

Killeen Options and Costs

January 30, 2024 Council
meeting

WCID 1 Water System
Improvements

WCID 1 Improvements-Killeen Options and Costs



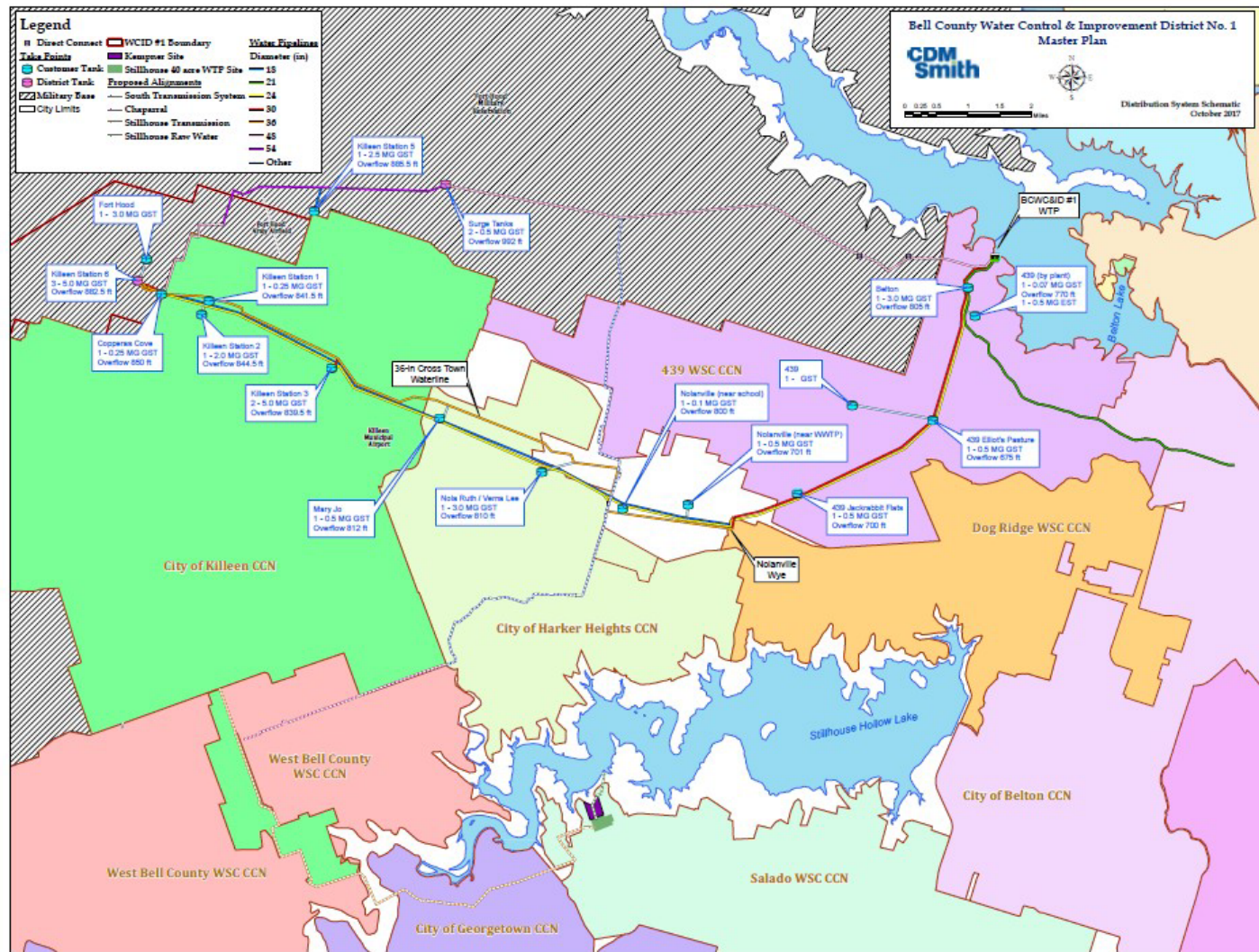
Killeen Transmission System Improvements

48-inch segment replacement
Surge Tank replacement project
Station 3 storage tank recoating

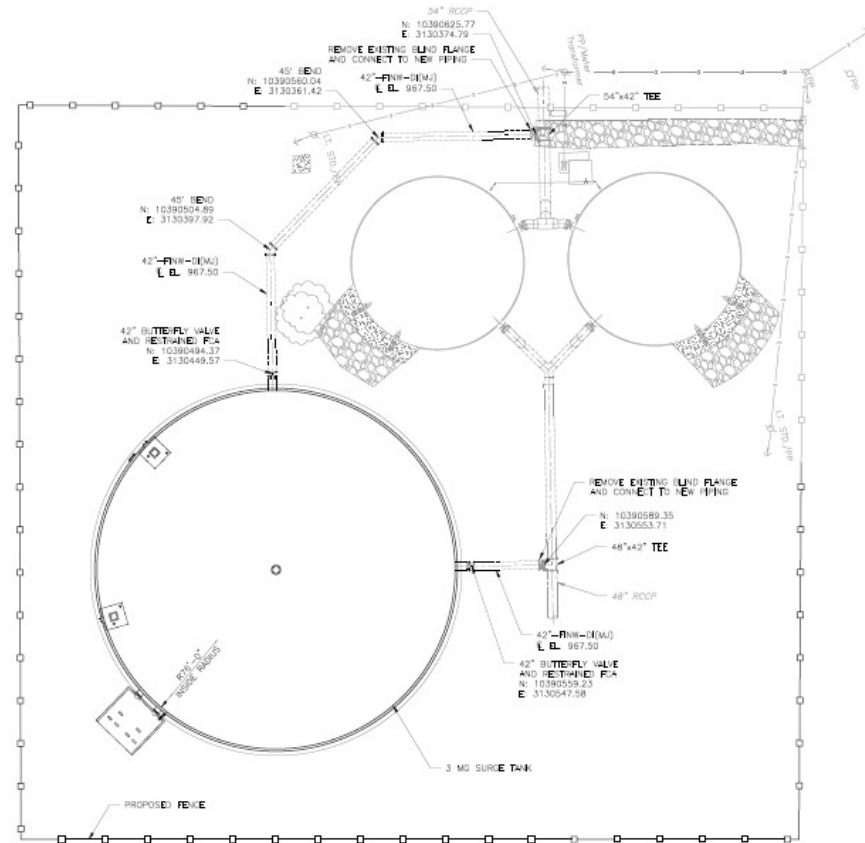


Belton Water Treatment Plant Upgrades

Maintenance
Capacity









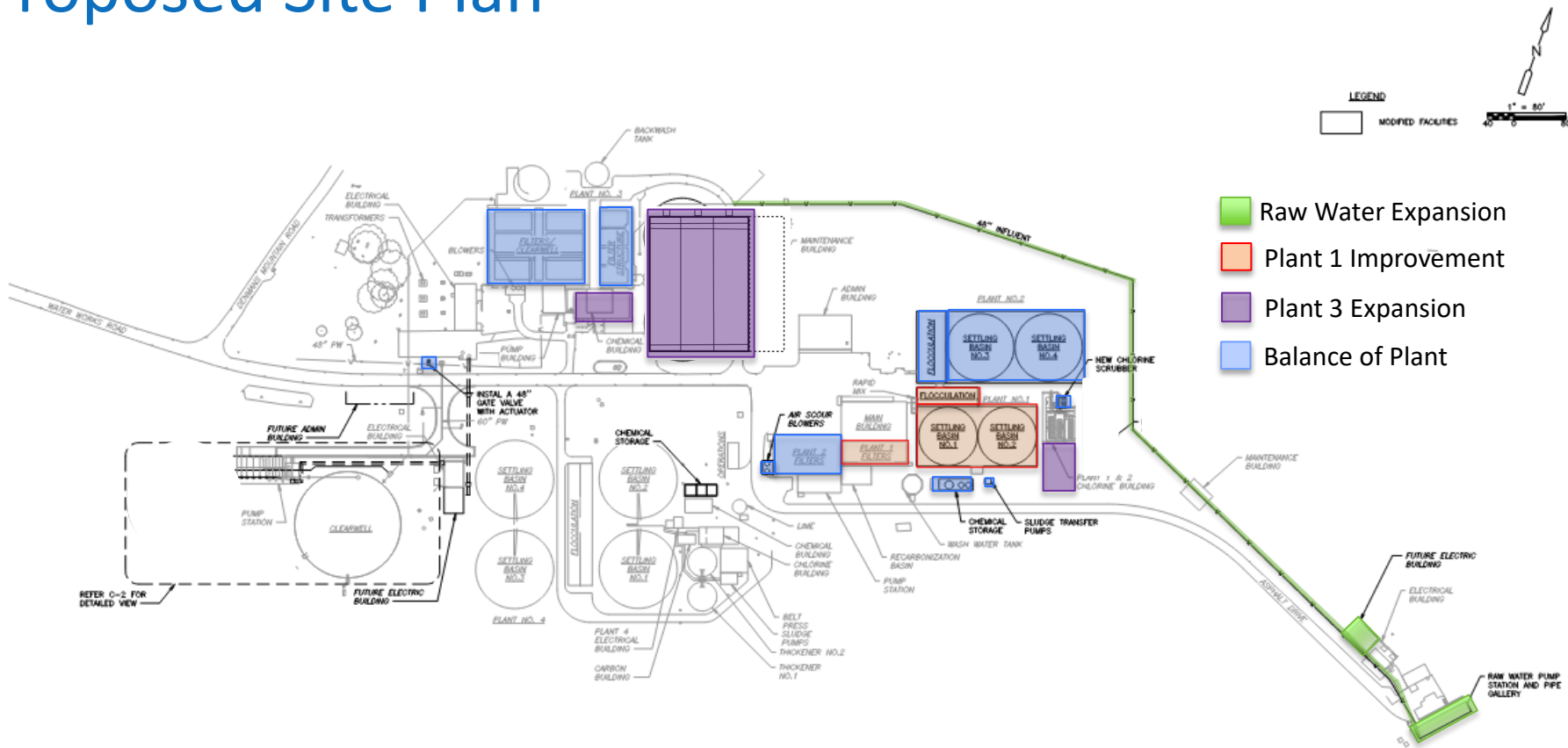
Bell County WCID 1

Plant Condition & Capacity Concept Design

November 2023



Proposed Site Plan

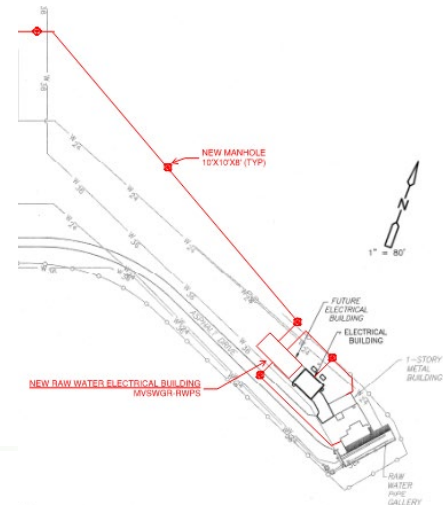




Raw Water Condition and Capacity

Raw Water Condition and Capacity

- Raw Water Pump Station Expansion
 - Replace three pumps (No. 9, No. 10 and No. 11)
- Raw Water Pump Station Electrical Improvements
 - New Raw Water Electrical Building
 - New Underground Ductbank to Existing Main Electrical Building
 - Re-power Existing Raw Water Electrical Buildings
- Raw Waterline Replacement





Plant 1 Improvement

Plant 1 Improvement

- Floc Basin Baffle Replacement
- Sludge Collector Mechanism
- Filter Gallery Repairs





Plant 3 Expansion

Plant 3 Expansion

- Demolition Existing Clarifiers
- New Conventional Treatment Structures (Three basins (11.7 MGD each) now, and one for future)
- Chemical Storage and Feed Facilities
- Road Improvements
- Misc. Sitework
- Electrical Improvements
- Plant 3 Chlorine System Expansion

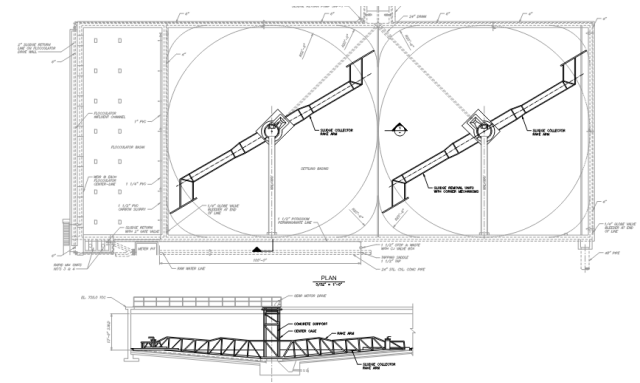




Balance of Plant

Balance of Plant

- Plant 1 and 2 Air Scour Blowers
- Plant 1 and 2 Chlorine Scrubber and Misc. Repairs
- Plant 1 and 2 LAS Tank Replacement
- Plant 2 Sludge Collector Mechanisms
- Plant 4 LAS Tank Replacement
- Plant 2, 3 and 4 Filter Gallery Repairs
- Plant 1 and 2 Sludge Transfer Pump Station Upgrade
- 48" GV/ Electric Actuator
- Allowance for the Hydraulic Adjustments at Plant 2 and Plant 4





Opinion for Construction Cost

Expansion Scenarios

Expansion Scenarios (MGD)	Description	Total Design Capacity (MGD)	Note
4	Plant 4 only	94.4	Plant 4 from 35 to 39 MGD
6	Plant 2 and Plant 4	96.4	Plant 4 from 35 to 39 MGD and Plant 2 from 16.5 to 19 MGD = 6.5 ~ 6 MGD
10	Plant 3 only	100.4	Adding 3*11.7 basins=35.1 MGD and demolishing existing basins 25.4 MGD, 35.1-25.4=9.7 ~ 10 MGD Net
14	Plant 4 and Plant 3	104.4	Plant 4 from 35 to 39 MGD and Plant 3 from 25.4 to 35.4 MGD
16	Plant 2, Plant 3 and Plant 4	106.4	Plant 4 from 35 to 39 MGD, Plant 2 from 16.5 to 19 MGD and Plant 3 from 25.4 to 35.4 MGD
28	Plant 2, Plant 4 and Plant 3 (Adding fourth Basin)	118.4	Plant 4 from 35 to 39 MGD, Plant 2 from 16.5 to 19 MGD and Plant 3 from 25.4 to 47.4 MGD

	Existing Capacity (MGD)	Filtering Capacity (MGD)
Plant 1	13.5	13.5
Plant 2	16.5	19.1
Plant 3	25.4	25.4
Plant 4	35.0	60.5
Total	90.4	118.5

Improvement Description		Capacity (C) or Maintenance (M)	Construction Cost ₁	Project Cost ₂
Raw Water Pump Station Expansion				
	Mechanical	C/M	\$5,764,500	\$7,180,000
	Raw Waterline	C	\$4,433,000	\$5,520,000
	Electrical Improvements	C/M	\$15,100,000	\$18,800,000
Plant 1 Improvements				
	Floc Basin Baffle Replacement	M	\$319,000	\$400,000
	Sludge Collector Mechanism	M	\$2,172,000	\$2,710,000
	Filter Gallery Repairs	M	\$333,000	\$420,000
Plant 3 Expansion				
	Demolition	C	\$2,000,000	\$2,490,000
	New Conventional Treatment Structures	C	\$34,425,000	\$42,860,000
	Chemical Storage and Feed Facilities	C	\$4,850,000	\$6,040,000
	Road Improvements	C	\$270,000	\$340,000
	Misc Sitework	C	\$1,900,000	\$2,370,000
	Plant 3 Electrical Improvements	C	\$11,800,000	\$14,700,000
	Plant 3 Chlorine System Expansion	C	\$3,900,000	\$4,860,000
Balance of Plant				
	Plant 1 and 2 Air Scour Blowers	M	\$1,178,000	\$1,470,000
	Plant 1 and 2 Chlorine Scrubber and Misc. Repairs	M	\$1,262,000	\$1,580,000
	Plant 1 and 2 LAS Tank Replacement	M	\$524,000	\$660,000
	Plant 2 Sludge Collector Mechanisms	M	\$2,088,000	\$2,600,000
	Plant 4 LAS Tank Replacement	M	\$708,000	\$890,000
	Plant 2, 3 and 4 Filter Gallery Repairs	M	\$929,000	\$1,160,000
	Plant 1 and 2 Sludge Transfer Pump Station Upgrade	M	\$180,000	\$230,000
	48" GV/ Electric Actuator	M	\$431,000	\$540,000
	Allowance for the Hydraulic Adjustments at Plant 2 and Plant 4	C	\$322,000	\$410,000
Total			\$94,900,000	<u>\$118,300,000</u>

OPCC Summary Table

Maintenance Subtotals	Construction Cost ₁	Project Cost ₂
Raw Water Pump Station Maintenance	\$12,700,000	\$15,820,000
Plant 1 Only Maintenance	\$2,824,000	\$3,520,000
Plant 1 and 2 Combined Maintenance	\$3,144,000	\$3,920,000
Remaining Maintenance Items	\$4,156,000	\$5,180,000
Total Maintenance	\$22,830,000	\$28,440,000

Note: The maintenance cost would increase by \$4.8M for the Plant 3 clarifiers mechanisms replacement for the 4-6 MGD expansion options

1. Contingency 30%, OH&P 12%, Escalation to Mid-Point 14%/2 years, General Condition 12%, Mobilization/Demobilization 3%

2. This includes 15% engineering, 7% bond reserves and 2.5% loan issuance fees.

* Considered 50% of mechanical and 65% of electrical improvement costs for maintenance and 50% of mechanical and 35% of electrical improvement costs for capacity expansions

OPCC Summary Table

10 MGD Capacity Expansion	Construction Cost ₁	Project Cost ₂
Raw Water Pump Station Expansion (Two New Pumps)*	\$7,190,000	\$8,960,000
Plant 3 Capacity Improvements	\$59,145,000	\$73,640,000
Raw Waterline Pipeline Modification	\$2,220,000	\$2,770,000
Deduct for Plant 3 Maintenance**	(\$3,850,000)	(\$4,800,000)
10 MGD Increase	\$64,710,000	\$80,570,000
14 MGD Capacity Expansion	Construction Cost ₁	Project Cost ₂
Raw Water Pump Station Expansion (Three New Pumps)*	\$8,170,000	\$10,180,000
Plant 3 Capacity Improvements	\$59,145,000	\$73,640,000
Raw Waterline Pipeline Modification	\$4,433,000	\$5,520,000
Allowance for the Hydraulic Adjustments at Plant 4	\$161,000	\$210,000
Deduct for Plant 3 Maintenance**	(\$3,850,000)	(\$4,800,000)
14 MGD Increase	\$68,060,000	\$84,750,000
16 MGD Capacity Expansion	Construction Cost ₁	Project Cost ₂
Raw Water Pump Station Expansion (Three New Pumps)*	\$8,170,000	\$10,180,000
Plant 3 Capacity ImprovementS	\$59,145,000	\$73,640,000
Raw Waterline Pipeline Modification	\$4,433,000	\$5,520,000
Allowance for the Hydraulic Adjustments at Plant 2 and Plant 4	\$322,000	\$410,000
Deduct for Plant 3 Maintenance**	(\$3,850,000)	(\$4,800,000)
16 MGD Increase	\$68,220,000	\$84,950,000

20 *Considered 50% of mechanical and 65% of electrical improvement costs for maintenance and 50% of mechanical and 35% of electrical improvement costs for capacity expansions

** Constructing new sed basins at plant 3 will save costs for the plant 3 maintenance

Expansion Costs

Capacity Expansion (MGD)	Expansion Cost (\$)	Cost/GD Expansion (\$)
4.0₁	\$26,420,000	\$6.61
6.0₂	\$32,140,000	\$5.36
10.0₃	\$80,570,000	\$8.06
14.0₄	\$84,750,000	\$6.05
16.0₅	\$84,950,000	\$5.31

1) 4.0 MGD at Plant 4

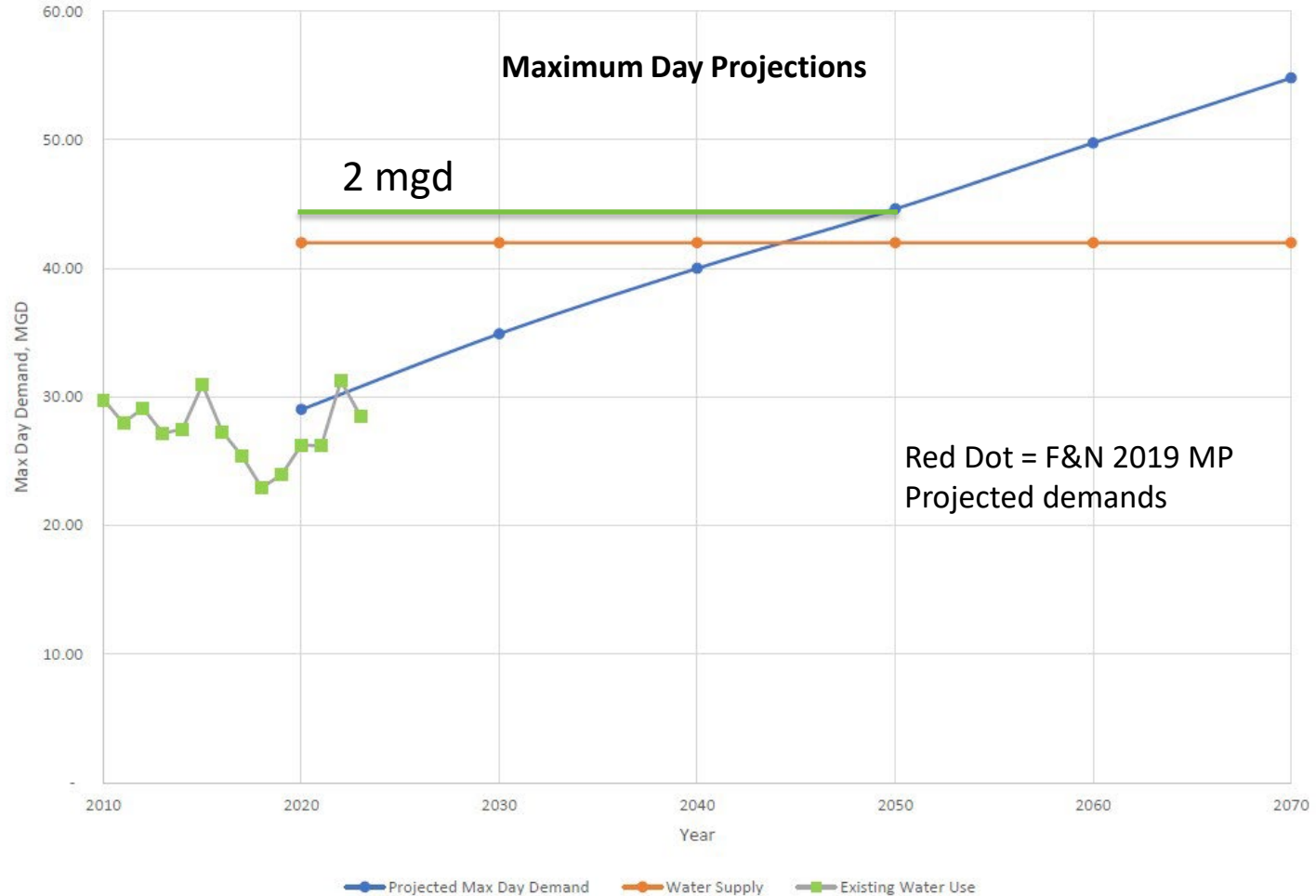
2) 4.0 MGD at Plant 4 + 2.0 MGD at Plant 2 = 6.0 MGD

3) 10.0. MGD at Plant 3 (Adding 3*11.7 basins=35.1 MGD and demoing existing basins 25.4 MGD, 35.1-25.4=9.7 ~ 10.0 MGD)

4) 4.0 MGD at Plant 4 + 10.0 MGD at Plant 3 = 14.0 MGD

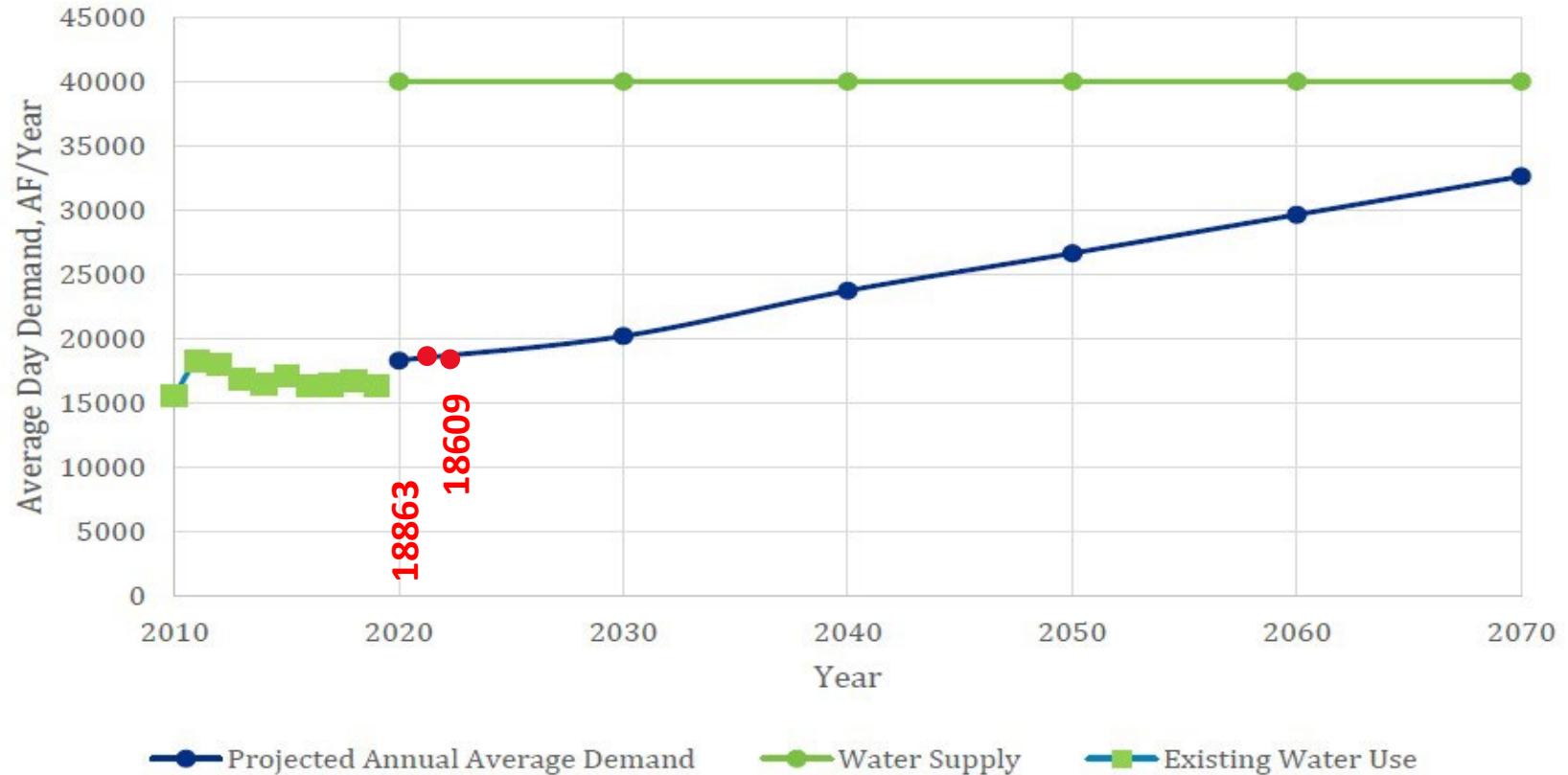
5) 4.0 MGD at Plant 4 + 2.0 MGD at Plant 2 + 10.0 MGD at Plant 3 = 16.0 MGD

Killeen



Annual Usage in Acre Feet

Killeen



Water Debt Service

Killeen

Maintenance

		Capacity Factor	Cost
48-inch	\$9,000,000	2/5 [32/80ths]	\$3,600,000
Surge Tank	\$5,300,000	2/5 [32/80ths]	\$2,120,000
Station 3 Tanks	\$2,400,000	2/5 [32/80ths]	\$960,000
Belton Plants*	\$25,000,000	16/37 [32/74ths]	\$10,810,811

Capacity

2	\$6 per gallon	\$12,000,000
		\$29,490,811

Killeen total capital outlay is \$29,490,811 for all planned maintenance and additional 2 million gallons of treatment capacity per day



Schedule

Schedule

- 10-16 MGD Expansion

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Questions?



