

Benefits & Impacts Survey: Decreased Influent Flows & Increased Constituent Concentrations for Wastewater Collection Systems

In 2018, the State of California passed legislation for “Making Conservation a Way of Life.” This required urban retail water suppliers to meet water budget targets based on efficient water use standards set in legislation and adopted by the State Water Resources Control Board.

In 2022, SB 1157 (Hertzberg) updated the indoor residential water use standard and directed the California Department of Water Resources (DWR), in coordination with the State Water Board, to evaluate indoor residential water use and quantify impacts of lower indoor residential water use standards on water supply, wastewater, and recycled water systems.

The indoor residential water use standard is one component of water-use that makes up an Urban Water Use Objective for each water supplier. Urban water suppliers must meet these targets by January 1, 2027.

We are a part of a multi-university team studying the benefits and impacts of the indoor standard to inform recommendations made by DWR and the State Water Board.

To support our study, this survey asks about the impact of decreasing influent flows and increased influent constituent concentrations on wastewater collection systems.

We greatly appreciate you helping us learn more about the impact of low influent flows on wastewater collection systems. This questionnaire should take no more than 10 minutes to complete. If you leave this site before completing the questionnaire, your answers will be automatically saved and appear in the questionnaire when you return to complete it. Responses to this survey will be aggregated and made anonymous. No information that can identify your agency or facility will be shared or reported outside the project team.

1 To begin, please tell us the name of your agency and the treatment facility your collection system drains to. If your system drains to multiple facilities please list them within the given text box separated by a semicolon (e.g. Facility A; Facility B; Facility C).

☐ Agency Name _____

☐ Facility Name(s) _____

2 As we proceed with our work, we will likely have follow-up questions and hope to continue to communicate with you. As such, please provide your name, email address, and telephone number.

☐ Contact Name _____

☐ Email Address _____

☐ Phone Number _____

3 Since 2011, has growth occurred in your service area that increased wastewater flows?

☐ Yes

☐ No

☐ Unsure

4 Since 2011, to what extent have increased flows associated with growth offset your flow reductions from conservation?

☐ Fully offset

☐ Partially offset

☐ Not at all offset

☐ Unsure

5 Since 2011, has your wastewater collection system experienced any challenges related to declining wastewater flows that required or will require operational changes or modifications to your system?

☐ Yes

☐ No

☐ Unsure

6 If an item listed below was not a challenge, mark “none”. For “major” or “minor”, we are interested in your general assessment. A challenge that was widespread or happened frequently or required significant changes in your workload/costs is “major”. A “minor” challenge is one that could not be ignored, but could be mostly handled as a normal part of your operations.

6.1 Challenges Since 2011 Involving Blockage and/or Overflows

	None	Minor	Major	Unsure
Solids accumulation/settling in the pipes	☐	☐	☐	☐
Root intrusion	☐	☐	☐	☐
Biological growth	☐	☐	☐	☐
Methane generation	☐	☐	☐	☐
Hydrogen Sulfide generation/Hydrogen Sulfide-related pipe corrosion	☐	☐	☐	☐
Other (please describe in the box below)	☐	☐	☐	☐

6.2 Challenges Since 2011 Involving Equipment and/or Physical Infrastructure

	None	Minor	Major	Unsure
Increased preventative maintenance	☐	☐	☐	☐
Solids accumulating in pumping facilities	☐	☐	☐	☐
Solids blocking or restricting pumps and valves	☐	☐	☐	☐
Increased corrosion of equipment (e.g., pumps, sensors)	☐	☐	☐	☐
Increased corrosion of structures (e.g. pipes, manholes)	☐	☐	☐	☐
Pipe fractures or breaks	☐	☐	☐	☐
More frequent equipment failures	☐	☐	☐	☐
More frequent equipment replacement	☐	☐	☐	☐
Other (please describe in the box below)	☐	☐	☐	☐

6.3 Challenges Since 2011 Regarding Operations

	None	Major	Minor	Unsure
Production of odorous gases	☐	☐	☐	☐
Production of methane or other gases (non-odor)	☐	☐	☐	☐
High mass loading events (i.e. surges in solids loading)	☐	☐	☐	☐
Restriction of pipe capacity (not enough to cause a blockage)	☐	☐	☐	☐
Increased power requirements or energy use including those related to additional potable water use	☐	☐	☐	☐
Compliance challenges (meeting limits)	☐	☐	☐	☐
Other (please describe in the box below)	☐	☐	☐	☐

7 What changes in equipment or capital infrastructure, if any, did you take or plan to take to address the challenges? Select all that apply.

☐

Monitoring

☐

Chemical injection

☐

Pumping

☐

Manholes

☐

Pipes

☐

Structures

☐

Other (please describe in the box below)

8 What changes in operations and maintenance did you take or plan to take to address the challenges? Select all that apply.

- ☐ Used more labor – increased hours, additional staff, more hours of contracted cleaning services
 - ☐ Employed more outside technical help (engineering consultants or specialized services)
 - ☐ Increased frequency of inspections
 - ☐ Increased frequency of preventative clean-outs (i.e., sewer flushing, pipe routing)
 - ☐ Purchased more or different chemicals
 - ☐ Other (please describe in the box below)
-

9 Please provide an estimate of the percentage (%) increase in costs your agency incurred associated with the above adjustments/modifications.

	None	1-5%	5-10%	10-20%	More than 20%	Unsure
Energy	☐	☐	☐	☐	☐	☐
Labor	☐	☐	☐	☐	☐	☐
Chemicals/potable water/other inputs	☐	☐	☐	☐	☐	☐
New equipment to perform work	☐	☐	☐	☐	☐	☐
Existing equipment/facilities maintenance	☐	☐	☐	☐	☐	☐
New technology to solve or address problems/challenges	☐	☐	☐	☐	☐	☐
Overall Capital and O&M Costs	☐	☐	☐	☐	☐	☐

10 How much would you estimate that flows have already been reduced in your system over the last 15 years?

- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

11 In the future, given current capacity of your systems, what range of influent flow reduction would require remediation actions?

- ☐ Remediation actions are already needed
- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

12 Which of the following remediation actions will be needed to respond to future low influent flows? Select all that apply.

- ☐ Operational or process adjustments
 - ☐ Equipment or capital adjustments
 - ☐ Increased potable water use
 - ☐ Changes to energy or power use
 - ☐ Changes in pumping
 - ☐ Offset reduction to maintain the system
 - ☐ Increased cleaning schedules from the increase of debris accumulation in lift stations
 - ☐ Other (please describe in the text box below)
-

13 Please provide any additional detail that would help us understand the remediation actions needed to respond to future low influent flows or higher influent loadings.

14 Is there a future flow reduction threshold (such as a 10% decrease from current levels), at which the required remediation actions would shift from routine operational expenditures to major capital expenditures?

- ☐ Remediation actions already necessitate major capital expenditures
- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

15 Which of the following are anticipated challenges your system might face from future low wastewater flows (i.e. related to the current capacity of lift stations, pumps, etc.)? Select all that apply.

- ☐ Operational or maintenance issues
- ☐ Energy or power usage impacts including those related to additional potable water use
- ☐ Costs associated with remediation actions
- ☐ Regulatory/permit compliance
- ☐ Potential stranding of assets, associated with low influent flows
- ☐ Possible disincentivizing, due to low influent flows, of investment in wastewater recycling/reuse by wastewater collection facilities
- ☐ Low influent flows may impact operations and require the use of potable water to flush systems
- ☐ Possible biological impacts of lower sewer flows (e.g., related to increased TAN, sBOB, H₂S, etc.)
- ☐ Other (please describe in the box below)

16 Please provide any additional detail that would help us understand the anticipated challenges your system might face from future low wastewater flows.

17 Are there any perceived benefits to your system or facility from low-flow conditions or programs addressing them? Select all that apply.

☐

Energy savings or improved energy efficiency

☐

Reduced maintenance or operational workload

☐

Other (please describe in the box below)

18 Please provide any additional detail that would help us understand any perceived benefits to your system or facility from low-flow conditions or programs addressing them.

19 Do you use a collection systems modeling software or program to support operations and planning?

☐ Yes

☐ No

☐ Unsure

20 If you use a collection systems modeling software or program to support operations and planning, please specify.

21 Have you used a collection systems modeling software or program to monitor constituents in influent?

- ☐ Yes
- ☐ No
- ☐ Unsure

22 If you have used a collection systems modeling software or program to monitor constituents in influent, please specify.

23 Do you monitor constituents in wastewater influent?

- ☐ Yes
- ☐ No
- ☐ Unsure

24 If you monitor constituents in wastewater influent, please specify.

25 Are you interested in being contacted for a follow-up case study interview with our project-team partner, Harold Leverenz, a researcher at the Office of Water Programs at Sacramento State and UC Davis?

☐ Yes

☐ No

Benefits & Impacts Survey: Decreased Influent Flows & Increased Constituent Concentrations for Recycle/Reuse Water Facilities

In 2018, the State of California passed legislation for “Making Conservation a Way of Life.” This required urban retail water suppliers to meet water budget targets based on efficient water use standards set in legislation and adopted by the State Water Resources Control Board.

In 2022, SB 1157 (Hertzberg) updated the indoor residential water use standard and directed the California Department of Water Resources (DWR), in coordination with the State Water Board, to evaluate indoor residential water use and quantify impacts of lower indoor residential water use standards on water supply, wastewater, and recycled water systems.

The indoor residential water use standard is one component of water-use that makes up an Urban Water Use Objective for each water supplier. Urban water suppliers must meet these targets by January 1, 2027.

We are a part of a multi-university team studying the benefits and impacts of the indoor standard to inform recommendations made by DWR and the State Water Board.

To support our study, this survey asks about the impact of decreasing influent flows and increased influent constituent concentrations on recycled/reuse water facilities.

We greatly appreciate you helping us learn more about the impact of low influent flows on recycled/reuse water facilities. This questionnaire should take no more than 10 minutes to complete. If you leave this site before completing the questionnaire, your answers will be automatically saved and appear in the questionnaire when you return to complete it. Responses to this survey will be aggregated and made anonymous. No information that can identify your agency or facility will be shared or reported outside the project team.

1 To begin, please tell us the name of your agency and your recycle/reuse facility. If have many recycle/reuse facilities please list them within the given text box separated by a semicolon (e.g. Facility A; Facility B; Facility C).

☐ Agency Name _____

☐ Facility Name(s) _____

2 As we proceed with our work, we will likely have follow-up questions and hope to continue to communicate with you. As such, please provide your name, email address, and telephone number.

☐ Contact Name _____

☐ Email Address _____

☐ Phone Number _____

3 How is recycled water that is produced by your facility used? Select all that apply.

- ☐ Agricultural irrigation
- ☐ Landscape and/or golf course irrigation
- ☐ Commercial and industrial applications
- ☐ Geothermal energy production
- ☐ Groundwater recharge
- ☐ Potable uses
- ☐ Other (please describe in the text box below)

4 How many recycled water metered accounts does your facility serve?

5 Since 2011, has your recycled water facility experienced any challenges related to low influent flows (or higher concentrations of salt or pollutants) that required operational changes or modifications to your system?

- ☐ Yes
- ☐ No
- ☐ Unsure

6 Since 2011, have you observed more or different impacts from low influent flows or high concentrations in years with below-average rainfall?

- ☐ Yes
- ☐ No
- ☐ Unsure

7 Can you please describe the more or different impacts you observed from low influent flows or high concentrations in years with below-average rainfall?

8 If an item listed below was not a challenge, mark “none”. For “major” or “minor”, we are interested in your general assessment. A challenge that was widespread or happened frequently or required significant changes in your workload/costs is “major”. A “minor” challenge is one that could not be ignored, but could be mostly handled as a normal part of your operations.

Challenges since 2011 with Reclaimed Water System Related to Declining Wastewater Flows and/or Increased Influent Constituent Concentrations

	None	Minor	Major	Unsure
For recycled water systems - difficulty supplying needed flows (e.g., difficulty meeting customer demands)	☐	☐	☐	☐
For recycled water systems - difficulty supplying needed water quality	☐	☐	☐	☐
For potable recycled water systems - difficulty meeting production targets	☐	☐	☐	☐
Difficulty meeting permit requirements	☐	☐	☐	☐
Impacts to offline unit treatment processing (e.g., increased biofouling of membranes)	☐	☐	☐	☐
Other (please describe in the text box below)	☐	☐	☐	☐

9 Please provide any additional details about how low influent flows or high concentrations have impacted:

- Water quality
- Ability to supply recycled water to meet customer demands
- Ability to meet potable recycled water production targets
- Ability to maintain seawater barrier
- Operational or maintenance needs
- Energy or power use (e.g., increased pumping, treatment energy requirements)
- Regulatory/permit compliance

10 What changes in equipment or capital infrastructure, if any, did you take or plan to make to address the challenges? Select all that apply.

- ☐ Monitoring
- ☐ Chemical injection
- ☐ Pumping
- ☐ Manholes
- ☐ Pipes
- ☐ Structures
- ☐ Other (please describe in the text box below)

11 What changes in operations and maintenance did you take or plan to make to address the challenges? Select all that apply.

- ☐ Used more labor – increased hours, additional staff, more hours of contracted cleaning services
- ☐ Employed more outside technical help (engineering consultants or specialized services)
- ☐ Increased frequency of inspections
- ☐ Purchased more or different chemicals
- ☐ Additional studies to maintain recycled water quality and quantity
- ☐ Other (please describe in the text box below)
-

12 Please provide an estimate of the percentage (%) increase in costs your agency incurred associated with the above adjustments/modifications.

	None	1-5%	5-10%	10-20%	More than 20%	Unsure
Energy	☐	☐	☐	☐	☐	☐
Labor	☐	☐	☐	☐	☐	☐
Chemicals/other inputs	☐	☐	☐	☐	☐	☐
Overall Capital and O&M costs	☐	☐	☐	☐	☐	☐

13 How much would you estimate that flows have been reduced in your system over the last 15 years?

- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

14 In the future, given current capacity of your systems, what range of influent flow reduction would require remediation actions or impact the feasibility of recycled water production?

- ☐ Remediation actions are already needed
- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

15 Which of the following remediation actions will be needed to respond to future low influent flows? Select all that apply.

- ☐ Operational or process adjustments
 - ☐ Reduction of total dissolved solids (TDS)
 - ☐ Equipment or capital adjustments
 - ☐ Energy or power usage impacts
 - ☐ Reduction of available recycled water supplies due to lower wastewater flows
 - ☐ Increased potable water use
 - ☐ Other (please describe in the text box below)
-

16 Please provide any additional details that would help us understand the remediation actions needed to respond to future low influent flows or impact your ability to meet recycled water demand or production goals.

17 Is there a future flow reduction threshold (such as a 10% decrease from current levels), at which the required remediation actions would shift from routine operational expenditures to major capital expenditures?

- ☐ Remediation actions already necessitate major capital expenditures
- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

18 Since 2011, to what extent have increased flows associated with growth offset your flow reductions from conservation?

- ☐ Fully offset
- ☐ Partially offset
- ☐ Not at all offset
- ☐ Unsure

19 Which of the following are anticipated challenges your facility might face from future low wastewater flows or high concentrations? Select all that apply.

- ☐ Operational or maintenance issues
- ☐ Energy or power usage impacts
- ☐ Changes in potable water use (flushing, blending, or customers switching to potable water due to water quality or availability)
- ☐ Costs to purchase other water supplies to replace or supplement recycled water
- ☐ Costs associated with remediation actions
- ☐ Potential stranding of assets
- ☐ Possible disincentivizing of investment in wastewater recycling/reuse
- ☐ Other (please describe in the text box below)

20 Please provide any additional detail that would help us understand the anticipated challenges your facility might face from future low wastewater flows or high concentrations.

21 Are there any perceived benefits to your facility from low-flow conditions or programs addressing them? Select all that apply.

☐

Energy savings or improved energy efficiency

☐

Reduced maintenance or operational workload

☐

Reduced hydraulic loadings on treatment processes

☐

Other (please describe in the text box below)

22 Please provide any additional detail that would help us understand any perceived benefits to your system or facility from low-flow conditions or programs addressing them.

23 Are you considering a potable reuse project for your reclamation water?

☐ Yes

☐ No

24 Is the project you are considering regulatory/permit compliance driven?

☐ Yes

☐ No

☐ Unsure

25 When do you anticipate that the facility will be online?

26 What percentage (%) of total production will the new potable reuse supply represent once the facility is online?

27 Are you interested in being contacted for a follow-up case study interview with our project-team partner, Harold Leverenz, a researcher at the Office of Water Programs at Sacramento State and UC Davis?

☐ Yes

☐ No

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☐ Agency Name _____

☐ Facility Name(s) _____

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☐ Email Address _____

☐ Phone Number _____

Q3 What type of receiving water body does your primary wastewater treatment facility discharge to?

- ☐ Ocean
- ☐ Freshwater (e.g., river, stream, lake, or reservoir)
- ☐ Estuary / lagoon / intertidal water body
- ☐ Multiple receiving water bodies
- ☐ Other
- ☐ Unsure

4 Since 2011, has your wastewater treatment facility experienced any challenges related to low influent flows or high influent concentrations that required operational changes or modifications to your system?

- ☐ Yes
- ☐ No
- ☐ Unsure

5 If an item listed below was not a challenge, mark “none”. For “major” or “minor”, we are interested in your general assessment. A challenge that was widespread or happened frequently or required significant changes in your workload/costs is “major”. A “minor” challenge is one that could not be ignored, but could be mostly handled as a normal part of your operations.

5.1 Challenges Since 2011 Associated with the Following Influent Conditions

	None	Minor	Major	Unsure
Constituent concentrations	☐	☐	☐	☐
Flow patterns (e.g. surges, low flow, more variability)	☐	☐	☐	☐
Load patterns (e.g. surges, more variability)	☐	☐	☐	☐
Odor	☐	☐	☐	☐
Pumping trouble (at the plant, not the collection system)	☐	☐	☐	☐
Increased corrosion	☐	☐	☐	☐
Other (please describe in the text box below)	☐	☐	☐	☐

5.2 Challenges Since 2011 Involving Treatment Processes

	None	Minor	Major	Unsure
Grit inflows or accumulation	☐	☐	☐	☐
Primary settling efficiency	☐	☐	☐	☐
Aeration requirements	☐	☐	☐	☐
Biological process stability or efficiency	☐	☐	☐	☐
Biosolids processing or biogas production	☐	☐	☐	☐
Filtration	☐	☐	☐	☐
Disinfection	☐	☐	☐	☐
Nutrient removal	☐	☐	☐	☐
Increases to fouling	☐	☐	☐	☐
Other (please describe in the text box below)	☐	☐	☐	☐

5.3 Challenges Since 2011 Associated with Meeting Regulatory Requirements

	None	Major	Minor	Unsure
Difficulty meeting discharge permit requirements	☐	☐	☐	☐
Other (please describe in the text box below)	☐	☐	☐	☐

6 If have had difficulty meeting discharge permit requirements, which specific parameters have exceeded permit limits (e.g., chloride, sulfate, TDS, etc.)?

7 What changes in operations and maintenance, if any, did you take or plan to take to address the challenges? Select all that apply.

- ☐ Purchased more or different chemicals
- ☐ Used more electricity (or other energy sources)
- ☐ Used more staff/hired labor
- ☐ Employed more outside technical consultants or specialized services
- ☐ Purchased replacement equipment sooner than expected
- ☐ Other (please describe in the text box below)

8 In what processes were capital improvements implemented (or planned) to address the challenges? Select all that apply.

- ☐ Headworks/pretreatment
 - ☐ Primary sedimentation
 - ☐ Biological system and/or secondary sedimentation
 - ☐ Disinfection system
 - ☐ Filtration system
 - ☐ Blower/diffuser
 - ☐ Other (please describe in the text box below)
-

9 Please provide an estimate of the percentage (%) increase in costs your agency incurred associated with the above adjustments/modification.

	None	1-5%	5-10%	10-20%	More than 20%	Unsure
Energy	☐	☐	☐	☐	☐	☐
Labor	☐	☐	☐	☐	☐	☐
Chemicals/potable water/other inputs	☐	☐	☐	☐	☐	☐
New equipment to perform work	☐	☐	☐	☐	☐	☐
Existing equipment/facilities maintenance	☐	☐	☐	☐	☐	☐
New technology to solve or address problems/challenges	☐	☐	☐	☐	☐	☐
Overall Capital and O&M costs	☐	☐	☐	☐	☐	☐

10 How much would you estimate that flows have been reduced in your system over the last 15 years?

- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

11 In the future, given current capacity of your systems, what range of influent reduction would require remediation actions?

- ☐ Remediation actions are already needed
- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

12 Which of the following remediation actions will be needed to respond to future decreasing influent flows? Select all that apply.

- ☐ Operational or process adjustments
- ☐ Equipment or capital improvements
- ☐ Changes to energy or power use
- ☐ Increased potable water use
- ☐ Other (please describe)

13 Please provide any additional detail that would help us understand the remediation actions needed to respond to future decreasing influent flows.

14 Is there a future flow reduction threshold (such as a 10% decrease from current levels), at which the required remediation actions would shift from routine operational expenditures to major capital expenditures?

- ☐ Remediation actions already necessitate major capital expenditures
- ☐ Less than 5% flow reduction
- ☐ Between 5% and 10% flow reduction
- ☐ Between 10% and 20% flow reduction
- ☐ Greater than 20% flow reduction
- ☐ Unsure

15 Which of the following are anticipated challenges your facility might face from future low influent wastewater flows? Select all that apply.

- ☐ Operational or maintenance issues
- ☐ Energy or power usage impacts
- ☐ Costs associated with remediation actions
- ☐ Costs associated with permitting and compliance
- ☐ Other (please describe in the text box below)

16 Please provide any additional detail that would help us understand the anticipated challenges your facility might face from future low wastewater flows.

17 Are there any perceived benefits to your facility from low-flow or high-concentration conditions or programs addressing them? Select all that apply.

- ☐ Energy savings or improved energy efficiency
- ☐ Reduced maintenance or operational workload
- ☐ Reduced recycled water supply resulting in higher potable water usage
- ☐ Other (please describe in the text box below)

18 Please provide any additional detail that would help us understand any perceived benefits to your facility from low-flow or high-concentration conditions or programs addressing them.

19 Do you use a collection systems modeling software or program to support operations and planning?

☐ Yes

☐ No

☐ Unsure

20 If you use a collection systems modeling software or program to support operations and planning, please specify.

21 Have you used a collection systems modeling software or program to evaluate flow impacts and effects?

☐ Yes

☐ No

☐ Unsure

22 If you have used a collection systems modeling software or program to evaluate flow impacts and effects, please specify.

The following question is optional and intended to gather additional insights on treatment process challenges. Please skip if this is not applicable to your facility or you do not wish to fill this out.

23 Please describe any specific challenges your facility has experienced (or would expect to experience) in any of the following treatment processes during periods of reduced influent flow. If possible, include details on the type of issue (e.g., settling, fouling, odor, process control, etc.).

Processes (for reference):

- Primary treatment
- Attached growth (e.g., trickling filters, bio-towers)
- Suspended growth (e.g., activated sludge)
- Biological nutrient removal (BNR)
- Membrane bioreactor (MBR)
- Lagoons
- Wetlands
- Solids processing
- Tertiary treatment
- Disinfection

24 Are you interested in being contacted for a follow-up case study interview with our project-team partner, Harold Leverenz, a researcher at the Office of Water Programs at Sacramento State and UC Davis?

- ☐ Yes
- ☐ No