

Phone: 916.683.7111
Fax: 916.691.3168

Web: www.elkgrovecity.org

8401 Laguna Palms Way
Elk Grove, California 95758



Modification or Addition to Improvement Standards and Details

Modification Number: 9-003

Effective Date of Change: ~~TBD~~ 3/24/10

Modification:

1. Revise the design runoff methodology required in Section 9-10 for street drainage, storm sewers, driveway culverts and private projects from the Sacramento Method to the Nolte Method.
2. Add Standard Drawings SD-1A, SD-1B and SD-1C for determining design runoff using the Nolte Method.

Section 9-10 of the City Improvement Standards is revised to read in its entirety as reflected in the attached. This modification shall apply to all projects for which a tentative map and/or development application has not been made of the Effective Date, but may be applied to any project if the applicant so elects.

Effect of Modification:


1. Makes the standard consistent with Sacramento County in terms of design and reimbursement through Zone 11A.
- 2.

Request for Modification Initiated By:


DARREN WILSON


3/22/10
Date

Modification Reviewed for Conformity and Consistency to Standards:


City Engineer

3/22/10
Date

Modification to Improvement Standards Approved:


Director of Public Works

3/23/10
Date

9-10 DESIGN RUNOFF

The required design methods, their appropriate applications, and design tools are summarized in Table 9-1. Use of design methods for runoff calculations in the City of Elk Grove is described in Volume 2 Hydrology Standards of the City/County Drainage Manual. Other design tools, including hydrodynamic model and analysis software (e.g. XPSWMM), may be used subject to approval of the Director. SACCALC is a Windows based software, available for free download, for assistance with these calculations. Design criteria concerning the approach for new and infill projects are summarized in Table 9-1A.

Table 9-1

Minimum Design Runoff Flows

Application	Hydrology Calculation	Method	Design Tools
Design of: · street drainage · storm sewers · culverts (driveway)	Flow from Charts	Nolte	Design Charts, SD-1A to SD-1C
Special Design Case*: · street drainage · storm sewers · culverts	Peak Flow and/or 100-year Volume	Sacramento	Design Charts, HEC-1 and SACCALC
Design of overland release, culverts, and bridges**	Peak Flow and/or 100-year Volume	Sacramento	Design Charts, HEC-1 and SACCALC
Master Plans Design of: · open channels · bridges · detention facilities	Peak Flow and Volume	Sacramento	HEC-1 and SACCALC
Water Quality Detention Basins	Volume	Sato	Design Chart

* Special design cases include: streets designated for emergency evacuation, high use public areas, areas with potential loss of life, areas with potential high property damages, areas with limited overland release, and areas lower than surrounding elevations.

** Overland release flows may be determined from Figures 2-11 and 2-18 thru 2-23 of the Volume 2 Hydrology Standards for shed areas less than 160 acres.

Table 9-1A

Design Criteria by Project Type

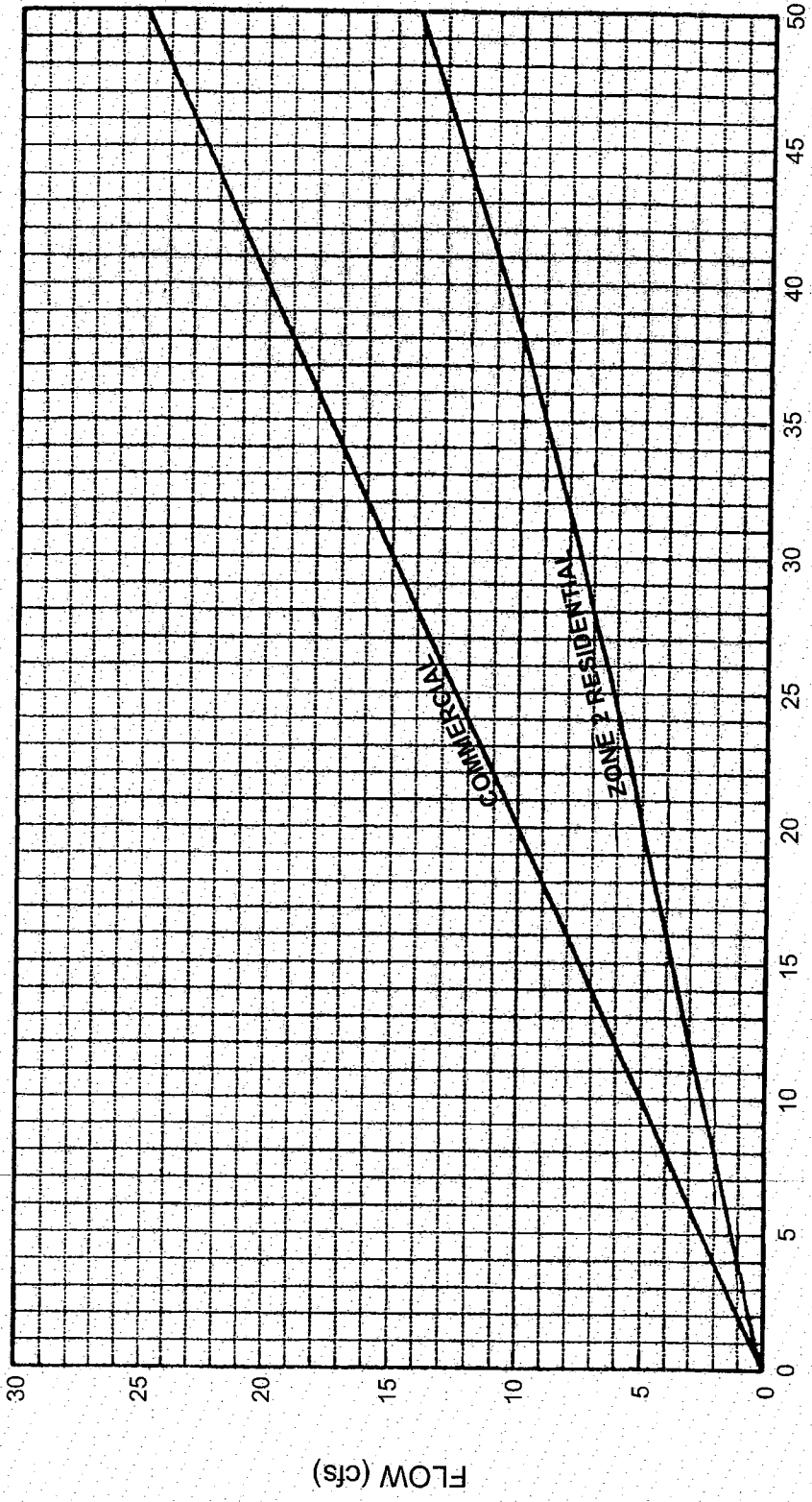
Condition	Hydrologic Calculation	Design HGL	Constraints
Connecting or Infill Projects	Nolte Method Zone 2	Use the 10/100 year water elevations of the drainage master plan or as calculated by the Engineer. If no drainage master plan, assume the 10-year water surface elevation at the connection point to be at the gutter flow line, or compute using summation of flow based on contributory areas working upstream starting at the downstream control.	Lowest building pad will be at least 1.0 foot above 100-year water level or 1.5 feet above the overland release peak flow level if the 100-year water level cannot be determined.
New Projects	Nolte Method	For 10-year, 6 inches below DI.	Lowest building pad will be at least 1.0 foot above the 100-year water level.

Computation of runoff shall be performed in the appropriate manner prescribed below.

Use the Nolte Method as outlined on City of Elk Grove hydrologic design criteria is described in Volume 2, Hydrology Standards, of the City/County Drainage Manual.. Elk Grove is in the Zone 2 Rainfall Zone for the Nolte Method. SACCALC is a Windows based software, available for free download, for assistance with these calculations.

The following shall be followed:

- A. The runoff used in storm drain pipe design for drainage area 160 acres and smaller shall be computed from the Drainage Zone Chart and the accompanying design runoff graphs. The selection of the appropriate Zone 2 chart from the Hydrology Standards Volume 2 will be based on the City General Plan and the Nolte Method. Copies of Zone 2 runoff graphs are included in these standards as drawings SD-1A to SD-1C.



DRAINAGE AREA (acres)

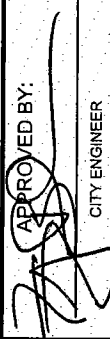

NOTE: Design runoff for multiple family development shall be based on the following formula:

$$Q_m = Q_r + (Q_c - Q_r)(I - 50)/40$$

Where:

- RD-7 I = 60
- RD-10 I = 70
- RD-20 I = 80
- RD-30 I = 90

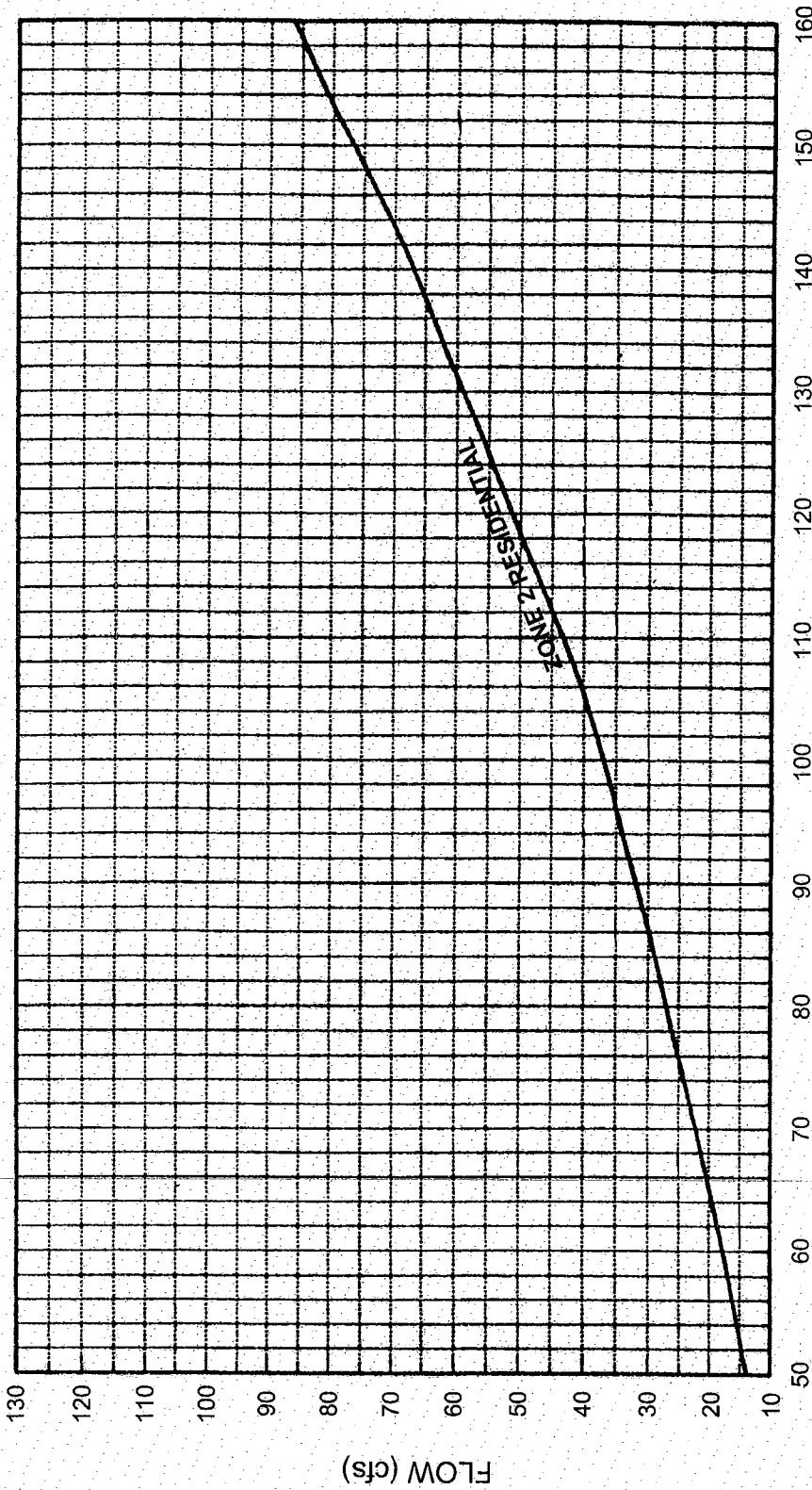
Source: County of Sacramento Master Drainage Plan, Part 1, County-wide Hydrology, Nolte and Assoc.

DATE: 12/04/2009	NOT TO SCALE	APPROVED BY:  CITY ENGINEER	 DRAWING NUMBER SD - 1A
REVISION BY	APPROVED		

CITY OF ELK GROVE - PUBLIC WORKS

**DESIGN RUNOFF
NOLTE METHOD**

DRAINAGE AREAS, <50 ACRES



DRAINAGE AREA (acres)



NOTE: Design runoff for multiple family development shall be based on the following formula:

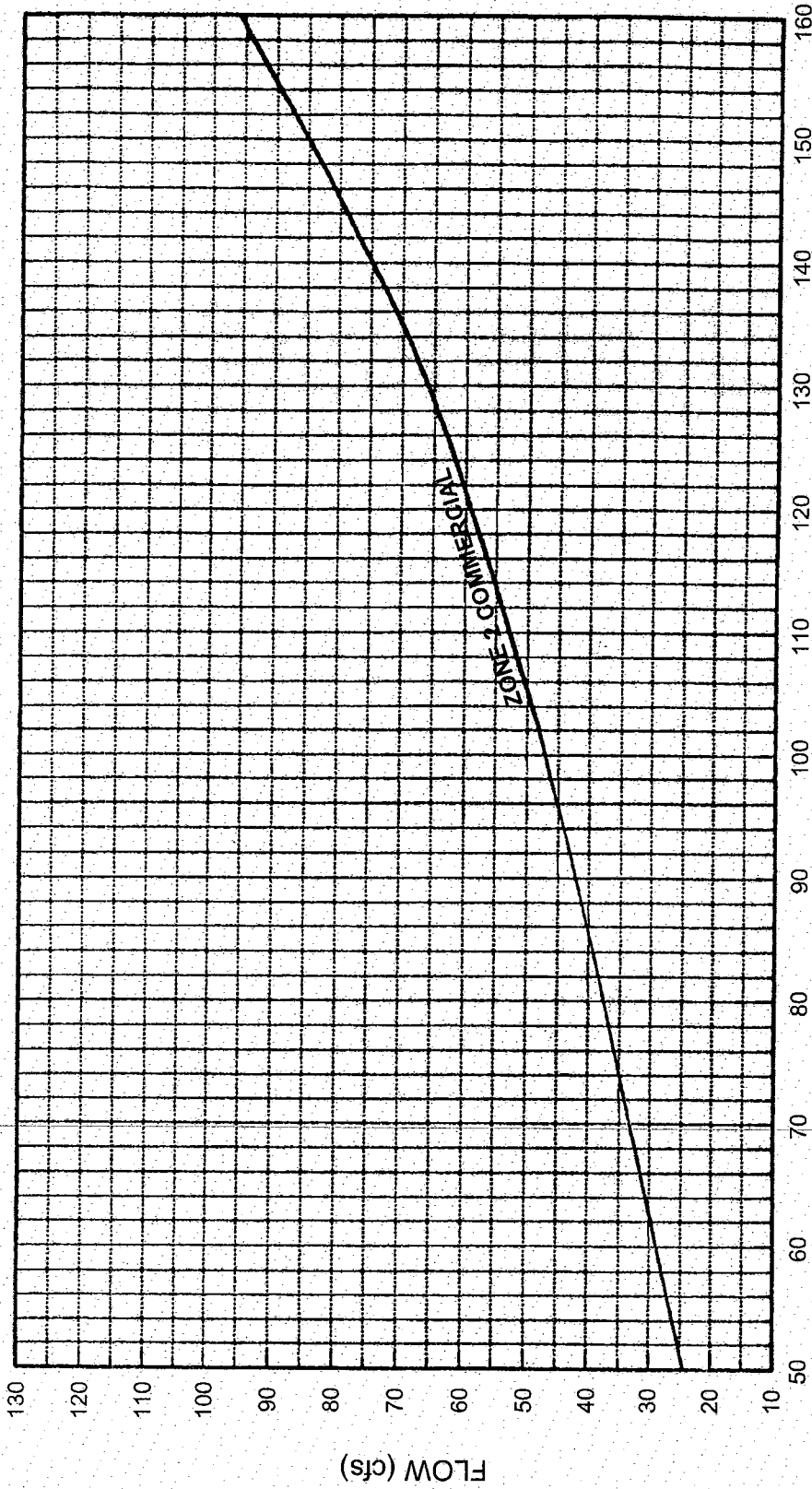
$$Q_m = Q_r + (Q_c - Q_r)(I - 50)/40$$

Where:

- RD-7 I = 60
- RD-10 I = 70
- RD-20 I = 80
- RD-30 I = 90

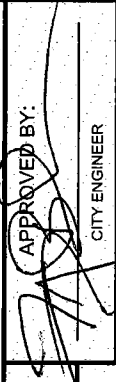

Source: County of Sacramento Master Drainage Plan, Part 1, County-wide Hydrology, Nolte and Assoc.

DATE: 12/04/2009	NOT TO SCALE	CITY OF ELK GROVE - PUBLIC WORKS DESIGN RUNOFF NOLTE METHOD RESIDENTIAL AREAS, 50-160 ACRES	APPROVED BY:  CITY ENGINEER
REVISION BY:	APPROVED DATE		DRAWING NUMBER SD - 1B
			



DRAINAGE AREA (acres)

Source: County of Sacramento Master Drainage Plan, Part 1, County-wide Hydrology, Nolte and Assoc.

DATE: 12/04/2009	NOT TO SCALE	 APPROVED BY: CITY ENGINEER
REVISION	APPROVED	
BY:	DATE:	 DESIGN RUNOFF NOLTE METHOD COMMERCIAL AREAS, 50-160 ACRES