

Group C1.01 – Reservoir Cats

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Project Sponsor: Freese and Nichols



Project Overview

The team was tasked with Designing a 2.5 MG elevated potable water storage tank (EST) at 8616 Southwest Parkway, Austin, TX, 78735, and transmission main to Old Bee Caves Rd.

Alternatives Considered

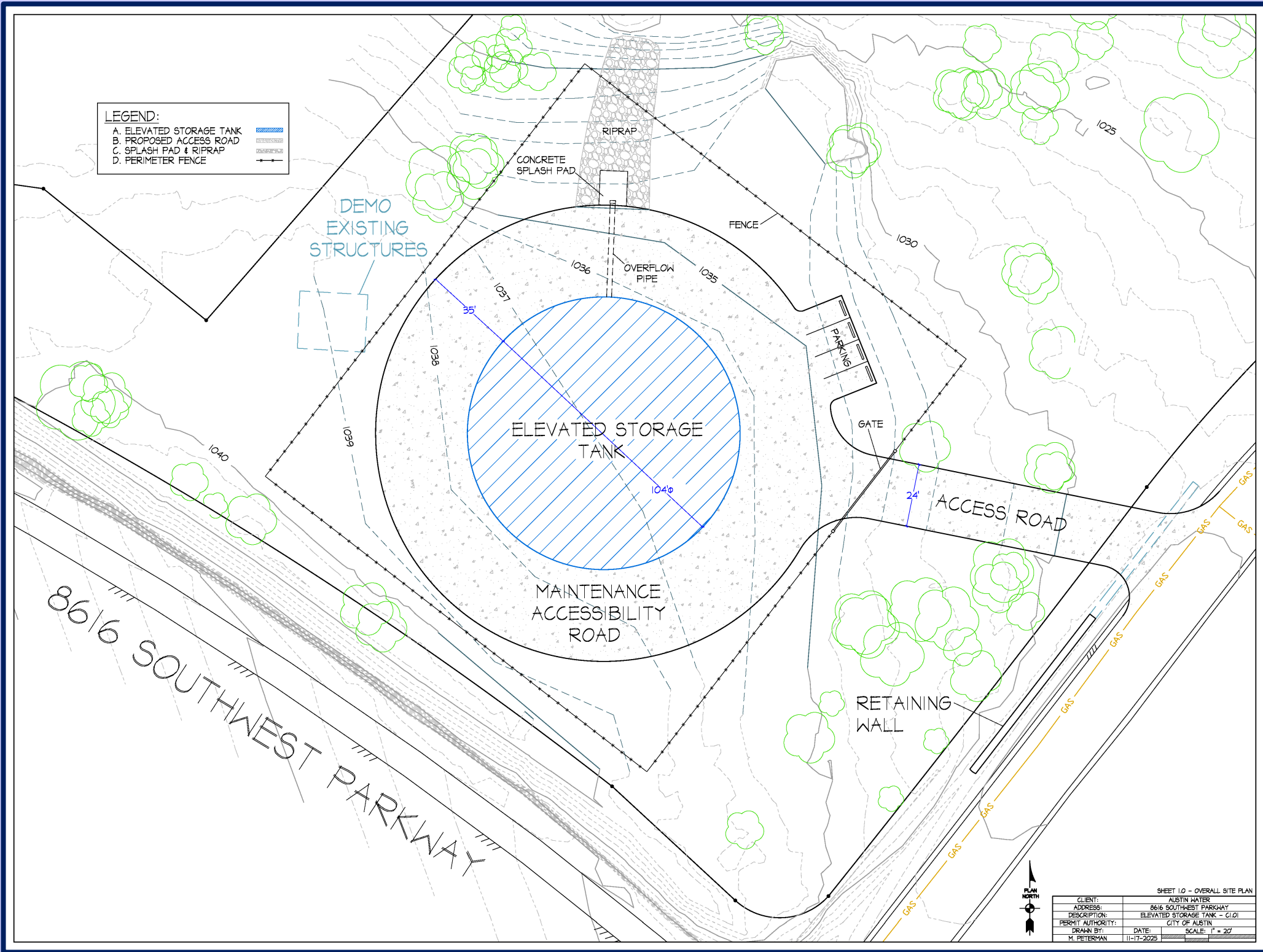
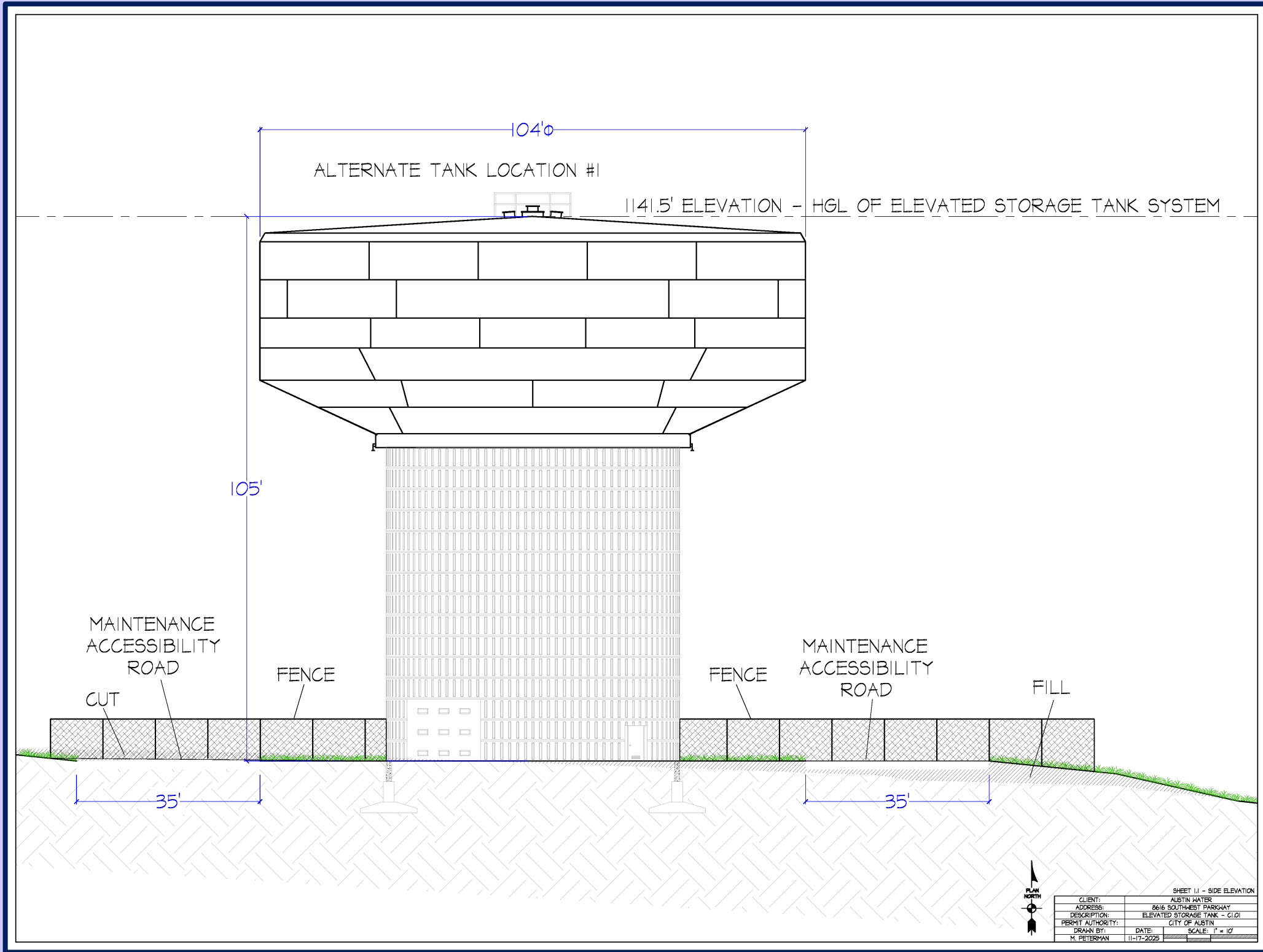
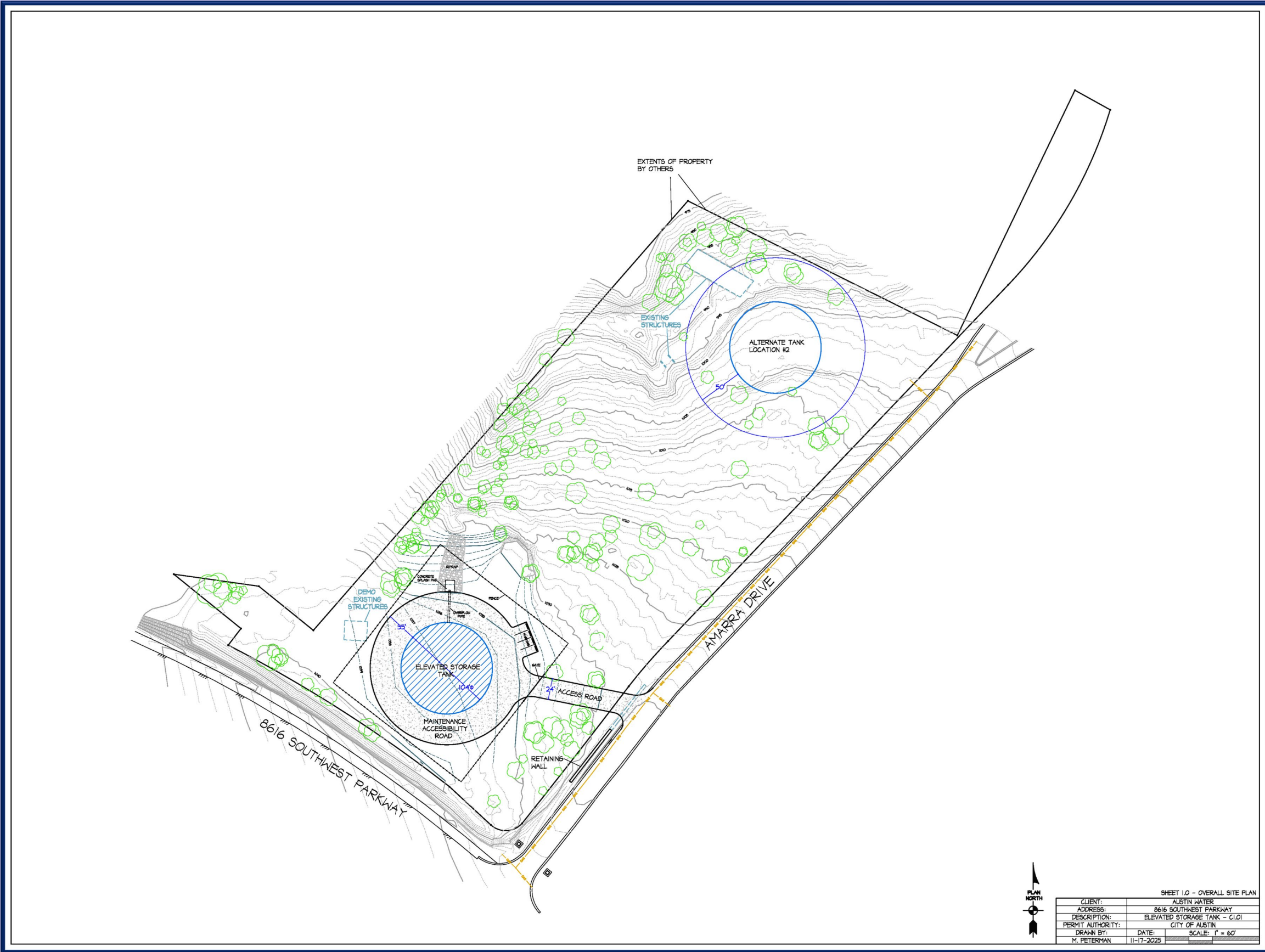
- Site Location**
Factors: cost, grading, maintenance access, and constructability
- Pipe Material**
Factors: cost, maintenance, durability, and environmental impact
- Pipe Route**
Factors: cost, maintenance, constructability, existing utilities & structures, traffic impact

Sustainability Evaluation

Credit Category	Applicable	Submitted	Percentage
 Quality of Life	156	67	43%
 Leadership	182	77	42%
 Resource Allocation	196	100	51%
 Natural World	182	53	29%
 Climate and Resilience	190	124	65%
Total Points / %	906	421	46%

The Envision v3 sustainability score for the EST was determined to be 46 % (Gold). With its strongest scores in Climate and Resource & Resource Allocation.

Elevated Storage Tank Site Location



Pipeline to Water Main Connection



Team Members



Capital Cost & Life Cycle Cost

Opinion of Probable Construction Costs (OPCC)					
Items	Unit	Quantity	Per Unit Price	Total Unit Cost	Total Unit Cost + 35% Contingency
36" Ductile Iron Pipe	LF	60	\$ 431.80	\$ 25,908.00	\$ 34,975.80
36" PVC Pipe	LF	3400	\$ 123.39	\$ 419,526.00	\$ 566,360.10
48" Carbon Steel Casing	LF	180	\$ 531.84	\$ 95,731.20	\$ 129,237.12
Elevated Storage Tank	N/A	1	\$ 8,650,000.00	\$ 8,650,000.00	\$ 11,677,500.00
Concrete Pavement	CY	235	\$ 122.95	\$ 28,893.25	\$ 39,005.89
Boring	LF	180	\$ 1,416.04	\$ 254,887.20	\$ 344,097.72
Rip Rap	CY	10	\$ 27.02	\$ 270.20	\$ 364.77
Geotextile Fabric	SY	17	\$ 1.91	\$ 32.47	\$ 43.83
Earth Work Fill	CY	85	\$ 17.78	\$ 1,511.30	\$ 2,040.26
Earth Work Cut	CY	145	\$ 17.78	\$ 2,578.10	\$ 3,480.44
Building Demolition	SF	3,200	\$ 8,113.58	\$ 8,113.58	\$ 10,953.33
Fencing	LF	800	\$ 43.95	\$ 35,160.00	\$ 47,466.00
Gate	N/A	1	\$ 3,026.53	\$ 3,026.53	\$ 4,085.82
Interior Epoxy Coating OCS1	SF	24,900	\$ 6.00	\$ 149,400.00	\$ 201,690.00
Exterior Paint	GAL	285	\$ 120.00	\$ 34,200.00	\$ 46,170.00
Total:				\$ 9,709,237.83	\$ 13,110,000.00

100 year Life-Cycle Cost Analysis (LCAA)						
Item	Initial Cost	Replacement Interval	Cost per Occurrence	Year(s)	Discount Rate	PC
36" PVC Pipe	\$ 419,526.00	50	\$ 419,526.00	50	6%	\$ 442,301.38
36" Ductile Iron Pipe	\$ 25,908.00	75	\$ 25,908.00	75	6%	\$ 26,235.71
Exterior Paint OCS1	\$ 46,170.00	15	\$ 46,170.00	15,30,45,60,75,90	6%	\$ 79,055.36
Interior Epoxy Coating	\$ 201,690.00	15	\$ 201,690.00	15,30,45,60,75,90	6%	\$ 345,347.08
Tank Cleaning	\$ 67,500.00	4	\$ 67,500.00	4,8,12,...,96	6%	\$ 256,208.57
Concrete Pavement	\$ 28,893.25	30	\$ 28,893.25	30,60,90	6%	\$ 34,952.24
O&M	\$ 54,816.00	1	\$ 54,816.00	Annually	6%	\$910,907.41
OPCC Cost	\$ 13,110,000.00	N/A	N/A	0	N/A	\$ 13,110,000.00
Total PC:						\$ 14,500,000.00

Using a 100-year analysis period the total life cycle cost including the OPPC cost is estimated to be \$14.5 Million.

Constraints & Standards

- UCM §2.9.2 – Water Systems
- COA Standard Product List (SPL WW-27)
- COA SPL – Steel Pipe Coating/Lining Requirements
- ECM §3.5.4 – Urban Forest Mitigation
- TCEQ – Public Water System Design Standards
- TWWA – Elevated Storage Tank Standards
- EPA – Water Storage Tank Guidelines