Red Gap Ranch Project Update

City Council Briefing

City of Flagstaff

October 22, 2024

Project Purpose and Need

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Project Purpose and Need

Citizens approve Future Water Supply Bond Election

Due to multi-years of drought and impacts to Flagstaff's water supplies, a $15 million Bond was approved by 71% of voters in 2004

- Purpose to acquire and/or develop property or water rights

THE ARIZONA REPUBLIC

azcentral.com

FRIDAY, APRIL 6, 20

4 effects of climate change

DROUGHT AND HEAT

Higher temperatures change oceanic conditions, leading to more intense droughts. Changes also can worsen the Valley's heat island effect and speed us closer to the first 100-degree overnight low.

Southwest could become Dust Bowl, study warns

By Shaun McKinnon
THE ARIZONA REPUBLIC

Near-term fire outlook

State predicts an average to above-average 10-week wildfire season.

Valley & State. B1

TRANSPORTATION

Big tax hike for roads argued

By Matthew Benson
THE ARIZONA REPUBLIC

Today's Presentation

1. Project Purpose and Need
2. Project History
3. ADOT Coordination
4. Rights of Way
5. Phase II Design
6. Environmental and Permitting
7. Opinion of Probable Construction Cost
8. Schedule

Project Purpose and Need

City Council authorized the purchase of Red Gap Ranch for $7.9M for its water supply in 2005

8,500 deeded acres +

7,000 acres State land

Total = 15,500 acres

Project Purpose and Need

Regional Planning

- Coconino Plateau Watershed Partnership & U.S. Bureau of Reclamation
  - Completed the North Central Arizona Water Supply Study in 2006 that identified the need for a new water supply for the region
  - Received a grant in 2013 to collaborate with the Navajo Nation on developing a groundwater model for the Leupp & Red Gap Ranch wellfield pumping

- Arizona Department of Water Resources
  - City obtained a 100-Year Designation of Adequate Water Supply for Red Gap Ranch in 2011
  - City modified its 100-Year Designation to include all of its water supplies in 2013

Project Purpose and Need

Overview

- Flagstaff faces a long-term water supply shortfall
- Water Services has been methodically planning for this shortfall looking at a variety of alternatives from additional water conservation to new supply options
- Other supply options will come to the Water Commission and City Council in the future
- Today's presentation is about Red Gap Ranch and Jacobs Phase II Feasibility Study

Project Purpose and Need

City of Flagstaff Planning

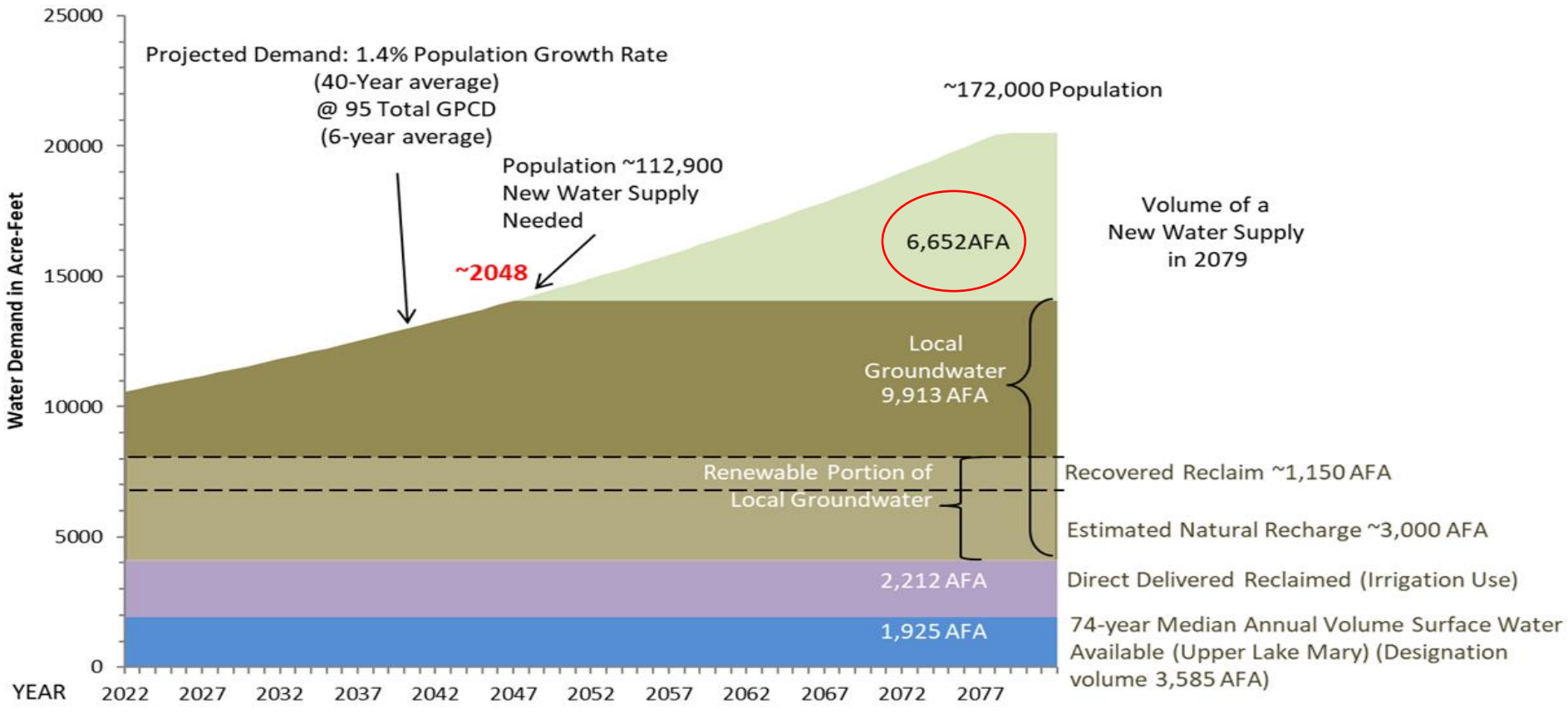
- Estimated Flagstaff's future water needs based upon population projections and land-use / zoning-based projections = ***6,700 AF to 11,800 AF annual deficit*** at buildout

- Conducted several evaluations on how to solve future water supply shortfall
  - Comprehensive study of Red Gap Ranch -Jacobs Feasibility Phase I report (2009)
  - Water Supply Alternatives (Carollo Engineering, 2017)
  - Advanced Water Reclamation Feasibility Study (Brown & Caldwell, 2018)
  - Water Conservation Strategic Plan (Maddaus, 2020)
  - Reclaimed Water Master Plan (Brown & Caldwell, 2021)
  - Red Gap Ranch – Jacobs Feasibility Phase 2 report (2024) – ***Today's Presentation***

- Conducted scenario analysis on Flagstaff's Resiliency & Redundancy due to climate change and catastrophic wildfire potential impacts on its water supplies

Population Demand Projections

R&R_Adequacy charts_2023 03NOV2023_AZWBv0.xls
R&R_Adequacy charts_2024 03JULY2024_AZWBv0.xls



Population Demand Projections

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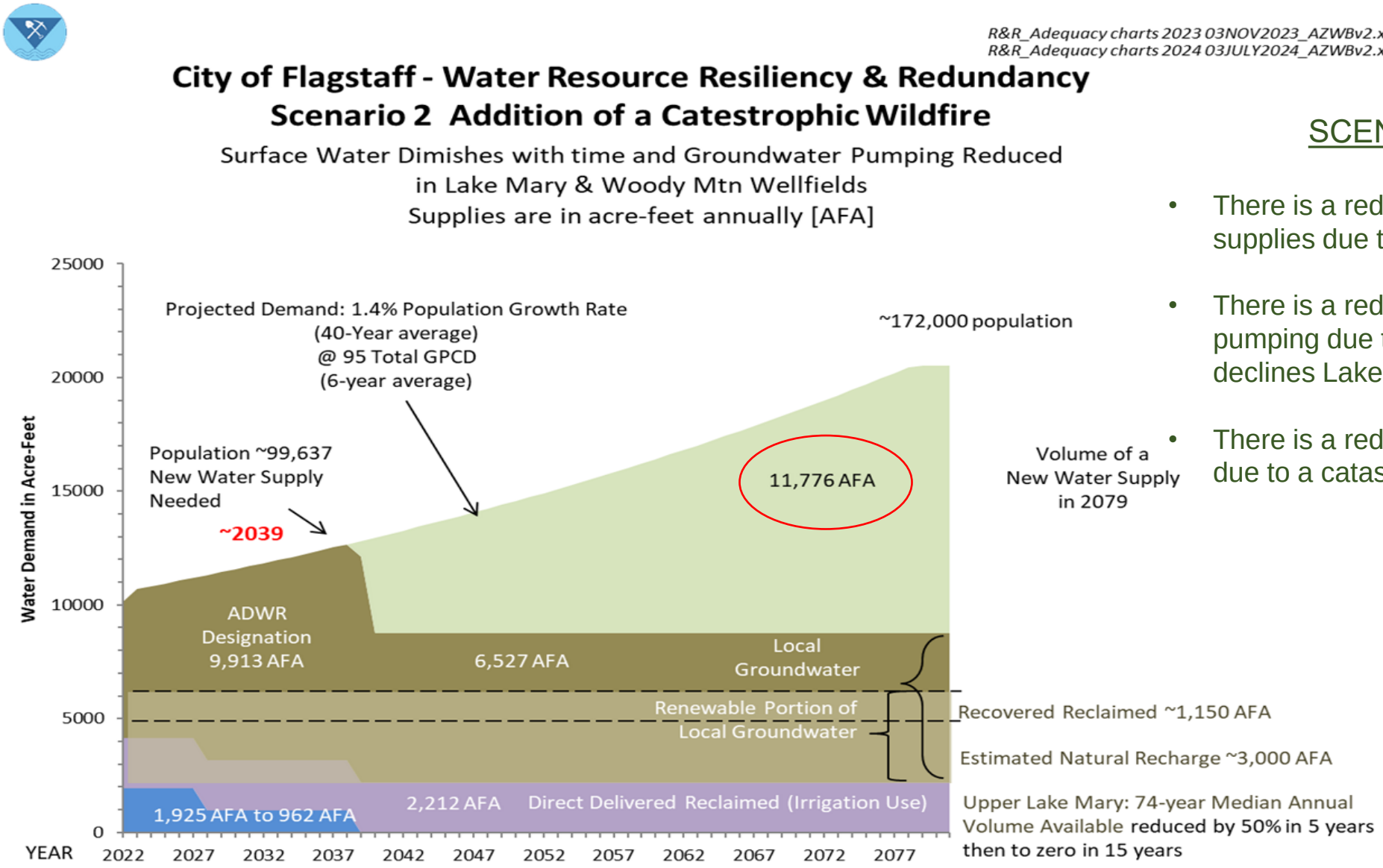

SCENARIO "What if?"

- There is a reduction in Upper Lake Mary supplies due to climate change
- There is a reduction in groundwater pumping due to excessive water level declines Lake Mary wellfield
- There is a reduction in groundwater supplies due to a catastrophic wildfire

Project History

2008 to 2024 (Phases I and II)

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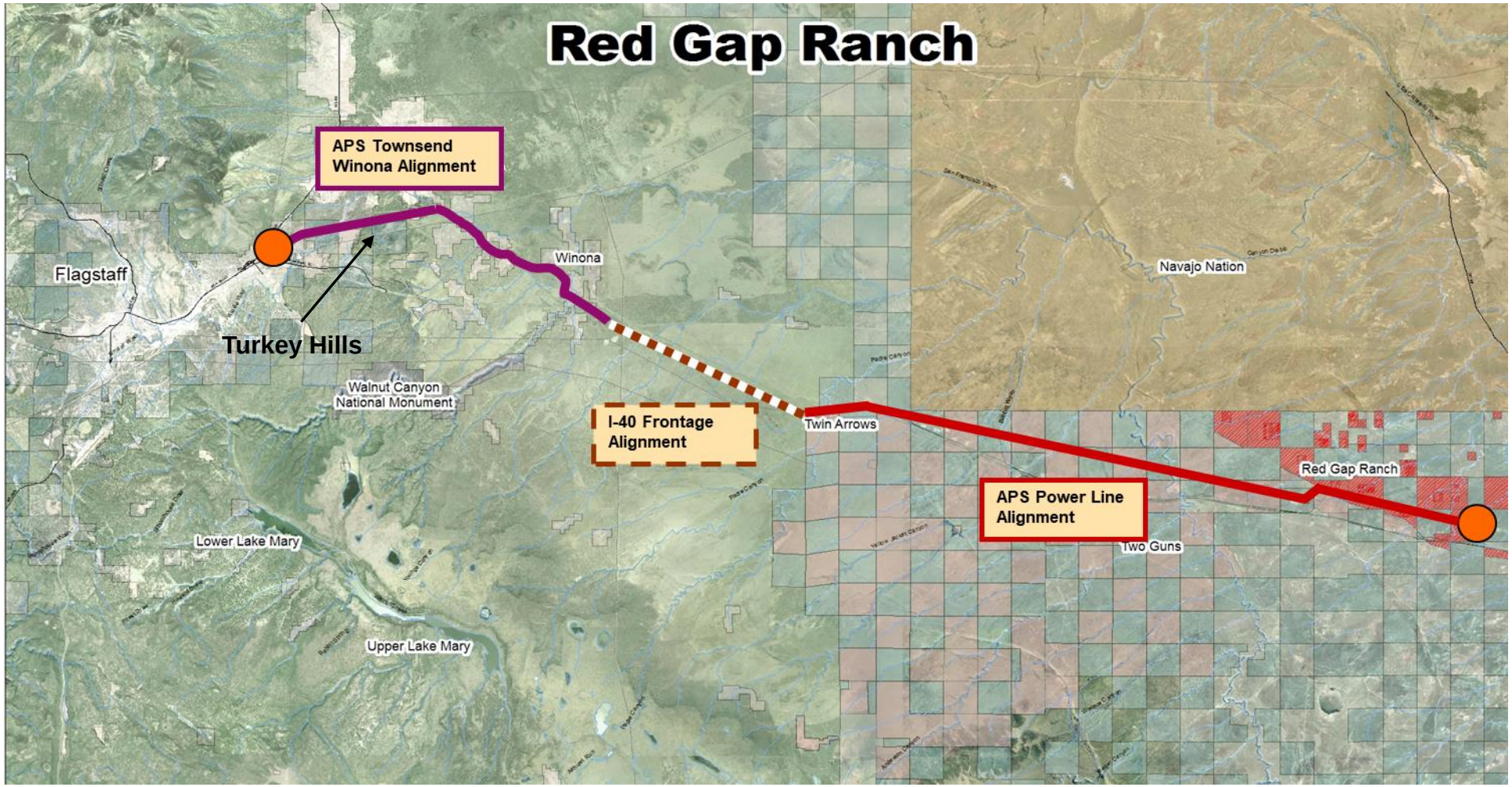
Project History

Historical Timeline

Item	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Phase I Study																		
Begin Phase II Field Work																		
Stop Work for ROW Evaluation				*														
Evaluate Southern Alignment																		
Pursue ADOT IGA																		
ADOT IGA Signed										*								
Coordinate ADOT IGA Design Criteria																		
Evaluate Segment 3																		
Resume Phase II Field Work																		
Phase II Engineering Work																		
Phase II Technical Workshop															*			
Prepare Phase II Draft Report																		
Presentation to Water Commission and City Council																		

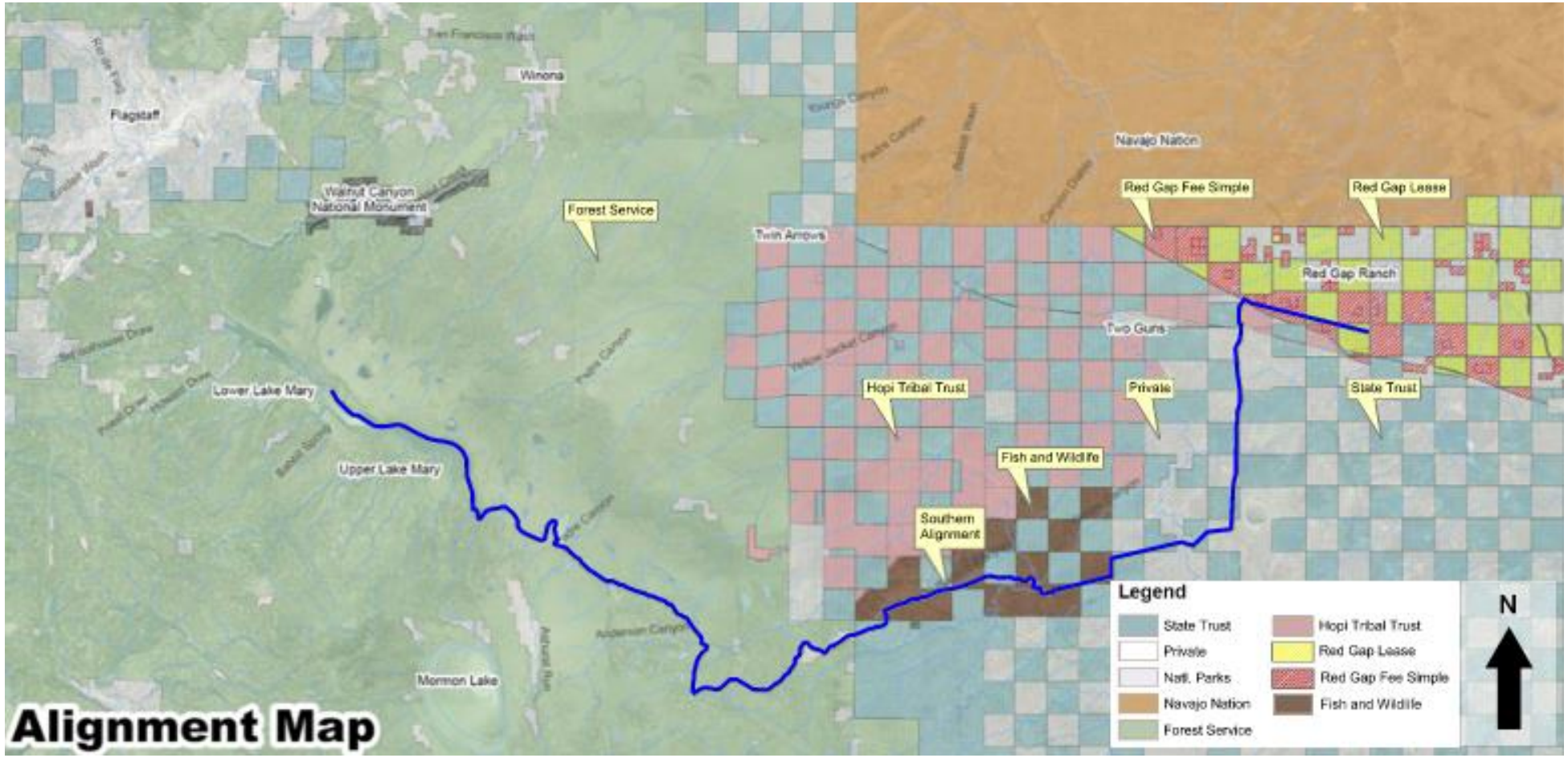
Project History

Phase I Selected Alignment (April 2009)



Project History

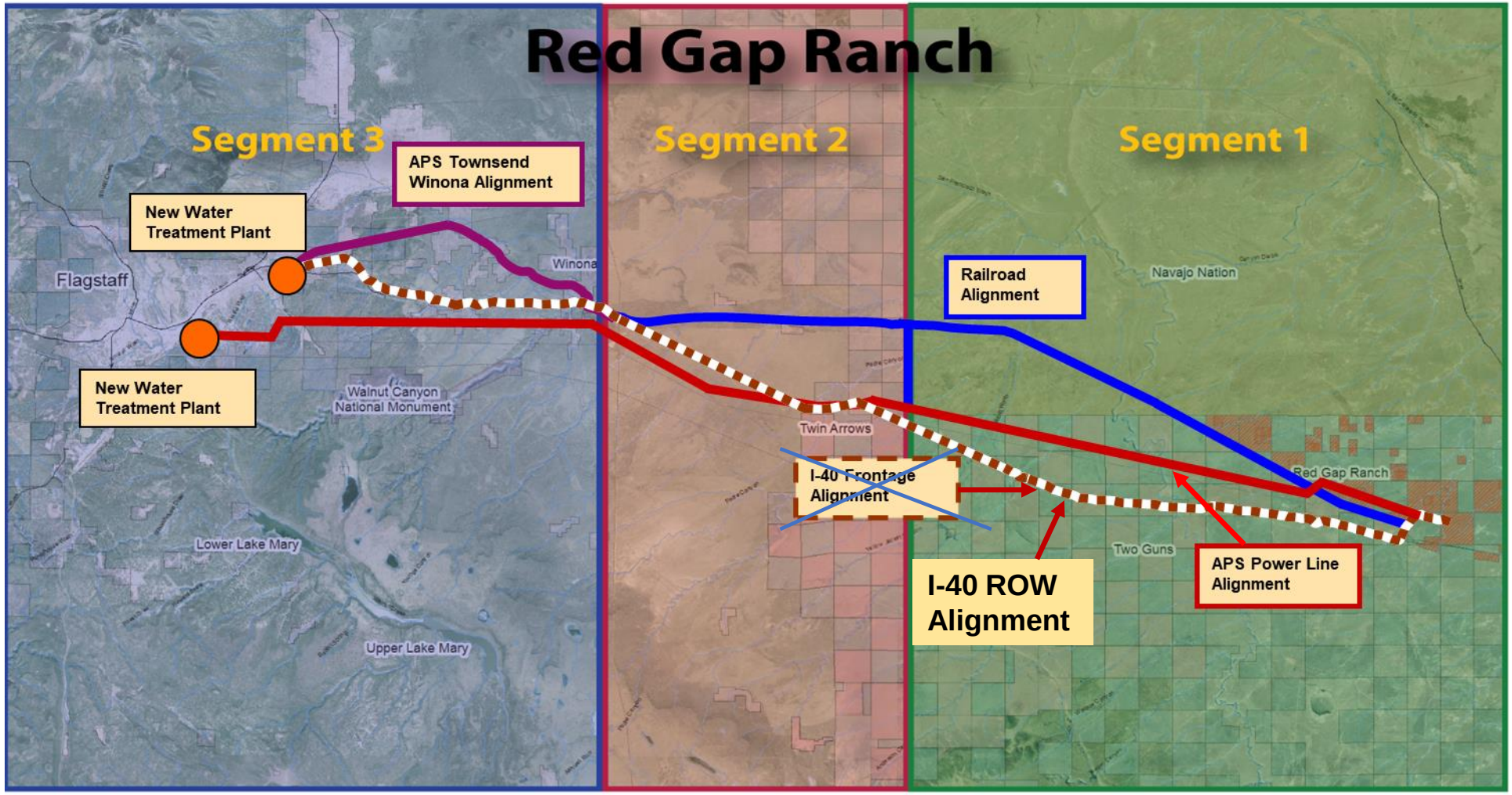
Southern Alignment Alternative (2011)



~ 18% increase in capital costs and ~ 8% increase in operational costs

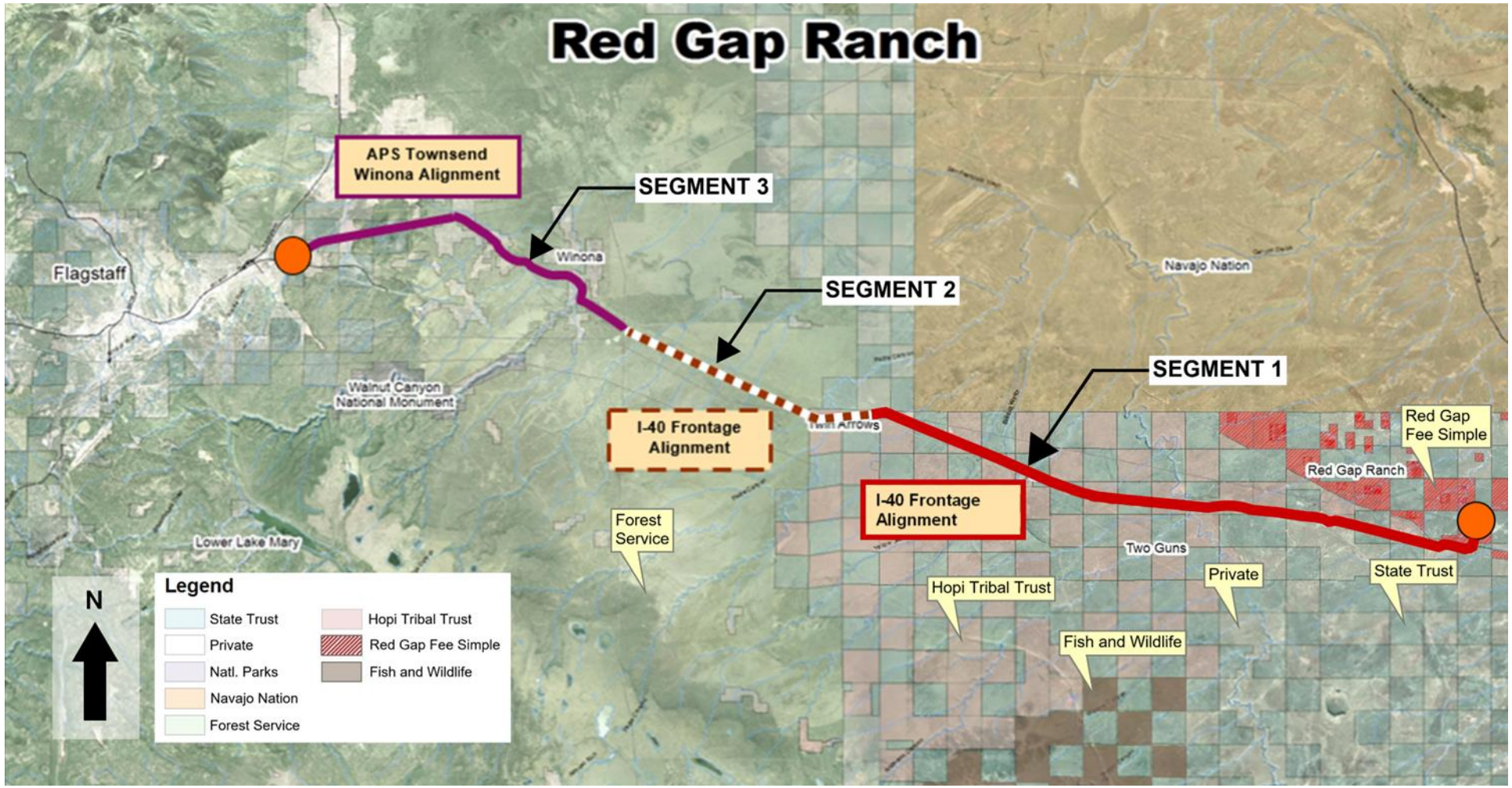
Project History

Segment 1 Revisions for I-40 Corridor (2016)



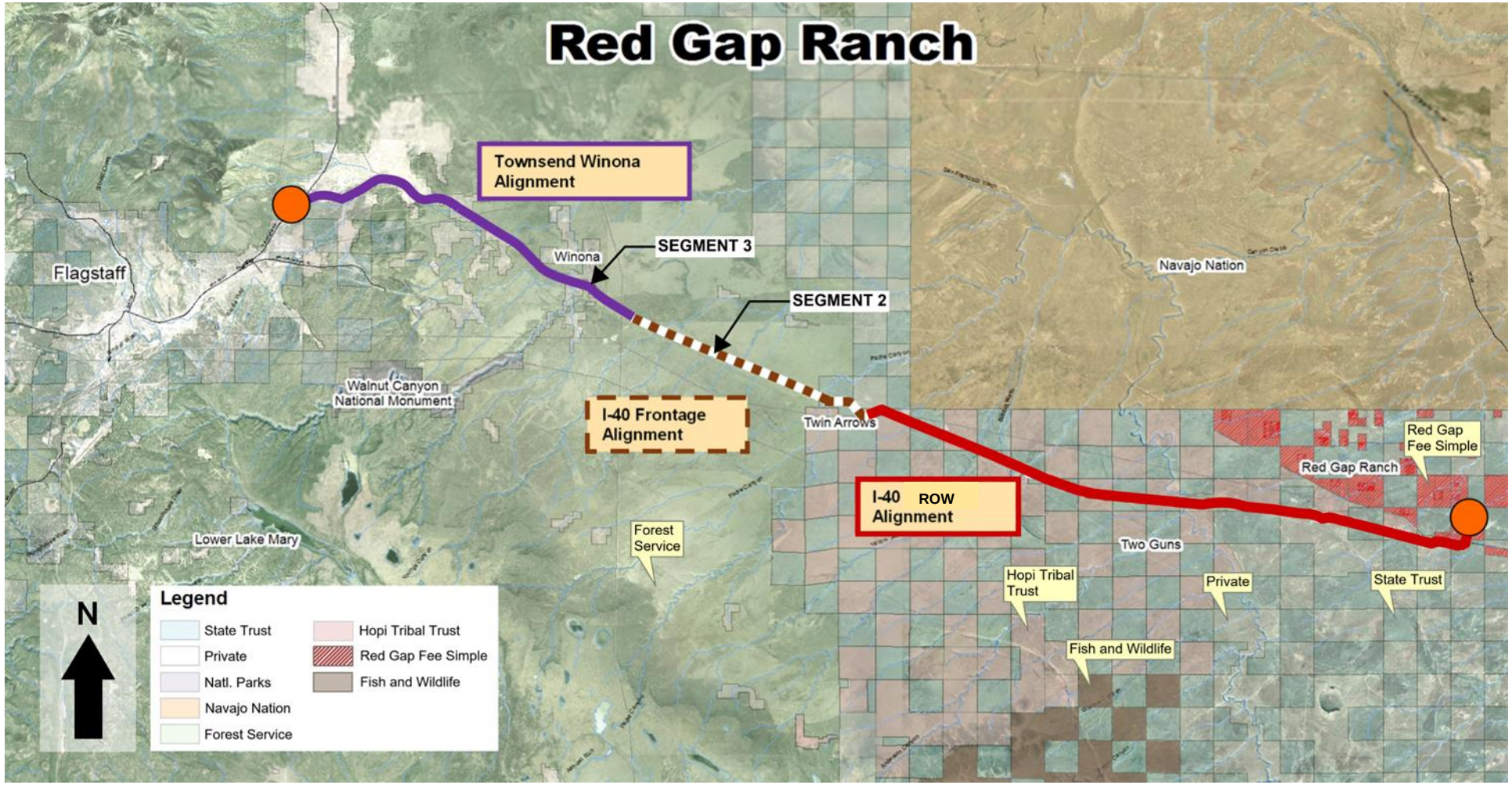
Project History

Segment 3 Cultural Resource (2019)



Project History

Alignment for Phase II Study (2021)



ADOT Coordination

ADOT Coordination

ADOT Coordination Items

- Intergovernmental Agreement (IGA) updates
  - Emergency response plan
  - Traffic mitigation costs
- Design criteria
  - ADOT engineering responses
  - Finalize criteria for final design
  - Minimum cover issue

Rights of Way

Rights of Way

Land Ownership Research

- Investigated in all 3 segments
- Ownership has changed since Phase I
- Pipeline alignment has shifted
- Determined to find out if there were barriers
- Determined to give the ability to anticipate land acquisition costs
- Majority of ASLD Right-of-Way has been acquired

Phase II Design

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Phase II Design

Pipeline Sizing, Materials, and Backfill

- 30” Steel Pipeline
- Geotechnical
- Trench Section

Phase II Design

Pump Stations

- Pump Station Nomenclature:
  - A: Red Gap Ranch
  - B: Two Guns
  - C: Twin Arrows
  - D: Townsend-Winona Road
- Pump stations sized to lift 18.4 million gallons per day (MGD) to next downstream (uphill) pump station
- Pressure break tanks at end of each pumped segment

Phase II Design

Electrical Supply – Typical Pump Station

- Three duty pumps, one standby pump, auxiliary support loads
- Primary power source:
  - Stepped-down 69 KV APS power (Pump Station A, B, and C)
  - 230 KV APS power (Pump Station D)
- Transformers from high to medium voltage (~4 KV) at pump stations
- Cost sharing between City and APS to be determined
- Double 2 MW diesel generators at each site (fuel tank sized for 24 hr operation)

Phase II Design

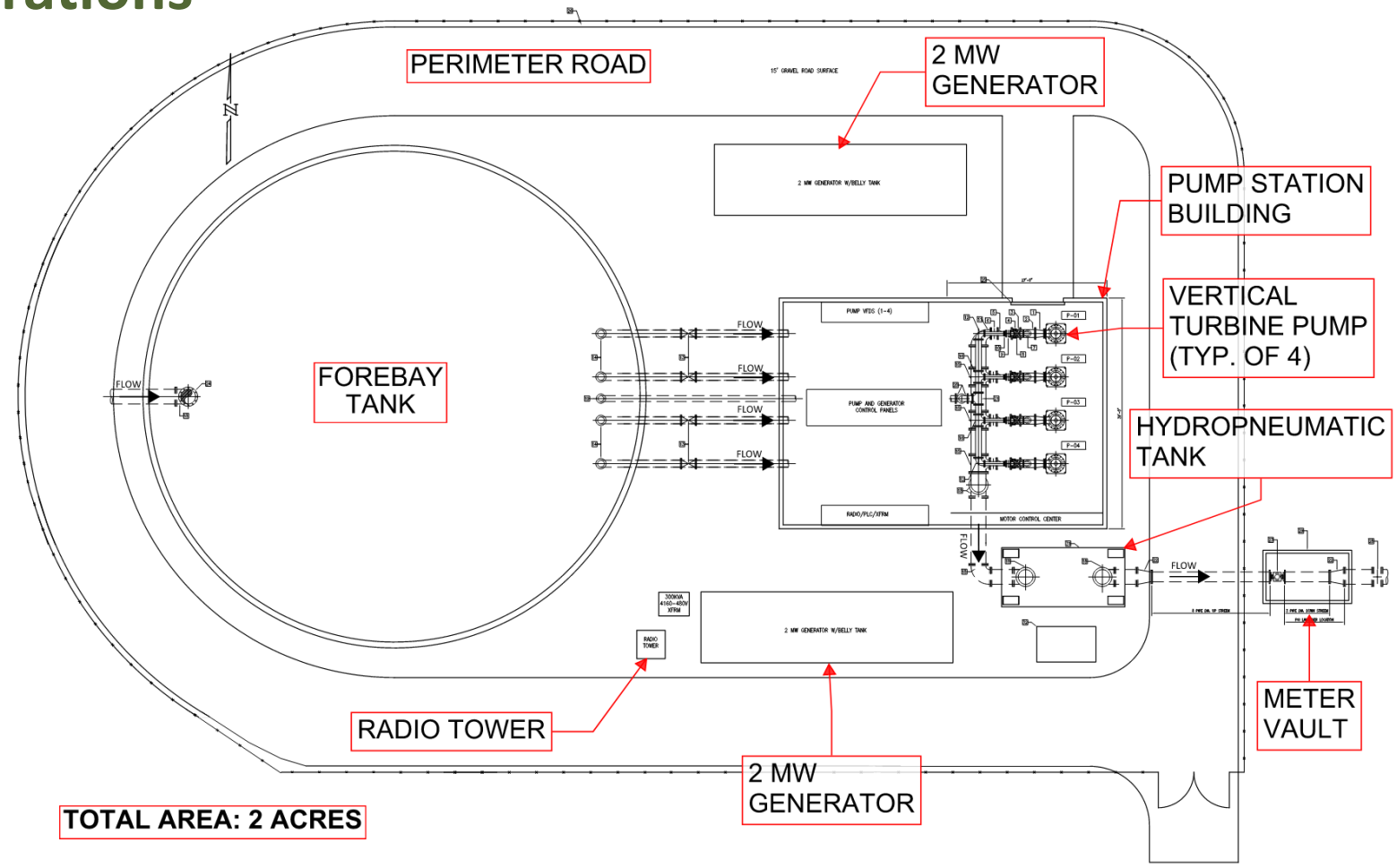
Solar Power

- Renewable energy supply desired for RGR in recognition of City Council's Climate Action and Adaptation Plan
- Ongoing communication between City and APS regarding solar panels at Red Gap Ranch
- Approximately 10 acres of land needed to generate 10 MW of electricity (2.5 MW for each pump station)
- Distribution of solar power from RGR to Pump Stations B, C, and D not evaluated
- Solar arrays at individual pump stations not evaluated

Phase II Design

Pump Station Site Considerations

- Pump equipment access
- Perimeter gravel road
- Crane “picks” pumps through skylights
- All valves and piping at operator level
- 8-ft overhead door for carting valves and fittings
- Meter in buried vault
- Several valves direct bury



Phase II Design

Control Schemes

- Demand-Based Controls (pull system):

  Downstream pump station flows are regulated by the respective upstream pump station's break-tank level to maintain the break-tank's level

- Supply-Based Controls (push system):

  Pump Station flows are based on the inflow from the Red Gap Ranch well field, or inflow from new water treatment plant (if located at RGR).

- To be determined in final design

Phase II Design

Water Treatment Plant Considerations

- Finished water quality desired
- Need for and type of treatment
- Location

Phase II Design

Comparative Water Qualities

Constituent	Flagstaff Existing (Wells)	Flagstaff Existing (Surface)	Red Gap Ranch	Glendale Water Services*
pH	N/A	7.2 to 8.7	7 to 7.5	7.01 to 8.16
TDS (mg/L)	122 to 309	50 to 309	**500 to 970**	332 to 862
Calcium (mg/L)	21 to 67	4 to 67	69 to 110	14 to 82
Sulfates (mg/L)	< 3	1.7 to 25	**140 to 300**	Nondetectable to 258
Chlorides (mg/L)	≤ 4	≤ 4	21 to 200	38 to 314
Hardness (mg/L)	100 to 270	17 to 270	170 to 370	203 to 280
Alkalinity (mg/L)	181 to 325	29 to 325	150 to 210	67 to 243

City Staff recommends 250 mg/L target for Flagstaff customers

**Obtained from Glendale Arizona's 2021 Annual Water Quality Report, selected to represent example of CAP water*

Phase II Design

Treatment Process Considerations – Sulfate and TDS

- Only method to remove TDS and sulfate is membrane technologies (reverse osmosis or nanofiltration)
- Conventional treatment will not provide same reduction of TDS and sulfate
- Membrane technologies have a brackish waste stream that require evaporation ponds, mechanical evaporation, or injection wells (saltwater injection wells are not permitted in Arizona at this time)
- Membrane technologies require pretreatment to protect the membrane from excessive scaling

Phase II Design

Water Treatment Plant Location

- Options
  - Red Gap Ranch
  - Near Wildcat Hill WWTP
  - Location near US 89 and Townsend Winona Road (undetermined)
- Considerations
  - Footprint and land acquisition
  - Brine disposal
  - Potential potable water customers along pipeline
  - Location of operations staff
- Current study assumes Red Gap Ranch
- Determination for final design

Environmental and Permitting

Environmental and Permitting

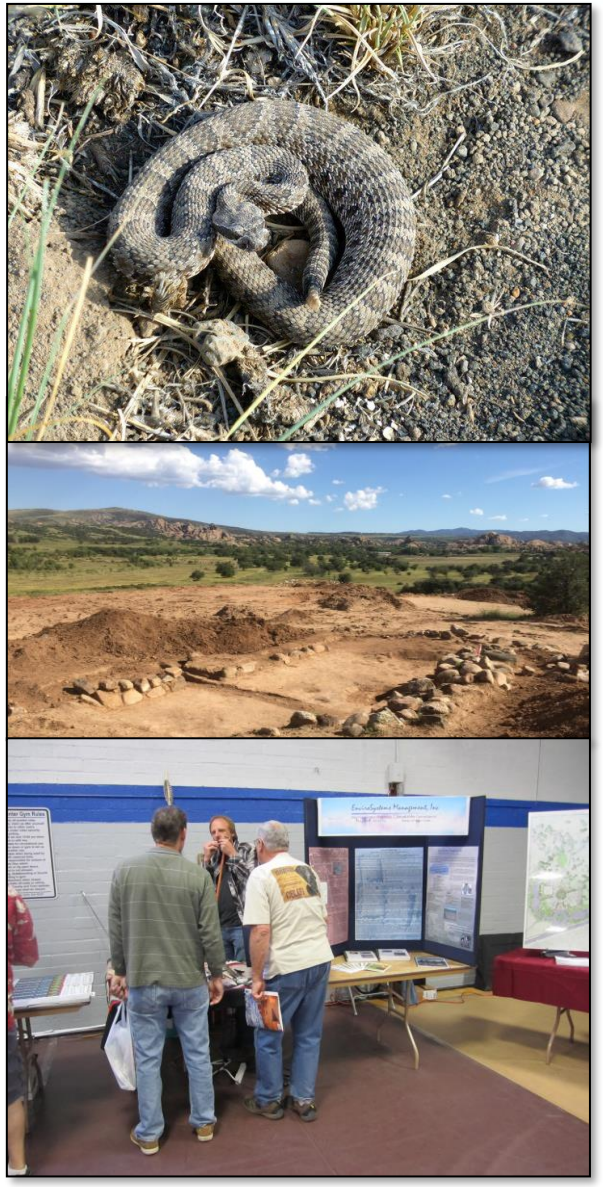
Environmental Scope

- Phases I & II
  - Alternatives Analysis for Environmental and Archaeological Issues, Opportunities and Constraints
- Phase III
  - Draft Feasibility Report
  - Stakeholder/Public Involvement Plan
  - Final Feasibility Report

Environmental and Permitting

Future Steps

- NEPA Compliance
- Environmental and Archaeological field investigations & mitigation recommendations for potential impacts
- Engage Bureau of Reclamation and begin coordination and transfer of information
- Establish rapport other affected agency personnel to open discussions of future steps



Opinion of Probable Construction Cost (OPCC)

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Opinion of Probable Construction Cost (OPCC)

Class 4 Estimate Summary	
Pipeline Component	$254.5M
Pump Station Component	$68.3M
Total Cost (Pipeline + Pump Station)	**$322.8M**
Water Treatment Plant Component (Membrane)	$98.8M
Total Cost (Pipeline + Pump Station + Treatment)	**$421.6M**

Assumptions

- 2023 dollars
- OPCC Level 4 (Feasibility) – Approx 10% design
- Contingency: 20%
- Overhead power cost not included
- RGR wellfield and collection system not included
- Solar power array(s) not included
- No phasing, full build
- Matches Phase II report assumptions
- No blending considered if treatment requirements are reduced
- No consideration of Settlement Agreement terms or components:
  - Additional phasing
  - Points of delivery
  - Reduced water treatment

Schedule

Schedule

Report Completion Schedule

- Near Term:
  - Phase II briefings: through October 2024
  - Phase II report complete: October 2024
  - Phase III: Work scope to be adjusted to align with USBR Appraisal process needs

- Beyond:
  - Investigate USBR collaboration opportunities
  - Coordinate with Water Commission
  - Coordinate with Coconino Plateau stakeholders
  - Investigate and monitor funding
  - Conduct public outreach events

For today, no decisions—just updating.