

Appendix I Rooftop Storage Design Guidance and Criteria

I.1 Rooftop Storage Design Guidance and Criteria

Rooftop storage, as described in this Appendix, is intended as a detention practice only. The rules and guidelines presented in this Appendix do not apply to green roofs (Section 3.2).

1. Rooftop storage may be used to provide detention for the 2-year and 15-year storms, as applicable. Detention calculations must follow the procedures identified in Chapter 2 and Appendix H.
2. Rainfall from the 2-year, 24-hour storm results in an accumulated rainfall of approximately 3.2 inches, and rainfall from the 15-year, 24-hour storm results in an accumulated rainfall of approximately 5.2 inches. Peak flow detention calculations for either of these storms will require less than these depths (assuming there is no run-on from other rooftop areas).
 - (a) Based on a snow load of 30 pounds per square foot or 5.8 inches of water, properly designed roofs must be structurally capable of holding the required detention volume with a reasonable factor of safety.
 - (b) Roofs calculated to store depths greater than three inches shall be required to show structural adequacy of the roof design.
3. No less than two roof drains shall be installed in roof areas of 10,000 square feet or less, and at least four drains shall be installed in roof areas over 10,000 square feet in area. Roof areas exceeding 40,000 square feet shall have one drain for each 10,000 square foot area.
4. Emergency overflow measures adequate to discharge the 100-year, 45-minute storm must be provided.
 - (a) If parapet walls exceed 5 inches in height, the designer shall provide openings (scuppers) in the parapet wall sufficient to discharge the design storm flow at a water level not exceeding 5 inches.
 - (b) One scupper shall be provided for every 20,000 square feet of roof area, and the invert of the scupper shall not be more than 5 inches above the roof level. (If such openings are not practical, then detention rings shall be sized accordingly).
5. Detention rings shall be placed around all roof drains that do not have controlled flow.
 - (a) The number of holes or size of openings in the rings shall be computed based on the area of roof drained and run-off criteria.
 - (b) The minimum spacing of sets of holes is 2 inches center-to-center.
 - (c) The height of the ring is determined by the roof slope and detention requirements, and shall be 5 inches maximum.

- (d) The diameter of the rings shall be sized to accommodate the required openings and, if scuppers are not provided, to allow the 100-year design storm to overtop the ring (overflow design is based on weir computations with the weir length equal to the circumference of the detention ring).
 - (e) Conductors and leaders shall also be sized to pass the expected flow from the 100-year design storm.
6. The maximum time of drawdown on the roof shall not exceed 17 hours.
 7. Josam Manufacturing Company and Zurn Industries, Inc. market “controlled-flow” roof drains. These products, or their equivalent, are acceptable.
 8. Computations required on plans:
 - (a) Roof area in square feet.
 - (b) Storage provided at design depth.
 - (c) Maximum allowable discharge rate.
 - (d) Inflow-outflow hydrograph analysis or acceptable charts (for Josam Manufacturing Company and Zurn Industries, Inc. standard drains, the peak discharge rates as given in their charts are acceptable for drainage calculation purposes without requiring full inflow-outflow hydrograph analysis).
 - (e) Number of drains required.
 - (f) Sizing of openings required in detention rings.
 - (g) Sizing of ring to accept openings and to pass 100-year design storm.

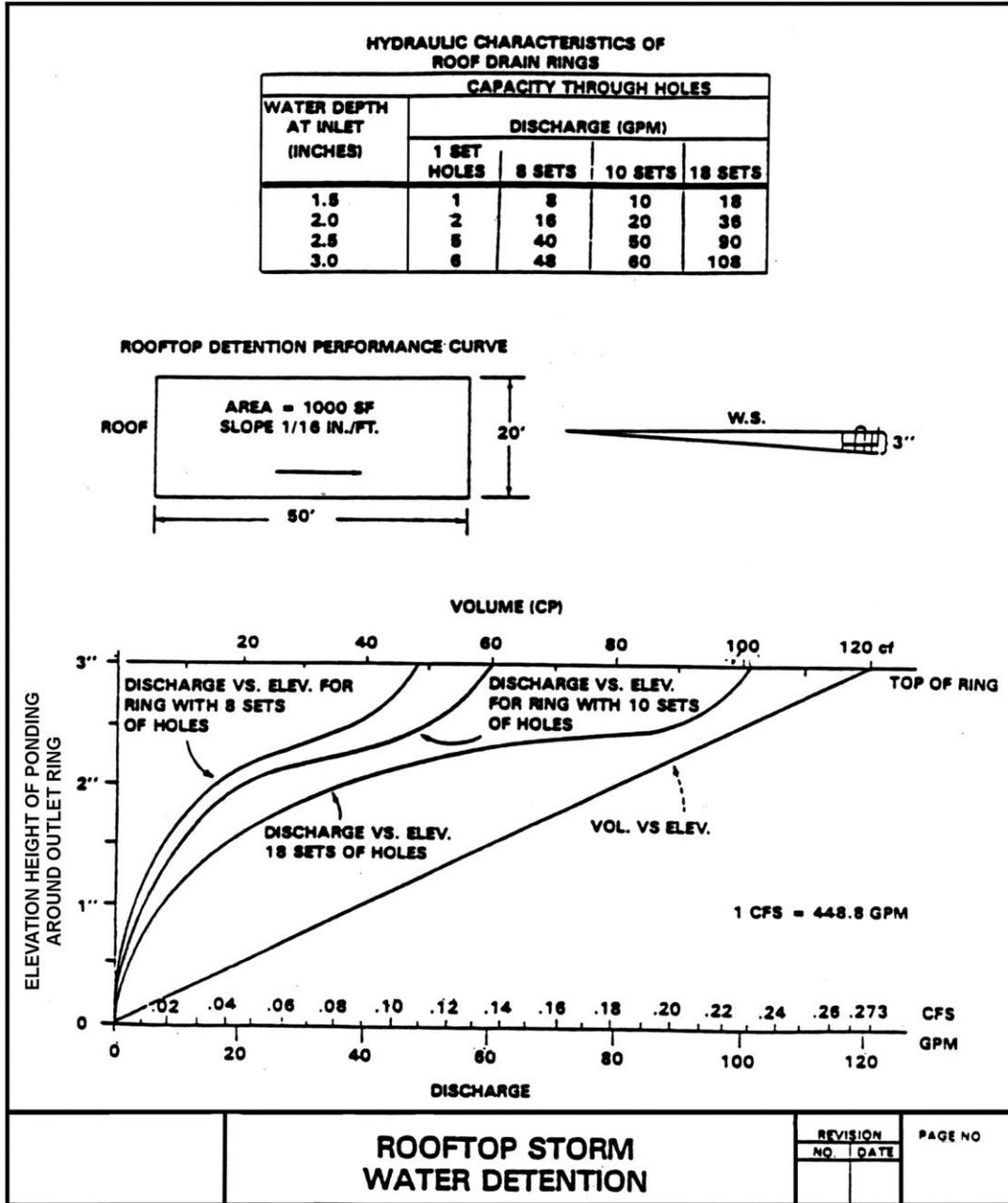


Figure I.1 Rooftop stormwater detention.

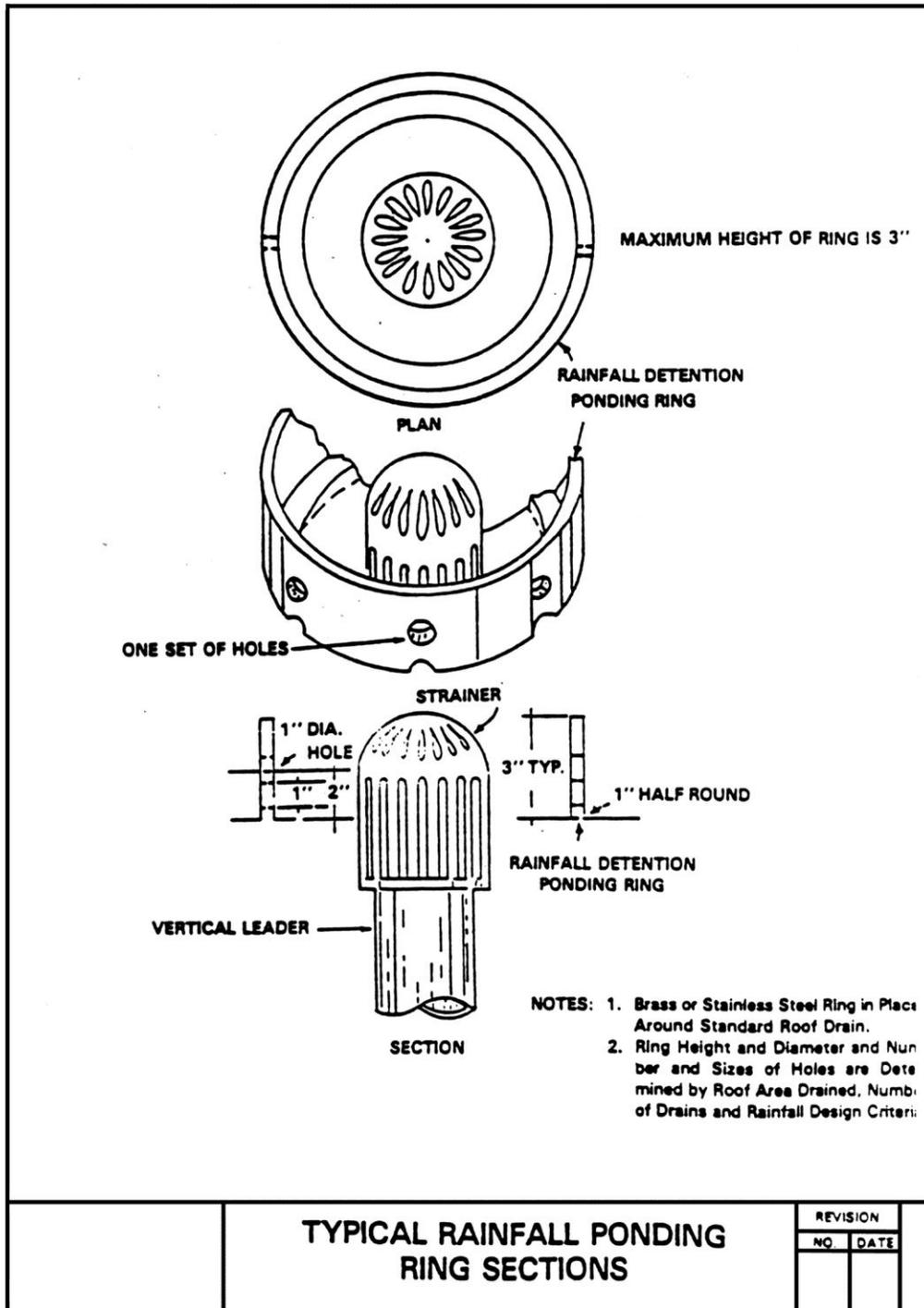


Figure I.2 Typical rainfall ponding ring sections.