LA-UR-19-31354
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Title:	Storm Water Management Overview at Los Alamos Nation Laboratory
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Intended for:	Presentation at New Mexico Tech for Undergraduate Civil Engineering Seminar
Issued:	2019-11-12

Los Alamos
NATIONAL LABORATORY
EST. 1943

Storm Water Management Overview at Los Alamos National Laboratory

William Foley

November 20, 2019

NNSA
National Nuclear Security Administration

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Introduction

- **Water Quality Regulatory Background**
- **Location Setting**
- **Storm Water Evaluation / Management - A Watershed Approach**
- **Recent Events / Subsequent Storm Water Management Efforts**
  - Cerro Grande Fire
  - Los Conches Fire
  - 2013 Flood Event
- **Integrated Storm Water Management**
  - Holistic Approach
  - Watershed Controls

Water Quality Regulatory Background

- **40 years ago…**
  - –Two-thirds of America's lakes, rivers and coastal waters were unsafe for fishing and swimming.
- **Before that…**
  - –The Cuyahoga River

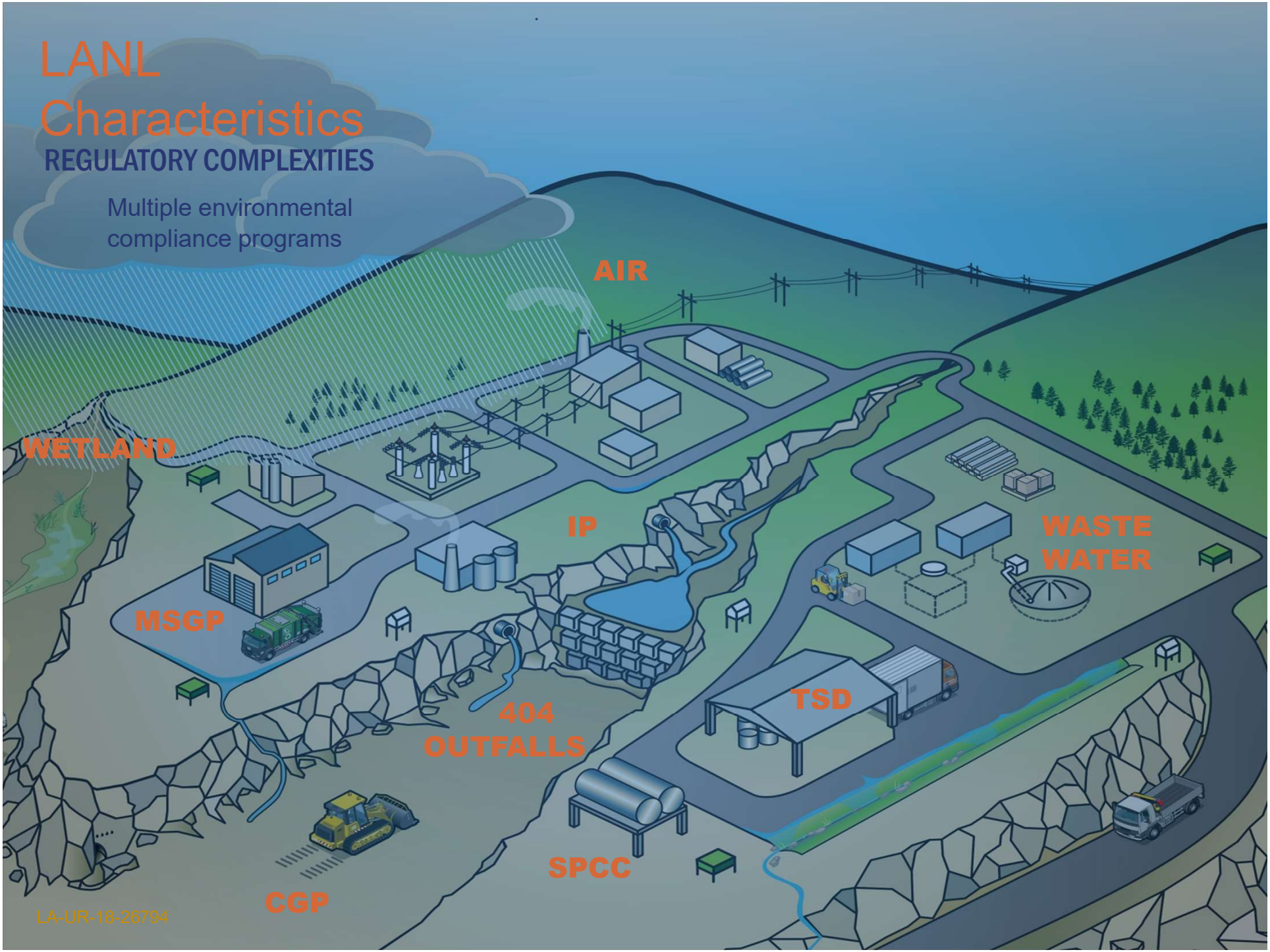
Location Setting

- Los Alamos National Laboratory established 1943
- 47 Technical Areas
- ~12,000 employees
- Situated on Pajarito Plateau
- 36 sq. mi.
- >2,600 buildings

LANL Characteristics

REGULATORY COMPLEXITIES

Multiple environmental compliance programs



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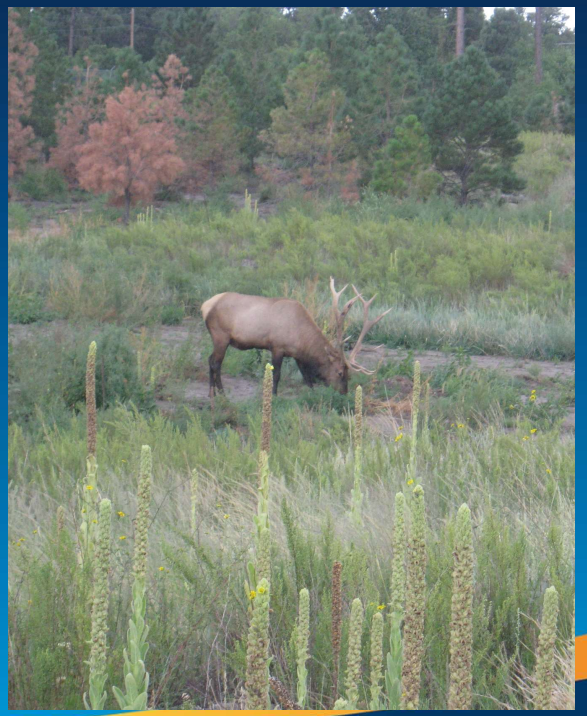
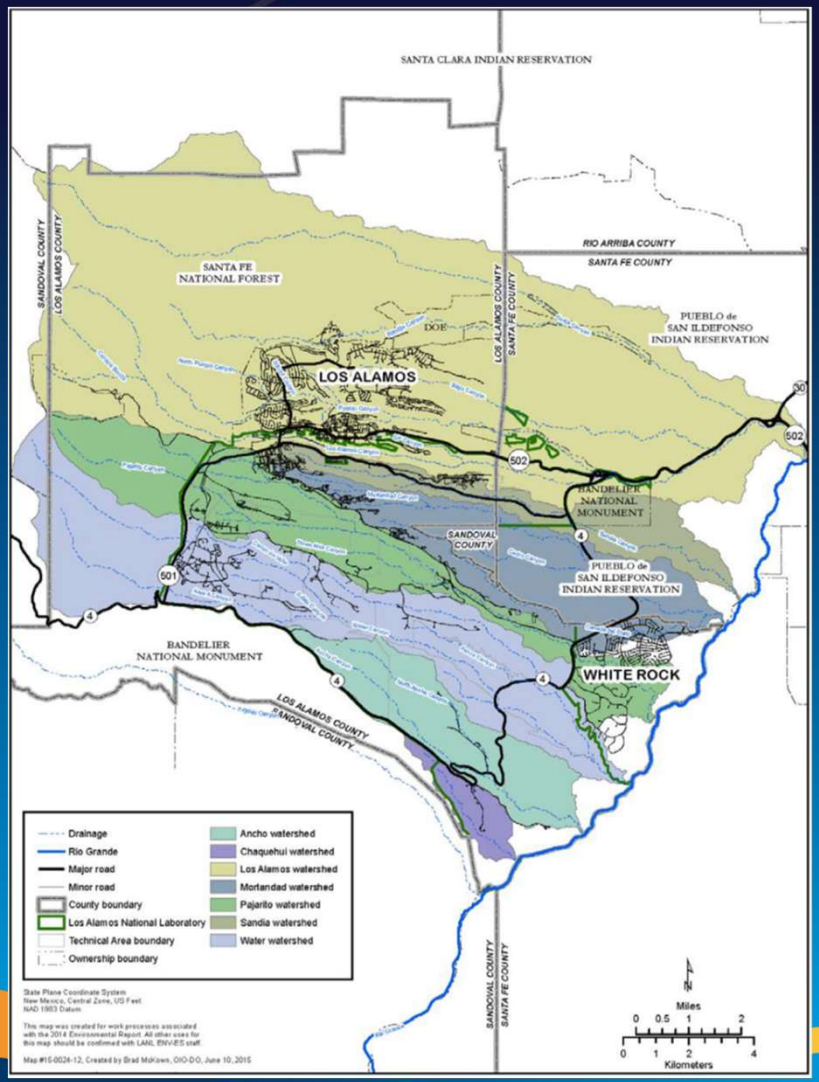
Location Setting

- **Primary Watersheds**
  - –Los Alamos
  - –Sandia
  - –Mortandad
  - –Pajarito
  - –Water
  - –Ancho
  - –Chaquehui



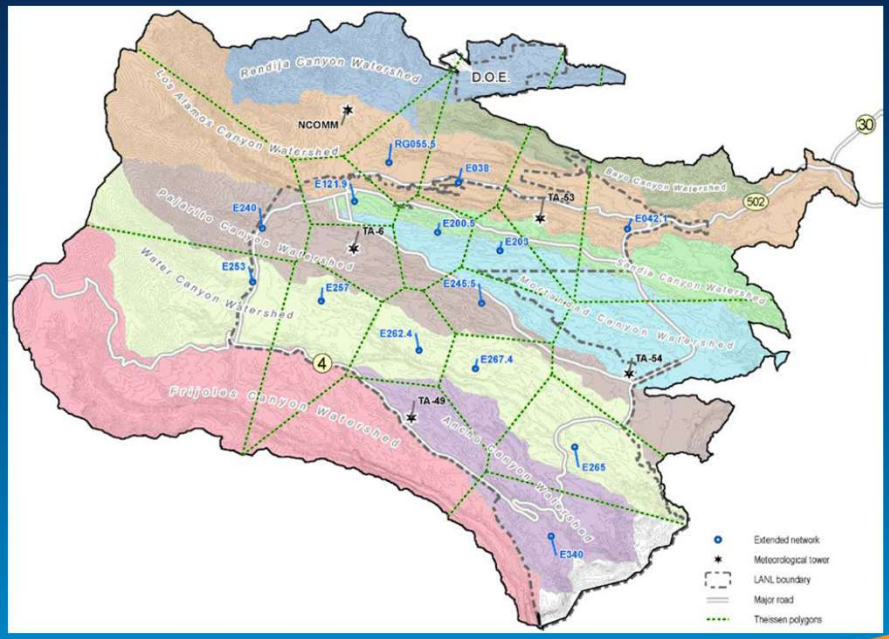
Location Setting



- Fingerlike mesas separated by deep east-to-west-oriented canyons
- Surface water primarily as ephemeral or intermittent reaches of streams.

Location Setting

- **Rainfall characteristics**
  - –Variation from west (19-in) to east (16-in)
  - –Variation based on proximity to ridgelines/mesa tops/canyon bottoms
  - –45% of rainfall between July - September
- **Met towers vs. extended network**

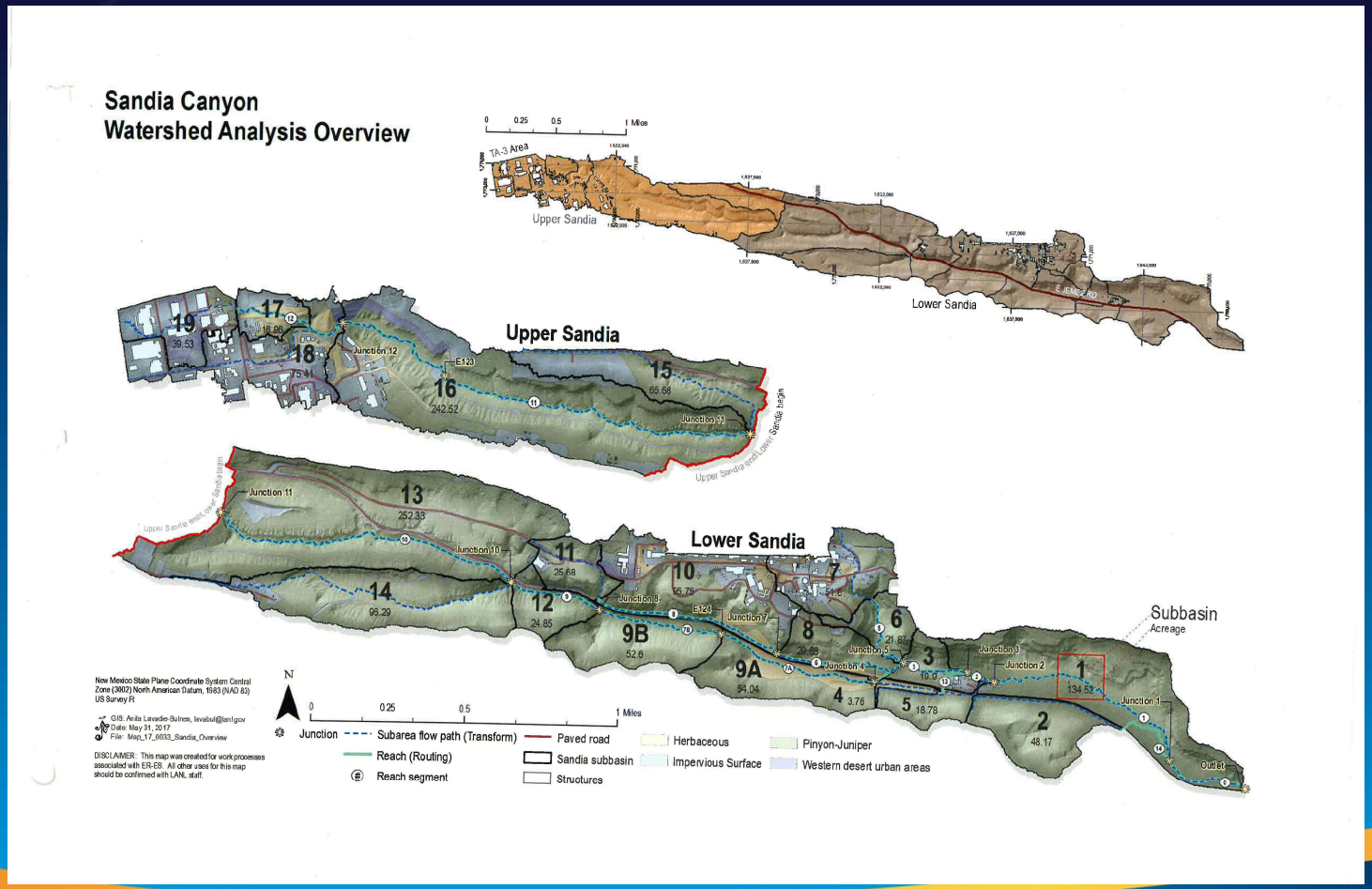


Location Setting

- Surface water flow characteristics
- Flow gages

Storm Water Evaluation/Management

Case Study - Sandia



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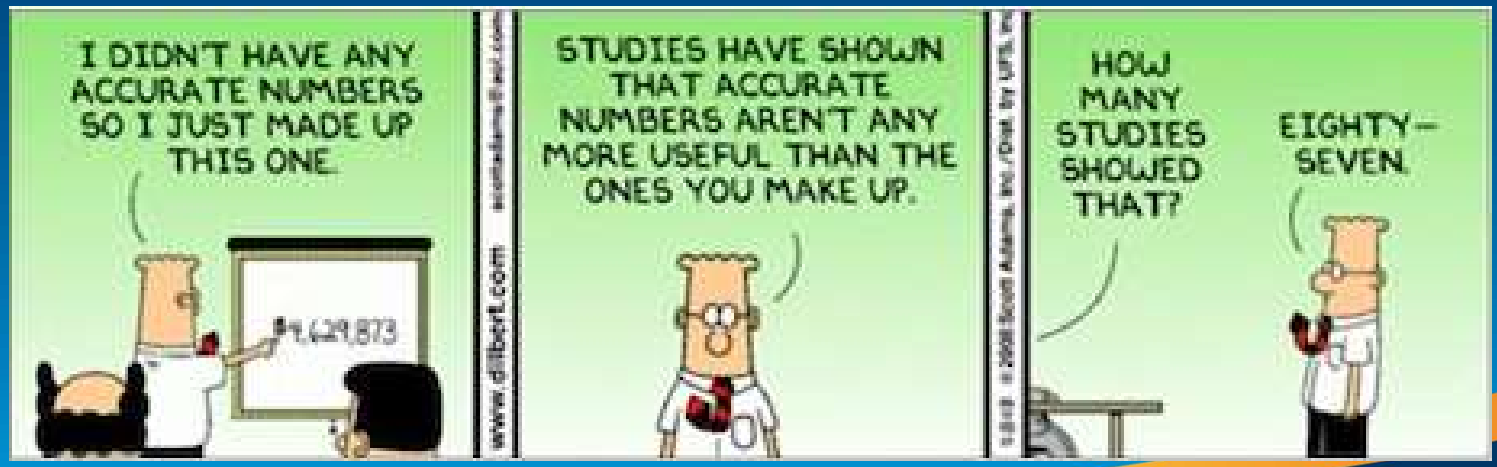
Storm Water Evaluation/Management

Case Study – Sandia

- **Evaluations**
  - –Upper Basin (control specific)
    - TR-55
    - SWMM
  - –Watershed Controls
    - HEC-HMS
    - HEC-RAS
    - Challenges



Storm Water Evaluation/Management

Case Study – Sandia

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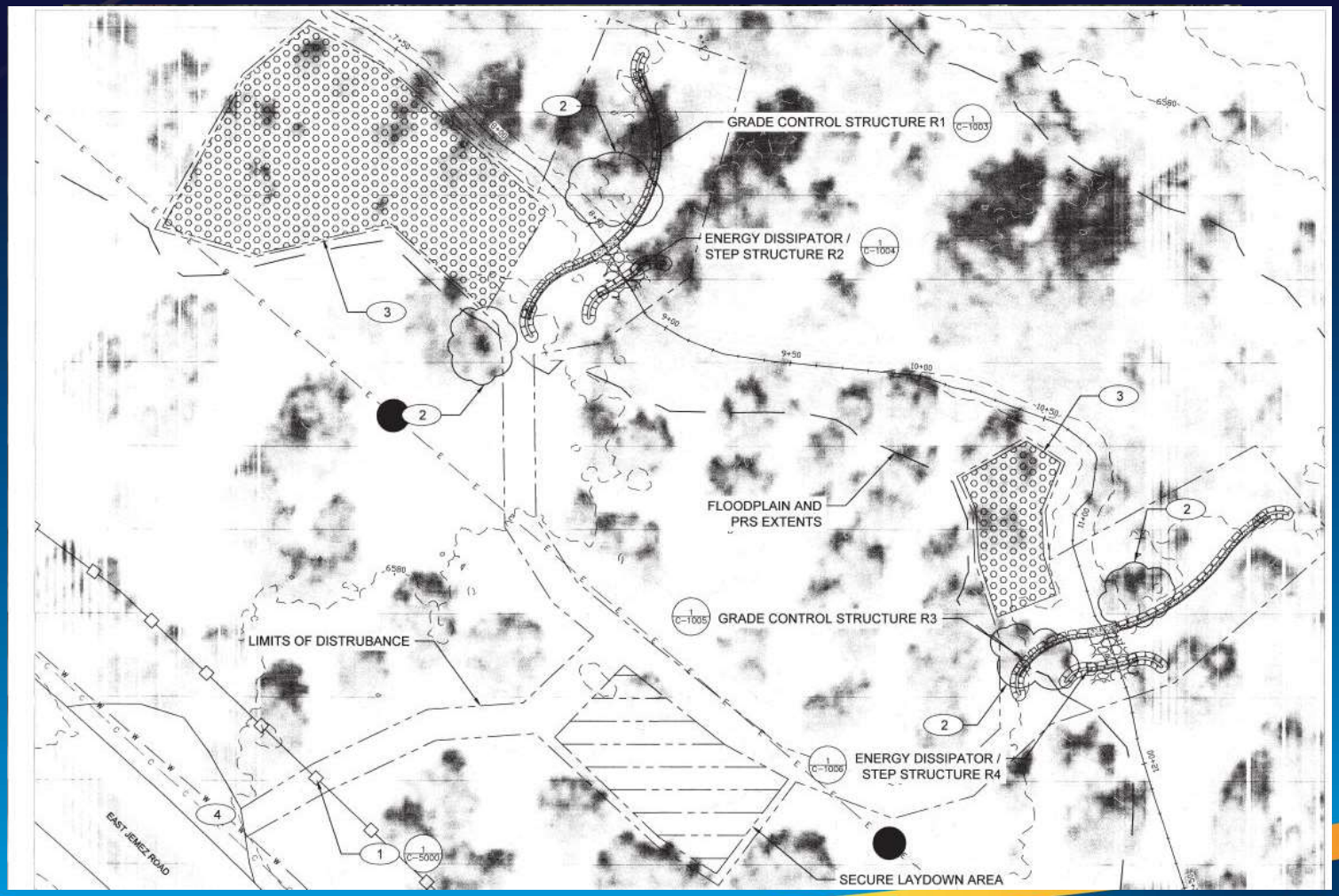
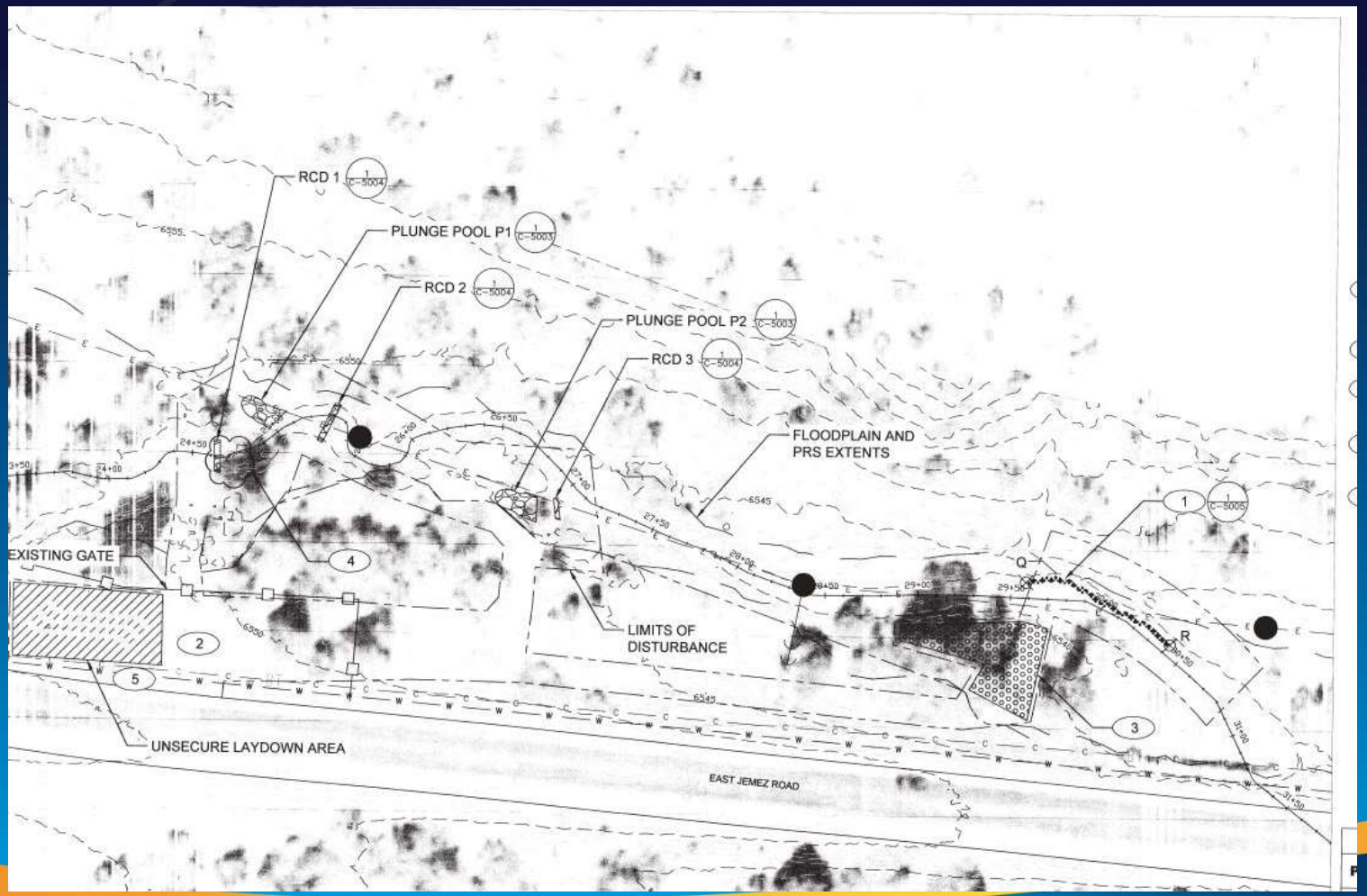


Storm Water Evaluation/Management

Case Study – Sandia



•Recent Events / Subsequent Storm Water Management Efforts

- **Cerro Grande Fire**
  - –May 2000
  - –48,000 acres
  - –Increased flooding concerns
  - –Increased sediment transport concerns
  - –Flood Controls

Los Alamos

Pajarito

•Recent Events / Subsequent Storm Water Management Efforts

- **Las Conchas Fire**
  - –June 2011
  - –>150,000 acres
  - –Increased flooding concerns
  - –Watershed/Boundary Controls
  - –Controls through watershed

Potrillo

•Recent Events / Subsequent Storm Water Management Efforts

- **September 2013 Rains**
  - –Sep 10 - 17
  - –200% - 600% of normal precipitation for period

Pueblo

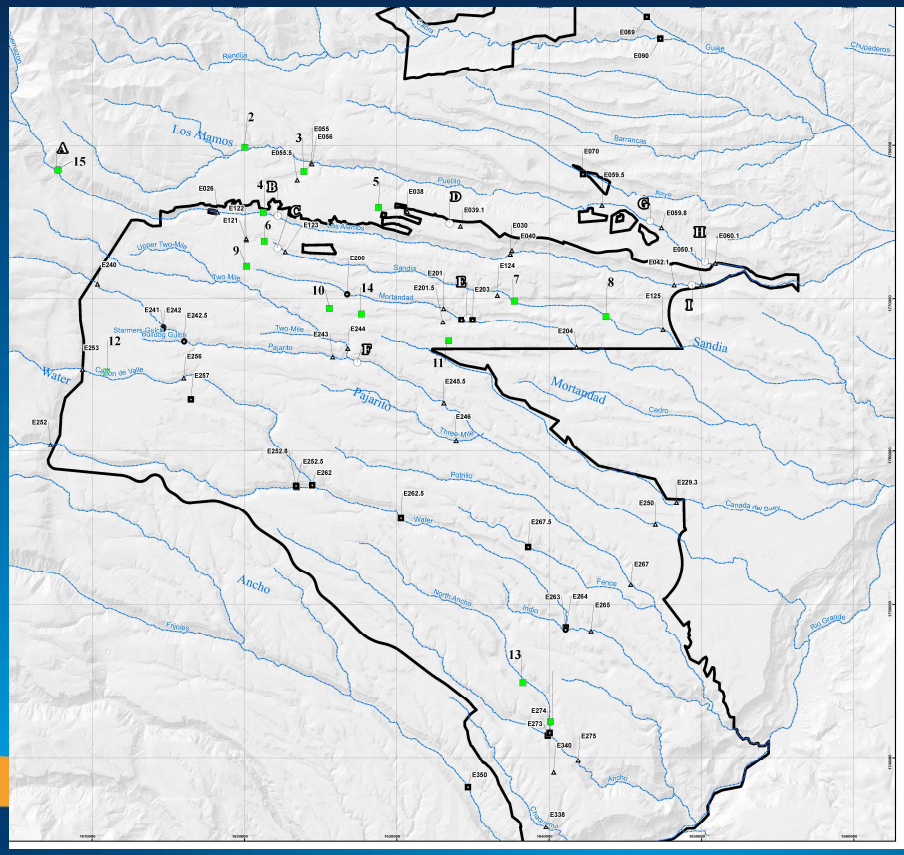
•Integrated Approach to Storm Water Management

- **Watershed Priority**
- **Primary Considerations**
  - –NEPA - Timeline
  - –Not used to meet other regulatory program requirements

Pollutant Loading	Flow Frequency/Discharge: Low	Flow Frequency/Discharge: Moderate	Flow Frequency/Discharge: High
Low	Twomile Canyon Canada del Buey Ancho Canyon Chaquehui Canyon	Pajarito Canyon Water Canyon	
Moderate	Potrillo Canyon Fence Canyon	Pueblo Canyon	DP Canyon Los Alamos Canyon Cañon de Valle
High	Mortandad Canyon	Acid Canyon Sandia Canyon North Ancho Canyon	

•Integrated Approach to Storm Water Management

- **Secondary Considerations**
  - –Regulatory constraints for new subprojects
  - –Operations and maintenance requirements
  - –Public safety
  - –Full watershed approach
  - –Runoff potential and impervious surfaces
  - –Undesirable impacts to resources
  - –Maximum benefits to stakeholders and resources
  - –Rough Order of Magnitude Estimates/Available Funding

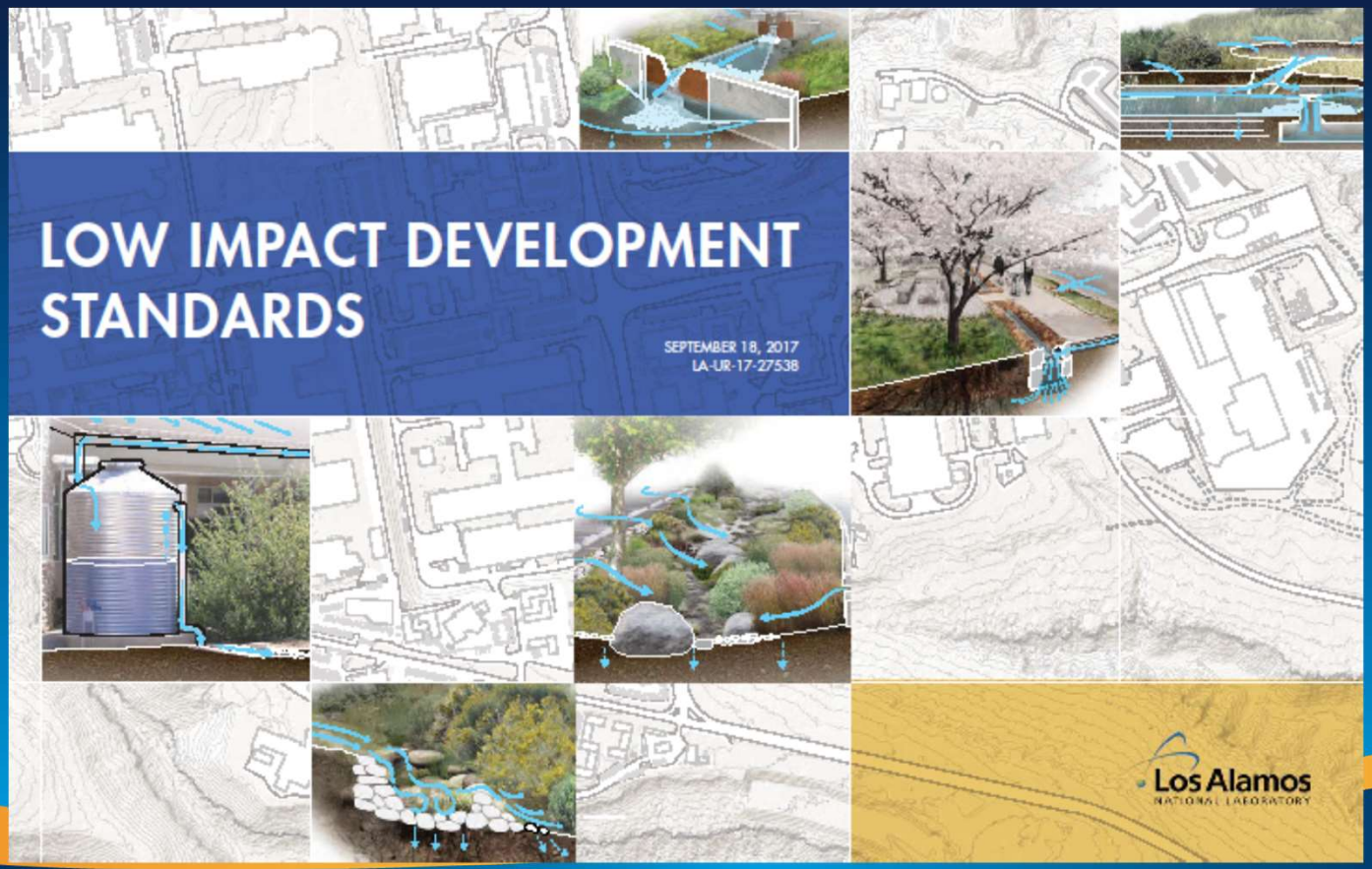


• Integrated Approach to Storm Water Management

• Top of Watershed - Low Impact Development (LID)

– Standards
- Provides project management and design engineers
- Selection criteria
- Concept Information
- Conflicts with traditional approach

– Master Plan
- Develop overall site-specific appropriate concepts
- Identify opportunities



• Integrated Approach to Storm Water Management

- **Watershed Controls**
  - Throughout canyon bottom
  - Current/Recent Projects

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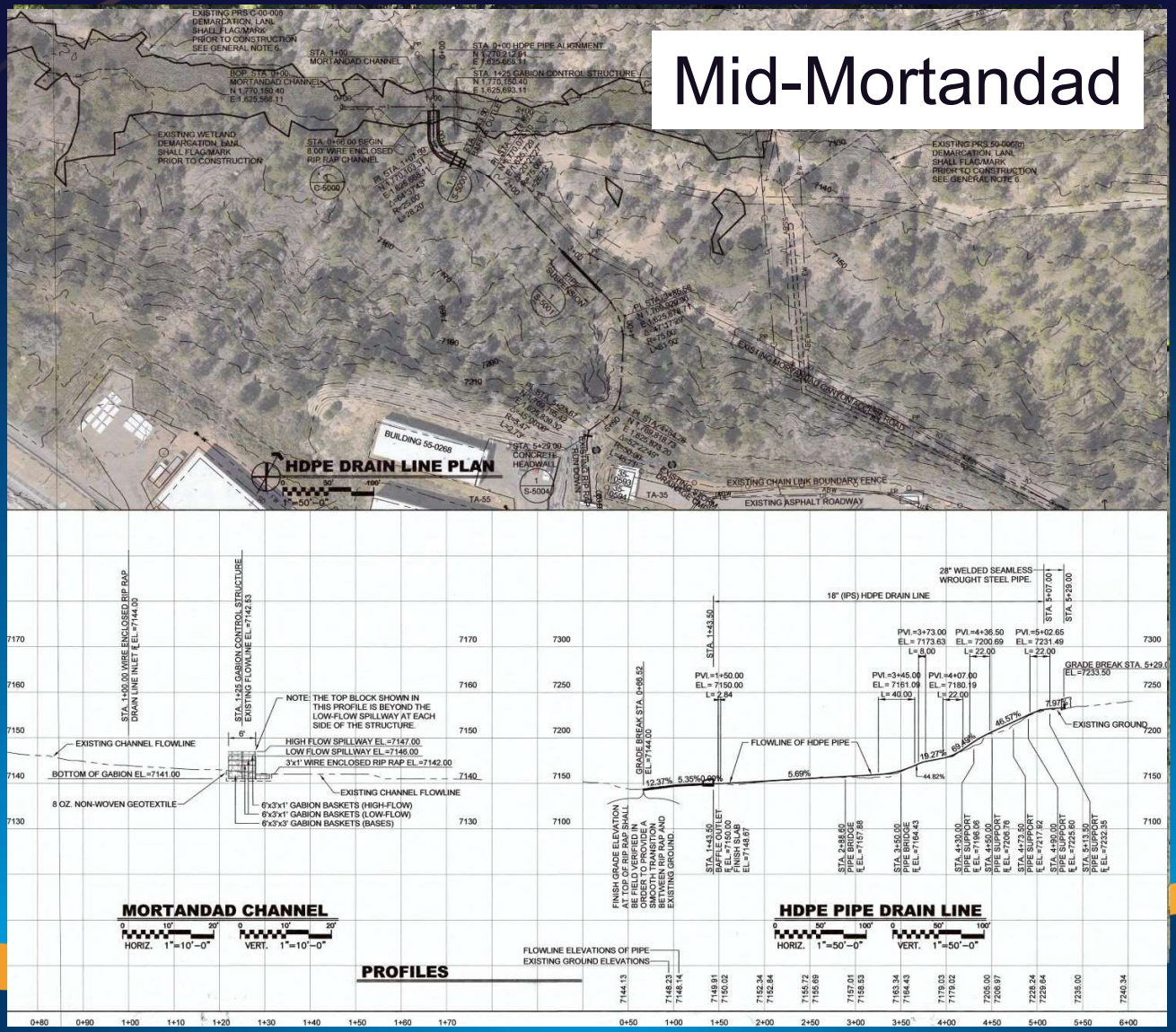

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QUESTIONS?