

URBAN HYDROLOGY FOR SMALL WATERSHEDS (TR-55)
PEAK DISCHARGE WORKSHEET
FOR CHAPTER 4 (APPENDICES D & E)

Project: CRAG OPTICAL By: K. Hill Date: 5-27-92
Checked: _____ Date: _____

Steps Peak Discharge Computations for up to 3 Storms: Type II, Duration 24 hours.

1. Data: Watershed Condition = FUTURE (present or future).
Drainage Area (DA) = 9.0 acres. Ave. Watershed Slope (S) = 0.3 %.

2. Runoff Curve Number (CN)

Hydrologic Soil Group (Appendix B)	Land Use Description (Table 2-2)	CN (Table 2-2) (3)	% or Area (acres) (4)	Product (3)(4) (5)
D	WOODLAND	93	50	4650
D	PASTURE OR RANGE LAND	59	50	2950
Totals =				100 9100

CN (weighted) = $\frac{\text{total col. (5)}}{\text{total col. (4)}} = \frac{9100}{100} = 91$ use CN = 91

3. Rainfall Frequency (F)
Rainfall Depth (P)

1st Storm	2nd Storm	3rd Storm
10	2.5	1.00
5.5	6.2	8.0

 inches

4. Runoff Depth (Q)
Use F, CN, and Table 2-1.

4.47	9.15	6.93
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 inches

5. Basic Peak Discharge (q)
Use S, DA, CN, and Figure D-2.
For graph: ☒ Flat (S = less than 3%)
labeled: ☐ Moderate (S = 3% to 7.9%)
(check one) ☐ Steep (S = 8% & greater)

6. Watershed Slope Factor
Use S, DA, and Table E-1.

1.09

7. Peak Discharge (q_p)
where q_p = Steps #4 x 5 x 6

28.4	32.7	44.0
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 cfs

See Steps 8 to 13 for adjustments that may be applicable.

(TR NOTICE 55-A, September 1981)

TR-55, CHAPTER 4 (APPENDICES D & E), PEAK DISCHARGE WORKSHEET (CONT.)

Steps Peak Discharge Computations with Adjustments

8. Data: Obtain if Adjustments are Applicable

Ponding and Swampy areas (PND) = _____ acres, _____ % of DA
Impervious Area (IPA) = 2.9 acres, 32 % of DA
Total Hydraulic Length (HL) = 820 feet
Hydraulic Length Modified (HLM) = 470 feet, 59 % of HL

Rainfall Frequency (F) from Step 3

1st Storm	2nd Storm	3rd Storm
10	2.5	1.00

 yrs.

Peak Discharge (q_p) from Step 7

28.4	32.7	44.0
X	X	X

 cfs

9. Ponding and Swampy Area Peak Factor
Use PND, F, and Tables E-2, 3 or 4.
Location in: ☐ at Design Point (E-2)
Watershed: ☐ Center or Spreadout (E-3)
(check one) ☐ Upper Reaches (E-4)

10. Watershed Shape Peak Factor
Use HL with Figure E-1 and read:
Equiv. Drainage Area (EDA) = _____ acres.
Use Figure D-2 graph from Step 5, CN, and EDA for:
Equiv. Peak/Inch Runoff (q_p) = _____ cfs/in.
Factor = $\frac{q_p}{q}$ from Step 5 x $\frac{DA}{EDA}$
Factor = [] x [] =

X

11. Impervious Area Peak Factor
Use IPA, CN and Figure 4-1.

1.09

12. Hydraulic Length Modified Peak Factor
Use HLM, CN and Figure 4-2.

1.16

13. Adjusted Peak Discharge (q_p)
 $q_p = q_p$ (from Step 7) x Steps #9 x 10 x 11 x 12

35.3	40.6	54.0
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 cfs

* If the adjustment is not applicable, enter a Factor of 1.0

(TR NOTICE 55-A, September 1981)

URBAN HYDROLOGY FOR SMALL WATERSHEDS (TR-55)
PEAK DISCHARGE WORKSHEET
FOR CHAPTER 4 (APPENDICES D & E)

Project: CRAG OPTICAL By: K. Hill Date: 5-27-92
Checked: _____ Date: _____

Steps Peak Discharge Computations for up to 3 Storms: Type II, Duration 24 hours.

1. Data: Watershed Condition = PRESENT (present or future).
Drainage Area (DA) = 13.3 acres. Ave. Watershed Slope (S) = 0.3 %.

2. Runoff Curve Number (CN)

Hydrologic Soil Group (Appendix B)	Land Use Description (Table 2-2)	CN (Table 2-2) (3)	% or Area (acres) (4)	Product (3)(4) (5)
D	PASTURE OR RANGE LAND	59	89	
Totals =				

CN (weighted) = $\frac{\text{total col. (5)}}{\text{total col. (4)}} = \frac{89}{100} = 89$ use CN = 89

3. Rainfall Frequency (F)
Rainfall Depth (P)

1st Storm	2nd Storm	3rd Storm
10	2.5	1.00
5.5	6.2	8.0

 inches

4. Runoff Depth (Q)
Use F, CN, and Table 2-1.

4.26	4.93	6.69
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 inches

5. Basic Peak Discharge (q)
Use S, DA, CN, and Figure D-2.
For graph: ☒ Flat (S = less than 3%)
labeled: ☐ Moderate (S = 3% to 7.9%)
(check one) ☐ Steep (S = 8% & greater)

6. Watershed Slope Factor
Use S, DA, and Table E-1.

1.09

7. Peak Discharge (q_p)
where q_p = Steps #4 x 5 x 6

35.3	40.8	55.2
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 cfs

See Steps 8 to 13 for adjustments that may be applicable.

(TR NOTICE 55-A, September 1981)

TR-55, CHAPTER 4 (APPENDICES D & E), PEAK DISCHARGE WORKSHEET (CONT.)

Steps Peak Discharge Computations with Adjustments

8. Data: Obtain if Adjustments are Applicable

Ponding and Swampy areas (PND) = _____ acres, _____ % of DA
Impervious Area (IPA) = _____ acres, _____ % of DA
Total Hydraulic Length (HL) = 1120 feet
Hydraulic Length Modified (HLM) = 220 feet, 20 % of HL

Rainfall Frequency (F) from Step 3

1st Storm	2nd Storm	3rd Storm
10	2.5	1.00

 yrs.

Peak Discharge (q_p) from Step 7

35.3	40.8	55.2
X	X	X

 cfs

9. Ponding and Swampy Area Peak Factor
Use PND, F, and Tables E-2, 3 or 4.
Location in: ☐ at Design Point (E-2)
Watershed: ☐ Center or Spreadout (E-3)
(check one) ☐ Upper Reaches (E-4)

10. Watershed Shape Peak Factor
Use HL with Figure E-1 and read:
Equiv. Drainage Area (EDA) = 13 acres.
Use Figure D-2 graph from Step 5, CN, and EDA for:
Equiv. Peak/Inch Runoff (q_p) = _____ cfs/in.
Factor = $\frac{q_p}{q}$ from Step 5 x $\frac{DA}{EDA}$
Factor = [] x [] =

X

11. Impervious Area Peak Factor
Use IPA, CN and Figure 4-1.

1.06

12. Hydraulic Length Modified Peak Factor
Use HLM, CN and Figure 4-2.

1.06

13. Adjusted Peak Discharge (q_p)
 $q_p = q_p$ (from Step 7) x Steps #9 x 10 x 11 x 12

37.4	43.2	58.5
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 cfs

* If the adjustment is not applicable, enter a Factor of 1.0

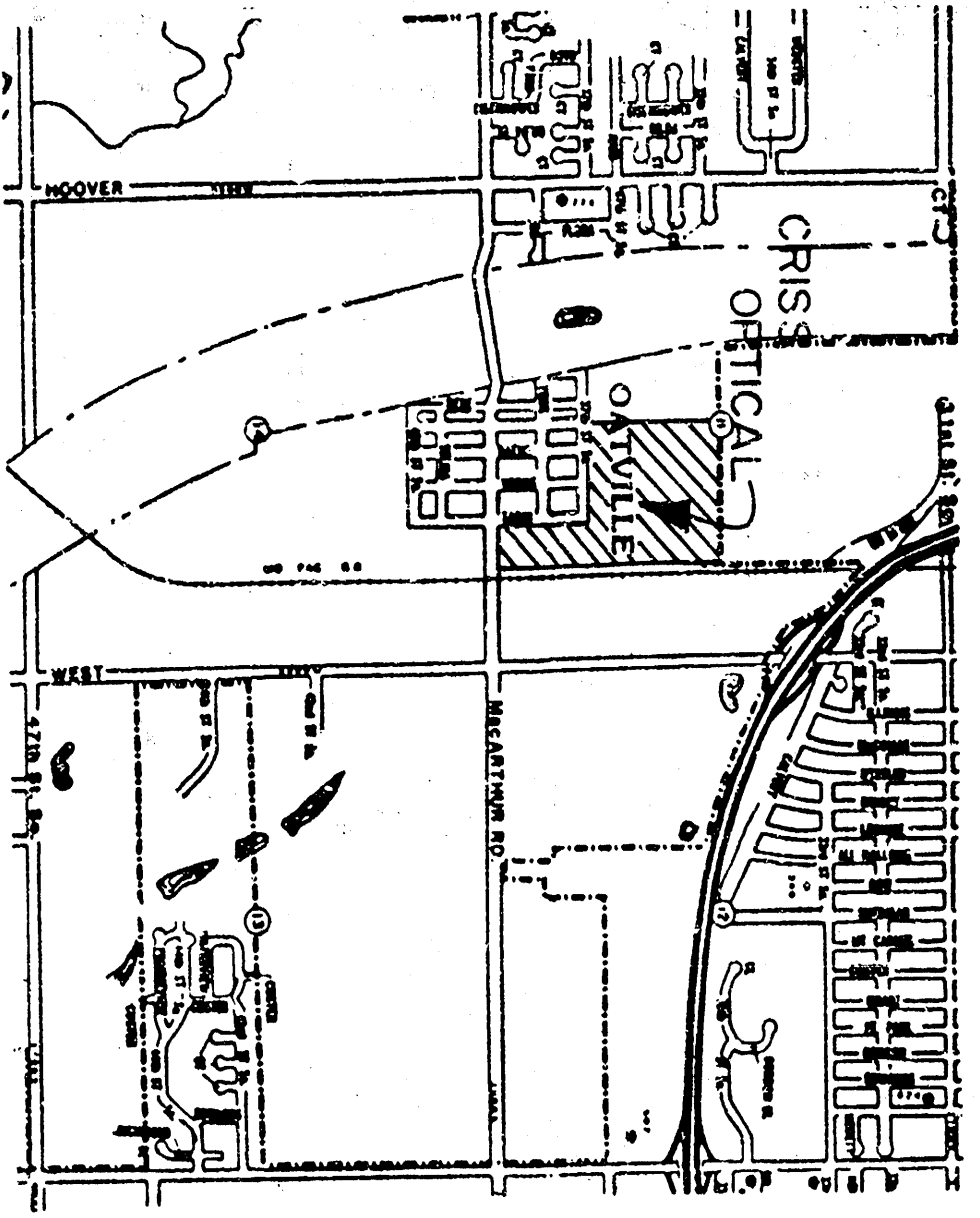
(TR NOTICE 55-A, September 1981)

BIG LAKE ADDITION
ZONING: G MOBILE HOME

ZONING: • E UNPLATTED COMMERCIAL LIGHT

$1'' = 100'$

VICINITY MAP
NO SCALE



B.M. = ELEV. 1289.15 - 60' to N.H.L.P. 90' West
8 4' South of SW cor.
SE 1/4, Sec. 11-28-1W

DRAINAGE PLAN & PRELIMINARY PLAT

DRAINAGE TO MAC ARTHUR	
PRESENT	FUTURE
DA = 13.3 Ac.	DA = 8.0 Ac.
Q ₁₀₀ = 58.5 cfs.	Q ₁₀₀ = 54.6 cfs.

22"x36" CMP @ 2.43% = 29 cfs
HW = 87.6 TW = 84.0

ROYAL INDUSTRIAL ADDITION
ZONING: "E" LIGHT COMMERCIAL

MO.	PAC.	R.R.	R/W
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C R I S S O P T I C A L A D D I T I O N

TO SEDGWICK COUNTY, KANSAS
DATE: MAY 27, 1992

OWNER: CRISS OPTICAL MFG. CO., INC.

ENGINEER: POE & ASSOCIATES OF KANSAS