Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley

July 2020

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

DOC #5828636

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF ABBREVIATIONS

CEQA	California Environmental Quality Act
County	Los Angeles County, California
DDW	California State Water Resources Control Board, Division of Drinking Water (formerly the California Department of Public Health, Drinking Water Program)
EIR	Environmental Impact Report
Handbook	Recycled Water Users Handbook
JOS	Joint Outfall System
LACDPH or County DPH	Los Angeles County Department of Public Health
mgd	million gallons per day
RWQCB or Regional Water Board	California Regional Water Quality Control Board
Sanitation Districts or LACSD	Los Angeles County Sanitation Districts
SCVSD	Santa Clarita Valley Sanitation District of Los Angeles County
SWRCB or State Water Board	California State Water Resources Control Board
WRP	Water Reclamation Plant

1. Introduction

Recycled water is safe and cost effective to use in lieu of drinking water for most non-potable applications, but there are common sense rules that need to be followed for the protection of public health and compliance with regulations. This *Recycled Water Users Handbook* (Handbook) provides information on the general rules, regulations, and guidelines regarding the safe use of recycled water produced by the Los Angeles County Sanitation Districts (Sanitation Districts) particularly Sanitation Districts Nos. 14 and 20 that serve areas in the Antelope Valley. The Handbook complements the Sanitation Districts' *Requirements for Recycled Water Users*, which is provided in Tab 1 of this Handbook. This Handbook includes:

- General information about the Sanitation Districts' water reuse program.
- State and local standards, regulations, and guidelines for the use of recycled water.
- Information on the duties and responsibilities of recycled water purveyors and users.
- Information on operational requirements at reuse sites.
- Information on notification requirements.

An electronic copy of this Handbook can be found online at the Sanitation Districts' Water Recycling Program website at: http://www.lacsd.org/waterreuse/. The Handbook should be used along with the Los Angeles Chapter of the California WateReuse Association's *Recycled Water Urban Irrigation User Manual*, which has more detailed information on water recycling. The *Recycled Water Urban Irrigation User Manual* is available at: http://www.lacsd.org/civicax/filebank/blobdload.aspx?blobid=11118. A list of important agency contacts for recycled water use is provided in Tab 2.

2. Background on the Los Angeles County Sanitation Districts

The Sanitation Districts protect public health and the environment through innovative and cost-effective wastewater and solid waste management, and in doing so, convert waste into resources such as recycled water, energy, and recycled materials. The Sanitation Districts are a partnership of 24 independent special districts serving over 5.6 million people in Los Angeles County, California (County). The Sanitation Districts' service area covers over 850 square miles and encompasses 78 cities and unincorporated territory within the County.

The Sanitation Districts construct, operate, and maintain facilities to collect, treat, recycle, and dispose of wastewater and industrial wastes. Individual Sanitation Districts operate and maintain their own portions of the collection system. The Sanitation Districts also provide for the management of solid wastes including disposal, transfer operations, materials recovery, and energy recovery. Local jurisdictions are responsible for the collection of wastewater through local sewers and the collection of solid waste. The 24 Sanitation Districts work cooperatively under a Joint Administration Agreement with one administrative staff headquartered near the City of Whittier. Each Sanitation District has a separate Board of Directors consisting of the mayor of each city within that Sanitation District and the Chair of the Board of Supervisors for County unincorporated territory. Each Sanitation District pays its proportionate share of joint administrative costs.

2.1 Wastewater Management System

The Sanitation Districts' 1,400 miles of main trunk sewers and 11 wastewater treatment plants convey and treat approximately 400 million gallons per day (mgd) of residential, commercial, and industrial wastewater, from which approximately 165 mgd of recycled water is produced and available for reuse in the dry Southern California climate. More information on the Sanitation Districts' wastewater management system is available at:
https://www.lacsd.org/services/wastewatersewage/default.asp.

2.2 Joint Outfall System (JOS)

Seventeen of the Sanitation Districts that provide sewerage services in the metropolitan Los Angeles area south of the San Gabriel Mountains are signatory to a Joint Outfall Agreement that provides for operation and maintenance of a regional, interconnected system of facilities known as the Joint Outfall System (JOS). The service area of the JOS encompasses 73 cities and unincorporated territory and includes some areas within the City of Los Angeles and Orange and San Bernardino counties. The JOS system includes the following wastewater treatment plants:

- Joint Water Pollution Control Plant in the City of Carson
- La Cañada Water Reclamation Plant (WRP) in the City of La Cañada Flintridge
- Long Beach WRP in the City of Long Beach
- Los Coyotes WRP in the City of Cerritos
- Pomona WRP in the City of Pomona
- San Jose Creek WRP adjacent to the City of Industry.
- Whittier Narrows WRP near the City of South El Monte

2.3 Santa Clarita Valley

The Santa Clarita Valley Sanitation District of Los Angeles County (SCVSD) serves an area encompassing the City of Santa Clarita and nearby unincorporated territory and operates the Saugus and Valencia WRPs. The recently formed Newhall Ranch Sanitation District of Los Angeles County will serve the proposed residential development to the west of the SCVSD.

2.4 Antelope Valley

Sanitation Districts Nos. 14 and 20 serve areas in the Antelope Valley. Sanitation District No. 14 serves the City of Lancaster, parts of the City of Palmdale and nearby unincorporated territory and operates the Lancaster WRP. Sanitation District No. 20 serves the City of Palmdale and nearby unincorporated territory and operates the Palmdale WRP.

3. Recycled Water Reuse

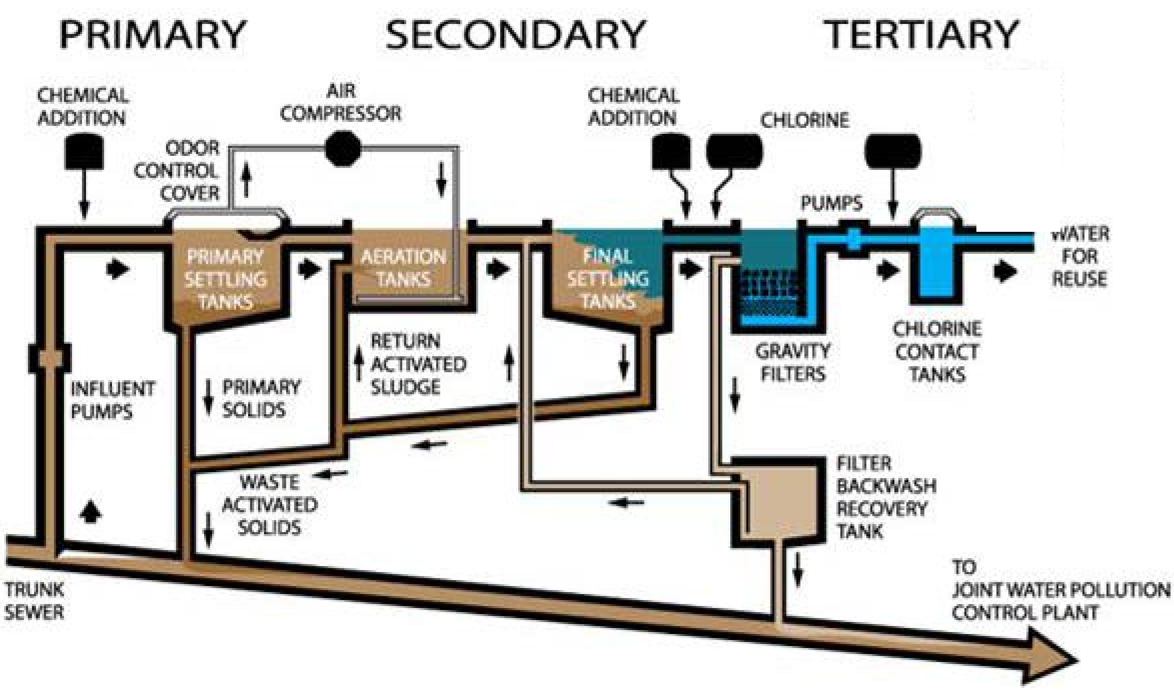
Water recycling is very important in arid Southern California where water must be imported from other parts of the state to meet local water demands. One goal of the Sanitation Districts is to recycle as much water from its treatment plants as possible to help meet the region's water needs. The Sanitation Districts are pioneers in using recycled water with projects launched as early as

1962. Recycled water is used at more than 930 sites throughout the County for uses such as landscape irrigation, agricultural irrigation, industrial processing, recreational impoundments, wildlife habitat maintenance, groundwater replenishment, and other uses. The actual amount of recycled water used and the percentages associated with specific applications vary from year to year depending on annual rainfall and other factors. More information on the Sanitation Districts' recycled water program, specific uses and reuse volumes is available at: http://www.lacsd.org/waterreuse/.

This Handbook is for anyone who obtains and/or uses recycled water produced by the Sanitation Districts Nos. 14 and 20 for allowed reuse applications. The Sanitation Districts produce recycled water that undergoes disinfected tertiary treatment to meet standards established by the State Water Resources Control Board's (State Water Board) Division of Drinking Water (DDW)[1] and the California Regional Water Quality Control Board, Lahontan Region (Lahontan Regional Water Board).

3.1 <u>Recycled Water Treatment Process</u>

A water reclamation plant is just like a natural river but in a concrete box. First, materials settle to the bottom or float to the top and are removed (primary treatment). Second, microbes use air to breath while they consume organic material, then the microbes settle out (secondary treatment). Third, inert material filter out leftover particles (tertiary treatment) like sand in the bottom of a river.



[1] On July 1, 2014, the Drinking Water Program was transferred from California Department of Public Health to the State Water Board as the Division of Drinking Water. The Division of Drinking Water regulates public water systems; oversees water recycling projects; permits water treatment devices; supports and promotes water system security; and performs a number of other functions.

3.1.1 Primary Treatment

Just as in nature, when runoff first enters a river, heavier solid particles settle to the bottom while lighter materials float to the top and are carried away. At the treatment plants, long concrete tanks substitute for the river. The heavier solids that settle to the bottom and the lighter materials, like plastic and grease, which float to the top, are respectively called primary sludge and skimmings. The primary sludge and skimmings are removed and undergo further treatment. The remaining wastewater containing dissolved and suspended materials (mostly organic) moves to the second phase of treatment in aeration tanks and secondary settling basins.

3.1.2 Secondary Treatment

As dirty water in a river flows downstream, naturally occurring microorganisms (or “microbes”) feed on the suspended and dissolved organic materials. As the river flows downstream, oxygen naturally enters the water so the organisms can breathe. In the secondary treatment aeration tanks of the treatment plants, air is bubbled through the water to supply oxygen. The same microbes in the wastewater grow as they feed on the organic materials in these tanks. In the secondary treatment settling tanks, the water flow is slowed down so that the microbes can clump together and settle to the bottom, where they are either removed from the process for solids treatment or returned back into the secondary treatment aeration tanks to go through the process again.

3.1.3 Tertiary Treatment

Finally, in a natural river, the clean water soaks into the ground beneath the river and joins the underground water supply. At the treatment plants, the ground is substituted by filters, which remove any remaining suspended materials from the water. Typically, the filters contain layers of anthracite coal, sand, and gravel; the Lancaster WRP uses anthracite and gravel whereas the Palmdale WRP uses cloth filters. The recycled water is then disinfected with chlorine and chloramines to kill any remaining microbes, especially harmful bacteria and viruses. The water is now safe for human contact, recharging groundwater, and a wide variety of other uses.

3.2 Allowed Uses

Recycled water has been proven to be a safe source of water for many different kinds of reuse applications. Because of its high level of treatment, disinfected tertiary recycled water can be used for a broad category of reuse applications as listed below. However, it is important to remember that the State or Regional Water Board issues water recycling permits to the Sanitation Districts and authorizes the specific uses that are approved for the recycled water produced at each treatment plant. Therefore, it is important to check with the Sanitation Districts’ Water Recycling Coordinator at 877-REUSE-83 (877-738-7383) or reuse@lacsd.org to find out which uses are allowed in your area.

Uses of Tertiary Recycled Water in California

Irrigation:

- Food crops
- Parks and playgrounds
- School yards
- Residential landscaping

- Golf courses
- Cemeteries
- Freeway landscaping
- Ornamental nurseries
- Pasture for milk animals
- Orchards
- Vineyards
- Fodder and fiber crops

Supply for Impoundments:
- Recreational impoundments
- Landscape impoundments

Supply for Cooling and Air Conditioning
- Industrial cooling towers and evaporative condensers
- Commercial cooling towers and evaporative condensers

Other Uses:
- Groundwater recharge (case-by-case basis)
- Flushing toilets and urinals
- Priming drain traps
- Industrial processing
- Industrial boiler feed
- Fire fighting
- Decorative fountains
- Commercial laundries
- Consolidation of backfill material around pipelines
- Artificial snow making
- Commercial car washes
- Soil compaction
- Mixing concrete
- Dust control on roads and streets
- Cleaning roads, sidewalks and outdoor work areas
- Flushing sanitary sewers

3.3 State and Local Standards, Regulations and Guidelines

A number of regulatory agencies have adopted requirements that must be followed when producing, distributing, or using recycled water.

- The California State Water Resources Control Board's (State Water Board) Division of Drinking Water (DDW; formerly the Drinking Water Program of California Department of Public Health) has adopted strict public health and safety requirements and guidelines to help protect the public from any potential risk associated with recycled water. These requirements include Title 17 and Title 22 of the California Code of Regulations, which can be viewed online at DDW's Recycled Water Information page on the State Water Board website at: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/RecycledWater.html. Key excerpts are provided in Tab 3 of this Handbook, including the Water Recycling Criteria that establish specific requirements for allowed uses of recycled water.

- The State Water Board oversees the production, conveyance and use of recycled water through its nine Regional Water Boards in California. The Lahontan Regional Water Board issues permits to the Sanitation Districts for the use of recycled water in the Antelope Valley. Copies of these recycling water permits are provided in Tab 4.

- The Sanitation Districts have adopted Water Recycling Ordinances and Requirements for Recycled Water Users. Anyone who obtains and/or uses recycled water produced by the Sanitation Districts must make sure that the use meets all regulations and complies with the conditions in the recycled water permits issued to the Sanitation Districts by the State or Lahontan Regional Water Boards, and with the Sanitation Districts' Water Recycling Ordinances and Requirements for Recycled Water Users. The *Requirements for Recycled Water Users* contain rules on what can and cannot be done with recycled water, how to obtain permission to use recycled water, how to operate and manage sites, information on site inspections and site access, corrective actions, notification and reporting, and record keeping. A copy of the *Requirements for Recycled Water Users* is provided in Tab 1. Copies of the Water Recycling Ordinances are provided in Tab 5.

- The Los Angeles County Department of Public Health (LACDPH) has guidelines and inspection requirements for the use of recycled water, which are provided in Tab 6.

4. Duties and Responsibilities

4.1 <u>Complying with Regulations</u>

It is important for anyone who obtains and/or uses recycled water to be familiar with all relevant regulatory and permitting requirements and to take all necessary steps to comply with those requirements.

4.2 <u>Obtaining Permission to Use Recycled Water</u>

The step-by-step processes for obtaining permission to use recycled water are included in the Sanitation Districts' *Requirements for Recycled Water Users* (Tab 1, Section 5.5 and Tables 1 and 2). One process (Table 1) is intended for anyone who receives recycled water directly from the Sanitation Districts and the other process (Table 2) is intended for anyone who receives recycled water from a recycled water purveyor. Each process table indicates the agencies with which to contact and interact, the documents that must be completed, and who must receive these documents.

4.2.1 User Agreement

Anyone who obtains recycled water directly from the Sanitation Districts must enter into a User Agreement for the use of recycled water or an amendment to an existing Agreement with

Sanitation District No. 14 or/and District No. 20 depending on the location of the reuse project (see *Requirements for Recycled Water Users* (Tab 1), Section 5.5). Recycled water purveyors, who provide recycled water produced by the Sanitation Districts to users, must enter into a User Agreement or an amendment to an existing User Agreement with Sanitation District No. 14 or/and District No. 20 depending on the location of the reuse project. It is preferable that the user also enter into a user agreement with the recycled water purveyor to indicate that the user will follow all requirements while using recycled water.

4.2.2 User Application

Prior to obtaining permission to use recycled water, a User Application Form (Application) must be completed and submitted to the Sanitation Districts (see *Requirements for Recycled Water Users* (Tab 1), Section 5.5). The Application is provided in Tab 7. Anyone who uses recycled water produced by Sanitation Districts must fill out the Application. If you plan to obtain recycled water from a recycled water purveyor, contact the purveyor if any additional application process needs to be completed. The Sanitation Districts will verify the information in the Application and send a letter or email conditionally approving the project. The approval is conditional until all of the regulatory steps have been completed. The Sanitation Districts' conditional approval letter or email will include instructions on the conditions under which recycled water use can begin as well as the monitoring and reporting information that will need to be provided to the Sanitation Districts on a routine basis (also see Section 4.8, Record Keeping).

To fill out the Application you will need information on the reuse site(s), uses of the recycled water, staffing and training, water outlets and plumbing fixtures, operational and best management practices, and backflow prevention measures.

4.2.3 Recycled Water System Operation Manual

Although not specifically required, it is recommended that you also prepare a Recycled Water System Operations Manual (Operations Manual; see *Requirements for Recycled Water Users* (Tab 1), Section 5.5). The Operations Manual should provide a description or a checklist of how the reuse site will be operated and maintained to comply with the Sanitation Districts' *Requirements for Recycled Water Users* (Tab 1).

4.2.4 Emergency Cross-Connection Response Plan

As part of the Application, you are also asked to prepare an Emergency Cross-Connection Response Plan (Cross-Connection Response Plan) should cross-connections between the recycled water and potable water systems occur (see *Requirements for Recycled Water Users* (Tab 1), Section 5.5). If the Cross-Connection Response Plan cannot be provided with the Application, then you will need to indicate the date it will be submitted. The Cross-Connection Response Plan should provide a narrative description or a checklist of how you will comply with the guidelines established by the LACDPH. The LACDPH guidelines are provided in Tab 6. A form you could use to prepare the Cross-Connection Response Plan is provided in Tab 8.

4.2.5 Plans and Specifications

Detailed plans and specifications for the recycled water system and connections to the potable water system must be given to, and approved by, LACDPH (see *Requirements for Recycled Water*

Users (Tab 1), Section 5.5). For dual plumbed projects, plans and specifications must also be submitted to and approved by DDW.

4.2.6 Engineering Report

Prior to approval of a reuse project, it is important to make sure that an Engineering Report has been sent to the Lahontan Regional Water and DDW, and that the Sanitation Districts receive a copy (see *Requirements for Recycled Water Users* (Tab 1), Tables 1 and 2). The Engineering Report describes the manner by which a project will comply with the Water Recycling Criteria. The Lahontan Regional Water Board and DDW determine if the report is complete and the start date for recycled water deliveries. The Engineering Reports are typically prepared by the water purveyor or in some cases by the user; the Sanitation Districts will contribute information on the treatment plants. Please check with your purveyor on the status of the Engineering Report for your project. In some cases, an Engineering Report that covers the project may have already been submitted and approved, so no further action is needed. For projects with an existing Engineering Report that propose to either expand their service area or add new sites or uses, the existing Engineering Report needs to be amended and submitted to the Lahontan Regional Water Board and DDW. Guidelines for preparing an engineering report can be found at the State Water Board website:
http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/recharge/ERGUIDE2001.pdf.

4.2.7 California Environmental Quality Act (CEQA)

Prior to approval of the reuse project, it is important to make sure that all the California Environmental Quality Act (CEQA) requirements have been met for your project (see *Requirements for Recycled Water Users* (Tab 1, Tables 1 and 2). The agency responsible for completing the CEQA process will typically be the recycled water purveyor or in some cases the Sanitation Districts. As part of the CEQA process, a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report (EIR) may need to be completed. For more information on CEQA requirements, go to the California Natural Resources Agency website at: https://resources.ca.gov/About-Us/Legal/CEQA-Supplemental-Documents.

4.2.8 Pre- and Post-Construction Inspections

Prior to project construction and start-up, County DPH must be contacted to arrange for a preconstruction meeting, site inspections, initial cross-connection and backflow prevention device testing. For recycled water site conversions in its jurisdiction, County DPH must review and approve all design drawings and specs prior to construction, must be present during the cross-connection test, and must issue final approval before the site is fully converted over to the recycled water supply. County DPH must also be present if a reuse site is converted over to a potable supply.

4.2.9 Project Start-up

Once a project has cleared all of its Lahontan Regional Water Board, State Water Board, LACDPH, and CEQA obligations, and the recycled water purveyor or direct user has notified the Sanitation Districts that these obligations have been met, a project may begin recycled water use, provided that the Sanitation Districts have granted approval (see *Requirements for Recycled Water*

Users (Tab 1), Tables 1 and 2). The date of delivery shall be arranged with the Sanitation Districts or the recycled water purveyor, as applicable.

The actual date for recycled water delivery will also depend upon completing the User Agreement or amendment with the Sanitation Districts, and completing the Sanitation Districts' User Application by:

- Providing proof that the Site Supervisor has received training.
- Submitting the Emergency Cross-Connection Response Plan.
- Submitting other information indicated in the Sanitation Districts' conditional approval letter.

4.2.10 Designating a Site Supervisor

Each reuse site must have a designated Site Supervisor (see *Requirements for Recycled Water Users* (Tab 1), Section 5.6). This person is responsible for:

- The proper installation, operation, and maintenance of the recycled water system and all backflow prevention devices on the potable water system;
- Compliance with all requirements in the Sanitation Districts' recycled water permits issued by the State or Lahontan Regional Water Board, applicable laws and regulations, State Water Board and LACDPH guidelines, and the Sanitation Districts' Ordinances and Requirements for Recycled Water Users;
- Preventing potential hazards;
- Minimizing the potential for runoff and overwatering;
- Minimizing fertilizer use at irrigation sites by taking into account the nutrient value of the recycled water;
- Coordinating with the cross-connection control program;
- Supervising work done by other site employees or contractors on the on-site recycled water system; and
- Preserving the recycled water system design drawings in "as built" form.

The Site Supervisor should be someone who is knowledgeable about recycled water practices and the on-site recycled water and potable water plumbing system and has the authority to make sure that operations personnel and contractors comply with all requirements and regulations. The Site Supervisor is the primary means for ensuring the safe and appropriate use of recycled water at the reuse site and is the 24-hour contact person for the reuse site.

4.2.11 Participating in Training

The Site Supervisor must receive appropriate training to assure proper operation of recycling facilities, operations personnel protection, and that the reuse site meets all applicable requirements and regulations (see Requirements for Recycled Water Users (Tab 1), Section 5.6). The Sanitation Districts provides the required training for Site Supervisors. Your water purveyor may also provide training, and there may also be training classes offered in the area. Please contact the Sanitation Districts' Recycled Water Coordinator for information on training opportunities, or visit the Sanitation Districts' website for a schedule and registration form at http://www.lacsd.org/waterreuse/recycledresources.asp.

4.3 Familiarity with On-Site Recycled Water System and Regulations

There are specific provisions in the Requirements for Recycled Water Users (Tab 1, Sections 5 - 9) that must be followed when installing and operating a recycled water system. The LACDPH may have additional requirements that will be discussed during their required pre-construction meeting. Each Site Supervisor must be familiar with the entire on-site recycled water system and with the applicable requirements and regulations. Some general practices to follow are:

Do's:

- Educate/train operations personnel on the safe use and restrictions of recycled water.
- Apply recycled water for irrigation only at agronomic rates (i.e., no more water than the vegetation needs and the soil can handle).
- Reduce fertilizer application rates due to nutrients in the recycled water.
- Install and maintain signs at all points of entry (pedestrian and vehicular).
- Install and maintain labels and tags on recycled water and potable water systems fixtures.
- Implement best management practices for the protection of public health and the environment.
- Operate the irrigation system:
  - Between 10 p.m. – 6 a.m. if automatically controlled (unless other restrictions apply).
  - At other times, if manually controlled and supervised by a site employee present to make sure the public does not come in contact with the recycled water.
  - At any time, if public access to the reuse site is restricted.
- Prevent runoff from the reuse sites due to overspray from sprinklers, overflow of ponds that contain recycled water, over watering, or broken sprinklers or irrigation lines.
- Quickly repair any breaks in recycled water irrigation or distribution lines and broken sprinklers.
- Use quick couplers instead of hose bibbs.
- Thoroughly wash tools used for the recycled water system before using them for the potable water system.
- Contact the Sanitation Districts if any water system (recycled or potable) modifications are anticipated.
- Be familiar with all of the notification requirements if any of the following has occurred:
  - A recycled water line break, spill, or off-site discharge of recycled water.
  - A non-compliance with the Sanitation Districts' Requirements for Recycled Water Users or recycled water use permits.
  - A cross-connection between the recycled water and potable water systems.
  - Any safety or health issues.
- Assist and cooperate during periodic inspections conducted by the Sanitation Districts or your water purveyor.
- Schedule all required backflow prevention and cross-connection testing.
- Assist and cooperate during periodic backflow prevention and cross-connection testing.
- Develop an Emergency Cross-Connection Response Plan.
- Keep records and as-built drawings up-to-date and accessible.
- Submit all required information and reports.

<u>*Don'ts:*</u>

- Don't drink recycled water.
- Don't use recycled water to wash hands or any other part of the body.
- Don't cross-connect two dissimilar water systems (recycled to potable).
- Don't allow recycled water to contact drinking fountains or eating areas.
- Don't overwater or over-fertilize.
- Don't allow recycled water to pond or run off-site.
- Don't use recycled water on an unauthorized site or for an unapproved use.
- Don't remove recycled water identification signs, tags or labels.
- Don't put hose bibbs on recycled water systems (unless public access is restricted).
- Don't use the same equipment on both recycled water and potable water systems (for example, quick couplers, etc.)
- Don't significantly modify any recycled water system without prior approval of the Sanitation Districts, your water purveyor, and LACDPH.

4.4 <u>Cross-Connection Testing and Backflow Prevention</u>

A major concern when recycled water is used on sites served with potable water is a cross-connection. A cross-connection is any actual or potential connection between the recycled water and potable water systems, even when separated by an approved air-gap backflow prevention device. There are specific requirements for backflow prevention in the State Water Board's recycled water regulations (see Tab 3). The Sanitation Districts' Requirements for Recycled Water Users also include cross-connection and backflow prevention requirements (Tab 1, Section 5.6).

Anyone who obtains and/or uses recycled water must be sure that an initial and final cross-connection test is conducted based on the requirements set by the LACDPH (see Tab 6) prior to connecting to the recycled water distribution system. This involves submitting a Cross-Connection Plan Approval Application to LACDPH and conducting the testing in the presence of both your water purveyor and the LACDPH, utilizing a specialist who has been certified by the American Water Works Association or a group with equivalent certification requirements. Follow-up cross-connection testing should be conducted when significant modifications have been made to either the recycled water system or potable water system or if problems are discovered during visual site inspections. For dual plumbed systems (see Glossary of Terms for definition), cross-connection inspections must be conducted annually, with actual testing of the recycled water system every four (4) years.

LACDPH follows the following protocol for cross-connection testing. First, the recycled water system is completely drained and depressurized for a period of time determined by LACDPH – this is called the shutdown period. At the end of the shutdown period and while the potable water system is still pressurized to the domestic outlets, all recycled water devices or stations are checked for flow and then the recycled water inlet is checked for backpressure or significant backflow. The potable water system is then shut down, drained, and depressurized for a period of time determined by LACDPH. At the end of this second shutdown period, all potable water fixtures are operated and tested for flow, after which the potable water inlet is tested for pressure or significant backflow of water. If no cross-connections are discovered, the recycled water system and potable water system are reactivated. A temporary potable water source with backflow prevention is required for all testing and flushing of the recycled and potable water systems prior to final project approval.

Every recycled water use site that will continue to maintain a potable water service must have the potable water supply protected by, at minimum, a reduced pressure backflow prevention device. All approved backflow prevention devices must be maintained and inspected annually by a certified backflow device inspector. This is typically done using a pressure test to verify physical separation between the recycled water and potable water systems. Dye tests can also be used.

4.5 Site Inspections

Each reuse site must be inspected periodically by the recycled water purveyor. The purpose of the site inspection is to make sure the reuse site is in compliance with all requirements and regulations. Site inspections must take place at least once every three (3) years per site or more frequently if requested by the Sanitation Districts. In addition, the Sanitation Districts will also conduct periodic inspections. To help with inspection coordination, your recycled water purveyor must email or fax the Sanitation Districts' Water Recycling Coordinator at least one (1) week prior to conducting a site inspection. At a minimum, the Sanitation Districts must inspect each reuse site at least once every three years if there are no reported violations and at least annually if there are prior violations at the reuse site.

A site inspection report must be filled out for each inspection. Tab 10 includes a sample Site Inspection Report Form, which will be used by the Sanitation Districts. The site inspection report must be signed by the Site Supervisor and the inspector, with copies provided to the Sanitation Districts within 30 days following the end of the quarter in which the inspection was conducted. The Site Supervisor must also keep copies of the inspection reports.

If an inspector finds a non-compliance condition, the Site Supervisor must be notified immediately. The Site Supervisor must immediately take corrective actions as described in Section 4.6, Corrective Actions. If non-compliance conditions are found during a Sanitation Districts' site inspection, the conditions will be noted on the Sanitation Districts' site inspection form with required follow-up actions and compliance dates. It is important to document in the site inspection report what has been done to correct the problem and when this occurred. Site Inspection requirements are specified in Section 6 of the Sanitation Districts' *Requirements for Recycled Water Users* (Tab 1).

4.6 Corrective Action

If an inspector finds a non-compliance condition, or a user discovers a non-compliance condition during routine operations, the Site Supervisor must be notified immediately. The Site Supervisor must immediately take corrective actions and notify the Sanitation Districts by phone, fax, or email of the non-compliant condition. The Site Supervisor must also provide written verification to the Sanitation Districts within three (3) business days from the date of confirmation of the violation. The recycled water purveyor must verify the corrective actions and provide written verification to the Sanitation Districts as described below in Section 4.7, Notifications and Reporting. Corrective action requirements are specified in Section 7 of the Sanitation Districts' *Requirements for Recycled Water Users* (Tab 1).

4.7 Notifications and Reporting

The Site Supervisor is responsible for reporting specific information to the Sanitation Districts – in some cases this must be done immediately and requires follow-up information in writing. Notification and reporting requirements are specified in Section 8 of the Sanitation Districts' *Requirements for Recycled Water Users* (Tab 1). Notifications and reporting to the Sanitation Districts are required for the following types of situations:

4.7.1 Public Health

1. If you become aware of a complaint concerning recycled water use that may involve illness.
2. If the potable water system has been contaminated due to a cross-connection with the recycled water system.

   Action for Nos. 1 and 2 **–** For a cross-connection incident, the Emergency Cross-Connection Response Plan must be immediately activated. Immediately, but not later than two (2) hours after discovering the cross-connection, notify the Sanitation Districts' Water Recycling Coordinator by telephone at 877-REUSE-83, and the Lahontan Regional Water Board, DDW, and LACDPH by telephone, email or fax after you are aware of the complaint. See Tab 2 for agency contact information. You must also provide written confirmation within three (3) business days to each agency.

4.7.2 Spills or Unauthorized Discharges of Recycled Water

1. Any spill or unauthorized discharge of more than 50,000 gallons of tertiary recycled water.

   Action **–** Immediately, but no later than two (2) hours after you are aware of the spill or unauthorized discharge, notify the Sanitation Districts' Spill Hotline by telephone at (866) 484-1224, and the Lahontan Regional Water Board, and LACDPH by telephone, email, or fax after you are aware of the spill or unauthorized discharge. DDW must be contacted if a drinking water source is threatened by the spill. If the environment is endangered by the spill, the California State Department of Fish and Wildlife (State Park Dispatch 951-443-2969) must be contacted. See Tab 2 for agency contact information. You must provide information on the date and time the spill began and ended, the location of the spill, if the spill entered a storm drain or receiving water, the estimated volume or flow if the spill is ongoing, the estimated time of repair, the cause of the spill, the agencies involved with repair and clean-up, and the corrective actions taken, or the plans for corrective actions. You must also provide written confirmation electronically (e.g., email or fax) within three (3) business days to each agency. A recycled water spill notification form to report spills or unauthorized discharges is provided in Tab 11.

2. For volumes less than 50,000 gallons, any recycled water leaving the site other than a minor amount of recycled water that occurred due to overspray or over watering, minor breaks in the recycled water irrigation or distribution system, or broken sprinklers. The Sanitation Districts has developed an operation and maintenance plan to control incidental runoff from landscape irrigation projects (see Tab 9).

Action **–** Immediately, but no later than two (2) hours after you are aware of the spill, notify the Sanitation Districts' Spill Hotline by telephone at 866-484-1224. You should provide information on the date and time the spill began and ended, the location of the spill, if the spill entered a storm drain or receiving water, the estimated volume or flow if the spill is ongoing, the estimated time of repair, the cause of the spill, the agencies involved with repair and clean-up, and corrective actions taken, or plans for corrective actions. You must also provide written confirmation electronically (e.g., email or fax) within three (3) business days to the Sanitation Districts. A recycled water spill notification form to report spills or unauthorized discharges is provided in Tab 11.

4.7.3 Non-compliance with Regulations

1. Any non-compliance with applicable laws and regulations.
2. Any non-compliance with the Sanitation Districts' water recycling permits issued by the Lahontan Regional Water Board.
3. Any non-compliance with the Sanitation Districts' Requirements for Recycled Water Users.

   Action for Nos. 1, 2 and 3 **–** Notify the Sanitation Districts' Water Recycling Coordinator by telephone at 877-REUSE-83 within two (2) hours after you are aware of the non-compliance. You must also provide written confirmation within three (3) business days to the Sanitation Districts.

4. Verification of Corrective Actions

   Action **–** Your water purveyor must provide written confirmation to the Sanitation Districts' Water Recycling Coordinator that corrective actions have been taken within 90 days of knowledge of non-compliance.

4.7.4 Site Inspections

1. Scheduling of site inspections.

   Action **–** Your water purveyor must notify the Sanitation Districts' Water Recycling Coordinator by telephone at 877-REUSE-83, or email at reuse@lacsd.org at least one (1) week prior to conducting a site inspection.

2. Results of site inspections.

   Action **–** A site inspection report must be filled out and signed by the Site Supervisor and the inspector, with copies provided to the Sanitation Districts' Water Recycling Coordinator within thirty (30) days following the end of the quarter in which the site inspection was conducted. See Tab 10 for a sample Site Inspection Report Form.

4.7.5 Changes at the Reuse Site

If there are any planned modifications or additions to the recycled water system.

Action **–** Notify the Sanitation Districts' Water Recycling Coordinator, by telephone at 877-REUSE-83 or email at reuse@lacsd.org, prior to any modifications or additions to the recycled water system. Any significant changes or modifications must be reviewed and approved by the Sanitation Districts before they are made.

4.7.6 Change in Site Supervisor

1. Any proposed changes in the individual designated as the Site Supervisor.
2. Contact information for the Site Supervisor including emergency information, or changes in the Site Supervisor's information.

Action for Nos. 1 and 2 – Notify the Sanitation Districts' Water Recycling Coordinator, by telephone at 877-REUSE-83 or email at reuse@lacsd.org, as soon as possible. A Recycled Water Site Contact Information Form is provided in Tab 12.

4.7.7 Information for Contractors Using Recycled Water

If you hire a contractor that will use recycled water, such as a truck hauler.

Action **–** You must provide contractors with information (preferably in writing) about the Sanitation Districts' Requirements for Recycled Water Users. It is highly recommended that the Site Supervisor review the Requirements for Recycled Water Users with contractors and their staff.

4.7.8 Monitoring and Reporting Requirements

In the conditional approval letter, the Sanitation Districts will specify the required information and when this information must be submitted to the Sanitation Districts to comply with the monitoring and reporting requirements specified in the Sanitation Districts' water recycling permits. Such information includes the uses of recycled water, the volume of recycled water used, tables demonstrating that irrigation water and fertilizer were applied at agronomic rates, and other information.

Action **–** You must provide this information to the Sanitation Districts as requested.

4.8 Record Keeping

The Site Supervisor or water purveyor must keep copies of the following that are available to employees at all time:

- Recycled Water System Operation Manual.
- Emergency Cross-Connection Response Plan.
- Sanitation Districts' Requirements for Recycled Water Users.
- Sanitation Districts' water recycling permits.
- Site inspection reports.
- As-built drawings and other design plans of the recycled water and potable water systems.
- Operations and maintenance logs

When you receive your conditional approval letter from the Sanitation Districts, the letter will include instructions on the specific type of information to be kept in the log such as the volumes of recycled water used at each reuse site, dates of inspections and cross-connection and backflow prevention testing, etc. From time to time, the Sanitation Districts may ask for additional information to be kept in the log. Record keeping requirements are specified in Section 9 of the Sanitation Districts' Requirements for Recycled Water Users (Tab 1).

5. Reuse Websites and Resources

- Los Angeles County Sanitation Districts
  http://www.lacsd.org/waterreuse/
- California State Water Resources Control Board, Division of Drinking Water
  https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/RecycledWater.html
- Los Angeles County Department of Public Health
  http://publichealth.lacounty.gov/eh/AreasofInterest/recycledwater.htm
- California Department of Water Resources
  https://water.ca.gov/
- State Water Resources Control Board & Regional Water Quality Control Boards
  http://www.swrcb.ca.gov/
- Lahontan Regional Water Quality Control Board
  https://www.waterboards.ca.gov/lahontan/
- WateReuse Association
  https://watereuse.org/
- United States Environmental Protection Agency (EPA)
  https://www.epa.gov/waterreuse
- EPA Guidelines for Water Reuse
  https://www.epa.gov/waterreuse/guidelines-water-reuse
- WateReuse Los Angeles Chapter
  https://watereuse.org/sections/watereuse-california/chapters/los-angeles-chapter/
- WateReuse Los Angeles Chapter Recycled Water Urban Irrigation User Manual
  http://www.lacsd.org/civicax/filebank/blobdload.aspx?blobid=11118
- Report Related to Recycled Water Safety Issues
  http://www.datainstincts.com/images/pdf/healthsafety.pdf

6. Glossary of Terms

Agronomic Rate - The rate of application of water to plants necessary to satisfy the plants' evapotranspiration requirements, considering allowances for precipitation, irrigation distribution uniformity, and leaching requirement, minimizing the movement of nutrients below the plants' root zone. Application of water at agronomic rates does not exceed vegetative water and nutrient demand and prevents overwatering, water ponding and runoff.

Applicant - An Owner or authorized representative of a potential reuse site who applies for recycled water service under terms of the appropriate regulations. An approved Applicant becomes a User.

Approved (Authorized) Use - An application of recycled water in a manner, and for a purpose, designed in a User Agreement entered into with the Sanitation Districts and in compliance with all applicable regulatory requirements.

Authorized Recycled Water Use (Reuse) Site - A site with well-defined boundaries authorized for the use of recycled water; the uses of recycled water and the site location must comply with permits as issued by the State or Regional Water Board.

Backflow Prevention Device - A device installed to protect the potable water supply from contamination by non-potable water. The backflow prevention device must be approved by the State Water Board Division of Drinking Water.

Cooling Tower - A device used to cool water and dissipate unwanted heat into the atmosphere through evaporation of a portion of the water being cooled.

County Department of Public Health - This agency is the local health protection agency for the municipality in question.

Cross-Connection - Any physical connection between any part of a water system used or intended to supply water for drinking purposes and any source or system containing water or substance that is not or cannot be approved as safe, wholesome, and potable for human consumption.

Disinfection - A process that uses chemical or physical means to inactivate pathogenic (disease-causing) organisms in water or wastewater.

Dual-Plumbed Site - A ruse site that uses separate piping systems for recycled and potable water within a facility and where the recycled water is used to 1) serve plumbing outlets (such as toilets and urinals but excluding fire suppression systems) within a building or 2) serve outdoor landscape irrigation at individual residences.

Filter - A unit for carrying out the process of filtration which consists of the combination of a filter medium and suitable hardware for constraining and supporting the filter medium in the path of the water. For example, in the case of a cartridge filter, the filter includes both the cartridge and the housing.

Groundwater - Water that is found in fully saturated soils, sediments, and rocks below the surface of the ground.

Hose Bibb - A faucet or similar device to which a common garden hose can be readily attached.

Industrial Cooling - Cooling of material or air for industrial processes or energy generation and does not include air conditioning for comfort of persons in a building.

Inspector - Any person authorized by the Sanitation Districts to perform inspections on or off the user site before construction, during construction, after construction, and during operation.

Irrigation Period - The time, from start of water flow to end, which a specific area receives recycled water by direct irrigation application, no matter how often the specific area is irrigated - that is length of the duty cycle.

Irrigation Use - An approved use of recycled water for landscape irrigation as defined for recycled water under Title 22, Chapter 3 of the California Code of Regulations.

Landscape Impoundment - An open body of recycled water on a use site that is utilized for aesthetic enjoyment or which otherwise serves a function not intended to include public contact.

Non-potable - Water that is not suitable for drinking by humans (includes recycled water).

Operations Personnel - Any employee of a User, whether permanent or temporary, or any contracted worker whose regular or assigned work involves the supervision, operation, or maintenance of equipment on any portion of on-site facilities using recycled water.

Operator - Any person, persons, or firm, who by entering into an agreement with a User is responsible for operating on-site facilities.

Overspray - Water that is transmitted through the air to a location other than where the direct application of recycled water is intended.

Owner - Any holder of legal title, contract purchaser, or lessee under a lease with an unexpired term of more than one (1) year, for property for which recycled water service has been requested or established.

Pathogen - Any agent, especially a microorganism, capable of causing disease.

Point of Connection - This is the point where the User's system ties to the Sanitation Districts' or purveyor's system, usually at the water meter.

Ponding - Unintentional retention of recycled water on the surface of the ground or other natural or manmade surface for a period following the cessation of an approved recycled water use activity such that a hazard or potential hazard to the public health results.

Potable Water - Water that is suitable for drinking and conforms to California drinking water standards and other applicable standards.

Public - Any person or persons at large and not associated with the operation of the site who may come in contact with facilities and/or areas where recycled water is approved for use.

Purveyor - Any public, private, investor-owned, or other water utility that is legally permitted to distribute water and that obtains recycled water from the Sanitation Districts for distribution to Users.

Recreational Impoundment - An open body of recycled water located on a use site that may be used for unrestricted body contact (e.g., swimming, wading) or restricted non-body contact (e.g., boating, fishing) recreation.

Recycled Water - Water produced by a municipal water reclamation facility that is suitable for a beneficial use.

Reuse Site - see "Authorized Recycled Water Use (Reuse) Site" definition.

Runoff - When recycled water is intentionally or unintentionally allowed to drain outside the approved recycled water irrigation area. Runoff is considered "incidental" when it occurs in small amounts due to over-spray or leakage from sprinklers, over watering, breaks in lines or overflow of ponds that contain recycled water during storms.

Site Supervisor - The person designated by the owner or manager of the property upon which recycled water will be or is applied, who will carry out the responsibility of the owner or manager of the property for: (a) installation, operation, and maintenance of the system that enables recycled water to be used; (b) prevention of potential hazards; (c) compliance with Sanitation Districts' water recycling permits, Sanitation Districts' *Requirements for Recycled Water Users*, applicable laws and regulations, health department guidelines, and other associated documents; and (d) coordination with the cross-connection control program. This person should be available to the Sanitation Districts at all times and should have the knowledge and authority to carry out any requirements.

Spray Irrigation - Application of recycled water to land to maintain vegetation or support growth of vegetation by spraying it from sprinklers, micro-sprinklers, drip irrigation, or orifices in piping.

Tertiary Treatment - The treatment of wastewater beyond the secondary, or biological, stage. Normally implies the removal of a high percentage of pathogens and of suspended solids through filtration and disinfection.

Unauthorized Discharge - Any release or spill of recycled water that does not comply with the Sanitation Districts' recycling water permits, Sanitation Districts' *Requirements for Recycled Water Users*, Sanitation Districts' ordinances, applicable Federal, State, or local statues, regulations, ordinances, contracts, or other requirements.

User - Any person to whom the Sanitation Districts distributes recycled water under the Permits issued to the Sanitation Districts by the State or Regional Water Board, including end users to whom recycled water is conveyed through an intermediate party. User does not include persons who have been independently issued Permits from the State or Regional Water Board.

User Agreement - A contractual agreement between the user and/or water purveyor and the Sanitation Districts that establishes the conditions for recycled water service and use.

Water Purveyor - Any public, private, investor-owned, or other water utility that is legally permitted to distribute water and that obtains recycled water from the Sanitation Districts for distribution to users.

Water Reclamation Facility - An arrangement of devices, structures, equipment, processes, and controls which produce a recycled water supply suitable for the intended reuse.

Windblown Spray - Dispersed, airborne particles of recycled water that can be transmitted through the air to locations other than those approved for the direct use of recycled water.

Sanitation Districts Nos. 14 and 20 of Los Angeles County
Recycled Water Users Handbook
For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley
July 2020

TAB 1

Sanitation Districts Nos. 14 and 20 of Los Angeles County Requirements for Recycled Water Users

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Requirements for Recycled Water Users
County Sanitation Districts of Los Angeles County
District Nos. 14 and 20

1. Introduction

These Requirements for Recycled Water Users (Requirements) establish regulations pursuant to California Water Code (Water Code) section 13523.1(b), and permits issued to the County Sanitation Districts of Los Angeles County (Districts) by the California Regional Water Quality Control Board, Lahontan Region (LRWQCB). These permits include waste discharge requirements (WDRs) issued pursuant to Water Code section 13263, water reclamation requirements (WRRs) issued pursuant to Water Code section 13523, or a master reclamation permit (Master Permit) issued pursuant to Water Code section 13523.1. The Requirements are in conformance with ordinances adopted by County Sanitation District No. 14 of Los Angeles County and by County Sanitation District No. 20 of Los Angeles County (Ordinances).

2. Background

Water Code section 13523.1(a) authorizes the issuance of Master Permits to suppliers or distributors, or both, of recycled water in lieu of issuing individual water reclamation requirements to each recycled water user. Water Code section 13523.1(b) sets forth the requirements for Master Permits issued by the Regional Water Quality Control Boards (RWQCBs), including a condition that the permittee establish and enforce rules or regulations for recycled water users governing the design and construction of recycled water use facilities and the use of recycled water, in accordance with the uniform Statewide Reclamation Criteria established pursuant to Water Code section 13521.

A Master Permit has been adopted by the LRWQCB for the Lancaster Water Reclamation Plant (WRP). Should the LRWQCB issue individual WDRs or WRRs to the Districts for the use of tertiary recycled water for non-potable reuse applications from the Lancaster WRP or Palmdale WRP, it is the Districts' intent that the Requirements established herein will apply to those uses. These Requirements may be updated, as necessary, to comply with revisions to this permit or applicable laws and regulations.

3. Findings

The Requirements are in conformance with the following:

- Provisions established by the WDRs, WRRs, or Master Permits issued by the LRWQCB to the Districts.
- Applicable portions of the Water Code, including Water Code section 13523.1.
- Applicable portions of the Health and Safety Code.
- California Code of Regulations (CCR), Title 22, Division 4, Chapter 3, Uniform Statewide Reclamation Criteria.
- CCR, Title 17, Division 1, Chapter 5, Subchapter 1, Group 4, Article 1 & 2.
- Regulations established by the County of Los Angeles Department of Public Health (LACDPH) for the use of recycled water.

The Requirements are consistent with the following:

- The Guidelines for the *Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water,* California State Department of Public Health (CDPH).

- Any measures that are deemed necessary for protection of public health, such as the American Water Works Association (AWWA) California/Nevada section, *Guidelines for the Distribution of Non-Potable Water* and *Guidelines for the On-Site Retrofit of Facilities Using Disinfected Tertiary Recycled Water* or alternate measures that are acceptable to CDPH.
- Relevant user manuals such as the Los Angeles County Recycled Water Advisory Committee's, 2005, *Recycled Water User Manual*.
- Relevant guidance issued by LACDPH for the use of recycled water.

4. Definitions that Apply to these Requirements

4.1. Authorized Recycled Water Use Site (Site) is a site authorized for use of recycled water; the uses of recycled water and the site location must comply with Permits as issued by the LRWQCB to the Districts.

4.2. Direct User is any person to whom the Districts directly distribute recycled water under the Permits issued to the Districts by the LRWQCB.

4.3. Incidental Runoff is any small amount of recycled water that leaves the Site as a result of over-spray or leakage from sprinklers, over watering, breaks in lines, or overflow of impoundments that contain recycled water during storms.

4.4. Master Reclamation Permit (Master Permit) contains requirements established by the LRWQCB for the Districts pursuant to Water Code section 13523.1.

4.5. Permit means any LWRQCB issued WDRs, WRRs, or Master Permit.

4.6. Person is any individual, partnership, corporation, governmental subdivision or unit of a governmental subdivision, or public or private organization or entity of any character.

4.7. Purveyor is any public, private, investor-owned, or other water utility that is legally permitted to distribute water and that obtains recycled water from the Districts for distribution to Users.

4.8. Recycled water is water produced by a municipal water reclamation facility that is suitable for a beneficial use.

4.9. User is any person to whom the Districts distribute recycled water under the Permits issued to the Districts by the LRWQCB, including end users to whom recycled water is conveyed through an intermediate party. User does not include persons who have been independently issued Permits by the LRWQCB.

4.10. User Agreement is a contractual agreement between the User and/or Purveyor and the Districts that establishes the conditions for recycled water service and use.

4.11. Waste Discharge Requirements (WDRs) are requirements established for the Districts by the LRWQCB pursuant to Water Code section 13263.

4.12. Water Recycling Criteria are the criteria established by the CDPH generally dealing with the levels of constituents in recycled water and the means for assurance of reliability under the design concept, which will result in safe recycled water from the standpoint of public health. The criteria are established pursuant to Water Code Section 13521, and are contained in the CCR, Title 22, Division 4, Chapter 3; also referred to as the "Uniform Statewide Reclamation Criteria."

4.13. Water Recycling Requirements (WRRs) are requirements established for the Districts by the LRWQCB pursuant to Water Code section 13523.

5. <u>Requirements for Recycled Water Users</u>

5.1 Effective Date

The effective date of the Requirements is July 1, 2008.

5.2 Applicability

5.2.1 Unless otherwise stated, these Requirements shall apply to any and all Users to whom the Districts distribute tertiary recycled water, either directly or through an intermediate party. These Requirements shall also apply to Purveyors that act as intermediate parties in delivering recycled water to Users. User does not include persons who have been independently issued Permits by the LRWQCB.

5.2.2 These Requirements do not apply to the Districts, when the Districts are both the Purveyor and/or the User, receiving WDRs or WRRs issued by the LRWQCB for the use of tertiary recycled water.

5.3 General Requirements

Use of recycled water must comply with all applicable state laws, regulations, Districts' Permits, and any amendments thereto, the Ordinances, and these Requirements.

5.4 General Prohibitions

5.4.1 Use of recycled water for any purposes other than those explicitly approved in the effective User Agreement is strictly prohibited.

5.4.2 The User shall insure that the treatment, storage, distribution or use of recycled water shall not create a nuisance as defined in Water Code section 13050(m).

5.4.3 The User shall not discharge recycled water from treatment facilities, irrigation holding tanks, storage ponds, or other containment, other than for permitted reuse, except in accordance with other LRWQCB issued Permits, contingency plans authorized by the LRWQCB or for an approved discharge to a municipal sewage treatment system.

5.5 Process to Obtain Permission to Use Recycled Water

5.5.1 Except as provided by the Ordinances, any Direct User or Purveyor who wishes to receive recycled water produced by the Districts must enter into a User Agreement with District No. 14 or No. 20 depending on the location of the reuse project before the use of recycled water can begin. The User Agreement shall include the Districts' terms and conditions for the use of recycled water.

5.5.2 Any Direct User, or Purveyor with a User, who intends to utilize recycled water produced by the Districts for an authorized use at a Site must file a User Application Form (Application) with the Districts and receive approval in writing from the Districts before the use of recycled water can begin for that use and Site.

5.5.3 The Application filed by the Direct User or Purveyor shall include:

.3.1. A detailed description of the proposed Site with:

(a) A map showing the specific boundaries of the proposed Site;

(b) The person or persons responsible for operation and maintenance of the site (O&M Staff), including the person designated as the Site Supervisor and contact information;

(c) Evidence that the O&M Staff and Site Supervisor have received appropriate training from the Districts or an equivalent training program or the date by which training will occur prior to delivery of recycled water such that the Site is operated and maintained in compliance with applicable laws and regulations, the Districts' Permits, and these Requirements;

(d) The specific use to be made of the recycled water at each Site.

.3.2. Design plans and a description of best management practices that show that the quality of waters of the State will be protected (*see* Section 5).

.3.3. Plans and specifications describing:

(a) Proposed piping systems to be used;

(b) Pipe locations for both recycled and potable systems;

(c) Type and location of the outlets and plumbing fixtures that will be accessible to the public;

(d) The methods and devices to be used to prevent backflow of recycled water into the potable water system.

.3.4. The Recycled Water System Operations Manual or the date by which a Recycled Water System Operations Manual will be submitted prior to the delivery of recycled water.

.3.5. Emergency Cross-Connection Response Plan in accordance with the guidelines established by LACDPH or the date by which the Emergency Cross-Connection Response Plan will be submitted prior to delivery of recycled water.

5.5.4 Any User or Purveyor who wishes to receive recycled water produced by the Districts must follow the process presented in Tables 1 and 2 that shows the various agencies involved in the process, documents that must be completed, how documents are routed, etc. Table 1 outlines the process for Direct Users or Purveyors. Table 2 outlines the process for Users receiving water from Purveyors

5.6 Operational Requirements and Best Management Practices

5.6.1 Each User shall designate a Site Supervisor who is responsible for the recycled water system at Site(s) under the User's control. Specific responsibilities of the Site Supervisor include the proper installation, operation and maintenance of the recycled water system; compliance with the Districts' Permits, applicable laws and regulations, local health department guidelines, and these Requirements; prevention of potential hazards; coordination with the cross-connection control program in accordance with CCR, Title 17 and LACDPH or local health department guidelines; preservation of the recycled water system in "as-built" form.

5.6.2 The User's Site Supervisor and O&M staff shall receive appropriate training to assure proper operation of the recycled water facilities, worker protection, and compliance with all applicable laws and regulations, the Districts' Permits, and these Requirements.

5.6.3 The Site Supervisor shall instruct any person at the Site involved with the use of recycled water on its proper use and precautions.

5.6.4 All recycled water facilities and control systems shall be maintained in good working order and operated as efficiently as possible to achieve compliance with all applicable laws and regulations, the Districts' Permits, and these Requirements.

5.6.5 Except as allowed under CCR, Title 17, section 7604, no physical connection shall be made nor shall a connection be allowed to exist between any recycled water system and potable water system.

5.6.6 Cross-connection test shall be performed as necessary to ensure the absolute separation of the recycled water system and potable water system, in accordance with the requirements of LACDPH or local health department.

.6.1. A cross-connection test shall be performed following any significant modifications to the recycled water system or potable water system, construction of new buildings, or any activity that may impact, or has impacted these systems.

.6.2. An initial cross-connection test shall be performed to determine if there are any unknown connections between potable piping and existing piping to be used for recycled water prior to construction or retrofit work.

.6.3. Prior to connection with the recycled water system, a final cross-connection test shall be performed to verify that construction or retrofit work was performed correctly.

.6.4. Cross-connection testing shall be performed by a specialist who has been certified by AWWA or a group with equivalent certification requirements.

5.6.7 The potable water supply shall not be used as a backup or supplemental source of water for a recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of CCR, Title 17, section 7602, Subdivision (a) and CCR, Title 17, section 7603, Subdivision (a), and that such connection has been approved by CDPH and/or its delegated local agency.

5.6.8 Any backflow prevention device installed to protect the potable water system shall be annually inspected and maintained in accordance with CCR, Title 17, section 7605.

.8.1. Backflow inspections shall be conducted by a person who has demonstrated competency in testing to the User, Purveyor, and/or LACDPH or local health department.

5.6.9 Hose bibs shall not be used in the recycled water system, except in the recycled water system for Sites for which there is restricted public access. Quick couplers that are different from that used on the potable water system may be used.

5.6.10 All recycled water piping and appurtenances in new installations and appurtenances in retrofit installations shall be colored purple or distinctively marked with purple tape in accordance with Health and Safety Code section 116815 and LACDPH or local health department requirements.

5.6.11 All sites shall be designed and operated to prevent direct human consumption of recycled water, or use of recycled water for processing of food or drink intended for human consumption.

.11.1. Where recycled water could potentially be accessed for human consumption, conspicuous signs shall be posted that include the following wording: "RECYCLED WATER – DO NOT DRINK."

.11.2. The prescribed wording included on the sign(s) shall also be translated into Spanish and other appropriate languages.

.11.3. Each sign shall display an international symbol similar to that shown in CCR, Title 22, section 60310, subdivision (g), Figure 60310-A.

.11.4. The sign(s) shall be of a size easily readable by the public; no less than 4 inches high by 8 inches wide.

5.6.12 Irrigation with disinfected tertiary recycled water shall not take place within 50 feet of any domestic water supply well.

5.6.13 Irrigation with disinfected tertiary recycled water shall not take place within 50 feet of any uncovered reservoir or stream currently used as a source of domestic water.

5.6.14 Impoundment of disinfected tertiary recycled water shall not occur within 100 feet of any domestic water supply well.

5.6.15 All recycled water impoundments shall be adequately protected from erosion, washout and flooding from a 24-hour rainfall event having a predicted frequency of once in 100 years.

5.6.16 Vehicles used for distributing recycled water for soil compaction and dust control or other uses shall have an adequate tank and plumbing systems to ensure that leaks and ruptures will not occur in the course of normal use.

.16.1. Control valves shall be provided and configured such that recycled water can be applied in a controlled fashion on the Site and completely retained during transit.

.16.2. Spray heads or nozzles shall be provided and configured such that recycled water is applied to prevent runoff, ponding, or windblown spray conditions.

.16.3. Each tank shall be equipped with an approved air-gap separation between the filler tube and the tank to prevent back-siphonage.

.16.4. Each tank used to store and/or transport recycled water must be flushed and disinfected prior to storage and/or transport of potable water or recycled water of better quality.

.16.5. The vehicles shall be clearly labeled in accordance with the requirements specified in Section 5.6.11.

5.6.17 Sites shall be designed and operated using best management practices (BMPs) to protect waters of the state and prevent public contact with recycled water.

5.6.18 The Sites shall be designed and operated using BMPs to prevent recycled water spray, mist, or surface flow from either leaving the Site or reaching:

(a) Any perennial surface waters located adjacent to the Site;

(b) Areas where the public has access (e.g., dwellings, designated outdoor eating areas, or food handling facilities);

(c) Drinking fountains unless specifically protected with a shielding device.

5.6.19 BMPs shall include, but not be limited to:

(a) Use of buffer zones;

(b) Discontinuation of application of recycled water during precipitation events, which are of sufficient magnitude to generate surface flow or significant ponding within the Site;

(c) Use of devices that protect drinking water fountains against contact with recycled water spray, mist, or surface flow;

(d) Irrigation with recycled water during periods of minimal human use of the irrigated area and timing of irrigation to allow an adequate dry-out time before the irrigated area will be used by the public.

5.6.20 Any storage facility or impoundment containing recycled water for reuse applications shall be managed in a manner to control odors, nuisance conditions or vectors such as

mosquitoes. Should such problems develop, a management plan shall be devised and implemented to monitor, correct, and control future occurrences.

5.6.21 Sites shall be designed and operated using BMPs so that application of recycled water occurs at agronomic rates whereby irrigation does not promote downward migration of salts (including nitrates), which could unreasonably affect present and anticipated beneficial uses of water, or result in water quality less than that prescribed in water quality control plans or policies.

.21.1. To demonstrate whether irrigation is at agronomic rates, the User shall provide information to the Districts including a tabular comparison of the volume of water required for plant growth in the landscape area to the volume of recycled water (and supplemental water) applied to the area.

5.6.22 Fertilizer application shall:

.22.1. Not unreasonably affect present and anticipated beneficial uses of water, or result in water quality less than that prescribed in water quality control plans or policies.

.22.2. Occur at agronomic rates. To demonstrate whether fertilizer application is at agronomic rates, the User shall provide information to the Districts including a tabular comparison of the amount of fertilizer needed for plant growth in the landscape area to the amount applied to the area.

.22.3. Occur if the levels of nitrogen in the recycled water are not sufficient for plant growth. If levels are not sufficient, the Site Supervisor shall calculate how much fertilizer needs to be applied by subtracting the level in recycled water from the level needed for plant growth.

5.6.23 Sites shall be designed and operated using BMPs so that adequate erosion control is implemented so that soil is not released into storm water runoff or surface waters.

5.6.24 Each User shall demonstrate to the Districts the means by which all applicable use area requirements as specified in the Districts' Permits and these Requirements will be complied with.

6. <u>Site Inspections and Site Access</u>

6.1 The Purveyor shall conduct periodic site inspections and prepare a report for each Site inspection pursuant to Section 8.3.

.1.1. Site inspections must be conducted at a minimum once every three (3) years per site or more frequently at the request of the Districts.

.1.2. In the event of identification of violation(s) during site inspections, corrective actions must be taken pursuant to Section 7 and notification shall be provided pursuant to Section 8.3.

6.2 The User shall allow an authorized representative of any of the following agencies the right to enter, inspect the Site, and conduct testing upon presentation of proper credentials: the Districts, LRWQCB, CDPH, and LACDPH or local health department.

6.3 In cooperation with the User or Purveyor, the Districts will make periodic inspections of the Site.

7. Corrective Action

7.1 The Site Supervisor shall immediately initiate corrective action to eliminate violation of any applicable laws or regulations, the Districts' Permits, or these Requirements, and make the appropriate notifications pursuant to Section 8.2.

7.2 The Purveyor or Direct User must verify the corrective action(s) and report to the Districts pursuant to Section 8.2.

7.3 In the event of contamination of a potable water system due to a cross-connection with the recycled water system, the Site Supervisor shall immediately invoke the Emergency Cross-Connection Response Plan and make the appropriate notifications pursuant to Section 8.1.

8. Notification and Reporting

8.1 Public Health, Spills, Unauthorized Discharges

8.1.1 Upon being notified or determining that one of the following events has occurred, the Site Supervisor shall immediately notify the Districts by telephone, and the LRWQCB, CDPH and LACDPH by telephone or electronic means. Written confirmation must be provided to all agencies within three (3) business days from the day of notification.

.1.1. There is a complaint (or other source of information) concerning recycled water use that may involve illness.

.1.2. An unauthorized discharge of more than 50,000 gallons of tertiary recycled water. Information provided shall include: the date and time the spill began and ended; the location of the spill; if the spill entered a storm drain or receiving water; the estimated volume of the spill or flow if the spill is ongoing; the estimated time of repair; the cause of the spill; the agencies involved with repair and clean-up; and corrective actions taken or plans for corrective actions.

.1.3. The potable water system has been contaminated due to a cross-connection with recycled water.

8.1.2 Upon being notified or determining that a spill or other release of recycled water from a Site, other than incidental runoff, including, but not limited to, breaks in the recycled water irrigation or distributions systems has occurred, the Site Supervisor shall immediately notify the Districts by telephone. Information provided shall include: the date and time the spill began and ended; the location of the spill; if the spill entered a storm drain or receiving water; the estimated volume of the spill or flow if the spill is ongoing; the estimated time of repair; the cause of the spill; the agencies involved with repair and clean-up; and corrective actions taken or plans for corrective actions. Written confirmation shall be provided within three (3) business days from the date of notification.

8.2 Non-compliance with Regulations

8.2.1 The Site Supervisor shall notify the Districts by telephone or electronic means upon knowledge of any noncompliance of applicable laws and regulations, the Districts' Permits, and these Requirements. Written confirmation shall be provided within three (3) business days from the date of notification.

8.2.2 The Purveyor or Direct User shall provide written verification to the Districts within ninety (90) days from the date of knowledge of the violation that corrective actions have been implemented.

8.3 Site Inspections

8.3.1 The site inspection report shall be signed and dated by the Site Supervisor and the inspector, and provided to the Districts within thirty (30) days following the end of the quarter in which the inspection was conducted.

8.3.2 The inspector shall immediately notify the Site Supervisor of violation(s) identified during site inspections and what corrective actions must be taken.

8.3.3 The Purveyor or Direct User shall notify the Districts by electronic means at least one (1) week prior to conducting a site inspection.

8.4 Miscellaneous Information

8.4.1 If someone other than the User is responsible for applying the recycled water (e.g., a truck hauler), then the User shall inform them of these Requirements in a written permit or other suitable manner.

8.4.2 The Site Supervisor is required to provide the Districts with an address and phone number(s) where he or she can be contacted at all times. The Site Supervisor is responsible for maintaining current pertinent information regarding the Site and Districts' contacts.

8.4.3 The Districts shall be notified in writing of any proposed changes in the individual designated as the Site Supervisor.

8.4.4 The Districts shall be notified in writing of any planned modifications or additions to the recycled water system. Any proposed significant modifications or additions to the recycled water system shall be reviewed and approved by the Districts before being made.

8.4.5 The User or Purveyor shall provide information as requested by the Districts in order for the Districts to comply with monitoring and reporting requirements issued by the LRWQCB.

9. Record Keeping

9.1 Current as-built drawings and other design plans of the recycled water system and potable water system, and any forms or reports as required by the Districts including, but not limited to, inspection reports, cross-connection tests, etc., shall be maintained by the Site Supervisor or Purveyor.

9.2 A copy of these Requirements, the Districts' Permits, the Emergency Cross-Connection Response Plan, and the Recycled Water System Operations Manual shall be maintained by the Site Supervisor so that they are available to operating personnel at all times.

9.3 For each site, the Site Supervisor or Purveyor must keep operation and maintenance logs that are available to the Districts. The logs shall include information that will be required for compliance with Permit requirements. This information, such as the monthly volumes of recycled water used at each site, dates of inspections and tests, etc, will be specified by the Districts in the approval letter.

Table 1. Process to Obtain Recycled Water for Direct Users or Purveyors

Process	Applicable Documents or Actions Required	Responsible Entity
Step 1 – Consult with Districts and review Recycled Water Users Handbook	Districts' Recycled Water Users Handbook	Direct User or Purveyor
Step 2 - Prepare draft plans and specifications	California Department of Public Health (CDPH) requirements in California Code of Regulations (CCR) Title 17 and 22[1], Los Angeles County Department of Public Health (LACDPH) Guidelines	Direct User or Purveyor
Step 3 - Draft User Agreement or amendment (if site is not covered under existing agreement)	Districts' User Agreement	Districts / Direct User or Purveyor
Step 4 - Approve User Agreement or Amendment	Present Agreement or Amendment to Districts' Board and governing body of Direct User or Purveyor for approval	Districts / Direct User or Purveyor
Step 5 - Submit Application for recycled water use	Districts' User Application Form	Direct User or Purveyor
Step 6 - Identify distribution issues, verify allowed uses, estimate quantity of water and delivery schedule	Verification of information provided in the Application Form. Send conditional approval in writing with caveat that project commencement is contingent upon Direct User or Purveyor receiving all regulatory approvals.	Districts
Step 7 – Complete California Environmental Quality Act (CEQA) Process	Make sure there is proper CEQA documentation for the site	Direct User or Purveyor
Step 8 – Consult with health agencies *(recommended)*	Describe project and show draft plans to CDPH and LACDPH	Direct User or Purveyor
Step 9 – Finalize and submit plans and specifications	Plans and specifications submitted to LACDPH; LACDPH Cross-Connection Plan Approval Application and fee.	Direct User or Purveyor
Step 10 - Provide materials and/or training to User on proper operation of a recycled water system	Districts' Recycled Water Users Handbook to be provided by Districts; training to be provided by Districts and/or Purveyor (or an other equivalent program can be substituted)	Districts or Purveyor
Step 11 – Consult with Lahontan Regional Water Quality Control Board (LRWQCB) *(recommended)*	Describe project and discuss Engineering Report needs	Direct User or Purveyor

[1] Hhttp://www.cdph.ca.gov/healthinfo/environhealth/water/Pages/Waterrecycling.aspxH.

Table 1. Process to Obtain Recycled Water for Direct Users or Purveyors

Process	Applicable Documents or Actions Required	Responsible Entity
Step 12 – Final plans and specifications	Obtain approval of final plans and specifications from LACDPH	Direct User or Purveyor
Step 13 – Prepare / amend Engineering Report	CDPH *Guidelines for Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*[2]; Districts' information on water reclamation plants; Direct User or Direct User or Purveyor completes the Engineering Report; the Districts provide information related to treatment facilities; the report must be prepared and stamped by a professional engineer registered in California.	Direct User or Purveyor and Districts
Step 14 – Submit Engineering Report to CDPH and LRWQCB, with copy to Districts	Completed Engineering Report	Direct User or Purveyor
Step 15 – If applicable, submit revised Engineering Report, with copy to Districts	Revisions/additional information may be requested by CDPH and/or the LRWQCB	Direct User or Purveyor
Step 16 – Authorization of project under existing or new LRWQCB permit	Letter or permit	LRWQCB; possibly CDPH and/or LACDPH
Step 17 – Notify Districts of Final Regulatory Approvals	Direct User or Purveyor sends copy of LRWQCB letter or permit to Districts and any other applicable CDPH or LACDPH documents	Direct User or Purveyor
Step 18 – Pre- and post-construction inspections	Contact LACDPH prior to construction to arrange for site inspections, initial cross-connection and backflow prevention device testing; LACDPH Guidelines and Recycled Water System Inspection Report.	Direct User or Purveyor
Step 19 – Approval of final construction	By LACDPH	Direct User or Purveyor
Step 20 – Begin project implementation		Direct User or Purveyor
Step 21 – Submit revised as-built drawings of recycled water distribution system if necessary	Must be provided to LACDPH and Districts if any modifications have been made to original drawings	Direct User or Purveyor

[2] Hhttp://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recharge/ERGUIDE2001.PDFH.

Table 2. Process to Obtain Recycled Water for Users Receiving Water From Purveyors

Process	Applicable Documents *or Actions Required*	Responsible Entity
Step 1 – Consult with Purveyor and review Recycled Water Users Handbook	Districts' Recycled Water Users Handbook	User and Purveyor
Step 2 – Prepare draft plans and specifications	California Department of Health Services (CDPH) requirements in California Code of Regulations (CCR) Title 17 and 22[3], Los Angeles County Department of Public Health (LACDPH) Guidelines.	User or Purveyor
Step 3 – Request for recycled water service	Use recycled water Purveyor's application process	User
Step 4 – Draft User Agreement or amendment (if site is not covered under existing agreement)	Districts' User Agreement or Amendment	Districts / Purveyor
Step 5 – Approve User Agreement or Amendment	Present Agreement or Amendment to Districts' Board and governing body of Purveyor for approval	Districts / Purveyor
Step 6 – Submit Application for recycled water use to Districts	Districts' User Application Form	Purveyor
Step 7 – Identify distribution issues, verify allowed uses, estimate quantity of water and delivery schedule	Verification of information provided in the Districts' User Application Form. Send conditional approval in writing with caveat that project commencement is contingent upon Direct User or Purveyor receiving all regulatory approvals.	Districts
Step 8 – Draft contract or amendment or other legal control mechanism (if site is not covered under existing contract or control mechanism)	Contract, contract amendment, or control mechanism between Purveyor and User	Purveyor and User
Step 9 – Approve contract or amendment or other legal control mechanism (if site is not covered under existing contract or control mechanisms)	Purveyor and User authorize contract, contract amendment, or control mechanism	Purveyor and User
Step 10 – Complete California Environmental Quality Act (CEQA) Process	Make sure there is proper CEQA documentation for the site	Purveyor and User
Step 11 – Consult with health agencies *(recommended)*	Describe project and show draft plans to CDPH and LACDPH	Purveyor
Step 12 – Finalize and submit plans and specifications	Plans and specifications submitted to LACDPH; LACDPH Cross-Connection Plan Approval Application and fee	Purveyor

[3] Hhttp://www.cdph.ca.gov/healthinfo/environhealth/water/Pages/Waterrecycling.aspxH.

Table 2. Process to Obtain Recycled Water for Users Receiving Water From Purveyors

Process	Applicable Documents *or Actions Required*	Responsible Entity
Step 13 – Provide materials and/or training to User on proper operation of a recycled water system	Districts' Recycled Water Users Handbook and training to be provided by Purveyor (the Districts' training program or another equivalent program can be substituted)	Purveyor
Step 14 – Consult with Lahontan Regional Water Quality Control Board (LRWQCB) *(recommended)*	Describe project and discuss Engineering Report needs	Purveyor
Step 15 – Final plans and specifications	Obtain approval of final plans and specifications from LACDPH	Purveyor
Step 16 – Prepare / amend Engineering Report	CDPH *Guidelines for Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*[4]; Districts' information on water reclamation plants; Purveyor completes the Engineering Report; the Districts provide information related to treatment facilities; the report must be prepared and stamped by a professional engineer registered in California.	Purveyor and Districts
Step 17 – Submit Engineering Report to CDPH and LRWQCB, with copy to Districts	Completed Engineering Report	Purveyor
Step 18 – If applicable, submit revised Engineering Report, with copy to Districts	Revisions/additional information may be requested by CDPH and/or the LRWQCB	Purveyor
Step 19 – Authorization of project under existing or new LRWQCB permit	Letter or permit	LRWQCB; possibly CDPH and/or LACDPH
Step 20 – Notify Districts of Final Regulatory Approvals	Purveyor sends copy of LRWQCB letter or permit to Districts and any other applicable CDPH or LACDPH documents	Purveyor
Step 21 – Pre- and post-construction inspections	Contact LACDPH prior to construction to arrange for site inspections, initial cross-connection and backflow prevention device testing; LACDPH *Guidelines and Recycled Water System Inspection Report*	Purveyor
Step 22 – Approval of final construction	By LACDPH	Purveyor
Step 23 – Begin project implementation		Purveyor and User
Step 24 – Submit revised as-built drawings of recycled water distribution system if necessary	Must be provided to LACDPH and Districts if any modifications have been made to original drawings	Purveyor

[4] Hhttp://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recharge/ERGUIDE2001.PDFH.

Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley

July 2020

TAB 2

Agency Contacts

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Agency Contact Information for Water Recycling

For Agency Contacts for Spills of Recycled Water – Go to Tab 11

Sanitation Districts
Contact: Water Recycling Coordinator
Phone: 877-REUSE83 (877-738-7383)
Email: reuse@lacsd.org
Website: http://www.lacsd.org/waterreuse/

State Water Resource Control Board, Department of Drinking Water
Recycled Water Unit
Contact: Randy Barnard
Phone: (619) 525-4022
Email: Randy.Barnard@waterboards.ca.gov
Website:
http://www.swrcb.ca.gov/drinking_water/certlic/drinkingwater/RecycledWater.shtml

Lahontan Regional Water Quality Control Board
Contact: Jehiel (Jay) Cass
Phone: (760) 241-6583
Email: jcass@waterboards.ca.gov
Website: http://www.waterboards.ca.gov/lahontan/

Los Angeles County Department of Public Health
Contact: Glen Van Eekhout
Phone: (626) 430-5290
Email: gvaneekhout@ph.lacounty.gov
Website:
http://www.publichealth.lacounty.gov/eh/EP/cross_con/cross_con_recycle.htm

Sanitation Districts Nos. 14 and 20 of Los Angeles County
Recycled Water Users Handbook
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TAB 3

California State Water Resources Control Board, Division of Drinking Water Excerpts from California Code of Regulations, Titles 17 and 22

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

NOTE: These excerpts are meant to be an aid and cannot be relied upon as the State of California's representation of the law. The published codes are the only official representation of the law. Refer to the published codes—in this case, Title 17 and 22 CCR— whenever specific citations are required.

California Regulations Related to Recycled Water

Excerpts from Titles 22 and 17 California Code of Regulations
State Board, Division of Drinking Water, Recycled Water Regulations
Last updated October 1, 2018

Contents

TITLE 17 CODE OF REGULATIONS

Division 1. State Department of Health Services

Chapter 5. Sanitation (Environmental)

Group 4. Drinking Water Supplies

Article 1. General.

§7583. Definitions.

In addition to the definitions in Section 4010.1 of the Health and Safety Code, the following terms are defined for the purpose of this Chapter:

(a) "**Approved Water Supply**" is a water supply whose potability is regulated by a State of local health agency.
(b) "**Auxiliary Water Supply**" is any water supply other than that received from a public water system.
(c) "**Air-gap Separation** (AG)" is a physical break between the supply line and a receiving vessel.
(d) "**AWWA Standard**" is an official standard developed and approved by the American Water Works Association (AWWA).
(e) "**Cross-Connection**" is an unprotected actual or potential connection between a potable water system used to supply water for drinking purposes and any source or system containing unapproved water or a substance that is not or cannot be approved as safe, wholesome, and potable. By-pass arrangements, jumper connections, removable sections, swivel or changeover devices, or other devices through which backflow could occur, shall be considered to be cross-connections.
(f) "**Double Check Valve Assembly** (DC)" is an assembly of at least two independently acting check valves including tightly closing shut-off valves on each side of the check valve assembly and test cocks available for testing the watertightness of each check valve.
(g) "**Health Agency**" means the California Department of Health Services, or the local health officer with respect to a small water system.
(h) "**Local Health Agency**" means the county or city health authority.
(i) "**Reclaimed Water**" is a wastewater which as a result of treatment is suitable for uses other than potable use.
(j) "**Reduced Pressure Principle Backflow Prevention Device** (RP)" is a backflow preventer incorporating not less than two check valves, an automatically operated differential relief valve located between the two check valves, a tightly closing shut-off valve on each side of the check valve assembly, and equipped with necessary test cocks for testing.
(k) "**User Connection**" is the point of connection of a user's piping to the water supplier's facilities.
(l) "**Water Supplier**" is the person who owns or operates the public water system.
(m) "**Water User**" is any person obtaining water from a public water supply.

§7584. Responsibility and scope of program.

The water supplier shall protect the public water supply from contamination by implementation of a cross-connection control program. The program, or any portion thereof, may be implemented directly by the water supplier or by means of a contract with the local health agency, or with another agency approved by the health agency. The water supplier's cross-connection control program shall for the purpose of addressing the requirements of Sections 7585 through 7605 include, but not be limited to, the following elements:

(a) The adoption of operating rules or ordinances to implement the cross-connection program.
(b) The conducting of surveys to identify water user premises where cross-connections are likely to occur,
(c) The provisions of backflow protection by the water user at the user's connection or within the user's premises or both,
(d) The provision of at least one person trained in cross-connection control to carry out the cross-connection program,
(e) The establishment of a procedure or system for testing backflow preventers, and
(f) The maintenance of records of locations, tests, and repairs of backflow preventers.

§7585. Evaluation of hazard.

The water supplier shall evaluate the degree of potential health hazard to the public water supply which may be created as a result of conditions existing on a user's premises. The water supplier, however, shall not be responsible for abatement of cross-connections which may exist within a user's premises. As a minimum, the evaluation should consider: the existence of cross-connections, the nature of materials handled on the property, the probability of a backflow occurring, the degree of piping system complexity and the potential for piping system modification. Special consideration shall be given to the premises of the following types of water users:

(a) Premises where substances harmful to health are handled under pressure in a manner which could permit their entry into the public water system. This includes chemical or biological process waters and water from public water supplies which have deteriorated in sanitary quality.
(b) Premises having an auxiliary water supply, unless the auxiliary supply is accepted as an additional source by the water supplier and is approved by the health agency.
(c) Premises that have internal cross-connections that are not abated to the satisfaction of the water supplier or the health agency.
(d) Premises where cross-connections are likely to occur and entry is restricted so that cross-connection inspections cannot be made with sufficient frequency or at sufficiently short notice to assure that cross-connections do not exist.
(e) Premises having a repeated history of cross-connections being established or re-established.

§7586. User supervisor.

The health agency and water supplier may, at their discretion, require an industrial water user to designate a user supervisor when the water user's premises has a multipiping system that convey various types of fluids, some of which may be hazardous and where changes in the piping system are frequently made. The user supervisor shall be responsible for the avoidance of cross-connections during the installation, operation and maintenance of the water user's pipelines and equipment.

Article 2. Protection of Water System.

§7601. Approval of backflow preventers.

Backflow preventers required by this Chapter shall have passed laboratory and field evaluation tests performed by a recognized testing organization which has demonstrated their competency to perform such tests to the Department.

§7602. Construction of backflow preventers.

(a) Air-gap Separation. An Air-gap separation (AG) shall be at least double the diameter of the supply pipe, measured vertically from the flood rim of the receiving vessel to the supply pipe; however, in no case shall this separation be less than one inch.

(b) Double Check Valve Assembly. A required double check valve assembly (DC) shall, as a minimum, conform to the AWWA Standard C506-78 (R83) adopted on January 28, 1978 for Double Check Valve Type Backflow Preventive Devices which is herein incorporated by reference.

(c) Reduced Pressure Principle Backflow Prevention Device. A required reduced pressure principle backflow prevention device (RP) shall, as a minimum, conform to the AWWA Standard C506-78 (R83) adopted on January 28, 1978 for Reduced Pressure Principle Type Backflow Prevention Devices which is herein incorporated by reference.

§7603. Location of backflow preventers.

(a) Air-gap Separation. An air-gap separation shall be located as close as practical to the user's connection and all piping between the user's connection and the receiving tank shall be entirely visible unless otherwise approved in writing by the water supplier and the health agency.

(b) Double Check Valve Assembly. A double check valve assembly shall be located as close as practical to the user's connection and shall be installed above grade, if possible, and in a manner where it is readily accessible for testing and maintenance.

(c) Reduced Pressure Principle Backflow Prevention Device. A reduced pressure principle backflow prevention device shall be located as close as practical to the user's connection and shall be installed a minimum of twelve inches (12") above grade and not more than thirty-six inches (36") above grade measured from the bottom of the device and with a minimum of twelve inches (12") side clearance.

§7604. Type of protection required.

The type of protection that shall be provided to prevent backflow into the public water supply shall be commensurate with the degree of hazard that exists on the consumer's premises. The type of protective device that may be required (listed in an increasing level of protection) includes: Double check Valve Assembly--(DC), Reduced Pressure Principle Backflow Prevention Device--(RP) and an Air gap Separation--(AG). The water user may choose a higher level of protection than required by the water supplier. The minimum types of backflow protection required to protect the public water supply, at the water user's connection to premises with various degrees of hazard, are given in Table 1. Situations not covered in Table 1 shall be evaluated on a case-by-case basis and the appropriate backflow protection shall be determined by the water supplier or health agency.

TABLE 1

TYPE OF BACKFLOW PROTECTION REQUIRED

Degree of Hazard	Minimum Type of Backflow Prevention
(a) Sewage and Hazardous Substances	
(1) Premises where there are waste water pumping and/or treatment plants and there is no interconnection with the potable water system. This does not	AG

include a single-family residence that has a sewage lift pump. A RP be provided in lieu of an AG if approved by the health agency and water supplier.

(2) Premises where hazardous substances are handled in any manner in which the substances may enter the potable water system. This does not include a single-family residence that has a sewage lift pump. A RP may be provided in lieu of an AG if approved by the health agency and water supplier. AG

(3) Premises where there are irrigation systems into which fertilizers, herbicides, or pesticides are, or can be, injected. RP

(b) Auxiliary Water Supplies

(1) Premises where there is an unapproved auxiliary water supply which is interconnected with the public water system. A RP or DC may be provided in lieu of an AG if approved by the health agency and water supplier AG

(2) Premises where there is an unapproved auxiliary RP water supply and there are no interconnections with the public water system. A DC may be provided in lieu of a RP if approved by the health agency and water supplier. RP

(c) Recycled water

(1) Premises where the public water system is used to supplement the recycled water supply. AG

(2) Premises where recycled water is used, other than as allowed in paragraph (3), and there is no interconnection with the potable water system. RP

(3) Residences using recycled water for landscape irrigation as part of an approved dual plumbed use area established pursuant to sections 60313 through 60316 unless the recycled water supplier obtains approval of the local public water supplier, or the Department if the water supplier is also the supplier of the recycled water, to utilize an alternative backflow protection plan that includes an annual inspection and annual shutdown test of the recycled water and potable water systems pursuant to subsection 60316(a). DC

(d) Fire Protection Systems

(1) Premises where the fire system is directly supplied from the public water system and there is an unapproved auxiliary water supply on or to the premises (not interconnected). DC

(2) Premises where the fire system is supplied from the public water system and interconnected with an unapproved auxiliary water supply. A RP may be provided in lieu of an AG if approved by the health agency and water supplier. AG

(3) Premises where the fire system is supplied from the public water system and where either elevated storage tanks or fire pumps which take suction from private reservoirs or tanks are used. DC

(4) Premises where the fire system is supplied from the public water system and where recycled water is used in a separate piping system within the same building. DC

(e) Dockside Watering Points and Marine Facilities

(1) Pier hydrants for supplying water to vessels for any purpose. RP

(2) Premises where there are marine facilities. RP

(f) Premises where entry is restricted so that inspections for cross-connections cannot be made with sufficient frequency or at sufficiently short notice to assure that do not exist.	RP
(g) Premises where there is a repeated history of crossconnections being established or re-established. RP	RP

§7605. Testing and maintenance of backflow preventers.

(a) The water supplier shall assure that adequate maintenance and periodic testing are provided by the water user to ensure their proper operation.
(b) Backflow preventers shall be tested by persons who have demonstrated their competency in testing of these devices to the water supplier or health agency.
(c) Backflow preventers shall be tested at least annually or more frequently if determined to be necessary by the health agency or water supplier. When devices are found to be defective, they shall be repaired or replaced in accordance with the provisions of this Chapter.
(d) Backflow preventers shall be tested immediately after they are installed, relocated or repaired and not placed in service unless they are functioning as required.
(e) The water supplier shall notify the water user when testing of backflow preventers is needed. The notice shall contain the date when the test must be completed.
(f) Reports of testing and maintenance shall be maintained by the water supplier for a minimum of three years.

TITLE 22 CODE OF REGULATIONS

Division 4. Environmental Health

Chapter 1. Introduction

Article 1. Definitions.

§60001. Department.
Whenever the term "department" is used in this division, it means the State Department of Health Services, unless otherwise specified.

§60003. Director.
Whenever the term "director" is used in this division, it means the Director, State Department of Health Services, unless otherwise specified.

Chapter 2. Regulations for the Implementation of the California Environmental Quality

Article 1. General Requirements and Categorical Exemptions

§60100. General requirements.
The Department of Health Services incorporates by reference the objectives, criteria, and procedures as delineated in Chapters 1, 2, 2.5, 2.6, 3, 4, 5, and 6, Division 13, Public Resources Code, Sections 21000 et seq., and the Guidelines for the Implementation of the California Environmental Quality Act, Title 14, Division 6, Chapter 3, California Administrative Code, Sections 15000 et seq.

§60101. Specific activities within categorical exempt classes.
The following specific activities are determined by the Department to fall within the classes of categorical exemptions set forth in Sections 15300 et seq. of Title 14 of the California Administrative Code:

- (a) Class 1: Existing Facilities.
  - (1) Any interior or exterior alteration of water treatment units, water supply systems, and pump station buildings where the alteration involves the addition, deletion, or modification of mechanical, electrical, or hydraulic controls.
  - (2) Maintenance, repair, replacement, or reconstruction to any water treatment process units, including structures, filters, pumps, and chlorinators.

- (b) Class 2: Replacement or Reconstruction.
  - (1) Repair or replacement of any water service connections, meters, and valves for backflow prevention, air release, pressure regulating, shut-off and blow-off or flushing.
  - (2) Replacement or reconstruction of any existing water supply distribution lines, storage tanks and reservoirs of substantially the same size.
  - (3) Replacement or reconstruction of any water wells, pump stations and related appurtenances.

(c) Class 3: New Construction of Small Structures.
  (1) Construction of any water supply and distribution lines of less than sixteen inches in diameter, and related appurtenances.
  (2) Construction of any water storage tanks and reservoirs of less than 100,000 gallon capacity.

(d) Class 4: Minor Alterations to Land.
  (1) Minor alterations to land, water, or vegetation on any officially existing designated wildlife management areas or fish production facilities for the purpose of reducing the environmental potential for nuisances or vector production.
  (2) Any minor alterations to highway crossings for water supply and distribution lines.

Chapter 3. Water Recycling Criteria

Article 1. Definitions.

§60301.050. 24-hour Composite Sample.
"24-hour Composite Sample" means an aggregate sample derived from no fewer than eight discrete samples collected at equal time intervals or collected proportional to the flow rate over the compositing period. The aggregate sample shall reflect the average source water quality covering the composite 24-hour sample period.

§60301.080. Added Tracer.
"Added Tracer" means a non-reactive substance, with measureable characteristics distinctly different from the receiving groundwater, intentionally added to the water applied at a Groundwater Replenishment Reuse Project (GRRP) for the purpose of being a tracer such that the tracer can be readily identified in the groundwater downgradient of the GRRP to determine the underground retention time of the applied water.

§60301.100. Approved laboratory.
"Approved laboratory" means a laboratory that has been certified by the Department to perform microbiological analyses pursuant to section 116390, Health and Safety Code.

§60301.120. Augmented Reservoir.
"Augmented Reservoir" means a surface water reservoir used as a source of domestic drinking water supply that receives recycled municipal wastewater from a Surface Water Source Augmentation Project (SWSAP).

§60301.160. Coagulated wastewater.
"Coagulated wastewater" means oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated upstream from a filter by the addition of suitable floc-forming chemicals.

§60301.170. Conventional treatment.
"Conventional treatment" means a treatment chain that utilizes a sedimentation unit process between the coagulation and filtration processes and produces an effluent that meets the definition for disinfected tertiary recycled water.

§60301.180. Department.

"Department" means the California Department of Public Health or its successor with authority to regulate public water systems.

§60301.190. Diluent Water.

"Diluent Water" means water, meeting the diluent requirements of this Chapter, used for reducing the recycled municipal wastewater contribution over time.

§60301.200. Direct beneficial use.

"Direct beneficial use" means the use of recycled water that has been transported from the point of treatment or production to the point of use without an intervening discharge to waters of the State.

§60301.220. Disinfected secondary-2.2 recycled water.

"Disinfected secondary-2.2 recycled water" means recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a most probable number (MPN) of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period.

§60301.225. Disinfected secondary-23 recycled water.

"Disinfected secondary-23 recycled water" means recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a most probable number (MPN) of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30 day period.

§60301.230. Disinfected tertiary recycled water.

"Disinfected tertiary recycled water" means a filtered and subsequently disinfected wastewater that meets the following criteria:

(a) The filtered wastewater has been disinfected by either:

(1) A chlorine disinfection process following filtration that provides a CT (the product of total chlorine residual and modal contact time measured at the same point) value of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or

(2) A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.

(b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

§60301.240. Drift.
"Drift" means the water that escapes to the atmosphere as water droplets from a cooling system.

§60301.245. Drift eliminator.
"Drift eliminator" means a feature of a cooling system that reduces to a minimum the generation of drift from the system.

§60301.250. Dual plumbed system.
"Dual plumbed system" or "dual plumbed" means a system that utilizes separate piping systems for recycled water and potable water within a facility and where the recycled water is used for either of the following purposes:

(a) To serve plumbing outlets (excluding fire suppression systems) within a building or
(b) Outdoor landscape irrigation at individual residences.

§60301.300. F-Specific bacteriophage MS-2.
"F-specific bacteriophage MS-2" means a strain of a specific type of virus that infects coliform bacteria that is traceable to the American Type Culture Collection (ATCC15597B1) and is grown on lawns of E. coli (ATCC 15597).

§60301.310. Facility.
"Facility" means any type of building or structure, or a defined area of specific use that receives water for domestic use from a public water system as defined in section 116275 of the Health and Safety Code.

§60301.320. Filtered wastewater.
"Filtered wastewater" means an oxidized wastewater that meets the criteria in subsection (a) or (b):

(a) Has been coagulated and passed through natural undisturbed soils or a bed of filter media pursuant to the following:
  (1) At a rate that does not exceed 5 gallons per minute per square foot of surface area in mono, dual or mixed media gravity, upflow or pressure filtration systems, or does not exceed 2 gallons per minute per square foot of surface area in traveling bridge automatic backwash filters; and
  (2) So that the turbidity of the filtered wastewater does not exceed any of the following:
    (A) An average of 2 NTU within a 24-hour period;
    (B) 5 NTU more than 5 percent of the time within a 24-hour period; and
    (C) 10 NTU at any time.

(b) Has been passed through a microfiltration, ultrafiltration, nanofiltration, or reverse osmosis membrane so that the turbidity of the filtered wastewater does not exceed any of the following:
  (1) 0.2 NTU more than 5 percent of the time within a 24-hour period; and
  (2) 0.5 NTU at any time.

§60301.330. Food crops.
"Food crops" means any crops intended for human consumption.

§60301.370. Groundwater.
"Groundwater" means water below the land surface in a saturated zone.

§60301.390. Groundwater Replenishment Reuse Project or GRRP.

"Groundwater Replenishment Reuse Project" or "GRRP" means a project involving the planned use of recycled municipal wastewater that is operated for the purpose of replenishing a groundwater basin designated in the Water Quality Control Plan [as defined in Water Code section 13050(j)] for use as a source of municipal and domestic water supply.

§60301.400. Hose bib.

"Hose bib" means a faucet or similar device to which a common garden hose can be readily attached.

§60301.450. Indicator Compound.

"Indicator Compound" means an individual chemical in a municipal wastewater that represents the physical, chemical, and biodegradable characteristics of a specific family of trace organic chemicals; is present in concentrations that provide information relative to the environmental fate and transport of those chemicals; may be used to monitor the efficiency of trace organic compound removal by treatment processes; and provides an indication of treatment process failure.

§60301.455. Intrinsic Tracer.

"Intrinsic Tracer" means a substance or attribute present in the recharge water at levels different from the receiving groundwater such that the substance in the water applied at the GRRP can be distinctly and sufficiently detected in the groundwater downgradient of the GRRP to determine the underground retention time of the water.

§60301.550. Landscape impoundment.

"Landscape impoundment" means an impoundment in which recycled water is stored or used for aesthetic enjoyment or landscape irrigation, or which otherwise serves a similar function and is not intended to include public contact.

§60301.575. Maximum Contaminant Level or MCL.

"Maximum Contaminant Level" or "MCL" means the maximum permissible concentration of a contaminant established pursuant to sections 116275(c)(1) and (d) of the Health and Safety Code or established by the U.S. Environmental Protection Agency.

§60301.600. Modal contact time.

"Modal contact time" means the amount of time elapsed between the time that a tracer, such as salt or dye, is injected into the influent at the entrance to a chamber and the time that the highest concentration of the tracer is observed in the effluent from the chamber.

§60301.620. Nonrestricted recreational impoundment.

"Nonrestricted recreational impoundment" means an impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities.

§60301.625. Notification Level or NL.

"Notification Level" or "NL" means the concentration of a contaminant established by the Department pursuant to section 116455 of the Health and Safety Code.

§60301.630. NTU.
"NTU" (Nephelometric turbidity unit) means a measurement of turbidity as determined by the ratio of the intensity of light scattered by the sample to the intensity of incident light as measured by method 2130 B. in Standard Methods for the Examination of Water and Wastewater, 20th ed.; Eaton, A. D., Clesceri, L. S., and Greenberg, A. E., Eds; American Public Health Association: Washington, DC, 1995; p. 2-8.

§60301.650. Oxidized wastewater.
"Oxidized wastewater" means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen.

§60301.660. Peak dry weather design flow.
"Peak Dry Weather Design Flow" means the arithmetic mean of the maximum peak flow rates sustained over some period of time (for example three hours) during the maximum 24-hour dry weather period. Dry weather period is defined as periods of little or no rainfall.

§60301.670. Project Sponsor.
"Project Sponsor" means an entity subject to a Regional Water Quality Control Board's (Regional Board's) water recycling requirements for a Groundwater Replenishment Reuse Project (GRRP) and is, in whole or part, responsible for applying to the Regional Board for a permit, obtaining a permit, operation of a GRRP, and complying with the terms and conditions of the permit and the requirements of this Chapter.

§60301.680. Public Water System.
"Public Water System" has the same meaning as defined in section 116275(h) of the Health and Safety Code.

§60301.685. Recharge Water.
"Recharge Water" means recycled municipal wastewater, or the combination of recycled municipal wastewater and credited diluent water, which is utilized by a GRRP for groundwater replenishment.

§60301.690. Recycled Municipal Wastewater.
"Recycled Municipal Wastewater" means recycled water that is the effluent from the treatment of wastewater of municipal origin.

§60301.700. Recycled water agency.
"Recycled water agency" means the public water system, or a publicly or privately owned or operated recycled water system, that delivers or proposes to deliver recycled water to a facility.

§60301.705. Recycled Municipal Wastewater Contribution or RWC.
"Recycled Municipal Wastewater Contribution" or "RWC" means the fraction equal to the quantity of recycled municipal wastewater applied at the GRRP divided by the sum of the quantity of recycled municipal wastewater and credited diluent water.

§60301.710. Recycling plant.
"Recycling plant" means an arrangement of devices, structures, equipment, processes and controls which produce recycled water.

§60301.740. Regulatory agency.
"Regulatory agency" means the California Regional Water Quality Control Board(s) that have jurisdiction over the recycling plant and use areas.

§60301.750. Restricted access golf course.
"Restricted access golf course" means a golf course where public access is controlled so that areas irrigated with recycled water cannot be used as if they were part of a park, playground, or school yard and where irrigation is conducted only in areas and during periods when the golf course is not being used by golfers.

§60301.760. Restricted recreational impoundment.
"Restricted recreational impoundment" means an impoundment of recycled water in which recreation is limited to fishing, boating, and other non-body-contact water recreational activities.

§60301.770. Regional Board.
"Regional Board" means the Regional Water Quality Control Board.

§60301.780. Saturated Zone.
"Saturated Zone" means an underground region or regions in which all interstices in, between, and below natural geologic materials are filled with water, with the uppermost surface of the saturated zone being the water table.

§60301.800. Spray irrigation.
"Spray irrigation" means the application of recycled water from sprinklers to crops or vegetation.

§60301.810. Spreading Area.
"Spreading Area" means a natural or constructed impoundment with a depth equal to or less than its widest surface dimension used by a GRRP to replenish a groundwater basin with recharge water infiltrating and percolating through a zone that, in the absence of a GRRP, would be an unsaturated zone.

§60301.830. Standby unit process.
"Standby unit process" means an alternate unit process or an equivalent alternative process which is maintained in operable condition and which is capable of providing comparable treatment of the actual flow through the unit for which it is a substitute.

§60301.840. Subsurface Application.
"Subsurface Application" means the application of recharge water to a groundwater basin(s) by a means other than surface application.

§60301.850. Surface Application.
"Surface Application" means the application of recharge water to a spreading area.

§60301.850.5. Surface Water.
As used in this Article and Article 5.3 of this Chapter, "Surface Water" has the same meaning as defined in section 64651.83 of Chapter 17[1].

§60301.851. Surface Water Source Augmentation Project or SWSAP.
"Surface Water Source Augmentation Project" or "SWSAP" means a project involving the planned placement of recycled municipal wastewater into a surface water reservoir that is used as a source of domestic drinking water supply, for the purpose of supplementing the source of domestic drinking water supply.

§60301.852. Surface Water Source Augmentation Project Public Water System or SWSAP PWS.
"Surface Water Source Augmentation Project Public Water System" or "SWSAP PWS" means a public water system that plans to utilize or is utilizing an augmented reservoir as a source of drinking water and is responsible for complying with the requirements of Chapter 17[1] and the applicable requirements of this Chapter.

§60301.853. Surface Water Source Augmentation Project Water Recycling Agency or SWSAP WRA.
"Surface Water Source Augmentation Project Water Recycling Agency" or "SWSAP WRA" means an agency that is subject to a Regional Water Quality Control Board's (Regional Board's) water-recycling requirements applicable to a Surface Water Source Augmentation Project (SWSAP) and is, in whole or part, responsible for applying to the Regional Board for a permit, obtaining a permit, the operation of a SWSAP, and complying with the terms and conditions of the Regional Board permit and the requirements of this Chapter.

§60301.855. Surrogate Parameter.
"Surrogate Parameter" means a measurable physical or chemical property that has been demonstrated to provide a direct correlation with the concentration of an indicator compound, can be used to monitor the efficiency of trace organic compounds removal by a treatment process, and/or provides an indication of a treatment process failure.

§60301.860. Total Nitrogen.
"Total Nitrogen" means the sum of concentrations of ammonia, nitrite, nitrate, and organic nitrogen-containing compounds, expressed as nitrogen.

§60301.870. Total Organic Carbon or TOC.
"Total Organic Carbon" or "TOC" means the concentration of organic carbon present in water.

§60301.900. Undisinfected secondary recycled water.
"Undisinfected secondary recycled water" means oxidized wastewater.

§60301.910. Unsaturated Zone.
"Unsaturated Zone" means the volume between the land surface and the uppermost saturated zone.

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[1] Chapter 17, in its entirety, may be found in the DDW's "Drinking Water-Related Regulations" located here: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Lawbook.html

§60301.920. Use area.

"Use area" means an area of recycled water use with defined boundaries. A use area may contain one or more facilities.

Article 2. Sources of Recycled Water.

§60302. Source specifications.

The requirements in this chapter shall only apply to recycled water from sources that contain domestic waste, in whole or in part.

Article 3. Uses of Recycled Water.

§60303. Exceptions.

The requirements set forth in this chapter shall not apply to the use of recycled water onsite at a water recycling plant, or wastewater treatment plant, provided access by the public to the area of onsite recycled water use is restricted.

§60304. Use of recycled water for irrigation.

(a) Recycled water used for the surface irrigation of the following shall be a disinfected tertiary recycled water, except that for filtration pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes:
  (1) Food crops, including all edible root crops, where the recycled water comes into contact with the edible portion of the crop,
  (2) Parks and playgrounds,
  (3) School yards,
  (4) Residential landscaping,
  (5) Unrestricted access golf courses, and
  (6) Any other irrigation use not specified in this section and not prohibited by other sections of the California Code of Regulations.

(b) Recycled water used for the surface irrigation of food crops where the edible portion is produced above ground and not contacted by the recycled water shall be at least disinfected secondary-2.2 recycled water.

(c) Recycled water used for the surface irrigation of the following shall be at least disinfected secondary-23 recycled water:
  (1) Cemeteries,
  (2) Freeway landscaping,
  (3) Restricted access golf courses,
  (4) Ornamental nursery stock and sod farms where access by the general public is not restricted,
  (5) Pasture for animals producing milk for human consumption, and
  (6) Any nonedible vegetation where access is controlled so that the irrigated area cannot be used as if it were part of a park, playground or school yard

(d) Recycled wastewater used for the surface irrigation of the following shall be at least undisinfected secondary recycled water:
  (1) Orchards where the recycled water does not come into contact with the edible portion of the crop,
  (2) Vineyards where the recycled water does not come into contact with the edible portion of the crop,
  (3) Non food-bearing trees (Christmas tree farms are included in this category provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting or allowing access by the general public),
  (4) Fodder and fiber crops and pasture for animals not producing milk for human consumption,
  (5) Seed crops not eaten by humans,
  (6) Food crops that must undergo commercial pathogen-destroying processing before being consumed by humans, and
  (7) Ornamental nursery stock and sod farms provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting, retail sale, or allowing access by the general public.

(e) No recycled water used for irrigation, or soil that has been irrigated with recycled water, shall come into contact with the edible portion of food crops eaten raw by humans unless the recycled water complies with subsection (a).

§60305. Use of recycled water for impoundments.

(a) (a) Except as provided in subsection (b), recycled water used as a source of water supply for nonrestricted recreational impoundments shall be disinfected tertiary recycled water that has been subjected to conventional treatment.

(b) (b) Disinfected tertiary recycled water that has not received conventional treatment may be used for nonrestricted recreational impoundments provided the recycled water is monitored for the presence of pathogenic organisms in accordance with the following:
  (1) During the first 12 months of operation and use the recycled water shall be sampled and analyzed monthly for *Giardia*, enteric viruses, and *Cryptosporidium*. Following the first 12 months of use, the recycled water shall be sampled and analyzed quarterly for *Giardia*, enteric viruses, and *Cryptosporidium*. The ongoing monitoring may be discontinued after the first two years of operation with the approval of the department. This monitoring shall be in addition to the monitoring set forth in section 60321.
  (2) The samples shall be taken at a point following disinfection and prior to the point where the recycled water enters the use impoundment. The samples shall be analyzed by an approved laboratory and the results submitted quarterly to the regulatory agency.

(c) The total coliform bacteria concentrations in recycled water used for nonrestricted recreational impoundments, measured at a point between the disinfection process and the point of entry to the use impoundment, shall comply with the criteria specified in section 60301.230 (b) for disinfected tertiary recycled water.

(d) Recycled water used as a source of supply for restricted recreational impoundments and for any publicly accessible impoundments at fish hatcheries shall be at least disinfected secondary-2.2 recycled water.

(e) Recycled water used as a source of supply for landscape impoundments that do not utilize decorative fountains shall be at least disinfected secondary-23 recycled water.

§60306. Use of recycled water for cooling.

(a) Recycled water used for industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist shall be a disinfected tertiary recycled water.

(b) Use of recycled water for industrial or commercial cooling or air conditioning that does not involve the use of a cooling tower, evaporative condenser, spraying, or any mechanism that creates a mist shall be at least disinfected secondary-23 recycled water.

(c) Whenever a cooling system, using recycled water in conjunction with an air conditioning facility, utilizes a cooling tower or otherwise creates a mist that could come into contact with employees or members of the public, the cooling system shall comply with the following:
  (1) A drift eliminator shall be used whenever the cooling system is in operation.
  (2) A chlorine, or other, biocide shall be used to treat the cooling system recirculating water to minimize the growth of *Legionella* and other microorganisms.

§60307. Use of recycled water for other purposes.

(a) Recycled water used for the following shall be disinfected tertiary recycled water, except that for filtration being provided pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes:
  (1) Flushing toilets and urinals,
  (2) Priming drain traps,
  (3) Industrial process water that may come into contact with workers,
  (4) Structural fire fighting,
  (5) Decorative fountains,
  (6) Commercial laundries,
  (7) Consolidation of backfill around potable water pipelines,
  (8) Artificial snow making for commercial outdoor use, and
  (9) Commercial car washes, including hand washes if the recycled water is not heated, where the general public is excluded from the washing process.

(b) Recycled water used for the following uses shall be at least disinfected secondary-23 recycled water:
  (1) Industrial boiler feed,
  (2) Nonstructural fire fighting,
  (3) Backfill consolidation around nonpotable piping,
  (4) Soil compaction,
  (5) Mixing concrete,
  (6) Dust control on roads and streets,
  (7) Cleaning roads, sidewalks and outdoor work areas and
  (8) Industrial process water that will not come into contact with workers.

(c) Recycled water used for flushing sanitary sewers shall be at least undisinfected secondary recycled water.

Article 4. Use Area Requirements.

§60310. Use area requirements.

(a) No irrigation with disinfected tertiary recycled water shall take place within 50 feet of any domestic water supply well unless all of the following conditions have been met:
  (1) A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface.
  (2) The well contains an annular seal that extends from the surface into the aquitard.
  (3) The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities.
  (4) The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well.
  (5) The owner of the well approves of the elimination of the buffer zone requirement.

(b) No impoundment of disinfected tertiary recycled water shall occur within 100 feet of any domestic water supply well.

(c) No irrigation with, or impoundment of, disinfected secondary-2.2 or disinfected secondary-23 recycled water shall take place within 100 feet of any domestic water supply well.

(d) No irrigation with, or impoundment of, undisinfected secondary recycled water shall take place within 150 feet of any domestic water supply well.

(e) Any use of recycled water shall comply with the following:
  (1) Any irrigation runoff shall be confined to the recycled water use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency.
  (2) Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities.
  (3) Drinking water fountains shall be protected against contact with recycled water spray, mist, or runoff.

(f) No spray irrigation of any recycled water, other than disinfected tertiary recycled water, shall take place within 100 feet of a residence or a place where public exposure could be similar to that of a park, playground, or school yard.

(g) All use areas where recycled water is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following wording: "RECYCLED WATER - DO NOT DRINK". Each sign shall display an international symbol similar to that shown in figure 60310-A. The Department may accept alternative signage and wording, or an educational program, provided the applicant demonstrates to the Department that the alternative approach will assure an equivalent degree of public notification.

(h) Except as allowed under section 7604 of title 17, California Code of Regulations, no physical connection shall be made or allowed to exist between any recycled water system and any separate system conveying potable water.

(i) Except for use in a cemetery that complies with the requirements of section 8118 of the Health and Safety Code, the portions of the recycled water piping system that are in areas subject to access by the general public shall not include any hose bibs. Only quick couplers that differ from those used on the potable water system shall be used on the portions of the recycled water piping system in areas subject to public access.

Water Recycling Criteria

FIGURE 60310–A

Article 5. Dual Plumbed Recycled Water Systems.

§60313. General requirements.

(a) No person other than a recycled water agency shall deliver recycled water to a dual plumbed facility.

(b) Except as allowed pursuant to section 13553(d) of the Water Code, a recycled water agency shall not deliver recycled water for any internal use to any individually- owned residential units including free-standing structures, multiplexes, or condominiums.[2]

(c) No recycled water agency shall deliver recycled water for internal use except for fire suppression systems, to any facility that produces or processes food products or beverages. For purposes of this Subsection, cafeterias or snack bars in a facility whose primary function does not involve the production or processing of foods or beverages are not considered facilities that produce or process foods or beverages.

(d) No recycled water agency shall deliver recycled water to a facility using a dual plumbed system unless the report required pursuant to section 13522.5 of the Water Code, and which meets the requirements set forth in section 60314, has been submitted to, and approved by, the regulatory agency.

§60314. Report submittal.

(a) For dual-plumbed recycled water systems, the report submitted pursuant to section 13522.5 of the Water Code shall contain the following information in addition to the information required by section 60323:
 (1) A detailed description of the intended use area identifying the following:
  (A) The number, location, and type of facilities within the use area proposing to use dual plumbed systems,
  (B) The average number of persons estimated to be served by each facility on a daily basis,
  (C) The specific boundaries of the proposed use area including a map showing the location of each facility to be served,
  (D) The person or persons responsible for operation of the dual plumbed system at each facility, and
  (E) The specific use to be made of the recycled water at each facility.
 (2) Plans and specifications describing the following:
  (A) Proposed piping system to be used,
  (B) Pipe locations of both the recycled and potable systems,
  (C) Type and location of the outlets and plumbing fixtures that will be accessible to the public, and
  (D) The methods and devices to be used to prevent backflow of recycled water into the public water system.
 (3) The methods to be used by the recycled water agency to assure that the installation and operation of the dual plumbed system will not result in cross connections between the recycled water piping system and the potable water piping system. This shall include a

[2] AB 1406, Chapter 537, Statutes of 2007, Water Code 13553, et seq., allows condominiums to be plumbed with recycled water, subject to a number of provisions.

description of pressure, dye or other test methods to be used to test the system every four years.

(b) A master plan report that covers more than one facility or use site may be submitted provided the report includes the information required by this section. Plans and specifications for individual facilities covered by the report may be submitted at any time prior to the delivery of recycled water to the facility.

§60315. Design requirements.

The public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of sections 7602 (a) and 7603 (a) of title 17, California Code of Regulations, and the approval of the public water system has been obtained.

§60316. Operation requirements.

(a) Prior to the initial operation of the dual-plumbed recycled water system and annually thereafter, the Recycled Water Agency shall ensure that the dual plumbed system within each facility and use area is inspected for possible cross connections with the potable water system. The recycled water system shall also be tested for possible cross connections at least once every four years. The testing shall be conducted in accordance with the method described in the report submitted pursuant to section 60314. The inspections and the testing shall be performed by a cross connection control specialist certified by the California-Nevada section of the American Water Works Association or an organization with equivalent certification requirements. A written report documenting the result of the inspection or testing for the prior year shall be submitted to the department within 30 days following completion of the inspection or testing.

(b) The recycled water agency shall notify the department of any incidence of backflow from the dual-plumbed recycled water system into the potable water system within 24 hours of the discovery of the incident.

(c) Any backflow prevention device installed to protect the public water system serving the dual-plumbed recycled water system shall be inspected and maintained in accordance with section 7605 of Title 17, California Code of Regulations.

Article 5.5. Other Methods of Treatment.

§60320.5. Other methods of treatment.

Methods of treatment other than those included in this chapter and their reliability features may be accepted if the applicant demonstrates to the satisfaction of the State Department of Health that the methods of treatment and reliability features will assure an equal degree of treatment and reliability.

Article 6. Sampling and Analysis.

§60321. Sampling and analysis.

(a) Disinfected secondary-23, disinfected secondary-2.2, and disinfected tertiary recycled water shall be sampled at least once daily for total coliform bacteria. The samples shall be taken from the disinfected effluent and shall be analyzed by an approved laboratory.

(b) Disinfected tertiary recycled water shall be continuously sampled for turbidity using a continuous turbidity meter and recorder following filtration. Compliance with the daily average operating filter effluent turbidity shall be determined by averaging the levels of recorded turbidity taken at four-hour intervals over a 24-hour period. Compliance with turbidity pursuant to section 60301.320 (a)(2)(B) and (b)(1) shall be determined using the levels of recorded turbidity taken at intervals of no more than 1.2- hours over a 24- hour period. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2-hours may be substituted for a period of up to 24-hours. The results of the daily average turbidity determinations shall be reported quarterly to the regulatory agency.

(c) The producer or supplier of the recycled water shall conduct the sampling required in subsections (a) and (b).

Article 7. Engineering Report and Operational Requirements.

§60323. Engineering report.

(a) No person shall produce or supply recycled water for reuse from a water reclamation plant without a Department-approved engineering report.

(b) The report shall be prepared by a qualified engineer licensed in California and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed reclamation system. The report shall clearly indicate the means for compliance with these regulations and any other features specified by the regulatory agency.

(c) The report shall contain a contingency plan which will assure that no untreated or inadequately treated wastewater will be delivered to the use area.

§60325. Personnel.

(a) Each reclamation plant shall be provided with a sufficient number of qualified personnel to operate the facility effectively so as to achieve the required level of treatment at all times.

(b) Qualified personnel shall be those meeting requirements established pursuant to Chapter 9 (commencing with Section 13625) of the Water Code.

§60327. Maintenance.

A preventive maintenance program shall be provided at each reclamation plant to ensure that all equipment is kept in a reliable operating condition.

§60329. Operating records and reports.

(a) Operating records shall be maintained at the reclamation plant or a central depository within the operating agency. These shall include: all analyses specified in the reclamation criteria; records of operational problems, plant and equipment breakdowns, and diversions to emergency storage or disposal; all corrective or preventive action taken.

(b) Process or equipment failures triggering an alarm shall be recorded and maintained as a separate record file. The recorded information shall include the time and cause of failure and corrective action taken.

(c) A monthly summary of operating records as specified under (a) of this section shall be filed monthly with the regulatory agency.

(d) Any discharge of untreated or partially treated wastewater to the use area, and the cessation of same, shall be reported immediately by telephone to the regulatory agency, the State Department of Health, and the local health officer.

§60331. Bypass.
There shall be no bypassing of untreated or partially treated wastewater from the reclamation plant or any intermediate unit processes to the point of use.

Article 8. General Requirements of Design.

§60333. Flexibility of design.
The design of process piping, equipment arrangement, and unit structures in the reclamation plant must allow for efficiency and convenience in operation and maintenance and provide flexibility of operation to permit the highest possible degree of treatment to be obtained under varying circumstances.

§60335. Alarms.
(a) Alarm devices required for various unit processes as specified in other sections of these regulations shall be installed to provide warning of:
   (1) Loss of power from the normal power supply.
   (2) Failure of a biological treatment process.
   (3) Failure of a disinfection process.
   (4) Failure of a coagulation process.
   (5) Failure of a filtration process.
   (6) Any other specific process failure for which warning is required by the regulatory agency.

(b) All required alarm devices shall be independent of the normal power supply of the reclamation plant.

(c) The person to be warned shall be the plant operator, superintendent, or any other responsible person designated by the management of the reclamation plant and capable of taking prompt corrective action.

(d) Individual alarm devices may be connected to a master alarm to sound at a location where it can be conveniently observed by the attendant. In case the reclamation plant is not attended full time, the alarm(s) shall be connected to sound at a police station, fire station or other full time service unit with which arrangements have been made to alert the person in charge at times that the reclamation plant is unattended.

§60337. Power supply.
The power supply shall be provided with one of the following reliability features:
(a) Alarm and standby power source.

(b) Alarm and automatically actuated short-term retention or disposal provisions as specified in Section 60341.

(c) Automatically actuated long-term storage or disposal provisions as specified in Section 60341.

Article 9. Reliability Requirements for Primary Effluent.

§60339. Primary treatment.

Reclamation plants producing reclaimed water exclusively for uses for which primary effluent is permitted shall be provided with one of the following reliability features:

(a) Multiple primary treatment units capable of producing primary effluent with one unit not in operation.

(b) Long-term storage or disposal provisions as specified in Section 60341.

Article 10. Reliability Requirements for Full Treatment.

§60341. Emergency storage or disposal.

(a) Where short-term retention or disposal provisions are used as a reliability feature, these shall consist of facilities reserved for the purpose of storing or disposing of untreated or partially treated wastewater for at least a 24-hour period. The facilities shall include all the necessary diversion devices, provisions for odor control, conduits, and pumping and pump back equipment. All of the equipment other than the pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

(b) Where long-term storage or disposal provisions are used as a reliability feature, these shall consist of ponds, reservoirs, percolation areas, downstream sewers leading to other treatment or disposal facilities or any other facilities reserved for the purpose of emergency storage or disposal of untreated or partially treated wastewater. These facilities shall be of sufficient capacity to provide disposal or storage of wastewater for at least 20 days, and shall include all the necessary diversion works, provisions for odor and nuisance control, conduits, and pumping and pump back equipment. All of the equipment other than the pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

(c) Diversion to a less demanding reuse is an acceptable alternative to emergency disposal of partially treated wastewater provided that the quality of the partially treated wastewater is suitable for the less demanding reuse.

(d) Subject to prior approval by the regulatory agency, diversion to a discharge point which requires lesser quality of wastewater is an acceptable alternative to emergency disposal of partially treated wastewater.

(e) Automatically actuated short-term retention or disposal provisions and automatically actuated long-term storage or disposal provisions shall include, in addition to provisions of (a), (b), (c), or (d) of this section, all the necessary sensors, instruments, valves and other devices to enable fully automatic diversion of untreated or partially treated wastewater to approved emergency storage or disposal in the event of failure of a treatment process and a manual reset to prevent automatic restart until the failure is corrected.

§60343. Primary treatment.
All primary treatment unit processes shall be provided with one of the following reliability features:

(a) Multiple primary treatment units capable of producing primary effluent with one unit not in operation.

(b) Standby primary treatment unit process.

(c) Long-term storage or disposal provisions.

§60345. Biological treatment.
All biological treatment unit processes shall be provided with one of the following reliability features:

(a) Alarm and multiple biological treatment units capable of producing oxidized wastewater with one unit not in operation.

(b) Alarm, short-term retention or disposal provisions, and standby replacement equipment.

(c) Alarm and long-term storage or disposal provisions.

(d) Automatically actuated long-term storage or disposal provisions.

§60347. Secondary sedimentation.
All secondary sedimentation unit processes shall be provided with one of the following reliability features:

(a) Multiple sedimentation units capable of treating the entire flow with one unit not in operation.

(b) Standby sedimentation unit process.

(c) Long-term storage or disposal provisions.

§60349. Coagulation.
(a) All coagulation unit processes shall be provided with the following mandatory features for uninterrupted coagulant feed:
  (1) Standby feeders,
  (2) Adequate chemical stowage and conveyance facilities,
  (3) Adequate reserve chemical supply, and
  (4) Automatic dosage control.

(b) All coagulation unit processes shall be provided with one of the following reliability features:
  (1) Alarm and multiple coagulation units capable of treating the entire flow with one unit not in operation;
  (2) Alarm, short-term retention or disposal provisions, and standby replacement equipment;
  (3) Alarm and long-term storage or disposal provisions;
  (4) Automatically actuated long-term storage or disposal provisions, or
  (5) Alarm and standby coagulation process.

§60351. Filtration.
All filtration unit processes shall be provided with one of the following reliability features:

(a) Alarm and multiple filter units capable of treating the entire flow with one unit not in operation.

(b) Alarm, short-term retention or disposal provisions and standby replacement equipment.

(c) Alarm and long-term storage or disposal provisions.

(d) Automatically actuated long-term storage or disposal provisions.

(e) Alarm and standby filtration unit process.

§60353. Disinfection.
(a) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with the following features for uninterrupted chlorine feed:
  (1) Standby chlorine supply,
  (2) Manifold systems to connect chlorine cylinders,
  (3) Chlorine scales, and
  (4) Automatic devices for switching to full chlorine cylinders. Automatic residual control of chlorine dosage, automatic measuring and recording of chlorine residual, and hydraulic performance studies may also be required.

(b) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with one of the following reliability features:
  (1) Alarm and standby chlorinator;
  (2) Alarm, short-term retention or disposal provisions, and standby replacement equipment;
  (3) Alarm and long-term storage or disposal provisions;
  (4) Automatically actuated long-term storage or disposal provisions; or
  (5) Alarm and multiple point chlorination, each with independent power source, separate chlorinator, and separate chlorine supply.

§60355. Other alternatives to reliability requirements
Other alternatives to reliability requirements set forth in Articles 8 to 10 may be accepted if the applicant demonstrates to the satisfaction of the State Department of Health that the proposed alternative will assure an equal degree of reliability.

* * * * *

TAB 4

Sanitation Districts Nos. 14 and 20 of Los Angeles County Water Recycling Permits Issued by the Lahontan Regional Water Quality Control Board

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

Sanitation Districts Nos. 14 and 20 of Los Angeles County
Recycled Water Users Handbook
For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley
July 2020

Water Recycling Permit for Lancaster WRP

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

California Regional Water Quality Control Board
Lahontan Region

Linda S. Adams
Secretary for Environmental Protection

2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150
(530) 542-5400 • Fax (530) 544-2271
http://www.waterboards.ca.gov/lahontan

Arnold Schwarzenegger
Governor

December 17, 2009

INTERESTED PERSONS AND AGENCIES:

ADOPTED MASTER RECYCLING REQUIREMENTS AND WASTE DISCHARGE REQUIREMENTS COUNTY SANITATION DISTRICT NO. 14 OF LOS ANGELES COUNTY (LANCASTER) DISINFECTED TERTIARY RECYCLED WATER

Enclosed is a copy of Board Order No. R6V-2009-0141 that was adopted at the Regional Board meeting held in South Lake Tahoe, CA on December 9, 2009.

Any person aggrieved by this action of the Regional Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must *receive* the petition by 5:00 p.m., 30 days after the date of the Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

Carrie Hackler

Carrie Hackler
Office Technician

Enclosure

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6V-2009-0141
WDID NO. 6B190501001

MASTER WATER RECYCLING REQUIREMENTS AND WASTE DISCHARGE REQUIREMENTS COUNTY SANITATION DISTRICT NO. 14 OF LOS ANGELES COUNTY (LANCASTER) DISINFECTED TERTIARY RECYCLED WATER

Los Angeles County

The California Regional Water Quality Control Board, Lahontan Region (Lahontan Water Board) finds:

1. Definitions

   The following terms, which are used within this Order, are defined by their respective code citations or policy references:

   a. **Disinfected Tertiary Recycled Water**: "...filtered and subsequently disinfected wastewater that meets the following criteria:

      (a) The filtered wastewater has been disinfected by either:
      (1) A chlorine disinfection process following filtration that provides a CT (the product of total chlorine residual and modal contact time measured at the same point) value of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or
      (2) A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque-forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposed of the demonstration.

      (b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters." [California Code of Regulations, title 22, section 60301.230]

b. **Incidental Runoff**: "...unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area." [Paragraph 7(a), Recycled Water Policy, State Water Resources Control Board Resolution No. 2009-0011]

c. **Master Recycling Permit**: "...a permit issued to a supplier or a distributor, or both, of recycled water, that includes waste discharge requirements prescribed pursuant to Water Code section 13263 and water recycling requirements prescribed pursuant to Water Code section 13523.1." [Water Code section 13050(r)]

d. **Reclaimed Water**. "...wastewater which as a result of treatment is suitable for uses other than potable use." [California Code of Regulations, title 17, section 7583(i)]

e. **Recycled Water**: "...water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource." [Water Code section 13050(n)]

2. <u>Recycled Water Report</u>

The County Sanitation District No. 14 of Los Angeles County (District) has filed an application with the Lahontan Water Board under Water Code section 13522.5. Pursuant to Water Code section 13523.1, the District's application requests the Lahontan Water Board to issue Master Water Recycling Requirements to the District for supply of disinfected tertiary recycled water as defined in California Code of Regulations, title 22, section 60301.230. The District submitted information on January 7, 2009, that completed the application.

3. <u>Facilities and Treatment Process</u>

The District collects and treats domestic wastewater generated in the District's service area, which is generally the City of Lancaster, portions of the City of Palmdale, and nearby unincorporated areas of northern Los Angeles County. The recycled water produced by the District is either discharged to surface water or used for various recycled water uses, such as agricultural irrigation or municipal and industrial uses. The District provides secondary wastewater treatment at its Lancaster Water Reclamation Plant. Disinfected tertiary wastewater treatment is provided at two separate facilities to produce disinfected tertiary recycled water. A third treatment facility is scheduled to begin operations and produce disinfected tertiary recycled water in the fall of 2010. The three tertiary recycled water facilities are identified below:

a. The Antelope Valley Tertiary Treatment Plant, which has an average 24-hour design capacity of 0.6 million gallons per day (mgd).

b. The Membrane Bioreactor Plant, which has an average 24-hour design capacity of 1.75 mgd (annual average flow is 1 mgd).

c. The Activated Sludge/Nitrification-Denitrification Plant (Stage V Tertiary Treatment Plant), planned to be completed by fall of 2010 and to have an initial average 24-hour design capacity of 18 mgd. (The District has plans to expand this plant to 21 mgd).

Total proposed disinfected tertiary recycled water flow is 19.6 mgd (annual average) with a proposed expansion to 22.6 mgd (annual average).

4. <u>Current Board Orders</u>

Board Order No. 6-85-35 and Board Order No. R6V-2002-0053 (as amended) establish waste discharge requirements for the discharge of recycled water pursuant to Water Code section 13523.1, subdivision (b)(1). Brief descriptions of the orders are discussed in items (a) and (c) of this finding.

a. <u>Waste Discharge Requirements</u>

Board Order No. R6V-2002-0053, initially adopted on September 11, 2002, and its amendments, Board Order No. R6V-2002-0053A1 (adopted on July 13, 2005) and R6V-2002-0053A2 (adopted on March 14, 2007) include effluent limits and monitoring requirements for the District's existing primary, secondary, and tertiary treatment facilities located at the District's water reclamation plant sites as shown in Attachment B of this Order.

b. <u>Waste Discharge and Water Recycling Requirements (Secondary Treatment)</u>

The District's treatment facilities produce un-disinfected and disinfected secondary recycled water that is supplied to Nebeker Ranch and discharged to Piute Ponds, respectively. Requirements for the discharge at Nebeker Ranch are prescribed by the Lahontan Water Board in Board Order No. 6-86-58, which was adopted on May 15, 1986. Requirements for the discharge at Piute Ponds are contained in Board Order No. R6V-2002-053 and its amendments. The discharge of disinfected secondary recycled water is not considered in this master recycling permit.

c. Waste Discharge and Water Recycling Requirements (Disinfected Tertiary Treatment)

One of the District's existing tertiary treatment plants, the Antelope Valley Tertiary Treatment Plant, has an average 24-hour treatment capacity of 0.6 mgd. From 1972 to the present, the existing 0.6 mgd disinfected tertiary treatment plant has generated recycled water that is used at Apollo Lakes Regional County Park (Apollo Park) and the General W.J. Fox Airfield (Fox Airfield). Requirements for these uses are prescribed by the Lahontan Water Board in Board Order No. 6-85-35, which was adopted on April 11, 1985. Board Order No. 6-85-35 will be rescinded and replaced by this master recycling permit.

The District's other existing tertiary treatment plant, the Membrane Bioreactor Tertiary Treatment Plant (MBR), has an average 24-hour treatment capacity of 1.75 mgd. The MBR produces recycled water that is used at the Eastern Agricultural Site (requirements for this use are prescribed by the Lahontan Water Board in Board Order No. R6V-2002-0053A2) as well as for other uses at various sites as described in Finding No. 4.d, below.

Board Order No. R6V-2002-0053A2 also includes requirements for the District's Stage V Tertiary Treatment Plant, planned to be completed by fall of 2010 and to have an initial average 24-hour treatment capacity of 18 mgd. The District plans to expand this plant to 21 mgd.

The District also uses the disinfected tertiary recycled water to irrigate a greenbelt at its treatment plant site and for soil compaction and dust control as described, below.

d. Water Recycling Requirements

On March 8, 2006, the Lahontan Water Board adopted Board Order No. R6V-2006-0009 establishing master recycling requirements for the Division Street Corridor Recycled Water Project (Division Street Project). The requirements allow the use of recycled water for landscape irrigation, dust control, and soil compaction within a 12.5 square-mile area in Lancaster. The area is bounded by Avenue J on the south, 10th Street West on the west, 15th Street East on the east, and Avenue E on the north.

Board Order No. R6V-2006-0009 was rescinded and replaced by Board Order No. R6V-2009-0034 on June 10, 2009. Board Order No. R6V-2009-0034 established master recycling requirements for the use of recycled water for municipal and industrial applications and for non-agricultural irrigation. Board Order No. R6V-2009-0034 allowed for the use of recycled water at sites located within the portion of the Antelope Valley bounded by the Los Angeles County/Kern County line to the north (north side of Township 8 North, San Bernardino Meridian); the Los Angeles County/San Bernardino County line to the east (east side of Range 8 West, San Bernardino Meridian); south side of Township 5 North, San Bernardino Meridian to the south; and the west side of Range 14 West, San Bernardino Meridian to the west (see Attachment B). Board Order No. R6V-2009-0034 will be rescinded and replaced by this master recycling permit.

5. Reason for Action

The following uses of disinfected tertiary recycled water (hereinafter, recycled water) have received project-level coverage pursuant to the California Environmental Quality Act (CEQA). The following uses are currently permitted under Board Order No. R6V-2009-0034.

- Irrigation for parks and playgrounds
- Irrigation for school yards
- Irrigation for residential landscaping (non-individually owned common areas)
- Irrigation for golf courses (both restricted and unrestricted-access)
- Irrigation for cemeteries
- Irrigation for freeways and greenbelt landscaping
- Irrigation for landfills
- Consolidation of backfill (around potable and non-potable pipes)
- Fire fighting (both structural and non-structural)
- Mixing concrete
- Soil compaction
- Decorative fountains
- Flushing sanitary sewers
- Flushing toilets and urinals
- Dust control for construction activities (includes demolition)
- Dust control on roads and streets
- Dust control at landfills
- Commercial laundries
- Priming drain traps
- Cleaning roads (street sweeping), sidewalks, and outdoor work areas

Additional uses of recycled water that are not listed above, but are allowed by Title 22, were assessed at the programatic-level in the adopted environmental impact report. The District is proposing to expand its current permitted uses for recycled water to include:

a. recycled water use resulting in full consumption (no discharge of any type);

b. recycled water use at facilities, such as power plants, that results in a discharge that will be regulated by the Lahontan Water Board or the California Energy Commission pursuant to its authority under the Warren-Alquist Act; and

c. recycled water use resulting in a discharge to a sanitary sewer system.

Furthermore, Lahontan Water Board staff proposes to include use of recycled water at the Apollo Park and the Fox Airfield (currently permitted by Order No. 6-85-35, discussed in Finding No. 4.c, above) into this permit in order to further consolidate the permitting of recycled water produced by the District's water reclamation facilities.

The total estimated water demand for all proposed recycled water uses at buildout within the Antelope Valley is 21,210 acre-feet per year (19.0 mgd) [Final Program Environmental Impact Report, November, 2008]. The total estimated water demand for the recycled water uses at buildout is less than the 19.6 mgd annual average recycled water flow estimated to be produced. This Order provides master water recycling requirements, including a requirement that the District regulate the distributors and users of the recycled water to ensure compliance with water recycling requirements contained in State of California laws and regulations.

6. Sources of Recycled Water

The District currently produces recycled water at two tertiary treatment facilities. The Membrane Bioreactor Plant has an average 24-hour design capacity flow of 1.75 mgd. The Antelope Valley Tertiary Treatment Plant has an average 24-hour design capacity of 0.6 mgd. Both facilities provide disinfection to the tertiary effluent.

The District is constructing a new tertiary treatment facility, the Stage V tertiary Treatment Plant, which will have an initial average 24-hour design capacity of 18 mgd and a planned expansion to 21 mgd.

The Palmdale Water Reclamation Plant (operated by County Sanitation District No. 20 of Los Angeles County) and the Rosamond Waste Water Treatment Plant (operated by the Rosamond Community Services District) also plan to provide recycled water as future phases of the North Los Angeles/Kern County Regional Recycled Water Project are completed and come on-line. Water recycling requirements for the County Sanitation District No. 20 of Los Angeles County and the Rosamond Community Services District will be necessary prior to these districts providing recycled water from their respective facilities.

7. Producer, Distributors and Users

Under this Order, the District is the producer of recycled water. Currently, both the City of Lancaster and the Los Angeles County Waterworks District No. 40 are the distributors of the recycled water. As future phases of the North Los Angeles/Kern County Regional Recycled Water Project are completed and come on-line, there may be additional distributors. Distributors may also be users of the recycled water. Other users may include other public agencies and private parties.

8. Recycled Water Distribution and Distribution System

The City of Lancaster previously constructed a large diameter force-main pipeline for transporting recycled water along Division Street (Division Street Pipeline) and steel tanks for storage of recycled water and supplemental water. Supplemental water is currently supplied by existing water supply well No. 4-15, which is owned by the Los Angeles County Waterworks District No. 40. The Division Street Pipeline connects to the District's existing recycled water force-main pipeline, which is located along Avenue E. Lateral pipelines are constructed for each individual user of recycled water once the site is ready to receive the recycled water.

The proposed North Los Angeles/Kern County Regional Recycled Water Project distribution system includes constructing approximately 70 miles of recycled water conveyance pipelines, four storage reservoirs, two distribution pump stations, and two booster pump stations. The proposed North Los Angeles/Kern County Regional Recycled Water Project will provide the primary distribution system for providing recycled water to end users in the Antelope Valley.

9. Permit Area

This Order authorizes use of recycled water at sites located within the portion of the Antelope Valley bounded by the Los Angeles County/Kern County line to the north (north side of Township 8 North, San Bernardino Meridian); the Los Angeles County/San Bernardino County line to the east (east side of Range 8 West, San Bernardino Meridian); south side of Township 5 North, San Bernardino Meridian to the south; and the west side of Range 14 West, San Bernardino Meridian to the west (Permit Area). The Permit Area is identified on Attachment B of this Order.

10. Authorized Recycled Water Uses

This Order authorizes recycled water use for those uses identified in Finding No. 5 of this Order. Generally, recycled water will be used for municipal and industrial applications and for non-agricultural irrigation.

11. Authorized Recycled Water Use Sites

The sites authorized for use of recycled water under this Order (Authorized Recycled Water Use Sites) are those:

a. located within the Permit Area described in Finding No. 9, above; and

b. where the use is limited to those described in Finding Nos. 5 and 10, above.

12. Topography

The Permit Area is located within the Antelope Valley, which is a closed topographic basin with no outlet to the ocean. The Antelope Valley is bordered by the San Gabriel Mountains to the south and west, by the Tehachapi Mountains to the west and northwest, and by a series of north-south running, low-elevation buttes that form the eastern boundaries of the valley. All water that enters the valley either infiltrates into the groundwater basin, evaporates, or flows toward the three dry lakes located on Edwards Air Force Base: Rosamond Lake, Buckhorn Lake, and Rogers Lake. In general, groundwater flows northeasterly from the mountain ranges to the dry lakes. Due to the relatively impervious nature of the dry lake soil and high evaporation rates, water that collects on the dry lakes eventually evaporates rather than infiltrates into the groundwater.

13. Hydrogeology

Unconsolidated alluvial deposits consisting of inter-bedded gravel, sand, silt and clay underlie the Permit Area. An extensive layer of lacustrine deposits is located at a depth of approximately 500 feet. Its depth and thickness varies.

The Antelope Valley Groundwater Basin is comprised of two primary aquifers: (1) the upper (principal) aquifer, and (2) the lower (deep) aquifer. Historically, the lacustrine deposits have been used to define the boundary between the two aquifers, and the deep aquifer is generally considered to be confined.

The principal aquifer is an unconfined aquifer that historically provided artesian flows due to perched water tables in some areas. These artesian conditions are currently absent due to extensive pumping of groundwater. Depth to groundwater (water table for the principal unconfined aquifer) ranges from approximately 50 to

350 feet below ground surface depending upon the location within the Antelope Valley.

In general, the principal aquifer is thickest in the southern portion of the region near the San Gabriel Mountains, while the deep aquifer is thickest in the vicinity of the dry lakes on Edwards Air Force Base.

14. Groundwater Quality

Groundwater quality is excellent within the principal aquifer but degrades toward the northern portion of the dry lake areas. Considered to be generally suitable for domestic, agricultural, and industrial uses, the water in the principal aquifer has a total dissolved solids (TDS) concentration ranging from 200 to 800 milligrams per liter (mg/l) [Department of Water Resources Bulletin 118, 2004]. The existing groundwater TDS concentration is below and within the maximum contaminant level (MCL) range of 500 to 1,000 mg/l (short term MCL is 1,500 mg/l). The deeper aquifers typically have higher TDS levels. Hardness levels range from 50 to 200 mg/l, and high fluoride, boron, and nitrates are problematic in some areas of the basin.

Arsenic is an emerging contaminant of concern in the region and has been observed in wells owned by Los Angeles County Waterworks District No. 40, Palmdale Water District, and Quartz Hill Water District in concentrations ranging from 2 to 60 micrograms per liter (µg/l). The MCL for arsenic is 10 µg/l. Arsenic is a naturally occurring inorganic element often found in groundwater and occasionally in surface water. Research conducted by Los Angeles County Waterworks District No. 40 and the United States Geologic Survey has shown the problem to reside primarily in the deep aquifer, and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the region.

There are also concerns with nitrate levels above the current MCL of 10 mg/l (as Nitrogen [N]) in portions of the basin. Groundwater monitoring data from the mid-to-late 1990s indicate nitrate (as N) concentrations exceeding the primary MCL for drinking water of 10 mg/l in two areas in the southern portion of the groundwater basin: one is northeast of the Palmdale Water Reclamation Plant and the other is near the community of Littlerock, slightly east of the upper reach of Littlerock Creek. It is estimated both nitrate plumes are similar in size, approximately five to six square miles. Agricultural fertilization practices, historic confined animal facility discharges, septic system disposal, and discharge of treated wastewater have likely contributed to the elevated levels. In the area near the Palmdale Water Reclamation Plant, actions have already been implemented by County Sanitation District No. 20 of Los Angeles County to address the nitrate plume and to minimize any future impacts from treated wastewater discharges, including treatment upgrades, a change in effluent management practices, the implementation of the

North Los Angeles/Kern County Regional Recycled Water Project, and performing groundwater remediation activities near the Palmdale Water Reclamation Plant. In the Littlerock area, Littlerock Creek Irrigation District extracts the nitrate-laden groundwater and blends it with other water sources to meet drinking water quality standards. The agricultural and confined animal facilities that are considered to have contributed to the Littlerock nitrate plume are no longer active.

15. Receiving Waters

The receiving waters are the groundwaters of the Antelope Valley Basin.

16. Lahontan Basin Plan

The Lahontan Water Board adopted a Water Quality Control Plan for the Lahontan Region (Basin Plan), which became effective on March 31, 1995. This Order implements the Basin Plan as amended.

17. Beneficial Uses – Groundwater

Groundwater has been, and continues to be, an important resource within the Antelope Valley. Prior to 1972, groundwater provided more than 90 percent of the total water supply (MUN, AGR, and IND). Since 1972, groundwater has provided between 50 and 90 percent of the total water supply. Groundwater pumping in the Antelope Valley peaked in the 1950s, and it decreased in the 1960s and 1970s when agricultural pumping (AGR) declined due to increased pumping costs from greater pumping lifts and higher electric power costs. The rapid increase in urban growth in the 1980s resulted in an increase in the demand for municipal (MUN) and industrial (IND) water and an increase in groundwater use. Projected urban growth and limits on the available local and imported water supply are likely to continue to increase the reliance on the groundwater. [Section 3.7, Final Program Environmental Impact Report, November, 2008]

The present and potential beneficial uses of the groundwaters of the Antelope Valley Basin as set forth and defined in the Basin Plan are:

a. Municipal and Domestic Supply (MUN);
b. Agricultural Supply (AGR);
c. Industrial Service Supply (IND); and
d. Freshwater Replenishment (FRSH)

18. State Water Board Recycled Water Policy

State Water Board Resolution No. 2009-0011, "Adoption of a Policy for Water Quality Control for Recycled Water," references and adopts the "State Water

Resources Control Board Recycled Water Policy" (Recycled Water Policy). The Recycled Water Policy provides direction to the State and Regional Water Boards regarding the appropriate criteria to be used in issuing permits for recycled water projects. The Recycled Water Policy describes permitting criteria intended to streamline, and provide consistency for, the permitting of the vast majority of recycled water projects. This Order implements the Recycled Water Policy.

Order No. III of this Master Recycling Permit requires the District to develop and/or participate in the development of a salt/nutrient management plan and to control incidental runoff consistent with Paragraphs 6 and 7(a), respectively, of the Recycled Water Policy. Finding Nos. 21 and 22 of this Order describe Lahontan Water Board consistency with the streamlined permitting criteria outlined in Paragraphs 7(b) and 7(c) of the Recycled Water Policy. Finding No. 22 of this Order describes Lahontan Water Board consistency with the antidegradation criteria outlined in Paragraph 9 of the Recycled Water Policy. This permit allows for increased use of recycled water consistent with the mandate established in Paragraph 4 of the Recycled Water Policy to increase the use of recycled water in California.

19. <u>Incidental Runoff of Recycled Water</u>

The Recycled Water Policy defines incidental runoff as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence.

The District must develop and implement an operations and management plan that applies to all landscape irrigation recycled water use areas. This plan must provide for detection of leaks from landscape irrigation facilities (for example, broken sprinkler heads) and correction within 72 hours of detection or prior to a release of 1,000 gallons, whichever occurs first.

20. <u>Discharges of Recycled Water from Surface Impoundments</u>

The Recycled Water Policy prohibits discharge to surface waters from a surface impoundment containing recycled water unless the discharge is a result of a 25-year, 24-hour storm event or greater. Surface water impoundments used for recycled water storage shall be maintained so that no discharge occurs except as a result of a 25-year, 24-hour storm event or greater.

21. Regulation of Recycled Water

a. California Code of Regulations, Title 22, Department of Public Health

The California Department of Public Health (CDPH), formerly the Department of Health Services, established criteria for using recycled water. These criteria are codified in Title 22 and include such requirements as Sources of Recycled Water, Uses of Recycled Water, and Use Area Requirements. The CDPH adopted revised Water Recycling Criteria that became effective on March 20, 2001. Applicable criteria are prescribed in this Order.

b. Engineering Reports

As required by California Code of Regulations, title 22, section 60323, the District has submitted engineering reports for the production and use of recycled water to the CDPH. The content and status of each report is described in the following table.

Engineering report title	**Scope**	**CDPH review status**	**Water Board Response to CDPH Review and Project Status**
City of Lancaster Addendum to Engineering Report for Division Street Recycled Water Distribution System, dated September 30, 2008.	Additional usage of Division Street distribution system to include additional uses within City of Lancaster.	CDPH recommended approval with conditions on December 24, 2008.	Lahontan Water Board adopted revised master recycling permit, Board Order No. R6V-2009-0034 on June 10, 2009.
Engineering Report for 0.5 mgd Antelope Valley Tertiary Treatment Plant (AVTTP) dated January 15, 2005.	Treatment and recycled water production	CDPH recommended approval with conditions on June 2, 2005	Lahontan Water Board accepted report. Adopted Board Order R6V-2002-0053A1 on July 13, 2005 and Board Order No. R6V-2006-0009 on March 8, 2006.
Revised report for Membrane Bioreactor with Chlorination, submitted June 16, 2008	Treatment and recycled water production	CDPH recommended approval with conditions on July 1, 2008	Lahontan Water Board accepted report September 16, 2008, allowing the use.

Membrane Bioreactor with UV (Wedeco), submitted June 25, 2008	Treatment and recycled water production	CDPH recommended approval with conditions on December 2, 2008, and provided additional comments on March 5, 2009. (See Attachment E)	Compliance with CDPH conditions required by this Order.
Membrane Bioreactor with UV (Trojan), submitted December 1, 2008	Treatment and recycled water production	CDPH recommended approval with conditions on April 15, 2009, amended May 15, 2009. (See Attachment E)	Compliance with CDPH conditions required by this Order.
NDN Facilities (Stage V Expansion), report expected to be submitted to CDPH prior to project completion and/or implementation.	Treatment and recycled water production	CDPH comment letter expected 30 days after report submittal to CDPH.	Compliance with CDPH conditions required by this Order upon receipt of CDPH conditions.
North Los Angeles/Kern County Regional Recycled Water Project, report expected to be submitted to CDPH prior to project completion and/or implementation.	Los Angeles/Kern County Regional Recycled Water Project distribution system	CDPH comment letter expected 30 days after report submittal to CDPH.	Compliance with CDPH conditions required by this Order upon receipt of CDPH conditions.

Prior to implementing the North Los Angeles/Kern County Regional Recycled Water Project distribution system, and prior to implementing yet-to-be identified uses, the District (or other responsible agency) will prepare the appropriate engineering reports, obtain acceptance of the project from appropriate agencies, and will implement as applicable the CDPH conditions for project acceptance pursuant to waste discharge requirements and/or water recycling requirements issued by the Lahontan Water Board.

c. Regulation

Water Code section 13523.1, subdivision (a), states:

"Each regional board, after consulting with, and receiving the recommendations of, the State Department of Health Services and any party who has requested in writing to be consulted, with the consent of the

proposed permittee, and after any necessary hearing, may, in lieu of issuing waste discharge requirements pursuant to Section 13263 or water reclamation requirements pursuant to Section 13523 for a user of reclaimed water, issue a master reclamation permit to a supplier or distributor, or both, of reclaimed water."

This Order includes water-recycling requirements which require the District to:

i. comply with waste discharge requirements (see Finding No. 4 and Water Recycling Specification No I.B.1 of this Order);

ii. comply with Uniform Statewide Reclamation Criteria (California Code of Regulations, title 22, sections 60301 through 60355) established pursuant to Water Code section 13521(see Water Recycling Specification No I.B.2 of this Order);

iii. establish and enforce rules or regulations for recycled water users (*Requirements for Recycled Water Users, Recycled Water Use Site Inspection Program,* and *Enforcement Response Plan* provided in Attachment C, which is made a part of this Order), governing the design and construction of recycled water use facilities and the use of recycled water (see Water Recycling Specification No I.B.3 of this Order);

iv. submit quarterly reports to the Lahontan Water Board summarizing recycled water use, including the total amount of recycled water supplied, the total number of recycled water use sites, the locations of the recycled water use sites, and the names of the hydrologic areas underlying the recycled water use sites (see Monitoring and Reporting Program No. R6V-2009-0141, Sections I.E and II.B); and

v. conduct periodic inspections of recycled water use sites to monitor compliance by users with the Uniform Statewide Reclamation Criteria established pursuant to Water Code section 13521 and the requirements of this Order (see Water Recycling Specifications No. I.B.3 and No. I.B.4 of this Order).

Regarding the requirement identified in Finding No. 21.c.i above, the District is under current requirements to comply with the waste discharge requirements listed in Finding No. 4 of this Order.

Regarding the requirement identified in Finding No. 21.c.ii above, the District, through information contained in its CEQA documents and the District's application, established that the proposed recycled water uses will comply with the Title 22 requirements.

Regarding requirements identified in Finding Nos. 21.c.iii and 21.c.v above, the District has completed and submitted a report to the Lahontan Water Board containing its *Requirements for Recycled Water Users, Recycled Water Use Site Inspection Program,* and *Enforcement Response Plan* (see Attachment C of this Order). The Lahontan Water Board approved these documents on September 16, 2008.

This Order implements the requirement identified in Finding No. 21.c.iv via adoption of Monitoring and Reporting Program No. R6V-2009-0141.

22. Streamlined Permitting

a. Eligibility

The landscape irrigation elements of the proposed water recycling project meet the criteria for streamlined permitting (Paragraph 7(c) of the Recycled Water Policy) for the following reasons:

i. The project complies with Title 22 regulations.

ii. The proposed landscape irrigation use will not exceed agronomic rates and will not occur when soils are saturated. An operations and management plan will be developed describing how appropriate irrigation amounts and rates will be applied and may include, but not be limited to, developing water budgets for use areas, providing supervisor training, conducting periodic inspections, developing tiered rate structures, and installing smart controllers. An operations and management plan may be developed to cover multiple sites.

iii. A salt/nutrient management plan has not been prepared for the Antelope Valley groundwater basin. This Order includes a requirement that the District must participate in the development of the salt/nutrient management plan for the Antelope Valley.

iv. The District will communicate to users the nutrient levels in the recycled water so that users can appropriately evaluate fertilizer needs.

b. Streamlined Permit Requirements

According to Paragraph 7(b)(4) of the Recycled Water Policy, landscape irrigation projects that qualify for streamline permitting are not required to conduct project-specific receiving water and groundwater monitoring unless otherwise required by an applicable salt/nutrient management plan. The

District will participate in the development of a salt/nutrient management plan for the Antelope Valley in lieu of performing project-specific monitoring as allowed by the Recycled Water Policy. This Order includes a requirement that the District must participate in the development of the salt/nutrient management plan for the Antelope Valley.

Additionally, the Recycled Water Policy requires streamlined permits to include monitoring of priority pollutants on a twice-annual basis and annual monitoring of Emerging Constituents/Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products, or pharmaceuticals) (CECs). The Recycled Water Policy recognizes a lack of complete knowledge regarding CECs, and the implementation of CEC monitoring is deferred in order to incorporate the recommendations of a blue-ribbon advisory panel, to be convened by the State Water Board. This Order includes monitoring for priority pollutants.

23. Maintenance of High Quality Waters in California

The proposed uses of recycled water will not result in a degradation of the existing groundwater quality within the Antelope Valley with respect to nutrients. The Stage V Tertiary Treatment Plant includes a denitrification process, which will result in reduced nitrogen concentrations in the recycled water. Furthermore, recycled water will be applied at agronomic rates to consume all remaining nitrogen.

Some of the proposed uses of recycled water could result in a degradation of the existing groundwater quality within the Antelope Valley with respect to salts (Total Dissolved Solids, or TDS). The Antelope Valley groundwater basin is estimated to have 68 million acre-feet of storage, of which 13 million acre-feet is available. TDS concentrations in the groundwater basin range from 200 to 800 mg/l [Department of Water Resources Bulletin 118, 2004], with an average of 300 mg/l. According to California Code of Regulations Title 22, the recommended secondary maximum contaminant level (MCL) in the groundwater basin for TDS is 500 mg/l, and the secondary MCL upper limit is 1,000 mg/l. The average TDS concentration in the recycled water is currently 654 mg/l, and this value is expected to be reduced to approximately 550 mg/l in 2011 after the Stage V Tertiary Treatment Plant is operational.

The District provided an analysis to conservatively calculate the groundwater basin's assimilative capacity for TDS and the proposed project's impact on the remaining assimilative capacity. Subtracting the average TDS concentration of 300 mg/l in the groundwater basin from the recommended MCL of 500 mg/l, the groundwater basin has an assimilative capacity of 200 mg/l. From a mass balance analysis, the multiple proposed uses of recycled water will not use more than one percent of the available assimilative capacity for TDS within the Antelope Valley groundwater basin over the next ten years. Extrapolating over a 30-year period where recycled water supply is at its maximum flow level, the Lahontan Water Board projects that the multiple proposed uses of recycled water will not use more than 8.5 percent of the available assimilative capacity for TDS within the Antelope Valley groundwater basin. This level of degradation is consistent with established policies, as discussed below.

State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," states,

"1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that a change will be consistent with the maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste...and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) pollution or nuisance will not occur, and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

This Order is consistent with Resolution No. 68-16 for the following reasons.

a. State Water Board, through Resolution No. 77-1, has identified the beneficial use of recycled water for the people for the State, and directs regional water boards to encourage the use of recycled water in water-short areas of the State. The Antelope Valley is located in a water-short area of the State. The current demand for potable water in the Antelope Valley exceeds supply in the region, and by 2035 this demand is expected to double. The people of the State will benefit from the use of recycled water in the Antelope Valley area, where recycled water will supplement and/or replace existing water supplies (e.g., imported surface waters and overdraft of groundwaters).

b. This Order prohibits the use of recycled water that causes a pollution or nuisance.

c. This Order requires the District to administer (1) *Requirements for Recycled Water Users*, (2) a *Recycled Water User Site Inspection Program*, and (3) an *Enforcement Response Plan* (see Attachment C), as previously accepted by the Lahontan Water Board. The requirements and the compliance inspection and enforcement programs are the mechanisms for ensuring that appropriate control measures are identified, implemented, and maintained. The control measures generally identified include (1) applying irrigation within agronomic rates to reduce the potential for runoff and increased nutrients into the groundwater; and (2) developing and implementing a salt/nutrient management plan to reduce the potential for salt and nutrient loading, thereby minimizing the impacts to groundwater quality within the Antelope Valley. The control measures will ensure that the discharge will result in the best practicable control for the maximum benefit of the people of the State to assure that a pollution or nuisance will not occur and that the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The waste discharge requirements adopted as part of this Order will ensure that the discharge will result in the best practicable control for the maximum benefit of the people of the State to assure that a pollution or nuisance will not occur and that the highest water quality consistent with maximum benefit to the people of the State will be maintained. The control measures will prevent the groundwater quality within the Antelope Valley from exceeding the standards established in existing applicable policies.

d. The use of recycled water as authorized by this Order will not result in water quality less than that prescribed in applicable policies.

24. Consideration of Water Code Section 13241 Factors

Section 13523.1(b)(1) of the Water Code requires master reclamation requirements to include waste discharge requirements adopted pursuant to Article 4 (commencing with section 13260) of Chapter 4. Section 13263(a) of the Water Code requires that such waste discharge requirements take into consideration the provisions of section 13241 of the Water Code. The Lahontan Water Board has considered these factors as follows:

a. Past, present, and probable future beneficial uses of water.

This Order identifies existing groundwater quality as described in Finding No. 14. This Order also identifies past, present, and probable future beneficial uses of the Antelope Valley groundwater as described in Finding No. 17. The proposed uses of recycled water will not adversely affect present or probable future beneficial uses of water, including municipal and domestic supply, agricultural supply, industrial service supply, and freshwater replacement.

b. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

Finding Nos. 13 and 14 describe the environmental characteristics and quality of available groundwater. Finding No. 14 details groundwater issues related to TDS, arsenic, and nitrate concentrations.

TDS concentrations range from 200 to 800 mg/L, with higher concentrations in the deeper aquifer. These levels are below and within the MCL range of 500 to 1,000 mg/L.

Arsenic has been observed in concentrations ranging from 2 to 60 μg/L and the MCL for arsenic is 10 μg/L. Arsenic is a naturally occurring inorganic element often found in groundwater and occasionally in surface water. Anthropogenic sources of arsenic include agricultural, industrial and mining activities. Research conducted by Los Angeles County Waterworks District No. 40 and the United States Geologic Survey has shown the problem to reside primarily in the deep aquifer, and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the region.

Nitrate concentrations exceed the primary MCL for drinking water of 10 mg/L (as N) in two areas in the southern portion of the groundwater basin. Agricultural fertilization practices, septic system disposal, and discharge of treated wastewater have likely contributed to the elevated levels.

c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors, which affect water quality in the area.

The requirements of the Order, including application of recycled water at agronomic rates, will result in the protection of existing and probable future beneficial uses to the maximum benefit to the people of the State of California. The requirements of this Order will also result in the protection of water quality to continue to meet the standards prescribed in applicable existing policies.

d. Economic considerations.

The Antelope Valley is faced with serious challenges with respect to management of water and wastewater resources in the region. The population in the Antelope Valley is expected to increase by 161 percent by 2035. Currently, the demand for potable water exceeds supply in the region, and by 2035 this demand is expected to double. Wastewater discharges also will increase in the future as the population increases. Existing demand for potable water is met largely by water imported through the State Water Project and groundwater pumped from the Antelope Valley Basin. Imported water supplies are becoming less reliable, the Antelope Valley Basin is facing overdraft conditions, and the water rights of overlying landowners of the Antelope Valley Basin have not yet been adjudicated. The Regional Water Management Group prepared an integrated water management plan for the Antelope Valley, and the proposed North Los Angeles/Kern County Regional Recycled Water Project is identified in the plan as a project that addresses the need for both increased water supplies and wastewater effluent management. [Section 1.5, Final Program Environmental Impact Report, November, 2008]

This Order authorizes the District to expand the list of authorized recycled water uses to include the uses identified by Title 22 and Finding No. 5. Use of recycled water will replace supplied groundwater and imported water for landscape irrigation, and potentially in the future, agricultural irrigation, groundwater recharge, and other Title 22 approved uses not listed in Finding No. 5. The potable water that is being replaced by this recycled water would be available for other uses, resulting in an increase in potable water supplies.

The proposed North Los Angeles/Kern County Regional Recycled Water Project also provides a management strategy for wastewater effluent by creating a system to distribute recycled water for beneficial use. The proposed North Los Angeles/Kern County Regional Recycled Water Project will eventually enable the District to produce, sell, and distribute disinfected, tertiary-treated effluent to local water purveyors.

e. <u>The need for developing housing within the region.</u>

The District is not responsible for developing housing within the Antelope Valley. The Final Program Environmental Impact Report, November, 2008, identified that the proposed project would not have an impact on housing and population. The proposed project is limited to the provision of water supply infrastructure, as opposed to housing and commercial development that would directly affect the number of residents or employees within the area. Therefore, the proposed North Los Angeles/Kern County Regional Recycled Water Project would not directly contribute to the creation of additional housing or jobs within the Antelope Valley and thus would not result in direct growth inducement.

The proposed North Los Angeles/Kern County Regional Recycled Water Project would reduce the area's existing and future demand for imported water through recycling. The imported water conserved through implementation of the proposed project would be available to serve potable water demands of planned growth. The Antelope Valley Regional Urban Water Management Plan projects that eight percent of the water demand in 2030 would be met with recycled water, although substantially more would be available as additional end use demand develops. The proposed project would not directly or indirectly induce growth or remove an obstacle to growth, since the increased population would occur in any case based on the cities' and counties' approved build-out growth control policies. The recycled water that would be made available as a result of the proposed project would be used to meet a small percentage of projected demand in 2030 that would otherwise be met with imported water.

f. The need to develop and use recycled water.

This Order authorizes the District to expand the list of authorized recycled water uses to include the uses identified in Finding No. 5.

25. California Environmental Quality Act Compliance (CEQA)

The Los Angeles County Waterworks District 40, Antelope Valley, prepared a Final Program Environmental Impact Report (PEIR) dated November 2008, for the North Los Angeles/Kern County Regional Recycled Water Project. The Los Angeles County Waterworks District 40, Antelope Valley, prepared a Findings of Fact, Statement of Overriding Considerations, Mitigation Monitoring and Reporting Program (Overriding Considerations) dated November 2008, for the same project. The Overriding Considerations addressed unavoidable noise and ground-vibration impacts that would result from construction activities. The Los Angeles County Board of Supervisors approved the PEIR on December 9, 2008, and a Notice of Determination was filed on December 15, 2008.

Mitigation measures that will be implemented as part of the project include control measures to ensure:

a. Application of recycled water at agronomic rates to reduce the potential for irrigation to adversely impact the quality of groundwater in terms of salts and nutrients (including nitrates),

b. There is adequate erosion control so soil is not released into stormwater runoff and surface waters, and

c. Fertilizer application does not adversely impact waters of the State.

The Lahontan Water Board, acting as a CEQA Responsible Agency in compliance with California Code of Regulations, title 14, section 15096, evaluated the impacts to water quality addressed in the PEIR. As a result of the analysis, the Lahontan Water Board finds the mitigation measures in the PEIR, combined with compliance with the requirements specified by this Order, to be adequate to reduce water quality impacts to levels that are less than significant for the uses identified in Finding No. 5 that were initially authorized by Board Order No. R6V-2009-0034.

Furthermore, the expansion of recycled water uses to those identified in Finding Nos. 5.a through 5.c were assessed at the programmatic level within the PEIR. Those additional recycled water uses are for: (1) those that result in full consumption without a discharge of any type; (2) those for facilities, such as power plants, that result in a discharge that will be regulated by the Lahontan Water Board or the California Energy Commission pursuant to its authority under the Warren-Alquist Act; and (3) those that result in a discharge to a sanitary sewer system. Based on the evaluation of the potential impacts from these specific uses that were assessed at the programmatic level within the PEIR, the Lahontan Water Board concludes that there is no possibility that the issuance of this Order will have a significant effect on the environment. Therefore, the expansion of recycled water uses to those uses identified in Finding Nos. 5.a through 5.c is exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, title 14, section 15061, subdivision (b)(3).

Finally, for Apollo Park and the Fox Airfield, these reclamation requirements govern the continued use of recycled water at existing facilities without any expansion of use. This continued use of recycled water without expansion is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) in accordance with California Code of Regulations, title 14, section 15301.

26. Notification of Interested Parties

The Lahontan Water Board has notified the District and interested persons of its intent to prescribe master recycling requirements.

27. Consideration of Public Comments

The Lahontan Water Board, in a public meeting, heard and considered all comments pertaining to the use of recycled water.

IT IS HEREBY ORDERED that the District must comply with the following:

I. WATER RECYCLING SPECIFICATIONS

A. Effluent Limitations

1. Recycled water production at the Antelope Valley Tertiary Treatment Plant must not exceed 0.6 mgd (maximum average 24-hour flow). Flow in excess of this limitation shall not be considered a violation of this provision unless

one or more of the Water Recycling Specifications I.B through I.C is also exceeded.

2. Recycled water production at the Membrane Bioreactor Plant must not exceed 1.75 mgd (maximum average 24-hour flow). Flow in excess of this limitation shall not be considered a violation of this provision unless one or more of the Water Recycling Specifications I.B through I.C is also exceeded.

3. Recycled water production at the Activated Sludge/Nitrification-Denitrification Plant (Stage V Tertiary Treatment Plant) must not exceed 18 mgd (maximum average 24-hour flow). Flow in excess of this limitation shall not be considered a violation of this provision unless one or more of the Water Recycling Specifications I.B through I.C is also exceeded.

   When expanded in accordance with the provisions of Board Order No. R6V-2002-0053A2, recycled water production at the Stage V Tertiary Treatment Plant must not exceed 21 mgd (maximum average 24-hour flow). Flow in excess of this limitation shall not be considered a violation of this provision unless one or more of the Water Recycling Specifications I.B through I.C is also exceeded.

4. All disinfected tertiary recycled water supplied to the recycled water distribution system must at some point following the treatment process meet the requirements specified in California Code of Regulations, Title 22.

B. Regulation and Enforcement

1. Pursuant to Water Code section 13523.1, subdivision (b)(1), the District must comply with all waste discharge requirements previously adopted by the Lahontan Water Board and are in effect for regulating the production of the disinfected tertiary recycled water.

2. Pursuant to Water Code section 13523.1, subdivision (b)(2), the District must comply with the Uniform Statewide Reclamation Criteria, which are contained in California Code of Regulations, title 22, sections 60301 through 60355 and are established pursuant to Water Code section 13521.

3. Pursuant to Water Code section 13523.1, subdivision (b)(3), the District must implement and enforce its *Requirements for Recycled Water Users, Recycled Water Users Site Inspection Program,* and *Enforcement Response Plan* (Attachment C, which is made a part of this Order) governing the design and construction of recycled water use facilities and the use of recycled water

4. Pursuant to Water Code section 13523.1, subdivision (b)(5), the District must conduct periodic inspections of the facilities of the recycled water users to monitor compliance by the users with the Uniform Statewide Reclamation Criteria and the District's *Requirements for Recycled Water Users, Recycled Water Users Site Inspection Program,* and *Enforcement Response Plan* (Attachment C, which is made a part of this Order). During the inspections, the District shall also monitor compliance with Water Recycling Specifications No. I.C.1 through I.C.14 of this Order. At a minimum, the District must inspect each recycled water use facility at least once every three years if there are no reported violations, and at least annually if there are prior violations at the facility.

5. The District must inspect recycled water use facilities and ensure users' compliance with these master water recycling requirements.

C. General Requirements and Prohibitions

1. The discharge of recycled water to surface waters other than the artificial lakes at Apollo Park, including excessive application, intentional overflow or application, or negligence, is prohibited. However, incidental runoff of recycled water, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area is not a violation of this Order.

2. Discharge of untreated or partially treated recycled water to the recycled water distribution system is prohibited.

3. The use of recycled water must not cause a pollution or threaten to cause a pollution as defined in Water Code Section 13050.

4. The use of recycled water must not cause a nuisance as defined in Water Code Section 13050.

5. The use of recycled water under this Order must be limited to the Authorized Recycled Water Use Sites defined in Finding No. 11 of this Order.

6. The uses of recycled water authorized under this Order are limited to those described in Finding No. 10 of this Order.

7. The source of recycled water must be limited to that described in Finding No. 6 of this Order.

8. Recycled water used to irrigate landscape areas must not be applied at a rate and amount that exceeds agronomic rates. The District must

communicate to recycled water users the nutrient levels in the recycled water at least monthly so that the recycled water users can appropriately evaluate fertilizer needs prior to application of fertilizers.

9. Recycled water must not be applied at a rate and amount that causes ponding or runoff that is other than incidental runoff.

10. Pipelines must be maintained so as to prevent leakage.

11. The use of recycled water that causes a violation of any narrative water quality objective contained in the Basin Plan is prohibited.

12. The use of recycled water that causes a violation of any numeric water quality objective contained in the Basin Plan is prohibited.

13. Where any numeric or narrative water quality objective contained in the Basin Plan is already being exceeded, the use of recycled water that causes further degradation or pollution is prohibited.

14. The District must ensure the implementation of an operation and maintenance plan for all recycled water use sites that includes the following practices:

    a. detection of leaks from landscape irrigation facilities and implementation of corrective action within 72 hours of learning of the leak, or prior to the release of 1,000 gallons, whichever occurs first;

    b. proper design and aim of sprinkler heads to ensure recycled water application at agronomic rates;

    c. refraining from recycled water application during precipitation events; and

    d. adequate protection of all facilities used to transport and store recycled water against overflow, structural damage, or a reduction in efficiency resulting from a 25-year, 24-hour storm or flood.

15. The District must not supply recycled water to parties who distribute, store, or use recycled water in a manner that is in violation of the Uniform Statewide Reclamation Criteria (as identified within California Code of Regulations, title 22) and the requirements of the Master Recycling Requirements.

II. PROVISIONS

A. The District may continue providing recycled water from its two existing tertiary treatment facilities (Membrane Bioreactor Tertiary Treatment Plant and Antelope Valley Tertiary Treatment Plant) to the Apollo Park and the Fox Airfield (described in Finding No. 4.c of this Order) and to the distributor (City of Lancaster) and current and future users located within the Division Street Corridor Recycled Water Project (Division Street Project) recycled water use area (defined in Finding No. 4.d of this Order) pursuant to the requirements of this Order.

B. The District must:

1. prior to supplying recycled water under this Order from the Stage V Tertiary Treatment Plant, submit to the Lahontan Water Board a copy of the final engineering report for the Stage V Tertiary Treatment Plant with written confirmation from the CDPH that it has reviewed the report and finds the report to be acceptable (Review and Acceptance Letter).

2. following receipt of the CDPH's Review and Acceptance Letter for the Stage V Tertiary Treatment Plant Final Engineering Report, comply with the CDPH's conditions as specified in the Review and Acceptance Letter.

3. prior to supplying recycled water under this Order to the North Los Angeles/Kern County Regional Recycled Water Project, submit to the Lahontan Water Board a copy of the final engineering report for the North Los Angeles/Kern County Regional Recycled Water Project with written confirmation from the CDPH that it has reviewed the report and finds the report to be acceptable (Review and Acceptance Letter).

4. following receipt of the CDPH's Review and Acceptance Letter for the North Los Angeles/Kern County Regional Recycled Water Project Final Engineering Report, comply with the CDPH's conditions as specified in the Review and Acceptance Letter.

5. comply with the conditions identified in the CDPH's Approval and Comment Letters (Attachment E of this Order) as applicable to the use of the Wedeco TAK-55HP Ultraviolet Light Disinfection System for the Membrane Bioreactor Tertiary Treatment Plant and of the Trojan 3000Plus Ultraviolet Light Disinfection System for the Membrane Bioreactor Tertiary Treatment Plant.

6. prior to providing recycled water to new users, have received, reviewed and approved a completed *Report of Proposed Recycled Water Use*, which

contains information demonstrating the user will comply with the Uniform Statewide Reclamation Criteria and the District's *Requirements for Recycled Water Users.* Copies of all approved *Reports of Proposed Recycled Water Use* and approval letters shall be maintained on file by the District.

C. Pursuant to California Code of Regulations, title 22, section 60316, subdivision (b), the District shall notify the Lahontan Water Board, State Department of Public Health and County of Los Angeles Department of Health Services of any incidence of backflow from a recycled water system into the potable water system within 24 hours of discovery of the incident.

D. Pursuant to Water Code section 13267, subdivision (b), the District shall comply with Monitoring and Reporting Program R6V-2009-0141 (Attachment F which is made a part of this Order) as specified by the Executive Officer.

E. The District shall comply with the "Standard Provisions for WDRs," dated September 1, 1994, in Attachment "D," which is part of this Order, with the exception that recycled water storage facilities shall be designed for protection against overflow during a 25-year, 24-hour storm.

III. RECYCLED WATER POLICY IMPLEMENTATION

A. The District must develop and/or participate in the development of a salt/nutrient management plan for the Antelope Valley that is consistent with Paragraph 6 of the Recycled Water Policy. The salt/nutrient management plan must be submitted to the Lahontan Water Board by **May 14, 2014**.

B. Before supplying recycled water to new users for landscape irrigation under this Order, the District must develop and implement an operations and management plan to control incidental runoff that is consistent with Paragraph 7(a) of the Recycled Water Policy.

IV. RESCISSION

A. Board Order No. 6-85-35 establishing recycling requirements for the ApolloPark and the Fox Airfield is hereby rescinded.

B. Board Order No. R6V-2009-0034 establishing master recycling requirements for the Permit Area is hereby rescinded.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on December 9, 2009.

Harold J. Singer

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments:
A. General Location Map
B. Permit Area Map
C. District Recycled Water Program
    1. Requirements for Recycled Water Users
    2. Recycled Water Use Site Inspection Program
    3. Reuse Site Inspection Report
    4. Enforcement Response Plan
D. Standard Provisions for Waste Discharge Requirements
E. CDPH Approval and Comment Letters
    1. March 5, 2009 Letter
    2. May 15, 2009 Letter
F. Monitoring and Reporting Program No. R6V-2009-0141

ATTACHMENT A
General Location Map

ATTACHMENT C
District Recycled Water Program

1. Requirements for Recycled Water Users
2. Recycled Water Use Site inspection Program
3. Reuse Site Inspection Report
4. Enforcement Response Plan

REQUIREMENTS FOR RECYCLED WATER USERS

Requirements for Recycled Water Users
County Sanitation Districts of Los Angeles County
District Nos. 14 and 20

1. Introduction

These Requirements for Recycled Water Users (Requirements) establish regulations pursuant to California Water Code (Water Code) section 13523.1(b), and permits issued to the County Sanitation Districts of Los Angeles County (Districts) by the California Regional Water Quality Control Board, Lahontan Region (LRWQCB). These permits include waste discharge requirements (WDRs) issued pursuant to Water Code section 13263, water reclamation requirements (WRRs) issued pursuant to Water Code section 13523, or a master reclamation permit (Master Permit) issued pursuant to Water Code section 13523.1. The Requirements are in conformance with ordinances adopted by County Sanitation District No. 14 of Los Angeles County and by County Sanitation District No. 20 of Los Angeles County (Ordinances).

2. Background

Water Code section 13523.1(a) authorizes the issuance of Master Permits to suppliers or distributors, or both, of recycled water in lieu of issuing individual water reclamation requirements to each recycled water user. Water Code section 13523.1(b) sets forth the requirements for Master Permits issued by the Regional Water Quality Control Boards (RWQCBs), including a condition that the permittee establish and enforce rules or regulations for recycled water users governing the design and construction of recycled water use facilities and the use of recycled water, in accordance with the uniform Statewide Reclamation Criteria established pursuant to Water Code section 13521.

A Master Permit has been adopted by the LRWQCB for the Lancaster Water Reclamation Plant (WRP). Should the LRWQCB issue individual WDRs or WRRs to the Districts for the use of tertiary recycled water for non-potable reuse applications from the Lancaster WRP or Palmdale WRP, it is the Districts' intent that the Requirements established herein will apply to those uses. These Requirements may be updated, as necessary, to comply with revisions to this permit or applicable laws and regulations.

3. Findings

The Requirements are in conformance with the following:

- Provisions established by the WDRs, WRRs, or Master Permits issued by the LRWQCB to the Districts.
- Applicable portions of the Water Code, including Water Code section 13523.1.
- Applicable portions of the Health and Safety Code.
- California Code of Regulations (CCR), Title 22, Division 4, Chapter 3, Uniform Statewide Reclamation Criteria.
- CCR, Title 17, Division 1, Chapter 5, Subchapter 1, Group 4, Article 1 & 2.
- Regulations established by the County of Los Angeles Department of Public Health (LACDPH) for the use of recycled water.

The Requirements are consistent with the following:

- The Guidelines for the *Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water,* California State Department of Public Health (CDPH).

- Any measures that are deemed necessary for protection of public health, such as the American Water Works Association (AWWA) California/Nevada section, *Guidelines for the Distribution of Non-Potable Water* and *Guidelines for the On-Site Retrofit of Facilities Using Disinfected Tertiary Recycled Water* or alternate measures that are acceptable to CDPH.
- Relevant user manuals such as the Los Angeles County Recycled Water Advisory Committee's, 2005, *Recycled Water User Manual.*
- Relevant guidance issued by LACDPH for the use of recycled water.

4. Definitions that Apply to these Requirements

4.1. Authorized Recycled Water Use Site (Site) is a site authorized for use of recycled water; the uses of recycled water and the site location must comply with Permits as issued by the LRWQCB to the Districts.

4.2. Direct User is any person to whom the Districts directly distribute recycled water under the Permits issued to the Districts by the LRWQCB.

4.3. Incidental Runoff is any small amount of recycled water that leaves the Site as a result of over-spray or leakage from sprinklers, over watering, breaks in lines, or overflow of impoundments that contain recycled water during storms.

4.4. Master Reclamation Permit (Master Permit) contains requirements established by the LRWQCB for the Districts pursuant to Water Code section 13523.1.

4.5. Permit means any LWRQCB issued WDRs, WRRs, or Master Permit.

4.6. Person is any individual, partnership, corporation, governmental subdivision or unit of a governmental subdivision, or public or private organization or entity of any character.

4.7. Purveyor is any public, private, investor-owned, or other water utility that is legally permitted to distribute water and that obtains recycled water from the Districts for distribution to Users.

4.8. Recycled water is water produced by a municipal water reclamation facility that is suitable for a beneficial use.

4.9. User is any person to whom the Districts distribute recycled water under the Permits issued to the Districts by the LRWQCB, including end users to whom recycled water is conveyed through an intermediate party. User does not include persons who have been independently issued Permits by the LRWQCB.

4.10. User Agreement is a contractual agreement between the User and/or Purveyor and the Districts that establishes the conditions for recycled water service and use.

4.11. Waste Discharge Requirements (WDRs) are requirements established for the Districts by the LRWQCB pursuant to Water Code section 13263.

4.12. Water Recycling Criteria are the criteria established by the CDPH generally dealing with the levels of constituents in recycled water and the means for assurance of reliability under the design concept, which will result in safe recycled water from the standpoint of public health. The criteria are established pursuant to Water Code Section 13521, and are contained in the CCR, Title 22, Division 4, Chapter 3; also referred to as the "Uniform Statewide Reclamation Criteria."

4.13. Water Recycling Requirements (WRRs) are requirements established for the Districts by the LRWQCB pursuant to Water Code section 13523.

5. Requirements for Recycled Water Users

5.1 Effective Date

The effective date of the Requirements is July 1, 2008.

5.2 Applicability

5.2.1 Unless otherwise stated, these Requirements shall apply to any and all Users to whom the Districts distribute tertiary recycled water, either directly or through an intermediate party. These Requirements shall also apply to Purveyors that act as intermediate parties in delivering recycled water to Users. User does not include persons who have been independently issued Permits by the LRWQCB.

5.2.2 These Requirements do not apply to the Districts, when the Districts are both the Purveyor and/or the User, receiving WDRs or WRRs issued by the LRWQCB for the use of tertiary recycled water.

5.3 General Requirements

Use of recycled water must comply with all applicable state laws, regulations, Districts' Permits, and any amendments thereto, the Ordinances, and these Requirements.

5.4 General Prohibitions

5.4.1 Use of recycled water for any purposes other than those explicitly approved in the effective User Agreement is strictly prohibited.

5.4.2 The User shall insure that the treatment, storage, distribution or use of recycled water shall not create a nuisance as defined in Water Code section 13050(m).

5.4.3 The User shall not discharge recycled water from treatment facilities, irrigation holding tanks, storage ponds, or other containment, other than for permitted reuse, except in accordance with other LRWQCB issued Permits, contingency plans authorized by the LRWQCB or for an approved discharge to a municipal sewage treatment system.

5.5 Process to Obtain Permission to Use Recycled Water

5.5.1 Except as provided by the Ordinances, any Direct User or Purveyor who wishes to receive recycled water produced by the Districts must enter into a User Agreement with District No. 14 or No. 20 depending on the location of the reuse project before the use of recycled water can begin. The User Agreement shall include the Districts' terms and conditions for the use of recycled water.

5.5.2 Any Direct User, or Purveyor with a User, who intends to utilize recycled water produced by the Districts for an authorized use at a Site must file a User Application Form (Application) with the Districts and receive approval in writing from the Districts before the use of recycled water can begin for that use and Site.

5.5.3 The Application filed by the Direct User or Purveyor shall include:

.3.1. A detailed description of the proposed Site with:

(a) A map showing the specific boundaries of the proposed Site;

(b) The person or persons responsible for operation and maintenance of the site (O&M Staff), including the person designated as the Site Supervisor and contact information;

(c) Evidence that the O&M Staff and Site Supervisor have received appropriate training from the Districts or an equivalent training program or the date by which training will occur prior to delivery of recycled water such that the Site is operated and maintained in compliance with applicable laws and regulations, the Districts' Permits, and these Requirements;

(d) The specific use to be made of the recycled water at each Site.

.3.2. Design plans and a description of best management practices that show that the quality of waters of the State will be protected (*see* Section 5).

.3.3. Plans and specifications describing:

(a) Proposed piping systems to be used;

(b) Pipe locations for both recycled and potable systems;

(c) Type and location of the outlets and plumbing fixtures that will be accessible to the public;

(d) The methods and devices to be used to prevent backflow of recycled water into the potable water system.

.3.4. The Recycled Water System Operations Manual or the date by which a Recycled Water System Operations Manual will be submitted prior to the delivery of recycled water.

.3.5. Emergency Cross-Connection Response Plan in accordance with the guidelines established by LACDPH or the date by which the Emergency Cross-Connection Response Plan will be submitted prior to delivery of recycled water.

5.5.4 Any User or Purveyor who wishes to receive recycled water produced by the Districts must follow the process presented in Tables 1 and 2 that shows the various agencies involved in the process, documents that must be completed, how documents are routed, etc. Table 1 outlines the process for Direct Users or Purveyors. Table 2 outlines the process for Users receiving water from Purveyors

5.6 Operational Requirements and Best Management Practices

5.6.1 Each User shall designate a Site Supervisor who is responsible for the recycled water system at Site(s) under the User's control. Specific responsibilities of the Site Supervisor include the proper installation, operation and maintenance of the recycled water system; compliance with the Districts' Permits, applicable laws and regulations, local health department guidelines, and these Requirements; prevention of potential hazards; coordination with the cross-connection control program in accordance with CCR, Title 17 and LACDPH or local health department guidelines; preservation of the recycled water system in "as-built" form.

5.6.2 The User's Site Supervisor and O&M staff shall receive appropriate training to assure proper operation of the recycled water facilities, worker protection, and compliance with all applicable laws and regulations, the Districts' Permits, and these Requirements.

5.6.3 The Site Supervisor shall instruct any person at the Site involved with the use of recycled water on its proper use and precautions.

5.6.4 All recycled water facilities and control systems shall be maintained in good working order and operated as efficiently as possible to achieve compliance with all applicable laws and regulations, the Districts' Permits, and these Requirements.

5.6.5 Except as allowed under CCR, Title 17, section 7604, no physical connection shall be made nor shall a connection be allowed to exist between any recycled water system and potable water system.

5.6.6 Cross-connection test shall be performed as necessary to ensure the absolute separation of the recycled water system and potable water system, in accordance with the requirements of LACDPH or local health department.

.6.1. A cross-connection test shall be performed following any significant modifications to the recycled water system or potable water system, construction of new buildings, or any activity that may impact, or has impacted these systems.

.6.2. An initial cross-connection test shall be performed to determine if there are any unknown connections between potable piping and existing piping to be used for recycled water prior to construction or retrofit work.

.6.3. Prior to connection with the recycled water system, a final cross-connection test shall be performed to verify that construction or retrofit work was performed correctly.

.6.4. Cross-connection testing shall be performed by a specialist who has been certified by AWWA or a group with equivalent certification requirements.

5.6.7 The potable water supply shall not be used as a backup or supplemental source of water for a recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of CCR, Title 17, section 7602, Subdivision (a) and CCR, Title 17, section 7603, Subdivision (a), and that such connection has been approved by CDPH and/or its delegated local agency.

5.6.8 Any backflow prevention device installed to protect the potable water system shall be annually inspected and maintained in accordance with CCR, Title 17, section 7605.

.8.1. Backflow inspections shall be conducted by a person who has demonstrated competency in testing to the User, Purveyor, and/or LACDPH or local health department.

5.6.9 Hose bibs shall not be used in the recycled water system, except in the recycled water system for Sites for which there is restricted public access. Quick couplers that are different from that used on the potable water system may be used.

5.6.10 All recycled water piping and appurtenances in new installations and appurtenances in retrofit installations shall be colored purple or distinctively marked with purple tape in accordance with Health and Safety Code section 116815 and LACDPH or local health department requirements.

5.6.11 All sites shall be designed and operated to prevent direct human consumption of recycled water, or use of recycled water for processing of food or drink intended for human consumption.

.11.1. Where recycled water could potentially be accessed for human consumption, conspicuous signs shall be posted that include the following wording: "RECYCLED WATER – DO NOT DRINK."

.11.2. The prescribed wording included on the sign(s) shall also be translated into Spanish and other appropriate languages.

.11.3. Each sign shall display an international symbol similar to that shown in CCR, Title 22, section 60310, subdivision (g), Figure 60310-A.

.11.4. The sign(s) shall be of a size easily readable by the public; no less than 4 inches high by 8 inches wide.

5.6.12 Irrigation with disinfected tertiary recycled water shall not take place within 50 feet of any domestic water supply well.

5.6.13 Irrigation with disinfected tertiary recycled water shall not take place within 50 feet of any uncovered reservoir or stream currently used as a source of domestic water.

5.6.14 Impoundment of disinfected tertiary recycled water shall not occur within 100 feet of any domestic water supply well.

5.6.15 All recycled water impoundments shall be adequately protected from erosion, washout and flooding from a 24-hour rainfall event having a predicted frequency of once in 100 years.

5.6.16 Vehicles used for distributing recycled water for soil compaction and dust control or other uses shall have an adequate tank and plumbing systems to ensure that leaks and ruptures will not occur in the course of normal use.

.16.1. Control valves shall be provided and configured such that recycled water can be applied in a controlled fashion on the Site and completely retained during transit.

.16.2. Spray heads or nozzles shall be provided and configured such that recycled water is applied to prevent runoff, ponding, or windblown spray conditions.

.16.3. Each tank shall be equipped with an approved air-gap separation between the filler tube and the tank to prevent back-siphonage.

.16.4. Each tank used to store and/or transport recycled water must be flushed and disinfected prior to storage and/or transport of potable water or recycled water of better quality.

.16.5. The vehicles shall be clearly labeled in accordance with the requirements specified in Section 5.6.11.

5.6.17 Sites shall be designed and operated using best management practices (BMPs) to protect waters of the state and prevent public contact with recycled water.

5.6.18 The Sites shall be designed and operated using BMPs to prevent recycled water spray, mist, or surface flow from either leaving the Site or reaching:

(a) Any perennial surface waters located adjacent to the Site;

(b) Areas where the public has access (e.g., dwellings, designated outdoor eating areas, or food handling facilities);

(c) Drinking fountains unless specifically protected with a shielding device.

5.6.19 BMPs shall include, but not be limited to:

(a) Use of buffer zones;

(b) Discontinuation of application of recycled water during precipitation events, which are of sufficient magnitude to generate surface flow or significant ponding within the Site;

(c) Use of devices that protect drinking water fountains against contact with recycled water spray, mist, or surface flow;

(d) Irrigation with recycled water during periods of minimal human use of the irrigated area and timing of irrigation to allow an adequate dry-out time before the irrigated area will be used by the public.

5.6.20 Any storage facility or impoundment containing recycled water for reuse applications shall be managed in a manner to control odors, nuisance conditions or vectors such as

mosquitoes. Should such problems develop, a management plan shall be devised and implemented to monitor, correct, and control future occurrences.

5.6.21 Sites shall be designed and operated using BMPs so that application of recycled water occurs at agronomic rates whereby irrigation does not promote downward migration of salts (including nitrates), which could unreasonably affect present and anticipated beneficial uses of water, or result in water quality less than that prescribed in water quality control plans or policies.

.21.1. To demonstrate whether irrigation is at agronomic rates, the User shall provide information to the Districts including a tabular comparison of the volume of water required for plant growth in the landscape area to the volume of recycled water (and supplemental water) applied to the area.

5.6.22 Fertilizer application shall:

.22.1. Not unreasonably affect present and anticipated beneficial uses of water, or result in water quality less than that prescribed in water quality control plans or policies.

.22.2. Occur at agronomic rates. To demonstrate whether fertilizer application is at agronomic rates, the User shall provide information to the Districts including a tabular comparison of the amount of fertilizer needed for plant growth in the landscape area to the amount applied to the area.

.22.3. Occur if the levels of nitrogen in the recycled water are not sufficient for plant growth. If levels are not sufficient, the Site Supervisor shall calculate how much fertilizer needs to be applied by subtracting the level in recycled water from the level needed for plant growth.

5.6.23 Sites shall be designed and operated using BMPs so that adequate erosion control is implemented so that soil is not released into storm water runoff or surface waters.

5.6.24 Each User shall demonstrate to the Districts the means by which all applicable use area requirements as specified in the Districts' Permits and these Requirements will be complied with.

6. <u>Site Inspections and Site Access</u>

6.1 The Purveyor shall conduct periodic site inspections and prepare a report for each Site inspection pursuant to Section 8.3.

.1.1. Site inspections must be conducted at a minimum once every three (3) years per site or more frequently at the request of the Districts.

.1.2. In the event of identification of violation(s) during site inspections, corrective actions must be taken pursuant to Section 7 and notification shall be provided pursuant to Section 8.3.

6.2 The User shall allow an authorized representative of any of the following agencies the right to enter, inspect the Site, and conduct testing upon presentation of proper credentials: the Districts, LRWQCB, CDPH, and LACDPH or local health department.

6.3 In cooperation with the User or Purveyor, the Districts will make periodic inspections of the Site.

7. Corrective Action

7.1 The Site Supervisor shall immediately initiate corrective action to eliminate violation of any applicable laws or regulations, the Districts' Permits, or these Requirements, and make the appropriate notifications pursuant to Section 8.2.

7.2 The Purveyor or Direct User must verify the corrective action(s) and report to the Districts pursuant to Section 8.2.

7.3 In the event of contamination of a potable water system due to a cross-connection with the recycled water system, the Site Supervisor shall immediately invoke the Emergency Cross-Connection Response Plan and make the appropriate notifications pursuant to Section 8.1.

8. Notification and Reporting

8.1 Public Health, Spills, Unauthorized Discharges

8.1.1 Upon being notified or determining that one of the following events has occurred, the Site Supervisor shall immediately notify the Districts by telephone, and the LRWQCB, CDPH and LACDPH by telephone or electronic means. Written confirmation must be provided to all agencies within three (3) business days from the day of notification.

.1.1. There is a complaint (or other source of information) concerning recycled water use that may involve illness.

.1.2. An unauthorized discharge of more than 50,000 gallons of tertiary recycled water. Information provided shall include: the date and time the spill began and ended; the location of the spill; if the spill entered a storm drain or receiving water; the estimated volume of the spill or flow if the spill is ongoing; the estimated time of repair; the cause of the spill; the agencies involved with repair and clean-up; and corrective actions taken or plans for corrective actions.

.1.3. The potable water system has been contaminated due to a cross-connection with recycled water.

8.1.2 Upon being notified or determining that a spill or other release of recycled water from a Site, other than incidental runoff, including, but not limited to, breaks in the recycled water irrigation or distributions systems has occurred, the Site Supervisor shall immediately notify the Districts by telephone. Information provided shall include: the date and time the spill began and ended; the location of the spill; if the spill entered a storm drain or receiving water; the estimated volume of the spill or flow if the spill is ongoing; the estimated time of repair; the cause of the spill; the agencies involved with repair and clean-up; and corrective actions taken or plans for corrective actions. Written confirmation shall be provided within three (3) business days from the date of notification.

8.2 Non-compliance with Regulations

8.2.1 The Site Supervisor shall notify the Districts by telephone or electronic means upon knowledge of any noncompliance of applicable laws and regulations, the Districts' Permits, and these Requirements. Written confirmation shall be provided within three (3) business days from the date of notification.

8.2.2 The Purveyor or Direct User shall provide written verification to the Districts within ninety (90) days from the date of knowledge of the violation that corrective actions have been implemented.

8.3 Site Inspections

8.3.1 The site inspection report shall be signed and dated by the Site Supervisor and the inspector, and provided to the Districts within thirty (30) days following the end of the quarter in which the inspection was conducted.

8.3.2 The inspector shall immediately notify the Site Supervisor of violation(s) identified during site inspections and what corrective actions must be taken.

8.3.3 The Purveyor or Direct User shall notify the Districts by electronic means at least one (1) week prior to conducting a site inspection.

8.4 Miscellaneous Information

8.4.1 If someone other than the User is responsible for applying the recycled water (e.g., a truck hauler), then the User shall inform them of these Requirements in a written permit or other suitable manner.

8.4.2 The Site Supervisor is required to provide the Districts with an address and phone number(s) where he or she can be contacted at all times. The Site Supervisor is responsible for maintaining current pertinent information regarding the Site and Districts' contacts.

8.4.3 The Districts shall be notified in writing of any proposed changes in the individual designated as the Site Supervisor.

8.4.4 The Districts shall be notified in writing of any planned modifications or additions to the recycled water system. Any proposed significant modifications or additions to the recycled water system shall be reviewed and approved by the Districts before being made.

8.4.5 The User or Purveyor shall provide information as requested by the Districts in order for the Districts to comply with monitoring and reporting requirements issued by the LRWQCB.

9. Record Keeping

9.1 Current as-built drawings and other design plans of the recycled water system and potable water system, and any forms or reports as required by the Districts including, but not limited to, inspection reports, cross-connection tests, etc., shall be maintained by the Site Supervisor or Purveyor.

9.2 A copy of these Requirements, the Districts' Permits, the Emergency Cross-Connection Response Plan, and the Recycled Water System Operations Manual shall be maintained by the Site Supervisor so that they are available to operating personnel at all times.

9.3 For each site, the Site Supervisor or Purveyor must keep operation and maintenance logs that are available to the Districts. The logs shall include information that will be required for compliance with Permit requirements. This information, such as the monthly volumes of recycled water used at each site, dates of inspections and tests, etc, will be specified by the Districts in the approval letter.

Table 1. Process to Obtain Recycled Water for Direct Users or Purveyors

Process	Applicable Documents or Actions Required	Responsible Entity
Step 1 – Consult with Districts and review Recycled Water Users Handbook	Districts' Recycled Water Users Handbook	Direct User or Purveyor
Step 2 - Prepare draft plans and specifications	California Department of Public Health (CDPH) requirements in California Code of Regulations (CCR) Title 17 and 22[1], Los Angeles County Department of Public Health (LACDPH) Guidelines	Direct User or Purveyor
Step 3 - Draft User Agreement or amendment (if site is not covered under existing agreement)	Districts' User Agreement	Districts / Direct User or Purveyor
Step 4 - Approve User Agreement or Amendment	Present Agreement or Amendment to Districts' Board and governing body of Direct User or Purveyor for approval	Districts / Direct User or Purveyor
Step 5 - Submit Application for recycled water use	Districts' User Application Form	Direct User or Purveyor
Step 6 - Identify distribution issues, verify allowed uses, estimate quantity of water and delivery schedule	Verification of information provided in the Application Form. Send conditional approval in writing with caveat that project commencement is contingent upon Direct User or Purveyor receiving all regulatory approvals.	Districts
Step 7 – Complete California Environmental Quality Act (CEQA) Process	Make sure there is proper CEQA documentation for the site	Direct User or Purveyor
Step 8 – Consult with health agencies *(recommended)*	Describe project and show draft plans to CDPH and LACDPH	Direct User or Purveyor
Step 9 – Finalize and submit plans and specifications	Plans and specifications submitted to LACDPH; LACDPH Cross-Connection Plan Approval Application and fee.	Direct User or Purveyor
Step 10 - Provide materials and/or training to User on proper operation of a recycled water system	Districts' Recycled Water Users Handbook to be provided by Districts; training to be provided by Districts and/or Purveyor (or an other equivalent program can be substituted)	Districts or Purveyor
Step 11 – Consult with Lahontan Regional Water Quality Control Board (LRWQCB) *(recommended)*	Describe project and discuss Engineering Report needs	Direct User or Purveyor

[1] http://www.cdph.ca.gov/healthinfo/environhealth/water/Pages/Waterrecycling.aspx.

Table 1. Process to Obtain Recycled Water for Direct Users or Purveyors

Process	Applicable Documents or Actions Required	Responsible Entity
Step 12 – Final plans and specifications	Obtain approval of final plans and specifications from LACDPH	Direct User or Purveyor
Step 13 – Prepare / amend Engineering Report	CDPH *Guidelines for Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*[2]; Districts' information on water reclamation plants; Direct User or Direct User or Purveyor completes the Engineering Report; the Districts provide information related to treatment facilities; the report must be prepared and stamped by a professional engineer registered in California.	Direct User or Purveyor and Districts
Step 14 – Submit Engineering Report to CDPH and LRWQCB, with copy to Districts	Completed Engineering Report	Direct User or Purveyor
Step 15 – If applicable, submit revised Engineering Report, with copy to Districts	Revisions/additional information may be requested by CDPH and/or the LRWQCB	Direct User or Purveyor
Step 16 – Authorization of project under existing or new LRWQCB permit	Letter or permit	LRWQCB; possibly CDPH and/or LACDPH
Step 17 – Notify Districts of Final Regulatory Approvals	Direct User or Purveyor sends copy of LRWQCB letter or permit to Districts and any other applicable CDPH or LACDPH documents	Direct User or Purveyor
Step 18 – Pre- and post-construction inspections	Contact LACDPH prior to construction to arrange for site inspections, initial cross-connection and backflow prevention device testing; LACDPH Guidelines and Recycled Water System Inspection Report.	Direct User or Purveyor
Step 19 – Approval of final construction	By LACDPH	Direct User or Purveyor
Step 20 – Begin project implementation		Direct User or Purveyor
Step 21 – Submit revised as-built drawings of recycled water distribution system if necessary	Must be provided to LACDPH and Districts if any modifications have been made to original drawings	Direct User or Purveyor

[2] http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recharge/ERGUIDE2001.PDF.

Table 2. Process to Obtain Recycled Water for Users Receiving Water From Purveyors

Process	Applicable Documents or Actions Required	Responsible Entity
Step 1 – Consult with Purveyor and review Recycled Water Users Handbook	Districts' Recycled Water Users Handbook	User and Purveyor
Step 2 – Prepare draft plans and specifications	California Department of Health Services (CDPH) requirements in California Code of Regulations (CCR) Title 17 and 22[3], Los Angeles County Department of Public Health (LACDPH) Guidelines.	User or Purveyor
Step 3 – Request for recycled water service	Use recycled water Purveyor's application process	User
Step 4 – Draft User Agreement or amendment (if site is not covered under existing agreement)	Districts' User Agreement or Amendment	Districts / Purveyor
Step 5 – Approve User Agreement or Amendment	Present Agreement or Amendment to Districts' Board and governing body of Purveyor for approval	Districts / Purveyor
Step 6 – Submit Application for recycled water use to Districts	Districts' User Application Form	Purveyor
Step 7 – Identify distribution issues, verify allowed uses, estimate quantity of water and delivery schedule	Verification of information provided in the Districts' User Application Form. Send conditional approval in writing with caveat that project commencement is contingent upon Direct User or Purveyor receiving all regulatory approvals.	Districts
Step 8 – Draft contract or amendment or other legal control mechanism (if site is not covered under existing contract or control mechanism)	Contract, contract amendment, or control mechanism between Purveyor and User	Purveyor and User
Step 9 – Approve contract or amendment or other legal control mechanism (if site is not covered under existing contract or control mechanisms)	Purveyor and User authorize contract, contract amendment, or control mechanism	Purveyor and User
Step 10 – Complete California Environmental Quality Act (CEQA) Process	Make sure there is proper CEQA documentation for the site	Purveyor and User
Step 11 – Consult with health agencies *(recommended)*	Describe project and show draft plans to CDPH and LACDPH	Purveyor
Step 12 – Finalize and submit plans and specifications	Plans and specifications submitted to LACDPH; LACDPH Cross-Connection Plan Approval Application and fee	Purveyor

[3] http://www.cdph.ca.gov/healthinfo/environhealth/water/Pages/Waterrecycling.aspx.

Table 2. Process to Obtain Recycled Water for Users Receiving Water From Purveyors

Process	Applicable Documents or *Actions Required*	Responsible Entity
Step 13 – Provide materials and/or training to User on proper operation of a recycled water system	Districts' Recycled Water Users Handbook and training to be provided by Purveyor (the Districts' training program or another equivalent program can be substituted)	Purveyor
Step 14 – Consult with Lahontan Regional Water Quality Control Board (LRWQCB) *(recommended)*	Describe project and discuss Engineering Report needs	Purveyor
Step 15 – Final plans and specifications	Obtain approval of final plans and specifications from LACDPH	Purveyor
Step 16 – Prepare / amend Engineering Report	CDPH *Guidelines for Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*[4]; Districts' information on water reclamation plants; Purveyor completes the Engineering Report; the Districts provide information related to treatment facilities; the report must be prepared and stamped by a professional engineer registered in California.	Purveyor and Districts
Step 17 – Submit Engineering Report to CDPH and LRWQCB, with copy to Districts	Completed Engineering Report	Purveyor
Step 18 – If applicable, submit revised Engineering Report, with copy to Districts	Revisions/additional information may be requested by CDPH and/or the LRWQCB	Purveyor
Step 19 – Authorization of project under existing or new LRWQCB permit	Letter or permit	LRWQCB; possibly CDPH and/or LACDPH
Step 20 – Notify Districts of Final Regulatory Approvals	Purveyor sends copy of LRWQCB letter or permit to Districts and any other applicable CDPH or LACDPH documents	Purveyor
Step 21 – Pre- and post-construction inspections	Contact LACDPH prior to construction to arrange for site inspections, initial cross-connection and backflow prevention device testing; LACDPH *Guidelines and Recycled Water System Inspection Report*	Purveyor
Step 22 – Approval of final construction	By LACDPH	Purveyor
Step 23 – Begin project implementation		Purveyor and User
Step 24 – Submit revised as-built drawings of recycled water distribution system if necessary	Must be provided to LACDPH and Districts if any modifications have been made to original drawings	Purveyor

[4] http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recharge/ERGUIDE2001.PDF.

RECYCLED WATER USE SITE INSPECTION PROGRAM

Recycled Water Use Site Inspection Program
County Sanitation Districts of Los Angeles County
District Nos. 14 and 20

1. Introduction

County Sanitation District Nos. 14 and 20 of Los Angeles County (Districts) have developed Requirements for Recycled Water Users (Requirements). The Requirements, which are mandated by the Water Code, have been developed to ensure that recycled water users comply with all applicable statutes, regulations, and the Districts' Master Permits. A Master Permit has been adopted by the California Regional Water Quality Control Board, Lahontan Region (LRWQCB) for the Lancaster Water Reclamation Plant (WRP). The Districts expect that a Master Permit for the Palmdale WRP will also be adopted in the future. For Master Permits, the Water Code specifies that the permittee conduct "periodic" inspections of the recycled water use sites (Sites) to monitor compliance with the uniform statewide recycling criteria established by California Department of Public Health (CDPH) and the Requirements of the Master Permit. The Requirements address Site inspections in Sections 6, 7, 8 and 9. This document summarizes the requirements pertaining to Site inspections and describes specific implementation procedures.

2. Inspection Program

The inspection program will consist of the following elements:

2.1. The Districts' inspection program consists of inspections conducted by both the Districts and the Purveyors, currently the City of Lancaster and the Los Angeles County Waterworks District No. 40. These inspections are in addition to inspections conducted by the Los Angeles County Department of Public Health (LACDPH) or other regulatory agencies.

2.2. The Districts will conduct an initial baseline inspection of new Sites during their first year of operation. The LACDPH will also conduct inspections during Site construction and prior to a Site's initial operation.

2.3. Upon completion of the baseline inspections, the Districts will conduct periodic site inspections once every three years. The Districts may conduct more frequent inspections depending on factors such as compliance record, potential for human exposure to recycled water and Site retrofits.

2.4. For Sites out of compliance, the Districts will conduct annual follow-up inspections.

2.5. The Purveyors must also conduct periodic inspections once every three years at a minimum. These inspections will be independent of the Districts' inspections. The Districts may require more frequent inspections by the Purveyors depending on factors such as compliance record, potential for human exposure to recycled water and Site retrofits.

2.6. The Districts will work with the Purveyors and users to ensure that the periodic inspections address the Master Permits, the Requirements, applicable laws and regulations, and LACDPH or local health department guidelines.

2.7. The Districts require Purveyors to develop and initiate an inspection program within the first year of a Site's operation.

2.8. A Site Inspection Report will be completed for each inspection. The Districts' Site Inspection Report Form is attached. The Purveyors may elect to use the Districts' Site Inspection Report

Form for adopt their own. In the latter case, the Districts will work with the Purveyors to ensure all regulatory requirements are addressed in the Site Inspection Report.

2.9. The Site Inspection Report shall be signed and dated by the Site Supervisor and the inspector, and provided to the Districts (if the Districts are not the inspector) within thirty (30) days following the end of the quarter in which the inspection was conducted.

2.10. The inspector shall immediately notify the Site Supervisor of violation(s) identified during Site inspections and what corrective actions and follow up actions must be taken.

2.11. The Site Supervisor shall notify the Districts by telephone or electronic means upon knowledge of any noncompliance with applicable laws and regulations, the Districts' Permits, and the Requirements. Written confirmation shall be provided within three (3) business days from the date of notification.

2.12. The Purveyor or Direct User shall provide written verification to the Districts within ninety (90) days from the date of knowledge of the violation that corrective actions have been implemented.

2.13. Site Inspection Reports shall be maintained by the Site Supervisor or Purveyor.

2.14. The Purveyor shall notify the Districts by electronic means at least one (1) week prior to conducting a Site inspection.

2.15. The Districts will maintain a database of Sites, inspections, and compliance actions.

2.16. The recycled water user shall allow an authorized representative of any of the following agencies the right to enter and conduct an inspection of the Site upon presentation of proper credentials: the Districts, LRWQCB, CDPH, LACDPH or local health department.

REUSE SITE INSPECTION REPORT

REUSE SITE INSPECTION REPORT
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
District Nos. 14 and 20

Recycled Water User:
Location of Site:
Type of Use:
Date & Time of Inspection:
Name of Inspector:
Name of User Representative/Title:

VERIFICATION OF COMPLIANCE INSPECTION AND ENFORCEMENT PROGRAM

Is recycled water used for any purposes not listed in the Regional Water Quality Control Board permit(s)? If yes, please provide an explanation in the space below.	☐ Yes	☐ No
Have there been any changes or modifications to the recycled water system? If yes, please provide an explanation in the space below.	☐ Yes	☐ No
Has there been a change in the Site Supervisor? If yes, please provide updated information in the space below.	☐ Yes	☐ No
Has on-site staff received appropriate training? If no, please explain in the space below when training will be provided.	☐ Yes	☐ No

Reuse Site:
Date:

Are copies of the Site Operation Manual, Emergency Cross-Connection Response Plan, and Districts' *Requirements for Recycled Water Users* available to employees at all times? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are there complete and up-to-date O&M records for the recycled water system? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
INSPECTION OF USER OPERATIONS		
Is irrigation limited to the authorized use areas? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Is recycled water running off from the authorized use area through surface runoff or windblown spray? If yes, please explain in the space below how and when this will be corrected, and make note of the source, volume, and destination of the runoff.	☐ Yes	☐ No
Are any unusual odors associated with the recycled water use, supply, or storage? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Is there any evidence of ponding of recycled water? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No

Reuse Site:
Date:

Is there any evidence of mosquito breeding? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are signs properly placed, labeled and legible with regard to not drinking recycled water? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are tags visible and legible? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Is there any evidence of overflows, erosion, or improper management of impoundments? If yes, please explain in the space below how and when this will be corrected	☐ Yes	☐ No
Are there any leaks or breaks in the irrigation system piping or evidence of plugged, broken, or otherwise faulty irrigation components including sprinklers? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Is recycled water being sprayed directly on people, dwellings, food-handling facilities, or drinking fountains? If yes, please explain in the space below how and when this will be corrected	☐ Yes	☐ No

Reuse Site:
Date:

Is irrigation system being operated during periods of minimal human use with adequate time to dry-out before public use? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Does irrigation take place within 50 feet of any domestic water supply well? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Does impoundment of disinfected tertiary recycled water occur within 100 feet of any domestic water supply well? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Does irrigation take place within 50 feet of any uncovered reservoir or stream currently used as a source of domestic water? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are all impoundments property maintained and adequately protected from erosion, washout, and flooding from a 24-hour rainfall event having a predicted frequency of once in 100 years? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are there any hose bibbs in the recycled water system? If yes, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No

Reuse Site:
Date:

Are pipes properly maintained and marked? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are valves and controllers properly maintained and marked? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are points of connection properly maintained and marked? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are other recycled water facilities and control systems including but not limited to pump stations, storage facilities and pressure reducers properly maintained? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Is backflow prevention in place? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Is there a schedule for testing backflow prevention and is testing up to date? If no, please explain in the space below how and when this will be corrected. Date of Last Test: ________________	☐ Yes	☐ No

Reuse Site:
Date:

Is there a need for cross-connection testing due to major modifications to the system? If yes, in the space below explain when the testing will be conducted.	☐ Yes	☐ No
Are best management practices being used to prevent erosion control and runoff? If no, please explain in the space below how and when this will be corrected.	☐ Yes	☐ No
Are best management practices being used to irrigate at agronomic rates? If no, please explain in the space below how and when this will be corrected.		
Is fertilizer being used? If yes explain below how best management practices are being used to protect water quality.	☐ Yes	☐ No

REQUIRED ACTION/FOLLOW-UP ACTION		
☐ None		
☐ Yes by District – List	Compliance Date	Date Achieved
☐ Yes by User – List		

Reuse Site:
Date:

ADDITIONAL COMMENTS

SIGNATURES	
Inspector's signature:	Date:
Site Supervisor's signature:	Date:

ENFORCEMENT RESPONSE PLAN

Enforcement Response Plan for Requirements for Recycled Water Users (ERP)
County Sanitation Districts of Los Angeles County
District Nos. 14 and 20

1. Introduction

In 2006 and 2007, County Sanitation District Nos. 14 and 20 of Los Angeles County (Districts) adopted Ordinances to govern the permitting, enforcement, and inspection activities associated with the use of recycled water to ensure that the Districts had the authority to take action to correct inappropriate uses of recycled water, revoke water users' sales agreements if inappropriate uses persisted, and cease deliveries of recycled water. In conformance with the Ordinances, the Districts have also established *Requirements for Recycled Water Users* (Requirements) to ensure that recycled water users comply with all applicable statutes, regulations, and the Districts' Master Reclamation Permits. The Requirements contain rules governing the use of recycled water, procedures for obtaining permission to use recycled water, requirements for the operation and management of sites, information on site inspection and site access, corrective actions, notification and reporting, and record keeping.

Timely and consistent enforcement of the Ordinances and Requirements is critical to the success of the Districts' water recycling program. Thus, the Districts have developed this ERP to create a framework for identifying and investigating instances of noncompliance, and for taking enforcement actions that are appropriate in relation to the nature and severity of the violation. It is the Districts' intent to respond to violations as soon as they are discovered and to encourage users to achieve compliance as soon as possible. The overall goal of the ERP is to promote and ensure compliance among recycled water users.

2. Progressive Enforcement

The ERP is founded on the principle of progressive enforcement. Progressive enforcement is an escalating series of actions that allows for the efficient and effective use of enforcement resources to: 1) assist users in achieving compliance; 2) compel compliance for repeat violations; and 3) provide a disincentive for noncompliance.

While the Districts consider each violation to be a priority that needs to be corrected immediately, the Districts intend to tailor the type of enforcement response to the severity of the violation. For example, for very serious violations, a user's recycled water service may be terminated. For less serious violations, the response may be a verbal notification or a written notice or compliance letter. Also, if a violation continues, the enforcement response may be escalated until compliance is achieved.

Examples of more serious types of violations may include, but are not limited to:

- Unauthorized discharges of recycled water, including discharge to surface water.
- Spraying of food prep areas or drinking fountains.
- Creating a nuisance condition, which would include any action that is injurious to health, is indecent or offensive to the senses, obstructs the use of property, or otherwise adversely affects an individual or community.

- Allowing for, or creating, cross-connections between a recycled water line and a potable water line.
- Allowing for backflow between a recycled water system and a potable water system or failure to install backflow prevention devices.
- Failure to prevent recycled water from leaving the site.
- Allowing the use of recycled water outside of an approved area.
- Unauthorized use of recycled water.
- Failure to conduct cross-connection or backflow prevention testing.
- Failure to allow access for inspections.
- Failure to take or complete corrective actions.
- Failure to report spills greater than 50,000 gallons, and incidents of illness, cross-connections or backflow.
- Failure to notify the Districts of violations.

Examples of less serious violations may include, but are not limited to:

- Failure to maintain the recycled water system in good working condition.
- Allowing ponding or pooling of recycled water.
- Improper signage or marking of reuse facilities.
- Improper pipe, valves, valve boxes, etc.
- Improper operation or application of best management practices at reuse sites.
- Irrigation above agronomic rate or fertilizer needs.
- Failure to provide training for recycled water system by personnel.
- Failure to report minor releases of recycled water from the site.
- Failure to provide the Districts with required or requested information.
- Failure to keep records.
- Failure to appoint and maintain a Site Supervisor.

Violations may be found during routine inspection by purveyors or during routine operations by users. Once a violation is discovered, the Site Supervisor must take actions in accordance with Sections 7 (Corrective Action) and 8 (Notification and Reporting) of the Requirements. Such actions include: 1) immediately notifying the Districts and regulatory agencies; 2) providing written confirmation to the Districts and regulatory agencies within 3 business days from the date of notification; 3) providing follow-up documentation that the necessary corrections have been made.

If violations are found during a Districts' inspection, they will be noted on the Districts' inspection form with required follow-up actions and compliance dates. Verification of the corrective action must be made by the purveyor within 90 days of the initial inspection and reported to the Districts.

ATTACHMENT D
Standard Provisions for Waste Discharge Requirements

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

STANDARD PROVISIONS
FOR WASTE DISCHARGE REQUIREMENTS

1. Inspection and Entry

The discharger shall permit Regional Board staff:

a. to enter upon premises in which an effluent source is located or in which any required records are kept;

b. to copy any records relating to the discharge or relating to compliance with the waste discharge requirements;

c. to inspect monitoring equipment or records; and

d. to sample any discharge.

2. Reporting Requirements

a. Pursuant to California Water Code 13267(b), the discharger shall immediately notify the Regional Board by telephone whenever an adverse condition occurred as a result of this discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills of petroleum products or toxic chemicals, or damage to control facilities that could affect compliance.

b. Pursuant to California Water Code Section 13260 (c), any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Regional Board at least 120 days in advance of implementation of any such proposal. This shall include, but not be limited to, all significant soil disturbances.

c. The owner(s) of, and discharger upon, property subject to waste discharge requirements shall be considered to have a continuing responsibility for ensuring compliance with applicable waste discharge requirements in the operations or use of the owned property. Pursuant to California Water Code Section 13260(c), any change in the ownership and/or operation of property subject to the waste discharge requirements shall be reported to the Regional Board. Notification of applicable waste discharge requirements shall be furnished in writing to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board.

d. If a discharger becomes aware that any information submitted to the Regional Board is incorrect, the discharger shall immediately notify the Regional Board, in writing, and correct that information.

e. Reports required by the waste discharge requirements, and other information requested by the Regional Board, must be signed by a duly authorized representative of the discharger. Under Section 13268 of the California Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1000) for each day of violation.

f. If the discharger becomes aware that their waste discharge requirements are no longer needed (because the project will not be built or the discharge will cease) the discharger shall notify the Regional Board in writing and request that their waste discharge requirements be rescinded.

3. <u>Right to Revise Waste Discharge Requirements</u>

The Board reserves the privilege of changing all or any portion of the waste discharge requirements upon legal notice to and after opportunity to be heard is given to all concerned parties.

4. <u>Duty to Comply</u>

Failure to comply with the waste discharge requirements may constitute a violation of the California Water Code and is grounds for enforcement action or for permit termination, revocation and reissuance, or modification.

5. <u>Duty to Mitigate</u>

The discharger shall take all reasonable steps to minimize or prevent any discharge in violation of the waste discharge requirements which has a reasonable likelihood of adversely affecting human health or the environment.

6. <u>Proper Operation and Maintenance</u>

The discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the discharger to achieve compliance with the waste discharge requirements. Proper operation and maintenance includes adequate laboratory control, where appropriate, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the discharger, when necessary to achieve compliance with the conditions of the waste discharge requirements.

7. Waste Discharge Requirement Actions

The waste discharge requirements may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for waste discharge requirement modification, revocation and reissuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any of the waste discharge requirements conditions.

8. Property Rights

The waste discharge requirements do not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

9. Enforcement

The California Water Code provides for civil liability and criminal penalties for violations or threatened violations of the waste discharge requirements including imposition of civil liability or referral to the Attorney General.

10. Availability

A copy of the waste discharge requirements shall kept and maintained by the discharger and be available at all times to operating personnel.

11. Severability

Provisions of the waste discharge requirements are severable. If any provision of the requirements is found invalid, the remainder of the requirements shall not be affected.

12. Public Access

General public access shall be effectively excluded from treatment and disposal facilities.

13. Transfers

Providing there is no material change in the operation of the facility, this Order may be transferred to a new owner or operation. The owner/operator must request the transfer in writing and receive written approval from the Regional Board Executive Officer.

14. Definitions

a. "Surface waters" as used in this Order, include, but are not limited to, live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of waters. "Surface waters" does not include artificial water courses or impoundments used exclusively for wastewater disposal.

b. "Ground waters" as used in this Order, include, but are not limited to, all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

15. Storm Protection

All facilities used for collection, transport, treatment, storage, or disposal of waste shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

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ATTACHMENT E
CDPH Approval and Comment Letters

1. March 5, 2009 Letter
2. May 15, 2009 Letter

MARCH 5, 2009 LETTER

State of California—Health and Human Services Agency
California Department of Public Health

MARK B HORTON, MD, MSPH
Director

ARNOLD SCHWARZENEGGER
Governor

March 5, 2009

Mr. Mike Plaziak, Supervising Engineer
California Regional Water Quality Control Board - Lahontan Region
Victorville Branch Office
14440 Civic Drive, Suite 200
Victorville, CA 92392-2306

SYSTEM NO. 1990005 – (REVISED) COMMISSIONING TESTS SUMMARY REPORT FOR WEDECO TAK-55HP ULTRAVIOLET LIGHT (UV) DISINFECTION SYSTEM OF THE MEMBRANE BIO-REACTOR (MBR) PLANT, LANCASTER, CALIFORNIA (REVISED)

Dear Mr. Plaziak:

We have received comments from Mr. Phil Ackman of the Sanitation Districts of Los Angeles County (District) regarding the Department's letter dated December 2, 2008. The letter refers to the District's Lancaster UV Field Commissioning Tests Summary Report (Report) for the Wedeco TAK-55HP UV Reactor prepared by Carollo Engineers, dated September 2008. The Department has reviewed the District's comments to the recommended provision provided in the Department's letter and determines that they are reasonable. Therefore, the Department has incorporated the District's comments to the following recommended provisions (changes are in *italic*):

1. These recommendations are based on the equipment cited in the Report. No equivalents or substitutions will be accepted without a demonstration of equivalent disinfection performance.

2. Since the LWWTP uses a membrane filter, the UV system must be operated to deliver a minimum UV dose of 80 mJ/cm^2 at all times.

3. The equations from the Report are to be used as part of the automatic UV disinfection control system for calculating UV dose and should be specified as a permit provision. They are:

MAR 11 2009 AM10:01 DOC # Tremblay R DOC #1228112

Equation 3

$$\text{Dose} = (S/ (0.8*S_0))*10^{-2.2548 - 0.8538 * \log \text{Flow} + 2.9182 * \log \text{UVT}}$$

Equation 4

$$S_0 = -0.046359*\text{UVT}+0.001476*\text{UVT}^2$$

Where:

Dose = Delivered UV dose per bank (mJ/cm^2);

UVT = % UV transmittance at 254 nm (%);

Flow = Flow rate per lamp [gallons per minute (gpm)/lamp], with gpm/lamp calculated as gpm divided by the number of lamps in one bank;

S = UV intensity as measured by the UV sensor, mW/cm^2;

S_0 = Expected UV intensity of a new lamp at 100 percent output and unfouled conditions, mW/cm^2;

4. The LWWTP Wedeco UV Reactor is limited to the following operational parameter ranges:

   a. Permit only flows from 230 to 866 gpm (0.3 to 1.2 MGD). The actual capacity of the Wedeco UV system for the design conditions of 65 % UVT, 80 mJ/cm^2 dose, end-of-lamp-life (EOLL) of 0.88, and fouling factor (FF) of 0.8, using Equations ES-1 and ES-2 of the Report, results in a capacity of 0.91 MGD (630 gpm). If the design capacity is to be based on 66.6 percent UVT, the system capacity using Equations ES-1 and ES-2 from this report meets the 1.0 mgd design objective with a delivered dose of 80.1 mJ/cm^2.

   b. Under worse-case conditions, assume end-of-lamp-life (EOLL) of 0.88, and fouling factor (FF) of 0.8; however, proper operation and maintenance should produce more favorable conditions and this may be monitored by UV intensity sensors.

c. UVTs should be maintained at or above 67 percent[1], unless the EOLL and FF can be demonstrated to be better than the assumed worst case factors, as measured by properly calibrated UV intensity sensors;

d. The water level in the Wedeco UV Reactor is maintained below the maximum value of 19.13 inches.

5. In all cases, the UV intensity sensors must monitor the combined effect of UVT, lamp aging and sleeve fouling to ensure that the target UV dose is being met at all times.

6. Flow meters, UV intensity sensors, and UVT monitors must be properly calibrated to ensure proper disinfection.

7. UV intensity sensors (duty sensors) must be checked against a reference sensor at least monthly.

8. For all UV intensity sensors in use, the ratio of the duty UV sensor intensity to the reference UV sensor intensity must be less than or equal to 1.2. If the calibration ratio is >1.2, the failed duty UV sensor must be replaced by a properly calibrated sensor and recalibrated by a qualified facility. The reference UV intensity sensors shall be recalibrated at least annually by a qualified facility using a National Institute of Standards and Technology (NIST) traceable standard.

9. UVT meter must be inspected and checked against a reference bench-top unit weekly to document accuracy.

10. *If the on-line analyzer UVT reading varies from the bench-top spectrophotometer UVT reading by 2% or more, the on-line UVT analyzer must be recalibrated by a procedure recommended by the manufacturer.*

11. *Flow meters measuring the flow through a UV reactor must be verified to determine accuracy at least monthly via checking the flow reading against other flow determination methods.*

12. The facility should be operated in accordance with an approved operations plan, which specifies clearly the operational limits and responses required for critical alarms.

13. These applicable recommendations should be incorporated into the final permit for the UV system. Approval for the use of any and all water recycling

---

[1] At UVT values below 67 percent, the validated and checked equations state that the Wedeco TAK-55HP can deliver 80 mJ.cm2 at a flow rate of 0.91 MGD, assuming the EOLL and FF.

applications is granted through the Regional Water Quality Control Board's Water Reclamation permitting process.

If you have questions regarding this letter, please contact Mr. Chi Diep at (213) 580-5727 or myself at (213) 580-3127.

Sincerely,

Stefan Cajina, P.E.
District Engineer
Central District

cc: Curt Shifrer
California Regional Water Quality Control Board - Lahontan Region
Victorville Branch Office
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Andrew Salveson
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Walnut Creek, CA 94598

MAY 15, 2009 LETTER

State of California—Health and Human Services Agency
California Department of Public Health

MARK B HORTON, MD, MSPH
Director

ARNOLD SCHWARZENEGGER
Governor

May 15, 2009

Mr. Mike Plaziak, Supervising Engineer
California Regional Water Quality Control Board - Lahontan Region
Victorville Branch Office
14440 Civic Drive, Suite 200
Victorville, CA 92392-2306

Dear Mr. Plaziak:

SYSTEM NO. 1990005 – COMMISSIONING TESTS SUMMARY REPORT FOR TROJAN 3000PLUS ULTRAVIOLET LIGHT (UV) DISINFECTION SYSTEM OF THE MEMBRANE BIO-REACTOR (MBR) PLANT, LANCASTER, CALIFORNIA

We were recently informed that there was an error on the letter dated April 15, 2009 regarding the above subject that was sent to your office. The dose equation under recommendation 5b has been corrected. Please replace the April 15, 2009 letter with the corrected version attached.

If you have questions regarding this letter, please contact Mr. Chi Diep at (213) 580-5727 or myself at (213) 580-3127.

Sincerely,

Stefan Cajina, P.E.
District Engineer
Central District

Enclosure

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April 15, 2009

Mr. Mike Plaziak, Supervising Engineer
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SYSTEM NO. 1990005 – COMMISSIONING TESTS SUMMARY REPORT FOR TROJAN 3000PLUS ULTRAVIOLET LIGHT (UV) DISINFECTION SYSTEM OF THE MEMBRANE BIO-REACTOR (MBR) PLANT, LANCASTER, CALIFORNIA

Dear Mr. Plaziak:

We have reviewed the Sanitation Districts of Los Angeles County (District) Lancaster UV Field Commissioning Tests Summary Report (Report) for the Trojan 3000Plus UV Reactor prepared by Carollo Engineers, dated December 2008 – revised February 2009. The Trojan UV Reactor is being evaluated as a primary disinfection process for the District's Membrane Bio-Reactor (MBR) treatment process at the Lancaster Waste Water Treatment Plant (LWWTP). UV disinfection systems designed and tested following the National Water Research Institute/American Water Works Association's UV Disinfection Guidelines (2003), when combined with accepted filtration technologies, should adequately achieve the microbiological water quality objectives of the California Code of Regulations, Title 22, Chapter 3, Article 1, Section 60301.230 (a)(2).

The Report documented the performance verification testing for the Trojan UV Reactor at Lancaster. The verification process included an on-site checkpoint bioassay using seeded MS2 applied over a range of flows. Results documenting virus disinfection performance of the UV system compared to the standards found in Title 22 CCR were submitted in the Report for review by the Department. The Department has completed its review and recommends the approval of the Trojan 3000Plus UV Reactor for the LWWTP with the following recommendations:

1. The following recommendations are based on the equipment cited in the report. No equivalents or substitutions will be accepted without a demonstration of equivalent disinfection performance.

2. Since the District's Lancaster plant uses a membrane filter, the UV system must be operated to deliver a minimum UV dose of 80 mJ/cm^2 at all times. The equation from the February 2006 validation report is to be used as part of the automatic UV disinfection control system for calculating UV dose and should be specified as a permit provision. This equation must be verified or modified via the on-site bioassay.

3. The District's Lancaster UV system has a sixteen-bulb array, rather than the twenty-four-bulb array configuration that was validated in 2005 and documented in "UV3000Plus Validation Report, Final" (Carollo Engineers, February 2006). Therefore, the hydraulic characteristics and ability to inactivate MS-2 must be re-validated.

4. The Report has the following issues delineated below.

   a. Tests were conducted at six flow rates in May and July 2007 (T1-T6), ranging from 164 to 830 gpm (the plant is rated at a maximum of one MGD or 694 gpm). These "check-points" were compared to the dose predicted by the operating equation developed and documented in the validation report of February 2006. Comparing the "Lower 75% Confidence Interval UV Dose/Bank mJ/cm^2", which is recommended by the NWRI guidance[1], the District's Lancaster UV system tests were from 49% less to 17% more dose delivered than predicted by the equation from the February 2006 validation report. Three of the six tests were below what the validated operational equation predicted.

      i. T4 was conducted at 830 gpm and the average dose measured was 34 mJ/cm2 with a Lower 75% Confidence Interval (CI) of 32.7 mJ/cm2 . This was 49% less dose delivered than predicted. An explanation for this poor performance postured by Carollo is that the hydraulics were poor because the water level was 0.25 inches too high at 17.25 inches.

      ii. Carollo proposes a maximum water level of 17 inches. It should be clarified whether the control system can ensure that the water level will not exceed 17.0 inches.

      iii. Test T4 should be disregarded because it was above the acceptable highest flow.

[1] 2003 Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse published by the National Water Research Institute/AWWA Research Foundation.

b. Tests were conducted at three flow rates in April 2008 (T7-T9), ranging from 396 to 719 gpm.

c. Seven more tests were conducted in July 2008 (C1-C7), at flow rates ranging from 389 to 700 gpm.

d. The District proposed development of a unique, site-specific UV dose equation for the Lancaster Trojan 3000Plus UV system. Analysis and incorporation of these results in development of a site-specific UV dose equation has the following issues:

   i. Tests were conducted by District.

   ii. Only two effluent samples were collected per tests C1-C7 as opposed to five for tests T1-T9.

   iii. Lower 75% Confidence Interval (CI) calculations raise questions because there are only two numbers rather than five.

   iv. The two samples for test C5 resulted in the same log inactivation and delivered dose.

   v. The two samples for test C5 resulted in a Lower 75% CI that is higher than the delivered dose - opposite to what is expected and confirmed in the other tests.

   vi. The two samples for test C6 also resulted in the same log inactivation and delivered dose.

e. To address the uncertainties of the C1-C7 tests, an additional dose response correction factor of <u>0.95</u> should be incorporated in the District's site-specific UV dose equation for the Lancaster Trojan UV3000Plus.

DISTRICT'S LANCASTER PERMIT FOR TROJAN 3000PLUS

5. **The following recommendations should be incorporated into the final permit for the UV system.** Approval for the use of any and all water recycling applications is granted through the Regional Water Quality Control Board's Water Reclamation permitting process.

   a. Since the LWWTP uses a membrane filter, the UV system must be operated to deliver a minimum UV dose of 80 mJ/cm^2 at all times.

b. A modification of the District proposed unique, site-specific UV dose equation for the Lancaster Trojan UV3000Plus is to be used as part of the automatic UV disinfection control system for calculating UV dose and should be specified as a permit provision. This equation was developed based on the on-site bioassay. In order to correct for uncertainties of the dose response curve during the on-site tests, an additional uncertainty correction factor of 0.95 should be incorporated in the District's site-specific UV dose equation for the Lancaster Trojan UV3000Plus.

The equations to be used as part of the automatic UV disinfection control system for calculating UV dose should be specified as a permit provision. They are:

$$\text{Dose} = (U_{DR})^*(FF)^*(LHF)^*10^{-6.3547 - 0.98208 * \log \text{Flow} + 4.0824 * \log \text{UVT} + 1.0396 * \log P}$$

and

$$\text{LHF} = \text{lamp hour factor} = 1\text{-[operational lamp hours} * (1\text{-EOLL})/9{,}000]$$

Where:

Dose = Delivered UV dose per bank (mJ/cm^2);

U_{DR} = Uncertainty of dose response curve = 0.95;

FF = Fouling Factor = 0.95;

UVT = % UV transmittance at 254 nm (%);

Flow = Flow rate per lamp [gallons per minute (gpm)/lamp], with gpm/lamp calculated as gpm divided by the number of lamps in one bank;

EOLL = End of Lamp Life = 0.98 at 9000 hours; and

P = percent power.

c. The Trojan 3000plus low-pressure high-output (LPHO) UV disinfection system reactor is limited to the following operational parameter ranges:

i. Permit flow up to 1.0 MGD (694 gpm).

ii. Minimum UVT = 64%.

iii. Minimum one of the four banks in redundant standby mode. If during short-term, unexpected conditions the UVT is less than 64 percent, the redundant bank would need to be utilized in order to maintain the required 80-mJ/cm2 dose, otherwise, the flow must be diverted.

iv. The water level in the Trojan reactor is maintained below the maximum value of 17 inches.

d. Flow meters and UVT monitors must be properly calibrated to ensure proper disinfection.

e. UVT meter must be inspected and checked against a reference bench-top unit weekly to document accuracy.

f. If the on-line analyzer UVT reading varies from the bench-top spectrophotometer UVT reading by 2% or more, the on-line UVT analyzer must be recalibrated by a procedure recommended by the manufacturer.

g. Flow meters measuring the flow through a UV reactor must be verified to determine accuracy at least monthly via checking the flow reading against other flow determination methods.

h. The Trojan 3000Plus system has an automated mechanical wiping mechanism to reduce sleeve fouling. A minimum frequency of wiping should be developed specific to the District's Lancaster UV system. This should then be correlated to the proposed 0.95 fouling factor, which is incorporated into the UV dose equation above.

i. The facility should be operated in accordance with an approved operations plan, which specifies clearly the operational limits and responses required for critical alarms.

If you have questions regarding this letter, please contact Mr. Chi Diep at (213) 580-5727 or myself at (213) 580-3127.

Sincerely,

Stefan Cajina, P.E.
District Engineer
Central District

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TrojanUV(005).doc
SC/CD:

ATTACHMENT F
Monitoring and Reporting Program No. R6V-2009-0141

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. R6V-2009-0141
WDID NO. 6B190501001

MASTER WATER RECYCLING REQUIREMENTS AND WASTE DISCHARGE REQUIREMENTS
COUNTY SANITATION DISTRICT NO. 14 OF LOS ANGELES COUNTY (LANCASTER)
DISINFECTED TERTIARY RECYCLED WATER

Los Angeles County

I. MONITORING

A. <u>Flow Monitoring</u>

1. County Sanitation District No. 14 of Los Angeles County (District) shall record the total volume, in million gallons, and the average flow rate, in million gallons per day (mgd), of recycled water provided by the District to each Authorized Water Use site (including Apollo Park and Fox Airfield sites). This information must be recorded and reported for each calendar month.

2. The District shall record the total volume, in million gallons, and the monthly average 24-hour flow rate, in mgd, of recycled water supplied by the Antelope Valley Tertiary Treatment Plant into the North Los Angeles/Kern County Regional Recycled Water Project distribution system. This information must be recorded and reported for each calendar month.

3. The District shall record the total volume, in million gallons, and the monthly average 24-hour flow rate, in mgd, of recycled water supplied by the Membrane Bioreactor Plant into the North Los Angeles/Kern County Regional Recycled Water Project distribution system. This information must be recorded and reported for each calendar month.

4. The District shall record the total volume, in million gallons, and the monthly average 24-hour flow rate, in mgd, of recycled water supplied by the Activated Sludge/Nitrification-Denitrification Plant (Stage V Tertiary Treatment Plant) into the North Los Angeles/Kern County Regional Recycled Water Project distribution system. This information must be recorded and reported for each calendar month.

B. Agronomic Application Rate Monitoring for Fertilizers and Recycled Water

1. For each calendar month, the District shall record, and provide a tabular comparison of, the:

   a. agronomic rate (volume of water) of each irrigated area;
   b. volume of recycled water (and non-recycled supplemental water) applied to each irrigated area; and
   c. number of acres for each irrigated area.

2. For each calendar month, the District shall record, and provide a tabular comparison of, the:

   a. agronomic rate of nitrogen (N) for each landscape and agricultural area;
   b. total amount of N applied to each area, including the amount of N in the recycled water and the amount of N in any fertilizer applied;
   c. total amount of N applied to each area, including the amount of N in the recycled water and the amount of N in any fertilizer applied; and
   d. number of acres for each area.

C. Recycled Water Quality Monitoring

The District must collect and analyze samples of the recycled water supplied by the (1) Antelope Valley Tertiary Treatment Plant, (2) Membrane Bioreactor Plant, and (3) Stage V Tertiary Treatment Plant for reuse by recycled water users in accordance with the following table:

Parameter	**Units**	**Type**	**Minimum Frequency**
Turbidity[1]	NTU	Recorder	Continuous
Total Chlorine Residual	mg/L	Recorder	Continuous (When chlorine is used as disinfectant)
Modal Contact Time[2]	minutes	Calculated	Daily (When chlorine is used as disinfectant)
CT Value[3]	mg-minutes/L	Calculated	Daily (When chlorine is used as disinfectant)
Total Coliform	MPN/100mL	Grab	Daily
Kjeldahl Nitrogen	mg/L	Composite	Monthly
Ammonia Nitrogen	mg/L	Composite	Monthly
Nitrate Nitrogen	mg/L	Composite	Monthly
Total Dissolved Solids	mg/L	Composite	Quarterly
Sulfate	mg/L	Composite	Quarterly
Chloride	mg/L	Composite	Quarterly

Table Continued:

Total Trihalomethanes	µg/L	Grab	Quarterly
n-nitrosodimethylamine	µg/L	Composite	Quarterly
Priority Pollutants, excluding asbestos (Appendix A to 40 CFR part 423)	as specified	Grab or composite	Semi Annually

[1]For each 24-hour period, record and report the following:

a. Antelope Valley Tertiary Treatment Plant: average turbidity, amount of time (minutes) the turbidity exceeded five (5) NTUs (if any), and the maximum turbidity.

b. Membrane Bioreactor Plant: amount of time (minutes the turbidity exceeded 0.2 NTUs (if any) and the maximum turbidity.

c. Stage V Tertiary Treatment Plant: average turbidity, amount of time (minutes) the turbidity exceeded five (5) NTUs (if any), and the maximum turbidity.

[2]The modal contact time at the highest and lowest flows must be recorded and reported for each 24-hour period, where there is production of disinfected tertiary recycled water. The "modal contact time" is the amount of time elapsed between the time that a tracer, such as salt or dye, is injected into the influent at the entrance to a chamber and the time that the highest concentration of the tracer is observed in the effluent from the chamber. For the purpose of this determination, modal contact time shall be derived from a predetermined plot correlating modal contact times to varying flow conditions. (CCR, title 22, sec 60301.600)

[3]When chlorine is used as the disinfectant in production of disinfected tertiary recycled water, the lowest CT value must be calculated for each 24-hour period. CT (mg-minutes per liter) = chlorine residual (mg/L) × modal contact time (minutes). To calculate the lowest value, first record the following data for the 24-hour period:

a. Modal contact time under highest flow and corresponding total chlorine residual at that time.

b. Lowest total chlorine residual and corresponding modal contact time.

c. Highest total chlorine residual and corresponding modal contact time.

d. Modal contact time under lowest flow and corresponding total chlorine residual at that time.

Next, calculate CT values for each of the four conditions, above. The lowest of the four calculated CT values is the lowest CT for the period.

D. Quarterly Recycled Water Use Monitoring

The District must record the following information each quarter (quarters defined in Requirement No. II.B, below) in accordance with Water Code section 13523.1(b)(4):

1. Total amount of recycled water supplied into the North Los Angeles/Kern County Regional Recycled Water Project distribution system during the quarter.

2. Total amount of recycled water supplied to the Apollo Park and Fox Airfield sites.

3. The total number of sites that received recycled water during the quarter.

4. A list of all recycled water use sites. For each site, the list must include:

   a. site name,
   b. site location
   c. name of underlying hydrologic area
   d. user name
   e. type of use
   f. site area (acres)
   g. date of District recycled water use approval

5. A map of suitable scale showing the boundary of the Permit Area (as defined by Finding No. 9 of Board Order R6V-2009-0141 and showing the approved recycled water use site locations.

E. Inspections and Enforcement Monitoring

1. The District must provide in its annual report (see Requirement No. II.D, below) an inspection schedule for all recycled water use facilities. The inspection schedule shall document the date of each facility's prior inspection and its respective compliance status. Any facility with a reported incidence of noncompliance in its most recent inspection report must be re-inspected no later than one year from its prior inspection. Any facility that was in compliance during its most recent inspection must be scheduled for a re-inspection no later than three years from its prior inspection.

2. The District must record and report on a quarterly basis all recycled water use sites inspected pursuant to Requirement No. I.B.4 of Board Order No. R6V-2009-0141 during each respective quarter (See Requirement No. II.B, below). The list of sites inspected must include the following information for each recycled water use site:

   a. Date of inspection, name of recycled water use site, user name, and type of use.
   b. A description of all noted violations (including compliance with Requirement Nos. I.C.1 through I.C.15 of Board Order No. R6V-2009-0141).
   c. The date compliance was achieved and the respective corrective action taken, if applicable.
   d. A description of enforcement action taken (if any), including any schedule for achieving compliance.
   e. Date of prior compliance inspection.

3. The District must ensure that monthly inspections of all signage informing the public that recycled water is currently being used at the artificial lakes at Apollo Park and for irrigation purposes at each irrigation recycled water use

facility are completed. Maintenance of this signage is required. The results of such inspections must be reported by the District in its quarterly report (see Requirement No. II.B, below).

4. The District must ensure that monthly inspections of all Best Management Practices (BMPs) in place to prevent contamination of potable water supplies (including groundwater) are completed. The results of such inspections and measures taken to maintain and repair these BMPs must be reported by the District in its quarterly report (see Requirement No. II.B, below).

5. The District must ensure that annual visual inspections of the recycled water distribution system for cross connections with the potable water supply are completed.

6. The District must ensure that the recycled water distribution system is annually inspected for leaks or drops in pressure, and that pressure tests are conducted at a minimum once every three years.

F. Operation and Maintenance Monitoring

The District must record and maintain records of all actions and analytical results necessary to demonstrate compliance with California Department of Public Health conditions identified in Board Order No. R6V-2009- 0141, Requirement No. II.B. and to document any operational problems and maintenance activities with the recycled water treatment facilities, distribution system, and user sites. The District must submit a brief summary of its findings to the California Regional Water Quality Control Board, Lahontan Region (Lahontan Water Board) with each quarterly monitoring report. This summary must discuss the elements listed below.

1. All modifications or additions to the recycled water treatment facilities, distribution systems, and user sites;

2. Test results of all backflow prevention devices at each recycled water use site.

3. The results of cross connection inspections at each authorized recycled water use site.

4. Test results of the District's recycled water distribution system pressure testing.

5. Any non-routine maintenance conducted on the recycled water treatment facilities, distribution system, and user systems.

6. Any major problems occurring to the recycled water treatment facilities, distribution system, and user systems.

7. Calibration results of any recycled water flow measuring devices.

II. REPORTING

A. General Provisions

1. The District must comply with the "General Provisions for Monitoring and Reporting," dated September 1, 1994, which is attached to and made part of this Monitoring and Reporting Program (Attachment A).

2. The District must comply with the Sampling and Analysis Plan that was submitted on September 8, 2009, which is attached to and made part of this Monitoring and Reporting Program (Attachment B).

B. Quarterly Reports

Beginning on **December 1, 2009**, quarterly monitoring reports including the preceding information must be submitted to the Lahontan Water Board by the first day of the third month following each quarterly monitoring period [Water Code section 13523.1, subdivision (b)(4)].

Quarterly monitoring periods are defined as follows:

First Quarter	January 1 - March 31
Second Quarter	April 1 - June 30
Third Quarter	July 1 - September 30
Fourth Quarter	October 1 - December 31

C. Semi-Annual Report

Beginning on **March 1, 2010**, semi-annual monitoring data including the preceding information must be submitted to the Lahontan Water Board by the first day of the third month following each semi-annual monitoring period [Water Code section 13523.1, subdivision (b)(6)]. Data that are required on a semi-annual basis will be incorporated into the quarterly report that coincides with the period for which the analyses are required.

Semi-annual monitoring periods are defined as follows:

First half	January 1 - June 30
Second half	July 1 – December 31

D. Annual Report

Beginning on **April 1, 2010** and continuing thereafter, the District must submit an annual report to the Lahontan Water Board with the information listed.

1. Documentation of the District's compliance status with Board Order No. R6V-2009-0141, including progress made towards developing the salt/nutrient management plan that is required by Board Order No. R6V-2009-0141, Requirement No. III.A.

2. The compliance record and the corrective actions taken or scheduled/planned to return the District into full compliance with Board Order No. R6V-2009- 0141.

3. The District's time schedule for completing corrective actions needed to achieve compliance.

Ordered by: Harold J. Singer Dated: Dec 9, 2009
HAROLD J. SINGER
EXECUTIVE OFFICER

Attachment A: General Provisions for Monitoring and Reporting Program
Attachment B: Sampling and Analysis Plan, dated September 8, 2009

ATTACHMENT A

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

GENERAL PROVISIONS
FOR MONITORING AND REPORTING

1. SAMPLING AND ANALYSIS

   a. All analyses shall be performed in accordance with the current edition(s) of the following documents:

      i. Standard Methods for the Examination of Water and Wastewater
      ii. Methods for Chemical Analysis of Water and Wastes, EPA

   b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board. Specific methods of analysis must be identified on each laboratory report.

   c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The method used shall also be reported. If methods other than USEPA approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board prior to use.

   d. The Discharger shall establish chain-of-custody procedures to ensure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.

   e. The Discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall ensure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.

   f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.

   g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

2. OPERATIONAL REQUIREMENTS

a. Sample Results

Pursuant to California Water Code Section 13267(b), the Discharger shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed; sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be obtained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

b. Operational Log

Pursuant to California Water Code Section 13267(b), an operation and maintenance log shall be maintained at the facility. All monitoring and reporting data shall be recorded in a permanent log book.

3. REPORTING

a. For every item where the requirements are not met, the Discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time and submit a timetable for correction.

b. Pursuant to California Water Code Section 13267(b), all sampling shall be made available to the Regional Board upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

c. The Discharger shall provide a brief summary of any operational problems and maintenance activities to the Regional Board with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.

d. Monitoring reports shall be signed by:

i. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates;

ii. In the case of a partnership, by a general partner;

iii. In the case of a sole proprietorship, by the proprietor;

iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

e. Monitoring reports are to include the following:

i. Name and telephone number of individual who can answer questions about the report.

ii. The Monitoring and Reporting Program Number.

iii. WDID Number.

f. Modifications

This Monitoring and Reporting Program may be modified at the discretion of the Regional Board Executive Officer.

4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000) for each day of violation under Section 13268 of the Water Code.

forms:general5.pro

ATTACHMENT B

SANITATION DISTRICTS OF LOS ANGELES COUNTY

Master Water Recycling Monitoring and Reporting Program

SELF-MONITORING
SAMPLING AND ANALYSIS PLAN (SAP)

September 8, 2009

Lancaster Water Reclamation Plant
County Sanitation District No. 14 of Los Angeles County

DOC #: 13848201

TABLE OF CONTENTS

Overview

This document describes the self-monitoring sampling and analysis plan (SAP) proposed by County Sanitation District No. 14 of Los Angeles County (Sanitation District No. 14) for the Lancaster Water Reclamation Plant (LWRP). This SAP is compiled in accordance with Board Order No. R6V-2009-0034 (Master Permit), adopted on June 10, 2009 by the California Regional Water Quality Control Board, Lahontan Region (Regional Board). The Master Permit includes Water Recycling Requirements (WRRs), Waste Discharge Requirements (WDRs), and the Monitoring and Reporting Program (MRP) for the LWRP's water recycling program.

Constituent concentrations will be monitored under the conditions specified in the MRP and this document at the following locations:

- Effluent from the LWRP membrane bioreactor facility (MBR), after chlorination disinfection and after ultraviolet light (UV) disinfection
- Effluent from the Antelope Valley Tertiary Treatment Plant (AVTTP)
- Effluent from the LWRP Stage V Activated Sludge /Nitrification-Denitrification (AS/NDN) Plant

Locations for effluent monitoring points are shown in Figures 2 and 3. The Stage V AS/NDN Plant is currently under construction; therefore, the exact location where the effluent samples will be sampled will be determined after facility completion.

Sampling Schedule

The complete self-monitoring sampling schedule is shown in Table 1. This schedule is a compilation of all the monitoring outlined in the MRP. In some cases the annual monitoring events will be conducted along with a quarterly and/or monthly event.

Sampling Constituents, Analytical Methods and Schedule

Table 2 provides a compilation of the sampling and analytical protocols for all constituents requiring self-monitoring. The analytical methods and sampling techniques used may change if alternative methods are found to provide better results. The Sanitation District will seek Regional Board staff's approval for any changes in analytical methods and sampling techniques prior to implementation.

Quality Assurance/Quality Control (QA/QC)

The Quality Assurance (QA) Group of the Sanitation Districts of Los Angeles County (Sanitation Districts, or LACSD) Laboratories Section is responsible for monitoring the validity and quality of analytical data produced in all laboratories operated by the Sanitation Districts. In order to accomplish this goal, a quality assurance plan prepared by the QA Group is strictly followed. The plan includes routine QA activities that are performed in the laboratories in order to assure the defensibility of data reported.

1. A routine practice of running laboratory control samples, duplicates and matrix spikes or duplicate spikes for every ten samples, or every analytical batch of less than ten samples, is maintained. Control limits have been established for both precision and accuracy, and quality control data are plotted on control charts for trend analyses. For situations where the data are outside of the control limits, corrective action is initiated and maintained at the bench level until the problems are solved.

2. A reagent or method blank is routinely run with each batch of samples as a contamination check.

3. Calibration standards are analyzed as required. For some tests, a daily calibration verification standard is used to check the initial calibration curve. For other tests, a multi-point calibration curve is prepared on each day of analysis.

4. For most organic constituents, surrogate standards are added to every sample, duplicate, spike, and blank. The results are compared to established acceptance limits. When unacceptable results are obtained, corrective action is performed.

5. Instrument QA is also performed (e.g., for GC/MS, mass calibration and tuning are performed to meet ion abundance criteria).

6. The Sanitation Districts laboratories supply data for NPDES monitoring programs and must participate in the United Sates Environmental Protection Agency's (EPA) annual Discharge Monitoring Report – Quality Assurance (DMR-QA) study. This requires the successful analysis of blind chemistry and toxicity samples obtained from one of the EPA certified suppliers.

7. All ten Sanitation Districts' laboratories are accredited by the California Department of Public Health Environmental Laboratory Accreditation Program (ELAP). To retain their certification, each laboratory must successfully analyze blind samples on an annual basis through Proficiency Testing studies. ELAP staff also performs site inspections of each laboratory.

8. Quality control samples in the form of blind check standards, either prepared in-house or purchased from commercial sources, are issued by the QA Group to all Los Angeles County Sanitation Districts' laboratories. In situations where the results are not acceptable, the analysts and their supervisors are informed and error resolutions are performed. This consists of checking calculations, data transcription, instrumentation, methodology, etc. Follow-up check samples are issued to verify that the analyses are back in control.

9. The QA Group also issues split samples collected from one of the water reclamation plants to each laboratory to assess their analysis with an actual environmental matrix. Results of these analyses are statistically evaluated for outliers.

Sampling Procedures

Samples are collected and handled in the manner specified in the analytical method. Table 2 provides additional sampling information for the monitoring crew including sample bottle material, holding times, and sample preservation.

Time-based 24-hour composite samples are currently utilized by LWRP and are preferred whenever possible. However, there are situations where grab samples are more appropriate or specified by standard procedures (e.g., total cyanide).

Two sampling procedures are attached:

1. Appendix 1 – Standard Operating Procedure for Daily Sample Collection (Without Custody Transfer)
2. Appendix 2 – Standard Operating Procedure for Collection of Samples for Priority Pollutant Analysis

Sample Chain of Custody

Chain of custody forms (COCs) using names of specific individuals are used to track the handling of samples. The COCs also contain the complete analytical request and full documentation of the sample origin including sample date, sample time, sample location, preservation, and sampler's name. An example of the COC form is attached (Appendix 3). This paper trail is archived along with the sample analytical results.

Results Reporting

Analytical results are reported following a review of the QA/QC data. Monitoring reports are to be submitted according to the due dates specified in the permit.

Table 1. Recycled Water Quality Self-Monitoring Schedule

Parameter	Units	Sample Type	Minimum Frequency
Flow	million gallons per day	Recorder	Continuous
Turbidity[1]	NTU	Recorder	Continuous
Total Chlorine Residual	mg/L	Recorder	Continuous[4]
Modal Contact Time[2]	minutes	Calculated	Daily[4]
CT Value[3]	mg-minutes/L	Calculated	Daily[4]
Total Coliform	MPN/100mL	Grab	Daily
Kjeldahl Nitrogen	mg/L	Composite	Monthly
Ammonia Nitrogen	mg/L	Composite	Monthly
Nitrate Nitrogen	mg/L	Composite	Monthly
Total Dissolved Solids	mg/L	Composite	Monthly
Sulfate	mg/L	Composite	Monthly
Chloride	mg/L	Composite	Monthly
Total Trihalomethanes	µg/L	Grab	Quarterly
n-nitrosodimethylamine	µg/L	Grab / Composite (as specified)	Quarterly
Priority Pollutants, excluding asbestos (Appendix A to 40CFR part 423)	as specified	Grab / Composite (as specified)	Semiannually

[1] For each 24-hour period, record and report the following:

a. AVTTP: average turbidity, amount of time (minutes) the turbidity exceeded five (5) NTUs (if any), and the maximum turbidity.
b. MBR: amount of time (minutes) the turbidity exceeded 0.2 NTUs (if any), and the maximum turbidity
c. Stage V AS/NDN Plant: average turbidity, amount of time (minutes) the turbidity exceeded five (5) NTUs (if any), and the maximum turbidity.

[2] The modal contact time at the highest and lowest flows must be recorded and reported for each 24-hour period, where there is production of disinfected tertiary recycled water. The "modal contact time" is the amount of time elapsed between the time that a tracer, such as salt or dye, is injected into the influent at the entrance to a chamber and the time that the highest concentration of the tracer is observed in the effluent from the chamber. For the purpose of this determination, modal contact time shall be derived from a predetermined plot correlating modal contact times to varying flow conditions. (CCR, title 22, sec 60301.600)

[3] When chlorine is used as the disinfectant in production of disinfected tertiary recycled water, the lowest CT value must be calculated for each 24-hour period. CT (mg-minutes per liter) = chlorine residual (mg/L) × modal contact time (minutes). To calculate the lowest value, first record the following data for the 24-hour period:

a. Modal contact time under highest flow and corresponding total chlorine residual at that time.
b. Lowest total chlorine residual and corresponding modal contact time.
c. Highest total chlorine residual and corresponding modal contact time.
d. Modal contact time under lowest flow and corresponding total chlorine residual at that time.

Next, calculate CT values for each of the four conditions, above. The lowest of the four calculated CT values is the lowest CT for the period.

[4] When chlorine is used as disinfectant.

Table 2. Sampling Handling, Analytical Methods and Detection Limits

Constituent	Method	Preservative	Holding Time (1)	Reporting Limit (2)	Units	Sample Type	Sample Bottle (3)	Analytical Lab (4)
Total Dissolved Solids	SM 2540C	Cool, 4°C	7 days	7 - 10	mg/L	composite	P/G	LACSD
Nitrate Nitrogen	SM 4500 NO_3-F / EPA 300.0	Cool, 4°C	48 hours	0.2 / 0.05	mg/L as N	composite	P/G	LACSD
Nitrite Nitrogen	SM 4500-NO_2B	Cool, 4°C	48 hours	0.03	mg/L as N	composite	P/G	LACSD
Total Kjeldahl Nitrogen	EPA 351.2	H_2SO_4 to pH<2; Cool, 4°C	28 days	0.2	mg/L as N	composite	P/G	LACSD
Ammonia Nitrogen	SM 4500-NH_3G	H_2SO_4 to pH<2; Cool, 4°C	28 days	0.1 as N	mg/L	composite	P/G	LACSD
Chloride	EPA 300.0	Cool, 4°C	28 days	0.2	mg/L	composite	P/G	LACSD
Sulfate	EPA 300.0	Cool, 4°C	28 days	0.5	mg/L	composite	P/G	LACSD
Heavy Metals (5)	EPA 200.8 + see Notes (5)	HNO_3 to pH<2; Cool, 4°C	6 months	0.25 - 10	µg/L	composite	P/G	LACSD
Mercury	EPA 245.1 / EPA 1631	HNO_3 to pH<2; Cool, 4°C	28 days	0.04 / 0.0005	µg/L	composite	G	LACSD
Hexavalent Chromium	SM 3500-CrB / EPA 218.6	Cool, 4°C	24 hours	10 / 0.1	µg/L	grab	P/G	LACSD
Total Cyanides	SM 45900-CNC, E	Sodium thiosulfate in presence of chlorine NaOH pH>12; Cool, 4°C	14 days	5	µg/L	grab	P/G	LACSD
Total Phenols	EPA 420.1	H_2SO_4 to pH<4; Cool, 4°C	28 days	0.006	µg/L	composite	G	LACSD
Bromoform	EPA 624	sodium thiosulfate in presence of chlorine; HCl to pH<2; Cool, 4°C	14 days	0.5	µg/L	grab	G, TFE lined cap	LACSD
Chloroform	EPA 624	sodium thiosulfate in presence of chlorine; HCl to pH<2; Cool, 4°C	14 days	0.5	µg/L	grab	G, TFE lined cap	LACSD
Dibromochloromethane	EPA 624	sodium thiosulfate in presence of chlorine; HCl to pH<2; Cool, 4°C	14 days	0.5	µg/L	grab	G, TFE lined cap	LACSD

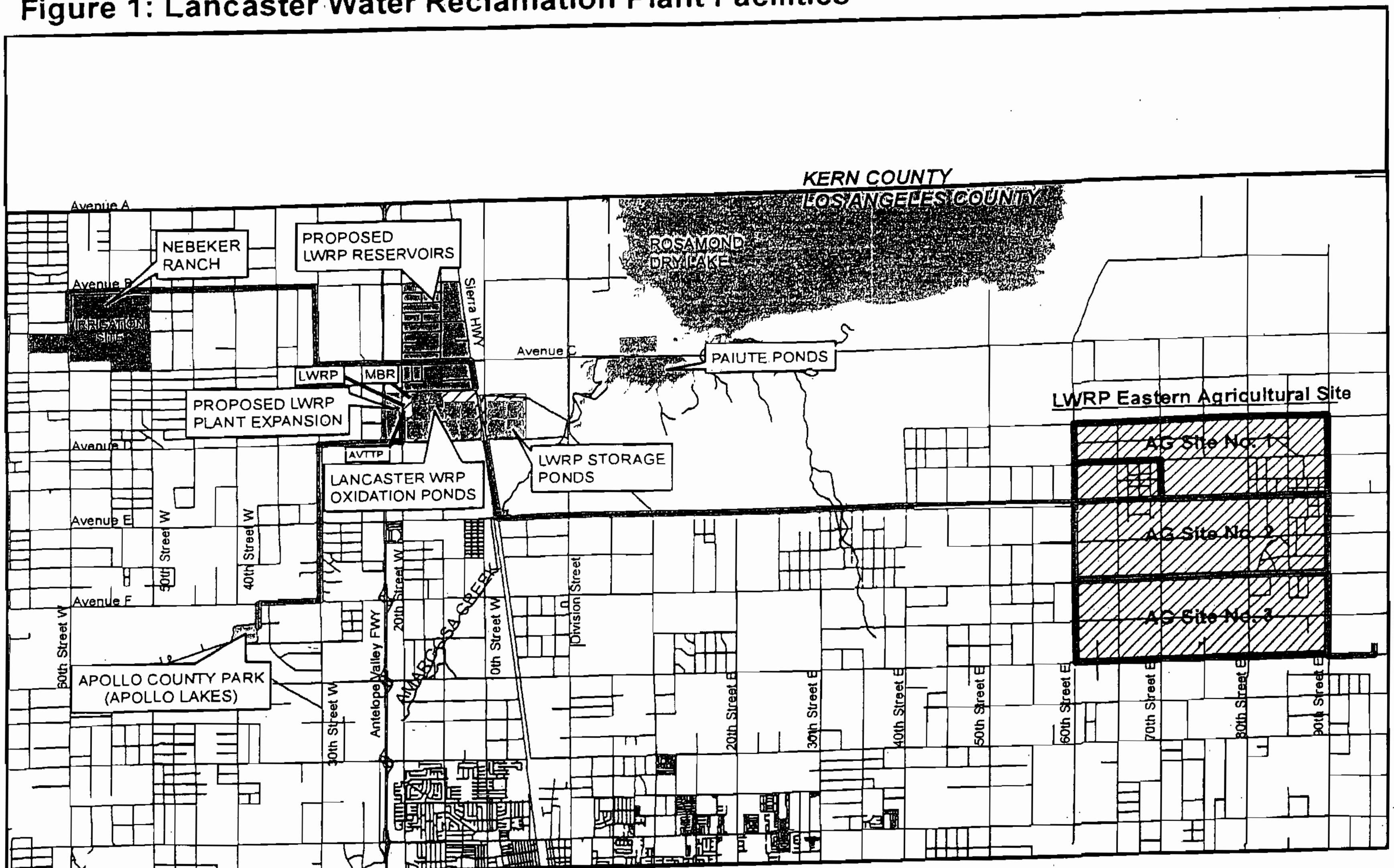
Table 2. Sampling Handling, Analytical Methods and Detection Limits (continued)

Constituent	Method	Preservative	Holding Time[1]	Reporting Limit[2]	Units	Sample Type	Sample Bottle[3]	Analytical Lab[4]
Dichlorobromomethane	EPA 624	sodium thiosulfate in presence of chlorine; HCl to pH<2; Cool, 4°C	14 days	0.5	µg/L	grab	G, TFE lined cap	LACSD
Volatile Organics [5]	EPA 624	sodium thiosulfate in presence of chlorine; HCl to pH<2; Cool, 4°C	14 days	0.5 - 2	µg/L	grab	G, TFE lined cap (zero headspace)	LACSD
Acid Extractable Organics [5]	EPA 625	sodium thiosulfate in presence of chlorine; Cool, 4°C	7 days; 40 days	1 - 10	µg/L	composite	Amber G, TFE lined cap	LACSD
Base/Neutral Extractable Organics [5]	EPA 625	sodium thiosulfate in presence of chlorine; Cool, 4°C	7 days; 40 days	1 - 10	µg/L	composite	Amber G, TFE lined cap	LACSD
Pesticides and PCBs [5]	EPA 608	sodium sulfite in presence of chlorine; Cool, 4°C	7 days; 40 days	0.01 - 0.5	µg/L	composite	Amber G, TFE lined cap	LACSD
Turbidity	SM 2130B	Cool, 4°C	48 hours	0.1	NTU	grab	P/G	LACSD
Chlorine Residual	SM 4500-CL C	None	immediately	0.05	mg/L	grab	P/G, zero headspace	LACSD
Total Coliform	SM 9222B	sodium thiosulfate in presence of chlorine	6 hours	1	cfu/100mL	grab	Sterile plastic	LACSD

Notes:

(1) Maximum holding times from Standard Methods/EPA specifications
(2) Reporting limit refers to the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and incorporates all dilution/concentration factors if any.
(3) G = glass; P = plastic; types of glass/plastic containers and rinsing techniques will vary depending on types of constituents being analyzed.
(4) In general, LACSD laboratories will perform all the analyses. However, LACSD will occasionally send samples to commercial laboratories for analysis.
(5) Please see Appendix 4 for specific Reporting Limits for individual parameters.

Figure 1: Lancaster Water Reclamation Plant Facilities



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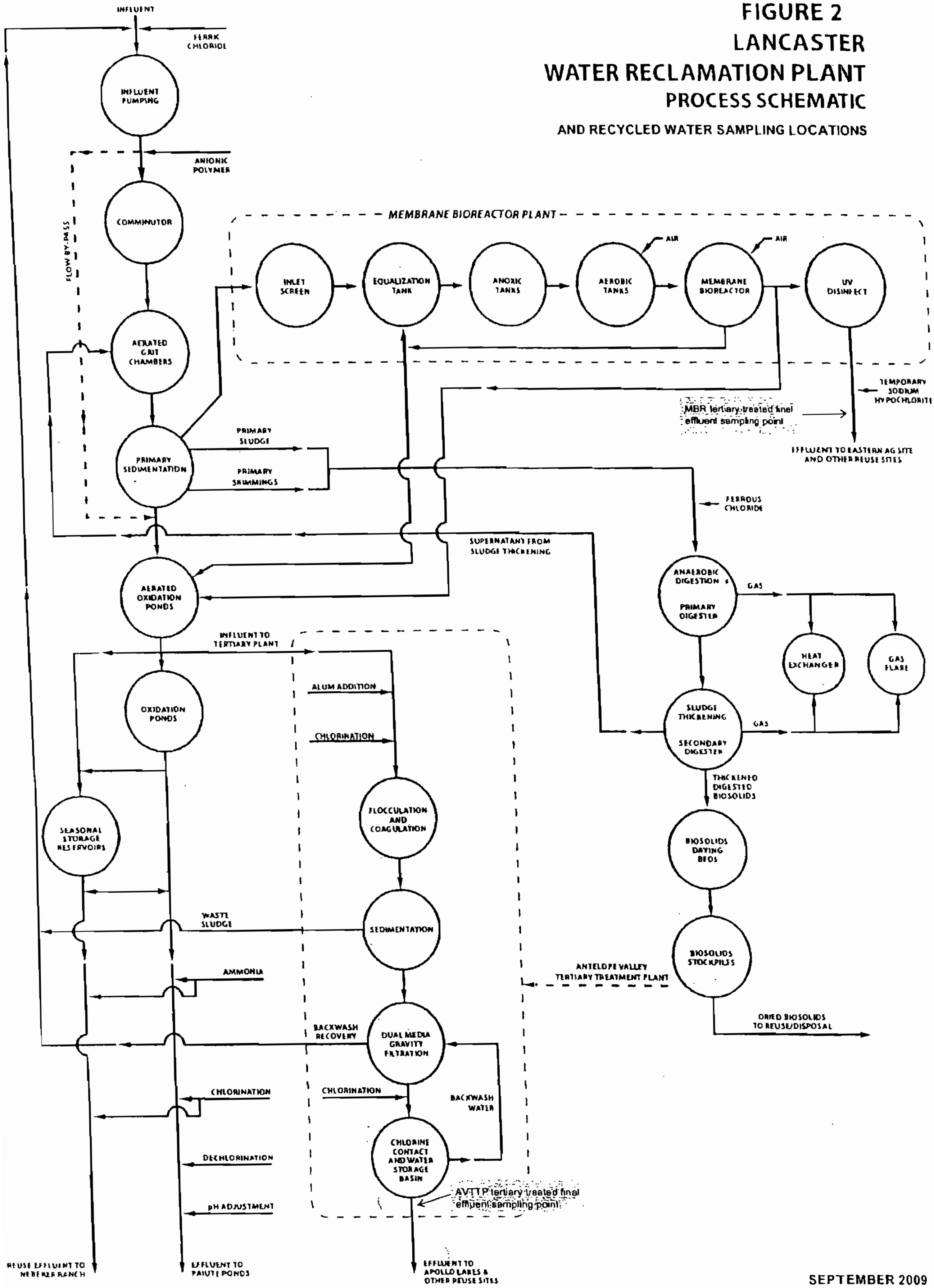
Recycled Water Force Mains

0 5,000 10,000 Feet

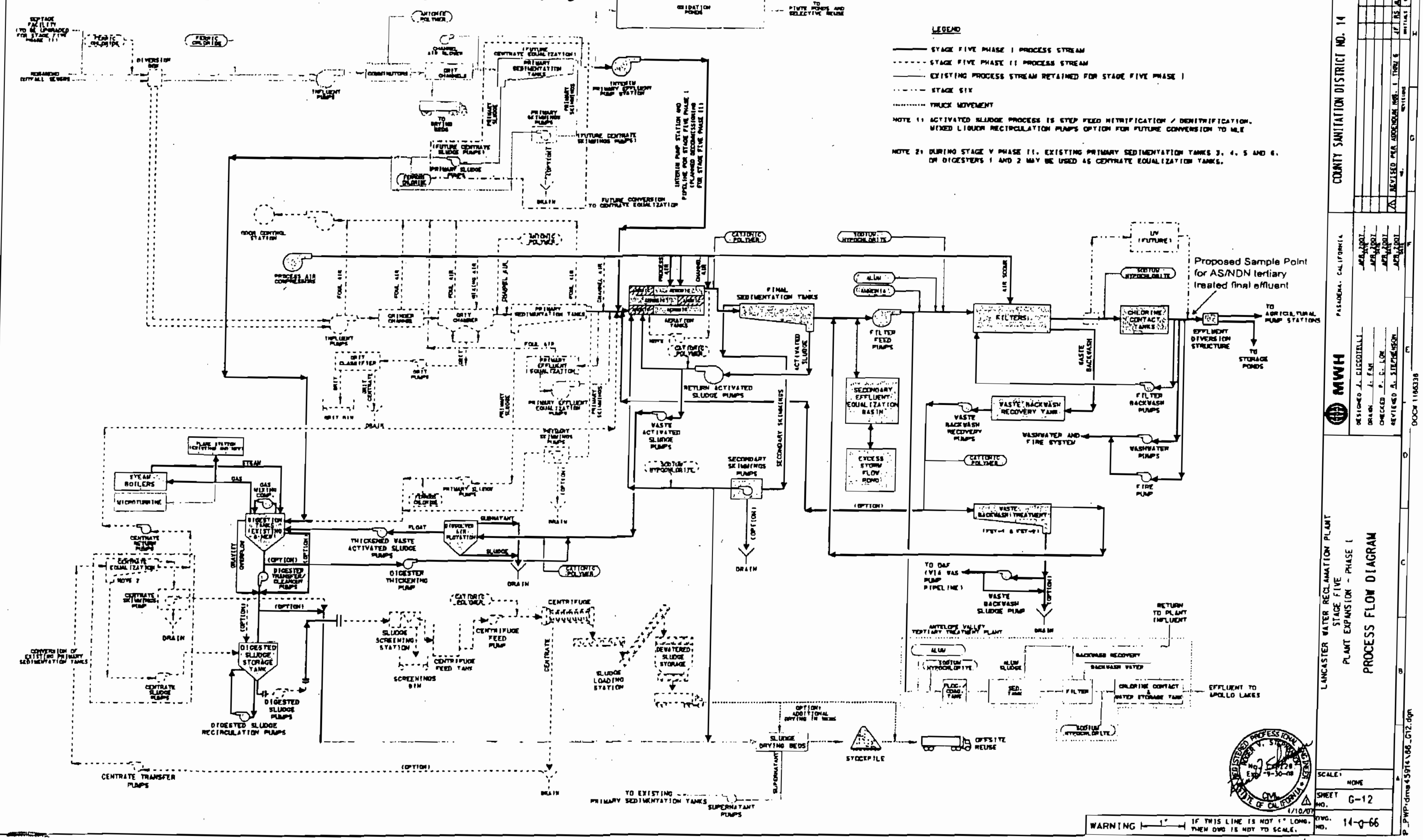
N

FIGURE 2
LANCASTER WATER RECLAMATION PLANT
PROCESS SCHEMATIC
AND RECYCLED WATER SAMPLING LOCATIONS



SEPTEMBER 2009

Figure 3. AS/NDN Plant Design Process Schematic and Recycled Water Sampling Location



Lancaster Water Reclamation Plant Standard Operating Procedure for Daily Sample Collection (Without Custody Transfer)

Introduction

This procedure is to be used when there is no custody transfer and the analyses are performed by the same person(s) responsible for collection of the sample(s). Typically, this type of operation is associated with water reclamation plant site laboratories, which are defined as Treatment Plant Laboratories. Samples collected in this manner are securely maintained on site until analyses have been completed, after which the same person(s) discard the sample(s).

Equipment, Materials and Supplies

- Automated samplers with programmable controls to allow for flow weighted compositing (SIGMA 900 Max or similar samplers).
- Paddle made of polypropylene for mixing collected sample.
- Large mouth glass sample container for sampler.
- Sample bottles which have been pre-cleaned and are compatible with constituents to be analyzed.
- Ice to be used in sampler if it is not refrigerated.
- Sample logbook.

Setting & Initiating Sampling

1. Position the sampler at a location representative of effluent being discharged from the WRP after completion of all treatment processes, or before treatment processes if influent untreated wastewater is desired.
2. Obtain typical plant flow data for influent or effluent streams covering a 24-hour period.
3. Establish numerical values that correspond to sample volumes to be collected at intervals that result in a flow weighted composite sample.
4. Enter sampling parameters along with numerical values into the sampler programming unit using the manufacturer's guidelines.
5. Install a clean sample collection container in the sampler and ice if it is not refrigerated.
6. Initiate the start of the sampler program (confirm the first sample in the sequence is collected).
7. Let sampler run.

Retrieval & Collection

1. At the end of the sample collection period, check the sampler to confirm that there was no malfunction and that the appropriate volume of sample was collected.
2. Visually inspect the area around the sample collection point to determine if any conditions exist that may lead to unusual analytical results. If the sampler malfunctioned or other conditions prevail that may contribute to unusual results, then record these observations in the sample logbook.
3. Pre-label clean bottles designated for specific constituent analyses. Sample dates, times, location, and type are to be recorded along with the name of the individual collecting the sample.
4. Take out sample container from sampler, and in a mix-pour manner, pour aliquots of the sample into pre-labeled bottles that are compatible with constituents to be analyzed.

5. Bottles are to be iced from this point until arrival at the laboratory.
6. Upon arrival at the laboratory, immediately commence with analysis of the sample(s) or proper preservation if the sample(s) is to be held.

Sampler Maintenance

- The sampler and its container are to be cleaned with water, detergent, acid and a solvent as necessary for its next use.
- If batteries are used, they are to be re-charged.

Lancaster Water Reclamation Plant Standard Operation Procedure for Collection of Samples for Priority Pollutant Analysis

Introduction

For compliance purposes, samples must be collected and analyzed for priority pollutants. Effluent samples are collected downstream of all treatment. 24-hour composite samples are generally representative of a Lancaster Water Reclamation Plant's (LWRP's) average discharge; however, there are times when a grab sample is more appropriate or specified by standard procedures (e.g., hexavalent chromium, volatile organic contaminants).

Time-Weighted Composite Sample Collection

A composite sample is composed of eight sub-samples (aliquots) collected over a 24-hour period. The volume of each aliquot is fixed, but sampling times are staggered to achieve flow-weighted proportions. Sampling is accomplished with automated equipment – a hard plumbed SIGMA 900 Max Refrigerated Sampler with 2.5 gal glass bottle reservoir, a Teflon-lined sample in-take line with stainless steel strainer probe, and silicone tubing for the peristaltic pump. Equipment is routinely maintained according to manufacturer's instructions, and specially cleaned according to a strict protocol using non-phosphate detergent, 1:1 nitric acid, methanol, and reagent-grade water.

SIGMA samplers are programmed and set up at the specific sampling location with the 2.5 gal glass reservoir set in an environmental chamber. After 24 hours of sampling, the site is physically inspected to check for any disturbance to the samplers. The SIGMA display is also reviewed for any inconsistencies, and any observations are recorded in a field notebook. The resulting composite sample is mixed and poured on-site into the appropriate sample bottles along with the required preservation method as noted in Table 2 of the Sample and Analysis Plan (pages 4-5).

Grab Sample Collection

To collect a representative grab sample, containers are directly lowered beneath the surface of the wastewater stream. For some samples, a small headspace allows better mixing and pouring of the sample (e.g., hexavalent chromium), but to minimize volatilization of organic compounds, septum vials are filled with zero headspace. Again, appropriate bottles and exact preservation methods are listed in Table 2 of the Sample and Analysis Plan.

Processing of Samples

After all grab and composite samples are collected and preserved, they are transported in ice chests back to Sample Receiving Group for processing. Each sample is given a unique ID number and all relevant information from the chain-of-custody form is entered into the laboratory's electronic data system. The samples are then ready for distribution to the laboratory for analysis.

County Sanitation District of Los Angeles County
Sample Request Form / Chain of Custody

LAB JOB NOS.: 1) SJ 2) SJ 3) SJ 4) SJ

CHARGE NOS.: 1: ______ B______ 2: ______ B______ 3: ______ B______

REQUESTED BY: ______________ SAMPLED BY: ______________

REPORT TO: 1) ______ 2) ______ 3) ______

DATE AND TIME - GRAB SAMPLES: 1) / / : 2) / / :
3) / / : 4) / / :

COMPOSITE SAMPLES:
1) FROM: / / : TO: / / :
2) FROM: / / : TO: / / :
3) FROM: / / : TO: / / :
4) FROM: / / : TO: / / :

SAMPLE LOCATION:
1) - - TYPE: VOLUME LITER
2) - - TYPE: VOLUME LITER
3) - - TYPE: VOLUME LITER
4) - - TYPE: VOLUME LITER

DESCRIPTION:
1) ______________________
2) ______________________
3) ______________________
4) ______________________

PROJ. NO.: NO. OF SAMPLES: LOCATIONS: 1) 2) 3) 4)
PROJECT TITLE:

TESTS REQUIRED:

	CODE:	TEST NAME:		CODE:	TEST NAME:
1)	______	- ______	16)	______	- ______
2)	______	- ______	17)	______	- ______
3)	______	- ______	18)	______	- ______
4)	______	- ______	19)	______	- ______
5)	______	- ______	20)	______	- ______
6)	______	- ______	21)	______	- ______
7)	______	- ______	22)	______	- ______
8)	______	- ______	23)	______	- ______
9)	______	- ______	24)	______	- ______
10)	______	- ______	25)	______	- ______
11)	______	- ______	26)	______	- ______
12)	______	- ______	27)	______	- ______
13)	______	- ______	28)	______	- ______
14)	______	- ______	29)	______	- ______
15)	______	- ______	30)	______	- ______

NOTES TO ANALYST:

CUSTODY RECORD

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	/ / AM/PM	

Sanitation Districts of Los Angeles County
Laboratory Detection and Reporting Limits for Individual Constituents

Name of Constituent	Approved Method	ML	MDL	RL	Units
pH	SM 4500-HB	*	*	1	pH
Conductivity	SM 2510B	*	*	*	µs/cm
Turbidity	SM 2130B	*	0.1	0.1	NTU
Temperature	SM 2550B	*	*	*	°F
Dissolved Oxygen	SM 4500-OG	*	*	1.0	mg/L
Total Dissolved Solids	SM 2540C	*	2.69 - 7	7 - 10	mg/L
Ammonia Nitrogen	SM 4500-NH3G	*	0.02	0.1	mg/L
Organic Nitrogen	By Calculation	*	0.05	0.2	mg/L
Total Kjeldahl Nitrogen (TKN)	EPA 351.2	*	0.135	0.2	mg/L
Nitrate Nitrogen	SM 4500-NO3-F / EPA 300.0	*	0.03 / 0.027	0.2 / 0.05	mg/L
Nitrite Nitrogen	SM 4500-NO2B	*	0.003	0.03	mg/L
Total Cyanide	SM4500-CN E	5	1	5	µg/L
Total Nitrogen	By Calculation	*	*	0.2	mg/L
Sulfate	EPA 300.0	*	0.09	0.5	mg/L
Chloride	EPA 300.0	*	0.11	2.0	mg/L
Chlorine Residual	SM 4500-CLC	*	0.05	0.05	mg/L
Total Hardness	SM 2340C / EPA 200.8	*	0.66 / 0.039	5 / 0.26	mg/L
Phenols	EPA 420.1	*	0.002	0.006	mg/L
Total Coliform (MF)	SM 9222B	*	*	1	CFU/0.1L
Total Coliform (MTF)	SM 9221B	*	*	1.8	MPN/0.1L
Fecal Coliform (MTF)	SM 9221E	*	*	1.8	MPN/0.1L
Fecal Coliform (MF)	SM 9222D	*	*	1	CFU/0.1L
4,4'-DDE	EPA 608	0.005	0.001 - 0.002	0.01	µg/L
4,4'-DDD	EPA 608	0.005	0.002	0.01	µg/L
4,4'-DDT	EPA 608	0.005	0.001	0.01	µg/L
Alpha-BHC	EPA 608	0.005	0.001	0.01	µg/L
gamma-BHC	EPA 608	0.005	0.001	0.01	µg/L
Heptachlor	EPA 608	0.005	0.0009 - 0.001	0.01	µg/L
Heptachlor Epoxide	EPA 608	0.005	0.001	0.01	µg/L
Aldrin	EPA 608	0.005	0.002	0.01	µg/L
Dieldrin	EPA 608	0.005	0.001	0.01	µg/L
Endrin	EPA 608	0.005	0.001 - 0.002	0.01	µg/L
Toxaphene	EPA 608	0.2	0.04 - 0.05	0.5	µg/L
Methoxlchlor	EPA 608	0.005	0.001 - 0.002	0.01	µg/L
2,4-D	EPA 8151A	0.5	0.21	0.50	µg/L
2,4,5 -TP (Silvex)	EPA 8151A	0.25	0.11	0.25	µg/L
PCB 1242	EPA 608	0.08	0.04 - 0.08	0.1	µg/L
PCB 1254	EPA 608	0.05	0.02 - 0.03	0.05	µg/L
beta-BHC	EPA 608	0.005	0.003 - 0.004	0.01	µg/L
delta-BHC	EPA 608	0.005	0.001 - 0.003	0.01	µg/L
Alpha-Endosulfan	EPA 608	0.005	0.001	0.01	µg/L
Beta-Endosulfan	EPA 608	0.005	0.003	0.01	µg/L
Endosulfan Sulfate	EPA 608	0.005	0.002	0.01	µg/L
Endrin Aldehyde	EPA 608	0.005	0.001	0.01	µg/L

Name of Constituent	Approved Method	ML	MDL	RL	Units
PCB 1016	EPA 608	0.1	0.03 - 0.04	0.1	µg/L
PCB 1221	EPA 608	0.5	0.2	0.5	µg/L
PCB 1232	EPA 608	0.3	0.1 - 0.2	0.3	µg/L
PCB 1248	EPA 608	0.1	0.03 - 0.04	0.1	µg/L
PCB 1260	EPA 608	0.1	0.02 - 0.05	0.1	µg/L
Chlordane	EPA 608	0.04	0.02 - 0.03	0.05	µg/L
Methylene Chloride	EPA 624	0.5	0.13 - 0.20	0.5	µg/L
Chloroform	EPA 624	0.5	0.09 - 0.13	0.5	µg/L
1,1,1 Trichloroethane	EPA 624	0.5	0.07 - 0.18	0.5	µg/L
Carbon Tetrachloride	EPA 624	0.5	0.09 - 0.2	0.5	µg/L
1,1 Dichloroethylene	EPA 624	0.5	0.10 - 0.22	0.5	µg/L
Trichloroethylene	EPA 624	0.5	0.12 - 0.17	0.5	µg/L
Tetrachloroethylene	EPA 624	0.5	0.14 - 0.5	0.5	µg/L
Dichlorobromomethane	EPA 624	0.5	0.09 - 0.12	0.5	µg/L
Chlorodibromomethane	EPA 624	0.5	0.08 - 0.11	0.5	µg/L
Bromoform	EPA 624	0.5	0.07 - 0.19	0.5	µg/L
Chlorobenzene	EPA 624	0.5	0.08 - 0.12	0.5	µg/L
Vinyl Chloride	EPA 624	0.5	0.17 - 0.37	0.5	µg/L
1,2 Dichlorobenzene	EPA 624	0.5	0.07- 0.23	0.5	µg/L
1,3 Dichlorobenzene	EPA 624	0.5	0.07 - 0.26	0.5	µg/L
1,4 Dichlorobenzene	EPA 624	0.5	0.07 - 0.32	0.5	µg/L
1,1 Dichloroethane	EPA 624	0.5	0.07 - 0.14	0.5	µg/L
1,1,2 Trichloroethane	EPA 624	0.5	0.09 - 0.10	0.5	µg/L
1,2 Dichloroethane	EPA 624	0.5	0.09 - 0.12	0.5	µg/L
Benzene	EPA 624	0.5	0.10 - 0.15	0.5	µg/L
Toluene	EPA 624	0.5	0.06 - 0.18	0.5	µg/L
Ethylbenzene	EPA 624	0.5	0.12 - 0.19	0.5	µg/L
O-Xylene	EPA 624	0.5	0.10 - 0.16	0.5	µg/L
Trans 1,2-Dichloroethylene	EPA 624	0.5	0.09 - 0.17	0.5	µg/L
Methyl Bromide	EPA 624	0.5	0.07 - 0.34	0.5	µg/L
Chloroethane	EPA 624	0.5	0.16 - 0.32	0.5	µg/L
2-Chloroethyl vinyl ether	EPA 624	0.5	0.07 - 0.18	0.5	µg/L
Chloromethane	EPA 624	0.5	0.06 - 0.20	0.5	µg/L
1,2 Dichloropropane	EPA 624	0.5	0.09 - 0.17	0.5	µg/L
Cis-1,3 Dichloropropene	EPA 624	0.5	0.11 - 0.13	0.5	µg/L
Trans-1,3-Dichloropropene	EPA 624	0.5	0.07 - 0.11	0.5	µg/L
1,1,2,2 Tetrachloroethane	EPA 624	0.5	0.08 - 0.16	0.5	µg/L
Acrolein	EPA 624	2.0	0.49 - 0.52	2.0	µg/L
Acrylonitrile	EPA 624	2.0	0.2 - 0.54	2.0	µg/L
Methyl-t-butyl ether (MTBE)	EPA 624	0.5	0.11 - 0.21	0.5	µg/L
M+P-Xylene	EPA 624	1.0	0.21 - 0.51	1.0	µg/L
1,4-Dioxane	EPA 8270 M	0.5	0.13	0.5	µg/L
1,2,3-Trichloropropane	EPA 524.2 M (SIM)	0.005	0.0012	0.005	µg/L
Total Arsenic	EPA 200.8	1	0.04	1	µg/L
Barium	EPA 200.8	0.5	0.02 - 0.1	0.5	µg/L
Cadmium	EPA 200.8	0.2	0.01 - 0.03	0.2	µg/L

Name of Constituent	Approved Method	ML	MDL	RL	Units
Total Chromium	EPA 200.8	0.5	0.02 - 0.05	0.5	µg/L
Hexavalent Chromium	SM 3500 CrB / EPA 218.6	10 / 0.1	0.30 - 2.94 / 0.047	10 / 0.1	µg/L
Copper	EPA 200.8	0.5	0.04 - 0.22	0.5	µg/L
Iron	EPA 200.8	20	5.8 - 8	20	µg/L
Lead	EPA 200.8	0.25	0.02 - 0.17	0.25	µg/L
Mercury	EPA 245.1 / EPA 1631	0.025 / 0.0005	0.01 / 0.000157	0.04 / 0.0005	µg/L
Nickel	EPA 200.8	1.0	0.02 - 0.13	1.0	µg/L
Selenium	EPA 200.8	1.0	0.09 - 0.18	1.0	µg/L
Silver	EPA 200.8	0.2	0.01 - 0.07	0.2	µg/L
Sodium	EPA 200.8	0.2	0.0052 - 0.026	0.2	mg/L
Zinc	EPA 200.8	1.0	0.38 - 0.48	1	µg/L
Antimony	EPA 200.8	0.5	0.14 - 0.16	0.5	µg/L
Beryllium	EPA 200.8	0.25	0.05 - 0.07	0.25	µg/L
Thallium	EPA 200.8	0.25	0.05 - 0.06	0.25	µg/L
Acenaphthene	EPA 625	1	0.15	1	µg/L
Acenaphthylene	EPA 625	10	0.14	10	µg/L
Anthracene	EPA 625	10	0.18	10	µg/L
Benzidine	EPA 625	5	1.67	5	µg/L
Benzo (a) Anthracene	EPA 625	5	0.19	5	µg/L
Benzo (a) Pyrene	EPA 625 / EPA 610	10 / 0.02	0.15 / 0.0089	10 / 0.02	µg/L
Benzo (b) Fluoranthene	EPA 625 / EPA 610	10 / 0.02	0.13 / 0.0082	10 / 0.02	µg/L
Benzo (g,h,i) Perylene	EPA 625 / EPA 610	5 / 0.02	0.19 / 0.009	5 / 0.02	µg/L
Benzo (k) Fluoranthene	EPA 625 / EPA 610	10 / 0.02	0.23 / 0.0084	10 / 0.02	µg/L
Bis (2-Chloroethoxyl) methane	EPA 625	5	0.13	5	µg/L
Bis(2-Chloroethyl) ether	EPA 625	1	0.19	1	µg/L
Bis(2-Chloroisopropyl) ether	EPA 625	2	0.16	2	µg/L
Bis(2-Ethylhexyl) phthalate	EPA 625	2	0.25	5	µg/L
4-Bromophenyl phenyl ether	EPA 625	5	0.21	5	µg/L
Butyl benzyl phthalate	EPA 625	10	0.16	10	µg/L
2-Chloronaphthalene	EPA 625	10	0.16	10	µg/L
4-Chlorophenyl phenyl ether	EPA 625	5	0.17	5	µg/L
Chrysene	EPA 625 / EPA 610	10 / 0.02	0.17 / 0.0093	10 / 0.02	µg/L
Dibenzo(a,h)-anthracene	EPA 625 / EPA 610	10 / 0.02	0.15 / 0.0089	10 / 0.02	µg/L
3,3' Dichlorobenzidine	EPA 625	5	1.16	5	µg/L
Diethyl phthalate	EPA 625	2	0.21	2	µg/L
Dimethyl phthalate	EPA 625	2	0.19	2	µg/L
di-n-Butyl phthalate	EPA 625	10	0.16	10	µg/L
2,4 Dinitrotoluene	EPA 625	5	0.20	5	µg/L
2,6 Dinitrotoluene	EPA 625	5	0.22	5	µg/L
di-n-Octyl phthalate	EPA 625	10	0.16	10	µg/L
1,2 Diphenylhydrazine	EPA 625	1	0.13	1	µg/L
Fluoranthene	EPA 625	1	0.19	1	µg/L
Fluorene	EPA 625	10	0.18	10	µg/L
Hexachlorobenzene	EPA 625	1	0.18	1	µg/L

Name of Constituent	Approved Method	ML	MDL	RL	Units
Hexachlorobutadiene	EPA 625	1	0.14	1	µg/L
Hexachloro-cyclopentadiene	EPA 625	5	0.75	5	µg/L
Hexachloroethane	EPA 625	1	0.14	1	µg/L
Indeno(1,2,3,cd)-pyrene	EPA 625 / EPA 610	10 / 0.02	0.14 / 0.0084	10 / 0.02	µg/L
Isophorone	EPA 625	1	0.13	1	µg/L
Naphthalene	EPA 625	1	0.18	1	µg/L
Nitrobenzene	EPA 625	1	0.22	1	µg/L
N-Nitrosodimethyl amine	EPA 625 / EPA 1625M	5 / 0.002	0.14 / 0.0005	5 / 0.002	µg/L
N-Nitroso-di-n-propyl amine	EPA 625	5	0.12	5	µg/L
Phenanthrene	EPA 625	5	0.19	5	µg/L
Pyrene	EPA 625	10	0.19	10	µg/L
2,3,7,8-TCDD (Dioxin b)	EPA 1613B	*	*	*	pg/L
2 Chlorophenol	EPA 625	5	0.15	5	µg/L
1,2,4 Trichlorobenzene	EPA 625	5	0.17	5	µg/L
2,4 Dichlorophenol	EPA 625	5	0.15	5	µg/L
2,4 Dimethylphenol	EPA 625	2	0.11	2	µg/L
2,4 Dinitrophenol	EPA 625	5	1.73	5	µg/L
2-Methyl-4,6-Dinitrophenol	EPA 625	5	1.31	5	µg/L
2-Nitrophenol	EPA 625	10	0.20	10	µg/L
4-Nitrophenol	EPA 625	10	1.37	10	µg/L
3-Methyl-4-Chlorophenol	EPA 625	1	0.13	1	µg/L
Pentachlorophenol	EPA 625 / 625-SIM	5 / 1	0.38	5 / 1	µg/L
Phenol	EPA 625	1	0.14	1	µg/L
2,4,6 Trichlorophenol	EPA 625	10	0.12	10	µg/L
N-Nitrosodiphenyl amine	EPA 625	1	0.15	1	µg/L
Nitrite-N + Nitrate-N	By Calculation	*	*	0.04	mg/L

* Not applicable or sample specific.

Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley

July 2020

Water Recycling Permit for Palmdale WRP

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6V-2012-0002
WDID NO. 6B190901008

MASTER WATER RECYCLING REQUIREMENTS AND
WASTE DISCHARGE REQUIREMENTS
COUNTY SANITATION DISTRICT NO. 20 OF LOS ANGELES COUNTY
(PALMDALE)
DISINFECTED TERTIARY RECYCLED WATER

Los Angeles County

The California Regional Water Quality Control Board, Lahontan Region (Lahontan Water Board) finds:

1. Definitions

   The following terms, which are used within this Order, are defined by their respective code citations or policy references:

   a. **Disinfected Tertiary Recycled Water**: "...filtered and subsequently disinfected wastewater that meets the following criteria:

      (a) The filtered wastewater has been disinfected by either:
      (1) A chlorine disinfection process following filtration that provides a CT (the product of total chlorine residual and modal contact time measured at the same point) value of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or
      (2) A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque-forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.

      (b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters." [California Code of Regulations, title 22, section 60301.230]

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b. **Incidental Runoff**: "...unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area." [Paragraph 7(a), Recycled Water Policy, State Water Resources Control Board Resolution No. 2009-0011]

c. **Master Recycling Permit**: "...a permit issued to a supplier or a distributor, or both, of recycled water, that includes waste discharge requirements prescribed pursuant to Water Code section 13263 and water recycling requirements prescribed pursuant to Water Code section 13523.1." [Water Code section 13050(r)]

d. **Reclaimed Water**. "...wastewater which as a result of treatment is suitable for uses other than potable use." [California Code of Regulations, title 17, section 7583(i)]

e. **Recycled Water**: "...water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource." [Water Code section 13050(n)]

2. Recycled Water Report

The County Sanitation District No. 20 of Los Angeles County (District) has filed an application with the Lahontan Water Board under Water Code section 13522.5. Pursuant to Water Code section 13523.1, the District's application requests the Lahontan Water Board to issue Master Water Recycling Requirements to the District for supply of disinfected tertiary recycled water as defined in California Code of Regulations, title 22, section 60301.230. The District submitted information on January 21, 2009, that completed the application.

3. Facilities and Treatment Process

The District collects and treats domestic wastewater generated in the District's service area, which includes parts of the City of Palmdale and nearby unincorporated areas of northern Los Angeles County.

The District recently completed construction for Phase I of a new tertiary treatment facility (Stage V Plant Expansion) at its Palmdale Water Reclamation Plant. The District had previously provided disinfected secondary treatment of wastewater at the plant. The Stage V Plant Expansion consists of activated sludge treatment, nitrogen removal using nitrification and denitrification processes, and disinfection. Phase I of the Stage V Plant Expansion provides treatment for up to 12 million gallons per day (mgd). Phase II of the Stage V Plant Expansion will add an additional 3 mgd for a total treatment capacity of 15 mgd for the Stage V Plant Expansion.

Flows from the Stage V Plant Expansion are currently discharged to the Storage Reservoir Site and to the Agricultural Site. However, the District anticipates using disinfected tertiary recycled water from the Stage V Plant Expansion for municipal and industrial reuse projects. The discharge of recycled water to the Agricultural Site is not considered in this master recycling permit since it is covered under Board Order No. R6V-2011-0012.

4. Current Board Orders

Board Order No. R6V-2011-0012 establishes waste discharge requirements and water recycling requirements for the discharge of disinfected secondary treated wastewater and of disinfected tertiary treated wastewater from the District's Palmdale Water Reclamation Plant. Board Order No. R6V-2011-0012 was adopted on March 9, 2011 pursuant to Water Code section 13263.

On December 9, 2009, the Lahontan Water Board adopted Board Order No. R6V-2009-0141 establishing master recycling requirements for the County Sanitation District No. 14 of Los Angeles County (Lancaster). The requirements allow the use of disinfected tertiary recycled water from the Lancaster Water Reclamation Plant at sites located within the portion of the Antelope Valley bounded by the Los Angeles County/Kern County line to the north (north side of Township 8 North, San Bernardino Meridian); the Los Angeles County/San Bernardino County line to the east (east side of Range 8 West, San Bernardino Meridian); south side of Township 5 North, San Bernardino Meridian to the south; and the west side of Range 14 West, San Bernardino Meridian to the west (see Attachment B).

Board Order No. R6V-2009-0141 authorized the distribution of up to 22.6 mgd (annual average) of disinfected tertiary recycled water from the Lancaster Water Reclamation Plant through the proposed North Los Angeles/Kern County Regional Recycled Water Project distribution system. This Order will also authorize the distribution of disinfected tertiary recycled water from the Palmdale Water Reclamation Plant through the same distribution system.

5. Reason for Action

The following uses of disinfected tertiary recycled water (hereinafter, recycled water) have received project-level coverage pursuant to the California Environmental Quality Act (CEQA).

- Irrigation for parks and playgrounds
- Irrigation for school yards
- Irrigation for residential landscaping (non-individually owned common areas)
- Irrigation for golf courses (both restricted and unrestricted-access)
- Irrigation for cemeteries
- Irrigation for freeways and greenbelt landscaping
- Irrigation for landfills
- Consolidation of backfill (around potable and non-potable pipes)
- Fire fighting (both structural and non-structural)
- Mixing concrete
- Soil compaction
- Decorative fountains
- Flushing sanitary sewers
- Flushing toilets and urinals
- Dust control for construction activities (includes demolition)
- Dust control on roads and streets
- Dust control at landfills
- Commercial laundries
- Priming drain traps
- Cleaning roads (street sweeping), sidewalks, and outdoor work areas

Additional uses of recycled water that are not listed above, but are allowed by Title 22, were assessed at the programmatic-level in the adopted environmental impact report. These include:

a. recycled water use resulting in full consumption (no discharge of any type);

b. recycled water use at facilities, such as power plants, that results in a discharge that will be regulated by the Lahontan Water Board or the California Energy Commission pursuant to its authority under the Warren-Alquist Act; and

c. recycled water use resulting in a discharge to a sanitary sewer system.

The total estimated water demand for all proposed recycled water uses at buildout within the Antelope Valley is 21,210 acre-feet per year (19.0 mgd) [Final Program Environmental Impact Report, November, 2008]. The total estimated water demand for the recycled water uses at buildout is less than the 37.6 mgd annual average recycled water flow permitted to be produced (22.6 mgd from the Lancaster Water Reclamation Plant and 15 mgd from the Stage V Expansion at the Palmdale Water Reclamation Plant). This Order provides master water recycling requirements, including a requirement that the District regulate the distributors and users of the recycled water to ensure compliance with water recycling requirements contained in State of California laws and regulations.

6. Sources of Recycled Water

The District recently completed construction of new tertiary treatment facilities (Stage V Plant Expansion), increasing the Palmdale Water Reclamation Plant's average 24-hour design capacity of 12 mgd with a planned expansion to 15 mgd.

The Lancaster Water Reclamation Plant (operated by County Sanitation District No. 14 of Los Angeles County) currently provides recycled water to the North Los Angeles/Kern County Regional Recycled Water Project. Water recycling requirements have been issued to authorize this use (Board Order No. R6V-2009-0141).

The Rosamond Waste Water Treatment Plant (operated by the Rosamond Community Services District) also plans to provide recycled water as future phases of the North Los Angeles/Kern County Regional Recycled Water Project are completed and come on-line. Water recycling requirements for the Rosamond Community Services District will be necessary prior to this district providing recycled water from its facility.

7. Producer, Distributors and Users

Under this Order, the District is the producer of recycled water. Currently, the City of Palmdale, the City of Lancaster, and the Los Angeles County Waterworks District No. 40 are the distributors of the recycled water. As future phases of the North Los Angeles/Kern County Regional Recycled Water Project are completed and come on-line, there may be additional distributors. Distributors may also be users of the recycled water. Other users may include other public agencies and private parties.

8. Recycled Water Distribution and Distribution System

The City of Lancaster previously constructed a large diameter force-main pipeline for transporting recycled water along Division Street (Division Street Pipeline) and steel tanks for storage of recycled water and supplemental water. Supplemental water is currently supplied by existing water supply well No. 4-15, which is owned by the Los Angeles County Waterworks District No. 40. The Division Street Pipeline connects to the County Sanitation District No. 14's existing recycled water force-main pipeline, which is located along Avenue E. Lateral pipelines are constructed for each individual user of recycled water once the site is ready to receive the recycled water.

The proposed North Los Angeles/Kern County Regional Recycled Water Project distribution system includes constructing approximately 70 miles of recycled water conveyance pipelines, four storage reservoirs, two distribution pump stations, and two booster pump stations. The proposed North Los Angeles/Kern County Regional Recycled Water Project will provide the primary distribution system for providing recycled water to end users in the Antelope Valley.

9. Permit Area

This Order authorizes use of recycled water at sites located within the portion of the Antelope Valley bounded by the Los Angeles County/Kern County line to the north (north side of Township 8 North, San Bernardino Meridian); the Los Angeles County/San Bernardino County line to the east (east side of Range 8 West, San Bernardino Meridian); south side of Township 5 North, San Bernardino Meridian to the south; and the west side of Range 14 West, San Bernardino Meridian to the west (Permit Area). The Permit Area is identified on Attachment B of this Order.

10. Authorized Recycled Water Uses

This Order authorizes recycled water use for those uses identified in Finding No. 5 of this Order. Generally, recycled water will be used for municipal and industrial applications and for non-agricultural irrigation.

11. Authorized Recycled Water Use Sites

The sites authorized for use of recycled water under this Order (Authorized Recycled Water Use Sites) are those:

a. located within the Permit Area described in Finding No. 9, above; and

b. where the use is limited to those described in Finding Nos. 5 and 10, above.

12. Topography

The Permit Area is located within the Antelope Valley, which is a closed topographic basin with no outlet to the ocean. The Antelope Valley is bordered by the San Gabriel Mountains to the south and west, by the Tehachapi Mountains to the west and northwest, and by a series of north-south running, low-elevation buttes that form the eastern boundaries of the valley. All water that enters the valley either infiltrates into the groundwater basin, evaporates, or flows toward the three dry lakes located on Edwards Air Force Base: Rosamond Lake, Buckhorn Lake, and Rogers Lake. In general, groundwater flows northeasterly from the mountain ranges to the dry lakes. Due to the relatively impervious nature of the dry lake soil and high evaporation rates, water that collects on the dry lakes eventually evaporates rather than infiltrates into the groundwater.

13. Hydrogeology

Unconsolidated alluvial deposits consisting of inter-bedded gravel, sand, silt and clay underlie the Permit Area. An extensive layer of lacustrine deposits is located at a depth of approximately 500 feet. Its depth and thickness vary.

The Antelope Valley Groundwater Basin is comprised of two primary aquifers: (1) the upper (principal) aquifer, and (2) the lower (deep) aquifer. Historically, the lacustrine deposits have been used to define the boundary between the two aquifers, and the deep aquifer is generally considered to be confined.

The principal aquifer is an unconfined aquifer that historically provided artesian flows due to perched water tables in some areas. These artesian conditions are currently absent due to extensive pumping of groundwater. Depth to groundwater (water table for the principal unconfined aquifer) ranges from approximately 50 to 350 feet below ground surface depending upon the location within the Antelope Valley.

In general, the principal aquifer is thickest in the southern portion of the region near the San Gabriel Mountains, while the deep aquifer is thickest in the vicinity of the dry lakes on Edwards Air Force Base.

14. Groundwater Quality

Groundwater quality is excellent within the principal aquifer but degrades toward the northern portion of the dry lake areas. Considered to be generally suitable for domestic, agricultural, and industrial uses, the water in the principal aquifer has a total dissolved solids (TDS) concentration ranging from 200 to 800 milligrams per liter (mg/l) [Department of Water Resources Bulletin 118, 2004]. The existing groundwater TDS concentration is below and within the maximum contaminant level (MCL) range of 500 to 1,000 mg/l (short term MCL is 1,500 mg/l). The deeper aquifers typically have higher TDS levels. Hardness levels range from 50 to 200 mg/l, and high fluoride, boron, and nitrates are problematic in some areas of the basin.

Arsenic is an emerging contaminant of concern in the region and has been observed in wells owned by Los Angeles County Waterworks District No. 40, Palmdale Water District, and Quartz Hill Water District in concentrations ranging from 2 to 60 micrograms per liter (μg/l). The MCL for arsenic is 10 μg/l. Arsenic is a naturally occurring inorganic element often found in groundwater and occasionally in surface water. Research conducted by Los Angeles County Waterworks District No. 40 and the United States Geologic Survey has shown the problem to reside primarily in the deep aquifer, and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the region.

There are also concerns with nitrate levels above the current MCL of 10 mg/l (as Nitrogen [N]) in portions of the basin. Groundwater monitoring data from the mid-to-late 1990s indicate nitrate (as N) concentrations exceeding the primary MCL for drinking water in two areas in the southern portion of the groundwater basin: one is northeast of the Palmdale Water Reclamation Plant and the other is near the community of Littlerock, slightly east of the upper reach of Littlerock Creek. It is estimated both nitrate plumes are similar in size, approximately five to six square miles. Agricultural fertilization practices, historic confined animal facility discharges, septic system disposal, and discharge of treated wastewater have likely contributed to the elevated levels. In the area near the Palmdale Water Reclamation Plant, actions have already been implemented by County Sanitation District No. 20 of Los Angeles County to address the nitrate plume and to minimize any future impacts from treated wastewater discharges, including treatment upgrades, a change in effluent management practices, the implementation of the North Los Angeles/Kern County Regional Recycled Water Project, and performing groundwater remediation activities near the Palmdale Water Reclamation Plant. In the Littlerock area, Littlerock Creek Irrigation District extracts the nitrate-laden groundwater and blends it with other water sources to meet drinking water quality standards. The agricultural and confined animal facilities that are considered to have contributed to the Littlerock nitrate plume are no longer active.

15. Receiving Waters

The receiving waters are the groundwaters of the Antelope Valley Basin.

16. Lahontan Basin Plan

The Lahontan Water Board adopted a Water Quality Control Plan for the Lahontan Region (Basin Plan), which became effective on March 31, 1995. This Order implements the Basin Plan as amended.

17. Beneficial Uses – Groundwater

Groundwater has been, and continues to be, an important resource within the Antelope Valley. Prior to 1972, groundwater provided more than 90 percent of the total water supply. Since 1972, groundwater has provided between 50 and 90 percent of the total water supply. Groundwater pumping in the Antelope Valley peaked in the 1950s, and it decreased in the 1960s and 1970s when agricultural pumping (AGR) declined due to increased pumping costs from greater pumping lifts and higher electric power costs. The rapid increase in urban growth in the 1980s resulted in an increase in the demand for municipal (MUN) and industrial (IND) water and an increase in groundwater use. Projected urban growth and limits on the available local and imported water supply are likely to continue to increase the reliance on the groundwater. [Section 3.7, Final Program Environmental Impact Report, November, 2008]

The present and potential beneficial uses of the groundwaters of the Antelope Valley Basin as set forth and defined in the Basin Plan are:

a. Municipal and Domestic Supply (MUN);
b. Agricultural Supply (AGR);
c. Industrial Service Supply (IND); and
d. Freshwater Replenishment (FRSH)

18. State Water Board Recycled Water Policy

State Water Board Resolution No. 2009-0011, "Adoption of a Policy for Water Quality Control for Recycled Water," references and adopts the "State Water Resources Control Board Recycled Water Policy" (Recycled Water Policy). The Recycled Water Policy provides direction to the State and Regional Water Boards regarding the appropriate criteria to be used in issuing permits for recycled water projects. The Recycled Water Policy describes permitting criteria intended to streamline, and provide consistency for, the permitting of the vast majority of recycled water projects. This Order implements the Recycled Water Policy.

Order No. III of this Master Recycling Permit requires the District to develop and/or participate in the development of a salt/nutrient management plan and to control incidental runoff consistent with Paragraphs 6 and 7(a), respectively, of the Recycled Water Policy. Finding No. 22 of this Order describes Lahontan Water Board consistency with the streamlined permitting criteria outlined in Paragraphs 7(b) and 7(c) of the Recycled Water Policy. Finding No. 23 of this Order describes Lahontan Water Board consistency with the antidegradation criteria outlined in Paragraph 9 of the Recycled Water Policy. This permit allows for increased use of recycled water consistent with the mandate established in Paragraph 4 of the Recycled Water Policy to increase the use of recycled water in California.

19. Incidental Runoff of Recycled Water

The Recycled Water Policy defines incidental runoff as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence.

The District must develop and implement an operations and management plan that applies to all landscape irrigation recycled water use areas. This plan must provide for detection of leaks from landscape irrigation facilities (for example, broken sprinkler heads) and correction within 72 hours of detection or prior to a release of 1,000 gallons, whichever occurs first.

20. <u>Discharges of Recycled Water from Surface Impoundments</u>

The Recycled Water Policy prohibits discharge to surface waters from a surface impoundment containing recycled water unless the discharge is a result of a 25-year, 24-hour storm event or greater. Surface water impoundments used for recycled water storage shall be maintained so that no discharge occurs except as a result of a 25-year, 24-hour storm event or greater.

21. <u>Regulation of Recycled Water</u>

a. <u>California Code of Regulations, Title 22, Department of Public Health</u>

The California Department of Public Health (CDPH), formerly the Department of Health Services, established criteria for using recycled water. These criteria are codified in Title 22 and include such requirements as Sources of Recycled Water, Uses of Recycled Water, and Use Area Requirements. The CDPH adopted revised Water Recycling Criteria that became effective on March 20, 2001. Applicable criteria are prescribed in this Order.

b. <u>Engineering Reports</u>

As required by California Code of Regulations, title 22, section 60323, the District will submit engineering reports for the production and use of recycled water to the CDPH. The content and status of each report is described in the following table.

Engineering report title	Scope	CDPH review status	Water Board Response to CDPH Review and Project Status
Tertiary Treatment Facilities (Stage V Plant Expansion), report expected to be submitted to CDPH prior to project implementation.	Treatment and recycled water production	CDPH comment letter expected 30 days after report submittal to CDPH.	Compliance with CDPH conditions required by this Order upon receipt of CDPH conditions.
North Los Angeles/Kern County Regional Recycled Water Project, report expected to be submitted to CDPH prior to project completion and/or implementation.	Los Angeles/Kern County Regional Recycled Water Project distribution system	CDPH comment letter expected 30 days after report submittal to CDPH.	Compliance with CDPH conditions required by this Order upon receipt of CDPH conditions.

Prior to implementing the North Los Angeles/Kern County Regional Recycled Water Project distribution system, and prior to implementing yet-to-be identified uses, the District (or other responsible agency) will prepare the appropriate engineering reports, obtain acceptance of the project from appropriate agencies, and will implement as applicable the CDPH conditions for project acceptance pursuant to waste discharge requirements and/or water recycling requirements issued by the Lahontan Water Board.

c. Regulation

Water Code section 13523.1, subdivision (a), states:

> *"Each regional board, after consulting with, and receiving the recommendations of, the State Department of Health Services and any party who has requested in writing to be consulted, with the consent of the proposed permittee, and after any necessary hearing, may, in lieu of issuing waste discharge requirements pursuant to Section 13263 or water reclamation requirements pursuant to Section 13523 for a user of reclaimed water, issue a master reclamation permit to a supplier or distributor, or both, of reclaimed water."*

This Order includes water-recycling requirements which require the District to:

i. comply with waste discharge requirements (see Finding No. 4 and Water Recycling Specification No. I.B.1 of this Order);

ii. comply with Uniform Statewide Reclamation Criteria (California Code of Regulations, title 22, sections 60301 through 60355) established pursuant to Water Code section 13521(see Water Recycling Specification No. I.B.2 of this Order);

iii. establish and enforce rules or regulations for recycled water users (*Requirements for Recycled Water Users, Recycled Water Use Site Inspection Program,* and *Enforcement Response Plan* provided in Attachment C, which is made a part of this Order), governing the design and construction of recycled water use facilities and the use of recycled water (see Water Recycling Specification No. I.B.3 of this Order);

iv. submit quarterly reports to the Lahontan Water Board summarizing recycled water use, including the total amount of recycled water supplied, the total number of recycled water use sites, the locations of the recycled water use sites, and the names of the hydrologic areas underlying the recycled water use sites (see Monitoring and Reporting Program No. R6V-2012-PROPOSED, Sections I.D and II.B); and

v. conduct periodic inspections of recycled water use sites to monitor compliance by users with the Uniform Statewide Reclamation Criteria established pursuant to Water Code section 13521 and the requirements of this Order (see Water Recycling Specifications No. I.B.3 and No. I.B.4 of this Order).

Regarding the requirement identified in Finding No. 21.c.i above, the District is under current requirements to comply with the waste discharge requirements listed in Finding No. 4 of this Order.

Regarding the requirement identified in Finding No. 21.c.ii above, the District, through information contained in its CEQA documents and the District's application, established that the proposed recycled water uses will comply with the Title 22 requirements.

Regarding requirements identified in Finding Nos. 21.c.iii and 21.c.v above, the District has completed and submitted a report to the Lahontan Water Board containing its *Requirements for Recycled Water Users, Recycled Water Use Site Inspection Program,* and *Enforcement Response Plan* (see Attachment C of this Order). The Lahontan Water Board staff accepted these documents on September 16, 2008.

This Order implements the requirement identified in Finding No. 21.c.iv via adoption of Monitoring and Reporting Program No. R6V-2012-0002.

22. Streamlined Permitting

a. Eligibility

The landscape irrigation elements of the proposed water recycling project meet the criteria for streamlined permitting (Paragraph 7(c) of the Recycled Water Policy) for the following reasons:

i. The project complies with Title 22 regulations.

ii. The proposed landscape irrigation use will not exceed agronomic rates and will not occur when soils are saturated. An operations and management plan will be developed describing how appropriate irrigation amounts and rates will be applied and may include, but not be limited to, developing water budgets for use areas, providing supervisor training, conducting periodic inspections, developing tiered rate structures, and installing smart controllers. An operations and management plan may be developed to cover multiple sites.

iii. A salt/nutrient management plan has not been prepared for the Antelope Valley groundwater basin. This Order includes a requirement that the District must participate in the development of the salt/nutrient management plan for the Antelope Valley. The District is currently a member of the Salt/Nutrient Management Plan subcommittee to the Antelope Valley Integrated Regional Water Management Group.

iv. The District will communicate to users the nutrient levels in the recycled water so that users can appropriately evaluate fertilizer needs. Both the Lancaster Water Reclamation Plant and the Palmdale Water Reclamation Plant will be simultaneously providing recycled water to the North Los Angeles/Kern County Regional Recycled Water Project distribution system. When this occurs, the District will use the highest nutrient levels provided from either reclamation plant at any given time when communicating nutrient levels to recycled water users.

b. Streamlined Permit Requirements

According to Paragraph 7(b)(4) of the Recycled Water Policy, landscape irrigation projects that qualify for streamline permitting are not required to conduct project-specific receiving water and groundwater monitoring unless otherwise required by an applicable salt/nutrient management plan. The District will participate in the development of a salt/nutrient management plan for the Antelope Valley in lieu of performing project-specific monitoring as allowed by the Recycled Water Policy. This Order includes a requirement that the District must participate in the development of the salt/nutrient management plan for the Antelope Valley.

Additionally, the Recycled Water Policy requires streamlined permits to include monitoring of priority pollutants on a twice-annual basis and annual monitoring of Emerging Constituents/Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products, or pharmaceuticals) (CECs). The Recycled Water Policy recognizes a lack of complete knowledge regarding CECs, and the implementation of CEC monitoring is deferred in order to incorporate the recommendations of a blue-ribbon advisory panel, convened by the State Water Board. On June 25, 2010, CEC Advisory Panel provided recommendations to the State Water Board and California Department of Public Health in its Final Report. The State Water Board has not amended the Recycling Water Policy to incorporate any of the Panel's recommendations, and therefore, this Order includes monitoring for priority pollutants, but no CECs.

23. Maintenance of High Quality Waters in California

The proposed uses of recycled water will not result in a degradation of the existing groundwater quality within the Antelope Valley with respect to nutrients. The Stage V Plant Expansion includes a nitrification/denitrification process, which will result in reduced nitrogen concentrations in the recycled water. Furthermore, recycled water will be applied at agronomic rates to consume all remaining nitrogen.

Some of the proposed uses of recycled water could result in a degradation of the existing groundwater quality within the Antelope Valley with respect to salts (Total Dissolved Solids, or TDS). The Antelope Valley groundwater basin is estimated to have 68 million acre-feet of storage, of which 13 million acre-feet is available. TDS concentrations in the groundwater basin range from 200 to 800 mg/l [Department of Water Resources Bulletin 118, 2004], with an average of 300 mg/l. According to California Code of Regulations, Title 22, the recommended secondary maximum contaminant level (MCL) in the groundwater basin for TDS is 500 mg/l, and the secondary MCL upper limit is 1,000 mg/l. The average TDS concentration in the secondary treated recycled water for 2010 is 524 mg/l, and the expected average TDS concentration in the tertiary treated effluent from the Stage V Plant Expansion facilities is 550 mg/l.

The District provided an analysis (2009) to conservatively calculate the groundwater basin's assimilative capacity for TDS and the proposed project's impact on the remaining assimilative capacity. Subtracting the average TDS concentration of 300 mg/l in the groundwater basin from the recommended MCL of 500 mg/l, the groundwater basin has an assimilative capacity of 200 mg/l. From a mass balance analysis, the multiple proposed uses of recycled water will not use more than one percent of the available assimilative capacity for TDS within the Antelope Valley groundwater basin over a ten-year period. Extrapolating over a 30-year period where recycled water supply is at its maximum flow level, the Lahontan Water Board projects that the multiple proposed uses of recycled water will not use more than 8.5 percent of the available assimilative capacity for TDS within the Antelope Valley groundwater basin. This level of degradation is consistent with established policies, as discussed below.

State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," states,

"1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that a change will be consistent with the maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste...and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) pollution or nuisance will not occur, and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

This Order is consistent with Resolution No. 68-16 for the following reasons.

a. State Water Board, through Resolution No. 77-1, has identified the beneficial use of recycled water for the people for the State, and directs regional water boards to encourage the use of recycled water in water-short areas of the State. The Antelope Valley is located in a water-short area of the State. The current demand for potable water in the Antelope Valley exceeds supply in the region, and by 2035 this demand is expected to double. The people of the State will benefit from the use of recycled water in the Antelope Valley area, where recycled water will supplement and/or replace existing water supplies (e.g., imported surface waters and overdraft of groundwaters).

b. This Order prohibits the use of recycled water that causes a pollution or nuisance.

c. This Order requires the District to administer (1) *Requirements for Recycled*

Water Users, (2) a *Recycled Water User Site Inspection Program*, and (3) an *Enforcement Response Plan* (see Attachment C), as previously accepted by the Lahontan Water Board. The requirements and the compliance inspection and enforcement programs are the mechanisms for ensuring that appropriate control measures are identified, implemented, and maintained. The control measures generally identified include (1) applying irrigation within agronomic rates to reduce the potential for runoff and increased nutrients into the groundwater; and (2) developing and implementing a salt/nutrient management plan to reduce the potential for salt and nutrient loading, thereby minimizing the impacts to groundwater quality within the Antelope Valley. The control measures will ensure that the discharge will result in the best practicable control for the maximum benefit of the people of the State to assure that pollution or a nuisance will not occur and that the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The waste discharge requirements adopted as part of this Order will ensure that the discharge will result in the best practicable control for the maximum benefit of the people of the State to assure that a pollution or nuisance will not occur and that the highest water quality consistent with maximum benefit to the people of the State will be maintained. The control measures will prevent the groundwater quality within the Antelope Valley from exceeding the standards established in existing applicable policies.

d. The use of recycled water as authorized by this Order will not result in water quality less than that prescribed in applicable policies.

24. <u>Consideration of Water Code Section 13241 Factors</u>

Section 13523.1, subdivision (b)(1) of the Water Code requires master reclamation requirements to include waste discharge requirements adopted pursuant to Article 4 (commencing with section 13260) of Chapter 4. Section 13263(a) of the Water Code requires that such waste discharge requirements take into consideration the provisions of section 13241 of the Water Code. The Lahontan Water Board has considered these factors as follows:

a. <u>Past, present, and probable future beneficial uses of water.</u>

This Order identifies existing groundwater quality as described in Finding No. 14. This Order also identifies past, present, and probable future beneficial uses of the Antelope Valley groundwater as described in Finding No. 17. The proposed uses of recycled water will not adversely affect present or probable future beneficial uses of water, including municipal and domestic supply, agricultural supply, industrial service supply, and freshwater replacement.

b. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

Finding Nos. 13 and 14 describe the environmental characteristics and quality of available groundwater. Finding No. 14 details groundwater issues related to TDS, arsenic, and nitrate concentrations.

TDS concentrations range from 200 to 800 mg/L, with higher concentrations in the deeper aquifer. These levels are below and within the MCL range of 500 to 1,000 mg/L.

Arsenic has been observed in concentrations ranging from 2 to 60 µg/L and the MCL for arsenic is 10 µg/L. Arsenic is a naturally occurring inorganic element often found in groundwater and occasionally in surface water. Anthropogenic sources of arsenic include agricultural, industrial and mining activities. Research conducted by Los Angeles County Waterworks District No. 40 and the United States Geologic Survey has shown the problem to reside primarily in the deep aquifer, and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the region.

Nitrate concentrations exceed the primary MCL for drinking water of 10 mg/L (as N) in two areas in the southern portion of the groundwater basin. Agricultural fertilization practices, septic system disposal, and discharge of treated wastewater have likely contributed to the elevated levels.

c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors, which affect water quality in the area.

The requirements of the Order, including application of recycled water at agronomic rates, will result in the protection of existing and probable future beneficial uses to the maximum benefit to the people of the State of California. The requirements of this Order will also result in the protection of water quality to continue to meet the standards prescribed in applicable existing policies.

d. Economic considerations.

The Antelope Valley is faced with serious challenges with respect to management of water and wastewater resources in the region. The population in the Antelope Valley is expected to increase by 161 percent by 2035. Currently, the demand for potable water exceeds supply in the region, and by 2035 this demand is expected to double. Wastewater discharges also will increase in the future as the population increases. Existing demand for potable water is met largely by water imported through the State Water Project and groundwater pumped from the Antelope Valley Basin. Imported water supplies are becoming less reliable, the Antelope Valley Basin is facing overdraft conditions, and the water rights of overlying landowners of the Antelope Valley Basin have not yet been adjudicated. The Regional Water Management Group prepared an integrated water management plan for the Antelope Valley, and the proposed North Los Angeles/Kern County Regional Recycled Water Project is identified in the plan as a project that addresses the need for both increased water supplies and wastewater effluent management. [Section 1.5, Final Program Environmental Impact Report, November, 2008]

This Order authorizes the District to expand the list of authorized recycled water uses to include the uses identified by Title 22 and Finding No. 5. Use of recycled water will replace supplied groundwater and imported water for landscape irrigation, and potentially in the future, agricultural irrigation, groundwater recharge, and other Title 22 approved uses not listed in Finding No. 5. The potable water that is being replaced by this recycled water would be available for other uses.

The proposed North Los Angeles/Kern County Regional Recycled Water Project also provides a management strategy for wastewater effluent by creating a system to distribute recycled water for beneficial use. The proposed North Los Angeles/Kern County Regional Recycled Water Project will eventually enable the District to produce, sell, and distribute disinfected, tertiary-treated effluent to local water purveyors.

e. The need for developing housing within the region.

The District is not responsible for developing housing within the Antelope Valley. The Final Program Environmental Impact Report, November, 2008, identified that the proposed project would not have an impact on housing and population. The proposed project is limited to the provision of water supply infrastructure, as opposed to housing and commercial development that would directly affect the number of residents or employees within the area. Therefore, the proposed North Los Angeles/Kern County Regional Recycled Water Project would not directly contribute to the creation of additional housing or jobs within the Antelope Valley and thus would not result in direct growth inducement.

The proposed North Los Angeles/Kern County Regional Recycled Water Project would reduce the area's existing and future demand for imported water through recycling. The imported water conserved through implementation of the proposed project would be available to serve potable water demands of planned growth. The Antelope Valley Regional Urban Water Management Plan projects that eight percent of the water demand in 2030 would be met with recycled water, although substantially more would be available as additional end use demand develops. The proposed project would not directly or indirectly induce growth or remove an obstacle to growth, since the increased population would occur in any case based on the cities' and counties' approved build-out growth control policies. The recycled water that would be made available as a result of the proposed project would be used to meet a small percentage of projected demand in 2030 that would otherwise be met with imported water.

f. <u>The need to develop and use recycled water.</u>

This Order authorizes the District to expand the list of authorized recycled water uses to include the uses identified in Finding No. 5.

25. <u>California Environmental Quality Act Compliance (CEQA)</u>

The Los Angeles County Waterworks District 40, Antelope Valley, prepared a Final Program Environmental Impact Report (PEIR) dated November 2008, for the North Los Angeles/Kern County Regional Recycled Water Project. The Los Angeles County Waterworks District 40, Antelope Valley, prepared a Findings of Fact, Statement of Overriding Considerations, Mitigation Monitoring and Reporting Program (Overriding Considerations) dated November 2008, for the same project. The Overriding Considerations addressed unavoidable noise and ground-vibration impacts that would result from construction activities. The Los Angeles County Board of Supervisors approved the PEIR on December 9, 2008, and a Notice of Determination was filed on December 15, 2008.

Mitigation measures that will be implemented as part of the project include control measures to ensure:

a. Application of recycled water at agronomic rates to reduce the potential for irrigation to adversely impact the quality of groundwater in terms of salts and nutrients (including nitrates),

b. There is adequate erosion control so soil is not released into stormwater runoff and surface waters, and

c. Fertilizer application does not adversely impact waters of the State.

The Lahontan Water Board, acting as a CEQA Responsible Agency in compliance with California Code of Regulations, title 14, section 15096, evaluated the impacts to water quality addressed in the PEIR. As a result of the analysis, the Lahontan Water Board finds the mitigation measures in the PEIR, combined with compliance with the requirements specified by this Order, to be adequate to reduce water quality impacts to levels that are less than significant for the uses identified in Finding No. 5.

Furthermore, the use of recycled water for those uses identified in Finding Nos. 5.a through 5.c were assessed at the programmatic level within the PEIR. Those additional recycled water uses are for: (1) those that result in full consumption without a discharge of any type; (2) those for facilities, such as power plants, that result in a discharge that will be regulated by the Lahontan Water Board or the California Energy Commission pursuant to its authority under the Warren-Alquist Act; and (3) those that result in a discharge to a sanitary sewer system. Based on the evaluation of the potential impacts from these specific uses that were assessed at the programmatic level within the PEIR, the Lahontan Water Board concludes that there is no possibility that the issuance of this Order will have a significant effect on the environment. Therefore, the use of recycled water for those uses identified in Finding Nos. 5.a through 5.c is exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, title 14, section 15061, subdivision (b)(3).

26. Notification of Interested Parties

The Lahontan Water Board has notified the District and interested persons of its intent to prescribe master water recycling requirements.

27. Consideration of Public Comments

The Lahontan Water Board, in a public meeting, heard and considered all comments pertaining to the use of recycled water.

IT IS HEREBY ORDERED that the District must comply with the following:

I. WATER RECYCLING SPECIFICATIONS

A. Effluent Limitations

1. Recycled water production at the Palmdale Water Reclamation Plant must not exceed 12 mgd (maximum average 24-hour flow). Flow in excess of this limitation shall not be considered a violation of this provision unless one or more of the Water Recycling Specifications I.B through I.C is also exceeded.

   When expanded in accordance with the provisions of Board Order No. R6V-2011-0012, recycled water production at the Palmdale Water Reclamation Plant must not exceed 15 mgd (maximum average 24-hour flow). Flow in excess of this limitation shall not be considered a violation of this provision unless one or more of the Water Recycling Specifications I.B through I.C is also exceeded.

2. All disinfected tertiary recycled water supplied to the recycled water distribution system must at some point following the treatment process meet the requirements specified in California Code of Regulations, Title 22.

B. Regulation and Enforcement

1. Pursuant to Water Code section 13523.1, subdivision (b)(1), the District must comply with all waste discharge requirements previously adopted by the Lahontan Water Board and are in effect for regulating the production of the disinfected tertiary recycled water.

2. Pursuant to Water Code section 13523.1, subdivision (b)(2), the District must comply with the Uniform Statewide Reclamation Criteria, which are contained in California Code of Regulations, title 22, sections 60301 through 60355 and are established pursuant to Water Code section 13521.

3. Pursuant to Water Code section 13523.1, subdivision (b)(3), the District must implement and enforce its *Requirements for Recycled Water Users, Recycled Water Users Site Inspection Program,* and *Enforcement Response Plan* (Attachment C, which is made a part of this Order) governing the design and construction of recycled water use facilities and the use of recycled water

4. Pursuant to Water Code section 13523.1, subdivision (b)(5), the District must conduct periodic inspections of the facilities of the recycled water users to monitor compliance by the users with the Uniform Statewide Reclamation Criteria and the District's *Requirements for Recycled Water Users, Recycled Water Users Site Inspection Program,* and *Enforcement Response Plan* (Attachment C, which is made a part of this Order). During the inspections, the District shall also monitor compliance with Water Recycling Specifications No. I.C.1 through I.C.15 of this Order. At a minimum, the District must inspect each recycled water use facility at least once every three years if there are no reported violations, and at least annually if there are prior violations at the facility.

5. The District must inspect recycled water use facilities and ensure users' compliance with these master water recycling requirements.

C. General Requirements and Prohibitions

1. The discharge of recycled water to surface waters including excessive application, intentional overflow or application, or negligence, is prohibited. However, incidental runoff of recycled water, such as unintended, minimal

over-spray from sprinklers that escapes the recycled water use area is not a violation of this Order.

2. Discharge of untreated or partially treated recycled water to the recycled water distribution system is prohibited.

3. The use of recycled water must not cause a pollution or threaten to cause a pollution as defined in Water Code Section 13050.

4. The use of recycled water must not cause a nuisance as defined in Water Code Section 13050.

5. The use of recycled water under this Order must be limited to the Authorized Recycled Water Use Sites defined in Finding No. 11 of this Order.

6. The uses of recycled water authorized under this Order are limited to those described in Finding No. 10 of this Order.

7. The source of recycled water must be limited to that described in Finding No. 6 of this Order.

8. Recycled water used to irrigate landscape areas must not be applied at a rate and amount that exceeds agronomic rates. The District must communicate to recycled water users the nutrient levels in the recycled water at least monthly so that the recycled water users can appropriately evaluate fertilizer needs prior to application of fertilizers. Both the Lancaster Water Reclamation Plant and the Palmdale Water Reclamation Plant will be simultaneously providing recycled water to the North Los Angeles/Kern County Regional Recycled Water Project distribution system. When this occurs, the District shall use the highest nutrient levels provided from either reclamation plant at any given time when communicating nutrient levels to recycled water users.

9. Recycled water must not be applied at a rate and amount that causes ponding or runoff that is other than incidental runoff.

10. Pipelines must be maintained so as to prevent leakage.

11. The use of recycled water that causes a violation of any narrative water quality objective contained in the Basin Plan is prohibited.

12. The use of recycled water that causes a violation of any numeric water quality objective contained in the Basin Plan is prohibited.

13. Where any numeric or narrative water quality objective contained in the Basin Plan is already being exceeded, the use of recycled water that causes further degradation or pollution is prohibited.

14. The District must ensure the implementation of an operation and maintenance plan for all recycled water use sites that includes the following practices:

    a. detection of leaks from landscape irrigation facilities and implementation of corrective action within 72 hours of learning of the leak, or prior to the release of 1,000 gallons, whichever occurs first;

    b. proper design and aim of sprinkler heads to ensure recycled water application at agronomic rates;

    c. refraining from recycled water application during precipitation events; and

    d. adequate protection of all facilities used to transport and store recycled water against overflow, structural damage, or a reduction in efficiency resulting from a 25-year, 24-hour storm or flood.

15. The District must not supply recycled water to parties who distribute, store, or use recycled water in a manner that is in violation of the Uniform Statewide Reclamation Criteria (as identified within California Code of Regulations, title 22) and the requirements of the Master Recycling Requirements.

II. PROVISIONS

A. The District may continue providing recycled water from its existing secondary treatment reclamation plant to the Agricultural Site.

B. The District must:

   1. prior to supplying recycled water under this Order from the Stage V Plant Expansion facilities, submit to the Lahontan Water Board a copy of the final engineering report for the Stage V Plant Expansion with written confirmation from the CDPH that it has reviewed the report and finds the report to be acceptable (Review and Acceptance Letter).

   2. following receipt of the CDPH's Review and Acceptance Letter for the Stage V Plant Expansion Final Engineering Report, comply with the CDPH's conditions as specified in the Review and Acceptance Letter.

3. prior to supplying recycled water under this Order to the North Los Angeles/Kern County Regional Recycled Water Project, submit to the Lahontan Water Board a copy of the final engineering report for the North Los Angeles/Kern County Regional Recycled Water Project with written confirmation from the CDPH that it has reviewed the report and finds the report to be acceptable (Review and Acceptance Letter).

4. following receipt of the CDPH's Review and Acceptance Letter for the North Los Angeles/Kern County Regional Recycled Water Project Final Engineering Report, comply with the CDPH's conditions as specified in the Review and Acceptance Letter.

5. prior to providing recycled water to new users, have received, reviewed and approved a completed *Report of Proposed Recycled Water Use*, which contains information demonstrating the user will comply with the Uniform Statewide Reclamation Criteria and the District's *Requirements for Recycled Water Users.* Copies of all approved *Reports of Proposed Recycled Water Use* and approval letters shall be maintained on file by the District.

C. Pursuant to California Code of Regulations, title 22, section 60316, subdivision (b), the District shall notify the Lahontan Water Board, California Department of Public Health and County of Los Angeles Department of Health Services of any incidence of backflow from a recycled water system into the potable water system within 24 hours of discovery of the incident.

D. Pursuant to Water Code section 13267, subdivision (b), the District shall comply with Monitoring and Reporting Program R6V-2012-PROPOSED (Attachment E which is made a part of this Order) as specified by the Executive Officer.

E. The District shall comply with the "Standard Provisions for Waste Discharge Requirements," dated September 1, 1994, in Attachment D, which is part of this Order, with the exception that recycled water storage facilities shall be designed for protection against overflow during a 25-year, 24-hour storm.

III. RECYCLED WATER POLICY IMPLEMENTATION

A. The District must develop and/or participate in the development of a salt/nutrient management plan for the Antelope Valley that is consistent with Paragraph 6 of the Recycled Water Policy. The salt/nutrient management plan must be submitted to, or an extension to submit the salt/nutrient management plan must be approved by, the Lahontan Water Board by **May 14, 2014**, in accordance with the Recycled Water Policy.

B. Before supplying recycled water to new users for landscape irrigation under this Order, the District must develop and implement an operations and management plan to control incidental runoff that is consistent with Paragraph 7(a) of the Recycled Water Policy.

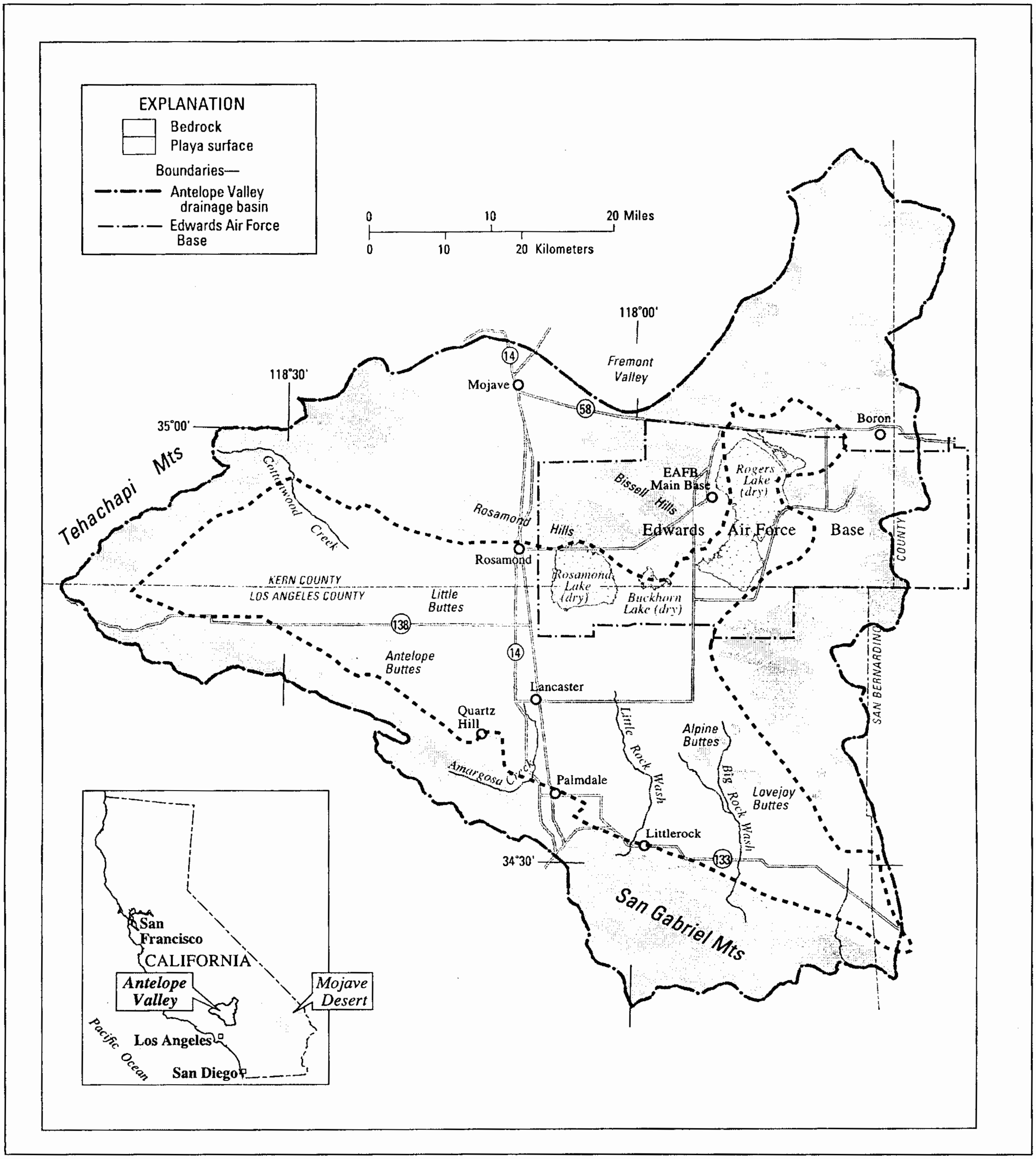
I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on January 11, 2012.

Harold J Singer

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments:
A. General Location Map
B. Permit Area Map
C. District Recycled Water Program
   1. Requirements for Recycled Water Users
   2. Recycled Water Use Site Inspection Program
   3. Reuse Site Inspection Report
   4. Enforcement Response Plan
D. Standard Provisions for Waste Discharge Requirements

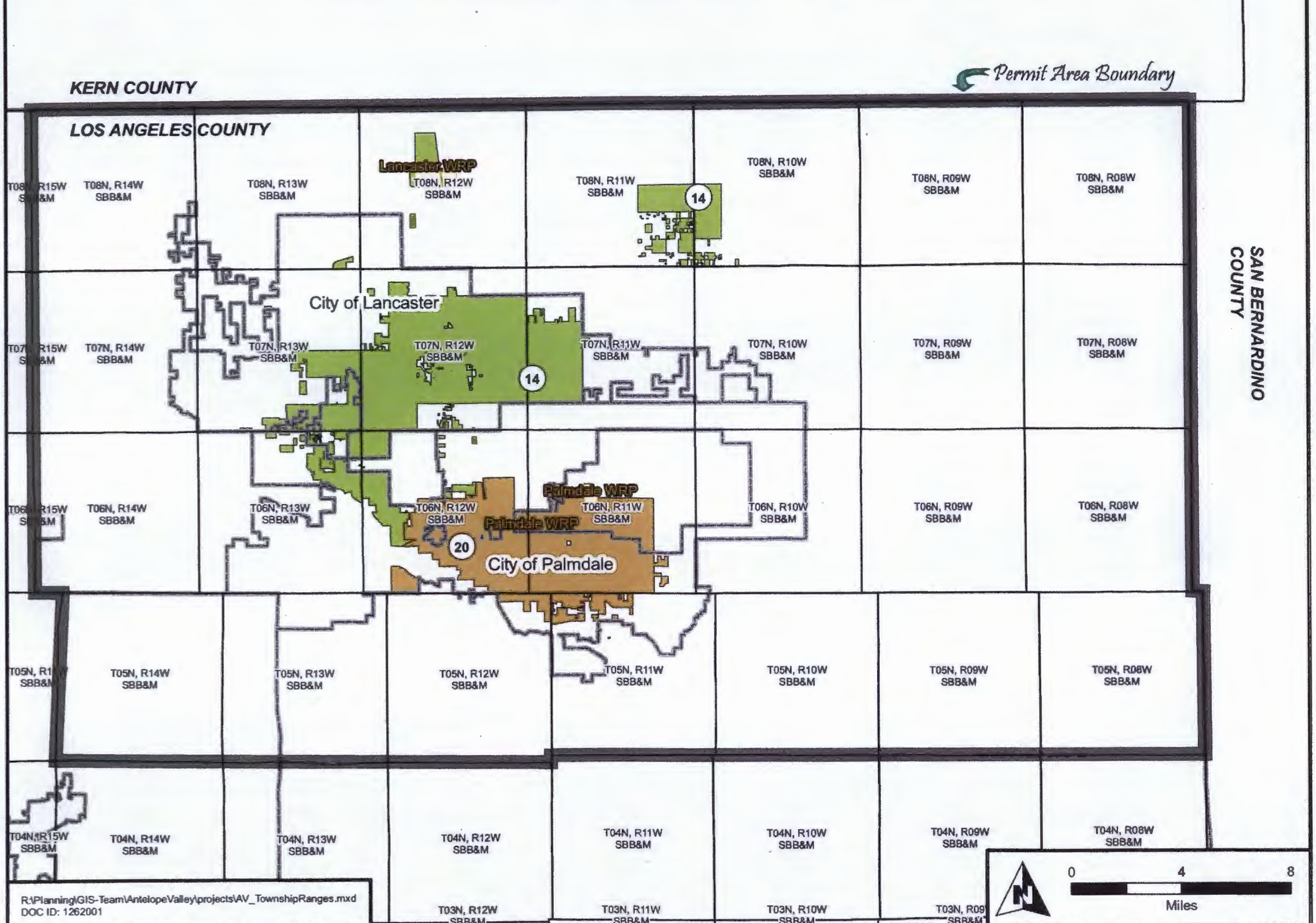
ATTACHMENT A
General Location Map



Modified from Figure 1, *Simulation of Groundwater Flow and Land Subsidence, Antelope Valley Ground-Water Basin*, USGS, 2003

ATTACHMENT B
Permit Area Map

ANTELOPE VALLEY: LOS ANGELES COUNTY SANITATION DISTRICTS NO. 14 AND 20



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DOC ID: 1262001

ATTACHMENT C
District Recycled Water Program

1. Requirements for Recycled Water Users
2. Recycled Water Use Site inspection Program
3. Reuse Site Inspection Report
4. Enforcement Response Plan

REQUIREMENTS FOR RECYCLED WATER USERS

Requirements for Recycled Water Users
County Sanitation Districts of Los Angeles County
District Nos. 14 and 20

1. Introduction

These Requirements for Recycled Water Users (Requirements) establish regulations pursuant to California Water Code (Water Code) section 13523.1(b), and permits issued to the County Sanitation Districts of Los Angeles County (Districts) by the California Regional Water Quality Control Board, Lahontan Region (LRWQCB). These permits include waste discharge requirements (WDRs) issued pursuant to Water Code section 13263, water reclamation requirements (WRRs) issued pursuant to Water Code section 13523, or a master reclamation permit (Master Permit) issued pursuant to Water Code section 13523.1. The Requirements are in conformance with ordinances adopted by County Sanitation District No. 14 of Los Angeles County and by County Sanitation District No. 20 of Los Angeles County (Ordinances).

2. Background

Water Code section 13523.1(a) authorizes the issuance of Master Permits to suppliers or distributors, or both, of recycled water in lieu of issuing individual water reclamation requirements to each recycled water user. Water Code section 13523.1(b) sets forth the requirements for Master Permits issued by the Regional Water Quality Control Boards (RWQCBs), including a condition that the permittee establish and enforce rules or regulations for recycled water users governing the design and construction of recycled water use facilities and the use of recycled water, in accordance with the uniform Statewide Reclamation Criteria established pursuant to Water Code section 13521.

A Master Permit has been adopted by the LRWQCB for the Lancaster Water Reclamation Plant (WRP). Should the LRWQCB issue individual WDRs or WRRs to the Districts for the use of tertiary recycled water for non-potable reuse applications from the Lancaster WRP or Palmdale WRP, it is the Districts' intent that the Requirements established herein will apply to those uses. These Requirements may be updated, as necessary, to comply with revisions to this permit or applicable laws and regulations.

3. Findings

The Requirements are in conformance with the following:

- Provisions established by the WDRs, WRRs, or Master Permits issued by the LRWQCB to the Districts.
- Applicable portions of the Water Code, including Water Code section 13523.1.
- Applicable portions of the Health and Safety Code.
- California Code of Regulations (CCR), Title 22, Division 4, Chapter 3, Uniform Statewide Reclamation Criteria.
- CCR, Title 17, Division 1, Chapter 5, Subchapter 1, Group 4, Article 1 & 2.
- Regulations established by the County of Los Angeles Department of Public Health (LACDPH) for the use of recycled water.

The Requirements are consistent with the following:

- The Guidelines for the *Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water,* California State Department of Public Health (CDPH).

- Any measures that are deemed necessary for protection of public health, such as the American Water Works Association (AWWA) California/Nevada section, *Guidelines for the Distribution of Non-Potable Water* and *Guidelines for the On-Site Retrofit of Facilities Using Disinfected Tertiary Recycled Water* or alternate measures that are acceptable to CDPH.
- Relevant user manuals such as the Los Angeles County Recycled Water Advisory Committee's, 2005, *Recycled Water User Manual*.
- Relevant guidance issued by LACDPH for the use of recycled water.

4. Definitions that Apply to these Requirements

4.1. Authorized Recycled Water Use Site (Site) is a site authorized for use of recycled water; the uses of recycled water and the site location must comply with Permits as issued by the LRWQCB to the Districts.

4.2. Direct User is any person to whom the Districts directly distribute recycled water under the Permits issued to the Districts by the LRWQCB.

4.3. Incidental Runoff is any small amount of recycled water that leaves the Site as a result of over-spray or leakage from sprinklers, over watering, breaks in lines, or overflow of impoundments that contain recycled water during storms.

4.4. Master Reclamation Permit (Master Permit) contains requirements established by the LRWQCB for the Districts pursuant to Water Code section 13523.1.

4.5. Permit means any LWRQCB issued WDRs, WRRs, or Master Permit.

4.6. Person is any individual, partnership, corporation, governmental subdivision or unit of a governmental subdivision, or public or private organization or entity of any character.

4.7. Purveyor is any public, private, investor-owned, or other water utility that is legally permitted to distribute water and that obtains recycled water from the Districts for distribution to Users.

4.8. Recycled water is water produced by a municipal water reclamation facility that is suitable for a beneficial use.

4.9. User is any person to whom the Districts distribute recycled water under the Permits issued to the Districts by the LRWQCB, including end users to whom recycled water is conveyed through an intermediate party. User does not include persons who have been independently issued Permits by the LRWQCB.

4.10. User Agreement is a contractual agreement between the User and/or Purveyor and the Districts that establishes the conditions for recycled water service and use.

4.11. Waste Discharge Requirements (WDRs) are requirements established for the Districts by the LRWQCB pursuant to Water Code section 13263.

4.12. Water Recycling Criteria are the criteria established by the CDPH generally dealing with the levels of constituents in recycled water and the means for assurance of reliability under the design concept, which will result in safe recycled water from the standpoint of public health. The criteria are established pursuant to Water Code Section 13521, and are contained in the CCR, Title 22, Division 4, Chapter 3; also referred to as the "Uniform Statewide Reclamation Criteria."

4.13. Water Recycling Requirements (WRRs) are requirements established for the Districts by the LRWQCB pursuant to Water Code section 13523.

5. <u>Requirements for Recycled Water Users</u>

5.1 Effective Date

The effective date of the Requirements is July 1, 2008.

5.2 Applicability

5.2.1 Unless otherwise stated, these Requirements shall apply to any and all Users to whom the Districts distribute tertiary recycled water, either directly or through an intermediate party. These Requirements shall also apply to Purveyors that act as intermediate parties in delivering recycled water to Users. User does not include persons who have been independently issued Permits by the LRWQCB.

5.2.2 These Requirements do not apply to the Districts, when the Districts are both the Purveyor and/or the User, receiving WDRs or WRRs issued by the LRWQCB for the use of tertiary recycled water.

5.3 General Requirements

Use of recycled water must comply with all applicable state laws, regulations, Districts' Permits, and any amendments thereto, the Ordinances, and these Requirements.

5.4 General Prohibitions

5.4.1 Use of recycled water for any purposes other than those explicitly approved in the effective User Agreement is strictly prohibited.

5.4.2 The User shall insure that the treatment, storage, distribution or use of recycled water shall not create a nuisance as defined in Water Code section 13050(m).

5.4.3 The User shall not discharge recycled water from treatment facilities, irrigation holding tanks, storage ponds, or other containment, other than for permitted reuse, except in accordance with other LRWQCB issued Permits, contingency plans authorized by the LRWQCB or for an approved discharge to a municipal sewage treatment system.

5.5 Process to Obtain Permission to Use Recycled Water

5.5.1 Except as provided by the Ordinances, any Direct User or Purveyor who wishes to receive recycled water produced by the Districts must enter into a User Agreement with District No. 14 or No. 20 depending on the location of the reuse project before the use of recycled water can begin. The User Agreement shall include the Districts' terms and conditions for the use of recycled water.

5.5.2 Any Direct User, or Purveyor with a User, who intends to utilize recycled water produced by the Districts for an authorized use at a Site must file a User Application Form (Application) with the Districts and receive approval in writing from the Districts before the use of recycled water can begin for that use and Site.

5.5.3 The Application filed by the Direct User or Purveyor shall include:

.3.1. A detailed description of the proposed Site with:

(a) A map showing the specific boundaries of the proposed Site;

(b) The person or persons responsible for operation and maintenance of the site (O&M Staff), including the person designated as the Site Supervisor and contact information;

(c) Evidence that the O&M Staff and Site Supervisor have received appropriate training from the Districts or an equivalent training program or the date by which training will occur prior to delivery of recycled water such that the Site is operated and maintained in compliance with applicable laws and regulations, the Districts' Permits, and these Requirements;

(d) The specific use to be made of the recycled water at each Site.

.3.2. Design plans and a description of best management practices that show that the quality of waters of the State will be protected (*see* Section 5).

.3.3. Plans and specifications describing:

(a) Proposed piping systems to be used;

(b) Pipe locations for both recycled and potable systems;

(c) Type and location of the outlets and plumbing fixtures that will be accessible to the public;

(d) The methods and devices to be used to prevent backflow of recycled water into the potable water system.

.3.4. The Recycled Water System Operations Manual or the date by which a Recycled Water System Operations Manual will be submitted prior to the delivery of recycled water.

.3.5. Emergency Cross-Connection Response Plan in accordance with the guidelines established by LACDPH or the date by which the Emergency Cross-Connection Response Plan will be submitted prior to delivery of recycled water.

5.5.4 Any User or Purveyor who wishes to receive recycled water produced by the Districts must follow the process presented in Tables 1 and 2 that shows the various agencies involved in the process, documents that must be completed, how documents are routed, etc. Table 1 outlines the process for Direct Users or Purveyors. Table 2 outlines the process for Users receiving water from Purveyors

5.6 Operational Requirements and Best Management Practices

5.6.1 Each User shall designate a Site Supervisor who is responsible for the recycled water system at Site(s) under the User's control. Specific responsibilities of the Site Supervisor include the proper installation, operation and maintenance of the recycled water system; compliance with the Districts' Permits, applicable laws and regulations, local health department guidelines, and these Requirements; prevention of potential hazards; coordination with the cross-connection control program in accordance with CCR, Title 17 and LACDPH or local health department guidelines; preservation of the recycled water system in "as-built" form.

5.6.2 The User's Site Supervisor and O&M staff shall receive appropriate training to assure proper operation of the recycled water facilities, worker protection, and compliance with all applicable laws and regulations, the Districts' Permits, and these Requirements.

5.6.3 The Site Supervisor shall instruct any person at the Site involved with the use of recycled water on its proper use and precautions.

5.6.4 All recycled water facilities and control systems shall be maintained in good working order and operated as efficiently as possible to achieve compliance with all applicable laws and regulations, the Districts' Permits, and these Requirements.

5.6.5 Except as allowed under CCR, Title 17, section 7604, no physical connection shall be made nor shall a connection be allowed to exist between any recycled water system and potable water system.

5.6.6 Cross-connection test shall be performed as necessary to ensure the absolute separation of the recycled water system and potable water system, in accordance with the requirements of LACDPH or local health department.

.6.1. A cross-connection test shall be performed following any significant modifications to the recycled water system or potable water system, construction of new buildings, or any activity that may impact, or has impacted these systems.

.6.2. An initial cross-connection test shall be performed to determine if there are any unknown connections between potable piping and existing piping to be used for recycled water prior to construction or retrofit work.

.6.3. Prior to connection with the recycled water system, a final cross-connection test shall be performed to verify that construction or retrofit work was performed correctly.

.6.4. Cross-connection testing shall be performed by a specialist who has been certified by AWWA or a group with equivalent certification requirements.

5.6.7 The potable water supply shall not be used as a backup or supplemental source of water for a recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of CCR, Title 17, section 7602, Subdivision (a) and CCR, Title 17, section 7603, Subdivision (a), and that such connection has been approved by CDPH and/or its delegated local agency.

5.6.8 Any backflow prevention device installed to protect the potable water system shall be annually inspected and maintained in accordance with CCR, Title 17, section 7605.

.8.1. Backflow inspections shall be conducted by a person who has demonstrated competency in testing to the User, Purveyor, and/or LACDPH or local health department.

5.6.9 Hose bibs shall not be used in the recycled water system, except in the recycled water system for Sites for which there is restricted public access. Quick couplers that are different from that used on the potable water system may be used.

5.6.10 All recycled water piping and appurtenances in new installations and appurtenances in retrofit installations shall be colored purple or distinctively marked with purple tape in accordance with Health and Safety Code section 116815 and LACDPH or local health department requirements.

5.6.11 All sites shall be designed and operated to prevent direct human consumption of recycled water, or use of recycled water for processing of food or drink intended for human consumption.

.11.1. Where recycled water could potentially be accessed for human consumption, conspicuous signs shall be posted that include the following wording: "RECYCLED WATER – DO NOT DRINK."

.11.2. The prescribed wording included on the sign(s) shall also be translated into Spanish and other appropriate languages.

.11.3. Each sign shall display an international symbol similar to that shown in CCR, Title 22, section 60310, subdivision (g), Figure 60310-A.

.11.4. The sign(s) shall be of a size easily readable by the public; no less than 4 inches high by 8 inches wide.

5.6.12 Irrigation with disinfected tertiary recycled water shall not take place within 50 feet of any domestic water supply well.

5.6.13 Irrigation with disinfected tertiary recycled water shall not take place within 50 feet of any uncovered reservoir or stream currently used as a source of domestic water.

5.6.14 Impoundment of disinfected tertiary recycled water shall not occur within 100 feet of any domestic water supply well.

5.6.15 All recycled water impoundments shall be adequately protected from erosion, washout and flooding from a 24-hour rainfall event having a predicted frequency of once in 100 years.

5.6.16 Vehicles used for distributing recycled water for soil compaction and dust control or other uses shall have an adequate tank and plumbing systems to ensure that leaks and ruptures will not occur in the course of normal use.

.16.1. Control valves shall be provided and configured such that recycled water can be applied in a controlled fashion on the Site and completely retained during transit.

.16.2. Spray heads or nozzles shall be provided and configured such that recycled water is applied to prevent runoff, ponding, or windblown spray conditions.

.16.3. Each tank shall be equipped with an approved air-gap separation between the filler tube and the tank to prevent back-siphonage.

.16.4. Each tank used to store and/or transport recycled water must be flushed and disinfected prior to storage and/or transport of potable water or recycled water of better quality.

.16.5. The vehicles shall be clearly labeled in accordance with the requirements specified in Section 5.6.11.

5.6.17 Sites shall be designed and operated using best management practices (BMPs) to protect waters of the state and prevent public contact with recycled water.

5.6.18 The Sites shall be designed and operated using BMPs to prevent recycled water spray, mist, or surface flow from either leaving the Site or reaching:

(a) Any perennial surface waters located adjacent to the Site;

(b) Areas where the public has access (e.g., dwellings, designated outdoor eating areas, or food handling facilities);

(c) Drinking fountains unless specifically protected with a shielding device.

5.6.19 BMPs shall include, but not be limited to:

(a) Use of buffer zones;

(b) Discontinuation of application of recycled water during precipitation events, which are of sufficient magnitude to generate surface flow or significant ponding within the Site;

(c) Use of devices that protect drinking water fountains against contact with recycled water spray, mist, or surface flow;

(d) Irrigation with recycled water during periods of minimal human use of the irrigated area and timing of irrigation to allow an adequate dry-out time before the irrigated area will be used by the public.

5.6.20 Any storage facility or impoundment containing recycled water for reuse applications shall be managed in a manner to control odors, nuisance conditions or vectors such as

mosquitoes. Should such problems develop, a management plan shall be devised and implemented to monitor, correct, and control future occurrences.

5.6.21 Sites shall be designed and operated using BMPs so that application of recycled water occurs at agronomic rates whereby irrigation does not promote downward migration of salts (including nitrates), which could unreasonably affect present and anticipated beneficial uses of water, or result in water quality less than that prescribed in water quality control plans or policies.

.21.1. To demonstrate whether irrigation is at agronomic rates, the User shall provide information to the Districts including a tabular comparison of the volume of water required for plant growth in the landscape area to the volume of recycled water (and supplemental water) applied to the area.

5.6.22 Fertilizer application shall:

.22.1. Not unreasonably affect present and anticipated beneficial uses of water, or result in water quality less than that prescribed in water quality control plans or policies.

.22.2. Occur at agronomic rates. To demonstrate whether fertilizer application is at agronomic rates, the User shall provide information to the Districts including a tabular comparison of the amount of fertilizer needed for plant growth in the landscape area to the amount applied to the area.

.22.3. Occur if the levels of nitrogen in the recycled water are not sufficient for plant growth. If levels are not sufficient, the Site Supervisor shall calculate how much fertilizer needs to be applied by subtracting the level in recycled water from the level needed for plant growth.

5.6.23 Sites shall be designed and operated using BMPs so that adequate erosion control is implemented so that soil is not released into storm water runoff or surface waters.

5.6.24 Each User shall demonstrate to the Districts the means by which all applicable use area requirements as specified in the Districts' Permits and these Requirements will be complied with.

6. <u>Site Inspections and Site Access</u>

6.1 The Purveyor shall conduct periodic site inspections and prepare a report for each Site inspection pursuant to Section 8.3.

.1.1. Site inspections must be conducted at a minimum once every three (3) years per site or more frequently at the request of the Districts.

.1.2. In the event of identification of violation(s) during site inspections, corrective actions must be taken pursuant to Section 7 and notification shall be provided pursuant to Section 8.3.

6.2 The User shall allow an authorized representative of any of the following agencies the right to enter, inspect the Site, and conduct testing upon presentation of proper credentials: the Districts, LRWQCB, CDPH, and LACDPH or local health department.

6.3 In cooperation with the User or Purveyor, the Districts will make periodic inspections of the Site.

7. Corrective Action

7.1 The Site Supervisor shall immediately initiate corrective action to eliminate violation of any applicable laws or regulations, the Districts' Permits, or these Requirements, and make the appropriate notifications pursuant to Section 8.2.

7.2 The Purveyor or Direct User must verify the corrective action(s) and report to the Districts pursuant to Section 8.2.

7.3 In the event of contamination of a potable water system due to a cross-connection with the recycled water system, the Site Supervisor shall immediately invoke the Emergency Cross-Connection Response Plan and make the appropriate notifications pursuant to Section 8.1.

8. Notification and Reporting

8.1 Public Health, Spills, Unauthorized Discharges

8.1.1 Upon being notified or determining that one of the following events has occurred, the Site Supervisor shall immediately notify the Districts by telephone, and the LRWQCB, CDPH and LACDPH by telephone or electronic means. Written confirmation must be provided to all agencies within three (3) business days from the day of notification.

.1.1. There is a complaint (or other source of information) concerning recycled water use that may involve illness.

.1.2. An unauthorized discharge of more than 50,000 gallons of tertiary recycled water. Information provided shall include: the date and time the spill began and ended; the location of the spill; if the spill entered a storm drain or receiving water; the estimated volume of the spill or flow if the spill is ongoing; the estimated time of repair; the cause of the spill; the agencies involved with repair and clean-up; and corrective actions taken or plans for corrective actions.

.1.3. The potable water system has been contaminated due to a cross-connection with recycled water.

8.1.2 Upon being notified or determining that a spill or other release of recycled water from a Site, other than incidental runoff, including, but not limited to, breaks in the recycled water irrigation or distributions systems has occurred, the Site Supervisor shall immediately notify the Districts by telephone. Information provided shall include: the date and time the spill began and ended; the location of the spill; if the spill entered a storm drain or receiving water; the estimated volume of the spill or flow if the spill is ongoing; the estimated time of repair; the cause of the spill; the agencies involved with repair and clean-up; and corrective actions taken or plans for corrective actions. Written confirmation shall be provided within three (3) business days from the date of notification.

8.2 Non-compliance with Regulations

8.2.1 The Site Supervisor shall notify the Districts by telephone or electronic means upon knowledge of any noncompliance of applicable laws and regulations, the Districts' Permits, and these Requirements. Written confirmation shall be provided within three (3) business days from the date of notification.

8.2.2 The Purveyor or Direct User shall provide written verification to the Districts within ninety (90) days from the date of knowledge of the violation that corrective actions have been implemented.

8.3 Site Inspections

8.3.1 The site inspection report shall be signed and dated by the Site Supervisor and the inspector, and provided to the Districts within thirty (30) days following the end of the quarter in which the inspection was conducted.

8.3.2 The inspector shall immediately notify the Site Supervisor of violation(s) identified during site inspections and what corrective actions must be taken.

8.3.3 The Purveyor or Direct User shall notify the Districts by electronic means at least one (1) week prior to conducting a site inspection.

8.4 Miscellaneous Information

8.4.1 If someone other than the User is responsible for applying the recycled water (e.g., a truck hauler), then the User shall inform them of these Requirements in a written permit or other suitable manner.

8.4.2 The Site Supervisor is required to provide the Districts with an address and phone number(s) where he or she can be contacted at all times. The Site Supervisor is responsible for maintaining current pertinent information regarding the Site and Districts' contacts.

8.4.3 The Districts shall be notified in writing of any proposed changes in the individual designated as the Site Supervisor.

8.4.4 The Districts shall be notified in writing of any planned modifications or additions to the recycled water system. Any proposed significant modifications or additions to the recycled water system shall be reviewed and approved by the Districts before being made.

8.4.5 The User or Purveyor shall provide information as requested by the Districts in order for the Districts to comply with monitoring and reporting requirements issued by the LRWQCB.

9. Record Keeping

9.1 Current as-built drawings and other design plans of the recycled water system and potable water system, and any forms or reports as required by the Districts including, but not limited to, inspection reports, cross-connection tests, etc., shall be maintained by the Site Supervisor or Purveyor.

9.2 A copy of these Requirements, the Districts' Permits, the Emergency Cross-Connection Response Plan, and the Recycled Water System Operations Manual shall be maintained by the Site Supervisor so that they are available to operating personnel at all times.

9.3 For each site, the Site Supervisor or Purveyor must keep operation and maintenance logs that are available to the Districts. The logs shall include information that will be required for compliance with Permit requirements. This information, such as the monthly volumes of recycled water used at each site, dates of inspections and tests, etc, will be specified by the Districts in the approval letter.

Table 1. Process to Obtain Recycled Water for Direct Users or Purveyors

Process	Applicable Documents or Actions Required	Responsible Entity
Step 1 – Consult with Districts and review Recycled Water Users Handbook	Districts' Recycled Water Users Handbook	Direct User or Purveyor
Step 2 - Prepare draft plans and specifications	California Department of Public Health (CDPH) requirements in California Code of Regulations (CCR) Title 17 and 22[1], Los Angeles County Department of Public Health (LACDPH) Guidelines	Direct User or Purveyor
Step 3 - Draft User Agreement or amendment (if site is not covered under existing agreement)	Districts' User Agreement	Districts / Direct User or Purveyor
Step 4 - Approve User Agreement or Amendment	Present Agreement or Amendment to Districts' Board and governing body of Direct User or Purveyor for approval	Districts / Direct User or Purveyor
Step 5 - Submit Application for recycled water use	Districts' User Application Form	Direct User or Purveyor
Step 6 - Identify distribution issues, verify allowed uses, estimate quantity of water and delivery schedule	Verification of information provided in the Application Form. Send conditional approval in writing with caveat that project commencement is contingent upon Direct User or Purveyor receiving all regulatory approvals.	Districts
Step 7 – Complete California Environmental Quality Act (CEQA) Process	Make sure there is proper CEQA documentation for the site	Direct User or Purveyor
Step 8 – Consult with health agencies *(recommended)*	Describe project and show draft plans to CDPH and LACDPH	Direct User or Purveyor
Step 9 – Finalize and submit plans and specifications	Plans and specifications submitted to LACDPH; LACDPH Cross-Connection Plan Approval Application and fee.	Direct User or Purveyor
Step 10 - Provide materials and/or training to User on proper operation of a recycled water system	Districts' Recycled Water Users Handbook to be provided by Districts; training to be provided by Districts and/or Purveyor (or an other equivalent program can be substituted)	Districts or Purveyor
Step 11 – Consult with Lahontan Regional Water Quality Control Board (LRWQCB) *(recommended)*	Describe project and discuss Engineering Report needs	Direct User or Purveyor
Step 12 – Final plans and specifications	Obtain approval of final plans and specifications from LACDPH	Direct User or Purveyor

[1] http://www.cdph.ca.gov/healthinfo/environhealth/water/Pages/Waterrecycling.aspx.

Table 1. Process to Obtain Recycled Water for Direct Users or Purveyors

Process	Applicable Documents or Actions Required	Responsible Entity
Step 13 – Prepare / amend Engineering Report	CDPH *Guidelines for Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*[2]; Districts' information on water reclamation plants; Direct User or Direct User or Purveyor completes the Engineering Report; the Districts provide information related to treatment facilities; the report must be prepared and stamped by a professional engineer registered in California.	Direct User or Purveyor and Districts
Step 14 – Submit Engineering Report to CDPH and LRWQCB, with copy to Districts	Completed Engineering Report	Direct User or Purveyor
Step 15 – If applicable, submit revised Engineering Report, with copy to Districts	Revisions/additional information may be requested by CDPH and/or the LRWQCB	Direct User or Purveyor
Step 16 – Authorization of project under existing or new LRWQCB permit	Letter or permit	LRWQCB; possibly CDPH and/or LACDPH
Step 17 – Notify Districts of Final Regulatory Approvals	Direct User or Purveyor sends copy of LRWQCB letter or permit to Districts and any other applicable CDPH or LACDPH documents	Direct User or Purveyor
Step 18 – Pre- and post-construction inspections	Contact LACDPH prior to construction to arrange for site inspections, initial cross-connection and backflow prevention device testing; LACDPH Guidelines and Recycled Water System Inspection Report.	Direct User or Purveyor
Step 19 – Approval of final construction	By LACDPH	Direct User or Purveyor
Step 20 – Begin project implementation		Direct User or Purveyor
Step 21 – Submit revised as-built drawings of recycled water distribution system if necessary	Must be provided to LACDPH and Districts if any modifications have been made to original drawings	Direct User or Purveyor

[2] http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recharge/ERGUIDE2001.PDF.

Table 2. Process to Obtain Recycled Water for Users Receiving Water From Purveyors

Process	Applicable Documents *or Actions Required*	Responsible Entity
Step 1 – Consult with Purveyor and review Recycled Water Users Handbook	Districts' Recycled Water Users Handbook	User and Purveyor
Step 2 – Prepare draft plans and specifications	California Department of Health Services (CDPH) requirements in California Code of Regulations (CCR) Title 17 and 22[3], Los Angeles County Department of Public Health (LACDPH) Guidelines.	User or Purveyor
Step 3 – Request for recycled water service	Use recycled water Purveyor's application process	User
Step 4 – Draft User Agreement or amendment (if site is not covered under existing agreement)	Districts' User Agreement or Amendment	Districts / Purveyor .
Step 5 – Approve User Agreement or Amendment	Present Agreement or Amendment to Districts' Board and governing body of Purveyor for approval	Districts / Purveyor
Step 6 – Submit Application for recycled water use to Districts	Districts' User Application Form	Purveyor
Step 7 – Identify distribution issues, verify allowed uses, estimate quantity of water and delivery schedule	Verification of information provided in the Districts' User Application Form. Send conditional approval in writing with caveat that project commencement is contingent upon Direct User or Purveyor receiving all regulatory approvals.	Districts
Step 8 – Draft contract or amendment or other legal control mechanism (if site is not covered under existing contract or control mechanism)	Contract, contract amendment, or control mechanism between Purveyor and User	Purveyor and User
Step 9 – Approve contract or amendment or other legal control mechanism (if site is not covered under existing contract or control mechanisms)	Purveyor and User authorize contract, contract amendment, or control mechanism	Purveyor and User
Step 10 – Complete California Environmental Quality Act (CEQA) Process	Make sure there is proper CEQA documentation for the site	Purveyor and User
Step 11 – Consult with health agencies *(recommended)*	Describe project and show draft plans to CDPH and LACDPH	Purveyor
Step 12 – Finalize and submit plans and specifications	Plans and specifications submitted to LACDPH; LACDPH Cross-Connection Plan Approval Application and fee	Purveyor

[3] http://www.cdph.ca.gov/healthinfo/environhealth/water/Pages/Waterrecycling.aspx.

Table 2. Process to Obtain Recycled Water for Users Receiving Water From Purveyors

Process	Applicable Documents *or Actions Required*	Responsible Entity
Step 13 – Provide materials and/or training to User on proper operation of a recycled water system	Districts' Recycled Water Users Handbook and training to be provided by Purveyor (the Districts' training program or another equivalent program can be substituted)	Purveyor
Step 14 – Consult with Lahontan Regional Water Quality Control Board (LRWQCB) *(recommended)*	Describe project and discuss Engineering Report needs	Purveyor
Step 15 – Final plans and specifications	Obtain approval of final plans and specifications from LACDPH	Purveyor
Step 16 – Prepare / amend Engineering Report	CDPH *Guidelines for Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*[4]; Districts' information on water reclamation plants; Purveyor completes the Engineering Report; the Districts provide information related to treatment facilities; the report must be prepared and stamped by a professional engineer registered in California.	Purveyor and Districts
Step 17 – Submit Engineering Report to CDPH and LRWQCB, with copy to Districts	Completed Engineering Report	Purveyor
Step 18 – If applicable, submit revised Engineering Report, with copy to Districts	Revisions/additional information may be requested by CDPH and/or the LRWQCB	Purveyor
Step 19 – Authorization of project under existing or new LRWQCB permit	Letter or permit	LRWQCB; possibly CDPH and/or LACDPH
Step 20 – Notify Districts of Final Regulatory Approvals	Purveyor sends copy of LRWQCB letter or permit to Districts and any other applicable CDPH or LACDPH documents	Purveyor
Step 21 – Pre- and post-construction inspections	Contact LACDPH prior to construction to arrange for site inspections, initial cross-connection and backflow prevention device testing; LACDPH *Guidelines and Recycled Water System Inspection Report*	Purveyor
Step 22 – Approval of final construction	By LACDPH	Purveyor
Step 23 – Begin project implementation		Purveyor and User
Step 24 – Submit revised as-built drawings of recycled water distribution system if necessary	Must be provided to LACDPH and Districts if any modifications have been made to original drawings	Purveyor

[4] http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recharge/ERGUIDE2001.PDF.

RECYCLED WATER USE SITE INSPECTION PROGRAM

Recycled Water Use Site Inspection Program
County Sanitation Districts of Los Angeles County
District Nos. 14 and 20

1. Introduction

County Sanitation District Nos. 14 and 20 of Los Angeles County (Districts) have developed Requirements for Recycled Water Users (Requirements). The Requirements, which are mandated by the Water Code, have been developed to ensure that recycled water users comply with all applicable statutes, regulations, and the Districts' Master Permits. A Master Permit has been adopted by the California Regional Water Quality Control Board, Lahontan Region (LRWQCB) for the Lancaster Water Reclamation Plant (WRP). The Districts expect that a Master Permit for the Palmdale WRP will also be adopted in the future. For Master Permits, the Water Code specifies that the permittee conduct "periodic" inspections of the recycled water use sites (Sites) to monitor compliance with the uniform statewide recycling criteria established by California Department of Public Health (CDPH) and the Requirements of the Master Permit. The Requirements address Site inspections in Sections 6, 7, 8 and 9. This document summarizes the requirements pertaining to Site inspections and describes specific implementation procedures.

2. Inspection Program

The inspection program will consist of the following elements:

2.1. The Districts' inspection program consists of inspections conducted by both the Districts and the Purveyors, currently the City of Lancaster and the Los Angeles County Waterworks District No. 40. These inspections are in addition to inspections conducted by the Los Angeles County Department of Public Health (LACDPH) or other regulatory agencies.

2.2. The Districts will conduct an initial baseline inspection of new Sites during their first year of operation. The LACDPH will also conduct inspections during Site construction and prior to a Site's initial operation.

2.3. Upon completion of the baseline inspections, the Districts will conduct periodic site inspections once every three years. The Districts may conduct more frequent inspections depending on factors such as compliance record, potential for human exposure to recycled water and Site retrofits.

2.4. For Sites out of compliance, the Districts will conduct annual follow-up inspections.

2.5. The Purveyors must also conduct periodic inspections once every three years at a minimum. These inspections will be independent of the Districts' inspections. The Districts may require more frequent inspections by the Purveyors depending on factors such as compliance record, potential for human exposure to recycled water and Site retrofits.

2.6. The Districts will work with the Purveyors and users to ensure that the periodic inspections address the Master Permits, the Requirements, applicable laws and regulations, and LACDPH or local health department guidelines.

2.7. The Districts require Purveyors to develop and initiate an inspection program within the first year of a Site's operation.

2.8. A Site Inspection Report will be completed for each inspection. The Districts' Site Inspection Report Form is attached. The Purveyors may elect to use the Districts' Site Inspection Report

Form for adopt their own. In the latter case, the Districts will work with the Purveyors to ensure all regulatory requirements are addressed in the Site Inspection Report.

2.9. The Site Inspection Report shall be signed and dated by the Site Supervisor and the inspector, and provided to the Districts (if the Districts are not the inspector) within thirty (30) days following the end of the quarter in which the inspection was conducted.

2.10. The inspector shall immediately notify the Site Supervisor of violation(s) identified during Site inspections and what corrective actions and follow up actions must be taken.

2.11. The Site Supervisor shall notify the Districts by telephone or electronic means upon knowledge of any noncompliance with applicable laws and regulations, the Districts' Permits, and the Requirements. Written confirmation shall be provided within three (3) business days from the date of notification.

2.12. The Purveyor or Direct User shall provide written verification to the Districts within ninety (90) days from the date of knowledge of the violation that corrective actions have been implemented.

2.13. Site Inspection Reports shall be maintained by the Site Supervisor or Purveyor.

2.14. The Purveyor shall notify the Districts by electronic means at least one (1) week prior to conducting a Site inspection.

2.15. The Districts will maintain a database of Sites, inspections, and compliance actions.

2.16. The recycled water user shall allow an authorized representative of any of the following agencies the right to enter and conduct an inspection of the Site upon presentation of proper credentials: the Districts, LRWQCB, CDPH, LACDPH or local health department.

REUSE SITE INSPECTION REPORT

COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
REUSE SITE INSPECTION REPORT
Sanitation District No.s 14 and 20

Recycled Water User/Site Name:
Location of Site:
Purveyor (If Known):
Type of Use: **Irrigation** **other:** ________________
Date & Time of Inspection:
Site Supervisor:
Site Supervisor Contact Info:
Name of User Representative/Title:
Name of Inspector: **Gary Salva**
GPS Coordinates:

Verification of Compliance Inspection and Enforcement Program

No.	**Factor**	**Comment**	**Yes**	**No**
1	Is recycled water used for any purposes not listed in the Regional Water Quality Control Board permit(s)? If yes, please provide an explanation in the space below.		☐ Yes	☐ No
2	Have there been any changes or modifications to the recycled water system? If yes, please provide an explanation in the space below.		☐ Yes	☐ No
3	Has there been a change in the Site Supervisor? If yes, please provide updated information in the space below.		☐ Yes	☐ No
4	Has on-site staff received appropriate training? If no, please explain in the space below when training will be provided.		☐ Yes	☐ No
5	Are copies of the site operation manual, Emergency Cross-Connection Response Plan, and Districts' *Requirements for Recycled Water Users* available to employees at all times? If no, please explain in the space below how and when this will be corrected.		☐ Yes	☐ No
6	Are there complete and up-to-date O&M records for the recycled water system? If no, please explain in the space below how and when this will be corrected.		☐ Yes	☐ No

INSPECTION OF USER OPERATIONS

7	Is irrigation limited to the authorized use areas? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
8	Is recycled water running off from the authorized use area through surface runoff or windblown spray? If yes, please explain in the space below how and when this will be corrected, and make note of the source, volume, and destination of the runoff.	☐ Yes ☐ No
9	Are any unusual odors associated with the recycled water use, supply, or storage? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
10	Is there any evidence of ponding of recycled water? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
11	Is there any evidence of mosquito breeding? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
12	Are signs properly placed and legible with regard to not drinking recycled water? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
13	Are tags visible and legible? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
14	Is there any evidence of overflows, erosion, or improper management of impoundments? If yes, please explain in the space below how and when this will be corrected	☐ Yes ☐ No
15	Are there any leaks or breaks in the irrigation system piping or evidence of plugged, broken, or otherwise faulty irrigation components? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
16	Is recycled water being sprayed directly on people, dwellings, food-handling facilities, or drinking fountains? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
17	Is irrigation system being operated during periods of minimal human use with adequate time to dry-out before public use? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
18	Does irrigation take place within 50 feet of any domestic water supply well? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No

INSPECTION OF USER OPERATIONS

19	Does impoundment of disinfected tertiary recycled water occur within 100 feet of any domestic water supply well? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
20	Does irrigation take place within 50 feet of any uncovered reservoir or stream currently used as a source of domestic water? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
21	Are all impoundments adequately protected from erosion, washout, and flooding from a 24-hour rainfall event having a predicted frequency of once in 100 years? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
22	Are there any hose bibs in the recycled water system? If yes, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
23	Are pipes properly marked? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
24	Are valves and controllers properly marked? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
25	Are points of connection properly marked? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
26	Is backflow prevention in place? If no, please explain in the space below how and when this will be corrected.	☐ Yes ☐ No
27	Is there a schedule for testing backflow prevention and is testing up to date? If no, please explain in the space below how and when this will be corrected. Date of Last Test: _______________	☐ Yes ☐ No
28	Is there a need for cross-connection testing due to major modifications to the system? If yes, in the space below explain when the testing will be conducted.	☐ Yes ☐ No

REQUIRED ACTION/FOLLOW-UP ACTION		
☐ None		
☐ Yes by District – List	Compliance Date	Date Achieved
☐ Yes by User – List	Compliance Date	Date Achieved

COMMENTS
No.__
No.__
No.__
No.__
No.__
No.__

SIGNATURES	
Inspector's signature:	Date:
Site Supervisor's signature:	Date:

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. R6V-2012-0002
WDID NO. 6B190901008

MASTER WATER RECYCLING REQUIREMENTS AND
WASTE DISCHARGE REQUIREMENTS
COUNTY SANITATION DISTRICT NO. 20 OF LOS ANGELES COUNTY
(PALMDALE)
DISINFECTED TERTIARY RECYCLED WATER

Los Angeles County

I. MONITORING

A. Flow Monitoring

1. County Sanitation District No. 20 of Los Angeles County (District) shall record the total volume, in million gallons, and the average flow rate, in million gallons per day (mgd), of recycled water provided by the District to each Authorized Water Use site. This information must be recorded and reported for each calendar month.

2. The District shall record the total volume, in million gallons, and the monthly average 24-hour flow rate, in mgd, of recycled water supplied by the Activated Sludge/Nitrification-Denitrification Plant (Stage V Plant Expansion facilities) into the North Los Angeles/Kern County Regional Recycled Water Project distribution system. This information must be recorded and reported for each calendar month.

B. Agronomic Application Rate Monitoring for Fertilizers and Recycled Water

1. For each calendar month, the District shall record, and provide a tabular comparison of, the:

   a. agronomic rate (volume of water) of each irrigated area;
   b. volume of recycled water (and non-recycled supplemental water) applied to each irrigated area; and
   c. number of acres for each irrigated area.

2. For each calendar month, the District shall record, and provide a tabular comparison of, the:

   a. agronomic rate of nitrogen (N) for each landscape and agricultural area;
   b. total amount of N applied to each area, including the amount of N in the recycled water and the amount of N in any fertilizer applied;

c. total amount of N applied to each area, including the amount of N in the recycled water and the amount of N in any fertilizer applied; and
d. number of acres for each area.

Both the Lancaster Water Reclamation Plant and the Palmdale Water Reclamation Plant will be simultaneously providing recycled water to the North Los Angeles/Kern County Regional Recycled Water Project distribution system. When this occurs, the District shall use the highest nutrient levels provided from either reclamation plant at any given time when reporting agronomic rate and total amounts of N, above.

C. <u>Recycled Water Quality Monitoring</u>

The District must collect and analyze samples of the recycled water supplied by the Stage V Plant Expansion facilities for reuse by recycled water users in accordance with the following table:

Parameter	**Units**	**Type**	**Minimum Frequency**
Turbidity[1]	NTU	Recorder	Continuous
Total Chlorine Residual	mg/L	Recorder	Continuous (When chlorine is used as disinfectant)
Modal Contact Time[2]	minutes	Calculated	Daily (When chlorine is used as disinfectant)
CT Value[3]	mg-minutes/L	Calculated	Daily (When chlorine is used as disinfectant)
Total Coliform	MPN/100mL	Grab	Daily
Kjeldahl Nitrogen	mg/L	Composite	Monthly
Ammonia Nitrogen	mg/L	Composite	Monthly
Nitrate Nitrogen	mg/L	Composite	Monthly
Total Dissolved Solids	mg/L	Composite	Quarterly
Sulfate	mg/L	Composite	Quarterly
Chloride	mg/L	Composite	Quarterly
Total Trihalomethanes	µg/L	Grab	Quarterly
n-nitrosodimethylamine	µg/L	Composite	Quarterly
Priority Pollutants, excluding asbestos (Appendix A to 40 CFR part 423)	as specified	Grab or composite	Semi Annually

[1]For each 24-hour period, record and report the following: Stage V Tertiary Plant Expansion facilities: average turbidity, amount of time (minutes) the turbidity exceeded five (5) NTUs (if any), and the maximum turbidity.

[2]The modal contact time at the highest and lowest flows must be recorded and reported for each 24-hour period, where there is production of disinfected tertiary recycled water. The "modal contact time" is the amount of time elapsed between the time that a tracer, such as salt or dye, is injected into the influent at the entrance to a chamber and the time that the highest concentration of the tracer is observed in the effluent from the chamber. For the purpose of this determination, modal contact time shall be derived from a predetermined plot correlating modal contact times to varying flow conditions. (CCR, title 22, sec 60301.600)

[3]When chlorine is used as the disinfectant in production of disinfected tertiary recycled water, the lowest CT value must be calculated for each 24-hour period. CT (mg-minutes per liter) = chlorine residual (mg/L) x modal contact time (minutes). To calculate the lowest value, first record the following data for the 24-hour period:

a. Modal contact time under highest flow and corresponding total chlorine residual at that time.
b. Lowest total chlorine residual and corresponding modal contact time.
c. Highest total chlorine residual and corresponding modal contact time.
d. Modal contact time under lowest flow and corresponding total chlorine residual at that time.

Next, calculate CT values for each of the four conditions, above. The lowest of the four calculated CT values is the lowest CT for the period.

D. Quarterly Recycled Water Use Monitoring

The District must record the following information each quarter (quarters defined in Requirement No. II.B, below) in accordance with Water Code section 13523.1, subdivision (b)(4):

1. Total amount of recycled water supplied into the North Los Angeles/Kern County Regional Recycled Water Project distribution system during the quarter.

2. The total number of sites that received recycled water during the quarter.

3. A list of all recycled water use sites. For each site, the list must include:

   a. site name,
   b. site location
   c. name of underlying hydrologic area
   d. user name
   e. type of use
   f. site area (acres)
   g. date of District recycled water use approval

4. A map of suitable scale showing the boundary of the Permit Area (as defined by Finding No. 9 of Board Order R6V-2012-0002 and showing the approved recycled water use site locations.

E. Inspections and Enforcement Monitoring

1. The District must provide in its annual report (see Requirement No. II.D, below) an inspection schedule for all recycled water use facilities. The inspection schedule shall document the date of each facility's prior

inspection and its respective compliance status. Any facility with a reported incidence of noncompliance in its most recent inspection report must be re-inspected no later than one year from its prior inspection. Any facility that was in compliance during its most recent inspection must be scheduled for a re-inspection no later than three years from its prior inspection.

2. The District must record and report on a quarterly basis all recycled water use sites inspected pursuant to Requirement No. I.B.4 of Board Order No. R6V-2012-0002 during each respective quarter (See Requirement No. II.B, below). The list of sites inspected must include the following information for each recycled water use site:

   a. Date of inspection, name of recycled water use site, user name, and type of use.
   b. A description of all noted violations (including compliance with Requirement Nos. I.C.1 through I.C.15 of Board Order No. R6V-2012-0002
   c. The date compliance was achieved and the respective corrective action taken, if applicable.
   d. A description of enforcement action taken (if any), including any schedule for achieving compliance.
   e. Date of prior compliance inspection.

3. The District must ensure that monthly inspections of all Best Management Practices (BMPs) in place to prevent contamination of potable water supplies (including groundwater) are completed. The results of such inspections and measures taken to maintain and repair these BMPs must be reported by the District in its quarterly report (see Requirement No. II.B, below).

4. The District must ensure that annual visual inspections of the recycled water distribution system for cross connections with the potable water supply are completed.

5. The District must ensure that the recycled water distribution system is annually inspected for leaks or drops in pressure, and that pressure tests are conducted at a minimum once every three years.

F. Operation and Maintenance Monitoring

The District must record and maintain records of all actions and analytical results necessary to demonstrate compliance with California Department of Public Health conditions identified in Board Order No. R6V-2012-0002 Requirement No. II.B. and to document any operational problems and maintenance activities with the recycled water treatment facilities, distribution system, and user sites. The District must submit a brief summary of its findings to the California Regional Water Quality Control Board, Lahontan Region (Lahontan Water Board) with each quarterly monitoring report. This summary must discuss the elements listed below.

1. All modifications or additions to the recycled water treatment facilities, distribution systems, and user sites;

2. Test results of all backflow prevention devices at each recycled water use site.

3. The results of cross connection inspections at each authorized recycled water use site.

4. Test results of the recycled water distribution system pressure testing.

5. Any non-routine maintenance conducted on the recycled water treatment facilities, distribution system, and user systems.

6. Any major problems occurring to the recycled water treatment facilities, distribution system, and user systems.

7. Calibration results of any recycled water flow measuring devices.

II. REPORTING

A. General Provisions

1. The District must comply with the "General Provisions for Monitoring and Reporting," dated September 1, 1994, which is attached to and made part of this Monitoring and Reporting Program (Attachment A).

2. The District must comply with the Sampling and Analysis Plan that was submitted on April 14, 2011, which is attached to and made part of this Monitoring and Reporting Program (Attachment B).

B. Quarterly Reports

Beginning on **June 1, 2012**, quarterly monitoring reports including the preceding information must be submitted to the Lahontan Water Board by the first day of the third month following each quarterly monitoring period [Water Code section 13523.1, subdivision (b)(4)].

Quarterly monitoring periods are defined as follows:

First Quarter	January 1 - March 31
Second Quarter	April 1 - June 30
Third Quarter	July 1 - September 30
Fourth Quarter	October 1 - December 31

C. Semi-Annual Report

Beginning on **September 1, 2012**, semi-annual monitoring data including the preceding information must be submitted to the Lahontan Water Board by the first day of the third month following each semi-annual monitoring period [Water Code section 13523.1, subdivision (b)(6)]. Data that are required on a semi-annual basis will be incorporated into the quarterly report that coincides with the period for which the analyses are required.

Semi-annual monitoring periods are defined as follows:

First half	January 1 - June 30
Second half	July 1 – December 31

D. Annual Report

Beginning on **April 1, 2013** and continuing thereafter, the District must submit an annual report to the Lahontan Water Board with the information listed.

1. Documentation of the District's compliance status with Board Order No. R6V-2012-0002, including progress made towards developing the salt/nutrient management plan that is required by Board Order No. R6V-2012-0002, Requirement No. III.A.

2. The compliance record and the corrective actions taken or scheduled/planned to return the District into full compliance with Board Order No. R6V-2012- 0002.

3. The District's time schedule for completing corrective actions needed to achieve compliance.

Ordered by: Harold J. Singer Dated: Jan 11, 2012
HAROLD J. SINGER
EXECUTIVE OFFICER

Attachment A: General Provisions for Monitoring and Reporting Program
Attachment B: Sampling and Analysis Plan

ATTACHMENT A
General Provisions for Monitoring and Reporting

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

GENERAL PROVISIONS
FOR MONITORING AND REPORTING

1. SAMPLING AND ANALYSIS

   a. All analyses shall be performed in accordance with the current edition(s) of the following documents:

      i. Standard Methods for the Examination of Water and Wastewater

      ii. Methods for Chemical Analysis of Water and Wastes, EPA

   b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board Executive Officer. Specific methods of analysis must be identified on each laboratory report.

   c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The methods used shall also be reported. If methods other than EPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board Executive Officer prior to use.

   d. The discharger shall establish chain-of-custody procedures to insure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage, and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.

   e. The discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall insure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.

   f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.

   g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

2. OPERATIONAL REQUIREMENTS

a. Sample Results

Pursuant to California Water Code Section 13267(b), the discharger shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed; sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

b. Operational Log

Pursuant to California Water Code Section 13267(b), an operation and maintenance log shall be maintained at the facility. All monitoring and reporting data shall be recorded in a permanent log book.

3. REPORTING

a. For every item where the requirements are not met, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and shall submit a timetable for correction.

b. Pursuant to California Water Code Section 13267(b), all sampling and analytical results shall be made available to the Regional Board upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

c. The discharger shall provide a brief summary of any operational problems and maintenance activities to the Board with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.

d. Monitoring reports shall be signed by:

i. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates;

ii. In the case of a partnership, by a general partner;

iii. In the case of a sole proprietorship, by the proprietor; or

iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

e. Monitoring reports are to include the following:

i. Name and telephone number of individual who can answer questions about the report.

ii. The Monitoring and Reporting Program Number.

iii. WDID Number.

f. Modifications

This Monitoring and Reporting Program may be modified at the discretion of the Regional Board Executive Officer.

4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000.00) for each day of violation.

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ATTACHMENT B
Sampling and Analysis Plan

WATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (562) 699-7411, FAX: (562) 699-5422
www.lacsd.org

STEPHEN R. MAGUIN
Chief Engineer and General Manager

November 10, 2011
File No. 20-04.01-55

Harold Singer
California Regional Water Quality Control Board
Lahontan Region - Victorville Branch Office
14440 Civic Drive, Suite 200
Victorville, CA 92392-2359

Dear Mr. Singer:

Submittal of the Revised Sampling and Analysis Plan (SAP) for the
<u>Palmdale Water Reclamation Plant (PWRP), WDID No. 6B190107069</u>

In compliance with the requirements set forth in the Monitoring and Reporting Program No. R6V-2011-0012 (MRP), issued by the California Regional Water Quality Control Board, Lahontan Region (Regional Board) and transmitted to County Sanitation District No. 20 of Los Angeles County (Sanitation District) in a letter dated April 8, 2011, the Sanitation District submits the enclosed Revised Sampling and Analysis Plan (SAP) for the Palmdale Water Reclamation Plant (PWRP). This SAP is submitted to reflect altered sampling requirements in anticipation of start-up operations of the PWRP tertiary treatment facilities.

If you have any questions or comments, please contact the undersigned at (562) 908-4288 extension 2855 or Peter Navas at extension 2847.

Very truly yours,

Stephen R. Maguin

Thomas E. Weiland

Thomas E. Weiland
Supervising Engineer
Monitoring Section

TW:pmn
Enclosure
cc: Linda Stone
Mike Coony

DOC #2089711

SANITATION DISTRICTS OF LOS ANGELES COUNTY

REVISED SELF-MONITORING
SAMPLING AND ANALYSIS PLAN (SAP)

Palmdale Water Reclamation Plant
County Sanitation District No. 20 of Los Angeles County

November 2, 2011

DOC #2005255

CONTENTS

Overview

This document describes the self-monitoring plan prepared by the County Sanitation District No. 20 of Los Angeles County (Sanitation District) for the Palmdale Water Reclamation Plant (PWRP) to satisfy the conditions specified in Board Order No. R6V-2011-0012, WDID No. 6B190107069, which delineates the Waste Discharge Requirements (WDR) and the Monitoring and Reporting Program (MRP). This order was adopted by the California Regional Water Quality Control Board, Lahontan Region (Regional Board) on March 9, 2011.

Constituent concentrations will be monitored at the following locations[1] in accordance to the requirements of the MRP and WDR as well as additional sampling requirements stated within this SAP:

a) Influent to the treatment facilities
b) Disinfected secondary – treated effluent [2]
c) Disinfected tertiary – treated effluent
d) Groundwater monitoring wells
e) Groundwater supply wells
f) Groundwater extraction wells
g) Vadose zone lysimeters

Flows will be monitored or calculated at a frequency described in Table 1 according to conditions specified in the WDR and the MRP:

a) Influent to the treatment facilities
b) Effluent from the treatment facilities
c) Recycled water flow sent to the Agricultural Site
d) Recycled water flow to the Storage Reservoirs
e) Recycled water flow to each center irrigation pivot or other irrigation system
f) Recycled water flow utilized for reuse purposes (other than internally–recycled process water) at Reclamation Plant and Storage Reservoir Sites
g) Extraction well flow

In addition to flow metering, freeboard in each storage reservoir will be monitored weekly.

An overview of the plant treatment process as well as illustrations, diagrams, and/or photos of selected monitoring locations can be found in Appendix A.

Reason for Updating the SAP

The SAP has been updated to reflect altered sampling requirements due to the completion and operation of the activated sludge and tertiary treatment facilities.

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1 Biosolids and sludge disposal offsite will be managed and monitored in accordance with applicable Federal, State, and Local permits and regulations (e.g., 40CFR503 for land application)

2 Samples for Disinfected Secondary-Treated Effluent will only be taken when secondary treatment is the final level of treatment.

Sampling Schedule

The complete self-monitoring schedule is shown in Tables 1, 2 and 3. Tables 1 and 2 list the compiled monitoring requirements as outlined in the MRP and WDR. Table 3 lists additional monitoring not required by the MRP or WDR but these analyses will be completed whenever samples can be obtained. Typically, annual, semiannual, or quarterly monitoring events will be conducted concurrently with monthly events.

Sampling Constituents and Analytical Methods

Table 4 provides a compilation of the sampling and analytical protocols for all constituents requiring self-monitoring, as accepted in the MRP. The analytical methods and sampling techniques used may change if alternative methods are found to provide better results. The Sanitation District will seek Regional Board approval for any changes in analytical methods and sampling techniques prior to implementation.

Quality Assurance/Quality Control (QA/QC)

The Quality Assurance (QA) Group of the Sanitation Districts of Los Angeles County (Sanitation Districts) Laboratories Section is responsible for ensuring the validity and quality of analytical data produced in all laboratories operated by the Sanitation Districts. In order to accomplish this goal, a quality assurance plan prepared by the QA Group is strictly followed. The plan includes routine QA activities that are performed in the laboratories in order to assure the defensibility of data reported.

1. A routine practice of running laboratory control samples, duplicates and matrix spikes or duplicate spikes for every ten samples, or every analytical batch of less than ten samples, is maintained. Control limits have been established for both precision and accuracy, and quality control data are plotted on control charts for trend analyses. For situations where the data are outside of the control limits, corrective action is initiated and maintained at the bench level until the problems are solved.

2. A reagent or method blank is routinely run with each batch of samples as a contamination check.

3. Calibration standards are analyzed as required. For some tests, a daily calibration verification standard is used to check the initial calibration curve. For other tests, a multi-point calibration curve is prepared on each day of analysis.

4. For some organic constituents, surrogate standards are added to every sample, duplicate, spike, and blank. The results are compared to established acceptance limits. When unacceptable QA results are obtained, corrective action is performed.

5. Instrument QA is also performed (e.g., mass calibration and tuning are performed on gas chromatography-mass spectrometry (GC/MS) equipment to meet ion abundance criteria).

6. The Sanitation Districts' San Jose Creek and Joint Water Pollution Control Plant (JWPCP) Water Quality Laboratories participate in the United Sates Environmental Protection Agency's (EPA) Discharge Monitoring Report (DMR) QA by analyzing chemistry samples purchased from one of the EPA certified suppliers. Overall performance is satisfactory.

7. The Lancaster Treatment Plant Laboratory participates in the California Department of Public Health (CDPH) Environmental Laboratory Accreditation Program Branch (ELAPB) Performance Evaluation studies. Overall performance is satisfactory.

8. Any subcontract commercial laboratories are required to participate in the CDPH ELAPB Performance Evaluation studies. Overall performance must be satisfactory.
9. Quality control samples in the form of QC check standards, either prepared in-house or purchased from commercial sources, are issued by the QA Group to all Sanitation Districts' laboratories. In situations where the results are not acceptable, the analysts and their supervisors are informed and error resolutions are performed. This consists of checking calculations, data transcription, instrumentation, methodology, etc. Follow-up check samples are issued to verify that the analyses are back in control.
10. The QA Group also issues split samples collected from one of the water reclamation plants to assess analysis in a real environmental matrix. Results of these analyses are also submitted to the QA Group for statistical evaluation.

Sampling Procedures

Samples are collected and handled in the manner specified in the appropriate analytical method, as described in 40 Code of Federal Regulations (CFR) Part 136. Table 4 provides additional sampling information, including sample bottle material, holding times, and type of sample preservation.

Flow-weighted 24-hour composite samples are currently utilized by PWRP and are preferred whenever possible. However, there are situations where grab samples are more appropriate or specified by standard procedures (e.g., oil & grease monitoring, groundwater sampling). Standard Operating Procedures (SOPs) for the applicable sampling procedures can be found in Appendix B.

Sample Chain of Custody

With the names of specific individual staff, chain of custody (COC) forms are used to track the handling of samples. The COC forms also contain the complete analytical request and full documentation of the sample origin including sample date, sample time, sample location, preservation method, and the sampling staff individual's name. An example of the COC form can be found in Appendix C. This paper trail is archived along with the sample analytical results.

Groundwater Monitoring Network

Survey and completion information for the monitoring wells and lysimeters, which make up the existing ground water monitoring system, are provided in Appendix A. Groundwater monitoring is performed according to the MRP.

Low flow sampling of monitoring wells is of utmost importance in order to maintain the integrity and representative nature of the sample. Two procedures are provided in the appendices to guide the samplers in proper techniques. The Sanitation District has developed a standard operating procedure entitled *Low-Flow Purging and Sampling for Groundwater*, which is based on the more detailed Cal/EPA guidance. The Cal/EPA Department of Toxic Substances Control issued a revised (Feb 2008) sampling methodology entitled *Representative Sampling of Groundwater for Hazardous Substances*. Both documents can be found in Appendix B. Upon any disagreement between the two documents, the Cal/EPA guidance shall be considered correct. If more reference material is required, see the USEPA document, *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers* (http://www.epa.gov/tio/tsp/download/gw_sampling_guide.pdf). The recommended allowable drawdown of any well being sampled is 0.33 feet.

As required by Section I.F.2 of the MRP, the Sanitation District's *Revised Groundwater Delineation and Monitoring Plan for Proposed Storage Reservoir Site*, dated May 30, 2008 (Doc #1042486) has been incorporated into this SAP by reference, except that monitoring for total dissolved solids (TDS) has been replaced with monitoring of conductivity per the MRP due to the volume requirements for TDS sample analysis. This document describes the intended soil moisture monitoring system and sampling lysimeters at the recycled water storage reservoirs site. The system has since been installed and sampling operations have commenced.

As noted in the *Revised Groundwater Delineation and Monitoring Plan for Proposed Storage Reservoir Site*, Section 5.4 (page 24), when sufficient water is obtained from a lysimeter, the sample collection will be prioritized in order of the following chemical analyses: nitrate (as nitrogen), conductivity, nitrite (as nitrogen), total Kjeldahl nitrogen (TKN), and ammonia-nitrogen. Analysis for conductivity has replaced the TDS analysis as noted above.

Results Reporting

Analytical results are reported following a review of the QA/QC data. Monitoring reports are to be submitted according to the due dates specified in the permit.

Table 1. Flow Monitoring Schedule[a]

Parameter	Units	Facility Influent[b]	Facility Effluent[c]	To Storage Reservoirs	Reuse at WRP Site & SRS	To AS[d]	Individual Center Pivot	Extraction Wells[e]
Average Daily Flow Rate	MGD	D	D	D	D	D[e]		D
Total Volumetric Flow	MG	D	D	M	M	M	M	M
Max. Inst. Flow Rate	MGD	D						D

Where: AS = Agricultural Site
D = Daily monitoring
M = Monthly monitoring
MG = million gallons
MGD = million gallons per day
SRS = Storage Reservoir Site

Notes:

a) Flow monitoring and recording shall be conducted at a frequency according to R6V–2011–0012. Symbols in the table represent recording frequency, which may or may not be the same as reporting frequency.
b) Facility influent flows are measured in the influent pump force main.
c) Facility effluent refers to flows produced from the facility only. These flows will be calculated if a portion of the effluent produced is diverted to the SRS or if flow from the SRS is mixed with plant effluent before the combined flow is measured at the AS pump station.
d) Total flow to the AS is metered on the effluent line of the AS pump station, which sends flow to all irrigation pivots.
e) For extraction well pumping, average daily flow rate and maximum instantaneous flow rate to be reported in gallons per minute (gpm).

Table 2. Schedule for Self-Monitoring of Constituents as Required by the MRP

Parameter	Influent	Disinfected Secondary-Treated Effluent	Disinfected Tertiary Treated Effluent	Monitoring Wells[a,b]	Extraction Wells[c]	Lysimeters[d]
Flow			C			
Modal contact time			D			
CT Value			D			
Turbidity			C	Q		
Static water depth				Q		
Electrical conductivity				Q		Q
Color				Q		
Total chlorine residual		W	C			
Total coliform		D	D			
Dissolved oxygen		W	W	Q		
pH		W	W	Q		
Temperature		W	W	Q		
Biochemical oxygen demand (BOD)	W	W	M			
Total suspended solids		W				
Chemical oxygen demand (COD)	W	W	M			
Ammonia nitrogen	M	M	M	Q	Q	Q
Kjeldahl nitrogen	M	M	M	Q	Q	Q
Nitrate nitrogen	M	M	M	Q	Q	Q
Nitrite nitrogen			M			Q
Chloride		M	Q	Q		
Sodium		M	Q	Q		
Sulfate		M	Q	Q		
Calcium			Q			
Magnesium			Q			
MBAS		M	Q	Q		
Total organic carbon (TOC)		Q[e]	Q	Q		
Total dissolved solids (TDS)	S	M	Q	Q	Q	
Total trihalomethanes	S	Q	Q	T		
Bromodichloromethane	S	Q	Q	T		A (AS only)
Bromoform	S	Q	Q	T		A (AS only)
Chloroform	S	Q	Q	T		A (AS only)
Dibromochloromethane	S	Q	Q	T		A (AS only)
Haloacetic acids[f]			Q	T		
monochloroacetic acid			Q	T		
dichloroacetic acid			Q	T		
trichloroacetic acid			Q	T		
monobromoacetic acid			Q	T		
dibromoacetic acid			Q	T		
N-nitrosodimethylamine			Q			

Parameter	Influent	Disinfected Secondary-Treated Effluent	Disinfected Tertiary Treated Effluent	Monitoring Wells[a,b]	Extraction Wells[c]	Lysimeters[d]
bis(2diethylhexyl)phthalate (DEHP)			Q	Q[i]		
TPH - Gasoline range	Q	Q	Q	Q		
TPH - Diesel range	Q	Q	Q	Q		
Oil and grease		Q				
Total chromium			A			
Hexavalent chromium			A			
Total phenols	A	A	A	T		
Inorganics[g, h]	A	A	A	T		
Total cyanides, (cyanide)	A	A	A	T		
Volatile organics[g]	A	A	A	T		
Semi-volatile organics[g]	A	A	A	T		
Pesticides-PCBs[g, h]	A	A	A	T		
Methyl tertiary butyl ether (MTBE)		A	A	T		

Where:
C = Continuous monitoring
D = Daily monitoring
W = Weekly monitoring
M = Monthly monitoring
Q = Quarterly monitoring
S = Semiannual monitoring
PCB = polychlorinated biphenyls
A = Annual monitoring
T = Tri-Annual (sampling once every three years)
AS = Agricultural Site vadose zone lysimeters
SRS = Storage Reservoir Site vadose zone lysimeters
MBAS = methylene blue active substances
TPH = total petroleum hydrocarbons

Notes:

a) Monitoring wells included in the sampling schedule are as follows: MW1, MW2, MW4, MW15R, MW16, W18R, MW19, MW21, MW22, MW23, MW24R, MW25, MW26, MW27, MW28, MW29, MW31, MW32, MW33, MW40, MW46, MW51, MW52, MW53, MW54, MW55, MW56, MW57, and MW58. Monitoring wells MW17, MW20, and MW37 shall be sampled quarterly for depth to water only. Monitoring wells MW38 and MW39 shall be sampled tri-annually for the constituents marked with either "Q" or "T."

b) Supply wells included in the sampling schedule are as follows: DW4-2, 17D1, LAWA-7, and SW2.

c) Extraction wells included in the sampling schedule are as follows: EW-1(R-10), EW-2(R-2), EW-3(R-3), EW-4(R-4), EW-5(R-9), and EW-6(R-8).

d) Monitoring at site(s) indicated (AS or SRS lysimeters). Lysimeters may not yield enough sample volume to perform all the specified analyses. In such situations, the Sanitation Districts will analyze for as many constituents as possible.

e) Monitor dissolved organic carbon in filtered sample of effluent.

f) Sum of five haloacetic acids – monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid.

g) Refer to Appendix D for a complete list of constituents, based on the priority pollutants listed in Attachment E of the MRP. Semi-volatile Organics include Base/Neutral Extractable Organics & Acid Extractable Organics.

h) Monitoring for Arochlors (PCBs) 1016, 1221, 1232, 1242, 1248, 1254, 1260; Dioxin (2,3,7,8-TCDD); and asbestos is not required per Section I.K.4 of the MRP.

i) Quarterly monitoring for DEHP [bis(2diethylhexyl)phthalate] is only required in the following monitoring wells: MW2, MW4, MW16, MW22, MW28, and MW32. After a minimum of four quarters of groundwater monitoring for DEHP, the Discharger may present the findings and recommendations regarding whether to continue, modify, or cease DEHP monitoring.

Table 3. Schedule for Additional Self-Monitoring

Constituent	MW17, MW20, and MW37
Color	S
Dissolved oxygen	S
pH	S
Temperature	S
Depth to water	S
Electrical conductivity	S
Turbidity	S
Sodium	S
Chloride	S
Sulfate	S
Kjeldahl nitrogen (TKN)	S
Ammonia nitrogen	S
Nitrate nitrogen	S
Nitrite nitrogen	S
Total nitrogen	S
Total dissolved solids (TDS)	S
Total organic carbon (TOC)	S
Nethylene blue active substances (MBAS)	S

Where: S = Semiannual monitoring

Table 4. Sample Handling and Analytical Methods

Constituent	Method	Preservative	Holding Time[a]	Units	Sample Type	Sample Bottle[b]	Analytical Lab[c]
Ammonia Nitrogen	SM 4500-NH_3	H_2SO_4 to pH<2; Cool, 4°C	28 days	mg/L	composite	P/G	LACSD
Bis(2diethylhexyl)phthalate	EPA 625	sodium thiosulfate in presence of chlorine; Cool, 4°C	7 days; 40 days	µg/L	composite	Amber G, TFE lined cap	LACSD
BOD	SM 5210B	Cool, 4°C	48 hours	mg/L	composite	P/G	LACSD
Calcium	EPA 200.7	HNO_3 to pH<2; Cool, 4°C	6 months	µg/L	composite	P/G	LACSD
Chloride	EPA 300.0	Cool, 4°C	28 days	mg/L	composite	P/G	LACSD
Chlorine Residual	SM 4500-CL C	None	immediately	mg/L	grab	P/G, zero headspace	LACSD
COD	SM 5220D	Analyze ASAP, or add H_2SO_4 to pH<2; Cool, 4°C	28 days	mg/L	composite	P/G	LACSD
Color	N/A	N/A	N/A	N/A	N/A	N/A	Field
Dissolved Organic Carbon (DOC)	SM 5310 C	Filtered, H_3PO_4 to pH<2; Cool to 4°C	28 days	mg/L	composite	G, TFE lined cap	LACSD
Dissolved Oxygen	SM 4500-OG	None	immediately	mg/L	grab	G- BOD bottle	LACSD
Electrical Conductivity	N/A	N/A	N/A	N/A	N/A	N/A	Field
Haloacetic acids (five)	EPA 552.2	Ammonium chloride, Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	commercial lab
Monochloroacetic acid	EPA 552.2	Ammonium chloride, Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	commercial lab
Dichloroacetic acid	EPA 552.2	Ammonium chloride, Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	commercial lab
Trichloroacetic acid	EPA 552.2	Ammonium chloride, Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	commercial lab
Monobromoacetic acid	EPA 552.2	Ammonium chloride, Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	commercial lab
Dibromoacetic acid	EPA 552.2	Ammonium chloride, Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	commercial lab
Inorganics (Heavy Metals)[d]	EPA 200.8 et al[e]	HNO_3 to pH<2; Cool, 4°C	6 months	µg/L	composite	P/G	LACSD
Hexavalent Chromium	EPA 218.6	Cool, 4°C	24 hours	µg/L	grab	P/G	commercial lab[f]
Kjeldahl Nitrogen	SM 4500-NORGB	H_2SO_4 to pH<2; Cool, 4°C	28 days	mg/L	composite	P/G	LACSD
Magnesium	EPA 200.7	HNO_3 to pH<2; Cool, 4°C	6 months	µg/L	composite	P/G	LACSD
MBAS	SM 5540C	Cool, 4°C	48 hours	mg/L	composite	P/G	LACSD
Mercury	EPA 245.1	HNO_3 to pH<2; Cool, 4°C	28 days	ug/L	composite	G	LACSD
Mercury	EPA 1631	Acidified in laboratory clean room	90 days	ng/L	composite	G	commercial lab

Constituent	Method	Preservative	Holding Time[a]	Units	Sample Type	Sample Bottle[b]	Analytical Lab[c]
Methyl tertiary-Butyl Ether	EPA 624	sodium thiosulfate in presence of chlorine; Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	LACSD
Nitrate Nitrogen	SM 4500 NO_3E	Cool, 4°C	48 hours	mg/L	composite	P/G	LACSD
Nitrite nitrogen	SM4500-NO_2-B	Cool, 4°C	48 hours	mg/L	composite	P/G	LACSD
N-nitrosodimethylamine	EPA 1625	sodium thiosulfate in presence of chlorine; Cool, 4°C	7 days; 40 days	ng/L	composite	Amber G, TFE lined cap	LACSD
Oil & Grease	EPA 1664A	HCl to pH<2; Cool, 4°C	28 days	mg/L	grab	G	LACSD
pH	SM 4500-HB	None	2 hours	pH unit	grab	P/G	LACSD
Sodium	EPA 200.7	HNO_3 to pH<2; Cool, 4°C	6 months	mg/L	composite	P/G	LACSD
Static Water Depth	N/A	N/A	N/A	N/A	N/A	N/A	Field
Sulfate	EPA 300.0	Cool, 4°C	28 days	mg/L	composite	P/G	LACSD
Temperature	SM 2550B	None	immediately	ºC	grab	P/G	LACSD
Total Coliform	SM 9221B	sodium thiosulfate in presence of chlorine	6 hours	MPN/100 mL	grab	Sterile plastic	LACSD
Total Cyanides	SM 4500-CNC, E	Sodium thiosulfate in presence of chlorine; NaOH pH>12; Cool, 4°C	14 days	µg/L	grab	P/G	LACSD
Total Dissolved Solids	SM 2540C	Cool, 4°C	7 days	mg/L	composite	P/G	LACSD
Total Organic Carbon (TOC)	SM 5310 C	Filter sample to measure dissolved organic carbon, H_3PO_4 to pH<2; Cool, 4°C	28 days	mg/L	composite	G, TFE lined cap	LACSD
Total Petroleum Hydrocarbons: Diesel Range	EPA 8015B	HCl to pH<2; Cool, 4°C	7 days	mg/L	composite	G, TFE lined cap	commercial lab
Total Petroleum Hydrocarbons: Gasoline Range	EPA 8015B	HCl to pH<2; Cool, 4°C	7 days	mg/L	composite	G, TFE lined cap	commercial lab
Total Phenols	EPA 420.1	H_3PO_4 to pH<4; Cool, 4°C	28 days	µg/L	composite	P/G	LACSD
Total Suspended Solids	SM 2540D	Cool, 4°C	7 days	mg/L	composite	P/G	LACSD
Total trihalomethanes	EPA 624	sodium thiosulfate in presence of chlorine; Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	LACSD
Bromoform	EPA 624	sodium thiosulfate in presence of chlorine; Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	LACSD
Chloroform	EPA 624	sodium thiosulfate in presence of chlorine; Cool, 4°C	14 days	µg/L	grab	G, TFE lined cap	LACSD

Constituent	Method	Preservative	Holding Time[a]	Units	Sample Type	Sample Bottle[b]	Analytical Lab[c]
Dibromochloromethane	EPA 624	sodium thiosulfate in presence of chlorine; Cool, 4°C	14 days	μg/L	grab	G, TFE lined cap	LACSD
Dichlorobromomethane	EPA 624	sodium thiosulfate in presence of chlorine; Cool, 4°C	14 days	μg/L	grab	G, TFE lined cap	LACSD
Turbidity	N/A	N/A	N/A	N/A	N/A	N/A	Field
Volatile Organics[d]	EPA 624	sodium thiosulfate in presence of chlorine; Cool, 4°C	14 days	μg/L	grab	G, TFE lined cap (zero headspace)	LACSD
Semivolatile Organics: Acid Extractable Organics[d]	EPA 625	sodium thiosulfate in presence of chlorine; Cool, 4°C	7 days; 40 days	μg/L	composite	Amber G, TFE lined cap	LACSD
Semivolatile Organics: Base/Neutral Extractable Organics[d]	EPA 625	sodium thiosulfate in presence of chlorine; Cool, 4°C	7 days; 40 days	μg/L	composite	Amber G, TFE lined cap	LACSD
Pesticides and PCBs[d]	SM6630B, EPA 608, EPA 8081 & 8082	sodium thiosulfate in presence of chlorine; Cool, 4°C	7 days; 40 days	μg/L	composite	Amber G, TFE lined cap	LACSD

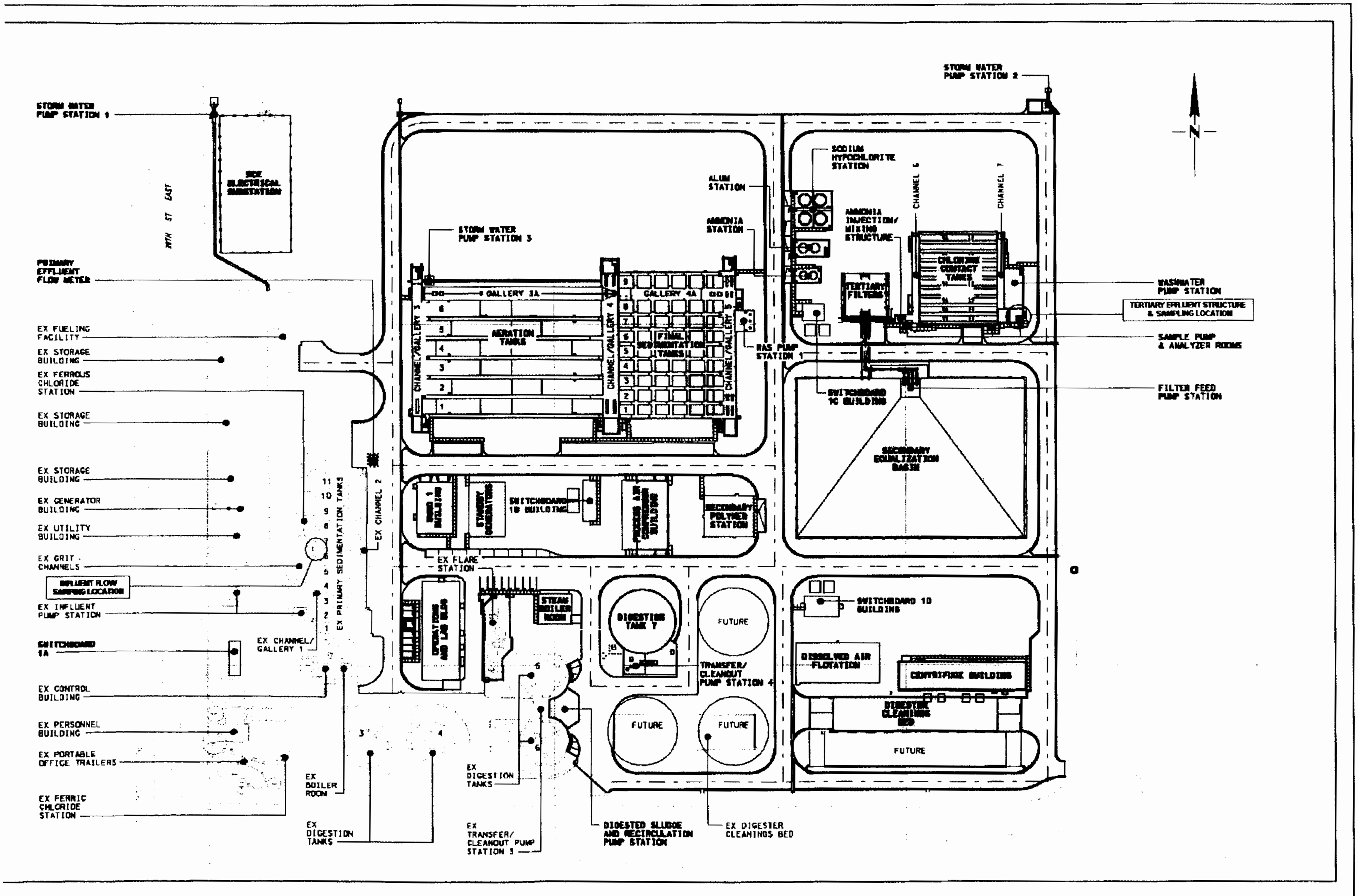
Notes:

NA = Not Applicable
a) Maximum holding times, per Standard Methods/EPA specifications
b) G = Glass, P = Plastic; Types of glass/plastic containers and rinsing techniques will vary depending on types of constituents being analyzed.
c) In general, the Sanitation Districts (LACSD) laboratories will perform all analyses. However, the Sanitation Districts will occasionally send samples to commercial laboratories for analysis.
d) Please see Appendix D for specific individual parameters.
e) Other methods are: antimony by EPA SW-846 Method 7062, arsenic by SM 3114 B 4,d, and selenium by SM 3114B.
f) Upon completion of the new laboratory facilities at Palmdale, hexavalent chromium analysis is planned to be performed in-house.

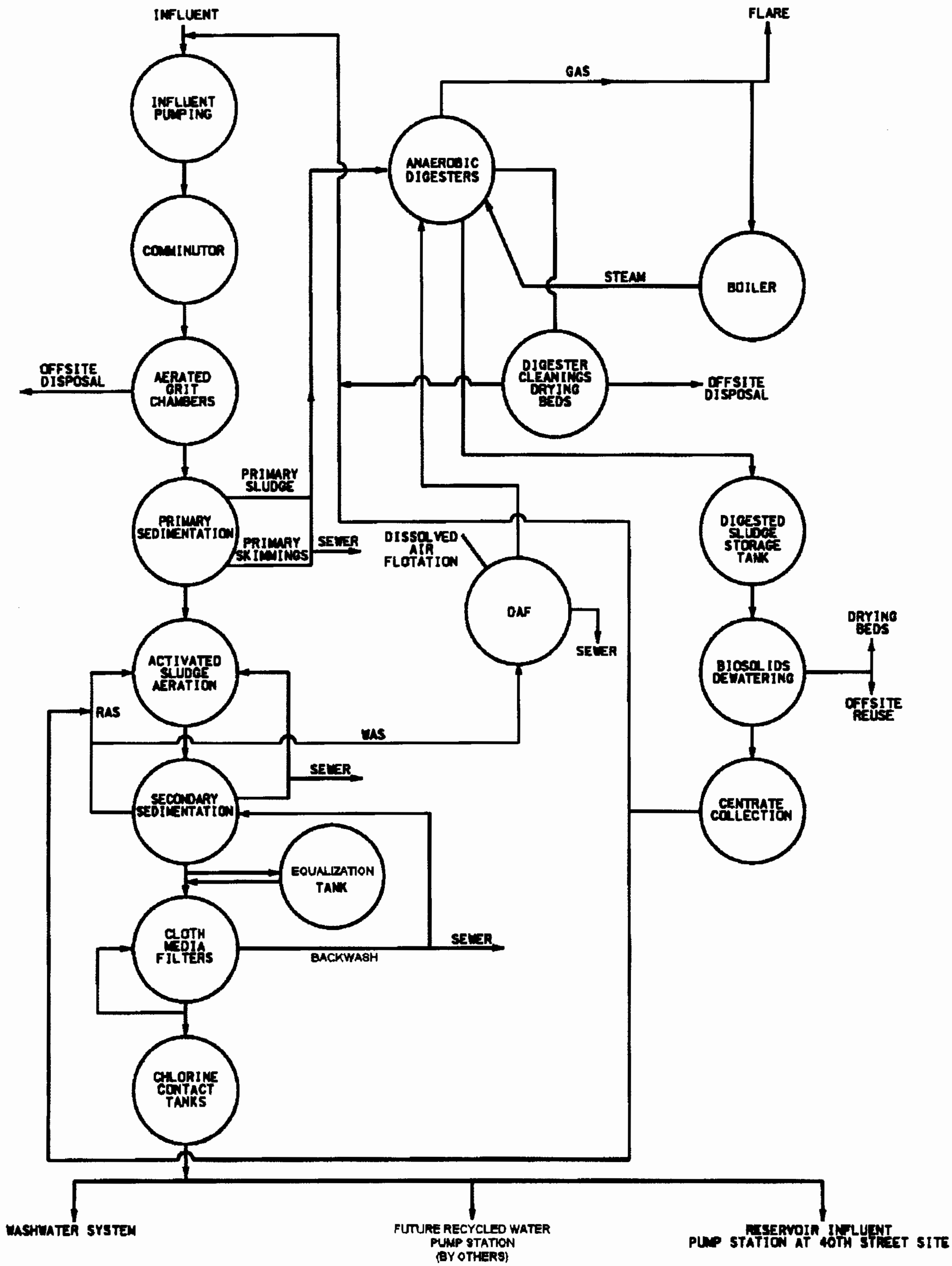
Appendix A

Sample Locations:
Maps, Diagrams, and Photographs

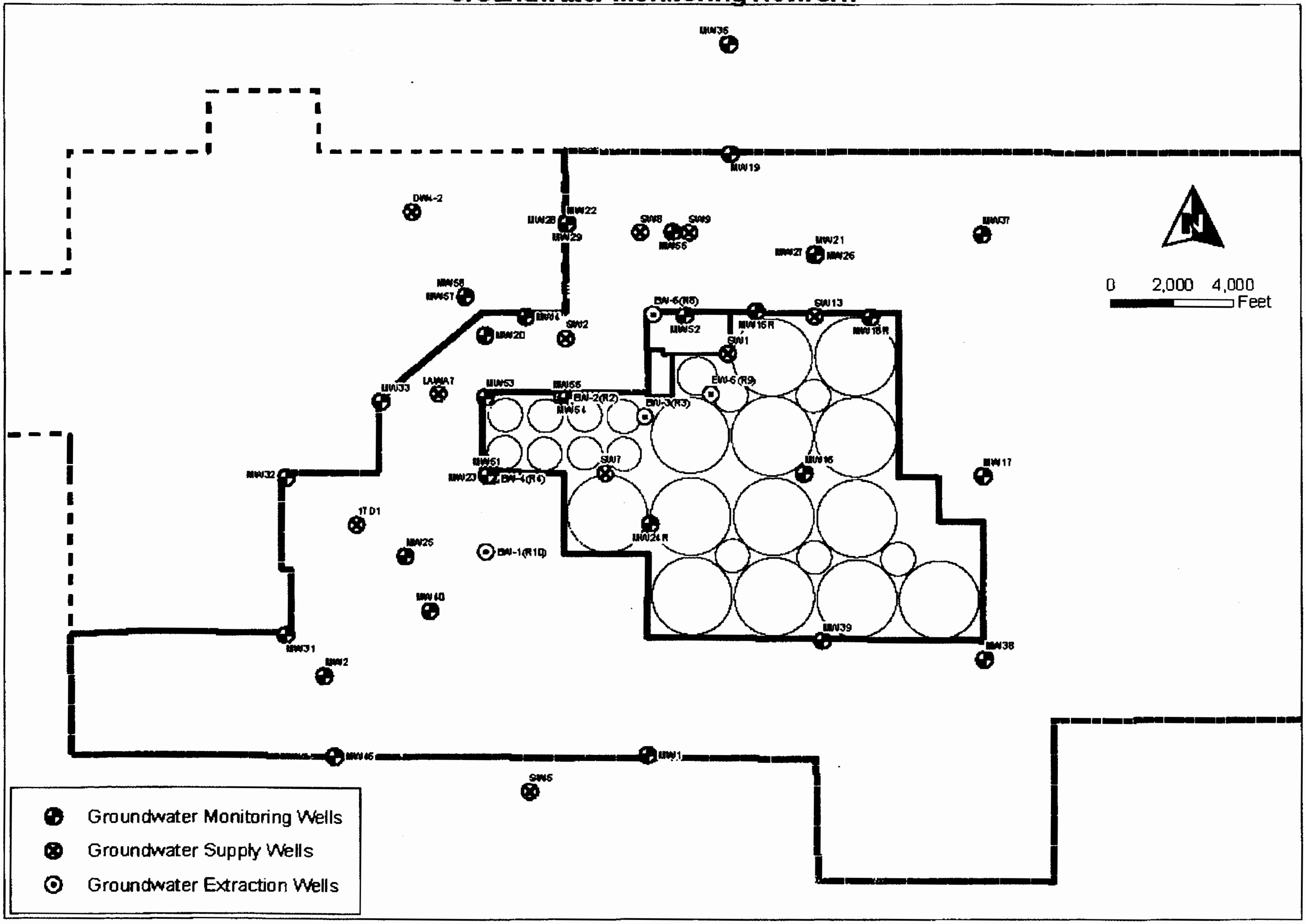
Palmdale Water Reclamation Plant Upgraded Facilities and Sampling Locations



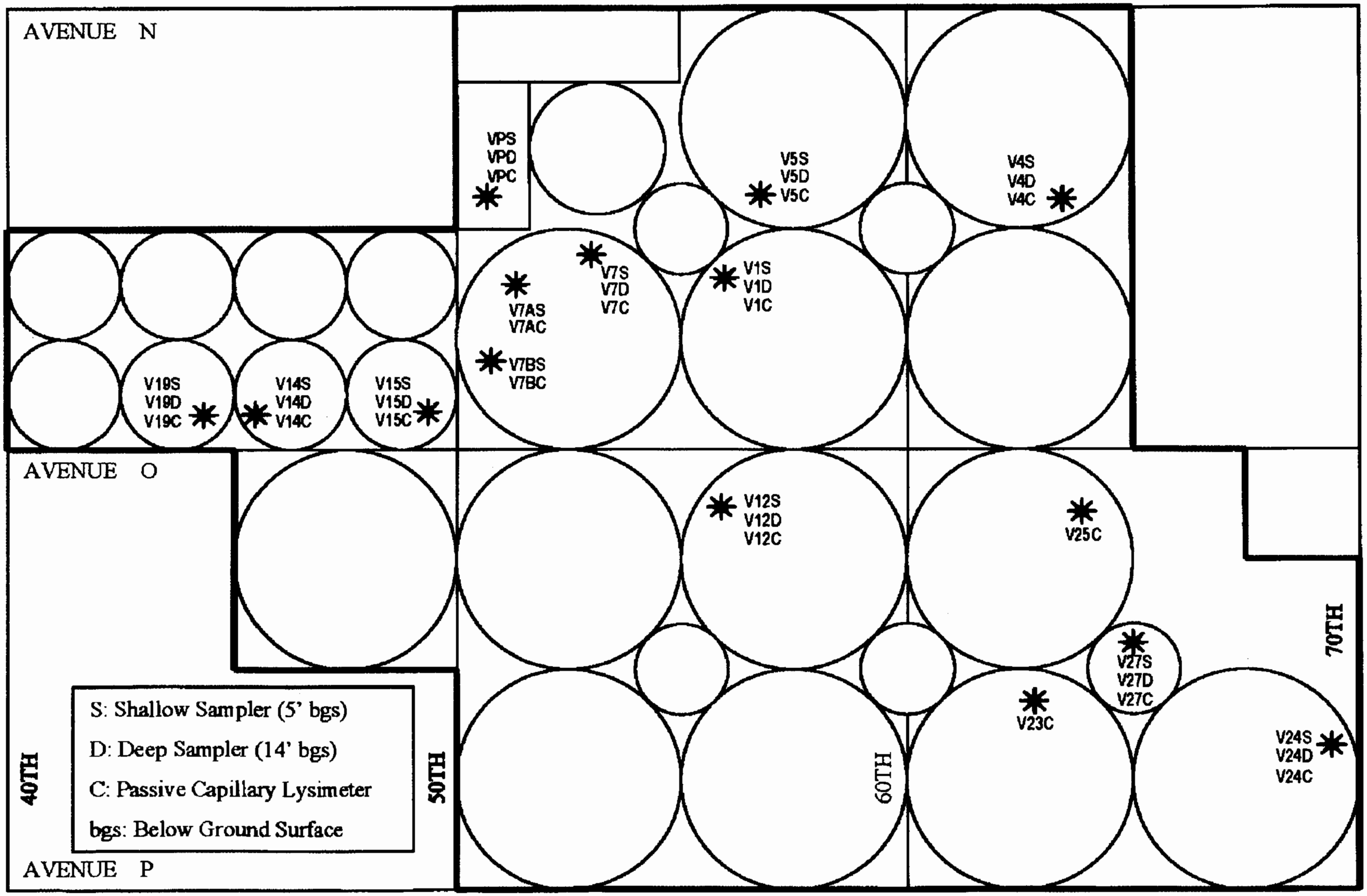
Tertiary Treatment Facilities Process Schematic



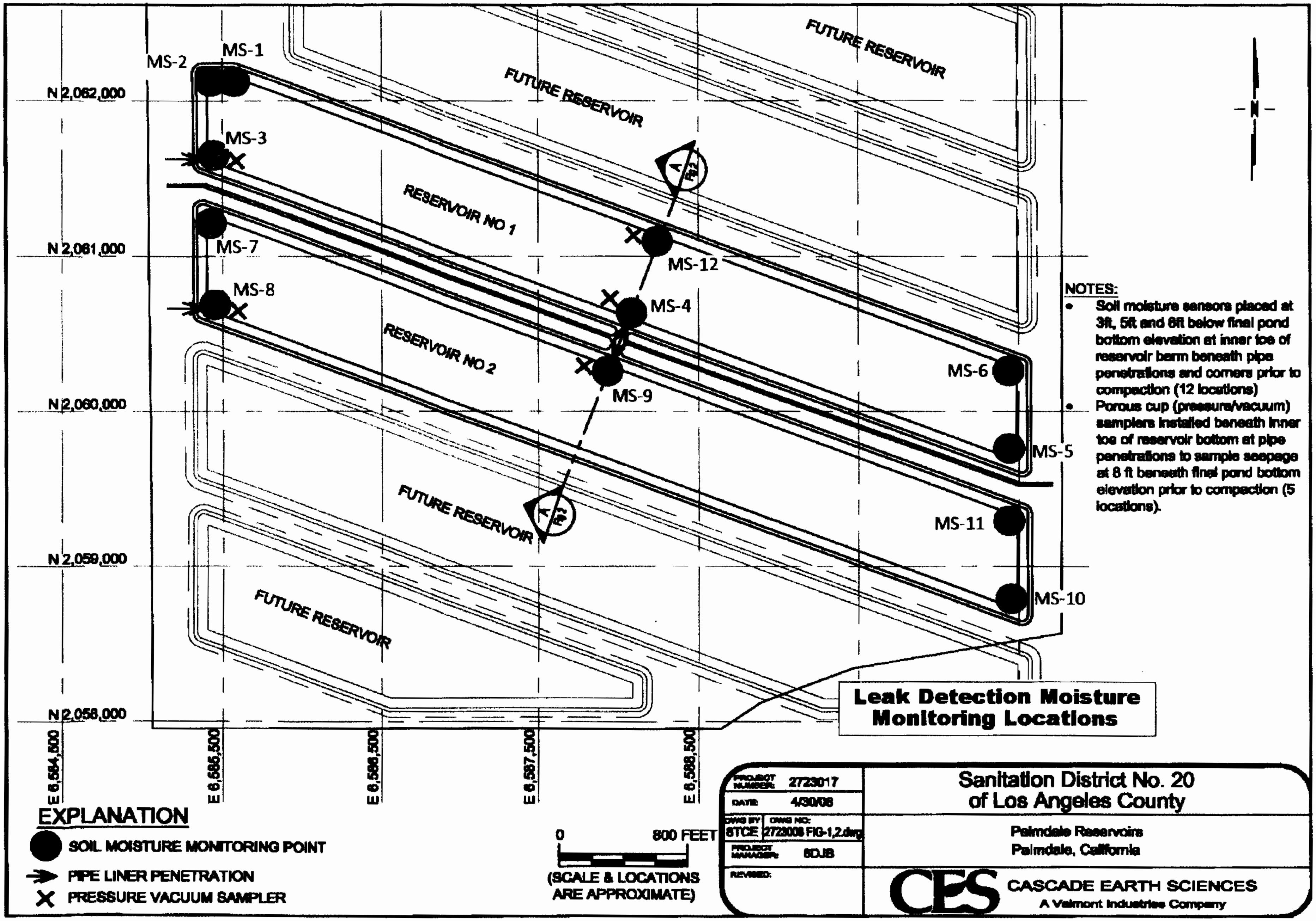
Groundwater Monitoring Network



Palmdale Agricultural Site Vadose Zone Monitoring Locations



Palmdale Storage Reservoir Soil Moisture and Lysimeter Locations



Monitoring Well Survey Data & Specifications

Palmdale Water Reclamation Plant
Palmdale, California

Well Name	Total Depth	Northing	Easting	Ground Surface Elevation	Well Screen Interval
MW-1	400	2037502.70	6549335.03	2590.70	360-400
MW-2	540	2040118.68	6538766.67	2560.61	480-540
MW-4	334	2052029.08	6545407.39	2500.78	292-336
MW-15R	373	2052219.40	6552858.10	2507.92	333-363
MW-16	333	2046854.80	6554373.48	2540.62	281-315
MW-17	290	2046767.52	6560141.64	2545.70	245-290
MW-18R	363	2052021.13	6556537.67	2515.04	326-356
MW-19	337	2057425.72	6552019.87	2488.75	290-335
MW-20	296	2051414.25	6544089.47	2501.66	257-295
MW-21	340	2054123.00	6554750.62	2506.27	300-340
MW-22	322	2055081.45	6546743.43	2487.28	282-320
MW-23	398	2046777.79	6544147.63	2525.42	369-397
MW-24R	358	2045155.50	6549411.66	2541.24	325-350
MW-25	350	2044080.79	6541437.49	2541.10	321-349
MW-26	373	2054081.84	6554746.34	2506.14	361-370
MW-27	401	2054101.23	6554747.28	2506.34	390-399
MW-28	436	2055132.47	6546744.10	2487.85	421-431
MW-29	510	2055109.47	6546744.01	2487.59	491-500
MW-31	520	2041476.81	6537512.68	2557.89	484-518
MW-32	403	2046690.83	6537504.06	2533.85	372-395
MW-33	379	2049208.24	6540626.73	2514.33	363-377
MW-37	359	2054760.76	6560134.16	2508.82	318-353
MW-38	320	2040685.28	6560198.38	2575.19	281-316
MW-39	350	2041306.44	6554954.21	2570.70	307-346
MW-40	364	2042274.80	6542261.12	2551.64	330-360
MW-46	551	2037457.67	6539111.68	2574.42	511-550
MW-51	458	2046787.89	6544376.40	2525.47	331-340
MW-52	353	2052075.29	6550543.03	2506.05	317-347
MW-53	340	2049363.46	6544090.92	2511.59	295-330
MW-54	364	2049395.84	6546871.91	2513.66	331-356
MW-55	483	2049332.46	6546718.30	2513.89	465-475
MW-56	500	2054844.72	6550164.18	2493.86	325-365
MW-57	359	2052690.05	6543446.04	2495.47	339-349
MW-58	440	2052709.35	6543438.26	2495.20	375-390

Appendix B

Sample Collection Standard Operating Procedures

Standard Operating Procedure
Palmdale Water Reclamation Plant
Daily Sample Collection
(Without Custody Transfer)

Introduction

This procedure is to be used when there is no custody transfer and the analyses are performed by the same person(s) responsible for collection of the sample(s). Typically, this type of operation is associated with laboratories located at the water reclamation plant (WRP) site and defined as Treatment Plant Laboratories. Samples collected in this manner are securely maintained on site until analyses have been completed, after which the same person(s) discard the sample(s).

Equipment, Materials and Supplies

- Automated samplers with programmable controls to allow for flow weighted compositing. (SIGMA 900 Max or similar samplers)
- Paddle made of polypropylene for mixing collected sample.
- Large mouth glass sample container for sampler
- Sample bottles which have been pre-cleaned and are compatible with constituents to be analyzed.
- Ice to be used in sampler if it is not refrigerated.
- Sample log book.

Setting & Initiating Sampling

1. Position the sampler at a location representative of effluent being discharged from the WRP after completion of all treatment processes or before treatment processes, if influent untreated wastewater is desired.
2. Obtain typical plant flow data for influent or effluent streams covering a 24-hour period.
3. Establish numerical values that correspond to sample volumes to be collected at intervals that result in a flow weighted composite sample.
4. Enter sampling parameters along with numerical values into the sampler programming unit using the manufacturer's guidelines.
5. Install a clean sample collection container in the sampler and ice if it is not refrigerated.
6. Initiate the start of the sampler program (and confirm the first sample in the sequence is collected).
7. Let it run.

Retrieval & Collection

- At the end of the sample collection period check the sampler to confirm that there was no malfunction and that the appropriate volume of sample was collected.

- Visually inspect the area around the sample collection point to determine if any conditions exist that may lead to unusual analytical results. If the sampler malfunctioned or other conditions prevail that may contribute to unusual results, then record these observations in the sample log book.
- Pre-label clean bottles designated for specific constituent analyses. Sample dates, times, location & type are to be recorded along with the name of the individual collecting the sample.
- Take out sample container from sampler, and in a mix-pour manner, pour aliquots of the sample into pre-labeled bottles that are compatible with constituents to be analyzed.
- Bottles are to be iced from this point till arrival at the laboratory.
- Upon return to the laboratory, immediately commence with analysis of the samples or proper preservation if the sample is to be held.

Sampler Maintenance

- The sampler and its container are to be cleaned with water, detergent, acid, and a solvent as necessary for its next use.
- If batteries are used, they are to be re-charged.

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

Method Number	Not Applicable
Method Name	Sigma Composite Sampling
Version	10.1.0
Method Date	February 18, 2010
Reasons for Method Revision	Annual Review; no revisions were made

Reviewed by:

Kelly Lechuga
Laboratory Technician II
Lancaster Sampling Receiving

Signature: Kelly Lechuga   Date: 3/24/10

Approved by:

Lavern Tamoria
Supervising Chemist
QA/Sample Receiving

Signature: Lavern Tamoria   Date: 3/24/10

Final Approval:

Maria Pang
Assistant Manager of
the Laboratories

Signature   Date: 4/22/10

SIGMA COMPOSITE SAMPLING PROCEDURE

INTRODUCTION

The Sample Receiving group collects influent and effluent samples for priority pollutants and other regulated constituents. The dedicated stationary samplers used by this group are Sigma 900 MAX All Weather Refrigerated Sampler manufactured by the HACH Company and we, therefore, refer to our samplers as Sigmas. Because it is impractical to study the entire body of water treated by a water reclamation plant, a sample is taken that represents the entire body. The Sigma sampler achieves this by collecting either a flow-weighted composite over a 24 hr period for the constantly fluctuating Raw Influent or a time-weighted composite for the Secondary Final Effluent due to its static flow rate. Sample Receiving field crews program the Sigma to collect fixed volumes at designated times based on the average daily flow of the reclamation plant being sampled. The aliquots are combined into a single container during sampling. Once sampling has been completed, the single large volume is divided into smaller containers for transport back to the lab for analysis.

The flow-weighted sample times are created using a flow calculation spreadsheet specific to each plant. The calculations are based on the average daily flow per hour of the reclamation plant's raw influent over a period of 3 days. The days used are typically weekdays which do not immediately follow weekends or holidays. These days are selected to record data that will be most representative of a typical day's influent into the plant. The hourly flows are then averaged into 2 hr increments and entered into a spreadsheet to generate 12 sample times for collection over a 24 hr period. Calculations are updated on a semi-annual basis following the time change for Daylight Savings Time. Time-weighted samples times are programmed into the Sigma at 2 hr intervals based on the start time, usually from 6:00 am to 6:00 am, in a 24 hr period.

Some samples require low-level analysis (e.g., Hg and NDMA). In these cases it is necessary to take further steps in preparing the Sigma sampler prior to sampling to insure no contaminants are introduced from the Sigma sampler or associated tubing. (See 9.)

1. Scope and Application

1.1 The Sigma composite sampler is used to collect a representative sample of the water reclamation plant's activity over a period of 24 hrs.

1.2 Raw influent and final effluent are collected by this method as required by Wastewater Discharge Requirements (WDR) permits.

2. Summary of Method

2.1 Composite samples are collected over a 24 hr period using calculated time intervals.

2.2 Typically 12 collection times for Raw Influent are calculated based on the flow into the particular reclamation plant.

2.3 Typically 12 collection times for the Secondary Final Effluent are set for every two hours from the time the Sigma is programmed.

3. Sample Handling and Preservation

3.1 Water Reclamation Plants (WRP) samples are collected using appropriate containers and preservation methods as directed in Standard Methods for the Examination of Water and Wastewater.

3.2 After collection, and as soon as possible, place samples into an ice chest with ice to keep their temperature at 0-6°C during transport from the sample collection site to Sample Receiving Control (SRC).

3.3 Once removed from the ice chest the samples are placed into a refrigerator or walk-in cooler to maintain the cold temperature for storage.

4. Interferences

4.1 If a reclamation plant is not operating normally, an extreme drop in water level below the strainer may interrupt sampling.

4.2 Interruption in power to the Sigma may cause failure to complete sampling.

4.3 During excessive rainfall, it may not be possible to collect a representative sample.

4.4 During excessive cold weather, sample line to the Sigma may freeze.

5. Apparatus

5.1 Sigma 900 MAX All Weather Refrigerated Sampler (Figure 1)

5.2 10, 12, or 25 ft, 3/8" ID – Teflon lined suction tubing with stainless steel strainer

5.3 3 ft Silastic medical grade silicon tubing

5.4 1 to 4 10 L glass jars depending on amount to be collected

5.5 Teflon stir bar

5.6 Stainless steel funnel

6. Reagents

6.1 ACS Grade Sodium Thiosulfate crystals

7. Procedure

7.1 Sigma Setup

7.1.1 Open the top cover from the Sigma sampler unit (Figure 1).

7.1.2 Remove cover plates from the pump case and liquid detector.

7.1.3 Thread the silicon tubing through the pump tube port and the center section tube guide.

7.1.4 Thread the other end of the silicon tubing through the pump case and the liquid detector.

7.1.5 Replace pump and liquid detector covers. When complete, the setup should look like Figure 2.

7.1.6 Place the 10 L glass jars into the refrigerated section.

7.1.7 If a dechlorinated sample is required, add 0.5 g of Sodium Thiosulfate crystals per 1 L of sample to the 10 L jar (approximately 4.5 g for a full sampling event).

7.1.8 Close the sampler.

7.2 Programming the Sigma

7.2.1 Basic set up is performed at initial equipment installation (see catalog #8854 Sigma 900 MAX All Weather Refrigerator user manual for instructions) operator must use the "Modify" option when programming the Sigma for sampling.

7.2.2 Figure 3 shows the programming tree of the programming options.

7.2.3 The first display should be MAIN MENU as seen in Figure 4. From the Main Menu select SETUP>MODIFY ALL ITEMS. Press ACCEPT.

7.2.4 Enter the number of sample bottles and the bottle volume. Select gallons or milliliters using the CHANGE UNIT key. Press ACCEPT and continue to Intake Tubing.

7.2.5 Enter the intake tube length of the intake tubing attached to the sampler. Length values from 100 to 3000cm (3 to 99ft) are valid. Change measurement unit using the CHANGE UNITS key. Press ACCEPT to move to the Intake Tubing Type

7.2.6 Select the type of intake tube (3/8 in. Teflon). Press ACCEPT pass PROGRAM LOCK and PROGRAM DELAY to continue with Sample Collection.

7.2.7 Select the type of sample collection; Time Proportional or Flow-Proportional Constant Volume, Variable Time (CVVT)

7.2.7.1 For **Time Proportional sampling** (time-weighted) go to Sample Collection menu, press CHANGE CHOICE until Timed Proportional is displayed, press ACCEPT and enter the interval between samples (normally two hours) and press ACCEPT. Select TAKE FIRST SAMPLE IMMEDIATELY or AFTER FIRST INTERVAL, press ACCEPT to start sampling program.

7.2.7.2 For **Flow Proportional Constant Volume, Variable Time (CVVT)** (flow-weighted) go to Sample Collection menu and press CHANGE CHOICE until Flow Proportional is displayed, press ACCEPT. In the Flow Proportional menu press CHANGE until CVVT is displayed. Press ACCEPT. Select either Internal or External flow meter and press ACCEPT. Enter the flow volume between samples and select a unit of measure using the CHANGE UNITS key. Enable or Disable the Timed Over-Ride using the CHANGE CHOICE key. Press ACCEPT, then enter a time period using numeric key. Select Take First Sample Immediately or After First Interval, press ACCEPT to start sampling program.

7.3 Setting up Sampler at the Reclamation Plant

7.3.1 Prior to departing for the sample location, contact the operations group of the reclamation plant to ensure the plant is operating normally.

7.3.2 Upon arrival to the sample location observe the surrounding area for normal sampling conditions. Note any unusual events if any are observed.

7.3.3 Open the cover of the top section.

7.3.4 Insert the Teflon lined suction tube into the loose end of the silicon pump tubing about 1 to 1.5 cm.

7.3.5 Lower the stainless steel strainer into the sample source. The strainer should be about 2 ft below the surface of the sample source. This depth can vary depending on the conditions of the source; however, 2 ft should be sufficient for most conditions.

7.3.6 Proceed with Programming the Sigma.

7.3.7 Replace the top cover.

7.4 Sigma Sampler Collection

7.4.1 Remove top cover.

7.4.2 Check display, it will indicate if any problem occurred while sampling

7.4.3 Remove suction tubing from pump tubing. If sample remains in the tubing, press REVERSE PUMP to purge the line.

7.4.4 Open refrigerated section of the sampler and remove sample jars.

7.4.5 Gently stir sample with Teflon bar.

7.4.6 Carefully pour sample into appropriate sample containers. If necessary, use a stainless steel funnel to aid in pouring.

7.4.7 Dump any remaining sample back into the sample source.

7.4.8 Collect all materials (tubing, cones, etc.) and store them securely in the vehicle.

7.4.9 Preserve samples as necessary and place all samples in an ice chest for transport. Take the necessary precautions in loading the cooler to prevent breakage during transport.

7.5 Cleaning the Sampler

7.5.1 Wash all equipment with Liquinox and water.

7.5.2 Run Liquinox through suction tubing using an Isco portable sampler pump.

7.5.3 Flush suction tubing thoroughly with tap water to remove all soap.

7.5.4 Rinse the inner surface of the 10L glass jar with a 1:1 nitric acid solution. Carefully move the acid solution around inside the jar to sufficiently coat the inner surface of the jar.

7.5.5 Dump excess acid into a sink under a fume hood and rinse the jar with copious volumes of DI water.

7.5.6 Rinse all equipment with methanol. Add a small amount into the tubing and jars. Move the methanol around in the equipment to sufficiently rinse the inner surface.

7.5.7 Rinse all equipment several times with DI water.

7.5.8 Set equipment out to air dry.

8. Calculations

8.1 Table 1 shows an example of the average daily flow measurements over a period of 3 days. The 2 hr averages are used in Table 1 to calculate sample collection times.

8.2 The calculations take into account the total average daily flow, the ratio of the 2 hr average flow, and the cumulative ratio of total flow to derive sample times which would be the most representative for the given 2 hr time interval.

9. Quality Assurance Guidelines

9.1 Equipment Blank

9.1.1 Fill a 10 L glass jar with reagent-grade water.

9.1.2 Place the stainless steel strainer into the 10L glass jar filled with reagent-grade water.

9.1.3 Press MANUAL SAMPLE or PUMP FORWARD to run the reagent-grade water through the sampling equipment and into the sample collection jar.

9.1.4 Pour off the collected water into appropriate containers for analysis.

9.2 NDMA Equipment Blank

9.2.1 Sampling the equipment blank and bottle blank for NDMA follows the same procedure as listed in 9.1 with a few additions.

9.2.3 The sample containers must be rinsed three times with laboratory's reagent-grade water before filling for the equipment blank or bottle blank.

10. Method Performance

10.1 Not Applicable.

11. References

11.1 User Manual Sigma 900 MAX All Weather Refrigerated Sampler, Copyright 2006.

11.2 Laboratory Section Procedures for the Characterization of Water and Wastewater, Fourth Edition, 1989, p. II-1 to II-14 – Sampling.

11.3 Sampling Receiving Control – Field Sampling Protocol, Section 1.

Figure 1.

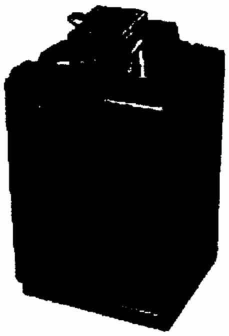


Figure 2.

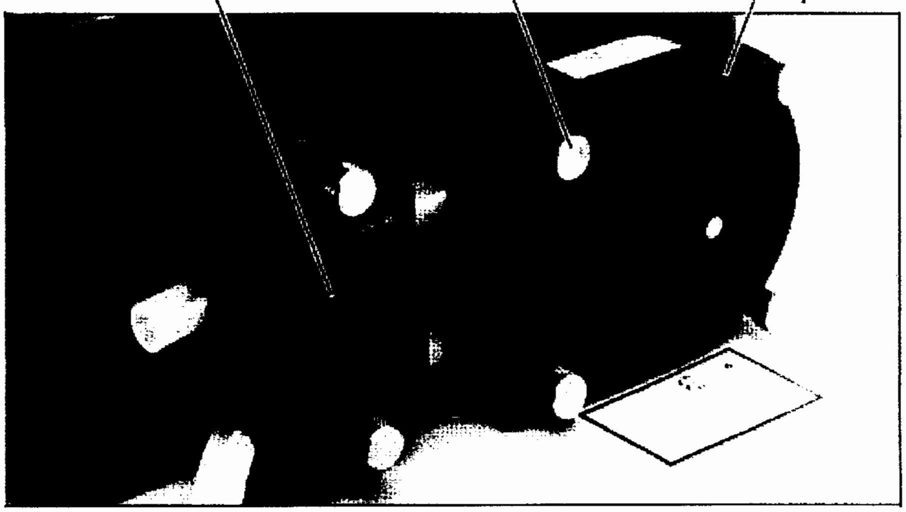


Figure 3.

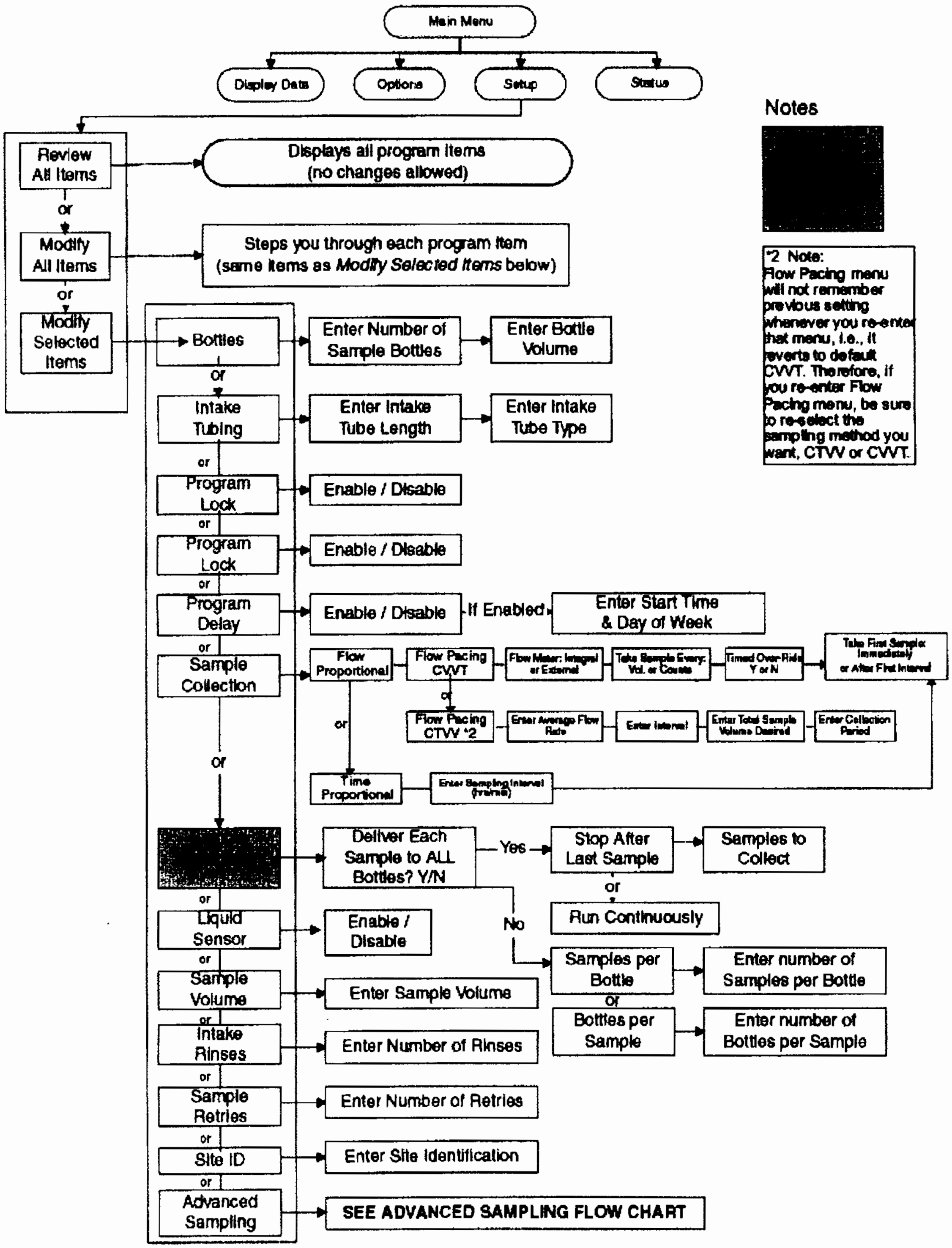

Main Menu
Display Data
Options
Setup
Status
Notes
[redacted]
*2 Note:
Flow Pacing menu will not remember previous setting whenever you re-enter that menu, i.e., it reverts to default CVVT. Therefore, if you re-enter Flow Pacing menu, be sure to re-select the sampling method you want, CTVV or CVVT.
Review All Items
or
Modify All Items
or
Modify Selected Items
Displays all program items (no changes allowed)
Steps you through each program item (same items as *Modify Selected Items* below)
Bottles
Enter Number of Sample Bottles
Enter Bottle Volume
or
Intake Tubing
Enter Intake Tube Length
Enter Intake Tube Type
or
Program Lock
Enable / Disable
or
Program Lock
Enable / Disable
or
Program Delay
Enable / Disable
If Enabled
Enter Start Time & Day of Week
or
Sample Collection
Flow Proportional
Flow Pacing CVVT
Flow Meter: Integral or External
Take Sample Every: Vol. or Counts
Timed Over Ride Y or N
Take First Sample: Immediately or After First Interval
or
Flow Pacing CTVV *2
Enter Average Flow Rate
Enter Interval
Enter Total Sample Volume Desired
Enter Collection Period
or
Time Proportional
Enter Sampling Interval (hr:min)
or
[redacted]
Deliver Each Sample to ALL Bottles? Y/N
Yes
Stop After Last Sample
Samples to Collect
or
Run Continuously
No
Samples per Bottle
Enter number of Samples per Bottle
or
Bottles per Sample
Enter number of Bottles per Sample
or
Liquid Sensor
Enable / Disable
or
Sample Volume
Enter Sample Volume
or
Intake Rinses
Enter Number of Rinses
or
Sample Retries
Enter Number of Retries
or
Site ID
Enter Site Identification
or
Advanced Sampling
SEE ADVANCED SAMPLING FLOW CHART

Table 1.

FLOW WEIGHTED COMPOSITE CALCULATIONS:

TIME	AVERAGE FLOW (MGD)	RATIO OF TOTAL FLOW	CUMULATIVE FLOW		SAMPLING TIMES
2.00	5.55	0.0667	0.066693	2.4632	2.28
4.00	5.97	0.0717	0.138394	4.7325	4.44
6.00	6.50	0.0781	0.216503	6.7637	6.46
8.00	7.30	0.0877	0.304226	8.6486	8.39
10.00	7.38	0.0887	0.39295	10.515	10.31
12.00	7.77	0.0933	0.486281	12.288	12.17
14.00	7.92	0.0951	0.581414	14.034	14.02
16.00	7.85	0.0943	0.675746	15.815	15.49
18.00	7.68	0.0923	0.768075	16.246	16.15
20.00	7.75	0.0931	0.861206	19.394	19.24
22.00	6.03	0.0725	0.933707	21.539	21.32
24.00	5.52	0.0663	1	24	24.00
TOTAL FLOW =	83.22 MGD				

Example Flow Calculation (first 2hr time interval):

$$\frac{(2/24) * 2}{0.563} + 4 - \frac{2}{0.0563} * 0.135428 = 2.14$$ (sample collection time in decimal form)

$(2.14 - 2) * 0.6 + 2 = 2.09$ (sample collection time)

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

Method Number	Not Applicable
Method Name	ISCO Composite Sampling Procedure
Version	10.1.0
Method Date	February 09, 2010
Reasons for Method Revision	Annual review; no modifications were made

Written by:

Jessica Pacheco
Laboratory Technician II
QA/Sample Receiving

Jessica Pacheco — Signature — 2/10/10 — Date

Approved by:

Lavern Tamoria
Supervising Chemist
QA/Sample Receiving

Lavern Tamoria — Signature — 3/10/2010 — Date

Final Approval:

Maria Pang
Assistant Manager of
the Laboratories

Signature — 3/15/10 — Date

ISCO COMPOSITE SAMPLING

INTRODUCTION

The Sample Receiving group collects influent and effluent samples for priority pollutants and other regulated constituents. The portable samplers used by this group are manufactured by the ISCO Company and we, therefore, refer to our samplers as ISCOs. Because it is impractical to study the entire body of water treated by a water reclamation plant, a sample is taken that represents the entire body. The ISCO sampler achieves this by collecting a flow-weighted composite over a 24 hr period. Sample Receiving field crews set up ISCOs to collect fixed volumes at designated times based on the average daily flow of the reclamation plant being sampled. The aliquots are combined into a single container during sampling. Once sampling has been completed, the single large volume is divided into smaller containers for transport back to the lab for analysis.

The flow-weighted sample times are created using a flow calculation spreadsheet specific to each plant. The calculations are based on the average daily flow per hour of the reclamation plant's final effluent discharge over a period of 3 days. The days used are typically weekdays which do not immediately follow weekends or holidays. These days are selected to record data that will be most representative of a typical day of discharge from the plant. The hourly flows are then averaged into 2 hr increments and entered into a spreadsheet to generate 12 sample times for collection over a 24 hr period. Calculations are updated on a semi-annual basis following the time change for Daylight Savings Time.

Some samples require low-level analysis (e.g., Hg and NDMA). In these cases it is necessary to take further steps in preparing the ISCO sampler prior to sampling to insure no contaminants are introduced to the sample from the sampler (see 9.).

1. Scope and Application

    1.1 The ISCO composite sampler is used to collect a representative sample of the water reclamation plant's activity over a period of 24 hrs.

    1.2 Raw influent and final effluent are collected by this method as required by National Pollution Discharge Elimination System (NPDES) permits.

2. Summary

    2.1 Composite samples are collected over a 24 hr period using calculated time intervals.

    2.2 Typically 12 collection times are calculated based on the flow discharged from the particular reclamation plant.

3. Sample Handling and Preservation

   3.1 Water Reclamation Plants (WRP) samples are collected using appropriate containers and preservation methods as directed in Standard Methods for the Examination of Water and Wastewater.

   3.2 After collection, and as soon as possible, place samples into an ice chest with ice to keep their temperature at 0-6°C during transport from the sample collection site to Sample Receiving Control (SRC).

   3.3 Once removed from the ice chest the samples are placed into a refrigerator or walk-in cooler to maintain the cold temperature for storage.

4. Interferences

   4.1 If a reclamation plant is not operating normally, an extreme drop in water level below the stainless steal strainer may interrupt sampling.

   4.2 Insufficiently charged batteries may cause failure to complete sampling.

   4.3 During excessive rainfall, it may not be possible to collect a representative sample.

5. Apparatus

   5.1 ISCO 3710 Compact portable sampler (Figure 1)

   5.2 10, 12, or 25 ft, 3/8" ID – Teflon lined suction tubing with stainless steel strainer

   5.3 3 ft Silastic medical grade silicon tubing

   5.4 10 L glass jar

   5.5 Charged rechargeable Ni/Cd or lead/acid battery

   5.6 Teflon stir bar

   5.7 Stainless steel funnel

   5.8 Orange safety cones

6. Reagents

6.1 Sodium Thiosulfate crystals

7. Procedure

7.1 ISCO Setup

7.1.1 Remove the top cover from the ISCO sampler unit (Figure 1).

7.1.2 Remove cover plates from the pump case and liquid detector (Figure1).

7.1.3 Thread the silicon tubing through the pump tube port and the center section tube guide (Figure 2).

7.1.4 Thread the other end of the silicon tubing through the pump case and the liquid detector as shown in Figure 3.

7.1.5 Replace pump and liquid detector covers.

7.1.6 Place the 10 L glass jar into the base section.

7.1.7 Fill the remaining space of the base section around the 10 L jar with ice.

7.1.8 If a dechlorinated sample is required, add 0.5 g of Sodium Thiosulfate crystals per 1 L of sample to the 10 L jar (approximately 4.5 g for a full sampling event).

7.1.9 Reassemble the sampler.

7.2 Programming the ISCO

7.2.1 Press the ON/OFF button to turn the sampler ON.

7.2.2 Figure 4 shows the programming tree of the programming options.

7.2.3 The first display should be STANDBY as seen in Figure 4. Anything other than STANDBY indicates the sampler encountered a problem during its last use. If this has happened the screen may read PROGRAM HALTED and should be treated the same as if it read STANDBY for initial programming. Press the ENTER/PROGRAM button to begin programming.

7.2.4 Figure 4 - Display #1, will appear as the next screen. Use the Left or Right Arrow keys to highlight PROGRAM, the selected item should flash when highlighted, and press ENTER.

7.2.5 Table 1 shows the series of steps to follow and the appropriate selection for each.

7.2.6 Next enter the appropriate collection times. Use Flow Calculations for the specific reclamation plant being sampled (Table 3).

7.2.7 Enter hours HH, minutes MM, day DD, and month MM pressing ENTER after each to proceed to the next. By default the day and month displayed will be the current day and month, where as the times will be the times previously programmed.

7.2.8 At 2400 hours enter 00:00 for the time value and advance the day to the next day.

7.2.9 Enter 750 mL for the sample volume; press ENTER.

7.2.10 This should complete programming and PROGRAMMING SEQUENCE COMPLETED should appear briefly before returning to the initial STANDBY screen.

7.2.11 Occasionally after entering the volume other options may appear on the display screen depending on the configuration of the sampler. Typically these two options will appear: SUCTION HEAD OF: 12 FEET (1 – 12) and CALIBRATE SAMPLE VOLUME [YES, NO]. If this does occur, enter the length of suction line being used for the first option and select NO for the second.

7.3 Setting up Sampler at the Reclamation Plant

7.3.1 Prior to departing for the sample location, contact the operations group of the reclamation plant to ensure the plant is operating normally.

7.3.2 Upon arrival to the sample location observe the surrounding area for normal sampling conditions. Note any unusual events if any are observed.

7.3.3 Place sampler at the appropriate sample location.

7.3.4 Remove the cover of the top section.

7.3.5 Insert the Teflon lined suction tube into the loose end of the silicon pump tubing about 1.5 to 2 cm.

7.3.6 Lower the stainless steel strainer into the sample source. The strainer should be about 2 ft below the surface of the sample source. This depth can vary depending on the conditions of the source; however, 2 ft should be sufficient for most conditions.

7.3.7 Wrap excess suction tubing around the base of the sampler. Be sure not to allow the tubing to become kinked or crushed under the weight of the sampler.

7.3.8 Press START SAMPLING, the display should read: SAMPLE 1 of 12, at HH:MM

7.3.9 Replace the top cover.

7.3.10 Place a safety cone near the sampler so that the equipment is clearly visible.

7.4 ISCO Sampler Pick-Up

7.4.1 Remove top cover.

7.4.2 Check display, it should read: DONE 12 SAMPLES

7.4.3 Remove suction tubing from pump tubing. If sample remains in the tubing, press REVERSE PUMP to purge the line.

7.4.4 Remove the center section from the base section.

7.4.5 Gently stir sample with a clean Teflon bar.

7.4.6 Carefully remove jar from base section. Avoid putting fingers inside the sample jar to remove it from the base.

7.4.7 Carefully pour sample into appropriate sample containers. If necessary, use a clean stainless steel funnel to aid in pouring.

7.4.8 Return any remaining sample back into the sample source.

7.4.9 Replace the jar into the base section and reassemble the sampler for transport back to SRC.

7.4.10 Collect all materials (tubing, cones, etc.) and store them securely in the vehicle.

7.4.11 Preserve samples as necessary and place all samples in an ice chest for transport. Take the necessary precautions in loading the cooler to prevent breakage during transport.

7.5 Cleaning the Sampler

7.5.1 Wash all equipment with Liquinox and water.

7.5.2 Run Liquinox through pump and suction tubing.

7.5.3 Flush pump and suction tubing thoroughly with tap water to remove all soap.

7.5.4 Rinse the inner surface of the 10 L ISCO jar with a 1:1 nitric acid solution. Carefully swirl the acid solution around the inside the jar to sufficiently coat the inner surface of the jar.

7.5.5 Dispose excess acid into a sink under a fume hood and rinse the jar with copious volumes of DI water.

7.5.6 Rinse all equipment with methanol. Add a small amount into the tubing and jars. Swirl the methanol around in the equipment to sufficiently rinse the inner surface.

7.5.7 Rinse all equipment several times with DI water.

7.5.8 For the final rinse use reagent-grade water from the SJC MRQA laboratory. Put the water into a carboy to be used at the cleaning station in SRC. Water should be renewed per each cleaning event.

7.5.9 Set equipment out to air dry.

8. Calculations

8.1 Table 2 shows an example of the average daily flow measurements over a period of 3 days. The 2 hr averages are used in Table 2 to calculate sample collection times.

8.2 The calculations take into account the total average daily flow, the ratio of the 2 hr average flow, and the cumulative ratio of total flow to derive sample times which would be the most representative for the given 2 hr time interval.

9. Quality Assurance Guidelines

9.1 Equipment Blank

9.1.1 Fill a 10 L glass jar with reagent-grade water.

9.1.2 Setup an ISCO sampler for normal sampling.

9.1.3 Place the stainless steel strainer into the 10 L ISCO jar filled with reagent-grade water.

9.1.4 Press MANUAL SAMPLE or PUMP FORWARD to run the reagent-grade water through the sampling equipment and into the sample collection jar.

9.1.5 Pour off the collected water into appropriate containers for analysis.

9.2 NDMA Equipment Blank

9.2.1 Sampling the equipment blank and bottle blank for NDMA follows the same procedure as listed in 9.1 with a few additions.

9.2.2 The source for the reagent-grade water is the SJC MRQA Laboratory; the laboratory where the sample will be analyzed.

9.2.3 Sample containers (4 L amber jugs) must be thoroughly rinsed with the laboratory's reagent-grade water. Rinse the containers several times before filling for the equipment blank or bottle blank.

10. Method Performance

10.1 Not Applicable

11. References

11.1 Instruction Manual 3710 Standard and Compact Sampler, Copyright 1996, Issued: July 12, 1996, Revision: D, January 1998.

11.2 Laboratory Section Procedures for the Characterization of Water and Wastewater, Fourth Edition, 1989, p. II-1 to II-14 – Sampling.

11.3 Sample Receiving Control – Field Sampling Protocol, Section 1.

FIGURE 1

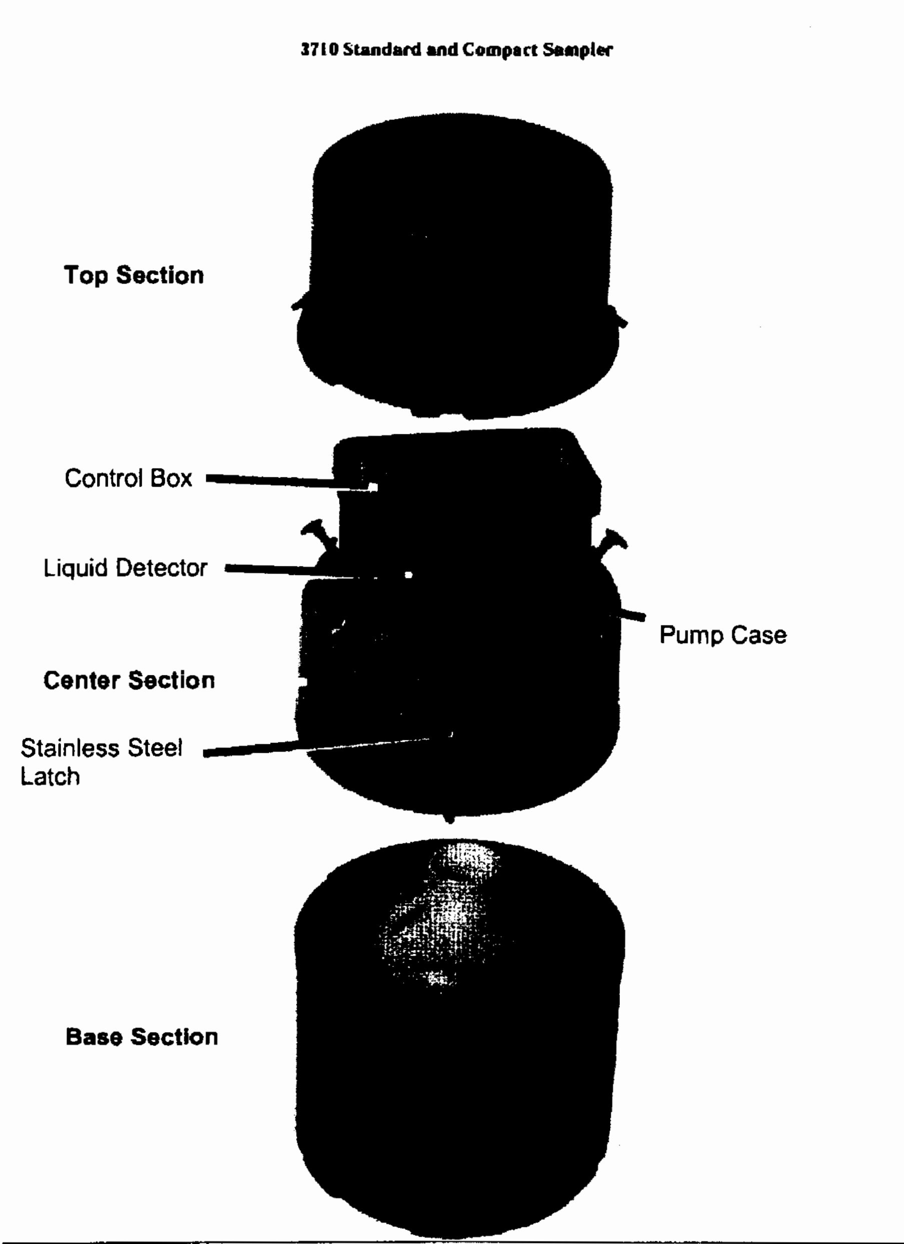

3710 Standard and Compact Sampler
Top Section
Control Box
Liquid Detector
Pump Case
Center Section
Stainless Steel
Latch
Base Section

FIGURE 2

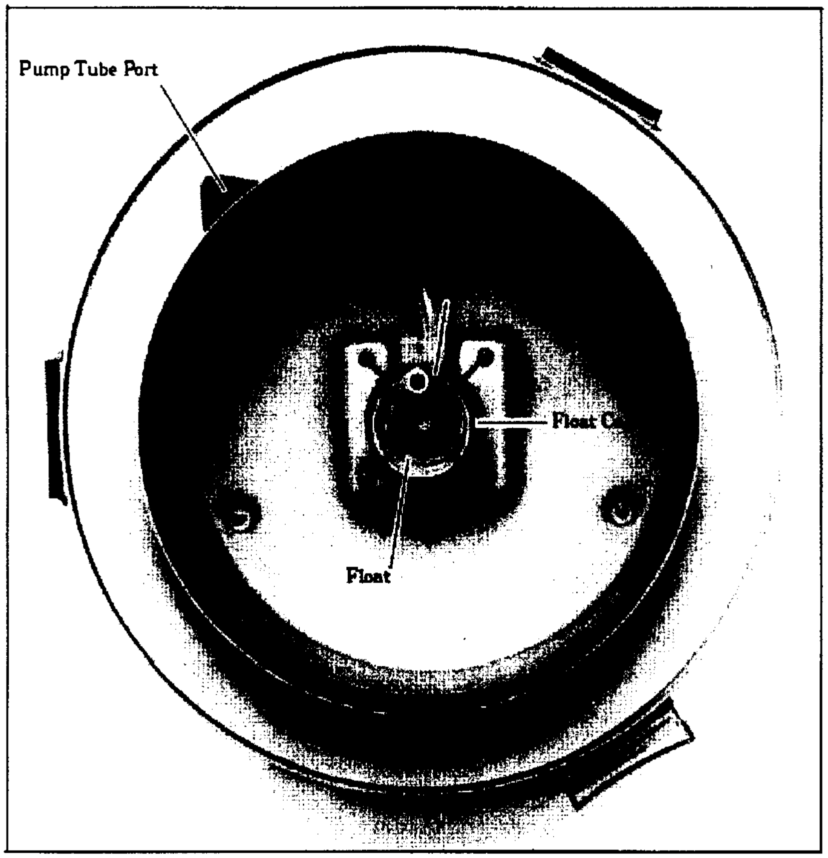


FIGURE 3

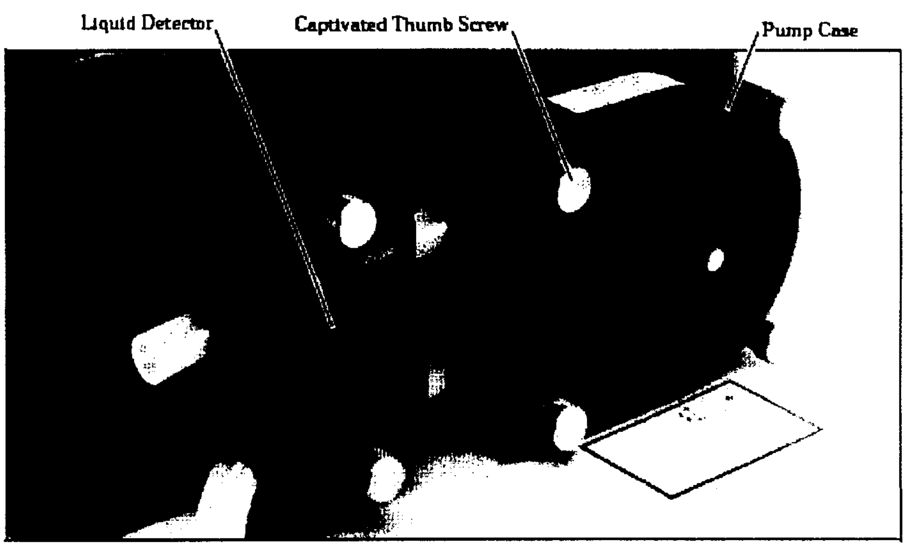


FIGURE 4

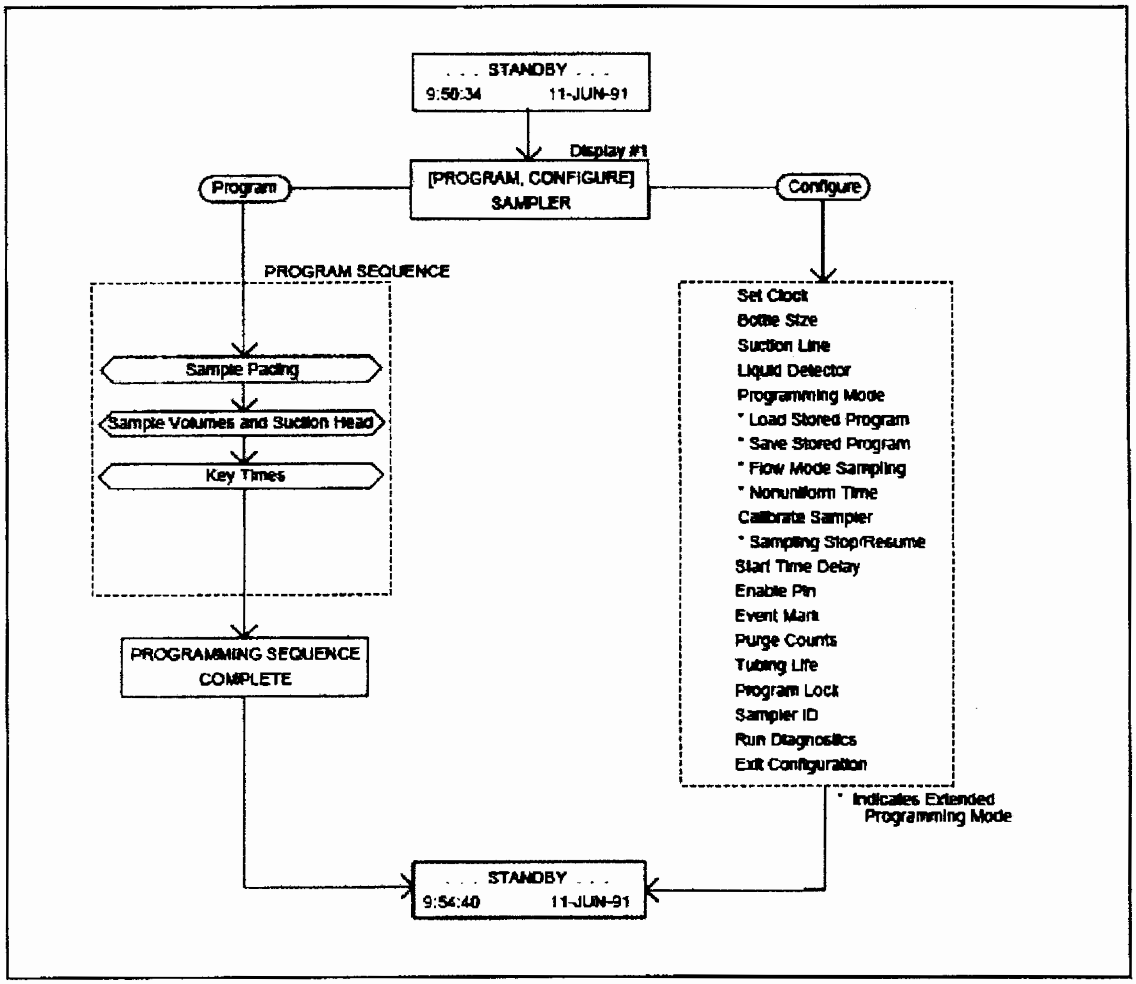

. . . STANDBY . . .
9:50:34 11-JUN-91
Display #1
[PROGRAM, CONFIGURE] SAMPLER
Program
Configure
PROGRAM SEQUENCE
Sample Pacing
Sample Volumes and Suction Head
Key Times
PROGRAMMING SEQUENCE COMPLETE
Set Clock
Bottle Size
Suction Line
Liquid Detector
Programming Mode
* Load Stored Program
* Save Stored Program
* Flow Mode Sampling
* Nonuniform Time
Calibrate Sampler
* Sampling Stop/Resume
Start Time Delay
Enable Pin
Event Mark
Purge Counts
Tubing Life
Program Lock
Sampler ID
Run Diagnostics
Exit Configuration
* Indicates Extended Programming Mode
. . . STANDBY . . .
9:54:40 11-JUN-91

TABLE 1

SECTION	CHOICES	SELECTION
SAMPLER	PROGRAM, CONFIGURE	PROGRAM
PACED SAMPLING	TIME, FLOW	TIME
TIME INTERVALS	UNIFORM, NONUNIFORM	NONUNIFORM
MODIFY SEQUENCE	YES, NO	YES

TABLE 2

TIME	FLOW 11/13/07	FLOW 11/14/07	FLOW 11/15/07	AVERAGE FLOW	2-HOUR AVE FLOW
1:00	5.30	5.40	5.80	5.50	
2:00	5.20	5.50	6.10	5.60	5.55
3:00	5.50	6.10	6.00	5.87	
4:00	6.00	6.10	6.10	6.07	5.97
5:00	5.80	6.40	6.70	6.30	
6:00	6.50	6.90	6.70	6.70	6.50
7:00	7.00	7.20	7.50	7.23	
8:00	6.90	7.50	7.70	7.37	7.30
9:00	6.90	7.50	7.70	7.37	
10:00	6.90	8.20	7.10	7.40	7.38
11:00	7.60	8.70	7.70	8.00	
12:00	7.60	7.00	8.00	7.53	7.77
13:00	7.80	7.90	8.10	7.93	
14:00	7.50	8.20	8.00	7.90	7.92
15:00	7.50	8.30	7.80	7.87	
16:00	7.20	8.30	8.00	7.83	7.85
17:00	7.30	7.90	8.00	7.73	
18:00	7.30	7.80	7.80	7.63	7.68
19:00	7.40	8.10	8.10	7.87	
20:00	7.50	7.80	7.60	7.63	7.75
21:00	7.30	5.70	6.60	6.53	
22:00	5.50	5.90	5.20	5.53	6.03
23:00	5.60	5.90	5.00	5.50	
0:00	5.50	6.50	4.60	5.53	5.52

TABLE 3

FLOW WEIGHTED COMPOSITE CALCULATIONS

TIME	AVERAGE FLOW (MGD)	RATIO OF TOTAL FLOW	CUMULATIVE FLOW	SAMPLING TIMES	
2.00	5.55	0.0667	0.066693	2.4632	2.28
4.00	5.97	0.0717	0.138394	4.7325	4.44
6.00	6.50	0.0781	0.216503	6.7637	6.46
8.00	7.30	0.0877	0.304226	8.6486	8.39
10.00	7.38	0.0887	0.392950	10.515	10.31
12.00	7.77	0.0933	0.486281	12.288	12.17
14.00	7.92	0.0951	0.581414	14.034	14.02
16.00	7.85	0.0943	0.675746	15.815	15.49
18.00	7.68	0.0923	0.768075	16.246	16.15
20.00	7.75	0.0931	0.861206	19.394	19.24
22.00	6.03	0.0725	0.933707	21.539	21.32
24.00	5.52	0.0663	1	24	24.00
TOTAL FLOW =	83.22 MGD				

Example Flow Calculation (first 2hr time interval):

$$\frac{(2/24) * 2}{0.563} + 4 - \frac{2}{0.0563} * 0.135428 = 2.14$$ (sample collection time in decimal form)

$(2.14 - 2) * 0.6 + 2 = 2.09$ (sample collection time)

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

Method Number	Not Applicable
Method Name	Volatile Organic Compound Sampling
Version	09.1.0
Method Date	November 19, 2009
Reasons for Method Revision	First formal written procedure

Written or revised by:

Andre Dubois
Laboratory Technician
QA/Sample Receiving

Signature — Date: 1/14/10

Approved by:

Lavern Tamoria
Supervising Chemist
QA/Sample Receiving

Signature: Lavern Tamoria — Date: 1/14/2010

Final Approval:

Maria Pang
Assistant Manager of
the Laboratories Section

Signature — Date: 3/17/2010

VOLATILE ORGANIC COMPOUND SAMPLING

INTRODUCTION

Volatile Organic Compounds (VOCs) are organic chemical compounds that have high enough vapor pressures under normal conditions to significantly vaporize and enter the atmosphere. The Sample Receiving Group frequently samples for these compounds at several well locations, and at all of the Los Angeles County Sanitation Districts water reclamation plants, for both raw influent and final effluent. This standard operating procedure (SOP) states the responsibilities and describes the process of sampling volatile organic compounds, including the selection of equipment and materials used in the sampling process.

1. Scope and Application

    1.1 Raw influent and final effluent are collected by this method as required by National Pollution Discharge Elimination System (NPDES) permits.

    1.2 A grab sample is collected to provide a snapshot of the current state of the reclamation plant's activity.

    1.3 A grab sample is collected to minimize loss of constituents through volatilization.

2. Summary

    2.1 Obtain a grab sample in a 1 L wide-mouth amber glass jar.

    2.2 If the sample is chlorinated, de-chlorinate the sample with sodium thiosulfate (see §7.2).

    2.3 Fill 3-6 septum vials (40 mL) with no headspace.

3. Sample Handling and Preservation

    3.1 Water Reclamation Plants (WRP) samples are collected using appropriate containers and preservation methods as directed in Standard Methods for the Examination of Water and Wastewater.

    3.2 After collection, and as soon as possible, place samples into an ice chest with ice to keep their temperature at 0-6°C during transport from the sample collection site to Sample Receiving Control (SRC). This will minimize volatilization of target analytes.

3.3 Once removed from the ice chest, the samples are placed into a refrigerator or walk-in cooler to maintain the cold temperature for storage.

4. Interferences

4.1 Several common office products can easily contaminate septum vials with VOCs including; cleaning solvents, paints, adhesives, markers, solvents and some strong odors. Storage of the septum vials nearby these products should be avoided.

4.2 Septum vials should not be stored near products that can potentially off-gas VOCs into the air (i.e. photocopy machines).

4.3 Burning biomass (including cigarette smoke) can emit VOCs into the air, contaminating samples, or sample containers.

4.4 The kit used by Sample Receiving personnel for field chlorine residual analysis has been linked to possible VOC contamination. This kit should not be used for storage of VOC vials at any time.

5. Apparatus

5.1 1 L wide-mouth amber glass jar

5.2 100 mL graduated cylinder

5.3 250 mL Nalgene cup

5.4 VOC vials. There are two types of vials typically used for VOC sampling including: 40 mL amber glass vials with a septum cap (Scientific Specialties Service, Inc. product number: 376840-VAC), and 40 mL clear glass vials with a septum cap, pre-preserved with Hydrochloric Acid(Scientific Specialties Service, Inc. product number: 376740-1/2HCL-V).

6. Reagents

6.1 Acetate Buffer Solution, pH 4

6.2 Potassium Iodide (KI)

6.3 Soluble Starch Solution

6.4 Deionized Water

6.5 1% Sodium Thiosulfate Solution. Dissolve 1 g of sodium thiosulfate in 1 L of deionized water, and pour an aliquot into a dropper bottle. This solution should be made on the day of sampling, and discarded at the end of the day.

7. Procedure

7.1 Collect the Grab Sample

7.1.1 Using white masking tape, securely attach the 1 L wide-mouth amber glass jar to the end of a grab pole, and collect the grab water sample by submerging the bottle 1 foot below the surface.

7.1.2 If the sample is chlorinated, de-chlorinate using §7.2 of this SOP.

7.1.3 Fill each septum vial with the sample. If the vial is pre-acidified, avoid any overflow of sample. To prevent volatilization of the compounds in the sample, minimize turbulence of the sample.

7.1.4 Pour a small amount of sample into the cap, and use the cap to top off the vial. The vial should be filled enough so that the surface tension holds the water in a "convex meniscus", and then apply the cap. Some overflow is lost using this method, but air space in the vial is eliminated.

7.1.5 After capping, turn the vial over and gently tap it to check for gas bubbles. If gas bubbles can be seen in any vials, those vials should be re-opened in order to repeat the procedure, until all samples are free of gas bubbles.

7.2 De-chlorinate the Sample

7.2.1 Rinse both the 100 mL graduated cylinder and the 250 mL Nalgene cup three times with deionized water, and then three times with a small portion (about 20 mL) of sample from the 1 L wide-mouth amber glass jar .

7.2.2 Fill the graduated cylinder with 100mL of sample from the 1 L wide-mouth amber glass jar. Transfer the 100mL of sample into the 250 mL Nalgene cup.

7.2.3 Add approximately 0.5 – 1 g KI crystals to the sample. Avoid a gross excess of KI. Add approximately 4 mL of acetate buffer solution.

7.2.4 Swirl to mix.

7.2.5 Add 1 mL starch solution. If a blue color is apparent, the sample must be de-chlorinated using the following steps. If the solution is clear, continue to §7.1.3

7.2.6 Drop-wise, add the 1% Sodium Thiosulfate Solution to the sample. Swirl to mix after each drop. When the sample is completely clear again, record the number of drops used.

7.2.7 Use Section 8 (Calculations) to determine how many drops of 1% Sodium Thiosulfate Solution to use to de-chlorinate the sample left in the 1 L wide-mouth amber glass jar.

7.2.8 Replace the lid to the 1 L wide-mouth amber glass jar, and gently swirl to mix. Do not shake the sample, as it can cause the volatilization of target compounds.

8. Calculations

8.1 Determine the approximate volume remaining in the 1 L wide-mouth amber glass jar. This volume would typically be between 800 and 900 mL.

8.2 Divide this volume by 100 mL (the volume of sample that was de-chlorinated in §7.2.2).

8.3 Multiply the result by the number of drops recorded in §7.2.6. The result is the number of drops of Sodium Thiosulfate Solution to add to the remaining sample in the 1 L wide-mouth amber glass jar.

9. Quality Assurance Guidelines

9.1 Trip Blanks must be made for each VOC constituent being analyzed. If VOCs are to be collected using both the clear and amber septum vials, then trip blanks must be made using both clear and amber vials.

9.1.1 Use water from the "double" deionized water system, located on the south wall of the Instrumentation Lab. Allow the water system to run for one full minute before filling the trip blank vials. Assure there is no headspace left in the vials, as in §7.1.5. If this water system cannot be accessed, or it is non-functional, use Arrowhead water from the tap in the Laboratories section break room.

9.2 The Trip Blanks must be kept alongside the sample vials until the sampling is complete, and samples have been delivered to SRC.

10. Method Performance

10.1 To verify the chlorine residual analysis method, sample collectors participate in quarterly quantitative chlorine residual analyses as part of the QA Check Sample program.

11. References

11.1 Standard Methods For The Examination Of Water And Wastewater, 21st Edition, 2005, pp. 6-1 to 6-3.

11.2 U.S. Environmental Protection Agency, 2004, 5.B. Sampling Procedures And Techniques, Office of Enforcement and Compliance Assurance, Washington, D.C.

11.3 U.S. Environmental Protection Agency, Methods For Organic Chemical Analysis Of Municipal And Industrial Wastewater, Method 624: Purgeables, 1996, Office of Science and Technology, Washington, D.C.

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

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Method Name	Dissolved Oxygen Field Measurements
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1S3. OXYGEN, DISSOLVED - FIELD MEASUREMENT

INTRODUCTION

The concentration of dissolved oxygen (DO) in a water source depends on the prevailing physical, chemical and biological activities. An electrometric method, using a dissolved oxygen meter, is based on the rate of diffusion of molecular oxygen across a membrane. As part of the "Receiving Water Limitations" in NPDES permits, the dissolved oxygen in receiving waters shall not be depressed below 5 mg/L as a result of the wastes discharged.

1. Scope and Application

   1.1 The membrane electrode provides an excellent method for DO analysis in polluted waters, highly colored waters, and strong waste effluents as well as drinking, surface, and saline waters.

   1.2 This method is recommended for use under conditions that are unfavorable for use of the Winkler method, or when that test and its modifications are subject to serious errors caused by interferences.

   1.3 The meter for the dissolved oxygen probe is calibrated in a convenient range (e.g., 0 to 5, 0 to 10, or 0 to 20 mg/L).

2. Summary of Method

   2.1 The dissolved oxygen probe functions on a polarographic principle, measuring the partial pressure of oxygen in a gas or dissolved in a liquid. The sensor consists of two electrodes, a silver anode and a gold cathode, in an electrolyte gel or solution. This system is separated from the sample by a gas permeable membrane. A polarizing voltage, supplied by the instrument, causes oxygen to diffuse across the membrane and be reduced at the gold cathode. This reduction causes a current to flow. This current is linearly proportional to the partial pressure of oxygen present. The current is amplified and monitored by the instrument. The instrument must be standardized regularly against known conditions.

3. Sample Handling and Preservation

   3.1 The probe may be used in the field in tanks, ponds, streams, etc. Where there is not rapid natural movement of the water, artificial agitation must be provided.

4. Interferences

4.1 Plastic films used with the membrane electrode systems are permeable to a variety of gases other than oxygen, none of which is easily depolarized at the indicator electrode.

4.2 Prolonged use of membrane electrode in water solutions containing gases such as H_2S tends to lower the cell sensitivity. This is eliminated by frequent changing of the membrane and calibration of the membrane electrode.

4.3 Dissolved oxygen probes are temperature-sensitive, and the manufacturer typically provides automatic temperature compensation.

4.4 Organic materials may coat the membrane, reducing sensitivity. Clean with detergent or HCl as directed by the manufacturer.

5. Apparatus

5.1 YSI 550 Handheld Dissolved Oxygen meter, or equivalent

5.2 300 mL glass BOD bottle with air-tight glass stopper

6. Reagents

6.1 Filling solutions, electrolytes, spare membranes; handle as directed in the manufacturer's manual.

6.2 Deionized water

7. Procedure

7.1 Use and Care of the Probe

7.1.1 The probe is kept in the transport chamber attached to the back of the instrument between measurements. A small sponge is kept moistened inside the chamber to provide a water saturated air environment, which is ideal for air calibration.

7.1.2 The probe is also stored in the transport chamber; the moist environment will prolong effective membrane performance and probe life.

7.1.3 Maintain sponge moistness'with tap water only.

7.2 Dissolved Oxygen Meter Air Calibration

7.2.1 The DO meter must be calibrated before making DO measurements.

7.2.2 Turn the instrument on by pressing the **ON/OFF** key. Allow 15 minutes for warm-up.

7.2.3 Fill a BOD bottle to about half with fresh DI water. Remove the probe from the storage chamber and unscrew the probe guard.

7.2.4 Press the **MODE** key until mg/L appears on the right side of the screen prior to calibration.

7.2.5 Place the probe in the bottle. Let the temperature acclimate for a couple of minutes. Record current temperature value as it will disappear once in calibration mode.

7.2.6 Enter the calibration menu by pressing and releasing both the **UP ARROW** and **DOWN ARROW** keys at the same time.

7.2.7 The meter should now display CAL on the lower left of the screen as well as the current DO reading.

7.2.8 Obtain the solubility of oxygen in mg/L by using a corresponding temperature displayed by the meter. Review the temperature you recorded and use it with the solubility chart (see Figure 1). Use this value as your adjusted calibration value. Record both the value you started with and the calibrated value you adjusted to in the calibration log.

7.2.9 Using the **UP ARROW** and **DOWN ARROW** keys, adjust the DO reading to the value found in the chart and press **ENTER**. The meter will now prompt you for a salinity value of the water that will be analyzed. Enter "0" and press the **ENTER** key.

7.2.10 The meter should now return to normal operation and is ready for use in the field. Screw the probe guard back on and place the probe back into the storage chamber for transport to the field.

7.3 DO Measurement of Aqueous Samples

7.3.1 Immerse the probe into a flowing water source assuring that it is kept below the surface. Keep all sediment and algae away from the tip of the probe.

7.3.2 Measure the DO of the sample. Record the value after the DO stabilizes.

7.3.3 If the value is out of acceptable range (exceedence is < 5 mg/L), check the DO of upstream receiving water station or outfall of the upstream water reclamation plant, whichever is closer. Record the upstream values to report with the exceedence. DO exceedences are reported by email to the appropriate laboratory and monitoring staff within a day or two of their discovery.

7.3.4 Rinse probe with deionized water after measurement and return to the transport chamber.

8. Calculations

8.1 Not Applicable

9. Quality Assurance Guidelines

9.1 Duplicate every tenth sample.

9.2 It is imperative that the DO meter be calibrated prior to use.

9.3 Rinse the probe with deionized water between measurements in the field.

9.4 Note correction value for temperature. Adjust value if applicable.

9.5 Check calibrated DO meter at least every 4th calibration by comparison with BOD dilution water obtained from the Treatment Plant laboratory. The Treatment Plant Laboratory determines the DO of the BOD dilution water by the Winkler method. Note the difference in the calibration log.

10. Method Performance

10.1 The thermometer of the meter is calibrated once a year by the QA group at SJCWQL by comparison to an NIST certified thermometer in a water bath.

11. References

11.1 Sanitation Districts of Los Angeles County, Laboratory Section: Procedures for the Characterization of Water and Wastes, 4th Edition, 1989, James D. Lehner, "Method 115B, Dissolved Oxygen".

11.2 YSI Incorporated Dissolved Oxygen Meter Model 550 Manual, September 2000.

Figure 1. Solubility of Oxygen in mg/L in Water Exposed to Water-Saturated Air at 760 mm Hg Pressure

Temp°C	Chlorinity: 0 Salinity: 0	5.0 ppt 9.0 ppt	10.0 ppt 18.1 ppt	15.0 ppt 27.1 ppt	20.0 ppt 36.1 ppt	25.0 ppt 45.2 ppt
0.0	14.62	13.73	12.89	12.10	11.36	10.66
1.0	14.22	13.36	12.550	11.78	11.07	10.39
2.0	13.83	13.00	12.22	11.48	10.79	10.14
3.0	13.46	12.66	11.91	11.20	10.53	9.90
4.0	13.11	12.34	11.61	10.92	10.27	9.66
5.0	12.77	12.02	11.32	10.66	10.03	9.44
6.0	12.45	11.73	11.05	10.40	9.80	9.23
7.0	12.14	11.44	10.78	10.16	9.58	9.02
8.0	11.84	11.17	10.53	9.93	9.36	8.83
9.0	11.56	10.91	10.29	9.71	9.16	8.64
10.0	11.29	10.66	10.06	9.49	8.96	8.45
11.0	11.03	10.42	9.84	9.29	8.77	8.28
12.0	10.78	10.18	9.62	9.09	8.59	8.11
13.0	10.54	9.96	9.42	8.90	8.41	7.95
14.0	10.31	9.75	9.22	8.72	8.24	7.79
15.0	10.08	9.54	9.03	8.54	8.08	7.64
16.0	9.87	9.34	8.84	8.37	7.92	7.50
17.0	9.67	9.15	8.67	8.21	7.77	7.36
18.0	9.47	8.97	8.50	8.05	7.62	7.22
19.0	9.28	8.79	8.33	7.90	7.48	7.09

Temp ₒC	Chlorinity: 0 Salinity: 0	5.0 ppt 9.0 ppt	10.0 ppt 18.1 ppt	15.0 ppt 27.1 ppt	20.0 ppt 36.1 ppt	25.0 ppt 45.2 ppt
20.0	9.09	8.62	8.17	7.75	7.35	6.96
21.0	8.92	8.46	8.02	7.61	7.21	6.84
22.0	8.74	8.30	7.87	7.47	7.09	6.72
23.0	8.58	8.14	7.73	7.34	6.96	6.61
24.0	8.42	7.99	7.59	7.21	6.84	6.50
25.0	8.26	7.85	7.46	7.08	6.72	6.39
26.0	8.11	7.71	7.33	6.96	6.62	6.28
27.0	7.97	7.58	7.20	6.85	6.51	6.18
28.0	7.83	7.44	7.08	6.73	6.40	6.09
29.0	7.69	7.32	6.96	6.62	6.30	5.99
30.0	7.56	7.19	6.85	6.51	6.20	5.90
31.0	7.43	7.07	6.73	6.41	6.10	5.81
32.0	7.31	6.96	6.62	6.31	6.01	5.72
33.0	7.18	6.84	6.52	6.21	5.91	5.63
34.0	7.07	6.73	6.42	6.11	5.82	5.550
35.0	6.95	6.62	6.31	6.02	5.73	5.46
36.0	6.84	3.52	6.22	5.93	5.65	5.38
37.0	6.73	6.42	6.12	5.84	5.56	5.31
38.0	6.62	6.32	6.03	5.75	5.48	5.23
39.0	6.52	6.22	5.98	5.66	5.40	5.15
40.0	6.41	6.12	5.84	5.58	5.32	5.08
41.0	6.31	6.03	5.75	5.49	5.24	5.01
42.0	6.21	5.93	5.67	5.41	5.17	4.93
43.0	6.12	5.84	5.58	5.33	5.09	4.86
44.0	6.02	5.75	5.50	5.25	5.02	4.79
45.0	5.93	5.67	5.41	5.17	4.94	4.72

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

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1S1. pH (HYDROGEN ION CONCENTRATION) - FIELD

INTRODUCTION

Measurement of pH is one of the most important and frequently used tests in water chemistry. At a given temperature the intensity of the acidic or basic character of a solution is indicated by pH or hydrogen ion activity. pH as defined by Sorenson as – log (H+); it is the intensity factor of acidity.

The pH value of a highly dilute solution is approximately the same as the negative common logarithm of the hydrogen ion concentration. Natural waters usually have pH values in the range of 4 to 9, and most are slightly basic because of the bicarbonates and carbonates of the alkali and alkaline earth metals. As part of the "Receiving Water Limitations" in the Joint Outfall System NPDES permits, the pH of inland surface waters shall not be depressed below 6.5 or raised above 8.5 as a result of the wastes discharged. For the Antelope Valley, the WDR limitations are 6.0 and 9.0 pH units as set forth by the Lahontan RWQCB.

1. Scope and Application

    1.1 This procedure is applicable to all waters and wastewaters.

2. Summary of Procedure

    2.1 The pH meter is standardized with the appropriate buffer solutions taking into account the solution temperature.

    2.2 For receiving water stations, the pH is measured by immersing the electrode directly in the stream with flow continuously running over the probe.

    2.3 For groundwater locations, the pH is measured using electrodes enclosed in a flow-through cell. The probe has a stirring apparatus attached to provide continuous mixing of the water sample.

3. Sample Handling and Preservation

    3.1 No sample is collected; this procedure is specific to field measurements.

4. Interferences

4.1 High sodium concentrations at a high pH will cause an error. This sodium error can be reduced by either using "low sodium error electrodes" or by making approximate corrections in accordance with information supplied by the manufacturer.

4.2 Temperature affects pH in two ways. First, the pH potential, i.e., the change in potential per pH unit, varies with temperature. Second, the ionization in the sample varies with temperature.

5. Apparatus

5.1 YSI 60 handheld pH meter, VWR Model SP20 portable pH meter, QED MicroPurge Basics Flow Cell MP20, Extech ExStik EC500, or equivalent

5.2 3-100 mL plastic graduated cylinders

5.3 Rinse container (for waste water used in calibration)

6. Reagents

6.1 Buffer solutions. Buffer solutions of various concentrations are prepared as indicated from commercially obtained reagents.

6.2 Deionized water

7. Procedure

7.1 Use and Care of the Electrode

7.1.1 For short term storage between measurements in the field (up to one week)

7.1.1.1 YSI. Place the probe in the transport chamber in the side of the instrument case. Make sure that the sponge inside the chamber is wet (tap water).

7.1.1.2 VWR. This probe does not require any special storage procedures. After being cleaned and dried, place the storage cap over the end of the probe to prevent any possible damage during storage or transport.

7.1.1.3 QED. Place approximately 1 cm of tap (**not distilled or deionized**) water in the transport storage container and insert probe.

7.1.1.4 ExTech: Place the probe in the wetting cap, ensuring that the sponge is moistened with pH 4 buffer solution.

7.1.2 For long term storage (over one week)

7.1.2.1 YSI: Place the probe in the storage bottle containing a mixture of 50 % pH 4 buffer and 50 % 1.5 M KCl. This will assure the fastest possible pH response. If this mixture is not available, storage in tap water is the next best choice. **Do NOT store the probe dry or in distilled or deionized water.**

7.1.2.2 VWR, QED, and Extech: Use the same procedures as for short-term storage.

7.1.3 The electrode should never be used in organic solvents.

7.1.4 The electrode should be rinsed and blotted dry with a Kimwipe. Do not wipe the surface, as it will damage the membrane (in the case of the YSI model). Do not use paper towels.

7.1.5 Cleaning and Maintenance

7.1.5.1 All meters and connectors should be wiped down after use to prevent any possible contamination and as part of maintaining a clean work environment.

7.1.5.2 The pH probes should be cleaned both prior to and after sampling, and may occasionally require other maintenance.

7.1.5.3 The glass bulbs may become coated with oil or other substances as a result of the samples being analyzed. If this occurs, remove the bulb cover (if present) and use a cotton swab and rubbing alcohol to carefully clean the probe of all residues. Should the above procedure prove insufficient to clean the sensor, use a cotton swab and 1 M HCl to gently clean the glass bulb.

7.1.5.4 The probe can also be soaked in a 1:1 dilution of chlorine bleach for up to an hour to remove any possible contaminants. **(NOTE: the probe should in turn be rinsed and soaked in deionized water for an additional hour to remove any remaining bleach.)**

7.1.5.5 Rinse and swab the probe with deionized water and replace the cover (if applicable).

7.1.5.6 Make sure that all probes are properly rinsed with deionized water and recalibrated prior to use.

7.2 Calibration of the pH Meter

7.2.1 YSI 60 Handheld pH meter

7.2.1.1 The pH meter must be calibrated before making pH measurements.

7.2.1.2 Turn the instrument on by pressing the **ON/OFF** key.

7.2.1.3 Remove the probe from the transport chamber and rinse with deionized water.

7.2.1.4 Place 25 to 30 mL of pH 7 buffer into a clean 100 mL graduated cylinder. **CAUTION:** Skin irritant; use safety goggles, gloves and lab coat for protection.

7.2.1.5 Immerse the probe into the cylinder being sure to immerse both the pH and temperature sensors.

7.2.1.6 Allow the probe to acclimate the pH 7 buffer before calibrating; this should take about 5 to 10 minutes.

7.2.1.7 Set the meter to calibrate by pressing and releasing the **UP ARROW** and **DOWN ARROW** keys at the same time. You should see CAL and STAND appear at the bottom of your screen if you are in calibration mode. STAND will be flashing, and the display should show a pH value of 7.

7.2.1.8 Press the **ENTER** key. STAND will stop flashing and the pH calibration value will be shown with middle decimal point flashing. When the reading is stable, the decimal point will stop flashing. Press and hold the **ENTER** key to save the calibration point. SAVE and OFS will flash on the display screen to indicate the value has been saved.

7.2.1.9 SLOPE will appear flashing. This indicates the meter is ready to be calibrated with a second point.

7.2.1.10 Rinse the probe with DI water and place into a clean 100 mL graduated cylinder with either pH 4 or pH 10 buffer solutions. If the pH is 4, a decimal point will flash to the left of the middle point and if it is pH 10, the decimal will flash to the right of the middle point.

7.2.1.11 Press the **ENTER** key. When the reading is stable the decimal point will stop flashing. Press and hold the **ENTER** key to save the first SLOPE. SAVE and SLP will flash on the screen to indicate the SLOPE has been saved. SLOPE will again flash on the screen to indicate the meter is ready for the third pH buffer.

7.2.1.12 Rinse and place the probe into the third clean 100 mL graduated cylinder with the pH buffer not yet chosen, either the pH 4 or pH 10. Press **ENTER.** Once again, depending on the value of the third pH buffer the decimal point will flash to the right or the left of the middle point. When the decimal stops flashing, press and hold the **ENTER** key to save the second slope value. Again the meter will flash SAVE and SLP to indicate the second slope has been saved.

7.2.1.13 The meter is now calibrated at three points and will now return to normal operation.

7.2.1.14 Rinse the probe and take a reading of pH 7 buffer solution from a 2nd lot and let acclimate for a few minutes. The reading should be within $\pm$ 0.2 pH units from 7.0.

7.2.1.15 Document the calibration, recording the calibrated values at each point in the calibration log.

7.2.2 VWR Model SP20 portable pH meter

7.2.2.1 The pH meter must be calibrated before making pH measurements.

7.2.2.2 Attach the electrode and ATC probes to meter

7.2.2.3 Press the power button to turn on the meter.

7.2.2.4 Rinse the probe with deionized (DI) water and then with pH 7.00 buffer solution.

7.2.2.5 Place 25 to 30 mL of pH 7 buffer into a clean 100 mL graduated cylinder. **CAUTION:** Skin irritant; use safety goggles, gloves and lab coat for protection.

7.2.2.6 Immerse the probe into the cylinder being sure to immerse both the pH and temperature sensors.

7.2.2.7 Allow the probe to acclimate the pH 7 buffer before calibrating; this should take about 5 to 10 minutes.

7.2.2.8 Set the meter to calibrate by pressing and releasing the **CAL** key. It will indicate that the probe is calibrating by displaying a slope graphic in the lower field of the screen.

7.2.2.9 P1 will be displayed in the temperature area as the first calibration measurement is being made.

7.2.2.10 When the **READY** light appears, press **OK**; this will accept the initial pH value.

7.2.2.11 When **P2** is displayed and flashing, the probe is ready to be calibrated with the second buffer.

7.2.2.12 Rinse the probe with DI water and place into a clean 100 mL graduated cylinder with either pH 4 or pH 10 buffer solutions.

7.2.2.13 The second calibration will begin as soon as the probe is immersed in the new solution. When the reading is stable the **READY** light will appear. Press the **OK** key to save the second calibration buffer data. The meter is ready for the third pH buffer.

7.2.2.14 Rinse and place the probe into the third clean 100 mL graduated cylinder with the pH buffer not yet chosen, either the pH 4 or pH 10. The third calibration will begin, and the **READY** light will appear when the reading is stable. Save the third calibration data by pressing the **OK** button to accept. The main field will display the slope obtained by the three-point calibration.

7.2.2.15 The meter is now calibrated at three points and will now return to normal operation.

7.2.2.16 Rinse the probe and take a reading of pH 7 buffer solution from a 2^{nd} lot and let acclimate for a few minutes. The reading should b within $\pm$ 0.2 pH units from 7.0.

7.2.2.17 Document the calibration, recording the calibrated values at each point in the calibration log.

7.2.3 QED MicroPurge Basics Flow Cell MP20

7.2.3.1 The pH meter must be calibrated before making pH measurements.

7.2.3.2 Turn on the meter and allow to boot up. When the meter is prepared to receive data, all applicable measuring criteria will be displayed.

7.2.3.3 Set the circulator to **OFF** if necessary by pressing the **ESC/Circulator** key. This will prevent any calibration standards used from being splashed.

7.2.3.4 Set the screen page to **CALIB**, and then scroll down using the arrow keys to pH, which is the value to be calibrated. The **7.00 Indicator Light** will flash in the corner of the display screen to show that this is the parameter being calibrated.

7.2.3.5 Attach the calibration cup; rinse the probe with deionized (DI) water and then with pH 7.00 buffer solution.

7.2.3.6 Fill the calibration cup to within 1cm of the top with pH 7.00 buffer solution. The pH probe should be fully immersed. **CAUTION:** Skin irritant; use safety goggles, gloves and lab coat for protection.

7.2.3.7 Press and release the **ARROW** (Enter) key to calibrate for the initial buffer solution.

7.2.3.8 The main display will show the value of the first buffer solution. Use the **UP** and/or **DOWN** arrows to change the display until the true value of the calibration solution is shown.

7.2.3.9 Press and release the **ARROW** key; this will accept the initial pH value. If the value is accepted for calibration, the display will return to the **CALIB** screen. Should the value not fall within the sensors parameters, the screen will read **FAIL** before returning to the **CALIB** screen.

7.2.3.10 Should such failure occur, replace the buffer solution and recalibrate. The probe may also require cleaning. If this is the case proceed with the proper procedures as listed in section 7.1.3.

7.2.3.11 When the initial calibration value has been accepted, the probe is ready to be calibrated with the second buffer. Press **ESC** to move to the second value for calibration.

7.2.3.12 Rinse the probe with DI water and fill the calibration cup with either pH 4 or pH 10 buffer solutions.

7.2.3.13 Press and release the **ARROW** key to begin calibrating for the second buffer. Use the **UP** and/or **DOWN** arrows until the display shows the true numeric value of the buffer solution. Press the **ARROW** key to accept the second calibration buffer data. The meter is ready for the third pH buffer.

7.2.3.14 Rinse the probe again, and fill the calibration cup with the pH buffer not yet chosen, either the pH 4 or pH 10. Use the **ARROW** key and **UP** and/or **DOWN** arrows to set the numeric value of the buffer solution. Save the third calibration data by pressing the **ARROW** button to accept. Use the **ESC** key to return to the main display page.

7.2.3.15 The meter is now calibrated at three points and ready to return to normal operation.

7.2.3.16 Rinse the probe and take a reading of pH 7 buffer solution from a 2nd lot and let acclimate for a few minutes. The reading should be within $\pm$ 0.2 pH units from 7.0.

7.2.3.17 Document the calibration, recording the calibrated values at each point in the calibration log.

7.2.4 Extech

7.2.4.1 The pH meter must be calibrated before making pH measurements.

7.2.4.2 Turn the instrument on by pressing the **ON/OFF** key.

7.2.4.3 Remove the probe from the transport chamber and rinse with deionized water.

7.2.4.4 Place approximately 4 mL of pH 7 buffer into the corresponding calibration tube. Insert the probe into the tube, ensuring that enough buffer is present to contact the tip of the electrode. **CAUTION:** Skin irritant; use safety goggles, gloves and lab coat for protection.

7.2.4.5 Allow the probe to acclimate the pH 7 buffer before calibrating; this should take about 5 to 10 minutes.

7.2.4.6 Set the meter to calibrate by pressing and holding the **CAL/RECALL** key. It will indicate that the probe is calibrating by displaying "CAL" in the lower field of the screen.

7.2.4.7 The pH reading will flash as the first calibration measurement is being made.

7.2.4.8 The meter automatically recognizes the solution, and calibrates to the corresponding value, as indicated by the circled letter on the LCD screen. These are indicated as **L** (4), **M** (7), and **H** (10).

7.2.4.9 The meter will display **SA**, then **END** when calibration is complete. It will then return to normal operation mode.

7.2.4.10 The unit is ready for the second calibration. Remove the probe from the solution, rinse with DI water, and fill the calibration cup with the second buffer solution, either pH 4 or 10.

7.2.4.11 Press and hold **CAL/RECALL** until "CAL" is displayed. The unit will now calibrate to the second buffer, again displaying the value (L, M, H) circled on the screen.

7.2.4.12 Calibration has been achieved when the unit displays **SA**, then **END**, and returns to normal operation mode.

7.2.4.13 Prepare the probe for the third calibration. Remove the probe from the solution, rinse with DI water, and fill the calibration cup with the third buffer solution, either pH 4 or 10 (whichever was not yet used).

7.2.4.14 Press and hold **CAL/RECALL** until "CAL" is displayed. The unit will now calibrate to the third buffer, again displaying the value (L, M, H) circled on the screen.

7.2.4.15 When the unit displays **SA**, then **END**, the third calibration has been completed, and the probe is ready for analysis. Remove from solution and rinse with DI water.

7.2.4.16 Rinse the probe and take a reading of pH 7 buffer solution from a 2nd lot and let acclimate for a few minutes. The reading should b within $\pm$ 0.2 pH units from 7.0.

7.2.4.17 Document the calibration, recording the calibrated values at each point in the calibration log.

7.2.5 Troubleshooting Procedures

7.2.5.1 pH Out of Range

7.2.5.1.1 Ensure that the probe is properly submerged in the solution to be measured, and that the electrodes are firmly connected to the meter.

7.2.5.1.2 Recalibrate using fresh buffer solutions. Make sure to check that the correct buffers are being used, and that they are not past their expiration dates.

7.2.5.1.3 Sample may indeed be out of range.

7.2.5.2 pH Auto-Calibration Errors. This can occur when the user is attempting to accept values that are outside the range or when calibrating buffers out of sequence.

7.2.5.3 Verify buffers being used, and recalibrate using fresh buffer samples.

7.2.5.4 Clean electrodes if necessary.

7.2.6 Calibration Standard Errors. Same pH values are recorded for two different buffers.

7.2.6.1 Check that different buffers are in fact being used, and that the correct buffer is being measured.

7.2.6.2 Recalibrate using fresh buffer solutions.

7.2.7 Bad Slope. pH slope is not inside the accepted value of 80-120%.

7.2.7.1 Recalibrate using fresh buffers.

7.2.7.2 Clean electrodes if necessary.

7.2.8 No Display

7.2.8.1 Press the power button to ensure that the meter did not utilize its auto shut-off function.

7.2.8.2 Check that batteries are properly aligned, and replace if necessary.

7.3 pH Measurement

7.3.1 Receiving Water Stations

7.3.1.1 Immerse the probe upstream of your position into the flow making sure to keep both temperature and pH sensors under the surface. Keep all sediment and algae away from the tip of the probe.

7.3.1.2 Let sit for a few minutes until pH stabilizes. Record value.

7.3.1.3 If value is out of acceptable range (6.5 – 8.5), check pH of upstream receiving water station or outfall of upstream water reclamation plant, whichever is closer. Record the upstream values to report with the exceedence to monitoring. pH exceedences are reported by e-mail to appropriate laboratory and monitoring staff within a day or two of their discovery.

7.3.1.4 Rinse probe with deionized water after measurement and return to transport chamber.

7.3.2 Groundwater Monitoring

7.3.2.1 Replace the storage cap with the flow-through cell, and attach the unit to the groundwater well using the enclosed tubing and corresponding connectors.

7.3.2.2 Press and release the **ESC** key while on the main screen to turn on the circulator (if necessary).

7.3.2.3 Use the **LEFT/RIGHT ARROW** keys to toggle the unit to **STORE** mode and select **ENTER** using the main arrow key.

7.3.2.4 The flow cell will now record field measurements at three0minute intervals until all corresponding parameters have stabilized. Field pH will show as stable when it maintains a range of $\pm$0.2 units.

7.3.2.5 The meter will beep and flash a slope icon when the sample is stable and ready for collection. Note the pH and other applicable data on the appropriate field sheet.

8. Calculations

8.1 Not applicable

9. Quality Assurance Guidelines

9.1 Duplicate every tenth sample or fraction thereof.

9.2 It is imperative that the pH meter be calibrated prior to use.

9.3 Rinse the probe with deionized water between changes of calibration buffer solutions and measurements in the field.

9.4 To test for drift during the day, rinse the probe and place in pH 7 buffer solution. Record the reading and repeat this step after returning back to SRC from the field using a different pH 7 standard. The reading should be $\pm$ 0.2 pH units.

9.5 Note correction factor for temperature. Adjust value if applicable.

10. Method Performance

10.1 The thermometer of the meter is calibrated once a year by the QA group at SJCWQL by comparison to a NIST certified thermometer in a water bath.

11. References

11.1 Laboratory Section: Procedures for the Characterization of Water and Wastes, 4th Edition, 1989, James D. Lehner, pp. 101-1 through 101-3.

11.2 YSI Incorporated Model 60 Manual, July 2001, pp. 6-16.

11.3 VWR Portable pH/ISE Meters Instruction Manual, April 2001, pp. 12, 24-25.

11.4 QED Flow Cell User's Guide, March 2004, pp. 9-11, 19-20.

11.5 Extech ExStik EC500 User's Guide, March 2008, pp. 8-9.

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

Method Number	302 (field measurement)
Method Name	Chlorine Residual Field Measurement
Version	10.1.0
Method Date	February 09, 2010
Reasons for Method Revision	Annual review; no modifications were made

Reviewed by:

Jessica Pacheco
Laboratory Technician II
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Jessica Pacheco — Signature | 2/10/10 — Date

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Signature | 3/15/2010 — Date

302. FIELD CHLORINE RESIDUAL QUALITATIVE ANALYSIS

INTRODUCTION

Chlorination is one way to disinfect or kill microorganisms during the final stages of wastewater treatment. The amount of the chlorine that can be discharged out of a treatment plant after the dechlorination stage must be less than 0.05 mg/L. High levels of chlorine are toxic to fish and other organisms. The field chlorine residual qualitative analysis is used to determine the presence or absence of chlorine in a sample. When chlorine levels exceed 0.05 mg/L a blue coloration will form and further quantitative measurements are necessary. The sample will be taken to one of the local treatment plant laboratories for quantitative analysis. Field chlorine residual is an NPDES permit requirement for the Saugus and Valencia Water Reclamation Plants operated by the Sanitation Districts of Los Angeles County, applicable to receiving water stations RA, RB, RC, RD, and RE.

1. Scope and Application

   1.1 The field chlorine Residual qualitative analysis detects the presence or absence of chlorine.

   1.2 The field chlorine residual qualitative analysis is conducted along receiving water sites covered in the NPDES permits for Saugus and Valencia Water Reclamation Plants.

2. Summary of Method

   2.1 Obtain sample and add KI, acetate buffer solution, and soluble starch solution. Swirl to mix.

   2.2 If the mixture appears clear, the level of chlorine present in the sample is less than 0.05 mg/L. If the mixture forms a blue color, the level of chlorine is greater than 0.05 mg/L.

3. Sample Handling and Preservation

   3.1 This procedure is performed in the field.

   3.2 The sample is observed for blue color immediately and discarded as prolonged exposure to sunlight may generate a false positive.

   3.3 When a sample exceeds 0.05mg/L, a sample is collected in a 1 liter Nalgene bottle with no headspace, and taken to a local treatment plant laboratory for a quantitative chlorine residual analysis. The sample should be analyzed immediately after collection and should not be stored or exposed to excessive light or agitation during transit.

4. Interferences

4.1 Manganese, iron, and nitrite interfere, but buffering to pH 4 before the addition of KI may minimize their effect.

4.2 An unusually high concentration of organic matter may cause some uncertainty in the endpoint. This uncertainty can be reduced by lowering the pH to 1.0 in the absence of manganese, iron, and nitrate.

5. Apparatus

5.1 250 mL Nalgene Cup

6. Reagents

6.1 Acetate Buffer Solution, pH 4

6.2 Potassium Iodide (KI)

6.3 Soluble Starch Solution

6.4 Deionized Water

7. Procedure

7.1 Rinse the 250 mL Nalgene cup three times with deionized water and then rinse three times with sample.

7.2 Collect 200 mL of sample in a 250 mL Nalgene cup.

7.3 Add approximately 0.5 – 1 g KI crystals to the sample. Avoid a gross excess of KI. Add approximately 4 mL of acetate buffer solution.

7.4 Swirl to mix.

7.5 Add 1 mL starch solution. If a blue color is apparent, a quantitative chlorine residual determination must be determined. If the solution is clear, record the chlorine residual as < 0.05 mg/L and disregard the rest of this procedure.

7.6 Upon completion of the qualitative measurement, collect waste in a 1 liter plastic Nalgene bottle for proper disposal in the laboratory. Rinse the 250 mL plastic cup three times with deionized water.

7.7 If chlorine is detected in the qualitative test, a sample is collected in a 1 liter Nalgene bottle with no headspace, and taken to a local treatment plant laboratory for a quantitative chlorine residual analysis. The sample must be analyzed as soon as possible after collection.

7.8 Notify Operations if chlorine is detected from the quantitative analysis, so treatment plant personnel are aware. Also, notify a supervisor or a chemist in the Sample Receiving Section to allow the result to be reported immediately to the Water Quality Control Board. An email notification of exceedence is sent to the applicable operations, monitoring and laboratory staff as soon as possible.

8. Calculations

8.1 Not applicable.

9. Quality Assurance Guidelines

9.1 All reagents must be replaced when the expiration date is exceeded.

9.2 Keep all reagents out of sunlight and tightly sealed when not in use.

9.3 Potassium iodide has a white color; a purple color indicates that it must be discarded and fresh used.

9.4 The soluble starch solution is prepared by the San Jose Creek West APL.

10. Method Performance

10.1 To verify the chlorine residual analysis method, quarterly quantitative chlorine residual analyses are performed as part of the QA Check Sample program.

11. References

11.1 Laboratory Section: Procedures for the Characterization of Water and Wastes, 4th Edition, 1989, James Lehner, Method.302A.

11.2 Sample Receiving Control - Field Sampling Protocol, Section 1.2.4, pp. 20-22.

REPRESENTATIVE SAMPLING OF GROUNDWATER FOR HAZARDOUS SUBSTANCES

Guidance Manual for Groundwater Investigations

July 1995
Revised February 2008

California Environmental Protection Agency
Department of Toxic Substances Control

FOREWORD

The California Environmental Protection Agency (Cal/EPA) was created in 1991 by Governor's Executive Order. Six Boards, Departments, and Office were placed within the Cal/EPA "umbrella" to create a cabinet level voice for the protection of human health and the environment. Cal/EPA's mission is to restore, protect, and enhance the environment, to ensure public health, environmental quality, and economic vitality. Within Cal/EPA, groundwater investigations are mainly conducted under the oversight of the Department of Toxic Substances Control (DTSC), the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs). DTSC's mission is to restore, protect, and enhance the environment, to ensure public health, environmental quality, and economic vitality, by regulating hazardous waste, conducting and overseeing cleanups, and developing and promoting pollution prevention. The SWRCB's mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. The mission of the RWQCBs is to develop and enforce water quality objectives and implementation plans which will best protect the beneficial uses of the State's waters, recognizing local differences in climate, topography, geology and hydrology.

Within DTSC's Emergency Response and Statewide Operations Division (ERSO), the Engineering and Geological Services Branch (EGSB), supports the other programs within DTSC by providing expert technical assistance. As part of the EGSB, the Geological Support Unit (GSU) provides geologic assistance, training, and guidance. This document was prepared by GSU staff and it provides guidelines for the characterization and investigation of groundwater at hazardous substance release and hazardous waste sites. It should be used in conjunction with the two-volume companion reference for hydrogeologic characterization activities:

> *Guidelines for Hydrogeologic Characterization of Hazardous Substances Release Sites* (Cal/EPA 1995a)
>
> *Volume 1: Field Investigation Manual*
> *Volume 2: Project Management Manual*

Within this document, the terms *hazardous substance release site, hazardous waste site* and *toxic waste site*, are used synonymously. However, it should be noted that any unauthorized release of a substance, hazardous or not, that degrades or threatens to degrade water quality may require corrective action to protect its beneficial use.

This document is an updated version of and supersedes the document, *Representative Sampling of Groundwater for Hazardous Substances, Guidance Manual for Groundwater Investigations* (Cal/EPA 1995c). Additional copies of this document may be obtained from DTSC's web site at www.dtsc.ca.gov.

COMMENT SHEET

As a user of this document, your comments are important. Please use this sheet to inform us of any errors, deficiencies or suggested improvements to this document. If you identify an error or deficiency, please suggest how it can be corrected. Attach additional sheets if necessary. Send your comments to:

California Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

Attention: Theodore Johnson, C.E.G., C.Hg., Geological Services Unit

REPRESENTATIVE SAMPLING OF GROUNDWATER FOR HAZARDOUS SUBSTANCES **GUIDANCE MANUAL FOR GROUNDWATER INVESTIGATIONS** JUNE 2005					
Contact Information - Providing contact information is optional; however, including this information will help us follow-up and address your comments.					
Name					
Agency/Company					
Street Address					
City		**State**		**Zip Code**	
Phone Number		**Email**			

Section Number		**Section Title**	
Comment			
Suggested Revision			

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Steve Belluomini	Senior Engineering Geologist
Kathleen Considine	Engineering Geologist
Marie McCrink	Engineering Geologist
Bill Owen	Engineering Geologist
John Woodling	Senior Engineering Geologist

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TABLE OF CONTENTS

APPENDICES

TABLES

1.0 INTRODUCTION

The goal of groundwater sampling is to generate effective, meaningful, and representative groundwater chemistry data. Samples representative of in-situ groundwater conditions are those collected by methods that minimize artifacts caused by sampling equipment or procedures. Groundwater sample collection and handling procedures can cause variability in reported water quality concentrations due to differences in personnel, sampling procedures, and equipment (U.S. EPA 1995). The goal of this document is to promote consistent sampling methods in order to minimize variability in groundwater sampling data caused by equipment or procedures.

No single sampling method is applicable for all sampling objectives. As new methods and/or equipment are developed, additional groundwater sampling protocols should be developed and incorporated into this document. This document was revised to include guidelines on low-flow (minimal drawdown) sampling procedures and the use of passive samplers. Key references are cited within this guidance. A more detailed discussion of sampling procedures, devices, techniques, etc. is provided in various publications by the United States Environmental Protection Agency (U.S. EPA) (Barcelona et al. 1985 and U.S. EPA 1993, 2002 (Yeskis and Zavala)) and the U.S. Geological Survey (Wilde et. al. 1998).

1.1 PURPOSE

This document is intended to provide guidelines for the sampling and analysis of groundwater used for the characterization of hazardous substance release and hazardous waste sites. The purpose of this document is to aid in the selection of sampling devices and analytical methods, provide recommended quality assurance and quality control (QA/QC) procedures, and to provide a standardized approach for the presentation of the resulting data. The recommendations contained herein represent minimum criteria judged necessary to obtain quality data and assure reasonable and independently verifiable interpretations.

The recommendations presented here are a subset of the larger site characterization process. Refer to the *Guidelines for Hydrogeologic Characterization for Hazardous Substance Release Sites* (Cal/EPA 1995a) for additional information on investigative tools for site characterization.

1.2 APPLICABILITY

This guidance is applicable to the characterization and investigation of groundwater associated with hazardous substance release sites, hazardous waste sites, and proposed new or expanding school sites under the oversight of DTSC pursuant to the following statutes:

- Hazardous waste sites - Health and Safety Code, division 20, chapter 6.5 – Hazardous Waste Control
- Hazardous substance release sites - Health and Safety Code, division 20, chapter 6.8 – Hazardous Substance Account
- Proposed new or expanding school sites - Education Code, sections 17210, 172101, 17213.1, and 17213.2

1.3 LIMITATIONS

The recommendations presented here represent criteria that can aid in obtaining quality data and assuring reasonable and independently verifiable interpretations. Some sites may require investigative efforts above and beyond the scope of this document, while at other sites a less rigorous application of this guidance may be appropriate. It is the obligation of the responsible parties and qualified professionals performing site investigations to consult with pertinent regulatory agencies, identify all requirements, and meet them appropriately.

This document discusses broad categories of methods and devices used in sampling groundwater. It does not define specific operating procedures for sampling nor propose guidelines for every available sampling device. This guidance is not intended to exclude alternate sampling approaches; however, any alternative method should only be used with the concurrence of Department of Toxic Substances Control (DTSC). The qualified professional in charge of the field investigation should specify the sampling methods, equipment, and operating procedures in an appropriate work plan and document any significant departures from the work plan.

This document does not supersede existing statutes and regulations. Applicable or relevant and appropriate federal, state and local regulations, statutes, and ordinances should be identified, and site characterization activities should be performed in accordance with the most stringent of these requirements.

2.0 WORK PLAN

A work plan should be prepared for the investigation to be conducted. The work plan provides the purpose of the investigation, summary of site background information, and a description of the tasks to be performed and should include a sampling and analysis plan (SAP) and health and safety plan (HSP). For groundwater investigations, the SAP should specify all procedures and techniques used for groundwater sample collection, sample preservation and shipment, analytical procedures, and chain-of-custody documentation. Field personnel should follow the SAP while performing, collecting, and analyzing groundwater samples. Project tasks and time lines, dates anticipated for initiating and completing monitoring activities may be included in the SAP.

2.1 SAMPLING AND ANALYSIS PLAN

The SAP consists of a field sampling plan (FSP) and a quality assurance project plan (QAPP). The FSP describes, in detail, the sampling and data-gathering methods to be used in the field on a project. The QAPP describes the policy, organization, activities, and protocols necessary to achieve the data quality objectives dictated by the intended use of the data. The SAP should include the following information:

- Field Sampling Plan (FSP)
    - Site background
    - Sampling objectives;
    - Sample location and frequency
    - Sample designation
    - Sampling equipment and procedures
    - Sample handling and analysis
- Quality Assurance Project Plan (QAPP)
    - Project description
    - Project organization and responsibilities
    - QA objectives for measurement
    - Sampling procedures
    - Calibration procedures
    - Analytical procedures
    - Data reduction, validation, and reporting
    - Internal Quality Control
    - Performance and systems audits
    - Preventative maintenance
    - Data assessment procedures
    - Corrective actions
    - Quality assurance reports

Additional guidance on the preparation of SAPs can be found in the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (U.S. EPA 1988).

During preparation, the following information specific to groundwater sampling should be considered and incorporated into the SAP:

- Sampling objectives
- Pre-sampling activities;
- Sampling method selection
- In-situ or field analyses
- Sample preservation and handling
- Chain-of-custody documentation and records management
- Analytical procedures and quantitation limits for both laboratory and field methods
- Field and laboratory quality assurance/quality control
- Evaluation of data quality

2.1.1 Sampling Objectives

The specific objectives of a sampling effort should describe the intended use of data and should include the collection of samples "representative" of the current groundwater conditions over a specific volume of aquifer (U.S. EPA 2002). In meeting this objective, sampling equipment, sampling method, monitoring well construction, monitoring well operation and maintenance, and sample handling procedures should not alter the chemistry of the sample. A sample obtained from a poorly constructed well, using improper sampling equipment, using poor sampling techniques, or improperly preserving samples, can bias the analytical results. Biased or unrepresentative samples can lead to misinterpretations of groundwater quality data (Nielson 1991and Nielsen, 2006)

The sampling program data quality objectives (DQOs) should be thoroughly developed, presented and understood by all parties involved in the sampling. The purpose of the sampling effort and data use(s) should be clearly defined when developing the DQOs. For example, DQOs for site assessment sampling to determine if a contaminant is present may differ from those for determining the nature and extent of a contaminant. Differences in the sampling objectives may dictate the type of sampling equipment used, type of information collected, sampling protocol, and analytical scheme.

A dynamic site conceptual model should be constructed to develop appropriate DQOs. The conceptual model, as it applies to the DQOs, should focus on the contaminant fate and transport processes, such as contaminant migration pathways, influence of geologic materials on contaminant migration (e.g. depositional environments, geologic structure, lithology, etc.), contaminant types (e.g., hydrophobic versus hydrophilic, dissolved verses suspended, and processes that influence concentrations of the contaminants present (e.g. dilution, biodegradation, and dispersion) (U.S. EPA 2002). The detail of the conceptual model is dependent on the information available when the plan is developed. The conceptual site model should be modified as new data becomes available. Initial investigations will have a simpler conceptual site model than previously investigated sites. Specific parameters that should be described or shown in a conceptual model that may impact the design of a groundwater-sampling program include:

- Geologic materials controlling contaminant transport to and from the site.
  - Horizontal (lateral) and vertical (thickness) , extent
  - Horizontal and vertical flow direction
  - Horizontal and vertical hydraulic conductivity and contrasts between different geologic materials
- Types of contaminants to be sampled and factors that could bias sampling results.
- Horizontal and vertical distribution of contaminants.

Prior to the completion of a groundwater monitoring well installation program, vertical aquifer characterization is strongly recommended. A detailed vertical aquifer characterization program should include field characterization of hydraulic conductivities, determination of vertical and horizontal flow directions, assessment of lithologic and geologic variations, and determination of vertical and horizontal contaminant distributions (U.S. EPA 2002).

2.1.2 Sampling Frequency

In most situations, sampling frequency should be based on the hydrogeology of the site. There is no minimum or maximum sampling frequency set by DTSC for all sites. Groundwater analytical results should be reviewed periodically, and sampling frequency modified according to data needs, historical water quality trends, and regulatory goals. To track potential seasonal changes in concentration, at least two sampling rounds should roughly coincide with maximum and minimum water table or potentiometric surface elevations. DTSC recommends sampling at least quarterly for a minimum of one year to track seasonal changes and establish water quality trends. The document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance* (U.S. EPA 1992a) suggests a method for choosing a sampling interval that will reflect site-specific hydrogeologic conditions. The method uses the Darcy equation to determine the horizontal component of the average linear velocity of groundwater flow for confined, semi-confined, and unconfined aquifers. This value is used to determine a sampling interval that will yield an independent sample of groundwater. Research performed in the area of groundwater sampling frequency (Barcelona et. al. 1989) indicates that groundwater monitoring data should be carefully collected over long periods of time (i.e. greater than two years) to determine optimal sampling frequency and to delineate seasonal trends in groundwater monitoring results. In this research, groundwater samples were collected biweekly for 18 months and analyzed for 26 water quality and geochemical constituents. The researchers determined that for the study site, groundwater sampling performed four to six times per year would result in an estimated data/information loss below 20 percent and would minimize redundancy. The researchers concluded that by using careful sampling and analytical procedures, sampling and analytical errors can be controlled to approximately ±20 percent of the annual mean inorganic chemical constituent concentration in groundwater.

2.1.3 Pre-Sampling Activities

The following activities should be conducted before each sampling event.

2.1.3.1 WELL-HEAD INSPECTION

Well-head conditions (e.g., condition of well casing, well lock, marking, standing water at surface, condition of surface pad, and annular seal) and any suggested maintenance should be assessed and documented in the field notes. The SAP should describe procedures and schedules for performing routine well maintenance. Incidental maintenance should be documented and conducted in a timely manner. A well-head maintenance checklist should be included in the SAP. The well-head inspection should include gas monitoring in and around well-heads and well vaults.

2.1.3.2 STATIC WATER LEVEL ELEVATION MEASUREMENT

The SAP should include provisions for measuring the static water elevation in each well prior to each sampling event. Measurement of water level elevations on a continuing basis is important to determine whether horizontal and vertical components of the hydraulic gradient change over time. A change in groundwater flow may necessitate modification to the design of the groundwater monitoring system. The following methods for determining water level elevations are suggested:

- Electric water level sounders
- Pressure transducers

These devices and other methods are described in more detail in U.S. EPA (1987), Aller et al. (1989), Nielsen (1991), and ASTM D4750 (2001). The SAP should specify the device to be used for water level measurements, procedure for measuring water levels, and accuracy of the measuring device.

The following criteria should be met when determining water level elevations in monitoring wells or piezometers:

- The top of the well casing should be surveyed and tied into a known vertical datum.

- Each well should have a permanent, easily identified reference point from which all depth measurements are taken. The reference point (the top of the inner casing, outer casing, or security/protective casing) should remain constant through all measurements, should be clearly marked on the casing and its description recorded. The inner casing should be used as a reference point, since the outer casing and surrounding area may be affected by other phenomena (e.g., general instability of outer casings due to frost heaving, and vehicular damage) which could cause movement of casings. The elevation of this reference point should be known and clearly marked at the well site (Nielsen, 1991 and Nielsen, 2006). This reference point should also have a known latitude and longitude consistent with the Regional and National Minimum Data Elements requirements. The elevation of the reference point should be surveyed relative to Mean Sea Level (MSL) using the NAVD 88 datum (U.S. EPA 2002).

- After well construction and development, water levels should be allowed to stabilize for a minimum of 24 hours prior to measurement. Low yield aquifers may take longer, and several water level measurements should be made over a period of several days to ensure that adequate recovery has occurred.

- Water levels (the depth to standing water) should be accurately measured with a precision of ±0.01 foot from the survey datum on the top of the well casing. The method or device used to measure water levels should be sufficiently sensitive so that a measurement to 0.01 foot can be reliably obtained.

- Water level measurements used to establish a water table (the surface of the zone of saturation) or any single potentiometric surface should be collected as soon as practicable (e.g., within less than one day). This practice is adequate if the magnitude of change is insignificant over a specific time period. In certain situations, small water level changes could be significant or site-specific variables may warrant collecting water level measurements within a short time interval. These situations may include:

    - tidally influenced aquifers
    - aquifers affected by river stage, bank storage, impoundments, and/or unlined ditches
    - aquifers stressed by intermittent pumping of production, irrigation or supply or remediation wells
    - aquifers being actively recharged because of recent precipitation
    - aquifers that demonstrate significant water level fluctuations in response to barometric pressure changes

- Water level and well depth measurement equipment should be constructed of chemically inert materials not prone to sorption or desorption.

- Water level and well depth measurement equipment should be decontaminated prior to use at each well to ensure sample integrity and prevent cross-contamination of groundwater.

- Devices used to measure water levels and well depths should be periodically calibrated.

- Total well depth measurements should be made periodically using a weighted tape measure or marked cable. The purpose of these depth-to-bottom measurements is two-fold. The first is to determine the length of the water column for purposes of well volume purging calculations. The second is to determine if the well is filling with sediment over time indicating the need for periodic removal of bottom sediments and/or well redevelopment. The weight should be heavy enough to keep the tape measure straight and it should be blunt so that it will not penetrate soft materials on the bottom of the well. The deeper the well, the heavier the weight has to be to "feel" the bottom of the well. Standing water level measuring devices may not be appropriate for making well depth measurements. For wells with dedicated equipment, the total depth should be measured anytime the pump is removed for repair or maintenance or when indicated by elevated turbidity measurements.

  Note: When using a well volume purge procedure, depth-to-bottom measurements should be made *before* purging and calculating the purge volume. For other sampling methods, where the well volume calculation is not critical (e.g., low-flow sampling), the depth-to-bottom measurement should be conducted *after* sampling to avoid generating artifact turbidity and to minimize the possibility of introducing contaminants before sampling.

2.1.3.3 DETECTION OF IMMISCIBLE LAYERS

The SAP should include provisions for detecting and measuring the thicknesses of immiscible liquid contaminants, such as light non-aqueous phase liquids (LNAPLs) and dense non-aqueous phase liquids (DNAPLs), if present or likely to be present each time the water level is measured. LNAPLs, also known as "floaters", are organic liquids, less dense than water, that tend to spread across the water table (in unconfined aquifers). DNAPLs, also known as "sinkers", are relatively insoluble organic liquids that are denser than water. DNAPLs tend to migrate downward and accumulate on underlying lower impermeable intervals. The detection of immiscible layers requires specialized equipment that should be used before a well is evacuated for conventional sampling. The SAP should specify the device(s) to be used to locate and determine the thickness of LNAPLs and DNAPLs, as well as the procedures to be used for detecting and sampling these contaminants.

Extra health and safety precautions should be taken when asphyxiates, LNAPLs or DNAPLs are expected in a well, and the lead regulatory agency should be notified when they are detected.

2.1.3.3.1 LNAPL Detection/Collection

The SAP should specify the following procedures for detecting the presence of LNAPLs. These procedures should be followed before the well is purged for conventional sampling.

1. Open the well vault and sample the air in the vault for target vapors using an appropriate testing device capable of detecting the contaminant; typically, a photoionization detector or an organic vapor analyzer is used for common organic contaminants. Record the measurement results. The air above the well head should be monitored to determine the potential for fire, explosion, or health and safety hazards. Air monitoring also serves as a first indication of the presence of LNAPLs. The presence of LNAPLs precludes the exclusive use of water level sounders to make a determination of static water level.

2. Inspect the well vault and the well head to observe evidence of infiltration or danger.

3. If it is safe to do so, and the lid can be opened without introducing non-native materials into the well, remove the locking and protective caps.

4. Sample the air in the well head for target vapors using an appropriate testing device and record the measurements.

5. Two possible methods to determine the presence of LNAPL are:

    a. Gently lower a clear disposable bailer into the well to just below the fluid level and retrieve a sample. Use of a clear bailer is best for visually determining the presence of very thin or sheen-type layers.

    b. Alternatively, lower an interface gauging probe or a weighted tape coated with commercially available reactive indicator into the well to determine the depth to the air/LNAPL and the LNAPL/water interfaces. The interface probe serves two related purposes. First, as it is lowered into the well, the probe registers when it is exposed to an organic liquid and thus identifies the presence of LNAPLs. Secondly, after passing through the LNAPL layer, the probe indicates the depth to water. Careful recording of the depths of the air/LNAPL and LNAPL/water interfaces establishes a measurement of the thickness of the LNAPL in the well casing.

6. The approach to collecting LNAPL samples depends on the depth to the floating layer surface and the thickness of the layer. A sample of the LNAPL should be collected without purging the well. To collect an LNAPL sample, a bottom valve bailer is the equipment of choice. The bailer should be lowered slowly until contact is made with the surface of the LNAPL. The bailer should then be lowered to a depth less than that of the LNAPL/water interface depth, determined beforehand using the interface probe.

2.1.3.3.2 DNAPL Detection/Collection

The SAP should specify the following procedures for detecting the presence of DNAPLs. These procedures should be followed before the well is evacuated for conventional sampling:

1. Open the well vault and sample the air in the vault for target vapors using an appropriate testing device capable of detecting the contaminant; typically a photoionization detector or an organic vapor analyzer is used for common organic contaminants, but specialized equipment should be employed where potentially dangerous volatiles are suspected. Record the measurement results. The air around and below the well head should be monitored to determine the potential for the accumulation of dense gases or low oxygen conditions. Air monitoring also serves as a first indication of the presence of DNAPLs. A water interface probes may be used to locate the depth to water, but the presence of DNAPLs can not be determined through the exclusive use of water level sounder.

2. Inspect the well vault and the well head to observe evidence of infiltration or danger.

3. If it is safe to do so, and the lid can be opened without introducing non-native materials into the well, remove the locking and protective caps.

4. Sample the air in the well head for target vapors using an appropriate testing device and record the measurement results

5. Determine the static groundwater level using a water level sounder or other device listed in Section 2.1.3.2.

6. Two possible methods to determine the presence of DNAPL are:

    a. lower an interface probe (conductivity or resistivity sensor) to the well bottom to determine if an organic liquid is present; or

    b. lower a transparent, double check-valve bailer to the bottom of the well and withdraw a sample to visually check for the presence of DNAPL. DNAPLs should be collected by slowly lowering and raising the bailer within the well or leaving the bailer in the bottom of the well for an extended period (i.e., overnight).

2.1.4 Sampling Method Selection

Sampling method selection should be based on site-specific conditions and site-specific DQOs. DQOs for the data collection activity include the overall level of uncertainty that a decision-maker is willing to accept in results derived from environmental data. This uncertainty is used to specify the quality of the measurement data required, usually in terms of objectives for precision, bias, representativeness, comparability, and completeness. As described in Chapter One of SW-846, DQOs should be defined prior to the initiation of the field and laboratory work (U.S. EPA 1992b).

Field and laboratory organizations performing the work of the DQOs should be informed so their personnel may make informed decisions during the course of the project to attain those DQOs. The procedures used to characterize the hydrogeology of a site, to design and construct a monitoring network, to collect and analyze environmental samples, and to evaluate analytical results should ensure that the data are of the type and quality necessary to allow for the detection of contamination when hazardous substances have migrated from the waste management area (U.S. EPA 1992b). Please refer to Section 2.1.1, Sampling Objectives, for additional information.

Method selection refers to the type of sampling method that will be used at the site, such as low-flow, bailer, or passive samplers. Implementation of each method will differ at each site and at specific wells. Some criteria to be considered when selecting a sampling method include location of the sampling intake, purge completion measurements, the general composition of the groundwater, recharge rates, and degree of screen submersion. Each of these and other site-specific conditions should be considered when selecting a groundwater sampling method for a site. Regardless of the sampling method used at the site, detailed step-by-step procedures and rationale for the proposed sampling method should be included in the SAP.

Sampling method selection should take into consideration that water in a well screen and surrounding filter pack is generally in a state of flux, while water in the blank casing above the screen tends to stagnate (Robin and Gillham 1987, Powell and Puls 1993, U.S. EPA 2002, and ASTM 2002). Groundwater sampling methods that purge relatively large volumes from the well to achieve a representative sample must ensure that the blank casing water is effectively removed before sample collection. Methods that do not remove multiple casing volumes must ensure the sampling location is within the screen interval to assure formation water is sampled. Non-pumping sampling methods, also known as passive sampling, relies on a constant state of flux in the screen zone and that samples are collected from the actively flushed portion of well (i.e. the screen zone).

The following sections include details of several common sampling methods. However, other methods may be applicable to a groundwater monitoring program. Methods not included here can be proposed to the regulatory agency, detailing the proposed method. Alternate methods, meeting site data quality objectives, are encouraged.

2.1.4.1 CHANGING SAMPLING METHODS

Cal-EPA recognizes sampling technologies or methods will evolve. During the site investigation or remediation, new technologies or sampling methods may be proposed. Maintaining the same sampling method throughout the life of a project, provided the method is carried out the same way every time (e.g., pump inlet depth), removes a variable that may impact sample results. However, a new method may be proposed as being more cost effective and capable of providing a representative sample. In cases where a new sampling method is proposed to replace a previous sampling method, some type of comparison evaluation is necessary. When applicable, comparisons should include conversion between volume-based purging and sampling and low flow purging and sampling.

Comparison between two sampling methods can be in the form of side-by-side evaluations (collection of water samples using the two different sampling methods over a period of time, trend evaluations (change sampling method and provide the trend plots from the previous and new sampling method on the same graph), or a combination of methods. How the method(s) will be compared and evaluated should be established prior to initiation of the new sampling method and presented in an appropriate workplan or SAP. Results of the comparison sampling can be provided in either a separate groundwater sampling report or incorporated into an existing routine groundwater report (e.g., quarterly groundwater monitoring report).

2.1.4.2 WELL PURGING METHOD SELECTION

Water standing in a monitoring well casing may not be representative of in-situ formation groundwater quality. Water in the blank (unscreened) portion of the well is generally considered "stagnant" and non-representative. Studies have shown that water within the screened section of a well can be representative of adjacent groundwater (Robin and Gillham 1987, Powell and Puls, 1993, U.S. EPA 2002, ASTM 2002). In cases where water from the "stagnant" casing cannot be separated from the screen zone water (e.g. during bail sampling, or due to drawdown during pumping), purging of well water is conducted to assure screen zone formation water is collected.

Well purging and the requirements for completion criteria were updated and revised in the groundwater literature over the last 20 years. This guidance incorporates findings of available research and field practice, as well as allowing for new findings and new technologies, and includes discussion and rationale for several well sampling procedures. No judgment is made about what purging methodology is most appropriate in every scenario because different sampling approaches may be applicable for different sampling needs. The overarching purpose of the guidance is to outline the requirements of several sampling protocols and to help the user choose a protocol appropriate for site-specific DQOs. For methods not specifically discussed, it is recommended that the user incorporate elements of a similar method/protocol in the SAP and discuss variances with the site's lead regulator for concurrence on the sampling methodology prior to sampling.

The SAP should include detailed, step-by-step procedures for the selected purge method including the purge method rationale. Depending on the type of purge method chosen, the SAP should contain descriptions of the equipment to be used for pumping, the instrumentation used to quantitatively measure water quality indicator parameters (including calibration methods), intervals between parameter readings, well drawdown, the location of the pump in relation to the well screen and water table, and the purge pump rate.

2.1.4.3 PURGE METHODS

Well purging methods are as follows:

1. Purge a Minimum of Three to Five Well Casing Volumes. This approach is based on the removal of a sufficient volume of water from the well prior to sample collection to assure "stagnant" or non-representative water is removed and formation water is being sampled. The minimal volume is cited as three to five casing volumes (U.S. EPA 1987, Wilde et. al. 1998) reportedly based on engineering calculations used to determine effective flushing. For enforcement purposes, U.S. EPA recommends the collection of water quality stabilization parameters (U.S. EPA 1998) during purging. As technology and experience with the practice of well sampling advanced, the collection of indicator parameters to document parameter stabilization with this method became routine. In such cases, many SAPs stipulate well purging will cease when one of the two criteria first occurs, either removal of the minimal purge volume (usually three casing volumes) or the attainment of the parameter stabilization criteria.

2. Purge to Stabilization. This approach is referred to as "Purging to Stabilization" or "Well Volume Approach" (U.S. EPA 2002). This method evolved from the traditional three to five well volume/parameter stabilization approach, but without purging a fixed minimum number of well volumes. The method is based on continuously monitoring groundwater indicator parameters during purging until they have stabilized within an acceptable range, at which point stagnant water is presumed to be removed and steady-state conditions achieved. When parameter stabilization occurs, the sample is presumed to be representative. This approach became possible with the development of flow-through cell water quality indicator parameter measurement instruments with continuous data recording capability, which greatly enhanced the ability to determine parameter stabilization characteristics and assurance of steady state conditions. The critical issue with this purge method is to define the criteria for indicator parameter stabilization (e.g., the time interval between measurements, minimal purge time, purge rate, and parameter selection.) Refer to U.S EPA 2002b for an example protocol for this purge method.

3. Low-Flow Purging ("Low-Stress Approach", "Micro-Purge Method" or "Minimal Drawdown Method"). Low-flow purging practices (Puls and Barcelona 1996) were the culmination of numerous observations and studies, in the late 1980s and early 1990s, that groundwater generally flows through the monitoring well screen with sufficient velocity to maintain an exchange with formation water surrounding the screen. If water is removed from a well at rate minimizing stress to the groundwater system, as measured by drawdown in the well, then the pumped water should be representative of formation water after water level and parameter stabilization. In low-flow purging, the pump intake must be situated within the screened portion of the well, and well drawdown must be minimized (Puls and Barcelona 1996). This approach effectively isolates the screened interval from the overlying (stagnant) casing water which the more traditional methods remove by purging. Groundwater indicator parameters are measured during low-flow purging and purging is considered complete, regardless of the amount of water removed from the well, when the indicators parameters have stabilized. During purging, careful measurement and documentation of water levels and pump rate are required to assure that this

method is being effectively performed. Puls and Barcelona recommend this method not be used with well screen intakes greater than ten feet. Refer to U.S EPA 2002a for an example protocol for this purge method.

DTSC recommends the type of sampling method chosen be determined on a well-by-well basis, depending on the hydraulic properties of the monitored zone, the physical nature of the contaminants, and the hydraulic performance of the well (Barcelona et al. 1990, Barcelona, 1985). DTSC will consider the following recommendations and requirements when evaluating monitoring well purge methods:

- Some purge method strategies may be better suited to specific site conditions than others. For example, purging three to five well volumes may detect contamination, while a low-flow method, at the same well, may not. This may be due to the differing hydraulic influence (i.e. radius of influence) of each method. At sites where characterization is limited or uncertain, where well characteristics are not fully known, or where specific constituents are sensitive to certain purge methods, side-by-side comparisons between purging protocols should be considered to determine which method should be used to yield the most representative data or to meet the site-specific DQOs.

- The use of purging equipment which can excessively disrupt the well and potentially affect sample quality, such as bailers or vacuum systems, are discouraged. The use of a dedicated pump is recommended to minimize turbulence during sampling and eliminates the need for equipment decontamination.

- Pump placement within the well may be critical to effective purging. The depth of pump placement should be determined based on the selected purge method, pump design, aquifer characterization, well characteristics, and the nature of contaminants. Comparative sampling at various depths within the screen interval may be required to avoid missing zones of contamination or preferential contaminant pathways.

- Wells should be purged at rates below those used to develop the well. This is to prevent excessive stress on the well (i.e. inducing high turbidity), to prevent damage to the well, and to avoid disturbing accumulated corrosion or reaction products in the well (Puls et al. 1990; Puls and Barcelona 1989a, Puls and Barcelona 1989b, Barcelona et al. 1985). A low purge rate will also reduce the possibility of stripping volatile organic compounds (VOCs) from groundwater, and will reduce the likelihood of mobilizing solids in the subsurface that are immobile under natural flow conditions. However, purge rates should not be purposefully kept low to mask deficiencies in well design or development, as shown by excessively high turbidity. Water quality parameters should be resampled at the lower sampling rate to ensure water quality parameters are stable.

- Water levels should be monitored during purging and sampling to ensure the proper pump flow rate is used to provide minimum drawdown and/or water level stabilization.

- Water quality indicator parameters should be measured in all cases to document stabilization and steady-state conditions. Parameters should include temperature, specific conductance, pH, oxidation-reduction potential (ORP), and dissolved oxygen (Puls and Eychaner 1990, Puls et al. 1990; Puls and Barcelona 1989a, Puls and Barcelona 1989b). In general, the order of parameter stabilization is pH, temperature, specific conductance, ORP, dissolved oxygen, and turbidity. In-line flow-through cells instruments are preferred, and are considered essential for the purge to stabilization method. Turbidity measurements should be collected during purging, and should be used to evaluate the need to redevelop monitoring wells.

- Parameter stabilization should be based on the criteria shown in Table 1, at the end of this section. The intervals between parameter readings should be based on either a set time interval or a specified volume of water purged. These intervals (time or water volume) should be of sufficient spacing and quantity to assure true stabilization trends are achieved before sampling. At a minimum, four parameter stabilization measurements should be recorded while purging.

- At a minimum, wells with screens below the water table should be purged of a volume of water equivalent to the volume of water standing in the blank casing of the well above the screened interval.

- For wells screened in media with low hydraulic conductivities, special considerations apply. If development data or pump tests show a well will either pump to dryness or that pumping will expose a significant portion of the saturated screen interval, the well recharge rate should be quantitatively determined to evaluate if water is entering the well with excessive turbulence. Turbulent flow can cause a significant loss of volatile contaminants and may affect water chemistry. Once identified and characterized, such wells should be purged at sufficiently low pump rates to avoid turbulent flow (low-flow).

- The purging/sampling method should ensure formation water does not cascade (i.e. flow vertically down the screen) down the sides of the well screen (this may occur when the water level in the well is lowered into or below the screened interval). Laboratory experiments have shown that unless cascading is prevented, up to 70 percent of the volatiles present could be lost before sampling. At no time should a well be purged to dryness if recharge causes formation water to cascade down the sides of the screen, as this may cause an accelerated loss of volatile constituents, resulting in a sample not representative of actual groundwater quality. This problem should be anticipated; water should be purged from the well at a rate that does not cause recharge water to be excessively agitated.

- Wells recharging at a slow rates should be sampled as soon as a sufficient volume of groundwater has entered the well to enable the collection of the necessary groundwater samples. Re-purging should be performed if a well is inactive for more than 24 hours after full recharge.

- Purged water should be stored in appropriate containers until analytical results are available, at which time proper arrangements for disposal or treatment should be made.

TABLE 1. Stabilization Criteria with References for Water-Quality-Indicator Parameters

Parameter	Stabilization Criteria	Reference
Temperature	± 3% of reading (minimum of ± 0.2° C	SAM 2002
pH	+/- 0.1	Puls and Barcelona, 1996; Wilde et al., 1998
specific electrical conductance (SEC)	+/- 3%	Puls and Barcelona, 1996
oxidation-reduction potential (ORP)	+/- 10 millivolts	Puls and Barcelona, 1996
dissolved oxygen (DO)	+/- 0.3 milligrams per liter	Wilde et al., 1998

2.1.4.4 PUMP INTAKE POSITION

There are two positions for pump intake placement, within the screened interval or the blank casing above the screen. Each of these positions has advantages and disadvantages based on the portion of the screen sampled, data reproducibility, and potential purge volumes (U.S. EPA 2002).

The vertical location within the well where the pump is placed during an assessment is of primary concern. Unless adequate precautions are taken to lower the pump into the exact position used in previous sampling rounds, or a dedicated system is used, the position of the sampling pump intake may vary between sampling rounds potentially resulting in sampling different zones within the aquifer. When the pump intake location varies along the well screen, reproducibility of the sampling results can be reduced. The variability of sample collection points along the well screen length can be reduced by using dedicated sampling pumps or a premeasured sampling pump hose.

To minimize the contact time between groundwater and the well construction materials during sampling, and ensure the evacuation of the stagnant water above the screen, Keely and Boateng (1987) suggested that the sample pump be gradually lowered through the submerged blank casing while purging. This would minimize contact time between the groundwater and the well construction materials while sampling, as well as ensure the evacuation of the stagnant water above the screen. (U.S. EPA 2002).

DTSC recommends placing the pump intake location during sampling within the well screen, instead of above it, to minimize potential mixing of stagnant water, to minimize the required purge time, and to keep the intake off the bottom of the well where accumulated sediment may be disturbed and drawn into the sample. Locating the pump intake centrally within the well screen provides the best opportunity to collect samples representative of water across the entire well screen (Varljen 2006). Shorter well screens are preferred to reduce concentration averaging across large profiles of the aquifer and to reduce time required for water to reach the pump intake from portions of the screen distant from the pump intake.

2.1.4.5 PASSIVE METHODS

Passive Sampling. Passive sampling approaches do not incorporate purging or pumping as part of the groundwater sampling method. These include diffusion samplers such as polyethylene diffusion bags (PDB), or rigid porous pipe samplers (RPP); ***equilibrated*** grab samplers such as the Snap Sampler or Hydrasleeve; and sorptive samplers such as the Gore sampler. These devices are placed in the screened section of wells for a device-specific equilibration period. Most devices can be left downhole between sampling events. Passive methods rely on ambient aquifer flow-through to deliver groundwater to the sampling device. The operation of these devices includes exposure and diffusion of contaminants of concern into the sampling device, or collection of a whole water sample at a user-identified collection event.

2.1.4.6 GROUNDWATER SAMPLING EQUIPMENT SELECTION AND USE

The following is a list of the most common categories and types of groundwater sampling devices (Nielsen 2006, Pohlmann and Hess 1988, ITRC 2007):

- Active
  - Grab samplers (e.g. bailers and syringe devices)
  - Positive displacement pumps (e.g. gear drive, bladder, helical rotor, piston, and centrifugal)
  - Suction lift pumps (e.g. peristaltic)
  - Gas contact pumps
- Passive
  - Polyethylene Diffusion Bags
  - Rigid Porous Pipe Samplers
  - Dialysis Membrane Sampler
  - Snap Samplers
  - Hydrasleeve

- Gore Sampler

DTSC prefers all sampling equipment be dedicated to a particular well. To encourage innovation, DTSC may allow the use of other devices that are not specifically mentioned above if it can be demonstrated that the device will yield "representative" groundwater samples.

The following criteria should be considered when selecting sampling equipment:

- Sampling equipment should be chosen based on the analytes of interest and the characteristics and depth of the saturated zone from which the sample is withdrawn. For example, the choice of sampling equipment should reflect consideration of the potential for LNAPLs and DNAPLs.

- Sample collection equipment should not alter analyte concentrations, such as by sorption or desorption, degradation, or corrosion.

- Sampling equipment should cause minimal sample agitation and should be selected to reduce/eliminate sample contact with the atmosphere during sample transfer. Sampling equipment should not allow volatilization or aeration of samples that may alter analyte concentrations.

Appendix A briefly discusses each category and various types of sampling devices, including their appropriateness for use and relative advantages and disadvantages.

2.1.4.7 DECONTAMINATING SAMPLING EQUIPMENT

When dedicated equipment is not used for sampling (or purging), or when dedicated equipment is stored outside of the well, the SAP should include procedures for disassembly and cleaning of equipment before each use at each well.

Disposable items such as rope and low-grade tubing should be properly disposed between wells. Thoroughly cleaning equipment parts that come into contact with well water is especially important. In addition, a clean plastic sheet should be placed adjacent to or around the well to prevent surface debris from coming in contact with the purging and sampling equipment. Clean sampling equipment should not be placed on the ground or on other contaminated surfaces prior to insertion in the well. The effects of cross-contamination can be minimized by sampling the least contaminated well first and progressing to more contaminated ones. Equipment blanks to document the effectiveness of the decontamination procedures should be collected on a regular basis from non-dedicated equipment. The frequency depends on the SAP and regional protocols.

The following cleaning procedure is recommended for organic constituents:

1. Wash the equipment with a non-phosphate detergent
2. Rinse with tap water
3. Rinse with organic-free reagent water or deionized water

If separate phase or hydrophobic contaminants are present (such as LNAPL, DNAPL, high levels of contaminants, etc.), additional decontamination steps may be added. For example, an organic solvent, such as reagent-grade isopropanol or acetone may be added as a first spraying/bucket prior to the soapy water/tap, water/deionized rinse procedure/buckets.

The following cleaning procedure is recommended for inorganic constituents:

1. Wash the equipment with a non-phosphate detergent/soap mixture
2. Rinse with dilute (0.1Mole) hydrochloric or nitric acid
3. Rinse with tap water

4. Rinse with reagent water. Dilute hydrochloric acid with a reagent water rinse is preferred when cleaning stainless steel because nitric acid may oxidize the steel.

The waste decontamination fluids should be containerized and characterized to determine whether they should be treated or disposed of as hazardous waste.

2.1.4.8 COLLECTING GROUNDWATER SAMPLES

Monitoring well sampling should always progress from the well expected to be least contaminated to the most contaminated, to minimize the potential for cross-contamination of samples that may result from inadequate decontamination of sampling equipment. Samples should be collected and containerized according to the volatility of the target analytes. The preferred collection order for some of the more common groundwater analytes is as follows:

- Volatile organic compounds (VOCs)
- Semivolatile organic compounds (SVOCs)
- Major water quality cations and anions
- Stable isotopes (e.g. oxygen, hydrogen, nitrogen, lead)
- Metals
- Cyanide
- Turbidity
- Radionuclides

The following guidelines should be adhered to while using and operating groundwater sampling equipment:

- Check valves should be designed and inspected to ensure that fouling problems do not reduce delivery capabilities or result in aeration of samples.

- Sampling equipment (especially bailers) should never be dropped into the well, as this will cause degassing of the water upon impact.

- Sampler contents should be transferred to sample containers in a way that will minimize sample agitation and aeration.

- Clean sampling equipment should not be allowed to come into contact with the ground or other contaminated surfaces prior to insertion into the well.

- The rate at which a well is sampled should not exceed the rate at which the well was purged. Sampling rates of less than one liter per minute are suggested for wells that have historically yielded turbid samples (Puls et al., 1990). Wells are routinely sampled at rates as low as 100 to 500 milliliter per minute (Puls, et al., 1990; Puls and Barcelona, 1989a).

- Water levels should be monitored during purging and sampling to ensure the proper pump flow rate is used to provide minimum drawdown and/or water level stabilization.

- If the rates of purging and sampling are different, the sample water should be verified as stable by collecting additional field parameters and utilizing the stabilization criteria herein.

- If a flow through cell is used, groundwater samples should be collected before the flow-through cell, between the flow-through cell and the well head. Installation of a Y-fitting approximately 1 foot from the inlet to the flow-through cell will facilitate sampling without interrupting flow.

2.1.5 In-Situ or Field Analyses

Physically or chemically unstable analytes should be measured in the field, rather than in the laboratory. Examples of unstable parameters include pH, redox potential, chlorine, dissolved oxygen, ferrous iron, alkalinity, and temperature. It is suggested that dissolved oxygen, turbidity, and specific conductance be determined in the field as soon as practicable. Although the specific conductance (i.e. electrical conductance) of a sample should be relatively stable, DTSC recommends that this analyte also be measured in the field. Most conductivity instruments require temperature compensation; therefore, the temperature of the samples should be measured at the time conductivity is determined unless the instrument automatically makes this compensation.

Three methods can be employed for measuring unstable field parameters:

- Specially designed meters with probes that may be lowered down into the well.
- In-line flow-through monitoring chamber with ports for probe attachment, allowing continuous readings during purging
- Collect a sample in a clean bottle or beaker in the same manner that a sample for laboratory analysis would be collected, and then to analyze the sample using field test kits or meters.

Unstable parameters should be measured in samples collected from the well after the well has been purged and before samples are collected for laboratory analysis. If down-hole probes (pH electrode, specific ion electrode, and thermistor) are used to measure unstable parameters, the probes should be decontaminated in a manner that prevents the probe(s) from contaminating the water in the well. In no case should field analyses be performed directly on samples that will be submitted for laboratory analysis. Monitoring probes should not be placed in shipping containers containing groundwater samples for laboratory analysis. Dissolved oxygen should only be measured with a flow-through cell or downhole instrument.

The SAP should list the specific parameters that will be measured in the field, types of instruments (e.g. downhole probes, meters) that will be used to make these measurements, and describe the procedures for operating the instruments and recording the measurements. The SAP should describe all instrument calibration procedures, including the frequency of calibration. The description of calibration procedures should include: discussion of initial calibration, multi-level calibration for determination of usable range, periodic calibration checks, conditions that warrant re-calibration of instruments, acceptable control limits, and the maintenance of calibration records in the field log book. All instruments should be calibrated with standards that have not exceeded their expiration dates. At a minimum, all field instruments should be calibrated at the beginning of each use and in accordance with the frequency suggested by the manufacturer. Field instruments should be calibrated using at least two calibration standards spanning the range of results anticipated during the sampling event. For example, the pH meter should be calibrated at 4 and 7 pH, or at 7 and 10 pH, dependent if the anticipated pH of the groundwater is either acidic or basic, respectively.

2.2 SAMPLE PRESERVATION AND HANDLING

The procedures employed for sample preservation and handling are nearly as important for ensuring the integrity of the samples as the collection device itself. Detailed procedures for containerization, preservation, packaging, and handling (e.g. shipped daily by overnight courier) should be provided in the SAP. Samples collected from a well should never be composited in a large container for subsequent transfer to the appropriate smaller bottles. Regardless of the analytes of concern, exposure of the samples to the ambient air should be minimized.

Splitting of samples is sometimes required for quality assurance/quality control purposes. When sampling for VOCs, the procedure is changed slightly. For non-VOC samples, one half of the sample is emptied from the sampling device into one container, and one half is emptied into the other, with the procedure being repeated until the containers are full. For VOCs, however, the first volatile organic analysis (VOA) container should be completely filled and sealed, and then the VOA container into which the other split sample will be placed should be completely filled and sealed.

2.2.1 Sample Containers

The SAP should identify the type of sample containers to be used to collect samples, as well as the procedures used to ensure that sample containers are free of contaminants prior to use. The SAP should refer to the specific analytical method that designates an acceptable container and sufficient sample quantity.

The most important factors to consider when choosing sample containers are compatibility with the contaminant or waste, cost, resistance to breakage, and volume. Containers must not distort, rupture, or leak as a result of chemical reactions with constituents of concern. The containers must have adequate wall thickness to withstand handling during sample collection and transport to the laboratory. Containers with wide mouths are often desirable to facilitate transfer of samples from samplers to containers.

New containers should be prepared based on the analyte of interest; used containers are to be discarded. The cleanliness of a batch of precleaned bottles should be verified in the laboratory. The residue analysis should be available prior to sampling in the field.

2.2.2 Sample Preservation

The SAP should identify the sample preservation methods that will be used. Methods of sample preservation are relatively limited, and are generally intended to 1) retard biological action, 2) retard chemical reactions such as hydrolysis or oxidation, and 3) reduce sorption effects. Preservation methods are generally limited to pH control, chemical addition, refrigeration, and protection from light.

Most sample containers provided by a laboratory have pre-added preservative if the analyte of interest requires preservation. If these are not available, then preservatives should be added in the field. Samples should not be brought back to the laboratory for preservation. For pH control, test strips should be used to verify that samples have attained the appropriate pH range for sample preservation.

Most commercial shipping containers ("coolers") leak when the interior water level reaches the lid-body interface and may result in the carrier refusing to ship the container. For this reason, DTSC recommends using two water-tight sealable polyethylene bags for shipping. The first will contain the sample bottles, the second the ice needed to keep the samples at 4±2 °C. Glass containers should be protected from breakage using holders bubble wrap and/or vermiculite. The vermiculite will also absorb any spills or melted ice. The number of samples in the cooler should not prevent effective sample preservation (i.e. cooling). Blue ice should only be used if the samples are pre-cooled before shipping, since blue ice may not chill the samples sufficiently for the duration of the trip to the laboratory. Care should also be taken with the VOC samples to prevent freezing in transit.

As specified by U.S. EPA (1998), a temperature history of the samples should be maintained as a quality control measure. This is done by recording the temperature on the chain-of-custody record (Section 2.3.4) before the sample containers are sealed for shipment. Upon receipt of the shipment, the laboratory is required to record the temperature at receipt on the chain-of-custody record. A temperature blank should be included in the cooler (i.e. a vial or container filled with clean water and marked as such, which is measured by the laboratory upon receipt).

Holding time refers to the period that begins when the sample is collected from the well and ends with its extraction or analysis. Holding time is not measured from the time the laboratory receives the samples. Any laboratory submission to DTSC should contain the date/time sampled, the date/time received, the date/time extracted, and the date/time analyzed.

2.2.3 Special Handling Considerations

During groundwater sampling, every attempt should be made to minimize changes in the chemistry of the samples so that data representative of subsurface hydrogeochemistry are collected. DTSC agrees with the following U.S. EPA protocols that will assist in preserving the natural chemistry of groundwater samples:

- Do not routinely filter groundwater samples in the field.
- Do not transfer samples from one sample container to another.
- Do not allow headspace in the containers of samples that will be analyzed for volatile organic compounds, alkalinity, and dissolved gases.

2.2.3.1 SAMPLE FILTRATION

Decisions to filter samples should be dictated by sampling objectives rather than as a fix for poor sampling practices. Field-filtering of certain compounds should not be the default. Evaluation of what the application of field-filtration is trying to accomplish should be considered (Puls and Barcelona 1996) and included in the SAP.

Groundwater samples used to determine if there is statistically significant evidence of groundwater contamination by organic compounds should not be field-filtered. Data generated from filtered samples provide information on only the dissolved constituents that are present, as suspended materials are removed by the filtration process. The analytical results of both filtered and un-filtered groundwater samples are used to determine if hazardous constituents were released to groundwater. As discussed in greater detail below, current research in groundwater sampling protocol indicates that hazardous constituents are mobile in the subsurface in both the aqueous (dissolved) phase and the solid phase. The research of Puls and Barcelona (1989a), Puls and Barcelona (1989b), Penrose et al. (1990), Backhus et al. (1993) and West (1990) are the primary sources of the discussion of field filtration that follows.

During groundwater sampling, every attempt should be made to minimize changes in the chemistry of the sample so the data is representative of site conditions. A sample that is exposed to the atmosphere or changes in ambient conditions as a result of field filtering is very likely to undergo chemical changes (e.g. volatilization, precipitation, chemical flocculation) that alter constituent concentrations. These reactions can change the concentrations of organic compounds and metals if they are present in the sample. VOCs may to partition to the atmosphere if exposed, thereby resulting in groundwater monitoring data that are not representative of in-situ concentrations. Further, precipitated and emulsion trapped constituents migrating in the aquifer are lost through field filtering, because they are unable to pass through a standard 0.45 micron field filter.

For metals analysis of groundwater samples, however, the situation is not as clear. The argument against filtering is that it will not provide accurate information concerning the mobility of metal contaminants. Metals may move through the aquifer matrices not only as dissolved species, but also as precipitated phases, and/or polymeric species; some metals may be adsorbed to, or encapsulated in, organic or inorganic particles (e.g. colloid-size particles), that are likely to be removed by filtration. In addition, field filtration may introduce oxygen into the sample, which can oxidize dissolved ferrous iron to form a ferric hydroxide precipitate ($Fe(OH)_3$); this may enmesh other metals in the sample, removing them from solution. Precipitated and entrapped constituents would be removed by field filtration.

The argument for filtering samples prior to analysis for inorganic constituents is that small differences in sample turbidity can mean very large differences in analytical results. Sample turbidity is an indirect measurement of the amount of particulate matter suspended in a sample, and is highly dependent on the nature of the aquifer material. In aquifers containing significant silt or clay, turbidity can be reduced through proper well design, construction and development, and by use of appropriate sample collection methods. However, turbidity is rarely eliminated. Since sample turbidity is not directly related to sources of contamination, resulting values from unfiltered samples do not necessarily provide direct evidence of metals contamination, and are generally not a useful indication of contaminant load in an aquifer.

Based on these arguments, the following recommendations are provided as a guide to sampling groundwater for the analysis of trace metals:

- For risk assessment, unfiltered samples should be analyzed if the potential for colloidal transport is suspected.

- Field filtered samples may be collected at the same time for comparison purposes, but field filtering is not a substitute for properly constructed, developed and sampled wells.

- Samples should never be filtered when a water supply well is sampled.

Since significant differences in water quality may be attributed to contamination, it is critical to control other variables that may affect groundwater quality. In addition to factors already discussed in this document, these recommendations, where applicable, should also be followed:

- Monitoring wells should be designed, constructed and developed to minimize turbidity; well construction is discussed in *Monitoring Well Design and Construction for Hydrogeologic Characterization* (Cal/EPA 1995b), and in the Department of Water Resources Bulletin 74-90 (DWR 1990).

- Whenever possible, well purging and sampling should be performed with dedicated pumps at low discharge rates.

- As previously stated throughout this document, wells should be purged until measured values for the stabilization criteria in Table 1 are achieved.

- In-line, positive-pressure filters should be used at all times; vacuum filtration is not acceptable.

- Manufacturer's recommendations for the volume of water to be flushed through the filter prior to sampling should be followed; if guidelines are not available, a volume of groundwater equal to twice the capacity of the filter should be flushed through the filter and discarded before collecting samples.

- There are certain circumstances where it is necessary to filter or centrifuge the sample under controlled laboratory conditions prior to analysis to prevent instrument damage. Sample filtration in the laboratory is permissible if insoluble materials that could damage laboratory equipment (e.g., silicates) remain after acid digestion of the sample. If this step is necessary, the filter and the filtering apparatus should be thoroughly cleaned and pre-rinsed with dilute nitric acid before use. Laboratory personnel should refer to SW-846 (U.S. EPA 1998) for information concerning these procedures. The analytical reports submitted to DTSC should clearly state that groundwater samples were laboratory filtered.

- Samples should not be transferred from one sample container to another. Transferring samples between containers may result in losses of organic material onto the walls of the container or sample aeration.

- To minimize the possibility of volatilization of organics, no headspace should exist in the containers of samples containing volatile organics. Field logs and laboratory analysis reports should note the headspace, if present, in the sample container(s) at the time of receipt by the laboratory, as well as at the time the sample was first transferred to the sample container at the wellhead.

2.3 CHAIN-OF-CUSTODY AND RECORDS MANAGEMENT

A chain-of-custody procedure should be designed to allow for the reconstruction of how and under what circumstances a sample was collected, including any problems encountered. U.S. EPA (1998) provides a complete description of chain-of-custody and records management. The chain-of-custody procedure is intended to prevent misidentification of the samples, to prevent tampering with the samples during shipping and storage, to allow easy identification of any tampering, and to allow for the easy tracking of possession. Groundwater samples should always be stored in a secure area.

To avoid water damage of the chain-of-custody form during transport in the sample cooler, the form should be placed into a water-tight sealable bag and placed on top of the cooler contents.

2.3.1 Sample Labels

To prevent sample misidentification, labels should be affixed to each sample container at the time of sampling. The labels should be sufficiently durable to remain legible even when wet and should contain, at a minimum, the following information:

- Site designation
- Sample identification number
- Name and signature of collector
- Date and time of collection
- Place of collection
- Parameters requested (if space permits)

Samples can be labeled by recording the above information directly on the sample containers. Alternatively, multiple-part labels consisting of a unique identification number that is placed on the container and at least two copies of the descriptive information for the samples (referenced to the identification number) may be used. One copy should be kept in a separate file or logbook, and a second copy is shipped inside the cooler with the samples to the laboratory.

2.3.2 Sample Custody Seal

In cases where samples leave the samplers immediate control (e.g. shipment to laboratory), a custody seal should be placed on the shipping container or on the individual sample bottles. Custody seals provide prevention or easy detection of sample tampering. The custody seal should bear the signature of the collector and the collection date. It can be placed on the front and back of a cooler, around the opening of sealable polyethylene bags or on the lid of each sample container before it is taped shut for shipping. Caution should be exercised in doing any of the above. Experience has shown that the seal may not always adhere to some plastic coolers, and the cooler may arrive at the destination without the appropriate seal. Sometimes the sample containers become wet from melting ice or condensation; thus, while their labels will stick, their custody seals may not. Taping over the seal with a transparent tape generally solves this problem and can be similarly applied to cooler lids (Note: Some tapes contain chemicals which may be chemicals of concern).

2.3.3 Field Logbook or Log Sheets

If a sample analysis produces an unexpected or unexplainable result, it will be necessary to determine if the circumstances of sample collection, rather than a change in the groundwater quality, are responsible. Examination of the field logbook or log sheets is critical in this process. The field logbook or log sheets should document the following:

- Well identification
- Condition of well and surface completion
- Top of casing surveyed elevation
- Well depth from top of casing
- Static water level depth and measurement technique
- Presence and thickness of immiscible layers and detection method
- Well purging procedure and equipment
- Purge volume and pumping rate
- Time well purged
- Well yield (high or low)

- Well recovery after purging (slow, fast)
- Collection method for immiscible layers
- Sample withdrawal procedure and equipment
- Date and time of collection
- Measurement of groundwater stabilization parameters
- Well sampling sequence
- Types of sample bottles used and sample identification numbers
- Preservatives used and pH verification
- Parameters requested for analysis
- Field observations of sampling event
- Name of collector
- Climatic conditions, including air temperature
- Internal temperature of field and shipping containers

The field logbook or log sheets for well purging and sampling should be included within reports submitted to DTSC.

2.3.4 Chain-of-Custody Record

Sample possession should be clear from the chain-of-custody record sheet. A chain-of-custody sheet should be filled out and should accompany all samples. It should also contain enough copies so that each person possessing the shipment receives his/her own copy. At a minimum, the record should contain the following information:

- Site designation
- Site address
- Sample number
- Sample description and location
- Signature of collector
- Date and time of collection
- Sample matrix (e.g. groundwater)
- Identification of sampling point (well)
- Number and types of containers
- Parameters requested for analysis
- Preservatives used
- Signature of persons involved in the chain of possession
- Inclusive dates and times of possession
- Internal temperature of shipping container when samples were sealed into the container for shipping
- Internal temperature of container when opened at the laboratory
- Remarks section to identify potential hazards or to relay other information to the laboratory

2.3.5 Sample Analysis Request Sheet

This document should accompany the sample(s) on delivery to the laboratory and clearly identify which sample containers have been designated for each requested parameter. It may be included in the chain-of-custody record. Addition of preservatives should also be noted. This document should include the following types of information:

- Name of person receiving the sample
- Name and addresses of analytical laboratory
- Laboratory sample number (if different from field number)
- Date of sample receipt
- Analyses to be performed
- Internal temperature of shipping container upon opening in the laboratory

- Preservatives added in the field

2.3.6 Laboratory Logbook

Once the sample has been received in the laboratory, the sample custodian and/or laboratory personnel should clearly document the processing steps that are applied to the sample. All sample preparation techniques and instrumental methods used should be identified in the logbook. Experimental conditions, such as the use of specific reagents, temperatures, reaction times, and instrument settings, should be noted. The results of the analyses of all laboratory quality control samples should be identified, specific to each batch of groundwater samples analyzed. The laboratory logbook should include the time, date, and name of the person who performed each processing step.

2.4 ANALYTICAL PROCEDURES

The SAP should describe in detail the analytical procedures that will be used to determine the concentrations of constituents or parameters of interest. These procedures should include suitable analytical methods, the associated analytical detection limits, as well as proper quality assurance and quality control protocols.

The SAP should identify a method that will be used for each specific parameter or target analyte that can achieve the required detection limits. The following should be addressed:

1. For SW-846 analytical methods, reference SW-846 and the analysis methods (by method number), including all sample preparation methods (U.S. EPA 1998).

2. For analysis by modified- or non-SW-846 methods, the analytical procedure and method detection limits to be used should be documented in the format of a Standard Operating Procedure (SOP).

2.5 FIELD AND LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

It is important to establish programs to ensure the reliability and validity of field and analytical laboratory data, as part of the overall groundwater monitoring program. Refer to SW-846 (U.S. EPA 1998) for requirements and guidance on establishing and maintaining field and laboratory quality control programs. In general, laboratory quality assurance and quality control (QA/QC) programs should address the following areas:

- Control samples
- Acceptance criteria
- Deviations
- Corrective action for sampling and analysis procedures
- Data handling
- Laboratory control samples
- Method blanks
- Matrix-specific effects

The SAP should explicitly describe the QA/QC program that will be used in the field and laboratory in the Quality Assurance Project Plan (QAPP). The QAPP describes the quality assurance and quality control (QA/QC) protocols necessary to achieve the objectives dictated by the intended use of the data. Control protocols include the procedures for sample collection, preservation, chain-of-custody, and transport, calibration and maintenance of instruments, processing verification, storage, and reporting of data, and other relevant QA/QC procedures required to maintain precision and accuracy of the data. The DQOs of the project should be described in terms of precision, accuracy, completeness, representativeness and comparability for both field activities (sampling, measurements and screening) and laboratory analyses, including the project required acceptance limits and means to achieve these QA objectives. Refer to U.S. EPA 1992b, for a discussion of DQOs. In addition, the preventative maintenance procedures to be used for the field and laboratory instruments and the groundwater monitoring system should be described. A table showing the type of maintenance to be performed and the frequency is appropriate. Many groundwater samples are analyzed at commercial laboratories. In these cases, the SAP should be used by the laboratory analyzing samples.

Both field and laboratory QC samples should be prepared during the sampling event. The following samples in Table 2 should be analyzed with each batch of samples (generally every 20 samples):

TABLE 2. Quality Control Samples

Type	Typical Frequency	Purpose
Field duplicate	1 per 10 samples	Evaluate precision of sampling and analysis procedures.
Matrix spike	1 per 20 samples or 1 per analytical batch	Evaluate accuracy of analytical procedures.
Matrix spike duplicate	1 per 20 samples or 1 per analytical batch	Evaluate accuracy of analytical procedures.
Equipment blank	1 per set of equipment cleaned. Collect one sample at the beginning of sampling and one each day after decontamination.	Evaluate cross-contamination caused by non-dedicated equipment.
Field blank	1 per day	Evaluate whether contaminants introduced by ambient air during sample collection.
Trip blank	1 per sample cooler containing VOCs	Evaluate whether VOC contamination introduced during sampling, storage, or shipment.
Temperature blank	1 per sample cooler	Evaluate whether sample preservation requirements are achieved.

The matrix-specific detection limit should be determined. This determination does not need to be made on a sample batch basis, but should be made whenever the matrix is suspected to have altered, or as frequently as necessary to document that the matrix has not altered. For an aquifer with relatively static hydrogeological characteristics, this may mean making a matrix-specific detection limit determination twice annually.

2.5.1 Field QA/QC Program

The SAP should provide for the routine collection and analysis of QC samples. Various types of QC samples and blanks should be used to verify that the sample collection and handling process has not affected the quality of the samples. Blanks are to be subjected to the same analysis as the groundwater. Contaminants found in the blanks may be the result of: (1) inter-action between the sample and the container, (2) contaminated rinse water, (3) contaminated preservatives, or (4) a handling procedure that alters the sample analysis results. The concentrations of any contaminants found in the blanks should not be used to correct the groundwater data. The contaminant concentrations should be noted, and if the concentrations are more than an order of magnitude greater than the field sample results, groundwater should be re-sampled. All field QC samples should be prepared exactly as regular investigation samples with regard to sample volume, containers, and preservation. The QC samples should be prepared and analyzed for all of the required monitoring parameters.

Other QA/QC practices such as sampling equipment calibration and decontamination procedures and chain-of-custody procedures should be described in the SAP. Refer to the previous sections in this document for a discussion of these practices.

2.5.2 Laboratory QA/QC Program

The SAP should provide for the use of control samples, as defined in SW-846 (U.S. EPA 1998). Appropriate statistical procedures (U.S. EPA 1992a) should be used to monitor and document performance and to implement an effective program to resolve testing problems (e.g. instrument maintenance, operator training). Data from control samples (e.g. spiked samples, duplicates and blanks) should be used as a measure of performance or as an indicator of potential sources of cross-contamination. When contaminants are detected in QA/QC samples (field, trip, or lab blanks), the accompanying sample results should be appropriately flagged. All sample results shall be reported unadjusted for blank results or spike recoveries. All QA/QC data should be submitted to DTSC with the groundwater monitoring sample results.

2.5.3 Groundwater Data Quality Evaluation

A groundwater sampling and analysis program produces a variety of hydrogeological, geophysical, and groundwater constituent concentration (GWCC) data. This section pertains primarily to the evaluation of GWCC data. The GWCC data may be presented to the owner or operator via electronic transmittal or on reporting sheets. These data then should be compiled and statistically analyzed prior to submittal to the lead regulatory agency. If data are to be transmitted electronically, the procedures should be discussed with the lead regulatory agency staff to ensure that all software and hardware being used are compatible with the electronic data formats for integration in the agencies database.

The following guidelines should help to ensure that units of measure associated with data values are reported consistently and unambiguously:

- The units of measure should accompany each target analyte. Laboratory data sheets that include the statement "values are reported in ppm unless otherwise noted" should generally be discouraged, and at least should be examined in detail by the technical reviewer.

- The units of measure for a given target analyte should be consistent throughout the report.

- Data should be reported correctly for the results to be valid. Chemical analysis, laboratory reporting, computer automation, and report preparation data should be generated and processed to avoid mistakes and ensure completeness and full documentation.

3.0 REFERENCES

Aller, L., T.W. Bennett, G. Hackett, R.J. Petty, J.H. Lehr, H. Sedoris, D.M. Nielsen, and J.E. Denne. 1989. Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells. EPA/EMSL-Las Vegas, U.S. EPA Cooperative Agreement CR-812350-01, EPA/600/4-89/034, NTIS #PB90-159807.

American Petroleum Institute (API) 2000. *No-Purge Groundwater Sampling: An Approach for Long-Term Monitoring, A Summary Of Research Results From API's Soil & Groundwater Technical Task Force,* Bulliton No. 12.

ASTM. 2001. *Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well),* D4750-87(2001)

American Society of Testing Materials (ASTM). 2002. Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations. *ASTM Subcommittee D18.21*: Designation D 6771-02.

Backhus, D,A., J.N. Ryan, D.M. Groher, J.K. McFarlane, and P.M. Gschwend. 1993. *Sampling Colloids and Colloid-Associated Contaminants in Groundwater.* Groundwater, 31(3):466-479.

Barcelona, M.J., J.P. Gibb, J.A. Helfrich, and E.E. Garske. 1985. *Practical Guide for Groundwater Sampling*, U.S. EPA, Cooperative Agreement #CR-809966-01, EPA/600/2-85/104, 169 pp.

Barcelona, M.J., H.A. Wehrmann, J.F. Keely, and W.A. Pettyjohn. 1990. *Contamination of Groundwater: Prevention, Assessment, Restoration.* Pollution Technology Review No. 184, Noyes Data Corporation, Park Ridge, NJ, 213 pp.

Barcelona, M.J., H.A. Wehrmann, M.R. Schock, M.E. Sievers, and J.R. Karny. 1989. *Sampling Frequency for Groundwater Quality Monitoring.* EPA Project Summary. EPA/600/S4-89/032, NTIS: PB-89-233-522/AS.

California Environmental Protection Agency (Cal/EPA). 1995a. *Guidelines for Hydrogeologic Characterization for Hazardous Substance Release Sites, Volume 1: Field Investigation Manual and Volume 2: Project Management Manual.* State of California Environmental Protection Agency. July 1995.

Cal/EPA. 1995b. *Monitoring Well Design and Construction for Hydrogeologic Characterization, Guidance Manual for Ground Water Investigations.* State of California Environmental Protection Agency. July 1995.

Cal/EPA. 1995c. *Representative Sampling of Ground Water for Hazardous Substances, Guidance Manual for Ground Water Investigations.* State of California Environmental Protection Agency. July 1995.

Church, P.E., Vroblesky, D.A., Lyford, F.P., and Willey, R.E., 2002, *Guidance on the Use of Passive-Vapor-Diffusion Samplers to Detect Volatile Organic Compounds in Groundwater-Discharge Areas, and Example Applications in New England*: U.S. Geological Survey Water-Resources Investigations Report 02-4186, 79 p.

Department of Water Resources (DWR). 1990. *Final Draft Bulletin 74-90, California Well Standards' Water Wells, Monitoring Wells, Cathodic Protection Wells; Supplement to Bulletin 74-81.*

Driscoll, F.G. 1986. *Groundwater and Wells*, 2nd edition. Johnson Division, St. Paul, Minnesota, 1089 pp.

Gillham, R.W., M.J.L. Robin, J.F. Barker, and J.A. Cherry. 1983. *Groundwater Monitoring and Sample Bias*, American Petroleum Institute, API Publication No. 4367, 200 pp.

Interstate Technology and Regulatory Council (ITRC), 2007, Protocol for use of Five Passive Samplers to Sample for a Variety of Contaminants in Groundwater, DSP-5, ITRC, Washington, DC, 88 p.

ITRC. 2006. *Technology Overview of Passive Sampler Technologies*. DSP-4. Washington, D.C.: Interstate Technology & Regulatory Council, Authoring Team. (www.itrcweb.org/Documents/DSP_4.pdf).

Keely, J.F. and K. Boateng, 1987, *Monitoring well Installation, Purging, and Sampling Techniques - Part 1: Conceptualizations*; Groundwater, Vol. 25, No. 4, pp. 427-439.

Morrison, R.D. 1984. *Groundwater Monitoring Technology Procedures, Equipment, and Applications*. Timco Mfg., Inc., Prairie du Sac, Wisconsin, 111 pp.

Nielsen, D.M., ed. 1991. *Practical Handbook of Groundwater Monitoring*. Lewis Publishers, Chelsea, MI, 717 pp.

Nielsen 2006, ed. 2006 Practical Handbook of Groundwater Monitoring, Second Edition... Taylor & Francis

Pearsall, K.A. and D.A.V. Eckhardt. 1987. *Effects of Selected Sampling Equipment and Procedures on the Concentrations of Trichloroethylene and Related Compounds in Groundwater Samples*. Groundwater Monitoring Review, Spring, pp. 64-73.

Penrose, W.R., W.L. Polzer, E.H. Essington, D.M. Nelson, and K.A. Orlandini. 1990. *Mobility of Plutonium and Americium through a Shallow Aquifer in a Semiarid Region*, Environ. Sci. Technol., 24:228-234.

Pohlmann, K.F. and J.W. Hess. 1988. *Generalized Groundwater Sampling Device Matrix*. Groundwater Monitoring Review, Fall, pp. 82-84.

Powell, R.M., and R.W. Puls. 1993. Passive Sampling of Groundwater Monitoring Wells Without Purging: Multilevel Well Chemistry and Tracer Disappearance. *Journal of Contaminant Hydrology* 12: 51-77.

Puls, R.W., and M.J. Barcelona. 1996. *Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures*. U.S. EPA Superfund Groundwater Issue, EPA/504/S-95/504.

Puls, R.W., and M.J. Barcelona. 1989a. *Filtration of Groundwater Samples for Metals Analysis*. Hazardous Waste and Hazardous Materials, v. 6, No. 4.

Puls, R.W., and M.J. Barcelona. 1989b. *Groundwater Sampling for Metals Analyses*. U.S. EPA Superfund Groundwater Issue, EPA/504/4-89/001, 6 pp.

Puls, R.W., and J.H. Eychaner. 1990. *Sampling of Groundwater for Inorganics - Pumping Rate, Filtration, and Oxidation Effects*, in Fourth National Outdoor Action Conference on Aquifer Restoration, Groundwater Monitoring, and Geophysical Methods, NWWA, May 14-17, 1990, pp. 313-327.

Puls, R.W., J.H. Eychaner, and R.M. Powell. 1990. *Colloidal Facilitated Transport of Inorganic Contaminants in Groundwater:* Part I. Sampling Considerations. Environmental Research Brief, EPA/600/M-90/023, 12pp.

Robin, M.J.L., and R.W. Gillham, 1987, *Field Evaluation of Well Purging Procedures*, Groundwater Monitoring Review, Vol. 7 No.4, pp. 92

Tai, D.Y., K.S. Turner and L.A. Garcia. 1991. *The Use of a Standpipe to Evaluate Groundwater Samplers*. Groundwater Monitoring Review, Winter, 125-132.

United States Environmental Protection Agency (U.S. EPA). 2002. *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers*. Ground Water Forum Issue Paper. Office of Solid Waste and Emergency Response. EPA 542-S-02-001

U.S. EPA 2002a. Example Standard Operating Procedure: Standard Operating Procedure for Low-Stress (Low Flow)/Minimal Drawdown Ground-Water Sample Collection. ATTACHMENT 3 in *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers*, May 2002, pgs. 27-38.

U.S. EPA 2002b. Example Standard Operating Procedure: Standard Operating Procedure for the Standard/Well-Volume Method for Collecting a Ground-Water Sample. ATTACHMENT 4 in *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers*, May 2002, pgs. 39-53.

U.S. EPA. 1998. *Test Methods for Evaluating Solid Waste, SW 846*, Office of Solid Waste and Emergency Response., November 1986, (Update III Revision 5, dated September, 1998).

U.S. EPA. 1995. Groundwater Sampling - A Workshop Summary, Dallas, Texas, November 30-December 2, 1993; EPA/600/R-94/205, 146 pp.

U.S. EPA. 1994. *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, EPA/600/R-96/055 Washington, D.C.

U.S. EPA. 1993. *Subsurface Characterization and Monitoring Techniques: A Desk Reference Guide: Volume I: Solids and Groundwater Appendices A and B*; EPA/625/R-93/003a.

U.S. EPA. 1992a *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Addendum to Interim Final Guidance.*

U. S. EPA. 1992b. *RCRA Groundwater Monitoring: Draft Technical Guidance*. Office of Solid Waste, Washington, D.C. EPA/530/R-93/001, NTIS PB 93-139350

U.S. EPA. 1987. A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001.

U.S. EPA. 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final.* Office of Emergency and Remedial Response. EPA/540/G-89/004. OSWER Directive 9355.3-01. October 1988.

U.S. EPA. 1983. *Draft RCRA Permit Writer's Manual*, Groundwater Protection, 40 CFR Part 264, Subpart F, 263 pp.

Varljen, M. D., Barcelona, M. J., Obereiner, J., and Kaminski, D. 2006. *Numerical Simulations to Assess the Monitoring Zone Achieved during Low-Flow Purging and Sampling;* Ground Water Monitoring & Remediation 26, no. 1/Winter 2006/pages 44–52.

Vroblesky, D.A., 2001a, *User's Guide for Polyethylene-Based Passive Diffusion Bag Samplers to Obtain Volatile Organic Compound Concentrations in Wells, Part 1: Deployment, Recovery, Data Interpretation, and Quality Control and Assurance*; U.S. Geological Survey Water-Resources Investigations Report 01-4060, 18 pp.

Vroblesky, D.A. ed., 2001b, *User's Guide for Polyethylene-Based Passive Diffusion Bag Samplers to Obtain Volatile Organic Compound Concentrations in Wells, Part 2: Field Tests*; U.S. Geological Survey Water-Resources Investigations Report 01-4061, variously paginated.

West, Candida Cook. 1990. *Transport of Macromolecules and Humate Colloids through a Sand and a Clay Amended Sand Laboratory Column.* EPA Project Summary, EPA/600/S2-90/020, 7 pp.

Wilde et al. 1998. Wilde, F.D., D.B. Radtke, J.Gibs and R.T. Iwatsubo, eds., 1998, National Field Manual for the Collection of Water-Quality Data; U.S. Geological Survey Techniques of Water-Resources Investigations, Book 9, Handbooks for Water-Resources Investigations, variously paginated.

Yeskis, D., K. Chiu, S. Meyers, J. Weiss, and T. Bloom. 1988. *A Field Study of Various Sampling Devices and Their Effects on Volatile Organic Contaminants.* Second National Outdoor Action Conference on Aquifer Restoration, Groundwater Monitoring and Geophysical Methods, NWWA, May 23-26, 1988, pp. 471-479.

APPENDIX A
Sampling Devices

GRAB SAMPLERS

The four main varieties of bailers are the single check valve, double check valve, messenger, and syringe bailers. Bailers are among the simplest groundwater sampling devices. A bailer is simply a rigid tube that fills with water when lowered into the well; when raised back out of the well, it is sealed on one or both ends by some mechanism. The groundwater sample is subsequently transferred into sample containers from the bailer. Bailers are relatively inexpensive to purchase or fabricate (especially the single and double check valve bailers), easy to clean, portable, simple to operate, and require no external power source (U.S. EPA, 1983).

Disadvantages are that their use can be time consuming and labor intensive and that the transfer of water to a sample container may significantly alter the chemistry of groundwater samples due to degassing, volatilization or aeration. Use of a bailer may also result in an increase of turbidity that may affect analysis results. Bailers should not be used to sample groundwater that will be analyzed for volatile organic compounds, unless a bailer is the only available method, or the bailer is used for sampling LNAPL or DNAPL or the use of a bailer is approved by the lead regulatory agency.

Bailers used to collect groundwater samples and the cable used to raise and lower the bailer should be constructed of material (e.g., fluorocarbon resin, Teflon®, stainless steel, HDPE, or PVC) which does not cause analyte concentrations alteration or cause loss of analytes via sorption. Ideally the bailer should be easy to disassemble to facilitate cleaning and decontamination.

Bailers should never be dropped into a well and should be removed from the well in a manner that causes as little agitation to the sample as possible. For example, the bailer should not be removed in a jerky fashion or be allowed to continually bang against the well casing as it is drawn up. To ensure consistent samples, DTSC recommends that the bailer be submerged only to a depth necessary for filling, except when the bailer is being used to sample a DNAPL. When transferring the sample from a bailer to a container, a bottom emptying device with a valve to allow the water to slowly drain from the bailer should be used. The sample should be allowed to run down the sides of the collection bottle to avoid excessive agitation of the sample.

POSITIVE DISPLACEMENT (SUBMERSIBLE) MECHANISMS

Positive displacement mechanisms for groundwater sampling include gear drive electric submersible pumps, bladder pumps, helical rotor electric submersible pumps, gas-drive piston pumps, and centrifugal pumps. The following sections briefly describe each of these types of pumps and their applications and limitations with regard to collecting groundwater samples.

Bladder Pumps

Bladder pumps (also referred to as gas squeeze pumps) consist of a flexible membrane often enclosed in a rigid stainless steel housing. A strainer or screen attaches below the bladder to filter any material that could clog either of the check valves located above and below the bladder. Water enters the membrane through the lower check valve; compressed gas is injected into the cavity between the housing and bladder. The sample is transported through the upper check valve and into the discharge line. The upper check valve prevents water from reentering the bladder. The process is repeated to cycle the water to the surface. Bladder volumes (e.g., volume per cycle) and sampler geometry can be modified to increase the sampling abilities of the pump. Automated control systems are available to control gas flow rates and pressurization cycles. Bladder pumps prevent contact between the gas and water sample and can be fabricated entirely of fluorocarbon resin and stainless steel. A nearly continuous flow can be attained with the proper cycles. Pohlmann and Hess (1988) determined that bladder pumps can be suitable for collecting groundwater samples for almost any given organic or inorganic constituent. Disadvantages of bladder pumps include the large gas volumes required to actuate the pump (especially for sampling deep groundwater), and potential bladder rupture. Hence, gas cylinders or air compressors are needed to power the pumps. If using a gasoline or diesel powered air compressor, the compressor should be placed downwind of the wellhead.

If a bladder pump has been chosen as the sampling device, it should be operated at a discharge rate of 100 ml/min or less when collecting samples for volatiles analysis. Higher flow rates can increase the loss of volatile constituents and can cause fluctuation in pH and pH-sensitive analytes. Bladder pumps should be operated in a continuous, non-pulsating manner so that they do not produce samples that are aerated in the return tube or upon discharge. Once the portions of the sample reserved for the analysis of volatile components have been collected, a higher pumping rate may be used, particularly if a large sample volume will be collected. The pump lines should be cleared at a low rate before collecting samples for volatiles analysis, or else the sample collected will be from when the pump was rapidly operating. Running the pump at a low flow rate will take time and may deter the use of a bladder pump when the wells are deep and the lines are long.

Helical Rotor Electric Submersible Pumps

The helical rotor electric submersible pump consists of a sealed electric motor that powers a helical rotor. The water sample is forced up a discharge line by an electrically driven rotor-stator assembly by centrifugal action. Submersible pumps provide relatively high discharge rates for water withdrawal at depths beyond suction lift capabilities. Pumping rates vary depending upon the size of the motor and sampling depth. Heat buildup should be monitored when low (less than 1 gpm) pump rates are used. Heat shields or pump shrouds may be used to aid in heat buildup. A submersible pump provides higher extraction rates than the majority of other methods. However, considerable sample agitation in the well results from operating at high rates, and this may cause alteration of the sample chemistry. In addition, high pumping rates can introduce sediments from the formation into the well that are immobile under ambient groundwater flow conditions, resulting in the collection of unrepresentative samples for metals due to potential partitioning upon contact with the sediment. Further, the potential exists for the introduction of trace metals into the sample from the pump materials. Steam cleaning of the unit followed by rinsing with unchlorinated, deionized water in between sampling is recommended. Where the submersible pump is used for sampling, those parts of the pump in contact with water should be constructed of stainless steel.

Gas-drive Piston Pumps

A piston pump uses compressed air to force a piston to raise the sample to the surface. A typical design consists of a stainless steel chamber between two pistons. The alternating chamber pressurization activates the piston, which allows water entry during the suction stroke of the piston, and forces the sample to the surface during the pressure stroke. Pumping rates of 500 ml/min have been reported from 30.5 meters; sampling depths of 150 meters are possible. The piston pump provides continuous sample withdrawal at depths greater than is possible with most other approaches. Nevertheless, contribution of trace elements from the stainless steel and brass fittings is a potential problem. Pumping rates at depths less than 150 meters are generally slower than with other pumps.

Centrifugal Pumps

A centrifugal (sometimes called impeller) pump is similar to the direct line pump except that a centrifugal pump is connected to the tubing at the surface rather than a vacuum pump. A foot valve is usually attached to the end of the well tubing to assist in priming the extraction tube. A centrifugal pump is capable of delivering large quantities of water, against high as well as low head conditions, with good efficiency. Under field conditions a centrifugal pump has an average suction lift capability of 20-25 feet (6.1-7.6 meters) (Driscoll, 1986). Although relatively high pumping rates can be attained, centrifugal pumps cause sample agitation.

SUCTION LIFT PUMPS

Suction lift pumps can be categorized as direct line and peristaltic. The direct line pump requires lowering one end of a plastic tube into a well or piezometer. The surface end of the tube is connected to a two-way stoppered bottle, and a manually or auxiliary powered vacuum pump is attached to a second tube that leads from the bottle. A check valve is attached between the second tube and the vacuum pump to maintain a constant vacuum control.

A peristaltic pump (also called rotary peristaltic) is a self-priming, low-volume suction pump consisting of a rotor and three ball bearing rollers. Plastic tubing inserted around the pump rotor is squeezed by the rollers as they revolve in a circle around the rotor. One end of the tubing is placed into the well while the other end is connected directly to a two-way stoppered flask. As the rotor revolves, water is drawn into the sampling tube and discharged into the collection vessel. A drive shaft connected to the rotor head can be extended so that multiple rotor heads can be attached to a single drive shaft. The withdrawal rate of peristaltic pumps can be carefully regulated by adjusting the rotor head revolution. The system can be arranged so that the sample contacts only fluorocarbon resin tubing prior to entering the sample container. A limiting factor is the depth of sampling; the depth of sample collection is limited to situations where the potentiometric level is less than 25 feet below land surface (Nielsen, 1991). The suction lift approach offers a simple retrieval method for shallow monitoring wells. However, the method can result in sample mixing and oxidation. Degassing and loss of volatiles also occur to some extent. A peristaltic pump provides a lower sampling rate and less agitation than direct line or centrifugal pumps. Hence, when sampling for VOCs, the sampling results will be biased low. Accordingly, sampling with suction lift pumps should be done for screening purposes only.

GAS CONTACT PUMPS

Gas contact sampling devices include gas-lift and gas-drive devices.

Gas-Lift Pumps

An air or gas lift pump allows collection of groundwater samples by bubbling air or gas at depth in the well. Sample transport occurs primarily as a result of the reduced specific gravity of the water being lifted to the surface. Water is forced up a discharge pipe, which may be the outer casing or a smaller diameter pipe inserted into the well. Air or gas lift methods can result in considerable sample agitation and mixing in the well, and are not permitted for collecting samples for chemical analysis. The considerable pressures required for deep sampling can result in significant redox and pH changes.

Gas-Drive Pumps

Gas drive (gas displacement) pumps are distinguished from air lift pumps by their method of sample transport. Gas displacement pumps force a column of water under linear flow conditions to the surface without extensive mixing of the pressurized gas and water. A vacuum can also be used to assist the gas. The disadvantages of a gas drive pump are that the drive gas comes into contact with the water and therefore, can be a source of contamination; also, the pump can be difficult to clean.

Gas control pumps should not be used for the collection of groundwater samples at hazardous substances release sites due to the potential for sample alteration.

PASSIVE SAMPLERS

The effectiveness of a single passive sampler in a well is dependent on groundwater flow through the well screen and whether the water quality directly adjacent to the sampler is representative of the entire screened interval. If there is intrabore flow, multiple intervals contributing to flow, or varying concentrations of contaminants vertically within the screened interval, then multiple passive samplers within a well may be more appropriate for sampling the well. (Vroblesky, D.A., 2001a, Vroblesky, D.A., 2001b).

Passive samplers are classified on the basis of sampler mechanism and nature of the collected sample. A more detailed discussion of these samplers can be found at www.itrcweb.org/Documents/DSP_4.pdf.:

1. *Devices that recover a grab well water sample.*
Samples are an instantaneous representation of conditions at the sampling point at the moment of sample collection.
• HydraSleeve™ Samplers
• Snap Sampler™
2. *Devices that rely on diffusion of the analytes for the sampler to reach and maintain equilibrium with the sampled medium.*
Samples are time-weighted toward conditions at the sampling point during the latter portion of the deployment period. The degree of weighting depends on analyte and device-specific diffusion rates. Typically, conditions during the last few days of sampler deployment are represented.
• Regenerated-Cellulose Dialysis Membrane Samplers
• Nylon-Screen Passive Diffusion Samplers (NSPDS)
• Passive Vapor Diffusion Samplers (PVDs)
• Peeper Samplers
• Polyethylene Diffusion Bag Samplers (PDBs)
• Rigid Porous Polyethylene Samplers (RPPS)
3. *Devices that rely on diffusion and sorption to accumulate analytes in the sampler.*
Samples are a time-integrated representation of conditions at the sampling point over the entire deployment period. The accumulated mass and duration of deployment are used to calculate analyte concentrations in the sampled medium.
• Semi-Permeable Membrane Devices (SPMDs)
• GORE™ Sorber Module
• Polar Organic Chemical Integrative Samplers (POCIS)
• Passive In-Situ Concentration Extraction Sampler (PISCES)

HYDRASLEEVE™ SAMPLERS

HydraSleeve™ samplers are designed to recover groundwater from monitoring wells without purging and can be used to sample a wide spectrum of analytes (e.g., VOCs, semi-volatile organics, and metals) and can also be used to sample low-yielding wells. HydraSleeve™ samplers allow recovery of discrete samples from the screened zone where the sampler is activated, with no drawdown and minimal agitation of the water column. The reed valve design keeps the device closed except during sample collection, thereby assuring that the sample is collected from the desired interval within the screened zone.

SNAP SAMPLER™

The Snap Sampler™ is designed to collect groundwater samples in situ without purging. The Snap Sampler™ utilizes specialty double-ended bottles closed while submerged in the well. A well re-equilibration period is recommended for passive deployments. The Snap Sampler™ VOA vial can be used directly in common laboratory auto sampler equipment, so samples are not exposed to ambient air during retrieval, field preparation, or analysis at the lab unless manual dilutions or re-analyses are required. Utilizing minimum sample volume requirements, this sampler can be used for analyzing many different physical and/or chemical water quality parameters, including VOCs and metals.

REGENERATED-CELLULOSE DIALYSIS MEMBRANE SAMPLERS

Regenerated-cellulose dialysis membrane samplers collect groundwater samples for inorganic ionic constituents as well as organic constituents using a diffusion-type sampler. Dialysis membrane samplers can be used to sample a wide spectrum of water-quality parameters.

NYLON-SCREEN PASSIVE DIFFUSION SAMPLERS (NSPDS)

NSPDS are diffusion based samplers developed to sample for a broader range of analytes than can be collected by the PDB sampler. Larger volumes can be obtained by using a stack of bottles in the same mesh sleeve.

PASSIVE VAPOR DIFFUSION (PVD) SAMPLERS

Passive-vapor-diffusion (PVD) samplers have been used successfully as reconnaissance tools at many hazardous waste sites. The primary use of PVD samplers is to identify locations where VOC contaminated groundwater is discharging into surface water. PVD samplers also have been used as passive-soil-gas samplers in the unsaturated zone. USGS Water-Resources Investigations Report 02-4186 provides detailed guidance for construction and use of PVD samplers.

PEEPER SAMPLERS

Peeper samplers (a.k.a. Hesslein In-situ Pore Water Sampler) are rigid structures, which can hold volumes of water separated from the environment by porous membranes to monitor constituents in saturated environments. Peeper samplers rely on diffusion of the analytes to reach equilibrium between the sampler and the pore water. Peeper samplers (i.e., dialysis cells) have been used for in situ monitoring of dissolved constituents in saturated sediments. The Peeper sampler measures pore water analyte concentrations. Peeper samplers can be stacked in a specially designed corer so that they sample discrete near-surface depths.

POLYETHYLENE DIFFUSION BAG (PDB) SAMPLERS

The Polyethylene Diffusion Bag (PDB) sampler was developed in the late 1990's and has become a widely accepted technique for determining concentrations of VOCs in groundwater monitoring wells. PDBs are installed in groundwater monitoring wells, at one or more intervals below the water surface in the well screen, and left in place under natural flow conditions. PDBs are also used in saturated sediments in and around surface water to approximate VOC discharge to the surface.

RIGID POROUS POLYETHYLENE SAMPLERS (RPPS)

Rigid porous polyethylene samplers (RPPSs) are diffusion based samplers developed to sample for a broader range of analytes than can be collected by the PDB sampler. The RPPS is constructed from thin sheets of foam-like porous polyethylene with pore sizes of 6 to 15 microns. The sampler is filled with water free of the target analytes, capped at both ends, and placed inside a mesh liner, which is subsequently attached to a deployment rope using cable-ties and deployed in a well.

SEMI-PERMEABLE MEMBRANE DEVICES (SPMDS)

Semi-permeable Membrane Devices (SPMDs) are designed to sample chemicals dissolved in surface water, mimicking the bioconcentration of organic contaminants into the fatty tissues of organisms. The SPMD enables concentration of trace organic contaminant mixtures for analysis, toxicity assessments, and toxicity identification evaluation. It is designed to sample lipid or fat-soluble (nonpolar or hydrophobic) semi-volatile organic chemicals from water and air. The SPMD is an integrative sampler which accumulates analyte mass over a deployment period ranging from days to months. SPMDs provide a highly reproducible means for monitoring contaminant levels, and are largely unaffected by many environmental stressors affecting biomonitoring organisms.

GORE™ SORBER MODULE

The GORE™ Sorber Module relying on diffusion and sorption to accumulate analytes in the sampler. These modules yield a total mass of analytes that can be correlated with analyte concentrations in water or air. This device can be utilized to sample soil gas in the vadose zone and dissolved organic analytes in water saturated soils or in groundwater monitoring wells. This device has been used in both fresh and saltwater environments, including sampling sediments in marshes, streams, river embankments, and coastal settings.

POLAR ORGANIC CHEMICAL INTEGRATIVE SAMPLER (POCIS)

The Polar Organic Chemical Integrative Sampler (POCIS) is designed to sample water-soluble (polar or hydrophilic) organic chemicals from aqueous environments. This device relies on diffusion and sorption to accumulate a total mass of analytes. The residence period ranges from weeks to months. The POCIS samples chemicals from the dissolved phase, mimicking the respiratory exposure of aquatic organisms. The POCIS also concentrates trace organic contaminants for toxicity assessments and toxicity identification evaluation (TIE) approaches.

PASSIVE IN-SITU CONCENTRATION EXTRACTION SAMPLER (PISCES)

The Passive In Situ Concentration Extraction Sampler (PISCES) is designed to sample non-polar or hydrophobic organic chemicals in surface water. This device relies on diffusion and sorption to accumulate a total mass of analytes. The residence period ranges from one day to one month. PISCES consist of a membrane, typically low-density polyethylene (LDPE), forming one end of a metal container filled with an organic solvent, typically hexane or isooctane (2,2,4- trimethylpentane). Analyte uptake is driven by the preferential partitioning of nonionic organic chemicals from water to the solvent. The membrane excludes ionic, high molecular-weight natural organic matter, and particulates.

Where site conditions are not fully characterized, side-by-side comparisons between multiple well-volume purge, low flow groundwater sampling, and diffusion bag sampling methods may be necessary to determine which method should be used to yield the most representative data. The sampling method ultimately used should be discussed with the lead agency before implementation.

Additional information on the use of these samplers can be found at www.itrcweb.org/Documents/DSP_4.pdf

PACKER ASSEMBLAGES

A packer assembly provides a means by which to isolate and sample a discrete interval in the subsurface. Hydraulic- or pneumatic-activated packers are wedged against the casing wall allowing sample collection from an isolated portion of the well. The packers deflate for vertical movement within the well and inflate when the desired depth is attained. Packers are usually constructed from some type of rubber or rubber compound and can be used with submersible, gas lift, and suction pumps.

If pumps are operated at a low rate, a packer assembly allows sampling of low-yielding wells, and wells that would otherwise produce turbid samples. A number of different samplers can be placed within the packers depending upon the analytical specifications for sample testing. One disadvantage is that vertical movement of water outside the well (e.g., if used in the screened interval) is possible with packer assemblages, depending upon the pumping rate and formation properties. Another possible disadvantage is that the packer material may contribute undesirable organic constituents to the water sample.

TABLE A1. Generalized guide for selection of groundwater sampling devices. Modified from U.S. EPA (1991).

Device Type		Device	Groundwater Parameters													
			Inorganic							Organic					Radioactive	
			EC	pH	Redox	Major ions	Trace metals	Nitrate/ Fluoride	Dissolved gases	Non-Volatile	Volatile	TOC	TOX	Coliform bacteria	Radium	Gross alpha and beta
Portable Sampling Devices	Grab	Open Bailer	!	G	G	!	!	!	G	!	G	G	G	!	!	G
Portable Sampling Devices	Grab	Point Source Bailer	!	!	!	!	!	!	G	!	G	!	!	!	!	G
Portable Sampling Devices	Grab	Passive Diffusion Bags	G	G	G	G	G	G	G	G	Limited constituents	G	G	G	G	G
Portable Sampling Devices	Grab	Bat Sampler	!	!	!	!	!	!	!	!	!	!	!	!	!	!
Portable Sampling Devices	Grab	Hydropunch	!	!	!	!	!	!	!	!	!	!	!	!	!	!
Portable Sampling Devices	Grab	Geoprobe	!	!	!	!	!	!	!	!	!	!	!	!	!	!
Portable Sampling Devices	Grab	Syringe Sampler	!	!	!	!	!	!	G	!	!	G	G	!	!	!
Portable Sampling Devices	Positive Displacement (Submersible)	Gear-drive	!	!	!	!	!	!	!	!	!	!	!	G	!	!
Portable Sampling Devices	Positive Displacement (Submersible)	Bladder Pump	!	!	!	!	!	!	!	!	!	!	!	!	!	!
Portable Sampling Devices	Positive Displacement (Submersible)	Helical Rotor (electrical)	!	!	!	!	!	!	!	!	!	!	!	G	!	!
Portable Sampling Devices	Positive Displacement (Submersible)	Piston Pump (gas drive)	!	G	G	!	!	!	G	!	!	G	G	G	!	!
Portable Sampling Devices	Positive Displacement (Submersible)	Centrifugal (low-rate)	!	!	!	!	!	!	!	!	!	!	!	!	!	!
Portable Sampling Devices	Suction Lift	Peristaltic	!	G	G	!	!	!	G	!	G	G	G	!	!	!
		Pneumatic	!	!	!	!	!	!	G	!	G	G	G	!	!	!

Acronyms and Abbreviations

EC	electroconductivity	TOC	total organic carbon
Redox	oxidation/reduction potential	TOX	total organic halides

Symbols

! Device is generally suitable for application (assuming device is properly operated and is constructed of suitable materials).

G Device may be unsuitable or untested for application.

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

Method Number	Not Applicable
Method Name	Low-flow purging for groundwater sampling
Version	10.1.0
Method Date	February 18, 2010
Reasons for Method Revision	Annual Review; no revisions were made

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LOW-FLOW PURGING AND SAMPLING FOR GROUNDWATER

INTRODUCTION

Monitoring wells in the Antelope Valley area have been used over a number of years to assess groundwater quality. The monitoring wells vary in depth from less than 15 feet (MW120 in Lancaster) to 540 feet (MW2 in Palmdale). Several wells are located in the same vicinity while others are more isolated (see Attachments 1 and 2).

1. Scope and Application

    1.1 This procedure is applicable to groundwater.

    1.2 This procedure explains the limiting factors involved in sampling low-flow monitoring wells, lists the hazards and appropriate safety precautions needed, and identifies what is required of personnel performing these tasks.

    1.3 This procedure describes the protocol for LACSD low-flow sampling of monitoring wells in Lancaster and Palmdale. It explains the proper procedures to collect field data including depth-to-water (DTW), purge wells, and to collect samples for later analysis by both Districts' and contract laboratories.

2. Summary of Procedure

    2.1 Measure the depth-to-water (DTW) of the well by lowering an engineering tape down the well casing until the probe contacts the surface of the water.

    If more than one well in the local area will be sampled, take DTW measurements of the wells **before any** purging or sampling is performed. Compare the DTW measurements, and sample the shallow well first, the deeper well next and the deepest well last.

    2.2 Assemble the well purging equipment. This includes connecting the hose valves to the control box and N_2/CO_2 canisters, attaching the control box to the well port, and connecting the flow cell to the discharge line on the well assembly.

    2.3 Adjust the settings on the control box according to the well specifications. Purge the well line, and allow the field parameters to reach stability prior to sampling the well water.

3. Sample Handling and Preservation

3.1 Groundwater samples are collected using appropriate containers and preservation methods as directed in Standard Methods for the Examination of Water and Wastewater.

3.2 After collection, and as soon as possible, place samples into an ice chest with ice to keep their temperatures at 0-6°C during transport from the sample location to Sample Receiving (SRC).

3.3 Once removed from the ice chest, the samples are placed into a refrigerator or walk-in cooler to maintain the cold temperature for storage.

4. Interferences

4.1 A flattened well bladder, or ruptured bladders/tubing, will result in insufficient sample volumes produced.

4.2 Blowing sand can affect sampling by contaminating the samples being collected. It can also damage the equipment, as sand particles can become lodged in the pressure relief valves, preventing the required pressure from being available for sampling.

4.3 Extreme temperatures are often a deterrent to well sampling. Highs above 100°F can cause the gases in the N_2/CO_2 tanks to expand, resulting in uncontrolled pressure fluctuations. Below freezing temperatures are common in the Antelope Valley during the winter months. Since the check valve on the well pump prevents backflow of water into the well, extreme low temperatures can freeze water contained within the upper feet of the pump tubing.

4.4 Fluctuating groundwater tables within the Antelope Valley can prevent well sampling. When the water levels are within three feet of the top of the well inlet, the water pressure becomes insufficient to provide the force necessary to raise the water to ground level. Additionally, any significant drawdown will prevent the bladder from fully inflating, resulting in poor sample volumes per purge.

5. Apparatus

5.1 Compressed nitrogen gas (cylinder size T is preferable), or compressed carbon dioxide gas (for use with the backpack sampler)

5.2 Depth-to-Water Meter [Micro Purge basics (MP) 30 Drawdown Meter]

5.3 Control Boxes (MP10 Controller)

5.4 Backpack Sampler (MP15 Control & Power Pack)

5.5 Hydrolab (MP20 Flow Cell)

5.6 Tubing (Bonded 1/4" and 3/8" Teflon-lined; 1/2" Tygon)

5.7 Hoses (200' extended reach reel; various hoses with male/female quick connects)

6. Reagents

6.1 Not Applicable.

7. Procedure

7.1 Use and Care of the Equipment

7.1.1 Check all equipment connections and hoses prior to and after each use to ensure that no damage has occurred.

7.1.1.1 Examine depth-to-water meter probe and individual flow cell probes for possible fouling of membranes after each use.

7.1.2 All equipment should be stored securely in the vehicle lock boxes to prevent possible theft or damage from the elements.

7.2 Calibration

7.2.1 The flow cell is calibrated in accordance with the specifications as outlined in the QED Flow Cell User's Guide.

7.2.1.1 Calibrations are performed at the start of each sampling day.

7.3 Procedural Guidelines

7.3.1 Depth-to-Water. This instrument measures depth readings from a set point at the top of the well port to a level even with the water's surface. It is composed of a probe at the end of a graduated engineering tape. The probe sends an audible signal when it comes in contact with the water.

7.3.1.1 Test the meter prior to use to ensure that the batteries are charged, as this allows the signal to be heard.

7.3.1.2 Switch the speaker control to on, and press the I/O button (unit on/off) to test for signal strength.

7.3.1.3 Note the tubing length for the well in question as this will approximate how far the probe may need to be fed into the well.

7.3.1.4 Remove the cap from the well assembly, and slowly lower the probe into the well casing. As there is no brake provided on the handle of the DTW meter, lower the line at a controllable rate.

7.3.1.5 When the probe sounds, indicating that it has come in contact with water, slowly reel in the line until the probe is just even with the water's surface.

7.3.1.6 Measurements will be taken at a point even with the top of the well port. This number should be documented as the DTW for the appropriate well.

7.3.1.7 Allowable drawdown is equal to 1/4 the distance from DTW to the pump.

7.3.1.7.1 For example, if the DTW is 310', and the tubing length is 330', drawdown equal to 5' is allowed for that well.

7.3.1.8 Switch the drawdown control to on, and lower the probe to the depth indicated as the maximum allowable drawdown. With drawdown control on, the probe will sound when it loses contact with water.

7.3.1.9 Attach one end of the cable connection to the control port on the meter; the other end should be attached to the control box.

7.3.1.9.1 This connector signals the controller when maximum allowable drawdown is reached, causing the unit to pause pumping until the well has recovered.

7.3.1.10 The DTW meter has its own port on the well assembly, so the line should remain in place during the well purge to monitor any possible drawdown.

7.3.1.10.1 **As purging and sampling can impact nearby wells, it is important, prior to purging wells adjacent to one another, to take all applicable DTW measurements.**

7.3.1.11 If the probe loses contact with water for more than ten minutes, the unit will automatically shut off; press the I/O button to turn it on again.

7.3.2 Assembly of Well Purging Equipment - This includes the gas cylinders, control box, hydrolab, tubing, and hoses. Most of the well equipment is fitted with male/female quick connects, allowing for easy assembly.

7.3.2.1 Nitrogen gas cylinders – These will typically only be used on deep Palmdale wells, although all wells can be purged using nitrogen gas.

7.3.2.1.1 Carefully remove the cover from the top of the cylinder, and screw on the protective sampling cap.

7.3.2.1.2 Screw the regulator to the cylinder, and use a wrench to ensure a secure connection.

7.3.2.1.3 Attach the other end of the hose to the "Air In" valve of the control box.

7.3.2.2 Backpack Sampler - This is a combination of a small aluminum CO_2 canister with attached control box. The backpack sampler is used for more remote Lancaster wells when accessibility is an issue. It consists of one hose, which attaches directly to the well cap.

7.3.2.2.1 Switch the power button to "on" after connecting the hose, and then turn on the cylinder.

7.3.2.2.2 Adjust the pressure by pulling out slightly on the regulator knob and then turning it to the correct psi setting.

7.3.2.2.3 All other adjustments are made as with the other control box.

7.3.2.3 Control Box

7.3.2.3.1 Attach one end of the connector hose to the "Air Out" valve of the control box, and the other end of the hose to the appropriate connection on the well cap.

7.3.2.3.2 Make sure the nitrogen cylinder is securely attached.

7.3.2.3.3 Open the valve slightly on the top of the cylinder, allowing the pressure to equilibrate.

7.3.2.3.4 Once the pressure is stable, and it is determined that no gas is leaking through the various connections, open the valve all the way, and lock the cylinder cap.

7.3.2.4 Hydrolab

7.3.2.4.1 The probes on the hydrolab are stored in a casing containing tap water, which prevents the probes from drying out.

7.3.2.4.2 Unscrew this cover, making sure not to spill the water, and set to the side.

7.3.2.4.3 With the hydrolab equipment is a flow-thru cell that allows water to pass over the probes and escape through a short piece of tygon tubing.

7.3.2.4.4 Attach the flow-thru cell to the probe end of the hydrolab. The flow-thru cell prevents the water from contacting air directly, thereby providing representative groundwater samples.

7.3.2.4.5 The hydrolab is equipped with a circulator, which provides a continuously fresh sample to the sensors, allowing for reliable dissolved oxygen measurements.

7.3.3 Well Purging. The wells are tagged with all the necessary information to perform a successful sampling event.

7.3.3.1 The control box should be set to the predetermined ID number (the ID numbers are pre-determined based on the number of cycles per minute, as well as discharge and refill rates).

7.3.3.1.1 This is achieved by pressing the "Mode" button once to get the curser underneath the ID number, and then using the up and down arrows to make any adjustments.

7.3.3.1.2 If needed, the cursor can be moved to the next column over using the (⇔) Value button.

7.3.3.2 Once set to the given ID number, adjust the pressure throttle to reflect the maximum pressure indicated on the well tag. This will result in the flow maintaining a slow and steady rate.

7.3.3.3 Press the start button to begin sampling.

7.3.3.4 It is recommended to have a 5-gallon bucket or similar to collect any water discharged.

7.3.3.5 Use a plastic beaker to measure the amount of water released per cycle. The estimated mL/min should be indicated on the well tag, as should the minimum purge volume (a value equal to the amount of water present in the tubing).

7.3.3.6 Once this minimum volume has been purged, connect the hydrolab to the dedicated well tubing with the tygon inflow tubing on the flow cell.

7.3.3.6.1 The connector may need to be replaced, depending on the tubing diameter of the well (various connector pieces are provided with the flow cell).

7.3.3.7 The hydrolab will gradually fill with water. When the flow cell is full, tilt the hydrolab to remove any air pockets surrounding the probes.

7.3.3.8 Use the left/right arrows to move the cursor to the purge scan icon marked "Store", and press Enter. This will execute the selected icon, and begin tracking for stabilization of the selected parameters.

7.3.3.8.1 The hydrolab will automatically store data every three minutes, with back-up data every five minutes.

7.3.3.9 When at least three consecutive readings have been taken that satisfy the stabilization range, the hydrolab will sound; note the time and record temperature (T), pH, dissolved oxygen (DO), and specific conductivity (SPC) from hydrolab readout.

7.3.3.10 Any water samples to be collected should be taken through the dedicated tubing to prevent possible sample contamination, so disconnect the hydrolab, and collect the requisite samples.

7.3.3.11 When the needed samples have been collected, push the hold "][" button on the control box. This will halt any further refill/discharge cycles.

7.3.3.12 Turn the gas cylinder to off. Turn the control box throttle counter-clockwise to release any remaining pressure in the "Air Out" line, and disconnect the hose from "Air Out" to the well cap.

7.3.3.13 Turn the throttle clockwise as far as possible, and push the hold button twice.

7.3.3.13.1 This will allow any air/nitrogen remaining in the "Air In" line to escape.

7.3.3.14 When no more gas is escaping, turn the throttle back to zero and disconnect the compressor/cylinder.

7.3.3.15 **Be sure to remove the regulator from the gas cylinder prior to transport.**

7.4 Troubleshooting Procedure

7.4.1 For wells that fail to produce water or have decreasing purge rates, try the following:

7.4.1.1 Pressure may drop/be insufficient for purging; check control box.

7.4.1.2 Adjust the discharge/refill times to ensure water is still being released at the end of the discharge cycle, and that at least five seconds of refill time remain when venting ceases.

7.4.1.3 Attach control box directly to compressor/cylinder without the extension hose.

7.4.1.4 Check that all attachments are secure.

7.4.1.5 Check tubing length for well. Occasionally there is too little water present to purge and sample. The water should be at least 3 feet over the top of the pump to provide sufficient lift.

7.4.1.6 Look for possible drawdown; the well may not have enough refill time to meet demand.

7.4.1.7 Examine the tubing for kinks or tears. Depending on outside temperatures, the water may also freeze in the lines, which will prevent sampling from occurring.

7.4.2 If the hydrolab is not stabilizing:

7.4.2.1 Make sure there is no air trapped in the flow cell.

7.4.2.2 Check the previous data frames to determine which constituent is preventing stabilization from being reached (typically DO)

7.4.2.3 The hydrolab can store up to 200 data frames; make sure it has not reached this maximum. If it has, "Fail" will be displayed in the parameter readings.

7.4.2.4 Look for the circulator icon on the unit screen. If the icon is not displayed, press and hold the "Esc" button to toggle it on again.

7.5 Hazard Control Measures and Limitations

7.5.1 Take proper precautions when approaching well sites to prevent vehicles from becoming trapped in the sand. Examine the ground if necessary, and contact the project engineer if the site is inaccessible.

7.5.2 *Sampling cannot be conducted under extreme climatic conditions. Freezing temperatures prevent sampling, as the water remains in the tubing at or above ground level. In addition, sampling also cannot occur on excessively hot days (temperatures in excess of 100 °F), due to pressure gradients in the hoses and control box.*

7.5.3 When opening well covers, do so carefully and open away from you to avoid possible contact with any animals, spiders, etc, which may be present.

7.5.4 Always carry a first-aid kit, and know the protocol to follow (contact persons, location of emergency care facilities, etc) in case of emergency. Familiarizing oneself with these procedures **in advance** may aid in avoiding confusion should incidents occur.

7.5.5 Snakes, coyotes, and other animals may be encountered, and spiders (black widows in particular) are an almost certainty. Vagrants are known to occasionally frequent areas near some of the well sites, so it is advisable to be alert to one's surroundings.

7.5.6 Improper connections could result in leakage of N_2/CO_2 gas, or hoses thrashing about if they become disconnected. Ensure that all connections are secure and tightened prior to turning on gas cylinders.

8. Calculations

8.1 Not Applicable.

9. Quality Assurance Guidelines

9.1 Not Applicable.

10. Method Performance

10.1 Not Applicable.

11. References

11.1 Laboratory Section: Procedures for the Characterization of Water and Wastes, 4th Edition, 1989, James D. Lehner.

11.2 QED Flow Cell User's Guide, March 2004.

Sanitation Districts of Los Angeles County
Laboratories Section

METHOD APPROVAL FORM

Method Number	Not Applicable
Method Name	Lysimeter Sampling of Groundwater
Version	10.1.0
Method Date	April 28, 2010
Reasons for Method Revision	Annual review; no revisions were made

Written by:

Julie Randol
Laboratory Technician II
Lancaster Sample Receiving

Julie Randol
Signature

04-28-10
Date

Approved by:

Lavern Tamoria
Supervising Chemist
QA/Sample Receiving

Lavern Tamoria
Signature

4/28/10
Date

Final Approval:

Maria Pang
Assistant Manager of Laboratories

Signature

4/28/10
Date

LYSIMETER SAMPLING OF GROUNDWATER

INTRODUCTION

LACSD utilizes lysimeters in Palmdale to sample vadose zone water quality in sites used for both effluent land application and water recycling through agricultural reuse. The vadose zone monitoring stations (VZ) are located within the authorized effluent management site, and consist of pressure-vacuum (p-v) samplers and passive capillary (pcap) lysimeters. Several samplers are installed at each station at depths of approximately 5 feet and 15 feet in order to provide a vertical distribution of vadose zone pore-fluid chemistry (see the District's amended Vadose Zone Monitoring Plan for lysimeter specifications and approximate locations).

1. Scope and Application

    1.1 This procedure is applicable to vadose-zone groundwater.

    1.2 This procedure explains the limiting factors involved in sampling lysimeters, lists the hazards and appropriate safety precautions needed, and identifies what is required of personnel performing these tasks.

    1.3 This procedure describes the protocol for LACSD sampling of lysimeters in Lancaster and Palmdale. It explains the proper procedures to collect samples for laboratory analysis.

2. Summary of Procedure

    2.1 Connect the sample line for the passive capillary lysimeter to the portable pump using the vacuum flask and appropriate hose.

    2.2 Turn on the portable pump, and use the vacuum flask to collect any water present in the system.

    2.3 For pressure-vacuum samplers, use the vacuum line attachment to set a vacuum, which allows the lysimeter to draw water from the surrounding area. The following day, use the pressure hose attachment to retrieve any water collected over the previous 24 hours.

3. Sample Handling and Preservation

    3.1 Lysimeter samples are collected using appropriate containers and preservation methods as directed in Standard Methods for the Examination of Water and Wastewater.

3.2 After collection, and as soon as possible, place samples into an ice chest with ice to keep the temperatures at 0-6°C during transport from the sample location to Sample Receiving.

3.3 Once removed from the ice chest, the samples are placed into a refrigerator or walk-in cooler to maintain the cold temperature for storage.

4. Interferences

4.1 The samplers are located in agricultural reuse areas, so the amount of water present is significantly affected by the amount of water being applied at that time. Fallow pivot areas may produce no moisture until crops are reintroduced.

4.2 Blowing sand can affect sampling by contaminating the samples being collected. It can also damage the equipment, as sand particles can become lodged in the pressure relief valves, preventing the required pressure from being available for sampling.

4.3 Agricultural equipment may occasionally cause damage by tearing through the sample lines during routine maintenance of the crop area.

5. Apparatus

5.1 Portable Electric P-V Pump Model 2008 (Soil Moisture Equipment Corp.)

5.2 Vacuum flask

5.3 Pressure/Vacuum Gauges

6. Reagents

6.1 Not Applicable.

7. Procedure

7.1 Use and Care of the Equipment

7.1.1 Check all equipment connections, gauges and lines prior to and after each use to ensure that no damage has occurred.

7.1.2 All equipment should be stored securely in the vehicle lock boxes to prevent possible theft or damage from the elements.

7.2 Calibration

7.2.1.1 Not applicable

7.3 Procedural Guidelines

7.3.1 Assembly of Sampling Equipment -

7.3.1.1 P-V Pump – The pump has two attachment sites, labeled "pressure port" and "vacuum port".

7.3.1.1.1 The pressure port is used exclusively for collection with the p-v samplers. It should be connected to the tubing of the lysimeter via the pressure gauge.

7.3.1.1.2 The vacuum port is used when producing a vacuum on the lysimeter sample lines. Attach the vacuum gauge to the appropriately labeled connector on the pump. Connect the gauge to the pressure-vacuum line if sampling a p-v lysimeter, or to a vacuum flask if collecting water from a pcap.

7.3.1.2 Vacuum Flask – This is only used when sampling pcap lysimeters, and allows for the collection of water samples while maintaining a vacuum on the sampling line.

7.3.1.2.1 Connect the vacuum gauge to the portable p-v pump. Attach the gauge to the flask via the short piece of black tubing attached to the hose barb.

7.3.1.2.2 Remove the o-ring from the pcap lysimeter blue sample line, and attach the sample line to the stopper of the flask via the attached green tubing.

7.3.2 Lysimeter Sampling – At the top of the lysimeter are two lines with 3/16" tubing attached to the end of each. These ends are folded over, and held in place with an o-ring that maintains the vacuum (where applicable) within the sample line. Note: the tubing may remain pinched after removing the o-rings. Roll or manipulate the tubing to allow for free flow of air/water.

7.3.2.1 Passive Capillary Lysimeters – Pcap lysimeters use a tipping spoon to collect water without applying pressure to the system.

The lysimeters contain a calibration line and a vacuum sampling line.

7.3.2.1.1 Attach the vacuum gauge to the p-v pump, and connect it to the blue sample line via the vacuum flask.

7.3.2.1.2 Turn on the pump, making sure to keep the flask in an upright position to prevent any sample from accidentally entering the pump via the gauge.

7.3.2.1.3 Any water present in the system will register on the gauge as an increase in in-Hg, and enter the vacuum flask via the sample line.

7.3.2.1.4 When all the water has been cleared from the system, turn the p-v pump off and record the amount of water collected in the flask. Remove the connections, and dispense the collected sample into the appropriate containers.

7.3.2.1.5 Replace the o-ring on the end of the sample line.

7.3.2.2 Pressure-Vacuum Sampler – P-V samplers collect water by first applying a vacuum to the line, and then using pressure to force the collected water to the surface. They consist of a p-v line and a separate sample line.

7.3.2.2.1 Connect the black p-v line to the pump via the vacuum gauge. Remove the o-ring at this time.

7.3.2.2.2 Turn on the pump, and allow it to run until the vacuum gauge reads approximately 20in-Hg.

7.3.2.2.3 Fold over the end of the p-v line to maintain the vacuum. Turn off the pump and replace the o-ring.

7.3.2.2.4 Wait 24 hours to allow the vacuum in the line to pull the interstitial moisture from the surrounding soil. This provides a sufficient period for collection without exceeding the holding time for required constituents.

7.3.2.2.5 Attach the black p-v line to the pump via the pressure gauge. Remove the o-ring from both the p-v line and the corresponding green sample line.

7.3.2.2.6 Turn on the pump, and allow it to run until no more moisture comes through the sample line.

7.3.2.2.7 Any sample present should be collected directly into the sample container(s). Debris can build up on the ends of the sample line, so allow it to run a second or two before directing the flow into the collection jar.

7.3.2.2.8 When there is no more moisture present in the system, turn off the pump. Remove the connections and replace the o-rings on the ends of the p-v and sample lines.

7.4 Troubleshooting Procedure

7.4.1 For lysimeters that fail to produce water, try the following:

7.4.1.1 Examine the tubing for kinks or tears. Depending on outside temperatures, the water may also freeze in the lines, which will prevent sampling from occurring.

7.4.1.2 Ensure that the correct gauge is being used, and that it is attached to the appropriate location on the p-v pump.

7.4.1.3 For p-v samplers, check that the vacuum has not been lost. If the vacuum was not maintained during the 24-hour period, it is possible that there may be a break in the line.

7.5 Hazard Control Measures and Limitations

7.5.1 Take proper precautions when approaching lysimeter sites to prevent vehicles from becoming trapped in the sand. Examine the ground if necessary, and contact the project engineer if the site is inaccessible.

7.5.2 ***Sampling cannot be conducted under extreme climatic conditions. Freezing temperatures prevent sampling, as the water remains in the tubing at or above ground level.***

7.5.3 When opening lysimeter covers, do so carefully and open away from you to avoid possible contact with any animals, spiders, etc, which may be present.

7.5.4 Always carry a first-aid kit, and know the protocol to follow (contact persons, location of emergency care facilities, etc) in case of emergency. Familiarizing oneself with these procedures **in advance** may aid in avoiding confusion should incidents occur.

7.5.5 Snakes, coyotes, and other animals may be encountered, and spiders (black widows in particular) are an almost certainty. Vagrants are known to occasionally frequent areas near some of the lysimeter sites, so it is advisable to be alert to one's surroundings.

8. Calculations

8.1 Not Applicable.

9. Quality Assurance Guidelines

9.1 Not Applicable.

10. Method Performance

10.1 Not Applicable.

11. References

11.1 Laboratory Section: Procedures for the Characterization of Water and Wastes, 4th Edition, 1989, James D. Lehner.

11.2 Vadose Zone Monitoring System Installation Report, October 2005, Cascade Earth Sciences.

Appendix C

Chain of Custody / Login Sheet

San Jose Creek Water Quality Laboratory
Chain of Custody/Login Sheet

162722 Collect Date: [illegible] Matrix: W
WO: PALM_WELL_Q Profile: [illegible] Sample ID: [illegible]
Project Manager: [illegible] Ext. [illegible] BU: [illegible] UID: [illegible]
Collector: [illegible] Receive Temperature ________ °C
Container List:

Work Lab: [illegible]

FLDDO - DissolvedOxygen(membrane) FLD
FLDDTW - Field Depth To Water
FLDPH - Field pH
FLDSM2510B - Conductivity, Field
FLDTEMP - Field Temperature (Water)
FLDTURB - Field Turbidity

Work Lab: [illegible]

E351.2 - Nitrogen, Kjeld,Total,FIA(TKN)
SM4500NH3G - Ammonia, FIA

Work Lab: [illegible]

SM2540C - Residue, Filterable (TDS)
SM4500NO3F - Nitrite-nitrate, Total, FIA

Work Lab: [illegible]

SM5540C - Surfactants (MBAS)

Work Lab: [illegible]

E200.8_W - Metals EPA 200.8 ICPMS (water)

Work Lab: [illegible]

SM5310C - Total Organic Carbon

Work Lab: [illegible]

SUB8015BDO - TPH as Diesel/TPH as Oil(Sub)

Work Lab: [illegible]

SUB8015GRO - TPH as Gasoline (Sub)
TOTAL_TPH - Total Petroleum Hydrocarbons

Work Lab: [illegible]

-

Work Lab: [illegible]

E625 - EPA 625 Semi-Volatiles

Work Lab: [illegible]

E300.0 - Anions by IC, EPA 300.0

Sample Inspection: (If "No" selected for any parameter, enter comment on sample and notify PM)

All Containers Intact?	Yes	No	N/A	**NOTES:**
Containers labeled correctly (match COC)?	Yes	No	N/A	
Proper containers for requested analyses?	Yes	No	N/A	
Containers preserved properly?	Yes	No	N/A	
VOA vial(s) free of headspace?	Yes	No	N/A	
Samples received on Ice?	Yes	No	N/A	**If N/A, directly from:**
Metals sample preserved with HNO3?	Yes	No	N/A	**If No, report to bench analyst immediately**
Special Handling Instructions?	Yes	No	N/A	**If Yes, report to bench analyst**

Relinquished by:________________ Date:________ __:__ Received by:________________ Date:________ __:__

Relinquished by: Date: : Received by: Date: :

Appendix D

Minimum Reporting Levels for Priority Pollutants

Minimum Levels for Individual Priority Pollutants As Listed in MRP, Attachment E

Inorganic Constituents

Name of Constituent	Minimum Level	Unit
Antimony	5	μg/L
Arsenic	1	μg/L
Asbestos*	0.2	MFL >10 μm
Beryllium	1	μg/L
Cadmium	0.25	μg/L
Chromium, Total	2	μg/L
Chromium, Hexavalent	5	μg/L
Copper	0.5	μg/L
Cyanide, Total	5	μg/L
Lead	0.5	μg/L
Mercury	0.0005	μg/L
Nickel	5	μg/L
Selenium	5	μg/L
Silver	1	μg/L
Thallium	1	μg/L
Zinc	10	μg/L

* Monitoring not required, according to MRP

Pesticides and PCBs

Name of Constituent	Minimum Level	Units
4,4-DDD	0.05	μg/L
4,4-DDE	0.05	μg/L
4,4-DDT	0.01	μg/L
Alpha-Endosulfan	0.02	μg/L
Alpha-BHC	0.01	μg/L
Aldrin	0.005	μg/L
Beta-Endosulfan	0.01	μg/L
Beta-BHC	0.005	μg/L
Chlordane	0.1	μg/L
Delta-BHC	0.005	μg/L
Dieldrin	0.01	μg/L
Endosulfan Sulfate	0.05	μg/L
Endrin	0.01	μg/L
Endrin Aldehyde	0.01	μg/L
Heptachlor	0.01	μg/L
Heptachlor Epoxide	0.01	μg/L
Lindane (Gamma-BHC)	0.02	μg/L
Aroclor 1016*	0.5	μg/L
Aroclor 1221*	0.5	μg/L
Aroclor 1232*	0.5	μg/L
Aroclor 1242*	0.5	μg/L
Aroclor 1248*	0.5	μg/L
Aroclor 1254*	0.5	μg/L
Aroclor 1260*	0.5	μg/L
Toxaphene	0.5	μg/L
2,3,7,8-TCDD (dioxin)*	5.00×10^{-6}	μg/L

* Monitoring not required, according to MRP

Volatile Organic Constituents

Name of Constituent	Minimum Level	Units
1,1-Dichloroethane	1	µg/L
1,1-Dichloroethene	0.5	µg/L
1,1,1-Trichloroethane	2	µg/L
1,1,2-Trichloroethane	0.5	µg/L
1,1,2,2-Tetrachloroethane	0.5	µg/L
1,2-Dichlorobenzene	2	µg/L
1,2-Dichloroethane	0.5	µg/L
1,2-Dichloropropane	0.5	µg/L
1,2,4-Trichlorbenzene	5	µg/L
1,3-Dichlorobenzene	2	µg/L
1,3-Dichloropropylene (cis & trans)	0.5	µg/L
1,4-Dichlorobenzene	2	µg/L
Acrolein	5	µg/L
Acrylonitrile	2	µg/L
Benzene	0.5	µg/L
Bromoform	2	µg/L
Bromomethane (Methyl Bromide)	2	µg/L
Carbon Tetrachloride	0.5	µg/L
Chlorobenzene (monochlorobenzene)	2	µg/L
Chloroethane	2	µg/L
2-Chloroethyl vinyl ether	1	µg/L
Chloroform	0.5	µg/L
Chloromethane (Methyl Chloride)	2.0	µg/L
Dibromochloromethane	0.5	µg/L
Dichlorobromomethane	0.5	µg/L
Dichlormethane (Methylene Chloride)	2	µg/L
Ethylbenzene	2	µg/L
Hexachlorobenzene	1	µg/L
Hexachlorobutadiene	1	µg/L
Hexachlorethane	1	µg/L
Naphthalene	10	µg/L
Tetrachloroethylene	0.5	µg/L
Toluene	2	µg/L
Trans 1,2-Dichloroethylene	1	µg/L
Trichloroethylene	2	µg/L
Vinyl Chloride	0.5	µg/L

Semi-Volatile Organic Constituents (Base/Neutral and Acid Extractable)

Name of Constituent	Minimum Level	Units
1,2-Benzanthracene (Benzo(a)Anthracene)	5	µg/L
1,2-Diphenylhydrazine	1	µg/L
2-Chlorophenol	2	µg/L
2,4-Dichlorophenol	1	µg/L
2,4-Dimethylphenol	2	µg/L
2,4-Dinitrophenol	5	µg/L
2,4 Dinitrotoluene	5	µg/L
2,4,6 Trichlorophenol	10	µg/L
2,6 Dinitrotoluene	5	µg/L
2-Nitrophenol	10	µg/L
2-Chloronaphthalene	10	µg/L
3,3-Dichlorobenzidine	5	µg/L
3,4-Benzofluoranthene (Benzo(b)fluoranthene)	10	µg/L
4-Chloro-3-Methylphenol	5	µg/L
4,6-Dinitro-2-methylphenol	10	µg/L
4-Nitrophenol	10	µg/L
4-Bromophenyl phenyl ether	10	µg/L
4-Chlorophenyl phenyl ether	5	µg/L
Acenaphthene	1	µg/L
Acenaphthylene	10	µg/L
Anthracene	10	µg/L
Benzidine	5	µg/L
Benzo(a)pyrene	2	µg/L
Benzo(g,h,i)perylene	5	µg/L
Benzo(k)fluoranthene	2	µg/L
Bis(2-chloroethoxy)methane	5	µg/L
Bis(2-chloroethyl)ether	1	µg/L
Bis(2-chloroisopropyl)ether	10	µg/L
Bis(2-ethylhexyl)phthalate	5	µg/L
Butyl benzyl phthalate	10	µg/L
Chrysene	5	µg/L
di-n-Butyl phthalate	10	µg/L
di-n-Octyl phthalate	10	µg/L
Dibenzo(a,h)-anthracene	0.1	µg/L
Diethyl phthalate	2	µg/L
Dimethyl phthalate	2	µg/L
Fluoranthene	10	µg/L
Fluorene	10	µg/L
Hexachlorocyclopentadiene	5	µg/L
Indeno(1,2,3,cd)-pyrene	0.05	µg/L
Isophorone	1	µg/L
N-Nitrosodiphenyl amine	1	µg/L
N-Nitrosodimethyl amine	5	µg/L
N-Nitroso-di-n-propyl amine	5	µg/L
Nitrobenzene	10	µg/L
Pentachlorophenol	1	µg/L
Phenanthrene	5	µg/L
Phenol	1	µg/L
Pyrene	10	µg/L

Sanitation Districts Nos. 14 and 20 of Los Angeles County
Recycled Water Users Handbook
For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley
July 2020

TAB 5

Sanitation Districts Nos. 14 and 20 of Los Angeles County Ordinances Providing for the Establishment and Enforcement of Regulations Pursuant to Water Recycling Requirements for Recycled Water Users

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

ORDINANCE PROVIDING FOR THE ESTABLISHMENT AND ENFORCEMENT OF REGULATIONS FOR RECYCLED WATER USERS

The Board of Directors of County Sanitation District No. 14 of Los Angeles County (hereinafter "District") ordains as follows:

1. AUTHORITY

This Ordinance is enacted pursuant to authority contained in the County Sanitation District Act, California Health and Safety Code Sections 4700 *et seq.*, and exercises authority conferred by law including but not limited to Division 7, Chapter 7, Article 4, Sections 13520 *et seq.* of the Water Code.

2. SHORT TITLE

This Ordinance shall be known as the **Water Recycling Ordinance** and may be cited as such.

3. PURPOSE

The purpose of this Ordinance is to provide for the establishment and enforcement of regulations pertaining to the administration of a Master Recycling Permit issued by the California Regional Water Quality Control Board, Lahontan Region ("Lahontan Regional Board") pursuant to Water Code Section 13523.1. This Ordinance will govern the use of recycled water in accordance with the Water Recycling Criteria established by the California Department of Health Services pursuant to Water Code Section 13521, and codified in Title 22, Division 4, Chapter 3 of the California Code of Regulations.

4. FINDINGS AND DETERMINATIONS

For over forty years, the County Sanitation Districts of Los Angeles County, including District No. 14, have owned and operated wastewater treatment plants capable of producing water that meets all requirements for recycled water, including but not limited to regulations and other directives issued by the California Department of Health Services and the Lahontan Regional Board.

The District is the producer of disinfected tertiary recycled water and supplies recycled water under a Master Recycling Permit to Users, including governmental agencies and private parties.

5. APPLICATION

This Ordinance shall apply to any and all Users to whom the District distributes recycled water, either directly or through an intermediate party.

6. DEFINITIONS

For purposes of this Ordinance, the following definitions shall apply to the following terms:

a) **"Authorized Recycled Water Use Site"** is a site authorized for use of recycled water under a Master Recycling Permit. The uses of recycled water and the site location must comply with permit conditions; also referred to as "Authorized Site."
b) **"Master Recycling Permit"** is a permit issued to a supplier or a distributor, or both, of recycled water, that includes waste discharge requirements prescribed pursuant to Section 13263 and water recycling requirements pursuant to Section 13523.1 of the Water Code.
c) **"Person"** is any individual, partnership, corporation, governmental subdivision or unit of a governmental subdivision, or public or private organization or entity of any character.
d) **"Recycled water"** is water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur, and is therefore considered a valuable resource.
e) **"Regional Water Quality Control Board, Lahontan Region"** is a California regional water quality control board, as specified in Water Code Section 13200, that exercises jurisdiction over the District; also referred to as "Lahontan Regional Board."
f) **"State Water Resources Control Board"** is an agency of the state of California created by the Legislature and exercising its powers pursuant to the Porter-Cologne Water Quality Control Act, Water Code Section 13000 *et seq.*
g) **"User"** is any person to whom the District distributes recycled water, including end users to whom recycled water is conveyed through an intermediate party.
h) **"Water Recycling Criteria"** are the criteria established by the California Department of Health Services generally dealing with the levels of constituents of recycled water, and the means for assurance of reliability under the design concept, which will result in safe recycled water from the standpoint of public health. The criteria are established pursuant to Water Code Section 13521, and are contained in the California Code of Regulations, Title 22, Division 4, Chapter 3; also referred to as the "Uniform Statewide Reclamation Criteria."

7. ADMINISTRATION

The District shall administer this Ordinance so as to comply with the terms and conditions of its Master Recycling Permit, which requires the District to establish and enforce regulations governing the use of recycled water in accordance with the Water Recycling Criteria established by the California Department of Health Services.

8. REQUIREMENTS

A. A User who receives the District's recycled water must comply with the terms of this Ordinance and with the following requirements:

1) Water Recycling Criteria, as established by the California Department of Health Services, Title 22, Division 4, Chapter 3 of the California Code of Regulations;[1]

[1] *Available at* http://government.westlaw.com/linkedslice/default.asp?SP=CCR-1000 [as of July 13, 2006].

2) Requirements, rules, regulations, and/or restrictions established by the California State Water Resources Control Board;[2]
3) Requirements, rules, regulations, and/or restrictions established by the Lahontan Regional Board;[3]
4) Requirements, rules, regulations and/or restrictions within Master Recycling Permits, which are incorporated herein and made a part hereof, to the extent that they are applicable to persons subject to the Ordinance;
5) Requirements, rules, regulations, and/or restrictions, pertaining to the quality of recycled water, adopted by any agency maintaining jurisdiction over any person subject to this Ordinance;

A User must keep apprised of any changes to the foregoing requirements. A User must conform to any applicable changes to the requirements; a violation thereof is the User's sole responsibility. A violation of any of the foregoing requirements will constitute a violation of this Ordinance.

B. A person seeking to operate a proposed Authorized Recycled Water Use Site ("Authorized Site"), and directly receive the District's recycled water, must comply with the following:

1) The person must file an application therefore with the District
2) The person must execute a User Agreement, which includes the District's terms and conditions for use of recycled water at the Authorized Site, including information required by Water Code section 13523.1. Any violation of a User Agreement shall be a violation of this Ordinance and punishable as such.

A person seeking to operate a proposed Authorized Site, and receive the District's recycled water through an intermediary, must file an application with the intermediate party prior to any delivery of recycled water. Such application shall not be effective until it has been approved by the District.

9. ENFORCEMENT

The Chief Engineer and General Manager of the District shall administer, implement, and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the Chief Engineer and General Manager may be delegated to persons acting in the beneficial interest of or in the employ of the District.

10. VIOLATION

A. A violation of this Ordinance shall constitute a basis for rescission of any User Agreement.

B. A violation of this Ordinance may constitute a basis for immediate cessation of recycled water delivery.

[2] *Available at* http://www.swrcb.ca.gov/ [as of July 13, 2006].
[3] *Available at* http://www.waterboards.ca.gov/lahontan/ [as of July 13, 2006].

C. The Chief Engineer shall adopt notice and hearing procedures to implement this section, which shall be consistent with the rights afforded by due process.

11. VALIDITY

If any part, section, subsection, paragraph, sentence, clause, or phrase of this Ordinance is held invalid or unconstitutional for any reason by any court, that decision does not affect the validity or constitutionality of the remainder of this Ordinance. The Board of Directors declares that it would have adopted each provision of this Ordinance irrespective of the validity of any other provision.

PASSED, APPROVED AND ADOPTED THIS 23rd day of August 2006.

Chairperson, Board of Directors PRO TEM
County Sanitation District No. 14
of Los Angeles County

ATTEST:

M. Alma Horwath
Clerk, Board of Directors
County Sanitation District No. 14
of Los Angeles County

PASSED AND ADOPTED by the Board of Directors of County Sanitation District No. 14 of Los Angeles County on August 23, 2006 by the following vote:

AYES: Directors Hearns and Antonovich

NOES: None

ABSENT: Director Ledford

M. Alma Horwath
Secretary of the Board of Directors
County Sanitation District No. 14
of Los Angeles County

ORDINANCE PROVIDING FOR THE ESTABLISHMENT AND ENFORCEMENT OF REGULATIONS PURSUANT TO WATER RECYCLING REQUIREMENTS FOR RECYCLED WATER USERS

The Board of Directors of County Sanitation District No. 20 of Los Angeles County (hereinafter "District") ordains as follows:

1. AUTHORITY

This Ordinance is enacted pursuant to authority contained in the County Sanitation District Act, California Health and Safety Code Sections 4700 *et seq.*, and exercises authority conferred by law including but not limited to Division 7, Chapter 7, Article 4, Sections 13520 *et seq.* of the Water Code.

2. SHORT TITLE

This Ordinance shall be known as the **District No. 20 Recycled Water Ordinance** and may be cited as such.

3. PURPOSE

The purpose of this Ordinance is to provide for the establishment and enforcement of regulations pertaining to the administration of waste discharge requirements ("WDRs") issued by the California Regional Water Quality Control Board, Lahontan Region ("Regional Board"), pursuant to Water Code Section 13263, water reclamation requirements ("WRRs") issued pursuant to Section 13523, or a master reclamation permit ("Master Permit") issued pursuant to Section 13523.1. This Ordinance will govern the use of recycled water in accordance with the Water Recycling Criteria established by the California Department of Health Services ("DHS") pursuant to Water Code Section 13521, and codified in Title 22, Division 4, Chapter 3 of the California Code of Regulations.

4. FINDINGS AND DETERMINATIONS

For over forty years, the County Sanitation Districts of Los Angeles County have owned and operated wastewater treatment plants capable of producing water that meets all requirements for recycled water, including but not limited to regulations and other directives issued by the DHS and the Regional Board.

No person may recycle water or use recycled water until a California Regional Water Quality Control Board either establishes WDRs, WRRs, or Master Permits (collectively, "Permits") or determines that no such Permits are necessary.[1] As the producer of recycled water, the District oversees the production and use of recycled water pursuant to Permits issued by the Regional Board.

[1] California Water Code § 13524.

5. APPLICATION

This Ordinance shall apply to any and all Users to whom the District distributes recycled water, either directly or through an intermediate party, including Purveyors that act as such intermediate parties in delivering recycled water to Users.

6. DEFINITIONS

For purposes of this Ordinance, the following definitions shall apply to the following terms:

a) **"Authorized Recycled Water Use Site"** is a site authorized for use of recycled water; the uses of recycled water and the site location must comply with Permits as issued by the Regional Board.
b) **"Chief Engineer"** is the Chief Engineer and General Manager of the District.
c) **"Master Reclamation Permit"** contains requirements established by the Regional Board pursuant to Water Code Section 13523.1.
d) **"Person"** is any individual, partnership, corporation, governmental subdivision or unit of a governmental subdivision, or public or private organization or entity of any character.
e) **"Purveyor"** is any public, private, investor-owned, or other water utility that is legally permitted to distribute water and that obtains recycled water from the District for distribution to Users.
f) **"Recycled water"** is water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur, and is therefore considered a valuable resource.
g) "**Regulations**" are requirements established by the Chief Engineer that govern the design and construction of recycled water use facilities and the use of recycled water, in accordance with the Uniform Statewide Reclamation Criteria. These may also be called the District's "*Requirements for Recycled Water Users*."
h) **"State Water Resources Control Board"** is an agency of the state of California created by the Legislature and exercising its powers pursuant to the Porter-Cologne Water Quality Control Act, Water Code Section 13000 *et seq.*
i) **"User"** is any person to whom the District distributes recycled water under the Permits issued to the District by the Regional Board, including end users to whom recycled water is conveyed through an intermediate party. User does not include persons who have been independently issued Permits from the Regional Board.
j) **"User Agreement"** is a contractual agreement between the User and/or Purveyor and the District that establishes the conditions for recycled water service and use.
k) **"Waste Discharge Requirements"** are requirements that are established by the Regional Board pursuant to Water Code Section 13263.
l) **"Water Recycling Criteria"** are the criteria established by the DHS generally dealing with the levels of constituents of recycled water, and the means for assurance of reliability under the design concept, which will result in safe recycled water from the standpoint of public health. The criteria are established pursuant to Water Code Section 13521, and are contained in the California Code of Regulations, Title 22, Division 4, Chapter 3; also referred to as the "Uniform Statewide Reclamation Criteria."
m) **"Water Recycling Requirements"** are requirements that are established by the Regional Board pursuant to Water Code section 13523.

7. ADMINISTRATION

The District shall administer this Ordinance so as to comply with the terms and conditions of Permits as issued by the Regional Board.

8. REQUIREMENTS

A. A User and/or Purveyor who receives the District's recycled water must comply with the terms of this Ordinance and with the following requirements:

1) Water Recycling Criteria, as established by the California Department of Health Services, Title 22, Division 4, Chapter 3 of the California Code of Regulations;
2) Requirements, rules, regulations, and/or restrictions established by the California State Water Resources Control Board;
3) Requirements, rules, regulations, and/or restrictions established by the Regional Board.
4) Permits issued by the Regional Board, which are incorporated herein and made a part hereof, to the extent that they are applicable to persons subject to this Ordinance;
5) Requirements, rules, regulations, and/or restrictions, pertaining to the quality of recycled water, adopted by any agency maintaining jurisdiction over any person subject to this Ordinance;
6) Regulations adopted by the Chief Engineer pursuant to Section 9 of this Ordinance.

A User and/or Purveyor must keep apprised of any changes to the foregoing requirements. A User and/or Purveyor must conform to any applicable changes to the requirements; a violation thereof is the User's and/or Purveyor's sole responsibility. A violation of any of the foregoing requirements will constitute a violation of this Ordinance.

B. A person seeking to operate a proposed Authorized Recycled Water Use Site ("Authorized Site"), and directly receive the District's recycled water, must comply with the following:

1) The person must file an application therefore with the District prior to using the recycled water. Persons who have already executed a User Agreement with the District are exempt from this requirement until such time as the Agreement is amended or revised.

2) The person must execute a User Agreement, which includes the District's terms and conditions for use of recycled water at the Authorized Site. Any violation of a User Agreement shall be a violation of this Ordinance and punishable as such. Any Person that has been a User for more than one year prior to the effective date of this Ordinance, and has otherwise been in conformance with all legal requirements and directives of the District, shall be exempt from this subparagraph (2) for a period of one year from said effective date.

A person seeking to operate a proposed Authorized Site, and receive the District's recycled water through a Purveyor, must file an application with the Purveyor prior to any delivery of recycled water. Such application shall not be effective until it has been approved by the District.

9. ENFORCEMENT

The Chief Engineer is granted authority to establish Regulations governing the use of recycled water as necessary, which shall be in accordance with existing law.

The Chief Engineer shall administer, implement, and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the Chief Engineer may be delegated to persons acting in the beneficial interest of or in the employ of the District.

10. VIOLATION

A. Upon a written determination of the Chief Engineer that a violation of this Ordinance has occurred, such action shall constitute a basis for:

1) termination of any User Agreement

2) immediate cessation of recycled water delivery

B. The Chief Engineer shall adopt notice and hearing procedures to implement this section, which shall be consistent with the rights afforded by due process.

11. VALIDITY

If any part, section, subsection, paragraph, sentence, clause, or phrase of this Ordinance is held invalid or unconstitutional for any reason by any court, that decision does not affect the validity or constitutionality of the remainder of this Ordinance. The Board of Directors declares that it would have adopted each provision of this Ordinance irrespective of the validity of any other provision.

Chairperson, Board of Directors
County Sanitation District
No. 20 of Los Angeles County

ATTEST:

M Alma Horvath

Clerk, Board of Directors
County Sanitation District
No. 20 of Los Angeles County

PASSED AND ADOPTED by the Board of Directors of County Sanitation District No. 20 of Los Angeles County on February 28, 2007, by the following vote:

AYES: Two (2) Directors Ledford, and Yaroslavsky

NOES: None

ABSTAIN: None

ABSENT: One (1) Director Dispenza

M. Alma Horvath

Secretary of the Board of Directors
County Sanitation District No. 20
of Los Angeles County

Sanitation Districts Nos. 14 and 20 of Los Angeles County
Recycled Water Users Handbook
For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley
July 2020

TAB 6

Los Angeles County Department of Public Health Forms and Guidelines

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

LOS ANGELES COUNTY ♦ DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH

CROSS CONNECTIONS AND WATER POLLUTION CONTROL PROGRAM
5050 Commerce Drive, Baldwin Park, CA 91706-1423
Tel (626) 430-5290 FAX (626) 813-3025

GUIDELINES FOR PIPELINE CONSTRUCTION AND INSTALLATION - FOR THE SAFE USE OF RECYCLED / RECLAIMED WASTEWATER

PURPOSE: As a result of increasing availability of recycled / reclaimed wastewater and an increased need for the transmission and use thereof, the Department of Public Health – Environmental Health (the Department) has found it necessary to establish the following regulations for pipeline construction and installation as well as for the safe use of recycled / reclaimed wastewater. These regulations are intended to protect public health by ensuring the safety of our domestic potable water supplies.

BACKGROUND: A recent increase in the number of inquiries and interest displayed regarding the use of recycled / reclaimed water, in the ongoing efforts to conserve water, have necessitated the need to establish definitions, standards and regulation for the uniform review and approval of recycled / reclaimed wastewater. Recycled / reclaimed water may be used for surface irrigation of the following: food crops; parks and playgrounds; school yards; residential landscaping; and unrestricted access golf courses.

DEFINITIONS:

Gray Water means untreated wastewater that has not come into contact with toilet waste, kitchen sink waste, dishwasher waste or similarly contaminated sources. Gray water includes water from bathtubs, showers, bathroom wash basins, clothes-washers and laundry tubs.

Non-Potable Water means water which is unfit for human or animal consumption due to contaminants that exceed the current permissible Maximum Contaminant Level (MCL) in drinking water.

Potable Water means water which is fit for consumption by humans and other animals. The U.S. Environmental Protection Agency (EPA) identifies contaminants that may adversely affect public health and occur in drinking water with a frequency and at levels that pose a threat to public health. The EPA establishes (MCLs) for both biological and chemical contaminants permissible in drinking water. These MCLs become enforceable standards that determine the potability of water.

Recycled / Reclaimed Water means non-potable water that meets or as a result of treatment, meets federal requirements for its intended uses. The level of treatment and quality of the reclaimed / recycled water shall be approved by the Authority Having Jurisdiction. Reclaimed / recycled water systems shall have no connection to any potable water system, with or without mechanical backflow prevention devices.

RECYCLED / RECLAIMED WASTEWATER SYSTEMS SHALL BE CONSTRUCTED IN COMPLIANCE WITH APPLICABLE POTABLE WATER SYSTEM CONSTRUCTION STANDARDS AS WELL AS THOSE SPECIFIED IN "THE PURPLE BOOK", CALIFORNIA HEALTH LAWS RELATED TO RECYCLED WATER, (CALIFORNIA HEALTH AND SAFETY CODE, WATER CODE, TITLES 22 AND 17 OF THE CALIFORNIA CODE OF REGULATIONS) AND THE LOS ANGELES COUNTY CODE (LACC), TITLE 28 – PLUMBING, APPENDIX J.

PRELIMINARY REQUIREMENTS

- Plans and specifications for recycled / reclaimed wastewater distribution systems, as well as the use and operation of such systems shall be submitted to the Department for review and approval prior to construction or implementation.

- Prior to commencing construction, the Contractor shall contact the Department to schedule an inspection of the proposed on-site recycled / reclaimed and potable water work.

- No piping for potable or recycled / reclaimed water in conjunction with a specified project shall be installed prior to plan check approval and preliminary inspection.

- Upon completion of construction, no excavation or open trench may be backfilled without first securing the Department approval. Any areas backfilled without prior approval will be required to be exposed and corrected as necessary.

- Only a Department approved temporary water connection, to a potable water supply via a dedicated, approved, reduced-pressure-principle backflow prevention device shall be permitted to be utilized for the purpose of flushing, pressure testing, construction, landscape use or the final cross-connection testing.

SEPARATION REQUIREMENTS

The maximum attainable separation of recycled / reclaimed wastewater lines and potable water lines shall be enforced in order to minimize potential risks associated with pipeline breaks resulting in infiltration of wastewater from leaking wastewater lines into domestic water lines, or accidental cross-connections between recycled wastewater and potable water systems.

- Parallel Construction: A horizontal separation of at least ten feet (10') shall be required between pressurized, buried, recycled / reclaimed and potable water piping (all distance to be measured from pipeline outside diameter).

- Cross-Over Construction: Buried potable water pipes crossing over pressurized recycled / reclaimed water pipes shall be laid not less than twelve inches (12”) above the reclaimed water pipes. Reclaimed water pipes laid in the same trench or crossing-over building sewer or drainage piping shall be installed in compliance with the LACC – Title 28, Plumbing, Sections 609.0 and 720.0.

- Unused or Abandoned Potable Water Lines: These lines are to be severed as close to water mains as practical, capped, and a ten foot (10’) section of abandoned line removed and cemented under direct supervision by the Department.

- Existing On-site Piping: Maximum separation of recycled / reclaimed wastewater lines and potable water lines shall be maintained upon system additions or modification.

PIPELINE MATERIALS AND IDENTIFICATION

All recycled / reclaimed water pipe materials, valves and fittings shall conforms to the requirements of the LACC – Title 28, Plumbing, Sections 604.0, 605.0 and 606.0.

All recycled / reclaimed wastewater lines (pressure / non-pressure), valve boxes, hydrants and appurtenances shall be identified to clearly distinguish between recycled / reclaimed wastewater, non-potable and potable water systems (as specified in LACC – Title 28, Plumbing, Appendix J).

- Recycled / Reclaimed Wastewater: All buried, recycled, wastewater systems (pressure / non-pressure) shall utilize purple pipe with black uppercase lettering “CAUTION: RECYCLED WATER – DO NOT DRINK” printed on opposite sides of the pipe. For limited application, the use of continuous lettering on three inch (3”) minimum width purple tape with one inch black or white contrasting uppercase lettering “CAUTION RECYCLED WATER – DO NOT DRINK” permanently affixed at intervals not to exceed five feet, atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and / or vaults, exposed piping, hydrants and quick couplers. All valves, except fixture supply control valves shall be equipped with a locking feature. All mechanical equipment that is appurtenant to the recycled / reclaimed water system shall be painted purple.

- Potable Water: All potable water lines shall be installed in accordance with the Uniform Plumbing Code and all other applicable potable water system construction standards. All buried potable water lines shall be clearly identified by continuous lettering on three inch (3”) minimum width blue tape with one inch (1”) white lettering bearing the repeated wording “POTABLE WATER” permanently affixed at ten foot intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and / or vaults, exposed piping and hydrants. Identification tape is not necessary for extruded colored PVC with continuous wording “POTABLE WATER” printed in contrasting lettering on opposite sides of the pipe.

- Non-Potable Water: All non-potable irrigation / industrial water lines (pressure / non-pressure) shall be identified by continuous lettering on three inch (3") minimum width tape with one inch (1") contrasting lettering bearing the continuous uppercase lettering "NON-POTABLE WATER – DO NOT DRINK" permanently affixed at ten foot (10') intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and / or vaults, exposed piping, hydrants and quick couplers. Exposed piping, valve boxes, vaults, control valves, quick coupling valves, outlets and related appurtenances shall be color-coded and labeled / tagged to differentiate between recycled / reclaimed wastewater, potable water and non-potable water systems. Tags identifying recycled / reclaimed water shall have the appropriate identification on both sides (wording on one side and symbol on the opposite side).

THE SAFE USE OF RECYCLED / RECLAIMED WATER PROTECTS POTABLE WATER

- Deteriorated or inadequately-protected well water casings shall be repaired or replaced to protect aquifers against contamination from recycled / reclaimed wastewater systems.

- An On-Site Water Supervisor shall be appointed, having the responsibility of oversight for the protection of the potable water system (provided for under Title 17, Section 7586, and California Code of Regulations). The name and position of the On-Site Water Supervisor shall be reported to the water purveyor and to the Department. This position will be responsible for the installation, operation and maintenance of the recycled / reclaimed wastewater and potable water systems; authorization of any piping changes or additions to either the potable or recycled systems; prevention of potential hazards; implementation of the regulations; and coordination with the Cross-Connection Program of the water purveyor and of this Department.

- Hose bibbs shall not be permitted in any areas of public access to recycled / reclaimed wastewater systems, to prevent unauthorized use of recycled wastewater. Quick-couplers are permitted in lieu of hose-bibb outlets but shall only be connected to recycled / reclaimed wastewater lines. Hose bibs may be permitted in areas that are not accessible to the public, provided they are properly identified with permanently affixed tags, labels, or plates with uppercase lettering "RECYCLED WATER – DO NOT DRINK" in English.

- The use of recycled / reclaimed wastewater for irrigation purposes shall minimize exposure of the wastewater spray to drinking fountains and picnic tables through selective location of equipment and by appropriate irrigation system design. Additionally, the following measures should be taken: recycled wastewater spraying shall be done during hours of least public exposure; any area where recycled wastewater is released, used or impounded should be posted, informing the public that recycled water is being used; and irrigation practices utilizing recycled water shall be controlled to prevent surface runoff.

BACKFLOW PROTECTION

- There shall be no interconnection between a potable water system and a recycled / reclaimed water system within the user's premises.

- A dye or pressure test shall be utilized to confirm the physical separation of a recycled wastewater system and a potable water system. Testing shall be performed in conjunction with the Water Purveyor and this Department and conducted before the introduction of recycled wastewater.

- An approved backflow prevention device shall be installed at the potable water service connection.

- In a recycled / reclaimed wastewater distribution system, a backflow prevention device may be required at the recycled wastewater meter or at specific on-site locations where said use could degrade the quality of the recycled wastewater supply.

COUNTY OF LOS ANGELES - DEPARTMENT OF PUBLIC HEALTH
CROSS CONNECTION & WATER POLLUTION CONTROL PROGRAM
5050 Commerce Drive, Rm 116, Baldwin Park, CA 91706-1423
(626) 430-5290 Fax# (626) 813-3025

ALTERNATE WATER SYSTEM PLAN APPLICATION

Date ______ Project Name/Site/Facility Name/DBA ______

Job / Facility Address

Address ______ City ______ Zip ______

Submitted by / Contractor / Consultant Name

Name ______

Address ______ City ______ State ______ Zip ______

Phone ______ Email ______

Owner Information

Owner Name ______

Address ______ City ______ State ______ Zip ______

Phone ______ Email ______

Domestic Water Purveyor ______ Recycled Water Purveyor ______

- ☐ 5310 - Recycled Water, New or Conversion $1,791.00
- ☐ 5311 - Shut-down Test for Final Approval Hourly rate
- ☐ 5320 - Rainwater for Residential Outdoor $2,041.00
- ☐ 5321 - Rainwater for Non-residential Outdoor $2,449.00
- ☐ 5322 - Rainwater for Residential Indoor $2,205.00
- ☐ 5323 - Rainwater for Non-residential Indoor $2,613.00
- ☐ 5330 - Untreated Graywater-sub-surface irrigation $1,878.00 (septic systems, refer to Land Use Program)
- ☐ 5340 - Graywater Residential Irrigation $1,960.00
- ☐ 5341 - Graywater Non-residential Irrigation $2,205.00
- ☐ 5342 - Treated Graywater Residential Indoor $2,123.00
- ☐ 5343 - Treated Graywater Non-residential Indoor $2,205.00
- ☐ 5351 - Stormwater Non-residential Outdoor $1,473.00
- ☐ 5351 - Stormwater Non-residential Indoor $3,520.00

Comments ______

INSTRUCTIONS FOR SUBMISSION OF PLANS

- ○ Submit 2 copies of the plan with an electronic version in a CD/thumb drive format (include the final approval plans from the local building & safety.
- ○ Checks/money orders must be for the exact fee, made out to: LOS ANGELES COUNTY PUBLIC HEALTH.
- ○ Personal checks must bear a name, address and telephone number.
- ○ This fee is not refundable nor is the application transferable.
- ○ Your plans will not be reviewed or approved until a fee is paid.
- ○ You will be contacted when your plans are ready.
- ○ Attach a copy of this form to your plans. Keep a second copy of this form for your records.
- ○ Plan approvals are valid for one year after the date of the approval.
- ○ Plans are reviewed in the order they are received. Missing information or improperly prepared plans will delay the approval process.
- ○ Note! Once your plans are reviewed, a letter of approval/denial will be issued to the persons submitting the plans, owner, water purveyor and State Water Resources Control Board.

FOR OFFICE USE ONLY

Date Field ______ Amount Paid ______

Check List for Plan Submittal

- ☐ Overall site plan.
- ☐ Utility Plans - meter locations, backflow assemblies, POCs.
- ☐ Landscape irrigation plans.
- ☐ Onsite plumbing schematics, both potable and alternate water.
- ☐ Plan Application with appropriate fee.
- ☐ Engineering Report - dual plumbed.
- ☐ Authorization/Delegation Letter (recycled water projects only).

- All water meters (utilities\civil plans).
- All irrigation connections, i.e. quick couplers, valve boxes, controllers, sprinklers, backflow devices, hose bibs, etc. (landscape plans).
- Connection of the potable water in the street to the meter (up to the curb) (utility\civil plans).
- Connection from the potable water meter to the building and the RPPD with make, model and serial number (plumbing plans).
- Fire service connection(s), location, and backflow device information (plumbing plans).
- Internal backflow devices, i.e. feeding industrial or other non-potable uses (plumbing plans).
- All buried pressurized water lines shall be identified w\ continuous tape (Ca UPC, Sec. 601.2.2.1).

  Potable (blue or green background w\ black lettering)
  "Potable Water Line"
  Recycled (CCR Title 22 water, purple background w\ black lettering)
  "Caution - Recycled/Reclaimed Water Line"
  Non-potable (Irrigation, from potable source, yellow background w\ black lettering)
  "Caution - Non-potable Water Line"
  Industrial/Non-potable (Industrial application, yellow w\ black lettering & direction of flow)
  "Caution - Industrial Water Line"
  Rainwater\Cistern Water (yellow or purple background w\ black lettering)
  "Caution - Non-potable Cistern Water Irrigation System Sub-surface only, Danger - Unsafe Water"
  Fire Line (red background w\ black lettering)
  "Fire Line"
  Graywater (gray or purple background w\ black lettering)
  "Caution - Non-potable Graywater - Do Not Drink"
  Treated Graywater (gray or purple background w\ black lettering)
  "Caution - On-site Treated Non-potable Water - Do Not Drink"

- Recycled, Graywater and Rainwater\Cistern projects may require an approved backflow prevention device on the potable service(s), installed as close to the meter(s) as possible.
- Signs - Excluding single family dwellings, install signs at all entrances stating the use of either recycled, cistern or gray water for landscape irrigation.
- Recycled water projects: The Los Angeles County DPH *Guidelines for Proposed Recycled Water Systems* shall be included in the contractors working plans as an addendum to the General Notes. State DPH has authorized this department to conduct recycled water project reviews within Los Angeles County.
- Rainwater\cistern water projects: the Los Angeles County DPH *Guidelines to safe stormwater/Rainwater/Cistern water reuse, pipeline construction and installation* shall be included in the plan proposal.
- Graywater projects shall obtain approvals from the administrative authority as per UPC, i.e. Building & Safety Department and\or County DPH - Land Use Program. Include approval documentation with application. Joint approval is required due to cross-connection requirements regulated by this department.

Guidelines for Alternate Water Sources: Indoor and Outdoor Non-Potable Uses

Los Angeles County Department of Public Health
February 2016

Table of Contents

BASIS FOR DEVELOPING THESE GUIDELINES

In moving toward a safe and sustainable water future for Los Angeles County we must learn to conserve water, replenish groundwater, and safely reuse water so that there is net zero water waste. There are many ways to approach this goal. Thanks to recent changes in State law, many opportunities now exist to reuse water safely. It is clear that if Los Angeles is to be successful in building a sustainable water future, we must learn to reduce the use of potable water (i.e. drinking water) for purposes such as flushing toilets, landscape irrigation, and washing clothes. One method to reduce the use of potable water for these tasks is to promote the safe use of alternate, non-potable water sources, such as rainwater, graywater, and stormwater. These alternate water sources can be used safely for a variety of indoor and outdoor uses, as long as public heath requirements are met. To assist the public with information on how to collect and safely use alternate water sources, the Los Angeles County Department of Public Health (DPH), Environmental Health Division (EH) prepared this document, in collaboration with stakeholders, as a guide for the safe use of alternate water sources in indoor and outdoor settings. These guidelines are intended to provide a user-friendly roadmap for alternate water use; however, it is ultimately the responsibility of the system owner and operator to ensure that non-potable water sources are used appropriately and monitored for safety throughout the life of the project.

This document expands the work begun in 2011, when DPH published its guidance document on outdoor uses of alternate water sources and seeks to build on that work by incorporating the expanded types and uses of alternate water now permitted under State law. These Guidelines are divided into two sections; indoor use and outdoor use of alternate water sources. Under each of these two sections, the four alternate water sources are discussed: rainwater, graywater, stormwater, and recycled water. Each of these alternate water sources is represented in terms of a "tier." Tier 1 represents rainwater; Tier 2, graywater; Tier 3, stormwater; and Tier 4, recycled water. Each tier has specific guidelines and requirements. The guidelines and requirements shall be reviewed annually and updated accordingly based on pertinent studies and research, or until the current federal, State or local regulations are superseded.

In reading this document, you will notice that Tier 1A systems intended for outdoor uses do not require the approval of DPH. However, please take note that all other systems, including Tier 1A systems intended to support indoor uses, do require the review and approval of DPH. Prior to final approval of Tier 1B, 2, 3, and 4 systems, DPH shall conduct project reviews to evaluate possible cross connection hazards between the domestic potable water supply and any alternate non-potable water systems, i.e., rainwater, graywater, stormwater and recycled water. These projects will be reviewed in conjunction with local building & safety departments and/or public works departments as these departments are the administrative authority referenced in the California Plumbing Code for such construction, and as such, EH recognizes their authority in granting joint approval for these types of projects.

If you have any questions regarding the approval process or these requirements, please contact the DPH EH Cross Connection and Water Pollution Control Section for additional information at (626) 430-5290 or visit our website www.publichealth.lacounty.gov/eh/ .

Indoor Water Uses

TIER 1: RAINWATER

Rainwater capture systems may be used at single family dwellings, apartments (R1), hotels (R2), commercial, institutional, and municipal facilities. If the system will combine rainwater and graywater, it will be classified as Tier 2: Graywater.

Includes: Rainwater that is collected and used onsite.

Excludes: Stormwater, dry weather runoff, recycled water, and rainwater collected from locations zoned for manufacturing or industrial use.

Tier 1A: Non-Pressurized Rain Barrels/Cisterns

Indoor use of rainwater requires a specially designed gravity feed system in addition to a supplemental supply of potable water. Therefore, the guidelines for Tier 1B, below, need to be followed for indoor uses of rainwater.

Tier 1B: Pressurized Rainwater Catchment Systems

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting*
• Toilet and urinal flushing • Laundry washing • Trap primers and cooling tower make-up	• Ch. 17 CPC E. coli < 100 CFU/100 ml, turbidity < 10 NTU *or* • NSF 350 *or* • CCR Title 22 Recycled Water Quality Equivalence at the point of use	• Ch. 17 CPC Table 1702.9.4 Prescreening & 100 µm filtration w/ disinfection • Evaluated on a case-by-case basis per project	• Owner-Occupied Single Family Dwelling: Upon installation and change of ownership • R1 & R2: Annually (Quarterly if used for laundry washing) • Commercial/institutional/industrial: Annually (Quarterly if used for laundry washing) *May suspend monitoring, report as non-operational, during quarters when dry.

Requirements

- ☐ Permits/approvals:
  - o Shall obtain a Building & Safety Building Permit from the local building authority
  - o Shall undergo a Public Health Review and Approval, including a Cross Connection Test, by DPH EH
- ☐ Shall follow all applicable regulations governing dual plumbing systems
- ☐ Shall incorporate failsafe designs and diversion to a protected potable source when treated water is out of specification[1]
- ☐ Shall not be connected to any unprotected conveyance of potable water systems[1]
- ☐ Shall be installed in accordance with manufacturer's instructions and installation requirements of the local building authority and of DPH.

TIER 2: GRAYWATER

Graywater systems may be used at single family dwellings, apartments (R1), hotels (R2), commercial, institutional, and municipal facilities.

Includes: "Graywater" that is collected and used onsite. Graywater systems may also use water from swimming pool backwash operations, air conditioner condensate, cooling tower-blow-down, steam system condensate, fluid cooler discharge water, food steamer discharge water, combination oven discharge water, industrial process water, fire pump test water, theme park recreation water operations, and foundation drainage. Systems that combine rainwater and graywater are classified as graywater systems.

Excludes: Stormwater, dry weather runoff (see instead Tier 3: Stormwater), and wastewater from kitchen sinks or toilets (see instead Tier 4: Recycled Water).

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting
• Toilet and urinal flushing • Laundry washing • Trap primers and cooling tower make-up	• NSF 350 with disinfection *or* • CCR Title 22 Recycled Water Quality Equivalence at the point of use *or* • Other standard matching or exceeding presently accepted standards	• Packaged Units and/or Design Build Units – evaluated and complying with NSF 350 certification standard as a complete system • Evaluated on a case-by-case basis per project	• Owner-Occupied, Single Family Dwelling: Upon installation and change of ownership • R1 & R2: Annually (Quarterly if used for laundry washing) • Commercial/institutional/industrial: Annually (Quarterly if used for laundry washing)

Requirements

- ☐ Permits/approvals:
  - Shall obtain Building & Safety Building Permit from the local building authority
  - Shall undergo Public Health Plan Review and Approval of the piping system, tanks, and pump, in order to reduce risk of cross connection with potable water supplies[2]
  - Non-NSF certified systems shall complete a 6 month demonstration phase showing water continually meets standard prior to treated graywater being used for any purpose other than subsurface irrigation
- ☐ Non-NSF certified systems shall be certified to meet NSF 350 or other applicable water quality standard by a 3rd party tester approved by DPH EH
- ☐ R1, R2, Commercial, Institutional, and Industrial systems including spray irrigation, outdoor water features, and vehicle washing must have manual developed by the engineer who designed the system identifying operation and maintenance of the system, online water quality
- ☐ Shall be screened or be otherwise equipped to prevent vector intrusion
- ☐ Shall incorporate failsafe designs to comply with failure sensing and signaling equipment standards in NSF 350[3]

- ☐ Shall incorporate diversion to a protected potable source when treated water is out of specification[4]
- ☐ Shall be equipped with an applicable overflow to an approved drainage system: wastewater typically draining to a sewer (e.g.) shall be plumbed to sewer, while wastewater typically draining to a storm drain, (e.g., foundation drainage) shall be plumbed to the storm drain
- ☐ Design and Build systems shall incorporate systems for the online monitoring of turbidity, pH, and Total Suspended Solids (TSS)
- ☐ Design and Build systems must have manual developed by the engineer who designed the system identifying operation and maintenance of the system, online water quality monitoring requirements, the water quality standards, sampling frequency, and procedures for response to different system failures
- ☐ Shall follow the same requirements as listed in Tier 1B
- ☐ Shall be installed in accordance with the manufacturer's instructions and installation requirements of local agencies

TIER 3: STORMWATER

Stormwater may be used at commercial, institutional, municipal, and industrial facilities only.

Includes: Stormwater and dry weather runoff collected from non-point sources. Stormwater may contain various contaminants: excess fertilizers, herbicides and insecticides from agricultural lands and residential areas; oil, grease and toxic chemicals from urban runoff and energy production; sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks; salt from irrigation practices and acid drainage from abandoned mines; bacteria and nutrients from livestock, pet wastes and faulty septic systems; atmospheric deposition and hydromodification.

Excludes: Any water that has not entered a municipal stormwater system.

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting
• Toilet and urinal flushing • Trap primers and cooling tower make-up	• NSF 350 *or* • CCR Title 22 Recycled Water Quality Equivalence at the point of use *or* • Other standard matching or exceeding presently accepted standards ***and*** Meets all bacterial limits at point of use when distributed offsite ***and*** Meets California Maximum Contamination Levels, and the California Toxics Rule Standards	• Packaged Units and/or Design Build Units – evaluated and complying with NSF 350 certification standard as a complete system • Specific treatment components shall be based on classification of chemical components during the first two years of operation • Evaluated on a case-by-case basis per project	• Stormwater influent shall be tested to characterize chemical components after the first rain event of the rainfall year and at least two additional times during each rainfall year.[5] Summary of stormwater analyses shall be maintained on premises • Annual reporting of final water quality

Requirements

☐ Permits/approvals:
- Shall obtain Building & Safety Building Permit from the local building authority
- Shall undergo Public Health Review and Approval[6]
- Shall undergo review by Sanitation District for contaminates that may affect the wastewater treatment facility

- Non-NSF certified systems shall complete a 6 month demonstration phase showing water continually meets standard prior to being used for any purpose other than sub-surface irrigation

- ☐ Non-NSF certified systems shall be certified to meet NSF 350 or other applicable water quality standard by a 3rd party tester approved by DPH EH
- ☐ R1, R2, Commercial, Institutional, and Industrial systems including spray irrigation, outdoor water features, and vehicle washing must have manual developed by the engineer who designed the system identifying operation and maintenance of the system, online water quality
- ☐ Shall be screened or be otherwise equipped to prevent vector intrusion
- ☐ Shall incorporate failsafe designs to comply with failure sensing and signaling equipment standards in NSF 350[3]
- ☐ Shall incorporate diversion to a protected potable source when treated water is out of specification[4]
- ☐ Shall be equipped with an applicable overflow to an approved drainage system: wastewater typically draining to a sewer (e.g.) shall be plumbed to sewer, while wastewater typically draining to a storm drain, (e.g., foundation drainage) shall be plumbed to the storm drain
- ☐ Design and Build systems shall incorporate systems for the online monitoring of turbidity, pH, and Total Suspended Solids (TSS)
- ☐ Shall be installed in accordance with the manufacturer's installation instructions and installation requirements of local agencies
- ☐ A typical Tier 3 system for offsite collection may also require any of the following:
  - Storm drain diversion
  - Pre-treatment screening/sedimentation device
  - Pump station (where applicable)
  - Underground retention facility and disinfection facility (where applicable)
  - Recirculation system
  - Connection to distribution system
  - A supplemental water supply from a domestic source via an approved dedicated backflow prevention device

TIER 4: RECYCLED WATER

Recycled water may be used at commercial, institutional, municipal, industrial facilities, and limited R1 and R2 sites including professionally managed apartment complexes, condominium complexes, and hotels. The use of recycled water indoors at single-family dwellings and non-professionally managed apartments is currently not permitted.

Includes: "Recycled water" provided by a regulated recycled water agency.

Excludes: Blackwater treated through an Onsite Wastewater Treatment System and domestic wastewater *not* treated through a three-stage process.

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting
• Toilet and urinal flushing • Laundry washing • Trap primers and cooling tower make-up • Other uses pending DPH review (e.g., industrial processes)	• CCR Title 22 Recycled Water Quality Equivalence at point of use	• CCR Title 22 Recycled Water Quality Equivalence • Additional treatment onsite to bring into compliance with water quality standards	• Permitted R1 & R2: Annually • Commercial/institutional/industrial: Annually

Requirements

- ☐ Permits/approvals:
  - o Shall obtain Building & Safety Building Permit from the local building authority
  - o Shall undergo Public Health Review and Approval
  - o Shall undergo review by the State Water Board
- ☐ Shall incorporate failsafe designs to comply with failure sensing and signaling equipment standards in NSF 350[3]
- ☐ R1, R2, commercial, institutional, and industrial systems shall incorporate systems for the online monitoring of turbidity, pH, and Total Suspended Solids (TSS)
- ☐ Shall incorporate diversion to a protected potable source when treated water is out of specification[4]
- ☐ Shall comply with all regulations and ordinances as applicable to tertiary treated recycled water under permit from the Regional Water Quality Control Board

Outdoor Water Uses

TIER 1: RAINWATER

Rainwater capture systems may be used at single-family dwellings, apartments (R1), hotels (R2), commercial, institutional, and municipal facilities.

Includes: Rainwater that is collected and used onsite.

Excludes: Stormwater, dry weather runoff, recycled water, and rainwater collected from locations zoned for manufacturing or industrial use.

Tier 1A: Non-Pressurized Rain Barrels/Cisterns

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting
• Surface or subsurface landscape irrigation • Vehicle washing	• Not applicable	• None required	• None required

Requirements

- ☐ Permits/approvals:
  - o May need to obtain Building & Safety Building Permit for stability issues
- ☐ Shall have a screened inflow opening, a spigot and/or hose bib, and an overflow pipe or equivalent
- ☐ Shall be clearly labeled to indicate non-potable water use only
- ☐ Shall not be connected to indoor/outdoor municipal potable plumbing, and shall not be pressurized or sprayed
- ☐ Shall be installed in accordance with the rain barrel manufacturer's instructions, and installation requirements of local agencies

Tier 1B: Pressurized Rainwater Catchment Systems

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting*
• Drip and subsurface irrigation • Spray irrigation < 360 gallons storage • Vehicle washing	• Not applicable	• Ch. 17 CPC Table 1702.9.4 pre-screening • 100 µm filtration for car washing and drip irrigation	• Not applicable
• Drip and subsurface irrigation • Vehicle washing • Spray irrigation ≥ 360 gallons storage • Non-interactive outdoor water feature	• Ch. 17 CPC E. coli < 100 CFU/100 ml, turbidity < 10 NTU *or* • NSF 350 with disinfection *or* • CCR Title 22 Recycled Water Quality Equivalence at the Point of Use	• Ch. 17 CPC Table 1702.9.4 prescreening and 100 µm filtration with disinfection • Evaluated on a case-by-case basis per project	• Owner-Occupied Single Family Dwelling: Upon installation and change of ownership • R1 (e.g. apartments) & R2 (e.g. hotels): Annually • Commercial/institutional/industrial: Annually *Monitoring and reporting frequencies may be suspended during quarters when cisterns are dry and shall be reported as non-operational. Frequencies shall be reevaluated periodically.

Requirements

- ☐ Permits/approvals:
    - o Shall obtain Building & Safety Building Permit from the local building authority
    - o Shall undergo Public Health Review and Approval, including a Cross Connection Test, by DPH EH
- ☐ Shall be equipped with an overflow device or rain diverter and be screened or otherwise equipped to prevent vector intrusion
- ☐ Shall be installed in accordance with the manufacturer's instructions, and installation requirements of local agencies

TIER 2: GRAYWATER

Graywater systems may be used at single-family dwellings, apartments (R1), hotels (R2), commercial, institutional, and municipal facilities.

Includes: "Graywater" refers to wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs. Must be collected and used onsite. Also includes water from swimming pool backwash operations, air conditioner condensate, cooling tower-blow-down, steam system condensate, fluid cooler discharge water, food steamer discharge water, combination oven discharge water, industrial process water, fire pump test water, theme park recreation water operations, and foundation drainage. Includes a system that combines rainwater and graywater.

Excludes: Stormwater, dry weather runoff (see instead: Tier 3: Stormwater), and wastewater from kitchen sinks or toilets (see instead: Tier 4: Recycled Water).

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting
UNTREATED • Mulch basin or subsurface irrigation	• Not applicable	• Pre-screening	• Not applicable
TREATED • As above • Spray and drip irrigation • Non-interactive outdoor water feature • Vehicle washing	• NSF 350 with disinfection *or* • Title 22 Recycled Water Quality Equivalence	• Packaged Units and/or Design Build Units shall be NSF 350 Certified as a complete system • Evaluated on a case-by-case basis per project	• Owner-Occupied Single-Family Dwelling: Upon installation and change of ownership • R1 (apartments) & R2 (hotels): Annually • Commercial/institutional/industrial: Annually

Requirements

- ☐ Permits/approvals:
    - o Shall obtain Building & Safety Building Permit from the local building authority
    - o Shall undergo Public Health Review and Approval, or equivalent approval by the appropriate local agency of the piping system, tanks, and pump, where applicable, in order to reduce risk of cross connection with potable water supplies
- ☐ Shall be screened or be otherwise equipped to prevent vector intrusion
- ☐ Shall incorporate failsafe designs to comply with failure sensing and signaling equipment standards in NSF 350[7]
- ☐ Shall incorporate diversion to a protected potable source when treated water is out of specification[4]
- ☐ Shall be equipped with an applicable overflow to an approved drainage system: wastewater typically draining to a sewer (e.g.) shall be plumbed to sewer, while wastewater typically draining to a storm drain, (e.g. foundation drainage) shall be plumbed to the storm drain

- ☐ R1, R2, Commercial, Institutional, and Industrial systems including spray irrigation, outdoor water features, and vehicle washing shall include online monitoring for turbidity, pH, and TSS
- ☐ R1, R2, Commercial, Institutional, and Industrial systems including spray irrigation, outdoor water features, and vehicle washing must have manual developed by the engineer who designed the system identifying operation and maintenance of the system, online water quality monitoring requirements, the water quality standards, sampling frequency, and procedures for response to different system failures
- ☐ Shall follow the same requirements as listed in Tier 1B
- ☐ Shall be installed in accordance with the manufacturer's instructions and installation requirements of local agencies

TIER 3: STORMWATER

Stormwater may be used at commercial, institutional, municipal, and industrial facilities only.

Includes: Stormwater and dry weather runoff collected from non-point sources. Stormwater may contain various contaminants: excess fertilizers, herbicides and insecticides from agricultural lands and residential areas; oil, grease and toxic chemicals from urban runoff and energy production; sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks; salt from irrigation practices and acid drainage from abandoned mines; bacteria and nutrients from livestock, pet wastes and faulty septic systems; atmospheric deposition and hydromodification.

Excludes: Any water that has not entered a municipal stormwater system.

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting
• Mulch basin, drip, and subsurface irrigation	• California Maximum Contamination Levels, and the California Toxics Rule Standards	• Package Units and/or Design Build Units evaluated on a case-by-case basis per project	• Stormwater influent shall be tested to characterize chemical components after the first rain event of the rain fall year and at least two additional times during each rain fall year.[5] Summary of stormwater analyses shall be maintained on premises • Annual reporting of final water quality
• As above • Spray irrigation • Non-interactive outdoor water feature • Vehicle washing • Street sweeping • Dust control	• NSF 350, if sprayed *or* • CCR Title 22 Recycled Water Quality Equivalence at the Point of Use *and* Meets all bacterial limits at point of use when distributed offsite *And* Meets California Maximum Contamination Levels, and the California Toxics Rule Standards	• Packaged Units and/or Design Build Units shall be NSF 350 Certified as a complete system • Evaluated on a case-by-case basis per project	

Requirements

☐ Permits/approvals:
  - Shall obtain Building & Safety Building Permit from the local building authority
  - Shall undergo Public Health Review and Approval
  - May require review by Regional Water Quality Control Board for contaminates that may affect the groundwater quality

- Non-NSF certified systems shall complete a 6 month demonstration phase showing water continually meets standard prior to being used for any purpose other than sub-surface irrigation

- ☐ Non-NSF certified systems shall be certified to meet NSF 350 or other applicable water quality standard by a 3rd party tester approved by the department
- ☐ R1, R2, Commercial, Institutional, and Industrial systems including spray irrigation, outdoor water features, and vehicle washing must have manual developed by the engineer who designed the system identifying operation and maintenance of the system, online water quality
- ☐ Shall be screened or be otherwise equipped to prevent vector intrusion
- ☐ Shall incorporate failsafe designs to comply with failure sensing and signaling equipment standards in NSF 350[8]
- ☐ Shall incorporate diversion to a protected potable source when treated water is out of specification[4]
- ☐ Shall be equipped with an applicable overflow device
- ☐ A typical Tier 3 system for offsite collection may also require any of the following:
  - Storm drain diversion
  - Pre-treatment screening/sedimentation device
  - Pump station (where applicable)
  - Underground retention facility and disinfection facility (where applicable)
  - Recirculation system
  - Connection to distribution system
  - A supplemental water supply from a domestic source via an approved dedicated backflow prevention device
- ☐ Shall be installed in accordance with the manufacturer's instructions and installation requirements of local agencies
- ☐ Additional requirements may apply. Check with local regulatory agencies for further information

TIER 4: RECYCLED WATER

Recycled water can be used by single-family dwellings, R1 (e.g. apartments), R2 (e.g. hotels), commercial, institutional, and industrial facilities.

Includes: "Recycled water" provided by a regulated recycled water agency.

Excludes: Blackwater treated through an onsite wastewater treatment system and domestic wastewater *not* treated through a three-stage process.

Allowed Uses	Min. Water Quality Standard	Treatment Process	Monitoring & Reporting
• Drip, spray, and subsurface irrigation • Non-interactive outdoor water feature • Street sweeping[8] • Dust control[9] • Other uses pending DPH review (e.g., vehicle washing)	• CCR Title 22 Recycled Water *and* • All bacterial limits met at the point of use for spray irrigation	• CCR Title 22 Recycled Water	• Owner-Occupied Single-Family Dwelling: Annually • R1 & R2: Annually • Commercial/institutional/industrial: Annually

Requirements

- ☐ Permits/approvals:
  - Shall obtain Building & Safety Building Permit from the local building authority
  - Shall undergo Public Health Review and Approval by DPH EH
  - Shall undergo review by the State Water Board
  - Shall undergo review by other local agencies as applicable
- ☐ Shall incorporate failsafe designs to comply with failure sensing and signaling equipment standards in NSF 350[8]
- ☐ Shall incorporate diversion to a protected potable source when treated water is out of specification[4]
- ☐ Shall comply with all regulations and ordinances as applicable to tertiary treated recycled water under permit from Regional Water Quality Control Board

DEFINITIONS AND ACRONYMS

Alternate non-potable water supply: A non-potable source of water which includes graywater, rainwater, stormwater, dry weather runoff, onsite treated water (non-potable), and recycled/reclaimed water. Alternate water sources include but are not limited to swimming pool backwash operations, air conditioner condensate, cooling tower blow-down water, steam system condensate, fluid cooler discharge water, food steamer discharge water combination oven discharge water, industrial process water, and fire pump test water, theme park recreation water operations, foundation drainage, and onsite dry weather runoff.

Blackwater: Wastewater containing bodily or other biological wastes, as from toilets, dishwashers, or kitchen drains, and kept separate from graywater in wastewater recycling systems.

Backflow: The undesirable reversal of flow of water or mixtures of water and other liquids, gases or other substances into the distribution pipes of the potable supply of water from any source or sources

CCR: California Code of Regulations.

CFU: Colony Forming Units.

Cistern: A component of a rainwater/stormwater catchment system for storing rainwater/stormwater for the purpose of using the water for non-potable uses.

CPC: California Plumbing Code.

Cross Connection: Any actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas, or substance other than the intended potable water with which the system is supplied.

DPH EH: Los Angeles County Department of Public Health, Environmental Health Division.

Drip irrigation: An irrigation method allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters.

Dry weather runoff water: Non-potable water, harvested from a municipal storm water system during dry weather from runoff which flows when potable water is wasted or used inefficiently, and that discharges to waters of the U.S. This does not include water from a combined sewer or from a Publicly Owned Treatment Works (POTW).

Graywater: 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.

Graywater includes, but not limited to, wastewater from domestic activities such as bathtubs, showers, bathroom washbasins, clothes washing machines, laundry tubs, but does not include wastewater from toilets, kitchen sinks and dishwashers.

Harvested rainwater: Rainwater that is collected from roofs of buildings and other (e.g. at grade) impervious surfaces, and does not leave the land parcel where it was collected.

Health Officer: The health officer of the county of Los Angeles, or his duly authorized representative.

Hydromodification: Alteration of the natural flow of water through a landscape, and often takes the form of channel modification or channelization. Hydromodification is one of the leading sources of impairment in streams, lakes, estuaries, aquifers, and other water bodies in the United States.

Industrial process water: Wastewater from industrial or commercial processes that has not been contaminated by any toilet discharge, infectious, bodily wastes, or by processing, manufacturing or operating wastes.

MS4: A municipal separate storm sewer system or of conveyances owned by a State, city, or other public entity that discharges to waters of the U.S. and is designed or used for collecting or conveying stormwater. MS4 does not include a combined sewer and is not part of a Publicly Owned Treatment Works (POTW).

Non-interactive outdoor water feature: Fountains, waterfalls, or other features not intended to act as play zones for children.

Non-point source: A source of pollution that issues from widely distributed or pervasive environmental elements, and does not have a distinct point of production or origin, such as a storm drain outlet at the beach, part of the storm drain system. Point sources include POTWs and power plants.

Non-potable cistern catchment system: A system using cisterns to collect harvested rainwater/stormwater from a rain event or from dry weather runoff. Cisterns in Los Angeles County may serve as a secondary source of non-potable water for applications that do not require potable water, such as landscape irrigation and indoor flushing, which can dramatically lower potable water demand and reduce offsite rainfall runoff.

Non-potable water: Water which is not intended for human or animal consumption.

NSF: National Sanitation Foundation.

NTU: Nephelometric Turbidity Units

Onsite treated non-potable water: Non-potable water that has been collected, treated, and intended to be used onsite and is suitable for direct beneficial use. Sources for onsite treated non-potable water include, but are not limited to, graywater, rainwater, stormwater, recycled water, reclaimed water, cooling tower blow-down water, condensate, and foundation drainage.

Potable water: Water which is fit for consumption by humans. The United States Environmental Protection Agency (EPA) identifies biological and chemical contaminants in drinking water that occur at levels that may adversely affect public health. The EPA establishes Maximum Contaminant Levels (MCLs) permissible in drinking water, which become enforceable standards.

Publicly Owned Treatment Works: A system owned and operated by a State, County or local government designed to provide secondary or tertiary treatment to sewage in order to reduce the number of pathogenic bacteria, and the components of the sewage that promote bacterial growth, such as Nitrogen, Biological Oxygen demand, and Total Suspended Solids to allow the waste effluent to be disposed of safely in the environment.

R1 & R2: Multi-unit residential occupancies. R1 – minimal stay (i.e., hotels, motels, bed and breakfast homes); R2 – long-term stay (i.e., dormitories, employee use, apartment houses).

Rain barrel: A container that collects rainwater that falls directly into the container or that is collected by an above ground collection system that prevents the collected water from contacting the ground. Rain barrels are connected to gravity flow systems only, and typically each rain barrel contains 55 gallons of water, more or less, but multiple rain barrels may be connected to increase water collection volume.

Rainwater: Precipitation on any public or private parcel that has not entered an offsite storm drain system or channel, a flood control channel, or any other stream channel.

Recycled water: Treated wastewater from sewage treatment plants to produce high quality non-potable water that is suitable for a range of non-drinking purposes. Recycled water meets California Department of Public Health statewide uniform criteria for disinfected tertiary treated wastewater.

Stormwater: Rainwater that has left a distinct parcel and entered a municipal storm water system or conveyances owned by a State, city, or other public entity that collects rainwater that discharges to waters of the U.S. This water does not include water from a combined sewer or from a Publicly Owned Treatment Works (POTW).

Subsurface irrigation: Irrigation field installed either below finish grade within the top soil, in a trench below the layer of top soil, or below a mulch bed at least two (2) inches deep.

VOCs: Volatile organic compounds.

REFERENCES

Referenced code sections:

- California Code of Regulations Title 22, Chapter 15, Article 4; Chapter 3 and Title 24 (California Plumbing Code), Part 5, Chapters 2, 6, 16 and 17; as adopted by Los Angeles County as Title 28
- California Health & Safety Code, Section 116800
- California Health and Safety Code, Chapter 4, California Safe Drinking Water Act
- Federal Register: December 1992, Part 2. 40 Code of Federal Regulations Part 131 Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance; Final Rule. A.K.A. California Toxics Rule

Other references:

Chau, Haan-Fawn, "Green Infrastructure for Los Angeles: Addressing Urban Runoff and Water Supply Through Low Impact Development," University of California School of Public Affairs, April 17, 2009.

Bellomo, Angelo J., "Rainwater Harvesting Policy 515.07," Los Angeles County Department of Public Health, January 25, 2010.

"Rainwater Catchment Design and Installation Standards," American Rainwater Catchment Systems Association, 2010.

"Rainwater Harvesting Design Standard 63, ANSI/ASPE/ARCSA, 2013.

"Stormwater Harvesting Design Standard 78, ANSI/ASPE/ARCSA, 2015.

"Green Plumbing & Mechanical Code Supplement," International Association of Plumbing and Mechanical Officials, 2010 rev.

"Rainwater Collection Systems (Cisterns)," Ventura County Resource Management Agency, 2006.

"Capturing Rainwater from Rooftops: An Efficient Water Resource Management Strategy that Increases Supply and Reduces Pollution," NRDC, 2011.

ENDNOTES

[1] A dedicated supply of potable water protected by an approved backflow assembly is allowed to be connected downstream of the cistern pump to supply water to the designed application.
[2] Manufacturer's instructions are written to apply to a general clientele and may require additional conditions for approval, therefore a plan review by Public Health and the local Building & Safety Department is also necessary.
[3] Specifically: NSF 350 sections 5.8.1, 5.8.2. 5.8.3, and 5.8.4, and flow design standards in sections 5.9. NSF 350 standards require a mechanism or process capable of detecting failures of electrical or mechanical components critical to the treatment processes and detecting high water condition. In the event of a detected failure or high water condition, a visual and audible alarm is required that operate even in the event of an electrical, mechanical, or hydraulic malfunction of the system. In addition, commercial systems require telemetric alarms by phone or email to the owner operator. For reuse treatment systems a bypass for discharge of untreated wastewater to the sewer system shall be present and shall be activated automatically in the event of a malfunction. The system shall also possess a means to control the volume of water in the systems and prevent the overflow to any location other than a locally approved water treatment and disposal system.
[4] A dedicated supply of potable water protected by an approved Reduced Pressure Principle Backflow Assembly (RP) is allowed to be connected to the non-pressurized storage tank (treated) and/or surge tank.
[5] A rainfall event is defined as 1/10th of an inch, as measured at the University of Southern California Monitoring Station, information available at Los Angeles County Department of Public Works webpage http://www.ladpw.org/wrd/precip/. The rainfall year is from July 1 through June 30, per the National Weather Service.
[6] The Tier 3 water qualities will be reviewed case by case by Los Angeles County Department of Public Heath, Los Angeles Regional Water Quality Control Board, and other local agencies as applicable. Other water quality standards being developed at the time of the writing of this guidance document shall be considered once the standard has been accepted by the Public Health Agency having Jurisdiction, i.e. IAPMO Z1002 and IAPMO Z1207.
[7] Specifically: NSF 350 sections 5.8.1, 5.8.2. 5.8.3, and 5.8.4.
[8] Both commercial and industrial allowed.

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City of Los Angeles Bureau of Sanitation/WPD
City of Santa Monica Office of Sustainability & the Environment
Heal the Bay
Natural Resources Defense Council
State Water Board Drinking Water Division
TreePeople

Approved by:
Terri S. Williams, REHS
Acting Director of Environmental Health

Date

MD

Approved by:
Jeffrey D. Gunzenhauser, M.D., M.P.H.
Interim Health Officer

Feb 11, 2016

Date

Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley

July 2020

TAB 7

Recycled Water User Application Form

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Application for Recycled Water Use

Sanitation Districts No.14 & 20

GENERAL INFORMATION

Date:	Project Name:
Location:	
Type of Site or Development:	
Brief Description of Proposed Use of Recycled Water:	
For Irrigation Sites, the Total Number of Acres or Square Feet to be Irrigated with Recycled Water:	
Expected Date to Commence Recycled Water Service (Month/Year):	
Estimated Water Requirements (AFY/MGD):	
Average Peak Demand (GPM):	
Purveyor:	
Owner: Address: Phone:	
Operator: Address: Phone:	
Contact: Address: Phone:	Title: Email: Cell Phone:

ITEMS REQUESTED FOR ATTACHMENT TO THIS FORM	✓
Site Description and Information	
• A map showing the specific boundaries of the proposed Site(s) - for irrigation sites, include the total number of acres or square feet to be irrigated with recycled water.	
• The name and contact information (title, address, phone number, cell phone number, and email) for the person or persons responsible for operation and maintenance of the site (O&M Staff), including the person designated as the Site Supervisor for each proposed site.	
• Evidence that the O&M Staff and Site Supervisor have received sufficient training (or the date when training will occur prior to delivery of recycled water) such that the site is operated and maintained in compliance with applicable laws and regulations, local health department requirements, the Districts' permit(s) issued by the Regional Water Quality Control Board, and the Districts' *Requirements for Recycled Users*.	
• The description of the specific use to be made of the recycled water at each Site.	
Design plans and a description of Best Management Practices (BMPs) that show that the use does not unreasonably affect present and anticipated beneficial uses of water, or result in water quality less than that prescribed in water quality control plans or policies.	
• Application of recycled water at agronomic rates.	
• Erosion control.	
• Fertilizer control.	
• Runoff prevention.	
Description of other BMPs used at the Site for Protection of Public Health	
• Use of buffer zones	
• Plans to discontinue application of recycled water during precipitation events, which are of sufficient magnitude to generate surface flow within the Site.	
• Use of devices that protect drinking water fountains against contact with recycled water spray, mist, or surface flow.	
• Irrigation schedules.	
• Signs and locations.	
• Marking of recycled water piping and appurtenances.	
Plans and specifications	
• Proposed piping systems to be used.	
• Pipe locations for both recycled and potable systems.	
• Type and location of the outlets and plumbing fixtures that will be accessible to the public.	
• The methods and devices to be used to prevent backflow of recycled water into the potable water system.	
Copy of the Recycled Water System Operations Manual or the date by which the Manual will be submitted prior to delivery of recycled water	
Copy of the Emergency Cross-Connection Response Plan or the date by which the Plan will be submitted prior to delivery of recycled water	

Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
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July 2020

TAB 8

Emergency Cross-Connection Response Plan

LOS ANGELES COUNTY SANITATION DISTRICTS

Converting Waste Into Resources

Los Angeles County Sanitation Districts

EMERGENCY CROSS-CONNECTION RESPONSE PLAN

Sanitation District Nos. 14 and 20

In the event that a cross-connection is discovered, you should immediately notify the Sanitation Districts by telephone, and the Lahontan Regional Water Quality Control Board, the State Water Resources Control Board Division of Drinking Water, the Los Angeles County Department of Public Health, and your purveyor. The following procedures will be implemented immediately:

Site Name:

Site Address: Date of Procedure:

Names of People Present During Procedure:

Name	Affiliation /Title
1.	
2.	
3.	
4.	

Procedure **Check When Completed**	✓
Step 1. Keep potable water system pressurized and post "Do Not Drink" signs at all potable water fixtures and outlets.	
Step 2. Immediately shut down the recycled water system to the facility at the meter.	
Step 3. Contact the water purveyor for collection of water samples and perform a 24-hour bacteriological analysis. Water samples should be collected from the closest acceptable point to the cross-connection.	
Step 4. Identify the cause and location of backflow and eliminate the cross-connection.	
Step 5. Conduct a cross-connection pressure test to verify that all cross-connections were eliminated.	
Step 6. If the bacteriological analysis conducted in Step 3 is positive, chlorinate the potable water system maintaining a chlorine residual of at least 50 mg/L for 24 hours. Otherwise proceed to Step 9.	
Step 7. Flush the potable water system after 24 hours and perform standard bacteriological analysis.	
Step 8. If the results from Step 7 are acceptable, proceed to Step 9. Otherwise repeat Steps 6-7.	
Step 9. Remove warning signs and reactivate system.	

Step 10. Revise the drawings of the recycled water and potable water systems to reflect any changes made in eliminating the cross-connection.	
Step 11. Submit revisions to appropriate agencies.	

DESCRIBE NATURE AND LOCATION OF CROSS-CONNECTION AND MEANS OF CORRECTION

Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley

July 2020

TAB 9

Operation and Maintenance Plan for the Control of Incidental Runoff from Landscape Irrigation Projects

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Operation and Maintenance Plan
Control of Incidental Runoff from Landscape Irrigation Projects
Sanitation Districts Nos. 14 & 20 of Los Angeles County

This Operations and Maintenance (O&M) Plan was developed to be used by operators of landscape irrigation projects to control incidental runoff, which is defined as unintended small volumes of runoff from recycled water use areas.

Excessive Release Detection and Correction

- Reuse site maintenance staff are to provide on-going surveillance of the above-ground irrigation system facilities (piping and control systems) during their regular maintenance duties. During surveillance of the reuse site, maintenance staff shall identify and document areas showing signs of a recycled water leak or improper operation of irrigation equipment (e.g. over irrigation), including ponding, oversaturated soil, trails of excessive runoff, etc.
- Any leaks, such as broken sprinkler heads or malfunctioning control systems, are to be repaired or replaced no later than 72 hours from discovery and prior to the release of one thousand (1,000) gallons, whichever occurs first. Upon discovery and until the appropriate repairs are completed, the particular irrigation station shall not be used.
- Locations, dates of discovery, and dates of repairs for any reuse site problem shall be recorded in the O&M log for the site. All logs maintained in relation to the irrigation project are subject to inspection by the Sanitation Districts.

Proper Design and Aim of Sprinkler Heads

- Sprinkler heads shall be properly designed and aimed to minimize over-spray leaving the irrigation area.
- Records of installation designs shall be maintained and be available for inspection.

Alteration of Irrigation Operations Due to Weather Conditions:

- No landscape irrigation shall take place during precipitation events.
- No landscape irrigation shall be permitted under high wind conditions unless observations indicate that recycled water is not leaving the site. Landscape irrigation shall not recommence until wind speeds have decreased to acceptable levels.

Management of Impoundments

- Impoundments containing recycled water shall not be the source of any discharge unless the discharge is the result of a 25-year, 24-hour storm event or greater, and the appropriate Regional Board Executive Officer is notified of the discharge.

TAB 10

Sanitation Districts Nos. 14 and 20 of Los Angeles County
Site Inspection Report Form

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Sanitation District Nos. 14 and 20

Reuse Site Inspection Report

Date & Time of Inspection:
Recycled Water User/Site Name:
Location of Site:
Purveyor (if known):
Type of Use: **Irrigation** **Industrial Cooling** **other:**
Site Supervisor:
Site Supervisor Contact Info:
Name of User Representative/Title:
Name of Inspector:
GPS Coordinates of Meter:

Verification of Compliance Inspection and Enforcement Program			
1	Is recycled water used for any purposes not listed in the Regional Water Quality Control Board permit(s)? If yes, explain.	☐ Yes Explain	☐ No
2	Have there been any changes or modifications to the recycled water system? If yes, explain.	☐ Yes Explain	☐ No
3	Has there been a change in the Site Supervisor? If yes, provide updated information.	☐ Yes Explain	☐ No
4	Has on-site staff received appropriate training? If no, explain when training will be provided.	☐ Yes	☐ No Explain
5	Are copies of the site operation manual, Emergency Cross-Connection Response Plan, and Districts' *Requirements for Recycled Water Users* available to employees at all times? If no, explain how and when this will be corrected.	☐ Yes	☐ No Explain
6	Are there complete and up-to-date O&M records for the recycled water system? If no, explain how and when this will be corrected.	☐ Yes	☐ No Explain
Inspection of User Operations			
7	Is recycled water use limited to the authorized uses and areas? If no, explain how and when this will be corrected.	☐ Yes	☐ No Explain
8	Is recycled water running off from the authorized use area through surface runoff or windblown spray? If yes, explain how and when this will be corrected, and indicate the source, volume, and destination of the runoff.	☐ Yes Explain	☐ No
9	Are any unusual odors associated with the recycled water use, supply, or storage? If yes, explain how and when this will be corrected.	☐ Yes Explain	☐ No
10	Is there any evidence of ponding of recycled water? If yes, explain how and when this will be corrected.	☐ Yes Explain	☐ No
11	Is there any evidence of mosquito breeding? If yes, explain how and when this will be corrected.	☐ Yes Explain	☐ No
12	Are signs legible and properly placed and labeled with regard to not drinking recycled water? If no, explain how and when this will be corrected.	☐ Yes	☐ No Explain
13	Are all of the following properly maintained and marked, with tags are visible and legible: pipes, valves and controllers, and points of connection? If no, explain how and when this will be corrected.	☐ Yes	☐ No Explain
14	Are other recycled water facilities and control systems (e.g., pump stations, storage facilities, and pressure reducers) properly maintained? If no, explain how and when this will be corrected.	☐ Yes ☐ N/A	☐ No Explain

15	Are there any leaks or breaks in the system piping or evidence of plugged, broken, or otherwise faulty components? If yes, explain how and when this will be corrected.	☐ Yes Explain ☐ No
16	Is recycled water being sprayed directly on people, dwellings, food-handling facilities, or drinking fountains? If yes, explain how and when this will be corrected.	☐ Yes Explain ☐ No
17	Are there any hose bibs in the recycled water system? If yes, explain how and when this will be corrected.	☐ Yes Explain ☐ No
18	Is backflow prevention in place, a schedule for testing backflow prevention, and is testing up to date? If no, explain how and when this will be corrected. Date of Last Test: ______________________________	☐ Yes ☐ No Explain
19	Is there a need for cross-connection testing due to major modifications to the system? If yes, explain when the testing will be conducted.	☐ Yes Explain ☐ No
20	Is the irrigation system being operated during periods of minimal human use with adequate time to dry-out before public use? If no, explain how and when this will be corrected.	☐ Yes ☐ N/A ☐ No Explain
21	Does irrigation take place within 50 feet of any domestic water supply well or any uncovered reservoir or stream currently used as a source of domestic water? If yes, explain how and when this will be corrected.	☐ Yes Explain ☐ No ☐ N/A
22	Are best management practices being used to irrigate at agronomic rates? If no, explain how and when this will be corrected.	☐ Yes ☐ N/A ☐ No Explain
23	Is fertilizer being used at the site?	☐ Yes ☐ No
24	Is there any evidence of overflows, erosion, or improper management of impoundments? If yes, explain how and when this will be corrected.	☐ Yes Explain ☐ No
25	Are all impoundments properly maintained and adequately protected from erosion, washout, and flooding from a 24-hour rainfall event having a predicted frequency of once in 100 years? If no, explain how and when this will be corrected.	☐ Yes ☐ N/A ☐ No Explain
26	Does impoundment of disinfected tertiary recycled water occur within 100 feet of any domestic water supply well? If yes, explain how and when this will be corrected.	☐ Yes Explain ☐ No

In the space below, provide the Question # and any comments/explanations required.

Required action or follow-up action? ☐ No ☐ Yes – list below: 1) the Action, 2) Responsibility (User and/or District), and 3) Compliance Date and/or Date Achieved

Inspector's signature Date

Site Supervisor's signature Date

Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
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Located in the Antelope Valley

July 2020

TAB 11

Recycled Water Spill Report Form

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Recycled Water Spill Notification

The Sanitation Districts' *Requirements for Recycled Water Users* contain specific provisions for reporting spills or unauthorized discharges.

Timely notifications must be made even if all the information is not available!

<u>Spills >50,000 gallons</u>: For any unauthorized discharge of more than 50,000 gallons of tertiary recycled water, the Site Supervisor must:

- Immediately (but not later than two (2) hours after becoming aware of the discharge) notify:
  - Notify the Sanitation Districts by telephone
  - Notify the following agencies by telephone or electronic means (e.g., email or fax):
    - Lahontan Regional Water Quality Control Board (Regional Board)
    - Los Angeles County Department of Public Health (County Health)
    - State Water Board's Division of Drinking Water (DDW) must be contacted if a drinking water source is threatened by the spill
    - California State Department of Fish and Wildlife must be contacted if the environment is endangered by the spill

- Provide the following information to all agencies being notified:
  - Date/time the spill began and ended
  - Location of the spill
  - If the spill entered a storm drain or receiving water
  - Estimated volume or flow if the spill is ongoing
  - Estimated time of repair
  - Cause of the spill
  - Agencies involved with repair and clean-up
  - Corrective actions taken or plans for corrective actions.

- Provide written confirmation electronically (e.g., email or fax) to the same agencies within three (3) business days from the date of notification. Use the form below or provide the same information in a letter or memo.

<u>Spills <50,000 gallons</u>: For any spills or other release of recycled water from a use site (other than minor runoff),[1] the Site Supervisor must:

- Immediately (but not later than two (2) hours after becoming aware of the spill) notify the Sanitation Districts by phone and provide the following information: date/time the spill began and ended, the location of the spill, if the spill entered a storm drain or receiving water, the estimated volume or flow if the spill is ongoing, the estimated time of repair, cause of the spill, agencies involved with repair and clean-up, and corrective actions taken or plans for corrective actions.

- Provide written confirmation electronically (e.g., email or fax) to the Sanitation Districts within three (3) business days from the date of notification using the form below or by providing the same information in a letter or memo.

---

[1] Minor runoff is considered runoff due to overspray or over watering, minor breaks in the recycled water irrigation or distribution system, or broken or misdirected sprinklers.

Spill Contact Information

Sanitation Districts
Spill Reporting Hotline: 866-484-1224
Email: reuse@lacsd.org

Lahontan Regional Water Quality Control Board
Name: Jehiel (Jay) Cass
Phone: (760) 241-2434 or 760-241-6583 (main office)
Email: jehiel.cass@waterboards.ca.gov

After normal business hours, you will be directed to call California Governor's Office of Emergency Services (Cal OES) at (800) 852-7550 (24 hours)

Los Angeles County Department of Public Health
Name: Nick Brakband
Phone: 626-430-5360 or 213-974-1234 (after business hours)
Email: nbrakband@ph.lacounty.gov

State Water Board's Division of Drinking Water
Name: Chi Diep
Phone: 818-551-2016 or 818-551-2004 (main office)
Email: chi.diep@waterboards.ca.gov

California State Department of Fish and Wildlife
Name: State Park Dispatch
Phone: 951-443-2969

RECYCLED WATER SPILL REPORT

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Name: Phone:

Agency:

Site Name:

Location:

Date:

Contact for Follow-up (Name/Phone):

INFORMATION ON SPILL OR UNAUTHORIZED DISCHARGE
Date/time spill or discharge began:
Date/time spill or discharge ended:
Location of spill or discharge:
Did the recycled water enter or will it enter storm drains or receiving waters (e.g., rivers, creeks, lakes, or ocean); if so identify.
Estimated volume of spill or discharge (gallons):
Estimated time of repair:
If still ongoing, estimate flow rate (gallons/minute):
Agencies/entities involved with repair and/or clean-up:
Cause of the spill or discharge:
Corrective actions taken and when, or plan to correct spill/discharge:

Sanitation Districts Nos. 14 and 20 of Los Angeles County

Recycled Water Users Handbook

For Using Recycled Water
Produced at the Lancaster or Palmdale Water Reclamation Plants,
Located in the Antelope Valley

July 2020

TAB 12

Recycled Water Site Contact Information Form

LOS ANGELES COUNTY SANITATION DISTRICTS

Converting Waste Into Resources

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Sanitation District Nos. 14 and 20

Recycled Water Site Contact Information Form

Name of Recycled Water User/Site: ______________________________

Site Address: ______________________________

City: ____________________ Zip Code: ____________________

Phone: ____________________ Fax: ____________________

Recycled Water Site Supervisor: ______________________________

Site Supervisor Training Date (month/year): __________ Training Location: __________

Title: ______________________________

Address: ______________________________

City: ____________________ State: __________ Zip Code: ____________________

Phone: ____________________ Fax: ____________________

Cell: ____________________ Pager: ____________________

Home Phone: ____________________ Email: ____________________

Work Schedule: ______________________________

Assistant Site Supervisor (if applicable): ______________________________

Title: ______________________________

Phone: ____________________ Pager: ____________________

Cell: ____________________ Email: ____________________

Property Management Company (if applicable): ______________________________

Mailing Address: ______________________________

City: ____________________ State: __________ Zip Code: ____________________

Contact Name: ______________________________

Contact Phone: ______________________________

Site Supervisor Training Date (month/year): __________ Training Location: __________

******Immediately notify the Sanitation Districts of any changes******

Please email this form to: reuse@lacsd.org