

SOUTH TAHOE PUBLIC UTILITY DISTRICT
**RECYCLED WATER
STRATEGIC PLAN**

Recycled Water Strategic Plan Update

May 18, 2023

Stephen Caswell, Principal Engineer
Elisa Garvey, Carollo Engineers



Introduction and Background



SOUTH TAHOE PUBLIC UTILITY DISTRICT
**RECYCLED WATER
STRATEGIC PLAN**

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District Recycled Water Strategic Plan Objectives

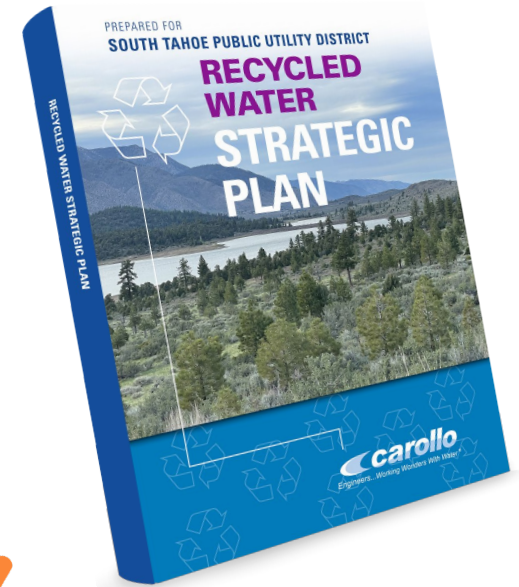
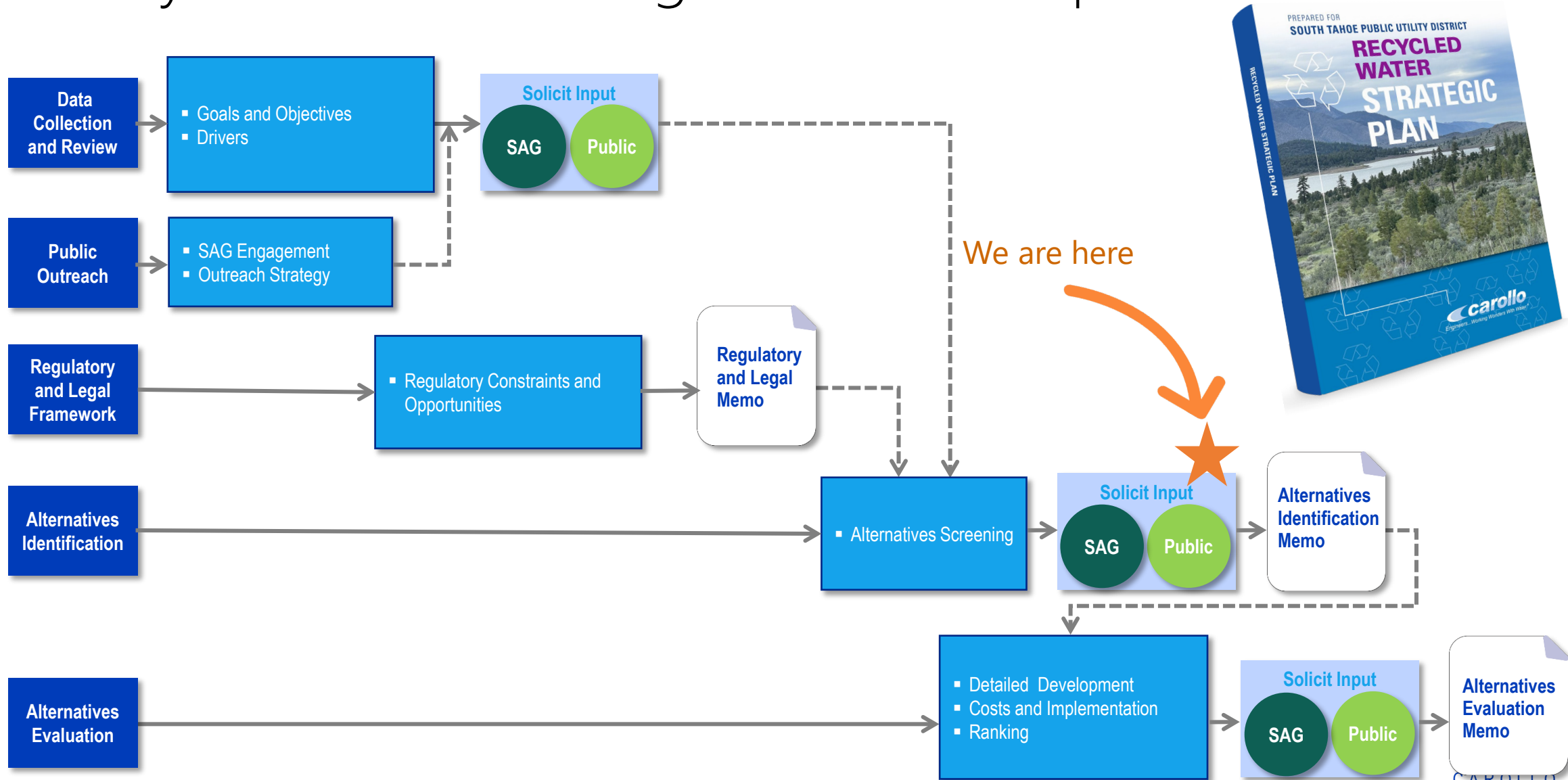


50 Year Planning Horizon

Develop a long-term strategy for District wastewater effluent disposal/reuse that incorporates viable alternatives to the existing system.

These alternatives would be triggered for implementation by existing or future drivers and/or constraints.

Recycled Water Strategic Plan Development



SAG = Stakeholder Advisory Group

Existing System Challenges

Economic

- Annual O&M cost for the system is ~\$6M per year.
- Annual cost for energy for export is approximately ~\$1.2M per year
- Limited or no revenue from alfalfa and recycled water

Regulatory

- Any permit changes may trigger Salt and Nutrient Management Plan (SNMP) requirements

Technical

- Current operations require continued investment to maintain District established level of service

Institutional

- Litigation between the District and Alpine County
- Rancher agreements will expire in 2028

Environmental and Sustainability

- Energy consumption and production of greenhouse gas emissions

Public

- General concern with the cost of service to treat and export effluent.

Alternatives Identification and Screening

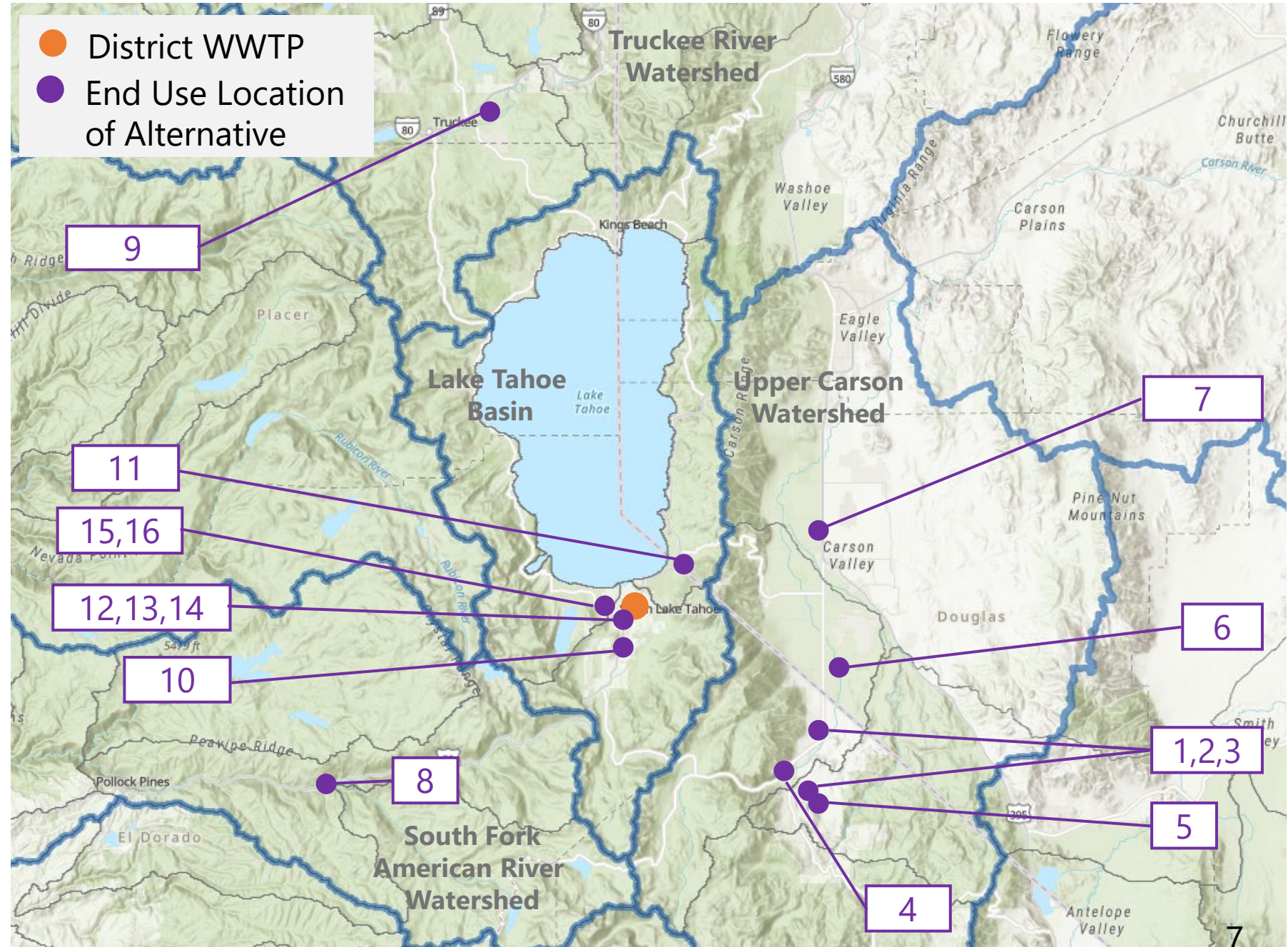


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Alternatives Identification and Screening

- Brainstorming exercise
- Wide net of potential options
- Identify most viable options for detailed evaluation



WWTP = wastewater treatment plant

Alternatives Identification and Screening

Truckee River Watershed



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Truckee River Watershed Alternatives

- Conveyance to TTSA for subsurface discharge to Truckee River



Key Challenges

Authority	Regulation/ Agreement/ Policy/ Permit	Description	Challenge
LRWQCB	TTSA NPDES Discharge Permit	Permit which includes permitted capacity associated with treatment of wastewater from existing service area	<ul style="list-style-type: none"> • Modifications to accommodate additional flow from the District
Tahoe Truckee Sanitation Agency	TTSA Ordinance	Defines the sources of wastewater and associated agreements with member agencies	<ul style="list-style-type: none"> • Modifications to include treatment of wastewater from the District • Agreement between District and TTSA
Tahoe City Public Utility District	TCPUD Ordinance	Defines the sources of wastewater and agreement with TTSA	<ul style="list-style-type: none"> • Modifications to include conveyance of wastewater from the District • Agreement between District and TCPUD

- Infrastructure and Treatment

- 15-mile transmission pipeline from District WWTP to TCPUD System
 - Significant challenges with pipeline construction
 - Potential environmental impacts
- TCPUD and TTSA are capacity limited

Alternatives Identification and Screening

South Fork American River Watershed



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South Fork American Watershed Alternatives

- Discharge to the American River
- Non-potable recycled water use in American River Watershed
 - Snowmaking
 - Irrigation



WWTP = wastewater treatment plant

Key Challenges

Authority	Regulation/ Agreement/ Policy/ Permit	Description	Challenge
CVRWQCB	NPDES Discharge Permit	Permit for discharge to South Fork American River	<ul style="list-style-type: none"> New NPDES permit required
CVRWQCB	1977 Letter from CVRWQCB – Discharge	Requires discharge below confluence of the Silver Fork and South Fork American River (near Kyburz, CA)	<ul style="list-style-type: none"> Modification of this CVRWQCB decision Or significant pipeline to convey treated effluent to allowed discharge location
CVRWQCB	Basin Plan	Water quality objectives for South Fork American River	<ul style="list-style-type: none"> Requires higher level of treatment

- Infrastructure and Treatment
 - 28-mile pipeline
 - Significant technical challenges
 - Potential for environmental impacts
 - Treatment upgrades for discharge to South Fork American River
 - Filtration and nutrient removal
 - Treatment upgrades for non-potable recycled water use
 - Filtration and disinfection

Alternatives Identification and Screening

Lake Tahoe Basin

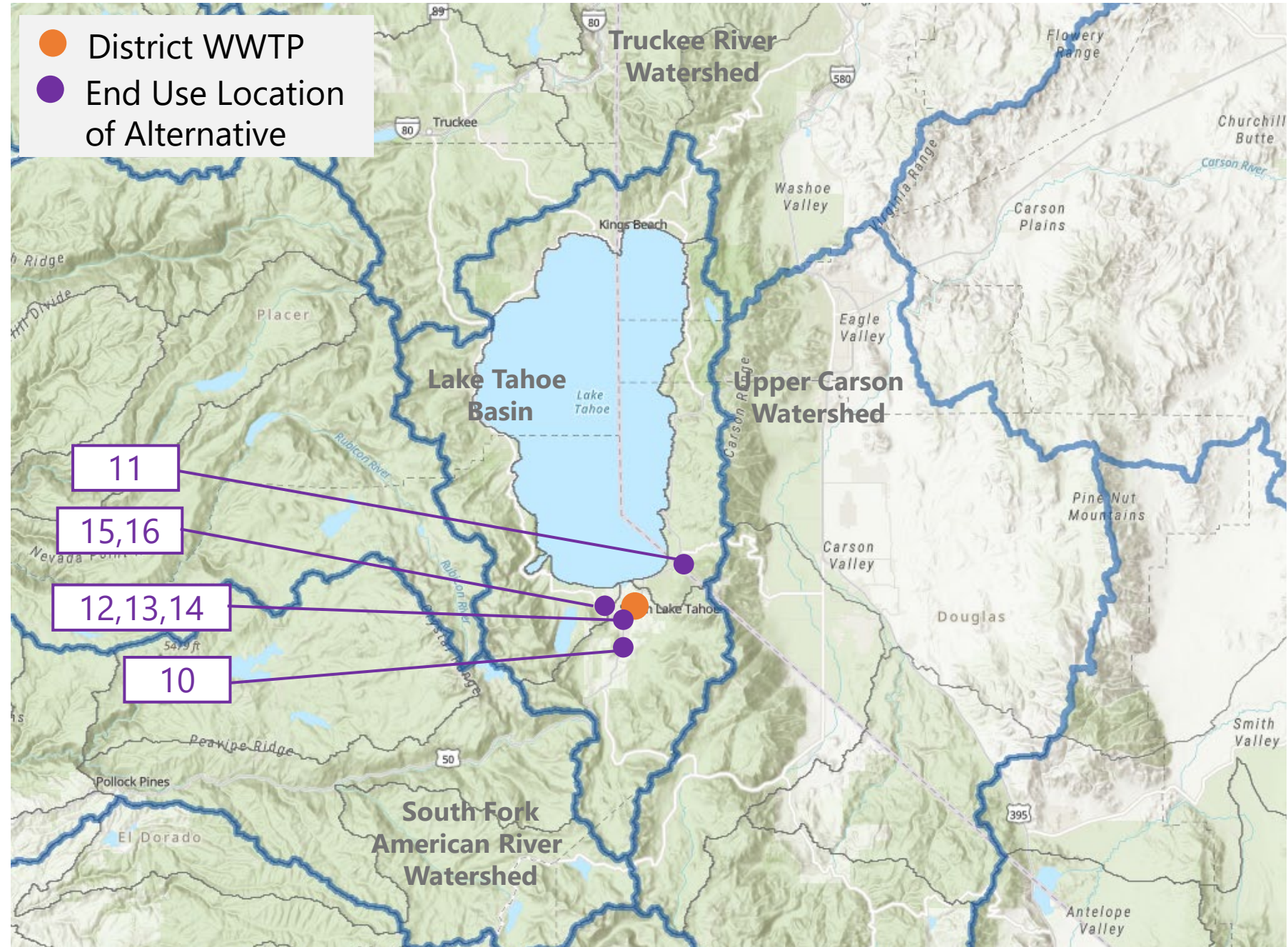


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Lake Tahoe Basin Alternatives

- Land Application
- Discharge to waterways
- Potable Reuse
 - Indirect Potable Reuse
 - Direct Potable Reuse



WWTP = wastewater treatment plant

Key Challenges

Authority	Regulation/ Agreement/ Policy/ Permit	Description	Challenge
State of California	Porter-Cologne Act	Requires export	<ul style="list-style-type: none"> Porter-Cologne Act modification. Approval by CA Legislature.
LRWQCB	Basin Plan	Designates Lake Tahoe as an ONRW.	<ul style="list-style-type: none"> De-designation of Lake Tahoe as Outstanding National Resource Waters (ONRW) Or meet water quality objectives at discharge
TRPA	Code or Ordinances	Prohibits municipal wastewater discharge to Tahoe region	<ul style="list-style-type: none"> Requires modification of TRPA code
US Congress	Settlement Act	Modifies the allocation of Carson River water between CA/NV	<ul style="list-style-type: none"> Potential litigation
State of California	SGMA	Annual reporting on water supply and demands	<ul style="list-style-type: none"> Ample water available
State of California	Title 22	Defines approved uses of recycled water	<ul style="list-style-type: none"> Not enough demand

Alternatives – Discharge to Tributaries or Land Application of recycled water

- Outstanding National Resource Waters (ONRW) designation of Lake Tahoe
- Applicable to:
 - » Lake Tahoe
 - » Tributaries
 - » Potentially applicable to land application of recycled water (irrigation or snowmaking)

		Total Dissolved Solids (mg/L)	Chloride (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
Tributaries	Water Quality Objective	50-60	0.15-4.0	0.19	0.015
WWTP Effluent	Average Quality	270	45	30	3.6

Treatment Requirements

		Total Dissolved Solids (mg/L)	Chloride (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
Tributaries	Water Quality Objective	50-60	0.15-4.0	0.19	0.015
WWTP Effluent	Average Quality	270	45	30	3.6

Requires TDS and chloride removal

Requires nutrient removal

- Total dissolved solids and chloride removal
 - » Reverse Osmosis (RO) is industry standard process
- Nutrient removal
 - » Limits of technology for biological nutrient removal = 3 mg/L TN
 - » Reverse Osmosis (RO) required to further reduce TN
 - TN objective may not be achievable
- Trace organics removal
 - » Ultraviolet disinfection and advanced oxidation (UV/AOP)

Treatment Train
Nutrient Removal +
MF+ RO + UV/AOP

WWTP Planning Level Cost Estimates

Treatment Train	Cost (\$M) ^(1,2)	O&M (\$M per year) ^(1,2)
Nutrient Removal	14	\$3.6
Nutrient Removal +MF + RO+ UV/AOP	75	\$7.6
1. Costs in 2021 dollars 2. Based on projected flow of 5.4 mgd 3. Brine disposal not included Planning Level Cost Estimates - Class 5 Cost Estimates with an accuracy of -30%/+50%		

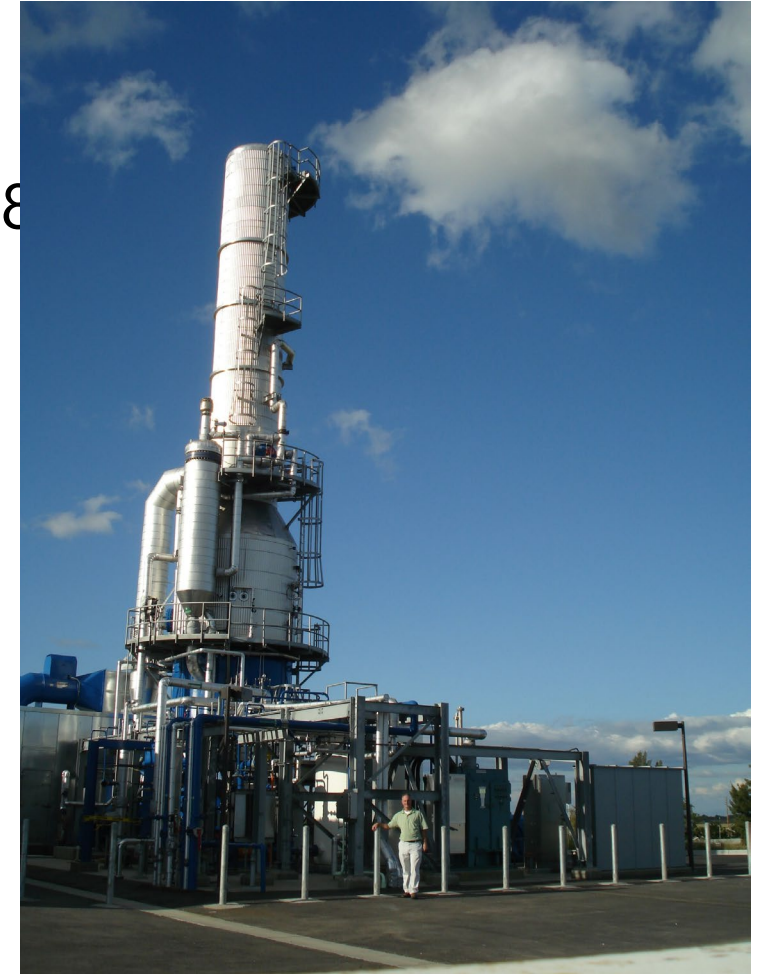
WWTP Energy Demand Comparison

Process	Millions of kWh for projected AAF ⁽¹⁾
Existing System - Pumping to DVR	14.3
Nutrient Removal	3.5
Nutrient Removal +MF + RO+ UV/AOP	14.9
1. Based on projected flow of 5.4 mgd 2. Brine disposal not included	

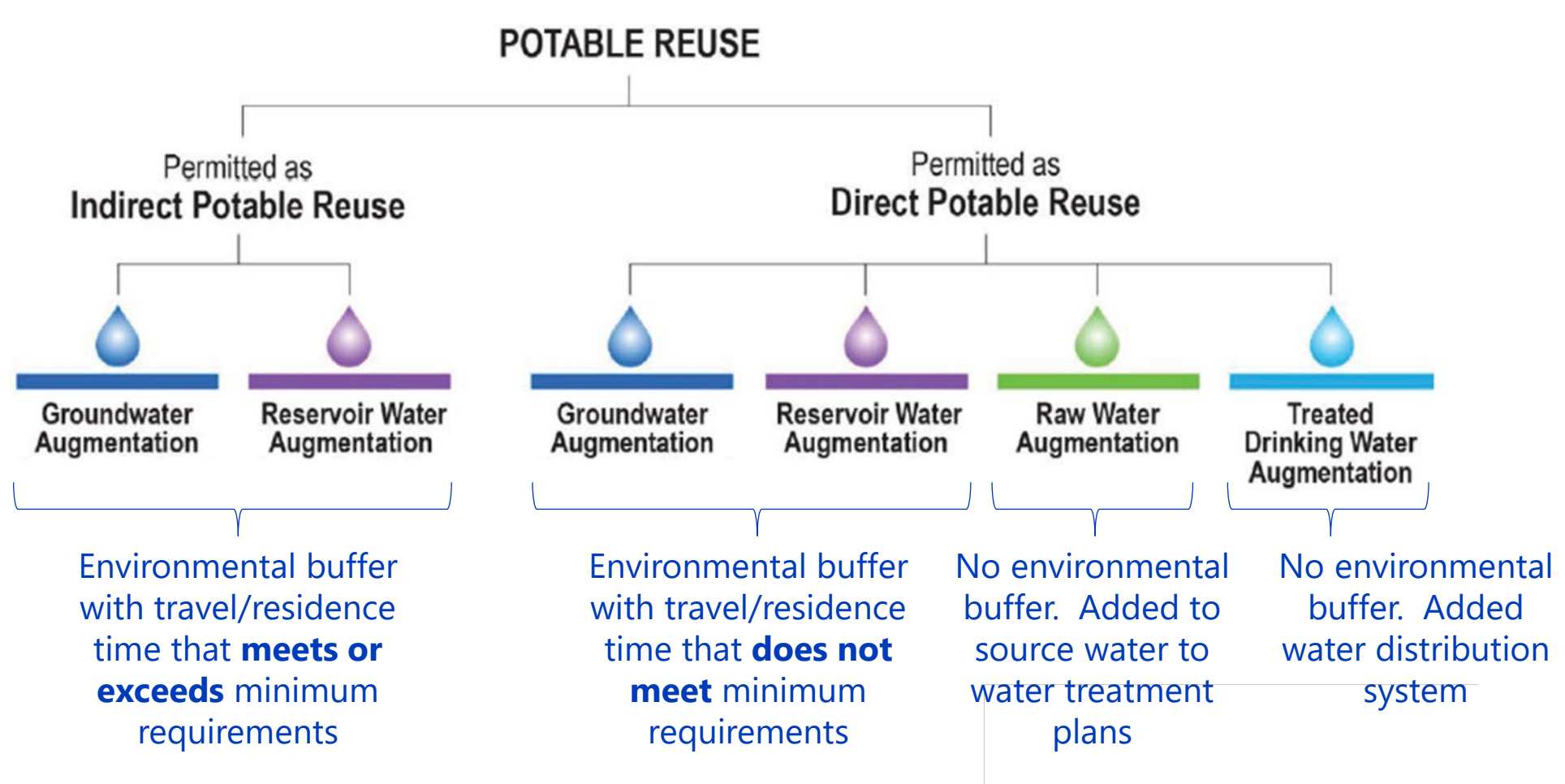
Additional Considerations – RO Brine Disposal

- RO brine disposal
 - » Estimated volume based on partial treatment = 250,8
 - » Disposal

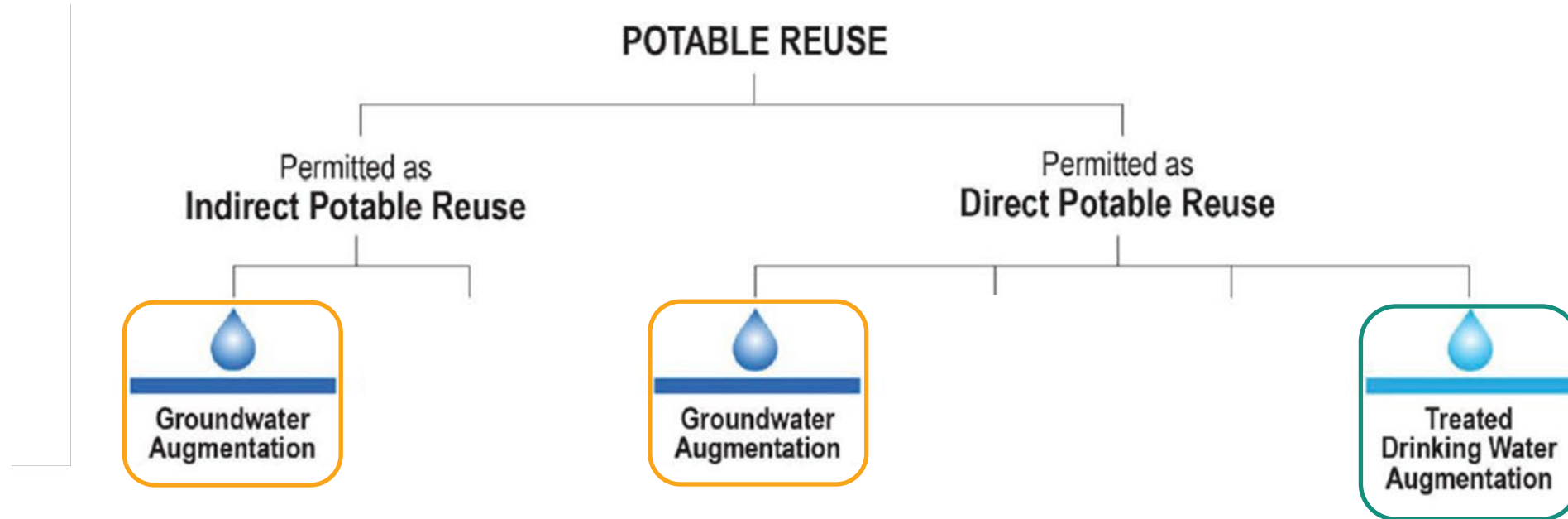
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Potable Reuse Alternatives



Potable Reuse Alternatives



- Injection only viable approach
- Potable reuse via injection requires
 - MF + RO + UV/AOP
 - Allowance to demonstrate equivalent treatment train (non-RO)
- Meeting groundwater quality objectives requires
 - RO and possibly nutrient removal

- Regulations expected end 2023
- Anticipated required treatment train includes RO
- No anticipated allowance to demonstrate equivalent treatment train (non-RO)

WWTP Planning Level Cost Estimates

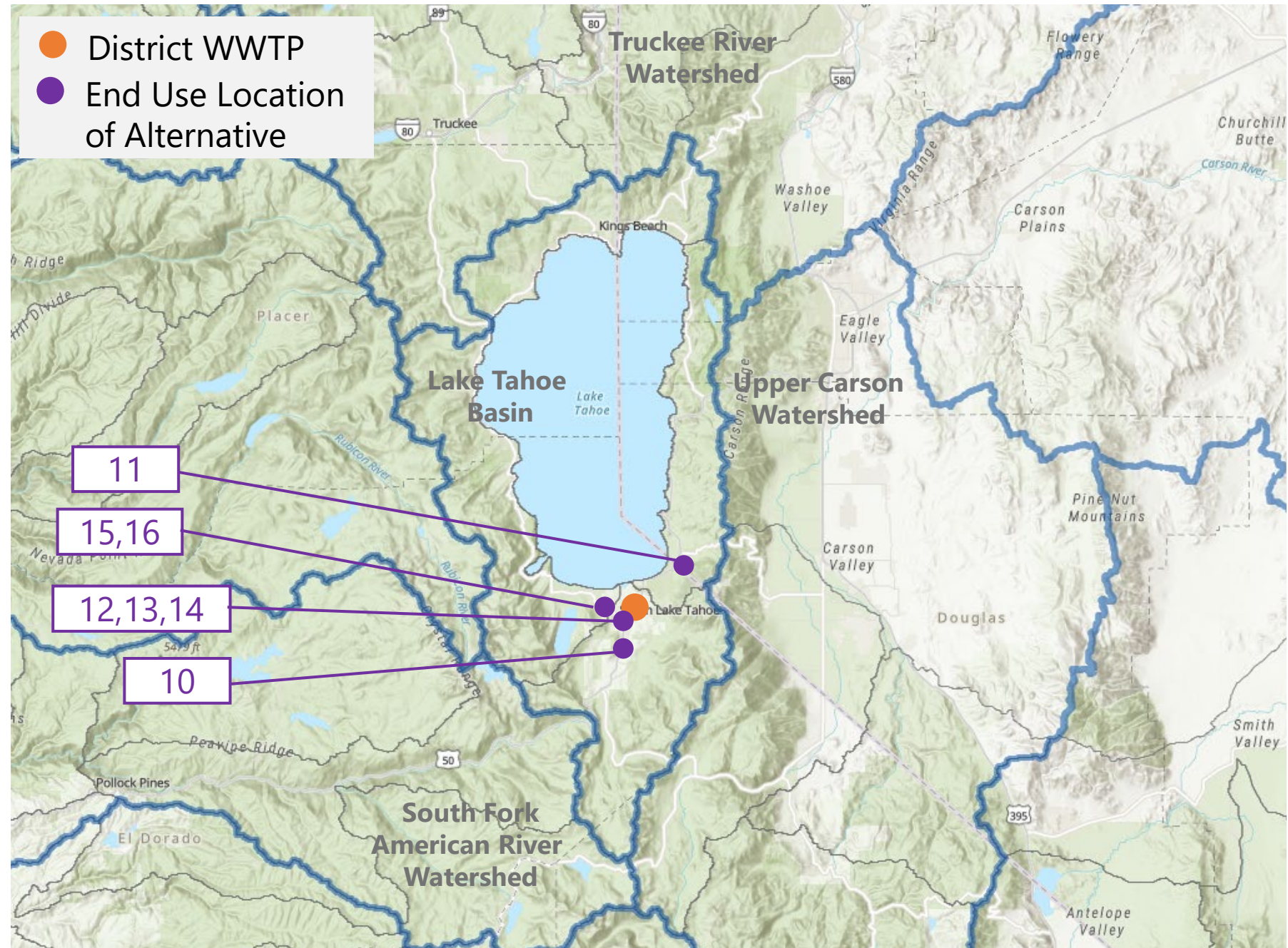
Treatment Train	Cost (\$M) ^(1,2)	O&M (\$M per year) ^(1,2)
MF + RO+ UV/AOP	61	\$4.0
Nutrient Removal	14	\$3.6
1. Costs in 2021 dollars 2. Based on projected flow of 5.4 mgd 3. Brine disposal, injection well not included Planning Level Cost Estimates - Class 5 Cost Estimates with an accuracy of -30%/+50%		

WWTP Energy Demand Comparison

Process	Millions of kWh for projected AAF ⁽¹⁾
Existing System - Pumping to DVR	14.3
MF + RO+ UV/AOP	11.4
Nutrient Removal	3.5
1. Based on projected flow of 5.4 mgd 2. Brine disposal, injection well not included	

Lake Tahoe Basin Alternatives

- Land Application
- Discharge to waterways
- Potable Reuse
 - Indirect Potable Reuse
 - Direct Potable Reuse



WWTP = wastewater treatment plant

Alternatives Identification and Screening

Carson River Watershed

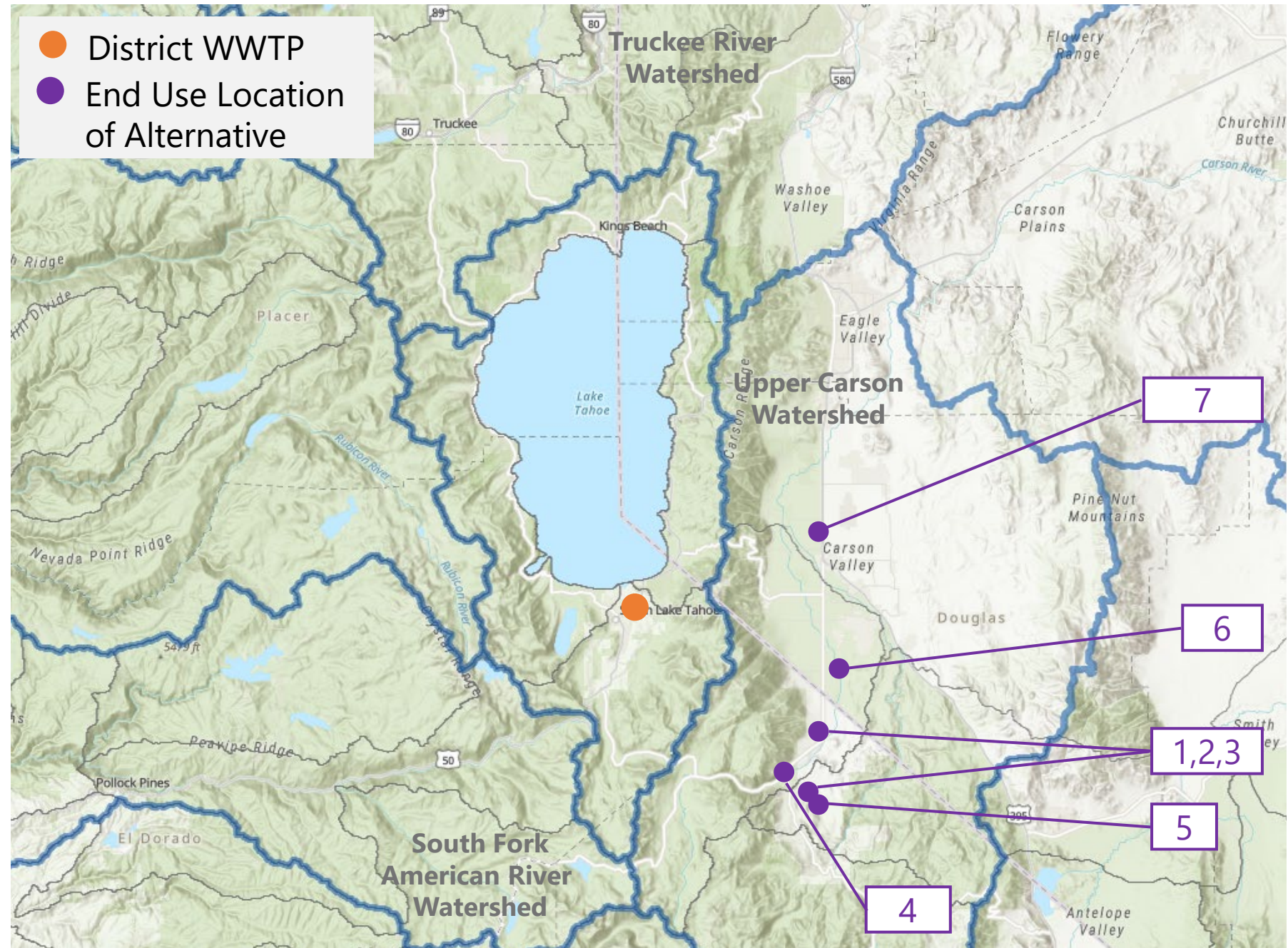


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Carson River Watershed Alternatives

- Existing System
- Expansion of non-potable recycled water use in Alpine County
- Treatment upgrades and expansion of non-potable recycled water use in NV

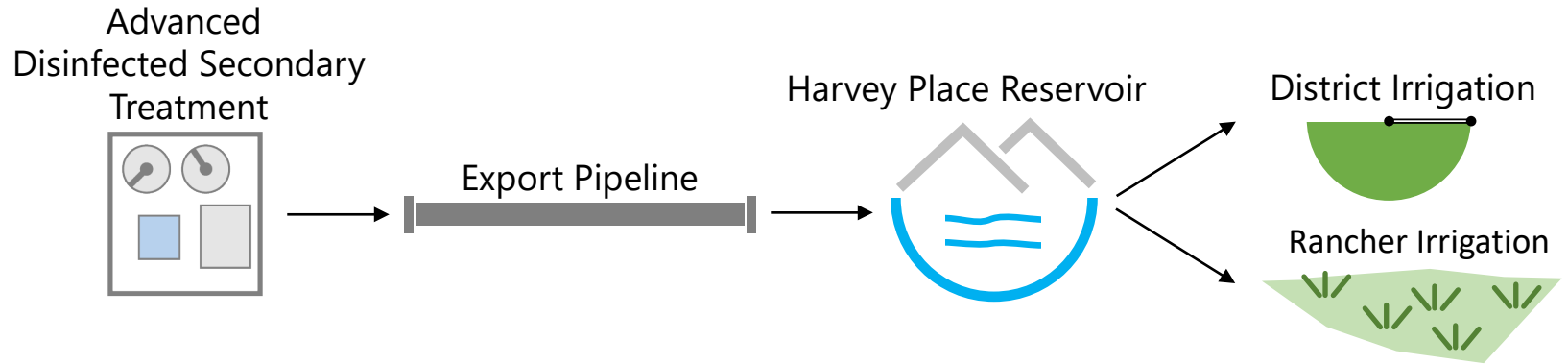


WWTP = wastewater treatment plant

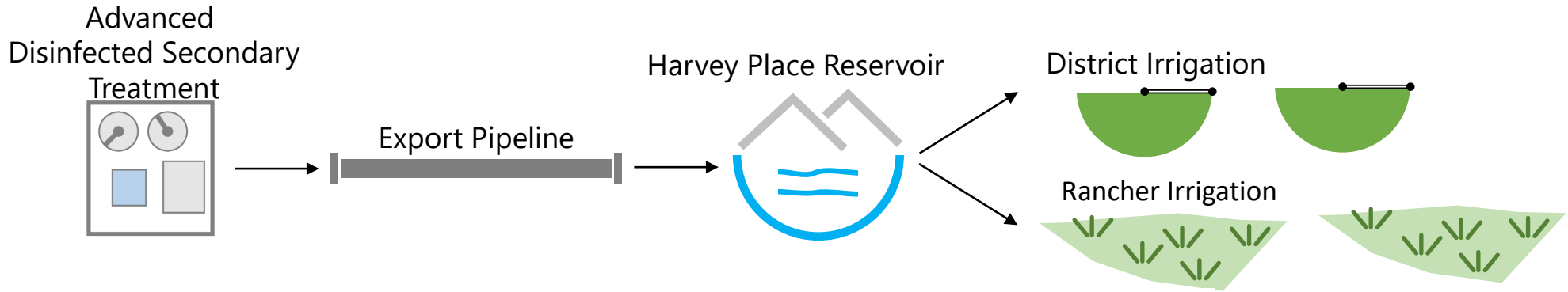
Key Challenges

Authority	Regulation/ Agreement/ Policy/ Permit	Description	Challenge
State of California	Title 22	Defines approved uses of recycled water	<ul style="list-style-type: none">Limited options
State of Nevada	Reuse Regs	Defines approved uses of recycled water	<ul style="list-style-type: none">Limited optionsCrossing State lines
NDEP	DCLTSA Permit	Recycled water permit	<ul style="list-style-type: none">Modifications to accommodate additional flow from the District
DCLTSA	DCLTSA Ordinance	Agreement needed between the two entities	<ul style="list-style-type: none">Negotiating agreement

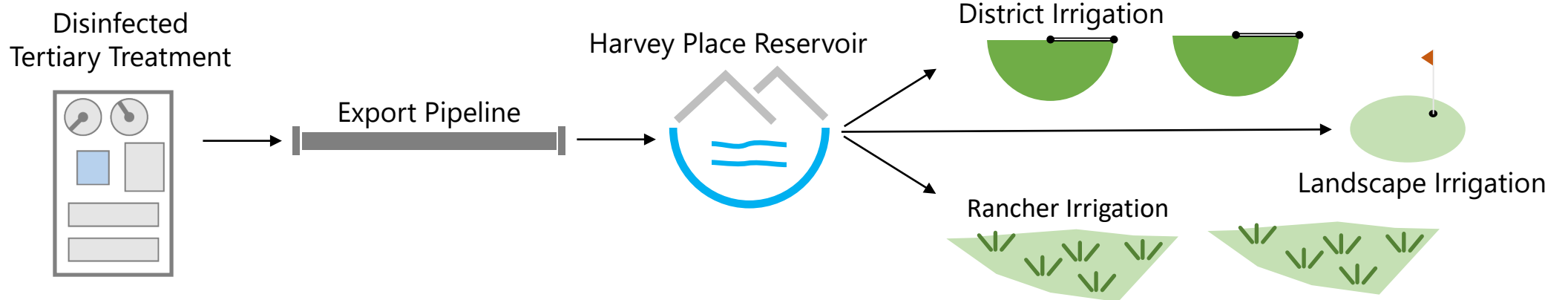
Existing System



Expanded Disinfected Secondary Effluent Reuse

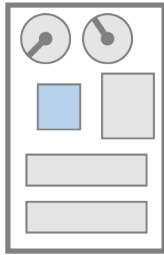


Expanded Disinfected Tertiary Effluent Reuse



**Expanded
Class A or B
Reuse in NV**

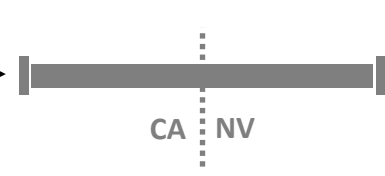
Treatment to Meet Class A
or B Reuse in NV*



Harvey Place Reservoir

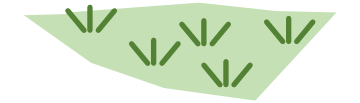


Conveyance
Pipeline or Indian Creek



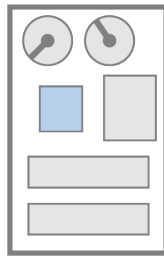
Landscape Irrigation

Pastureland Irrigation



**Conveyance
to DCLTSA**

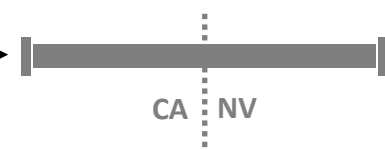
Tertiary Treatment
Nutrient Removal



DCLTSA
Export Pump Station



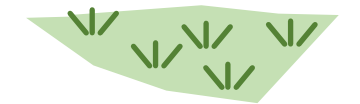
DCLTSA
Export Pipeline



Alfalfa Irrigation

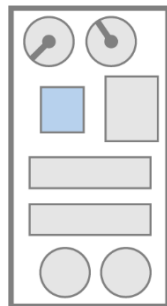


Pastureland Irrigation



**Discharge
to West Fork
Carson River**

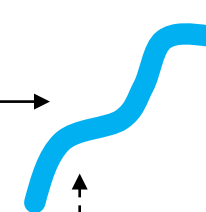
Tertiary Treatment
Nutrient Removal
Reverse Osmosis



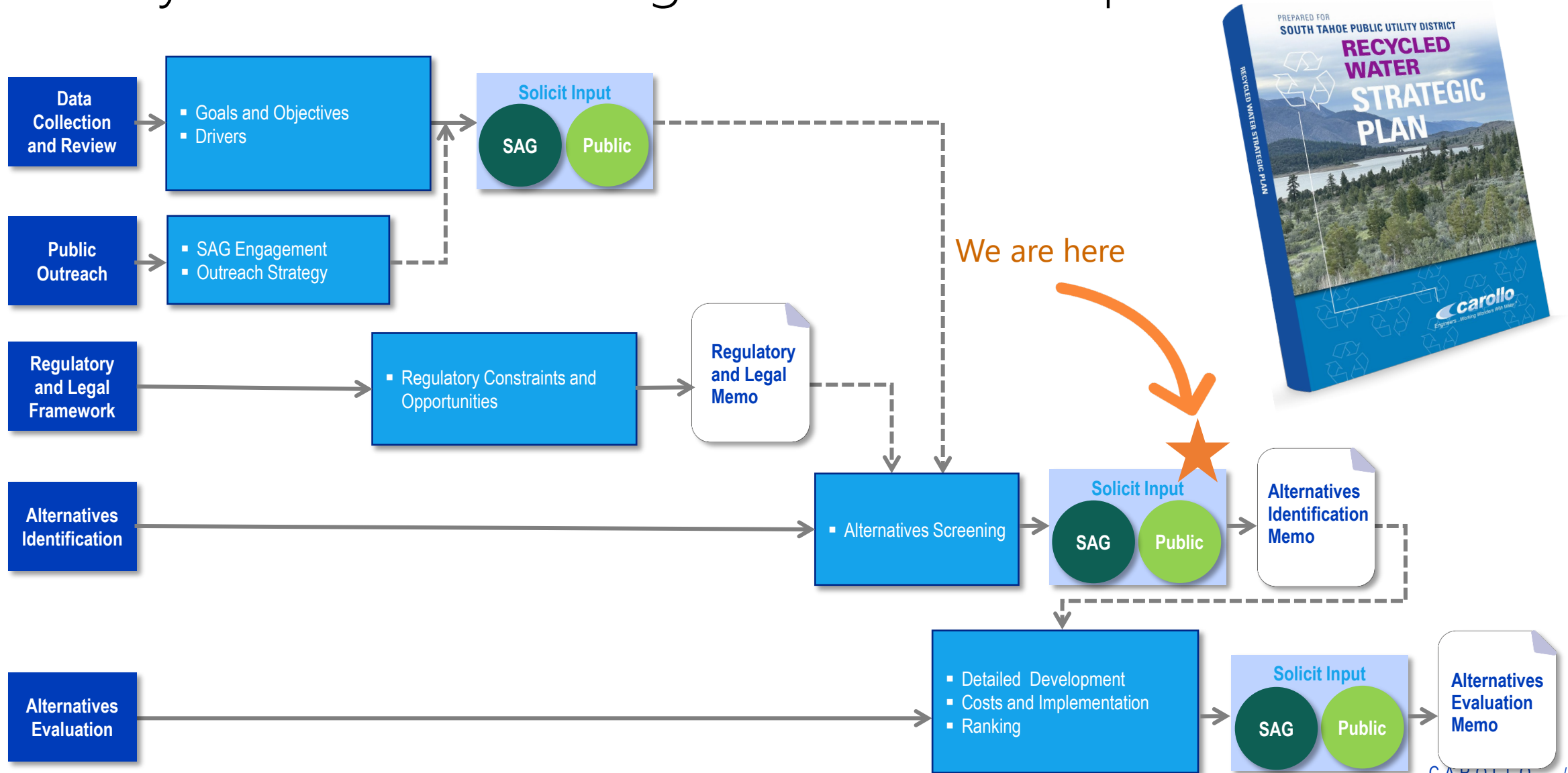
Harvey Place Reservoir



West Fork Carson



Recycled Water Strategic Plan Next Steps



SAG = Stakeholder Advisory Group

Questions?



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