Riverbend Water Resources District
Regional Water Master Plan

Town Hall Meeting

Texarkana (Texas) Convention Center
July 25, 2018

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Presentation Outline

- Project Overview and Recap of Goals
- Final Population and Water Demand Projections – Municipal and Manufacturing
- Water Infrastructure Assessment (New Boston Road, Millwood, Graphic Packaging International Facilities)
- Final Alternatives – Regional Water Infrastructure (Sizing and Cost Estimates)
- Summary and Conclusions
- Q&A Discussion

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Project Participants

- Riverbend WRD
- Bowie County
- Cass County
- Red River County
- Central Bowie County WSC*
- City of Annona
- City of Atlanta
- City of Avery
- City of Clarksville*
- City of De Kalb
- City of Hooks
- City of Leary
- City of Maud
- City of Nash
- City of New Boston
- City of Red Lick*
- City of Redwater
- City of Texarkana (Texas)
- City of Wake Village
- Graphic Packaging International*
- TexAmericas Center

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Scope of Work

- **Service Area Description – Data Collection**
- **Population & Water Demand Projections**
  - Quantify population and water demand projections through a data driven process; developed in five-year increments
- **Water Infrastructure Assessment & Alternatives**
  - Incorporate a more focused evaluation of existing water supplies and infrastructure alternatives available to RWRD
- **Water Supply Assessment & Alternatives**
  - Provide a high-level evaluation of present and future water supply and needs along with a defensible approach for RWRD moving forward
- **Water Conservation/Drought Management Plans**
- **Funding Options**
  - Develop master plan for RWRD that aligns with TWDB Region D and well-positions RWRD for various grants and financing alternatives

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Important Study Drivers

1) **Regulatory**
   - TCEQ Minimum Criteria: 0.6 gpm/connection
   - COE Ultimate & Interim Rule Curve
2) **Capacity and Demand (Existing & Future)**
   - Municipal (Current & Potential Member Entities)
   - Manufacturing (GPI, TAC)
   - Agricultural (Wheat, Soybeans, Timber, Livestock)
   - Environmental Flows
3) **Conservation and Firm Supply Availability**
   - TWDB Water Consumption Goal: 140 gpcd

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Project Timeline

- **Project Kick-off Meeting (July 21, 2016)**
- **Data Collection Activities (August 31, 2016)**
- **WTP Site Assessments (October 26-27, November 2 and November 8, 2016)**
- **First Town Hall Meeting (November 8, 2017)**
  - Discuss project overview, status update and planning region
- **Second Town Hall Meeting (January 31, 2017)**
  - Discuss population/water demand data and various regional water supply, distribution/treatment alternatives
- **Third Town Hall Meeting (October 24, 2017)**
  - Discuss preliminary cost analysis and evaluation of final alternatives for regional supply, distribution and treatment
- **Fourth Town Hall Meeting (July 25, 2018)**
  - Discuss highlights of Final Report

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Municipal Population & Water Demand Projections

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Municipal Population Projections – TWDB Revision Request

- Methodology for Population Projections:
  - (1) Determined 2015 population for cities based on their current meter count and multiplied by Average Household Size (U.S. Census data)
  - (2) Determined projected growth rate based on annual historical meter counts from 2010-2015;
  - (3) Referenced recent Comprehensive Plans prepared by engineering consultants for future decadal growth rate; also compared to TWDB decadal growth rate if available;
  - (4) Reviewed city's existing CCN area and future annexation plans to determine city's build-out period.
- Revised municipal projections for *2021 Region D Water Plan* approved by TWDB Board on April 16, 2018.

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Data Source Comparison for Counties

	2050 TWDB (Pop. & Avg. Annual Growth)*		2050 TDC (Pop. & Avg. Annual Growth)**	
Bowie County	99,263	0.17%	100,503	0.21%
Cass County	31,229	0.06%	31,326	0.07%
Red River County	12,976	0.02%	12,064	-0.16%

* Based on 2012 TDC data and represents 0.5 Migration Scenario; used for 2016 and Draft 2021 Region D Water Plan

** Based on 2014 Texas Demographic Center (TDC) data and represents 0.5 Migration Scenario

2070 Population Projections

Name of Entity	2021 TWDB (Pop. & % Annual Growth)*		2016 TWDB (Pop. & % Annual Growth)	
Central Bowie Co. WSC (Bowie Co.)	12,101	1.03%	7,937	0.64%
City of Atlanta (Cass Co.)	7,427	0.51%	5,818	0.04%
City of Clarksville (Red River Co.)	3,315	0.01%	3,016	0.02%
City of Redwater (Bowie Co.)	5,429	0.84%	1,134	0.12%
City of Texarkana (TX) (Bowie Co.)	47,102	0.43%	39,046	0.12%

* Data provided by participating entities; approved by TWDB Board on April 16, 2018

Maximum Day Water Demands

- Most important criteria for a municipal infrastructure planning project
- Basis for determining required capacity of intakes, WTPs and sizing transmission mains
- TCEQ Minimum Criteria: 0.6 gpm/connection
- Calculated Maximum Day and Average Day Water Demand Ratio for New Boston Road and Millwood WTPs to determine peaking factor
- **Total maximum water demands for municipal project participants in 2070 = 22.5 MGD**

TAC Manufacturing
Water Demand Projections

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Background on TAC Water Demand Projections

- **Riverbend WRD acquired the wet utilities from TAC** and took responsibility for wet utility contract with Red River Army Depot on May 1, 2016.
- **RWRD's contractual obligation to TAC:** required to construct necessary infrastructure to **deliver not less than 30.0 MGD of raw water by May 1, 2026** and then an additional 60.0 MGD (total 90.0 MGD).
- TexAmericas Center – **industrial park in its infancy;** identified industrial park similar to TAC in Pryor, Oklahoma to serve as direct model for TAC growth and development.

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Infrastructure Assessment – New Boston Road Raw Water Intake

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New Boston Road Raw Water Intake

- New Boston Road raw water intake and pumping facilities constructed in 1957;
- Facilities are aged with minimal upgrades since construction;
- Facilities consist of a crib-type intake constructed from reinforced concrete, four vertical turbine low service pumps, and a 9.3 mile, 33-inch diameter concrete cylinder pipeline;
- Previous reports indicate pump station capacity has decreased from 24.5 MGD to 19.6 MGD; and,
- Plant staff indicate the current capacity of the transmission system is currently around 18 MGD.

New Boston Road Raw Water Intake

Discharge Piping in Raw Water Pump Station showing coating in need of repair and other wear and tear.

New Boston Road Raw Water Intake

Front of Prefabricated Building at Wright Patman Lake (to New Boston Road WTP); Raw Water Intake and Pump Station.

Infrastructure Assessment – New Boston Road Water Treatment Plant

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New Boston Road WTP

- New Boston Road WTP was constructed in 1957.
- Although the structural facilities have been maintained well, the true value of the infrastructure assets are approaching their useful life.
- Additional state and federal regulatory treatment requirements may not warrant the plant to remain in operation for an extended period of time.
- Plant staff suggested the permitted WTP capacity was 24-25 MGD; however, TWU and TCEQ confirmed that the treatment capacity of the New Boston Road WTP is limited to 18 MGD.
- WTP site is located within a floodplain and has limited land available for an expansion.

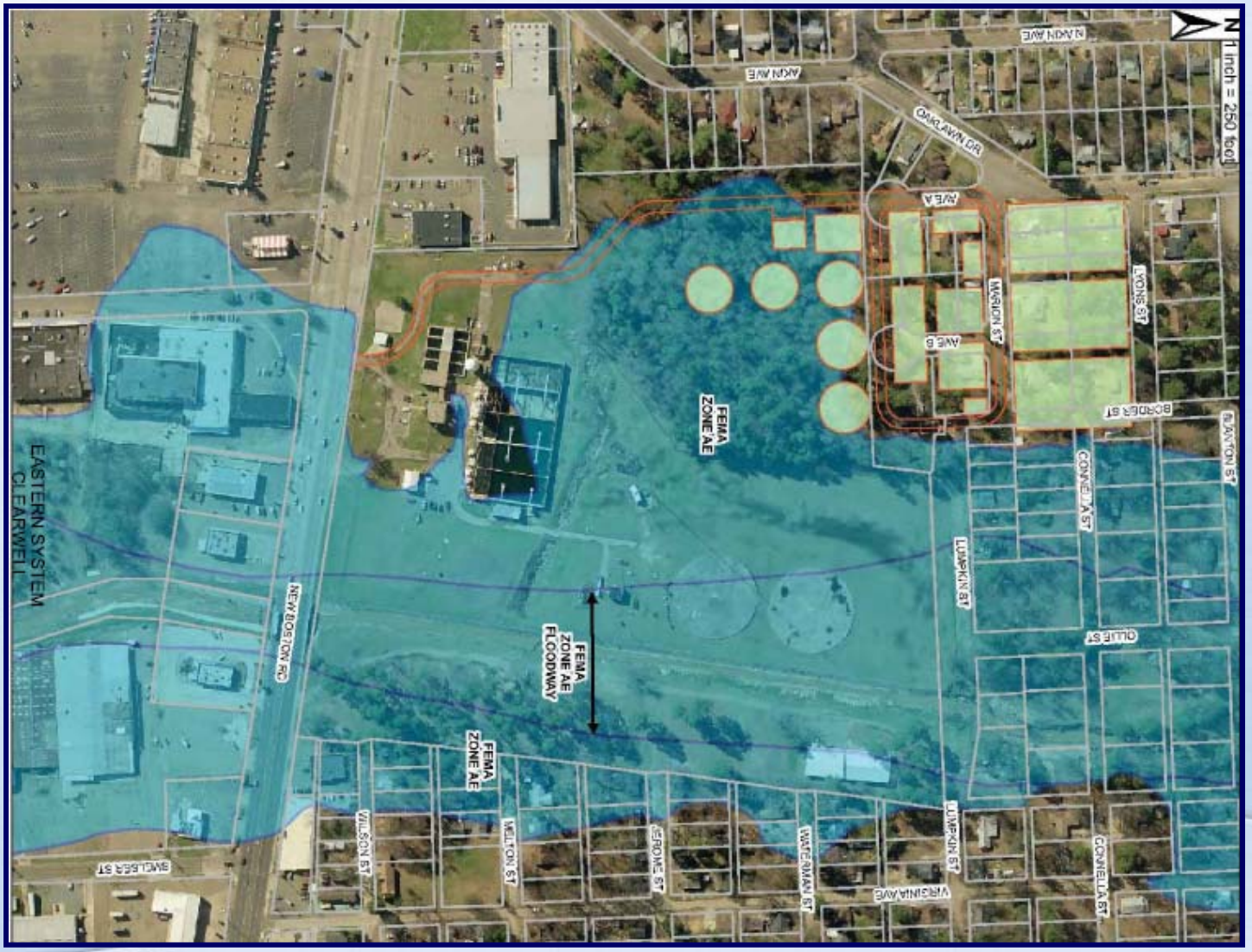
Flocculation / Sedimentation Basins

New Boston Road WTP Flocculation / Sedimentation Basins showing baffles and sludge collectors that are past their expected useful life.

NBR WTP – Flash Mix Basins

New Boston Road (NBR) WTP Flash Mix Basin showing mixers that are aged past their useful life.

New Boston Road WTP – Floodplain Limits



*Source: RWRD Phase 3 Report on Water Treatment Plant and Raw Water Intake Site Selection; CH2M HILL (August 29, 2012)

Infrastructure Assessment – Millwood Water Treatment Plant

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Millwood WTP

- The plant is approximately 30 years old and is mostly original with very few upgrades; plant mechanical components have a typical useful life of 15 -25 years.
- WTP is rated at 15 MGD and has a design and permitted capacity of 20 MGD; located on a 90-acre site and designed for an additional 20 MGD mirrored expansion.
- WTP is jointly owned by Texarkana (TX) and Texarkana (AR); TWU operates the plant, and SWAWD owns and operates the raw water conveyance system.
- Texarkana (AR) owns the contracted water rights.

Millwood WTP (continued)

- WTP basins observed are a major structural concern and require an extensive structural analysis.
- There are no construction or expansion joints observed throughout basins lending them to major cracks and extreme leaks.
- Extensive spalling at the basins could mean original concrete mix used had defects either in the materials used or did not meet quality control requirements for mixing and placing of concrete.
- Due to the observed deflection of the cantilevered portion of the basins, additional concrete thickness/extra reinforcing would be required to address the strength concerns; epoxy repair cannot correct this issue.

Millwood WTP – Observed Cracking in Basin Walls

Millwood WTP – Observed Cracking on Basin

Infrastructure Assessment – Graphic Packaging International (GPI) Water Treatment Plant

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Graphic Packaging International WTP

- WTP was constructed in 1972 and expanded in 1978 (added flocculation basin, sedimentation basin, and three sand filters). In 2000, GAC contactors, clearwell, and associated sodium hypochlorite system were added.
- Graphic Packaging International (GPI) WTP, owned by Texarkana (TX) and operated by GPI to provide potable water to the mill, as well as Cities of Atlanta, Domino, and sometimes Queen City (connection for redundancy); TWU owns and operates the raw water conveyance facilities.
- Structurally, the intake appears to be in good condition for the short-term and long-term.

Graphic Packaging International WTP (cont.)

- Several cracks and leaks observed in the basin walls; several wet areas resulting in corrosion of bolts, members, and equipment. Many overhead pipe-supports that show cracks and appear unstable.
- The GPI WTP is aged, with many original plant components still active. Based on observations, there does not appear to be much remaining life; repairs, although likely expensive, would only be a temporary solution.
- Future construction at the location of the existing facilities would be a challenge; GPI WTP is located in the heart of the mill, making it very difficult for construction traffic and staging.

GPI Raw Water Intake

GPI Raw Water Intake on Wright Patman Lake Shown in Good Condition.

GPI WTP – Basin Wall

An entire length of the basin wall is braced back for support (note large crack in wall).

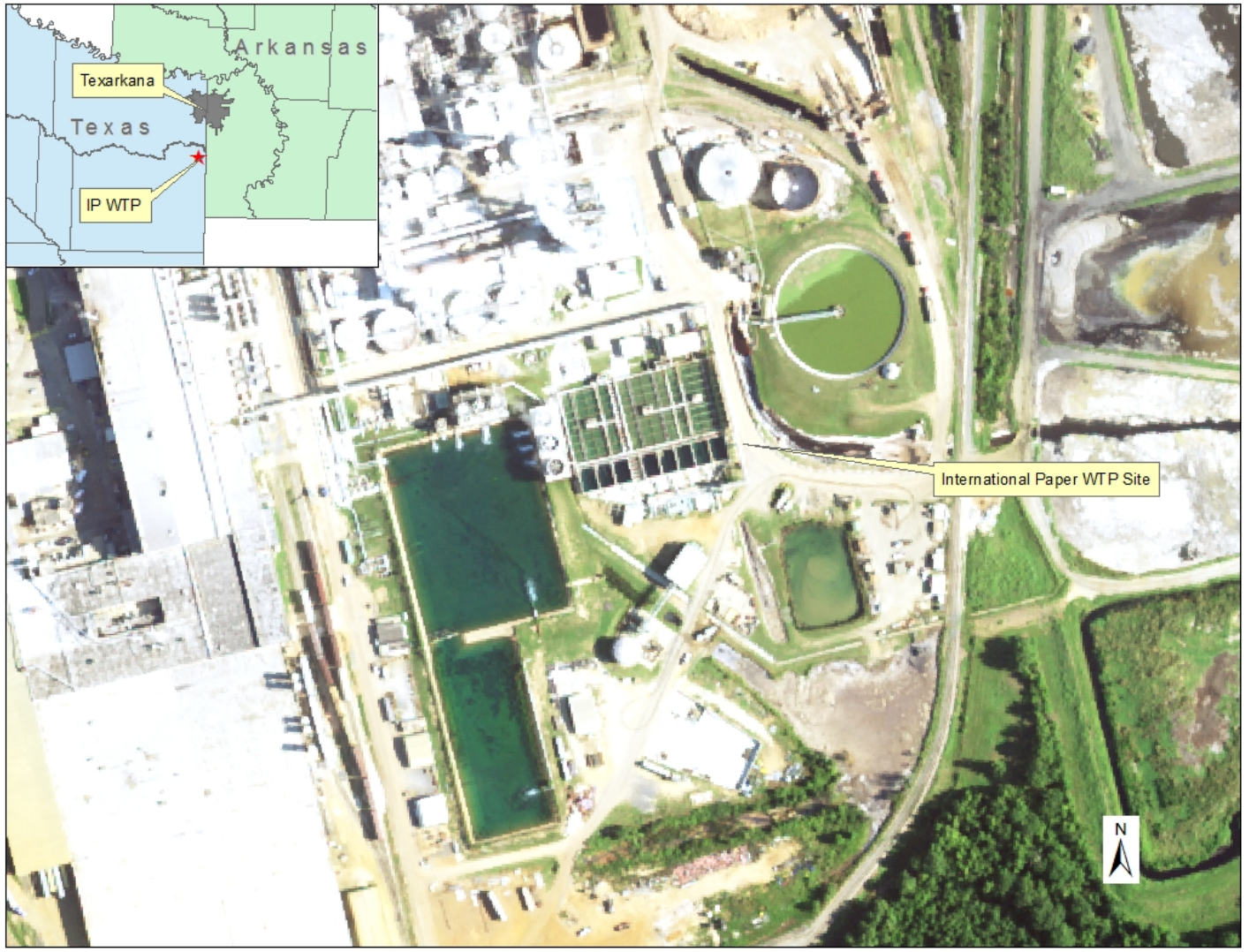
GPI WTP – Basin Wall

Example of Cracks in Basin Wall at GPI WTP.

GPI WTP – Aged Piping

Aged Pipes with Pipe Repair Clamps at GPI WTP Showing Corrosion.

Existing Site - Graphic Packaging International



Recap of Voting Exercise

- **Alternative 1:** Construct New Intake Structure and Raw Water Pipeline at Wright Patman Lake
  - A) TexAmericas Center
  - B) New Boston Road Water Treatment Plant
- **Alternative 2:** Make Necessary Improvements at New Boston Road Water Treatment Plant
  - A) Modify Raw Water Delivery System (i.e. intake, pump station, raw water pipeline)
  - B) Expand WTP from 18 to 24 MGD to utilize entire permitted treatment capacity
- **Alternative 3:** Construct New Water Treatment Plant at TexAmericas Center
  - A) Bowie County Parkway site
  - B) Southwest Corner of the former Ammunition Plant
- **Alternative 4:** Consider Water Treatment Options in Cass County
  - A) Expand existing Graphic Packaging International WTP
  - B) Construct New Water Treatment Plant in Cass County

Final Alternatives – Regional Water Infrastructure

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ALTERNATIVE 1

Construct New Intake Structure and Raw Water Pipeline at Wright Patman Lake

1A) TexAmericas Center

1B) Connection to existing New Boston Road Water Treatment Plant

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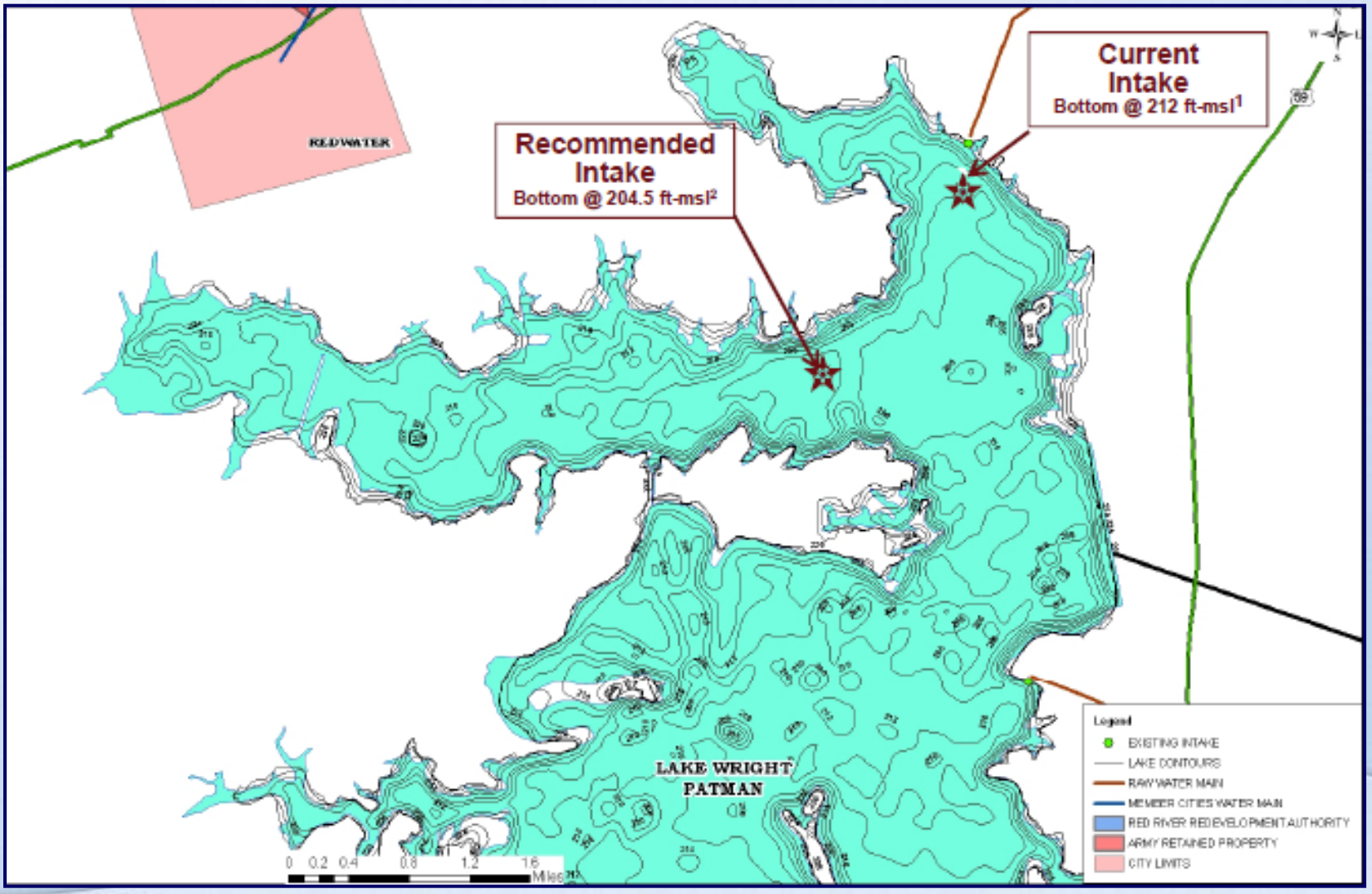
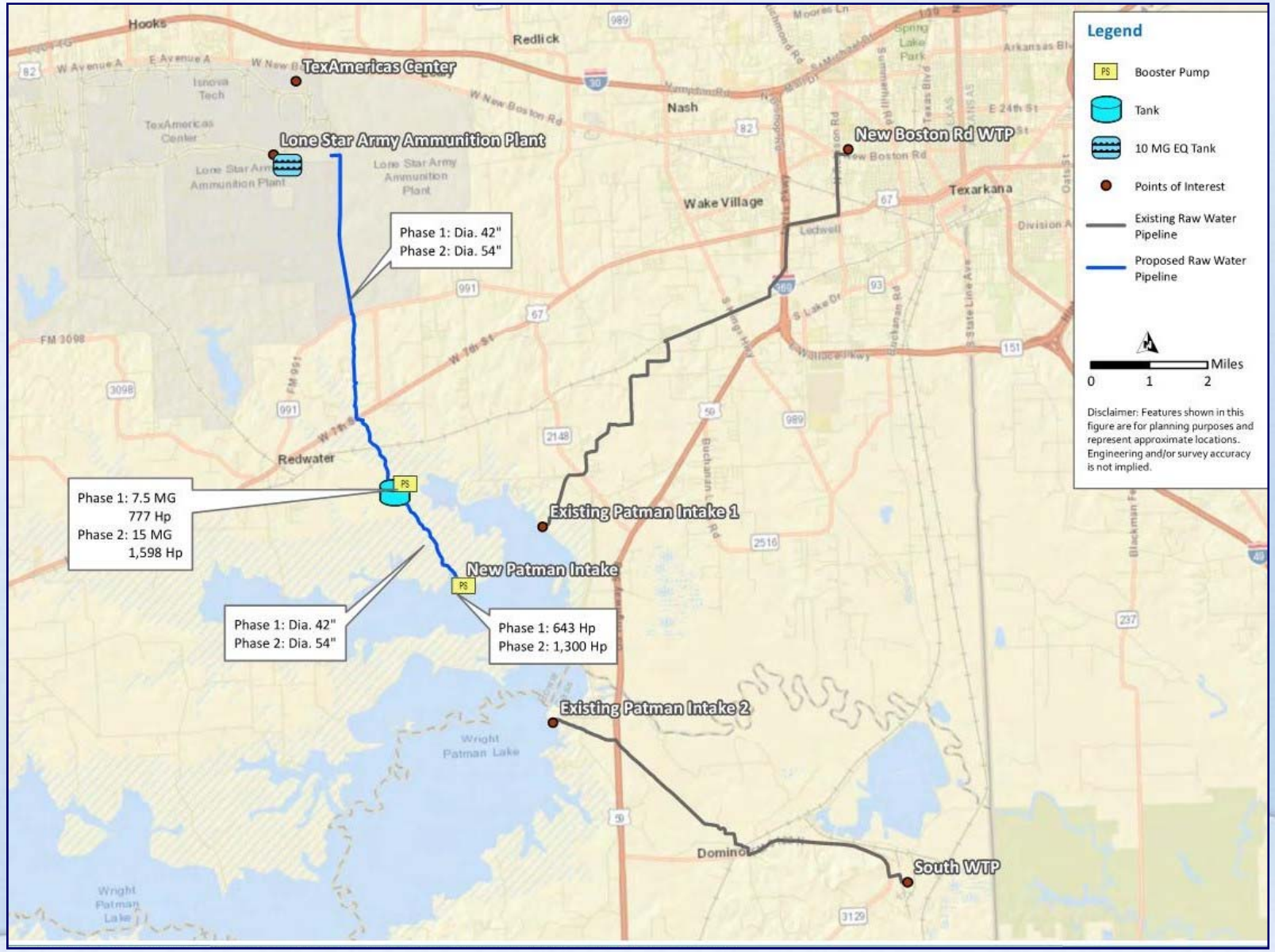
Recommended Location of New Raw Water Intake at Wright Patman Lake



*Source: RWRD Phase 3 Report on Water Treatment Plant and Raw Water Intake Site Selection; CH2M HILL (August 29, 2012)

Alternative 1A – Phased (TAC Raw Water)



Cost Summary – Alternative 1A (Combined Phases 1 & 2)

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Intake Pump Stations (30 MGD)	1	LS	$ 14,000,000	$ 14,000,000
2	Intake Pump Stations (60 MGD)	1	LS	$ 23,000,000	$ 23,000,000
3	Transmission Pipeline (42 in dia., 8 miles)	44,000	LF	$ 241	$ 10,599,000
4	Transmission Pipeline (54 in dia., 8 miles)	44,000	LF	$ 320	$ 14,087,000
5	Transmission Pump Station(s) & Storage Tank(s)	2	LS	$ 9,136,000	$ 18,272,000
6	Terminal Equalization Tank (10 MG)	1	LS	$ 2,100,000	$ 2,100,000
7	Pigging Station	1	LS	$ 300,000	$ 300,000
				Construction Subtotal	$ 82,358,000
	Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies				$ 32,943,000
	Land Acquisition and Surveying				$ 98,000
	Interest During Construction (4% for 3 years with a 1% ROI)				$ 12,118,000
				Project Total	**$ 127,517,000**

ALTERNATIVE 3

Construct New Water Treatment Plant at TexAmericas Center

3A) Bowie County Parkway site

3B) Southwest Corner of former Ammunition Plant

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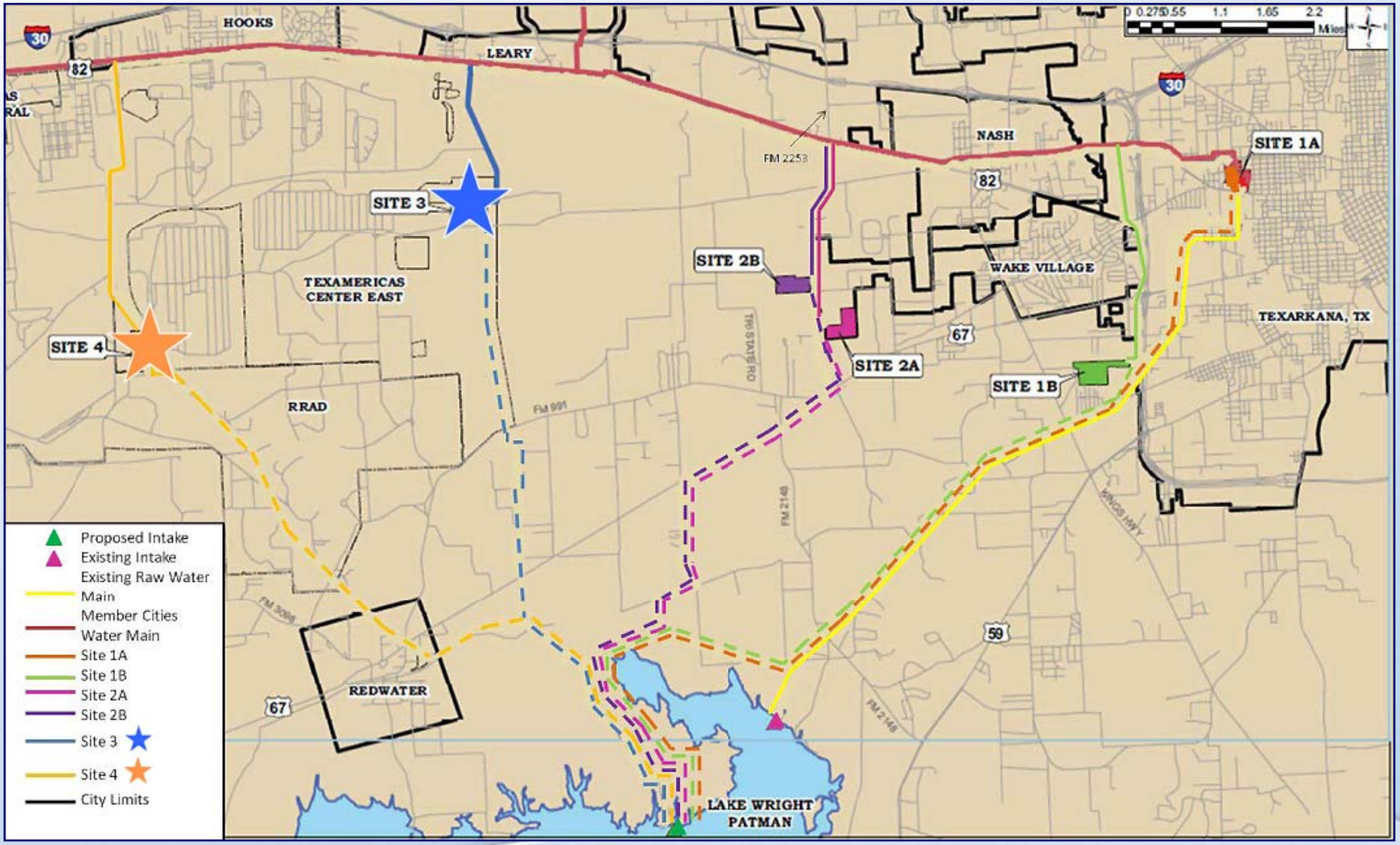
Options for New Water Treatment Plant Site



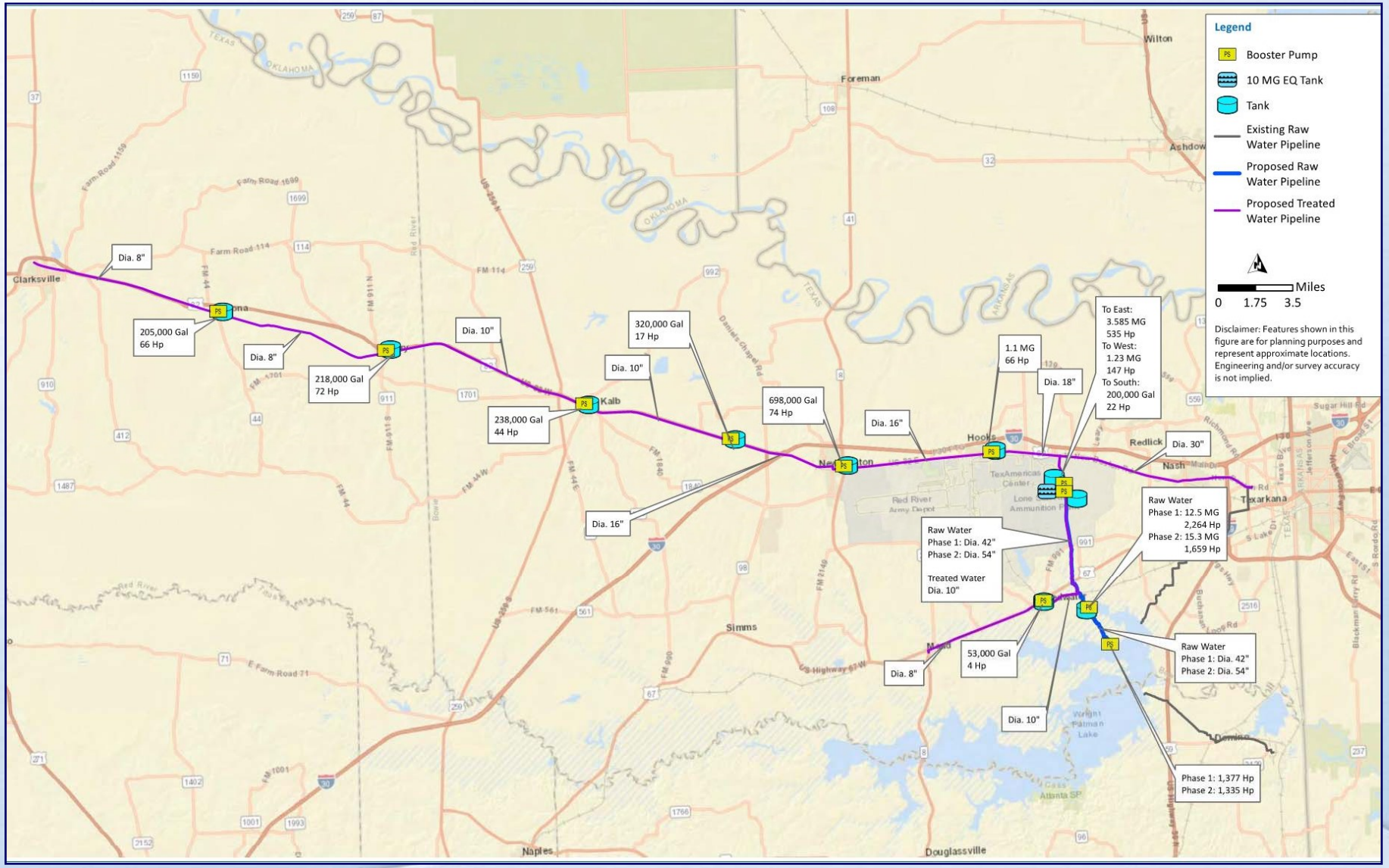
*Source: RWRD Phase 3 Report on Water Treatment Plant and Raw Water Intake Site Selection; CH2M HILL (August 29, 2012)

Evaluation of Sites for New TAC WTP

Alternative 3A-Bowie County Parkway Site selected as location for new TAC WTP for the following reasons:

- One of two sites to receive highest votes;
- Ideal location to tie into transmission line along Highway 82 to the other RWRD entities and closer to the greater demand;
- Reserved property by TAC for new WTP and located within RWRD Water CCN;
- Location in close proximity to new raw water line that needs to be constructed to serve TAC; and,
- CH2M HILL study identified environmental concerns on the former Ammunition Plant Site.

Alternative 3A (TAC WTP) – Phased*



*Phase 1 - Initial TAC WTP at 15MGD (designed hydraulically up to 25 MGD);
*Phase 2 – Additional 10 MGD WTP expansion (total 25 MGD)

Cost Summary – Alternative 3A (Phase 1)

Item No.	Item Description	Quantity	Unit		Unit Cost		Total Cost
1	Intake Pump Stations (50 MGD)	1	LS	$	20,000,000	$	20,000,000
2	Transmission Pipeline (8 in dia., 9 miles)	46,500	LF	$	36	$	1,693,000
3	Transmission Pipeline (10 in dia., 7 miles)	37,550	LF	$	39	$	1,446,000
4	Transmission Pipeline (18 in dia., 5 miles)	25,600	LF	$	78	$	2,004,000
5	Transmission Pipeline (30 in dia., 11 miles)	57,750	LF	$	173	$	9,989,000
6	Raw Transmission Pipeline (42 in dia., 8 miles)	44,000	LF	$	241	$	10,599,000
7	Treated - Transmission Pump Station(s) & Storage Tank(s)	1	LS	$	16,870,000	$	16,870,000
8	Raw - Transmission Pump Station(s) & Storage Tank(s)	1	LS	$	11,500,000	$	11,500,000
9	Terminal Equalization Tank (10 MG)	1	LS	$	2,100,000	$	2,100,000
10	Water Treatment Plant (15 MGD)	1	LS	$	39,750,000	$	39,750,000
11	Pigging Station	1	LS	$	300,000	$	300,000
					Construction Subtotal		$116,251,000
	Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies					$	46,500,000
	Land Acquisition and Surveying (107 acres)					$	269,000
	Interest During Construction (4% for 3 years with a 1% ROI)					$	15,448,000
					Project Total		**$178,468,000**

Cost Summary – Alternative 3A (Phase 2)

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Intake Pump Stations (61.2 MGD)	1	LS	$ 24,000,000	$ 24,000,000
2	Raw Transmission Pipeline (54 in dia., 8 miles)	44,000	LF	$ 320	$ 14,087,000
3	Raw - Transmission Pump Station(s) & Storage Tank(s)	1	LS	$ 12,251,000	$ 12,251,000
4	Water Treatment Plant (10 MGD)	1	LS	$ 22,500,000	$ 22,500,000
				Construction Subtotal	$ 72,838,000
	Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies				$ 29,135,000
	Land Acquisition and Surveying (32 acres)				$ 87,000
	Interest During Construction (4% for 3 years with a 1% ROI)				$ 9,772,000
				Project Total	**$ 111,832,000**

ALTERNATIVE 4

Consider Water Treatment Options in Cass County

4A) Expand existing Graphic Packaging International Water Treatment Plant

4B) Construct New Water Treatment Plant in Cass County

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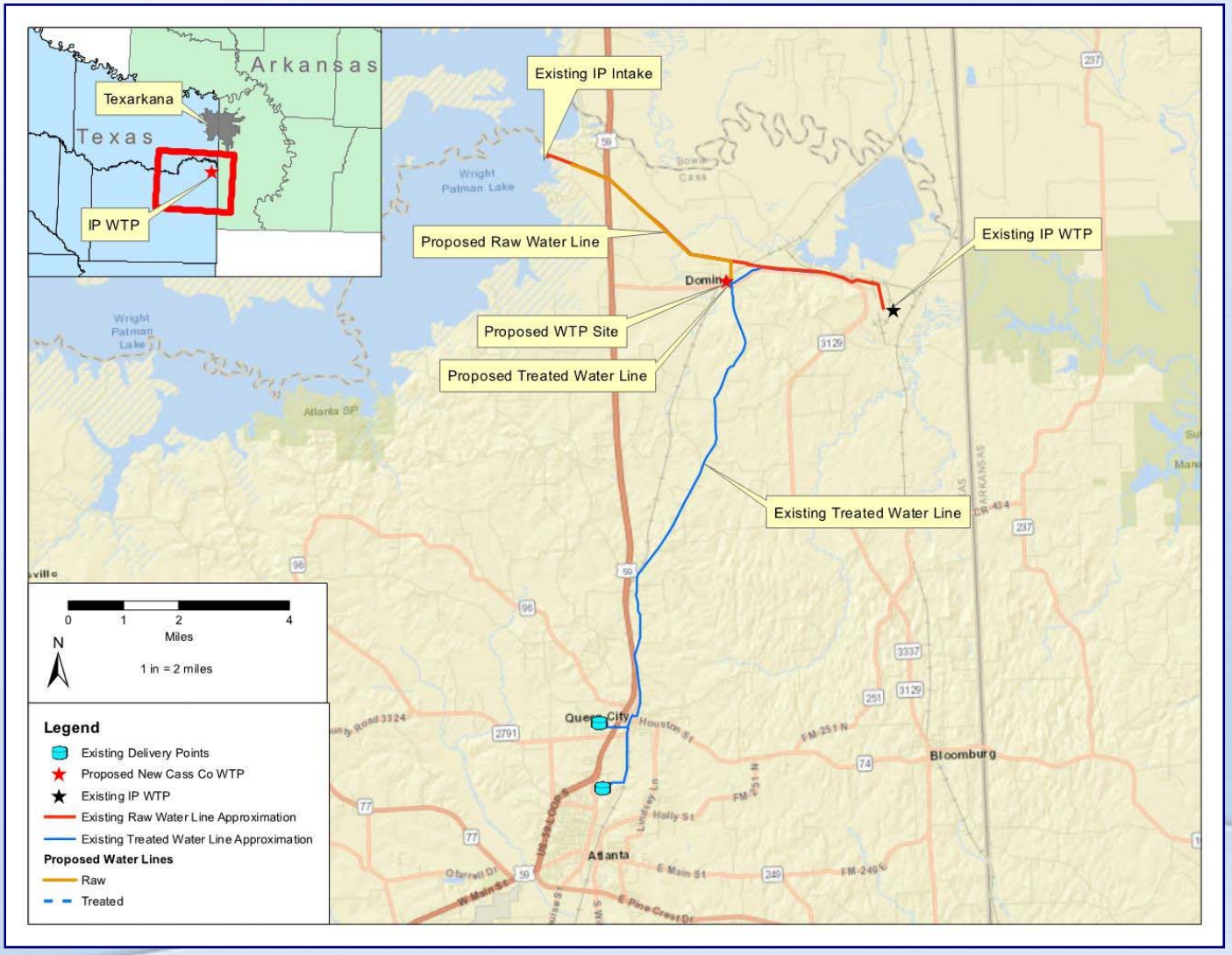
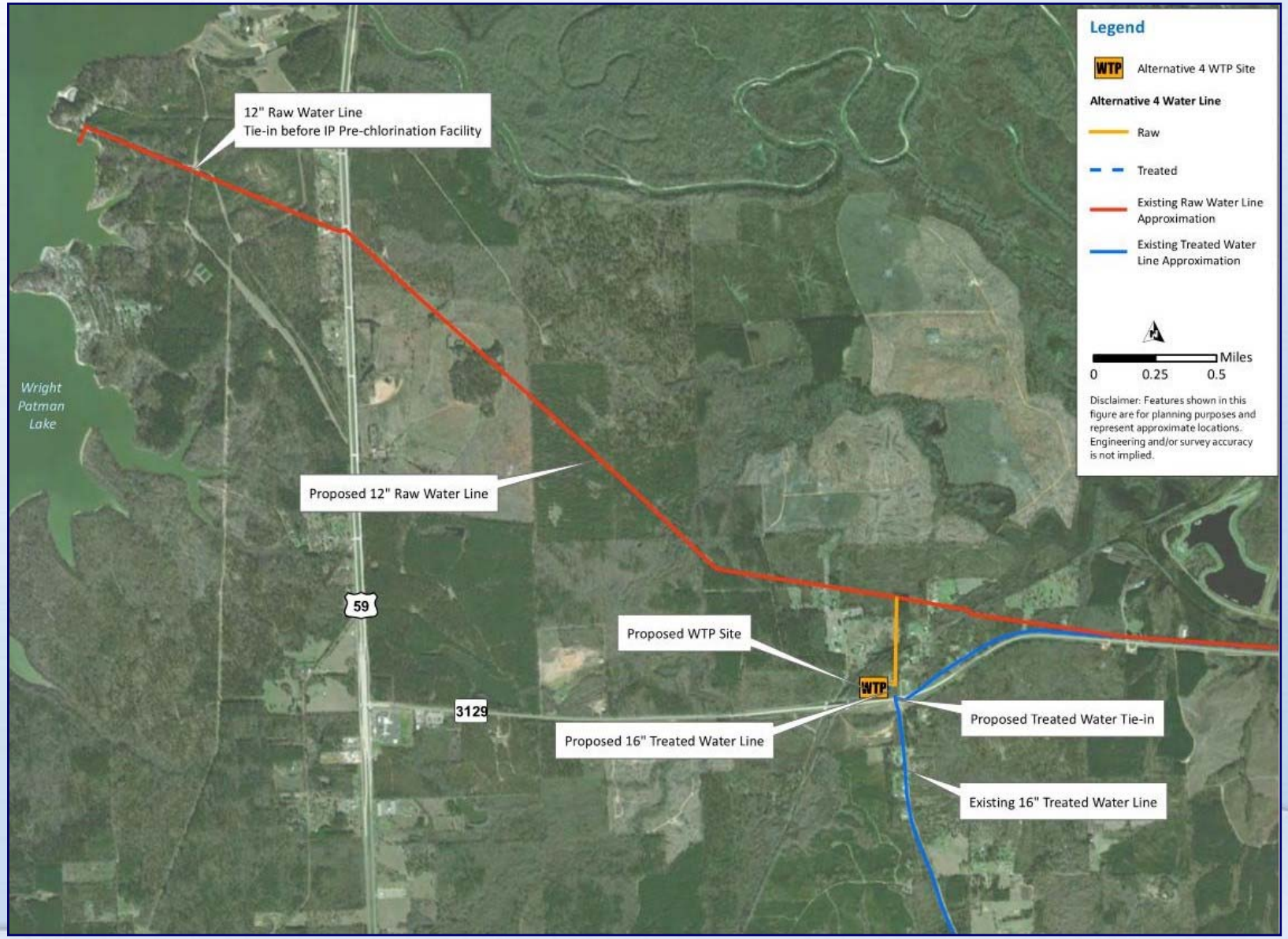
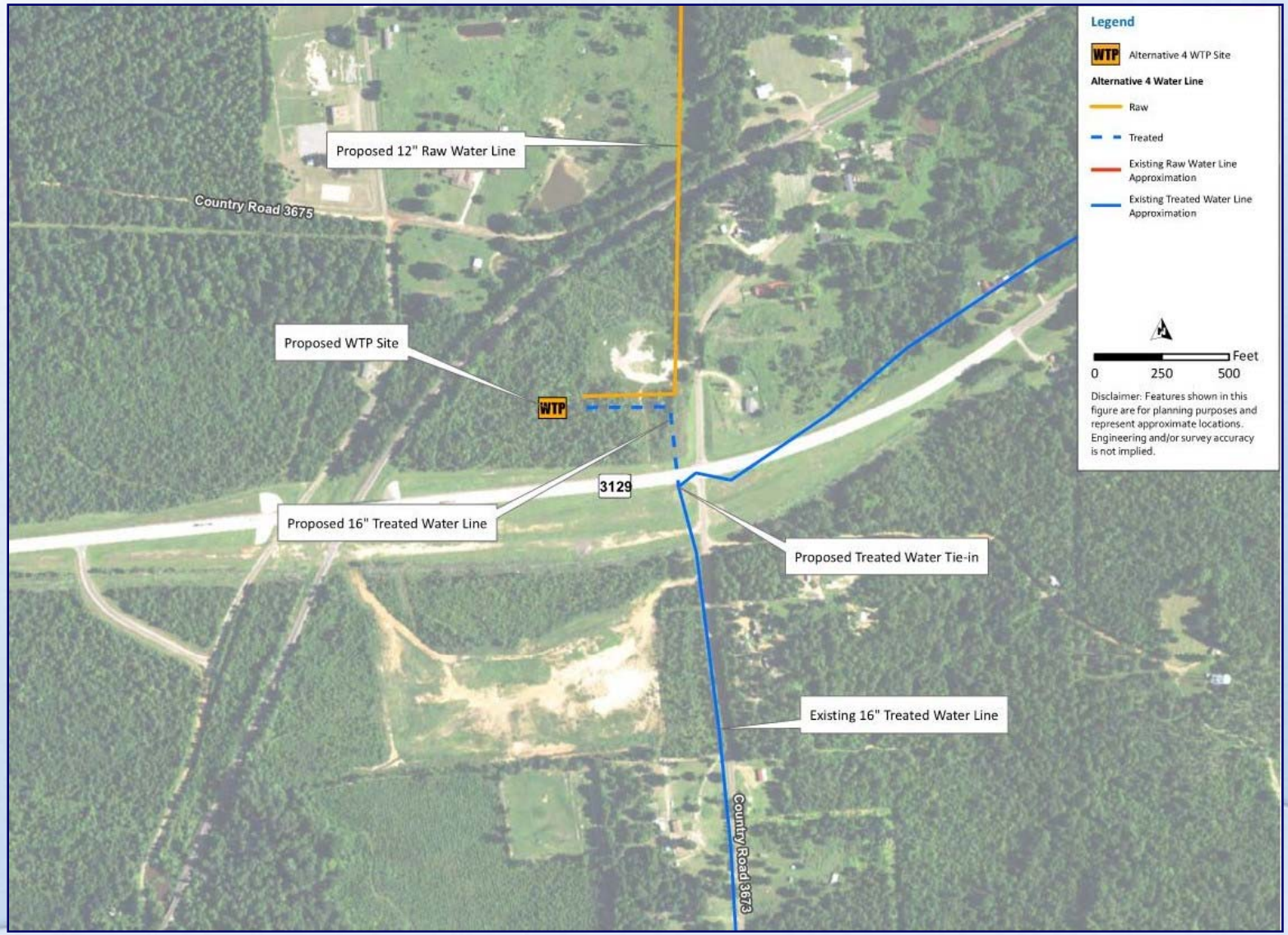
Alternative 4B: New WTP in Cass Co.



Alternative 4B: New WTP in Cass Co.



Alternative 4B: New WTP in Cass Co.



Cost Summary – Alternative 4B

Item No.	Item Description	Quantity	Unit		Unit Cost		Total Cost
1	Raw Water - Transmission Pipeline (12 in dia., 4 miles)	20,560	LF	$	39	$	806,000
2	Treated Water - Transmission Pipeline (16 in dia., 600 ft)	600	LF	$	167	$	100,000
3	Treated - Transmission Pump Station(s) & Storage Tank(s)	1	LS	$	1,476,000	$	1,476,000
4	Raw - Transmission Pump Station(s) & Storage Tank(s)	1	LS	$	1,584,000	$	1,584,000
5	Water Treatment Plant (2.5 MGD)	1	LS	$	5,375,000	$	5,375,000
					Construction Subtotal	$	9,341,000
	Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies					$	3,737,000
	Land Acquisition and Surveying (15 acres)					$	40,000
	Interest During Construction (4% for 3 years with a 1% ROI)					$	1,152,000
					Project Total	**$**	**14,270,000**

Summary and Conclusions

- Commence work immediately within the next 3 to 5 years with preliminary engineering design beginning within the year.
- Secure favorable financing through TWDB and should be applied for during the December 2018 – February 2019 timeframe.
- Construct Alternative 3A—Phase 1 of New TAC WTP, Raw Water Conveyance System (intake, raw water line, pump station) and Regional Transmission Line to serve TAC and the RWRD Member Entities.
- Construct Alternative 4B—New Cass County WTP in the City of Domino.

Q&A Discussion

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