CITY OF MORGAN HILL

Morgan Hill Water

2020 Urban Water Management Plan Update

Town Hall - September 1, 2021

Workshop Components

- Introduction & Background
- Water System
- Ground Water Supply
- Water Conservation
- Recycled Water Planning
- Next Steps

Background

City of Morgan Hill

- Water Retailer
- Local Government – Enforcement Authority

Valley Water

- Water Wholesaler
- Groundwater Management Agency

Our Water Supply

CITY OF MORGAN HILL

Morgan Hill is 100% Groundwater

- Two Aquifers
  - **Llagas subbasin** of the Gilroy-Hollister Groundwater Basin
  - **Coyote Valley Subarea** of the Santa Clara Subbasin of Santa Clara Valley Groundwater Basin
- We rely on Valley Water to recharge the groundwater in both locations
- The City pays Valley Water to pump water out of the ground, “Pump Tax”

Our Water Supply

CITY OF MORGAN HILL

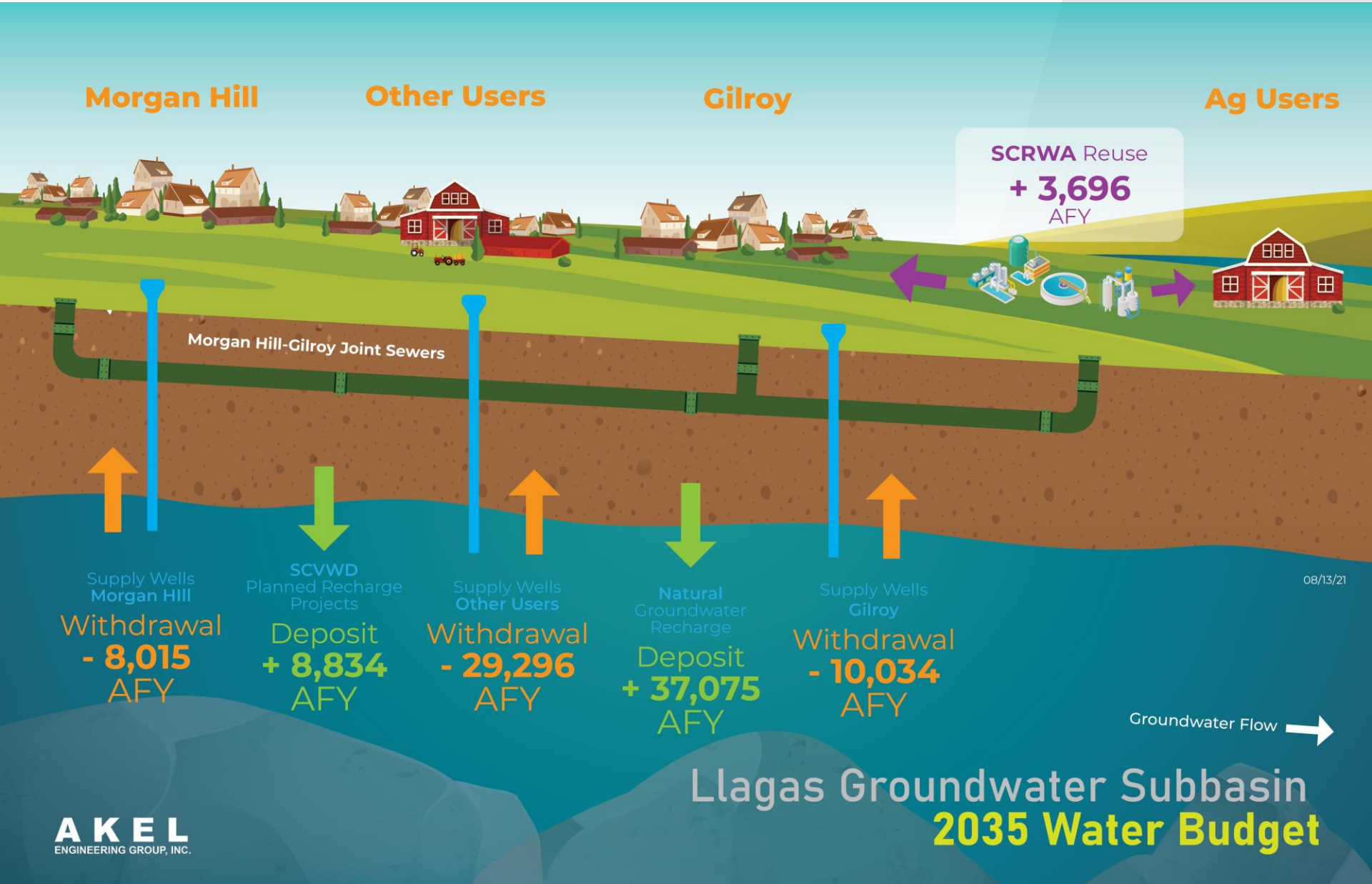
Water is a shared resource

- Communities across the State rely on imported water
- The City relies on Valley Water to recharge our aquifers
- Valley Water purchases imported water to support the region
- 55% of water used in Santa Clara County is imported

https://www.valleywater.org/your-water/where-your-water-comes

Our Water Supply

CITY OF MORGAN HILL



AKEL
ENGINEERING GROUP, INC.

Water System Funding

Morgan Hill is 100% Groundwater

- Rates of approximately $16.0M Annually
  - Rates Fund maintenance and operations of the City's supply system
  - The City pays Valley Water ~$4M annually in ground water rates
- Impact Fees are collected to pay for any system expansions needed so that ratepayers are not forced to pay for development related costs

Water System Planning

CITY OF MORGAN HILL

Major Planning Components

- Urban Water Management Plan – Every 5 Years as required by the State
- Water Loss Contingency Plan – newly required as a separate document
- Water Supply Master Plan – Determines needs of the water system and is the base for user fees and impact fees
- Water Rate Study – Establishes user rates
- Impact Fee Study – Establishes impact fees

Morgan Hill's Water System

Morgan Hill Water System

Water System Setup

- Subbasins (Aquifers).
- Wells
- Storage Tanks
- Booster Stations
- Piping Network
- SCADA (Supervisory Control and Data Acquisition).

Water Supply Capacity and Aquifer Recharge Options

- Wells capacity
- Recharging the aquifers
- Staff work with Valley Water and Future Projects.
- Chart of wells levels (Current versus previous drought)

Service Area and Water Supply vs Demand Tables.

- Service Area
- Water projection table for each subbasin
- Summary

Morgan Hill Water System

MH gets water from one source: Groundwater

That groundwater comes from two subbasins or (aquifers):

Llagas and Coyote which are managed by the Valley Water District.

(What is an aquifer? An aquifer is an underground layer of water-bearing permeable rock.)

Morgan Hill Water System

16 Wells

The groundwater is pumped from the two aquifers using 16 municipal wells with a total pumping capacity of approximately 15mgd. Three (3) wells get their water from the Coyote subbasin while the thirteen (13) other wells get their water from the Llagas subbasin. The wells range from 10-16 inches in diameter and 300-380 feet in depth.

Morgan Hill Water System

12 Storage Tanks

The storage tanks have a total capacity of 10.23 million gallons and store the treated water that is distributed in the system.

They store enough water to serve the residents and allow staff enough time to respond and make repairs to water emergencies.

Morgan Hill Water System

10 Booster Stations

The booster stations play a crucial role; they help to pressurize the system so we can fill the storage tanks and move water through the transmission and distribution water lines.

Morgan Hill Water System

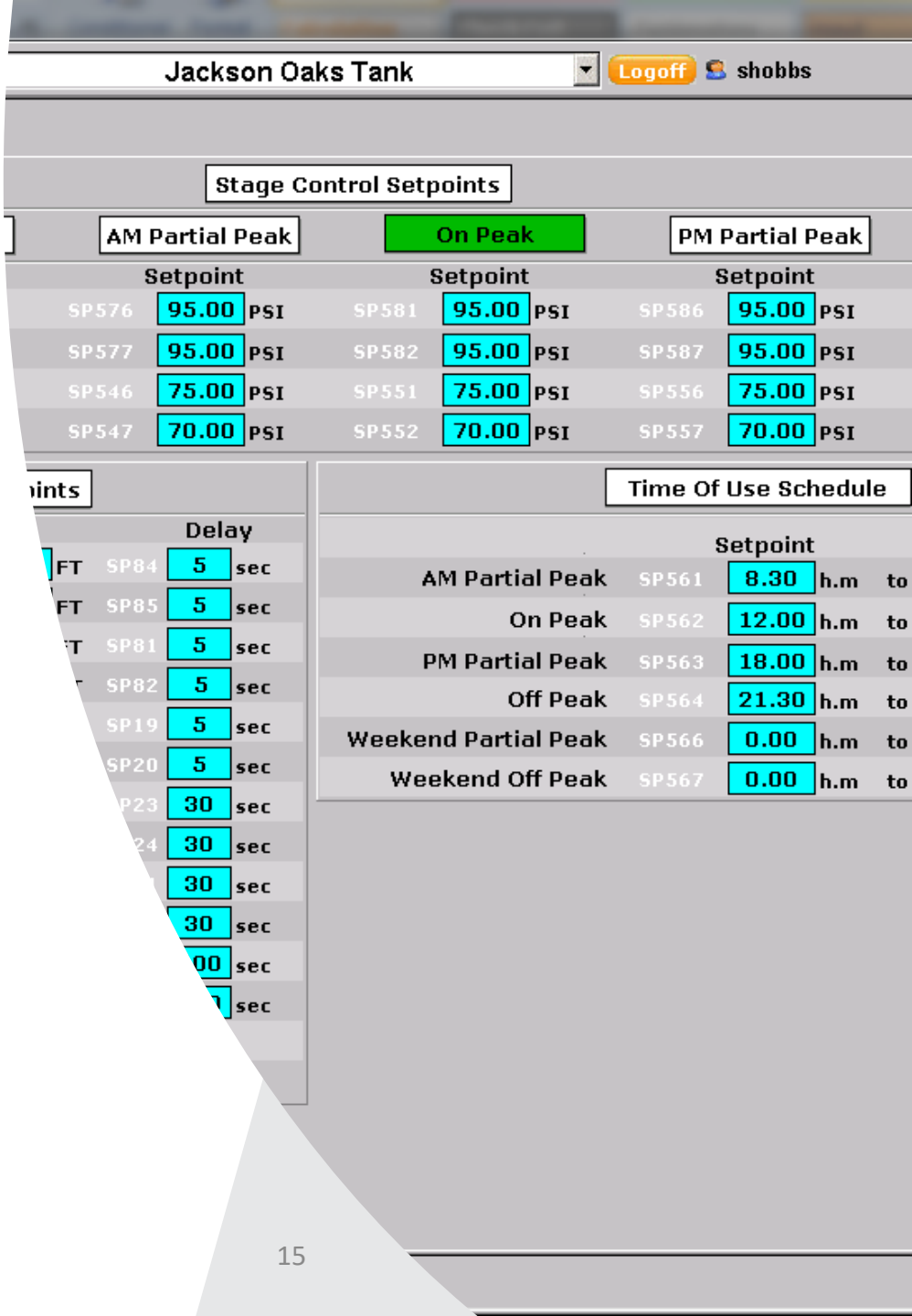
175 Miles of Pipe

175 miles of piping of different sizes and materials which form the transmission and distribution network for delivering treated water to homes and businesses throughout our service area.

Morgan Hill Water System

SCADA

The remote sub-systems mentioned earlier have associated electrical, communications, and instrumentation controls which allow us to monitor the sites continuously using our supervisory control and data acquisition (SCADA) system.



Supply Capacity and Aquifer Recharge Options

Wells capacity

- The combined supply capacity for the 16 wells is approximately 18,600 acre-feet per year with a firm capacity (minus largest unit) of approximately 16,700 acre-feet per year.

Recharge Options

- As we withdraw water from the aquifers, their water levels drop, and the levels will continue to drop until we either stop/reduce pumping or until they are recharged. The situation becomes more challenging when we have a drought as we are experiencing right now.

Recharging the aquifers is done:

- Naturally through rainwater, and
- Imported water as Valley Water District is doing, to replenish our lakes, creeks, ponds, and dams.
- Use reclaimed water from the SRWWTP to recharge the Aquifers.

Figure 2. Estimated Cumulative Managed Recharge in the Coyote Valley

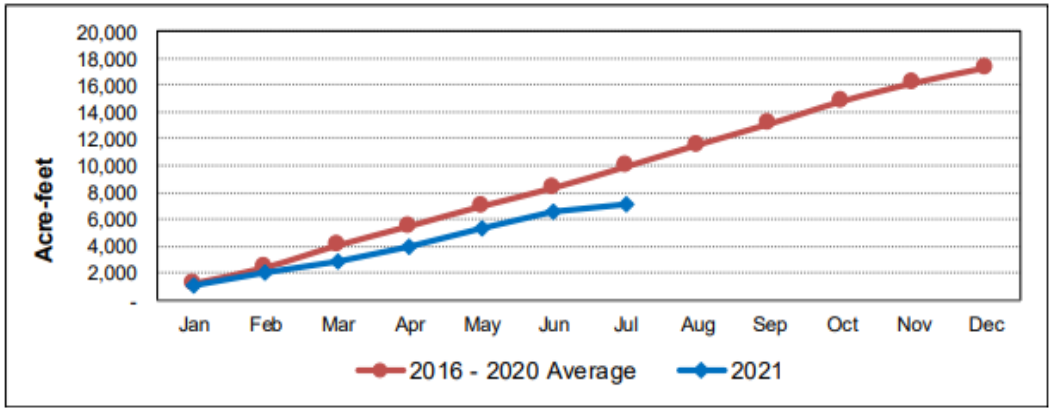
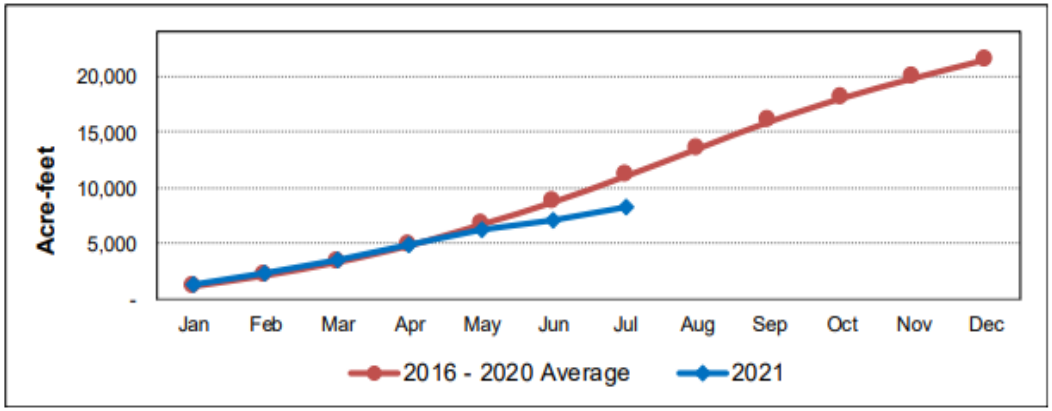


Figure 3. Estimated Cumulative Managed Recharge in the Llagas Subbasin



Morgan Hill Water System

CITY OF MORGAN HILL

Staff work with Valley Water

Staff continuously monitor our wells' water levels and have regular meetings with Valley Water every two months to ensure the recharge of the aquifers.

Future Projects

- City staff is looking at all options on recycled water as a means of securing additional/new water supply for our community.
- Our 2017 Water System Master Plan calls for the City to install two new groundwater wells (2,600 AFY total capacity) by 2030 for serving anticipated population growth, we are currently exploring sites to build the wells.
- Start study of pipeline improvement project(s) to link the different water zones for increased reliability and redundancy.
- Water supply facility improvements (reservoirs repairs and re-coating) and upsize two (2) existing ones from 0.1 to 0.25 million gallons.

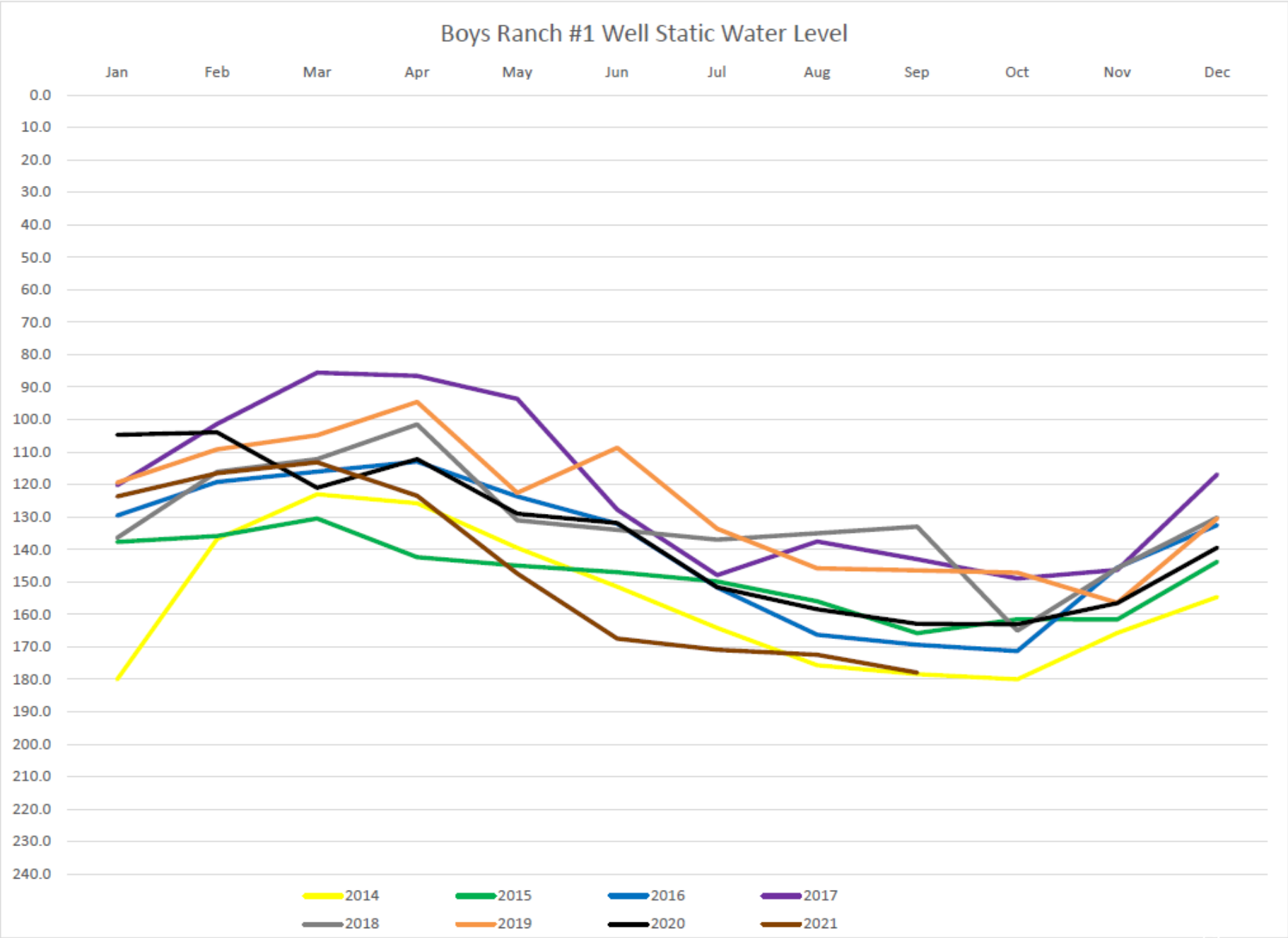
Morgan Hill Water System

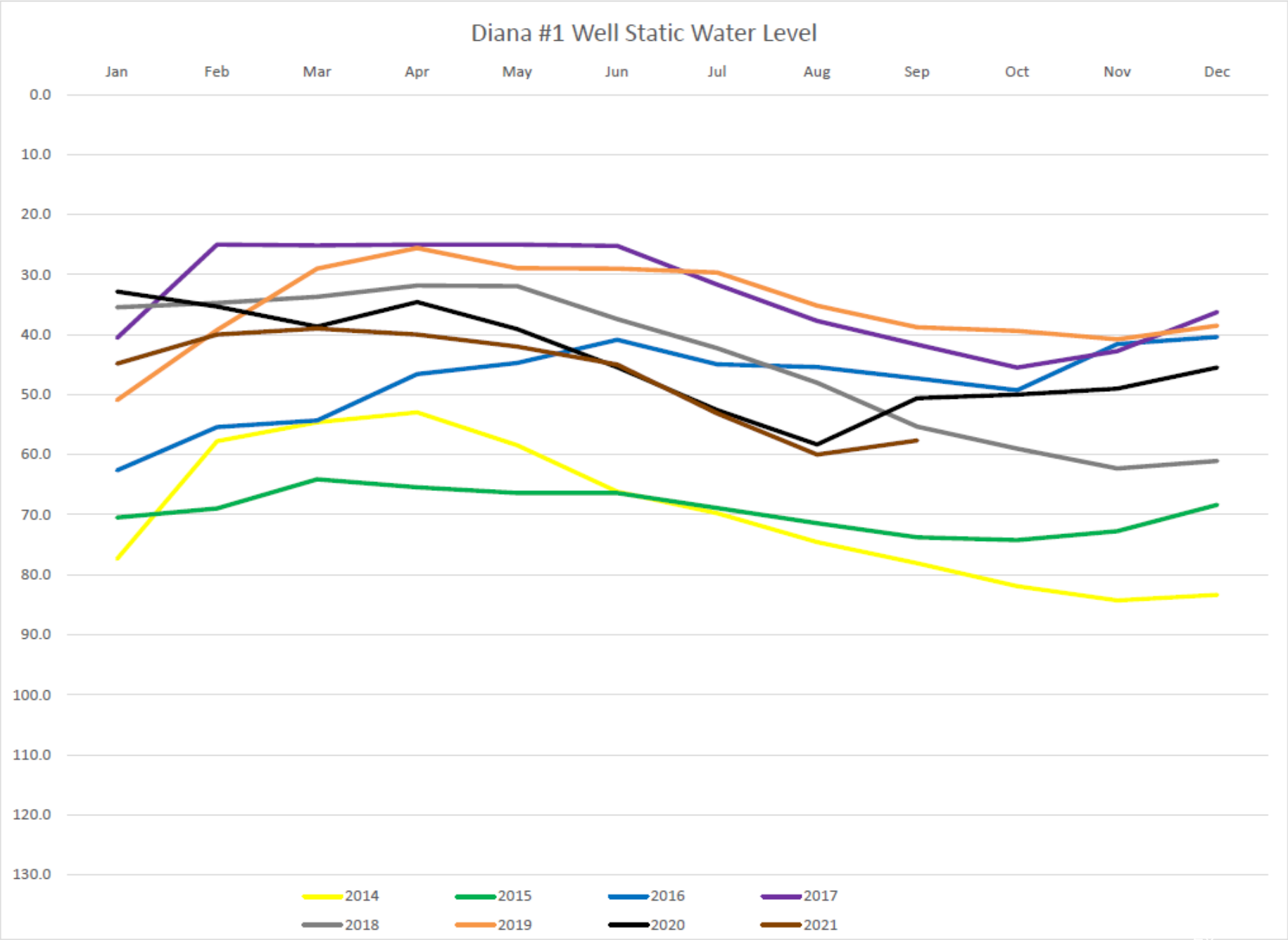
Chart of well levels (Current versus previous drought)

A graphical representation of the well levels for each subbasin for the past 8 years is shown below:

Coyote Subbasin: Boys Ranch Well # 1

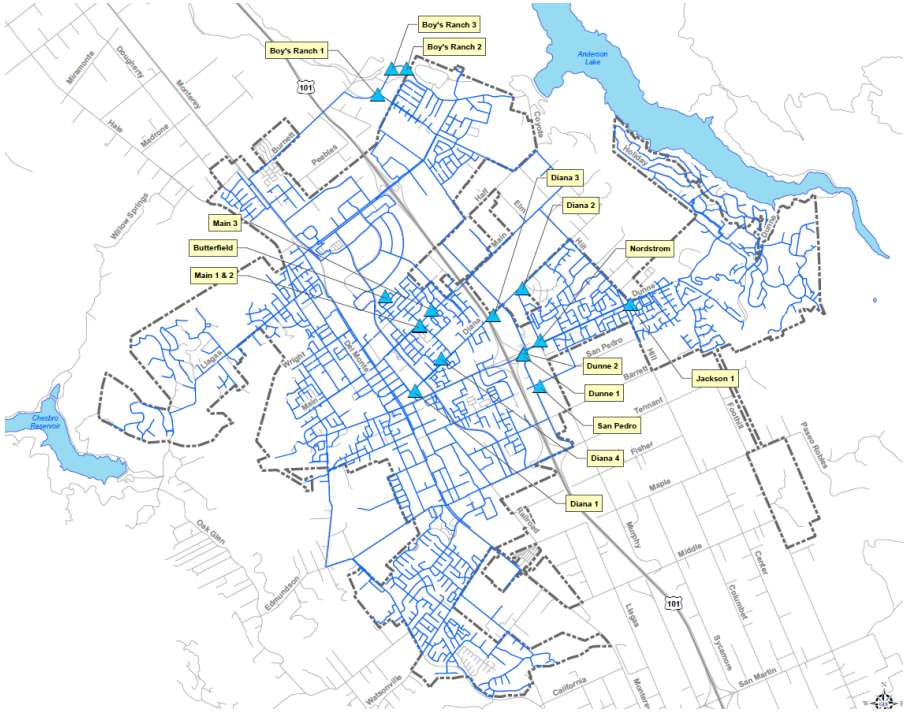
Llagas Subbasin: Diana Well # 1


Boys Ranch #1 Well Static Water Level
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
210.0
220.0
230.0
240.0
2014
2015
2016
2017
2018
2019
2020
2021


Diana #1 Well Static Water Level
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
2014
2015
2016
2017
2018
2019
2020
2021

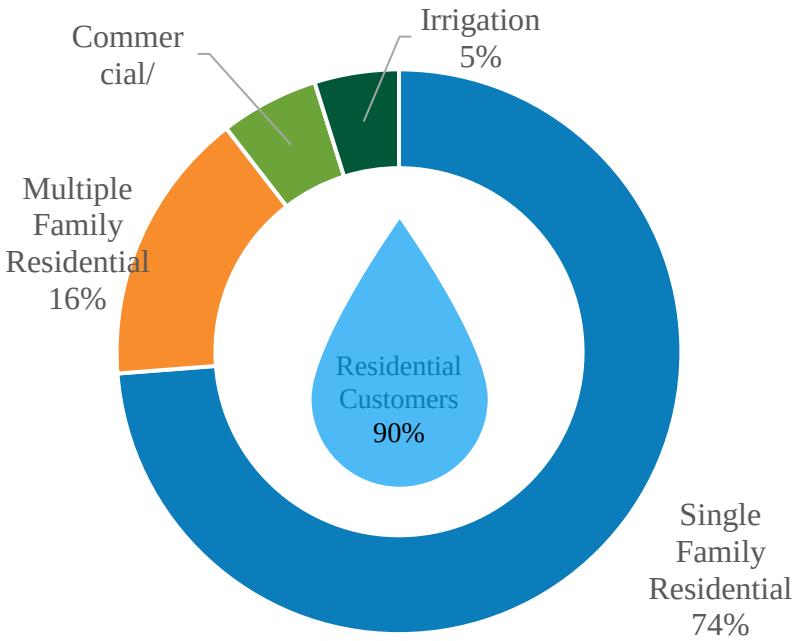
Water Service Overview

- 46,500 population in 2020
- 14,400 active service connections

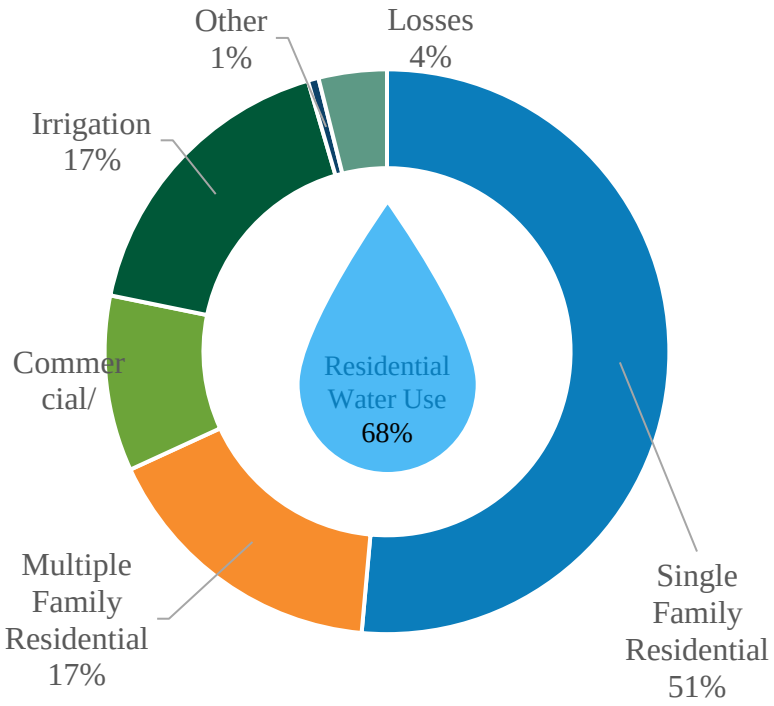


Service Connections vs Water Use

Service Connections



Water Use



Water Supply vs Demand (Llagas Subbasin)

Normal Year Supply and Demand Comparison (Llagas)					
	2025	2030	2035	2040	2045
Projected Water Supply of the Llagas Subbasin					
Natural Groundwater Recharge	22,478	22,478	22,478	22,478	22,478
Local Surface Water	10,251	13,408	14,597	14,832	15,199
Valley Water CVP Deliveries	12,918	9,626	8,834	8,415	8,201
Recycled Water Supply	1,673	2,069	2,464	2,464	2,464
Recycled Water (WWTP Utility Water)	1,224	1,228	1,232	1,232	1,232
Total Supplies with WWTP Utility Water	48,544	48,808	49,605	49,420	49,574
Total Supplies	47,320	47,580	48,373	48,188	48,342
Projected Average Annual Water Demand					
City of Gilroy	8,646	9,314	10,034	10,809	11,645
City of Morgan Hill	6,865	7,507	8,015	8,557	9,083
Other Users	31,455	30,057	29,296	27,832	26,644
Total Demands	46,966	46,878	47,345	47,198	47,372
Supply vs Demand Comparison					
Difference (Supply - Demand)	354	702	1,028	990	970
Percent of Total Supply	99%	99%	98%	98%	98%

Water Supply vs Demand (Coyote Subbasin)

Normal Year Supply and Demand Comparison (Coyote)					
	2025	2030	2035	2040	2045
Projected Water Supply of the Llagas Subbasin					
Natural Groundwater Recharge	2,301	2,304	2,304	2,304	2,304
Local Surface Water	5,167	6,481	6,495	6,503	6,494
Valley Water CVP Deliveries	4,996	4,377	4,965	5,506	5,852
Total Supplies	12,465	13,162	13,764	14,313	14,650
Projected Average Daily Water Demand					
City of Morgan Hill	1,806	1,974	2,108	2,251	2,389
Other Users	9,316	9,489	9,999	10,427	10,636
Total Demands	11,122	11,463	12,107	12,678	13,025
Supply vs Demand Comparison					
Difference (Supply - Demand)	1,343	1,699	1,657	1,635	1,625
Percent of Total Supply	89%	87%	88%	89%	89%

Morgan Hill Water Systemic

Our water supply for 2020 was 7,808 acre-feet which averages to about 7.0 mgd. Our target gallons per capita demand (gpcd) was 159 gpcd, and our actual was 150 gpcd.

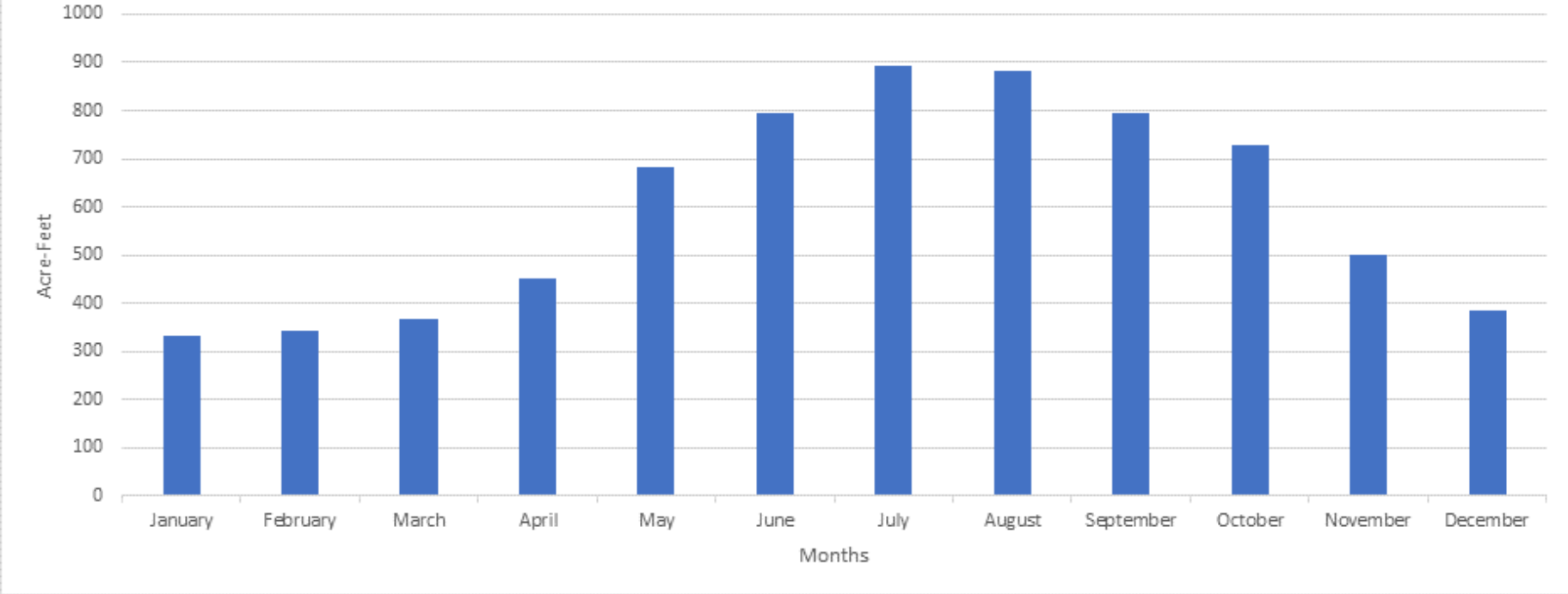
The existing firm capacity (approximately 16,700 acre-feet per year) meets the City's current demands. As demands increase, additional groundwater wells and other infrastructure will be constructed as necessary.

Water Conservation & Sustainable Supply

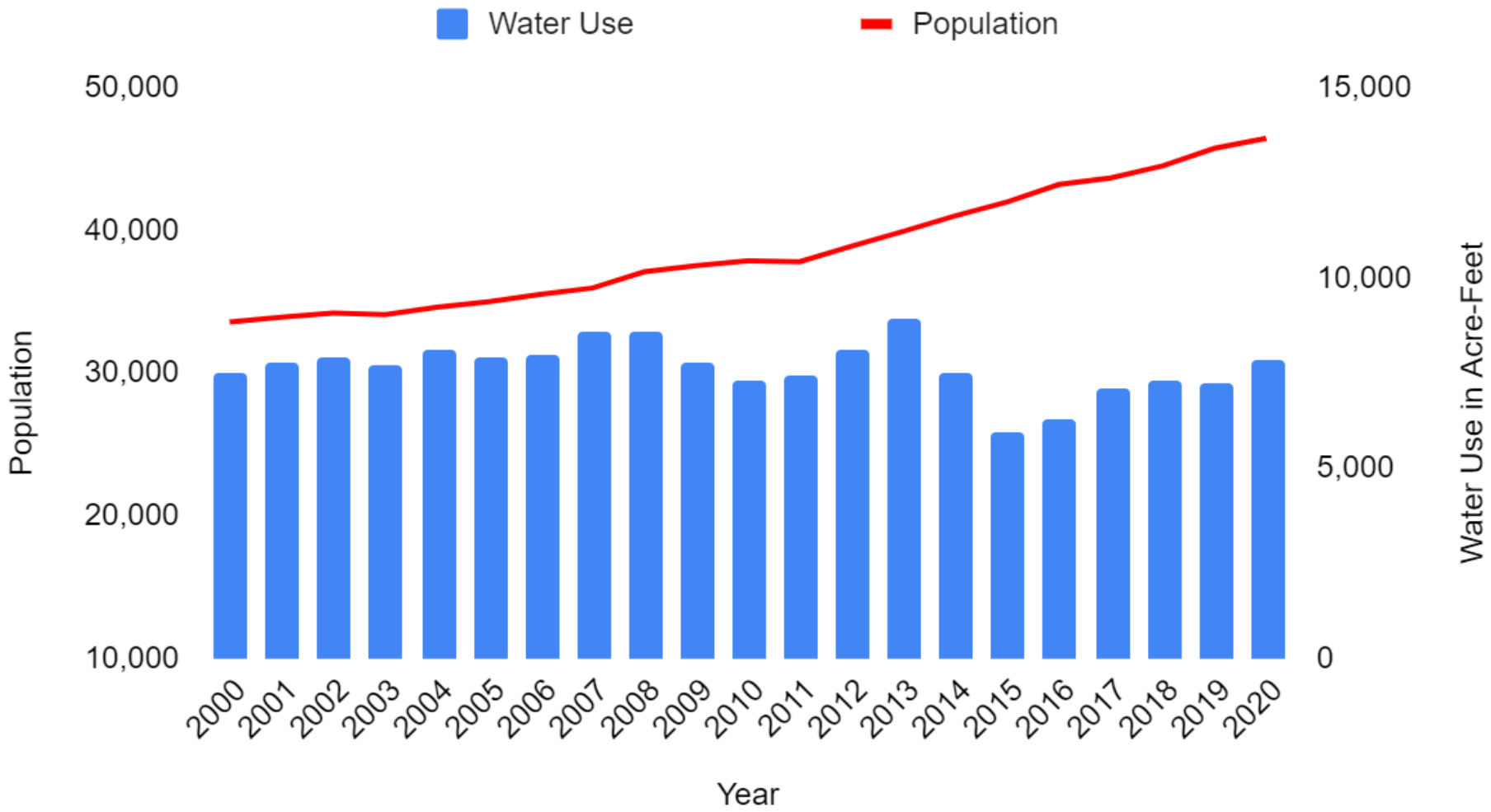
Conservation Outline

- How We Use Water
- Current Approach
- Recommended Approach
- Planning for a Sustainable Water Supply
- Water Shortage Contingency Plan

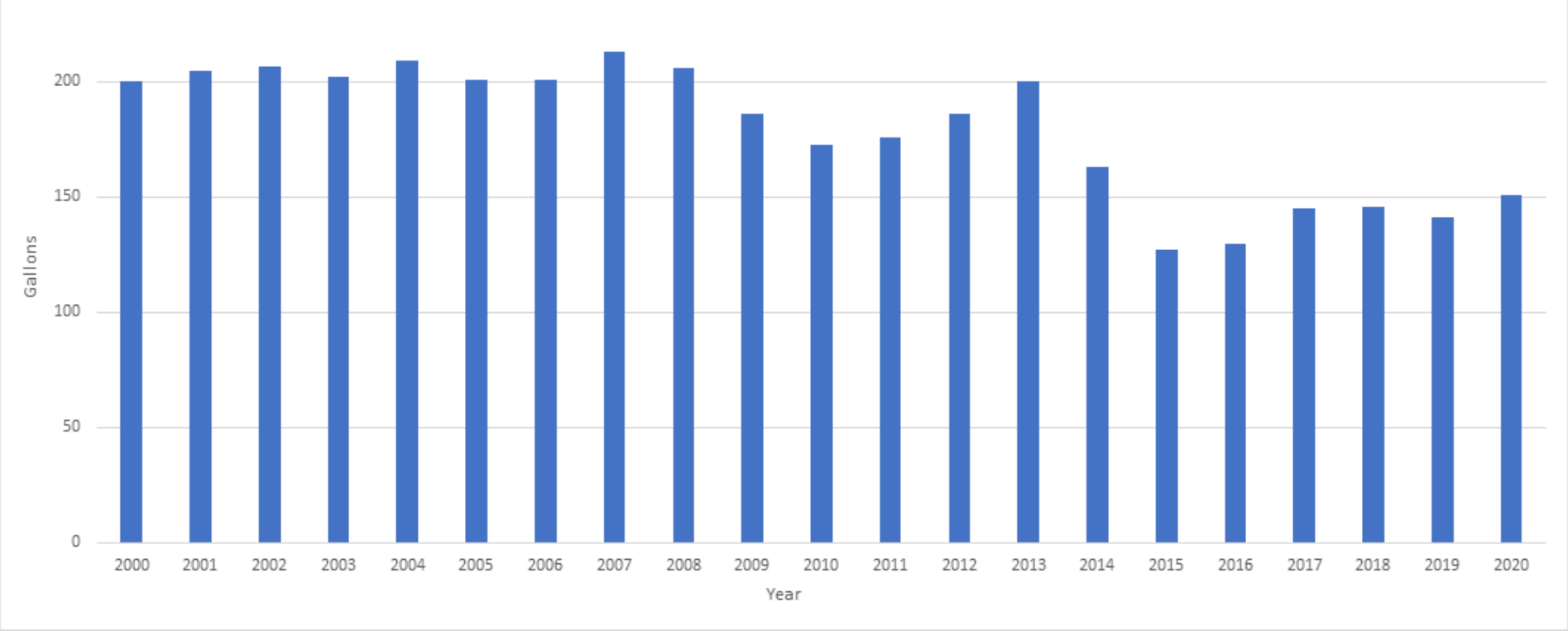
Average Monthly Water Use



Morgan Hill Population and Water Use 2000 - 2020



Water Use Daily Per Person



Morgan Hill Water Shortage Levels

Shortage Level	Shortage Level Condition	Percentage Range
Level 0	Normal	Up to 10%
Level 1	Alert	Up to 20%
Level 2	Severe	Up to 40%
Level 3	Crisis	>40%

Permanent Water Waste Rules

- Limits on Watering Hours, Days, and Duration
- No Excessive Water Flow or Runoff
- No Washing Down Hard or Paved Surfaces
- Obligation to Fix Leaks, Breaks or Malfunctions
- Recirculating Water Required for Water Fountains and Decorative Water Features
- Limits on Washing Vehicles
- Drinking Water Served Upon Request Only

Permanent Water Waste Rules

- Commercial Lodging Establishments Must Provide Guests Option to Decline Daily Linen Services
- No Installation of Single Pass Cooling Systems
- No Installation of Nonrecirculating in Commercial Car Wash and Laundry Systems
- Restaurants Required to Use Water Conserving Dish Wash Spray Valves.
- Commercial Car Wash Systems Must Recycle

Current Levels

- Level 1 – almost no change
- Level 2 – reduced two-day irrigation schedule in summer
- Level 3 – no irrigation + limits on serving new development (likely not enforceable on housing developments)
- No rationing or allocations
- No emphasis on enforcement effort
- Emphasis on faster leak repairs – unenforceable
- “Nuclear” approach to irrigation

Shortage Level	Percent Supply Shortage/ Reduction	Morgan Hill Shortage Level	*Valley Water Shortage Level Title*	Water Supply Condition
Level 0	**None**	**Normal**	*Normal*	At Level 0, no Water Supply Shortage condition exists.
Level 1	**Up to 10%**	**Alert**	*Alert*	A Level 1 Water Supply Shortage condition exists when City Council determines and agrees that 1% - 10% consumer demand reduction is necessary to make more efficient use of water.
Level 2	**11 to 20%**	**Significant**	*Severe*	A Level 2 Water Supply Shortage condition exists when City Council determines and agrees that 11% - 20% consumer demand reduction is necessary to make more efficient use of water.
Level 3	**21 to 30%**	**Severe**	*Critical*	A Level 3 Water Supply Shortage condition exists when City Council determines and agrees that 21% - 30% consumer demand reduction is necessary to make more efficient use of water.
Level 4	**31 to 40%**	**Critical**	*Critical*	A Level 4 Water Supply Shortage condition exists when City Council determines and agrees that 31% - 40% consumer demand reduction is necessary to make more efficient use of water.
Level 5	**41 to 50%**	**Crisis**	*Emergency*	A Level 5 Water Supply Shortage condition exists when City Council determines and agrees that 41% - 50% consumer demand reduction is necessary to make more efficient use of water.
Level 6	**> 50%**	**Emergency**	*Emergency*	A Level 6 Water Supply Shortage condition exists when City Council determines and agrees that a consumer demand reduction of greater than 50% is necessary to maintain public water supplies.

Level	Restrictions and Prohibitions on End Users Category	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
Level 0 *(Year-Round)*	Landscape - Limit landscape irrigation to specific times	Prohibits watering or irrigating lawn, landscape, or other vegetated area 9:00 a.m. and 5:00 p.m. with the following exceptions: - Using a hand-held bucket or similar container - Using a hand-held hose equipped with a positive self-closing water shut-off nozzle or device - For very short periods of time for the express purpose of adjusting or repairing an irrigation system	Yes
Level 0 *(Year-Round)*	Landscape - Limit landscape irrigation to specific times	Prohibits watering or irrigating of lawn, landscape, or other vegetated area using a system or device that is left unattended for more than fifteen (15) minutes per day per station. Exceptions include low-flow drip systems where no emitter produces flow more than two (2) gallons per hour, and weather based controllers or stream rotor sprinklers with 70% efficiency standard.	Yes
Level 0 *(Year-Round)*	Landscape - Restrict or prohibit runoff from landscape irrigation	Prohibits watering or irrigating of lawn, landscape, or other vegetated area that causes or allows excessive flow or runoff onto sidewalk, driveway, street, etc.	Yes
Level 0 *(Year-Round)*	Other - Prohibit use of potable water for washing hard surfaces	No washing down hard or paved surfaces except with the use of hand-held water container, hand-held hose with a positive self-closing water shut-off device, low-volume high-pressure cleaning machine equipped to recycle any water used, or low-volume high-pressure water broom.	Yes
Level 0 *(Year-Round)*	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Requires repairs to be made to breaks, leaks, or other malfunctions no more than ten (10) days upon receiving written notice from the City.	Yes

Level	Restrictions and Prohibitions on End Users Category	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
Level 0 *(Year-Round)*	Water Features - Restrict water use for decorative water features, such as fountains	Prohibits operation of a water fountain or decorative water features that does not use recirculated water.	Yes
Level 0 *(Year-Round)*	Other	Prohibits using water to wash a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not except by the use of a hand-held water container or hand-held hose with a positive self-closing water shut-off device. This does not apply to any commercial car washing facility.	Yes
Level 0 *(Year-Round)*	CII - Restaurants may only serve water upon request		Yes
Level 0 *(Year-Round)*	CII - Lodging establishment must offer opt out of linen service	Requires hotels, motels, and other commercial lodging established to provide customers the option of not having towels and linen laundered daily. Commercial lodging establishments must prominently display notice of this option in each bathroom using clear and easily understood language.	Yes
Level 0 *(Year-Round)*	CII - Other CII restriction or prohibition	Prohibits installation of a single pass cooling system for buildings requesting new water service.	Yes
Level 0 *(Year-Round)*	CII - Other CII restriction or prohibition	Prohibits installation of non-recirculating water systems in new commercial conveyor car wash and new commercial laundry systems.	Yes
Level 0 *(Year-Round)*	CII - Commercial kitchens required to use pre-rinse spray valves	Prohibits the use of non-water conserving dishwasher spray valves in food preparation establishments, such as restaurants or cafes.	Yes

Level	Restrictions and Prohibitions on End Users Category	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
Level 0 *(Year-Round)*	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	All commercial conveyor car wash systems must have installed recirculating water systems, or secured a waiver of this requirement from the City.	Yes
Level 0 *(Year-Round)*	Landscape - Limit landscape irrigation to specific days	Limits watering or irrigating of lawn, landscape or other vegetated area to three days per week during the months of March through October. Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to no more than one day per week during the months of November through February. This provision does not apply to landscape irrigation zones that exclusively use very low flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour. This provision also does not apply to watering or irrigating by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or for very short periods of time for the express purpose of adjusting or repairing an irrigation system.	Yes
Level 1	Expand Public Information Campaign	Communication campaign asking community to conserve water use.	Yes
Level 2	Expand Public Information Campaign	Targeted communications relating to leaks and high water users.	Yes
Level 3	Landscape - Limit landscape irrigation to specific days	Active enforcement of limiting watering or irrigating of lawn, landscape or other vegetated area to 3 times per week during March to October.	Yes

Level	Restrictions and Prohibitions on End Users Category	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
Level 3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Prohibits using water to wash a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not except at a commercial car washing facility that utilizes a recirculating water system to capture or reuse water.	Yes
Level 3	Implement or Modify Drought Rate Structure or Surcharge	Imposition of alternative "drought" rate schedule if City adopts such a schedule.	Yes
Level 4	Landscape - Limit landscape irrigation to specific days	Active enforcement of limiting watering or irrigating of lawn, landscape or other vegetated area to 2 times per week during March to October.	Yes
Level 5	Landscape - Limit landscape irrigation to specific days	Active enforcement of limiting watering or irrigating of trees and shrubs to 1 time per week during March to October.	Yes

Level	Restrictions and Prohibitions on End Users Category	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
Level 5	Moratorium or Net Zero Demand Increase on New Connections	Limits on New Potable Water Service: Upon declaration of a Level 5 Water Shortage Crisis condition, the City may limit the issuance of new potable water services, temporary meters and/or statements of immediate ability to serve or provide potable water service (such as, will-serve letters, certificates, or letters of availability), except under the following circumstances: - A valid, unexpired building permit has been issued for the project; - The project is necessary to protect the public health, safety, and welfare; - The applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s) to the satisfaction of the City. - This provision does not preclude the resetting or turn-on of meters to provide continuation of water service or the restoration of service that has been interrupted for a period of one year or less.	Yes
Level 5	Landscape - Limit landscape irrigation to specific days	No irrigation for turf, except turf utilized for active recreation at a school, park, or public facility may remain at 2 times per week during March to October.	Yes
Level 6	Landscape - Limit landscape irrigation to specific days	No irrigation allowed.	Yes
Note: Active enforcement means utility AMI data would be mined to find water users not abiding by published schedule + utility to allocate funds to contract or hire 1 FTE enforcement officer.			

Sustainable Water Supply

CITY OF MORGAN HILL

More About Climate Change, Biology, and Infrastructure Failures than Growth

- Recycled Water – ultimate resilient supply
- Drought Rate Schedule – new tool for water shortages
- Penalty Rate Schedule – new enforcement tool
- Water Offsets – “new” water for new growth

Recycled Water

Recycled Water Options

CITY OF MORGAN HILL

Past Planning Work with Valley Water/Gilroy

- Draft Countywide Reuse Master Plan (Core Plan)
- 2015 South County Recycled Water Master Plan

Table 6-9. Potential Future South County Reuse Opportunities

Reuse Type	Source Flow	Delivery Point	Summary	Capital Cost ($2019)
NPR	SCRWA	New Morgan Hill NPR distribution system	Per the 2015 South County RWMP, extend pipeline parallel to existing joint sewer trunk line to convey recycled water from SCRWA in Gilroy to Morgan Hill	$60M [a]
NPR+	SBWR	New Morgan Hill NPR distribution system	Extend Silver Creek Pipeline from Metcalf Energy Center to customers in Morgan Hill; includes a 6-mile pipeline extension and serving peak demands up to 5 mgd for an estimated annualized NPR demand of 2,900 AFY Referred to as Morgan Hill OPTION 1	$70M [b]
GWR	Morgan Hill satellite WWTP and AWPF	San Pedro Ponds (assumed location for design and costs)	Recharge Llagas Subbasin using purified water from a satellite WWTP and AWPF in Morgan Hill (flow diverted from the SCRWA trunk line) Referred to as Morgan Hill OPTION 2	$130M [b]
SWA	Morgan Hill satellite WWTP and AWPF	Anderson Reservoir	Augment Anderson Reservoir using purified water from a satellite WWTP and AWPF in Morgan Hill, pumping to the reservoir for blending and dilution, and subsequently treating at Santa Teresa and/or Rinconada WTPs. In exchange, Valley Water would recharge Llagas Subbasin with equal volume of raw water from Santa Clara Conduit Referred to as Morgan Hill OPTION 3	$150M [b]

https://www.valleywater.org/your-water/recycled-and-purified-water

Recycled Water Options

Future Work

- Continue to explore in more detail the current options identified to determine best path forward
  - Each option has some flaws
  - All must be explored in partnership with Valley Water and Gilroy

- Treated Water Augmentation
  - Delivery of purified water into the potable water distribution system
  - State guidelines are nearing completion

Next Steps

Next Steps

- Urban Water Management – October 6
- Monitor drought situation and update water conservation needs as necessary
- Continue to work with Valley Water on drought contingency and water conservation planning as it relates to non-City users
- Continue/accelerate work on recycled water planning with our partners
- Prepare to include recycled water in Water System Master Plan – late 2021
- Update Water System Master Plan
- Water Rate Study – early 2022

Questions?

CITY OF MORGAN HILL