



# Calvary Lane

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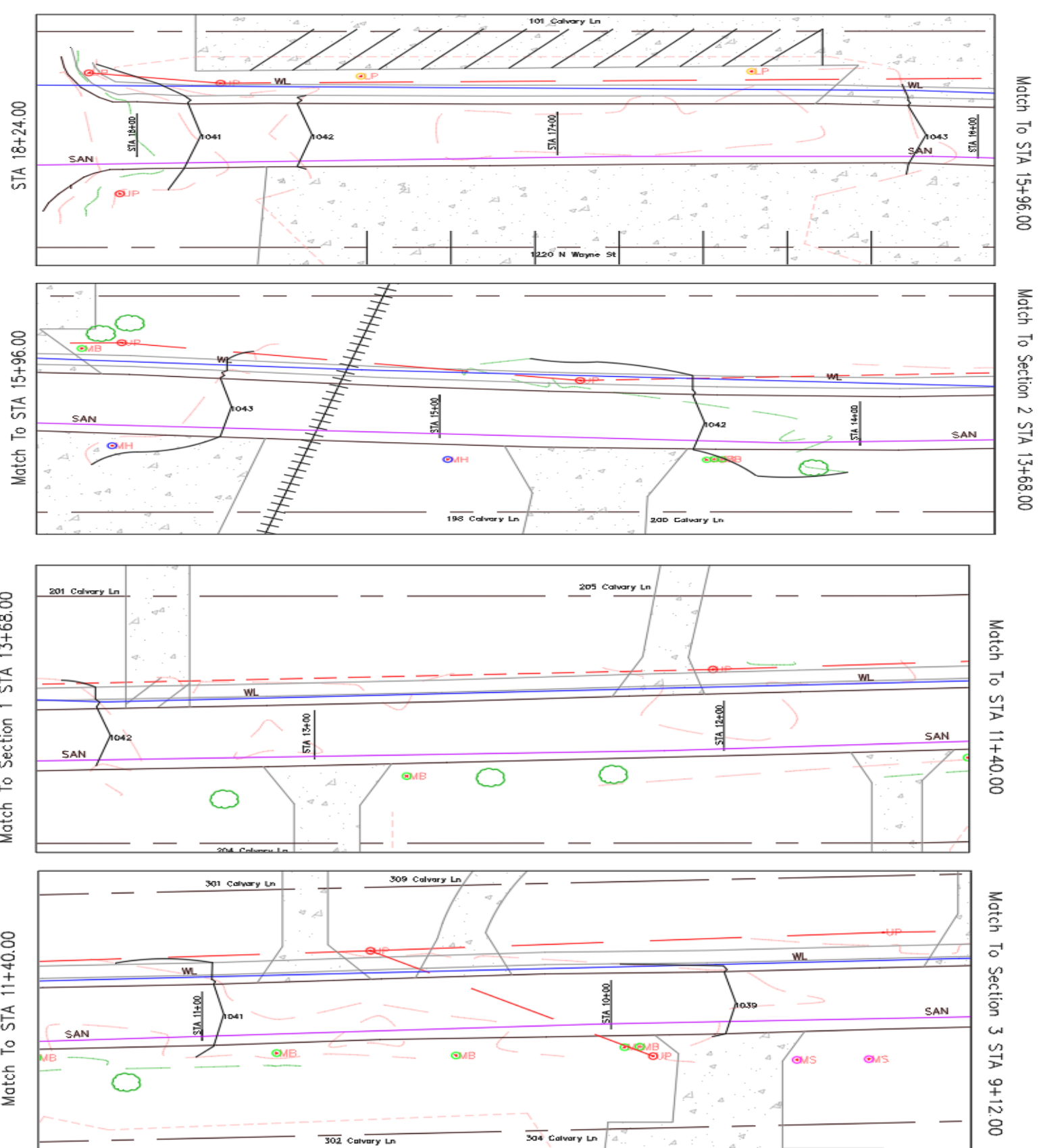
## INTRODUCTION

The site is located here in Angola, the site spans the length of Cavalry lane from North Wayne Street to Williams St. This is a mostly residential road with a church and the Great Wall Buffet located around it. The city wanted us to replace the water main, as well as adding a sidewalk along the road, and reconstruct the roadway. The water main spans along the whole road on the north side.



## Grading Plan

The grading plan consists of a 2 percent cross slope along the entire span of the road. We wanted this so the road has proper drainage to our planter boxes.



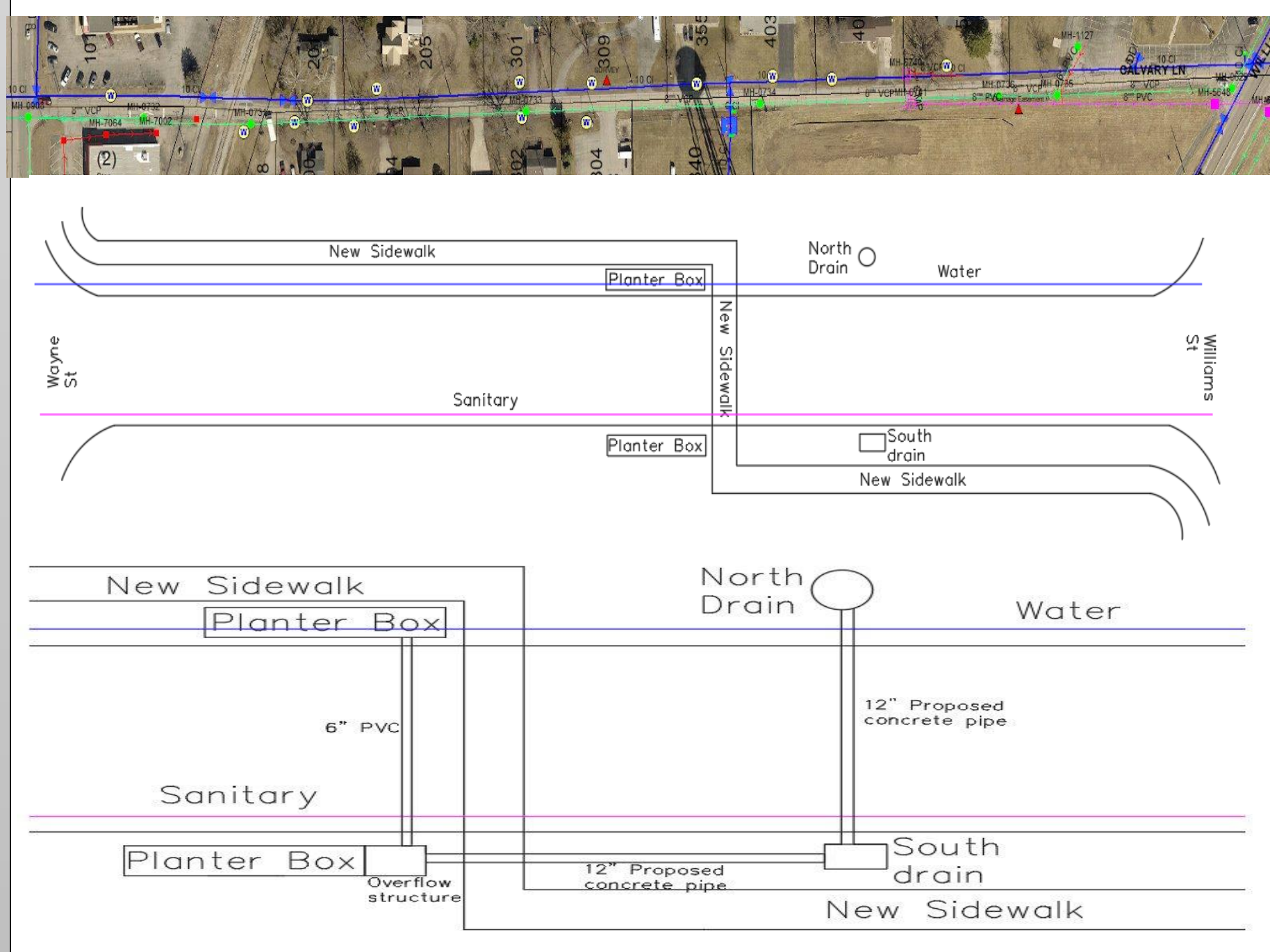
## SITE TOPO

The 1800-ft long site had a high point near the west edge and a high point on the east edge. This led to the hydraulic focus of our site to be on the low point near the middle of the road.



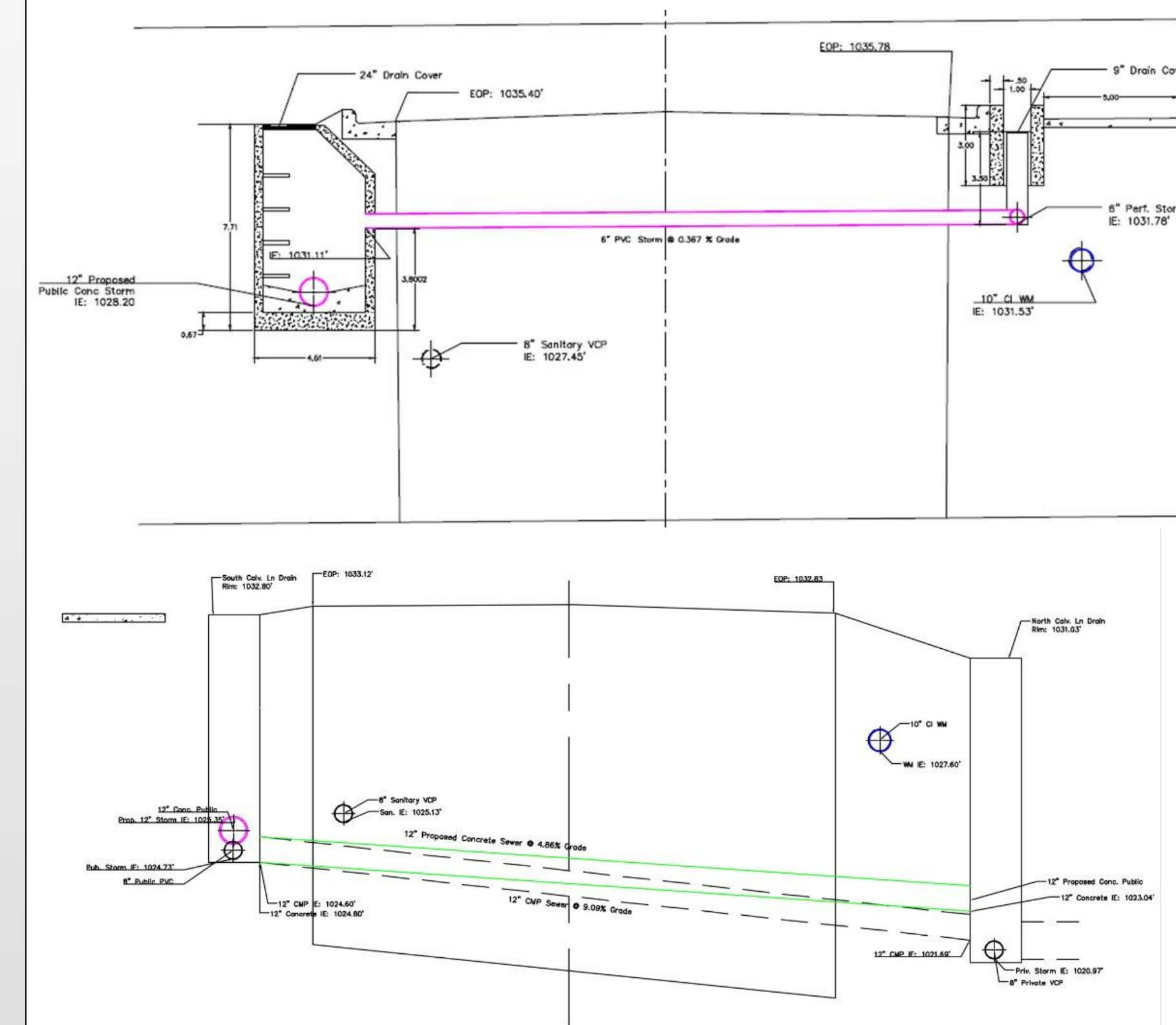
## SITE DESIGN

For the site design, we kept the water main going along the north side of the road. The sidewalk starts at Williams St. and runs along the south side of the road until it reaches the low point of the road. It then crosses the road and continues going towards Wayne St. on the north side of the road. We will have planter boxes right next to the sidewalk, and the road will have curb and gutter.



## STORMWATER MANAGEMENT

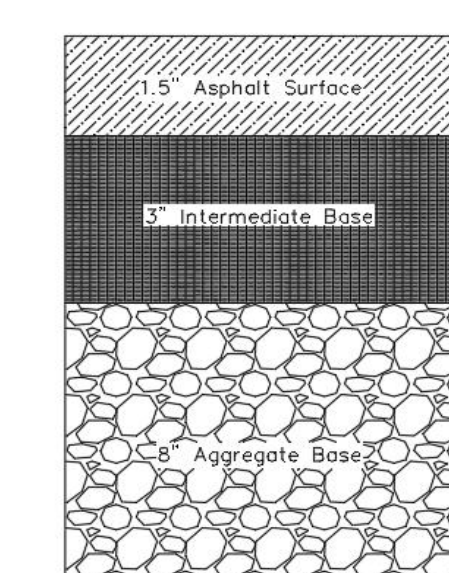
The design is consisted of different sections that include curb and gutter, planter boxes, a 12" pipe connecting between two different drains, and implementing a new stormwater pipe. The new storm sewer will span roughly 200 ft and will connect the planter boxes to a drain on the south side of our road.



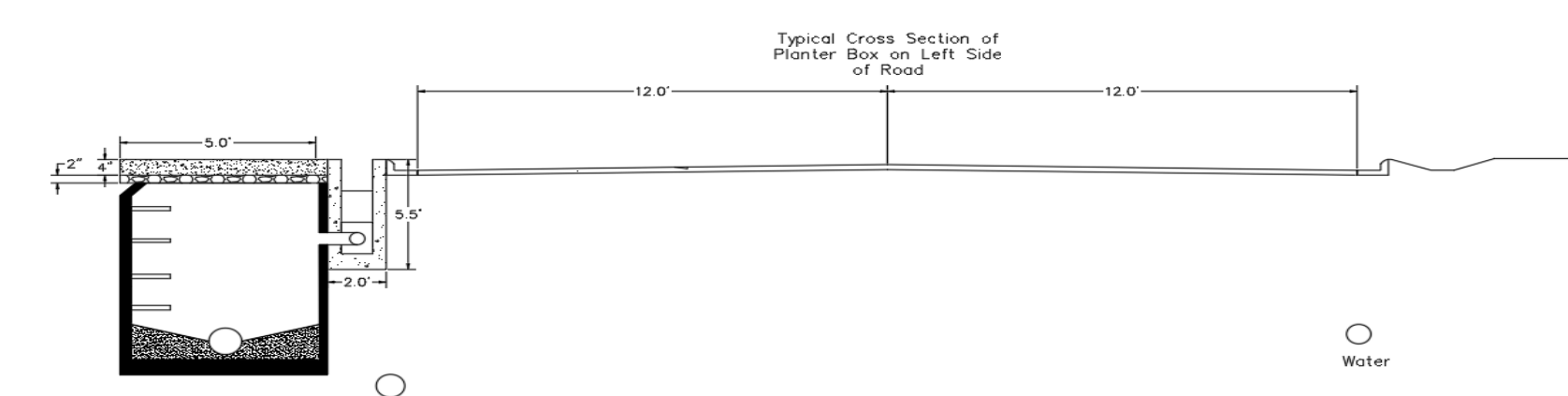
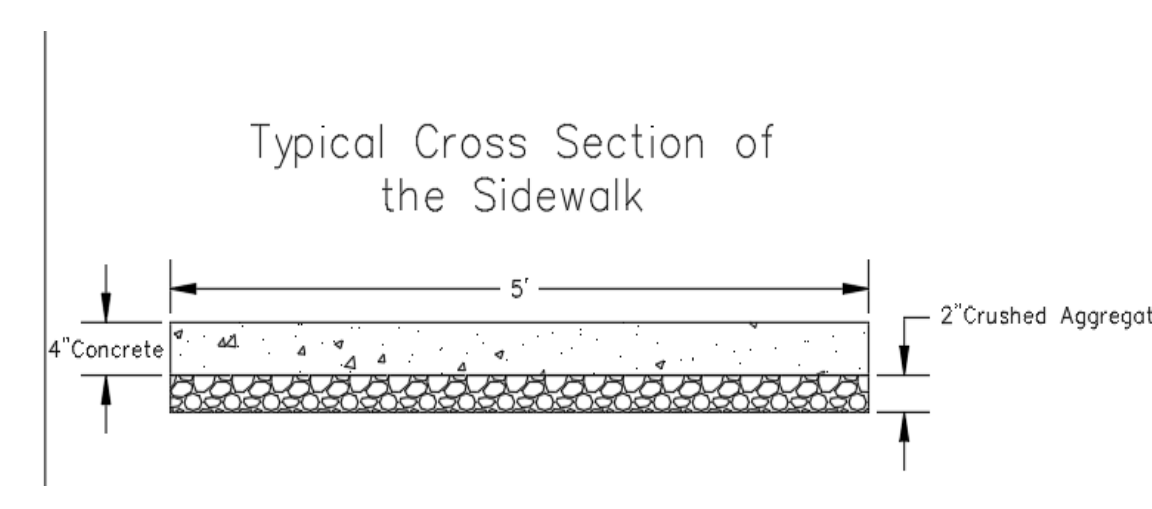
## PAVEMENT DESIGN

We used the minimum pavement thickness based on Angola standards. We computed a SN of 2.86, design ESALs of 450,000. The road allows for 450 cars, and 5 semis. For our sidewalk, we used the Angola standards, and we followed all ADA requirements.

Typical Depth of Pavement

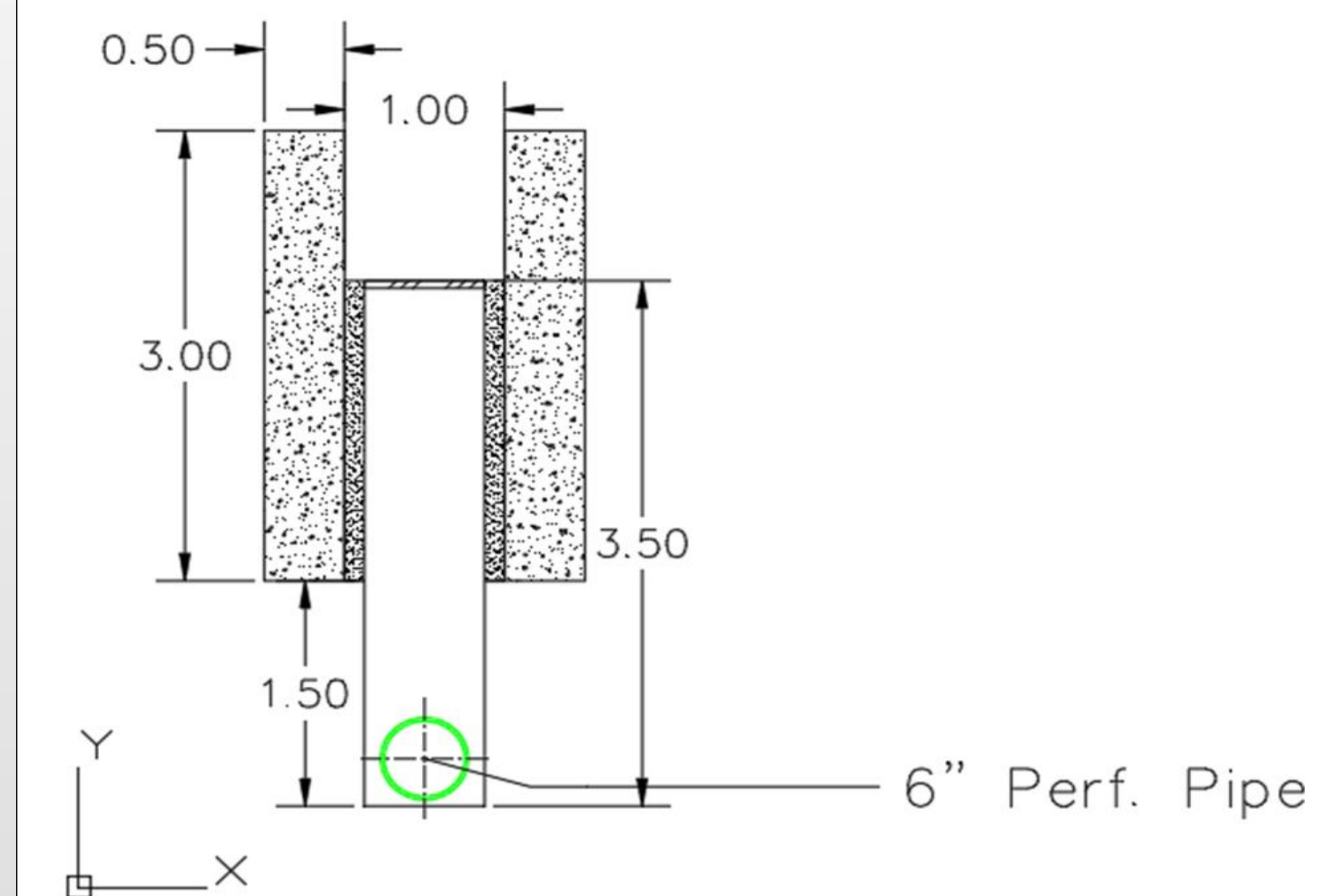


Typical Cross Section of the Sidewalk



## LID DESIGN

We decided to implement low-impact development (LID) in our project using planter boxes for stormwater runoff storage. We followed the codes from the City of Angola, Fort Wayne, and the Michigan LID Manual. The planter boxes are located near the crosswalk and drain to the existing tiled drains.



## FINAL COST ESTIMATE

The final cost estimate was based on Gordian Building Construction Costs 2022 which includes the overhead and profit of the contractors to give a realistic price estimate. Our calculated cost was roughly:  
\$612,000.00

Name	Page #	Per Unit	Cost	O&P Cost	Quantity	Total
Demolition						
Stump Removal less than 12"	622	Ea	\$ 154.50	\$ 191.00	2	\$ 382.00
Tree Removal less than 12"	622	Ea	\$ 343.00	\$ 450.00	2	\$ 900.00
Asphalt Road Removal	29	SY	\$ 4.91	\$ 6.55	4800	\$ 31,440.00
Railroad Removal And Replacement	30	LF	\$ 52.60	\$ 76.00	40	\$ 3,040.00
Site Construction						
Rough Grading(43,200 sf)	624	Ea	\$ 2,015.00	\$ 2,625.00	1	\$ 2,625.00
Silt Fence	645	LF	\$ 2.75	\$ 3.79	1800	\$ 6,822.00
Road&Sidewalk Construction						
Aggregate Base Crushed 3/4" 6" deep	659	SY	\$ 5.17	\$ 5.85	4800	\$ 28,080.00
Plant-Mix Asphalt Paving 1.5" Thick	660	SY	\$ 6.50	\$ 7.40	4800	\$ 35,520.00
Sidewalk-Concrete 3000psi, CIP, 4" Thick, W1.4xW1.4 mesh	659	SF	\$ 4.95	\$ 6.25	7220	\$ 45,125.00
Precast Concrete Curb 6"x18", straight	665	LF	\$ 16.30	\$ 19.50	200	\$ 3,900.00
Pedestrian Signals and Controls	717	Signal	\$6,060.00	\$7,225.00	1	\$ 7,225.00
Waterline Construction						
Waterline Ductile Iron 10" Pipe	687	LF	\$ 140.37	\$ 160.00	1800	\$ 288,000.00
Waterline Utility Trench: 4" wide, 12" deep, Chain Trencher 12HP	627	LF	\$ 0.81	\$ 1.11	1800	\$ 1,998.00
Waterline Backfill: 4" wide, 12" deep	627	LF	\$ 0.55	\$ 0.79	1800	\$ 1,422.00
Utility Connection: Water	686	Ea	\$5,680.00	\$7,125.00	16	\$ 114,000.00
Water Tower Ductile Iron 10" Pipe	687	LF	\$ 140.37	\$ 160.00	150	\$ 24,000.00
Water Tower Pipping, fittings, mechanical joint, AWWA C110 10"	688	Ea	\$1,059.15	\$1,200.00	1	\$ 1,200.00
Planters Construction						
Subdrain Vitrified clay 6" diameter, 18 ga	693	LF	\$ 14.44	\$ 18.75	100	\$ 1,875.00
Planter-Concrete 3000psi, CIP, 4" Thick, W1.4xW1.4 mesh	659	SF	\$ 4.95	\$ 6.25	300	\$ 1,875.00
Concrete Stormwater 12" Pipe	695	LF	\$ 26.84	\$ 34.00	200	\$ 6,800.00
Trench 4' to 6' Deep with 1/2 CY excavator	625	BCY	\$ 5.79	\$ 7.90	900	\$ 7,110.00
Total Project Cost=						\$ 612,057.00