

1. Storm drain design shall be in conformance with the City of Ripon's current storm drainage master plan.
2. Minimum gutter slope 0.0033 ft/ft.
3. Minimum gutter slope around radius corner 0.0065 ft/ft.
4. Off-street parking area surface drainage: Minimum cross-slope on asphalt concrete 2%, Minimum cross-slope on concrete 0.5%, Maximum cross-slope on asphalt concrete and concrete 5%.
5. Catch basins shall connect by laterals to manhole only.
6. Access to storm drain pipe shall be provided by a manhole at intervals of 400 feet on lines 18 inches or smaller and 600 feet on lines greater than 18 inches.
7. Manholes shall be provided at all junctions and changes of alignment, grade, or size of pipe.
8. Lines shall be placed through the manhole.
9. Storm drain mains shall be a minimum of 15 inches.
10. Valley gutters will not be permitted for street drainage.
11. Inverted siphons will not be permitted for street drainage.
12. The use of dry wells for disposal of runoff will not be permitted.
13. Controlling factors: maximum encroachment of water 10 feet from face of curb.
14. Maximum gutter length, per catch basin, shall not exceed 600 feet.
15. Mannings "n" typical for concrete pipe shall be 0.013.
16. Storm drain mains shall be designed to flow at a minimum of 3.0 feet per second.
17. Storm drain lines shall have a minimum cover of 30 inches.
18. Minimum of 18 inch laterals at a slope of 0.008 ft/ft to connect catch basins to storm manholes.
19. The rational method is to be used for the determination of peak rates of flow for storm water runoff, and shall be used in the design of detention basins.

$Q=CIA$

Q = the runoff rate in cubic feet per second


C = the coefficient of runoff

I = the average rainfall intensity in inches per hour for a duration equal to the time of concentration

A = the size of the tributary drainage area in acres

20. Runoff coefficients for the City of Ripon

<u>Land Use Type</u>	<u>C</u>	<u>Minimum Overland Flow Time in Minutes</u> <u>(Mild Slope)</u>
Industrial	0.90	10
Commercial	0.75	15
Professional	0.75	15
Administrative	0.75	15
Multi-family Residential	0.45	20
Single family Residential	0.40	25
Schools	0.25	25
Parks and Agricultural	0.10	30

NO.	REVISED	BY	Criteria for Design of Storm Drain Facilities	APPROVED
				
				CITY ENGINEER RCE-28191
				DATE: 2-2-99
DRAWN BY: Matt			CITY OF RIPON	STANDARD NO. SD-1
CHECKED BY: DJR				
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(Continued from 20) Basic runoff coefficients:

<u>Surface Type</u>	<u>C</u>
Pavement	0.95
Roofs	0.95
Compacted Earth or Gravel	0.75
Lawns and Open Areas	0.15

21. Design frequency based on 10 year 48 hour storm event.
22. The storm drain retention basin volume shall be determined by the following formula:

$$V = (CAR)/12$$


V = the basin volume in acre feet

C = the runoff coefficient (see coefficients for City of Ripon)

A = the contributing area in acres

R = total rainfall in inches for the storm period is as follows: urbanized area 3.56 inches

23. Retention basin outlet, either by gravity or pump, shall empty the basin over a 24 hour period.
24. The volume of retention basins shall be determined with no allowance for percolation or outlet facilities. If desired the developer may conduct a percolation test and storm drain analysis for approval by the City Engineer.
25. When storm drain requires a lift station other than for detention basin, it shall be designed for a 100 year storm.
26. Drain basins shall have a maximum side slope of 10:1 (horizontal to vertical) slope. Steeper slopes must be approved by the City Engineer.
27. Bottom elevation shall be a minimum of five (5) feet above the historical water table average.
28. Maximum depth of basin shall be approved by the City Engineer.
29. The high water elevation of the drainage basin shall be one (1) foot below the hydraulic grade line.
30. Upon completion of all testing and after streets are paved, the contractor shall clean the storm drain. All foreign matter and debris shall be removed, and disposed of in a manner acceptable to the City Engineer.
31. A sprinkler irrigation system shall be designed for and installed in the drain basin. The design shall be approved by the City Engineer. The design shall include a system controller.
32. Basins will be hydro-seeded and maintained for one year by the contractor.
33. Any deviation from these criteria shall have the approval of the City Engineer.

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				 CITY ENGINEER RCE-28191
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