

Leveraging Alternative Water Sources for a Sustainable Water Supply

WaterReuse LA Chapter Meeting
December 8, 2020



City of Santa Monica

Overview of Santa Monica's Water/Wastewater System



93,000+ residents
2,700+ commercial
customers



Drinking water and
fire protection



groundwater (local)
surface water (MWD)



Sewer collection and
recycled water

9 million gallons
of high-quality drinking
water daily

14 million
of wastewater
captured and
delivered for treatment

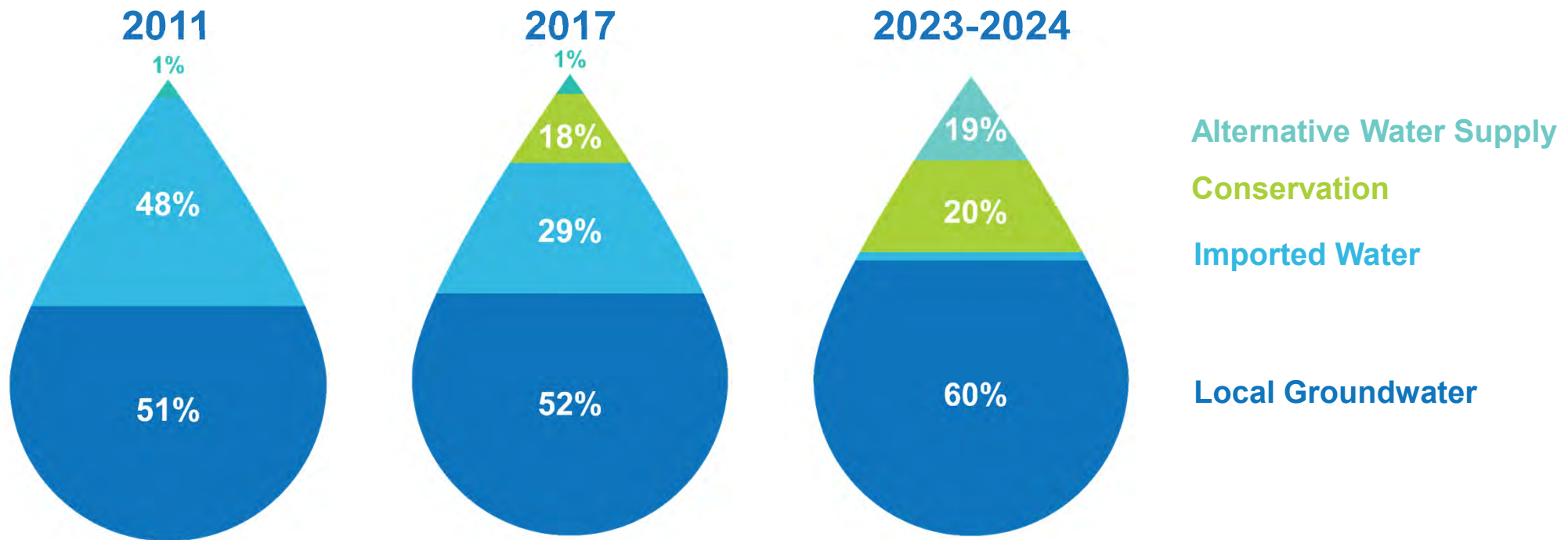
77,000 gallons
per day of recycled
water

**4 water storage
reservoirs**
totaling 40 million gallons



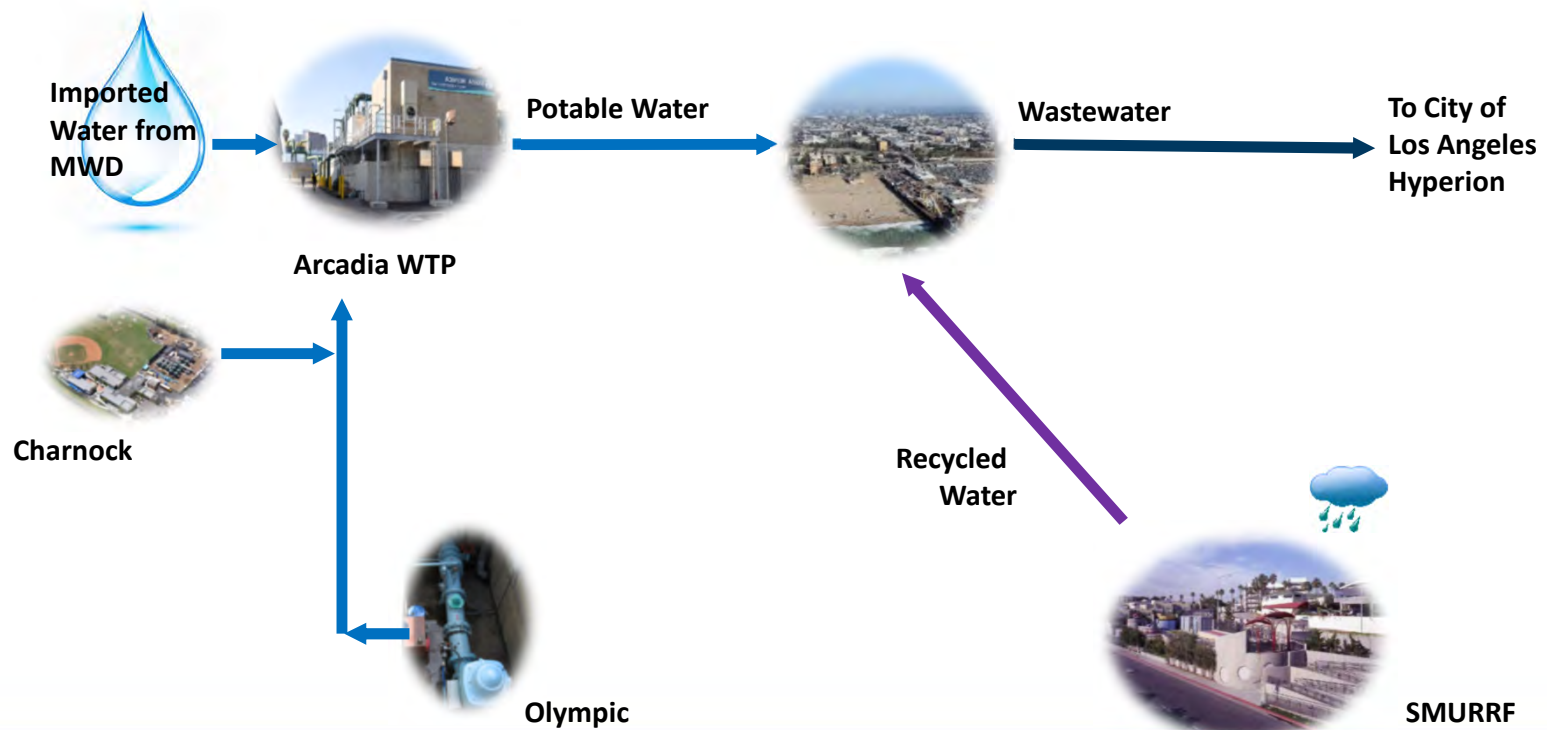
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Sustainable Water Supply = Sustainable Community



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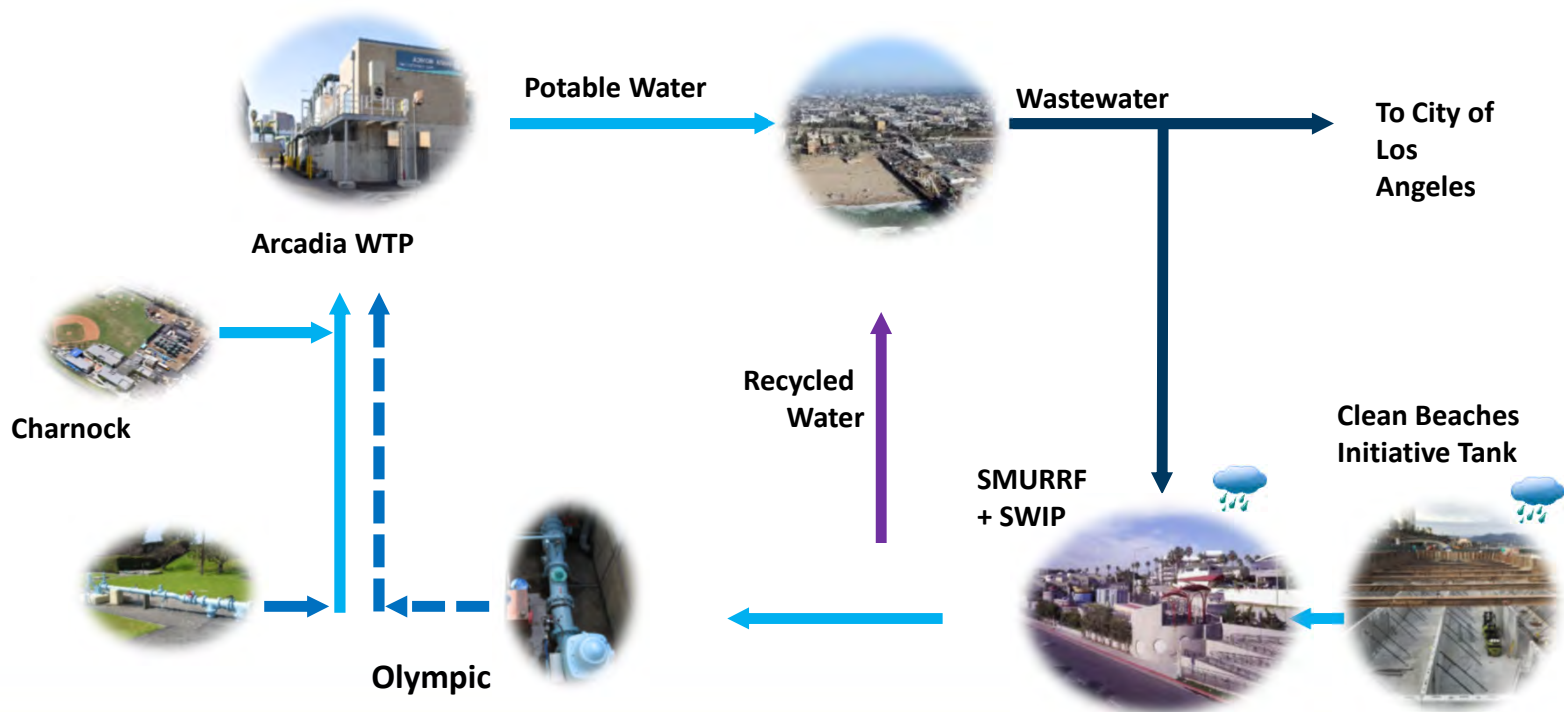
Integrated One Water Approach



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Water Self-Sufficient by 2023

- Component 1 – Conservation
- Component 2 – Alternative Water Supply
- Component 3 – New Local Groundwater





Arcadia WTP Production Efficiency Enhancement

- Optimize Closed Circuit Reverse Osmosis (CCRO) configurations to minimize life-cycle cost
- Leverage CCRO to increase overall recovery $\geq 90\%$
- Recover an additional 1,200 AFY of drinking water



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Brown and Caldwell

Alternative High Recovery RO Process – Flow Reversal

- Flow reversal and block rotation arrangement
- Potential retrofit of existing RO skids to achieve >90% recovery
- Potential reduction in chemicals and CIP frequency

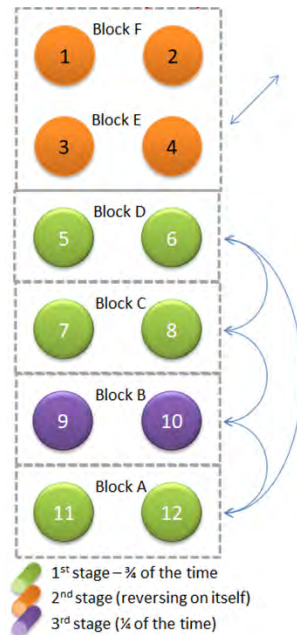


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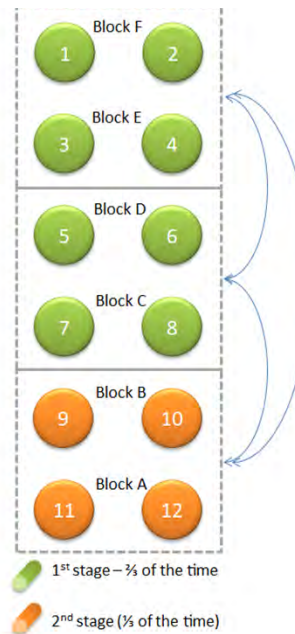
Alternative High Recovery RO Process – Flow Reversal



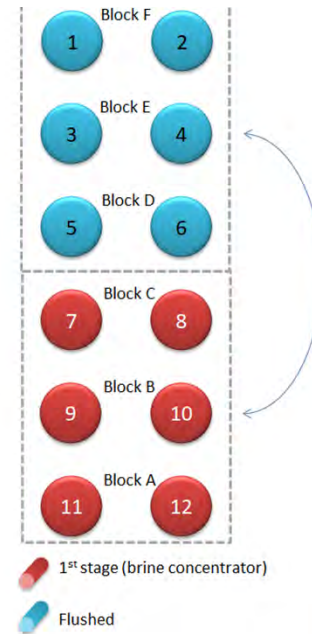
Mode 1 - 3:2:1



Mode 2 - 4:2



Mode 3 - 3:3



Sustainable Water Infrastructure Project (SWIP)



- **Element 1**
 - 1.5 MG Clean Beaches Tank
 - Santa Monica Urban Runoff Recycling Facility (SMURRF)
- **Element 2**
 - 1 MGD AWTF
 - 30/70 Blend of Stormwater and Wastewater
- **Element 3**
 - New 1.5 MG Stormwater capture tank

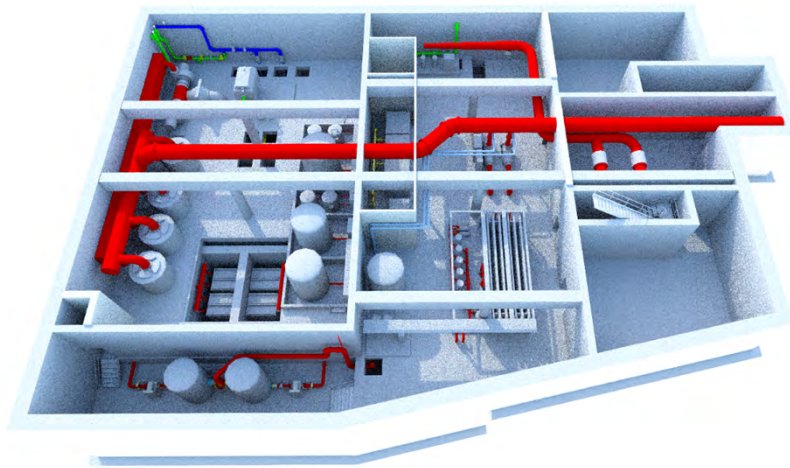
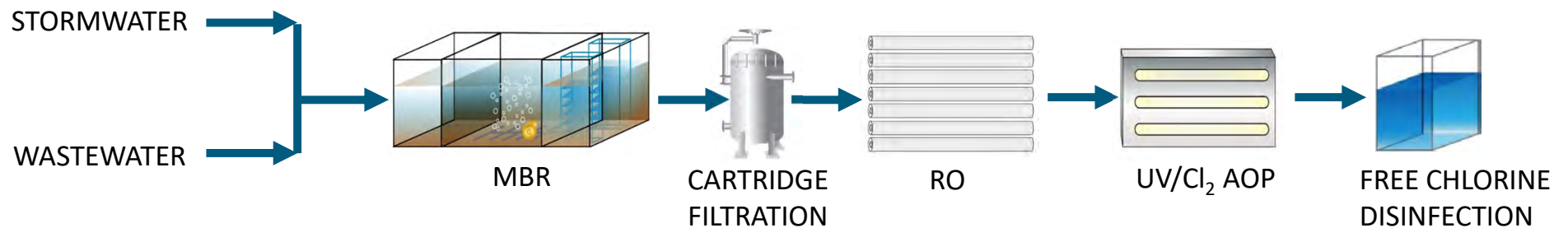
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New SWIP AWTF

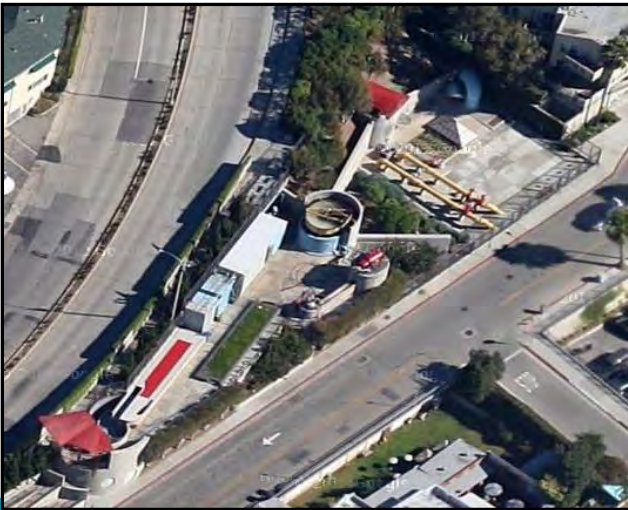
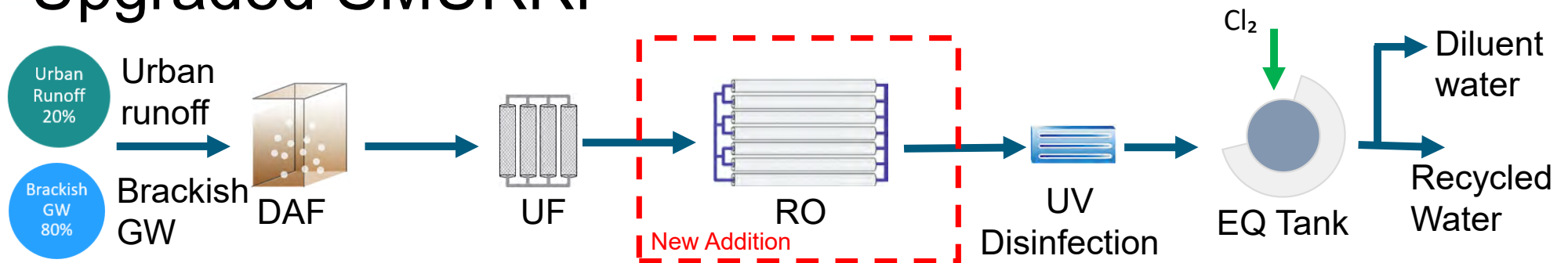


- Source Water - Wastewater with up to 30% stormwater contribution when available
- AWTF completely underground
- Ability to meet 12-10-10 within AWTF
- Produces 1,100 AFY of purified water for non-potable and potable reuse



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Upgraded SMURRF

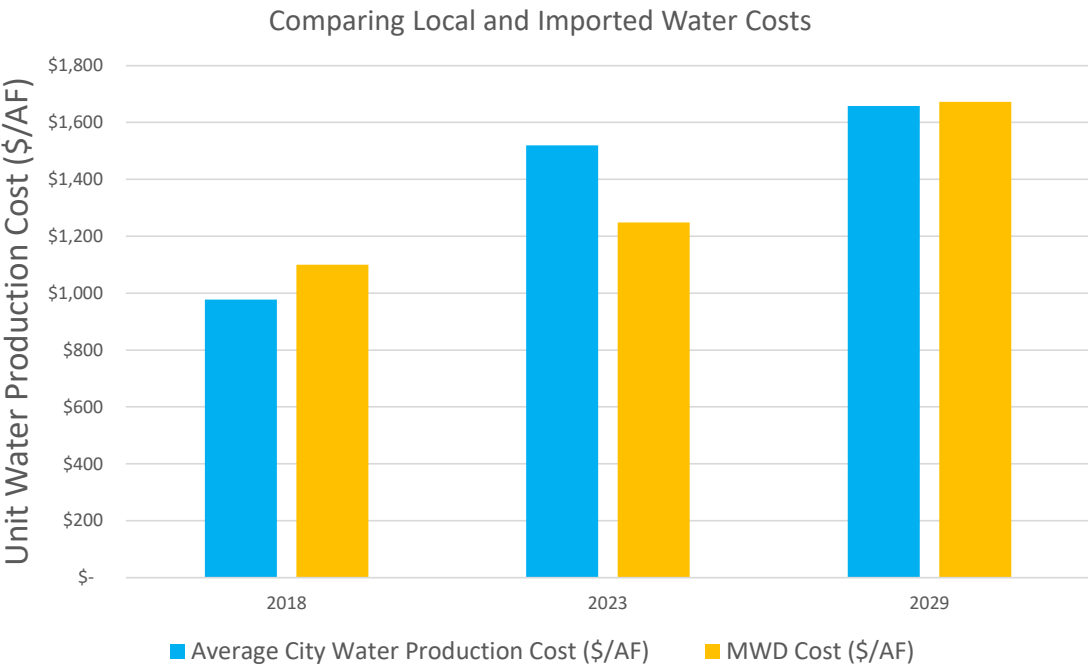
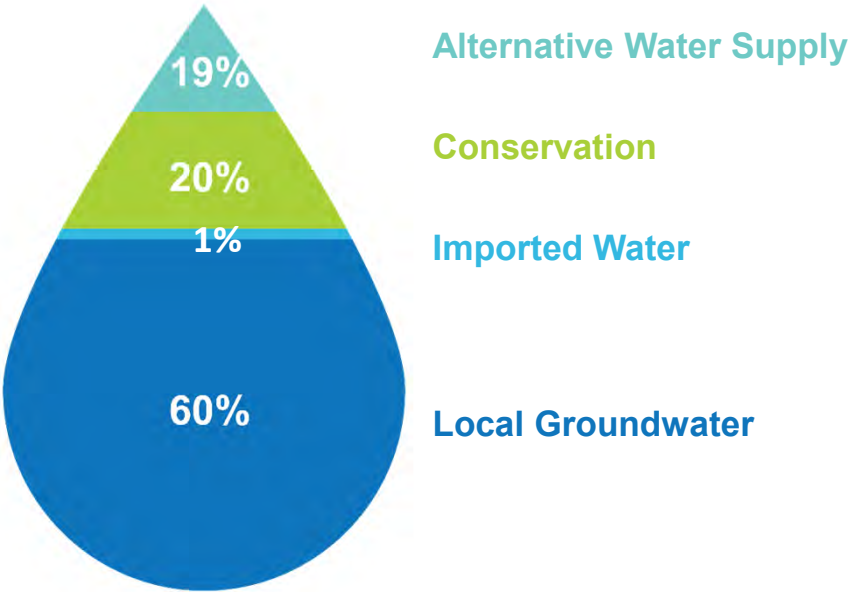


- Provides pollution control for Santa Monica Bay via stormwater diversion
- Source Water – Urban Runoff + Brackish GW
- Upgrade SMURRF to meet diluent water requirements for groundwater augmentation
- Produces up to 500 AFY of diluent water



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Leveraging Alternative Water Supplies for a Sustainable Future



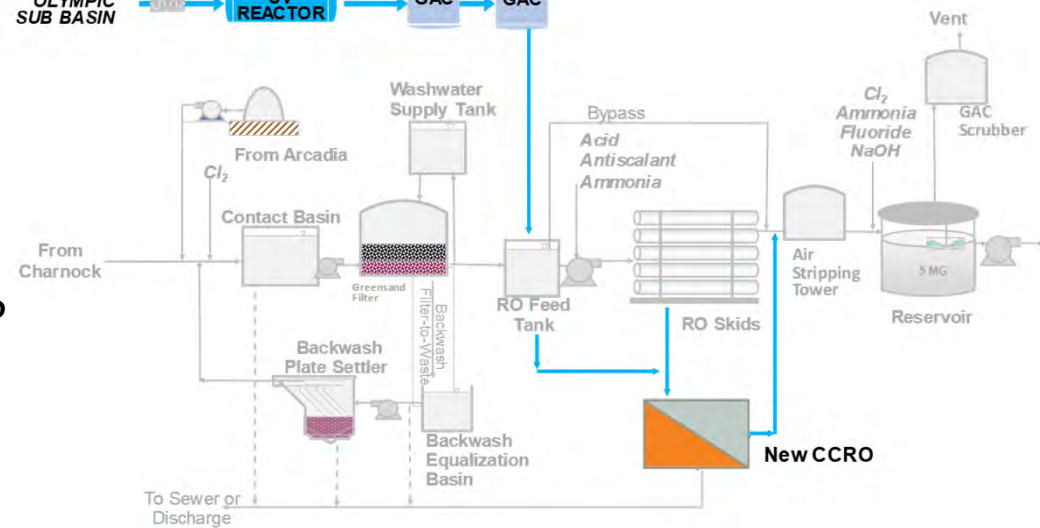
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graph LR
    SW[STORMWATER] --> J(( ))
    WW[WASTEWATER] --> J
    J --> MBR[MBR]
    MBR --> CF[CARTRIDGE FILTRATION]
    CF --> RO[RO]
    RO --> AOP[UV/Cl2 AOP]
    AOP --> FCD[FREE CHLORINE DISINFECTION]
  
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Groundwater Augmentation via Direct Injection at Olympic Sub Basin

The diagram illustrates the water treatment process for groundwater augmentation. It begins with a tank labeled "E CHLORINE DISINFECTION". An arrow points from this tank to a "DIRECT INJECTION" point, which is shown as a vertical pipe entering the "OLYMPIC SUB BASIN". From the injection point, the water flows through a "UV REACTOR", then through two "GAC" (Granular Activated Carbon) filter units, and finally into a "DISTRIBUTION" system, represented by a network of pipes.

- Pending DDW guidelines
- <10% Contribution in Raw Water to Arcadia WTP
- Additional treatment through UV/H₂O₂ AOP, GAC, and RO at Arcadia WTP
- Existing Arcadia WTP is a 97-005 facility



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THANK YOU FOR YOUR TIME!