

ISC Grant County AWSA Tier 2 Application Review

Summary of Draft Preliminary Engineering Report

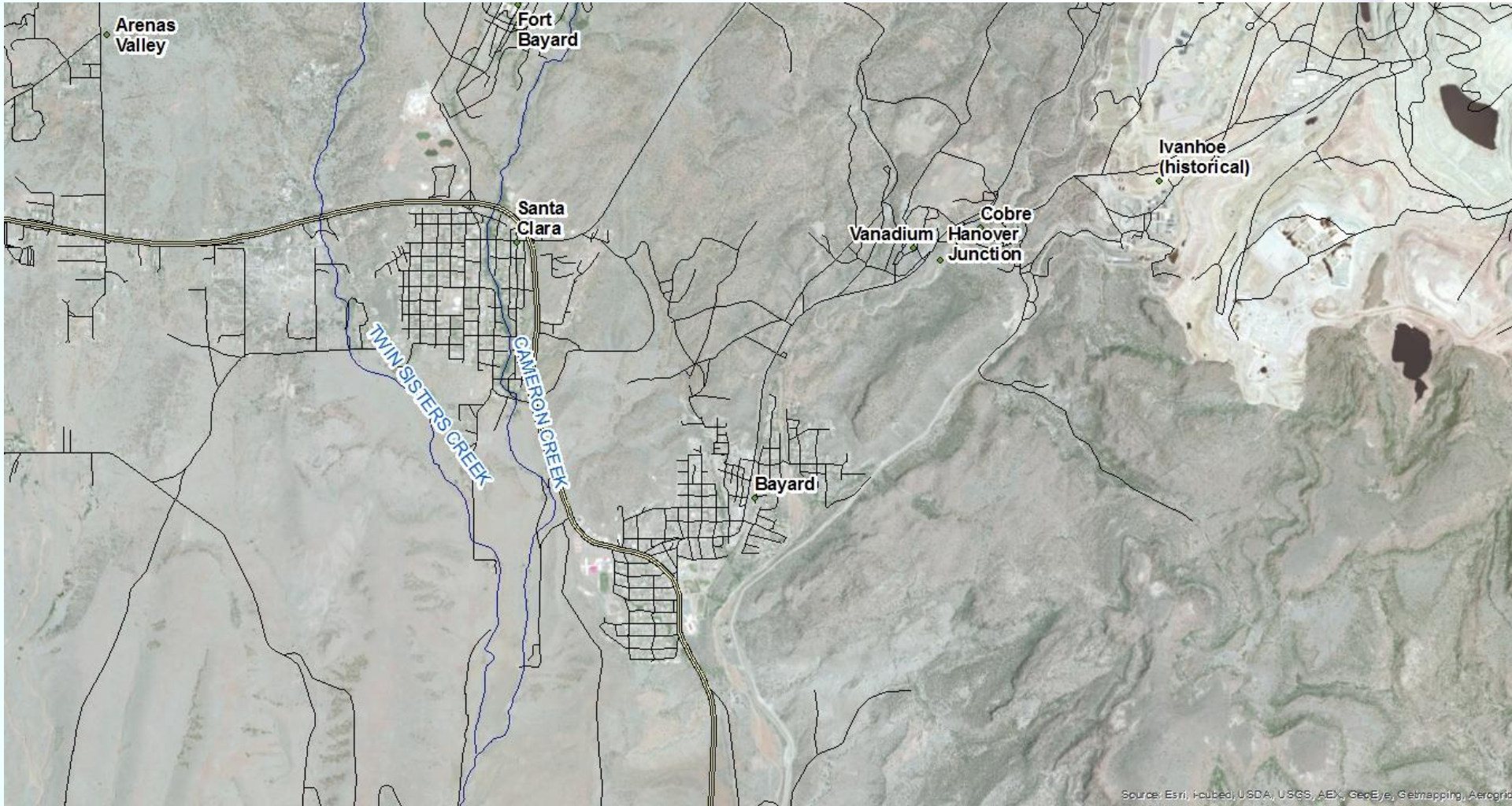
BHI Project #20130326

October 21, 2013

Task Objective

- ▲ BHI hired to evaluate the Grant County and City of Bayard proposals, to comply with the ISC directive for further evaluation of 16 selected proposals
- ▲ City of Bayard Application subsequently withdrawn

Area Map



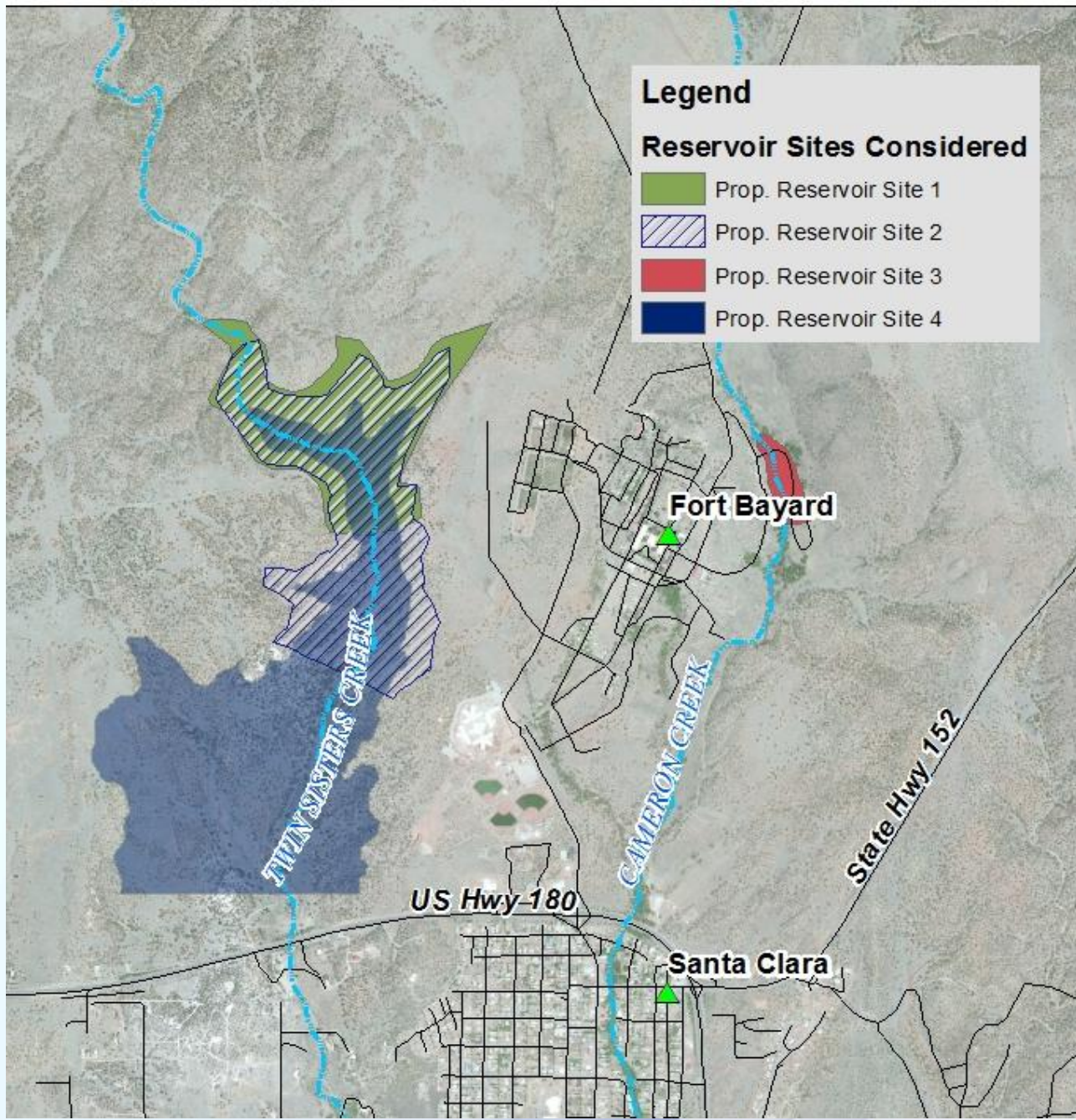
Source: Esri, Imbodo, USDA, USGS, Aero, GeoEye, Geomapping, AeroGRID

Work Summary, slide 1

- ▲ Review Grant County AWSA Tier 2 proposal (Grant Co application)
- ▲ Review 2 previous reports by John Shomaker & Associate(JSAI)
- ▲ Verify calculations (storage volumes, evaporation, runoff)
- ▲ Compile base maps of the area

Work Summary, slide 2

- ▲ Site Visits
- ▲ Research property ownership
- ▲ Identify permitting requirements
- ▲ Identify additional investigations needed (environmental, geotechnical, geological)
- ▲ Preliminary cost estimates



Report Review

- ▲ “Preliminary Hydrogeological Evaluation of the Grant County Reservoir and Water Reuse Project, Near Fort Bayard, New Mexico,” John Shomaker & Associates, October 2011 **(JSAI 2011 Study)**
- ▲ “Assessment of Potential Hydrologic Impacts from Proposed Reservoir(s) Near Fort Bayard, New Mexico,” John Shomaker & Associates, September 2012. **(JSAI 2012 Study)**
- ▲ “Grant County AWSA Tier 2 Application,” by Engineers Inc., October 2011.

JSAI 2011 Study

- ▲ Feasibility study for developing a reservoir under 3 scenarios:
 - Filling from stormwater
 - Filling from treated effluent
 - Filling from existing potable supply

JSAI 2011 Study

▲ Calculations verified by BHI

▲ Findings

- Suitable topography (Site 3 is limited in area)
- Underlying rock of low permeability (limits seepage)
- Annual runoff from Twin Sisters – 70 AFY
- Annual runoff from Cameron – 110 AFY
- All sites feasible – size of reservoir will depend on water source available

JSAI 2012 Study

▲ Objectives

- Quantify hydrologic effects on downstream wells of building a reservoir
- Discuss effects of infiltration of treated WW to the water table (no longer relevant)
- Included a groundwater model to calculate potential seepage and aquifer response

JSAI 2012 Study

▲ Results (based on Site 2)

- Stormwater runoff between 70 and 178 AFY.
- 60 AFY decrease in recharge if stormwater is impounded.
- 60 AFY increase in recharge if stormwater is routed around the reservoir.
- Bottom line – need to sustain release of runoff to creeks for groundwater recharge

Grant County AWSA Tier 2 Application

- ▲ Proposal components
 - Reuse of treated effluent
 - Recreational reservoir

Treated effluent source water no longer available
due to withdrawal of City of Bayard proposal

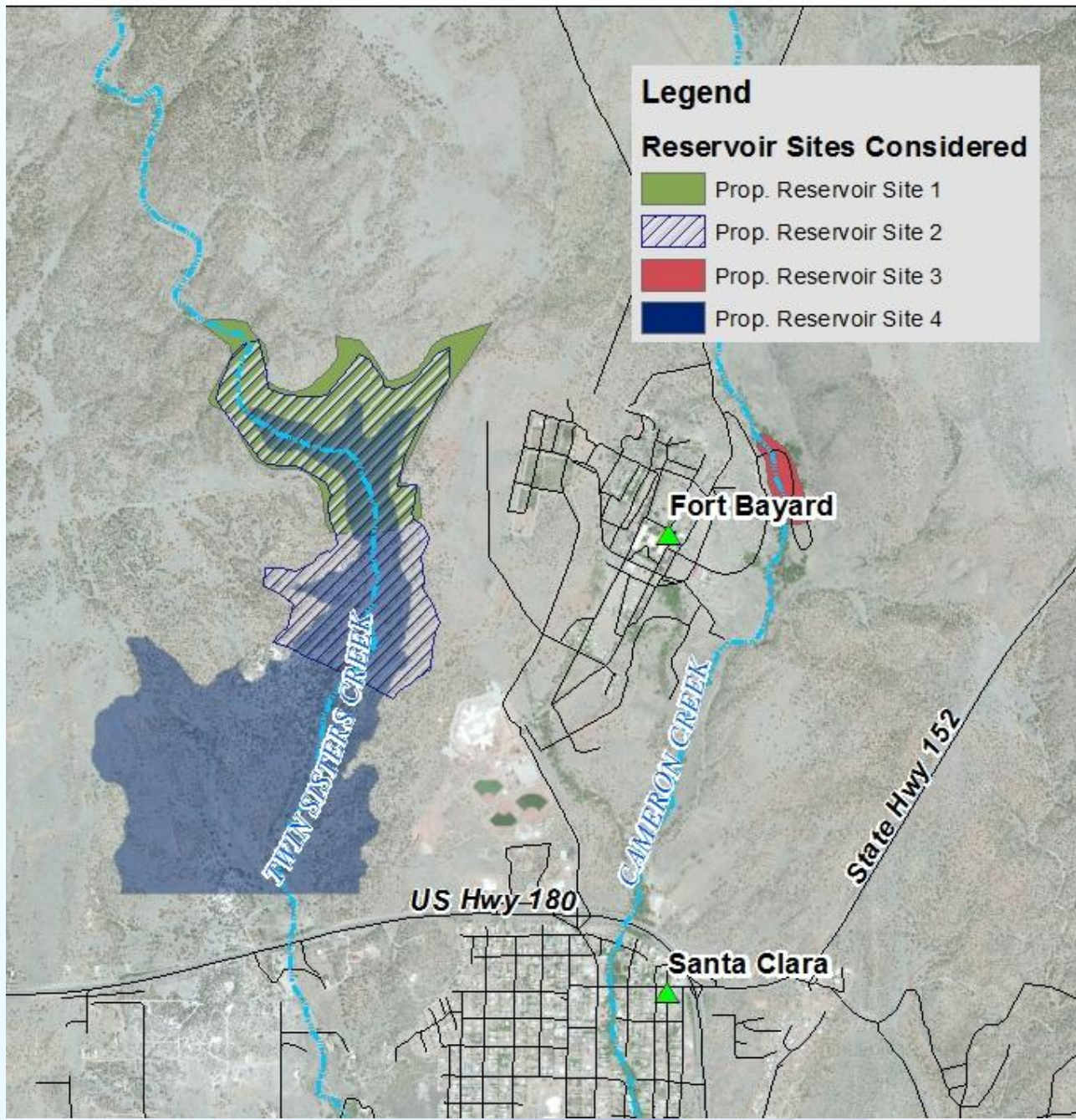
Comparison of BHI and JSAI calculations

		Surface Area (acres)		Max WSE (ft)	Storage (acre-feet)		Evaporation (acre-ft/year)	
		BHI	JSAI		BHI	JSAI	BHI	JSAI
Site ID	Watershed							
Site 1	Twin Sisters	81.7	89.8	6,100	1,636	1,856	340	374
Site 2	Twin Sisters	124.8	132.5	6,090	2,996	3,297	520	552
Site 3	Cameron	5.3	6.2	6,100	37.0	52.9	21.9	26
Site 4	Twin Sisters	318.5	N/A	6,080	14,103	N/A	1,327	N/A

BHI Estimated Reservoir Costs (10% appraisal level)

Site Name	Surface Area	Total Cost *
Twin Sisters Site 1	81.7	\$13.9 m
Twin Sisters Site 2	124.8	\$17.1 m
Cameron Creek Site 3	5.3	\$12.9 m
Twin Sisters Site 4	318.5	\$26.4 m

*Costs including survey, design, permitting, ROW and land acquisition, construction observation and management, contingency and NMGRT



Estimated Costs Per Acre Foot (10% appraisal level)

Site No	Site Name	Volume (acre-ft)	Construction Cost/acre-ft
Site 1	Twin Sisters (Max Elevation 6100)	1,636	\$9,070
Site 2	Twin Sisters (Max Elevation 6090)	2,996	\$6,029
Site 3	Cameron Creek (Max Elevation 6100)	37	\$374,216
Site 4	Twin Sisters (Max Elevation 6080)	14,103	\$1,938

*Raw cost includes reservoir, pipeline and booster station, including design, permitting, ROW and land acquisition, construction observation and management, contingency and NMGRT

Environmental Compliance

▲ Permitting

- National Environmental Protection Act
- Clean Water Act
- National Pollutant Discharge Elimination System
- Section 106 National Historic Preservation Act
- 40 Code of Federal Regulations (CFR) Part 85 Air Pollution
- 29 CFR 1926 Noise Levels

▲ Estimated Cost - \$130,000

Recommended Reservoir Site

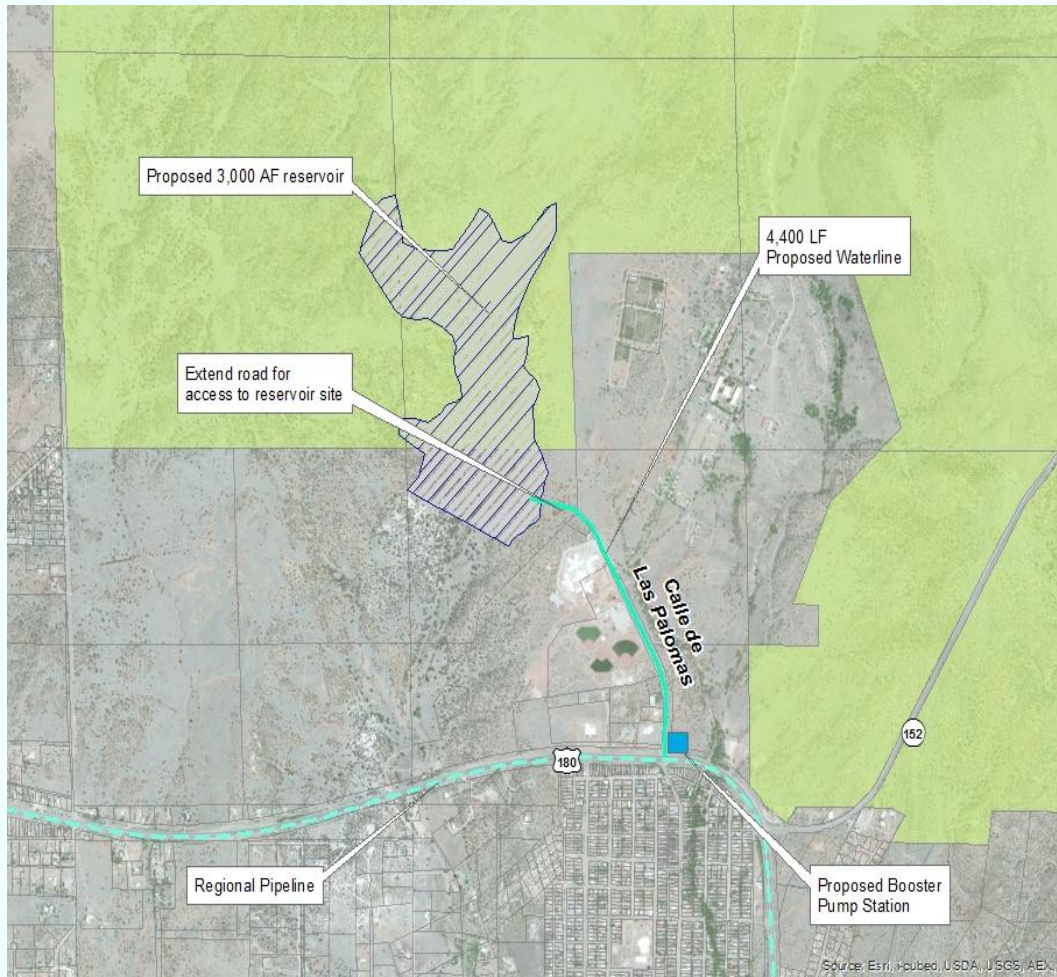
- ▲ Site 2 recommended due to size (3,000 AF in volume and 125 AC in surface area)
 - Recreational opportunities
 - Proximity to ball fields
 - Convenient access from Calle de Las Palomas

Reservoir Size Vs. Volume Vs. Cost

Site ID	Dam Height	Volume (AF)	Surface Area	Total Cost*
Site 1	62	1,636	81.7	\$13.9 m
Site 2	91	2,996	124.8	\$17.1 m
Site 4	120	14,103	318.5	\$26.4 m

*Costs including survey, design, permitting, ROW and land acquisition, construction observation and management, contingency and NMGRT

Recommended Project



- ▲ Site 2 Reservoir
- ▲ Pipeline
- ▲ Booster Station

Recommended Project Cost

Item	Cost
Reservoir Construction	\$13,623,000
Pipeline and Booster Station Construction	\$684,000
Design	\$858,000
Topographic Survey	\$47,500
Right-of-Way Easement Development	\$3,000
Permitting, Environmental & Geotechnical Investigations	\$130,000
Land Acquisition Services	\$5,000
ROW and Land Acquisition	\$100,000
Construction Observation and Management	\$1,431,000
Subtotal	\$16,881,500
NMGRT	\$1,182,000
Total	\$18,063,500

*Cost includes Site 2 reservoir shown on BHI Estimated Reservoir Costs slide plus pipeline, booster station and associated costs

Estimated Annual Operating & Maintenance Costs

(based on overall construction cost of \$14.3 million)

Item	Amount
Parts and Repairs (0.1% of Construction Costs)	\$14,000
Equipment (10% of Parts and Repairs)	\$1,400
Labor (1 full time operator)	\$45,000
Electrical Costs	\$32,850
Miscellaneous training, insurance, etc.	\$12,000
Total	\$105,250

Dam Safety

- ▲ Dam on Twin Sisters will be High Hazard Dam under OSE-DSB regulations.
- ▲ Emergency Action Plan (EAP) required
- ▲ EAP identifies potential emergency conditions at a dam and preplanned actions to be followed to minimize property damage and loss of life.
- ▲ EAP includes inundation map and evacuation map.
- ▲ Highway 180 would likely be closed in the event of a dam failure or even operation of the emergency spillway at the dam on Twin Sisters Creek.

Questions?

