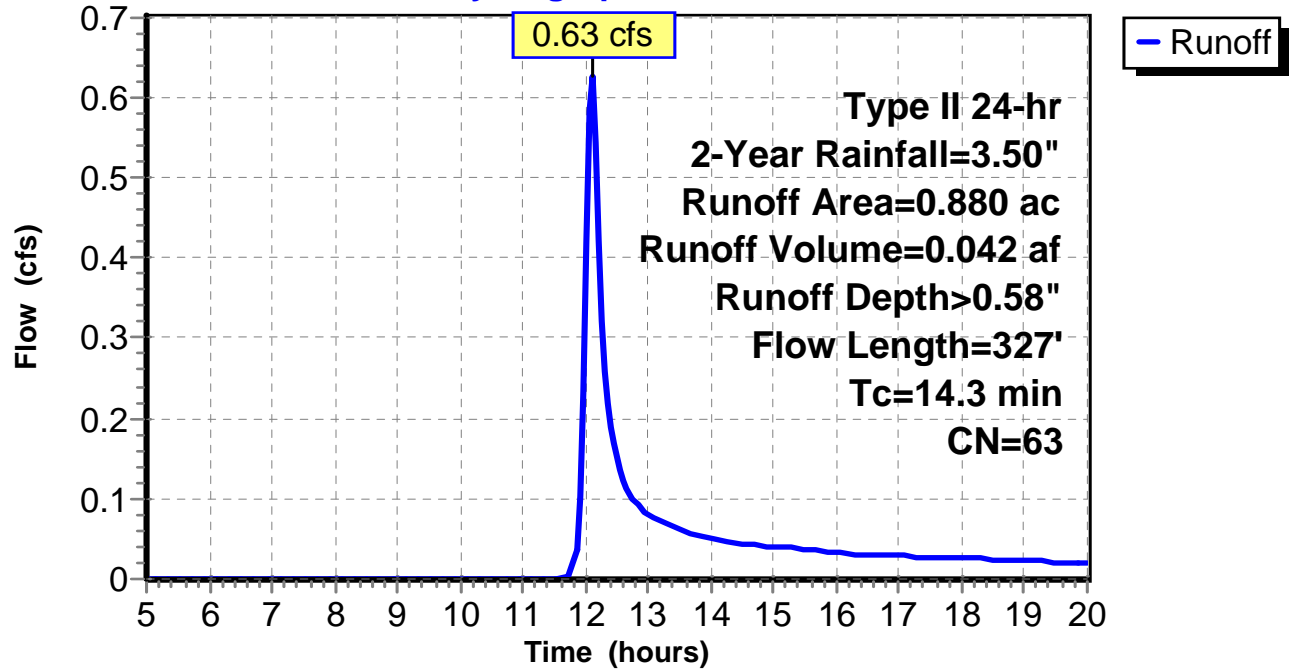
Subcatchment 18: C AR-706.018

Hydrograph



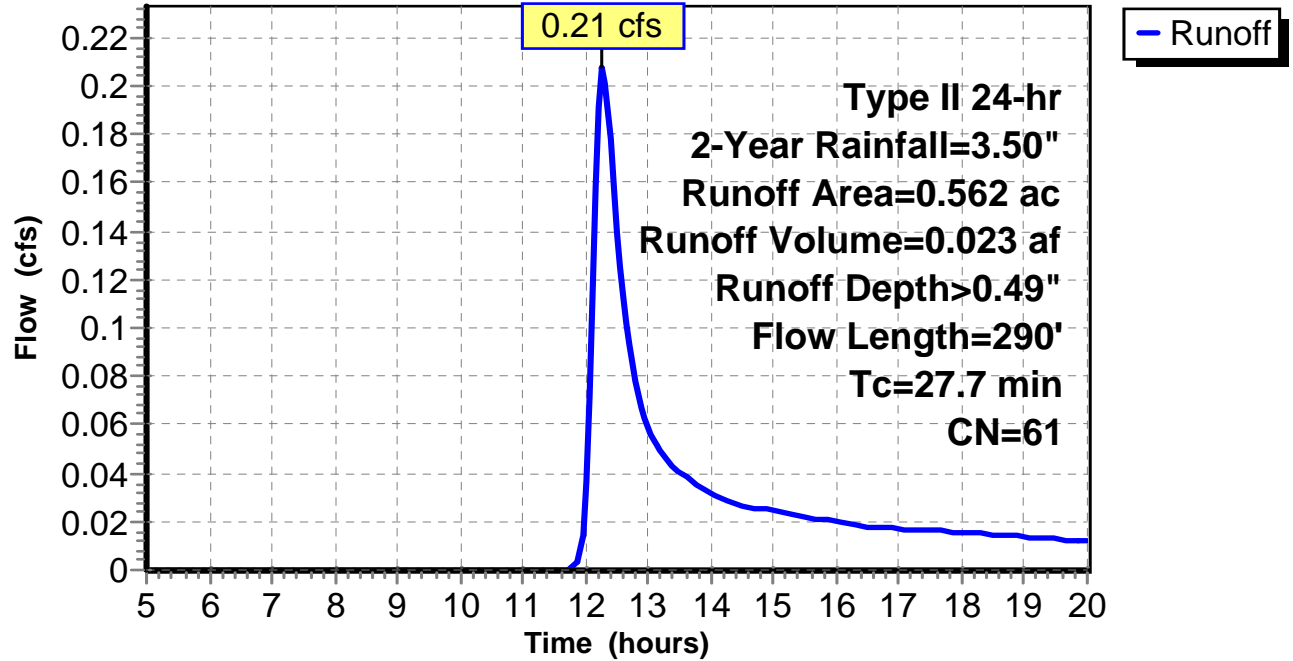
Subcatchment 19: C 323.003

Hydrograph



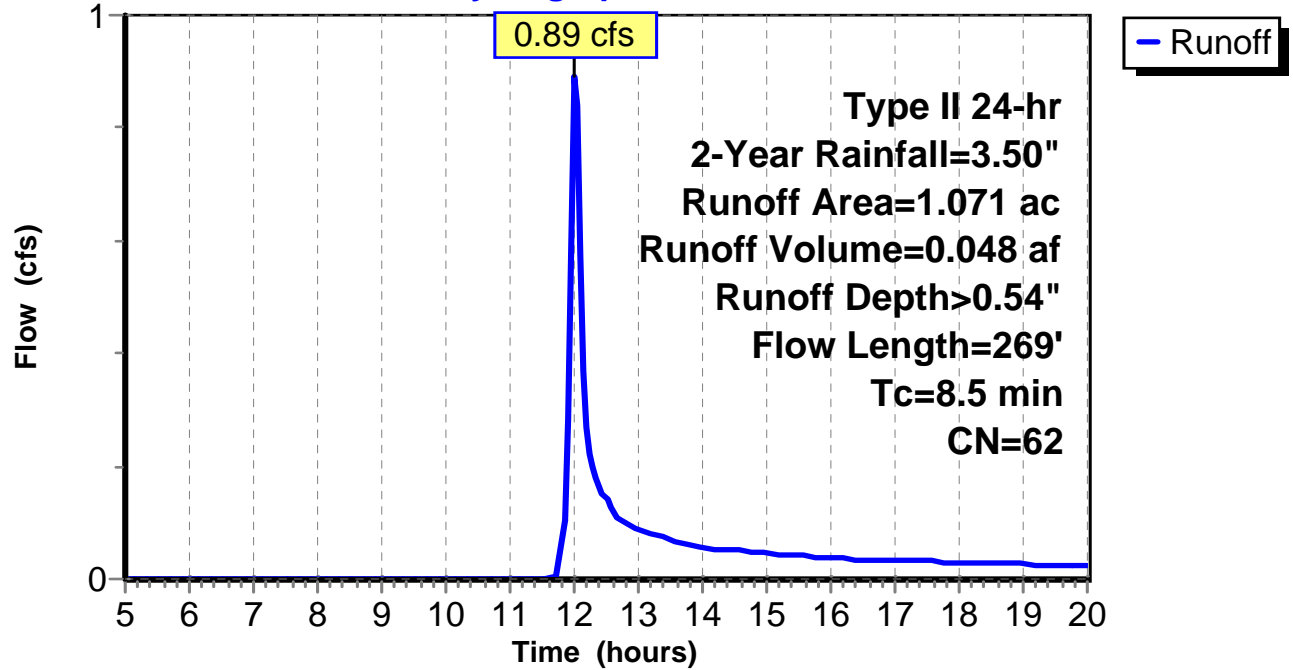
Subcatchment 20: C 323.004

Hydrograph



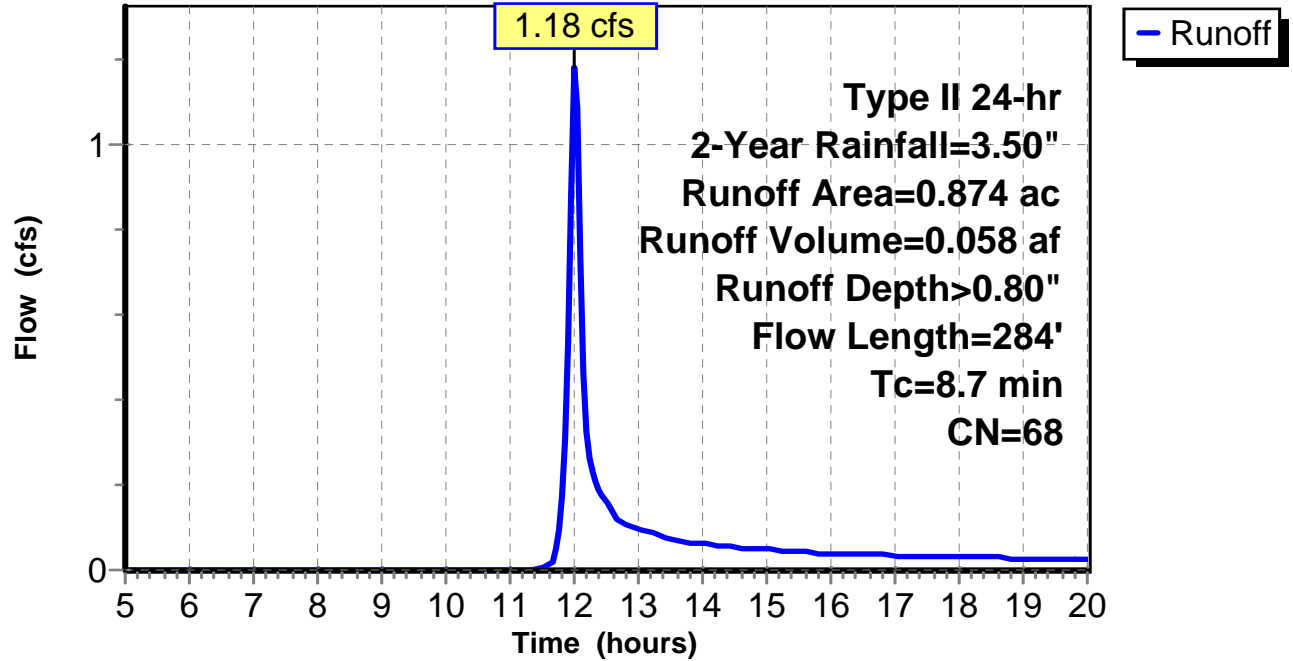
Subcatchment 21: C 323.005

Hydrograph



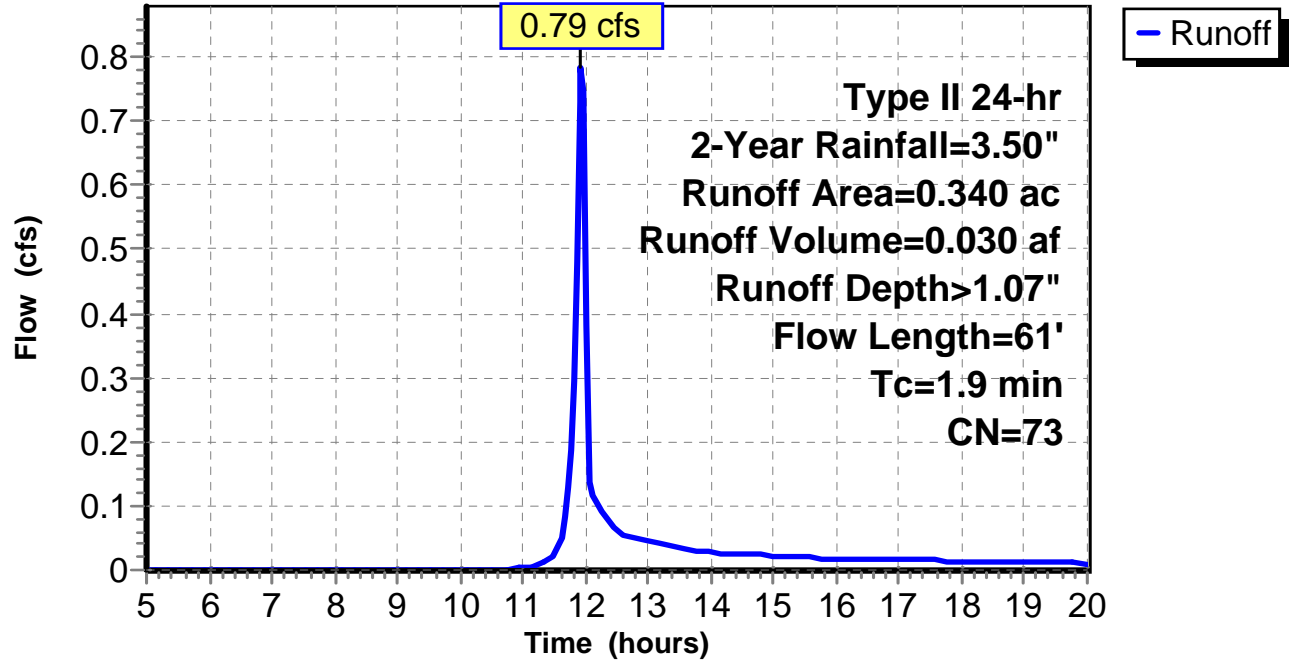
Subcatchment 22: C 323.006

Hydrograph



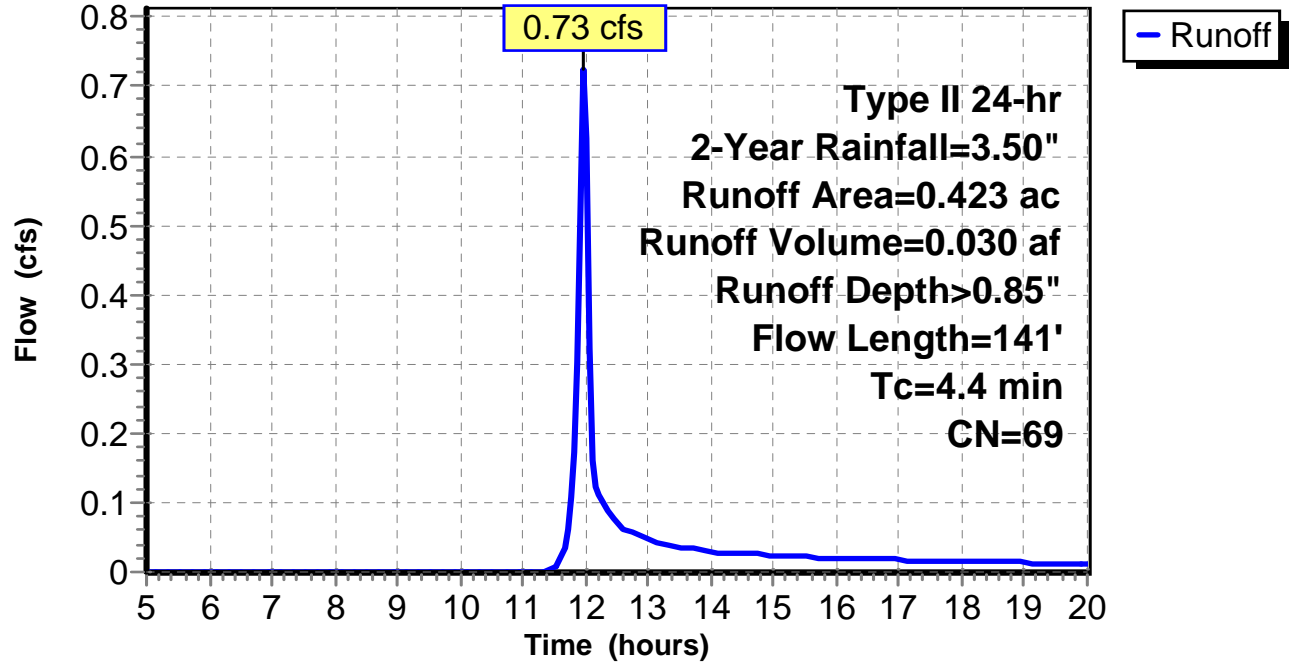
Subcatchment 23: C 323.007

Hydrograph



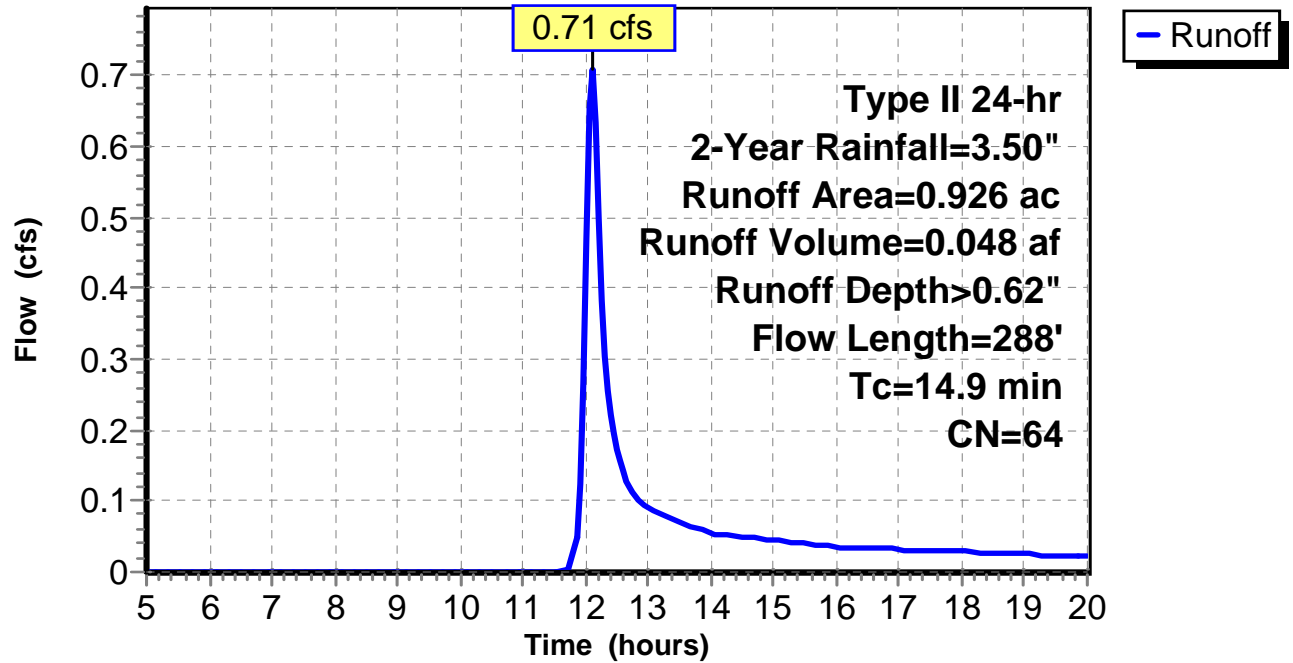
Subcatchment 24: C 323.008

Hydrograph



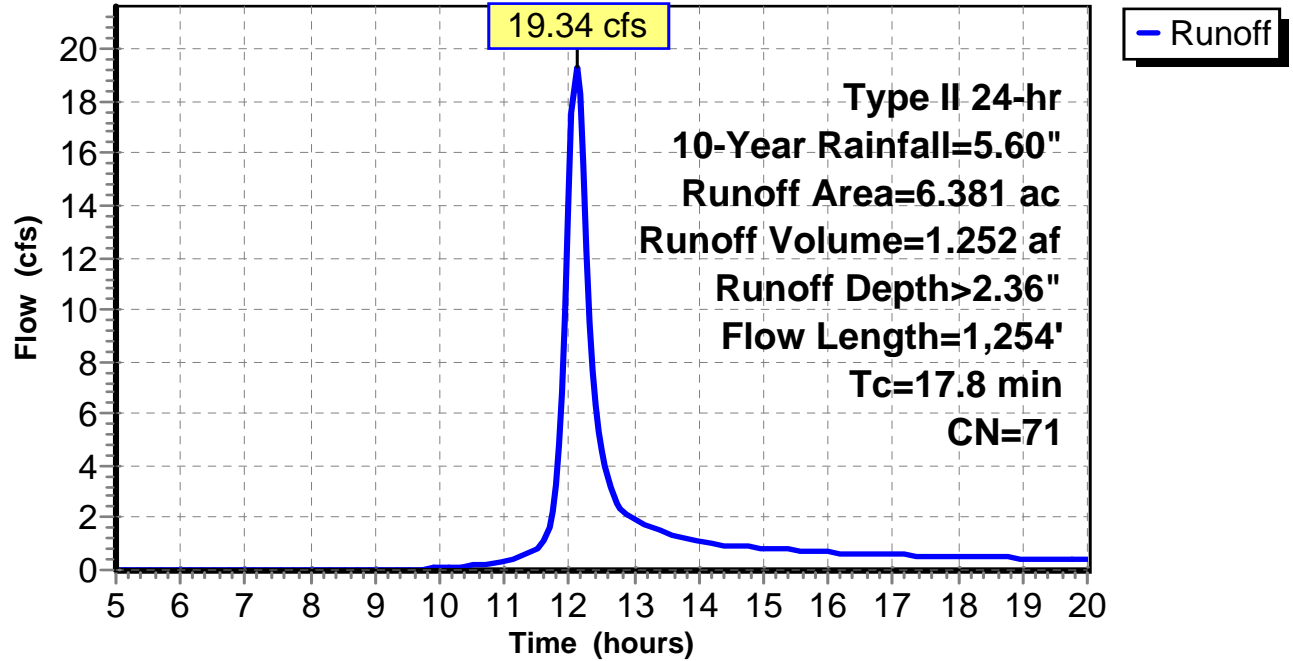
Subcatchment 25: C 323.009

Hydrograph



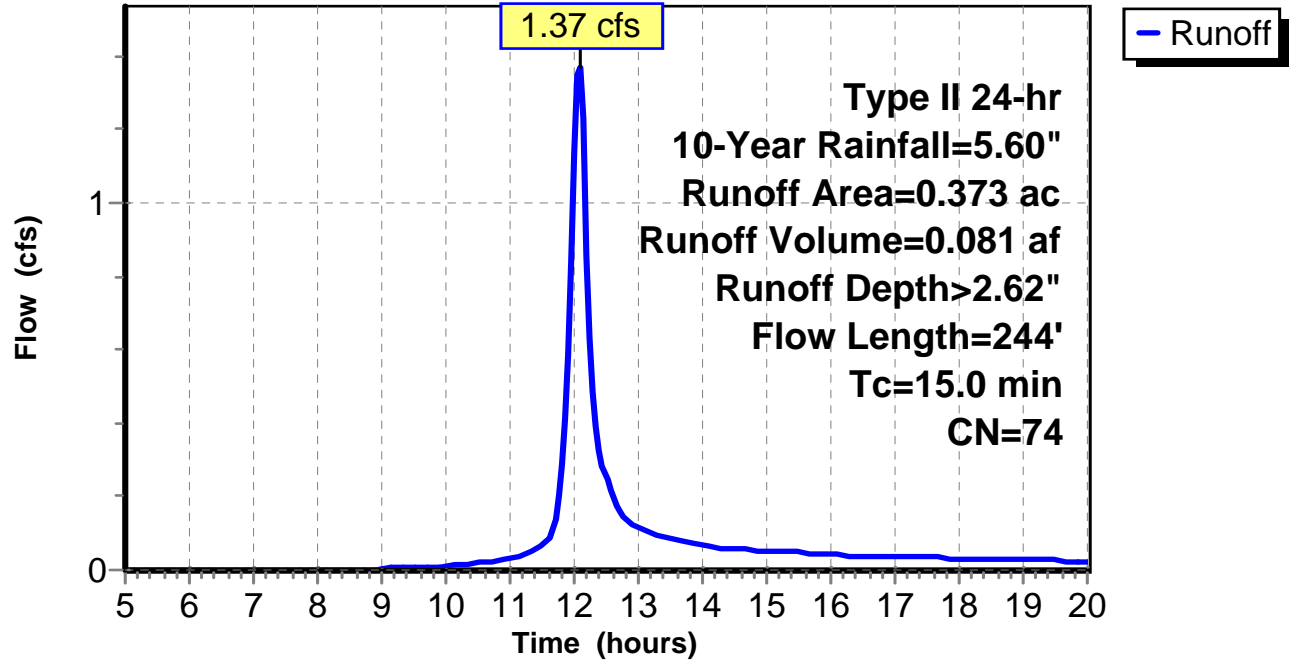
Subcatchment 1: C AR-706.001

Hydrograph



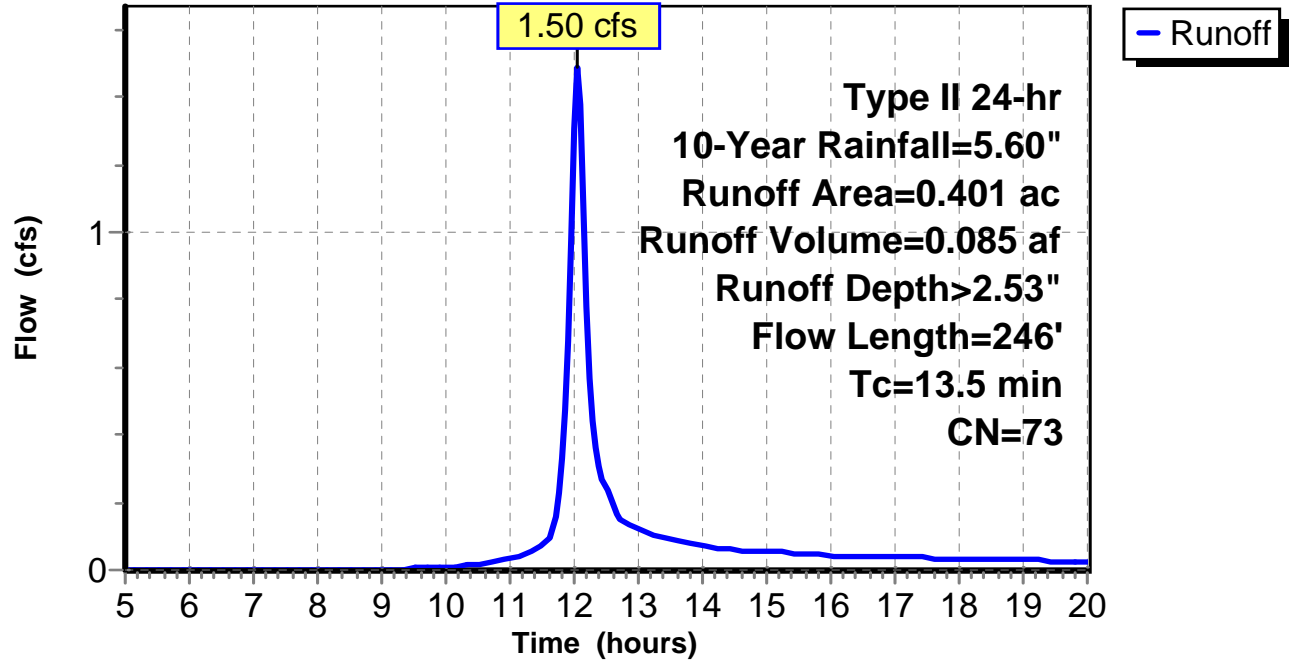
Subcatchment 2: C AR-706.002

Hydrograph



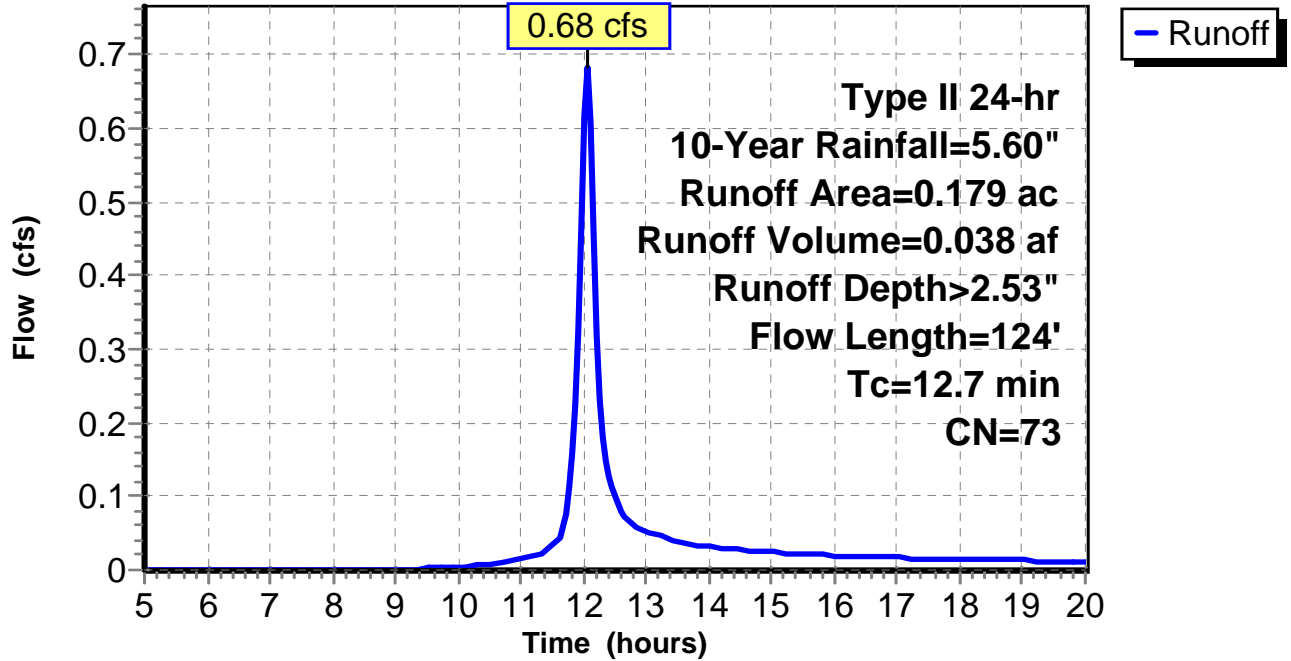
Subcatchment 3: C AR-706.003

Hydrograph



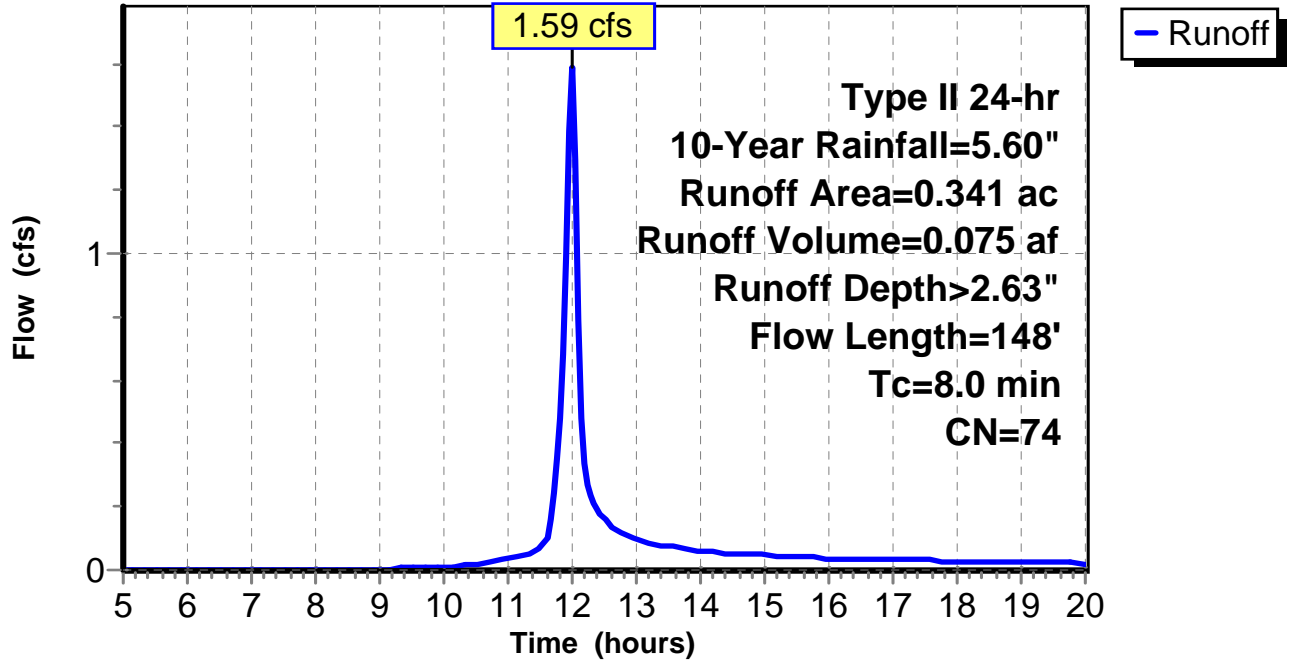
Subcatchment 4: C AR-706.004

Hydrograph



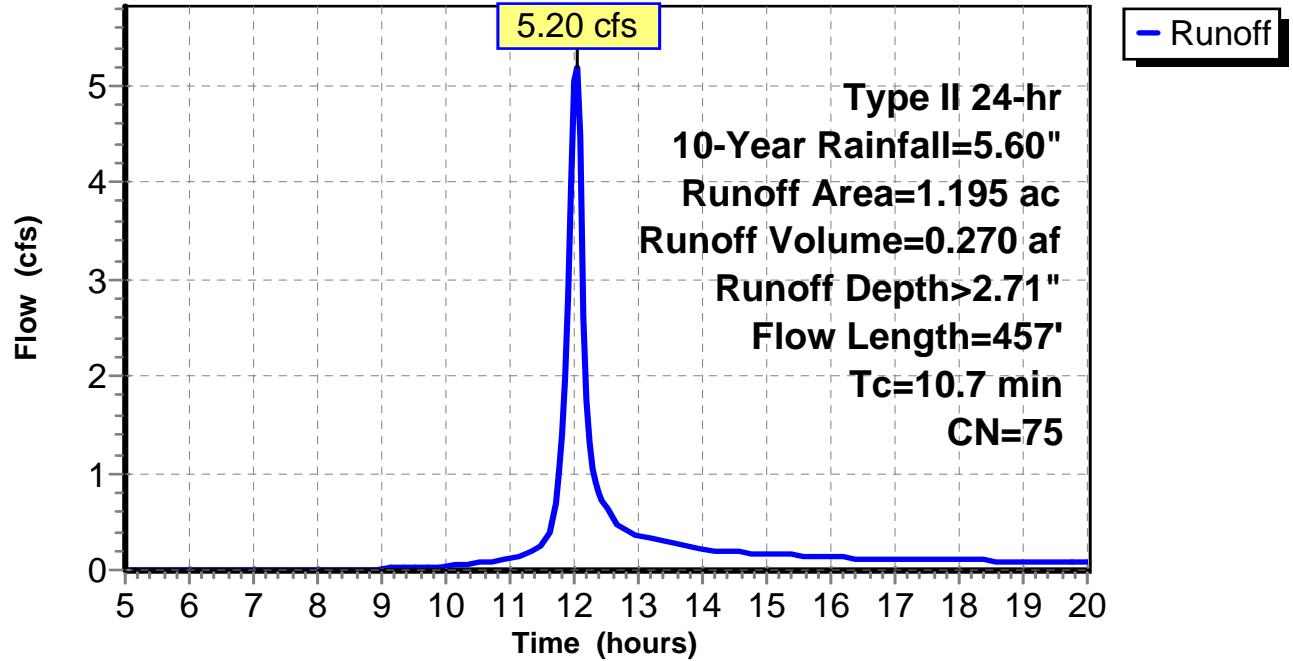
Subcatchment 5: C AR-706.005

Hydrograph



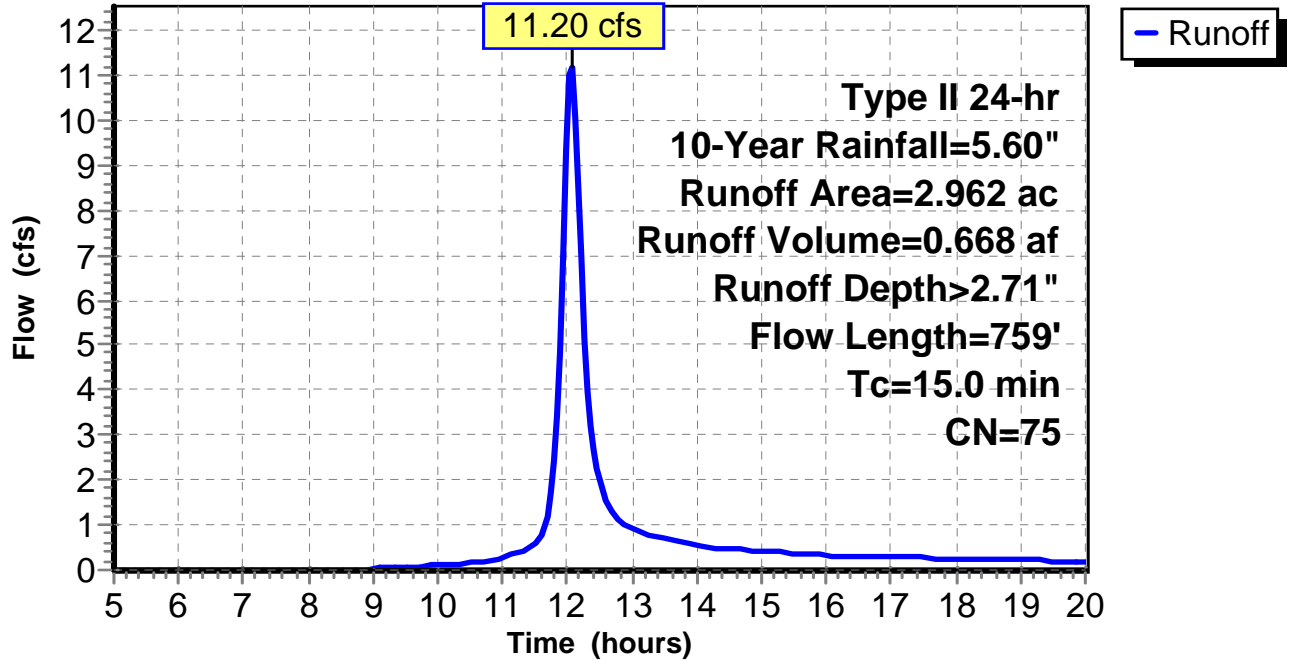
Subcatchment 6: C AR-706.006

Hydrograph



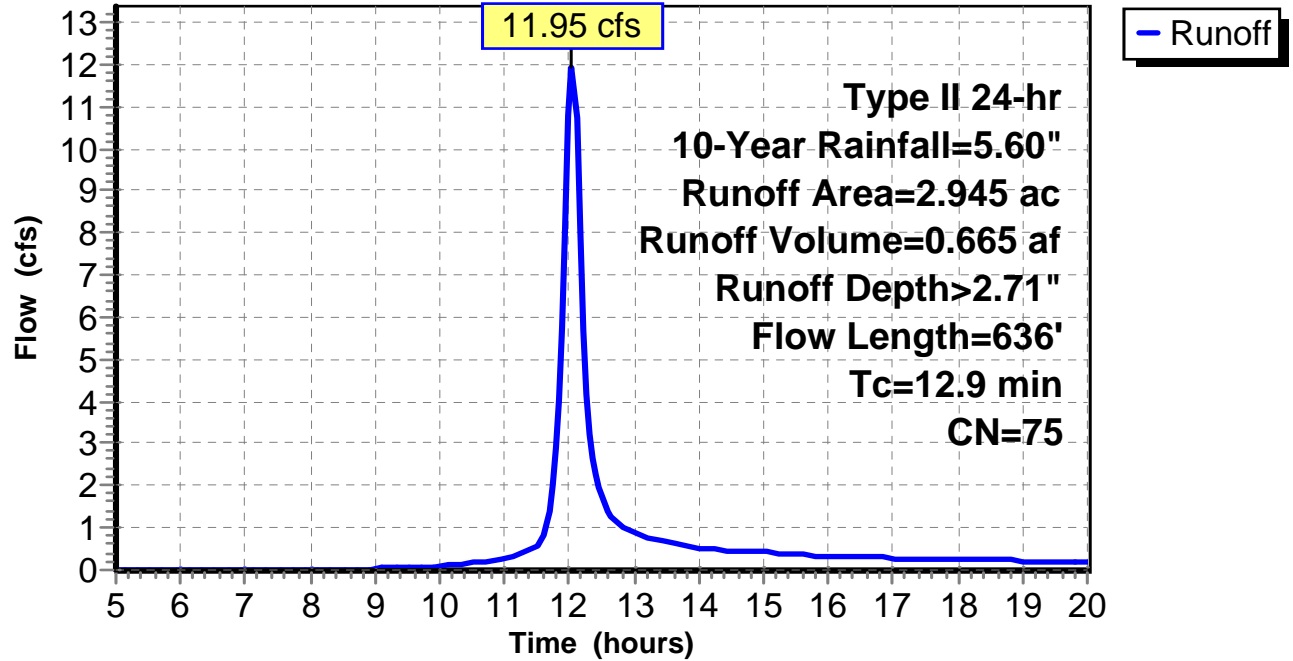
Subcatchment 7: C AR-706.007

Hydrograph



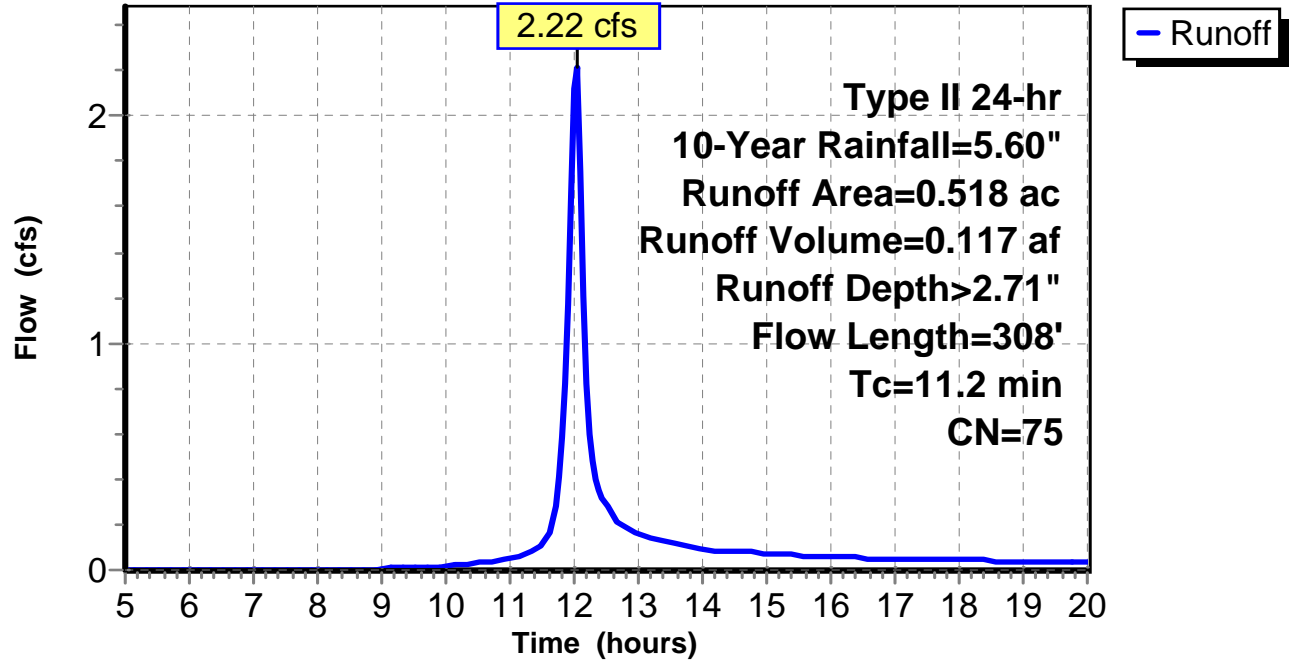
Subcatchment 8: C AR-706.008

Hydrograph



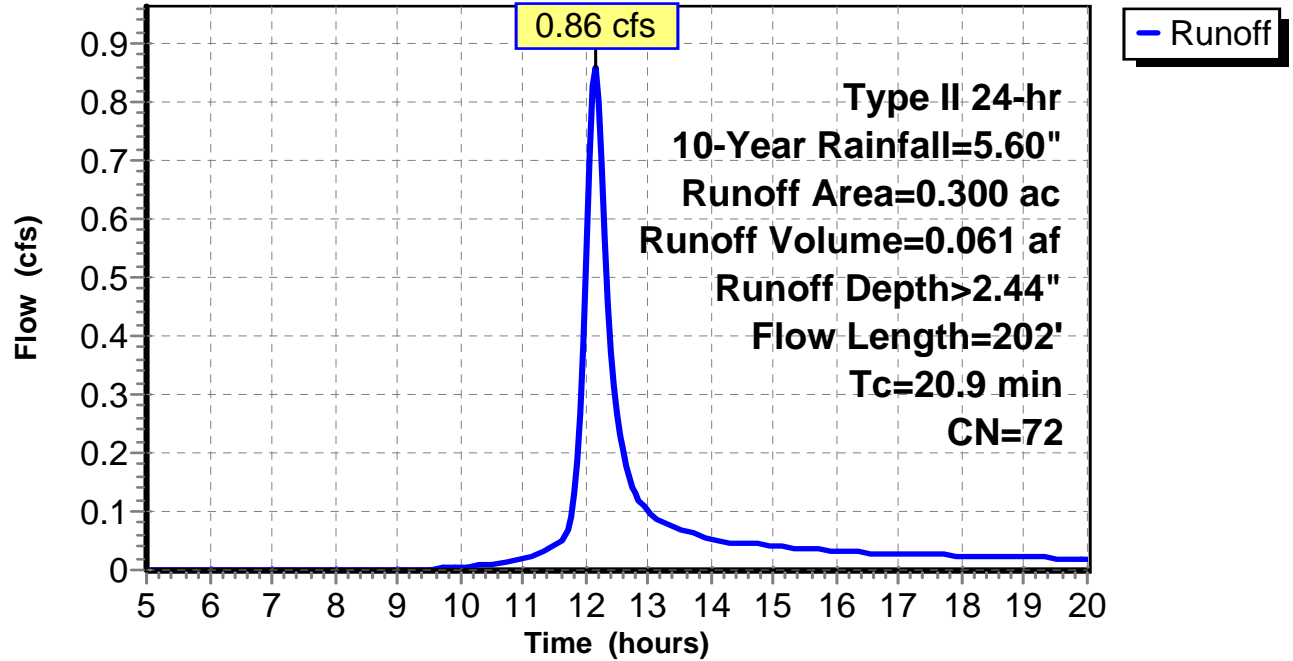
Subcatchment 9: C AR-706.009

Hydrograph



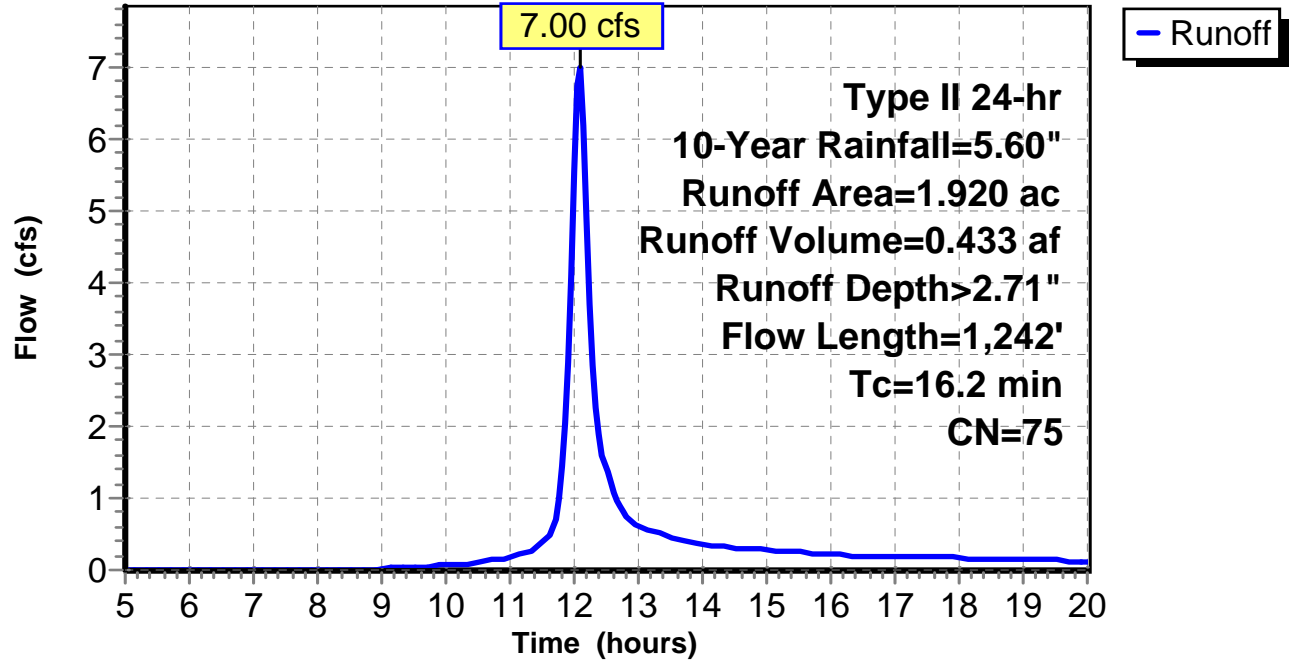
Subcatchment 10: C AR-706.010

Hydrograph



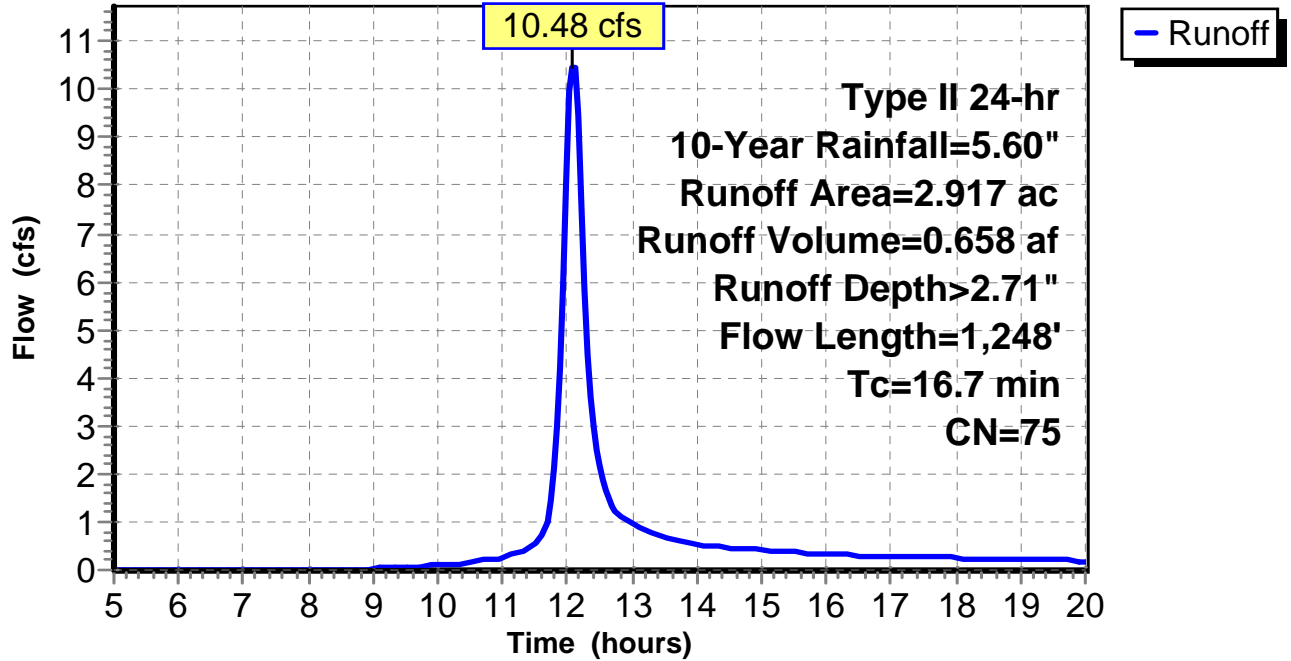
Subcatchment 11: C AR-706.011

Hydrograph



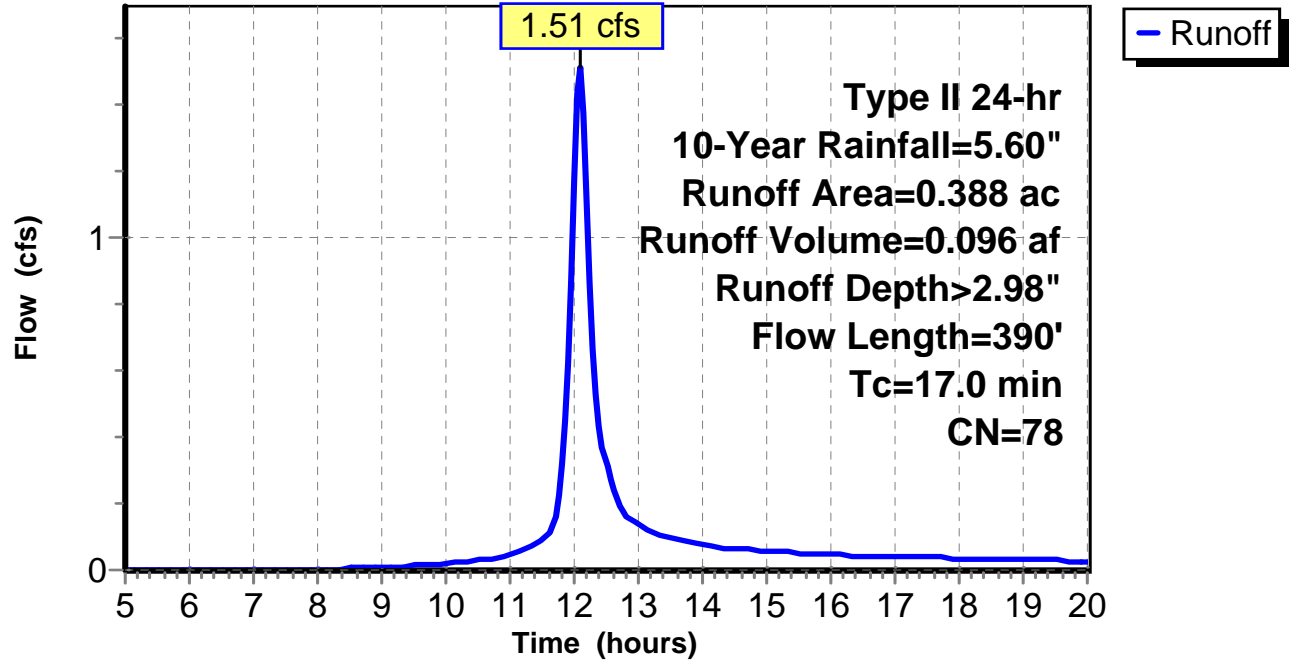
Subcatchment 12: C AR-706.012

Hydrograph



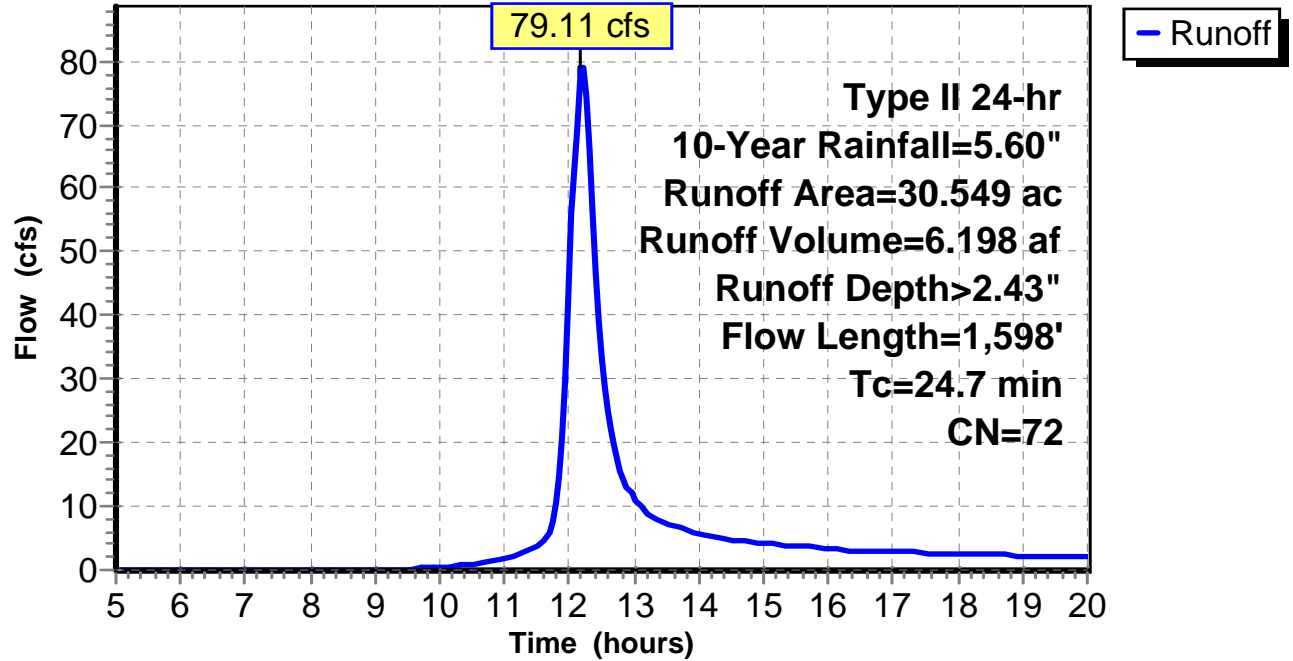
Subcatchment 13: C AR-706.013

Hydrograph



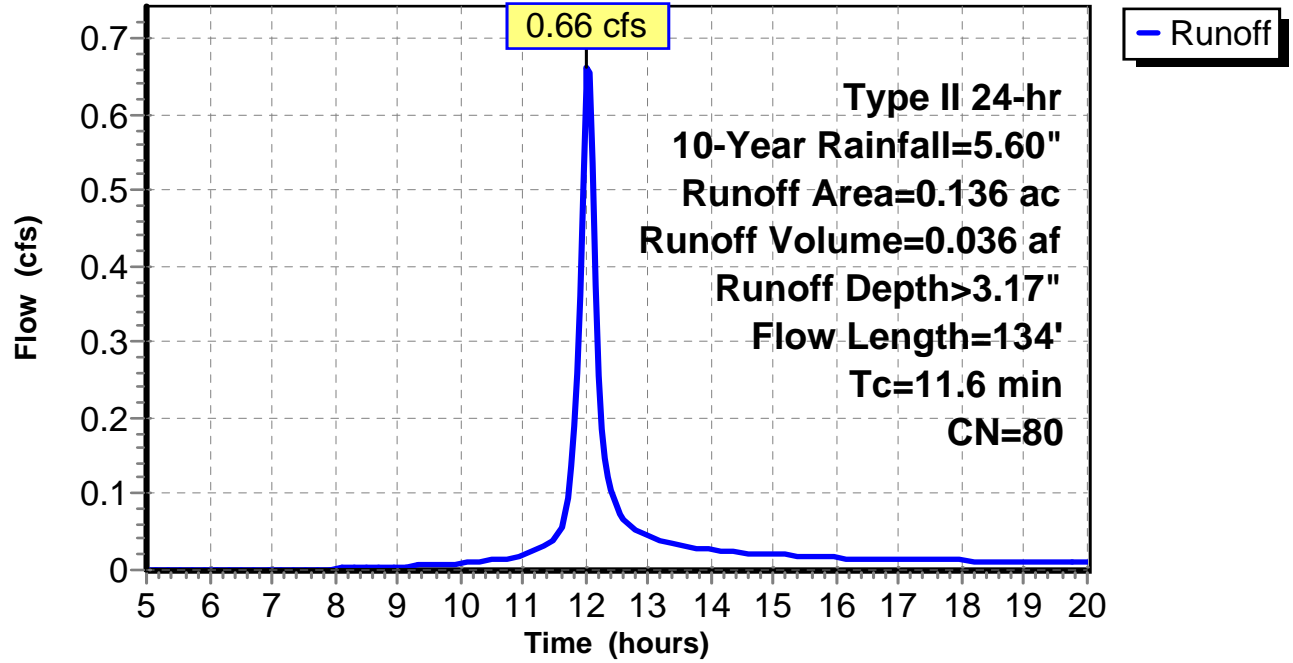
Subcatchment 14: C AR-706.014

Hydrograph



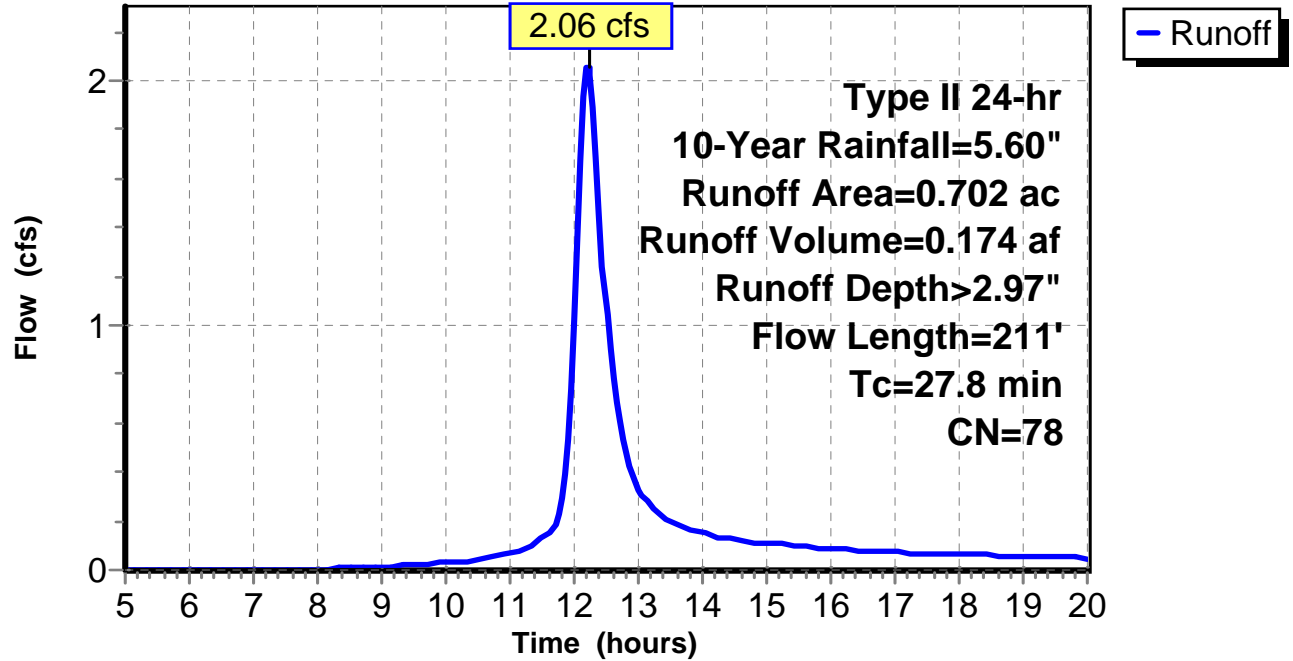
Subcatchment 15: C AR-706.015

Hydrograph



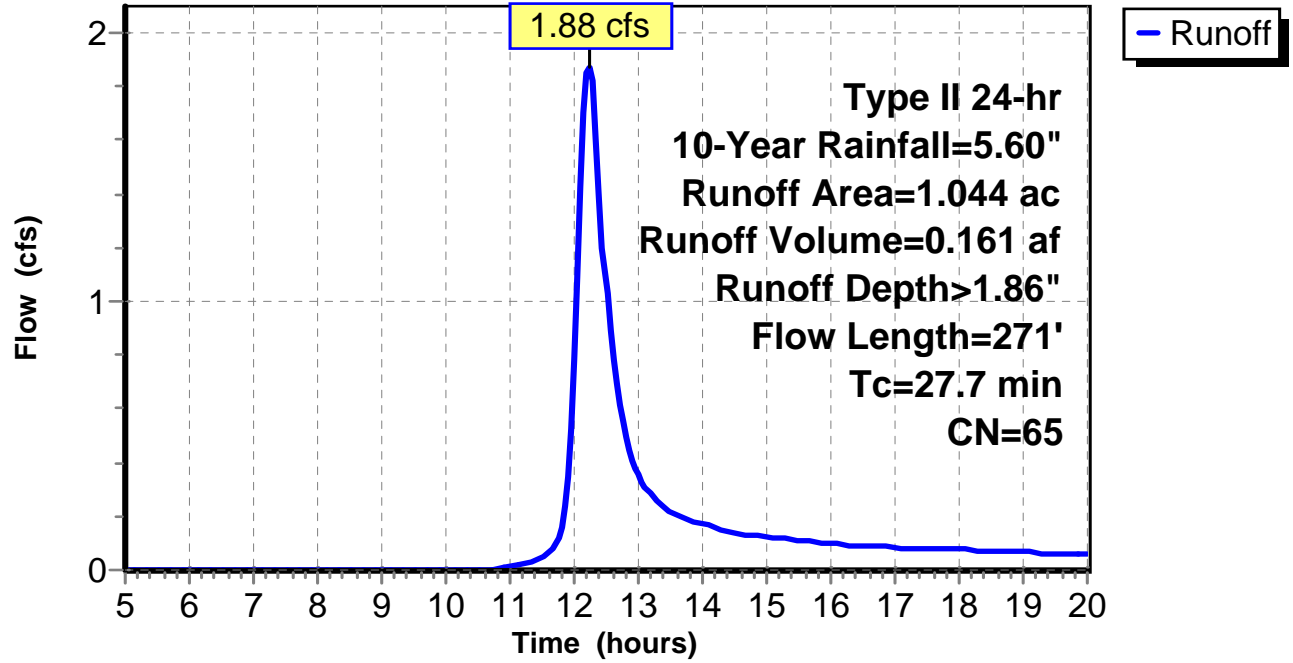
Subcatchment 16: C AR-706.016

Hydrograph



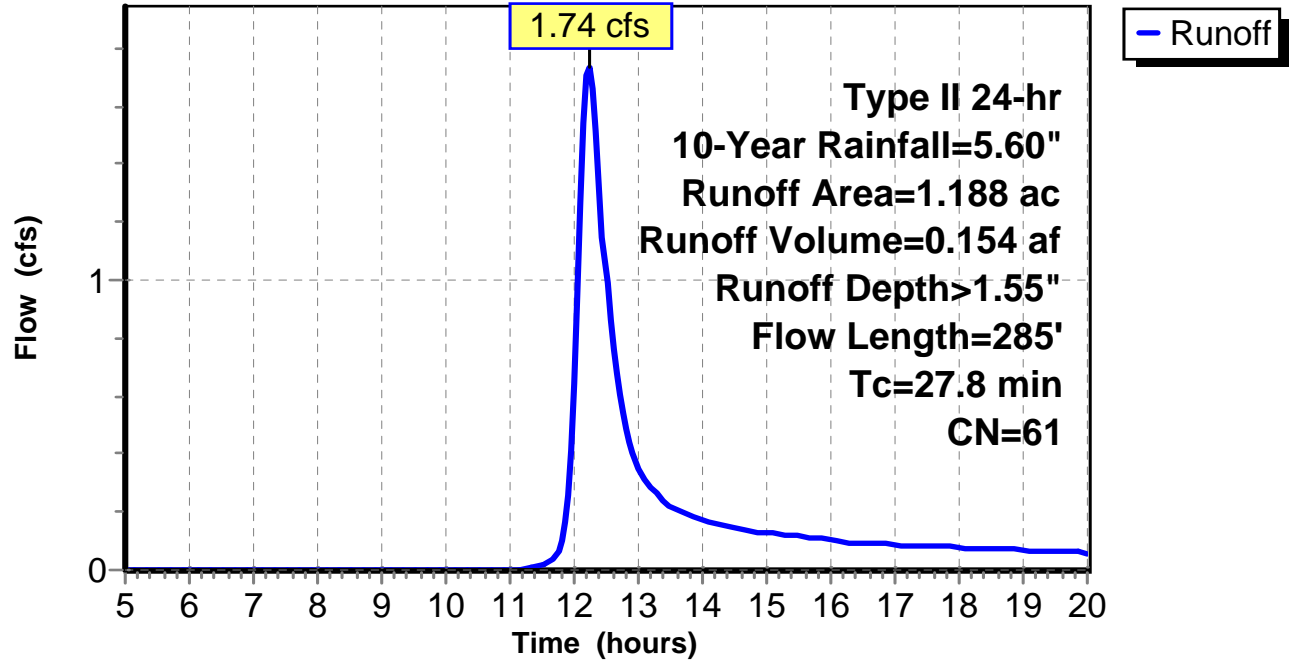
Subcatchment 17: C AR-706.017

Hydrograph



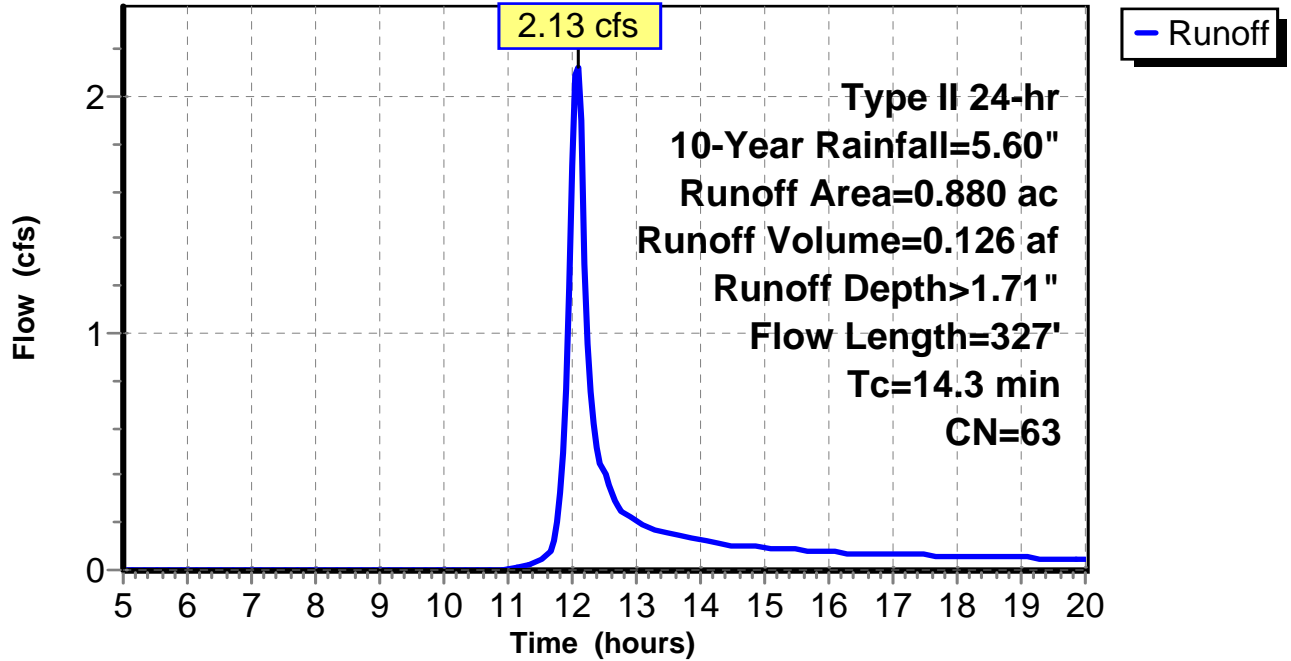
Subcatchment 18: C AR-706.018

Hydrograph



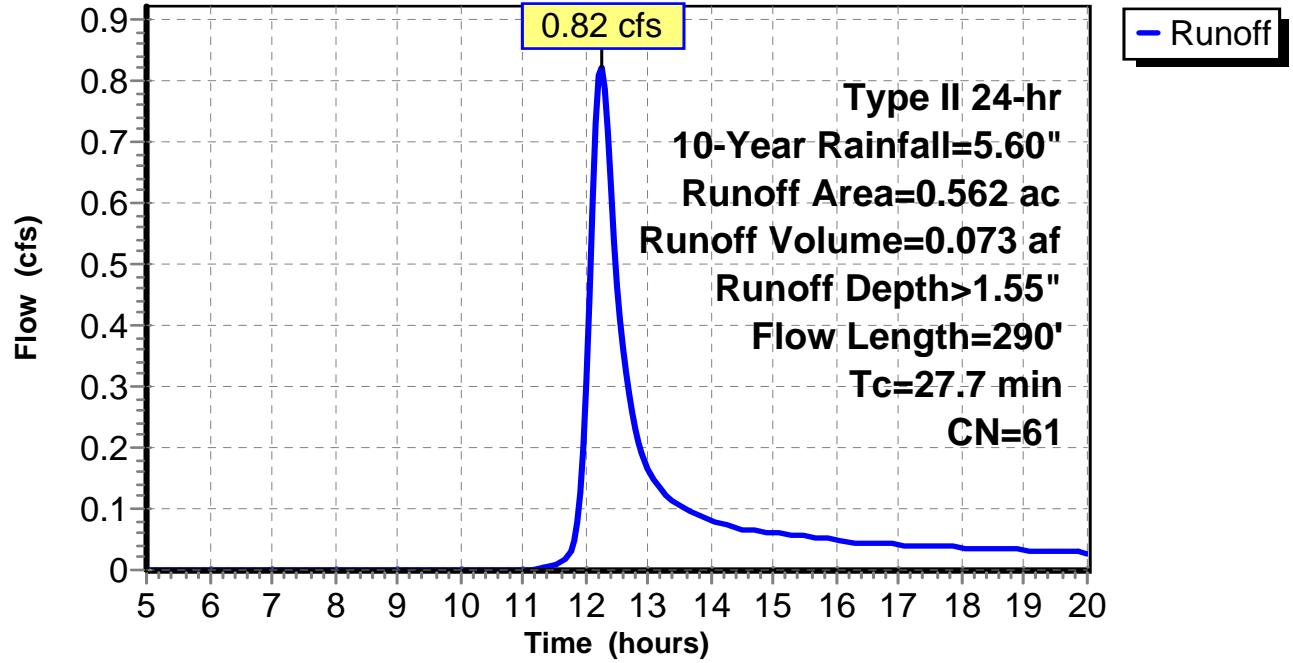
Subcatchment 19: C 323.003

Hydrograph



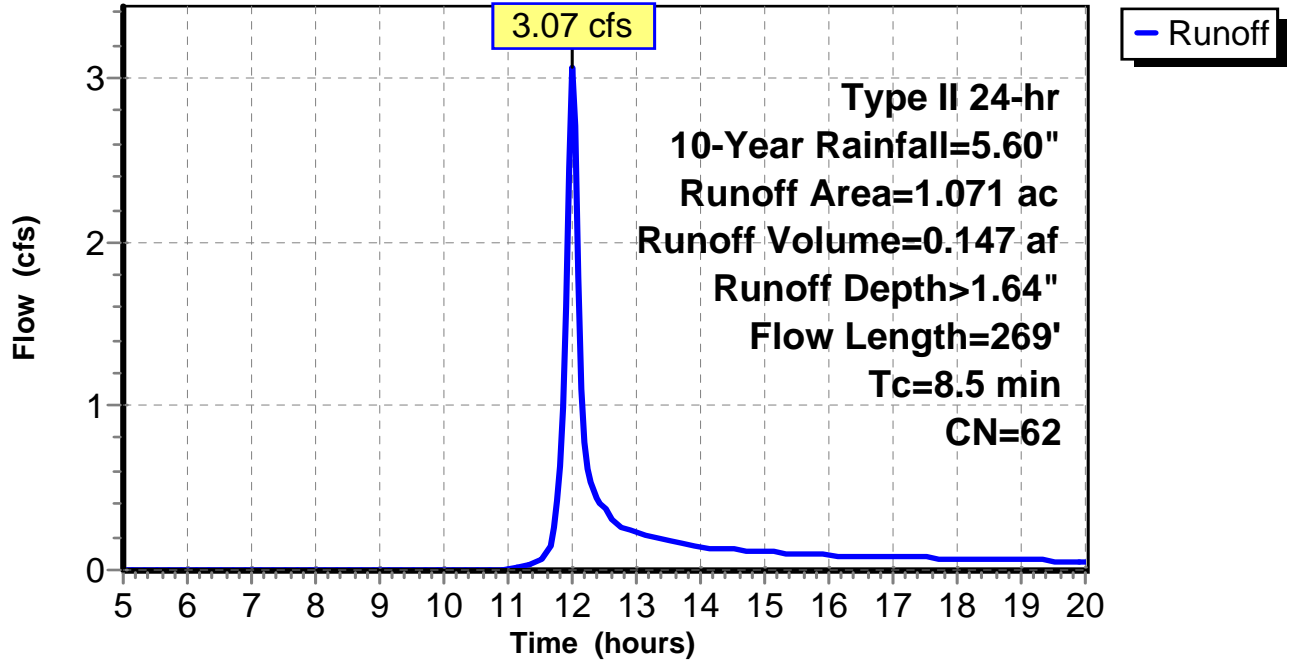
Subcatchment 20: C 323.004

Hydrograph



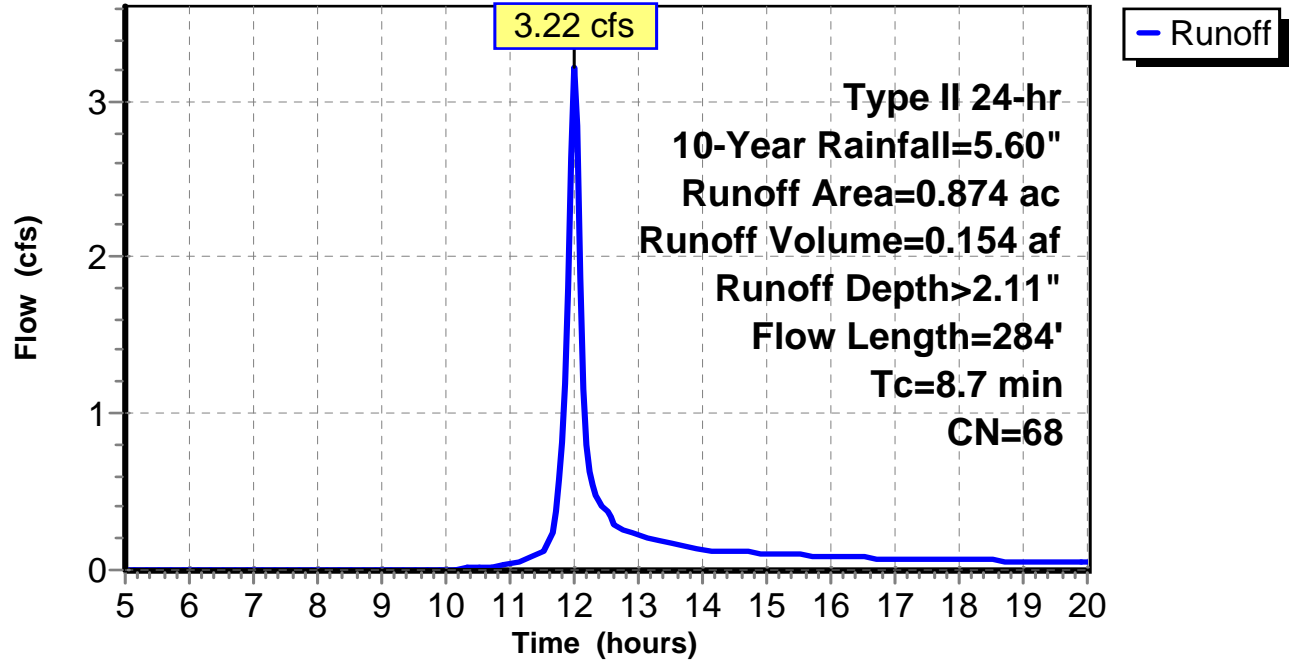
Subcatchment 21: C 323.005

Hydrograph



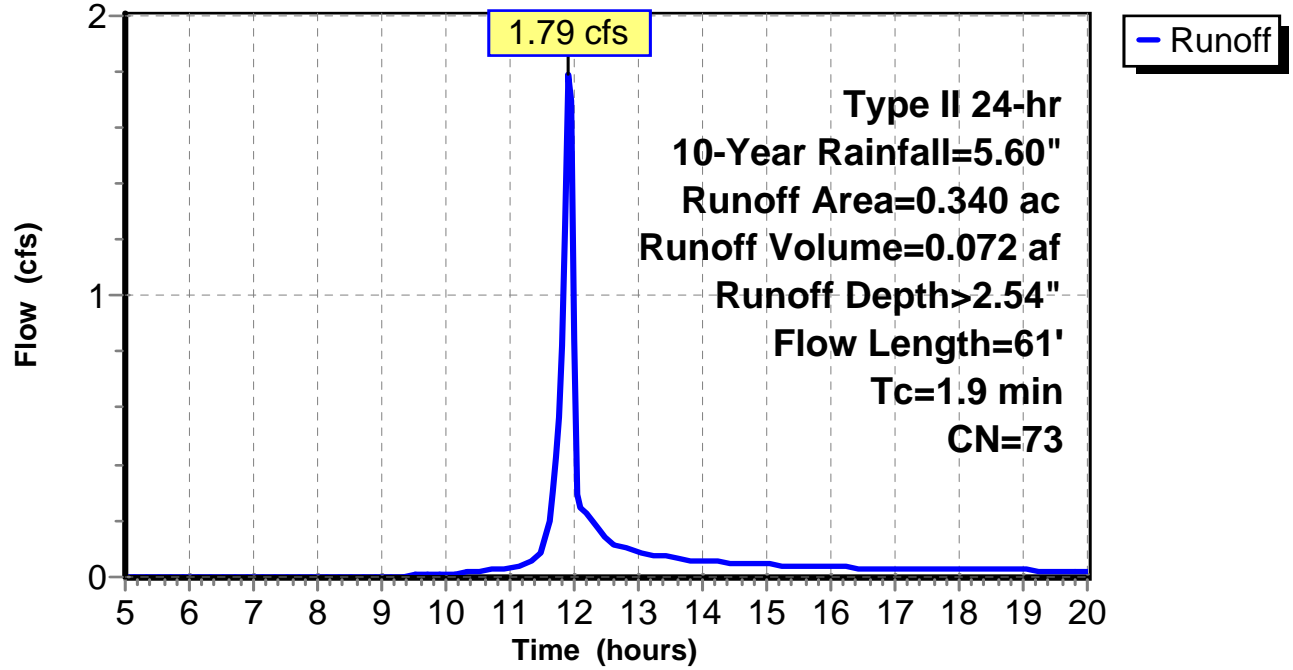
Subcatchment 22: C 323.006

Hydrograph



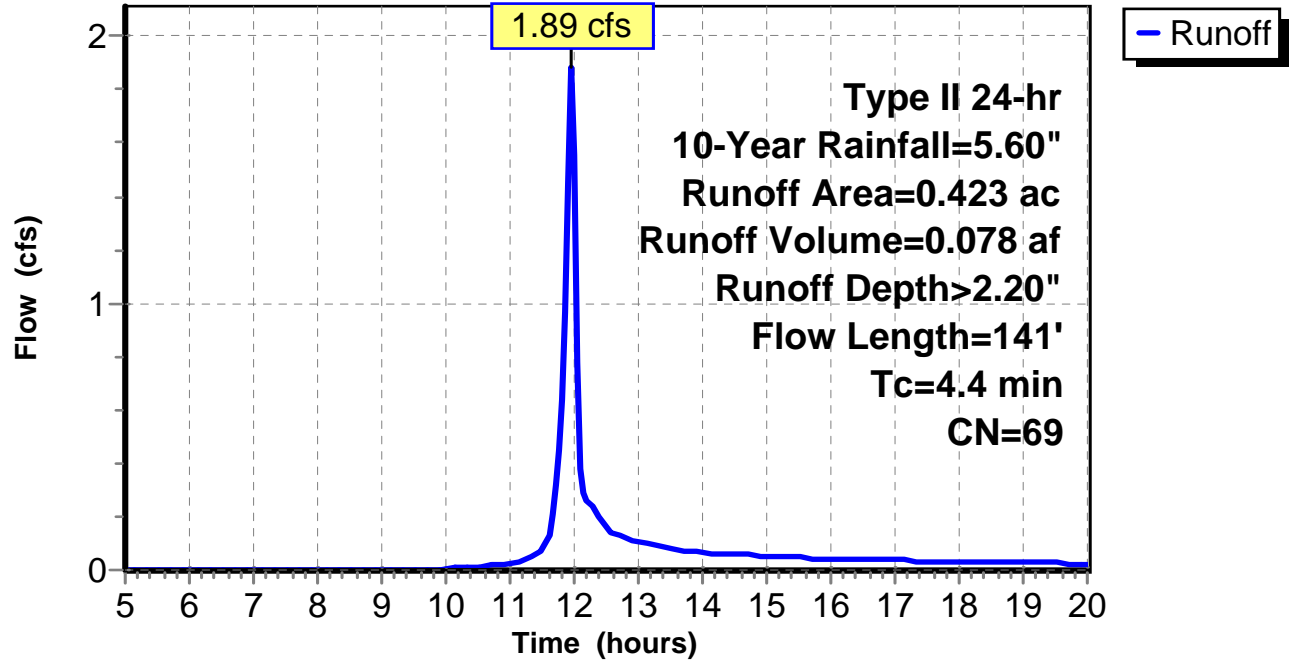
Subcatchment 23: C 323.007

Hydrograph



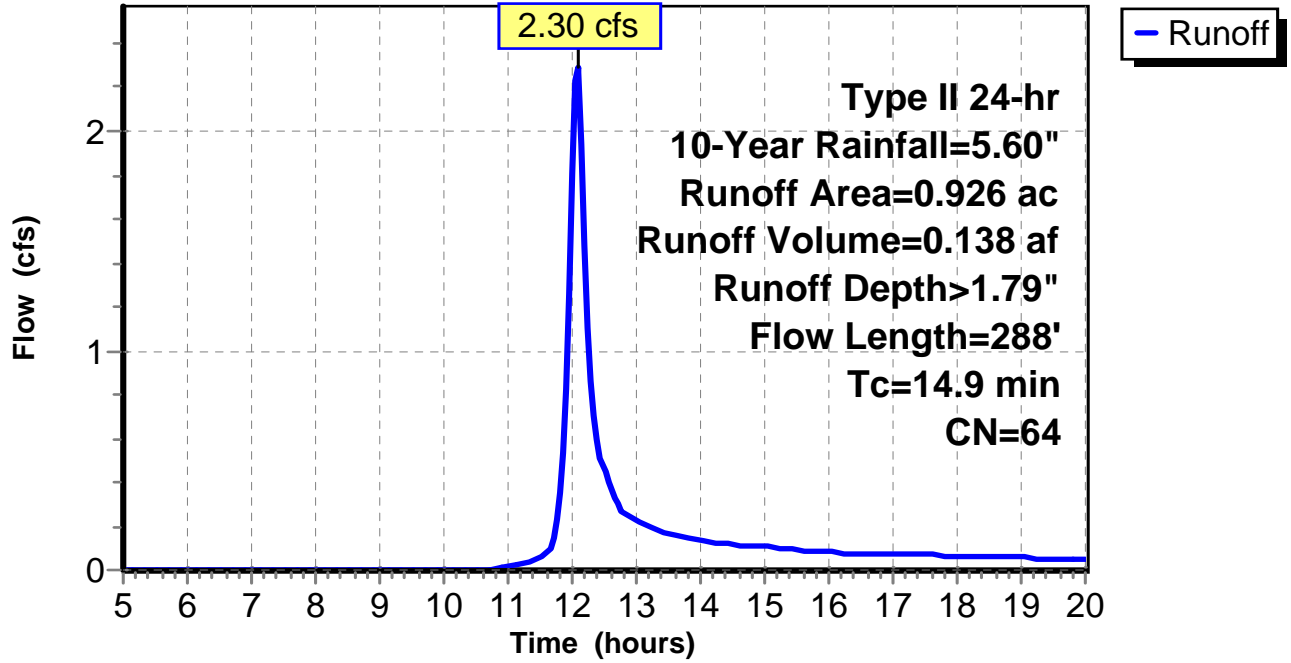
Subcatchment 24: C 323.008

Hydrograph



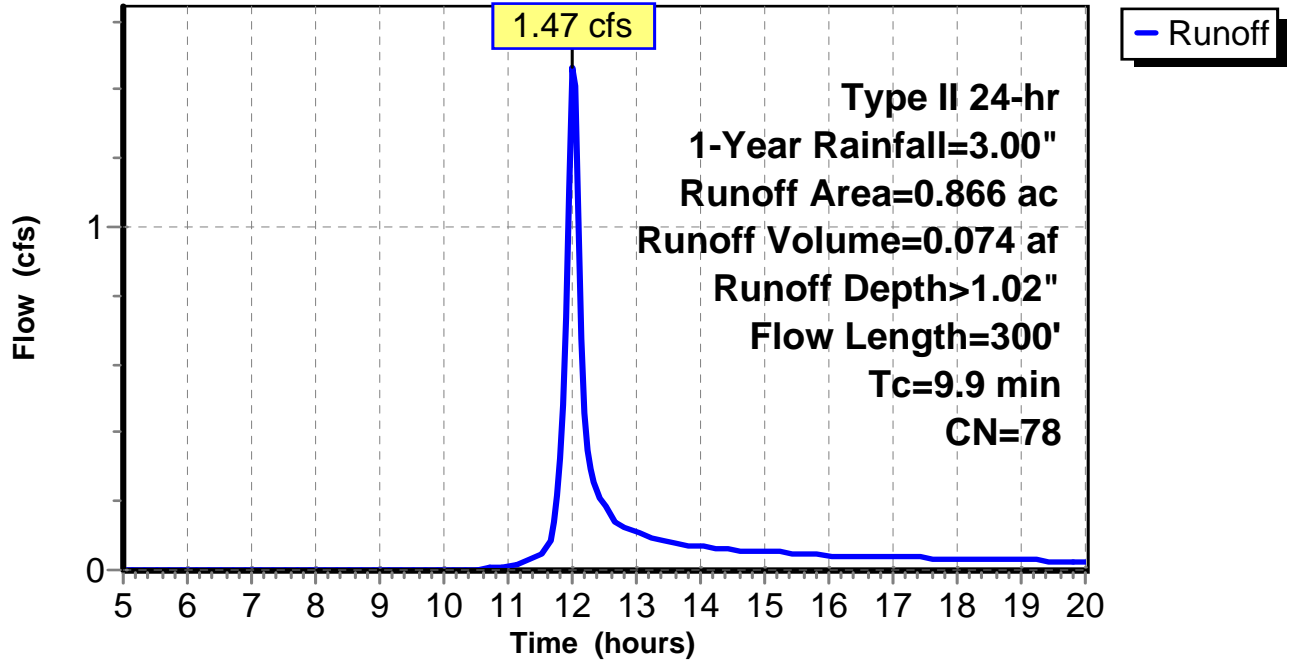
Subcatchment 25: C 323.009

Hydrograph



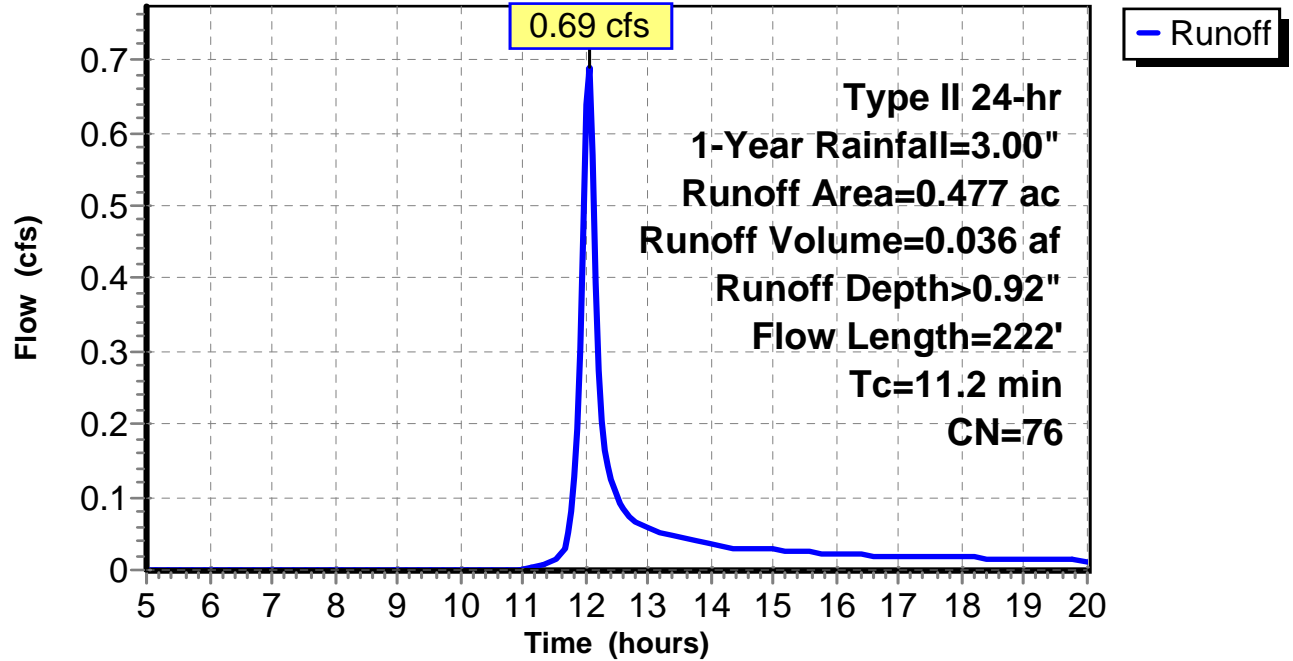
Subcatchment 1: C 323.001

Hydrograph



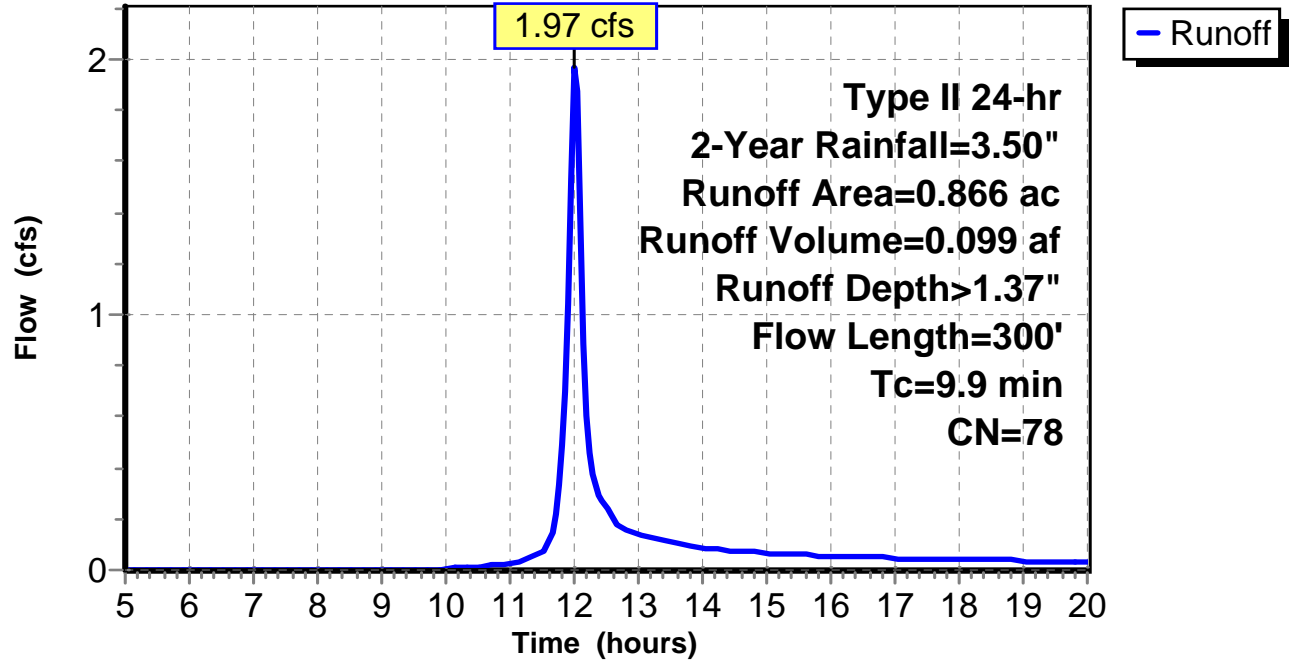
Subcatchment 2: C 323.002

Hydrograph



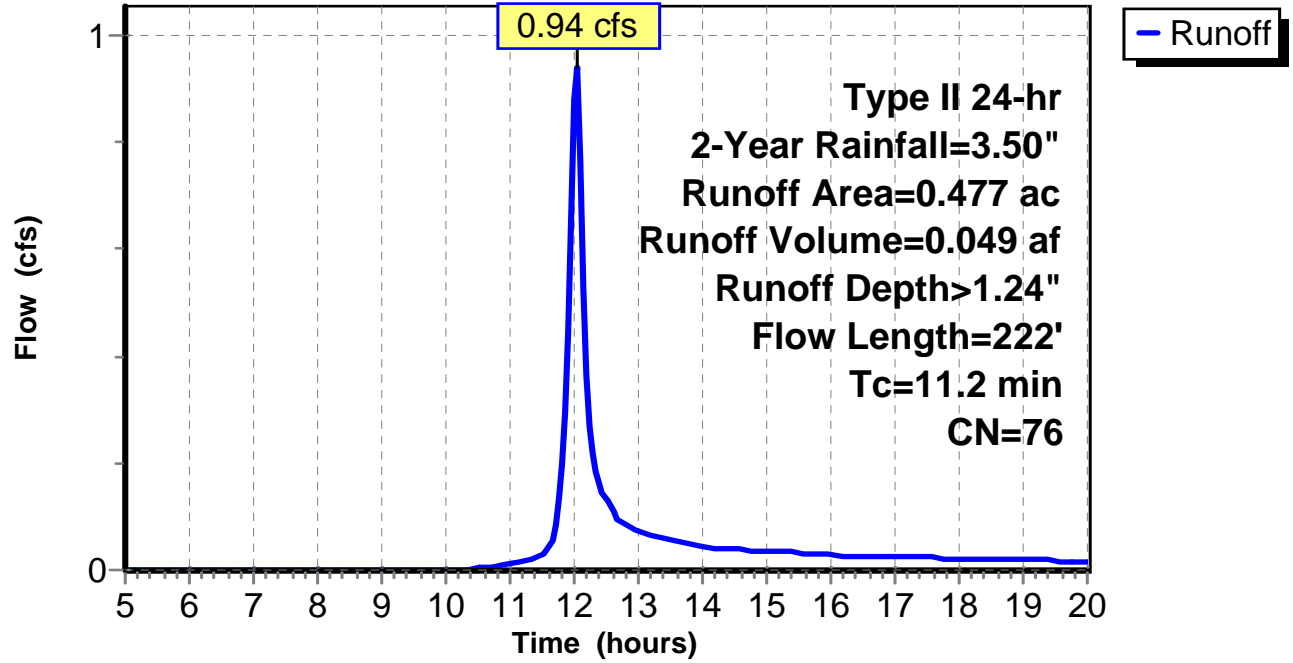
Subcatchment 1: C 323.001

Hydrograph



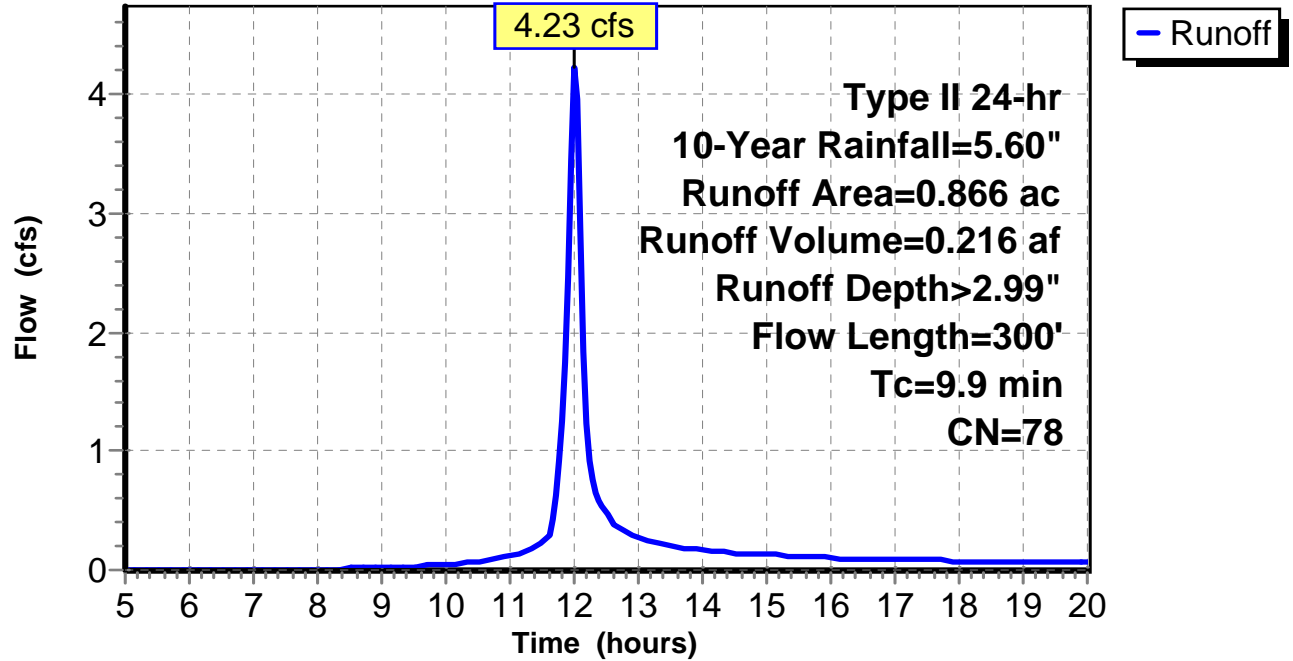
Subcatchment 2: C 323.002

Hydrograph



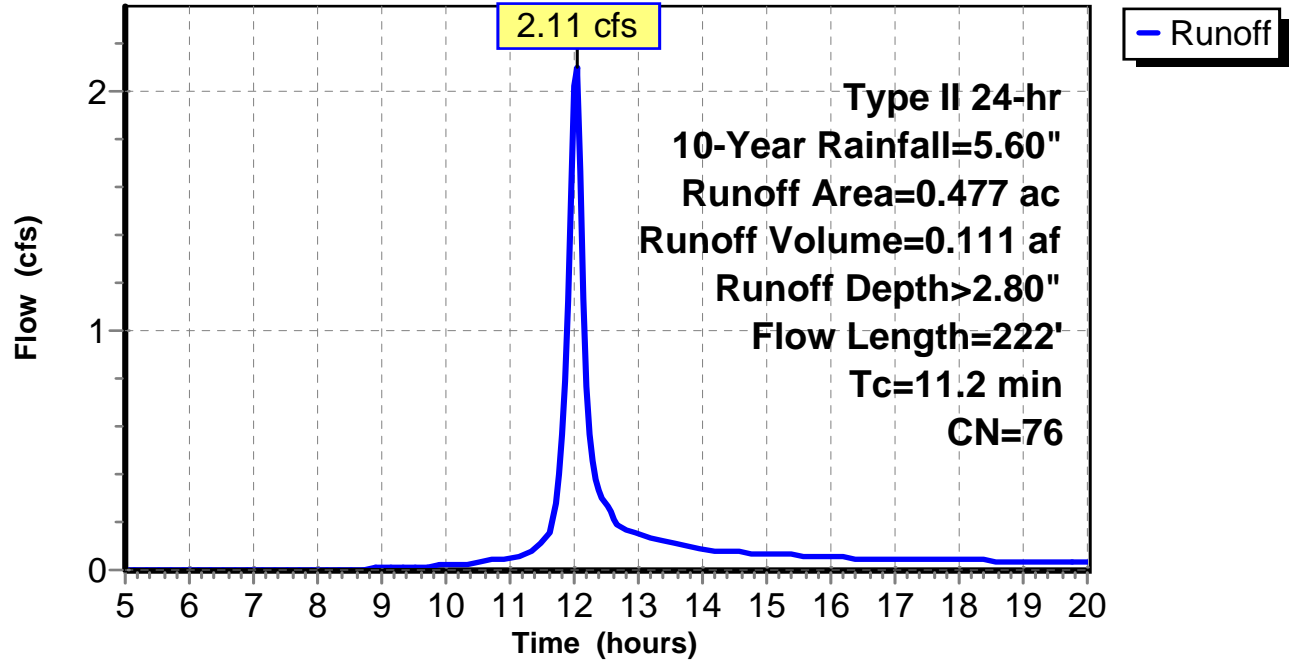
Subcatchment 1: C 323.001

Hydrograph



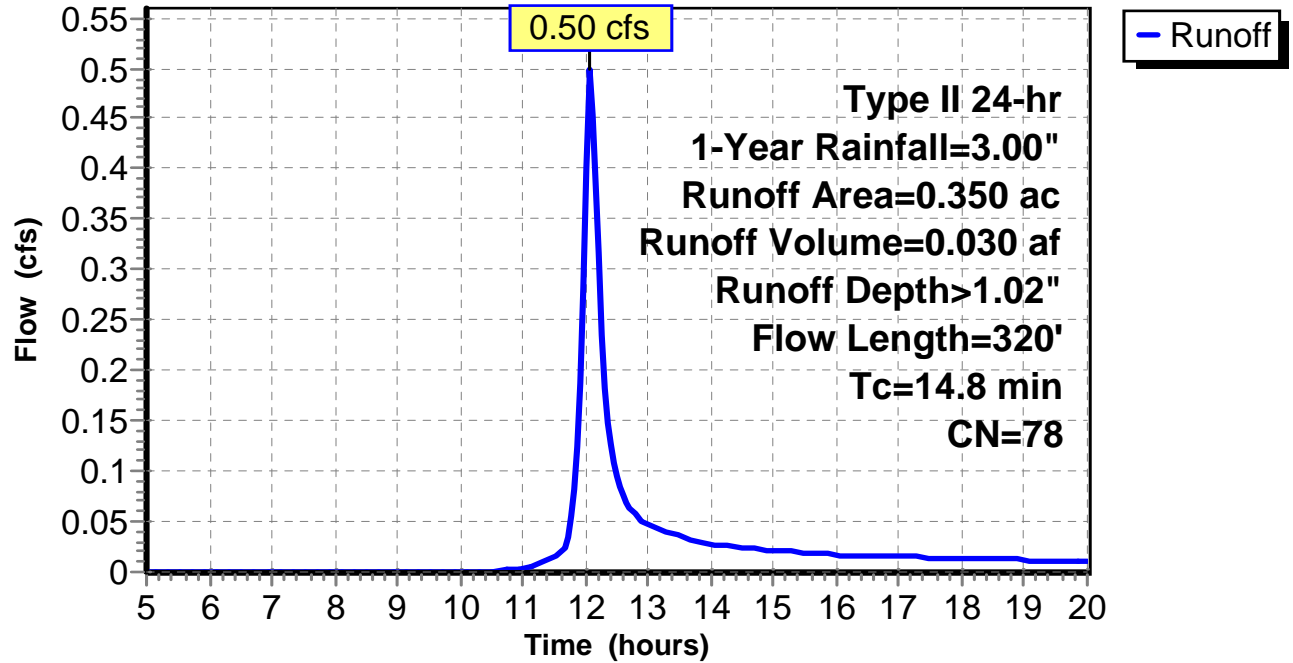
Subcatchment 2: C 323.002

Hydrograph



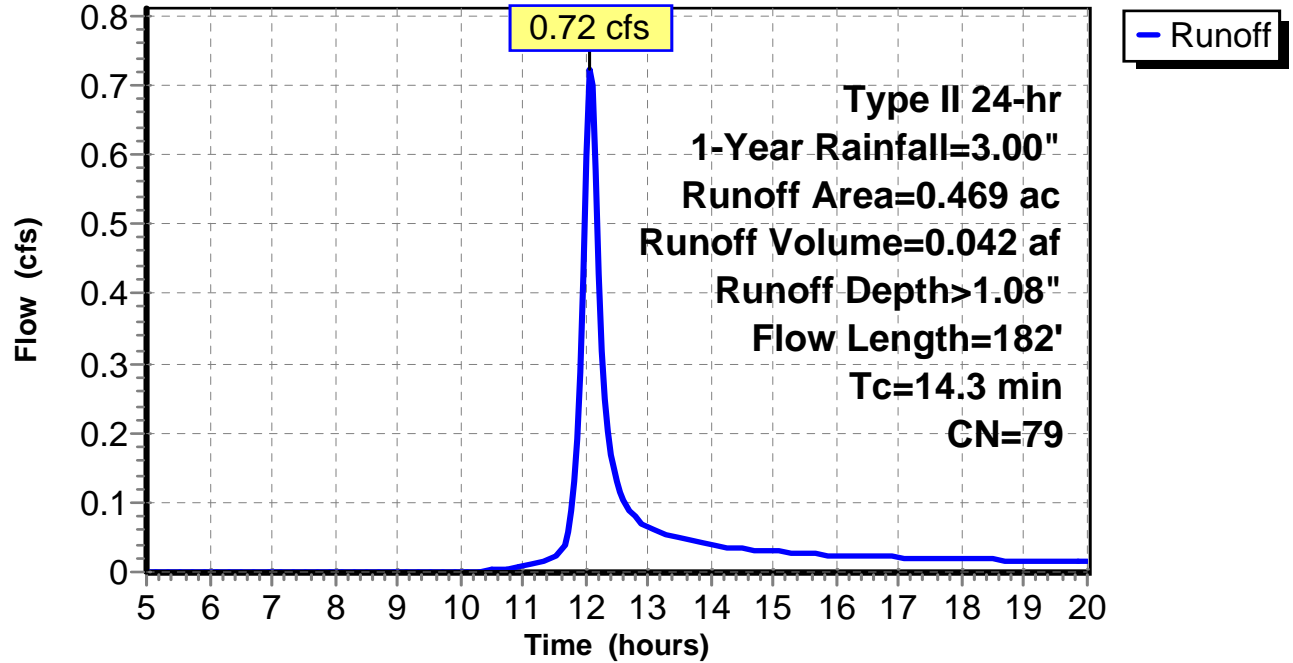
Subcatchment 1: C AR-707.001

Hydrograph



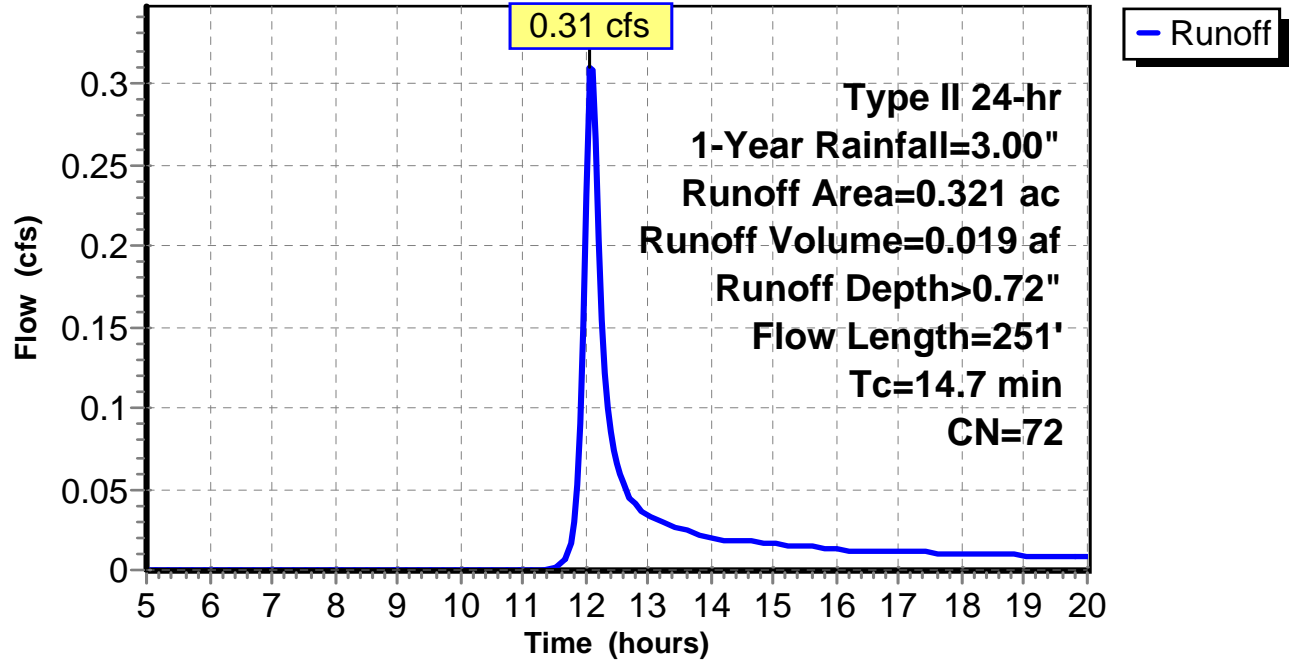
Subcatchment 2: C AR-707.002

Hydrograph



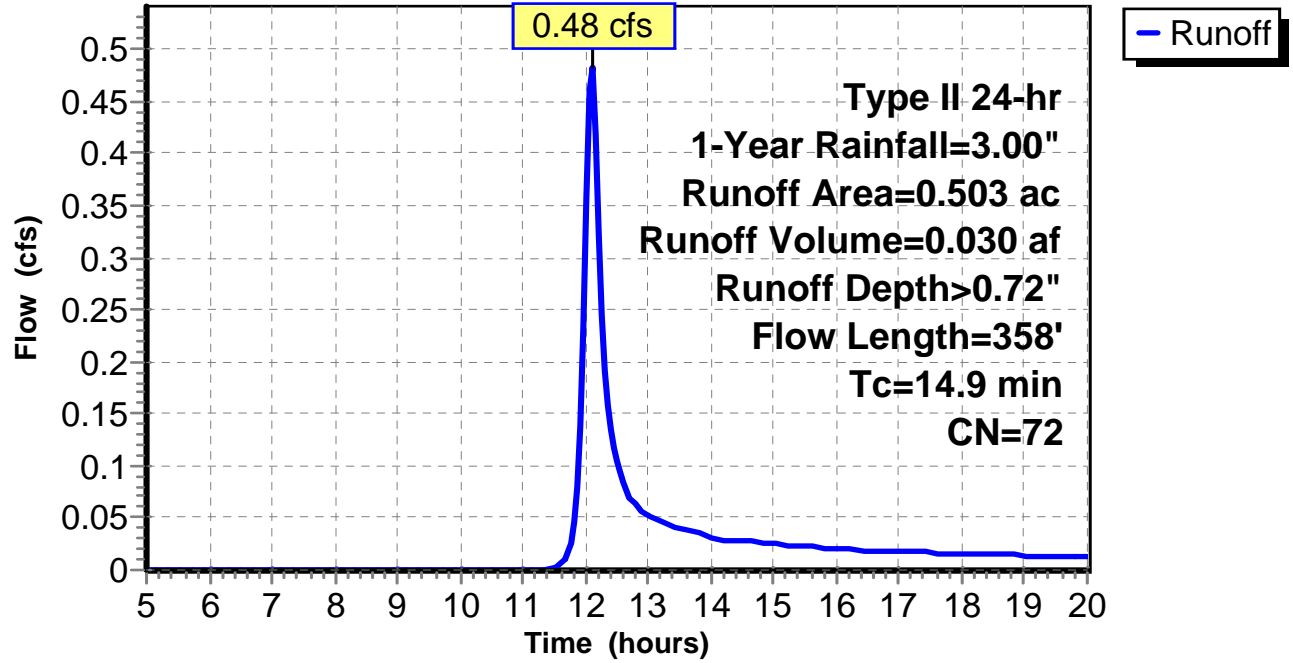
Subcatchment 3: C AR-707.003

Hydrograph



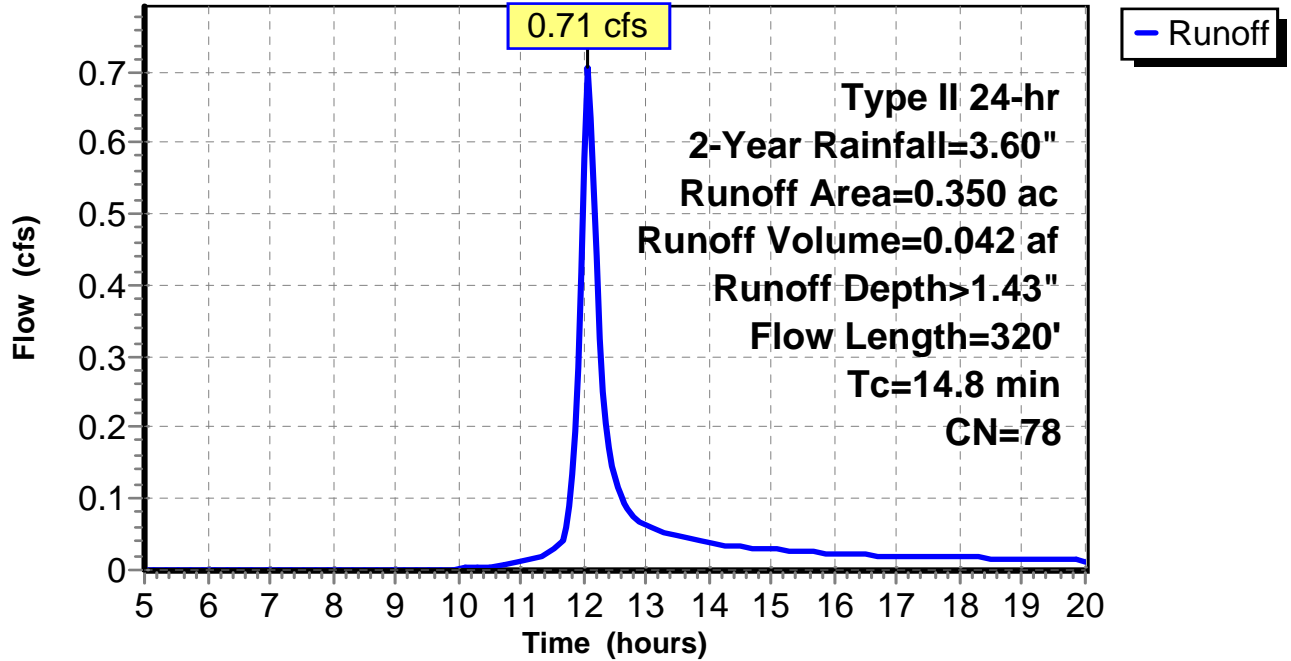
Subcatchment 4: C AR-707.004

Hydrograph



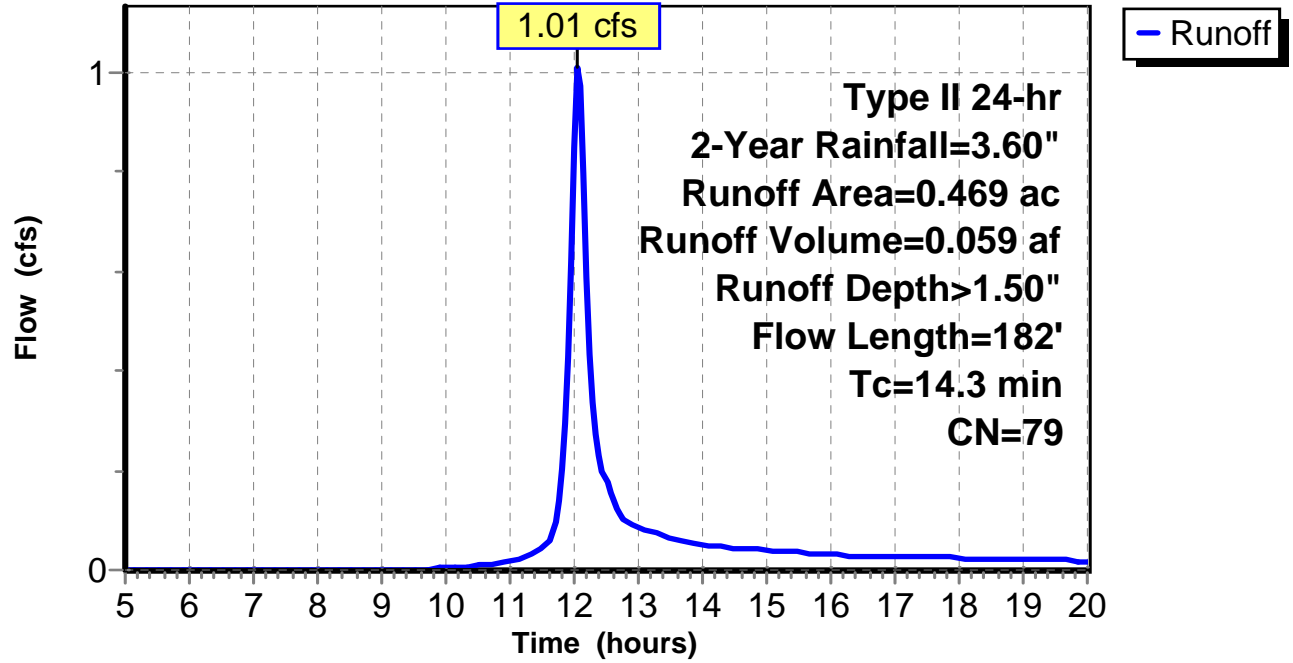
Subcatchment 1: C AR-707.001

Hydrograph



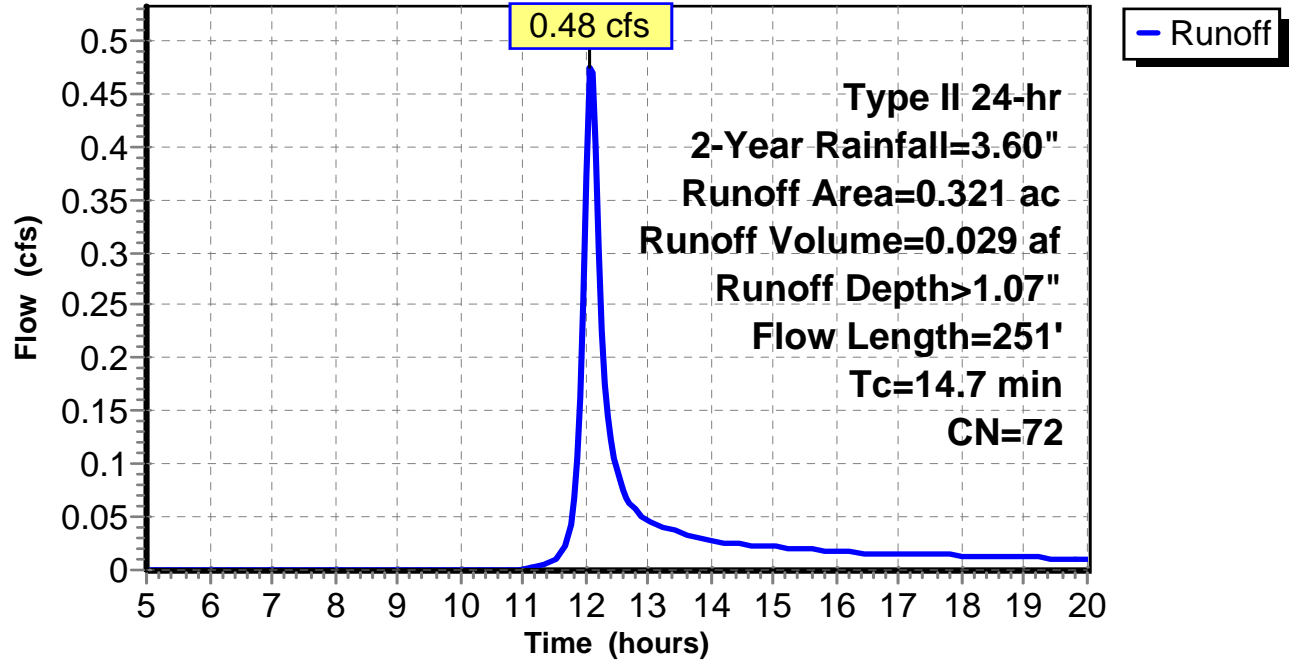
Subcatchment 2: C AR-707.002

Hydrograph



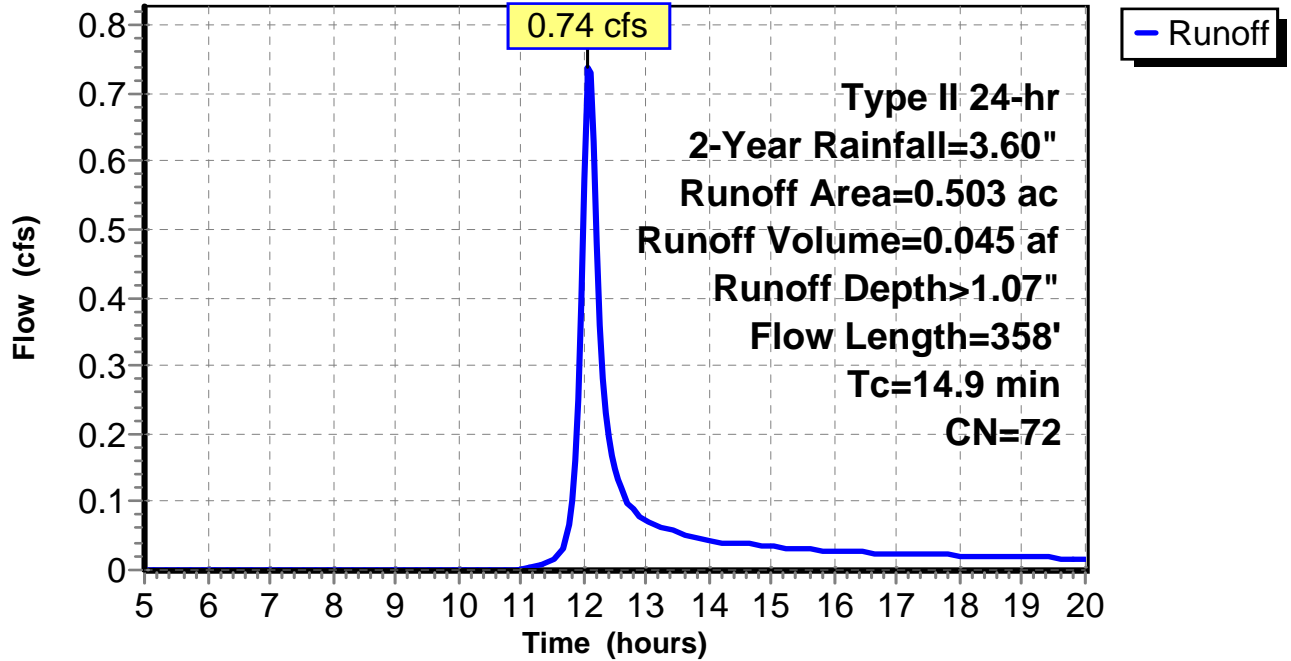
Subcatchment 3: C AR-707.003

Hydrograph



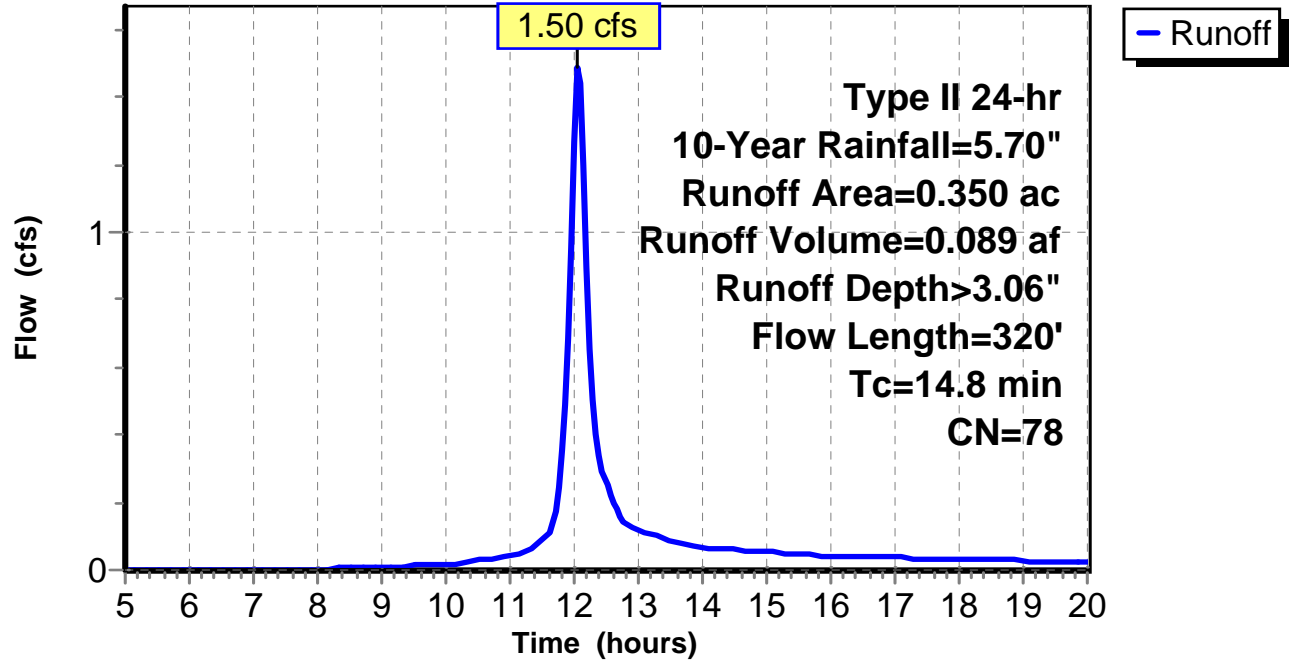
Subcatchment 4: C AR-707.004

Hydrograph



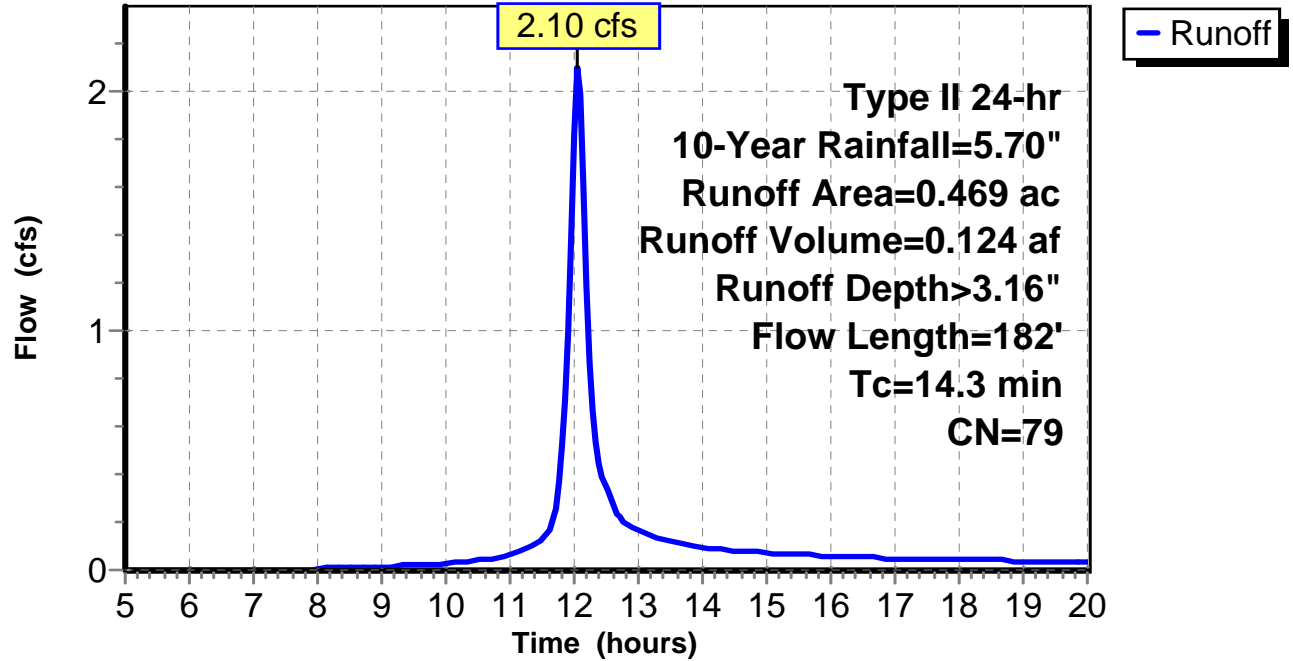
Subcatchment 1: C AR-707.001

Hydrograph



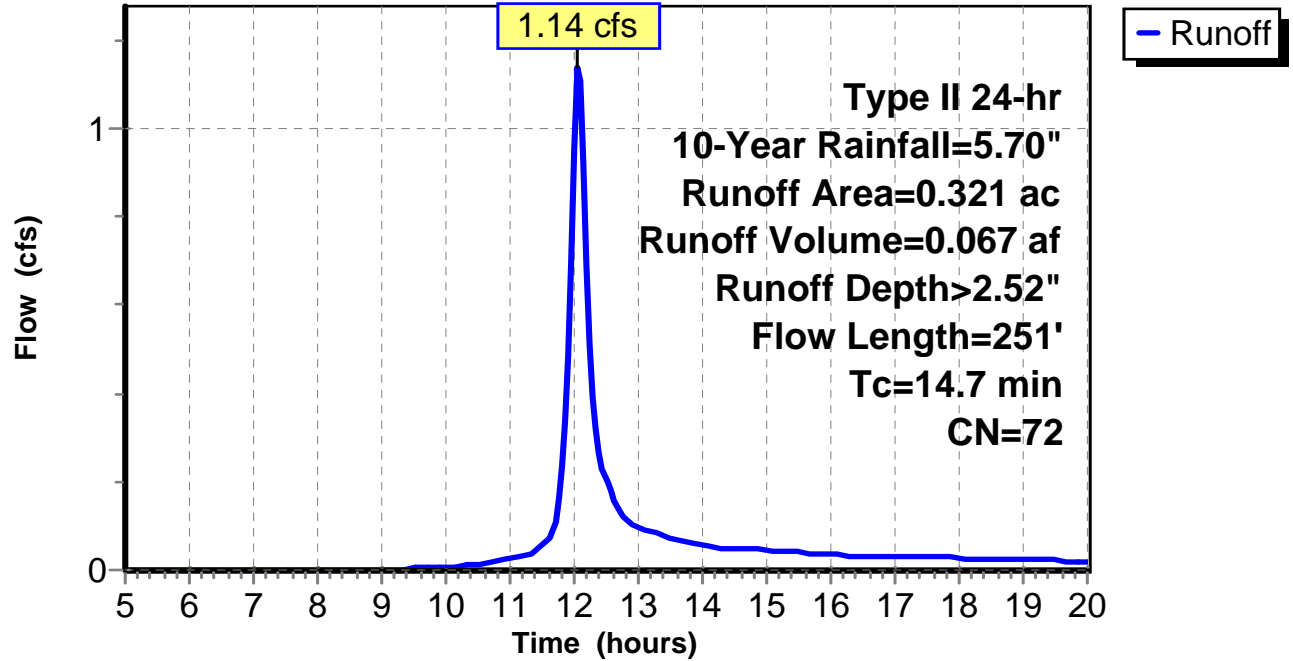
Subcatchment 2: C AR-707.002

Hydrograph



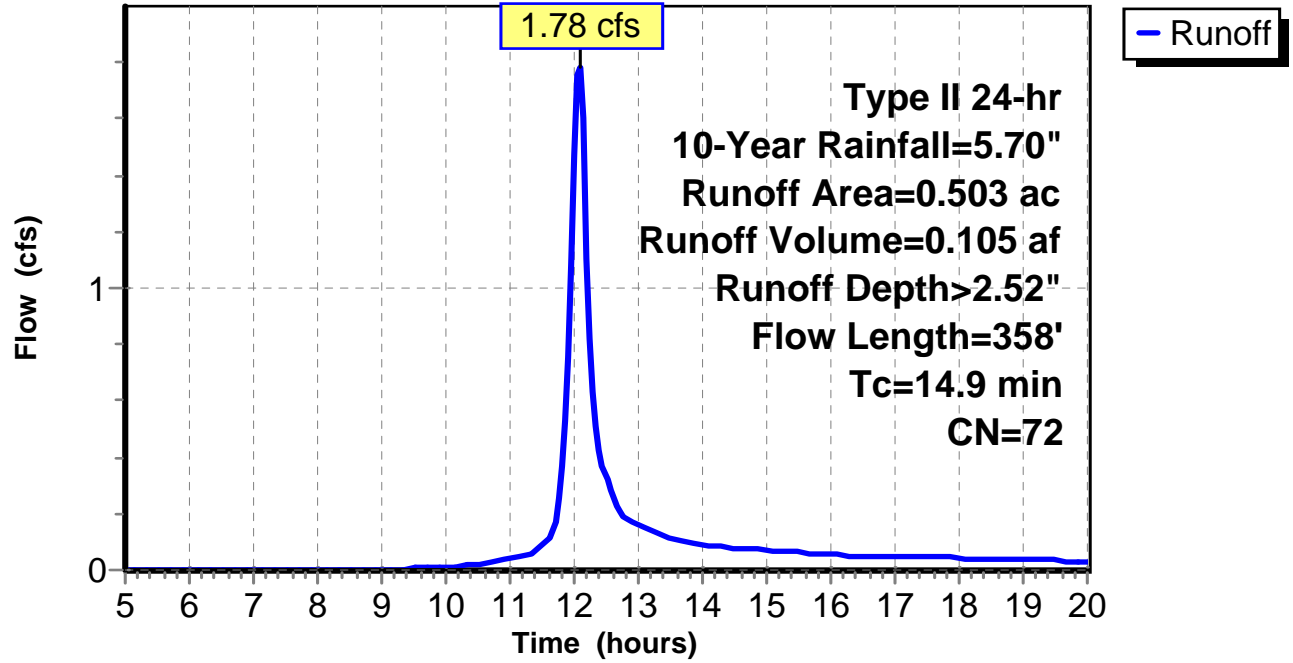
Subcatchment 3: C AR-707.003

Hydrograph



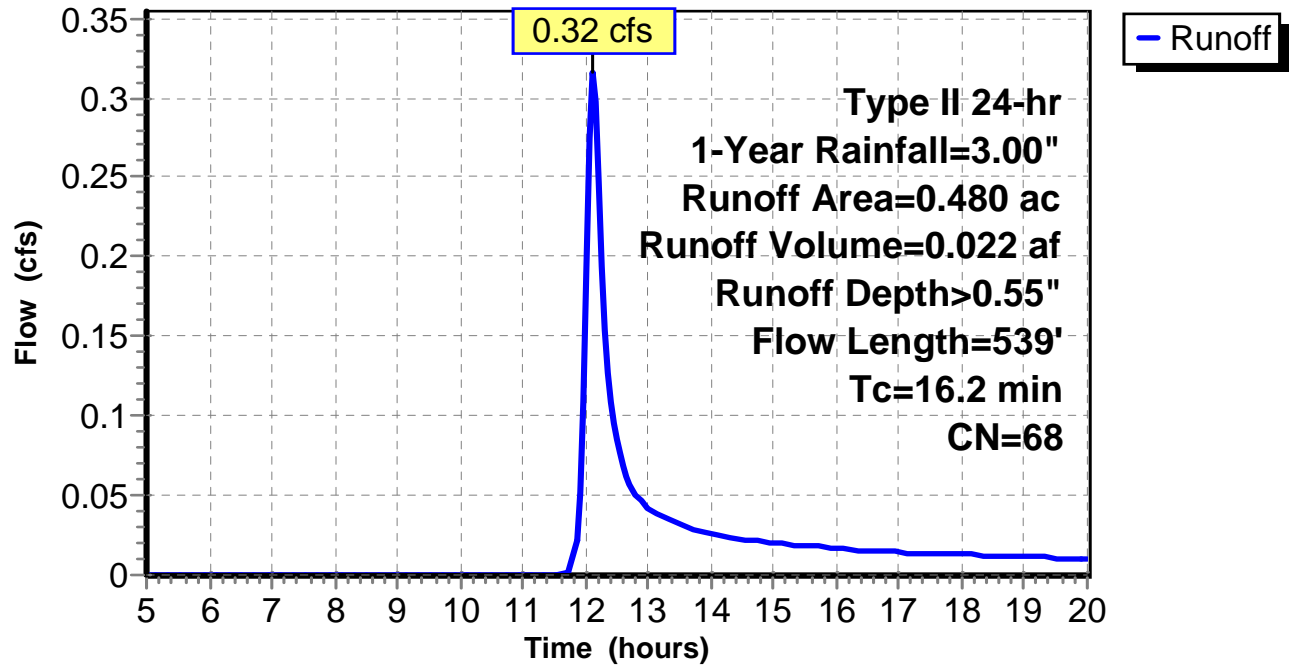
Subcatchment 4: C AR-707.004

Hydrograph



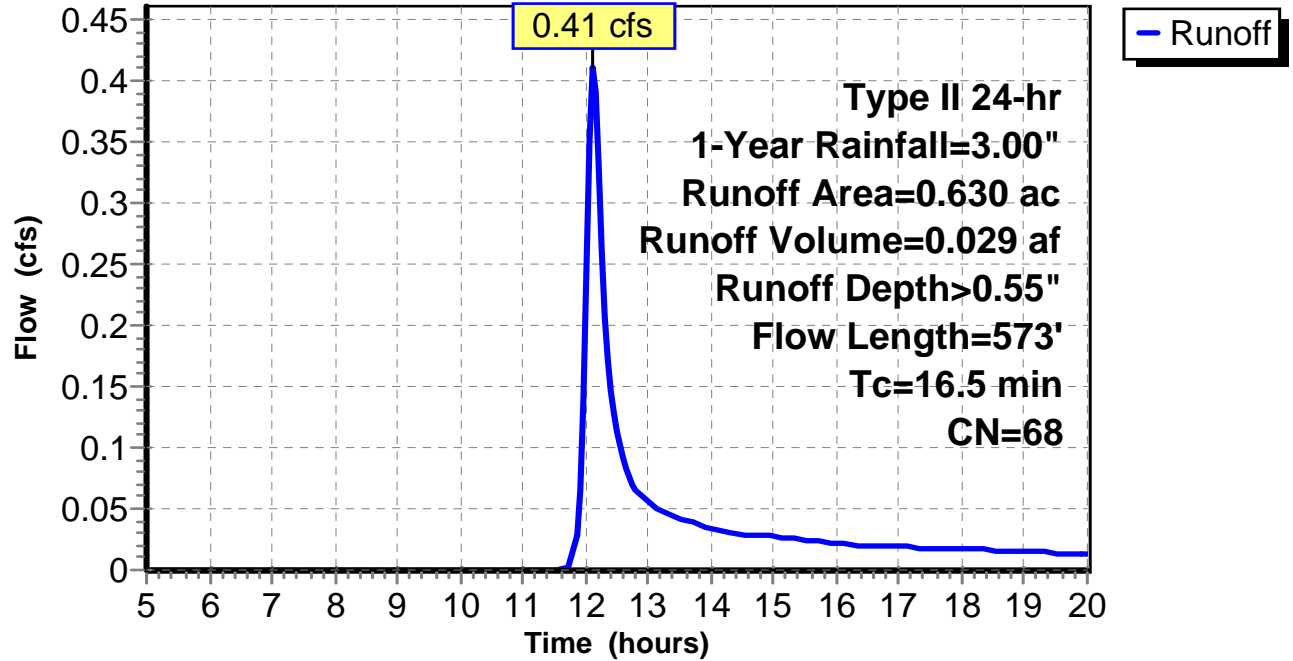
Subcatchment 1: C AR-709.001

Hydrograph



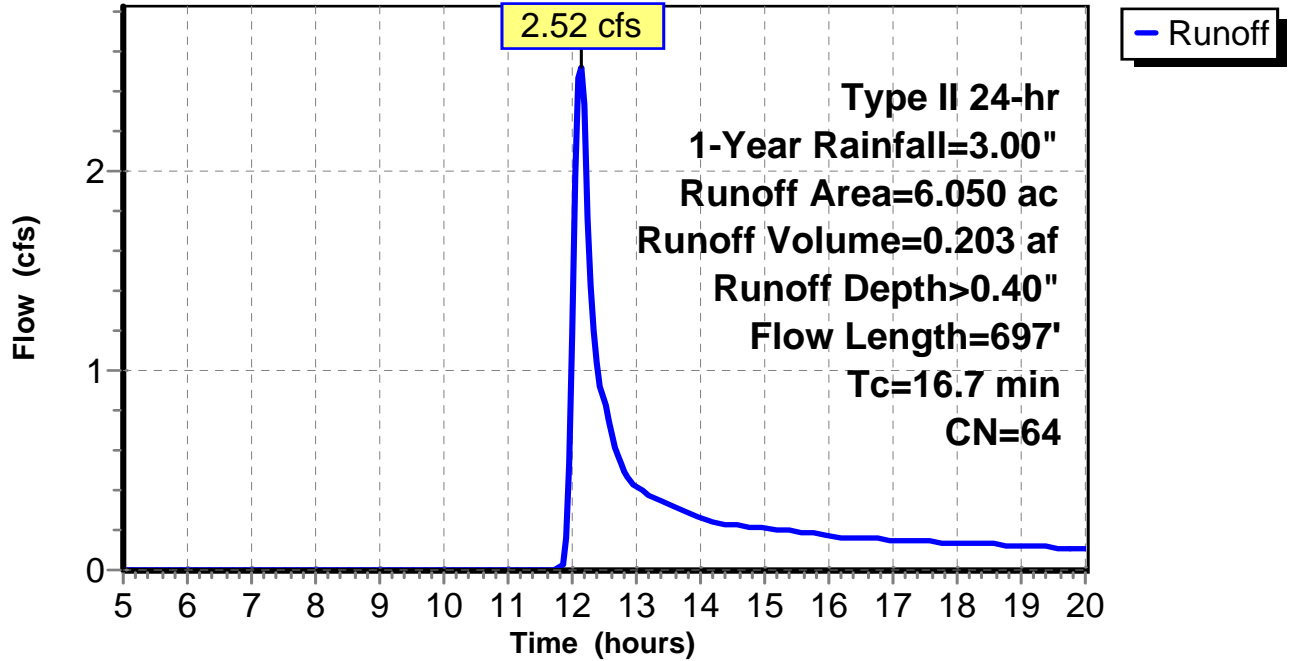
Subcatchment 2: C AR-709.002

Hydrograph



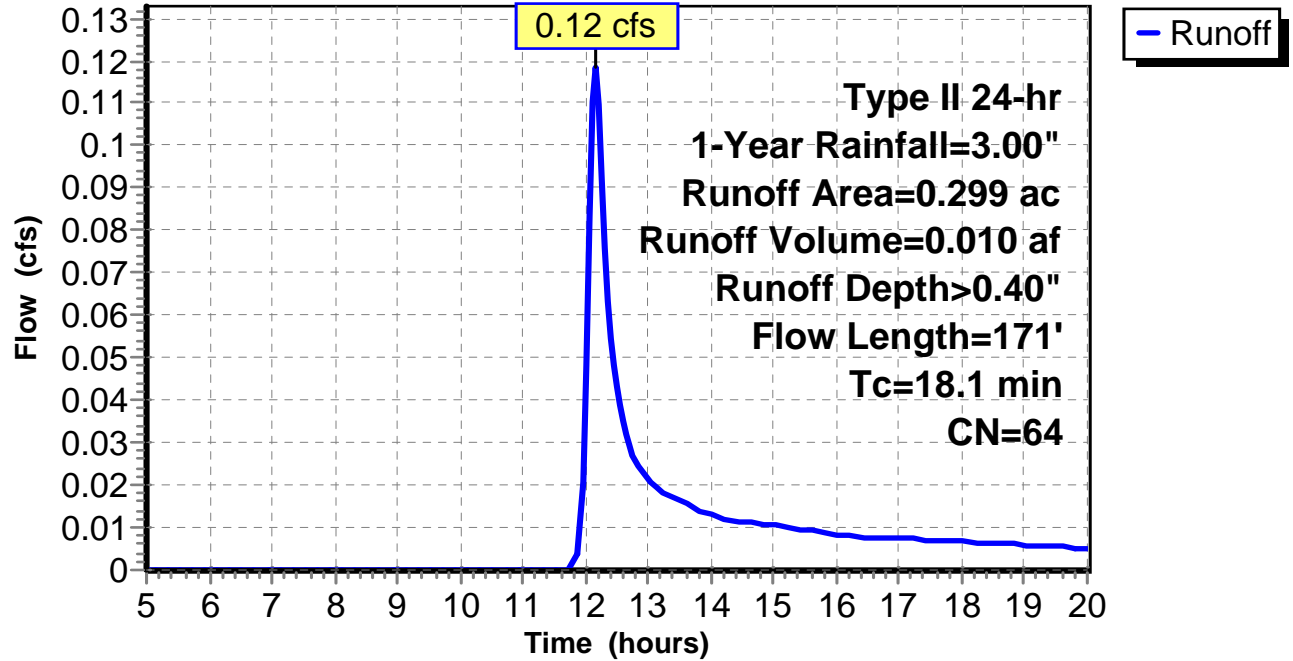
Subcatchment 3: C AR-709.003

Hydrograph



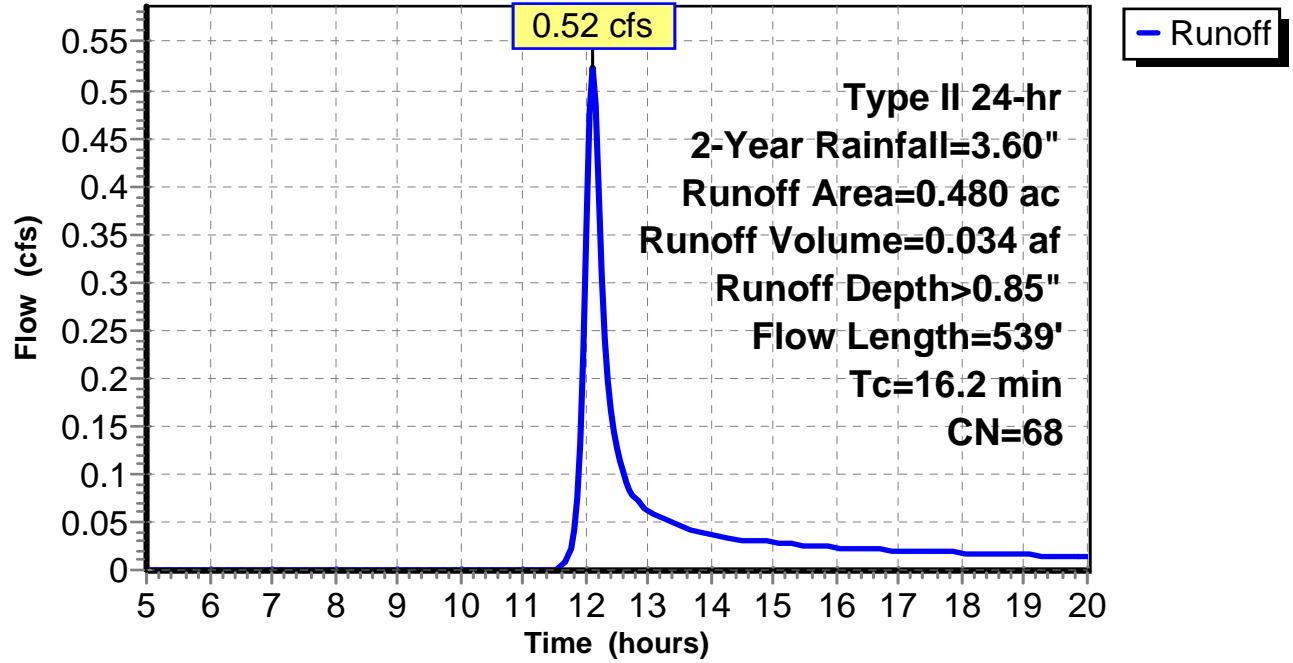
Subcatchment 4: C 331.001

Hydrograph



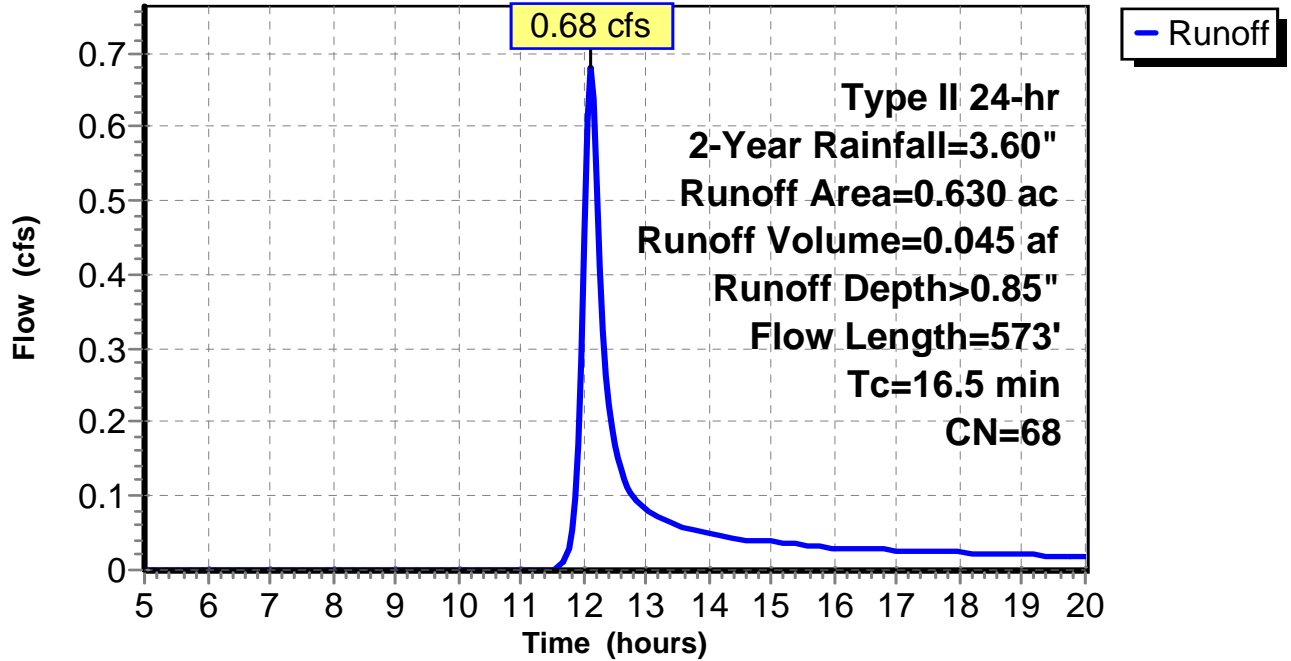
Subcatchment 1: C AR-709.001

Hydrograph



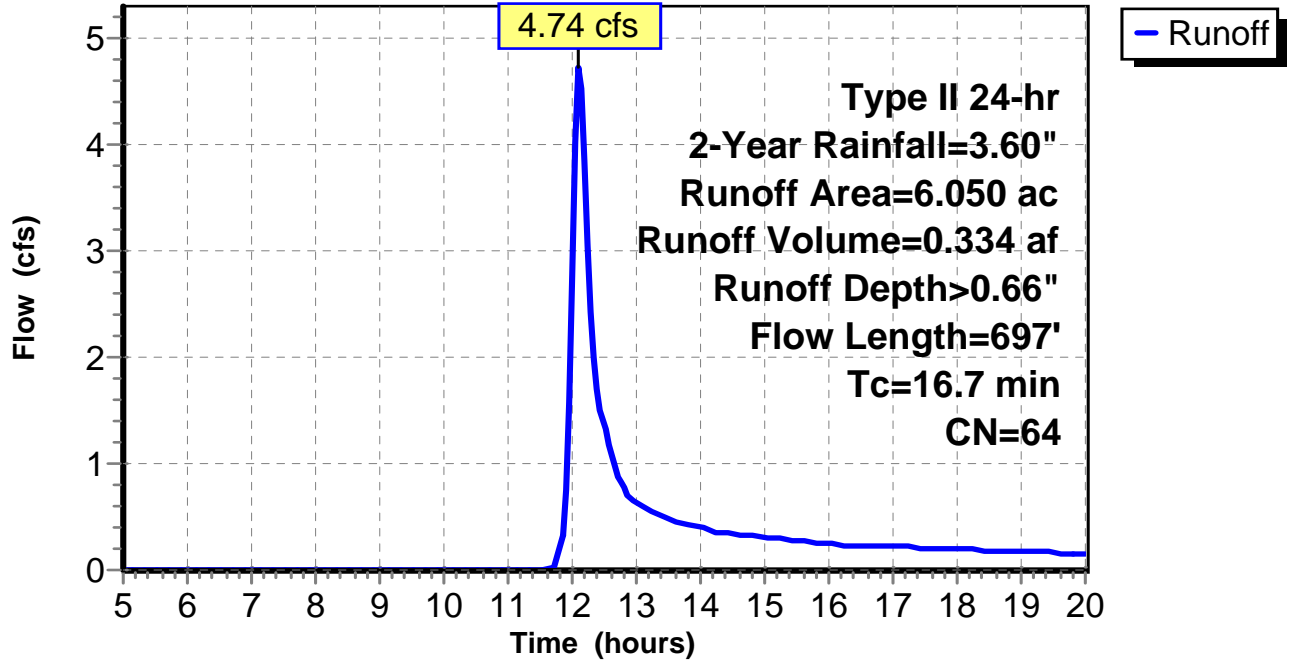
Subcatchment 2: C AR-709.002

Hydrograph



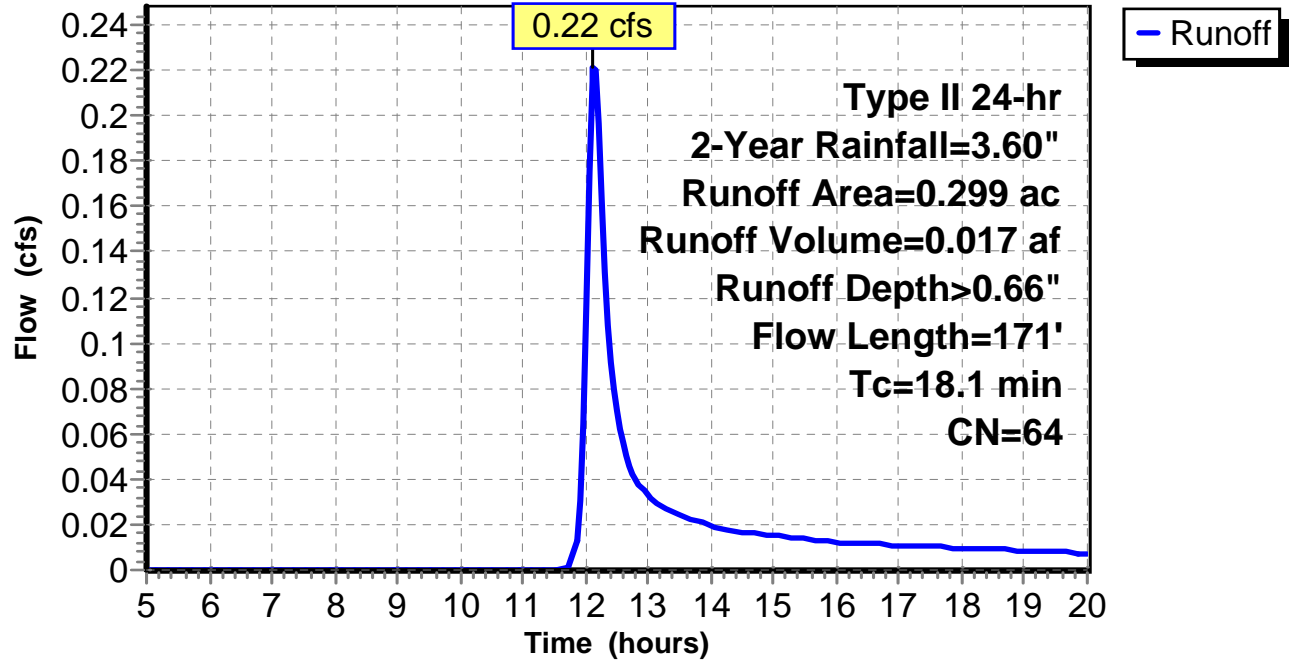
Subcatchment 3: C AR-709.003

Hydrograph



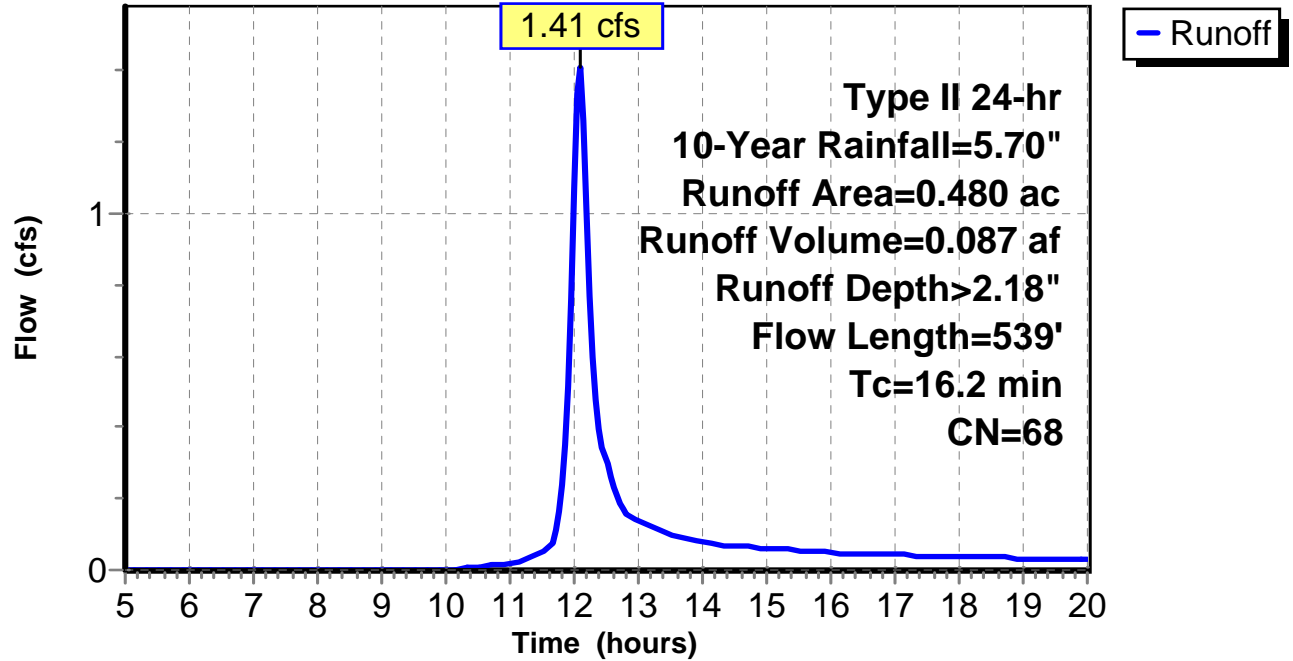
Subcatchment 4: C 331.001

Hydrograph



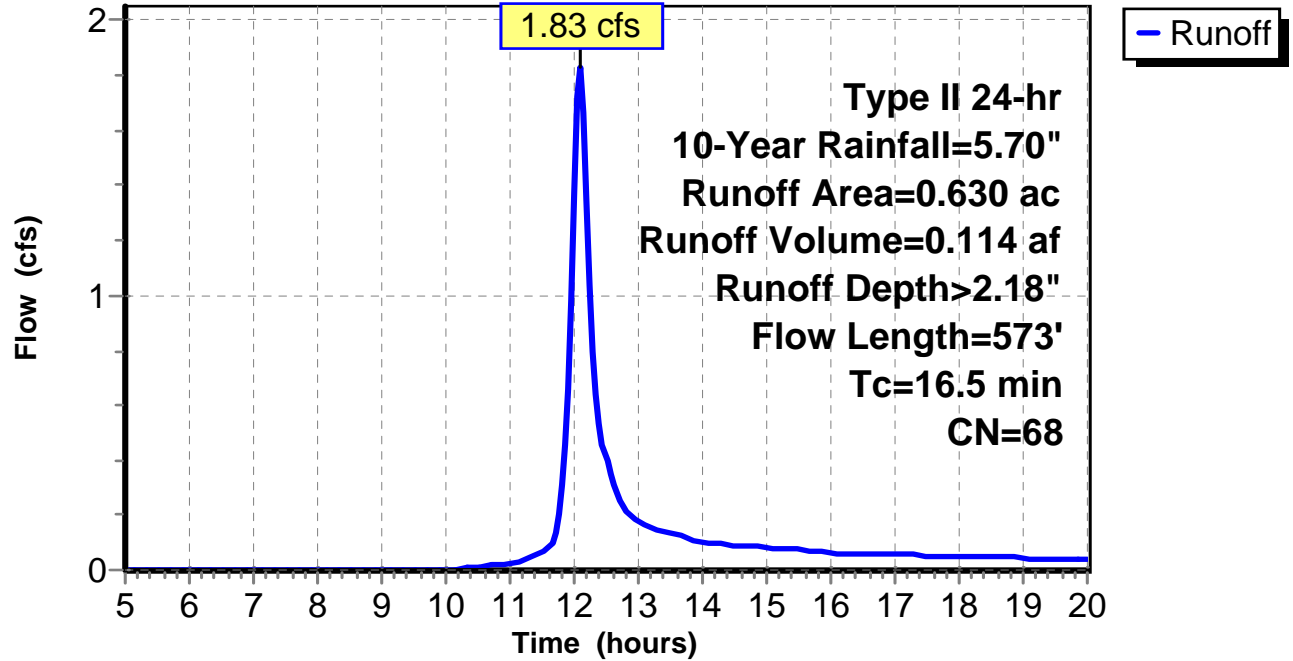
Subcatchment 1: C AR-709.001

Hydrograph



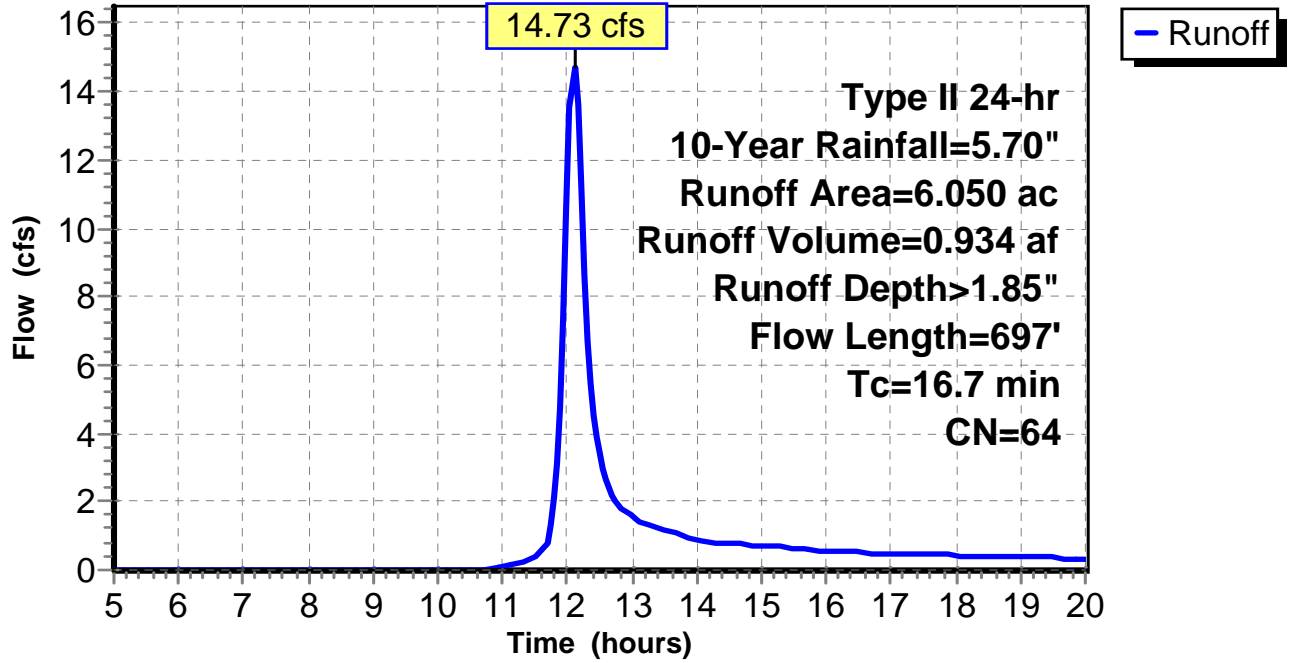
Subcatchment 2: C AR-709.002

Hydrograph



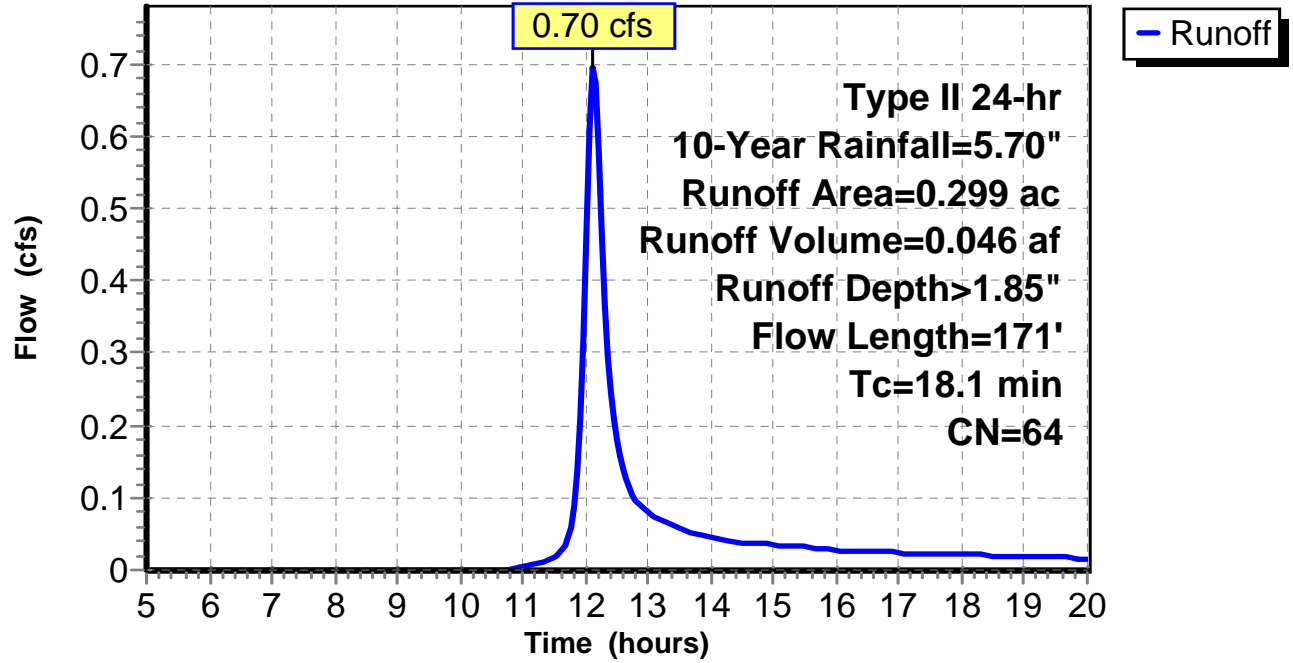
Subcatchment 3: C AR-709.003

Hydrograph



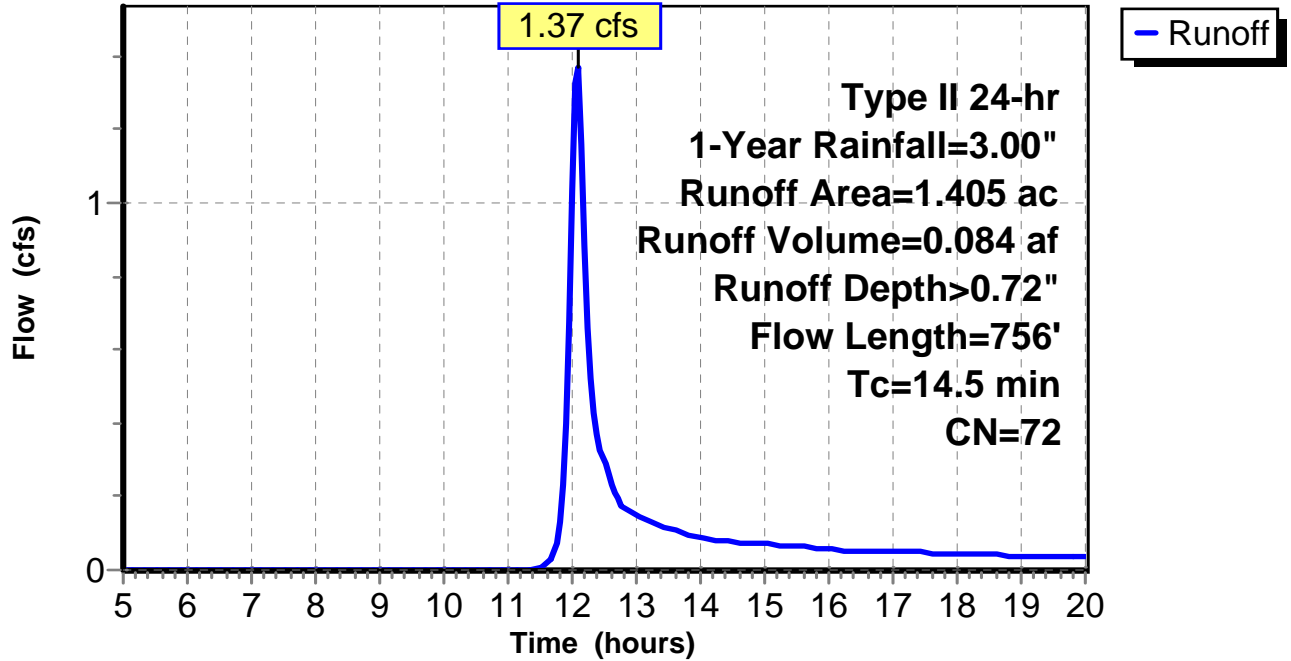
Subcatchment 4: C 331.001

Hydrograph



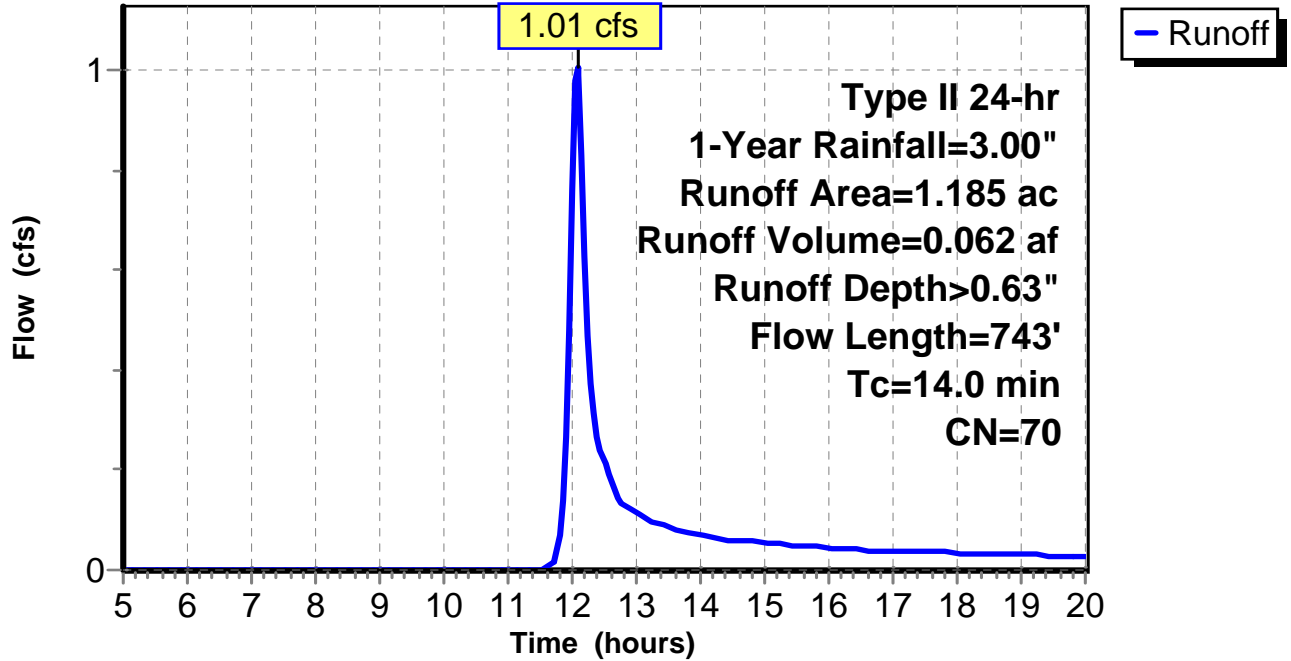
Subcatchment 1: C AR-710.001

Hydrograph



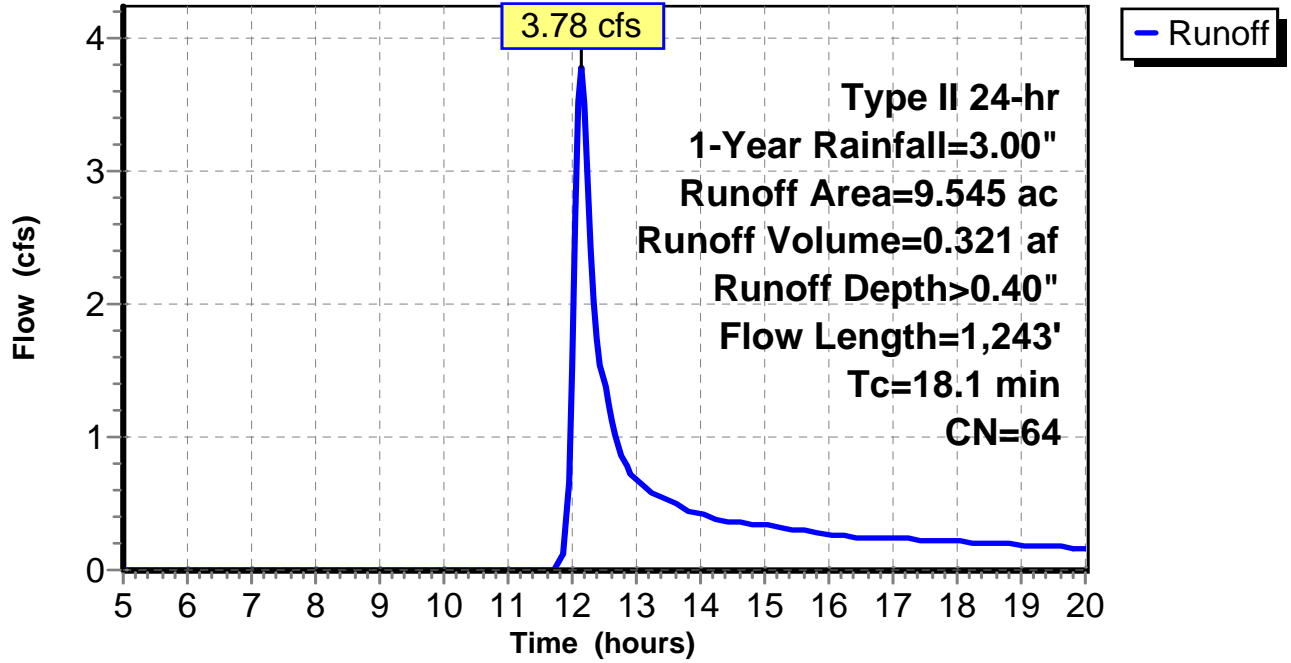
Subcatchment 2: C AR-710.002

Hydrograph



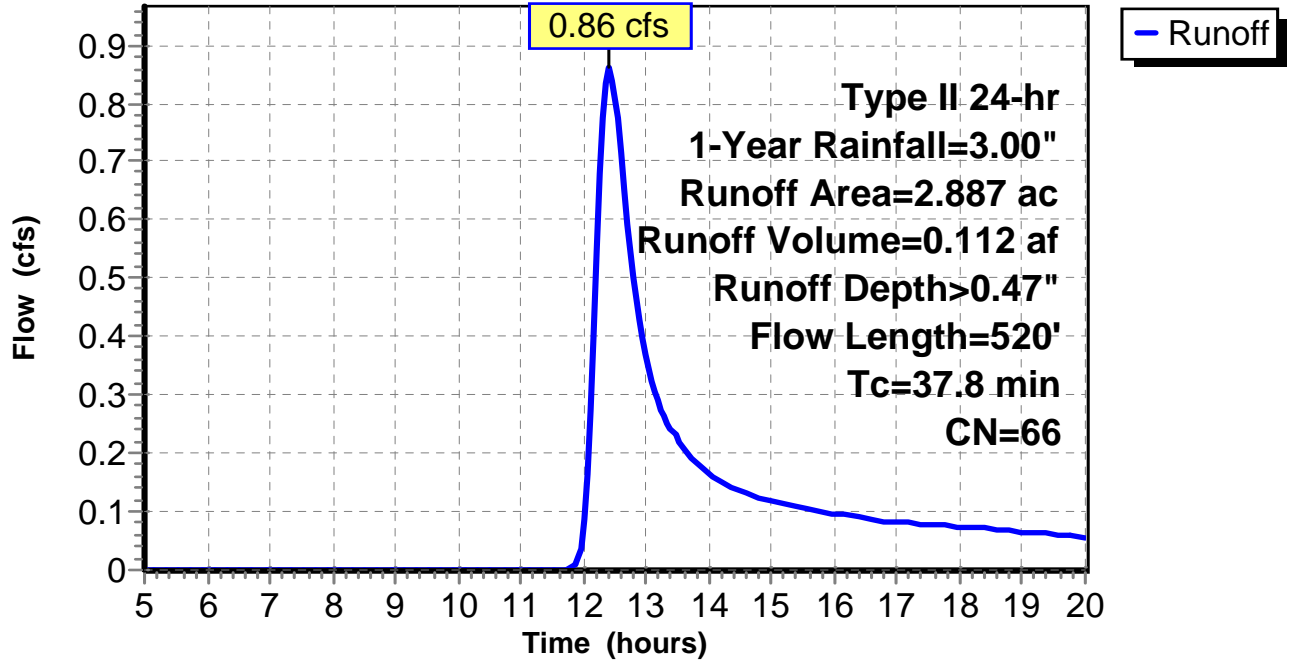
Subcatchment 3: C AR-710.003

Hydrograph



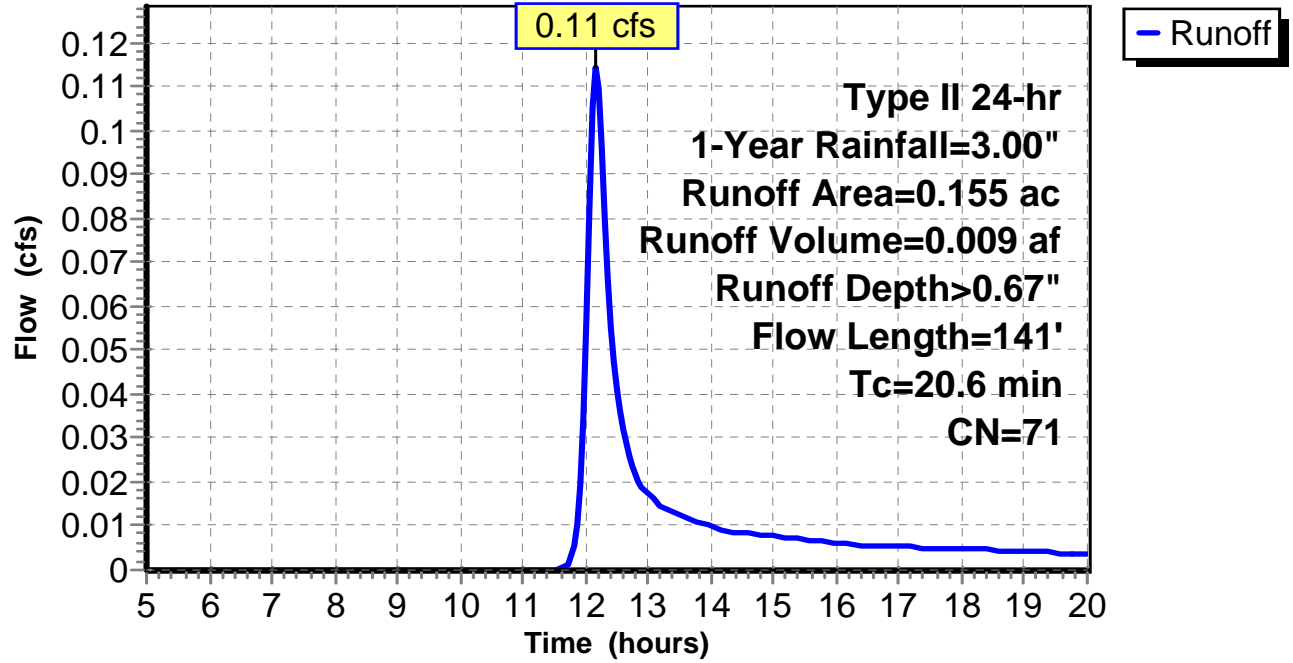
Subcatchment 4: C AR-710.004

Hydrograph



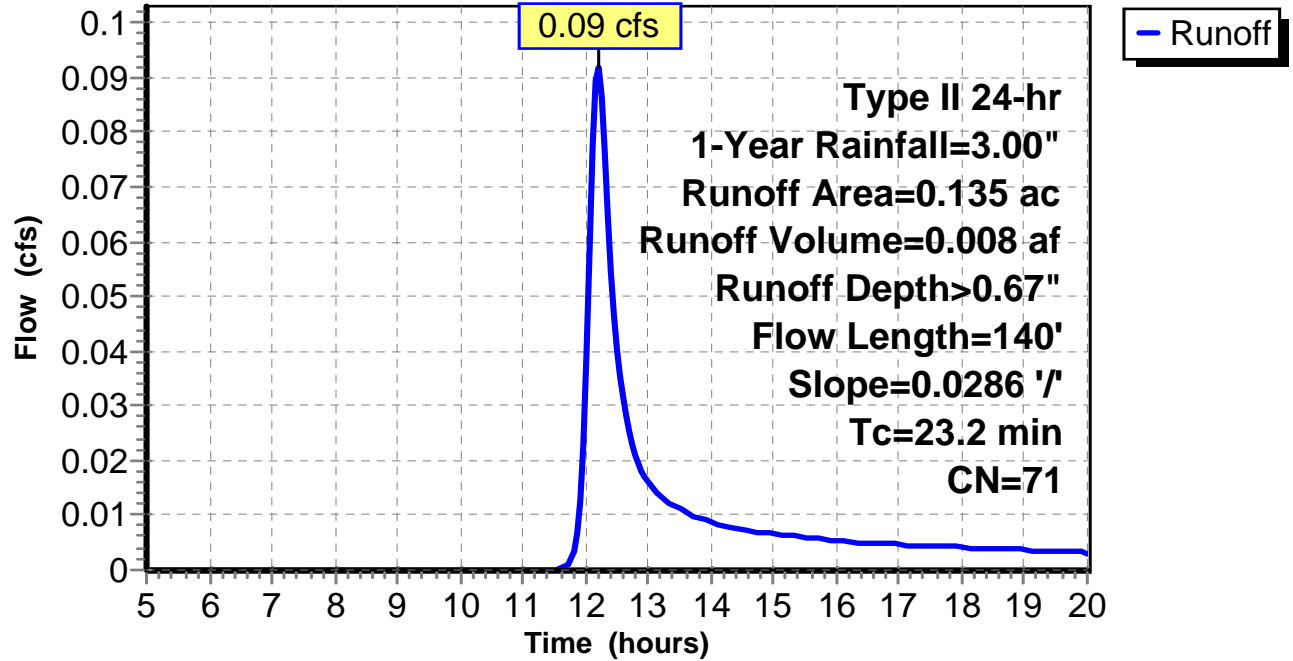
Subcatchment 5: C 337.001

Hydrograph



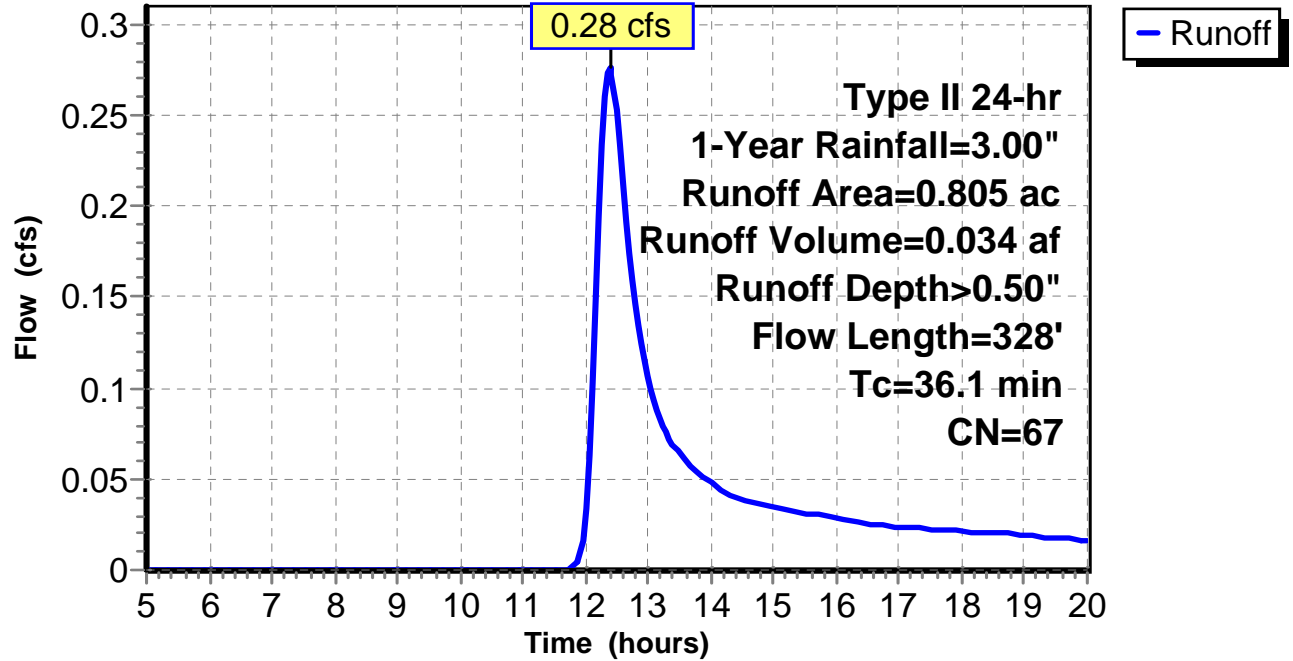
Subcatchment 6: C 337.002

Hydrograph



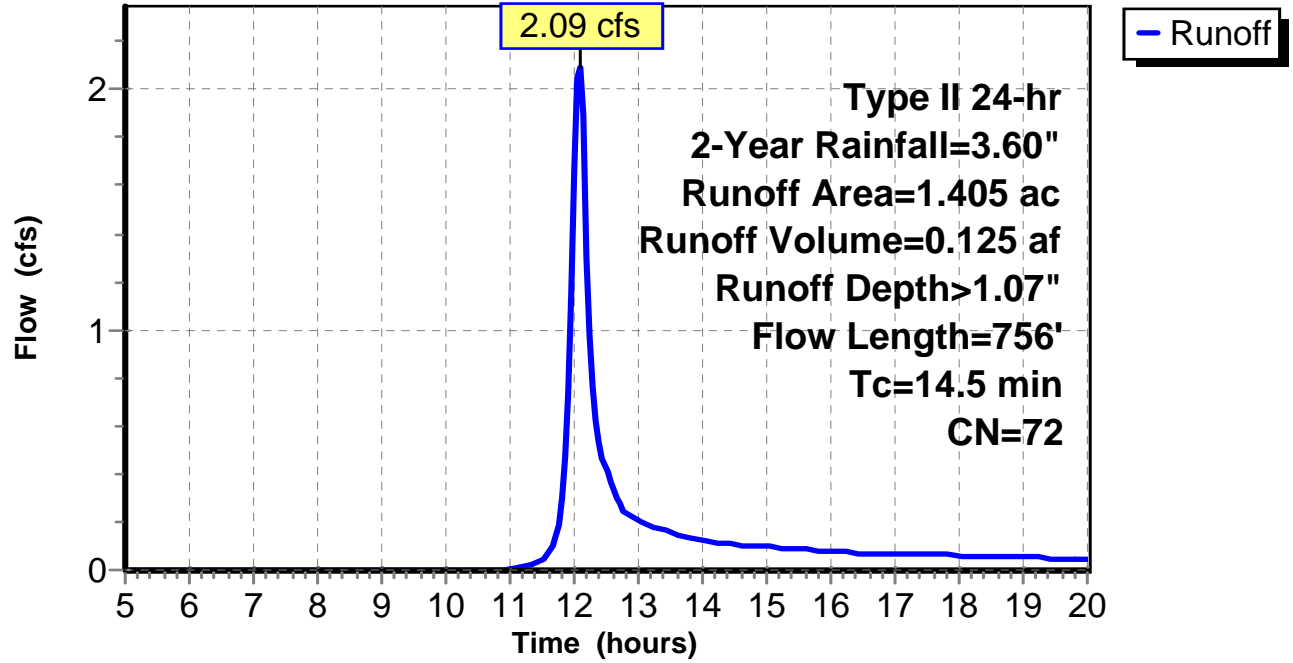
Subcatchment 7: C 337.003

Hydrograph



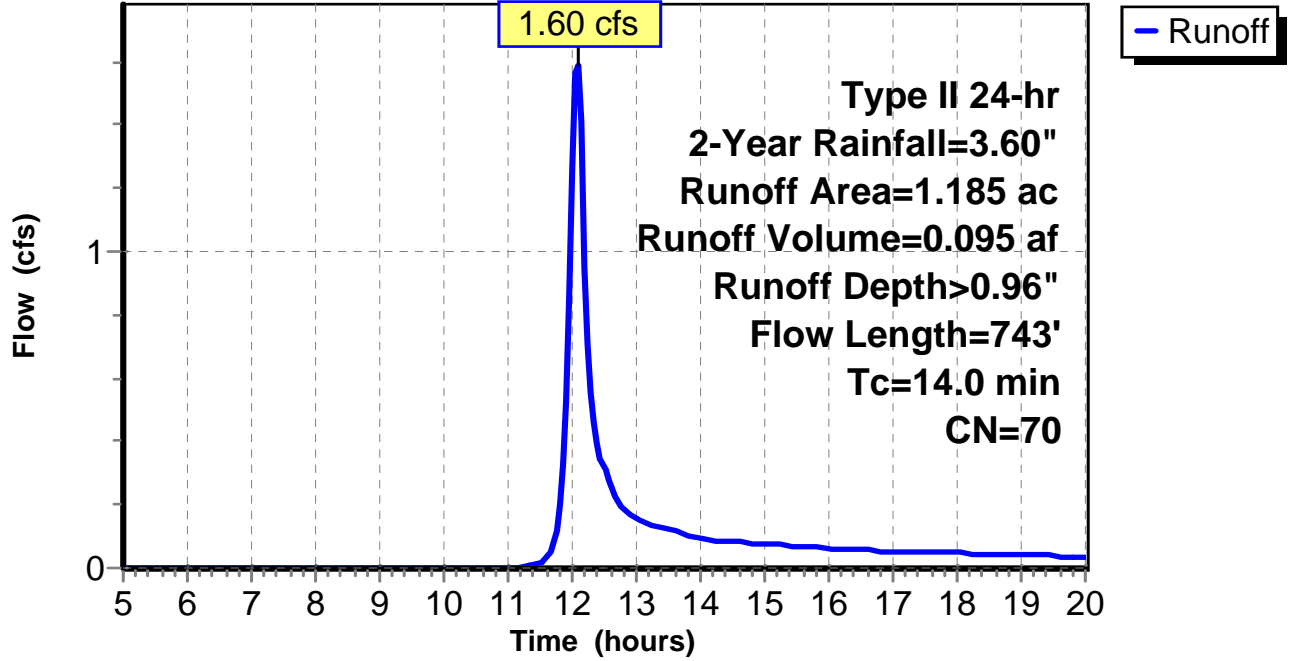
Subcatchment 1: C AR-710.001

Hydrograph



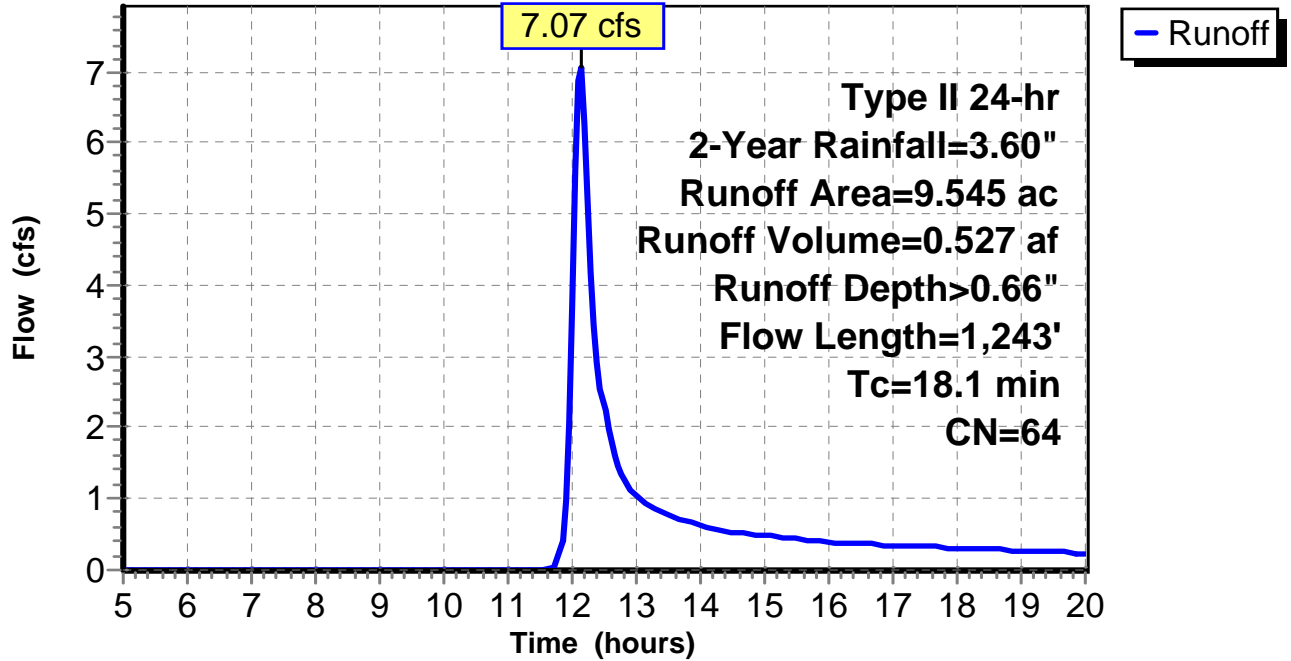
Subcatchment 2: C AR-710.002

Hydrograph



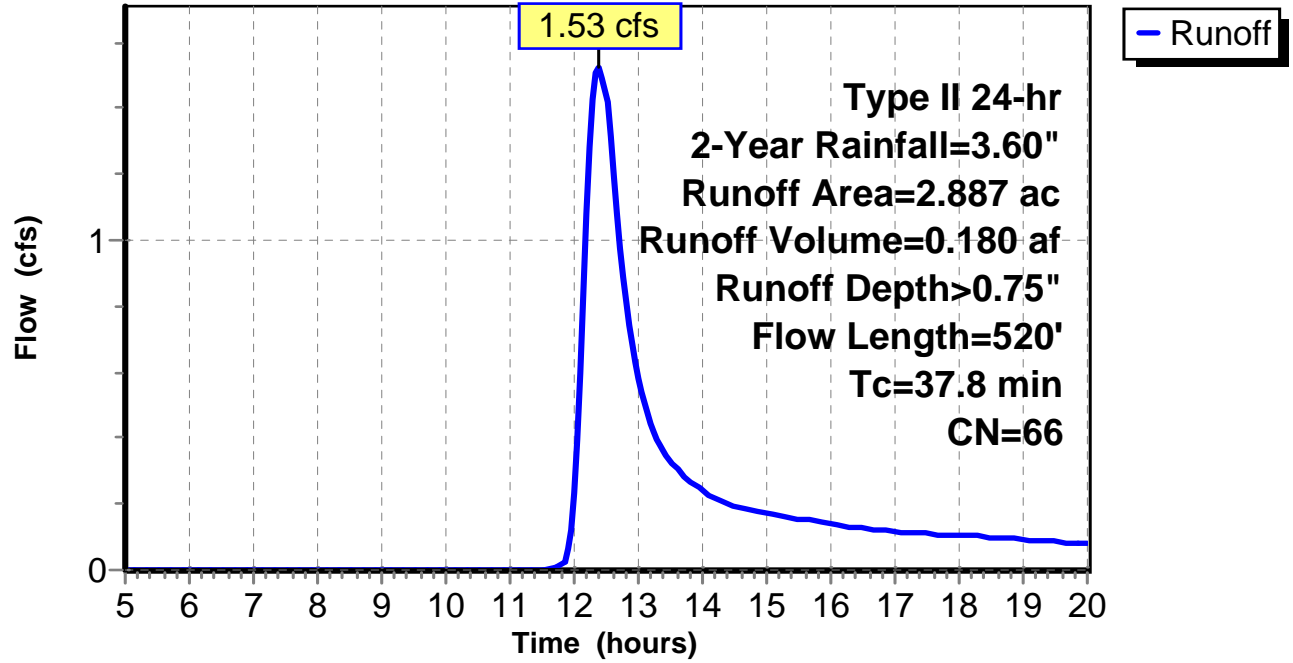
Subcatchment 3: C AR-710.003

Hydrograph



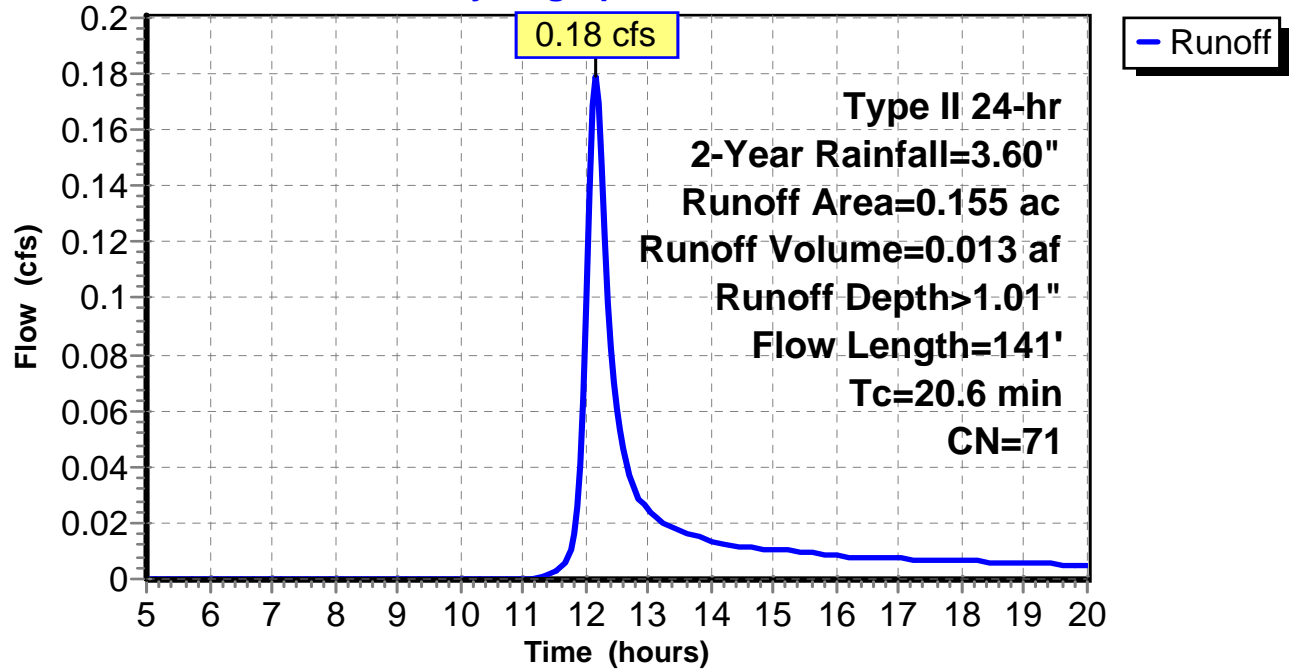
Subcatchment 4: C AR-710.004

Hydrograph



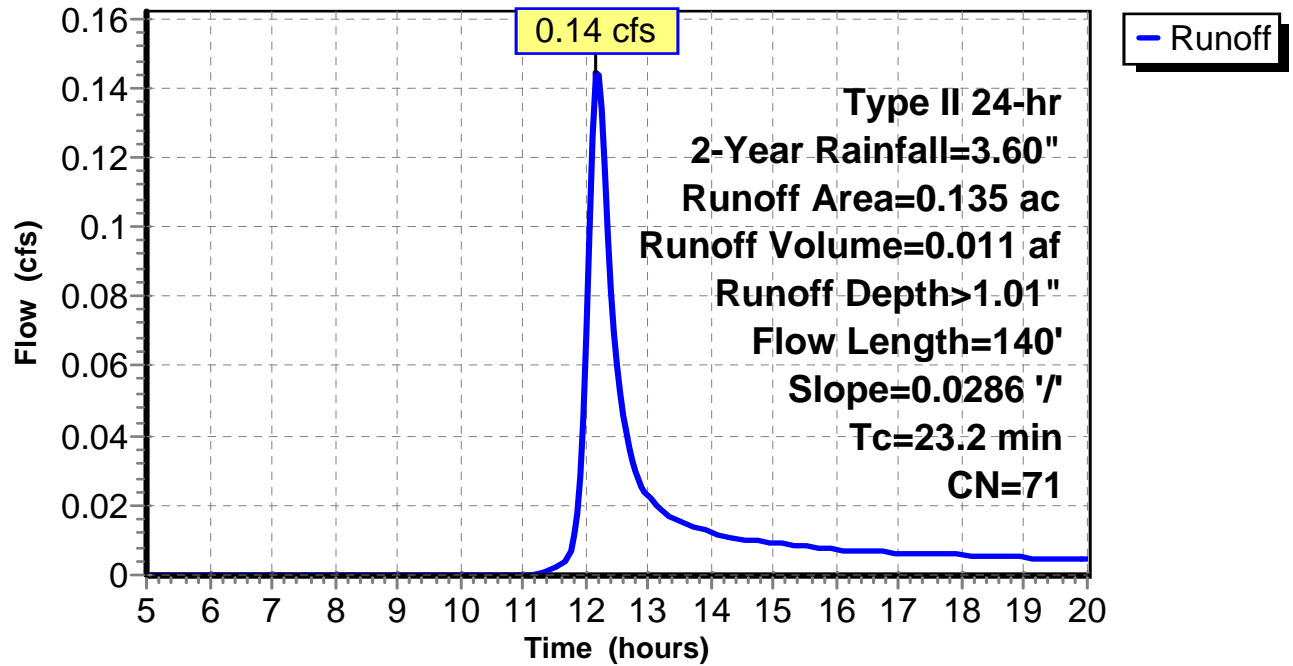
Subcatchment 5: C 337.001

Hydrograph



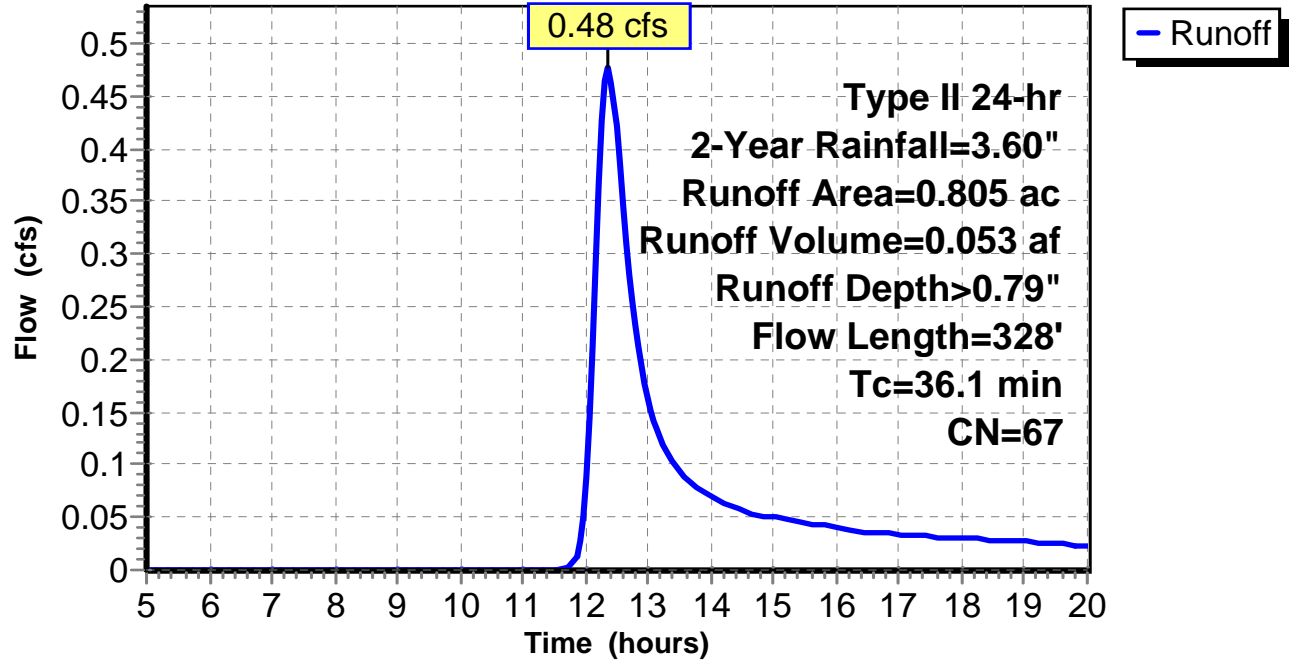
Subcatchment 6: C 337.002

Hydrograph



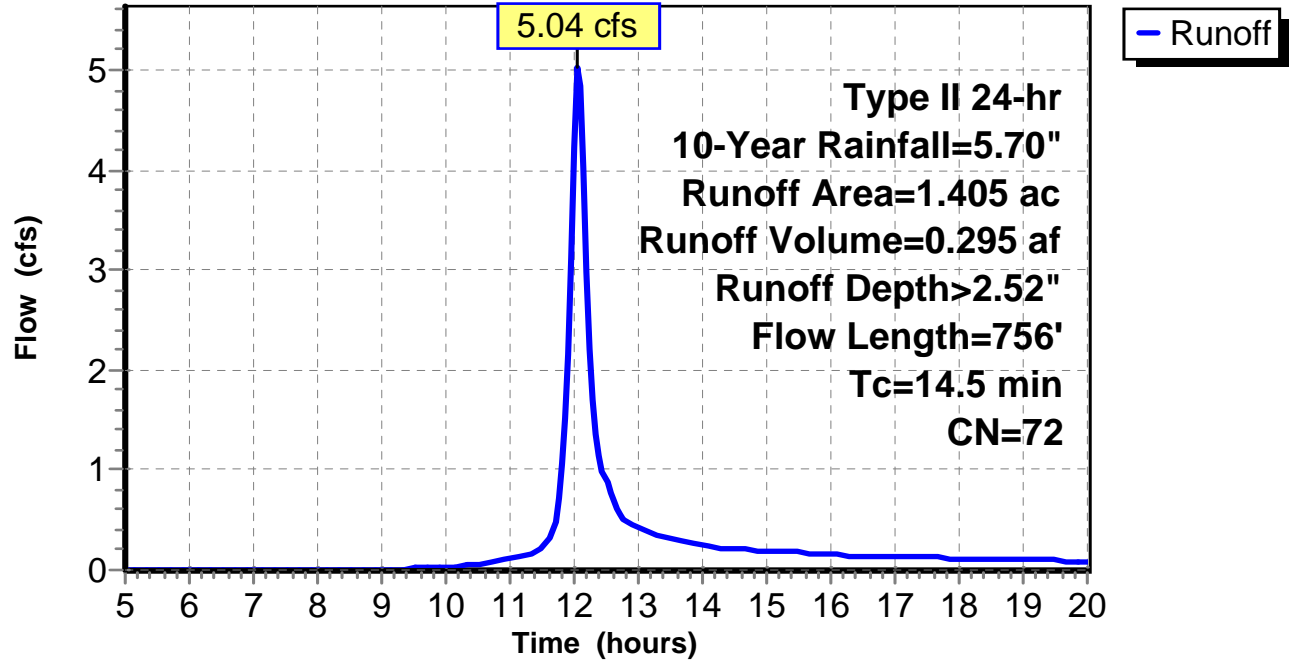
Subcatchment 7: C 337.003

Hydrograph



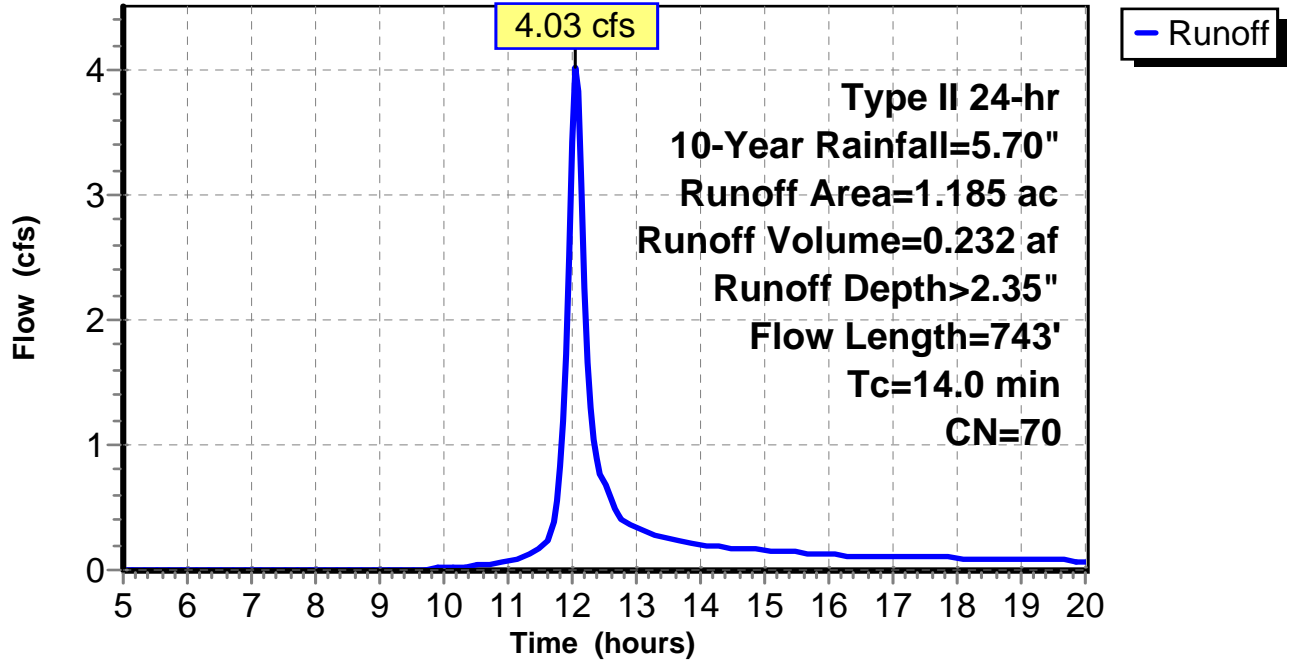
Subcatchment 1: C AR-710.001

Hydrograph



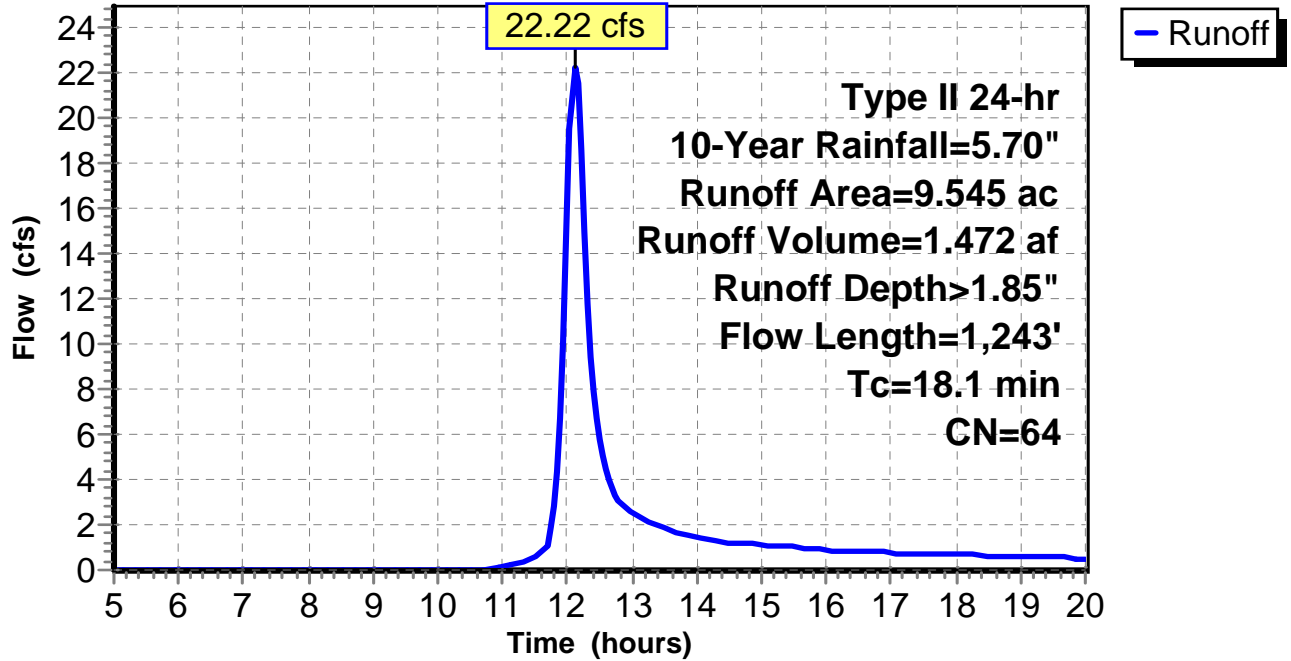
Subcatchment 2: C AR-710.002

Hydrograph



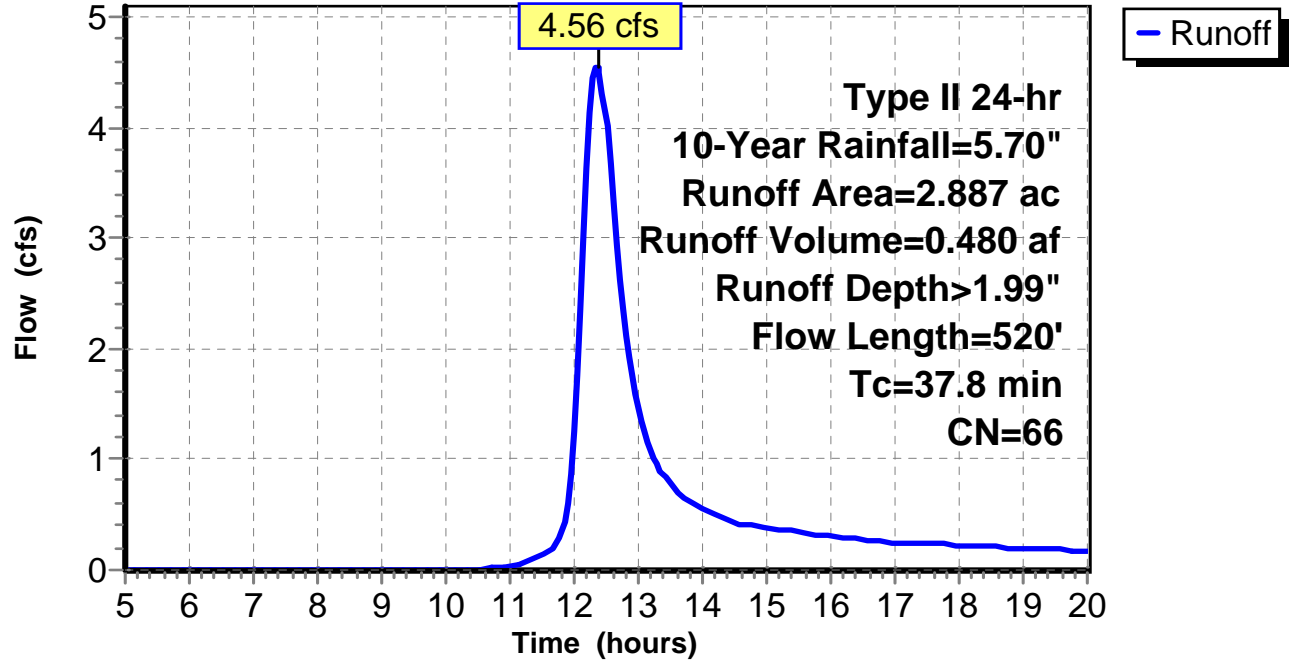
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Hydrograph



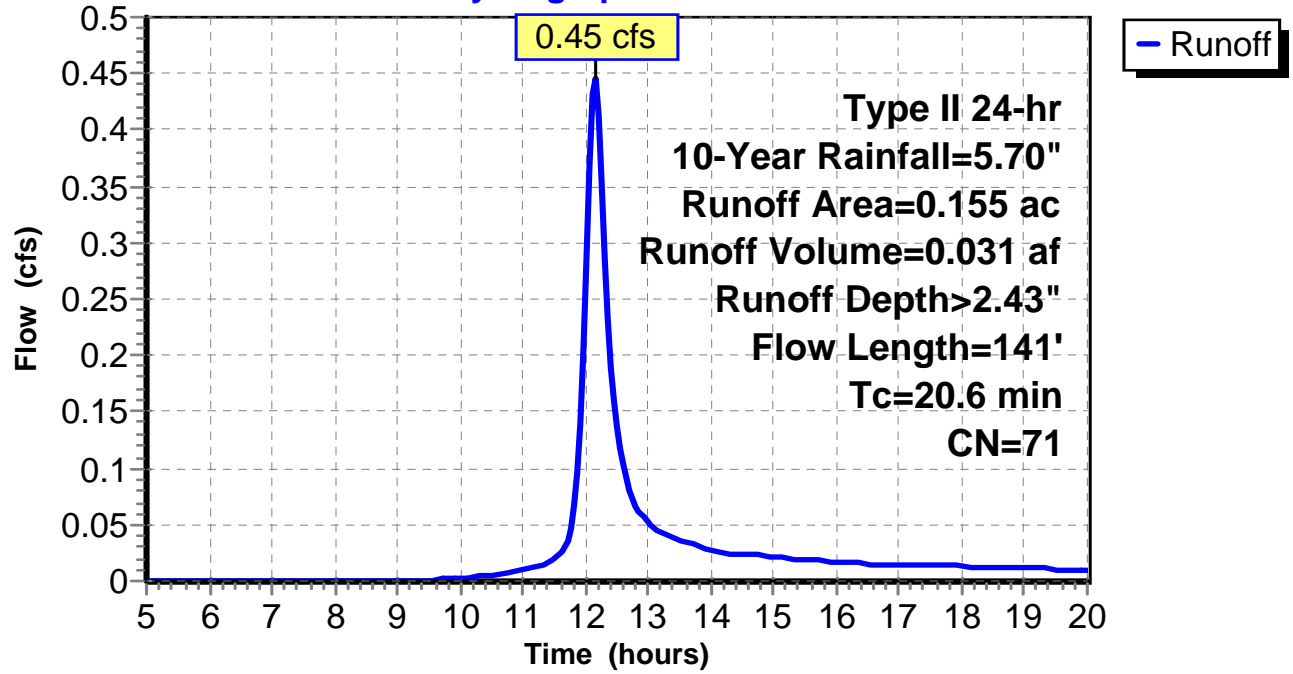
Subcatchment 4: C AR-710.004

Hydrograph



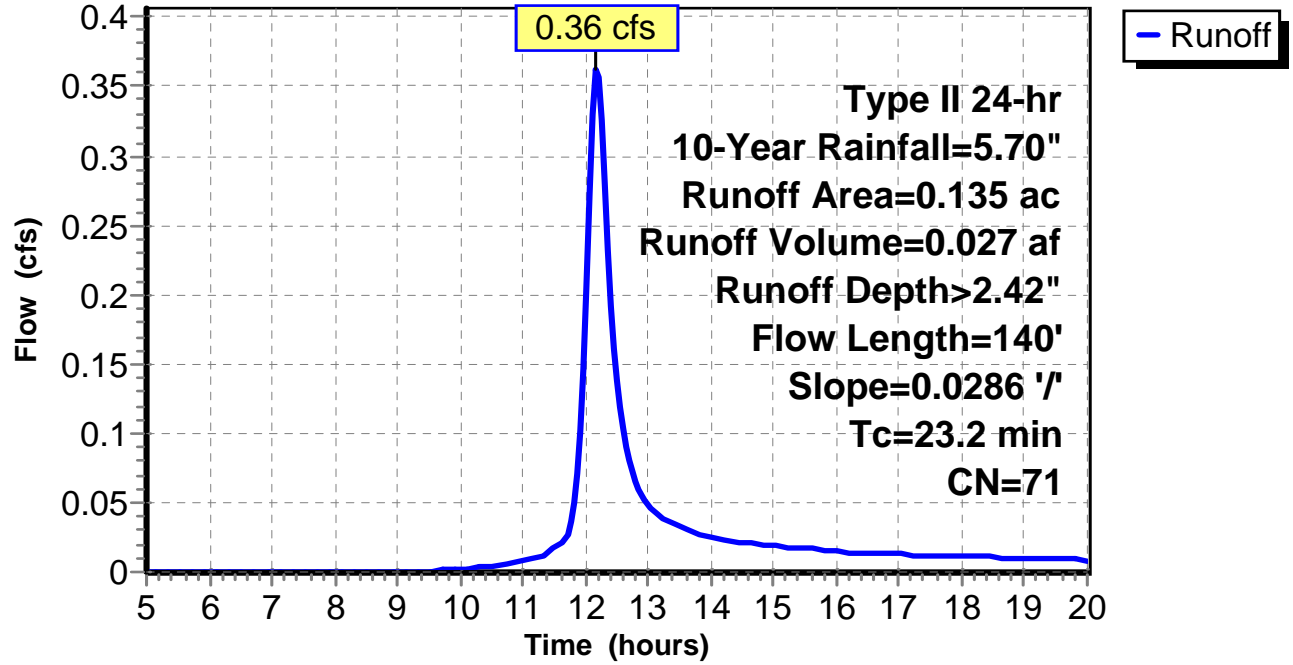
Subcatchment 5: C 337.001

Hydrograph



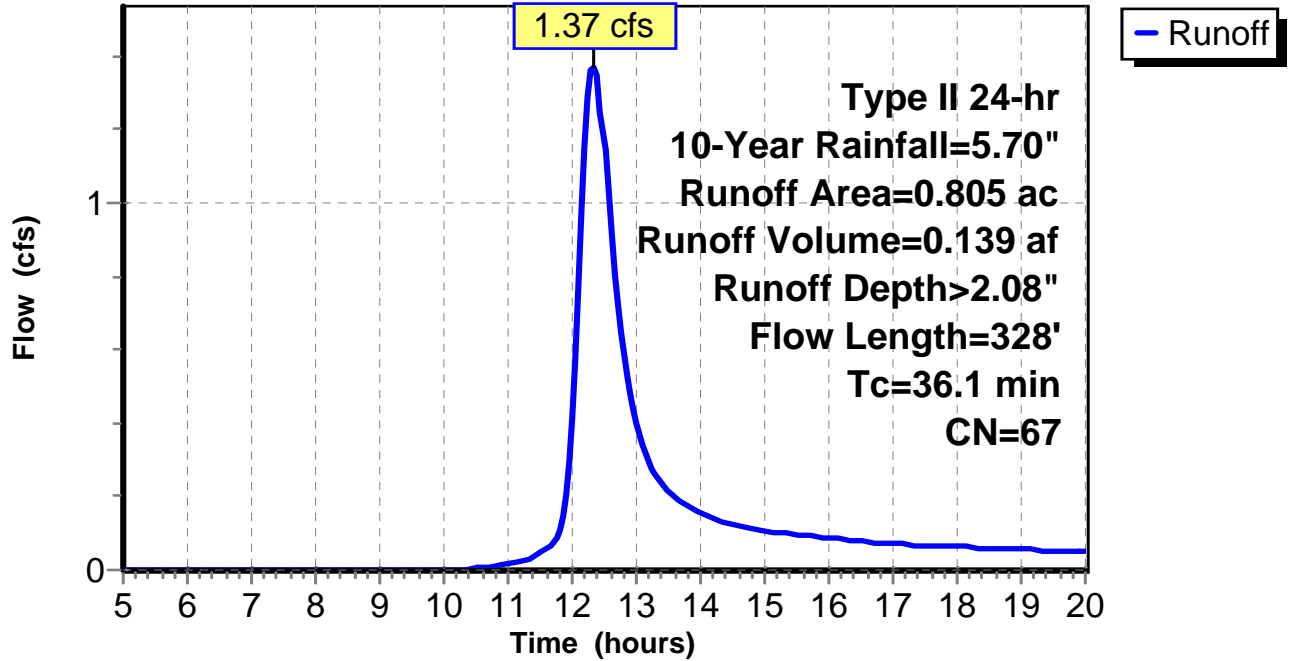
Subcatchment 6: C 337.002

Hydrograph



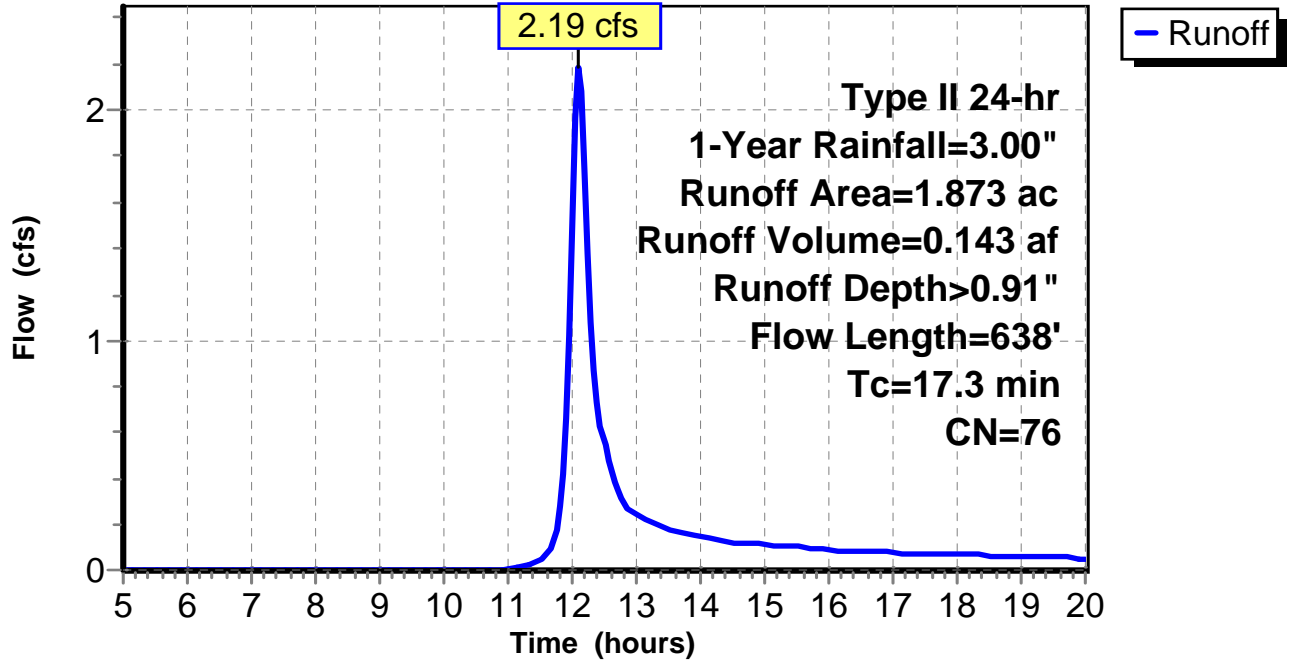
Subcatchment 7: C 337.003

Hydrograph



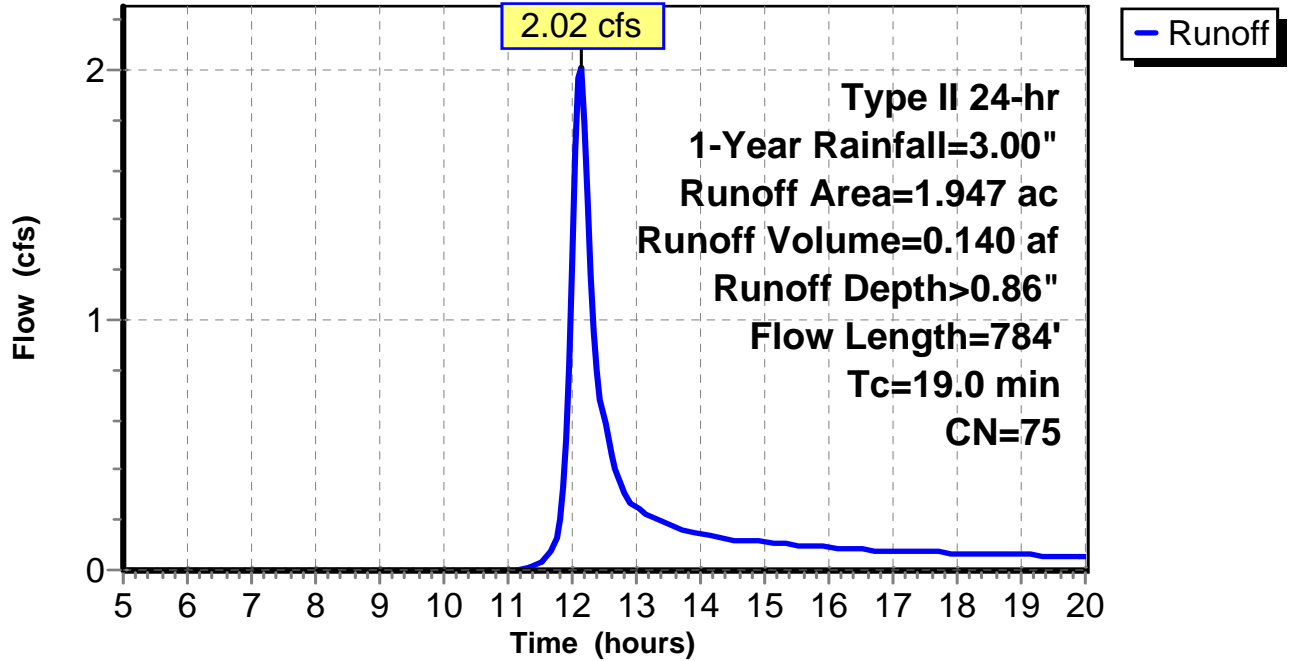
Subcatchment 1: C AR-710.005

Hydrograph



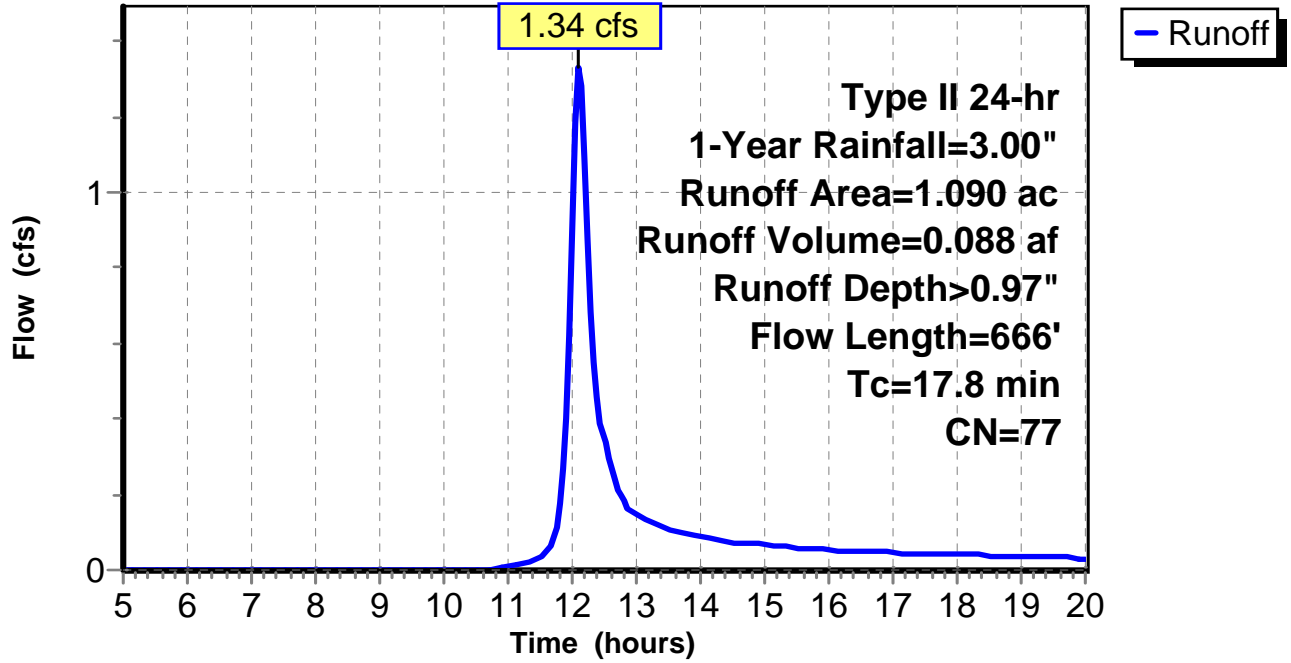
Subcatchment 2: C AR-710.006

Hydrograph



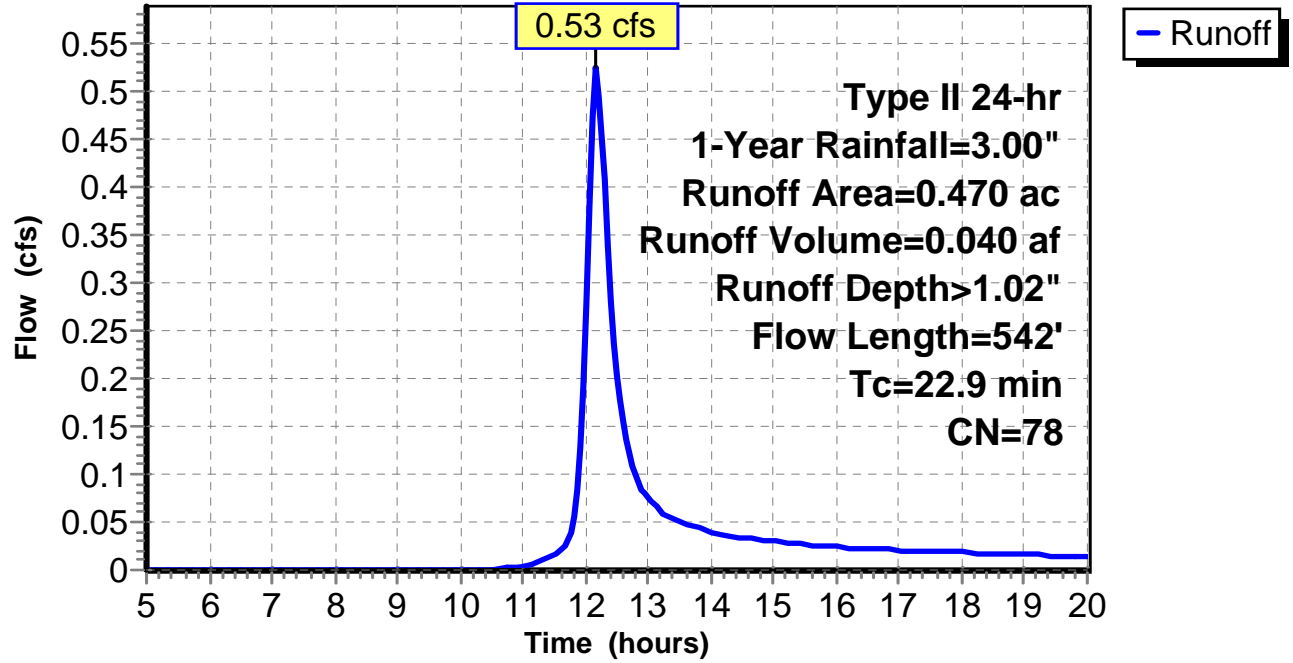
Subcatchment 3: C 339.001

Hydrograph



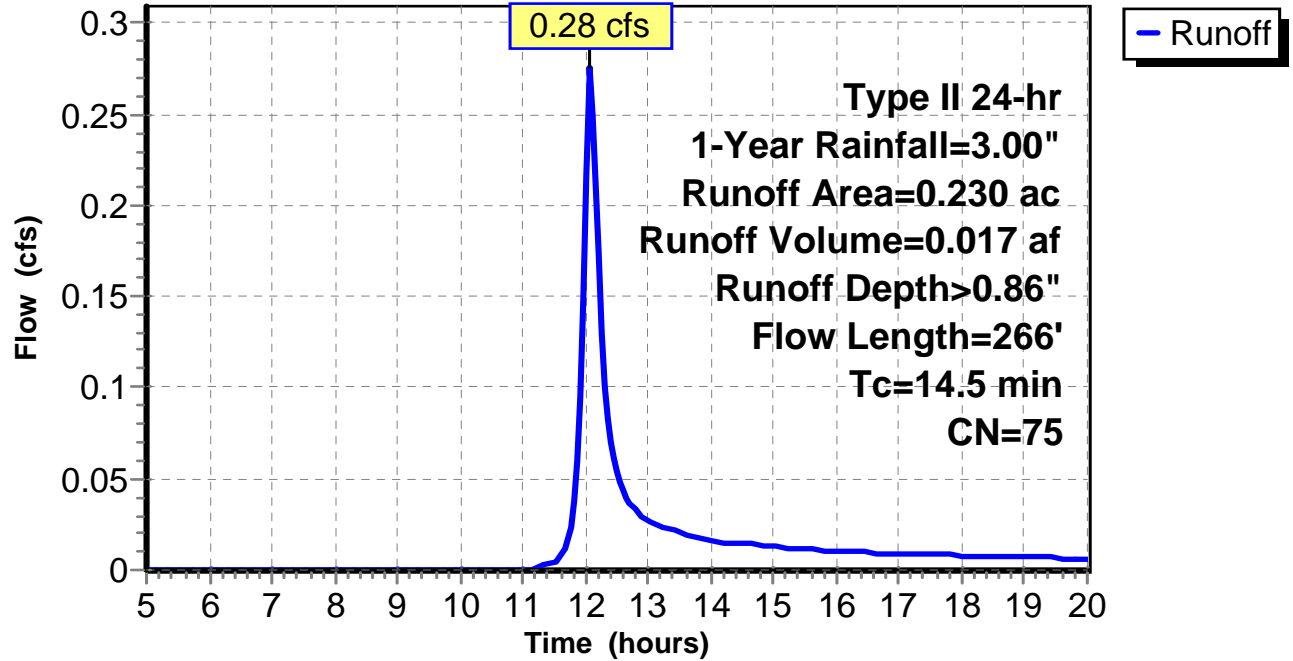
Subcatchment 4: C 339.002

Hydrograph



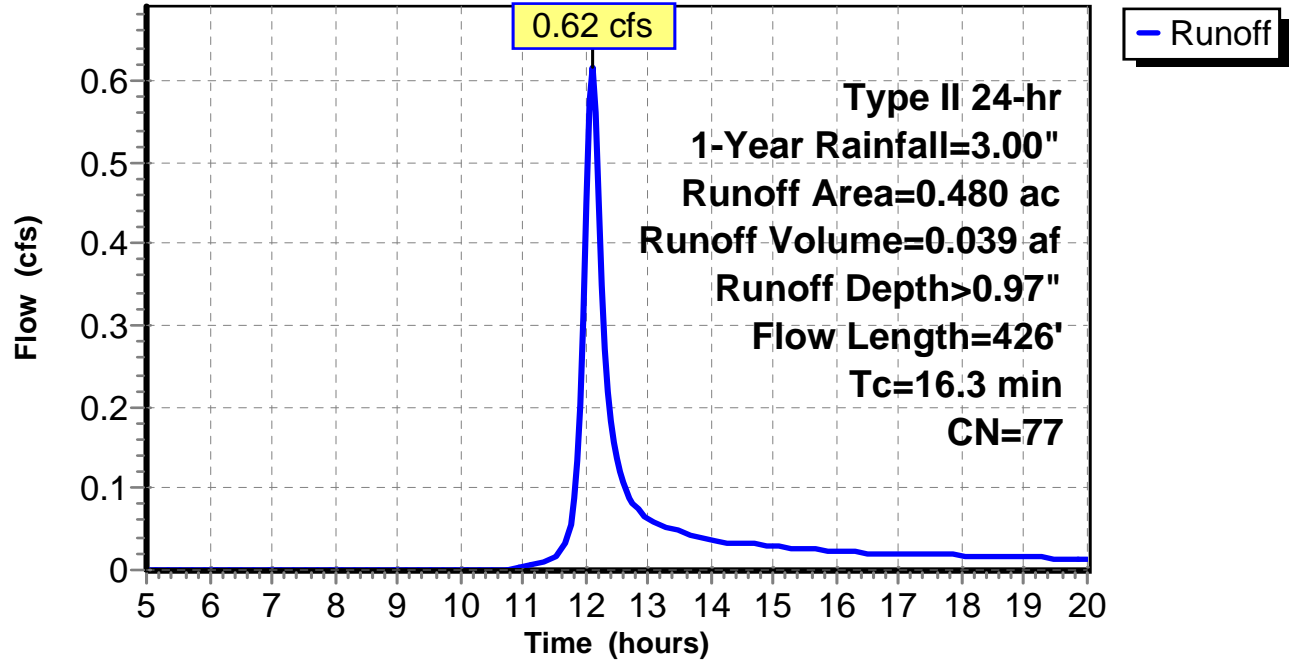
Subcatchment 5: C 339.003

Hydrograph



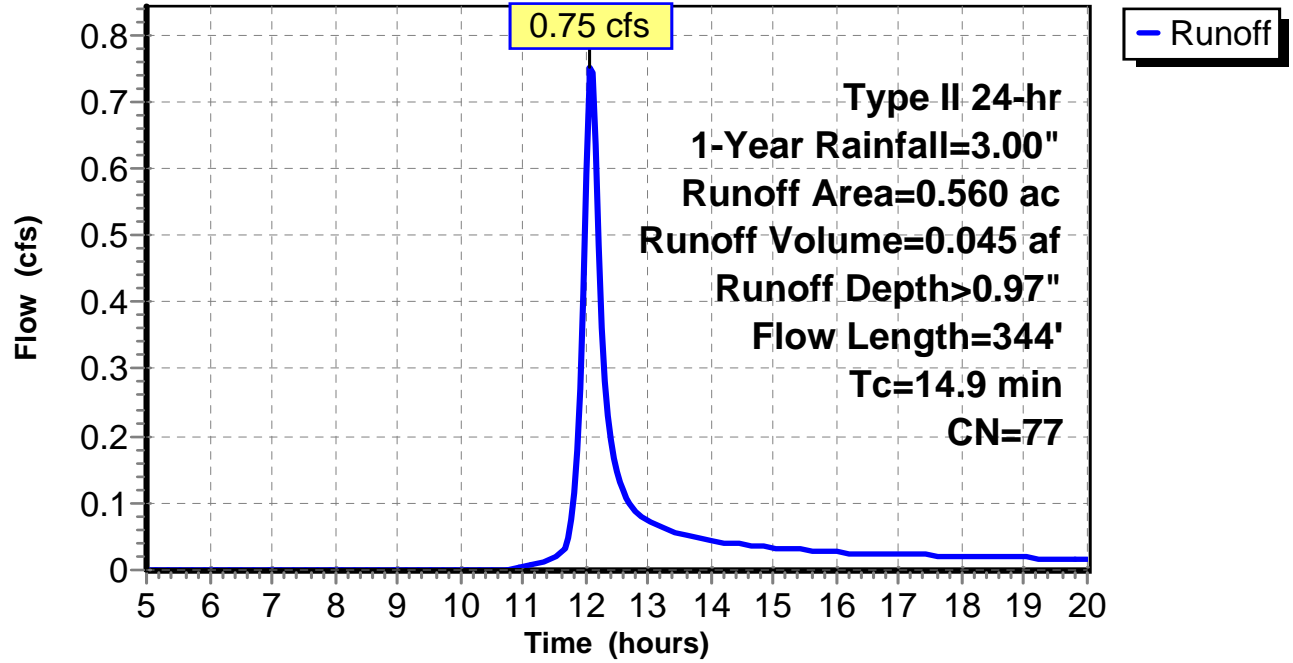
Subcatchment 6: C 339.004

Hydrograph



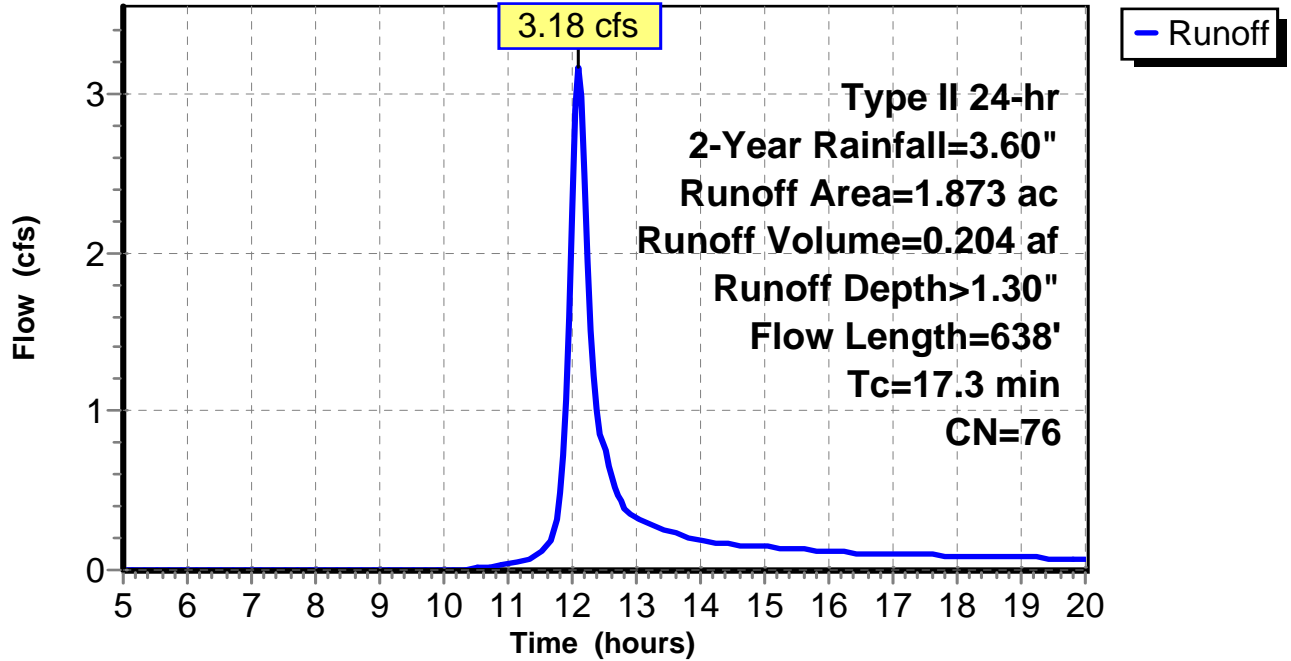
Subcatchment 7: C 339.005

Hydrograph



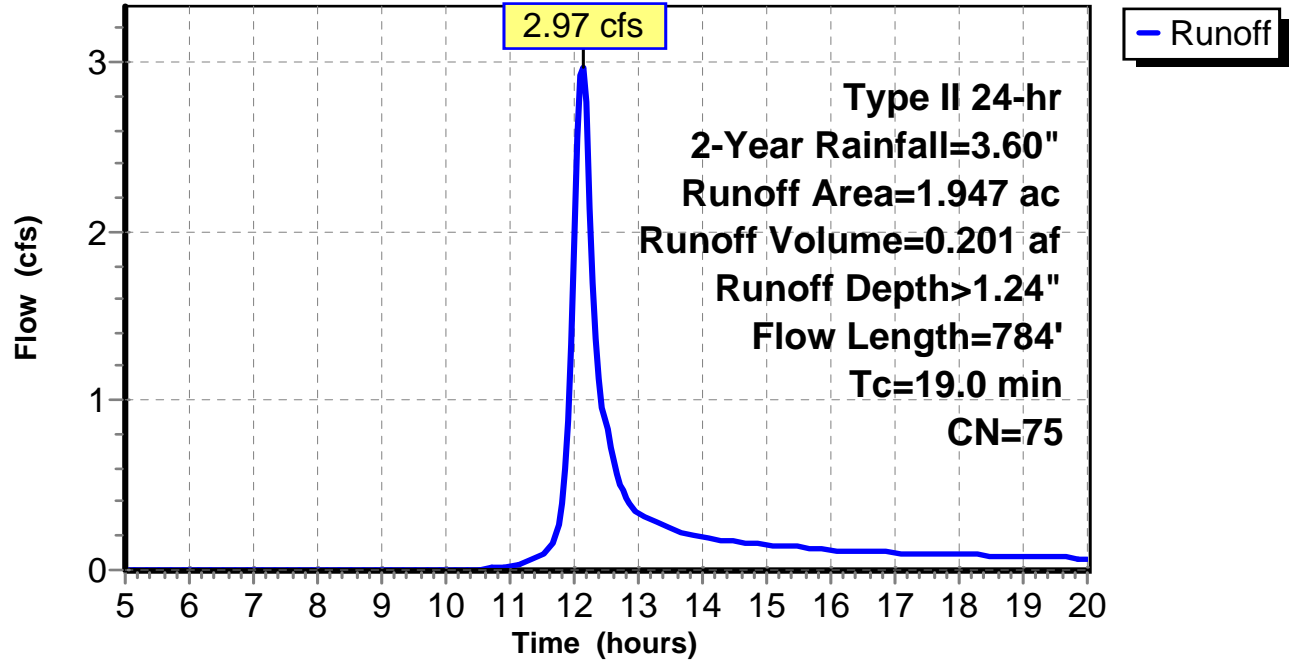
Subcatchment 1: C AR-710.005

Hydrograph



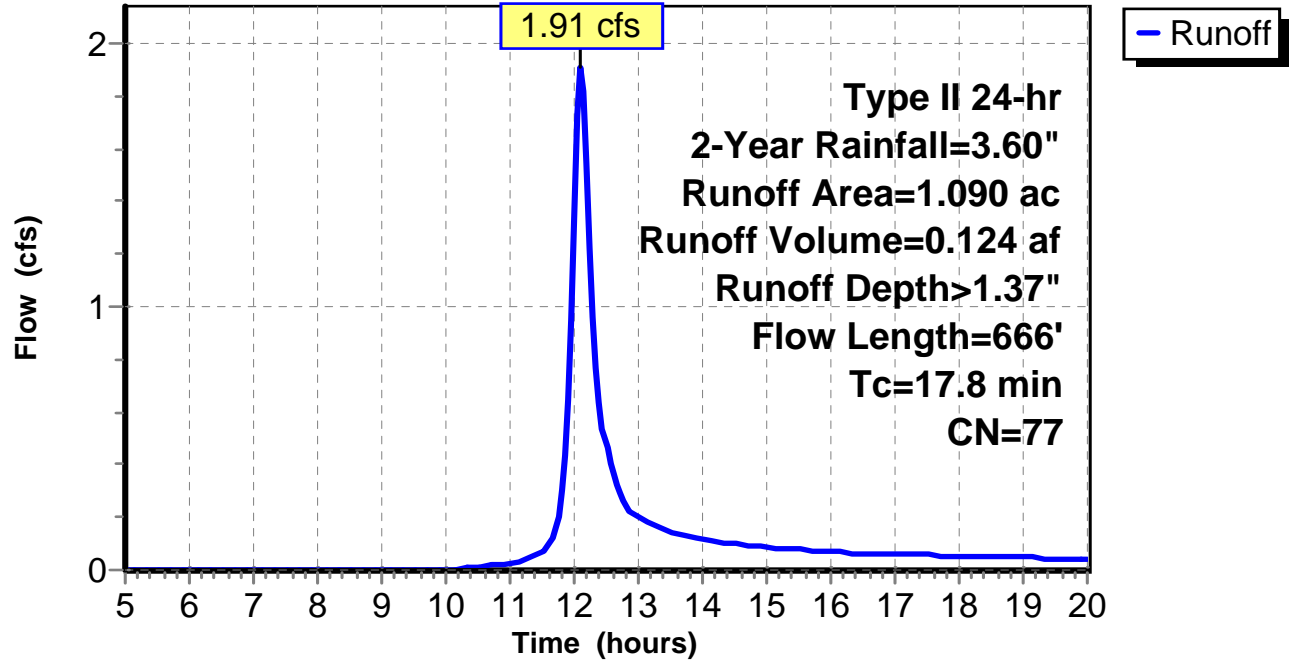
Subcatchment 2: C AR-710.006

Hydrograph



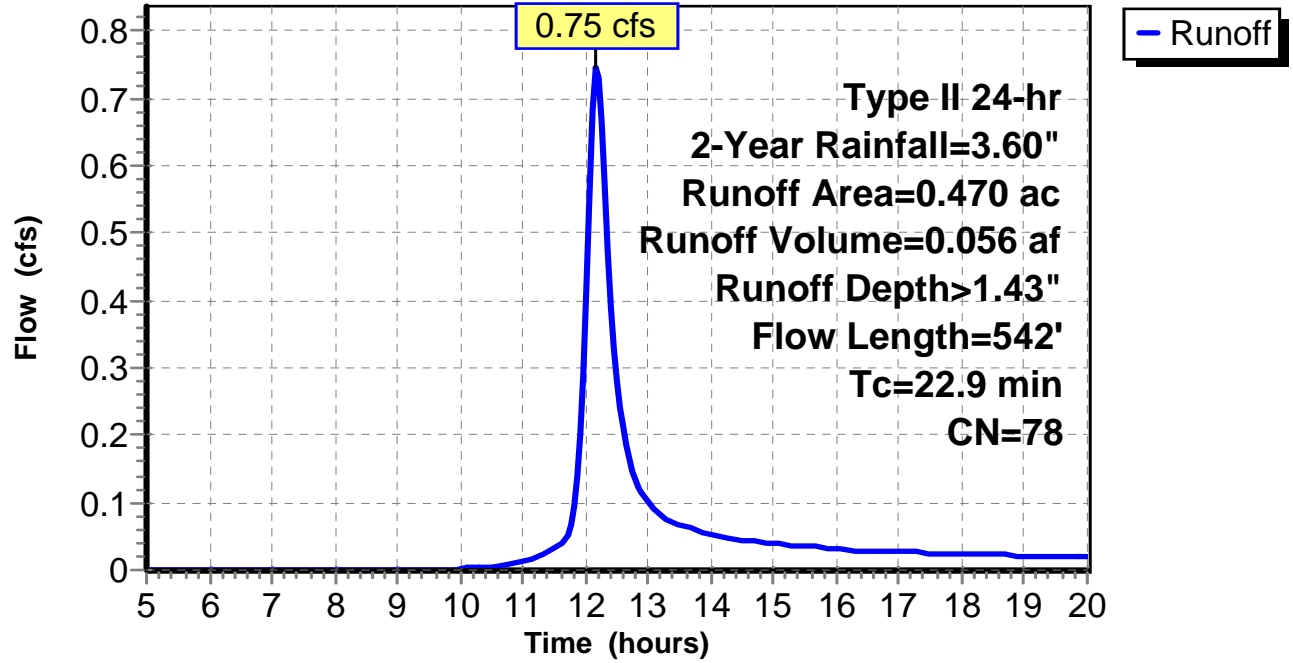
Subcatchment 3: C 339.001

Hydrograph



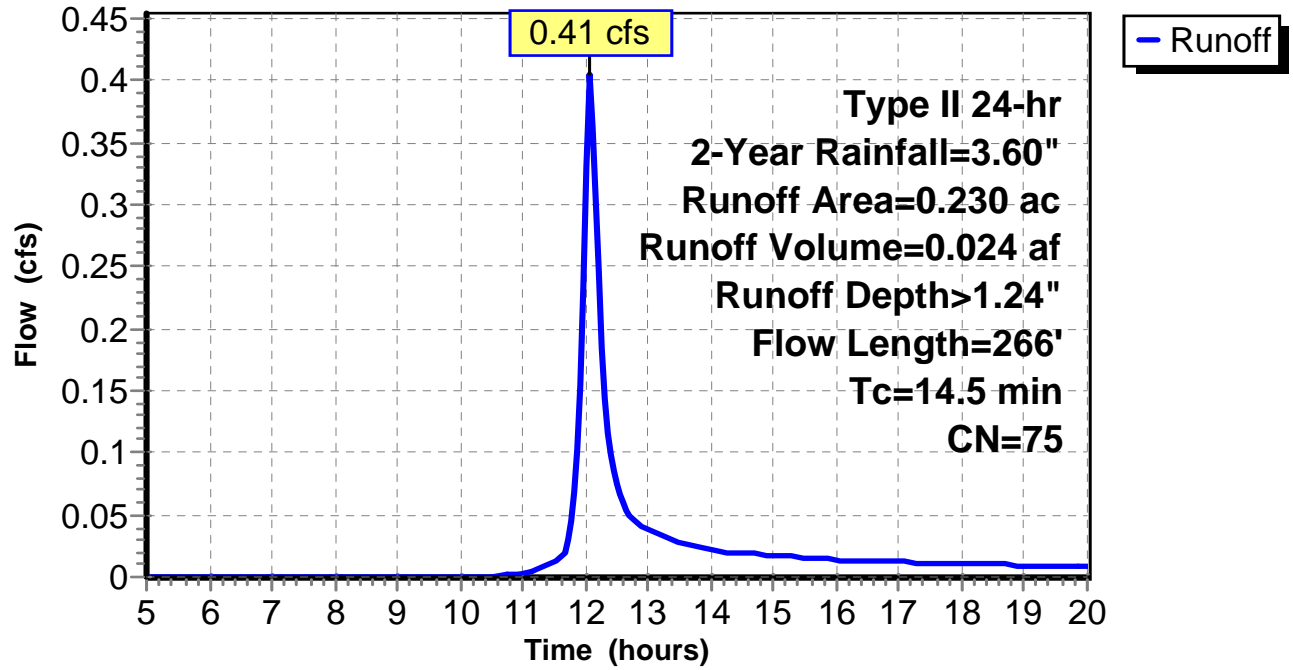
Subcatchment 4: C 339.002

Hydrograph



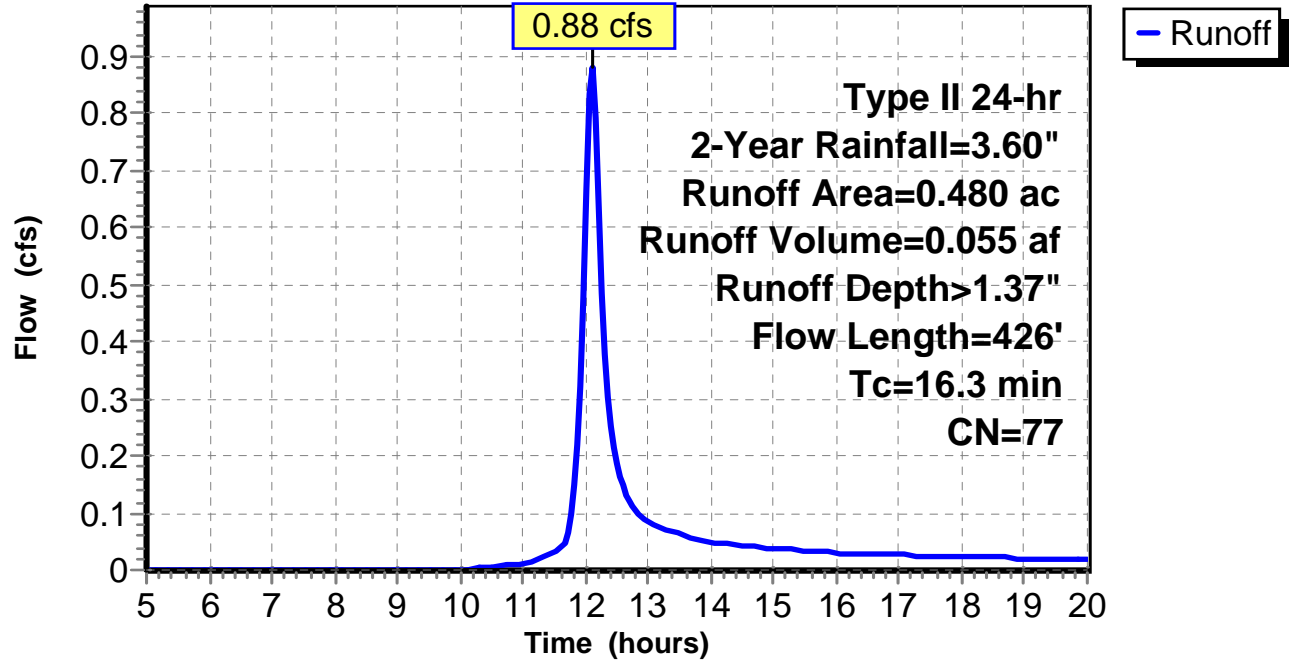
Subcatchment 5: C 339.003

Hydrograph



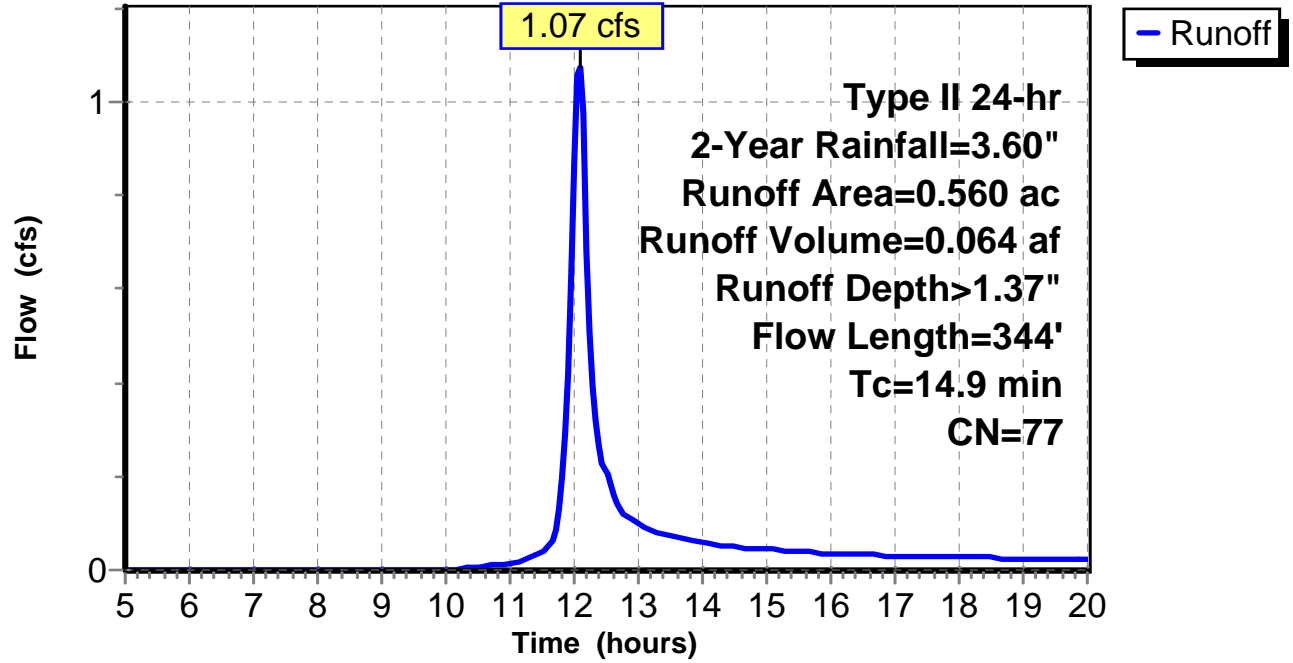
Subcatchment 6: C 339.004

Hydrograph



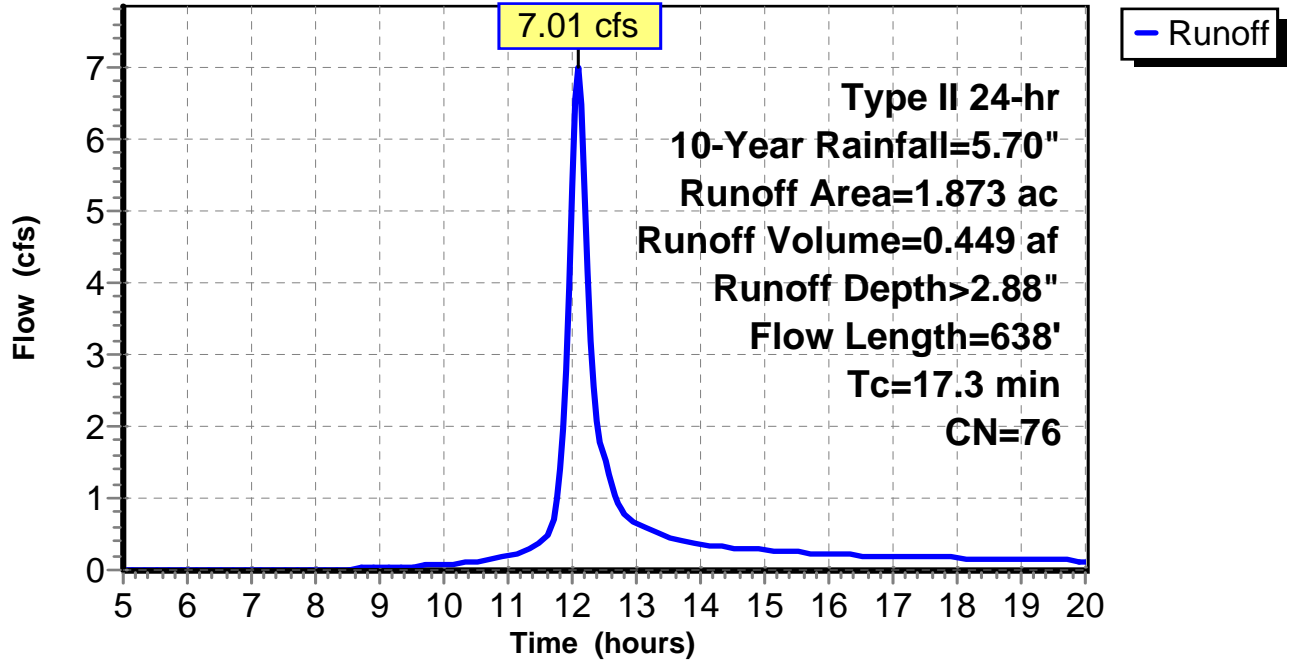
Subcatchment 7: C 339.005

Hydrograph



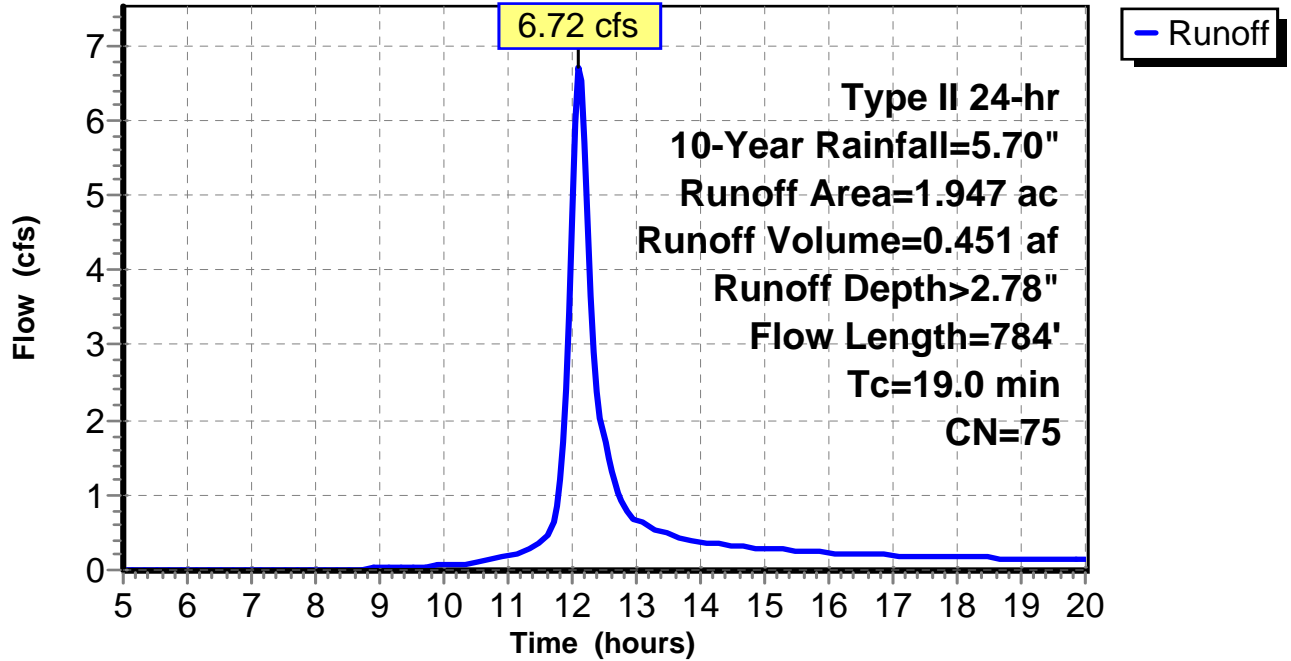
Subcatchment 1: C AR-710.005

Hydrograph



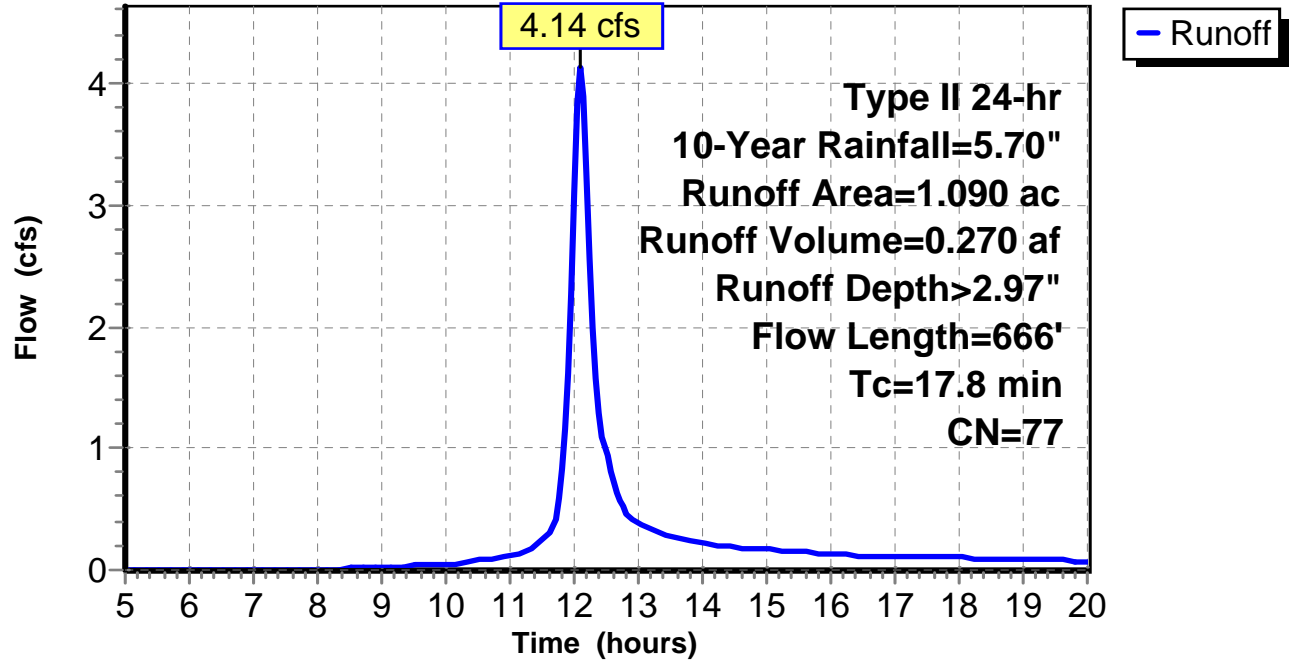
Subcatchment 2: C AR-710.006

Hydrograph



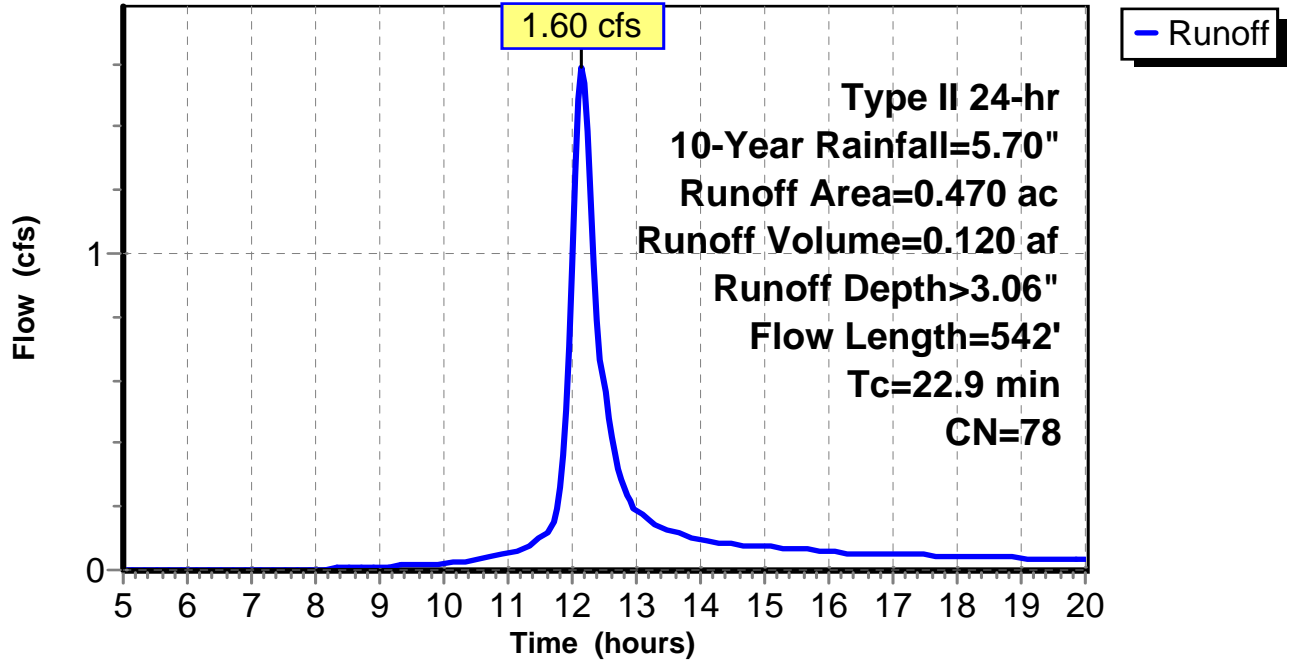
Subcatchment 3: C 339.001

Hydrograph



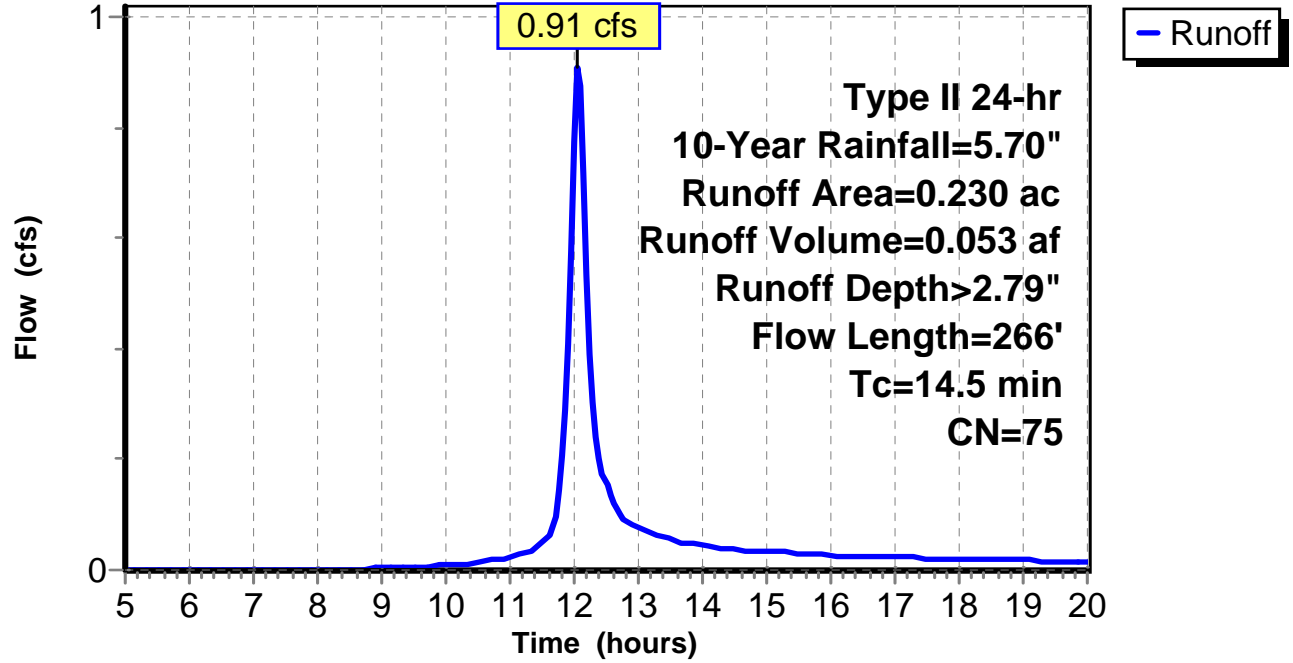
Subcatchment 4: C 339.002

Hydrograph



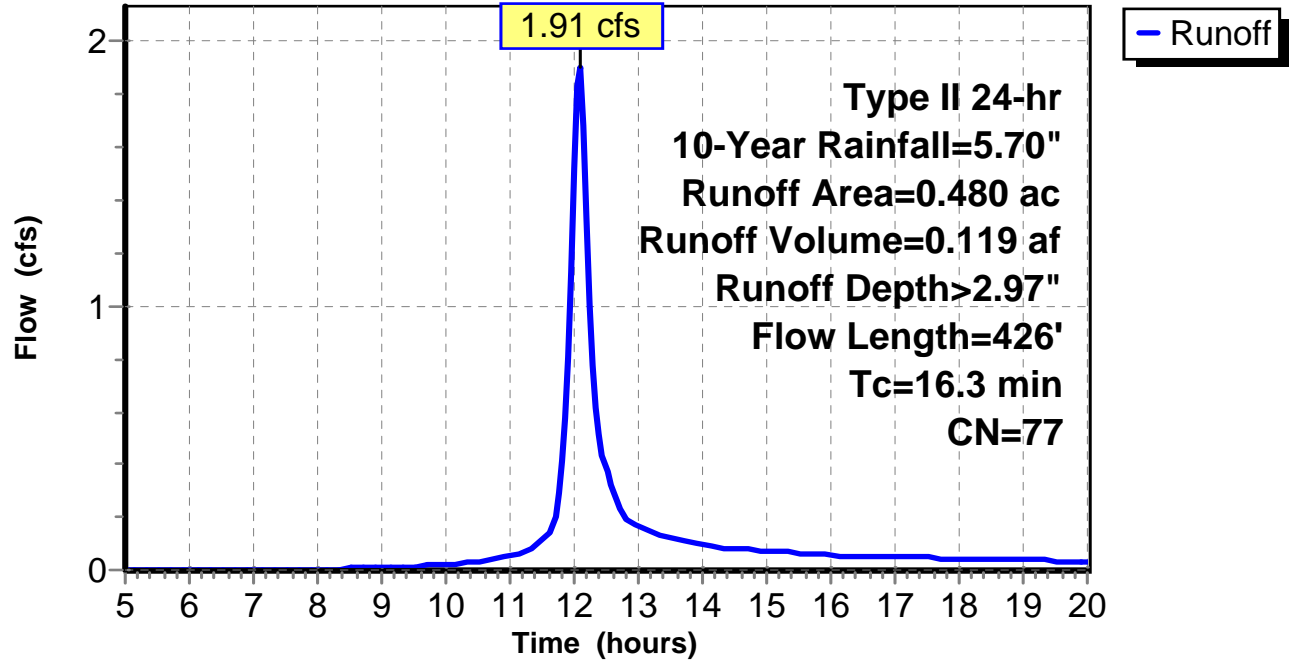
Subcatchment 5: C 339.003

Hydrograph



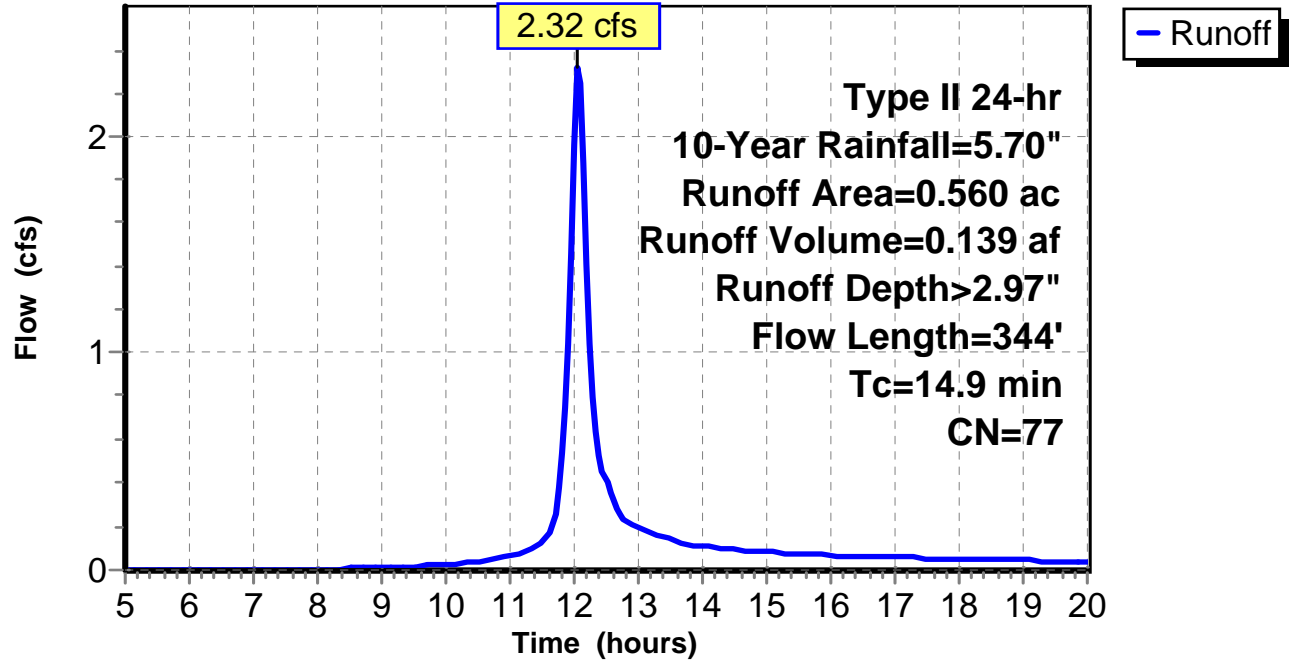
Subcatchment 6: C 339.004

Hydrograph



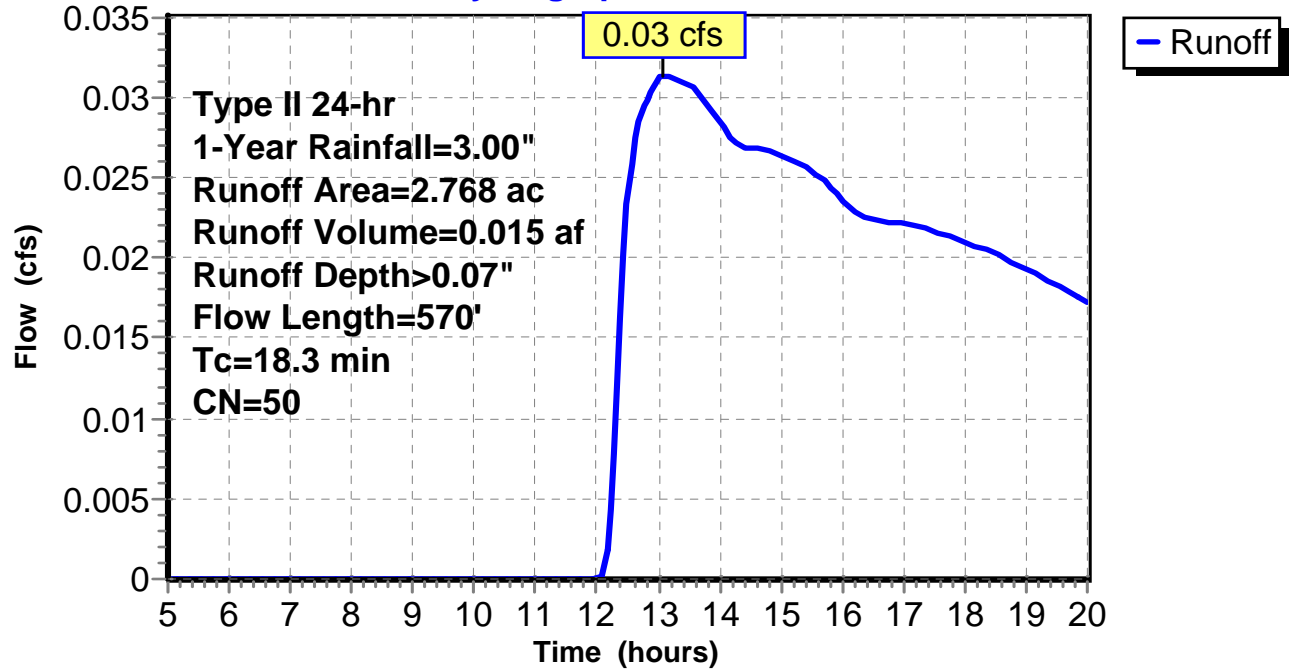
Subcatchment 7: C 339.005

Hydrograph



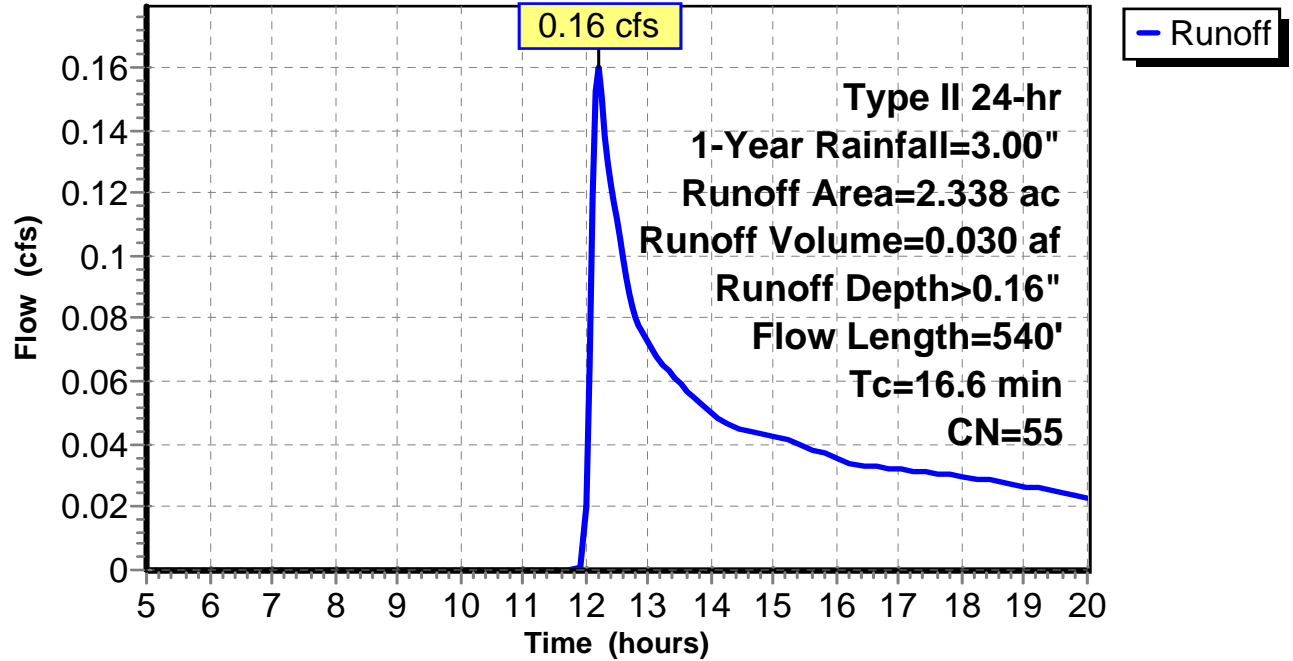
Subcatchment 1: C 340.001

Hydrograph



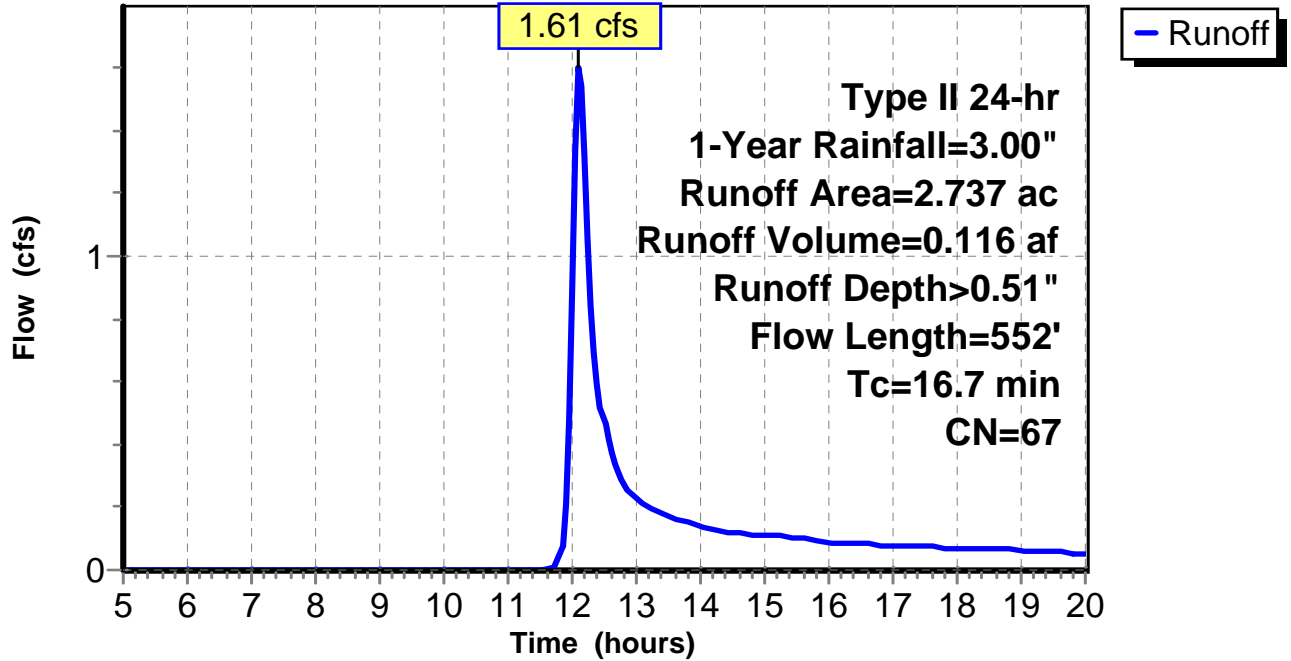
Subcatchment 2: C 340.002

Hydrograph



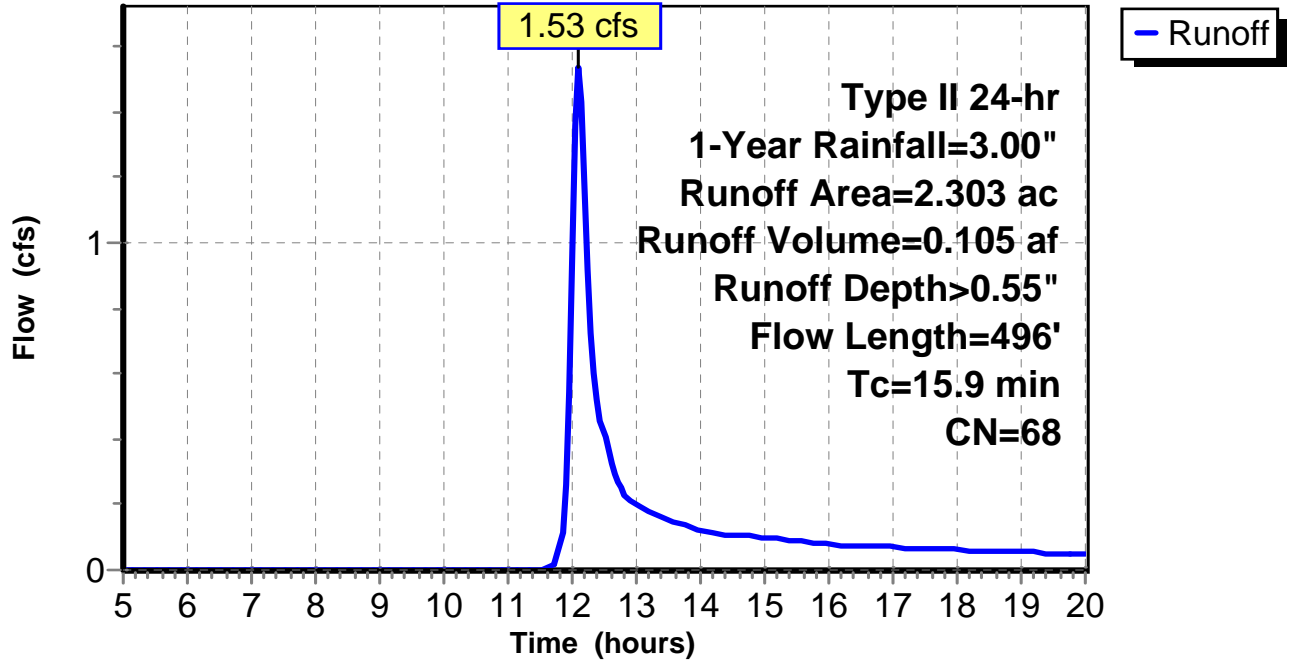
Subcatchment 3: C 340.003

Hydrograph



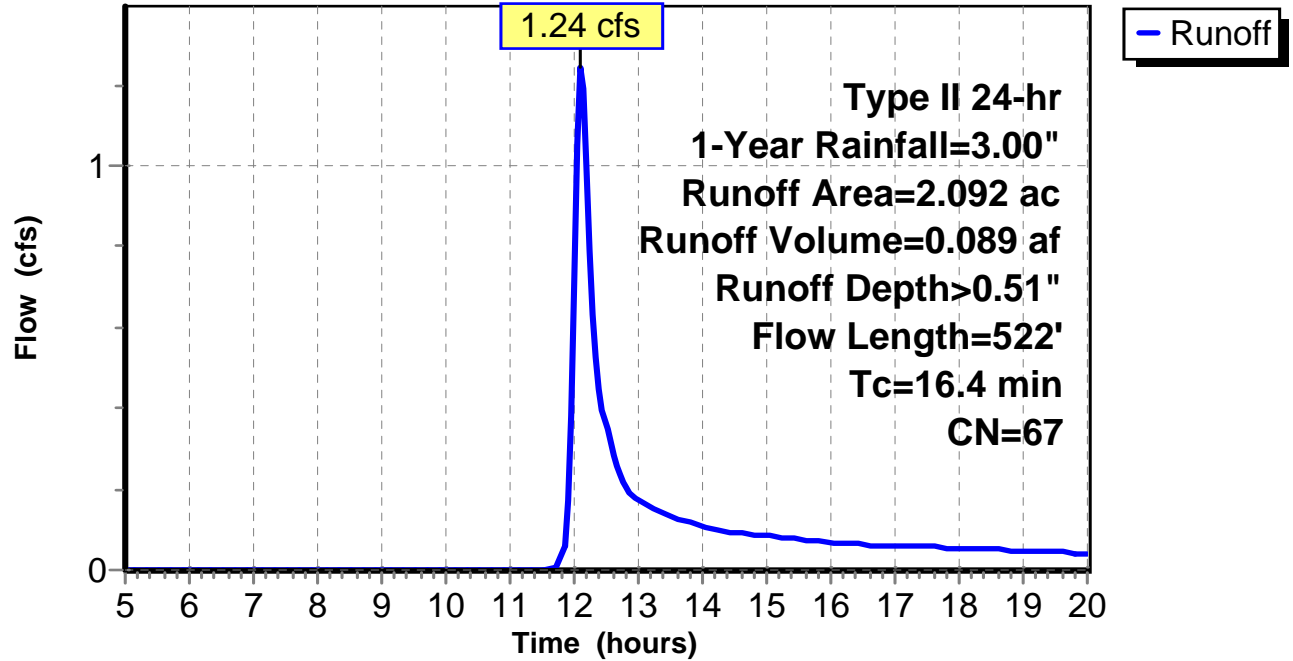
Subcatchment 4: C 340.004

Hydrograph



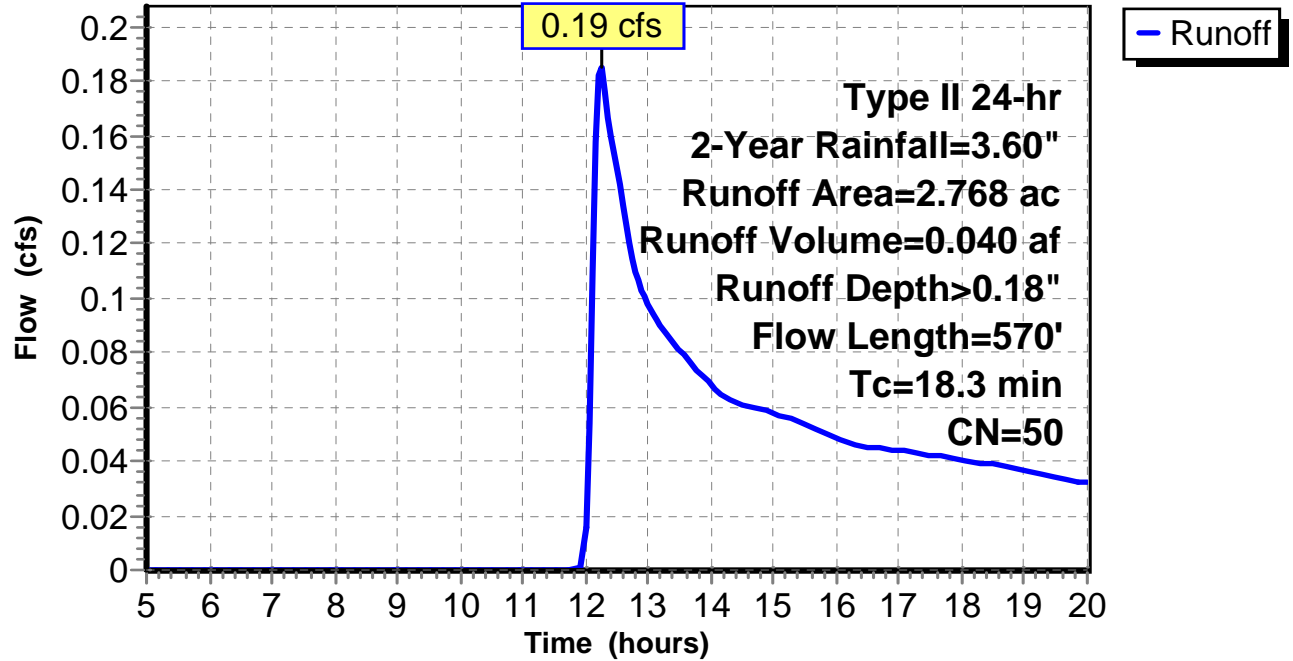
Subcatchment 5: C 340.005

Hydrograph



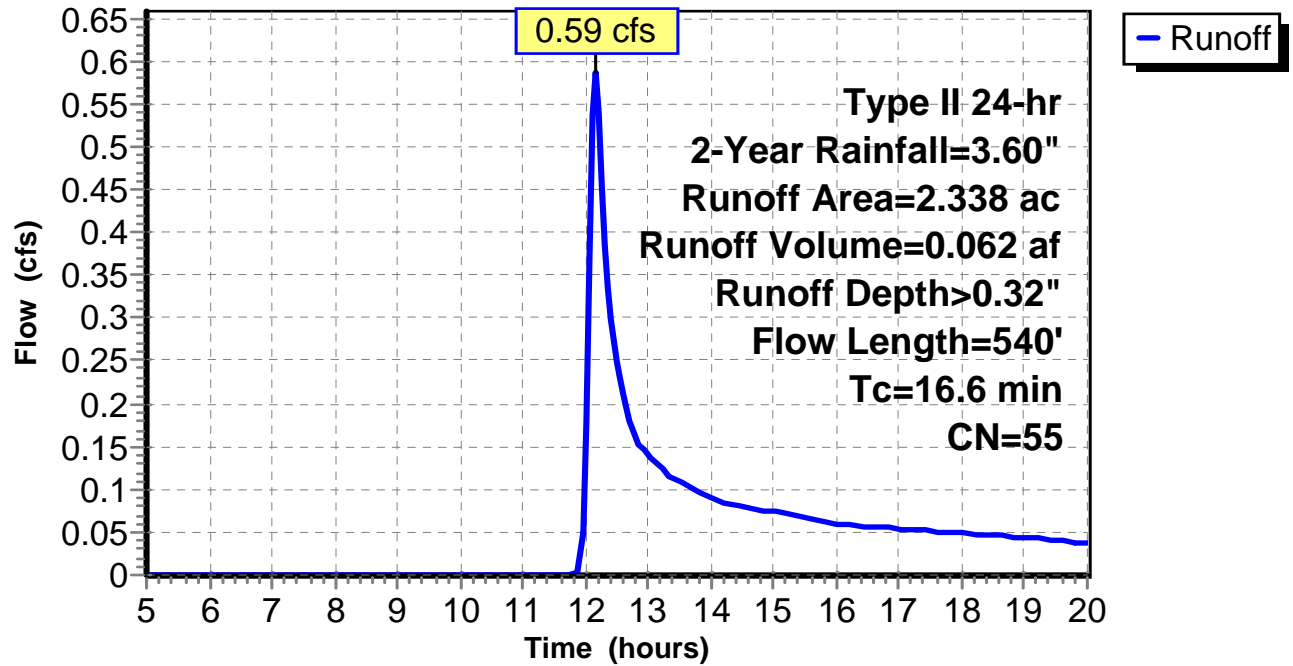
Subcatchment 1: C 340.001

Hydrograph



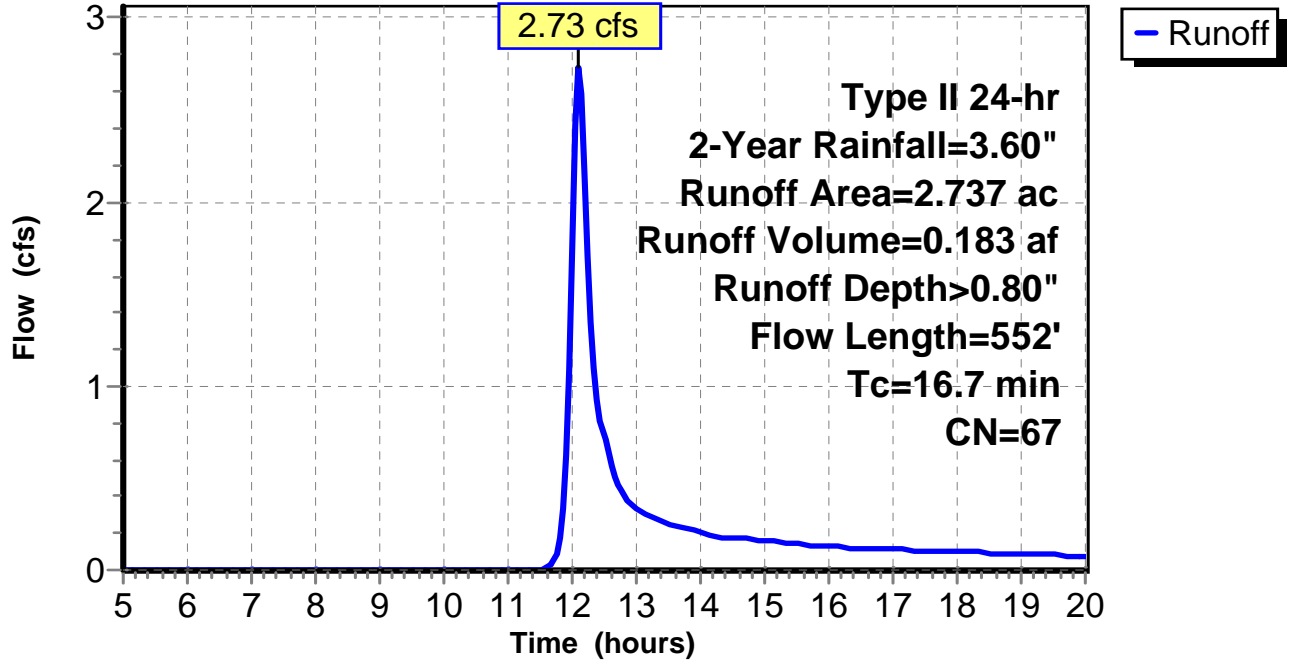
Subcatchment 2: C 340.002

Hydrograph



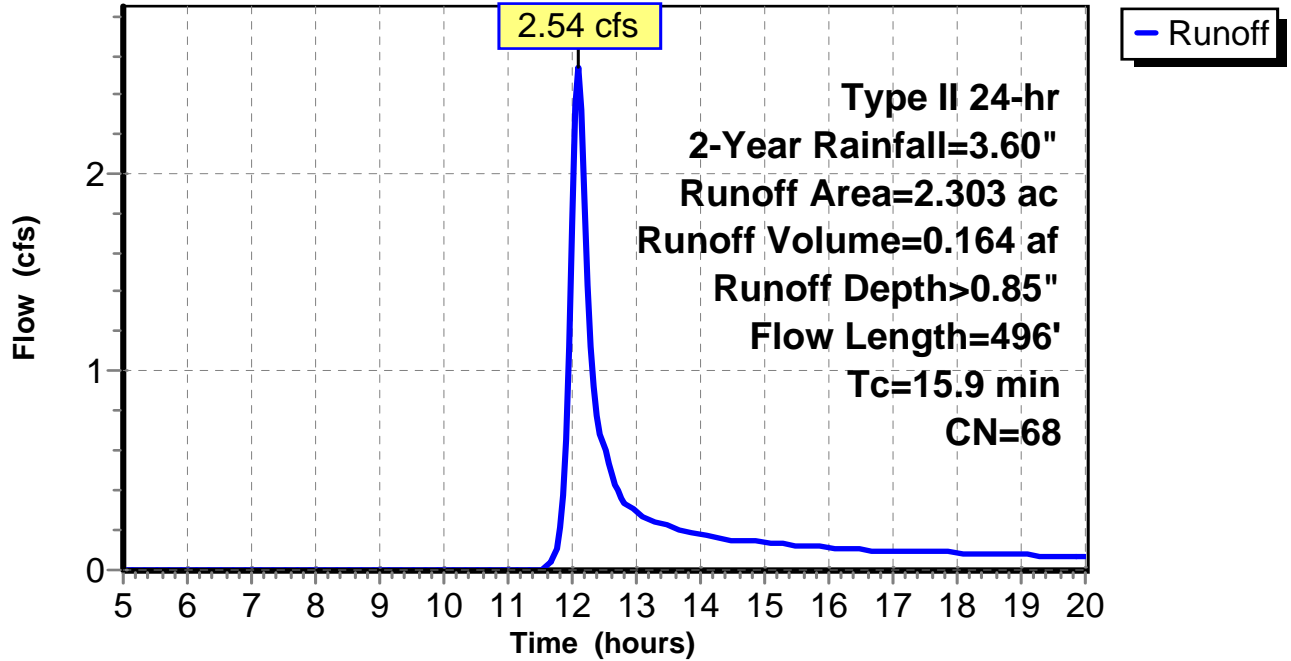
Subcatchment 3: C 340.003

Hydrograph



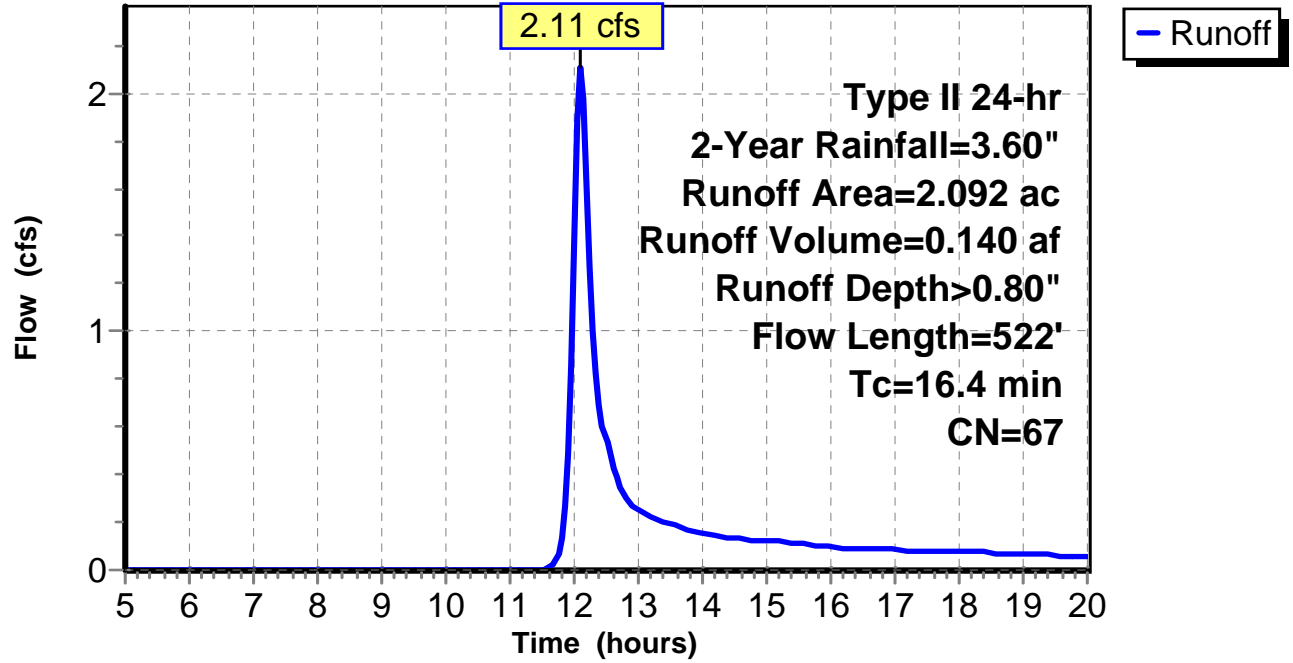
Subcatchment 4: C 340.004

Hydrograph



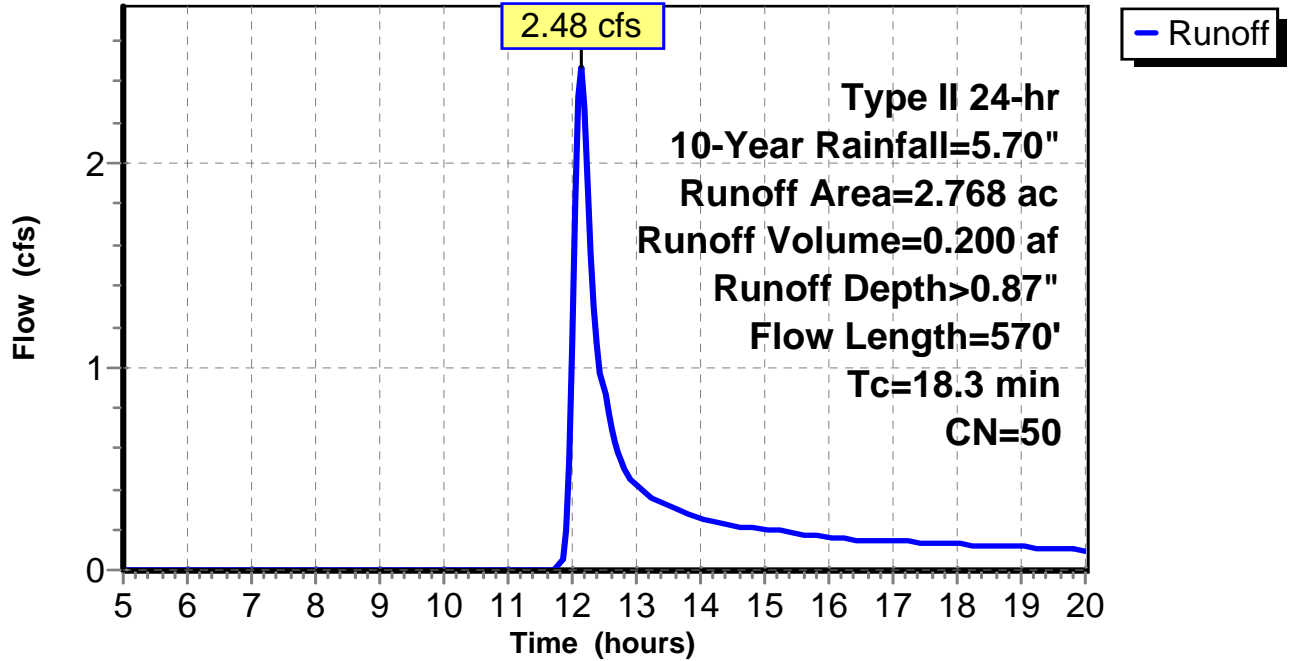
Subcatchment 5: C 340.005

Hydrograph



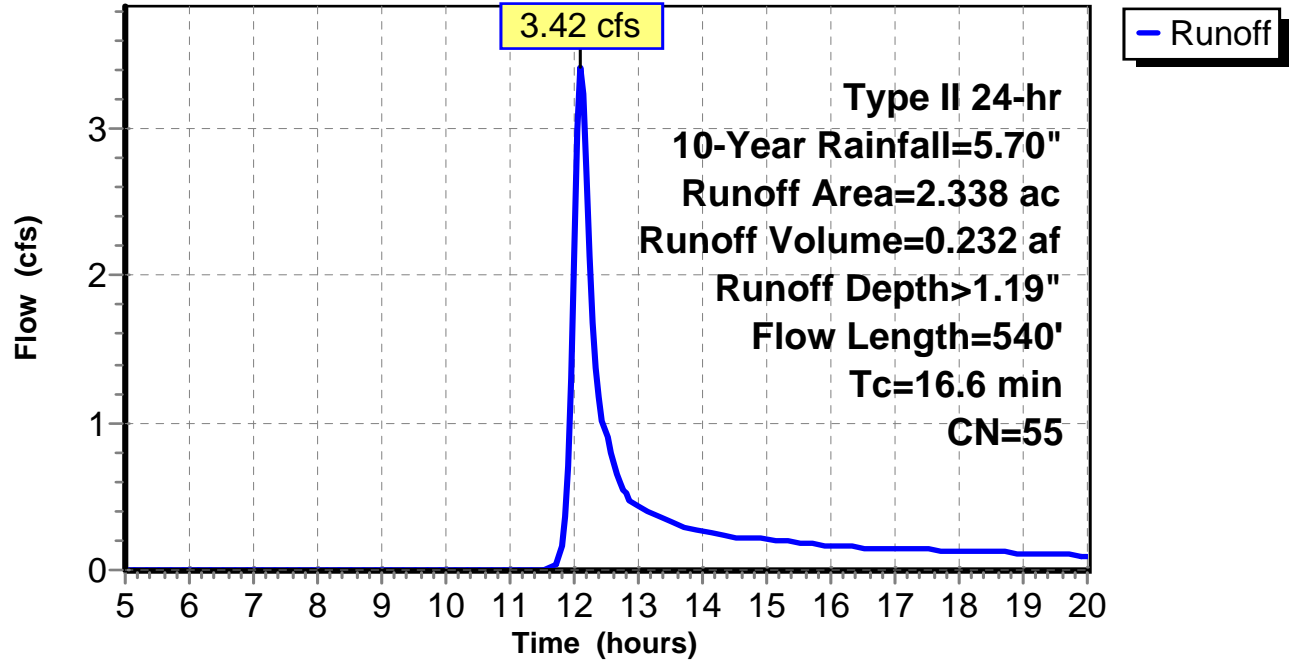
Subcatchment 1: C 340.001

Hydrograph



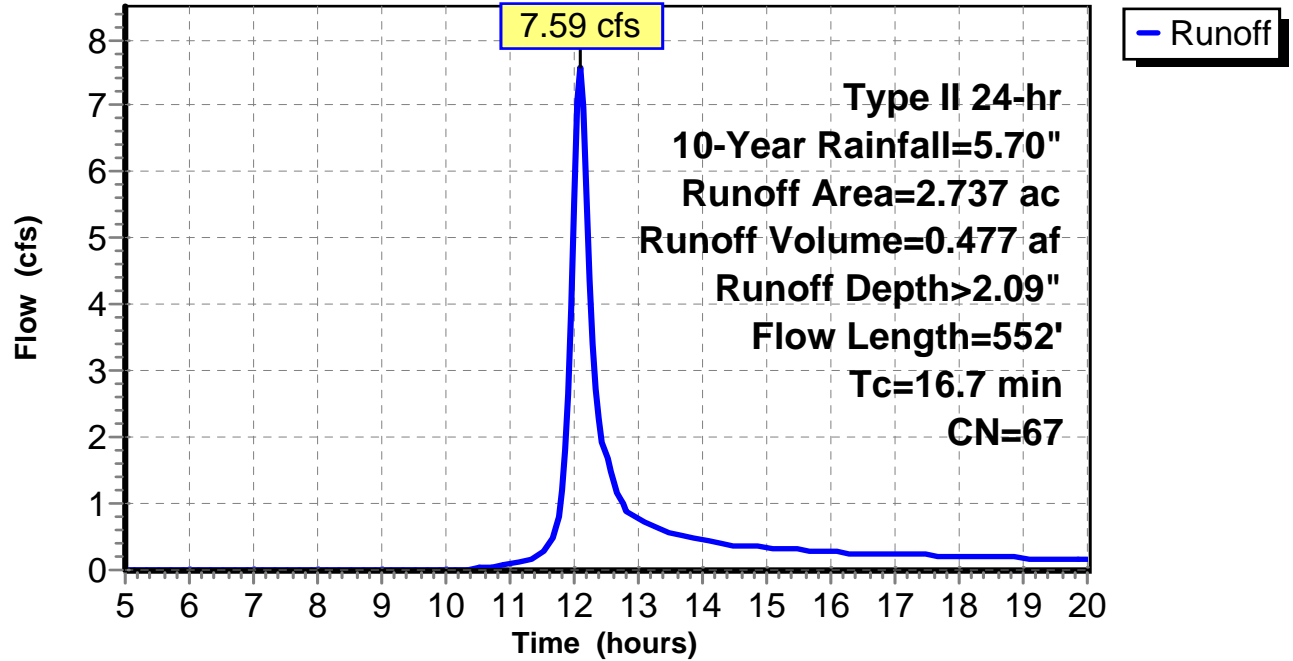
Subcatchment 2: C 340.002

Hydrograph



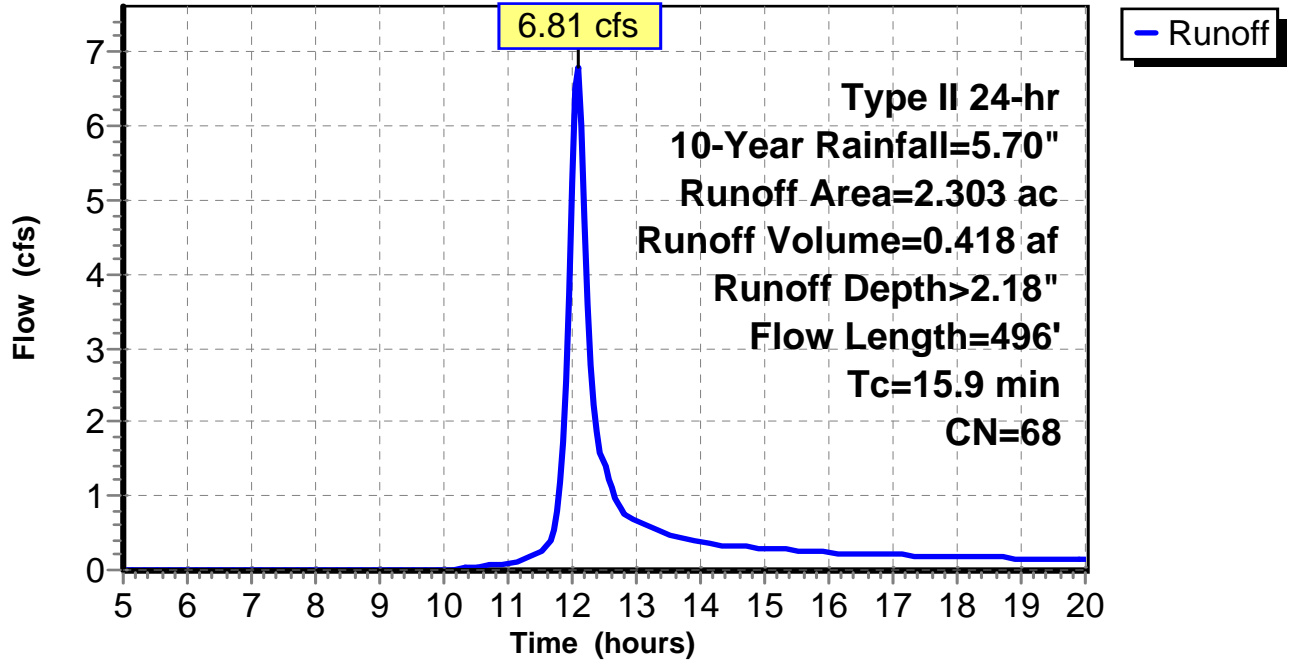
Subcatchment 3: C 340.003

Hydrograph



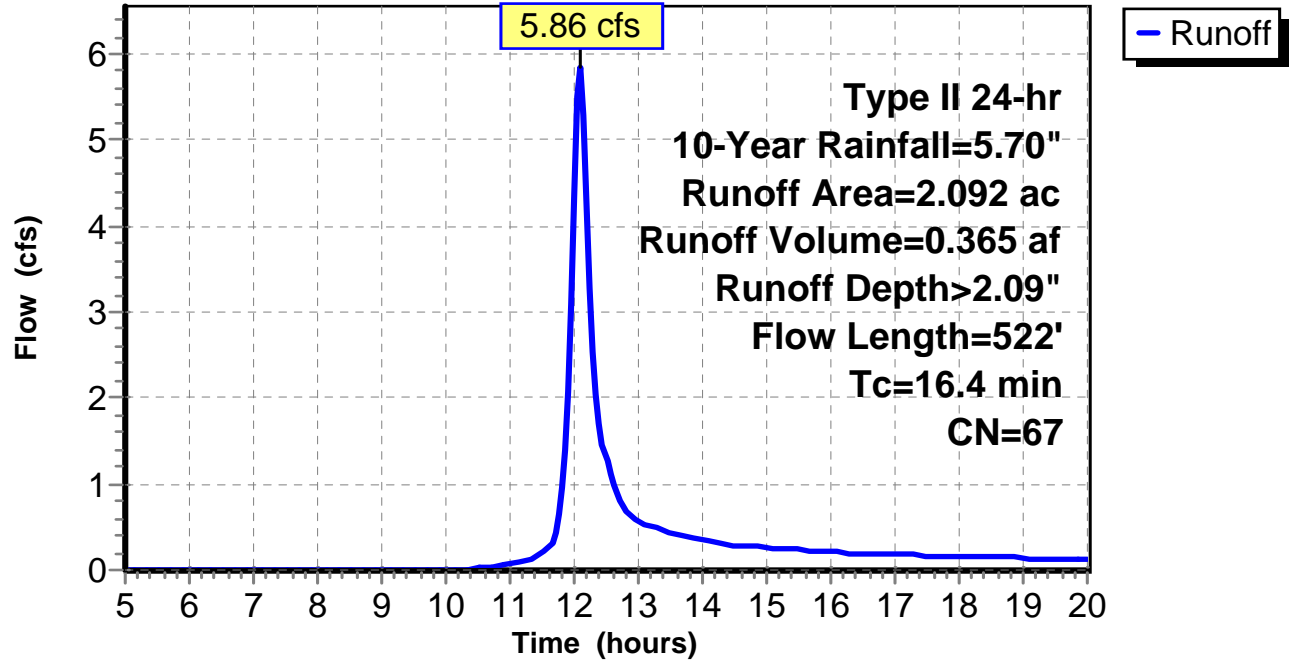
Subcatchment 4: C 340.004

Hydrograph



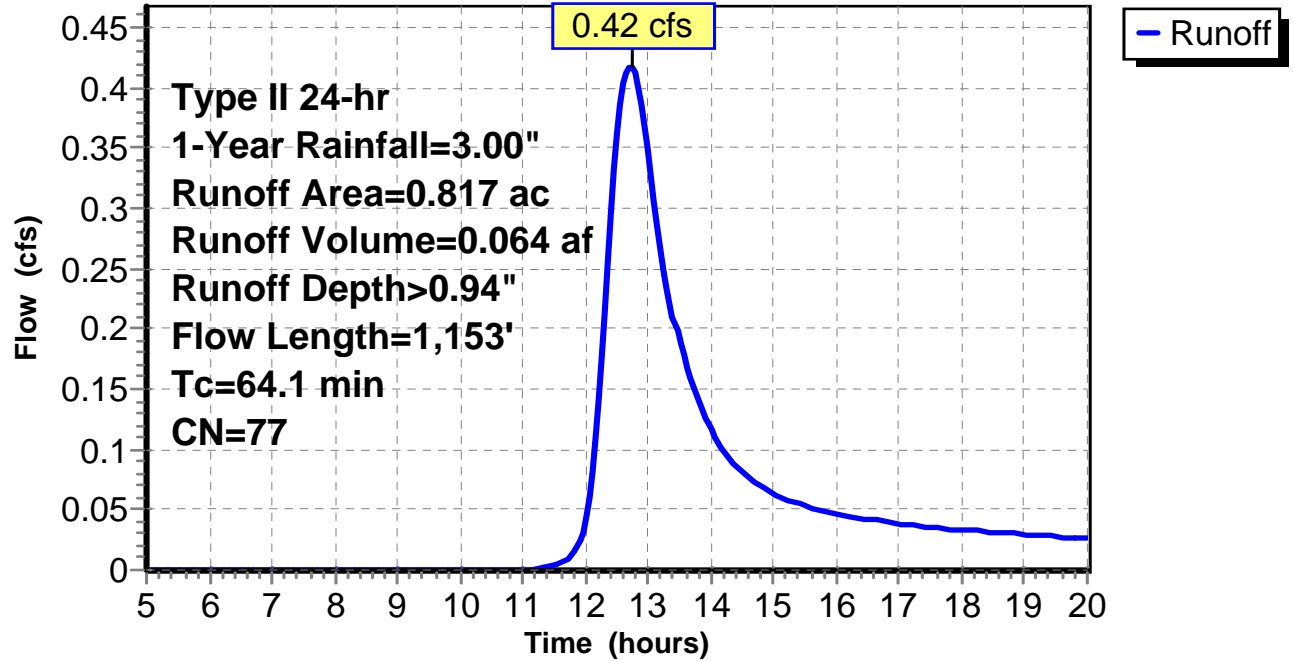
Subcatchment 5: C 340.005

Hydrograph



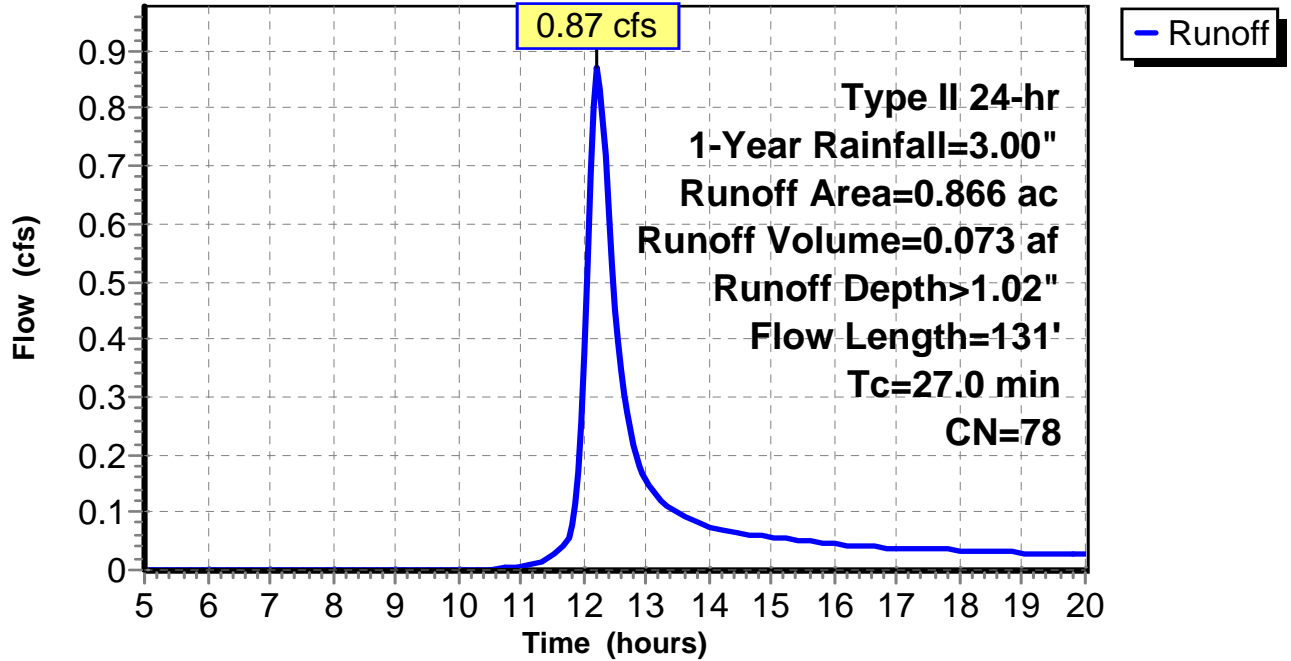
Subcatchment 1: C 26.002

Hydrograph



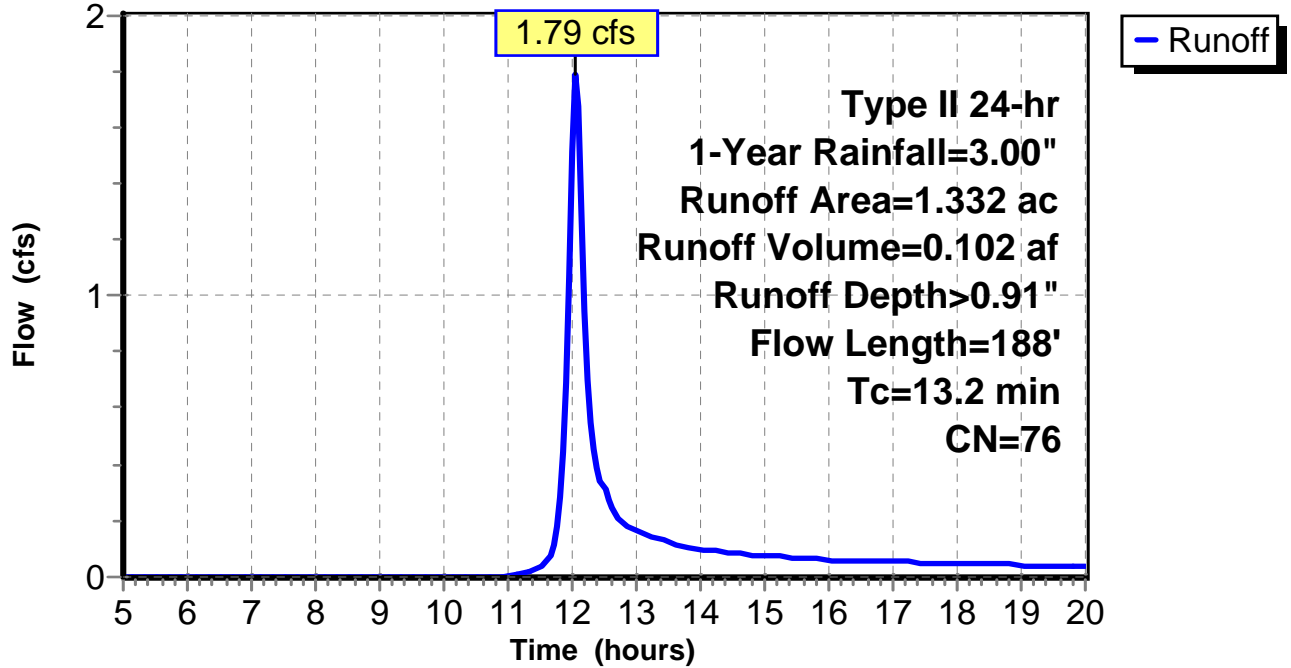
Subcatchment 2: C 26.003

Hydrograph



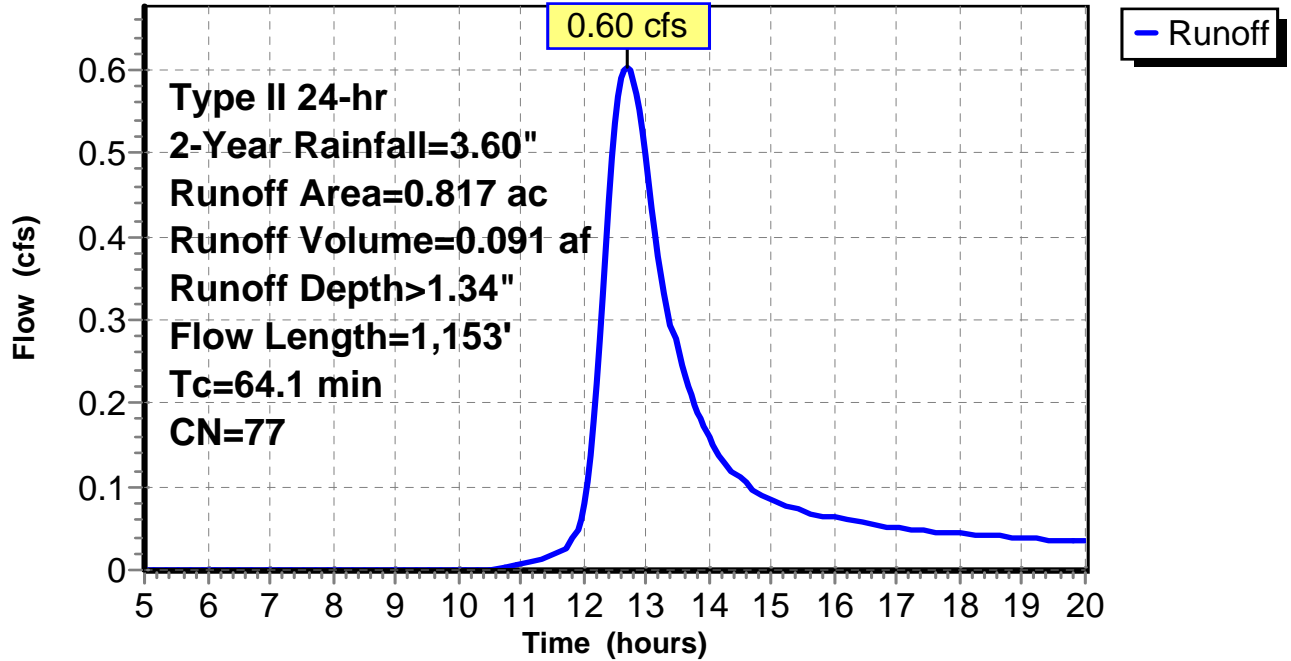
Subcatchment 3: C 26.004

Hydrograph



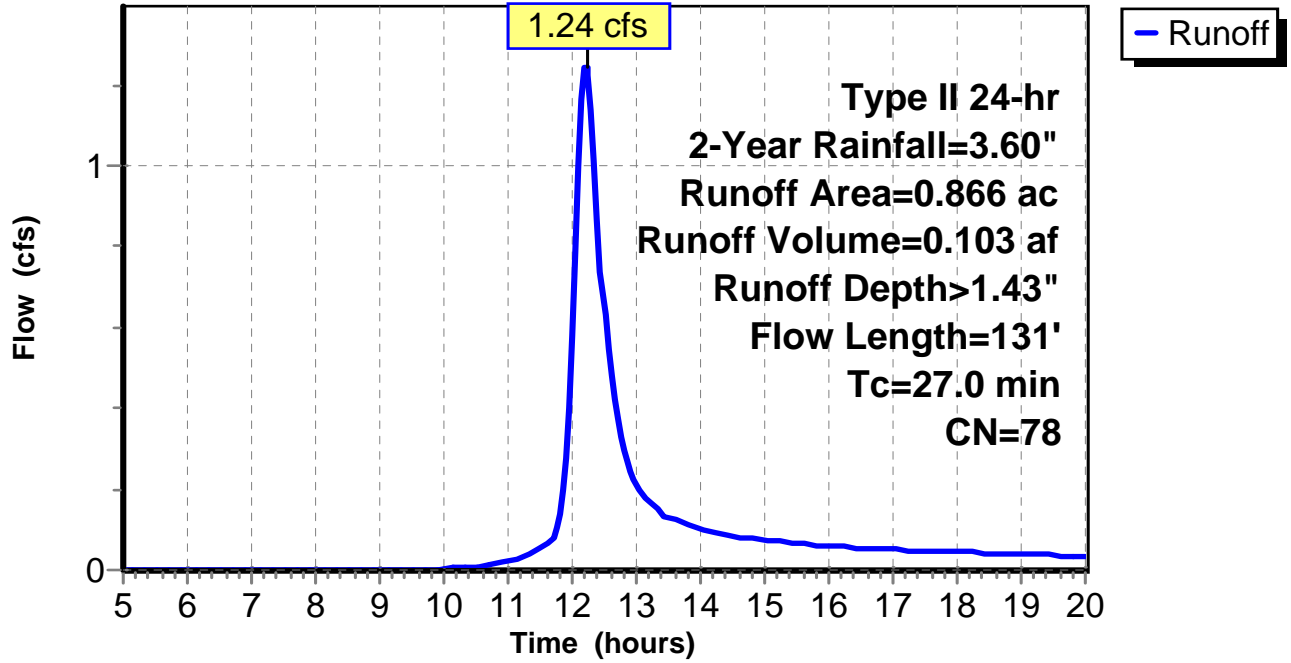
Subcatchment 1: C 26.002

Hydrograph



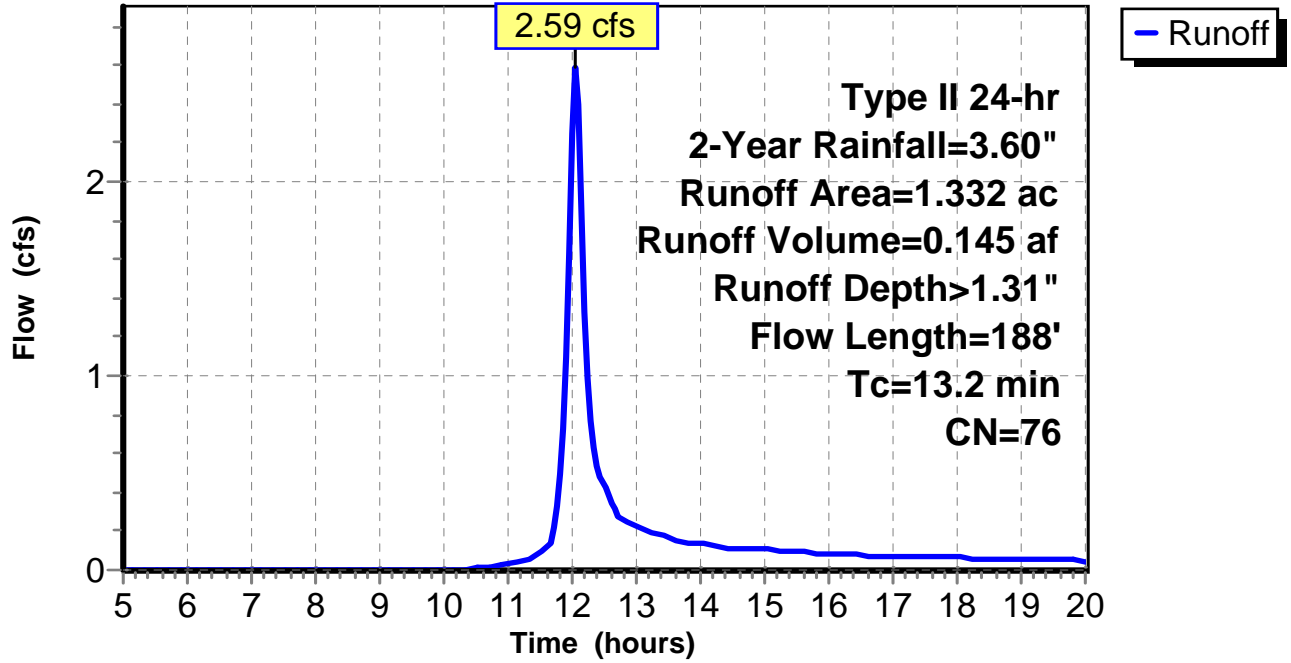
Subcatchment 2: C 26.003

Hydrograph



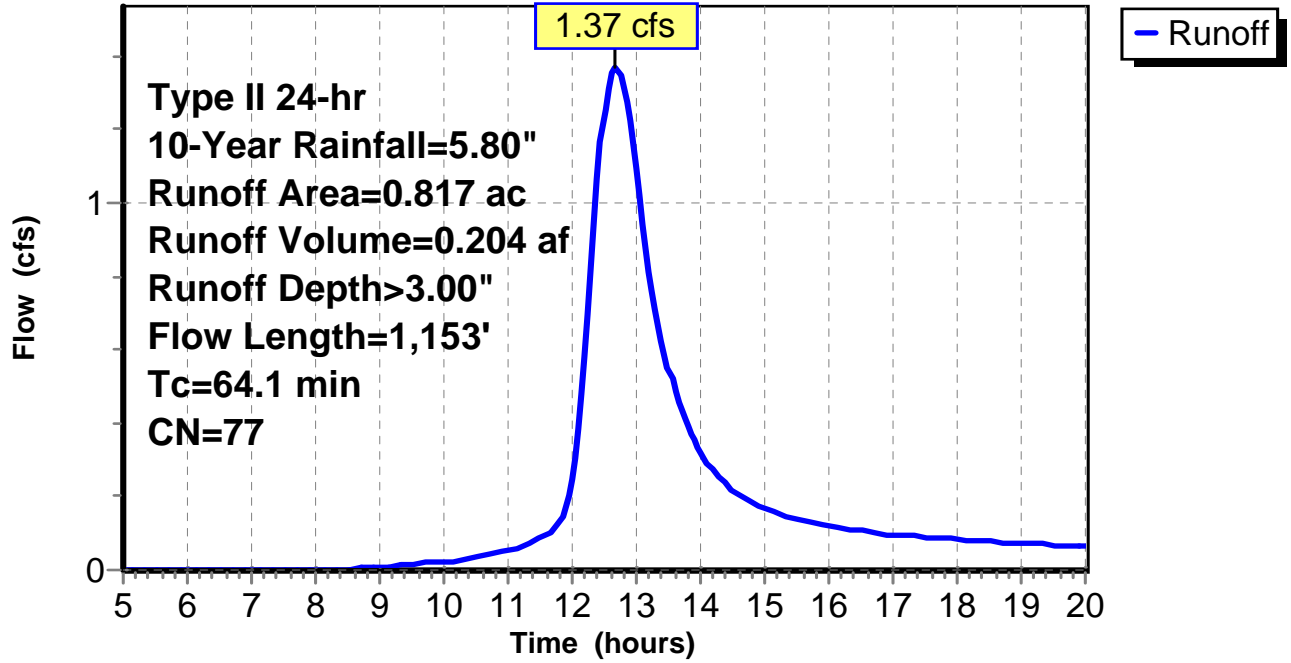
Subcatchment 3: C 26.004

Hydrograph



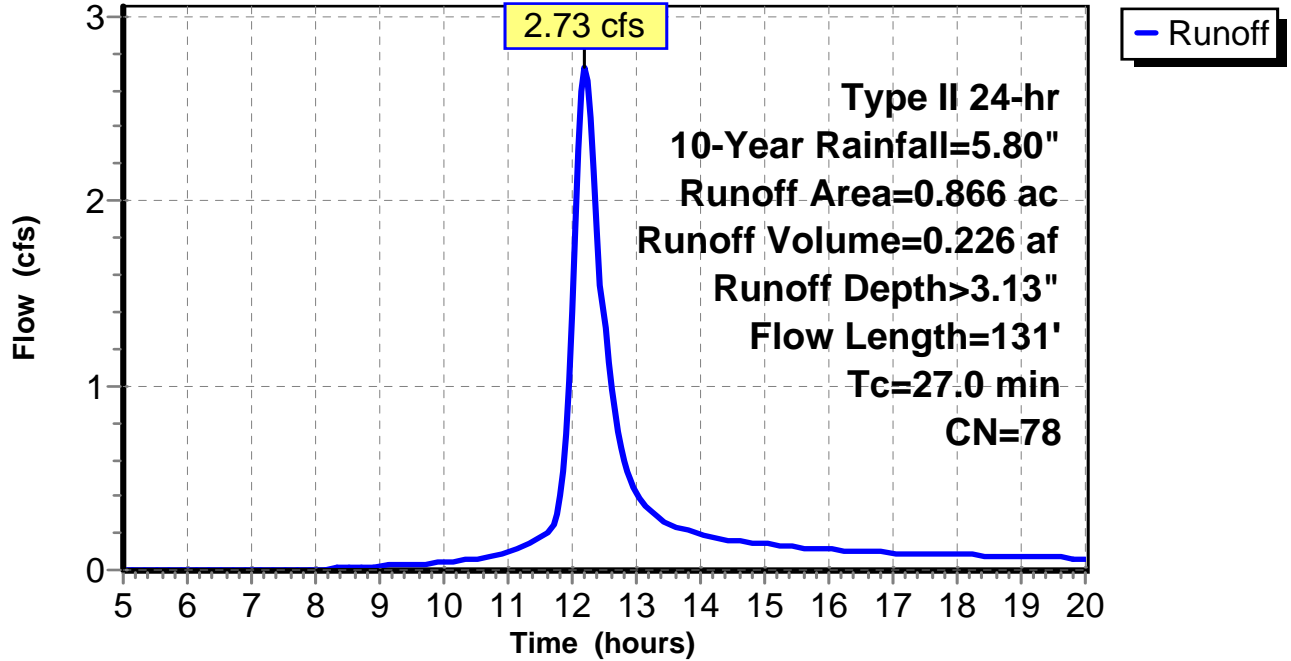
Subcatchment 1: C 26.002

Hydrograph



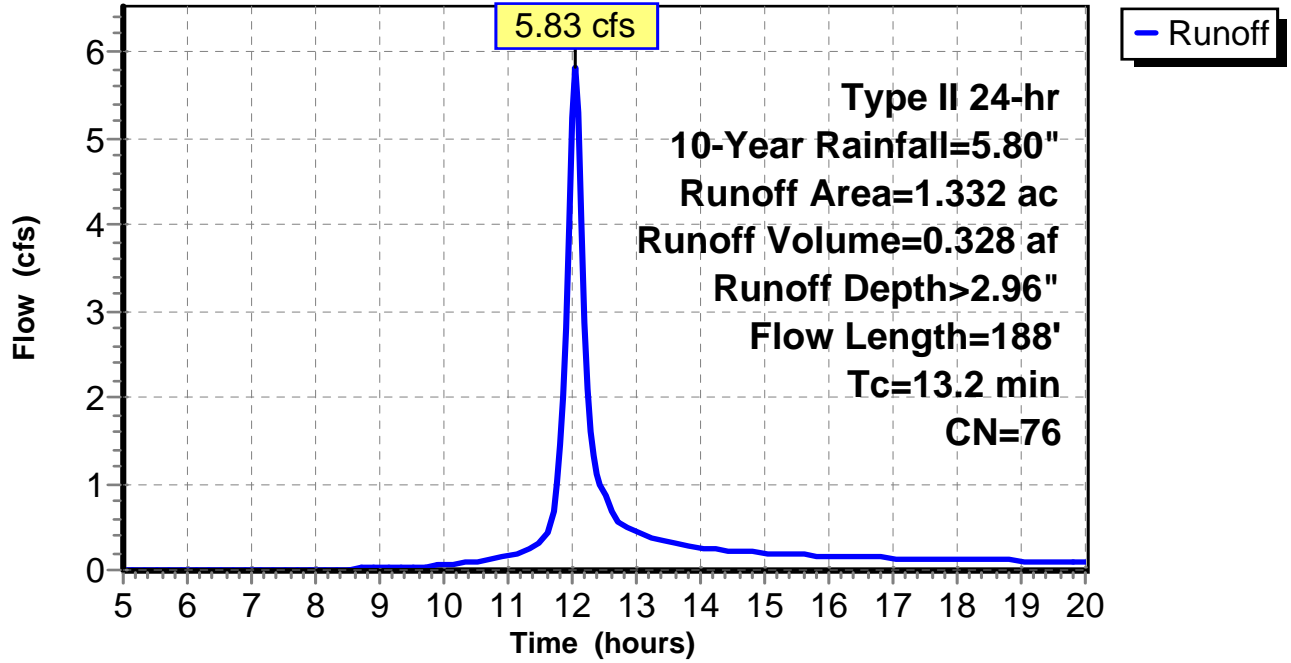
Subcatchment 2: C 26.003

Hydrograph



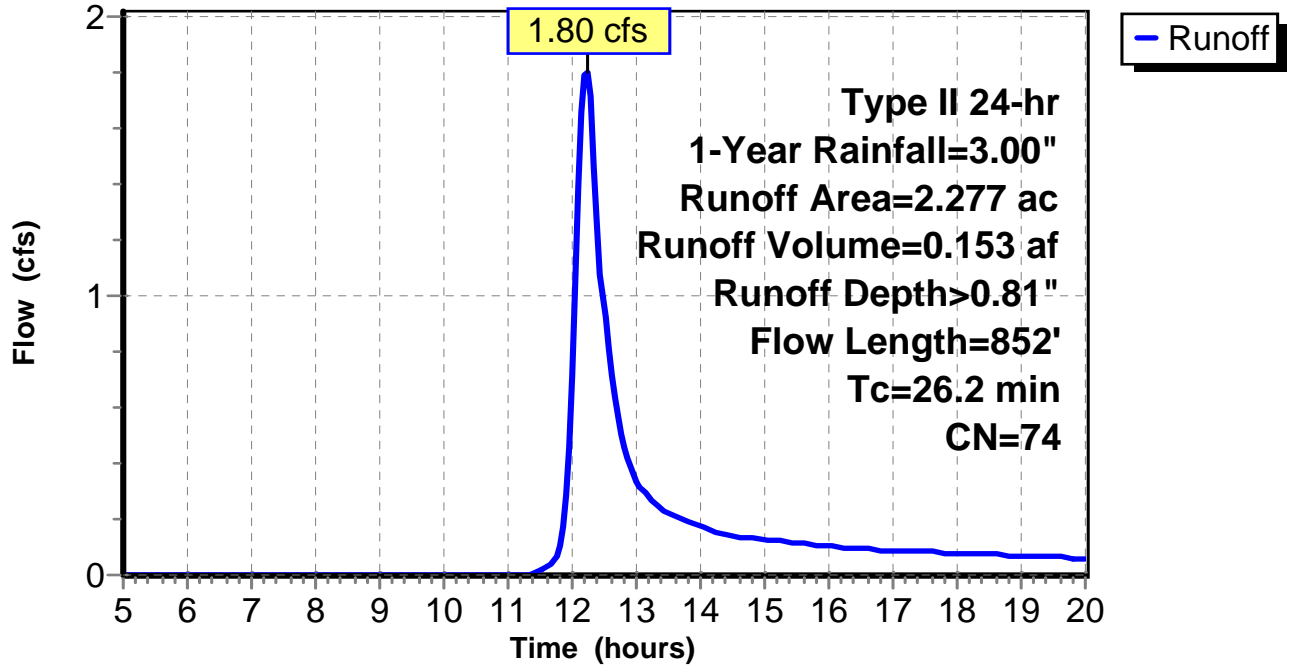
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Hydrograph



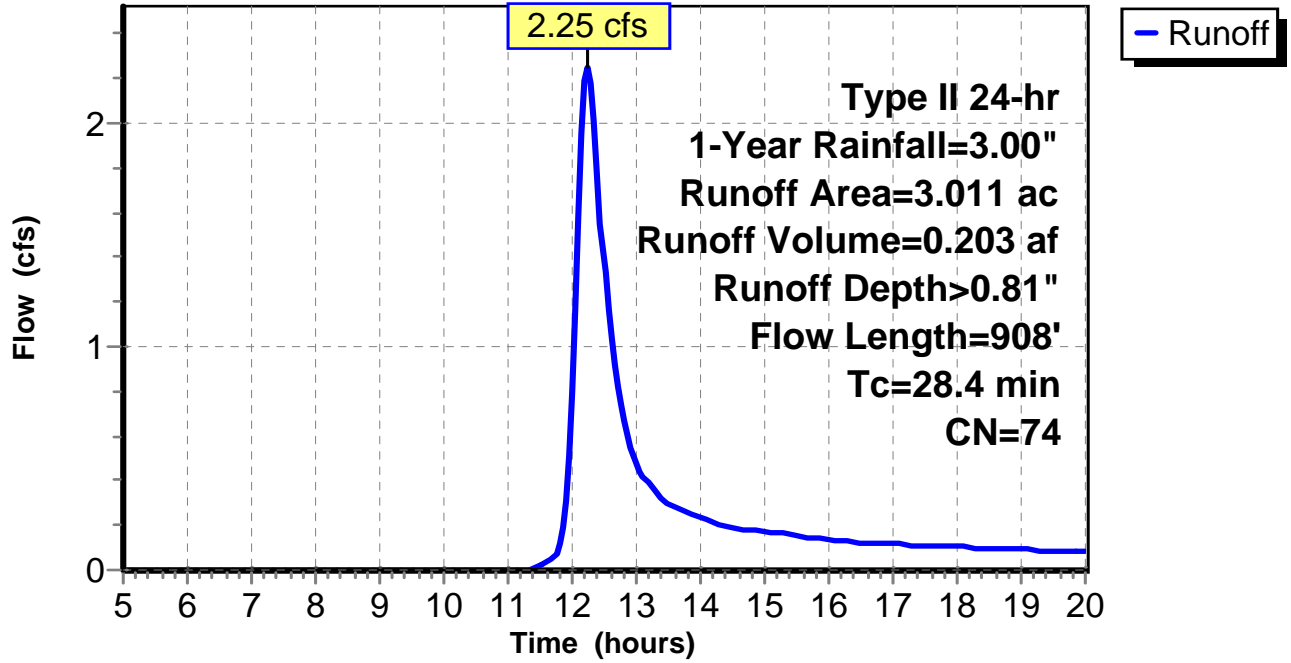
Subcatchment 1: C 28.001

Hydrograph



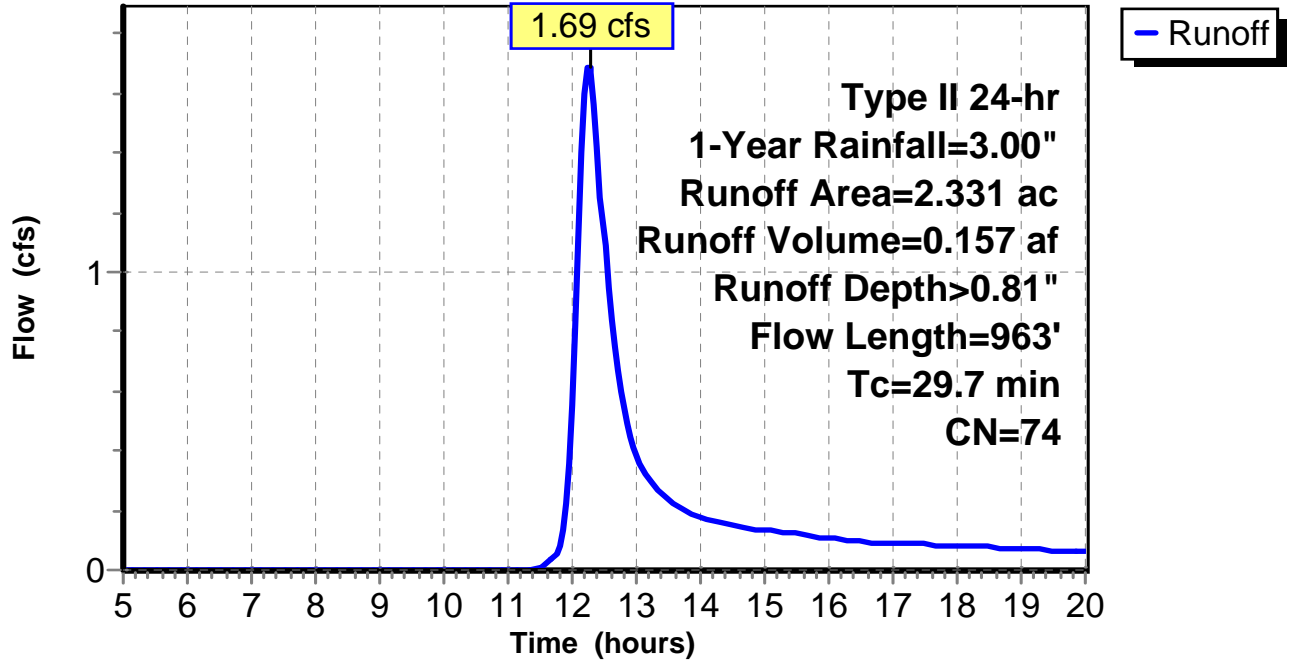
Subcatchment 2: C 28.002

Hydrograph



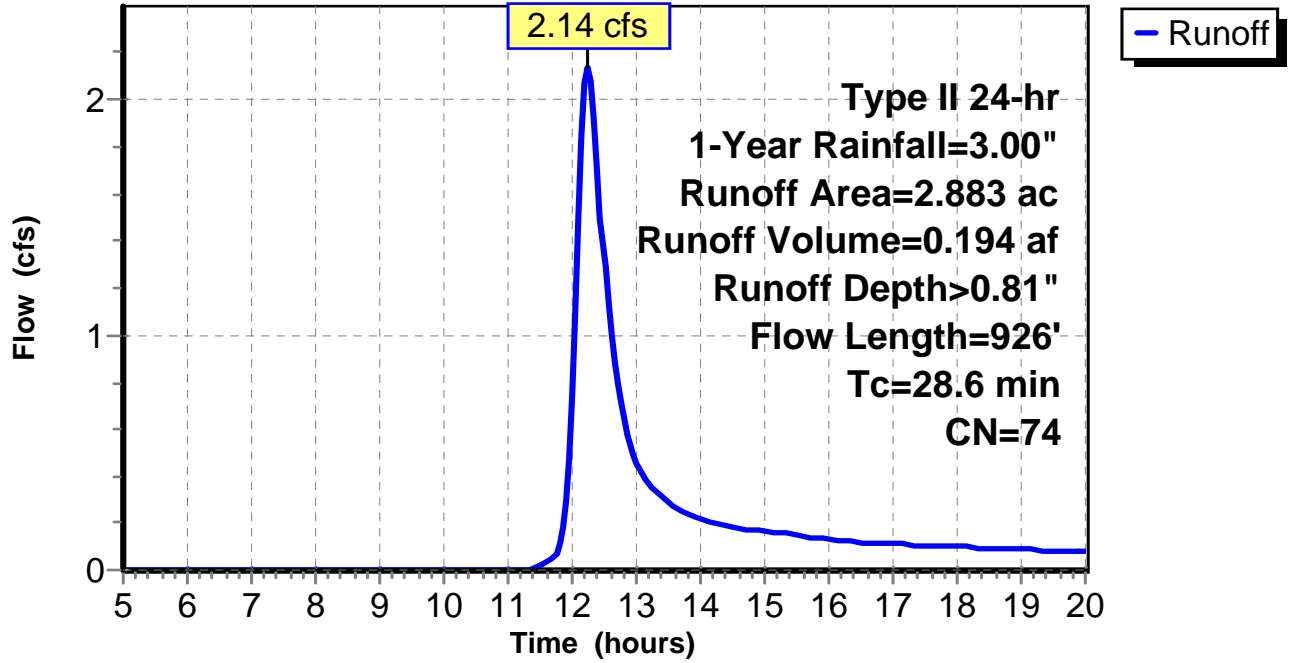
Subcatchment 3: C 28.003

Hydrograph



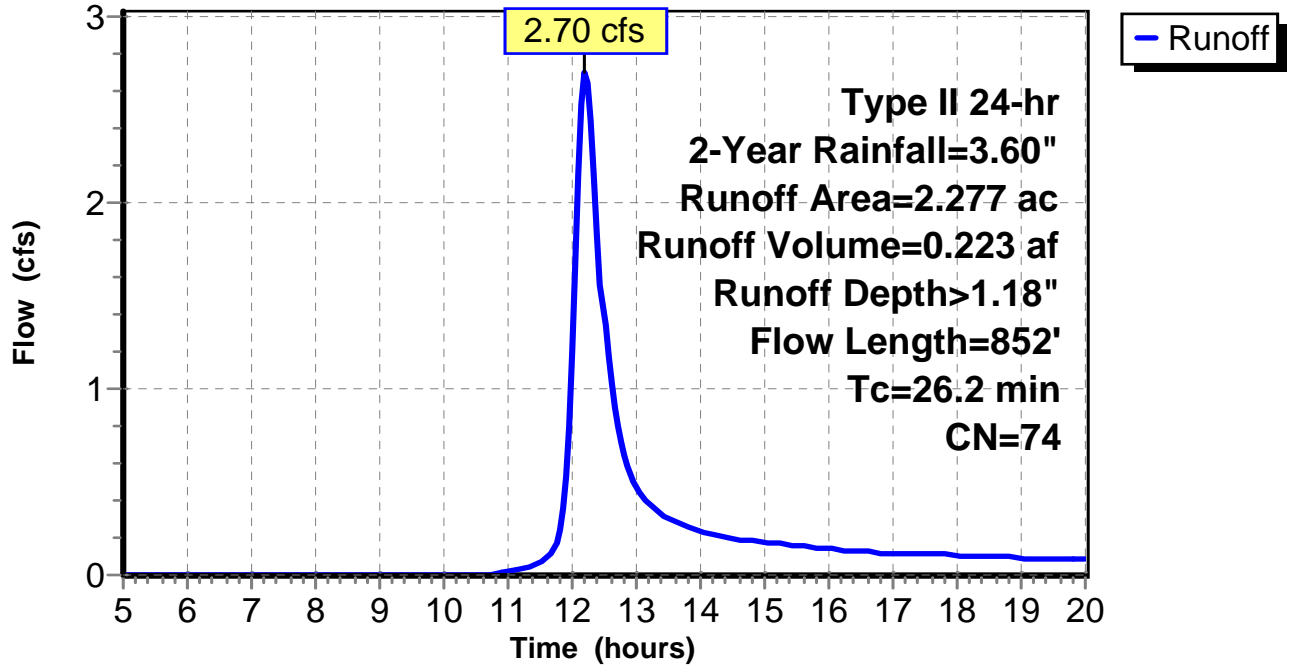
Subcatchment 4: C 28.004

Hydrograph



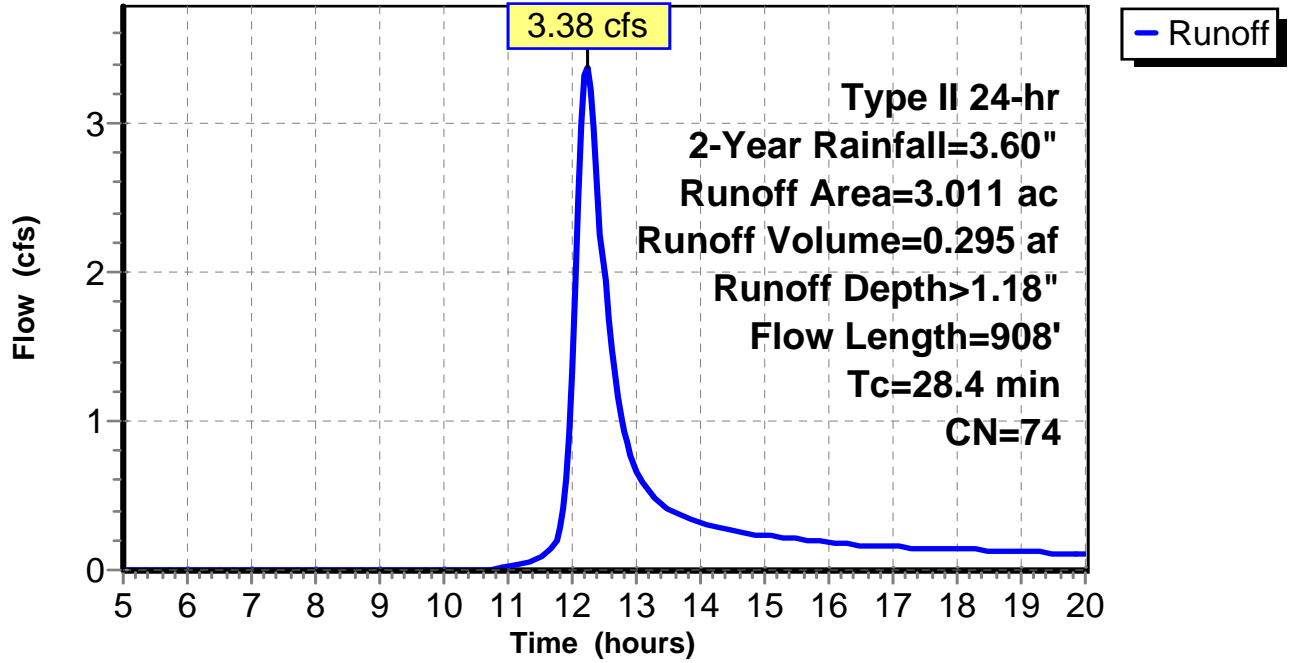
Subcatchment 1: C 28.001

Hydrograph



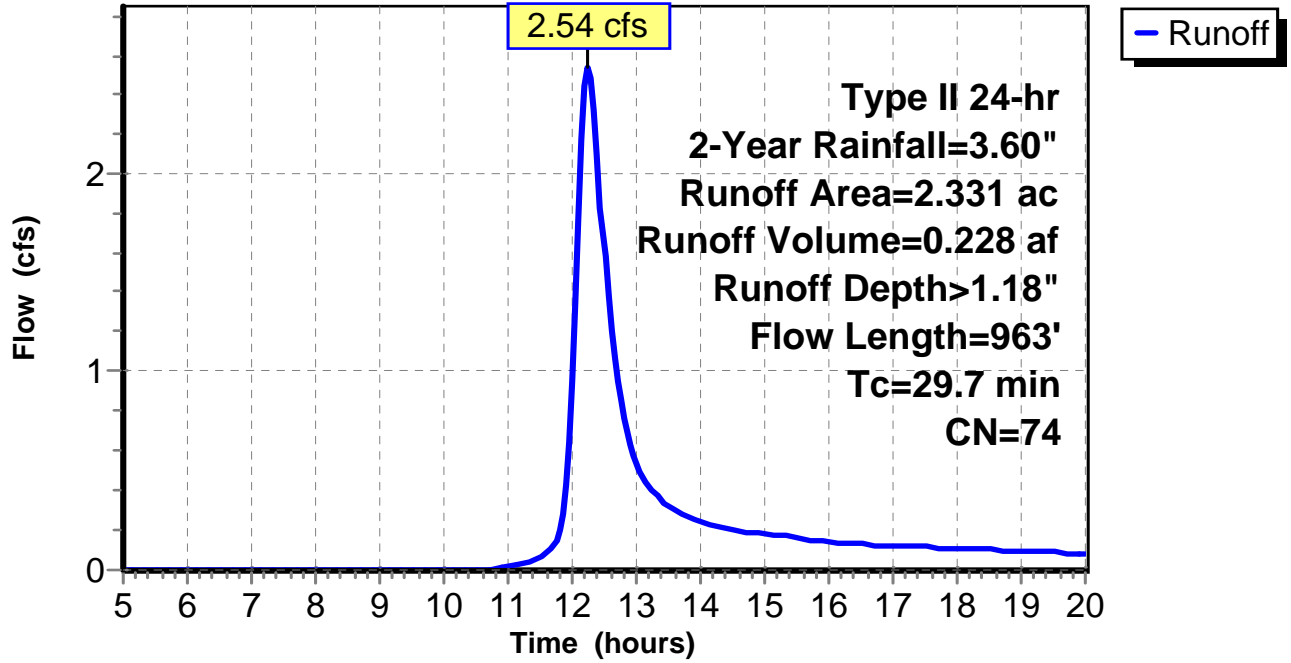
Subcatchment 2: C 28.002

Hydrograph



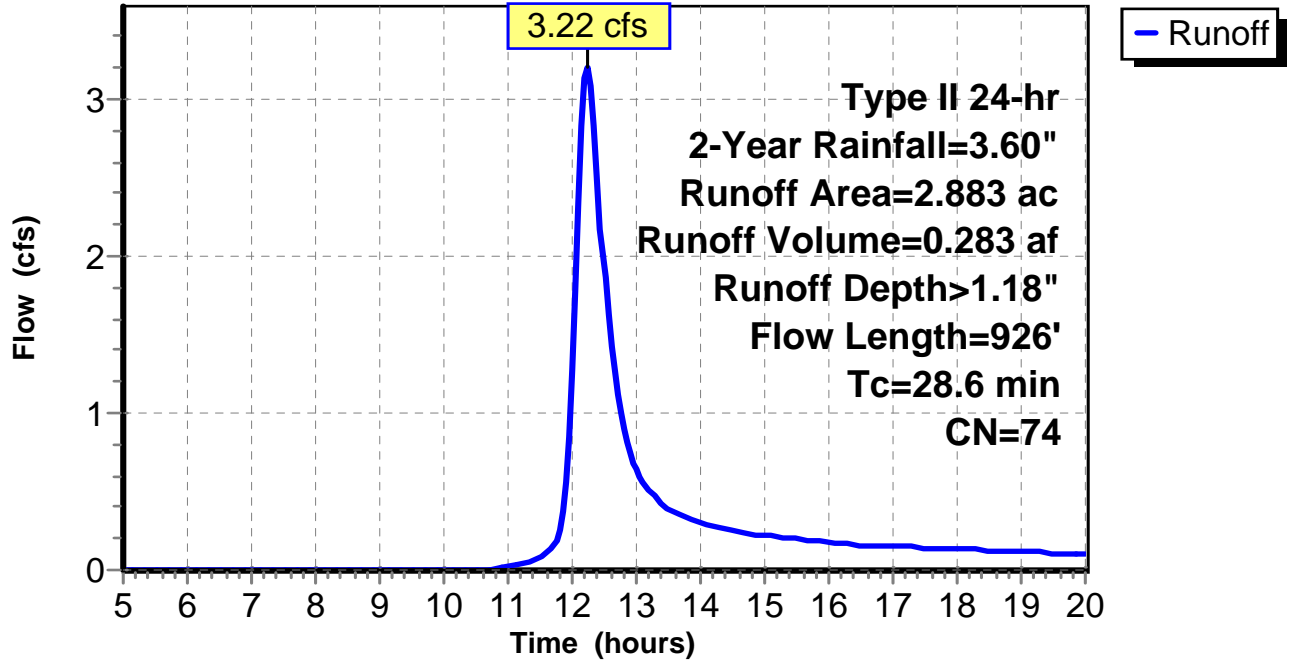
Subcatchment 3: C 28.003

Hydrograph



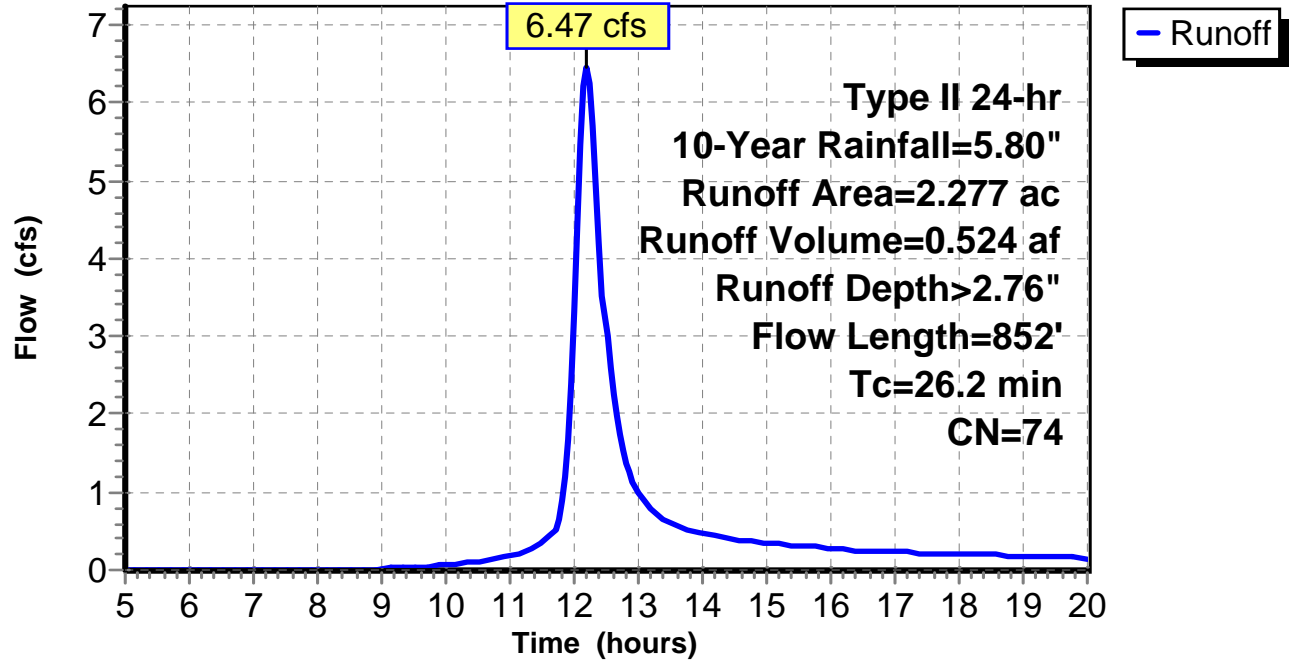
Subcatchment 4: C 28.004

Hydrograph



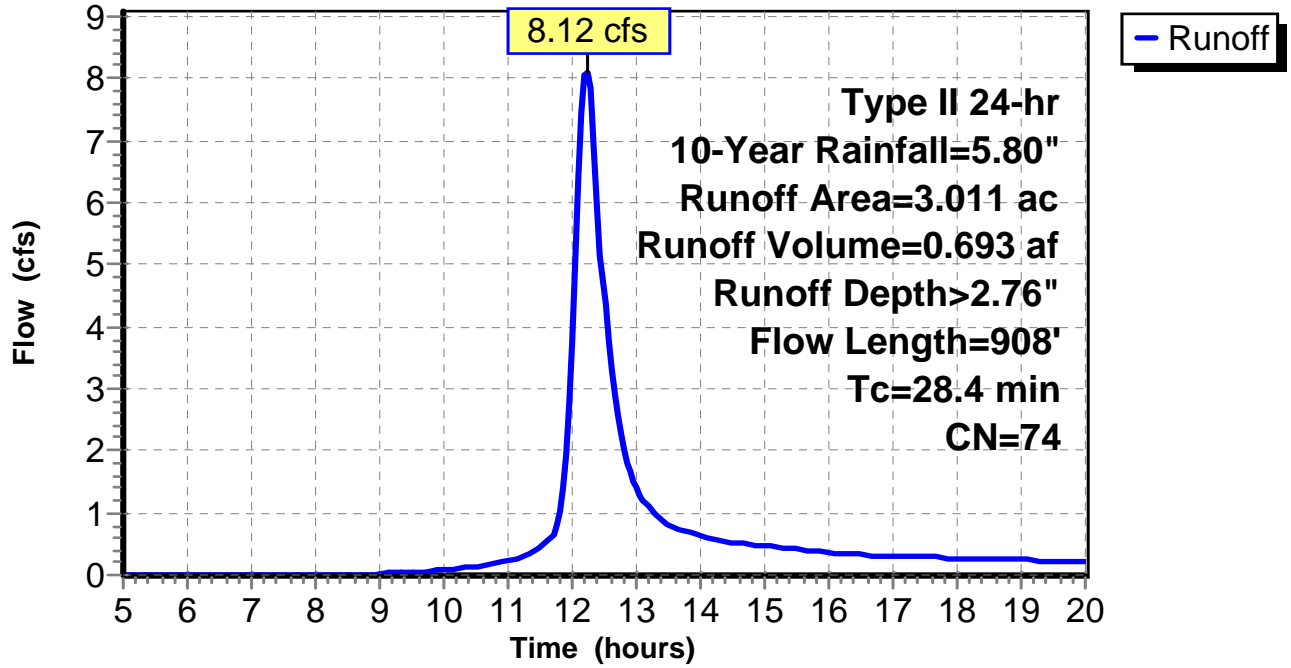
Subcatchment 1: C 28.001

Hydrograph



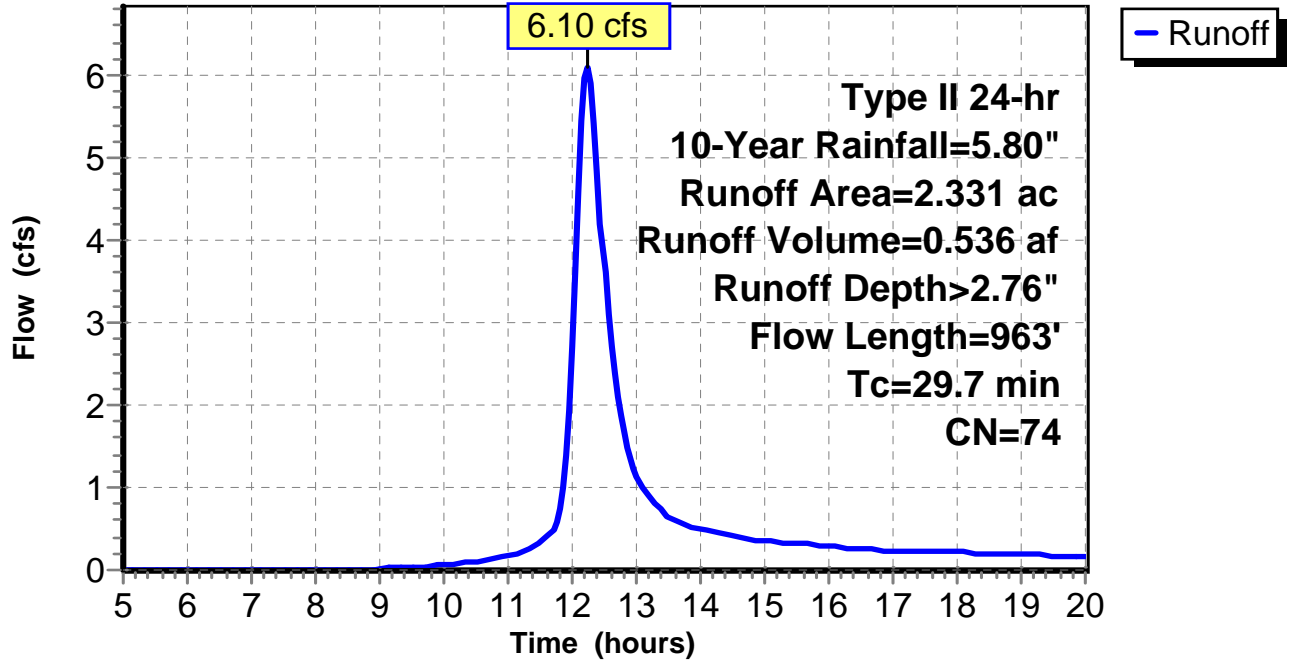
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Hydrograph



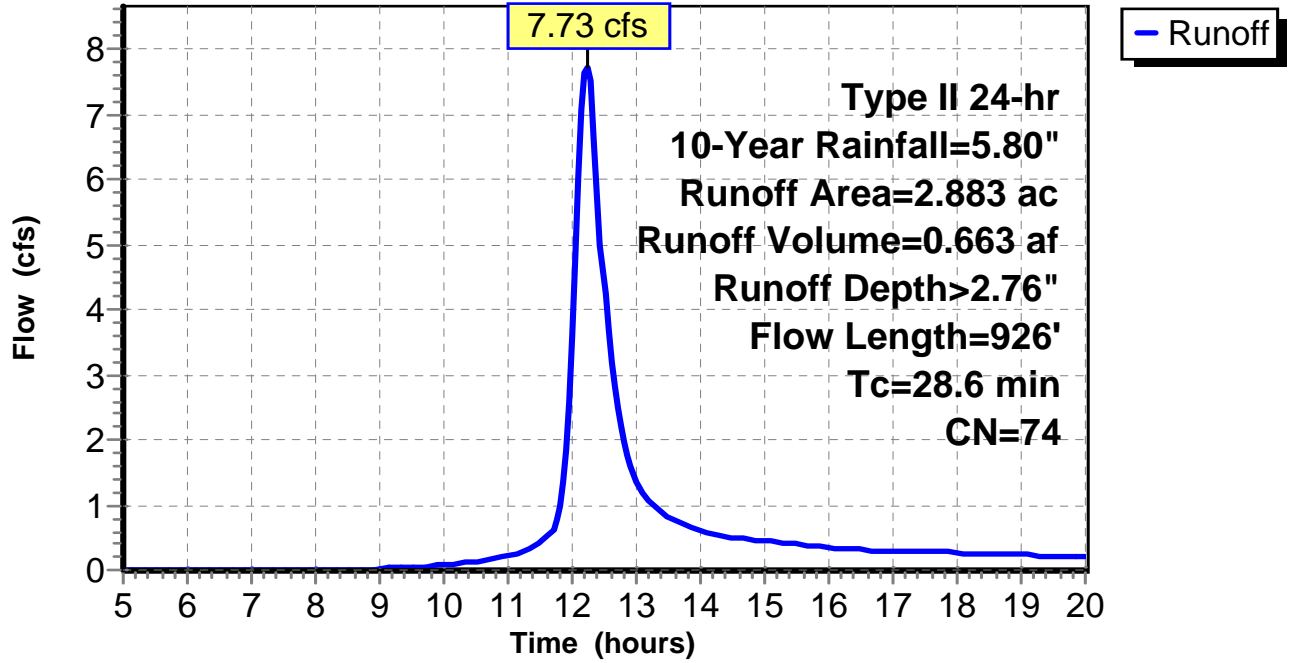
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Hydrograph



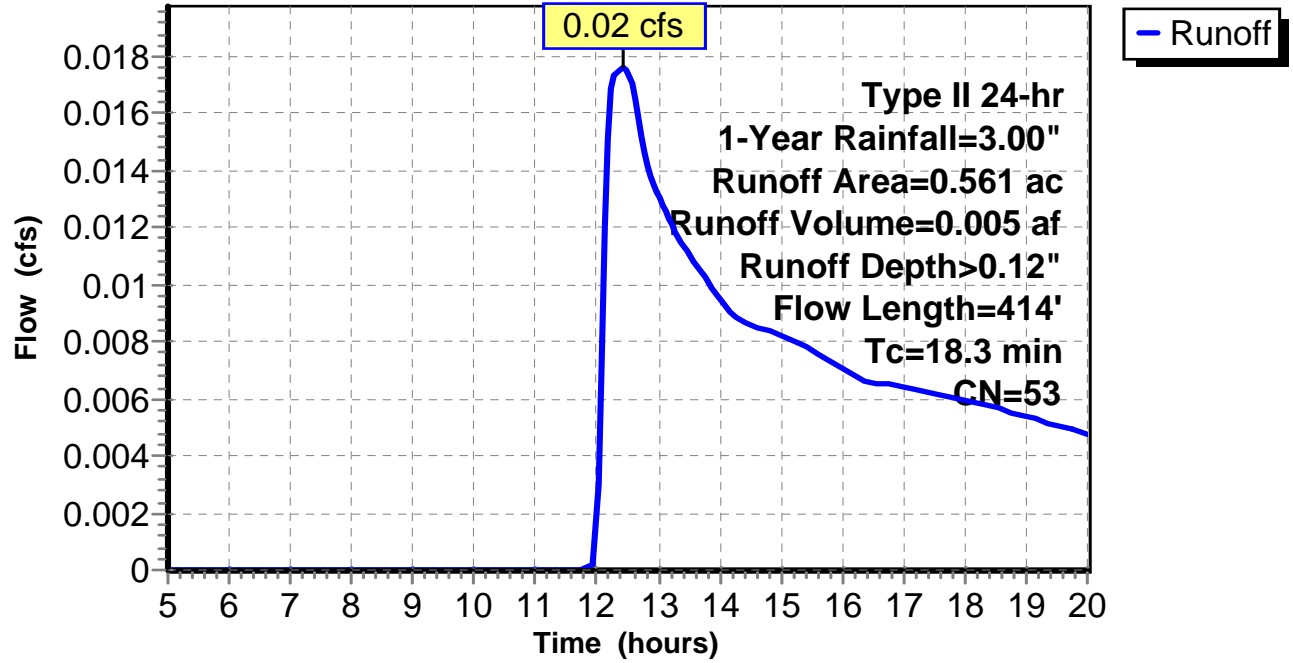
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Hydrograph



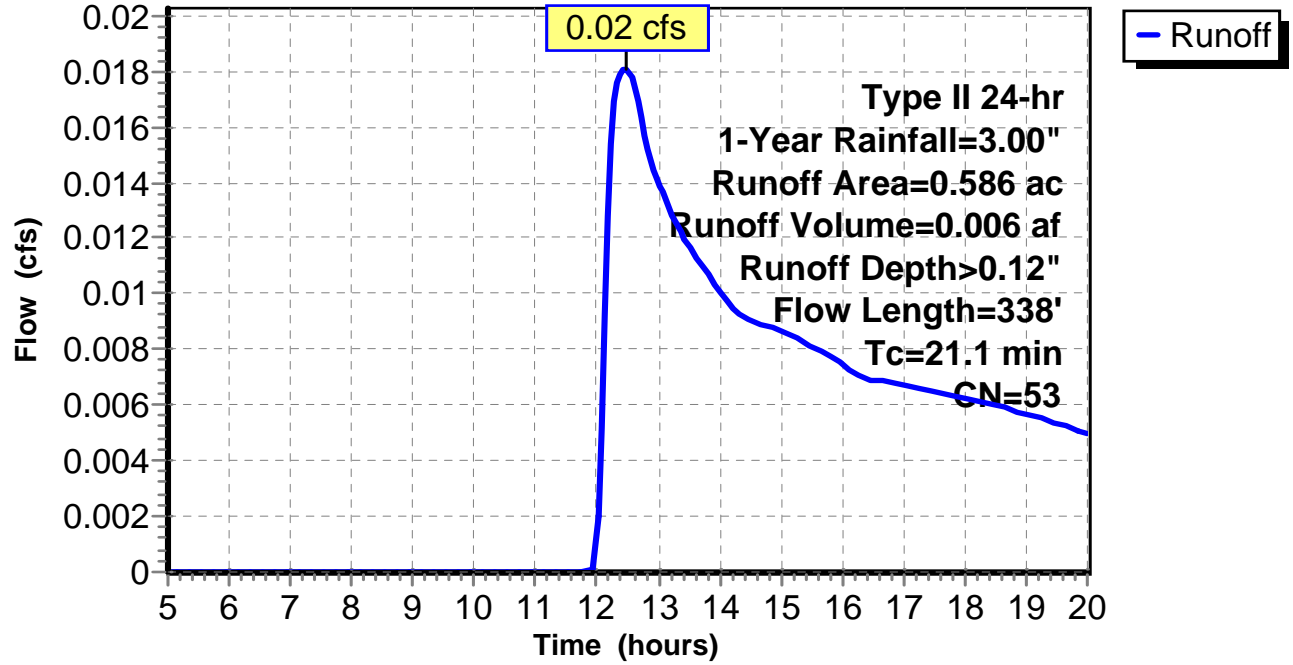
Subcatchment 1: C 31.001

Hydrograph



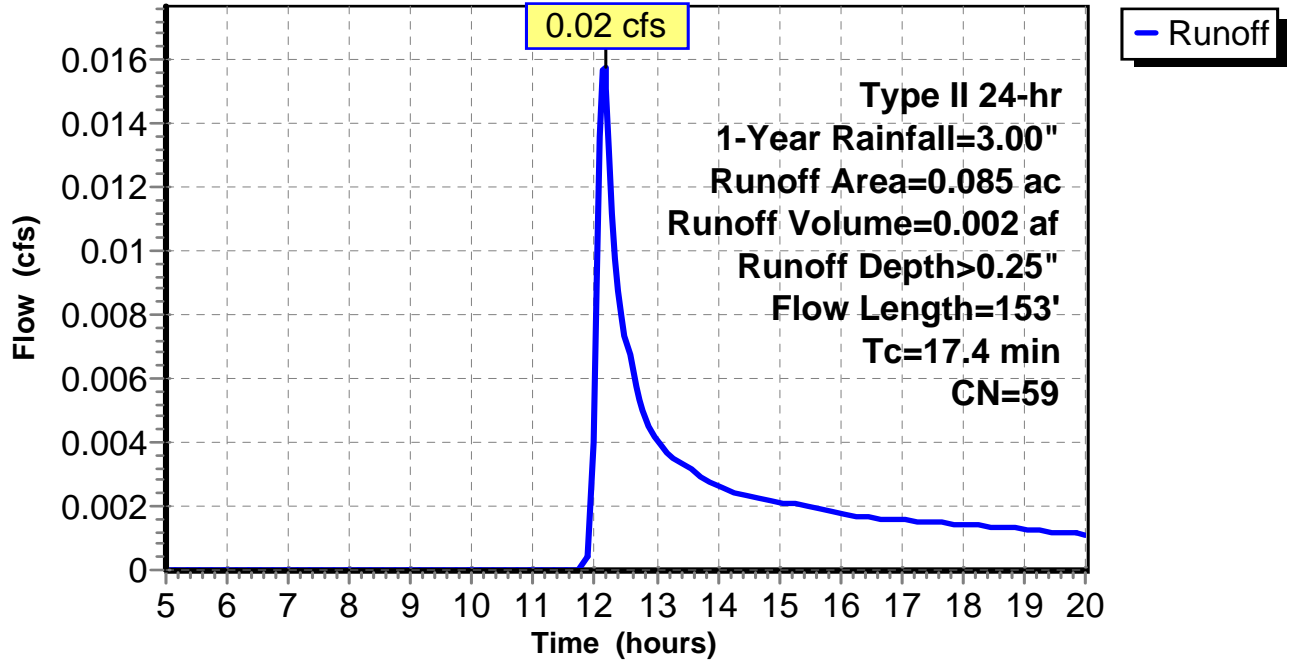
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Hydrograph



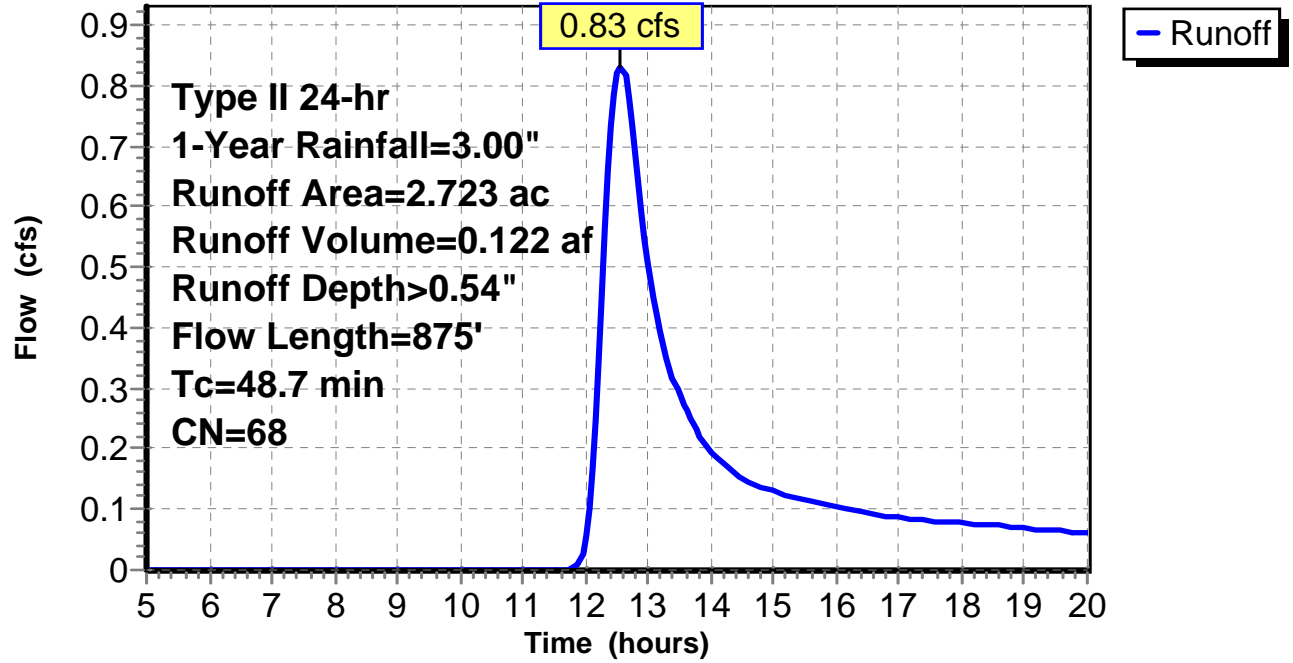
Subcatchment 3: C 31.003

Hydrograph



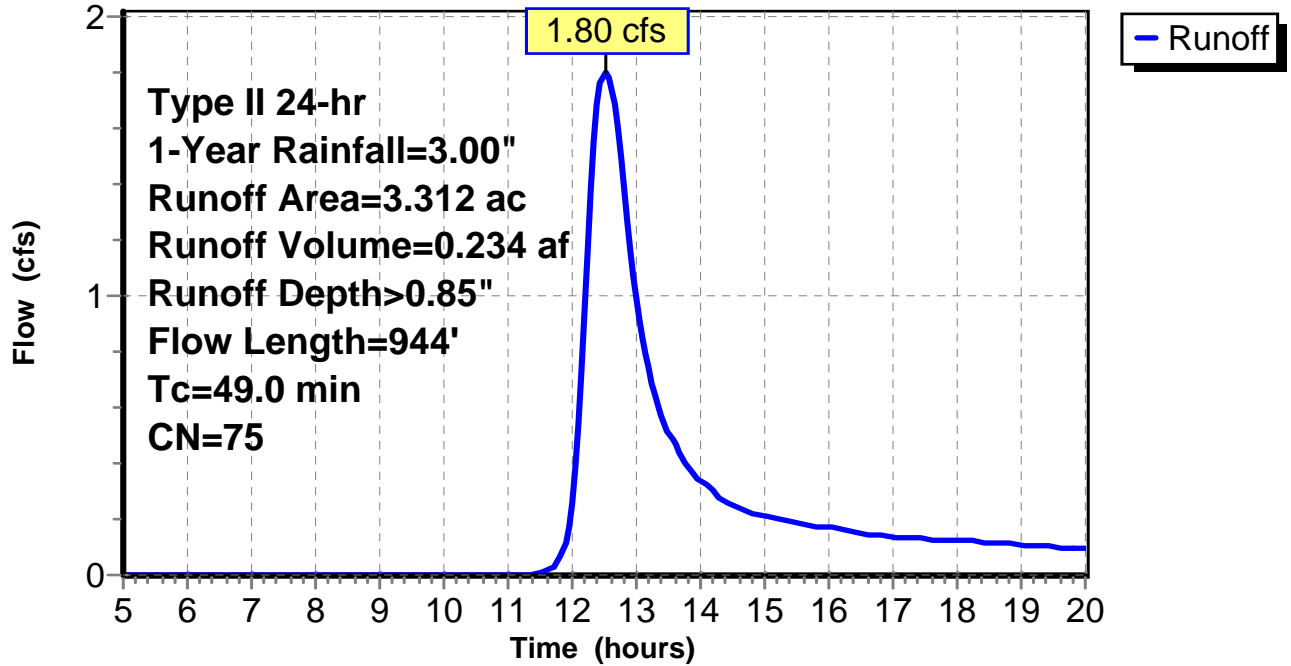
Subcatchment 4: C 32.001

Hydrograph



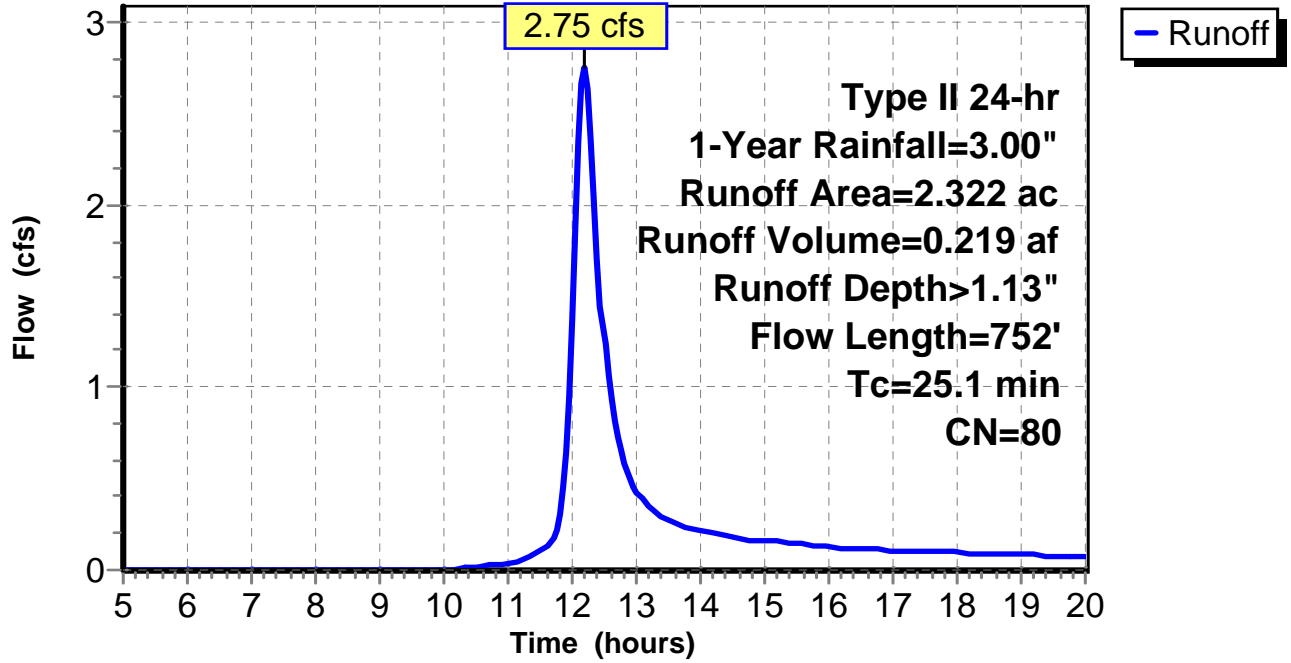
Subcatchment 5: C 32.002

Hydrograph



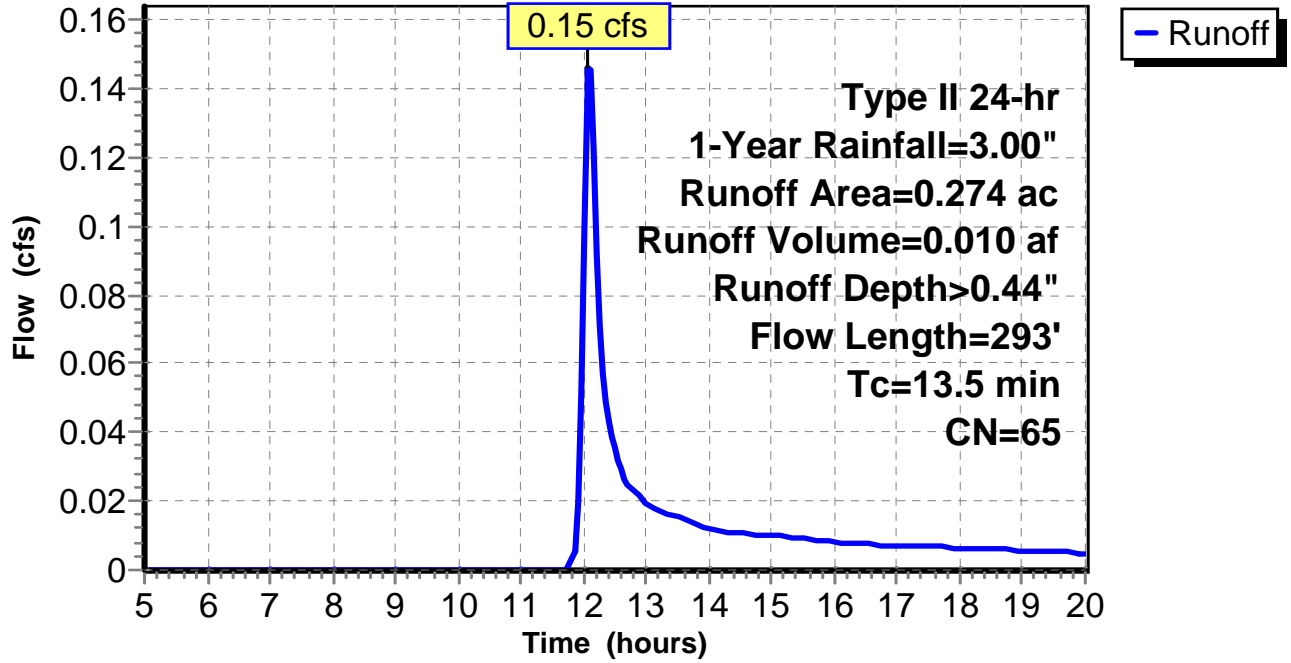
Subcatchment 6: C 32.003

Hydrograph



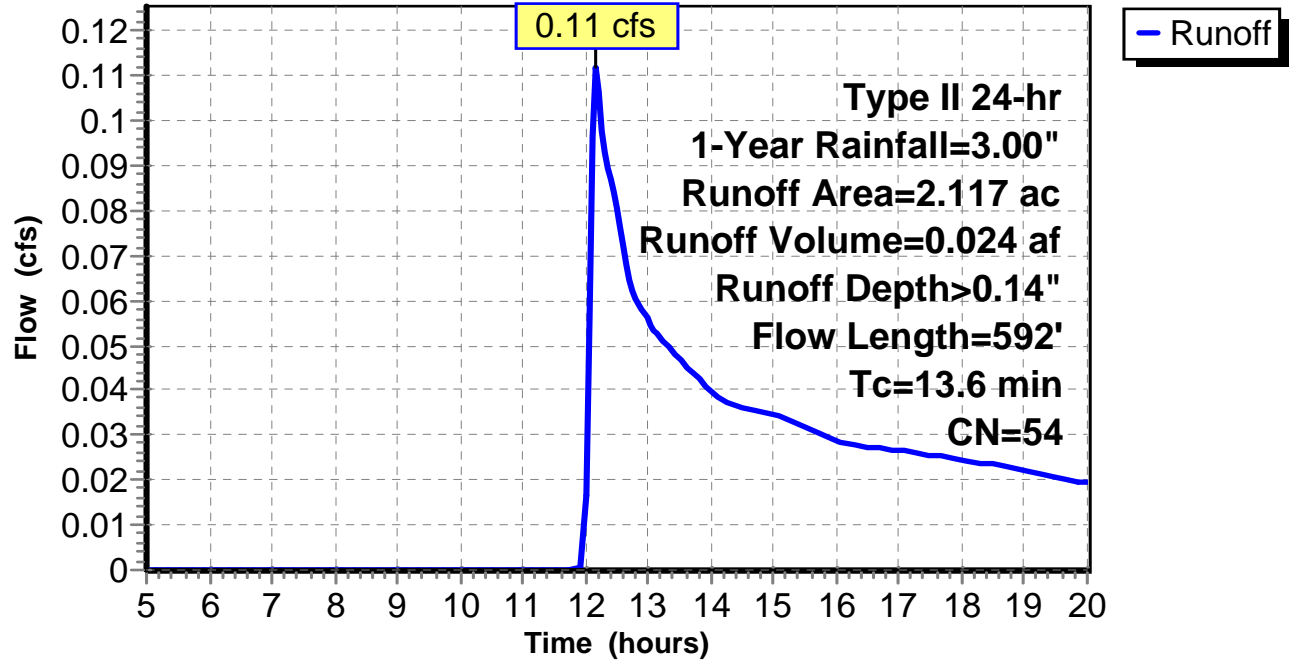
Subcatchment 7: C 32.004

Hydrograph



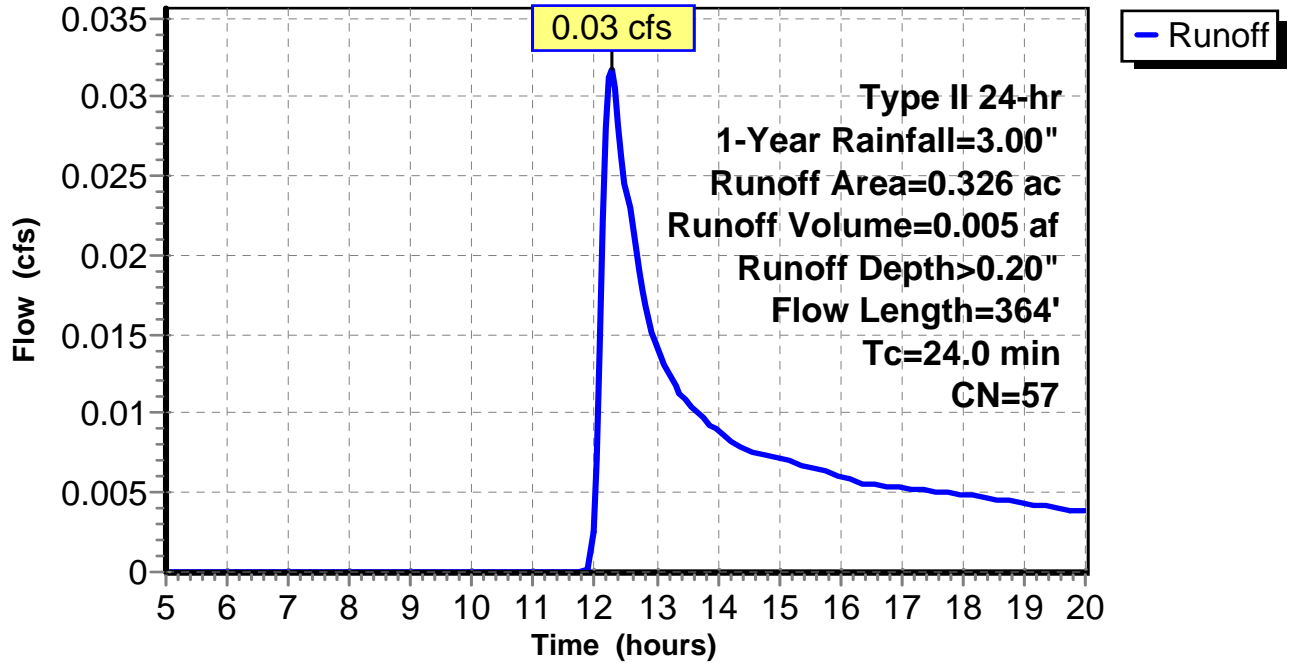
Subcatchment 8: C 32.005

Hydrograph



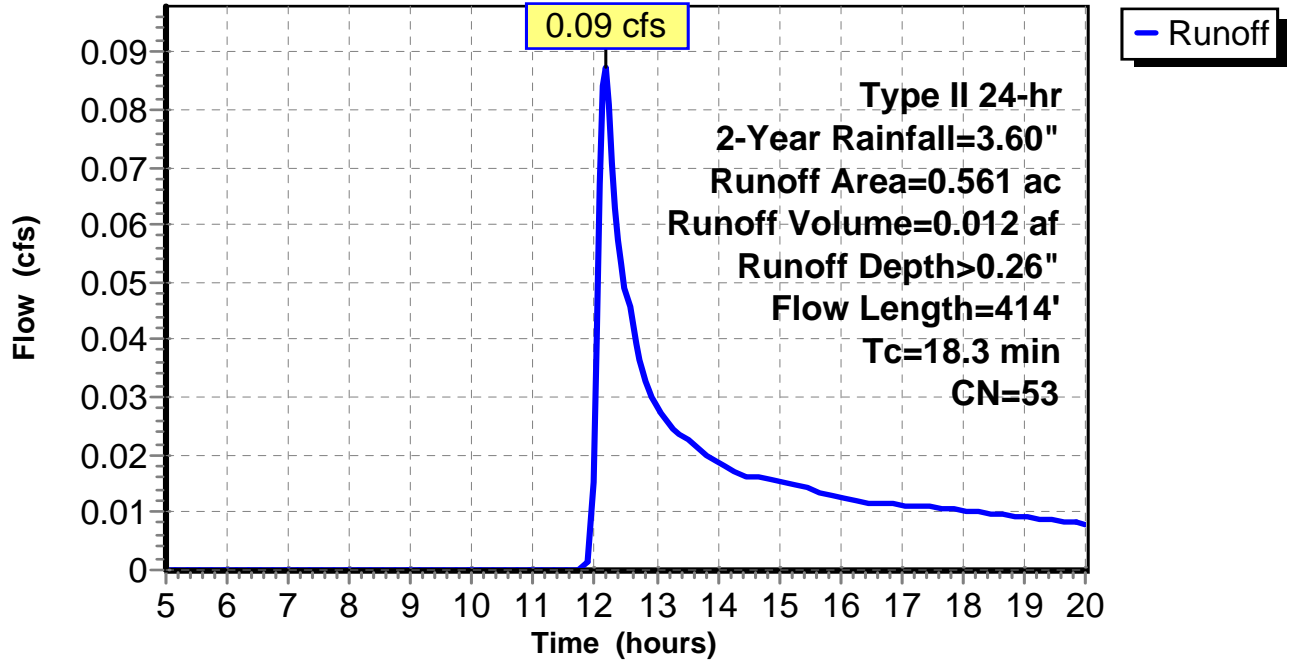
Subcatchment 9: C 32.006

Hydrograph



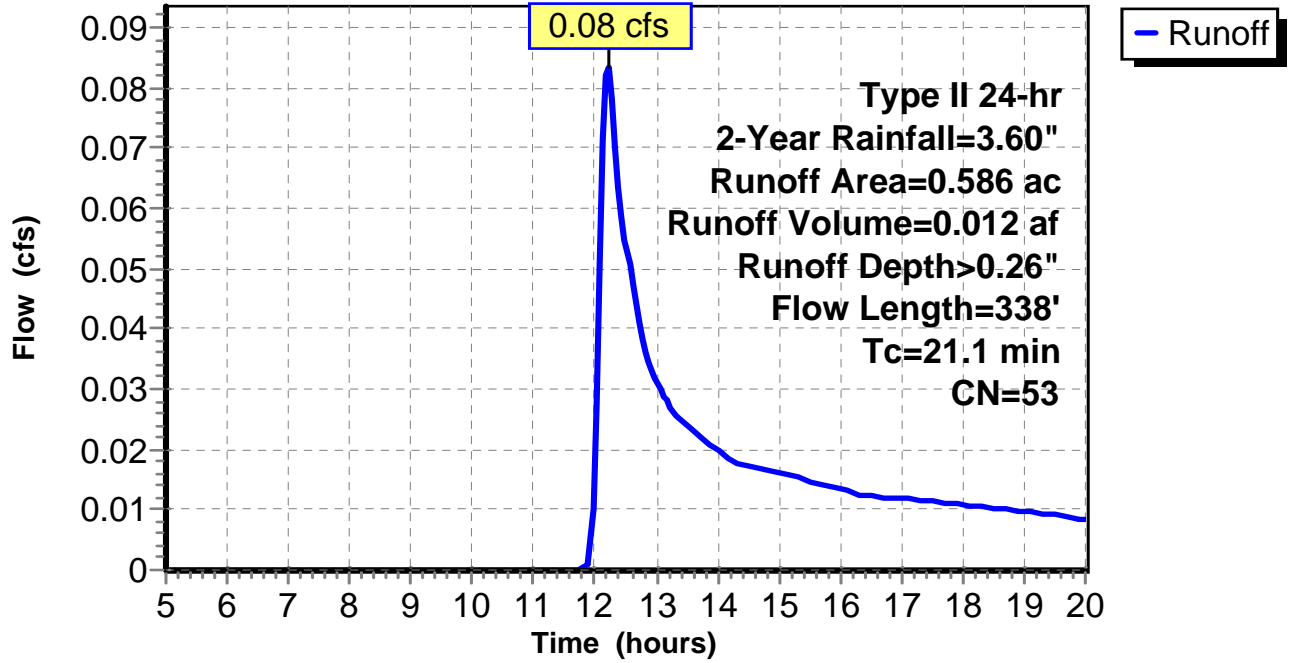
Subcatchment 1: C 31.001

Hydrograph



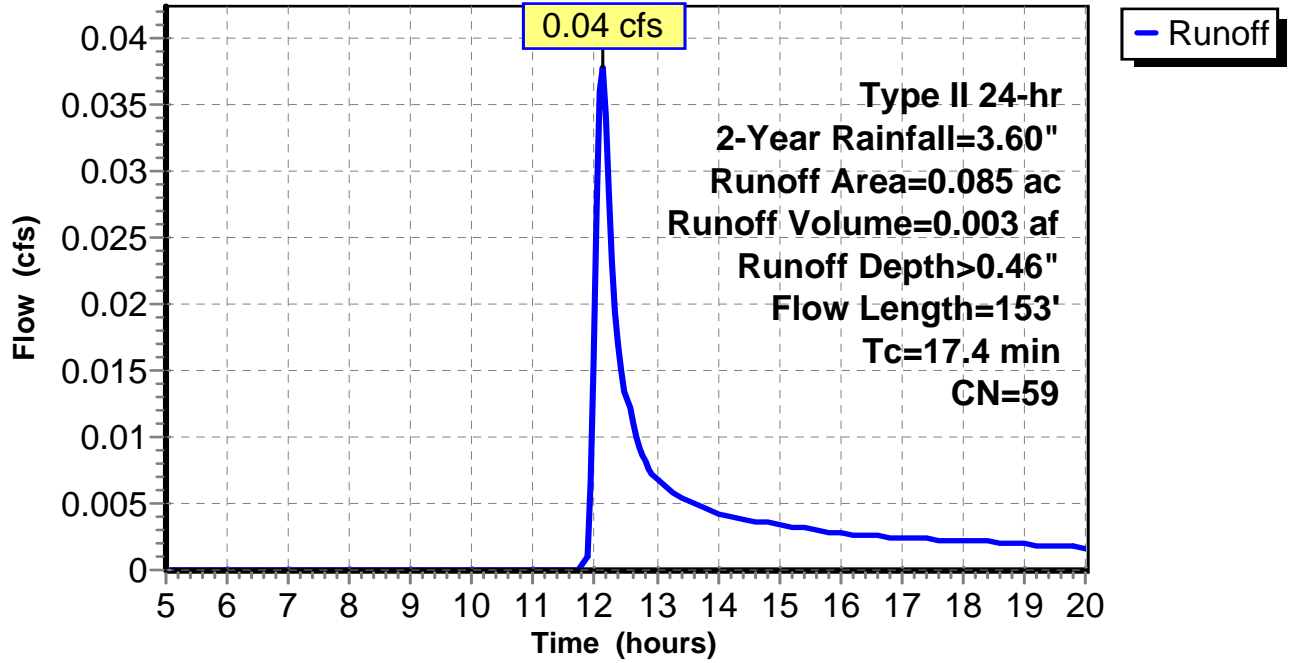
Subcatchment 2: C 31.002

Hydrograph



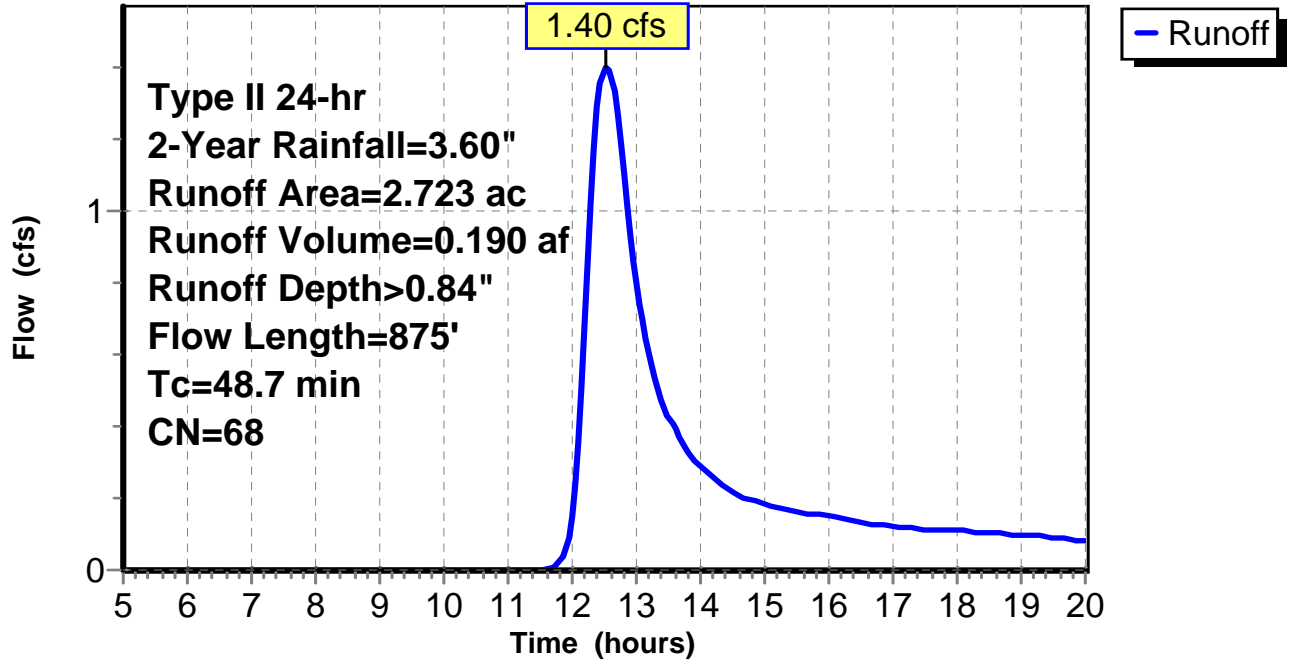
Subcatchment 3: C 31.003

Hydrograph



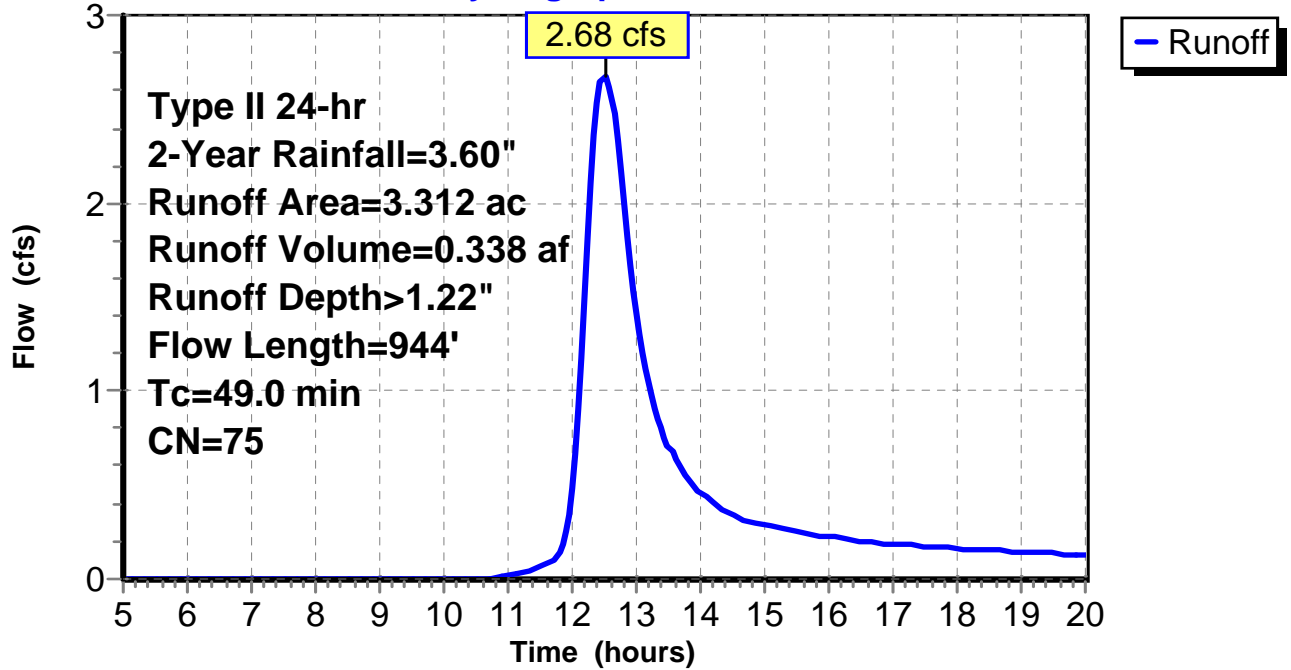
Subcatchment 4: C 32.001

Hydrograph



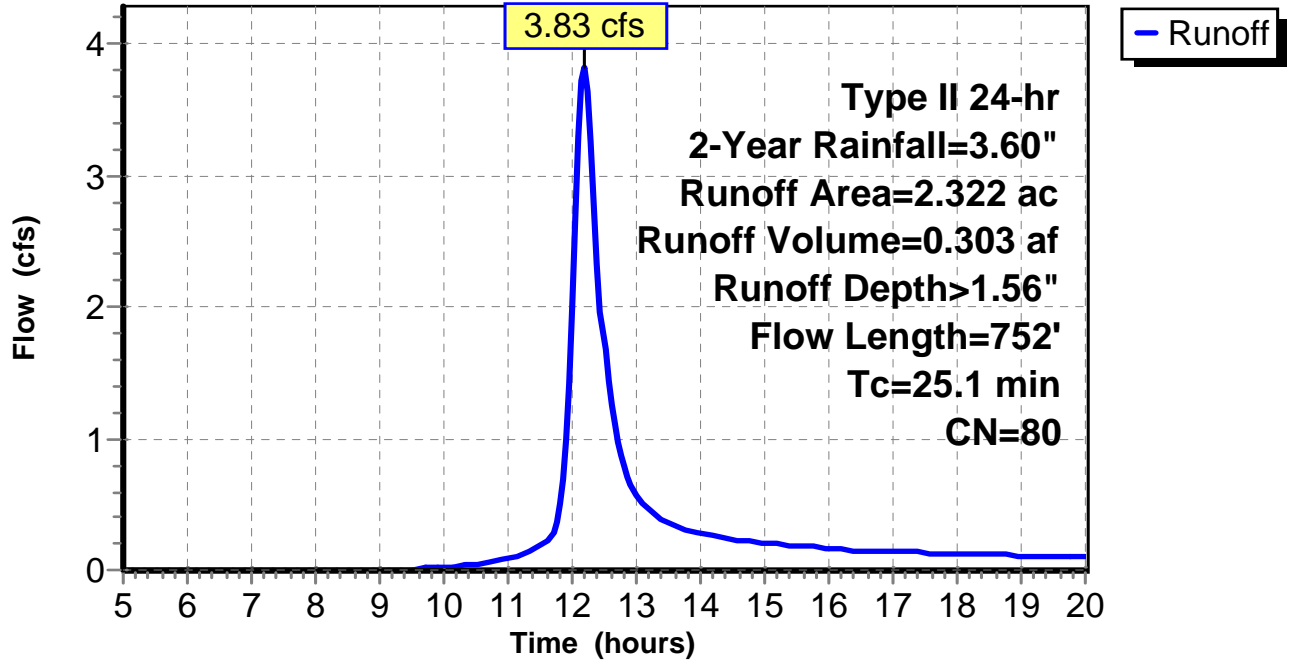
Subcatchment 5: C 32.002

Hydrograph



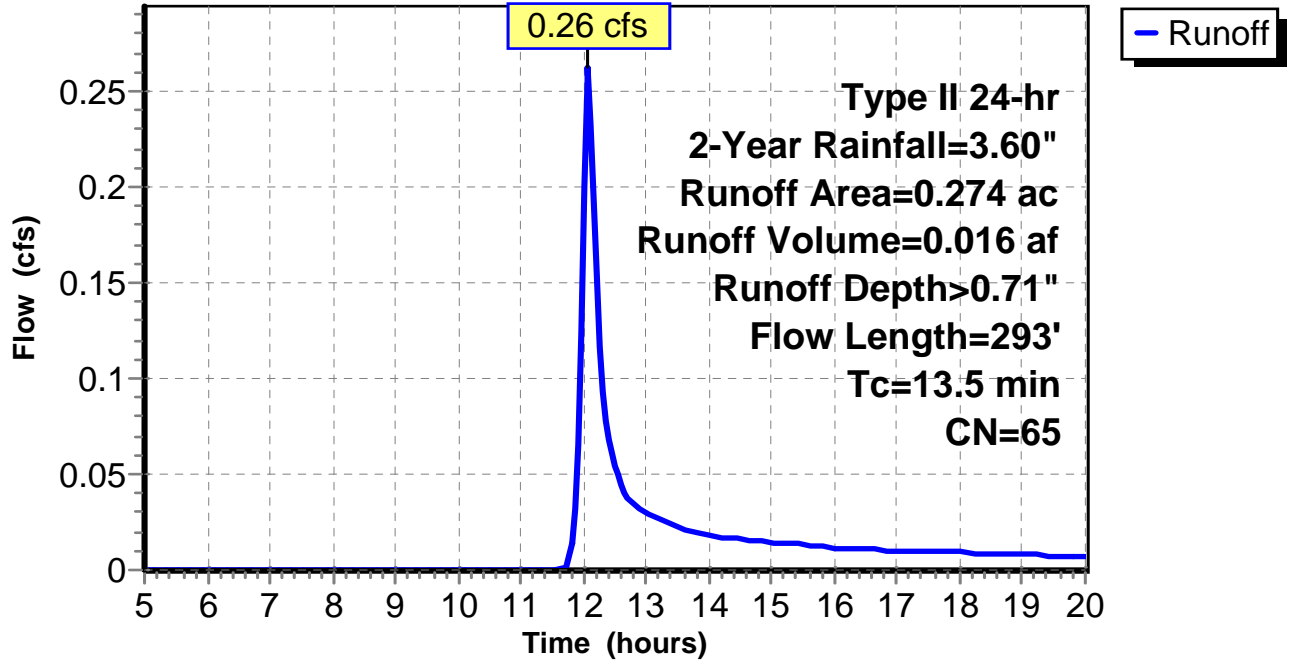
Subcatchment 6: C 32.003

Hydrograph



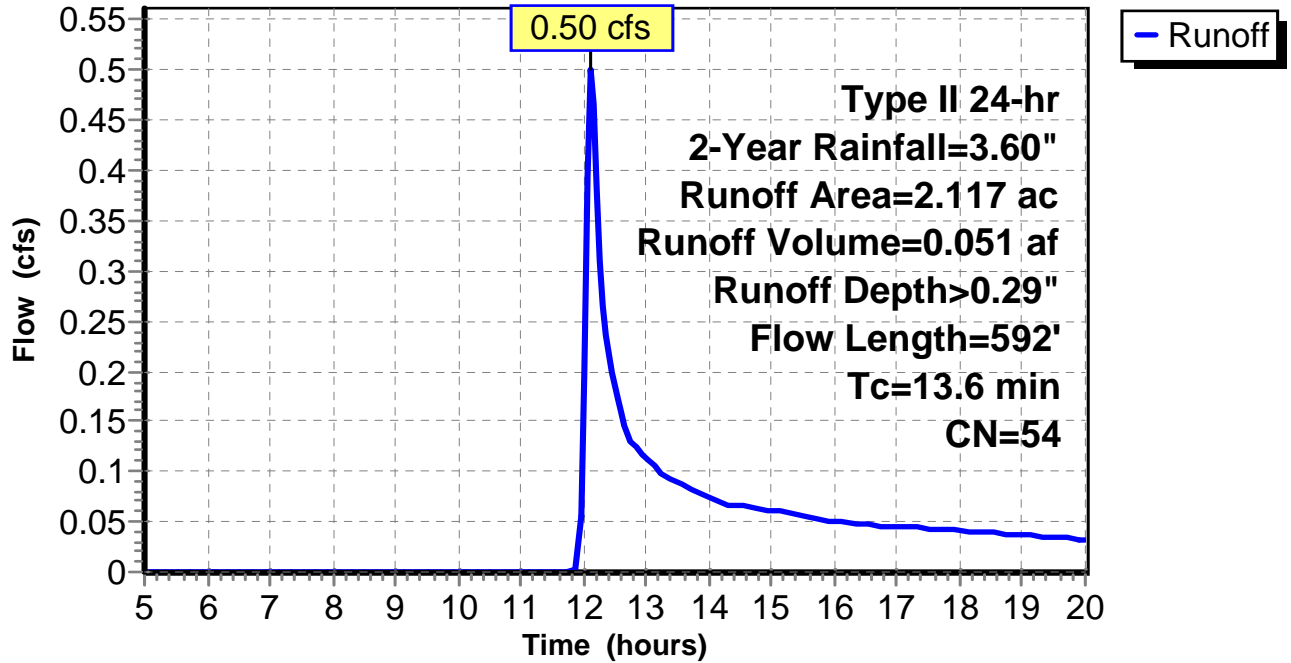
Subcatchment 7: C 32.004

Hydrograph



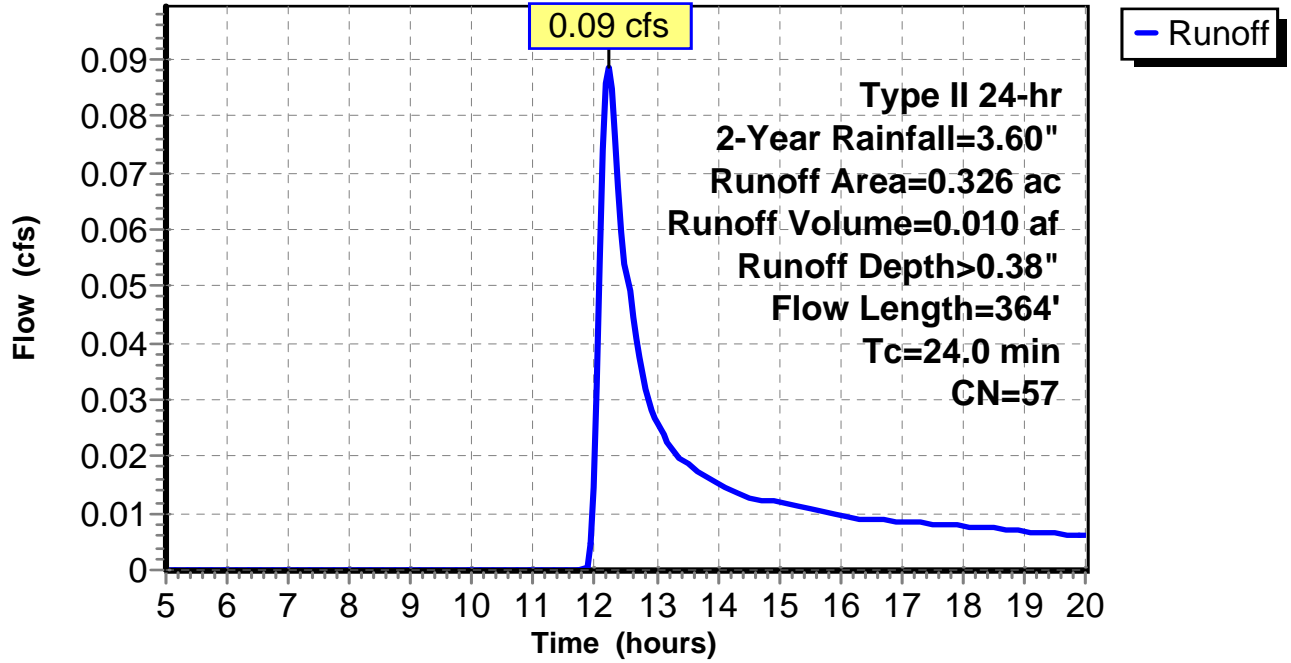
Subcatchment 8: C 32.005

Hydrograph



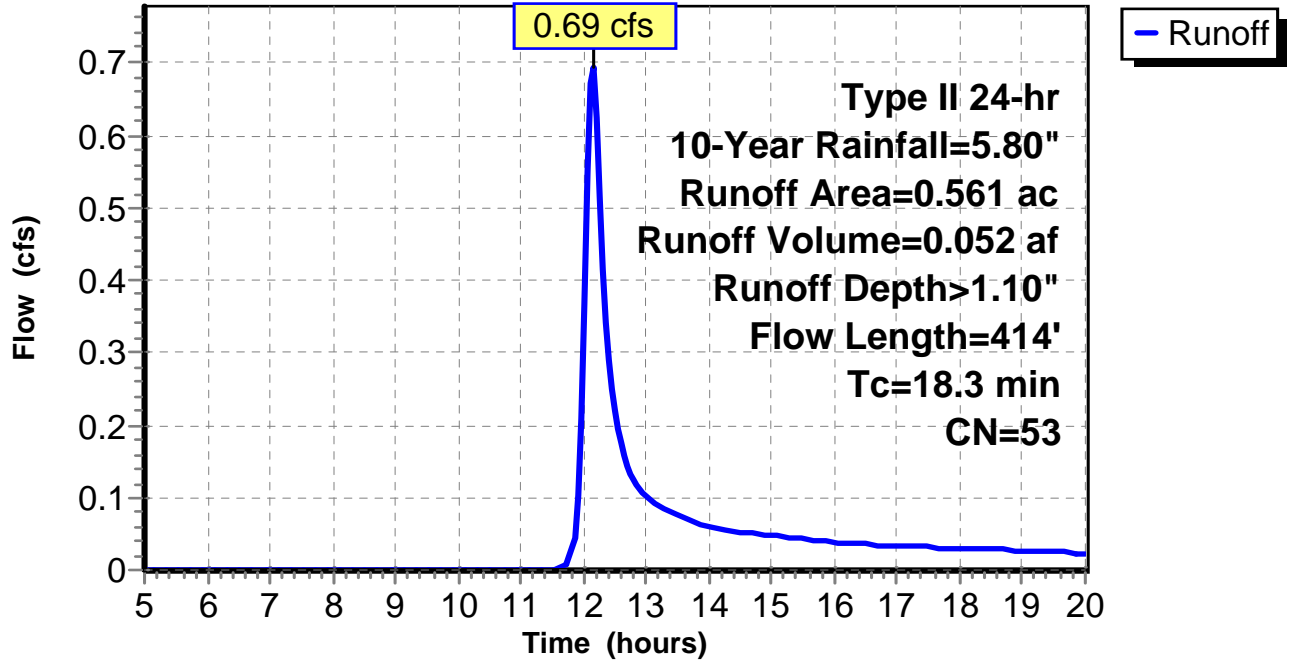
Subcatchment 9: C 32.006

Hydrograph



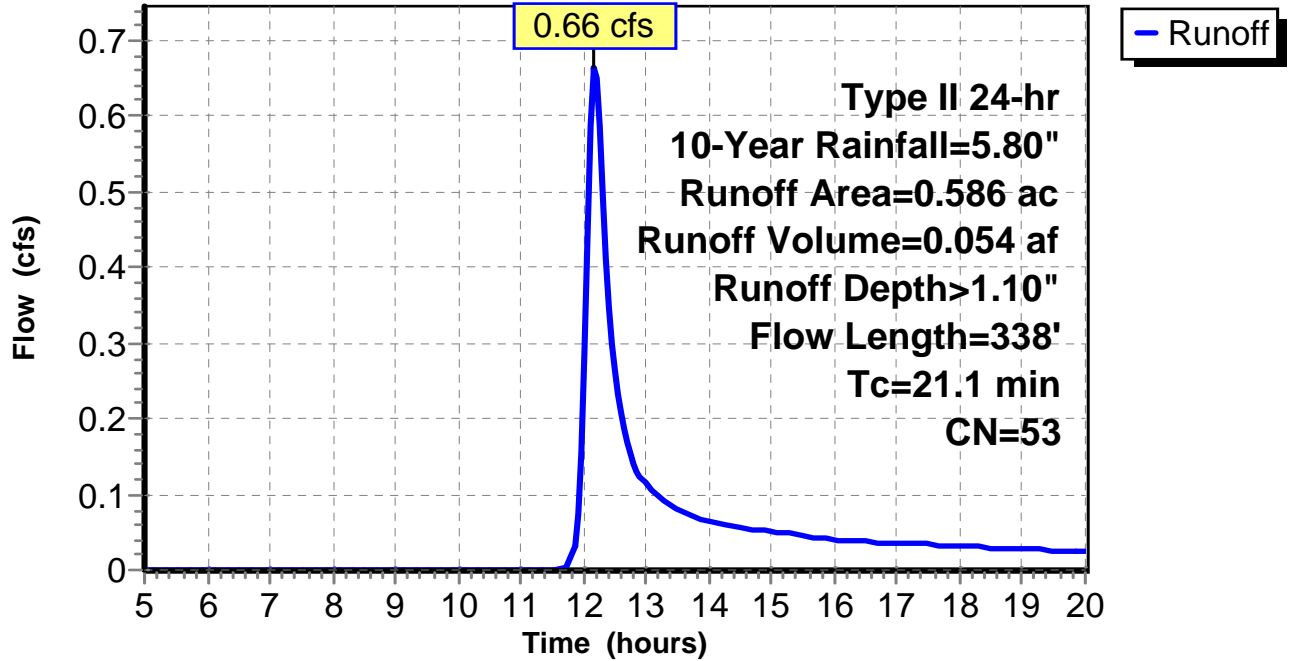
Subcatchment 1: C 31.001

Hydrograph



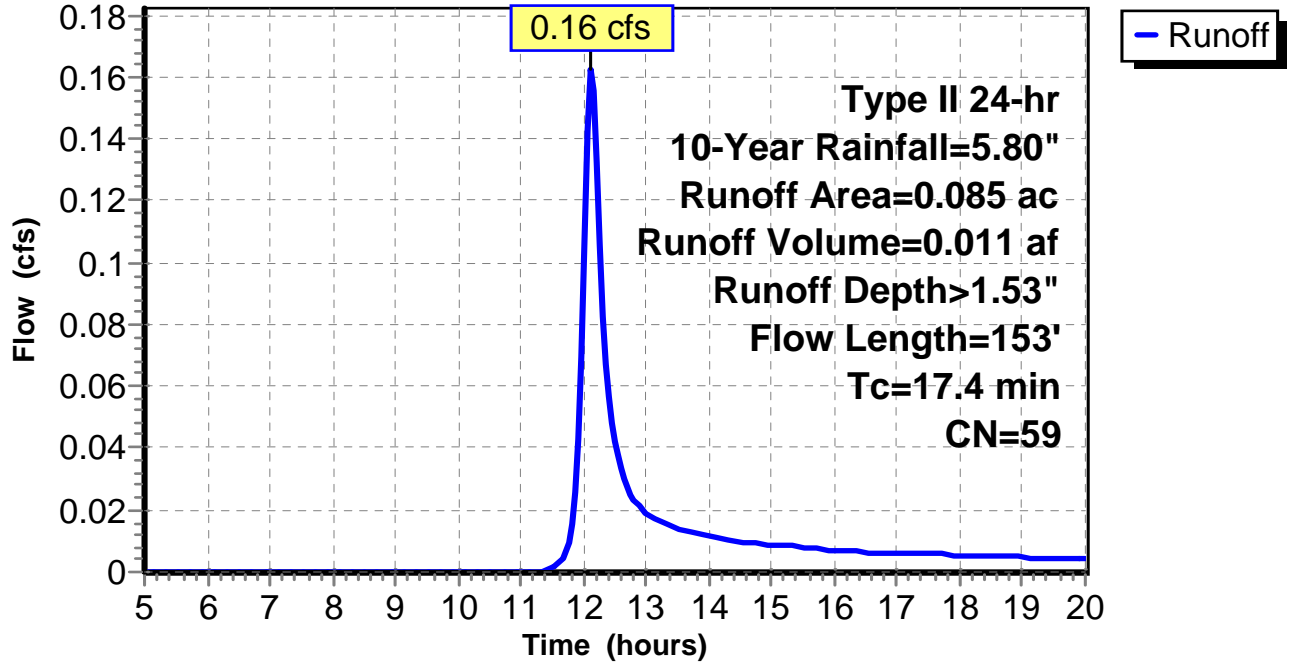
Subcatchment 2: C 31.002

Hydrograph



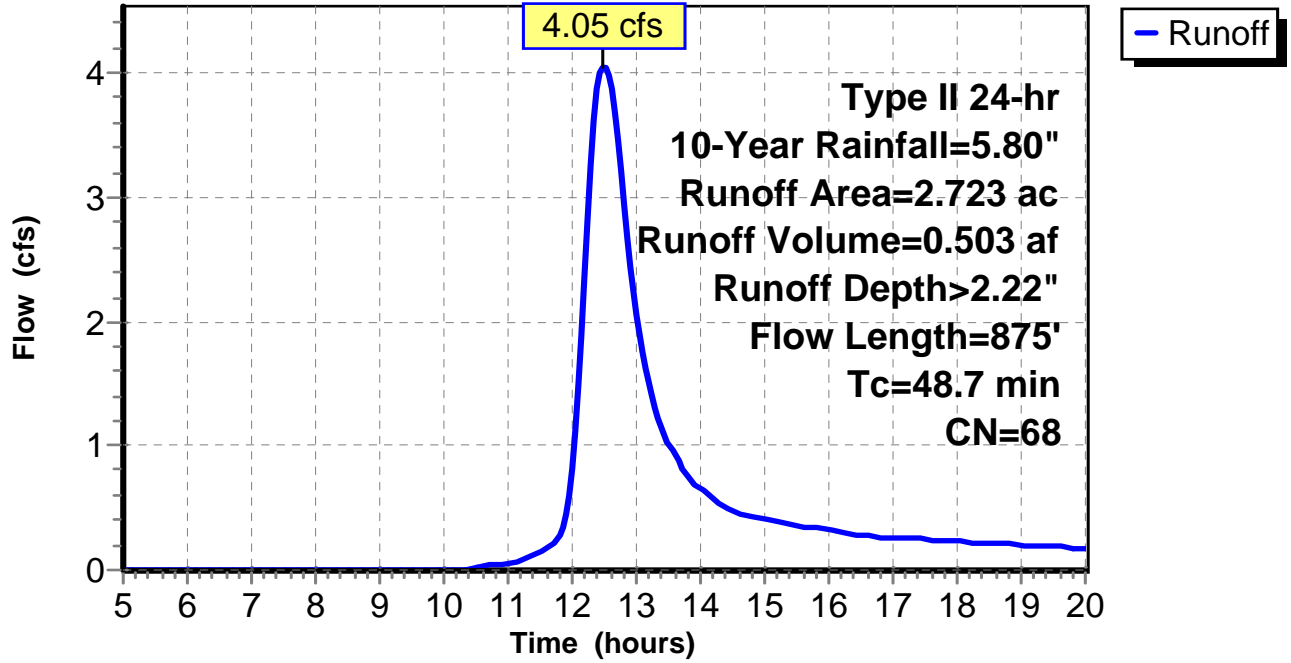
Subcatchment 3: C 31.003

Hydrograph



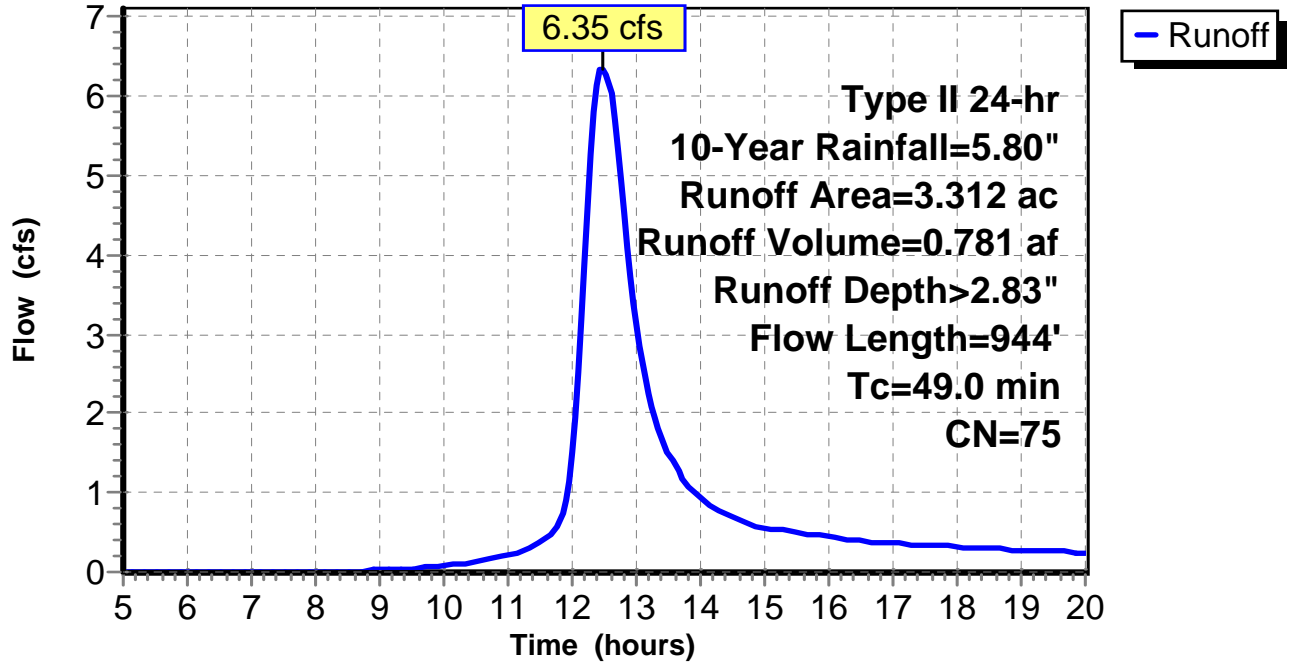
Subcatchment 4: C 32.001

Hydrograph



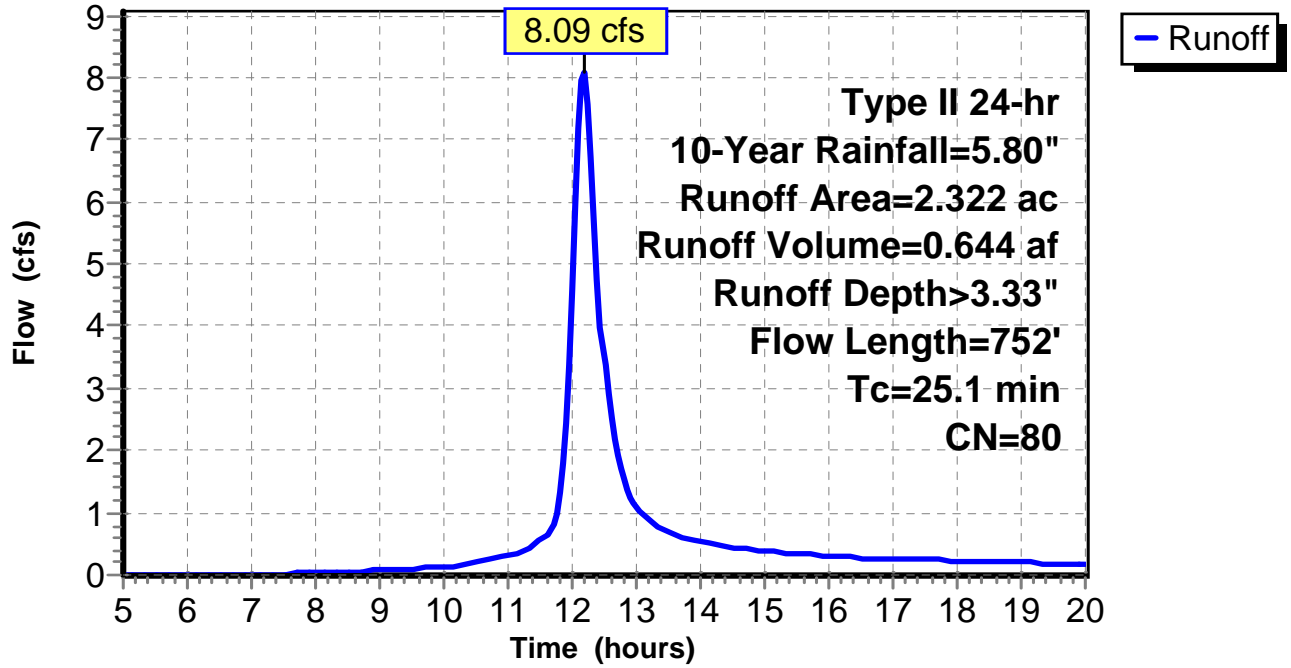
Subcatchment 5: C 32.002

Hydrograph



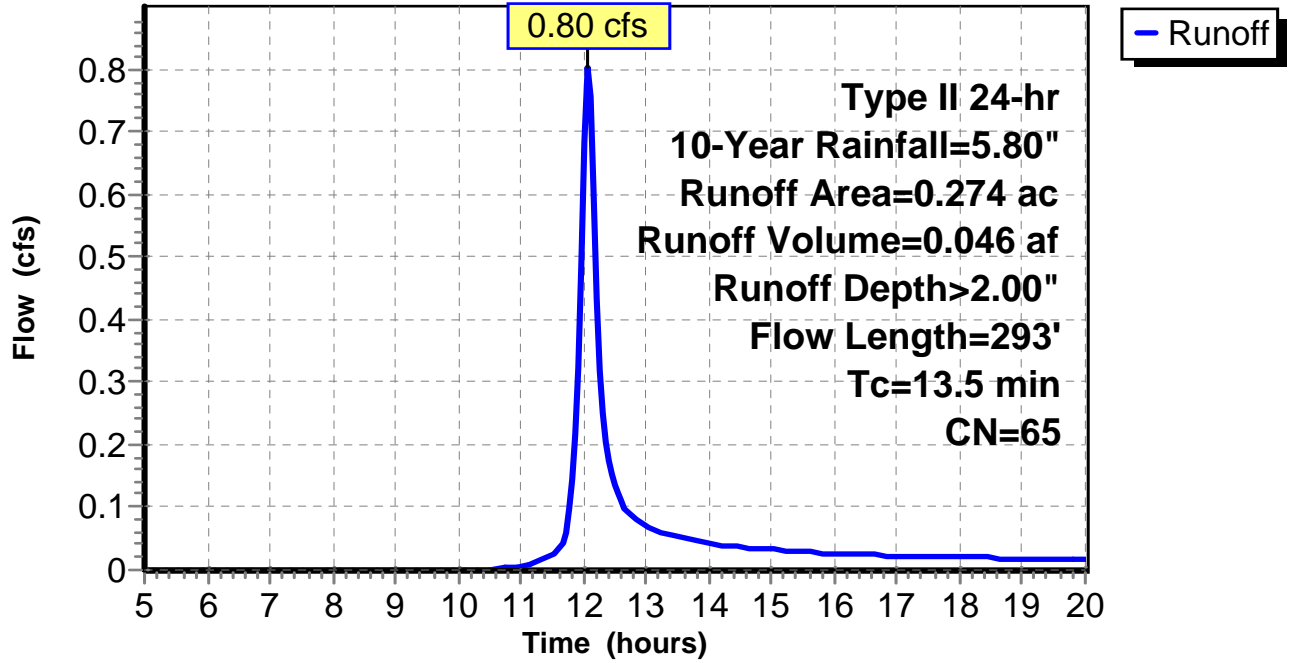
Subcatchment 6: C 32.003

Hydrograph



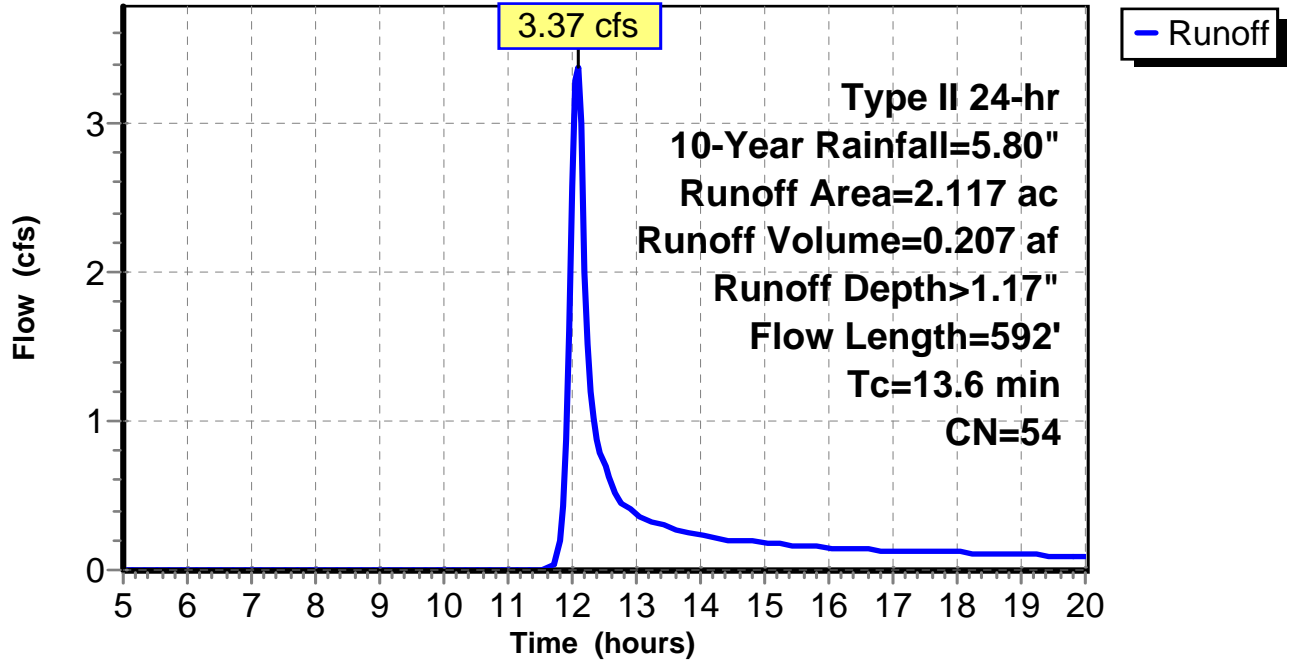
Subcatchment 7: C 32.004

Hydrograph



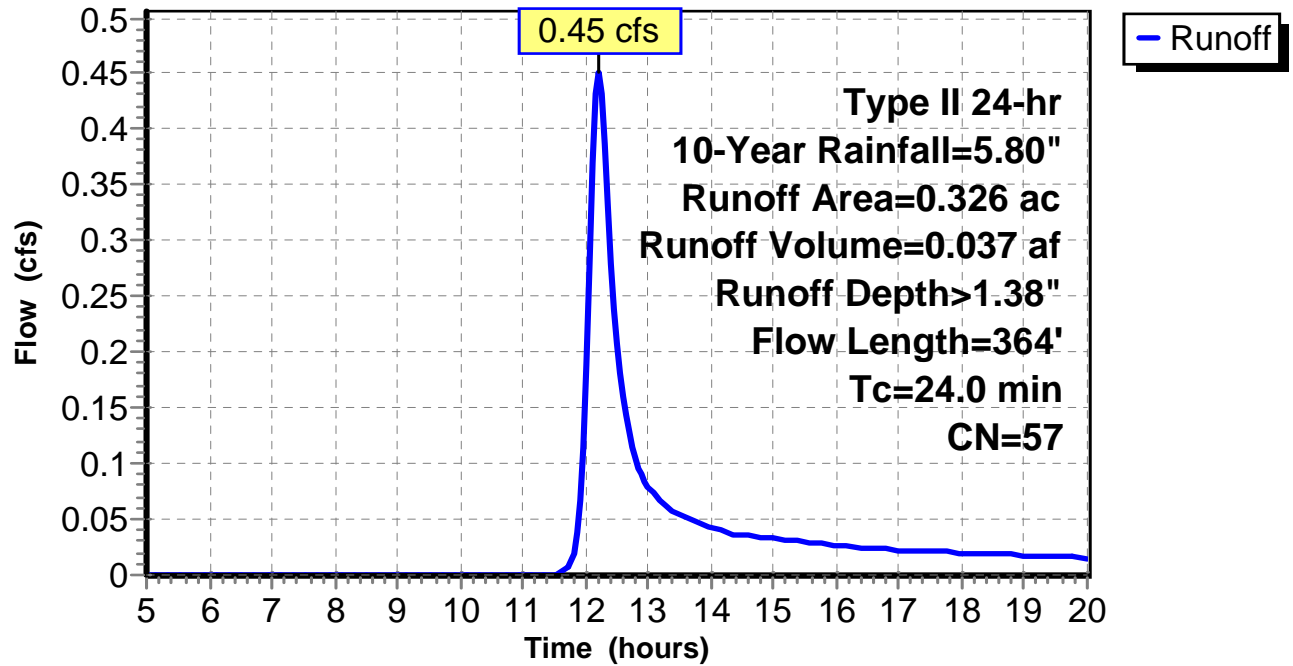
Subcatchment 8: C 32.005

Hydrograph



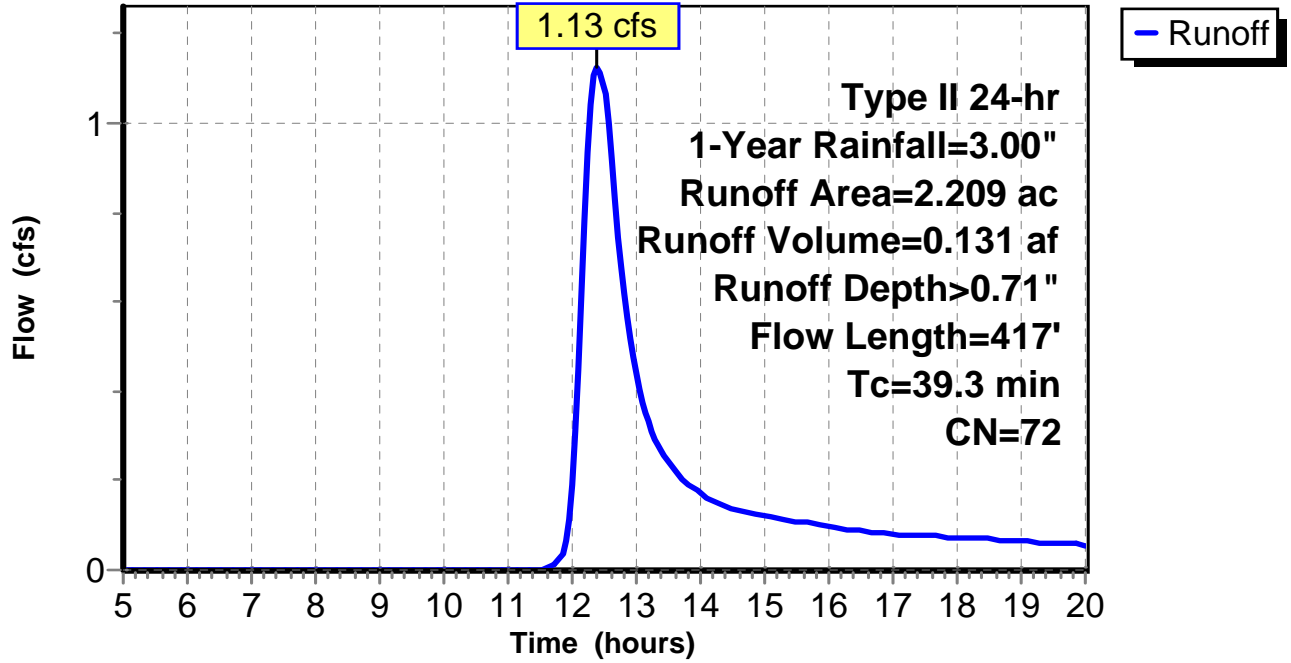
Subcatchment 9: C 32.006

Hydrograph



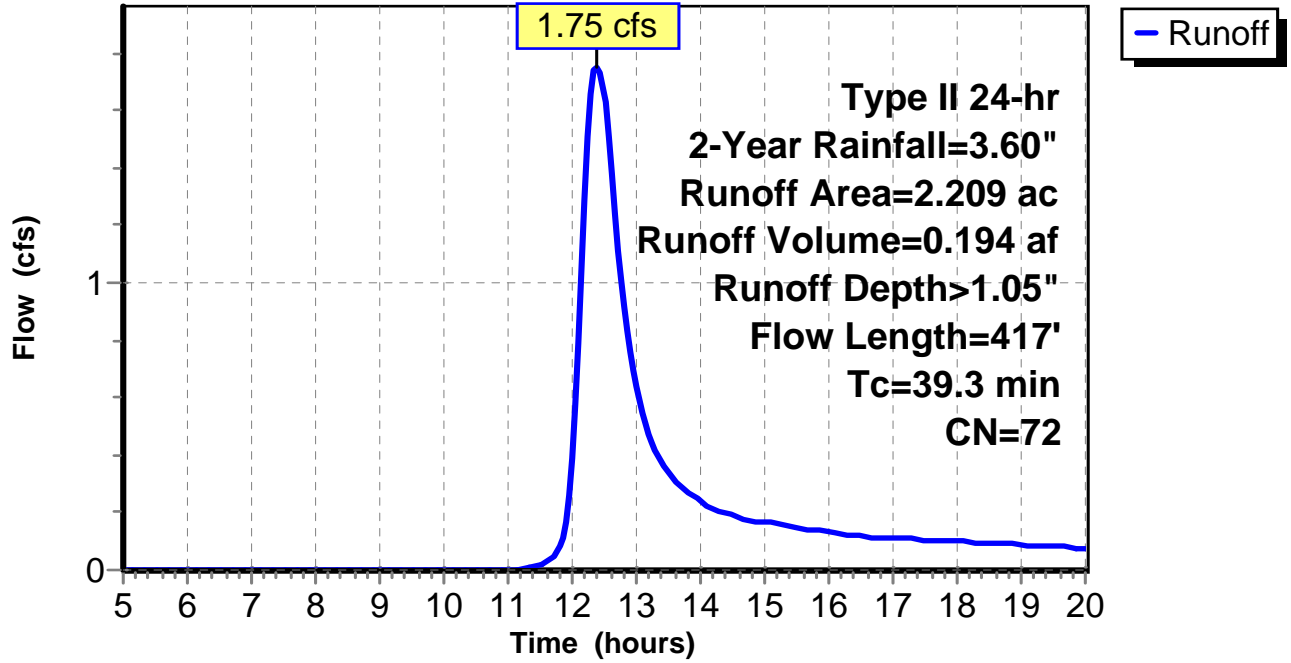
Subcatchment 1: C 33.001

Hydrograph



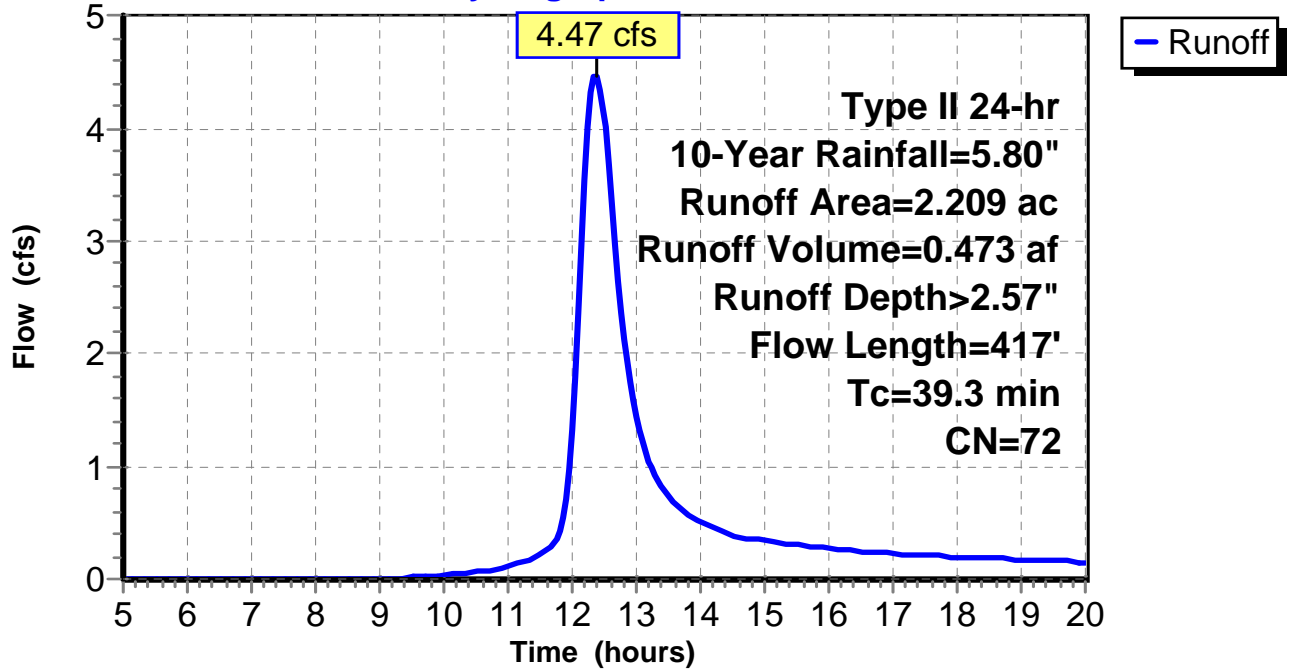
Subcatchment 1: C 33.001

Hydrograph



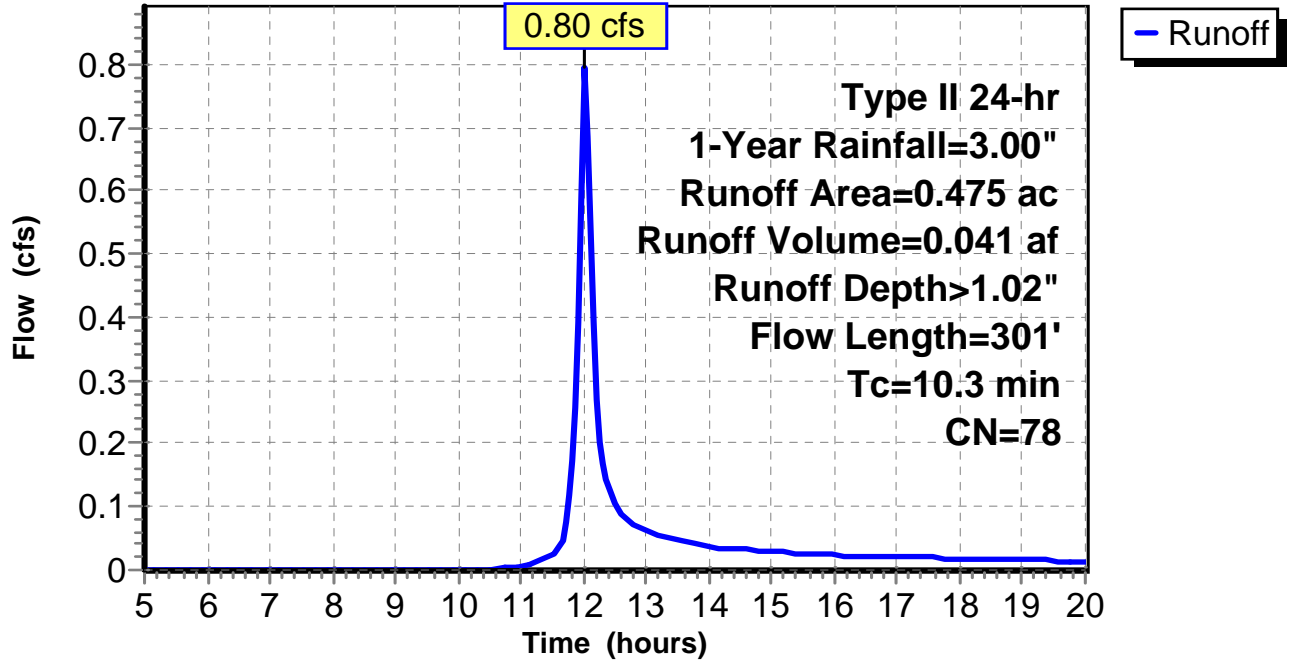
Subcatchment 1: C 33.001

Hydrograph



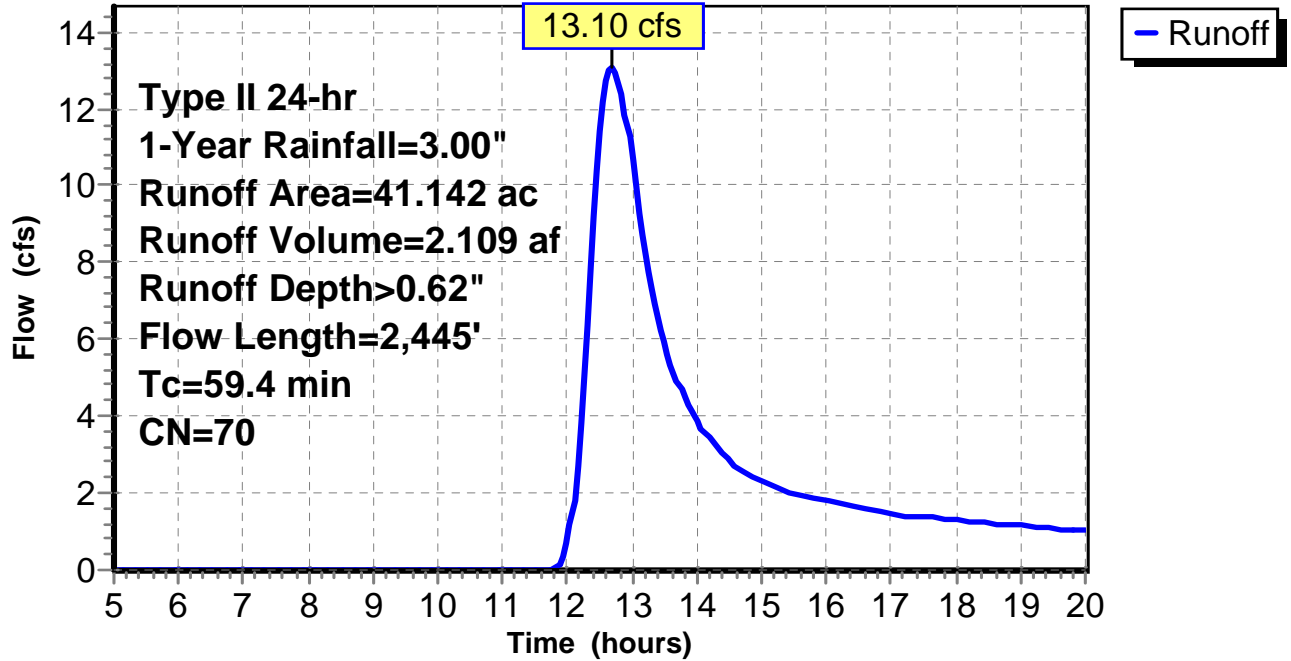
Subcatchment 1: C 34.001

Hydrograph



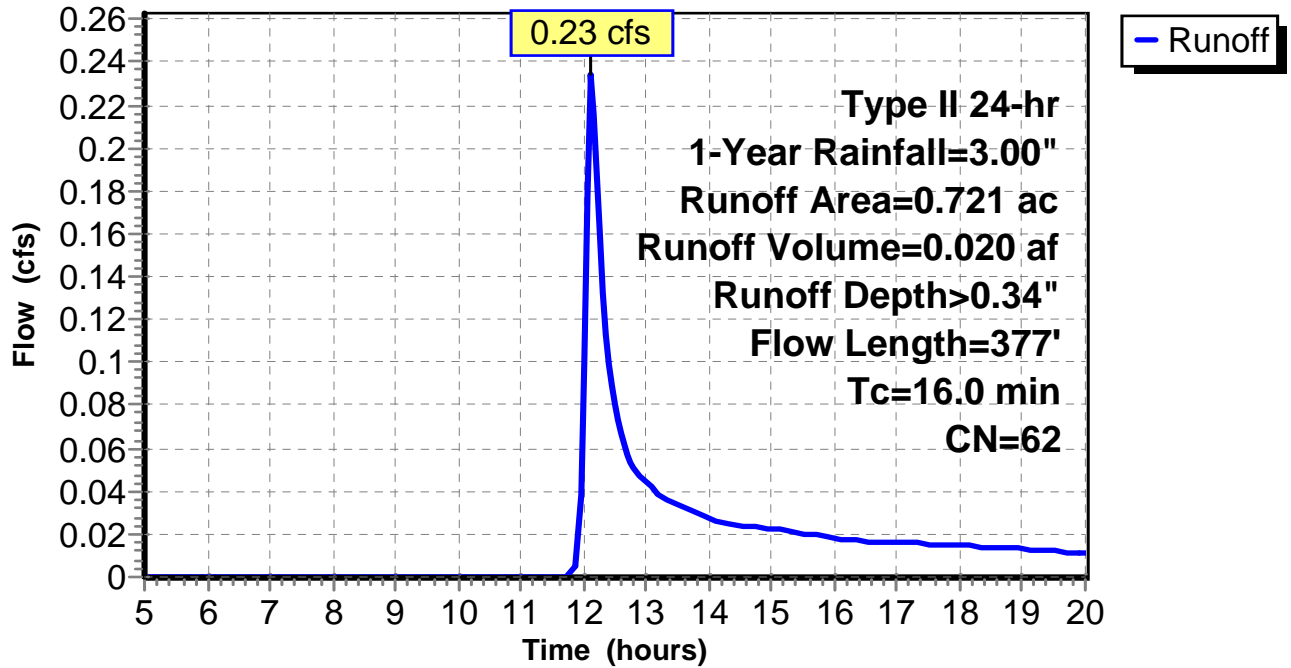
Subcatchment 2: C 34.002

Hydrograph



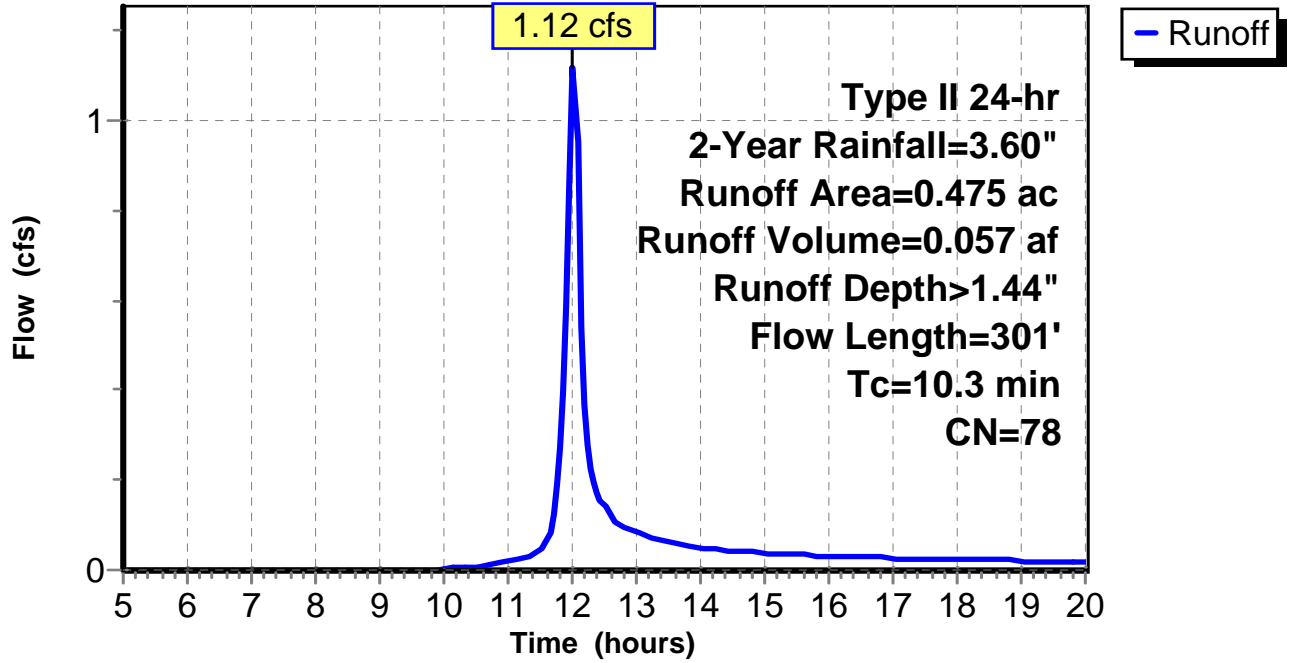
Subcatchment 3: C 34.003

Hydrograph



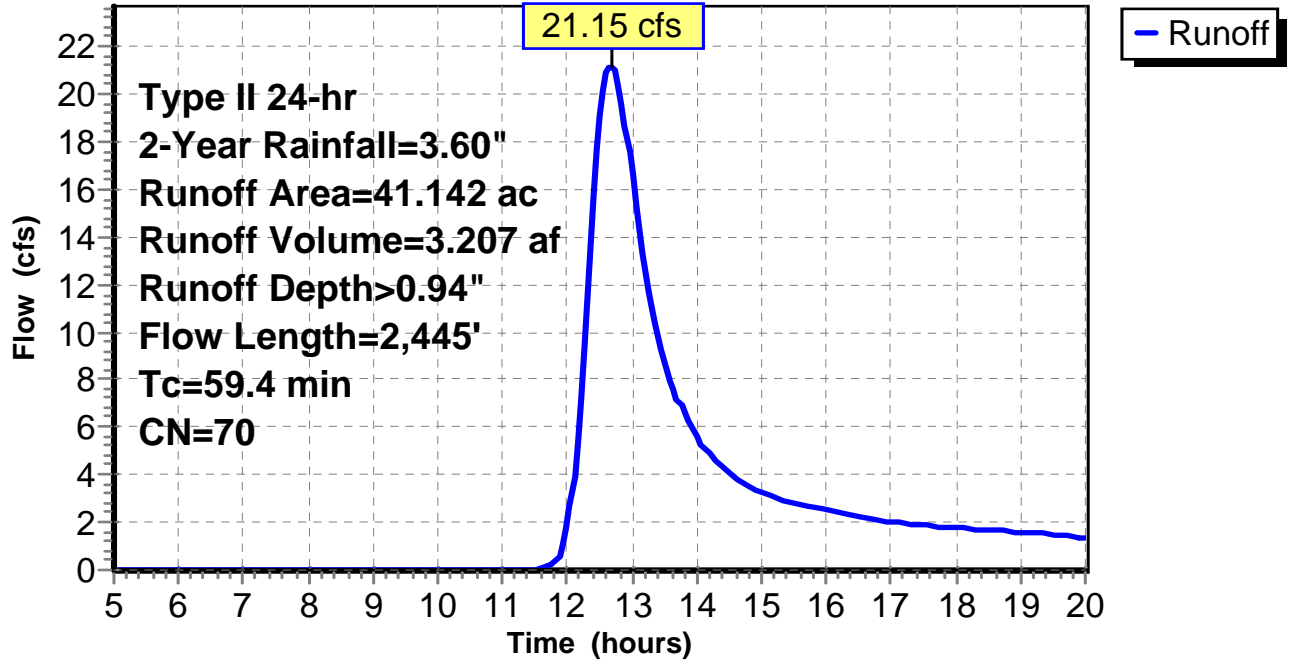
Subcatchment 1: C 34.001

Hydrograph



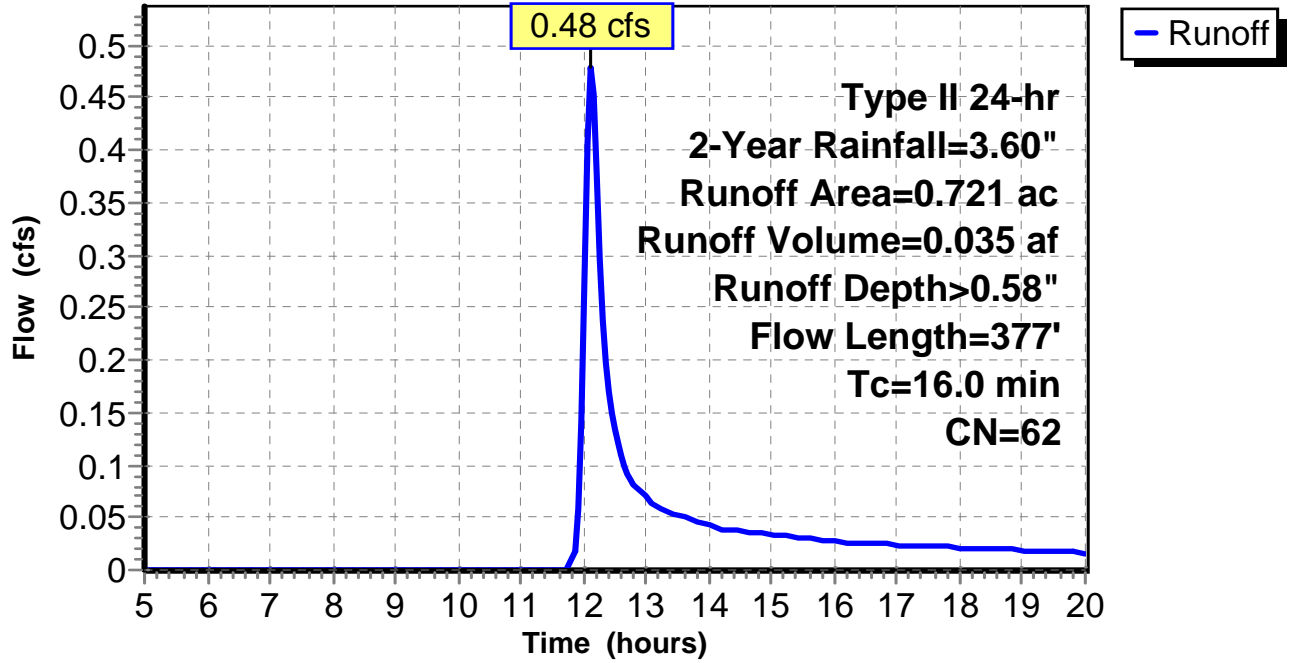
Subcatchment 2: C 34.002

Hydrograph



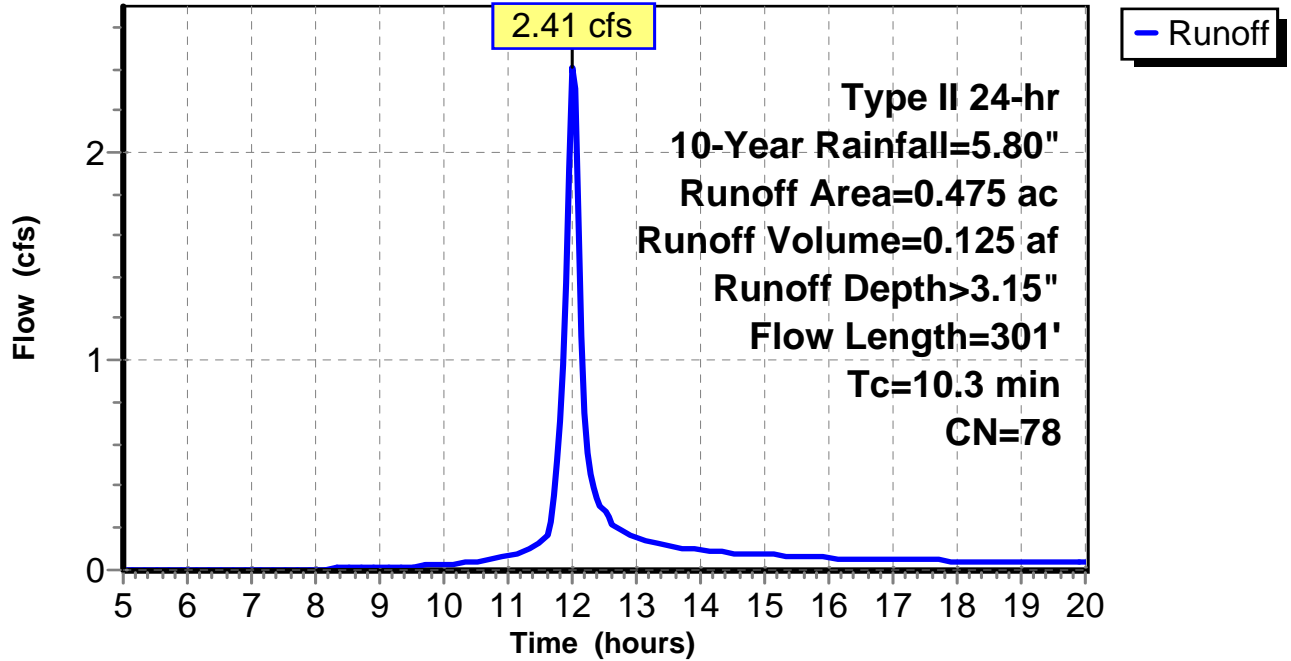
Subcatchment 3: C 34.003

Hydrograph



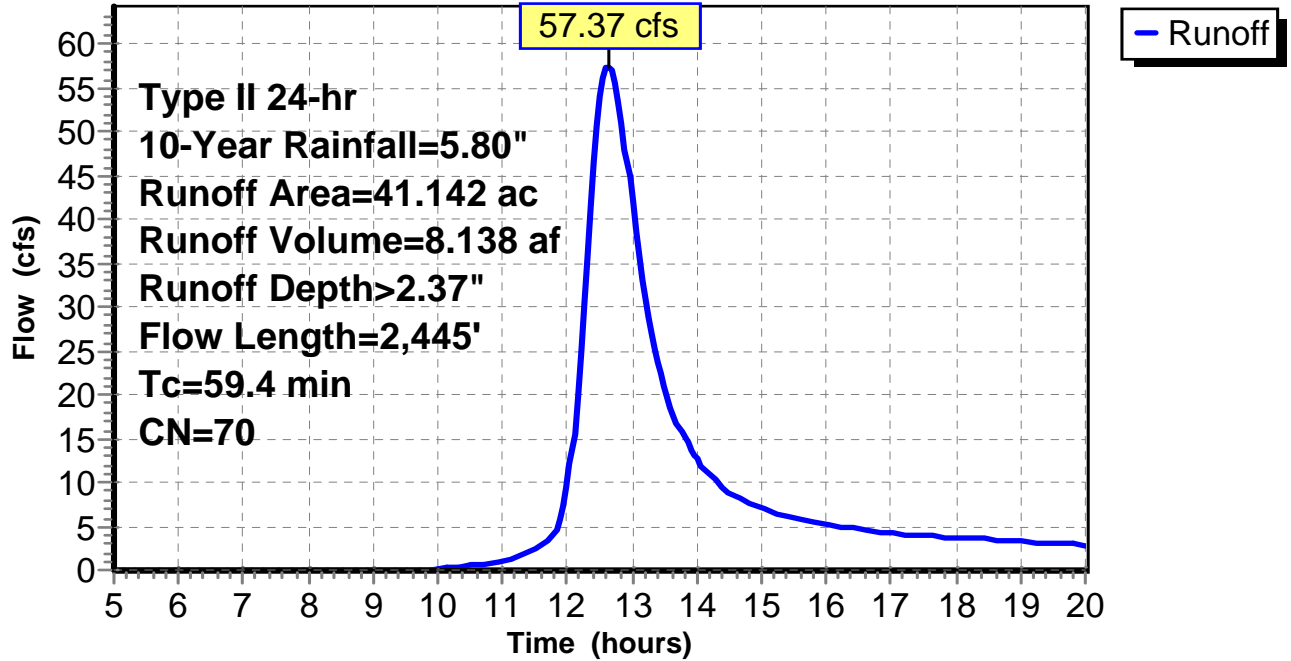
Subcatchment 1: C 34.001

Hydrograph



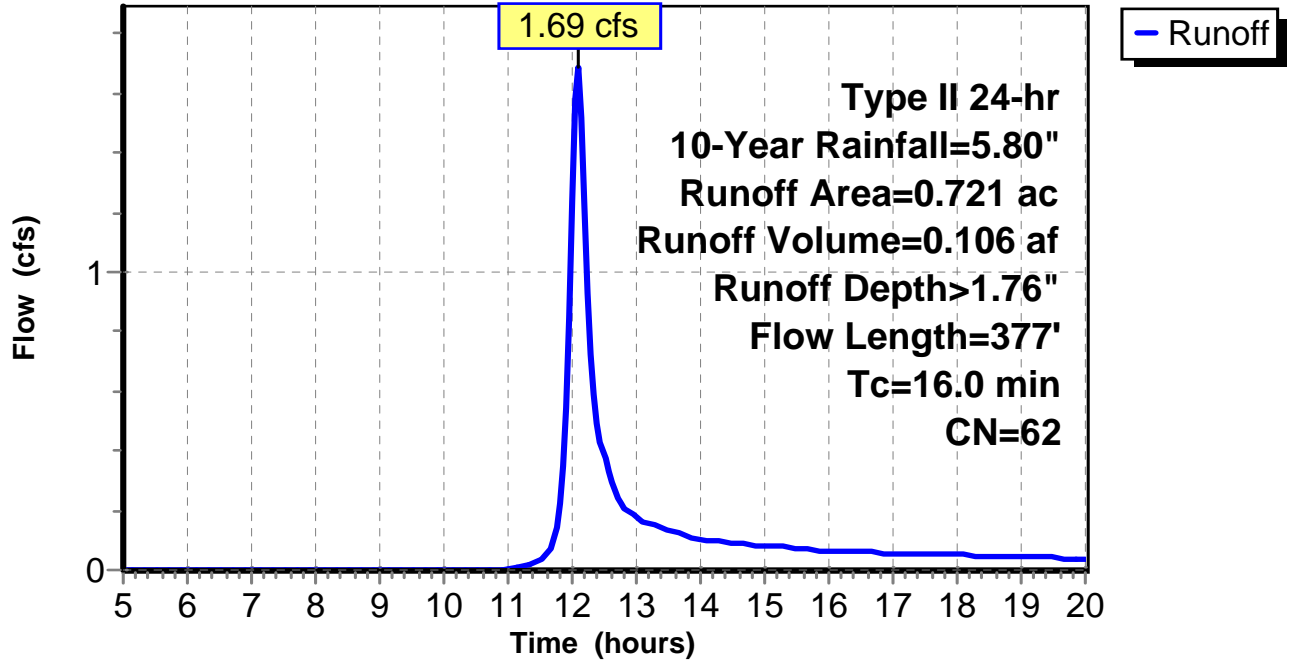
Subcatchment 2: C 34.002

Hydrograph



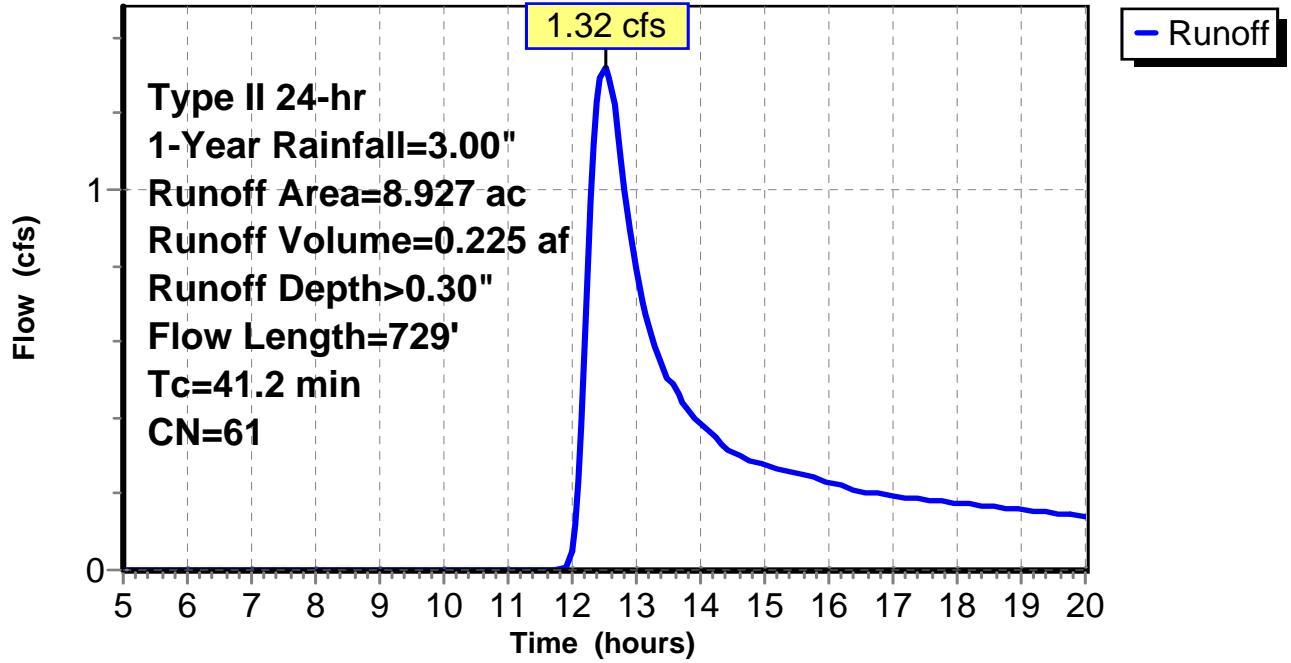
Subcatchment 3: C 34.003

Hydrograph



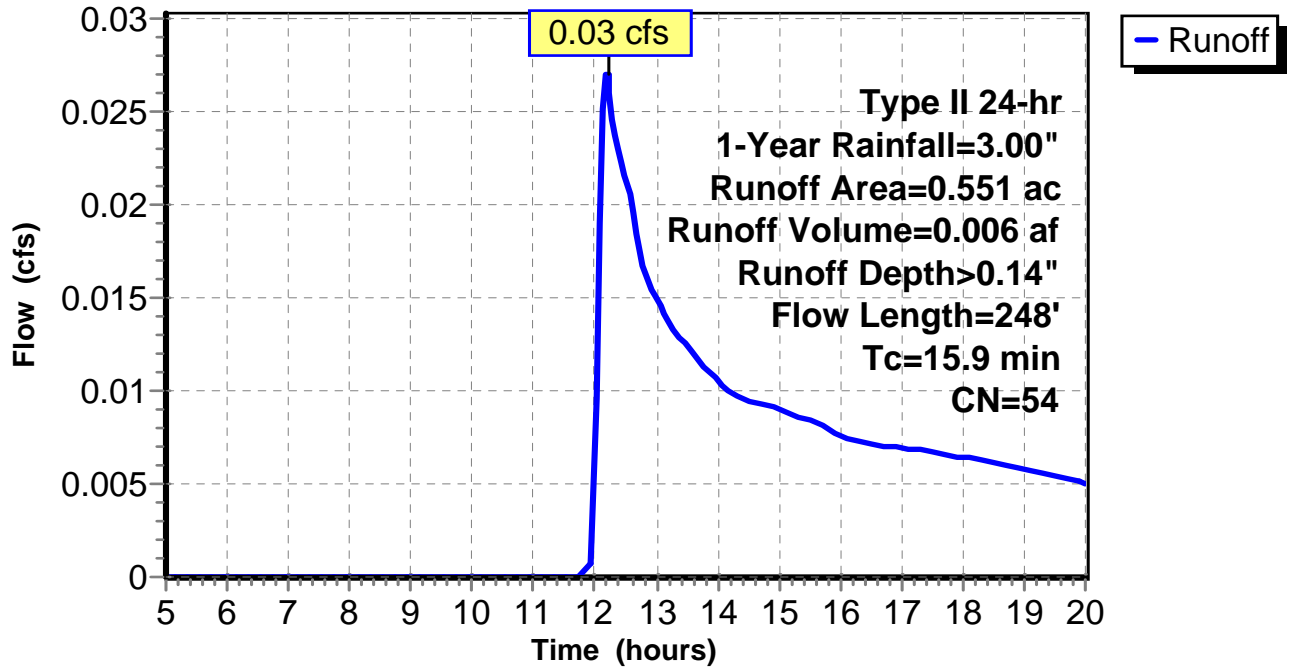
Subcatchment 1: C 41.001

Hydrograph



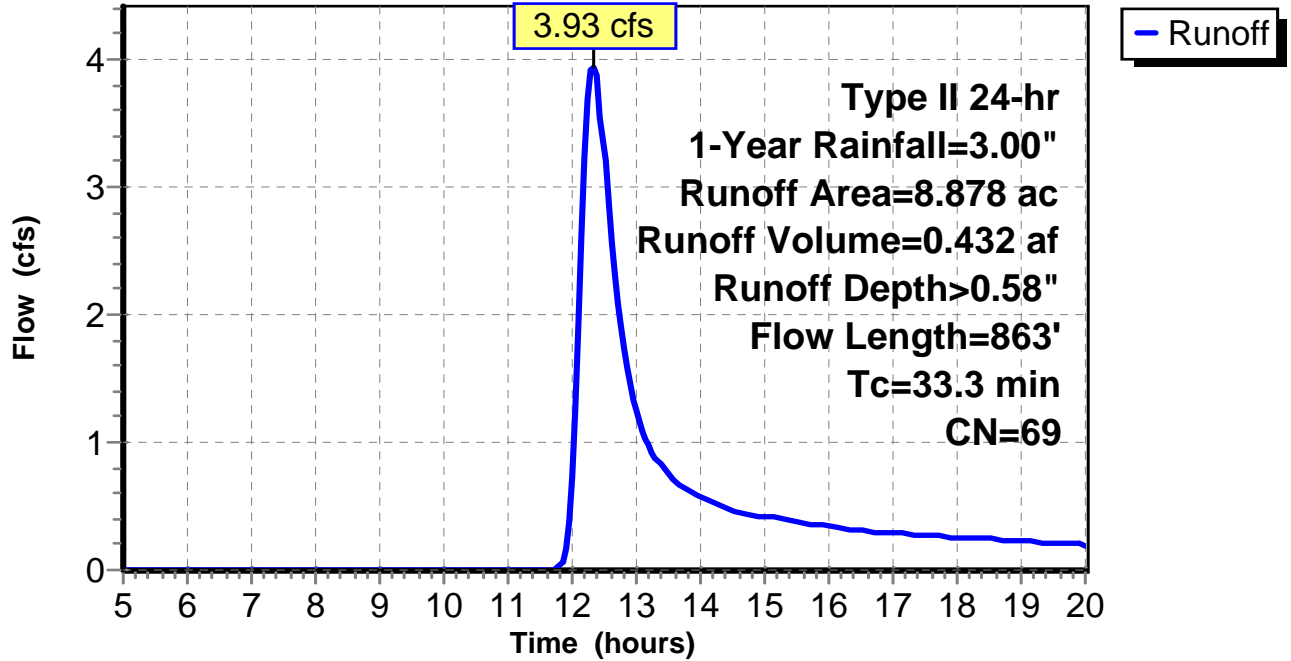
Subcatchment 2: C 41.002

Hydrograph



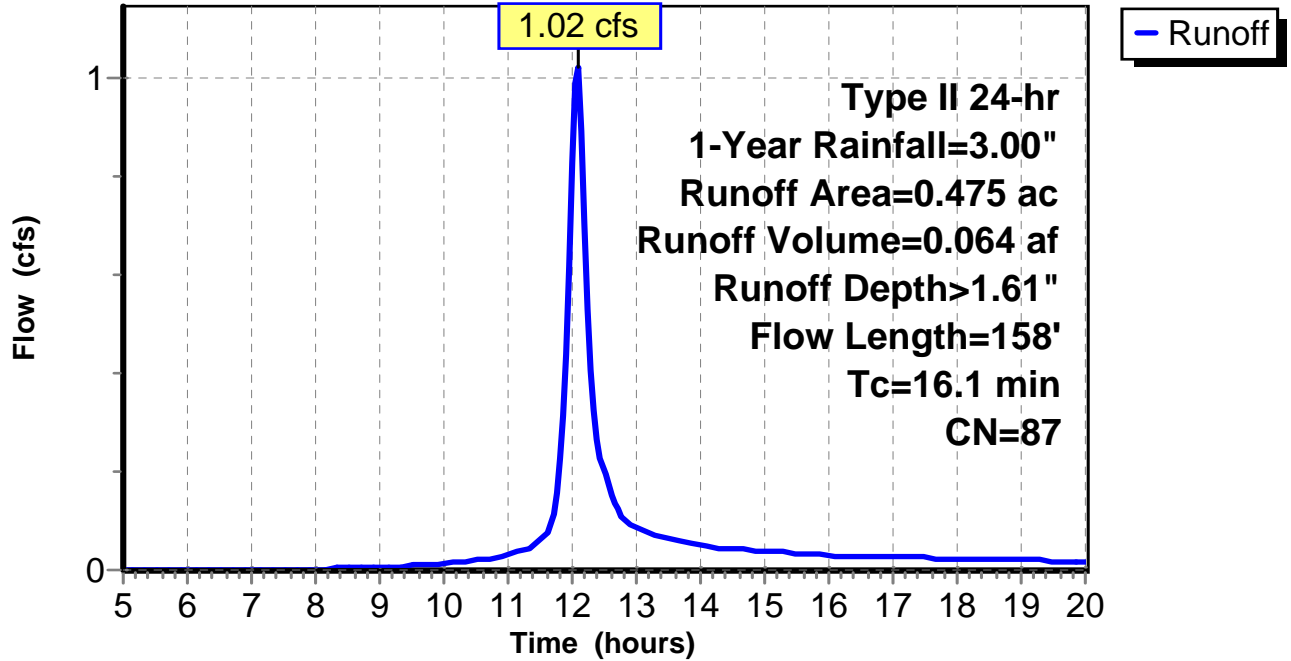
Subcatchment 3: C 41.003

Hydrograph



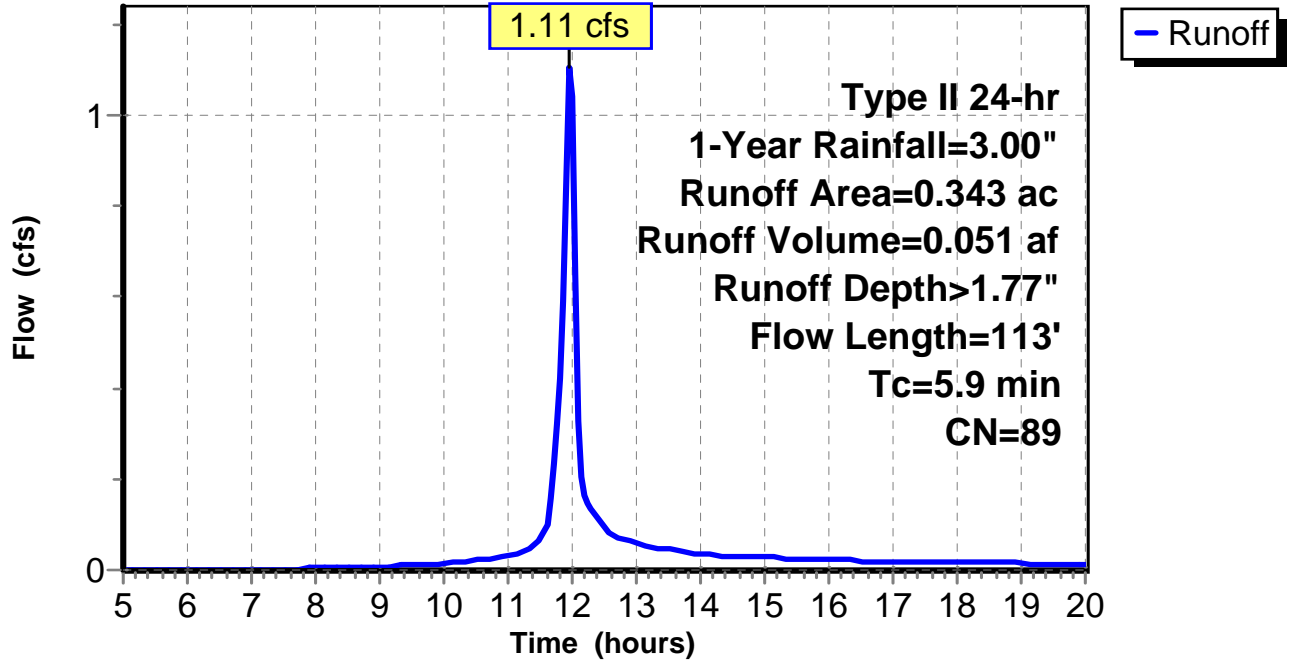
Subcatchment 4: C 42.001

Hydrograph



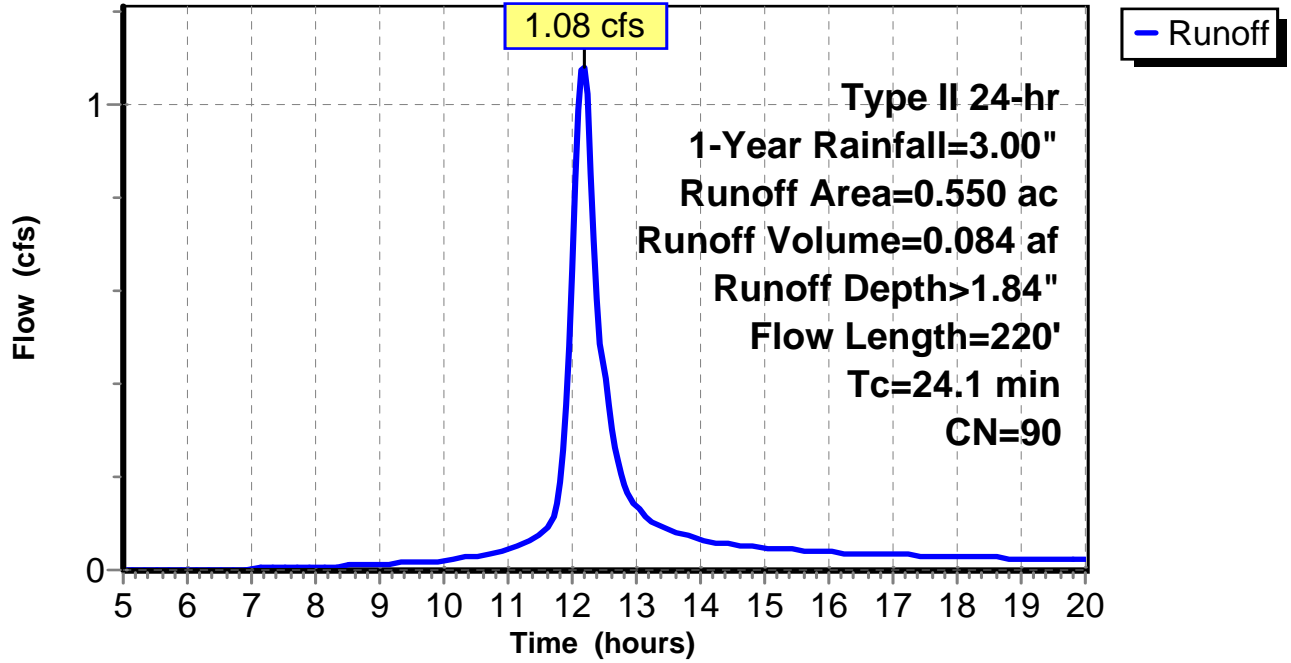
Subcatchment 5: C 42.002

Hydrograph



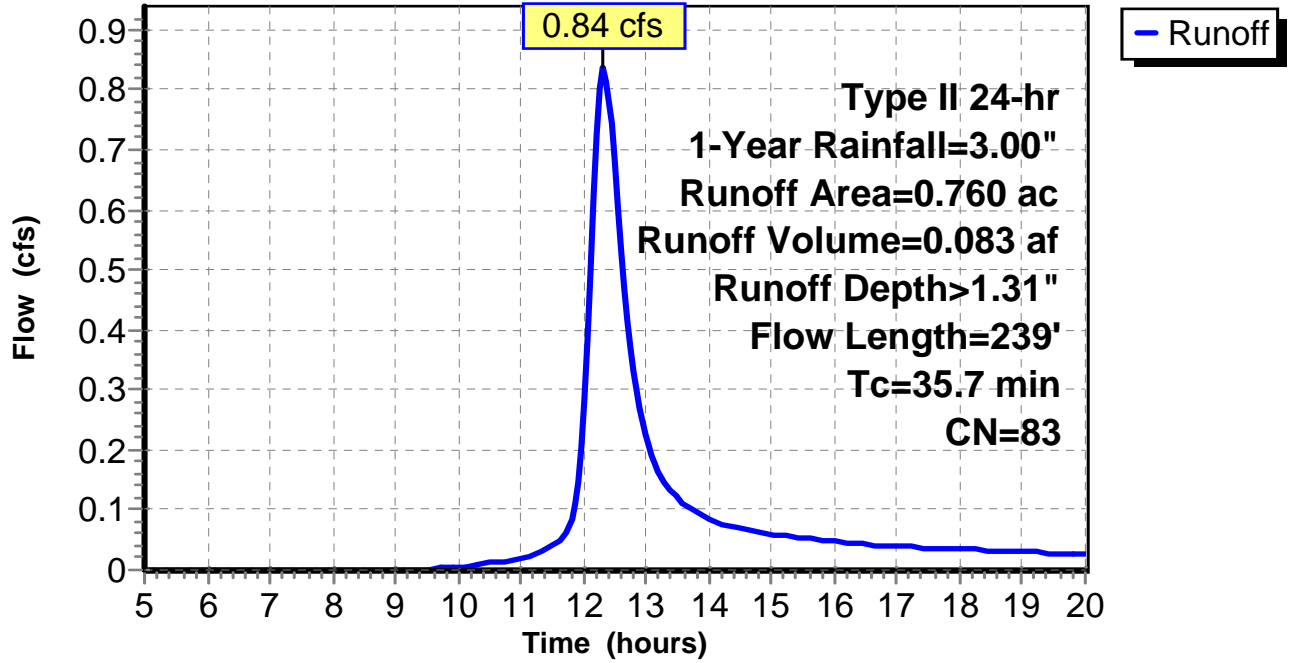
Subcatchment 6: C 42.003

Hydrograph



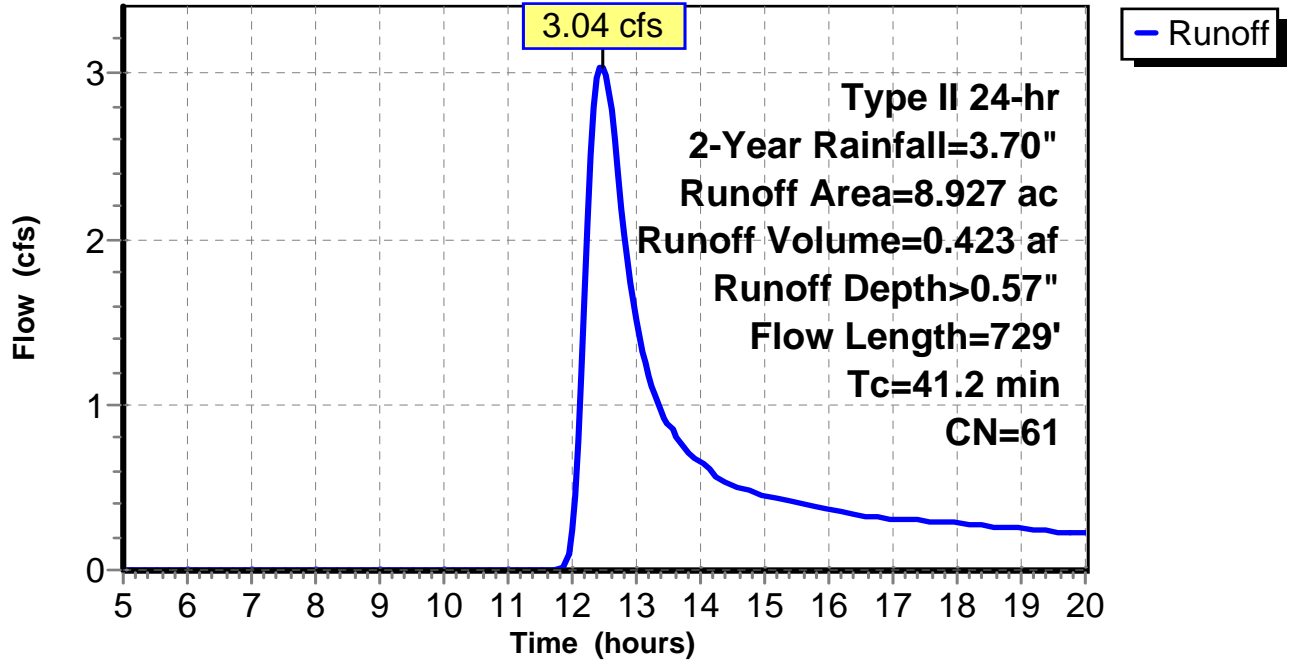
Subcatchment 7: C 42.004

Hydrograph



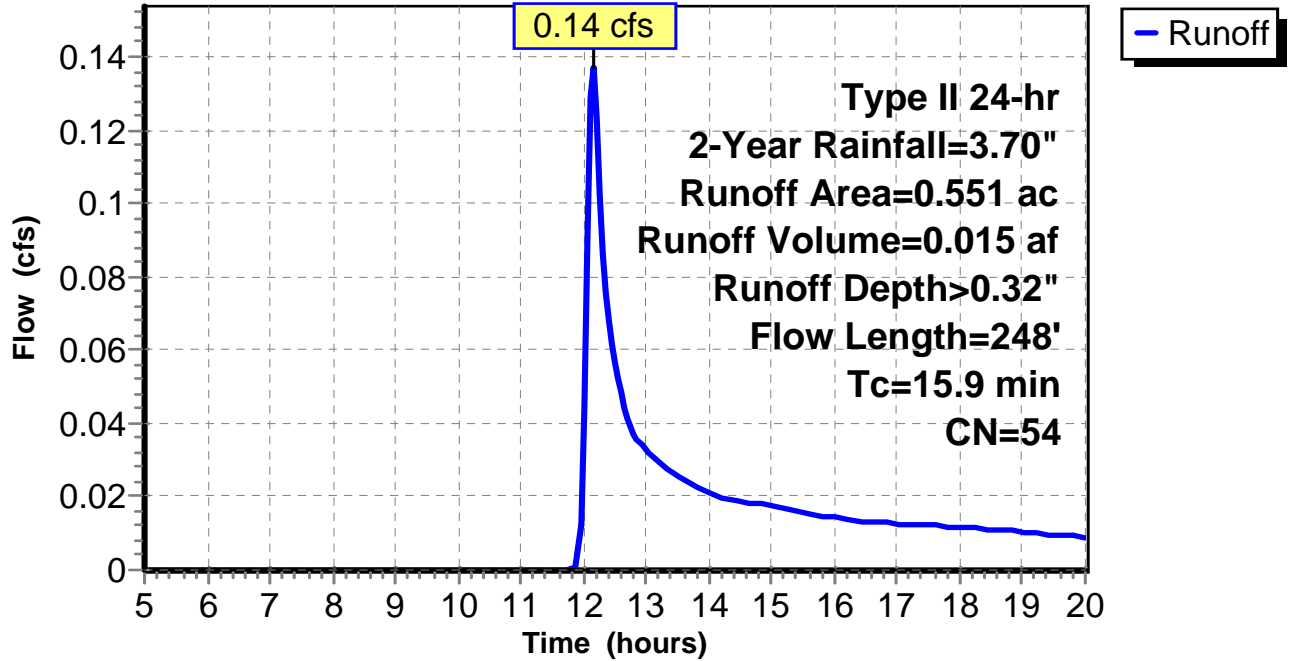
Subcatchment 1: C 41.001

Hydrograph



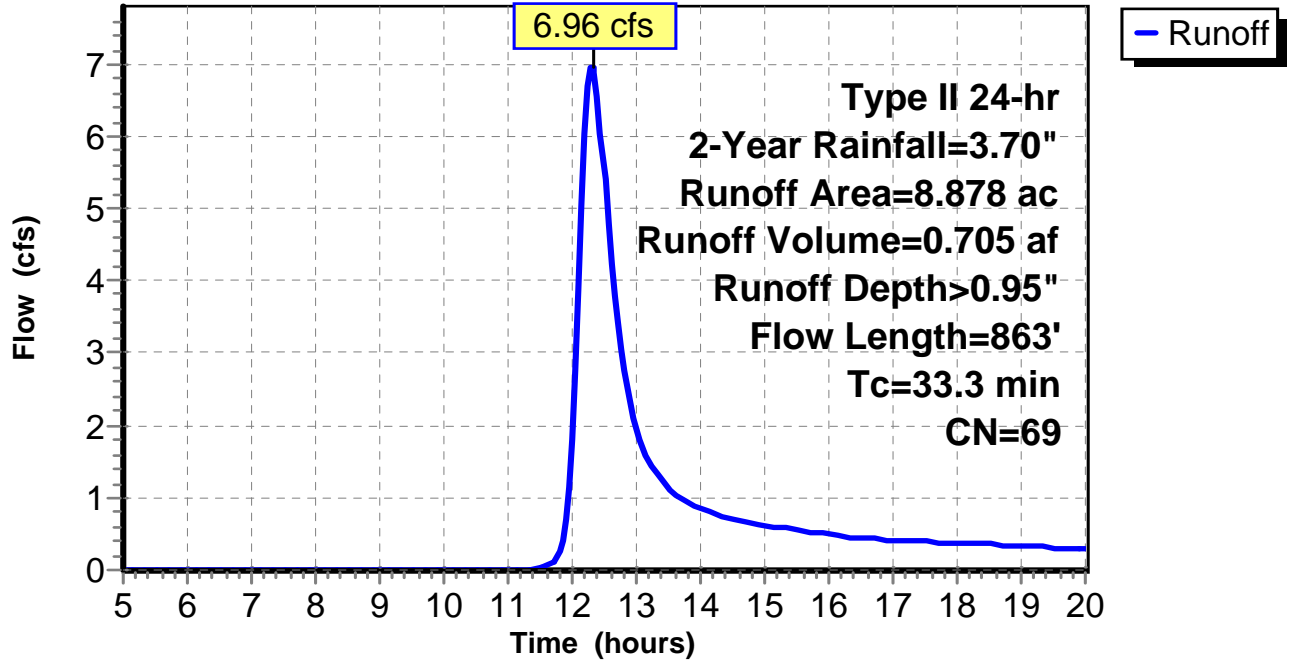
Subcatchment 2: C 41.002

Hydrograph



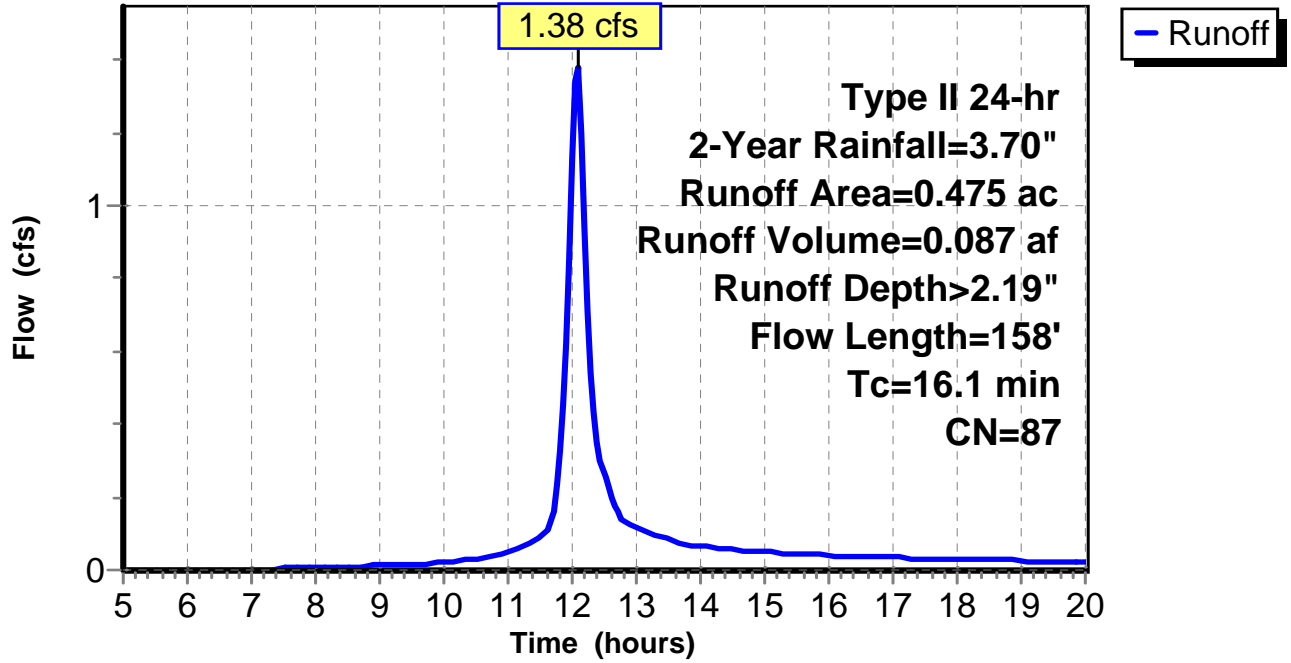
Subcatchment 3: C 41.003

Hydrograph



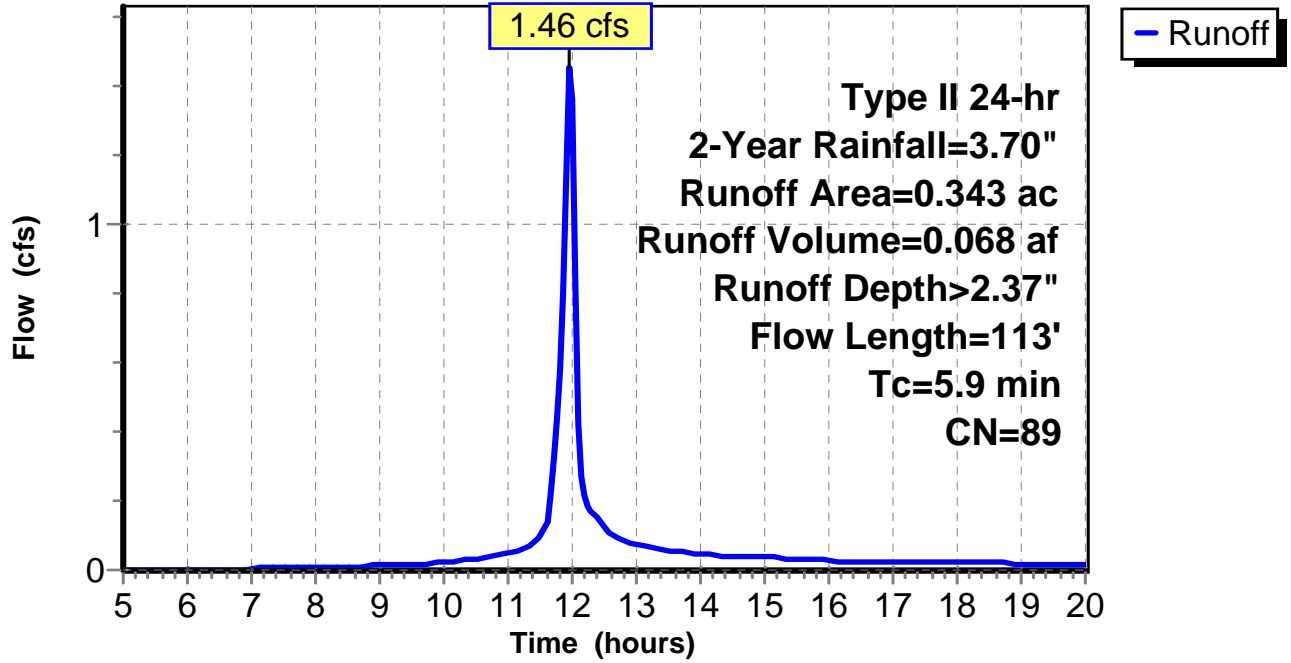
Subcatchment 4: C 42.001

Hydrograph



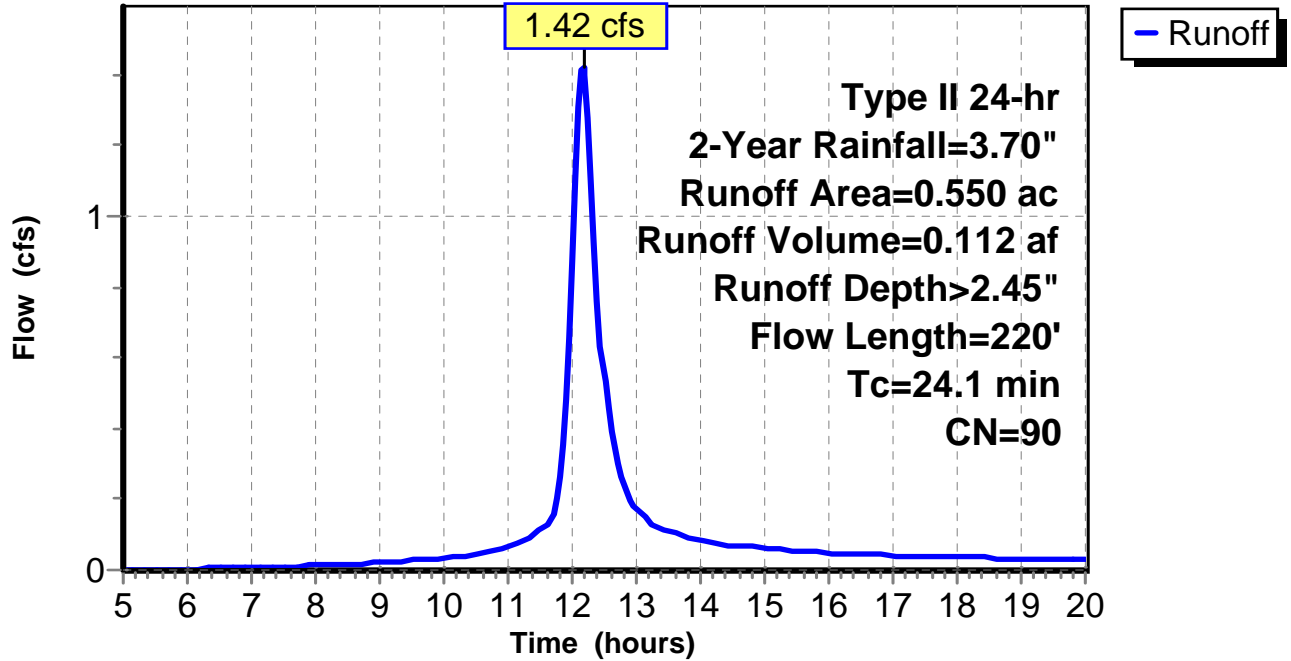
Subcatchment 5: C 42.002

Hydrograph



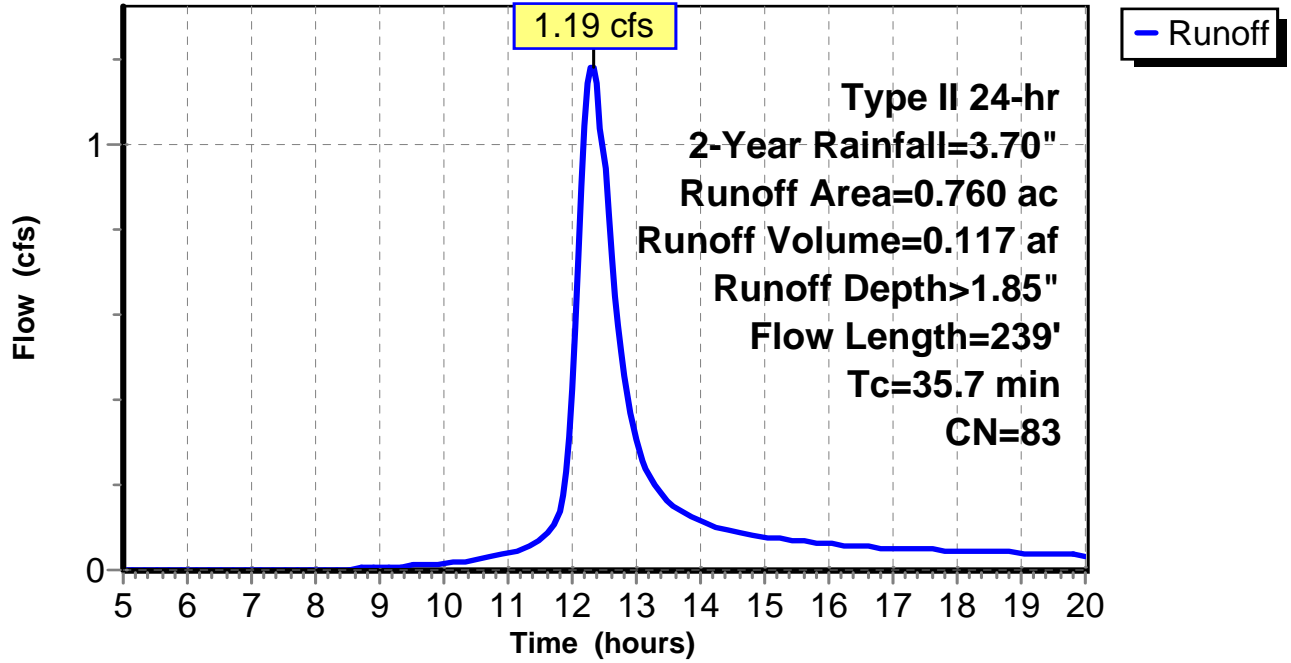
Subcatchment 6: C 42.003

Hydrograph



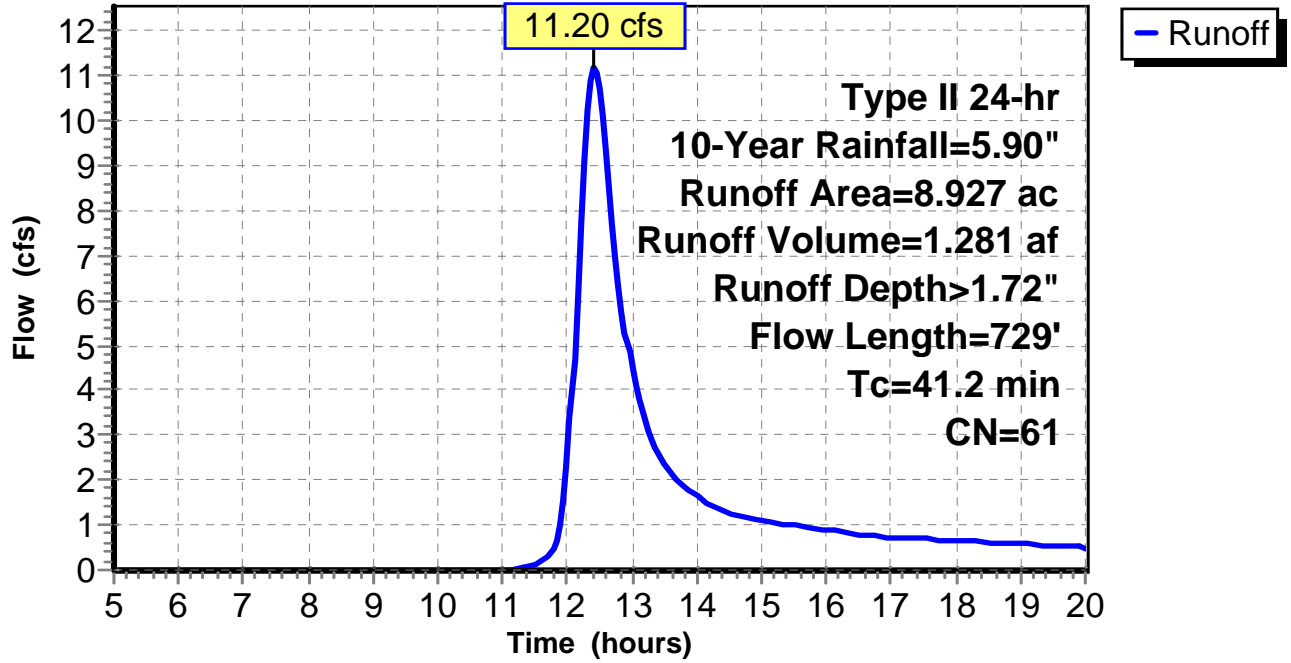
Subcatchment 7: C 42.004

Hydrograph



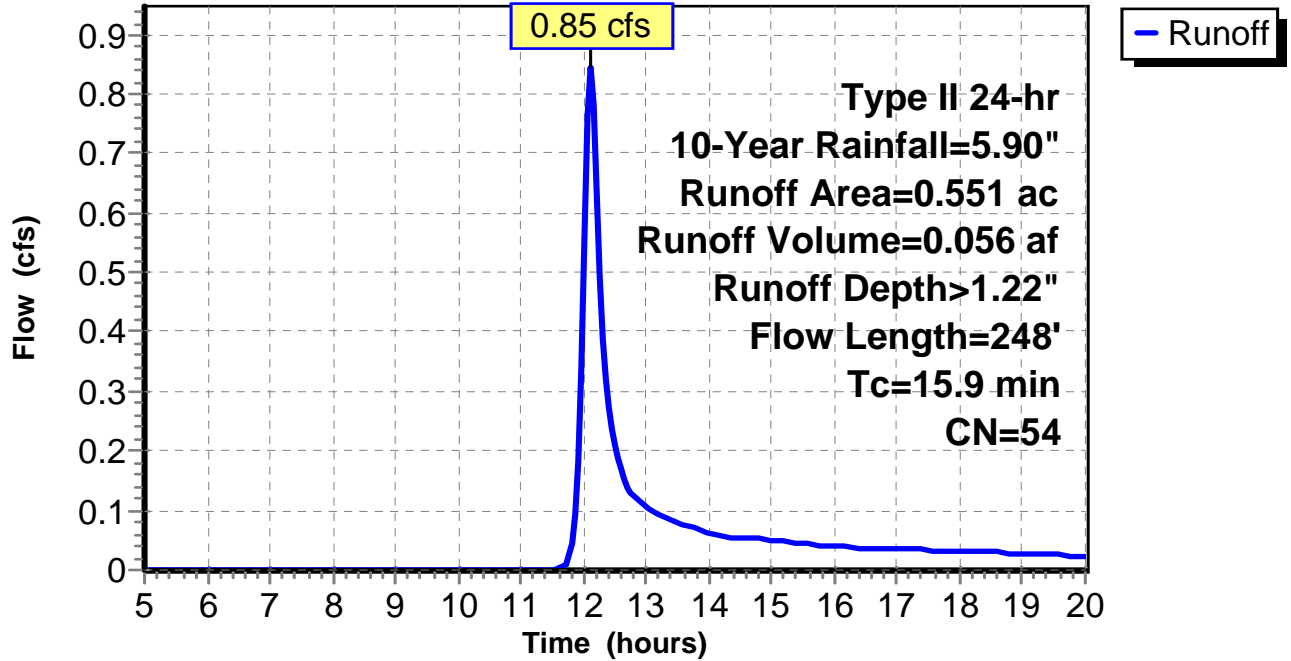
Subcatchment 1: C 41.001

Hydrograph



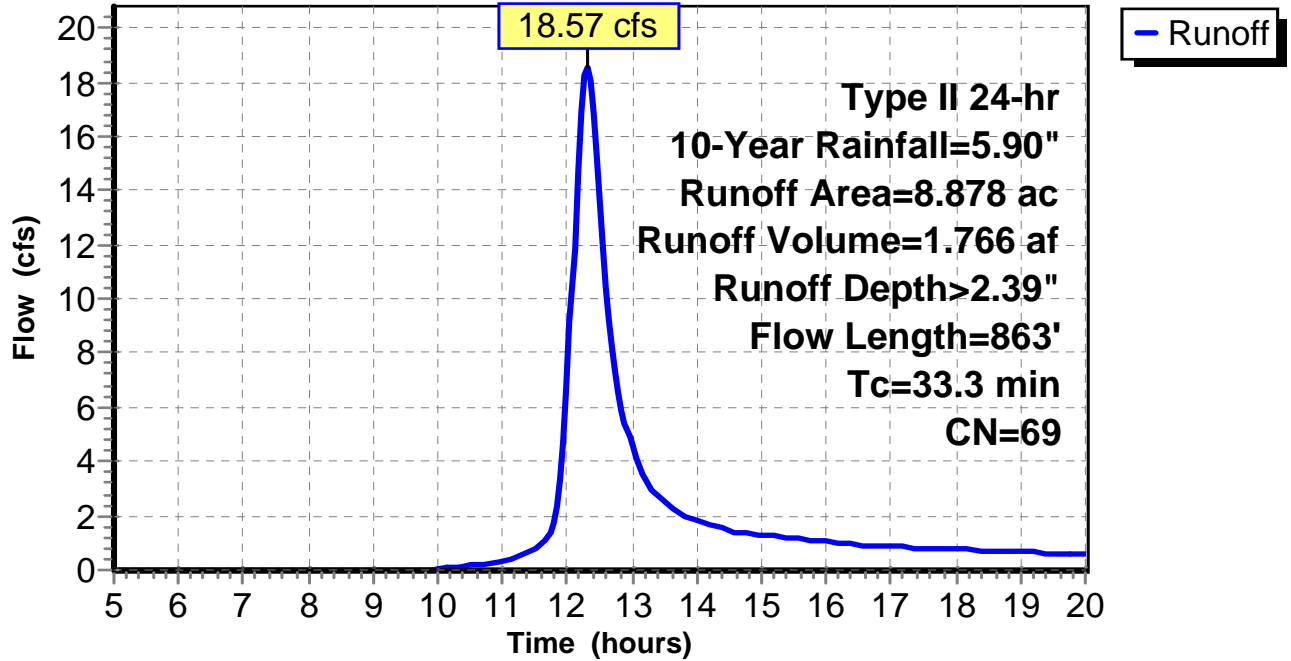
Subcatchment 2: C 41.002

Hydrograph



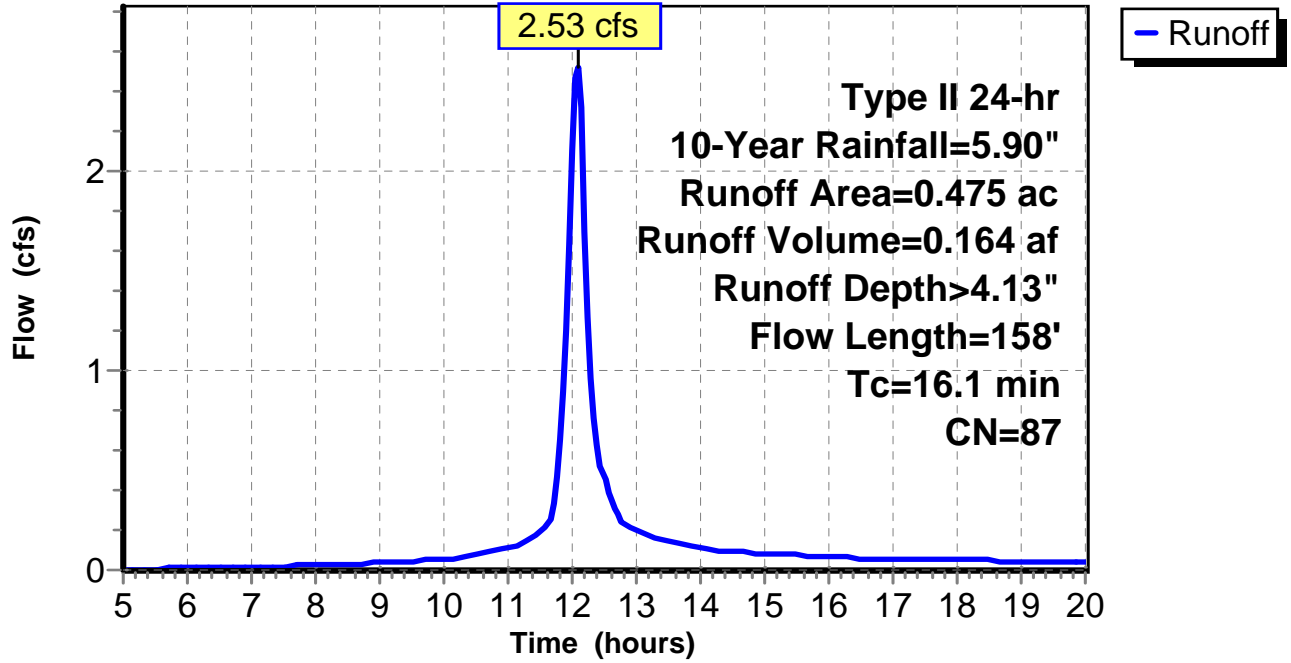
Subcatchment 3: C 41.003

Hydrograph



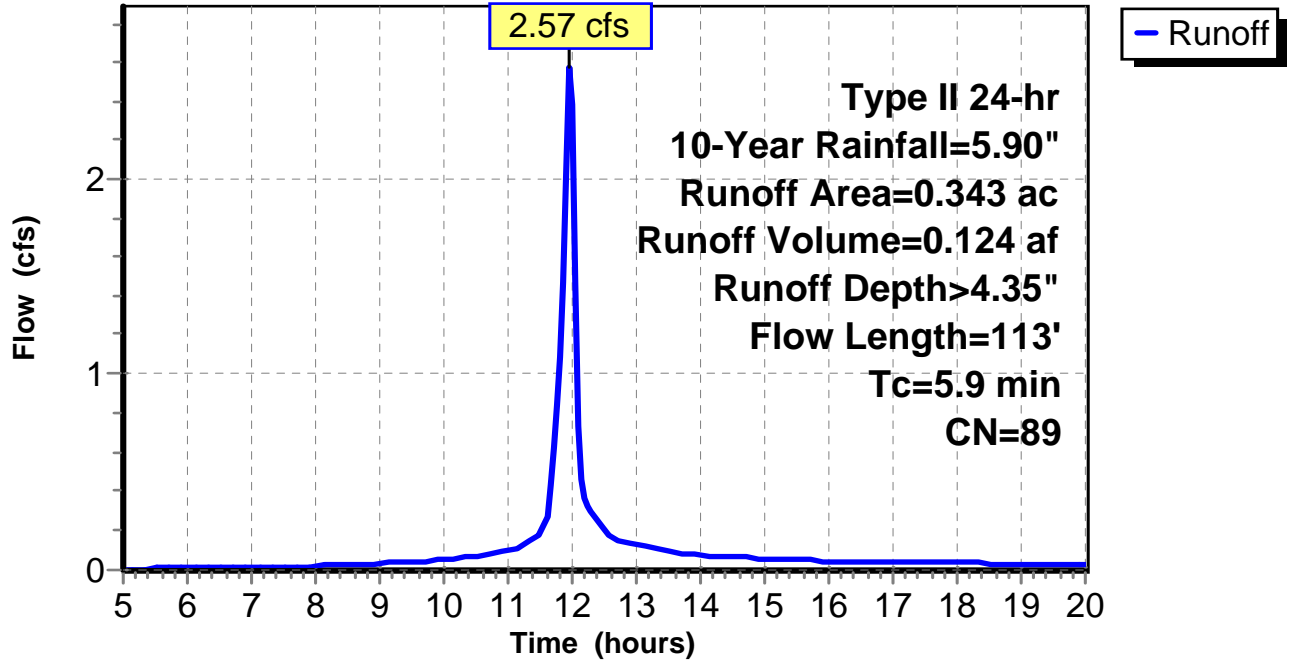
Subcatchment 4: C 42.001

Hydrograph



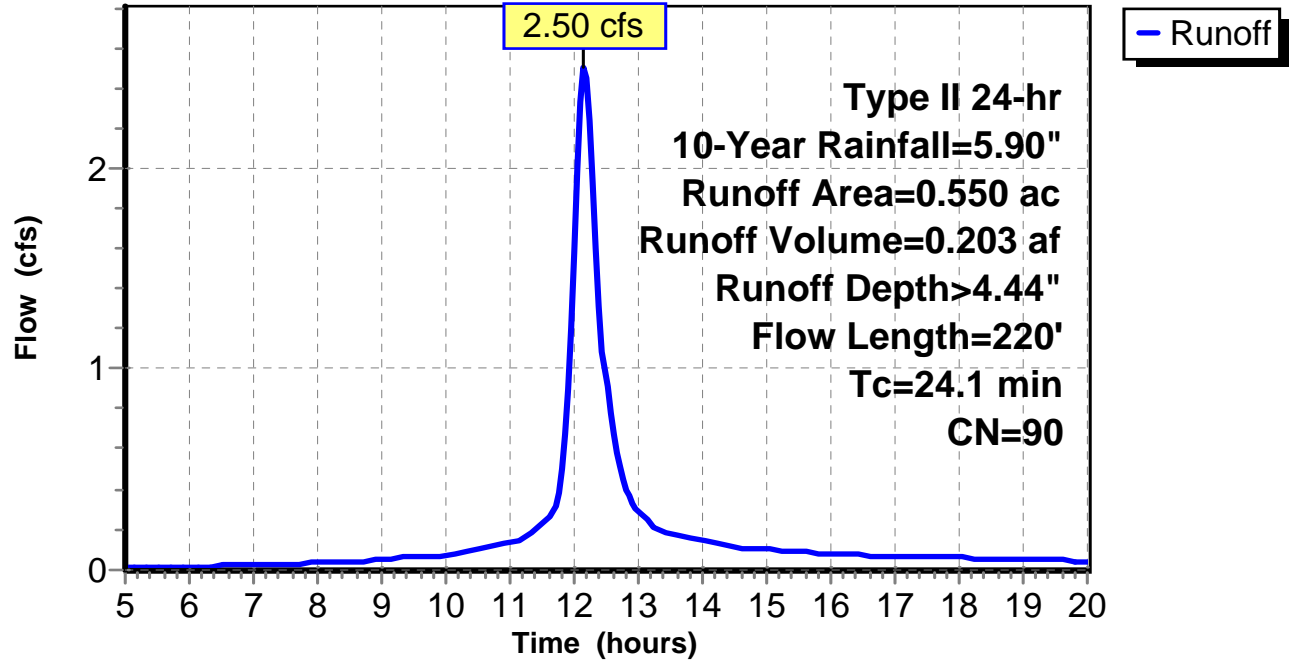
Subcatchment 5: C 42.002

Hydrograph



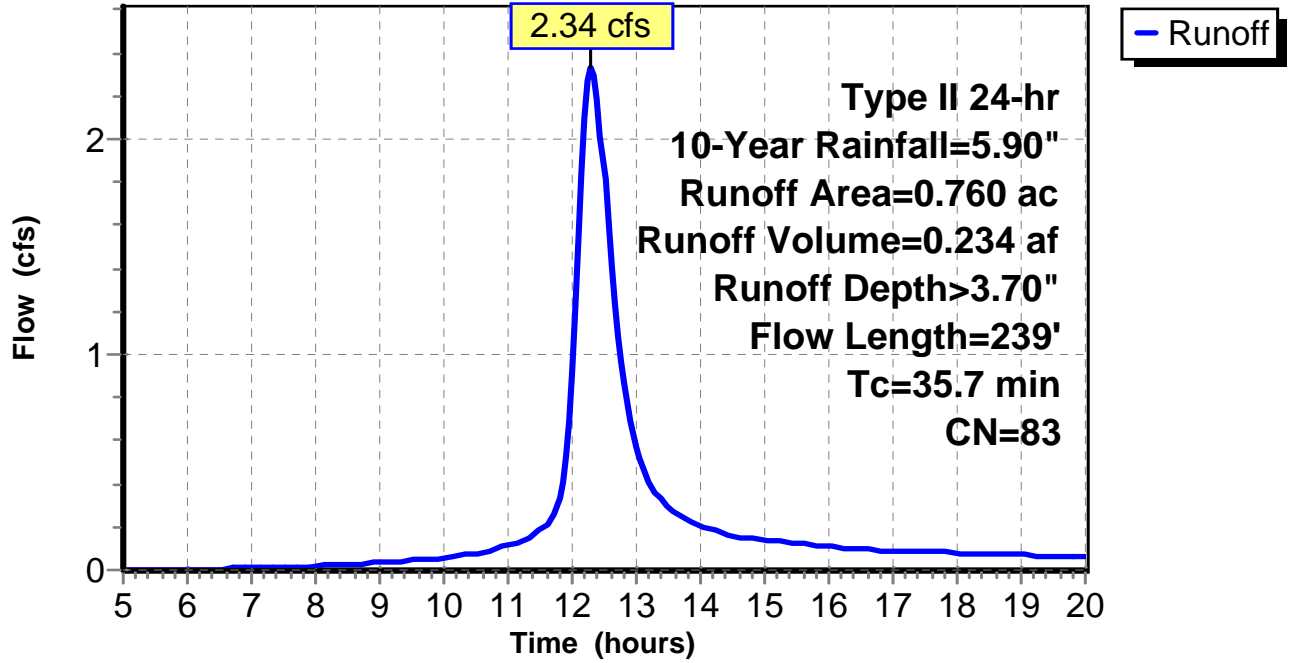
Subcatchment 6: C 42.003

Hydrograph



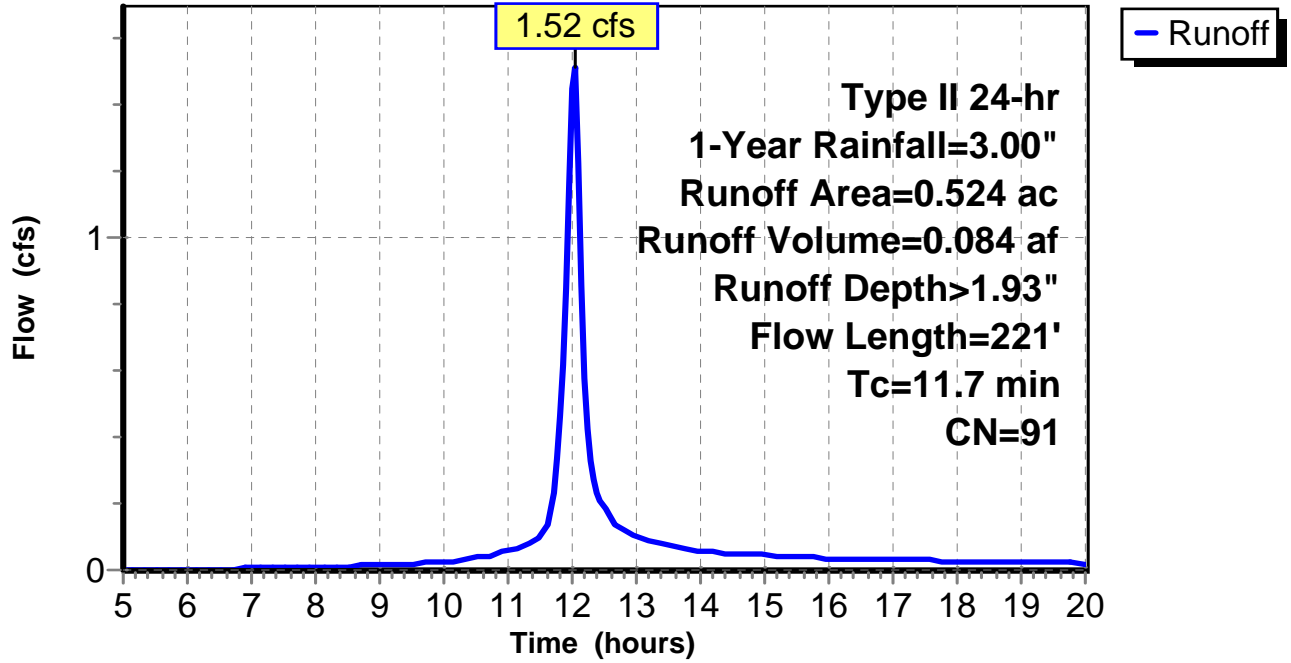
Subcatchment 7: C 42.004

Hydrograph



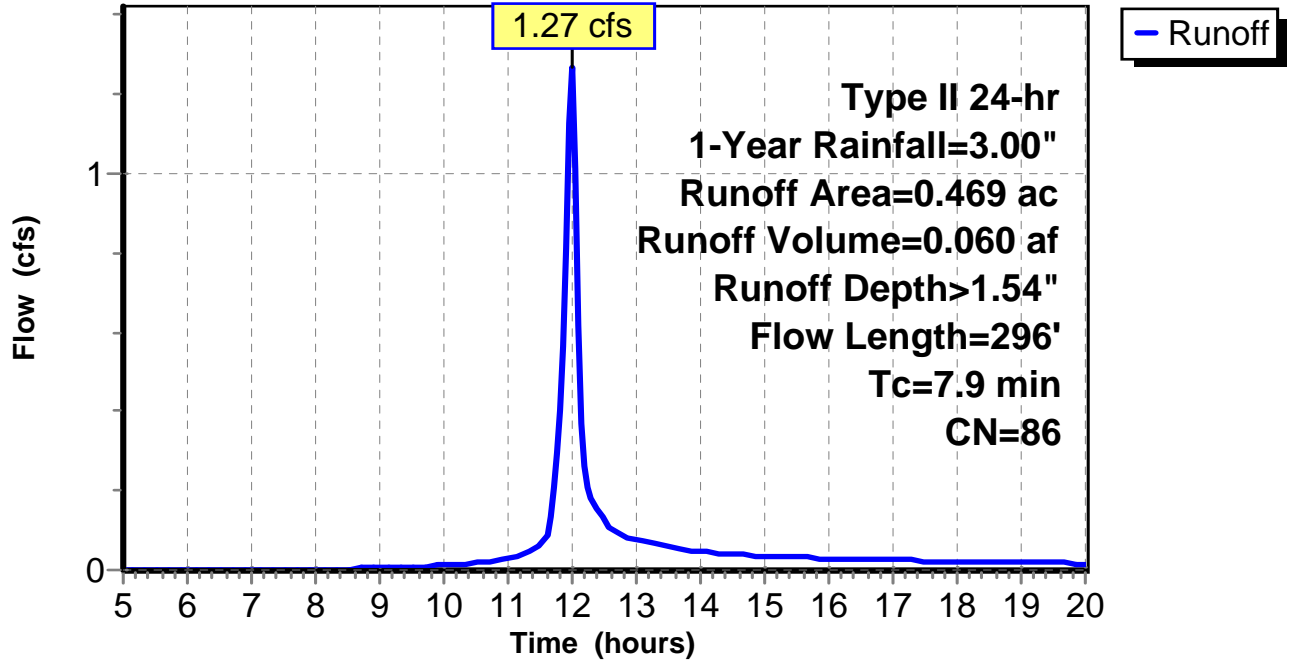
Subcatchment 1: C 66.001

Hydrograph



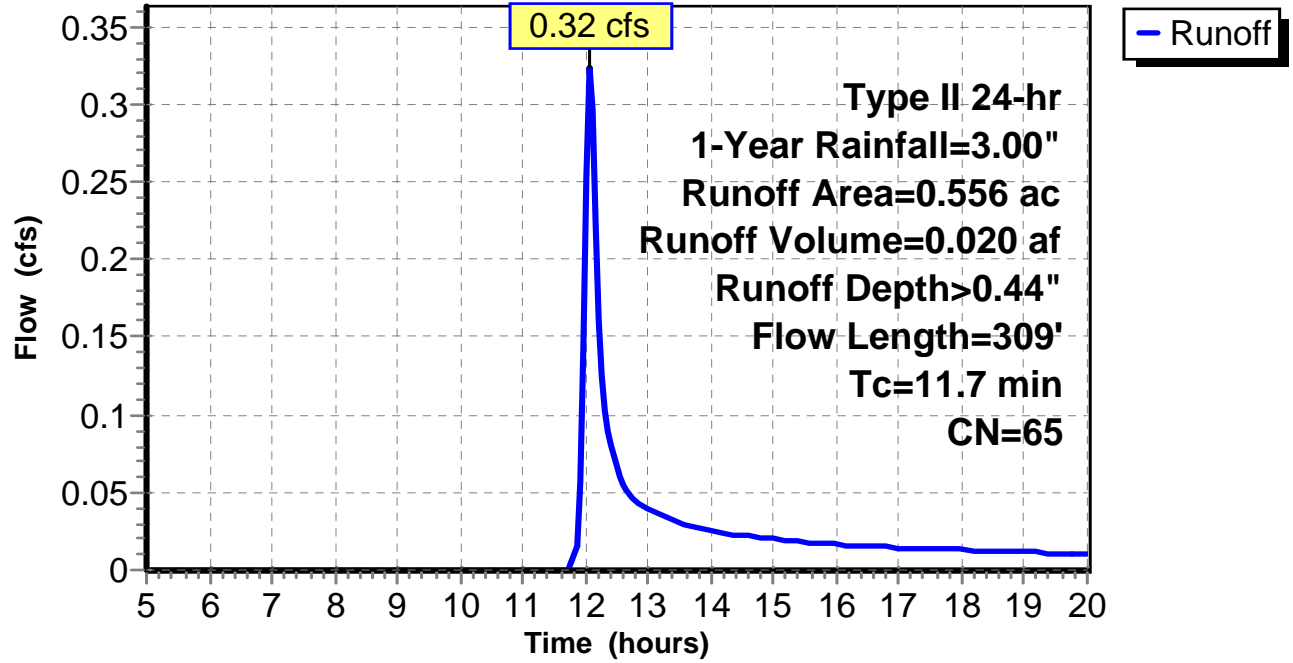
Subcatchment 2: C 66.002

Hydrograph



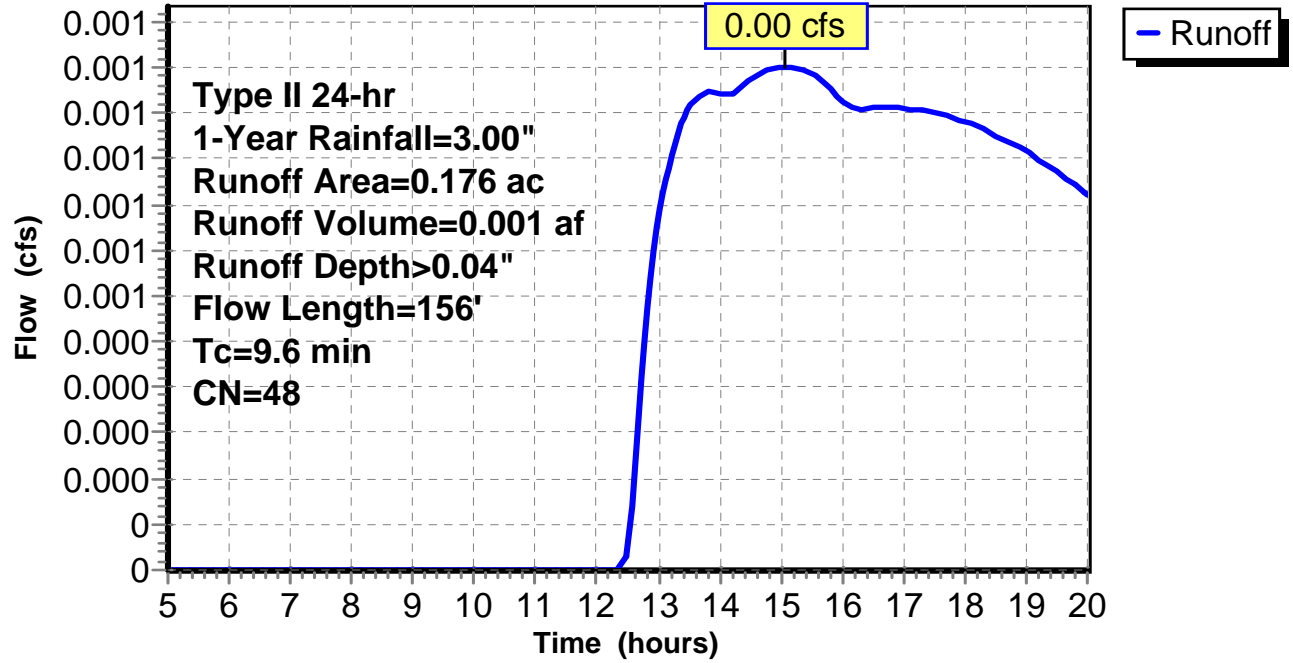
Subcatchment 3: C 66.003

Hydrograph



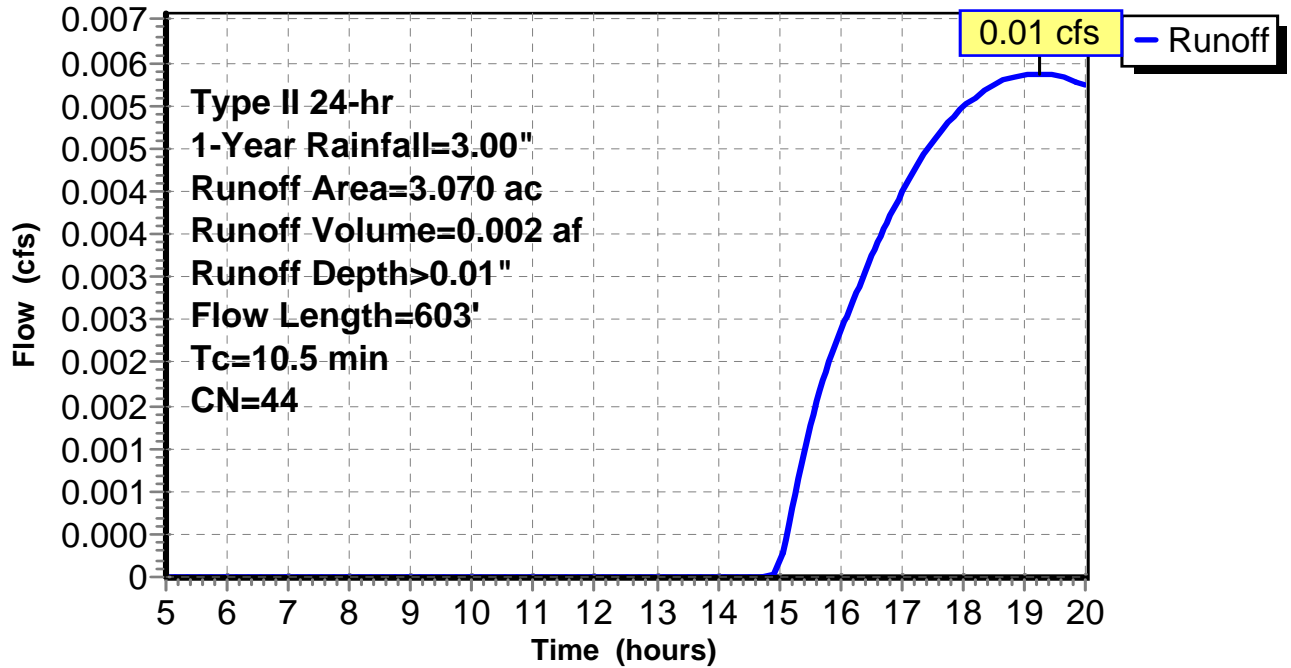
Subcatchment 4: C 66.004

Hydrograph



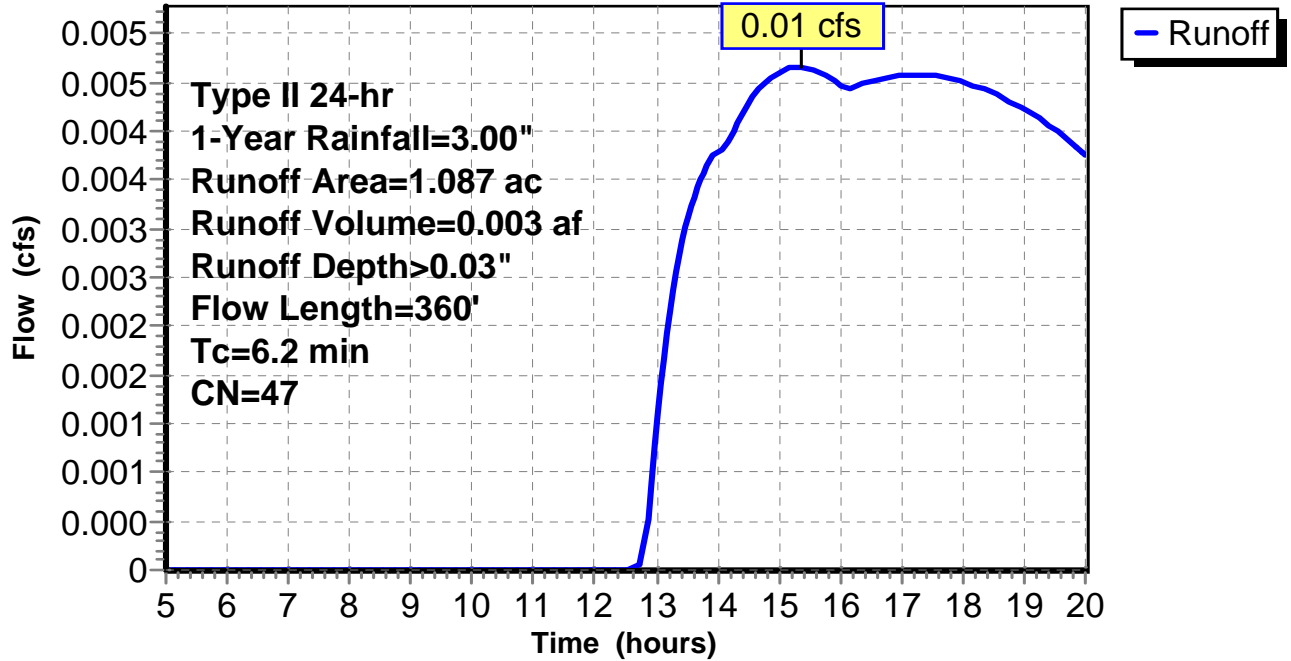
Subcatchment 5: C AR102.047

Hydrograph



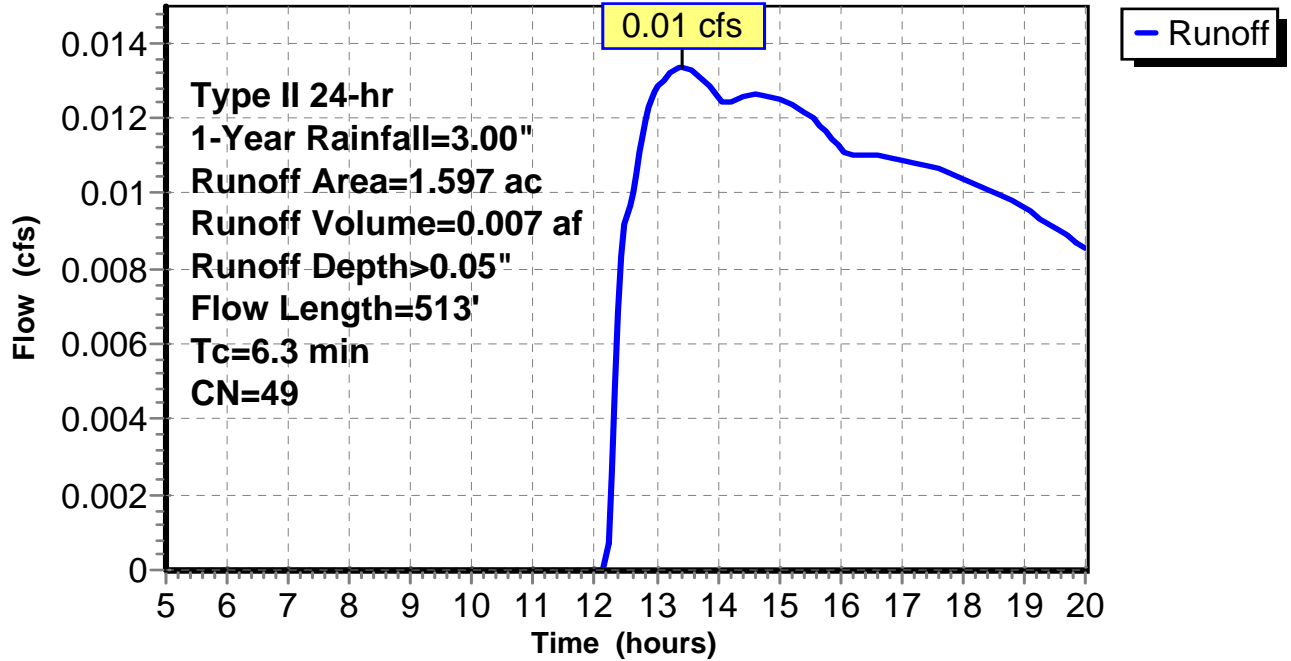
Subcatchment 6: C AR102.048

Hydrograph



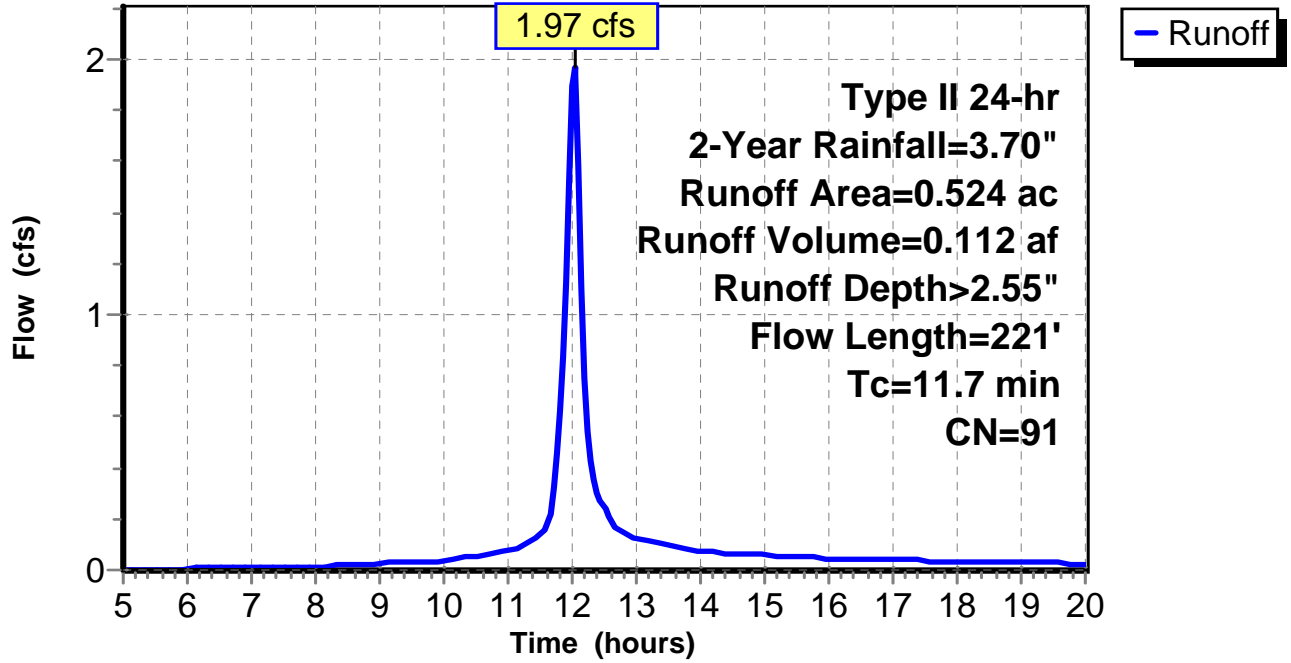
Subcatchment 7: C AR102.049

Hydrograph



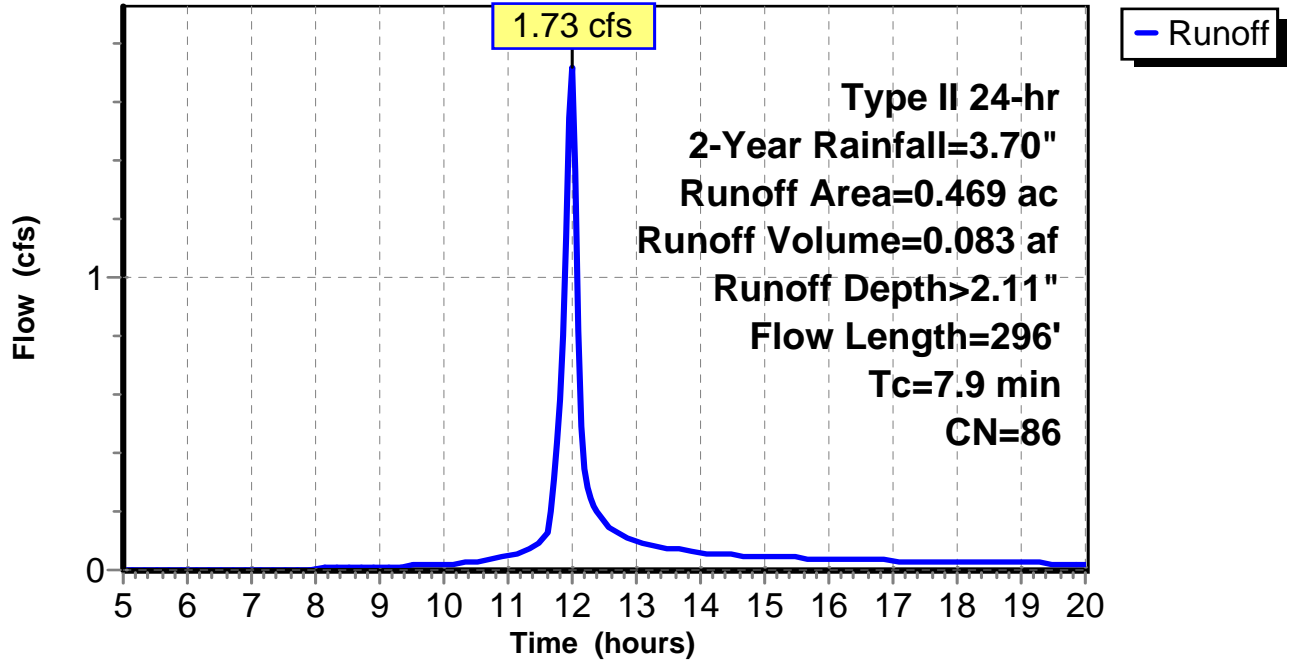
Subcatchment 1: C 66.001

Hydrograph



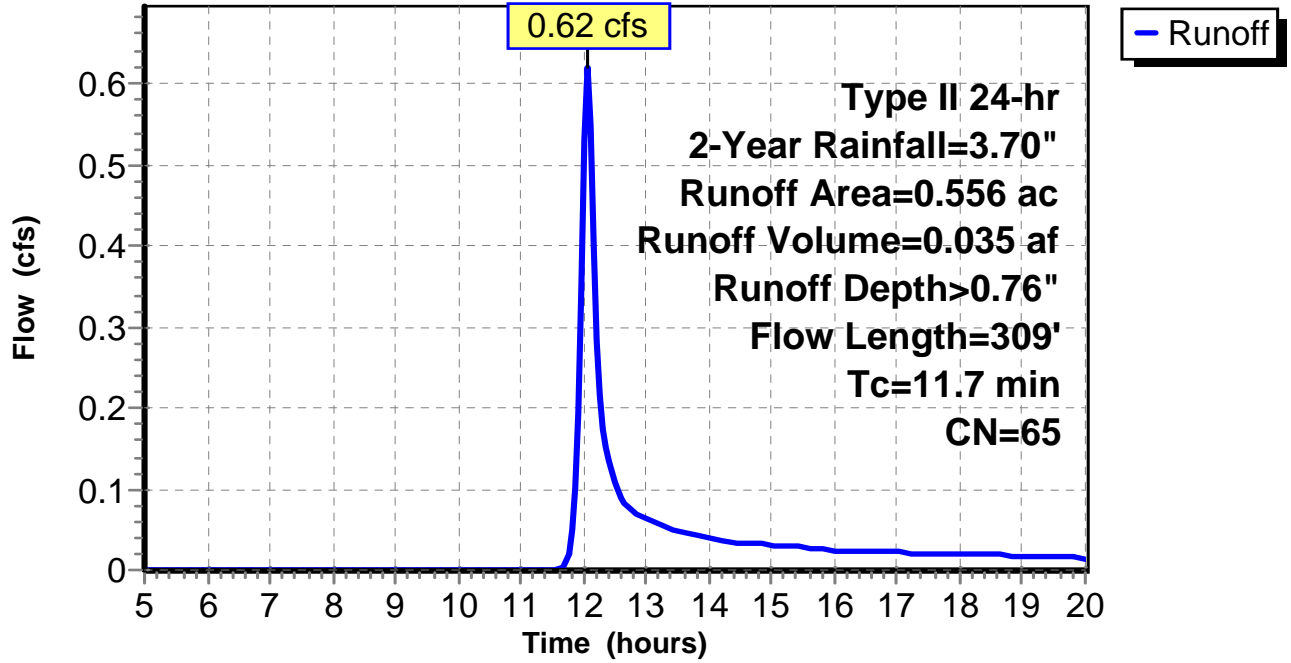
Subcatchment 2: C 66.002

Hydrograph



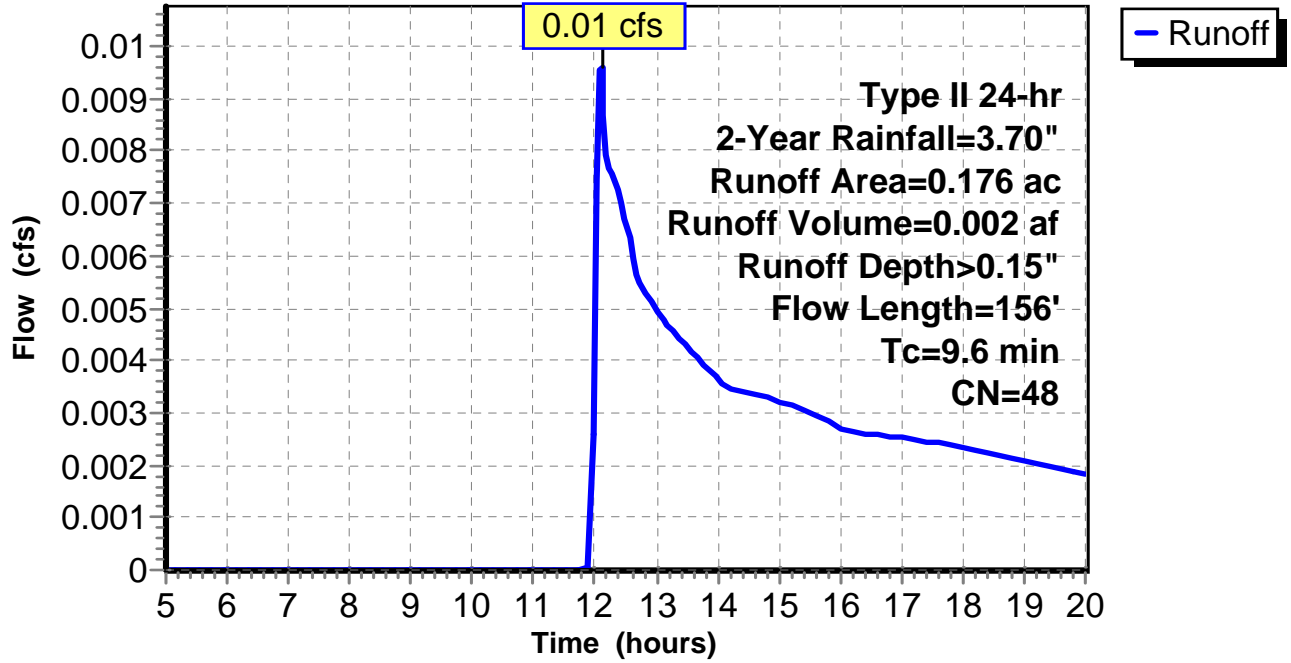
Subcatchment 3: C 66.003

Hydrograph



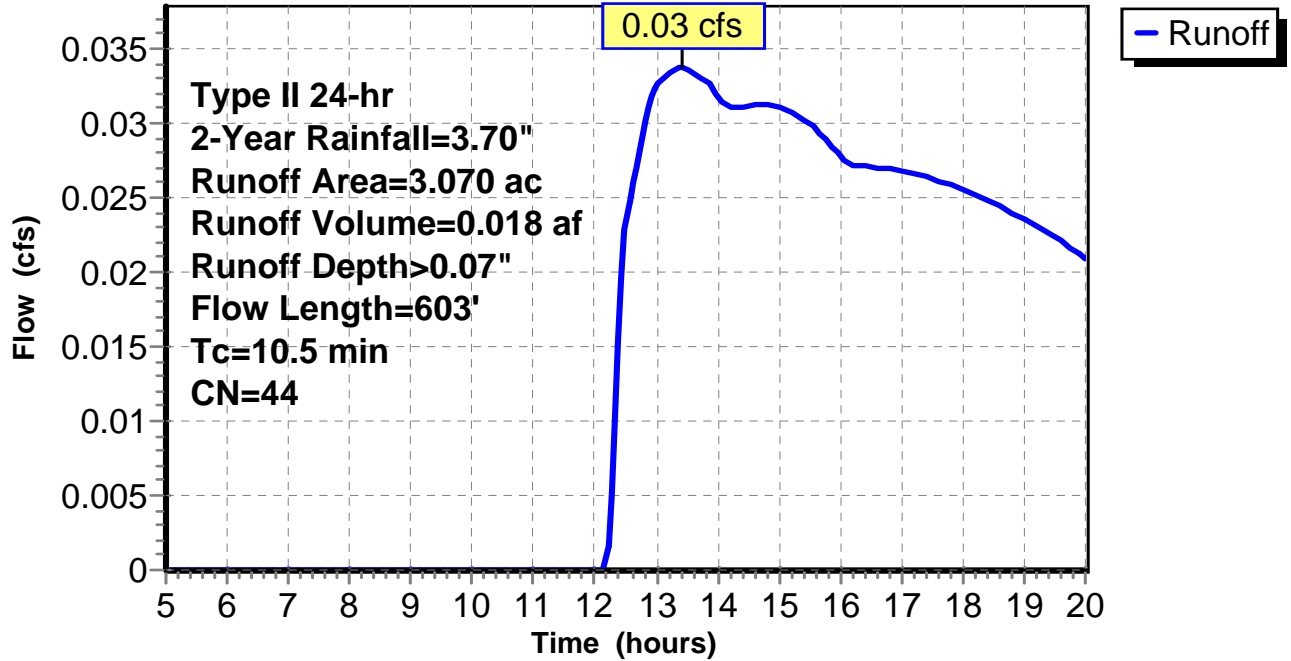
Subcatchment 4: C 66.004

Hydrograph



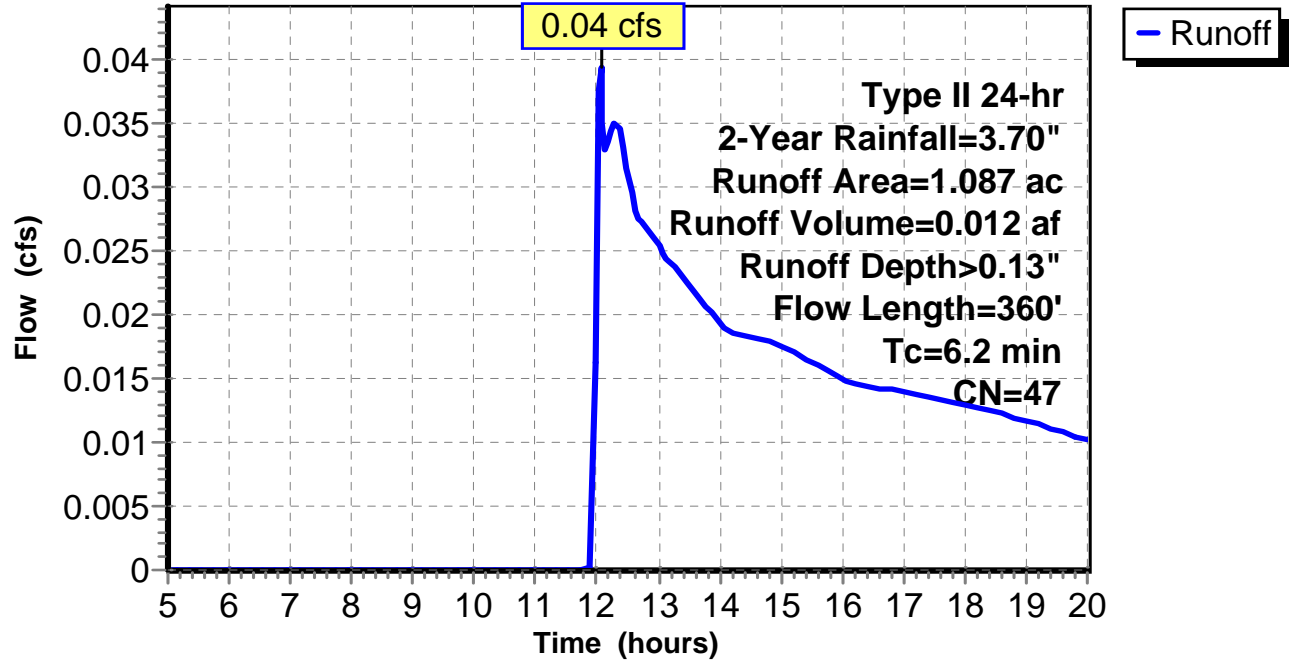
Subcatchment 5: C AR102.047

Hydrograph



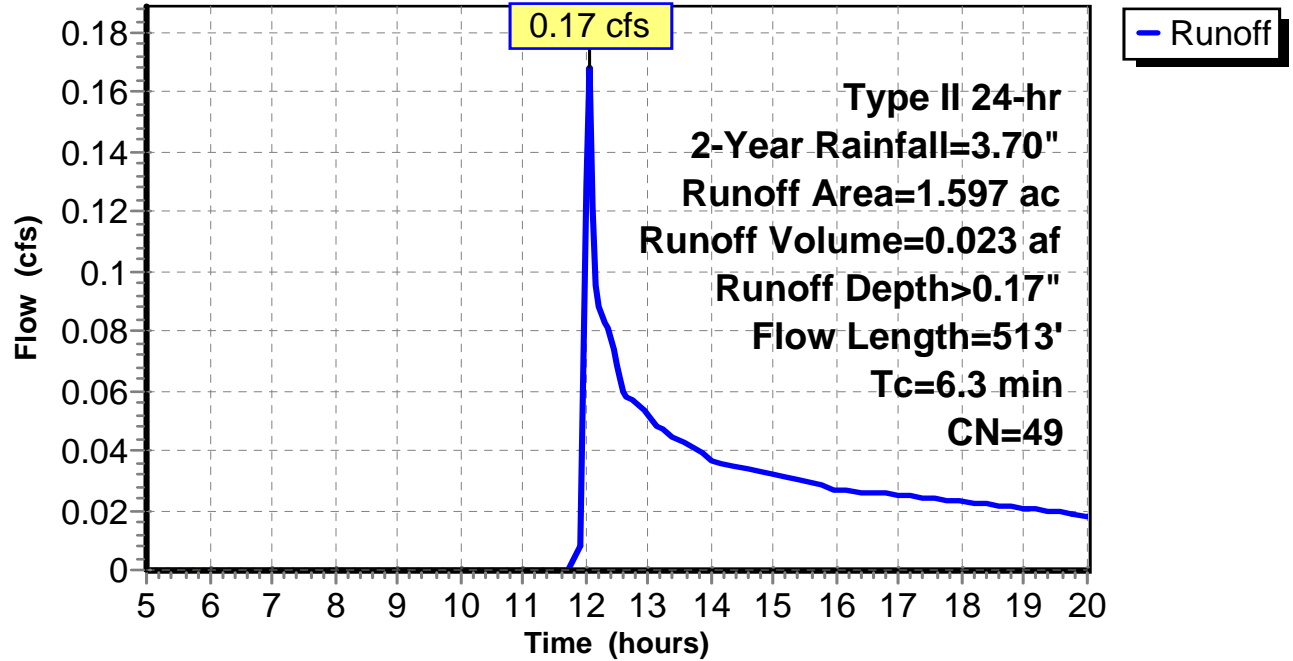
Subcatchment 6: C AR102.048

Hydrograph



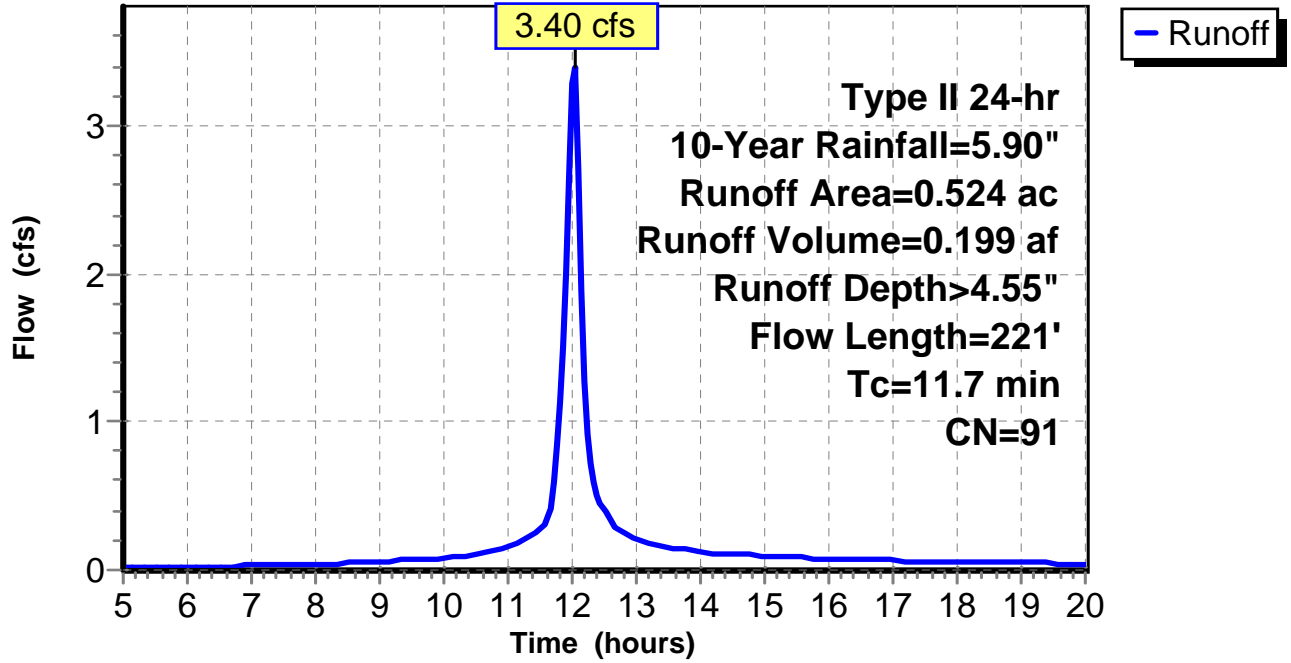
Subcatchment 7: C AR102.049

Hydrograph



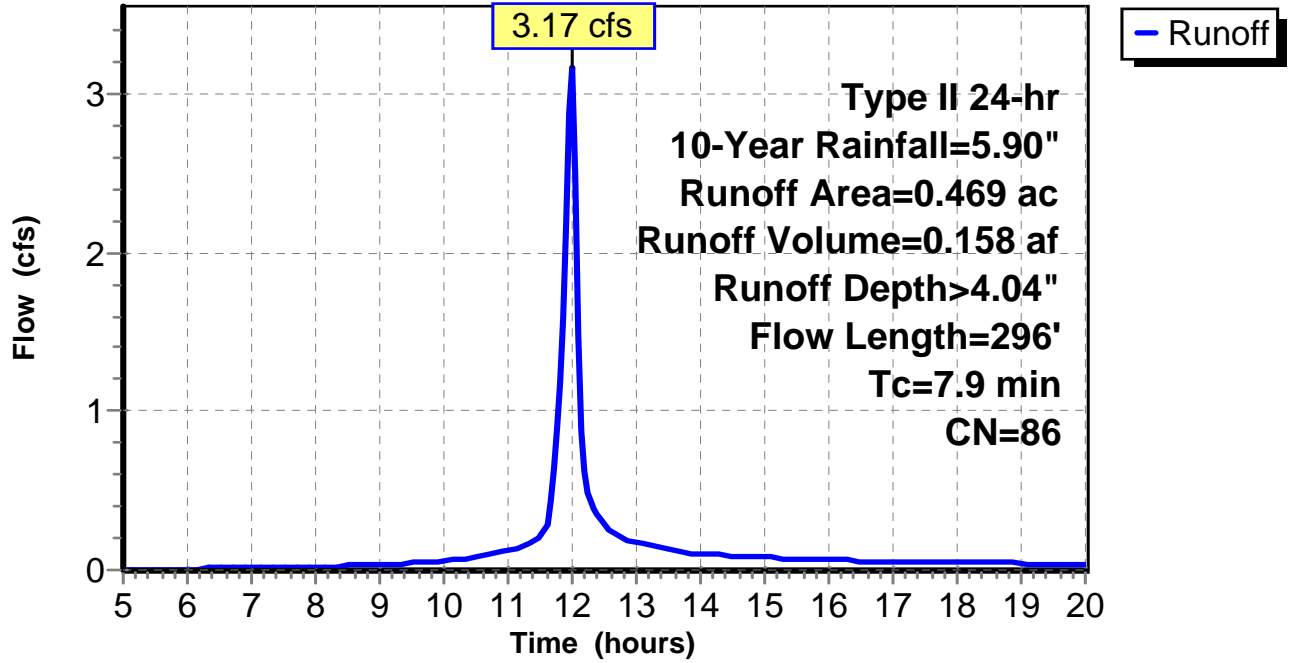
Subcatchment 1: C 66.001

Hydrograph



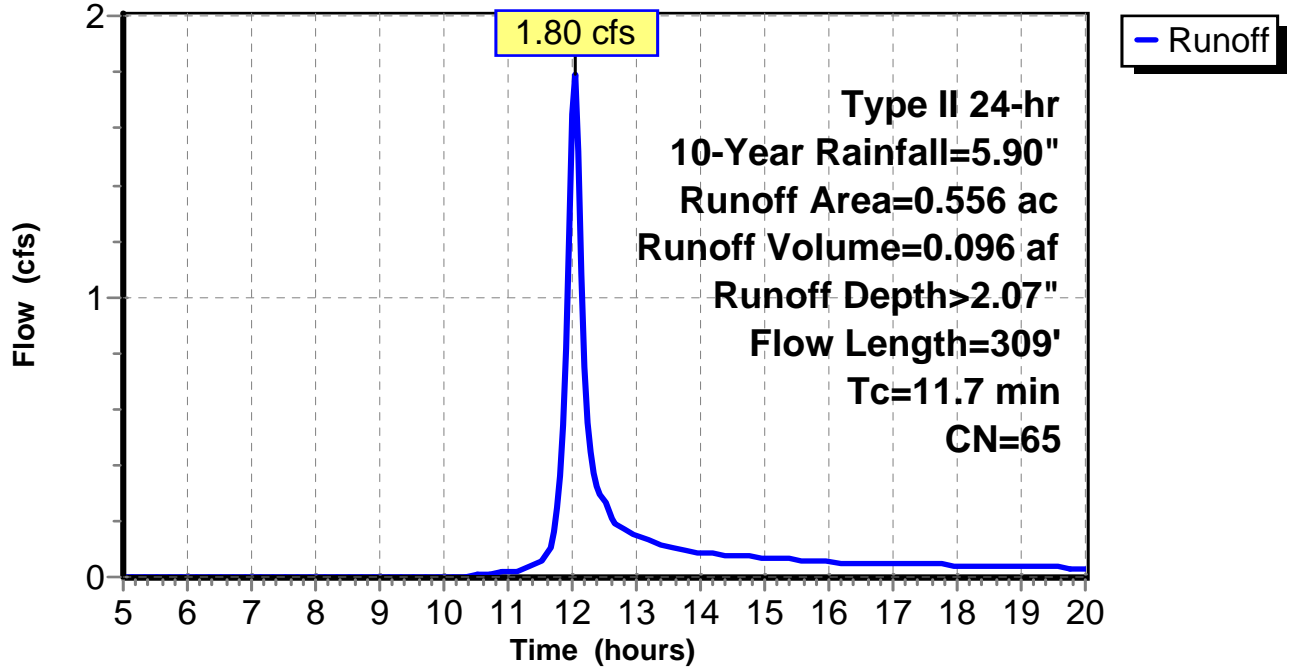
Subcatchment 2: C 66.002

Hydrograph



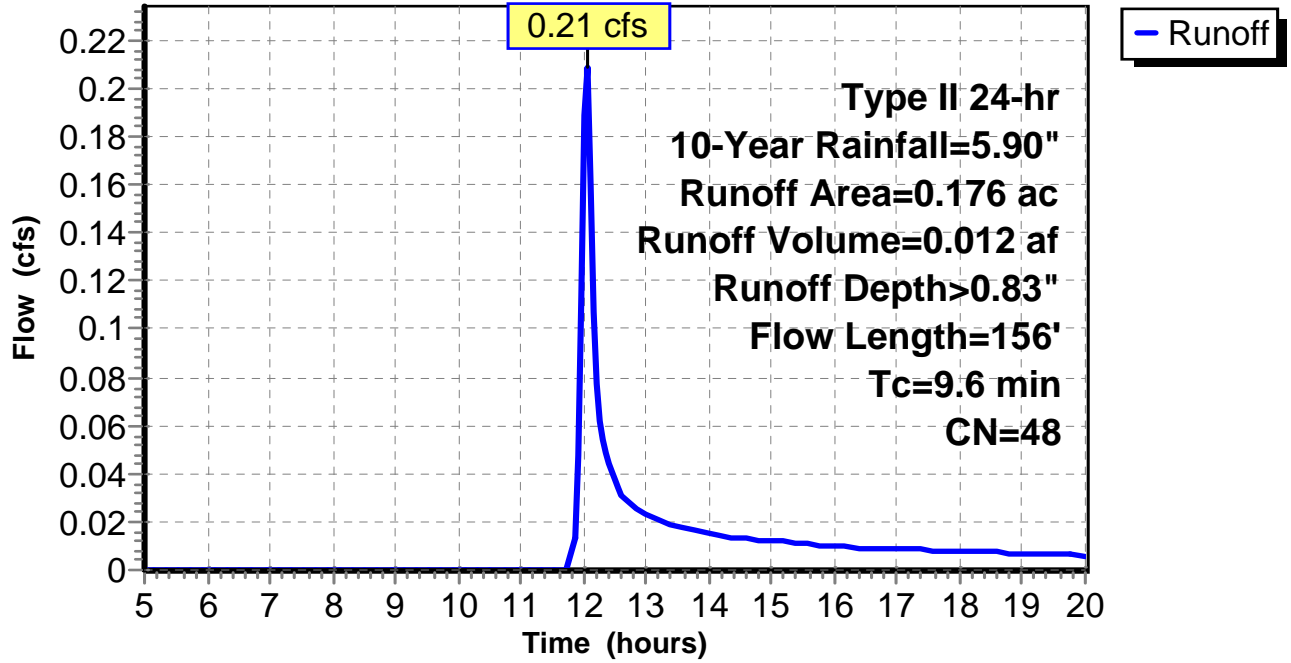
Subcatchment 3: C 66.003

Hydrograph



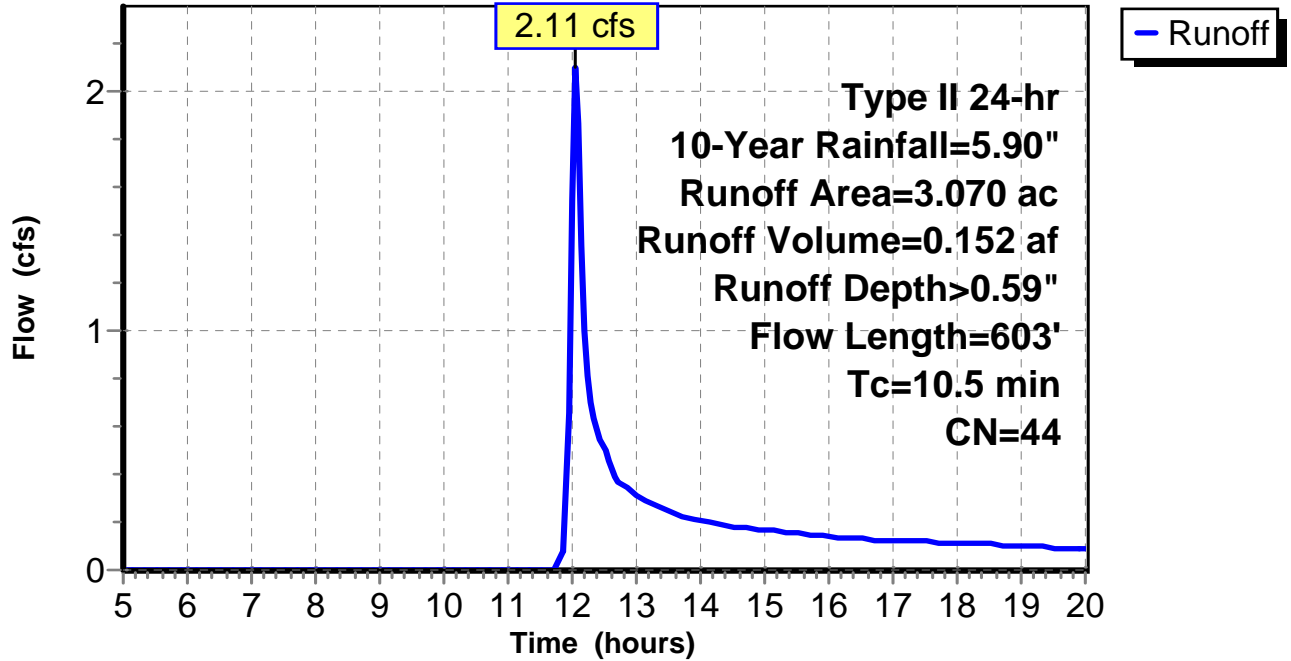
Subcatchment 4: C 66.004

Hydrograph



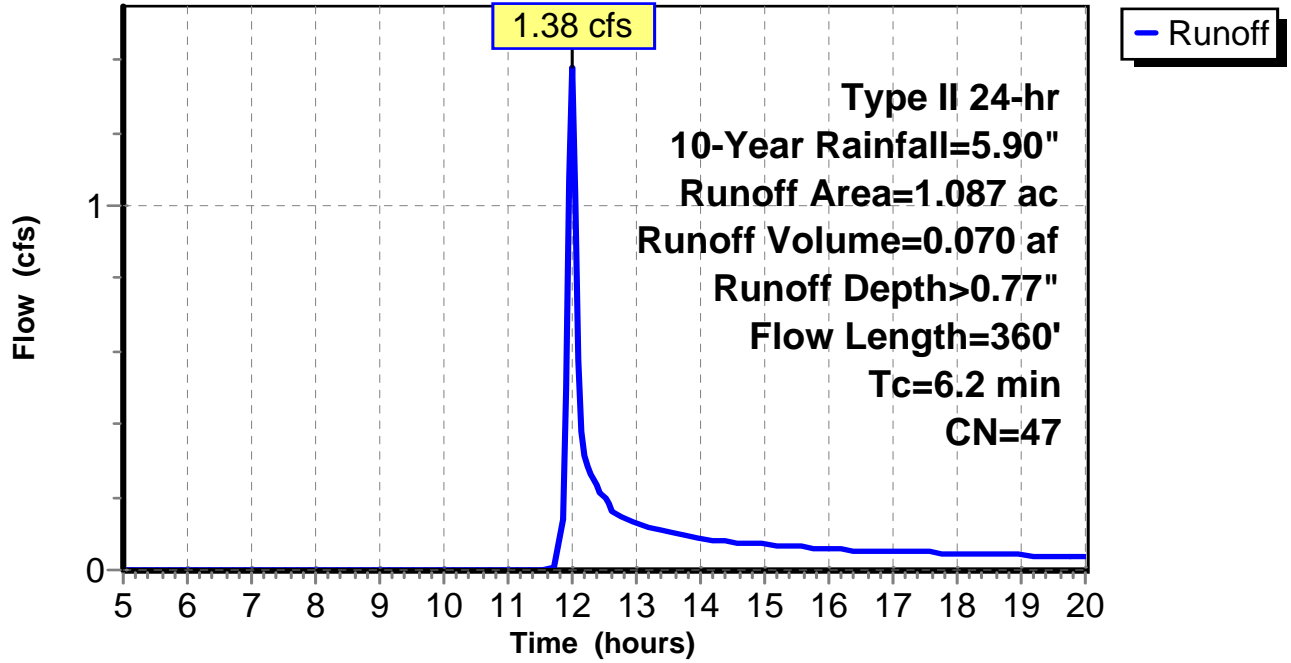
Subcatchment 5: C AR102.047

Hydrograph



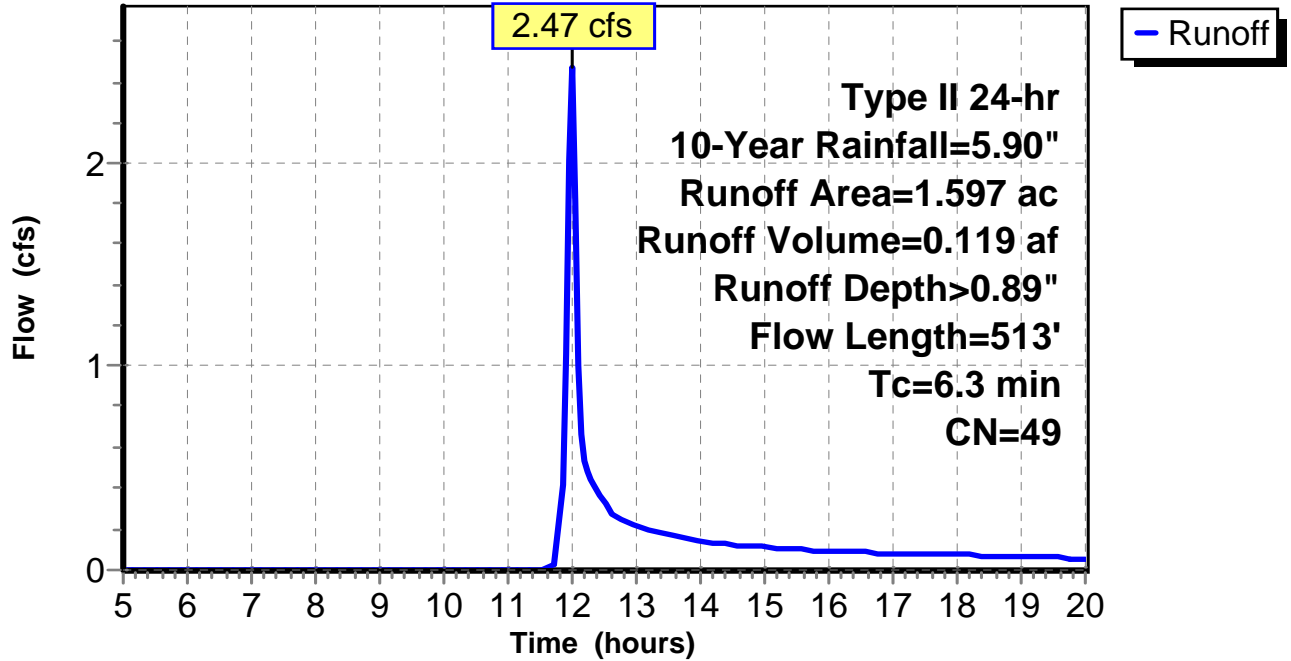
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Hydrograph



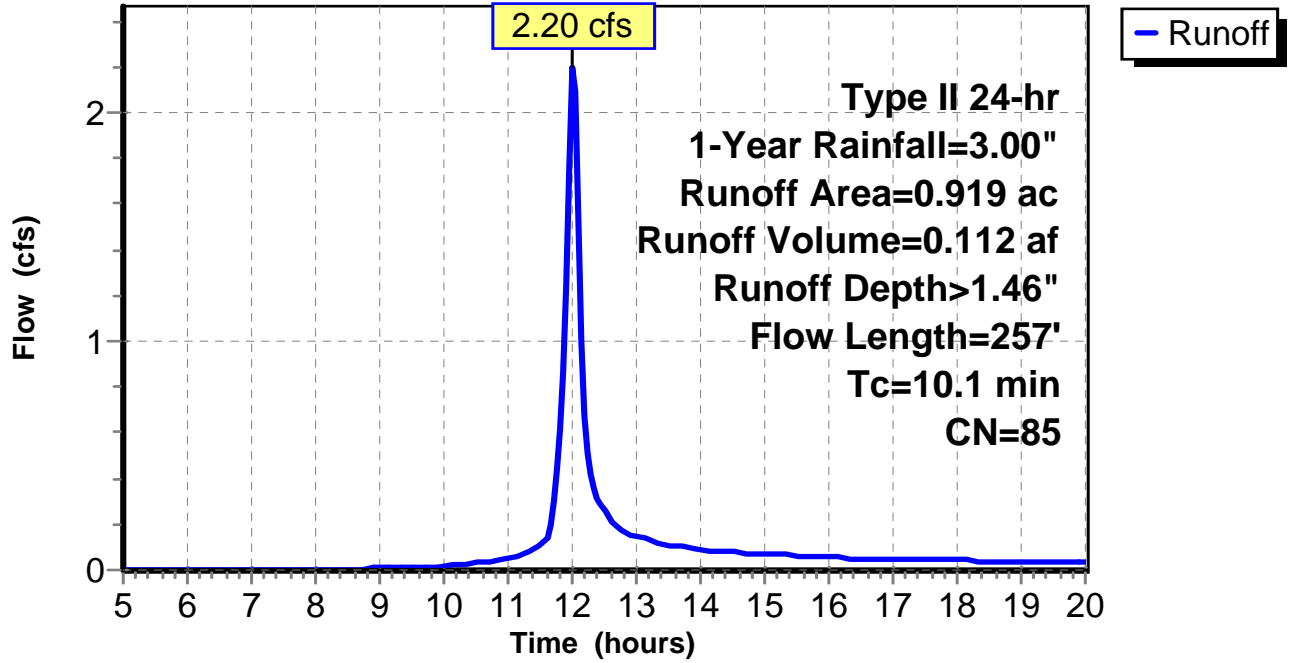
Subcatchment 7: C AR102.049

Hydrograph



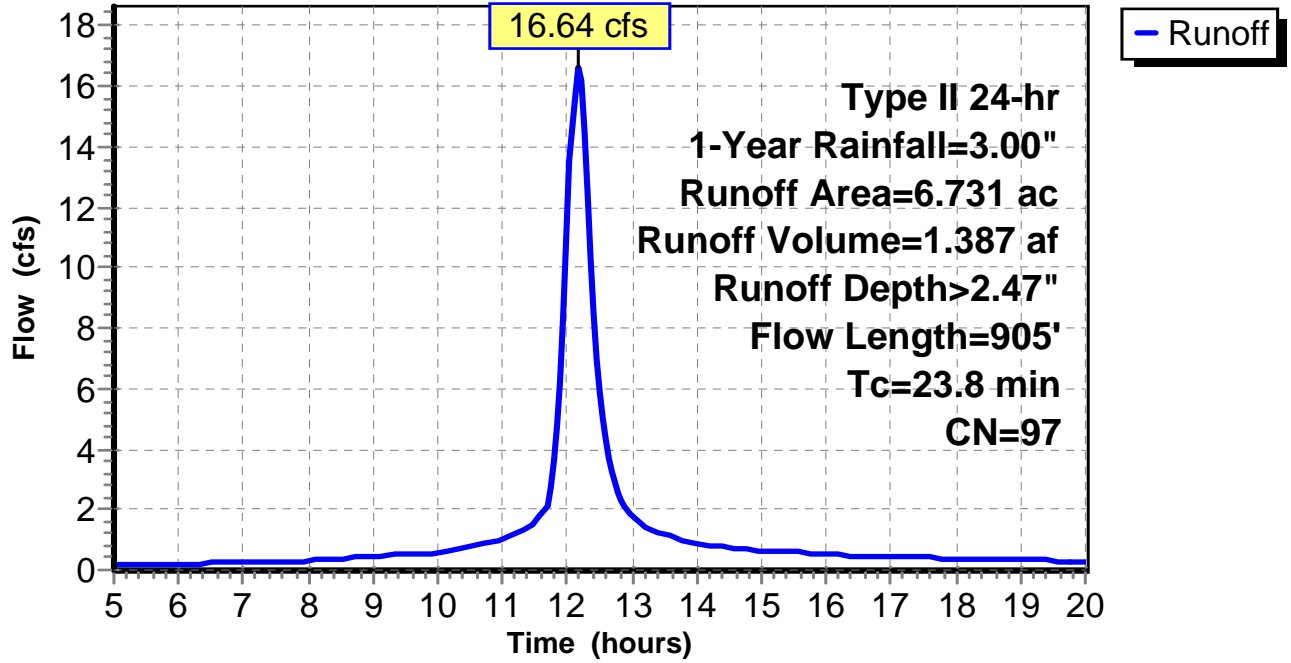
Subcatchment 1: C 68.001

Hydrograph



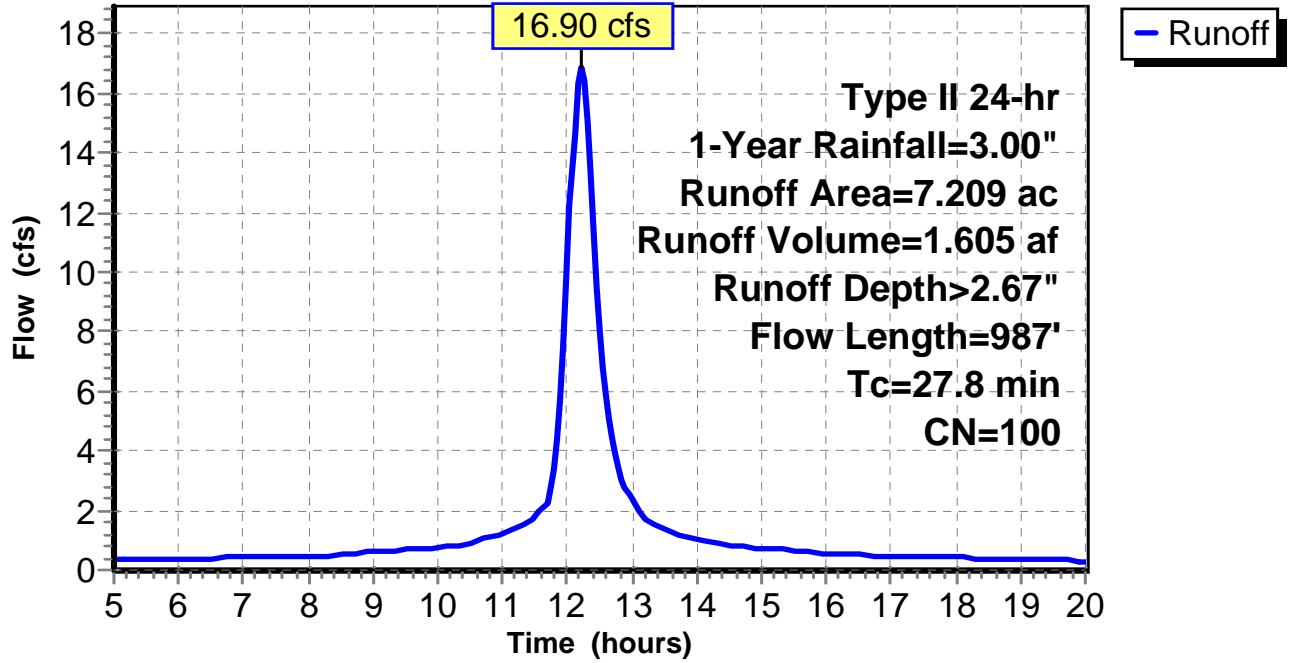
Subcatchment 2: C 68.002

Hydrograph



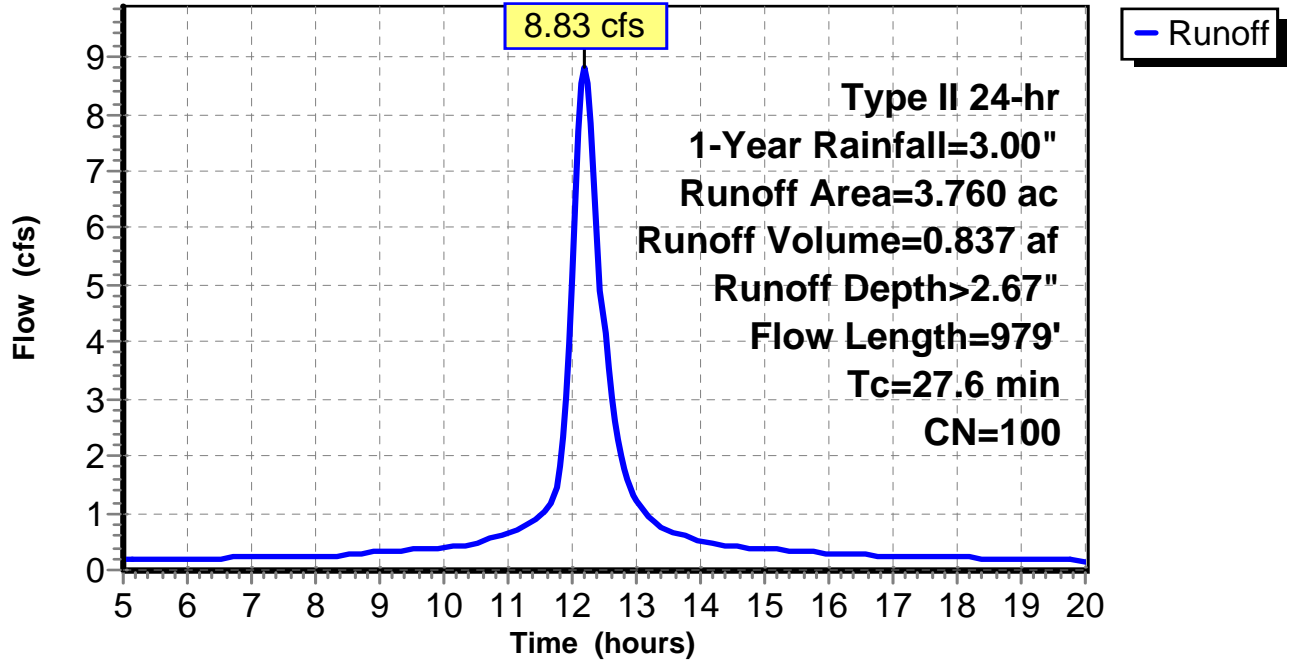
Subcatchment 3: C 68.003

Hydrograph



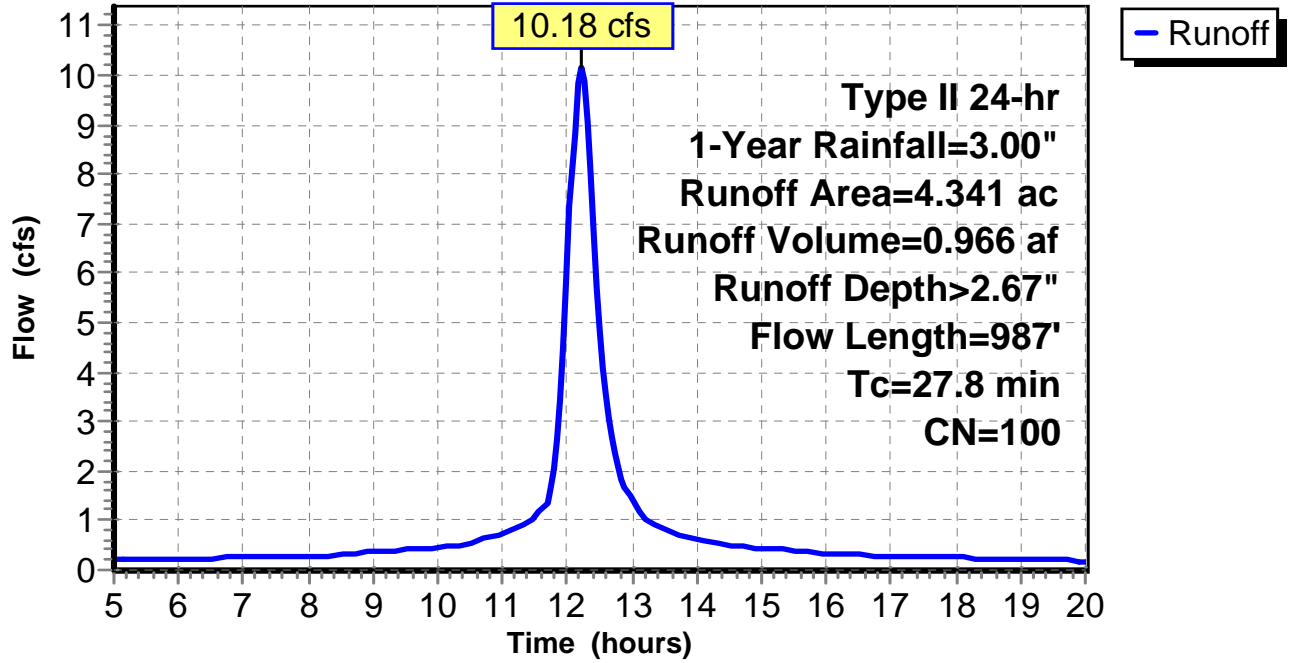
Subcatchment 4: C 68.004

Hydrograph



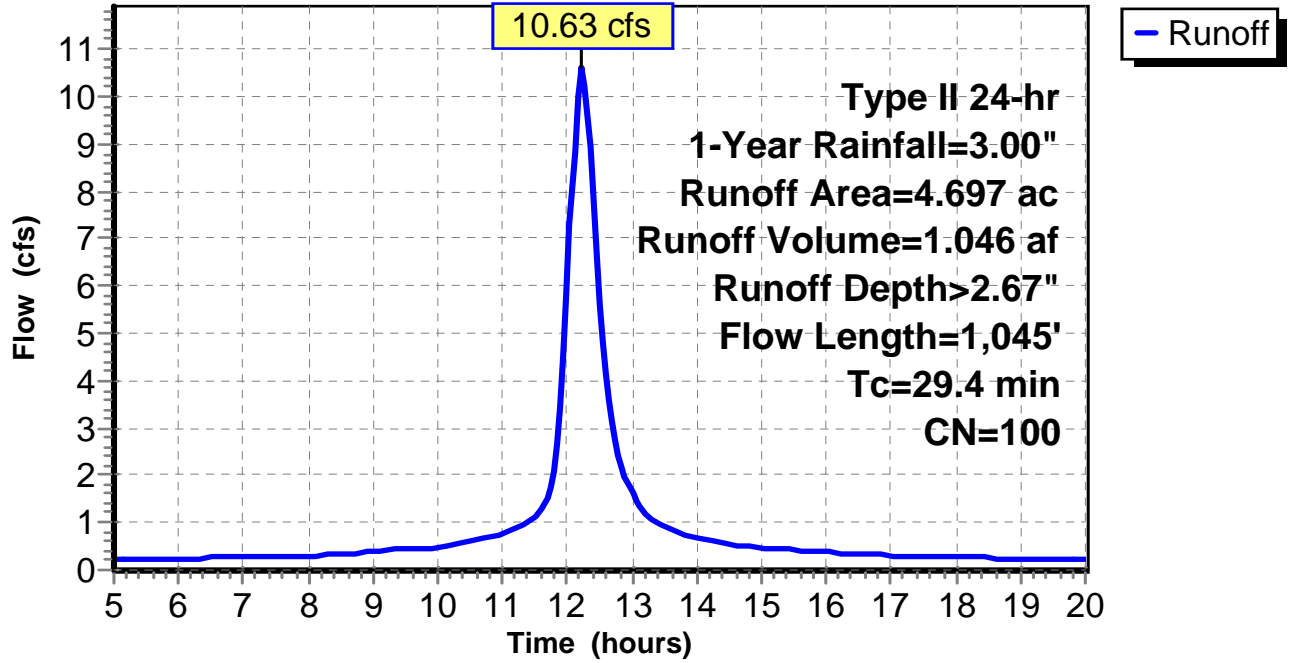
Subcatchment 5: C 68.005

Hydrograph



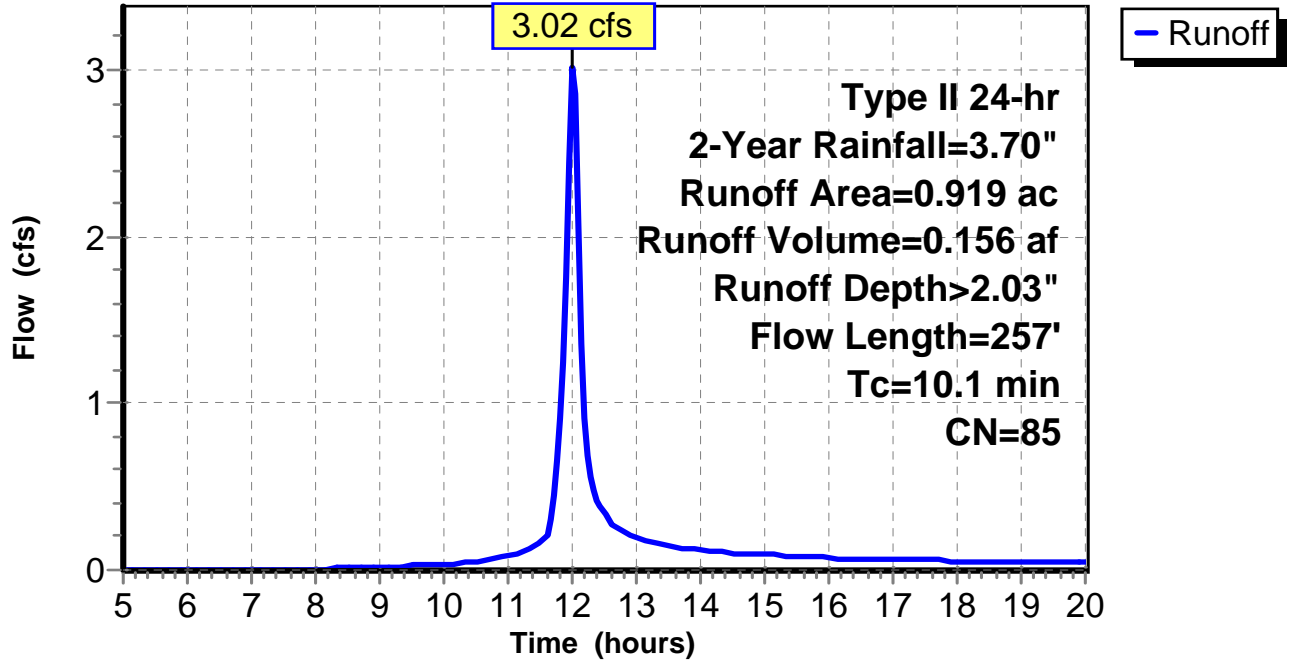
Subcatchment 6: C 68.006

Hydrograph



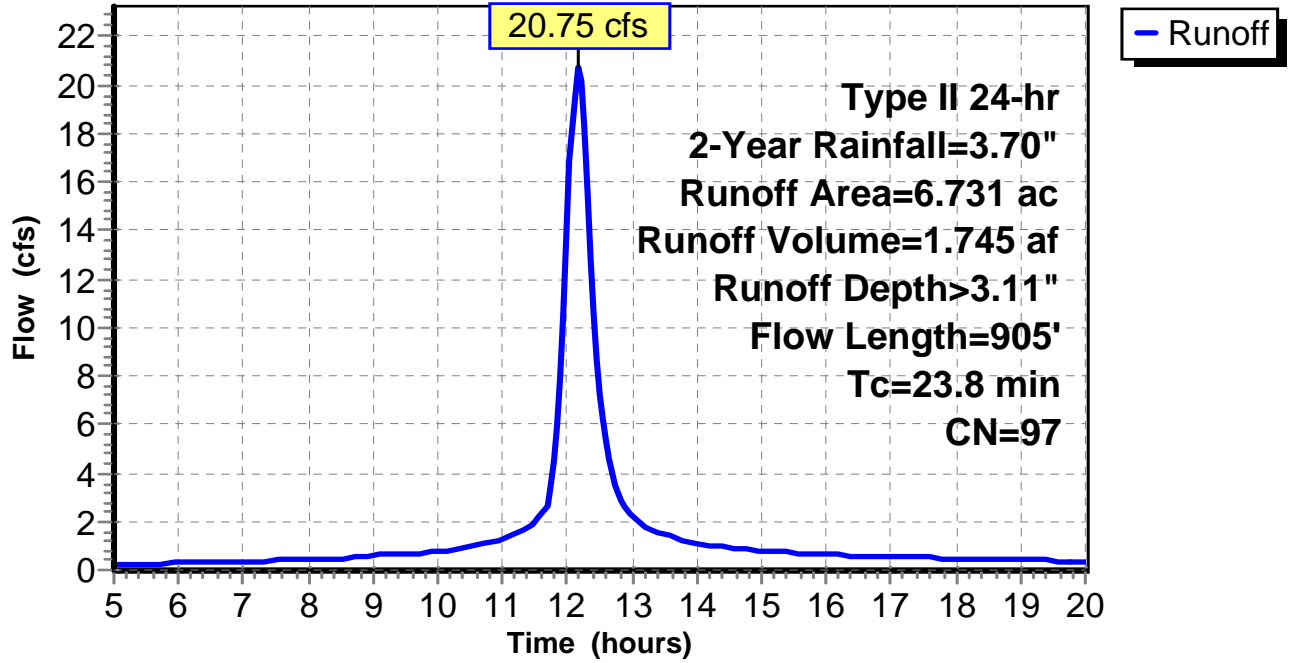
Subcatchment 1: C 68.001

Hydrograph



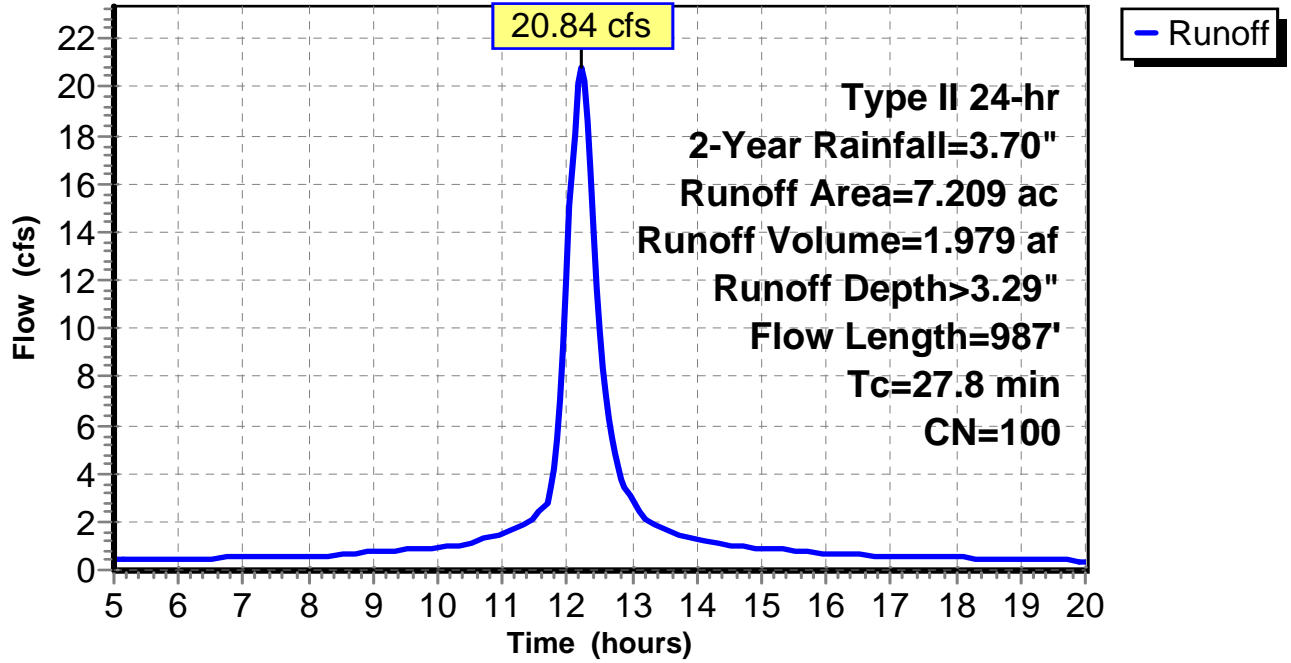
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Hydrograph



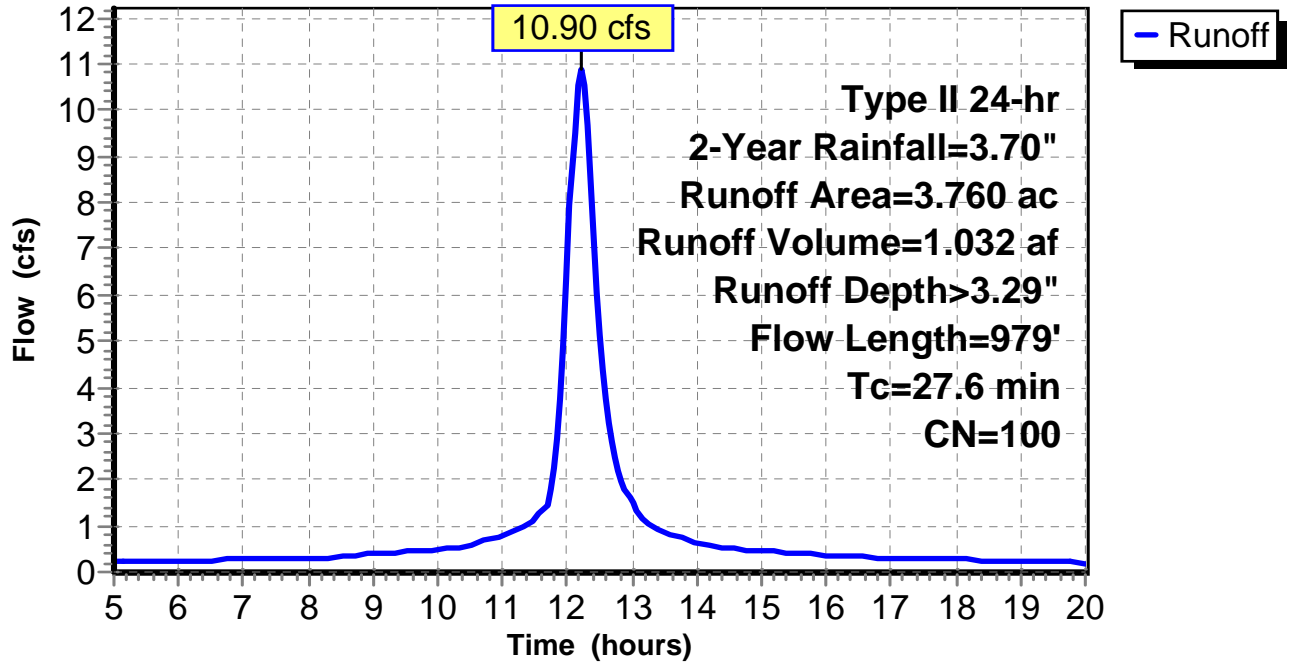
Subcatchment 3: C 68.003

Hydrograph



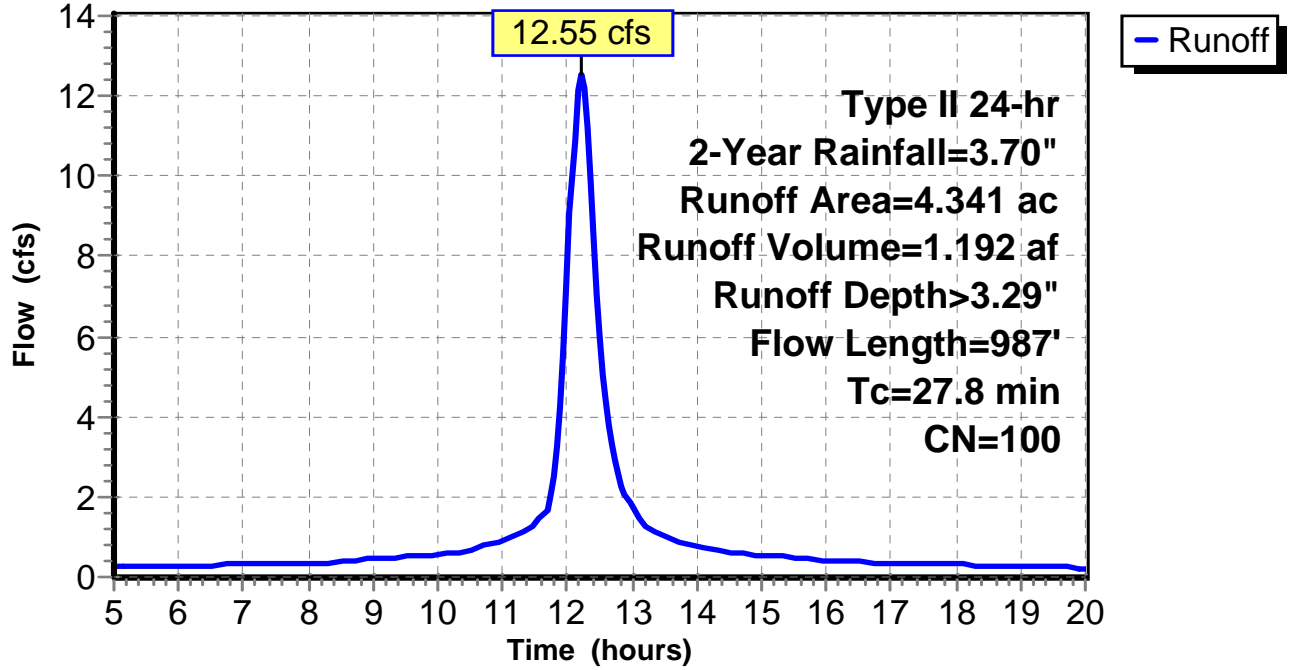
Subcatchment 4: C 68.004

Hydrograph



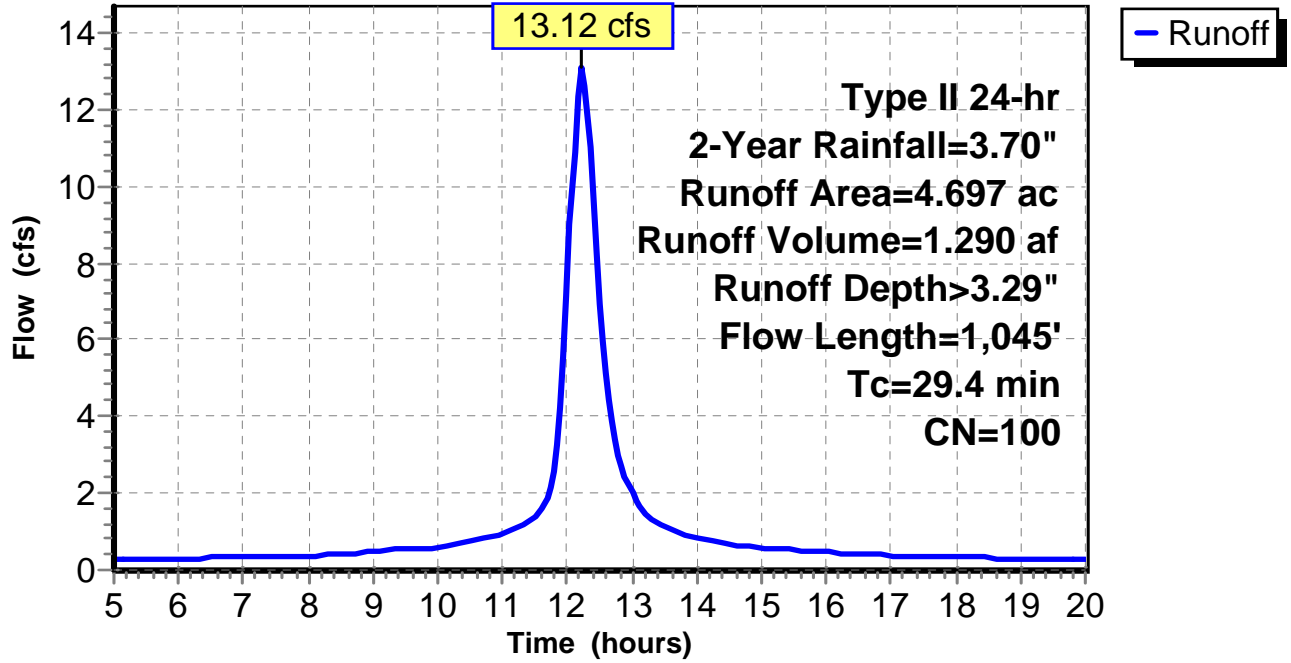
Subcatchment 5: C 68.005

Hydrograph



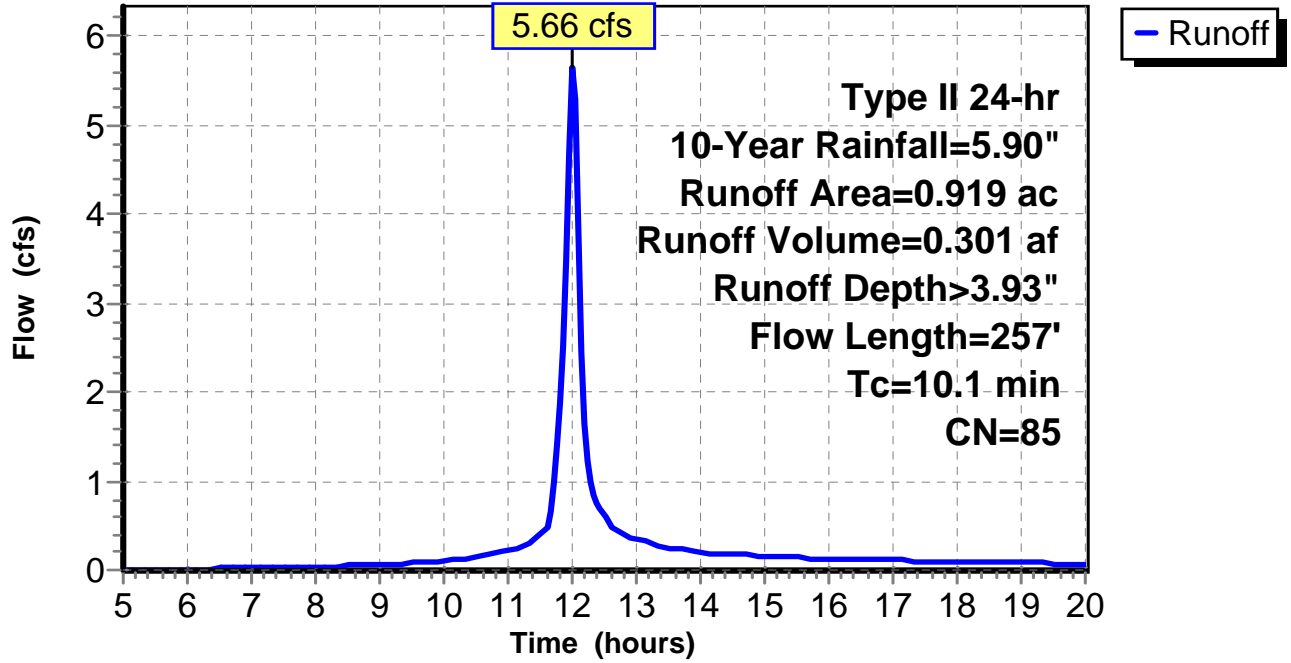
Subcatchment 6: C 68.006

Hydrograph



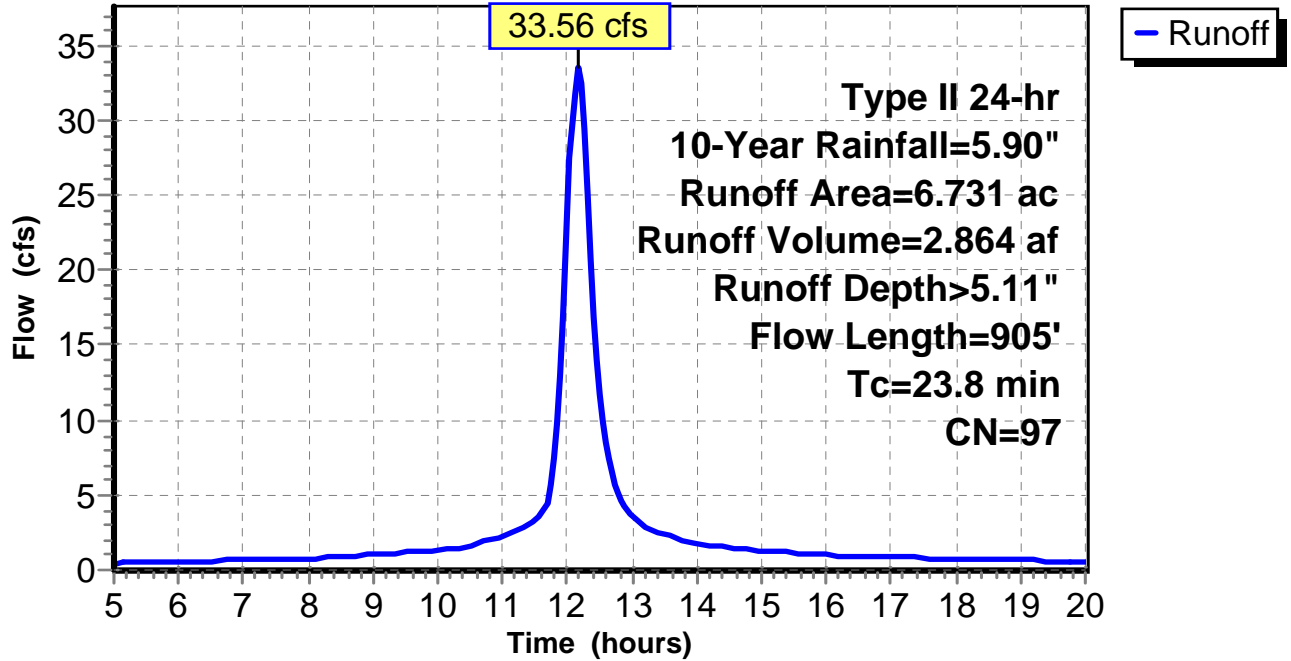
Subcatchment 1: C 68.001

Hydrograph



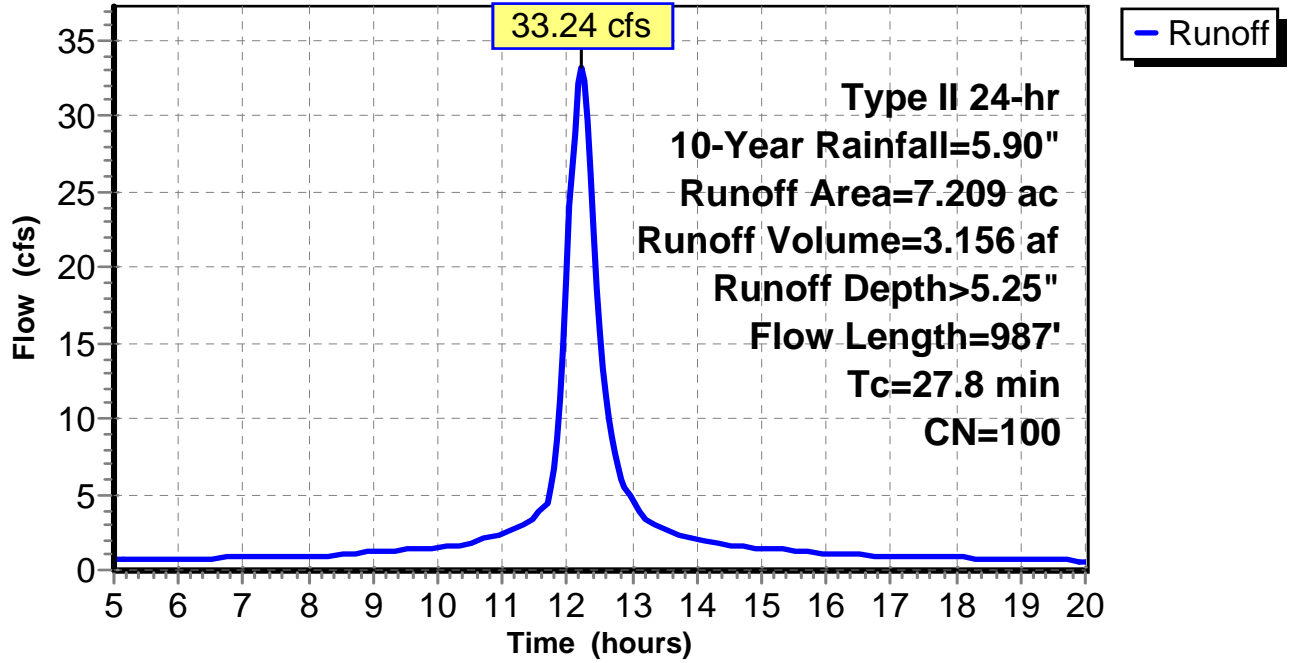
Subcatchment 2: C 68.002

Hydrograph



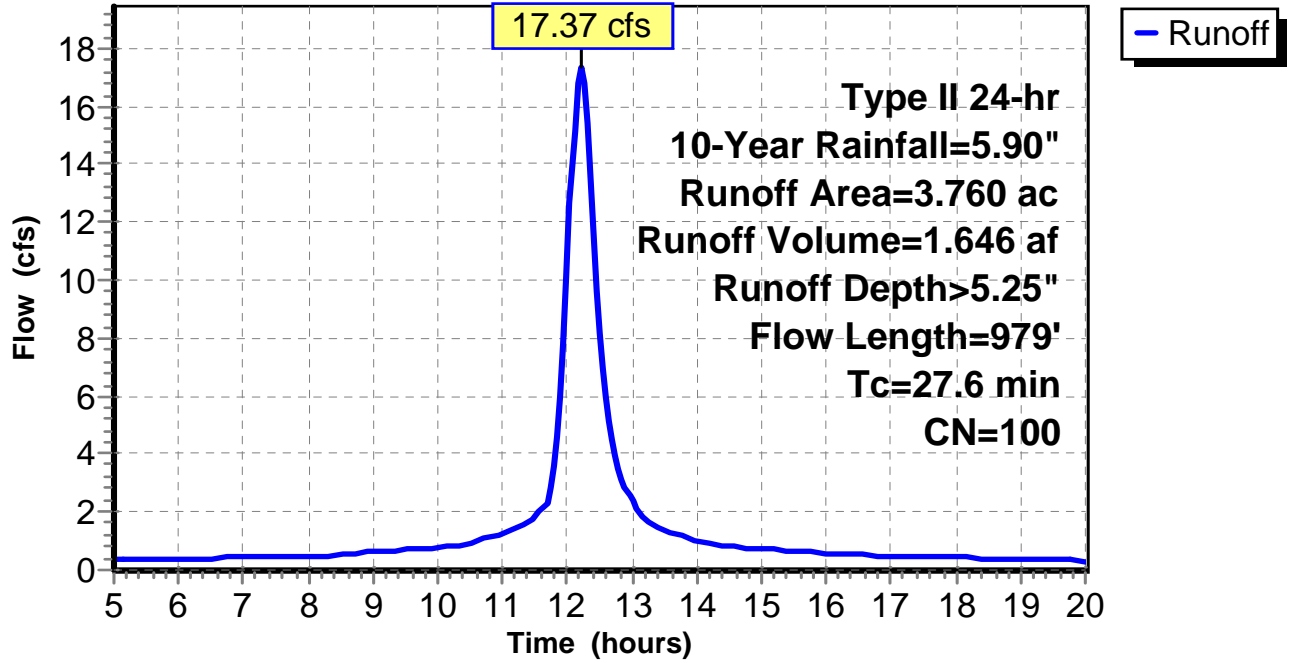
Subcatchment 3: C 68.003

Hydrograph



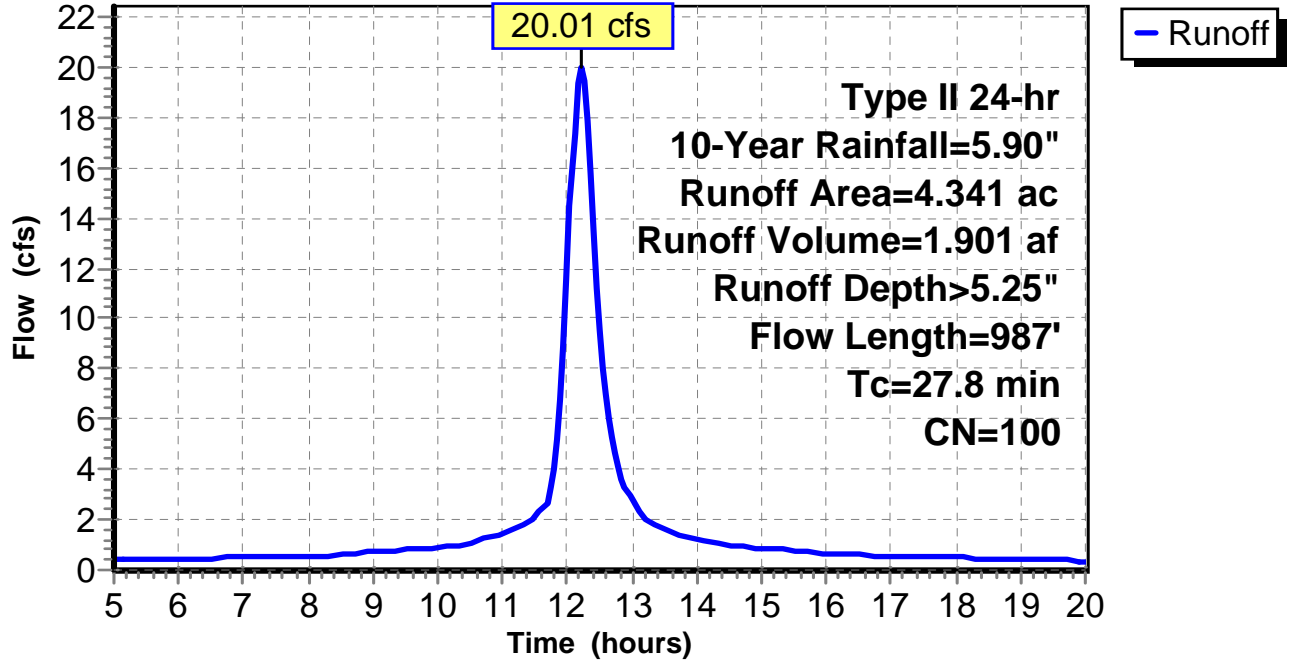
Subcatchment 4: C 68.004

Hydrograph



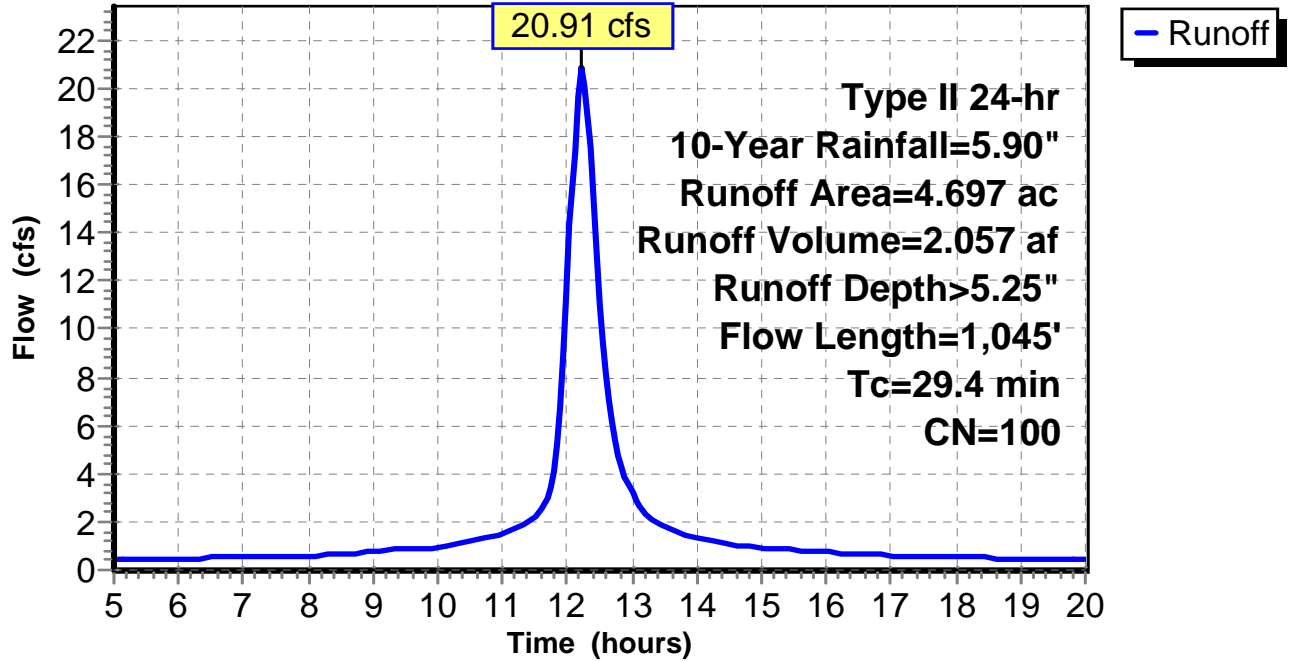
Subcatchment 5: C 68.005

Hydrograph



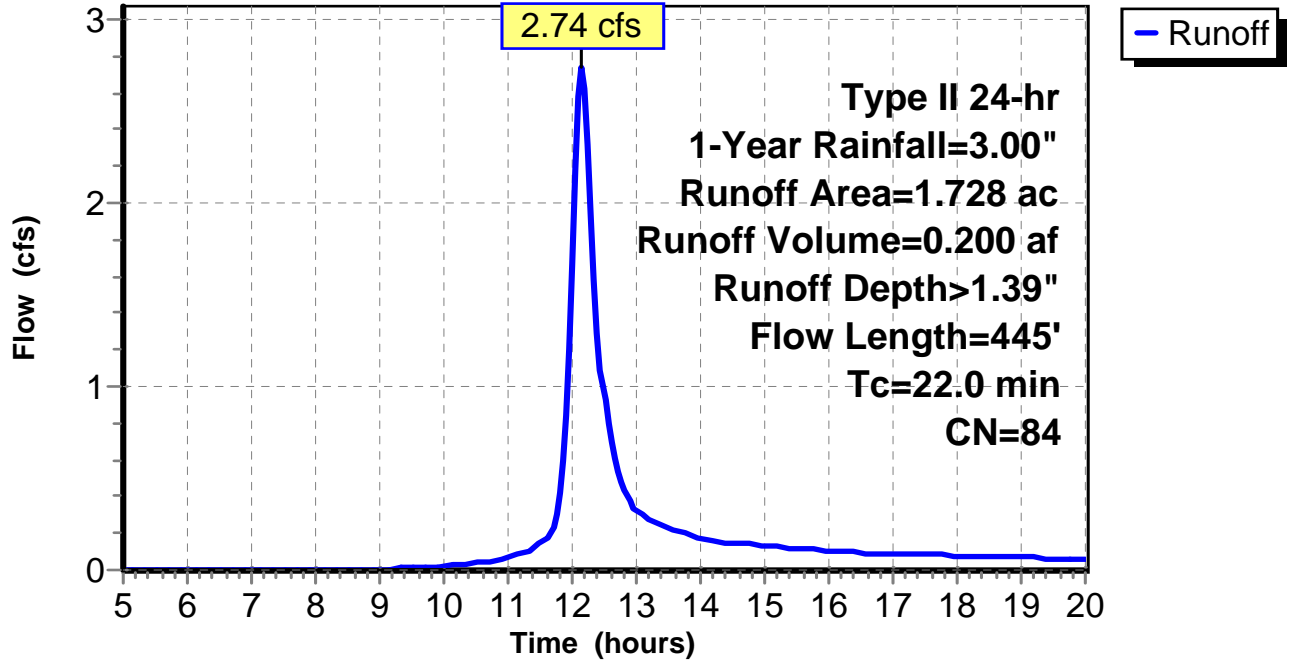
Subcatchment 6: C 68.006

Hydrograph



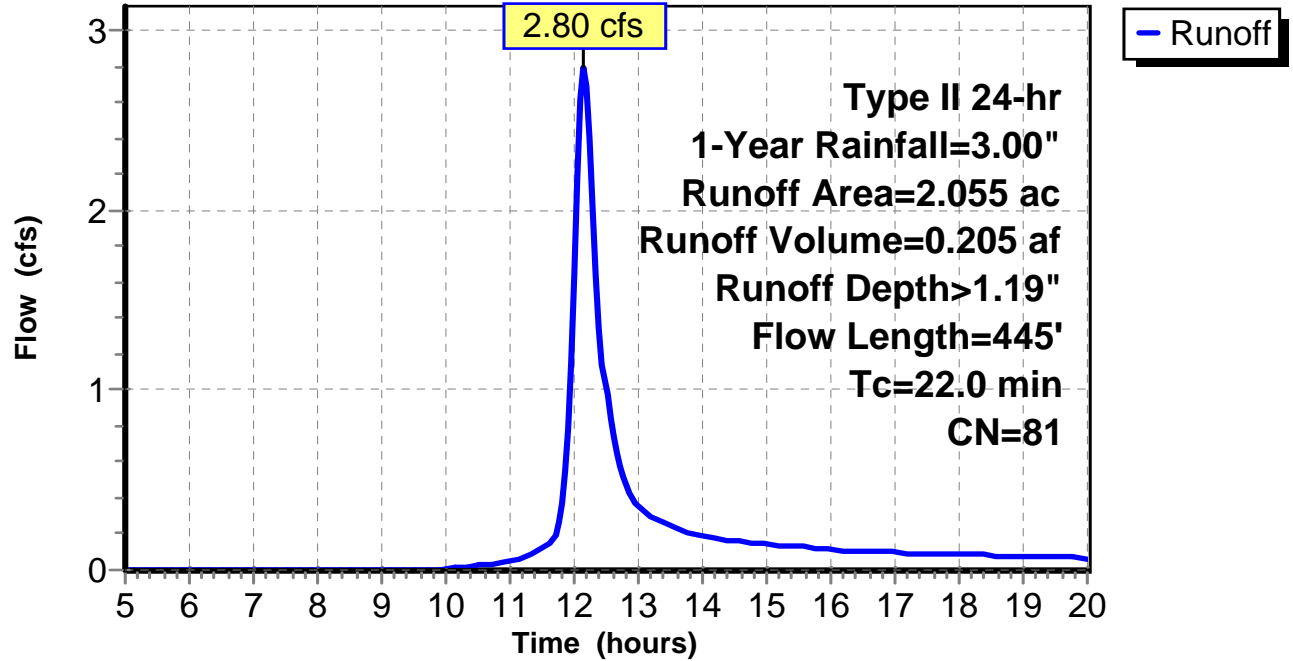
Subcatchment 1: C AR102.029

Hydrograph



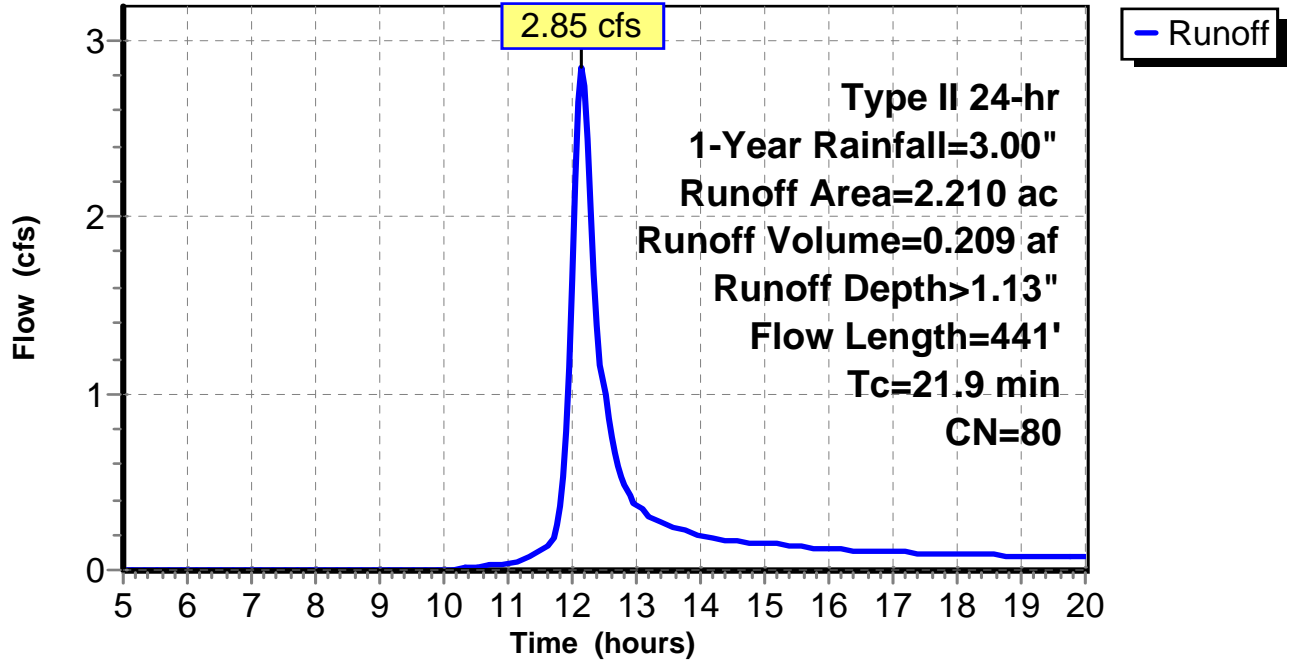
Subcatchment 2: C AR102.030

Hydrograph



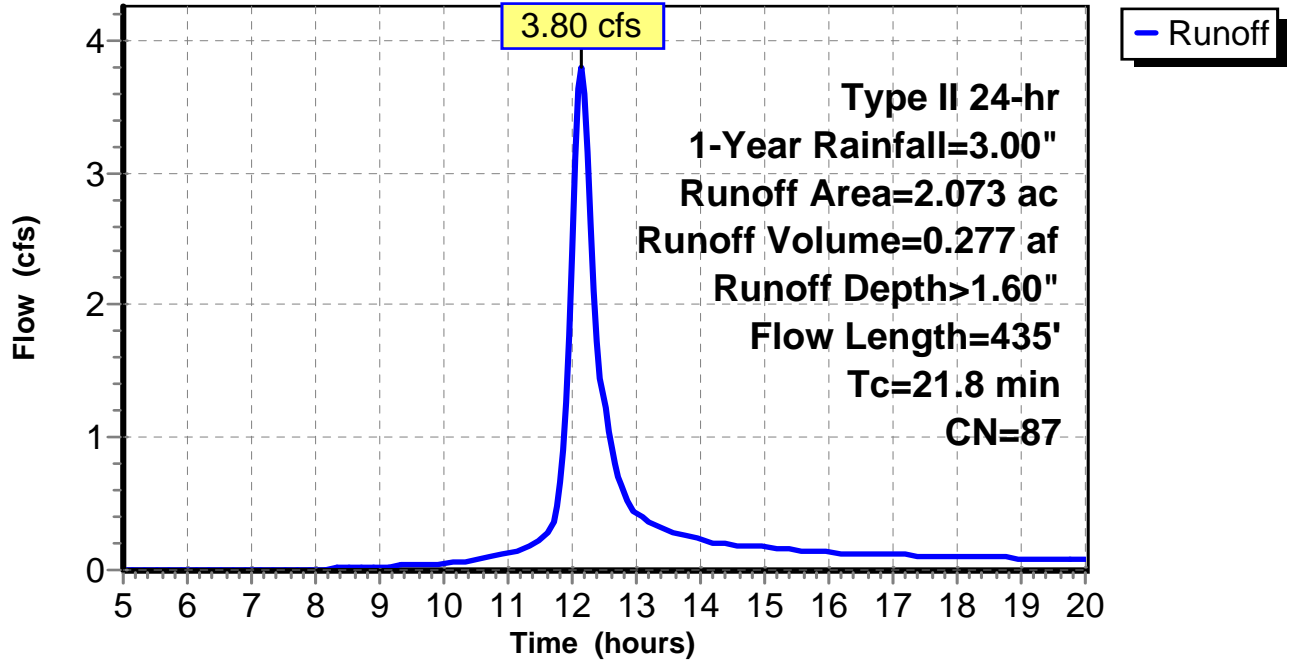
Subcatchment 3: C AR102.031

Hydrograph



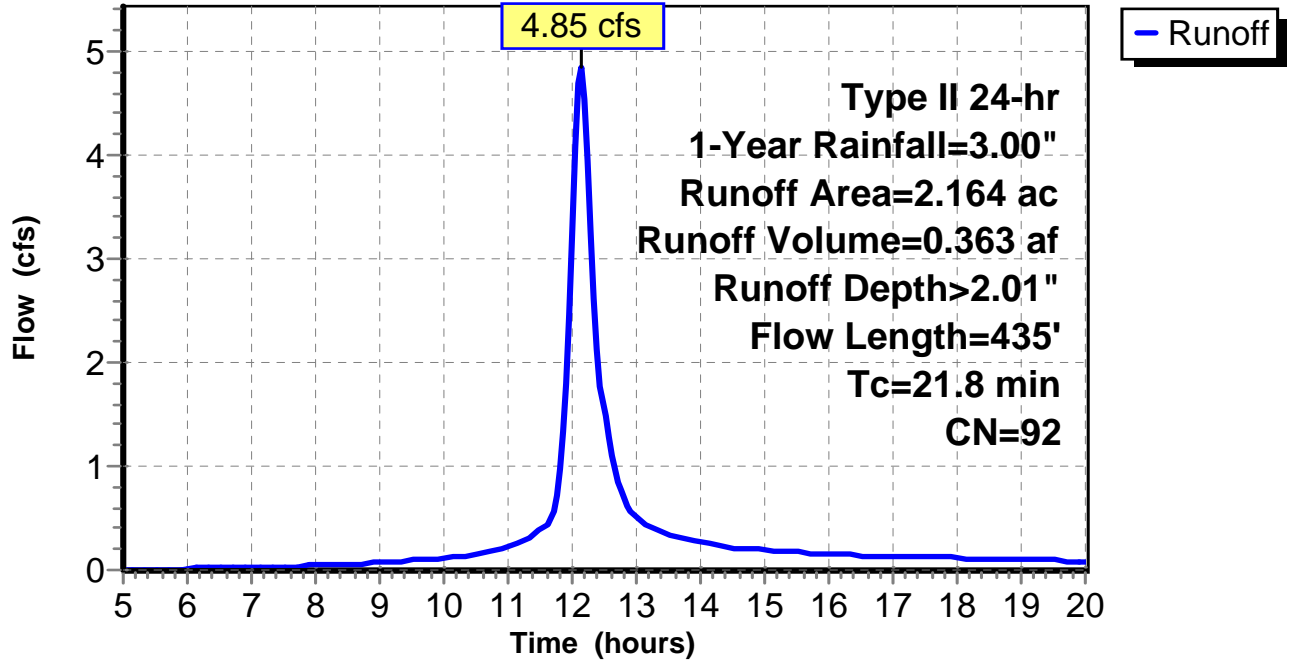
Subcatchment 4: C AR102.032

Hydrograph



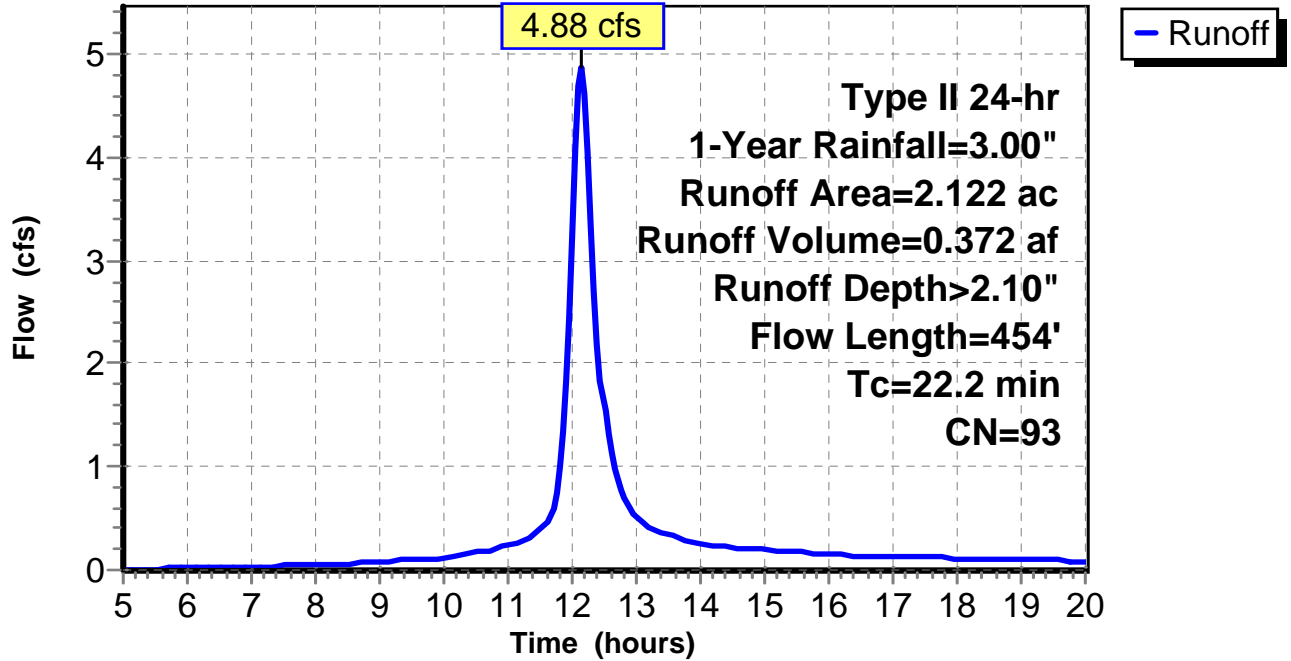
Subcatchment 5: C AR102.033

Hydrograph



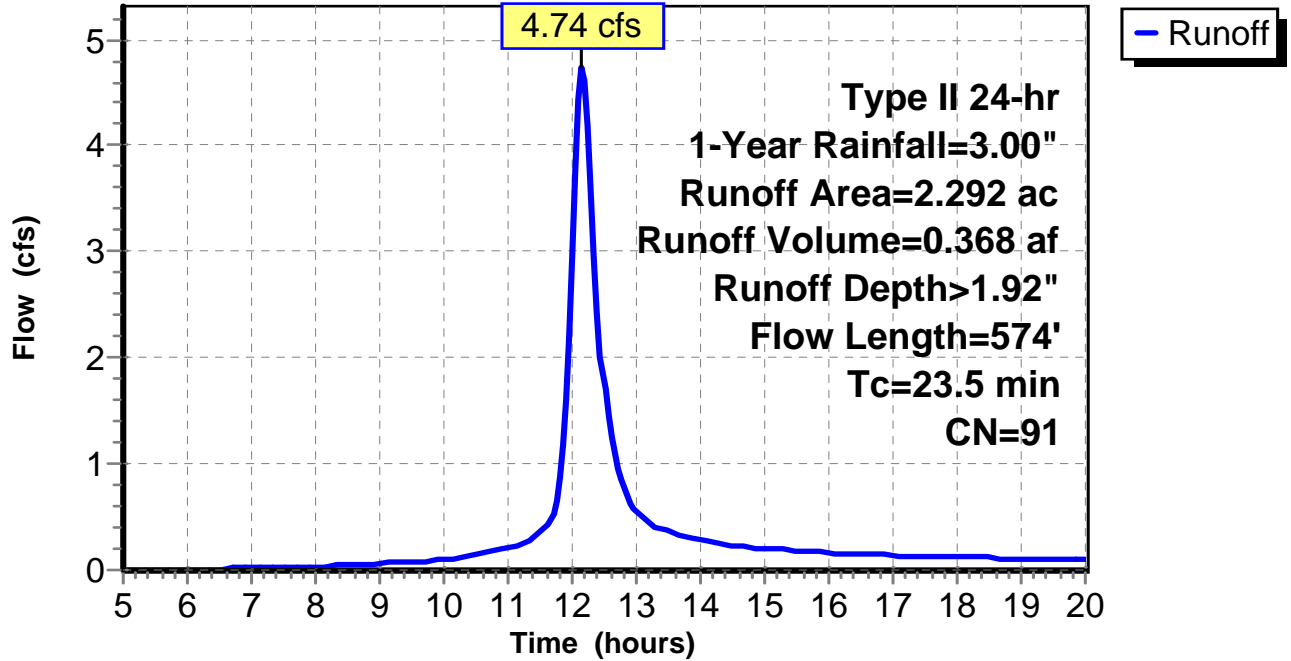
Subcatchment 6: C AR102.034

Hydrograph



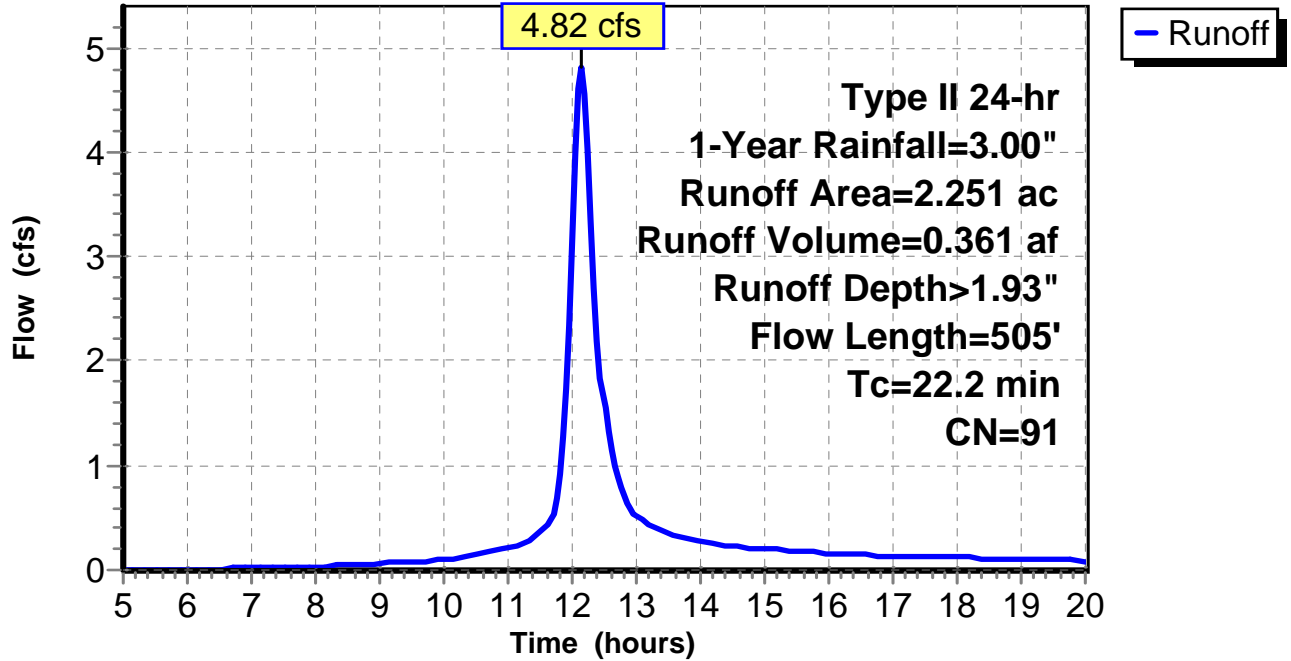
Subcatchment 7: C AR102.035

Hydrograph



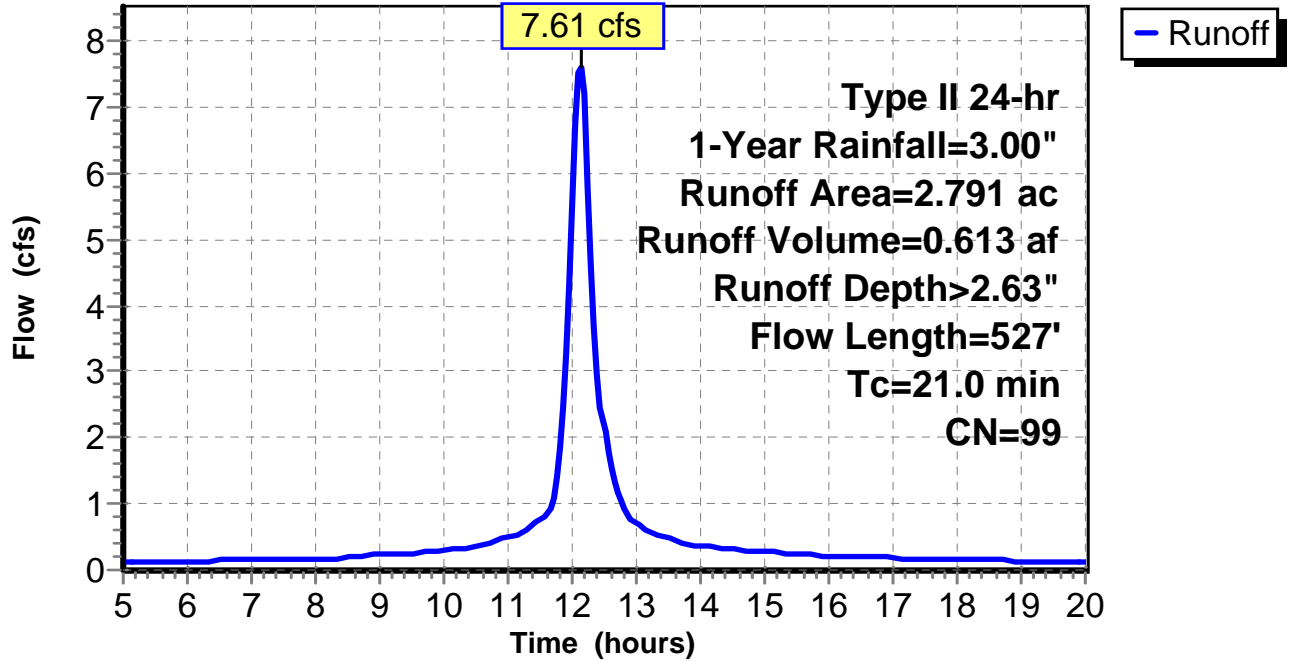
Subcatchment 8: C AR102.036

Hydrograph



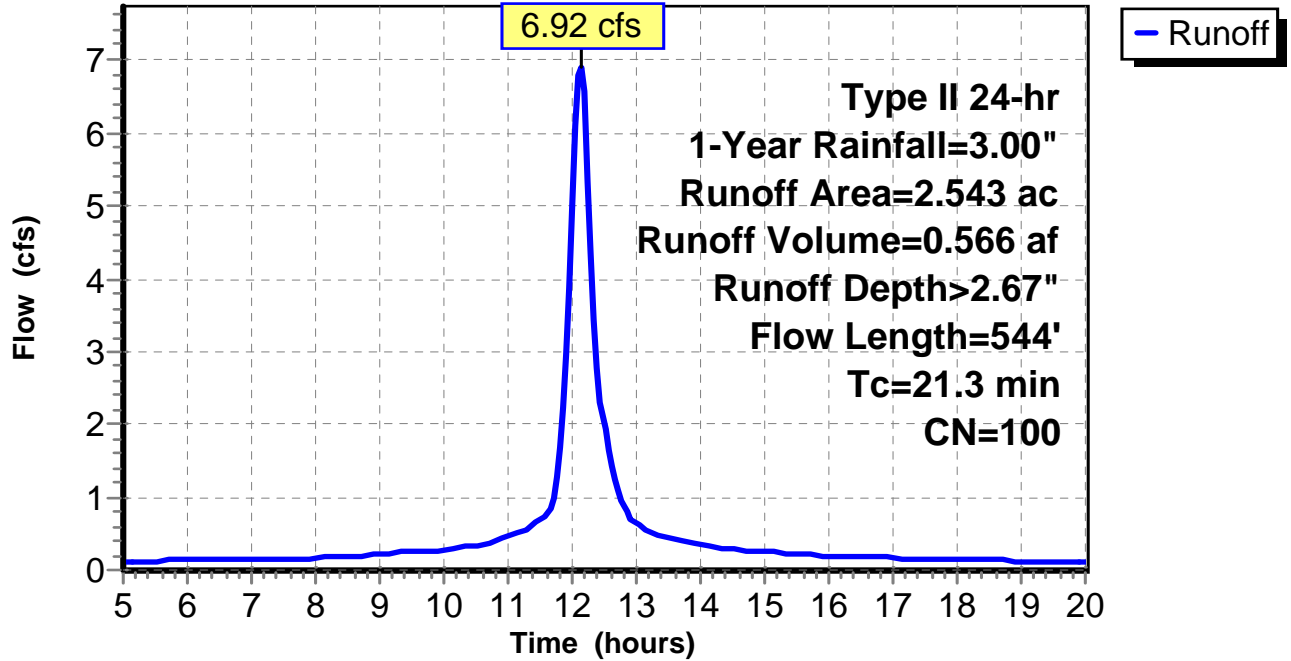
Subcatchment 9: C AR102.037

Hydrograph



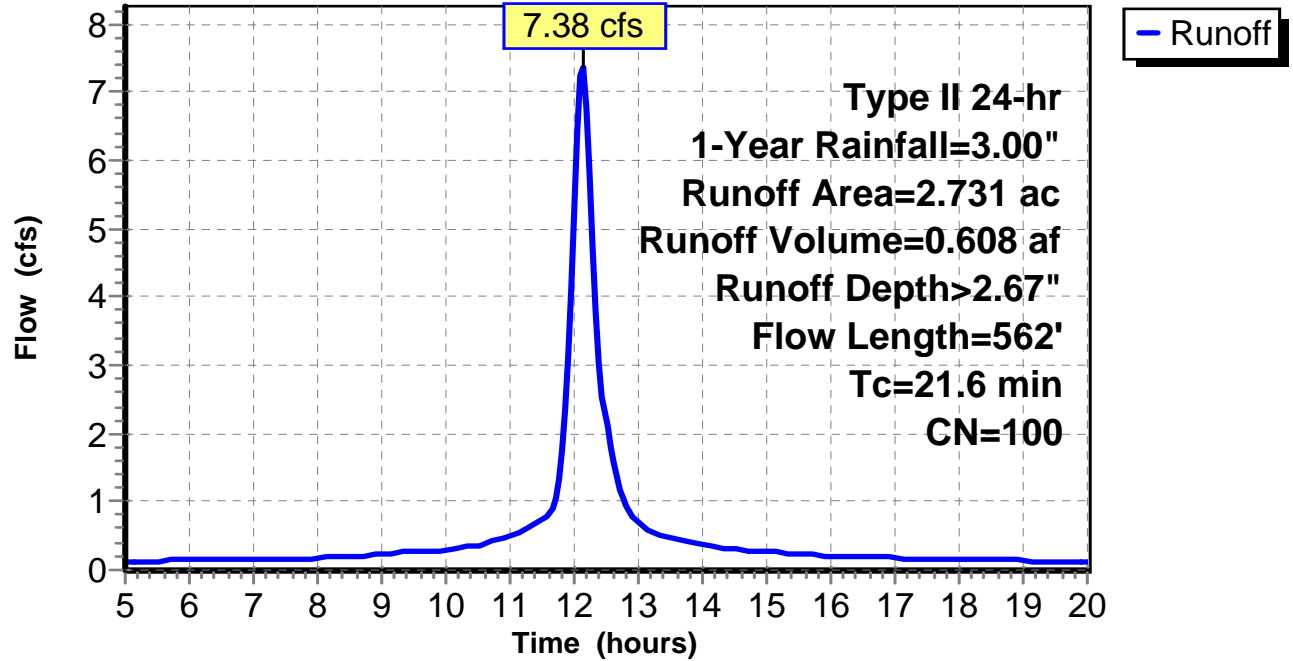
Subcatchment 10: C AR102.038

Hydrograph



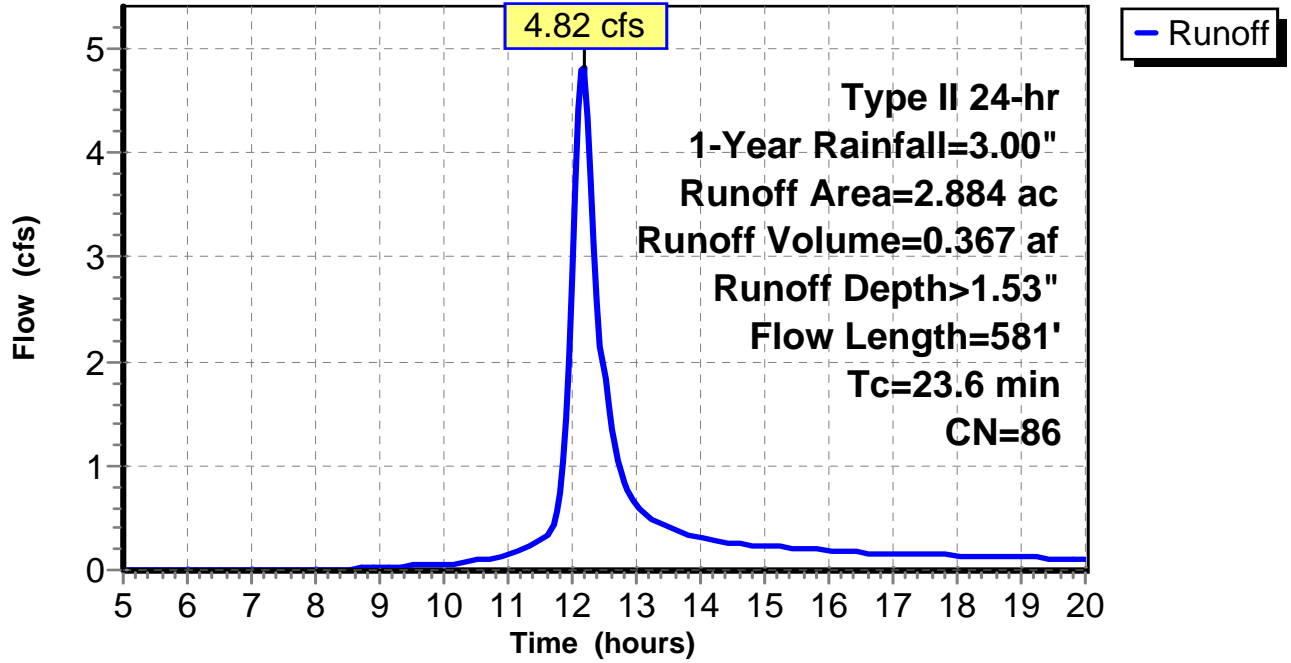
Subcatchment 11: C AR102.039

Hydrograph



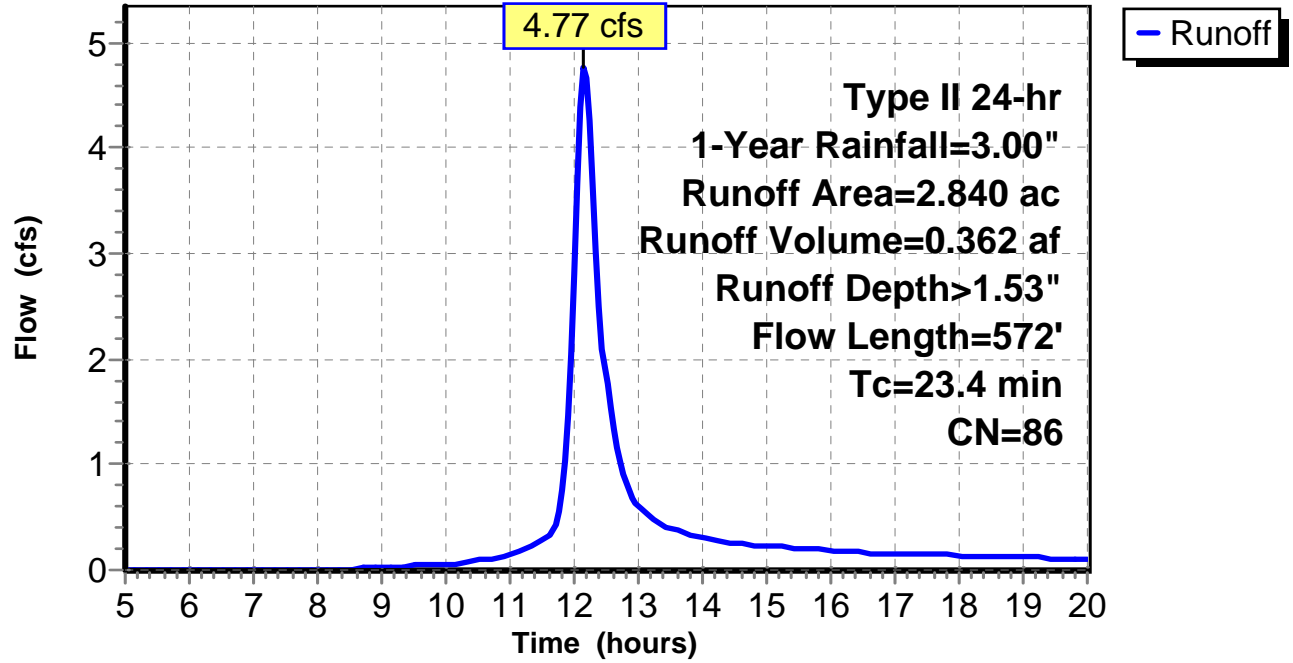
Subcatchment 12: C AR102.040

Hydrograph



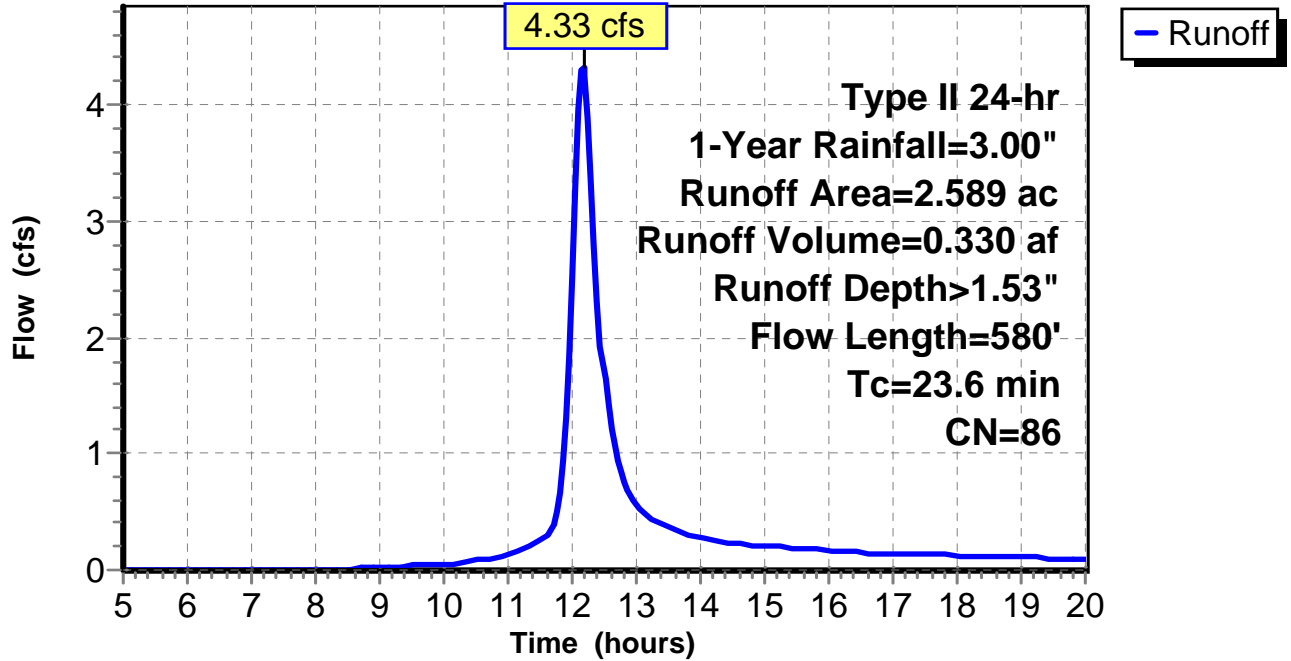
Subcatchment 13: C AR102.041

Hydrograph



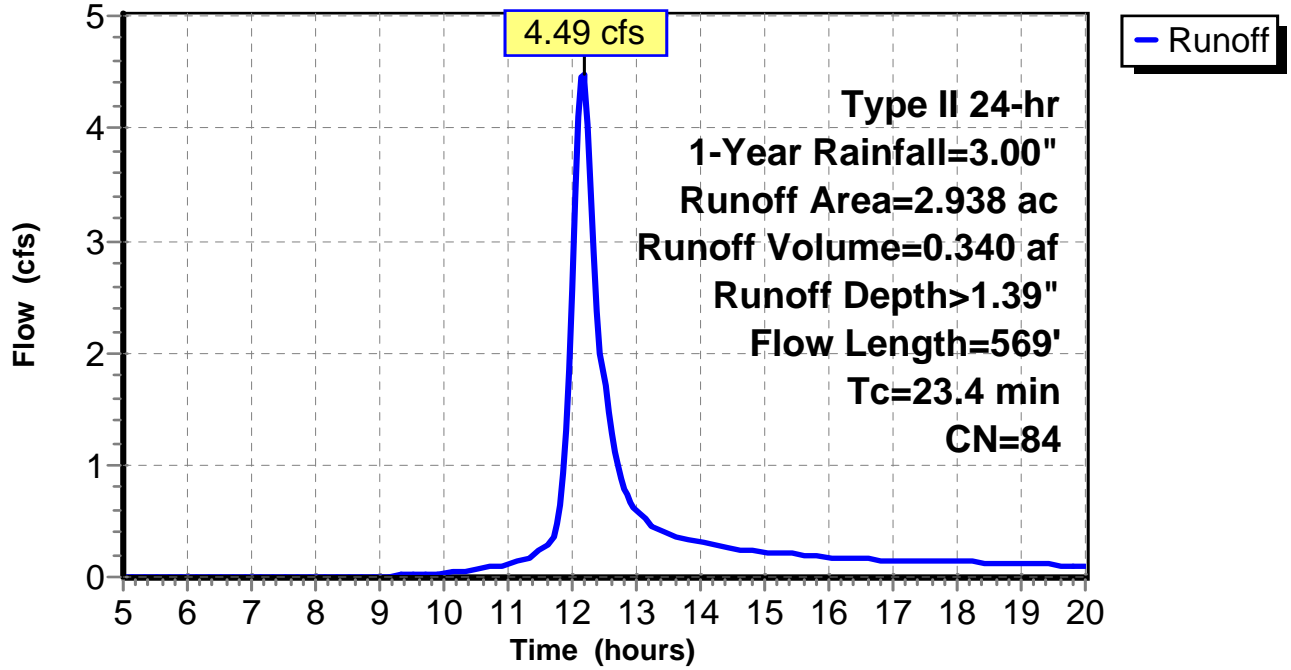
Subcatchment 14: C AR102.042

Hydrograph



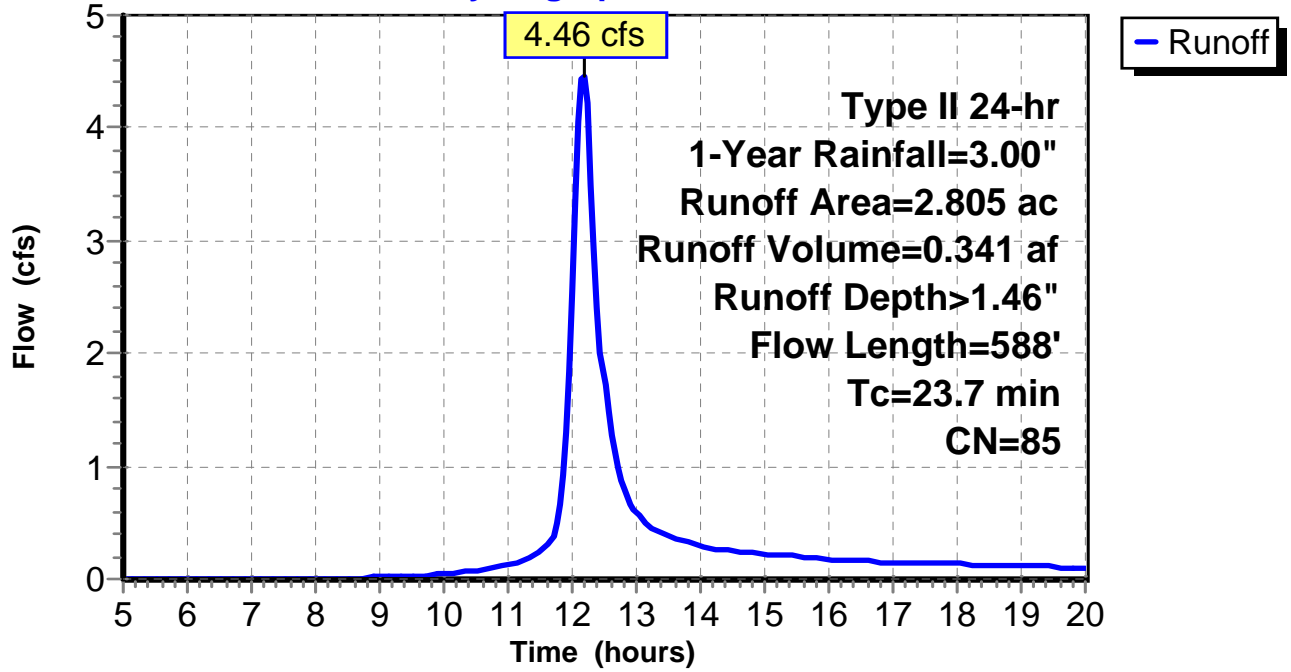
Subcatchment 15: C AR102.043

Hydrograph



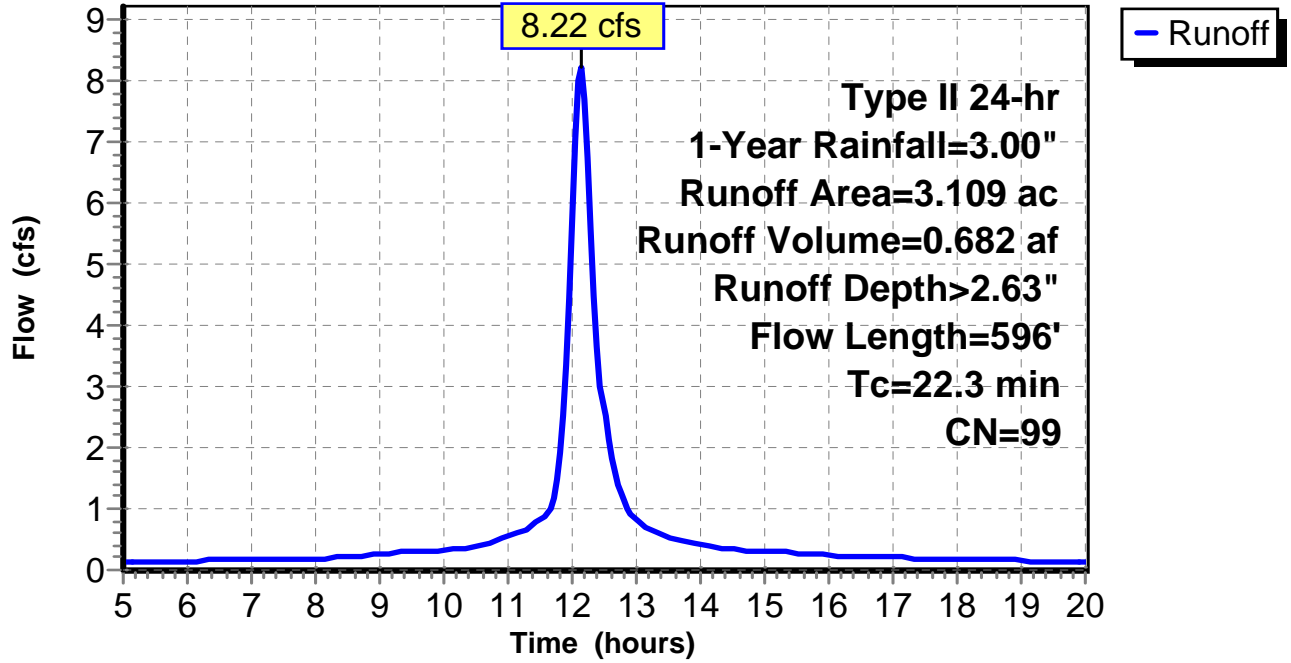
Subcatchment 16: C AR102.044

Hydrograph



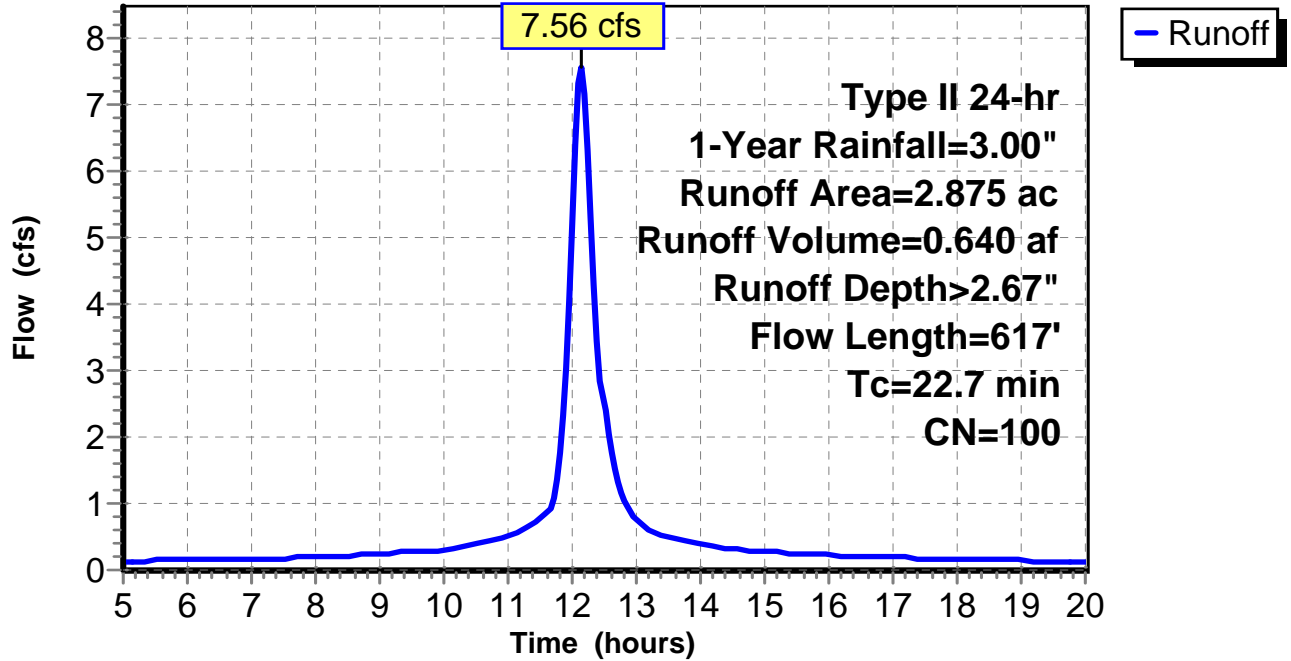
Subcatchment 17: C AR102.045

Hydrograph



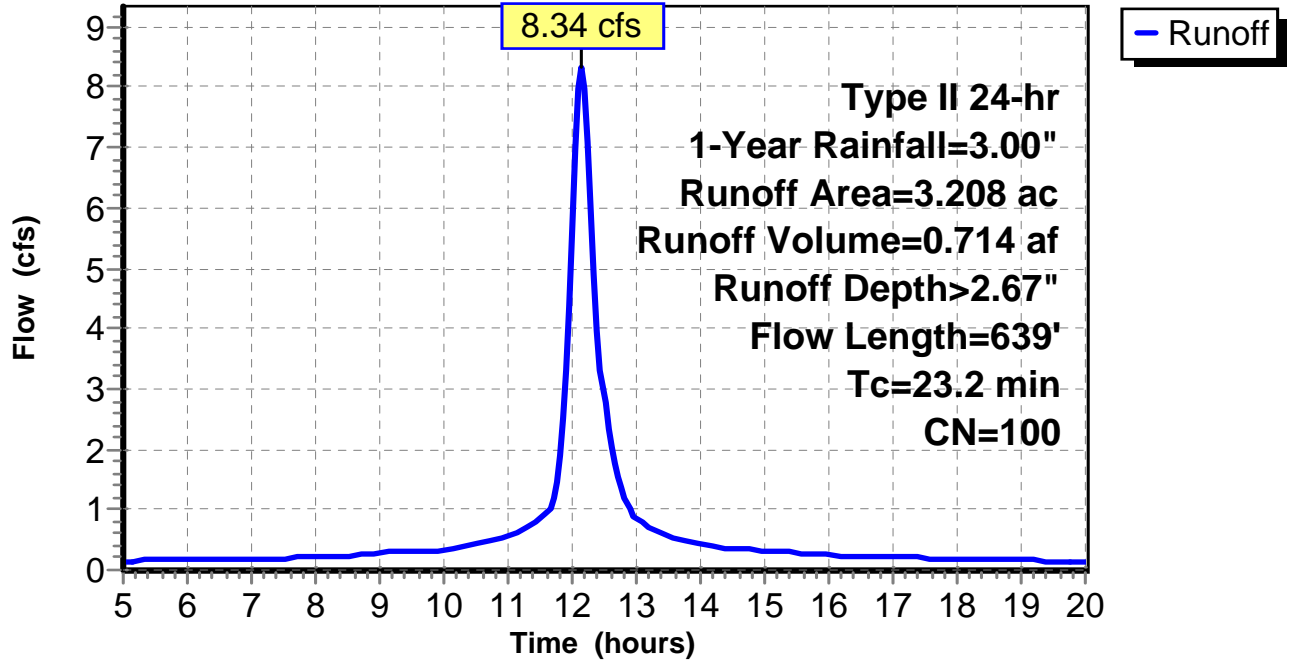
Subcatchment 18: C AR102.046

Hydrograph



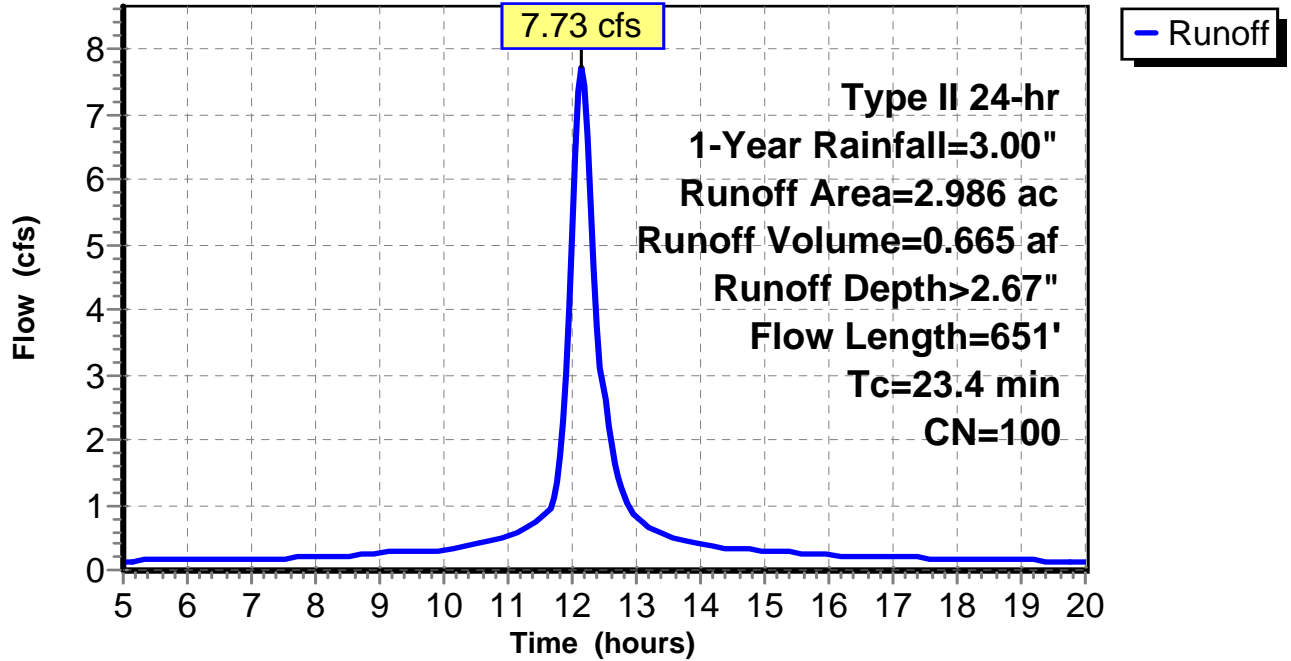
Subcatchment 19: C 75.001

Hydrograph



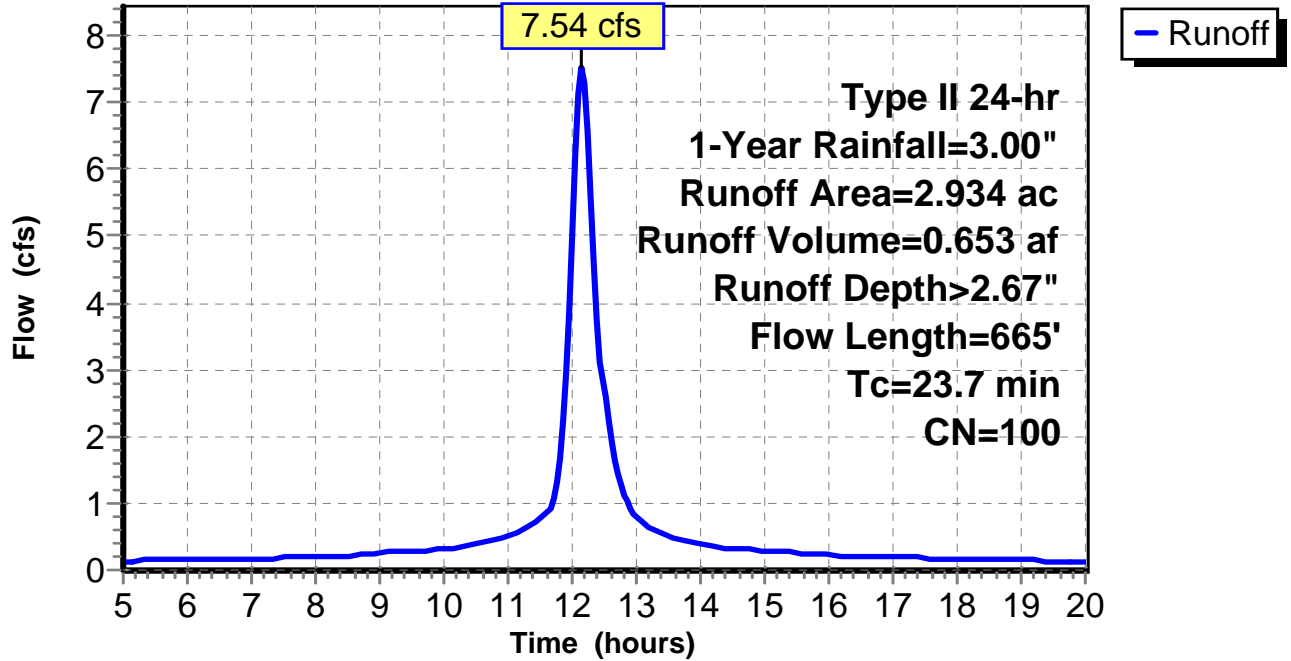
Subcatchment 20: C 75.002

Hydrograph



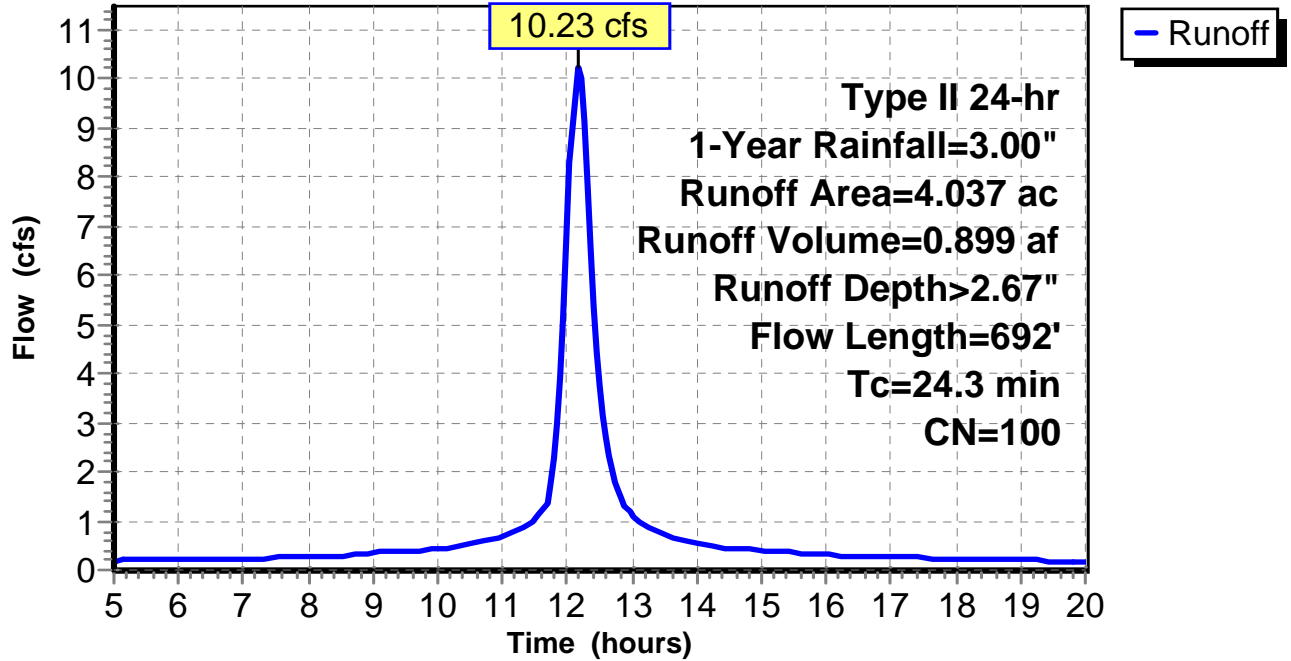
Subcatchment 21: C 75.003

Hydrograph



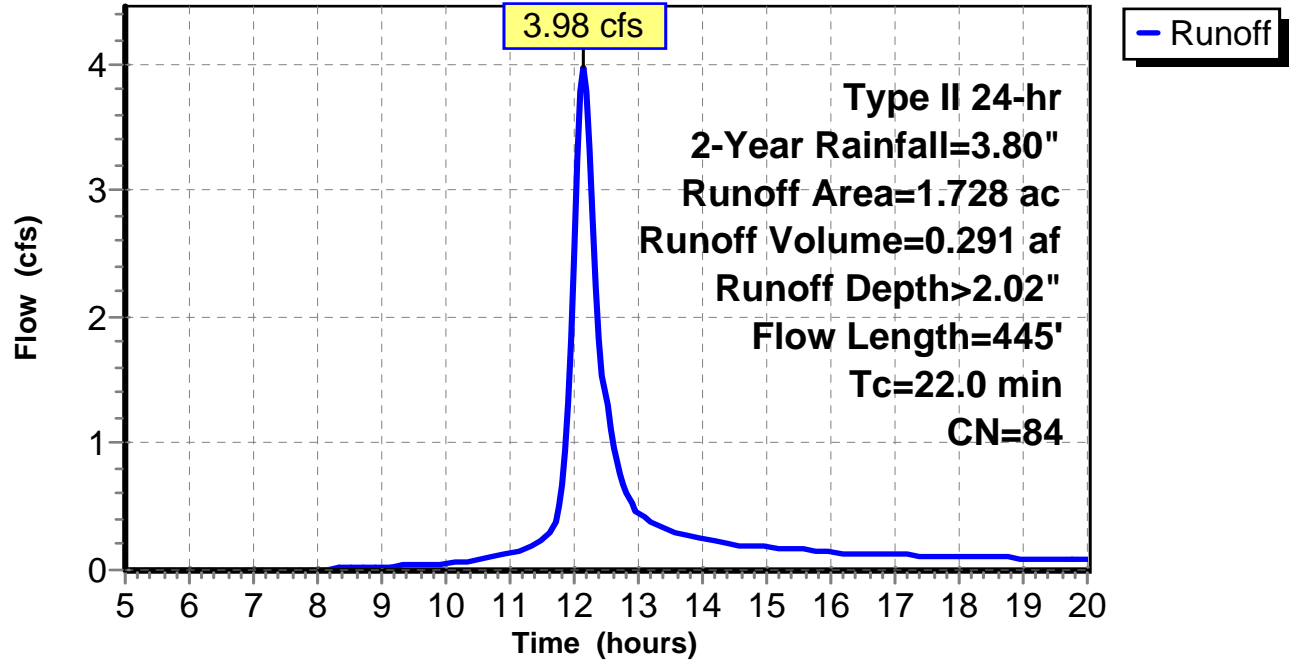
Subcatchment 22: C 75.004

Hydrograph



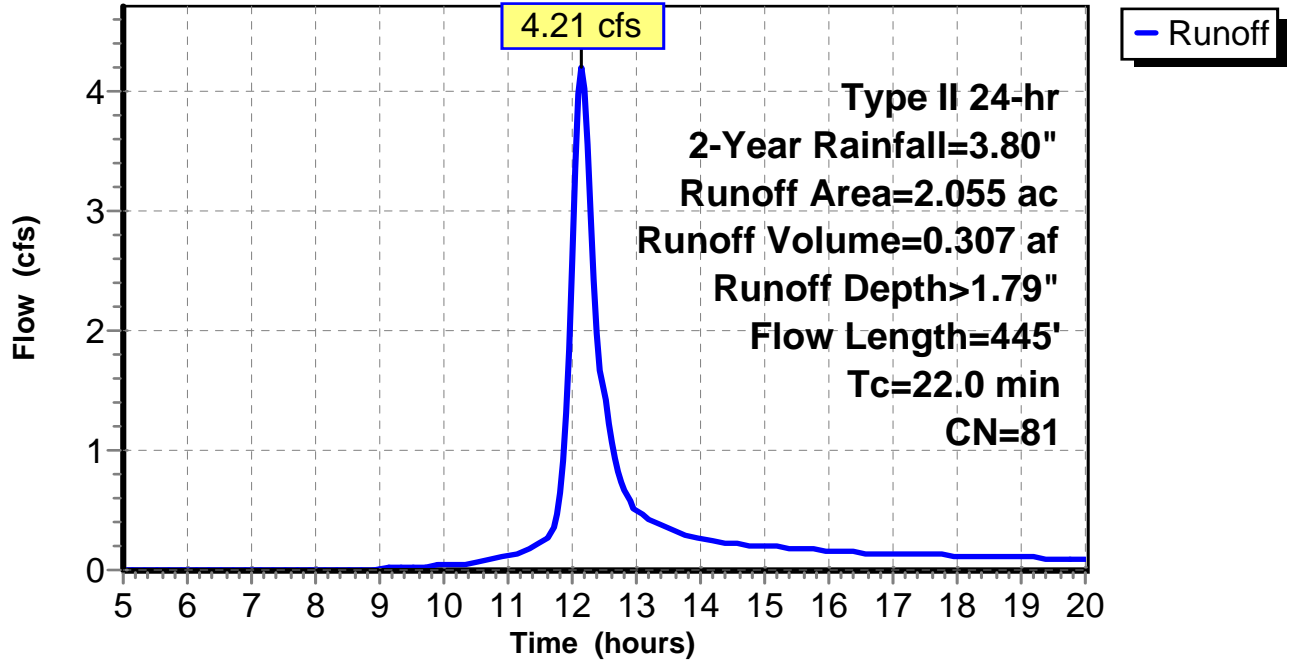
Subcatchment 1: C AR102.029

Hydrograph



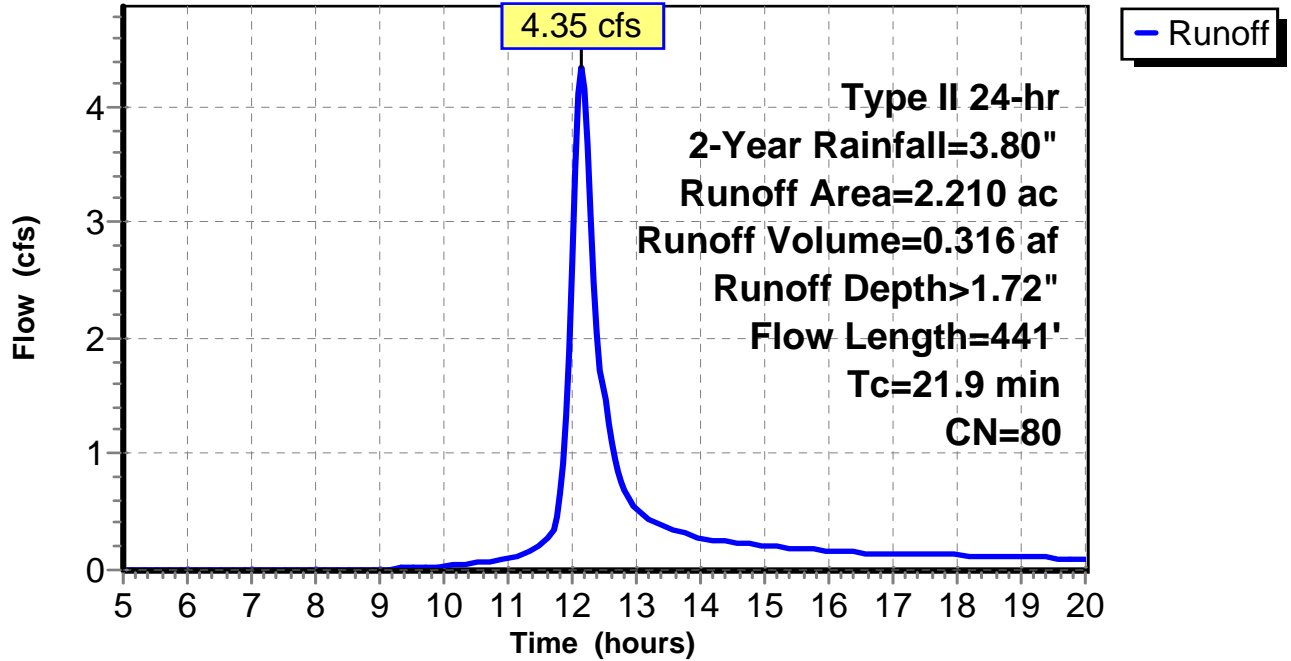
Subcatchment 2: C AR102.030

Hydrograph



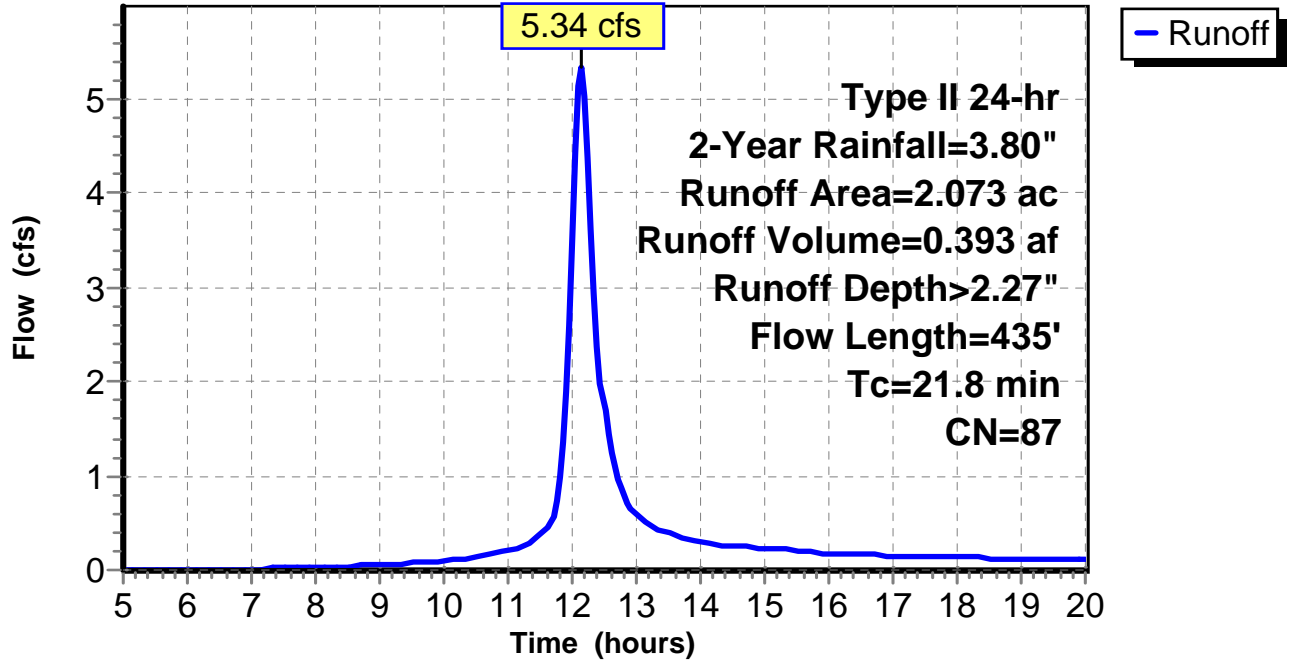
Subcatchment 3: C AR102.031

Hydrograph



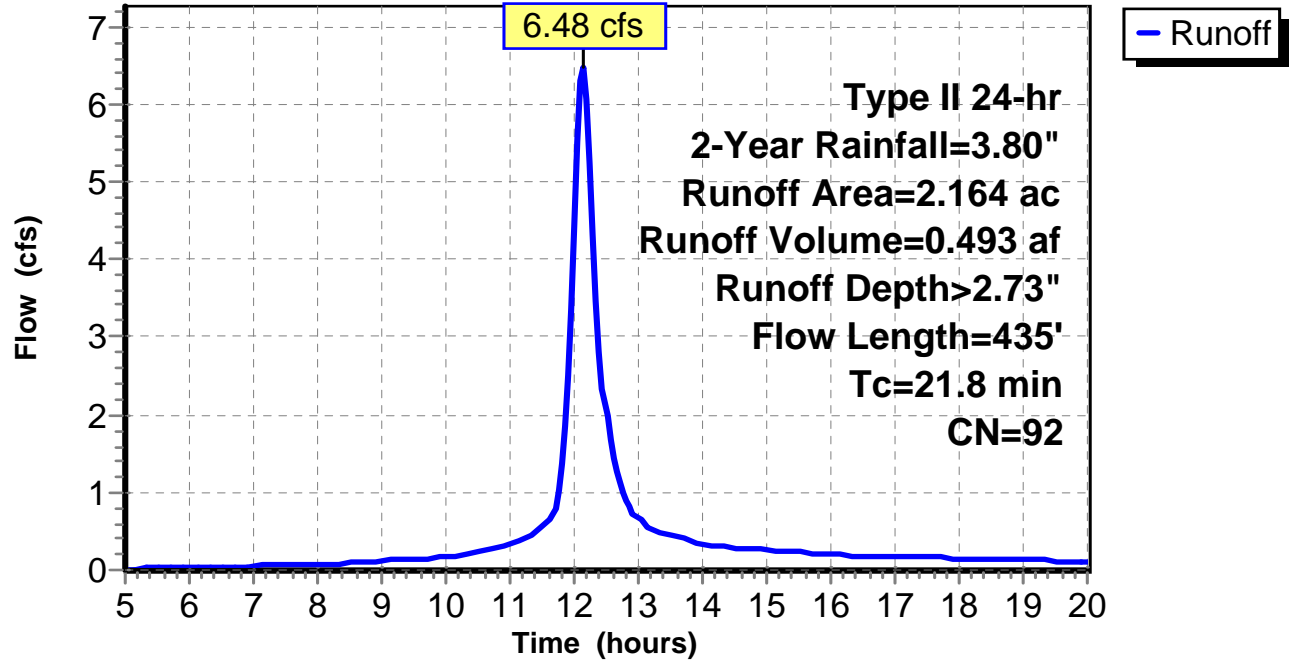
Subcatchment 4: C AR102.032

Hydrograph



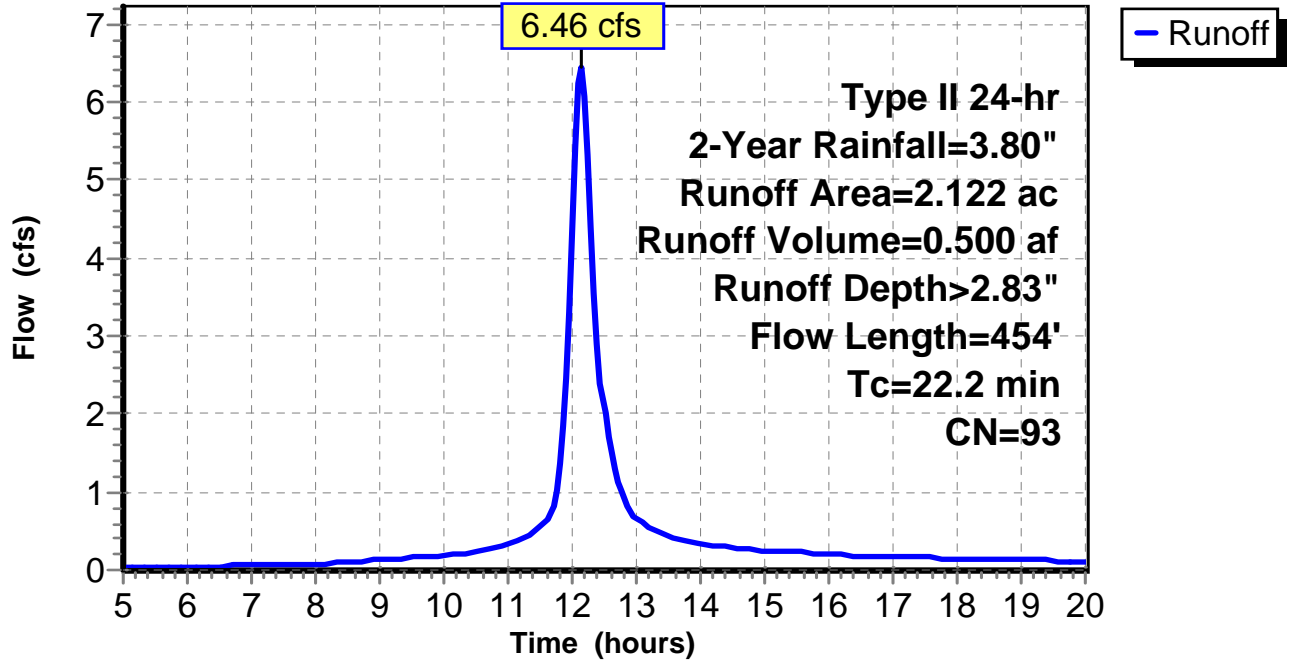
Subcatchment 5: C AR102.033

Hydrograph



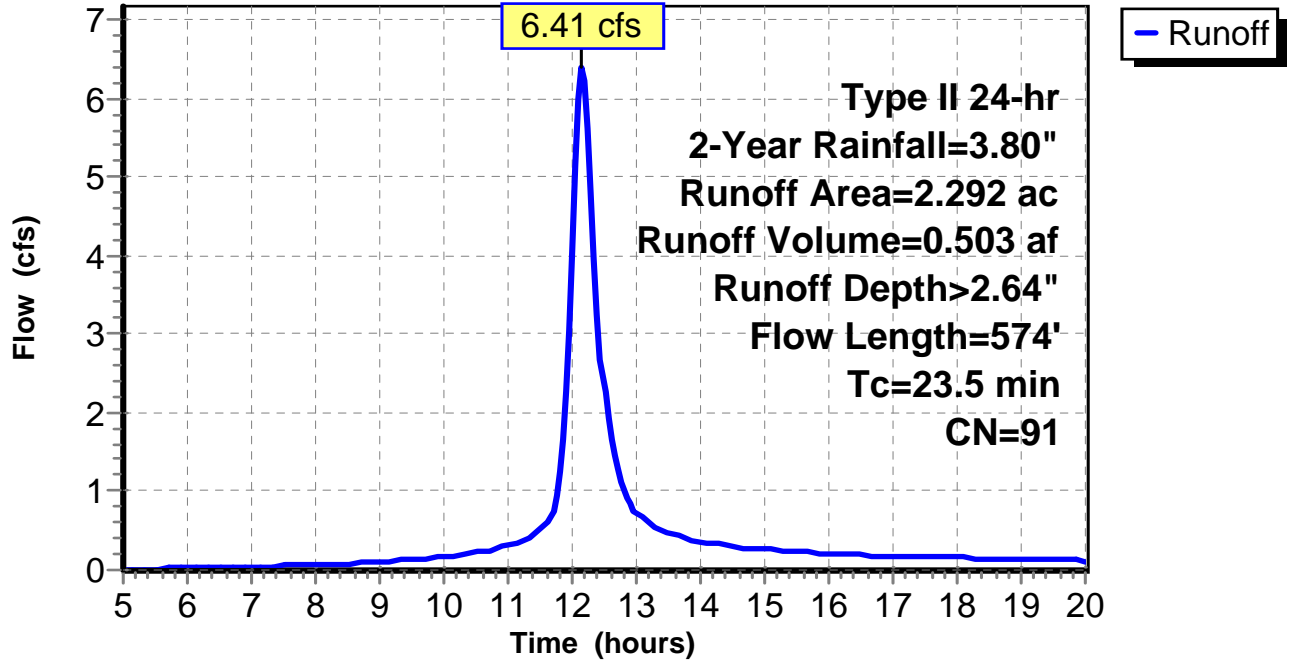
Subcatchment 6: C AR102.034

Hydrograph



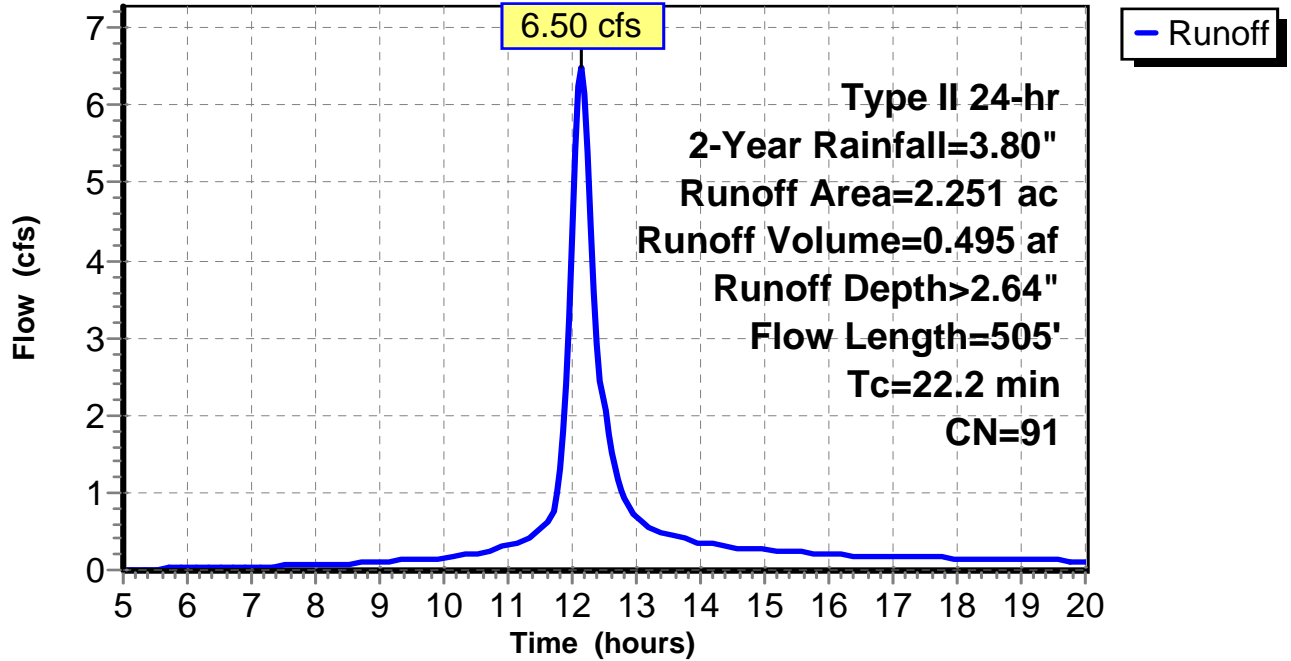
Subcatchment 7: C AR102.035

Hydrograph



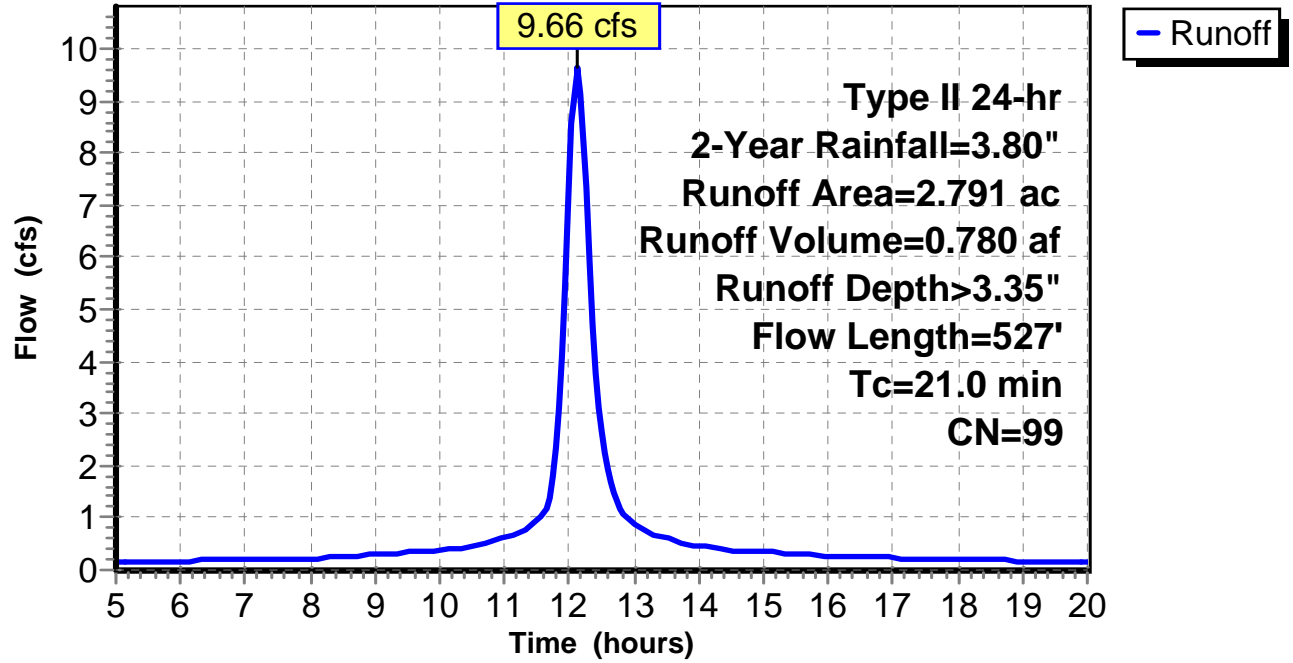
Subcatchment 8: C AR102.036

Hydrograph



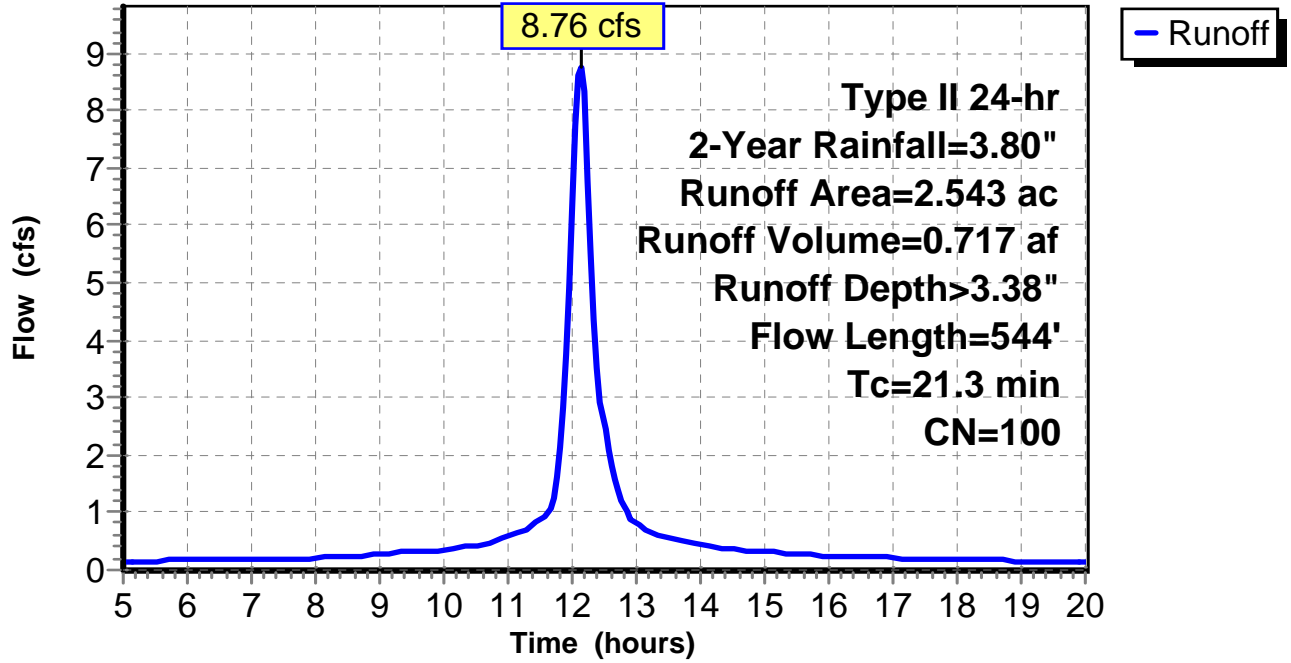
Subcatchment 9: C AR102.037

Hydrograph



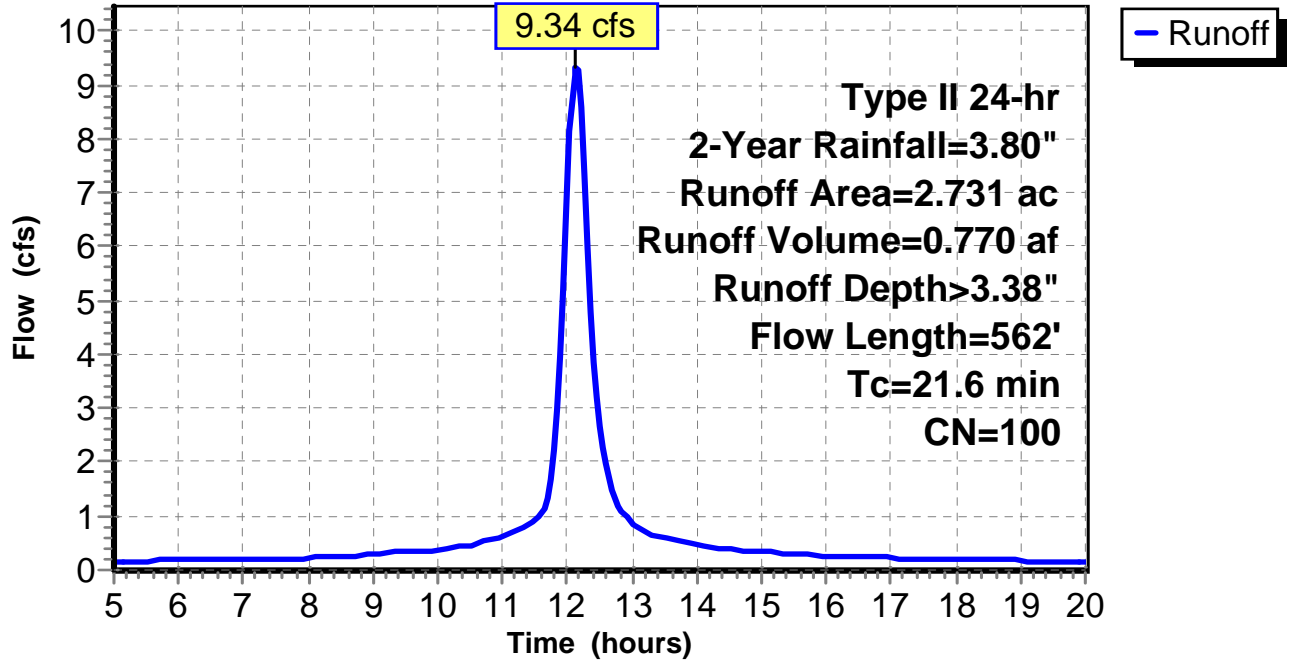
Subcatchment 10: C AR102.038

Hydrograph



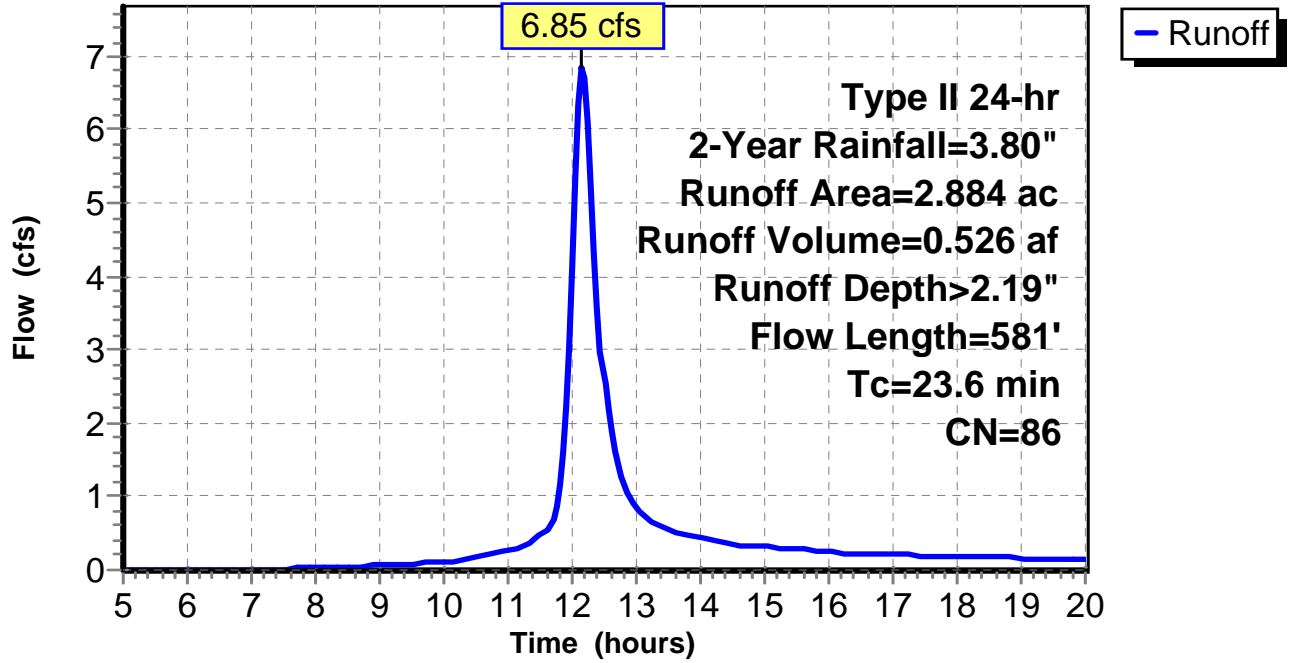
Subcatchment 11: C AR102.039

Hydrograph



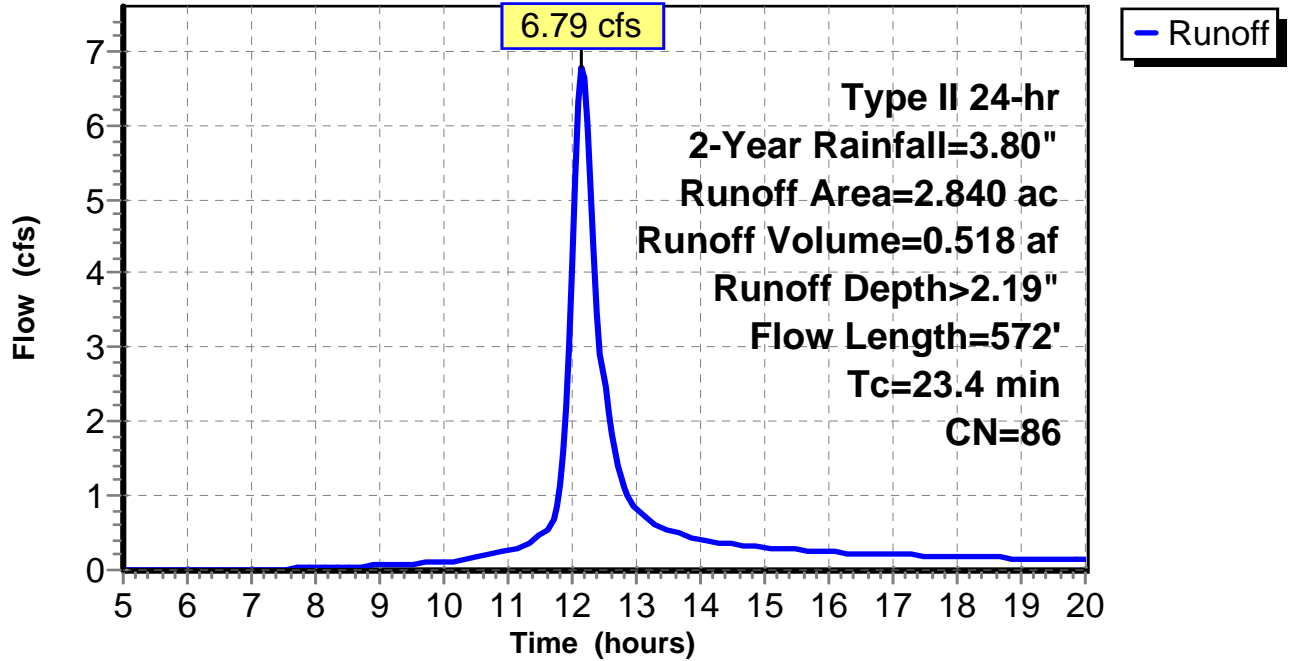
Subcatchment 12: C AR102.040

Hydrograph



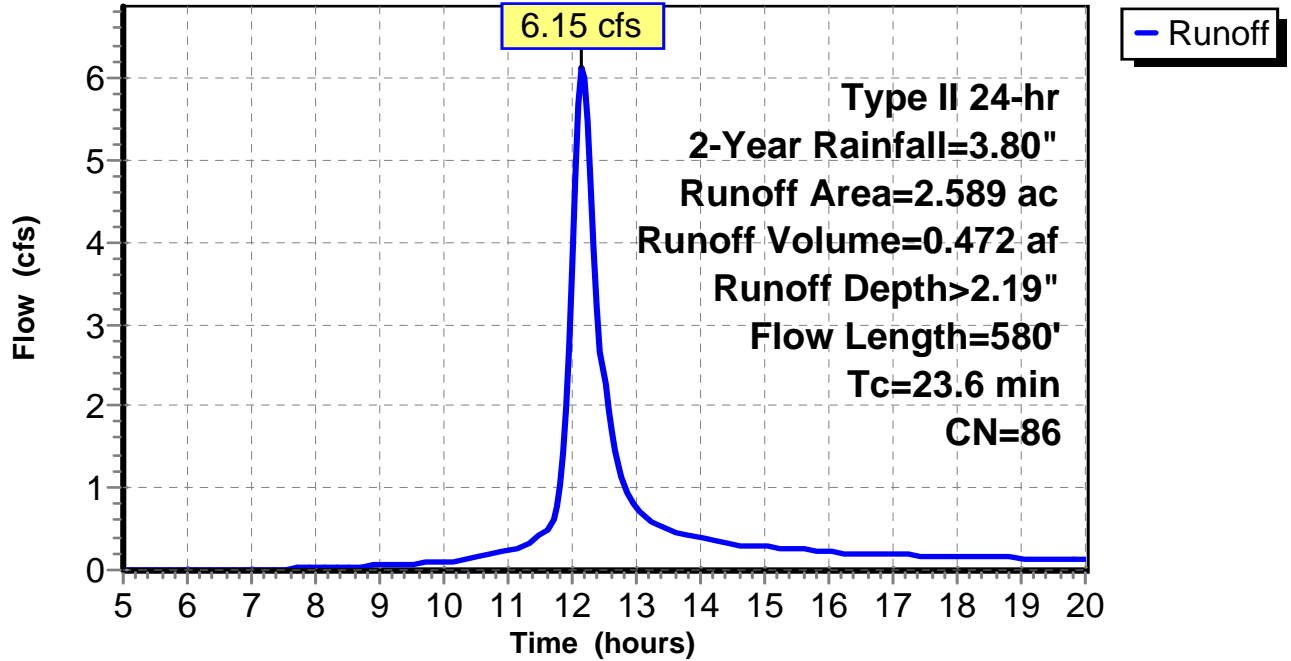
Subcatchment 13: C AR102.041

Hydrograph



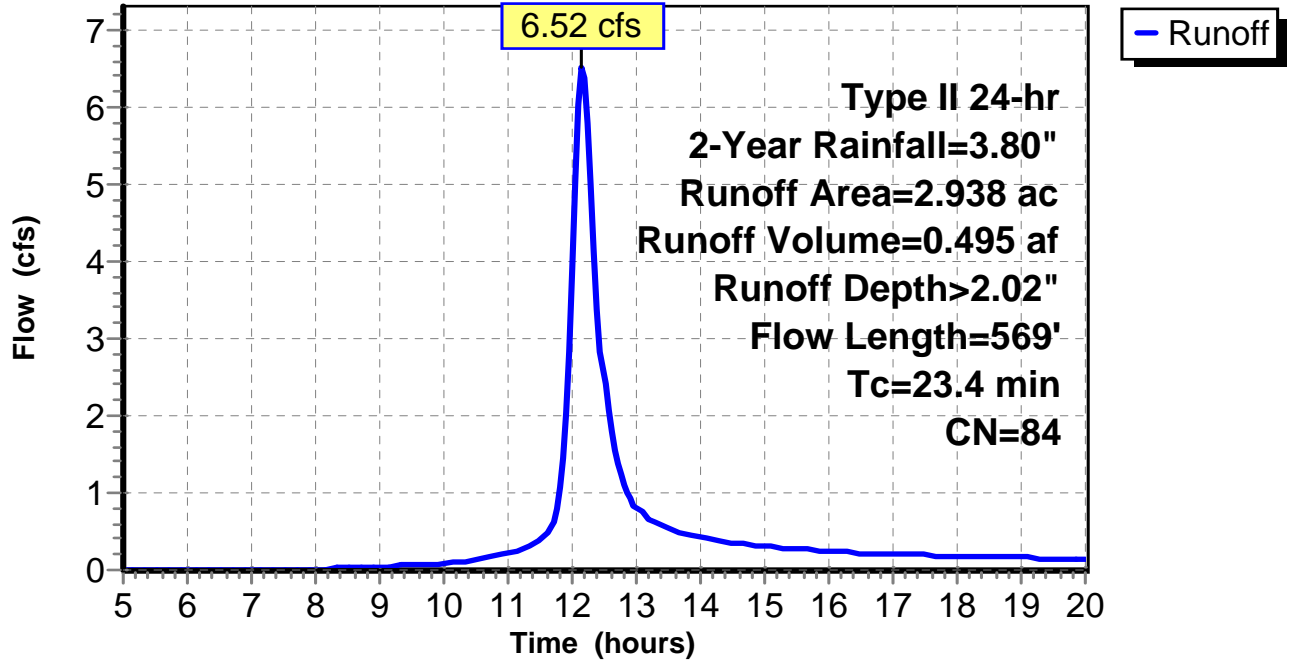
Subcatchment 14: C AR102.042

Hydrograph



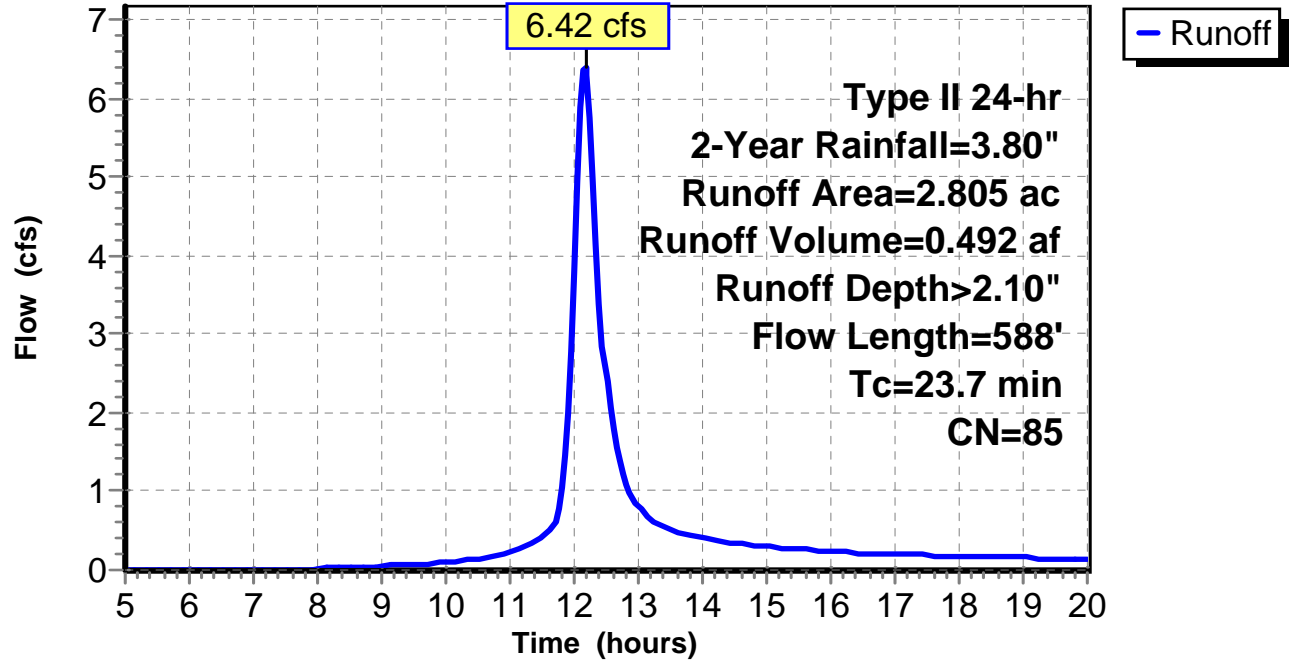
Subcatchment 15: C AR102.043

Hydrograph



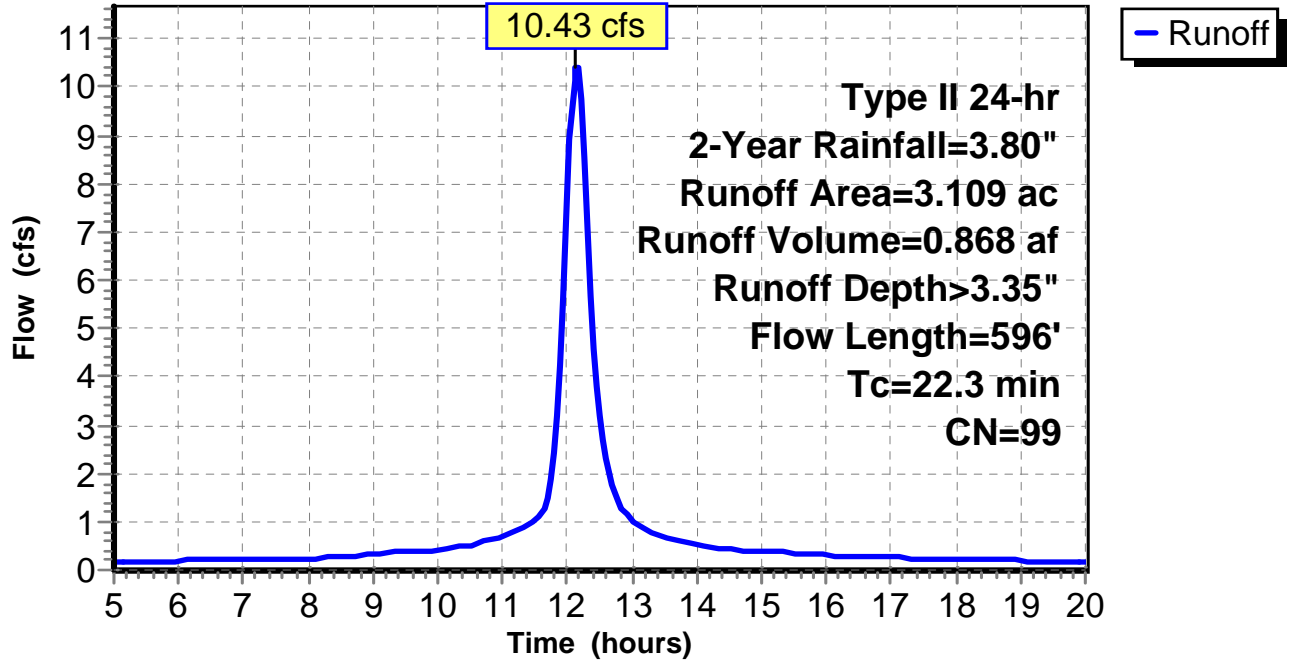
Subcatchment 16: C AR102.044

Hydrograph



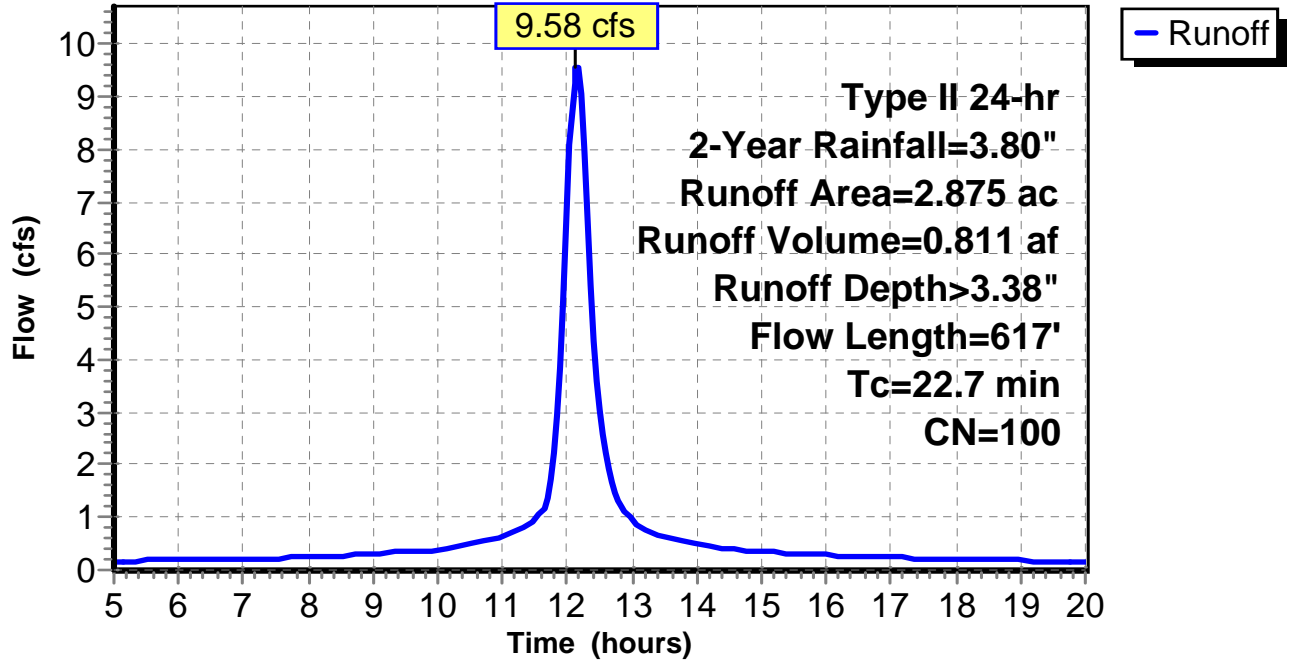
Subcatchment 17: C AR102.045

Hydrograph



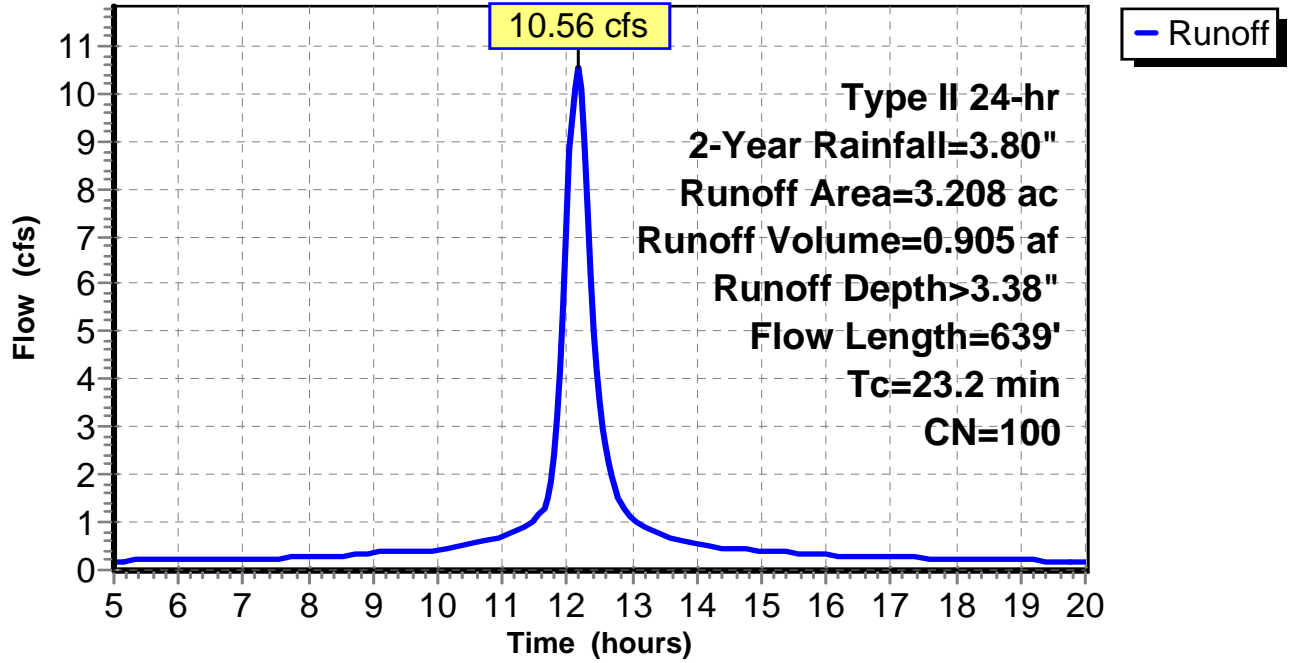
Subcatchment 18: C AR102.046

Hydrograph



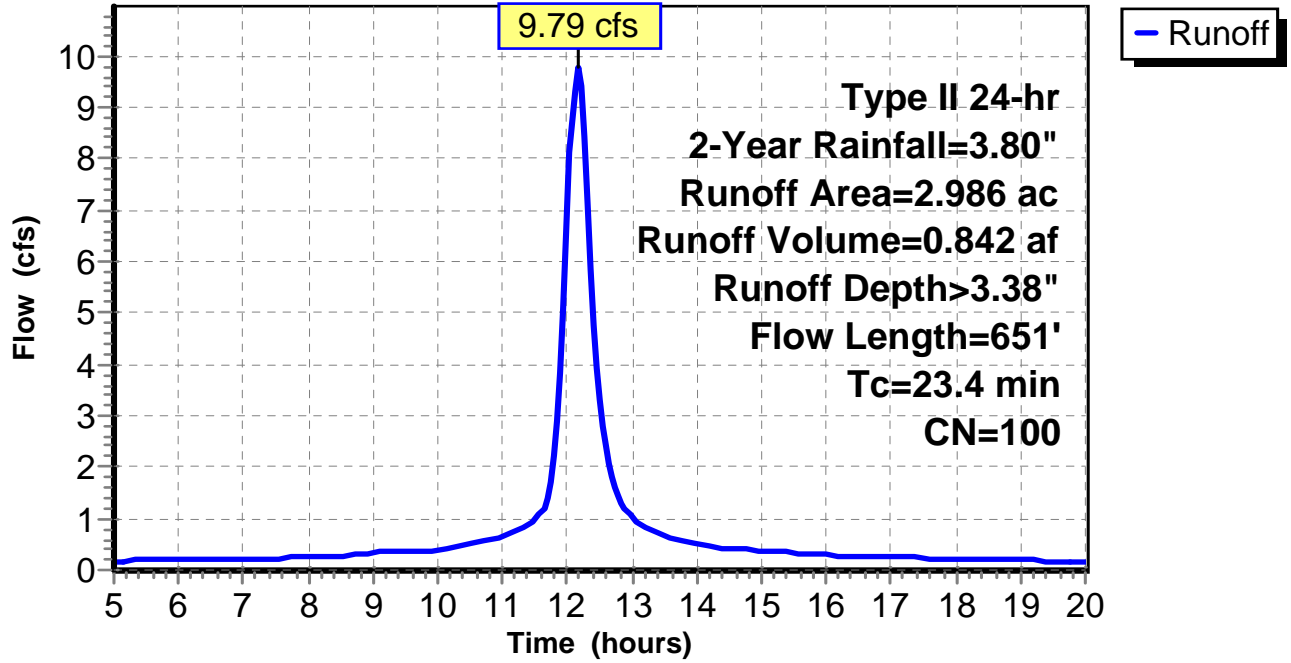
Subcatchment 19: C 75.001

Hydrograph



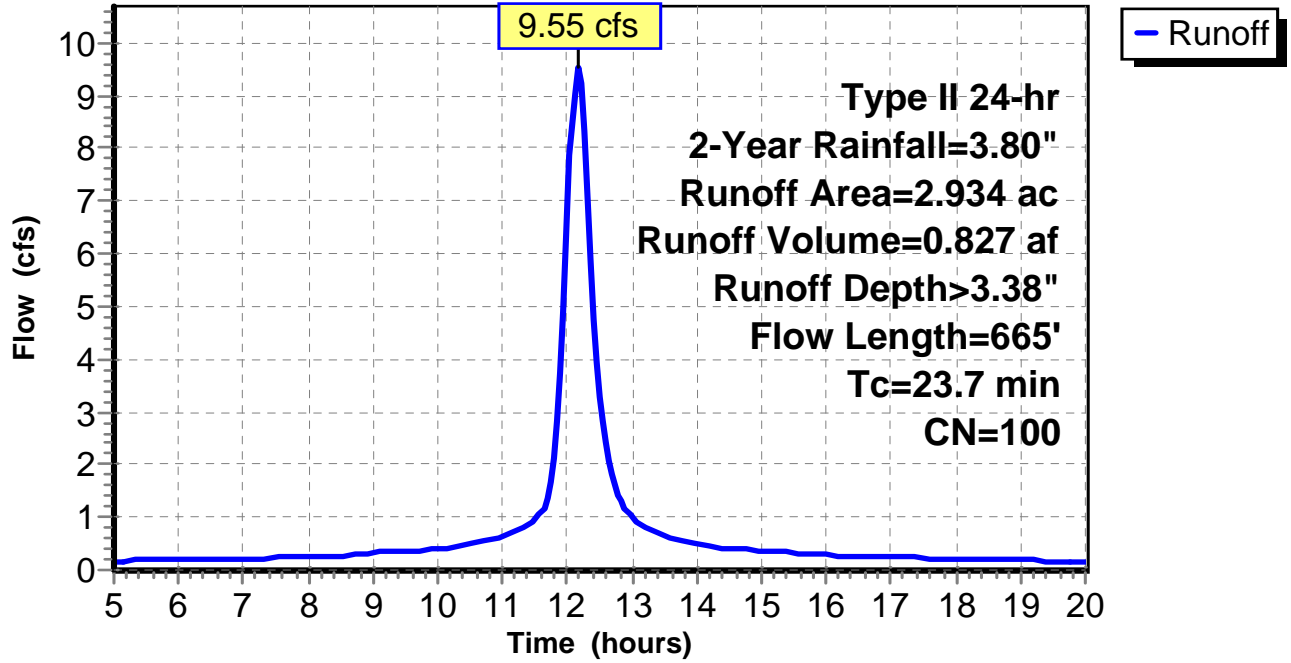
Subcatchment 20: C 75.002

Hydrograph



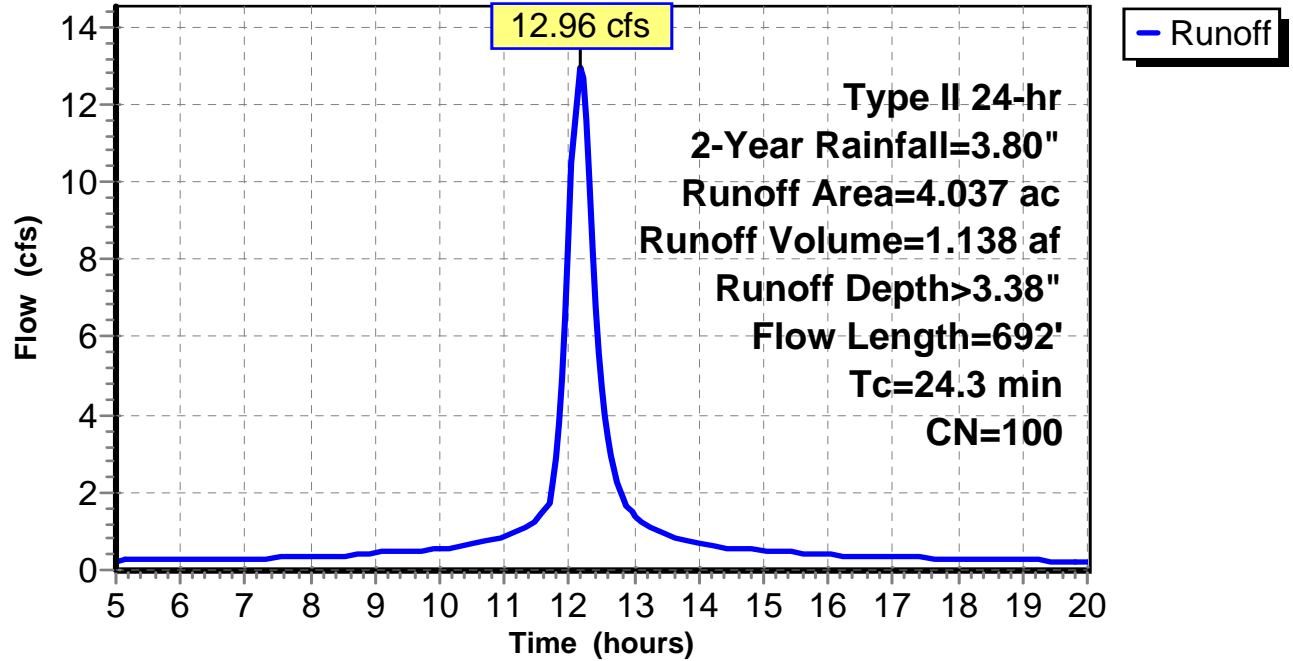
Subcatchment 21: C 75.003

Hydrograph



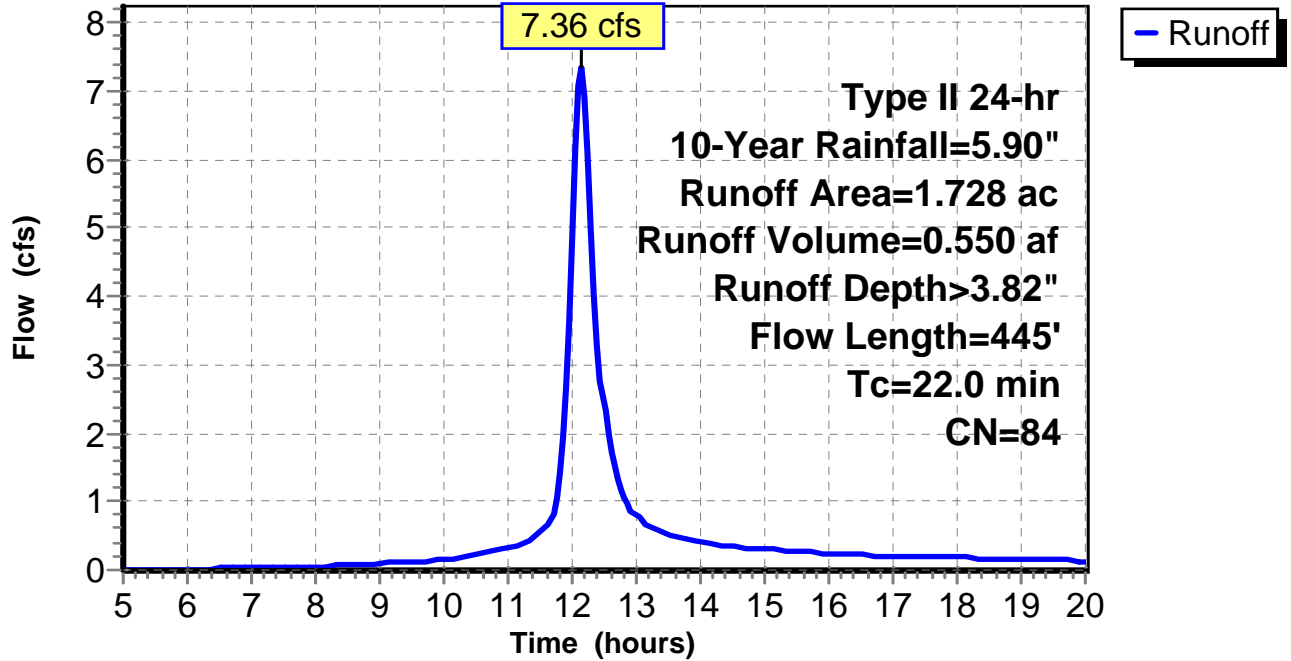
Subcatchment 22: C 75.004

Hydrograph



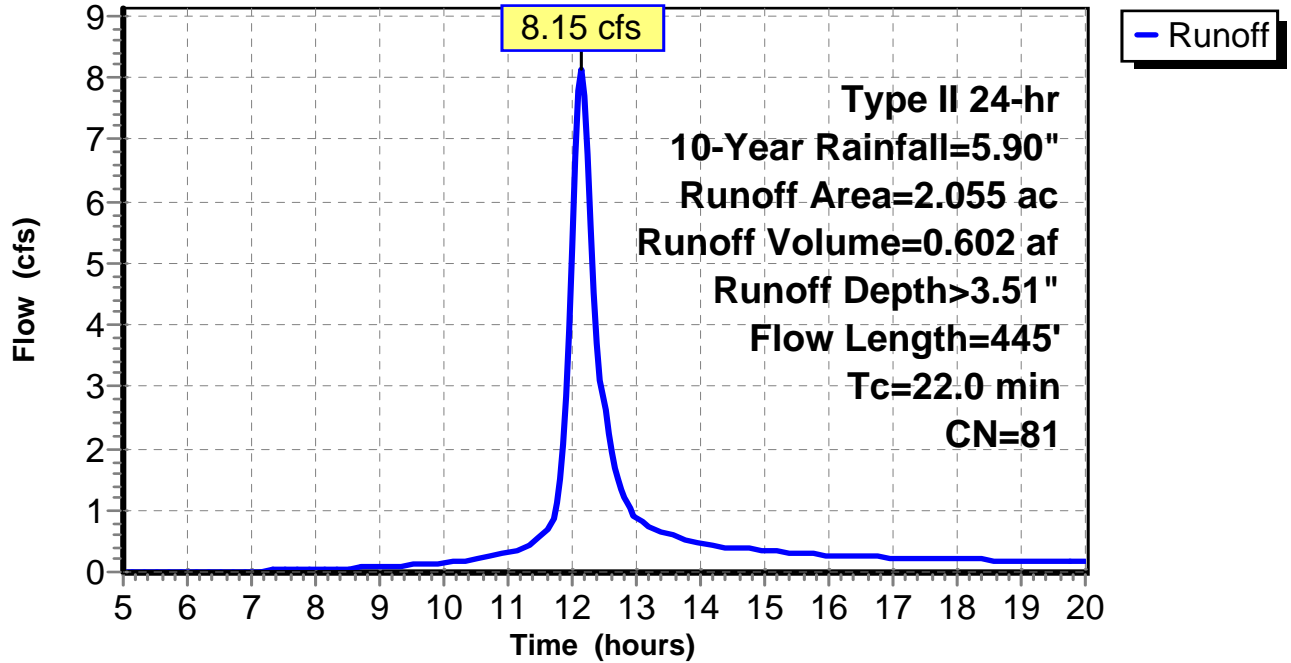
Subcatchment 1: C AR102.029

Hydrograph



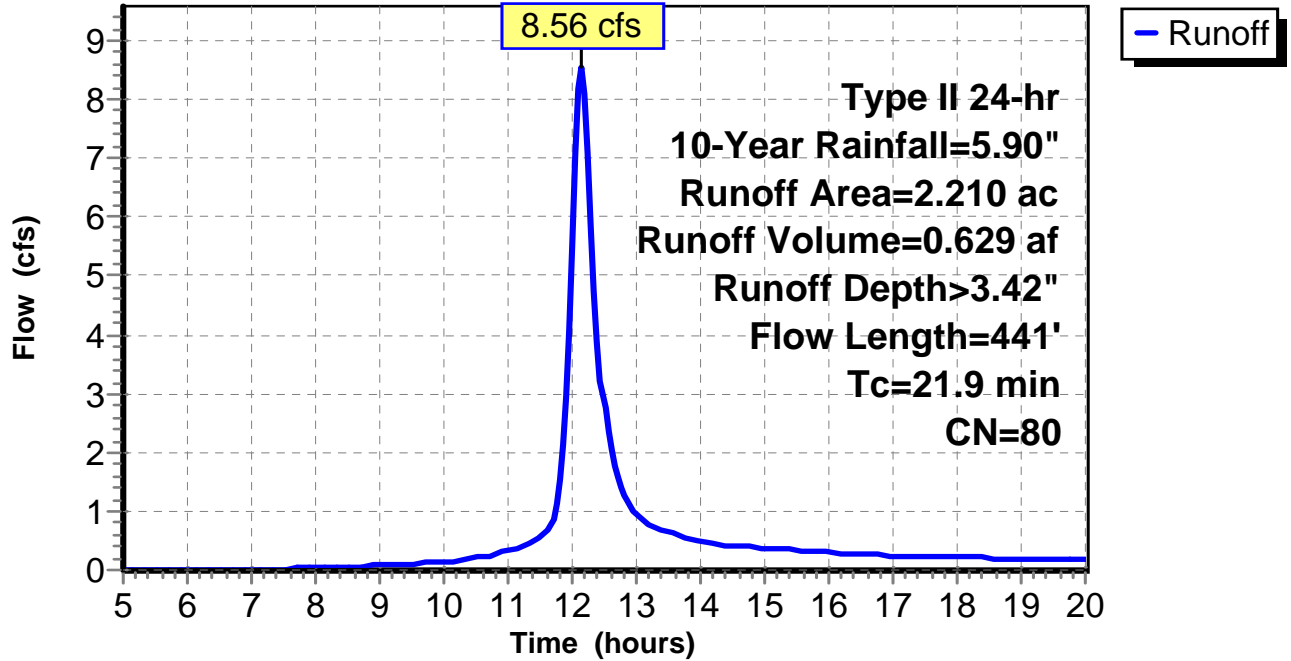
Subcatchment 2: C AR102.030

Hydrograph



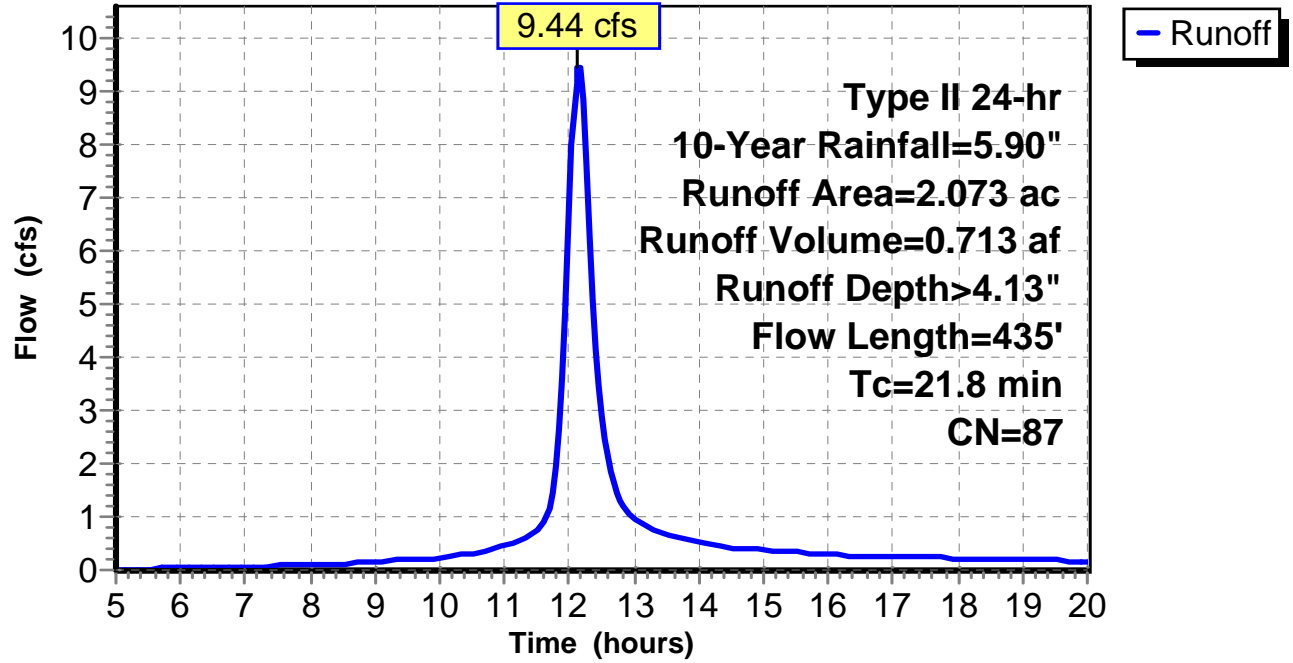
Subcatchment 3: C AR102.031

Hydrograph



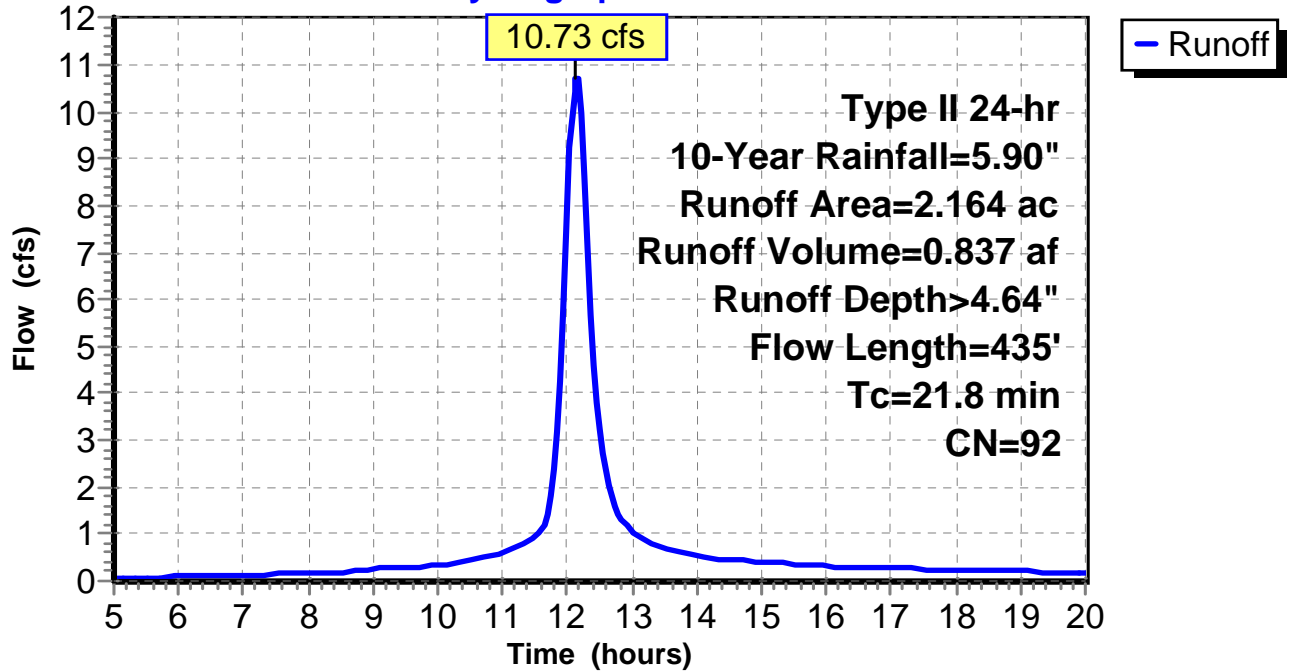
Subcatchment 4: C AR102.032

Hydrograph



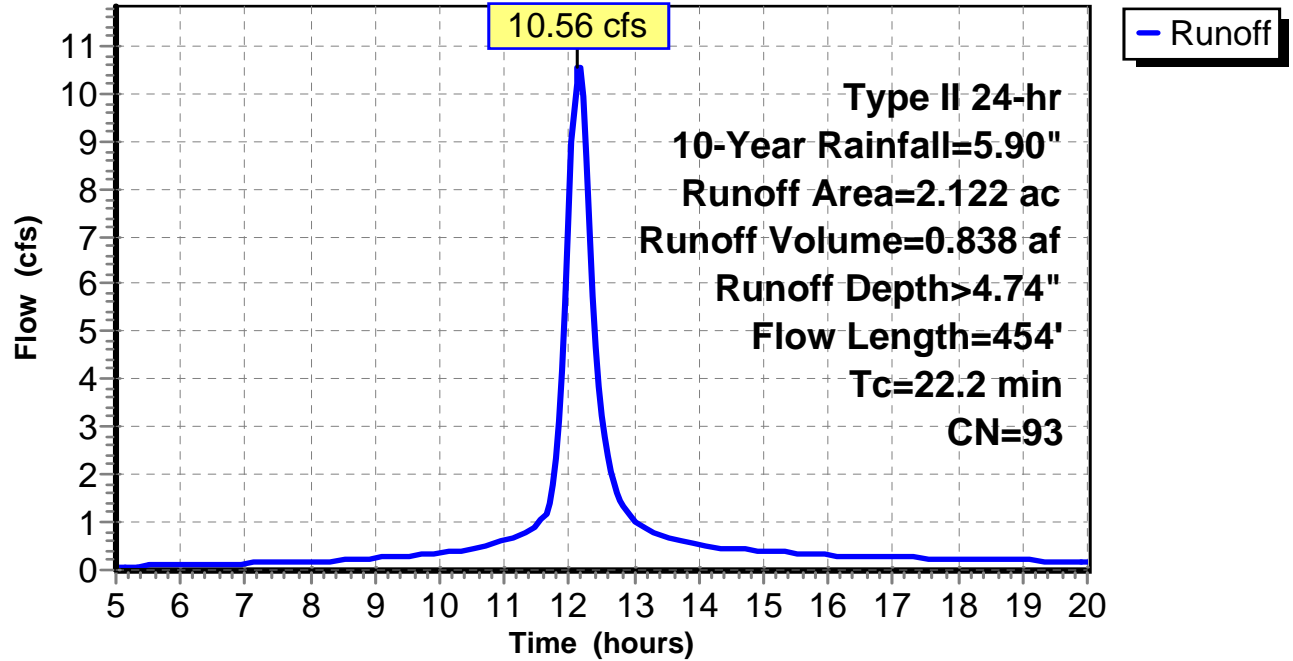
Subcatchment 5: C AR102.033

Hydrograph



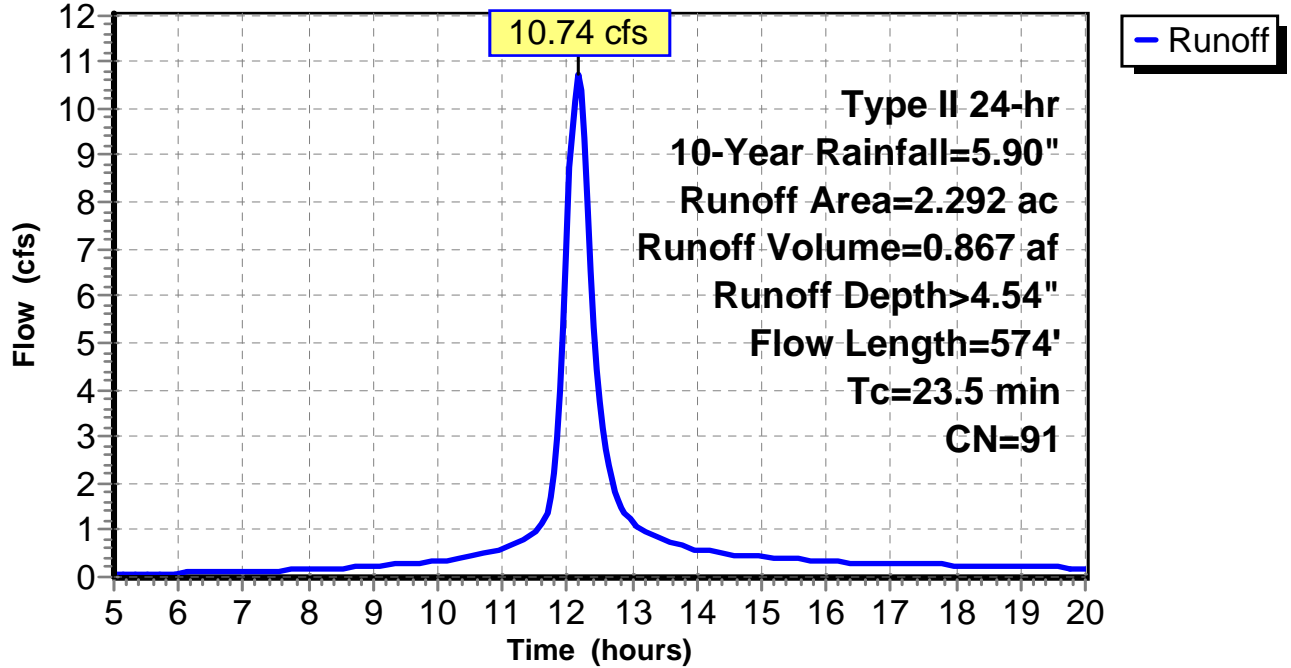
Subcatchment 6: C AR102.034

Hydrograph



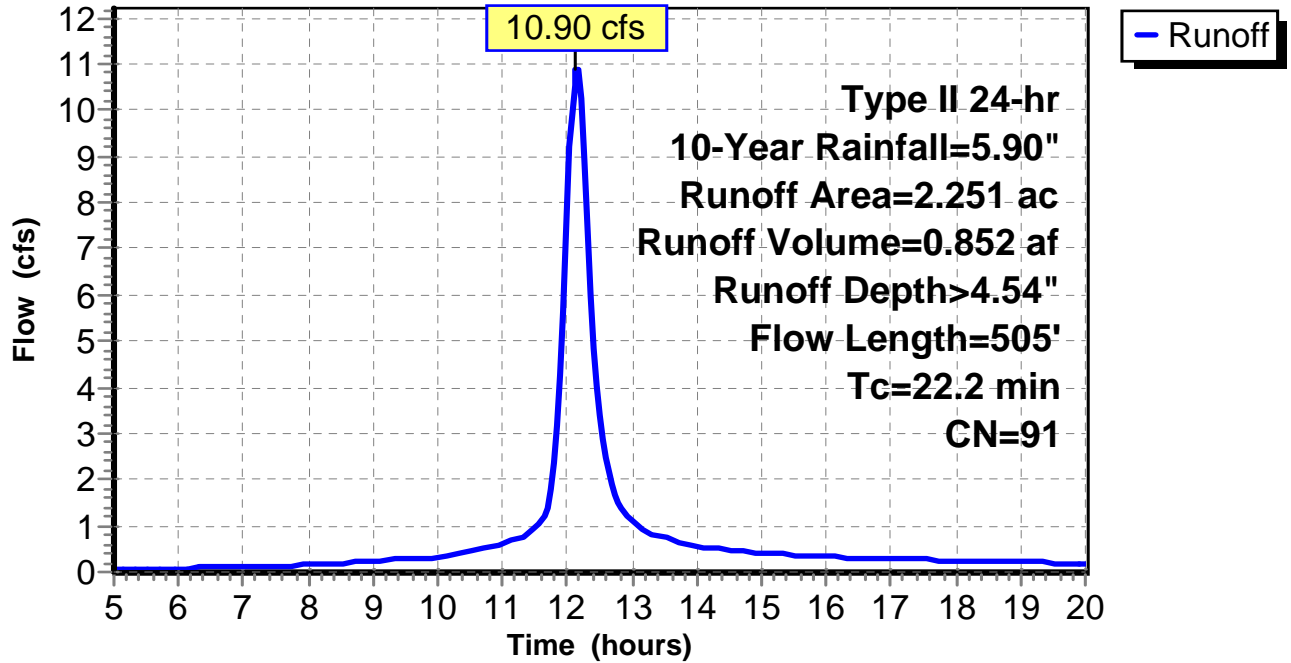
Subcatchment 7: C AR102.035

Hydrograph



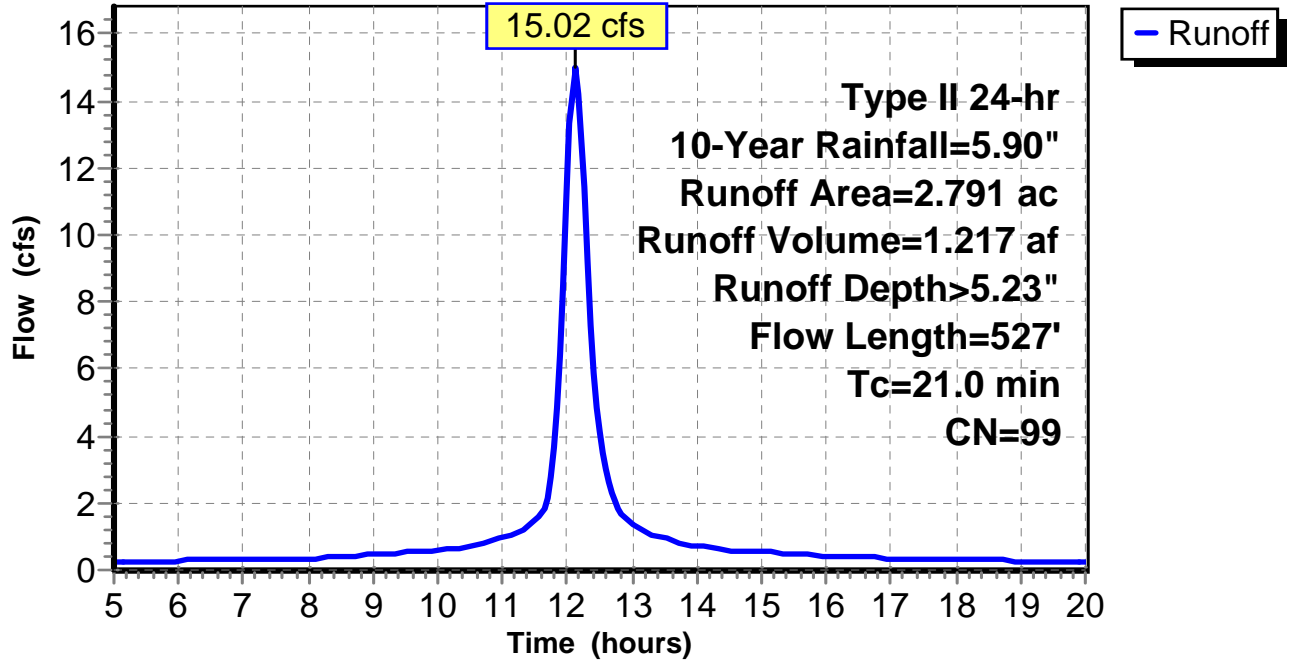
Subcatchment 8: C AR102.036

Hydrograph



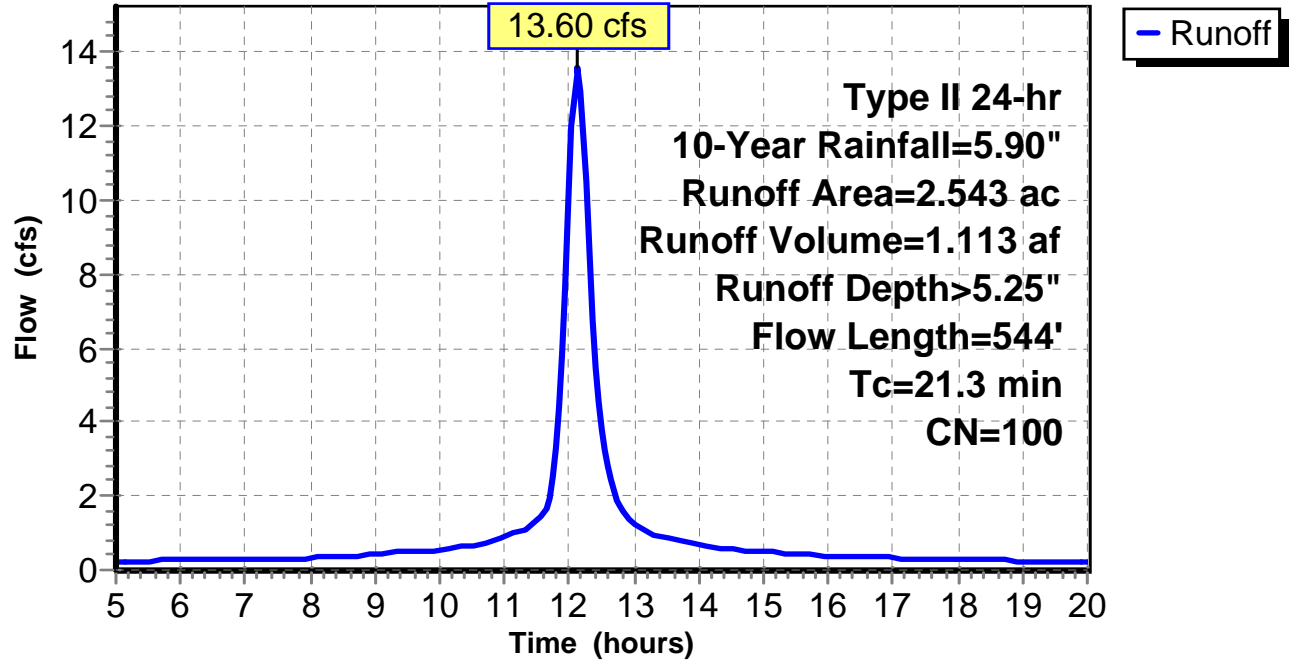
Subcatchment 9: C AR102.037

Hydrograph



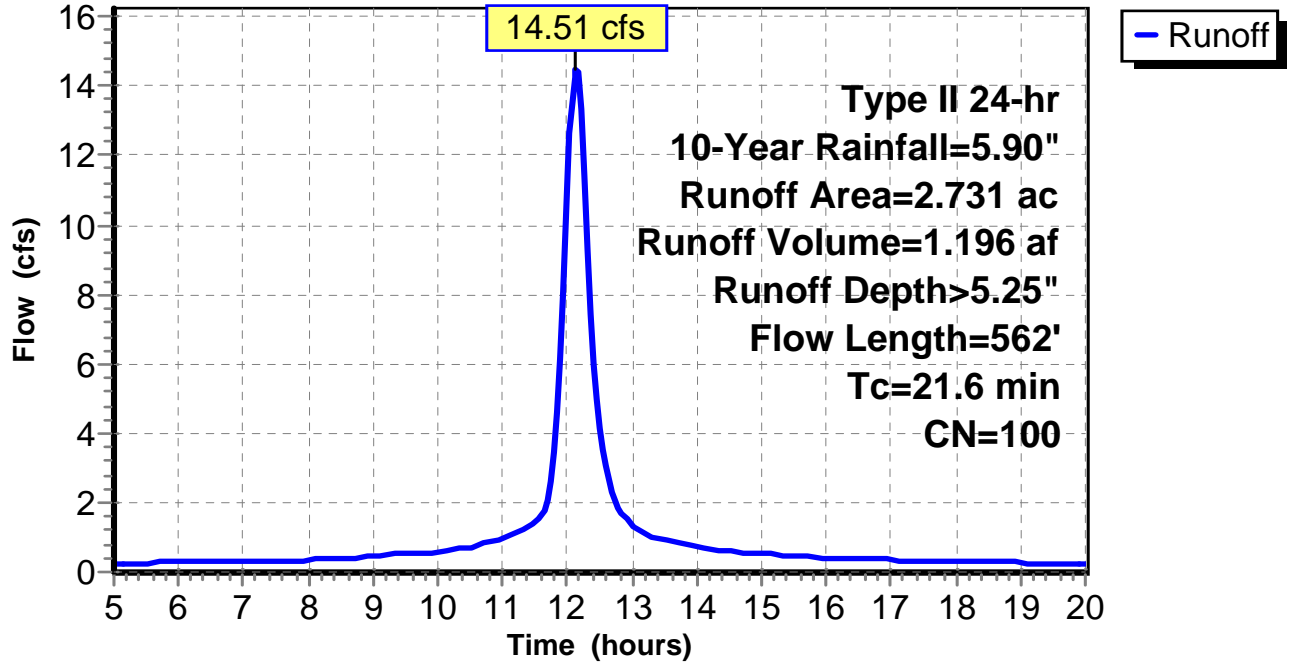
Subcatchment 10: C AR102.038

Hydrograph



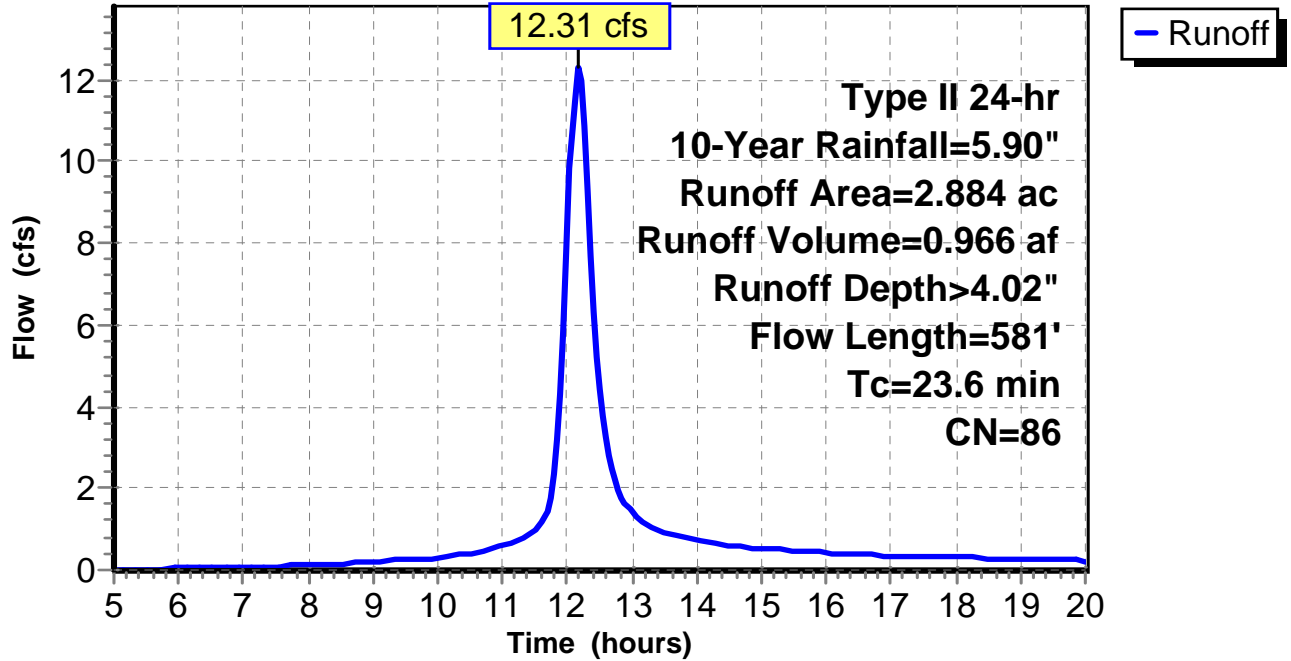
Subcatchment 11: C AR102.039

Hydrograph



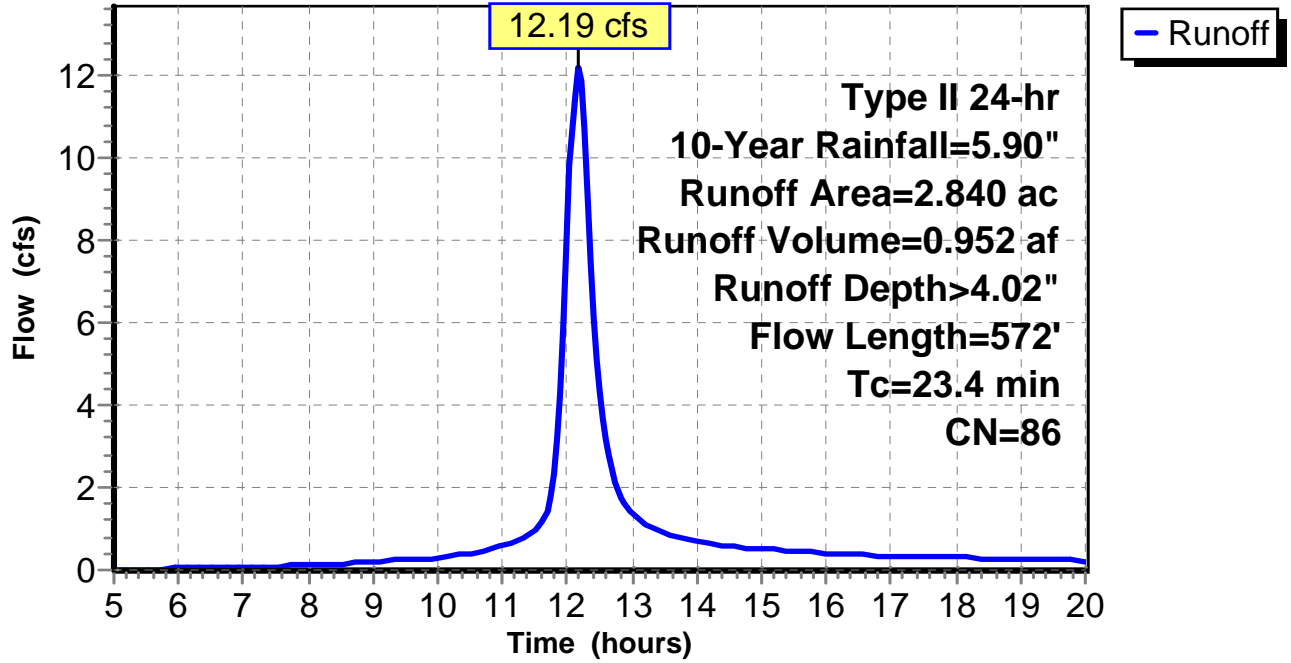
Subcatchment 12: C AR102.040

Hydrograph



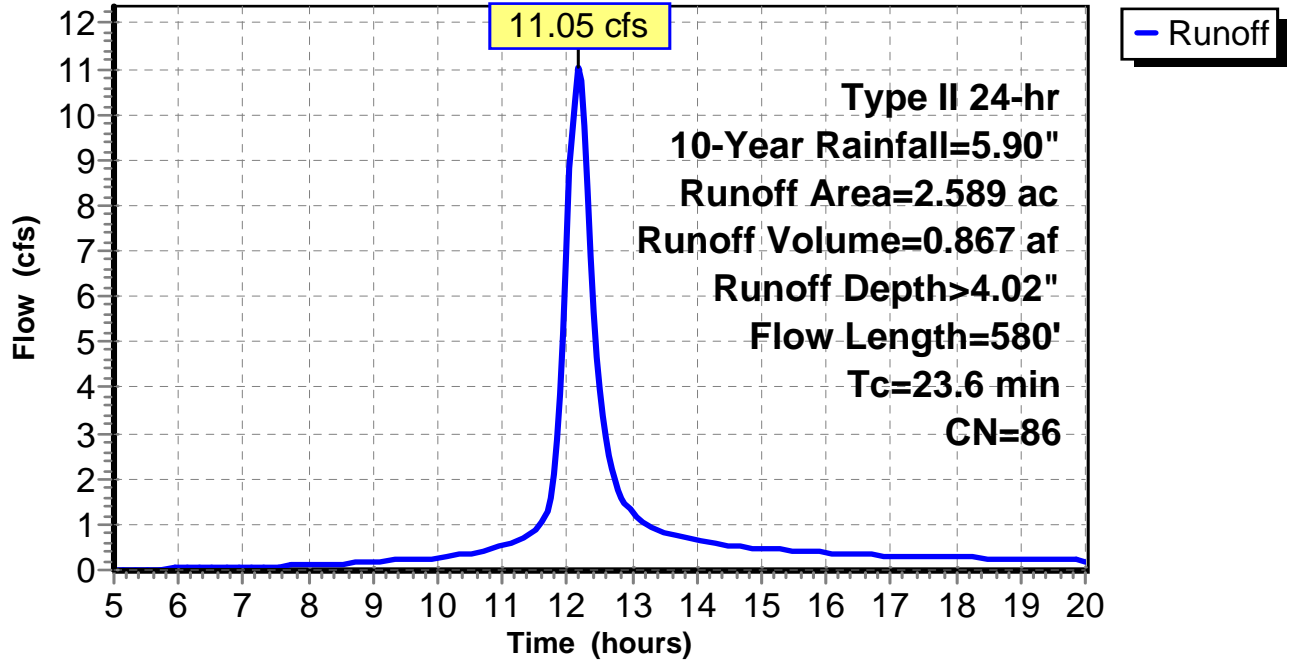
Subcatchment 13: C AR102.041

Hydrograph



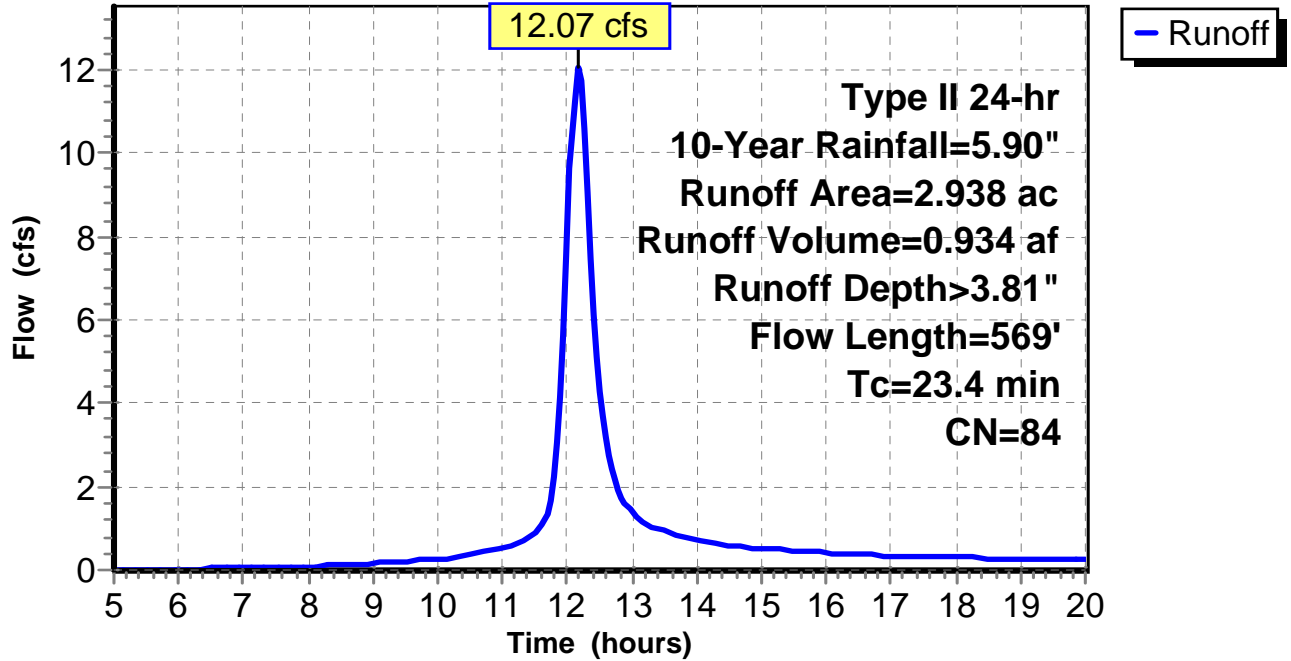
Subcatchment 14: C AR102.042

Hydrograph



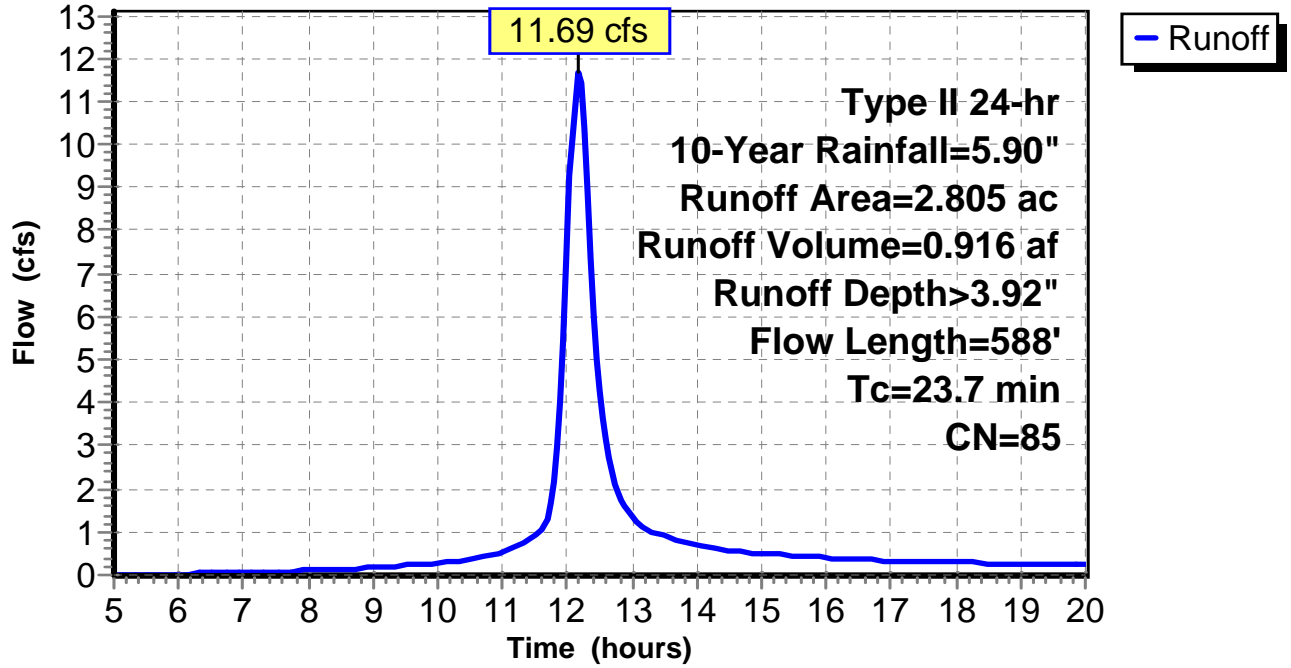
Subcatchment 15: C AR102.043

Hydrograph



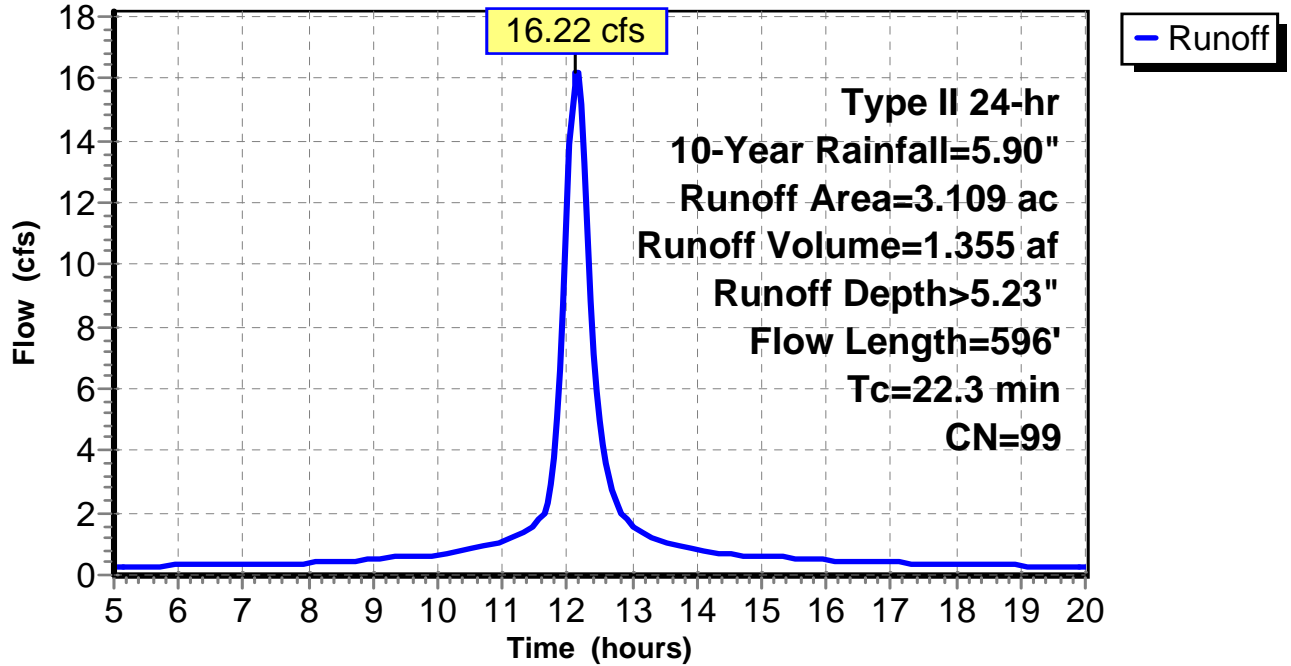
Subcatchment 16: C AR102.044

Hydrograph



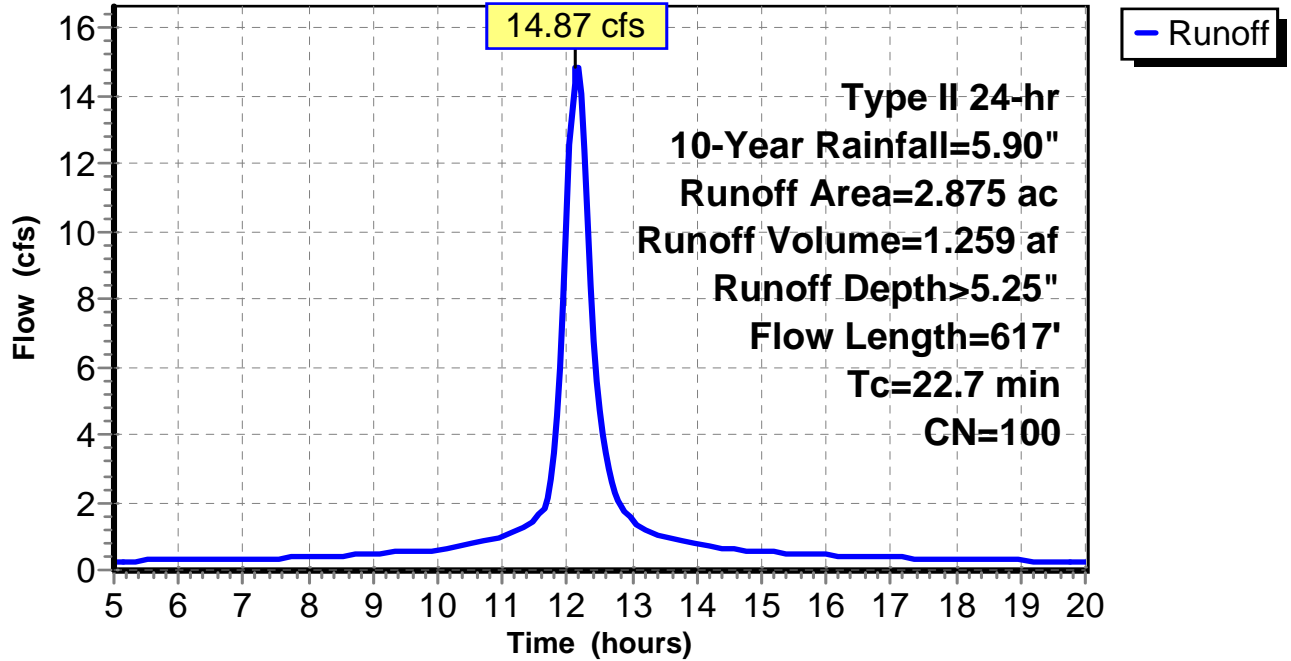
Subcatchment 17: C AR102.045

Hydrograph



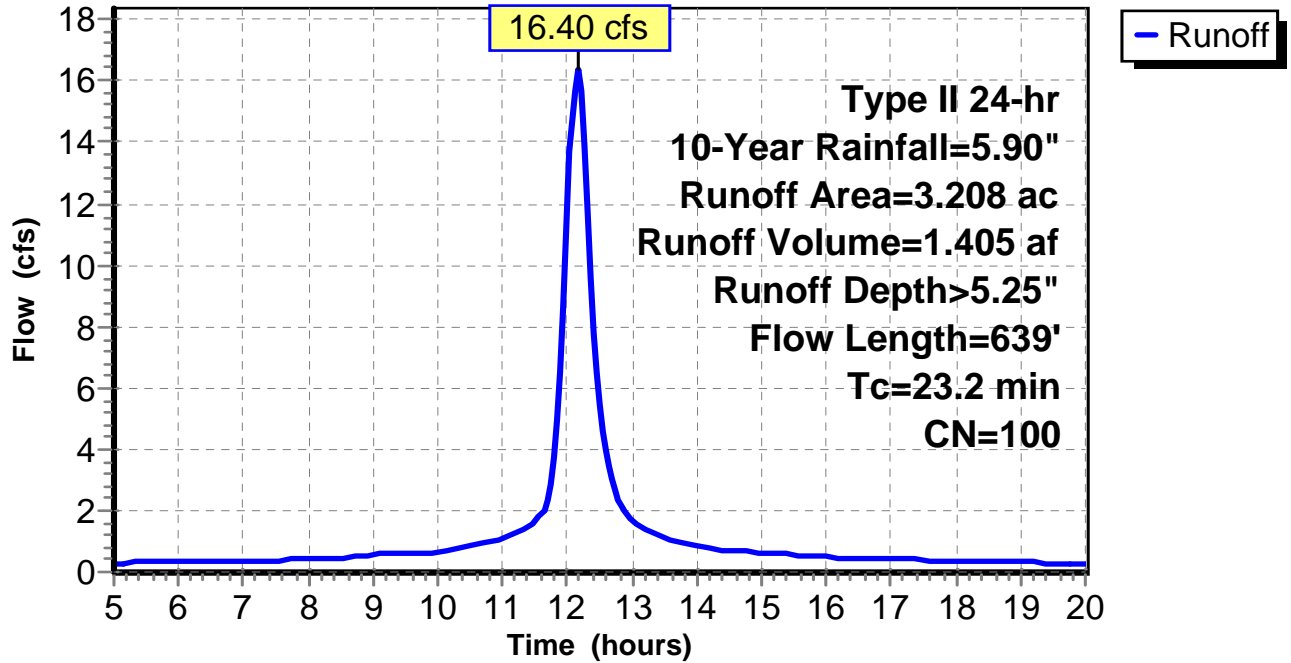
Subcatchment 18: C AR102.046

Hydrograph



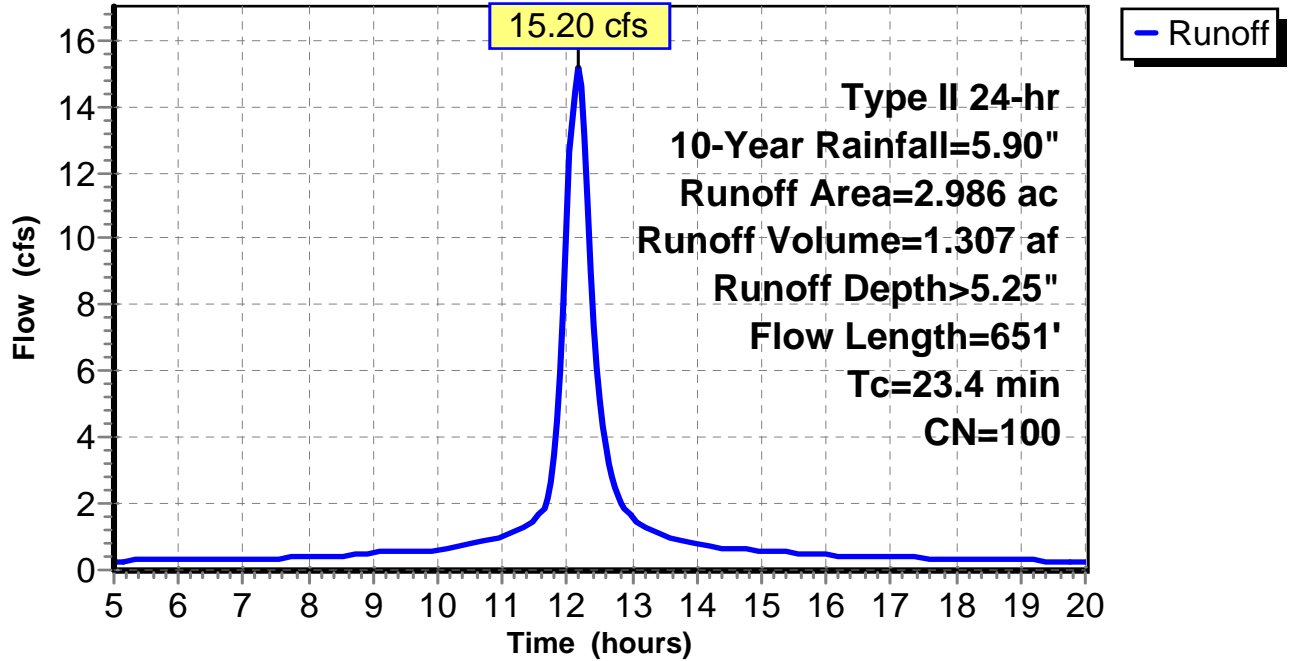
Subcatchment 19: C 75.001

Hydrograph



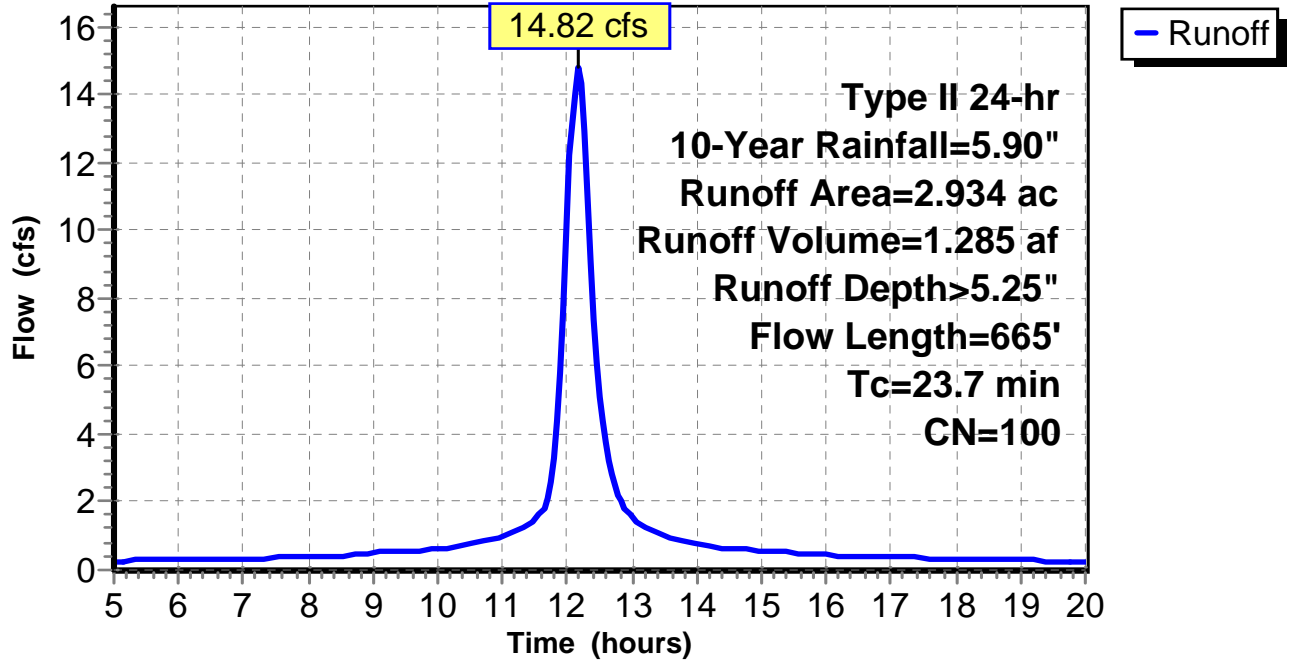
Subcatchment 20: C 75.002

Hydrograph



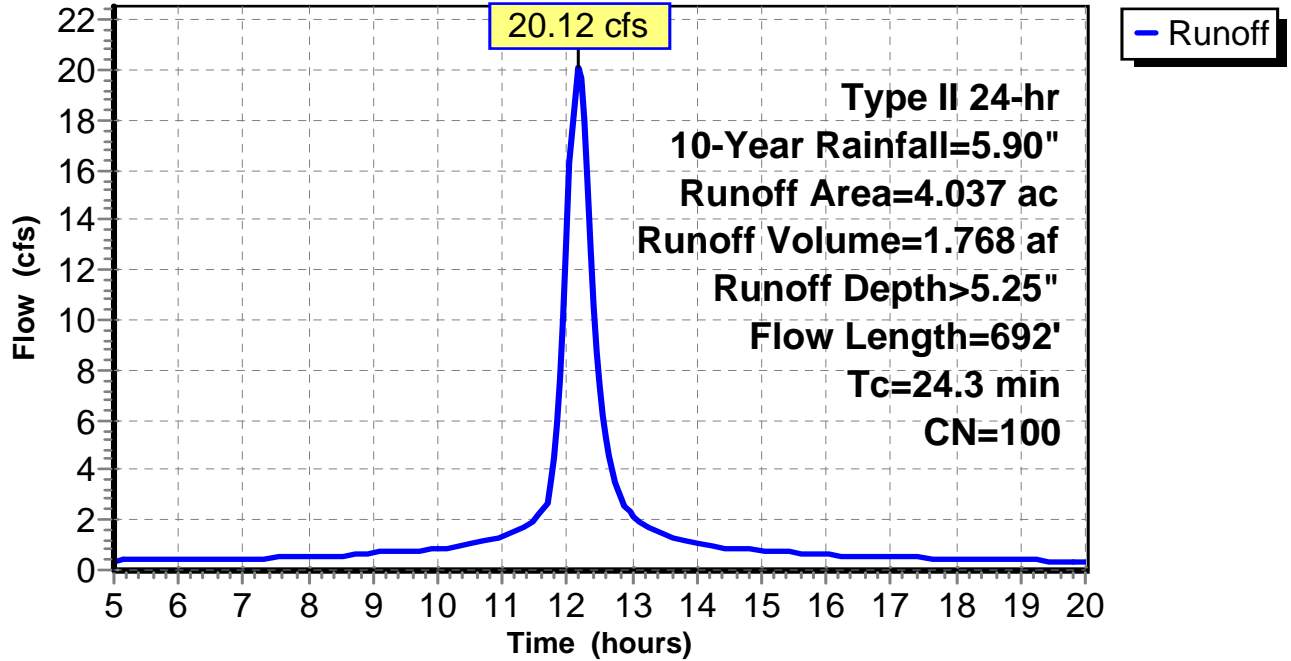
Subcatchment 21: C 75.003

Hydrograph



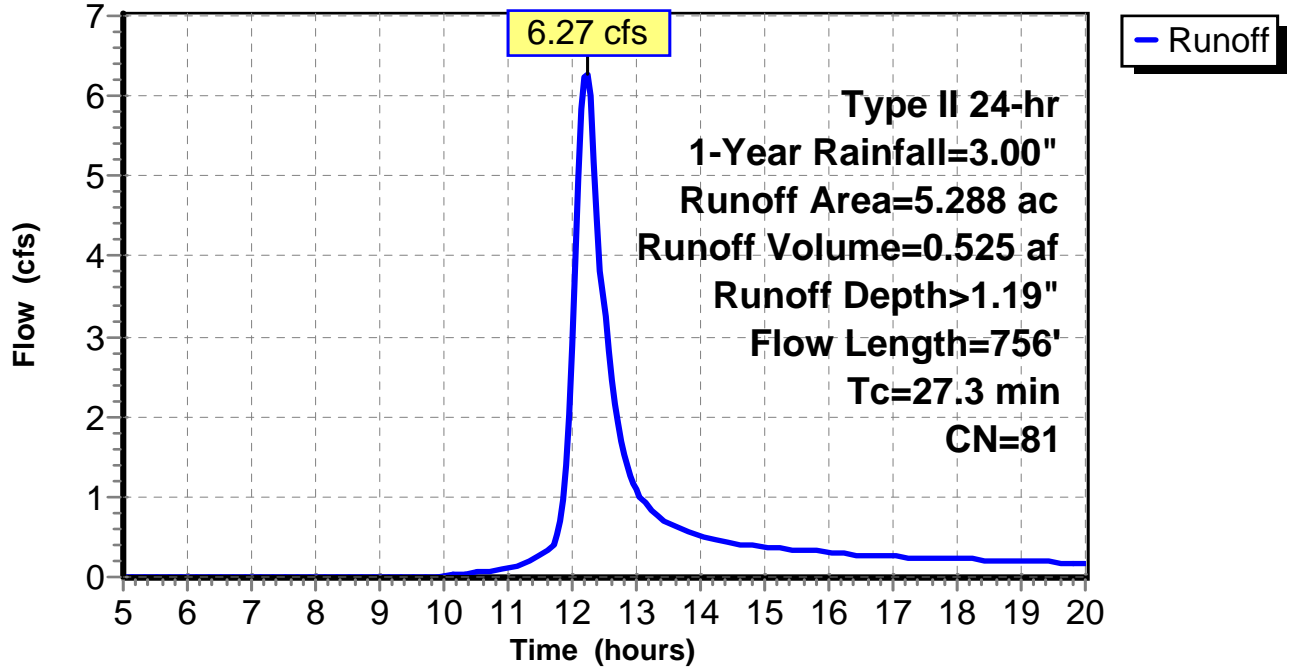
Subcatchment 22: C 75.004

Hydrograph



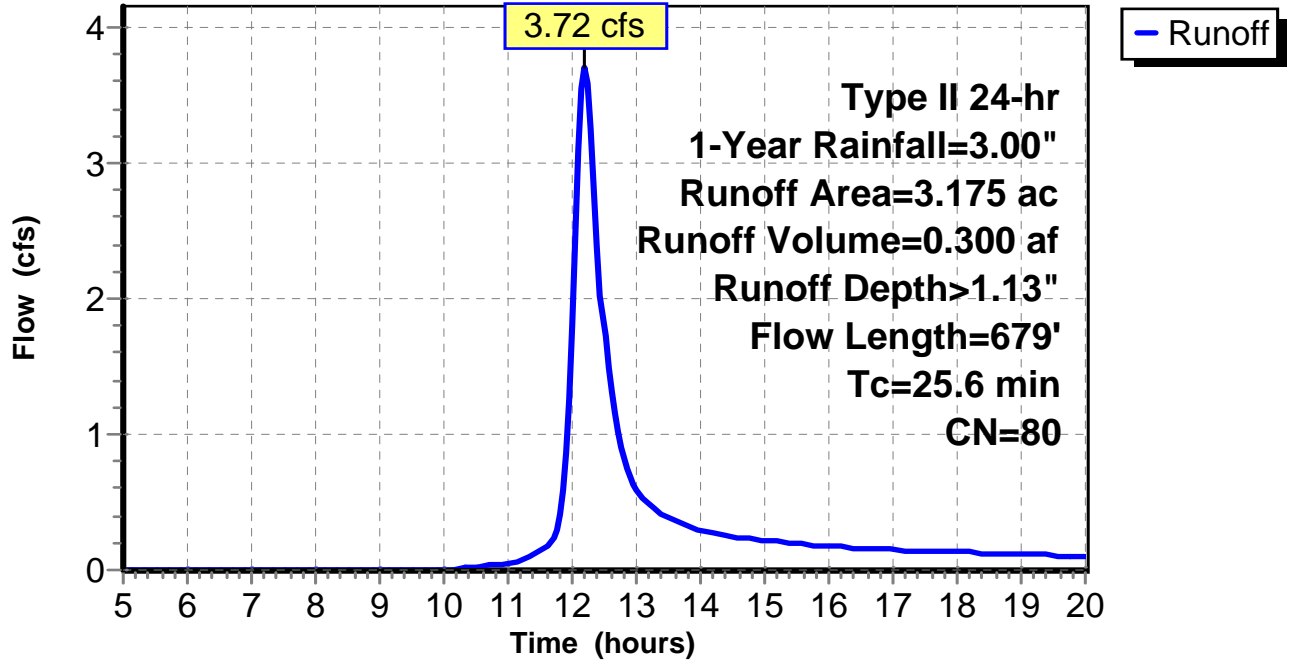
Subcatchment 1: C AR102.015

Hydrograph



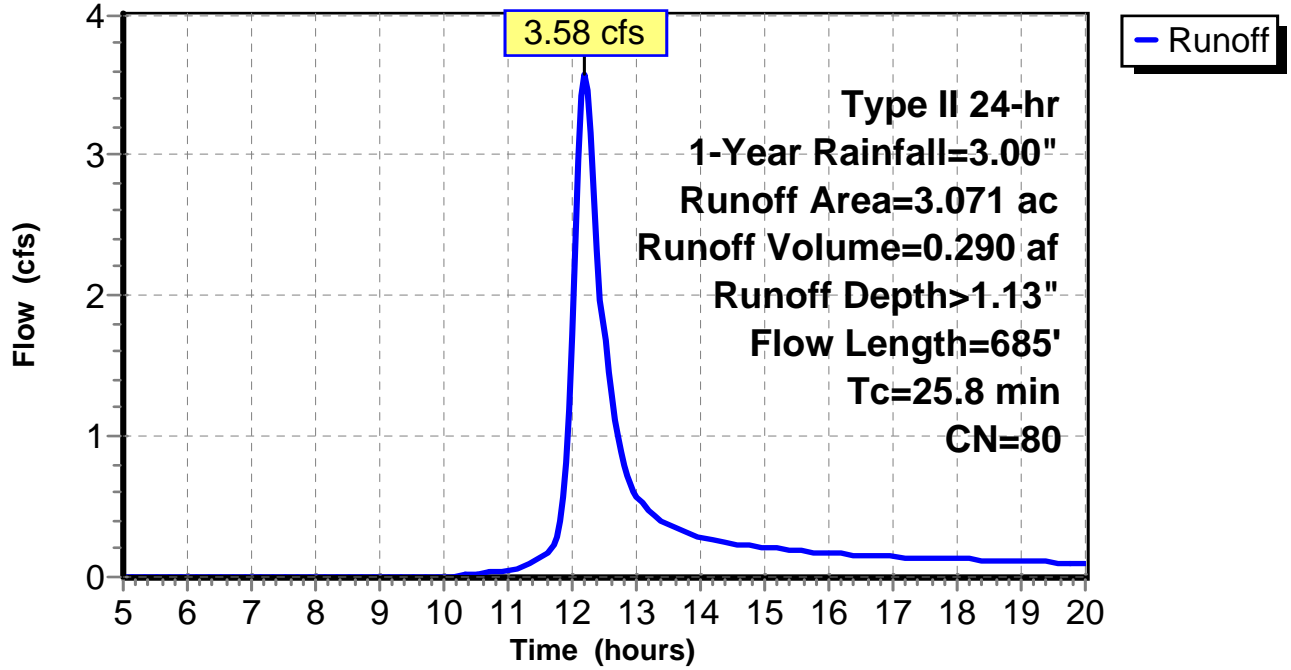
Subcatchment 2: C AR102.016

Hydrograph



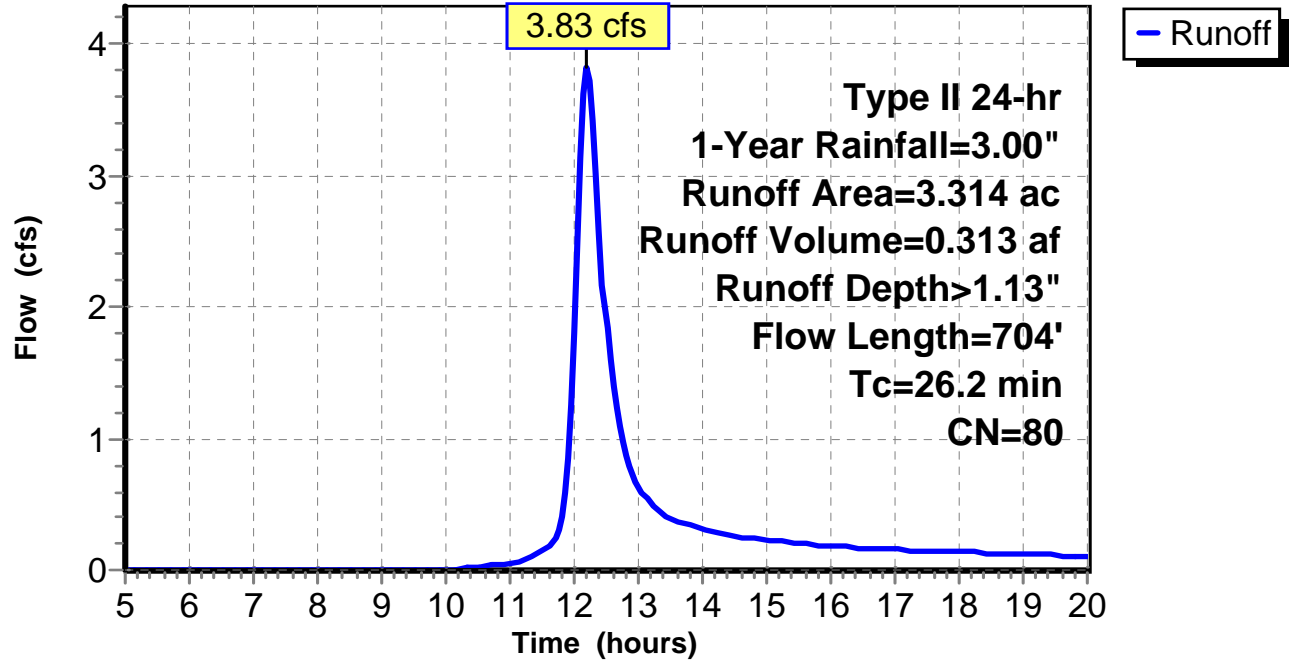
Subcatchment 3: C AR102.017

Hydrograph



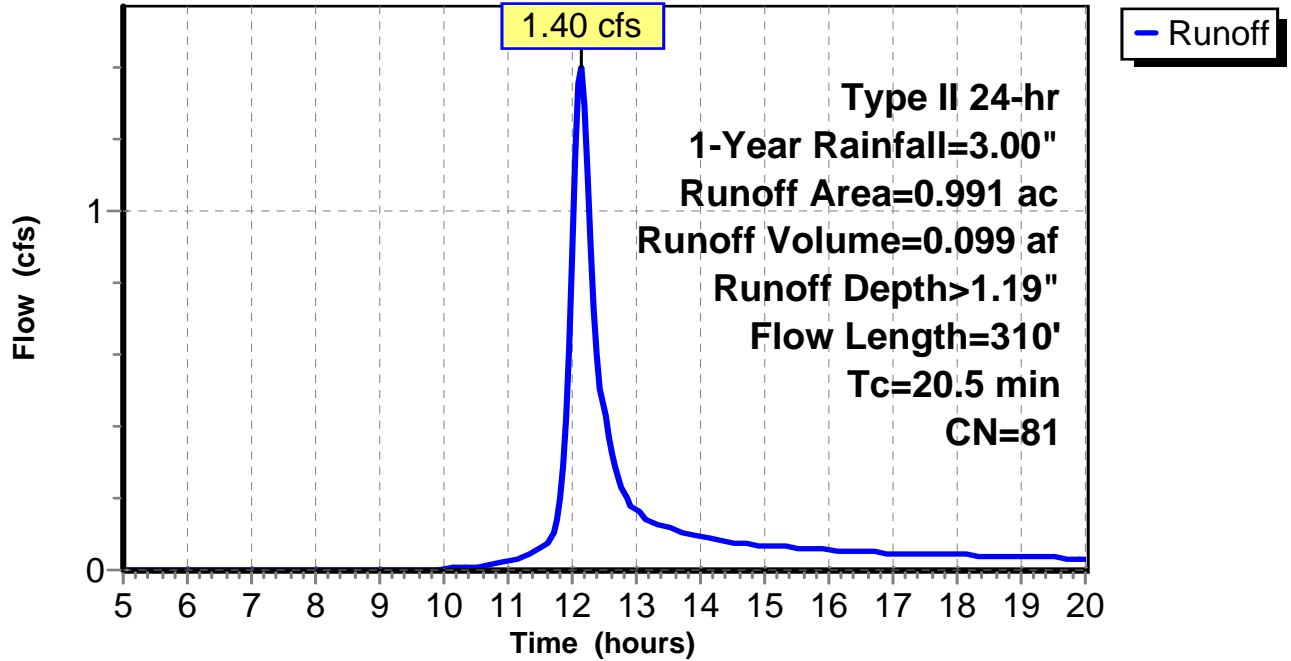
Subcatchment 4: C AR102.018

Hydrograph



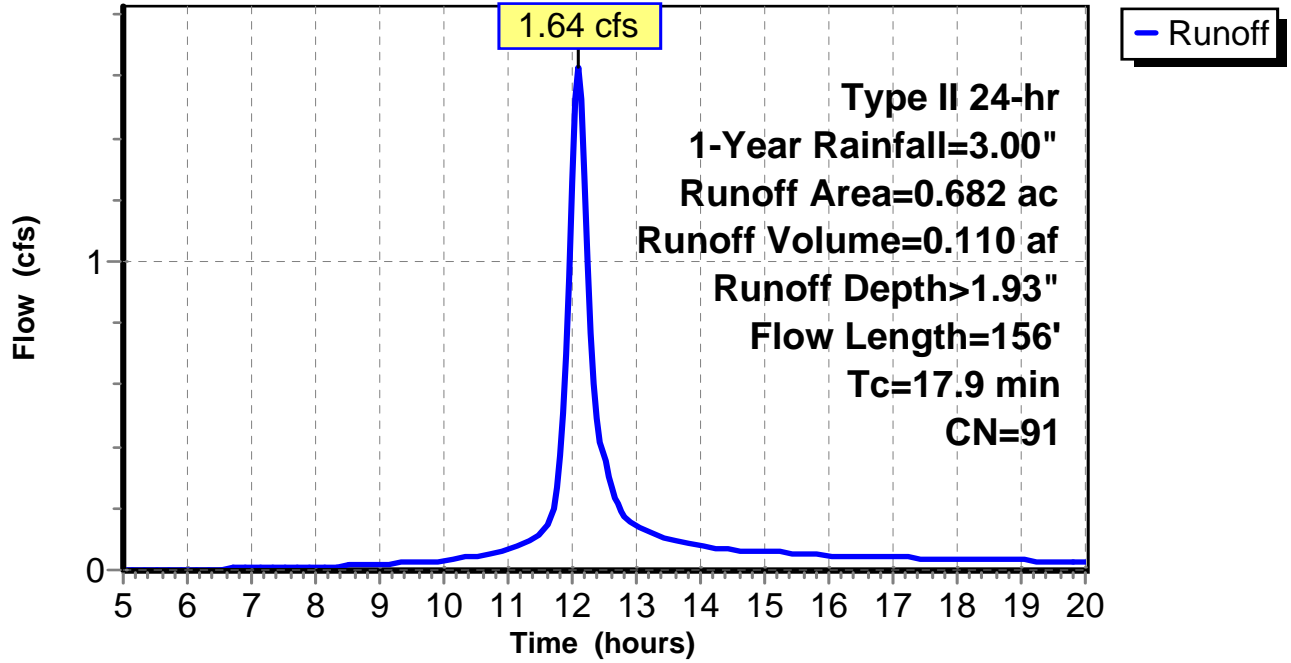
Subcatchment 5: C AR102.019

Hydrograph



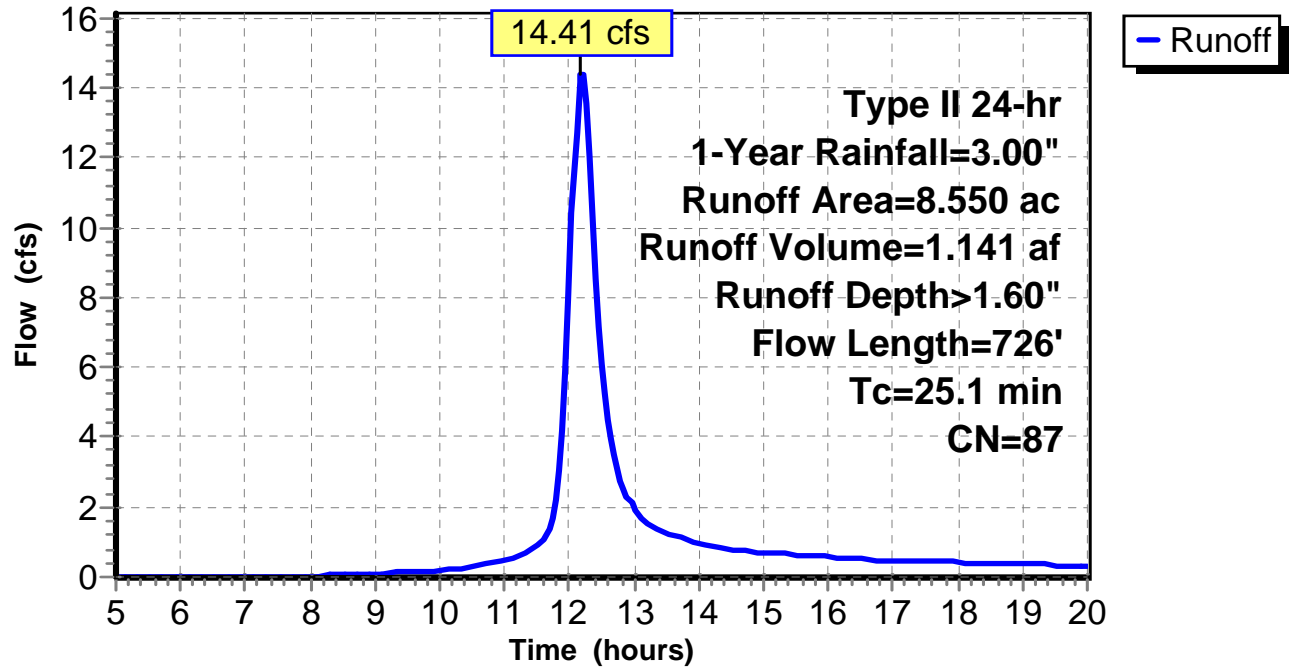
Subcatchment 6: C AR102.020

Hydrograph



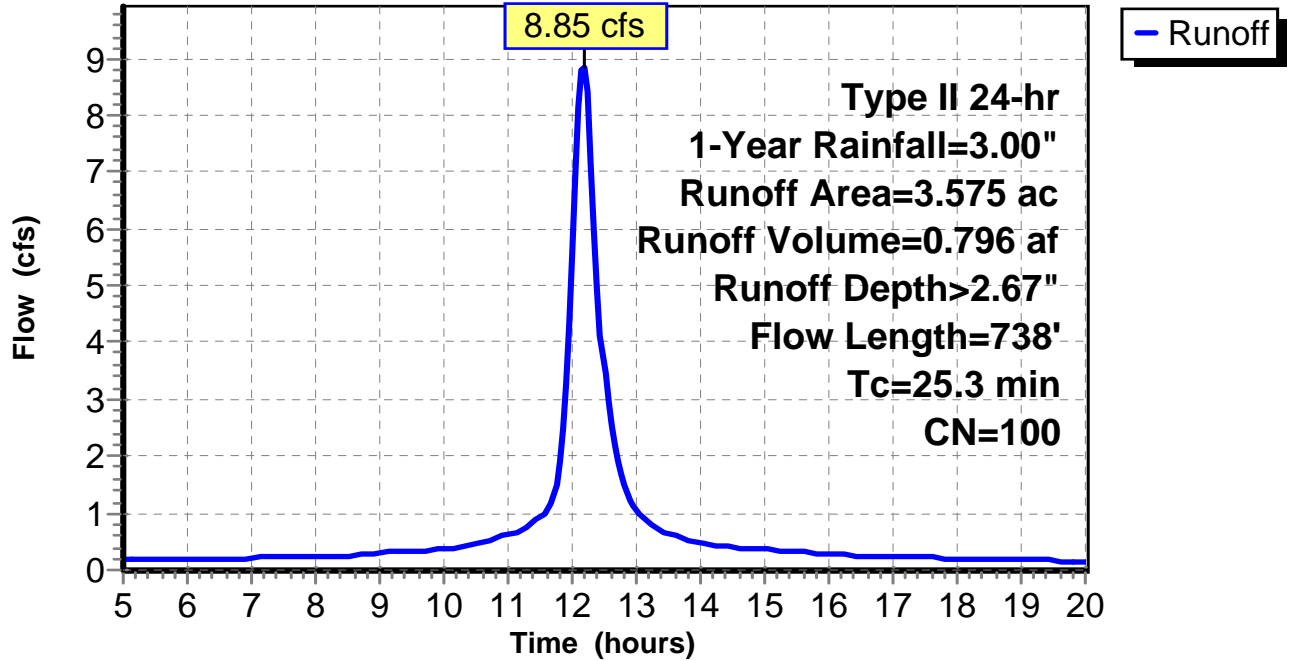
Subcatchment 7: C AR102.021

Hydrograph



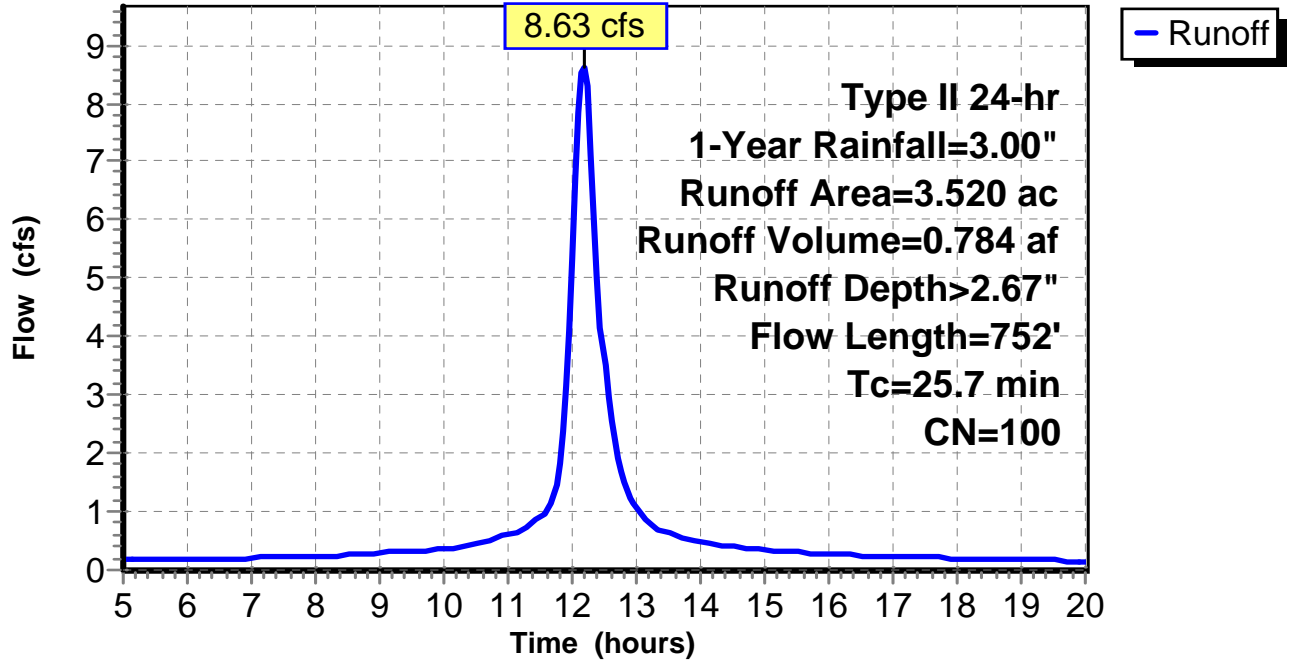
Subcatchment 8: C AR102.022

Hydrograph



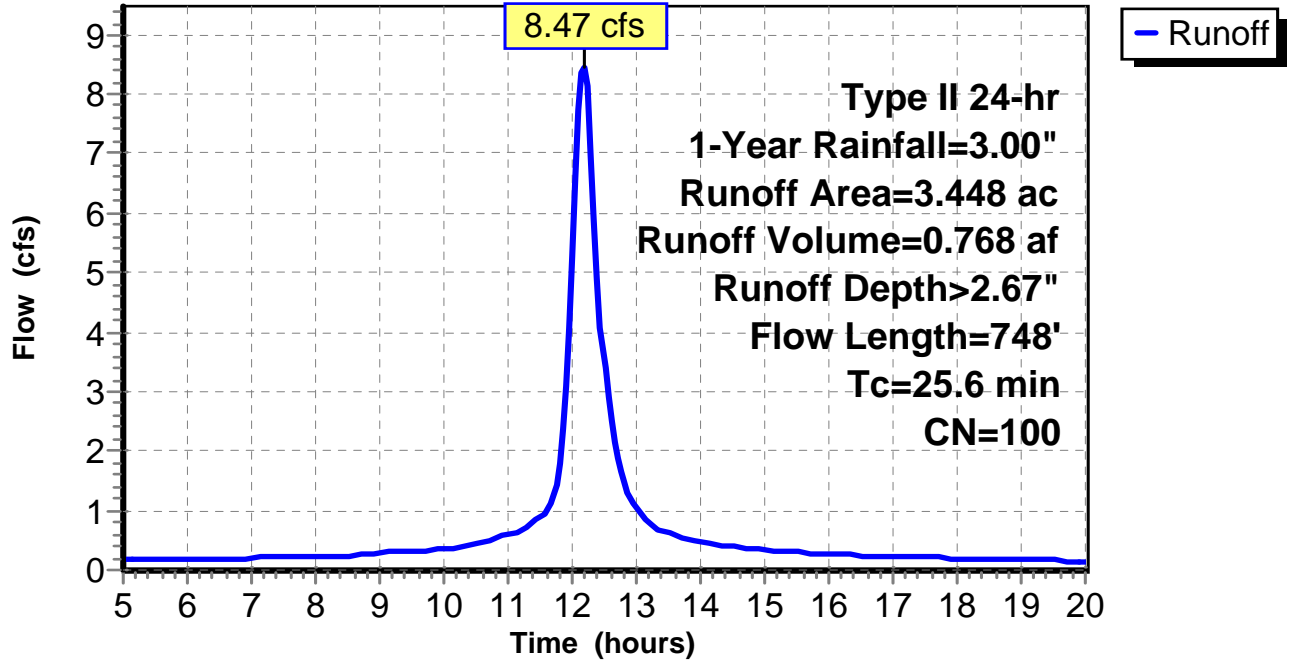
Subcatchment 9: C AR102.023

Hydrograph



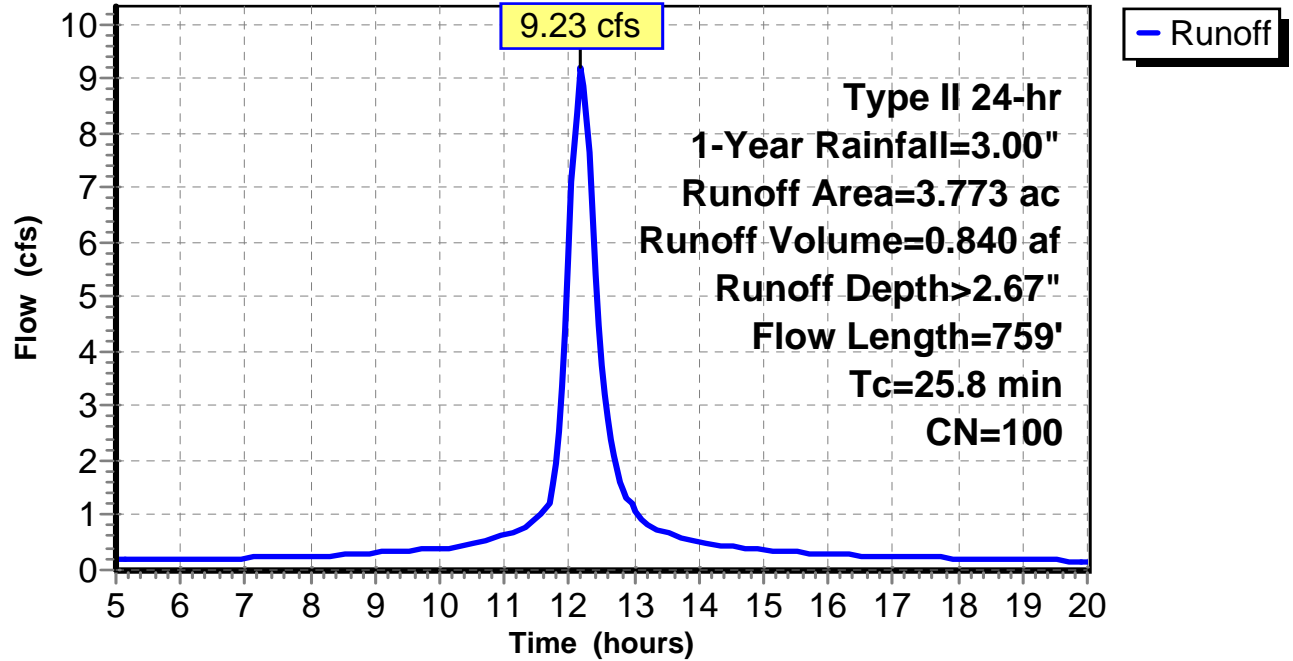
Subcatchment 10: C AR102.024

Hydrograph



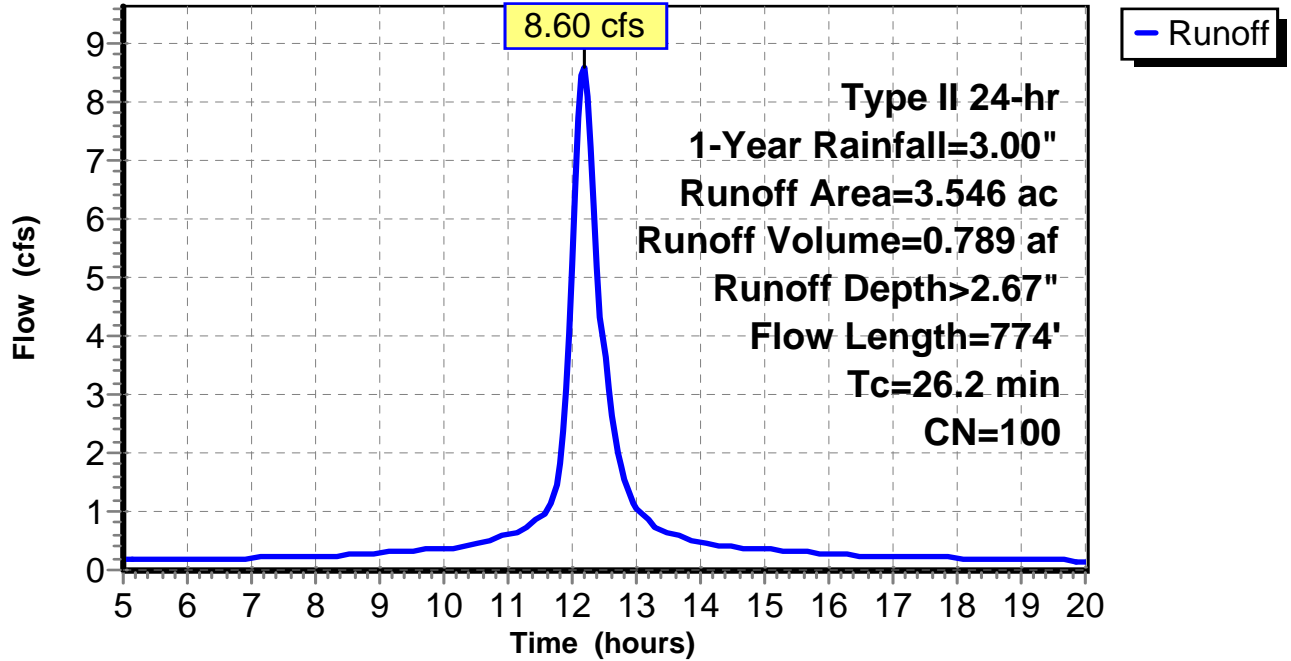
Subcatchment 11: C AR102.025

Hydrograph



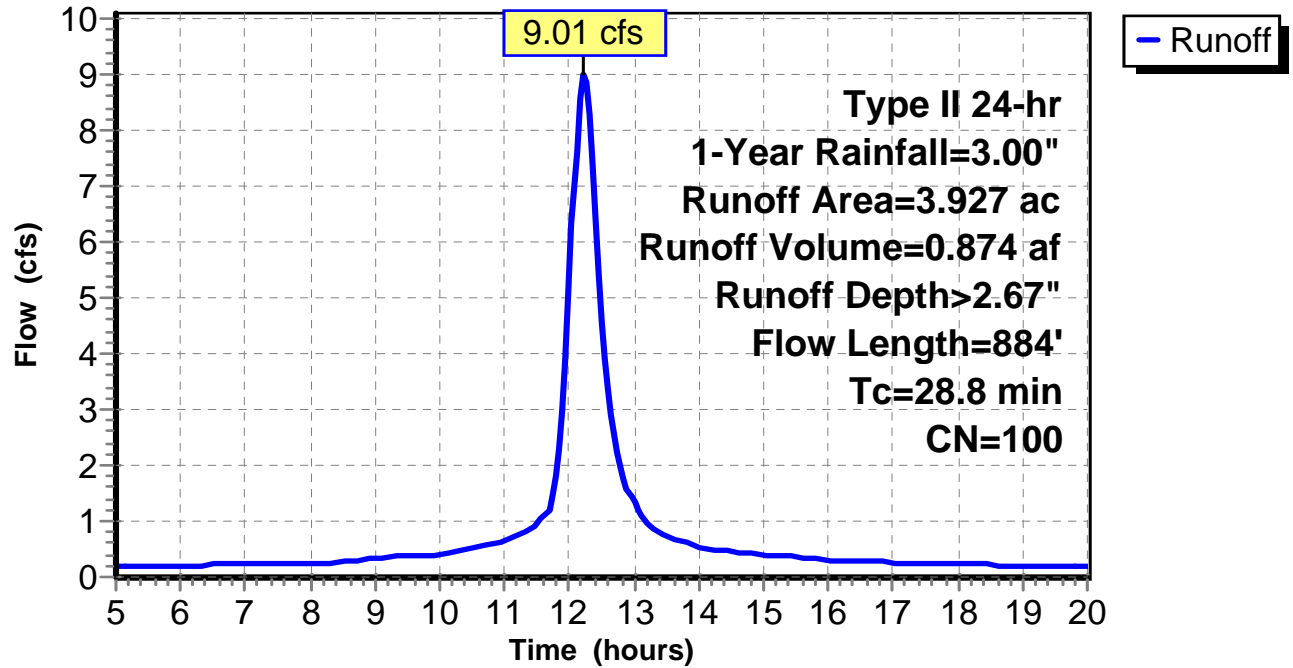
Subcatchment 12: C AR102.026

Hydrograph



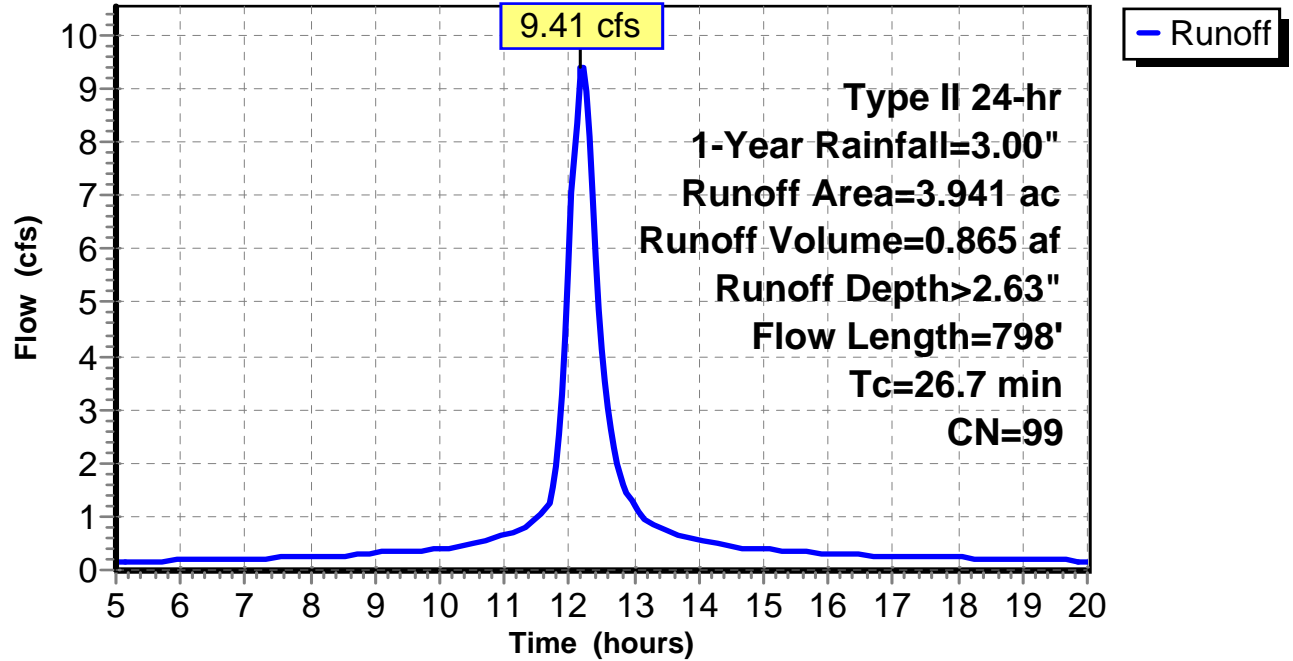
Subcatchment 13: C AR102.027

Hydrograph



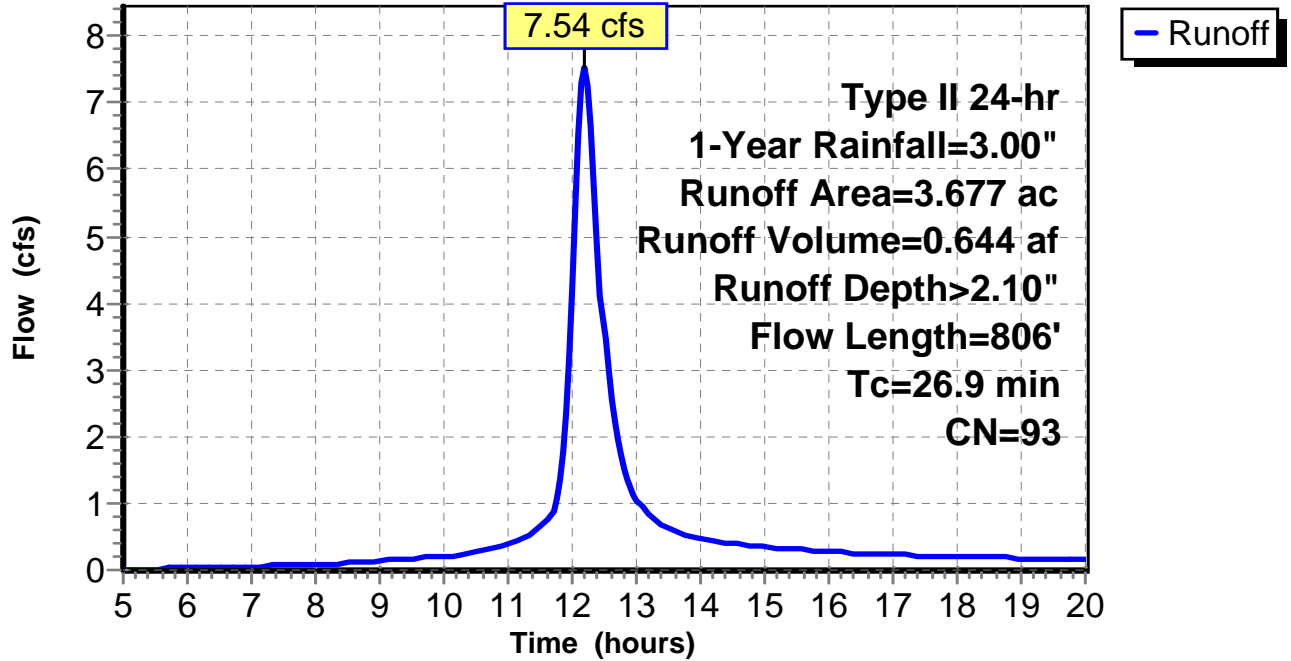
Subcatchment 14: C AR102.028

Hydrograph



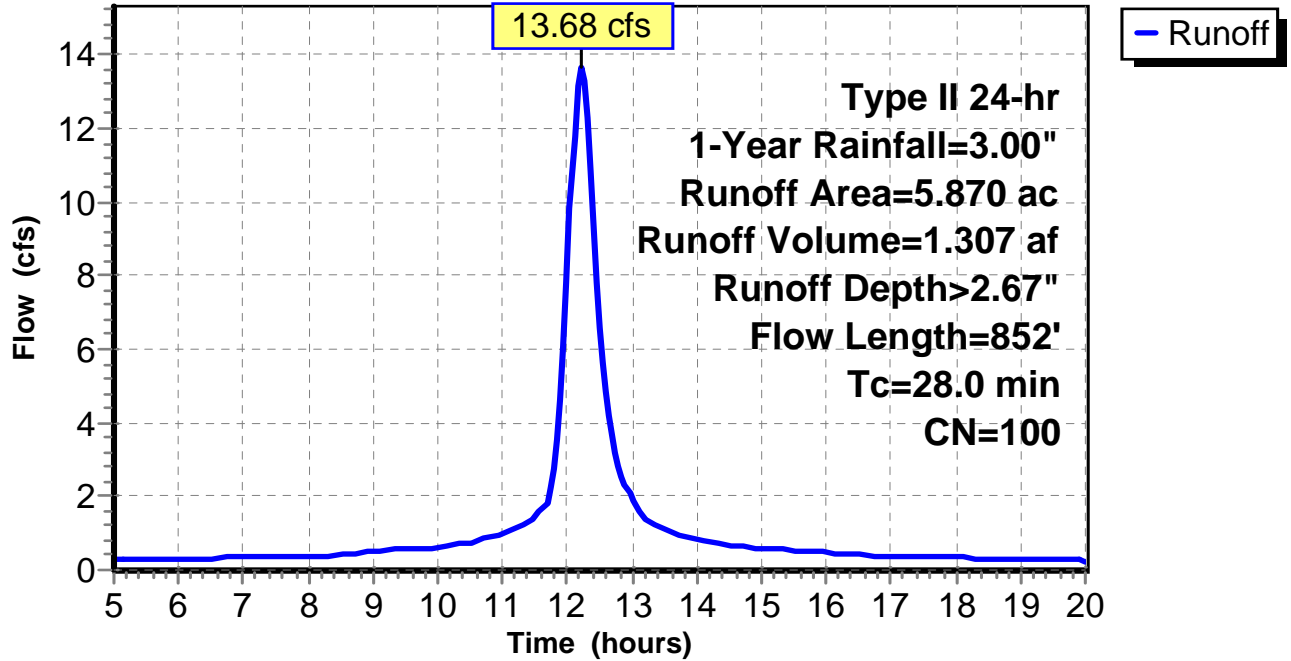
Subcatchment 15: C 76.003

Hydrograph



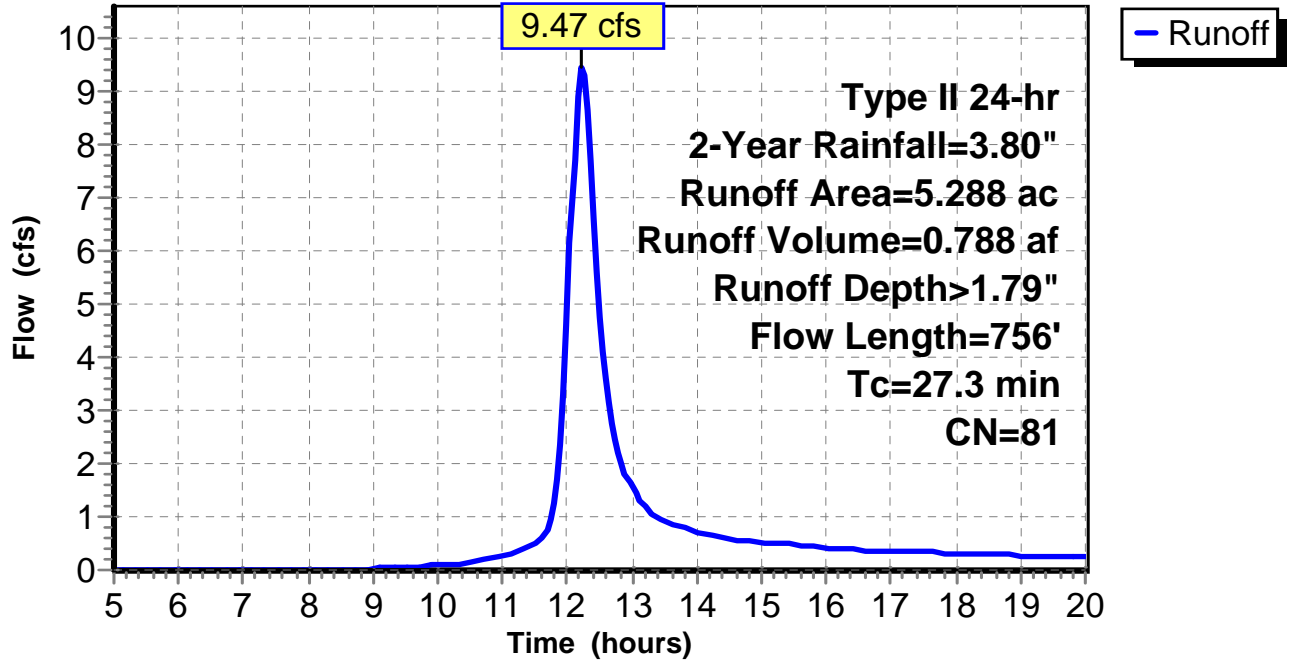
Subcatchment 16: C 76.004

Hydrograph



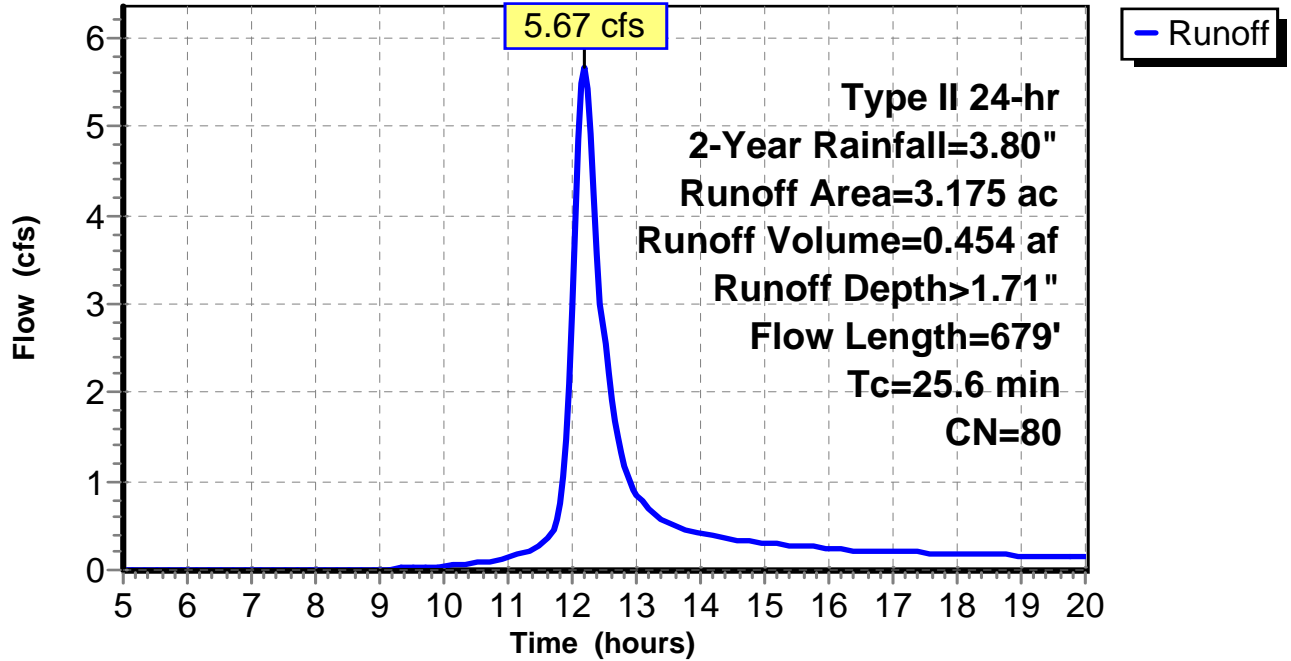
Subcatchment 1: C AR102.015

Hydrograph



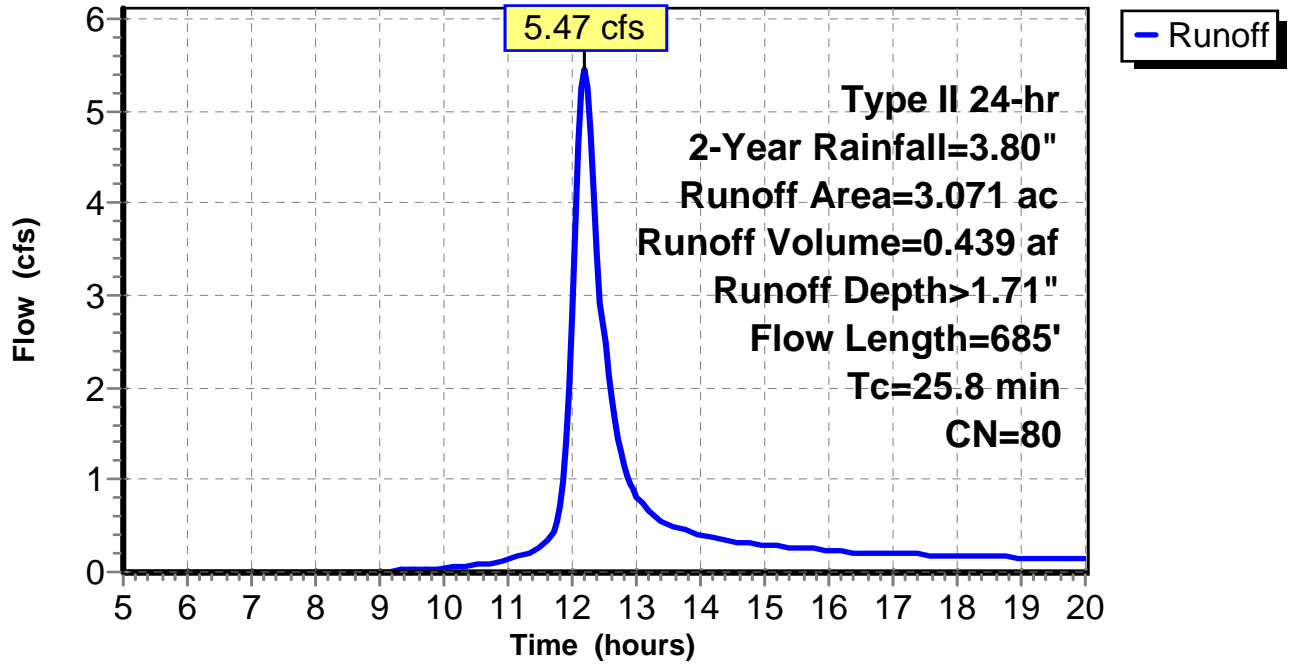
Subcatchment 2: C AR102.016

Hydrograph



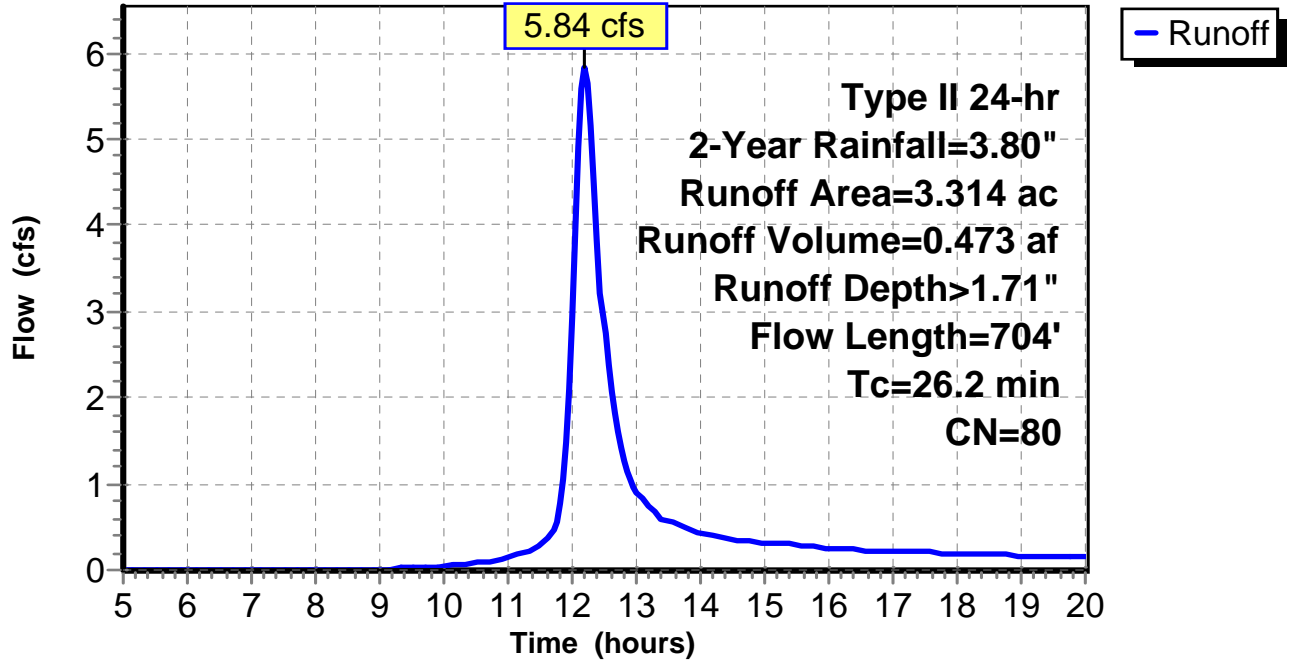
Subcatchment 3: C AR102.017

Hydrograph



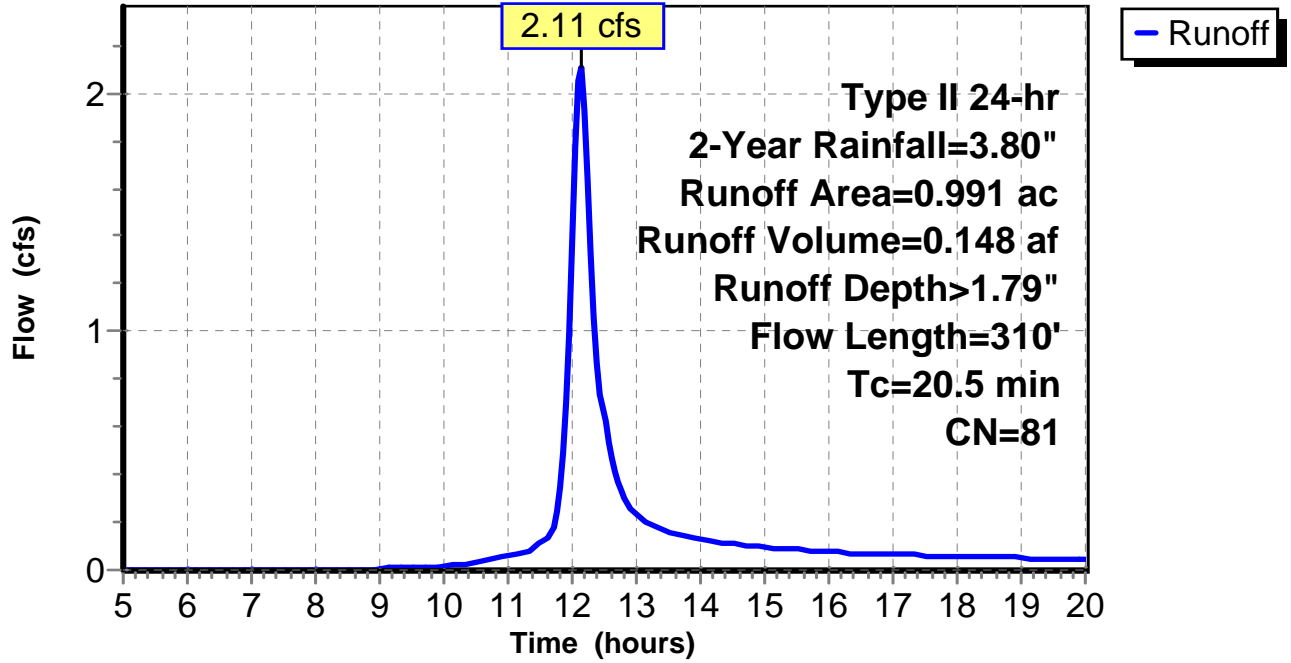
Subcatchment 4: C AR102.018

Hydrograph



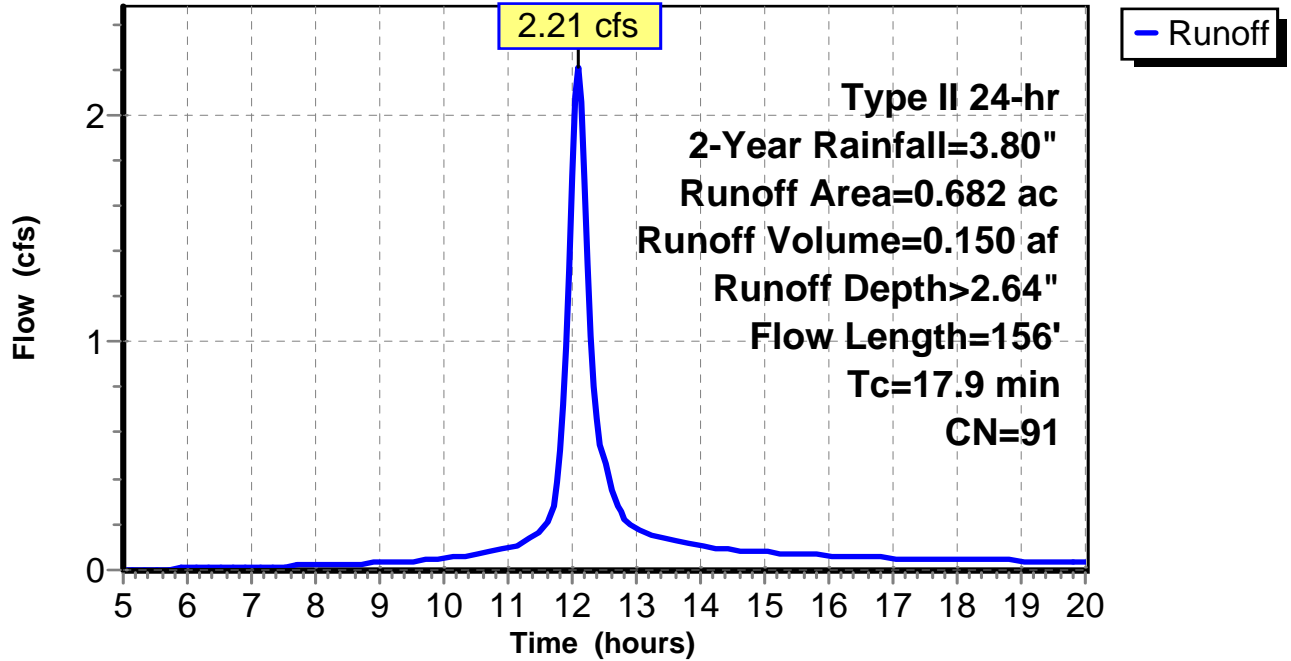
Subcatchment 5: C AR102.019

Hydrograph



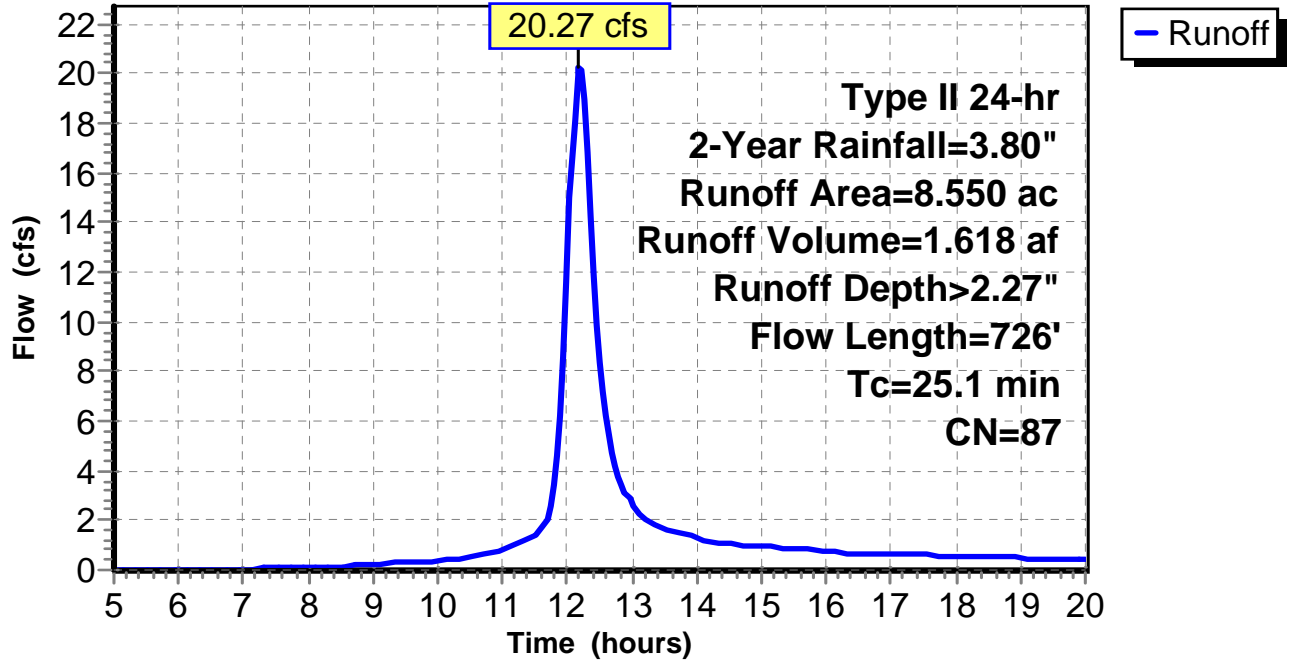
Subcatchment 6: C AR102.020

Hydrograph



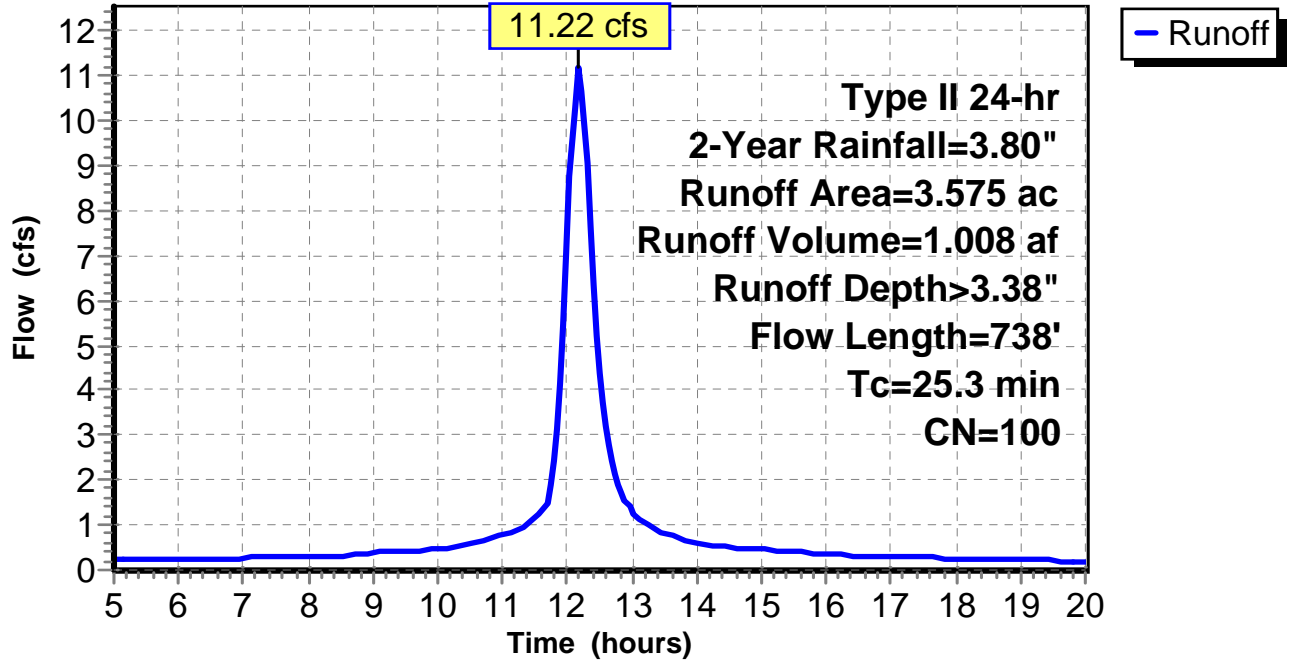
Subcatchment 7: C AR102.021

Hydrograph



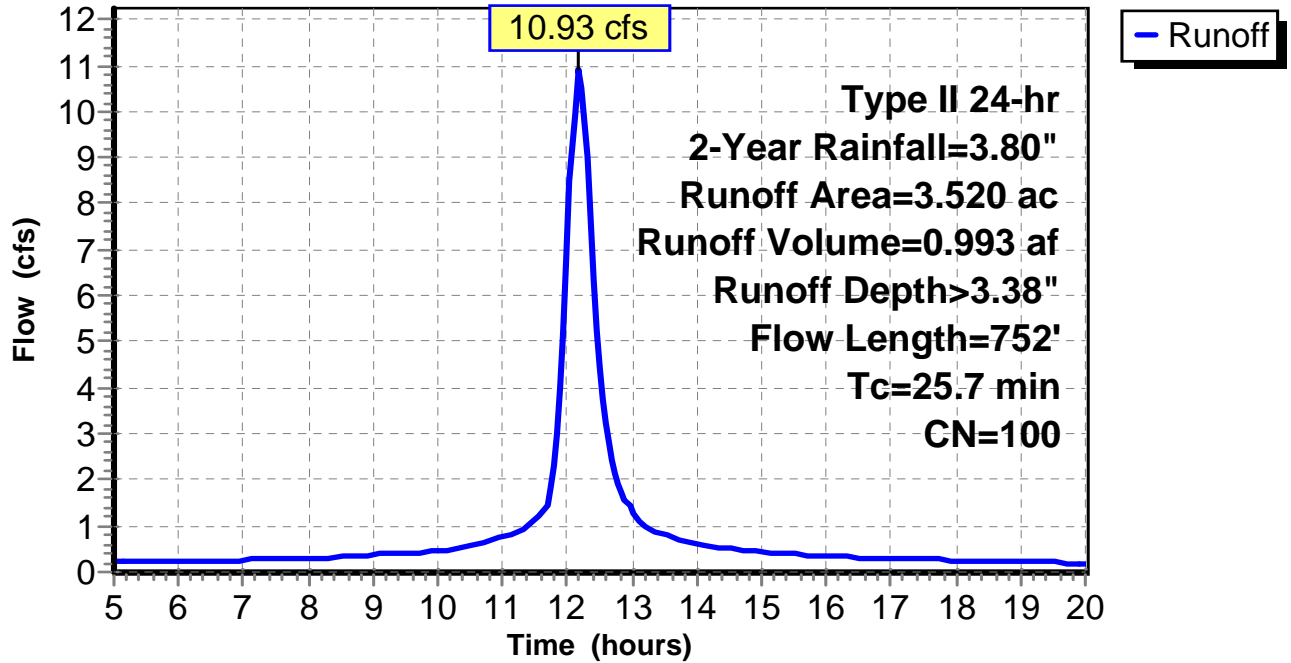
Subcatchment 8: C AR102.022

Hydrograph



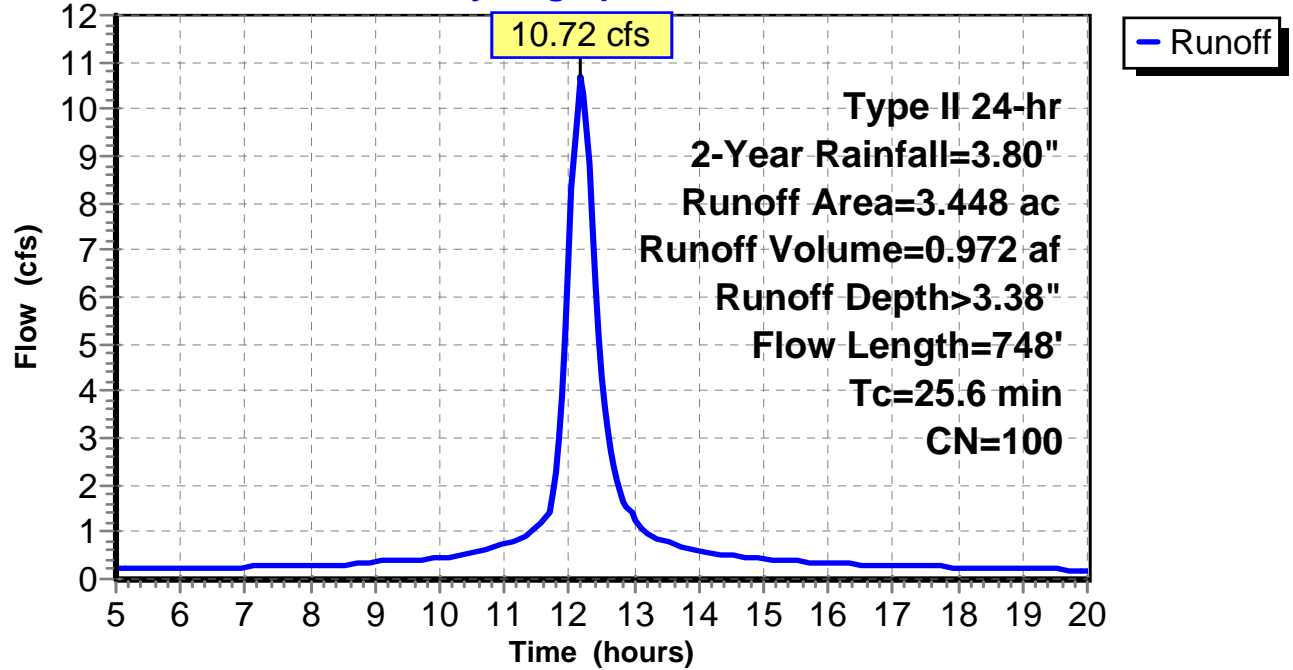
Subcatchment 9: C AR102.023

Hydrograph



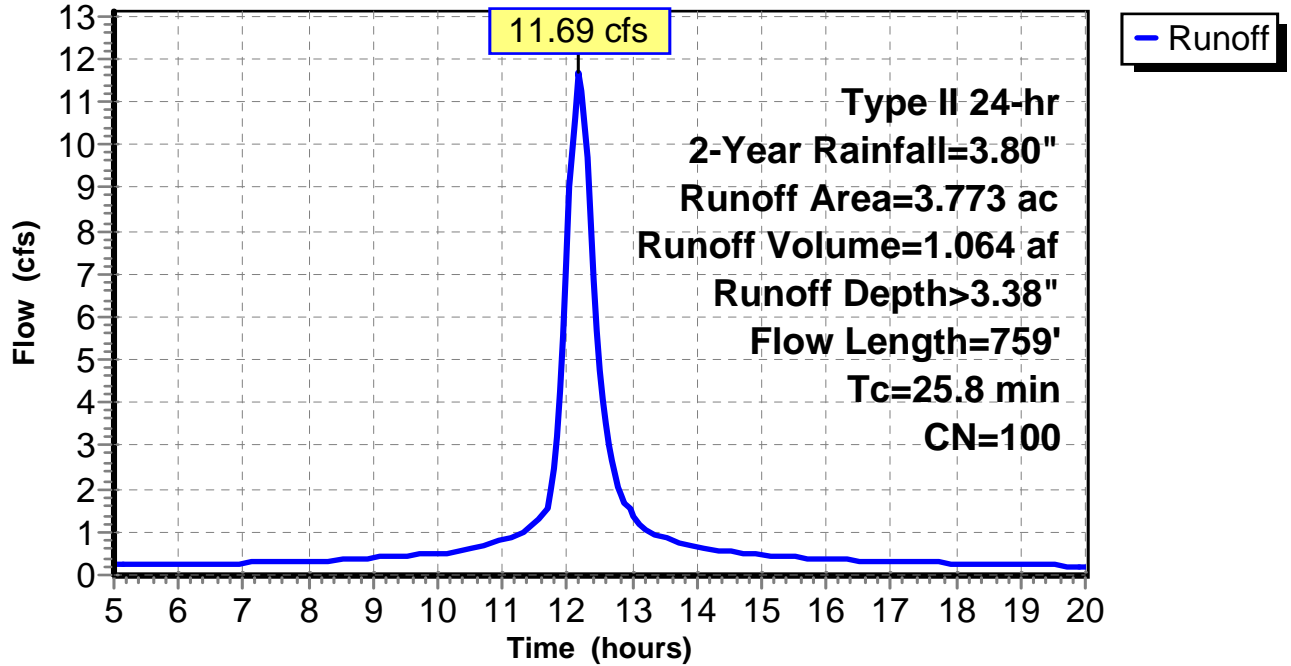
Subcatchment 10: C AR102.024

Hydrograph



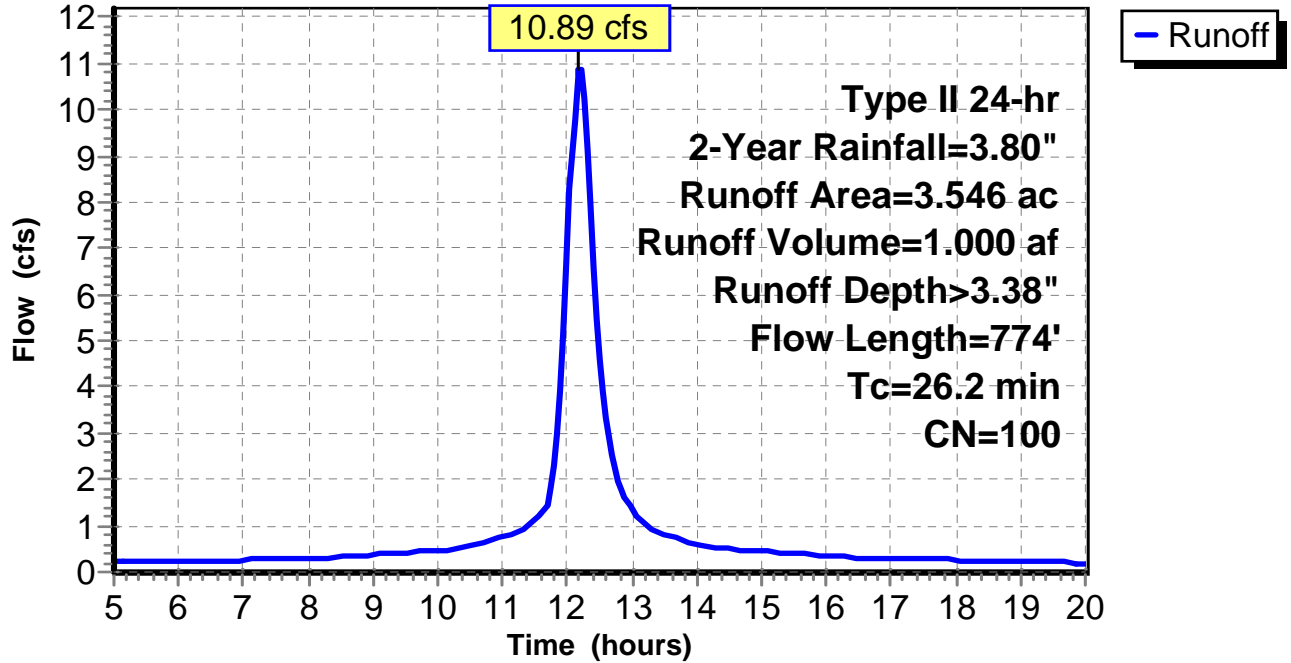
Subcatchment 11: C AR102.025

Hydrograph



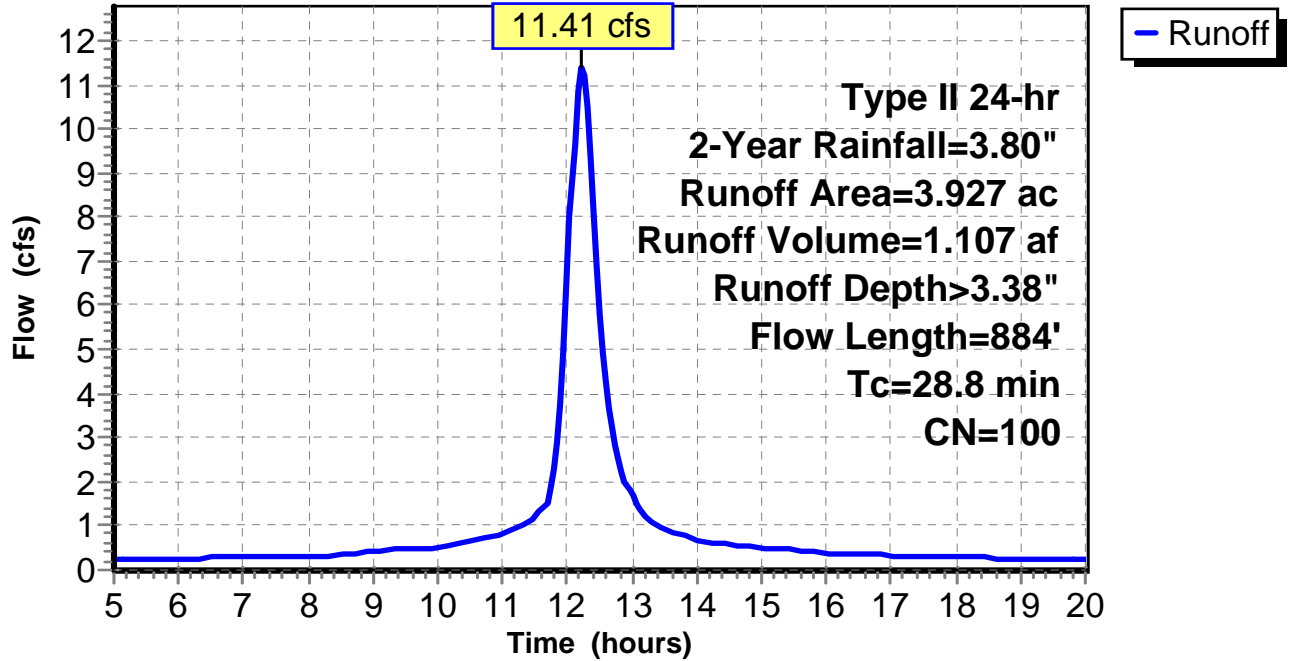
Subcatchment 12: C AR102.026

Hydrograph



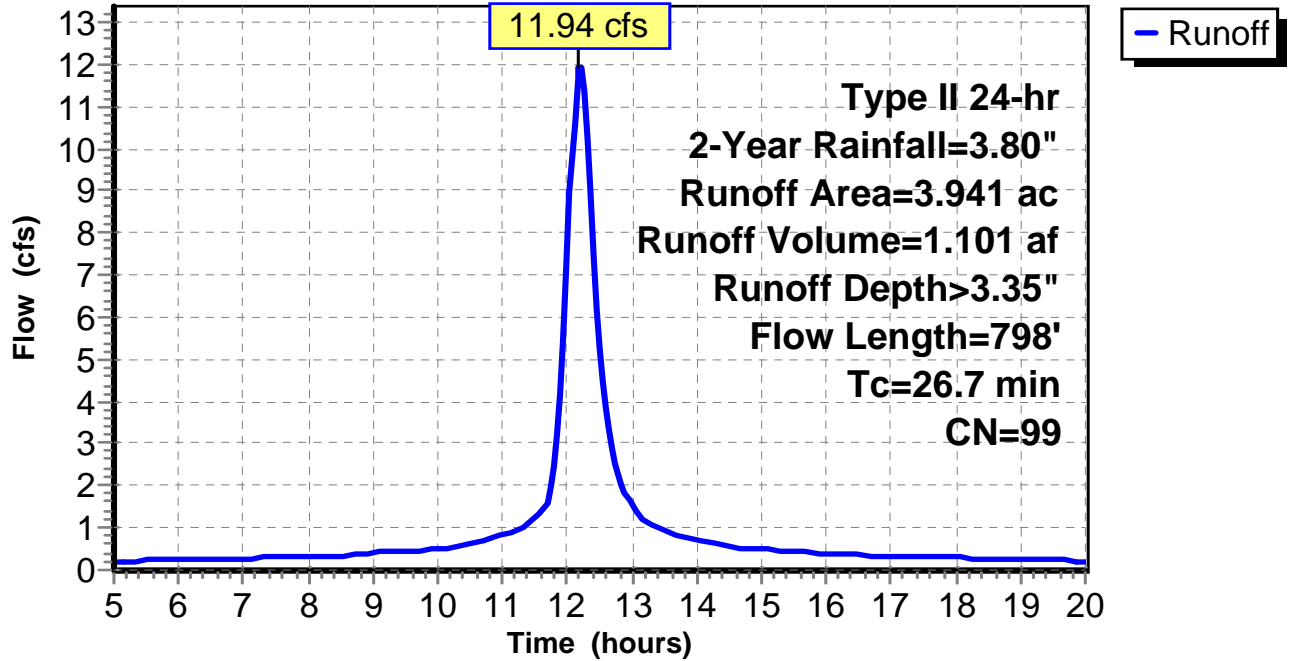
Subcatchment 13: C AR102.027

Hydrograph



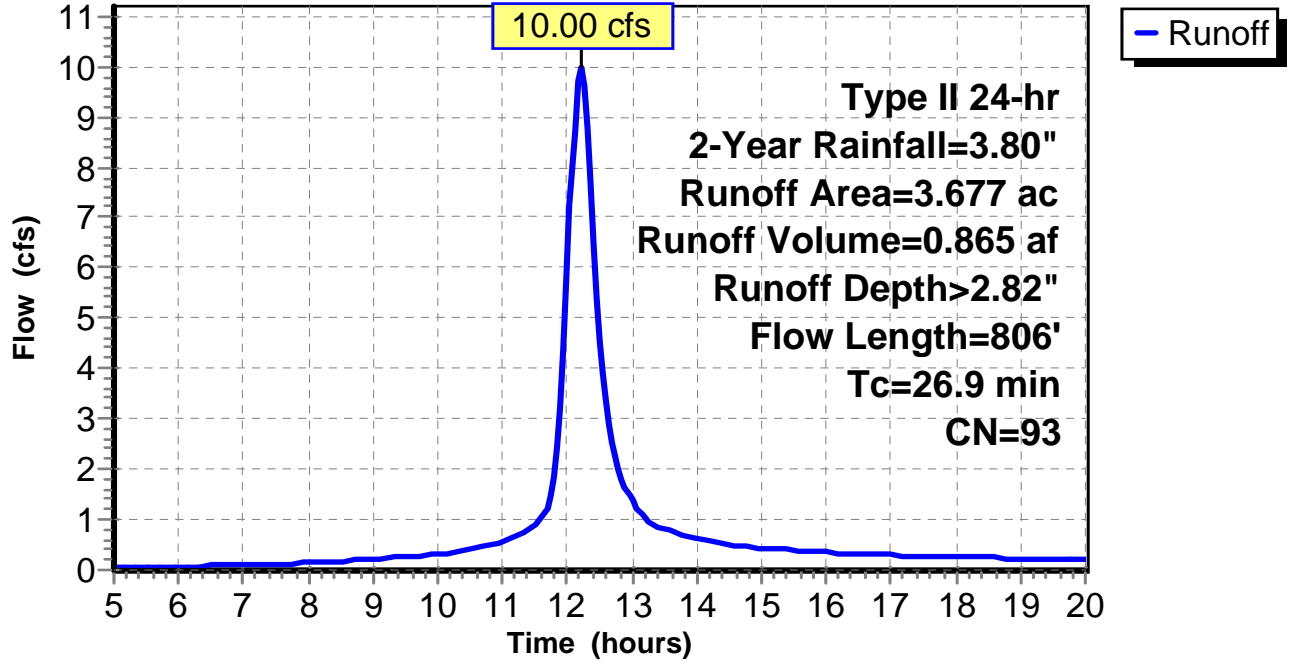
Subcatchment 14: C AR102.028

Hydrograph



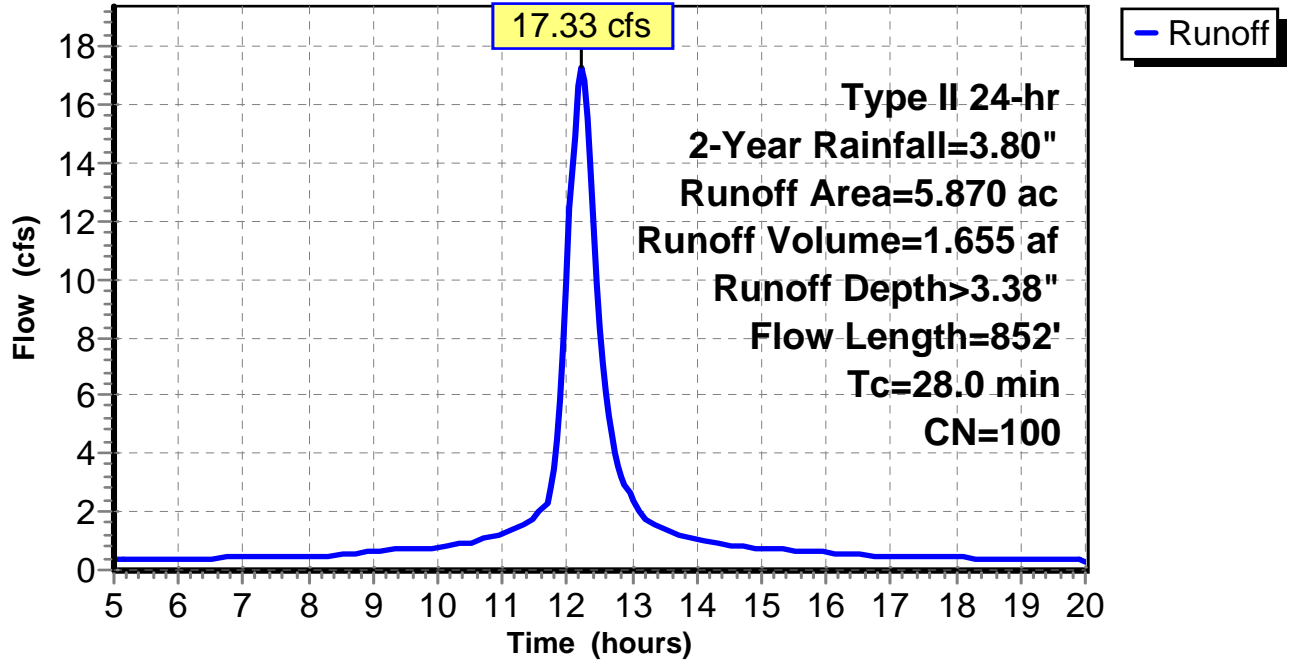
Subcatchment 15: C 76.003

Hydrograph



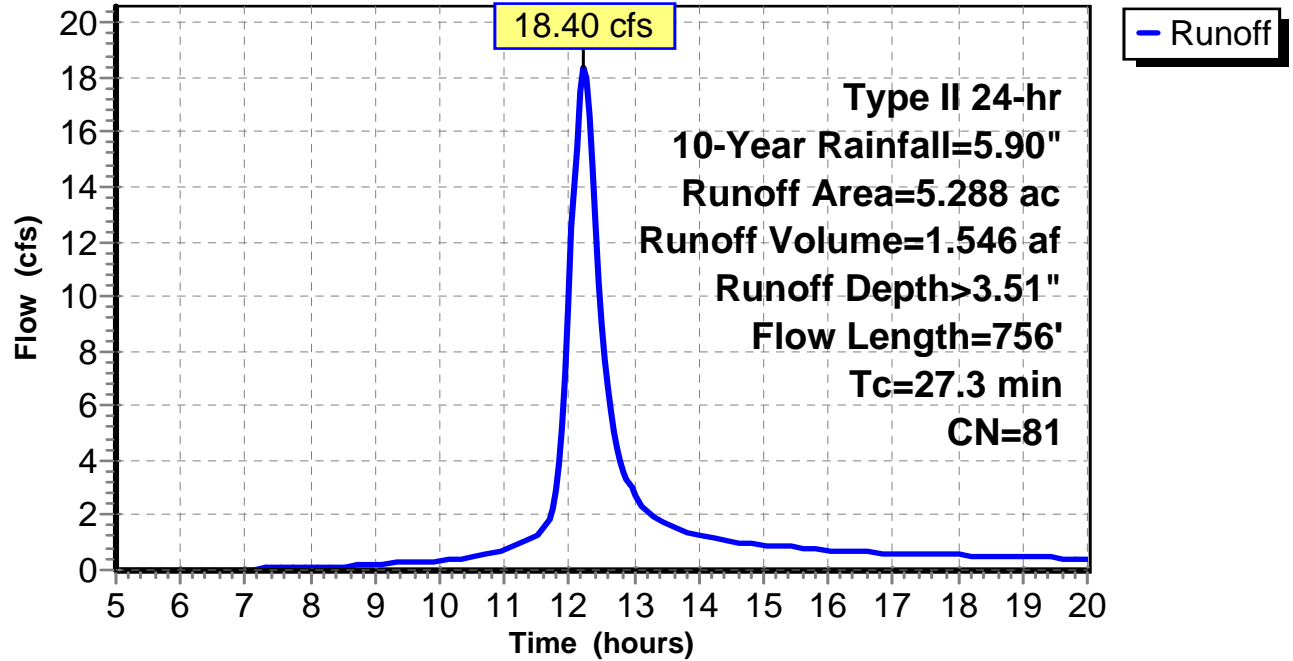
Subcatchment 16: C 76.004

Hydrograph



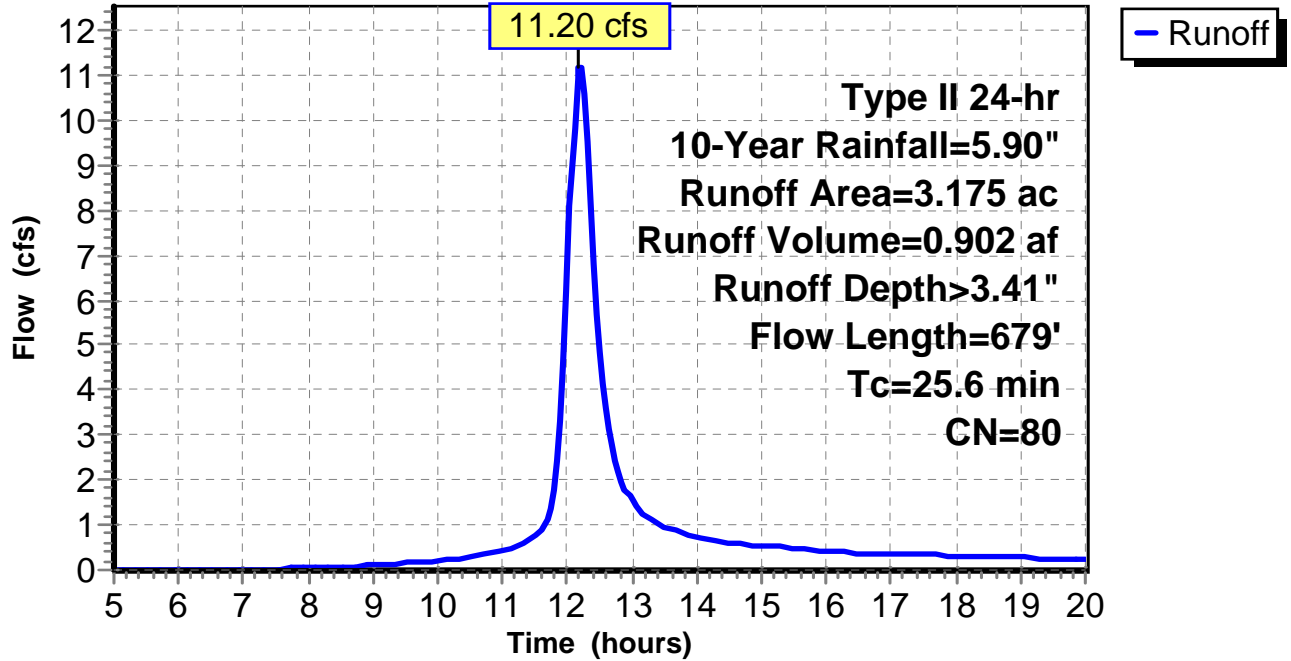
Subcatchment 1: C AR102.015

Hydrograph



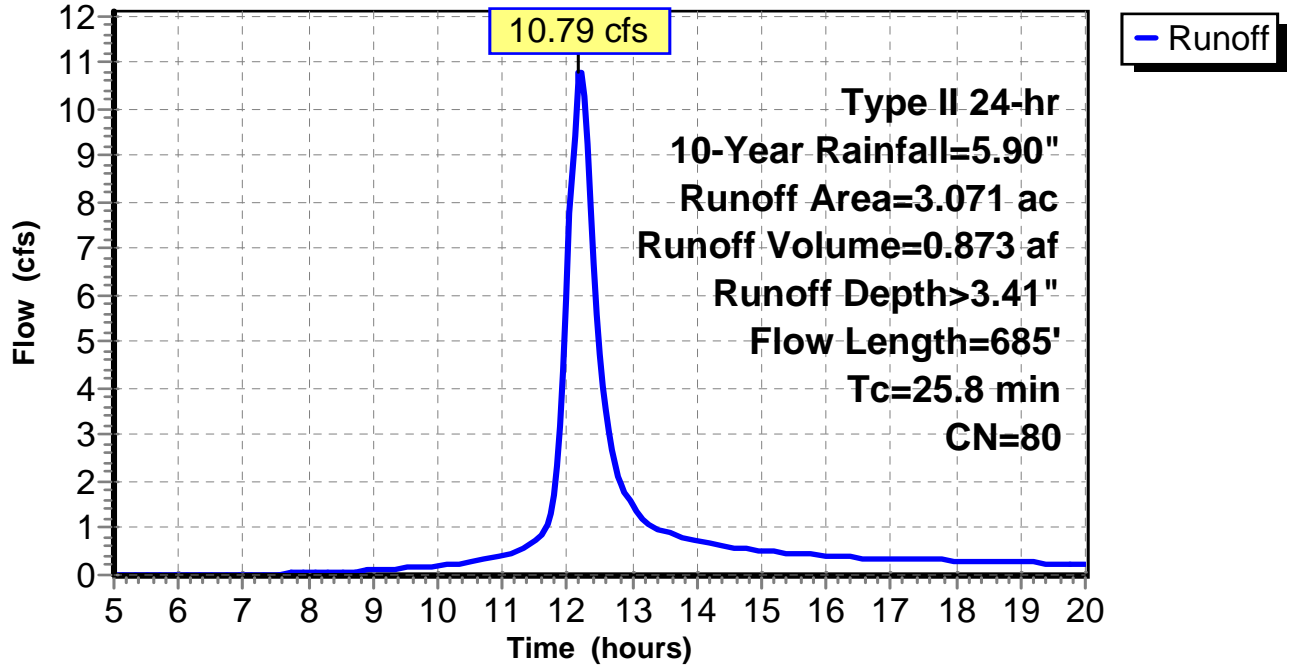
Subcatchment 2: C AR102.016

Hydrograph



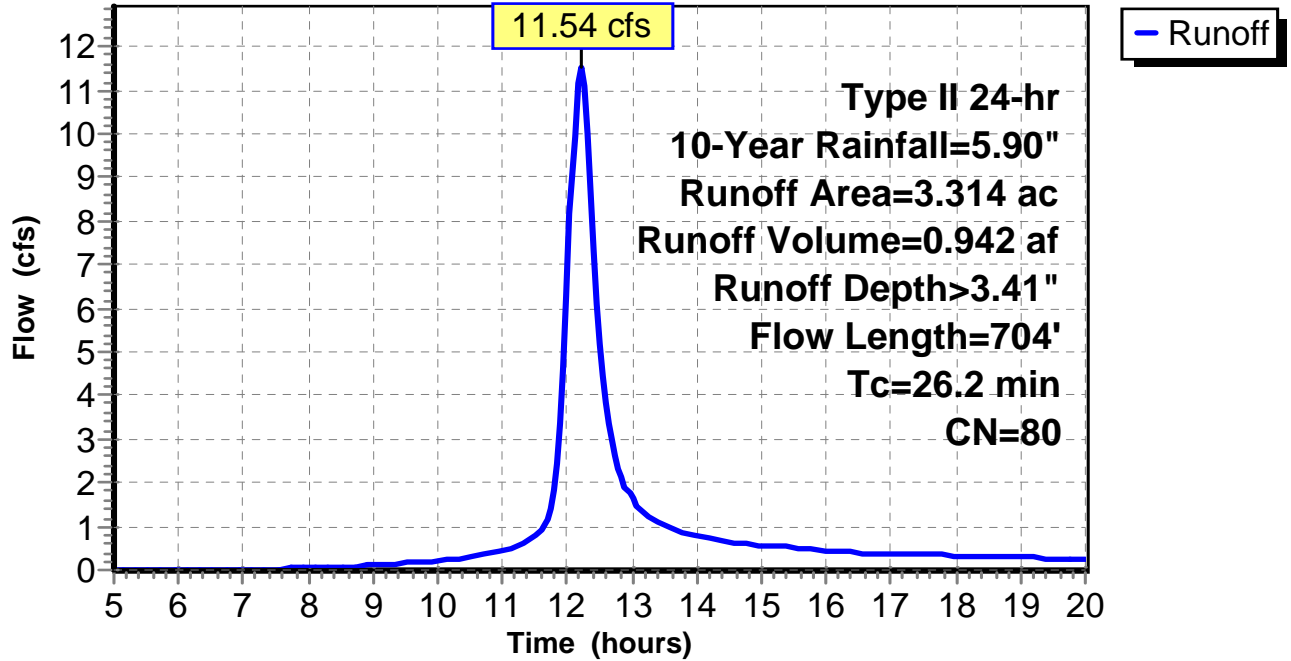
Subcatchment 3: C AR102.017

Hydrograph



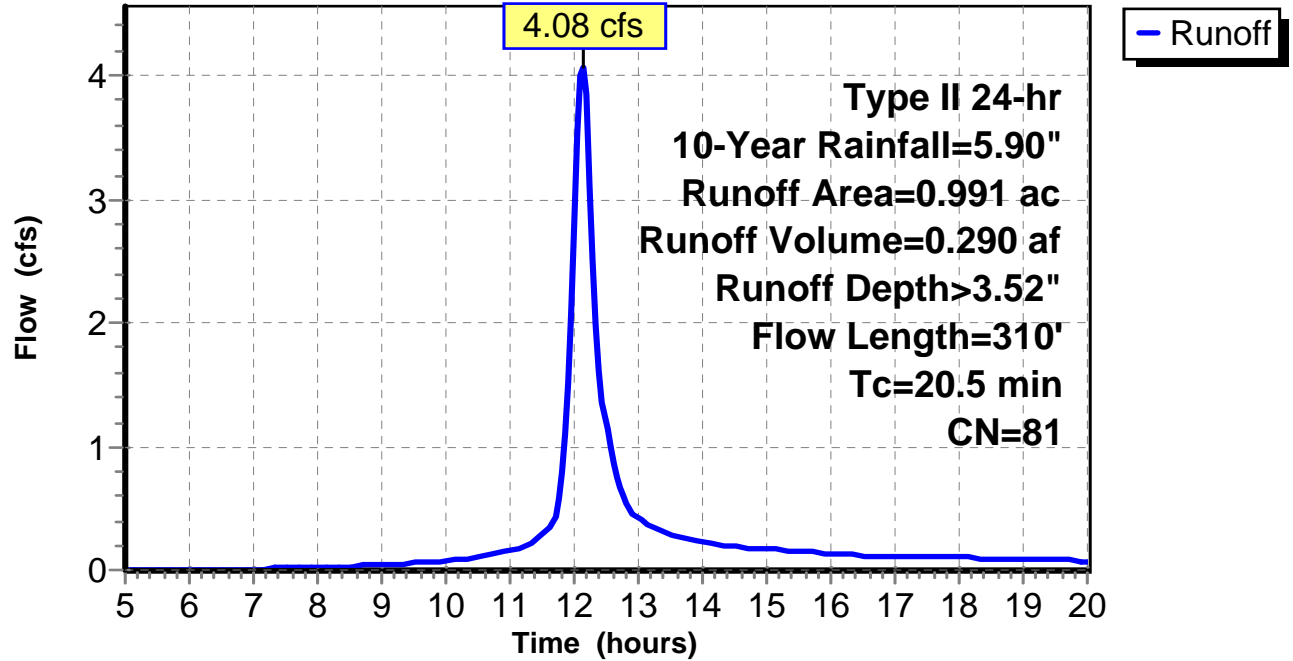
Subcatchment 4: C AR102.018

Hydrograph



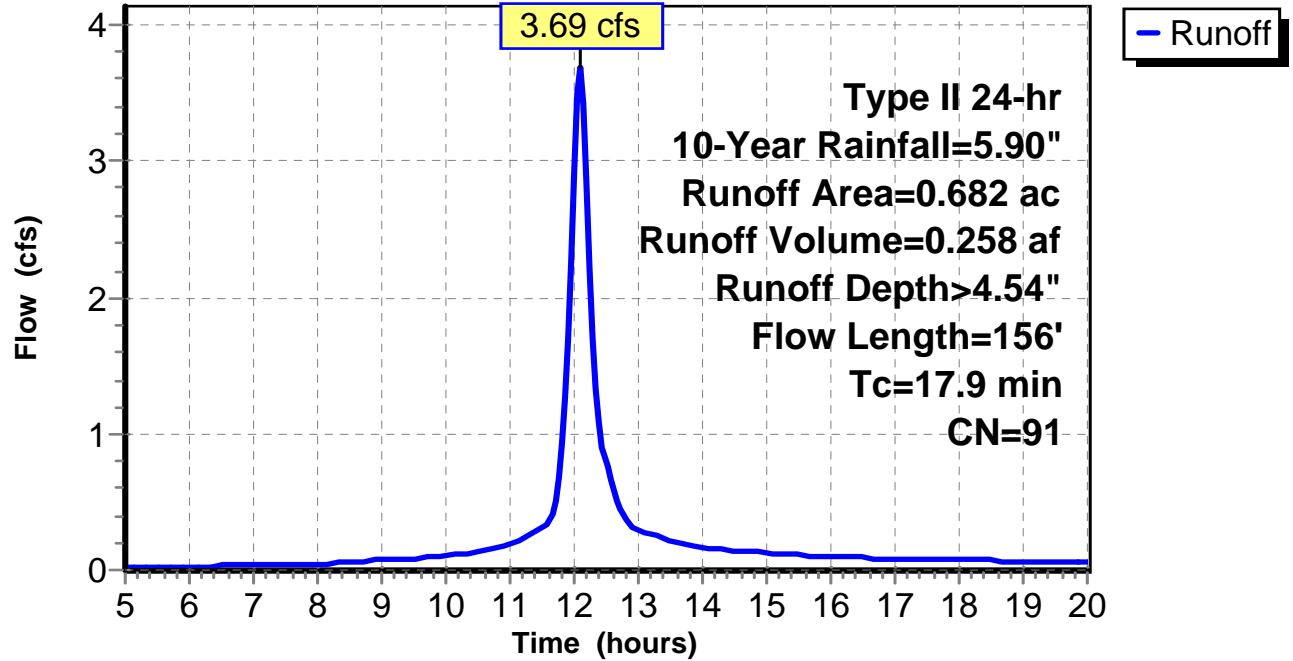
Subcatchment 5: C AR102.019

Hydrograph



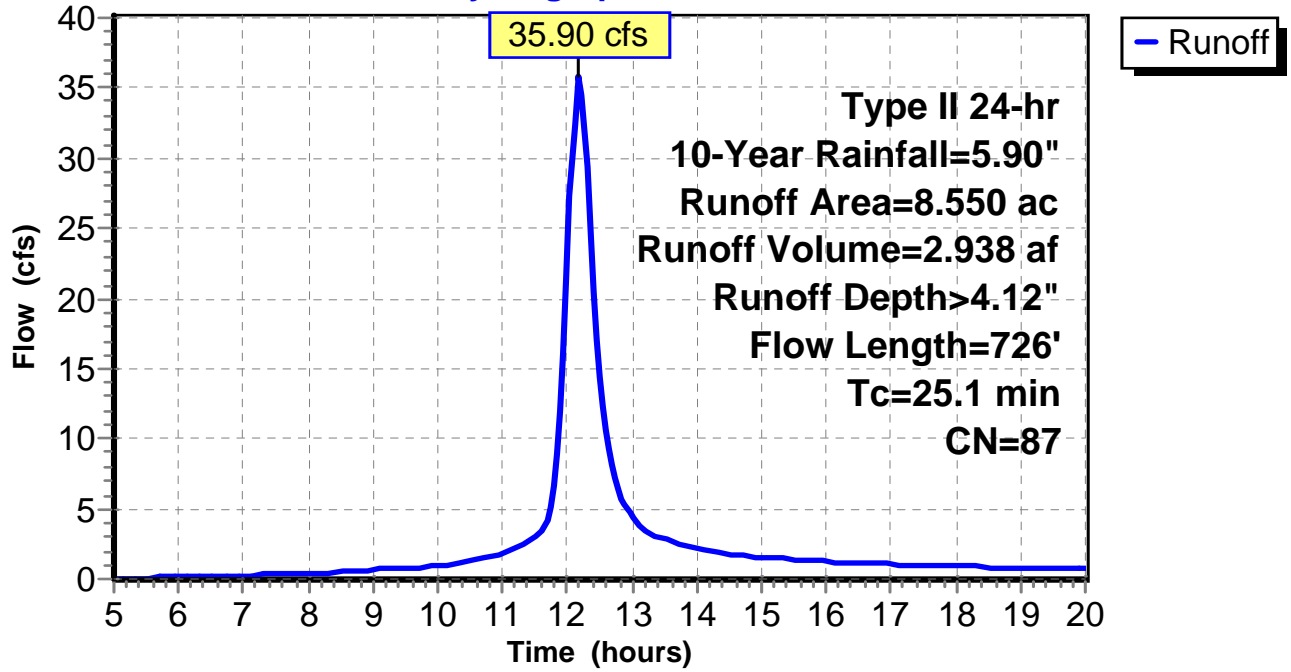
Subcatchment 6: C AR102.020

Hydrograph



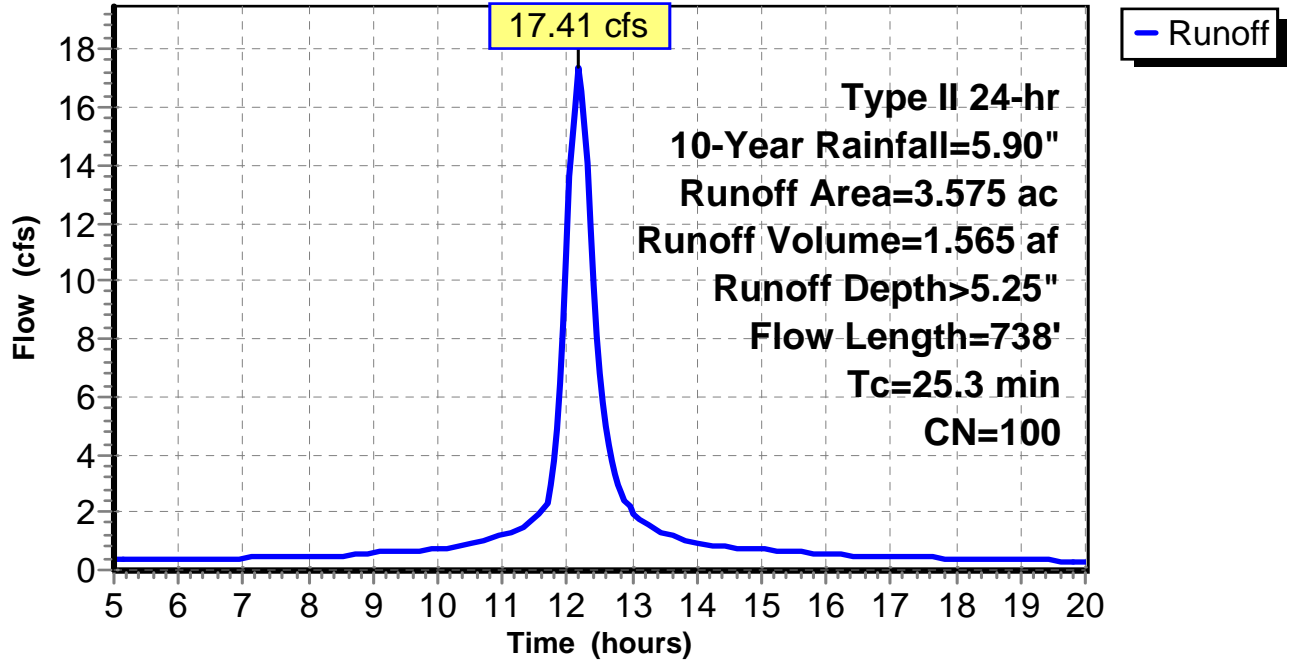
Subcatchment 7: C AR102.021

Hydrograph



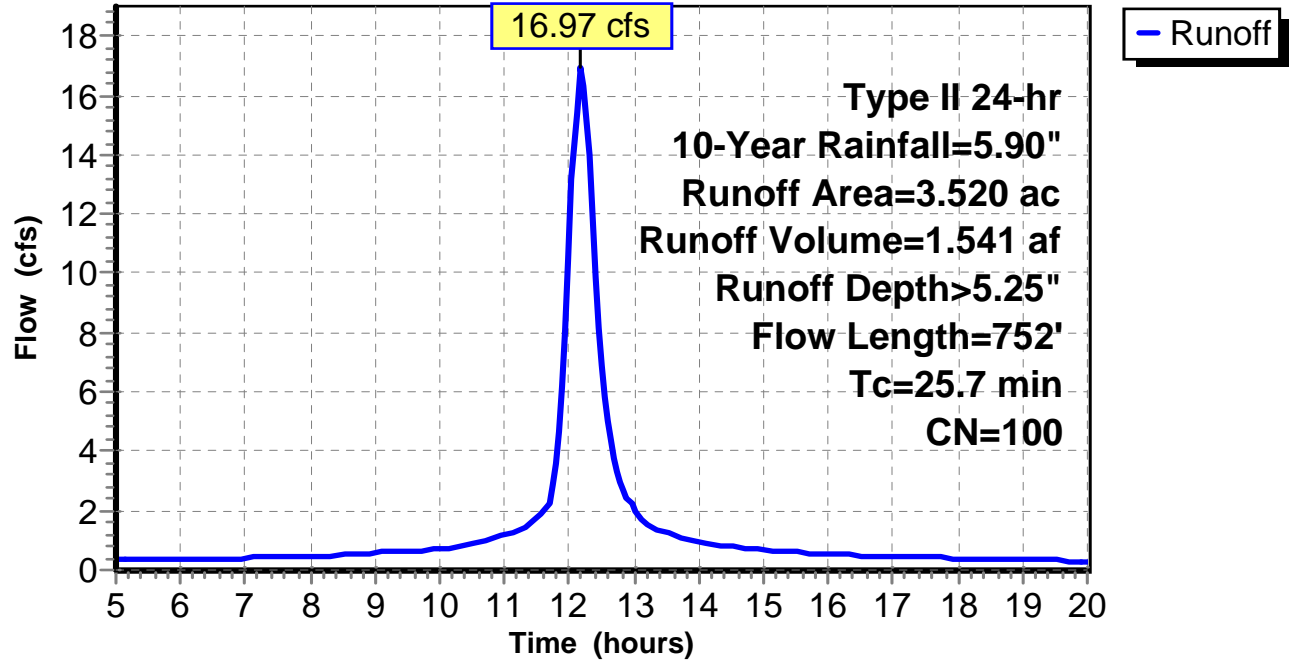
Subcatchment 8: C AR102.022

Hydrograph



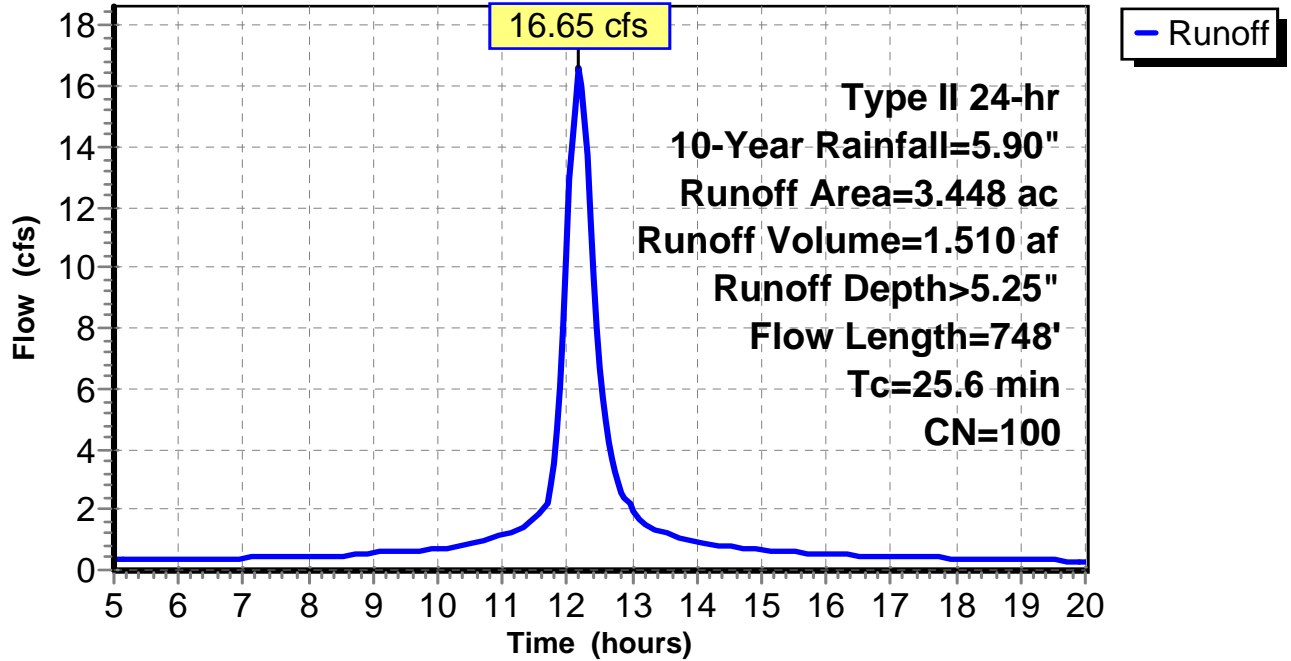
Subcatchment 9: C AR102.023

Hydrograph



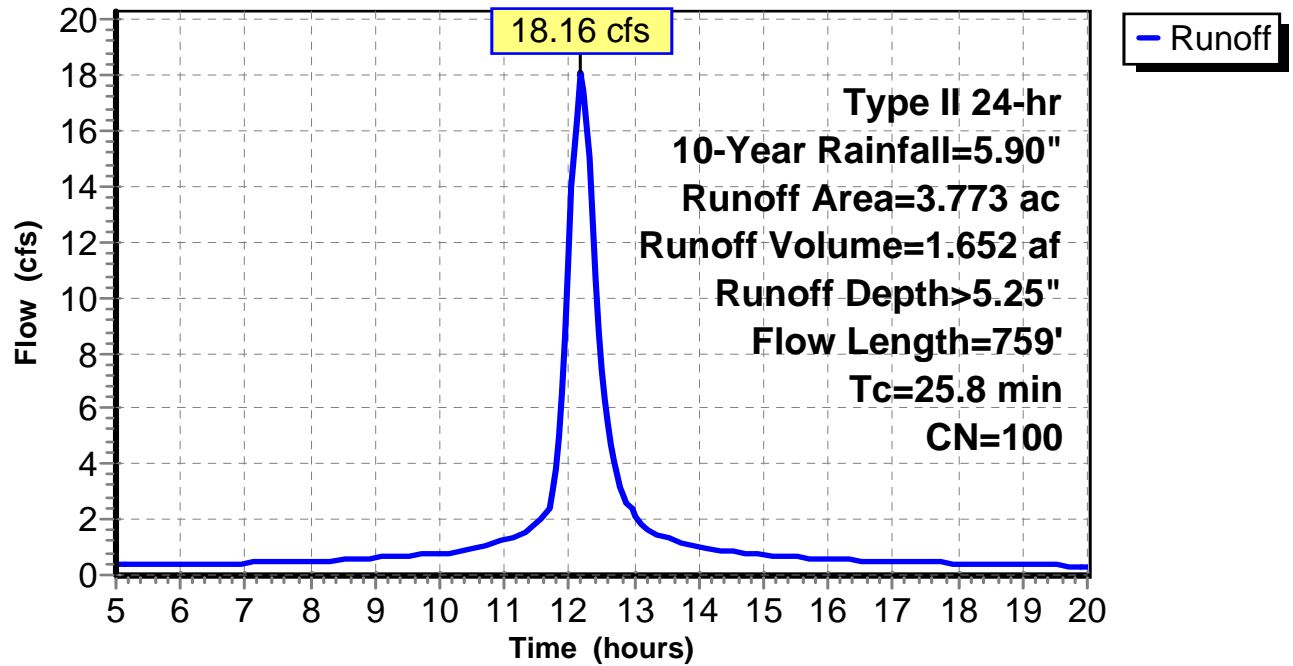
Subcatchment 10: C AR102.024

Hydrograph



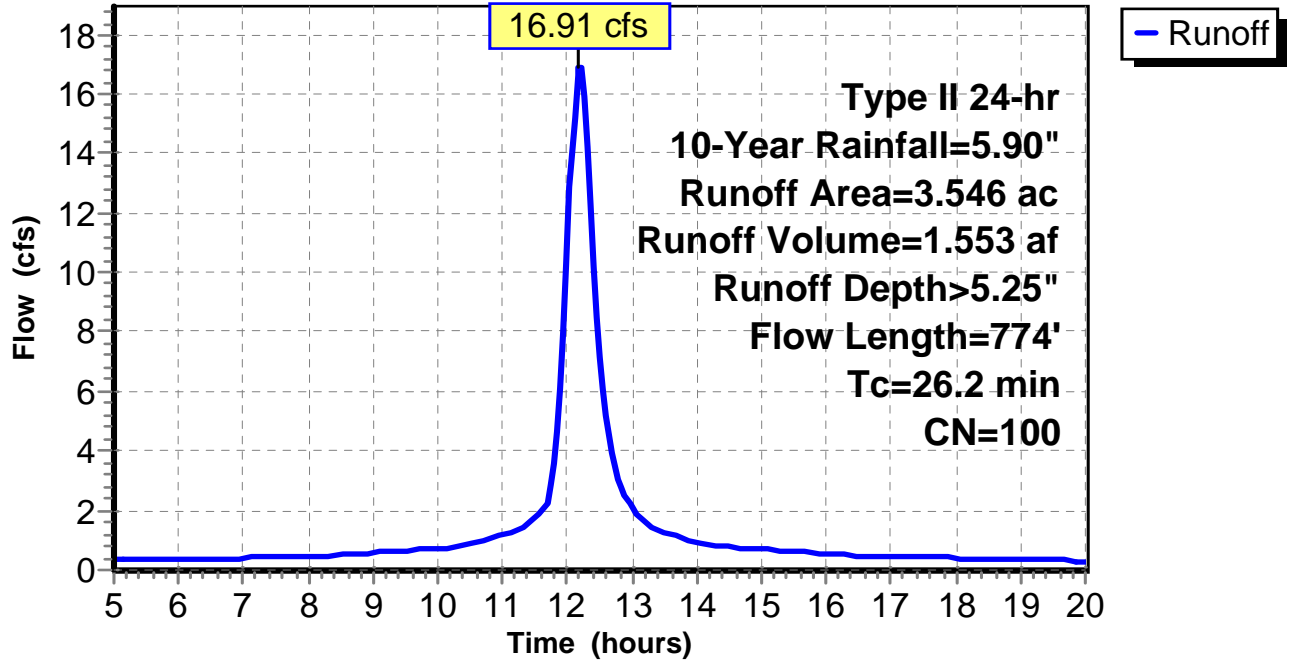
Subcatchment 11: C AR102.025

Hydrograph



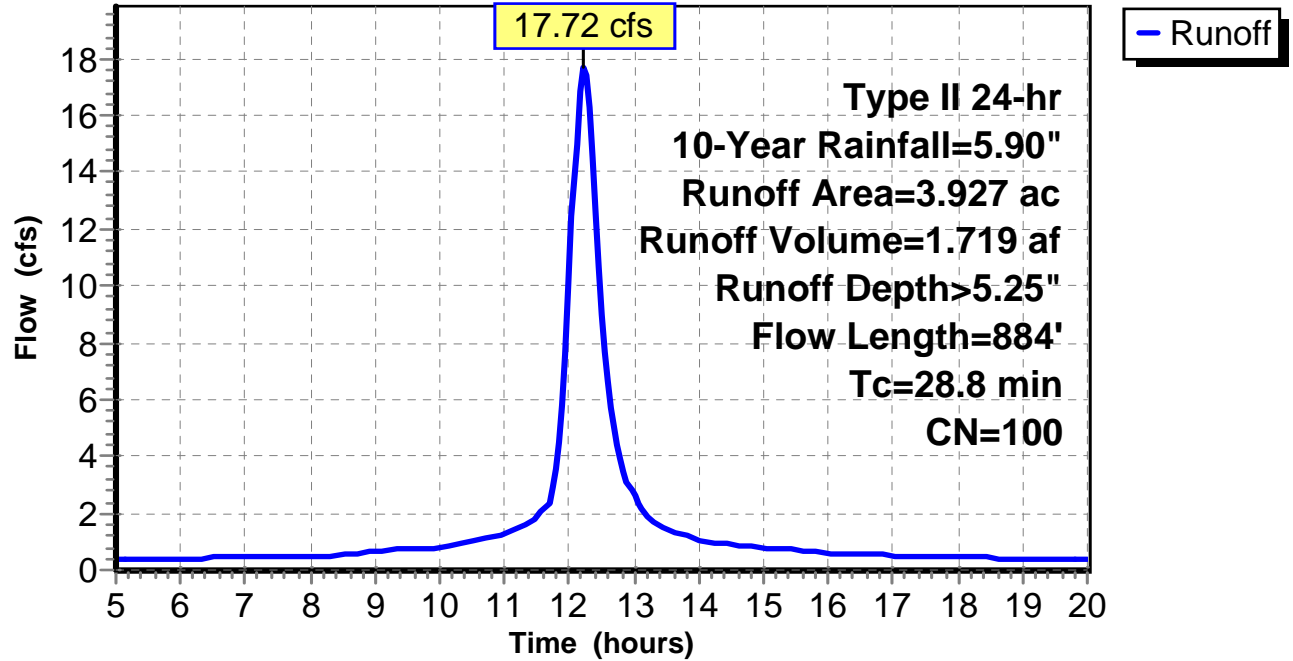
Subcatchment 12: C AR102.026

Hydrograph



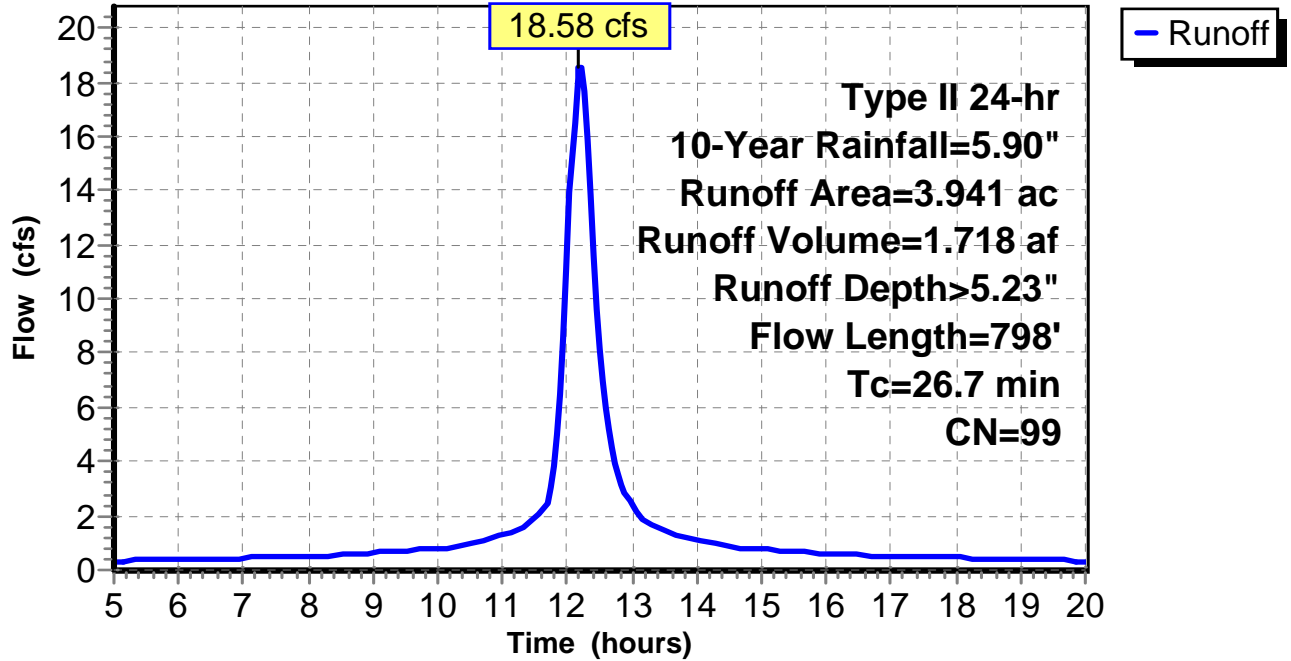
Subcatchment 13: C AR102.027

Hydrograph



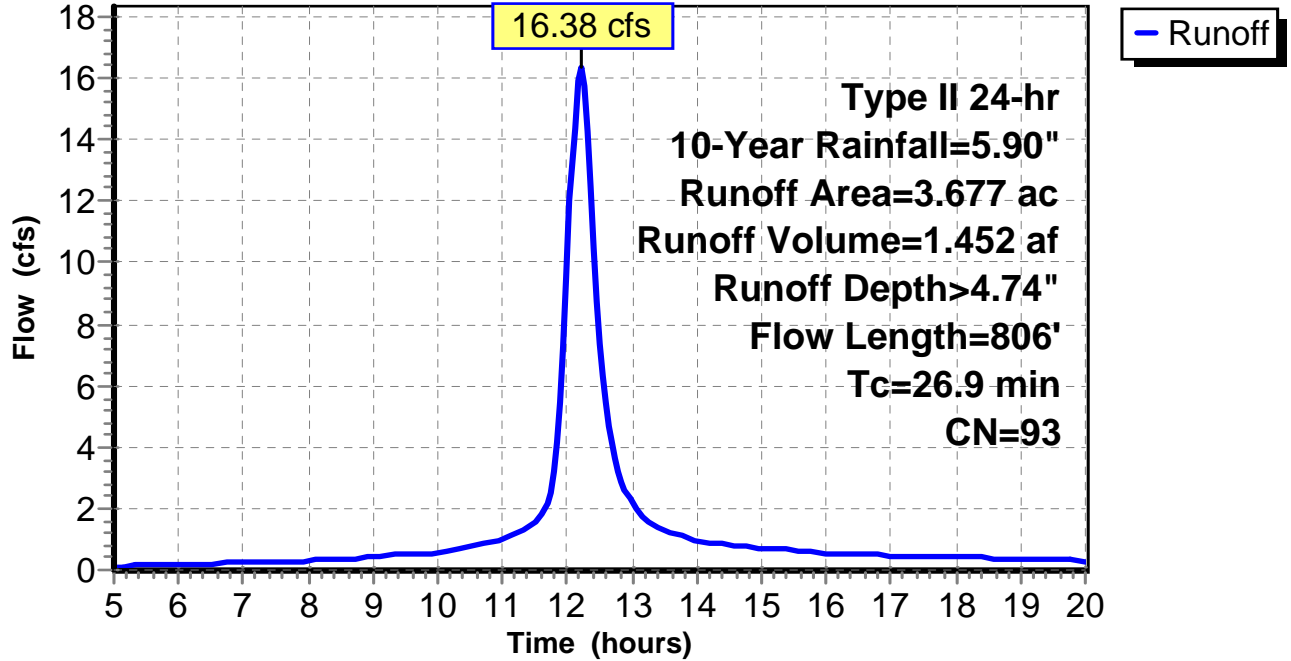
Subcatchment 14: C AR102.028

Hydrograph



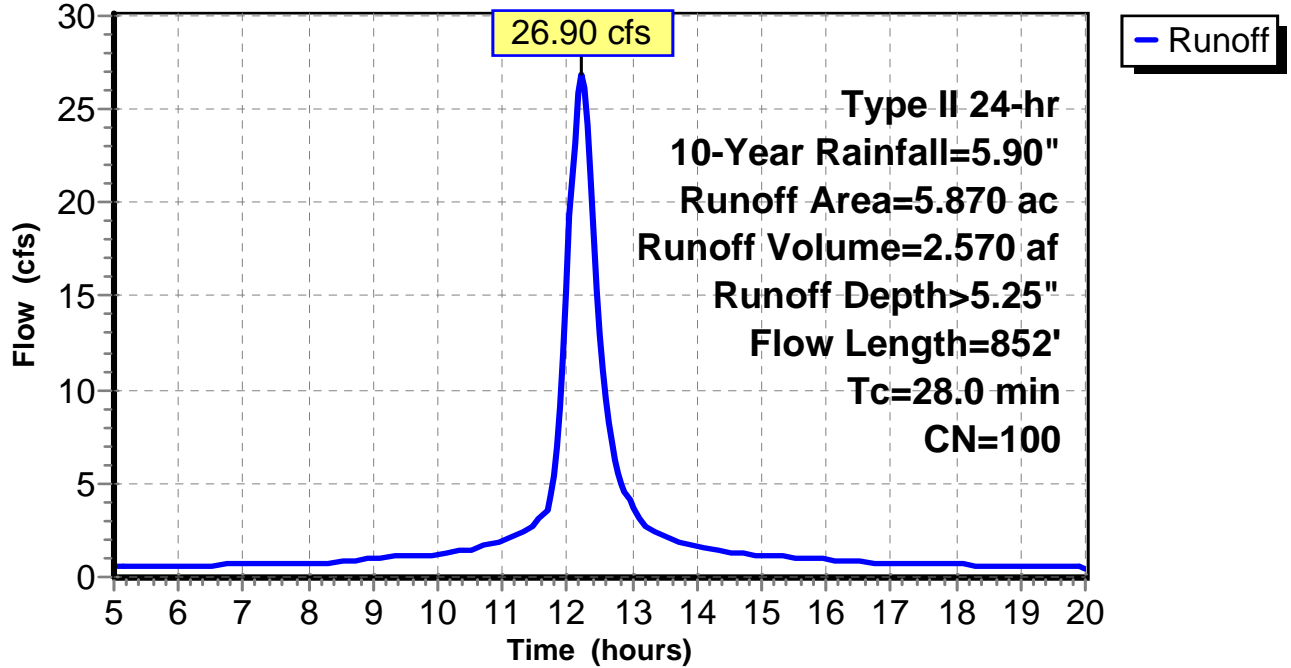
Subcatchment 15: C 76.003

Hydrograph



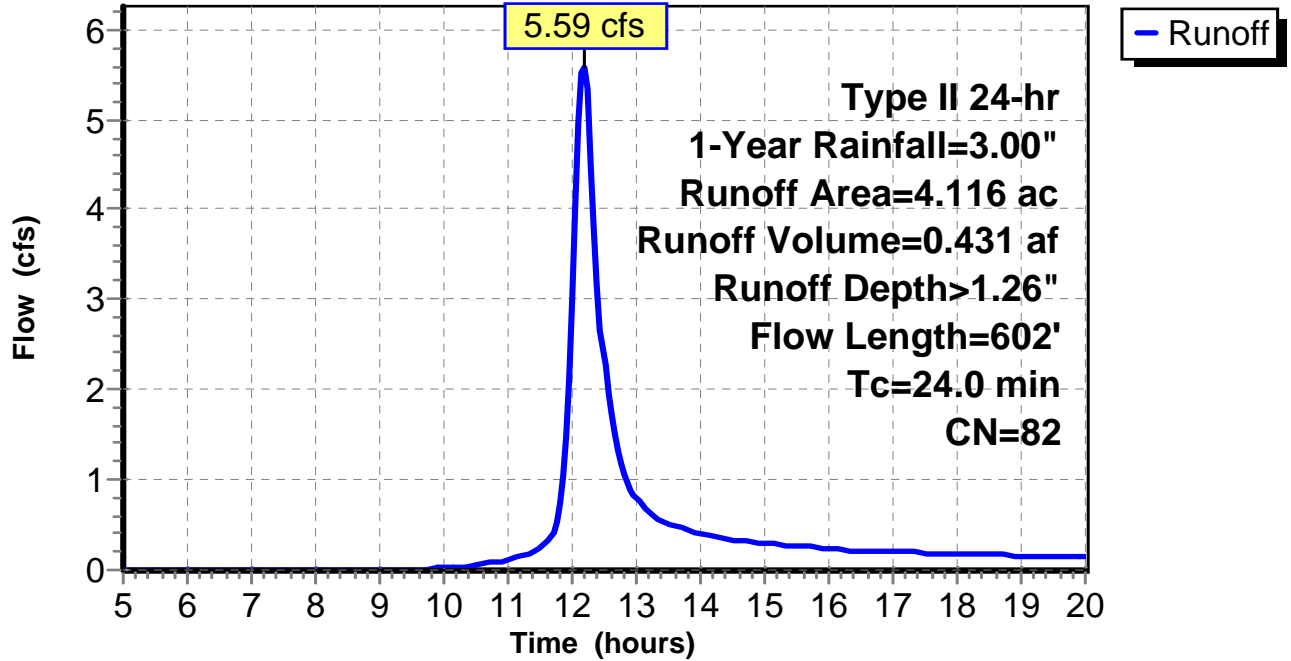
Subcatchment 16: C 76.004

Hydrograph



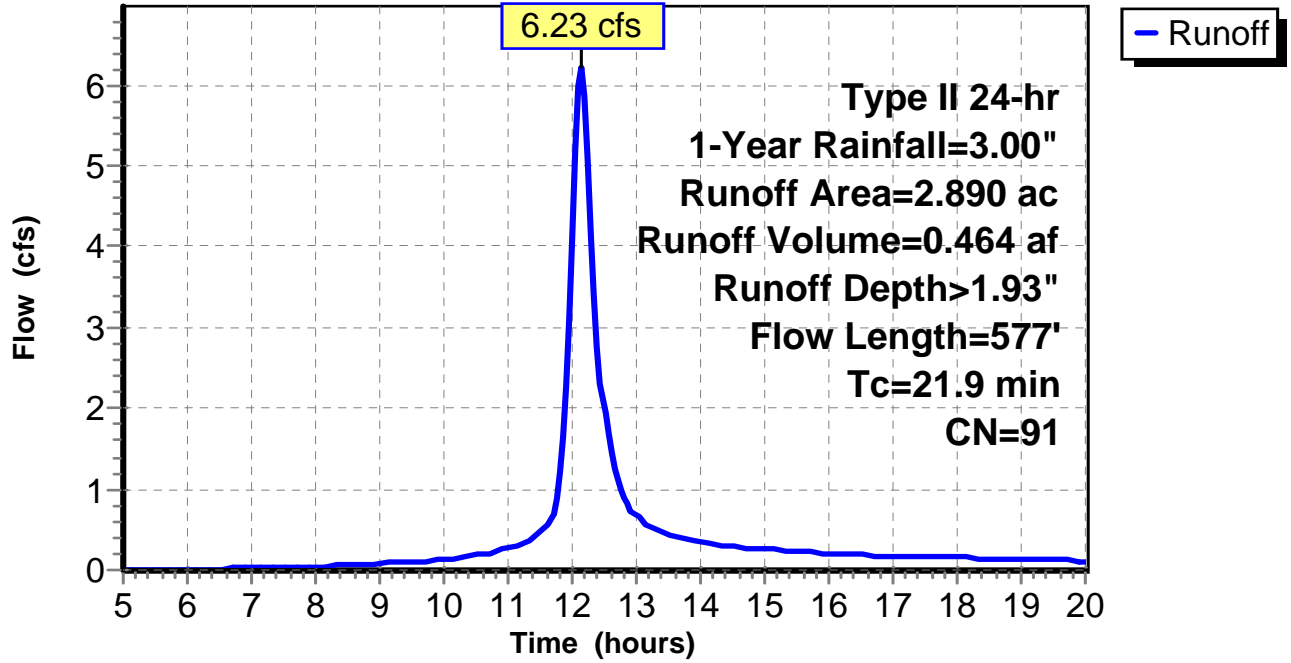
Subcatchment 1: C AR102.001

Hydrograph



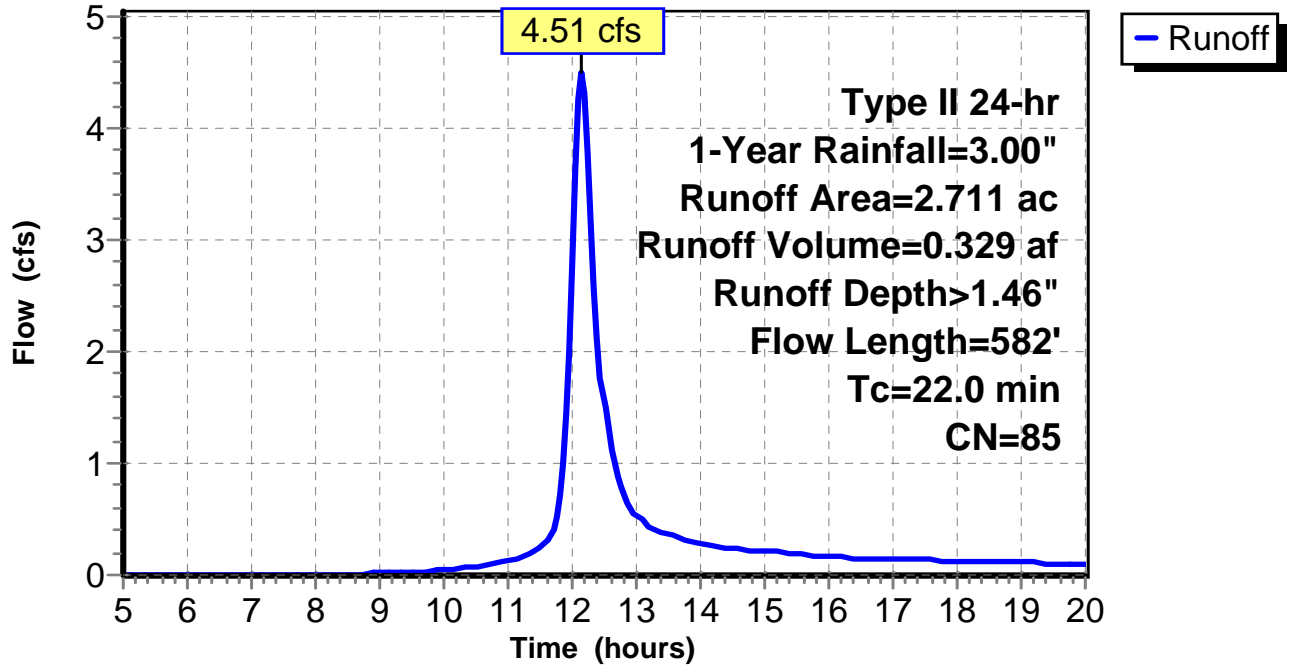
Subcatchment 2: C AR102.002

Hydrograph



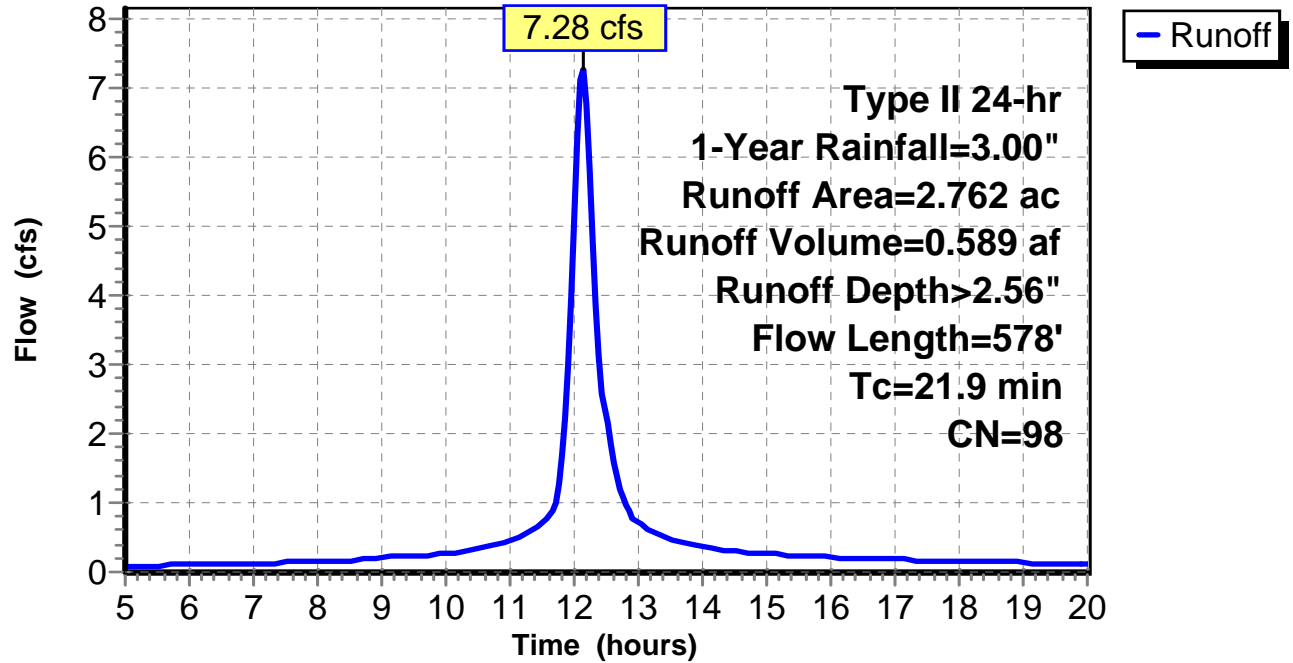
Subcatchment 3: C AR102.003

Hydrograph



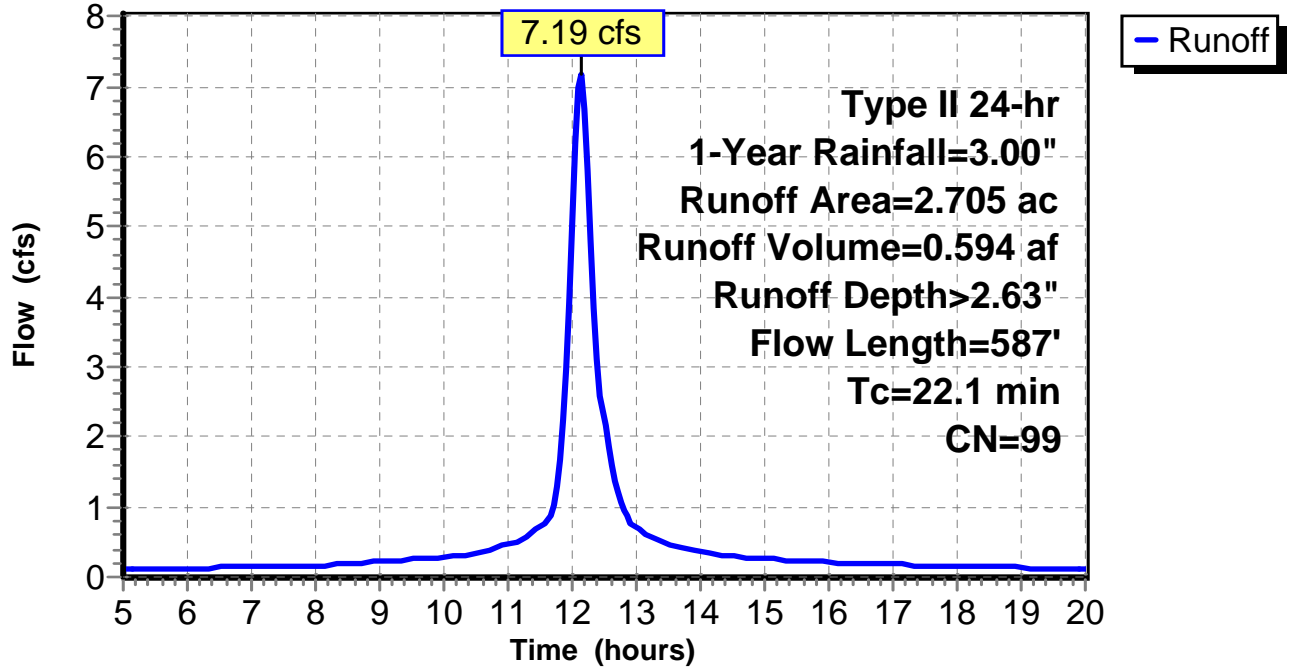
Subcatchment 4: C AR102.004

Hydrograph



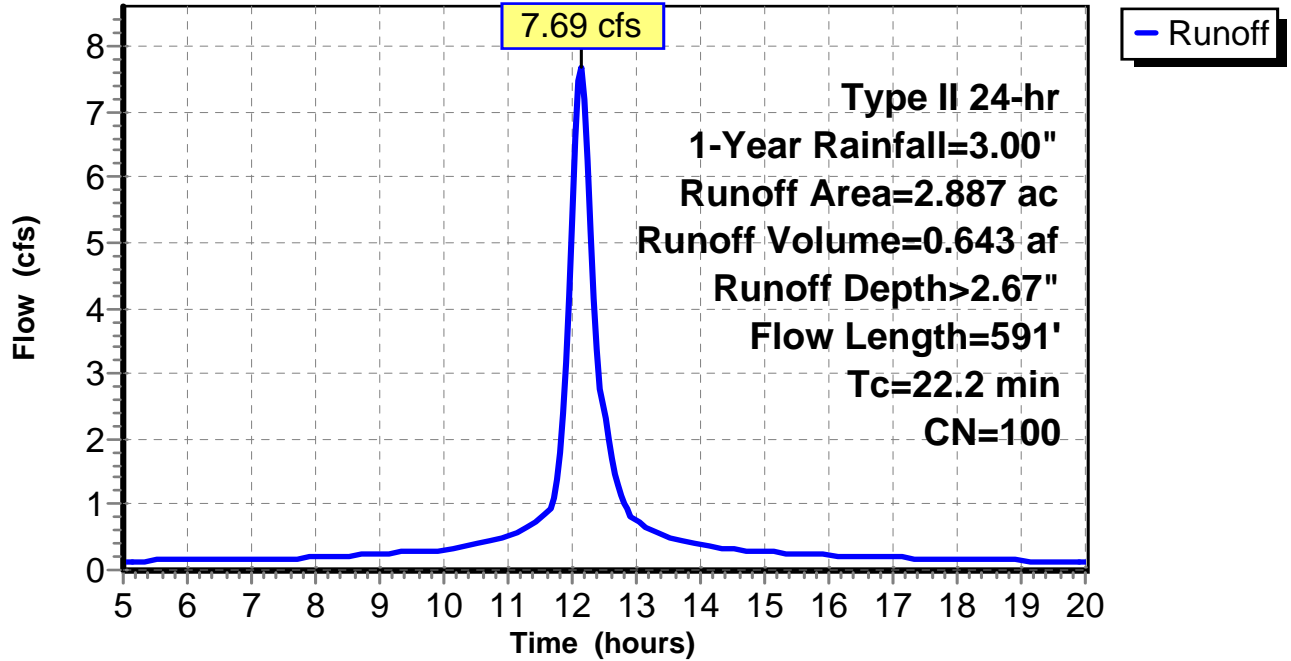
Subcatchment 5: C AR102.005

Hydrograph



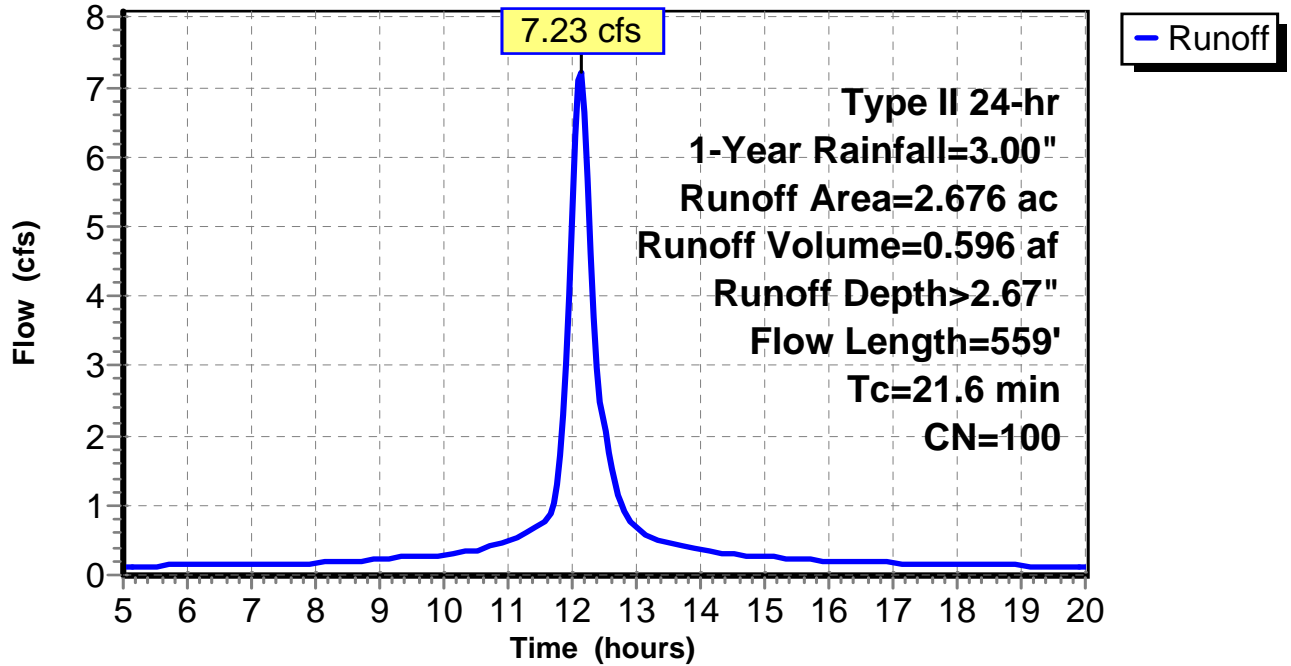
Subcatchment 6: C AR102.006

Hydrograph



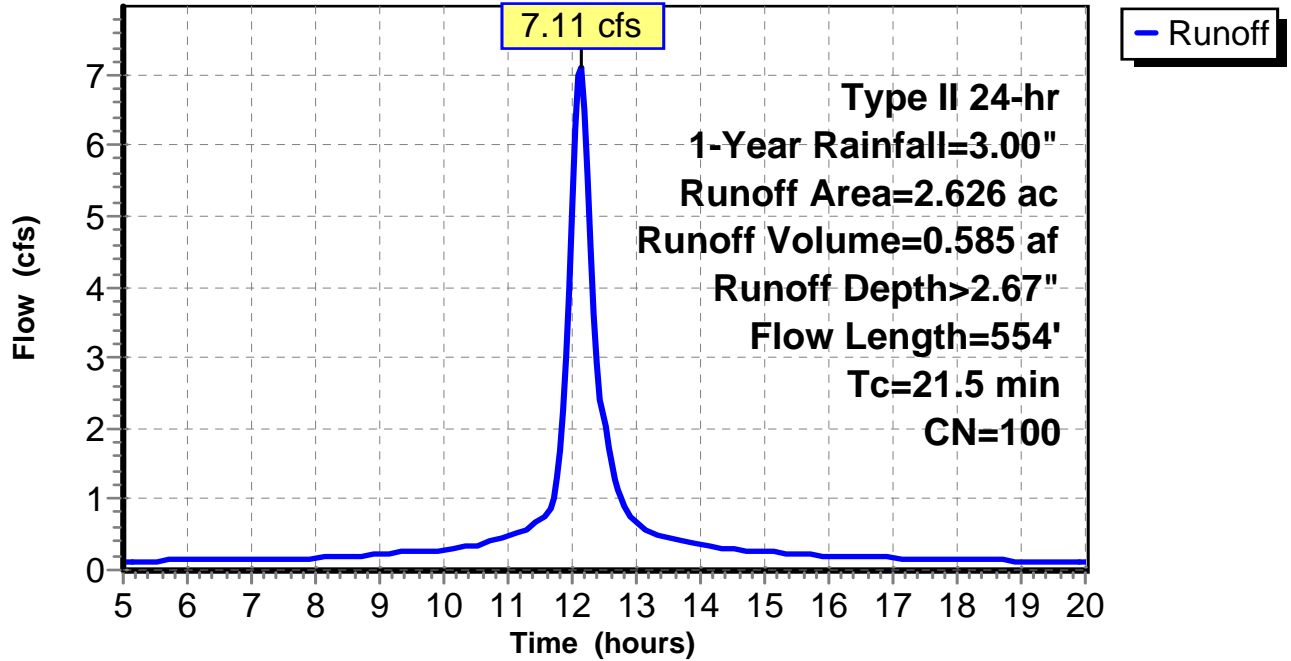
Subcatchment 7: C AR102.007

Hydrograph



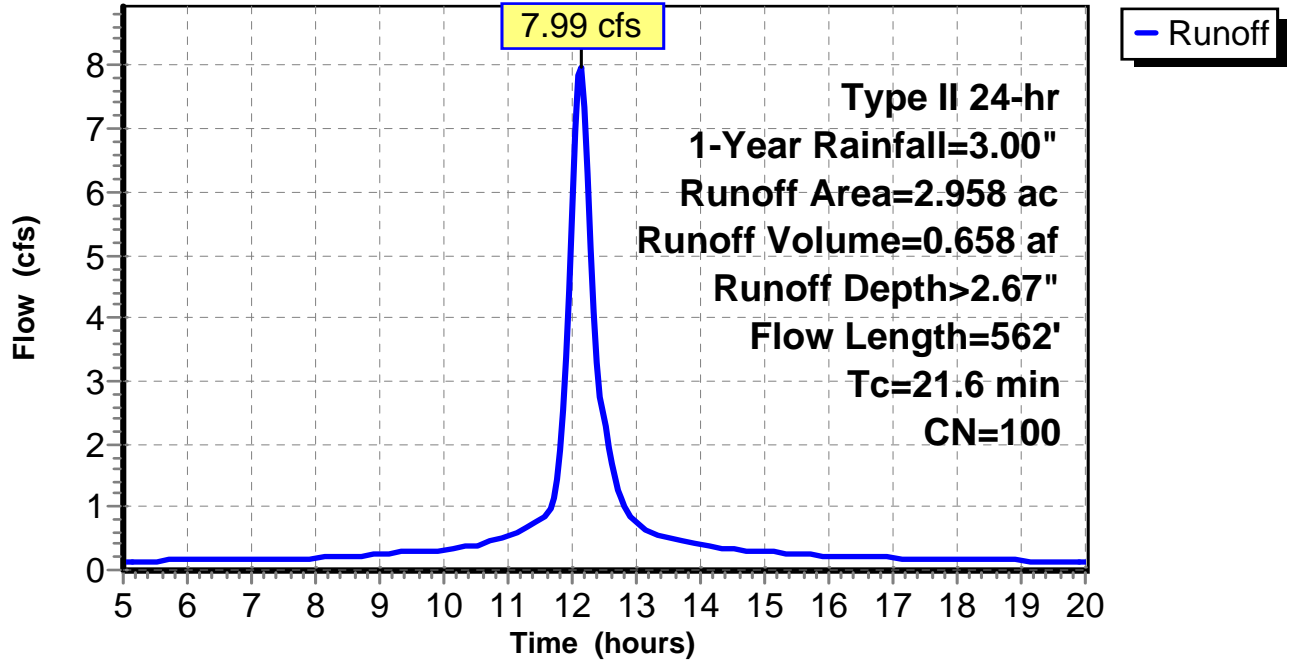
Subcatchment 8: C AR102.008

Hydrograph



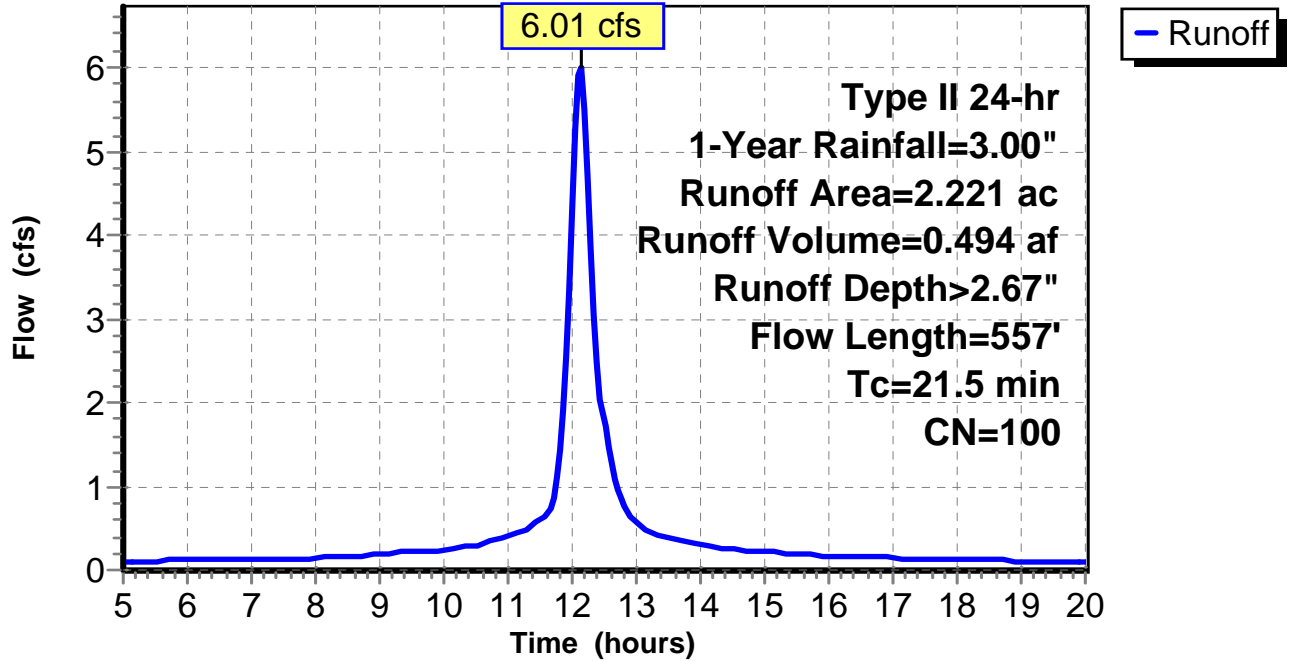
Subcatchment 9: C AR102.009

Hydrograph



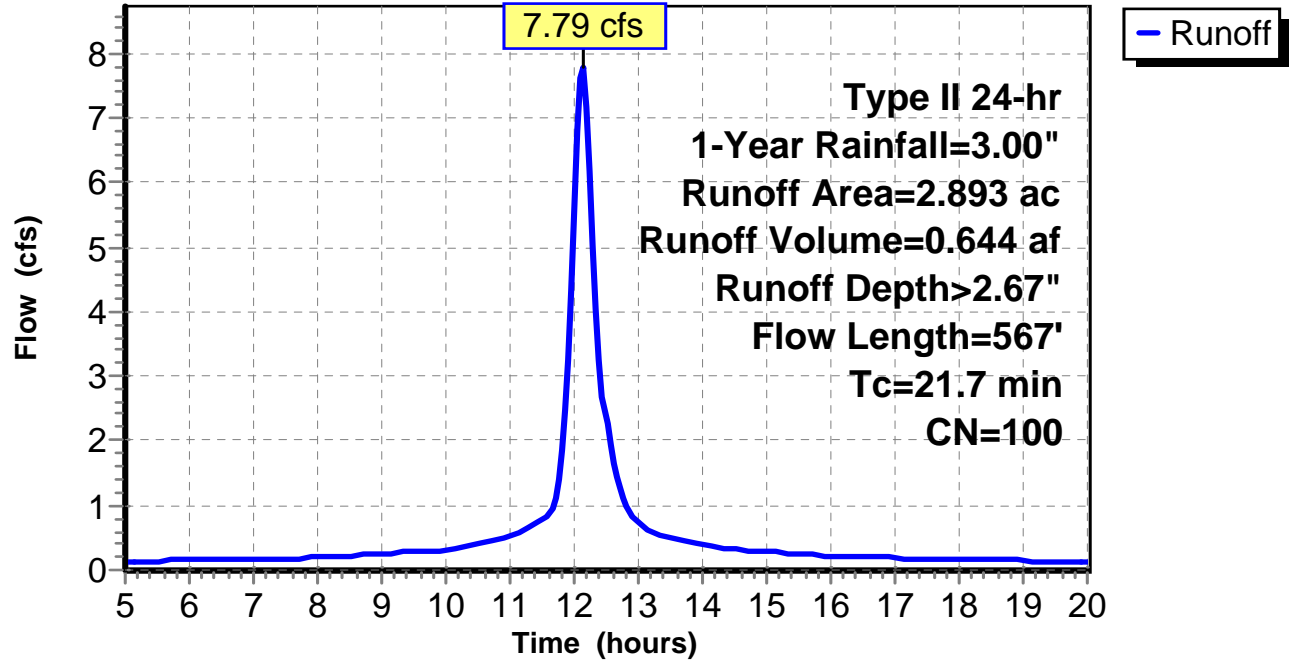
Subcatchment 10: C AR102.010

Hydrograph



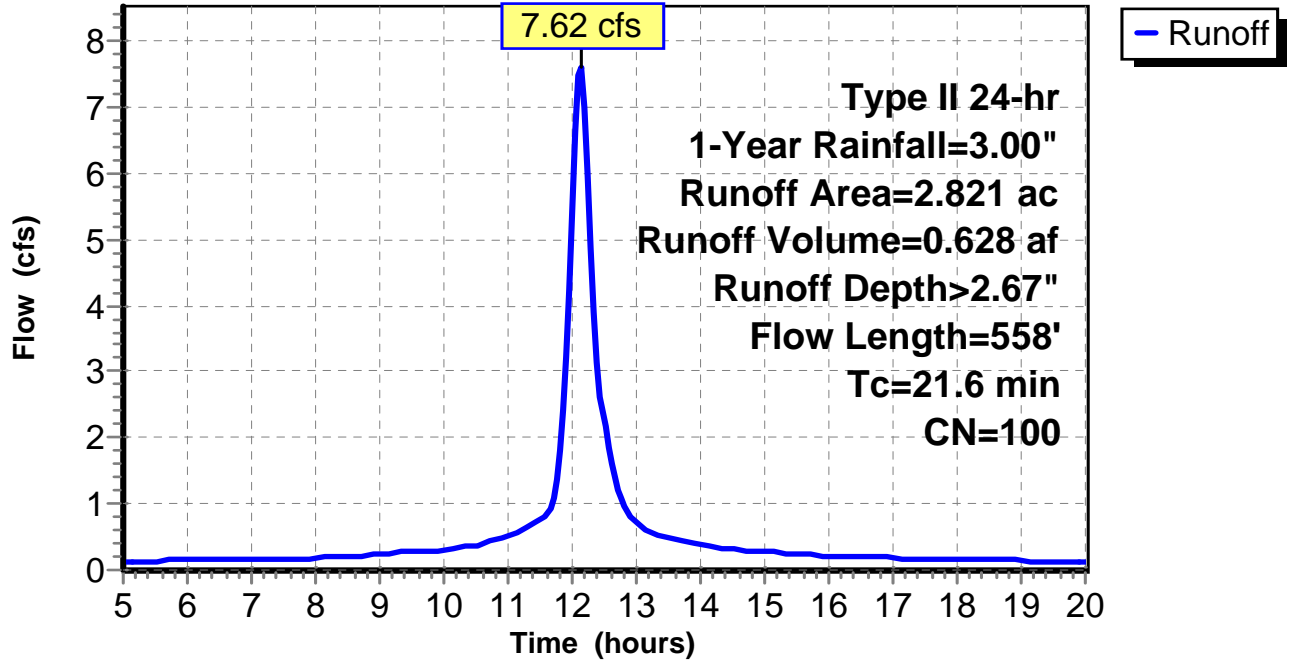
Subcatchment 11: C AR102.011

Hydrograph



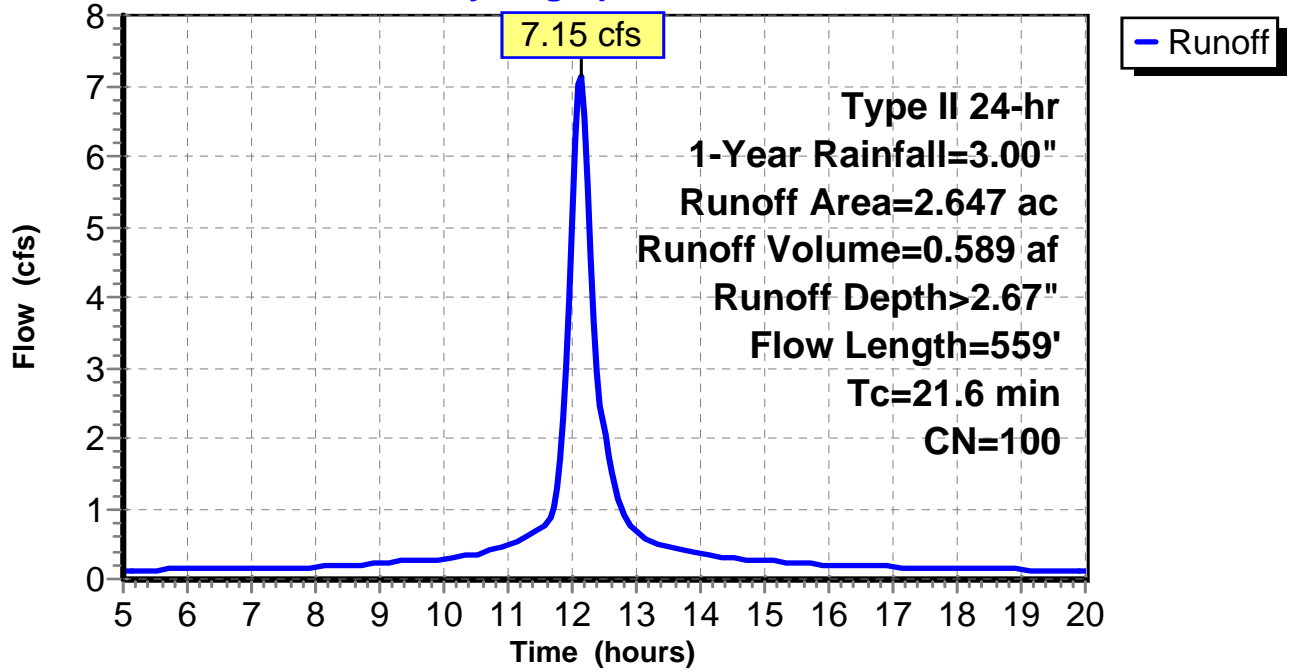
Subcatchment 12: C AR102.012

Hydrograph



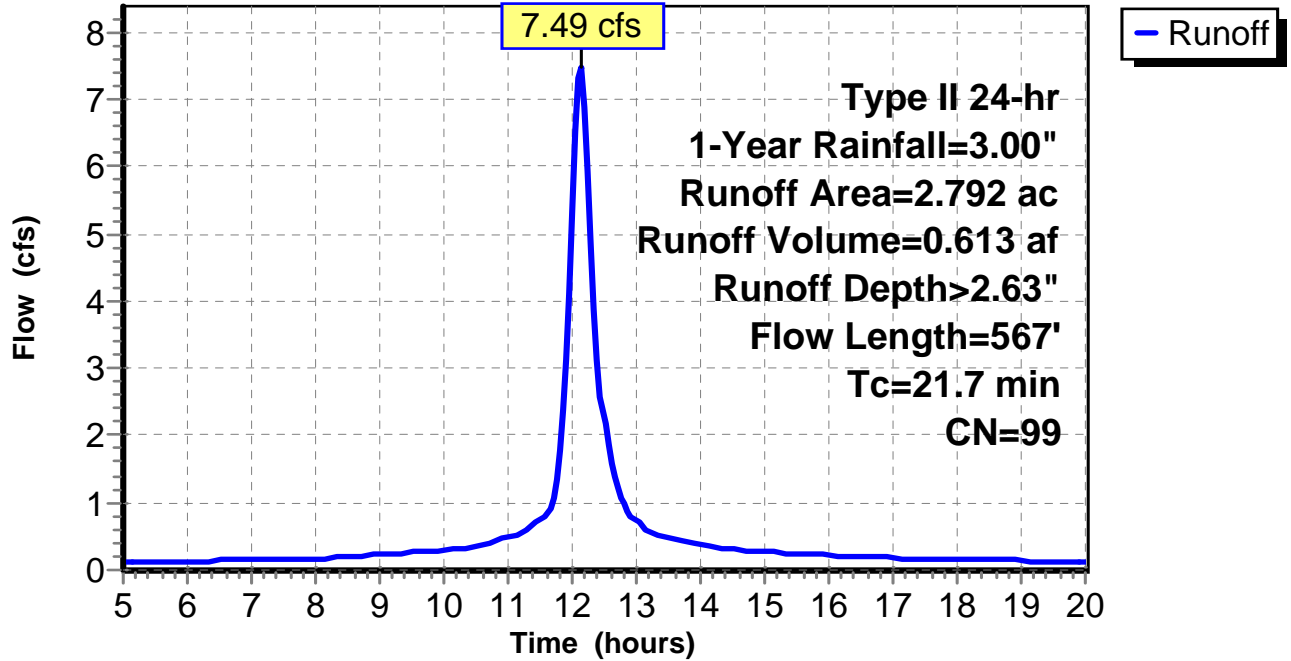
Subcatchment 13: C AR102.013

Hydrograph



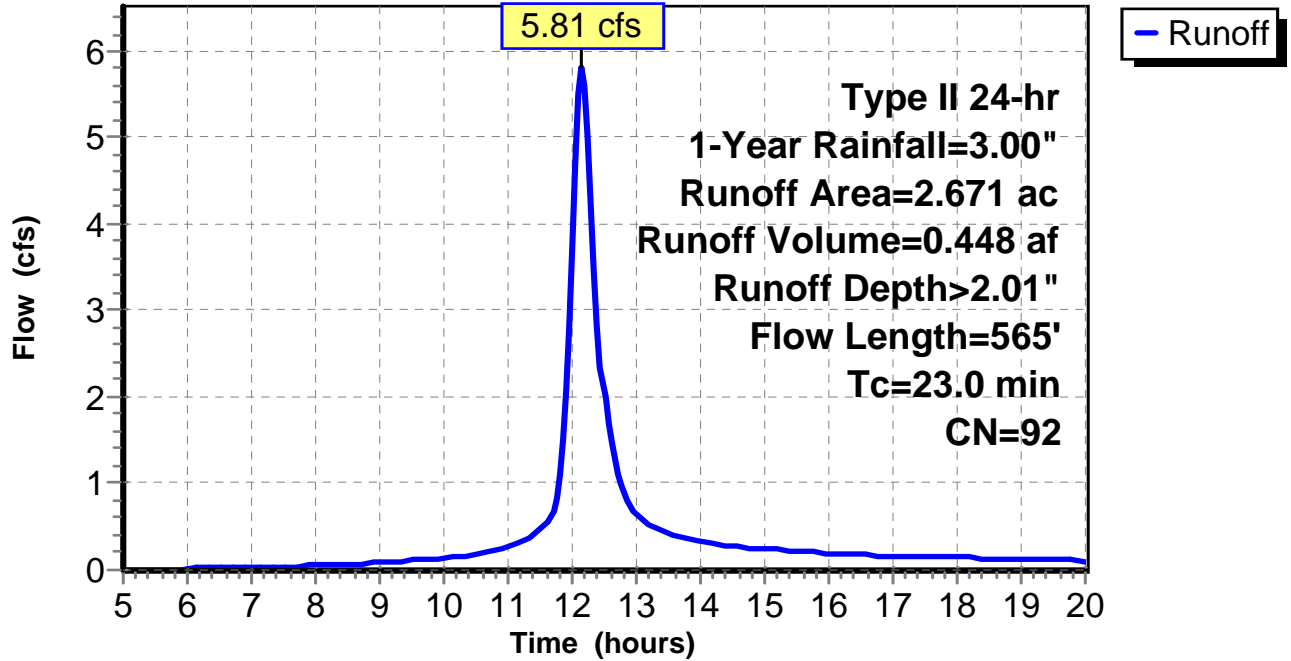
Subcatchment 14: C AR102.014

Hydrograph



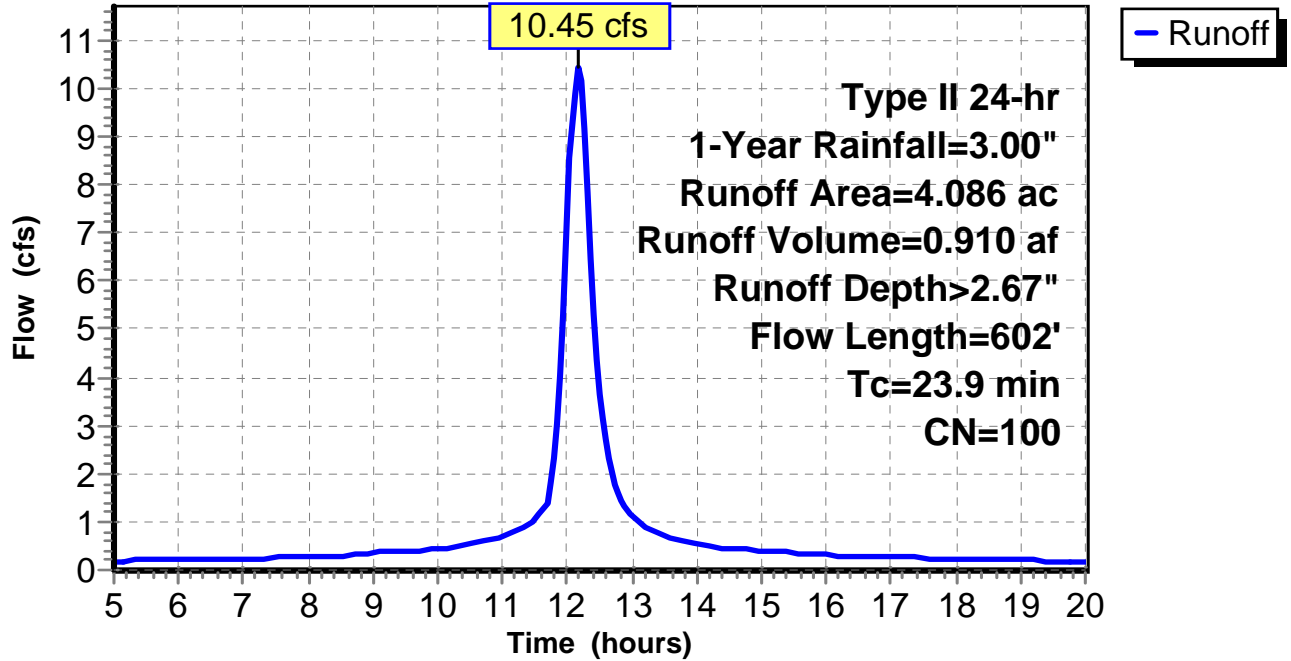
Subcatchment 15: C 76.001

Hydrograph



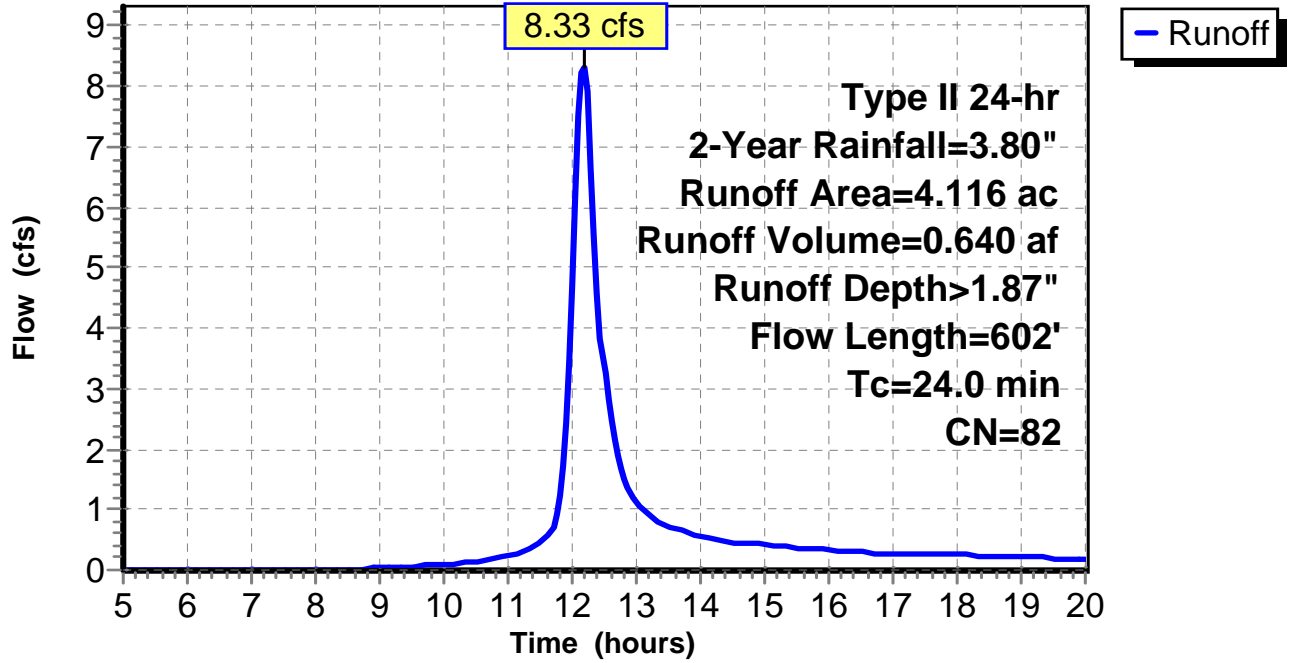
Subcatchment 16: C 76.002

Hydrograph



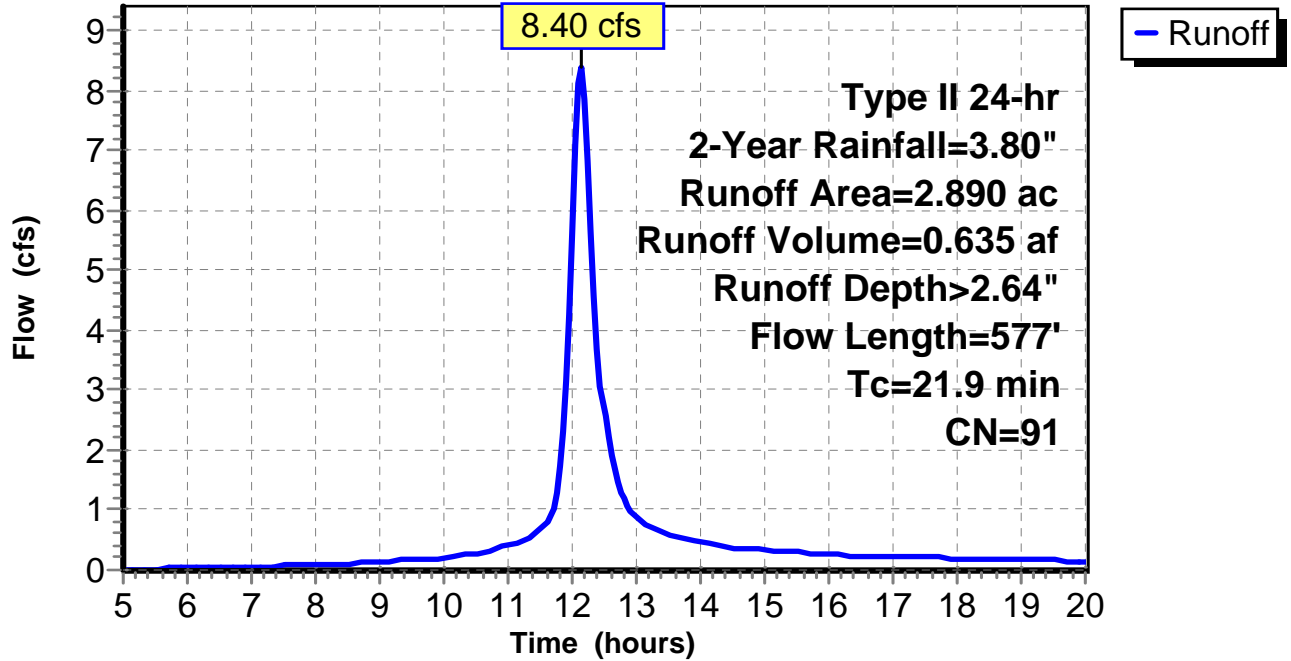
Subcatchment 1: C AR102.001

Hydrograph



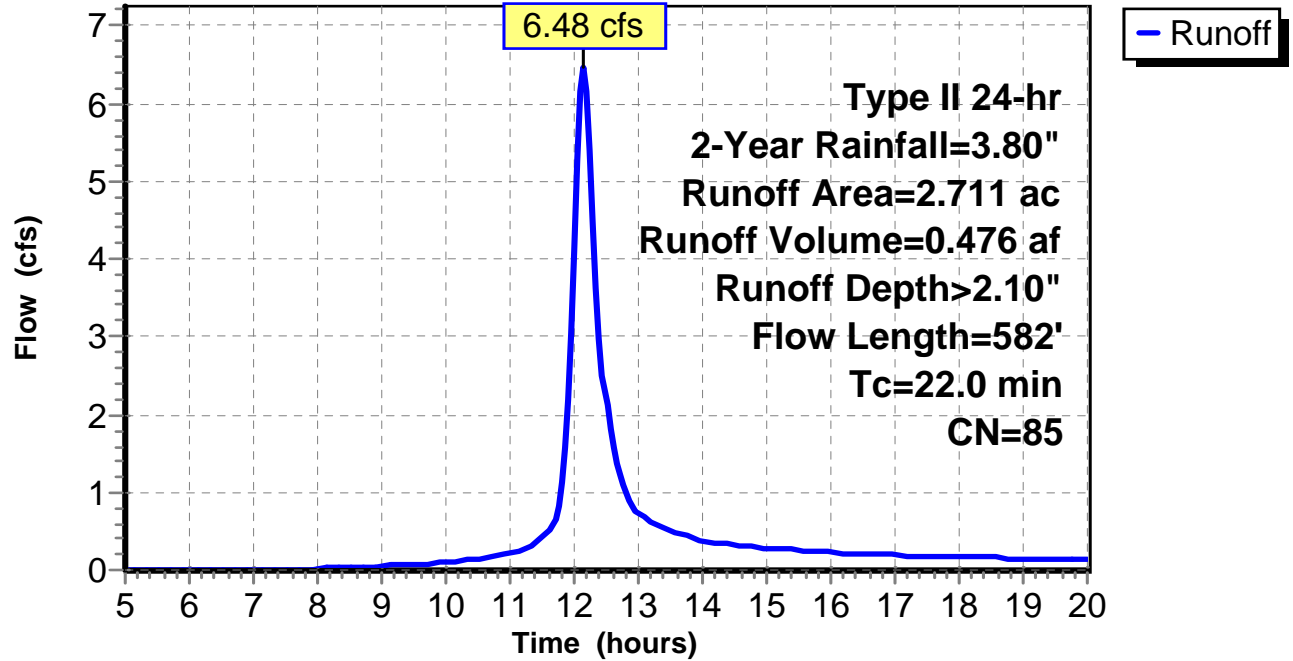
Subcatchment 2: C AR102.002

Hydrograph



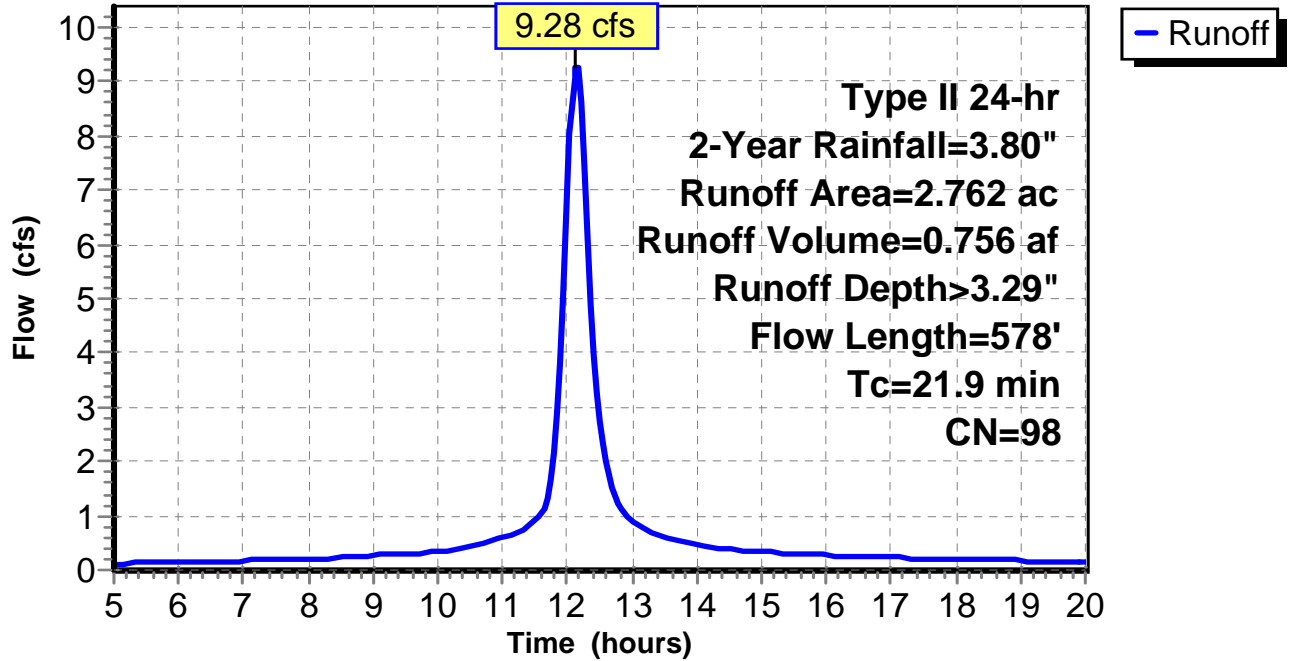
Subcatchment 3: C AR102.003

Hydrograph



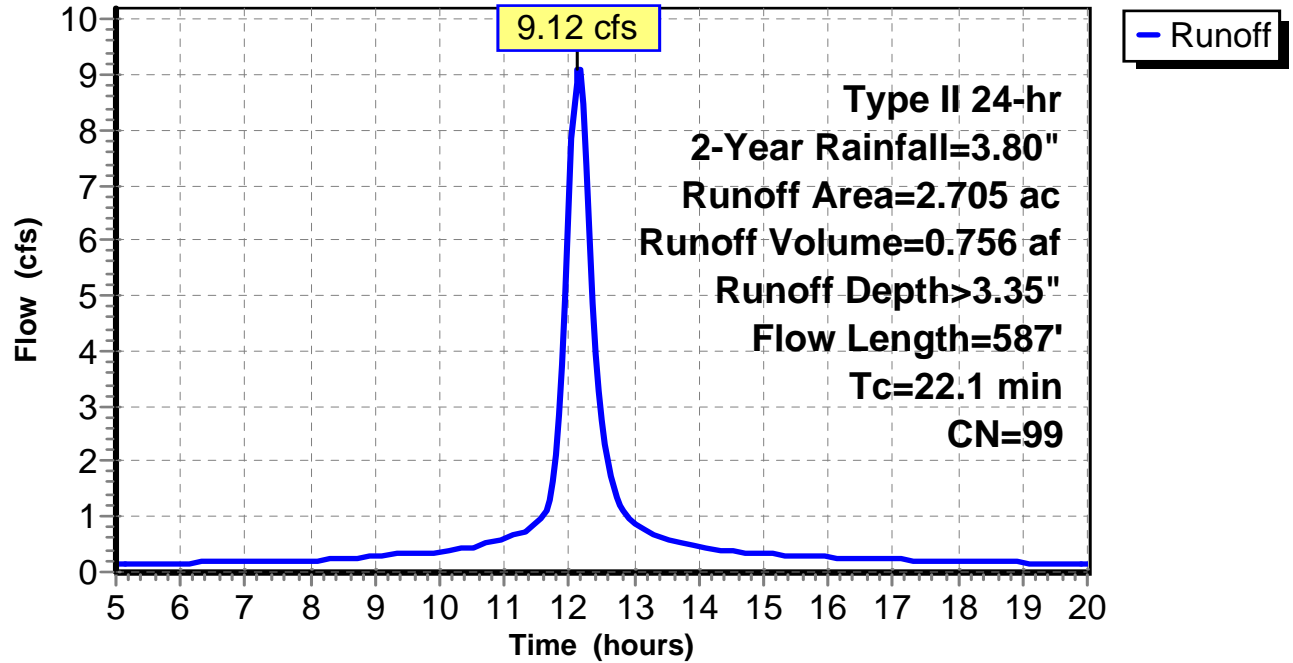
Subcatchment 4: C AR102.004

Hydrograph



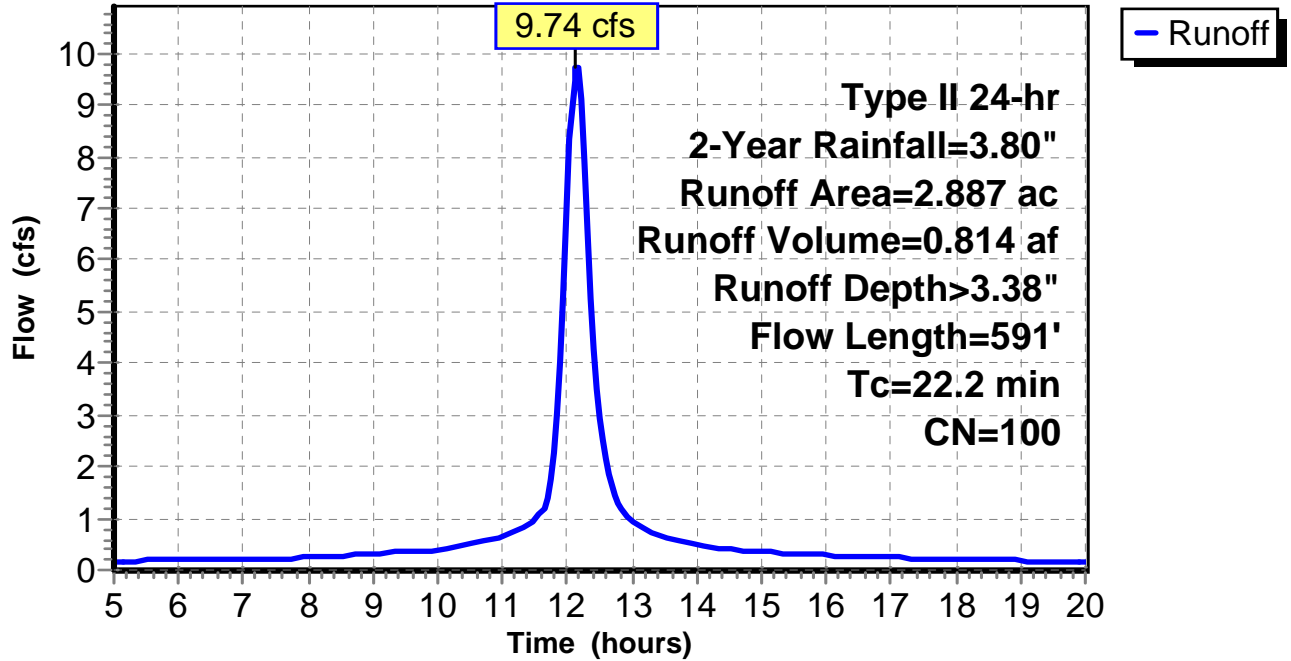
Subcatchment 5: C AR102.005

Hydrograph



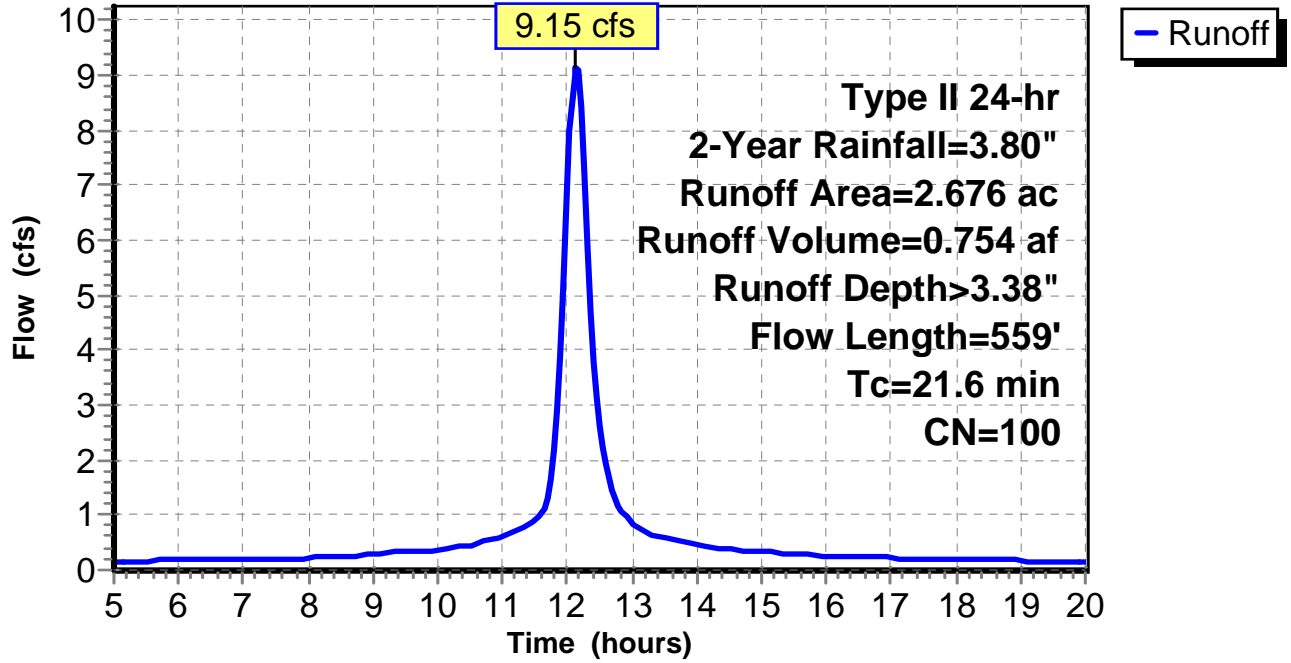
Subcatchment 6: C AR102.006

Hydrograph



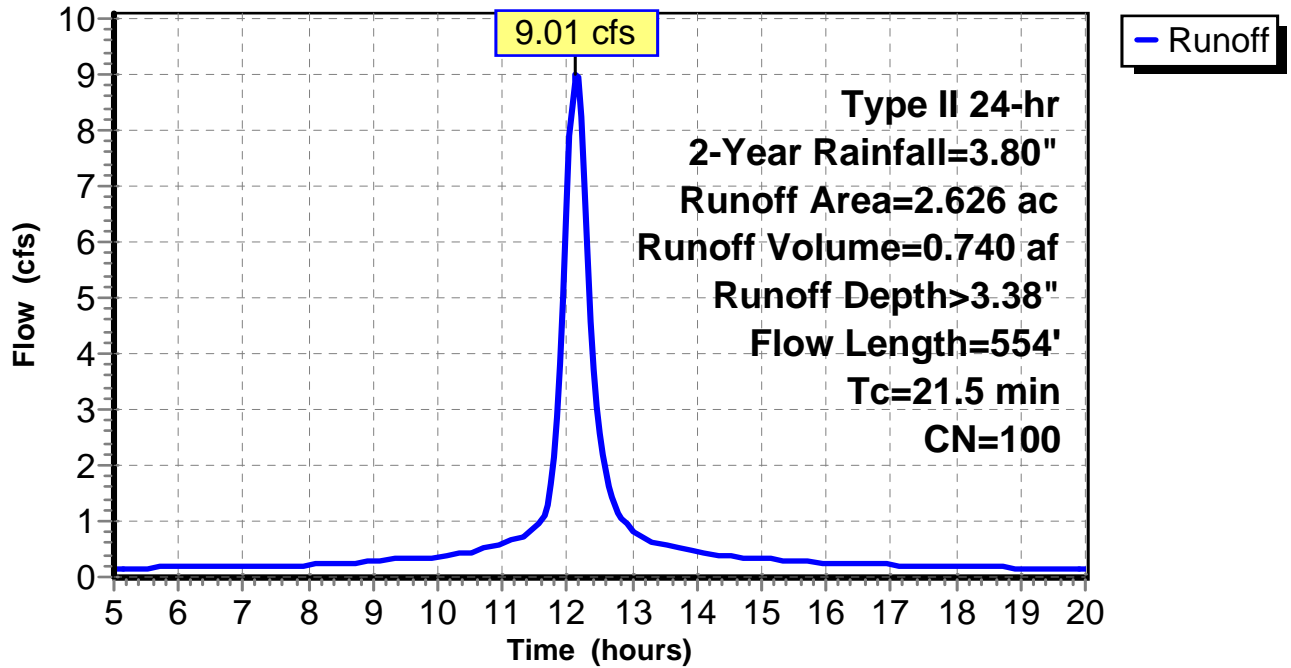
Subcatchment 7: C AR102.007

Hydrograph



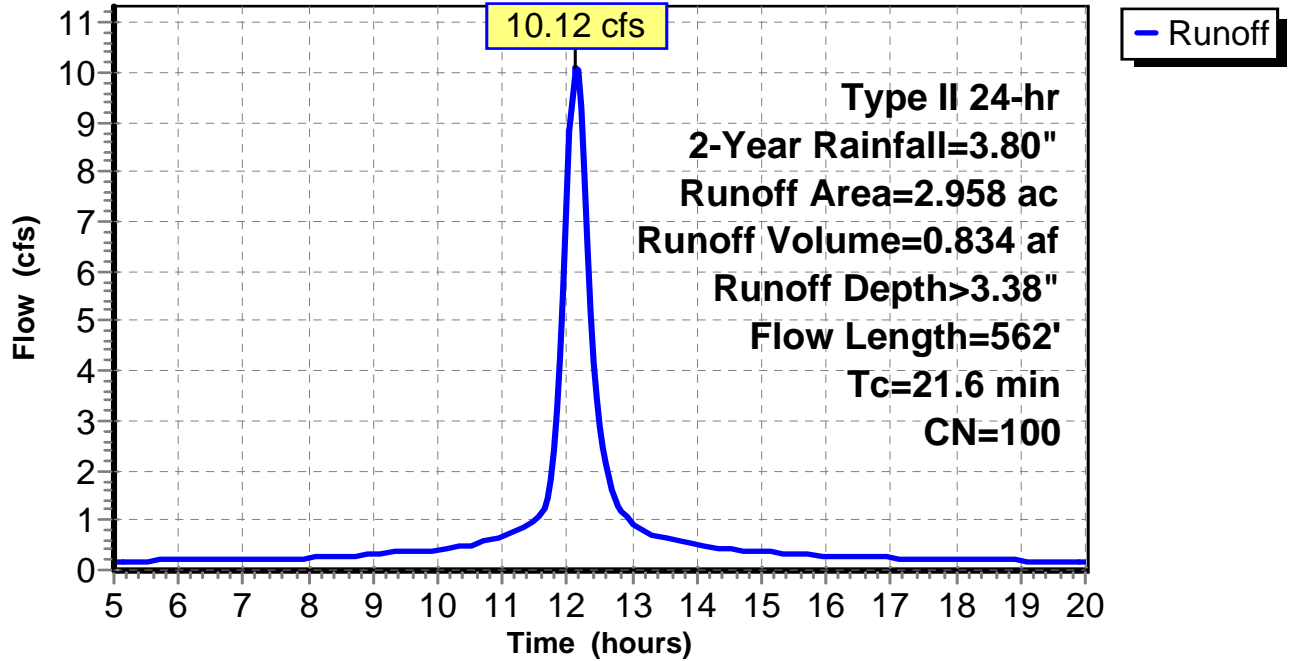
Subcatchment 8: C AR102.008

Hydrograph



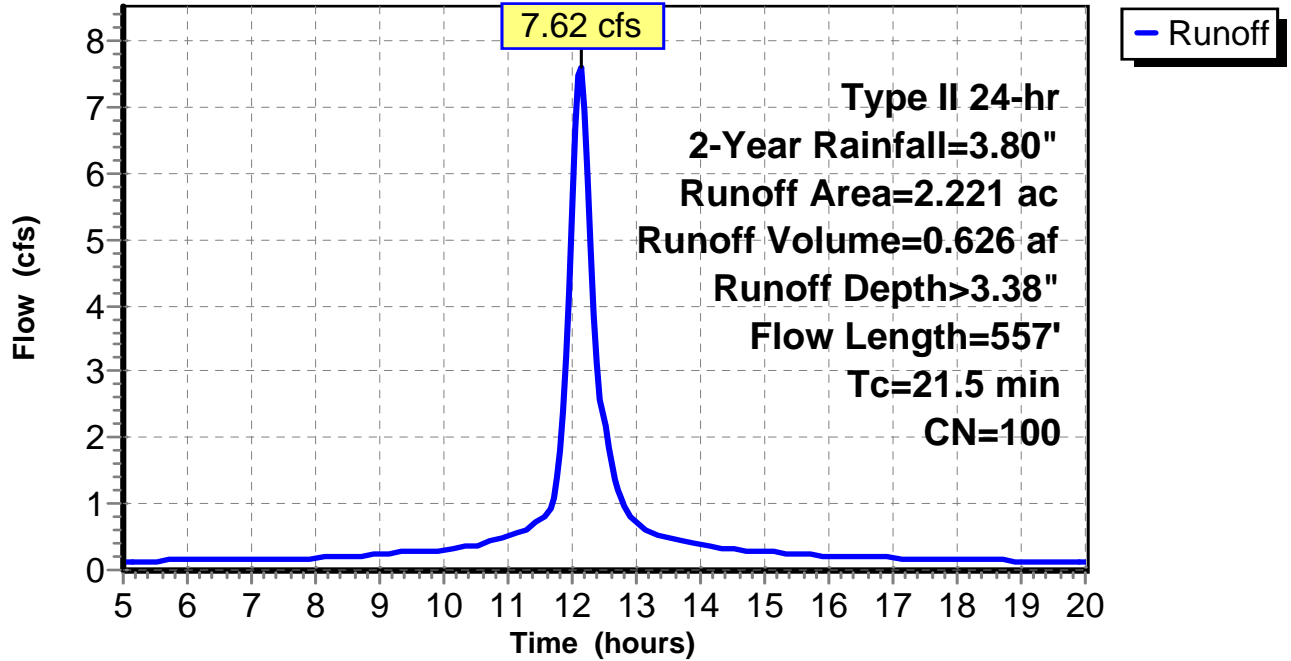
Subcatchment 9: C AR102.009

Hydrograph



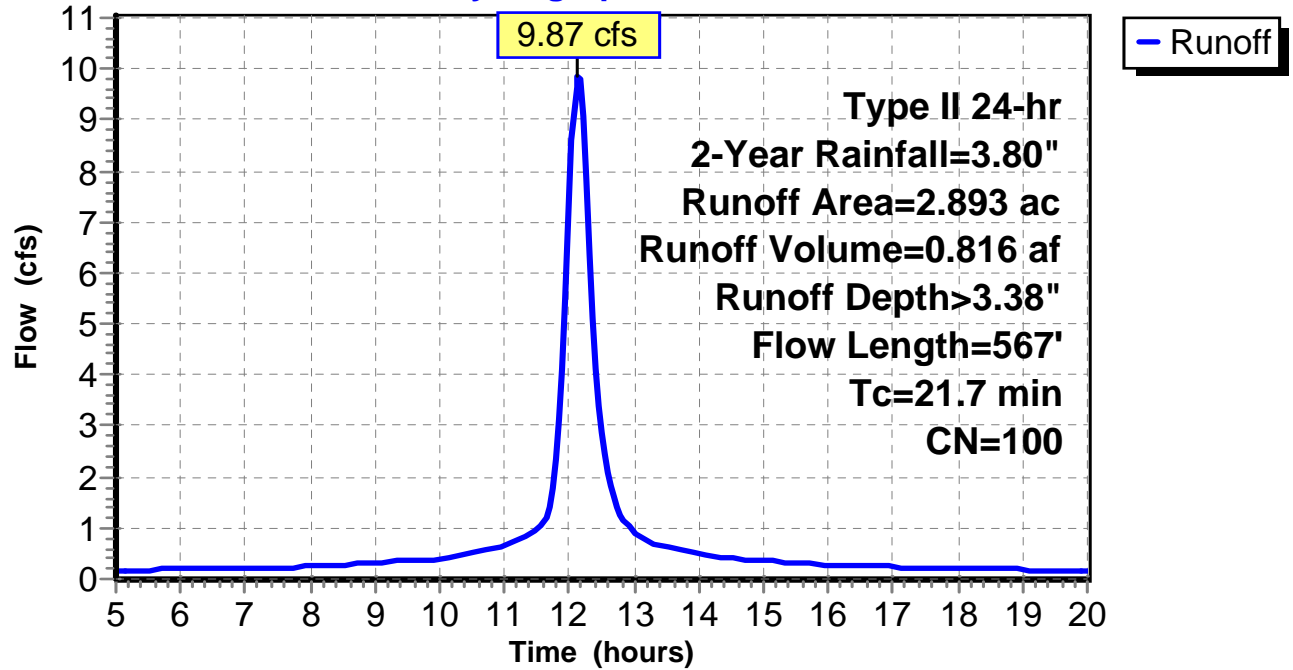
Subcatchment 10: C AR102.010

Hydrograph



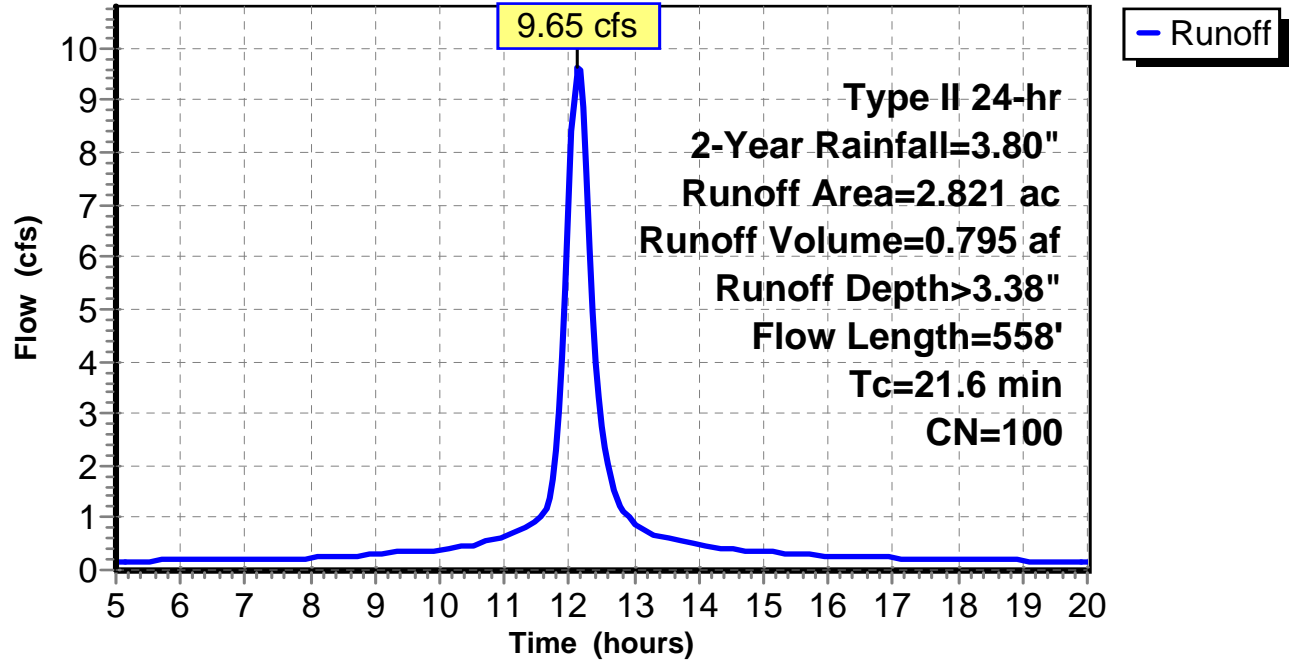
Subcatchment 11: C AR102.011

Hydrograph



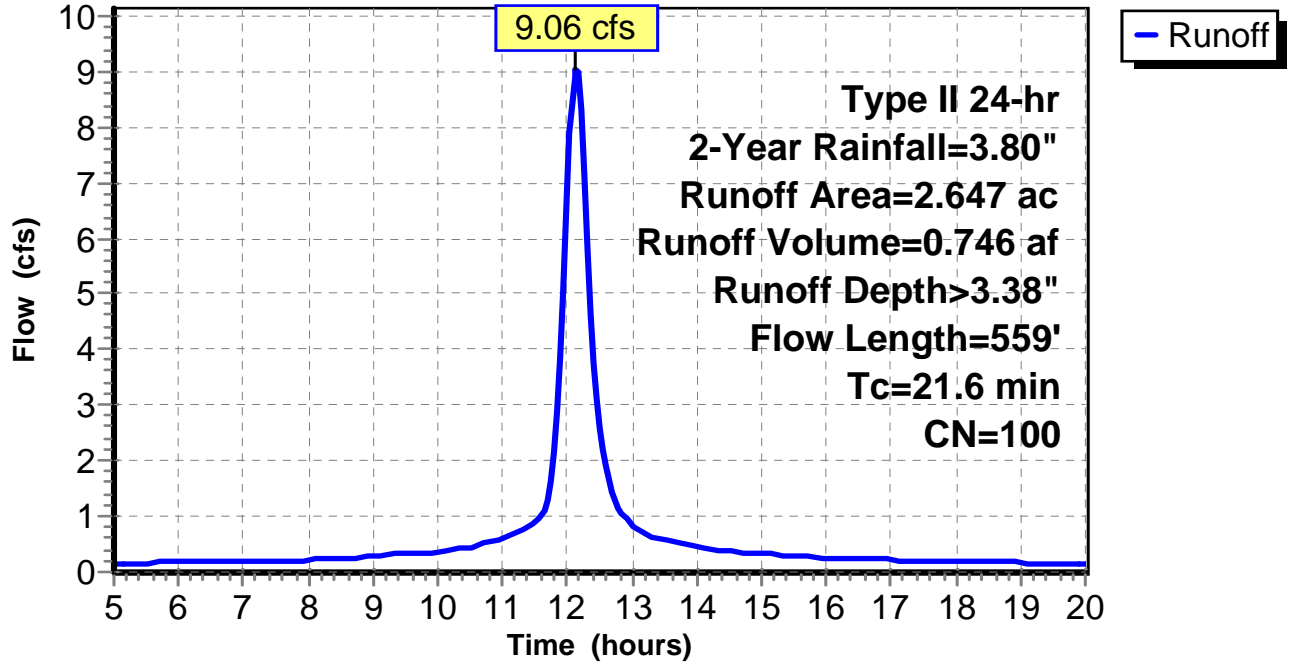
Subcatchment 12: C AR102.012

Hydrograph



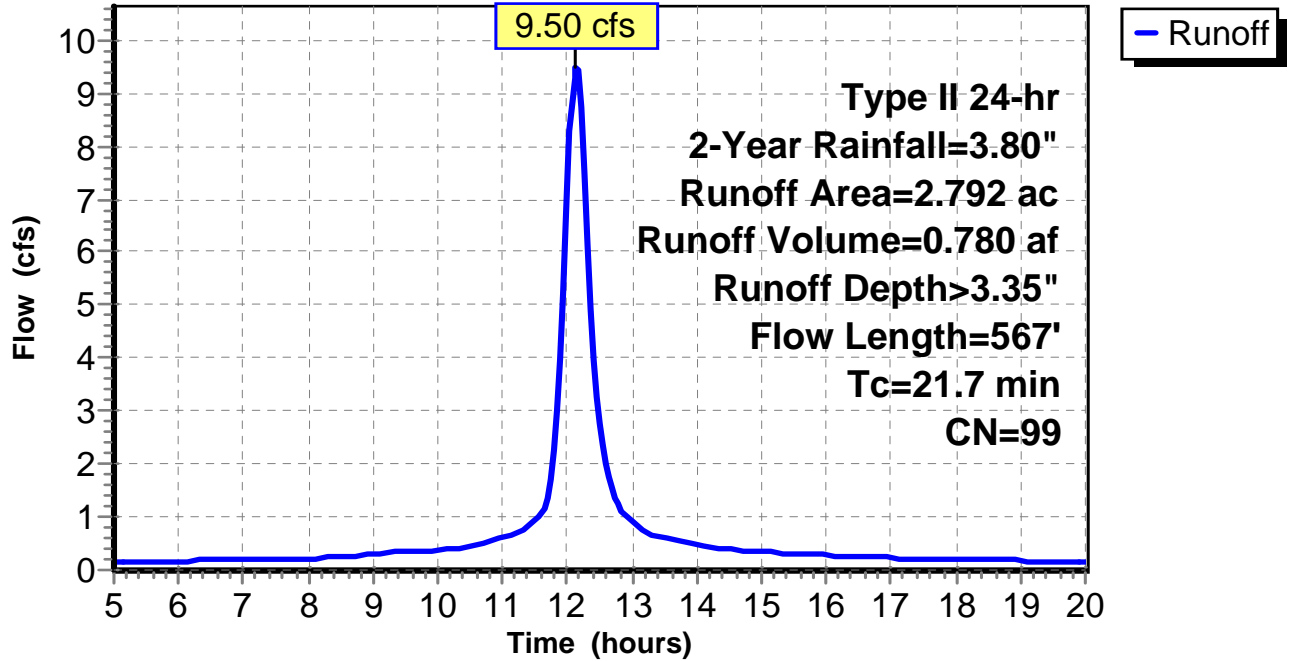
Subcatchment 13: C AR102.013

Hydrograph



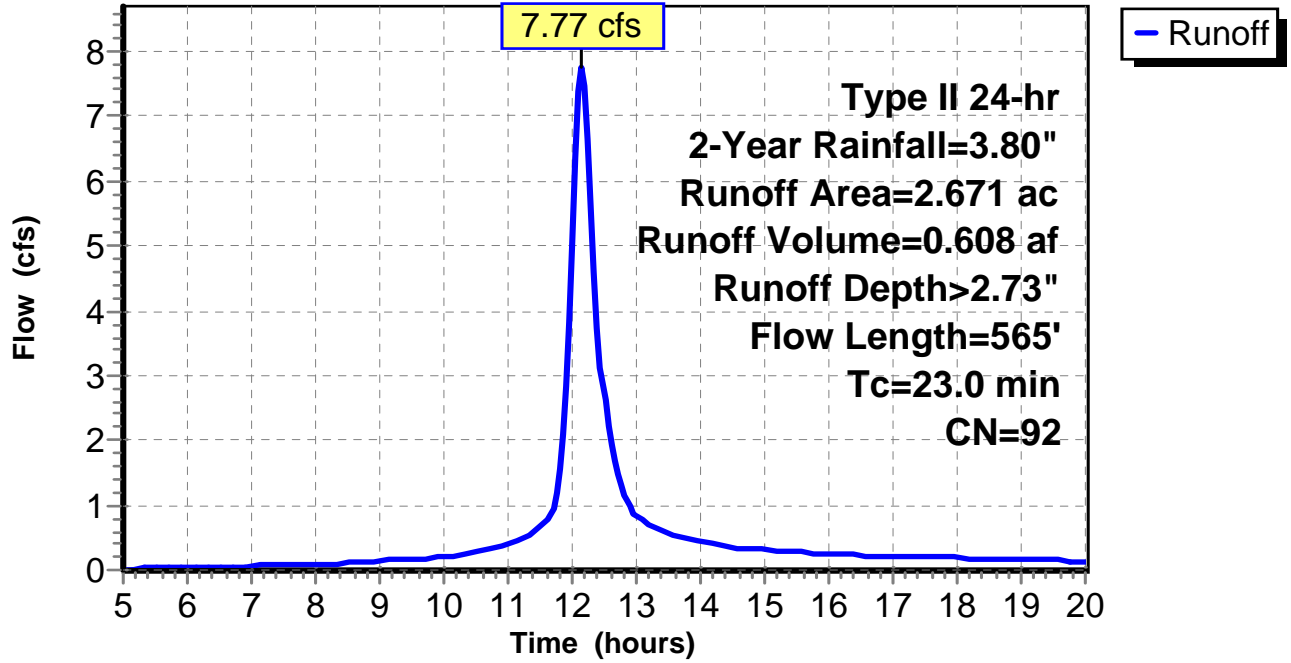
Subcatchment 14: C AR102.014

Hydrograph



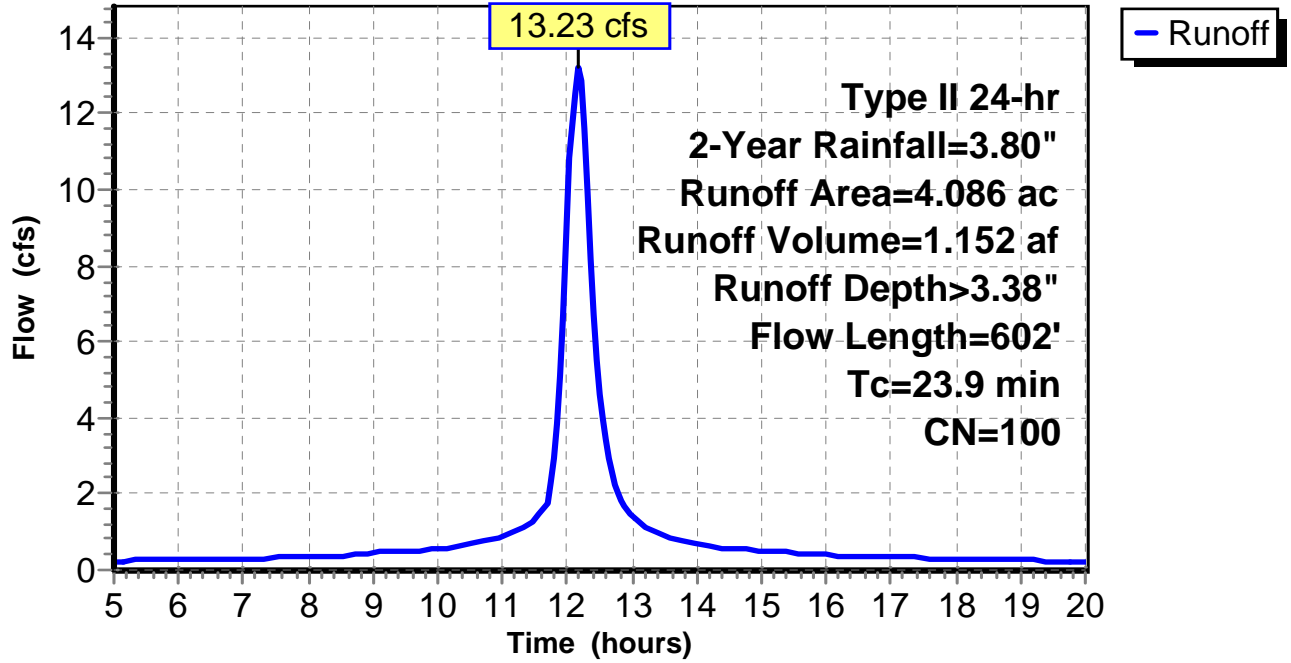
Subcatchment 15: C 76.001

Hydrograph



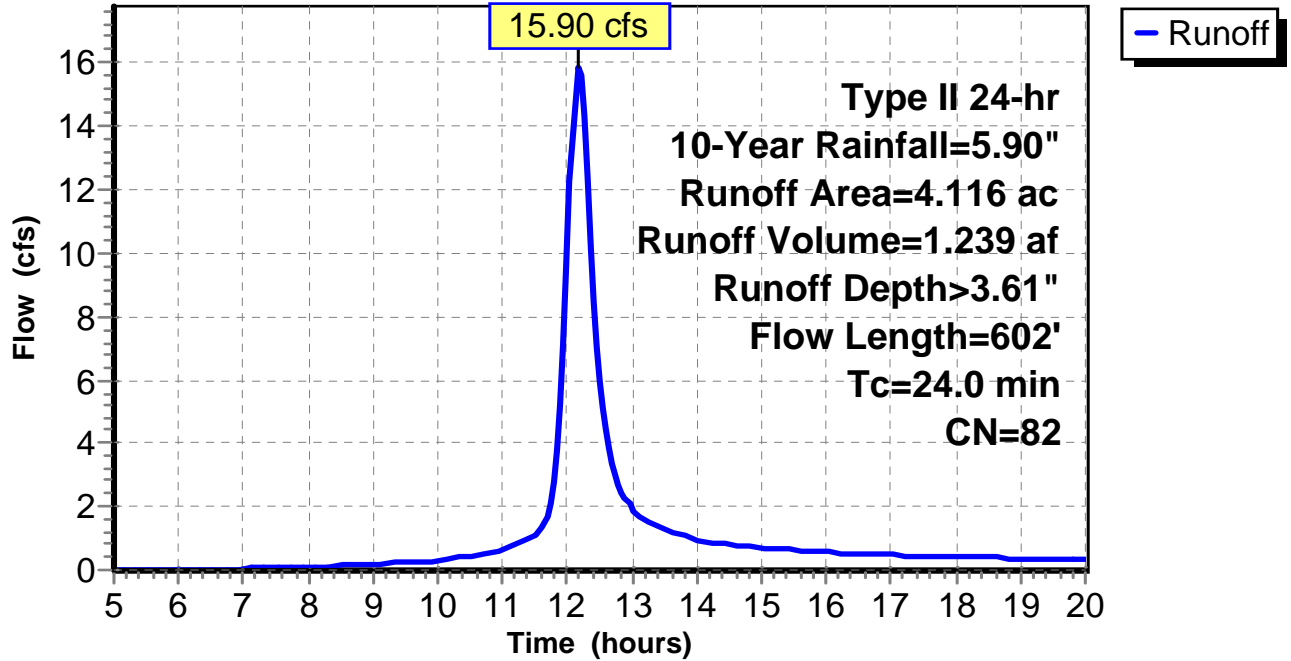
Subcatchment 16: C 76.002

Hydrograph



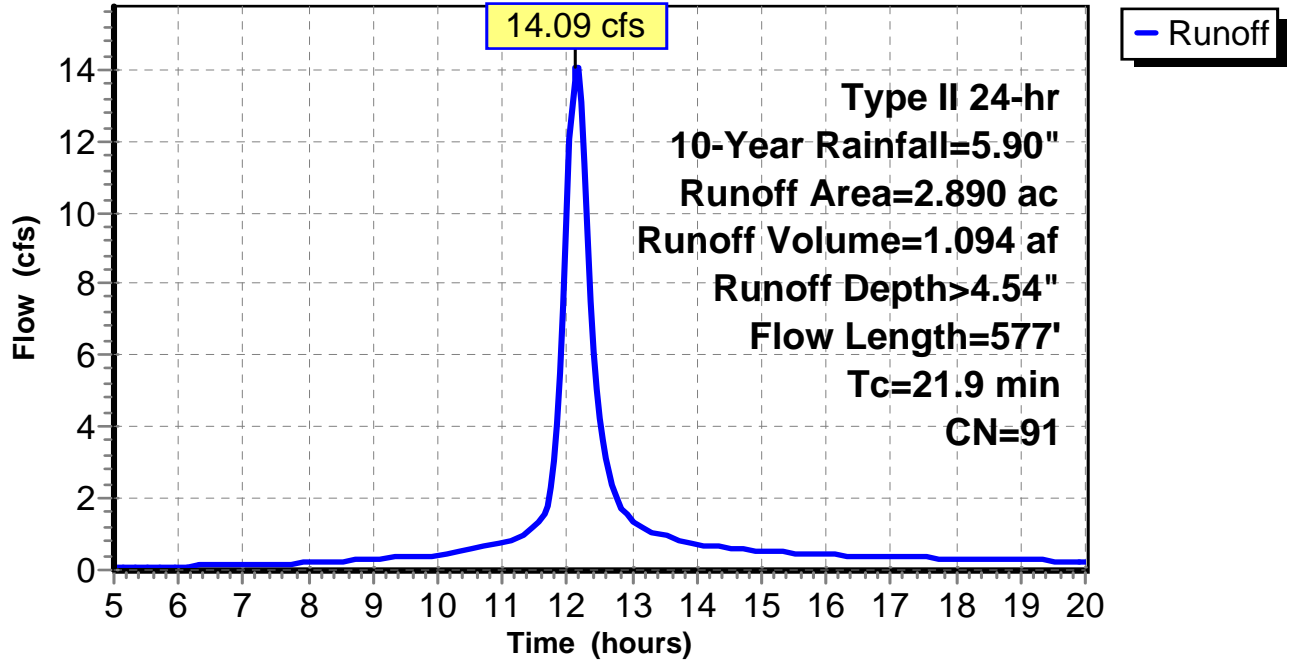
Subcatchment 1: C AR102.001

Hydrograph



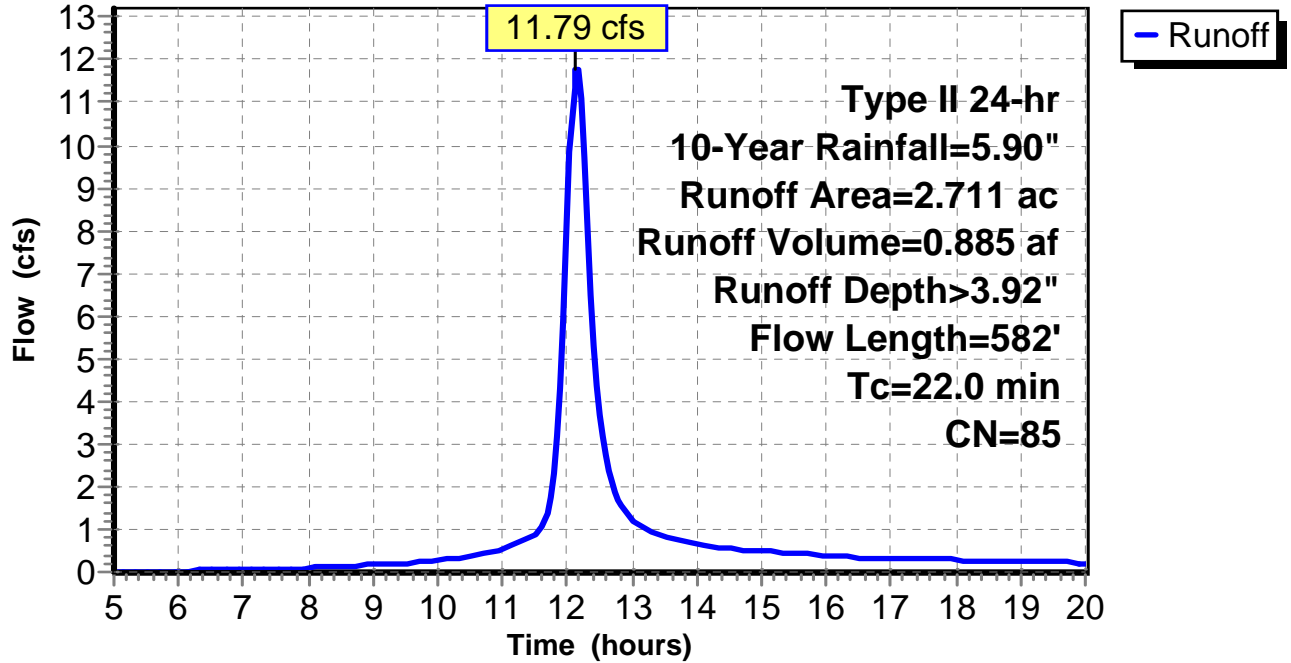
Subcatchment 2: C AR102.002

Hydrograph



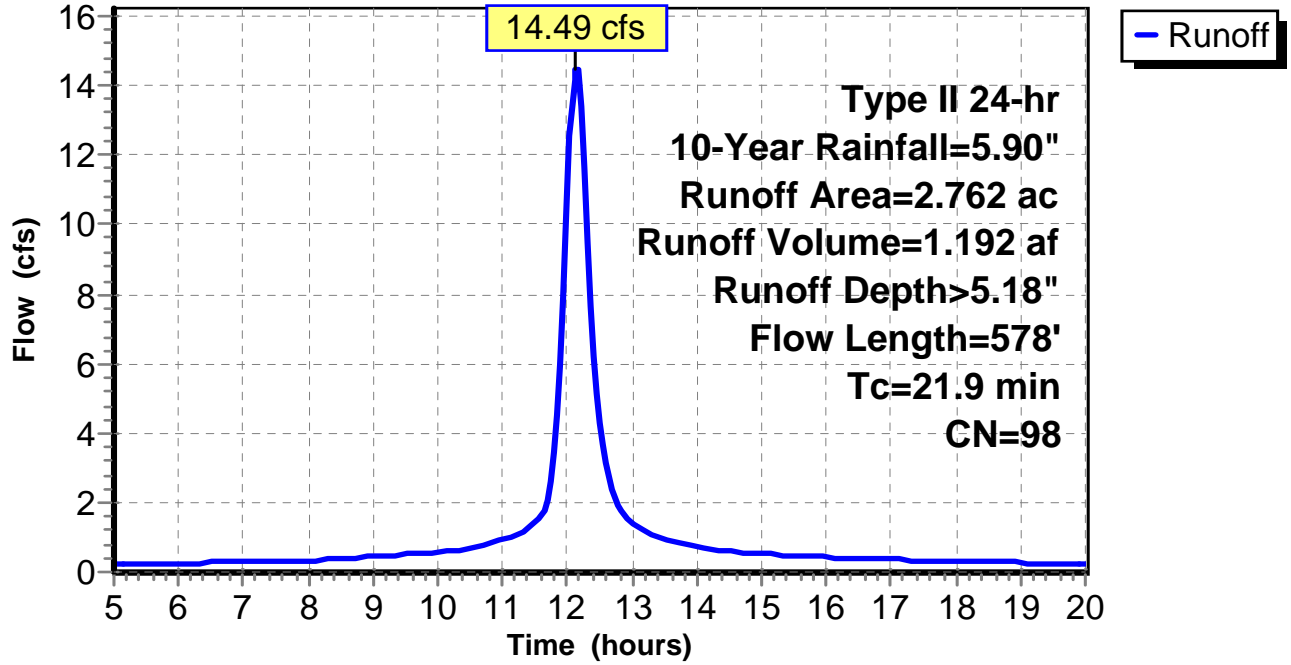
Subcatchment 3: C AR102.003

Hydrograph



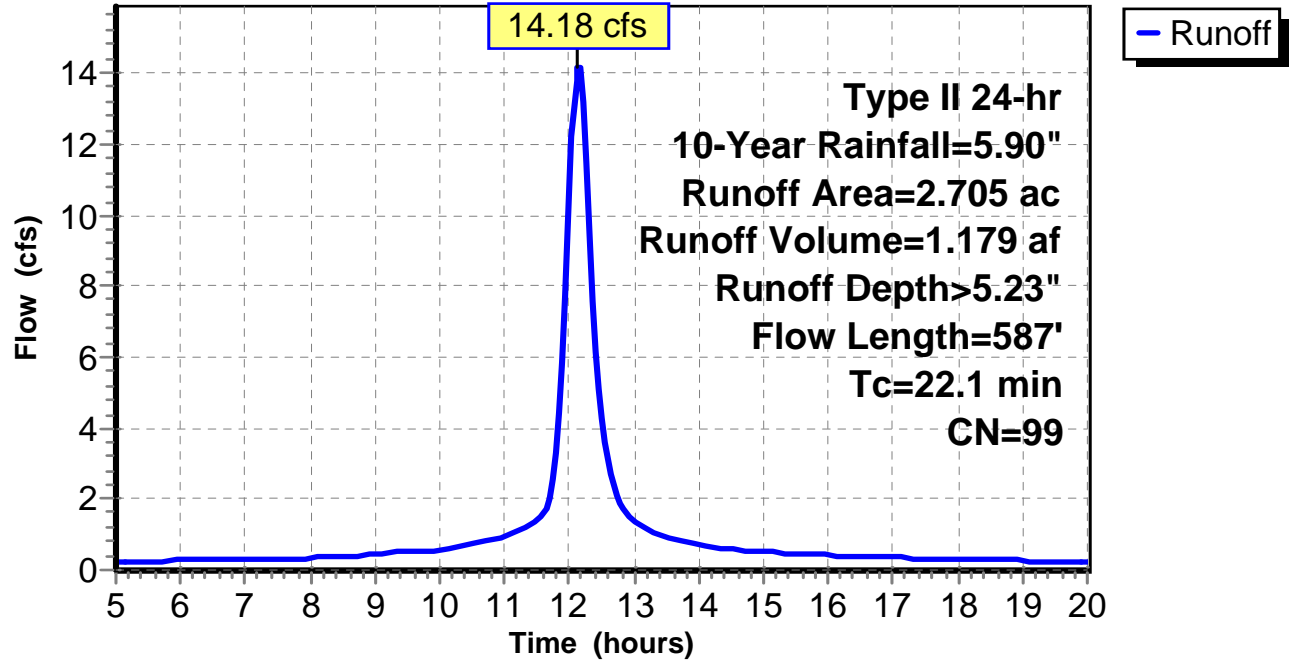
Subcatchment 4: C AR102.004

Hydrograph



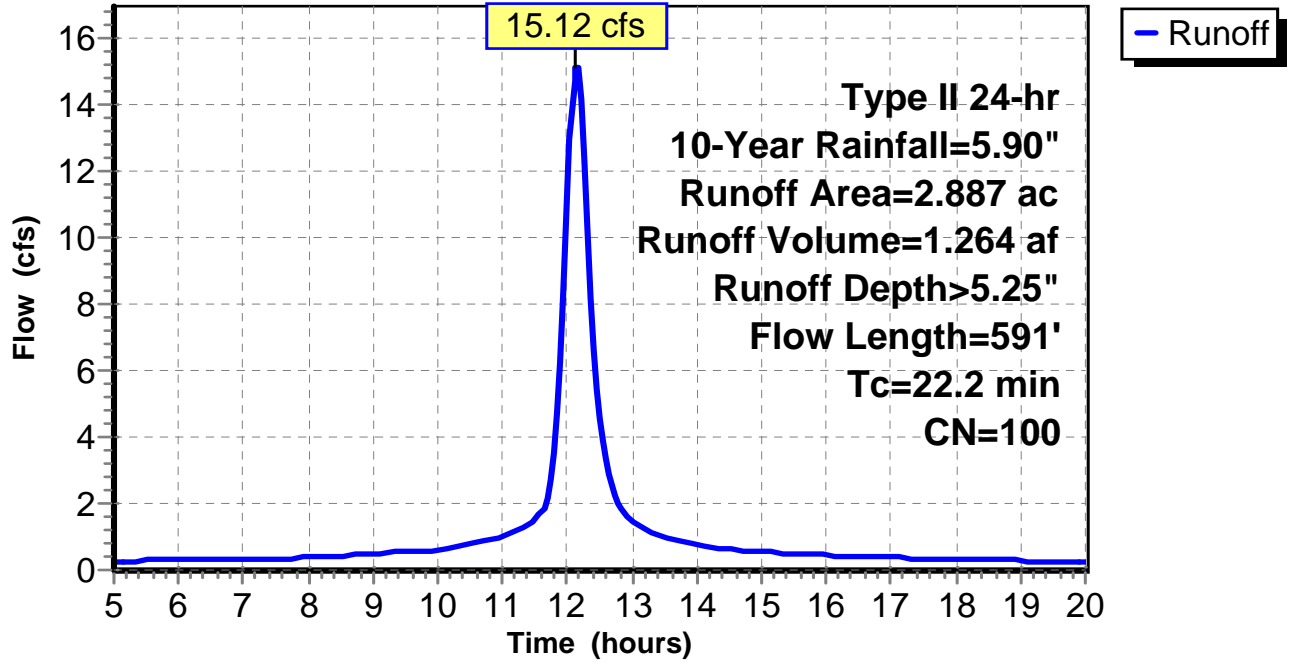
Subcatchment 5: C AR102.005

Hydrograph



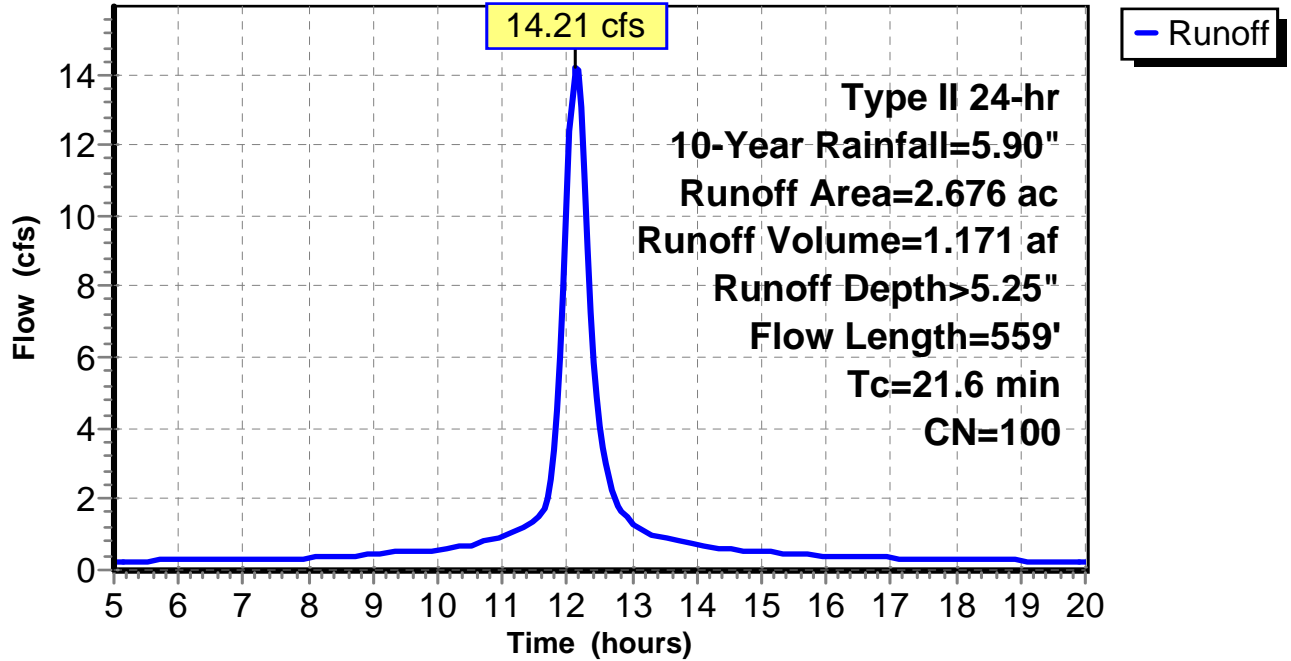
Subcatchment 6: C AR102.006

Hydrograph



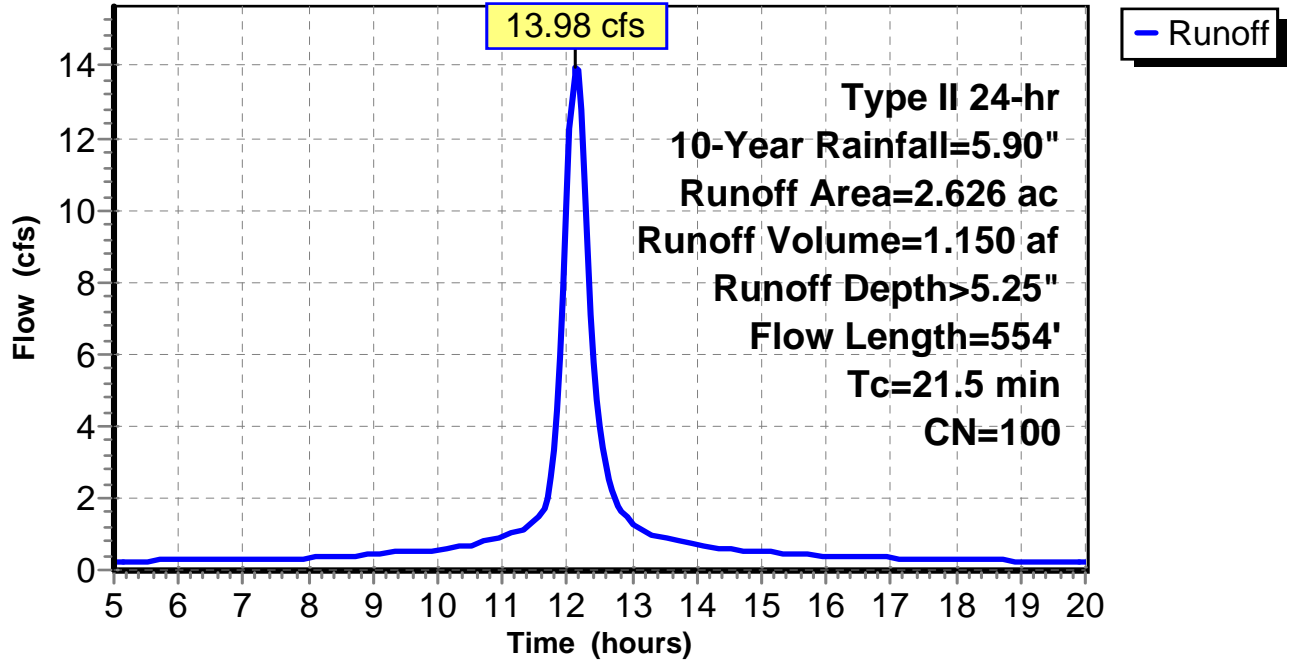
Subcatchment 7: C AR102.007

Hydrograph



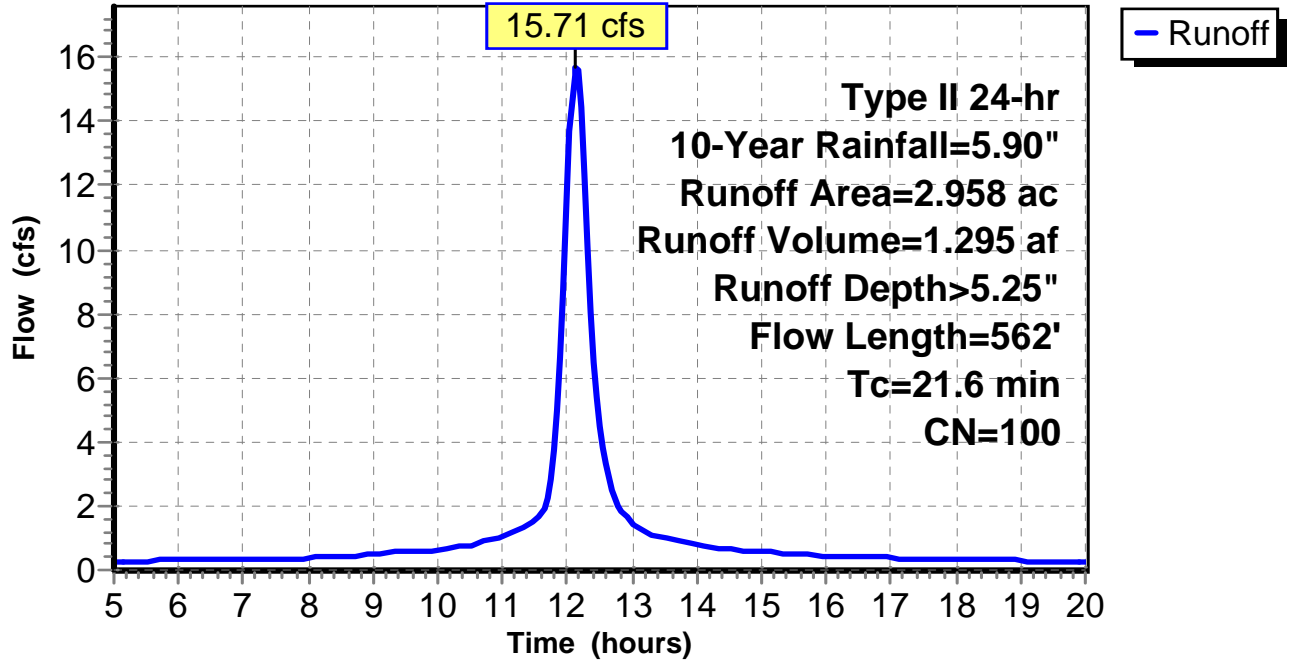
Subcatchment 8: C AR102.008

Hydrograph



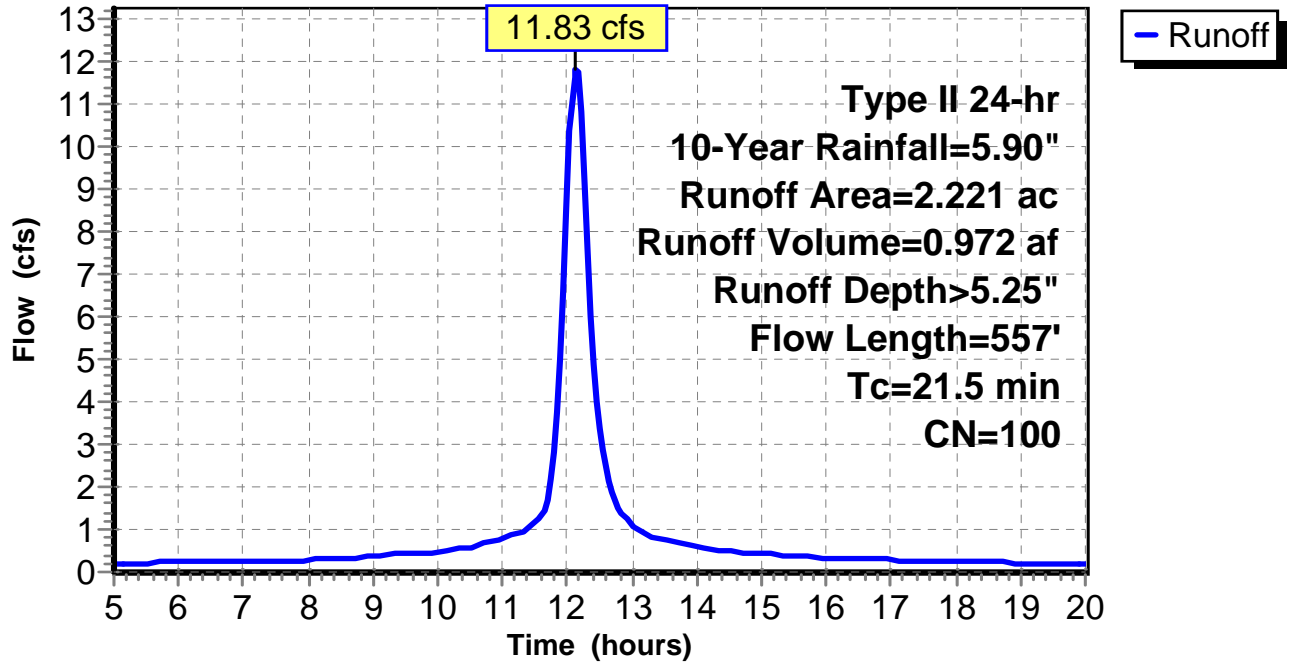
Subcatchment 9: C AR102.009

Hydrograph



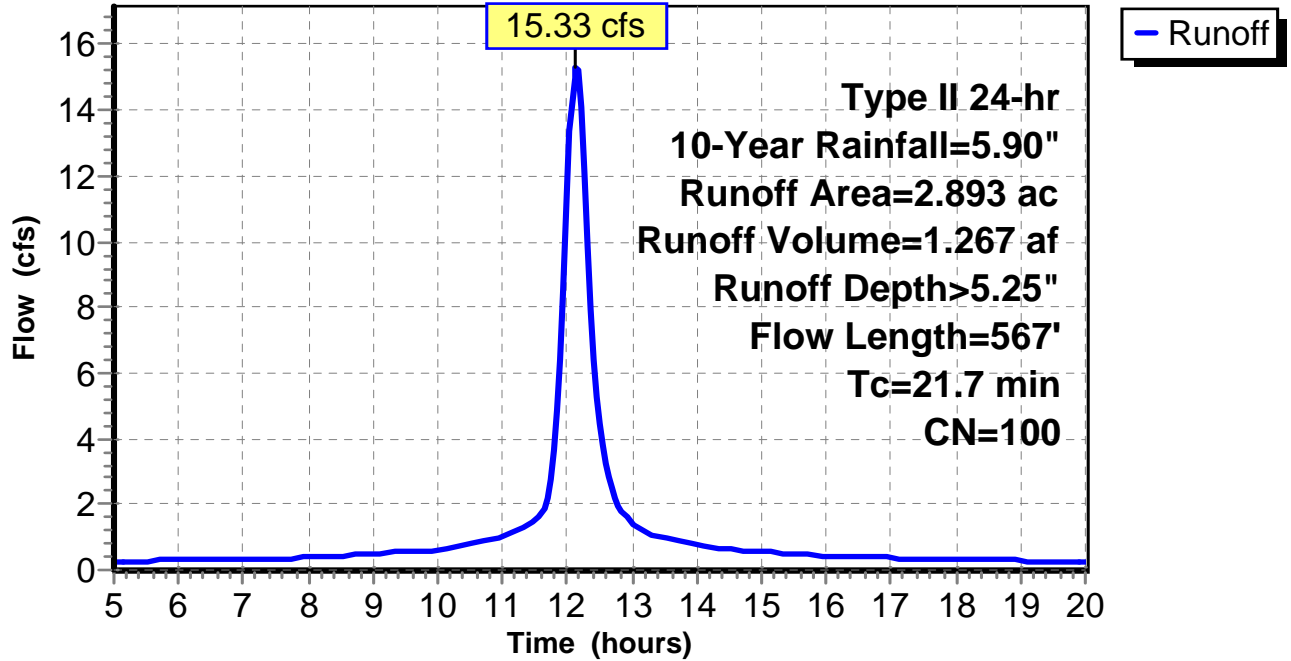
Subcatchment 10: C AR102.010

Hydrograph



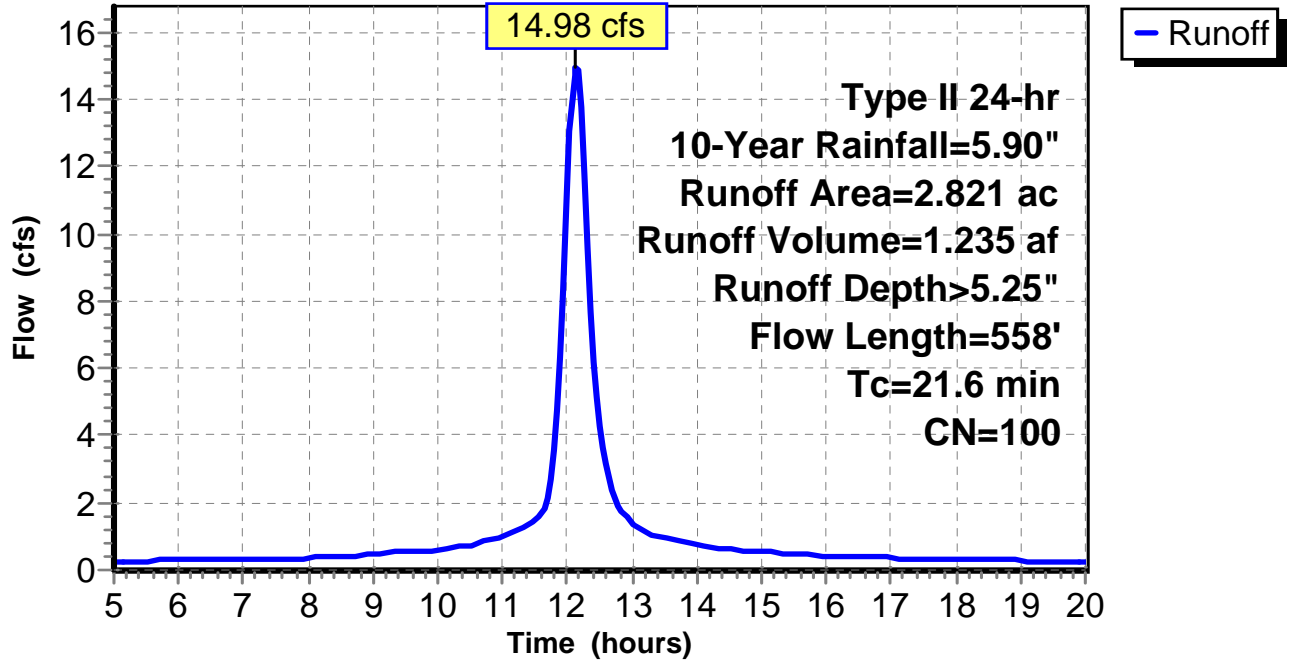
Subcatchment 11: C AR102.011

Hydrograph



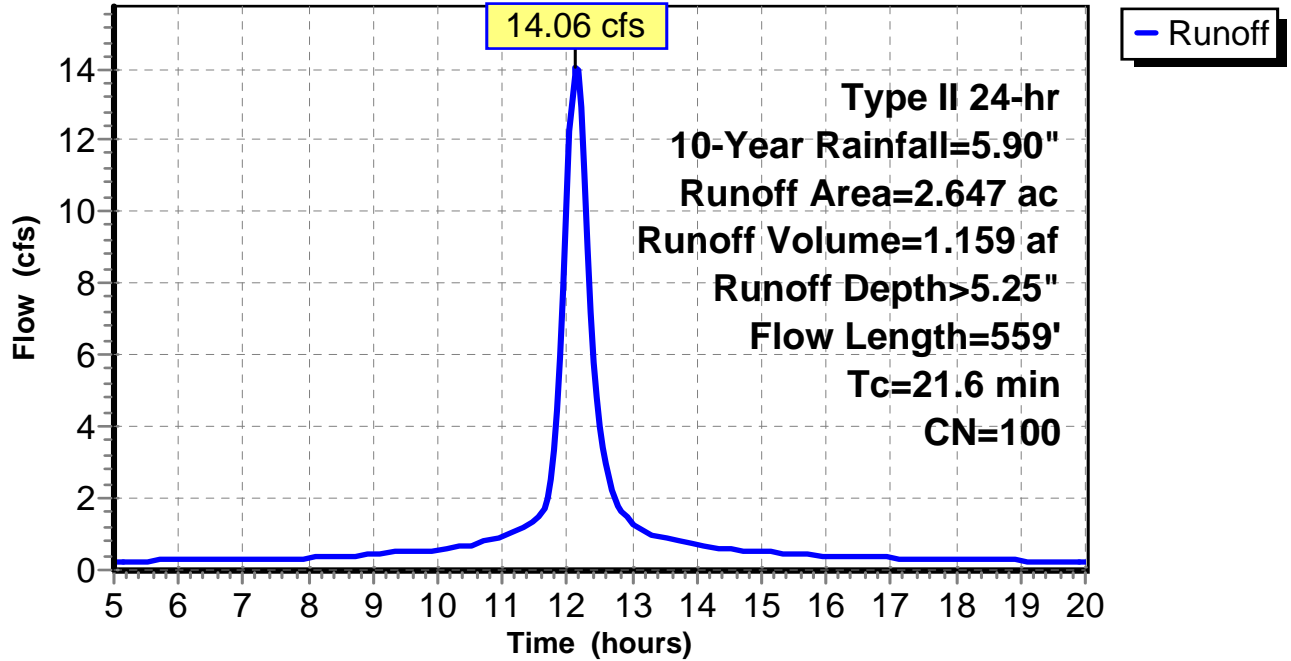
Subcatchment 12: C AR102.012

Hydrograph



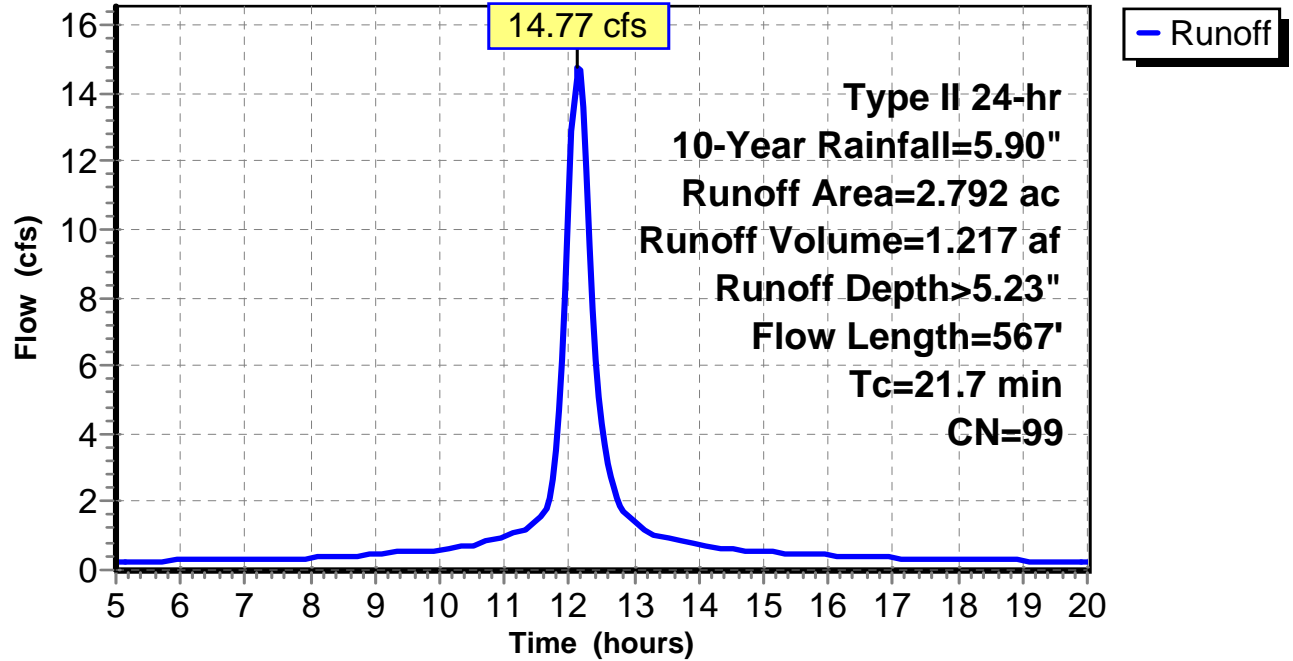
Subcatchment 13: C AR102.013

Hydrograph



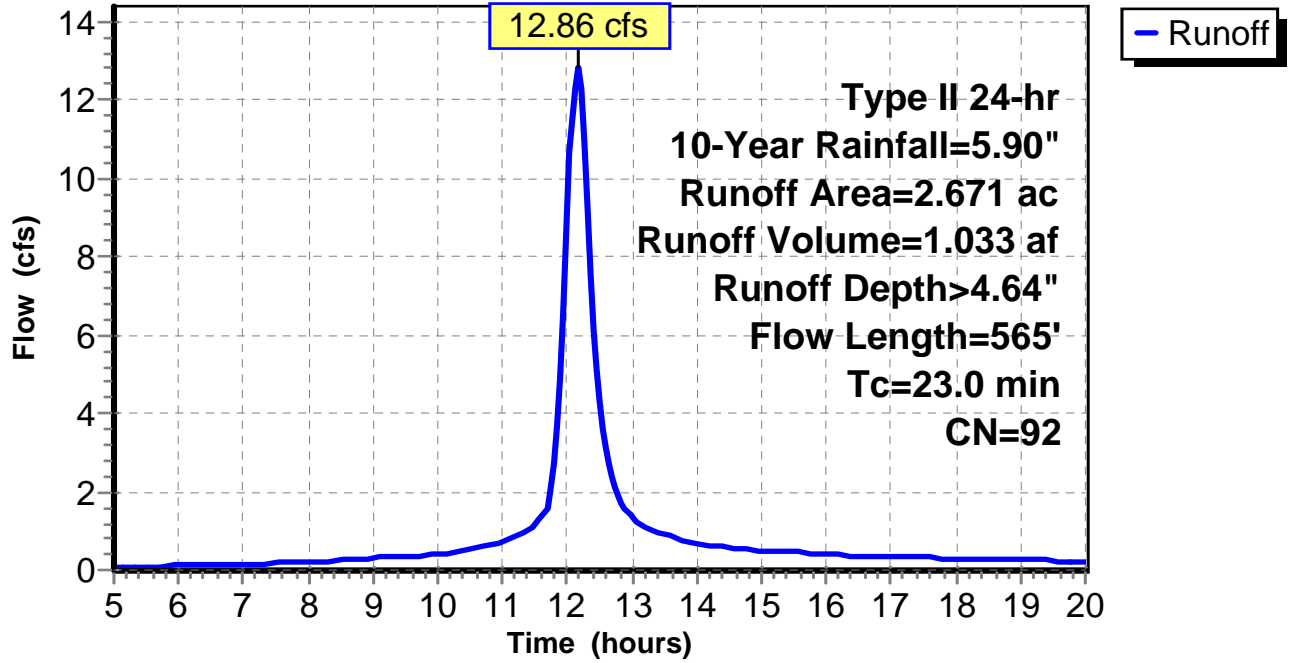
Subcatchment 14: C AR102.014

Hydrograph



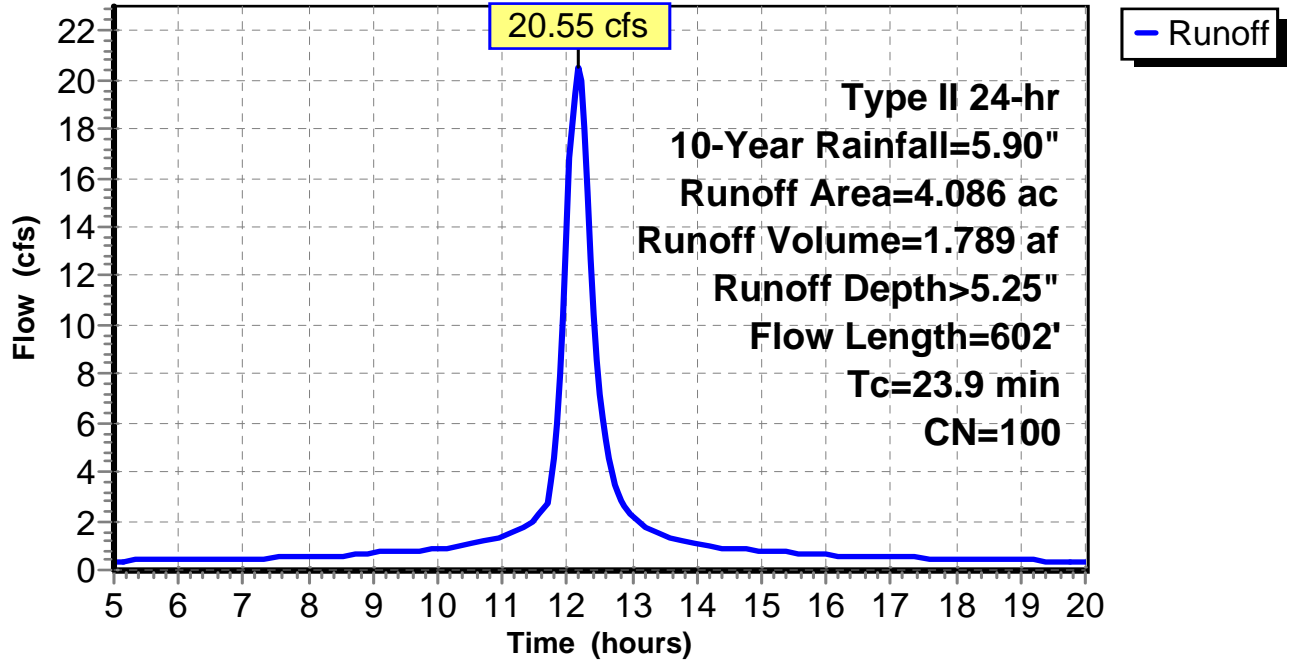
Subcatchment 15: C 76.001

Hydrograph



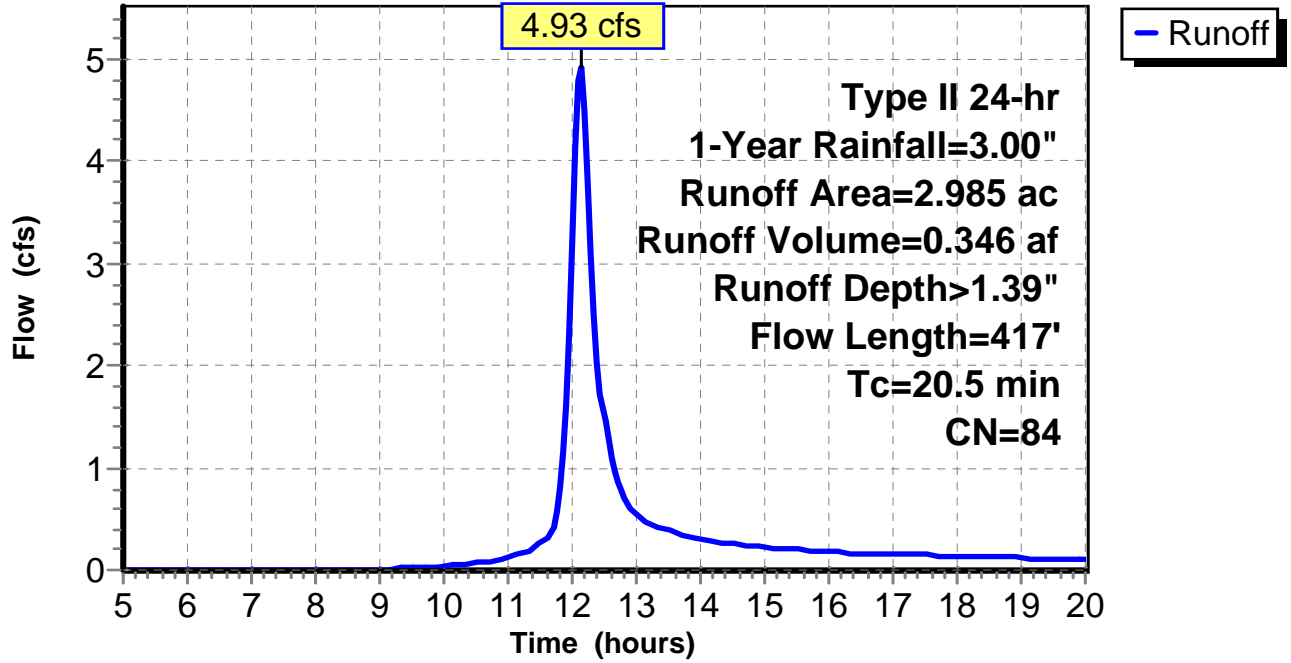
Subcatchment 16: C 76.002

Hydrograph



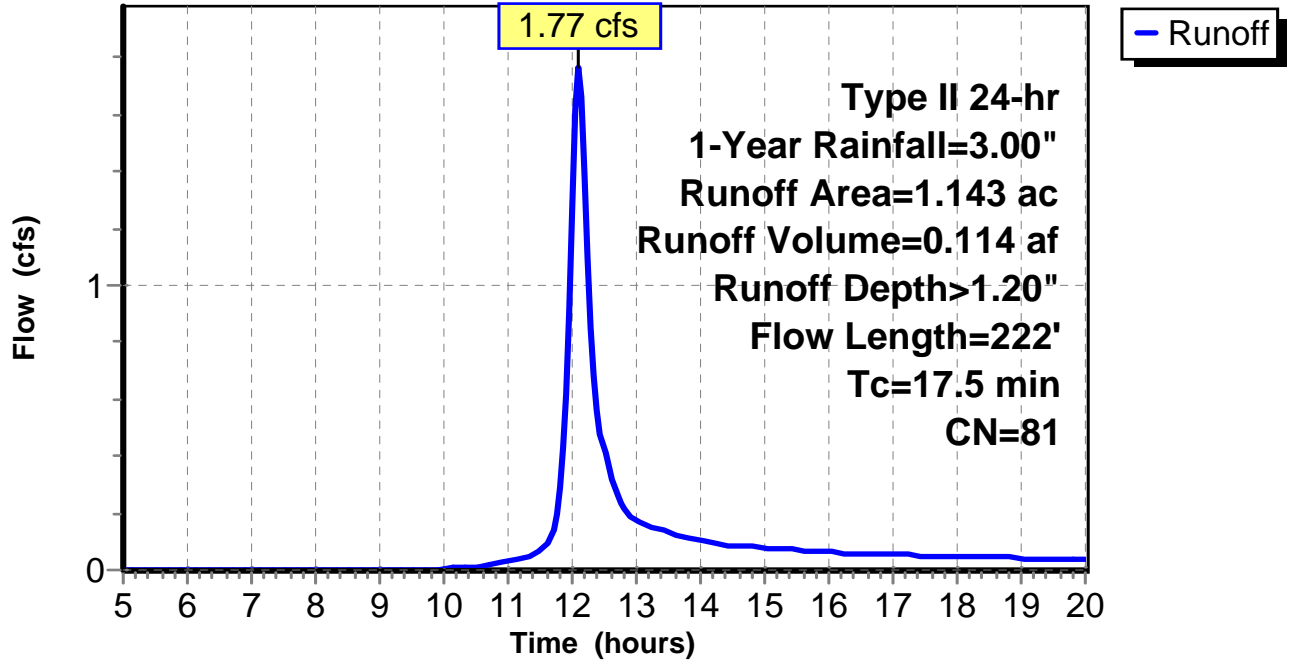
Subcatchment 1: C 80.001

Hydrograph



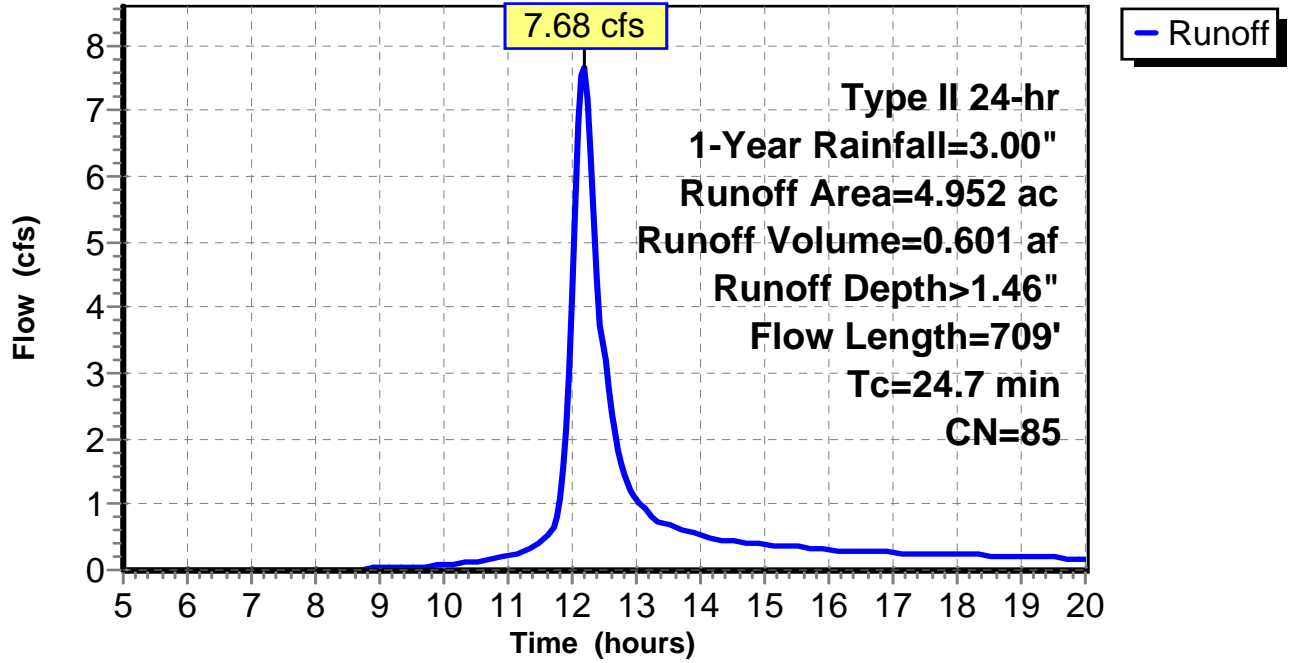
Subcatchment 2: C 80.002

Hydrograph



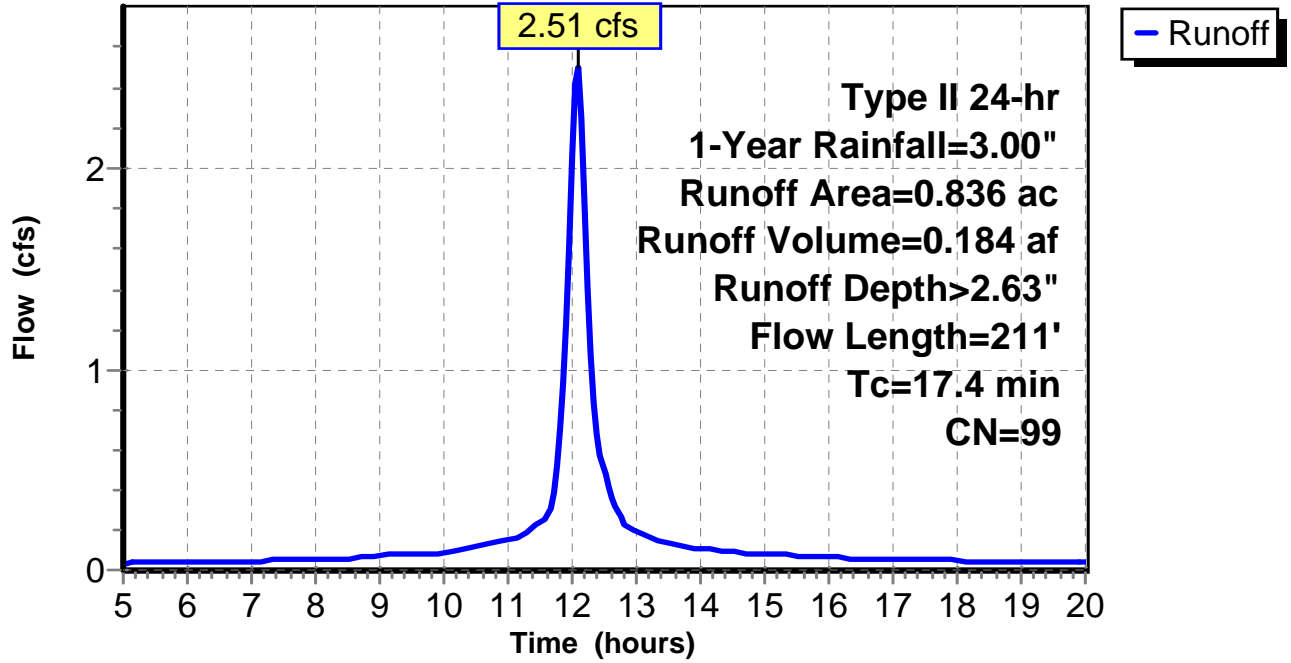
Subcatchment 3: C 80.003

Hydrograph



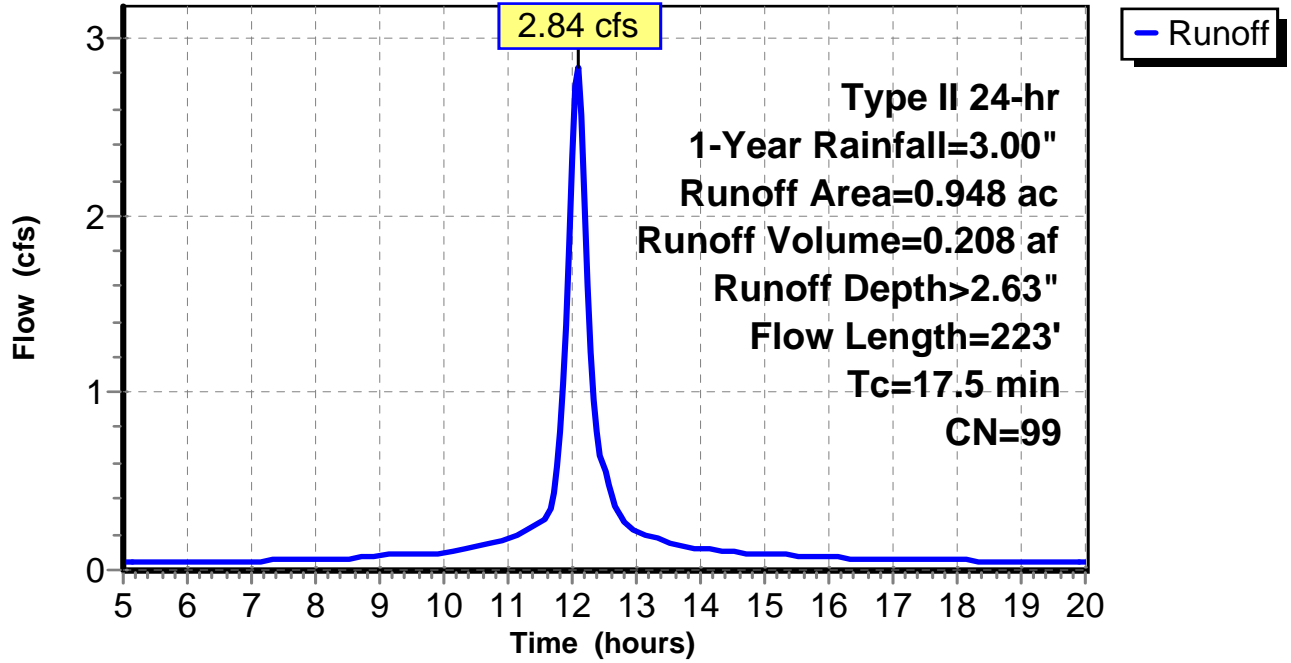
Subcatchment 4: C 80.004

Hydrograph



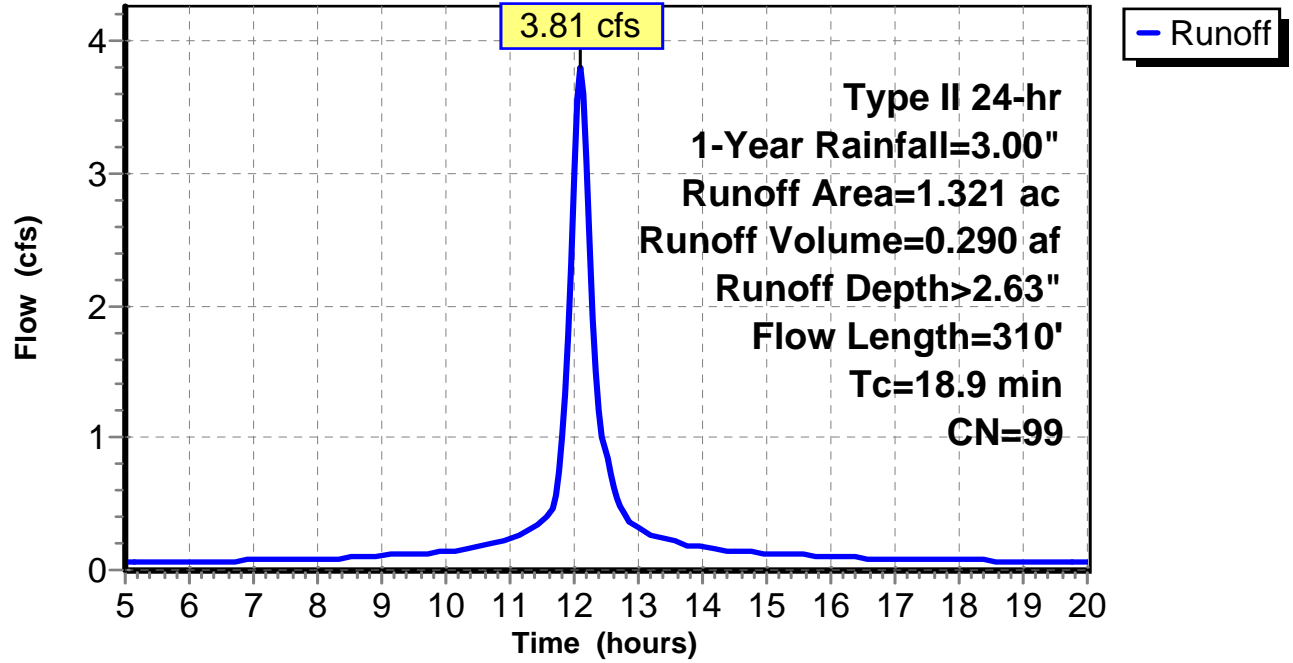
Subcatchment 5: C 80.005

Hydrograph



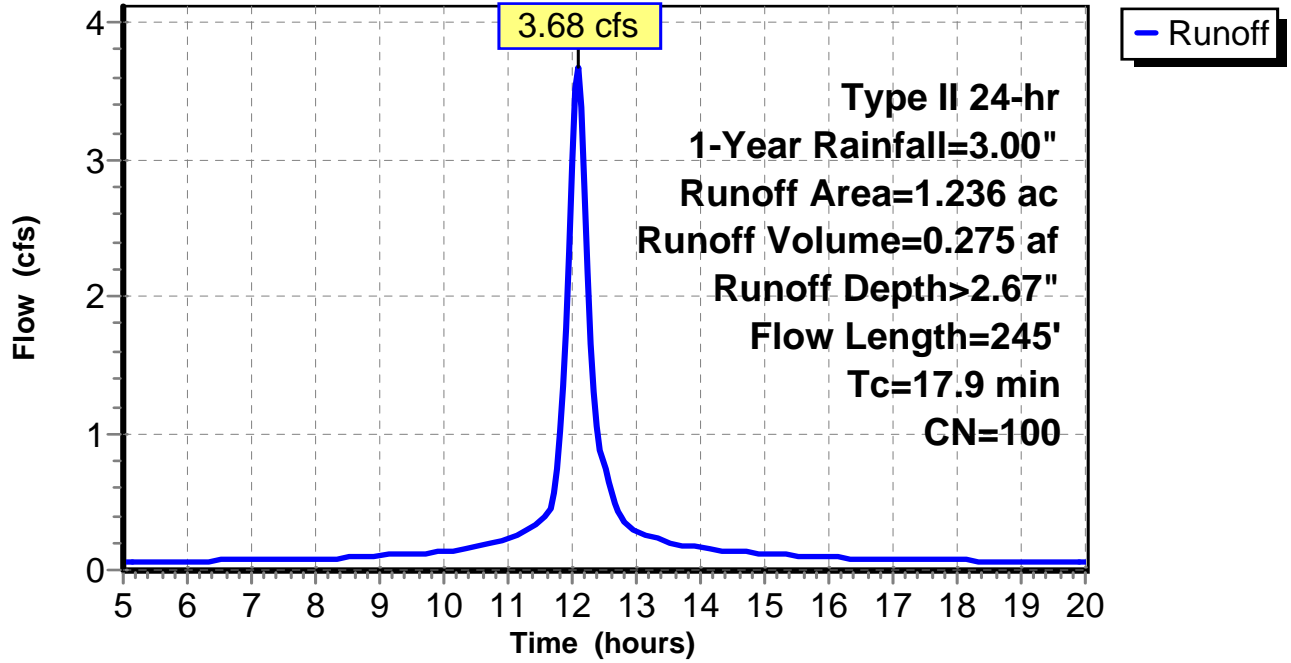
Subcatchment 6: C 80.006

Hydrograph



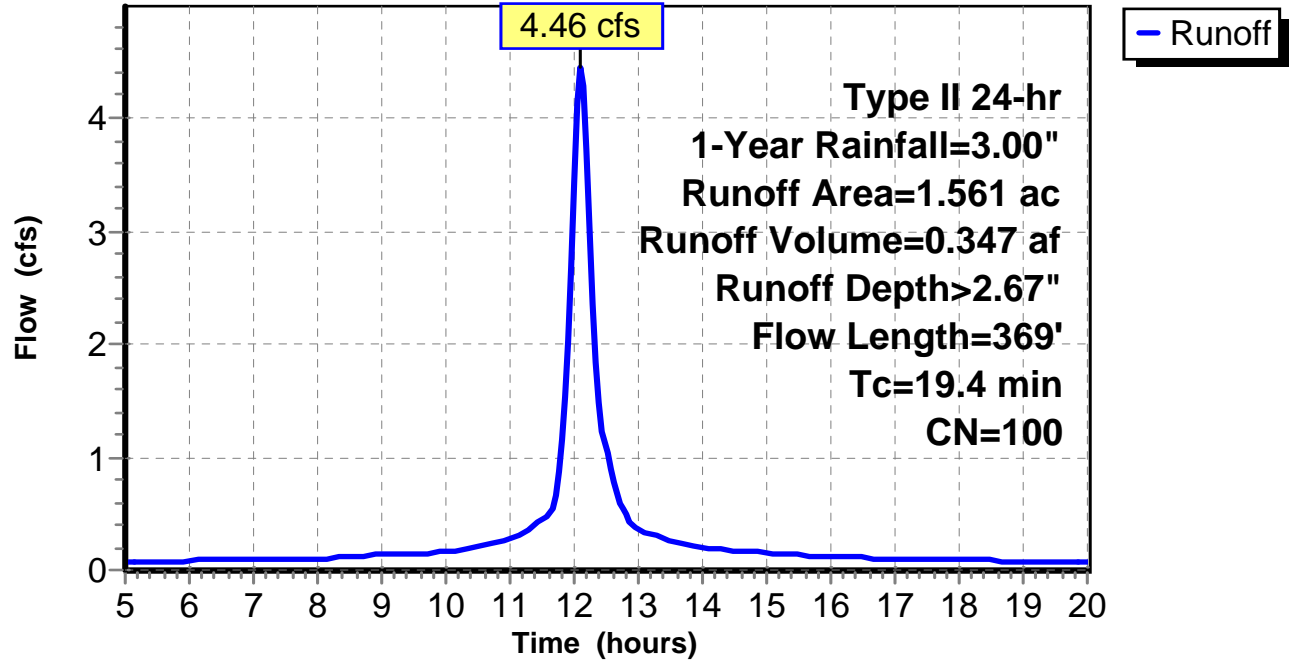
Subcatchment 7: C 80.007

Hydrograph



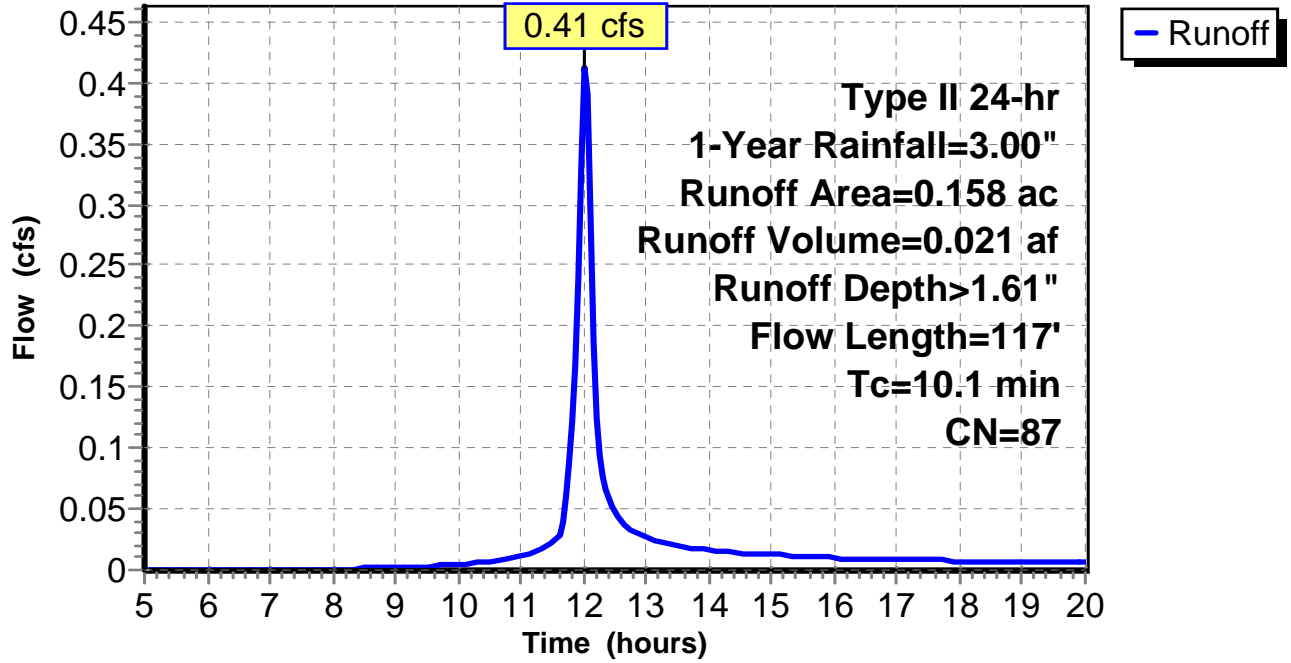
Subcatchment 8: C 80.008

Hydrograph



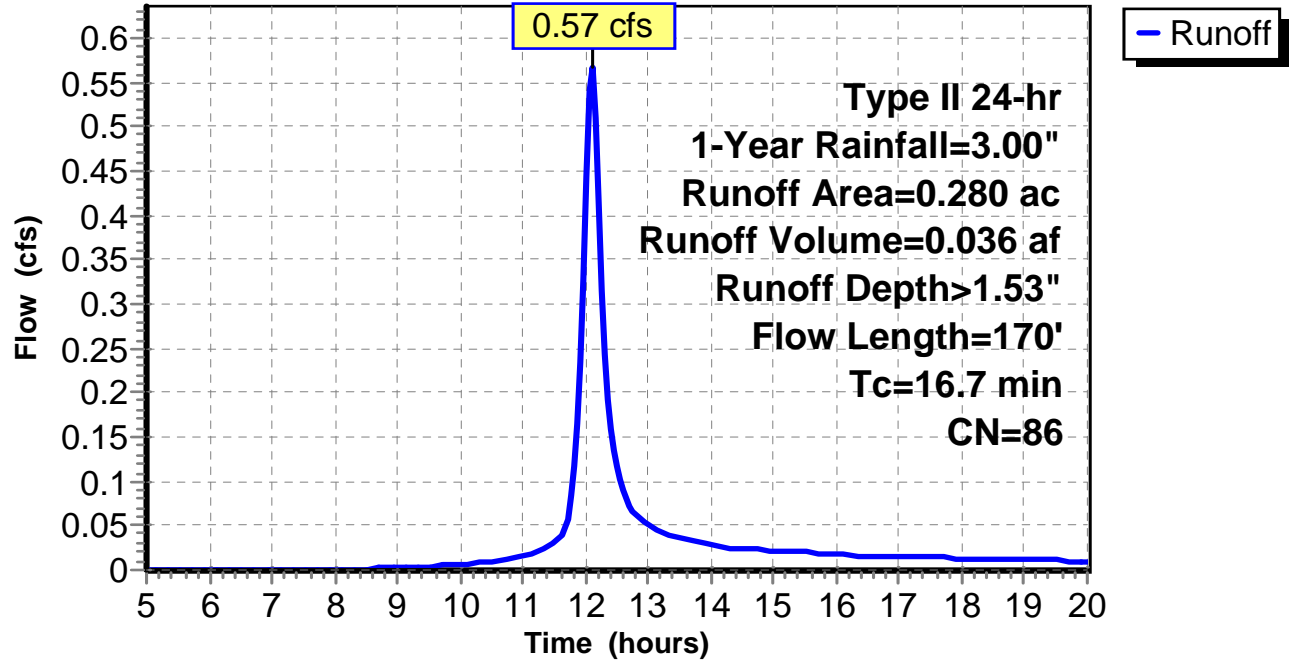
Subcatchment 9: C 81.001

Hydrograph



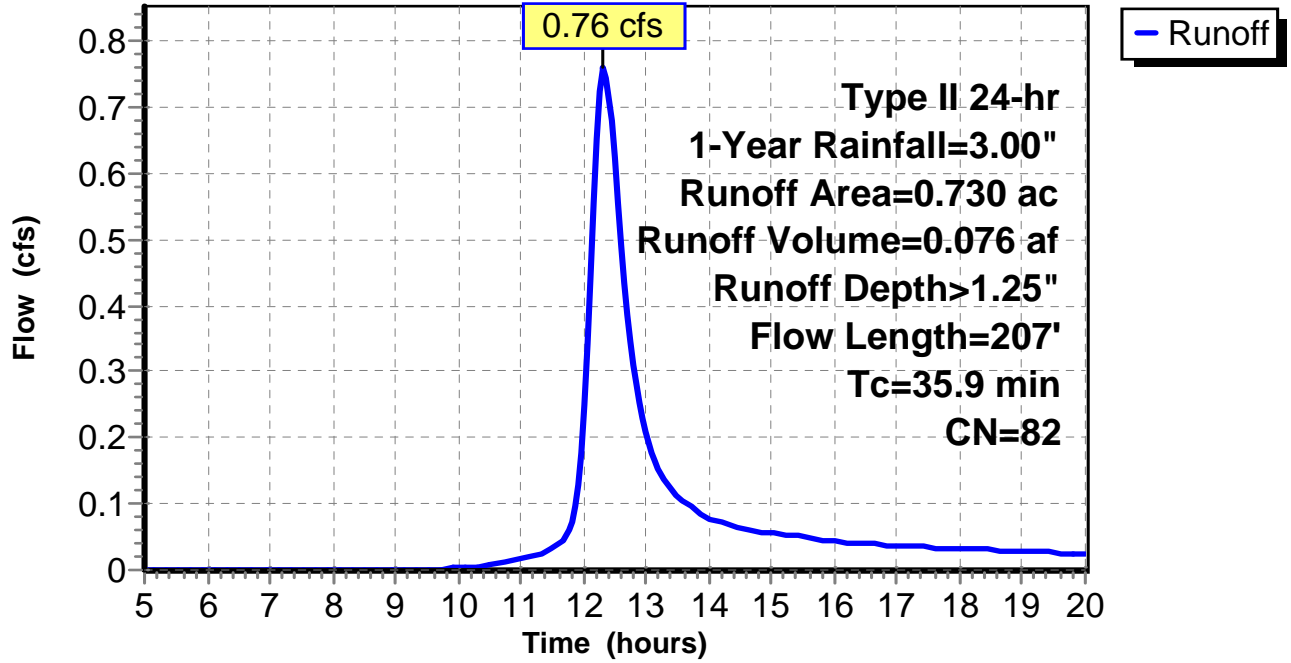
Subcatchment 10: C 81.002

Hydrograph



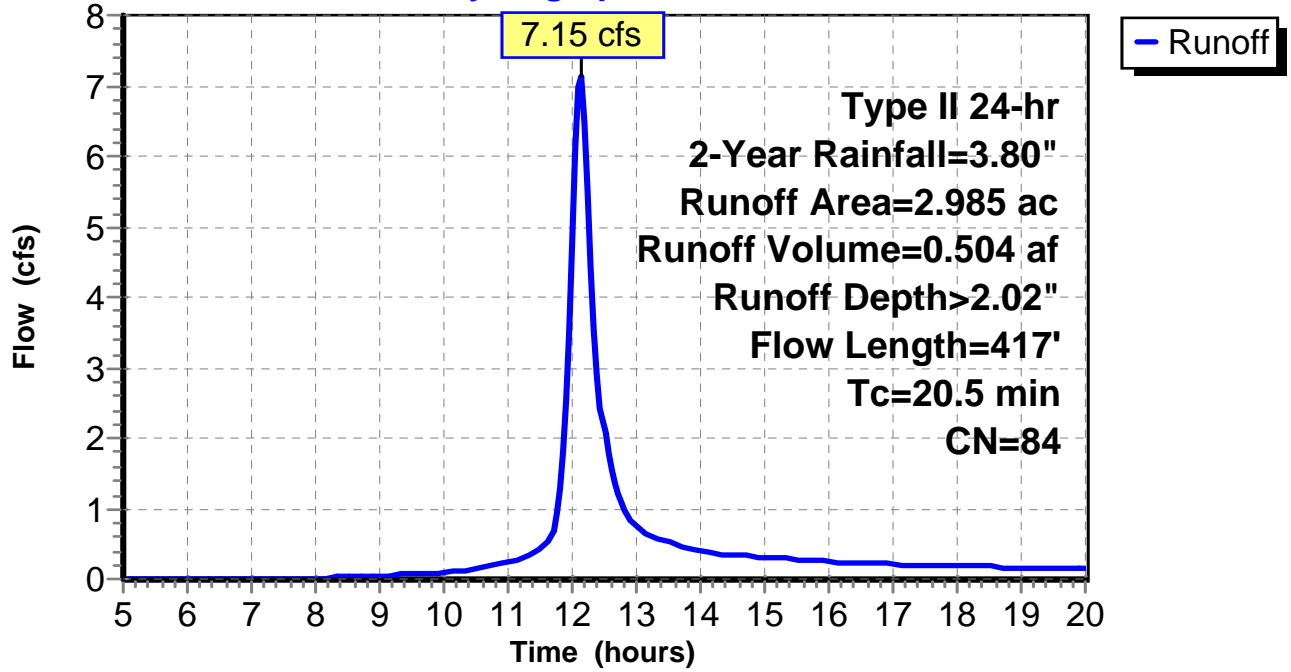
Subcatchment 11: C 81.003

Hydrograph



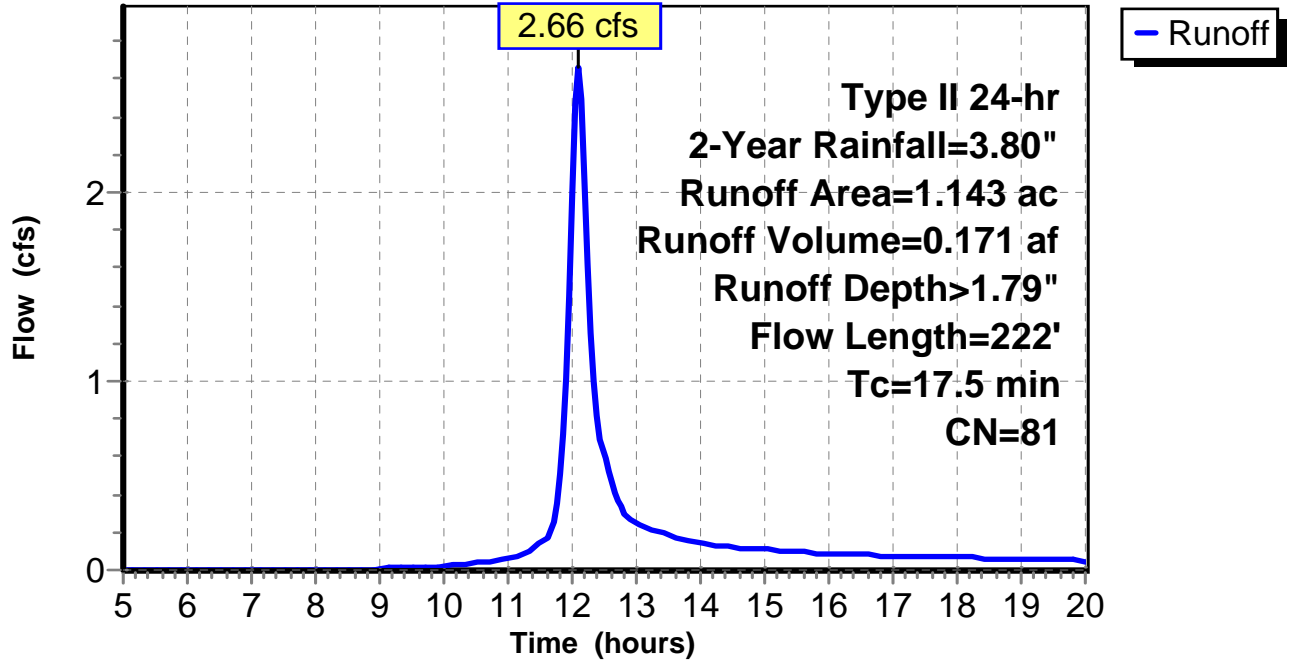
Subcatchment 1: C 80.001

Hydrograph



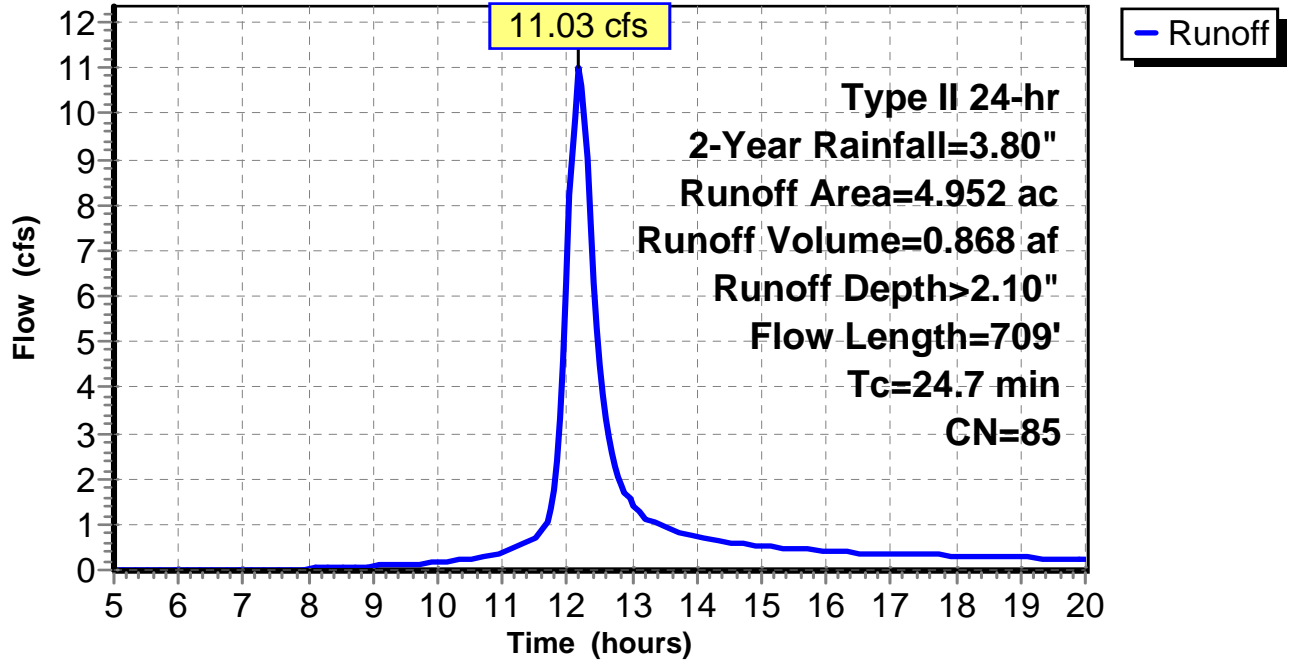
Subcatchment 2: C 80.002

Hydrograph



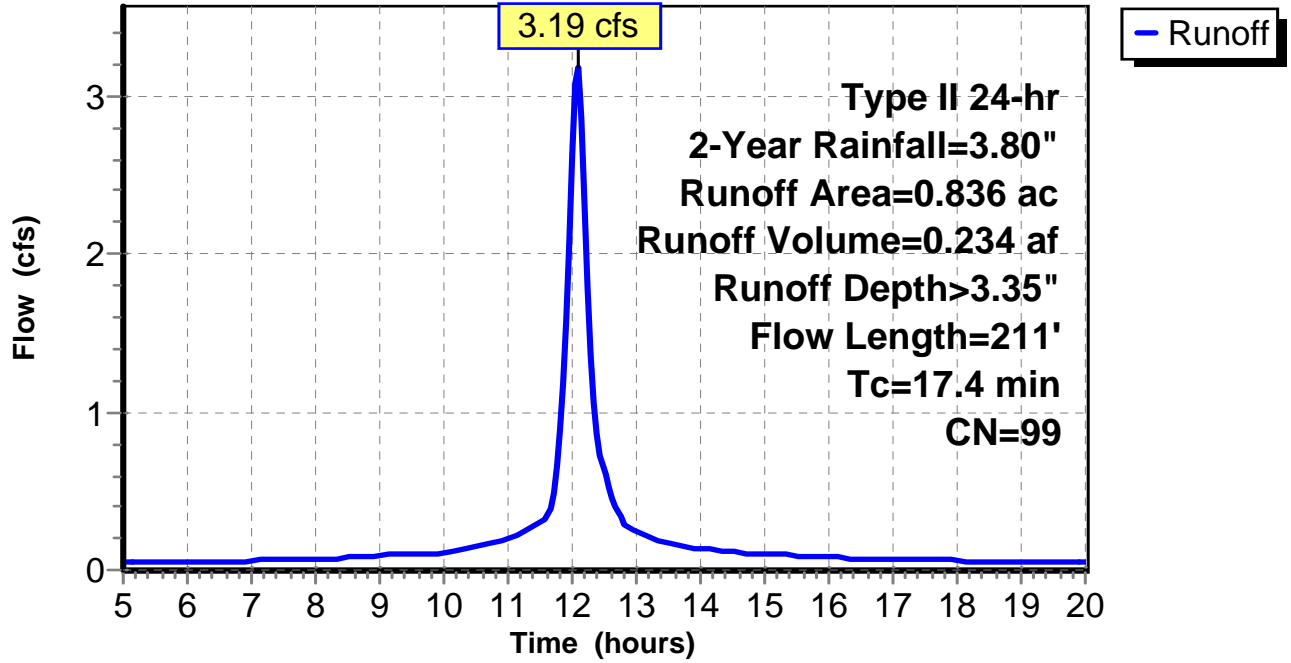
Subcatchment 3: C 80.003

Hydrograph



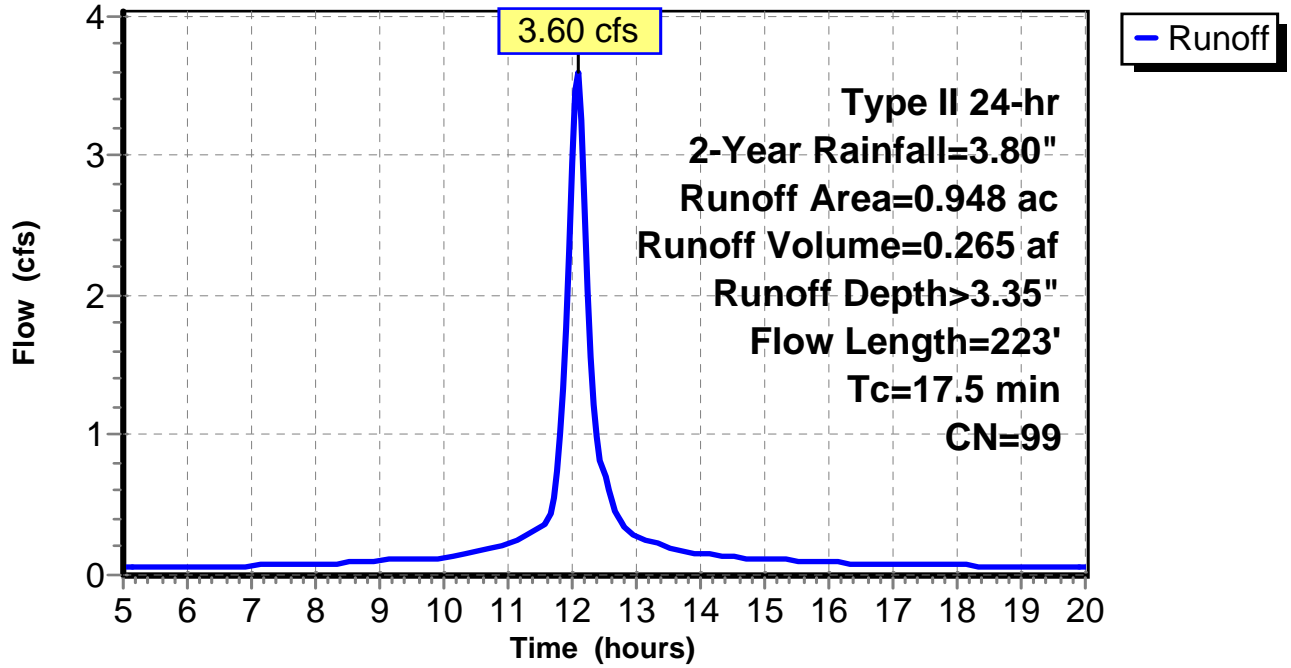
Subcatchment 4: C 80.004

Hydrograph



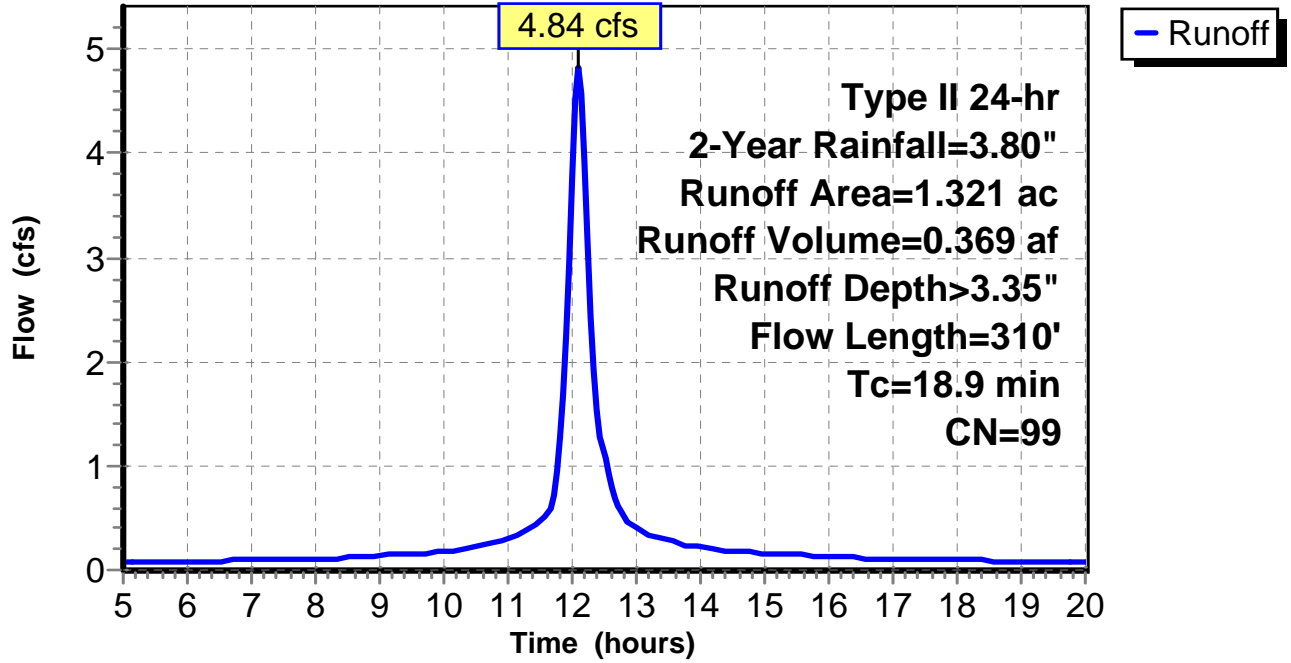
Subcatchment 5: C 80.005

Hydrograph



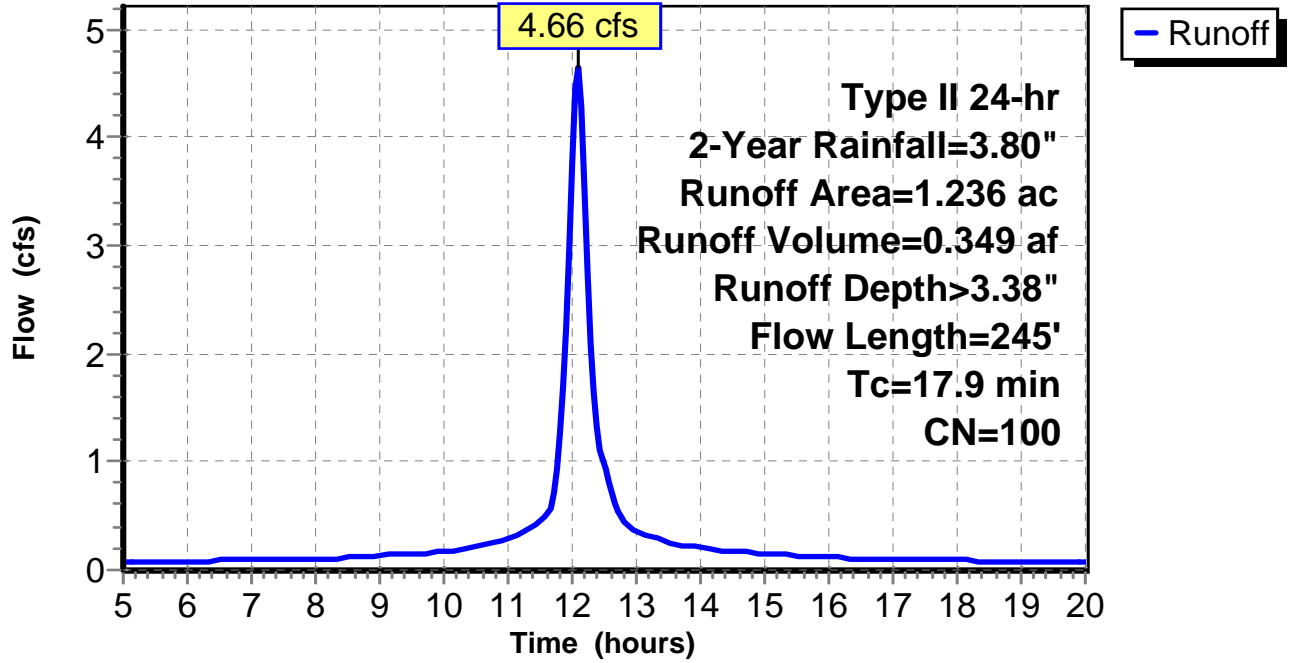
Subcatchment 6: C 80.006

Hydrograph



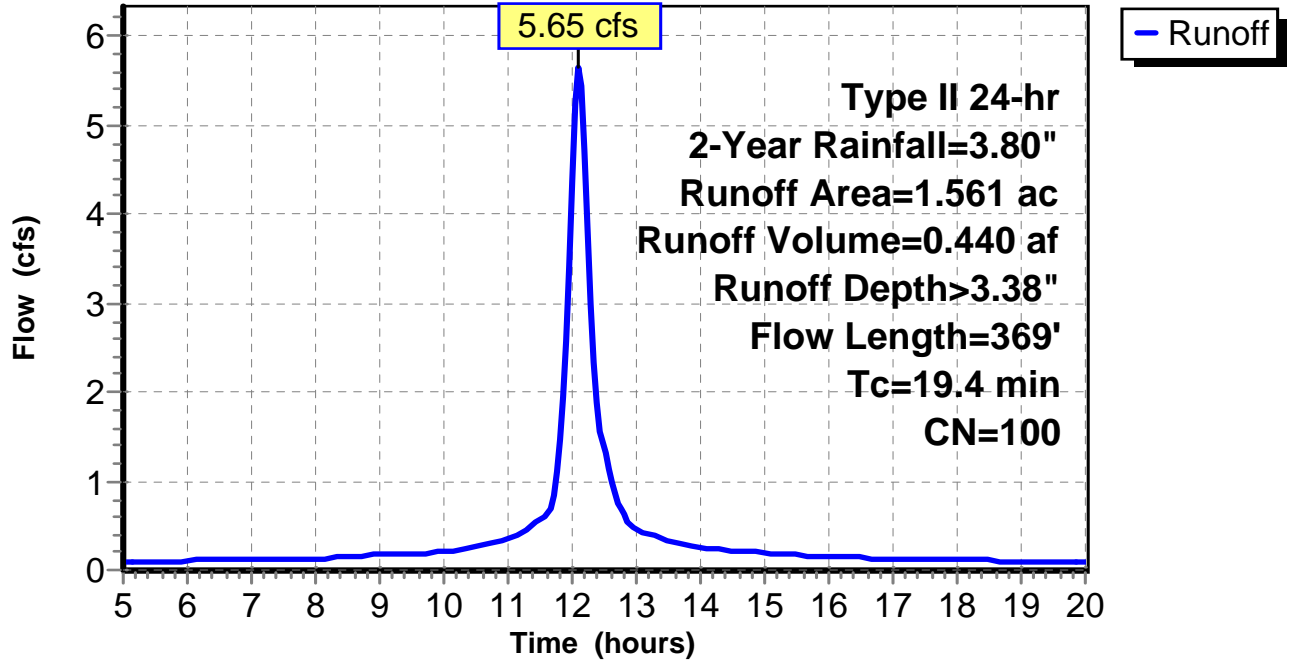
Subcatchment 7: C 80.007

Hydrograph



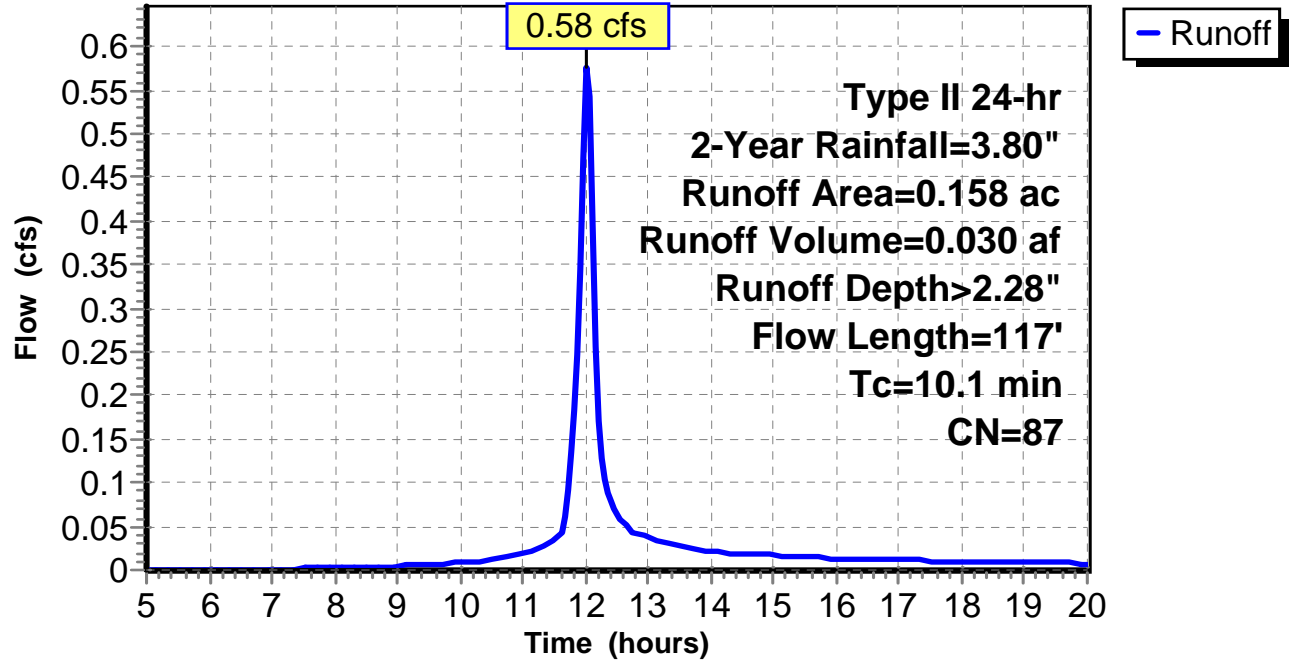
Subcatchment 8: C 80.008

Hydrograph



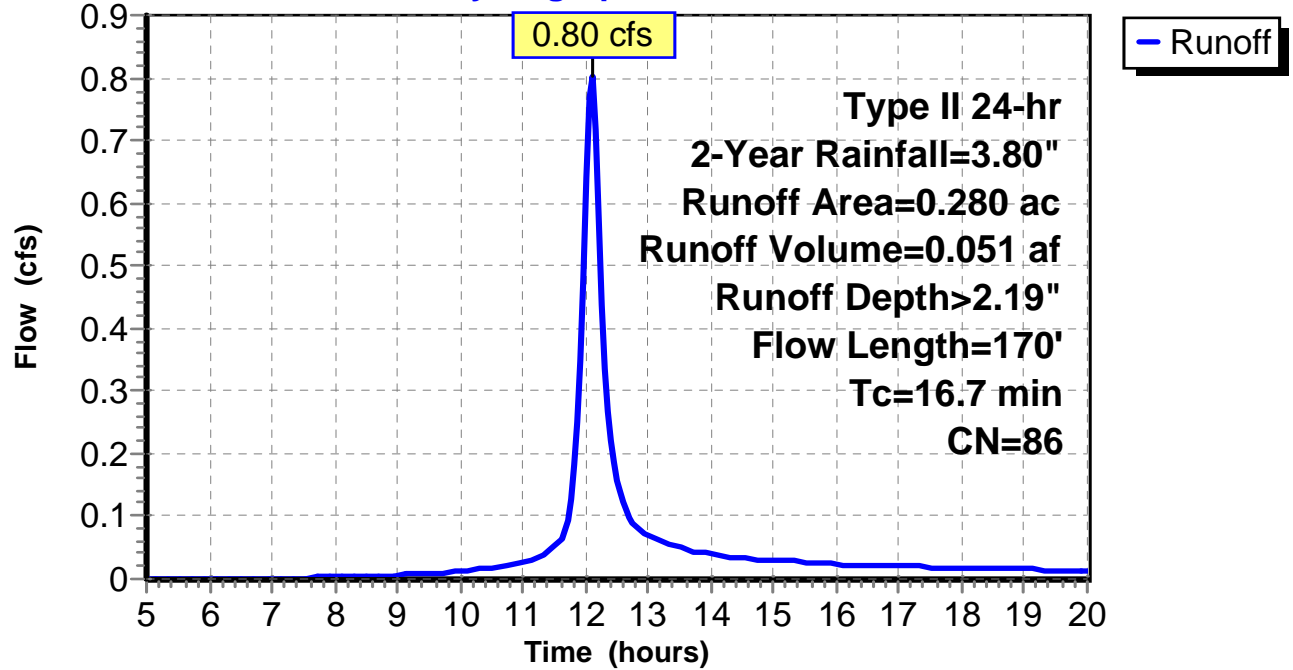
Subcatchment 9: C 81.001

Hydrograph



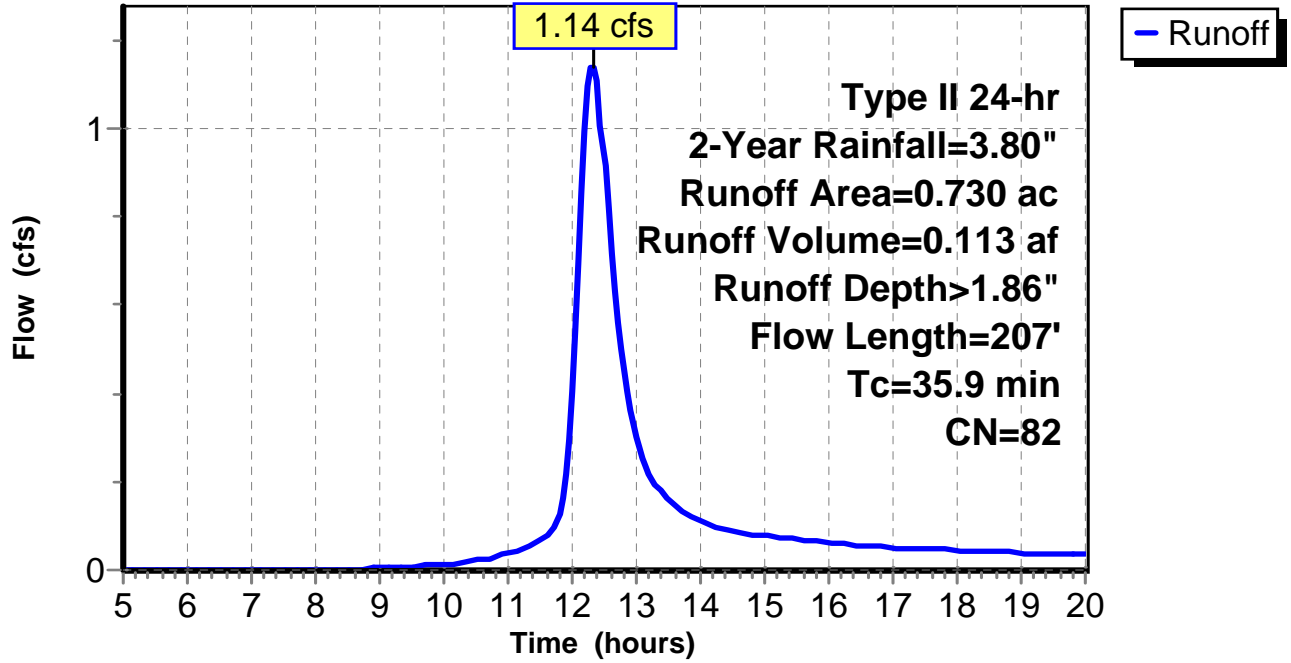
Subcatchment 10: C 81.002

Hydrograph



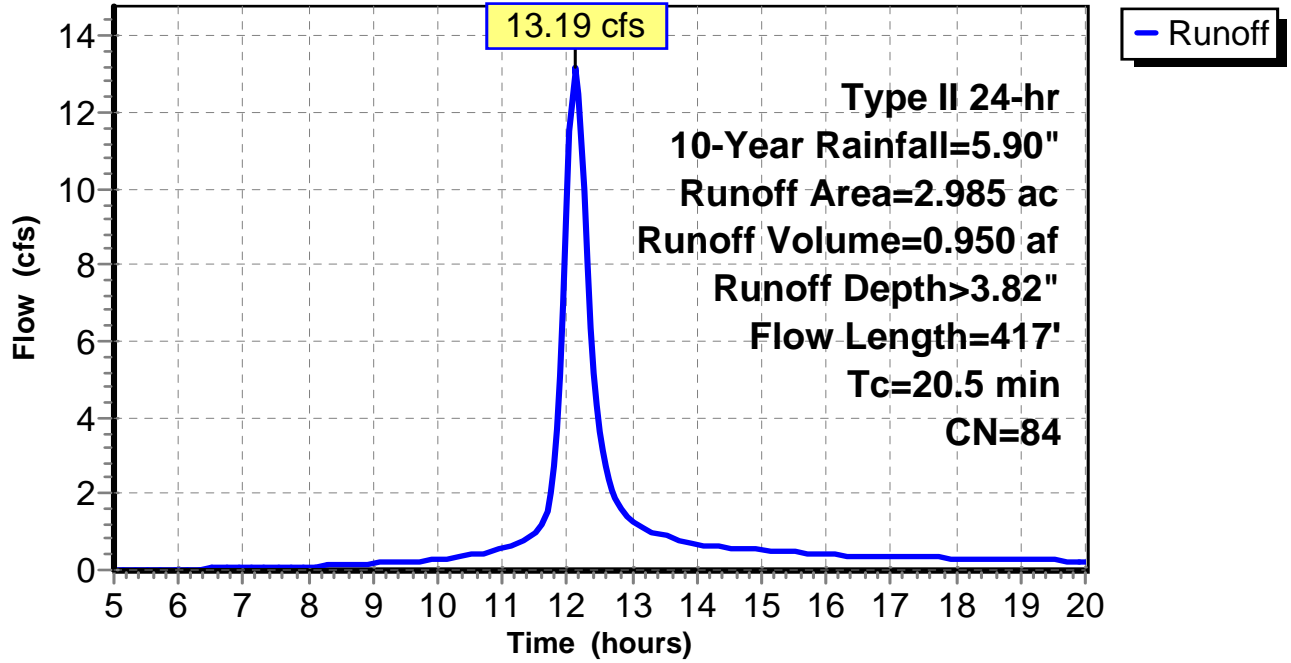
Subcatchment 11: C 81.003

Hydrograph



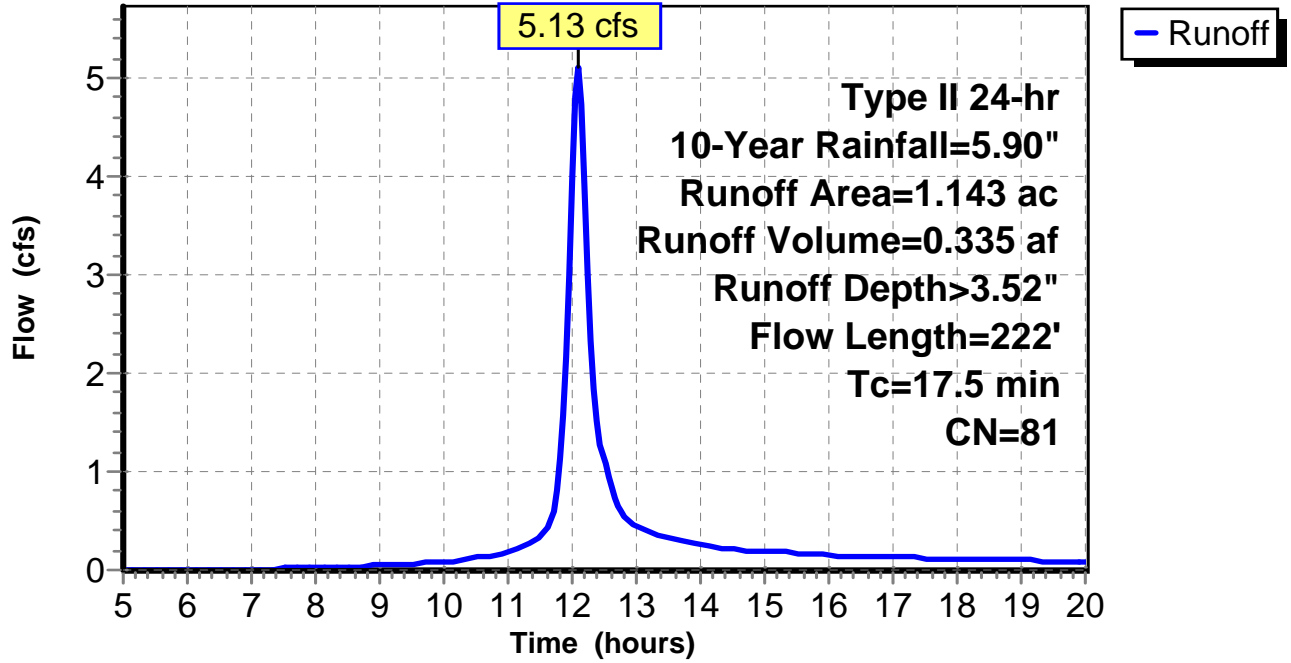
Subcatchment 1: C 80.001

Hydrograph



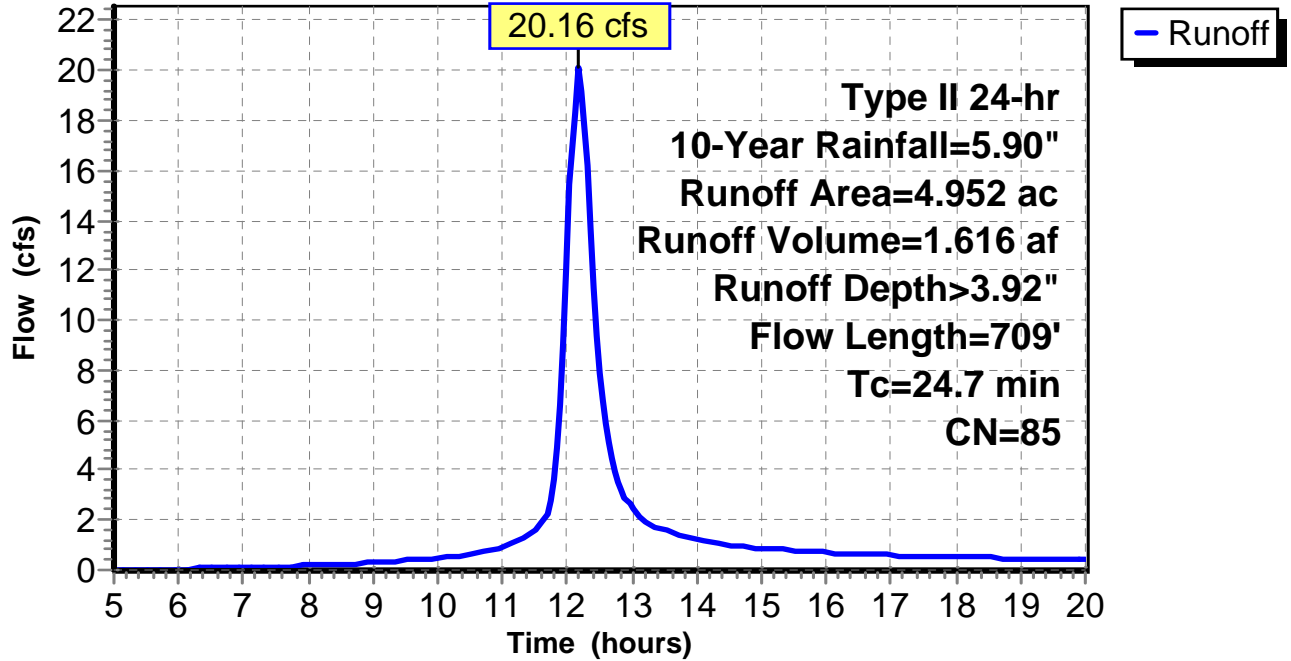
Subcatchment 2: C 80.002

Hydrograph



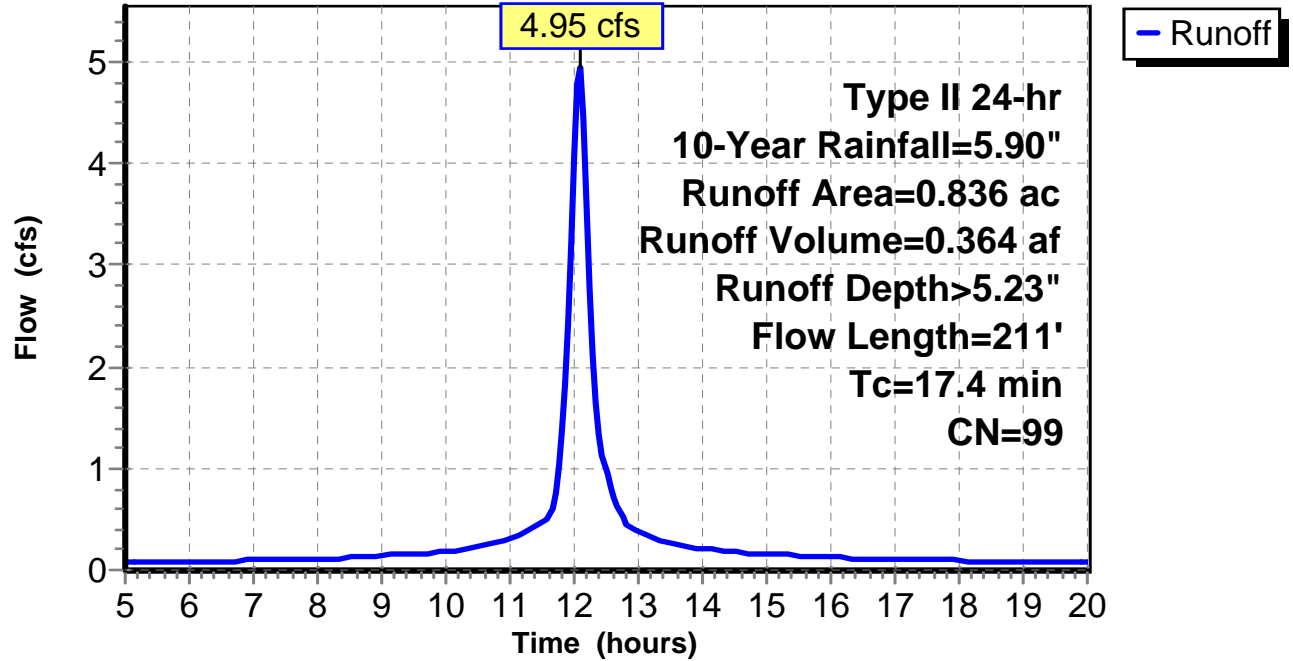
Subcatchment 3: C 80.003

Hydrograph



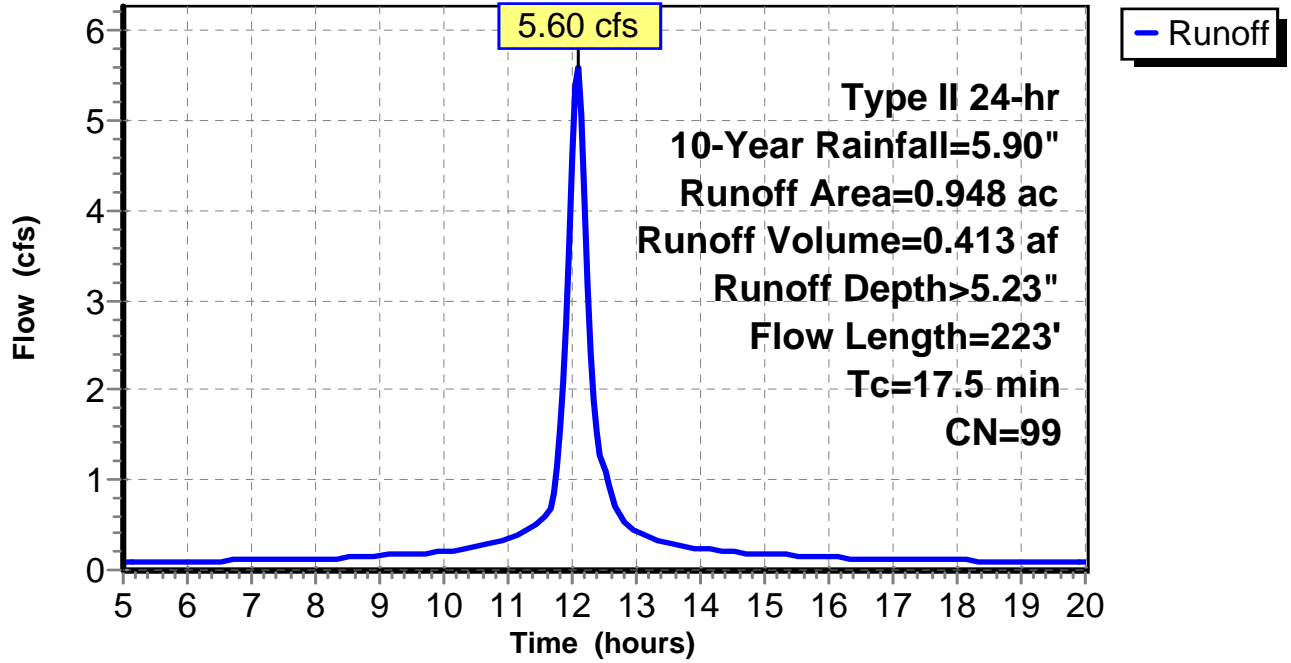
Subcatchment 4: C 80.004

Hydrograph



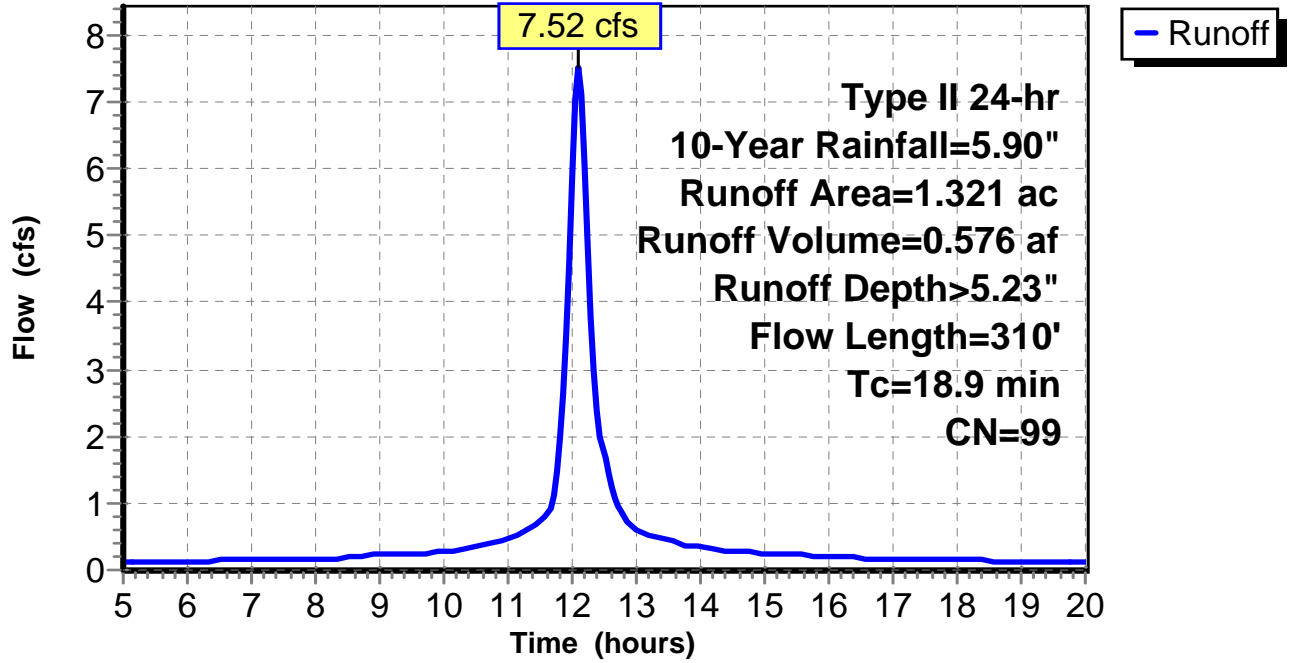
Subcatchment 5: C 80.005

Hydrograph



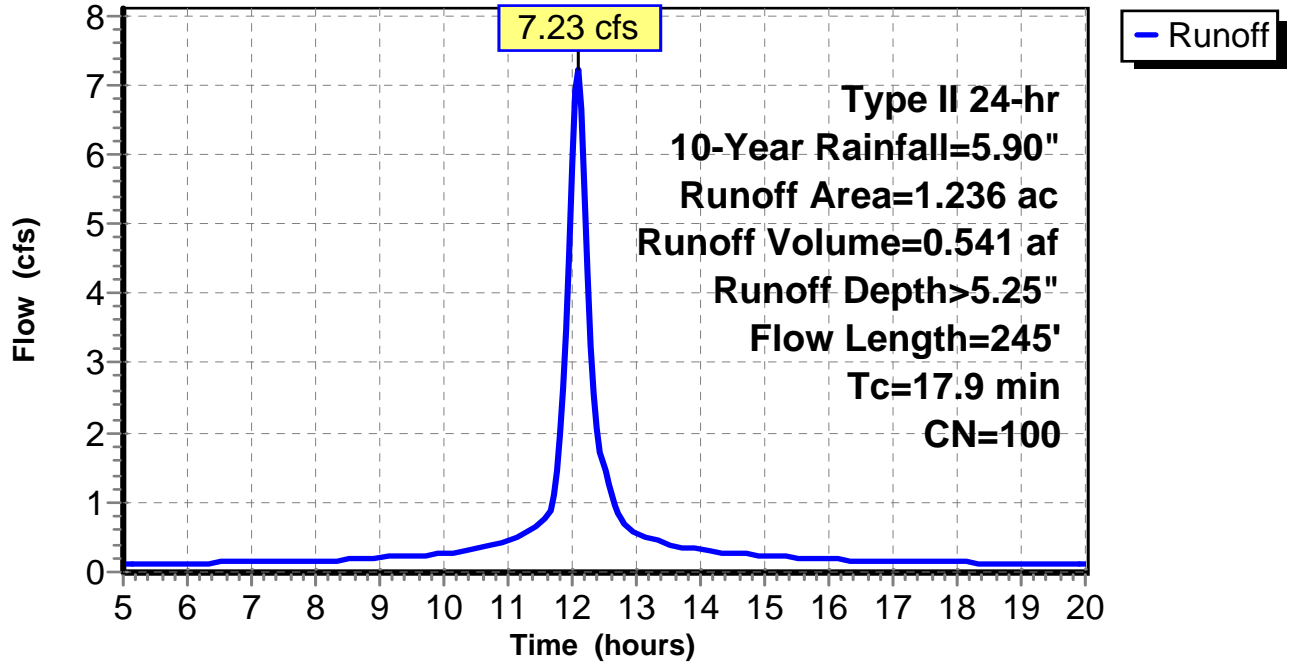
Subcatchment 6: C 80.006

Hydrograph



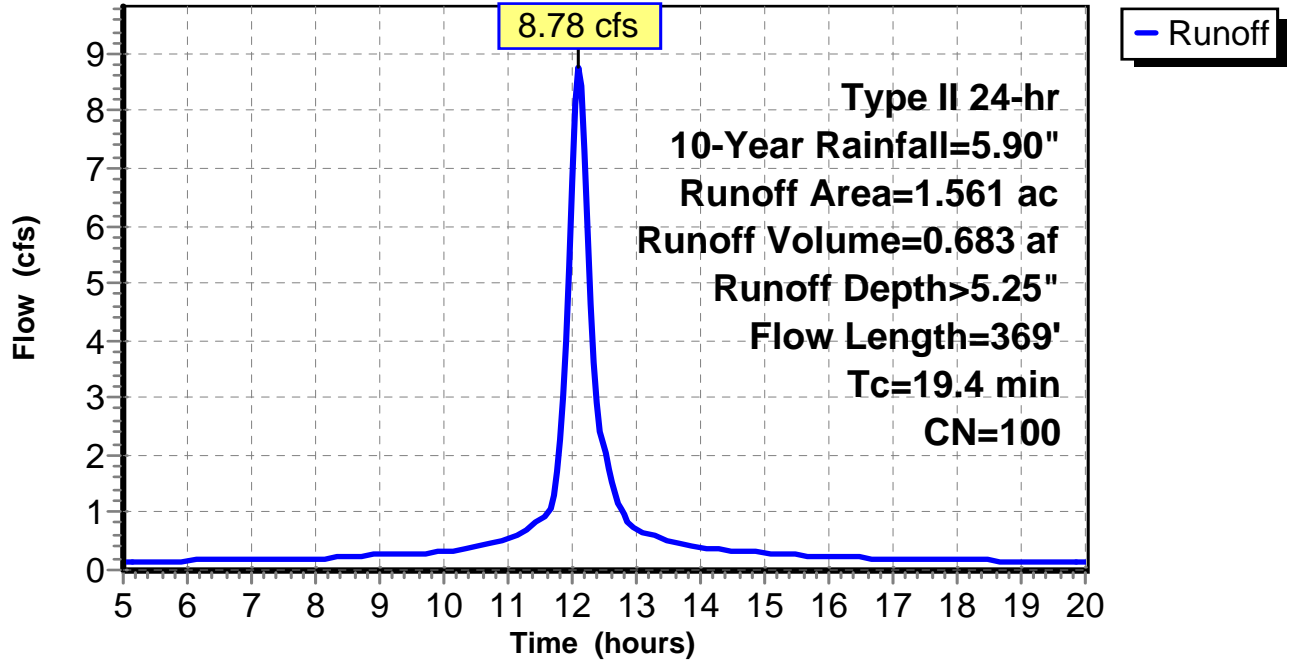
Subcatchment 7: C 80.007

Hydrograph



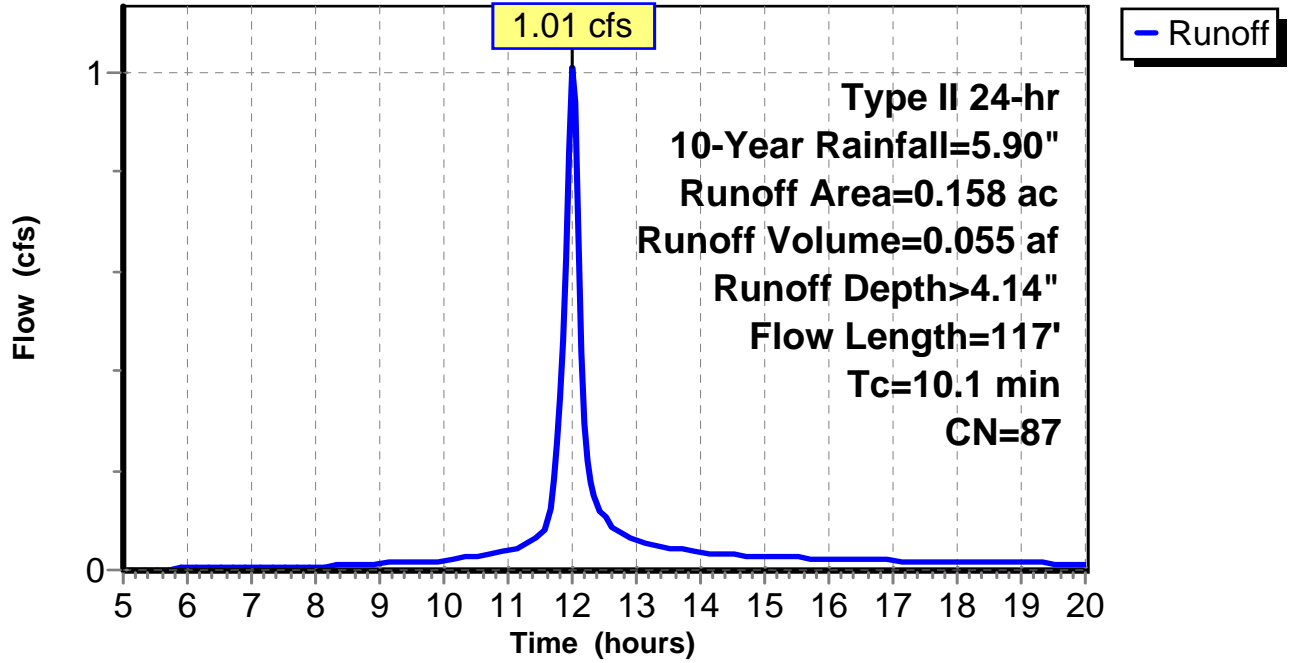
Subcatchment 8: C 80.008

Hydrograph



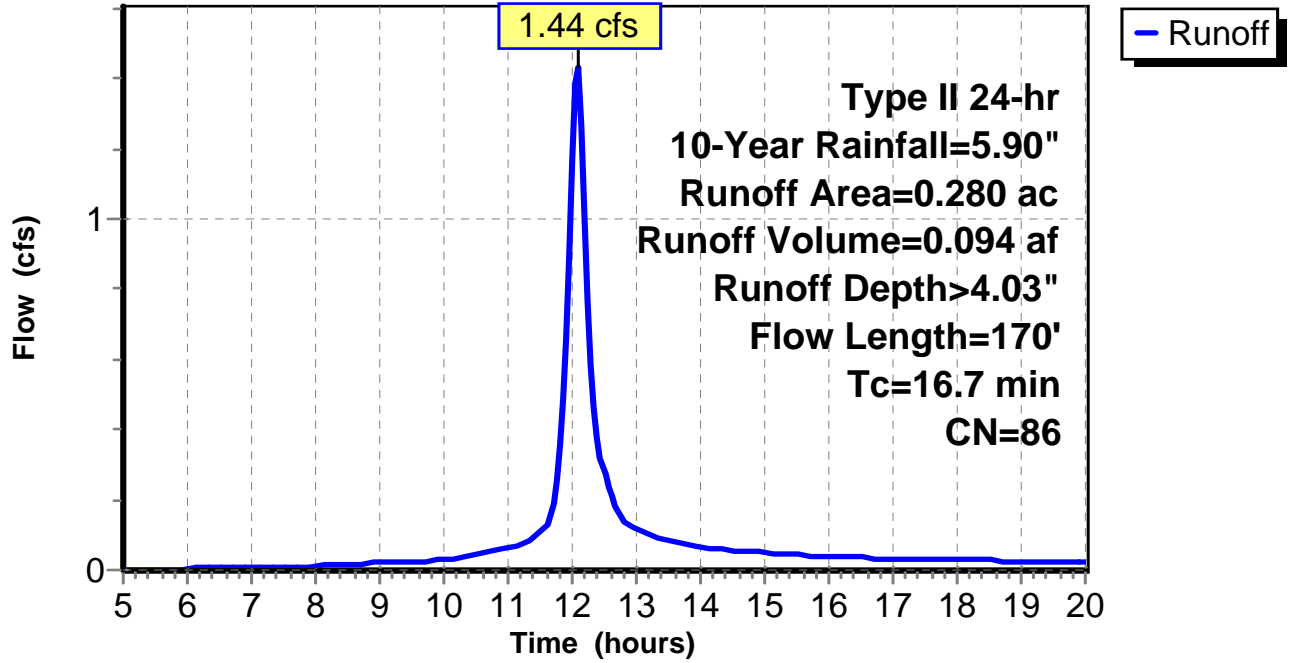
Subcatchment 9: C 81.001

Hydrograph



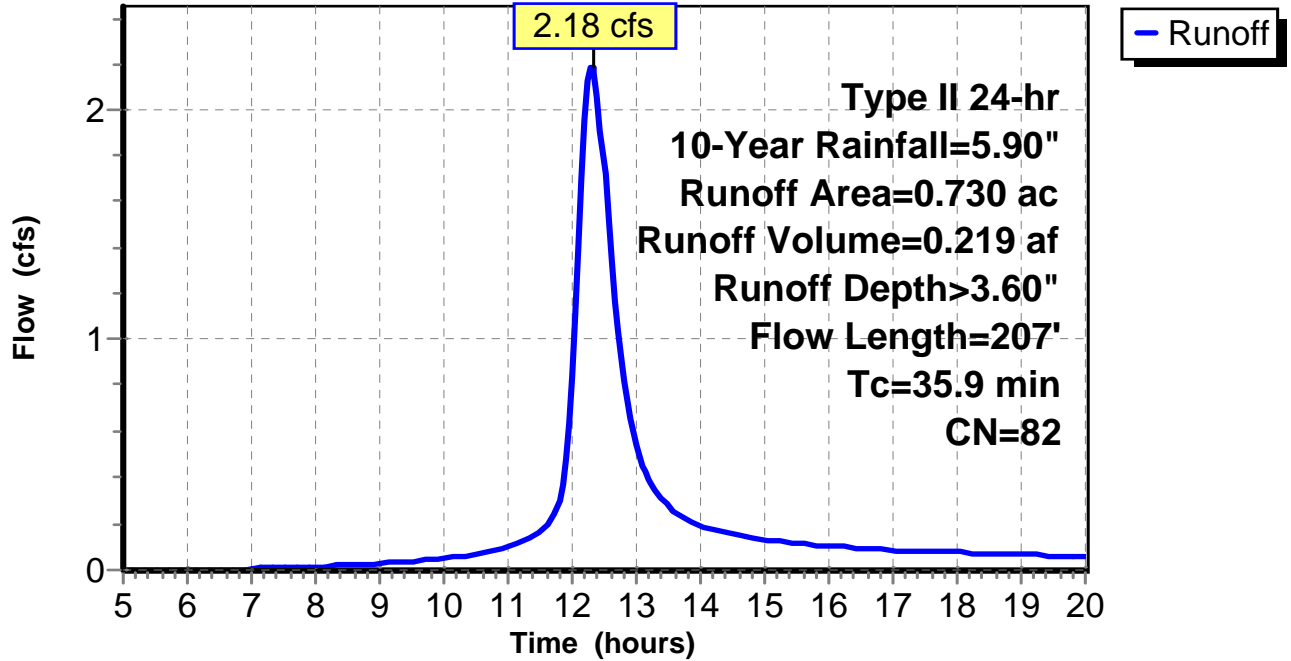
Subcatchment 10: C 81.002

Hydrograph



Subcatchment 11: C 81.003

Hydrograph

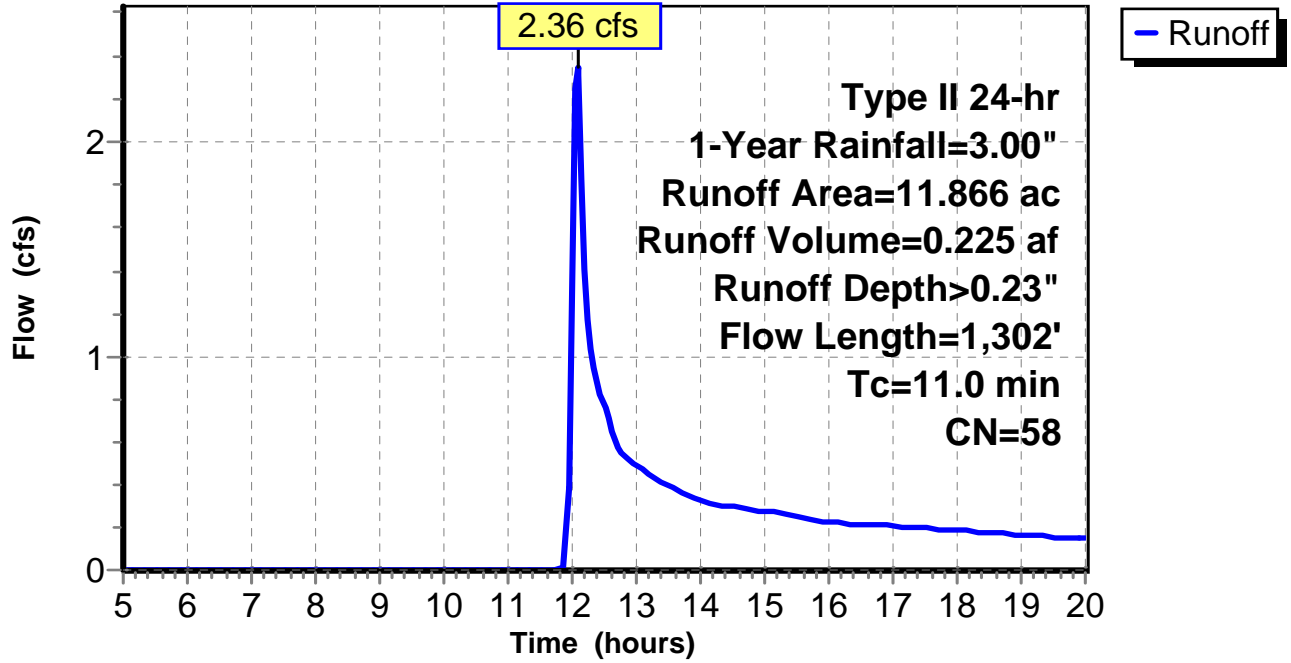


ATTACHMENT 1.3

Culvert Drainage Areas, Temporary Access Roads, Construction Conditions

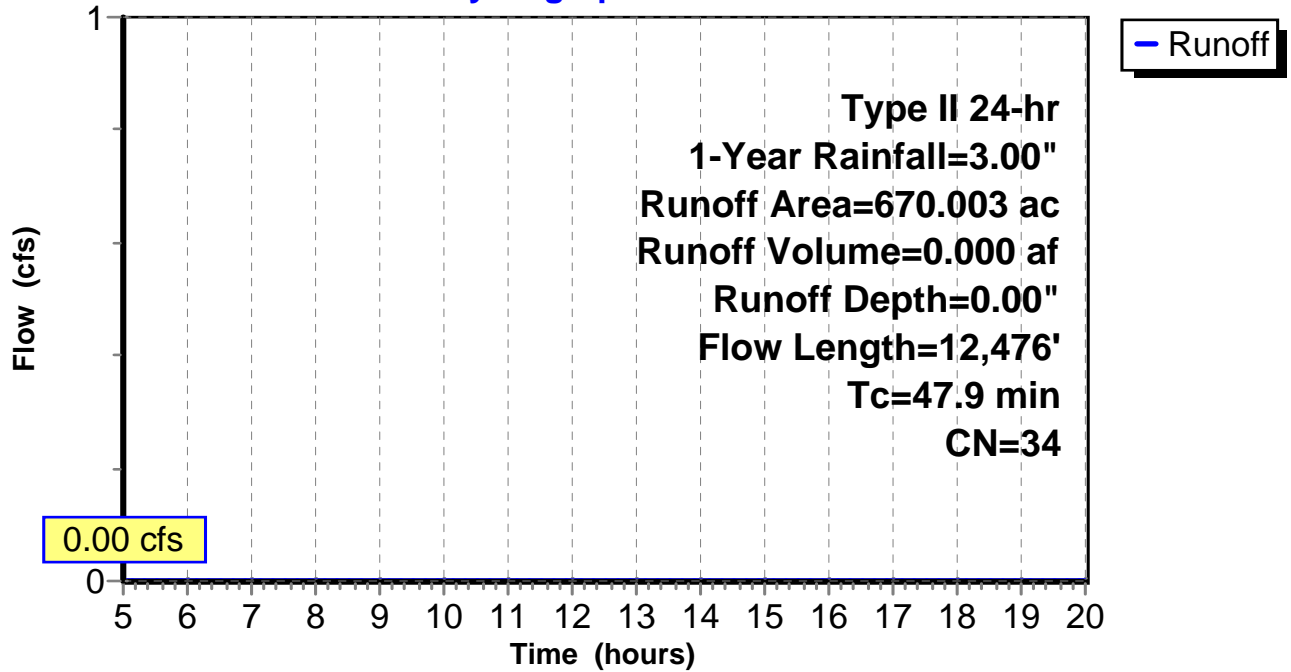
Subcatchment 1: C AR-501.014

Hydrograph



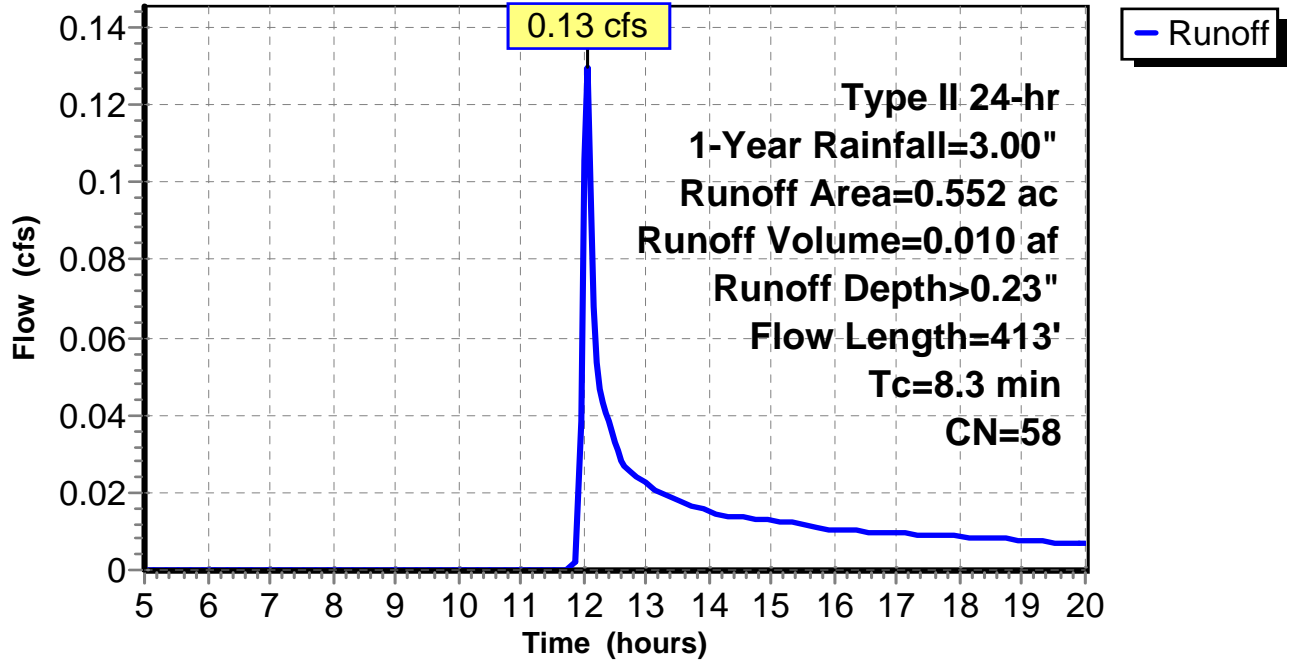
Subcatchment 2: C AR-501.015

Hydrograph



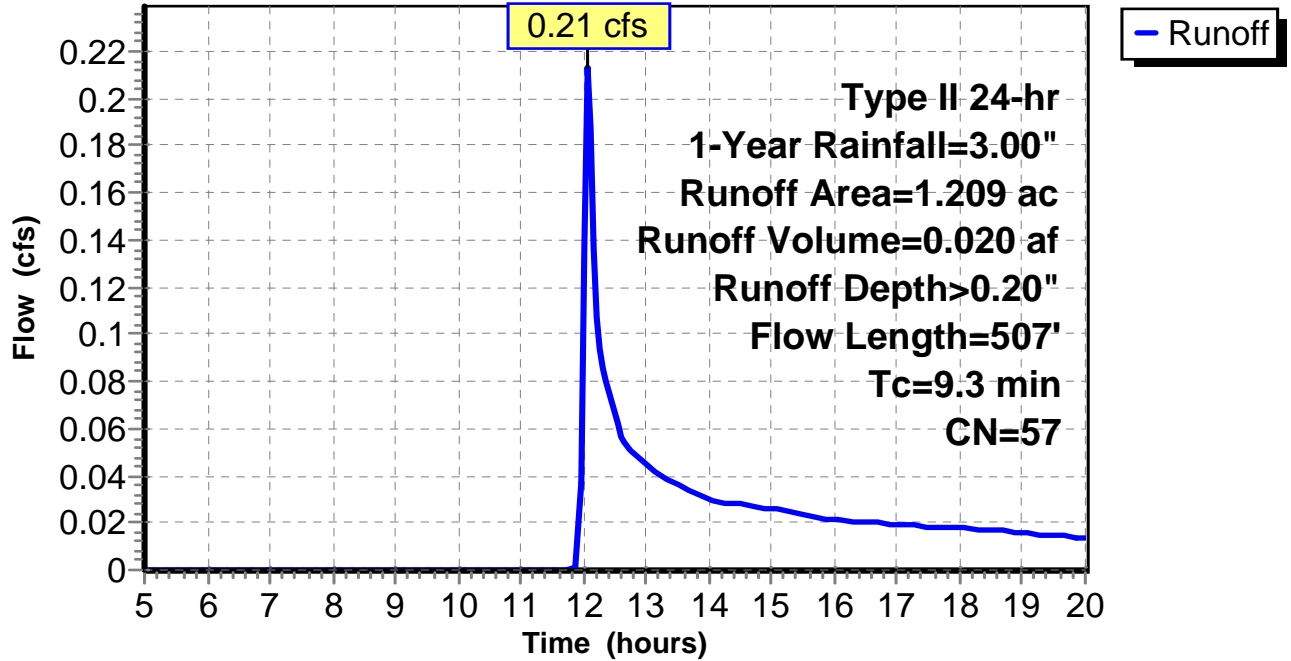
Subcatchment 3: C 161.001

Hydrograph



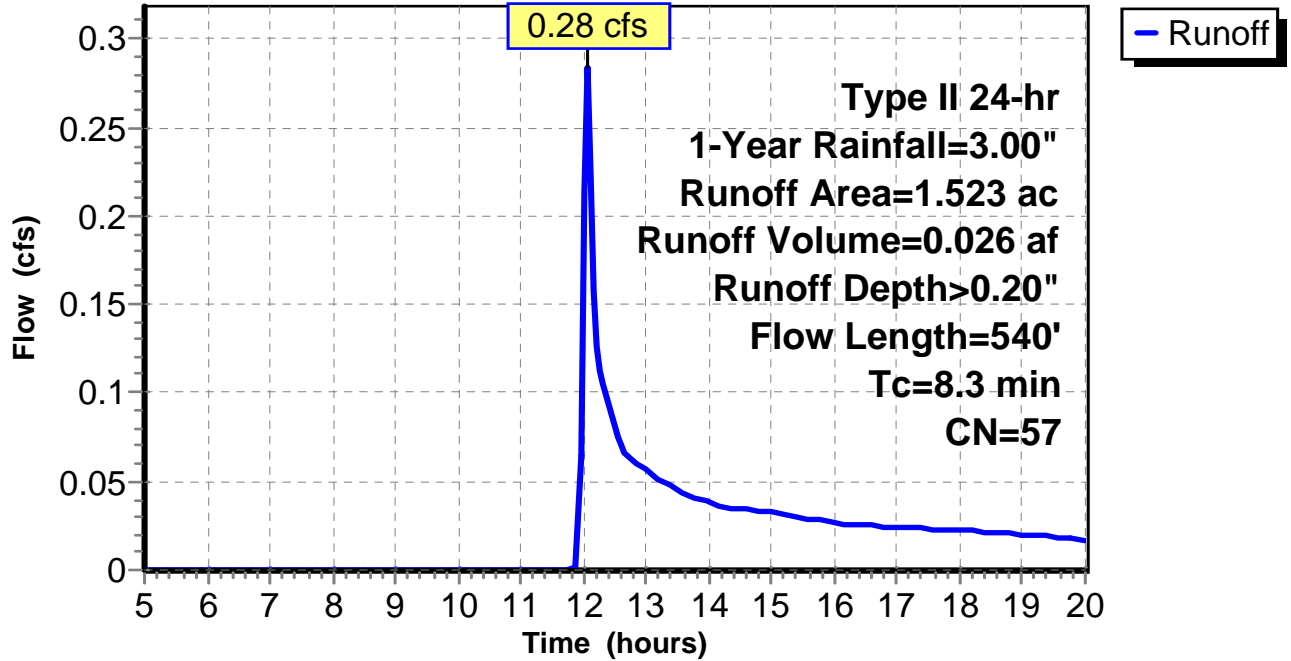
Subcatchment 4: C 161.002

Hydrograph



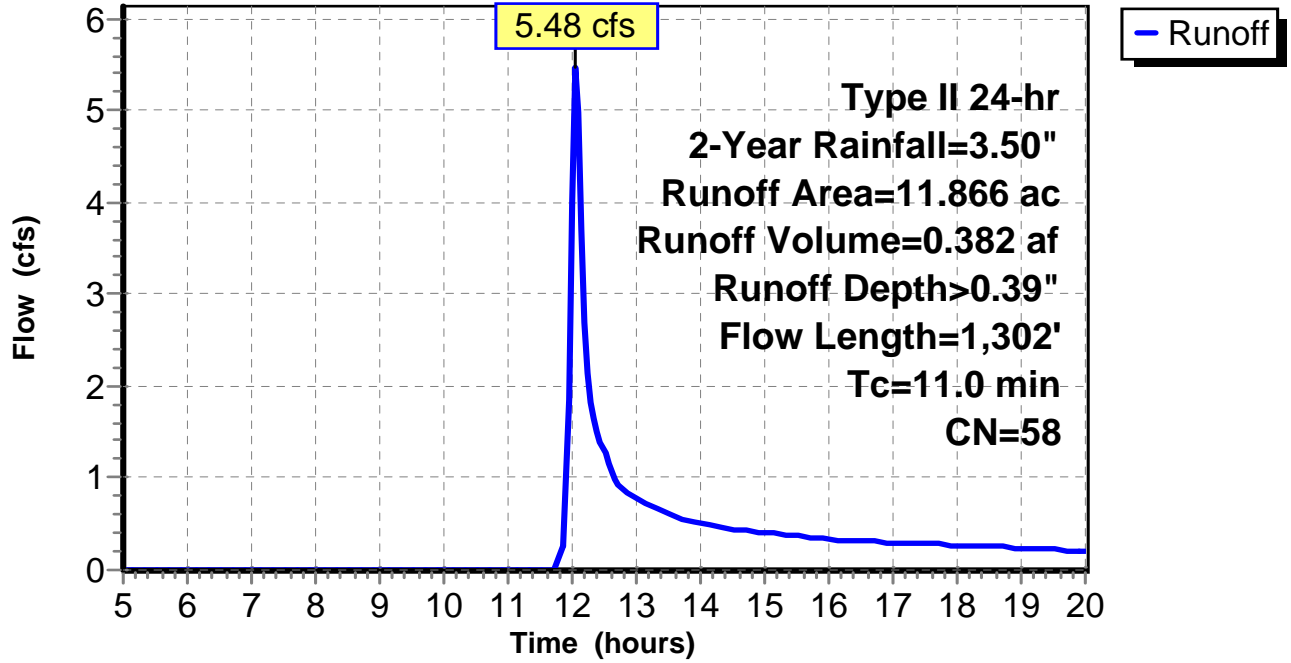
Subcatchment 5: C 161.003

Hydrograph



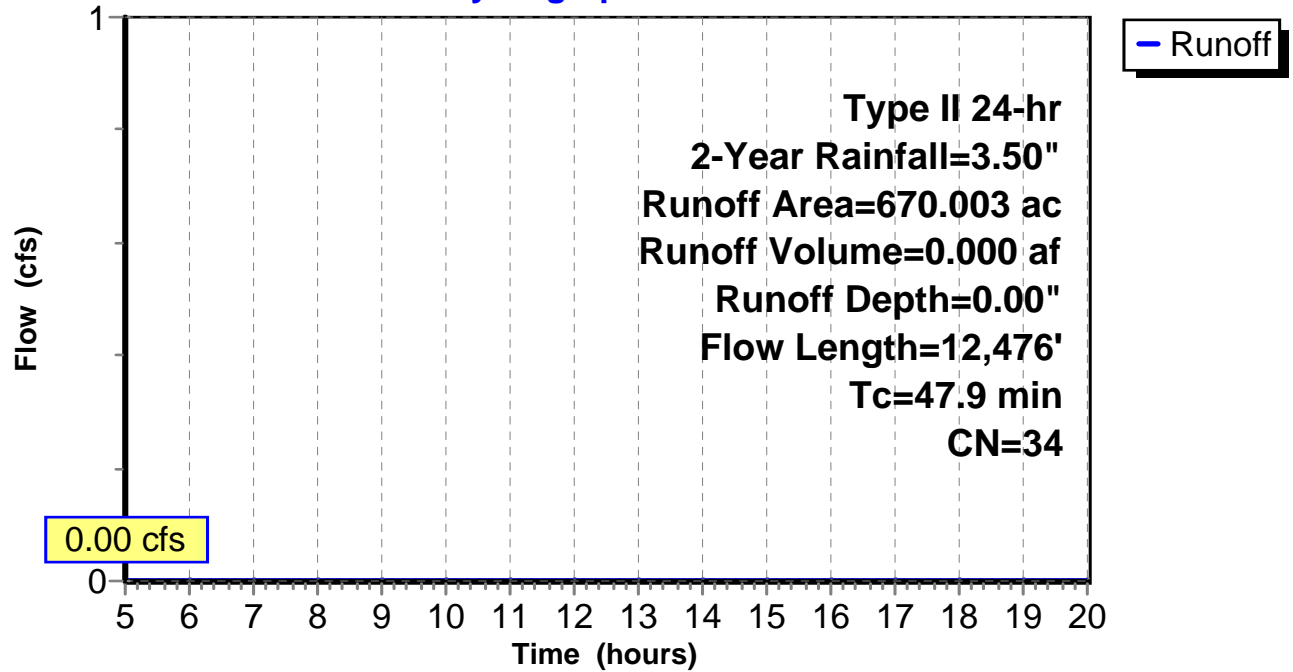
Subcatchment 1: C AR-501.014

Hydrograph



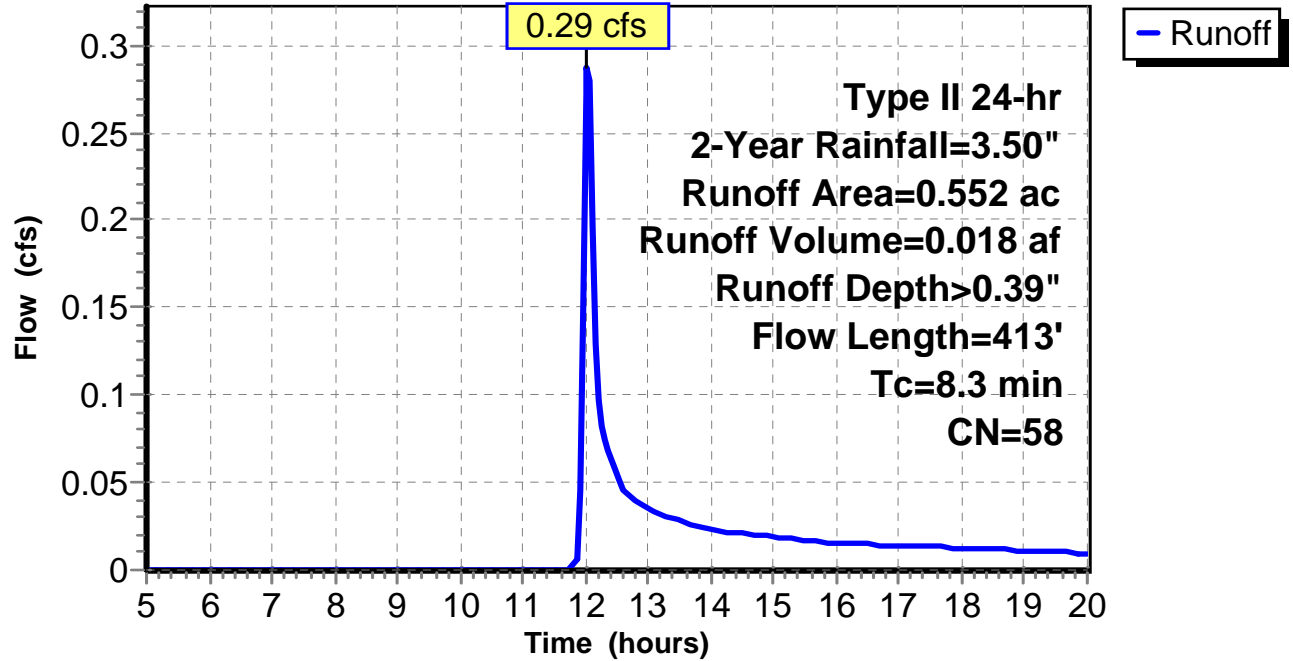
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Hydrograph



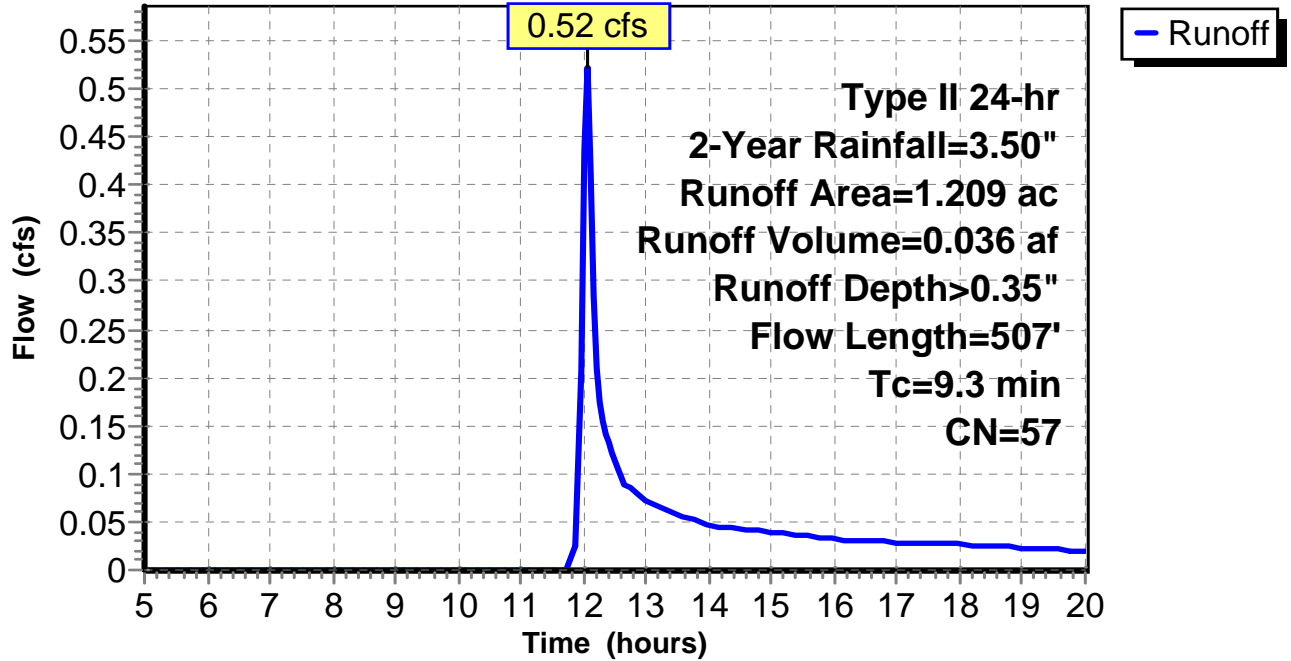
Subcatchment 3: C 161.001

Hydrograph



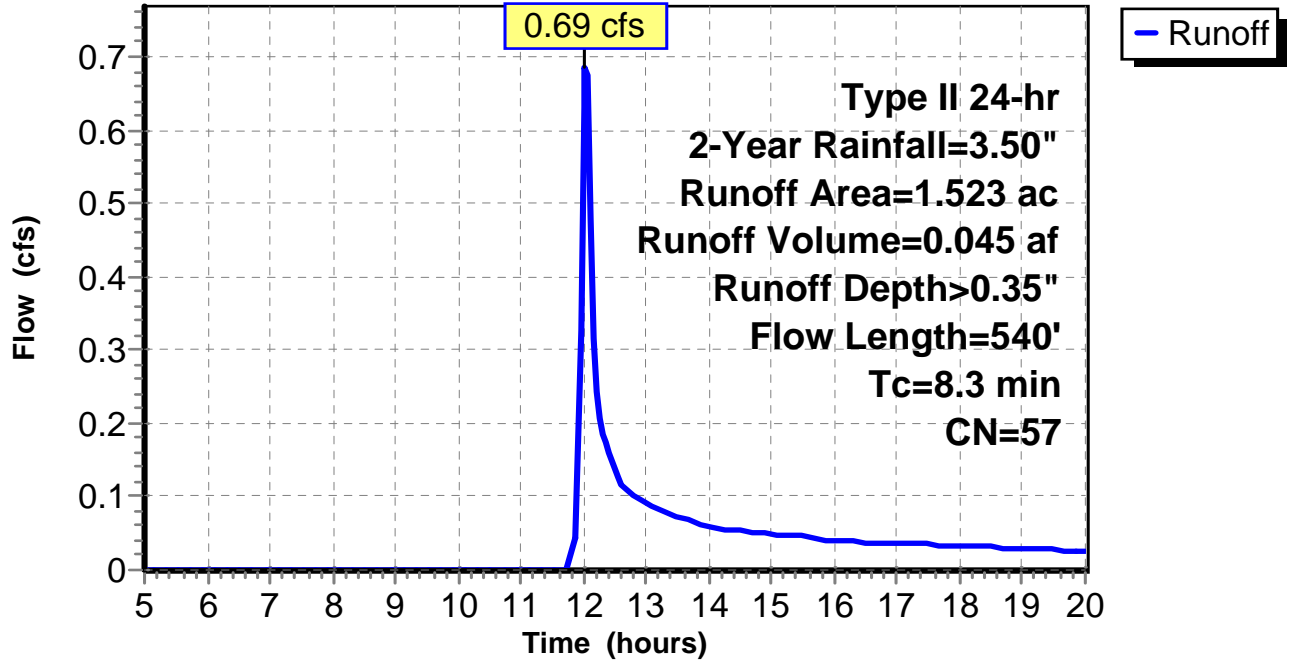
Subcatchment 4: C 161.002

Hydrograph



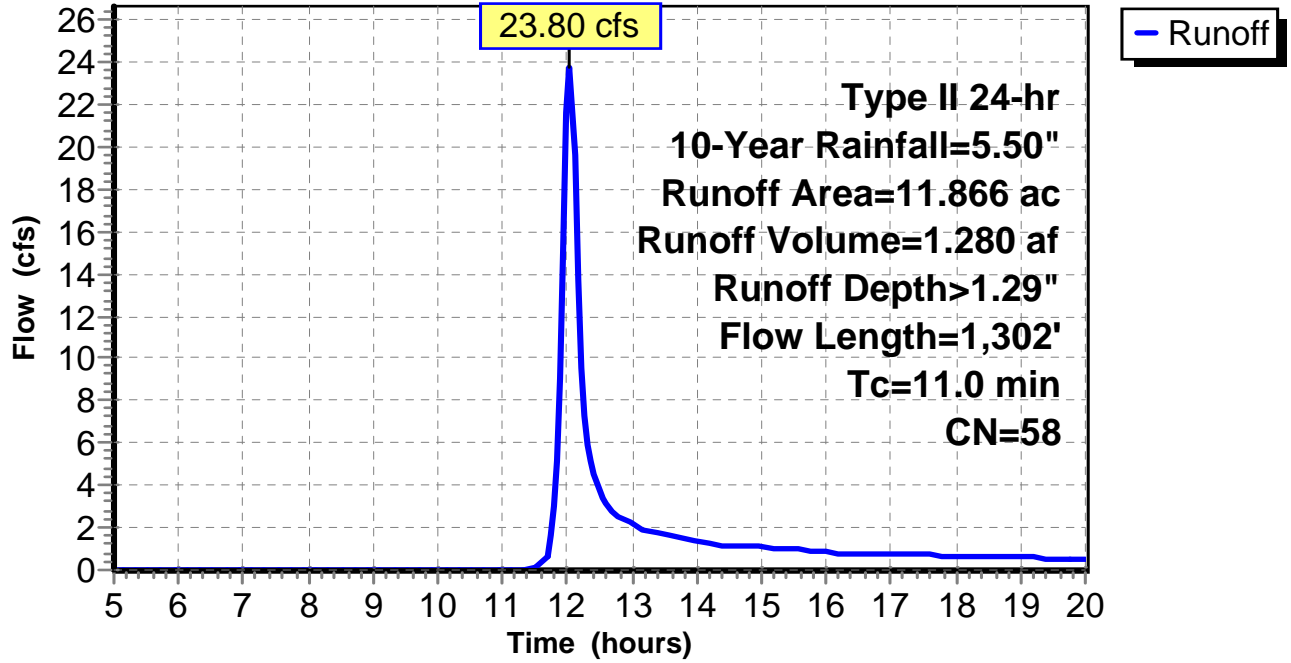
Subcatchment 5: C 161.003

Hydrograph



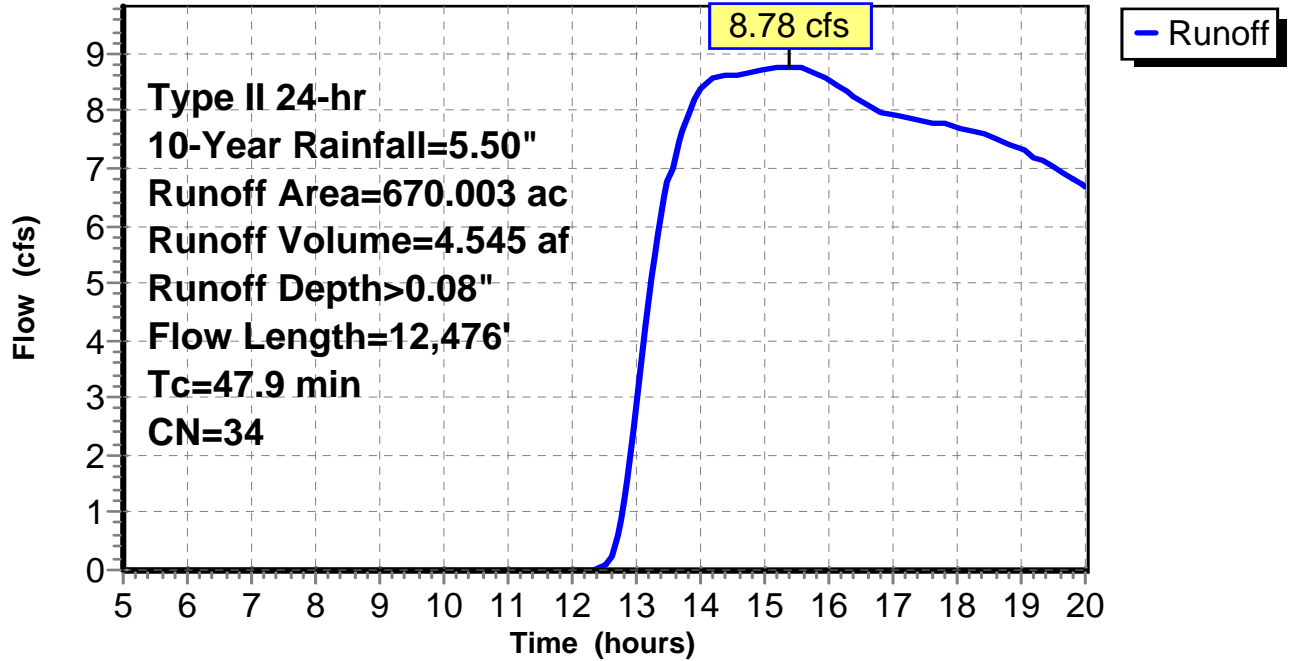
Subcatchment 1: C AR-501.014

Hydrograph



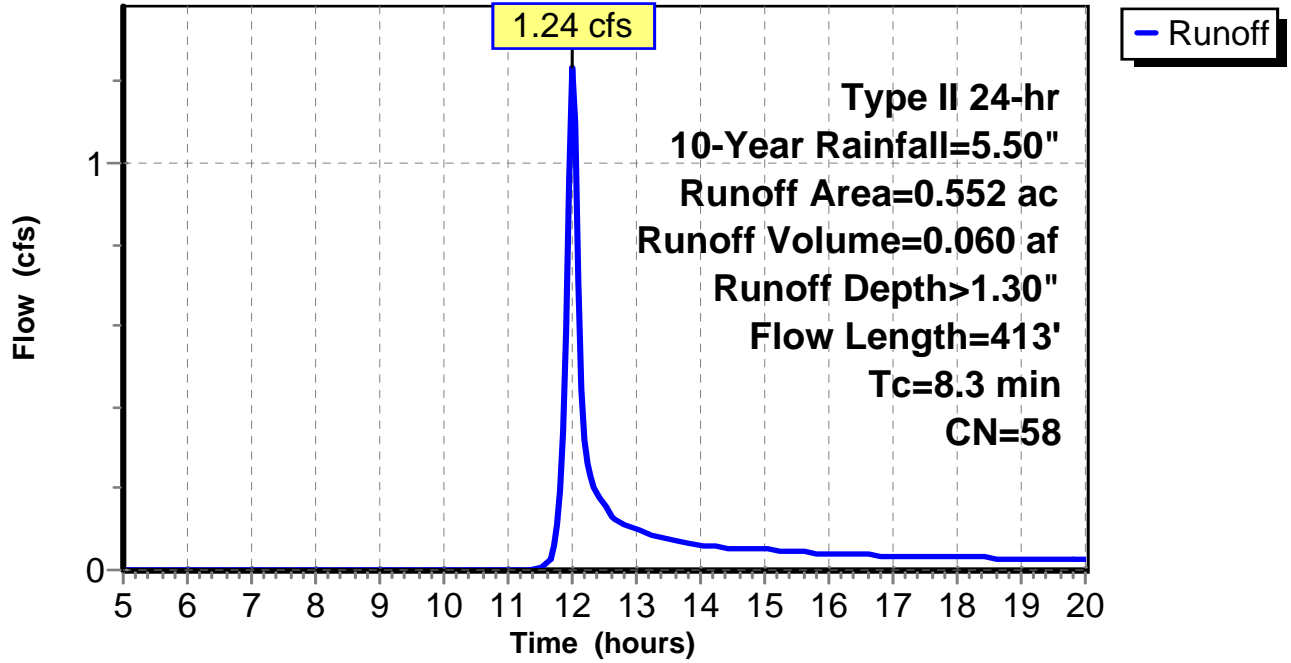
Subcatchment 2: C AR-501.015

Hydrograph



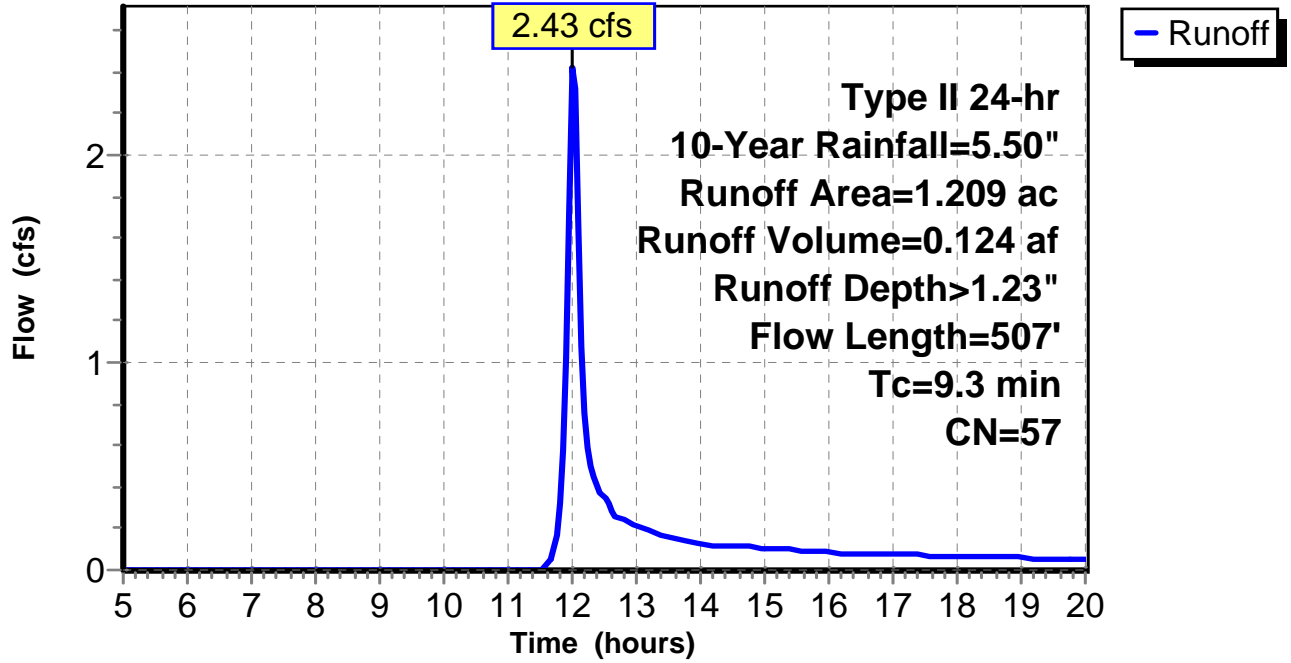
Subcatchment 3: C 161.001

Hydrograph



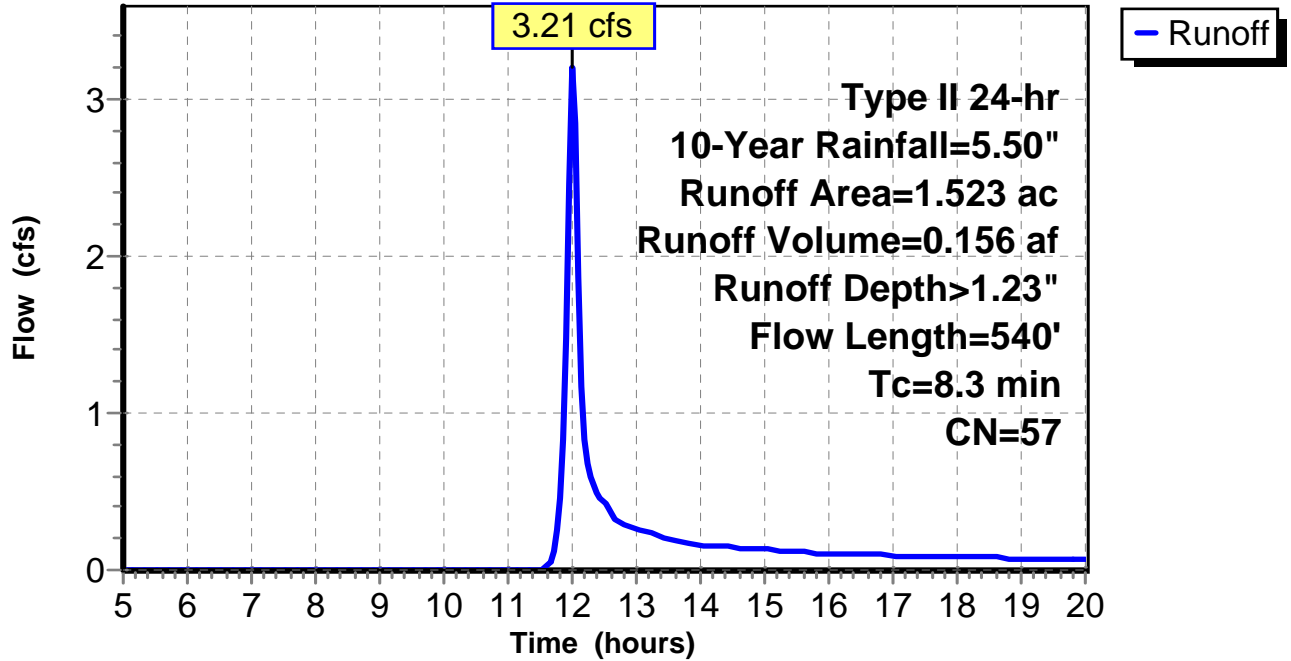
Subcatchment 4: C 161.002

Hydrograph



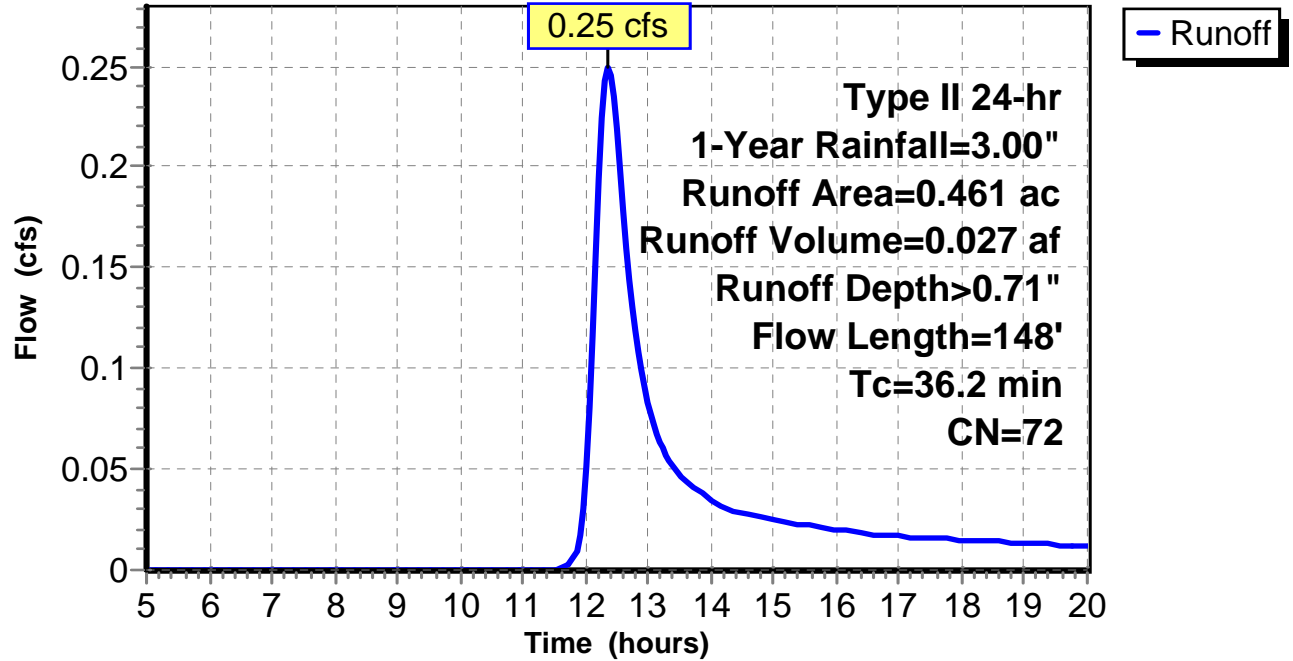
Subcatchment 5: C 161.003

Hydrograph



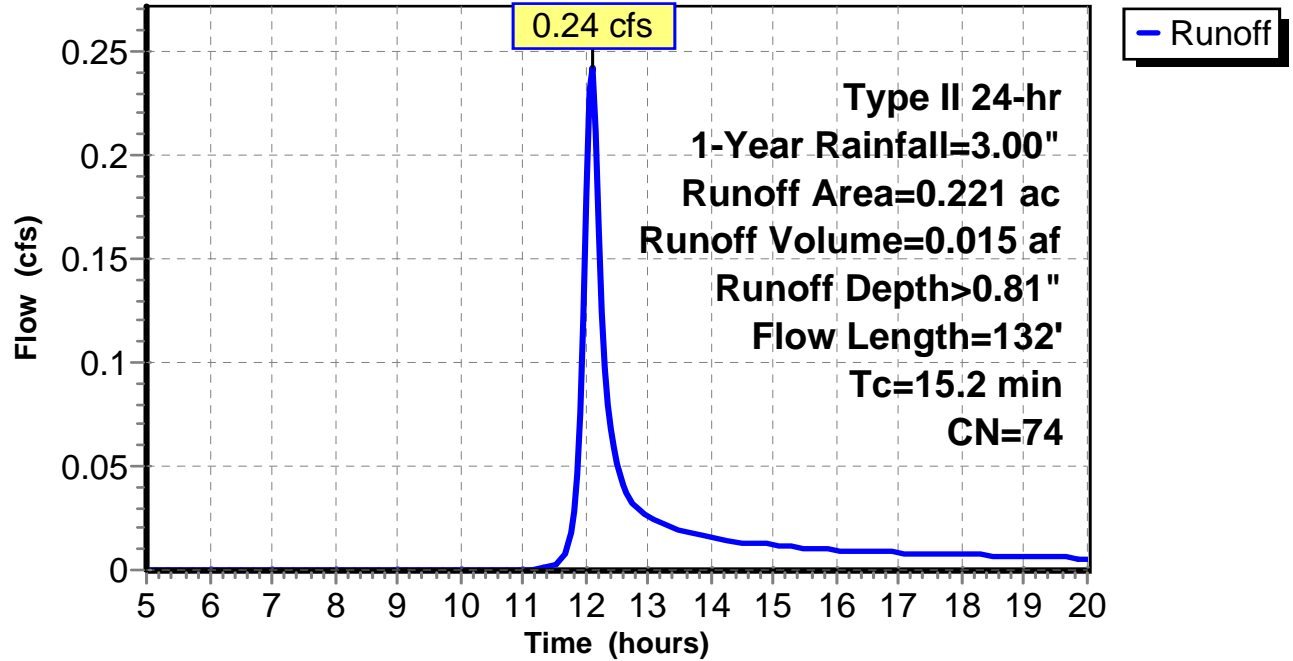
Subcatchment 1: C AR-700.001

Hydrograph



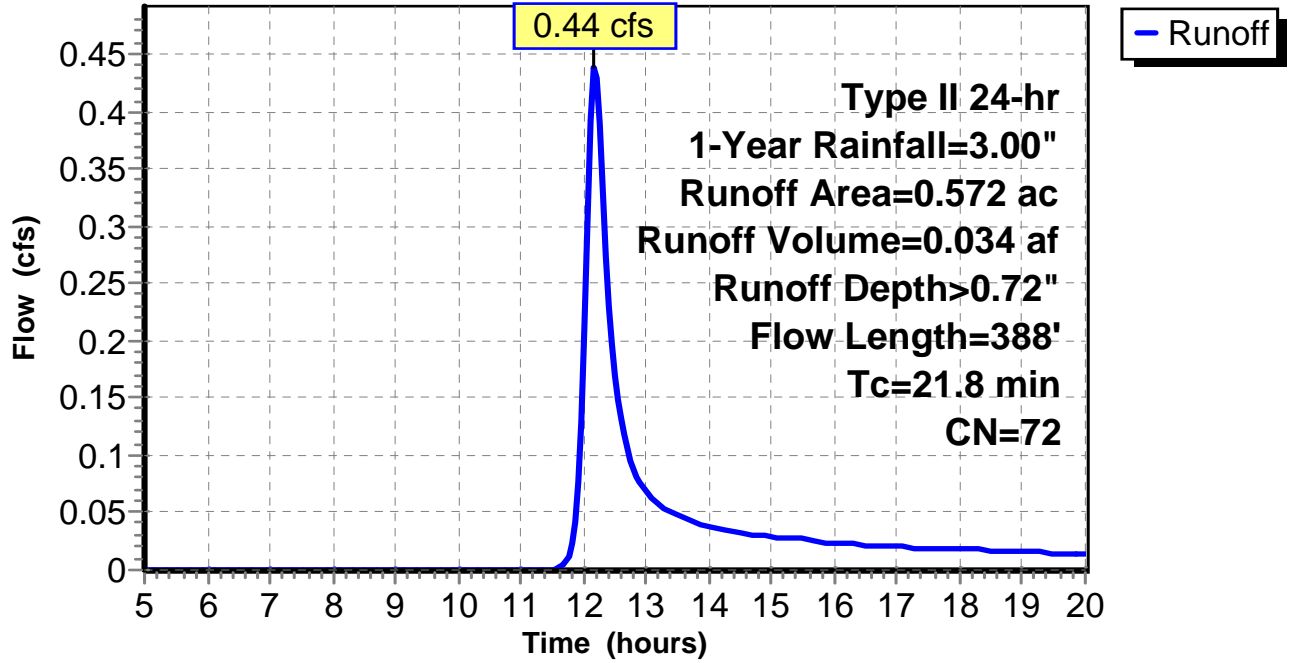
Subcatchment 2: C AR-700.002

Hydrograph



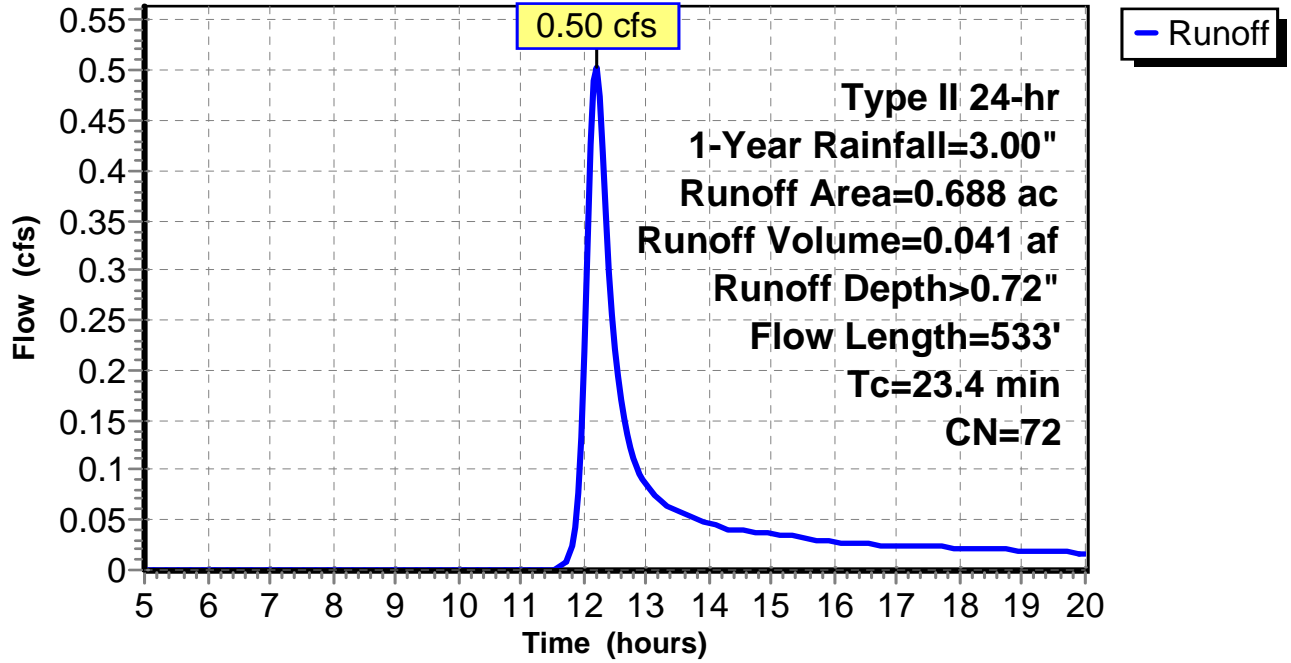
Subcatchment 3: C AR-700.003

Hydrograph



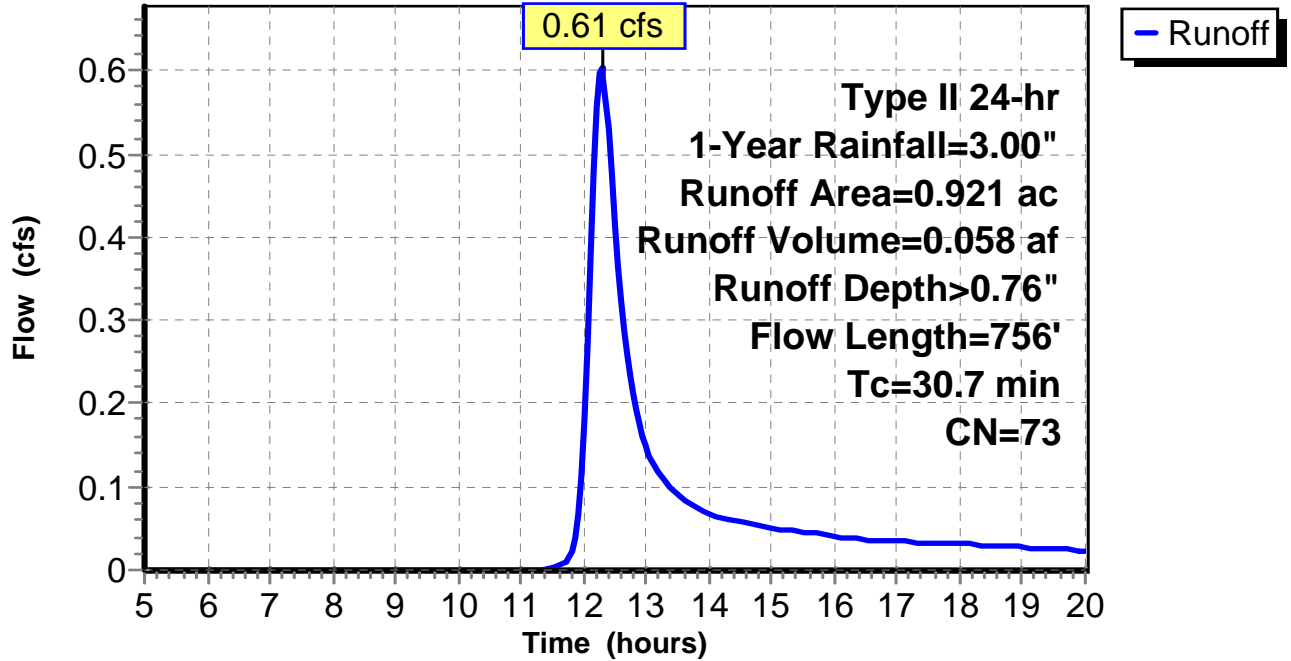
Subcatchment 4: C AR-700.004

Hydrograph



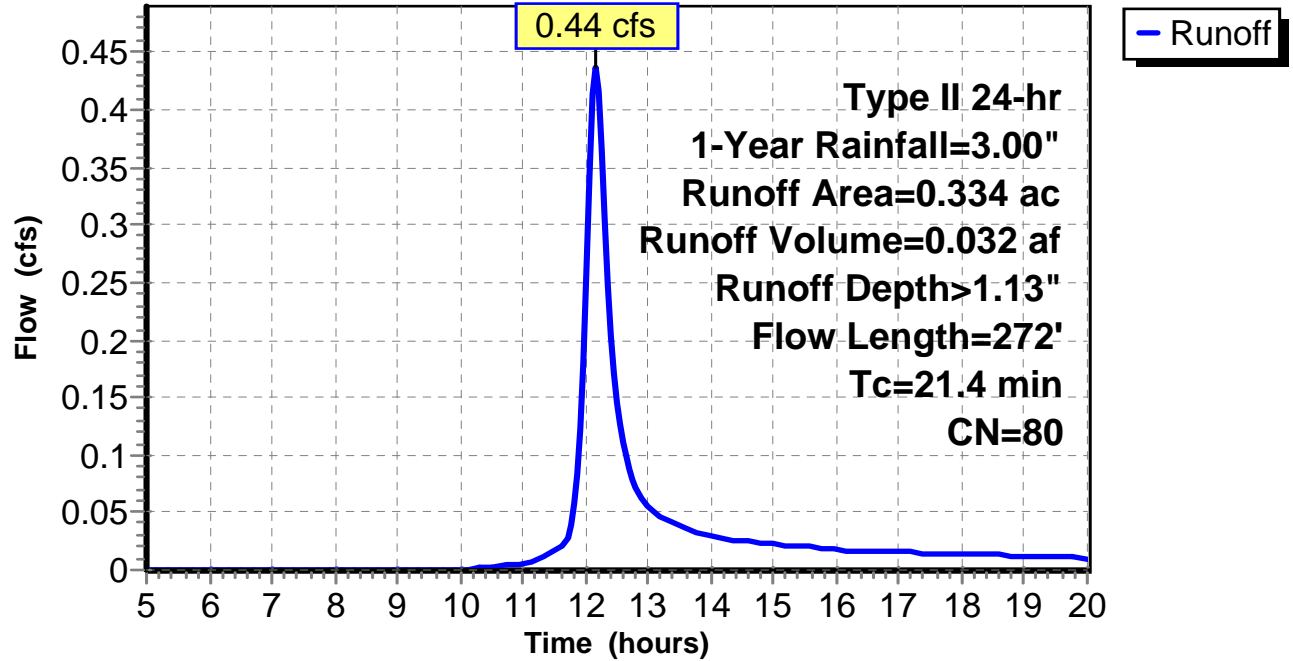
Subcatchment 5: C AR-700.005

Hydrograph



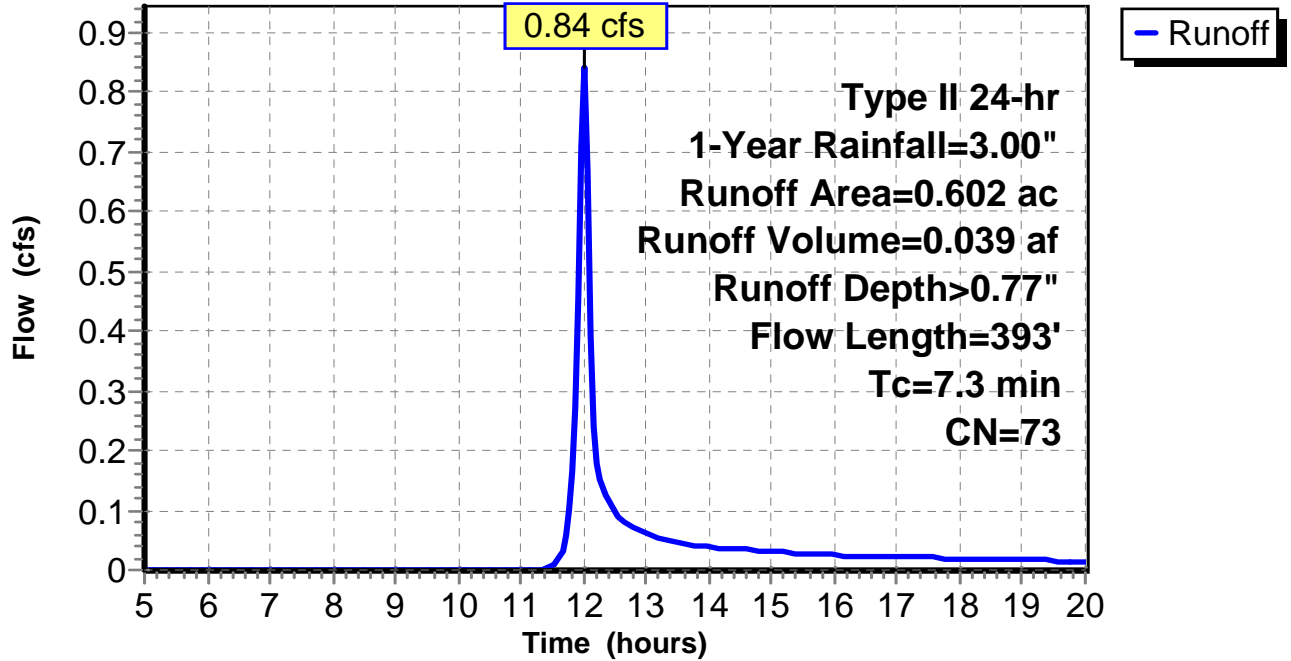
Subcatchment 6: C AR-700.006

Hydrograph



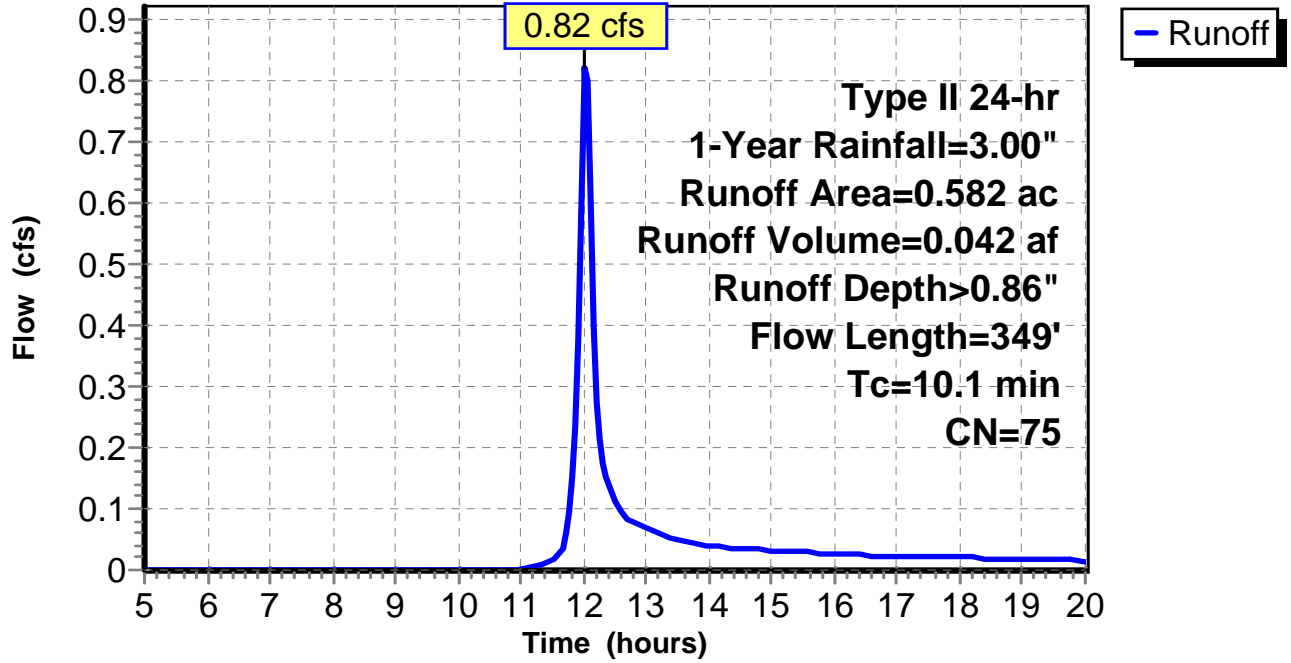
Subcatchment 7: C AR-700.008

Hydrograph



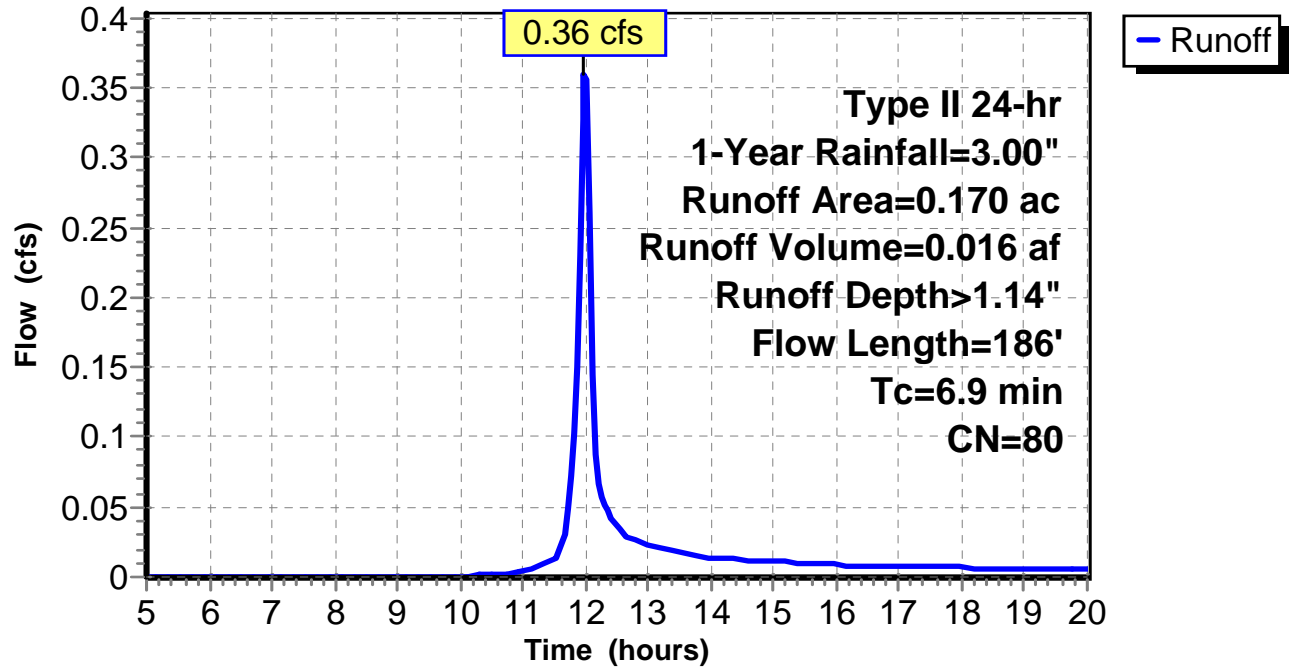
Subcatchment 8: C AR-700.009

Hydrograph



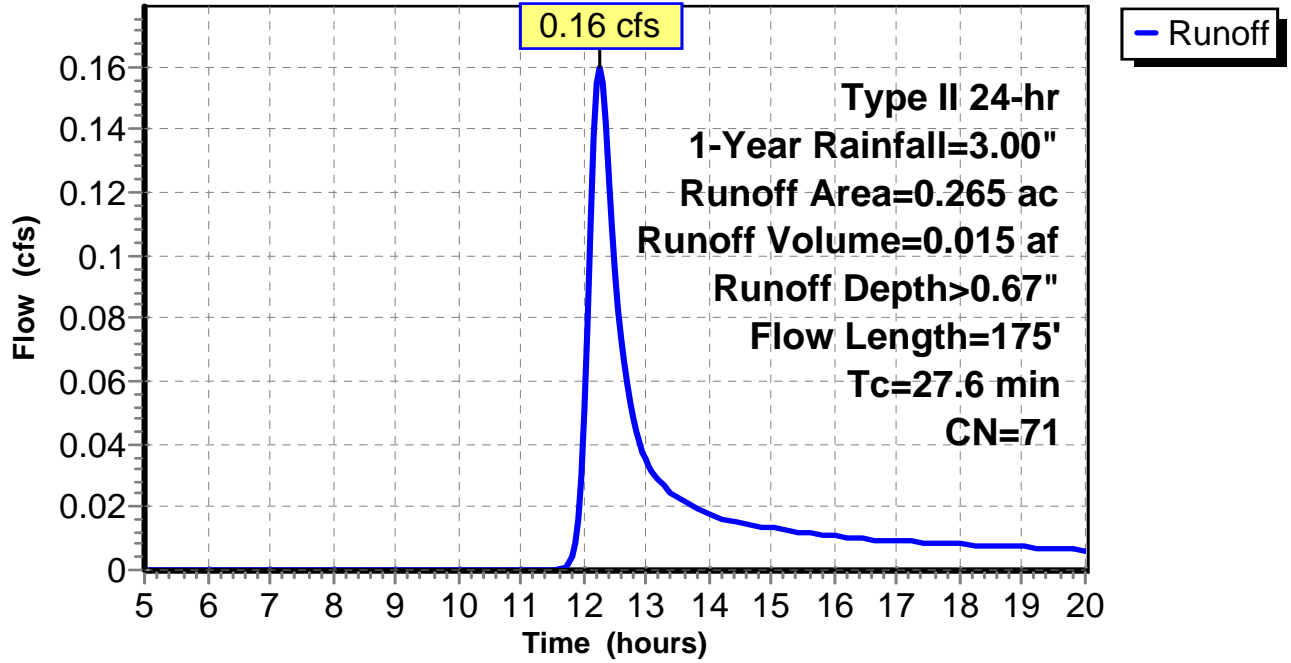
Subcatchment 9: C AR-700.010

Hydrograph



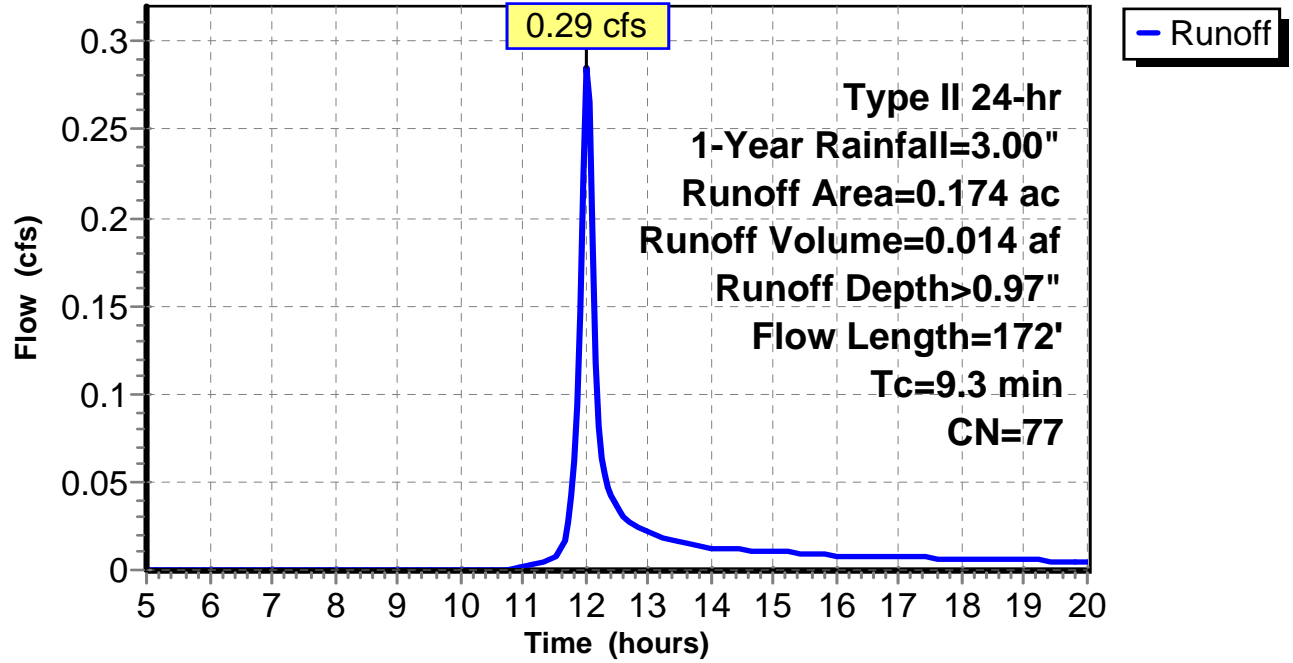
Subcatchment 10: C 249.012

Hydrograph



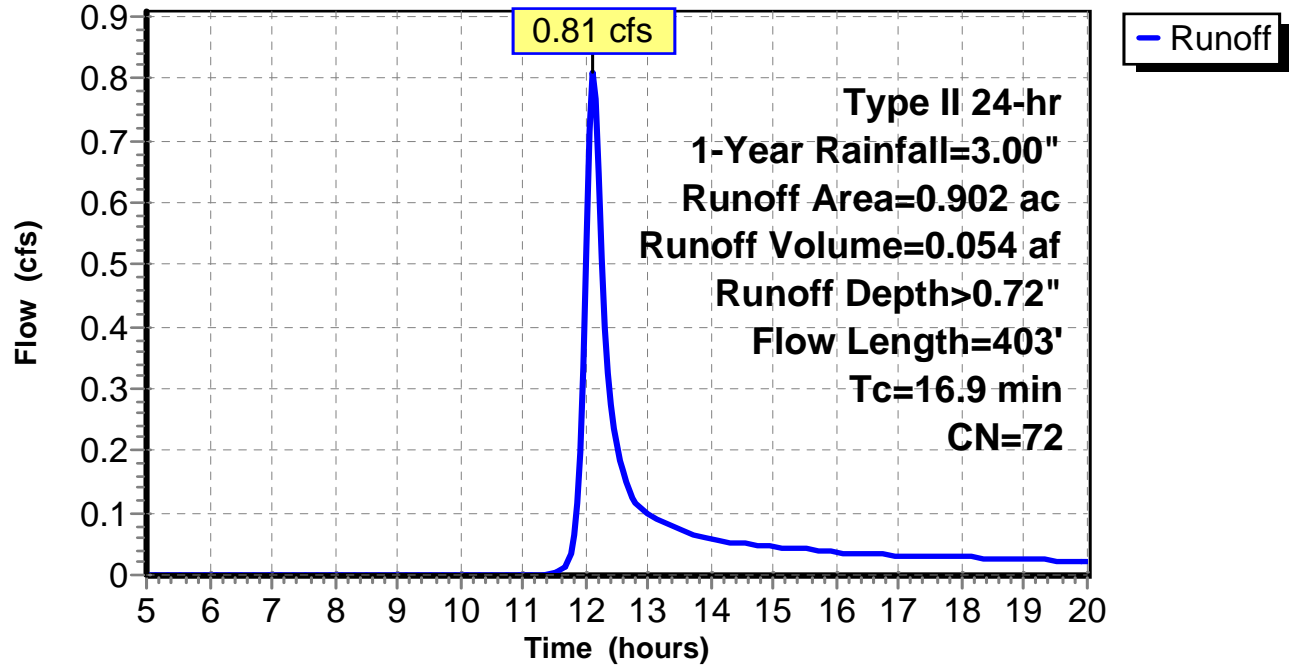
Subcatchment 11: C 249.013

Hydrograph



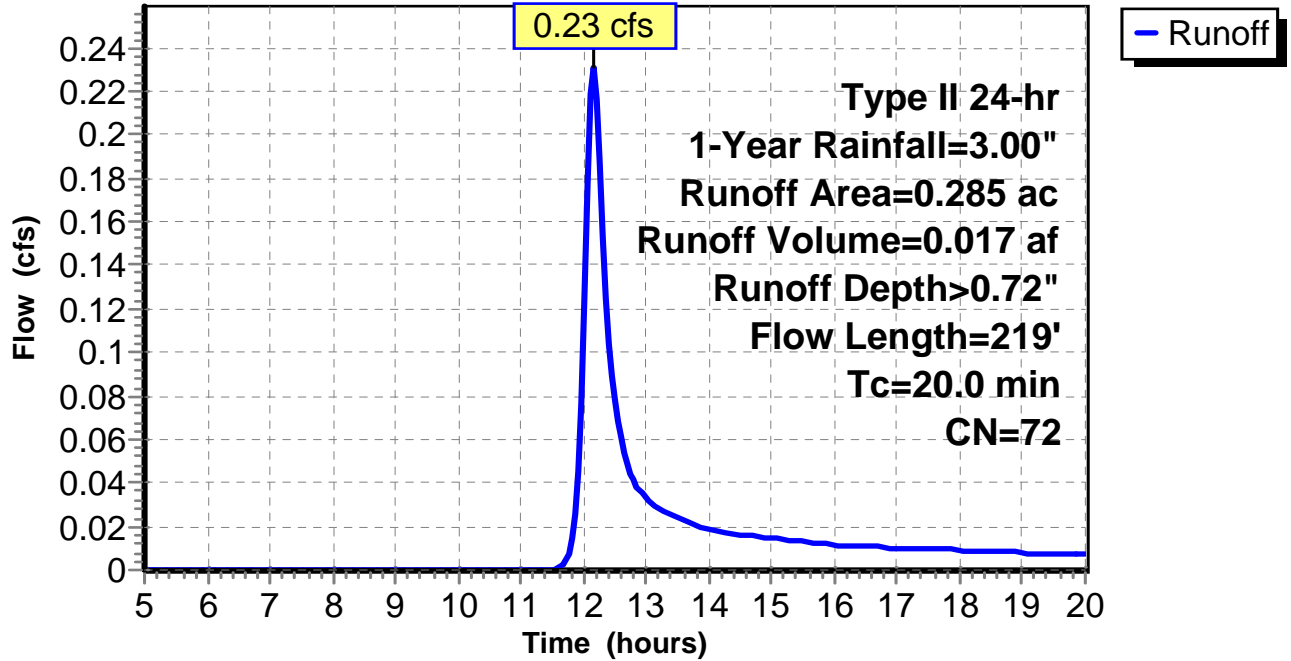
Subcatchment 12: C 249.014

Hydrograph



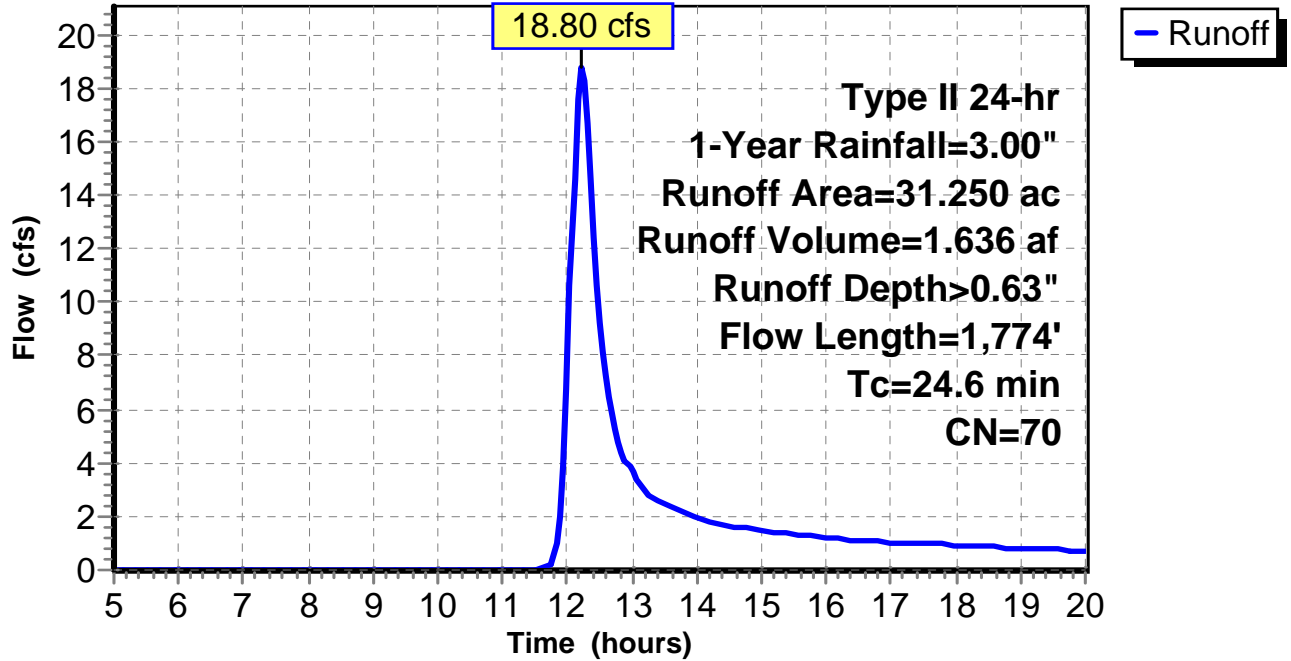
Subcatchment 13: C 249.015

Hydrograph



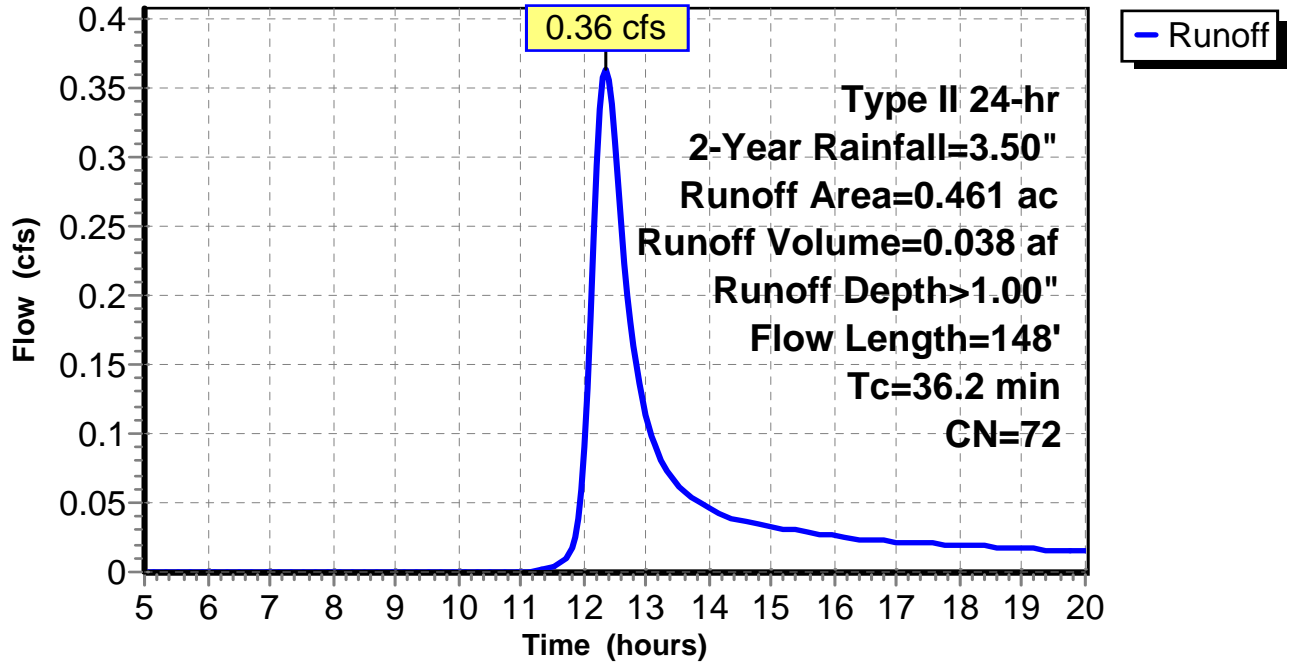
Subcatchment 14: C 249.016

Hydrograph



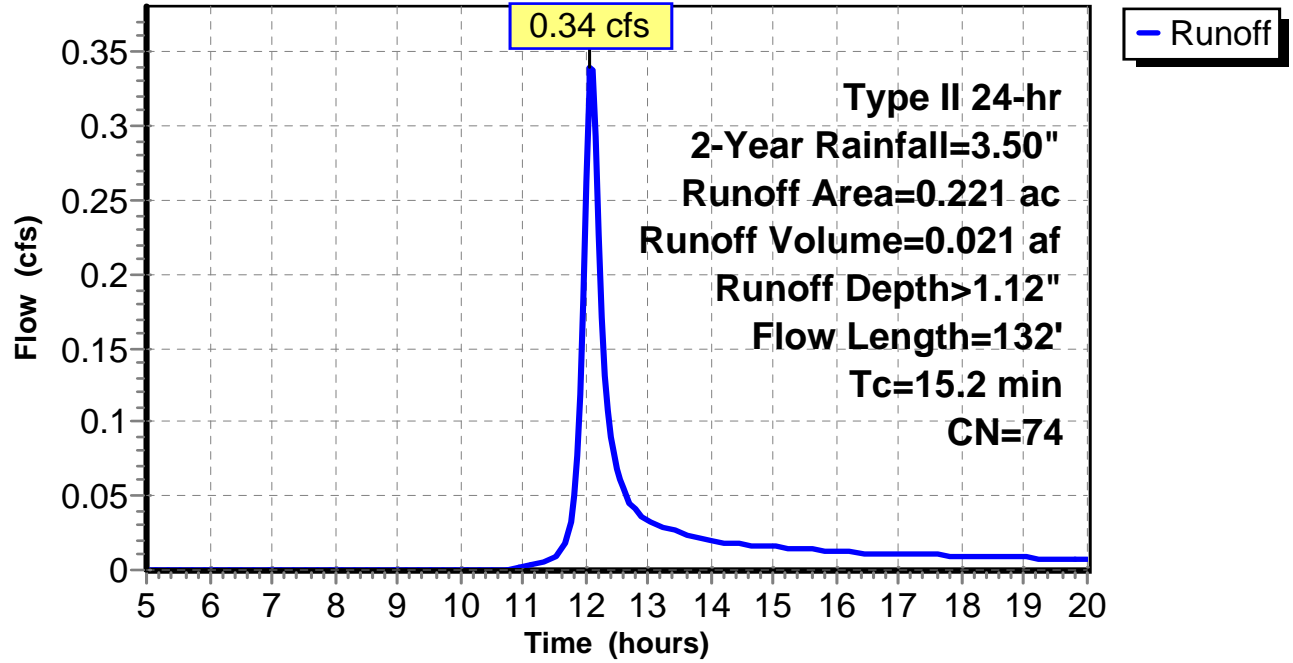
Subcatchment 1: C AR-700.001

Hydrograph



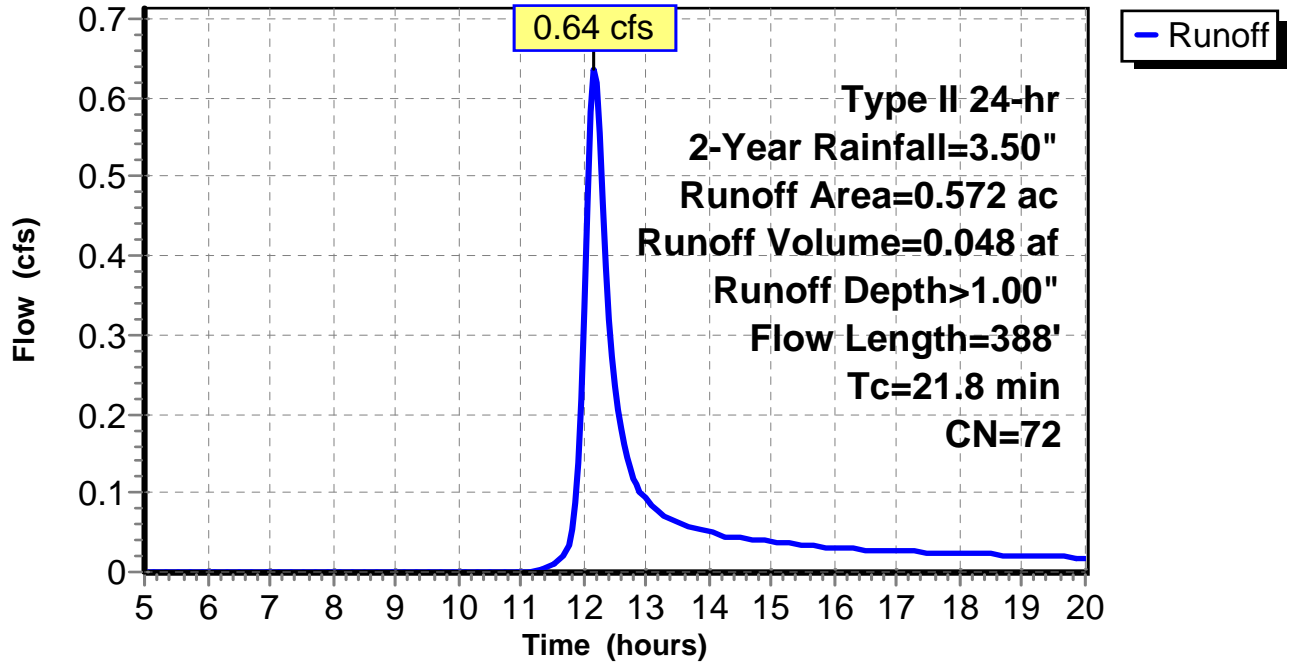
Subcatchment 2: C AR-700.002

Hydrograph



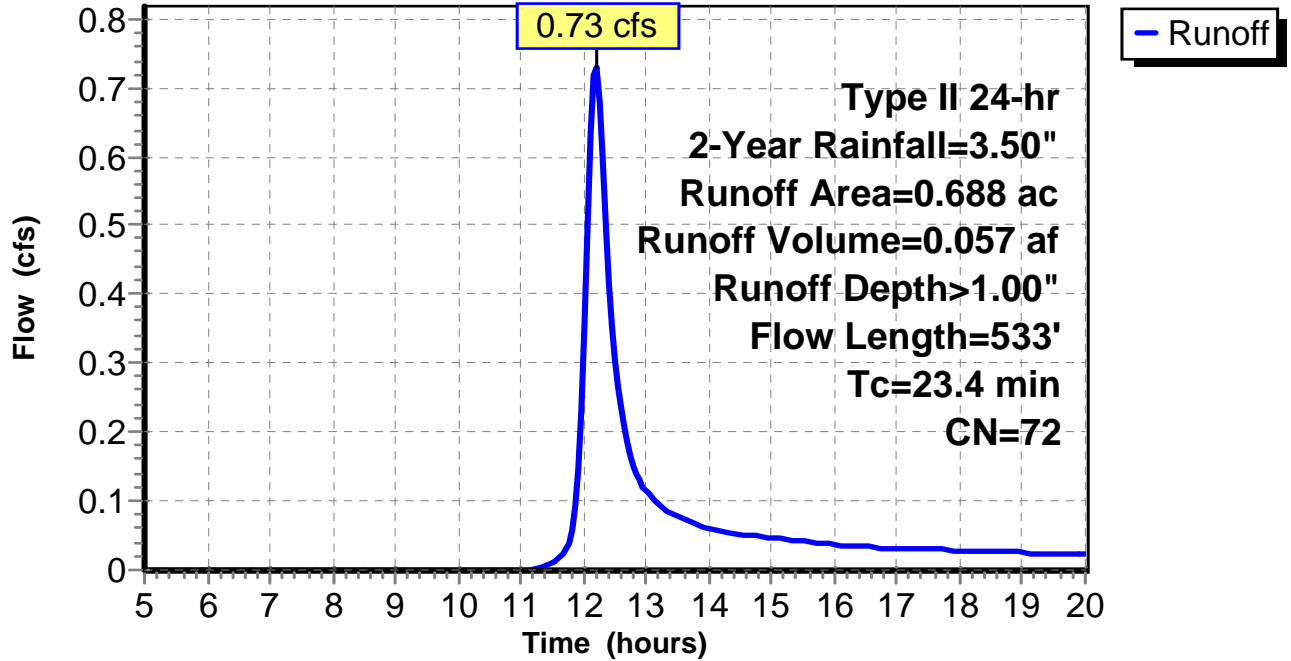
Subcatchment 3: C AR-700.003

Hydrograph



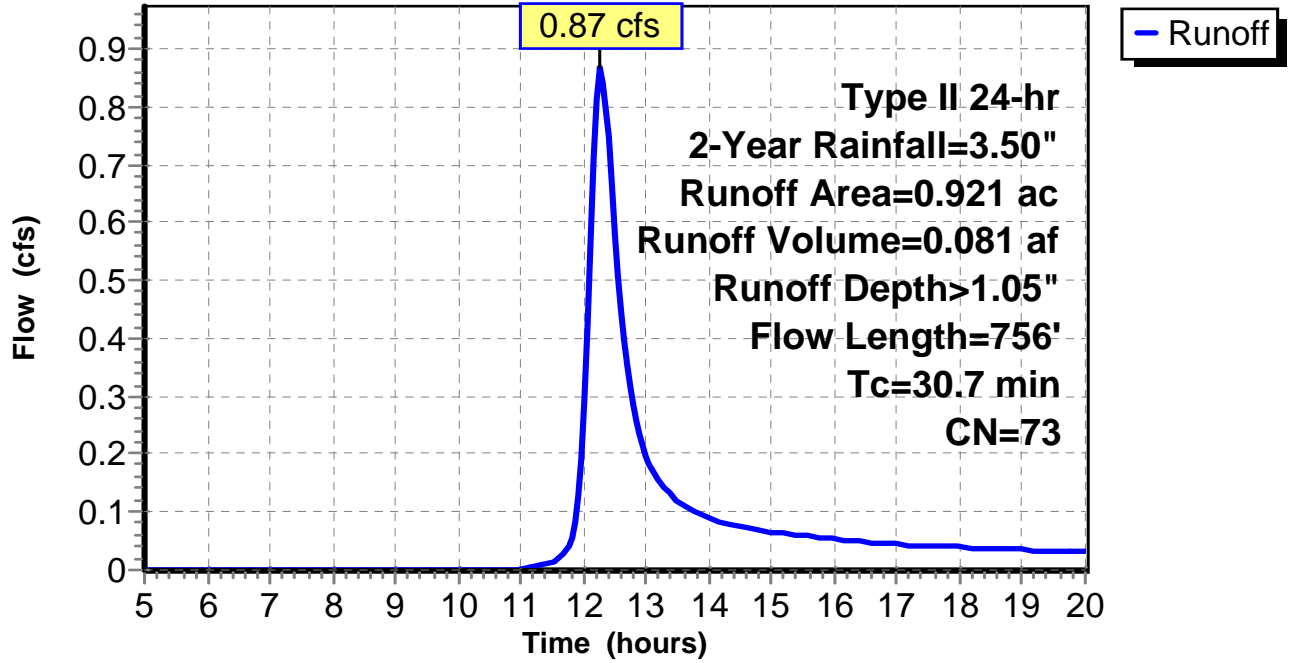
Subcatchment 4: C AR-700.004

Hydrograph



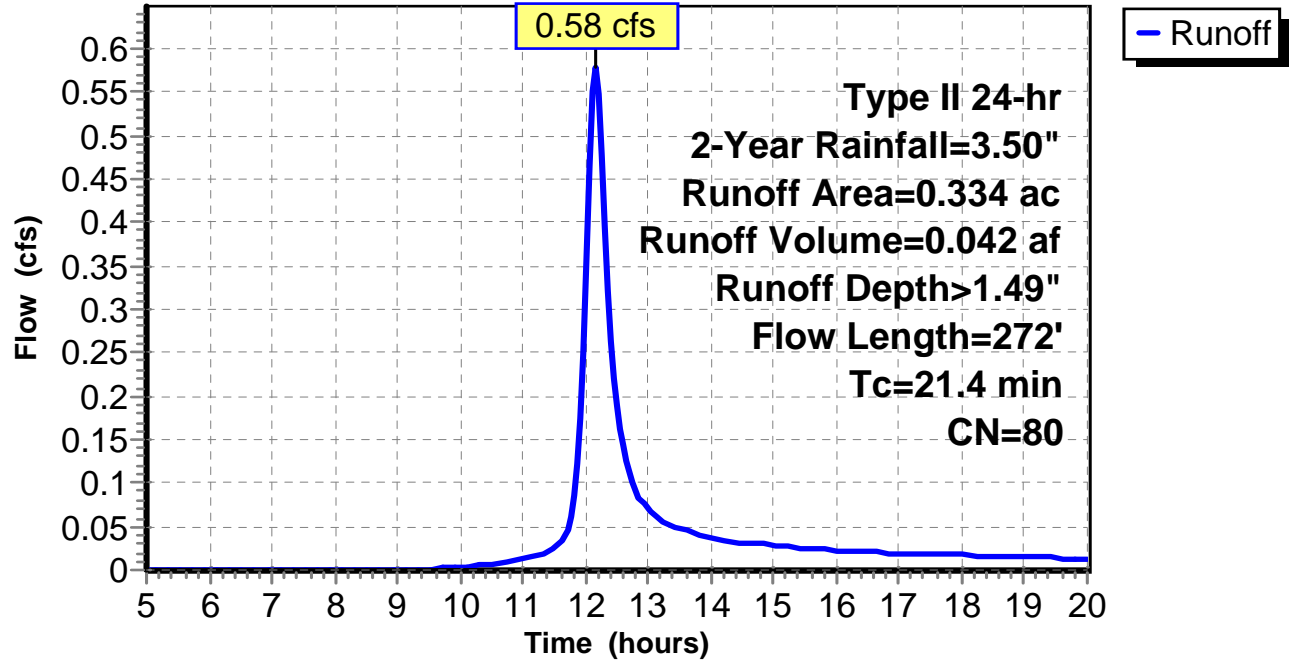
Subcatchment 5: C AR-700.005

Hydrograph



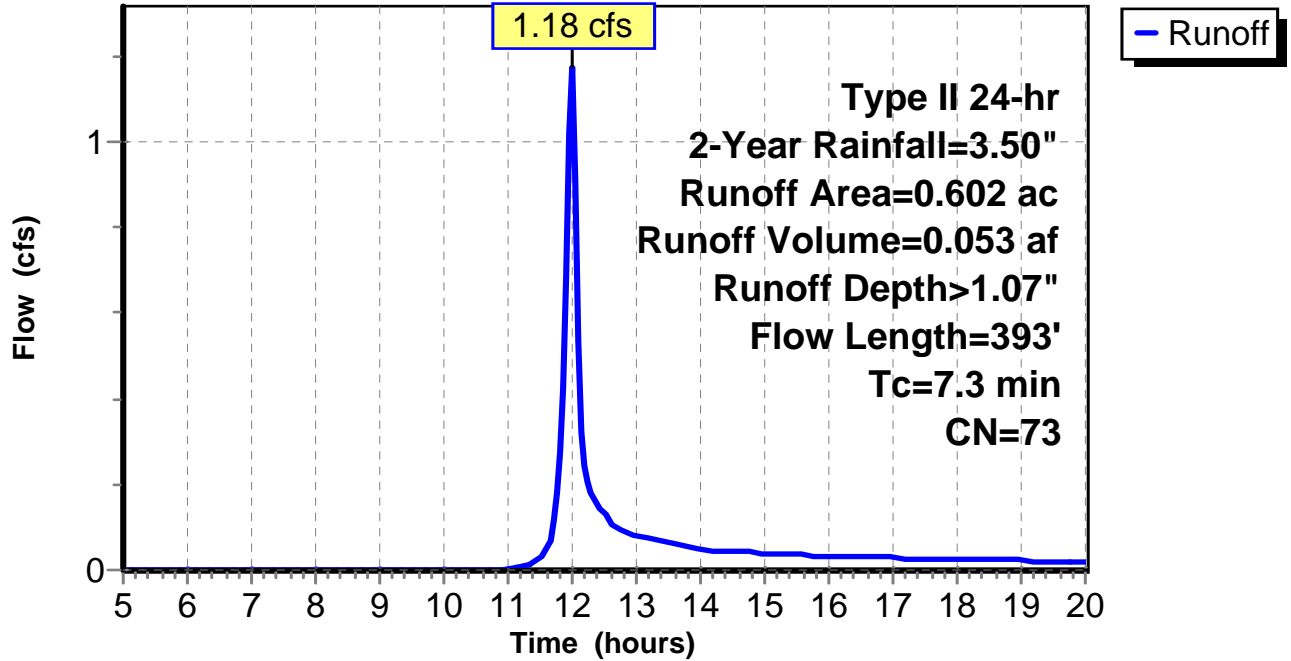
Subcatchment 6: C AR-700.006

Hydrograph



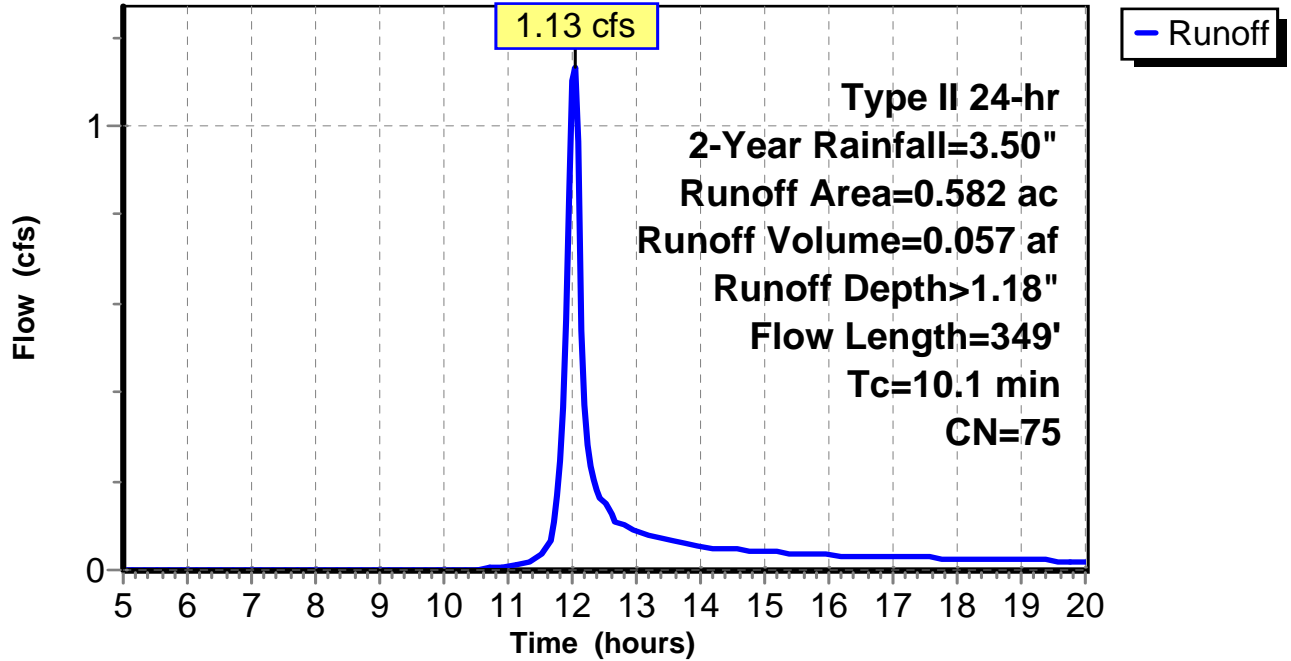
Subcatchment 7: C AR-700.008

Hydrograph



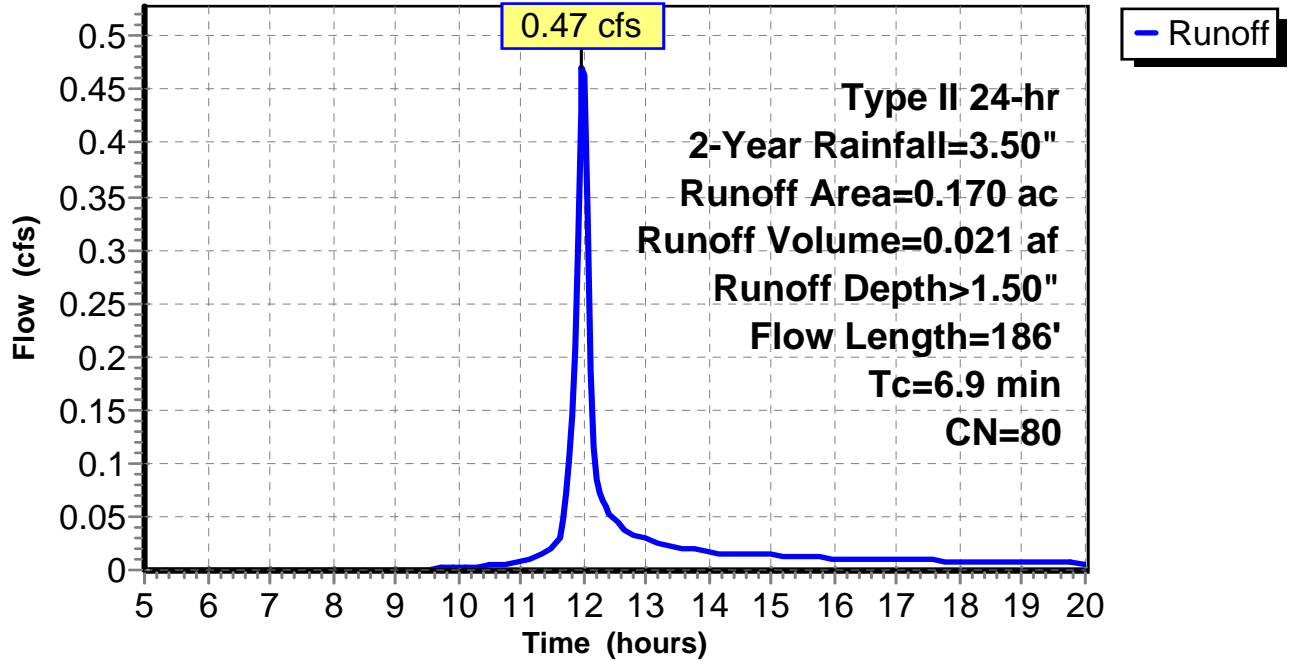
Subcatchment 8: C AR-700.009

Hydrograph



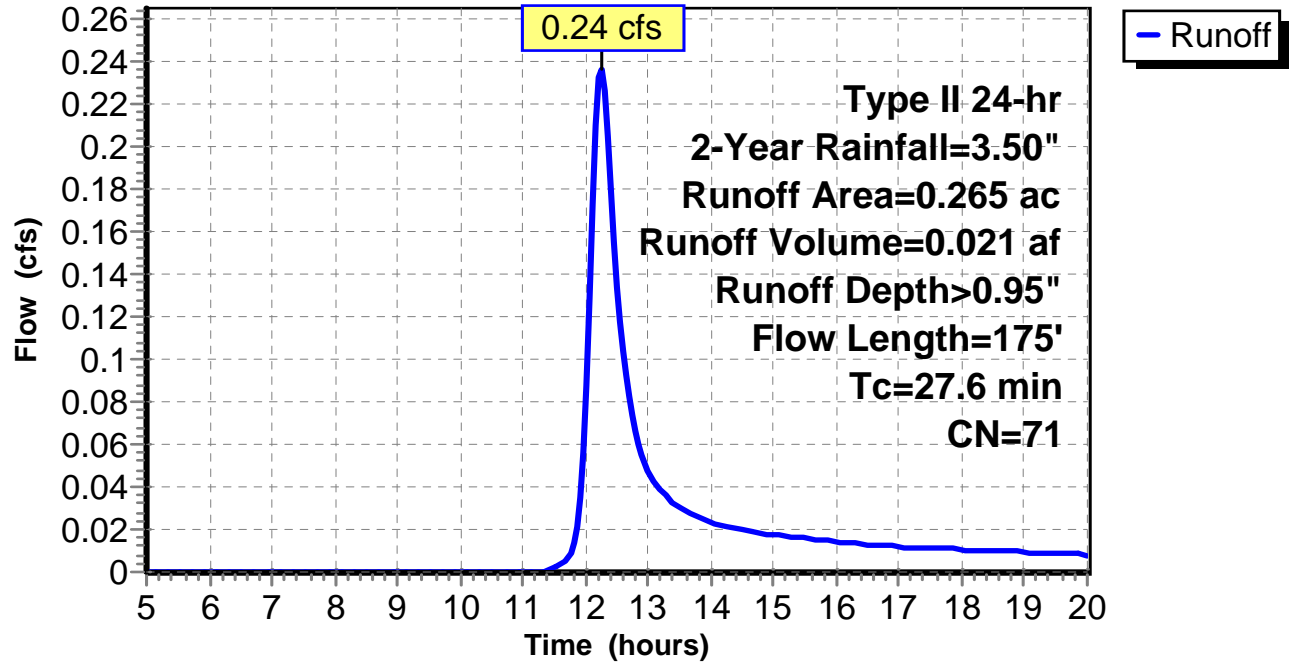
Subcatchment 9: C AR-700.010

Hydrograph



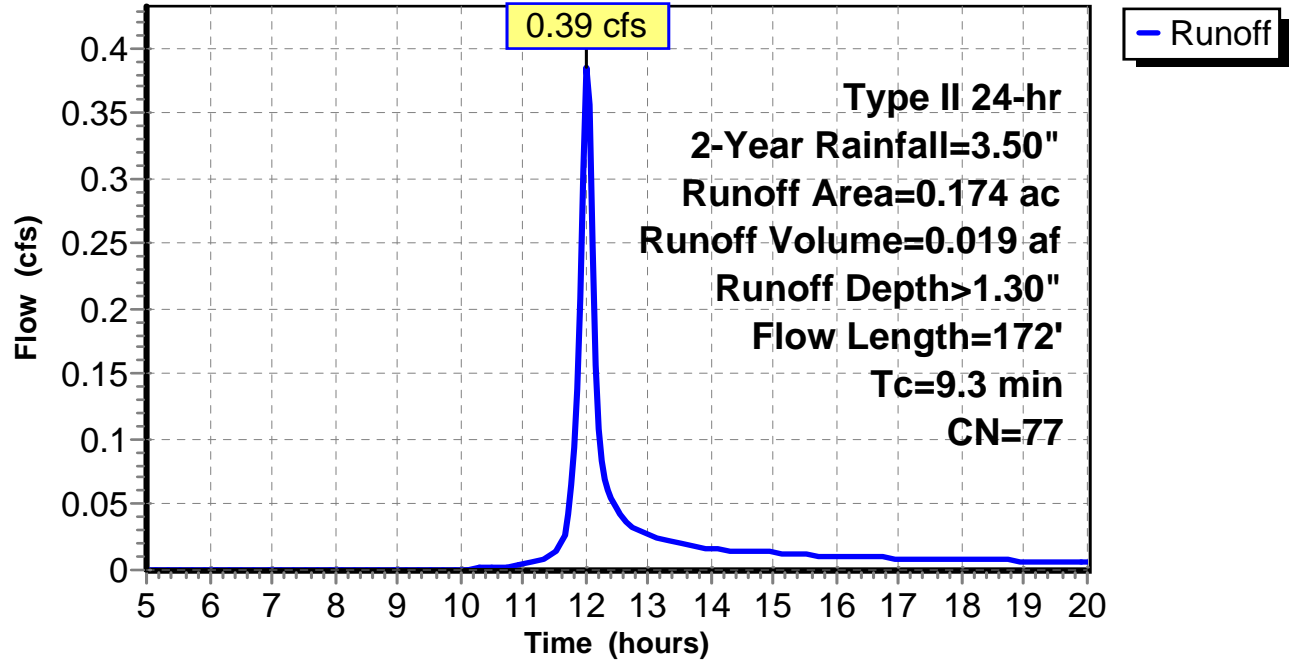
Subcatchment 10: C 249.012

Hydrograph



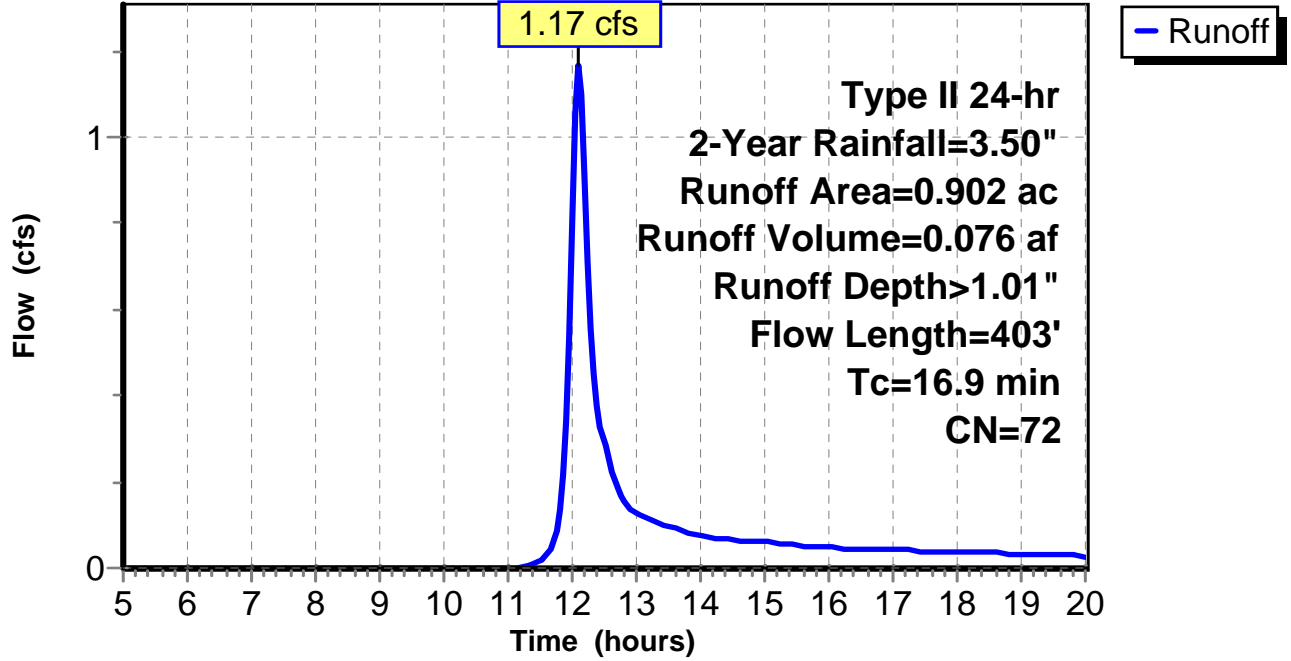
Subcatchment 11: C 249.013

Hydrograph



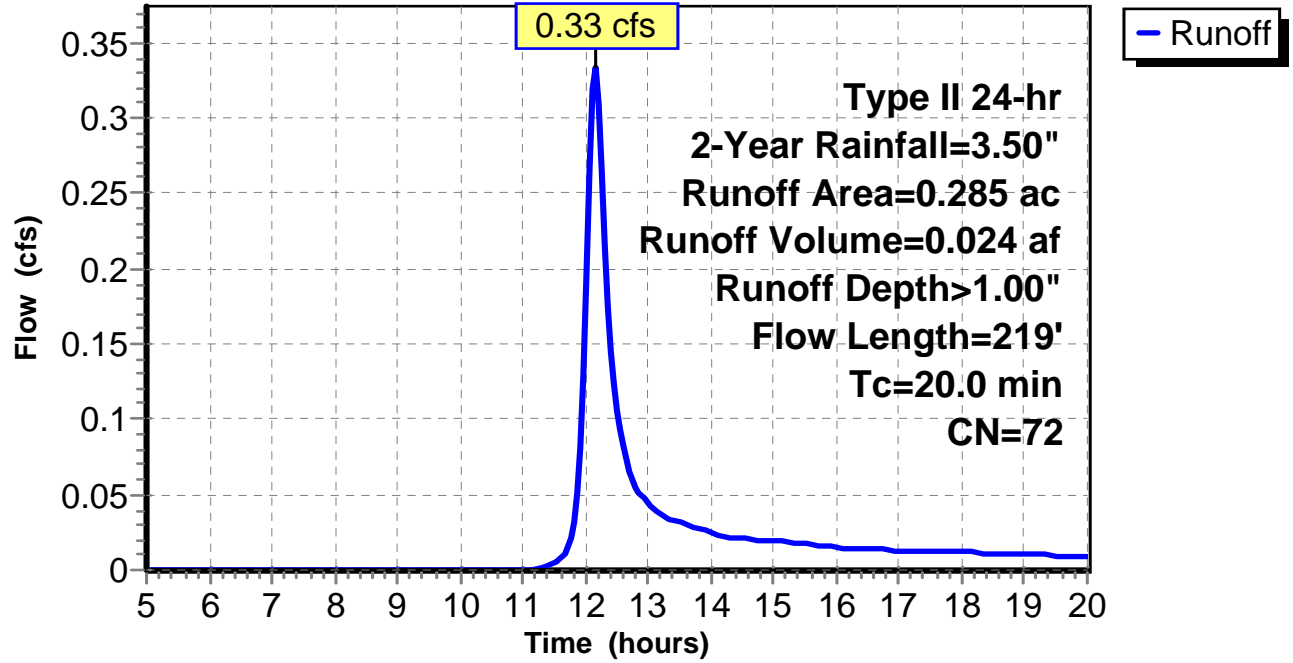
Subcatchment 12: C 249.014

Hydrograph



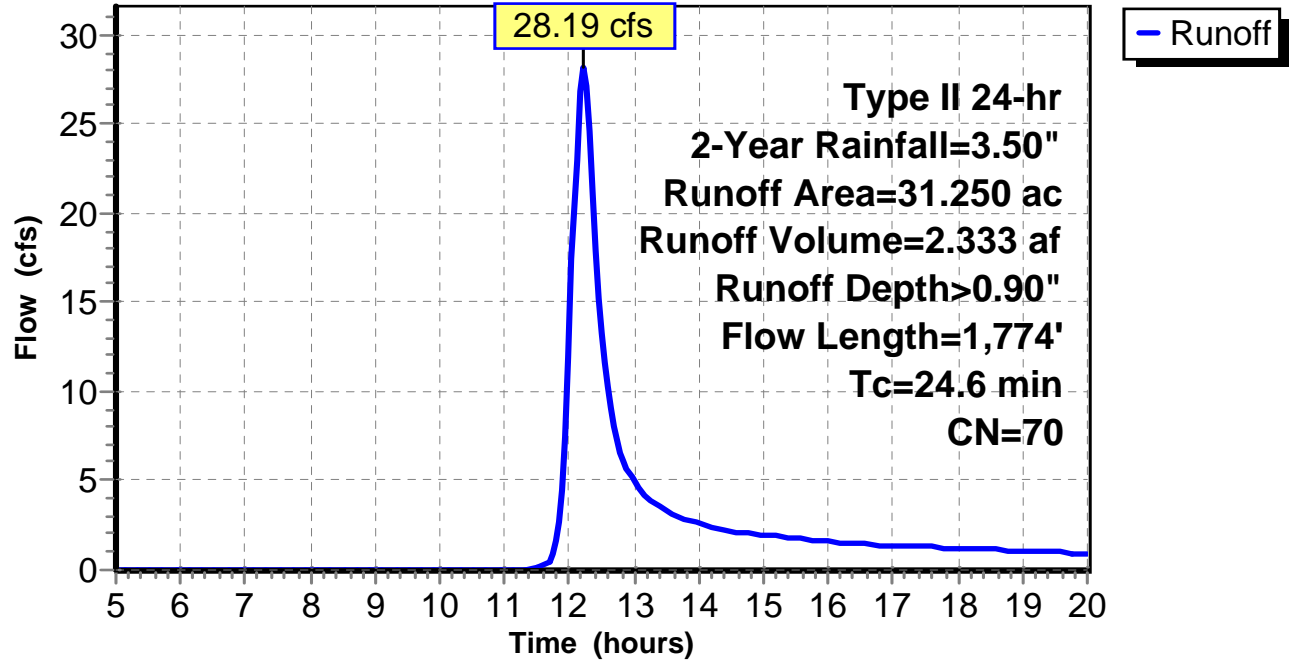
Subcatchment 13: C 249.015

Hydrograph



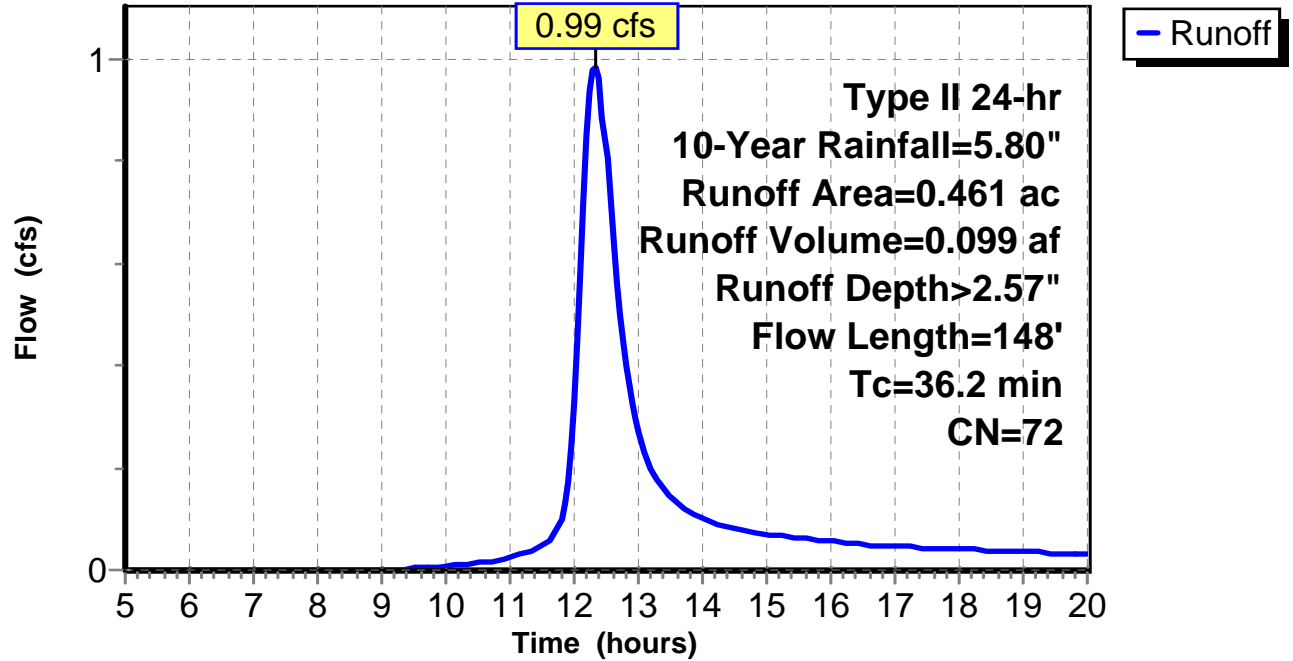
Subcatchment 14: C 249.016

Hydrograph



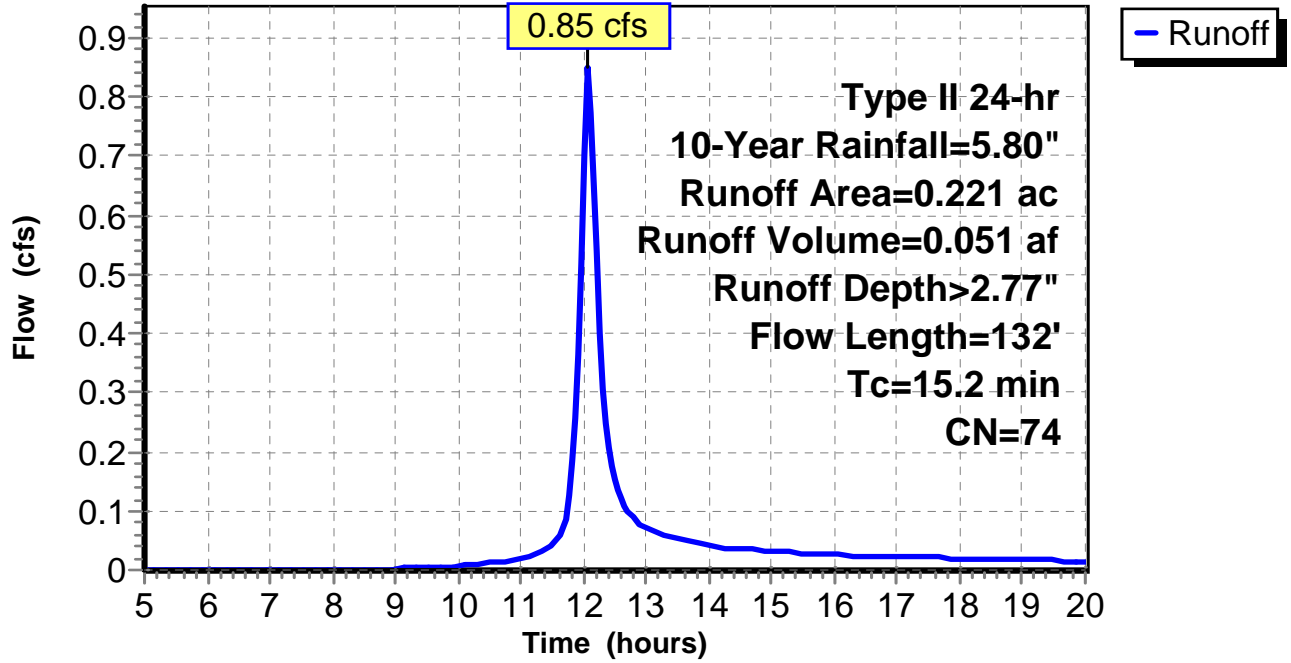
Subcatchment 1: C AR-700.001

Hydrograph



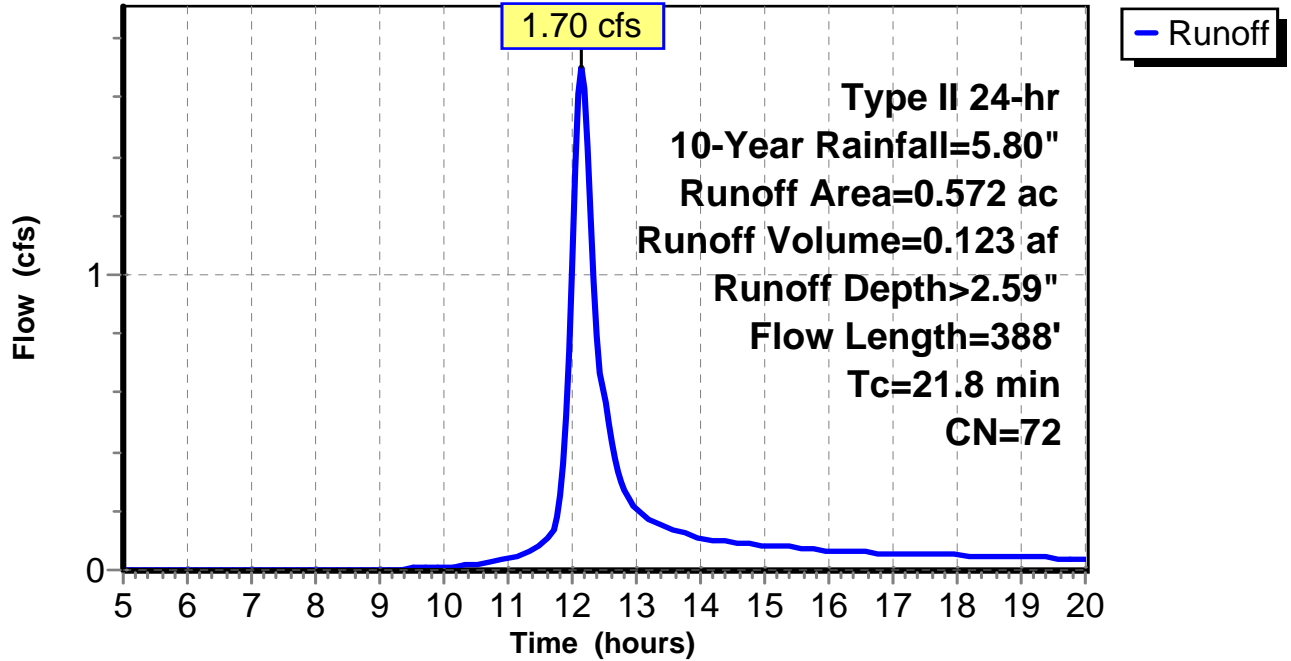
Subcatchment 2: C AR-700.002

Hydrograph



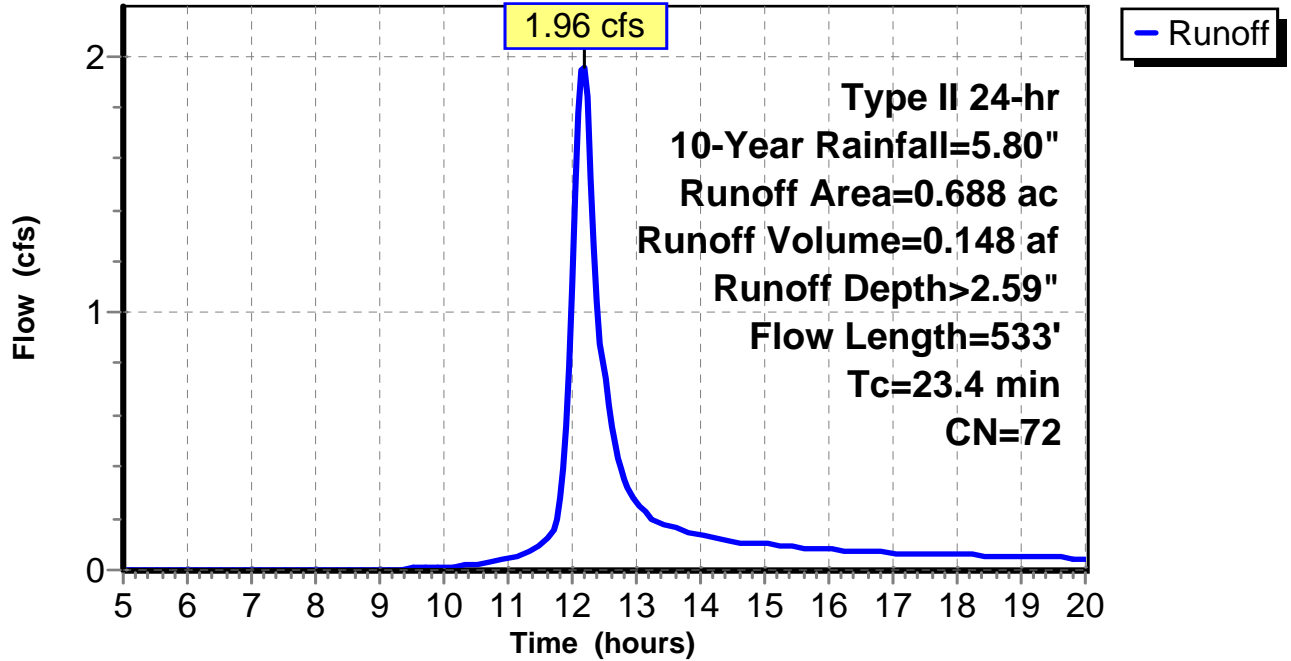
Subcatchment 3: C AR-700.003

Hydrograph



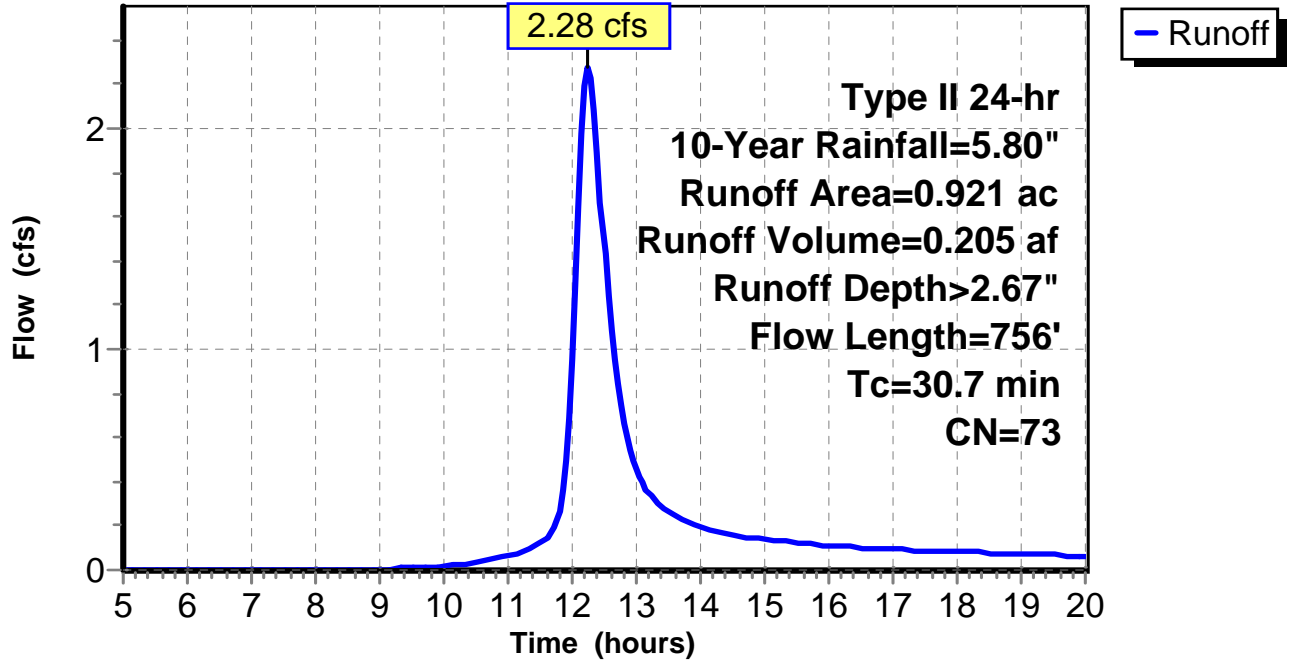
Subcatchment 4: C AR-700.004

Hydrograph



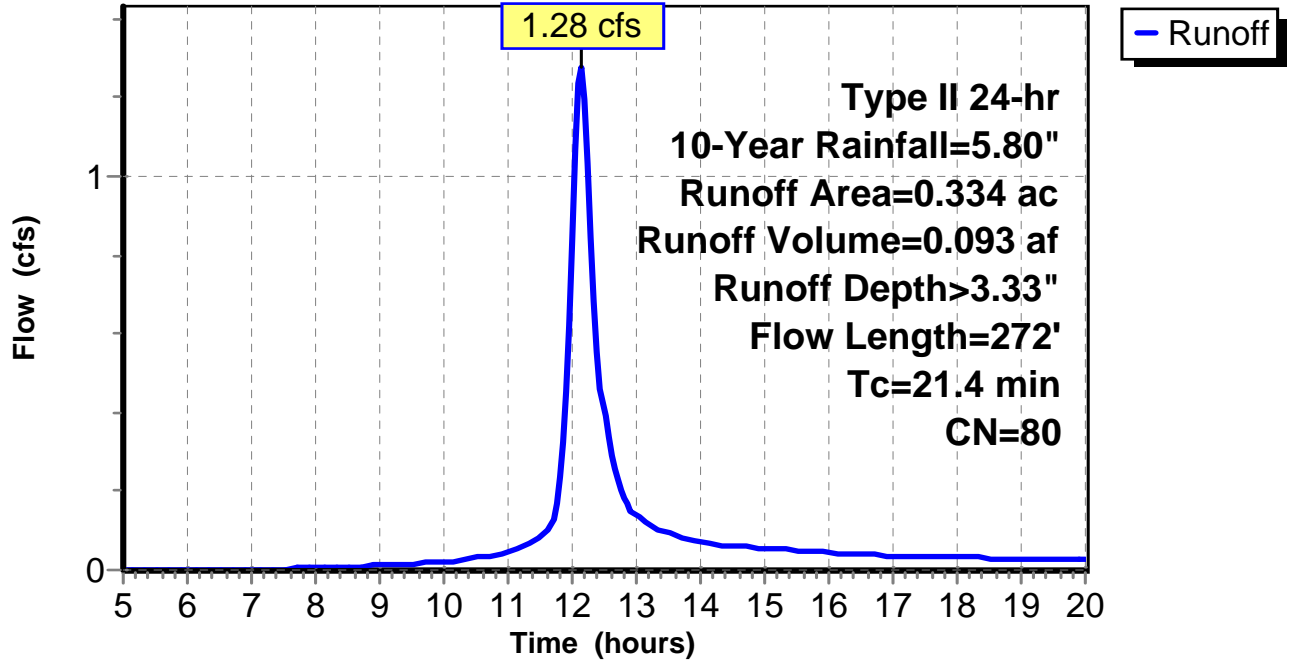
Subcatchment 5: C AR-700.005

Hydrograph



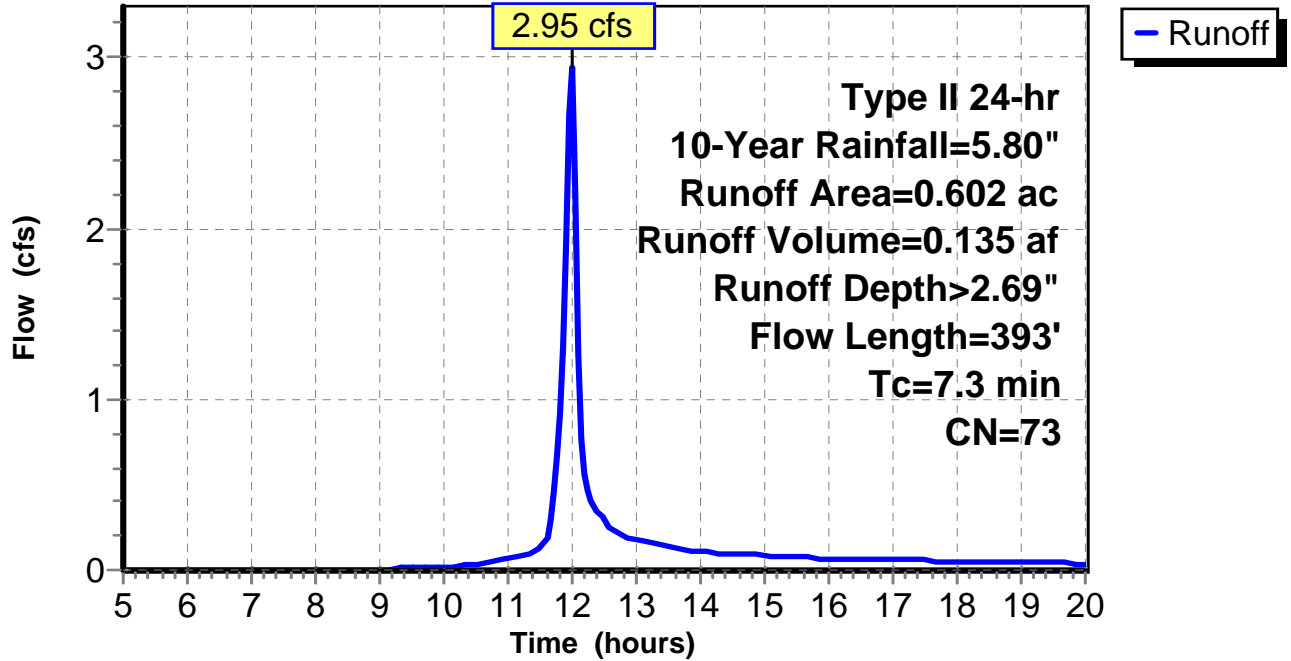
Subcatchment 6: C AR-700.006

Hydrograph



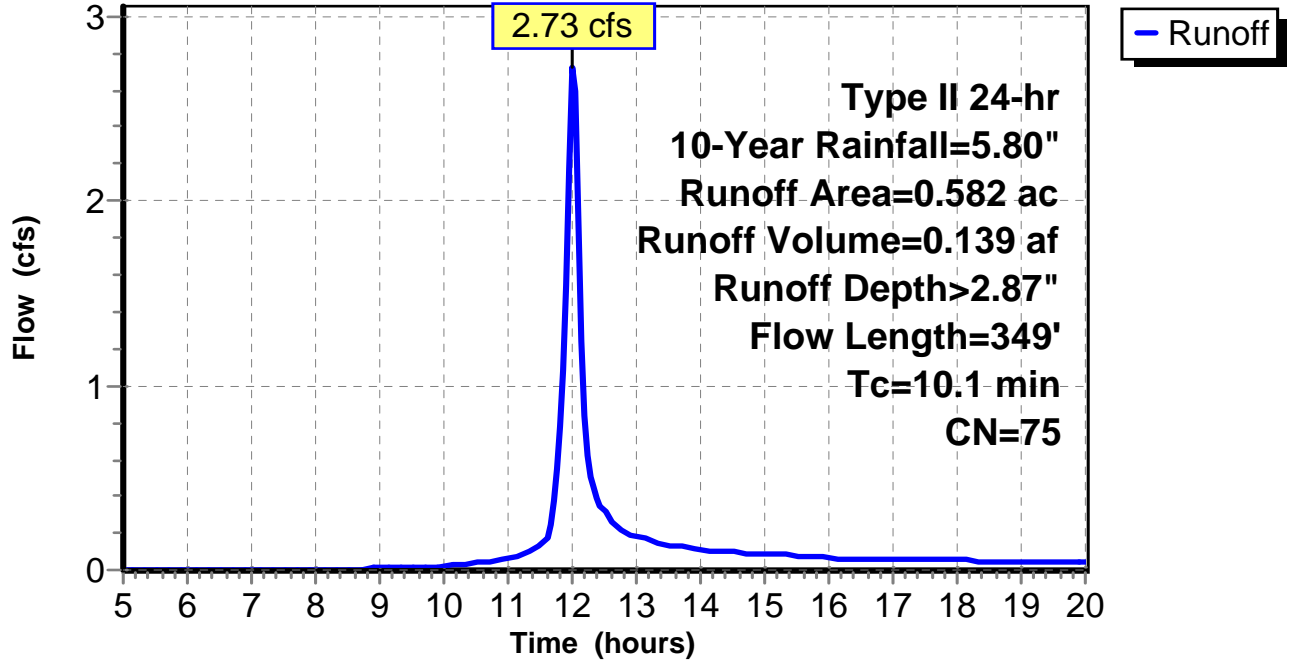
Subcatchment 7: C AR-700.008

Hydrograph



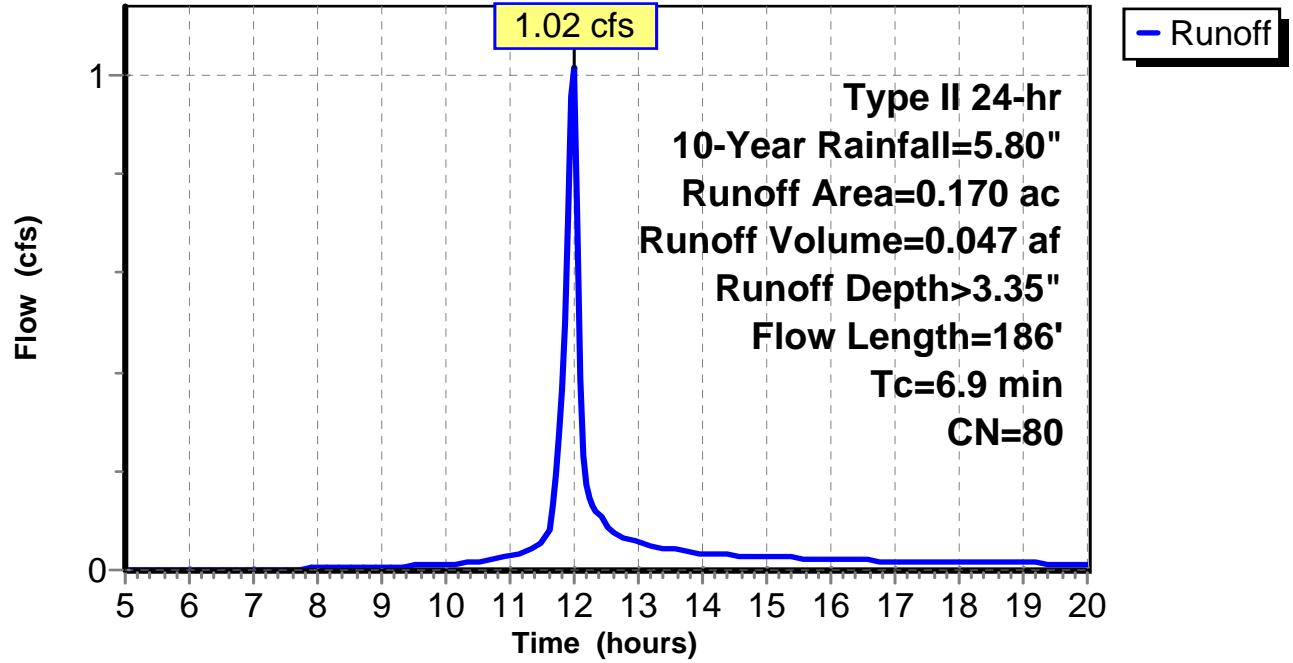
Subcatchment 8: C AR-700.009

Hydrograph



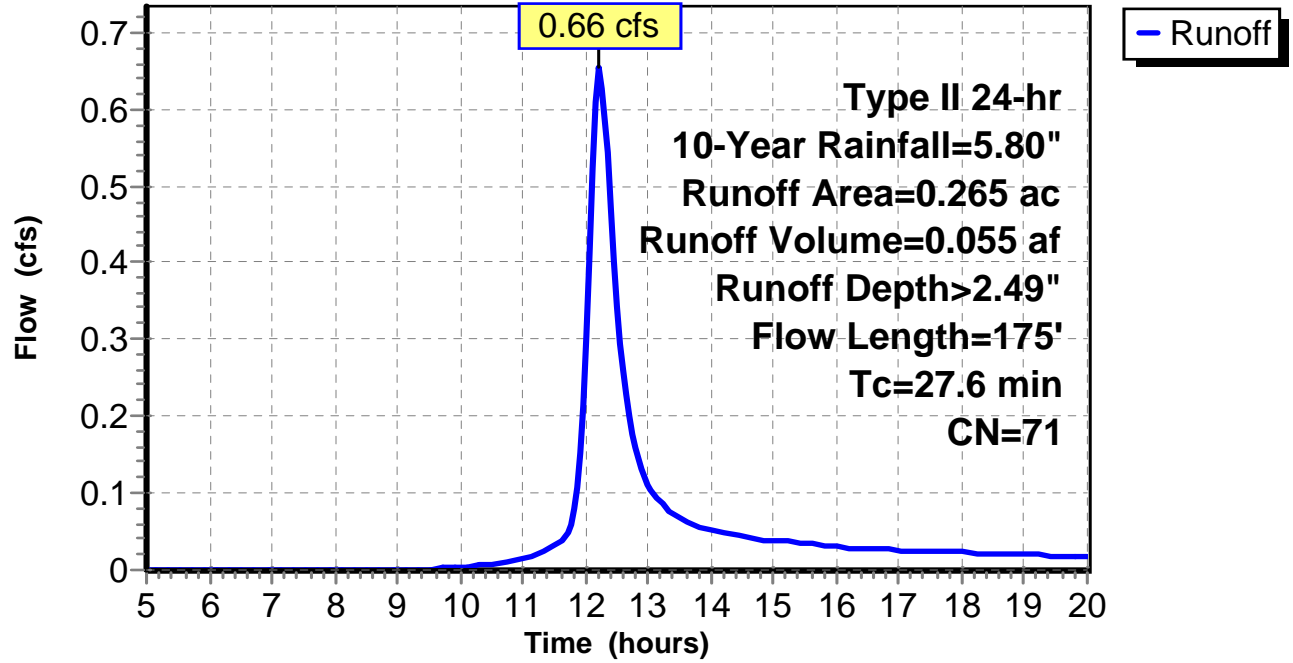
Subcatchment 9: C AR-700.010

Hydrograph



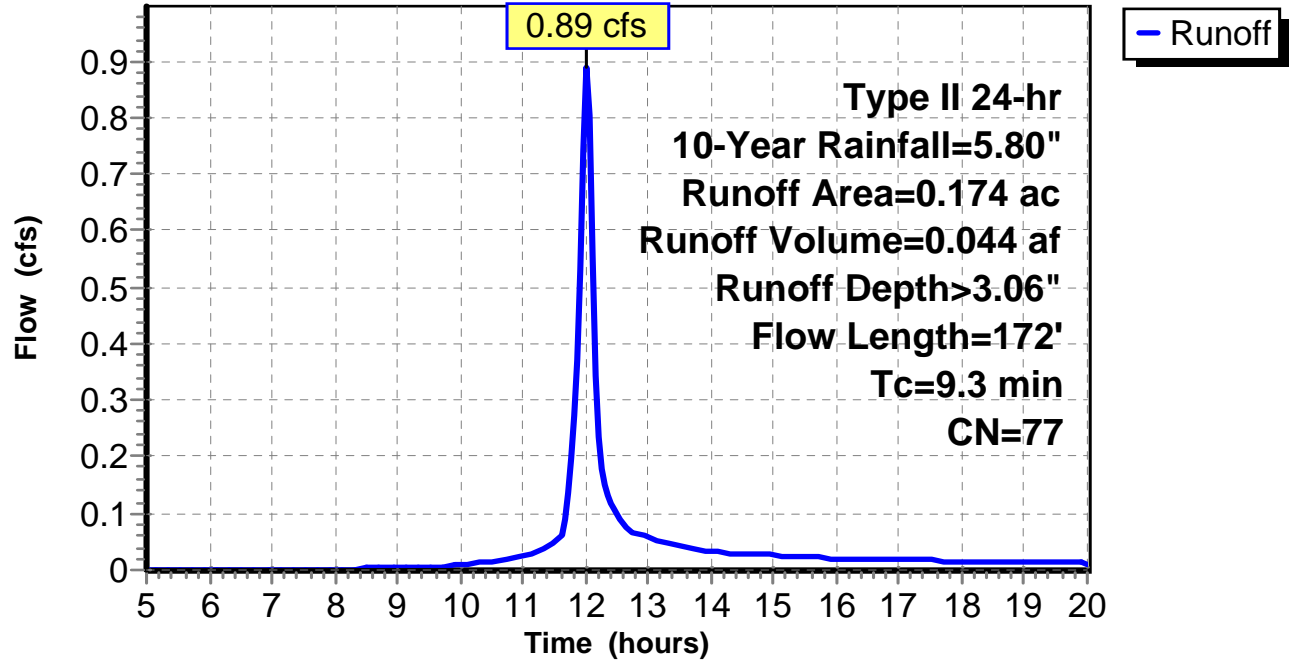
Subcatchment 10: C 249.012

Hydrograph



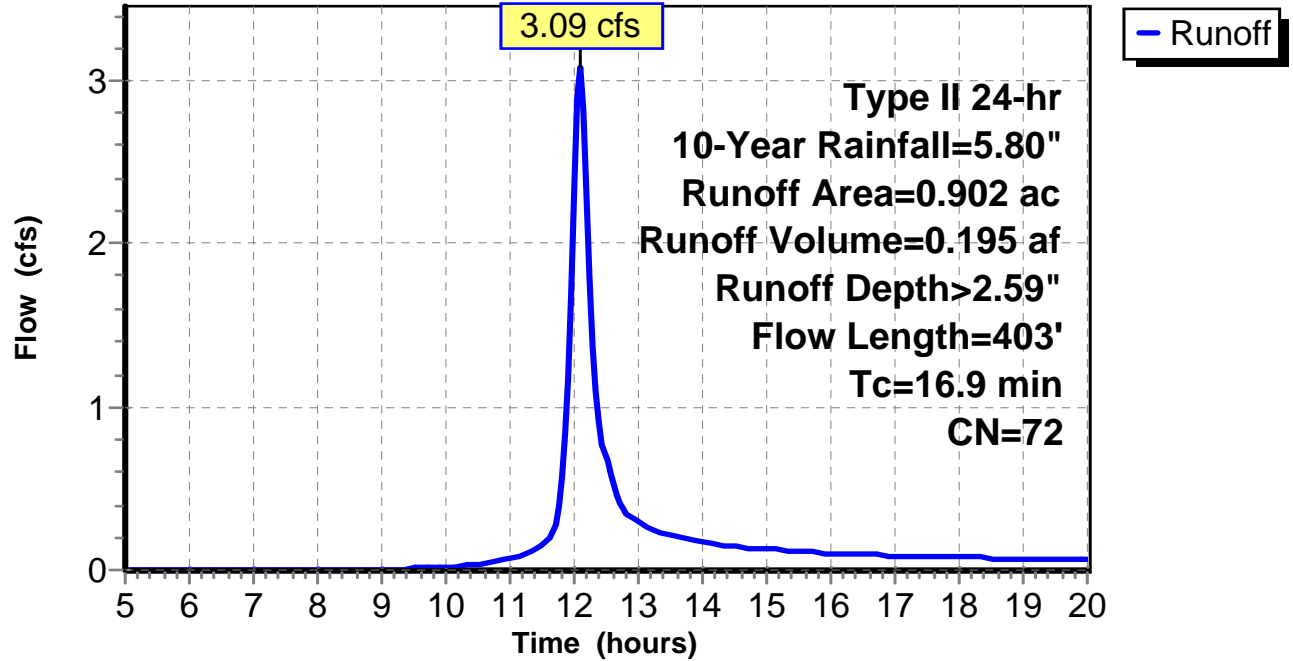
Subcatchment 11: C 249.013

Hydrograph



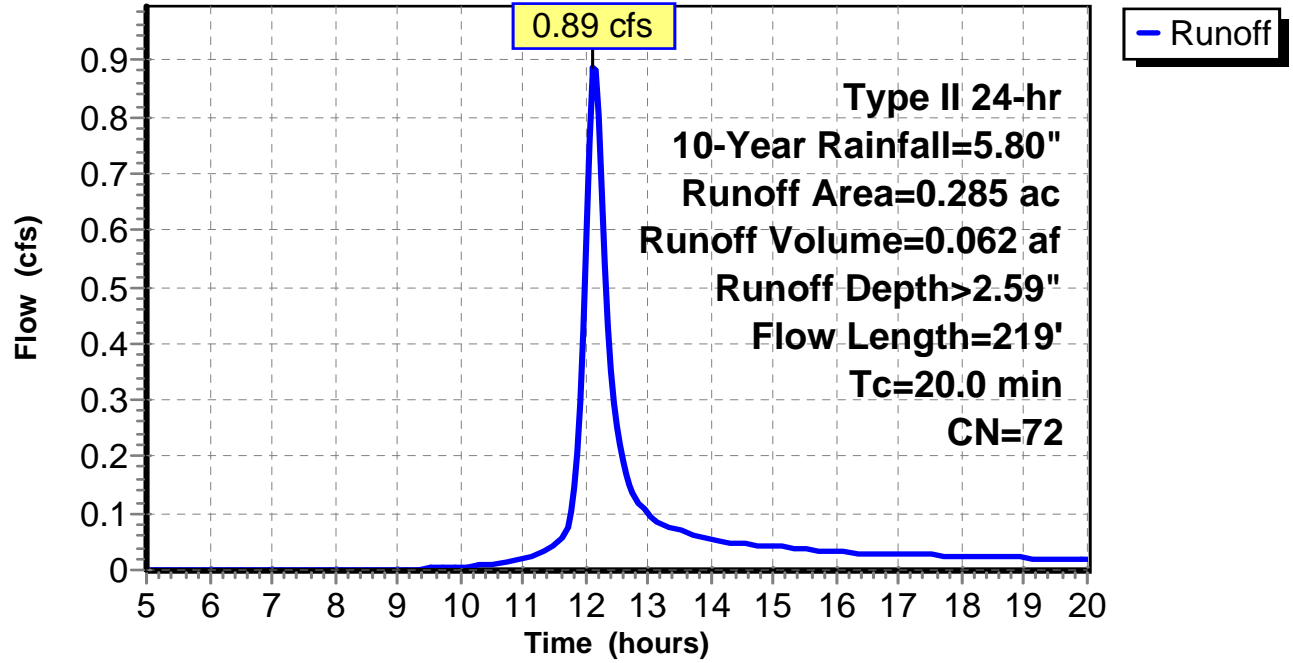
Subcatchment 12: C 249.014

Hydrograph



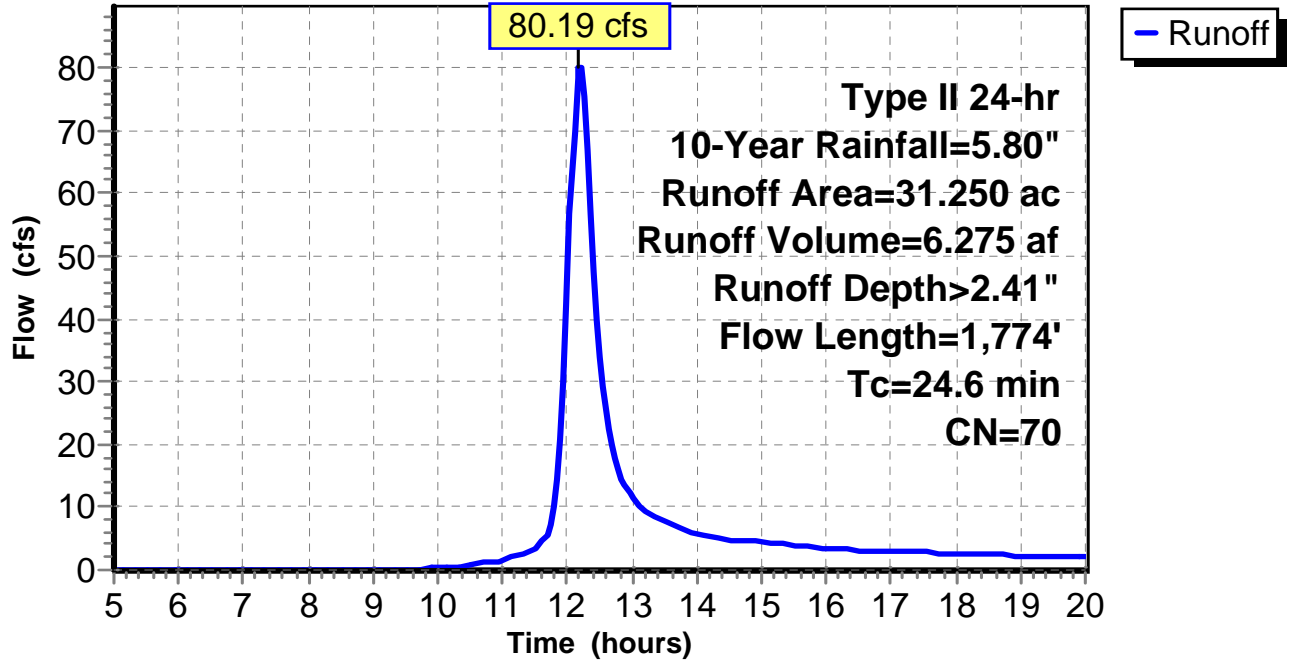
Subcatchment 13: C 249.015

Hydrograph



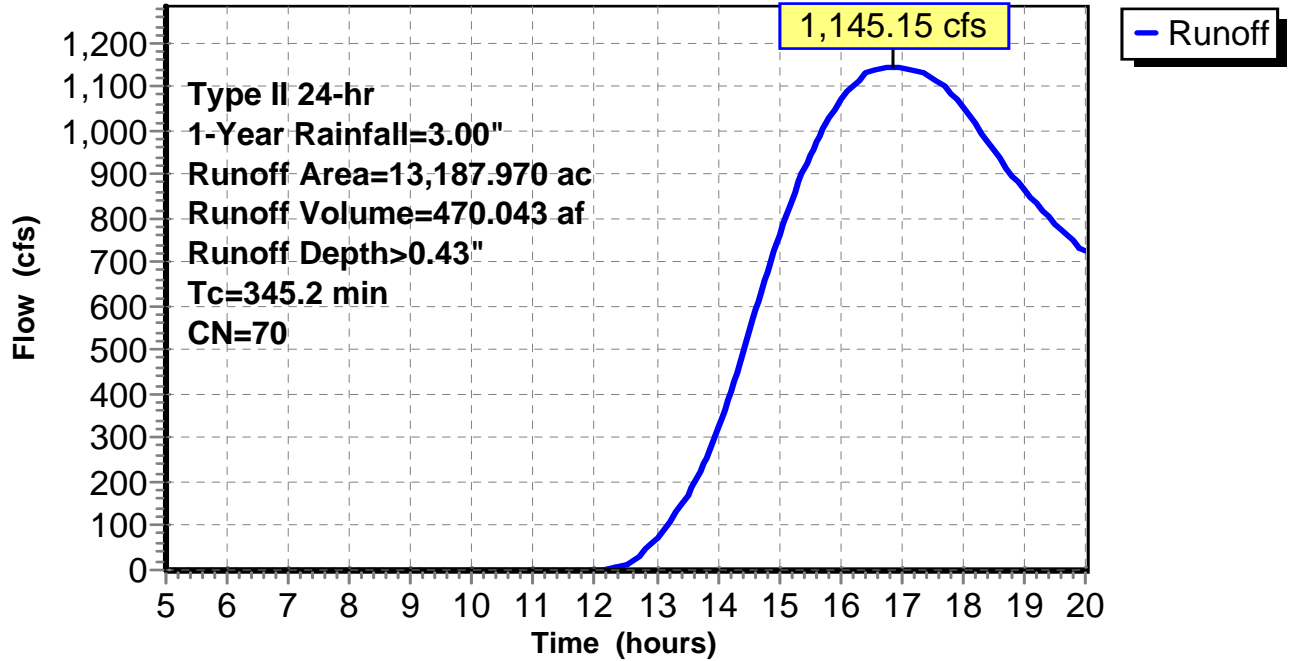
Subcatchment 14: C 249.016

Hydrograph



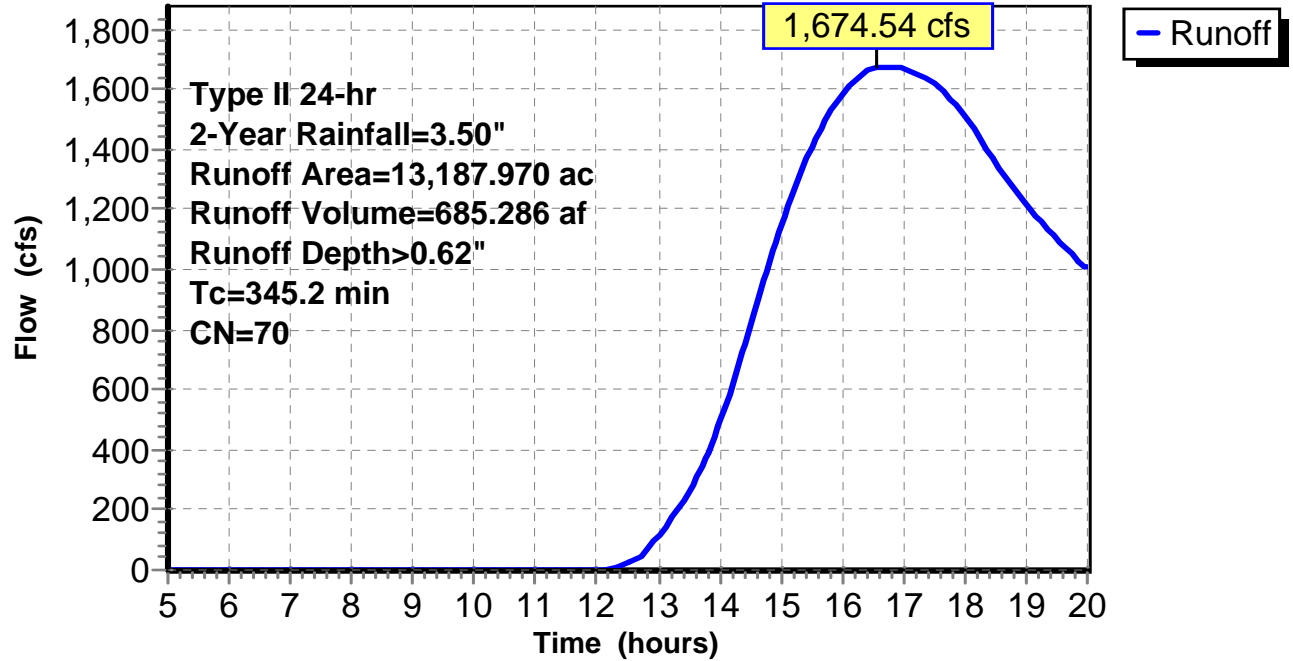
Subcatchment 1S: C AR-700.007

Hydrograph



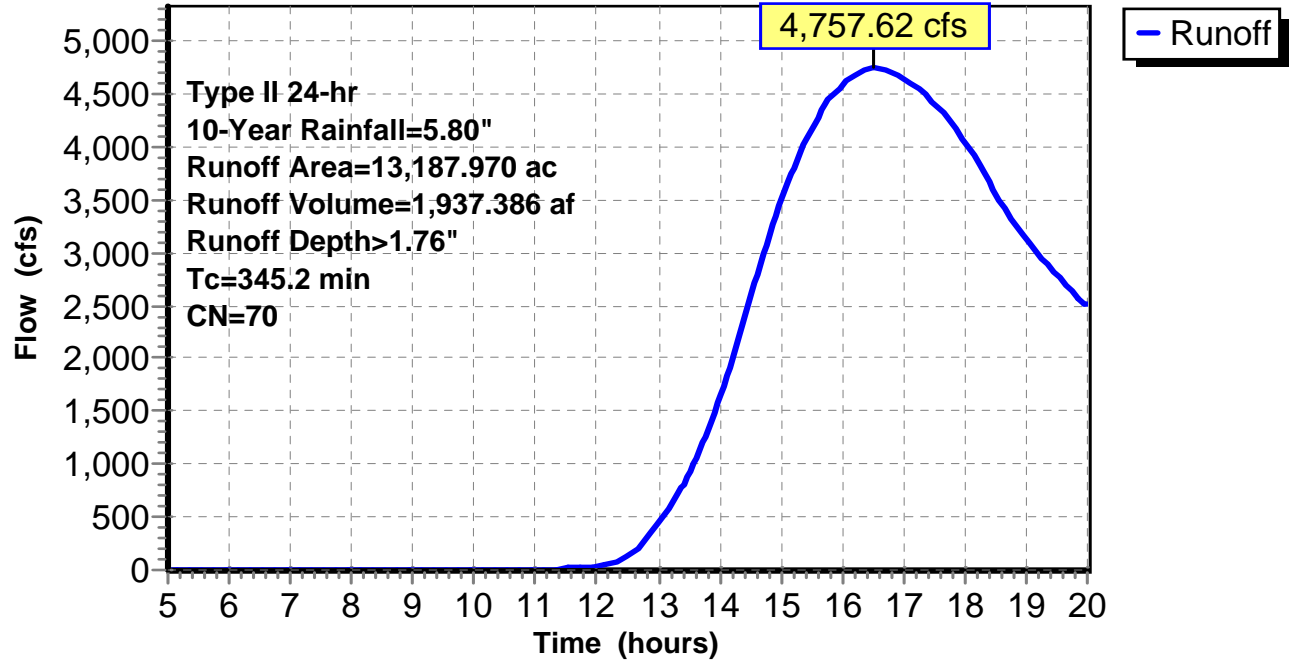
Subcatchment 1S: C AR-700.007

Hydrograph



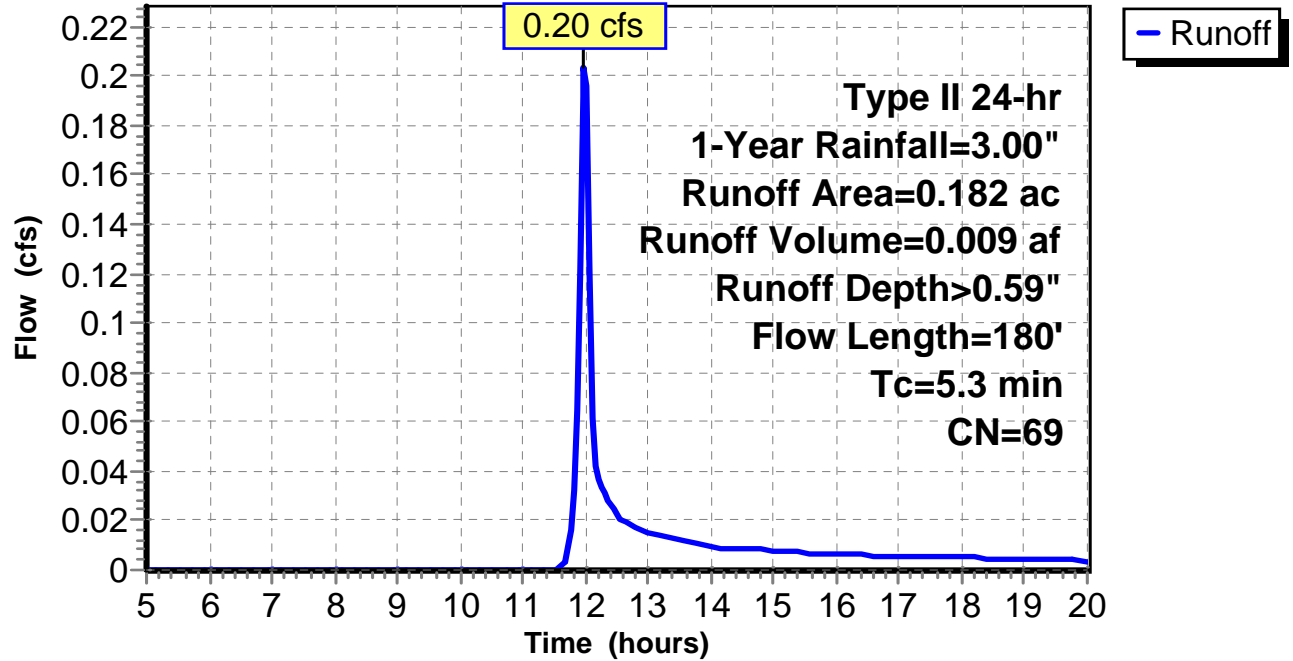
Subcatchment 1S: C AR-700.007

Hydrograph



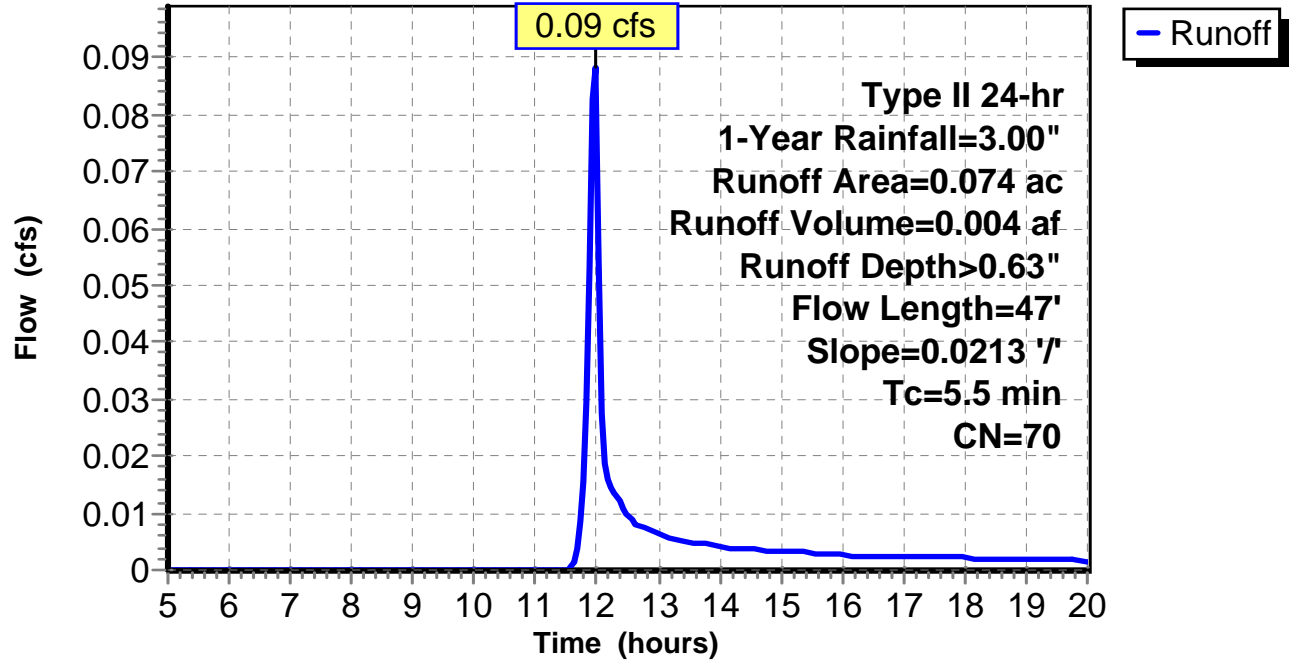
Subcatchment 1: C 262.001

Hydrograph



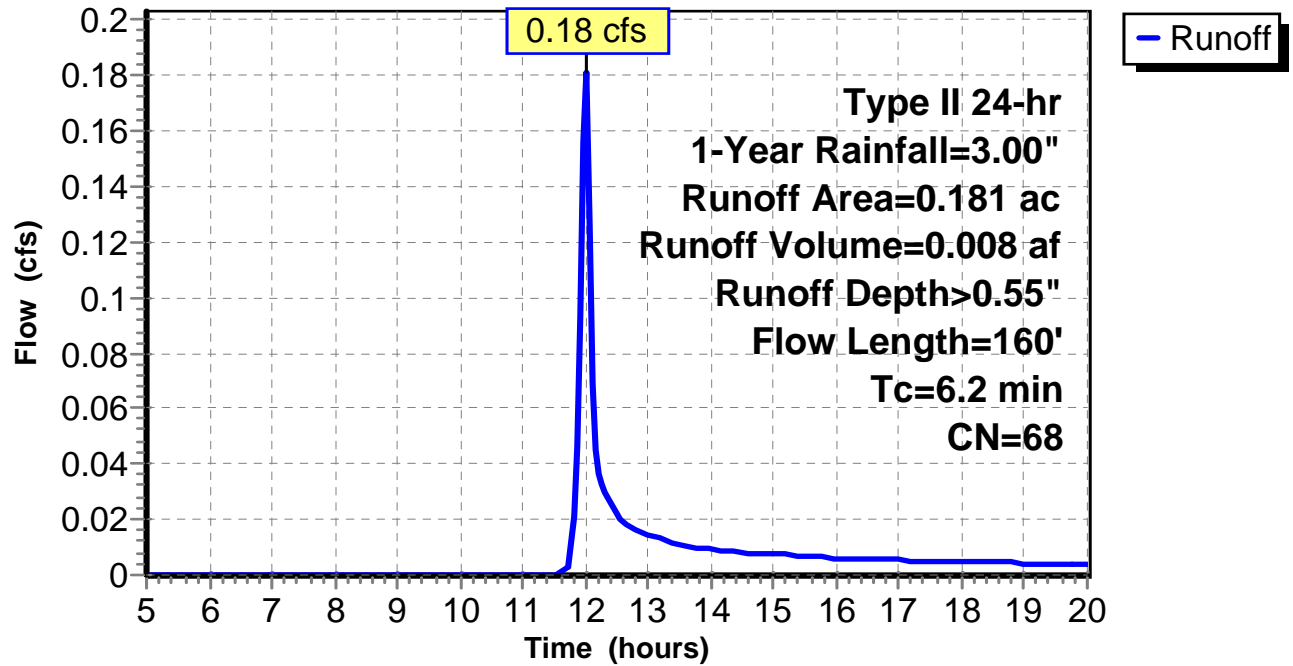
Subcatchment 2: C 262.002

Hydrograph



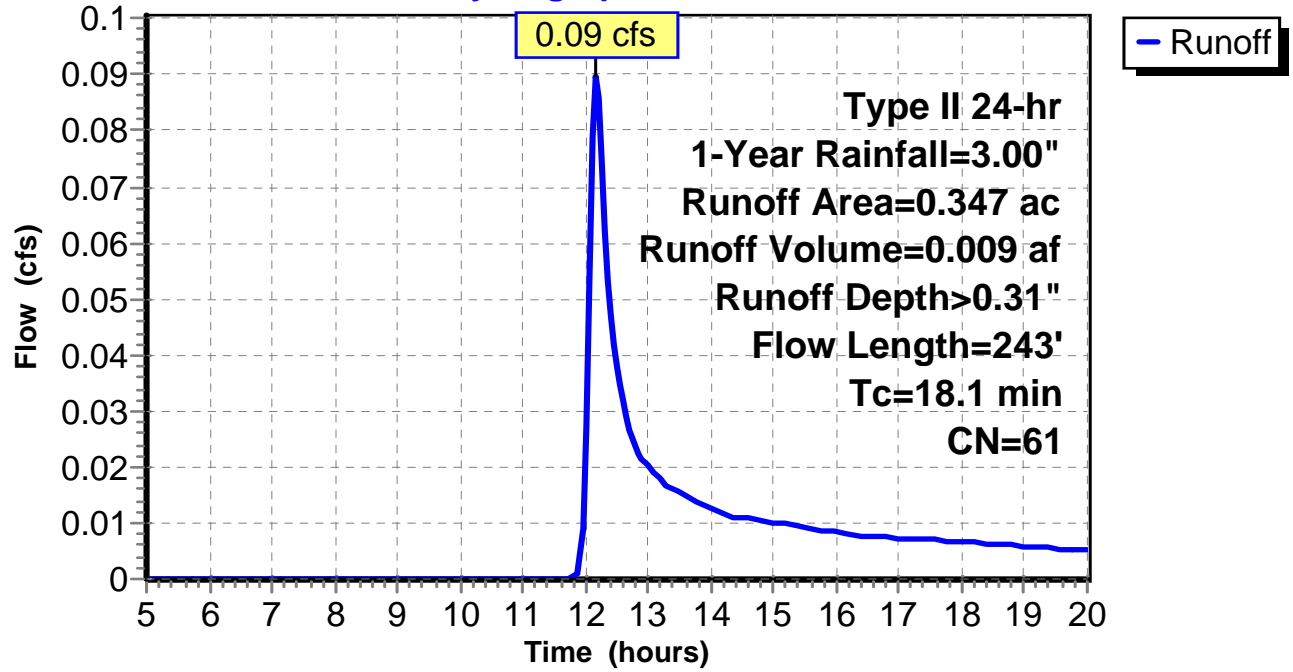
Subcatchment 3: C 262.003

Hydrograph



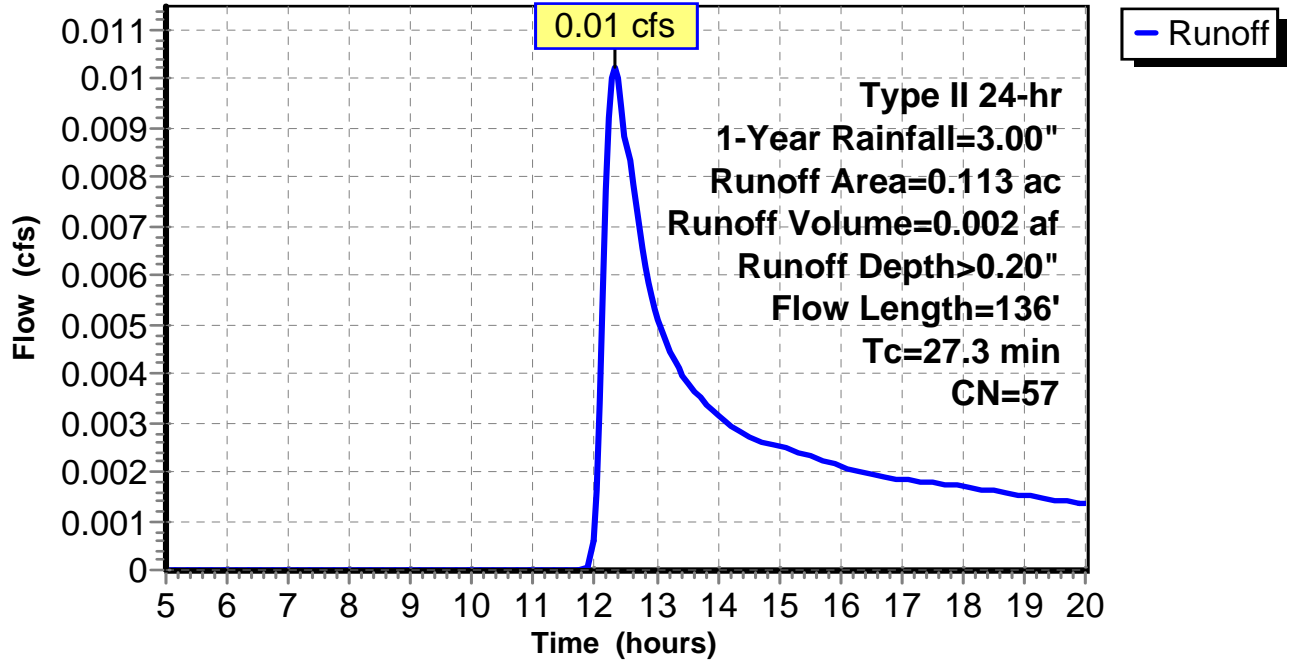
Subcatchment 4: C 262.004

Hydrograph



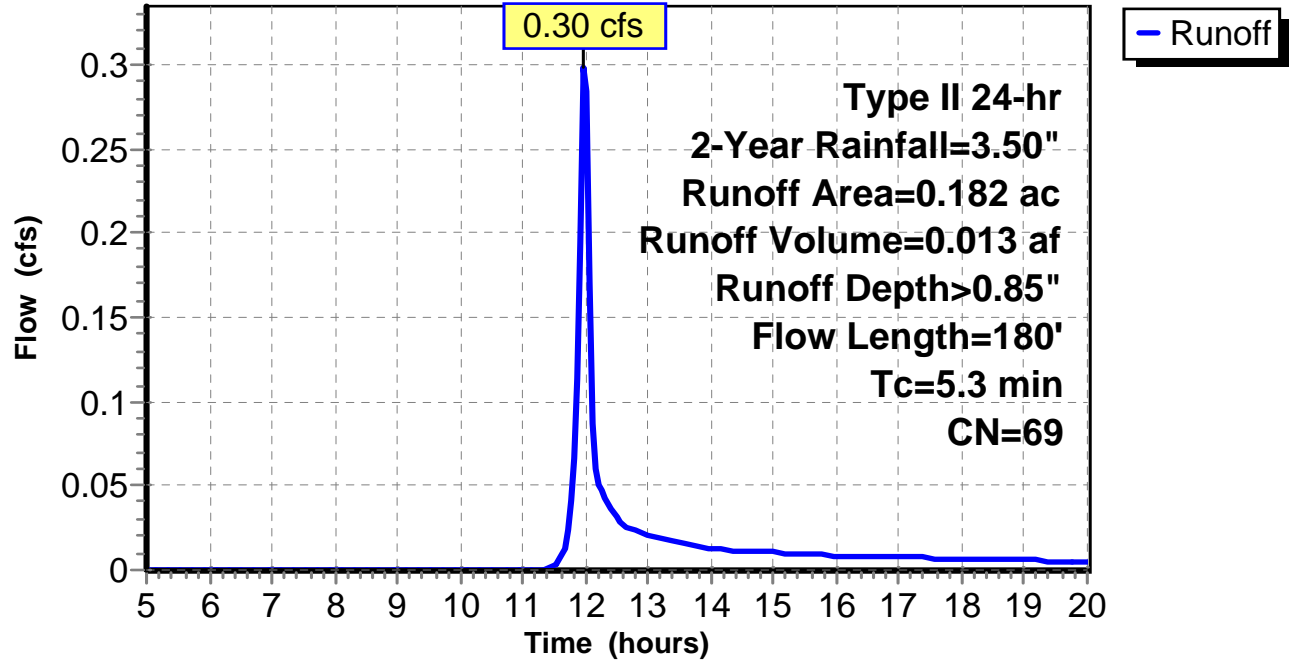
Subcatchment 5: C 262.005

Hydrograph



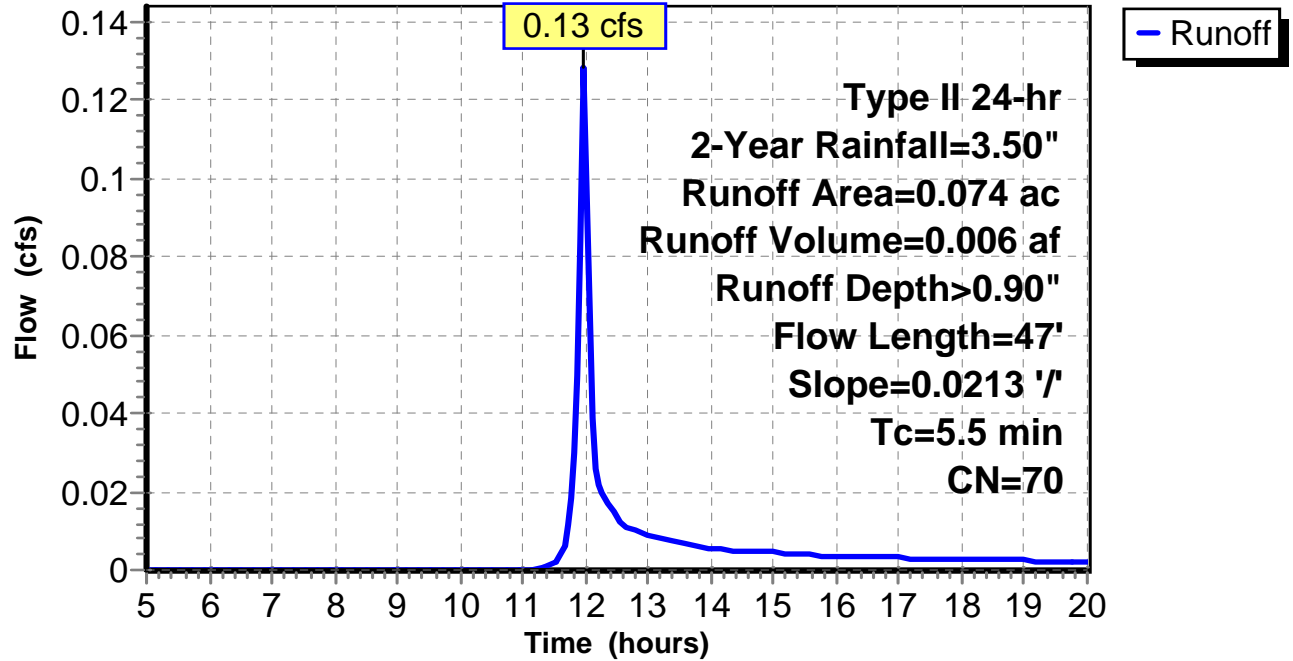
Subcatchment 1: C 262.001

Hydrograph



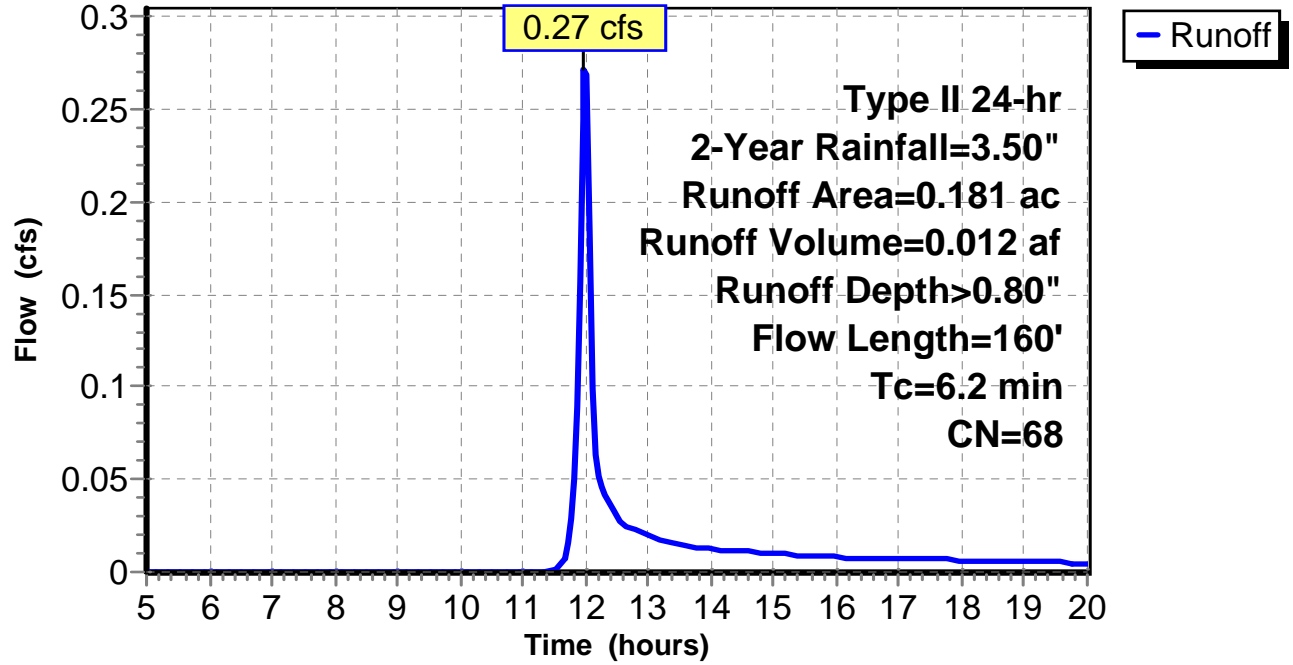
Subcatchment 2: C 262.002

Hydrograph



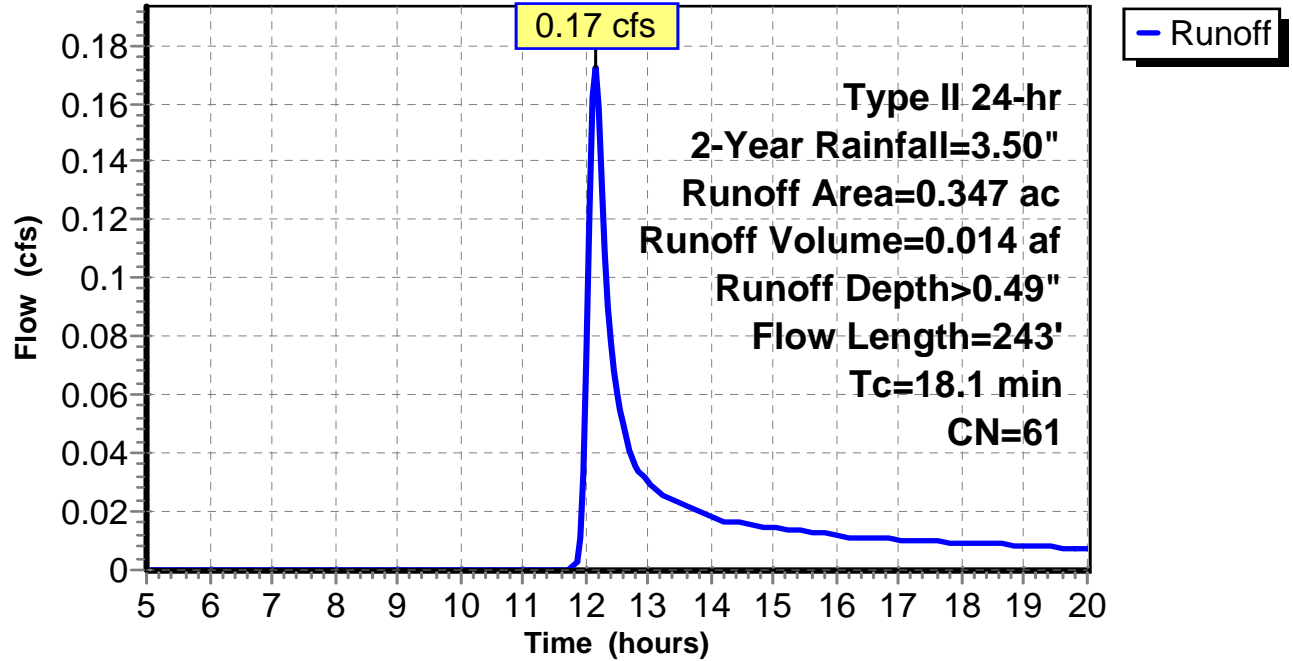
Subcatchment 3: C 262.003

Hydrograph



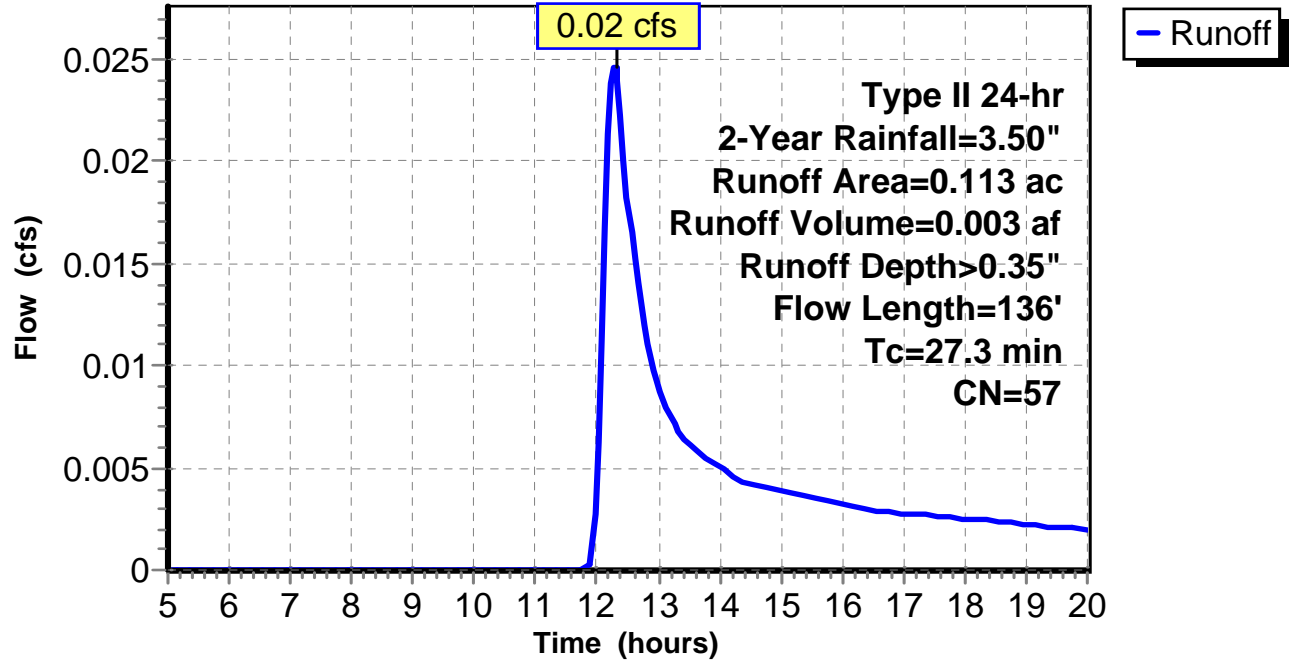
Subcatchment 4: C 262.004

Hydrograph



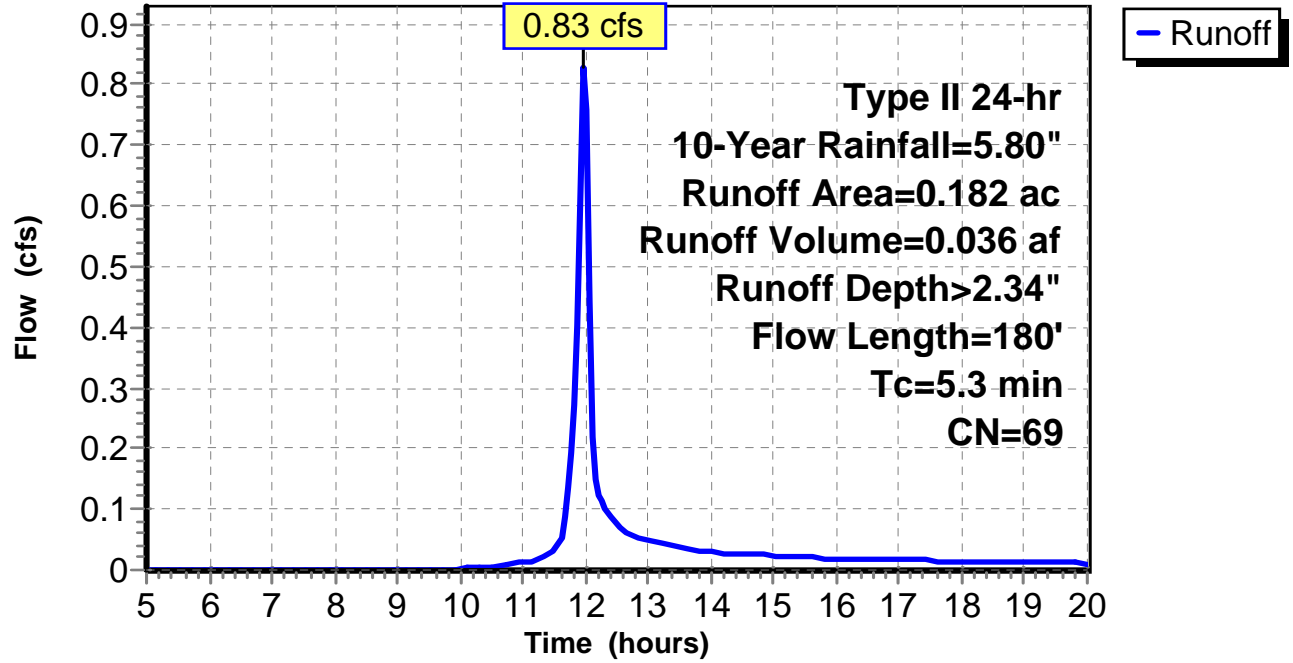
Subcatchment 5: C 262.005

Hydrograph



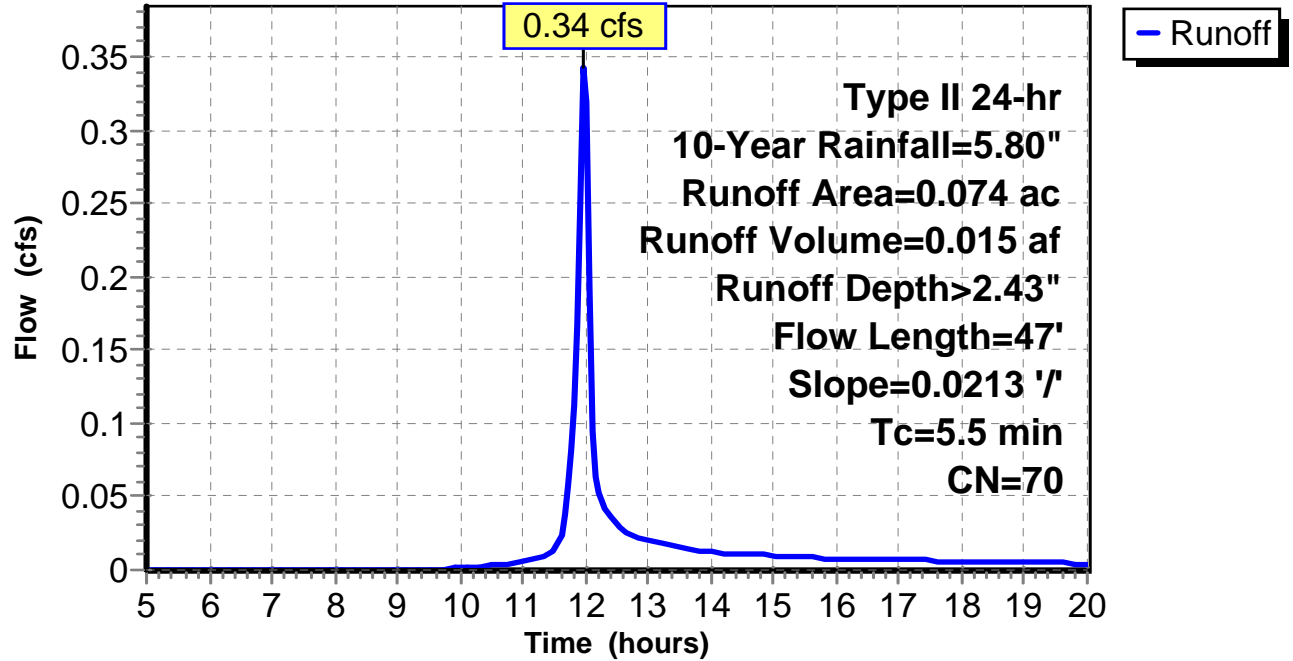
Subcatchment 1: C 262.001

Hydrograph



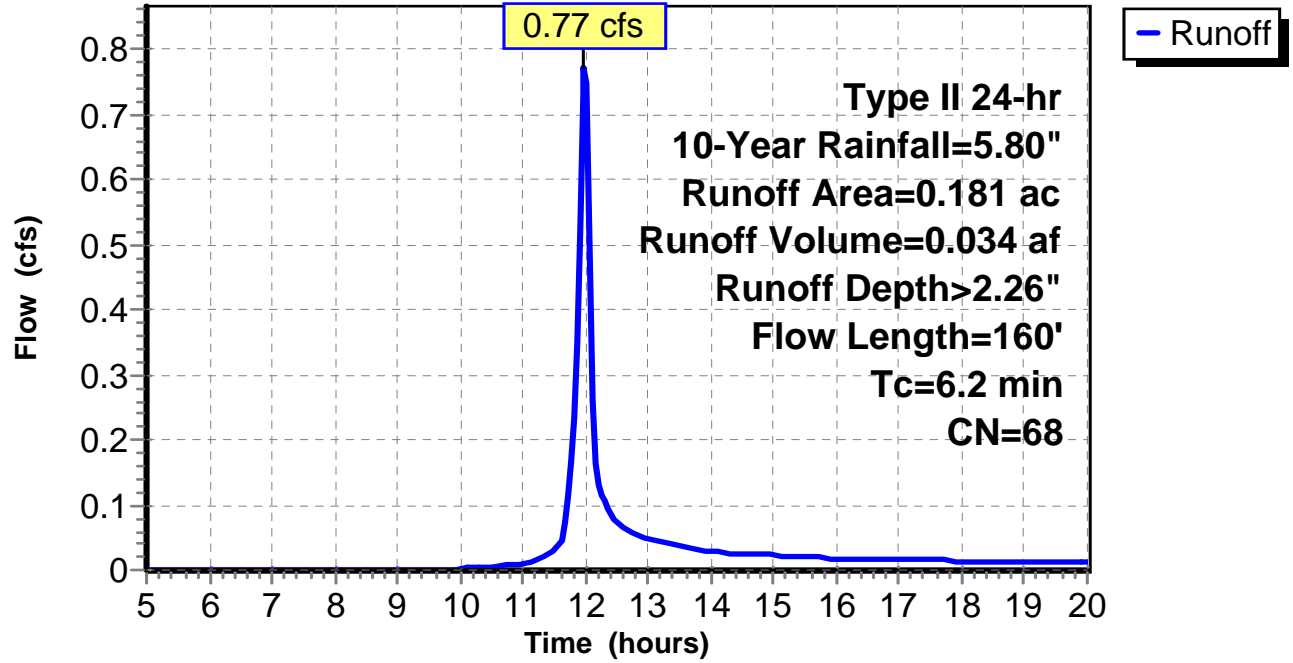
Subcatchment 2: C 262.002

Hydrograph



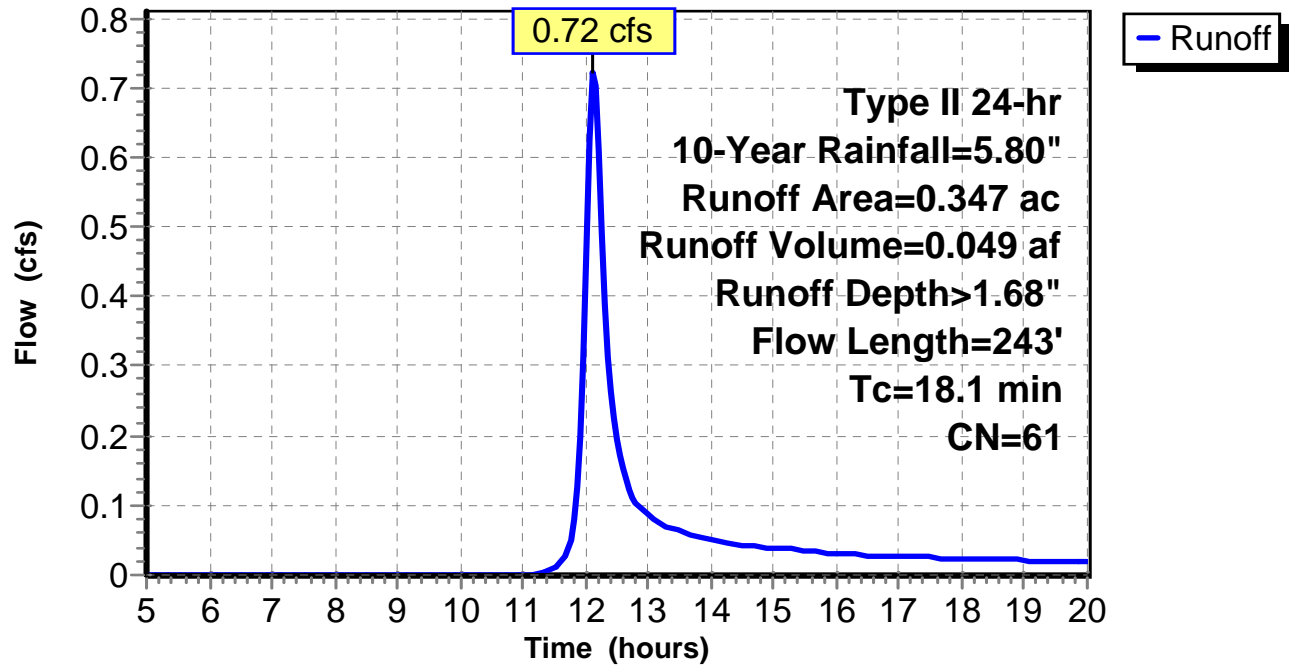
Subcatchment 3: C 262.003

Hydrograph



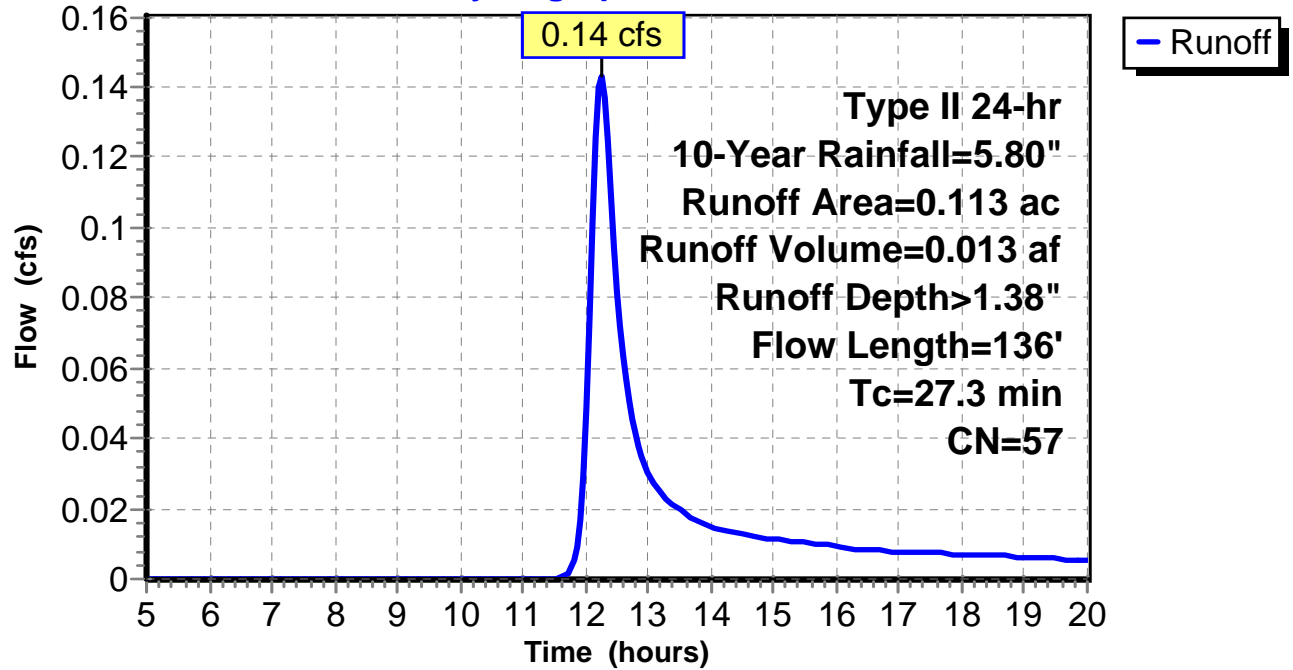
Subcatchment 4: C 262.004

Hydrograph



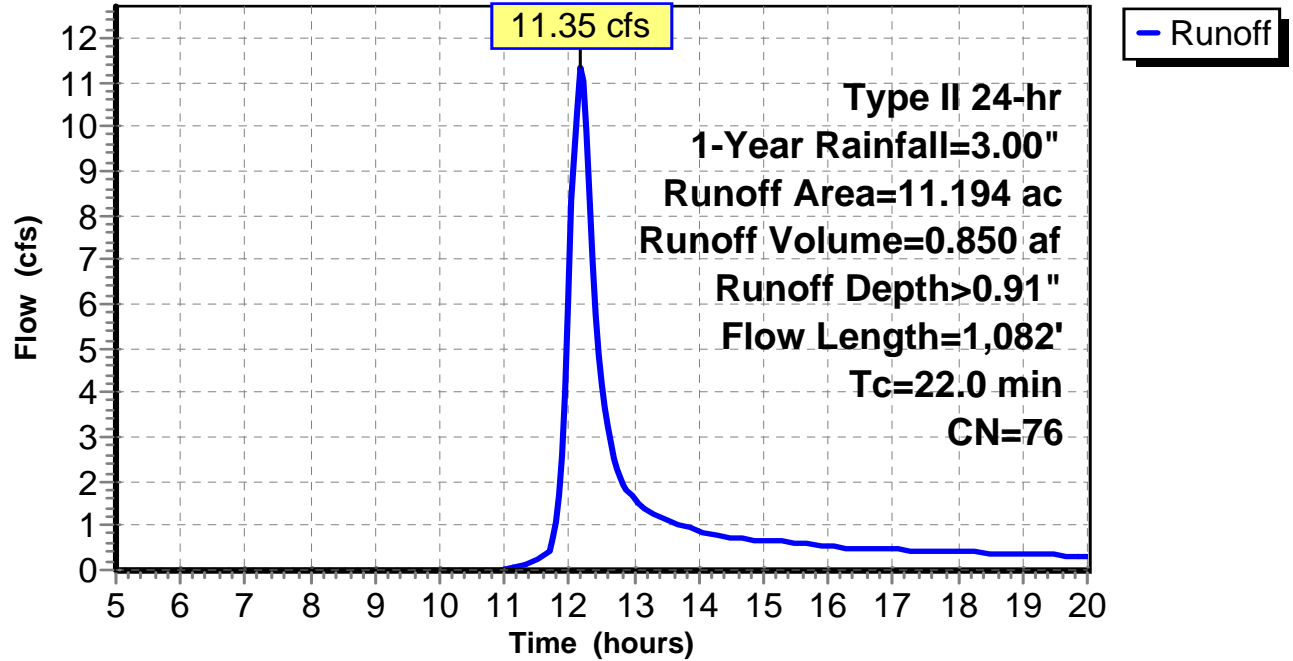
Subcatchment 5: C 262.005

Hydrograph



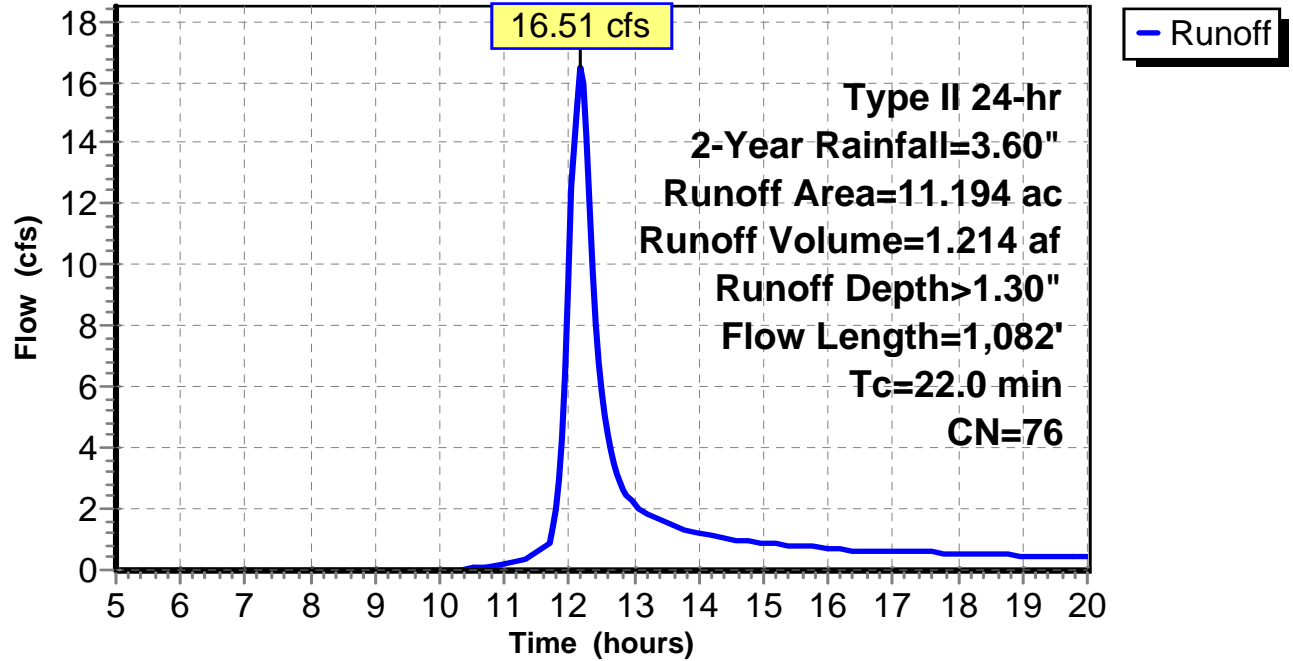
Subcatchment 1: C AP5.001

Hydrograph



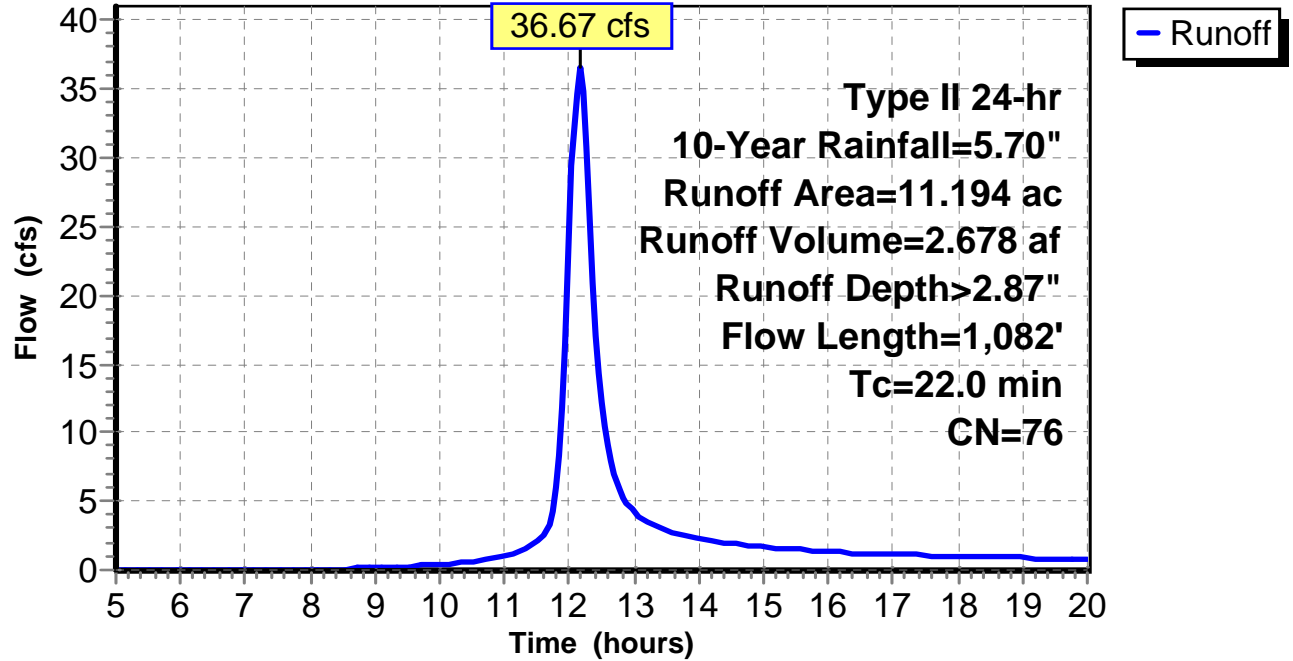
Subcatchment 1: C AP5.001

Hydrograph



Subcatchment 1: C AP5.001

Hydrograph



ATTACHMENT 2.1

DEQ Virginia Runoff Reduction Method New Development Compliance
Spreadsheets – Version 3.0

Project Name: Angola Creek-Appomattox River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.02	30.12	16.76	29.99	76.89 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	1.19	9.68	11.57	3.33	25.77
Impervious Cover (acres)	0.00	0.14	0.12	0.00	0.26
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					102.92

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-22.10

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	76.89
Weighted Rv (forest)	0.04
% Forest	75%
Managed Turf Cover (acres)	25.77
Weighted Rv (turf)	0.21
% Managed Turf	25%
Impervious Cover (acres)	0.26
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	102.92
Site Rv	0.09

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.7343
Treatment Volume (cubic feet)	31,988
TP Load (lb/yr)	20.10
TN Load (lb/yr) (Informational Purposes Only)	143.78

Project Name: **Barterbrook Branch-Christians Creek 07-001-A155.AR-AR 1**
Proposed New Road

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.08	0.00	0.05	0.13
Impervious Cover (acres)	0.00	0.15	0.00	0.05	0.20
					0.33

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.36**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.22
% Managed Turf	40%
Impervious Cover (acres)	0.20
Rv (impervious)	0.95
% Impervious	60%
Site Area (acres)	0.33
Site Rv	0.66

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0179
Treatment Volume (cubic feet)	779
TP Load (lb/yr)	0.49
TN Load (lb/yr) (Informational Purposes Only)	3.50

Project Name: **Barterbrook Branch-Christians Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	6.32	0.85	0.00	7.17 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	13.37	1.23	9.46	24.06
Impervious Cover (acres)	0.00	0.19	0.00	0.13	0.33
					31.56

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.38**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	7.17
Weighted Rv (forest)	0.03
% Forest	23%
Managed Turf Cover (acres)	24.06
Weighted Rv (turf)	0.22
% Managed Turf	76%
Impervious Cover (acres)	0.33
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	31.56
Site Rv	0.19

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.4868
Treatment Volume (cubic feet)	21,204
TP Load (lb/yr)	13.32
TN Load (lb/yr) (Informational Purposes Only)	95.31

Project Name: Beaver Creek-Rockfish River 08-210.AR-AR 1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.09	0.00	0.00	0.09 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.13	0.00	0.00	0.13
Impervious Cover (acres)	0.00	0.24	0.00	0.00	0.24
					0.46

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.39

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.09
Weighted Rv (forest)	0.03
% Forest	20%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.20
% Managed Turf	28%
Impervious Cover (acres)	0.24
Rv (impervious)	0.95
% Impervious	52%
Site Area (acres)	0.46
Site Rv	0.55

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0210
Treatment Volume (cubic feet)	916
TP Load (lb/yr)	0.58
TN Load (lb/yr) (Informational Purposes Only)	4.12

Project Name: Beaver Creek-Rockfish River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	45.12	0.31	2.12	47.55 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	8.22	0.47	0.37	9.06
Impervious Cover (acres)	0.00	0.17	0.00	0.08	0.25
					56.86

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-15.22

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	47.55
Weighted Rv (forest)	0.03
% Forest	84%
Managed Turf Cover (acres)	9.06
Weighted Rv (turf)	0.20
% Managed Turf	16%
Impervious Cover (acres)	0.25
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	56.86
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2957
Treatment Volume (cubic feet)	12,880
TP Load (lb/yr)	8.09
TN Load (lb/yr) (Informational Purposes Only)	57.89

Project Name: **Beaver Pond Creek-Nottoway River 13-041-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.08	0.08 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.02	0.02
Impervious Cover (acres)	0.00	0.00	0.00	0.11	0.11
					0.21

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.18**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.08
Weighted Rv (forest)	0.05
% Forest	37%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.25
% Managed Turf	10%
Impervious Cover (acres)	0.11
Rv (impervious)	0.95
% Impervious	54%
Site Area (acres)	0.21
Site Rv	0.55

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0099
Treatment Volume (cubic feet)	429
TP Load (lb/yr)	0.27
TN Load (lb/yr) (Informational Purposes Only)	1.93

Project Name: **Beaver Pond Creek-Nottoway River 14-001-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.01	0.01 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.06	0.06
Impervious Cover (acres)	0.00	0.00	0.00	0.10	0.10
					0.17

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.18**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.01
Weighted Rv (forest)	0.05
% Forest	8%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.25
% Managed Turf	33%
Impervious Cover (acres)	0.10
Rv (impervious)	0.95
% Impervious	59%
Site Area (acres)	0.17
Site Rv	0.65

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0092
Treatment Volume (cubic feet)	400
TP Load (lb/yr)	0.25
TN Load (lb/yr) (Informational Purposes Only)	1.80

Project Name: Beaver Pond Creek-Nottoway River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	73.51	0.00	14.08	87.59 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	17.39	0.00	1.25	18.64
Impervious Cover (acres)	0.00	0.43	0.00	0.08	0.51
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					106.74

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-27.39

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	87.59
Weighted Rv (forest)	0.03
% Forest	82%
Managed Turf Cover (acres)	18.64
Weighted Rv (turf)	0.20
% Managed Turf	17%
Impervious Cover (acres)	0.51
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	106.74
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5984
Treatment Volume (cubic feet)	26,066
TP Load (lb/yr)	16.38
TN Load (lb/yr) (Informational Purposes Only)	117.16

Project Name: **Bennett Creek-Nansemond River 26-060-A082.AR1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.17	0.14	0.00	0.00	0.31 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.35	0.25	0.27	0.79	1.67
Impervious Cover (acres)	0.60	0.43	0.33	1.33	2.69
					4.67

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **4.75**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.31
Weighted Rv (forest)	0.02
% Forest	7%
Managed Turf Cover (acres)	1.67
Weighted Rv (turf)	0.22
% Managed Turf	36%
Impervious Cover (acres)	2.69
Rv (impervious)	0.95
% Impervious	58%
Site Area (acres)	4.67
Site Rv	0.63

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2436
Treatment Volume (cubic feet)	10,610
TP Load (lb/yr)	6.67
TN Load (lb/yr) (Informational Purposes Only)	47.69

Project Name: **Bennett Creek-Nansemond River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.41	1.81	0.19	0.83	3.25 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	7.54	3.07	0.68	2.64	13.94
Impervious Cover (acres)	0.00	0.03	0.00	0.00	0.03
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					17.22

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-0.90

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	3.25
Weighted Rv (forest)	0.03
% Forest	19%
Managed Turf Cover (acres)	13.94
Weighted Rv (turf)	0.18
% Managed Turf	81%
Impervious Cover (acres)	0.03
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	17.22
Site Rv	0.16

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2251
Treatment Volume (cubic feet)	9,804
TP Load (lb/yr)	6.16
TN Load (lb/yr) (Informational Purposes Only)	44.07

Project Name: Bishop Creek-Willis River 09-080-AR 1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.17	0.22	0.00	0.39 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.03	0.00	0.00	0.03
Impervious Cover (acres)	0.00	0.22	0.25	0.00	0.47
					0.88

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.69

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.39
Weighted Rv (forest)	0.04
% Forest	44%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.20
% Managed Turf	3%
Impervious Cover (acres)	0.47
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	0.88
Site Rv	0.52

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0386
Treatment Volume (cubic feet)	1,683
TP Load (lb/yr)	1.06
TN Load (lb/yr) (Informational Purposes Only)	7.56

Project Name: Bishop Creek-Willis River 09-113-AR 3 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.12	0.00	0.00	0.12 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.10	0.00	0.00	0.10
					0.22

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.14

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.12
Weighted Rv (forest)	0.03
% Forest	53%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.10
Rv (impervious)	0.95
% Impervious	47%
Site Area (acres)	0.22
Site Rv	0.46

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0083
Treatment Volume (cubic feet)	364
TP Load (lb/yr)	0.23
TN Load (lb/yr) (Informational Purposes Only)	1.63

Project Name: Bishop Creek-Willis River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	15.84	49.60	10.95	76.38 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	1.95	3.49	0.18	5.61
Impervious Cover (acres)	0.00	0.06	2.72	0.00	2.78
					84.78

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-19.14

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	76.38
Weighted Rv (forest)	0.04
% Forest	90%
Managed Turf Cover (acres)	5.61
Weighted Rv (turf)	0.21
% Managed Turf	7%
Impervious Cover (acres)	2.78
Rv (impervious)	0.95
% Impervious	3%
Site Area (acres)	84.78
Site Rv	0.08

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5709
Treatment Volume (cubic feet)	24,866
TP Load (lb/yr)	15.62
TN Load (lb/yr) (Informational Purposes Only)	111.77

Project Name: **Bolar Run-Jackson River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	47.33	10.56	10.49	9.60	77.97 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	2.37	0.70	3.45	9.22	15.75
Impervious Cover (acres)	0.49	0.18	0.05	0.06	0.77
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					94.49

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-24.02

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	77.97
Weighted Rv (forest)	0.03
% Forest	83%
Managed Turf Cover (acres)	15.75
Weighted Rv (turf)	0.23
% Managed Turf	17%
Impervious Cover (acres)	0.77
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	94.49
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5377
Treatment Volume (cubic feet)	23,421
TP Load (lb/yr)	14.72
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	105.27

Project Name: **Buck Creek-Rockfish River 08-086-A036.AR1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.13	0.13 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.01	0.02
Impervious Cover (acres)	0.00	0.00	0.00	0.16	0.16
					0.31

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.25**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.13
Weighted Rv (forest)	0.05
% Forest	41%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.24
% Managed Turf	5%
Impervious Cover (acres)	0.16
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	0.31
Site Rv	0.54

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0137
Treatment Volume (cubic feet)	598
TP Load (lb/yr)	0.38
TN Load (lb/yr) (Informational Purposes Only)	2.69

Project Name: **Buck Creek-Rockfish River 08-086-A039-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.03	0.00	0.00	0.01	0.04 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.05	0.00	0.00	0.02	0.07
Impervious Cover (acres)	0.08	0.00	0.00	0.04	0.12
					0.23

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.20**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.04
Weighted Rv (forest)	0.03
% Forest	18%
Managed Turf Cover (acres)	0.07
Weighted Rv (turf)	0.18
% Managed Turf	29%
Impervious Cover (acres)	0.12
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	0.23
Site Rv	0.56

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0108
Treatment Volume (cubic feet)	470
TP Load (lb/yr)	0.30
TN Load (lb/yr) (Informational Purposes Only)	2.11

Project Name: **Buck Creek-Rockfish River 08-086-A045-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.03	0.00	0.00	0.03 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.03	0.00	0.00	0.03
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					0.06

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.03**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.03
Weighted Rv (forest)	0.03
% Forest	55%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.03
Rv (impervious)	0.95
% Impervious	45%
Site Area (acres)	0.06
Site Rv	0.44

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0021
Treatment Volume (cubic feet)	90
TP Load (lb/yr)	0.06
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	0.40

Project Name: **Buck Creek-Rockfish River 08-086-A045-AR 2 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.12	0.00	0.00	0.12 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.02	0.00	0.00	0.02
Impervious Cover (acres)	0.00	0.15	0.00	0.00	0.15
					0.29

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.22**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.12
Weighted Rv (forest)	0.03
% Forest	41%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.20
% Managed Turf	7%
Impervious Cover (acres)	0.15
Rv (impervious)	0.95
% Impervious	52%
Site Area (acres)	0.29
Site Rv	0.52

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0126
Treatment Volume (cubic feet)	547
TP Load (lb/yr)	0.34
TN Load (lb/yr) (Informational Purposes Only)	2.46

Project Name: **Buck Creek-Rockfish River 08-113-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.16	0.00	0.05	0.21 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.17	0.00	0.05	0.23
					0.43

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.33**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.21
Weighted Rv (forest)	0.03
% Forest	48%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.23
Rv (impervious)	0.95
% Impervious	52%
Site Area (acres)	0.43
Site Rv	0.51

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0185
Treatment Volume (cubic feet)	806
TP Load (lb/yr)	0.51
TN Load (lb/yr) (Informational Purposes Only)	3.62

Project Name: **Buck Creek-Rockfish River 08-113-AR 2 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.27	0.00	0.13	0.40 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.28	0.00	0.13	0.41
					0.81

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.59**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.40
Weighted Rv (forest)	0.04
% Forest	49%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.41
Rv (impervious)	0.95
% Impervious	51%
Site Area (acres)	0.81
Site Rv	0.50

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0337
Treatment Volume (cubic feet)	1,466
TP Load (lb/yr)	0.92
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	6.59

Project Name: **Buck Creek-Rockfish River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	3.54	100.05	0.75	5.80	110.14 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	2.04	11.21	0.00	2.14	15.39
Impervious Cover (acres)	0.04	0.49	0.00	0.10	0.63
					126.16

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-35.59

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	110.14
Weighted Rv (forest)	0.03
% Forest	87%
Managed Turf Cover (acres)	15.39
Weighted Rv (turf)	0.20
% Managed Turf	12%
Impervious Cover (acres)	0.63
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	126.16
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5895
Treatment Volume (cubic feet)	25,679
TP Load (lb/yr)	16.13
TN Load (lb/yr) (Informational Purposes Only)	115.42

Project Name: **Buckhorn Swamp-Meherrin River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.96	1.75	0.64	30.76	34.12 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.35	3.71	3.00	5.50	12.56
Impervious Cover (acres)	0.00	0.53	0.05	1.19	1.77
					48.45

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-5.84

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	34.12
Weighted Rv (forest)	0.05
% Forest	70%
Managed Turf Cover (acres)	12.56
Weighted Rv (turf)	0.23
% Managed Turf	26%
Impervious Cover (acres)	1.77
Rv (impervious)	0.95
% Impervious	4%
Site Area (acres)	48.45
Site Rv	0.13

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5123
Treatment Volume (cubic feet)	22,317
TP Load (lb/yr)	14.02
TN Load (lb/yr) (Informational Purposes Only)	100.31

Project Name: **Buffalo Branch-Middle River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.44	4.40	0.06	6.11	11.01 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.44	24.91	0.00	3.31	28.66
Impervious Cover (acres)	0.00	0.42	0.00	0.00	0.42
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					40.09

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-1.10

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	11.01
Weighted Rv (forest)	0.04
% Forest	27%
Managed Turf Cover (acres)	28.66
Weighted Rv (turf)	0.21
% Managed Turf	71%
Impervious Cover (acres)	0.42
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	40.09
Site Rv	0.17

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5603
Treatment Volume (cubic feet)	24,405
TP Load (lb/yr)	15.33
TN Load (lb/yr) (Informational Purposes Only)	109.69

Project Name: **Butterwood Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.74	84.45	3.21	8.46	96.86 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	17.73	0.00	0.00	17.73
Impervious Cover (acres)	0.00	0.72	0.00	0.00	0.72
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					115.32

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-30.56

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	96.86
Weighted Rv (forest)	0.03
% Forest	84%
Managed Turf Cover (acres)	17.73
Weighted Rv (turf)	0.20
% Managed Turf	15%
Impervious Cover (acres)	0.72
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	115.32
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.6111
Treatment Volume (cubic feet)	26,618
TP Load (lb/yr)	16.72
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	119.64

Project Name: Cabin Creek-Mill Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	14.56	27.78	16.32	14.94	73.61 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	12.80	1.49	4.11	18.41
Impervious Cover (acres)	0.00	0.34	0.00	0.15	0.49
					92.50

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-22.18

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	73.61
Weighted Rv (forest)	0.03
% Forest	80%
Managed Turf Cover (acres)	18.41
Weighted Rv (turf)	0.21
% Managed Turf	20%
Impervious Cover (acres)	0.49
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	92.50
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5755
Treatment Volume (cubic feet)	25,068
TP Load (lb/yr)	15.75
TN Load (lb/yr) (Informational Purposes Only)	112.67

Project Name: Canada Run-South River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	3.55	22.83	2.59	3.46	32.43 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.58	45.57	3.99	7.27	57.40
Impervious Cover (acres)	0.02	1.11	0.06	0.03	1.23
					91.06

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-5.19

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	32.43
Weighted Rv (forest)	0.03
% Forest	36%
Managed Turf Cover (acres)	57.40
Weighted Rv (turf)	0.21
% Managed Turf	63%
Impervious Cover (acres)	1.23
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	91.06
Site Rv	0.15

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	1.1744
Treatment Volume (cubic feet)	51,156
TP Load (lb/yr)	32.14
TN Load (lb/yr) (Informational Purposes Only)	229.93

Project Name: **Cattail Creek-Fontaine Creek 15-029-AR 2 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.21	0.22	0.00	0.43 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.21	0.00	0.00	0.21
Impervious Cover (acres)	0.00	0.57	0.25	0.00	0.81
					1.45

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **1.30**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.43
Weighted Rv (forest)	0.04
% Forest	29%
Managed Turf Cover (acres)	0.21
Weighted Rv (turf)	0.20
% Managed Turf	15%
Impervious Cover (acres)	0.81
Rv (impervious)	0.95
% Impervious	56%
Site Area (acres)	1.45
Site Rv	0.57

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0692
Treatment Volume (cubic feet)	3,017
TP Load (lb/yr)	1.90
TN Load (lb/yr) (Informational Purposes Only)	13.56

Project Name: **Cattail Creek-Fontaine Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	2.77	10.44	20.92	34.13 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	1.02	5.93	3.35	10.30
Impervious Cover (acres)	0.00	0.25	0.59	0.34	1.18
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					45.61

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-7.26

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	34.13
Weighted Rv (forest)	0.05
% Forest	75%
Managed Turf Cover (acres)	10.30
Weighted Rv (turf)	0.23
% Managed Turf	23%
Impervious Cover (acres)	1.18
Rv (impervious)	0.95
% Impervious	3%
Site Area (acres)	45.61
Site Rv	0.11

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.4180
Treatment Volume (cubic feet)	18,207
TP Load (lb/yr)	11.44
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	81.84

Project Name: Cedar Lake-Nansemond River 26-060-A082.AR1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.03	0.02	0.02	0.01	0.08
Impervious Cover (acres)	0.07	0.04	0.02	0.00	0.13
					0.21

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.24

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.08
Weighted Rv (turf)	0.20
% Managed Turf	36%
Impervious Cover (acres)	0.13
Rv (impervious)	0.95
% Impervious	64%
Site Area (acres)	0.21
Site Rv	0.68

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0119
Treatment Volume (cubic feet)	519
TP Load (lb/yr)	0.33
TN Load (lb/yr) (Informational Purposes Only)	2.33

Project Name: Cedar Lake-Nansemond River 26-060-A098.AR1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.33	0.33 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.03	0.03
Impervious Cover (acres)	0.00	0.00	0.00	0.42	0.42
					0.77

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.64

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.33
Weighted Rv (forest)	0.05
% Forest	42%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.25
% Managed Turf	4%
Impervious Cover (acres)	0.42
Rv (impervious)	0.95
% Impervious	54%
Site Area (acres)	0.77
Site Rv	0.54

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0349
Treatment Volume (cubic feet)	1,518
TP Load (lb/yr)	0.95
TN Load (lb/yr) (Informational Purposes Only)	6.82

Project Name: Cedar Lake-Nansemond River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.47	4.02	0.00	47.88	54.36 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	1.45	2.40	0.00	3.01	6.87
Impervious Cover (acres)	0.01	0.00	0.00	0.25	0.25
					61.49

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-15.50

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	54.36
Weighted Rv (forest)	0.05
% Forest	88%
Managed Turf Cover (acres)	6.87
Weighted Rv (turf)	0.21
% Managed Turf	11%
Impervious Cover (acres)	0.25
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	61.49
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3547
Treatment Volume (cubic feet)	15,451
TP Load (lb/yr)	9.71
TN Load (lb/yr) (Informational Purposes Only)	69.45

Project Name: **Cellar Creek 12-108-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.03	0.00	0.00	0.03 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.06	0.00	0.00	0.06
Impervious Cover (acres)	0.00	0.14	0.00	0.00	0.14
					0.24

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.23**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.03
Weighted Rv (forest)	0.03
% Forest	15%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.20
% Managed Turf	26%
Impervious Cover (acres)	0.14
Rv (impervious)	0.95
% Impervious	59%
Site Area (acres)	0.24
Site Rv	0.62

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0121
Treatment Volume (cubic feet)	527
TP Load (lb/yr)	0.33
TN Load (lb/yr) (Informational Purposes Only)	2.37

Project Name: **Cellar Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.25	49.53	5.98	6.97	63.73 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	8.54	1.04	0.63	10.21
Impervious Cover (acres)	0.00	0.27	0.09	0.02	0.39
					74.33

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-20.07

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	63.73
Weighted Rv (forest)	0.03
% Forest	86%
Managed Turf Cover (acres)	10.21
Weighted Rv (turf)	0.21
% Managed Turf	14%
Impervious Cover (acres)	0.39
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	74.33
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3801
Treatment Volume (cubic feet)	16,557
TP Load (lb/yr)	10.40
TN Load (lb/yr) (Informational Purposes Only)	74.42

Project Name: Chair Draft-Calfpasture River 07-001.AR1-AR 4 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.07	0.00	0.00	0.00	0.07 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.05	0.00	0.00	0.00	0.05
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					0.12

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.07

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.07
Weighted Rv (forest)	0.02
% Forest	55%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.05
Rv (impervious)	0.95
% Impervious	45%
Site Area (acres)	0.12
Site Rv	0.44

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0043
Treatment Volume (cubic feet)	188
TP Load (lb/yr)	0.12
TN Load (lb/yr) (Informational Purposes Only)	0.84

Project Name: Chair Draft-Calfpasture River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	3.58	47.39	0.32	3.84	55.14 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.97	5.58	0.15	0.86	7.55
Impervious Cover (acres)	0.10	0.56	0.04	0.22	0.92
					63.61

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-16.77

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	55.14
Weighted Rv (forest)	0.03
% Forest	87%
Managed Turf Cover (acres)	7.55
Weighted Rv (turf)	0.20
% Managed Turf	12%
Impervious Cover (acres)	0.92
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	63.61
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3401
Treatment Volume (cubic feet)	14,814
TP Load (lb/yr)	9.31
TN Load (lb/yr) (Informational Purposes Only)	66.58

Project Name: Chapel Swamp-Somerton Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	6.15	6.15 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.88	0.88
Impervious Cover (acres)	0.00	0.00	0.00	0.02	0.02
					7.05

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-1.64

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	6.15
Weighted Rv (forest)	0.05
% Forest	87%
Managed Turf Cover (acres)	0.88
Weighted Rv (turf)	0.25
% Managed Turf	12%
Impervious Cover (acres)	0.02
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	7.05
Site Rv	0.08

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0457
Treatment Volume (cubic feet)	1,992
TP Load (lb/yr)	1.25
TN Load (lb/yr) (Informational Purposes Only)	8.95

Project Name: Cohoon Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	4.25	4.38	4.36	13.54	26.53 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	5.70	3.40	4.43	7.05	20.59
Impervious Cover (acres)	0.01	0.04	0.14	0.11	0.30
					47.42

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-6.61

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	26.53
Weighted Rv (forest)	0.04
% Forest	56%
Managed Turf Cover (acres)	20.59
Weighted Rv (turf)	0.21
% Managed Turf	43%
Impervious Cover (acres)	0.30
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	47.42
Site Rv	0.12

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.4690
Treatment Volume (cubic feet)	20,428
TP Load (lb/yr)	12.83
TN Load (lb/yr) (Informational Purposes Only)	91.82

Project Name: **Darden Pond-Mill Swamp 25-055-A003.AR1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.05	0.00	0.05 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.25	0.00	0.25
Impervious Cover (acres)	0.00	0.00	0.35	0.00	0.35
					0.65

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.62**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.05
Weighted Rv (forest)	0.04
% Forest	8%
Managed Turf Cover (acres)	0.25
Weighted Rv (turf)	0.22
% Managed Turf	39%
Impervious Cover (acres)	0.35
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	0.65
Site Rv	0.60

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0323
Treatment Volume (cubic feet)	1,408
TP Load (lb/yr)	0.88
TN Load (lb/yr) (Informational Purposes Only)	6.33

Project Name: Darden Pond-Mill Swamp ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.24	3.19	5.83	9.26 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	2.63	17.99	4.85	25.47
Impervious Cover (acres)	0.00	0.05	0.30	0.01	0.35
					35.08

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.34

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	9.26
Weighted Rv (forest)	0.05
% Forest	26%
Managed Turf Cover (acres)	25.47
Weighted Rv (turf)	0.22
% Managed Turf	73%
Impervious Cover (acres)	0.35
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	35.08
Site Rv	0.18

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5381
Treatment Volume (cubic feet)	23,442
TP Load (lb/yr)	14.73
TN Load (lb/yr) (Informational Purposes Only)	105.36

Project Name: **Deep Creek-Southern Branch Elizabeth River 27-045.AR1-revised
Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.34	0.34 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.37	0.37
Impervious Cover (acres)	0.00	0.00	0.00	1.00	1.00
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					1.70

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 1.71

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.34
Weighted Rv (forest)	0.05
% Forest	20%
Managed Turf Cover (acres)	0.37
Weighted Rv (turf)	0.25
% Managed Turf	21%
Impervious Cover (acres)	1.00
Rv (impervious)	0.95
% Impervious	58%
Site Area (acres)	1.70
Site Rv	0.62

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0879
Treatment Volume (cubic feet)	3,829
TP Load (lb/yr)	2.41
TN Load (lb/yr) (Informational Purposes Only)	17.21

Project Name: Deep Creek-Southern Branch Elizabeth River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	5.76	0.00	0.00	56.59	62.35 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.64	0.00	0.00	30.78	31.42
Impervious Cover (acres)	0.17	0.00	0.00	15.17	15.33
					109.10

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

12.97

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	62.35
Weighted Rv (forest)	0.05
% Forest	57%
Managed Turf Cover (acres)	31.42
Weighted Rv (turf)	0.25
% Managed Turf	29%
Impervious Cover (acres)	15.33
Rv (impervious)	0.95
% Impervious	14%
Site Area (acres)	109.10
Site Rv	0.23

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	2.1085
Treatment Volume (cubic feet)	91,844
TP Load (lb/yr)	57.71
TN Load (lb/yr) (Informational Purposes Only)	412.82

Project Name: Douglas Run-Meherrin River 15-011-AR 1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.03	0.03
Impervious Cover (acres)	0.00	0.00	0.00	0.02	0.02
					0.06

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.05

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.25
% Managed Turf	61%
Impervious Cover (acres)	0.02
Rv (impervious)	0.95
% Impervious	39%
Site Area (acres)	0.06
Site Rv	0.53

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0025
Treatment Volume (cubic feet)	110
TP Load (lb/yr)	0.07
TN Load (lb/yr) (Informational Purposes Only)	0.49

Project Name: Douglas Run-Meherrin River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	11.37	34.07	24.34	69.78 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.47	10.03	1.72	12.22
Impervious Cover (acres)	0.00	0.07	0.84	0.05	0.96
					82.96

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-19.04

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	69.78
Weighted Rv (forest)	0.04
% Forest	84%
Managed Turf Cover (acres)	12.22
Weighted Rv (turf)	0.22
% Managed Turf	15%
Impervious Cover (acres)	0.96
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	82.96
Site Rv	0.08

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5472
Treatment Volume (cubic feet)	23,835
TP Load (lb/yr)	14.98
TN Load (lb/yr) (Informational Purposes Only)	107.13

Project Name: Dry Run 36-014.AR3 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.17	0.00	0.00	0.00	2.17 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.07	0.00	0.00	0.00	0.07
Impervious Cover (acres)	2.58	0.00	0.00	0.00	2.58
					4.82

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 3.74

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	2.17
Weighted Rv (forest)	0.02
% Forest	45%
Managed Turf Cover (acres)	0.07
Weighted Rv (turf)	0.15
% Managed Turf	1%
Impervious Cover (acres)	2.58
Rv (impervious)	0.95
% Impervious	54%
Site Area (acres)	4.82
Site Rv	0.52

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2090
Treatment Volume (cubic feet)	9,102
TP Load (lb/yr)	5.72
TN Load (lb/yr) (Informational Purposes Only)	40.91

Project Name: Dry Run ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	26.63	15.84	0.00	2.21	44.67 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.57	3.04	0.00	2.22	5.83
Impervious Cover (acres)	0.13	0.04	0.00	0.00	0.17
					50.67

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-15.02

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	44.67
Weighted Rv (forest)	0.03
% Forest	88%
Managed Turf Cover (acres)	5.83
Weighted Rv (turf)	0.21
% Managed Turf	12%
Impervious Cover (acres)	0.17
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	50.67
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2104
Treatment Volume (cubic feet)	9,164
TP Load (lb/yr)	5.76
TN Load (lb/yr) (Informational Purposes Only)	41.19

Project Name: **Ducker Creek-Appomattox River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	14.22	17.35	0.70	32.27 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.28	2.42	0.00	2.70
Impervious Cover (acres)	0.00	0.02	0.12	0.00	0.14
					35.11

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-10.11

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	32.27
Weighted Rv (forest)	0.04
% Forest	92%
Managed Turf Cover (acres)	2.70
Weighted Rv (turf)	0.22
% Managed Turf	8%
Impervious Cover (acres)	0.14
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	35.11
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1567
Treatment Volume (cubic feet)	6,826
TP Load (lb/yr)	4.29
TN Load (lb/yr) (Informational Purposes Only)	30.68

Project Name: Dutch Creek-Rockfish River 08-086-A045-AR 3 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.37	0.00	0.00	0.37 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.40	0.00	0.00	0.40
					0.77

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.58

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.37
Weighted Rv (forest)	0.03
% Forest	48%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.40
Rv (impervious)	0.95
% Impervious	52%
Site Area (acres)	0.77
Site Rv	0.51

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0326
Treatment Volume (cubic feet)	1,419
TP Load (lb/yr)	0.89
TN Load (lb/yr) (Informational Purposes Only)	6.38

Project Name: Dutch Creek-Rockfish River 08-086-A050-AR 1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.09	0.00	0.00	1.09 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.04	0.00	0.00	0.04
Impervious Cover (acres)	0.00	1.30	0.00	0.00	1.30
					2.42

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 1.91

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	1.09
Weighted Rv (forest)	0.03
% Forest	45%
Managed Turf Cover (acres)	0.04
Weighted Rv (turf)	0.20
% Managed Turf	2%
Impervious Cover (acres)	1.30
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	2.42
Site Rv	0.52

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1059
Treatment Volume (cubic feet)	4,614
TP Load (lb/yr)	2.90
TN Load (lb/yr) (Informational Purposes Only)	20.74

Project Name: Dutch Creek-Rockfish River 08-086-A054.AR1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.49	0.00	0.00	0.49 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.06	0.00	0.00	0.06
Impervious Cover (acres)	0.00	0.64	0.00	0.00	0.64
					1.18

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.95

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.49
Weighted Rv (forest)	0.03
% Forest	41%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.20
% Managed Turf	5%
Impervious Cover (acres)	0.64
Rv (impervious)	0.95
% Impervious	54%
Site Area (acres)	1.18
Site Rv	0.53

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0525
Treatment Volume (cubic feet)	2,285
TP Load (lb/yr)	1.44
TN Load (lb/yr) (Informational Purposes Only)	10.27

Project Name: Dutch Creek-Rockfish River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	63.49	3.60	0.66	67.75 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.55	0.00	0.00	0.55
Impervious Cover (acres)	0.00	0.14	0.00	0.00	0.14
					68.44

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-22.76

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	67.75
Weighted Rv (forest)	0.03
% Forest	99%
Managed Turf Cover (acres)	0.55
Weighted Rv (turf)	0.20
% Managed Turf	1%
Impervious Cover (acres)	0.14
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	68.44
Site Rv	0.03

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1935
Treatment Volume (cubic feet)	8,429
TP Load (lb/yr)	5.30
TN Load (lb/yr) (Informational Purposes Only)	37.88

Project Name: Edison Creek-Middle River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	15.40	0.00	4.96	20.36 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	43.67	0.00	2.61	46.28
Impervious Cover (acres)	0.00	0.43	0.00	0.09	0.52
					67.16

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-3.37

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	20.36
Weighted Rv (forest)	0.03
% Forest	30%
Managed Turf Cover (acres)	46.28
Weighted Rv (turf)	0.20
% Managed Turf	69%
Impervious Cover (acres)	0.52
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	67.16
Site Rv	0.16

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.8828
Treatment Volume (cubic feet)	38,457
TP Load (lb/yr)	24.16
TN Load (lb/yr) (Informational Purposes Only)	172.85

Project Name: **Falling Run-Meherrin River 15-029-AR 2 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.12	0.00	0.00	0.12 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.13	0.00	0.00	0.13
					0.25

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.19**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.12
Weighted Rv (forest)	0.03
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.13
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	0.25
Site Rv	0.52

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0108
Treatment Volume (cubic feet)	470
TP Load (lb/yr)	0.30
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	2.11

Project Name: **Falling Run-Meherrin River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	2.31	10.86	10.95	24.12 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.99	1.05	0.43	2.48
Impervious Cover (acres)	0.00	0.25	0.26	0.11	0.62
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					27.22

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-6.19

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	24.12
Weighted Rv (forest)	0.04
% Forest	89%
Managed Turf Cover (acres)	2.48
Weighted Rv (turf)	0.22
% Managed Turf	9%
Impervious Cover (acres)	0.62
Rv (impervious)	0.95
% Impervious	2%
Site Area (acres)	27.22
Site Rv	0.08

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1815
Treatment Volume (cubic feet)	7,907
TP Load (lb/yr)	4.97
TN Load (lb/yr) (Informational Purposes Only)	35.54

Project Name: **Folly Mills Creek-Christians Creek 07-001-A138.AR 1 Proposed New Road**
 Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.17	0.00	0.00	0.17 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.53	0.07	0.00	0.60
Impervious Cover (acres)	0.00	0.79	0.08	0.00	0.87
					1.64

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **1.51**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.17
Weighted Rv (forest)	0.03
% Forest	10%
Managed Turf Cover (acres)	0.60
Weighted Rv (turf)	0.20
% Managed Turf	37%
Impervious Cover (acres)	0.87
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	1.64
Site Rv	0.58

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0795
Treatment Volume (cubic feet)	3,463
TP Load (lb/yr)	2.18
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	15.56

Project Name: **Folly Mills Creek-Christians Creek 07-001-A148-AR 1 Proposed New Road**
 Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.51	0.00	0.37	0.88
Impervious Cover (acres)	0.00	0.60	0.00	0.54	1.14
					2.02

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **2.08**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.03
% Forest	0%
Managed Turf Cover (acres)	0.88
Weighted Rv (turf)	0.22
% Managed Turf	44%
Impervious Cover (acres)	1.14
Rv (impervious)	0.95
% Impervious	56%
Site Area (acres)	2.02
Site Rv	0.63

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1061
Treatment Volume (cubic feet)	4,622
TP Load (lb/yr)	2.90
TN Load (lb/yr) (Informational Purposes Only)	20.77

Project Name: Folly Mills Creek-Christians Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	24.37	11.18	6.96	42.51 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	25.08	5.30	6.84	37.23
Impervious Cover (acres)	0.00	0.57	0.02	0.25	0.84
					80.58

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-9.73

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	42.51
Weighted Rv (forest)	0.04
% Forest	53%
Managed Turf Cover (acres)	37.23
Weighted Rv (turf)	0.21
% Managed Turf	46%
Impervious Cover (acres)	0.84
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	80.58
Site Rv	0.13

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.8515
Treatment Volume (cubic feet)	37,090
TP Load (lb/yr)	23.30
TN Load (lb/yr) (Informational Purposes Only)	166.71

Project Name: Grease Creek-Slate River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	8.26	0.45	2.06	10.77 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.94	0.00	0.29	1.23
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
					12.00

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-3.49

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	10.77
Weighted Rv (forest)	0.03
% Forest	90%
Managed Turf Cover (acres)	1.23
Weighted Rv (turf)	0.21
% Managed Turf	10%
Impervious Cover (acres)	0.00
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	12.00
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0524
Treatment Volume (cubic feet)	2,283
TP Load (lb/yr)	1.43
TN Load (lb/yr) (Informational Purposes Only)	10.26

Project Name: **Hamilton Branch ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	7.87	32.60	4.19	5.56	50.23 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	3.59	2.21	7.83	8.14	21.77
Impervious Cover (acres)	0.21	0.09	0.00	0.17	0.47
					72.46

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-14.28

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	50.23
Weighted Rv (forest)	0.03
% Forest	69%
Managed Turf Cover (acres)	21.77
Weighted Rv (turf)	0.22
% Managed Turf	30%
Impervious Cover (acres)	0.47
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	72.46
Site Rv	0.09

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5636
Treatment Volume (cubic feet)	24,549
TP Load (lb/yr)	15.42
TN Load (lb/yr) (Informational Purposes Only)	110.34

Project Name: **Holloway Draft-Calfpasture River 07-001-A017.AR1 Proposed New Road**
 Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.01	0.00	0.00	0.01 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.17	0.02	0.12	0.00	0.31
Impervious Cover (acres)	0.19	0.04	0.15	0.00	0.38
					0.70

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.66**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.01
Weighted Rv (forest)	0.03
% Forest	2%
Managed Turf Cover (acres)	0.31
Weighted Rv (turf)	0.18
% Managed Turf	44%
Impervious Cover (acres)	0.38
Rv (impervious)	0.95
% Impervious	54%
Site Area (acres)	0.70
Site Rv	0.59

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0346
Treatment Volume (cubic feet)	1,507
TP Load (lb/yr)	0.95
TN Load (lb/yr) (Informational Purposes Only)	6.77

Project Name: **Holloway Draft-Calfpasture River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	8.41	11.16	0.85	2.15	22.57 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	22.99	7.89	5.43	14.55	50.86
Impervious Cover (acres)	0.20	0.08	0.14	0.18	0.60
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					74.02

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-5.11

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	22.57
Weighted Rv (forest)	0.03
% Forest	30%
Managed Turf Cover (acres)	50.86
Weighted Rv (turf)	0.19
% Managed Turf	69%
Impervious Cover (acres)	0.60
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	74.02
Site Rv	0.15

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.9224
Treatment Volume (cubic feet)	40,179
TP Load (lb/yr)	25.24
TN Load (lb/yr) (Informational Purposes Only)	180.59

Project Name: Horsepen Creek-Slate River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	21.37	39.16	8.34	68.87 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	3.78	1.24	1.02	6.05
Impervious Cover (acres)	0.00	0.06	0.09	0.00	0.15
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					75.07

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-21.53

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	68.87
Weighted Rv (forest)	0.04
% Forest	92%
Managed Turf Cover (acres)	6.05
Weighted Rv (turf)	0.21
% Managed Turf	8%
Impervious Cover (acres)	0.15
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	75.07
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3380
Treatment Volume (cubic feet)	14,721
TP Load (lb/yr)	9.25
TN Load (lb/yr) (Informational Purposes Only)	66.17

Project Name: Inch Branch-Back Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	9.98	50.82	6.17	8.95	75.92 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	8.96	4.70	0.00	1.47	15.12
Impervious Cover (acres)	0.34	0.48	0.00	0.20	1.03
					92.07

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-23.97

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	75.92
Weighted Rv (forest)	0.03
% Forest	82%
Managed Turf Cover (acres)	15.12
Weighted Rv (turf)	0.18
% Managed Turf	16%
Impervious Cover (acres)	1.03
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	92.07
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5037
Treatment Volume (cubic feet)	21,939
TP Load (lb/yr)	13.78
TN Load (lb/yr) (Informational Purposes Only)	98.61

Project Name: Jacks Swamp ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.22	1.20	1.42 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.01	0.70	0.71
Impervious Cover (acres)	0.00	0.00	0.00	0.02	0.02
					2.15

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-0.28

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	1.42
Weighted Rv (forest)	0.05
% Forest	66%
Managed Turf Cover (acres)	0.71
Weighted Rv (turf)	0.25
% Managed Turf	33%
Impervious Cover (acres)	0.02
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	2.15
Site Rv	0.12

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0220
Treatment Volume (cubic feet)	956
TP Load (lb/yr)	0.60
TN Load (lb/yr) (Informational Purposes Only)	4.30

Project Name: Jennings Branch 07-001-A057.AR-AR 1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.09	0.00	0.00	0.09
Impervious Cover (acres)	0.00	0.10	0.00	0.00	0.10
					0.20

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.18

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.20
% Managed Turf	48%
Impervious Cover (acres)	0.10
Rv (impervious)	0.95
% Impervious	52%
Site Area (acres)	0.20
Site Rv	0.59

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0096
Treatment Volume (cubic feet)	420
TP Load (lb/yr)	0.26
TN Load (lb/yr) (Informational Purposes Only)	1.89

Project Name: Jennings Branch 07-001-AR 7 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.19	0.00	0.00	0.19 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.05	0.31	0.00	0.00	0.36
Impervious Cover (acres)	0.07	0.74	0.00	0.00	0.81
					1.36

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 1.38

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.19
Weighted Rv (forest)	0.03
% Forest	14%
Managed Turf Cover (acres)	0.36
Weighted Rv (turf)	0.19
% Managed Turf	26%
Impervious Cover (acres)	0.81
Rv (impervious)	0.95
% Impervious	60%
Site Area (acres)	1.36
Site Rv	0.62

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0706
Treatment Volume (cubic feet)	3,077
TP Load (lb/yr)	1.93
TN Load (lb/yr) (Informational Purposes Only)	13.83

Project Name: Jennings Branch ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	6.03	60.04	0.91	3.27	70.25 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.48	25.67	0.00	0.19	26.34
Impervious Cover (acres)	0.12	0.73	0.00	0.01	0.85
					97.44

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-21.28

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	70.25
Weighted Rv (forest)	0.03
% Forest	72%
Managed Turf Cover (acres)	26.34
Weighted Rv (turf)	0.20
% Managed Turf	27%
Impervious Cover (acres)	0.85
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	97.44
Site Rv	0.08

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.6821
Treatment Volume (cubic feet)	29,713
TP Load (lb/yr)	18.67
TN Load (lb/yr) (Informational Purposes Only)	133.55

Project Name: **Jim Dave Run-Back Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	29.76	23.40	2.43	54.85	110.43 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.80	1.62	2.44	0.21	5.07
Impervious Cover (acres)	0.00	0.21	0.00	0.05	0.26
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					115.76

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-35.12

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	110.43
Weighted Rv (forest)	0.04
% Forest	95%
Managed Turf Cover (acres)	5.07
Weighted Rv (turf)	0.20
% Managed Turf	4%
Impervious Cover (acres)	0.26
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	115.76
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.4511
Treatment Volume (cubic feet)	19,650
TP Load (lb/yr)	12.35
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	88.32

Project Name: Jones Swamp ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.31	7.63	3.22	26.03	37.19 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	2.42	2.32	6.94	6.18	17.86
Impervious Cover (acres)	0.04	0.05	0.14	0.09	0.32
					55.38

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-9.31

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	37.19
Weighted Rv (forest)	0.04
% Forest	67%
Managed Turf Cover (acres)	17.86
Weighted Rv (turf)	0.22
% Managed Turf	32%
Impervious Cover (acres)	0.32
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	55.38
Site Rv	0.11

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.4894
Treatment Volume (cubic feet)	21,318
TP Load (lb/yr)	13.39
TN Load (lb/yr) (Informational Purposes Only)	95.82

Project Name: Kingsale Swamp ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.02	3.04	2.12	11.24	16.41 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.93	2.93	4.18	5.12	13.16
Impervious Cover (acres)	0.00	0.02	0.23	0.08	0.33
					29.90

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-3.18

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	16.41
Weighted Rv (forest)	0.04
% Forest	55%
Managed Turf Cover (acres)	13.16
Weighted Rv (turf)	0.22
% Managed Turf	44%
Impervious Cover (acres)	0.33
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	29.90
Site Rv	0.13

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3317
Treatment Volume (cubic feet)	14,450
TP Load (lb/yr)	9.08
TN Load (lb/yr) (Informational Purposes Only)	64.95

Project Name: Lake Drummond-Dismal Swamp ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.40	0.40 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	1.06	1.06
Impervious Cover (acres)	0.00	0.00	0.00	1.92	1.92
					3.39

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 3.42

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.40
Weighted Rv (forest)	0.05
% Forest	12%
Managed Turf Cover (acres)	1.06
Weighted Rv (turf)	0.25
% Managed Turf	31%
Impervious Cover (acres)	1.92
Rv (impervious)	0.95
% Impervious	57%
Site Area (acres)	3.39
Site Rv	0.62

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1758
Treatment Volume (cubic feet)	7,659
TP Load (lb/yr)	4.81
TN Load (lb/yr) (Informational Purposes Only)	34.43

Project Name: Lake Prince ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	3.22	2.96	2.18	0.58	8.94 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	6.11	3.87	2.44	1.69	14.11
Impervious Cover (acres)	0.07	0.63	0.00	0.15	0.85
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					23.90

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-1.29

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	8.94
Weighted Rv (forest)	0.03
% Forest	37%
Managed Turf Cover (acres)	14.11
Weighted Rv (turf)	0.19
% Managed Turf	59%
Impervious Cover (acres)	0.85
Rv (impervious)	0.95
% Impervious	4%
Site Area (acres)	23.90
Site Rv	0.16

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3107
Treatment Volume (cubic feet)	13,536
TP Load (lb/yr)	8.50
TN Load (lb/yr) (Informational Purposes Only)	60.84

Project Name: Lewis Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.75	0.00	0.00	0.75 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	18.16	0.88	0.00	19.04
Impervious Cover (acres)	0.00	0.27	0.00	0.00	0.27
					20.06

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 1.14

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.75
Weighted Rv (forest)	0.03
% Forest	4%
Managed Turf Cover (acres)	19.04
Weighted Rv (turf)	0.20
% Managed Turf	95%
Impervious Cover (acres)	0.27
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	20.06
Site Rv	0.20

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3423
Treatment Volume (cubic feet)	14,909
TP Load (lb/yr)	9.37
TN Load (lb/yr) (Informational Purposes Only)	67.01

Project Name: Lick Run-Stuart Run ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	13.79	11.03	22.13	32.19	79.14 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.64	3.79	0.53	0.77	5.73
Impervious Cover (acres)	0.06	0.04	0.12	0.00	0.22
					85.09

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-24.69

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	79.14
Weighted Rv (forest)	0.04
% Forest	93%
Managed Turf Cover (acres)	5.73
Weighted Rv (turf)	0.20
% Managed Turf	7%
Impervious Cover (acres)	0.22
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	85.09
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3726
Treatment Volume (cubic feet)	16,231
TP Load (lb/yr)	10.20
TN Load (lb/yr) (Informational Purposes Only)	72.96

Project Name: Little Creek-Deep Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	8.72	43.45	19.39	24.22	95.78 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.21	7.40	5.54	2.51	15.66
Impervious Cover (acres)	0.00	0.23	0.17	0.00	0.40
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					111.84

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-29.43

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	95.78
Weighted Rv (forest)	0.04
% Forest	86%
Managed Turf Cover (acres)	15.66
Weighted Rv (turf)	0.21
% Managed Turf	14%
Impervious Cover (acres)	0.40
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	111.84
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.6001
Treatment Volume (cubic feet)	26,139
TP Load (lb/yr)	16.42
TN Load (lb/yr) (Informational Purposes Only)	117.49

Project Name: Little Creek-Flat Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.35	18.18	12.15	17.88	49.55 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	11.40	6.00	1.48	18.88
Impervious Cover (acres)	0.00	0.22	0.10	0.00	0.32
					68.75

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-13.99

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	49.55
Weighted Rv (forest)	0.04
% Forest	72%
Managed Turf Cover (acres)	18.88
Weighted Rv (turf)	0.21
% Managed Turf	27%
Impervious Cover (acres)	0.32
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	68.75
Site Rv	0.09

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5187
Treatment Volume (cubic feet)	22,596
TP Load (lb/yr)	14.20
TN Load (lb/yr) (Informational Purposes Only)	101.56

Project Name: Little Willis River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.22	7.26	33.25	16.02	56.75 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.61	8.64	5.27	14.53
Impervious Cover (acres)	0.00	0.00	0.26	0.24	0.50
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					71.77

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-15.36

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	56.75
Weighted Rv (forest)	0.04
% Forest	79%
Managed Turf Cover (acres)	14.53
Weighted Rv (turf)	0.23
% Managed Turf	20%
Impervious Cover (acres)	0.50
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	71.77
Site Rv	0.09

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5139
Treatment Volume (cubic feet)	22,386
TP Load (lb/yr)	14.07
TN Load (lb/yr) (Informational Purposes Only)	100.62

Project Name: Lower Tarrara Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.32	2.35	11.02	8.77	23.46 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	3.46	20.42	0.43	24.31
Impervious Cover (acres)	0.00	0.02	0.29	0.00	0.32
					48.10

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-4.74

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	23.46
Weighted Rv (forest)	0.04
% Forest	49%
Managed Turf Cover (acres)	24.31
Weighted Rv (turf)	0.22
% Managed Turf	51%
Impervious Cover (acres)	0.32
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	48.10
Site Rv	0.14

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5474
Treatment Volume (cubic feet)	23,847
TP Load (lb/yr)	14.98
TN Load (lb/yr) (Informational Purposes Only)	107.19

Project Name: **Maclins Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.16	0.09	0.25 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.02	0.02
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					0.27

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-0.04

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.25
Weighted Rv (forest)	0.04
% Forest	92%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.02
Rv (impervious)	0.95
% Impervious	8%
Site Area (acres)	0.27
Site Rv	0.11

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0026
Treatment Volume (cubic feet)	113
TP Load (lb/yr)	0.07
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	0.51

Project Name: Meadow Creek-North River 09-045.AR3 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.30	0.36	0.66 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.17	0.17
Impervious Cover (acres)	0.00	0.00	0.35	0.58	0.93
					1.76

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 1.46

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.66
Weighted Rv (forest)	0.05
% Forest	37%
Managed Turf Cover (acres)	0.17
Weighted Rv (turf)	0.25
% Managed Turf	10%
Impervious Cover (acres)	0.93
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	1.76
Site Rv	0.54

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0797
Treatment Volume (cubic feet)	3,472
TP Load (lb/yr)	2.18
TN Load (lb/yr) (Informational Purposes Only)	15.60

Project Name: Meadow Creek-North River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	12.33	17.32	16.34	45.99 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.15	3.39	10.30	13.84
Impervious Cover (acres)	0.00	0.04	0.23	0.00	0.27
					60.10

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-12.13

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	45.99
Weighted Rv (forest)	0.04
% Forest	77%
Managed Turf Cover (acres)	13.84
Weighted Rv (turf)	0.24
% Managed Turf	23%
Impervious Cover (acres)	0.27
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	60.10
Site Rv	0.09

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.4572
Treatment Volume (cubic feet)	19,916
TP Load (lb/yr)	12.51
TN Load (lb/yr) (Informational Purposes Only)	89.52

Project Name: Mill Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.22	2.38	2.60 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
					2.60

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-0.78

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	2.60
Weighted Rv (forest)	0.05
% Forest	100%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.00
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	2.60
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0107
Treatment Volume (cubic feet)	464
TP Load (lb/yr)	0.29
TN Load (lb/yr) (Informational Purposes Only)	2.09

Project Name: **Mill Swamp-Fontaine Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.50	1.88	22.56	38.99	64.93 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.79	3.93	22.98	8.68	36.38
Impervious Cover (acres)	0.08	0.04	0.58	0.22	0.92
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					102.23

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-14.68

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	64.93
Weighted Rv (forest)	0.05
% Forest	64%
Managed Turf Cover (acres)	36.38
Weighted Rv (turf)	0.22
% Managed Turf	36%
Impervious Cover (acres)	0.92
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	102.23
Site Rv	0.12

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.9950
Treatment Volume (cubic feet)	43,344
TP Load (lb/yr)	27.23
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	194.82

Project Name: **Moffett Creek 07-001-A023.AR-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.03	0.00	0.15	0.18
Impervious Cover (acres)	0.00	0.03	0.00	0.17	0.19
					0.38

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.37**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.18
Weighted Rv (turf)	0.24
% Managed Turf	49%
Impervious Cover (acres)	0.19
Rv (impervious)	0.95
% Impervious	51%
Site Area (acres)	0.38
Site Rv	0.60

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0190
Treatment Volume (cubic feet)	828
TP Load (lb/yr)	0.52
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	3.72

Project Name: **Moffett Creek 07-001-A029.AR-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.17	0.00	0.03	0.19
Impervious Cover (acres)	0.00	0.18	0.00	0.03	0.21
					0.40

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.38**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.19
Weighted Rv (turf)	0.21
% Managed Turf	48%
Impervious Cover (acres)	0.21
Rv (impervious)	0.95
% Impervious	52%
Site Area (acres)	0.40
Site Rv	0.59

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0198
Treatment Volume (cubic feet)	862
TP Load (lb/yr)	0.54
TN Load (lb/yr) (Informational Purposes Only)	3.88

Project Name: **Moffett Creek 07-001-A030-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.43	0.00	0.00	0.43
Impervious Cover (acres)	0.00	0.50	0.00	0.00	0.50
					0.93

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.90**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.43
Weighted Rv (turf)	0.20
% Managed Turf	46%
Impervious Cover (acres)	0.50
Rv (impervious)	0.95
% Impervious	54%
Site Area (acres)	0.93
Site Rv	0.60

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0470
Treatment Volume (cubic feet)	2,046
TP Load (lb/yr)	1.29
TN Load (lb/yr) (Informational Purposes Only)	9.20

Project Name: **Moffett Creek 07-001-A030-AR 2 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.10	0.00	0.00	0.10
Impervious Cover (acres)	0.00	0.10	0.00	0.00	0.10
					0.20

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.18**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.10
Weighted Rv (turf)	0.20
% Managed Turf	48%
Impervious Cover (acres)	0.10
Rv (impervious)	0.95
% Impervious	52%
Site Area (acres)	0.20
Site Rv	0.59

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0097
Treatment Volume (cubic feet)	423
TP Load (lb/yr)	0.27
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	1.90

Project Name: **Moffett Creek 07-001-AR 7 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.02	0.00	0.00	0.02 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.01	0.00	0.00	0.01
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					0.03

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.02**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.02
Weighted Rv (forest)	0.03
% Forest	55%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.20
% Managed Turf	4%
Impervious Cover (acres)	0.01
Rv (impervious)	0.95
% Impervious	40%
Site Area (acres)	0.03
Site Rv	0.41

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0010
Treatment Volume (cubic feet)	46
TP Load (lb/yr)	0.03
TN Load (lb/yr) (Informational Purposes Only)	0.20

Project Name: **Moffett Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	3.51	20.90	0.00	0.51	24.92 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.66	30.90	11.05	6.75	49.36
Impervious Cover (acres)	0.00	1.07	0.19	0.00	1.26
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					75.54

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-2.87

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	24.92
Weighted Rv (forest)	0.03
% Forest	33%
Managed Turf Cover (acres)	49.36
Weighted Rv (turf)	0.21
% Managed Turf	65%
Impervious Cover (acres)	1.26
Rv (impervious)	0.95
% Impervious	2%
Site Area (acres)	75.54
Site Rv	0.16

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	1.0267
Treatment Volume (cubic feet)	44,721
TP Load (lb/yr)	28.10
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	201.01

Project Name: **Ramseys Draft ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.17	18.82	0.51	0.52	21.01 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	3.38	0.36	0.22	0.00	3.96
Impervious Cover (acres)	0.04	0.00	0.06	0.00	0.10
					25.08

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-7.18

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	21.01
Weighted Rv (forest)	0.03
% Forest	84%
Managed Turf Cover (acres)	3.96
Weighted Rv (turf)	0.16
% Managed Turf	16%
Impervious Cover (acres)	0.10
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	25.08
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1135
Treatment Volume (cubic feet)	4,943
TP Load (lb/yr)	3.11
TN Load (lb/yr) (Informational Purposes Only)	22.22

Project Name: **Red Oak Creek-Nottoway River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.55	0.00	0.00	0.55 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	3.20	0.00	0.00	3.20
Impervious Cover (acres)	0.00	0.80	0.00	0.00	0.80
					4.54

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **1.36**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.55
Weighted Rv (forest)	0.03
% Forest	12%
Managed Turf Cover (acres)	3.20
Weighted Rv (turf)	0.20
% Managed Turf	70%
Impervious Cover (acres)	0.80
Rv (impervious)	0.95
% Impervious	18%
Site Area (acres)	4.54
Site Rv	0.31

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1179
Treatment Volume (cubic feet)	5,136
TP Load (lb/yr)	3.23
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	23.08

Project Name: Reedy Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	51.91	2.66	35.67	90.23 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	5.37	2.59	1.11	9.07
Impervious Cover (acres)	0.00	0.36	0.48	0.91	1.74
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					101.04

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-25.41

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	90.23
Weighted Rv (forest)	0.04
% Forest	89%
Managed Turf Cover (acres)	9.07
Weighted Rv (turf)	0.21
% Managed Turf	9%
Impervious Cover (acres)	1.74
Rv (impervious)	0.95
% Impervious	2%
Site Area (acres)	101.04
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.5851
Treatment Volume (cubic feet)	25,489
TP Load (lb/yr)	16.01
TN Load (lb/yr) (Informational Purposes Only)	114.57

Project Name: Ripley Creek-Walton Fork ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	28.16	18.08	7.11	53.35 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.49	0.00	0.96	1.45
Impervious Cover (acres)	0.00	0.12	0.00	0.05	0.18
					54.97

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-17.00

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	53.35
Weighted Rv (forest)	0.04
% Forest	97%
Managed Turf Cover (acres)	1.45
Weighted Rv (turf)	0.23
% Managed Turf	3%
Impervious Cover (acres)	0.18
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	54.97
Site Rv	0.04

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2023
Treatment Volume (cubic feet)	8,814
TP Load (lb/yr)	5.54
TN Load (lb/yr) (Informational Purposes Only)	39.62

Project Name: **Round Gut-Nottoway River 25-078-AR 1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.05	0.17	0.06	0.27
Impervious Cover (acres)	0.00	0.05	0.20	0.06	0.31
					0.58

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.57**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.00
Weighted Rv (forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.27
Weighted Rv (turf)	0.22
% Managed Turf	47%
Impervious Cover (acres)	0.31
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	0.58
Site Rv	0.61

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0297
Treatment Volume (cubic feet)	1,294
TP Load (lb/yr)	0.81
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	5.82

Project Name: Round Gut-Nottoway River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.21	11.14	11.60	22.90	47.85 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	6.47	6.02	13.75	7.43	33.67
Impervious Cover (acres)	0.08	0.27	0.61	0.19	1.15
					82.67

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-10.77

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	47.85
Weighted Rv (forest)	0.04
% Forest	58%
Managed Turf Cover (acres)	33.67
Weighted Rv (turf)	0.21
% Managed Turf	41%
Impervious Cover (acres)	1.15
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	82.67
Site Rv	0.12

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.8449
Treatment Volume (cubic feet)	36,806
TP Load (lb/yr)	23.12
TN Load (lb/yr) (Informational Purposes Only)	165.43

Project Name: Rucker Run ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	7.68	0.00	0.00	7.68 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					7.68

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-2.62

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	7.68
Weighted Rv (forest)	0.03
% Forest	100%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.00
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	7.68
Site Rv	0.03

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0192
Treatment Volume (cubic feet)	837
TP Load (lb/yr)	0.53
TN Load (lb/yr) (Informational Purposes Only)	3.76

Project Name: **Saylers Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	7.41	33.28	0.70	9.08	50.46 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	1.71	10.62	0.55	0.47	13.34
Impervious Cover (acres)	0.04	0.15	0.00	0.12	0.30
					64.11

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-15.94

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	50.46
Weighted Rv (forest)	0.03
% Forest	79%
Managed Turf Cover (acres)	13.34
Weighted Rv (turf)	0.20
% Managed Turf	21%
Impervious Cover (acres)	0.30
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	64.11
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3780
Treatment Volume (cubic feet)	16,464
TP Load (lb/yr)	10.34
TN Load (lb/yr) (Informational Purposes Only)	74.00

Project Name: **Scotchtown Draft-Cowpasture River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	8.34	21.27	2.67	24.59	56.86 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.17	0.38	0.55	2.46	3.57
Impervious Cover (acres)	0.04	0.00	0.14	0.00	0.18
					60.61

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-17.66

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	56.86
Weighted Rv (forest)	0.04
% Forest	94%
Managed Turf Cover (acres)	3.57
Weighted Rv (turf)	0.24
% Managed Turf	6%
Impervious Cover (acres)	0.18
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	60.61
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2627
Treatment Volume (cubic feet)	11,443
TP Load (lb/yr)	7.19
TN Load (lb/yr) (Informational Purposes Only)	51.44

Project Name: Slagles Lake-Three Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	5.11	1.56	0.91	7.59 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	2.11	0.62	0.36	3.09
Impervious Cover (acres)	0.00	0.24	0.06	0.00	0.29
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					10.97

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-1.79

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	7.59
Weighted Rv (forest)	0.03
% Forest	69%
Managed Turf Cover (acres)	3.09
Weighted Rv (turf)	0.21
% Managed Turf	28%
Impervious Cover (acres)	0.29
Rv (impervious)	0.95
% Impervious	3%
Site Area (acres)	10.97
Site Rv	0.11

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0990
Treatment Volume (cubic feet)	4,313
TP Load (lb/yr)	2.71
TN Load (lb/yr) (Informational Purposes Only)	19.38

Project Name: South Fork Rockfish River 08-001-B013-AR 1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.27	0.00	0.00	0.27 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.05	0.00	0.00	0.05
Impervious Cover (acres)	0.00	0.38	0.00	0.00	0.38
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					0.69

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.57

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.27
Weighted Rv (forest)	0.03
% Forest	39%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.20
% Managed Turf	7%
Impervious Cover (acres)	0.38
Rv (impervious)	0.95
% Impervious	54%
Site Area (acres)	0.69
Site Rv	0.54

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0312
Treatment Volume (cubic feet)	1,358
TP Load (lb/yr)	0.85
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	6.10

Project Name: South Fork Rockfish River 08-001-B051-AR 1 Proposed New Road

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.11	0.00	0.12	0.23 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.04	0.00	0.02	0.06
Impervious Cover (acres)	0.00	0.17	0.00	0.15	0.32
					0.60

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | 0.49

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.23
Weighted Rv (forest)	0.04
% Forest	38%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.22
% Managed Turf	10%
Impervious Cover (acres)	0.32
Rv (impervious)	0.95
% Impervious	53%
Site Area (acres)	0.60
Site Rv	0.54

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0269
Treatment Volume (cubic feet)	1,171
TP Load (lb/yr)	0.74
TN Load (lb/yr) (Informational Purposes Only)	5.26

Project Name: South Fork Rockfish River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	7.08	74.92	0.57	2.06	84.63 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	4.03	2.02	1.46	4.21	11.72
Impervious Cover (acres)	0.24	0.36	0.00	0.00	0.60
					96.95

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-27.28

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	84.63
Weighted Rv (forest)	0.03
% Forest	87%
Managed Turf Cover (acres)	11.72
Weighted Rv (turf)	0.20
% Managed Turf	12%
Impervious Cover (acres)	0.60
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	96.95
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.4558
Treatment Volume (cubic feet)	19,854
TP Load (lb/yr)	12.47
TN Load (lb/yr) (Informational Purposes Only)	89.24

Project Name: Speights Run-Lake Kilby ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	4.84	4.84 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.64	0.64
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method					5.49

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-1.33

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	4.84
Weighted Rv (forest)	0.05
% Forest	88%
Managed Turf Cover (acres)	0.64
Weighted Rv (turf)	0.25
% Managed Turf	12%
Impervious Cover (acres)	0.00
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	5.49
Site Rv	0.07

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0336
Treatment Volume (cubic feet)	1,462
TP Load (lb/yr)	0.92
TN Load (lb/yr) (Informational Purposes Only)	6.57

Project Name: **Sturgeon Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	47.38	0.00	16.01	63.39 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	9.82	0.00	1.17	10.99
Impervious Cover (acres)	0.00	0.19	0.00	0.01	0.20
					74.58

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-19.93

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	63.39
Weighted Rv (forest)	0.04
% Forest	85%
Managed Turf Cover (acres)	10.99
Weighted Rv (turf)	0.21
% Managed Turf	15%
Impervious Cover (acres)	0.20
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	74.58
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3890
Treatment Volume (cubic feet)	16,943
TP Load (lb/yr)	10.65
TN Load (lb/yr) (Informational Purposes Only)	76.16

Project Name: **Sycamore Creek-James River 08-214-B007.AR1 Proposed New Road**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.30	0.09	0.00	0.39 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.03	0.00	0.03
Impervious Cover (acres)	0.00	0.29	0.15	0.00	0.44
					0.85

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) | **0.64**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	0.39
Weighted Rv (forest)	0.03
% Forest	45%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.21
% Managed Turf	4%
Impervious Cover (acres)	0.44
Rv (impervious)	0.95
% Impervious	51%
Site Area (acres)	0.85
Site Rv	0.51

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0363
Treatment Volume (cubic feet)	1,580
TP Load (lb/yr)	0.99
TN Load (lb/yr) (Informational Purposes Only)	7.10

Project Name: Sycamore Creek-James River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.51	23.52	27.02	36.55	87.60 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.09	3.08	7.04	1.40	11.60
Impervious Cover (acres)	0.01	4.09	5.98	0.21	10.29
					109.49

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-8.57

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	87.60
Weighted Rv (forest)	0.04
% Forest	80%
Managed Turf Cover (acres)	11.60
Weighted Rv (turf)	0.22
% Managed Turf	11%
Impervious Cover (acres)	10.29
Rv (impervious)	0.95
% Impervious	9%
Site Area (acres)	109.49
Site Rv	0.15

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	1.3270
Treatment Volume (cubic feet)	57,806
TP Load (lb/yr)	36.32
TN Load (lb/yr) (Informational Purposes Only)	259.82

Project Name: Tommeheton Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	8.62	3.06	0.82	12.49 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	3.26	0.00	0.23	3.50
Impervious Cover (acres)	0.00	0.36	0.00	0.00	0.36
					16.35

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-3.34

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	12.49
Weighted Rv (forest)	0.03
% Forest	76%
Managed Turf Cover (acres)	3.50
Weighted Rv (turf)	0.20
% Managed Turf	21%
Impervious Cover (acres)	0.36
Rv (impervious)	0.95
% Impervious	2%
Site Area (acres)	16.35
Site Rv	0.09

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1231
Treatment Volume (cubic feet)	5,362
TP Load (lb/yr)	3.37
TN Load (lb/yr) (Informational Purposes Only)	24.10

Project Name: Union Camp Holding Pond-Blackwater River ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.72	5.32	13.28	13.73	35.05 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	3.89	7.73	17.55	3.94	33.11
Impervious Cover (acres)	0.04	0.14	0.49	0.22	0.89
					69.05

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-7.20

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	35.05
Weighted Rv (forest)	0.04
% Forest	51%
Managed Turf Cover (acres)	33.11
Weighted Rv (turf)	0.21
% Managed Turf	48%
Impervious Cover (acres)	0.89
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	69.05
Site Rv	0.13

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.7711
Treatment Volume (cubic feet)	33,590
TP Load (lb/yr)	21.10
TN Load (lb/yr) (Informational Purposes Only)	150.98

Project Name: **Waqua Creek ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	64.69	3.53	4.56	72.79 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	7.37	1.12	0.37	8.86
Impervious Cover (acres)	0.00	0.31	0.05	0.09	0.46
					82.10

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-23.27

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	72.79
Weighted Rv (forest)	0.03
% Forest	89%
Managed Turf Cover (acres)	8.86
Weighted Rv (turf)	0.20
% Managed Turf	11%
Impervious Cover (acres)	0.46
Rv (impervious)	0.95
% Impervious	1%
Site Area (acres)	82.10
Site Rv	0.06

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.3796
Treatment Volume (cubic feet)	16,535
TP Load (lb/yr)	10.39
TN Load (lb/yr) (Informational Purposes Only)	74.32

Project Name: West Creek ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	9.12	25.38	8.51	1.12	44.13 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	2.47	0.77	0.00	3.24
Impervious Cover (acres)	0.00	0.10	0.07	0.00	0.17
					47.54

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-14.55

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	44.13
Weighted Rv (forest)	0.03
% Forest	93%
Managed Turf Cover (acres)	3.24
Weighted Rv (turf)	0.20
% Managed Turf	7%
Impervious Cover (acres)	0.17
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	47.54
Site Rv	0.05

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.1805
Treatment Volume (cubic feet)	7,864
TP Load (lb/yr)	4.94
TN Load (lb/yr) (Informational Purposes Only)	35.35

Project Name: Western Branch Reservoir ROW -

Date: June 5, 2017 REV 1

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.35	9.89	0.00	0.14	12.38 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	7.31	3.15	0.02	0.00	10.48
Impervious Cover (acres)	0.43	0.29	0.00	0.00	0.72
					23.58

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-3.36

**

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	12.38
Weighted Rv (forest)	0.03
% Forest	53%
Managed Turf Cover (acres)	10.48
Weighted Rv (turf)	0.17
% Managed Turf	44%
Impervious Cover (acres)	0.72
Rv (impervious)	0.95
% Impervious	3%
Site Area (acres)	23.58
Site Rv	0.12

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.2306
Treatment Volume (cubic feet)	10,044
TP Load (lb/yr)	6.31
TN Load (lb/yr) (Informational Purposes Only)	45.14

Project Name: **Whispering Creek-Willis River ROW -**

Date: **June 5, 2017 REV 1**

BMP Design Specifications List: **2013 Draft Stds & Specs**

Site Information

Post-Development Project (Treatment Volume and Loads)

Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.44	6.80	0.96	8.21 *
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.76	2.64	3.40
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
<i>* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method</i>					11.61

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)

-2.11

TP LOAD REDUCTION NOT REQUIRED

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary	
Forest/Open Space Cover (acres)	8.21
Weighted Rv (forest)	0.04
% Forest	71%
Managed Turf Cover (acres)	3.40
Weighted Rv (turf)	0.24
% Managed Turf	29%
Impervious Cover (acres)	0.00
Rv (impervious)	0.95
% Impervious	0%
Site Area (acres)	11.61
Site Rv	0.10

Treatment Volume and Nutrient Loads	
Treatment Volume (acre-ft)	0.0969
Treatment Volume (cubic feet)	4,220
TP Load (lb/yr)	2.65
TN Load (lb/yr) <i>(Informational Purposes Only)</i>	18.97

ATTACHMENT 2.2

DEQ Virginia Runoff Reduction Method Re-Development Compliance
Spreadsheets – Version 3.0

Project Name: **Bennett Creek-Nansemond River 26-060-A080.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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data input cells
 constant values
 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.08876817
Post-Development TP Load Reduction for Site (lb/yr):	0.21

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.02	0.00	0.00	0.00	0.02
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.10	0.09	0.04	0.00	0.23
Impervious Cover (acres)	0.04	0.03	0.01	0.00	0.09
					0.34

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.01	0.00	0.00	0.00	0.01
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.07	0.05	0.03	0.00	0.15
Impervious Cover (acres)	0.08	0.06	0.03	0.00	0.17
Area Check	OK	OK	OK	OK	0.34

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.02	0.01
Weighted Rv(forest)	0.02	0.02
% Forest	6%	5%
Managed Turf Cover (acres)	0.23	0.15
Weighted Rv(turf)	0.18	0.18
% Managed Turf	68%	60%
Impervious Cover (acres)	0.09	0.09
Rv(impervious)	0.95	0.95
% Impervious	26%	35%
Total Site Area (acres)	0.34	0.25
Site Rv	0.37	0.44

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.02
% Forest	4%
Managed Turf Cover (acres)	0.15
Weighted Rv (turf)	0.18
% Managed Turf	44%
Impervious Cover (acres)	0.17
Rv(impervious)	0.95
% Impervious	52%
Final Site Area (acres)	0.34
Final Post Dev Site Rv	0.57

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.02
% Forest	5%
Managed Turf Cover (acres)	0.15
Weighted Rv (turf)	0.18
% Managed Turf	60%
ReDev. Impervious Cover (acres)	0.09
Rv(impervious)	0.95
% Impervious	35%
Total ReDev. Site Area (acres)	0.25
ReDev Site Rv	0.44

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.09
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0103	0.0091
Pre-ReDevelopment Treatment Volume (cubic feet)	450	396
Pre-ReDevelopment TP Load (lb/yr)	0.28	0.25
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.84	1.00
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.10

Final Post-Development Treatment Volume (acre-ft)	0.0161
Final Post-Development Treatment Volume (cubic feet)	702
Final Post-Development TP Load (lb/yr)	0.44
Final Post-Development TP Load per acre (lb/acre/yr)	1.31

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0091
Post-ReDevelopment Treatment Volume (cubic feet)	396
Post-ReDevelopment Load (TP) (lb/yr) ²	0.25
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.00
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.05

Post-Development Treatment Volume (acre-ft)	0.0070
Post-Development Treatment Volume (cubic feet)	306
Post-Development TP Load (lb/yr)	0.19
TP Load Reduction Required for New Impervious Area (lb/yr)	0.16

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.21
Linear Project TP Load Reduction Required (lb/yr):	0.21

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	2.02
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	3.16
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Project Name: **Bishop Creek-Willis River 09-103.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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data input cells
 constant values
 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.358734331
Post-Development TP Load Reduction for Site (lb/yr): 0.91

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.39	0.40	0.00	0.78
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.21	0.00	0.21
Impervious Cover (acres)	0.00	0.14	0.23	0.00	0.38
					1.37

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.24	0.26	0.00	0.50
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.13	0.00	0.13
Impervious Cover (acres)	0.00	0.28	0.45	0.00	0.73
Area Check	OK	OK	OK	OK	1.37

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.78	0.50
Weighted Rv(forest)	0.04	0.04
% Forest	57%	50%
Managed Turf Cover (acres)	0.21	0.13
Weighted Rv(turf)	0.22	0.22
% Managed Turf	15%	13%
Impervious Cover (acres)	0.38	0.38
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	1.37	1.01
Site Rv	0.31	0.40

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.50
Weighted Rv(forest)	0.04
% Forest	37%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.22
% Managed Turf	10%
Impervious Cover (acres)	0.73
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	1.37
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.50
Weighted Rv(forest)	0.04
% Forest	50%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.22
% Managed Turf	13%
ReDev. Impervious Cover (acres)	0.38
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	1.01
ReDev Site Rv	0.40

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.36
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0359	0.0337
Pre-ReDevelopment Treatment Volume (cubic feet)	1,563	1,466
Pre-ReDevelopment TP Load (lb/yr)	0.98	0.92
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.72	0.91
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.41

Final Post-Development Treatment Volume (acre-ft)	0.0621
Final Post-Development Treatment Volume (cubic feet)	2,703
Final Post-Development TP Load (lb/yr)	1.70
Final Post-Development TP Load per acre (lb/acre/yr)	1.24

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0337
Post-ReDevelopment Treatment Volume (cubic feet)	1,466
Post-ReDevelopment Load (TP) (lb/yr) ²	0.92
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.91
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.18

Post-Development Treatment Volume (acre-ft)	0.0284
Post-Development Treatment Volume (cubic feet)	1,237
Post-Development TP Load (lb/yr)	0.78

TP Load Reduction Required for New Impervious Area (lb/yr)	0.63
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.81
 Linear Project TP Load Reduction Required (lb/yr): 0.91

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	7.03
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	12.15
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Project Name: **Bishop Creek-Willis River 09-113-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.489300191
Post-Development TP Load Reduction for Site (lb/yr): 1.25

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.76	0.12	0.42	1.30
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.05	0.00	0.00	0.05
Impervious Cover (acres)	0.00	0.29	0.04	0.15	0.49
					1.84

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.48	0.08	0.27	0.83
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.03	0.00	0.00	0.03
Impervious Cover (acres)	0.00	0.58	0.09	0.31	0.98
Area Check	OK	OK	OK	OK	1.84

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.30	0.83
Weighted Rv(forest)	0.04	0.04
% Forest	71%	62%
Managed Turf Cover (acres)	0.05	0.03
Weighted Rv(turf)	0.20	0.20
% Managed Turf	3%	2%
Impervious Cover (acres)	0.49	0.49
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	1.84	1.35
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.83
Weighted Rv(forest)	0.04
% Forest	45%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.20
% Managed Turf	2%
Impervious Cover (acres)	0.98
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.84
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.83
Weighted Rv(forest)	0.04
% Forest	62%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.20
% Managed Turf	2%
ReDev. Impervious Cover (acres)	0.49
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	1.35
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.49
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0435	0.0417
Pre-ReDevelopment Treatment Volume (cubic feet)	1,894	1,817
Pre-ReDevelopment TP Load (lb/yr)	1.19	1.14
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.65	0.85
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.55

Final Post-Development Treatment Volume (acre-ft)	0.0805
Final Post-Development Treatment Volume (cubic feet)	3,505
Final Post-Development TP Load (lb/yr)	2.20
Final Post-Development TP Load per acre (lb/acre/yr)	1.20

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0417
Post-ReDevelopment Treatment Volume (cubic feet)	1,817
Post-ReDevelopment TP Load (lb/yr) ²	1.14
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.85
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.23

Post-Development Treatment Volume (acre-ft)	0.0387
Post-Development Treatment Volume (cubic feet)	1,687
Post-Development TP Load (lb/yr)	1.06
TP Load Reduction Required for New Impervious Area (lb/yr)	0.86

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.09**
 Linear Project TP Load Reduction Required (lb/yr): **1.25**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **8.51**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **15.75**

Project Name: **Bolar Run-Jackson River 06-001-C028.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	1.024621184
Post-Development TP Load Reduction for Site (lb/yr):	2.64

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.71	0.00	0.00	0.00	2.71
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.14	0.00	0.00	0.00	0.14
Impervious Cover (acres)	1.04	0.00	0.00	0.00	1.04
					3.90

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.74	0.00	0.00	0.00	1.74
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.09	0.00	0.00	0.00	0.09
Impervious Cover (acres)	2.07	0.00	0.00	0.00	2.07
Area Check	OK	OK	OK	OK	3.90

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.71	1.74
Weighted Rv(forest)	0.02	0.02
% Forest	70%	61%
Managed Turf Cover (acres)	0.14	0.09
Weighted Rv(turf)	0.15	0.15
% Managed Turf	4%	3%
Impervious Cover (acres)	1.04	1.04
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	3.90	2.87
Site Rv	0.27	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.74
Weighted Rv(forest)	0.02
% Forest	45%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.15
% Managed Turf	2%
Impervious Cover (acres)	2.07
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	3.90
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.74
Weighted Rv(forest)	0.02
% Forest	61%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.15
% Managed Turf	3%
ReDev. Impervious Cover (acres)	1.04
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	2.87
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.02
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0887	0.0865
Pre-ReDevelopment Treatment Volume (cubic feet)	3,865	3,767
Pre-ReDevelopment TP Load (lb/yr)	2.43	2.37
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.62	0.82
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		1.18

Final Post-Development Treatment Volume (acre-ft)	0.1676
Final Post-Development Treatment Volume (cubic feet)	7,301
Final Post-Development TP Load (lb/yr)	4.59
Final Post-Development TP Load per acre (lb/acre/yr)	1.18

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0865
Post-ReDevelopment Treatment Volume (cubic feet)	3,767
Post-ReDevelopment Load (TP) (lb/yr) ¹	2.37
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.82
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.47

Post-Development Treatment Volume (acre-ft)	0.0811
Post-Development Treatment Volume (cubic feet)	3,533
Post-Development TP Load (lb/yr)	2.22
TP Load Reduction Required for New Impervious Area (lb/yr)	1.80

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	2.27
Linear Project TP Load Reduction Required (lb/yr):	2.64

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	17.37
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	32.81
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Project Name: **Bolar Run-Jackson River 06-001-C032.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.854212341
Post-Development TP Load Reduction for Site (lb/yr): 2.21

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.61	0.27	0.33	0.06	2.28
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.05	0.03	0.00	0.00	0.08
Impervious Cover (acres)	0.61	0.12	0.12	0.02	0.88
					3.24

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.03	0.17	0.21	0.04	1.45
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.03	0.02	0.00	0.00	0.05
Impervious Cover (acres)	1.22	0.23	0.24	0.05	1.73
Area Check	OK	OK	OK	OK	3.24

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.28	1.45
Weighted Rv(forest)	0.02	0.02
% Forest	70%	61%
Managed Turf Cover (acres)	0.08	0.05
Weighted Rv(turf)	0.17	0.17
% Managed Turf	2%	2%
Impervious Cover (acres)	0.88	0.88
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	3.24	2.38
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.45
Weighted Rv(forest)	0.02
% Forest	45%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.17
% Managed Turf	2%
Impervious Cover (acres)	1.73
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	3.24
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.45
Weighted Rv(forest)	0.02
% Forest	61%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.17
% Managed Turf	2%
ReDev. Impervious Cover (acres)	0.88
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	2.38
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.85
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0754	0.0733
Pre-ReDevelopment Treatment Volume (cubic feet)	3,287	3,194
Pre-ReDevelopment TP Load (lb/yr)	2.06	2.01
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.64	0.84
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.98

Final Post-Development Treatment Volume (acre-ft)	0.1409
Final Post-Development Treatment Volume (cubic feet)	6,139
Final Post-Development TP Load (lb/yr)	3.86
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0733
Post-ReDevelopment Treatment Volume (cubic feet)	3,194
Post-ReDevelopment Load (TP) (lb/yr) ²	2.01
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.84
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.40

Post-Development Treatment Volume (acre-ft)	0.0676
Post-Development Treatment Volume (cubic feet)	2,946
Post-Development TP Load (lb/yr)	1.85
TP Load Reduction Required for New Impervious Area (lb/yr)	1.50

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.90**
 Linear Project TP Load Reduction Required (lb/yr): **2.21**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **14.77**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **27.59**

Project Name: **Bolar Run-Jackson River 06-001-C036.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.142311849
Post-Development TP Load Reduction for Site (lb/yr): 0.39

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.01	0.00	0.01
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.12	0.23	0.04	0.39
Impervious Cover (acres)	0.00	0.08	0.15	0.02	0.25
					0.65

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.01	0.00	0.01
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.08	0.15	0.02	0.25
Impervious Cover (acres)	0.00	0.13	0.23	0.03	0.39
Area Check	OK	OK	OK	OK	0.65

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.01	0.01
Weighted Rv(forest)	0.04	0.04
% Forest	1%	1%
Managed Turf Cover (acres)	0.39	0.25
Weighted Rv(turf)	0.22	0.22
% Managed Turf	60%	49%
Impervious Cover (acres)	0.25	0.25
Rv(impervious)	0.95	0.95
% Impervious	39%	50%
Total Site Area (acres)	0.65	0.51
Site Rv	0.50	0.58

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.04
% Forest	1%
Managed Turf Cover (acres)	0.25
Weighted Rv (turf)	0.22
% Managed Turf	38%
Impervious Cover (acres)	0.39
Rv(impervious)	0.95
% Impervious	61%
Final Site Area (acres)	0.65
Final Post Dev Site Rv	0.66

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.04
% Forest	1%
Managed Turf Cover (acres)	0.25
Weighted Rv (turf)	0.22
% Managed Turf	49%
ReDev. Impervious Cover (acres)	0.25
Rv(impervious)	0.95
% Impervious	50%
Total ReDev. Site Area (acres)	0.51
ReDev Site Rv	0.58

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.14
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0270	0.0245
Pre-ReDevelopment Treatment Volume (cubic feet)	1,176	1,065
Pre-ReDevelopment TP Load (lb/yr)	0.74	0.67
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.14	1.32
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.21

Final Post-Development Treatment Volume (acre-ft)	0.0357
Final Post-Development Treatment Volume (cubic feet)	1,556
Final Post-Development TP Load (lb/yr)	0.98
Final Post-Development TP Load per acre (lb/acre/yr)	1.51

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0245
Post-ReDevelopment Treatment Volume (cubic feet)	1,065
Post-ReDevelopment Load (TP) (lb/yr) ²	0.67
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.32
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0113
Post-Development Treatment Volume (cubic feet)	491
Post-Development TP Load (lb/yr)	0.31

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.13
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.25
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.38**
 Linear Project TP Load Reduction Required (lb/yr): 0.39

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	5.28
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	6.99
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Project Name: **Bolar Run-Jackson River 06-001-C037.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.93075428
Post-Development TP Load Reduction for Site (lb/yr): 2.46

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.77	0.42	0.00	0.58	1.77
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.39	0.41	0.00	0.00	0.80
Impervious Cover (acres)	0.57	0.43	0.00	0.20	1.20
					3.77

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.49	0.27	0.00	0.37	1.12
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.25	0.26	0.00	0.00	0.51
Impervious Cover (acres)	1.01	0.72	0.00	0.41	2.13
Area Check	OK	OK	OK	OK	3.77

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.77	1.12
Weighted Rv(forest)	0.03	0.03
% Forest	47%	40%
Managed Turf Cover (acres)	0.80	0.51
Weighted Rv(turf)	0.18	0.18
% Managed Turf	21%	18%
Impervious Cover (acres)	1.20	1.20
Rv(impervious)	0.95	0.95
% Impervious	32%	42%
Total Site Area (acres)	3.77	2.83
Site Rv	0.36	0.45

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.12
Weighted Rv(forest)	0.03
% Forest	30%
Managed Turf Cover (acres)	0.51
Weighted Rv (turf)	0.18
% Managed Turf	14%
Impervious Cover (acres)	2.13
Rv(impervious)	0.95
% Impervious	57%
Final Site Area (acres)	3.77
Final Post Dev Site Rv	0.57

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.12
Weighted Rv(forest)	0.03
% Forest	40%
Managed Turf Cover (acres)	0.51
Weighted Rv (turf)	0.18
% Managed Turf	18%
ReDev. Impervious Cover (acres)	1.20
Rv(impervious)	0.95
% Impervious	42%
Total ReDev. Site Area (acres)	2.83
ReDev Site Rv	0.45

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.93
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1114	0.1055
Pre-ReDevelopment Treatment Volume (cubic feet)	4,854	4,596
Pre-ReDevelopment TP Load (lb/yr)	3.05	2.89
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.81	1.02
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.16

Final Post-Development Treatment Volume (acre-ft)	0.1792
Final Post-Development Treatment Volume (cubic feet)	7,805
Final Post-Development TP Load (lb/yr)	4.90
Final Post-Development TP Load per acre (lb/acre/yr)	1.30

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1055
Post-ReDevelopment Treatment Volume (cubic feet)	4,596
Post-ReDevelopment TP Load (lb/yr) ²	2.89
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.02
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.58

Post-Development Treatment Volume (acre-ft)	0.0737
Post-Development Treatment Volume (cubic feet)	3,210
Post-Development TP Load (lb/yr)	2.02
TP Load Reduction Required for New Impervious Area (lb/yr)	1.64

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **2.21**
 Linear Project TP Load Reduction Required (lb/yr): **2.46**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	21.82
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	35.08
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Project Name: **Bolar Run-Jackson River 06-001-C037.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	1.44686765
Post-Development TP Load Reduction for Site (lb/yr):	3.77

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	3.31	0.29	0.00	0.00	3.59
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.40	0.00	0.00	0.00	0.40
Impervious Cover (acres)	1.47	0.11	0.00	0.00	1.57
					5.57

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.11	0.18	0.00	0.00	2.29
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.26	0.00	0.00	0.00	0.26
Impervious Cover (acres)	2.81	0.21	0.00	0.00	3.02
Area Check	OK	OK	OK	OK	5.57

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	3.59	2.29
Weighted Rv(forest)	0.02	0.02
% Forest	65%	56%
Managed Turf Cover (acres)	0.40	0.26
Weighted Rv(turf)	0.15	0.15
% Managed Turf	7%	6%
Impervious Cover (acres)	1.57	1.57
Rv(impervious)	0.95	0.95
% Impervious	28%	38%
Total Site Area (acres)	5.57	4.12
Site Rv	0.29	0.38

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	2.29
Weighted Rv(forest)	0.02
% Forest	41%
Managed Turf Cover (acres)	0.26
Weighted Rv (turf)	0.15
% Managed Turf	5%
Impervious Cover (acres)	3.02
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	5.57
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	2.29
Weighted Rv(forest)	0.02
% Forest	56%
Managed Turf Cover (acres)	0.26
Weighted Rv (turf)	0.15
% Managed Turf	6%
ReDev. Impervious Cover (acres)	1.57
Rv(impervious)	0.95
% Impervious	38%
Total ReDev. Site Area (acres)	4.12
ReDev Site Rv	0.38

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.45
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1359	0.1318
Pre-ReDevelopment Treatment Volume (cubic feet)	5,920	5,743
Pre-ReDevelopment TP Load (lb/yr)	3.72	3.61
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.67	0.88
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		1.69

Final Post-Development Treatment Volume (acre-ft)	0.2464
Final Post-Development Treatment Volume (cubic feet)	10,733
Final Post-Development TP Load (lb/yr)	6.74
Final Post-Development TP Load per acre (lb/acre/yr)	1.21

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1318
Post-ReDevelopment Treatment Volume (cubic feet)	5,743
Post-ReDevelopment Load (TP) (lb/yr) ¹	3.61
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.88
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.1145
Post-Development Treatment Volume (cubic feet)	4,990
Post-Development TP Load (lb/yr)	3.13

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.72
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TP Load Reduction Required for New Impervious Area (lb/yr)	2.54
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	3.26
Linear Project TP Load Reduction Required (lb/yr)	3.77

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	26.61
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	48.24
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Project Name: **Bolar Run-Jackson River 06-001-C037.AR3 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.466289442
Post-Development TP Load Reduction for Site (lb/yr): 1.17

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.61	0.00	0.00	0.26	0.87
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.19	0.00	0.00	0.24	0.43
Impervious Cover (acres)	0.29	0.00	0.00	0.18	0.46
					1.75

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.39	0.00	0.00	0.16	0.55
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.12	0.00	0.00	0.15	0.27
Impervious Cover (acres)	0.57	0.00	0.00	0.35	0.93
Area Check	OK	OK	OK	OK	1.75

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.87	0.55
Weighted Rv(forest)	0.03	0.03
% Forest	49%	43%
Managed Turf Cover (acres)	0.43	0.27
Weighted Rv(turf)	0.21	0.21
% Managed Turf	24%	21%
Impervious Cover (acres)	0.46	0.46
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	1.75	1.29
Site Rv	0.31	0.40

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.55
Weighted Rv(forest)	0.03
% Forest	32%
Managed Turf Cover (acres)	0.27
Weighted Rv (turf)	0.21
% Managed Turf	16%
Impervious Cover (acres)	0.93
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.75
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.55
Weighted Rv(forest)	0.03
% Forest	43%
Managed Turf Cover (acres)	0.27
Weighted Rv (turf)	0.21
% Managed Turf	21%
ReDev. Impervious Cover (acres)	0.46
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	1.29
ReDev Site Rv	0.40

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.47
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0459	0.0425
Pre-ReDevelopment Treatment Volume (cubic feet)	1,998	1,851
Pre-ReDevelopment TP Load (lb/yr)	1.26	1.16
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.72	0.90
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.53

Final Post-Development Treatment Volume (acre-ft)	0.0794
Final Post-Development Treatment Volume (cubic feet)	3,459
Final Post-Development TP Load (lb/yr)	2.17
Final Post-Development TP Load per acre (lb/acre/yr)	1.24

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0425
Post-ReDevelopment Treatment Volume (cubic feet)	1,851
Post-ReDevelopment TP Load (lb/yr) ²	1.16
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.90
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.23

Post-Development Treatment Volume (acre-ft)	0.0369
Post-Development Treatment Volume (cubic feet)	1,608
Post-Development TP Load (lb/yr)	1.01
TP Load Reduction Required for New Impervious Area (lb/yr)	0.82

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.05**
 Linear Project TP Load Reduction Required (lb/yr): **1.17**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **8.98**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **15.55**

Project Name: **Bolar Run-Jackson River 36-014.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: **20%**
The site's net increase in impervious cover (acres) is: **1.181456042**
Post-Development TP Load Reduction for Site (lb/yr): **3.18**

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.23	0.85	0.00	0.00	2.08
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	1.06	0.13	0.00	0.00	1.18
Impervious Cover (acres)	1.25	0.39	0.00	0.00	1.64
					4.90

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.79	0.54	0.00	0.00	1.33
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.67	0.08	0.00	0.00	0.76
Impervious Cover (acres)	2.07	0.75	0.00	0.00	2.82
Area Check	OK	OK	OK	OK	4.90

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.08	1.33
Weighted Rv(forest)	0.02	0.02
% Forest	42%	36%
Managed Turf Cover (acres)	1.18	0.76
Weighted Rv(turf)	0.16	0.16
% Managed Turf	24%	20%
Impervious Cover (acres)	1.64	1.64
Rv(impervious)	0.95	0.95
% Impervious	33%	44%
Total Site Area (acres)	4.90	3.72
Site Rv	0.37	0.46

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.33
Weighted Rv(forest)	0.02
% Forest	27%
Managed Turf Cover (acres)	0.76
Weighted Rv (turf)	0.16
% Managed Turf	15%
Impervious Cover (acres)	2.82
Rv(impervious)	0.95
% Impervious	58%
Final Site Area (acres)	4.90
Final Post Dev Site Rv	0.58

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.33
Weighted Rv(forest)	0.02
% Forest	36%
Managed Turf Cover (acres)	0.76
Weighted Rv (turf)	0.16
% Managed Turf	20%
ReDev. Impervious Cover (acres)	1.64
Rv(impervious)	0.95
% Impervious	44%
Total ReDev. Site Area (acres)	3.72
ReDev Site Rv	0.46

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.18
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1493	0.1422
Pre-ReDevelopment Treatment Volume (cubic feet)	6,504	6,196
Pre-ReDevelopment TP Load (lb/yr)	4.09	3.89
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.83	1.05
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		1.53

Final Post-Development Treatment Volume (acre-ft)	0.2358
Final Post-Development Treatment Volume (cubic feet)	10,271
Final Post-Development TP Load (lb/yr)	6.45
Final Post-Development TP Load per acre (lb/acre/yr)	1.32

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1422
Post-ReDevelopment Treatment Volume (cubic feet)	6,196
Post-ReDevelopment Load (TP) (lb/yr) ²	3.89
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.05
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.78

Post-Development Treatment Volume (acre-ft)	0.0935
Post-Development Treatment Volume (cubic feet)	4,074
Post-Development TP Load (lb/yr)	2.56

TP Load Reduction Required for New Impervious Area (lb/yr)	2.08
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **2.85**
 Linear Project TP Load Reduction Required (lb/yr): **3.18**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	29.23
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	46.16
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Project Name: **Buck Creek-Rockfish River 08-014-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	1.16571755
Post-Development TP Load Reduction for Site (lb/yr):	3.00

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	3.07	0.00	0.07	3.14
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.07	0.00	0.00	0.07
Impervious Cover (acres)	0.00	1.16	0.00	0.03	1.19
					4.40

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.96	0.00	0.05	2.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.04	0.00	0.00	0.04
Impervious Cover (acres)	0.00	2.30	0.00	0.05	2.35
Area Check	OK	OK	OK	OK	4.40

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	3.14	2.00
Weighted Rv(forest)	0.03	0.03
% Forest	72%	62%
Managed Turf Cover (acres)	0.07	0.04
Weighted Rv(turf)	0.20	0.20
% Managed Turf	2%	1%
Impervious Cover (acres)	1.19	1.19
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	4.40	3.23
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	2.00
Weighted Rv(forest)	0.03
% Forest	46%
Managed Turf Cover (acres)	0.04
Weighted Rv (turf)	0.20
% Managed Turf	1%
Impervious Cover (acres)	2.35
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	4.40
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	2.00
Weighted Rv(forest)	0.03
% Forest	62%
Managed Turf Cover (acres)	0.04
Weighted Rv (turf)	0.20
% Managed Turf	1%
ReDev. Impervious Cover (acres)	1.19
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	3.23
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.17
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1029	0.0996
Pre-ReDevelopment Treatment Volume (cubic feet)	4,484	4,340
Pre-ReDevelopment TP Load (lb/yr)	2.82	2.73
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.64	0.84
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.33

Final Post-Development Treatment Volume (acre-ft)	0.1919
Final Post-Development Treatment Volume (cubic feet)	8,360
Final Post-Development TP Load (lb/yr)	5.25
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0996
Post-ReDevelopment Treatment Volume (cubic feet)	4,340
Post-ReDevelopment Load (TP) (lb/yr) ¹	2.73
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.84
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0923
Post-Development Treatment Volume (cubic feet)	4,020
Post-Development TP Load (lb/yr)	2.53

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.55
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TP Load Reduction Required for New Impervious Area (lb/yr)	2.05
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¹ Adjusted Land Cover Summary:
 Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	2.59
Linear Project TP Load Reduction Required (lb/yr):	3.00

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	20.15
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	37.58
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Project Name: **Butterfly Creek 13-006.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.067693969
Post-Development TP Load Reduction for Site (lb/yr): 0.17

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.19	0.00	0.00	0.19
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.07	0.00	0.00	0.07
					0.26

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.12	0.00	0.00	0.12
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.13	0.00	0.00	0.13
Area Check	OK	OK	OK	OK	0.26

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.19	0.12
Weighted Rv(forest)	0.03	0.03
% Forest	74%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.20	0.20
% Managed Turf	1%	1%
Impervious Cover (acres)	0.07	0.07
Rv(impervious)	0.95	0.95
% Impervious	25%	34%
Total Site Area (acres)	0.26	0.19
Site Rv	0.27	0.35

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.12
Weighted Rv(forest)	0.03
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.20
% Managed Turf	1%
Impervious Cover (acres)	0.13
Rv(impervious)	0.95
% Impervious	52%
Final Site Area (acres)	0.26
Final Post Dev Site Rv	0.51

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.12
Weighted Rv(forest)	0.03
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.20
% Managed Turf	1%
ReDev. Impervious Cover (acres)	0.07
Rv(impervious)	0.95
% Impervious	34%
Total ReDev. Site Area (acres)	0.19
ReDev Site Rv	0.35

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.07
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0057	0.0055
Pre-ReDevelopment Treatment Volume (cubic feet)	248	240
Pre-ReDevelopment TP Load (lb/yr)	0.16	0.15
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.61	0.80
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.08

Final Post-Development Treatment Volume (acre-ft)	0.0109
Final Post-Development Treatment Volume (cubic feet)	474
Final Post-Development TP Load (lb/yr)	0.30
Final Post-Development TP Load per acre (lb/acre/yr)	1.16

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0055
Post-ReDevelopment Treatment Volume (cubic feet)	240
Post-ReDevelopment TP Load (lb/yr) ²	0.15
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.80
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0054
Post-Development Treatment Volume (cubic feet)	233
Post-Development TP Load (lb/yr)	0.15

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.03
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.12
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.15**
 Linear Project TP Load Reduction Required (lb/yr): **0.17**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	1.11
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	2.13
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Project Name: **Butterwood Creek 13-007.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.075267853
Post-Development TP Load Reduction for Site (lb/yr): 0.20

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.17	0.00	0.00	0.17
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.04	0.00	0.00	0.04
Impervious Cover (acres)	0.00	0.09	0.00	0.00	0.09
					0.30

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.11	0.00	0.00	0.11
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.03	0.00	0.00	0.03
Impervious Cover (acres)	0.00	0.16	0.00	0.00	0.16
Area Check	OK	OK	OK	OK	0.30

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.17	0.11
Weighted Rv(forest)	0.03	0.03
% Forest	58%	50%
Managed Turf Cover (acres)	0.04	0.03
Weighted Rv(turf)	0.20	0.20
% Managed Turf	14%	12%
Impervious Cover (acres)	0.09	0.09
Rv(impervious)	0.95	0.95
% Impervious	29%	38%
Total Site Area (acres)	0.30	0.22
Site Rv	0.32	0.40

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.11
Weighted Rv(forest)	0.03
% Forest	37%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.20
% Managed Turf	9%
Impervious Cover (acres)	0.16
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	0.30
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.11
Weighted Rv(forest)	0.03
% Forest	50%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.20
% Managed Turf	12%
ReDev. Impervious Cover (acres)	0.09
Rv(impervious)	0.95
% Impervious	38%
Total ReDev. Site Area (acres)	0.22
ReDev Site Rv	0.40

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.08
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0079	0.0075
Pre-ReDevelopment Treatment Volume (cubic feet)	344	327
Pre-ReDevelopment TP Load (lb/yr)	0.22	0.21
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.72	0.92
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.09

Final Post-Development Treatment Volume (acre-ft)	0.0135
Final Post-Development Treatment Volume (cubic feet)	586
Final Post-Development TP Load (lb/yr)	0.37
Final Post-Development TP Load per acre (lb/acre/yr)	1.23

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0075
Post-ReDevelopment Treatment Volume (cubic feet)	327
Post-ReDevelopment TP Load (lb/yr) ²	0.21
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.92
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.04

Post-Development Treatment Volume (acre-ft)	0.0060
Post-Development Treatment Volume (cubic feet)	260
Post-Development TP Load (lb/yr)	0.16

TP Load Reduction Required for New Impervious Area (lb/yr)	0.13
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.17**
 Linear Project TP Load Reduction Required (lb/yr): 0.20

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	1.54
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	2.64
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Project Name: **Cabin Creek-Mill Creek 36-091.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.221896909
Post-Development TP Load Reduction for Site (lb/yr): 0.58

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.35	0.13	0.00	0.00	0.48
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.13	0.00	0.00	0.13
Impervious Cover (acres)	0.13	0.14	0.00	0.00	0.27
					0.88

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.23	0.08	0.00	0.00	0.31
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.08	0.00	0.00	0.08
Impervious Cover (acres)	0.25	0.23	0.00	0.00	0.49
Area Check	OK	OK	OK	OK	0.88

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.48	0.31
Weighted Rv(forest)	0.02	0.02
% Forest	55%	47%
Managed Turf Cover (acres)	0.13	0.08
Weighted Rv(turf)	0.20	0.20
% Managed Turf	15%	13%
Impervious Cover (acres)	0.27	0.27
Rv(impervious)	0.95	0.95
% Impervious	30%	40%
Total Site Area (acres)	0.88	0.66
Site Rv	0.33	0.42

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.31
Weighted Rv(forest)	0.02
% Forest	35%
Managed Turf Cover (acres)	0.08
Weighted Rv (turf)	0.20
% Managed Turf	10%
Impervious Cover (acres)	0.49
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	0.88
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.31
Weighted Rv(forest)	0.02
% Forest	47%
Managed Turf Cover (acres)	0.08
Weighted Rv (turf)	0.20
% Managed Turf	13%
ReDev. Impervious Cover (acres)	0.27
Rv(impervious)	0.95
% Impervious	40%
Total ReDev. Site Area (acres)	0.66
ReDev Site Rv	0.42

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.22
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0242	0.0230
Pre-ReDevelopment Treatment Volume (cubic feet)	1,052	1,003
Pre-ReDevelopment TP Load (lb/yr)	0.66	0.63
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.75	0.95
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.27

Final Post-Development Treatment Volume (acre-ft)	0.0406
Final Post-Development Treatment Volume (cubic feet)	1,768
Final Post-Development TP Load (lb/yr)	1.11
Final Post-Development TP Load per acre (lb/acre/yr)	1.26

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0230
Post-ReDevelopment Treatment Volume (cubic feet)	1,003
Post-ReDevelopment TP Load (lb/yr) ²	0.63
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.95
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.13

Post-Development Treatment Volume (acre-ft)	0.0176
Post-Development Treatment Volume (cubic feet)	765
Post-Development TP Load (lb/yr)	0.48

TP Load Reduction Required for New Impervious Area (lb/yr)	0.39
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.52**
 Linear Project TP Load Reduction Required (lb/yr): **0.58**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	4.73
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	7.95
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Project Name: Cedar Lake-Nansemond River 26-060-A080.AR1 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 1.35

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.358651937
 Post-Development TP Load Reduction for Site (lb/yr): 0.92

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.16	0.79	0.00	0.00	0.96
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.03	0.00	0.03
Impervious Cover (acres)	0.06	0.29	0.01	0.00	0.36
					1.35

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.10	0.50	0.00	0.00	0.61
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.02	0.00	0.02
Impervious Cover (acres)	0.11	0.58	0.02	0.00	0.72
Area Check	OK	OK	OK	OK	1.35

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.96	0.61
Weighted Rv(forest)	0.03	0.03
% Forest	71%	62%
Managed Turf Cover (acres)	0.03	0.02
Weighted Rv(turf)	0.22	0.22
% Managed Turf	2%	2%
Impervious Cover (acres)	0.36	0.36
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	1.35	0.99
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.61
Weighted Rv(forest)	0.03
% Forest	45%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.22
% Managed Turf	1%
Impervious Cover (acres)	0.72
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.35
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.61
Weighted Rv(forest)	0.03
% Forest	62%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.22
% Managed Turf	2%
ReDev. Impervious Cover (acres)	0.36
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.99
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.36
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0312	0.0302
Pre-ReDevelopment Treatment Volume (cubic feet)	1,359	1,315
Pre-ReDevelopment TP Load (lb/yr)	0.85	0.83
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.84
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.40

Final Post-Development Treatment Volume (acre-ft)	0.0586
Final Post-Development Treatment Volume (cubic feet)	2,551
Final Post-Development TP Load (lb/yr)	1.60
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0302
Post-ReDevelopment Treatment Volume (cubic feet)	1,315
Post-ReDevelopment TP Load (lb/yr) ¹	0.83
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.84
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.17

Post-Development Treatment Volume (acre-ft)	0.0284
Post-Development Treatment Volume (cubic feet)	1,237
Post-Development TP Load (lb/yr)	0.78
TP Load Reduction Required for New Impervious Area (lb/yr)	0.63

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.80
 Linear Project TP Load Reduction Required (lb/yr): 0.92

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	6.11
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	11.47
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Project Name: **Cellar Creek 12-101-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.663287565
Post-Development TP Load Reduction for Site (lb/yr): 1.70

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.65	0.00	0.00	1.65
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.18	0.00	0.00	0.18
Impervious Cover (acres)	0.00	0.69	0.00	0.00	0.69
					2.52

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.05	0.00	0.00	1.05
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.11	0.00	0.00	0.11
Impervious Cover (acres)	0.00	1.35	0.00	0.00	1.35
Area Check	OK	OK	OK	OK	2.52

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.65	1.05
Weighted Rv(forest)	0.03	0.03
% Forest	66%	57%
Managed Turf Cover (acres)	0.18	0.11
Weighted Rv(turf)	0.20	0.20
% Managed Turf	7%	6%
Impervious Cover (acres)	0.69	0.69
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	2.52	1.85
Site Rv	0.29	0.38

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.05
Weighted Rv(forest)	0.03
% Forest	42%
Managed Turf Cover (acres)	0.11
Weighted Rv (turf)	0.20
% Managed Turf	5%
Impervious Cover (acres)	1.35
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	2.52
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.05
Weighted Rv(forest)	0.03
% Forest	57%
Managed Turf Cover (acres)	0.11
Weighted Rv (turf)	0.20
% Managed Turf	6%
ReDev. Impervious Cover (acres)	0.69
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	1.85
ReDev Site Rv	0.38

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.66
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0613	0.0588
Pre-ReDevelopment Treatment Volume (cubic feet)	2,672	2,560
Pre-ReDevelopment TP Load (lb/yr)	1.68	1.61
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.67	0.87
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.76

Final Post-Development Treatment Volume (acre-ft)	0.1113
Final Post-Development Treatment Volume (cubic feet)	4,847
Final Post-Development TP Load (lb/yr)	3.05
Final Post-Development TP Load per acre (lb/acre/yr)	1.21

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0588
Post-ReDevelopment Treatment Volume (cubic feet)	2,560
Post-ReDevelopment Load (TP) (lb/yr) ²	1.61
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.87
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0525
Post-Development Treatment Volume (cubic feet)	2,287
Post-Development TP Load (lb/yr)	1.44

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.32
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TP Load Reduction Required for New Impervious Area (lb/yr)	1.17
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¹ Adjusted Land Cover Summary: Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)
Linear Project TP Load Reduction Required (lb/yr):

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	12.01
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	21.79
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Project Name: **Chair Draft-Calfpasture River 07-001-A009-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.155226152
Post-Development TP Load Reduction for Site (lb/yr): 0.41

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.32	0.00	0.00	0.00	0.32
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.11	0.00	0.00	0.00	0.11
Impervious Cover (acres)	0.19	0.00	0.00	0.00	0.19
					0.62

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.21	0.00	0.00	0.00	0.21
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.07	0.00	0.00	0.00	0.07
Impervious Cover (acres)	0.34	0.00	0.00	0.00	0.34
Area Check	OK	OK	OK	OK	0.62

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.32	0.21
Weighted Rv(forest)	0.02	0.02
% Forest	52%	44%
Managed Turf Cover (acres)	0.11	0.07
Weighted Rv(turf)	0.15	0.15
% Managed Turf	18%	15%
Impervious Cover (acres)	0.19	0.19
Rv(impervious)	0.95	0.95
% Impervious	30%	41%
Total Site Area (acres)	0.62	0.47
Site Rv	0.33	0.42

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.21
Weighted Rv(forest)	0.02
% Forest	33%
Managed Turf Cover (acres)	0.07
Weighted Rv (turf)	0.15
% Managed Turf	11%
Impervious Cover (acres)	0.34
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	0.62
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.21
Weighted Rv(forest)	0.02
% Forest	44%
Managed Turf Cover (acres)	0.07
Weighted Rv (turf)	0.15
% Managed Turf	15%
ReDev. Impervious Cover (acres)	0.19
Rv(impervious)	0.95
% Impervious	41%
Total ReDev. Site Area (acres)	0.47
ReDev Site Rv	0.42

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.16
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0169	0.0162
Pre-ReDevelopment Treatment Volume (cubic feet)	737	707
Pre-ReDevelopment TP Load (lb/yr)	0.46	0.44
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.74	0.95
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.19

Final Post-Development Treatment Volume (acre-ft)	0.0285
Final Post-Development Treatment Volume (cubic feet)	1,242
Final Post-Development TP Load (lb/yr)	0.78
Final Post-Development TP Load per acre (lb/acre/yr)	1.25

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0162
Post-ReDevelopment Treatment Volume (cubic feet)	707
Post-ReDevelopment Load (TP) (lb/yr) ²	0.44
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.95
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.09

Post-Development Treatment Volume (acre-ft)	0.0123
Post-Development Treatment Volume (cubic feet)	535
Post-Development TP Load (lb/yr)	0.34

TP Load Reduction Required for New Impervious Area (lb/yr)	0.27
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.36**
 Linear Project TP Load Reduction Required (lb/yr): **0.41**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	3.31
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	5.58
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Project Name: **Chair Draft-Calfpasture River 07-001-A055.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.73333825
Post-Development TP Load Reduction for Site (lb/yr): 1.92

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.76	0.03	0.00	1.79
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.14	0.11	0.00	0.25
Impervious Cover (acres)	0.00	0.78	0.09	0.00	0.86
					2.91

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.13	0.02	0.00	1.15
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.09	0.07	0.00	0.16
Impervious Cover (acres)	0.00	1.46	0.14	0.00	1.60
Area Check	OK	OK	OK	OK	2.91

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.79	1.15
Weighted Rv(forest)	0.03	0.03
% Forest	62%	53%
Managed Turf Cover (acres)	0.25	0.16
Weighted Rv(turf)	0.21	0.21
% Managed Turf	9%	7%
Impervious Cover (acres)	0.86	0.86
Rv(impervious)	0.95	0.95
% Impervious	30%	40%
Total Site Area (acres)	2.91	2.17
Site Rv	0.32	0.41

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.15
Weighted Rv(forest)	0.03
% Forest	40%
Managed Turf Cover (acres)	0.16
Weighted Rv (turf)	0.21
% Managed Turf	6%
Impervious Cover (acres)	1.60
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	2.91
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.15
Weighted Rv(forest)	0.03
% Forest	53%
Managed Turf Cover (acres)	0.16
Weighted Rv (turf)	0.21
% Managed Turf	7%
ReDev. Impervious Cover (acres)	0.86
Rv(impervious)	0.95
% Impervious	40%
Total ReDev. Site Area (acres)	2.17
ReDev Site Rv	0.41

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.73
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0772	0.0739
Pre-ReDevelopment Treatment Volume (cubic feet)	3,361	3,221
Pre-ReDevelopment TP Load (lb/yr)	2.11	2.02
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.73	0.93
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.89

Final Post-Development Treatment Volume (acre-ft)	0.1320
Final Post-Development Treatment Volume (cubic feet)	5,750
Final Post-Development TP Load (lb/yr)	3.61
Final Post-Development TP Load per acre (lb/acre/yr)	1.24

Treatment Volume and Nutrient Load

Post-ReDevelopment Treatment Volume (acre-ft)	0.0739
Post-ReDevelopment Treatment Volume (cubic feet)	3,221
Post-ReDevelopment TP Load (lb/yr) ²	2.02
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.93
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0581
Post-Development Treatment Volume (cubic feet)	2,529
Post-Development TP Load (lb/yr)	1.59

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.40
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TP Load Reduction Required for New Impervious Area (lb/yr)	1.29
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.69**
 Linear Project TP Load Reduction Required (lb/yr): 1.92

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	15.11
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	25.85
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Project Name: **Chair Draft-Calfpasture River 07-001-AR 3 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 5.86

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 1.524944845
Post-Development TP Load Reduction for Site (lb/yr): 3.95

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.51	2.99	0.30	0.00	3.80
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.09	0.25	0.06	0.00	0.41
Impervious Cover (acres)	0.22	1.29	0.15	0.00	1.65
					5.86

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.33	1.90	0.19	0.00	2.42
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.06	0.16	0.04	0.00	0.26
Impervious Cover (acres)	0.42	2.48	0.28	0.00	3.18
Area Check	OK	OK	OK	OK	5.86

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	3.80	2.42
Weighted Rv(forest)	0.03	0.03
% Forest	65%	56%
Managed Turf Cover (acres)	0.41	0.26
Weighted Rv(turf)	0.19	0.19
% Managed Turf	7%	6%
Impervious Cover (acres)	1.65	1.65
Rv(impervious)	0.95	0.95
% Impervious	28%	38%
Total Site Area (acres)	5.86	4.33
Site Rv	0.30	0.39

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	2.42
Weighted Rv(forest)	0.03
% Forest	41%
Managed Turf Cover (acres)	0.26
Weighted Rv (turf)	0.19
% Managed Turf	4%
Impervious Cover (acres)	3.18
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	5.86
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	2.42
Weighted Rv(forest)	0.03
% Forest	56%
Managed Turf Cover (acres)	0.26
Weighted Rv (turf)	0.19
% Managed Turf	6%
ReDev. Impervious Cover (acres)	1.65
Rv(impervious)	0.95
% Impervious	38%
Total ReDev. Site Area (acres)	4.33
ReDev Site Rv	0.39

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.52
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1468	0.1410
Pre-ReDevelopment Treatment Volume (cubic feet)	6,392	6,142
Pre-ReDevelopment TP Load (lb/yr)	4.02	3.86
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.69	0.89
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		1.78

Final Post-Development Treatment Volume (acre-ft)	0.2617
Final Post-Development Treatment Volume (cubic feet)	11,401
Final Post-Development TP Load (lb/yr)	7.16
Final Post-Development TP Load per acre (lb/acre/yr)	1.22

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1410
Post-ReDevelopment Treatment Volume (cubic feet)	6,142
Post-ReDevelopment TP Load (lb/yr) ²	3.86
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.89
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.77

Post-Development Treatment Volume (acre-ft)	0.1207
Post-Development Treatment Volume (cubic feet)	5,259
Post-Development TP Load (lb/yr)	3.30
TP Load Reduction Required for New Impervious Area (lb/yr)	2.68

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **3.45**
 Linear Project TP Load Reduction Required (lb/yr): **3.95**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **28.73**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **51.24**

Project Name: **Chair Draft-Calfpasture River 07-001-AR 6 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.242708336
Post-Development TP Load Reduction for Site (lb/yr): 0.62

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.67	0.00	0.00	0.67
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.24	0.00	0.00	0.24
Totals					0.91

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.43	0.00	0.00	0.43
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.48	0.00	0.00	0.48
Area Check	OK	OK	OK	OK	0.91

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.67	0.43
Weighted Rv(forest)	0.03	0.03
% Forest	74%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.24	0.24
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	0.91	0.67
Site Rv	0.27	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.43
Weighted Rv(forest)	0.03
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.48
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	0.91
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.43
Weighted Rv(forest)	0.03
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.24
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.67
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.24
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0207	0.0201
Pre-ReDevelopment Treatment Volume (cubic feet)	903	876
Pre-ReDevelopment TP Load (lb/yr)	0.57	0.55
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.62	0.82
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.27

Final Post-Development Treatment Volume (acre-ft)	0.0393
Final Post-Development Treatment Volume (cubic feet)	1,713
Final Post-Development TP Load (lb/yr)	1.08
Final Post-Development TP Load per acre (lb/acre/yr)	1.18

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0201
Post-ReDevelopment Treatment Volume (cubic feet)	876
Post-ReDevelopment Load (TP) (lb/yr) ²	0.55
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.82
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.11

Post-Development Treatment Volume (acre-ft)	0.0192
Post-Development Treatment Volume (cubic feet)	837
Post-Development TP Load (lb/yr)	0.53

TP Load Reduction Required for New Impervious Area (lb/yr)	0.43
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.54**
 Linear Project TP Load Reduction Required (lb/yr): **0.62**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	4.06
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	7.70
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Project Name: **Darden Pond-Mill Swamp 25-048-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.042792469
Post-Development TP Load Reduction for Site (lb/yr): 0.11

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.12	0.12
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.04	0.04
					0.16

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.08	0.08
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.08	0.08
Area Check	OK	OK	OK	OK	0.16

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.12	0.08
Weighted Rv(forest)	0.05	0.05
% Forest	76%	67%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.04	0.04
Rv(impervious)	0.95	0.95
% Impervious	24%	33%
Total Site Area (acres)	0.16	0.12
Site Rv	0.27	0.34

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.08
Weighted Rv(forest)	0.05
% Forest	50%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.08
Rv(impervious)	0.95
% Impervious	50%
Final Site Area (acres)	0.16
Final Post Dev Site Rv	0.50

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.08
Weighted Rv(forest)	0.05
% Forest	67%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.04
Rv(impervious)	0.95
% Impervious	33%
Total ReDev. Site Area (acres)	0.12
ReDev Site Rv	0.34

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.04
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0036	0.0034
Pre-ReDevelopment Treatment Volume (cubic feet)	158	150
Pre-ReDevelopment TP Load (lb/yr)	0.10	0.09
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.61	0.79
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.05

Final Post-Development Treatment Volume (acre-ft)	0.0068
Final Post-Development Treatment Volume (cubic feet)	298
Final Post-Development TP Load (lb/yr)	0.19
Final Post-Development TP Load per acre (lb/acre/yr)	1.15

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0034
Post-ReDevelopment Treatment Volume (cubic feet)	150
Post-ReDevelopment Load (TP) (lb/yr) ²	0.09
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.79
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0034
Post-Development Treatment Volume (cubic feet)	148
Post-Development TP Load (lb/yr)	0.09

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.02
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.08
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.09
 Linear Project TP Load Reduction Required (lb/yr): 0.11

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	0.71
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	1.34
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Project Name: **Deep Creek-Southern Branch Elizabeth River 27-002-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.852348244
Post-Development TP Load Reduction for Site (lb/yr): 2.16

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	2.14	2.14
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.22	0.22
Impervious Cover (acres)	0.00	0.00	0.00	0.86	0.86
					3.21

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	1.36	1.36
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.14	0.14
Impervious Cover (acres)	0.00	0.00	0.00	1.71	1.71
Area Check	OK	OK	OK	OK	3.21

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.14	1.36
Weighted Rv(forest)	0.05	0.05
% Forest	66%	58%
Managed Turf Cover (acres)	0.22	0.14
Weighted Rv(turf)	0.25	0.25
% Managed Turf	7%	6%
Impervious Cover (acres)	0.86	0.86
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	3.21	2.36
Site Rv	0.30	0.39

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.36
Weighted Rv(forest)	0.05
% Forest	42%
Managed Turf Cover (acres)	0.14
Weighted Rv (turf)	0.25
% Managed Turf	4%
Impervious Cover (acres)	1.71
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	3.21
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.36
Weighted Rv(forest)	0.05
% Forest	58%
Managed Turf Cover (acres)	0.14
Weighted Rv (turf)	0.25
% Managed Turf	6%
ReDev. Impervious Cover (acres)	0.86
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	2.36
ReDev Site Rv	0.39

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.85
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0817	0.0768
Pre-ReDevelopment Treatment Volume (cubic feet)	3,559	3,346
Pre-ReDevelopment TP Load (lb/yr)	2.24	2.10
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.70	0.89
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.97

Final Post-Development Treatment Volume (acre-ft)	0.1443
Final Post-Development Treatment Volume (cubic feet)	6,286
Final Post-Development TP Load (lb/yr)	3.95
Final Post-Development TP Load per acre (lb/acre/yr)	1.23

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0768
Post-ReDevelopment Treatment Volume (cubic feet)	3,346
Post-ReDevelopment TP Load (lb/yr) ¹	2.10
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.89
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.42

Post-Development Treatment Volume (acre-ft)	0.0675
Post-Development Treatment Volume (cubic feet)	2,939
Post-Development TP Load (lb/yr)	1.85

TP Load Reduction Required for New Impervious Area (lb/yr)	1.50
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.92**
 Linear Project TP Load Reduction Required (lb/yr): **2.16**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	16.00
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	28.25
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Project Name: **Deep Creek-Southern Branch Elizabeth River 27-006-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.634294021
Post-Development TP Load Reduction for Site (lb/yr): 1.58

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	1.14	1.14
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.61	0.61
Impervious Cover (acres)	0.00	0.00	0.00	0.66	0.66
					2.41

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.73	0.73
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.39	0.39
Impervious Cover (acres)	0.00	0.00	0.00	1.29	1.29
Area Check	OK	OK	OK	OK	2.41

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.14	0.73
Weighted Rv(forest)	0.05	0.05
% Forest	47%	41%
Managed Turf Cover (acres)	0.61	0.39
Weighted Rv(turf)	0.25	0.25
% Managed Turf	25%	22%
Impervious Cover (acres)	0.66	0.66
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	2.41	1.78
Site Rv	0.35	0.43

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.73
Weighted Rv(forest)	0.05
% Forest	30%
Managed Turf Cover (acres)	0.39
Weighted Rv (turf)	0.25
% Managed Turf	16%
Impervious Cover (acres)	1.29
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	2.41
Final Post Dev Site Rv	0.56

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.73
Weighted Rv(forest)	0.05
% Forest	41%
Managed Turf Cover (acres)	0.39
Weighted Rv (turf)	0.25
% Managed Turf	22%
ReDev. Impervious Cover (acres)	0.66
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	1.78
ReDev Site Rv	0.43

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.63
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0695	0.0631
Pre-ReDevelopment Treatment Volume (cubic feet)	3,027	2,750
Pre-ReDevelopment TP Load (lb/yr)	1.90	1.73
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.79	0.97
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.73

Final Post-Development Treatment Volume (acre-ft)	0.1133
Final Post-Development Treatment Volume (cubic feet)	4,937
Final Post-Development TP Load (lb/yr)	3.10
Final Post-Development TP Load per acre (lb/acre/yr)	1.29

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0631
Post-ReDevelopment Treatment Volume (cubic feet)	2,750
Post-ReDevelopment TP Load (lb/yr) ²	1.73
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.97
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.35

Post-Development Treatment Volume (acre-ft)	0.0502
Post-Development Treatment Volume (cubic feet)	2,187
Post-Development TP Load (lb/yr)	1.37

TP Load Reduction Required for New Impervious Area (lb/yr)	1.11
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.46**
 Linear Project TP Load Reduction Required (lb/yr): **1.58**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	13.60
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	22.19
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Project Name: **Deep Creek-Southern Branch Elizabeth River 27-006-AR 2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.629625456
Post-Development TP Load Reduction for Site (lb/yr): 1.58

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	1.35	1.35
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.40	0.40
Impervious Cover (acres)	0.00	0.00	0.00	0.65	0.65
					2.39

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.86	0.86
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.25	0.25
Impervious Cover (acres)	0.00	0.00	0.00	1.28	1.28
Area Check	OK	OK	OK	OK	2.39

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.35	0.86
Weighted Rv(forest)	0.05	0.05
% Forest	56%	49%
Managed Turf Cover (acres)	0.40	0.25
Weighted Rv(turf)	0.25	0.25
% Managed Turf	17%	14%
Impervious Cover (acres)	0.65	0.65
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	2.39	1.76
Site Rv	0.33	0.41

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.86
Weighted Rv(forest)	0.05
% Forest	36%
Managed Turf Cover (acres)	0.25
Weighted Rv (turf)	0.25
% Managed Turf	11%
Impervious Cover (acres)	1.28
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	2.39
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.86
Weighted Rv(forest)	0.05
% Forest	49%
Managed Turf Cover (acres)	0.25
Weighted Rv (turf)	0.25
% Managed Turf	14%
ReDev. Impervious Cover (acres)	0.65
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	1.76
ReDev Site Rv	0.41

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.63
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0650	0.0600
Pre-ReDevelopment Treatment Volume (cubic feet)	2,831	2,613
Pre-ReDevelopment TP Load (lb/yr)	1.78	1.64
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.74	0.93
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.72

Final Post-Development Treatment Volume (acre-ft)	0.1098
Final Post-Development Treatment Volume (cubic feet)	4,784
Final Post-Development TP Load (lb/yr)	3.01
Final Post-Development TP Load per acre (lb/acre/yr)	1.26

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0600
Post-ReDevelopment Treatment Volume (cubic feet)	2,613
Post-ReDevelopment TP Load (lb/yr) ²	1.64
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.93
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.33

Post-Development Treatment Volume (acre-ft)	0.0498
Post-Development Treatment Volume (cubic feet)	2,171
Post-Development TP Load (lb/yr)	1.36

TP Load Reduction Required for New Impervious Area (lb/yr)	1.11
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.43**
 Linear Project TP Load Reduction Required (lb/yr): **1.58**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	12.72
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	21.50
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Project Name: **Douglas Run-Meherrin River 15-011-A001-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.112705301
Post-Development TP Load Reduction for Site (lb/yr): 0.29

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.28	0.00	0.28
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.04	0.00	0.04
Impervious Cover (acres)	0.00	0.00	0.12	0.00	0.12
					0.44

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.18	0.00	0.18
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.02	0.00	0.02
Impervious Cover (acres)	0.00	0.00	0.23	0.00	0.23
Area Check	OK	OK	OK	OK	0.44

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.28	0.18
Weighted Rv(forest)	0.04	0.04
% Forest	64%	56%
Managed Turf Cover (acres)	0.04	0.02
Weighted Rv(turf)	0.22	0.22
% Managed Turf	8%	7%
Impervious Cover (acres)	0.12	0.12
Rv(impervious)	0.95	0.95
% Impervious	28%	37%
Total Site Area (acres)	0.44	0.33
Site Rv	0.31	0.39

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.18
Weighted Rv(forest)	0.04
% Forest	41%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.22
% Managed Turf	5%
Impervious Cover (acres)	0.23
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	0.44
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.18
Weighted Rv(forest)	0.04
% Forest	56%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.22
% Managed Turf	7%
ReDev. Impervious Cover (acres)	0.12
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	0.33
ReDev Site Rv	0.39

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.11
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0112	0.0107
Pre-ReDevelopment Treatment Volume (cubic feet)	489	465
Pre-ReDevelopment TP Load (lb/yr)	0.31	0.29
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.70	0.89
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.13

Final Post-Development Treatment Volume (acre-ft)	0.0196
Final Post-Development Treatment Volume (cubic feet)	853
Final Post-Development TP Load (lb/yr)	0.54
Final Post-Development TP Load per acre (lb/acre/yr)	1.22

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0107
Post-ReDevelopment Treatment Volume (cubic feet)	465
Post-ReDevelopment Load (TP) (lb/yr) ²	0.29
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.89
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0089
Post-Development Treatment Volume (cubic feet)	389
Post-Development TP Load (lb/yr)	0.24

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.06
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.20
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.26
 Linear Project TP Load Reduction Required (lb/yr): 0.29

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	2.20
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	3.84
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Project Name: Douglas Run-Meherrin River 15-011-AR 3 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 1.98

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.477041735
 Post-Development TP Load Reduction for Site (lb/yr): 1.24

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.39	0.07	0.46
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.82	0.05	0.87
Impervious Cover (acres)	0.00	0.00	0.60	0.04	0.65
					1.98

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.25	0.05	0.30
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.53	0.03	0.56
Impervious Cover (acres)	0.00	0.00	1.04	0.09	1.13
Area Check	OK	OK	OK	OK	1.98

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.46	0.30
Weighted Rv(forest)	0.04	0.04
% Forest	23%	20%
Managed Turf Cover (acres)	0.87	0.56
Weighted Rv(turf)	0.22	0.22
% Managed Turf	44%	37%
Impervious Cover (acres)	0.65	0.65
Rv(impervious)	0.95	0.95
% Impervious	33%	43%
Total Site Area (acres)	1.98	1.50
Site Rv	0.42	0.50

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.30
Weighted Rv(forest)	0.04
% Forest	15%
Managed Turf Cover (acres)	0.56
Weighted Rv (turf)	0.22
% Managed Turf	28%
Impervious Cover (acres)	1.13
Rv(impervious)	0.95
% Impervious	57%
Final Site Area (acres)	1.98
Final Post Dev Site Rv	0.61

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.30
Weighted Rv(forest)	0.04
% Forest	20%
Managed Turf Cover (acres)	0.56
Weighted Rv (turf)	0.22
% Managed Turf	37%
ReDev. Impervious Cover (acres)	0.65
Rv(impervious)	0.95
% Impervious	43%
Total ReDev. Site Area (acres)	1.50
ReDev Site Rv	0.50

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.48
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0690	0.0627
Pre-ReDevelopment Treatment Volume (cubic feet)	3,005	2,729
Pre-ReDevelopment TP Load (lb/yr)	1.89	1.71
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.95	1.14
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.62

Final Post-Development Treatment Volume (acre-ft)	0.1004
Final Post-Development Treatment Volume (cubic feet)	4,374
Final Post-Development TP Load (lb/yr)	2.75
Final Post-Development TP Load per acre (lb/acre/yr)	1.39

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0627
Post-ReDevelopment Treatment Volume (cubic feet)	2,729
Post-ReDevelopment Load (TP) (lb/yr) ²	1.71
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.14
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0378
Post-Development Treatment Volume (cubic feet)	1,645
Post-Development TP Load (lb/yr)	1.03

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.34
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.84
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	1.18
Linear Project TP Load Reduction Required (lb/yr)	1.24

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	13.51
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	19.66
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Project Name: **Douglas Run-Meherrin River 15-014.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.660083708
Post-Development TP Load Reduction for Site (lb/yr): 1.77

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.75	0.00	0.75
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	1.07	0.00	1.07
Impervious Cover (acres)	0.00	0.00	1.02	0.00	1.02
					2.85

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.49	0.00	0.49
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.68	0.00	0.68
Impervious Cover (acres)	0.00	0.00	1.68	0.00	1.68
Area Check	OK	OK	OK	OK	2.85

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.75	0.49
Weighted Rv(forest)	0.04	0.04
% Forest	26%	22%
Managed Turf Cover (acres)	1.07	0.68
Weighted Rv(turf)	0.22	0.22
% Managed Turf	38%	31%
Impervious Cover (acres)	1.02	1.02
Rv(impervious)	0.95	0.95
% Impervious	36%	47%
Total Site Area (acres)	2.85	2.19
Site Rv	0.43	0.52

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.49
Weighted Rv(forest)	0.04
% Forest	17%
Managed Turf Cover (acres)	0.68
Weighted Rv (turf)	0.22
% Managed Turf	24%
Impervious Cover (acres)	1.68
Rv(impervious)	0.95
% Impervious	59%
Final Site Area (acres)	2.85
Final Post Dev Site Rv	0.62

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.49
Weighted Rv(forest)	0.04
% Forest	22%
Managed Turf Cover (acres)	0.68
Weighted Rv (turf)	0.22
% Managed Turf	31%
ReDev. Impervious Cover (acres)	1.02
Rv(impervious)	0.95
% Impervious	47%
Total ReDev. Site Area (acres)	2.19
ReDev Site Rv	0.52

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.66
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1030	0.0949
Pre-ReDevelopment Treatment Volume (cubic feet)	4,487	4,134
Pre-ReDevelopment TP Load (lb/yr)	2.82	2.60
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.99	1.19
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.90

Final Post-Development Treatment Volume (acre-ft)	0.1472
Final Post-Development Treatment Volume (cubic feet)	6,410
Final Post-Development TP Load (lb/yr)	4.03
Final Post-Development TP Load per acre (lb/acre/yr)	1.41

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0949
Post-ReDevelopment Treatment Volume (cubic feet)	4,134
Post-ReDevelopment TP Load (lb/yr) ²	2.60
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.19
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.52

Post-Development Treatment Volume (acre-ft)	0.0523
Post-Development Treatment Volume (cubic feet)	2,276
Post-Development TP Load (lb/yr)	1.43
TP Load Reduction Required for New Impervious Area (lb/yr)	1.16

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.68**
 Linear Project TP Load Reduction Required (lb/yr): **1.77**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **20.17**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **28.81**

Project Name: **Dry Run 36-014.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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 constant values
 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **11.52**

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 2.6958489
Post-Development TP Load Reduction for Site (lb/yr): 7.35

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	2.69	1.09	0.00	0.00	3.78
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	1.97	1.66	0.00	0.00	3.63
Impervious Cover (acres)	2.55	1.57	0.00	0.00	4.11
					11.52

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.71	0.70	0.00	0.00	2.41
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	1.25	1.05	0.00	0.00	2.30
Impervious Cover (acres)	4.24	2.57	0.00	0.00	6.80
Area Check	OK	OK	OK	OK	11.52

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	3.78	2.41
Weighted Rv(forest)	0.02	0.02
% Forest	33%	27%
Managed Turf Cover (acres)	3.63	2.30
Weighted Rv(turf)	0.17	0.17
% Managed Turf	32%	26%
Impervious Cover (acres)	4.11	4.11
Rv(impervious)	0.95	0.95
% Impervious	36%	47%
Total Site Area (acres)	11.52	8.82
Site Rv	0.40	0.49

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	2.41
Weighted Rv(forest)	0.02
% Forest	21%
Managed Turf Cover (acres)	2.30
Weighted Rv (turf)	0.17
% Managed Turf	20%
Impervious Cover (acres)	6.80
Rv(impervious)	0.95
% Impervious	59%
Final Site Area (acres)	11.52
Final Post Dev Site Rv	0.60

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	2.41
Weighted Rv(forest)	0.02
% Forest	27%
Managed Turf Cover (acres)	2.30
Weighted Rv (turf)	0.17
% Managed Turf	26%
ReDev. Impervious Cover (acres)	4.11
Rv(impervious)	0.95
% Impervious	47%
Total ReDev. Site Area (acres)	8.82
ReDev Site Rv	0.49

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	2.69
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.3849	0.3632
Pre-ReDevelopment Treatment Volume (cubic feet)	16,768	15,822
Pre-ReDevelopment TP Load (lb/yr)	10.54	9.94
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.91	1.13
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		3.62

Final Post-Development Treatment Volume (acre-ft)	0.5765
Final Post-Development Treatment Volume (cubic feet)	25,111
Final Post-Development TP Load (lb/yr)	15.78
Final Post-Development TP Load per acre (lb/acre/yr)	1.37

Treatment Volume and Nutrient Load

Post-ReDevelopment Treatment Volume (acre-ft)	0.3632
Post-ReDevelopment Treatment Volume (cubic feet)	15,822
Post-ReDevelopment Load (TP) (lb/yr) ²	9.94
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.13
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.2132
Post-Development Treatment Volume (cubic feet)	9,289
Post-Development TP Load (lb/yr)	5.84

TP Load Reduction Required for Redeveloped Area (lb/yr)	1.99
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TP Load Reduction Required for New Impervious Area (lb/yr)	4.73
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 6.72
 Linear Project TP Load Reduction Required (lb/yr): 7.35

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	75.37
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	112.87
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Project Name: **Dry Run 36-018.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.475874446
Post-Development TP Load Reduction for Site (lb/yr): 1.24

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.11	0.00	0.00	0.00	1.11
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.21	0.00	0.00	0.00	0.21
Impervious Cover (acres)	0.54	0.00	0.00	0.00	0.54
					1.85

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.71	0.00	0.00	0.00	0.71
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.13	0.00	0.00	0.00	0.13
Impervious Cover (acres)	1.01	0.00	0.00	0.00	1.01
Area Check	OK	OK	OK	OK	1.85

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.11	0.71
Weighted Rv(forest)	0.02	0.02
% Forest	60%	51%
Managed Turf Cover (acres)	0.21	0.13
Weighted Rv(turf)	0.15	0.15
% Managed Turf	11%	10%
Impervious Cover (acres)	0.54	0.54
Rv(impervious)	0.95	0.95
% Impervious	29%	39%
Total Site Area (acres)	1.85	1.38
Site Rv	0.30	0.40

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.71
Weighted Rv(forest)	0.02
% Forest	38%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.15
% Managed Turf	7%
Impervious Cover (acres)	1.01
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	1.85
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.71
Weighted Rv(forest)	0.02
% Forest	51%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.15
% Managed Turf	10%
ReDev. Impervious Cover (acres)	0.54
Rv(impervious)	0.95
% Impervious	39%
Total ReDev. Site Area (acres)	1.38
ReDev Site Rv	0.40

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.48
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0469	0.0453
Pre-ReDevelopment Treatment Volume (cubic feet)	2,041	1,972
Pre-ReDevelopment TP Load (lb/yr)	1.28	1.24
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.69	0.90
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.56

Final Post-Development Treatment Volume (acre-ft)	0.0829
Final Post-Development Treatment Volume (cubic feet)	3,613
Final Post-Development TP Load (lb/yr)	2.27
Final Post-Development TP Load per acre (lb/acre/yr)	1.23

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0453
Post-ReDevelopment Treatment Volume (cubic feet)	1,972
Post-ReDevelopment Load (TP) (lb/yr) ²	1.24
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.90
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.25

Post-Development Treatment Volume (acre-ft)	0.0377
Post-Development Treatment Volume (cubic feet)	1,641
Post-Development TP Load (lb/yr)	1.03
TP Load Reduction Required for New Impervious Area (lb/yr)	0.84

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	1.08
Linear Project TP Load Reduction Required (lb/yr)	1.24

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	9.17	Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	16.24
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Project Name: **Dry Run 36-027.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **4.52**

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 1.204672093
Post-Development TP Load Reduction for Site (lb/yr): 3.09

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	1.38	1.35	0.00	0.55	3.29
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.04	0.04
Impervious Cover (acres)	0.50	0.49	0.00	0.21	1.19
					4.52

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.88	0.86	0.00	0.35	2.10
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.03	0.03
Impervious Cover (acres)	1.00	0.98	0.00	0.42	2.39
Area Check	OK	OK	OK	OK	4.52

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	3.29	2.10
Weighted Rv(forest)	0.03	0.03
% Forest	73%	63%
Managed Turf Cover (acres)	0.04	0.03
Weighted Rv(turf)	0.25	0.25
% Managed Turf	1%	1%
Impervious Cover (acres)	1.19	1.19
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	4.52	3.31
Site Rv	0.27	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	2.10
Weighted Rv(forest)	0.03
% Forest	46%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.25
% Managed Turf	1%
Impervious Cover (acres)	2.39
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	4.52
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	2.10
Weighted Rv(forest)	0.03
% Forest	63%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.25
% Managed Turf	1%
ReDev. Impervious Cover (acres)	1.19
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	3.31
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.20
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1029	0.0997
Pre-ReDevelopment Treatment Volume (cubic feet)	4,482	4,344
Pre-ReDevelopment TP Load (lb/yr)	2.82	2.73
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.62	0.82
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.36

Final Post-Development Treatment Volume (acre-ft)	0.1951
Final Post-Development Treatment Volume (cubic feet)	8,498
Final Post-Development TP Load (lb/yr)	5.34
Final Post-Development TP Load per acre (lb/acre/yr)	1.18

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0997
Post-ReDevelopment Treatment Volume (cubic feet)	4,344
Post-ReDevelopment TP Load (lb/yr) ²	2.73
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.82
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.55

Post-Development Treatment Volume (acre-ft)	0.0954
Post-Development Treatment Volume (cubic feet)	4,154
Post-Development TP Load (lb/yr)	2.61

TP Load Reduction Required for New Impervious Area (lb/yr)	2.12
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	2.66
Linear Project TP Load Reduction Required (lb/yr) ³	3.09

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	20.14
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	38.20
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Project Name: **Dutch Creek-Rockfish River 08-086-A112.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.11052353
Post-Development TP Load Reduction for Site (lb/yr):	0.30

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.11	0.00	0.01	0.13
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.17	0.00	0.01	0.18
Impervious Cover (acres)	0.00	0.16	0.00	0.01	0.17
					0.48

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.07	0.00	0.01	0.08
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.11	0.00	0.01	0.12
Impervious Cover (acres)	0.00	0.26	0.00	0.02	0.28
Area Check	OK	OK	OK	OK	0.48

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.13	0.08
Weighted Rv(forest)	0.03	0.03
% Forest	27%	23%
Managed Turf Cover (acres)	0.18	0.12
Weighted Rv(turf)	0.20	0.20
% Managed Turf	38%	31%
Impervious Cover (acres)	0.17	0.17
Rv(impervious)	0.95	0.95
% Impervious	35%	46%
Total Site Area (acres)	0.48	0.37
Site Rv	0.42	0.51

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.08
Weighted Rv(forest)	0.03
% Forest	18%
Managed Turf Cover (acres)	0.12
Weighted Rv (turf)	0.20
% Managed Turf	24%
Impervious Cover (acres)	0.28
Rv(impervious)	0.95
% Impervious	58%
Final Site Area (acres)	0.48
Final Post Dev Site Rv	0.61

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.08
Weighted Rv(forest)	0.03
% Forest	23%
Managed Turf Cover (acres)	0.12
Weighted Rv (turf)	0.20
% Managed Turf	31%
ReDev. Impervious Cover (acres)	0.17
Rv(impervious)	0.95
% Impervious	46%
Total ReDev. Site Area (acres)	0.37
ReDev Site Rv	0.51

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.11
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0169	0.0156
Pre-ReDevelopment Treatment Volume (cubic feet)	736	681
Pre-ReDevelopment TP Load (lb/yr)	0.46	0.43
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.96	1.16
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.15

Final Post-Development Treatment Volume (acre-ft)	0.0244
Final Post-Development Treatment Volume (cubic feet)	1,062
Final Post-Development TP Load (lb/yr)	0.67
Final Post-Development TP Load per acre (lb/acre/yr)	1.39

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0156
Post-ReDevelopment Treatment Volume (cubic feet)	681
Post-ReDevelopment TP Load (lb/yr) ²	0.43
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.16
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0087
Post-Development Treatment Volume (cubic feet)	381
Post-Development TP Load (lb/yr)	0.24

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.09
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.19
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.28
Linear Project TP Load Reduction Required (lb/yr):	0.30

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	3.31
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	4.78
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Project Name: Grease Creek-Slate River 09-051.AR1 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.03

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.007079315
 Post-Development TP Load Reduction for Site (lb/yr): 0.02

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.01	0.00	0.01
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.01	0.00	0.01
Impervious Cover (acres)	0.00	0.00	0.01	0.00	0.01
					0.03

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.01	0.00	0.01
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.01	0.00	0.01
Impervious Cover (acres)	0.00	0.00	0.02	0.00	0.02
Area Check	OK	OK	OK	OK	0.03

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.01	0.01
Weighted Rv(forest)	0.04	0.04
% Forest	45%	38%
Managed Turf Cover (acres)	0.01	0.01
Weighted Rv(turf)	0.22	0.22
% Managed Turf	28%	25%
Impervious Cover (acres)	0.01	0.01
Rv(impervious)	0.95	0.95
% Impervious	28%	36%
Total Site Area (acres)	0.03	0.02
Site Rv	0.34	0.42

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.04
% Forest	30%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.22
% Managed Turf	19%
Impervious Cover (acres)	0.02
Rv(impervious)	0.95
% Impervious	51%
Final Site Area (acres)	0.03
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.04
% Forest	38%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.22
% Managed Turf	25%
ReDev. Impervious Cover (acres)	0.01
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.02
ReDev Site Rv	0.42

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.01
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0009	0.0008
Pre-ReDevelopment Treatment Volume (cubic feet)	38	36
Pre-ReDevelopment TP Load (lb/yr)	0.02	0.02
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.78	0.95
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.01

Final Post-Development Treatment Volume (acre-ft)	0.0014
Final Post-Development Treatment Volume (cubic feet)	60
Final Post-Development TP Load (lb/yr)	0.04
Final Post-Development TP Load per acre (lb/acre/yr)	1.23

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0008
Post-ReDevelopment Treatment Volume (cubic feet)	36
Post-ReDevelopment Load (TP) (lb/yr) ²	0.02
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.95
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.00

Post-Development Treatment Volume (acre-ft)	0.0006
Post-Development Treatment Volume (cubic feet)	24
Post-Development TP Load (lb/yr)	0.02
TP Load Reduction Required for New Impervious Area (lb/yr)	0.01

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.02
 Linear Project TP Load Reduction Required (lb/yr): 0.02

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 0.17

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 0.27

Project Name: **Hamilton Branch 07-001-F002.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.374274292
Post-Development TP Load Reduction for Site (lb/yr): 0.97

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.77	0.00	0.14	0.90
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.04	0.00	0.09	0.13
Impervious Cover (acres)	0.00	0.30	0.00	0.11	0.42
					1.45

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.49	0.00	0.09	0.57
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.03	0.00	0.06	0.09
Impervious Cover (acres)	0.00	0.60	0.00	0.20	0.79
Area Check	OK	OK	OK	OK	1.45

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.90	0.57
Weighted Rv(forest)	0.03	0.03
% Forest	62%	53%
Managed Turf Cover (acres)	0.13	0.09
Weighted Rv(turf)	0.24	0.24
% Managed Turf	9%	8%
Impervious Cover (acres)	0.42	0.42
Rv(impervious)	0.95	0.95
% Impervious	29%	39%
Total Site Area (acres)	1.45	1.08
Site Rv	0.32	0.40

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.57
Weighted Rv(forest)	0.03
% Forest	40%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.24
% Managed Turf	6%
Impervious Cover (acres)	0.79
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	1.45
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.57
Weighted Rv(forest)	0.03
% Forest	53%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.24
% Managed Turf	8%
ReDev. Impervious Cover (acres)	0.42
Rv(impervious)	0.95
% Impervious	39%
Total ReDev. Site Area (acres)	1.08
ReDev Site Rv	0.40

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.37
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0382	0.0364
Pre-ReDevelopment Treatment Volume (cubic feet)	1,665	1,585
Pre-ReDevelopment TP Load (lb/yr)	1.05	1.00
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.72	0.92
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.44

Final Post-Development Treatment Volume (acre-ft)	0.0660
Final Post-Development Treatment Volume (cubic feet)	2,875
Final Post-Development TP Load (lb/yr)	1.81
Final Post-Development TP Load per acre (lb/acre/yr)	1.24

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0364
Post-ReDevelopment Treatment Volume (cubic feet)	1,585
Post-ReDevelopment TP Load (lb/yr) ²	1.00
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.92
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.20

Post-Development Treatment Volume (acre-ft)	0.0296
Post-Development Treatment Volume (cubic feet)	1,291
Post-Development TP Load (lb/yr)	0.81
TP Load Reduction Required for New Impervious Area (lb/yr)	0.66

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.86**
 Linear Project TP Load Reduction Required (lb/yr): 0.97

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	7.48
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	12.92
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Project Name: **Hamilton Branch 07-001-F002.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.310258065
Post-Development TP Load Reduction for Site (lb/yr): 0.79

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.62	0.00	0.25	0.86
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.22	0.00	0.09	0.31
					1.17

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.39	0.00	0.16	0.55
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.44	0.00	0.18	0.62
Area Check	OK	OK	OK	OK	1.17

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.86	0.55
Weighted Rv(forest)	0.04	0.04
% Forest	74%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.31	0.31
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	1.17	0.86
Site Rv	0.27	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.55
Weighted Rv(forest)	0.04
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.62
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.17
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.55
Weighted Rv(forest)	0.04
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.31
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.86
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.31
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment	Adjusted ¹	Final Post-Development
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0268	0.0258
Pre-ReDevelopment Treatment Volume (cubic feet)	1,166	1,126
Pre-ReDevelopment TP Load (lb/yr)	0.73	0.71
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.82
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.35

Final Post-Development Treatment Volume (acre-ft)	0.0504
Final Post-Development Treatment Volume (cubic feet)	2,196
Final Post-Development TP Load (lb/yr)	1.38
Final Post-Development TP Load per acre (lb/acre/yr)	1.18

Treatment Volume and Nutrient Load	
Post-ReDevelopment	Adjusted ¹
Post-ReDevelopment Treatment Volume (acre-ft)	0.0258
Post-ReDevelopment Treatment Volume (cubic feet)	1,126
Post-ReDevelopment TP Load (lb/yr) ²	0.71
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.82
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.14

Post-Development Treatment Volume (acre-ft)	0.0246
Post-Development Treatment Volume (cubic feet)	1,070
Post-Development TP Load (lb/yr)	0.67
TP Load Reduction Required for New Impervious Area (lb/yr)	0.55

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.69
 Linear Project TP Load Reduction Required (lb/yr): 0.79

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	5.24
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	9.87
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Project Name: **Hamilton Branch 07-001-F009.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.11903717
Post-Development TP Load Reduction for Site (lb/yr):	0.30

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.11	0.00	0.00	0.11
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.22	0.00	0.00	0.22
Impervious Cover (acres)	0.00	0.13	0.00	0.00	0.13
					0.47

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.07	0.00	0.00	0.07
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.14	0.00	0.00	0.14
Impervious Cover (acres)	0.00	0.25	0.00	0.00	0.25
Area Check	OK	OK	OK	OK	0.47

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.11	0.07
Weighted Rv(forest)	0.03	0.03
% Forest	24%	21%
Managed Turf Cover (acres)	0.22	0.14
Weighted Rv(turf)	0.20	0.20
% Managed Turf	48%	41%
Impervious Cover (acres)	0.13	0.13
Rv(impervious)	0.95	0.95
% Impervious	29%	39%
Total Site Area (acres)	0.47	0.35
Site Rv	0.38	0.45

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.07
Weighted Rv(forest)	0.03
% Forest	15%
Managed Turf Cover (acres)	0.14
Weighted Rv (turf)	0.20
% Managed Turf	30%
Impervious Cover (acres)	0.25
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	0.47
Final Post Dev Site Rv	0.58

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.07
Weighted Rv(forest)	0.03
% Forest	21%
Managed Turf Cover (acres)	0.14
Weighted Rv (turf)	0.20
% Managed Turf	41%
ReDev. Impervious Cover (acres)	0.13
Rv(impervious)	0.95
% Impervious	39%
Total ReDev. Site Area (acres)	0.35
ReDev Site Rv	0.45

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.12
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0146	0.0132
Pre-ReDevelopment Treatment Volume (cubic feet)	637	574
Pre-ReDevelopment TP Load (lb/yr)	0.40	0.36
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.86	1.04
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.14

Final Post-Development Treatment Volume (acre-ft)	0.0226
Final Post-Development Treatment Volume (cubic feet)	984
Final Post-Development TP Load (lb/yr)	0.62
Final Post-Development TP Load per acre (lb/acre/yr)	1.32

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0132
Post-ReDevelopment Treatment Volume (cubic feet)	574
Post-ReDevelopment Load (TP) (lb/yr) ²	0.36
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.04
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0094
Post-Development Treatment Volume (cubic feet)	410
Post-Development TP Load (lb/yr)	0.26

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.07
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.21
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.28
Linear Project TP Load Reduction Required (lb/yr):	0.30

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	2.86
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	4.42
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Project Name: **Hamilton Branch 07-001-F012.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.187848393
Post-Development TP Load Reduction for Site (lb/yr): 0.49

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.12	0.00	0.32	0.44
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.02	0.00	0.00	0.06	0.08
Impervious Cover (acres)	0.01	0.04	0.00	0.16	0.21
					0.74

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.08	0.00	0.20	0.28
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.02	0.00	0.00	0.04	0.05
Impervious Cover (acres)	0.02	0.08	0.00	0.29	0.40
Area Check	OK	OK	OK	OK	0.74

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.44	0.28
Weighted Rv(forest)	0.04	0.04
% Forest	60%	51%
Managed Turf Cover (acres)	0.08	0.05
Weighted Rv(turf)	0.22	0.22
% Managed Turf	11%	10%
Impervious Cover (acres)	0.21	0.21
Rv(impervious)	0.95	0.95
% Impervious	29%	39%
Total Site Area (acres)	0.74	0.55
Site Rv	0.33	0.41

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.28
Weighted Rv(forest)	0.04
% Forest	38%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.22
% Managed Turf	7%
Impervious Cover (acres)	0.40
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	0.74
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.28
Weighted Rv(forest)	0.04
% Forest	51%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.22
% Managed Turf	10%
ReDev. Impervious Cover (acres)	0.21
Rv(impervious)	0.95
% Impervious	39%
Total ReDev. Site Area (acres)	0.55
ReDev Site Rv	0.41

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.19
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0200	0.0189
Pre-ReDevelopment Treatment Volume (cubic feet)	872	822
Pre-ReDevelopment TP Load (lb/yr)	0.55	0.52
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.74	0.94
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.22

Final Post-Development Treatment Volume (acre-ft)	0.0338
Final Post-Development Treatment Volume (cubic feet)	1,470
Final Post-Development TP Load (lb/yr)	0.92
Final Post-Development TP Load per acre (lb/acre/yr)	1.25

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0189
Post-ReDevelopment Treatment Volume (cubic feet)	822
Post-ReDevelopment Load (TP) (lb/yr) ²	0.52
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.94
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.10

Post-Development Treatment Volume (acre-ft)	0.0149
Post-Development Treatment Volume (cubic feet)	648
Post-Development TP Load (lb/yr)	0.41

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.43**
 Linear Project TP Load Reduction Required (lb/yr): **0.49**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	3.92
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	6.61
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Project Name: **Hamilton Branch 07-001-F029.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.42250154
Post-Development TP Load Reduction for Site (lb/yr):	1.06

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.03	0.00	0.04	0.00	0.07
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.45	0.00	0.65	0.00	1.10
Impervious Cover (acres)	0.18	0.00	0.34	0.00	0.52
					1.69

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.02	0.00	0.03	0.00	0.05
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.30	0.00	0.40	0.00	0.70
Impervious Cover (acres)	0.35	0.00	0.60	0.00	0.95
Area Check	OK	OK	OK	OK	1.69

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.07	0.05
Weighted Rv(forest)	0.03	0.03
% Forest	4%	4%
Managed Turf Cover (acres)	1.10	0.70
Weighted Rv(turf)	0.19	0.19
% Managed Turf	65%	55%
Impervious Cover (acres)	0.52	0.52
Rv(impervious)	0.95	0.95
% Impervious	31%	41%
Total Site Area (acres)	1.69	1.27
Site Rv	0.42	0.50

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.05
Weighted Rv(forest)	0.03
% Forest	3%
Managed Turf Cover (acres)	0.70
Weighted Rv (turf)	0.19
% Managed Turf	41%
Impervious Cover (acres)	0.95
Rv(impervious)	0.95
% Impervious	56%
Final Site Area (acres)	1.69
Final Post Dev Site Rv	0.61

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.05
Weighted Rv(forest)	0.03
% Forest	4%
Managed Turf Cover (acres)	0.70
Weighted Rv (turf)	0.19
% Managed Turf	55%
ReDev. Impervious Cover (acres)	0.52
Rv(impervious)	0.95
% Impervious	41%
Total ReDev. Site Area (acres)	1.27
ReDev Site Rv	0.50

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.42
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0592	0.0527
Pre-ReDevelopment Treatment Volume (cubic feet)	2,578	2,295
Pre-ReDevelopment TP Load (lb/yr)	1.62	1.44
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.96	1.14
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.52

Final Post-Development Treatment Volume (acre-ft)	0.0861
Final Post-Development Treatment Volume (cubic feet)	3,752
Final Post-Development TP Load (lb/yr)	2.36
Final Post-Development TP Load per acre (lb/acre/yr)	1.39

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0527
Post-ReDevelopment Treatment Volume (cubic feet)	2,295
Post-ReDevelopment TP Load (lb/yr) ²	1.44
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.14
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0334
Post-Development Treatment Volume (cubic feet)	1,457
Post-Development TP Load (lb/yr)	0.92

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.29
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.74
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	1.03
Linear Project TP Load Reduction Required (lb/yr)	1.06

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	11.59
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	16.87
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Project Name: **Horsepen Creek-Slate River 09-048.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 1.088187645
Post-Development TP Load Reduction for Site (lb/yr): 2.67

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.18	0.94	0.17	1.29
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.10	1.37	0.24	1.71
Impervious Cover (acres)	0.00	0.10	0.84	0.16	1.10
					4.10

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.12	0.60	0.11	0.83
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.06	0.86	0.15	1.08
Impervious Cover (acres)	0.00	0.21	1.67	0.30	2.19
Area Check	OK	OK	OK	OK	4.10

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.29	0.83
Weighted Rv(forest)	0.04	0.04
% Forest	32%	28%
Managed Turf Cover (acres)	1.71	1.08
Weighted Rv(turf)	0.22	0.22
% Managed Turf	42%	36%
Impervious Cover (acres)	1.10	1.10
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	4.10	3.01
Site Rv	0.36	0.44

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.83
Weighted Rv(forest)	0.04
% Forest	20%
Managed Turf Cover (acres)	1.08
Weighted Rv (turf)	0.22
% Managed Turf	26%
Impervious Cover (acres)	2.19
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	4.10
Final Post Dev Site Rv	0.57

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.83
Weighted Rv(forest)	0.04
% Forest	28%
Managed Turf Cover (acres)	1.08
Weighted Rv (turf)	0.22
% Managed Turf	36%
ReDev. Impervious Cover (acres)	1.10
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	3.01
ReDev Site Rv	0.44

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.09
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1230	0.1098
Pre-ReDevelopment Treatment Volume (cubic feet)	5,357	4,782
Pre-ReDevelopment TP Load (lb/yr)	3.37	3.00
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.82	1.00
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.23

Final Post-Development Treatment Volume (acre-ft)	0.1959
Final Post-Development Treatment Volume (cubic feet)	8,535
Final Post-Development TP Load (lb/yr)	5.36
Final Post-Development TP Load per acre (lb/acre/yr)	1.31

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1098
Post-ReDevelopment Treatment Volume (cubic feet)	4,782
Post-ReDevelopment TP Load (lb/yr) ²	3.00
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.00
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.60

Post-Development Treatment Volume (acre-ft)	0.0861
Post-Development Treatment Volume (cubic feet)	3,753
Post-Development TP Load (lb/yr)	2.36

TP Load Reduction Required for New Impervious Area (lb/yr)	1.91
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **2.51**
 Linear Project TP Load Reduction Required (lb/yr): **2.67**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	24.08
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	38.36
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Project Name: **Horsepen Creek-Slate River 09-051.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 1.16

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.31030819
Post-Development TP Load Reduction for Site (lb/yr): 0.79

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.85	0.00	0.85
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.31	0.00	0.31
					1.16

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.54	0.00	0.54
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.62	0.00	0.62
Area Check	OK	OK	OK	OK	1.16

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.85	0.54
Weighted Rv(forest)	0.04	0.04
% Forest	73%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.22	0.22
% Managed Turf	0%	0%
Impervious Cover (acres)	0.31	0.31
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	1.16	0.85
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.54
Weighted Rv(forest)	0.04
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.22
% Managed Turf	0%
Impervious Cover (acres)	0.62
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.16
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.54
Weighted Rv(forest)	0.04
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.22
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.31
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.85
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.31
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0273	0.0262
Pre-ReDevelopment Treatment Volume (cubic feet)	1,188	1,143
Pre-ReDevelopment TP Load (lb/yr)	0.75	0.72
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.64	0.84
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.35

Final Post-Development Treatment Volume (acre-ft)	0.0508
Final Post-Development Treatment Volume (cubic feet)	2,213
Final Post-Development TP Load (lb/yr)	1.39
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0262
Post-ReDevelopment Treatment Volume (cubic feet)	1,143
Post-ReDevelopment TP Load (lb/yr) ²	0.72
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.84
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.14

Post-Development Treatment Volume (acre-ft)	0.0246
Post-Development Treatment Volume (cubic feet)	1,070
Post-Development TP Load (lb/yr)	0.67
TP Load Reduction Required for New Impervious Area (lb/yr)	0.55

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.69**
 Linear Project TP Load Reduction Required (lb/yr): 0.79

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	5.34
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	9.95
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Project Name: Jennings Branch 07-001.AR1-AR 9 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 2.08

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.527969462
 Post-Development TP Load Reduction for Site (lb/yr): 1.38

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.26	0.11	0.81	0.00	1.18
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.14	0.00	0.14	0.00	0.28
Impervious Cover (acres)	0.19	0.03	0.41	0.00	0.62
					2.08

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.16	0.08	0.52	0.00	0.75
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.09	0.00	0.09	0.00	0.18
Impervious Cover (acres)	0.33	0.06	0.76	0.00	1.15
Area Check	OK	OK	OK	OK	2.08

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.18	0.75
Weighted Rv(forest)	0.03	0.03
% Forest	57%	49%
Managed Turf Cover (acres)	0.28	0.18
Weighted Rv(turf)	0.19	0.19
% Managed Turf	13%	11%
Impervious Cover (acres)	0.62	0.62
Rv(impervious)	0.95	0.95
% Impervious	30%	40%
Total Site Area (acres)	2.08	1.55
Site Rv	0.33	0.42

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.75
Weighted Rv(forest)	0.03
% Forest	36%
Managed Turf Cover (acres)	0.18
Weighted Rv (turf)	0.19
% Managed Turf	8%
Impervious Cover (acres)	1.15
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	2.08
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.75
Weighted Rv(forest)	0.03
% Forest	49%
Managed Turf Cover (acres)	0.18
Weighted Rv (turf)	0.19
% Managed Turf	11%
ReDev. Impervious Cover (acres)	0.62
Rv(impervious)	0.95
% Impervious	40%
Total ReDev. Site Area (acres)	1.55
ReDev Site Rv	0.42

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.53
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0568	0.0540
Pre-ReDevelopment Treatment Volume (cubic feet)	2,475	2,351
Pre-ReDevelopment TP Load (lb/yr)	1.55	1.48
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.75	0.95
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.64

Final Post-Development Treatment Volume (acre-ft)	0.0958
Final Post-Development Treatment Volume (cubic feet)	4,172
Final Post-Development TP Load (lb/yr)	2.62
Final Post-Development TP Load per acre (lb/acre/yr)	1.26

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0540
Post-ReDevelopment Treatment Volume (cubic feet)	2,351
Post-ReDevelopment TP Load (lb/yr) ²	1.48
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.95
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0418
Post-Development Treatment Volume (cubic feet)	1,821
Post-Development TP Load (lb/yr)	1.14

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.30
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.93
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 1.22
 Linear Project TP Load Reduction Required (lb/yr): 1.38

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	11.12
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	18.75
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Project Name: **Jennings Branch 07-001-A011.AR-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.312953951
Post-Development TP Load Reduction for Site (lb/yr):	0.80

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.81	0.00	0.06	0.86
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.01	0.00	0.00	0.01
Impervious Cover (acres)	0.00	0.29	0.00	0.02	0.31
					1.19

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.52	0.00	0.04	0.55
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.01	0.00	0.00	0.01
Impervious Cover (acres)	0.00	0.59	0.00	0.04	0.63
Area Check	OK	OK	OK	OK	1.19

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.86	0.55
Weighted Rv(forest)	0.03	0.03
% Forest	73%	63%
Managed Turf Cover (acres)	0.01	0.01
Weighted Rv(turf)	0.20	0.20
% Managed Turf	1%	1%
Impervious Cover (acres)	0.31	0.31
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	1.19	0.88
Site Rv	0.28	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.55
Weighted Rv(forest)	0.03
% Forest	47%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.20
% Managed Turf	1%
Impervious Cover (acres)	0.63
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.19
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.55
Weighted Rv(forest)	0.03
% Forest	63%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.20
% Managed Turf	1%
ReDev. Impervious Cover (acres)	0.31
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.88
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.31
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0273	0.0265
Pre-ReDevelopment Treatment Volume (cubic feet)	1,191	1,153
Pre-ReDevelopment TP Load (lb/yr)	0.75	0.72
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.83
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.36

Final Post-Development Treatment Volume (acre-ft)	0.0512
Final Post-Development Treatment Volume (cubic feet)	2,232
Final Post-Development TP Load (lb/yr)	1.40
Final Post-Development TP Load per acre (lb/acre/yr)	1.18

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0265
Post-ReDevelopment Treatment Volume (cubic feet)	1,153
Post-ReDevelopment Load (TP) (lb/yr) ²	0.72
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.83
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.14

Post-Development Treatment Volume (acre-ft)	0.0248
Post-Development Treatment Volume (cubic feet)	1,079
Post-Development TP Load (lb/yr)	0.68
TP Load Reduction Required for New Impervious Area (lb/yr)	0.55

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.69
Linear Project TP Load Reduction Required (lb/yr):	0.80

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	5.35
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	10.03
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Project Name: Jennings Branch 07-001-A011-AR 1 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.56

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.144683301
 Post-Development TP Load Reduction for Site (lb/yr): 0.37

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.43	0.00	0.00	0.43
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.13	0.00	0.00	0.13
					0.56

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.28	0.00	0.00	0.28
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.28	0.00	0.00	0.28
Area Check	OK	OK	OK	OK	0.56

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.43	0.28
Weighted Rv(forest)	0.03	0.03
% Forest	76%	68%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.13	0.13
Rv(impervious)	0.95	0.95
% Impervious	24%	32%
Total Site Area (acres)	0.56	0.42
Site Rv	0.25	0.33

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.28
Weighted Rv(forest)	0.03
% Forest	50%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.28
Rv(impervious)	0.95
% Impervious	50%
Final Site Area (acres)	0.56
Final Post Dev Site Rv	0.49

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.28
Weighted Rv(forest)	0.03
% Forest	68%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.13
Rv(impervious)	0.95
% Impervious	32%
Total ReDev. Site Area (acres)	0.42
ReDev Site Rv	0.33

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.14
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0117	0.0113
Pre-ReDevelopment Treatment Volume (cubic feet)	508	492
Pre-ReDevelopment TP Load (lb/yr)	0.32	0.31
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.57	0.74
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.17

Final Post-Development Treatment Volume (acre-ft)	0.0228
Final Post-Development Treatment Volume (cubic feet)	991
Final Post-Development TP Load (lb/yr)	0.62
Final Post-Development TP Load per acre (lb/acre/yr)	1.11

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0113
Post-ReDevelopment Treatment Volume (cubic feet)	492
Post-ReDevelopment Load (TP) (lb/yr) ²	0.31
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.74
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.06

Post-Development Treatment Volume (acre-ft)	0.0115
Post-Development Treatment Volume (cubic feet)	499
Post-Development TP Load (lb/yr)	0.31
TP Load Reduction Required for New Impervious Area (lb/yr)	0.25

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.32
 Linear Project TP Load Reduction Required (lb/yr): 0.37

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 2.28

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 4.45

Project Name: **Jennings Branch 07-001-AR 3 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:
The site's net increase in impervious cover (acres) is:
Post-Development TP Load Reduction for Site (lb/yr):

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	2.24	0.00	0.27	2.50
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.02	0.00	0.00	0.02
Impervious Cover (acres)	0.00	0.82	0.00	0.10	0.92
					3.44

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.43	0.00	0.17	1.60
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.02	0.00	0.00	0.02
Impervious Cover (acres)	0.00	1.64	0.00	0.19	1.83
Area Check	OK	OK	OK	OK	3.44

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.50	1.60
Weighted Rv(forest)	0.03	0.03
% Forest	73%	63%
Managed Turf Cover (acres)	0.02	0.02
Weighted Rv(turf)	0.20	0.20
% Managed Turf	1%	1%
Impervious Cover (acres)	0.92	0.92
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	3.44	2.53
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.60
Weighted Rv(forest)	0.03
% Forest	46%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.20
% Managed Turf	0%
Impervious Cover (acres)	1.83
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	3.44
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.60
Weighted Rv(forest)	0.03
% Forest	63%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.20
% Managed Turf	1%
ReDev. Impervious Cover (acres)	0.92
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	2.53
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.92
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0798	0.0772
Pre-ReDevelopment Treatment Volume (cubic feet)	3,475	3,363
Pre-ReDevelopment TP Load (lb/yr)	2.18	2.11
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.84
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		1.04

Final Post-Development Treatment Volume (acre-ft)	0.1497
Final Post-Development Treatment Volume (cubic feet)	6,521
Final Post-Development TP Load (lb/yr)	4.10
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0772
Post-ReDevelopment Treatment Volume (cubic feet)	3,363
Post-ReDevelopment TP Load (lb/yr) ²	2.11
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.84
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.42

Post-Development Treatment Volume (acre-ft)	0.0725
Post-Development Treatment Volume (cubic feet)	3,158
Post-Development TP Load (lb/yr)	1.98
TP Load Reduction Required for New Impervious Area (lb/yr)	1.61

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)
 Linear Project TP Load Reduction Required (lb/yr):

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)

Project Name: **Jennings Branch 07-001-AR 6 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.004123979
Post-Development TP Load Reduction for Site (lb/yr):	0.01

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.01	0.00	0.00	0.01
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
					0.02

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.01	0.00	0.00	0.01
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.01	0.00	0.00	0.01
Area Check	OK	OK	OK	OK	0.02

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.01	0.01
Weighted Rv(forest)	0.03	0.03
% Forest	85%	80%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.00	0.00
Rv(impervious)	0.95	0.95
% Impervious	15%	20%
Total Site Area (acres)	0.02	0.01
Site Rv	0.17	0.22

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.03
% Forest	61%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.01
Rv(impervious)	0.95
% Impervious	39%
Final Site Area (acres)	0.02
Final Post Dev Site Rv	0.39

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.01
Weighted Rv(forest)	0.03
% Forest	80%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.00
Rv(impervious)	0.95
% Impervious	20%
Total ReDev. Site Area (acres)	0.01
ReDev Site Rv	0.22

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.00
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0003	0.0002
Pre-ReDevelopment Treatment Volume (cubic feet)	11	10
Pre-ReDevelopment TP Load (lb/yr)	0.01	0.01
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.39	0.49
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.01

Final Post-Development Treatment Volume (acre-ft)	0.0006
Final Post-Development Treatment Volume (cubic feet)	25
Final Post-Development TP Load (lb/yr)	0.02
Final Post-Development TP Load per acre (lb/acre/yr)	0.89

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0002
Post-ReDevelopment Treatment Volume (cubic feet)	10
Post-ReDevelopment Load (TP) (lb/yr) ²	0.01
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.49
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.00

Post-Development Treatment Volume (acre-ft)	0.0003
Post-Development Treatment Volume (cubic feet)	14
Post-Development TP Load (lb/yr)	0.01

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

* Reduction below new development load limitation not required

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.01
Linear Project TP Load Reduction Required (lb/yr):	0.01

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	0.05
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	0.11
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Project Name: **Jim Dave Run-Back Creek 06-001-C004.AR3 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.693990246
Post-Development TP Load Reduction for Site (lb/yr): 1.73

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.90	0.13	0.00	0.00	1.03
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.86	0.03	0.00	0.89
Impervious Cover (acres)	0.32	0.36	0.01	0.00	0.69
					2.61

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.58	0.08	0.00	0.00	0.66
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.55	0.02	0.00	0.56
Impervious Cover (acres)	0.65	0.72	0.02	0.00	1.39
Area Check	OK	OK	OK	OK	2.61

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.03	0.66
Weighted Rv(forest)	0.02	0.02
% Forest	39%	34%
Managed Turf Cover (acres)	0.89	0.56
Weighted Rv(turf)	0.20	0.20
% Managed Turf	34%	30%
Impervious Cover (acres)	0.69	0.69
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	2.61	1.91
Site Rv	0.33	0.41

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.66
Weighted Rv(forest)	0.02
% Forest	25%
Managed Turf Cover (acres)	0.56
Weighted Rv (turf)	0.20
% Managed Turf	22%
Impervious Cover (acres)	1.39
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	2.61
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.66
Weighted Rv(forest)	0.02
% Forest	34%
Managed Turf Cover (acres)	0.56
Weighted Rv (turf)	0.20
% Managed Turf	30%
ReDev. Impervious Cover (acres)	0.69
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	1.91
ReDev Site Rv	0.41

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.69
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0714	0.0654
Pre-ReDevelopment Treatment Volume (cubic feet)	3,110	2,848
Pre-ReDevelopment TP Load (lb/yr)	1.95	1.79
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.75	0.93
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.78

Final Post-Development Treatment Volume (acre-ft)	0.1203
Final Post-Development Treatment Volume (cubic feet)	5,241
Final Post-Development TP Load (lb/yr)	3.29
Final Post-Development TP Load per acre (lb/acre/yr)	1.26

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0654
Post-ReDevelopment Treatment Volume (cubic feet)	2,848
Post-ReDevelopment TP Load (lb/yr) ²	1.79
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.93
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.36

Post-Development Treatment Volume (acre-ft)	0.0549
Post-Development Treatment Volume (cubic feet)	2,393
Post-Development TP Load (lb/yr)	1.50

TP Load Reduction Required for New Impervious Area (lb/yr)	1.22
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.58**
 Linear Project TP Load Reduction Required (lb/yr): **1.73**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	13.98
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	23.56
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Project Name: **Jim Dave Run-Back Creek 06-001-C026.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.299676639
Post-Development TP Load Reduction for Site (lb/yr): 0.78

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.80	0.00	0.00	0.00	0.80
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.03	0.00	0.00	0.00	0.03
Impervious Cover (acres)	0.31	0.00	0.00	0.00	0.31
					1.15

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.51	0.00	0.00	0.00	0.51
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.02	0.00	0.00	0.00	0.02
Impervious Cover (acres)	0.61	0.00	0.00	0.00	0.61
Area Check	OK	OK	OK	OK	1.15

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.80	0.51
Weighted Rv(forest)	0.02	0.02
% Forest	70%	61%
Managed Turf Cover (acres)	0.03	0.02
Weighted Rv(turf)	0.15	0.15
% Managed Turf	3%	3%
Impervious Cover (acres)	0.31	0.31
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	1.15	0.85
Site Rv	0.28	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.51
Weighted Rv(forest)	0.02
% Forest	45%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.15
% Managed Turf	2%
Impervious Cover (acres)	0.61
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.15
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.51
Weighted Rv(forest)	0.02
% Forest	61%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.15
% Managed Turf	3%
ReDev. Impervious Cover (acres)	0.31
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	0.85
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.30
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0263	0.0257
Pre-ReDevelopment Treatment Volume (cubic feet)	1,145	1,118
Pre-ReDevelopment TP Load (lb/yr)	0.72	0.70
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.83
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.35

Final Post-Development Treatment Volume (acre-ft)	0.0494
Final Post-Development Treatment Volume (cubic feet)	2,151
Final Post-Development TP Load (lb/yr)	1.35
Final Post-Development TP Load per acre (lb/acre/yr)	1.18

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0257
Post-ReDevelopment Treatment Volume (cubic feet)	1,118
Post-ReDevelopment Load (TP) (lb/yr) ²	0.70
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.83
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0237
Post-Development Treatment Volume (cubic feet)	1,033
Post-Development TP Load (lb/yr)	0.65

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.14
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.53
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¹ Adjusted Land Cover Summary:
 Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.67
 Linear Project TP Load Reduction Required (lb/yr): 0.78

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	5.15
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	9.67
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Project Name: **Lick Run-Stuart Run 36-001.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **6.30**

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 1.677938285
Post-Development TP Load Reduction for Site (lb/yr): 4.29

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.20	4.22	0.21	4.63
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.07	1.54	0.06	1.67
					6.30

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.13	2.68	0.14	2.95
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.14	3.08	0.13	3.35
Area Check	OK	OK	OK	OK	6.30

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	4.63	2.95
Weighted Rv(forest)	0.04	0.04
% Forest	73%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	1.67	1.67
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	6.30	4.62
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	2.95
Weighted Rv(forest)	0.04
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	3.35
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	6.30
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	2.95
Weighted Rv(forest)	0.04
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	1.67
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	4.62
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.68
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1476	0.1420
Pre-ReDevelopment Treatment Volume (cubic feet)	6,431	6,188
Pre-ReDevelopment TP Load (lb/yr)	4.04	3.89
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.64	0.84
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.89

Final Post-Development Treatment Volume (acre-ft)	0.2749
Final Post-Development Treatment Volume (cubic feet)	11,974
Final Post-Development TP Load (lb/yr)	7.52
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1420
Post-ReDevelopment Treatment Volume (cubic feet)	6,188
Post-ReDevelopment Load (TP) (lb/yr) ²	3.89
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.84
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.1328
Post-Development Treatment Volume (cubic feet)	5,786
Post-Development TP Load (lb/yr)	3.64

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.78
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TP Load Reduction Required for New Impervious Area (lb/yr)	2.95
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¹ Adjusted Land Cover Summary:
 Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 3.73
 Linear Project TP Load Reduction Required (lb/yr): 4.29

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	28.91
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	53.82
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Project Name: **Lick Run-Stuart Run 36-001.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.39

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.101712735
Post-Development TP Load Reduction for Site (lb/yr): 0.26

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.17	0.02	0.10	0.29
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.06	0.00	0.04	0.10
					0.39

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.11	0.01	0.07	0.19
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.12	0.01	0.07	0.20
Area Check	OK	OK	OK	OK	0.39

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.29	0.19
Weighted Rv(forest)	0.04	0.04
% Forest	74%	65%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.10	0.10
Rv(impervious)	0.95	0.95
% Impervious	26%	35%
Total Site Area (acres)	0.39	0.28
Site Rv	0.27	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.19
Weighted Rv(forest)	0.04
% Forest	48%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.20
Rv(impervious)	0.95
% Impervious	52%
Final Site Area (acres)	0.39
Final Post Dev Site Rv	0.51

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.19
Weighted Rv(forest)	0.04
% Forest	65%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.10
Rv(impervious)	0.95
% Impervious	35%
Total ReDev. Site Area (acres)	0.28
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.10
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0087	0.0084
Pre-ReDevelopment Treatment Volume (cubic feet)	381	367
Pre-ReDevelopment TP Load (lb/yr)	0.24	0.23
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.62	0.81
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.12

Final Post-Development Treatment Volume (acre-ft)	0.0165
Final Post-Development Treatment Volume (cubic feet)	718
Final Post-Development TP Load (lb/yr)	0.45
Final Post-Development TP Load per acre (lb/acre/yr)	1.17

Treatment Volume and Nutrient Load	
Post-ReDevelopment	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0084
Post-ReDevelopment Treatment Volume (cubic feet)	367
Post-ReDevelopment Load (TP) (lb/yr) ²	0.23
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.81
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0081
Post-Development Treatment Volume (cubic feet)	351
Post-Development TP Load (lb/yr)	0.22

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.05
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.18
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¹ Adjusted Land Cover Summary:
 Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.22**
 Linear Project TP Load Reduction Required (lb/yr): 0.26

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	1.71
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	3.23
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Project Name: **Lick Run-Stuart Run 36-016.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **2.12**

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.557092063
Post-Development TP Load Reduction for Site (lb/yr): 1.43

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.03	0.82	0.62	1.46
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.01	0.00	0.07	0.08
Impervious Cover (acres)	0.00	0.01	0.29	0.27	0.58
					2.12

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.02	0.52	0.39	0.93
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.01	0.00	0.04	0.05
Impervious Cover (acres)	0.00	0.03	0.59	0.52	1.14
Area Check	OK	OK	OK	OK	2.12

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.46	0.93
Weighted Rv(forest)	0.04	0.04
% Forest	69%	60%
Managed Turf Cover (acres)	0.08	0.05
Weighted Rv(turf)	0.24	0.24
% Managed Turf	4%	3%
Impervious Cover (acres)	0.58	0.58
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	2.12	1.56
Site Rv	0.30	0.39

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.93
Weighted Rv(forest)	0.04
% Forest	44%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.24
% Managed Turf	2%
Impervious Cover (acres)	1.14
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	2.12
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.93
Weighted Rv(forest)	0.04
% Forest	60%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.24
% Managed Turf	3%
ReDev. Impervious Cover (acres)	0.58
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	1.56
ReDev Site Rv	0.39

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.56
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0528	0.0503
Pre-ReDevelopment Treatment Volume (cubic feet)	2,300	2,190
Pre-ReDevelopment TP Load (lb/yr)	1.45	1.38
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.68	0.88
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.64

Final Post-Development Treatment Volume (acre-ft)	0.0944
Final Post-Development Treatment Volume (cubic feet)	4,111
Final Post-Development TP Load (lb/yr)	2.58
Final Post-Development TP Load per acre (lb/acre/yr)	1.22

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0503
Post-ReDevelopment Treatment Volume (cubic feet)	2,190
Post-ReDevelopment TP Load (lb/yr) ¹	1.38
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.88
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.28

Post-Development Treatment Volume (acre-ft)	0.0441
Post-Development Treatment Volume (cubic feet)	1,921
Post-Development TP Load (lb/yr)	1.21
TP Load Reduction Required for New Impervious Area (lb/yr)	0.98

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.25**
 Linear Project TP Load Reduction Required (lb/yr): **1.43**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **10.34**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **18.48**

Project Name: **Lick Run-Stuart Run 36-039.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.342620811
Post-Development TP Load Reduction for Site (lb/yr): 0.88

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.27	0.00	0.62	0.89
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.05	0.01	0.00	0.00	0.06
Impervious Cover (acres)	0.03	0.11	0.00	0.22	0.36
					1.31

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.17	0.00	0.40	0.57
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.03	0.01	0.00	0.00	0.04
Impervious Cover (acres)	0.05	0.21	0.00	0.45	0.70
Area Check	OK	OK	OK	OK	1.31

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.89	0.57
Weighted Rv(forest)	0.04	0.04
% Forest	68%	59%
Managed Turf Cover (acres)	0.06	0.04
Weighted Rv(turf)	0.16	0.16
% Managed Turf	5%	4%
Impervious Cover (acres)	0.36	0.36
Rv(impervious)	0.95	0.95
% Impervious	28%	37%
Total Site Area (acres)	1.31	0.97
Site Rv	0.30	0.39

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.57
Weighted Rv(forest)	0.04
% Forest	43%
Managed Turf Cover (acres)	0.04
Weighted Rv (turf)	0.16
% Managed Turf	3%
Impervious Cover (acres)	0.70
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	1.31
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.57
Weighted Rv(forest)	0.04
% Forest	59%
Managed Turf Cover (acres)	0.04
Weighted Rv (turf)	0.16
% Managed Turf	4%
ReDev. Impervious Cover (acres)	0.36
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	0.97
ReDev Site Rv	0.39

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.34
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0326	0.0311
Pre-ReDevelopment Treatment Volume (cubic feet)	1,418	1,354
Pre-ReDevelopment TP Load (lb/yr)	0.89	0.85
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.68	0.88
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.40

Final Post-Development Treatment Volume (acre-ft)	0.0582
Final Post-Development Treatment Volume (cubic feet)	2,536
Final Post-Development TP Load (lb/yr)	1.59
Final Post-Development TP Load per acre (lb/acre/yr)	1.22

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0311
Post-ReDevelopment Treatment Volume (cubic feet)	1,354
Post-ReDevelopment TP Load (lb/yr) ²	0.85
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.88
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.17

Post-Development Treatment Volume (acre-ft)	0.0271
Post-Development Treatment Volume (cubic feet)	1,182
Post-Development TP Load (lb/yr)	0.74
TP Load Reduction Required for New Impervious Area (lb/yr)	0.60

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.77**
 Linear Project TP Load Reduction Required (lb/yr): **0.88**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **6.37**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **11.40**

Project Name: **Lick Run-Stuart Run 36-059.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.078749345
Post-Development TP Load Reduction for Site (lb/yr): 0.21

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.14	0.00	0.00	0.00	0.14
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.08	0.00	0.00	0.00	0.08
Impervious Cover (acres)	0.10	0.00	0.00	0.00	0.10
					0.33

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.09	0.00	0.00	0.00	0.09
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.05	0.00	0.00	0.00	0.05
Impervious Cover (acres)	0.18	0.00	0.00	0.00	0.18
Area Check	OK	OK	OK	OK	0.33

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.14	0.09
Weighted Rv(forest)	0.02	0.02
% Forest	43%	37%
Managed Turf Cover (acres)	0.08	0.05
Weighted Rv(turf)	0.15	0.15
% Managed Turf	25%	21%
Impervious Cover (acres)	0.10	0.10
Rv(impervious)	0.95	0.95
% Impervious	32%	42%
Total Site Area (acres)	0.33	0.25
Site Rv	0.35	0.44

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.09
Weighted Rv(forest)	0.02
% Forest	28%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.15
% Managed Turf	16%
Impervious Cover (acres)	0.18
Rv(impervious)	0.95
% Impervious	56%
Final Site Area (acres)	0.33
Final Post Dev Site Rv	0.56

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.09
Weighted Rv(forest)	0.02
% Forest	37%
Managed Turf Cover (acres)	0.05
Weighted Rv (turf)	0.15
% Managed Turf	21%
ReDev. Impervious Cover (acres)	0.10
Rv(impervious)	0.95
% Impervious	42%
Total ReDev. Site Area (acres)	0.25
ReDev Site Rv	0.44

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.08
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0095	0.0090
Pre-ReDevelopment Treatment Volume (cubic feet)	414	394
Pre-ReDevelopment TP Load (lb/yr)	0.26	0.25
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.79	1.00
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.10

Final Post-Development Treatment Volume (acre-ft)	0.0153
Final Post-Development Treatment Volume (cubic feet)	665
Final Post-Development TP Load (lb/yr)	0.42
Final Post-Development TP Load per acre (lb/acre/yr)	1.28

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0090
Post-ReDevelopment Treatment Volume (cubic feet)	394
Post-ReDevelopment Load (TP) (lb/yr) ²	0.25
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.00
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.05

Post-Development Treatment Volume (acre-ft)	0.0062
Post-Development Treatment Volume (cubic feet)	272
Post-Development TP Load (lb/yr)	0.17

TP Load Reduction Required for New Impervious Area (lb/yr)	0.14
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.19
 Linear Project TP Load Reduction Required (lb/yr): 0.21

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	1.86
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	2.99
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Project Name: **Little Creek-Deep Creek 12-047-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 1.98

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.524913424
Post-Development TP Load Reduction for Site (lb/yr): 1.35

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.10	0.93	0.34	0.07	1.44
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.01	0.00	0.00	0.01
Impervious Cover (acres)	0.04	0.34	0.12	0.02	0.53
					1.98

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.07	0.59	0.22	0.05	0.92
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.01	0.00	0.00	0.01
Impervious Cover (acres)	0.08	0.68	0.25	0.05	1.05
Area Check	OK	OK	OK	OK	1.98

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.44	0.92
Weighted Rv(forest)	0.03	0.03
% Forest	73%	63%
Managed Turf Cover (acres)	0.01	0.01
Weighted Rv(turf)	0.20	0.20
% Managed Turf	1%	1%
Impervious Cover (acres)	0.53	0.53
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	1.98	1.45
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.92
Weighted Rv(forest)	0.03
% Forest	46%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.20
% Managed Turf	0%
Impervious Cover (acres)	1.05
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.98
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.92
Weighted Rv(forest)	0.03
% Forest	63%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.20
% Managed Turf	1%
ReDev. Impervious Cover (acres)	0.53
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	1.45
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.52
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment	Adjusted ¹	Final Post-Development
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0458	0.0443
Pre-ReDevelopment Treatment Volume (cubic feet)	1,995	1,930
Pre-ReDevelopment TP Load (lb/yr)	1.25	1.21
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.83
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.60

Final Post-Development Treatment Volume (acre-ft)	0.0859
Final Post-Development Treatment Volume (cubic feet)	3,740
Final Post-Development TP Load (lb/yr)	2.35
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment	Adjusted ¹
Post-ReDevelopment Treatment Volume (acre-ft)	0.0443
Post-ReDevelopment Treatment Volume (cubic feet)	1,930
Post-ReDevelopment TP Load (lb/yr) ¹	1.21
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.83
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0416
Post-Development Treatment Volume (cubic feet)	1,810
Post-Development TP Load (lb/yr)	1.14

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.24
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.92
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¹ Adjusted Land Cover Summary: Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.16**
 Linear Project TP Load Reduction Required (lb/yr): 1.35

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	8.96
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	16.81
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Project Name: **Little Creek-Flat Creek 12-012-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: **20%**
The site's net increase in impervious cover (acres) is: **0.472066903**
Post-Development TP Load Reduction for Site (lb/yr): **1.21**

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.79	0.52	0.00	0.00	1.30
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.29	0.18	0.00	0.00	0.47
					1.77

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.50	0.33	0.00	0.00	0.83
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.57	0.37	0.00	0.00	0.94
Area Check	OK	OK	OK	OK	1.77

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.30	0.83
Weighted Rv(forest)	0.02	0.02
% Forest	74%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.47	0.47
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	1.77	1.30
Site Rv	0.27	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.83
Weighted Rv(forest)	0.02
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.94
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.77
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.83
Weighted Rv(forest)	0.02
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.47
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	1.30
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.47
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0396	0.0387
Pre-ReDevelopment Treatment Volume (cubic feet)	1,727	1,686
Pre-ReDevelopment TP Load (lb/yr)	1.08	1.06
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.61	0.81
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.53

Final Post-Development Treatment Volume (acre-ft)	0.0761
Final Post-Development Treatment Volume (cubic feet)	3,313
Final Post-Development TP Load (lb/yr)	2.08
Final Post-Development TP Load per acre (lb/acre/yr)	1.17

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0387
Post-ReDevelopment Treatment Volume (cubic feet)	1,686
Post-ReDevelopment Load (TP) (lb/yr) ²	1.06
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.81
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.21

Post-Development Treatment Volume (acre-ft)	0.0374
Post-Development Treatment Volume (cubic feet)	1,628
Post-Development TP Load (lb/yr)	1.02

TP Load Reduction Required for New Impervious Area (lb/yr)	0.83
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.04**
 Linear Project TP Load Reduction Required (lb/yr): **1.21**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	7.76
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	14.89
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Project Name: **Little Willis River 09-129-AR 2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.630559145
Post-Development TP Load Reduction for Site (lb/yr): 1.61

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	1.63	0.08	1.71
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.03	0.00	0.03
Impervious Cover (acres)	0.00	0.00	0.61	0.03	0.64
					2.38

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	1.04	0.05	1.09
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.02	0.00	0.02
Impervious Cover (acres)	0.00	0.00	1.21	0.06	1.27
Area Check	OK	OK	OK	OK	2.38

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.71	1.09
Weighted Rv(forest)	0.04	0.04
% Forest	72%	63%
Managed Turf Cover (acres)	0.03	0.02
Weighted Rv(turf)	0.22	0.22
% Managed Turf	1%	1%
Impervious Cover (acres)	0.64	0.64
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	2.38	1.75
Site Rv	0.29	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.09
Weighted Rv(forest)	0.04
% Forest	46%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.22
% Managed Turf	1%
Impervious Cover (acres)	1.27
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	2.38
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.09
Weighted Rv(forest)	0.04
% Forest	63%
Managed Turf Cover (acres)	0.02
Weighted Rv (turf)	0.22
% Managed Turf	1%
ReDev. Impervious Cover (acres)	0.64
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	1.75
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.63
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0566	0.0543
Pre-ReDevelopment Treatment Volume (cubic feet)	2,466	2,367
Pre-ReDevelopment TP Load (lb/yr)	1.55	1.49
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.65	0.85
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.72

Final Post-Development Treatment Volume (acre-ft)	0.1043
Final Post-Development Treatment Volume (cubic feet)	4,541
Final Post-Development TP Load (lb/yr)	2.85
Final Post-Development TP Load per acre (lb/acre/yr)	1.20

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0543
Post-ReDevelopment Treatment Volume (cubic feet)	2,367
Post-ReDevelopment TP Load (lb/yr) ¹	1.49
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.85
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0499
Post-Development Treatment Volume (cubic feet)	2,174
Post-Development TP Load (lb/yr)	1.37

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.30
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TP Load Reduction Required for New Impervious Area (lb/yr)	1.11
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¹ Adjusted Land Cover Summary: Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	1.41
Linear Project TP Load Reduction Required (lb/yr)	1.61

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	11.09
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	20.41
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Project Name: **Little Willis River 10-007-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.235506546
Post-Development TP Load Reduction for Site (lb/yr): 0.60

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.52	0.00	0.52
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.14	0.00	0.14
Impervious Cover (acres)	0.00	0.00	0.24	0.00	0.24
					0.90

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.33	0.00	0.33
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.09	0.00	0.09
Impervious Cover (acres)	0.00	0.00	0.48	0.00	0.48
Area Check	OK	OK	OK	OK	0.90

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.52	0.33
Weighted Rv(forest)	0.04	0.04
% Forest	58%	50%
Managed Turf Cover (acres)	0.14	0.09
Weighted Rv(turf)	0.22	0.22
% Managed Turf	15%	13%
Impervious Cover (acres)	0.24	0.24
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	0.90	0.66
Site Rv	0.31	0.40

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.33
Weighted Rv(forest)	0.04
% Forest	37%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.22
% Managed Turf	10%
Impervious Cover (acres)	0.48
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	0.90
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.33
Weighted Rv(forest)	0.04
% Forest	50%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.22
% Managed Turf	13%
ReDev. Impervious Cover (acres)	0.24
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	0.66
ReDev Site Rv	0.40

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.24
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0234	0.0219
Pre-ReDevelopment Treatment Volume (cubic feet)	1,019	953
Pre-ReDevelopment TP Load (lb/yr)	0.64	0.60
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.71	0.91
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.27

Final Post-Development Treatment Volume (acre-ft)	0.0405
Final Post-Development Treatment Volume (cubic feet)	1,765
Final Post-Development TP Load (lb/yr)	1.11
Final Post-Development TP Load per acre (lb/acre/yr)	1.24

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0219
Post-ReDevelopment Treatment Volume (cubic feet)	953
Post-ReDevelopment Load (TP) (lb/yr) ²	0.60
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.91
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.12

Post-Development Treatment Volume (acre-ft)	0.0186
Post-Development Treatment Volume (cubic feet)	812
Post-Development TP Load (lb/yr)	0.51
TP Load Reduction Required for New Impervious Area (lb/yr)	0.41

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.53**
 Linear Project TP Load Reduction Required (lb/yr): 0.60

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 4.58

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 7.93

Project Name: Lower Tarrara Creek 25-001-B047.AR 1 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 1.07

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.273182891
 Post-Development TP Load Reduction for Site (lb/yr): 0.66

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.76	0.00	0.76
Impervious Cover (acres)	0.00	0.00	0.31	0.00	0.31
					1.07

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.48	0.00	0.48
Impervious Cover (acres)	0.00	0.00	0.58	0.00	0.58
Area Check	OK	OK	OK	OK	1.07

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	0.76	0.48
Weighted Rv(turf)	0.22	0.22
% Managed Turf	71%	61%
Impervious Cover (acres)	0.31	0.31
Rv(impervious)	0.95	0.95
% Impervious	29%	39%
Total Site Area (acres)	1.07	0.79
Site Rv	0.43	0.50

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.48
Weighted Rv (turf)	0.22
% Managed Turf	45%
Impervious Cover (acres)	0.58
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	1.07
Final Post Dev Site Rv	0.62

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.48
Weighted Rv (turf)	0.22
% Managed Turf	61%
ReDev. Impervious Cover (acres)	0.31
Rv(impervious)	0.95
% Impervious	39%
Total ReDev. Site Area (acres)	0.79
ReDev Site Rv	0.50

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.27
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0383	0.0332
Pre-ReDevelopment Treatment Volume (cubic feet)	1,666	1,448
Pre-ReDevelopment TP Load (lb/yr)	1.05	0.91
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.98	1.15
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.32

Final Post-Development Treatment Volume (acre-ft)	0.0549
Final Post-Development Treatment Volume (cubic feet)	2,390
Final Post-Development TP Load (lb/yr)	1.50
Final Post-Development TP Load per acre (lb/acre/yr)	1.41

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0332
Post-ReDevelopment Treatment Volume (cubic feet)	1,448
Post-ReDevelopment Load (TP) (lb/yr) ¹	0.91
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.15
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.18

Post-Development Treatment Volume (acre-ft)	0.0216
Post-Development Treatment Volume (cubic feet)	942
Post-Development TP Load (lb/yr)	0.59
TP Load Reduction Required for New Impervious Area (lb/yr)	0.48

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.66
 Linear Project TP Load Reduction Required (lb/yr): 0.66

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 7.49

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 10.74

Project Name: Lower Tarrara Creek 25-048-AR 1 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.07

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.018162252
Post-Development TP Load Reduction for Site (lb/yr):	0.05

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.05	0.05
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.02	0.02
					0.07

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.04	0.04
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.03	0.03
Area Check	OK	OK	OK	OK	0.07

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.05	0.04
Weighted Rv(forest)	0.05	0.05
% Forest	77%	69%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.02	0.02
Rv(impervious)	0.95	0.95
% Impervious	23%	31%
Total Site Area (acres)	0.07	0.05
Site Rv	0.26	0.33

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.04
Weighted Rv(forest)	0.05
% Forest	51%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.03
Rv(impervious)	0.95
% Impervious	49%
Final Site Area (acres)	0.07
Final Post Dev Site Rv	0.49

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.04
Weighted Rv(forest)	0.05
% Forest	69%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.02
Rv(impervious)	0.95
% Impervious	31%
Total ReDev. Site Area (acres)	0.05
ReDev Site Rv	0.33

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.02
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0015	0.0014
Pre-ReDevelopment Treatment Volume (cubic feet)	66	63
Pre-ReDevelopment TP Load (lb/yr)	0.04	0.04
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.58	0.75
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.02

Final Post-Development Treatment Volume (acre-ft)	0.0029
Final Post-Development Treatment Volume (cubic feet)	125
Final Post-Development TP Load (lb/yr)	0.08
Final Post-Development TP Load per acre (lb/acre/yr)	1.11

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0014
Post-ReDevelopment Treatment Volume (cubic feet)	63
Post-ReDevelopment Load (TP) (lb/yr) ²	0.04
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.75
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.01

Post-Development Treatment Volume (acre-ft)	0.0014
Post-Development Treatment Volume (cubic feet)	63
Post-Development TP Load (lb/yr)	0.04
TP Load Reduction Required for New Impervious Area (lb/yr)	0.03

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.04
Linear Project TP Load Reduction Required (lb/yr):	0.05

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	0.30
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	0.56
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Project Name: Meadow Creek-North River 09-040.AR-AR 1 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

CLEAR ALL
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data input cells
 constant values
 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.19

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.049164853
 Post-Development TP Load Reduction for Site (lb/yr): 0.12

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.15	0.00	0.15
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.04	0.00	0.04
					0.19

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.10	0.00	0.10
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.09	0.00	0.09
Area Check	OK	OK	OK	OK	0.19

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.15	0.10
Weighted Rv(forest)	0.04	0.04
% Forest	78%	70%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.04	0.04
Rv(impervious)	0.95	0.95
% Impervious	22%	30%
Total Site Area (acres)	0.19	0.14
Site Rv	0.24	0.31

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.10
Weighted Rv(forest)	0.04
% Forest	52%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.09
Rv(impervious)	0.95
% Impervious	48%
Final Site Area (acres)	0.19
Final Post Dev Site Rv	0.47

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.10
Weighted Rv(forest)	0.04
% Forest	70%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.04
Rv(impervious)	0.95
% Impervious	30%
Total ReDev. Site Area (acres)	0.14
ReDev Site Rv	0.31

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.05
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0039	0.0037
Pre-ReDevelopment Treatment Volume (cubic feet)	170	163
Pre-ReDevelopment TP Load (lb/yr)	0.11	0.10
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.55	0.71
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.06

Final Post-Development Treatment Volume (acre-ft)	0.0076
Final Post-Development Treatment Volume (cubic feet)	332
Final Post-Development TP Load (lb/yr)	0.21
Final Post-Development TP Load per acre (lb/acre/yr)	1.08

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0037
Post-ReDevelopment Treatment Volume (cubic feet)	163
Post-ReDevelopment TP Load (lb/yr) ²	0.10
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.71
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.02

Post-Development Treatment Volume (acre-ft)	0.0039
Post-Development Treatment Volume (cubic feet)	170
Post-Development TP Load (lb/yr)	0.11
TP Load Reduction Required for New Impervious Area (lb/yr)	0.09

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.11
 Linear Project TP Load Reduction Required (lb/yr): 0.12

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 0.76

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 1.49

Project Name: **Meadow Creek-North River 09-040.AR-AR 4 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.076637345
Post-Development TP Load Reduction for Site (lb/yr): 0.20

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.22	0.00	0.00	0.22
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.07	0.00	0.00	0.07
					0.29

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.14	0.00	0.00	0.14
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.15	0.00	0.00	0.15
Area Check	OK	OK	OK	OK	0.29

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.22	0.14
Weighted Rv(forest)	0.03	0.03
% Forest	75%	66%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.07	0.07
Rv(impervious)	0.95	0.95
% Impervious	25%	34%
Total Site Area (acres)	0.29	0.22
Site Rv	0.26	0.34

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.14
Weighted Rv(forest)	0.03
% Forest	49%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.15
Rv(impervious)	0.95
% Impervious	51%
Final Site Area (acres)	0.29
Final Post Dev Site Rv	0.50

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.14
Weighted Rv(forest)	0.03
% Forest	66%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.07
Rv(impervious)	0.95
% Impervious	34%
Total ReDev. Site Area (acres)	0.22
ReDev Site Rv	0.34

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.08
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0063	0.0061
Pre-ReDevelopment Treatment Volume (cubic feet)	274	265
Pre-ReDevelopment TP Load (lb/yr)	0.17	0.17
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.59	0.77
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.09

Final Post-Development Treatment Volume (acre-ft)	0.0122
Final Post-Development Treatment Volume (cubic feet)	530
Final Post-Development TP Load (lb/yr)	0.33
Final Post-Development TP Load per acre (lb/acre/yr)	1.14

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0061
Post-ReDevelopment Treatment Volume (cubic feet)	265
Post-ReDevelopment TP Load (lb/yr) ²	0.17
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.77
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0061
Post-Development Treatment Volume (cubic feet)	264
Post-Development TP Load (lb/yr)	0.17

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.03
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.13
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.17**
 Linear Project TP Load Reduction Required (lb/yr): 0.20

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	1.23
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	2.38
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Project Name: Meadow Creek-North River 09-040-A001-AR 1 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 1.29

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.339881903
 Post-Development TP Load Reduction for Site (lb/yr): 0.87

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.90	0.00	0.00	0.90
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.04	0.00	0.00	0.04
Impervious Cover (acres)	0.00	0.35	0.00	0.00	0.35
					1.29

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.57	0.00	0.00	0.57
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.03	0.00	0.00	0.03
Impervious Cover (acres)	0.00	0.69	0.00	0.00	0.69
Area Check	OK	OK	OK	OK	1.29

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.90	0.57
Weighted Rv(forest)	0.03	0.03
% Forest	70%	61%
Managed Turf Cover (acres)	0.04	0.03
Weighted Rv(turf)	0.20	0.20
% Managed Turf	3%	3%
Impervious Cover (acres)	0.35	0.35
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	1.29	0.95
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.57
Weighted Rv(forest)	0.03
% Forest	45%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.20
% Managed Turf	2%
Impervious Cover (acres)	0.69
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.29
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.57
Weighted Rv(forest)	0.03
% Forest	61%
Managed Turf Cover (acres)	0.03
Weighted Rv (turf)	0.20
% Managed Turf	3%
ReDev. Impervious Cover (acres)	0.35
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	0.95
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.34
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0305	0.0295
Pre-ReDevelopment Treatment Volume (cubic feet)	1,329	1,284
Pre-ReDevelopment TP Load (lb/yr)	0.84	0.81
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.65	0.85
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.39

Final Post-Development Treatment Volume (acre-ft)	0.0564
Final Post-Development Treatment Volume (cubic feet)	2,456
Final Post-Development TP Load (lb/yr)	1.54
Final Post-Development TP Load per acre (lb/acre/yr)	1.20

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0295
Post-ReDevelopment Treatment Volume (cubic feet)	1,284
Post-ReDevelopment TP Load (lb/yr) ¹	0.81
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.85
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.16

Post-Development Treatment Volume (acre-ft)	0.0269
Post-Development Treatment Volume (cubic feet)	1,172
Post-Development TP Load (lb/yr)	0.74
TP Load Reduction Required for New Impervious Area (lb/yr)	0.60

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.76
 Linear Project TP Load Reduction Required (lb/yr): 0.87

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	5.98
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	11.04
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Project Name: **Meadow Creek-North River 09-048.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.006712694
Post-Development TP Load Reduction for Site (lb/yr): 0.02

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.02	0.02
Impervious Cover (acres)	0.00	0.00	0.00	0.01	0.01
					0.03

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.01	0.01
Impervious Cover (acres)	0.00	0.00	0.00	0.02	0.02
Area Check	OK	OK	OK	OK	0.03

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	0.02	0.01
Weighted Rv(turf)	0.25	0.25
% Managed Turf	63%	53%
Impervious Cover (acres)	0.01	0.01
Rv(impervious)	0.95	0.95
% Impervious	37%	47%
Total Site Area (acres)	0.03	0.03
Site Rv	0.51	0.58

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.25
% Managed Turf	42%
Impervious Cover (acres)	0.02
Rv(impervious)	0.95
% Impervious	58%
Final Site Area (acres)	0.03
Final Post Dev Site Rv	0.65

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.25
% Managed Turf	53%
ReDev. Impervious Cover (acres)	0.01
Rv(impervious)	0.95
% Impervious	47%
Total ReDev. Site Area (acres)	0.03
ReDev Site Rv	0.58

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.01
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0014	0.0013
Pre-ReDevelopment Treatment Volume (cubic feet)	61	55
Pre-ReDevelopment TP Load (lb/yr)	0.04	0.03
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.17	1.32
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.01

Final Post-Development Treatment Volume (acre-ft)	0.0018
Final Post-Development Treatment Volume (cubic feet)	78
Final Post-Development TP Load (lb/yr)	0.05
Final Post-Development TP Load per acre (lb/acre/yr)	1.49

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0013
Post-ReDevelopment Treatment Volume (cubic feet)	55
Post-ReDevelopment Load (TP) (lb/yr) ¹	0.03
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.32
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0005
Post-Development Treatment Volume (cubic feet)	23
Post-Development TP Load (lb/yr)	0.01

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.01
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.01
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.02
 Linear Project TP Load Reduction Required (lb/yr): 0.02

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	0.28
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	0.35
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Project Name: **Mill Swamp-Fontaine Creek 15-055-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.277940549
Post-Development TP Load Reduction for Site (lb/yr): 0.71

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.75	0.00	0.75
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.02	0.00	0.02
Impervious Cover (acres)	0.00	0.00	0.28	0.00	0.28
					1.05

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.48	0.00	0.48
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.01	0.00	0.01
Impervious Cover (acres)	0.00	0.00	0.56	0.00	0.56
Area Check	OK	OK	OK	OK	1.05

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.75	0.48
Weighted Rv(forest)	0.04	0.04
% Forest	72%	62%
Managed Turf Cover (acres)	0.02	0.01
Weighted Rv(turf)	0.22	0.22
% Managed Turf	2%	2%
Impervious Cover (acres)	0.28	0.28
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	1.05	0.77
Site Rv	0.29	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.48
Weighted Rv(forest)	0.04
% Forest	46%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.22
% Managed Turf	1%
Impervious Cover (acres)	0.56
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.05
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.48
Weighted Rv(forest)	0.04
% Forest	62%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.22
% Managed Turf	2%
ReDev. Impervious Cover (acres)	0.28
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.77
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.28
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0251	0.0241
Pre-ReDevelopment Treatment Volume (cubic feet)	1,093	1,049
Pre-ReDevelopment TP Load (lb/yr)	0.69	0.66
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.65	0.85
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.32

Final Post-Development Treatment Volume (acre-ft)	0.0461
Final Post-Development Treatment Volume (cubic feet)	2,008
Final Post-Development TP Load (lb/yr)	1.26
Final Post-Development TP Load per acre (lb/acre/yr)	1.20

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0241
Post-ReDevelopment Treatment Volume (cubic feet)	1,049
Post-ReDevelopment TP Load (lb/yr) ²	0.66
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.85
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.13

Post-Development Treatment Volume (acre-ft)	0.0220
Post-Development Treatment Volume (cubic feet)	958
Post-Development TP Load (lb/yr)	0.60
TP Load Reduction Required for New Impervious Area (lb/yr)	0.49

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.62**
 Linear Project TP Load Reduction Required (lb/yr): **0.71**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **4.91**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **9.02**

Project Name: **Mill Swamp-Fontaine Creek 15-067-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 1.69

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.391489107
Post-Development TP Load Reduction for Site (lb/yr): 1.05

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.26	0.10	0.36
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.71	0.01	0.72
Impervious Cover (acres)	0.00	0.00	0.56	0.04	0.61
					1.69

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.17	0.07	0.23
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.46	0.00	0.46
Impervious Cover (acres)	0.00	0.00	0.92	0.08	1.00
Area Check	OK	OK	OK	OK	1.69

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.36	0.23
Weighted Rv(forest)	0.04	0.04
% Forest	21%	18%
Managed Turf Cover (acres)	0.72	0.46
Weighted Rv(turf)	0.22	0.22
% Managed Turf	43%	35%
Impervious Cover (acres)	0.61	0.61
Rv(impervious)	0.95	0.95
% Impervious	36%	47%
Total Site Area (acres)	1.69	1.30
Site Rv	0.44	0.53

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.23
Weighted Rv(forest)	0.04
% Forest	14%
Managed Turf Cover (acres)	0.46
Weighted Rv (turf)	0.22
% Managed Turf	27%
Impervious Cover (acres)	1.00
Rv(impervious)	0.95
% Impervious	59%
Final Site Area (acres)	1.69
Final Post Dev Site Rv	0.63

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.23
Weighted Rv(forest)	0.04
% Forest	18%
Managed Turf Cover (acres)	0.46
Weighted Rv (turf)	0.22
% Managed Turf	35%
ReDev. Impervious Cover (acres)	0.61
Rv(impervious)	0.95
% Impervious	47%
Total ReDev. Site Area (acres)	1.30
ReDev Site Rv	0.53

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.39
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0626	0.0573
Pre-ReDevelopment Treatment Volume (cubic feet)	2,725	2,496
Pre-ReDevelopment TP Load (lb/yr)	1.71	1.57
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.01	1.21
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.53

Final Post-Development Treatment Volume (acre-ft)	0.0883
Final Post-Development Treatment Volume (cubic feet)	3,846
Final Post-Development TP Load (lb/yr)	2.42
Final Post-Development TP Load per acre (lb/acre/yr)	1.43

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0573
Post-ReDevelopment Treatment Volume (cubic feet)	2,496
Post-ReDevelopment Load (TP) (lb/yr) ²	1.57
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.21
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.31

Post-Development Treatment Volume (acre-ft)	0.0310
Post-Development Treatment Volume (cubic feet)	1,350
Post-Development TP Load (lb/yr)	0.85
TP Load Reduction Required for New Impervious Area (lb/yr)	0.69

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.00**
 Linear Project TP Load Reduction Required (lb/yr): 1.05

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 12.25

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 17.29

Project Name: **Mill Swamp-Fontaine Creek 15-072-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **2.71**

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.672478818
Post-Development TP Load Reduction for Site (lb/yr): 1.70

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.04	0.02	0.00	0.36	0.42
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.10	0.32	0.28	0.74	1.43
Impervious Cover (acres)	0.05	0.15	0.14	0.52	0.86
					2.71

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.03	0.01	0.00	0.23	0.27
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.06	0.21	0.18	0.46	0.92
Impervious Cover (acres)	0.10	0.27	0.24	0.93	1.53
Area Check	OK	OK	OK	OK	2.71

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.42	0.27
Weighted Rv(forest)	0.05	0.05
% Forest	15%	13%
Managed Turf Cover (acres)	1.43	0.92
Weighted Rv(turf)	0.23	0.23
% Managed Turf	53%	45%
Impervious Cover (acres)	0.86	0.86
Rv(impervious)	0.95	0.95
% Impervious	32%	42%
Total Site Area (acres)	2.71	2.04
Site Rv	0.43	0.51

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.27
Weighted Rv(forest)	0.05
% Forest	10%
Managed Turf Cover (acres)	0.92
Weighted Rv (turf)	0.23
% Managed Turf	34%
Impervious Cover (acres)	1.53
Rv(impervious)	0.95
% Impervious	56%
Final Site Area (acres)	2.71
Final Post Dev Site Rv	0.62

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.27
Weighted Rv(forest)	0.05
% Forest	13%
Managed Turf Cover (acres)	0.92
Weighted Rv (turf)	0.23
% Managed Turf	45%
ReDev. Impervious Cover (acres)	0.86
Rv(impervious)	0.95
% Impervious	42%
Total ReDev. Site Area (acres)	2.04
ReDev Site Rv	0.51

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.67
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0967	0.0862
Pre-ReDevelopment Treatment Volume (cubic feet)	4,210	3,757
Pre-ReDevelopment TP Load (lb/yr)	2.65	2.36
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.98	1.16
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.84

Final Post-Development Treatment Volume (acre-ft)	0.1395
Final Post-Development Treatment Volume (cubic feet)	6,076
Final Post-Development TP Load (lb/yr)	3.82
Final Post-Development TP Load per acre (lb/acre/yr)	1.41

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0862
Post-ReDevelopment Treatment Volume (cubic feet)	3,757
Post-ReDevelopment TP Load (lb/yr) ²	2.36
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.16
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.47

Post-Development Treatment Volume (acre-ft)	0.0532
Post-Development Treatment Volume (cubic feet)	2,319
Post-Development TP Load (lb/yr)	1.46
TP Load Reduction Required for New Impervious Area (lb/yr)	1.18

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	1.65
Linear Project TP Load Reduction Required (lb/yr)	1.70

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	18.92
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	27.31
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Project Name: **Red Oak Creek-Nottoway River 14-003-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? **Yes**

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **0.11**

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.021647784
Post-Development TP Load Reduction for Site (lb/yr): 0.06

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? **Yes**
 Land cover areas entered correctly? **✓**
 Total disturbed area entered? **✓**

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.06	0.00	0.00	0.06
Impervious Cover (acres)	0.00	0.04	0.00	0.00	0.04
					0.11

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.04	0.00	0.00	0.04
Impervious Cover (acres)	0.00	0.06	0.00	0.00	0.06
Area Check	OK.	OK.	OK.	OK.	0.11

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	0.06	0.04
Weighted Rv(turf)	0.20	0.20
% Managed Turf	61%	51%
Impervious Cover (acres)	0.04	0.04
Rv(impervious)	0.95	0.95
% Impervious	39%	49%
Total Site Area (acres)	0.11	0.08
Site Rv	0.49	0.56

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.04
Weighted Rv (turf)	0.20
% Managed Turf	41%
Impervious Cover (acres)	0.06
Rv(impervious)	0.95
% Impervious	59%
Final Site Area (acres)	0.11
Final Post Dev Site Rv	0.64

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.04
Weighted Rv (turf)	0.20
% Managed Turf	51%
ReDev. Impervious Cover (acres)	0.04
Rv(impervious)	0.95
% Impervious	49%
Total ReDev. Site Area (acres)	0.08
ReDev Site Rv	0.56

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.02
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0043	0.0039
Pre-ReDevelopment Treatment Volume (cubic feet)	187	171
Pre-ReDevelopment TP Load (lb/yr)	0.12	0.11
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.12	1.29
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.03

Final Post-Development Treatment Volume (acre-ft)	0.0056
Final Post-Development Treatment Volume (cubic feet)	246
Final Post-Development TP Load (lb/yr)	0.15
Final Post-Development TP Load per acre (lb/acre/yr)	1.47

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0039
Post-ReDevelopment Treatment Volume (cubic feet)	171
Post-ReDevelopment Load (TP) (lb/yr) ¹	0.11
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.29
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0017
Post-Development Treatment Volume (cubic feet)	75
Post-Development TP Load (lb/yr)	0.05

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.02
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.04
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.06**
 Linear Project TP Load Reduction Required (lb/yr): **0.06**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	0.84
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	1.11
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Project Name: **Reedy Creek 14-096-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **1.47**

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Maximum reduction required: **20%**
 The site's net increase in impervious cover (acres) is: **0.391687576**
 Post-Development TP Load Reduction for Site (lb/yr): **0.98**

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.42	0.00	0.41	0.83
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.10	0.00	0.15	0.25
Impervious Cover (acres)	0.00	0.19	0.00	0.20	0.39
					1.47

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.27	0.00	0.26	0.53
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.07	0.00	0.09	0.16
Impervious Cover (acres)	0.00	0.38	0.00	0.40	0.78
Area Check	OK	OK	OK	OK	1.47

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.83	0.53
Weighted Rv(forest)	0.04	0.04
% Forest	57%	49%
Managed Turf Cover (acres)	0.25	0.16
Weighted Rv(turf)	0.23	0.23
% Managed Turf	17%	15%
Impervious Cover (acres)	0.39	0.39
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	1.47	1.08
Site Rv	0.31	0.39

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.53
Weighted Rv(forest)	0.04
% Forest	36%
Managed Turf Cover (acres)	0.16
Weighted Rv (turf)	0.23
% Managed Turf	11%
Impervious Cover (acres)	0.78
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.47
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.53
Weighted Rv(forest)	0.04
% Forest	49%
Managed Turf Cover (acres)	0.16
Weighted Rv (turf)	0.23
% Managed Turf	15%
ReDev. Impervious Cover (acres)	0.39
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	1.08
ReDev Site Rv	0.39

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.39
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0382	0.0355
Pre-ReDevelopment Treatment Volume (cubic feet)	1,666	1,546
Pre-ReDevelopment TP Load (lb/yr)	1.05	0.97
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.71	0.90
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.44

Final Post-Development Treatment Volume (acre-ft)	0.0665
Final Post-Development Treatment Volume (cubic feet)	2,897
Final Post-Development TP Load (lb/yr)	1.82
Final Post-Development TP Load per acre (lb/acre/yr)	1.24

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0355
Post-ReDevelopment Treatment Volume (cubic feet)	1,546
Post-ReDevelopment Load (TP) (lb/yr) ²	0.97
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.90
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0310
Post-Development Treatment Volume (cubic feet)	1,351
Post-Development TP Load (lb/yr)	0.85

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.19
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.69
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.88**
 Linear Project TP Load Reduction Required (lb/yr): **0.98**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	7.49
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	13.02
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Project Name: **Reedy Creek 14-103-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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 calculation cells
 final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.978725958
Post-Development TP Load Reduction for Site (lb/yr): 2.47

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.04	0.83	0.85	1.72
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.49	0.45	0.06	0.99
Impervious Cover (acres)	0.00	0.25	0.47	0.33	1.05
					3.76

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.02	0.53	0.54	1.09
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.32	0.29	0.04	0.65
Impervious Cover (acres)	0.00	0.43	0.93	0.66	2.02
Area Check	OK	OK	OK	OK	3.76

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	1.72	1.09
Weighted Rv(forest)	0.04	0.04
% Forest	46%	39%
Managed Turf Cover (acres)	0.99	0.65
Weighted Rv(turf)	0.21	0.21
% Managed Turf	26%	23%
Impervious Cover (acres)	1.05	1.05
Rv(impervious)	0.95	0.95
% Impervious	28%	38%
Total Site Area (acres)	3.76	2.78
Site Rv	0.34	0.42

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.09
Weighted Rv(forest)	0.04
% Forest	29%
Managed Turf Cover (acres)	0.65
Weighted Rv (turf)	0.21
% Managed Turf	17%
Impervious Cover (acres)	2.02
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	3.76
Final Post Dev Site Rv	0.56

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.09
Weighted Rv(forest)	0.04
% Forest	39%
Managed Turf Cover (acres)	0.65
Weighted Rv (turf)	0.21
% Managed Turf	23%
ReDev. Impervious Cover (acres)	1.05
Rv(impervious)	0.95
% Impervious	38%
Total ReDev. Site Area (acres)	2.78
ReDev Site Rv	0.42

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.98
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1067	0.0982
Pre-ReDevelopment Treatment Volume (cubic feet)	4,648	4,277
Pre-ReDevelopment TP Load (lb/yr)	2.92	2.69
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.78	0.97
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.14

Final Post-Development Treatment Volume (acre-ft)	0.1757
Final Post-Development Treatment Volume (cubic feet)	7,652
Final Post-Development TP Load (lb/yr)	4.81
Final Post-Development TP Load per acre (lb/acre/yr)	1.28

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0982
Post-ReDevelopment Treatment Volume (cubic feet)	4,277
Post-ReDevelopment TP Load (lb/yr) ²	2.69
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.97
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0775
Post-Development Treatment Volume (cubic feet)	3,375
Post-Development TP Load (lb/yr)	2.12

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.54
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TP Load Reduction Required for New Impervious Area (lb/yr)	1.72
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **2.26**
 Linear Project TP Load Reduction Required (lb/yr): **2.47**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	20.89
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	34.40
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Project Name: Ripley Creek-Walton Fork 09-005-AR 3 Major Upgrade
 Date: June 5, 2017 REV 1
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.78

Maximum reduction required: 20%
 The site's net increase in impervious cover (acres) is: 0.193492989
 Post-Development TP Load Reduction for Site (lb/yr): 0.51

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.26	0.14	0.00	0.40
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.14	0.00	0.00	0.14
Impervious Cover (acres)	0.00	0.19	0.05	0.00	0.24
					0.78

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.16	0.09	0.00	0.26
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.09	0.00	0.00	0.09
Impervious Cover (acres)	0.00	0.33	0.10	0.00	0.43
Area Check	OK	OK	OK	OK	0.78

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.40	0.26
Weighted Rv(forest)	0.03	0.03
% Forest	52%	44%
Managed Turf Cover (acres)	0.14	0.09
Weighted Rv(turf)	0.20	0.20
% Managed Turf	18%	15%
Impervious Cover (acres)	0.24	0.24
Rv(impervious)	0.95	0.95
% Impervious	31%	41%
Total Site Area (acres)	0.78	0.58
Site Rv	0.34	0.43

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.26
Weighted Rv(forest)	0.03
% Forest	33%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.20
% Managed Turf	11%
Impervious Cover (acres)	0.43
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	0.78
Final Post Dev Site Rv	0.56

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.26
Weighted Rv(forest)	0.03
% Forest	44%
Managed Turf Cover (acres)	0.09
Weighted Rv (turf)	0.20
% Managed Turf	15%
ReDev. Impervious Cover (acres)	0.24
Rv(impervious)	0.95
% Impervious	41%
Total ReDev. Site Area (acres)	0.58
ReDev Site Rv	0.43

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.19
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0222	0.0209
Pre-ReDevelopment Treatment Volume (cubic feet)	966	912
Pre-ReDevelopment TP Load (lb/yr)	0.61	0.57
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.78	0.98
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.24

Final Post-Development Treatment Volume (acre-ft)	0.0363
Final Post-Development Treatment Volume (cubic feet)	1,580
Final Post-Development TP Load (lb/yr)	0.99
Final Post-Development TP Load per acre (lb/acre/yr)	1.28

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0209
Post-ReDevelopment Treatment Volume (cubic feet)	912
Post-ReDevelopment Load (TP) (lb/yr) ¹	0.57
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.98
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.11

Post-Development Treatment Volume (acre-ft)	0.0153
Post-Development Treatment Volume (cubic feet)	667
Post-Development TP Load (lb/yr)	0.42
TP Load Reduction Required for New Impervious Area (lb/yr)	0.34

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.45
 Linear Project TP Load Reduction Required (lb/yr): 0.51

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 4.34

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 7.10

Project Name: **Round Gut-Nottoway River 25-066-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.294306247
Post-Development TP Load Reduction for Site (lb/yr): 0.75

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.51	0.00	0.31	0.82
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.18	0.00	0.11	0.29
Totals					1.11

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.32	0.00	0.20	0.52
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.36	0.00	0.22	0.59
Area Check	OK	OK	OK	OK	1.11

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.82	0.52
Weighted Rv(forest)	0.04	0.04
% Forest	74%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.29	0.29
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	1.11	0.81
Site Rv	0.28	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.52
Weighted Rv(forest)	0.04
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.59
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	1.11
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.52
Weighted Rv(forest)	0.04
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.29
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.81
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.29
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment		Adjusted ¹
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0256	0.0247
Pre-ReDevelopment Treatment Volume (cubic feet)	1,114	1,074
Pre-ReDevelopment TP Load (lb/yr)	0.70	0.67
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.83
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.33

Final Post-Development Treatment Volume (acre-ft)	0.0480
Final Post-Development Treatment Volume (cubic feet)	2,089
Final Post-Development TP Load (lb/yr)	1.31
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0247
Post-ReDevelopment Treatment Volume (cubic feet)	1,074
Post-ReDevelopment Load (TP) (lb/yr) ¹	0.67
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.83
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.13

Post-Development Treatment Volume (acre-ft)	0.0233
Post-Development Treatment Volume (cubic feet)	1,015
Post-Development TP Load (lb/yr)	0.64

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.65**
 Linear Project TP Load Reduction Required (lb/yr): **0.75**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	5.01
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	9.39
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Project Name: **Round Gut-Nottoway River 25-074-AR 3 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.071415914
Post-Development TP Load Reduction for Site (lb/yr): 0.18

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.05	0.16	0.20
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.02	0.05	0.07
					0.27

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.03	0.10	0.13
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.03	0.11	0.14
Area Check	OK	OK	OK	OK	0.27

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.20	0.13
Weighted Rv(forest)	0.05	0.05
% Forest	75%	66%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.07	0.07
Rv(impervious)	0.95	0.95
% Impervious	25%	34%
Total Site Area (acres)	0.27	0.20
Site Rv	0.28	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.13
Weighted Rv(forest)	0.05
% Forest	49%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.14
Rv(impervious)	0.95
% Impervious	51%
Final Site Area (acres)	0.27
Final Post Dev Site Rv	0.51

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.13
Weighted Rv(forest)	0.05
% Forest	66%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.07
Rv(impervious)	0.95
% Impervious	34%
Total ReDev. Site Area (acres)	0.20
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.07
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment		Adjusted ¹
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0063	0.0060
Pre-ReDevelopment Treatment Volume (cubic feet)	275	262
Pre-ReDevelopment TP Load (lb/yr)	0.17	0.16
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.81
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.08

Final Post-Development Treatment Volume (acre-ft)	0.0117
Final Post-Development Treatment Volume (cubic feet)	509
Final Post-Development TP Load (lb/yr)	0.32
Final Post-Development TP Load per acre (lb/acre/yr)	1.17

Treatment Volume and Nutrient Load	
Post-ReDevelopment	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0060
Post-ReDevelopment Treatment Volume (cubic feet)	262
Post-ReDevelopment Load (TP) (lb/yr) ²	0.16
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.81
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.03

Post-Development Treatment Volume (acre-ft)	0.0057
Post-Development Treatment Volume (cubic feet)	246
Post-Development TP Load (lb/yr)	0.15
TP Load Reduction Required for New Impervious Area (lb/yr)	0.13

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.16
 Linear Project TP Load Reduction Required (lb/yr): 0.18

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	1.23
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	2.29
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Project Name: **Sayers Creek 11-040.AR-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.68

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly? ✓
 Total disturbed area entered? ✓

Maximum reduction required: **20%**
 The site's net increase in impervious cover (acres) is: **0.177957714**
 Post-Development TP Load Reduction for Site (lb/yr): **0.46**

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.41	0.00	0.00	0.00	0.41
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.08	0.00	0.00	0.00	0.08
Impervious Cover (acres)	0.19	0.00	0.00	0.00	0.19
					0.68

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.26	0.00	0.00	0.00	0.26
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.06	0.00	0.00	0.00	0.06
Impervious Cover (acres)	0.37	0.00	0.00	0.00	0.37
Area Check	OK	OK	OK	OK	0.68

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.41	0.26
Weighted Rv(forest)	0.02	0.02
% Forest	60%	52%
Managed Turf Cover (acres)	0.08	0.06
Weighted Rv(turf)	0.15	0.15
% Managed Turf	12%	11%
Impervious Cover (acres)	0.19	0.19
Rv(impervious)	0.95	0.95
% Impervious	27%	37%
Total Site Area (acres)	0.68	0.51
Site Rv	0.29	0.38

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.26
Weighted Rv(forest)	0.02
% Forest	38%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.15
% Managed Turf	8%
Impervious Cover (acres)	0.37
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	0.68
Final Post Dev Site Rv	0.53

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.26
Weighted Rv(forest)	0.02
% Forest	52%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.15
% Managed Turf	11%
ReDev. Impervious Cover (acres)	0.19
Rv(impervious)	0.95
% Impervious	37%
Total ReDev. Site Area (acres)	0.51
ReDev Site Rv	0.38

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.18
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment	Adjusted ¹	Final Post-Development
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0166	0.0160
Pre-ReDevelopment Treatment Volume (cubic feet)	724	698
Pre-ReDevelopment TP Load (lb/yr)	0.46	0.44
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.67	0.87
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.21

Final Post-Development Treatment Volume (acre-ft)	0.0301
Final Post-Development Treatment Volume (cubic feet)	1,312
Final Post-Development TP Load (lb/yr)	0.82
Final Post-Development TP Load per acre (lb/acre/yr)	1.20

Treatment Volume and Nutrient Load	
Post-ReDevelopment	Adjusted ¹
Post-ReDevelopment Treatment Volume (acre-ft)	0.0160
Post-ReDevelopment Treatment Volume (cubic feet)	698
Post-ReDevelopment Load (TP) (lb/yr) ¹	0.44
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.87
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0141
Post-Development Treatment Volume (cubic feet)	614
Post-Development TP Load (lb/yr)	0.39

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.09
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.31
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.40**
 Linear Project TP Load Reduction Required (lb/yr): **0.46**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	3.26
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	5.90
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Project Name: **Scotchtown Draft-Cowpasture River 36-027.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.227388911
Post-Development TP Load Reduction for Site (lb/yr): 0.59

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.52	0.00	0.00	0.52
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.10	0.00	0.00	0.10
Impervious Cover (acres)	0.00	0.26	0.00	0.00	0.26
					0.88

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.33	0.00	0.00	0.33
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.06	0.00	0.00	0.06
Impervious Cover (acres)	0.00	0.48	0.00	0.00	0.48
Area Check	OK	OK	OK	OK	0.88

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.52	0.33
Weighted Rv(forest)	0.03	0.03
% Forest	60%	51%
Managed Turf Cover (acres)	0.10	0.06
Weighted Rv(turf)	0.20	0.20
% Managed Turf	11%	10%
Impervious Cover (acres)	0.26	0.26
Rv(impervious)	0.95	0.95
% Impervious	29%	39%
Total Site Area (acres)	0.88	0.65
Site Rv	0.32	0.41

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.33
Weighted Rv(forest)	0.03
% Forest	38%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.20
% Managed Turf	7%
Impervious Cover (acres)	0.48
Rv(impervious)	0.95
% Impervious	55%
Final Site Area (acres)	0.88
Final Post Dev Site Rv	0.55

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.33
Weighted Rv(forest)	0.03
% Forest	51%
Managed Turf Cover (acres)	0.06
Weighted Rv (turf)	0.20
% Managed Turf	10%
ReDev. Impervious Cover (acres)	0.26
Rv(impervious)	0.95
% Impervious	39%
Total ReDev. Site Area (acres)	0.65
ReDev Site Rv	0.41

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.23
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0232	0.0221
Pre-ReDevelopment Treatment Volume (cubic feet)	1,010	963
Pre-ReDevelopment TP Load (lb/yr)	0.63	0.61
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.72	0.93
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.27

Final Post-Development Treatment Volume (acre-ft)	0.0401
Final Post-Development Treatment Volume (cubic feet)	1,747
Final Post-Development TP Load (lb/yr)	1.10
Final Post-Development TP Load per acre (lb/acre/yr)	1.25

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0221
Post-ReDevelopment Treatment Volume (cubic feet)	963
Post-ReDevelopment Load (TP) (lb/yr) ²	0.61
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.93
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.12

Post-Development Treatment Volume (acre-ft)	0.0180
Post-Development Treatment Volume (cubic feet)	784
Post-Development TP Load (lb/yr)	0.49

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.52**
 Linear Project TP Load Reduction Required (lb/yr): **0.59**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **4.54**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **7.85**

Project Name: **Slagles Lake-Three Creek 14-103-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.125354277
Post-Development TP Load Reduction for Site (lb/yr): 0.34

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.34	0.00	0.00	0.34
Impervious Cover (acres)	0.00	0.21	0.00	0.00	0.21
					0.55

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.21	0.00	0.00	0.21
Impervious Cover (acres)	0.00	0.34	0.00	0.00	0.34
Area Check	OK	OK	OK	OK	0.55

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	0.34	0.21
Weighted Rv(turf)	0.20	0.20
% Managed Turf	61%	50%
Impervious Cover (acres)	0.21	0.21
Rv(impervious)	0.95	0.95
% Impervious	39%	50%
Total Site Area (acres)	0.55	0.42
Site Rv	0.49	0.57

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.21
Weighted Rv (turf)	0.20
% Managed Turf	39%
Impervious Cover (acres)	0.34
Rv(impervious)	0.95
% Impervious	61%
Final Site Area (acres)	0.55
Final Post Dev Site Rv	0.66

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.21
Weighted Rv (turf)	0.20
% Managed Turf	50%
ReDev. Impervious Cover (acres)	0.21
Rv(impervious)	0.95
% Impervious	50%
Total ReDev. Site Area (acres)	0.42
ReDev Site Rv	0.57

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.13
Rv(impervious)	0.95

Treatment Volume and Nutrient Load

Pre-ReDevelopment Treatment Volume (acre-ft)	0.0224	0.0203
Pre-ReDevelopment Treatment Volume (cubic feet)	976	885
Pre-ReDevelopment TP Load (lb/yr)	0.61	0.56
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.12	1.31
Baseline TP Load (lb/yr) <i>(0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)</i>		0.17

Final Post-Development Treatment Volume (acre-ft)	0.0302
Final Post-Development Treatment Volume (cubic feet)	1,317
Final Post-Development TP Load (lb/yr)	0.83
Final Post-Development TP Load per acre (lb/acre/yr)	1.51

Treatment Volume and Nutrient Load

Post-ReDevelopment Treatment Volume (acre-ft)	0.0203
Post-ReDevelopment Treatment Volume (cubic feet)	885
Post-ReDevelopment Load (TP) (lb/yr) ²	0.56
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.31
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0099
Post-Development Treatment Volume (cubic feet)	432
Post-Development TP Load (lb/yr)	0.27

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.11
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.22
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.33**
 Linear Project TP Load Reduction Required (lb/yr): 0.34

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	4.38
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	5.92
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Project Name: **Slagles Lake-Three Creek 14-106-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? **Yes**

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **0.24**

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.051218129
Post-Development TP Load Reduction for Site (lb/yr):	0.14

BMP Design Specifications List: **2013 Draft Stds & Specs**
 Linear project? **Yes** ✓
 Land cover areas entered correctly? **✓**
 Total disturbed area entered? **✓**

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.15	0.00	0.15
Impervious Cover (acres)	0.00	0.00	0.10	0.00	0.10
					0.24

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.10	0.00	0.10
Impervious Cover (acres)	0.00	0.00	0.15	0.00	0.15
Area Check	OK	OK	OK	OK	0.24

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	0.15	0.10
Weighted Rv(turf)	0.22	0.22
% Managed Turf	60%	49%
Impervious Cover (acres)	0.10	0.10
Rv(impervious)	0.95	0.95
% Impervious	40%	51%
Total Site Area (acres)	0.24	0.19
Site Rv	0.51	0.59

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.10
Weighted Rv (turf)	0.22
% Managed Turf	39%
Impervious Cover (acres)	0.15
Rv(impervious)	0.95
% Impervious	61%
Final Site Area (acres)	0.24
Final Post Dev Site Rv	0.67

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.10
Weighted Rv (turf)	0.22
% Managed Turf	49%
ReDev. Impervious Cover (acres)	0.10
Rv(impervious)	0.95
% Impervious	51%
Total ReDev. Site Area (acres)	0.19
ReDev Site Rv	0.59

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.05
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0104	0.0095
Pre-ReDevelopment Treatment Volume (cubic feet)	454	413
Pre-ReDevelopment TP Load (lb/yr)	0.29	0.26
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.17	1.35
Baseline TP Load (lb/yr) <i>(0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)</i>		0.08

Final Post-Development Treatment Volume (acre-ft)	0.0135
Final Post-Development Treatment Volume (cubic feet)	590
Final Post-Development TP Load (lb/yr)	0.37
Final Post-Development TP Load per acre (lb/acre/yr)	1.52

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0095
Post-ReDevelopment Treatment Volume (cubic feet)	413
Post-ReDevelopment Load (TP) (lb/yr) ²	0.26
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.35
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0041
Post-Development Treatment Volume (cubic feet)	177
Post-Development TP Load (lb/yr)	0.11

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.05
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.09
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.14
Linear Project TP Load Reduction Required (lb/yr):	0.14

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	2.04
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	2.65
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Project Name: **Sycamore Creek-James River 08-214-B004-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.930401064
Post-Development TP Load Reduction for Site (lb/yr):	2.38

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.40	0.07	1.11	2.59
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.51	0.02	0.39	0.92
					3.51

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.89	0.05	0.71	1.66
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	1.02	0.05	0.78	1.85
Area Check	OK	OK	OK	OK	3.51

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.59	1.66
Weighted Rv(forest)	0.04	0.04
% Forest	74%	64%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.92	0.92
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	3.51	2.57
Site Rv	0.28	0.36

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.66
Weighted Rv(forest)	0.04
% Forest	47%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	1.85
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	3.51
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.66
Weighted Rv(forest)	0.04
% Forest	64%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.92
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	2.57
ReDev Site Rv	0.36

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.93
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0812	0.0782
Pre-ReDevelopment Treatment Volume (cubic feet)	3,535	3,404
Pre-ReDevelopment TP Load (lb/yr)	2.22	2.14
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.83
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.06

Final Post-Development Treatment Volume (acre-ft)	0.1518
Final Post-Development Treatment Volume (cubic feet)	6,613
Final Post-Development TP Load (lb/yr)	4.15
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0782
Post-ReDevelopment Treatment Volume (cubic feet)	3,404
Post-ReDevelopment Load (TP) (lb/yr) ¹	2.14
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.83
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.43

Post-Development Treatment Volume (acre-ft)	0.0737
Post-Development Treatment Volume (cubic feet)	3,208
Post-Development TP Load (lb/yr)	2.02
TP Load Reduction Required for New Impervious Area (lb/yr)	1.63

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	2.06
Linear Project TP Load Reduction Required (lb/yr):	2.38

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	15.89
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	29.72
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Project Name: **Sycamore Creek-James River 09-001-A001.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → **4.72**

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 1.234803286
Post-Development TP Load Reduction for Site (lb/yr): 3.02

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.58	0.33	0.91
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.72	0.97	0.80	2.50
Impervious Cover (acres)	0.00	0.26	0.63	0.42	1.32
					4.72

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.37	0.21	0.58
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.46	0.62	0.51	1.59
Impervious Cover (acres)	0.00	0.53	1.19	0.83	2.55
Area Check	OK	OK	OK	OK	4.72

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.91	0.58
Weighted Rv(forest)	0.04	0.04
% Forest	19%	17%
Managed Turf Cover (acres)	2.50	1.59
Weighted Rv(turf)	0.22	0.22
% Managed Turf	53%	46%
Impervious Cover (acres)	1.32	1.32
Rv(impervious)	0.95	0.95
% Impervious	28%	38%
Total Site Area (acres)	4.72	3.48
Site Rv	0.39	0.47

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.58
Weighted Rv(forest)	0.04
% Forest	12%
Managed Turf Cover (acres)	1.59
Weighted Rv (turf)	0.22
% Managed Turf	34%
Impervious Cover (acres)	2.55
Rv(impervious)	0.95
% Impervious	54%
Final Site Area (acres)	4.72
Final Post Dev Site Rv	0.59

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.58
Weighted Rv(forest)	0.04
% Forest	17%
Managed Turf Cover (acres)	1.59
Weighted Rv (turf)	0.22
% Managed Turf	46%
ReDev. Impervious Cover (acres)	1.32
Rv(impervious)	0.95
% Impervious	38%
Total ReDev. Site Area (acres)	3.48
ReDev Site Rv	0.47

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.23
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1540	0.1359
Pre-ReDevelopment Treatment Volume (cubic feet)	6,710	5,922
Pre-ReDevelopment TP Load (lb/yr)	4.22	3.72
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.89	1.07
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.43

Final Post-Development Treatment Volume (acre-ft)	0.2337
Final Post-Development Treatment Volume (cubic feet)	10,180
Final Post-Development TP Load (lb/yr)	6.40
Final Post-Development TP Load per acre (lb/acre/yr)	1.36

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1359
Post-ReDevelopment Treatment Volume (cubic feet)	5,922
Post-ReDevelopment Load (TP) (lb/yr) ²	3.72
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.07
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.74

Post-Development Treatment Volume (acre-ft)	0.0978
Post-Development Treatment Volume (cubic feet)	4,258
Post-Development TP Load (lb/yr)	2.68
TP Load Reduction Required for New Impervious Area (lb/yr)	2.17

¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **2.91**
 Linear Project TP Load Reduction Required (lb/yr) **3.02**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) **30.16**

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) **45.76**

Project Name: **Sycamore Creek-James River 09-001-A011-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.217770805
Post-Development TP Load Reduction for Site (lb/yr): 1.01

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.17	0.14	0.00	0.31
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.22	0.08	0.00	0.30
Impervious Cover (acres)	0.00	0.67	0.63	0.00	1.30
					1.91

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.11	0.09	0.00	0.20
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.14	0.06	0.00	0.20
Impervious Cover (acres)	0.00	0.81	0.71	0.00	1.51
Area Check	OK	OK	OK	OK	1.91

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.31	0.20
Weighted Rv(forest)	0.03	0.03
% Forest	16%	12%
Managed Turf Cover (acres)	0.30	0.20
Weighted Rv(turf)	0.21	0.21
% Managed Turf	16%	12%
Impervious Cover (acres)	1.30	1.30
Rv(impervious)	0.95	0.95
% Impervious	68%	77%
Total Site Area (acres)	1.91	1.69
Site Rv	0.68	0.76

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.20
Weighted Rv(forest)	0.03
% Forest	10%
Managed Turf Cover (acres)	0.20
Weighted Rv (turf)	0.21
% Managed Turf	10%
Impervious Cover (acres)	1.51
Rv(impervious)	0.95
% Impervious	79%
Final Site Area (acres)	1.91
Final Post Dev Site Rv	0.78

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.20
Weighted Rv(forest)	0.03
% Forest	12%
Managed Turf Cover (acres)	0.20
Weighted Rv (turf)	0.21
% Managed Turf	12%
ReDev. Impervious Cover (acres)	1.30
Rv(impervious)	0.95
% Impervious	77%
Total ReDev. Site Area (acres)	1.69
ReDev Site Rv	0.76

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.22
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1086	0.1065
Pre-ReDevelopment Treatment Volume (cubic feet)	4,730	4,638
Pre-ReDevelopment TP Load (lb/yr)	2.97	2.91
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.56	1.72
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.69

Final Post-Development Treatment Volume (acre-ft)	0.1237
Final Post-Development Treatment Volume (cubic feet)	5,389
Final Post-Development TP Load (lb/yr)	3.39
Final Post-Development TP Load per acre (lb/acre/yr)	1.77

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1065
Post-ReDevelopment Treatment Volume (cubic feet)	4,638
Post-ReDevelopment Load (TP) (lb/yr) ²	2.91
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.72
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.58

Post-Development Treatment Volume (acre-ft)	0.0172
Post-Development Treatment Volume (cubic feet)	751
Post-Development TP Load (lb/yr)	0.47
TP Load Reduction Required for New Impervious Area (lb/yr)	0.38

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 0.97
 Linear Project TP Load Reduction Required (lb/yr): 1.01

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	21.26
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	24.22
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Project Name: **Sycamore Creek-James River 09-005-AR 3 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0
Post-Development TP Load Reduction for Site (lb/yr): 0.00

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?
TP LOAD REDUCTION NOT REQUIRED

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
					0.00

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
					0.00
Area Check	OK	OK	OK	OK	OK

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.03	0.03
% Forest	95%	95%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.20	0.20
% Managed Turf	4%	4%
Impervious Cover (acres)	0.00	0.00
Rv(impervious)	0.95	0.95
% Impervious	1%	1%
Total Site Area (acres)	0.00	0.00
Site Rv	0.05	0.05

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.03
% Forest	95%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.20
% Managed Turf	4%
Impervious Cover (acres)	0.00
Rv(impervious)	0.95
% Impervious	1%
Final Site Area (acres)	0.00
Final Post Dev Site Rv	0.05

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.03
% Forest	95%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.20
% Managed Turf	4%
ReDev. Impervious Cover (acres)	0.00
Rv(impervious)	0.95
% Impervious	1%
Total ReDev. Site Area (acres)	0.00
ReDev Site Rv	0.05

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.00
Rv(impervious)	--

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0000	0.0000
Pre-ReDevelopment Treatment Volume (cubic feet)	0	0
Pre-ReDevelopment TP Load (lb/yr)	0.00	0.00
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.10	0.10
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.00

Final Post-Development Treatment Volume (acre-ft)	0.0000
Final Post-Development Treatment Volume (cubic feet)	0
Final Post-Development TP Load (lb/yr)	0.00
Final Post-Development TP Load per acre (lb/acre/yr)	0.10

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0000
Post-ReDevelopment Treatment Volume (cubic feet)	0
Post-ReDevelopment TP Load (TP) (lb/yr) ²	0.00
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.10
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.00

Post-Development Treatment Volume (acre-ft)	--
Post-Development Treatment Volume (cubic feet)	--
Post-Development TP Load (lb/yr)	--

TP Load Reduction Required for New Impervious Area (lb/yr)	0
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¹ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

* Reduction below new development load limitation not required

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.00**
 Linear Project TP Load Reduction Required (lb/yr): **0.00**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	0.00
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	0.00
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Project Name: **Union Camp Holding Pond-Blackwater River 26-001.AR1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Maximum reduction required: **20%**
 The site's net increase in impervious cover (acres) is: **1.115349173**
 Post-Development TP Load Reduction for Site (lb/yr): **2.81**

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.28	0.17	0.81	1.00	2.26
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.45	0.30	0.08	0.00	0.83
Impervious Cover (acres)	0.26	0.18	0.32	0.36	1.12
					4.21

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.18	0.11	0.52	0.64	1.45
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.29	0.19	0.05	0.00	0.53
Impervious Cover (acres)	0.53	0.35	0.64	0.72	2.23
Area Check	OK	OK	OK	OK	4.21

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.26	1.45
Weighted Rv(forest)	0.04	0.04
% Forest	54%	47%
Managed Turf Cover (acres)	0.83	0.53
Weighted Rv(turf)	0.17	0.17
% Managed Turf	20%	17%
Impervious Cover (acres)	1.12	1.12
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	4.21	3.09
Site Rv	0.31	0.39

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.45
Weighted Rv(forest)	0.04
% Forest	34%
Managed Turf Cover (acres)	0.53
Weighted Rv (turf)	0.17
% Managed Turf	13%
Impervious Cover (acres)	2.23
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	4.21
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.45
Weighted Rv(forest)	0.04
% Forest	47%
Managed Turf Cover (acres)	0.53
Weighted Rv (turf)	0.17
% Managed Turf	17%
ReDev. Impervious Cover (acres)	1.12
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	3.09
ReDev Site Rv	0.39

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	1.12
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1082	0.1010
Pre-ReDevelopment Treatment Volume (cubic feet)	4,714	4,401
Pre-ReDevelopment TP Load (lb/yr)	2.96	2.77
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.70	0.89
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		1.27

Final Post-Development Treatment Volume (acre-ft)	0.1893
Final Post-Development Treatment Volume (cubic feet)	8,248
Final Post-Development TP Load (lb/yr)	5.18
Final Post-Development TP Load per acre (lb/acre/yr)	1.23

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1010
Post-ReDevelopment Treatment Volume (cubic feet)	4,401
Post-ReDevelopment TP Load (TP) (lb/yr) ¹	2.77
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.89
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.55

Post-Development Treatment Volume (acre-ft)	0.0883
Post-Development Treatment Volume (cubic feet)	3,846
Post-Development TP Load (lb/yr)	2.42
TP Load Reduction Required for New Impervious Area (lb/yr)	1.96

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **2.51**
 Linear Project TP Load Reduction Required (lb/yr): **2.81**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	21.19	Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	37.07
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Project Name: **Waqua Creek 14-020-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

CLEAR ALL
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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Maximum reduction required: **20%**
 The site's net increase in impervious cover (acres) is: **0.739758904**
 Post-Development TP Load Reduction for Site (lb/yr): **1.90**

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.98	0.00	0.04	2.02
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.02	0.02
Impervious Cover (acres)	0.00	0.72	0.00	0.03	0.74
					2.79

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.26	0.00	0.03	1.29
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.01	0.01
Impervious Cover (acres)	0.00	1.44	0.00	0.05	1.48
Area Check	OK	OK	OK	OK	2.79

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	2.02	1.29
Weighted Rv(forest)	0.03	0.03
% Forest	73%	63%
Managed Turf Cover (acres)	0.02	0.01
Weighted Rv(turf)	0.25	0.25
% Managed Turf	1%	1%
Impervious Cover (acres)	0.74	0.74
Rv(impervious)	0.95	0.95
% Impervious	27%	36%
Total Site Area (acres)	2.79	2.05
Site Rv	0.28	0.37

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	1.29
Weighted Rv(forest)	0.03
% Forest	46%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.25
% Managed Turf	0%
Impervious Cover (acres)	1.48
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	2.79
Final Post Dev Site Rv	0.52

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	1.29
Weighted Rv(forest)	0.03
% Forest	63%
Managed Turf Cover (acres)	0.01
Weighted Rv (turf)	0.25
% Managed Turf	1%
ReDev. Impervious Cover (acres)	0.74
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	2.05
ReDev Site Rv	0.37

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.74
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0644	0.0624
Pre-ReDevelopment Treatment Volume (cubic feet)	2,805	2,718
Pre-ReDevelopment TP Load (lb/yr)	1.76	1.71
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.63	0.83
Baseline TP Load (lb/yr) [0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover]		0.84

Final Post-Development Treatment Volume (acre-ft)	0.1210
Final Post-Development Treatment Volume (cubic feet)	5,269
Final Post-Development TP Load (lb/yr)	3.31
Final Post-Development TP Load per acre (lb/acre/yr)	1.19

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0624
Post-ReDevelopment Treatment Volume (cubic feet)	2,718
Post-ReDevelopment TP Load (lb/yr) ²	1.71
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.83
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.34

Post-Development Treatment Volume (acre-ft)	0.0586
Post-Development Treatment Volume (cubic feet)	2,551
Post-Development TP Load (lb/yr)	1.60

TP Load Reduction Required for New Impervious Area (lb/yr)	1.30
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.64**
 Linear Project TP Load Reduction Required (lb/yr): **1.90**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	12.61
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	23.68
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Project Name: **Warm Springs Run-Jackson River 36-014.AR2 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required: 20%
The site's net increase in impervious cover (acres) is: 0.793636981
Post-Development TP Load Reduction for Site (lb/yr): 2.12

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	1.18	0.00	0.00	1.18
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	1.00	0.00	0.00	1.00
Impervious Cover (acres)	0.00	1.14	0.00	0.00	1.14
					3.31

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.75	0.00	0.00	0.75
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.64	0.00	0.00	0.64
Impervious Cover (acres)	0.00	1.93	0.00	0.00	1.93
Area Check	OK	OK	OK	OK	3.31

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ³
Forest/Open Space Cover (acres)	1.18	0.75
Weighted Rv(forest)	0.03	0.03
% Forest	35%	30%
Managed Turf Cover (acres)	1.00	0.64
Weighted Rv(turf)	0.20	0.20
% Managed Turf	30%	25%
Impervious Cover (acres)	1.14	1.14
Rv(impervious)	0.95	0.95
% Impervious	34%	45%
Total Site Area (acres)	3.31	2.52
Site Rv	0.40	0.49

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.75
Weighted Rv(forest)	0.03
% Forest	23%
Managed Turf Cover (acres)	0.64
Weighted Rv (turf)	0.20
% Managed Turf	19%
Impervious Cover (acres)	1.93
Rv(impervious)	0.95
% Impervious	58%
Final Site Area (acres)	3.31
Final Post Dev Site Rv	0.60

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.75
Weighted Rv(forest)	0.03
% Forest	30%
Managed Turf Cover (acres)	0.64
Weighted Rv (turf)	0.20
% Managed Turf	25%
ReDev. Impervious Cover (acres)	1.14
Rv(impervious)	0.95
% Impervious	45%
Total ReDev. Site Area (acres)	2.52
ReDev Site Rv	0.49

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.79
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.1096	0.1024
Pre-ReDevelopment Treatment Volume (cubic feet)	4,772	4,459
Pre-ReDevelopment TP Load (lb/yr)	3.00	2.80
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.90	1.11
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		1.03

Final Post-Development Treatment Volume (acre-ft)	0.1652
Final Post-Development Treatment Volume (cubic feet)	7,196
Final Post-Development TP Load (lb/yr)	4.52
Final Post-Development TP Load per acre (lb/acre/yr)	1.36

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.1024
Post-ReDevelopment Treatment Volume (cubic feet)	4,459
Post-ReDevelopment TP Load (lb/yr) ⁴	2.80
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.11
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.56

Post-Development Treatment Volume (acre-ft)	0.0628
Post-Development Treatment Volume (cubic feet)	2,737
Post-Development TP Load (lb/yr)	1.72
TP Load Reduction Required for New Impervious Area (lb/yr)	1.39

³ Adjusted Land Cover Summary:

Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 1.95
 Linear Project TP Load Reduction Required (lb/yr): 2.12

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr) 21.45

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr) 32.34

Project Name: **West Creek 12-028-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) → 0.81

Maximum reduction required: **20%**
 The site's net increase in impervious cover (acres) is: **0.214580636**
 Post-Development TP Load Reduction for Site (lb/yr): **0.54**

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.29	0.10	0.00	0.39
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.21	0.00	0.00	0.21
Impervious Cover (acres)	0.00	0.18	0.04	0.00	0.21
					0.81

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.19	0.06	0.00	0.25
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.13	0.00	0.00	0.13
Impervious Cover (acres)	0.00	0.35	0.07	0.00	0.43
Area Check	OK	OK	OK	OK	0.81

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.39	0.25
Weighted Rv(forest)	0.03	0.03
% Forest	48%	42%
Managed Turf Cover (acres)	0.21	0.13
Weighted Rv(turf)	0.20	0.20
% Managed Turf	26%	22%
Impervious Cover (acres)	0.21	0.21
Rv(impervious)	0.95	0.95
% Impervious	26%	36%
Total Site Area (acres)	0.81	0.59
Site Rv	0.32	0.40

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.25
Weighted Rv(forest)	0.03
% Forest	31%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.20
% Managed Turf	16%
Impervious Cover (acres)	0.43
Rv(impervious)	0.95
% Impervious	53%
Final Site Area (acres)	0.81
Final Post Dev Site Rv	0.54

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.25
Weighted Rv(forest)	0.03
% Forest	42%
Managed Turf Cover (acres)	0.13
Weighted Rv (turf)	0.20
% Managed Turf	22%
ReDev. Impervious Cover (acres)	0.21
Rv(impervious)	0.95
% Impervious	36%
Total ReDev. Site Area (acres)	0.59
ReDev Site Rv	0.40

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.21
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0213	0.0197
Pre-ReDevelopment Treatment Volume (cubic feet)	928	856
Pre-ReDevelopment TP Load (lb/yr)	0.58	0.54
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.72	0.91
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.24

Final Post-Development Treatment Volume (acre-ft)	0.0366
Final Post-Development Treatment Volume (cubic feet)	1,596
Final Post-Development TP Load (lb/yr)	1.00
Final Post-Development TP Load per acre (lb/acre/yr)	1.24

Treatment Volume and Nutrient Load

Post-ReDevelopment Treatment Volume (acre-ft)	0.0197
Post-ReDevelopment Treatment Volume (cubic feet)	856
Post-ReDevelopment Load (TP) (lb/yr) ²	0.54
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.91
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0170
Post-Development Treatment Volume (cubic feet)	740
Post-Development TP Load (lb/yr)	0.46

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.11
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TP Load Reduction Required for New Impervious Area (lb/yr)	0.38
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¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **0.48**
 Linear Project TP Load Reduction Required (lb/yr): **0.54**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	4.17
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Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	7.17
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Project Name: **Whispering Creek-Willis River 09-113-AR 1 Major Upgrade**
 Date: **June 5, 2017 REV 1**
 Linear Development Project? Yes

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Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

Maximum reduction required:	20%
The site's net increase in impervious cover (acres) is:	0.052669287
Post-Development TP Load Reduction for Site (lb/yr):	0.13

BMP Design Specifications List: 2013 Draft Stds & Specs
 Linear project? Yes
 Land cover areas entered correctly?
 Total disturbed area entered?

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.15	0.00	0.00	0.15
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.05	0.00	0.00	0.05
					0.20

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.10	0.00	0.00	0.10
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.10	0.00	0.00	0.10
Area Check	OK	OK	OK	OK	0.20

* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.15	0.10
Weighted Rv(forest)	0.03	0.03
% Forest	74%	65%
Managed Turf Cover (acres)	0.00	0.00
Weighted Rv(turf)	0.00	0.00
% Managed Turf	0%	0%
Impervious Cover (acres)	0.05	0.05
Rv(impervious)	0.95	0.95
% Impervious	26%	35%
Total Site Area (acres)	0.20	0.15
Site Rv	0.27	0.35

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.10
Weighted Rv(forest)	0.03
% Forest	48%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
Impervious Cover (acres)	0.10
Rv(impervious)	0.95
% Impervious	52%
Final Site Area (acres)	0.20
Final Post Dev Site Rv	0.51

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.10
Weighted Rv(forest)	0.03
% Forest	65%
Managed Turf Cover (acres)	0.00
Weighted Rv (turf)	0.00
% Managed Turf	0%
ReDev. Impervious Cover (acres)	0.05
Rv(impervious)	0.95
% Impervious	35%
Total ReDev. Site Area (acres)	0.15
ReDev Site Rv	0.35

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.05
Rv(impervious)	0.95

Treatment Volume and Nutrient Load		
Pre-ReDevelopment Treatment Volume (acre-ft)	0.0045	0.0043
Pre-ReDevelopment Treatment Volume (cubic feet)	194	189
Pre-ReDevelopment TP Load (lb/yr)	0.12	0.12
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.61	0.80
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.06

Final Post-Development Treatment Volume (acre-ft)	0.0085
Final Post-Development Treatment Volume (cubic feet)	370
Final Post-Development TP Load (lb/yr)	0.23
Final Post-Development TP Load per acre (lb/acre/yr)	1.16

Treatment Volume and Nutrient Load	
Post-ReDevelopment Treatment Volume (acre-ft)	0.0043
Post-ReDevelopment Treatment Volume (cubic feet)	189
Post-ReDevelopment Load (TP) (lb/yr) ²	0.12
Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.80
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%

Post-Development Treatment Volume (acre-ft)	0.0042
Post-Development Treatment Volume (cubic feet)	182
Post-Development TP Load (lb/yr)	0.11

TP Load Reduction Required for Redeveloped Area (lb/yr)	0.02
--	-------------

TP Load Reduction Required for New Impervious Area (lb/yr)	0.09
---	-------------

¹ Adjusted Land Cover Summary:

Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column 1 shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.12
Linear Project TP Load Reduction Required (lb/yr):	0.13

Nitrogen Loads (Informational Purposes Only)

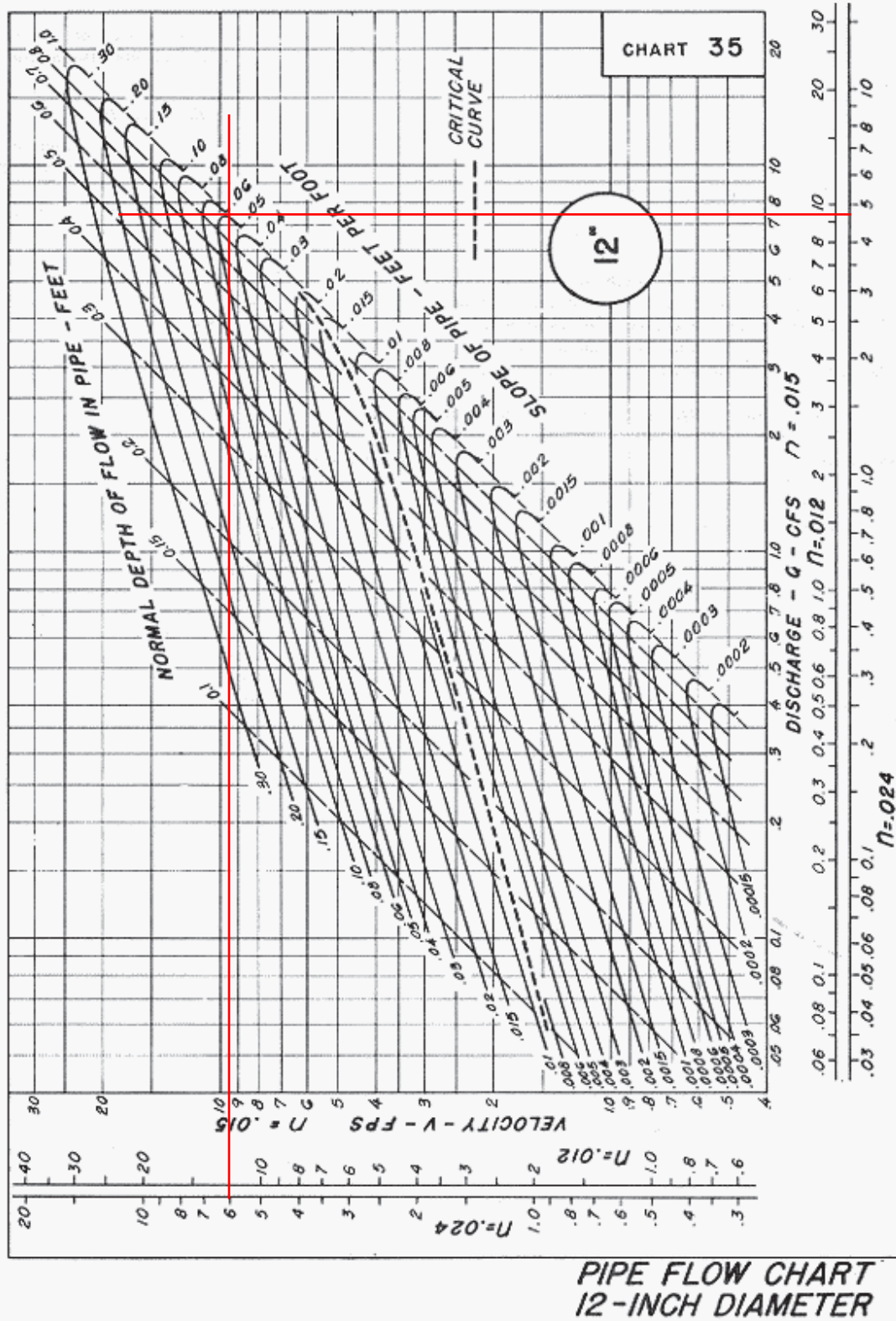
Pre-ReDevelopment TN Load (lb/yr)	0.87
-----------------------------------	------

Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	1.66
--	------

ATTACHMENT 3.1

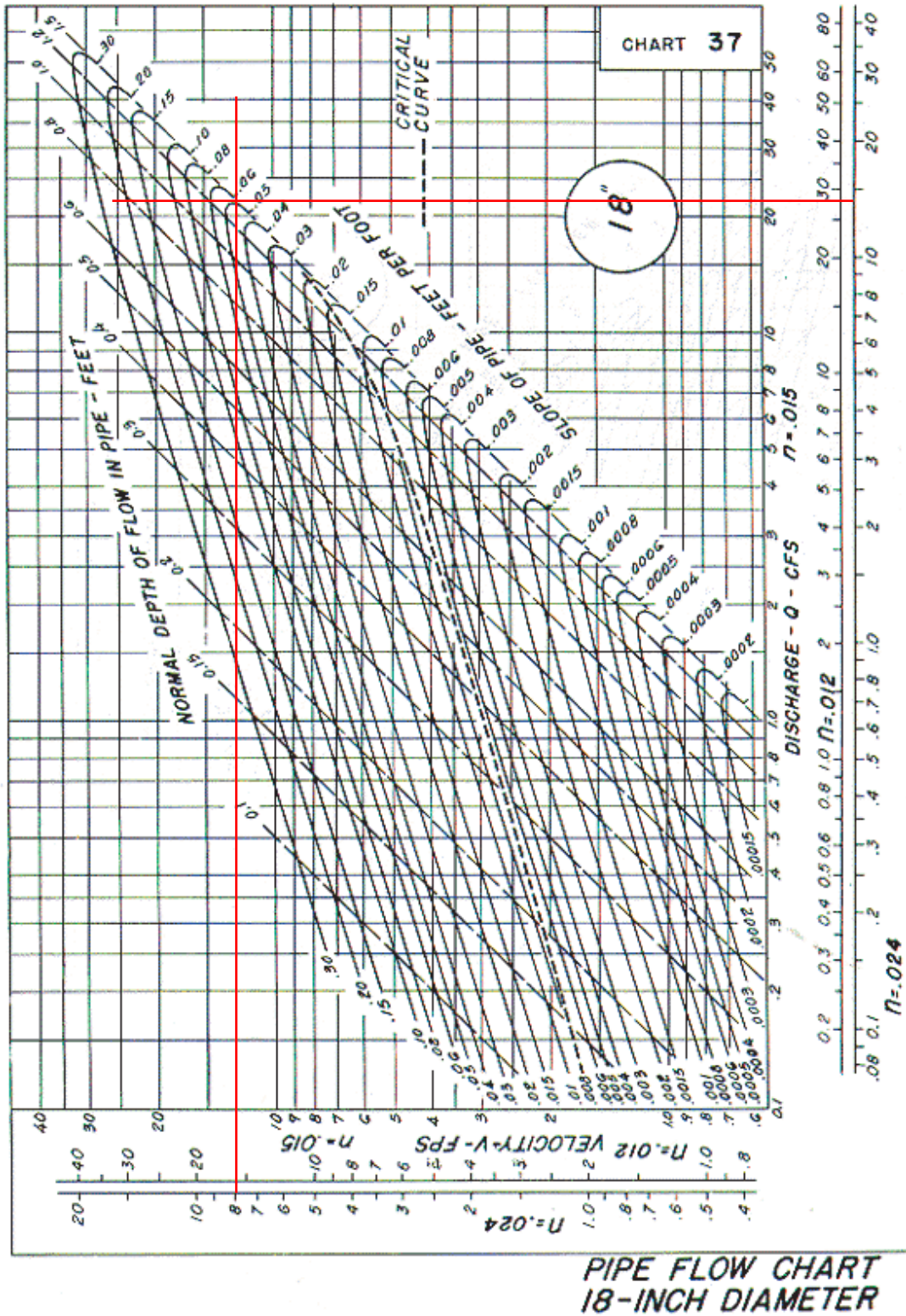
Circular Pipe Flow Charts

Appendix 8C-61 Circular Pipe Flow Chart (Diameter = 12")



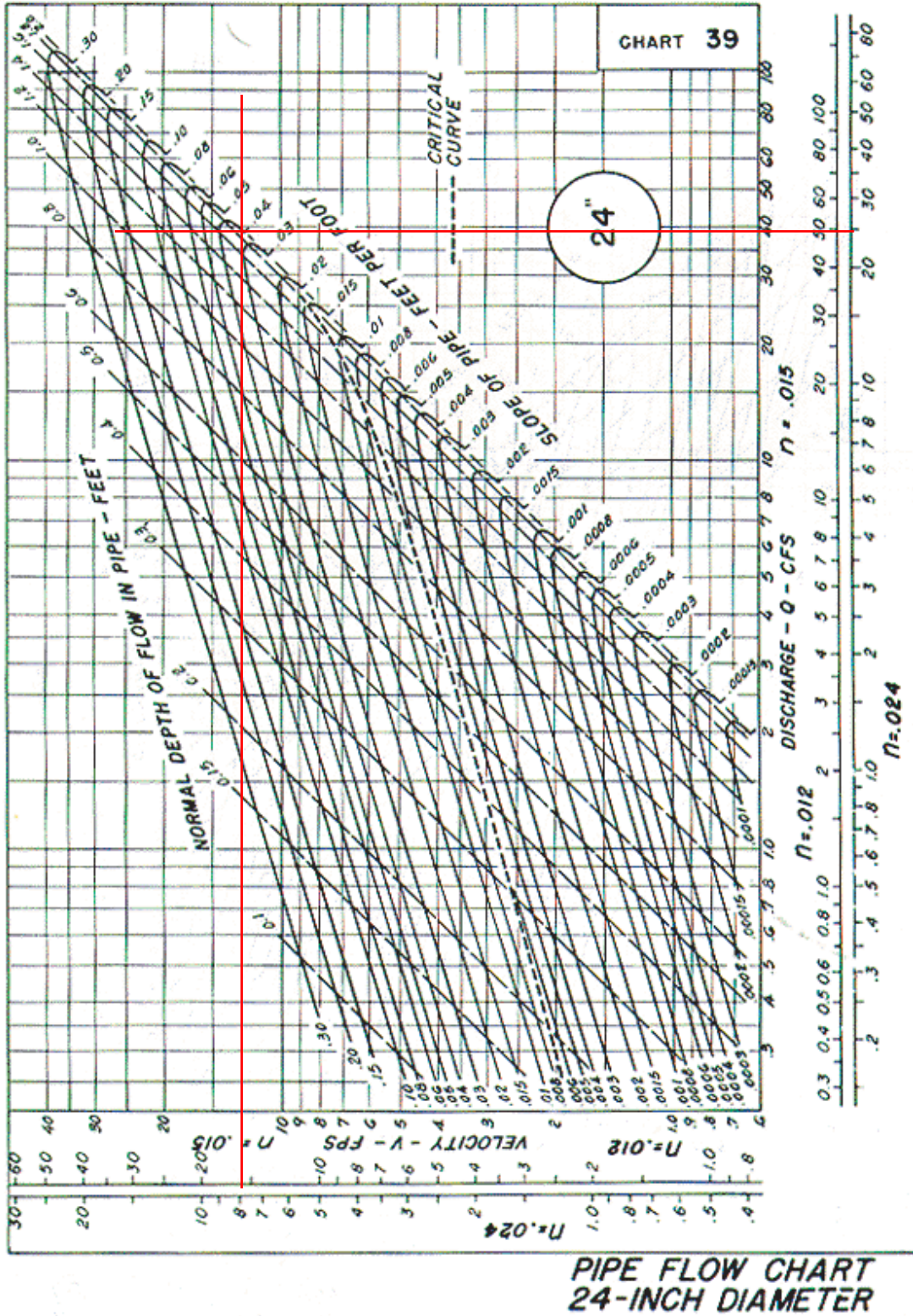
Source: HDS-3

Appendix 8C-63 Circular Pipe Flow Chart (Diameter = 18")



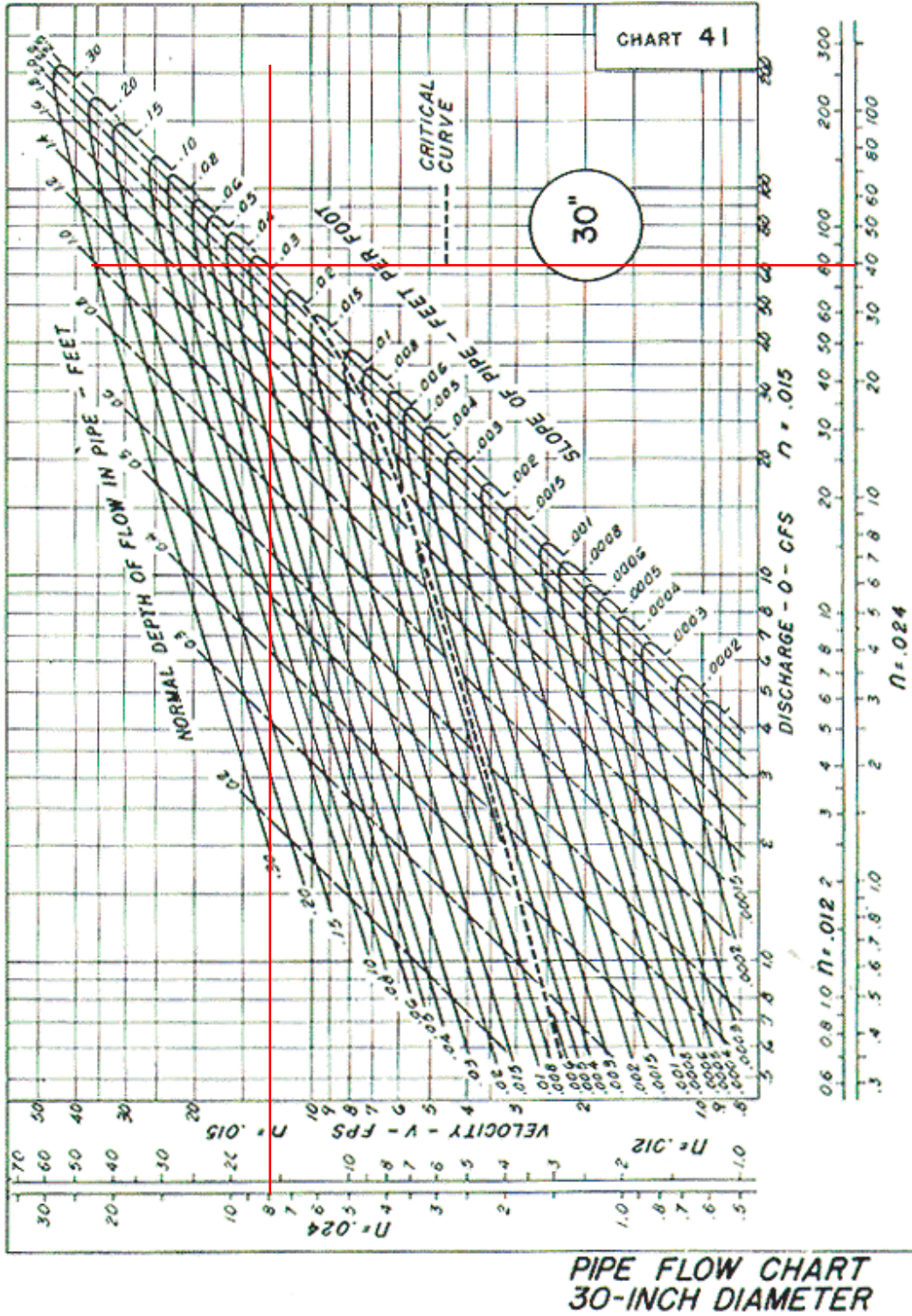
Source: HDS-3

Appendix 8C-65 Circular Pipe Flow Chart (Diameter = 24")



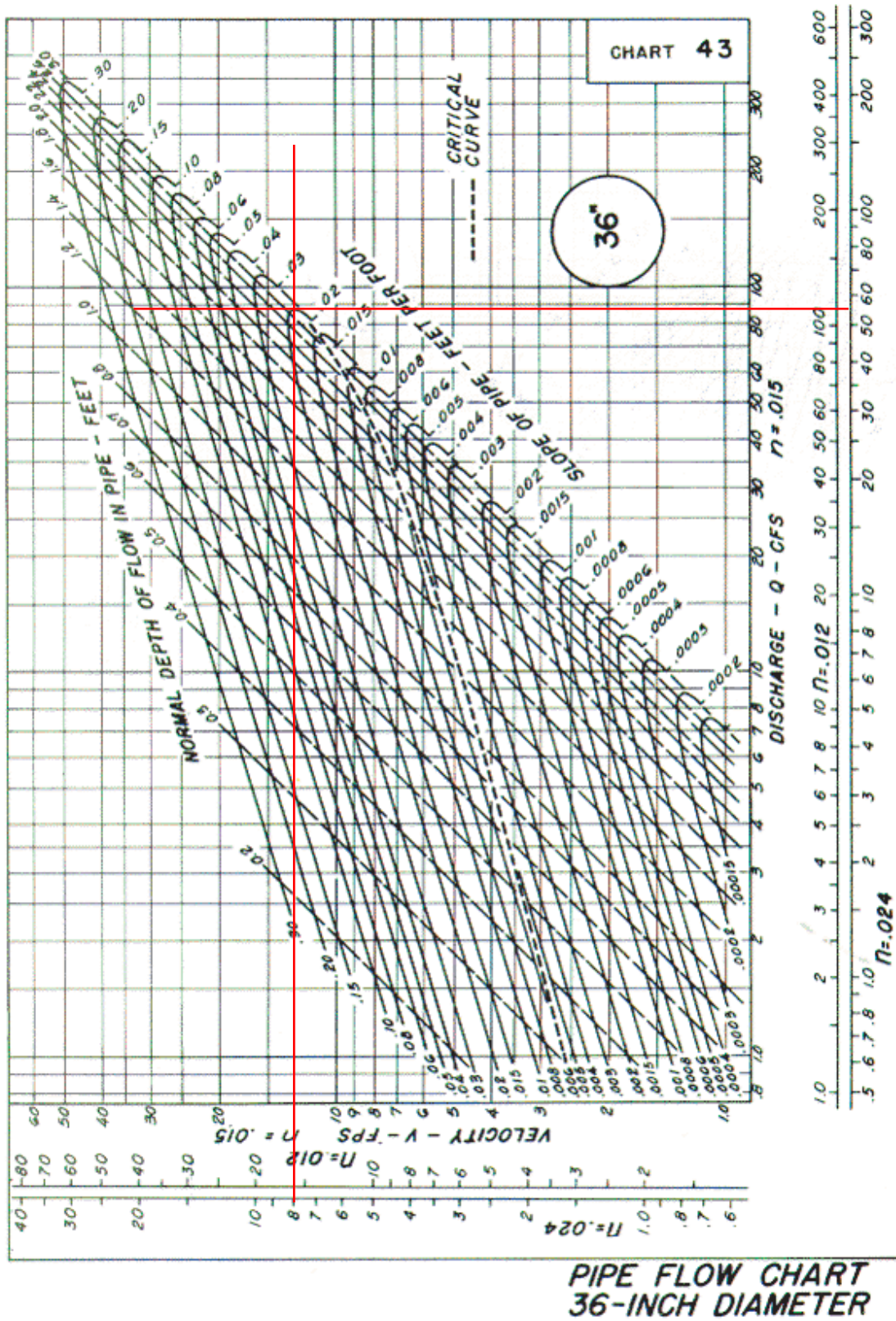
Source: HDS-3

Appendix 8C-67 Circular Pipe Flow Chart (Diameter = 30")



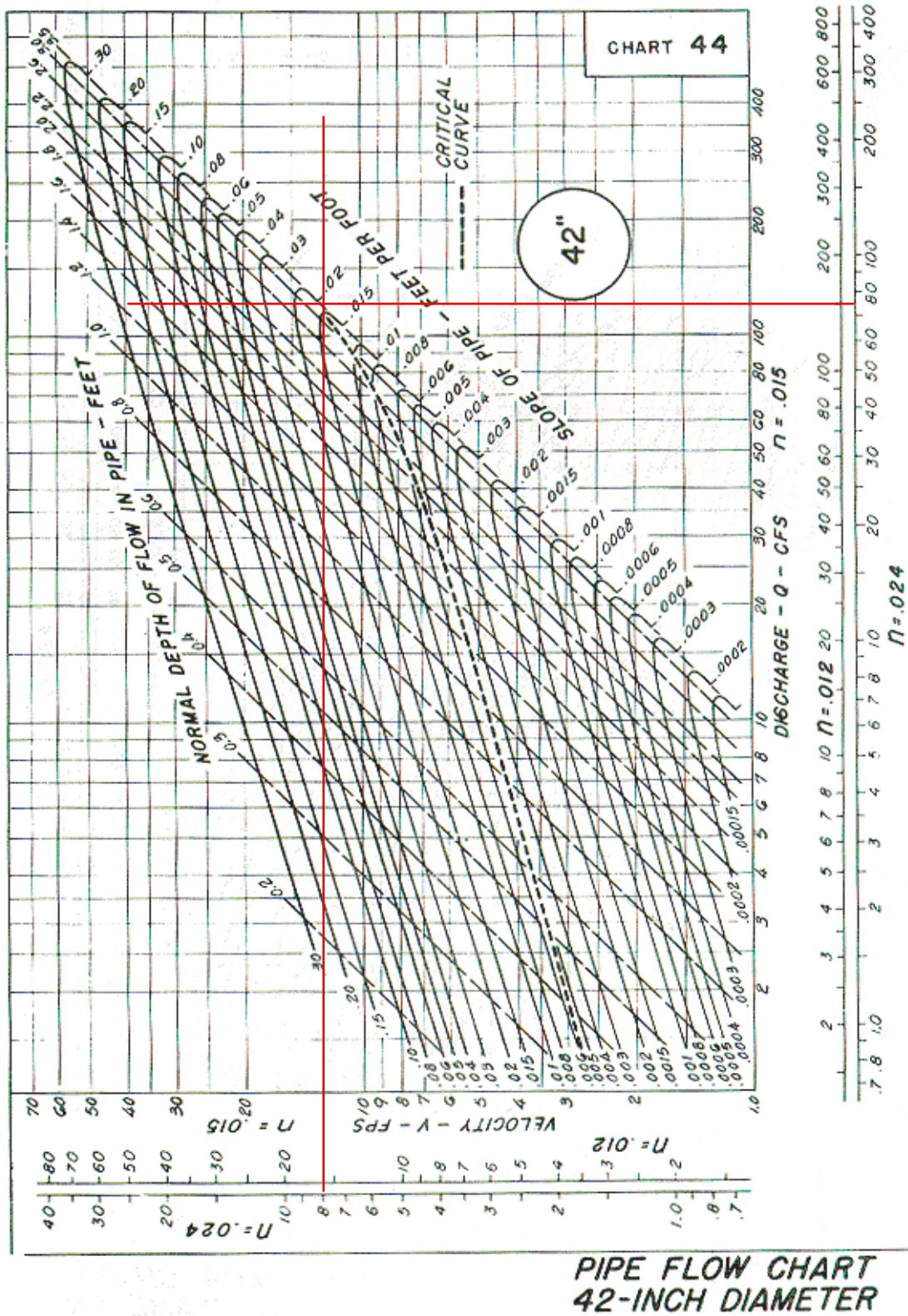
Source: HDS-3

Appendix 8C-69 Circular Pipe Flow Chart (Diameter = 36")



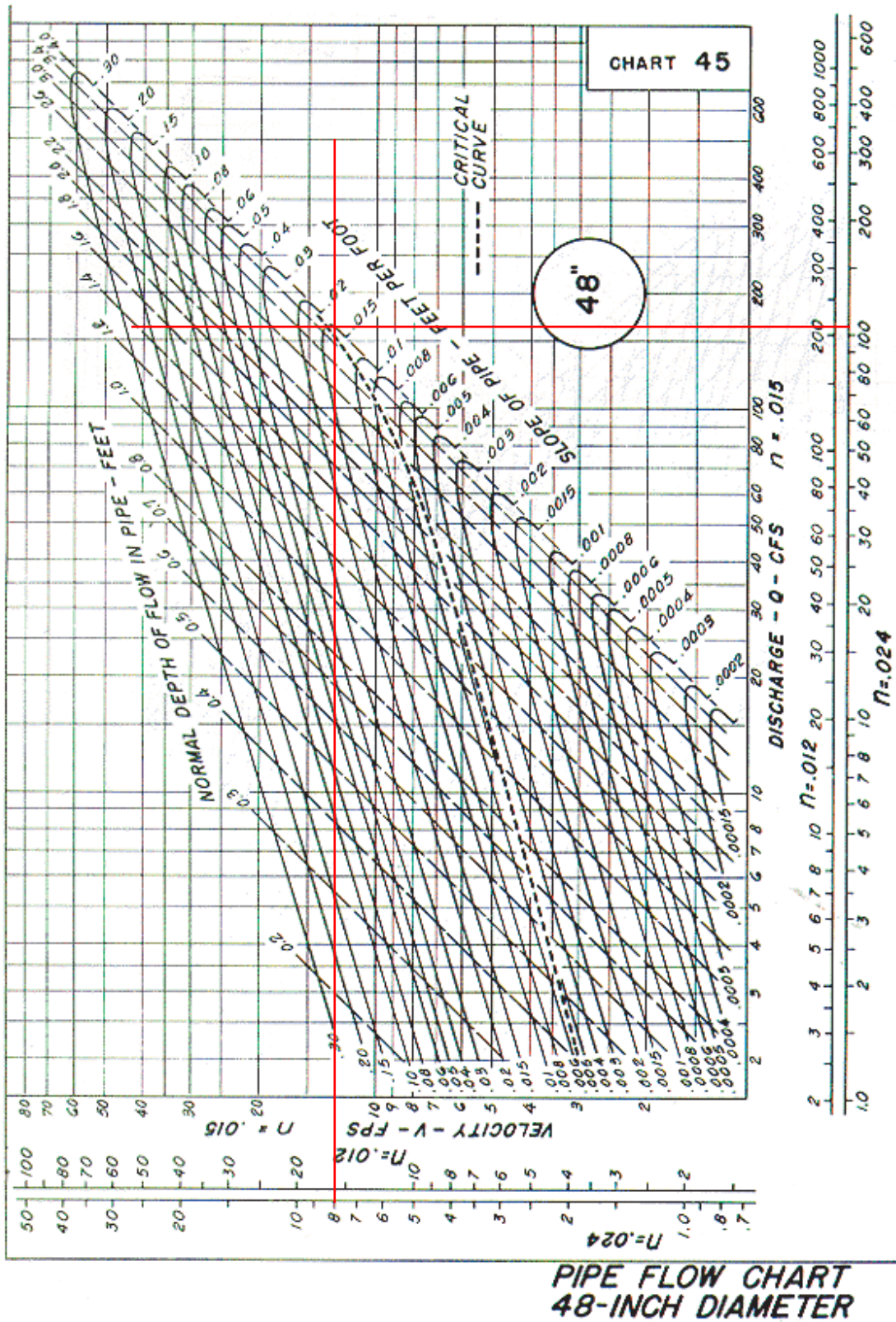
Source: HDS-3

Appendix 8C-70 Circular Pipe Flow Chart (Diameter = 42")



Source: HDS-3

Appendix 8C-71 Circular Pipe Flow Chart (Diameter 48")



Source: HDS-3

ATTACHMENT 3.2

Riprap Outlet Protection Reference

8.3.2.6 Maximum Outlet Velocity

Our culvert outlet protection procedure has emphasis on the existing soil type to: 1) insure protection of the downstream channel or swale where material or lining in the downstream channel or swale may be unstable (erodible) under the anticipated velocities exiting the culvert, and 2) insure protection of the culvert end by providing measures to prevent the formation of a scour hole at the culvert outlet.*

The type of material in the swale/channel at culvert outlets will need to be determined based on observations or field borings. The allowable velocity for natural material can be found in the table shown in Appendix 7D-2 of the VDOT Drainage Manual. The guidelines and procedures presented herein shall be implemented on all VDOT projects and those which will ultimately come under Department jurisdiction.

Highlights of these procedures/details are:

1. Maintains current rip rap sizes for outlet velocities 8 fps and greater
2. Establishes new riprap size for outlet velocities up to 8 fps
3. Allows the use of EC-3 Type B for velocities less than 6 fps
4. Maintains current apron dimensions for culvert installations with a total hydraulic opening of less than 7 ft².
5. Increases apron length to five times the height of the culvert for culvert installations with a total hydraulic opening of 7 ft² or greater.
6. Evaluates need for outlet protection based on 2-year culvert outlet velocity and allowable velocity of material in outlet channel or swale
7. Evaluates type of outlet protection required based on culvert outlet velocity for design discharge

The objectives of these details/procedures are to:

1. Minimize impacts to right of way of easement areas at smaller culvert sites
2. Minimize length of stream impacts
3. Minimize need for outlet protection where channel/swale material will be stable for culvert outlet velocities
4. Provide alternative to riprap at sites with low outlet velocities
5. Satisfy DCR Minimum Standard 11

OUTLET PROTECTION DETAILS

- Dimensions Of Outlet Protection Apron:
 - Type A Installation – Minimum 3H Length & Minimum 3S Width

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- Type B Installation – Minimum 5H Length & Minimum 3S Width
 - Where: S = Span of Culvert
H = Height of Culvert
 - For a multiple culvert line installations the largest S and H, dimensions of the individual culvert lines should be used in determining the minimum apron length dimensions.
- Outlet Protection Material*
 - Standard EC-3 Type B
 - Class A1 – Class A1 Dry Riprap
 - Class I – Class I Dry Riprap
 - Class II – Class II Dry Riprap

NEW OUTLET PROTECTION PROCEDURE

The following procedure shall be used to analyze the need for outlet protection on:

- All cross drain culverts
- All storm drain outlet pipes
- All entrance and crossover pipes with a diameter of 24" (or equivalent hydraulic opening) or greater

Step 1 - Determine if Culvert Outlet Protection is required for protection of swale or channel.

- A. *Compute culvert outlet velocity for 2-year design flood.*
- B. *Compare 2-year design flood culvert outlet velocity to allowable velocity for outlet swale/channel material or lining.*
 - *Swale/channel material type based on field borings/observations or proposed lining.*
 - *Allowable velocity for natural swale/channel material based on VDOT Drainage Manual Chapter 7 - Appendix 7D-2.*
- C. *If two year design storm culvert outlet velocity is equal to or less than allowable velocity for swale/channel material, no Culvert Outlet Protection is required for swale/channel protection.*
 - *Go to Step 2.*
- D. *If two year design flood culvert outlet velocity is greater than allowable velocity for swale/channel material, Culvert Outlet Protection is required.*
 - *Go to Step 3*.*

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Step 2 - Determine Culvert Outlet Protection required for culvert end protection

- A. Compute culvert outlet velocity for culvert design flood.
- B. If culvert outlet velocity for culvert design flood is less than 6 fps, Culvert Outlet Protection is not required for culvert end protection.
 - Stop
- C. If culvert outlet velocity for design storm is 6 fps or greater, Culvert Outlet Protection is required for culvert end protection.
 - Go to Step 3.

Step 3 – Determine Class of Culvert Outlet Protection to use.

- A. When EC-1 Culvert Outlet Protection is required by either Step 1 or Step 2, EC-3 Type B or the Class of EC-1 to be specified shall be based on the culvert design storm outlet velocity with the following velocity limitations.
 - EC-3 Type B – maximum outlet velocity is 6 fps.
 - EC-1 Class A1 – maximum outlet velocity is 8 fps.
 - EC-1 Class I – maximum outlet velocity is 14 fps.
 - EC-1 Class II – maximum outlet velocity is 19 fps.
 - Use Special Design Culvert Outlet Protection for outlet velocity greater than 19 fps.
- Go to Step 4

Step 4 - Determine Type of EC-1 Installation to use.

- A. When Culvert Outlet Protection is required by either Step 1 or Step 2, specify the Type of Installation to use based on the total hydraulic opening of the culvert installation.
 - Use Type A Installation for culvert installations with a total hydraulic opening of less than 7 ft²*
 - Use Type B Installation for culvert installations with a total hydraulic opening of 7 ft² or greater.

PLAN DESCRIPTION

- _____ Sq. Yds. (Tons) Standard EC-1 Class _____ Required Type _____ Installation
- _____ Sq. Yds. Standard EC-3 Type B Culvert Outlet Protection Required

Road and Bridge Standard drawings 113.01 and 113.04 and Road and Bridge Specification Sections 414 and 606 have been revised to incorporate these protection measure details.

* Rev 9/09

ATTACHMENT 3.3

Roadside Ditch Analysis Reference

Hydraulics Branch
Library



U.S. Department
of Transportation

**Federal Highway
Administration**

Hydraulic Engineering Circular No. 15

Publication No. FHWA-IP-87-7

April 1988

DESIGN OF ROADSIDE CHANNELS WITH FLEXIBLE LININGS

Research, Development, and Technology
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, Virginia 22101-2296

IV. DESIGN PROCEDURE

This section outlines the design procedure for flexible channel linings. Channels with steep gradients (slopes greater than 10%) will usually produce a tractive force in excess of the permissible shear stress for most linings presented in this chapter at relatively small discharges. Also, when riprap is used on steeper gradients, the design procedure must take into consideration the additional forces acting on the riprap. Designs involving riprap should be checked and compared to results obtained from design procedures presented in chapter V, Steep Gradient Design. The more conservative results, i.e., largest riprap size, should be used for design. Other linings presented in this chapter are applicable over a wide range of channel gradients, provided the permissible shear for the lining is not exceeded.

The basic design procedure is supplemented for riprap lined channels with side slopes steeper than 3:1. Use of side slopes steeper than 3:1 is not encouraged for flexible linings other than riprap or gabions because of the potential for erosion of the side slopes. If a combination of linings is used, the composite channel lining procedure outlined in chapter VI should be used. In cases where flexible linings discussed in this circular do not provide adequate protection, other alternatives, including rigid linings should be considered. Because of the substantial increased cost of rigid linings, and their vulnerability to failure, other alternatives such as use of additional inlets, a modified channel geometry or a flatter channel gradient are preferred.

Flexible Lining Design

The basic design procedure for flexible channel linings is quite simple. It involves only two computations and several straight forward comparisons of lining performance. The computations include a determination of the uniform flow depth in the channel, known as the normal depth, and determination of the shear stress at maximum flow depth. Designers familiar with methods for determining normal depth may use any convenient method and the Manning's roughness coefficients provided in this manual. A nomograph is also provided in this chapter for determining the normal depth in trapezoidal channels. The computation for shear stress is much simpler and can be carried out without the need of any design aids.

The basic comparison required in the design procedure is that of permissible to computed shear stress for a lining. A table and two figures are provided that give permissible shear stress values for a variety of lining types. If the permissible shear stress is greater than the computed shear, the lining is considered acceptable. If a lining is unacceptable, a lining with a higher permissible shear stress is selected and the calculations for normal depth and shear stress is repeated. A worksheet is provided at the end of this chapter (figure 23) for carrying out the design procedures presented in this chapter.

Channels lined with gravel or riprap on side slopes steeper than 3:1 must be designed using the steep side slope design procedure. Steep side slopes are allowable within a channel if cohesive soil conditions exist. Channels with steep slopes should not be allowed if the channel is constructed in non-cohesive soils.

Permissible Shear Stress

The permissible shear stress, τ_p , indicates the force required to initiate movement of the lining material. Prior to movement of the lining, the underlying soil is relatively protected. Therefore permissible shear stress is not significantly affected by the erodibility of the underlying soil. However, if the lining is eroded and moved, the bed material is exposed to the erosive force of the flow. The consequence of lining failure on highly erodible soils is great, since the erosion rate after failure is high compared to soils of low erodibility.

Values for permissible shear stress for linings are based on research conducted at laboratory facilities and in the field. The values presented here are judged to be conservative and appropriate for design use. Table 2 presents permissible shear stress values for manufactured, vegetative, and riprap lining types. The permissible shear stress for non-cohesive soils is a function of mean diameter of the channel material as shown in chart 1. For larger stone sizes not shown in chart 1 and rock riprap, the permissible shear stress is given by the following equation:

$$\tau_p = 4.0 D_{50} \quad (8)$$

where D_{50} is the mean riprap size in feet. For cohesive materials the variation in permissible shear stress is governed by many soil properties. The plasticity index of the cohesive soil provides a good guide to the permissible shear stress as shown in chart 2.

Determination of Normal Flow Depth

The condition of uniform flow in a channel at a known discharge is computed using the Manning's equation combined with the continuity equation:

$$Q = \frac{1.49}{n} AR^{2/3} S_f^{1/2} \quad (9)$$

where Q = discharge;
 n = Manning's roughness coefficient;
 A = cross-sectional area;
 R = hydraulic radius; and
 S_f = friction gradient which, for uniform flow conditions, equals the channel bed gradient, S .

Chart 3 provides a solution to Manning's equation for trapezoidal channels. The geometric properties of a trapezoidal channel can be found using chart 4 or the equations provided in appendix A.

Manning's Roughness Coefficients for Nonvegetative Linings. Table 3 gives recommended values of the Manning's roughness coefficient for flexible channel lining materials, including riprap-type lining materials. The n values will vary with flow depth. The channel roughness will be higher for shallow flow depths and lower for large flow depths. The range of flow depths from 0.5 ft (15 cm) to 2.0 ft (60 cm) is typical of highway drainage channels and should be used in most cases.

Manning's Roughness Coefficients for Vegetative Linings. Manning's roughness coefficient for vegetative linings varies significantly depending on the amount of submergence of the vegetation and the flow force exerted on the channel bed. As a result, the Manning's n value must be determined by trial and error taking into consideration both the depth of flow and the flow force. Charts 5 to 9 show the variation in Manning's n for five classes of vegetation. These charts can be used to determine Manning's n for a wide range of flow conditions.

Determination of Shear Stress on Channel

As presented in chapter III, Tractive Force Theory (page 13), the shear stress on the channel lining at maximum depth, τ_d , is computed using the following equation:

$$\tau_d = \gamma d S \quad (5)$$

where γ = unit weight of water (62.4 lb/ft³);
 d = flow depth, ft; and
 S = channel gradient, ft/ft.

Flow around a channel bend imposes higher shear stress on the channel bottom and banks. For bends, the maximum shear stress is given by the following equation:

$$\tau_b = K_b \tau_d \quad (6)$$

where the value of K_b can be found using chart 10. In chart 10, the radius of curvature of the channel center line, R_c , and the bottom width of the channel, B , determine the magnitude of factor K_b . The length of protection, L_p , required downstream of a bend is found using chart 11. The length of protection is a function of the roughness of the lining material in the bend (n_b) and the depth of flow.

Side Slope Stability

Channels lined with gravel or riprap on side slopes steeper than 3:1 may become unstable. As the angle of the side slopes approaches the angle of repose of the channel lining, the lining material becomes less stable. However, the shear stress on the channel side is less than the maximum shear stress occurring on the channel bed. The stability of a side slope is a function of the channel side slope and the angle of repose of the rock lining material.

When the tractive force ratio is compared to the ratio of the shear stress on the sides to the shear stress on the bottom of the channel, the rock size for the channel side slope can be determined. The angle of repose, θ , for different rock shapes and sizes is provided in chart 12. The ratio of shear stress on the sides and bottom of a trapezoidal channel, K_1 , is given in chart 13 and the tractive force ratio, K_2 , is given in chart 14. The required rock size (mean diameter of the gradation D_{50}) for the side slopes is found using the following equation:

$$(D_{50})_{sides} = \frac{K_1}{K_2} (D_{50})_{bottom} \quad (10)$$

Maximum Discharge Approach

In many cases, the designer simply needs to know the maximum discharge a channel can convey given the permissible shear stress and the corresponding allowable depth. By knowing the maximum discharge that a lining can sustain, the designer can determine the maximum length of lining for a channel, based on the hydrology of the site. This information can assist the designer in an economic evaluation of lining types and can determine inlet spacing.

The procedure presented is for both vegetative linings and non-vegetative linings. Applying the procedure for vegetative linings is particularly useful, since it does not involve a trial and error solution.

Design Considerations for Riprap Lining

Two additional design considerations are required for riprap channel linings: (1) riprap gradation and thickness, and (2) use of filter material under rock riprap.

Riprap Gradation and Thickness. Riprap gradation should follow a smooth size distribution curve. Most riprap gradations will fall in the range of D_{100}/D_{50} and D_{50}/D_{20} between 3.0 to 1.5, which is acceptable. The most important criterion is a proper distribution of sizes in the gradation so that interstices formed by larger stones are filled with smaller sizes in an interlocking fashion, preventing the formation of open pockets. These gradation requirements apply regardless of the type of filter design used.

In general, riprap constructed with angular stones has the best performance. Round stones are acceptable as riprap provided they are not placed on side slopes steeper than 3:1. Flat slab-like stones should be avoided since they are easily dislodged by the flow. An approximate guide to stone shape is that neither the breadth nor thickness of a single stone is less than one-third its length.

The thickness of a riprap lining should equal the diameter of the largest rock size in the gradation. For most gradations, this will mean a thickness of from 1.5 to 3.0 times the mean riprap diameter.

Filter Design. When rock riprap is used the need for an underlying filter material must be evaluated. The filter material may be either a granular filter blanket or an engineering fabric.

For a granular filter blanket, the following criteria must be met:

$$\frac{D_{15} \text{ filter}}{D_{85} \text{ base}} < 5 < \frac{D_{15} \text{ filter}}{D_{15} \text{ base}} < 40 \quad (11)$$

$$\frac{D_{50} \text{ filter}}{D_{50} \text{ base}} < 40 \quad (12)$$

In the above relationships, "filter" refers to the overlying material and "base" refers to the underlying material. The relationships must hold between the filter blanket and base material and between the riprap and filter blanket.

The thickness of the granular filter blanket should approximate the maximum size in the filter gradation. The minimum thickness for a filter blanket should not be less than 6 inches.

In selecting an engineering filter fabric, the fabric should be able to transmit water from the soil and also have a pore structure that will hold back soil. The following properties of an engineering filter fabric are required to assure that their performance is adequate as a filter under riprap. (18)

1. The fabric must be able to transmit water faster than the soil.
2. The following criteria for the apparent opening size (AOS) must be met:
 - a. For soil with less than 50 percent of the particles by weight passing a U.S. No. 200 sieve, $AOS < 0.6 \text{ mm}$ (0.024 in) (greater than #30 U.S. Std. Sieve).
 - b. For soil with more than 50 percent of the particles by weight passing a U.S. No. 200 sieve, $AOS < 0.297 \text{ mm}$ (0.012 in) (greater than #50 U.S. Std. Sieve).

The above criteria only applies to non-severe or non-critical installations. Severe or critical installations should be designed based on permeability tests.

Design Procedures

The design procedure is summarized below. The procedure for flexible linings is a basic stepwise solution approach.

FLEXIBLE LINING DESIGN PROCEDURE (see computation sheet, figure 23)

1. Select a flexible lining and determine the permissible shear stress, τ_p . (see Table 2)
2. Estimate flow depth for vegetation or flow depth range for non-vegetative linings, the channel shape, slope and design discharge(s).
3. Determine Manning's n value for estimated flow depth.
 - a. For non-vegetive linings, use Table 3.
 - b. For vegetation:
 - (1) Calculate the hydraulic radius, R . (Use chart 4 for trapezoidal channels and Appendix A for other shapes.)
 - (2) Determine n from Chart 5, 6, 7, 8, or 9.

4. Calculate the flow depth, d , in the channel. (Chart 3 for trapezoidal channels.)
5. Compare computed flow depth, d , with estimated flow depth, d_i . If d is outside the assumed range for non-vegetative linings or differs by more than 0.1 ft from d_i for vegetation, repeat steps 2 through 4.
6. Calculate the shear stress, τ_d . If $\tau_d > \tau_p$, the lining is not acceptable, repeat steps 1 through 5.

$$\tau_d = \gamma d S$$

7. For channel bends:

- a. Determine the factor for maximum shear stress on channel bends, K_b , from chart 10. This is a function of the ratio of channel curvature to bottom width, R_c/B .

- b. Calculate the shear stress in the bend, τ_b .

$$\tau_b = K_b \tau_d \quad (6)$$

If $\tau_b > \tau_p$, the lining is not acceptable, repeat steps 1 through 7.

- c. Calculate length of protection, L_p , downstream of the bend from chart 11.

- d. Calculate superelevation.

$$\Delta d = \frac{V^2 T}{g R_c} \quad (3)$$

8. For riprap or gravel linings on steep side slopes (steeper than 3:1):

- a. Determine the angle of repose for the rock size and shape from chart 12.

- b. Determine K_1 , the ratio of maximum side shear to maximum bottom shear for a trapezoidal channel from chart 13.

- c. Determine K_2 , the tractive force ratio from chart 14.

- d. Calculate the required D_{50} for the side slopes.

$$(D_{50})_{sides} = \frac{K_1}{K_2} (D_{50})_{bottom} \quad (10)$$

9. For riprap on slopes greater than 10%, check design procedure in chapter V. Use whichever procedure results in the larger riprap size.

Table 1. Classification of Vegetal Covers as to Degree of Retardance. (4)

Retardance Class	Cover	Condition
A	Weeping lovegrass Yellow bluestem Ischaemum	Excellent stand, tall (average 30") (76 cm) Excellent stand, tall (average 36") (91 cm)
B	Kudzu Bermuda grass Native grass mixture (little bluestem, blue- stem, blue gamma, and other long and short midwest grasses)..... Weeping lovegrass Lespedeza sericea Alfalfa Weeping lovegrass Kudzu Blue gamma	Very dense growth, uncut Good stand, tall (average 12") (30 cm) Good stand, unmowed Good stand, tall (average 24") (61 cm) Good stand, not woody, tall (average 19") (48 cm) Good stand, uncut (average 11") (28 cm) Good stand, unmowed (average 13") (33 cm) Dense growth, uncut Good stand, uncut (average 13") (28 cm)
C	Crabgrass Bermuda grass Common lespedeza Grass-legume mixture-- summer (orchard grass, redtop, Italian ryegrass, and common lespedeza).... Centipedegrass..... Kentucky bluegrass.....	Fair stand, uncut (10 to 48") (25 to 120 cm) Good stand, mowed (average 6") (15 cm) Good stand, uncut (average 11") (28 cm) Good stand, uncut (6 to 8 inches) (15 to 20 cm) Very dense cover (average 6 inches) (15 cm) Good stand, headed (6 to 12 inches (15 to 30 cm)
D	Bermuda grass..... Common lespedeza Buffalo grass Grass-legume mixture-- fall, spring (orchard grass, redtop, Italian ryegrass, and common lespedeza)..... Lespedeza sericea	Good stand, cut to 2.5-inch height (6 cm) Excellent stand, uncut (average 4.5") (11 cm) Good stand, uncut (3 to 6 inches (8 to 15 cm) Good stand, uncut (4 to 5 inches) (10 to 13 cm) After cutting to 2-inch height (5 cm) Very good stand before cutting
E	Bermuda grass Bermuda grass	Good stand, cut to 1.5 inch height (4 cm) Burned stubble

NOTE: Covers classified have been tested in experimental channels. Covers were green and generally uniform.

Table 2. Permissible Shear Stresses for Lining Materials.

Lining Category	Lining Type	Permissible Unit Shear Stress ¹	
		(lb/ft ²)	(Kg/m ²)
Temporary*	Woven Paper Net	0.15	0.73
	Jute Net	0.45	2.20
	Fiberglass Roving:		
	Single	0.60	2.93
	Double	0.85	4.15
	Straw with Net	1.45	7.08
	Curled Wood Mat	1.55	7.57
	Synthetic Mat	2.00	9.76
Vegetative	Class A	3.70	18.06
	Class B	2.10	10.25
	Class C	1.00	4.88
	Class D	0.60	2.93
	Class E	0.35	1.71
Gravel Riprap	1-inch	0.33	1.61
	2-inch	0.67	3.22
Rock Riprap	6-inch	2.00	9.76
	12-inch	4.00	19.52
Bare Soil	Non-cohesive	See Chart 1	
	Cohesive	See Chart 2	

¹Based on data in (5, 8, 13, 14, 15).

*Some "temporary" linings become permanent when buried.

Chart 10

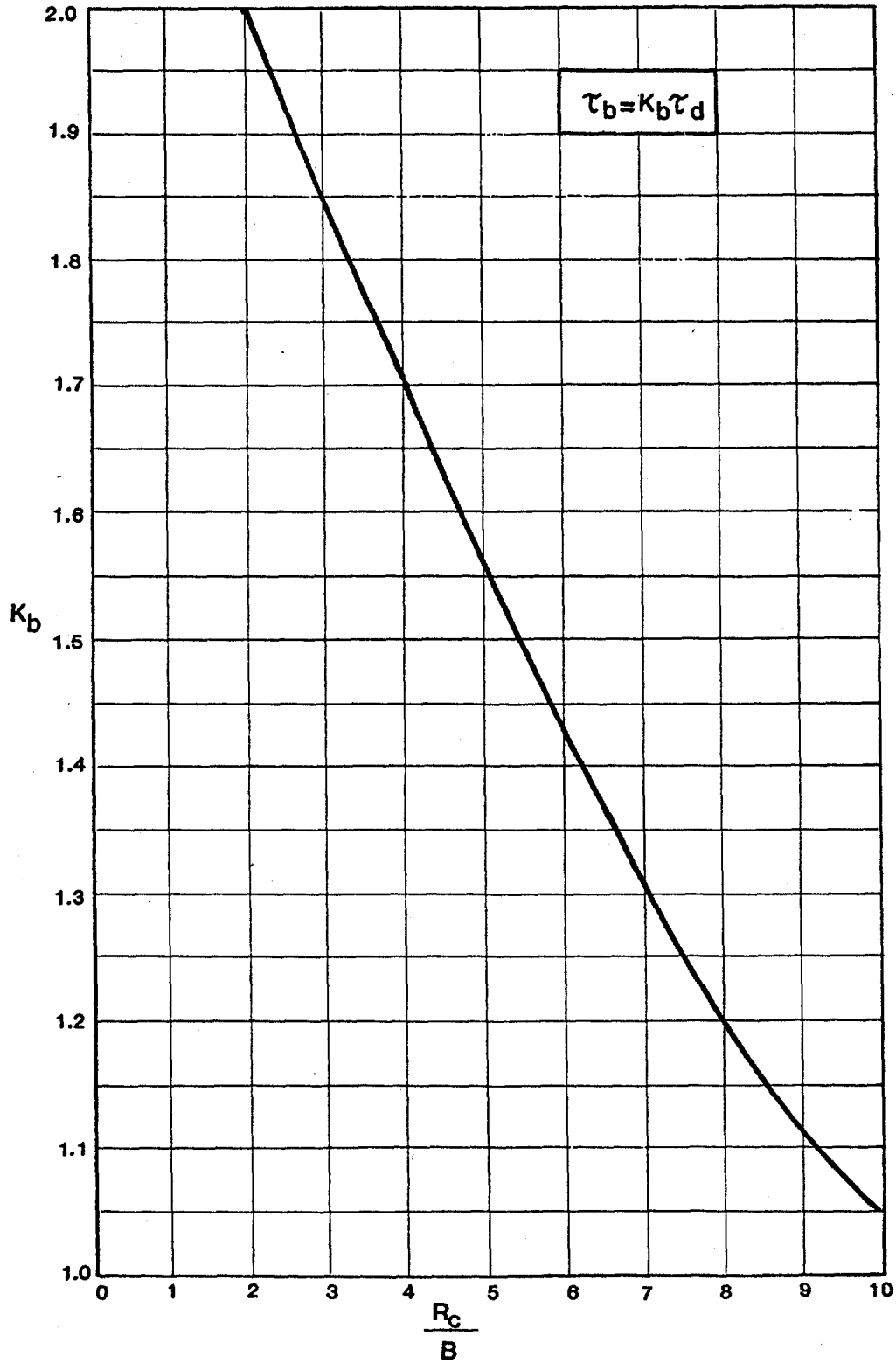


Chart 10. K_b factor for maximum shear stress on channel bends. (12)

Chart 13

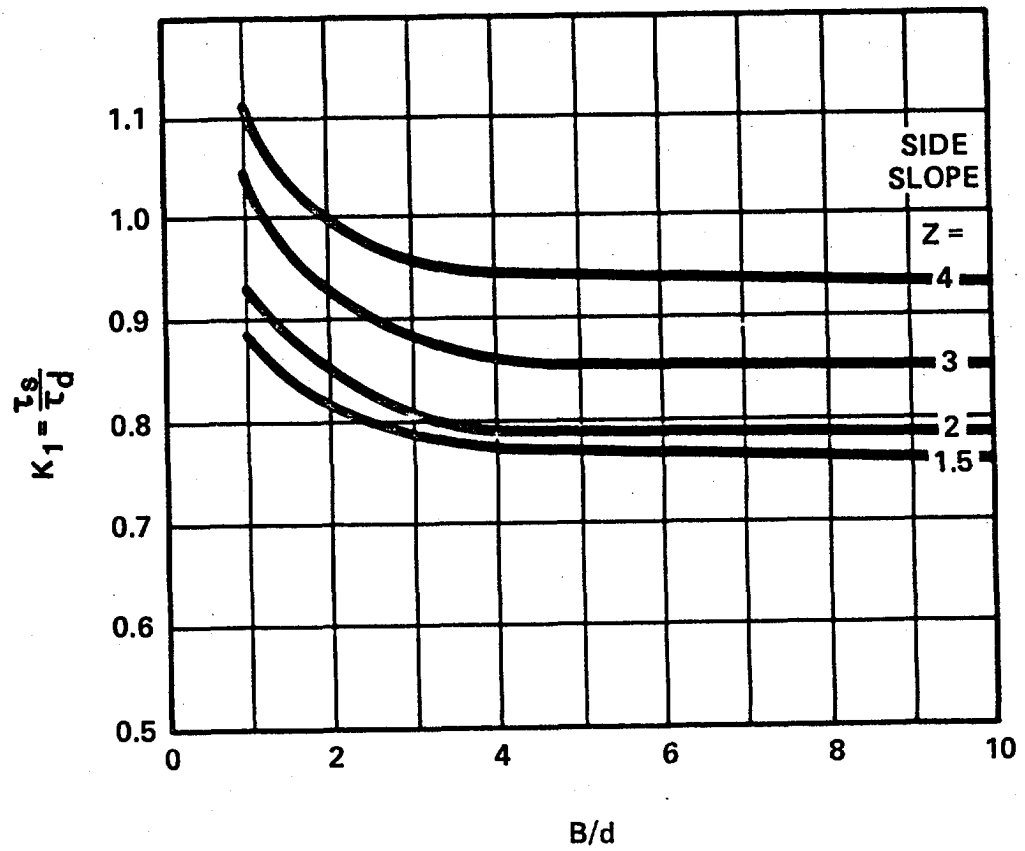


Chart 13. Channel side shear stress to bottom shear stress ratio, K_1 . (8)

Chart 14

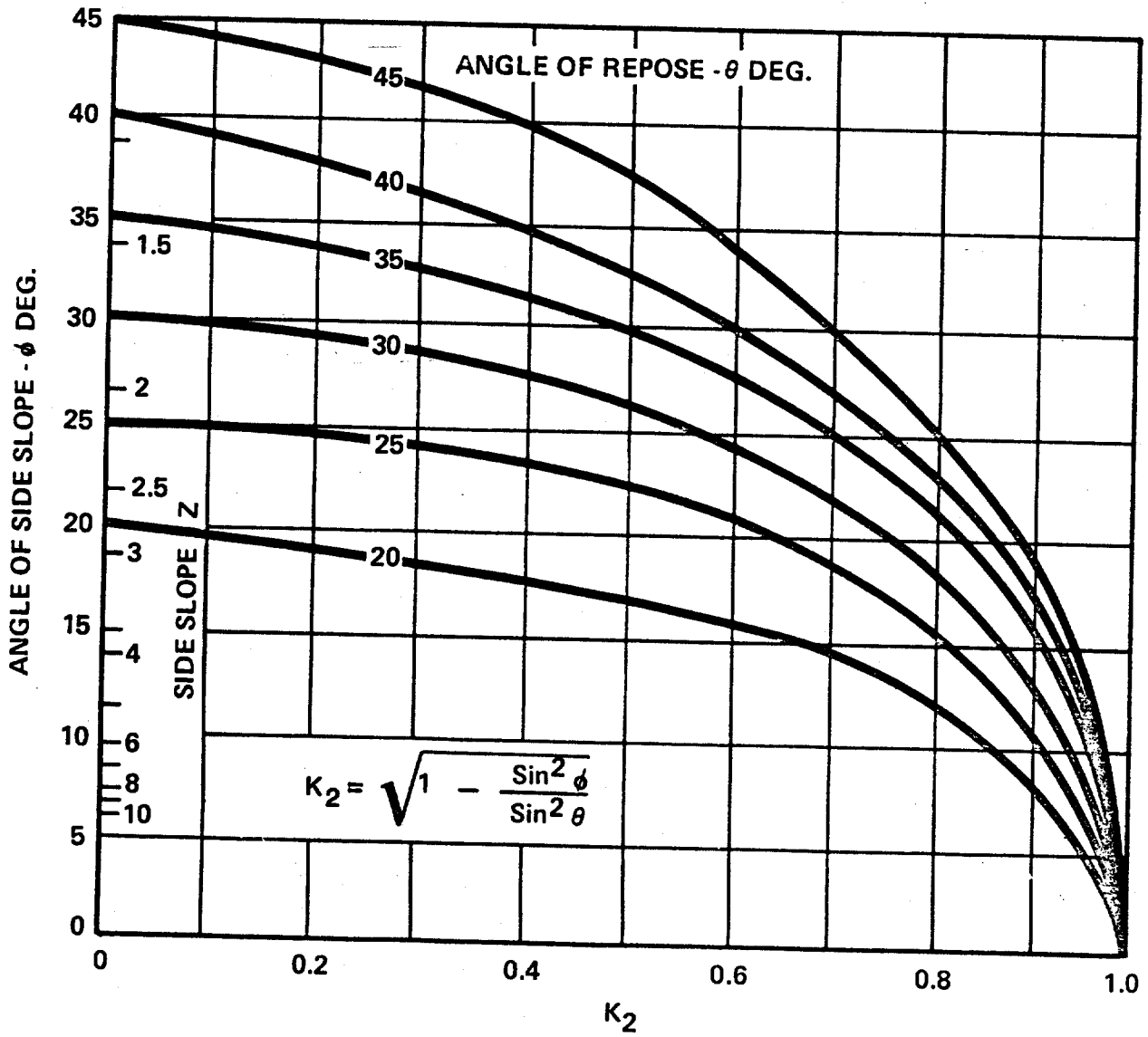


Chart 14. Tractive force ratio, K_2 . (8)