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Water Availability Analysis

Silverado Resort & Spa Project
Minor Modification to Non-Winery Use Permit
P24-00141-MM
Planning Commission Hearing – November 5, 2025

Water Availability Analysis

For

The Grove at the Silverado Resort & Spa

APN 060-010-001

**1600 Atlas Peak Rd,
Napa, CA 94558**



Revised September 2024



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ATTACHMENTS

- 1: Existing & Proposed Landscape Area Exhibit
- 2: Existing & Proposed Water Demand Calculations
- 3: WELO Appendix A – Reference Evapotranspiration (ET_o) Table, The Grove Proposed Planting Species

1.0 PROJET SUMMARY

The Silverado Resort and Spa located at 1600 Atlas Peak Road in Napa County is proposing to enclose an existing events space within the golf course area on the subject parcel. The project proposes the demolition of existing paved surfaces and the construction of two (2) event buildings (the Pavilion and the Lounge). As requested by Napa County Planning, Building & Environmental Services (PBES) Department, this analysis provides a Tier 1 analysis per the Water Availability Analysis (WAA) guidance document to evaluate the existing and proposed groundwater uses for the project.

1.1 Site Description

The 278 acre subject parcel is located approximately four miles north east of the City of Napa off Atlas Peak road and within the Milliken-Sarco-Tulocay (MST) area of Napa County. The project site is currently developed with a golf course, resort buildings, a spa, and private club homes. The parcel is relatively flat and falls within a designated groundwater deficient area as defined in Napa County Code, Section 13.15.010.C.

1.1.1 Land Use

The Silverado Resort & Spa is located in the Urban Residential (UR) area and is zoned for Planned Development (PD). The site is predominately vegetated with golf course turf and areas of oak woodland. An unnamed blue line stream¹ flows through two portions of the parcel until converging into Milliken Creek. A vicinity map per the Napa County Geological Information Systems (GIS) online mapping database is shown below:



Figure 1 Vicinity Map

¹ National Hydrography Dataset (NHD) Permanent Identifier 41663111

2.0 WATER SOURCES

2.1 Domestic and Fire Water

The domestic and fire water uses for the project are currently served by the City of Napa municipal water system. The project does not propose any new uses and therefore an increase in water usage is not proposed for the project. The existing water lines will be extended to the proposed buildings for water and fire protection services that are provided through an existing meter connection. The water line extension is shown on the Use Permit Minor Modification Plans sheet C4.0.

2.2 Landscape Irrigation

The landscape water usage for the project will be served through the existing onsite wells. The project proposes to decrease water demand for landscape irrigation by replacing high water use turf grass with low to moderate water use plants and native grasses.

3.0 WATER DEMAND

3.1 Domestic Water Demand

Domestic water is not proposed to increase as part of the project and will continue to be sourced from the City of Napa Water Division. Therefore, domestic water demands are not calculated as part of this Water Availability Analysis.

3.2 Existing Landscape Irrigation Demand

Existing water meter readings were not available for the Grove area for landscape irrigation values. The existing landscape water usage is estimated based on the Model Water Efficient Landscape Ordinance (MWELO) worksheet for estimating water usage based on plant type, irrigation efficiency, and climate. The existing plant types are based on observation of existing plant type as well as discussions with the landscape architect. The existing landscape areas and plant types at the Grove include:

- 61,550 square feet (sf) of high-water usage plans (turf grass)
- 16,150 sf of low to moderate water usage plants.

Refer to the Existing Landscape Area Exhibit in Attachment 1 for the existing landscape areas, plant types, corresponding plant factors (PF), and landscape irrigation efficiency (IE).

The plant factors for the corresponding plant types are referenced from the Department of Water Resources 2000 publication of "Water Use Classification of Landscape Species (WUCOLS)". Using MWELO water usage calculations, the Estimated Total Water Usage (ETWU) for the existing landscape areas is calculated to be 6.42 acre-feet/year. The MWELO water use calculations are included in Attachment 2.

3.3 Proposed Landscape Irrigation Demand

The project proposes to remove existing turf grass areas and replace them with lower water usage plants. The proposed landscape areas at the Grove include:

- 19,062 sf of turf grass
- 23,456 sf of low to moderate water usage plants
- 41,224 native grasses

The proposed landscape irrigation areas are shown in Attachment 1 as well as the corresponding plant types, corresponding plant factors (PF), and landscape irrigation efficiency (IE). The proposed irrigation demand is estimated based on the proposed landscape areas and the MWELO worksheet for estimating water usage. The proposed plant types and corresponding Plant Factors are included in Attachment 3. The ETWU for the existing landscape areas is calculated to be 3.62 acre-feet/year.

3.3.1 MWELO Criteria

The MWELO criteria requires the ETWU for the project to be equal or less than the Maximum Applied Water Usage (MAWA) for the proposed development. The MAWA for the proposed landscape area is calculated to be 4.34 acre-feet/year. The calculated ETWU of 3.62 acre-feet/year is less than the calculated MAWA which is compliant with the MWELO criteria for water efficiency. Refer to Attachment 2 for the MWELO water use calculations.

4.0 CONCLUSION

Per Table 2A of the WAA Guidance Document the MST Groundwater Deficient Area screening criterion is 0.3 acre-feet per acre per year or “no net increase” over existing conditions. Domestic water is sourced from the City of Napa municipal water system and is not proposed to increase as part of this project. The project is proposing a decrease in landscape irrigation water which is sourced from groundwater wells. The project proposes a decrease in water usage from 6.42 acre-feet per year to 3.62 acre-feet per year by replacing high-water usage turf grass with lower water use plantings. Although the total area of landscape is increasing, the total landscape irrigation demand is decreasing because the project proposes replacement of high water use turf grass with low to moderate water use plants.

The proposed decrease in water usage associated with the Minor Modification Permit Application are within the Tier 1 criteria set forward by the WAA guidance document.

Attachment 1:
Existing & Proposed Landscape Area Exhibit

Existing Landscape Information

Planter Areas ³		Area (sf)	PF	CF	SLA	IE	
	A	61,550	0.8	0.62	0	0.71	High-Water Use Plants (Turf Grass)
	B	0	0.4	0.62	0	0.71	Medium-High Water Shrubs
	C	16,150	0.3	0.62	0	0.71	Low-Moderate Water Planting
	D	0	0.2	0.62	0	0.71	Native Grass/Seed Mix
Total		77,700	sf				
		0.24	acres				

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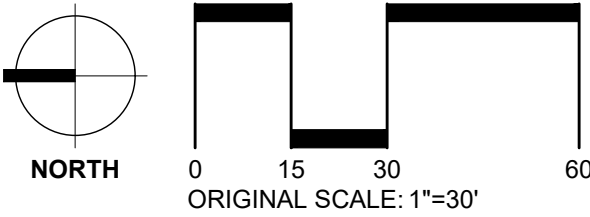
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NAPA COUNTY WELO

RELEASE DATE
03/08/24

REVISIONS
1 9/05/2024

PROJECT NO. 7174
MADE BY KC/HL
REVIEWED BY SB

EXISTING
LANDSCAPE
AREA EXHIBIT



Attachment 2:
Existing & Proposed Water Demand Calculations

Model Water Efficient Landscape Ordinance (MWEL)

Existing Landscape Irrigation Calculations

MAWA = Maximum Applied Water Allowance (gallons per year)
 ETo = Reference Evapotranspiration from Appendix A (inches per year)
 0.7 = ET Adjustment Factor (ETAF)
 LA = Landscaped Area includes Special Landscape Area (square feet)
 0.62 = Conversion factor (to gallons per square foot)
 SLA = Portion of the landscape area identified as Special Landscape Area (square feet)
 0.3 = the additional ET Adjustment Factor for Special Landscape Area (1.0 - 0.7 = 0.3)

Project Specific Climate Data

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ETO ¹ (in)	1.30	1.70	2.80	3.90	5.10	6.00	7.10	6.10	4.80	3.10	1.50	0.90	44.30 in/year
Rainfall (in) ²	3.97	4.00	3.49	1.63	0.54	0.13	0.00	0.00	0.16	1.51	2.55	4.81	22.79 in/year
Eppt (in)	0.99	1.00	0.87	0.41	0.14	0.03	0.00	0.00	0.04	0.38	0.64	1.20	5.70 in/year

Landscape Design Information

Planter Areas ³	Area (sf)	PF ⁴	CF	SLA	IE	
A	61,550	0.8	0.62	0	0.71	Irrigated Turf
B	0	0.4	0.62	0	0.71	Medium-High Water Shrubs
C	16,150	0.3	0.62	0	0.71	Low-Moderate Water Planting
D	0	0.2	0.62	0	0.71	Native Grass/Seed Mix
Total	77,700	sf				
	0.24	acres				

Existing ETWU

$$ETWU = (ETo)(0.62) \left(\frac{PF \times HA}{IE} + SLA \right)$$

where:

ETWU = Estimated total water use per year (gallons per year)
 ETo = Reference Evapotranspiration (inches per year)
 PF = Plant Factor from WUCOLS (see Definitions)
 HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
 SLA = Special Landscape Area (square feet)
 0.62 = Conversion Factor (to gallons per square foot)
 IE = Irrigation Efficiency (minimum 0.71)

Planter Areas ³	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A	55,898	73,097	120,395	167,693	219,291	257,990	305,288	262,290	206,392	133,295	64,497	38,698	1,904,825 gal/year
B	0	0	0	0	0	0	0	0	0	0	0	0	0 gal/year
C	5,500	7,192	11,846	16,500	21,577	25,385	30,039	25,808	20,308	13,116	6,346	3,808	187,426 gal/year
D	0	0	0	0	0	0	0	0	0	0	0	0	0 gal/year
Total	61,398	80,290	132,242	184,194	240,869	283,375	335,327	288,098	226,700	146,410	70,844	42,506	2,092,252 gal/year
													6.42 acre-feet/year

Notes/References

1. ETO values are referenced from Appendix A - Reference Evapotranspiration (ETO) Table from the Model Efficient Landscape Ordinance (WEL) for Yountville (see Attachment 3).
2. Monthly average rainfall amounts are taken from PRISM <https://prism.oregonstate.edu/> for the project site (4km cell) and averaged monthly from Jan 2012 to Jan 2022
3. Refer to the WEL Irrigation Exhibit for the Softscape Reference Plan provided by the project Landscape Architect Design Works.
4. The existing plant types are based on discussions with the landscape architect and the plant factors are based on the Department of Water Resources 2000 publication of "Water Use Classification of Landscape Species (WUCOLS)".

Planter Areas³	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A	2543.889	5790.966	15,946	28,893	41,074	49,368	58,737	50,464	39,379	22,523	7,135	0	321,854 gal/year
B	0	0	0	0	0	0	0	0	0	0	0	0	0 gal/year
C	3130.324	7125.942	19,622	35,553	50,543	60,749	72,277	62,097	48,456	27,715	8,780	0	396,050 gal/year
D	5501.578	12523.92	34,486	62,485	88,830	106,766	127,028	109,137	85,163	48,709	15,431	0	696,061 gal/year
Total	11175.79	25440.83	70,053	126,932	180,448	216,883	258,043	221,699	172,998	98,947	31,347	0	1,413,965 gal/year 4.34 acre-feet/year

ETWU

$$ETWU = (ET_o)(0.62) \left(\frac{PF \times HA}{IE} + SLA \right)$$

where:

ETWU = Estimated total water use per year (gallons per year)
 ET_o = Reference Evapotranspiration (inches per year)
 PF = Plant Factor from WUCOLS (see Definitions)
 HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
 SLA = Special Landscape Area (square feet)
 0.62 = Conversion Factor (to gallons per square foot)
 IE = Irrigation Efficiency (minimum 0.71)

Planter Areas ³	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A	17,311	22,638	37,286	51,934	67,914	79,898	94,546	81,230	63,919	41,281	19,975	11,985	589,916 gal/year
B	0	0	0	0	0	0	0	0	0	0	0	0	0 gal/year
C	7,988	10,446	17,205	23,965	31,339	36,869	43,628	37,483	29,495	19,049	9,217	5,530	272,215 gal/year
D	9,360	12,240	20,159	28,079	36,719	43,198	51,118	43,918	34,559	22,319	10,800	6,480	318,948 gal/year
Total	34,659	45,324	74,651	103,978	135,971	159,966	189,293	162,632	127,972	82,649	39,991	23,995	1,181,079 gal/year
													3.62 acre-feet/year

Notes/References

1. ETO values are referenced from Appendix A - Reference Evapotranspiration (ETO) Table from the Model Efficient Landscape Ordinance (WELO) for Yountville (see Attachment 3).
2. Monthly average rainfall amounts are taken from PRISM <https://prism.oregonstate.edu/> for the project site (4km cell) and averaged monthly from Jan 2012 to Jan 2022
3. Refer to the WELO Irrigation Exhibit for the Softscape Reference Plan provided by the project Landscape Architect Design Works.
4. The plant factors are based on the plant types and seed mixes provided by the landscape architect and included in Attachment 3.

Attachment 3:

WELO Appendix A – Reference Evapotranspiration (ET_o) Table, The Grove Proposed Planting Species

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
MODOC													
Modoc/Alturas	0.9	1.4	2.8	3.7	5.1	6.2	7.5	6.6	4.6	2.8	1.2	0.7	43.2
MONO													
Bridgeport	0.7	0.9	2.2	3.8	5.5	6.6	7.4	6.7	4.7	2.7	1.2	0.5	43.0
MONTEREY													
Arroyo Seco	1.5	2.0	3.7	5.4	6.3	7.3	7.2	6.7	5.0	3.9	2.0	1.6	52.6
Castroville	1.4	1.7	3.0	4.2	4.6	4.8	4.0	3.8	3.0	2.6	1.6	1.4	36.2
Gonzales	1.3	1.7	3.4	4.7	5.4	6.3	6.3	5.9	4.4	3.4	1.9	1.3	45.7
MONTEREY													
Greenfield	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
King City	1.7	2.0	3.4	4.4	4.4	5.6	6.1	6.7	6.5	5.2	2.2	1.3	49.6
King City-Oasis Rd.	1.4	1.9	3.6	5.3	6.5	7.3	7.4	6.8	5.1	4.0	2.0	1.5	52.7
Long Valley	1.5	1.9	3.2	4.1	5.8	6.5	7.3	6.7	5.3	3.6	2.0	1.2	49.1
Monterey	1.7	1.8	2.7	3.5	4.0	4.1	4.3	4.2	3.5	2.8	1.9	1.5	36.0
Pajaro	1.8	2.2	3.7	4.8	5.3	5.7	5.6	5.3	4.3	3.4	2.4	1.8	46.1
Salinas	1.6	1.9	2.7	3.8	4.8	4.7	5.0	4.5	4.0	2.9	1.9	1.3	39.1
Salinas North	1.2	1.5	2.9	4.1	4.6	5.2	4.5	4.3	3.2	2.8	1.5	1.2	36.9
San Ardo	1.0	1.7	3.1	4.5	5.9	7.2	8.1	7.1	5.1	3.1	1.5	1.0	49.0
San Juan	1.8	2.1	3.4	4.6	5.3	5.7	5.5	4.9	3.8	3.2	2.2	1.9	44.2
Soledad	1.7	2.0	3.4	4.4	5.5	5.4	6.5	6.2	5.2	3.7	2.2	1.5	47.7
NAPA													
Angwin	1.8	1.9	3.2	4.7	5.8	7.3	8.1	7.1	5.5	4.5	2.9	2.1	54.9
Carneros	0.8	1.5	3.1	4.6	5.5	6.6	6.9	6.2	4.7	3.5	1.4	1.0	45.8
Oakville	1.0	1.5	2.9	4.7	5.8	6.9	7.2	6.4	4.9	3.5	1.6	1.2	47.7
St Helena	1.2	1.5	2.8	3.9	5.1	6.1	7.0	6.2	4.8	3.1	1.4	0.9	44.1
Yountville	1.3	1.7	2.8	3.9	5.1	6.0	7.1	6.1	4.8	3.1	1.5	0.9	44.3
NEVADA													
Grass Valley	1.1	1.5	2.6	4.0	5.7	7.1	7.9	7.1	5.3	3.2	1.5	0.9	48.0
Nevada City	1.1	1.5	2.6	3.9	5.8	6.9	7.9	7.0	5.3	3.2	1.4	0.9	47.4
ORANGE													
Irvine	2.2	2.5	3.7	4.7	5.2	5.9	6.3	6.2	4.6	3.7	2.6	2.3	49.6
Laguna Beach	2.2	2.7	3.4	3.8	4.6	4.6	4.9	4.9	4.4	3.4	2.4	2.0	43.2
Santa Ana	2.2	2.7	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	2.0	48.2
PLACER													
Auburn	1.2	1.7	2.8	4.4	6.1	7.4	8.3	7.3	5.4	3.4	1.6	1.0	50.6
Blue Canyon	0.7	1.1	2.1	3.4	4.8	6.0	7.2	6.1	4.6	2.9	0.9	0.6	40.5
Colfax	1.1	1.5	2.6	4.0	5.8	7.1	7.9	7.0	5.3	3.2	1.4	0.9	47.9
Roseville	1.1	1.7	3.1	4.7	6.2	7.7	8.5	7.3	5.6	3.7	1.7	1.0	52.2
Soda Springs	0.7	0.7	1.8	3.0	4.3	5.3	6.2	5.5	4.1	2.5	0.7	0.7	35.4
Tahoe City	0.7	0.7	1.7	3.0	4.3	5.4	6.1	5.6	4.1	2.4	0.8	0.6	35.5
Truckee	0.7	0.7	1.7	3.2	4.4	5.4	6.4	5.7	4.1	2.4	0.8	0.6	36.2
PLUMAS													
Portola	0.7	0.9	1.9	3.5	4.9	5.9	7.3	5.9	4.3	2.7	0.9	0.5	39.4
Quincy	0.7	0.9	2.2	3.5	4.9	5.9	7.3	5.9	4.4	2.8	1.2	0.5	40.2
RIVERSIDE													
Beaumont	2.0	2.3	3.4	4.4	6.1	7.1	7.6	7.9	6.0	3.9	2.6	1.7	55.0
Blythe	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Cathedral City	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Coachella	2.9	4.4	6.2	8.4	10.5	11.9	12.3	10.1	8.9	6.2	3.8	2.4	88.1

The Grove Proposed Planting Species

ENHANCED PLANTING

Plant Name	Water Use	WUCOLS Plant Factor	Notes
Achillea millefolium 'Island Pink'	low, moderate	0.1-0.3	Native cultivar according to Calscape (Santa Cruz)
Deschampsia cespitosa 'Goldtau'	moderate, regular	0.1-0.3	
Heteromeles arbutifolia	moderate	0.1-0.3	
Muhlenbergia rigens	low, moderate	0.1-0.3	
Penstemon mexical 'Pikes Peak Purple'	low, moderate	0.1-0.3	
Salvia greggii 'Mirage Salmon'	moderate	0.1-0.3	
Salvia leucantha	moderate, regular	0.1-0.3	
Sisyrinchium bellum	low, moderate	<0.1	
Stipa ichu	moderate, regular	0.1-0.3	

NATIVE BUFFER

Plant Name	Water Use	WUCOLS Plant Factor	Notes
Achillea millefolium 'Island Pink'	low, moderate	0.1-0.3	Elymus condensatus Melica imperfecta is <0.1
Aquilegia formosa	regular	0.1-0.3	
Carex divulsa	moderate	0.1-0.3	
Ceanothus hearstiorum	low	0.1-0.3	
Ceanothus thyrsiflorus 'Skylark'	low	0.1-0.3	
Deschampsia cespitosa 'Goldtau'	moderate, regular	0.1-0.3	
Epilobium canum	low, moderate	0.1-0.3	
Eriogonum grande rubescens	low, moderate	0.1-0.3	
Eriophyllum lanatum	low, moderate	0.1-0.3	
Festuca californica	moderate, regular	0.1-0.3	
Festuca idahoensis 'Tomales Bay'	moderate, regular	<0.1	
Festuca glauca 'Elijah Blue'	moderate, regular	0.1-0.3	
Frangula californica	low, moderate	<0.1	
Glandularia lilacina 'De La Mina'	low, moderate	0.1-0.3	
Iris douglasiana	low, moderate	0.1-0.3	
Leymus condensatus 'Canyon Prince'	low, moderate	0.1-0.3	
Melica californica	low, moderate	Not in List	
Monardella villosa 'Russian River'	low	<0.1	
Muhlenbergia rigens	low, moderate	0.1-0.3	
Pennisetum massaicum	moderate, regular	0.1-0.3	
Penstemon heterophyllus 'Blue Springs'	low, moderate	0.1-0.3	
Penstemon heterophyllus 'Margarita BOP'	low, moderate	Unknown	
Sisyrinchium bellum	low, moderate	<0.1	
Solanum xanti	moderate, regular	0.1-0.3	
Stipa pulchra	low	<0.1	

TREES

Plant Name	Water Use	WUCOLS Plant Factor	Notes
Ceanothus x 'Ray Hartman'		0.1-0.3	
Cercis occidentalis		<0.1	
Quercus garryana		0.1-0.3	

SEED MIX

Plant Name	Water Use	WUCOLS Plant Factor	Notes
Achillea millefolium	low, moderate	0.1-0.3	Melica imperfecta is <0.1
Claytonia perfoliata	low, moderate-high (in winter)	Not in List	
Collinsia heterophylla	low	Not in List	
Festuca idahoensis	moderate, regular	<0.1	
Festuca rubra 'Molate'	moderate, regular	0.1-0.3	
Iris douglasiana	low, moderate	0.1-0.3	
Melica californica	low, moderate	Not in List	
Monardella villosa	low	<0.1	