

# Critical Duration

# Definitions

## Critical Duration:

The duration of a specific storm event (i.e.: 100 year storm) which creates the largest volume or highest rate of net storm water runoff (Post “Q” less Pre “Q”) for typical durations up to and including the 10 day duration event.

Return Period (years)		Duration (hours)					Duration (days)		
		1	2	4	8	24	3	7	10
2	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
5	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
10	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
25	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
50	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
100	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑

48 Storm  
Matrix

Return Period (years)		Duration (hours)					Duration (days)		
		1	2	4	8	24	3	7	10
2	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
5	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
10	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
25	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
50	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
100	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑

**Pre-Condition  
Critical  
Duration  
Events**

Return Period (years)		Duration (hours)					Duration (days)		
		1	2	4	8	24	3	7	10
2	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
5	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
10	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
25	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
50	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
100	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑

Post-Condition  
Critical  
Duration  
Events

Return Period (years)		Duration (hours)					Duration (days)		
		1	2	4	8	24	3	7	10
2	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
5	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
10	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
25	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
50	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
100	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑

**Pre vs. Post  
Critical  
Duration  
Events**

Return Period (years)		Duration (hours)					Duration (days)		
		1	2	4	8	24	3	7	10
2	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
5	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
10	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
25	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
50	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
100	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑

**Max Pre vs.**

**Max Post**

**Not**

**Every**

**Individual**

**Storm**

Return Period (years)		Duration (hours)					Duration (days)		
		1	2	4	8	24	3	7	10
2	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
5	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
10	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
25	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
50	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑
100	pre	↑	↑	↑	↑	↑	↑	↑	↑
	post	↑	↑	↑	↑	↑	↑	↑	↑

**Minimum  
Analysis  
&  
Documentation**



# Critical Duration

- Do your homework – show analysis
- Each frequency has a critical duration
- Consider all durations
- Critical duration can vary by frequency
- Not required to match pre vs. post for each frequency/duration event