Appendix D-2

Supplemental Wastewater Memorandum

Technical Memorandum

HydroScience
Strategic Water Solutions

Sacramento • Berkeley • San Jose

To: Acorn Environmental

From: Angela Singer, PE

Reviewed By: Curtis Lam, PE

Subject: Wastewater Storage and Disposal Options for No Surface Water Discharge; Koi Nation Shiloh Resort and Casino

Date: October 18, 2024

HydroScience Engineers (HydroScience) was retained by Acorn Environmental (Acorn) to complete a Water and Wastewater Feasibility Study (Feasibility Study) evaluating the regulatory, technical, and engineering issues associated with supplying water and handling wastewater from the proposed Koi Resort and Casino Project (Project). Provided herein is a supplement to the Feasibility Study summarizing the offsite disposal requirements assuming that surface water discharge to Pruitt Creek is limited to 1% of the surface flows in Pruitt Creek, versus at the downstream Mark West gage. Because there is no flow data available for Pruitt Creek from which to base discharge assumptions, this memorandum conservatively assumes a "no surface water discharge" condition under the Alternative A program.

The intent is to summarize the most conservative condition to understand the upper limits of the management strategies. This technical memorandum (TM) is not intended to duplicate any analyses or data already provided in the Feasibility Study.

Alternative A Disposal and Storage

A water balance was developed for each alternative considered in the Feasibility Study. The water balance is designed to estimate the maximum seasonal storage needs based on anticipated wastewater flows and disposal alternatives. Program Alternatives A through C were analyzed. This analysis is intended to build upon the prior analysis conducted as part of the Feasibility Study and expand upon the Alternative A storage and disposal options. **Table 1** summarizes the projections of wastewater volumes generated for Alternative A by project Buildout. These projections are based on the Buildout space program provided by Acorn.

Table 1: Wastewater Flow Estimates for Alternative A Buildout

Wastewater Flow	Buildout (gpd)
Average Day	232,000
Peak Day Flow	335,000
Peaking Factor	1.4

Four alternatives for treated effluent reuse/disposal were evaluated in the Feasibility Study including two onsite alternatives and two offsite. All alternatives consider recycled water use for dual-plumbed purposes (toilet and urinal flushing), cooling tower makeup, onsite landscape and vineyard irrigation, and surface water discharge. The options evaluated for Alternative A for the Feasibility Study included:

- **Option 1:** During the dry season, effluent from the on-site WWTP would be recycled and used on-site for toilet and urinal flushing, cooling tower makeup, as well as for landscape and vineyard irrigation at agronomic rates. Effluent that could not be used for either purpose would be stored in the seasonal storage pond.

  During the wet season, effluent from the on-site WWTP would be recycled and used on-site for dual plumbed and cooling purposes, discharged on-site to Pruitt Creek, stored in on-site seasonal storage ponds, and used to irrigate the vineyards and landscaping at agronomic rates. The landscaped areas and vineyard would be irrigated by pumping effluent out of the seasonal storage pond. Effluent stored in the seasonal storage pond would be discharged to Pruitt Creek, tributary to the Russian River, in accordance with flow limitation requirements.

- **Option 2:** Similar to Option 1, except that seasonal storage would be accomplished with a closed tank. The primary objective is to reduce the storage footprint such that it may fit within the proposed water treatment site. A tank will have a smaller footprint but will be a taller facility. Since evaporation loss would not occur in a closed tank, this option means a larger storage volume required overall.
- **Option 3:** Similar to Option 1 with the addition of 11 acres of off-site irrigation for effluent disposal and consequently reduced seasonal storage volume required.
- **Option 4:** Similar to Options 2 and 3, which includes a seasonal storage tank, and the addition of 11 acres of off-site irrigation for effluent disposal and consequently reduced seasonal storage volume. Since evaporation loss would not occur in a closed tank, this option means a larger storage volume required over Option 3.

For the purposes of this supplemental analysis, it is assumed that recycled water is used for dual-plumbed purposes (toilet and urinal flushing), cooling tower makeup, and onsite landscape and vineyard irrigation are implemented. It is assumed that onsite irrigation is consistent across all alternatives and that any additional disposal would be developed offsite. The effluent disposal strategies presented include vineyard irrigation and landscape (i.e. turf) irrigation. The irrigation rates are discussed in detail in the Feasibility Study, **Section 2.3.4.1**. Storage requirements are presented for both seasonal storage ponds and enclosed storage tanks. Options analyzed include:

- **Option 5:** Year-round, effluent from the on-site WWTP would be recycled and used on-site for dual plumbed and cooling tower makeup, as well as for landscape and vineyard irrigation at agronomic rates. Effluent that could not be used for either purpose would be discharged to offsite vineyards or stored in the onsite seasonal storage pond. Additional storage needs are supplemented by storage tanks.
- **Option 6:** Similar to Option 5, except that all seasonal storage would be accomplished with a closed tank.
- **Option 7:** Similar to Option 5 except that off-site landscape/turf irrigation is assumed for effluent disposal and consequently reduced seasonal storage volume required.
- **Option 8:** Similar to Option 6, this includes an enclosed storage tank as well as off-site landscape/turf irrigation for effluent disposal.

Options 5 and 6 assume that the Project will be able to dispose of effluent both within the project site to landscape/turf and vineyard irrigation as well as to offsite vineyards. Similarly, Options 7 and 8 assume the use of onsite landscape/turf and vineyard irrigation with the balance of effluent

disposed of to offsite landscape/turf irrigation. Options 5 and 7 assume storage ponds and enclosed tanks while Options 6 and 8 assume enclosed tanks will be used onsite for seasonal storage. All options assume 4.4 acres of onsite landscape irrigation. Vineyard irrigation area is affected by the storage ponds in Options 5 and 7. There are 17.4 acres of vineyard irrigation in Options 6 and 8, and the area is reduced by the pond area to 12.4 acres for Options 5 and 7.

Table 2 summarizes conceptual estimates of the seasonal storage requirements and disposal requirements for the four effluent disposal options for Alternative A. Irrigation areas represent totals and are inclusive of both onsite and offsite storage. These estimates are preliminary and are for planning purposes only.

Table 2: Estimated Seasonal Storage and Disposal Requirements for Alternative A

Seasonal Disposal Strategy	Landscape/Turf Irrigation (AF)		Vineyard Irrigation (AF)		Max Storage (AF)
	On-site	Off-site	On-site	Off-site	
Option 5– Vineyard disposal with storage pond	13.3	0	3.9	128.7	103.7
Option 6 – Vineyard disposal with tanks	13.3	0	5.5	127.1	89.5
Option 7 – Landscape/Turf disposal with storage pond	13.3	133.8	3.9	0	101.0
Option 8 – Landscape/Turf disposal with tank	13.3	135.5	5.5	0	86.7

Notes:
1. This disposal strategy assumes that all effluent will be disposed to the irrigated areas from April to October and stored in a reservoir or tank during the wet season.
2. Onsite landscape irrigation includes 4.4 acres of irrigated area and vineyard irrigation consists of 17.4 acres for a total onsite disposal area of 21.8 acres. This is equivalent to 18.8 AF of disposal onsite.

To manage storage pond footprint, it was assumed that ponds would be constructed with deeper basins with a water depth of approximately 15 ft. The berms are assumed to be constructed with a 2:1 side slope approximately 5-1/2 ft tall and 10 ft wide and pond depth approximately 11-1/2 ft below the surrounding grade, allowing for 2 ft of freeboard. For the Feasibility Study, a maximum depth of 10 ft was assumed. The footprint of the pond remains the same as that proposed for Alternative A Option 1 in the Feasibility Study, however, increasing the height of the pond increases the storage capacity. A summary of the irrigation area and storage volume requirements are provided in **Table 3**.

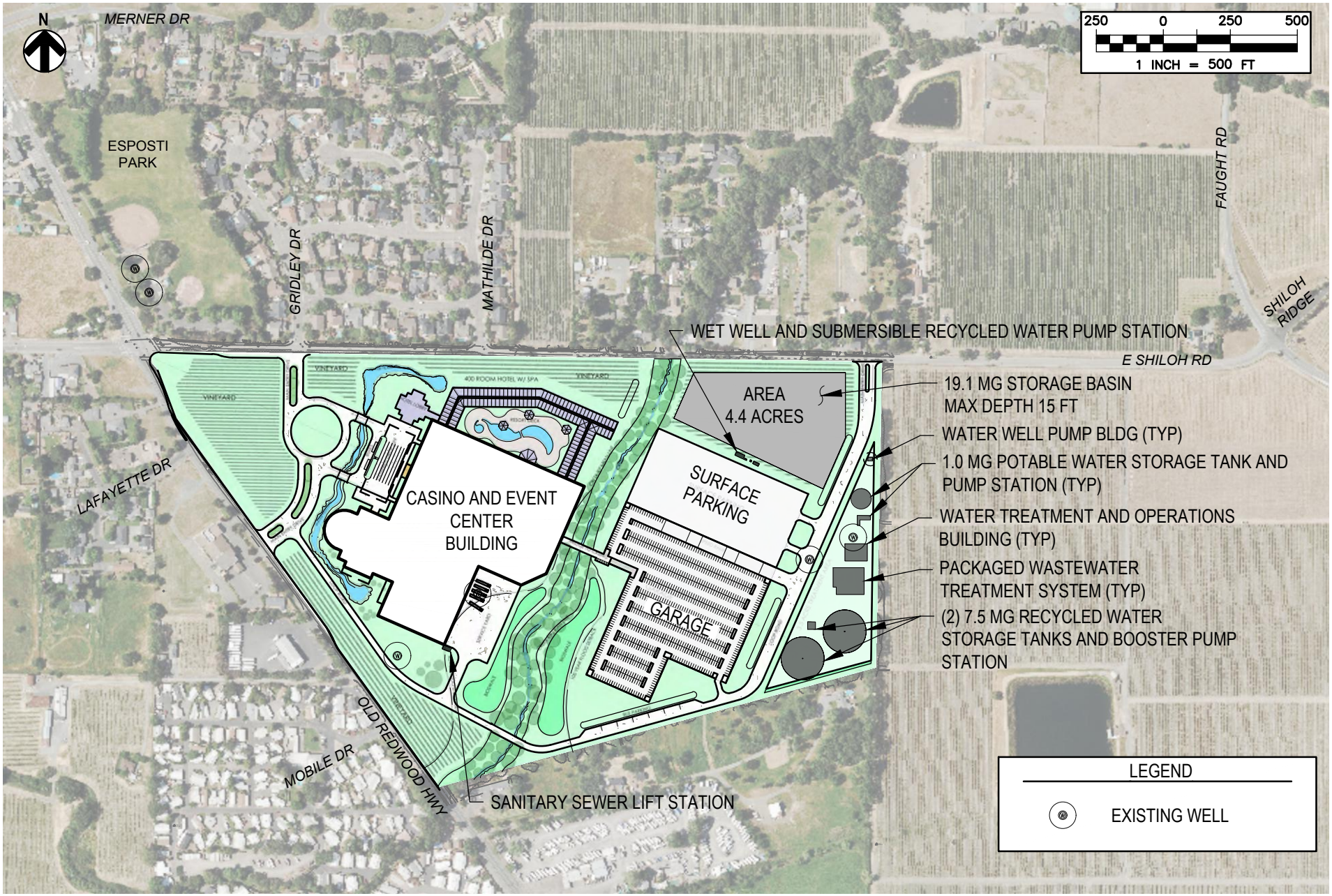
Table 3: Disposal Area and Storage Volume Requirements

Options	Landscape/Turf Irrigation (acres)		Vineyard Irrigation (acres)		Storage Requirements (MG)
	On-site	Off-site	On-site	Off-site	
Option 5	4.4	0	12.4	406.3	33.8
Option 6	4.4	0	17.4	406.4	29.2
Option 7	4.4	44.3	12.4	0	32.9
Option 8	4.4	44.8	17.4	0	28.3

Disposal to landscape/turf grass is significantly more efficient than irrigation of vineyards and substantially reduces the disposal area required.

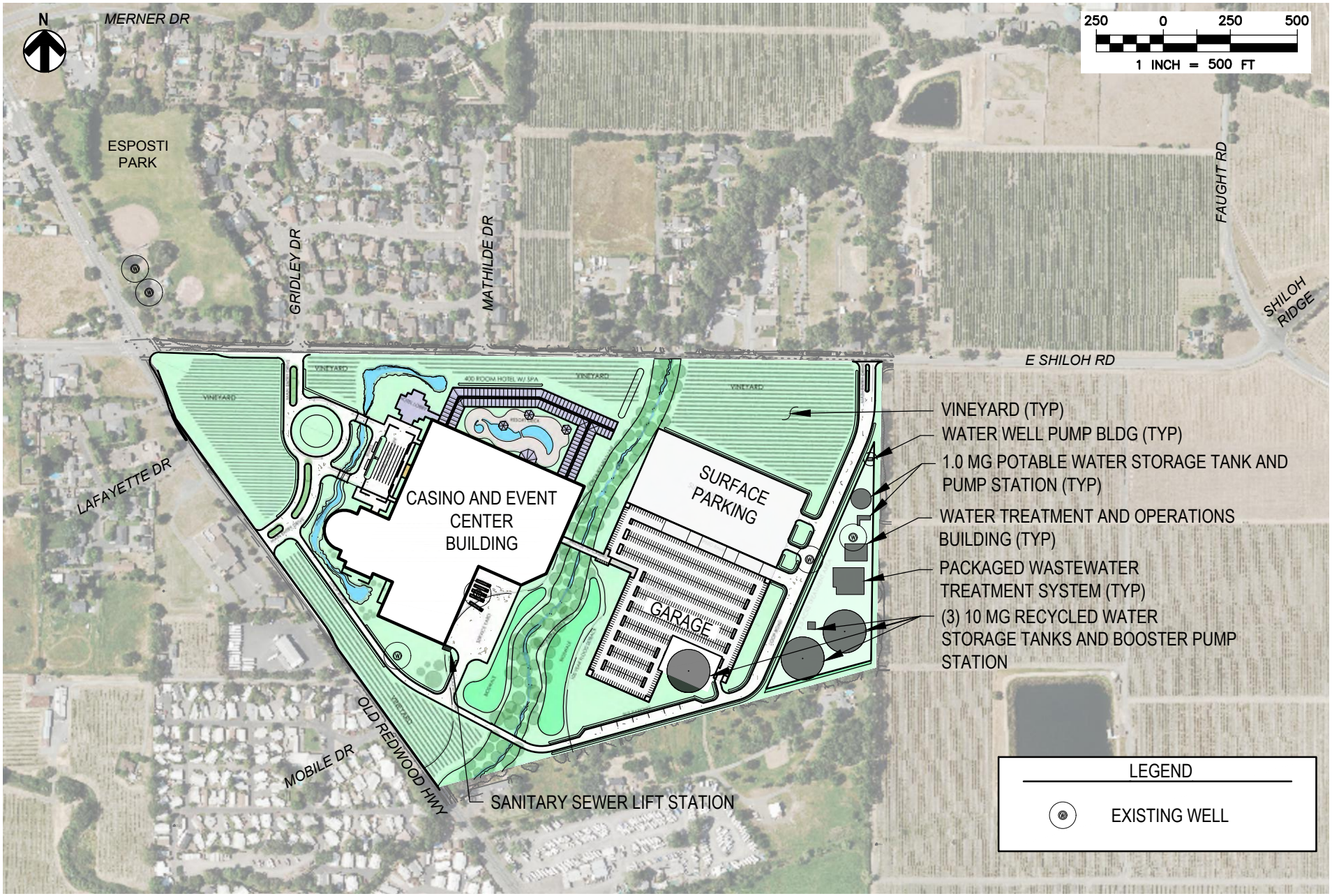
Attachment A includes figures of potential layouts for each Option. Storage tanks are assumed to be up to 64 feet tall and the number of tanks and respective diameters are adjusted according to each Option to meet the storage needs. Copies of water balances are provided as **Attachment B**.

ATTACHMENT A
Acorn Environmental
Summary of Wastewater Storage and Disposal Options
Site Layouts for Options 5 through 8



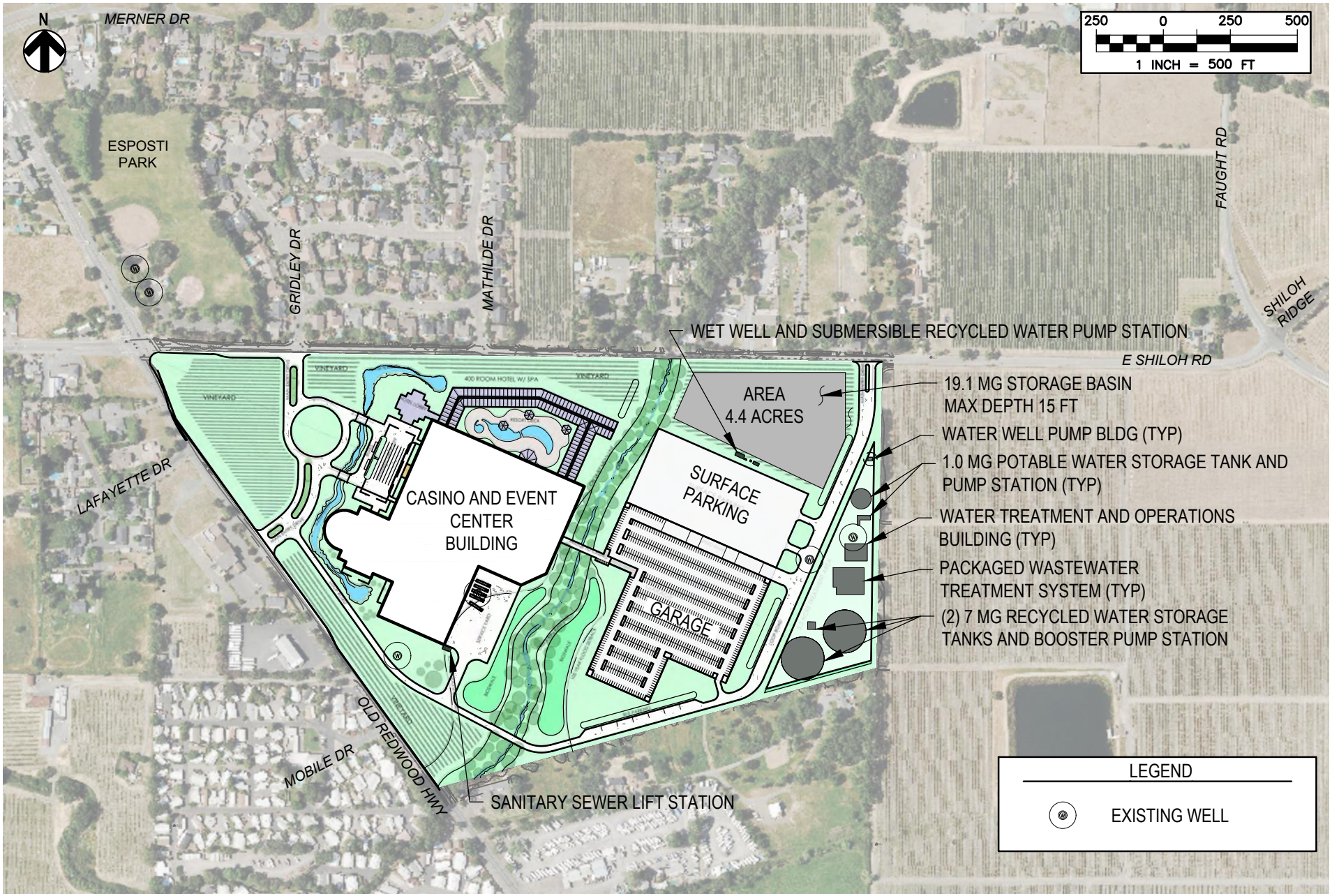
Attachment A Figure 1
Acorn Environmental
Shiloh Resort and Casino Project Water and Wastewater Feasibility Study
Option 5 - Alternative A

HydroScience



Attachment A Figure 2
Acorn Environmental
Koi Nation Shiloh Resort and Casino Project Wastewater Storage and Disposal
Option 6 and 8 - Alternative A

HydroScience



Attachment A Figure 3
Acorn Environmental
Koi Nation Shiloh Resort and Casino Project Wastewater Storage and Disposal
Option 7 - Alternative A

HydroScience

ATTACHMENT B

Acorn Environmental

Summary of Wastewater Storage and Disposal Options

No Surface Water Discharge – Water Balances

Water Balance - Shiloh Resort and Casino Feasibility Study - Proposed (Alternative A)

Scenario: Alternative A - Option 5

March 2024 By: Angela Singer, HydroScience

INPUT

INPUT-Adjust as necessary

OUTPUT-Max Elevation

WASTEWATER INFLUENT FLOW			***STORAGE DATA***			***OTHER INPUTS***			***RECYCLED WATER DISTRIBUTION AND DISPOSAL ALTERNATIVES*** [2]								
Daily Average Wastewater Influent Flow	**231,900**	gpd	Basin Volume	19.1	MG	100-YR Multiplier	2.06	unitless	andscape Irrigation (Casino)	4.4	acres	Vineyards (Total)	418.7	acres	Landscpe Irrig (TBD)	0.0	acres
I/I (PWWF-PDWF)	**250,452**	gpd	Basin Area	4.48	acres	Pan Evap Coefficient	0.75	unitless	Dual Plumbing	26.4	MG	Surface Water Discharge	0	MG	Additonal Turf Grass	0.0	acres
			Tank(s) Total Volume	14.7	MG											**7.8**	

		100-YEAR ANNUAL PRECIPITATION RETURN PERIOD													***AVERAGE ANNUAL PRECIPITATION RETURN PERIOD***												
No. Days		31	30	31	31	28	31	30	31	30	31	31	30		31	30	31	31	28	31	30	31	30	31	31	30	
	Units	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Water Year**	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Water Year**
CLIMATE INPUTS																											
Precipitation	in	4.32	6.85	14.63	11.59	12.16	8.50	4.08	2.00	0.51	0.02	0.02	0.31	65.00	2.10	3.33	7.11	5.63	5.91	4.13	1.98	0.97	0.25	0.01	0.01	0.15	31.58
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.40	0.93	0.86	1.21	2.13	4.37	6.68	8.25	9.92	9.05	6.50	55.57	4.29	1.86	1.25	1.15	1.61	2.84	4.37	6.68	8.25	9.92	9.05	6.50	57.75
WASTEWATER GENERATION																											
Facility Wastewater Influent (ADWF)	MG	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6
I/I Contributions	MG	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1
TOTAL Wastewater Influent	ac-ft	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0
WWTP CONTRIBUTIONS																											
Site Run-off	ac-ft	0.2	0.4	0.8	0.6	0.6	0.5	0.2	0.1	0.0	0.0	0.0	0.0	3.5	0.1	0.2	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	1.7
Open Storage Basin	acre	4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.4	3.3		4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.4	3.3	
Total Water Surface Area	acre	4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.4	3.3		4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.4	3.3	
Cooling Tower Evaporation/Drift Loss[5]	ac-ft	-0.05	-0.04	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.5	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.6
Total Evaporation	ac-ft	-1.6	-0.5	-0.3	-0.3	-0.4	-0.7	-1.4	-2.1	-2.5	-2.9	-2.6	-1.8	-17.2	-1.6	-0.7	-0.4	-0.4	-0.5	-0.9	-1.4	-2.1	-2.5	-2.9	-2.6	-1.8	-18.0
Total Precipitation	ac-ft	1.6	2.5	5.2	4.0	4.1	2.8	1.3	0.6	0.2	0.0	0.0	0.1	22.5	0.8	1.2	2.5	2.0	2.0	1.4	0.6	0.3	0.1	0.0	0.0	0.0	10.9
Total Percolation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECYCLED WATER DISTRIBUTION																											
Dual Plumbing	ac-ft	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1
Cooling Tower	ac-ft	-3.3	-2.6	-2.7	-2.7	-2.4	-2.7	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-35.9	-3.3	-3.2	-3.3	-3.3	-3.0	-3.3	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-39.2
Landscape Irrigation (TBD)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Landscape Irrigation (Casino)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-1.6	-2.7	-2.9	-2.5	-1.8	-11.6	-0.1	0.0	0.0	0.0	0.0	0.0	-1.0	-2.0	-2.8	-2.9	-2.5	-1.9	-13.3
Vineyard Irrigation (Total)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-14.3	-40.7	-40.8	-24.2	-6.2	-126.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-18.6	-42.5	-40.8	-24.2	-6.5	-132.6
Additional Turf Grass	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Water Discharge (Creek)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAW WATER MAKE-UP																											
Blend Raw Water[1]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
MONTHLY STORAGE BALANCE																											
Beginning Storage Volume	ac-ft	**0.0**	12.0	26.5	44.7	61.5	77.2	92.2	103.7	98.3	64.1	29.3	11.8		13.4	24.4	36.6	50.9	64.6	77.0	89.5	99.3	88.7	52.4	17.5	0.0	
Change in Water Volume[4]	ac-ft	12.0	14.5	18.2	16.8	15.7	15.1	11.5	-5.4	-34.3	-34.8	-17.5	1.6		11.0	12.2	14.3	13.7	12.5	12.5	9.8	-10.5	-36.3	-34.9	-17.5	1.3	
Final Storage Volume	ac-ft	12.0	26.5	44.7	61.5	77.2	92.2	103.7	98.3	64.1	29.3	11.8	13.4		24.4	36.6	50.9	64.6	77.0	89.5	99.3	88.7	52.4	17.5	0.0	1.3	
													Maximum Seasonal Storage (ac-ft)	**103.7**													Maximum Seasonal Storage (ac-ft)	**99.3**
													mg	**33.8**													mg	**32.3**

Note:

1. Blend Raw Water is the deficit in ww flow generated to meet recycled water demands, to resolve then less water would be discharged for irrigation or surface water.
2. Total available area for vineyard/spray/leach field is 17.4 acres approximately.
3. Assumed all equipment open basin/tankage would include covers and won't contribute to ww flows, confirm as more information becomes available.
4. Change in water volume negative since stored volume is available to be transferred out to distribution.
5. Cooling tower evaporation loss estimated at 1.5% of monthly water demand.

Water Balance - Shiloh Resort and Casino Feasibility Study - Proposed (Alternative A)

Scenario: Alternative A - Option 6

March 2024 By: Angela Singer, HydroScience

INPUT

INPUT-Adjust as necessary

OUTPUT-Max Elevation

WASTEWATER INFLUENT FLOW			***STORAGE DATA***		***OTHER INPUTS***		***RECYCLED WATER DISTRIBUTION AND DISPOSAL ALTERNATIVES*** [2]								
Daily Average Wastewater Influent Flow	**231,900**	gpd	Tank(s) Total Volume	29.2 MG	100-YR Multiplier	2.06 unitless	andscape Irrigation (Casino)	4.4	acres	Vineyards (Total)	418.8	acres	Landscpe Irrig (TBD)	0.0	acres
I/I (PWWF-PDWF)	**250,452**	gpd			Pan Evap Coefficient	0.75 unitless	Dual Plumbing	26.4	MG	Surface Water Discharge	0	MG	Additonal Turf Grass	0.0	acres

		100-YEAR ANNUAL PRECIPITATION RETURN PERIOD													***AVERAGE ANNUAL PRECIPITATION RETURN PERIOD***											
No. Days		31	30	31	31	28	31	30	31	30	31	31	30		31	30	31	31	28	31	30	31	30	31	31	30	
	Units	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Water Year**	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Water Year**
CLIMATE INPUTS																											
Precipitation	in	4.32	6.85	14.63	11.59	12.16	8.50	4.08	2.00	0.51	0.02	0.02	0.31	65.00	2.10	3.33	7.11	5.63	5.91	4.13	1.98	0.97	0.25	0.01	0.01	0.15	31.58
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.40	0.93	0.86	1.21	2.13	4.37	6.68	8.25	9.92	9.05	6.50	55.57	4.29	1.86	1.25	1.15	1.61	2.84	4.37	6.68	8.25	9.92	9.05	6.50	57.75
WASTEWATER GENERATION																											
Facility Wastewater Influent (ADWF)	MG	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6
I/I Contributions	MG	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1
TOTAL Wastewater Influent	ac-ft	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0
WWTP CONTRIBUTIONS																											
Site Run-off	ac-ft	0.2	0.4	0.8	0.6	0.6	0.5	0.2	0.1	0.0	0.0	0.0	0.0	3.5	0.1	0.2	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	1.7
Open Storage Basin	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Water Surface Area	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cooling Tower Evaporation/Drift Loss[5]	ac-ft	-0.05	-0.04	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.5	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.6
Total Evaporation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Precipitation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Percolation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECYCLED WATER DISTRIBUTION																											
Dual Plumbing	ac-ft	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1
Cooling Tower	ac-ft	-3.3	-2.6	-2.7	-2.7	-2.4	-2.7	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-35.9	-3.3	-3.2	-3.3	-3.3	-3.0	-3.3	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-39.2
Landscape Irrigation (TBD)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Landscape Irrigation (Casino)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-1.6	-2.7	-2.9	-2.5	-1.8	-11.6	-0.1	0.0	0.0	0.0	0.0	0.0	-1.0	-2.0	-2.8	-2.9	-2.5	-1.9	-13.3
Vineyard Irrigation (Total)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-14.3	-40.7	-40.8	-24.2	-6.2	-126.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-18.6	-42.5	-40.8	-24.2	-6.5	-132.6
Additional Turf Grass	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Water Discharge (Creek)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAW WATER MAKE-UP																											
Blend Raw Water[1]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
MONTHLY STORAGE BALANCE																											
Beginning Storage Volume	ac-ft	**0.0**	12.0	24.5	37.8	50.9	62.8	75.8	87.4	83.5	51.5	19.7	4.8		8.2	20.0	31.6	43.8	55.9	66.9	79.0	89.5	80.8	46.9	14.9	0.0	
Change in Water Volume[4]	ac-ft	12.0	12.5	13.3	13.1	11.9	13.0	11.6	-3.9	-31.9	-31.9	-14.9	3.4		11.8	11.6	12.2	12.1	11.0	12.0	10.5	-8.7	-33.9	-31.9	-14.9	3.0	
Final Storage Volume	ac-ft	12.0	24.5	37.8	50.9	62.8	75.8	87.4	83.5	51.5	19.7	4.8	8.2		20.0	31.6	43.8	55.9	66.9	79.0	89.5	80.8	46.9	14.9	0.0	3.0	
													Maximum Seasonal Storage (ac-ft)	**87.4**												Maximum Seasonal Storage (ac-ft)	**89.5**
													mg	**28.5**												mg	**29.2**

Note:

1. Blend Raw Water is the deficit in ww flow generated to meet recycled water demands, to resolve then less water would be discharged for irrigation or surface water.
2. Total available area for vineyard/spray/leach field is 17.4 acres approximately.
3. Assumed all equipment open basin/tankage would include covers and won't contribute to ww flows, confirm as more information becomes available.
4. Change in water volume negative since stored volume is available to be transferred out to distribution.
5. Cooling tower evaporation loss estimated at 1.5% of monthly water demand.

Water Balance - Shiloh Resort and Casino Feasibility Study - Proposed (Alternative A)

Scenario: Alternative A - Option 7

March 2024 By: Angela Singer, HydroScience

INPUT

INPUT-Adjust as necessary

OUTPUT-Max Elevation

WASTEWATER INFLUENT FLOW		***STORAGE DATA***		***OTHER INPUTS***		***RECYCLED WATER DISTRIBUTION AND DISPOSAL ALTERNATIVES*** [2]								
Daily Average Wastewater Influent Flow	**231,900** gpd	Basin Volume	19.1 MG	100-YR Multiplier	2.06 unitless	andscape Irrigation (Casino)	4.4	acres	Vineyards (Total)	12.4	acres	Landscpe Irrig (TBD)	0.0	acres
I/I (PWWF-PDWF)	**250,452** gpd	Basin Area	4.48 acres	Pan Evap Coefficient	0.75 unitless	Dual Plumbing	26.4	MG	Surface Water Discharge	0	MG	Additonal Turf Grass	44.3	acres
		Tank(s) Total Volume	13.8 MG											

		100-YEAR ANNUAL PRECIPITATION RETURN PERIOD													***AVERAGE ANNUAL PRECIPITATION RETURN PERIOD***											
No. Days		31	30	31	31	28	31	30	31	30	31	31	30		31	30	31	31	28	31	30	31	30	31	31	30	
	Units	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Water Year**	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Water Year**
CLIMATE INPUTS																											
Precipitation	in	4.32	6.85	14.63	11.59	12.16	8.50	4.08	2.00	0.51	0.02	0.02	0.31	65.00	2.10	3.33	7.11	5.63	5.91	4.13	1.98	0.97	0.25	0.01	0.01	0.15	31.58
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.40	0.93	0.86	1.21	2.13	4.37	6.68	8.25	9.92	9.05	6.50	55.57	4.29	1.86	1.25	1.15	1.61	2.84	4.37	6.68	8.25	9.92	9.05	6.50	57.75
WASTEWATER GENERATION																											
Facility Wastewater Influent (ADWF)	MG	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6
I/I Contributions	MG	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1
TOTAL Wastewater Influent	ac-ft	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0
WWTP CONTRIBUTIONS																											
Site Run-off	ac-ft	0.2	0.4	0.8	0.6	0.6	0.5	0.2	0.1	0.0	0.0	0.0	0.0	3.5	0.1	0.2	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	1.7
Open Storage Basin	acre	3.3	3.4	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5		4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.4	3.3	
Total Water Surface Area	acre	3.3	3.4	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5		4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.4	3.3	
Cooling Tower Evaporation/Drift Loss[5]	ac-ft	-0.05	-0.04	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.5	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.6
Total Evaporation	ac-ft	-1.2	-0.4	-0.3	-0.3	-0.4	-0.7	-1.4	-2.3	-2.9	-3.5	-3.3	-2.4	-19.0	-1.6	-0.7	-0.4	-0.4	-0.5	-0.9	-1.4	-2.1	-2.5	-2.9	-2.6	-1.8	-18.0
Total Precipitation	ac-ft	1.2	2.0	4.3	3.5	3.8	2.7	1.3	0.7	0.2	0.0	0.0	0.1	19.9	0.8	1.2	2.5	2.0	2.0	1.4	0.6	0.3	0.1	0.0	0.0	0.0	10.9
Total Percolation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECYCLED WATER DISTRIBUTION																											
Dual Plumbing	ac-ft	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1
Cooling Tower	ac-ft	-3.3	-2.6	-2.7	-2.7	-2.4	-2.7	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-35.9	-3.3	-3.2	-3.3	-3.3	-3.0	-3.3	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-39.2
Landscape Irrigation (TBD)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Landscape Irrigation (Casino)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-1.6	-2.7	-2.9	-2.5	-1.8	-11.6	-0.1	0.0	0.0	0.0	0.0	0.0	-1.0	-2.0	-2.8	-2.9	-2.5	-1.9	-13.3
Vineyard Irrigation (Total)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	-1.2	-1.2	-0.7	-0.2	-3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	-1.3	-1.2	-0.7	-0.2	-3.9
Additional Turf Grass	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	-15.8	-26.9	-29.2	-25.5	-18.5	-116.4	-1.0	0.0	0.0	0.0	0.0	0.0	-10.3	-20.5	-28.1	-29.2	-25.5	-19.2	-133.8
Surface Water Discharge (Creek)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAW WATER MAKE-UP																											
Blend Raw Water[1]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	
MONTHLY STORAGE BALANCE																											
Beginning Storage Volume	ac-ft	**0.0**	12.0	26.1	43.4	59.8	75.2	90.2	101.0	93.6	71.6	46.6	26.4		15.0	25.0	37.2	51.5	65.1	77.6	90.1	89.5	76.6	53.4	29.0	9.4	
Change in Water Volume[4]	ac-ft	12.0	14.0	17.3	16.4	15.4	15.0	10.9	-7.4	-22.0	-25.0	-20.2	-11.4		10.0	12.2	14.3	13.7	12.5	12.5	-0.5	-13.0	-23.2	-24.5	-19.6	-9.4	
Final Storage Volume	ac-ft	12.0	26.1	43.4	59.8	75.2	90.2	101.0	93.6	71.6	46.6	26.4	15.0		25.0	37.2	51.5	65.1	77.6	90.1	89.5	76.6	53.4	29.0	9.4	0.0	
												Maximum Seasonal Storage (ac-ft)		**101.0**												Maximum Seasonal Storage (ac-ft)		**90.1**
												mg		**32.9**							#DIV/0!					mg		**29.4**

Note:

1. Blend Raw Water is the deficit in ww flow generated to meet recycled water demands, to resolve then less water would be discharged for irrigation or surface water.
2. Total available area for vineyard/spray/leach field is 17.4 acres approximately.
3. Assumed all equipment open basin/tankage would include covers and won't contribute to ww flows, confirm as more information becomes available.
4. Change in water volume negative since stored volume is available to be transferred out to distribution.
5. Cooling tower evaporation loss estimated at 1.5% of monthly water demand.

Water Balance - Shiloh Resort and Casino Feasibility Study - Proposed (Alternative A)

Scenario: Alternative A - Option 8

March 2024 By: Angela Singer, HydroScience

INPUT

INPUT-Adjust as necessary

OUTPUT-Max Elevation

WASTEWATER INFLUENT FLOW			***STORAGE DATA***			***OTHER INPUTS***			***RECYCLED WATER DISTRIBUTION AND DISPOSAL ALTERNATIVES*** [2]									
Daily Average Wastewater Influent Flow	**231,900**	gpd	Tank(s) Total Volume	28.3	MG	100-YR Multiplier	2.06	unitless	andscape Irrigation (Casino)	4.4	acres	Vineyards (Total)	17.4	acres	Landscpe Irrig (TBD)	0.0	acres	
I/I (PWWF-PDWF)	**250,452**	gpd				Pan Evap Coefficient	0.75	unitless	Dual Plumbing	26.4	MG	Surface Water Discharge	0	MG	Additonal Turf Grass	44.8	acres	**9.9**

		100-YEAR ANNUAL PRECIPITATION RETURN PERIOD													***AVERAGE ANNUAL PRECIPITATION RETURN PERIOD***											
	No. Days	31	30	31	31	28	31	30	31	30	31	31	30		31	30	31	31	28	31	30	31	30	31	31	30	
	Units	October	November	December	January	February	March	April	May	June	July	August	September	Water Year	October	November	December	January	February	March	April	May	June	July	August	September	Water Year
CLIMATE INPUTS																											
Precipitation	in	4.32	6.85	14.63	11.59	12.16	8.50	4.08	2.00	0.51	0.02	0.02	0.31	65.00	2.10	3.33	7.11	5.63	5.91	4.13	1.98	0.97	0.25	0.01	0.01	0.15	31.58
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.40	0.93	0.86	1.21	2.13	4.37	6.68	8.25	9.92	9.05	6.50	55.57	4.29	1.86	1.25	1.15	1.61	2.84	4.37	6.68	8.25	9.92	9.05	6.50	57.75
WASTEWATER GENERATION																											
Facility Wastewater Influent (ADWF)	MG	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6	7.2	7.0	7.2	7.2	6.5	7.2	7.0	7.2	7.0	7.2	7.2	7.0	84.6
I/I Contributions	MG	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.1
TOTAL Wastewater Influent	ac-ft	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0	22.1	21.4	22.1	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	260.0
WWTP CONTRIBUTIONS																											
Site Run-off	ac-ft	0.2	0.4	0.8	0.6	0.6	0.5	0.2	0.1	0.0	0.0	0.0	0.0	3.5	0.1	0.2	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	1.7
Open Storage Basin	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Water Surface Area	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cooling Tower Evaporation/Drift Loss[5]	ac-ft	-0.05	-0.04	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.5	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.6
Total Evaporation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Precipitation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Percolation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECYCLED WATER DISTRIBUTION																											
Dual Plumbing	ac-ft	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1	-6.9	-6.7	-6.9	-6.9	-6.2	-6.9	-6.7	-6.9	-6.7	-6.9	-6.9	-6.7	-81.1
Cooling Tower	ac-ft	-3.3	-2.6	-2.7	-2.7	-2.4	-2.7	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-35.9	-3.3	-3.2	-3.3	-3.3	-3.0	-3.3	-3.2	-3.3	-3.2	-3.3	-3.3	-3.2	-39.2
Landscape Irrigation (TBD)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Landscape Irrigation (Casino)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-1.6	-2.7	-2.9	-2.5	-1.8	-11.6	-0.1	0.0	0.0	0.0	0.0	0.0	-1.0	-2.0	-2.8	-2.9	-2.5	-1.9	-13.3
Vineyard Irrigation (Total)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	-1.7	-1.7	-1.0	-0.3	-5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8	-1.8	-1.7	-1.0	-0.3	-5.5
Additional Turf Grass	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-0.7	-15.9	-27.2	-29.5	-25.8	-18.7	-117.8	-1.0	0.0	0.0	0.0	0.0	0.0	-10.4	-20.7	-28.4	-29.6	-25.8	-19.5	-135.5
Surface Water Discharge (Creek)	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAW WATER MAKE-UP																											
Blend Raw Water[1]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	
MONTHLY STORAGE BALANCE																											
Beginning Storage Volume	ac-ft	**0.0**	12.0	24.5	37.8	50.9	62.8	75.8	86.7	80.6	60.4	38.1	20.6		11.2	22.0	33.6	45.8	58.0	69.0	81.0	81.1	69.5	47.9	25.5	8.0	
Change in Water Volume[4]	ac-ft	12.0	12.5	13.3	13.1	11.9	13.0	10.9	-6.2	-20.1	-22.3	-17.5	-9.4		10.8	11.6	12.2	12.1	11.0	12.0	0.1	-11.7	-21.6	-22.4	-17.6	-8.0	
Final Storage Volume	ac-ft	12.0	24.5	37.8	50.9	62.8	75.8	86.7	80.6	60.4	38.1	20.6	11.2		22.0	33.6	45.8	58.0	69.0	81.0	81.1	69.5	47.9	25.5	8.0	0.0	
												Maximum Seasonal Storage (ac-ft)		**86.7**												Maximum Seasonal Storage (ac-ft)		**81.1**
												mg		**28.3**												mg		**26.4**

Note:

1. Blend Raw Water is the deficit in ww flow generated to meet recycled water demands, to resolve then less water would be discharged for irrigation or surface water.
2. Total available area for vineyard/spray/leach field is 17.4 acres approximately.
3. Assumed all equipment open basin/tankage would include covers and won't contribute to ww flows, confirm as more information becomes available.
4. Change in water volume negative since stored volume is available to be transferred out to distribution.
5. Cooling tower evaporation loss estimated at 1.5% of monthly water demand.