May 13, 2013

Yankton Water Supply and Treatment Plant Upgrades

Key Issues

- Provide Future Capacity
- Meet Disinfection Byproduct Rules
- Meet Surface Water Treatment Rules
- Prepare for future or changing regulations
- Softened Water
- Aesthetically pleasing water
- Iron and Manganese Controlled

Needs Assessment

Existing Facilities

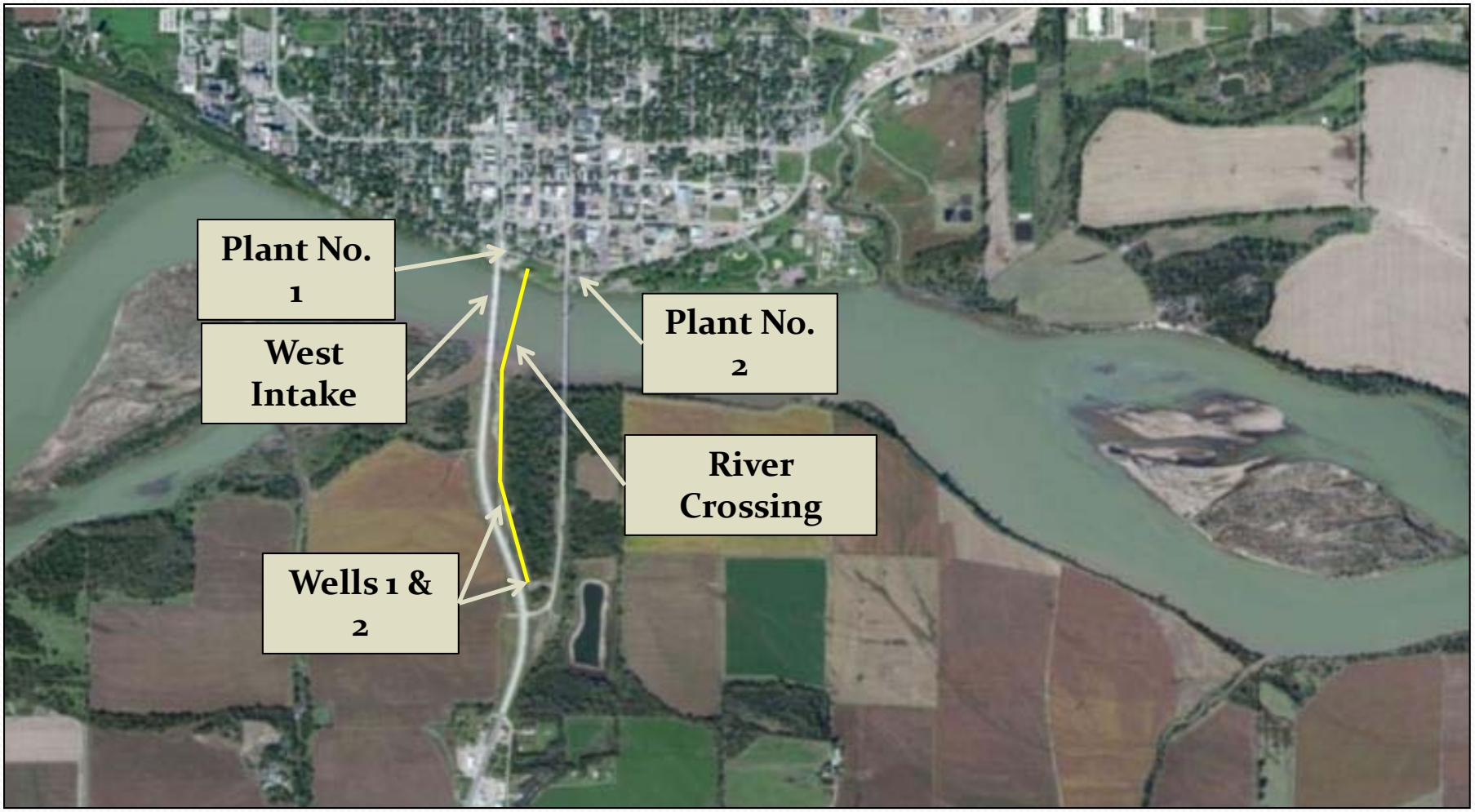
		Total (MGD)		Reliable (MGD)
Source	Intake	5.5	9.7	4.2
	Well 1	2.1		
	Well 2	2.1		
Treatment	No. 1	3.0	8.0	5.5[1]
	No. 2	5.0		

Requirements

Year	Max Day Demand
2015	8.2 MGD
2025	9.1 MGD
2035	10.0 MGD

SD DENR definition of reliable service is largest unit out of service. Plant No. 2 provides 2.5 MGD reliable service with one solids contactor out of service

Existing Water Supply and Treatment



Nebraska Well Field

- Constructed in 2011
- Capacity: 1500 gpm each
  4.2 MGD Total
- Water Quality
- Hard water
- High Iron, Manganese and Ammonia
- Helps reduce TTHM in distribution system

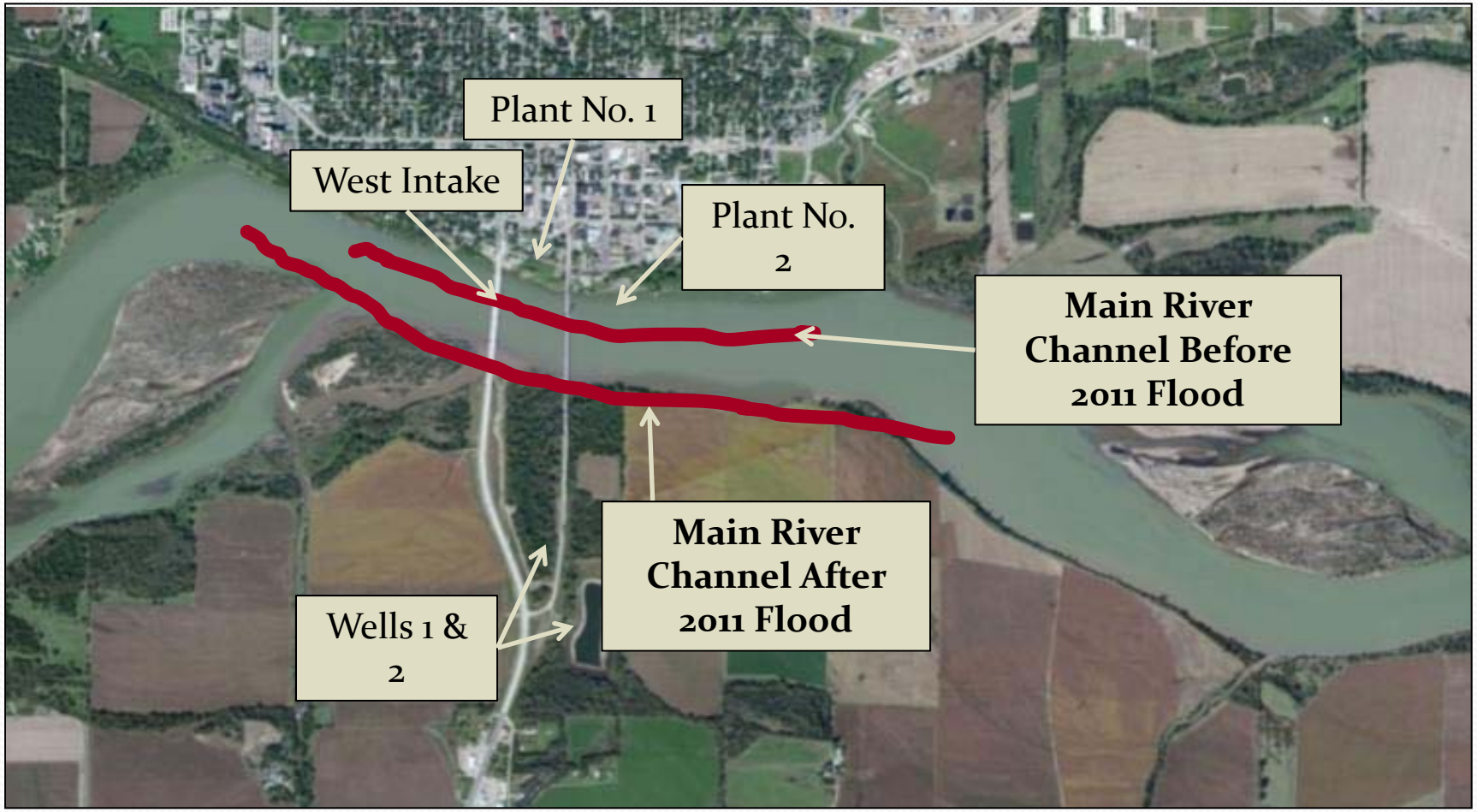
Missouri River Intake

- Capacity:
  - Design 5.5 MGD
- Quality
  - Low Hardness
  - TTHM Precursors
  - Spring Color Events
- Long-Term Issues
  - Continuous channel degradation
  - West Intake has been extended 3 times

Long Term Issues (Continued)

  - East Intake extended 2 times before being abandoned due to river bed degradation
  - Zebra Mussel Potential
  - Frazil Icing Conditions
- Following 2011 flood
  - Main river channel moved
  - River levels lowered at least 1-ft
  - Screens raised 4-ft to be above the sand bar

River Channel Migration



Water supply is jeopardized during low river flows

Water Treatment Plant No. 1 (West Plant)

- Constructed in 1929
- Capacity: 3.0 MGD
- Operated as Peaking Plant
- Not reliable or cost effective to rehabilitate (2007 study)
- Equipment and controls replacement parts difficult to obtain. Some parts need to be custom-fabricated to keep plant operating.
- Structural and architectural upgrades are required

Recommend decommissioning Plant No. 1 and use as Maintenance Facility.

Water Treatment Plant No. 2 (East Plant)

- Constructed in 1972
- Capacity: 5.0 MGD
- Operated as Base Load Plant
- Aging Equipment Requiring Upgrade or Replacement
  - Current Plant No. 2 Upgrade Project
    - Lime transfer
    - Powered Activated Carbon Feeder
    - Carbon Dioxide Feeder
    - Lime Sludge Pumping
  - Upgrade with New Water Plant
    - Controls and Electronic Gear

Needed Improvements

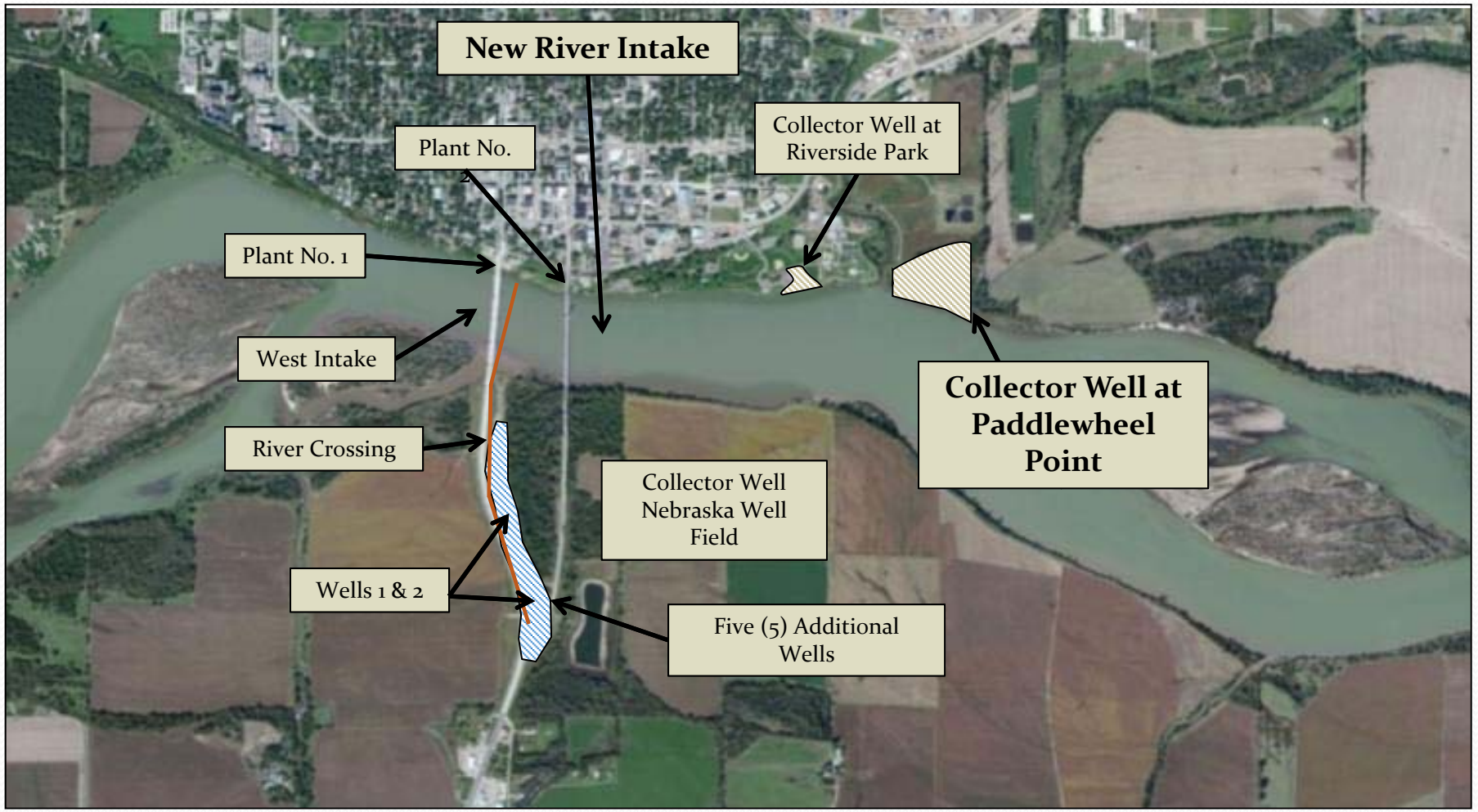
Supply

- Replace West Intake with minimum 5.8 MGD reliable source

Treatment

- New 5 MGD facility
  - Base plant
- Plant No. 2
  - Continue as peaking plant
  - Maintain
    - Chlorine Contact Basin
    - Clear Well
  - Upgrade High Service Pump Station to 10 MGD

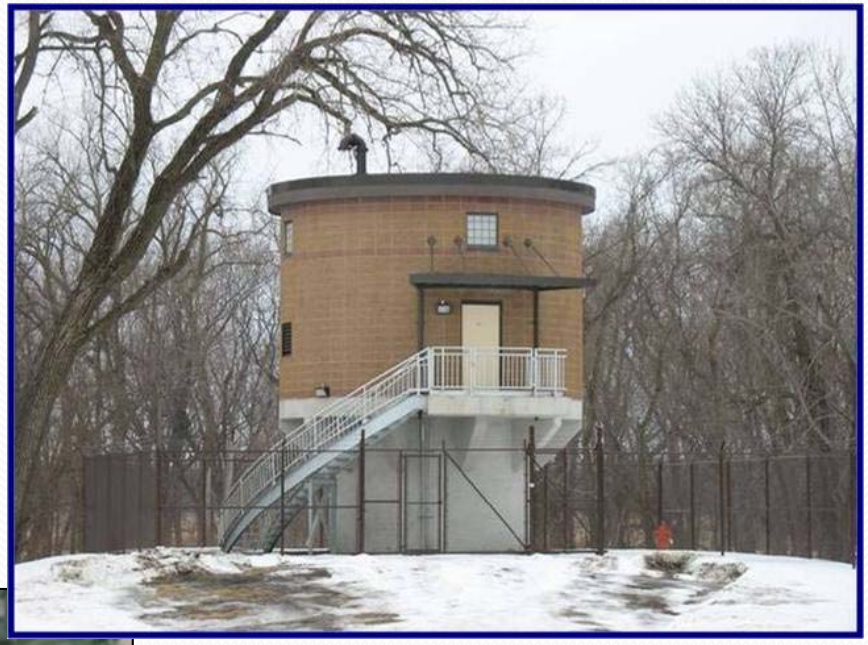
Source of Supply Investigation



Potential Water Supply

- Paddlewheel Point
- Estimated Cost
- Collector Well: $5,190,000
- Raw Water Pipe: $4,140,000

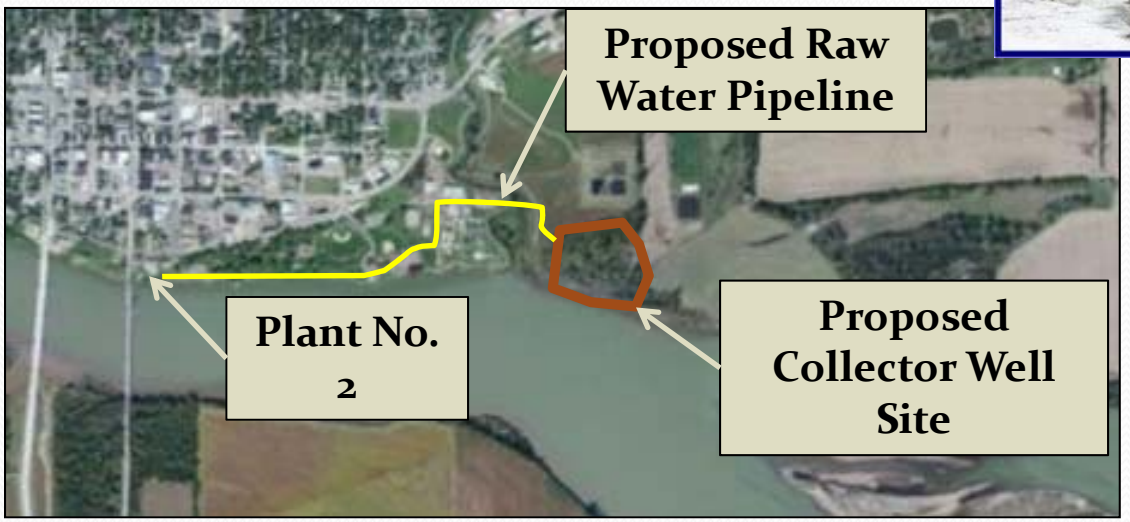
Total: $9,330,000



Example Collector Well

Provides:

- **Redundancy**
- **Reliability**
- **Good Quality Water**



Treatment Alternatives

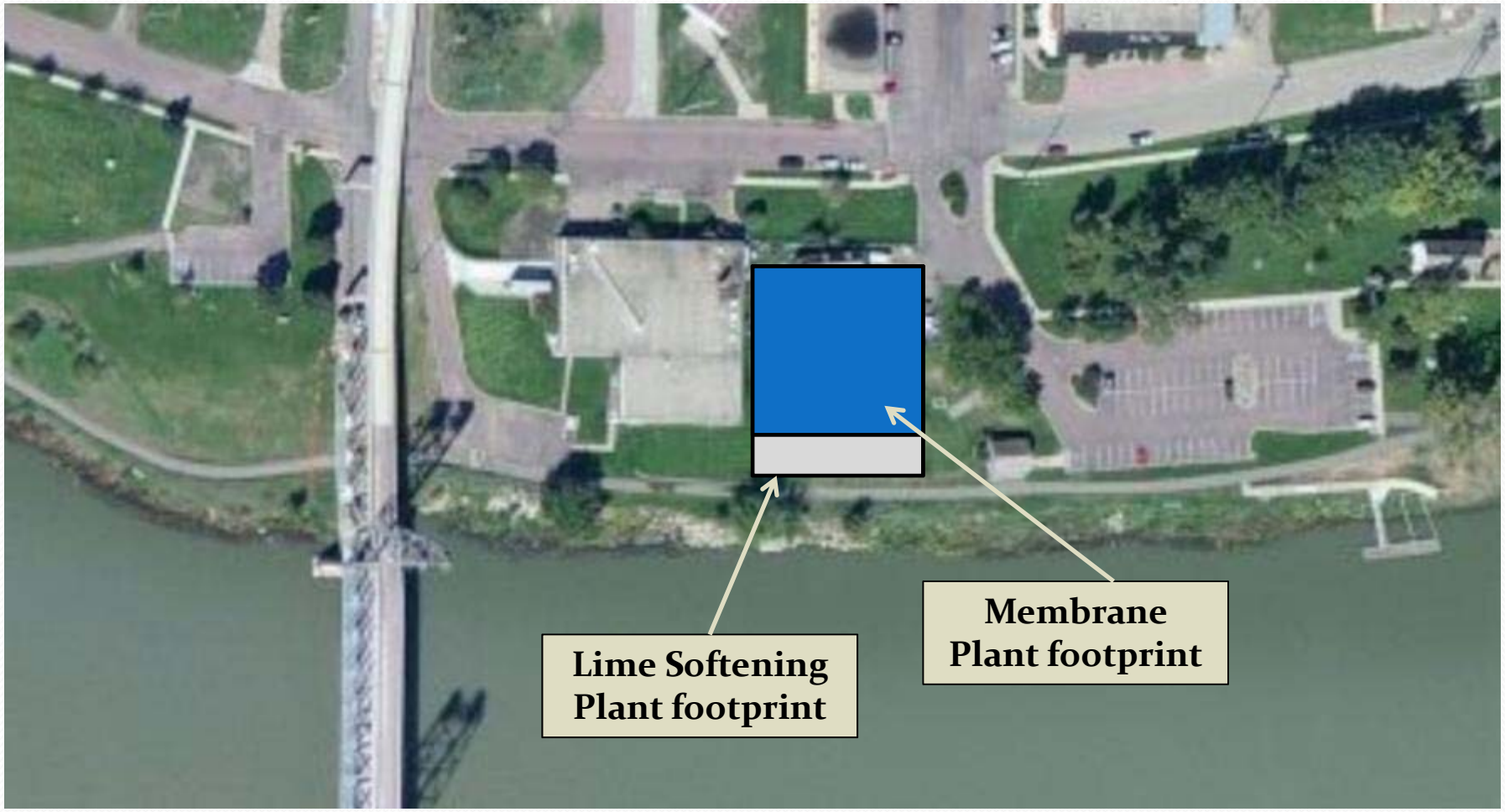
Lime Softening

- Similar to Plants No. 1 and 2
- Add lime to soften water
- Sand/Anthracite filter
- Relocate and expand sludge drying lagoons

Membrane Treatment

- New technology for Yankton
- Pretreatment
- Two types of membrane systems used
  - First (ultrafiltration) used to remove particulates
  - Second (reverse osmosis) to soften water

Proposed Water Plant Location



Capital Cost Estimate

Capital Improvements	Cost
Plant No. 2 Upgrades	$ 675,000
Water Treatment Plant	$ 12,911,000
Collector Well	$ 5,200,000
Piping	$ 4,140,000
Brine Discharge Outfall	$ 400,000
Engineering, Legal, Administration, Contingency	$ 5,374,000
Total	**$ 28,700,000**

Membrane Softening

Operating Cost
$880,000

Proposed Timeline

Item	Start	Complete
Collector Well Design	Spring 2013	Summer 2013
Collector Well Bidding	Summer 2013	Summer 2013
Pilot Testing	Summer 2013	Summer 2013
Water Treatment Plant Design	Summer 2013	Winter 2014
Collector Well Construction	Fall 2013	Spring 2014
Water Treatment Plant Bidding	Spring 2014	Spring 2014
Collector Well Startup	Spring 2014	Spring 2014
Water Treatment Plant Construction	Summer 2014	Summer 2015
Water Treatment Plant Startup	Summer 2015	Summer 2015

Summary

- Water demands are expected to exceed supply and treatment capacity by 2015
- Missouri River source has become unreliable due to the 2011 flood and historical intake reliability
- Plant No. 1 is mechanically unreliable and replacement/repair parts are no longer available. Plant No. 1 needs to be replaced
- Improvements needed at Plant No. 2 and are in progress

Total Water Project	$29,000,000.00
Cash on Hand	$3,000,000.00
New SRF(26 Million @ 3%	$26,000,000.00
Legal Debt Limit Margin	$19,700,000.00
	$6,300,000.00

Current and Future Debt	**Annual Debt Service**
Existing SRF Debt	$610,810.80
New SRF($26 Million @ 3%)	$1,735,000.00
Total	$2,345,810.80
Operating Income 2013	$789,521.00
New Annual Money Needed	$1,556,289.80
Estimated Operating Revenue 2013	
$3,471,652.03	44.83%