Withlacoochee WPCP Sewer System Improvements

Workshop No. 2

Pump Station & Route Analysis Selection

Technical Memorandum No. 1 (TM1)

Withlacoochee Wastewater Flows (MGD) for Developing Sewer Improvement Alternatives

Sub Basin/Sewershed	2008	2018	2038	2050
Mall Area P.S., Peak Hour	9.94	14.27	19.23	21.98
Mall Area P.S., Minimum Hour	2.15	3.09	4.16	4.76
Gornto Rd Area P.S., Peak Hour	5.54	8.35	13.66	15.79
Gornto Rd Area P.S., Minimum Hour	0.83	1.25	2.05	2.37

Planned Installed Pumping Capacity

Planned Installed Infrastructure Capacity

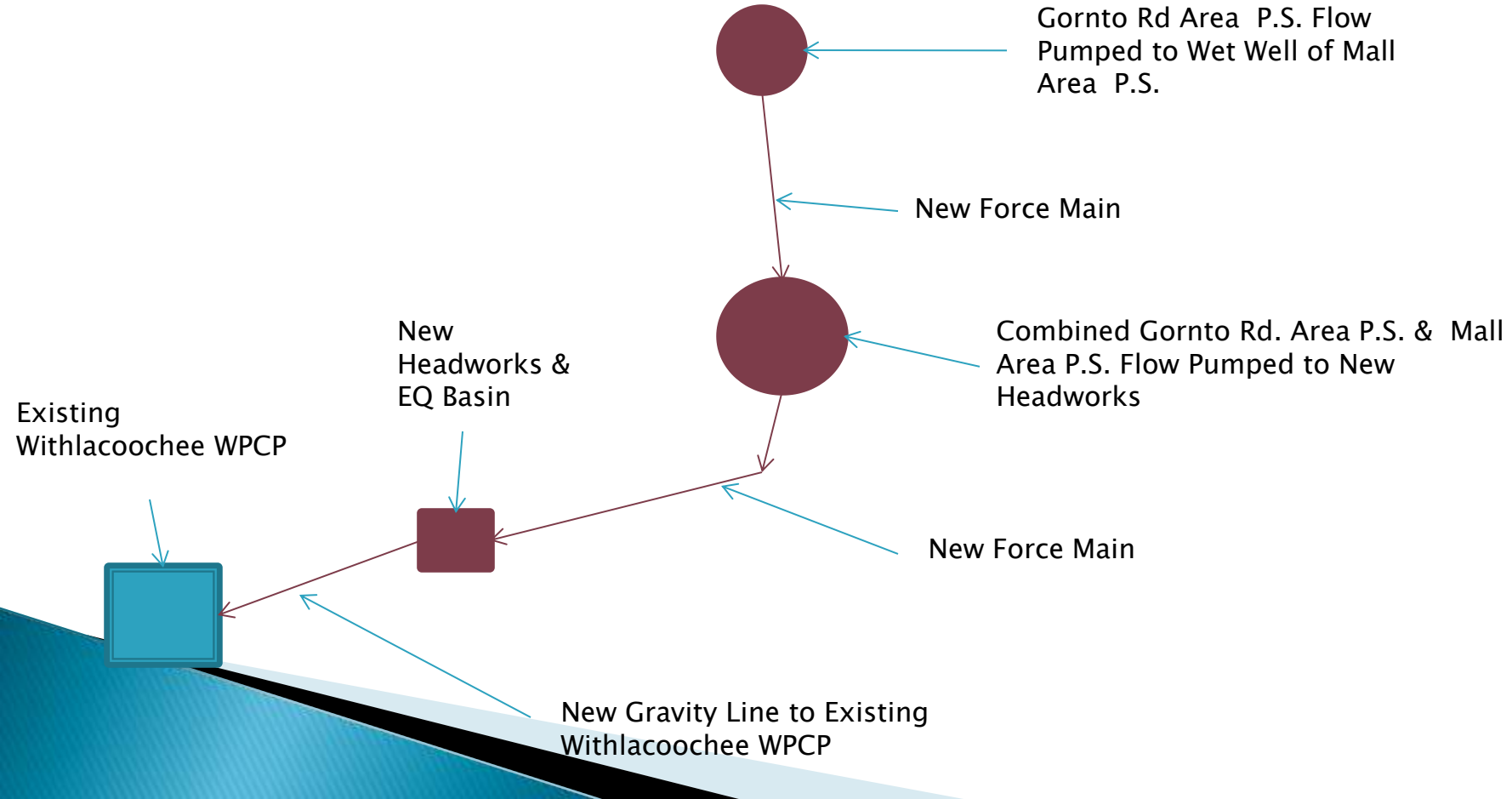
Technical Memorandum No. 1 (TM1)

Withlacoochee WPCP Sub -Basin Average Dry Weather Flow - MGD

Sub Basin/Sewershed	2008	2018	2038	2050
Mall Area P.S.	3.31	4.76	6.41	7.33
Gornto Rd. Area P.S.	1.85	2.78	4.55	5.26
Direct to Withlacoochee WPCP	0.00	0.10	0.30	0.35
Total Withlacoochee WPCP	**5.16**	**7.64**	**11.26**	**12.94**

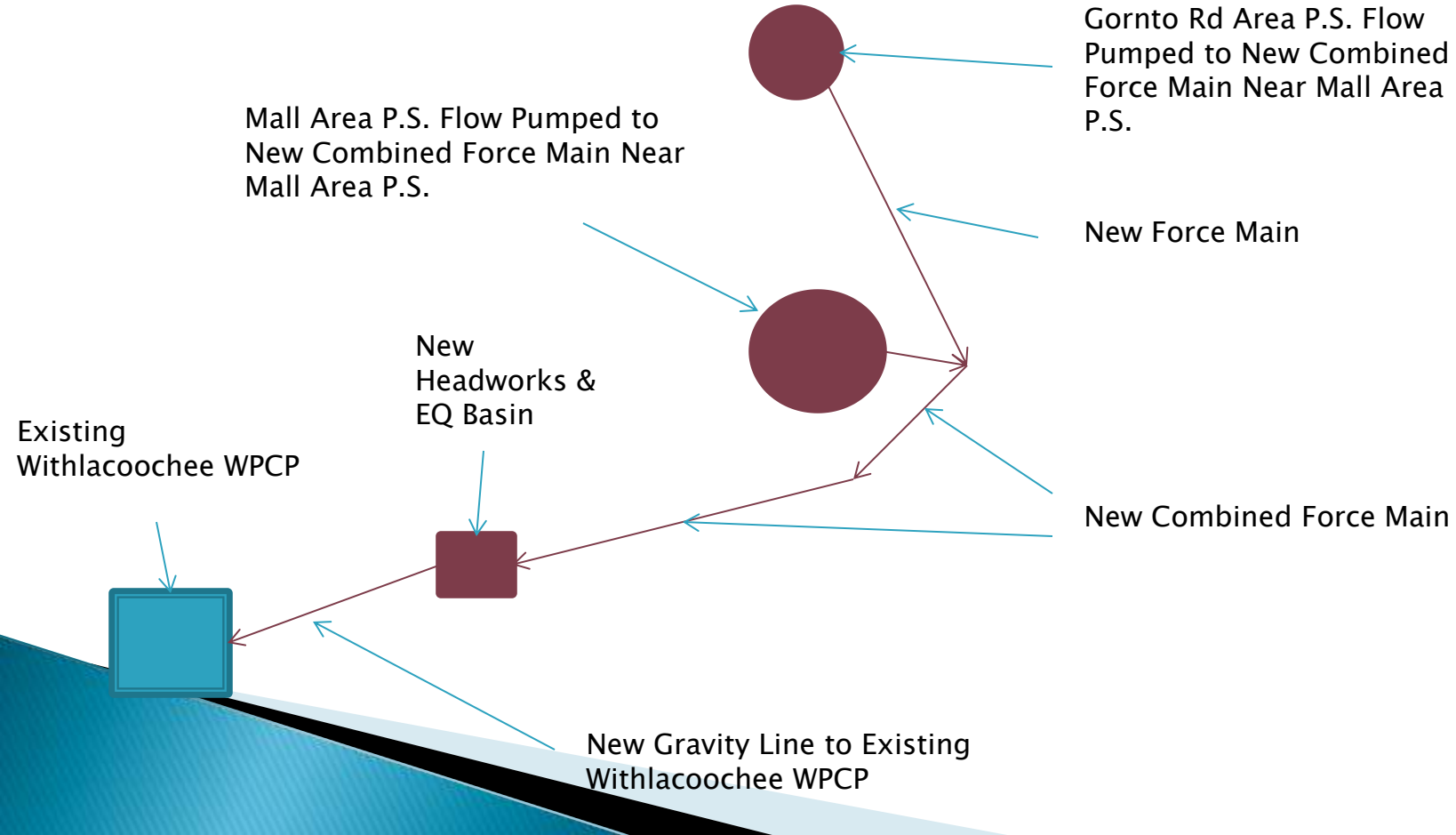
Workshop No. 2
Alternative Selection

- Alternatives Description
- Option 1



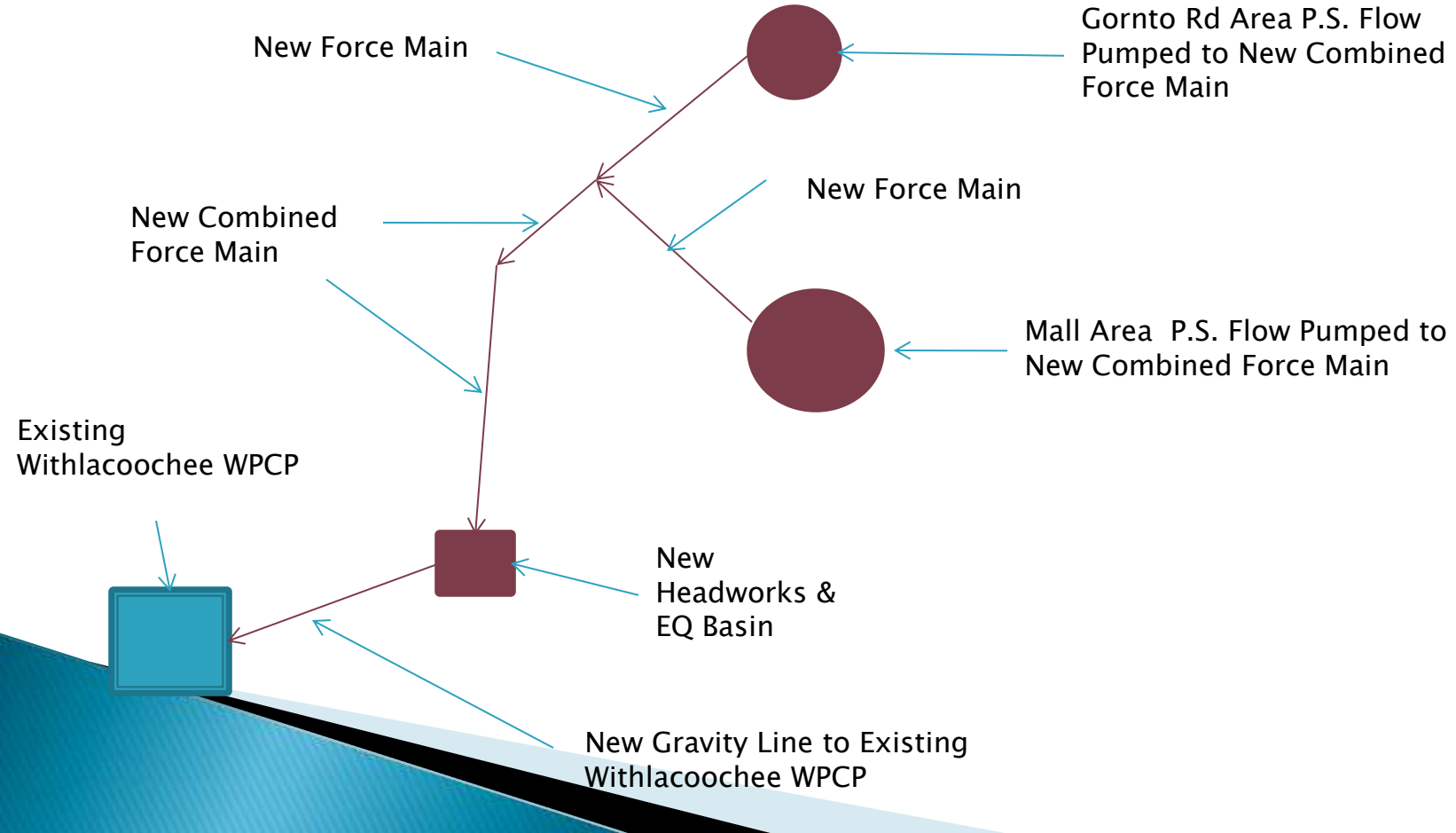
Workshop No. 2
Alternative Selection

- Alternatives Description
- Option 2



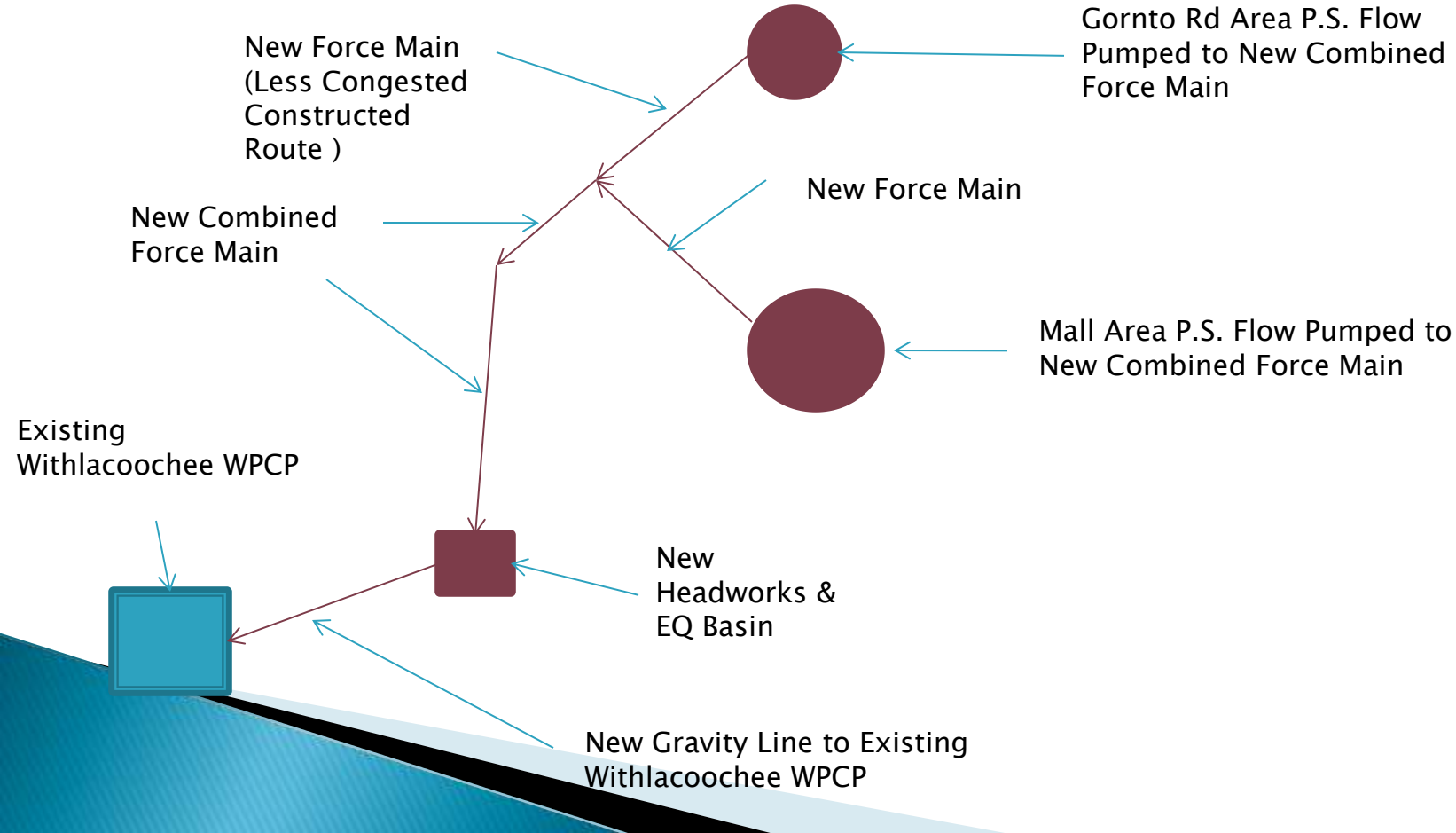
Workshop No. 2
Alternative Selection

- Alternatives Description
- Option 3

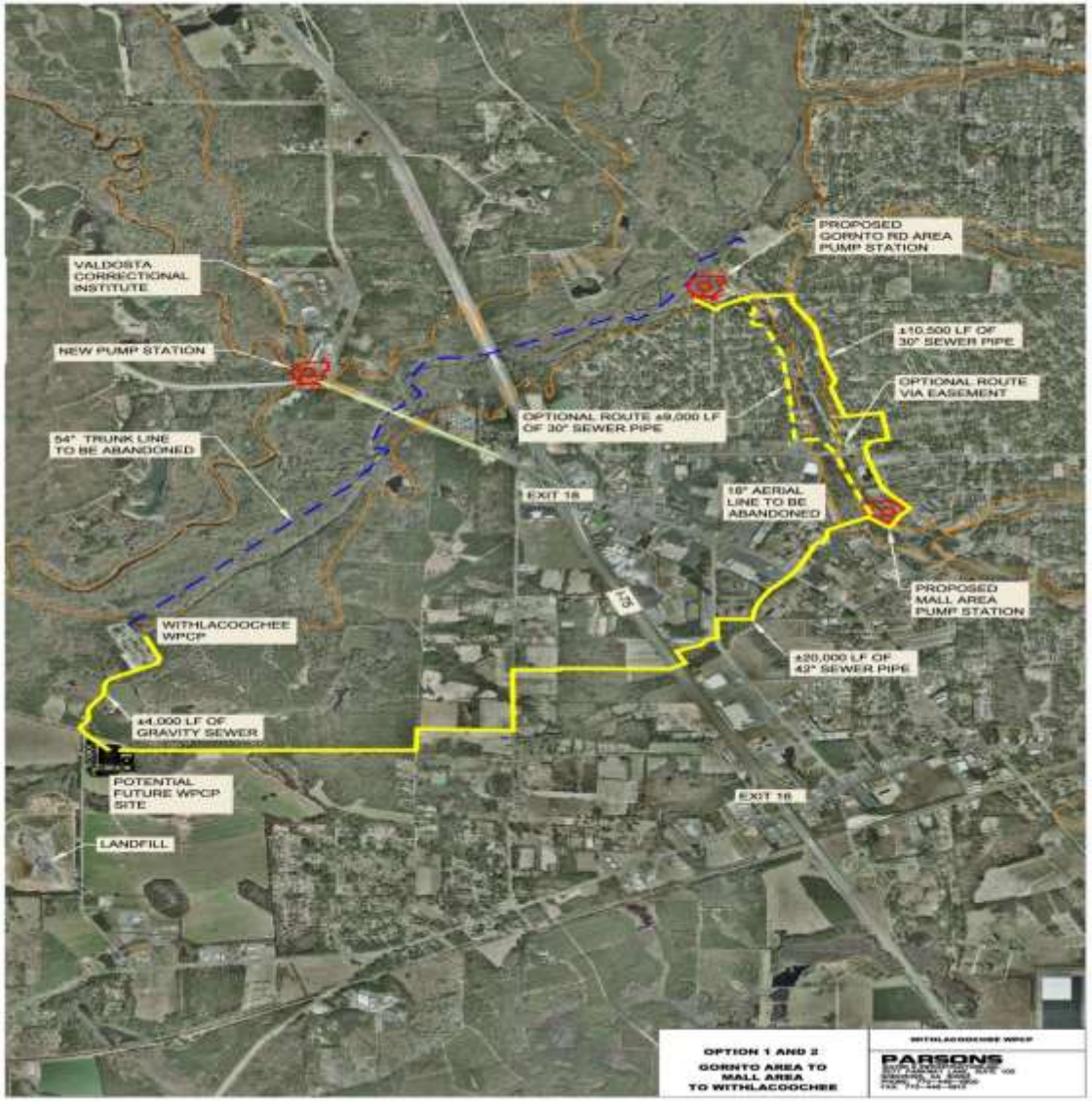


Workshop No. 2
Alternative Selection

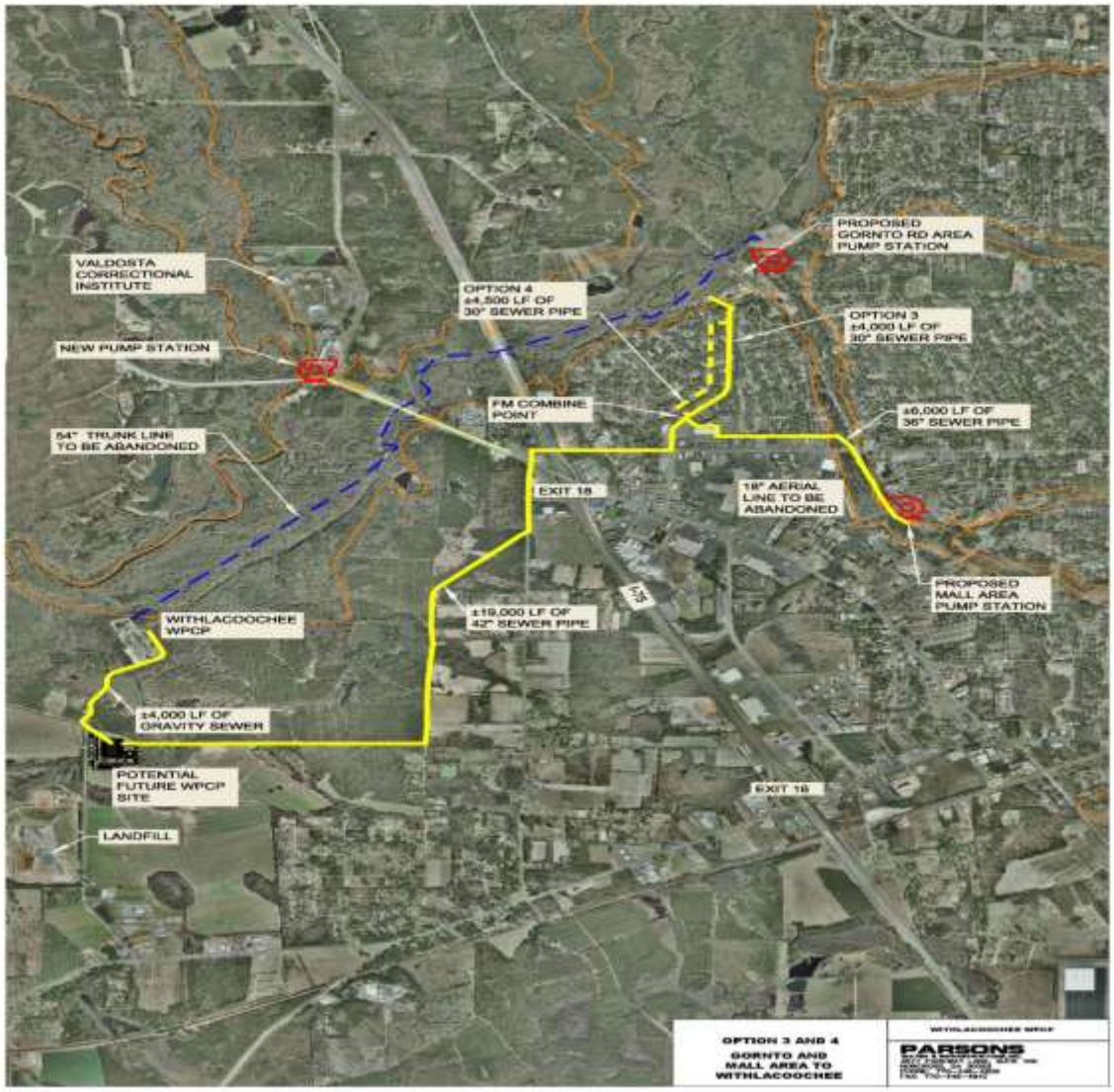
- Alternatives Description
- Option 4



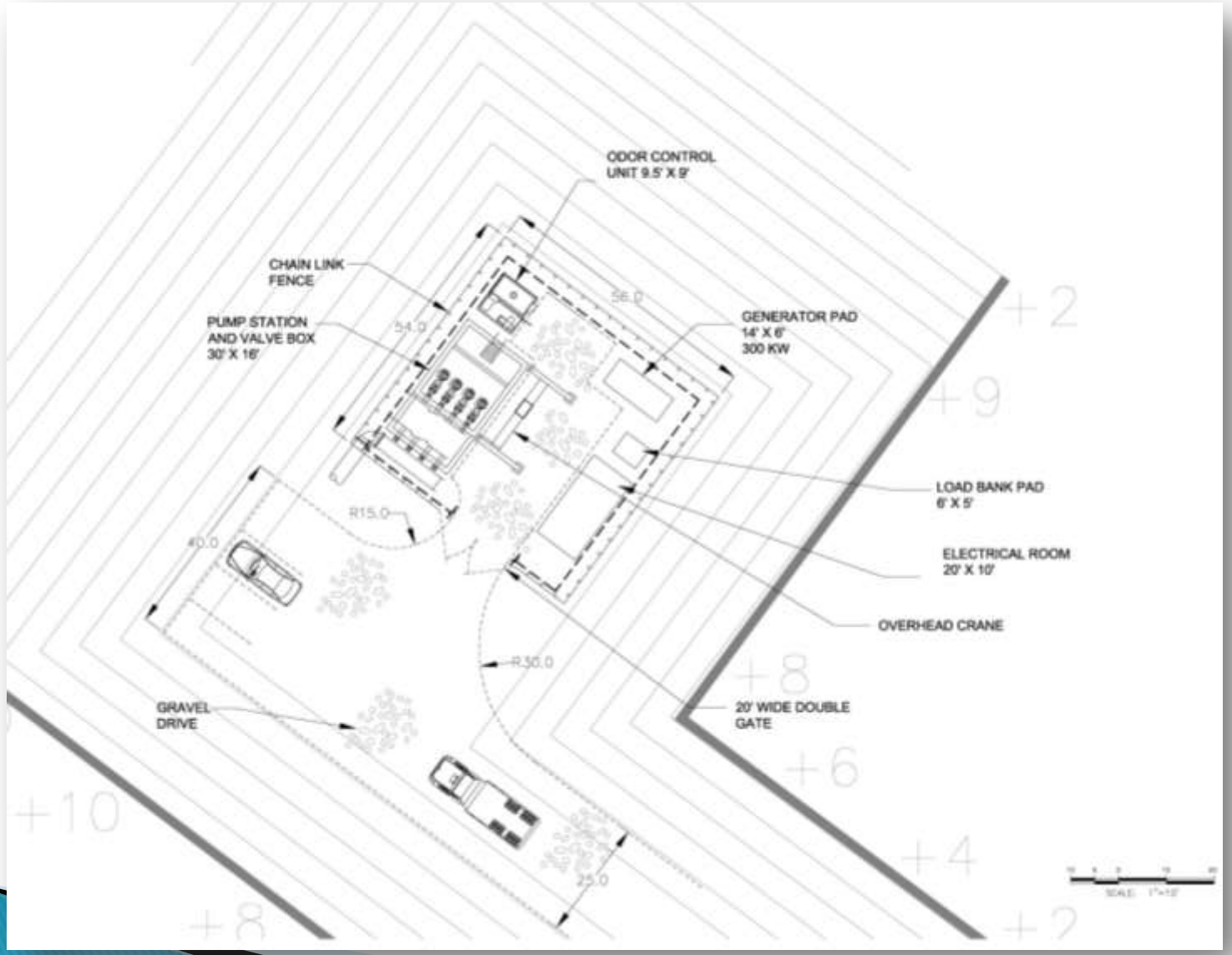
Force Main Alternatives 1 & 2



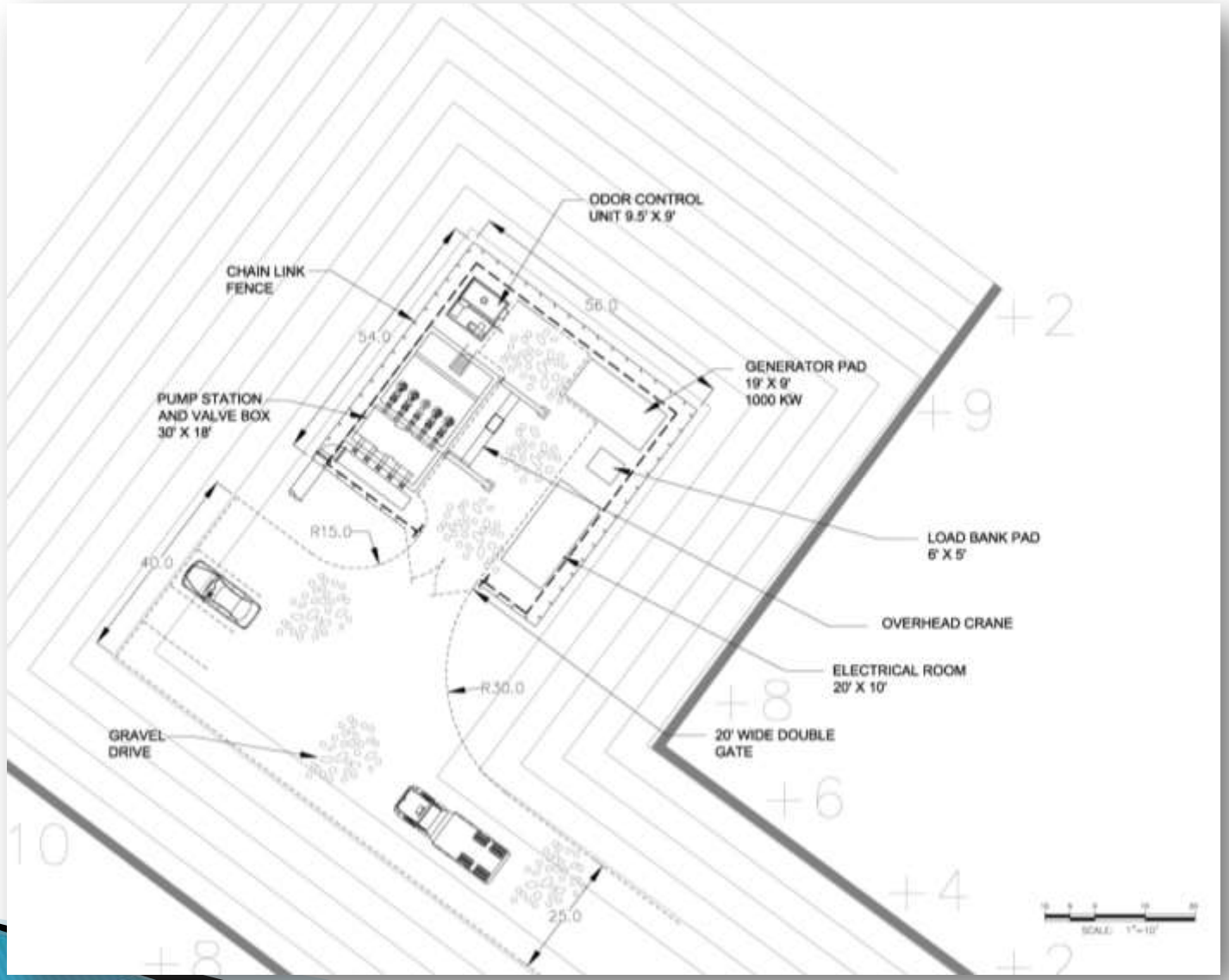
Force Main Alternatives 3 & 4



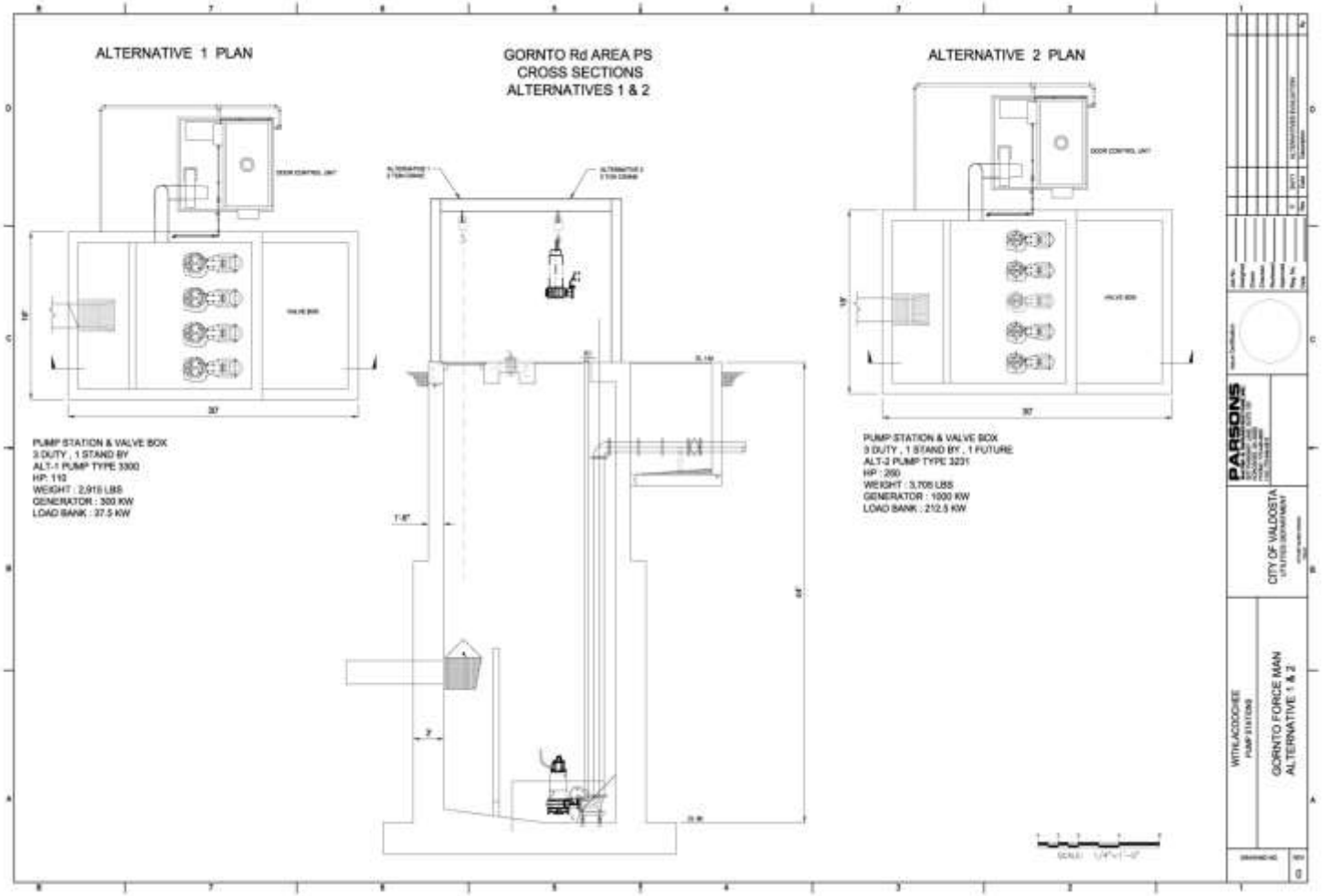
Gornto Rd. Area P.S. Alternative 1 plan view



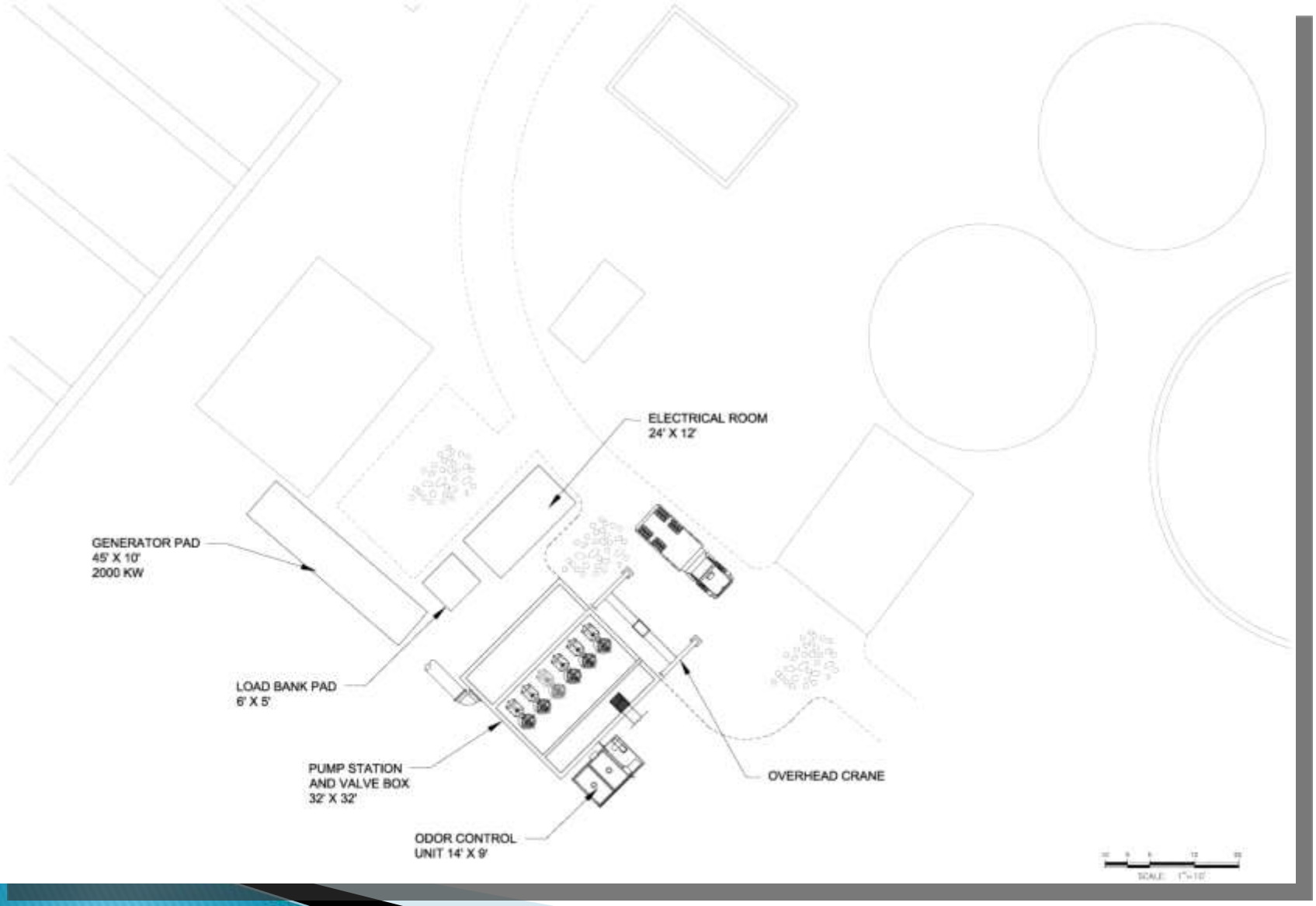
Gornto Rd. Area P.S. Alternative 2 plan view



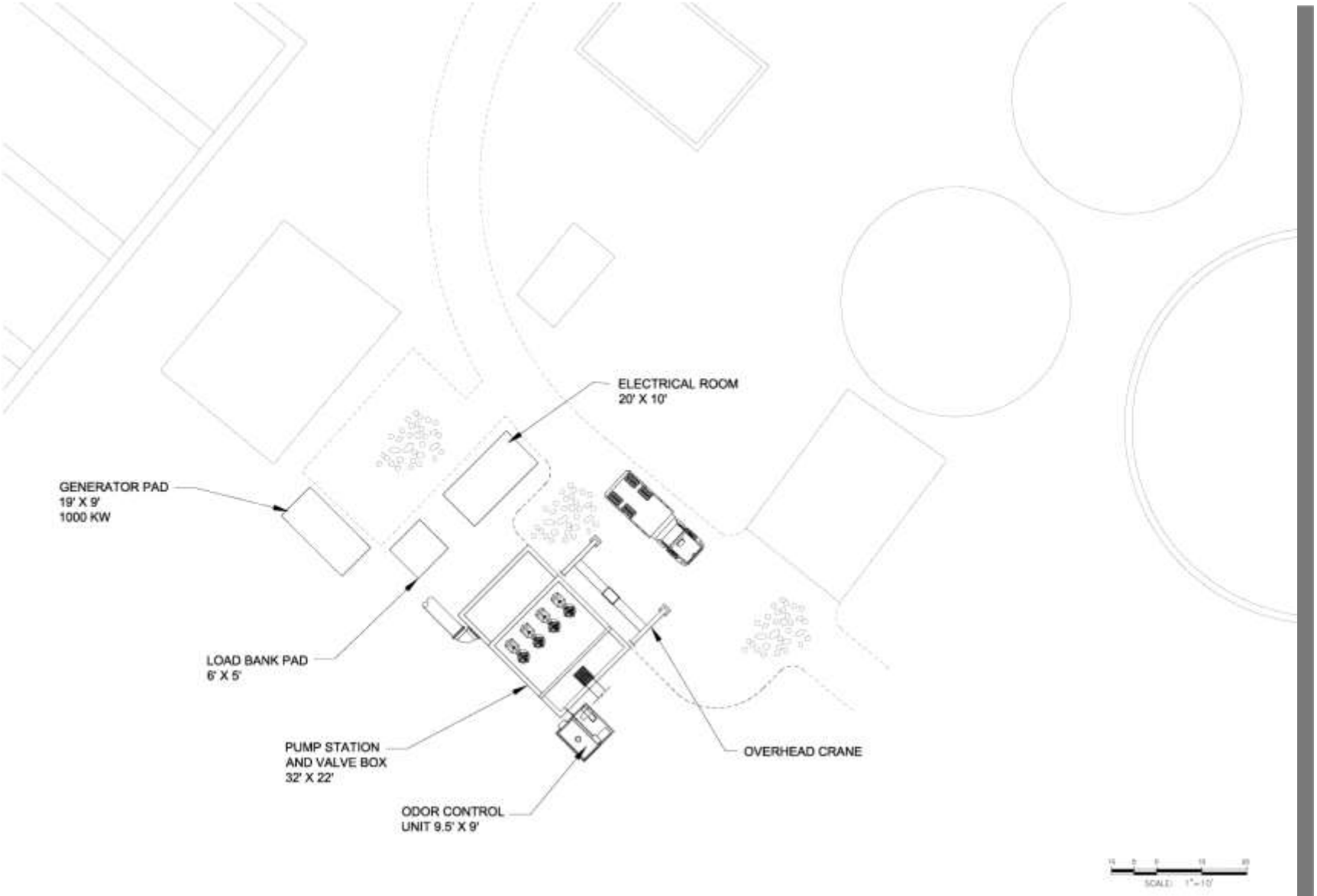
Gornto Rd. Area P.S. Alternatives 1& 2 Cross Sections



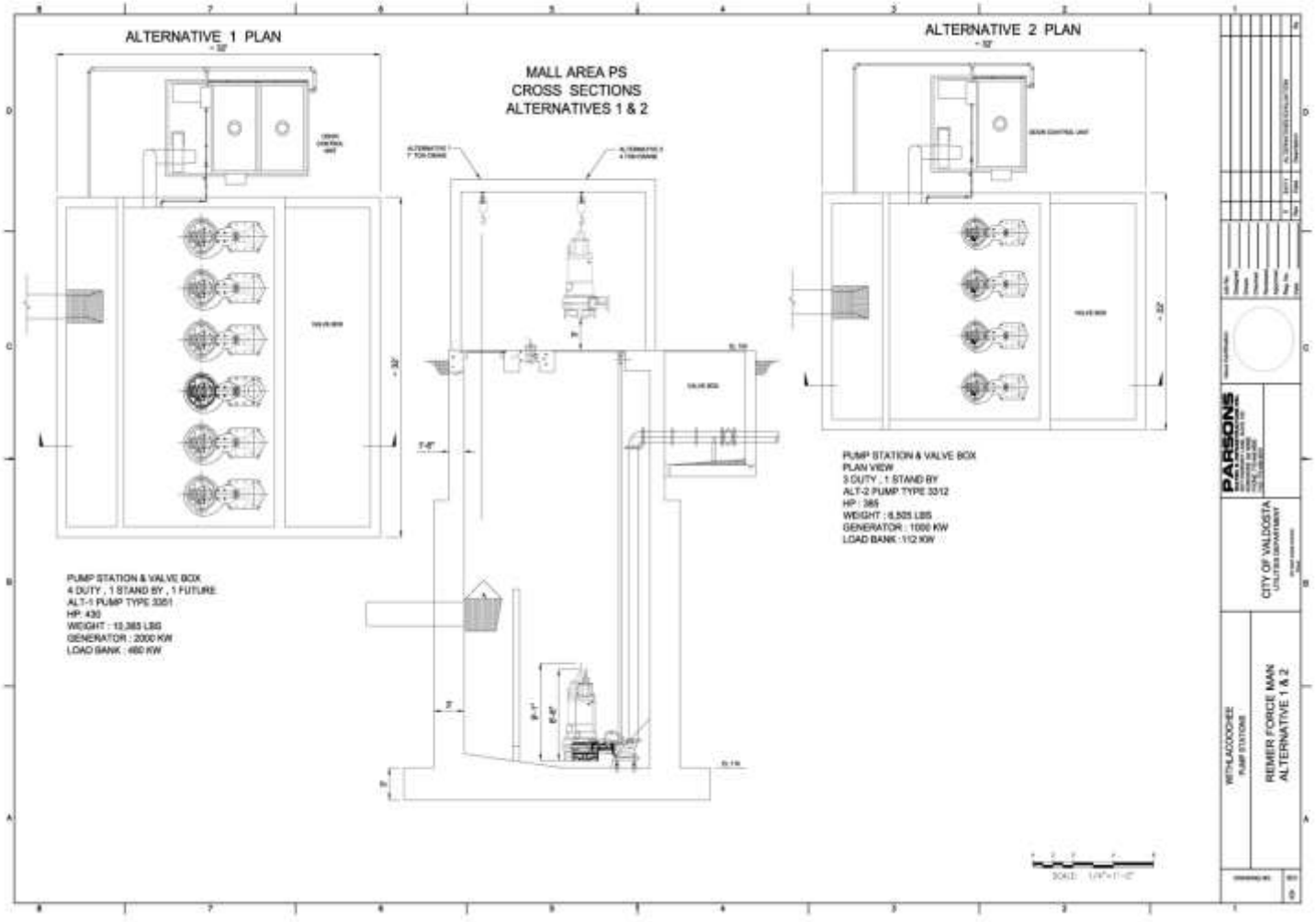
Mall Area P.S. Alternative 1 plan view



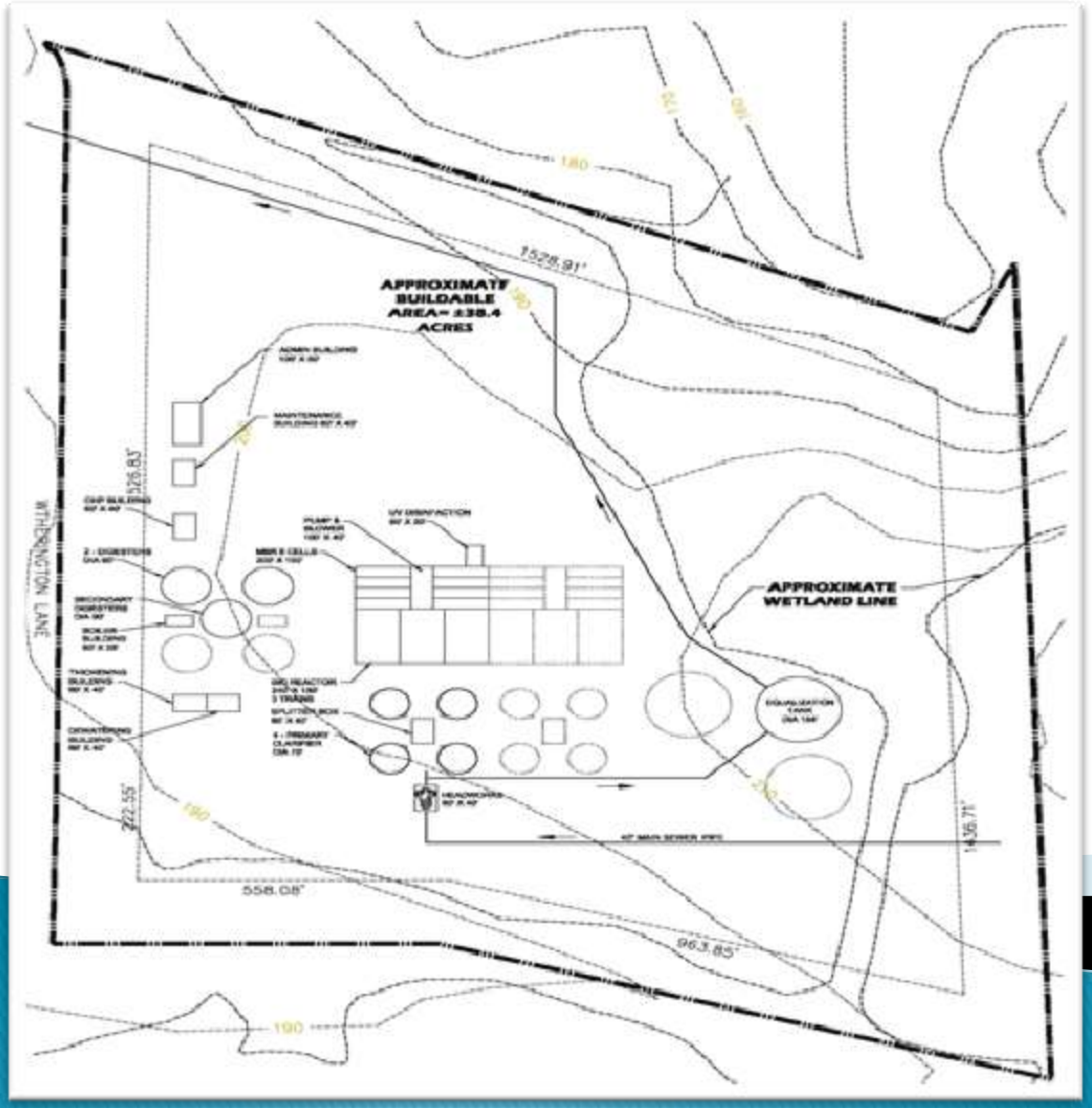
Mall Area P.S. Alternative 2 plan view



Mall Area P.S. Alternatives 1& 2 Cross Sections



Conceptual 12 MGD (Expandable to 24 MGD)
New Plant Layout



Workshop No. 2
Alternative Selection

Force Main Analysis

Option	From	To	Pipe Diameter inches	Pipe Length Feet	Pipe Material Type	Maximum Elev. Ft above sea level	Minimum Elev. Ft above sea level	Cost
1 & 2	Gornto Rd. Area P.S. to	Mall Area P.S. to	30	10,596	HDPE	185/174	115	
	Mall Area P.S.	New Headworks	42	20,629	HDPE	234	131	
Total				31,225				
	VCI Pump Station	Gravity Line Near Exit 18	12	4,000	HDPE			$8,856,750
	New Headworks	Existing Plant Headworks	36	4,390	PVCSDR35			$791,300
	Total			39,615				$9,648,050
3 & 4	Gornto Rd. P.S. to	Combined Flow Intersection	30	5,186	HDPE	215	115	
	Mall Area P.S.	Combined Flow Intersection	36	6,413	HDPE	211	131	
	Combined Flow Intersection	New Headworks	42	17,832	HDPE	234	160	
Total				29,431				
	VCI Pump Station	Gravity Line Near Exit 18	12	4,000	HDPE			$9,040,500
	New Headworks	Existing Plant Headworks	36	4,390	PVCSDR35			$791,300
	Total			37,821				$9,831,800

Workshop No. 2
Alternative Selection

Pump Station Analysis

Option	Pump Station	Installed Pumps - Year 2038 Duty - HP	Stand-By - HP	Future Pumps - 2050 Build-Out Additonal - HP	2038 Peak Flow Installed MGD	2050 Build Out Peak Flow MGD	Construction Costs	Present Value (PV) Life Cycle Costs (LCC) (2011 to 2038)	Total Construction + LCC
1	Gornto Rd. Area	110	110	0	16	16			
		110							
		110							
	Total	330	110	0			$3,352,611	$1,192,538	$4,545,149
	Mall Area	430	430	430	33	38			
		430							
		430							
		430							
	Total	1,720	430	430			$7,306,677	$3,901,187	$11,207,863
	Combined Totals	**2,050**	**540**	**430**			**$10,659,288**	**$5,093,725**	**$15,753,013**
2, 3, 4	Gornto Rd. Area	250	250	250	14	16			
		250							
		250							
	Total	750	250	250			$4,365,446	$2,117,737	$6,483,184
	Mall Area	385	385	0	22	22			
		385							
		385							
	Total	1155	385	0			$5,477,414	$2,978,003	$8,455,418
	Combined Totals	**1,905**	**635**	**250**			**$9,842,861**	**$5,095,741**	**$14,938,601**

Workshop No. 2
Alternative Selection

Withlacoochee WPCP Sewer Systems Improvements
Cost Analysis

Option	Force Main	Easements (Est.)	Total Force Main	Pump Station	Total Construction	Life Cycle Cost (LCC)	Total Construction + LCC
1	$9,648,050	$190,249	$9,838,299	$10,659,288	$20,497,586	$5,093,725	$25,591,311
2	$9,648,050	$190,249	$9,838,299	$9,842,861	$19,681,159	$5,095,741	$24,776,900
3	$9,831,800	$484,829	$10,316,629	$9,842,861	$20,159,490	$5,095,741	$25,255,230
4	$9,831,800	$484,829	$10,316,629	$9,842,861	$20,159,490	$5,095,741	$25,255,230

Note: Easement Estimated Cost = 1.5 x Tax Map Land Value

Workshop No. 2
Alternative Selection

Criterion	Rank	Weight	Description
Capital Cost			The alternative pump station configurations being considered will differ in the size of the pumps, the amount of reinforced concrete required for new structures, the length and diameter of the force mains. The process with the lowest capital cost will receive the most favorable score.
Life Cycle Costs			The alternative pump station configurations being considered will differ in the amount of electrical power consumed (kwh/yr) and maintenance costs. Life Cycle Costs (LCCs) which include both capital and 50 year O&M costs will be developed for comparative purposes. The process with the lowest annual O&M cost would receive the most favorable score.
Environmental Impacts			The alternatives differ in their impacts on the environment. These impacts include impacts upon wetlands, air quality, noise, and other unavoidable impacts of this construction.
Community Impacts			The alternatives being considered will differ in their impacts on the surrounding community. Community impacts include permanent and temporary impacts of construction on the surrounding neighborhoods and businesses. These impacts include road closures during construction.
Reliability/Maintainability			This criteria includes the ease of monitoring, control, operation, and maintenance considerations. The alternatives also differ in accessibility for maintenance, and equipment modularity between pump stations.

Workshop No. 2
Alternative Selection

Name _____

Criterion	Option			
	1	2	3	4
Capital Cost				
Life Cycle Costs				
Environmental Impacts				
Community Impacts				
Reliability/Maintainability				

Rate each option against the listed criteria. Use a 1 to 5 scale, with 5 being most desirable.

Economic Criteria

Capital Cost. Capital costs were developed for comparative purposes. These costs include estimated construction costs, allowances for lega and administrative costs, general conditions and contingencies.

Life-Cycle Cost. Life Cycle Costs (LCCs) which include both capital and 27 year (to 2038) O&M costs were developed for comparative purposes. Operation and maintenance costs were estimated based on pumping costs and equipment maintenance. Most of the projected O&M expenses are in the electrical costs of operating the pumps. The present worth for 27 years of annual O&M costs at an annual interest rate of 6.0% was added to the estimated capital cost to determine the present worth of life cycle costs for each option.

Non-economic Criteria

Impacts on the Environment. Environmental impacts include impacts upon wetlands, air quality, noise, and other unavoidable impacts of such construction.

Impacts on the Community. Community impacts include permanent and temporary impacts of construction on the surrounding neighborhoods. An example of this impact is road closures during construction.

Reliability /Maintainability. This criteria includes the ease of monitoring, control, operation, acce[illegible]ility and maintenance considerations.

Workshop No. 2
Alternative Selection

Alternative Selection Analysis
Summary Table

	Weighted Scores			
Criterion	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Reliability/Maintainability	6.4	6.8	6.0	5.2
Capital Cost	6.3	6.7	5.6	5.3
Life Cycle Cost	6.5	5.2	5.2	5.2
Environmental Impacts	4.5	4.8	5.1	4.5
Community Impacts	3.0	4.3	3.8	3.3
Total Scores	26.7	27.7	25.7	23.4