COMPARATIVE ANALYSIS OF THE 1990 SOUTH BROADWAY SECTOR DRAINAGE MANAGEMENT PLAN BY BOHANNAN-HUSTON, INC. AND THE 2013 SOUTH BROADWAY DRAINAGE & WATER QUALITY MANAGEMENT PLAN BY URS

Introduction

In an ongoing effort to improve storm water master planning for the South Broadway neighborhoods two major studies for the area have been performed in the last two decades. The consulting firm of Bohannan-Huston, Inc. prepared the South Broadway Section Drainage Management Plan (DMP) in 1990. A subsequent analysis of the same study area, called the South Broadway Drainage & Water Quality Management Plan (SBDMP), was prepared by the URS Corporation in 2013 (refer to *Figure E-1: Study Area Limits* included below). The goal of the present report is to provide a comparative analysis of these two studies based on the various planning alternatives adduced by each firm. This comparative analysis will seek to determine to what extent the two studies have provided reasonable solutions to the drainage problems encountered in the South Broadway area and to identify drainage analysis deficiencies in areas that were either overlooked or only partially treated. This report does not seek to report on the validity or correctness of the hydrologic and hydraulic parameters and analyses performed by the two firms mentioned above.

The 1990 Bohannan-Huston DMP Study

As part of the City of Albuquerque's storm water master planning effort, the Bohannan-Huston DMP Study presented the results of existing and developed conditions drainage analysis in 1990 for the South Broadway Sector. Bohannan-Huston, Inc. (BHI) reported at the time that construction of Interstate 25 and the South Diversion channel had effectively diverted most off-site flows which had previously entered the South Broadway area from the east. After the diversions the flooding occurring in the South Broadway Sector was confined to low lying areas from on-site runoff between I-25 and the railroad tracks. (Refer to the study area map included below.) BHI pointed out in its report that the only outfall for the study area was the San Jose Drain.

BHI used the SWMM computer program to model the hydrology, the surface flow, street flow, channel flow, pipe flow (both pressure and non-pressure), and pump hydraulics for the Bell/Commercial pump station within the study area. The storm modeled was the 6-hour rainfall event being used by the City of Albuquerque at the time. A schematic of the South Broadway SWMM model used by BHI is included below as *Plate 11*. As can be seen by the schematic, the South Broadway, Kathryn, and Mechem Ponds were nonexisteent at the time. These ponds were built subsequently. Using the SWMM program 10-year and 100-year flow depths for storm sewer pipes, 10-year and 100-year flow depths in streets, and 100-year flood boundaries within the study area were determined. BHI presented a summary of the predicted flood damages for the 10-year and 100-year storms for existing conditions (refer to Section 11.0 of the BHI study). BHI also determined that the Bell/Commercial Pump Station was undersized for the 100-year event.

Using the SWMM software BHI prepared existing and developed conditions models of the study area. It was determined that three main trunk lines running north/south along Broadway, Williams, and Commercial to the San Jose Drain were undersized for existing and developed conditions. Surcharging of the higher elevation Broadline trunkline had the effect of spilling excess runoff out of the system and westward to the adjacent Williams storm drain sytem which in turn also overflowed and proceeded westward into the Commercial storm sewer system. The 1990 existing conditions capacity of the San Jose Drain was computed to be 350 cfs. Under fully developed conditions, runoff from the study site increased substantially and overcharged the San Jose Drain beyond capacity. In order to convey discharge from the three northern storm sewer lines BHI determined it would be necessary to upsize the San Jose Drain for a length of 12,000 feet to its confluence with the Riverside Drain. In addition BHI determined that the San Jose Drain outfall into the Rio Grande would also have to be upsized for greater carrying capacity.

In its SWMM model BHI applied the use of detention ponds to attenuate peak runoff rates, reduce flooding, and eliminate surcharging of the South Broadway storm water drainage system and the San Jose Drain. The proposed solutions were termed Improvement Projects in the BHI study. The Improvement Projects incorporate the construction of two major detention ponds: a North Detention Pond and a South Detention Pond. The North Detention Pond was designed to capture the runoff generated between Santa Fe on the north and Bell on the south and then direct this runoff to the Bell/Commercial Pump Station. The South Detention Pond designated as Project 1-04-B described three differnet locations for the South Pond. These were designated at Options 1, 2, and 3. (Refer below to *Plate 11: SWMM Model Schematic* for the locations of the proposed ponds.) Options 4 and 5 of Project 1-04-B proposed upsizing the San Jose Drain as an alternative to detention. In all BHI's Drainage Management Plan reported six Improvement Projects designed to provide reasonable solutions to the drainage problems encountered in the South Broadway area. (Refer to *Section 14.2.2 Improvement Projects* in the BHI study for a listing of the six Improvement Projects.)

The 2013 URS SBDMP Study

The objective of the URS SBDMP study was to revise the 1990 DMP by updating the hydrology and adding storm sewer system detail and storm system revisions. *Appendix C* of the 2013 SBDMP summarizes the results of 49 alternatives covering six subsystems which make up the South Broadway System (refer to *Figure C.1: Subsystem Delineation*). Selected alternatives were used as components to build improvement options. Six improvement options were developed to reduce flooding caused by the 100-year, 24-hour storm throughout the South Broadway System. The six improvement options are summarized in Table 3 and described in greater detail in Table 4 of the SBDMP (refer to Tables 3 and 4 included below). Plan sheets depicting these options are also included as an aid in graphically visualizing the six improvement options (refer to *Figures D.1 – D.6* below).

URS Recommended Improvement Option

Although the URS SBDMP study describes six improvement options in detail, only one Recommended Improvement Option was put forth by URS. The Recommended Improvement

Option involved expansion of the three existing detention facilites, restriction of flow to undersized storm sewer lines, the installation of improved detention pond outlets, and construction of additional storm sewer trunkline. The selected improvement was Improvement Option 5. This Recommended Improvement Option was divided by URS into four projects three of which involve pond expansion and can be constructed independently of one another. The four projects listed under Improvement Option 5 were prioritized based on flood reduction potential. *Figure D* below provides a graphical representation and written description of each project forming a part of the Recommended Improvement Option in the URS study. Each of these four projects was also termed "Priority". The URS study indicated that three of the Priorities forming part of Improvement Option 5 (the Mechem Pond modifications, the Kathryn Pond expansion, and the South Broadway Pond expansion) could be constructed at anytime and independently of one another. URS recommended that Priority 4 of Improvement Option 5 not be constructed until the three pond improvements had been completed.

Comparative Observations concerning the 1990 Bohannan-Huston DMP Study and the 2013 URS SBDMP Study

Although a time interval of twenty-three years transpired between the two studies, certain similarities exist. Both studies centered on the same geographic area constituting the South Broadway Sector of Albuquerque. Both BHI and URS utilized essentially the same project limits and the same drainage basins in hydrologic analysis. Both studies employed SWMM to model the hydrologic and hydraulic components of the study area. Another characteristic shared by both studies was the use of detention ponds and replacement of storm drain lines having insufficient pipe capacity to larger size pipe to achieve a reduction in flooding throughout the South Broadway Sector. The replacement and upsizing of storm sewer pipe occurred chiefly in the three main storm sewer lines running north to south along Broadway, William Street, and Commercial.

Notable differences exist between the two studies. The URS SBDMP revised the 1990 DMP by updating the hydrology and using a 24-hour 100-year storm in addition to the 6-hour 100-year storm used by BHI. The effect this had was substantial. For instance the BHI 1990 model reported a peak 100-year discharge of 890 cfs in the San Jose Drain at the city limits whereas the URS 2013 model reported a peak discharge of 430 cfs for the same location. The same tendency was seen at various analysis points where peak discharges reported by URS were generally 50% of the flows reported by BHI for the same identical locations (refer to page 9 of the URS SBDMP study).

Another difference is seen in BHI's SWMM analysis which considered only two ponds in contrast to the three ponds by URS. The two ponds analyzed by BHI in its Improvement Projects included a North Detention Pond and a South Detention Pond. The North Detention Pond was set at a fixed location and the South Detention Pond had three alternate locations as can be seen in the exhibit labeled *Plate 11 Schematic*. In the interim between the two studies three major detention ponds within the South Broadway Sector were constructed by the City of Albuquerque. These included the South Broadway Pond, the Kathryn Pond, and the Mechem Pond. The URS study made great use of these three ponds in its analysis.

It is important to note that the URS study did not extend its SWMM model as far south as the BHI model (refer to *Figure E-1* which indicates the approximate area not included in the URS study). Also as can be seen on the *Plate 11* exhibit BHI recommended a pond location in the vicinity of Woodward and the San Jose Drain. As explained in more detail below in the section entitled "Impacts to the San Jose Drain" the URS study reported release rates from the South Broadway study area for Recommended Improvements 1 through 5 that would exceed the maximum capacity of the San Jose Drain reported by BHI in 1990.

Deficiencies Observed in the BHI DMP Study and the URS SBDMP Study

Water Quality

One immediately observes that the BHI study lacked a water quality component for treatment of the South Broadway Sector runoff. By current standards this might be considered a deficiency in its engineering analysis. This is understandable keeping in mind that the BHI study predated the period when water quality best management practices were consistently applied and formed a mainstay of drainage design. This was not this case with the 2013 URS study which included water quality considerations in its report. The URS SBDMP outlines six Improvement Projects that include water quality consideration. Throughout the URS study reference is made to water quality treatment through enhancement of the existing detention ponds. This is a general statement that does not indicate specifically the manner by which water quality treatment would be attained nor the efficiency of pollutant and sediment removal at the pond locations. In addition without this information it would be difficult to determine if any further water quality treatment of effluent discharging into the Rio Grande would be required.

Flooding at Pond Locations

URS reported that the six Improvement Options it considered generally reduce flooding throughout the South Broadway System. Under various Improvement Options it was reported that flooding was either entirely eliminated or significantly reduced. For Improvement Options 1 and 3 URS reported that flooding at the Kathryn Pond was reduced but not eliminated. At this pond location some amount of overtopping and downstream flooding would occur. The same comment was made with regards to Mechem Pond when considering Improvement Option 3. Flooding here would be reduced but not entirely eliminated. In light of this it is recommended that a more detailed analysis of these two ponds be performed in order to produce a model which demonstrates how flooding might be eliminated entirely.

Mechem Pond Standpipe

In its discussion regarding Improvement Options 3, 4, and URS recommended the construction of a water quality standpipe at the Mechem Pond. It was suggested that this standpipe would increase the detention time of the pond and therefore improve the water quality. It should be noted that the use of a standpipe which in effect reduces the area of outlet opening will have the added effect of backing up the amount of inflow into the pond and increase the level of storage required. More

detailed analysis of the hydraulic performance of this detention pond and outlet works is recommended to determine the amount of additional storage which might be required and to maintain a minimum amount of freeboard at this pond.

Connection of 72" Storm Drain to 36" Line along William Street

Under Improvement Options 3, 4, and 5 URS recommended routing flood flows under Thaxton to an existing 72 inch storm drain under William Street in order to bypass Mechem Pond. Elsewhere URS shows an existing 36 inch storm drain along William Street. It is recommended that the size of storm drain trunkline under William Street be verified .

Catch Basins Assumption

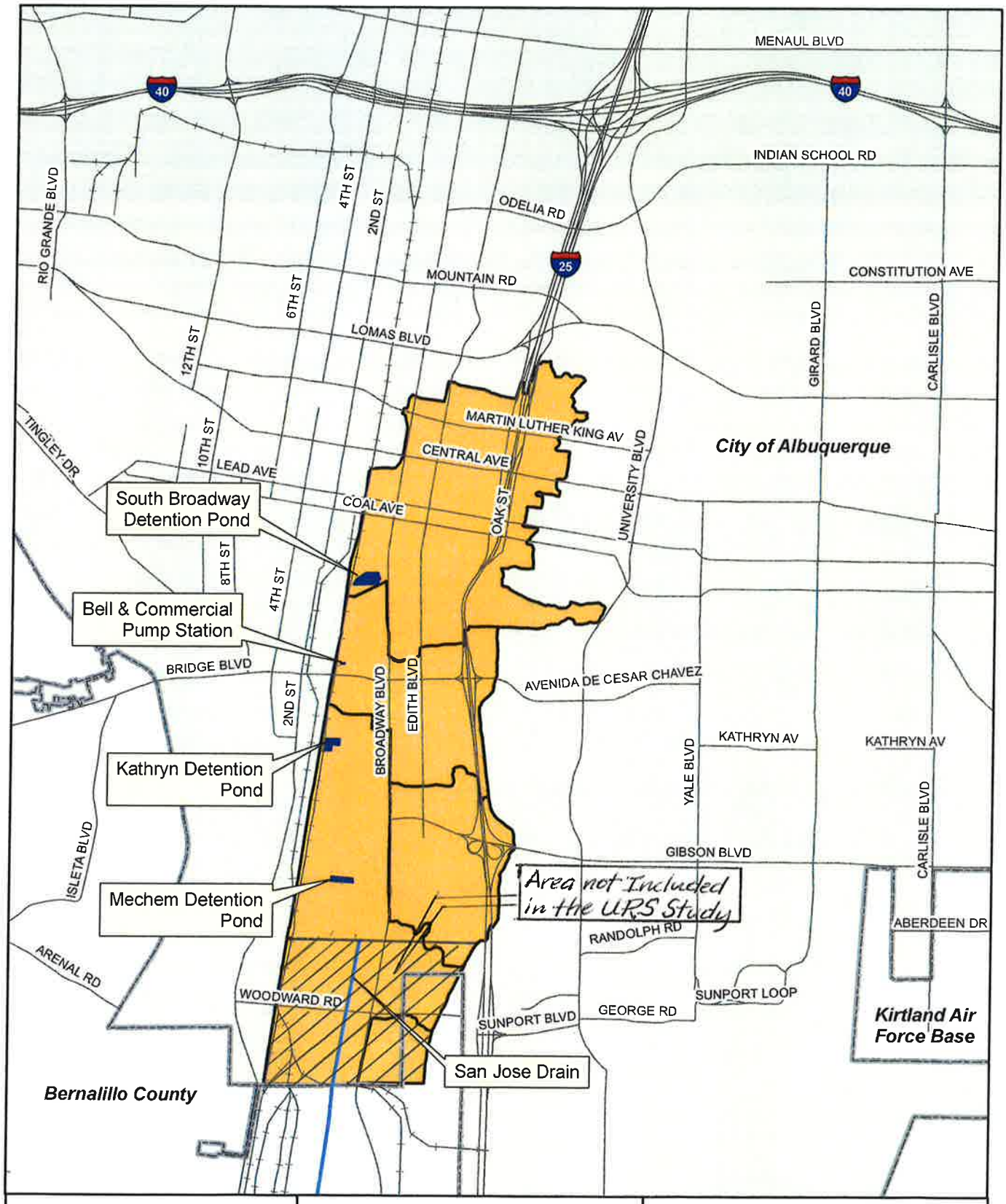
With regards to storm sewer and catch basins certain assumptions were made in in both studies in assessing the hydraulic capacity of the structures. Regarding the analysis of catch basins within the South Broadway Sector, the assumption was made that each catch basin has an inlet capacity of 4 cfs. URS reported approximately 530 existing inlets within the study area. Based on the 4 cfs per inlet capacity and the 100-year 24-hour watershed flows is was predicted that an additional 750 inlets would be required for the study area. Considering that the URS SBDMP is a macro-level storm water master plan study, the 4 cfs per inlet capacity is an acceptable assumption. Nontheless considering the projection of such a large amount of inlets that would be required to control flooding in the future, a more detailed storm drain analysis determining that actual inlet capacity of each catch basin would be required in order to arrive at a more realistic number of inlets and thus minimize the cost associated with providing additional inlets.

Impacts to the San Jose Drain

The BHI study made the observation that the area storm sewer lines flowed from north to south and eventually emptied into the San Jose Drain. It was noted that the San Jose Drain could accept 350 cfs from the study area. BHI therefore suggested in various of its Improvement Projects providing that concrete lining be provided and that the capacity of the San Jose Drain and crossing structures be increased to 1140 cfs downstream of the study area. It is unknown at this time if the City of Albuquerque or other agency carried out these recommendations in succeeding years. It was observed that the URS SBDMP does not make reference to any San Jose Drain improvements. The URS study indicated a release rate of 560 cfs under Recommended Improvement 1, 511 cfs under Recommended Improvement 2, 482 cfs under Recommended Improvement 3, 476 cfs under Recommended Improvement 4, and 476 cfs under Recommended Improvement 5. Keeping in mind that BHI indicated at the time of its study that the San Jose Drain would only be able to accept 350 cfs from the study area, the flow rates reported by URS would thus exceed the maximum capacity of the San Jose Drain reported by BHI in 1990. In the event the San Jose Drain improvements suggested by BHI have not been carried out since the 1990, the flows reported in the URS study will then exceed the San Jose Drain's capacity.

In order to avoid flooding of the San Jose Drain it is strongly recommended that a South Detention Pond as suggested by BHI in 1990 be constructed. BHI suggested three locations for the South Detention Pond. Current constraints would make it difficult to construct a South Detention Pond

at the locations indicated by Options 1, 2, and 3 of the BHI study. Recognizing the need of this detention facility Huitt-Zollars recommends the construction of a pond at a new location just west of the Option 1 location at the northwest corner of the intersection of Woodward and the San Jose Drain. Refer to *Plate 11* and *Figure D.4* for the proposed location of the South Detention Pond.



Study Area Limits

South Broadway Drainage and Storm Water Quality Management Plan

Figure E-1

TUNING 44-132 64256

PROJECT	PROPOSED IMPROVEMENT
1-01-1B	UPGRADE PUMPING STATION TO 185 cfs CAPACITY.
1-01-2B	REPLACE 36" FORCE MAIN W/72" GRAVITY LINE TO PUMP STATION. BUILD FORCE MAIN TO RIO GRANDE.
1-01-3B	BUILD 23 ac-ft DETENTION RESERVOIR. INSTALL 36" RCP.
1-02-1C	INSTALL 84" RCP.
1-02-2C	REPLACE 60" RCP W/ 84" RCP.
1-02-3C	DIVERT 48" RCP TO 72" RCP
1-03-1D	REPLACE 36" RCP W/ 72" RCP.
1-04-1B	BUILD 33 ac-ft DETENTION RESERVOIR. DIVERT SAN JOSE DRAIN INTO DETENTION RESERVOIR. DIVERT 36" WOODWARD LINE INTO DETENTION RESERVOIR. INSTALL 60" RCP DISCHARGE LINE FROM RESERVOIR TO SAN JOSE DRAIN.
1-05-1B	PLUG 54" RCP & INSTALL 72" RCP.
1-05-2B	REPLACE 60" RCP W/ 72" RCP.
1-06-C	BUILD 24" STORM DRAIN W/3 CATCH BASINS.

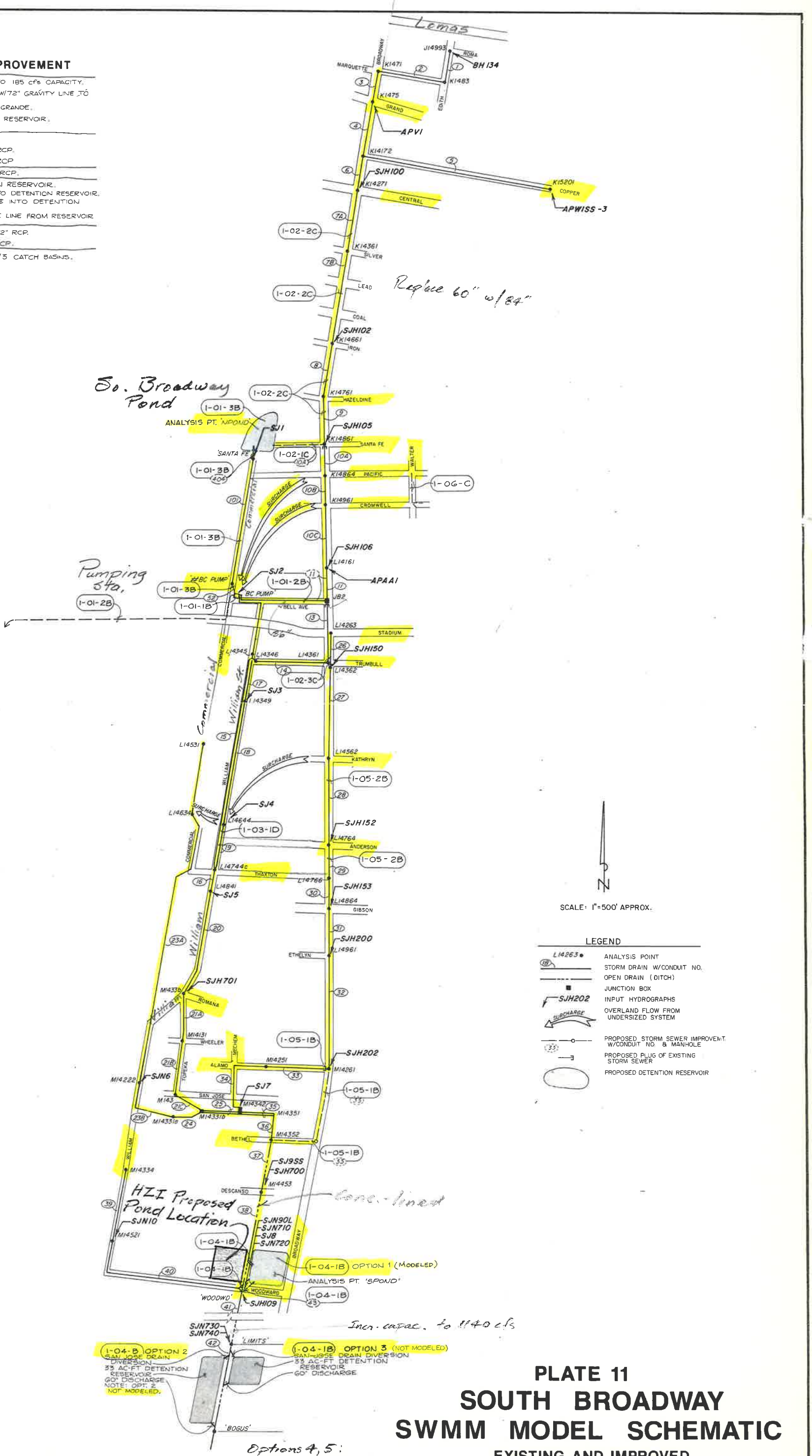


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PLATE 11
SOUTH BROADWAY SWMM MODEL SCHEMATIC
EXISTING AND IMPROVED
AUGUST 1990

BOHANNAN-HUSTON, INC.

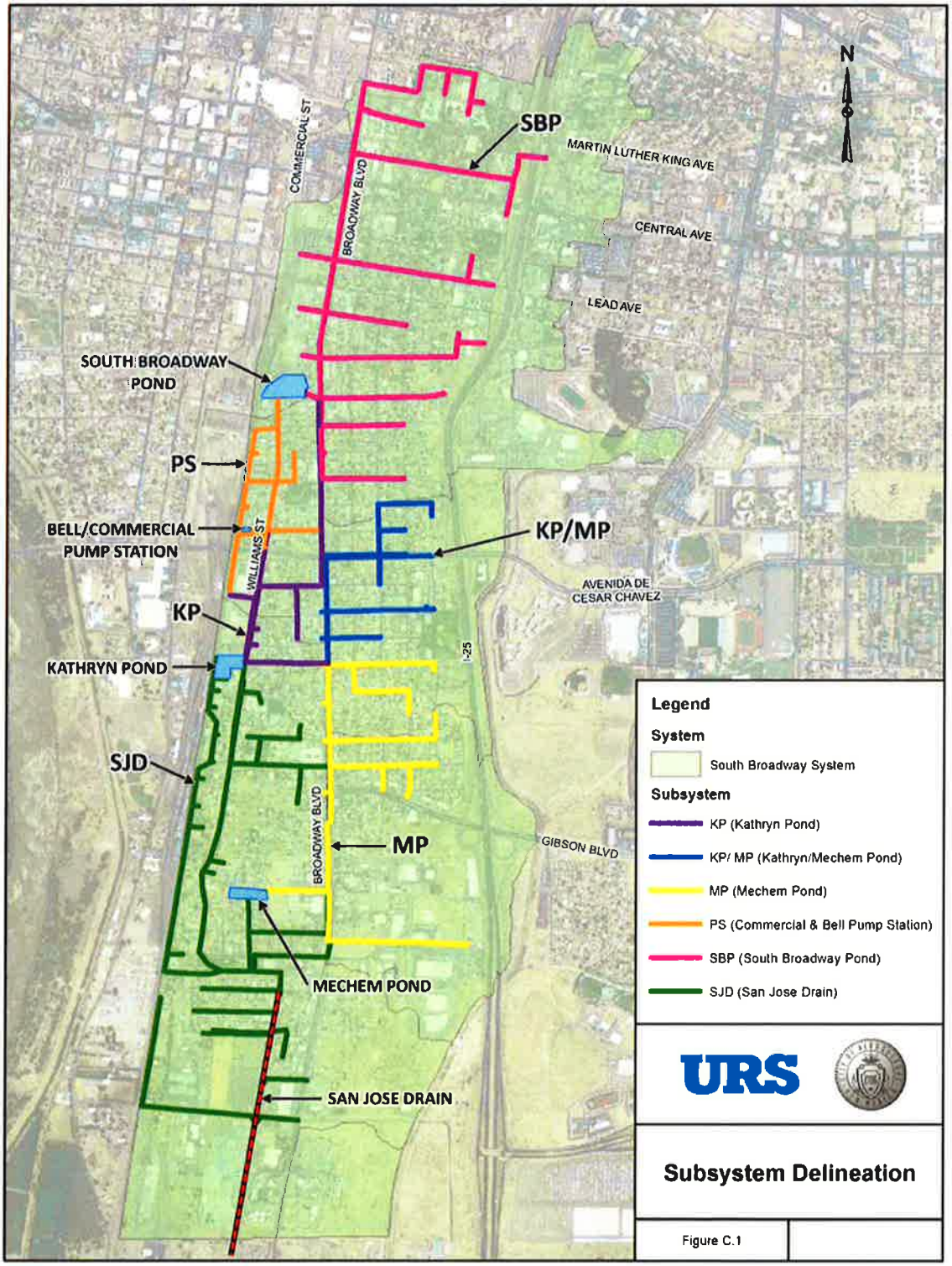


Figure C.1: Subsystem Delineation

Six Improvement Options

Table 3: Improvement Option Components Summary

Major Components[1]	Existing Conditions	Improvement 1	Improvement 2	Improvement 3	Improvement 4	Improvement 5	Improvement 6
New Edith Boulevard Storm Drain		X	X	X		X	
Enlarge South Broadway Pond			X	X	X	X	
Increase Storage of South Broadway Pond on existing footprint							X
Pump storm water west out of South Broadway System		X	X	X			
Enlarge Kathryn Pond		X			X	X	
Increase Storage of the Kathryn Pond on existing footprint				X			X
Replace Mechem Pond outlet drain		X	X				X
Bypass Mechem Pond via Thaxton Avenue				X	X	X	
Add water quality outlet features to all ponds		X	X	X	X	X	X
Construction / Property Acquisition Cost	$0	$13,504,000	$13,319,000	$11,752,000	$3,127,000	$8,496,000	$2,119,000
Annual Triple Bottom Line value (cost-benefit)	$222,000	$704,000	$769,000	$573,000	$120,000	$314,000	$148,000

Notes: 1. Triple Bottom Line methodology discussed in Section 7.

2. Property acquisition costs are based on the *"Total Full Value" of the entire parcel listed in the Bernalillo County website: http://www.bernco.gov/property-tax-search/ for the 2012 tax year plus 30% contingency*

Table 4: Improvement Option Components and Objectives

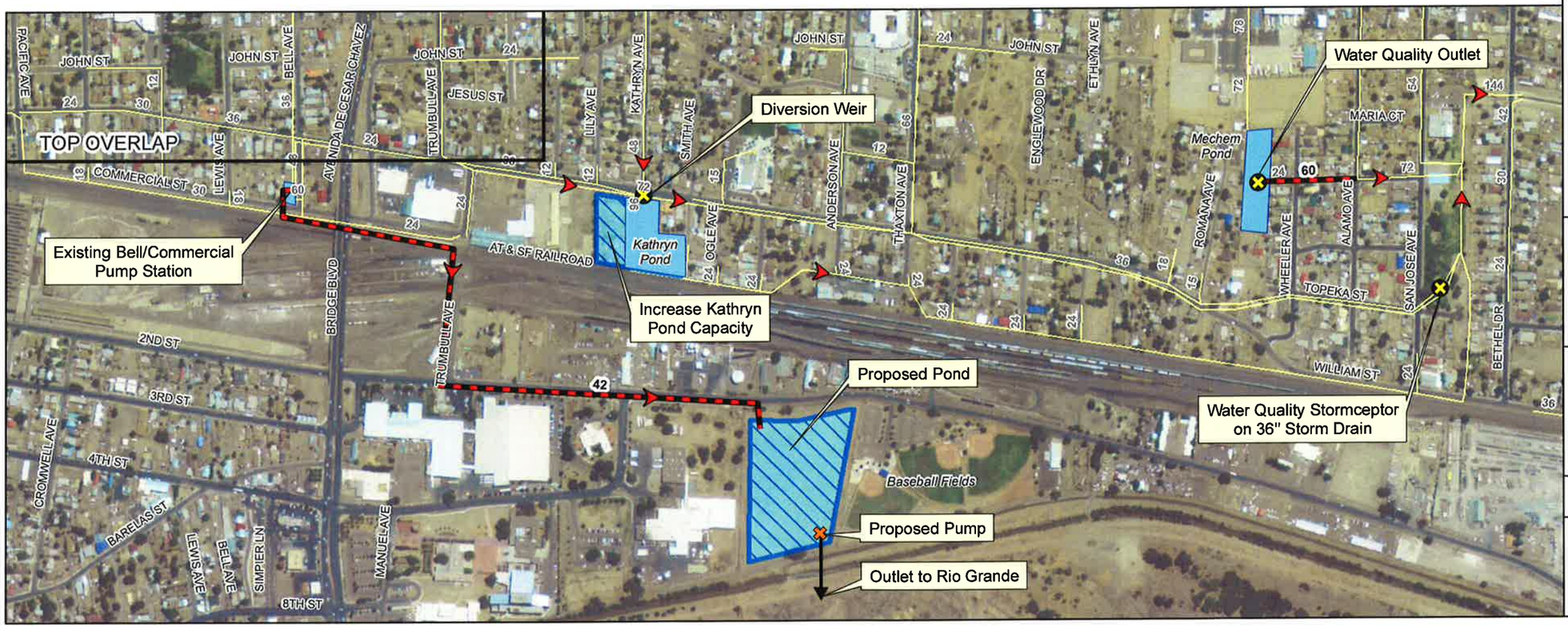
	Reduce North Flow Out of System	Reduce Property Flooding	Reduce Street Flooding	Reduce Existing Pond Flooding	Reduce Discharge to San Jose Drain	Improve Water Quality	Capital Costs
DO NOTHING:	0	0	0	0	0	0	$0
Existing Conditions							
IMPROVEMENT OPTION 1:	1	3	4	3	1	3	**$13,504,000**
New trunk line along Edith Blvd. from Copper Ave. to Cromwell Ave.	✓		✓				$6,185,000
Increase the size of Kathryn detention pond by acquiring land located directly north		✓	✓	✓			$499,000
Increase the size of the Mechem detention pond outlet; add water quality features		✓	✓	✓		✓	$838,000
Pump flow under rail road to a proposed detention pond north of baseball fields on 2nd street (2,301,452 CY)		✓	✓	✓	✓		$5,737,000
Add stormceptor manhole						✓	$239,000
Change 18-inch orifice plate to weir within junction box located near Kathryn Avenue and William Street						✓	$6,000
IMPROVEMENT OPTION 2:	1	3	4	3	1	3	$13,319,000
New trunk line along Edith Blvd. from Copper Ave. to Hazeldine Ave.	✓		✓				$4,425,000
New detention pond to work in conjunction with the existing South Broadway detention pond		✓	✓	✓			$908,000
Increase the size of the Mechem detention pond outlet; add water quality features		✓	✓	✓		✓	$1,088,000
Pump flow under rail road to a proposed detention pond north of baseball fields on 2nd street (2,301,452 CY)		✓	✓	✓	✓		$6,673,000
Add stormceptor manhole						✓	$219,000
Change 18-inch orifice plate to weir within junction box located near Kathryn Ave. and William St						✓	$6,000

Table 4: Improvement Option Components and Objectives (Continued)

	Reduce North Flow Out of System	Reduce Property Flooding	Reduce Street Flooding	Reduce Existing Pond Flooding	Reduce Discharge to San Jose Drain	Improve Water Quality	Capital Costs
IMPROVEMENT OPTION 3:	1	4	5	4	1	3	**$11,752,000**
New trunk line along Edith Blvd. from Copper Ave. to Hazeldine Ave.	✓		✓				$4,445,000
New detention pond to work in conjunction with the existing South Broadway detention pond		✓	✓	✓			$906,000
Redirect flow from Broadway Blvd. to William St. using conduit along thaxton Ave.		✓	✓	✓		✓	$43,000
Increase the size of Kathryn detention pond by increasing side slopes to 1:1		✓	✓	✓			$134,000
Pump flow under rail road to a proposed detention pond north of baseball fields on 2nd street		✓	✓	✓	✓		$5,737,000
Add stormceptor manhole						✓	$219,000
Add catch basins at Mechem St. and Alamo Ave.						✓	$18,000
IMPROVEMENT OPTION 4:	0	3	3	3	0	4	$3,127,000
New detention pond to work in conjunction with the existing South Broadway detention pond		✓	✓	✓			$2,209,000
Increase the size of Kathryn detention pond by acquiring land located directly north		✓	✓	✓			$382,000
Change 18-inch orifice plate to weir within junction box located near Kathryn Avenue and William Street						✓	$6,000
Redirect flow from Broadway Blvd. to William St. using conduit along thaxton Ave.		✓	✓	✓		✓	$43,000
Add stormceptor manhole						✓	$219,000
Add water quality features to Mechem detention pond						✓	$250,000

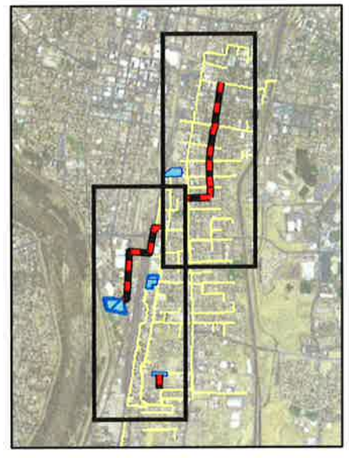
Table 4: Improvement Option Components and Objectives (Continued)

	Reduce North Flow Out of System	Reduce Property Flooding	Reduce Street Flooding	Reduce Existing Pond Flooding	Reduce Discharge to San Jose Drain	Improve Water Quality	Capital Cost
IMPROVEMENT OPTION 5:	1	3	4	3	0	4	$8,498,000
New detention pond to work in conjunction with the existing South Broadway detention pond		✓	✓	✓			$2,688,000
New trunk line along Edith Blvd. from Copper Ave. to Hazeldine Ave.	✓		✓				$4,352,000
Increase the size of Kathryn detention pond by acquiring land located directly north		✓	✓	✓			$383,000
Change 18-inch orifice plate to weir within junction box located near Kathryn Avenue and William Street						✓	$6,000
Redirect flow from Broadway Blvd. to William St. using conduit along Thaxton Ave, Install Catchbasins.at Alamo and Mechem		✓	✓	✓		✓	$100,000
Add Stormceptor manhole						✓	$219,000
Add water quality features to Mechem, Kathryn, and South Broadway detention ponds						✓	$750,000
IMPROVEMENT OPTION 6:	0	5	5	3	0	3	$2,119,000
Increase the size of Broadway detention pond by increasing side slopes to 1:1		✓	✓	✓			$927,000
Increase the size of Kathryn detention pond by increasing side slopes to 1:1		✓	✓	✓			$134,000
Change 18-inch orifice plate to weir within junction box located near Kathryn Avenue and William Street						✓	$6,000
Redirect flow east of I-25 and south of Roosevelt Park to South Diversion Channel		✓	✓				Cost Responsibility of Others
Add detention pond in vacant lot on east side of Interstate-25, north of Avenida De Cesar Chavez		✓	✓				Cost Responsibility of Others
Increase the size of the Mechem detention pond outlet; add water quality features		✓	✓	✓		✓	$815,000
Add Stormceptor manhole						✓	$219,000



Legend

- Existing Storm Drain
- Existing Pond
- Proposed Alternative
- Pipe Flow Direction
- Proposed Water Quality Improvement
- Proposed Catch Basin



N

0 300 600 1,200 Feet

1 inch = 600 feet

South Broadway Project Recommended Improvements

Improvement 1

Figure D.1	Page D.41

URS

Legend

- Existing Storm Drain
- Existing Pond
- Proposed Alternative
- Pipe Flow Direction
- Water Quality Improvement

N

0 500 1,000 Feet

1 inch = 600 feet

South Broadway Project Recommended Improvements

Improvement 2

Figure D.2	Page D.42

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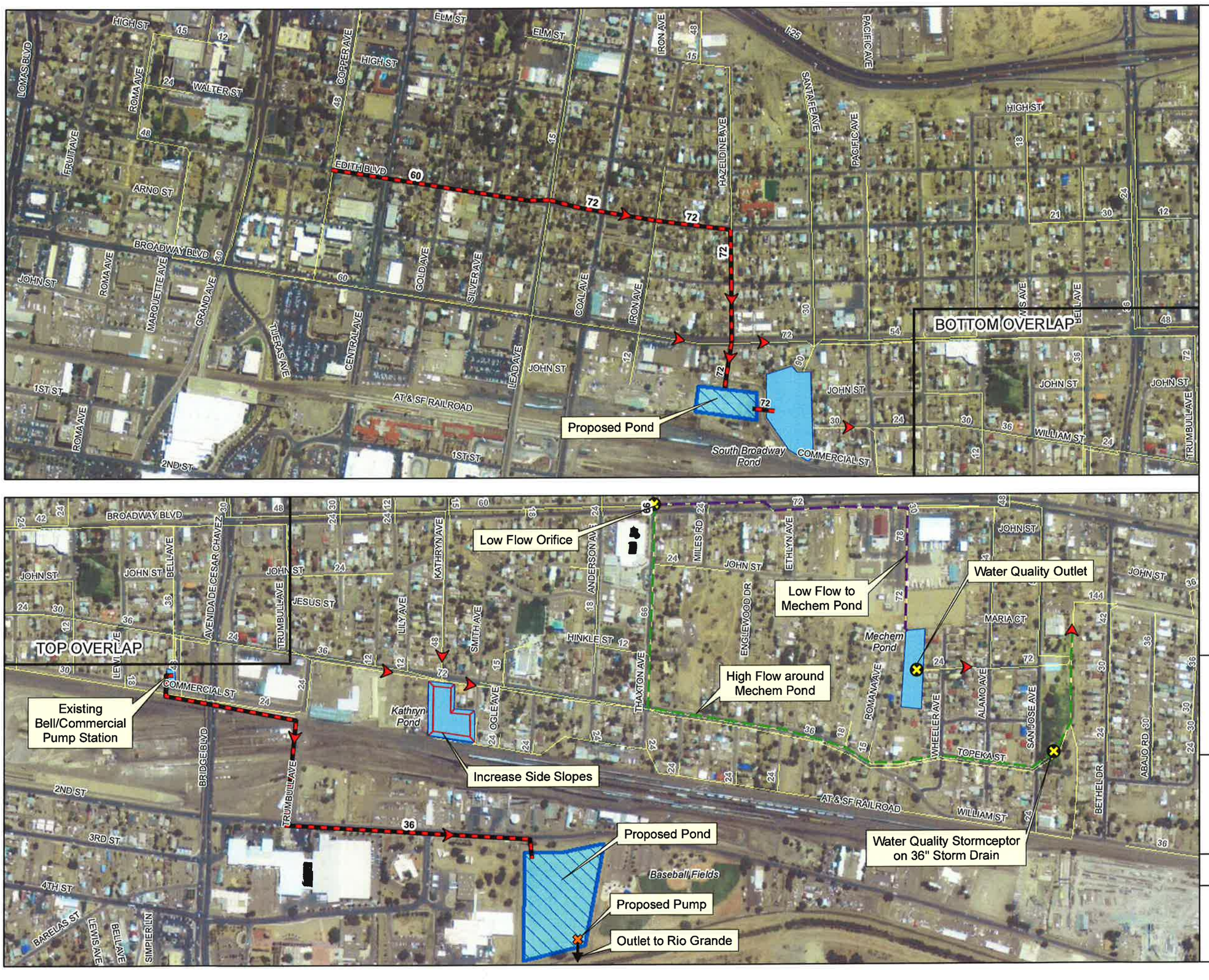

South Broadway Project Recommended Improvements

Improvement 3

Figure D.3	Page D.43

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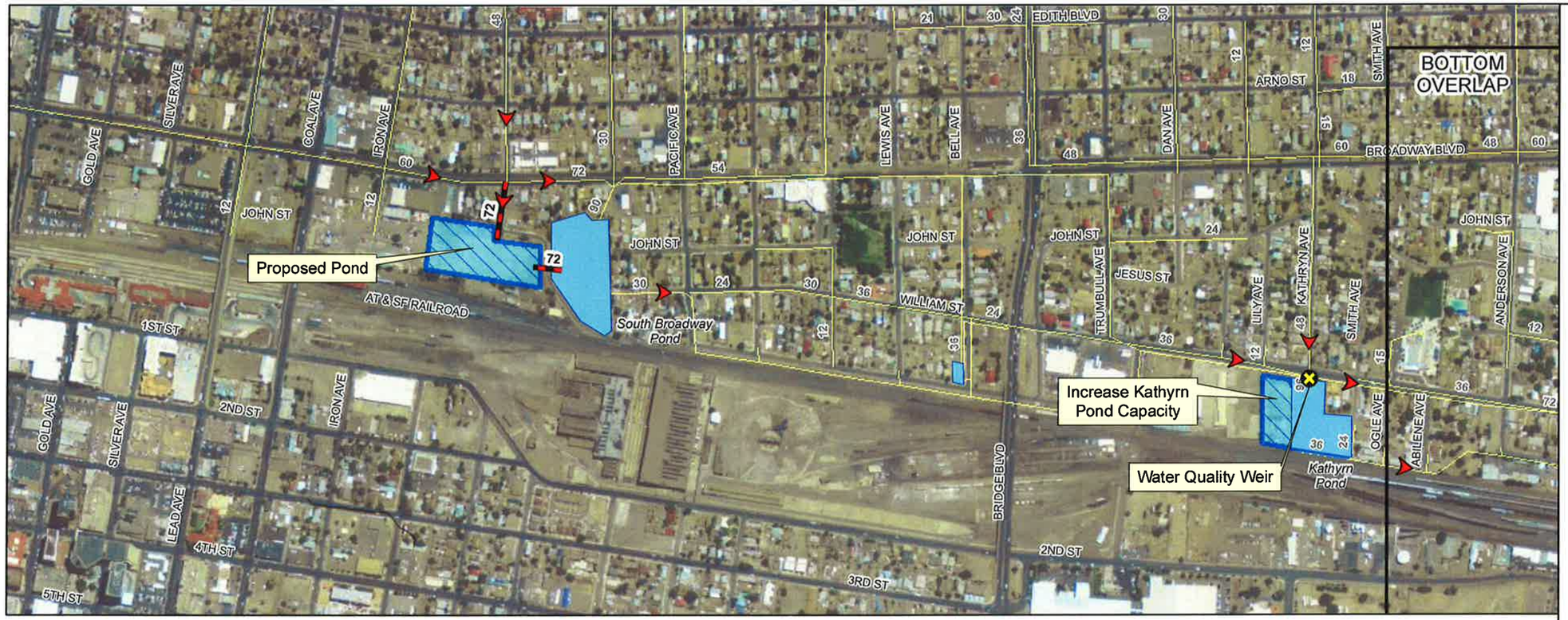

Legend

- Existing Storm Drain
- Existing Pond
- Proposed Alternative
- Pipe Flow Direction
- Water Quality Improvement

N

0 500 1,000 Feet

1 inch = 600 feet

South Broadway Project Recommended Improvements

Improvement 4

Figure D.4	Page D.44

URS

Legend

- Existing Storm Drain
- Existing Pond
- Proposed Alternative
- Pipe Flow Direction
- Water Quality Improvement

N

0 500 1,000 Feet

1 inch = 600 feet

South Broadway Project Recommended Improvements

Improvement 5

Figure D.5	Page D.45

URS

Legend

- Existing Storm Drain
- Existing Pond
- Proposed Alternative
- Pipe Flow Direction
- Water Quality Improvement

N

0 500 1,000 Feet

1 inch = 800 feet

South Broadway Project Recommended Improvements

Improvement 6

Figure D.6	Page D.46

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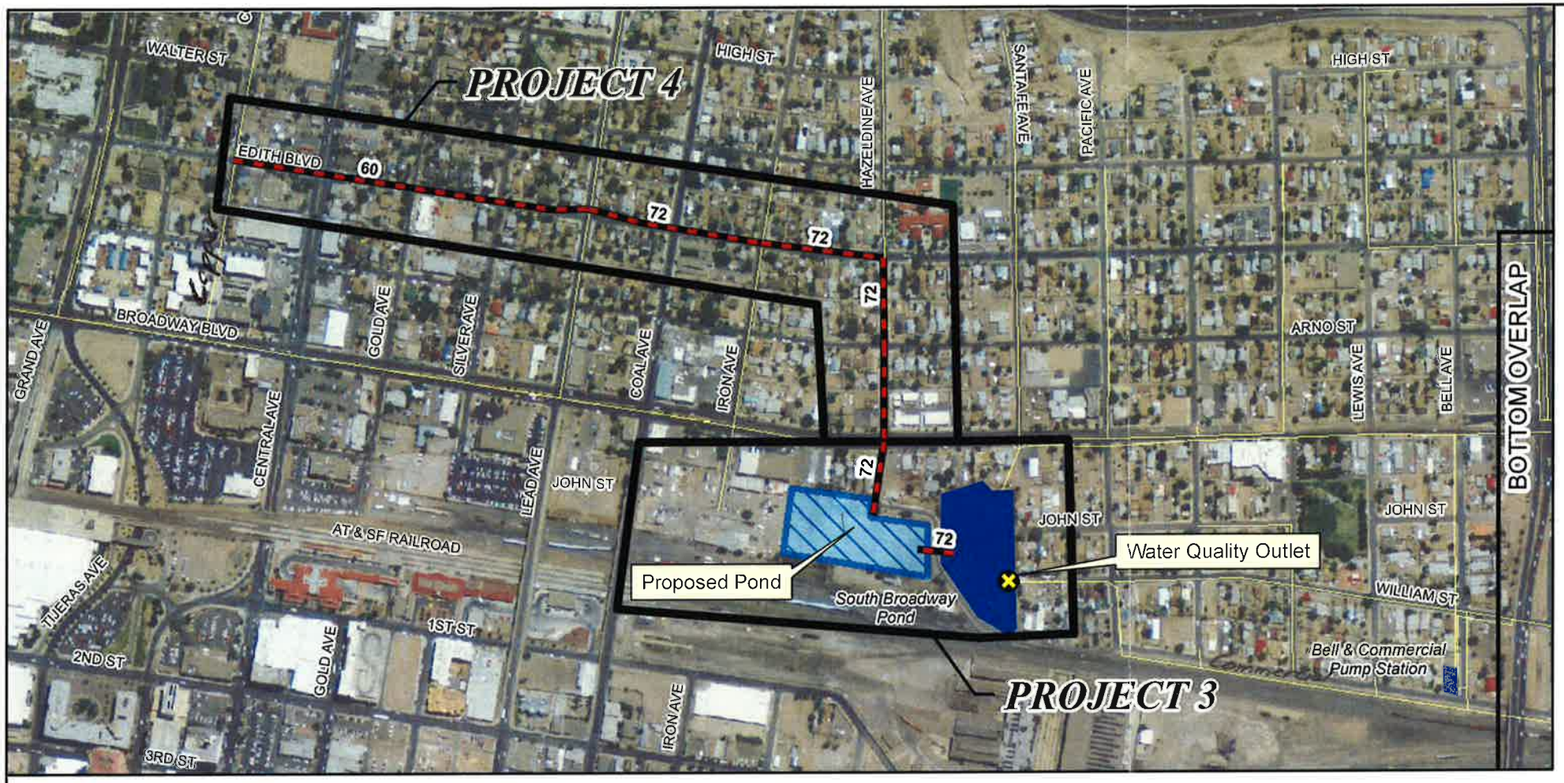
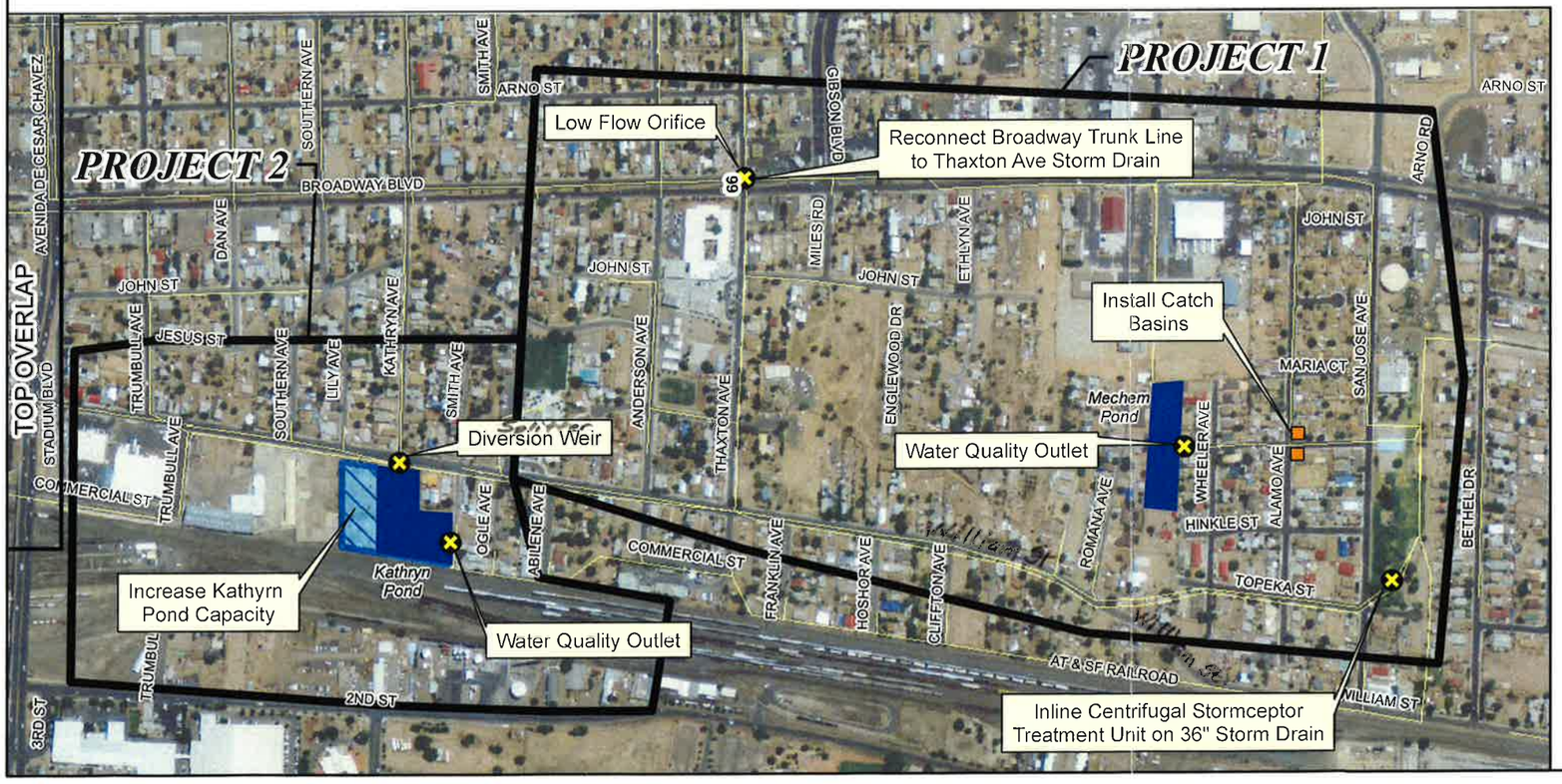
Improvement Option #5: 4 projects





Priority	Item #	Improvement	Estimated Cost
1		**Modify inlet/Outlet of Mechem Pond**	
	1	Redirect flow from Broadway Blvd to William St using conduit along Thaxton Ave	$43,000
	2	Install water quality outlet	$250,000
	3	Install catch basins at Mechem St and Alamo Ave	$57,000
	4	Install stormceptor manhole in San Jose Park	$219,000
		Priority 1 Total	**$569,000**
2		**Expand Kathryn Pond**	
	1	Purchase Lot A-1 property at 1701 Williams Street SE	$256,000*
	2	Construct pond expansion	$127,000
	3	Install water quality outlet	$250,000
	4	Change 18-inch orifice plate to weir within junction box located near Kathryn Ave and William St	$6,000
		Priority 2 Total	**$639,000**
3		**Expand South Broadway Pond**	
	1	Purchase Track 1 Iron property at 100 Iron Ave SE	$1,160,000*
	2	Construct pond expansion	$1,049,000
	3	Construct culvert crossing under Commercial Ave	$84,000
	4	Construct 72" storm drain connection from Broadway Blvd trunk line to pond, including outlet structure	$395,000
	5	Install a water quality outlet	$250,000
		Priority 3 Total	**$2,938,000**
4		**Construct storm sewer trunk line on Edith Blvd**	
	1	Construct Edith Blvd storm drain trunk to South Broadway pond expansion via Hazeldine Ave	$4,352,000
	1-ALT	*Alternative to Item 1:* Construct the Edith Blvd storm drain trunk line to South Broadway pond expansion via Coal Ave. (Assumes the alternative linear South Broadway Pond expansion costs the same as the non-linear choice)	$3,583,000
		Priority 4 Total	**$4,352,000**

Total Cost of All Improvement	***$8,498,000***
Total Cost of All Improvement with Priority 4 Alternative	***$7,729,000***

Costs include 30% Contingency, 10% Engineering and Design, 7% NMGRT

* *Property acquisition costs are based on the "Total Full Value" of the entire parcel listed in the Bernalillo County website: http://www.bernco.gov/property-tax-search/ for the 2012 tax year plus 30% contingency.*

Legend

- Existing Storm Drain
- Existing Pond
- Proposed Alternative
- Proposed Water Quality Improvement
- Proposed Catch Basin

N

0 300 600 1,200 Feet

1 inch = 600 feet

Recommended Improvement Option

South Broadway Drainage and Storm Water Quality Management Plan

Figure D

URS