

## Policy for Water Quality Control for Recycled Water

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<b><u>Acronym</u></b>	<b><u>Definition</u></b>
<u>afy</u>	<u>Acre feet per year</u>
<u>AhR</u>	<u>Aryl hydrocarbon receptor</u>
<u>AOP</u>	<u>Advanced oxidation process</u>
<u>Basin plan</u>	<u>Water quality control plan</u>
<u>BEQ</u>	<u>Bioanalytical equivalent concentration</u>
<u>CEC</u>	<u>Constituent of emerging concern</u>
<u>CEQA</u>	<u>California Environmental Quality Act</u>
<u>DOC</u>	<u>Dissolved organic carbon</u>
<u>ELAP</u>	<u>Environmental Laboratory Accreditation Program</u>
<u>ER-<math>\alpha</math></u>	<u>Estrogen receptor - alpha</u>
<u>MEC</u>	<u>Measured environmental concentration</u>
<u>MTL</u>	<u>Monitoring trigger level</u>
<u>NDMA</u>	<u>N-nitrosodimethylamine</u>
<u>NMOR</u>	<u>N-Nitrosomorpholine</u>
<u>Order WQ 2016-0068- DDW</u>	<u>Order WQ 2016-0068-DDW, Water Reclamation Requirements for Recycled Water Use</u>
<u>Policy</u>	<u>Policy for Water Quality Control for Recycled Water</u>
<u>Regional water board</u>	<u>Regional water quality control board</u>
<u>RO</u>	<u>Reverse osmosis</u>
<u>State Water Board</u>	<u>State Water Resources Control Board</u>
<u>STORMS</u>	<u>Strategy to Optimize Resource Management of Stormwater</u>
<u>TNI</u>	<u>The National Environmental Laboratory Accreditation Conference Institute</u>
<u>Uniform Statewide Recycling Criteria</u>	<u>California Code of Regulations, title 22, division 4, chapter 3</u>
<u>U.S. EPA</u>	<u>U.S. Environmental Protection Agency</u>
<u>UV</u>	<u>Ultraviolet</u>
<u>Water Code</u>	<u>California Water Code</u>

## **Definitions**

The following are definitions of terms used in the Policy.

Bioanalytical equivalent concentration (BEQ): The output from bioanalytical screening tools are referenced to a substance that initiates a physiological response from the receptor (strong agonist) to generate BEQs. A BEQ is generated from a standard curve of a strong agonist for the receptor and is expressed in mass (ng/L) or molar concentration units. A BEQ is typically derived by comparing the 50<sup>th</sup> percentile effect concentration (EC50) or 10<sup>th</sup> percentile effect concentration (EC10) responses of the test sample with the same effect concentration (EC) level of the standard curve. The BEQ is compared to the Monitoring Trigger Level in water for the strong agonist for the receptor used to generate the BEQ.

Bioanalytical screening tools: *In vitro* (cell or protein-based) assays that can be used to screen for CECs and measure potential adverse effects of CECs on living cells or tissues.

Constituents of emerging concern (CECs): For purposes of this Policy, CECs are defined to be constituents in personal care products; pharmaceuticals; antimicrobials; industrial, agricultural, and household chemicals; naturally-occurring hormones; food additives; transformation products; inorganic constituents; microplastics; and nanomaterials.

Desalination facility: An industrial facility that processes water to remove salts and other components from the source water to produce water that is less saline than the source water.

Enclosed bays: Enclosed bays are indentations along the coast which enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. This definition includes but is not limited to: Humboldt Bay, Bodega Harbor, Tomales Bay, Drakes Estero, San Francisco Bay, Morro Bay, Los Angeles Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay.

Estuaries and coastal lagoons: Estuaries and coastal lagoons are waters at the mouths of streams that serve as mixing zones for fresh and ocean waters during a major portion of the year. Mouths of streams that are temporarily separated from the ocean by sandbars shall be considered as estuaries. Estuarine waters will generally be considered to extend from a bay or the open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters. The waters described by this definition include but are not limited to the Sacramento-San Joaquin Delta as defined by section 12220 of the California Water Code, Suisun Bay, Carquinez Strait downstream to Carquinez Bridge, and appropriate areas of the Smith, Klamath, Mad, Eel, Noyo, and Russian Rivers

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Groundwater recharge: Indirect potable reuse for groundwater recharge is defined in Water Code section 13561(c), as the planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system. Groundwater recharge by surface application is the controlled application of water to a spreading area for infiltration resulting in the recharge of a groundwater basin or an aquifer. Subsurface application is the controlled application of water to a groundwater basin or aquifer by a means other than surface application, such as direct injection through a well.

Health-based CECs: CECs that have toxicological relevance to human health. Some health-based CECs may also serve as performance indicator CECs.

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. Water leaving a recycled water use area is not considered incidental if it is due to the facility design, excessive application, intentional overflow or application, or negligence.

Measured environmental concentration (MEC): Concentration measured at the monitoring locations specified in Attachment A.

Monitoring trigger level (MTL): CEC concentrations above which response actions may be required. MTLs were established by the Science Advisory Panel for CECs in Recycled Water in their final report “[Monitoring Strategies for Constituents of Emerging Concern \(CECs\) in Recycled Water – Recommendations of a Science Advisory Panel](#)”, dated April 2018.

Municipal wastewater treatment plant: A wastewater treatment plant that treats or reclaims raw sewage in whole or in part of municipal origin. Some municipal wastewater treatment plants may also be recycled water producers.

Non-potable recycled water: recycled water that is treated for non-potable use pursuant to the uniform statewide recycling criteria in California Code of Regulations, title 22. Non-potable recycled water uses include but are not limited to irrigation, industrial or commercial cooling, supply for recreational impoundment, toilet flushing, and dust control.

Notification level: Health-based advisory levels established by the State Water Board’s Division of Drinking Water for chemicals in drinking water that lack maximum contaminant levels. When chemicals are found at concentrations greater than their notification levels, certain requirements and recommendations apply.

Ocean waters: The territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons.

Performance indicator CECs: CECs that do not have human health relevance, but can be used to monitor the efficacy of recycled water treatment processes.

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Permit: For purposes of this Policy, the term “permit” means an order adopted by a regional water board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements pursuant to Water Code section 13523, master recycling permits pursuant to Water Code section 13523.1, National Pollutant Discharge Elimination System permits pursuant to the Federal Water Pollution Control Act and Water Code section 13377, waste discharge requirements pursuant to Water Code section 13263, and waivers of waste discharge requirements pursuant to Water Code section 13269.

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 §13050(n)).

Recycled water producer: An entity that is permitted to produce recycled water, which may then be used on- or off-site.

Recycled water project proponent: An entity seeking permit coverage for a planned recycled water project.

Regional water board: A regional water quality control board. All references to regional water board include the executive officer or his/her designee, who may act for the regional water board in carrying out the provisions of this Policy consistent with Water Code section 13223.

Reservoir water augmentation: The planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system or into a constructed system conveying water to such a reservoir (Wat. Code § 13561; also referred to as surface water augmentation in Wat. Code § 13562).

State Water Board: The State Water Resources Control Board. All references to the State Water Board include the executive director or his/her designee.

Surrogate: A measurable physical or chemical property that can be used to measure the effectiveness of trace organic compound removal by treatment process and/or provide an indication of a treatment process failure.

Water purveyor: An entity that supplies water.

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*Preamble*

— California is facing an unprecedented water crisis.

The collapse of the Bay Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River and failing levees in the Delta to create a new reality that challenges California's ability to provide the clean water needed for a healthy environment, a healthy population and a healthy economy, both now and in the future.

These challenges also present an unparalleled opportunity for California to move aggressively towards a sustainable water future. The State Water Resources Control Board (State Water Board) declares that we will achieve our mission to "preserve, enhance and restore the quality of California's water resources to the benefit of present and future generations." To achieve that mission, we support and encourage every region in California to develop a salt/nutrient management plan by 2014 that is sustainable on a long-term basis and that provides California with clean, abundant water. These plans shall be consistent with the Department of Water Resources' Bulletin 160, as appropriate, and shall be locally developed, locally controlled and recognize the variability of California's water supplies and the diversity of its waterways. We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and maintenance of supply infrastructure and the use of stormwater (including dry weather urban runoff) in these plans; these sources of supply are drought proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater. To this end, we adopt the following goals for California:

- Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.
- Increase the use of stormwater over use in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.
- Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

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## **1. Purpose**

- 1.1. The purpose of ~~this Policy for Water Quality Control for Recycled Water (Recycled Water Policy, hereafter Policy)~~ is to ~~encourage increase the safe use~~ of recycled water from municipal wastewater sources that meets the definition in California Water Code (Water Code) section 13050(n), in a manner that implements state and federal water quality laws and protects public health and the environment. ~~The State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.~~

## **2. Purpose of the Policy**

- 1.2 a. ~~The purpose of This Policy is to provides direction to the regional water quality control boards (regional water boards), proponents of recycled water projects, and the public regarding the methodology and appropriate criteria to be used by for the State Water Board and the regional water boards to use when in issuing permits for recycled water projects.~~
- 1.3 b. ~~It is the intent of the State Water Board that All elements of this Policy are to be interpreted in a manner that fully implements state and federal water quality laws and regulations in order to enhance the environment and put the waters of the state to the fullest use of which they are capable.~~
- 1.4 c. ~~This Policy describes the circumstances under which permittees may enroll under the statewide water reclamation requirements for recycled water use (e.g., State Water Board Order WQ 2016-0068-DDW) or choose an alternate permitting mechanism, such as a master recycling permit. For cases where use of statewide water reclamation requirements for recycled water use may not be appropriate, this Policy provides permitting criteria that are intended to streamline the permitting of aid in the vast majority antidegradation analysis of some recycled water projects. The intent of this streamlined permitting process is to expedite the implementation of recycled water projects in a manner that implements state and federal water quality laws while allowing the regional water boards to focus their limited resources on projects that require substantial regulatory review due to unique site-specific conditions.~~
- 1.5 d. ~~By prescribing permitting criteria that apply to the vast majority of recycled water projects, It is the State Water Board's intent to promotemaximize consistency in the permitting of recycled water projects in California while also preserving to the Regional Water Boards sufficient authority and flexibility for the regional water boards to address site-specific conditions.~~
- e. ~~The State Water Board will establish additional policies that are intended to assist the State of California in meeting the goals established in the preamble to this Policy for water conservation and the use of stormwater.~~

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f. For purposes of this Policy, the term “permit” means an order adopted by a Regional Water Board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements, master reclamation permits, and waste discharge requirements.

### 3. Benefits of recycled water

2.1 When used in compliance with this Policy, California Code of Regulations, title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2.2 The State Water Board finds that the use of Recycled water is presumed to have a beneficial impact when used in accordance with this Policy and all applicable regulations, that is, which when supporting the sustainable use of groundwater and/or surface water, which is sufficiently treated so as not to adversely impact public health or the environment and which ideally with the intent of substituting for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

### 3. 4. Mandate for the Use of Recycled Water Goals and reporting requirements to track recycled water

3.1. Goals. To encourage the increased use of recycled water in California, the State Water Board adopts the following goals:

3.1.1. Increase the use of recycled water from the use of 714,000 acre-feet per year (afy) to 1.5 million afy by 2020 and to 2.5 million afy by 2030.

3.1.2. Minimize the direct discharge of treated municipal wastewater to enclosed bays, estuaries and coastal lagoons, and ocean waters, except where necessary to maintain beneficial uses. For the purpose of this goal, treated municipal wastewater does not include brine discharges from recycled water facilities or desalination facilities.

3.2. Reporting requirements. The State Water Board will evaluate progress toward these goals and revise the goals or establish mandates as necessary. To support this evaluation, municipal wastewater treatment plants shall electronically report to the State Water Board the volume of influent, treated water produced, and treated water disposed, as specified in 3.2.1, unless otherwise directed by the Executive Director. Recycled water producers shall electronically report to the State Water Board the volume of treated water produced and disposed, as specified in 3.2.2.1 and 3.2.2.2, unless otherwise directed by the Executive Director. Recycled water producers and municipal wastewater treatment plants that are also recycled water producers shall report

to the State Water Board the volume of recycled water use, as specified in 3.2.1.4 and 3.2.2.3, unless otherwise directed by the Executive Director. All volumetric data shall be reported as acre-feet per year (afy) to a database identified by the State Water Board. The Executive Director will issue an order to implement the requirements of this section.

3.2.1. Municipal wastewater treatment plants. This section includes reporting requirements for municipal wastewater treatment plants and for municipal wastewater treatment plants that are also recycled water producers. Municipal wastewater treatment plants shall report:

3.2.1.1. Influent. Volume of untreated wastewater or raw sewage entering a municipal wastewater treatment plant, on a monthly basis.

3.2.1.2. Production. Volume of municipal wastewater treated to each of the following standards, on a monthly basis:

- Undisinfected secondary, as defined in California Code of Regulations, title 22, §60301.900
- Disinfected secondary-23, as defined in California Code of Regulations, title 22, §60301.225
- Disinfected secondary-2.2, as defined in California Code of Regulations, title 22, §60301.220
- Disinfected tertiary, as defined in California Code of Regulations, title 22, §60301.230
- Full advanced treatment, as defined in California Code of Regulations, title 22, §60320.201.

3.2.1.3. Disposal. Volume of treated municipal wastewater discharged to each of the following, on a monthly basis:

- Inland surface waters, specifying volume required to maintain minimum instream flow
- Enclosed bays, estuaries and coastal lagoons, and ocean waters
- Underground injection wells, such as those classified by U.S. EPA's Underground Injection Control Program
- Land.

3.2.1.4. Reuse.

3.2.1.4.1. Volume of treated municipal wastewater distributed to a recycled water producer for further treatment and use, at least on an annual basis.

3.2.1.4.2. Volume of treated municipal wastewater directly distributed for beneficial use in compliance with California Code of Regulations, title 22 in each of the use categories listed below, at least on an annual basis. This category excludes volume reported in 3.2.1.4.1.

- Agricultural irrigation: pasture or crop irrigation
- Landscape irrigation: irrigation of parks, greenbelts, and playgrounds; school yards; athletic fields; golf courses; cemeteries; residential landscaping, common areas; commercial landscaping, except eating areas; industrial landscaping, except eating areas; and freeway, highway, and street landscaping
- Commercial and industrial application: dual-plumbed projects, business use (such as laundries and office buildings), manufacturing facilities, cooling towers, process water, and appurtenant landscaping that is not separately metered
- Geothermal energy production: augmentation of geothermal fields
- Other non-potable uses: including but not limited to dust control, flushing sewers, fire protection, fill stations, snow making, recreational impoundments, etc.
- Groundwater recharge: surface or subsurface application, except for seawater intrusion barrier use
- Seawater intrusion barrier: groundwater recharge via subsurface application intended to reduce seawater intrusion into a coastal aquifer with a seawater interface
- Reservoir water augmentation: the planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system, as defined in Section 116275 of the Health and Safety Code, or into a constructed system conveying water to such a reservoir (Water Code § 13561)
- Raw water augmentation: the planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system, as defined in Section 116275 of the Health and Safety Code, or into a

constructed system conveying water to such a reservoir (Water Code § 13561)

- Other potable uses: both indirect and direct potable reuse other than for groundwater recharge; seawater intrusion barrier, reservoir water augmentation, and raw water augmentation

3.2.2. Recycled water producers. This section includes reporting requirements for facilities that are solely recycled water producers (i.e., not also municipal wastewater treatment plants). Recycled water producers shall report:

3.2.2.1. Production. Volume of municipal wastewater treated to each of the standards described in 3.2.1.2, on a monthly basis.

3.2.2.2. Disposal. Volume of treated municipal wastewater not used for any direct beneficial use described in 3.2.2.3 below, including volume of treated municipal wastewater discharged to each of the following, on a monthly basis:

- Inland surface waters, specifying volume required to maintain minimum instream flow
- Enclosed bays, estuaries and coastal lagoons, and ocean waters
- Underground injection wells, such as those classified by U.S. EPA's Underground Injection Control Program
- Land.

3.2.2.3. Reuse. Volume of treated municipal wastewater directly distributed for beneficial use in compliance with California Code of Regulations, title 22 in the use categories described in 3.2.1.4.2, at least on an annual basis.

3.3. a. The State Water Board and regional water boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws and with state and federal laws to protect public health.

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

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3.3.1. (2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

3.3.2. (3) ~~The State Water Board hereby declares that, pursuant to Water Code sections 13550 et seq., it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject pursuant to the conditions established in Water Code sections 13550 et seq.~~ The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible, as appropriate, to enforce these requirements the mandates of this subparagraph.

b. ~~These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.~~

c. ~~The water industry and the environmental community have agreed jointly to advocate for \$1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.~~

3.4 d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission, (CPUC), and the California Department of Water Resources, (CDWR) ~~State Lands Commission, and Coastal Commission~~ to use their respective authorities to the fullest extent possible practicable to assist the State Water Board and the regional water boards in increasing the use of recycled water in California to make progress toward achieving the recycled water goals set forth in 3.1.

**4. 5. State agency roles of the State Water Board, Regional Water Boards, CDPH and CDWR**

The State Water Board recognizes that it shares jurisdiction over the use of recycled water with the regional water boards and with CDPH. In addition, the State Water Board recognizes that CDWR and the CPUC ~~several agencies~~ have important roles to play in encouraging the use of recycled water. The State Water Board believes that it is important to clarify the respective roles of each of these agencies in connection with recycled water projects, as follows:

4.1 a. The State Water Board establishes general policies governing the permitting of recycled water projects, develops uniform water recycling criteria appropriate to particular uses of water, processes and approves wastewater change petitions filed by wastewater dischargers for recycled water projects that have the potential to decrease the flow in any portion of a watercourse such as a river or stream, adopts statewide orders for the permitting of recycled water

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projects, reviews and approves Title 22 engineering reports for recycled water use, and allocates and disperses funding for recycled water projects consistent with its roles of protecting water quality, public health, and sustaining water supplies. The State Water Board exercises general oversight over recycled water projects, including review of regional water board permitting practices, and shall leads the effort to meet the recycled water use goals set forth in 3.1the Preamble to this Policy. The State Water Board is also charged by statute with developing a general permit for irrigation uses of recycled water.

- 4.2 b. The CDPH is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions The regional water boards issue permits that include requirements needed to protect water quality, human health, and the environment consistent with the State and regional Water Quality Control Plans.
- 4.3 d. CDWR The Department of Water Resources is charged with reviewing urban water management plans and, every five years, updating the California Water Plan, including evaluating the quantity of recycled water presently being used, and planning for the potential for future uses of recycled water, and updating statewide targets for recycled water use, consistent with Water Code section 10608.50(b). Pursuant to Water Code section 13577, the Department of Water Resources is also charged with adopting regulations in the California Plumbing Code to provide design standards to safely plumb buildings with both potable and recycled water systems. The State Water Board and Department of Water Resources work in collaboration to track recycled water volume and use in California. In undertaking these tasks, CDWR the Department of Water Resources may appropriately rely on annual recycled water production and use data collected by the State Water Board as well as urban water management plans, and The Department of Water Resources may share the data from those plans with the State Water Board and the regional water boards. CDWR The Department of Water Resources also shares with the State Water Board the authority to allocate and distribute bond funding, which can provide incentives for the use of recycled water.
- 4.4. e. The CPUC Public Utilities Commission is charged with approving rates and terms of service for the use of recycled water by investor-owned utilities.
- 4.5. The Department of Food and Agriculture is charged with promoting California agriculture and food products and ensuring the safety and quality of such

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products for the consumer, including products irrigated with recycled water.  
The State Water Board and Department of Food and Agriculture will work in  
collaboration to support agricultural diversity and sustainability by working with  
grower coalitions, third-party technical service providers, public and private  
agricultural entities, and academia.

## **5. Wastewater change petitions**

In many cases, recycled water project proponents will be required to obtain  
approvals from several regulatory agencies prior to implementing their project. If the  
proposed recycled water project will result in reduced stream flows, an approved  
“wastewater change petition” may be required pursuant to Water Code section 1211  
as described below. For this reason, the State Water Board encourages early  
coordination by the recycled water project proponent with the State Water Board’s  
Division of Water Rights, Division of Financial Assistance, the regional water boards,  
Department of Water Resources, and Department of Fish and Wildlife in the process  
of funding and permitting recycled water projects to ensure compliance with Water  
Code section 1211.

- 5.1. The use of recycled water may only occur if all requirements prescribed by the  
State Water Board pursuant to Water Code section 1211 are being met. Prior  
to changing the point of discharge, place of use, or purpose of use of treated  
wastewater that could decrease the flow in any portion of a watercourse, or  
receiving state funding for the treatment or use of recycled water, the recycled  
water project proponent must receive (1) a determination from the State Water  
Board’s Division of Water Rights that an order approving the change is not  
required; or (2) State Water Board approval for the proposed change pursuant  
to Water Code section 1211. The recycled water project proponent shall notify  
the applicable regional water board and any applicable state funding agency  
(such as the Division of Financial Assistance of the State Water Board or the  
Department of Water Resources) of this determination.
- 5.2. To approve a wastewater change petition, the State Water Board must  
determine that the proposed change will not injure any other legal user of the  
water involved, will not unreasonably affect instream uses including fish and  
wildlife, and is in the public interest. In addition, the State Water Board must  
find that the requirements of CEQA have been met. The State Water Board  
also has an independent obligation to consider the effect of the proposed  
change on public trust resources and to protect those resources where  
feasible. (National Audubon Society v. Superior Court (1983) 33 Cal.3d 419  
[189 Cal. Rptr. 346, 658 P.2d 709].)
- 5.3. The State Water Board may consider potential cumulative impacts to the  
environment and public trust resources caused by the proposed recycled water  
project and related projects that may reduce stream flows. Although impacts  
caused by the incremental decrease in streamflow resulting from the approval  
of a single wastewater change petition may be insignificant, impacts to the  
environment may be cumulatively considerable when viewed together with

impacts from past, present, and probable future projects with the potential to decrease the streamflow. This is particularly true for streams where discharges from wastewater treatment facilities comprise the majority of streamflow for a portion of the year, such as the dry summer months.

- 5.4. Approval of a wastewater change petition shall not be construed to release any recycled water project proponent from the obligation to comply with any regional water board requirements applicable to the recycled water project.

## 6. Salt/ and nutrient management plans

### 6.1 a. *Introduction:*

6.1.1 (1) Some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable regional water board water quality control plans (basin plans), and. Not all basin plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salts or nutrients. These conditions can be caused by natural soils/conditionsnaturally-occurring sources of salinity, discharges of waste agricultural, domestic, and municipal wastewater and residual solids (including on-site wastewater treatment systems). In addition, irrigation using imported water, surface water, groundwater, or recycled water, and indirect potable reuse for groundwater recharge (groundwater recharge) can contribute to increased salt and nutrient loading and water supply augmentation using surface or recycled water. Regulation of recycled water alone maywill not fully address these conditions.

6.1.2 (2) It is the intent of this Policy that Salts and nutrients from all sources must be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address The most effective way to address salt and nutrient pollution issues is typically through the development of regional or subregional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects or other individual sources of salts and nutrients.

### b. Adoption of Salt/ Nutrient Management Plans.

6.1.3. Basin evaluation. To sustain the ongoing development of salt and nutrient management plans in basins where plans are needed and to clarify where salt and nutrient management planning is not needed, each regional water board shall evaluate each basin or subbasin in its region within two years of [effective date of the amendment] and identify basins where salts and/or nutrients are a threat to water quality and therefore need salt and nutrient management planning to achieve water quality objectives in the long term.

Each regional water board shall update this evaluation at least every 10 years to consider any changes in these factors that have occurred that would change the findings from the initial evaluation. Basin evaluations completed prior to [effective date of the amendment] can be used to satisfy this requirement if the prior evaluation clearly identifies whether the basin requires salt and nutrient management planning to achieve water quality objectives in the long term. Regional water boards may consider the following factors in this determination, as well as any additional region-specific factors:

- Magnitude of and trends in the concentrations of salts and nutrients in groundwater
- Contribution of imported water and recycled water to the basin water supply
- Reliance on groundwater to supply the basin or subbasin
- Population
- Number and density of on-site wastewater treatment systems
- Other sources of salts and nutrients including irrigated agriculture and confined animal facilities

## 6.2. Development and adoption of salt and nutrient management plans.

(1) The State Water Board recognizes that, pursuant to the letter dated December 19, 2008 and attached to the Resolution adopting this Policy, the encourages collaborative work among salt and nutrient management planning groups, the agricultural community, the regional water boards, Integrated Regional Water Management groups, and groundwater sustainability agencies formed under the Sustainable Groundwater Management Act to achieve the goals of groundwater sustainability, recycled water use, and water quality protection. For basins identified in 6.1.3, the State Water Board encourages local water and wastewater entities, together with local salt and nutrient contributing stakeholders, will fund to continue locally driven and controlled, collaborative processes open to all stakeholders that will prepare result in salt and nutrient management plans for each groundwater basins and the management of salts and nutrients on a basin-wide basis/sub-basin in California, including compliance with CEQA and participation by the regional water board staff.

6.2.1.1. (a) It is the intent of this Policy for Every groundwater basin/ and sub-basin identified pursuant to 6.1.3 shall have a consistent salt/ and nutrient management plan or plan that is

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~~functionally equivalent per 6.2.1.4. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality.~~ (b) Salt and nutrient management plans shall be tailored to address the water quality concerns in each of the basin/ and sub-basin. Such plans shall include address and implementation measures provisions, as appropriate, for to address all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects using recycled water for irrigation and groundwater recharge reuse projects. The salt and nutrient management plans may, depending upon the local situation, address constituents other than salts and nutrients that adversely affect groundwater quality.

6.2.1.2. It is also the intent of ~~t~~The State Water Board recognizes that because stormwater is typically lower in nutrients and salts and can augment local water supplies, inclusion of a significant stormwater use and recharge component within the salt/ and nutrient management plans is critical to can play a vital role in the long-term sustainable use of water in California. Inclusion of stormwater recharge is consistent with the California Water Plan and the State Water Board Strategy to Optimize Resource Management of Stormwater (STORMS) vision, as adopted in State Water Board Resolution No. 2016-0003, that stormwater be managed as a resource, wherein water quality improvement and water supply enhancement are complementary goals. Resolution No. 2005-0006, which establishes sustainability as a core value for State Water Board programs and also assists in implementing Resolution No. 2008-0030, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

(c) Such plans may be developed or funded pursuant to the provisions of Water Code sections 10750 et seq. or other appropriate authority.

(d) Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.

6.2.1.3. (e) The requirements of ~~6.2.4~~ this paragraph shall not apply to areas that have already completed a Regional Water Board approved are covered by an existing salt and nutrient management plan that is accepted by the regional water board pursuant to 6.2.3.2 or any

applicable basin plan amendment adopted by the regional water board pursuant to 6.2.3.3.

6.2.1.4. The regional water board may determine pursuant to 6.2.3 that a groundwater management plan for a basin, sub-basin, or other regional planning area is functionally equivalent to paragraph 6(b)3 a salt and nutrient management plan. For example, the regional water board may find that groundwater sustainability plans developed pursuant to the Sustainable Groundwater Management Act include water quality components that sufficiently address the components of 6.2.4 and therefore are functionally equivalent to a salt and nutrient management plan.

~~(2) Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.~~

6.2.1.5. The regional water board may use its authority pursuant to Water Code section 13242 to adopt plans and programs of implementation for the protection of beneficial uses in basins whether or not a salt and nutrient management plan has been accepted by the regional water board pursuant to 6.2.3.2 or a basin plan amendment has been adopted by the regional water board pursuant to 6.2.3.3.

6.2.2. Implementation of salt and nutrient management plans may require a regional water board to amend its basin plan. The regional water board shall consider for adoption a basin plan amendment when implementation of a salt and nutrient management plan involves adoption and/or modification of water quality objectives, beneficial uses, or programs of implementation consistent with Water Code sections 13240, 13241, and 13242. In other cases where a regional water board determines a basin plan amendment is not required, the accepted salt and nutrient management plan serves as a technical document to support future regional water board decisions.

6.2.3. Regional water board review and acceptance of salt and nutrient management plans. Proposed salt and nutrient management plans shall be submitted to the regional water board for review. The regional water board shall evaluate the salt and nutrient management plan in accordance with the provisions of 6.2.4. Following review, the regional water board shall make one of the following determinations through a resolution. This determination shall be made within six months of receipt of a proposed salt and nutrient management plan, unless compliance with CEQA is required.

- 6.2.3.1. The proposed salt and nutrient management plan does not fully satisfy the requirements of 6.2.4. In this case, the regional water board shall provide specific findings regarding which components in 6.2.4 are not adequately addressed and recommendations for what may need to be included or modified in the proposed salt and nutrient management plan for the regional water board to accept the plan.
  - 6.2.3.2. The proposed salt and nutrient management plan fully satisfies the requirements of 6.2.4, a basin plan amendment is not needed to implement the plan, and the regional water board will accept the plan. In this case, the accepted salt and nutrient management plan will serve as a technical document to support regional water board decisions.
  - 6.2.3.3. The proposed salt and nutrient management plan fully satisfies the requirements of 6.2.4 and a basin plan amendment will be needed to implement the plan. In this case, the regional water board shall initiate a process to amend the basin plan based on the accepted salt and nutrient management plan.
- 6.2.4. Required components of salt and nutrient management plans. The degree of specificity within salt and nutrient management plans and the length of the plans will be dependent on a variety of site-specific factors, including but not limited to, size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality. Each salt and nutrient management plan shall include the following components:
- 6.2.4.1. (a) A basin/or sub-basin-wide monitoring plan that includes an appropriate network of monitoring locations. ~~The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in the salt and nutrient management plans are consistent with applicable water quality objectives. The number, type, and density of monitoring locations to be sampled and other aspects of the monitoring program shall be dependent upon basin-specific conditions and input from the regional water board.~~ Salts, nutrients, and the constituents identified in ~~6.2.1.1 paragraph 6(b)(1)(f)~~ shall be monitored. The frequency of monitoring shall be ~~determined proposed~~ in the salt/and nutrient management plan ~~and approved for review~~ by the regional water board pursuant to ~~6.2.3 paragraph 6(b)(2)~~.
  - 6.2.4.1.1. (i) ~~The monitoring plan must be designed to determine effectively evaluate water quality in the basin. The plan must focus on basin water quality near water supply wells and areas~~

proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

6.2.4.1.2. (ii) ~~The preferred approach to monitoring plan development is to collect samples may include water quality data from existing wells if feasible as long as where the existing wells are located and screened appropriately to determine water quality throughout the most critical areas of the basin. The State Water Board supports monitoring approaches that leverage the use of groundwater monitoring wells from other regulatory programs, such as the Irrigated Lands Regulatory Program and the Sustainable Groundwater Management Act.~~

6.2.4.1.3. (iii) ~~The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be electronically reported annually to a database in a format identified by the Regional State Water Board (e.g., GeoTracker) at least every three years.~~

(b) ~~A provision for annual monitoring of Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.~~

6.2.4.2. (e) ~~Water recycling and stormwater recharge/use goals and objectives.~~

6.2.4.3. (d) ~~Salt and nutrient source identification, basin/ or sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.~~

6.2.4.4. (e) ~~Implementation measures to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure.~~

6.2.4.5. (f) ~~An antidegradation analysis demonstrating that the existing projects, reasonably foreseeable future projects, and other sources of loading to the basin included within the plan will, cumulatively/collectively, satisfy the requirements of State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California (Antidegradation Policy).~~

6.2.5. (4) Nothing in this Policy shall prevent stakeholders from developing a plan that is more protective of water quality than applicable standards in the

basin plan. No regional water board, however, shall seek to modify basin plan objectives without full-compliance with Water Code section 13241 the process for such modification as established by existing law.

6.2.6. Data assessment. The regional water boards, in consultation with stakeholders, shall assess and review monitoring data generated from these plans approximately every 5 years but no more than every 10 years, unless an alternate timeline has been established in a basin plan amendment adopted by the regional water board pursuant to 6.2.3.3. This assessment shall include an evaluation of:

- observed trends in water quality data as compared with trends predicted in the salt and nutrient management plan;
- the ability of the monitoring network to adequately characterize groundwater quality in the basin;
- potential new data gaps;
- groundwater quality impacts predicted in the salt and nutrient management plan based on most recent trends and any relied-upon models, including an evaluation of the ability of the model to simulate groundwater quality; and
- available assimilative capacity based on observed trends and most recent water quality data.

6.2.7. The regional water boards, in consultation with stakeholders, shall use the results of these periodic assessments to update basin evaluations of available assimilative capacity, projected trends, and concentrations of salts and nutrients in groundwater, and assess whether potential updates or revisions to the salt and nutrient management plan may be warranted.

## **7. Permitting and antidegradation analysis for non-potable recycled water projects**

The purpose of this section is to describe permitting options and associated antidegradation analysis for non-potable recycled water projects seeking or proposing to revise a permit. Recycled water project proponents must also comply with related statutes and regulations, such as those contained in Water Code sections 13263, 13267, 13377, 13523, 13523.1, and California Code of Regulations, title 17 and title 22.

### **7.1. Antidegradation analysis for non-potable recycled water projects**

7.1.1. Landscape Irrigation and other non-potable uses of with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water

for irrigation may, regardless of its source, ~~collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.~~

- 7.1.2. For non-potable recycled water project proponents within a basin for which the regional water board has adopted a basin plan amendment based on an accepted salt and nutrient management plan pursuant to 6.2.3.3, compliance with the Antidegradation Policy may consist of an analysis demonstrating that the project is consistent with the adopted basin plan amendment. For non-potable recycled water project proponents within a basin with an accepted salt and nutrient management plan without an associated basin plan amendment, the antidegradation analysis may be based, in part, on the technical findings of the accepted salt and nutrient management plan as described in 6.2.2. For non-potable recycled water project proponents within a basin where a salt and nutrient management plan has not been accepted by the regional water board, compliance with the Antidegradation Policy will depend on the permitting mechanism selected by the regional water board as described in 7.2. and 7.3 below. If the proposed project is in a basin identified pursuant to 6 as needing a salt and nutrient management plan and if directed by a regional water board pursuant to Water Code section 13267, the recycled water project proponent may be required to develop or participate in developing a salt and nutrient management plan.

## 7.2. Use of statewide water reclamation requirements

The State Water Board adopted statewide water reclamation requirements (e.g., Order WQ 2016-0068-DDW) to streamline permitting of recycled water projects where recycled water is used for non-potable uses.

- 7.2.1. To achieve the goals of statewide consistency, streamlined permitting, and efficiency of resource management, all appropriate and eligible projects with the capability of taking on the responsibility of administrating water recycling programs shall enroll under statewide water reclamation requirements.
- 7.2.2. Antidegradation analysis. Recycled water project proponents seeking to enroll under statewide water reclamation requirements can demonstrate compliance with the Antidegradation Policy by demonstrating that the project complies with the conditions of the order, which includes compliance with an accepted salt and nutrient management plan or participation in an existing salt and nutrient management planning effort, if directed by the State Water Board or applicable regional water board.

## 7.3. Site-specific permitting for non-potable recycled water projects

7.3.1. If a project is not appropriate or eligible to enroll under statewide water reclamation requirements, the regional water board shall consider a new site-specific order for adoption or consider the project for enrollment under an existing order (e.g., a master recycling permit), pursuant to 7.3.2 or 7.3.3.

7. Landscape Irrigation Projects<sup>4</sup>

a. Control of incidental runoff. Incidental runoff is defined 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. Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a National Pollutant Discharge Elimination System (NPDES) permit, including municipal separate storm water system permits, but regardless of the regulatory instrument, the project shall include, but is not limited to, the following practices:

- (1) Implementation of an operations and management plan that may apply to multiple sites and provides for detection of leaks, (for example, from broken sprinkler heads), and correction either within 72 hours of learning of the runoff, or prior to the release of 1,000 gallons, whichever occurs first,
- (2) Proper design and aim of sprinkler heads;
- (3) Refraining from application during precipitation events, and
- (4) Management of any ponds containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and there is notification of the appropriate Regional Water Board Executive Officer of the discharge.

7.3.2. b. Criteria for streamlined permitting.

7.3.2.1. (c) This section provides permitting criteria that, if met, can aid in compliance with the Antidegradation Policy for some recycled water

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<sup>4</sup> Specified uses of recycled water considered “landscape irrigation” projects include any of the following:

- i. Parks, greenbelts, and playgrounds;
- ii. School yards;
- iii. Athletic fields;
- iv. Golf courses;
- v. Cemeteries;
- vi. Residential landscaping, common areas;
- vii. Commercial landscaping, except eating areas;
- viii. Industrial landscaping, except eating areas; and
- ix. Freeway, highway, and street landscaping.

projects. This section applies to non-potable recycled water projects where the proposed use of recycled water or method of recycled water storage would not cause or contribute to pollution or nuisance, or otherwise fail to comply with the applicable basin plan or State Water Board plans or policies. Non-potable recycled water projects Irrigation projects using recycled water that meet all of the following criteria are eligible for streamlined permitting, and if otherwise in compliance with applicable laws, shall be approved consistent with the requirements of 7.3.2.2:

- 7.3.2.1.1. (1) Compliance with the requirements for recycled water established in Title 22 of the California Code of Regulations, including the requirements for treatment and use area restrictions, together with any other recommendations by CDPH, all applicable laws and regulations, including those related to recycled water contained in California Code of Regulations, title 17 and California Code of Regulations, title 22 (including subsequent revisions), and recommendations by the State Water Board for the protection of public health pursuant to Water Code section 13523.
- 7.3.2.1.2. Compliance with an approved Title 22 engineering report that demonstrates or defines compliance with the Uniform Statewide Recycling Criteria (and amendments).
- 7.3.2.1.3. (2) Application in amounts and at rates as needed for the landscape (i.e., at agronomic rates and not when the soil is saturated). Each irrigation project shall be subject to an operations and management plan, that may apply to multiple sites, provided to the Regional Water Board that specifies the agronomic rate(s) and describes a set of reasonably practicable measures to ensure compliance with this requirement, which may include the development of water budgets for use areas, site supervisor training, periodic inspections, tiered rate structures, the use of smart controllers, or other appropriate measures. For irrigation projects, application of recycled water at rates that minimize percolation of recycled water below the plants' root zone, i.e., in a manner (1) necessary to satisfy the plants' evapotranspiration requirements, (2) that considers allowances for supplemental water, irrigation distribution uniformity, leaching, and climate, and (3) when the soil is not saturated. The regional water board may require a recycled water project proponent to submit an operations and management plan, which may apply to multiple sites. The operations and management plan shall include the rate(s) of application of recycled water and describe a set of reasonably practicable measures to ensure compliance with this paragraph.

7.3.2.1.4. (3) Compliance with any applicable salt and nutrient management plan accepted by the regional water board pursuant to 6.2.3.2 or any applicable basin plan amendment adopted by the regional water board pursuant to 6.2.3.3.

7.3.2.1.5. (4) Appropriate use of fertilizers that takes into account the nutrient levels in the recycled water and nutrient demand by plants. Recycled water producers shall monitor and communicate to the users the nutrient levels in their recycled water.

7.3.2.1.6. Compliance with Water Code section 1211 for facilities where the changes to the discharge are necessary to accomplish water recycling and will result in changes in flow in a watercourse.

7.3.2.1.7. Compliance with all requirements of applicable waste discharge requirements, waivers of waste discharge requirements, including, without limitation, waste discharge requirements or waivers regulating agricultural discharges from irrigated lands.

7.3.2.2. For recycled water projects that meet the streamlined criteria in 7.3.2.1 and where the recycled water project proponent and regional water board select a permitting option other than statewide water reclamation requirements (e.g., master recycling permit):

7.3.2.2.1. (1) The regional water boards shall, absent unusual circumstances (i.e.g., unique, site-specific conditions such as where recycled water is proposed to be used for irrigation over high transmissivity soils over a shallow (5' or less) high quality groundwater aquifer, or proposed to be stored in unlined ponds where the regional water board determines that it will result in an unacceptable threat to groundwater quality), approve permit recycled water projects that meet the criteria set forth in this Policy, consistent with a site-specific permit the provisions of this paragraph.

7.3.2.2.2. (2) If The regional water board determines that unusual circumstances apply, the Regional Water Board shall make a finding of unusual circumstances in a site-specific permit pursuant to 7.3.3, resolution or other order based on substantial evidence in the record if the regional water board determines that unusual circumstances apply, after public notice and hearing.

(3) Projects meeting the criteria set forth below and eligible for enrollment under requirements established in a general order

shall be enrolled by the State or Regional Water Board within 60 days from the date on which an application is deemed complete by the State or Regional Water Board. For projects that are not enrolled in a general order, the Regional Water Board shall consider permit adoption within 120 days from the date on which the application is deemed complete by the Regional Water Board.

- 7.3.2.2.3. (4) Landscape irrigation projects that qualify for streamlined permitting The regional water board shall not be required to include a project-specific receiving water and groundwater monitoring component if the recycled water project meets the criteria set forth in 7.3.2.1, unless such project-specific monitoring is required under the adopted accepted salt/ and nutrient management plan or applicable basin plan. During the interim while the salt management plan is under development, a landscape irrigation project proponent can either perform project specific monitoring, or actively participate in the development and implementation of a salt/nutrient management plan, including basin/sub-basin monitoring. Permits or requirements for landscape irrigation projects shall include, in addition to any other appropriate recycled water monitoring requirements, monitoring for priority pollutants in the recycled water at the recycled water production facility once per year, except when the recycled water production facility has a design production flow for the entire water reuse system of one million gallons per day or less. For these smaller facilities, the recycled water shall be monitored for priority pollutants once every five years.
- (5) It is the intent of the State Water Board that the general permit for landscape irrigation projects be consistent with the terms of this Policy.

- 7.3.2.2.4. The regional water board may require submittal of a site-specific Implementation Plan or Operations and Management Plan as a condition of the permit if the recycled water project meets the criteria set forth in 7.3.2.1.

- 7.3.2.2.5. Antidegradation analysis. Non-potable recycled water project proponents can satisfy the requirements of the Antidegradation Policy by submitting an analysis demonstrating that the project is consistent with the criteria specified in 7.3.2.1 to the regional water board with the report of waste discharge, which includes compliance with any applicable salt and nutrient management plan accepted by the regional water board pursuant to 6.2.3.2 or

any applicable basin plan amendment adopted by the regional water board pursuant to 6.2.3.3.

7.3.3. *Permitting for non-potable recycled water projects that do not meet the requirements of 7.3.2.1*

7.3.3.1. Projects that are ineligible or inappropriate for enrollment under statewide water reclamation requirements and that do not meet the criteria of 7.3.2.1 must be reviewed and permitted on a site-specific basis.

7.3.3.2. *Antidegradation analysis.* Non-potable recycled water project proponents ineligible or inappropriate for enrollment under statewide water reclamation requirements and that do not meet the criteria specified in 7.3.2.1 must submit an antidegradation analysis to the regional water board with the report of waste discharge to demonstrate compliance with the Antidegradation Policy.

7.4. *Incidental runoff of recycled water for irrigation*

Recycled water shall not be allowed to escape from the use area as surface flow that would either pond or enter surface waters, unless authorized by waste discharge requirements, waivers of waste discharge requirements, or conditional prohibitions (e.g., agricultural discharges from irrigated lands).

**8. Permitting and antidegradation analysis for Recycled Water groundwater recharge projects**

8.1. *Permitting for groundwater recharge projects*

8.1.1. (a) The State Water Board acknowledges that All recycled water groundwater recharge projects must be reviewed and permitted on a site-specific basis, and so such projects will require project-by-project review.

8.1.2. (b) Approved groundwater recharge projects will shall meet the following criteria:

8.1.2.1. (1) Compliance with regulations adopted by CDPH related to recycled water for groundwater recharge projects (including subsequent revisions) contained or, in California Code of Regulations, title 17 and California Code of Regulations, title 22, and the interim until such regulations are approved, CDPH's recommendations by the State Water Board for the protection of public health pursuant to Water Code section 13523 for the project (e.g., level of treatment, retention time, setback distance, source control, monitoring program, etc.).

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8.1.2.2. (2) Implementation of a monitoring program for constituents of emerging concern (CECs) that is consistent with Attachment A and any recommendations from the State Water BoardCDPH.  
~~Groundwater recharge projects shall include monitoring of recycled water for priority pollutants twice per year.~~

8.1.2.3. (c) Nothing in this sectionparagraph shall be construed to limit the authority of a regional water board to protect designated beneficial uses, provided that any proposed limitations for the protection of public health may only be imposed following regular consultation by the regional water board with the State Water BoardCDPH, consistent with the precedent established in State Water Board Orders WQ 2005-0007 and 2006-0001.

8.1.2.4. (d) Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater.

8.1.2.5. (e) Projects that utilize surface spreading to recharge groundwater with recycled water treated by reverse osmosis shall be permitted by a regional water board within one year of receipt of an approved Title 22 engineering report, provided that the project proposes a brine disposal method to the satisfaction of the regional water boardrecommendations from CDPH. Furthermore, the regional water board shall give a high priority to review and approval of such projects.

## 8.2. Antidegradation analysis for groundwater recharge projects

(a) ~~The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the Legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.~~

(b) ~~Activities involving the disposal of waste that could impact high quality waters are required to implement best practicable treatment or control of the discharge necessary to ensure that pollution or nuisance will not occur, and the highest water quality consistent with the maximum benefit to the people of the state will be maintained.~~

8.2.1. (c) Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, ~~the State Water Board finds that~~ groundwater recharge projects using recycled

water have the potential to degrade~~lower~~ water quality within a basin. To ensure a project does not degrade water quality within a basin, the proponent of a groundwater recharge project must submit and antidegradation analysis to the regional water board with the report of waste discharge to demonstrate compliance with the Antidegradation Policy. Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:

- 8.2.2. For groundwater recharge projects within a basin for which the regional water board has adopted a basin plan amendment based on an accepted salt and nutrient management plan pursuant to 6.2.3.3, compliance with the Antidegradation Policy may consist of conducting an analysis demonstrating that the project is consistent with the adopted basin plan amendment.
- 8.2.3. For groundwater recharge projects within a basin with a salt and nutrient management plan accepted by the regional water board pursuant to 6.2.3.2 (i.e., without an associated basin plan amendment), the antidegradation analysis may be based, in part, on the technical findings of the accepted salt and nutrient management plan as described in 6.2.2.
- 8.2.4. If a groundwater recharge project proponent is actively participating in the development of a salt and nutrient management plan for the basin or subbasin to the satisfaction of the applicable regional water board, then compliance with the Antidegradation Policy may be demonstrated as follows:
  - 8.2.4.1. (1) If a groundwater recharge project proposes to that utilizes less than 10 percent of the available assimilative capacity in a basin/or sub-basin (or multiple projects to utilizing less than 20 percent of the available assimilative capacity in a basin/or sub-basin) the antidegradation analysis need only conduct an antidegradation analysis verifying the demonstrate that the project will use of the less than 10 percent (or multiple projects will use less than 20 percent) of the available assimilative capacity. For those basins/or sub-basins where the regional water boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the regional water board, until such time as the salt/and nutrient management plan is approved accepted by the regional water board consistent with 6.2 and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/or sub-basin, either over the most recent five years of data available or using a data set approved by the regional water board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or

projects, the regional water board shall calculate the impacts of the project or projects over at least a ten-year time frame.

- 8.2.4.2. (2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in 8.2.4.1 subparagraph (1), then a ~~Regional Water Board~~ deemed acceptable more detailed antidegradation analysis shall be performed to comply with the Antidegradation Policy Resolution No. 68-16. The project proponent shall provide sufficient information for the regional water board to make this determination. An example of an approved method is the method used by ~~the~~ in State Water Board in connection with Resolution No. 2004-0060 and ~~the~~ in California Regional Water Quality Control Board, Santa Ana Region in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of the Antidegradation Policy Resolution No. 68-16 is encouraged.
- 8.2.5. For groundwater recharge projects within a basin without a salt and nutrient management plan accepted by the regional water board pursuant to 6.2.3.2 or any applicable basin plan amendment adopted by the regional water board pursuant to 6.2.3.3, a more detailed antidegradation analysis shall be performed to comply with the Antidegradation Policy. The project proponent shall provide sufficient information for the regional water board to make this determination. An example of an approved method is the method used in State Water Board Resolution No. 2004-0060 and the regional water board in California Regional Water Quality Control Board, Santa Ana Region Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of the Antidegradation Policy is encouraged.

(1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

(2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin).

## 9. Permitting for reservoir water augmentation

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- 9.1. All recycled water reservoir water augmentation projects must be reviewed and permitted on a site-specific basis.
- 9.2. Approved reservoir water augmentation projects shall meet the following criteria:
  - 9.2.1. Compliance with regulations adopted by the State Water Board for reservoir water augmentation projects; and
  - 9.2.2. Implementation of a monitoring program for CECs that is consistent with Attachment A and recommendations by the State Water Board for the protection of public health pursuant to Water Code section 13523.
- 9.3. Nothing in this section shall be construed to limit the authority of a regional water board to protect designated beneficial uses, provided that any proposed limitations for the protection of public health may only be imposed following regular consultation by the regional water board with the State Water Board, consistent with the precedent established in State Water Board Orders WQ 2005-0007 and WQ 2006-0001.

## **10. Constituents of emerging concern**

### a. General Provisions

- (1) ~~Regulatory requirements for recycled water shall be based on the best available peer-reviewed science. In addition, all uses of recycled water must meet conditions set by CDPH.~~
- (2) ~~Knowledge of risks will change over time and recycled water projects must meet legally applicable criteria. However, when standards change, projects should be allowed time to comply through a compliance schedule.~~

#### ***10.1. Introduction***

- 10.1.1. ~~(3) The presence, variety, and concentration of CECs in water may vary over time. In addition, (3) the state of knowledge regarding CECs is inherently incomplete and will change over time based on scientific developments. Continuing There needs to be additional research is needed to support understanding of which CECs present a risk to public health and the environment. and development of analytical methods and surrogates to determine potential environmental and public health impacts.~~
- 10.1.2. Agencies should employ source control and/or pollution prevention programs to minimize the likelihood of CECs impacting human health and the environment by means of source control and/or pollution prevention programs.

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(4) Regulating most CECs will require significant work to develop test methods and more specific determinations as to how and at what level CECs impact public health or our environment.

10.1.3. Additional research to improve analytical methods and screening tools, increase the availability of toxicological studies, and improve our understanding of prevalence and persistence of CECs in water will assist in the State Water Board in identifying CECs with the greatest potential to be of toxicological relevance to human health and the environment.

10.2. b. *Research Program*

10.2.1. (1) The State Water Board, in consultation with CDPH, shall convened a “blue ribbon” Science Advisory Panel every five years to guide future actions relating to CECs.

10.2.2. (a) The Panel was actively managed by the State Water Board and was shall be composed of members representing the following areas of expertise: one human health toxicologist, one environmental toxicologist, one epidemiologist, one biochemistry, one civil engineering (particularly familiar with the design and construction of recycled water treatment facilities), and one analytical chemistry (particularly familiar with the design and operation of advanced laboratory methods for the detection of CECs emerging constituents), and human health pathology (particularly expertise on antibiotic resistant bacteria and antibiotic resistance genes). Each of these panelists shall have had extensive experience as a principal investigator in their respective areas of expertise.

10.2.3. (b) The panel will review the scientific literature and submitted a report to the State Water Board and CDPH that describesd the current state of scientific knowledge regarding the risks of CECs to public health and the environment. In December 2010, the State Water Board, in coordination with CDPH, held a public hearing to hear a presentation on the report and to receive comments from stakeholders.

(c) The State Water Board considered the panel report and the comments received and adopted an amendment to the Policy establishing monitoring requirements for CECs in recycled water. These monitoring requirements are prescribed in Attachment A.

(2) The panel or a similarly constituted panel shall update the report every five years. The next update is due in June 2015.

10.2.4. (a) Each updated report shall recommend actions that the State of California should take to improve our understanding of CECs and, as may be appropriate, to protect public human health and the environment.

10.2.5. (b) The updated Each reports shall answer at minimum address the following question~~s~~topics:

10.2.5.1. What are The appropriate constituents to be monitored in recycled water, including analytical methods and method detection reporting limits?

10.2.5.2. What is The known toxicological information for the above constituents and persistence through treatment systems?

10.2.5.3. Would Any change to the above constituents lists change based on level of treatment and uses specified in Title 22 and for reservoir augmentation? If so, how?

10.2.5.4. What are possible The indicators or surrogates that can be used to represent a suite of CECs?

10.2.5.5. What levels of CEC's The concentrations of CECs that should trigger enhanced monitoring of CEC's in recycled water, groundwater and/or surface waters?

10.2.5.6. Recommendations regarding antibiotic resistant bacteria and antibiotic resistance genes.

10.2.6. (e) Within six months from receipt of an updated report, the State Water Board shall hold a hearing to consider recommendations from staff and shall endorse the recommendations, as appropriate, after making any necessary modifications.

## **11. Maximizing consistency in permitting recycled water projects**

### **11.1. CEC permit provisions**

Permits for recycled water projects shall be consistent with any applicable CDPH recommendations to protect public health and the monitoring requirements prescribed in Attachment A.

### **11.2. Regional water board general orders**

To ensure consistent regulation of recycled water statewide, coverage under existing regional water board general orders for non-potable uses of recycled water will terminate on [one year from the effective date of this Policy] and, except for enforcement purposes, these orders will have no further force and effect. Regional water boards shall, where appropriate, transition enrollees from these orders to Order WQ 2016-0068-DDW or its successor before [one year from the effective date of this Policy].

### **11.3. Permit review**

By [three years from the effective date of this Policy],

- 11.3.1. The State Water Board shall review Title 22 engineering reports for recycled water permits issued prior to 2000 for consistency with all applicable regulations, including those related to recycled water contained in California Code of Regulations, title 17 and California Code of Regulations, title 22. If the Title 22 engineering report was never prepared or is inconsistent with applicable regulations, the State Water Board may require a new or updated Title 22 engineering report to be submitted for review and approval.
- 11.3.2. Regional water boards shall review all recycled water permits and shall identify any recycled water permits that are (1) inconsistent with this Policy, (2) inconsistent with an approved Title 22 engineering report pursuant to 11.3.1 or (3) inconsistent with the applicable regional water board basin plan.
- 11.3.3. Regional water boards shall update any permits and/or monitoring and reporting programs as identified in 11.3.2 and, if appropriate, enroll permittees in Order WQ 2016-0068-DDW or its successor.
- 11.3.4. The regional water boards shall prioritize updating orders, permits and/or monitoring and reporting programs that were issued prior to January 1, 2000 or are located in basins identified pursuant to 6.
- 11.3.5. Timelines consistent with a prioritized approach identified in a basin plan amendment based on an accepted salt and nutrient management plan pursuant to 6.2.3.3 will supersede the three-year timeline identified above.

*11. Incentives for the Use of Recycled Water*

a. *Funding*

~~The State Water Board will request CDWR to provide priority funding for projects that have major recycling components; particularly those that decrease demand on potable water supplies. The State Water Board will also request priority funding for stormwater recharge projects that augment local water supplies. The State Water Board shall promote the use of the State Revolving Fund (SRF) for water purveyor, stormwater agencies, and water recyclers to use for water reuse and stormwater use and recharge projects.~~

b. *Stormwater*

~~The State Water Board strongly encourages all water purveyors to provide financial incentives for water recycling and stormwater recharge and reuse projects. The State Water Board also encourages the Regional Water Boards to require less stringent monitoring and regulatory requirements~~

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~~for stormwater treatment and use projects than for projects involving untreated stormwater discharges.~~

**c. TMDLs**

~~Water recycling reduces mass loadings from municipal wastewater sources to impaired waters. As such, waste load allocations shall be assigned as appropriate by the Regional Water Boards in a manner that provides an incentive for greater water recycling.~~

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## ATTACHMENT A

### REQUIREMENTS FOR MONITORING CONSTITUENTS OF EMERGING CONCERN FOR RECYCLED WATER

The purpose of this attachment to the ~~Recycled Water Policy (Policy)~~ is to provide direction to the ~~Regional Water Quality Control Boards~~ (regional water boards) on monitoring requirements for constituents of emerging concern<sup>1</sup> (CECs) in ~~recycled municipal wastewater, herein referred to as “recycled water.”~~ The monitoring requirements and criteria for evaluating monitoring results in the ~~Policy~~ are based on recommendations from a Science Advisory Panel<sup>2</sup>.

The monitoring requirements in this attachment pertain only to the production and use of recycled water for groundwater recharge ~~reuse~~<sup>3</sup> by surface and subsurface application methods and reservoir water augmentation. The monitoring requirements apply to Recycled water producers, including entities that further treat or enhance the quality of recycled water supplied by municipal wastewater treatment facilities, and using recycled water for groundwater recharge or for reservoir water augmentation shall follow the monitoring requirements in this attachment.

Groundwater recharge by surface application is the controlled application of water to a spreading area for infiltration resulting in the recharge of a groundwater basin. Subsurface application is the controlled application of water to a groundwater basin or aquifer by a means other than surface application, such as direct injection through a well.

~~The California Department of Public Health (CDPH) shall be consulted for any additional monitoring requirements for recycled water use found necessary by CDPH to protect human health.~~

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<sup>1</sup> For this Policy, CECs are defined to be chemicals in personal care products, pharmaceuticals including antibiotics, antimicrobials; industrial, agricultural, and household chemicals; hormones; food additives; transformation products, inorganic constituents; and nanomaterials.

<sup>2</sup> The Science Advisory Panel was convened in accordance with provision 10.210.b. of the Policy. The panel's recommendations were presented in the report; [Monitoring Strategies for Chemicals Constituents of Emerging Concern \(CECs\) in Recycled Water – Recommendations of a Science Advisory Panel](#), dated April 2018/June 25, 2010.

<sup>3</sup> As used in this attachment, use of recycled water for groundwater recharge reuse has the same meaning as indirect potable reuse for groundwater recharge as defined in Water Code section 13561(c), where it is defined as the planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system.

## 1. CECs AND SURROGATES

Within this Policy, CECs of toxicological relevance to human health are referred to as “health-based CECs.”<sup>4</sup> CECs determined not to have human health relevance, but useful for monitoring treatment process effectiveness, are referred to as “performance indicator CECs.” A performance indicator CEC is an individual CEC used for evaluating a family of CECs with similar physicochemical or biodegradable characteristics. The removal of a performance indicator CEC through a treatment process provides an indication of removal of CECs with similar properties. A health-based CEC may also serve as a performance indicator CEC.

A surrogate is a measurable physical or chemical property, such as chlorine residual or electrical conductivity, that can be used to measure the effectiveness of trace organic compound removal by treatment process and/or provide an indication of a treatment process failure. A reverse osmosis (RO) treatment process, for example, is expected to substantially reduce the electrical conductivity of the recycled water being treated. This reduction in the level of the surrogate also provides an indication that inorganic and organic compounds, including CECs, are being removed.

Recycled water monitoring programs used for groundwater recharge reuse shall include monitoring for: (1) human health-based CECs; (2) performance indicator CECs; and (3) surrogates. The purpose of monitoring performance indicator CECs and surrogates is to assess the effectiveness of unit processes to remove CECs. For this policy for groundwater recharge reuse, unit processes that remove CECs include RO, advanced oxidation processes (AOPs), and soil aquifer treatment.<sup>5</sup> AOPs are treatment processes involving the use of oxidizing agents, such as hydrogen peroxide and ozone, combined with ultraviolet light irradiation. Soil aquifer treatment is a natural treatment process that removes CECs as water passes through soil, the vadose zone, and within an aquifer.

This Policy provides CEC monitoring requirements for recycled water which undergoes additional treatment by soil aquifer treatment or by RO followed by AOPs. CEC monitoring requirements for groundwater recharge reuse projects implementing treatment processes that provide control of CECs by processes other than soil aquifer treatment or RO/AOPs shall be established on a case-by-case basis by the State Water Board in consultation with CDPH.

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<sup>4</sup> Health-based CECs were determined through a screening process that was developed and conducted by the CEC Science Advisory Panel; [Monitoring Strategies for Chemicals of Emerging Concern \(CECs\) in Recycled Water—Recommendations of a Science Advisory Panel](#), dated June 25, 2010.

<sup>5</sup> For evaluating removal of CECs, the treatment zone for soil aquifer treatment is from the surface of the application area through the unsaturated zone to groundwater, including groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

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~~Monitoring of health-based CECs or performance indicator CECs is not required for recycled water used for landscape irrigation due to the low risk for ingestion of the water.~~<sup>6</sup>

### **1.1. CECs for Monitoring Programs**

~~This Policy provides requirements for monitoring CECs in recycled water used for groundwater recharge reuse. The regional water boards shall not issue requirements for monitoring of additional CECs in recycled water beyond the requirements provided in this Policy except when recommended by the State Water Board CDPH or requested by the recycled water project proponent or recycled water producer.~~

~~CEC monitoring requirements for groundwater recharge projects implementing treatment processes that provide control of CECs by processes other than soil aquifer treatment or reverse osmosis/advanced oxidation processes (RO/AOPs) shall be established on a case-by-case basis by the State Water Board. CEC monitoring requirements for reservoir water augmentation projects implementing treatment processes that provide control of CECs by processes other than RO/AOPs shall be established on a case-by-case basis by the State Water Board.~~

~~Monitoring results required by this Policy shall be electronically reported to a database identified by the State Water Board.~~

~~Table 1 provides the health-based CECs and performance indicator CECs to be monitored along with their respective reporting limits. All CECs listed for a recycled water application shall be monitored during an initial assessment monitoring phase, as described in Section 3.1. Based on monitoring results and findings, the list of performance indicator CECs required for monitoring may be refined for subsequent monitoring phases. The health-based CECs listed in Table 1 shall be monitored during the entirety of the initial assessment and baseline monitoring phases (Sections 3.1 and 3.2). Based on the results of the baseline monitoring phase and/or subsequent monitoring, the list of health-based CECs required for monitoring may be revised. The method for evaluation of monitoring results for health-based CECs is provided in Section 4.2.~~

## **1 QUALITY ASSURANCE AND QUALITY CONTROL**

~~This section is to ensure laboratories conducting CEC monitoring generate data of known, consistent, and documented quality and to verify that the laboratory can meet~~

<sup>6</sup> “For monitoring programs to assess CEC threats for urban irrigation reuse, none of the chemicals for which measurement methods and exposure data are available exceeded the threshold for monitoring priority. This is largely attributable to higher Monitoring Trigger Levels (MTLs), because of reduced water ingestion in a landscape irrigation setting compared to drinking water.” MTLs are health-based screening level values for CECs for a particular water reuse scenario. MTLs were established in, [Monitoring Strategies for Chemicals of Emerging Concern \(CECs\) in Recycled Water—Recommendations of a Science Advisory Panel](#), dated June 25, 2010.

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the required reporting limits. Quality assurance and quality control measures shall be used for both collection of samples and laboratory analysis work. The recycled water project proponent or recycled water producer shall develop a quality assurance project plan that is consistent with this Policy includes the appropriate number of field blanks, laboratory blanks, replicate samples, and matrix spikes. The quality assurance project plan shall be submitted to and approved by the regional water board prior to beginning any sampling and analysis.

### **Quality Management Systems**

The recycled water project proponent or recycled water producer shall confirm and be able to produce documentation that a laboratory used to perform analysis of CECs required under this Policy has a laboratory quality management system in place that meets the requirements described in 1.1.1 or 1.1.2 below. The requirements in 1.1.1 and 1.1.2 describe equivalent quality management systems. The recycled water project proponent or recycled water producer shall make such documentation available if requested by the State Water Board or regional water board. A laboratory must comply with the requirements of either 1.1.1 or 1.1.2:

Comply with the management and technical requirements applicable to their operations in accordance with The National Environmental Laboratory Accreditation Conference Institute (TNI) 2016 Standard Volume 1, Module 2 – 7, with the following exceptions:

Volume 1, Module 2, Section 4.1.7.2(f) – Technical Manager Qualifications; and

Volume 1, Module 2, Section 5.2.6 – Additional Personnel Requirements.

Develop and implement a quality assurance program to ensure the reliability and validity of the analytical or bioanalytical data produced by the laboratory. As evidence of such a program, the laboratory shall develop and maintain a quality manual.

The quality manual shall address all quality assurance and quality control practices to be employed by the laboratory and shall, at least, include the quality assurance and quality control requirements specified for the CECs and bioanalytical test methods. The quality manual shall include the following elements: laboratory organization and personnel responsibilities; quality assurance objectives for measurement data; sampling procedures (when the laboratory performs the sampling); custody, handling, and disposal of samples; calibration procedures and frequency; analytical procedures; acquisition and reduction, validation and reporting of data; internal quality control checks; performance and system audits; preventive maintenance; assessment of precision and accuracy; corrective action; and quality assurance reports.

The laboratory's technical manager shall review, and amend if necessary, the quality assurance program and quality manual at least annually. The technical manager shall also review and amend the quality assurance program and manual whenever there are changes in methods or laboratory equipment employed, in the laboratory structure or physical arrangements, or changes in the laboratory organization.

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A laboratory shall maintain records of the implementation of its quality assurance program, and provide those records upon request of the State Water Board or the regional water board. Records shall be maintained for a minimum of five years.

## **Chemistry Analyses**

### **Selection of Analytical Chemistry Methods**

Analytical chemistry methods for laboratory analysis of CECs shall be selected to achieve the reporting limits presented in Table 1. The State Water Board views the use of drinking water methods as most appropriate, since they are generally more sensitive than wastewater methods. However, this may not always be possible, since there may be characteristics of recycled water (e.g., high total dissolved solids) that may make the use of drinking water methods impractical. A laboratory providing analysis of CECs shall be accredited by the Environmental Laboratory Accreditation Program (ELAP) for whichever method is selected based on (1)-(4) below, if such accreditation is available at the time that monitoring is required to begin. Any modifications to the methods shall be submitted to the State Water Board for review and subsequently submitted to the regional water board in an updated quality assurance project plan.

Analytical chemistry methods shall be selected in the following hierarchical order:

- (1) Use USEPA-approved methods, if available. If more than a single USEPA-approved method is available, consult with the State Water Board to determine the appropriate USEPA-approved method. If these methods are unavailable;
- (2) Use Standard Methods, if available. If more than a single Standard Method is available, consult with the State Water Board to determine the appropriate Standard Method. If these methods are unavailable;
- (3) Use methods required by the State Water Board for state-only drinking water standards or for identifying chemicals having notification levels. If these methods are unavailable;
- (4) Use a method from the scientific literature (e.g., peer-reviewed journals). If more than one method is available, consult with State Water Board to determine an appropriate method.

### **Analytical chemistry data submission**

Method detection limit studies and reporting limit verification data shall be submitted to the State Water Board for review and approval prior to beginning any sampling and analysis to ensure that the data meets the required reporting limits in Table 1. Percent recoveries and acceptable recovery ranges for each analyte shall be reported to the regional water board with each data set.

## **Bioanalytical Screening Tools**

### **Selection of Bioanalytical Screening Tool Methods**

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Bioanalytical screening tool methods shall be selected to achieve the reporting limits presented in Table 2. A laboratory providing analysis for bioanalytical screening tools shall be accredited by ELAP for whichever method is selected based on (1) or (2) below, if such accreditation is available at the time that monitoring is required to begin. Any modifications to the methods shall be submitted to the State Water Board for review and subsequently submitted to the regional water board in an updated quality assurance project plan.

Bioanalytical screening tool methods shall be selected in the following hierarchical order:

- (1) Use USEPA methods, if available. If more than a single USEPA-approved method is available, consult with the State Water Board to determine the appropriate USEPA-approved method. If these methods are unavailable:
- (2) Consult with the State Water Board to determine an appropriate method.

**Bioanalytical screening tool data submission**

Method detection limit studies and reporting limit verification data shall be submitted to the State Water Board for review and approval prior to beginning any sampling and analysis to ensure that the data meets the required reporting limits in Table 2.

**CEC MONITORING REQUIREMENTS**

**Health-based CECs and Performance Indicator CECs**

Table 1 provides the monitoring requirements and reporting limits for the health-based CECs and performance indicator CECs for groundwater recharge and reservoir water augmentation.

All CECs listed for a recycled water application shall be monitored during an initial assessment monitoring phase, as described in 4.1 of Attachment A. Based on monitoring results and findings, the regional water board may refine the required list of performance indicator CECs for subsequent monitoring phases.

The health-based CECs listed in Table 1 shall be monitored during the entirety of the initial assessment and baseline monitoring phases (4.1 and 4.2 of Attachment A). Based on the results of the baseline monitoring phase and/or subsequent monitoring, the regional water board may refine the required list of health-based CECs. The method for evaluating monitoring results for health-based CECs is provided in 5.2 of Attachment A.

Table 1: Health-based CECs and performance indicator CECs Table 1 – CECs to be Monitored

Constituent	Constituent Group	Relevance/Indicator Type	Reporting Limit ( $\mu\text{g/L}$ )
GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION			

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17 $\beta$ -estradiol	Steroid hormones	Health	0.004
Caffeine	Stimulant	Health & Performance	0.05
<u>1,4-Dioxane</u>	<u>Industrial chemical</u>	<u>Health</u>	<u>0.1</u>
N-Nitrosodimethylamine (NDMA)	Disinfection byproduct	Health	0.002
<u>N-Nitrosomorpholine (NMOR)</u>	<u>Industrial chemical</u>	<u>Health</u>	<u>0.002</u>
Triclosan	Antimicrobial	Health	0.05
Gemfibrozil	Pharmaceutical	Performance	0.01
Iohexol	Pharmaceutical	Performance	0.05
Iopromide	Pharmaceutical	Performance	0.05
N,N-Diethyl-metatoluamide (DEET)	Personal care product	Performance	0.05
Sucralose	Food additive	Performance	0.1
Sulfamethoxazole	Antibiotic	Performance	0.01

**RESERVOIR WATER AUGMENTATION AND GROUNDWATER RECHARGE  
REUSE - SUBSURFACE APPLICATION**

17 $\beta$ -estradiol	Steroid hormones	Health	0.004
Caffeine	Stimulant	Health & Performance	0.05
<u>1,4-Dioxane</u>	<u>Industrial chemical</u>	<u>Health</u>	<u>0.1</u>
NDMA	Disinfection byproduct	Health & Performance	0.002
<u>NMOR</u>	<u>Industrial chemical</u>	<u>Health</u>	<u>0.002</u>
Triclosan	Antimicrobial	Health	0.05
DEET	Personal care product	Performance	0.05
Sucralose	Food additive	Performance	0.1
Sulfamethoxazole	Antibiotic	Performance	0.01

µg/L – Micrograms per liter

Analytical methods for laboratory analysis of CECs shall be selected to achieve the reporting limits presented in Table 1. The analytical methods shall be based on methods published by the United States Environmental Protection Agency, methods certified by CDPH, or peer reviewed and published methods that have been reviewed by CDPH, including those published by voluntary consensus standards bodies such as the Standards Methods Committee and the American Society for Testing and Materials International. Any modifications to the published or certified methods shall be reviewed by CDPH and subsequently submitted to the Regional Water Board in an updated quality assurance project plan.

## **1.2. Surrogates for CECs Monitoring Programs**

Table 2 presents a list of surrogates that shall be considered for monitoring treatment of recycled water used for groundwater recharge reuse and reservoir water augmentation. Other surrogates not listed in Table 2 may also be considered.

The recycled water project proponent or recycled water producer shall propose develop surrogates to monitor on a case-by-case basis appropriate for the treatment process or processes, in consultation with the regional water board. The regional water board shall review and approve the selected surrogates in consultation with the State Water Board CDPH.

Where applicable, surrogates may be measured using on-line or hand-held instruments provided that instrument calibration procedures are implemented in accordance with the manufacturer's specifications and that calibration is documented.

*Table 2: Surrogates for CECs*

GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION
Ammonia
<u>Total Dissolved Organic Carbon (TDOC)</u>
Nitrate
<u>Total fluorescence</u>
<u>Ultraviolet (UV) Light Absorbance</u>
RESERVOIR WATER AUGMENTATION AND GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION
Electrical Conductivity
<u>TDOC</u>
<u>UV Light Absorbance</u>

## **Bioanalytical Screening Tools for CECs**

Table 3 provides the required bioanalytical screening tools and reporting limits for groundwater recharge and reservoir water augmentation. All bioanalytical screening tools listed in Table 3 shall be used in monitoring during an initial assessment monitoring phase, as described in 4.1 of Attachment A. The bioanalytical screening tools listed in Table 3 shall be used in monitoring during the entirety of the initial assessment and baseline monitoring phases (4.1 and 4.2 of Attachment A). Based on the results of the baseline monitoring phase and/or subsequent monitoring, the regional water board may revise the frequency of monitoring with bioanalytical screening tools. The method for evaluating bioanalytical screening tool monitoring results is provided in 5.3 of Attachment A.

*Table 3: Bioanalytical screening tools for CECs*

<u>Endpoint Activity</u>	<u>Relevant CECs</u>	<u>Adverse effect</u>	<u>Reporting Limit (ng/L)</u>
<u>RESERVOIR WATER AUGMENTATION AND GROUNDWATER RECHARGE – SURFACE AND SUBSURFACE APPLICATION</u>			
<u>Estrogen receptor-α (ER-α)</u>	<u>Estradiol, bisphenol A, nonylphenol</u>	<u>Feminization, impaired reproduction, cancer</u>	<u>0.5</u>
<u>Aryl hydrocarbon receptor (AhR)</u>	<u>Dioxin-like chemicals, polycyclic aromatic hydrocarbons, pesticides</u>	<u>Cancer, impaired reproduction</u>	<u>0.5</u>

## **2. MONITORING LOCATIONS**

Monitoring locations for the CEC Monitoring Requirements in Section 2-s and surrogates are described in this section and are presented in Table 4, Table 5, and Table 6.

### **2.1. Health-Based CEC Monitoring Locations**

#### **2.1.1. Groundwater Recharge Reuse - Surface Application**

For groundwater recharge reuse projects implementing surface application of recycled water, health-based CECs, performance indicator CECs, surrogates and bioanalytical screening tools shall be monitored at these locations:

(1) Following tertiary treatment<sup>7</sup> prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with the State Water Board~~CDPH~~ within the distance groundwater travels downgradient from the application site in 30 days.

~~Monitoring locations for health-based CECs for the phases of monitoring are presented in Tables 3 through 5.~~

### **2.1.2. Groundwater Recharge Reuse - Subsurface Application**

#### **Monitoring Locations for Health-Based CECs and Bioanalytical Screening Tools**

For groundwater recharge ~~reuse~~ projects implementing subsurface application of recycled water, health-based CECs and bioanalytical screening tools shall be monitored at a location following treatment prior to release into ~~an~~the aquifer.

#### **2.2. Monitoring Locations for Performance Indicator CECs and Surrogates**

##### **Monitoring Locations**

~~To allow evaluation of individual unit processes or a combination of unit processes that provide removal of CECs, performance indicator CECs and surrogates shall be monitored at the locations described below and presented in Tables 3 through 5.~~

##### **2.2.1. Groundwater Recharge Reuse – Surface Application**

~~For groundwater recharge reuse projects using surface application of recycled water, performance indicator CECs and surrogates shall be monitored at these locations:~~

(1) Following tertiary treatment prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels downgradient from the application site in 30 days.

~~Monitoring locations for performance indicator CECs and surrogates for the phases of monitoring are presented in Tables 3 through 5.~~

##### **2.2.2. Groundwater Recharge Reuse – Subsurface Application**

For groundwater recharge ~~reuse~~ projects using subsurface application of recycled water, performance indicator CECs shall be monitored in recycled water at these locations:

(1) Prior to treatment by RO; and

(2) Following treatment prior to release into the aquifer.

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<sup>7</sup> Standards for disinfected tertiary recycled water presented in California Code of Regulations, Title 22, section 60301.230 and 60301.320.

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If the recycled water project proponent or recycled water producer can demonstrate that the RO unit will not substantially remove a CEC, the regional water board may allow monitoring for that CEC prior to the AOPs, instead of prior to the RO unit.

For groundwater recharge ~~reuse~~ projects using subsurface application of recycled water, surrogates shall be monitored at locations proposed by the project proponent or recycled water producer and approved by the regional water board in consultation with the State Water Board~~CDPH~~.

### **Reservoir Water Augmentation**

#### **Monitoring Locations for Health-Based CECs and Bioanalytical Screening Tools**

For reservoir water augmentation projects, health-based CECs and bioanalytical screening tools shall be monitored at a location following treatment prior to release into the surface water reservoir.

#### **Monitoring Locations for Performance Indicator CECs and Surrogates**

For reservoir water augmentation projects, performance indicator CECs shall be monitored in recycled water at these locations:

(1) Prior to treatment by RO; and

(2) Following treatment prior to release into the surface water reservoir.

If the recycled water project proponent or producer can demonstrate that the RO unit will not substantially remove a CEC, the regional water board may allow monitoring for that CEC prior to the AOPs, instead of prior to the RO unit. For reservoir water augmentation projects, surrogates shall be monitored at locations proposed by the recycled water project proponent or producer and approved by the regional water board in consultation with the State Water Board.

## **3. PHASED MONITORING REQUIREMENTS**

The regional water board shall phase the monitoring requirements for CECs, and surrogates, and bioanalytical screening tools for groundwater recharge ~~reuse and reservoir water augmentation~~ projects. The purpose of phased monitoring is to allow monitoring requirements for health-based CECs, performance indicator CECs and surrogates, and bioanalytical screening tools to be refined based on the monitoring results and findings of the previous phase. An initial assessment monitoring phase, followed by a baseline monitoring phase, shall be conducted to determine the project-specific monitoring requirements for standard operations. The initial assessment and baseline monitoring phases shall be conducted after State Water Board~~CDPH~~ approval for groundwater recharge ~~reuse project operation or reservoir water augmentation~~ project's Title 22 Engineering Report.

### **3.1. Initial Assessment Monitoring Phase**

The purposes of the initial assessment phase are to: (1) identify the occurrence of health-based CECs, performance indicator CECs, and surrogates in recycled water and

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groundwater;<sup>8</sup> (2) determine treatment effectiveness; (3) define the project-specific performance indicator CECs and surrogates to monitor during the baseline phase; and (4) specify the expected removal percentages for performance indicator CECs and surrogates; and (5) determine whether bioactivity for ER- $\alpha$  and AhR bioassays are below their respective action levels. The monitoring requirements for the initial assessment monitoring phase shall apply to the start-up of new facilities, piloting of new unit processes at existing facilities, and existing facilities where CECs, and surrogates, and bioanalytical screening tools have not been assessed equivalent to the requirements of this Policy. Data from prior assessment need not replicate the exact frequency and duration of the initial assessment phase requirements specified in Table 43, if the overall robustness and size of the data are sufficient to adequately characterize the CECs, surrogates, bioactivity, and treatment performance. The initial assessment monitoring phase shall be conducted for a period of one year.

During the initial assessment monitoring phase for the applicable recycled water application method, each of the health-based CECs and performance indicator CECs listed in Table 1 and appropriate surrogates (see Section 12.2 of Attachment A) shall be monitored, as well as the bioanalytical screening tools. Surrogates shall be selected to monitor individual unit processes or combinations of unit processes that remove CECs. Performance indicator CEC and surrogate monitoring results that demonstrate measurable removal for a given unit process shall be candidates for use in the monitoring programs for the baseline and standard operation phases. Monitoring requirements for the initial assessment phase are summarized in Table 43.

For existing groundwater recharge reuse projects in operation prior to 2013, historic monitoring data may be used to assess the occurrence and removal of CECs and surrogates. Existing projects demonstrating prior assessment of CECs and surrogates equivalent to the initial assessment phase requirements of this Policy may skip the initial monitoring phase and initiate the baseline monitoring phase requirements in Section 34.2 of Attachment A. Existing projects shall conduct bioanalytical monitoring according to the frequency specified in Table 4.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern, such as finding a concentration of a health-based CEC above the thresholds described in Table 7, more frequent monitoring may be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operations. If additional monitoring is required, the regional water board shall consult with the State Water BoardCDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on the monitoring results are presented in Section 45 of Attachment A.

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<sup>8</sup> The identification of the occurrence of health-based CECs, performance indicator CECs, and surrogates in groundwater only applies to groundwater recharge reuse by surface application.

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Following completion of the initial assessment monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the baseline monitoring phase shall be determined on a project-specific basis.

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*Table 43: Initial Assessment Phase Monitoring Requirements*

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse - Surface Application	Health-Based CECs and Performance Indicator CECs: All listed in Table 1.	Quarterly <sup>1</sup>	<ul style="list-style-type: none"> <li>- Following tertiary treatment prior to application to surface spreading area.</li> <li>- At monitoring well locations designated in consultation with the State Water Board CDPH.<sup>2</sup></li> </ul>
	Surrogates: To be selected on a project-specific basis (see 2.2), considering those listed in Table 2. <sup>5</sup>	1 <sup>st</sup> 3 months: To be determined on a project-specific basis. <sup>3</sup>	<ul style="list-style-type: none"> <li>- Following tertiary treatment prior to application to the surface spreading area.</li> <li>- At monitoring well locations designated in consultation with the State Water Board CDPH.<sup>2</sup></li> </ul>
		3-12 months: To be determined on a project-specific basis. <sup>3</sup>	<ul style="list-style-type: none"> <li>- Following tertiary treatment prior to application to the surface spreading area.</li> <li>- At monitoring well locations designated in consultation with the State Water Board CDPH.<sup>2</sup></li> </ul>
	Bioanalytical Screening Tools: All listed in Table 2.	Quarterly <sup>1</sup>	<ul style="list-style-type: none"> <li>- Following tertiary treatment prior to application to surface spreading area.</li> <li>- At monitoring well locations designated in consultation with the State Water Board.<sup>2</sup></li> </ul>
Reservoir Water Augmentation and Groundwater Recharge Reuse - Subsurface Application	Health-Based CECs: All listed in Table 1.	Quarterly <sup>1</sup>	Following treatment prior to release to the aquifer or surface water reservoir.
	Performance Indicator CECs: All listed in Table 1.	Quarterly <sup>1</sup>	<ul style="list-style-type: none"> <li>- Prior to RO treatment.<sup>4</sup></li> <li>- Following treatment prior to release to the aquifer or surface water reservoir.</li> </ul>
	Surrogates: To be selected on a project-specific basis (see 2.2), considering those listed in Table 2. <sup>5</sup>	To be determined on a project-specific basis.	<ul style="list-style-type: none"> <li>- At locations approved by the regional water board.<sup>65</sup></li> </ul>
	Bioanalytical Screening Tools: All listed in Table 2.	Quarterly <sup>1</sup>	Following treatment prior to release to the aquifer or surface water reservoir.

<sup>1</sup> —This is the initial monitoring frequency for the monitoring and reporting program. The regional water board may require additional monitoring to respond to a concern as stated in Section 34.1 of Attachment A.

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<sup>2</sup> —Groundwater within the distance groundwater travels downgradient from the application site in 30-days.

<sup>3</sup> —The monitoring frequency shall be determined by the regional water board in consultation with the State Water Board~~CDPH~~. The intent is to have an increased monitoring frequency during the first three months and a decreased monitoring frequency after three months.

<sup>4</sup> —If the recycled water project proponent or producer can demonstrate that the RO unit will not substantially remove a CEC, the regional water board may allow monitoring for that CEC prior to the AOP, instead of prior to the RO unit.

<sup>5</sup> —See Section 1.2 for guidance on selection of surrogates.

<sup>6</sup> —See Section 23.2.2 of Attachment A for information on surrogate monitoring locations for subsurface application and 3.3.2 of Attachment A for reservoir water augmentation.

### **3.2. Baseline Monitoring Phase**

Based on the findings of the initial assessment monitoring phase, project-specific performance indicator CECs and surrogates shall be selected for monitoring during the baseline monitoring phase. The purpose of the baseline monitoring phase is to assess and refine which health-based CECs, performance indicator CECs, and surrogates, and bioanalytical screening tools are appropriate to monitor the removal of CECs and treatment system performance for the standard operation of a facility. Performance indicator CECs and surrogates that exhibited reduction by unit processes and/or provided an indication of operational performance shall be selected for monitoring during the baseline monitoring phase. Surrogates not reduced through a unit process are not good indicators of the unit's intended performance. For example, soil aquifer treatment may not effectively lower electrical conductivity. Therefore, electrical conductivity may not be a good surrogate for soil aquifer treatment. The baseline monitoring phase shall be conducted for a period of three years following the initial assessment monitoring phase. Monitoring requirements for the baseline phase are summarized in Table 54. If a performance indicator CEC listed in Table 1 is found not to be a good indicator, the recycled water producer shall propose an alternative performance indicator CEC representative of the constituent group to monitor. This performance indicator CEC shall be subject to approval by the regional water board in consultation with the State Water BoardCDPH.

For existing groundwater recharge reuse projects in operation prior to 2013, historic monitoring data may be used to assess removal of health-based CECs, performance indicator CECs and surrogates. Existing pProjects in operation prior to 2013 that can demonstrate prior assessment of CECs and surrogates equivalent to the initial assessment phase and baseline phase requirements of this Policy may be eligible for the standard operation monitoring requirements.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern, such as finding a concentration of a health-based CEC above the thresholds described in Table 7, more frequent monitoring may be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operation. If additional monitoring is required, the regional water board shall consult with the State Water BoardCDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on the monitoring results are presented in Section 45 of Attachment A.

Following the baseline operation monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the standard operation of a project shall be determined on a project-specific basis consistent with 4.3 of Attachment A.

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*Table 54: Baseline Phase Monitoring Requirements*

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse – Surface Application	Health-Based CECs: All listed in Table 1.  Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually <sup>1</sup>	- Following tertiary treatment prior to application to the surface spreading area.  - At monitoring well locations designated in consultation with the State Water BoardCDPH. <sup>2</sup>
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase.	- Following tertiary treatment prior to application to the surface spreading area.  - At monitoring well locations designated in consultation with the State Water BoardCDPH. <sup>2</sup>
	Bioanalytical Screening Tools: All listed in Table 2.	Semi-Annually <sup>1</sup>	- Following tertiary treatment prior to application to the surface spreading area.  - At monitoring well locations designated in consultation with the State Water Board. <sup>2</sup>
Reservoir Water Augmentation and Groundwater Recharge Reuse – Subsurface Application	Health-Based CECs: All listed in Table 1.	Semi-Annually <sup>1</sup>	Following treatment prior to release to the aquifer or surface water reservoir.
	Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually <sup>1</sup>	- Prior to RO treatment. <sup>3</sup>  - Following treatment prior to release to the aquifer or surface water reservoir.
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase.	- At locations approved by the regional water board. <sup>4</sup>
	Bioanalytical Screening Tools: All listed in Table 2.	Semi-Annually <sup>1</sup>	Following treatment prior to release to the aquifer or surface water reservoir.

<sup>1</sup>—More frequent monitoring may be required to respond to a concern as stated in Section 34.2 of Attachment A.

<sup>2</sup>—Groundwater within the distance groundwater travels downgradient from the application site in 30-days.

<sup>3</sup>—If the recycled water producer project proponent can demonstrate that the RO unit will not substantially remove a CEC, the regional water board may allow monitoring for that CEC prior to the AOP, instead of prior to the RO unit.

<sup>4</sup>—See Section 23.2.2 of Attachment A for information on surrogate monitoring locations for subsurface application and 3.3.2 of Attachment A for reservoir water augmentation.

### **3.3. Standard Operation Monitoring Phase**

Based on the findings of the baseline monitoring phase, monitoring requirements for health-based CECs, performance indicator CECs, and surrogates, and bioanalytical screening tools may be refined to establish project-specific requirements for monitoring the standard operating conditions of a groundwater recharge reuse or reservoir water augmentation project. Monitoring requirements for the standard operation phase are summarized in Table 65. The list of health-based CECs may be revised to remove a health-based CEC from the list if monitoring results meet the conditions of the minimum threshold level presented in Table 87. Performance indicator CECs and surrogates that exhibited reduction by a unit process and/or provided an indication of operational performance shall be selected for monitoring of standard operations. If a performance indicator CEC is found to be a poor indicator, the recycled water producer project proponent shall propose an alternative performance indicator CEC representative of the constituent group to monitor. This performance indicator CEC shall be subject to approval by the regional water board in consultation with the State Water BoardCDPH. The list of bioanalytical screening tools may be revised to remove a bioanalytical screening tool from the list if monitoring results meet the conditions of the minimum threshold level presented in Table 4.

Monitoring locations for the standard operation phase shall be the same as the locations used for the baseline monitoring phase.

Monitoring for health-based CECs, and performance indicator CECs, and with bioanalytical screening tools shall be conducted on a semi-annual basis, unless the project demonstrates consistency in treatment effectiveness in removal of CECs, treatment operational performance, and appropriate recycled water quality. These projects may be monitored for CECs and with bioanalytical screening tools on an annual basis. Monitoring frequencies for CECs and surrogates for standard operation monitoring are presented in Table 65.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern, such as finding a health-based CEC above the thresholds described in Table 7 or a decline in removal of a performance indicator CEC from the performance levels established during the initial and baseline monitoring phases, more frequent monitoring may be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operation. If additional monitoring is required, the regional water board shall consult with the State Water BoardCDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on the monitoring results are presented in Section 45 of Attachment A.

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**Table 65: Standard Operation Monitoring Requirements**

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse -Surface Application	Health-Based CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually <sup>1</sup>	- Following tertiary treatment prior to application to the surface spreading area.  - At monitoring well locations designated in consultation with the State Water BoardCDPH. <sup>2</sup>
	Performance Indicator CECs: Selected based on the findings of the baseline phase.		
	Surrogates: Selected based on the findings of the baseline phase.	Based on findings of the baseline assessment phase.	- Following tertiary treatment prior to application to the surface spreading area.  - At monitoring well locations designated in consultation with the State Water BoardCDPH. <sup>2</sup>
	<u>Bioanalytical Screening Tools:</u> <u>Selected based on the findings of the baseline phase.</u>	<u>Semi-Annually<sup>1</sup></u>	<u>- Following tertiary treatment prior to application to the surface spreading area.</u>  <u>- At monitoring well locations designated in consultation with the State Water Board.<sup>2</sup></u>
Reservoir Water Augmentation and Groundwater Recharge Reuse -Subsurface Application	Health-Based CECs: Selected based on the findings of the baseline phase	Semi-Annually or Annually <sup>1</sup>	-Following RO/AOPs treatment prior to release to the aquifer or surface water reservoir.
	Performance Indicator CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually <sup>1</sup>	- Prior to RO treatment. <sup>3</sup>  - Following treatment prior to release to the aquifer or surface water reservoir.
	Surrogates: Selected based on the findings of the baseline phase, <sup>12</sup>	Based on findings of the baseline assessment phase.	At locations approved by the regional water board. <sup>4</sup>
	<u>Bioanalytical Screening Tools: Selected based on the findings of the baseline phase.</u>	<u>Semi-Annually<sup>1</sup></u>	<u>Following treatment prior to release to the aquifer or surface water reservoir.</u>

<sup>1</sup> —More frequent monitoring may be required to respond to a concern as stated in Section 34.3 of Attachment A.

<sup>2</sup> —Groundwater within the distance groundwater travels downgradient from the application site in 30-days.

<sup>3</sup> —If the recycled water producer project proponent can demonstrate that the RO unit will not substantially remove a CEC, the regional water board may allow monitoring for that CEC prior to the AOP, instead of prior to the RO unit.

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<sup>4</sup> —See Section 23.2.2 of Attachment A for information on surrogate monitoring locations for subsurface application and 3.3.2 of Attachment A for reservoir water augmentation.

#### **4. EVALUATION OF CEC, AND SURROGATE, AND BIOANALYTICAL SCREENING TOOL MONITORING RESULTS**

This section presents the approaches for evaluating treatment process performance and health-based CEC and bioanalytical screening tool monitoring results. Monitoring results for performance indicator CECs and surrogates shall be used to evaluate the operational performance of a treatment process and the effectiveness of a treatment process in removing CECs. For evaluation of health-based CEC and bioanalytical screening tool monitoring results, a multi-tiered approach of thresholds and corresponding response actions is presented in 5.2 and 5.3 of Attachment A, respectively Section 4.2. The evaluation of monitoring results shall be included in monitoring reports submitted to the regional water boardand CDPH.

##### **4.1 Evaluation of Performance Indicator CEC and Surrogate Results**

The effectiveness of a treatment process to remove CECs shall be evaluated by determining the removal percentages for performance indicator CECs and surrogates. The removal percentage is the difference in the concentration of a compound in recycled water prior to and after a treatment process (e.g., soil aquifer treatment or RO followed by AOPs), divided by the concentration prior to the treatment process and multiplied by 100.

$$\text{Removal Percentage} = ([X_{in} - X_{out}]/X_{in}) (100)$$

$X_{in}$  - Concentration in recycled water prior to a treatment process

$X_{out}$  - Concentration in recycled water after a treatment process

During the initial assessment, the recycled water project proponent or recycled water producer shall monitor performance to determine removal percentages for performance indicator CECs and surrogates. The removal percentages shall be confirmed during the baseline monitoring phase. One example of removal percentages from Drews et. al. (2008) for each application scenario and their associated processes (i.e., soil aquifer treatment or RO/AOPs) is presented in Table 76. The established removal percentages for each project shall be used to evaluate treatment effectiveness and operational performance.

###### ***4.1.1. Groundwater Recharge Reuse – Surface Application***

For groundwater recharge reuse by surface application, the removal percentage shall be determined by comparing the quality of the recycled water applied to a surface spreading area to the quality of groundwater at monitoring wells. The distance between the application site and the monitoring wells shall be no more than the distance the groundwater travels in 30 days downgradient from the application site. The location of the monitoring wells shall be designated by the regional water board in consultation with the State Water BoardCDPH. The removal percentage shall be adjusted to account for differences in concentrations due to dilution from potable water applied to the

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application site, storm-water applied to the application site, and native groundwater. The removal percentage shall also be adjusted to account for CECs in these waters. The recycled water project proponent or recycled water producer shall submit a proposal to the regional water board and the State Water Board<sup>CDPH</sup> as part of its operation plan on how it will perform this accounting.

#### **4.1.2 Groundwater Recharge Reuse – Subsurface Application**

For groundwater recharge ~~reuse~~ using subsurface application, the removal percentage shall be determined by comparing recycled water quality before treatment by RO/AOPs and after treatment prior to release into the aquifer.

#### **Reservoir Water Augmentation**

For reservoir water augmentation, the removal percentage shall be determined by comparing recycled water quality before treatment by RO/AOPs and after treatment prior to release into the surface water reservoir.

### **4.2 Evaluation of Health-Based CEC Results**

The recycled water project proponent or recycled water producer shall evaluate health-based CEC monitoring results. To determine the appropriate response actions, the recycled water project proponent or recycled water producer shall compare measured environmental concentrations (MECs) to their respective monitoring trigger levels<sup>9</sup> (MTLs) listed in Table 76 to determine MEC/MTL ratios. The recycled water project proponent or recycled water producer shall compare the calculated MEC/MTL ratios to the thresholds presented in Table 87 and shall implement the response actions corresponding to the threshold.

For surface application, the results shall be evaluated for groundwater collected from the monitoring wells. For subsurface application and reservoir water augmentation projects, results shall be evaluated for the recycled water released into the aquifer.

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<sup>9</sup> Monitoring Trigger Level (MTL): Health-based screening level value for a CEC for a particular water reuse scenario. Recommended MTLs were established in, [Monitoring Strategies for Chemicals Constituents of Emerging Concern \(CECs\) in Recycled Water – Recommendations of a Science Advisory Panel](#), dated April 6, 2018/June 25, 2010.

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*Table 76: Monitoring Trigger Levels and Example Removal Percentages*

Constituent/ Parameter	Relevance/Indicator Type/Surrogate	Monitoring Trigger Level (micrograms/liter) <sup>1</sup>	Example Removal Percentages (%) <sup>2</sup>
<b>GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION<sup>3</sup></b>			
17 $\beta$ -estradiol	Health	0.0009	-- <sup>4</sup>
Caffeine	Health & Performance	0.35	>90
1,4-Dioxane	Health	1	-- <sup>4</sup>
NDMA	Health	0.01	--
NMOR	Health	0.012	--
Triclosan	Health	0.35	--
Gemfibrozil	Performance	--	>90
Iohexol	Performance	--	>90
Iopromide	Performance	--	>90
DEET	Performance	--	>90
Sucralose	Performance	--	<25 <sup>5</sup>
Sulfamethoxazole	Performance	--	>30
Ammonia	Surrogate	--	>90
TDOC	Surrogate	--	>30
Nitrate	Surrogate	--	>30
Total fluorescence	Surrogate	--	>30
UV Absorbanceception	Surrogate	--	>30
<b>RESERVOIR WATER AUGMENTATION AND GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION<sup>6</sup></b>			
17 $\beta$ -estradiol	Health	0.0009	--
Caffeine	Health & Performance	0.35	>90
1,4-Dioxane	Health	1	--
NDMA	Health & Performance	0.01	25-50, >80 <sup>7</sup>
NMOR	Health	0.012	--
Triclosan	Health	0.35	--
DEET	Performance	--	>90
Sucralose	Performance	--	>90
Sulfamethoxazole	Performance	--	>90
Electrical Conductivity	Surrogate	--	>90
TDOC	Surrogate	--	>90
UV Absorbance	Surrogate	--	>50

1 – Recommended monitoring trigger levels for groundwater recharge reuse and reservoir water augmentation landscape irrigation applications were established in

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[Monitoring Strategies for Chemicals Constituents of Emerging Concern \(CECs\) in Recycled Water – Recommendations of a Science Advisory Panel](#), dated April 6, 2018~~June 25, 2010~~.

2 – The removal percentages presented in this table are from work by Drewes et al. (2008) and provide an example of performance for that specific research. Project specific removal percentages will be developed for each groundwater recharge reuse project during the initial and baseline monitoring phases.

3 – Treatment process: Soil aquifer treatment. The stated removal percentages are examples and need to be finalized during the initial and baseline monitoring phases for a given site.

4 – Not applicable

5 – Sucralose degrades poorly during soil aquifer treatment. It is included here mainly as a tracer.

6 – Treatment process: RO/AOP~~Reverse osmosis and advanced oxidation process~~.

7 – For treatment using RO~~reverse osmosis~~, removal percentage is between 25 and 50 percent. For treatment using RO/AOP~~reverse osmosis and advanced oxidation~~ processes, removal percentage is greater than 80 percent.

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*Table 87: MEC/MTL Thresholds and Response Actions*

MEC/MTL Threshold	Response Action
If greater than 75 percent of the MEC/MTL ratio results for a CEC are less than or equal to 0.1 during the baseline monitoring phase and/or subsequent monitoring -	A) After completion of the baseline monitoring phase, consider requesting removal of the CEC from the monitoring program.
If MEC/MTL ratio is greater than 0.1 and less than or equal to 1 -	B) Continue to monitor.
If MEC/MTL ratio is greater than 1 and less than or equal to 10 -	C) Check the data.  Continue to monitor.
If MEC/MTL ratio is greater than 10 and less than or equal to 100 -	D) <u>Check the data, Resample</u> immediately and analyze to confirm CEC result.  Continue to monitor.
If MEC/MTL ratio is greater than 100 -	E) <u>Check the data, Resample</u> immediately and analyze to confirm <u>CEC</u> result.  Continue to monitor.  Contact the regional water board and <u>the State Water Board</u> <del>CDPH</del> to discuss additional actions.  (Additional actions may include, but are not limited to, additional monitoring, toxicological studies, engineering removal studies, modification of facility operation, implementation of a source identification program, and monitoring at additional locations.)

### **Evaluation of Bioanalytical Screening Tool Results**

The recycled water project proponent or recycled water producer shall evaluate bioanalytical assay monitoring results. To determine the appropriate response actions, the recycled water project proponent or recycled water producer shall compare bioanalytical equivalent concentrations (BEQs) to their respective action levels (ALs) listed in Table 3 to determine BEQ/AL ratios. The recycled water project proponent or recycled water producer shall compare the calculated BEQ/AL ratios to the thresholds presented in Table 4 and shall implement the response actions corresponding to the threshold.

For groundwater recharge - surface application, the results shall be evaluated for groundwater collected from the monitoring wells. For groundwater recharge - subsurface application and reservoir water augmentation projects, results shall be evaluated for the recycled water following treatment prior to release to the aquifer or surface water reservoir.

*Table 2: Required Equivalency Agonists and Action Levels for Bioanalytical Screening Tools*

<u>Constituent/Parameter</u>	<u>Equivalency Agonist</u>	<u>Action Level (nanograms/liter)</u>
<u>Estrogen receptor-<math>\alpha</math> (ER-<math>\alpha</math>)</u>	<u>17-beta-estradiol</u>	<u>3.5</u>
<u>Aryl hydrocarbon receptor (AhR)</u>	<u>2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)</u>	<u>0.5</u>

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*Table 3: BEQ/AL Thresholds and Response Actions*

BEQ/AL Threshold	Response Action
If BEQ/AL ratio is consistently less than 0.1	A) Consider decreasing monitoring frequency or eliminating requirement for inclusion of endpoint
If BEQ/AL ratio is greater than 0.1 and less than or equal to 10	B) Continue to monitor.
If BEQ/AL ratio is greater than 10 and less than or equal to 1000	C) Check the data, resample immediately and analyze to confirm bioassay result.  Continue to monitor.  Contact the regional water board and State the Water Board to discuss additional actions.  (Additional actions may include, but are not limited to, targeted analytical chemistry monitoring, increased frequency of bioassay monitoring, and implementation of a source identification program.)
If BEQ/AL ratio is greater than 1000	D) Check the data, resample immediately and analyze to confirm bioassay result.  Continue to monitor.  Contact the regional water board and the State Water Board to discuss additional actions.  (Additional actions may include, but are not limited to, targeted and/or non-targeted analytical chemistry monitoring, increased frequency of bioassay monitoring, toxicological studies, engineering removal studies, modification of facility operation, implementation of a source identification program, and monitoring at additional locations.)