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Title: **Design Storm for “Total Retention” under Individual Permit, Poster, Individual Permit for Storm Water, NPDES Permit No. NM0030759**

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Intended for: Public

Purpose: This poster was prepared for the December 2012 Individual Permit for Storm Water (IP) public meeting. The purpose of the meeting was to update the public on implementation of the permit as required under Part 1.I (7) of the IP (National Pollutant Discharge Elimination System Permit No. NM0030759). The poster will be available on Los Alamos National Laboratory’s (LANL’s) public website.



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Design Storm for "Total Retention" under Individual Permit

Background

The Individual Permit (IP):

- Regulates storm water discharges from Solid Waste Management Units and Areas of Concern (Sites)
- Monitored at Site Monitoring Area (SMA) scale (i.e., drainage basins)

IP requires "corrective action" when a storm water sample exceeds a target action level (TAL) for one or more constituents

One method of corrective action is "total retention" of storm water

The IP does not specify a "design storm" for total retention

Retention vs. Detention

Is your objective to detain storm water and release in a controlled manner?

Use Detention System

- Detention is the temporary storage of storm water
- Storm water leaves via a discharge structure, infiltration, evaporation and transpiration
- Detention is used under Los Alamos National Laboratory's Engineering Standards Manual (ESM) ISD 341-2, Chapter 3, Section 3 G-10

Is your objective to retain storm water?

Use Retention System

- Retention implies storm water is stored indefinitely
- Storm water leaves via infiltration, evaporation, transpiration
- Increased water quality treatment than a detention system for the same water quality capture volume
- Energy Independence and Security Act of 2007 (EISA) and the EISA Technical Guidance requires retention where applicable for new and redeveloped federal facilities
- A Corrective Action option under the IP Section E.2.(b)

Some Considerations in Selecting Design Storm

SMA's vary significantly in area, current development condition, and physical characteristics

Sites may comprise either a small portion or large portion of an SMA

IP is a technology based effluent limitation permit that reflects best industry practice considering technological availability, economic achievability and practicability

Ability to incorporate additional low impact development (LID) components

Recovery of water quality capture volume

Design Storms

Storm events:

Defined in two ways:

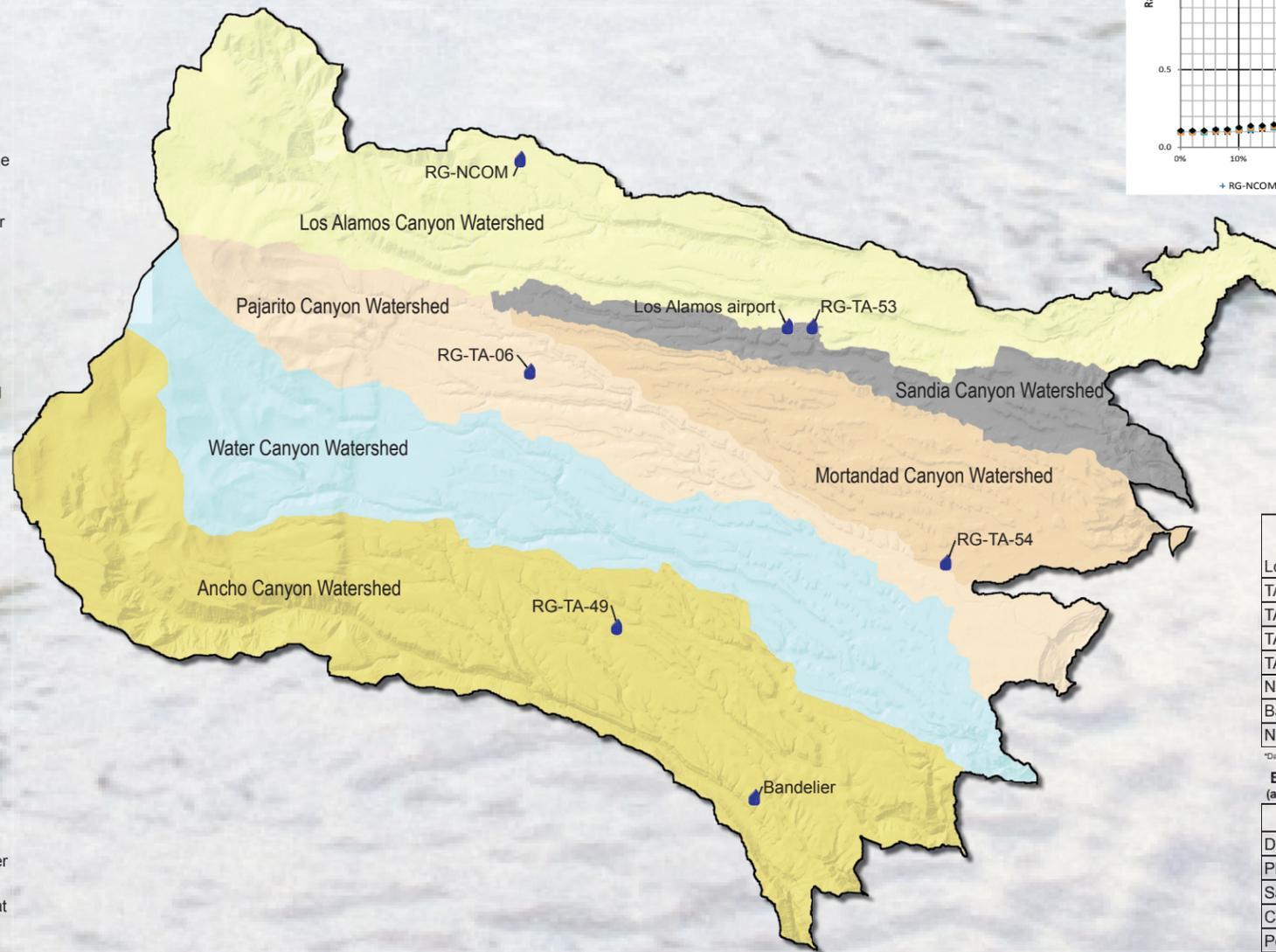
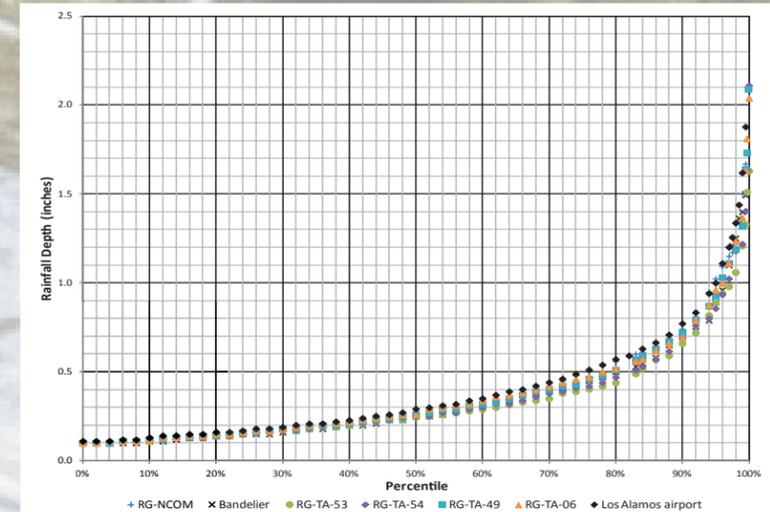
- Specified time period for a given return period (e.g., a 100 year 24-hour storm)
- Percentile rainfall event (e.g., an 80th percentile rainfall event)

Limitations:

- Actual storm events are statistically independent from each other (e.g. more than one 25 year event may occur in a single year)
- Performance of control measure depends upon site conditions at beginning of storm event
 - Saturated vs unsaturated conditions
 - Previous storm events
 - Available storage within storm water management system
- Retention systems discharge after the water quality capture volume is collected

Examples of applicable regulation and guidance:

- Los Alamos National Laboratory - Engineering Standards Manual ISD 341-2 (ESM)
- Energy Independence and Security Act of 2007
- Stormwater Runoff Requirements for Federal Projects under Section 438 of the EISA (EPA 841-B-09-001) 2009 (EISA Technical Guidance)



Data Evaluation

Data from seven (7) gages evaluated

Utilized EISA Technical Guidance methodology

Analyzed data sets based on two periods:

- Annual Basis (January–December)
 - Permit Monitoring Period (April–November) data analysis
- Highest results used for "total retention" designs

95th Percentile Storm Events From Local Gage Data

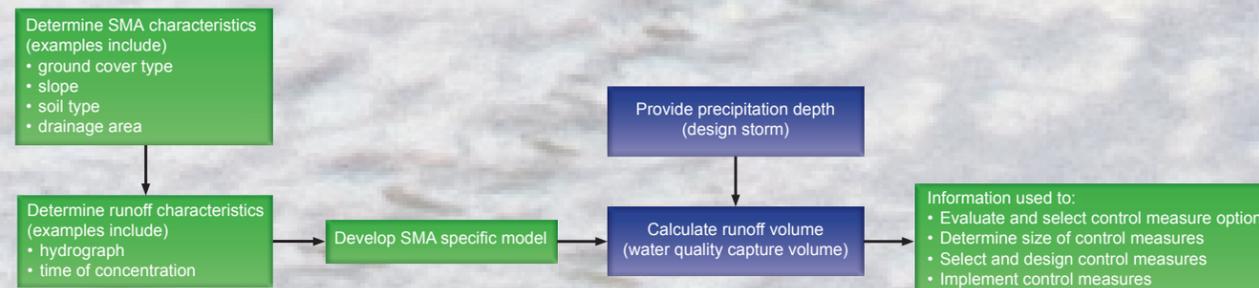
Location	Period of Record (years)	Precipitation Depth Year Round (in)	Precipitation Depth Monitoring Period (in)
TA-06	22	0.89	0.96
TA-49	25	0.88	0.93
TA-53	20	0.85	0.89
TA-54	20	0.80	0.86
NCCOMM	26	0.95	1.02
Bandelier	29	0.79	0.89
NOAA Gauge*	60	0.98	1.00

*Data from 60 years (July 1, 1952–July 1, 2012) of the period of record analyzed.

Example 95th Percentile Storm Events for Select Western U.S. Cities (adapted from Energy Independence and Security Act Technical Guidance, USEPA, 2009)

City	95th Percentile Event Rainfall Total (in)
Denver, CO	1.1
Phoenix, AZ	1.0
Salt Lake City, UT	0.8
Coeur D'Alene, ID	0.7
Portland, OR	1.0
Seattle, WA	1.6

Water Quality Capture Volume



Design Storm Selection for "Total Retention" Option

95% Storm Selected

- Use value from Monitoring Period
- Value developed in accordance with EISA Technical Guidance
- Based on decades of local precipitation data
- Utilize to determine water quality capture volume