TETRA TECH

complex world | CLEAR SOLUTIONS™

Retrofit of the Pino Maintenance Yard

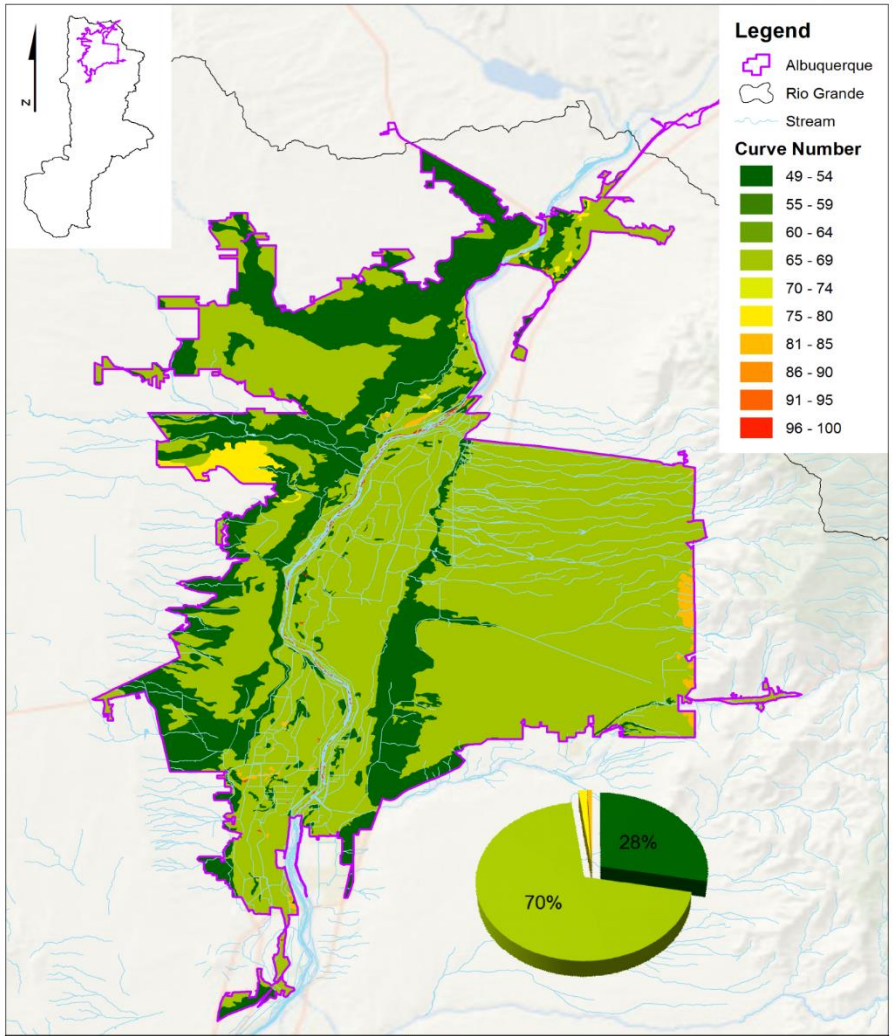
Calculating Percentile Storm (CWP, 2008)

Incorporate a stormwater quality design standard that manages on-site the 90th percentile storm event discharge volume associated with new development sites and 80th percentile storm event discharge volume associated with redevelopment sites, through stormwater controls that infiltrate, evapotranspire the discharge volume

Methods

- Identify pre-development conditions
  - Soils
  - Land use (assumed desert shrub)
- Hydrologic evaluation (TR-55) to define runoff-rainfall relationship for a range of rainfall depths which might cause measureable runoff
- Evaluate the minimum depth under predevelopment conditions which results in measureable runoff

CN Under Predevelopment Conditions



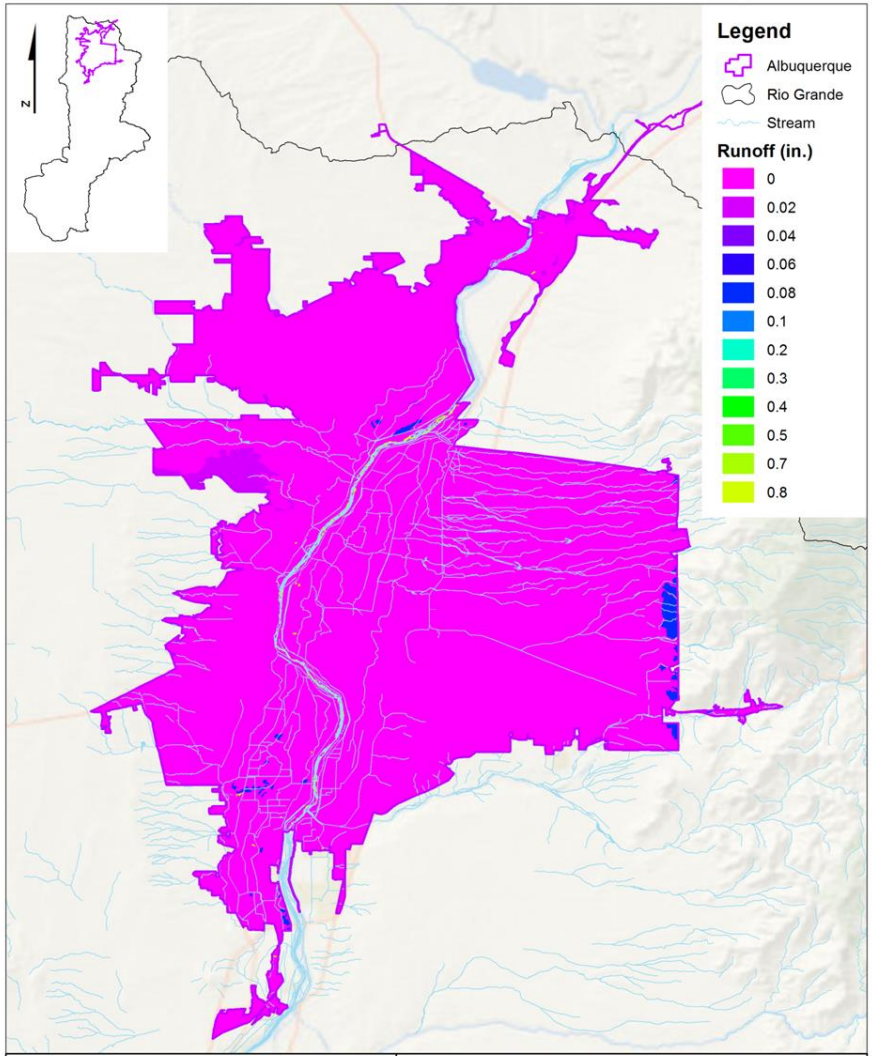
Albuquerque MS4 Areas
CN for Predevelopment (Good)

GCS North American 1983

Determining Predevelopment Hydrology: Methods

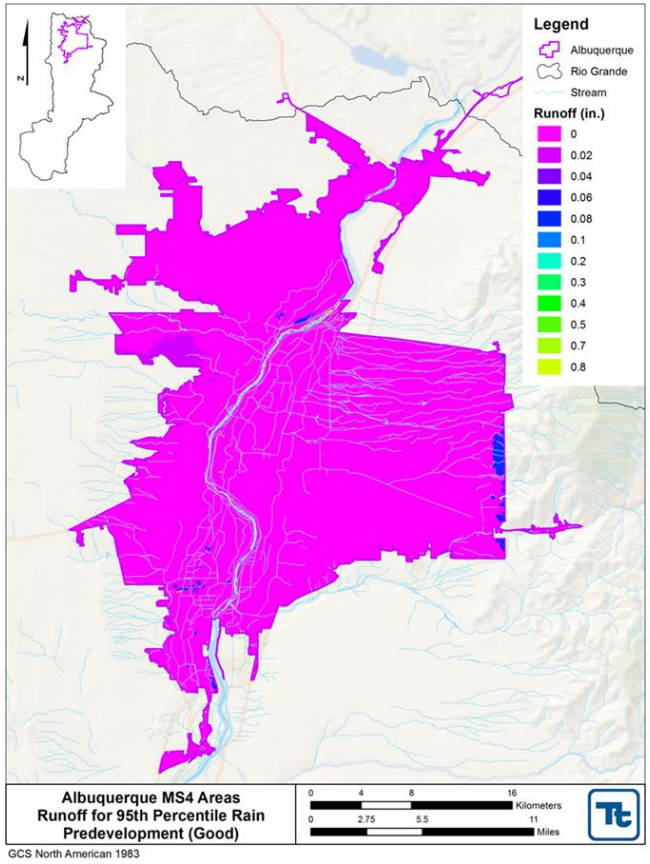
- Develop hydrologic response model of subject area (SWAT)
- Conduct long term (30 years) simulation using gauge precip. Data
- Compare predicted runoff to rainfall depth

Runoff from 95th %-ile storm under predevelopment conditions

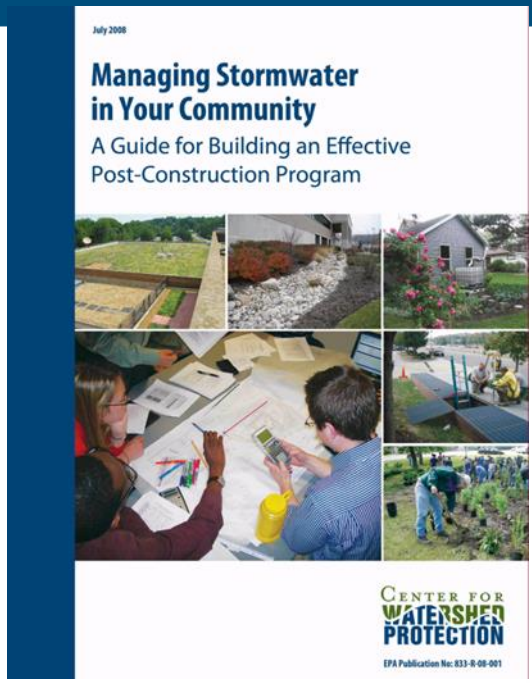


Results and Discussion

- Measurable runoff, defined as ranging between 0.01” and 0.1”, occurs between 90th and 95th percentile event

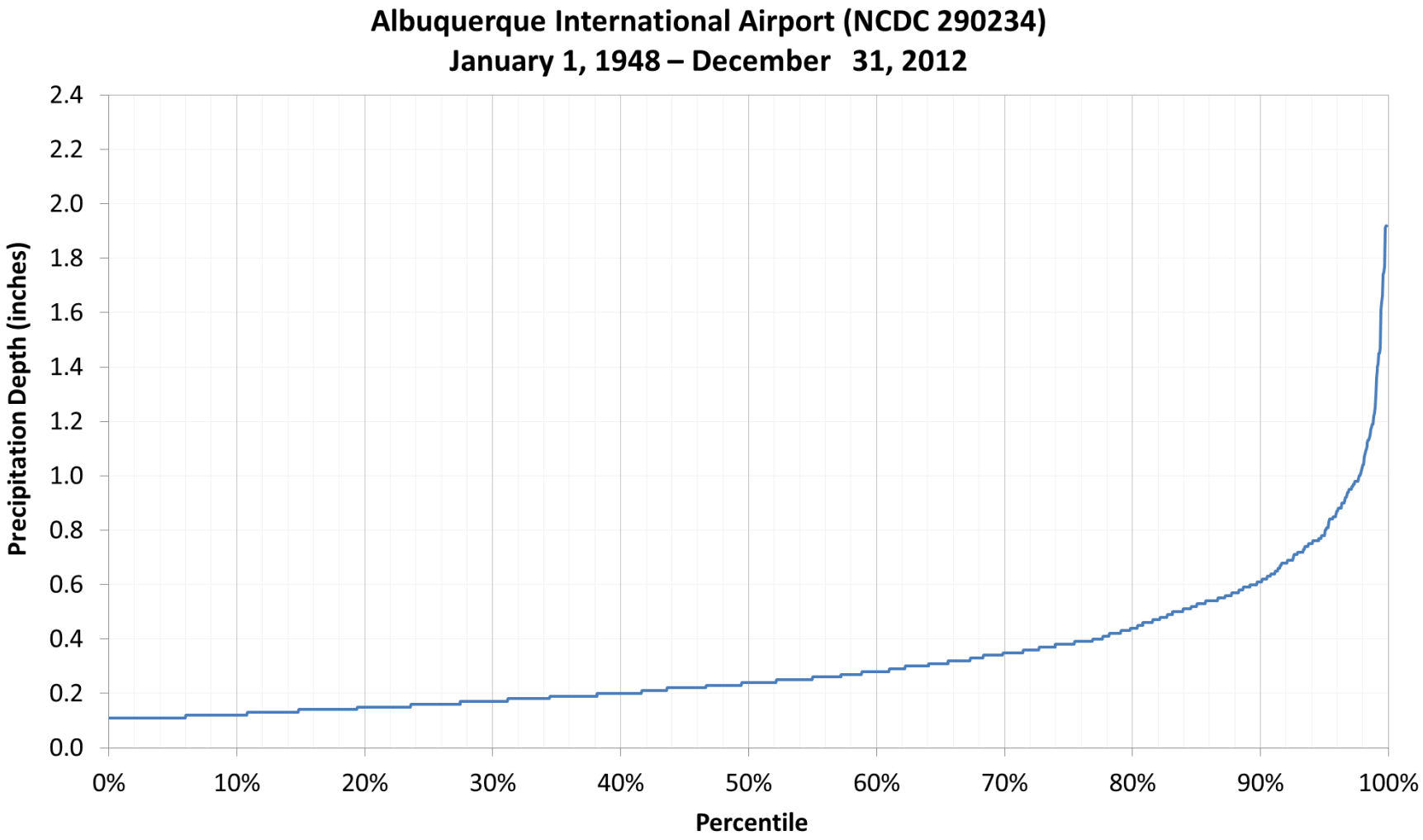


Calculating Percentile Storm (CWP, 2008)

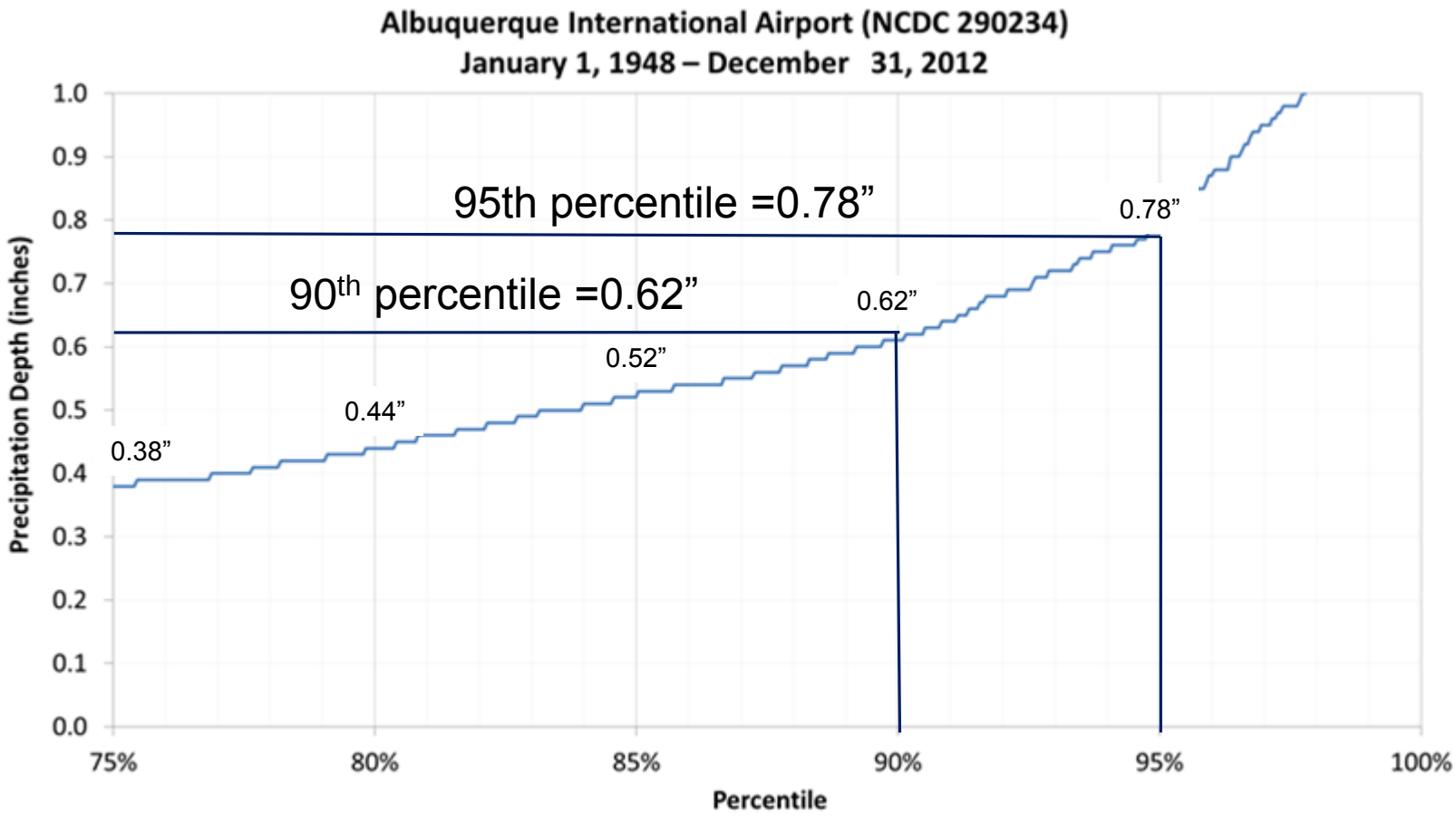


1. Obtain a long-term rainfall record
   - daily precipitation
   - at least 30 years of daily record
   - Remove rainfall events less than 0.1 inch and snowfall events that do not immediately melt.
2. Develop frequency distribution for the percentage of rainfall events less than or equal to a given numerical value (e.g., 0.2, 0.5, 1.0, 1.5 inches).
3. Construct a curve of rainfall depth versus frequency
   - Evaluate rainfall depth values for 75%, 80% , 90%, 95% , and 99% frequencies.

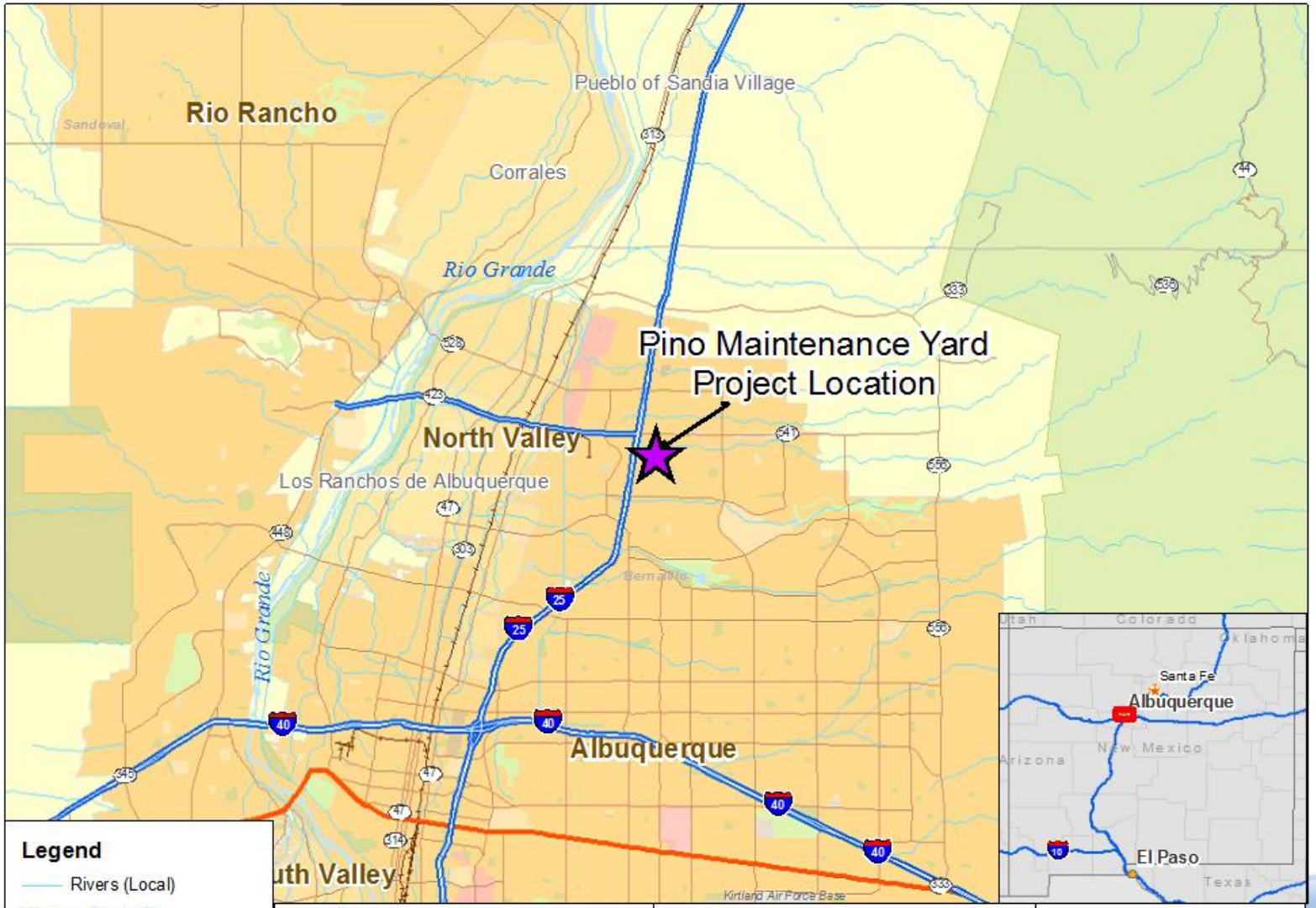
Percentile Rainfall Analysis



Percentile Rainfall Analysis (continued)



Project Elements and Goals



Legend

Rivers (Local)

Water (Local)

Lake/Pond/Stream/River

Swamp/Marsh

N

0 0.5 1 2 Miles

City of Albuquerque
New Mexico
Project Location

TETRA TECH

TETRA TECH

EPA Storm Water Permit Mandate

NPDES Permit No. NMS000101
Page 1 of Part I

Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

NPDES Permit No. NMS000101

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"), the co-permittees as listed below,

City of Albuquerque
Department of Municipal Development
P.O. Box 1293
Albuquerque, NM 87103

Albuquerque Metropolitan Arroyo
Flood Control Authority (AMAFCA)
2600 Prospect NE
Albuquerque, NM 87107

New Mexico Department of Transportation
District HI
P.O. Box 91750
Albuquerque, NM 87199-1750

University of New Mexico
Department of Safety, Health
and Environmental Affairs 1801
Tucker Street N.E.
Albuquerque, NM 87131

are authorized to discharge from all portions of the Albuquerque Municipal Separate Storm Sewer System (MS4) owned or operated by any permittee listed above, to waters of the United States, in accordance with the Storm Water Management Program(s), effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, IV, V, VI, VII, and VIII herein.

This is a renewal NPDES permit issued for these portions of the municipal separate storm sewer system.

This permit shall become effective on March 1, 2012

This permit and the authorization to discharge shall expire the earlier of (1) ninety (90) days following the effective date of a watershed-based permit for the regulated Middle Rio Grande MS4s in the Albuquerque area or (2) at midnight February 28, 2017

Issued on January 31, 2012

11 lam K. on ker. P.E.
Acting Director
Water Quality Protection Division

Prepared by

. Perea
Environmental Scientist
NPDES Permits and TMDLs Branch

c. Pollution Prevention/Good Housekeeping for Municipal/Co-permitee Operations.. The permittee shall implement, review and enhance their current pollution prevention practices and develop and implement new source control procedures as detailed in this part to control the amount of pollutants in stormwater contributing to or discharging from its MS4. ……

(ii) Measures to control or eliminate the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer stations, fleet or maintenance shops with outdoor storage areas, and salt and sand storage locations and snow disposal areas.

Project Elements and Goals

- Lead: DMD Storm Water Management Section
- Scope is to Develop LID Techniques to capture the stormwater quality design storm at the site
- Tasked to look at permeable pavements, swales, storm water harvesting, bioretention, and extended detention.
- Goal is to make this a demonstration project for LID techniques suitable for an arid climate

LID Retrofit Study – City Project # 5280.0

- Study will Prioritize Recommended Projects
  - For In-house Construction
  - For Future Storm Drainage Bond Issues

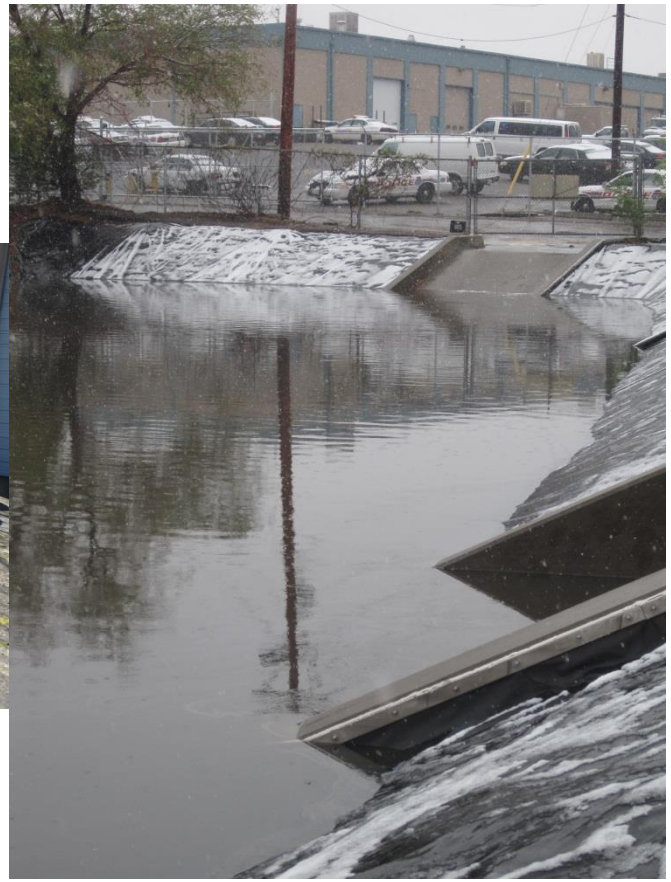
Projects may range from Porous Pavements to Vegetated Swales in Parking Areas

To

New Salt Storage Facilities, Oil Water Separators and a Central Truck Washing Facility

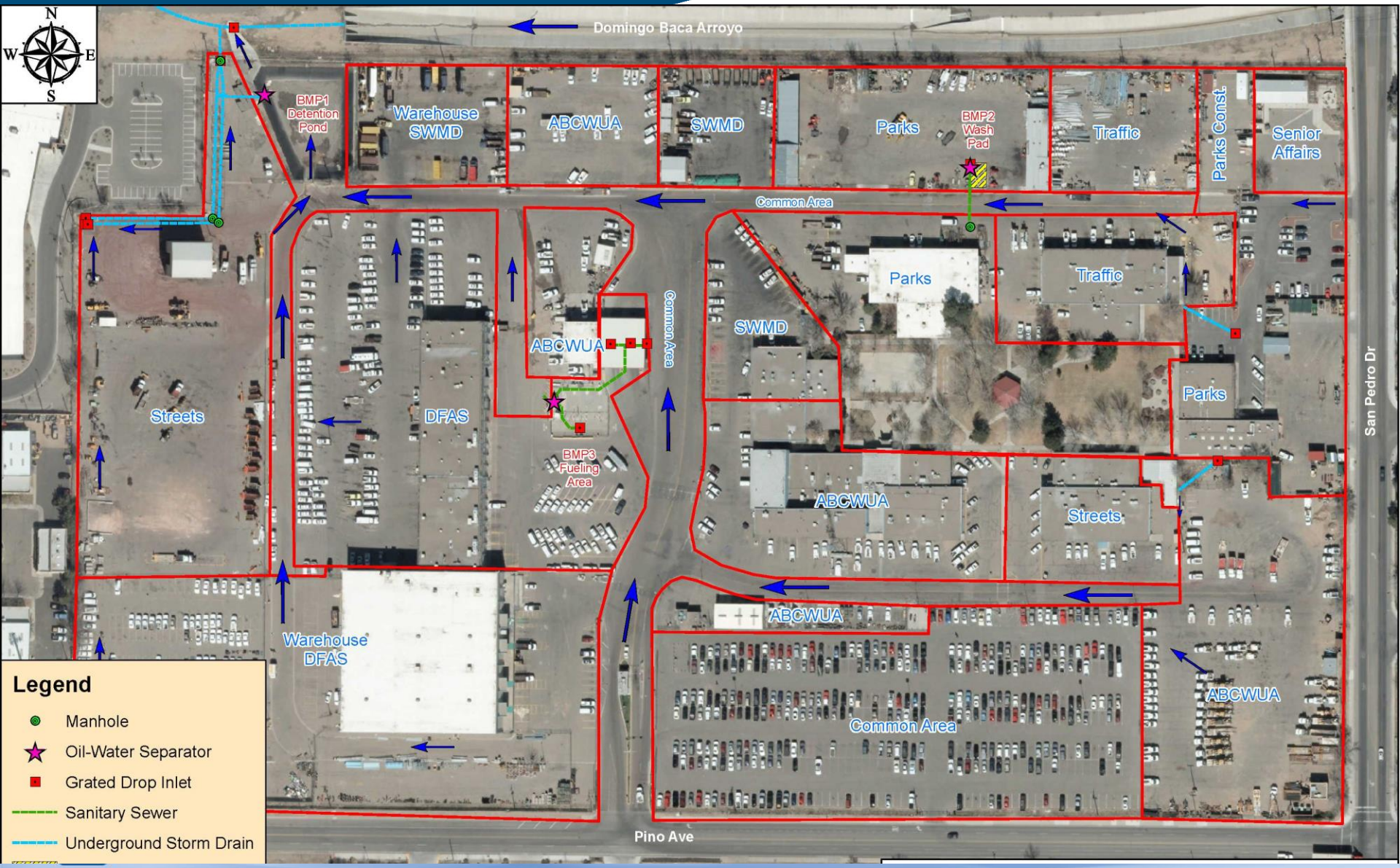
LID Retrofit Study – City Project # 5280.0

Why should we care?



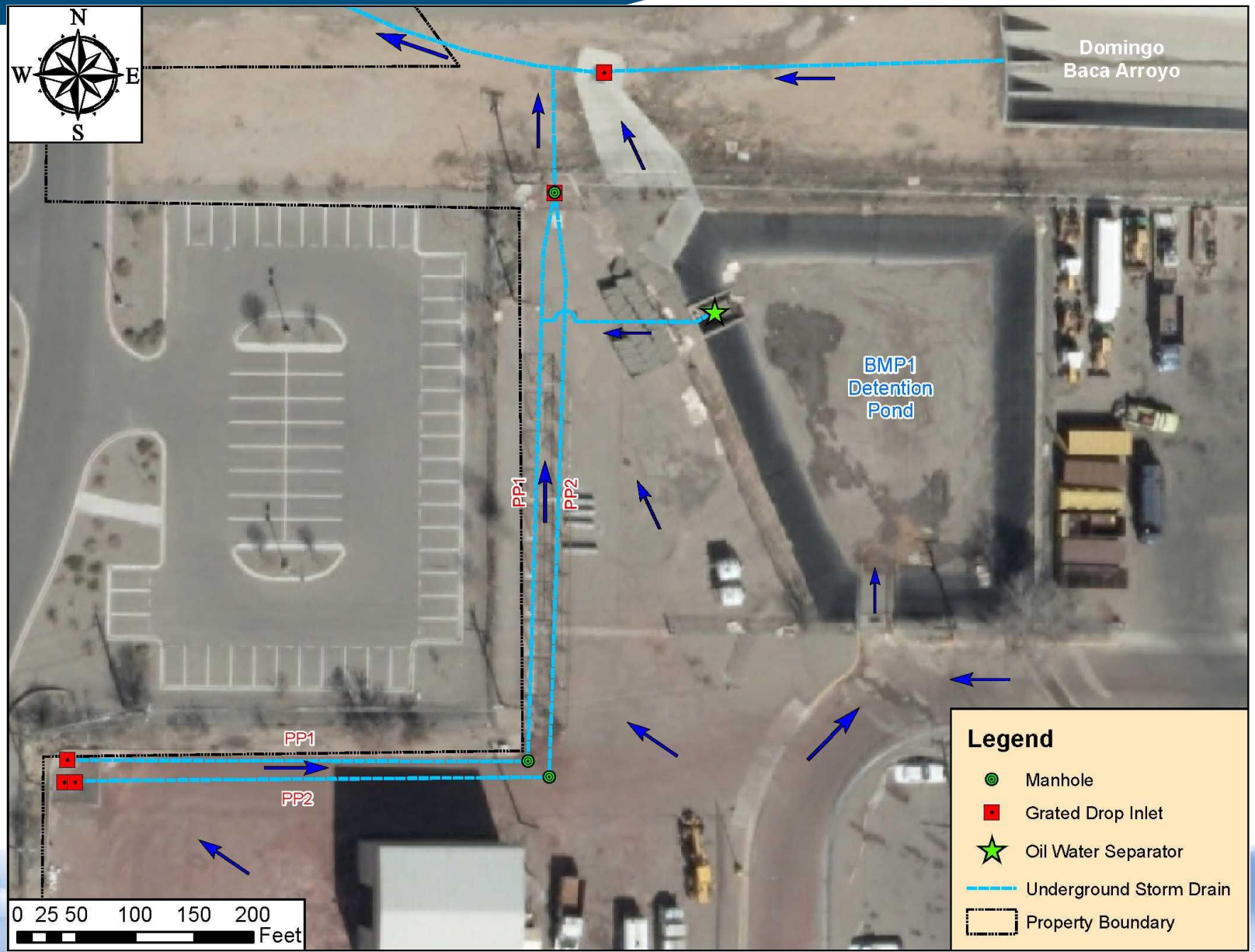
Let's follow the water ……

Drainage Schematic



Detention Pond

Detention Pond Plumbing



Detention Pond Drains to Domingo Baca Arroyo

Domingo Baca Inlet to North Diversion Channel

Source: City of Albuquerque

North Diversion Channel Outfall to Rio Grande

Source: City of Albuquerque

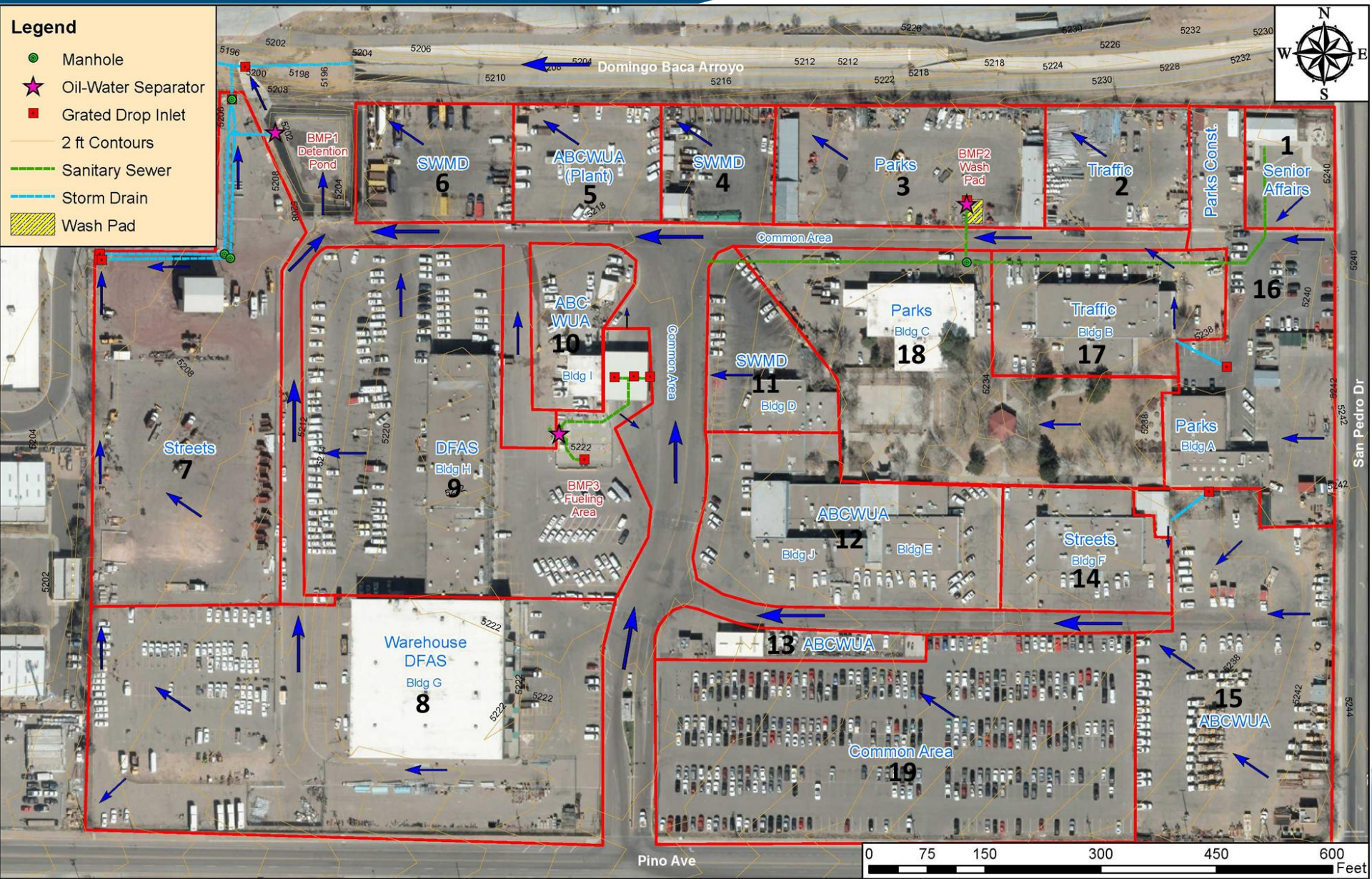
Question:
How far is it from the North Diversion Channel Outfall downstream to the Drinking Water Project Diversion Dam?

LID Retrofit Study

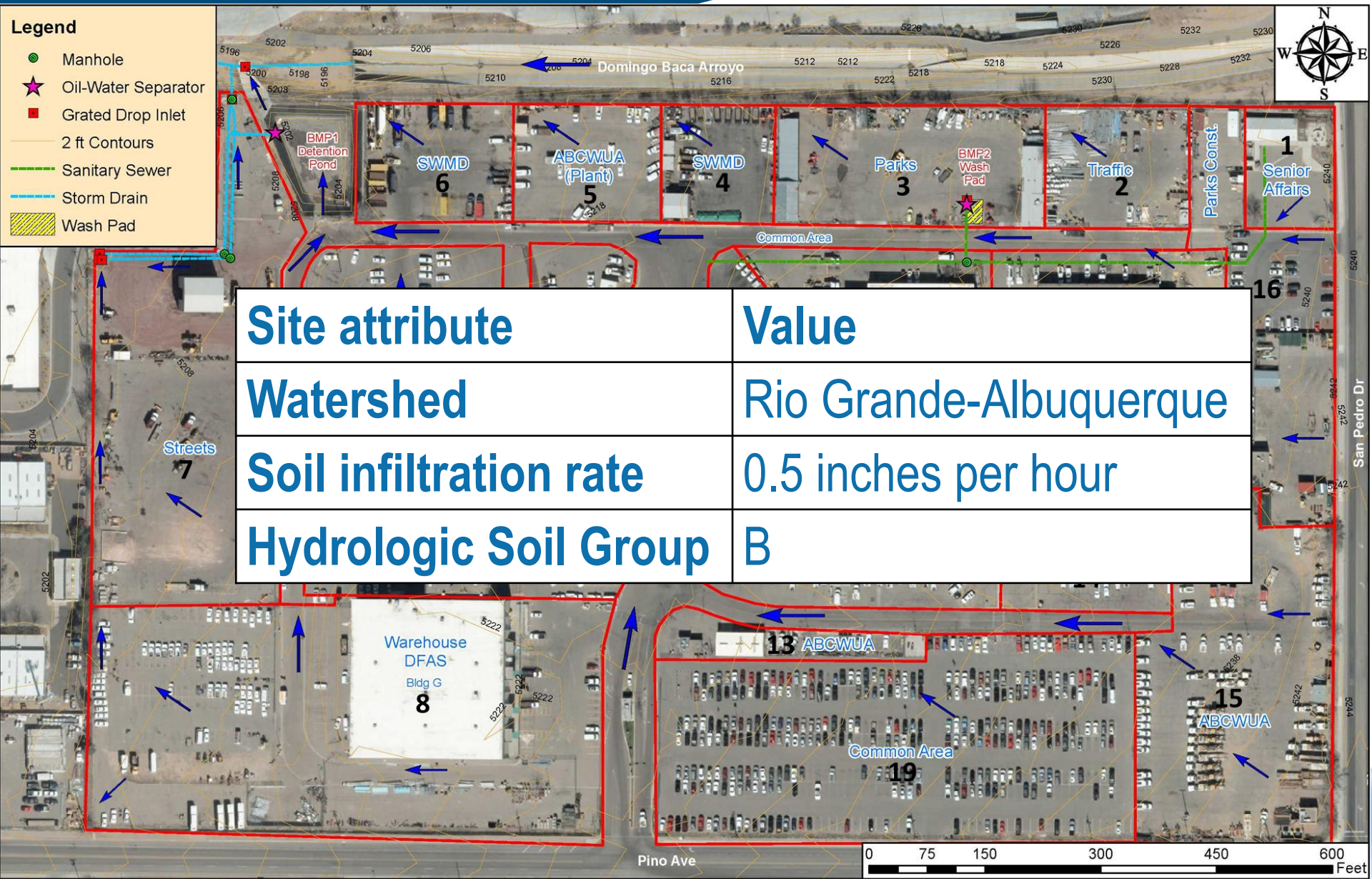
- This is not a “housekeeping” study.
  - But we will make note of it:

  - Both good…… ……and not so good…

LID Retrofit Study

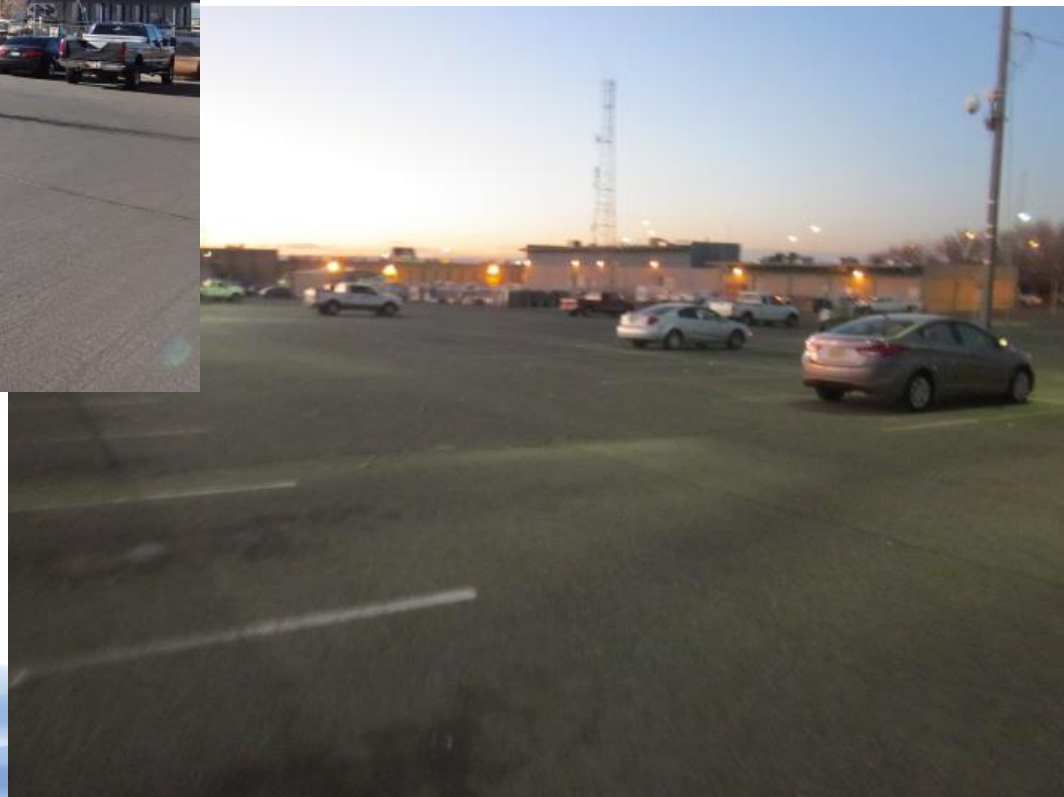


LID Retrofit Study



Site attribute	Value
Watershed	Rio Grande-Albuquerque
Soil infiltration rate	0.5 inches per hour
Hydrologic Soil Group	B

LID Retrofit Study



TETRA TECH

LID Retrofit Study

TETRA TECH

LID Retrofit Study

Subwatershed ID	Drainage Area (ac)	Responsible Party	Percent Impervious (%)	WQ Runoff Volume (ft^3)	100-yr Runoff Volume (ft^3)
1	0.418	Senior Affairs	81.1	369	3,326
2	0.681	Traffic	95.7	709	6,156
3	1.254	Parks	96.2	1,314	11,394
4	0.514	SWMD	96.8	542	4,695
5	0.667	ABCWUA (Plant)	97.4	707	6,115
6	0.716	SWMD	96.8	755	6,535
7	2.923	Streets	97.6	3,107	26,856
8	4.681	Warehouse DFAS	92.6	4,720	41,262
9	3.692	DFAS	100.0	4,020	34,573
10	0.531	ABCWUA	100.0	579	4,967
11	0.661	SWMD	94.2	678	5,902
12	1.675	ABCWUA	98.2	1,791	15,458
13	0.362	ABCWUA	100.0	395	3,393
14	0.756	Streets	100.0	823	7,078
15	2.447	ABCWUA	93.5	2,492	21,734
16	1.813	Parks	94.6	1,868	16,251
17	1.062	Traffic	75.6	874	8,015
18	2.371	Parks	60.7	1,567	15,270
19	3.577	Common Area	96.4	3,755	32,544

LID Retrofit Study

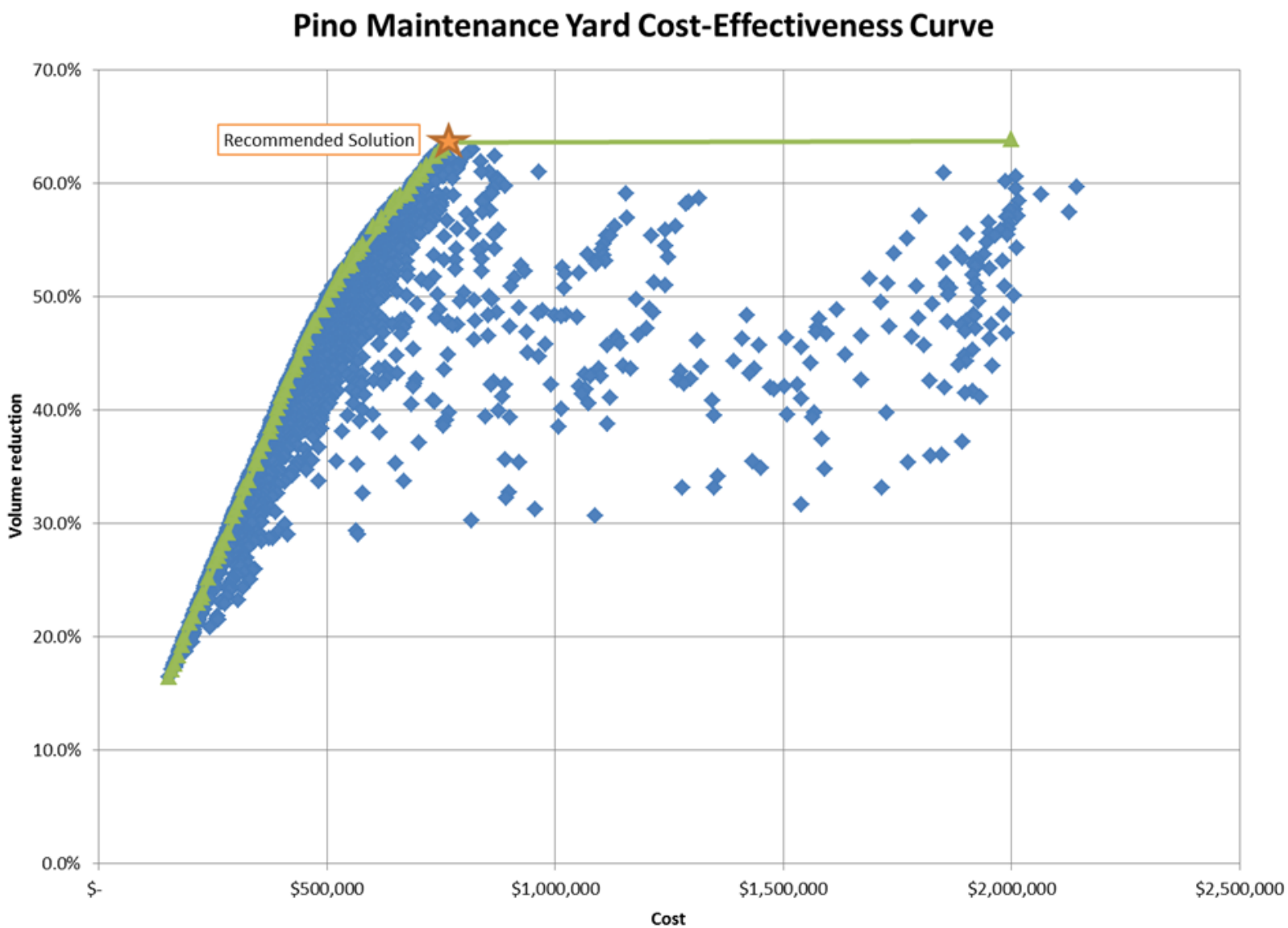
Pino Maintenance Yard - Recommended BMP Retrofits

NAD_1983_StatePlane_New_Mexico_Central_FIPS_3002_feet
Map produced 07-02-2013

0 50 100 200 Meters
0 150 300 600 Feet

TETRA TECH
complex world | CLEAR SOLUTIONS™

LID Retrofit Study



LID Retrofit Study

Pino Maintenance Yard - Recommended BMP Retrofits

NAD_1983_StatePlane_New_Mexico_Central_FIPS_3002_feet
Map produced 07-02-2013

0 50 100 200 Meters
0 150 300 600 Feet

TETRA TECH
complex world | CLEAR SOLUTIONS™

Subwatershed ID	Drainage Area (ac)	BMP Type (or routing)	Length (ft)	Width (ft)	Area (ft^2)	Treatment Volume (ft^3)
1	0.418	Bioretention	13.0	13.0	169	369
2	0.681	Bioretention	129.0	4.0	516	709
3	1.254	Bioretention	139.0	4.0	556	1,314
4	0.514	Bioretention	133.0	4.0	532	542
5	0.667	Bioretention	115.0	4.0	460	707
6	0.716	Bioretention*	691.0	5.0	3,455	755
7a	0.397	NONE	-	-	-	-
7b	2.526	Bioretention	425.0	6.0	2,550	4,201
		Permeable Pavement	413.0	8.0	3,304	
8a	1.674	Bioretention	273.0	6.0	1,638	1,688
8b	3.007	Route to Permeable Pavement in 7b and 9b	-	-	-	-
9a	0.513	NONE	-	-	-	-
9b	1.991	Permeable Pavement	413.0	8.0	3,304	3,684
9c	1.188	NONE	-	-	-	-
10	0.531	NONE	-	-	-	-
11	0.661	Route to Bioretention in 18a	-	-	-	-
12a	0.262	Route to Bioretention in 18b	-	-	-	-
12b	1.412	NONE	-	-	-	-

LID Retrofit Study

Subwatershed ID	Drainage Area (ac)	BMP Type (or routing)	Length (ft)	Width (ft)	Area (ft^2)	Treatment Volume (ft^3)
13	0.362	NONE	-	-	-	-
14a	0.369	Route to Bioretention in 15a	-	-	-	-
14b	0.387	NONE	-	-	-	-
15a	0.772	Bioretention	76.0	6.0	456	1,189
15b	1.675	Bioretention	251.0	6.0	1,506	1,705
16a	0.298	Bioretention	61.0	4.0	244	307
16b	0.455	Permeable Pavement	15.0	38.0	570	469
16c	1.059	Route to Bioretention in 17a	-	-	-	-
17a	0.455	Bioretention	24.0	30.0	720	1,466
17b	0.606	NONE	-	-	-	-
18a	1.022	Bioretention	169.0	6.0	1,014	1,353
18b	0.638	Bioretention*	8.0	25.0	200	702
18c	0.711	Bioretention*	16.5	30.0	495	470
19	3.577	Permeable Pavement	161.0	38.0	6,118	3,755

LID Retrofit Study

Pino Maintenance Yard - Recommended BMP Retrofits

NAD_1983_StatePlane_New_Mexico_Central_FIPS_3002_feet
Map produced 07-02-2013

0 50 100 200 Meters
0 150 300 600 Feet

TETRA TECH
complex world | CLEAR SOLUTIONS™

LID Retrofit Study

TETRA TECH

LID Retrofit

Constituent	Percent Reduction
Flow	64.0%
TSS	65.0%
TN	65.0%
TP	65.0%
Tcu	65.0%
TPb	65.0%
TZn	65.0%
TCr	65.0%
Fecal	65.0%
HC	62.0%

LID Retrofit Study

Pino Maintenance Yard - Recommended BMP Retrofits

NAD_1983_StatePlane_New_Mexico_Central_FIPS_3002_feet
Map produced 07-02-2013

0 50 100 200 Meters
0 150 300 600 Feet

TETRA TECH
complex world | CLEAR SOLUTIONS™