



City of Morgan Hill

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PREPARED BY: Dan Repp, Deputy Director Utilities Services
APPROVED BY: City Manager

MORGAN HILL AND SOUTH COUNTY RECYCLED WATER PLANNING

RECOMMENDATION(S)

1. Receive Report on 2015 South County Recycled Water Master Plan Update;
2. Accept 2015 Morgan Hill Recycled Water Feasibility Evaluation; and
3. Direct staff to proceed with further analysis of long term water supply strategies including groundwater recharge using recycled water.

COUNCIL PRIORITIES, GOALS & STRATEGIES:

Ongoing Priorities

Enhancing public safety
Protecting the environment
Maintaining fiscal responsibility
Preserving and cultivating public trust

2016 Focus Areas

Planning Our Community
Developing Our Community
Enhancing Our Services
Participate in Regional Issues

REPORT NARRATIVE:

Executive Summary

Santa Clara Valley Water District (SCVWD) has completed a draft 2015 South County Recycled Water Master Plan Update and is now unveiling it to affected agencies. This plan is an update to the original 2004 South County Recycled Water Master Plan also compiled by the Water District. At this time, recycled water in the south county is produced at the Wastewater Treatment Plant (WWTP) in Gilroy. In preparing the 2015 update, the Water District worked closely with the cities of Morgan Hill and Gilroy who represent the two large municipal water retailers in the south county and also represent the only entities that contribute wastewater effluent to the WWTP in Gilroy.

The goals for the 2015 update are to identify opportunities to shore up the recycling infrastructure at the WWTP and to expand the availability of recycled water in the south county. To accomplish this, a thorough evaluation of the existing infrastructure was performed, a market analysis was undertaken, and a review of emerging technologies was prepared. Finally, a list of capital improvement projects spanning 20 years to expand recycled water use in the south county was recommended based on the findings in the study.

In addition, the City commissioned its own smaller study to take a closer look at the recycled water options in Morgan Hill. That study has become a companion to the larger 2015 south county update as it builds on the technical and market assessment data from the larger study.

While several alternatives for bringing recycled water to Morgan Hill were identified and scoped in the study, the final recommended capital improvement program does not fund any of them. The primary reason for this is the high initial capital costs to pump recycled water uphill to the City of Morgan Hill. The findings of the 2015 South County Recycled Water Master Plan Update will not deter the City of Morgan Hill from pursuing recycled water as a component of the City's future water supply. The initial planning is in place with this 2015 study.

The Council will hear a report from representatives of the SCVWD on the 2015 South County Recycled Water Master Plan Update and a report from the City's consultant on the Morgan Hill feasibility analysis.

Background

On April 15, 2015, the Council approved a consulting services agreement for a not to exceed amount of \$40,191 with Akel Engineering Group, Inc. to prepare a recycled water feasibility evaluation for Morgan Hill. At the time of this action, the SCVWD was in the beginning stages of the 2015 South County Recycled Water Master Plan Update. That study, which focused on recycling wastewater from the regional WWTP in Gilroy, is intended to update the 2004 Water Recycling Plan. The April 15, 2015 Council staff report recommended Akel Engineering for their familiarity with previous Morgan Hill water master planning efforts and because they were a key sub-consultant participating in the larger South County study commissioned by the Water District. Given that the most significant source of recycled water in South County comes from the Gilroy wastewater treatment plant, the staff recommendation to Council was that Akel's efforts in the larger South County study would also inform the Morgan Hill study.

Introduction

Since April 2015, both the Santa Clara Water District and Akel Engineering have completed their tasks to prepare recycled water planning documents. Akel Engineering has prepared the Morgan Hill Recycled Water Feasibility Evaluation document which evaluates the opportunities and challenges

with using recycled water in the City. The SCVWD has completed its 2015 South County Recycled Water Master Plan Update which explores alternatives for continued use of recycled water in the southern portion of Santa Clara County and for promoting the expansion of recycled water in the region. The documents were prepared as a cooperative effort between the City of Morgan Hill, Santa Clara Valley Water District (SCVWD or District), the South County Regional Wastewater Authority (SCRWA), and the City of Gilroy (Gilroy). Both draft reports are attached to this document. Note that the Morgan Hill Recycled Water Feasibility Evaluation document is included in the 2015 South County Recycled Water Master Plan Update as Appendix D.

Below are summaries of the major elements and recommendations contained in each report. Following the report summaries is a section on next steps for City Council consideration and discussion.

SANTA CLARA WATER DISTRICT 2015 SOUTH COUNTY RECYCLED WATER MASTER PLAN UPDATE

The purpose of the 2015 Master Plan Update

- Identify potential new customers and recycled water needs
- Update regulatory and treatment requirements
- Update demand projections
- Evaluate recycled water options for Morgan Hill
- Develop and evaluate alternatives
- Develop system operational guidelines
- Determine recommended improvement projects
- Prepare 10% designs of the recommended non-potable reuse (NPR) alternative
- Identify outreach, environmental, and funding needs

Market Analysis

The 2015 Plan starts with market assessment to identify potential recycled water users in both Gilroy and Morgan Hill. These potential users were prioritized based on the following criteria:

- Year-round versus seasonal use
- Proximity to existing distribution system
- Desired use quantity
- Implementation factors
- Preliminary environmental factors

Forty eight potential future recycled water users were identified in Gilroy and an additional 79 potential recycled water users were identified in Morgan Hill. Given the preliminary status of the feasibility of bringing recycled water to Morgan Hill, potential customers were identified but not contacted.

Regulatory Considerations

The Central Coast Water Quality Control Board (CCQCB) has issued Master Water Reclamation Requirements Order No. 98-052 to regulate recycled water production at the SCRWA WWTP and specific use requirements. Disinfected tertiary effluent is sufficient for most landscape and irrigation, municipal and industrial, and agricultural applications. However, potable reuse of recycled water

such as groundwater replenishment requires higher levels of treatment. California Title 22 Recycled Water Regulations describes two categories of potable reuse: 1) indirect potable reuse (IPR) and 2) direct potable reuse (DPR). In IPR, secondary wastewater effluent is treated in an advanced water treatment facility. The treated water is stored in an environmental buffer and further treated in a water treatment plant or supplied to a potable water distribution system. Examples of environmental buffers include groundwater aquifers and reservoirs. Typical treatment processes utilized for IPR applications are microfiltration (MF) or ultrafiltration (UF) followed by reverse osmosis (RO) and advanced oxidation processes (AOP). Examples of full-scale IPR projects include Orange County Water District, West Basin Municipal Water District, Bedok NEWater Facility in Singapore, and the City of San Diego IPR Demonstration project.

In DPR, primary/secondary effluent is treated in an advanced water treatment facility. The treated water is supplied into a raw water supply or into a drinking water treatment plant or directly into a potable water distribution system. There are only two DPR full-scale facilities in the United States (Big Springs, TX and Wichita Falls, TX). Both of these facilities have MF followed by RO and AOP, but the section of a treatment train is dependent on the specific application. A noteworthy addition is the Silicon Valley Advanced Water Purification Center which uses the above treatment technologies but the effluent has not been used in potable applications.

Demand Projections

Recycled water demands vary with the time of day and month of the year. It is necessary to quantify this variability in demand so that the recycled water distribution system can be evaluated and designed to provide reliable water service under these conditions. Agriculture and irrigation customers have high demand peaks during the summer months and low total usage during the winter, while commercial customers have more consistent usage throughout the year. Water use conditions that are of importance to recycled water distribution systems include the average day demand (ADD), the maximum month demand (MMD), the maximum day demand (MDD), and the peak hour demand (PHD). The demand projections from the plan are: ADD = 4,366 gallons per minute (gpm), MMD = 7,765 gpm, and MDD = 11,245 gpm.

Project Alternatives

The 2015 Master Plan Update identifies several recycled water system alternatives that would both expand the use of recycled water in southern Santa Clara County and mitigate deficiencies of the existing recycled water system. These alternatives are categorized as either expansions of the existing non-potable reuse (NPR) distribution system or emerging recycled water technologies. The analysis considered both expansions of the recycled water system within Gilroy and initiation of a recycled water system in Morgan Hill. The potential project alternatives are categorized as City of Gilroy Alignments, City of Morgan Hill Alternatives, and emerging technologies.

City of Gilroy Alignments

The Gilroy alternatives include five alignments that would address system deficiencies and expand recycled water to identified potential recycled water users in Gilroy and surrounding area. These alignments include:

- **Baseline Alignment:** This alignment would extend service westward from the WWTP along Luchessa Avenue through the Glen Loma Development to the Zone 2 Pump Station in Christmas Hill Park, from Christmas Hill Park to Santa Teresa Boulevard, and continue northwest through the Meritage Development. The Baseline alignment is similar to the recommended alignments in the 2004 Master Plan. The 2004 Master Plan alignments were

revised based on the imminent roadway and utility infrastructure improvements planned for the Glen Loma and Meritage Developments, easement acquisitions, and completed projects.

- **Lake Kathryn Alignment:** This alignment would build off the Baseline Alignment and extend westward from the Meritage Development to Lake Kathryn to service the existing nurseries in western Gilroy. This alignment is similar to the proposed Hecker Pass extension improvements in the 2004 Master Plan to bring service to the users in western Gilroy.
- **High Speed Rail Alignment:** This alignment would extend service along the future High Speed Rail easement along Monterey Road to service potential customers in central Gilroy.
- **Cameron Boulevard Alignment:** This alignment would extend service along Cameron Boulevard in eastern Gilroy to serve customers in central Gilroy similar to the High Speed Rail Alignment.

City of Morgan Hill Alternatives

The existing distribution system does not provide recycled water to Morgan Hill. The 2015 Master Plan Update evaluated three recycled water alternatives to provide recycled water service to Morgan Hill.

- **Alternative 1 - MH High Speed Rail Transmission Main:** This alignment would extend a pipeline along the future High Speed Rail easement along Monterey Road to convey recycled water from the WWTP in Gilroy to Morgan Hill and service potential customers in Morgan Hill.
- **Alternative 2 - Joint Trunk Transmission Main:** This alignment would extend a pipeline parallel to existing joint sewer trunk line to convey recycled water from the WWTP in Gilroy to Morgan Hill and service potential customers in Morgan Hill.
- **Alternative 3 - Scalping Plant:** This alternative would construct a satellite WWTP in Morgan Hill to divert flow from the sewer system and treat it to recycled water quality standards for use in Morgan Hill.

Emerging Technologies

Improvements in advanced water treatment technologies and likely regulatory changes have created new opportunities for wastewater reuse. The 2015 Master Plan Update evaluated the feasibility of implementing a groundwater replenishment IPR project in southern Santa Clara County. This alternative is attractive because it would allow recycled water to be utilized all year long, and specifically, during times when other demands for recycled water were low.

Recommended Projects

One of the primary purposes for the 2015 Master Plan Update is to make a recommendation for future project expenditures in the SCVWD Capital Improvement Program (CIP) document. The expenditures are largely paid for with groundwater extraction charges levied on retailers and other well operators.

The Water District is recommending a 20-year \$98M Capital Improvement Program that will both improve the reliability of the recycling program at the Gilroy wastewater treatment plant and expand the utilization of recycled water. None of the projects in the Water District recommendation will bring

recycled water to Morgan Hill, however the groundwork has been laid to service Morgan Hill in the future.

Of the alternatives considered in the 2015 Master Plan Update, the projects recommended for implementation in the SCVWD CIP include the Baseline Alignment plus the Lake Kathryn Alignment in Gilroy. These alignments were selected because they would connect recycled water users that were identified in the Market Assessment to be the most economical, mitigate existing system deficiencies, and provide redundancy.

None of the Morgan Hill alternatives were selected for implementation because these alternatives did not present enough benefit for expansion due to small water demands and the high cost of infrastructure that would be required. A list of the proposed Morgan Hill projects and the costs associated with those alternatives is attached to this report.

CITY OF MORGAN HILL RECYCLED WATER FEASIBILITY EVALUATION

The City of Morgan Hill initiated its own study to evaluate the feasibility of bringing recycled water to the municipality. As stated above, it became a companion effort with the larger 2015 South County Recycled Water Master Plan Update. A copy of the feasibility evaluation prepared by Akel Engineering is attached to this report.

Purpose

The City of Morgan Hill is exploring options for implementing the use of recycled water in its portfolio of water supplies. By bringing recycled water into the mix of water supplies, the City can help preserve the precious groundwater reserves.

Four project alternatives have been identified. Potential recycled water customers were also identified to develop potential recycled water distribution systems for each alternative. The purpose of this Morgan Hill specific report is to evaluate the feasibility of each alternative recycled water project. This evaluation was prepared in coordination with the SCVWD team and the 2015 Santa Clara Valley Water District Master Plan Update.

MARKET ANALYSIS

The market assessment identified potential recycled water customers using the same criteria as the 2015 SCVWD Master Plan Update. Each potential user was ranked based on the following criteria:

- Year Round/seasonal Use and High/Low Demand
- Flexibility of Water Usage/On-Site Storage
- Proximity to the Baseline System
- Level of Interest /Water Quality
- Capital, Construction, and O&M Annual Costs

The analysis identified seventy nine potential recycled water customers in the City.

ALTERNATIVES EVALUATED

The following recycled water alternatives were evaluated for Morgan Hill.

1. Transport recycled water from existing SCRWA WWTP to users in Morgan Hill
2. Recharge aquifers using recycled water to augment groundwater supply
3. Utilize a satellite treatment plant to produce recycled water in Morgan Hill
4. Promote “gray water” reuse systems in Morgan Hill
5. Bring recycled water to Morgan Hill from the north county (San Jose area)

1) Alternatives for Conveying Recycled Water from SCRWA to Morgan Hill

The two potential recycled water transmission main alignment alternatives for bringing recycled water from the SCRWA WWTP to Morgan Hill are described as follows:

- **SCRWA to MH Alternative 1 - MH High Speed Rail Transmission Main:** This Morgan Hill alignment is to extend a Morgan Hill recycled water transmission main along the future High Speed Rail easement along Monterey Road to service potential customers and/or for potential recharge in Morgan Hill.
- **SCRWA to MH Alternative 2 - Joint Trunk Transmission Main:** Similar to the MH High Speed Rail Alignment, this transmission main along the existing sewer joint trunk is intended to take advantage of the existing easements to Morgan Hill and the possibility of re-purposing the existing sewer trunk for recycled water purposes.

Alternatives for Recycled Water Distribution Systems

The recycled water distribution system options for the transmission main alternatives focus on the east side of Morgan Hill and expand from south to north. The recycled water system expansion options for the alternatives are as follows:

- **Distribution System Option 1 (1 mgd) and 3 (2.25 mgd):** Option 1 begins with an 18-inch main heading east on Maple from the proposed 24-inch transmission main in Llagas and connects to the Institute Golf Course. Option 3 expands the recycled water system from 1 mgd to 2.25 and includes additional customers along Condit Road. Estimated Cost = \$41.8M to \$46.3M
- **Distribution System Option 2 (1 mgd) and 4 (2.25 mgd):** Option 2 begins with a 24-inch main extending from the proposed 24-inch transmission main in Llagas Avenue to connect customers up to Barrett Avenue. Option 4 expands the recycled water system from 1 mgd to 2.25 mgd and includes additional customers north along Condit Road and Dunne Avenue up to Cochrane Road.

Estimated Cost = \$42.0M to \$54.6M

2) Using Recycled Water for Recharge

Recycled water can be supplied to underground aquifers to augment groundwater that is used as a drinking water source. This practice is categorized as indirect potable reuse (IPR), which is illustrated in Figure 9. The underlying aquifer serves as a natural storage reservoir in addition to providing treatment as the recycled water flows through the porous media. Storing recycled water in an aquifer would allow Morgan Hill to take advantage surplus recycled water capacity from the SCRWA WWTP at times when the demand for recycled water is low.

Water Quality Regulations Regarding Recharging Groundwater with Recycled Water

Groundwater replenishment projects that apply treated wastewater to an aquifer that serves as a

water supply are regulated by the State Water Resources Control Board Division of Drinking Water (SWRCB DDW) Title 22 Recycled Water Regulations. These regulations were substantially updated in 2014 to include separate requirements for groundwater replenishment projects that use surface spreading and groundwater replenishment projects that use injection wells.

Effluent that meets the Title 22 definition for tertiary disinfected wastewater and demonstrates at least six months of underground retention time, as estimated with a tracer study, can be used in IPR surface spreading projects with no further treatment. If six months of underground retention time cannot be demonstrated, additional treatment will be required by California Title 22 regulations.

In addition to complying with Title 22 Recycled Water Regulations, recycled water being used to recharge groundwater should be consistent with the goals of the 2014 Llagas Subbasin Salt and Nutrient Management Plan (SNMP). The Llagas Subbasin is located in Southern Santa Clara County and is the main drinking water source for the Cities of Gilroy and Morgan Hill. The (SNMP) establishes nitrate and total dissolved solids (TDS) as appropriate indicators for salts and nutrients in the groundwater.

In order to not degrade the quality of groundwater in the Llagas Subbasin, water used for recharge should meet the water quality objectives established by the Central Coast Regional water Quality Control Board for TDS and Nitrate.

South County Regional Wastewater Authority Wastewater Treatment Plant

This evaluation identifies the SCRWA WWTP as the most viable source of recycled water. Existing treatment facilities at the SCRWA WWTP can produce tertiary disinfected water as described in Section 2.1.1. Additional treatment may be required to achieve compliance with Title 22 regulations or with the water quality objectives for the groundwater basin.

Recycled Water Available for Recharge

The average volume of recycled water that would be available for recharge is estimated to be 5.2 MGD. A majority of this supply is available during off-peak months, when demand for recycled water is low. It should be noted that the volume of recycled water available for recharge could be less if SCRWA plant influent flows do not meet the permitted capacity

Groundwater Recharge Alternatives

The transmission mains required for conveying recycled water from the SCRWA WWTP to Morgan Hill for recharge are similar to those as described in Chapter 2.5; Alternative 1 - High Speed Rail Alignment, and Alternative 2 - Joint Trunk Transmission Main Alignment. For the recharge alternative the transmission main will extend from Maple Avenue to the potential recharge facilities.

3) Scalping Plant Evaluation

Decentralized wastewater treatment plants, also known as scalping plants, intercept and treat wastewater before it flows to the centralized treatment facility. Scalping plants are typically utilized to produce recycled water in close proximity to both the source of wastewater that feeds the plant and the demand for the treated effluent. This type of decentralized treatment becomes attractive when it is challenging to convey recycled water from the centralized treatment plant to potential users.

The SCRWA operates the South County Regional WWTP, located over nine miles south of the southern boundary for the Morgan Hill. The SCRWA WWTP is currently producing Title 22 recycled water, however, the distance between the plant and potential recycled water users in Morgan Hill

warrants the consideration of a scalping plant.

The cost to construct a scalping plant in Morgan Hill is estimated at between \$32M and \$38M with an annual cost of approximately \$1.5M per year to operate.

Scalping Plant Treatment Technology

The proposed scalping plant would consist of a pretreatment process, a biological treatment process, and a disinfection step. The main treatment process of a scalping plant typically utilizes membrane bioreactor (MBR) technology. Solids from the process are transported to the central wastewater treatment plant via existing sanitary sewers.

Scalping Plant Environmental and Regulatory Considerations

The proposed scalping plant would have no solids handling facilities, instead, returning solids to the central wastewater treatment plant. While this would simplify the environmental and regulatory considerations of this project, there would still be two categories of regulations that would apply to this project.

For the uses considered for Morgan Hill's Scalping Plant recycled water system, irrigation and industrial, California State Water Resources Control Board, Title 22 regulations would require the effluent from the proposed scalping plant to receive tertiary treatment and disinfection. An MBR at a satellite plant would meet the tertiary treatment requirement and chlorine disinfection was assumed as the disinfection method for this study.

Alternative Scalping Plant Recycled Water Distribution Systems

The two proposed distribution system alignment options for the scalping plant alternative are to either serve customers on the east or west side of Highway 101. Similar to the transmission main analysis, different system options are presented as customer preference, user interest, or connection viability is based on planning level assumptions. The total demands the hydraulic analysis will focus on are based on 1.0 MGD of recycled water for existing conditions and 2.25 MGD of recycled water for buildout conditions. The 2.25 MGD scalping plant alternative is based on the sewer flows for the general plan buildout of Morgan Hill (approximately 4.5 MGD). The recycled water distribution system expansion options for this alternative are as follows:

- **Option 1 (1 mgd) and 7 (2.25 mgd):** Option 1 serves customers on the east side of Highway 101 and begins with an 18-inch main heading east on Maple from the proposed scalping plant and connects to the Institute Golf Course. Option 7 expands the recycled water system from 1 mgd to 2.25 and includes additional customers along Condit Road and Dunne Avenue.
- **Option 5 (1 mgd) and 6 (2.25 mgd):** Option 5 serves customers on the west side of Highway 101 and begins with as 18-inch main extending north from the proposed scalping plant to connect customers along Butterfield Boulevard up to Main Street. Option 6 expands the recycled water system from 1 mgd to 2.25 mgd and includes additional customers north along Butterfield Boulevard up to Burnett Avenue.

Scalping Plant Impacts

A scalping plant diverts flow away from the sewer line for use in recycled water applications. This can cause substantial reductions in sewer system flows downstream of the scalping plant. If flows drop too low odor issues can arise from the anaerobic decomposition of organics. Clogging can also become an issue when flows are so low that debris does not get flushed through the system. A

successful scalping plant would be designed to maintain minimum flows in the sewer line at all times, even during hourly minimums resulting from the diurnal flow pattern typical of collection systems. Membranes are not well suited for large variations in flow rates. Large diurnal variations in sewer flows could therefore limit to the capacity of the MBR to an unacceptably small value, or influent flow equalization would be required. The scalping plant also would need to be sized so as to leave adequate flow in the sewer during times of minimum sewer flows.

Scalping Plant Impacts to SCRWA WWTP

Returning waste activated sludge to the collection system, while eliminating the need for on-site solids treatment, could cause negative impacts on the SCRWA WWTP. The biological processes that would occur in a scalping plant would reduce BOD loadings to the SCRWA WWTP but could substantially change the composition of the influent wastewater. Inconsistent sludge wasting at the scalping facility could also cause downstream problems with the biological processes. Small changes in the influent wastewater composition could cause major problems with the SCRWA WWTP.

Before progressing with the planning of a satellite scalping plant, the potential effect to the biological processes at the existing central WWTP would need to be carefully evaluated. If it is determined that downstream effects would be unacceptable, on-site solids processing may be required. This would substantially increase the capital and operational costs.

Scalping Plant Impacts to Current Recycled Water Users

The SCRWA WWTP maintains and operates a recycled water treatment and distribution system. During peak recycled water demands, SCRWA utilizes a majority of the plant influent to produce recycled water. A scalping plant that diverts flow from the collection system would negatively impact the SCRWA recycled water system by reducing plant inflows during critical periods of peak recycled water demand (i.e., summer months). This could result in an inability to meet current recycled water demands.

4) Gray Water System Evaluation

Gray water systems collect residential wastewater from clothes washing machines, baths/showers, and bathroom wash basins for onsite irrigation. Utilizing gray water for onsite irrigation can offset potable water demand and allow for increased irrigation during times of water scarcity.

Gray Water Definitions

Gray water is defined as untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. In practical terms gray water generally includes discharges from clothes washing machines, showers, and bathroom washbasins but does not include discharges from toilets, kitchen sinks, or dishwashing machines. A gray water system collects and transports gray water for use in onsite landscape irrigation or disposal in a leaching field or mulch basin.

Gray Water System Types

Gray water systems vary in complexity from inexpensive systems designed by homeowners to complex systems requiring professional design and installation. This section explores the most common types of residential onsite gray water recycling systems.

Gray Water Laundry to Landscape Systems

The simplest type of gray water system is known as a Laundry-to-Landscape System. A Laundry-to-

Landscape System transports gray water from the washing machine discharge hose to the receiving landscape without altering any existing plumbing or utilizing pumps or storage devices. This type of gray water system can be installed by the home owner and does not require a permit. Several local agencies promote Laundry-to-Landscape gray water systems because of their relative simplicity and inexpensive installation and operation.

Gray Water Branched Drain Systems

A Branched Drain System diverts gray water from shower/bath, wash basin, and clothes washing machine drainage pipes to the receiving landscape via a series of branching pipes under the force of gravity alone. This type of system requires a permit from the local enforcing agency.

Gray Water Pumped Systems

A pumped system transports gray water from showers/baths, wash basins, and clothes washing machines to a small storage tank. A pump is used to transport the gray water to the receiving landscape. This type of system also requires a permit.

Gray Water System Regulations

Title 24, Part 5, Chapter 16 of the California Department of Housing and Human Development Plumbing Code establishes the legal framework for permitting gray water systems in the State of California. The following is a listing of some of the relevant gray water regulations. For a complete list of gray water regulations see Chapter 16 of the California Plumbing Code, available online at: http://www.hcd.ca.gov/codes/state-housing-law/preface_et_emergency_graywater.pdf

- Gray water cannot pool or run off the receiving landscape
- Gray water systems must be designed to allow the user to direct flow to the sewer system to avoid pooling and runoff
- Gray water cannot be used in spray type irrigation methods (sprinklers)
- Gray water must not be used to irrigate root crops or food crops that touch the soil
- An owner's manual must be kept with a gray water system so future users can maintain and operate the system correctly
- The gray water system must be completely contained on the lot where the gray water is produced
- Any gray water system that is connected to the potable water distribution system must have a backflow prevention device

Gray Water Construction Permit

Section 1603A.0 of the California Plumbing Code requires a written construction permit issued by the local enforcing agency prior to the construction of any gray water system other than a Laundry-to-Landscape type system. To provide residents with a legal way to construct gray water systems, the Morgan Hill Community Development Division would need to establish a system to issue permits.

Model Water Efficient Landscape Ordinance

The Model Water Efficient Landscape Ordinance (MWELO) mandates local agencies to place restrictions on new and renovated landscapes in an effort to reduce water use to the lowest practical amount. In response to the current drought, the California Department of Water Resources has updated the MWELO to improve water savings. This update is pending final approval from the Office of Administrative Law. The revised ordinance includes an exemption from a majority of the MWELO requirements for certain landscapes irrigated entirely with gray water.

Implementation of Gray Water Systems in Morgan Hill

Large scale participation in a City wide gray water program would require homeowners and property managers to assume the responsibility of installing, maintaining, and operating gray water systems on their property. Neglected or improperly installed systems pose an environmental and public health risk.

Existing Gray Water Program

Morgan Hill residents are currently eligible for a \$200 rebate to cover gray water system costs through the Santa Clara Valley Water District Laundry to Landscape Program provided they meet the program requirements. These requirements include conforming to the California Plumbing Code regulations for laundry to landscape gray water systems and an assessment by Santa Clara Water District officials. The assessment may include a series of questions or inspections before and after the installation of the gray water system.

Other Local Gray Water Programs

Currently, many jurisdictions, including the City of Santa Cruz, the City of Santa Rosa, San Francisco Public Utilities Commission, and the City of Tucson, AZ, offer rebates from \$150 to \$1000 for customers who install a gray water system. Santa Cruz and San Francisco specify that the gray water system must be a Laundry-to-Landscape System while Tucson and Santa Rosa do not place this restriction on the rebate. These agencies also offer workshops, informational resources, and assistance to customers.

Gray Water Impediments

Major barriers to large scale participation in onsite gray water reuse systems include the potentially costly and time consuming permitting process, complex and expensive installation, maintenance costs, and environmental and public health concerns. A city-wide gray water incentive program that addresses all of the barriers stated above would be required to maximize participation.

Education and Outreach

The first component of a successful gray water incentive program is education and outreach aimed at informing residents what a gray water system is and how they can implement one to conserve water. The information could present the benefits to users who install a gray water system including reduced water costs and the ability to irrigate landscaping more frequently without violating of the City's Level II Water Supply Shortage Water Use Restrictions. Workshops and brochures could be used to distribute this information.

Gray Water Technical Guide

A technical manual could provide residents information including the types of gray water systems available, the laws and regulations associated with operating a gray water system, detailed instructions on how to install and operate a gray water system, and assistance in navigating the permitting process. The San Francisco Public Utilities Commission Gray Water Design Manual, published in 2012, could serve as an example (See <http://sfwater.org/>).

Gray Water Rebates

The City could offer additional rebates to residents who install a gray water system on their property to offset construction costs and encourage participation in the program.

Local Permitting

A streamlined permitting process would reduce the time and cost of installing a gray water system

and encourage participation. Laundry-to-Landscape systems do not require a permit and could be advertised as an easier method for homeowners to implement a gray water system.

Impact of Gray Water on Achieving Conservation Goals and Irrigation Needs

Utilizing gray water for landscape irrigation can offset potable water demand. The extent of potable water demand reduction will heavily depend on the participation rate, the type of gray water systems in use, and the method of irrigation.

Residential Water Reductions

Predicting residential water demand reductions resulting from the installation of a gray water system is challenging because of the variety of gray water systems available and because the installation of the system may correspond to changes in landscaping practices or increased water conservation efforts.

Effect of Gray Water Systems on SCRWA WWTP and Current Recycled Water Customers

A gray water system diverts water that would otherwise be destined for the sewer system to the receiving landscape. This will cause a reduction in the influent flows of the South County Regional Wastewater Authority (SCRWA) Wastewater Treatment Plant.

Gray water systems will not reduce wastewater treatment plant inflows uniformly throughout the year. During the wet season more gray water will be routed through the sewer system to avoid pooling and runoff in the receiving landscape. If 50% of Morgan Hill Residents implement a Laundry-to-Landscape type gray water system, there would be up to a 2% reduction in urban water demand. Assuming all of this flow is redirected away from the sewer system and 40% of SCRWA WWTP influent comes from the Morgan Hill service area, a reduction in SCRWA WWTP influent flows of around 1% would be expected.

Benefits of a Gray Water System

Large scale participation in a gray water program could offset the demand for potable water by utilizing gray water instead of potable water of irrigation needs. Implementation of a gray water system would allow residents to continue irrigation beyond allowable levels under a water restriction. Current water restrictions allow for irrigation only on specific days of the week. Utilizing a gray water system at landscapes regulated by the California Model Water Efficient Landscape Ordinance would exempt the landscape from a majority of the restrictions of the ordinance.

Costs of a Gray Water System

While offsetting potable water demand could reduce variable costs associated with delivering potable water and potential future expansion costs, any agency providing rebates would be required to fund this upfront expense. Any installation or maintenance costs of a gray water system not covered by rebates would have to be assumed by homeowners. Given the distributed nature of residential gray water systems, installation and maintenance requirements would largely be assumed by homeowners. If systems are not installed or maintained properly, gray water can pool or runoff into the stormwater system or water bodies. This could pose an environmental or public health risk. Permitting gray water systems, while important for maintaining environmental and public health, could potentially induce costs and tie up resources to the enforcing agency.

5) Bring recycled water to Morgan Hill from the north county (San Jose area)

The SCVWD indicated that recycled water from the Silicon Valley Advanced Water Purification Center is fully allocated to customers in north county and therefore is not available.

TECHNICAL FEASIBILITY

This section presents the anticipated technical challenges associated with each of the recycled water alternatives discussed above.

Bringing Recycled Water from SCRWA

There are no exceptional technical challenges identified for this alternative.

Using Recycled water for Recharge

The major technical challenge identified for using recycled water for groundwater recharge is the potential need for additional treatment. As described in Section 3, recycled water used for groundwater recharge could require additional treatment to meet the California Title 22 regulations. These treatment facilities would like include an RO process which would necessitate the development of a RO concentrate disposal solution.

Scalping Plant

Several technical challenges are identified for this alternative. Firstly, operating a satellite treatment facility requires additional staff with wastewater treatment plant operations experience on a part time or full time basis. Secondly, a scalping plant could cause odor and clogging problems in the downstream collection system. Lastly, scalping flow off of the sewer main could create process performance issues at the SCRWA WWTP due to the change in composition of the incoming wastewater.

Gray Water System

The major technical challenge identified with promoting gray water systems is gray water systems are installed and maintained properly. Because gray water systems would be installed and maintained by homeowners, the City would need to make an effort to ensure systems remain functional.

CAPITAL COSTS

Capital costs for the above three recycled water options (recycled water from SCRWA, groundwater recharge water from SCRWA, and scalping plant) are summarized in Attachment 3. The costs are presented according to each recycled water option. The first cost summary shows costs to bring recycled water to the City from the SCRWA plant and distributing it to end users. The second summary shows costs to bring recycled water from SCRWA to a groundwater recharge basin(s) in the City. The final cost summary gives the costs to build a scalping plant in Morgan Hill.

REGULATORY CONSIDERATIONS

The following sections provide a summary of the regulatory challenges associated with each of the alternatives.

Bringing recycled water from SCRWA WWTP

This alternative comes with very limited regulatory considerations because the recycled water produced at the SCRWA WWTP is already permitted as disinfected tertiary effluent according to the Title 22 Recycled Water Regulations.

Using Recycled Water for Recharge

Regulatory requirements for using recycled water for recharge include complying with Article 5.2 of

the Title 22 Recycled Water Regulations. Actions would include developing an engineering report for the RWQCB and the DDW to demonstrate compliance with Title 22 regulations and potential tracer studies, analytical modeling, or numerical modeling, to demonstrate sufficient underground detention time for the recycled water.

Scalping Plant

Recycled water from a scalping would need to be designated as tertiary disinfected recycled water by the DDW. The treatment processes at the scalping plant would need to be validated to show they provide sufficient bacterial and virus removal. Additionally, a CEQA review process would be required prior to the construction of a scalping plant.

Promoting Gray Water Systems

The regulatory framework is already in place for gray water systems in California. The only challenge would be creating a permitting system with the City of Morgan Hill to approve and regulate gray water systems.

Value of Recycled Water Supply

The value of the recycled water provided by each alternative will depend on its quality, quantity, and availability of the recycled water.

Bringing recycled water from SCRWA WWTP

Recycled water delivered from the SCRWA WWTP to customers in Morgan Hill, would be of lower value because recycled water availability would not correspond with recycled water demand. This is because current customers already use a majority of the recycled water supply during peak demand periods. Recycled water use in Morgan Hill would be limited to times when there is a surplus supply of recycled water, like wet months and during off demand times of the day.

Using Recycled Water for Recharge

Using recycled water for recharge would provide the highest value recycled water. This is because all surplus recycled water can be stored in the groundwater aquifer and then used during peak demand periods. Additionally, if the Title 22 Recycled Water Regulations for Groundwater Replenishment Projects are met, this water would be suitable for potable use. Groundwater is sold by the City as part of its drinking water supply which means recycled water supplied to the aquifer would provide increased revenue when it is sold as drinking water. This revenue would be greater than the revenue expected from the sale of recycled water.

Scalping Plant

The quantity of recycled water produced by a scalping plant would be limited by the amount of wastewater produced upstream of the scalping plant. Wastewater intercepted by a scalping plant would likely otherwise be diverted to the tertiary treatment facilities at the SCRWA WWTP. Typically, recycled water is sold to customers for less than the price of drinking water, but the cost to produce it, based on the estimates provided above, would be far higher. For this reason, there is little value associated with operating a scalping plant to produce recycled water.

Promoting Gray Water Systems

Recycled water produced from gray water systems is of low value. This is because it is only available during times when the gray water is being produced, it is only available on the site where it is produced, and it is only a fraction of the total wastewater that is produced.

NEXT STEPS

As noted above Morgan Hill faces several challenges in the development of recycled water as a source to help meet its water needs. Using recycled water for groundwater recharge is challenged by the City's physical location relative to the SCRWA WWTP, significant regulatory requirements for recycled water potable reuse, and the high capital costs for treatment and pipe systems. However, it may be a matter of timing to address these challenges. For example, high capital costs may be offset with cost sharing with SCVWD and with potential state and federal grant funding. Responding to regulatory requirements will require a detailed analysis of where and how the City can comply with IPR and DPR requirements. Staff sees a significant amount of work needed to comply with the IPR and DPR requirements, however, the City can and will continue to partner with the SCVWD to overcome the barriers that are present. In particular, the work defining the environmental barriers necessary to allow groundwater recharge with recycled water is happening at this time. Furthermore, advanced treatment technologies, such as reverse osmosis, needed to bring wastewater to potable standards are still evolving. Staff expects wider application of these technologies in the near future. As these technologies become more widespread we can expect the costs to decrease and better methods for managing the waste products from their treatment process both of which are hurdles for these technologies.

Given the challenges noted herein, staff suggests that as a path forward, the City's portfolio of future water supplies be evaluated in a manner that considers all potential sources. Recycled water is one component to the City's water supply portfolio that should be pursued. The planning effort would also provide for both short term and longer term project development including funding and regional partnering opportunities. With water system master planning already in progress as part of the City's comprehensive plan update now would be good time to look at water supplies including recycled water.

The City could also start identifying suitable groundwater recharge locations that meet indirect potable reuse requirements. This work will likely require groundwater modeling, tracer studies, and other aquifer characterization tasks to determine areas where environmental barriers may exist. Acquisition of acceptable recharge sites would follow once the sites were identified.

COMMUNITY ENGAGEMENT: Consult

February 23, 2016 - SCVWD Board hears draft report findings

March 2, 2016 - SCRWA Board hears draft report findings

March, 2016 - Public meeting in Morgan Hill (specific date not set at time of staff report publication)

ALTERNATIVE ACTIONS:

Council can direct staff to focus on other recycled water options

PRIOR CITY COUNCIL AND COMMISSION ACTIONS:

May 15, 2015 - Council approves agreement with Akel

FISCAL AND RESOURCE IMPACT:

None with this action.

CEQA (California Environmental Quality Act):

Not a Project

The analysis of long term water supply strategies is not a project, as defined in Section 15378 of the State CEQA Guidelines.

LINKS/ATTACHMENTS:

1. 2015 South County Recycled Water Master Plan Update
2. Recycled Water Feasibility Evaluation
3. Capital Cost Summary