



LEGEND	
DA Boundary	
Subarea DA	

Ellicott City Flood Study
CWP SWM Facility Drainage Areas

SCALE: 1" = 500'

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA1, SWM 1.1

TR-55 Data

Study Area: 0.402 acres
 Storm Event: 2yr
 Rainfall Depth (P): 3.21 inches

Prop Conditions RCN: 88 from TR-55
 Initial Abstraction (I_a) = 0.273 ($200 / \text{RCN} - 2$)
 Runoff Depth: 2.01 in ($(P - I_a)^2 / (P - I_a + (1000 / \text{RCN}) - 10)$)

Adjust RCN with ESD Volume

Total ESD_v Provided: 0.034 ac/ft
 ESD_v Watershed Inches: 1.00 in = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P + 2Q + 2) - (5PQ + 4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q = 1.01 in

Adjusted RCN = 73

Design Firm:
McCormick Taylor, INC

Maryland Environmental Site Design Calculations
RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01
Date 6/17/2013
Designer: ADM
Checked
SA/SWM # SA1, SWM 1.2

TR-55 Data

Study Area:	0.625	acres	Prop Conditions RCN:	88	from TR-55
Storm Event	2yr		Initial Abstraction (I_a) =	0.273	(200 / RCN)-2
Rainfall Depth (P):	3.21	inches	Runoff Depth:	2.01 in	$(P-I_a)^2 / (P-I_a) + (1000/RCN) - 10$

Adjust RCN with ESD Volume

Total ESD_v Provided: 0.052 ac/ft
ESD_v Watershed Inches: 1.00 in = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

$$Q = 1.01 \text{ in}$$

$$\text{Adjusted RCN} = 73$$

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA1, SWM 1.3

TR-55 Data

Study Area:	<input type="text" value="0.405"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.01 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA1, SWM 1.4

TR-55 Data

Study Area:	<input type="text" value="0.419"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.01 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA2, SWM 2.5

TR-55 Data

Study Area:	<input type="text" value="3.680"/>	acres	Prop Conditions RCN:	<input type="text" value="87"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I_a) =	<input type="text" value="0.308"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="1.90 in"/>	(P- I_a) ² /(P- I_a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

Adjusted RCN = $\frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$ from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA2, SWM 2.6

TR-55 Data

Study Area:	<input type="text" value="2.338"/>	acres	Prop Conditions RCN:	<input type="text" value="92"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.174"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.36 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

Adjusted RCN = $\frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$ from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.8

TR-55 Data

Study Area:	<input type="text" value="0.204"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.65 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.9

TR-55 Data

Study Area:	<input type="text" value="0.448"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.65 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:
McCormick Taylor, INC

Maryland Environmental Site Design Calculations
RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01
Date 6/17/2013
Designer: ADM
Checked
SA/SWM # SA3, SWM 3.28

TR-55 Data

Study Area:	0.204	acres	Prop Conditions RCN:	98	from TR-55
Storm Event	2yr		Initial Abstraction (I _a) =	0.041	(200 / RCN)-2
Rainfall Depth (P):	3.21	inches	Runoff Depth:	2.98 in	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: 0.017 ac/ft
ESD_v Watershed Inches: 1.00 in = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

$$Q = 1.98 \text{ in}$$

$$\text{Adjusted RCN} = 88$$

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.10

TR-55 Data

Study Area:	<input type="text" value="0.189"/>	acres	Prop Conditions RCN:	<input type="text" value="92"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.174"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.36 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.11

TR-55 Data

Study Area:	<input type="text" value="0.240"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.01 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.12

TR-55 Data

Study Area:	<input type="text" value="0.366"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.01 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA4, SWM 4.27

TR-55 Data

Study Area:	<input type="text" value="0.991"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.01 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

Adjusted RCN = $\frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$ from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA6, SWM 6.16

TR-55 Data

Study Area:	<input type="text" value="1.330"/>	acres	Prop Conditions RCN:	<input type="text" value="87"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I_a) =	<input type="text" value="0.299"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="1.92 in"/>	$(P-I_a)^2 / (P-I_a) + (1000/RCN) - 10$

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

Adjusted RCN = $\frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$ from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA6, SWM 6.17

TR-55 Data

Study Area:	<input type="text" value="1.463"/>	acres	Prop Conditions RCN:	<input type="text" value="92"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.174"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.36 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:
McCormick Taylor, INC

Maryland Environmental Site Design Calculations
RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01
Date 6/17/2013
Designer: ADM
Checked
SA/SWM # SA6, SWM 6.18

TR-55 Data

Study Area:	3.994	acres	Prop Conditions RCN:	82	from TR-55
Storm Event	2yr		Initial Abstraction (I_a) =	0.439	(200 / RCN)-2
Rainfall Depth (P):	3.21	inches	Runoff Depth:	1.55 in	$(P-I_a)^2 / (P-I_a) + (1000/RCN) - 10$

Adjust RCN with ESD Volume

Total ESD_v Provided: 0.333 ac/ft
ESD_v Watershed Inches: 1.00 in = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

$$Q = 0.55 \text{ in}$$

$$\text{Adjusted RCN} = 64$$

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA6, SWM 6.22

TR-55 Data

Study Area:	<input type="text" value="0.355"/>	acres	Prop Conditions RCN:	<input type="text" value="93"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.151"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="2.46 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA6, SWM 6.26

TR-55 Data

Study Area:	<input type="text" value="0.530"/>	acres	Prop Conditions RCN:	<input type="text" value="75"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.667"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="1.10 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

Adjusted RCN = $\frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$ from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA6, SWM 6.30

TR-55 Data

Study Area:	<input type="text" value="1.700"/>	acres	Prop Conditions RCN:	<input type="text" value="85"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.353"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="1.77 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA7, SWM 7.19

TR-55 Data

Study Area:	<input type="text" value="1.466"/>	acres	Prop Conditions RCN:	<input type="text" value="81"/>	from TR-55
Storm Event	<input type="text" value="2yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.469"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="3.21"/>	inches	Runoff Depth:	<input type="text" value="1.48 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.8

TR-55 Data

Study Area:	<input type="text" value="0.204"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="10yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="4.94"/>	inches	Runoff Depth:	<input type="text" value="4.36 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.8

TR-55 Data

Study Area:	<input type="text" value="0.204"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="50yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="7.28"/>	inches	Runoff Depth:	<input type="text" value="6.68 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.8

TR-55 Data

Study Area:	<input type="text" value="0.204"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="100yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="8.53"/>	inches	Runoff Depth:	<input type="text" value="7.93 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.9

TR-55 Data

Study Area:	<input type="text" value="0.448"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="10yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="4.94"/>	inches	Runoff Depth:	<input type="text" value="4.36 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.9

TR-55 Data

Study Area:	<input type="text" value="0.448"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="50yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="7.28"/>	inches	Runoff Depth:	<input type="text" value="6.68 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.9

TR-55 Data

Study Area:	<input type="text" value="0.448"/>	acres	Prop Conditions RCN:	<input type="text" value="95"/>	from TR-55
Storm Event	<input type="text" value="100yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.105"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="8.53"/>	inches	Runoff Depth:	<input type="text" value="7.93 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.28

TR-55 Data

Study Area:	<input type="text" value="0.204"/>	acres	Prop Conditions RCN:	<input type="text" value="98"/>	from TR-55
Storm Event	<input type="text" value="10yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.041"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="4.94"/>	inches	Runoff Depth:	<input type="text" value="4.70 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.28

TR-55 Data

Study Area:	<input type="text" value="0.204"/>	acres	Prop Conditions RCN:	<input type="text" value="98"/>	from TR-55
Storm Event	<input type="text" value="50yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.041"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="7.28"/>	inches	Runoff Depth:	<input type="text" value="7.04 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:
McCormick Taylor, INC

Maryland Environmental Site Design Calculations
RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01
Date 6/17/2013
Designer: ADM
Checked
SA/SWM # SA3, SWM 3.28

TR-55 Data

Study Area:	0.204	acres	Prop Conditions RCN:	98	from TR-55
Storm Event	100yr		Initial Abstraction (I_a) =	0.041	(200 / RCN)-2
Rainfall Depth (P):	8.53	inches	Runoff Depth:	8.29 in	$(P-I_a)^2 / (P-I_a) + (1000/RCN) - 10$

Adjust RCN with ESD Volume

Total ESD_v Provided: 0.017 ac/ft
ESD_v Watershed Inches: 1.00 in = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

$$Q = 7.29 \text{ in}$$

$$\text{Adjusted RCN} = 90$$

Design Firm:
McCormick Taylor, INC

Maryland Environmental Site Design Calculations
RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01
Date 6/17/2013
Designer: ADM
Checked
SA/SWM # SA3, SWM 3.10

TR-55 Data

Study Area:	0.189	acres	Prop Conditions RCN:	92	from TR-55
Storm Event	10yr		Initial Abstraction (I_a) =	0.174	(200 / RCN)-2
Rainfall Depth (P):	4.94	inches	Runoff Depth:	4.03 in	$(P-I_a)^2 / (P-I_a) + (1000/RCN) - 10$

Adjust RCN with ESD Volume

Total ESD_v Provided: 0.016 ac/ft
ESD_v Watershed Inches: 1.00 in = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

$$Q = 3.03 \text{ in}$$

$$\text{Adjusted RCN} = 82$$

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.10

TR-55 Data

Study Area:	<input type="text" value="0.189"/>	acres	Prop Conditions RCN:	<input type="text" value="92"/>	from TR-55
Storm Event	<input type="text" value="50yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.174"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="7.28"/>	inches	Runoff Depth:	<input type="text" value="6.33 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:
McCormick Taylor, INC

Maryland Environmental Site Design Calculations
RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01
Date 6/17/2013
Designer: ADM
Checked
SA/SWM # SA3, SWM 3.10

TR-55 Data

Study Area:	0.189	acres	Prop Conditions RCN:	92	from TR-55
Storm Event	100yr		Initial Abstraction (I_a) =	0.174	(200 / RCN)-2
Rainfall Depth (P):	8.53	inches	Runoff Depth:	7.57 in	$(P-I_a)^2 / (P-I_a) + (1000/RCN) - 10$

Adjust RCN with ESD Volume

Total ESD_v Provided: 0.016 ac/ft
ESD_v Watershed Inches: 1.00 in = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

$$Q = 6.57 \text{ in}$$

$$\text{Adjusted RCN} = 84$$

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.11

TR-55 Data

Study Area:	<input type="text" value="0.240"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="10yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="4.94"/>	inches	Runoff Depth:	<input type="text" value="3.61 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.11

TR-55 Data

Study Area:	<input type="text" value="0.240"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="50yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="7.28"/>	inches	Runoff Depth:	<input type="text" value="5.87 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

Design Firm:

McCormick Taylor, INC

Maryland Environmental Site Design Calculations

RCN Adjustment for Storms Exceeding 1-Year

Project: Ellicott City, CWP SWM Facilities

Project# 5493-01

Date 6/17/2013

Designer: ADM

Checked

SA/SWM # SA3, SWM 3.11

TR-55 Data

Study Area:	<input type="text" value="0.240"/>	acres	Prop Conditions RCN:	<input type="text" value="88"/>	from TR-55
Storm Event	<input type="text" value="100yr"/>		Initial Abstraction (I _a) =	<input type="text" value="0.273"/>	(200 / RCN)-2
Rainfall Depth (P):	<input type="text" value="8.53"/>	inches	Runoff Depth:	<input type="text" value="7.09 in"/>	(P-I _a) ² /(P-I _a)+(1000/RCN)-10

Adjust RCN with ESD Volume

Total ESD_v Provided: ac/ft
 ESD_v Watershed Inches: = ESD_v / A

$$\text{Adjusted RCN} = \frac{200}{(P+2Q+2)-(5PQ+4Q^2)^{.5}}$$

from: "Modeling Infiltration Practices Using TR-20", October, 1983 Maryland Department of the Environment

where: P = Rainfall Depth

Q = Runoff Depth - Volume Provided

Q =

Adjusted RCN =

SCS TR-55 RUNOFF CURVE NUMBER COMPUTATION

JOB NAME: Ellicott City Flood Study
Howard County
Drainage Subarea 1-2, CN Revised- Reduced CN Method (2yr) for CWP (Facilities 1.1,1.3)

DATE: 05/30/13
 JOB NO.: 5493-01

COMPUTED BY: ADM STUDY POINT: _____ CONDITION: _____ ULTIMATE
 CHECKED BY: CJB _____ X EXISTING

RUNOFF CURVE NUMBER COMPUTATION

HYDROLOGIC SOIL GROUP	LAND USE	RUNOFF CURVE NO.	Area (ft ²)	AREA (ac)	RCN x A
B	Brush - (good)	48	32774	0.75	36.11
D	Brush - (good)	73	11902	0.27	19.95
B	Residential - 1/4 acre	75	216271	4.96	372.37
B	Small grain - SR - (good)	75	584292	13.41	1006.01
D	Small grain - SR - (good)	87	386968	8.88	772.87
B	Urban district - industrial	88	335095	7.69	676.96
D	Urban district - industrial	93	49877	1.15	106.49
		TOTAL	1617179.00	37.13	2990.76
				MI²	0.0580

WEIGHTED RUNOFF CURVE NUMBER = $\frac{\text{TOT RCN} \times \text{AC}}{\text{TOTAL ACRES}}$ = $\frac{2990.76}{37.13}$ = **80.6**

SCS TR-55 RUNOFF CURVE NUMBER COMPUTATION

JOB NAME: Ellicott City Flood Study
Howard County
Drainage Subarea 3-4, CN Revised- Reduced CN Method (10yr) for CWP (Facilities 3.10,3.11,3.12)

DATE: 05/30/13
 JOB NO.: 5493-01

COMPUTED BY: ADM STUDY POINT: _____ CONDITION: _____ ULTIMATE
 CHECKED BY: CJB X EXISTING

RUNOFF CURVE NUMBER COMPUTATION

HYDROLOGIC SOIL GROUP	LAND USE	RUNOFF CURVE NO.	Area (ft ²)	AREA (ac)	RCN x A
B	Residential - 1/4 acre	75	117749	2.70	202.74
D		87	30675	0.70	61.27
B	Urban district - commercial/business	92	85347	1.96	180.26
D		95	379149	8.70	826.89
B	Urban district - industrial	88	721818	16.57	1458.22
D		93	159538	3.66	340.61
B	Woods - (good)	55	89976	2.07	113.61
B	SWMF-5	55	159,714	3.67	201.66
B	SWMF-24	55	149,653	3.44	188.96
NA	CWP-3.10	82	8,226	0.19	15.49
NA	CWP-3.11	77	10,431	0.24	18.44
NA	CWP-3.12	77	15,953	0.37	28.20
TOTAL			1928229.00	44.27	3636.32
				MI²	0.0692

WEIGHTED RUNOFF CURVE NUMBER = $\frac{\text{TOT RCN x AC}}{\text{TOTAL ACRES}} = \frac{3636.32}{44.27} = 82.1$

SCS TR-55 RUNOFF CURVE NUMBER COMPUTATION

JOB NAME: Ellicott City Flood Study
Howard County
Drainage Subarea 3-4, CN Revised- Reduced CN Method (50yr) for CWP (Facilities 3.10,3.11,3.12)

DATE: 05/30/13
 JOB NO.: 5493-01

COMPUTED BY: ADM STUDY POINT: _____ CONDITION: _____ ULTIMATE
 CHECKED BY: CJB X EXISTING

RUNOFF CURVE NUMBER COMPUTATION

HYDROLOGIC SOIL GROUP	LAND USE	RUNOFF CURVE NO.	Area (ft ²)	AREA (ac)	RCN x A
B	Residential - 1/4 acre	75	117749	2.70	202.74
D		87	30675	0.70	61.27
B	Urban district - commercial/business	92	85347	1.96	180.26
D		95	379149	8.70	826.89
B	Urban district - industrial	88	721818	16.57	1458.22
D		93	159538	3.66	340.61
B	Woods - (good)	55	89976	2.07	113.61
B	SWMF-5	55	159,714	3.67	201.66
B	SWMF-24	55	149,653	3.44	188.96
NA	CWP-3.10	83	8,226	0.19	15.67
NA	CWP-3.11	79	10,431	0.24	18.92
NA	CWP-3.12	79	15,953	0.37	28.93
TOTAL			1928229.00	44.27	3637.72
				MI²	0.0692

WEIGHTED RUNOFF CURVE NUMBER = $\frac{\text{TOT RCN x AC}}{\text{TOTAL ACRES}} = \frac{3637.72}{44.27} = 82.2$

SCS TR-55 RUNOFF CURVE NUMBER COMPUTATION

JOB NAME: Ellicott City Flood Study
Howard County
Drainage Subarea 3-4, CN Revised- Reduced CN Method (100yr) for CWP (Facilities 3.10,3.11,3.12)

DATE: 05/30/13
 JOB NO.: 5493-01

COMPUTED BY: ADM STUDY POINT: _____ CONDITION: _____ ULTIMATE
 CHECKED BY: CJB X EXISTING

RUNOFF CURVE NUMBER COMPUTATION

HYDROLOGIC SOIL GROUP	LAND USE	RUNOFF CURVE NO.	Area (ft ²)	AREA (ac)	RCN x A
B	Residential - 1/4 acre	75	117749	2.70	202.74
D		87	30675	0.70	61.27
B	Urban district - commercial/business	92	85347	1.96	180.26
D		95	379149	8.70	826.89
B	Urban district - industrial	88	721818	16.57	1458.22
D		93	159538	3.66	340.61
B	Woods - (good)	55	89976	2.07	113.61
B	SWMF-5	55	159,714	3.67	201.66
B	SWMF-24	55	149,653	3.44	188.96
NA	CWP-3.10	84	8,226	0.19	15.86
NA	CWP-3.11	80	10,431	0.24	19.16
NA	CWP-3.12	80	15,953	0.37	29.30
TOTAL			1928229.00	44.27	3638.51
				MI²	0.0692

WEIGHTED RUNOFF CURVE NUMBER = $\frac{\text{TOT RCN} \times \text{AC}}{\text{TOTAL ACRES}} = \frac{3638.51}{44.27} = 82.2$

SCS TR-55 RUNOFF CURVE NUMBER COMPUTATION

JOB NAME: Ellicott City Flood Study
Howard County
Drainage Subarea 3-7, CN Revised- Reduced CN Method (10yr) for CWP (Facilities 3.8,3.9,3.28)

DATE: 05/30/13
 JOB NO.: 5493-01

COMPUTED BY: ADM STUDY POINT: _____ CONDITION: _____ ULTIMATE
 CHECKED BY: CJB X EXISTING

RUNOFF CURVE NUMBER COMPUTATION

HYDROLOGIC SOIL GROUP	LAND USE	RUNOFF CURVE NO.	Area (ft ²)	AREA (ac)	RCN x A
B	Brush - (good)	48	70751	1.62	77.96
D		73	39247	0.90	65.77
D	Impervious - rds paved curb/pipe (incl ROW)	98	274910	6.31	618.48
D	Open Space (good) - grass >75%	80	318123	7.30	584.25
B	Residential - 1/8 acre or less	85	63	0.00	0.12
D		92	520	0.01	1.10
D	Urban district - commercial/business	95	144339	3.31	314.79
NA	SWM 3.28	89	8867	0.20	18.12
NA	SWM 3.8	85	38592	0.89	75.31
NA	SWM 3.9	86	19498	0.45	38.49
TOTAL			914910.00	21.00	1794.39
				MI²	0.0328

WEIGHTED RUNOFF CURVE NUMBER = $\frac{\text{TOT RCN x AC}}{\text{TOTAL ACRES}} = \frac{1794.39}{21.00} = 85.4$

SCS TR-55 RUNOFF CURVE NUMBER COMPUTATION

JOB NAME: Ellicott City Flood Study
Howard County
Drainage Subarea 3-7, CN Revised- Reduced CN Method (50yr) for CWP (Facilities 3.8,3.9,3.28)

DATE: 05/30/13
 JOB NO.: 5493-01

COMPUTED BY: ADM STUDY POINT: _____ CONDITION: _____ ULTIMATE
 CHECKED BY: CJB X EXISTING

RUNOFF CURVE NUMBER COMPUTATION

HYDROLOGIC SOIL GROUP	LAND USE	RUNOFF CURVE NO.	Area (ft ²)	AREA (ac)	RCN x A
B	Brush - (good)	48	70751	1.62	77.96
D		73	39247	0.90	65.77
D	Impervious - rds paved curb/pipe (incl ROW)	98	274910	6.31	618.48
D	Open Space (good) - grass >75%	80	318123	7.30	584.25
B	Residential - 1/8 acre or less	85	63	0.00	0.12
D		92	520	0.01	1.10
D	Urban district - commercial/business	95	144339	3.31	314.79
NA	SWM 3.28	90	8867	0.20	18.32
NA	SWM 3.8	86	38592	0.89	76.19
NA	SWM 3.9	86	19498	0.45	38.49
TOTAL			914910.00	21.00	1795.48
				MI²	0.0328

WEIGHTED RUNOFF CURVE NUMBER = $\frac{\text{TOT RCN} \times \text{AC}}{\text{TOTAL ACRES}} = \frac{1795.48}{21.00} = 85.5$

SCS TR-55 RUNOFF CURVE NUMBER COMPUTATION

JOB NAME: Ellicott City Flood Study
Howard County
Drainage Subarea 3-7, CN Revised- Reduced CN Method (100yr) for CWP (Facilities 3.8,3.9,3.28)

DATE: 05/30/13
 JOB NO.: 5493-01

COMPUTED BY: ADM STUDY POINT: _____ CONDITION: _____ ULTIMATE
 CHECKED BY: CJB _____ X EXISTING

RUNOFF CURVE NUMBER COMPUTATION

HYDROLOGIC SOIL GROUP	LAND USE	RUNOFF CURVE NO.	Area (ft ²)	AREA (ac)	RCN x A
B	Brush - (good)	48	70751	1.62	77.96
D		73	39247	0.90	65.77
D	Impervious - rds paved curb/pipe (incl ROW)	98	274910	6.31	618.48
D	Open Space (good) - grass >75%	80	318123	7.30	584.25
B	Residential - 1/8 acre or less	85	63	0.00	0.12
D		92	520	0.01	1.10
D	Urban district - commercial/business	95	144339	3.31	314.79
NA	SWM 3.28	90	8867	0.20	18.32
NA	SWM 3.8	87	38592	0.89	77.08
NA	SWM 3.9	87	19498	0.45	38.94
TOTAL			914910.00	21.00	1796.82
				MI²	0.0328

WEIGHTED RUNOFF CURVE NUMBER = $\frac{\text{TOT RCN} \times \text{AC}}{\text{TOTAL ACRES}} = \frac{1796.82}{21.00} = 85.5$

1

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	TITLE	CN MGMT-	CWP SWM Included-	MGMT STRUCTURES,	NOPLOTS
TITLE				10 yr Storm-	SA3 ONLY
2	XSECTN	027	1.0	317.00	
8			316.00	0.00	0.00
8			316.50	2.68	2.59
8			317.00	10.37	6.88
8			317.50	24.26	12.84
8			318.00	45.55	20.50
8			318.50	70.64	34.75
8			319.00	137.01	60.50
8			319.25	200.57	76.25
8			319.50	273.06	92.00
8			319.75	353.76	107.75
8			320.00	442.13	123.50
8			320.50	640.03	155.00
8			321.00	863.72	186.50
9	ENDTBL				
2	XSECTN	032	1.0	313.00	
8			310.00	0.00	0.00
8			311.00	12.25	5.50
8			312.00	52.16	16.00
8			312.50	83.38	23.13
8			313.00	123.94	31.50
8			313.25	148.02	36.16
8			313.50	174.79	41.13
8			313.75	204.34	46.41
8			314.00	236.81	52.00
8			314.50	278.65	65.75
8			315.00	353.72	84.00
9	ENDTBL				
2	XSECTN	034	1.0	338.50	
8			338.00	0.00	0.00
8			338.10	4.87	2.46
8			338.25	22.73	6.38
8			338.50	73.99	13.53
8			338.75	149.34	21.45
8			339.00	247.95	30.13
8			339.50	515.65	49.78
9	ENDTBL				
2	XSECTN	037	1.0	331.00	
8			330.00	0.00	0.00
8			330.25	14.29	3.25
8			330.50	46.85	7.00
8			330.75	95.34	11.25
8			331.00	159.64	16.00
8			331.25	240.13	21.25
8			331.50	337.44	27.00
8			331.75	452.26	33.25
8			332.00	585.36	40.00

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			332.50	875.33	55.81
---	--	--	--------	--------	-------

		SA310YR.OUT		
8		333.00	1272.05	75.25
9	ENDTBL			
3	STRUCT	31		
8		356.38	0.0	0.00
8		357.26	10.90	0.02
8		357.50	12.30	0.03
8		358.00	14.70	0.05
8		359.00	18.70	0.10
8		360.00	22.00	0.16
8		361.00	24.90	0.25
8		361.50	26.20	0.30
8		362.00	27.50	0.36
8		362.50	28.70	0.43
8		362.90	29.60	0.49
8		363.50	51.30	0.60
8		363.75	65.70	0.67
8		364.00	82.60	0.72
8		364.20	83.30	0.83
8		364.60	100.00	0.88
8		366.80	260.00	1.47
8		366.92	340.00	1.49
8		366.98	380.00	1.50
9	ENDTBL			
3	STRUCT	32		
8		375.40	0.00	0.00
8		379.36	1.00	0.74
8		380.00	5.00	0.89
8		380.20	10.00	0.94
8		380.33	15.00	0.98
8		380.45	20.00	1.01
8		380.55	25.00	1.04
8		380.65	30.00	1.06
8		381.19	40.00	1.21
8		381.78	44.00	1.39
8		382.59	66.00	1.66
8		382.79	88.00	1.75
8		382.89	110.00	1.79
8		382.97	132.00	1.83
9	ENDTBL			
3	STRUCT	33		
8		350.00	0.00	0.00
8		354.30	1.00	1.08
8		354.47	2.00	1.15
8		354.87	5.00	1.30
8		355.38	10.00	1.50
8		356.18	20.00	1.84
8		356.88	40.00	2.15
8		357.27	60.00	2.33
8		357.46	80.00	2.42

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		358.08	100.00	2.73
8		358.14	120.00	2.76
8		358.19	140.00	2.78
8		358.25	171.00	2.81
8		358.27	180.00	2.82
9	ENDTBL			
3	STRUCT	34		
9	ENDTBL			

SA310YR.OUT

6	RUNOFF	1	024		1	0.0505	76.581	0.3401		DA1	
6	RESVOR	2		31	1			1		SWMF3	
6	RUNOFF	1	025		3	0.0748	75.950	0.3581		DA2	
6	ADDHYD	4	026	2	3			1		DA1+2	
6	REACH	3	027	4	1	1021.0		1			
6	RUNOFF	1	028		2	0.0599	71.428	0.3231		DA3	
6	ADDHYD	4	030	1	2			1		DA12+3	
6	RUNOFF	1	031		1	0.0692	82.147	0.2761		DA4	
6	REACH	3	032	1	6	1603.0		1			
6	RUNOFF	1	033		2	0.0084	95.000	0.1921		DA5	
6	RESVOR	2		32	2			1		SWMF11	
6	REACH	3	034	3	7	583.0		1			
6	RUNOFF	1	035		1	0.0275	94.963	0.2481		DA6	
6	RESVOR	2		33	1			1		SWMF8	
6	ADDHYD	4	036	7	2			1		DA5+6	
6	RESVOR	2		34	1			1		HWYSTOR3	
6	REACH	3	037	2	4	934.0		1			
6	RUNOFF	1	038		1	0.0328	85.433	0.1901		DA7	
6	ADDHYD	4	039	4	1			1		DA56+7	
6	RUNOFF	1	040		2	0.0393	80.617	0.3671		DA8	
6	ADDHYD	4	041	5	2			1		DA3+8	
6	ADDHYD	4	042	6	1			1		DA4+8	
6	ADDHYD	4	043	3	2			1		1 DA7+8	
ENDATA											
7	INCREM	6				.06					
7	COMPUT	7	024		043	0.0	4.94	1.02	2	1	10
ENDCMP 1											
ENDJOB 2											

*****END OF 80-80 LIST*****

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr Storm- SA3 ONLY 2.04TEST
 15:58:19 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .060 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 24 TO XSECTION 43
 STARTING TIME = .00 RAIN DEPTH = 4.94 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .060 HOURS
 ALTERNATE NO. = 1 STORM NO. =10 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 24

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.09	85.7	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.53 WATERSHED INCHES; 83 CFS-HRS; 6.8 ACRE-FEET.

*** WARNING - STRUCTURE 31, MAIN TIME INCREMENT EXCEEDS MAXIMUM ALLOWABLE
 TIME INCREMENT OF .043 HOURS. ***

*** WARNING - STRUCTURE 31, RESERVOIR ROUTING HAS NEGATIVE DISCHARGES
 FIRST NEGATIVE VALUE IS 0 CFS. ***

OPERATION RESVOR STRUCTURE 31

SA310YR.OUT

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.16 80.3 363.97

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.53 WATERSHED INCHES; 83 CFS-HRS; 6.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 25

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.11 121.4 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.48 WATERSHED INCHES; 120 CFS-HRS; 9.9 ACRE-FEET.

OPERATION ADDHYD XSECTION 26

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.13 199.5 (NULL)

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr Storm- SA3 ONLY 2.04TEST
 15:58:19 PASS 1 JOB NO. 1 PAGE 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.50 WATERSHED INCHES; 202 CFS-HRS; 16.7 ACRE-FEET.

OPERATION REACH XSECTION 27

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.24 180.2 319.17

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.50 WATERSHED INCHES; 202 CFS-HRS; 16.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 28

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.09 85.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.10 WATERSHED INCHES; 81 CFS-HRS; 6.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 30

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.20 244.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.37 WATERSHED INCHES; 284 CFS-HRS; 23.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 31

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.05 155.5 (RUNOFF)

SA310YR.OUT

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
3.04 WATERSHED INCHES; 136 CFS-HRS; 11.2 ACRE-FEET.

OPERATION REACH XSECTION 32

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.15 141.4 313.18

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
3.04 WATERSHED INCHES; 136 CFS-HRS; 11.2 ACRE-FEET.

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 10 yr storm- SA3 ONLY 2.04TEST
15:58:19 PASS 1 JOB NO. 1 PAGE 3

OPERATION RUNOFF XSECTION 33

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
11.99 28.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
4.35 WATERSHED INCHES; 24 CFS-HRS; 2.0 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 32, TRUNCATED AT 400 POINTS
WITH .38 AC-FT (.07 WATERSHED INCHES) FLOOD STORAGE
REMAINING IN RESERVOIR AT ELEV. 377.43. ***

OPERATION RESVOR STRUCTURE 32

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.18 12.8 380.27

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
3.51 WATERSHED INCHES; 19 CFS-HRS; 1.6 ACRE-FEET.

OPERATION REACH XSECTION 34

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.24 12.7 338.17

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
3.50 WATERSHED INCHES; 19 CFS-HRS; 1.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 35

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.03 84.6 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
4.35 WATERSHED INCHES; 77 CFS-HRS; 6.4 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 33, TRUNCATED AT 400 POINTS
WITH .95 AC-FT (.05 WATERSHED INCHES) FLOOD STORAGE
REMAINING IN RESERVOIR AT ELEV. 353.80. ***

SA310YR.OUT

OPERATION RESVOR STRUCTURE 33

1
 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr Storm- SA3 ONLY 2.04TEST
 15:58:19 PASS 1 JOB NO. 1 PAGE 4

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.14 64.4 357.31

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.70 WATERSHED INCHES; 66 CFS-HRS; 5.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 36

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.17 71.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.66 WATERSHED INCHES; 85 CFS-HRS; 7.0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 34

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.17 71.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.66 WATERSHED INCHES; 85 CFS-HRS; 7.0 ACRE-FEET.

*** WARNING - ROUTING COEFFICIENT (C) EQUALS 1.0,
 CONSIDER SMALLER MAIN TIME INCREMENT FOR XSECTION 37. ***

OPERATION REACH XSECTION 37

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.17 71.6 330.63

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.66 WATERSHED INCHES; 85 CFS-HRS; 7.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 38

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.00 91.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.35 WATERSHED INCHES; 71 CFS-HRS; 5.9 ACRE-FEET.

OPERATION ADDHYD XSECTION 39

1
 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr storm- SA3 ONLY 2.04TEST
 15:58:19 PASS 1 JOB NO. 1 PAGE 5

SA310YR.OUT
 PEAK TIME(HRS) 12.06 PEAK DISCHARGE(CFS) 136.1 PEAK ELEVATION(FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.51 WATERSHED INCHES; 156 CFS-HRS; 12.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 40

PEAK TIME(HRS) 12.11 PEAK DISCHARGE(CFS) 73.3 PEAK ELEVATION(FEET) (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.89 WATERSHED INCHES; 73 CFS-HRS; 6.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 41

PEAK TIME(HRS) 12.18 PEAK DISCHARGE(CFS) 309.8 PEAK ELEVATION(FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.46 WATERSHED INCHES; 357 CFS-HRS; 29.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 42

PEAK TIME(HRS) 12.17 PEAK DISCHARGE(CFS) 449.8 PEAK ELEVATION(FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.60 WATERSHED INCHES; 493 CFS-HRS; 40.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 43

PEAK TIME(HRS) 12.14 PEAK DISCHARGE(CFS) 566.9 PEAK ELEVATION(FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.77 WATERSHED INCHES; 648 CFS-HRS; 53.6 ACRE-FEET.

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

1
 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr Storm- SA3 ONLY 2.04TEST
 15:58:19 PASS 2 JOB NO. 1 PAGE 6

1
 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr Storm- SA3 ONLY 2.04TEST
 15:58:19 SUMMARY, JOB NO. 1 PAGE 7

SUMMARY TABLE 1

 SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

SA310YR.OUT

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 4.94 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .060 HOURS

ALTERNATE 1 STORM 10

XSECTION 43 ADDHYD .36 2.77 --- 12.14 567 1575.0

1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr storm- SA3 ONLY 2.04TEST
 15:58:19 SUMMARY, JOB NO. 1 PAGE 8

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION

ROUTING PARAMETERS

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			

BASEFLOW IS .0 CFS

ALTERNATE 1 STORM 10

27	1021		198	12.1	180	12.2	.69	1.31	.054	.908	.53
32	1603		155	12.1	139	12.1	1.36	1.31	.065	.895	.53
34	583		13	12.2	13	12.2	1.14	1.62	.005	.988	.92?
37	934		71	12.2	71	12.2	2.35	1.53	.004	1.000	1.00?

1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 10 yr storm- SA3 ONLY 2.04TEST
 15:58:19 SUMMARY, JOB NO. 1 PAGE 9

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - RISING TRUNCATED HYDROGRAPH.

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....
------------------------------	-----------------------------	--------------------

XSECTION 43 .36

ALTERNATE 1

567

TR20 ----- SA310YR.OUT ----- SCS -
06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
CN MGMT- CWP SWM Included- 10 yr Storm- SA3 ONLY 2.04TEST

END OF 1 JOBS IN THIS RUN

SCS TR-20, VERSION 2.04TEST
FILES

INPUT = sa310yr.dat , GIVEN DATA FILE
OUTPUT = sa310yr.OUT , DATED 06/18/**,15:58:19

FILES GENERATED - DATED 06/18/**,15:58:19

NONE!

TOTAL NUMBER OF WARNINGS = 3, MESSAGES = 2

*** TR-20 RUN COMPLETED ***

1

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	TITLE	CN MGMT-	CWP SWM Included-	MGMT STRUCTURES,	NOPLOTS
TITLE				100 yr Storm-	SA3 ONLY
2	XSECTN	027	1.0	317.00	
8			316.00	0.00	0.00
8			316.50	2.68	2.59
8			317.00	10.37	6.88
8			317.50	24.26	12.84
8			318.00	45.55	20.50
8			318.50	70.64	34.75
8			319.00	137.01	60.50
8			319.25	200.57	76.25
8			319.50	273.06	92.00
8			319.75	353.76	107.75
8			320.00	442.13	123.50
8			320.50	640.03	155.00
8			321.00	863.72	186.50
9	ENDTBL				
2	XSECTN	032	1.0	313.00	
8			310.00	0.00	0.00
8			311.00	12.25	5.50
8			312.00	52.16	16.00
8			312.50	83.38	23.13
8			313.00	123.94	31.50
8			313.25	148.02	36.16
8			313.50	174.79	41.13
8			313.75	204.34	46.41
8			314.00	236.81	52.00
8			314.50	278.65	65.75
8			315.00	353.72	84.00
9	ENDTBL				
2	XSECTN	034	1.0	338.50	
8			338.00	0.00	0.00
8			338.10	4.87	2.46
8			338.25	22.73	6.38
8			338.50	73.99	13.53
8			338.75	149.34	21.45
8			339.00	247.95	30.13
8			339.50	515.65	49.78
9	ENDTBL				
2	XSECTN	037	1.0	331.00	
8			330.00	0.00	0.00
8			330.25	14.29	3.25
8			330.50	46.85	7.00
8			330.75	95.34	11.25
8			331.00	159.64	16.00
8			331.25	240.13	21.25
8			331.50	337.44	27.00
8			331.75	452.26	33.25
8			332.00	585.36	40.00

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8 332.50 875.33 55.81

		SA3100YR.OUT		
8		333.00	1272.05	75.25
9	ENDTBL			
3	STRUCT	31		
8		356.38	0.0	0.00
8		357.26	10.90	0.02
8		357.50	12.30	0.03
8		358.00	14.70	0.05
8		359.00	18.70	0.10
8		360.00	22.00	0.16
8		361.00	24.90	0.25
8		361.50	26.20	0.30
8		362.00	27.50	0.36
8		362.50	28.70	0.43
8		362.90	29.60	0.49
8		363.50	51.30	0.60
8		363.75	65.70	0.67
8		364.00	82.60	0.72
8		364.20	83.30	0.83
8		364.60	100.00	0.88
8		366.80	260.00	1.47
8		366.92	340.00	1.49
8		366.98	380.00	1.50
9	ENDTBL			
3	STRUCT	32		
8		375.40	0.00	0.00
8		379.36	1.00	0.74
8		380.00	5.00	0.89
8		380.20	10.00	0.94
8		380.33	15.00	0.98
8		380.45	20.00	1.01
8		380.55	25.00	1.04
8		380.65	30.00	1.06
8		381.19	40.00	1.21
8		381.78	44.00	1.39
8		382.59	66.00	1.66
8		382.79	88.00	1.75
8		382.89	110.00	1.79
8		382.97	132.00	1.83
9	ENDTBL			
3	STRUCT	33		
8		350.00	0.00	0.00
8		354.30	1.00	1.08
8		354.47	2.00	1.15
8		354.87	5.00	1.30
8		355.38	10.00	1.50
8		356.18	20.00	1.84
8		356.88	40.00	2.15
8		357.27	60.00	2.33
8		357.46	80.00	2.42

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		358.08	100.00	2.73
8		358.14	120.00	2.76
8		358.19	140.00	2.78
8		358.25	171.00	2.81
8		358.27	180.00	2.82
9	ENDTBL			
3	STRUCT	34		
9	ENDTBL			

SA3100YR.OUT

6	RUNOFF	1	024		1	0.0505	76.581	0.3401		DA1
6	RESVOR	2		31	1			1		SWMF3
6	RUNOFF	1	025		3	0.0748	75.950	0.3581		DA2
6	ADDHYD	4	026	2	3			1		DA1+2
6	REACH	3	027	4	1	1021.0		1		
6	RUNOFF	1	028		2	0.0599	71.428	0.3231		DA3
6	ADDHYD	4	030	1	2			1		DA12+3
6	RUNOFF	1	031		1	0.0692	82.196	0.2761		DA4
6	REACH	3	032	1	6	1603.0		1		
6	RUNOFF	1	033		2	0.0084	95.000	0.1921		DA5
6	RESVOR	2		32	2			1		SWMF11
6	REACH	3	034	3	7	583.0		1		
6	RUNOFF	1	035		1	0.0275	94.963	0.2481		DA6
6	RESVOR	2		33	1			1		SWMF8
6	ADDHYD	4	036	7	2			1		DA5+6
6	RESVOR	2		34	1			1		HWYSTOR3
6	REACH	3	037	2	4	934.0		1		
6	RUNOFF	1	038		1	0.0328	85.549	0.1901		DA7
6	ADDHYD	4	039	4	1			1		DA56+7
6	RUNOFF	1	040		2	0.0393	80.617	0.3671		DA8
6	ADDHYD	4	041	5	2			1		DA3+8
6	ADDHYD	4	042	6	1			1		DA4+8
6	ADDHYD	4	043	3	2			1		1 DA7+8
ENDATA										
7	INCREM	6				.06				
7	COMPUT	7	024		043	0.0	8.53	1.02	2	1 99
ENDCMP 1										
ENDJOB 2										

*****END OF 80-80 LIST*****

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 100 yr Storm- SA3 ONLY 2.04TEST
 15:58:55 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .060 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 24 TO XSECTION 43
 STARTING TIME = .00 RAIN DEPTH = 8.53 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .060 HOURS
 ALTERNATE NO. = 1 STORM NO. =99 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 24

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.09	192.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.71 WATERSHED INCHES; 186 CFS-HRS; 15.4 ACRE-FEET.

*** WARNING - STRUCTURE 31, MAIN TIME INCREMENT EXCEEDS MAXIMUM ALLOWABLE
 TIME INCREMENT OF .043 HOURS. ***

*** WARNING - STRUCTURE 31, RESERVOIR ROUTING HAS NEGATIVE DISCHARGES
 FIRST NEGATIVE VALUE IS 0 CFS. ***

OPERATION RESVOR STRUCTURE 31

SA3100YR.OUT

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.13 185.8 365.78

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.70 WATERSHED INCHES; 186 CFS-HRS; 15.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 25

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.10 273.9 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.63 WATERSHED INCHES; 272 CFS-HRS; 22.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 26

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.11 457.4 (NULL)

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 100 yr Storm- SA3 ONLY 2.04TEST
 15:58:55 PASS 1 JOB NO. 1 PAGE 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.66 WATERSHED INCHES; 458 CFS-HRS; 37.8 ACRE-FEET.

OPERATION REACH XSECTION 27

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.19 444.6 320.01

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.66 WATERSHED INCHES; 458 CFS-HRS; 37.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 28

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.08 209.7 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.09 WATERSHED INCHES; 197 CFS-HRS; 16.3 ACRE-FEET.

OPERATION ADDHYD XSECTION 30

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.15 621.7 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.48 WATERSHED INCHES; 655 CFS-HRS; 54.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 31

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.05 317.6 (RUNOFF)

SA3100YR.OUT

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
6.38 WATERSHED INCHES; 285 CFS-HRS; 23.6 ACRE-FEET.

OPERATION REACH XSECTION 32

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.15 287.8 314.56

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
6.38 WATERSHED INCHES; 285 CFS-HRS; 23.6 ACRE-FEET.

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 100 yr storm- SA3 ONLY 2.04TEST
15:58:55 PASS 1 JOB NO. 1 PAGE 3

OPERATION RUNOFF XSECTION 33

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
11.99 49.7 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
7.92 WATERSHED INCHES; 43 CFS-HRS; 3.6 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 32, TRUNCATED AT 400 POINTS
WITH .53 AC-FT (.10 WATERSHED INCHES) FLOOD STORAGE
REMAINING IN RESERVOIR AT ELEV. 378.25. ***

OPERATION RESVOR STRUCTURE 32

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.09 38.7 381.12

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
6.74 WATERSHED INCHES; 37 CFS-HRS; 3.0 ACRE-FEET.

*** WARNING - ROUTING COEFFICIENT (C) EQUALS 1.0,
CONSIDER SMALLER MAIN TIME INCREMENT FOR XSECTION 34. ***

OPERATION REACH XSECTION 34

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.09 38.7 338.33

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
6.74 WATERSHED INCHES; 37 CFS-HRS; 3.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 35

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.03 149.4 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
7.92 WATERSHED INCHES; 141 CFS-HRS; 11.6 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 33, TRUNCATED AT 400 POINTS
Page 5

SA3100YR.OUT
WITH 1.05 AC-FT (.06 WATERSHED INCHES) FLOOD STORAGE
REMAINING IN RESERVOIR AT ELEV. 354.18. ***

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 100 yr Storm- SA3 ONLY 2.04TEST
15:58:55 PASS 1 JOB NO. 1 PAGE 4

OPERATION RESVOR STRUCTURE 33

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.07 148.8 358.21

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
7.24 WATERSHED INCHES; 128 CFS-HRS; 10.6 ACRE-FEET.

OPERATION ADDHYD XSECTION 36

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.07 187.4 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
7.12 WATERSHED INCHES; 165 CFS-HRS; 13.6 ACRE-FEET.

OPERATION RESVOR STRUCTURE 34

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.07 187.4 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
7.12 WATERSHED INCHES; 165 CFS-HRS; 13.6 ACRE-FEET.

*** WARNING - ROUTING COEFFICIENT (C) EQUALS 1.0,
CONSIDER SMALLER MAIN TIME INCREMENT FOR XSECTION 37. ***

OPERATION REACH XSECTION 37

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.07 187.4 331.09

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
7.12 WATERSHED INCHES; 165 CFS-HRS; 13.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 38

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.00 178.3 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
6.78 WATERSHED INCHES; 144 CFS-HRS; 11.9 ACRE-FEET.

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 100 yr storm- SA3 ONLY 2.04TEST
15:58:55 PASS 1 JOB NO. 1 PAGE 5

SA3100YR.OUT

OPERATION ADDHYD XSECTION 39
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.05 345.5 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 6.96 WATERSHED INCHES; 309 CFS-HRS; 25.5 ACRE-FEET.

OPERATION RUNOFF XSECTION 40
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.10 154.1 (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 6.19 WATERSHED INCHES; 157 CFS-HRS; 13.0 ACRE-FEET.

OPERATION ADDHYD XSECTION 41
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.14 771.6 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.60 WATERSHED INCHES; 812 CFS-HRS; 67.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 42
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.14 1059.3 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.79 WATERSHED INCHES; 1097 CFS-HRS; 90.6 ACRE-FEET.

OPERATION ADDHYD XSECTION 43
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.11 1329.3 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 6.01 WATERSHED INCHES; 1405 CFS-HRS; 116.1 ACRE-FEET.

1
 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 100 yr Storm- SA3 ONLY 2.04TEST
 15:58:55 PASS 2 JOB NO. 1 PAGE 6

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1
 1
 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 100 yr Storm- SA3 ONLY 2.04TEST
 15:58:55 SUMMARY, JOB NO. 1 PAGE 7

SUMMARY TABLE 1

 SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.

SA3100YR.OUT

A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF 8.53 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 2, ARC 2							
MAIN TIME INCREMENT .060 HOURS							

ALTERNATE 1 STORM 99

XSECTION	43	ADDHYD	.36	6.01	---	12.11	1329	3691.7
----------	----	--------	-----	------	-----	-------	------	--------

1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 100 yr storm- SA3 ONLY 2.04TEST
 15:58:55 SUMMARY, JOB NO. 1 PAGE 8

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC	REACH	FLOOD PLAIN	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
ID	LENGTH (FT)	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS .0 CFS											
ALTERNATE 1 STORM 99											
27	1021		457	12.1	444	12.2	.32	1.50	.022	.971	.73?
32	1603		317	12.1	284	12.1	1.84	1.20	.076	.897	.51
34	583		38	12.1	38	12.1	1.15	1.60	.006	1.000	1.00?
37	934		185	12.1	185	12.1	2.54	1.49	.005	1.000	1.00?

1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 100 yr storm- SA3 ONLY 2.04TEST
 15:58:55 SUMMARY, JOB NO. 1 PAGE 9

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - RISING TRUNCATED HYDROGRAPH.

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 99
XSECTION 43	.36	

SA3100YR.OUT

1 ALTERNATE 1 1329
TR20 ----- SCS -
06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
CN MGMT- CWP SWM Included- 100 yr Storm- SA3 ONLY 2.04TEST

END OF 1 JOBS IN THIS RUN

SCS TR-20, VERSION 2.04TEST
FILES

INPUT = sa3100yr.dat , GIVEN DATA FILE
OUTPUT = sa3100yr.OUT , DATED 06/18/**,15:58:55

FILES GENERATED - DATED 06/18/**,15:58:55

NONE!

TOTAL NUMBER OF WARNINGS = 4, MESSAGES = 2

*** TR-20 RUN COMPLETED ***

1

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	TITLE	CN MGMT-	CWP FACILITY	CN REDUCTION	INCLUDED-	NOLOTS	MGMT STRUCTURES,
TITLE						2YR STORM	
2	XSECTN	002		1.0	389.50		
8				389.00	0.00	0.00	
8				389.25	1.65	1.06	
8				389.50	6.25	2.75	
8				389.75	14.40	5.06	
8				390.00	26.75	8.00	
8				390.25	45.54	14.33	
8				390.50	68.67	15.00	
8				390.75	96.11	18.88	
8				391.00	127.89	23.00	
8				391.25	164.08	27.38	
8				391.50	204.77	32.00	
8				391.75	250.06	36.88	
9	ENDTBL						
2	XSECTN	005		1.0	367.00		
8				366.00	0.00	0.00	
8				366.50	3.51	1.5	
8				367.00	13.55	4.00	
8				367.50	30.53	9.00	
8				367.75	47.87	13.00	
8				368.00	72.23	18.00	
8				368.25	104.79	23.98	
8				368.50	146.13	30.94	
8				368.75	197.14	38.86	
8				369.00	258.63	47.75	
8				369.25	331.41	57.61	
8				369.50	416.25	68.44	
9	ENDTBL						
3	STRUCT	11					
8				380.00	0.00	0.00	
8				381.00	2.70	0.53	
8				382.20	53.00	1.16	
8				383.80	186.80	1.40	
9	ENDTBL						
2	XSECTN	008		1.0	330.00		
8				356.00	0.00	0.00	
8				356.50	20.21	6.94	
8				357.00	68.51	15.75	
8				357.50	144.11	26.44	
8				358.00	248.93	39.00	
8				358.50	389.07	53.25	
8				359.00	561.31	69.00	
8				359.50	767.14	86.25	
8				360.00	1008.16	105.00	
8				361.00	1375.68	147.50	
8				361.50	1604.19	171.38	
9	ENDTBL						

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

2	XSECTN	016		1.0	333.08		
---	--------	-----	--	-----	--------	--	--

		CWP2YR.OUT		
8		331.08	0.00	0.00
8		332.08	80.21	8.00
8		333.08	225.50	16.00
8		333.58	310.09	20.00
8		334.08	399.94	24.00
8		334.58	493.86	28.00
8		335.08	590.97	32.00
8		335.58	690.67	36.00
8		336.08	792.47	40.00
8		336.58	896.02	44.00
9	ENDTBL			
2	XSECTN 023	1.0	314.40	
8		313.22	0.00	0.00
8		313.51	1.10	0.89
8		313.81	3.51	1.84
8		314.10	16.22	5.61
8		314.40	34.66	9.74
8		314.68	48.28	24.71
8		314.96	79.66	42.09
8		315.24	126.64	61.87
8		315.52	189.07	84.06
8		315.80	267.27	108.64
8		316.08	361.75	135.63
8		316.36	473.14	165.02
8		316.64	602.11	196.81
8		316.92	749.37	231.00
8		317.20	878.70	277.25
8		317.48	1103.89	329.14
8		317.76	1358.10	382.70
8		318.04	1640.58	437.94
8		318.32	1950.87	494.86
8		318.60	2288.69	553.45
9	ENDTBL			
3	STRUCT 21			
8		364.00	0.00	0.00
8		366.00	0.30	0.55
8		368.00	0.50	1.31
8		369.00	3.20	1.80
8		370.00	5.20	2.29
8		372.00	7.80	3.48
8		374.00	9.60	5.00
8		375.00	10.40	5.86
8		376.00	45.30	6.79
8		376.50	74.10	7.31
8		377.00	106.80	7.83
8		378.00	149.80	8.90
8		379.00	155.60	10.06
8		380.00	162.00	11.29
9	ENDTBL			

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

3	STRUCT 22			
8		352.50	0.00	0.00
8		358.65	100.00	0.91
8		361.76	140.00	3.28
8		363.64	160.00	5.47
8		366.18	180.00	9.58
8		368.71	200.00	14.77
8		370.61	250.00	19.31

CWP2YR.OUT

9	ENDTBL				
3	STRUCT	23			
9	ENDTBL				
2	XSECTN	027	1.0	317.00	
8			316.00	0.00	0.00
8			316.50	2.68	2.59
8			317.00	10.37	6.88
8			317.50	24.26	12.84
8			318.00	45.55	20.50
8			318.50	70.64	34.75
8			319.00	137.01	60.50
8			319.25	200.57	76.25
8			319.50	273.06	92.00
8			319.75	353.76	107.75
8			320.00	442.13	123.50
8			320.50	640.03	155.00
8			321.00	863.72	186.50
9	ENDTBL				
2	XSECTN	032	1.0	313.00	
8			310.00	0.00	0.00
8			311.00	12.25	5.50
8			312.00	52.16	16.00
8			312.50	83.38	23.13
8			313.00	123.94	31.50
8			313.25	148.02	36.16
8			313.50	174.79	41.13
8			313.75	204.34	46.41
8			314.00	236.81	52.00
8			314.50	278.65	65.75
8			315.00	353.72	84.00
9	ENDTBL				
2	XSECTN	034	1.0	338.50	
8			338.00	0.00	0.00
8			338.10	4.87	2.46
8			338.25	22.73	6.38
8			338.50	73.99	13.53
8			338.75	149.34	21.45
8			339.00	247.95	30.13
8			339.50	515.65	49.78
9	ENDTBL				
2	XSECTN	037	1.0	331.00	
8			330.00	0.00	0.00

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			330.25	14.29	3.25
8			330.50	46.85	7.00
8			330.75	95.34	11.25
8			331.00	159.64	16.00
8			331.25	240.13	21.25
8			331.50	337.44	27.00
8			331.75	452.26	33.25
8			332.00	585.36	40.00
8			332.50	875.33	55.81
8			333.00	1272.05	75.25
9	ENDTBL				
2	XSECTN	044	1.0	288.90	
8			287.68	0.00	0.00
8			287.99	1.15	0.94
8			288.29	3.69	1.95

		CWP2YR.OUT		
8		288.60	17.06	5.98
8		288.90	36.44	10.37
8		289.19	63.07	39.25
8		289.47	121.85	69.50
8		289.76	206.05	101.12
8		290.05	313.23	134.09
8		290.33	442.07	168.42
8		290.62	591.78	204.12
8		290.91	761.87	241.18
8		291.19	952.02	279.60
8		291.48	1162.04	319.38
8		291.77	1391.84	360.52
8		292.05	1641.40	403.02
8		292.34	1910.74	446.89
8		292.63	2199.92	492.11
8		292.91	2509.04	538.70
8		293.20	2838.22	586.65
9	ENDTBL			
3	STRUCT	31		
8		356.38	0.0	0.00
8		357.26	10.90	0.02
8		357.50	12.30	0.03
8		358.00	14.70	0.05
8		359.00	18.70	0.10
8		360.00	22.00	0.16
8		361.00	24.90	0.25
8		361.50	26.20	0.30
8		362.00	27.50	0.36
8		362.50	28.70	0.43
8		362.90	29.60	0.49
8		363.50	51.30	0.60
8		363.75	65.70	0.67
8		364.00	82.60	0.72
8		364.20	83.30	0.83
8		364.60	100.00	0.88

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		366.80	260.00	1.47
8		366.92	340.00	1.49
8		366.98	380.00	1.50
9	ENDTBL			
3	STRUCT	32		
8		375.40	0.00	0.00
8		379.36	1.00	0.74
8		380.00	5.00	0.89
8		380.20	10.00	0.94
8		380.33	15.00	0.98
8		380.45	20.00	1.01
8		380.55	25.00	1.04
8		380.65	30.00	1.06
8		381.19	40.00	1.21
8		381.78	44.00	1.39
8		382.59	66.00	1.66
8		382.79	88.00	1.75
8		382.89	110.00	1.79
8		382.97	132.00	1.83
9	ENDTBL			
3	STRUCT	33		
8		350.00	0.00	0.00

CWP2YR.OUT

8			354.30	1.00	1.08
8			354.47	2.00	1.15
8			354.87	5.00	1.30
8			355.38	10.00	1.50
8			356.18	20.00	1.84
8			356.88	40.00	2.15
8			357.27	60.00	2.33
8			357.46	80.00	2.42
8			358.08	100.00	2.73
8			358.14	120.00	2.76
8			358.19	140.00	2.78
8			358.25	171.00	2.81
8			358.27	180.00	2.82
9	ENDTBL				
3	STRUCT	34			
9	ENDTBL				
2	XSECTN	051	1.0	282.40	
8			281.10	0.00	0.00
8			281.42	1.24	1.09
8			281.75	3.96	2.26
8			282.07	18.30	6.92
8			282.40	39.09	12.00
8			282.88	67.33	37.27
8			283.36	131.17	65.87
8			283.84	225.10	97.78
8			284.32	348.01	133.01
8			284.80	499.91	171.56
8			285.28	681.29	213.43

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*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			285.76	892.92	258.61
8			286.24	1135.70	307.11
8			286.72	1410.63	358.94
8			287.20	1718.74	414.08
8			287.68	2061.13	472.54
8			288.16	2438.87	534.31
8			288.64	2853.08	599.41
8			289.12	3301.76	667.84
8			289.60	3785.91	739.78
9	ENDTBL				
2	XSECTN	053	1.0	289.00	
8			288.00	0.00	0.00
8			288.50	9.00	2.88
8			289.00	34.26	7.50
8			289.50	79.27	13.88
8			290.00	147.75	22.00
8			290.50	227.49	31.94
8			291.00	332.02	43.75
8			291.50	463.75	57.44
8			291.75	540.56	64.98
8			292.00	625.07	73.00
9	ENDTBL				
2	XSECTN	063	1.0	248.40	
8			247.07	0.00	0.00
8			247.41	1.85	1.14
8			247.74	5.93	2.35
8			248.07	27.43	7.18
8			248.40	58.61	12.46
8			248.67	89.70	40.04

		CWP2YR.OUT		
8		248.95	158.39	68.99
8		249.22	256.90	99.30
8		249.49	382.40	130.99
8		249.77	533.43	164.04
8		250.04	709.09	198.46
8		250.31	908.86	234.24
8		250.59	1132.40	271.40
8		250.86	1379.55	309.92
8		251.13	1650.25	349.81
8		251.41	1944.49	391.07
8		251.68	2262.35	433.69
8		251.95	2603.94	477.69
8		252.23	2969.40	523.05
8		252.50	3358.93	569.78
9	ENDTBL			
3	STRUCT	61		
8		329.75	0.00	0.00
8		330.00	1.56	0.01
8		332.00	4.37	0.13
8		334.00	5.96	0.39
8		334.10	6.01	0.40

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		334.50	10.20	0.47
8		335.00	16.10	0.56
8		336.00	28.91	0.75
8		337.00	40.10	0.97
9	ENDTBL			
3	STRUCT	62		
8		287.30	0.00	0.00
8		288.00	5.45	0.01
8		289.00	9.05	0.05
8		290.00	11.60	0.13
8		292.00	15.35	0.50
8		294.00	18.40	1.19
8		294.30	18.92	1.26
8		294.50	20.73	1.40
8		295.00	36.40	1.60
8		295.40	38.00	1.80
8		296.00	51.10	2.15
8		297.00	69.60	2.75
8		298.00	86.80	3.44
8		298.68	98.50	3.91
8		298.80	107.56	4.00
9	ENDTBL			
3	STRUCT	63		
8		259.43	0.00	0.00
8		260.00	1.30	0.026
8		260.50	1.70	0.050
8		261.00	2.10	0.075
8		261.50	2.40	0.095
8		262.00	2.70	0.119
8		262.50	2.90	0.160
8		263.00	3.20	0.205
8		263.50	3.40	0.245
8		264.00	3.60	0.285
8		264.50	3.80	0.360
8		265.00	3.90	0.415
8		265.50	4.10	0.480

		CWP2YR.OUT		
8		266.00	11.00	0.537
8		266.50	15.40	0.620
8		267.00	16.00	0.709
8		267.50	30.30	0.798
8		268.00	56.00	0.887
8		268.50	145.68	0.976
9	ENDTBL			
2	XSECTN	065	1.0	300.50
8			300.00	0.00
8			300.10	0.29
8			300.25	1.47
8			300.40	3.55
8			300.50	5.48
8			300.60	7.88

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*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		300.75	12.45	3.19
8		300.90	18.28	4.23
8		301.00	22.91	5.00
8		301.10	28.18	5.83
8		301.25	37.36	7.19
8		301.40	48.14	8.68
8		301.50	56.26	9.75
9	ENDTBL			
2	XSECTN	070	1.0	248.40
8			247.07	0.00
8			247.41	1.85
8			247.74	5.93
8			248.07	27.43
8			248.40	58.61
8			248.67	89.70
8			248.95	158.39
8			249.22	256.90
8			249.49	382.40
8			249.77	533.43
8			250.04	709.09
8			250.31	908.86
8			250.59	1132.40
8			250.86	1379.55
8			251.13	1650.25
8			251.41	1944.49
8			251.68	2262.35
8			251.95	2603.94
8			252.23	2969.40
8			252.50	3358.93
9	ENDTBL			
2	XSECTN	072	1.0	248.40
8			247.07	0.00
8			247.41	1.85
8			247.74	5.93
8			248.07	27.43
8			248.40	58.61
8			248.67	89.70
8			248.95	158.39
8			249.22	256.90
8			249.49	382.40
8			249.77	533.43
8			250.04	709.09
8			250.31	908.86

		CWP2YR.OUT	
8		250.59	1132.40
8		250.86	1379.55
8		251.13	1650.25
8		251.41	1944.49
8		251.68	2262.35
8		251.95	2603.94
8		252.23	2969.40

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*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		252.50	3358.93	569.78	
9	ENDTBL				
2	XSECTN	077	1.0	229.00	
8			226.00	0.00	0.00
8			226.50	11.73	5.31
8			227.00	42.97	13.25
8			227.50	96.50	23.81
8			228.00	175.93	37.00
8			228.50	258.13	54.25
8			229.00	385.22	77.00
8			229.50	561.82	105.25
8			230.00	793.74	139.00
8			230.50	1079.38	179.94
8			231.00	1462.49	229.75
8			231.50	1953.75	288.44
8			232.00	2564.16	356.00
8			232.50	3408.70	429.13
8			233.00	4351.01	504.50

9	ENDTBL				
2	XSECTN	080	1.0	212.00	
8			210.50	0.00	0.00
8			210.75	4.72	2.23
8			211.00	15.68	4.92
8			211.25	32.36	8.06
8			211.50	54.93	11.67
8			211.75	83.70	15.73
8			212.00	119.05	20.25
8			212.25	163.87	25.14
8			212.50	215.35	30.31
8			212.75	273.55	35.77
8			213.00	338.57	41.50
8			214.00	669.42	67.25
8			215.00	806.07	99.00
8			216.00	1088.03	138.25
8			217.00	1451.30	187.50
8			218.00	1978.93	249.25
8			219.00	2262.06	340.00
8			220.00	3115.20	476.25
8			221.00	4892.67	639.25

9	ENDTBL						
6	RUNOFF	1 001	1	0.0336	79.478	0.4051	DA1
6	REACH	3 002	1 2	1170.0		1	
6	RUNOFF	1 003	1	0.0580	80.558	0.3751	DA2**
6	ADDHYD	4 004	1 2 3			1	DA1+2
6	RESVOR	2 11	3 1			1	SWMF10
6	REACH	3 005	1 2	797.0		1	
6	RUNOFF	1 006	3	0.0798	75.925	0.3921	DA3**
6	ADDHYD	4 007	2 3 4			1	1 DA12+3
6	REACH	3 008	4 7	1221.0		1	SA1-SA2
6	RUNOFF	1 009	1	0.0734	87.960	0.4221	DA1**

				CWP2YR.OUT				
6	RUNOFF	1	054	1	0.0072	55.000	0.2561	DA2
6	RUNOFF	1	055	2	0.0322	74.166	0.2491	DA3
6	ADDHYD	4	056	7 2 4			1	SA4+DA3
6	ADDHYD	4	057	5 1 3			1	DA1+2
6	ADDHYD	4	058	4 3 5			1	DA12+3
6	RUNOFF	1	059	1	0.0266	72.902	0.2611	DA4
6	ADDHYD	4	060	5 1 2			1	DA123+4
6	RUNOFF	1	061	3	0.0173	72.707	0.2971	DA5
6	ADDHYD	4	062	2 3 6			1	1 DA1234+5
6	REACH	3	063	6 7	1959.0		1	SA5-SA6
6	RUNOFF	1	064	1	0.0110	88.119	0.5211	DA1
6	RESVOR	2	61	1 2			1	SWMF19
6	REACH	3	065	2 3	1283.0		1	
6	RUNOFF	1	066	1	0.0458	78.695	0.2391	DA2**
6	RESVOR	2	62	1 2			1	SWMF18
6	ADDHYD	4	067	3 2 4			1	DA1+2
6	RUNOFF	1	068	5	0.0778	79.383	0.2281	DA3**
6	ADDHYD	4	069	4 5 1			1	DA12+3
6	REACH	3	070	1 2	2166.0		1	
6	RUNOFF	1	071	1	0.0119	85.744	0.1221	DA4
6	RESVOR	2	63	1 3			1	SWMF2
6	REACH	3	072	3 4	1081.0		1	
6	RUNOFF	1	073	5	0.1100	65.497	0.2051	DA5**
6	ADDHYD	4	074	7 5 1			1	SA5+DA5
6	ADDHYD	4	075	2 4 6			1	DA123+4
6	ADDHYD	4	076	1 6 2			1	1 DA12345
6	REACH	3	077	2 7	884.0		1	SA6-SA7
6	RUNOFF	1	078	2	0.0510	73.827	0.1971	DA1
6	ADDHYD	4	079	7 2 1			1	SA6+DA1
6	REACH	3	080	1 2	1296.0		1	
6	RUNOFF	1	081	3	0.0513	78.929	0.1621	DA3
6	ADDHYD	4	082	2 3 4			1	DA1+3
6	RUNOFF	1	083	1	0.0313	70.330	0.1861	DA2
6	ADDHYD	4	084	4 1 2			1	DA13+2
6	RUNOFF	1	085	3	0.1187	70.444	0.3211	DA4**
6	ADDHYD	4	086	2 3 1			1	DA123+4
6	RUNOFF	1	087	4	0.0159	87.661	0.1421	DA5
6	ADDHYD	4	088	1 4 7			1	1 DA1234+5
ENDATA								
7	INCREM	6			.06			
7	COMPUT	7	001	088	0.0	3.21	1.02 2 1 2	
ENDCMP 1								
ENDJOB 2								

*****END OF 80-80 LIST*****

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 15:33:07 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .060 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO XSECTION 88
 STARTING TIME = .00 RAIN DEPTH = 3.21 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .060 HOURS
 ALTERNATE NO. = 1 STORM NO. = 2 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 1

CWP2YR.OUT

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.14 27.7 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.37 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

OPERATION REACH XSECTION 2

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.23 26.2 389.99

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.37 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

OPERATION RUNOFF XSECTION 3

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.12 53.2 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.45 WATERSHED INCHES; 54 CFS-HRS; 4.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 4

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.15 76.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.42 WATERSHED INCHES; 84 CFS-HRS; 6.9 ACRE-FEET.

OPERATION RESVOR STRUCTURE 11

1

TR20 ----- SCS -
 06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 15:33:07 CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 PASS 1 JOB NO. 1 PAGE 2

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.24 73.7 382.45

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.42 WATERSHED INCHES; 84 CFS-HRS; 6.9 ACRE-FEET.

OPERATION REACH XSECTION 5

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.31 70.4 367.98

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.41 WATERSHED INCHES; 84 CFS-HRS; 6.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 6

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.14 55.1 (RUNOFF)

CWP2YR.OUT

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.15 WATERSHED INCHES; 59 CFS-HRS; 4.9 ACRE-FEET.

OPERATION ADDHYD XSECTION 7

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.29 109.1 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.29 WATERSHED INCHES; 143 CFS-HRS; 11.8 ACRE-FEET.

OPERATION REACH XSECTION 8

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.36 107.0 357.25

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.29 WATERSHED INCHES; 143 CFS-HRS; 11.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 9

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.13 87.9 (RUNOFF)

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.00 WATERSHED INCHES; 95 CFS-HRS; 7.8 ACRE-FEET.

*** MESSAGE - STRUCTURE 21, USER ENTERED STARTING ELEVATION OR STRUCTURE TABLE
STARTS 4.00 FEET BELOW ASSUMED CREST ELEVATION AT 368.00. ***
THIS CAN DECREASE OUTFLOW HYDROGRAPH VOLUME.

OPERATION RESVOR STRUCTURE 21

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
13.24 8.9 373.21

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.69 WATERSHED INCHES; 80 CFS-HRS; 6.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 10

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
11.98 8.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.95 WATERSHED INCHES; 6 CFS-HRS; .5 ACRE-FEET.

OPERATION RESVOR STRUCTURE 22

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)

13.37 CWP2YR.OUT 353.05
8.9

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.69 WATERSHED INCHES; 80 CFS-HRS; 6.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 11

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.04 43.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.99 WATERSHED INCHES; 37 CFS-HRS; 3.0 ACRE-FEET.

OPERATION ADDHYD XSECTION 12

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.35 118.4 (NULL)

1 TR20 ----- SCS -
Ellicott City Flood study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 4

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.22 WATERSHED INCHES; 180 CFS-HRS; 14.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 13

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.05 19.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.34 WATERSHED INCHES; 17 CFS-HRS; 1.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 14

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.35 124.9 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.33 WATERSHED INCHES; 260 CFS-HRS; 21.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 15

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.35 130.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.33 WATERSHED INCHES; 276 CFS-HRS; 22.8 ACRE-FEET.

OPERATION RESVOR STRUCTURE 23

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.35 130.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
Page 13

CWP2YR.OUT
1.33 WATERSHED INCHES; 276 CFS-HRS; 22.8 ACRE-FEET.

*** WARNING - ROUTING COEFFICIENT (C) EQUALS 1.0,
CONSIDER SMALLER MAIN TIME INCREMENT FOR XSECTION 16. ***

OPERATION REACH XSECTION 16

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.35 130.6 332.43

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
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RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.33 WATERSHED INCHES; 276 CFS-HRS; 22.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 17

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
11.98 36.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.99 WATERSHED INCHES; 27 CFS-HRS; 2.2 ACRE-FEET.

OPERATION RUNOFF XSECTION 18

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.04 54.6 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.35 WATERSHED INCHES; 47 CFS-HRS; 3.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 19

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
11.99 60.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.73 WATERSHED INCHES; 45 CFS-HRS; 3.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 20

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.01 89.5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.20 WATERSHED INCHES; 75 CFS-HRS; 6.2 ACRE-FEET.

OPERATION ADDHYD XSECTION 21

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.00 150.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
Page 14

CWP2YR.OUT
2.00 WATERSHED INCHES; 120 CFS-HRS; 9.9 ACRE-FEET.

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 6

OPERATION ADDHYD XSECTION 22

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.04 243.9 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.48 WATERSHED INCHES; 394 CFS-HRS; 32.6 ACRE-FEET.

OPERATION REACH XSECTION 23

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.18 202.4 315.57

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.48 WATERSHED INCHES; 394 CFS-HRS; 32.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 24

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.10 39.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.19 WATERSHED INCHES; 39 CFS-HRS; 3.2 ACRE-FEET.

*** WARNING - STRUCTURE 31, MAIN TIME INCREMENT EXCEEDS MAXIMUM ALLOWABLE
TIME INCREMENT OF .043 HOURS. ***

*** WARNING - STRUCTURE 31, RESERVOIR ROUTING HAS NEGATIVE DISCHARGES
FIRST NEGATIVE VALUE IS 0 CFS. ***

OPERATION RESVOR STRUCTURE 31

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.26 26.8 361.75

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.19 WATERSHED INCHES; 39 CFS-HRS; 3.2 ACRE-FEET.

OPERATION RUNOFF XSECTION 25

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.11 54.5 (RUNOFF)

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 7

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
Page 15

CWP2YR.OUT
1.16 WATERSHED INCHES; 56 CFS-HRS; 4.6 ACRE-FEET.

OPERATION ADDHYD XSECTION 26

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.13 79.3 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.17 WATERSHED INCHES; 95 CFS-HRS; 7.8 ACRE-FEET.

OPERATION REACH XSECTION 27

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.27 70.2 318.49

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.17 WATERSHED INCHES; 95 CFS-HRS; 7.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 28

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.10 34.3 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.91 WATERSHED INCHES; 35 CFS-HRS; 2.9 ACRE-FEET.

OPERATION ADDHYD XSECTION 29

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.17 233.2 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.40 WATERSHED INCHES; 429 CFS-HRS; 35.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 30

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.19 298.1 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.36 WATERSHED INCHES; 524 CFS-HRS; 43.3 ACRE-FEET.

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 8

OPERATION RUNOFF XSECTION 31

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.06 79.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.55 WATERSHED INCHES; 69 CFS-HRS; 5.7 ACRE-FEET.

OPERATION REACH XSECTION 32

PEAK TIME(HRS) 12.16 PEAK DISCHARGE(CFS) 70.2 PEAK ELEVATION(FEET) 312.29

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.55 WATERSHED INCHES; 69 CFS-HRS; 5.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 33

PEAK TIME(HRS) 12.00 PEAK DISCHARGE(CFS) 17.6 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.65 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 32, TRUNCATED AT 400 POINTS WITH .28 AC-FT (.05 WATERSHED INCHES) FLOOD STORAGE REMAINING IN RESERVOIR AT ELEV. 376.89. ***

OPERATION RESVOR STRUCTURE 32

*** MESSAGE - NO SIGNIFICANT PEAK FOUND, MAX. DISCHARGE 1 CFS, AT STRUCTURE 32 ***

PEAK TIME(HRS) 13.26 PEAK DISCHARGE(CFS) 1.0 PEAK ELEVATION(FEET) 379.31

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.03 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

*** WARNING - XSECTION 34, INSUFFICIENT LOW FLOW RATING, PEAK FLOW LESS THAN 2ND TABLE VALUE. THIS REACH ROUTING MAY BE INCORRECT, UNLESS NEW RATING TABLE VALUES ARE INSERTED. ***

OPERATION REACH XSECTION 34

1

TR20 ----- SCS - Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST 15:33:07 PASS 1 JOB NO. 1 PAGE 9

*** MESSAGE - NO SIGNIFICANT PEAK FOUND, MAX. DISCHARGE 1 CFS, AT XSECTION 34 ***

PEAK TIME(HRS) 13.38 PEAK DISCHARGE(CFS) 1.0 PEAK ELEVATION(FEET) 338.02

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.02 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

OPERATION RUNOFF XSECTION 35

PEAK TIME(HRS) 12.03 PEAK DISCHARGE(CFS) 53.3 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.65 WATERSHED INCHES; 47 CFS-HRS; 3.9 ACRE-FEET.

CWP2YR.OUT

OPERATION RESVOR STRUCTURE 33

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.25	20.8	356.21
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
2.10 WATERSHED INCHES;	37 CFS-HRS;	3.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 36

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.26	21.4	(NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
2.08 WATERSHED INCHES;	48 CFS-HRS;	4.0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 34

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.26	21.4	(NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
2.08 WATERSHED INCHES;	48 CFS-HRS;	4.0 ACRE-FEET.

OPERATION REACH XSECTION 37

1

TR20 ----- SCS -
 06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 15:33:07 CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 PASS 1 JOB NO. 1 PAGE 10

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.32	21.4	330.30
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
2.08 WATERSHED INCHES;	48 CFS-HRS;	4.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 38

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.01	49.4	(RUNOFF)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
1.79 WATERSHED INCHES;	38 CFS-HRS;	3.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 39

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.03	52.3	(NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
1.94 WATERSHED INCHES;	86 CFS-HRS;	7.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 40

CWP2YR.OUT

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.11 36.4 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.45 WATERSHED INCHES; 37 CFS-HRS; 3.0 ACRE-FEET.

OPERATION ADDHYD XSECTION 41

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.18 331.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.36 WATERSHED INCHES; 561 CFS-HRS; 46.3 ACRE-FEET.

OPERATION ADDHYD XSECTION 42

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.17 401.6 (NULL)

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 15:33:07 PASS 1 JOB NO. 1 PAGE 11

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.38 WATERSHED INCHES; 630 CFS-HRS; 52.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 43

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.16 440.3 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.43 WATERSHED INCHES; 714 CFS-HRS; 59.0 ACRE-FEET.

OPERATION REACH XSECTION 44

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.31 400.4 290.24

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.42 WATERSHED INCHES; 714 CFS-HRS; 59.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 45

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.14 32.2 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.16 WATERSHED INCHES; 36 CFS-HRS; 2.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 46

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.17 35.1 (RUNOFF)

CWP2YR.OUT

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.03 WATERSHED INCHES; 42 CFS-HRS; 3.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 47

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.16 67.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.08 WATERSHED INCHES; 77 CFS-HRS; 6.4 ACRE-FEET.

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 12

OPERATION RUNOFF XSECTION 48

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.05 47.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.32 WATERSHED INCHES; 40 CFS-HRS; 3.3 ACRE-FEET.

OPERATION ADDHYD XSECTION 49

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.29 416.7 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.42 WATERSHED INCHES; 754 CFS-HRS; 62.3 ACRE-FEET.

OPERATION ADDHYD XSECTION 50

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.27 473.5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.38 WATERSHED INCHES; 831 CFS-HRS; 68.7 ACRE-FEET.

OPERATION REACH XSECTION 51

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.40 449.3 284.64

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.38 WATERSHED INCHES; 831 CFS-HRS; 68.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 52

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.06 1.2 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.29 WATERSHED INCHES; 2 CFS-HRS; .1 ACRE-FEET.

CWP2YR.OUT

*** WARNING - XSECTION 53, INSUFFICIENT LOW FLOW RATING, PEAK FLOW LESS THAN 2ND TABLE VALUE. THIS REACH ROUTING MAY BE INCORRECT, UNLESS NEW RATING TABLE VALUES ARE INSERTED. ***

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 13

OPERATION REACH XSECTION 53

*** MESSAGE - NO SIGNIFICANT PEAK FOUND, MAX. DISCHARGE 1 CFS, ***
AT XSECTION 53

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.12	.9	288.05

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.28 WATERSHED INCHES; 2 CFS-HRS; .1 ACRE-FEET.

OPERATION RUNOFF XSECTION 54

*** MESSAGE - NO SIGNIFICANT PEAK FOUND, MAX. DISCHARGE 1 CFS, ***
AT XSECTION 54

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.12	.6	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.25 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION RUNOFF XSECTION 55

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.05	25.4	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.05 WATERSHED INCHES; 22 CFS-HRS; 1.8 ACRE-FEET.

OPERATION ADDHYD XSECTION 56

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.39	455.9	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.37 WATERSHED INCHES; 852 CFS-HRS; 70.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 57

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.14	1.5	(NULL)

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TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 14

CWP2YR.OUT

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.27 WATERSHED INCHES; 3 CFS-HRS; .2 ACRE-FEET.

OPERATION ADDHYD XSECTION 58

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.39 456.8 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.35 WATERSHED INCHES; 855 CFS-HRS; 70.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 59

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.06 18.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.98 WATERSHED INCHES; 17 CFS-HRS; 1.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 60

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.39 462.8 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.34 WATERSHED INCHES; 872 CFS-HRS; 72.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 61

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.08 11.3 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.97 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

OPERATION ADDHYD XSECTION 62

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.39 466.7 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.33 WATERSHED INCHES; 883 CFS-HRS; 73.0 ACRE-FEET.

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 15

OPERATION REACH XSECTION 63

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.56 433.1 249.58

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
Page 22

CWP2YR.OUT
1.33 WATERSHED INCHES; 882 CFS-HRS; 72.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 64

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.19 11.9 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.01 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION RESVOR STRUCTURE 61

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.56 5.3 333.13

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.01 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION REACH XSECTION 65

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.68 5.2 300.49

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.01 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION RUNOFF XSECTION 66

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.04 47.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.32 WATERSHED INCHES; 39 CFS-HRS; 3.2 ACRE-FEET.

*** WARNING - STRUCTURE 62, MAIN TIME INCREMENT EXCEEDS MAXIMUM ALLOWABLE
TIME INCREMENT OF .043 HOURS. ***

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 16

*** WARNING - STRUCTURE 62, RESERVOIR ROUTING HAS NEGATIVE DISCHARGES
FIRST NEGATIVE VALUE IS 0 CFS. ***

OPERATION RESVOR STRUCTURE 62

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.29 16.4 292.72

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.32 WATERSHED INCHES; 39 CFS-HRS; 3.2 ACRE-FEET.

OPERATION ADDHYD XSECTION 67

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)

12.45 CWP2YR.OUT 21.2 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.46 WATERSHED INCHES; 53 CFS-HRS; 4.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 68
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.04 84.0 (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.37 WATERSHED INCHES; 69 CFS-HRS; 5.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 69
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.04 100.7 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.40 WATERSHED INCHES; 122 CFS-HRS; 10.1 ACRE-FEET.

OPERATION REACH XSECTION 70
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.25 76.5 248.56
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.40 WATERSHED INCHES; 122 CFS-HRS; 10.1 ACRE-FEET.

1
 TR20 ----- SCS -
 Ellicott City Flood study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 15:33:07 PASS 1 JOB NO. 1 PAGE 17

OPERATION RUNOFF XSECTION 71
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 11.96 20.3 (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.82 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION RESVOR STRUCTURE 63
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.22 3.9 264.92
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.82 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION REACH XSECTION 72
 PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.42 3.9 247.57
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)

CWP2YR.OUT
1.82 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION RUNOFF XSECTION 73

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.05 48.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.63 WATERSHED INCHES; 44 CFS-HRS; 3.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 74

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.55 442.2 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.26 WATERSHED INCHES; 927 CFS-HRS; 76.6 ACRE-FEET.

OPERATION ADDHYD XSECTION 75

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
15:33:07 PASS 1 JOB NO. 1 PAGE 18

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.25 80.3 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.44 WATERSHED INCHES; 136 CFS-HRS; 11.2 ACRE-FEET.

OPERATION ADDHYD XSECTION 76

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.53 496.7 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.28 WATERSHED INCHES; 1063 CFS-HRS; 87.8 ACRE-FEET.

OPERATION REACH XSECTION 77

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.60 495.8 229.31

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.28 WATERSHED INCHES; 1063 CFS-HRS; 87.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 78

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.03 42.3 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.03 WATERSHED INCHES; 34 CFS-HRS; 2.8 ACRE-FEET.

OPERATION ADDHYD XSECTION 79

PEAK TIME(HRS) 12.59 PEAK DISCHARGE(CFS) 501.6 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.27 WATERSHED INCHES; 1097 CFS-HRS; 90.6 ACRE-FEET.

*** WARNING - ROUTING COEFFICIENT (C) EQUALS 1.0, CONSIDER SMALLER MAIN TIME INCREMENT FOR XSECTION 80. ***

OPERATION REACH XSECTION 80

1 TR20 ----- SCS -
 Ellicott City Flood study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 15:33:07 PASS 1 JOB NO. 1 PAGE 19

PEAK TIME(HRS) 12.59 PEAK DISCHARGE(CFS) 501.6 PEAK ELEVATION(FEET) 213.49

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.27 WATERSHED INCHES; 1097 CFS-HRS; 90.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 81

PEAK TIME(HRS) 12.00 PEAK DISCHARGE(CFS) 59.9 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.34 WATERSHED INCHES; 44 CFS-HRS; 3.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 82

PEAK TIME(HRS) 12.59 PEAK DISCHARGE(CFS) 508.3 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.28 WATERSHED INCHES; 1141 CFS-HRS; 94.3 ACRE-FEET.

OPERATION RUNOFF XSECTION 83

PEAK TIME(HRS) 12.03 PEAK DISCHARGE(CFS) 21.0 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .85 WATERSHED INCHES; 17 CFS-HRS; 1.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 84

PEAK TIME(HRS) 12.59 PEAK DISCHARGE(CFS) 511.3 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.27 WATERSHED INCHES; 1158 CFS-HRS; 95.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 85

PEAK TIME(HRS) 12.10 PEAK DISCHARGE(CFS) 63.5 PEAK ELEVATION(FEET) (RUNOFF)

1
 TR20 ----- SCS -
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 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 15:33:07 PASS 1 JOB NO. 1 PAGE 20

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .86 WATERSHED INCHES; 66 CFS-HRS; 5.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 86

PEAK TIME(HRS) 12.58 PEAK DISCHARGE(CFS) 527.0 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.24 WATERSHED INCHES; 1224 CFS-HRS; 101.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 87

PEAK TIME(HRS) 11.97 PEAK DISCHARGE(CFS) 28.3 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.98 WATERSHED INCHES; 20 CFS-HRS; 1.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 88

PEAK TIME(HRS) 12.57 PEAK DISCHARGE(CFS) 529.7 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.24 WATERSHED INCHES; 1244 CFS-HRS; 102.8 ACRE-FEET.

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

1
 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 15:33:07 SUMMARY, JOB NO. 1 PAGE 21

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 3.21 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2

MAIN TIME INCREMENT .060 HOURS

ALTERNATE	1	STORM	2					
XSECTION	7	ADDHYD	.17	1.29	---	12.29	109	641.2
XSECTION	22	ADDHYD	.41	1.48	---	12.04	244	595.1
XSECTION	43	ADDHYD	.78	1.43	---	12.16	440	564.1
XSECTION	50	ADDHYD	.93	1.38	---	12.27	473	508.6
XSECTION	62	ADDHYD	1.03	1.33	---	12.39	467	453.4
XSECTION	76	ADDHYD	1.28	1.28	---	12.53	497	388.3
XSECTION	88	ADDHYD	1.55	1.24	---	12.57	530	341.9

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 15:33:07 SUMMARY, JOB NO. 1 PAGE 22

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION							ROUTING PARAMETERS				
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT-KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			

BASEFLOW IS .0 CFS

ALTERNATE	1	STORM	2							
2	1170	28	12.1	26	12.2	1.57	1.36	.038	.949	.59
5	797	74	12.2	70	12.3	2.16	1.22	.025	.950	.80?
8	1221	109	12.3	107	12.4	1.17	1.47	.013	.983	.79?
16	920	130	12.4	130	12.4	3.61	1.49	.001	1.000	1.00?
23	1379	242	12.1	202	12.2	.97	1.19	.063	.837	.36
27	1021	79	12.1	70	12.2	1.10	1.17	.079	.881	.41
32	1603	80	12.1	70	12.2	1.29	1.33	.076	.876	.48
34	583	1	13.3	1	13.4	1.14	1.62	.001	.999	.49
37	934	21	12.2	21	12.3	2.31	1.55	.003	.996	.95?
44	1428	439	12.2	400	12.3	.42	1.36	.040	.911	.42
51	1275	471	12.2	448	12.4	.57	1.32	.030	.952	.48
53	652	1	12.1	1	12.1	2.05	1.40	.027	.795	.58
63	1959	465	12.4	433	12.5	.75	1.28	.047	.930	.36
65	1283	5	12.5	5	12.7	2.47	1.43	.011	.995	.54
70	2166	100	12.1	76	12.2	1.67	1.16	.123	.764	.29
72	1081	4	12.2	4	12.4	1.50	1.61	.005	.995	.51
77	884	496	12.5	496	12.6	1.93	1.22	.010	.999	.88?
80	1296	501	12.6	501	12.6	1.60	1.44	.003	1.000	1.00?

1

TR20 ----- SCS -
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 06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST
 Page 28

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES
QUESTION MARK (?) AFTER: OUTFLOW PEAK - RISING TRUNCATED HYDROGRAPH.

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 2
XSECTION 7	.17	

ALTERNATE 1		109
XSECTION 22	.41	

ALTERNATE 1		244
XSECTION 43	.78	

ALTERNATE 1		440
XSECTION 50	.93	

ALTERNATE 1		473
XSECTION 62	1.03	

ALTERNATE 1		467
XSECTION 76	1.28	

ALTERNATE 1		497
XSECTION 88	1.55	

ALTERNATE 1		530

1 TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP FACILITY CN REDUCTION INCLUDED- 2YR STORM 2.04TEST

END OF 1 JOBS IN THIS RUN

SCS TR-20, VERSION 2.04TEST
FILES

INPUT = cwp2yr.dat

, GIVEN DATA FILE

1

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	TITLE	Ellicott City Flood Study-	MGMT	STRUCTURES,	NOPLOTS
TITLE	CN	MGMT- CWP SWM Included-	2 yr	Storm- SA3 ONLY	
2	XSECTN	027	1.0	317.00	
8			316.00	0.00	0.00
8			316.50	2.68	2.59
8			317.00	10.37	6.88
8			317.50	24.26	12.84
8			318.00	45.55	20.50
8			318.50	70.64	34.75
8			319.00	137.01	60.50
8			319.25	200.57	76.25
8			319.50	273.06	92.00
8			319.75	353.76	107.75
8			320.00	442.13	123.50
8			320.50	640.03	155.00
8			321.00	863.72	186.50
9	ENDTBL				
2	XSECTN	032	1.0	313.00	
8			310.00	0.00	0.00
8			311.00	12.25	5.50
8			312.00	52.16	16.00
8			312.50	83.38	23.13
8			313.00	123.94	31.50
8			313.25	148.02	36.16
8			313.50	174.79	41.13
8			313.75	204.34	46.41
8			314.00	236.81	52.00
8			314.50	278.65	65.75
8			315.00	353.72	84.00
9	ENDTBL				
2	XSECTN	034	1.0	338.50	
8			338.00	0.00	0.00
8			338.10	4.87	2.46
8			338.25	22.73	6.38
8			338.50	73.99	13.53
8			338.75	149.34	21.45
8			339.00	247.95	30.13
8			339.50	515.65	49.78
9	ENDTBL				
2	XSECTN	037	1.0	331.00	
8			330.00	0.00	0.00
8			330.25	14.29	3.25
8			330.50	46.85	7.00
8			330.75	95.34	11.25
8			331.00	159.64	16.00
8			331.25	240.13	21.25
8			331.50	337.44	27.00
8			331.75	452.26	33.25
8			332.00	585.36	40.00

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8 332.50 875.33 55.81

		SA32YR.OUT		
8		333.00	1272.05	75.25
9	ENDTBL			
3	STRUCT	31		
8		356.38	0.0	0.00
8		357.26	10.90	0.02
8		357.50	12.30	0.03
8		358.00	14.70	0.05
8		359.00	18.70	0.10
8		360.00	22.00	0.16
8		361.00	24.90	0.25
8		361.50	26.20	0.30
8		362.00	27.50	0.36
8		362.50	28.70	0.43
8		362.90	29.60	0.49
8		363.50	51.30	0.60
8		363.75	65.70	0.67
8		364.00	82.60	0.72
8		364.20	83.30	0.83
8		364.60	100.00	0.88
8		366.80	260.00	1.47
8		366.92	340.00	1.49
8		366.98	380.00	1.50
9	ENDTBL			
3	STRUCT	32		
8		375.40	0.00	0.00
8		379.36	1.00	0.74
8		380.00	5.00	0.89
8		380.20	10.00	0.94
8		380.33	15.00	0.98
8		380.45	20.00	1.01
8		380.55	25.00	1.04
8		380.65	30.00	1.06
8		381.19	40.00	1.21
8		381.78	44.00	1.39
8		382.59	66.00	1.66
8		382.79	88.00	1.75
8		382.89	110.00	1.79
8		382.97	132.00	1.83
9	ENDTBL			
3	STRUCT	33		
8		350.00	0.00	0.00
8		354.30	1.00	1.08
8		354.47	2.00	1.15
8		354.87	5.00	1.30
8		355.38	10.00	1.50
8		356.18	20.00	1.84
8		356.88	40.00	2.15
8		357.27	60.00	2.33
8		357.46	80.00	2.42

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*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		358.08	100.00	2.73
8		358.14	120.00	2.76
8		358.19	140.00	2.78
8		358.25	171.00	2.81
8		358.27	180.00	2.82
9	ENDTBL			
3	STRUCT	34		
9	ENDTBL			

```

                                SA32YR.OUT
6  RUNOFF 1 024          1          0.0505      76.581      0.3401      DA1
6  RESVOR 2          31 1 2          0.0748      75.950      0.3581      SWMF3
6  RUNOFF 1 025          3          0.0748      75.950      0.3581      DA2
6  ADDHYD 4 026        2 3 4          0.0748      75.950      0.3581      DA1+2
6  REACH 3 027        4 1          1021.0      71.428      0.3231      DA3
6  RUNOFF 1 028          2          0.0599      71.428      0.3231      DA12+3
6  ADDHYD 4 030        1 2 5          0.0692      82.079      0.2761      DA4**
6  RUNOFF 1 031          1          0.0692      82.079      0.2761      DA4**
6  REACH 3 032        1 6          1603.0      95.000      0.1921      DA5
6  RUNOFF 1 033          2          0.0084      95.000      0.1921      DA5
6  RESVOR 2          32 2 3          583.0      94.963      0.2481      SWMF11
6  REACH 3 034        3 7          583.0      94.963      0.2481      DA6
6  RUNOFF 1 035          1          0.0275      94.963      0.2481      SWMF8
6  RESVOR 2          33 1 2          0.0275      94.963      0.2481      DA5+6
6  ADDHYD 4 036        7 2 1          0.0275      94.963      0.2481      HWYSTOR3
6  RESVOR 2          34 1 2          934.0      85.339      0.1901      DA7**
6  REACH 3 037        2 4          934.0      85.339      0.1901      DA56+7
6  RUNOFF 1 038          1          0.0328      85.339      0.1901      DA8
6  ADDHYD 4 039        4 1 3          0.0393      80.617      0.3671      DA3+8
6  RUNOFF 1 040          2          0.0393      80.617      0.3671      DA4+8
6  ADDHYD 4 041        5 2 1          0.0393      80.617      0.3671      DA4+8
6  ADDHYD 4 042        6 1 2          0.0393      80.617      0.3671      1 DA7+8
6  ADDHYD 4 043        3 2 1          0.0393      80.617      0.3671      1 DA7+8
  ENDDATA
7  INCREM 6          .06
7  COMPUT 7 024      043          0.0        3.21      1.02 2 1 2
  ENDCMP 1
  ENDJOB 2

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*****END OF 80-80 LIST*****

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TR20 ----- SCS -
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06/18/**      CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY      2.04TEST
15:58:00      PASS 1 JOB NO. 1      PAGE 1

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EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .060 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 24 TO XSECTION 43
 STARTING TIME = .00 RAIN DEPTH = 3.21 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .060 HOURS
 ALTERNATE NO. = 1 STORM NO. = 2 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 24

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.10	39.1	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.19 WATERSHED INCHES; 39 CFS-HRS; 3.2 ACRE-FEET.

*** WARNING - STRUCTURE 31, MAIN TIME INCREMENT EXCEEDS MAXIMUM ALLOWABLE
 TIME INCREMENT OF .043 HOURS. ***

*** WARNING - STRUCTURE 31, RESERVOIR ROUTING HAS NEGATIVE DISCHARGES
 FIRST NEGATIVE VALUE IS 0 CFS. ***

OPERATION RESVOR STRUCTURE 31

SA32YR.OUT

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.26 26.8 361.75

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.19 WATERSHED INCHES; 39 CFS-HRS; 3.2 ACRE-FEET.

OPERATION RUNOFF XSECTION 25

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.11 54.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.16 WATERSHED INCHES; 56 CFS-HRS; 4.6 ACRE-FEET.

OPERATION ADDHYD XSECTION 26

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.13 79.3 (NULL)

1

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 06/18/** CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
 15:58:00 PASS 1 JOB NO. 1 PAGE 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.17 WATERSHED INCHES; 95 CFS-HRS; 7.8 ACRE-FEET.

OPERATION REACH XSECTION 27

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.27 70.2 318.49

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.17 WATERSHED INCHES; 95 CFS-HRS; 7.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 28

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.10 34.3 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .91 WATERSHED INCHES; 35 CFS-HRS; 2.9 ACRE-FEET.

OPERATION ADDHYD XSECTION 30

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.20 95.8 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.08 WATERSHED INCHES; 130 CFS-HRS; 10.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 31

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.06 79.8 (RUNOFF)

SA32YR.OUT

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.55 WATERSHED INCHES; 69 CFS-HRS; 5.7 ACRE-FEET.

OPERATION REACH XSECTION 32

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.16 70.2 312.29

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.55 WATERSHED INCHES; 69 CFS-HRS; 5.7 ACRE-FEET.

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
15:58:00 PASS 1 JOB NO. 1 PAGE 3

OPERATION RUNOFF XSECTION 33

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.00 17.6 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.65 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 32, TRUNCATED AT 400 POINTS
WITH .28 AC-FT (.05 WATERSHED INCHES) FLOOD STORAGE
REMAINING IN RESERVOIR AT ELEV. 376.89. ***

OPERATION RESVOR STRUCTURE 32

*** MESSAGE - NO SIGNIFICANT PEAK FOUND, MAX. DISCHARGE 1 CFS,
AT STRUCTURE 32 ***

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
13.26 1.0 379.31

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.03 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

*** WARNING - XSECTION 34, INSUFFICIENT LOW FLOW RATING, PEAK FLOW LESS THAN
2ND TABLE VALUE. THIS REACH ROUTING MAY BE INCORRECT,
UNLESS NEW RATING TABLE VALUES ARE INSERTED. ***

OPERATION REACH XSECTION 34

*** MESSAGE - NO SIGNIFICANT PEAK FOUND, MAX. DISCHARGE 1 CFS,
AT XSECTION 34 ***

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
13.38 1.0 338.02

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.02 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

OPERATION RUNOFF XSECTION 35

SA32YR.OUT
PEAK TIME(HRS) 12.03 PEAK DISCHARGE(CFS) 53.3 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.65 WATERSHED INCHES; 47 CFS-HRS; 3.9 ACRE-FEET.

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
15:58:00 PASS 1 JOB NO. 1 PAGE 4

OPERATION RESVOR STRUCTURE 33

PEAK TIME(HRS) 12.25 PEAK DISCHARGE(CFS) 20.8 PEAK ELEVATION(FEET) 356.21

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.10 WATERSHED INCHES; 37 CFS-HRS; 3.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 36

PEAK TIME(HRS) 12.26 PEAK DISCHARGE(CFS) 21.4 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.08 WATERSHED INCHES; 48 CFS-HRS; 4.0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 34

PEAK TIME(HRS) 12.26 PEAK DISCHARGE(CFS) 21.4 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.08 WATERSHED INCHES; 48 CFS-HRS; 4.0 ACRE-FEET.

OPERATION REACH XSECTION 37

PEAK TIME(HRS) 12.32 PEAK DISCHARGE(CFS) 21.4 PEAK ELEVATION(FEET) 330.30

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.08 WATERSHED INCHES; 48 CFS-HRS; 4.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 38

PEAK TIME(HRS) 12.01 PEAK DISCHARGE(CFS) 49.4 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.79 WATERSHED INCHES; 38 CFS-HRS; 3.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 39

1

TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
Page 6

PEAK TIME(HRS) 12.03 PEAK DISCHARGE(CFS) 52.3 PEAK ELEVATION(FEET) (NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.94 WATERSHED INCHES; 86 CFS-HRS; 7.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 40

PEAK TIME(HRS) 12.11 PEAK DISCHARGE(CFS) 36.4 PEAK ELEVATION(FEET) (RUNOFF)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.45 WATERSHED INCHES; 37 CFS-HRS; 3.0 ACRE-FEET.

OPERATION ADDHYD XSECTION 41

PEAK TIME(HRS) 12.17 PEAK DISCHARGE(CFS) 129.3 PEAK ELEVATION(FEET) (NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.15 WATERSHED INCHES; 166 CFS-HRS; 13.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 42

PEAK TIME(HRS) 12.17 PEAK DISCHARGE(CFS) 199.5 PEAK ELEVATION(FEET) (NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.24 WATERSHED INCHES; 236 CFS-HRS; 19.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 43

PEAK TIME(HRS) 12.15 PEAK DISCHARGE(CFS) 240.3 PEAK ELEVATION(FEET) (NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.38 WATERSHED INCHES; 322 CFS-HRS; 26.6 ACRE-FEET.

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

1 TR20 ----- SCS -
06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
15:58:00 CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
PASS 2 JOB NO. 1 PAGE 6

1 TR20 ----- SCS -
06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
15:58:00 CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
SUMMARY, JOB NO. 1 PAGE 7

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.

SA32YR.OUT

A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 3.21 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .060 HOURS

ALTERNATE 1 STORM 2

XSECTION	43	ADDHYD	.36	1.38	---	12.15	240	666.7
----------	----	--------	-----	------	-----	-------	-----	-------

1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
 15:58:00 SUMMARY, JOB NO. 1 PAGE 8

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A EQ.	LENGTH	PEAK	ATT-	
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)	FACTOR (k*)	RATIO Q/I (Q*)	KIN COEFF (C)

BASEFLOW IS .0 CFS

ALTERNATE 1 STORM 2

27	1021		79	12.1	70	12.2	1.10	1.17	.079	.881	.41
32	1603		80	12.1	70	12.2	1.29	1.33	.076	.876	.48
34	583		1	13.3	1	13.4	1.14	1.62	.001	.999	.49
37	934		21	12.2	21	12.3	2.31	1.55	.003	.996	.95?

1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST
 15:58:00 SUMMARY, JOB NO. 1 PAGE 9

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - RISING TRUNCATED HYDROGRAPH.

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....
------------------------------	-----------------------------	--------------------

XSECTION	43	.36
----------	----	-----

SA32YR.OUT

1 ALTERNATE 1 240
TR20 ----- SCS -
06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
CN MGMT- CWP SWM Included- 2 yr Storm- SA3 ONLY 2.04TEST

END OF 1 JOBS IN THIS RUN

SCS TR-20, VERSION 2.04TEST
FILES

INPUT = sa32yr.dat , GIVEN DATA FILE
OUTPUT = sa32yr.OUT , DATED 06/18/**,15:58:00

FILES GENERATED - DATED 06/18/**,15:58:00

NONE!

TOTAL NUMBER OF WARNINGS = 3, MESSAGES = 3

*** TR-20 RUN COMPLETED ***

SA350YR.OUT

1

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20				NOPLOTS
TITLE	Ellicott City Flood Study-MGMT STRUCTURES,			
TITLE	CN MGMT-	CWP SWM Included-	50 yr Storm-	SA3 ONLY
2	XSECTN	027	1.0	317.00
8			316.00	0.00
8			316.50	2.59
8			317.00	6.88
8			317.50	12.84
8			318.00	20.50
8			318.50	34.75
8			319.00	60.50
8			319.25	76.25
8			319.50	92.00
8			319.75	107.75
8			320.00	123.50
8			320.50	155.00
8			321.00	186.50
9	ENDTBL			
2	XSECTN	032	1.0	313.00
8			310.00	0.00
8			311.00	5.50
8			312.00	16.00
8			312.50	23.13
8			313.00	31.50
8			313.25	36.16
8			313.50	41.13
8			313.75	46.41
8			314.00	52.00
8			314.50	65.75
8			315.00	84.00
9	ENDTBL			
2	XSECTN	034	1.0	338.50
8			338.00	0.00
8			338.10	2.46
8			338.25	6.38
8			338.50	13.53
8			338.75	21.45
8			339.00	30.13
8			339.50	49.78
9	ENDTBL			
2	XSECTN	037	1.0	331.00
8			330.00	0.00
8			330.25	3.25
8			330.50	7.00
8			330.75	11.25
8			331.00	16.00
8			331.25	21.25
8			331.50	27.00
8			331.75	33.25
8			332.00	40.00

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			332.50	875.33	55.81
---	--	--	--------	--------	-------

		SA350YR.OUT		
8		333.00	1272.05	75.25
9	ENDTBL			
3	STRUCT	31		
8		356.38	0.0	0.00
8		357.26	10.90	0.02
8		357.50	12.30	0.03
8		358.00	14.70	0.05
8		359.00	18.70	0.10
8		360.00	22.00	0.16
8		361.00	24.90	0.25
8		361.50	26.20	0.30
8		362.00	27.50	0.36
8		362.50	28.70	0.43
8		362.90	29.60	0.49
8		363.50	51.30	0.60
8		363.75	65.70	0.67
8		364.00	82.60	0.72
8		364.20	83.30	0.83
8		364.60	100.00	0.88
8		366.80	260.00	1.47
8		366.92	340.00	1.49
8		366.98	380.00	1.50
9	ENDTBL			
3	STRUCT	32		
8		375.40	0.00	0.00
8		379.36	1.00	0.74
8		380.00	5.00	0.89
8		380.20	10.00	0.94
8		380.33	15.00	0.98
8		380.45	20.00	1.01
8		380.55	25.00	1.04
8		380.65	30.00	1.06
8		381.19	40.00	1.21
8		381.78	44.00	1.39
8		382.59	66.00	1.66
8		382.79	88.00	1.75
8		382.89	110.00	1.79
8		382.97	132.00	1.83
9	ENDTBL			
3	STRUCT	33		
8		350.00	0.00	0.00
8		354.30	1.00	1.08
8		354.47	2.00	1.15
8		354.87	5.00	1.30
8		355.38	10.00	1.50
8		356.18	20.00	1.84
8		356.88	40.00	2.15
8		357.27	60.00	2.33
8		357.46	80.00	2.42

1

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8		358.08	100.00	2.73
8		358.14	120.00	2.76
8		358.19	140.00	2.78
8		358.25	171.00	2.81
8		358.27	180.00	2.82
9	ENDTBL			
3	STRUCT	34		
9	ENDTBL			

SA350YR.OUT

6	RUNOFF	1	024		1	0.0505	76.581	0.3401		DA1
6	RESVOR	2		31	1			1		SWMF3
6	RUNOFF	1	025		3	0.0748	75.950	0.3581		DA2
6	ADDHYD	4	026	2	3			1		DA1+2
6	REACH	3	027	4	1	1021.0		1		
6	RUNOFF	1	028		2	0.0599	71.428	0.3231		DA3
6	ADDHYD	4	030	1	2			1		DA12+3
6	RUNOFF	1	031		1	0.0692	82.178	0.2761		DA4
6	REACH	3	032	1	6	1603.0		1		
6	RUNOFF	1	033		2	0.0084	95.000	0.1921		DA5
6	RESVOR	2		32	2			1		SWMF11
6	REACH	3	034	3	7	583.0		1		
6	RUNOFF	1	035		1	0.0275	94.963	0.2481		DA6
6	RESVOR	2		33	1			1		SWMF8
6	ADDHYD	4	036	7	2			1		DA5+6
6	RESVOR	2		34	1			1		HWYSTOR3
6	REACH	3	037	2	4	934.0		1		
6	RUNOFF	1	038		1	0.0328	85.485	0.1901		DA7
6	ADDHYD	4	039	4	1			1		DA56+7
6	RUNOFF	1	040		2	0.0393	80.617	0.3671		DA8
6	ADDHYD	4	041	5	2			1		DA3+8
6	ADDHYD	4	042	6	1			1		DA4+8
6	ADDHYD	4	043	3	2			1		1 DA7+8
ENDATA										
7	INCREM	6				.06				
7	COMPUT	7	024		043	0.0	7.28	1.02	2	1 50
ENDCMP 1										
ENDJOB 2										

*****END OF 80-80 LIST*****

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 50 yr Storm- SA3 ONLY 2.04TEST
 15:58:42 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .060 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 24 TO XSECTION 43
 STARTING TIME = .00 RAIN DEPTH = 7.28 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .060 HOURS
 ALTERNATE NO. = 1 STORM NO. =50 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 24

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.09	154.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.57 WATERSHED INCHES; 149 CFS-HRS; 12.3 ACRE-FEET.

*** WARNING - STRUCTURE 31, MAIN TIME INCREMENT EXCEEDS MAXIMUM ALLOWABLE
 TIME INCREMENT OF .043 HOURS. ***

*** WARNING - STRUCTURE 31, RESERVOIR ROUTING HAS NEGATIVE DISCHARGES
 FIRST NEGATIVE VALUE IS 0 CFS. ***

OPERATION RESVOR STRUCTURE 31

SA350YR.OUT

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.13 149.0 365.27

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.56 WATERSHED INCHES; 149 CFS-HRS; 12.3 ACRE-FEET.

OPERATION RUNOFF XSECTION 25

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.10 220.0 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.50 WATERSHED INCHES; 217 CFS-HRS; 17.9 ACRE-FEET.

OPERATION ADDHYD XSECTION 26

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.11 367.2 (NULL)

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 50 yr Storm- SA3 ONLY 2.04TEST
 15:58:42 PASS 1 JOB NO. 1 PAGE 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.52 WATERSHED INCHES; 366 CFS-HRS; 30.2 ACRE-FEET.

OPERATION REACH XSECTION 27

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.20 352.5 319.75

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.53 WATERSHED INCHES; 366 CFS-HRS; 30.3 ACRE-FEET.

OPERATION RUNOFF XSECTION 28

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.08 165.3 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.00 WATERSHED INCHES; 155 CFS-HRS; 12.8 ACRE-FEET.

OPERATION ADDHYD XSECTION 30

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.17 488.4 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.36 WATERSHED INCHES; 521 CFS-HRS; 43.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 31

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.05 263.0 (RUNOFF)

SA350YR.OUT

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.20 WATERSHED INCHES; 232 CFS-HRS; 19.2 ACRE-FEET.

OPERATION REACH XSECTION 32

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.14 242.3 314.07

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.19 WATERSHED INCHES; 232 CFS-HRS; 19.2 ACRE-FEET.

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TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 50 yr storm- SA3 ONLY 2.04TEST
15:58:42 PASS 1 JOB NO. 1 PAGE 3

OPERATION RUNOFF XSECTION 33

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
11.99 42.3 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
6.68 WATERSHED INCHES; 36 CFS-HRS; 3.0 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 32, TRUNCATED AT 400 POINTS
WITH .48 AC-FT (.09 WATERSHED INCHES) FLOOD STORAGE
REMAINING IN RESERVOIR AT ELEV. 378.00. ***

OPERATION RESVOR STRUCTURE 32

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.09 33.1 380.82

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.60 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

*** WARNING - ROUTING COEFFICIENT (C) EQUALS 1.0,
CONSIDER SMALLER MAIN TIME INCREMENT FOR XSECTION 34. ***

OPERATION REACH XSECTION 34

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.09 33.1 338.30

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.60 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

OPERATION RUNOFF XSECTION 35

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.03 126.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
6.67 WATERSHED INCHES; 118 CFS-HRS; 9.8 ACRE-FEET.

*** MESSAGE - RESERVOIR ROUTING, STRUCTURE 33, TRUNCATED AT 400 POINTS
Page 5

SA350YR.OUT
WITH 1.02 AC-FT (.06 WATERSHED INCHES) FLOOD STORAGE ***
REMAINING IN RESERVOIR AT ELEV. 354.09.

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 50 yr Storm- SA3 ONLY 2.04TEST
15:58:42 PASS 1 JOB NO. 1 PAGE 4

OPERATION RESVOR STRUCTURE 33

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.12 104.8 358.09
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.99 WATERSHED INCHES; 106 CFS-HRS; 8.8 ACRE-FEET.

OPERATION ADDHYD XSECTION 36

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.11 137.5 (NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.90 WATERSHED INCHES; 137 CFS-HRS; 11.3 ACRE-FEET.

OPERATION RESVOR STRUCTURE 34

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.11 137.5 (NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.90 WATERSHED INCHES; 137 CFS-HRS; 11.3 ACRE-FEET.

*** WARNING - ROUTING COEFFICIENT (C) EQUALS 1.0,
CONSIDER SMALLER MAIN TIME INCREMENT FOR XSECTION 37. ***

OPERATION REACH XSECTION 37

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.11 137.5 330.91
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.90 WATERSHED INCHES; 137 CFS-HRS; 11.3 ACRE-FEET.

OPERATION RUNOFF XSECTION 38

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
12.00 148.3 (RUNOFF)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
5.57 WATERSHED INCHES; 118 CFS-HRS; 9.7 ACRE-FEET.

1
TR20 ----- SCS -
Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
06/18/** CN MGMT- CWP SWM Included- 50 yr Storm- SA3 ONLY 2.04TEST
15:58:42 PASS 1 JOB NO. 1 PAGE 5

SA350YR.OUT

OPERATION ADDHYD XSECTION 39

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.03 270.9 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.74 WATERSHED INCHES; 254 CFS-HRS; 21.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 40

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.10 126.4 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.02 WATERSHED INCHES; 127 CFS-HRS; 10.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 41

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.15 607.3 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.47 WATERSHED INCHES; 648 CFS-HRS; 53.6 ACRE-FEET.

OPERATION ADDHYD XSECTION 42

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.15 850.9 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.64 WATERSHED INCHES; 880 CFS-HRS; 72.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 43

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.12 1072.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.85 WATERSHED INCHES; 1135 CFS-HRS; 93.8 ACRE-FEET.

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 50 yr Storm- SA3 ONLY 2.04TEST
 15:58:42 PASS 2 JOB NO. 1 PAGE 6

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

1

TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 50 yr Storm- SA3 ONLY 2.04TEST
 15:58:42 SUMMARY, JOB NO. 1 PAGE 7

SUMMARY TABLE 1

 SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.

SA350YR.OUT

A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 7.28 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .060 HOURS

ALTERNATE 1 STORM 50

XSECTION	43	ADDHYD	.36	4.85	---	12.12	1072	2977.8
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1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 50 yr storm- SA3 ONLY 2.04TEST
 15:58:42 SUMMARY, JOB NO. 1 PAGE 8

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A EQ.		LENGTH	PEAK	ATT-
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)	FACTOR (k*)	RATIO Q/I (Q*)	KIN COEFF (C)

BASEFLOW IS .0 CFS

ALTERNATE 1 STORM 50

27	1021		367	12.1	350	12.2	.37	1.47	.027	.954	.68?
32	1603		262	12.1	240	12.1	1.44	1.29	.059	.916	.57
34	583		33	12.1	33	12.1	1.15	1.61	.006	1.000	1.00?
37	934		137	12.1	137	12.1	2.47	1.51	.004	1.000	1.00?

1 TR20 ----- SCS -
 Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
 06/18/** CN MGMT- CWP SWM Included- 50 yr storm- SA3 ONLY 2.04TEST
 15:58:42 SUMMARY, JOB NO. 1 PAGE 9

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - RISING TRUNCATED HYDROGRAPH.

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....
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50

XSECTION	43	.36
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SA350YR.OUT

1 ALTERNATE 1 1072
TR20 ----- SCS -
06/18/** Ellicott City Flood Study- All Combined SAs- MGMT STRUCTURES, VERSION
CN MGMT- CWP SWM Included- 50 yr Storm- SA3 ONLY 2.04TEST

END OF 1 JOBS IN THIS RUN

SCS TR-20, VERSION 2.04TEST
FILES

INPUT = sa350yr.dat , GIVEN DATA FILE
OUTPUT = sa350yr.OUT , DATED 06/18/**,15:58:42

FILES GENERATED - DATED 06/18/**,15:58:42

NONE!

TOTAL NUMBER OF WARNINGS = 4, MESSAGES = 2

*** TR-20 RUN COMPLETED ***