



# **WASTEWATER ALTERNATIVES**

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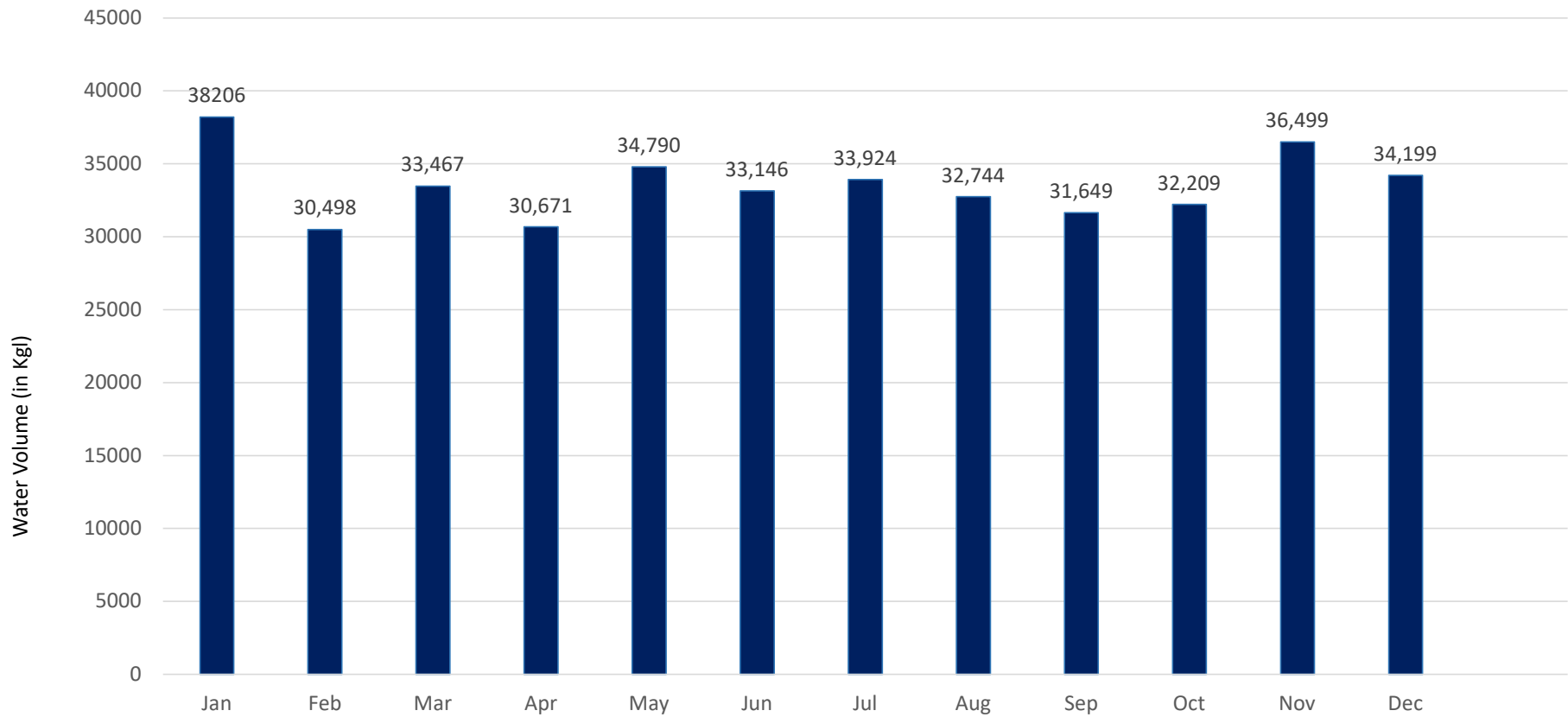
**Doa Ross**

**Deputy General Manager, Engineering**

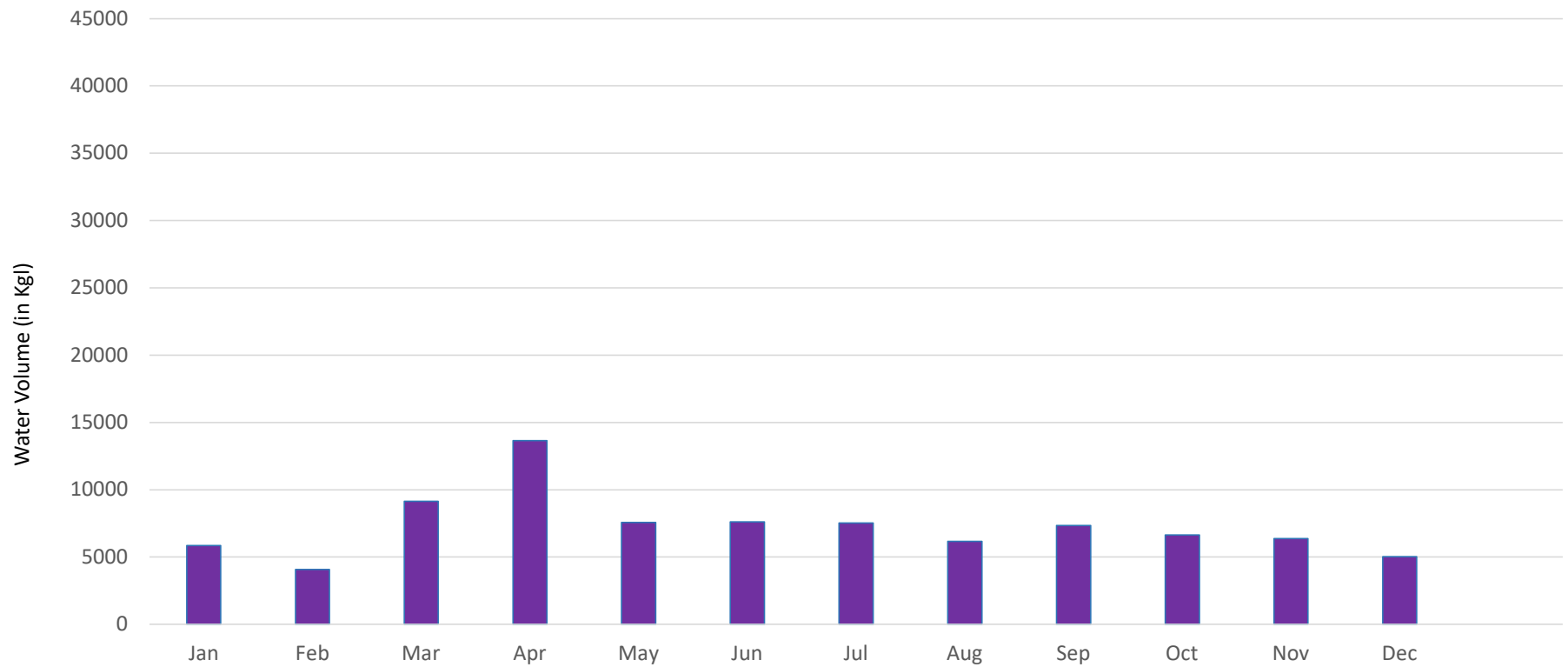
# OVERVIEW

- The City of Boulder City currently operates a wastewater treatment facility with an average effluent rate of 33.5 million gallons per month (~1,234 AFY) with low seasonal variability
- The City has a contract with a local quarry operation for an average volume of 7.25 million gallons per month (~267 AFY), which has significant and unpredictable variability
- The remaining volume (~967 AFY) is discharged to evaporation ponds; Boulder City is the only SNWA partner agency whose recovered indoor water does not produce return-flow credits
- The City operates two golf courses irrigated using a combination of raw/potable water; in 2021, Boulder City Golf Course used 313.8 million gallons for irrigation, while Boulder Creek used 419.8 million gallons
- The City also maintains numerous irrigated parks and common spaces, including Veterans Memorial Park, Veterans Cemetery, Bicentennial Park, Hemenway Park and numerous other facilities. All of these properties' irrigation needs are currently met through a raw water distribution system.

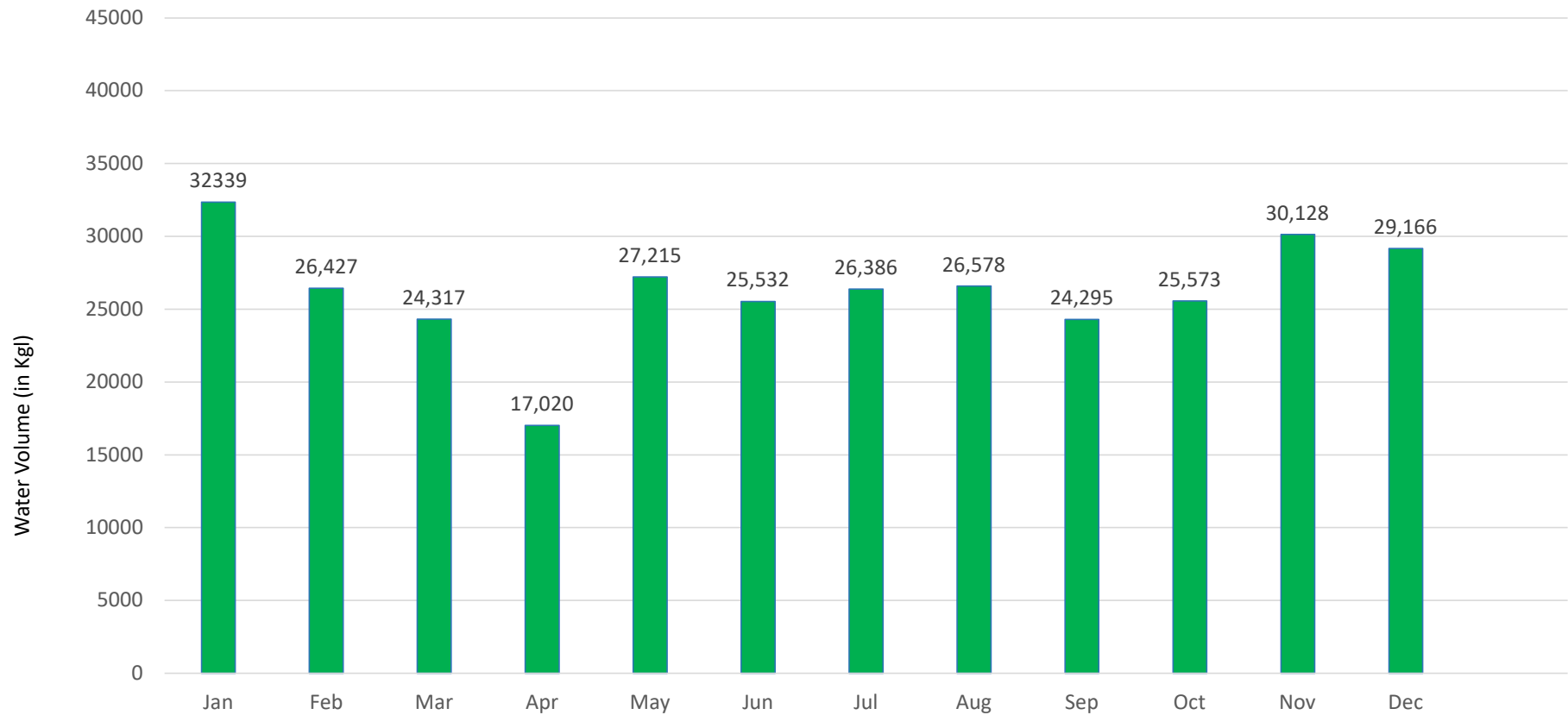
# 2021 WASTEWATER EFFLUENT (BY MONTH)



# 2021 TREATED EFFLUENT SALES (BY MONTH)



# 2021 EFFLUENT BEING EVAPORATED (BY MONTH)



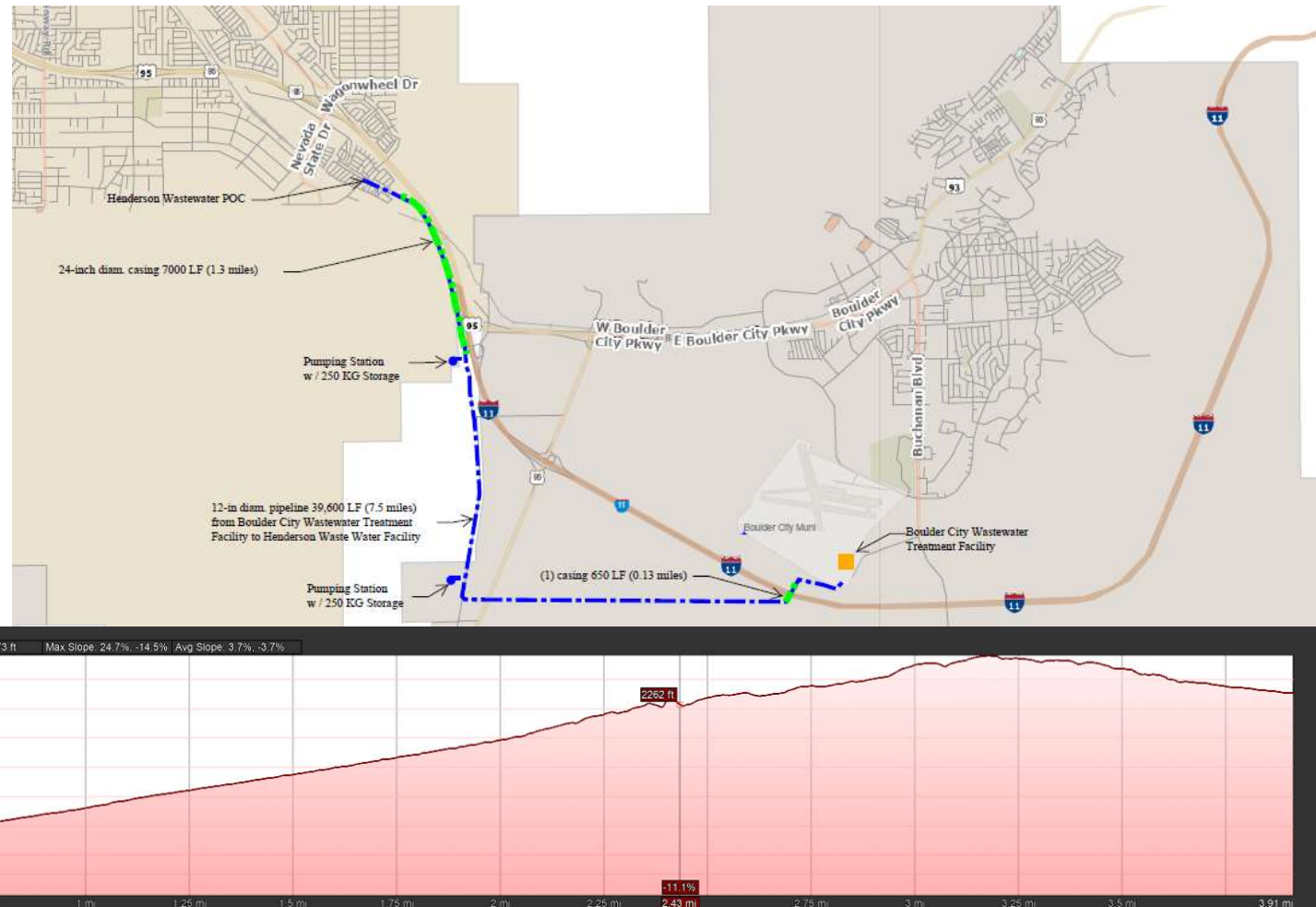
# WASTEWATER OPTIONS FOR CONSIDERATION

- 1 Conveyance to Henderson Wastewater Treatment Facility for return-flow credits
- 2 Direct Reuse for Boulder City Irrigation
- 3 Return to Lake Mead via recharge well for return flow credits
- 4 Return-flow credits options with Eldorado Valley opportunity

# 1 CONVEYANCE TO HENDERSON – DESCRIPTION OF ALTERNATIVE

## Key System Components:

- Two Pumping Stations (with 250 Kgl storage each)
- 12" pipeline (estimated ~40,000 LF)
- 24" casing (estimated ~7,000 LF)



## **1 CONVEYANCE TO HENDERSON – Considerations**

- Provides 100 percent utilization of treated effluent
- Requires operating agreement with City of Henderson to treat returned wastewater
- Minimizes operational responsibilities and costs
- Allows potential repurposing of existing raw water distribution network as potable system back-up
- Does not require wastewater treatment plant upgrade/replacement



# 1 CONVEYANCE TO HENDERSON – Estimated Costs

## Cost Summary

### Option 1: Convey BC Wastewater to Henderson Wastewater Facility

Proposed Facilities - BC to COH	Size	Cost w/ 50% Contingency
(2) Pumping Stations + (2) 250 KG Storage	1.0 MGD + 250 KG Storage /PS	\$ 20,252,000
12-inch diam pipeline 39,600 LF (7.5 miles)	39,600 LF / 12 diam	\$ 18,573,000
24-inch diam casing 7,650 LF (1.4 miles)	7,650 LF / 24 in diam.	\$ 4,126,000
		<b>Total \$ 42,951,000</b>

\* Estimate does not include ROW acquisition costs private or public lands

Annual Costs	Size	Annual Cost Estimate
Annual Henderson Processing Fee	1.0 MGD	\$ 500,000

Connection charges and an investment in COH capital improvements is estimated to be \$20,000,000 more

## 2 DIRECT REUSE – DESCRIPTION OF ALTERNATIVE

### Key System Components:

- Wastewater Treatment Facility and Pumping Station (1 MGD capacity)
- Treated Wastewater Pipeline (~ 21,000 linear feet)



## 2 **DIRECT REUSE FOR IRRIGATION – KEY CONSIDERATIONS**

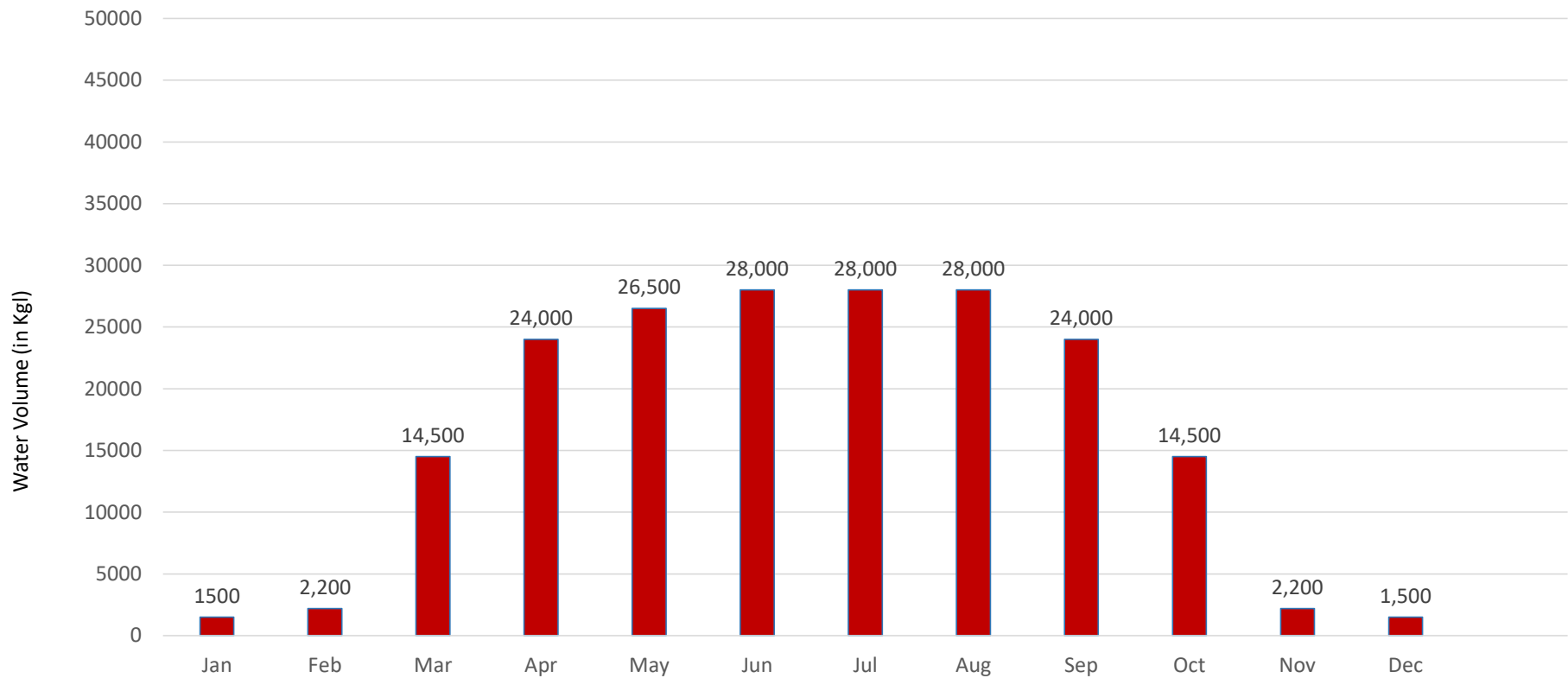
- Provides 100 percent utilization of treated effluent
- Does not require operating agreements with other local municipalities
- Requires wastewater treatment plant upgrade/replacement (improved water quality effluent needed for irrigation)
- Involves repurposing existing raw water line, blending potable and treated wastewater for irrigation
- Allows potential repurposing of existing raw water transmission system as potable system back-up
- Water quality implications of using high TDS treated wastewater during winter require monitoring and management at the end user level

## 2 **DIRECT REUSE – Assumptions**

- **Boulder City Golf Course will reduce irrigation usage to 4 af/ac**  
(Combination of warm-season turf utilization and improved irrigation practices; water demand by month will reflect practices for non-overseeded warm-season grasses)
- **Boulder Creek Golf Course will reduce irrigation usage to 4 af/ac**  
(Combination of turf/pond reduction and improved irrigation practices - already warm season with no overseeding)
- **Veteran's Memorial Park and Veteran's Cemetery will reduce water by 20% by the time project is operational**  
(Convert non-functional and marginal grass areas to drip-irrigated landscaping, improve irrigation efficiency, and/or potentially convert turf areas to warm-season varieties)
- **100% of effluent will be used in low-irrigation months**  
The direct reuse option utilizes the entirety of the raw water irrigation network. During shoulder and peak seasons, supplemental raw water will be needed, mitigating water quality issues.

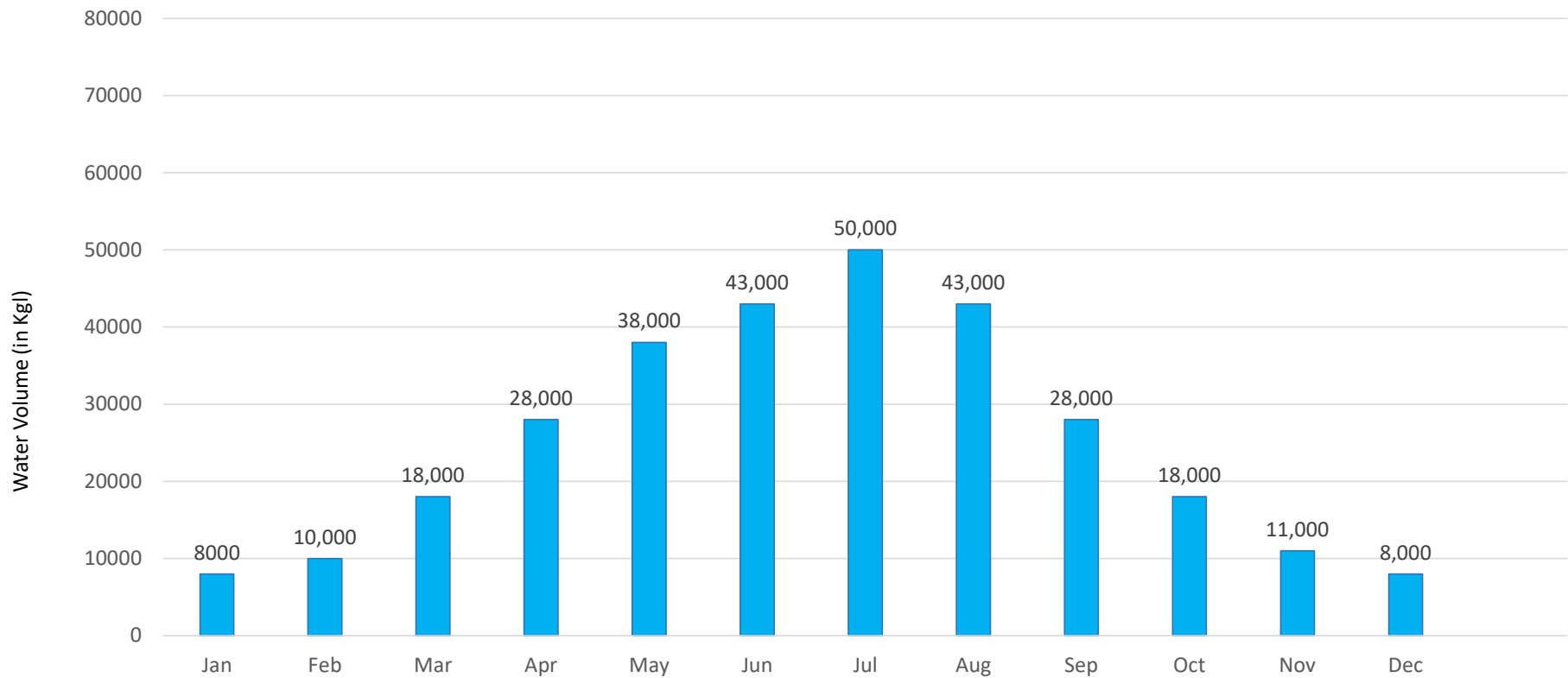
## 2 BOULDER CITY GOLF COURSE IRRIGATION USAGE (Projected)

*Projected at 4 acre feet per acre*



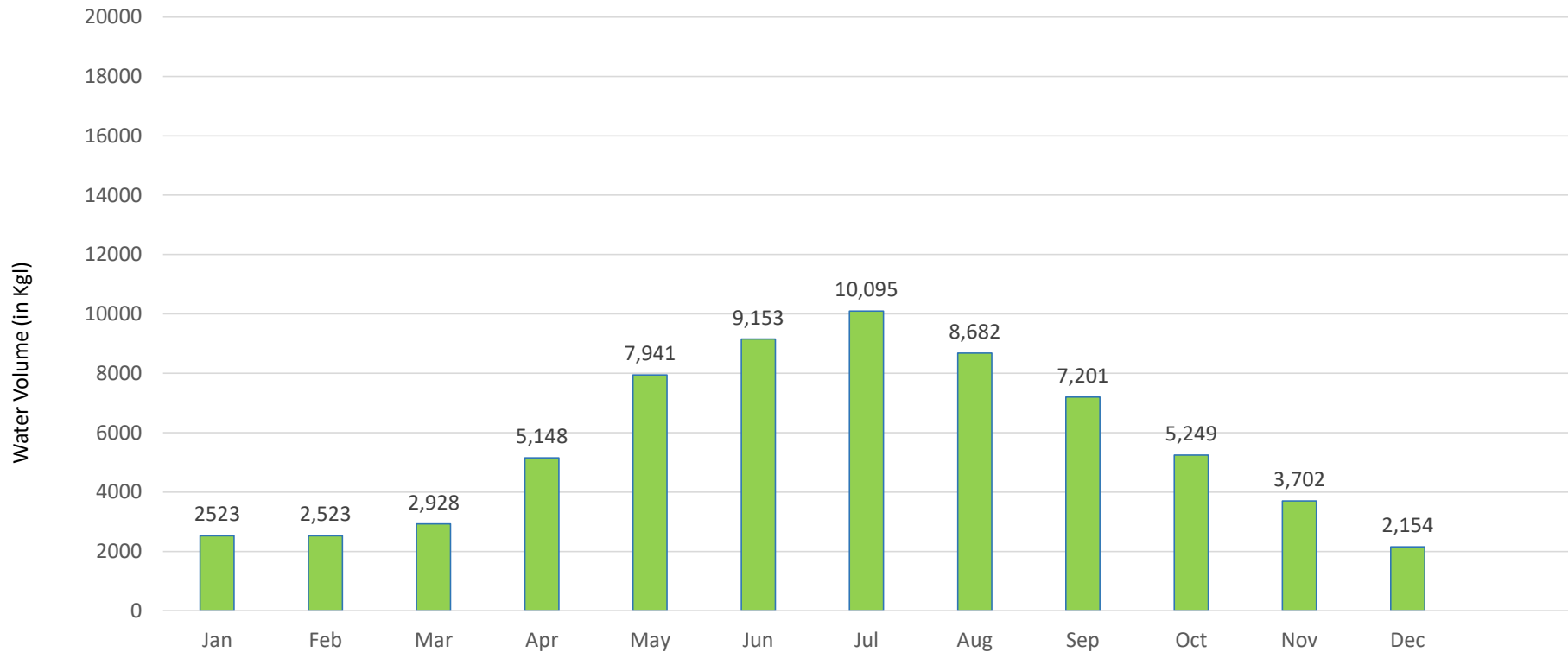
## 2 BOULDER CREEK GOLF COURSE IRRIGATION USAGE (Projected)

*Projected at 4 acre feet per acre*



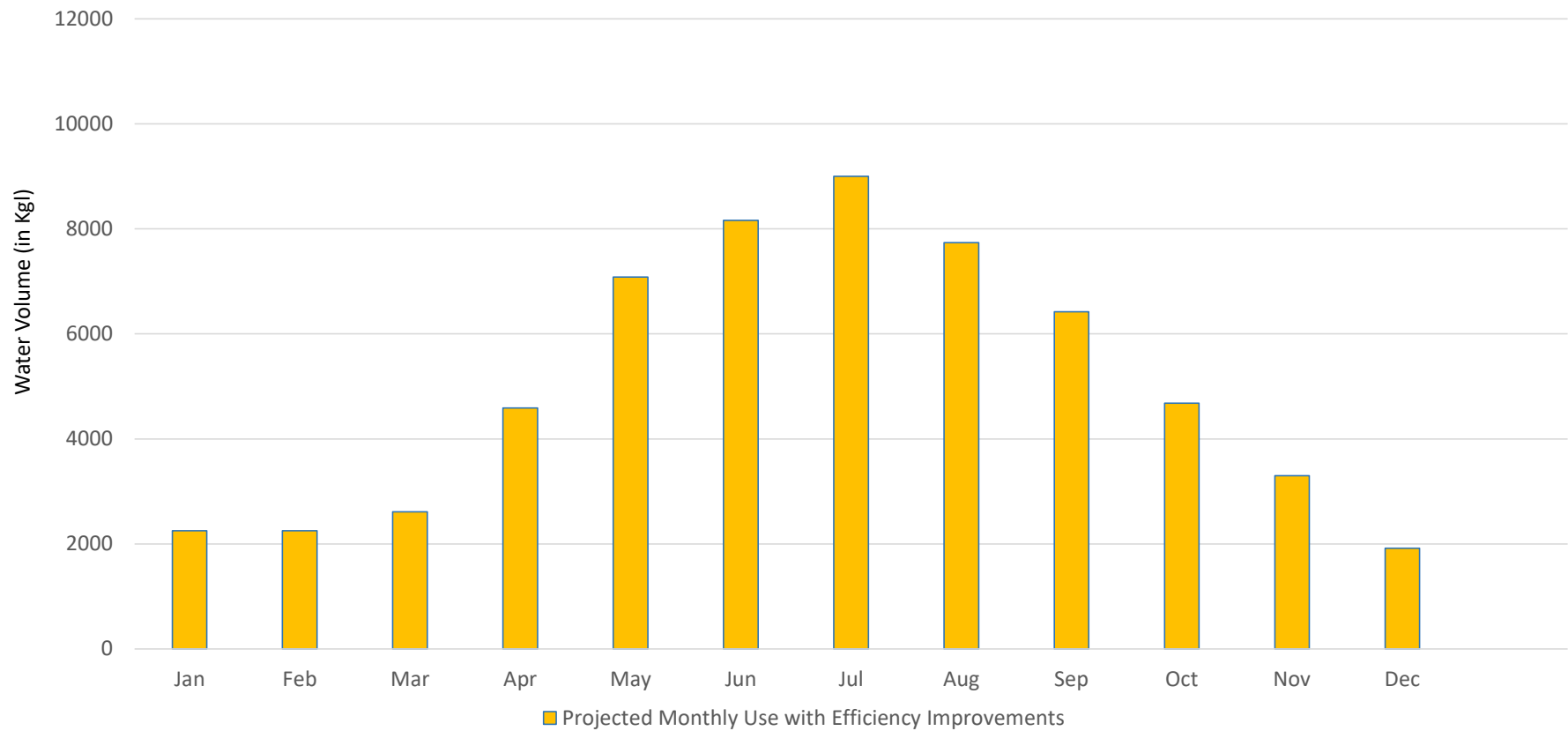
## 2 VETERAN'S MEMORIAL PARK IRRIGATION USAGE (Projected)

*Efficiency improvements assumed*



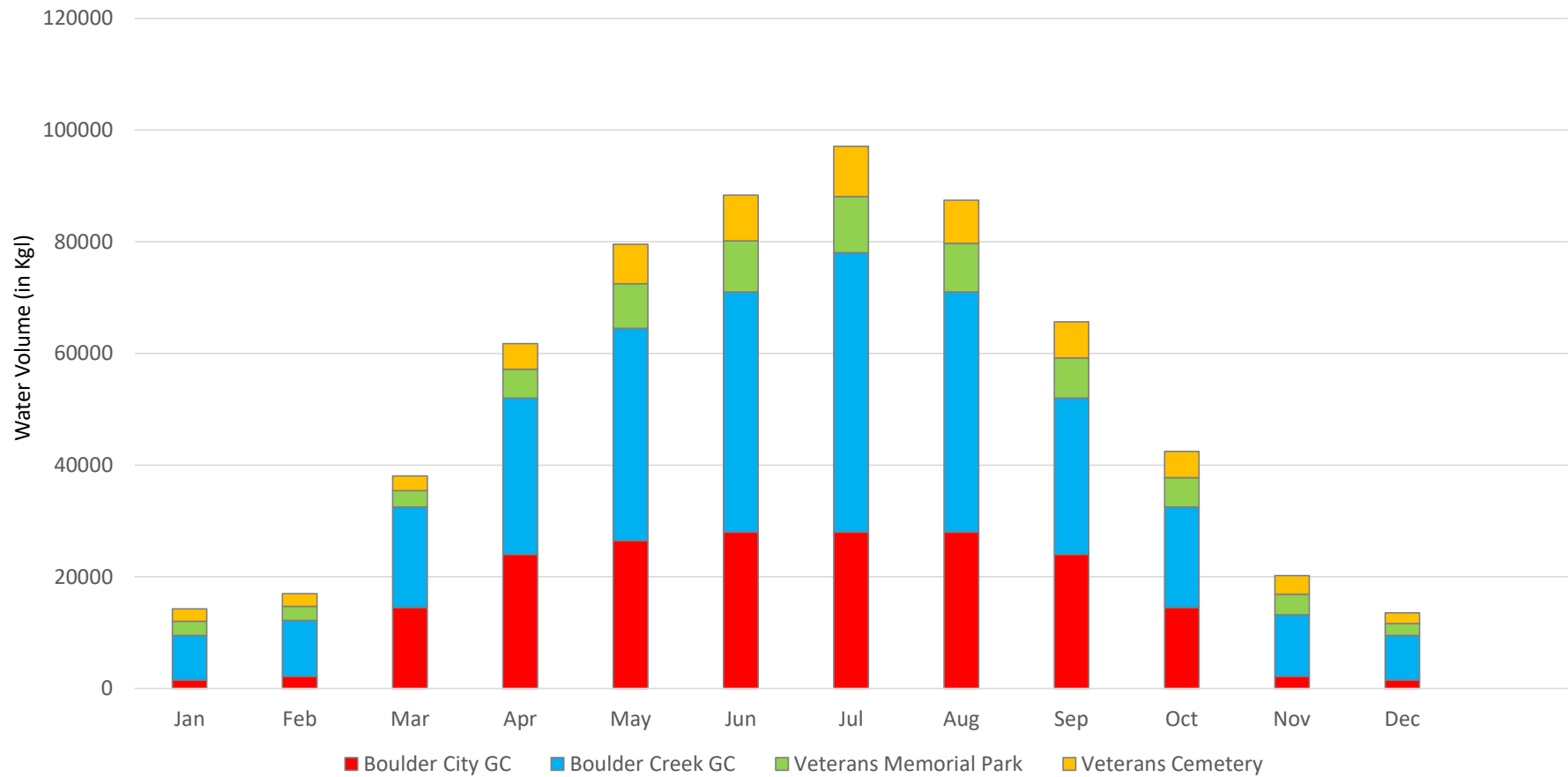
## 2 VETERAN'S CEMETERY IRRIGATION USAGE (Projected)

*Efficiency improvements assumed*

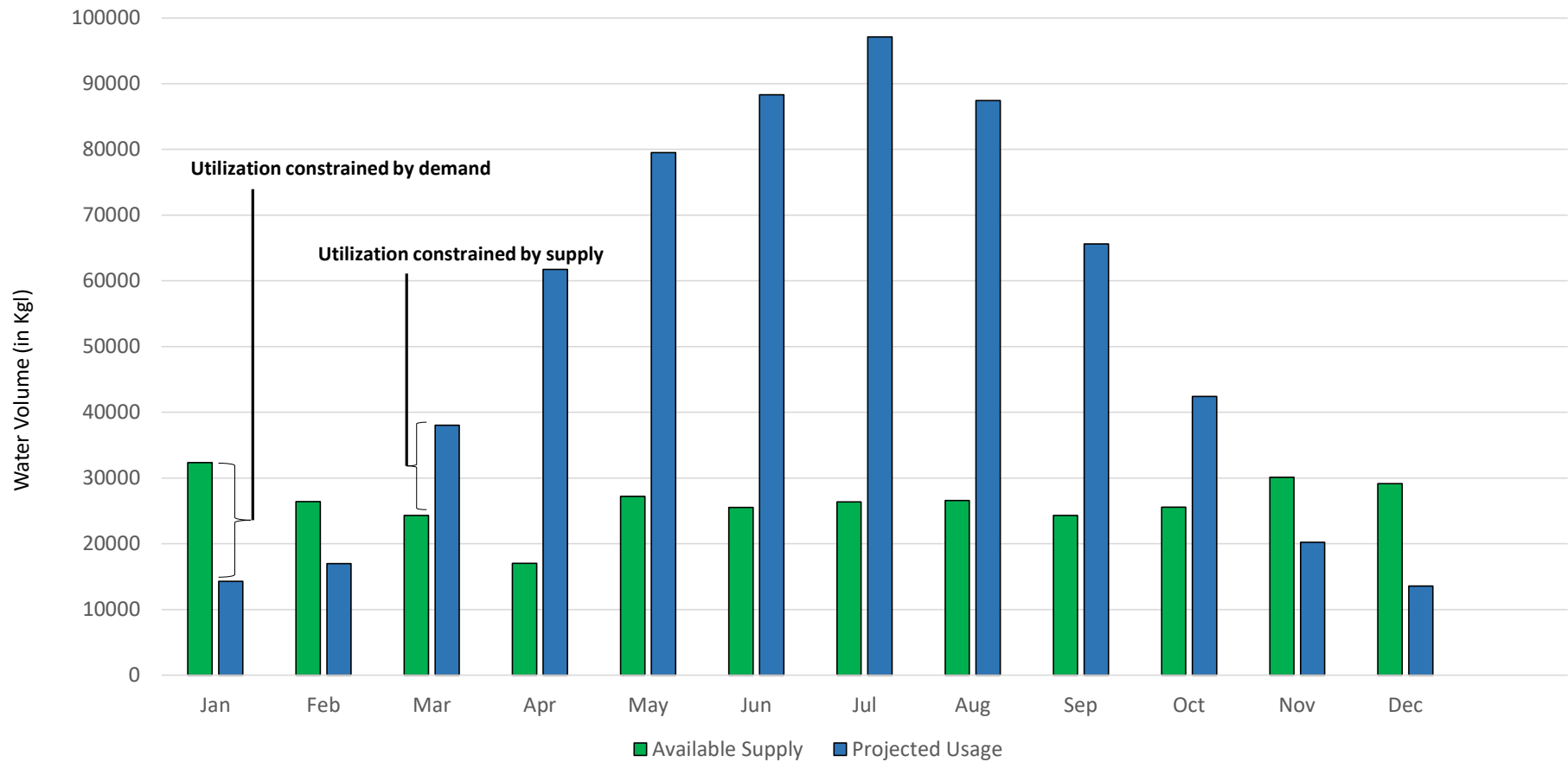




## 2 COMBINED IRRIGATION USAGE (Projected)



## 2 COMBINED IRRIGATION DEMAND VS. AVAILABLE EFFLUENT



## 2 DIRECT REUSE – Estimated Costs

### Cost Estimate

#### Boulder City Treated WasteWater to Black Mountain Reservoir

Proposed Facilities	Size	Cost Estimate
BC Water Resource Center	1.0 MGD	\$ 18,952,000
Pumping Station	1.0 MGD	\$ 7,699,000
12-inch diam. Pipeline to existing Filtration Plant (4 miles)	21,120 LF / 12-in diam	\$ 5,528,000
<b>Total</b>		<b>\$ 32,179,000</b>

\* Estimate does not include ROW acquisition costs private or public lands

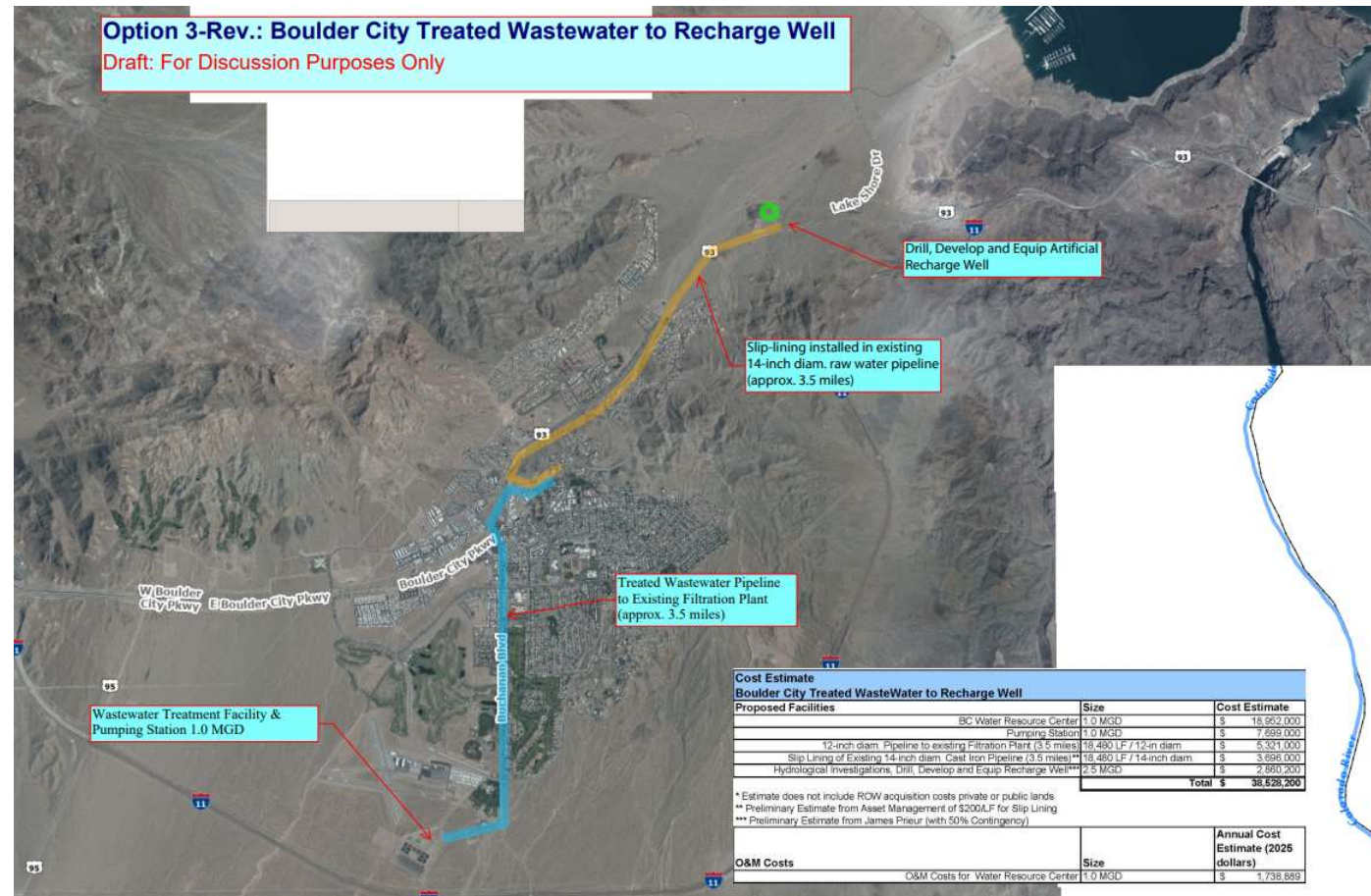
O&M Costs	Size	Annual Cost Estimate (2025 dollars)
O&M Costs for Recycled Water Resource System	1.0 MGD	\$ 1,738,889

3

## RETURN TO LAKE MEAD VIA RECHARGE WELL

### Key System Components:

- Wastewater Treatment Facility and Pumping Station (1 MGD capacity)
- Treated Wastewater Pipeline to existing filtration plant (~18,000 linear feet)
- Installation of lining to existing 14" raw water pipeline (~3.5 miles)
- Artificial Recharge Well



3

## RETURN TO LAKE MEAD VIA RECHARGE WELL

# KEY CONSIDERATIONS

- Provides 100 percent utilization of treated effluent
- Requires wastewater treatment plant upgrade/replacement (improved effluent quality for release)
- Will require special dispensation from Bureau of Reclamation to receive return flow credits
- Allows potential repurposing of existing raw water distribution network as potable system back-up
- Does not require operating agreements with other local municipalities

3

## RETURN TO LAKE MEAD VIA RECHARGE WELL

**COSTS****Cost Estimate****Boulder City Treated WasteWater to Hoover Dam**

<b>Proposed Facilities</b>	<b>Size</b>	<b>Cost Estimate</b>
BC Water Resource Center	1.0 MGD	\$ 18,952,000
Pumping Station	1.0 MGD	\$ 7,699,000
12-inch diam. Pipeline to existing Filtration Plant (3.5 miles)	18,480 LF / 12-in diam	\$ 5,321,000
Slip Lining of Existing 14-inch diam. Cast Iron Pipeline (7.0 miles)**	36,960 LF / 14-inch diam.	\$ 7,392,000
		<b>Total \$ 39,364,000</b>

\* Estimate does not include ROW acquisition costs private or public lands

\*\* Preliminary Estimate from Asset Management of \$200/LF for Slip Lining

<b>O&amp;M Costs</b>	<b>Size</b>	<b>Annual Cost Estimate (2025 dollars)</b>
O&M Costs for Water Resource Center	1.0 MGD	\$ 1,738,889

4A

# RETURN TO LAKE MEAD VIA HENDERSON

## *Eldorado Valley Variation*

### Key System Components:

- Two Pumping Stations  
(with 360 Kgl storage each)
- 12" pipeline  
(estimated ~40,000 linear feet)
- 24" casing  
(estimated ~7,000 linear feet)
- 10" pipeline  
(estimated ~21,000 linear feet)
- Lift station conveying wastewater with solids to BC Wastewater Treatment Facility





4A

## RETURN TO LAKE MEAD VIA HENDERSON - CONSIDERATIONS

### *Eldorado Valley Variation*

- Provides 100 percent utilization of treated effluent
- Requires operating agreement with City of Henderson to treat returned wastewater
- *By Others: El Dorado Valley would become a customer of Boulder City*
- *By Others: Offset operating costs for treatment due to cost-sharing opportunity*



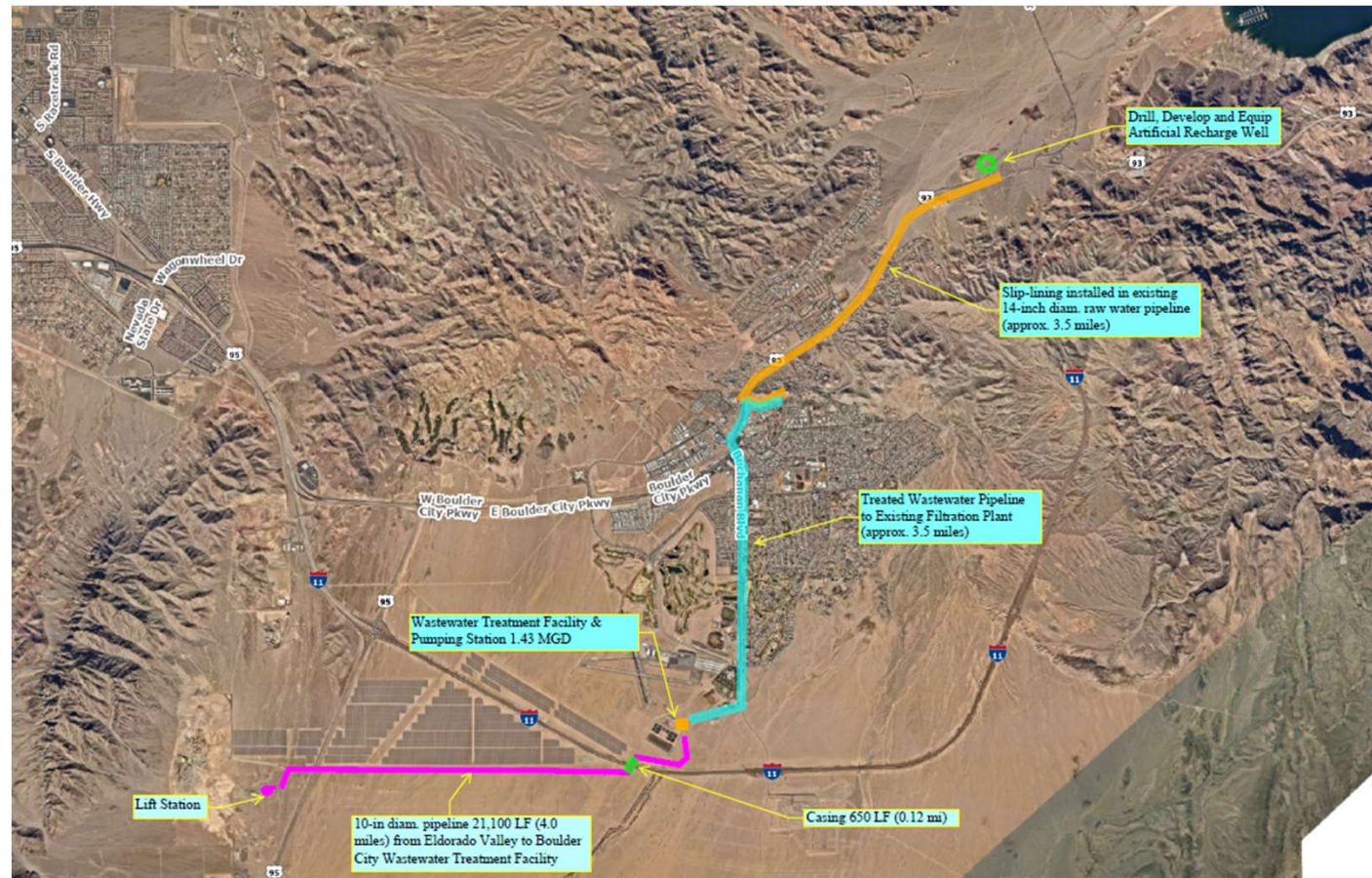
4B

# RETURN TO LAKE MEAD VIA RECHARGE WELL - CONSIDERATIONS

## *Eldorado Valley Variation*

### Key System Components:

- Wastewater Treatment Facility and Pumping Station (1.4 MGD capacity)
- Treated Wastewater Pipeline to existing filtration plant (~18,000 linear feet)
- Installation of lining to existing 14" raw water pipeline (~3.5 miles)
- Artificial Recharge Well



4B

## RETURN TO LAKE MEAD VIA RECHARGE WELL – ELDORADO VALLEY OPTION

### KEY CONSIDERATIONS

- Provides 100 percent utilization of treated effluent
- Requires wastewater treatment plant upgrade/replacement (improved effluent quality for release)
- Will require special dispensation from Bureau of Reclamation to receive return flow credits
- Allows potential repurposing of existing raw water distribution network as potable system back-up
- *By Others: El Dorado Valley would become a customer of Boulder City*

## **NEXT STEPS**

- Boulder City Council selects preferred alternative
- SNWA hires a consultant to perform a feasibility study of the Council's preferred alternative
- October: BOR funding announcement (applied for \$1 million to support evaluation and feasibility study)
- Upon completion, feasibility study shared with Boulder City Council

