

Intermediate durations of 10 and 30 minutes for a desired return period:

$$10 \text{ minute rainfall} = 0.590 (15 \text{ minute rainfall}) + 0.410 (5 \text{ minute rainfall})$$

$$30 \text{ minute rainfall} = 0.490 (60 \text{ minute rainfall}) + 0.510 (15 \text{ minute rainfall})$$

Intermediate return periods for a desired duration which is less than 1 hour:

$$5 \text{ year rainfall} = 0.278 (100 \text{ year rainfall}) + 0.674 (2 \text{ year rainfall})$$

$$10 \text{ year rainfall} = 0.449 (100 \text{ year rainfall}) + 0.496 (2 \text{ year rainfall})$$

$$25 \text{ year rainfall} = 0.669 (100 \text{ year rainfall}) + 0.293 (2 \text{ year rainfall})$$

$$50 \text{ year rainfall} = 0.835 (100 \text{ year rainfall}) + 0.146 (2 \text{ year rainfall})$$

Example: Compute the 25 year – 10 minute rainfall for Indianapolis

Step 1: Determine the 5 and 15 minute rainfalls for return periods of 2 and 100 years from the isopluvial maps.

$$2 \text{ year} - 5 \text{ minute rainfall} = 0.450 \text{ inches}$$

$$2 \text{ year} - 15 \text{ minute rainfall} = 0.862 \text{ inches}$$

$$100 \text{ year} - 5 \text{ minute rainfall} = 0.800 \text{ inches}$$

$$100 \text{ year} - 15 \text{ minute rainfall} = 1.650 \text{ inches}$$

Step 2: Compute the 5 and 15 minute rainfall amounts for a 25 year return period.

$$\begin{aligned} 25 \text{ year} - 5 \text{ minute rainfall} &= 0.669 (0.800) + 0.293 (0.450) \\ &= 0.667 \text{ inches} \end{aligned}$$

$$\begin{aligned} 25 \text{ year} - 15 \text{ minute rainfall} &= 0.669 (1.650) + 0.293 (0.862) \\ &= 1.356 \text{ inches} \end{aligned}$$

Step 3: Compute the 10 minute rainfall using the 25 year – 5 and 15 minute amounts:

$$\begin{aligned} 25 \text{ year} - 10 \text{ minute rainfall} &= 0.590 (1.356) + 0.410 (0.667) \\ &= 1.074 \text{ inches} \end{aligned}$$