WRF Facility Plan

City of Rapid City
Public Works Committee Meeting
March 15, 2016

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PURPOSE FOR PLANNING

- New Permit Limits Anticipated
  - New Ammonia Discharge Limits
  - Nutrient Discharge Limits (Total Nitrogen and Phosphorus)

- Long-term Solution Drives Short Term Decisions
  - Didn’t want to expend funds on items not consistent with long term plan

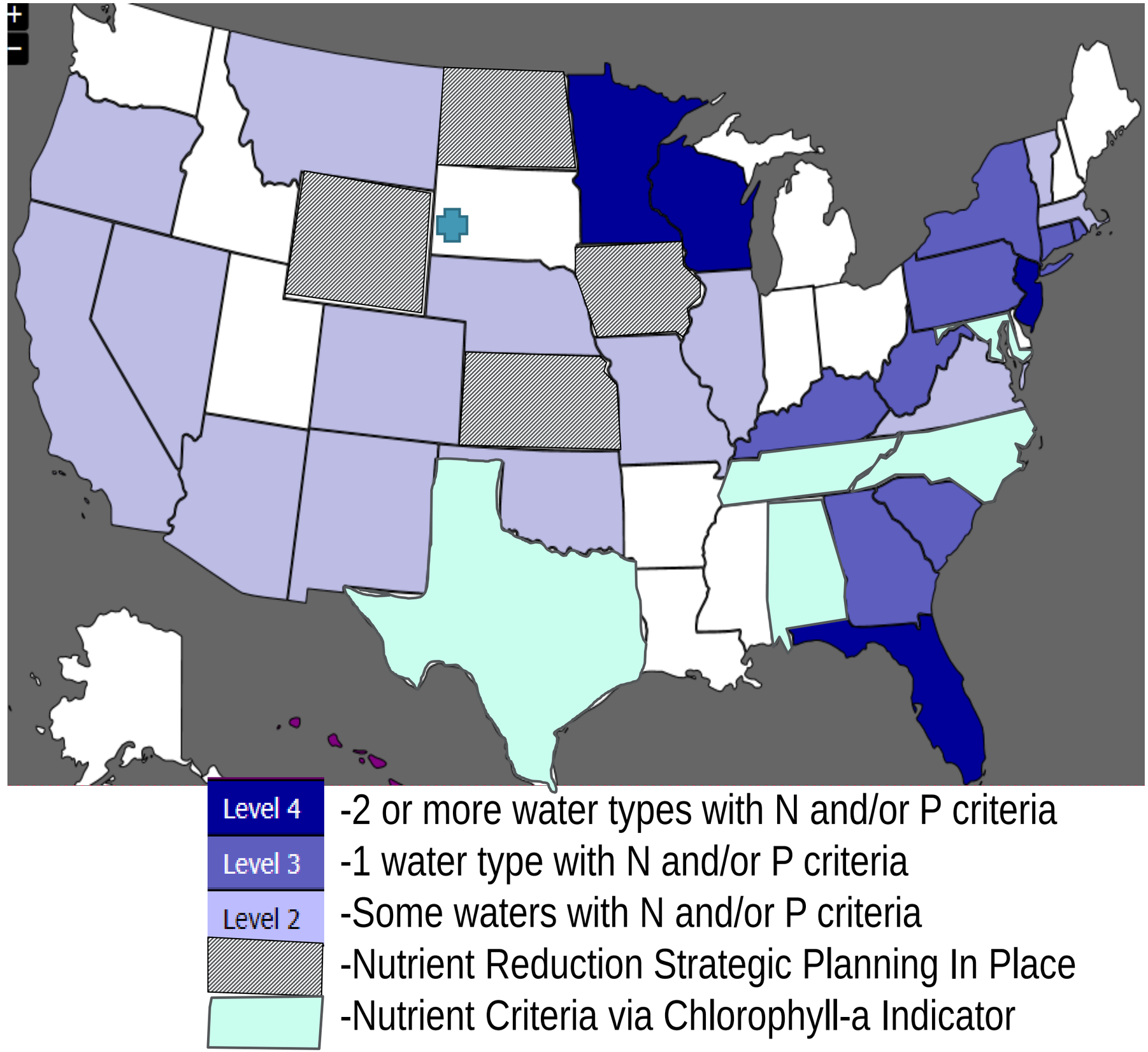
- Last Facility Plan was Adopted in 2000
  - Plan addressed new regulatory discharge limits and treatment capacity
  - Identified new treatment processes and necessary facility improvements
  - Balanced funding capabilities with treatment requirements

REGULATORY CHANGES

Permit Cycle (Year)	Projected Limitations	Recommended Activity
Current Permit 2016	New Ammonia Standards based on updated Rapid Creek water quality	Identify how to achieve reliable ammonia removals and improve plant serviceability and reliability. Establish schedule for construction – assume major projects are 5 years from study completion unless other justification (i.e. Trickling Filter Pump Station type trigger).
Permit #1 2020	Compliance Schedule for New Ammonia Standards based on 2013 EPA Ammonia Criteria	Begin design to construct modifications to achieve ammonia removals. Project to be constructed by 2025. Ammonia standards will become part of the SD Water Quality Standards After 2017 and new treatment process is required to meet proposed Ammonia limits.
Permit #2 2025	New Ammonia Standards	Assuming required improvements for ammonia removals complete. Begin design to construct modifications to achieve nutrient removal (TN 10 / TP 1) to be constructed by 2030.
Permit #3 2030	New Nutrient Standards : Total Nitrogen and Total Phosphorus Limits @ 8-10 mg/l TN and 0.5-1.0 mg/l P	Assuming modifications to achieve nutrient removal (TN 10 / TP 1) complete. Nutrient discharge limits have medium level of uncertainty. Track potential for more stringent nutrient standards.
Permit #4 2035	Potentially more Stringent TN and TP	Track potential for more stringent nutrient standards.

REGULATORY CHANGES ARE IN THE FUTURE FOR SOUTH DAKOTA.

- Over half of states have implemented some nutrient limits.
- Blue and Green Shaded States do or will have Nutrient Related Regulations in Place by 2019



TREATMENT CAPACITY

- Treatment Capacity is a Combination of:
  - Hydraulic Capacity (Volume of Water)
  - Process Used to Treat Water to Meet Discharge Limits
- As Service Population Increases so does Wastewater Flow Received at the Facility
- As Wastewater Flow Increases Time to Treat Wastewater in the Facility Decreases
- Higher Treatment Capacity Processes will be Required to Meet Increased Treatment Capacity Needs

TOTAL CAPACITY OF EXISTING WRF BASED ON EQUIVALENT POPULATION

	Currently Served	Existing Permit Limits Facility Capacity	2016 Permit Limits	Permit #2 New Ammonia Limits	Permit #3 New Nutrient Limits
Population Equivalent	79,855	94,000	91,155	81,855	0 (Treatment Processes are Not in Place)

CAPITAL IMPROVEMENT DRIVERS

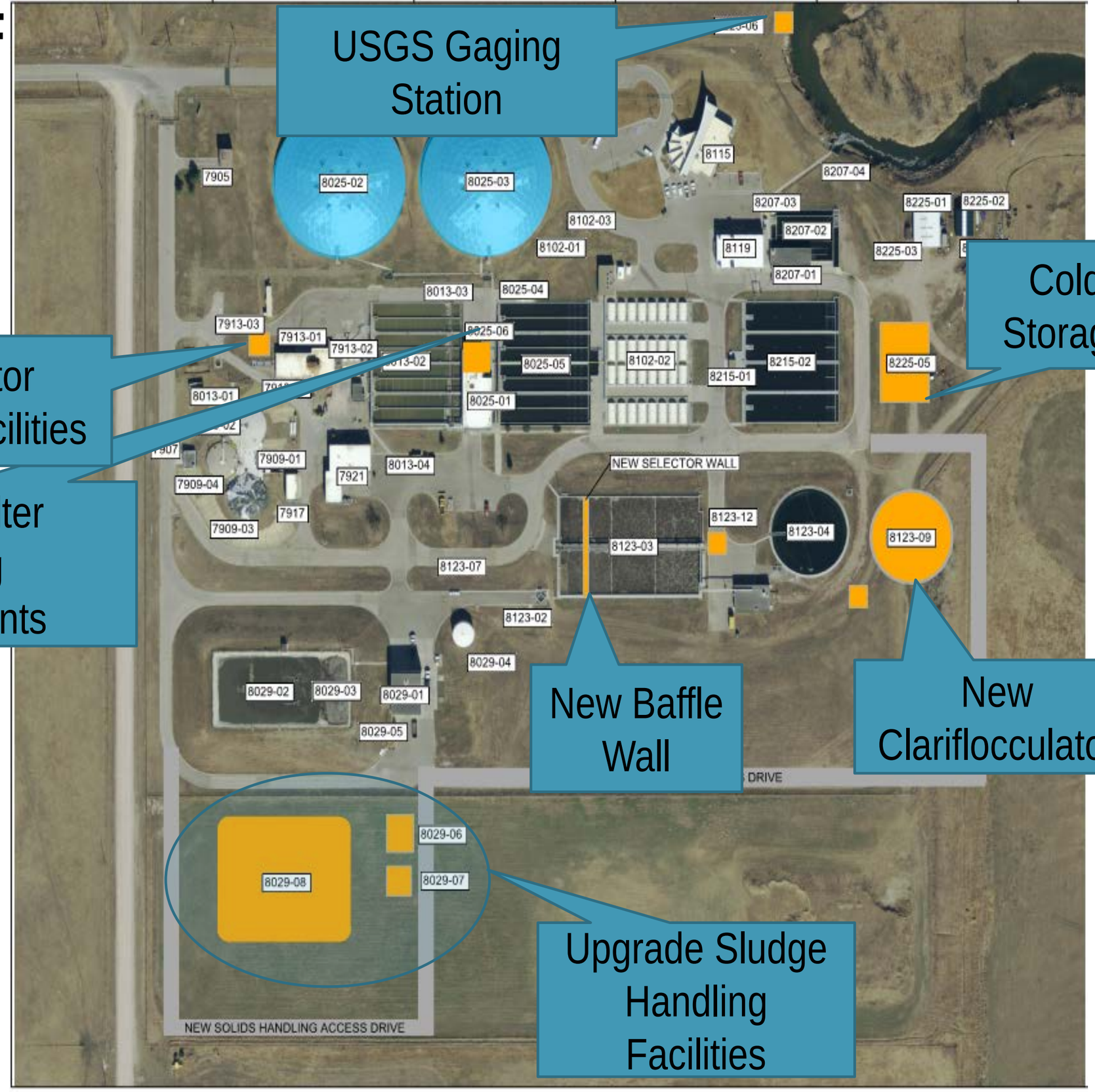
- Regulatory Requirements
  - Increased Treatment Capacity Processes
  - New Treatment Capability
- Flow and Loads
- Age and Condition of Facility
  - Process Equipment
  - Structural and Architectural
  - Electrical
  - Health and Safety

RAPID CITY WRF MAJOR IMPROVEMENTS

CAPITAL IMPROVEMENTS PLAN HAS BEEN DEVELOPED TO MATCH NEEDS OF WRF TO MEET RAPID CITY NEEDS AND ANTICIPATED FUTURE REGULATIONS.

Driving Force		Fiscal Years							
		FY 2016-2020		FY 2021-2025		FY 2026-2030		FY 2031+	Total
		Priority 1	Priority 2	Required to meet Permit No. 2	Priority 3	Required to meet Permit No. 3	Priority 4	Priority 5	
Capacity, Age & Condition	Activated Sludge Improvements	$4,014,000							$4,014,000
	Trickling Filter Pump Sta. Improvements	$2,410,000							$2,410,000
	Sludge Handling Improvements	$11,950,000			$1,220,000		$3,460,000		$16,630,000
	Misc. Improvements	$256,000	$3,790,000		$1,860,000		$400,000	$2,290,000	$8,596,000
	Age & Condition Total	$18,630,000	$3,790,000		$3,080,000		$3,860,000	$2,290,000	$31,650,000
Operation & Energy	Operation	$120,000	$300,000		$290,000				$710,000
	Energy	$470,000							$470,000
	Operation & Energy Total	$590,000	$300,000		$290,000				$1,180,000
Regulatory				$20,570,000		$7,800,000		$800,000	$29,170,000
Period Totals		$19,220,000	$4,090,000	$20,570,000	$3,370,000	$7,800,000	$3,860,000	$3,090,000	$62,000,000

RAPID CITY WRF PROPOSED AGE AND CONDITION IMPROVEMENTS



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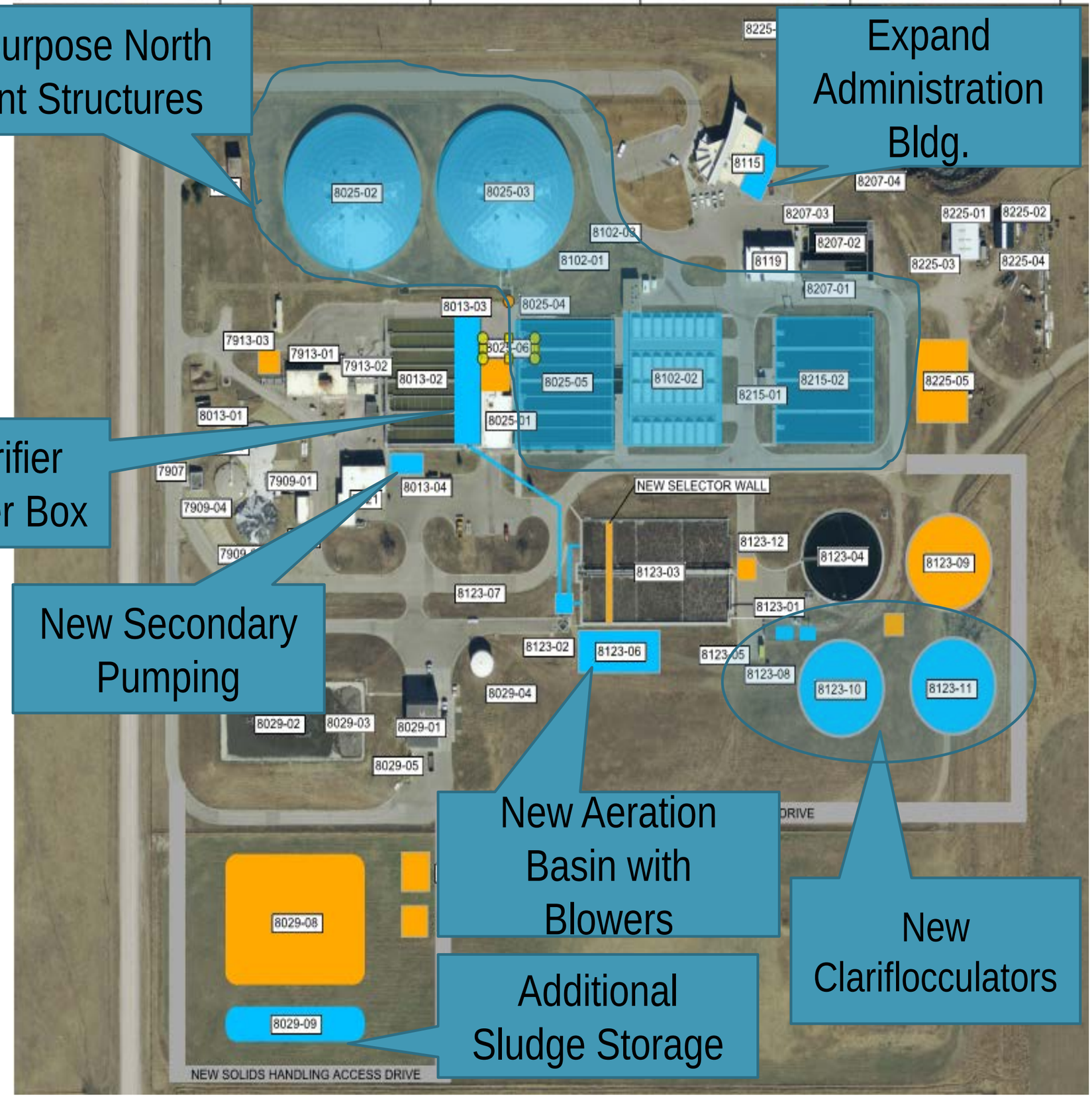
Age & Condition

PERMIT #2 IMPROVEMENTS



Repurpose North Plant Structures

Expand Administration Bldg.

New Primary Clarifier Effluent with Splitter Box

New Secondary Pumping

New Aeration Basin with Blowers

New Clariflocculators

Additional Sludge Storage

Legend

Age & Condition

Permit #2 Improvements

PERMIT 3 IMPROVEMENTS

Legend

- Age & Condition
- Permit #2 Improvements
- Permit #3 Improvements

FACILITY PLAN QUESTIONS?