

# 5

## WATER SUPPLY RELIABILITY & WATER SHORTAGE CONTINGENCY PLANNING

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### 5.1 Water Supply Reliability

***Urban Water Management Planning Act Requirement:***

*10620(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.*

Water supply reliability includes both the availability of the groundwater and the distribution and storage facilities that make up the City’s water system. The City of Morgan Hill is dependent upon groundwater and currently has no need to import water from other regions for its regular water supply. To ensure the local supplies are maximized to meet demands, the City of Morgan Hill monitors population growth and associated demands and implements a capital improvement program to construct additional wells, as necessary, to utilize the additional groundwater supplies available.

***Urban Water Management Planning Act Requirement:***

*10631(c)(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.*

Currently, the only source of water that the City of Morgan Hill utilizes is supplier-pumped groundwater. Legal factors do not impact the availability of the water supply, since the Santa Clara Subbasin and Llagas Subbasin are not adjudicated. Additionally, no environmental factors limit the availability of supply. The factors that do affect the reliability of the water supply from these two groundwater basins are summarized in Table 5.1.1, which includes water quality

and climactic factors, which are described in detail below. Both factors affecting the reliability of water supply can have impacts at the Llagas Subbasin supply and the Coyote Valley supply. Therefore, both supplies are discussed simultaneously.

Table 5.1.1					
Factors Resulting in Inconsistency of Supply					
Water Supply Sources	Legal	Environmental	Water Quality	Climatic	Additional information
Llagas			✓	✓	
Coyote Valley			✓	✓	

### Water Quality

Water quality reliability issues include water contamination due to biological and chemical factors. Specifically, the City of Morgan Hill potential water quality impacts are related to perchlorate and hexavalent chromium contamination. A detailed review of water quality issues is provided in Section 5.3.

### Climatic

It has been observed that the groundwater levels in the Santa Clara and Llagas subbasins are highly dependent on rainfall levels and tend to be very dynamic in years of high or low amounts of rainfall. Inconsistency in water levels due to drought is a short-term event that can significantly impact the water supply to the City of Morgan Hill. Currently, the Santa Clara Valley Water District, in conjunction with the City of Morgan Hill and its other member agencies, has several preventative measures in place to mitigate the effects a drought may have on the overall water supply. These effects include:

- Maintaining a groundwater recharge system. SCVWD imports raw water and manages a recharge system to maintain groundwater levels. Droughts may reduce the amount of raw water available to supplement natural recharge (which will also decrease with decreased rainfall during a drought), which has been shown to reduce groundwater levels.
- Maintaining a surplus supply. A surplus of water is necessary for SCVWD to ensure that a reliable water source is available. During drought, decreased groundwater and

imported water with increasing demand puts strain on the surplus. As the surplus dwindles, the outlook for future water supplies becomes less reliable and alternate, usually more expensive and less reliable, sources must be considered.

- Maintaining water connections for imported water. SCVWD supplies water provided through other districts and programs such as the SWP. As the effects of droughts increase, potable water from these additional sources must be rationed to meet the needs of a much larger population than just the SCVWD.

For more information on the mitigating the effects of a drought, see Section 5.4: Drought Planning, which identifies the water reliability during normal, single dry, and multiple dry years.

## 5.2 Water Shortage Contingency Planning

### ***Urban Water Management Planning Act Requirement:***

*10632(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*

Catastrophic failures that put the water supply at risk include fires and earthquakes that could damage the infrastructure to the water distribution system. In the event of a catastrophic event that prevents the City of Morgan Hill from obtaining water for distribution, the Santa Clara Valley Water District (SCVWD) implements actions and methods to continue supplying water to customers of its member agencies. Among these methods to ensure that water is continually supplied to the customers include stockpiling emergency pipeline repair materials, the addition of groundwater wells and line valves, and working with state, county, and local personnel in the event of a catastrophic emergency. Furthermore, effects from earthquakes and power outages are considered in the City of Morgan Hill's Water Shortage Contingency Plan.

Currently, the City's water storage facilities contain water reserves equivalent to approximately 1.25 days of average water use in the event of a catastrophic event. The City is considering the construction of additional reservoirs to address the need for added capacity under these scenarios, as well as operational and fire reserve requirements, consistent with APWA guidelines.

The City of Morgan Hill has an Emergency Response Plan that serves to address the City's catastrophic water supply interruption response(s) in the following areas:

### Regional Power Outage

In order to mitigate the impacts of a regional power outage, the City of Morgan Hill ensures that backup generators are easily accessible or transportable to wellheads to ensure continuous pumping into the water distribution system. In the case of a power outage, emergency generators are to be placed on-line to provide minimum water pressure to the system and disinfectant residual to be increased to prevent potential contamination. The City of Morgan Hill has 22 backup generators available for use in maintaining the water supply during a power outage.

### Earthquake

In order to mitigate the impacts associated with a large-scale earthquake, the City of Morgan Hill identifies specific emergency actions to implement, including facility inspections and repairs. A large scale earthquake has the potential to damage water supply lines resulting in leaks. The following specific actions are taken to maintain a reliable supply of water:

- Leaks – Increase system disinfectant residual, determine locations of leaks and make temporary repairs, isolate leaks by turning off power or flow if required for repair or replacement, prioritize repairs by maximum system population service lines, and disinfect all repairs.
- Low Pressure or Service Interruption – Increase production to provide maximum system output, and increase disinfectant residual as a precaution against potential contamination.

In addition to damage to the City of Morgan Hill system, a major earthquake would have the potential to affect the statewide water supply by damaging the San Francisco Bay Delta. If the levee system was damaged, the impacts would be catastrophic. Apart from the resulting flooding, the ineffective levee system would cut off the supply of water to millions of people within the State of California. Throughout California, water supplies would be reduced to using groundwater supplies and surplus storage.

It was estimated by the DWR that reservoir supplies could last at most 36 months, with extreme conservation methods in place. However, this would also require the excessive use of groundwater (where available to suppliers) which has the potential to overdraft groundwater basins to dangerously low conditions. Some basins may even be unavailable, due to initial seawater intrusion upon levee failure. In this event, the State would be required to enact the most stringent conservation methods and to ensure that water is carefully and strategically rationed to mitigate the effects. It is estimated that initial repairs to the levee system would take

15 months, and only be able to restore a portion of the water service. If this were to occur, SCVWD would lose a significant portion of its water supply from the SWP. To make up for this, SCVWD would resort to groundwater supplies from the Santa Clara Basin and Llagas Subbasin. Specific to Morgan Hill, this would put strain on the groundwater basins used to make-up for the lost water imported by SCVWD, creating a potential for seawater intrusion (due to flooding and overdraft) and resulting in diminished water supplies and quality.

The State has acknowledged that the best method to mitigate the effects of a catastrophic earthquake on the Sacramento – San Joaquin River Delta system is to prevent the levee failure. The State has initiated and is currently overseeing repairs to the levee system in hopes to prevent damage during an earthquake.

The California Department of Water Resources has conducted extensive studies and models on the events that may occur following catastrophic damage to the Delta levee system. Please see the DWR website for more information, as well as the statewide Water Shortage Contingency Plan that may be enacted in the event of a levee failure.

**Rationing Stages During a Water Shortage**

With population growth, energy shortages, earthquakes, and the threat of terrorism experienced by California; maintaining the gentle balance between water supply and demand is a complicated task that requires planning and forethought. In the event that a water shortage occurs, simple measures can be implemented to conserve the water supply at a public level. Below, stages are discussed during which various conservation measures will be imposed by the City of Morgan Hill.

<b>Table 5.2.1 Water Shortage Contingency — Rationing Stages to Address Water Supply Shortages</b>		
<b>Stage No.</b>	<b>Water Supply Conditions</b>	<b>% Shortage</b>
Level 0- Permanent Restrictions	Water conservation requirements are effective at all times and are permanent.	0 – 10%
Level 1	A Level 1 Water Supply Shortage exists when the City Council determines, in its sole discretion, that due to drought or other water supply conditions, a water supply shortage or threatened shortage exists and an 11% - 20% consumer demand reduction is necessary to make more efficient use of water and appropriately respond to existing water conditions.	11-20%

<p>Level 2</p>	<p>A Level 2 Water Supply Shortage exists when the City Council declares, in its sole discretion, that due to drought or other water supply conditions, a water supply shortage or threatened shortage exists and a 21% - 35% consumer demand reduction is necessary to make more efficient use of water and appropriately respond to existing water conditions.</p>	<p>21-35%</p>
<p>Level 3</p>	<p>A Level 3 Water Supply Shortage is referred to as a Water Shortage Emergency. A Level 3 condition exists when the City Council declares, in its sole discretion, a water shortage emergency and notifies its residents and businesses that a greater than 35% reduction in consumer demand is necessary to maintain sufficient water supplies for public health and safety, pursuant to Water Code Section 350 et seq.</p>	<p>&gt; 35%, including 50% reduction</p>

***Urban Water Management Planning Act Requirement:***

*10632(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*

*10632(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.*

In the event of a significant reduction of water supply, the City of Morgan Hill has several stages of actions to take and policies to implement to minimize the impacts of water shortage, prepare for an increase in shortage, and attempt to conserve water to prevent further shortage. The City has adopted Ordinance No. 1932 in May of 2009, which describes the measures to take in the event of a water shortage. The plan consists of permanent water use restrictions and three additional levels of conservation measures to take in the case of a shortage of supply. The level of conservation is determined by the percent shortage. Tables 5.2.2 and 5.2.3 provide an overview of the mandatory prohibitions and the consumption reduction methods the City will implement to compensate for the water shortage. A copy of City Ordinance 1932 is in Appendix F.

<b>Table 5.2.2</b>	
<b>Water Shortage Contingency — Mandatory Prohibitions</b>	
<b>Examples of Prohibitions</b>	<b>Stage When Prohibition Becomes Mandatory</b>
No use of Non-Recirculating Water for Fountains or Decorative Water Features	Level 0 – Permanent Restrictions
Restaurants to Serve Water Only Upon Request	Level 0 – Permanent Restrictions
No Installation of Single Pass Cooling Systems	Level 0 – Permanent Restrictions
No Installation of Non-Recirculating Commercial Car Wash and Laundry Systems	Level 0 – Permanent Restrictions
Restaurants must use water conserving dishwasher spray valves	Level 0 – Permanent Restrictions
No Washing Down Hard or Paved Surfaces	Level 1
No Watering or Irrigating	Level 3
No New Annexations	Level 3

<b>Table 5.2.3</b>		
<b>Water Shortage Contingency — Consumption Reduction Methods</b>		
<b>Consumption Reduction Methods</b>	<b>Stage When Method Takes Effect</b>	<b>Projected Reduction (%)</b>
Limits on Watering Days	Level 1	20%
Obligation to Fix Leaks, Breaks, or Malfunctions	Level 1	20%
Limits on Filling Ornamental Lakes or Ponds	Level 2	35%
Limits on Washing Vehicles	Level 2	35%
Limits on Filling Residential Swimming Pools & Spas	Level 2	35%
Limits on New Potable Water Service	Level 3	50%
Limits on Building Permits	Level 3	50%

**Level 0 – Permanent Restrictions on Water Use**

The following water conservation requirements, as described in Ordinance 1392, are effective at all times in the City of Morgan Hill and are permanent. These actions contribute to an estimated water use reduction of up to ten percent.

- **Limits on Watering Hours:** Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited between the hours of 9:00 a.m. and 5:00 p.m.

Pacific Standard/Daylight Savings Time on any day, except 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.

- **Limit on Watering Duration:** Watering or irrigating of lawn, landscape or other vegetated area with potable water using a landscape irrigation system or a watering device that is not continuously attended is limited to no more than fifteen (15) minutes watering per day per station. This subsection does not apply to landscape irrigation systems that exclusively use very low-flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour and weather based controllers or stream rotor sprinklers that meet a 70% efficiency standard.
- **No Excessive Water Flow or Runoff:** Watering or irrigating of any lawn, landscape or other vegetated area in a manner that causes or allows excessive water flow or runoff onto an adjoining sidewalk, driveway, street, alley, gutter or ditch is prohibited.
- **No Washing Down Hard or Paved Surfaces:** Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device, a low-volume, high-pressure cleaning machine equipped to recycle any water used, or a low-volume high-pressure water broom.
- **Obligation to Fix Leaks, Breaks or Malfunctions:** Excessive use, loss or escape of water through breaks, leaks or other malfunctions in the water user's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected and in no event more than ten (10) days of receiving written notice from the City, is prohibited.
- **Recirculating Water Required for Water Fountains and Decorative Water Features:** Operating a water fountain or other decorative water feature that does not use recirculated water is prohibited.
- **Limits on Washing Vehicles:** Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not is prohibited, except by use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility.

- **Drinking Water Served Upon Request Only:** Eating or drinking establishments, including but not limited to a restaurant, hotel, cafe, cafeteria, bar, or other public place where food or drinks are sold, served, or offered for sale, are prohibited from providing drinking water to any person unless expressly requested.
- **Commercial Lodging Establishments Must Provide Guests Option to Decline Daily Linen Services:** Hotels, motels and other commercial lodging establishments must 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.
- **No Installation of Single Pass Cooling Systems:** Installation of single pass cooling systems is prohibited in buildings requesting new water service.
- **No Installation of Non-recirculating Commercial Car Wash and Laundry Systems:** Installation of non-recirculating water systems is prohibited in new commercial conveyor car wash and new commercial laundry systems.
- **Restaurants Required to Use Water Conserving Dishwasher Spray Valves:** Food preparation establishments, such as restaurants or cafes, are prohibited from using non-water conserving dishwasher spray valves.
- **Commercial Car Wash Systems:** All commercial conveyor car wash systems must have installed operational recirculating water systems, or must have secured a waiver of this requirement from the City.

### Level 1 Water Supply Shortage (11% - 20% reduction)

The following mandatory water conservation requirements, in addition to the prohibited uses of water for water waste reduction, apply during such time that the Level 1 Water Supply Shortage is in effect per Ordinance 1932:

- **Limits on Watering Days.** Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to three to five days per week (as necessary to achieve reductions as determined in the discretion of the superintendent) on a schedule established and posted by the City. During the months of November through March, watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to no more than one day per week on a schedule established and posted by the City. 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.

- **Obligation to Fix Leaks, Breaks or Malfunctions.** All leaks, breaks, or other malfunctions in the water user’s plumbing or distribution system must be repaired within seventy-two (72) hours of notification by the City unless other arrangements are made with the City.
- **No Washing Down Hard or Paved Surfaces.** Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device, a low-volume, high-pressure cleaning machine equipped to recycle any water used, or a low-volume high-pressure water broom.

#### **Level 2 Water Supply Shortage (21% - 35% reduction).**

The following mandatory water conservation requirements, in addition to the prohibited uses of water for reducing water waste and Level 1 actions, apply during such time that the Level 2 Water Supply Shortage is in effect per Ordinance 1932:

- **Watering Days.** Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to two days per week (as necessary to achieve reductions as determined in the discretion of the superintendent) on a schedule established and posted by the City. During the months of November through March, watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to no more than one day per week on a schedule established and posted by the City. 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.
- **Obligation to Fix Leaks, Breaks or Malfunctions.** All leaks, breaks, or other malfunctions in the water user’s plumbing or distribution system must be repaired within

forty-eight (48) hours of notification by the City unless other arrangements are made with the City.

- **Limits on Filling Ornamental Lakes or Ponds.** Filling or re-filling ornamental lakes or ponds with potable water is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to declaration of a supply shortage level under this section.
- **Limits on Washing Vehicles.** Using water to wash or clean a vehicle, including but not limited to, any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not, is prohibited except at a commercial car washing facility that utilizes a recirculating water system to capture or reuse water.
- **Limits on Filling Residential Swimming Pools & Spas.** Re-filling of more than one foot and initial filling of residential swimming pools or outdoor spas with potable water is prohibited.

### **Level 3 Water Supply Shortage – Emergency Condition (Greater than 35% reduction)**

The following mandatory water conservation requirements, in addition to the prohibited uses of water for reducing water waste and Level 1 and Level 2 actions, apply during such time that the Level 3 Water Supply Shortage is in effect per Ordinance 1932:

- **No Watering or Irrigating.** Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited. This restriction does not apply to the following categories of use, unless the City has determined that recycled water is available and may be applied to the use:
  - Maintenance of vegetation, including trees and shrubs, that are watered using a hand-held bucket or similar container, hand-held hose equipped with a positive self-closing water shut-off nozzle or device;
  - Maintenance of existing landscape necessary for fire protection;
  - Maintenance of existing landscape for soil erosion control;
  - Maintenance of plant materials identified to be rare or essential to the well-being of protected species;
  - Maintenance of landscape within active public parks and playing fields, day care centers, golf course greens, and school grounds, provided that such irrigation does not exceed two (2) days per week for no more than fifteen (15) minutes

watering per day per station and is prohibited between the hours of 9:00 a.m. and 5:00 p.m. Pacific Standard/Daylight Savings Time, according to the schedule established in subsection D(1) of Ordinance 1932 or this section.

- Actively irrigated environmental mitigation projects.
- **Obligation to Fix Leaks, Breaks or Malfunctions.** All leaks, breaks, or other malfunctions in the water user’s plumbing or distribution system must be repaired within twenty-four (24) hours of notification by the City unless other arrangements are made with the City.
- **Limits on New Potable Water Service:** Upon declaration of a Level 3 Water Shortage Emergency 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; or
  - 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.
- **Limits on Building Permits.** Upon declaration of a Level 3 Water Supply Shortage Emergency condition, the City Manager is authorized to implement a program in his or her discretion to limit or withhold the issuance of building permits which require new or expanded water service, except to protect the public health, safety and welfare, or in cases which meet the City’s adopted conservation offset requirements.
- **Discontinue Service.** The City, in its sole discretion, may discontinue service to consumers who willfully violate provisions of this section.
- **No New Annexations.** Upon the declaration of a Level 3 Water Supply Shortage condition, the City may suspend consideration of annexations to its service area. This subsection does not apply to boundary corrections and annexations that will not result in any immediate increased use of water.

### County Measures

In addition to the City Ordinance, the City of Morgan Hill has worked with the SCVWD and its other member agencies to prepare a County-wide Water Shortage Contingency Plan to be implemented in the event of a severe water shortage. It was created since many of the county’s water agencies share similar water conservation goals. The Contingency Plan offers actions to be taken by water suppliers to encourage (and in some cases require) water conservation methods to be undertaken by their customers. The full Draft Water Shortage Contingency Plan for the SCVWD and provided to its member agencies, including the City of Morgan Hill, can be found in Appendix G.

**Urban Water Management Planning Act Requirement:**  
 10632(f) Penalties or charges for excessive use, where applicable.

In the case of a water supply shortage, violators of Ordinance 1932 can face a maximum of fine of \$1,000 or imprisonment for no more than 30 days. Table 5.2.4 describes the penalties associated with single and recurring violations, which are outlined in the ordinance. This includes a first warning, and subsequent fines increasing from \$100, and, on the fourth violation, a notice of intent to install a flow restrictor.

Table 5.2.4 Water Shortage Contingency — Penalties and Charges		
Penalties or Charges	Stage When Penalty Takes Effect	Amount
First Violation of Water Ordinance	All Stages	Written Warning
Second Violation of Water Ordinance within a 12-Month Period	All Stages	\$100
Third Violation of Water Ordinance within a 12-Month Period	All Stages	\$200
Subsequent Violations of Water Ordinance within a 12-Month Period	All Stages	\$500 and subject to a water flow restrictor device of approximately 1 gpm

***Urban Water Management Planning Act Requirement:***

*10632(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f) inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*

During a water shortage, revenue is expected to decrease due to a reduction in water sales. Furthermore, expenditures would be expected to increase due to the necessary marketing of water conservation methods to reduce water use. In the event that expenditures significantly outweigh revenue, the City has an emergency fund that could be used to provide funds; however, these funds would need to be replenished through additional water sales following any kind of emergency situation. The City also has the authority to increase water use rates during times of drought. The results of this would be two-fold: bringing in additional revenue with similar sales while simultaneously discouraging water waste. These options allow the City to respond quickly to funding issues accompanied with a drought situation.

***Urban Water Management Planning Act Requirement:***

*10632(h) A draft water shortage contingency resolution or ordinance.*

Ordinance No. 1932, which describes the actions to be taken in case of a water shortage, can be found in Appendix F. The SCVWD Water Shortage Contingency Plan, which describes countywide actions to be taken during a water shortage can be found in Appendix G.

### 5.3 Water Quality

***Urban Water Management Planning Act Requirement:***

*10634 The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects urban water management strategies and supply reliability.*

The City of Morgan Hill obtains all water supplies from groundwater; the main concern regarding water quality is the contamination of the water from the wells. Contamination of concern generally includes waste, toxic chemicals, and sewage. Causes of water quality issues are examined more in detail below. The City of Morgan Hill has adopted policies as listed in the *Morgan Hill General Plan* outlining the necessary precautions to protect the quality of the groundwater. The following actions have been adopted by the City of Morgan Hill, as described in the General Plan, to ensure safe potable water:

1. Evaluate water quality to ensure compliance with community standards and applicable State and federal provisions.
2. Develop standards requiring minimization of sediment and hydrocarbon runoff to streams.
3. Require wetland delineation and mitigation as part of the environmental review of future development.
4. Coordinate with jurisdictional agencies, as required, as part of the environmental review process for development projects.

For the City's system, water quality is assured at each wellhead. Chlorine residual is maintained and bacteria presence is detected through the monitoring of residual levels. If a well tests positive for bacteria, the pump is shut down. The City's Emergency Response Plan (ERP) speaks to the system it has in place in case of such an occurrence, which includes, but is not limited to, having the following notifications already developed for broadcasts if/when needed:

- Boil Water Order
- Unsafe Water Alert

- Do Not Drink Notice

The ERP provides details on what unsafe water quality condition(s) must exist to warrant the notification.

Table 5.3.1 below indicates the potential effects of water quality on the supply to the City. Since the City pumps only groundwater, water quality due to water quality contamination is most likely at a single well. To estimate the impacts that this would have on the total water supply, the production of the largest capacity well is assumed to be no longer available, assuming that it becomes contaminated. In addition, it is assumed that the well is lost during the summer, when well flows are expected to peak. As described in Chapter 4, this would not severely impact the water supply, however, as Morgan Hill pumps only a fraction of its full capacity. Even if the largest well were to become contaminated and unavailable, the City would still be able to provide the total estimated demand.

<b>Water source</b>	<b>Description of condition</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
Groundwater	Contamination of the Nordstrom well	1,650	1,650	1,650	1,650	1,650

*Units: acre-feet per year*

### **Chemical Contamination**

Water quality is affected by the chemicals that are used in the population’s everyday life. Runoff of chemicals such as pesticides, oils, and industrial solvents have the potential to enter the groundwater system and reduce the overall quality of the water pumped by the City of Morgan Hill. To prevent potentially contaminated water from entering the supply system, the City of Morgan Hill ensures with thorough water quality monitoring and testing that its water meets the federal and state water standards.

#### *Perchlorate*

Of particular interest to the City of Morgan Hill is the contamination of perchlorate, which has been detected in several wells. The source of perchlorate, a chemical used in manufacturing explosives, was identified to be a highway safety flare plant operated by Olin Chemical Corporation near the City of Morgan Hill, which caused a ten-mile long plume of perchlorate in groundwater.

As of 2010, the SCVWD identified that only eight wells within the County had perchlorate levels above the threshold 6 ppb, down from over 150 wells in 2004; none of the eight wells identified are in the City of Morgan Hill. This is due to the Cleanup and Abatement issued to the Olin Chemical Corporation to ensure a cleanup is performed and alternate water supplies are available to affected wells. Additionally, in January 2011, the California Office of Environmental Health Hazard Assessment (OEHHA) released a draft public health goal (PHG) of 1 part per billion (ppB), reduced from 6 ppb, for perchlorate in drinking water, further emphasizing the importance treating the water contaminated with perchlorates.

#### *Hexavalent Chromium*

While currently there is no drinking water standard for hexavalent chromium (chromium-VI), the OEHHA established a draft PHG for hexavalent chromium in drinking water. The draft proposes a PHG of 0.02 ppb hexavalent chromium in drinking water. However, the development of the PHG is indicative of future potential requirements for a drinking water standard. The City of Morgan Hill currently has well sites which have detected hexavalent chromium. In order to meet a future drinking water standard for hexavalent chromium the City may be required to implement additional treatment facilities.

#### **Biological**

Without proper treatment, water may be infected with possible biological contaminants. Biological contamination can arise from improperly treated wastewater and the decay of once living plants and animals. Biological pollutants include bacteria, viruses, protozoans and parasitic worms that use water as a means of transportation to a host (i.e. humans).

The City has not reported any significant issues regarding the water quality of its wells regarding biological factors. Currently the City of Morgan Hill has stringent water quality standards considering biological contamination.

**5.4 Drought Planning**

***Urban Water Management Planning Act Requirement:***

*10631(c)(1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) an average water year, (B) a single dry water year, (C) multiple dry water years.*

All groundwater basins used by the City of Morgan Hill are managed ultimately by the Santa Clara Valley Water District. The basins that are managed by the SCVWD in Santa Clara County are used by other water retailers in the county, including the City of Gilroy, the City of San Jose, and privately-owned wells. The Water supply reliability will be based on the total capacity available to the City of Morgan Hill through existing wells. It should be noted that the demand is significantly less than the total pumping capacity. Regardless of contamination or drought, ensuring that wells will be available to pump potable water for the City’s water needs increases the overall reliability of the supply and mitigates the impacts in the event that a single or multiple wells are unable to provide potable water.

The following table identifies the normal, single dry, and multiple dry water years chosen to represent the water supply for the City of Morgan Hill, as identified by rainfall data available from the California Department of Water Resources.

<b>Table 5.4.1 Basis of Water Year Data</b>	
<b>Water Year Type</b>	<b>Base Year(s)</b>
<b>Average Water Year</b>	2002
<b>Single-Dry Water Year</b>	1977
<b>Multiple-Dry Water Years</b>	1988-1990

During these years, the supply that was available to the public for use decreases. During dry events, other water retailers in the Santa Clara County are likely to become more dependent on groundwater as opposed to imported water. When other retailers must rely on groundwater more heavily, it reduces the groundwater available for the City of Morgan Hill for longer term droughts. Since the City of Morgan Hill considers its groundwater reliability to be based on imported water supplies available to other water retailers during dry events, the reliability of imported water available to the SCVWD is reported in Table 5.4.2.

<b>Table 5.4.2</b>				
<b>Supply Reliability — Historic Conditions</b>				
<b>Average / Normal Water Year (2002)</b>	<b>Single Dry Water Year (1977)</b>	<b>Multiple Dry Water Years</b>		
		<b>Year 1 (1988)</b>	<b>Year 2 (1989)</b>	<b>Year 3 (1990)</b>
301,470	183,730	210,750	210,750	210,750
Percent of Average/Normal Year:	61%	70%	70%	70%

*Units: acre-feet per year*

**Urban Water Management Planning Act Requirement:**

*10632(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.*

In the event of a water supply shortage, the City of Morgan Hill has in place several stages of action to take. These are listed above in the Water Shortage Contingency Plan Section.

**Urban Water Management Planning Act Requirement:**

*10632(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency’s water supply.*

The table below shows the minimum water supply available during the next three years with a multiple year hydrology as defined by the 1988-1990 water years, the driest three consecutive years of the multiple dry year period identified in Table 5.4.2. It can be seen that water supplies for the next three years are expected to be able to meet 100% of the demand for the City of Morgan Hill. This is due to the total pumping capacity available to the City.

**Table 5.4.3**  
**Supply Reliability — Current Water Sources**

Water supply sources	Average / Normal Water Year Supply	Multiple Dry Water Year (1988)	Multiple Dry Water Year (1989)	Multiple Dry Water Year (1990)
		Year 2011	Year 2012	Year 2013
Llagas	2,476	2,476	2,476	2,476
Coyote Valley	15,578	15,578	15,578	15,578
Percent of normal year:		100%	100%	100%

*Units: acre-feet per year*

The numbers reported in Table 5.4.3 represent the total pumping capacity for the City of Morgan Hill. The City has anticipated solely using groundwater to provide water for its customers.

Although the supplies are great enough to be met for the next three years in the event of a drought, continuing to pump such quantities from the basins outweighs the water replenished by rainfall and groundwater recharge. This could potentially result in overdraft conditions of the basins. In this event, the City of Morgan Hill would have to reduce demand by implementing the water conservation measures described above in the Water Shortage Contingency Plan Section to prevent overdraft. Implementation of these measures would be determined by monitoring the groundwater recharge and groundwater levels. The City of Morgan Hill also will work closely with the Santa Clara Valley Water District to ensure that the basins are not over pumped, resulting in overdraft conditions.

***Urban Water Management Planning Act Requirement:***  
*10632(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

Under normal water supply conditions, potable water production figures are recorded monthly. During water shortages, figures will be read monthly, or more frequently as necessary, from the wellhead meters and reported to the City Manager. A comparison of the monthly production to the target monthly production will verify that the reduction goal is being met. Monthly reports will be presented to the City Council at the discretion of the City Manager if reduction goals are not

met so that corrective action can be taken. As necessary, production will be monitored by sector and consumer.

In the event of an emergency shortage, daily production figures will be collected and reported to the City Manager. In addition, if deemed necessary, off-line wells with high, yet safe, perchlorate levels may be put back on-line.

***Urban Water Management Planning Act Requirement:***

*10635(a) Every urban water management supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.*

The supply available to the City remains constant, as the total supply available to the City is equal to the pumping capacity. During drought years, the demand projections will be slightly higher than predicted and described in Chapter 3, due to a higher need for water for irrigation and agriculture arising from longer growing years, an increase in average temperature, and less natural precipitation. The increase in demand was estimated by calculating the evapotranspiration (ET<sub>o</sub>) from climatic data available from the DWR. A correlation relating the climatic data and existing ET<sub>o</sub> data from the DWR's California Irrigation Management Information System (CIMIS) was made and the ET<sub>o</sub> for normal, single dry, and multiple dry years was calculated. The agricultural demand increase during single and multiple dry years was projected by comparing the ET<sub>o</sub> increase during single dry and multiple dry years to that of the normal, 2002 year. The estimated ET<sub>o</sub> values and corresponding agricultural demand are shown in Table 5.4.4.

<b>Table 5.4.4</b>					
<b>Demand Increase Projections</b>					
	<b>Average / Normal Water Year (2002)</b>	<b>Single Dry Water Year (1977)</b>	<b>Multiple Dry Water Year (1988)</b>	<b>Multiple Dry Water Year (1989)</b>	<b>Multiple Dry Water Year (1990)</b>
ETo (in/month)	4.37	4.93	4.89	4.71	4.77
Demand Increase	0%	13%	12%	8%	9%

The following tables, 5.4.5 through 5.4.7, compare the total supply and demand as identified in Chapters 3 and 4 for normal, single dry, and multiple dry years. It can be seen that the supply available to the City is well above the total demand, even during multiple dry years. However, continued pumping at rates which exceed the total groundwater recharge can be harmful to the basins. For this reason, during dry and multiple dry years, the City and the SCVWD are committed to monitoring groundwater levels and implementing water conservation strategies *before* water levels become dangerously low.

During single dry and multiple dry years, the overall demand for the Santa Clara County may decrease as a result of conservation efforts, as shown in Table 5.4.2. However, during these years, the larger demands could be met, if conservation efforts were not implemented. Tables 5.4.6 and 5.4.7 indicate the maximum supply and demand anticipated, without the reduction of use due to conservation efforts. However, described in the previous sections, the City of Morgan Hill and the SCVWD monitor groundwater levels to determine when conservation efforts need to be encouraged and/or mandated.

<b>Table 5.4.4</b>				
<b>Supply and Demand Comparison — Normal Year</b>				
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Supply Totals</b>	15,946	15,946	15,946	15,946
<b>Demand Totals</b>	9,023	8,571	9,049	9,637
<b>Difference</b>	6,923	7,375	6,897	6,309
Difference as % Of Supply	43%	46%	43%	40%
Difference as % Of Demand	77%	86%	76%	65%

*Units are in acre-feet per year.*

<b>Table 5.4.5</b>				
<b>Supply and Demand Comparison — Single Dry Year</b>				
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Supply Totals</b>	15,946	15,946	15,946	15,946
<b>Demand Totals</b>	9,255	8,791	9,281	9,885
<b>Difference</b>	6,691	7,155	6,665	6,061
Difference as % of Supply	42%	45%	42%	38%
Difference as % of Demand	74%	83%	74%	63%

*Units are in acre-feet per year.*

<b>Table 5.4.6</b>					
<b>Supply and Demand Comparison — Multiple Dry-Year Events</b>					
		<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Multiple-dry year first year supply</b>	<b>Supply Totals</b>	15,946	15,946	15,946	15,946
	<b>Demand Totals</b>	9,237	8,774	9,264	9,865
	<b>Difference</b>	6,709	7,172	6,682	6,081
	Difference as % of Supply	42%	45%	42%	38%
	Difference as % of Demand	74%	84%	74%	63%
<b>Multiple-dry year second year supply</b>	<b>Supply Totals</b>	15,946	15,946	15,946	15,946
	<b>Demand Totals</b>	9,166	8,706	9,192	9,789
	<b>Difference</b>	6,780	7,240	6,754	6,157
	Difference as % of Supply	43%	45%	42%	39%
	Difference as % of Demand	75%	84%	75%	64%
<b>Multiple-dry year third year supply</b>	<b>Supply Totals</b>	15,946	15,946	15,946	15,946
	<b>Demand Totals</b>	9,183	8,723	9,210	9,808
	<b>Difference</b>	6,763	7,223	6,736	6,138
	Difference as % of Supply	42%	45%	42%	38%
	Difference as % of Demand	75%	84%	74%	64%

*Units are in acre-feet per year.*