

Water and Wastewater Technology

Inland Empire/Desert Region (Riverside and San Bernardino counties)

Summary



Over the next five years (2021-2026), employment for water and wastewater treatment plant and system operators is projected to



The Inland Empire/Desert Centers of Excellence

 **Recommends**

water and wastewater technology program expansion to meet the need for more workers in the region

Introduction

California Community College water and wastewater technology programs (TOP 0958.00) prepare students for employment through the instruction of the principles, technical skills and equipment used to process, purify, store and distribute potable water, and dispose of waste water. These programs include the design, construction, operation, and maintenance of equipment for water or waste water treatment systems (Taxonomy of Programs, 2012). The knowledge, skills, and abilities trained by water and wastewater technology programs lead to employment as water and wastewater treatment plant and system operators.

Water and Wastewater Treatment Plant and System Operators (51-8031)

Operate or control an entire process or system of machines, often through the use of control boards, to transfer or treat water or wastewater.

Sample job titles: Plant Operator, Process Operator (Process Op), Relief Operator, SCADA Operator (Supervisory Control and Data Acquisition Operator), Waste Water Treatment Plant Operator (WWTP Operator), Wastewater Operator (WW Operator), Water Control Dispatcher, Water Plant Operator, Water Treatment Operator, Water Treatment Plant Operator

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: More than 12 months of on-the-job training

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 44%

Job Counts and Projections

In 2021, there were 1,343 water and wastewater treatment plant and system operator jobs in the region. Regional employment for this occupation is projected to increase by 6% through 2026; 150 job openings are projected annually. Exhibit 1 displays the job counts, five-year projected job growth, job openings, and the share of incumbent workers aged 55 years and greater in the region.

Exhibit 1. Five-year projections for water and wastewater treatment plant and system operators, Inland Empire/Desert Region, 2021-2026

Occupation	2021 Jobs	2026 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Water and Wastewater Treatment Plant and System Operators	1,343	1,422	6%	749	150	28%

Source: Lightcast 2023.1

An online job ad search for water and wastewater treatment plant and system operators was conducted to reveal the employers seeking these workers, including the median posting duration, earnings information, and in-demand skills. Exhibit 2 displays the number of job ads posted for water and wastewater treatment plant and system operators over the last 12 months and the median posting duration. Over the last 12 months, there were 90 job ads for water and wastewater treatment plant and system operators in the region.

On average, regional employers kept online job ads for water and wastewater treatment plant and system operators open for 25 days. The average regional online job is open for 29 days, indicating that employers may face fewer challenges filling water and wastewater treatment plant and system operator positions than other jobs.

Exhibit 2. Job ads and posting duration, Inland Empire/Desert Region, May 2022 through April 2023

Occupation	Job Ads	Median Posting Duration (Days)
Water and Wastewater Treatment Plant and System Operators	90	25

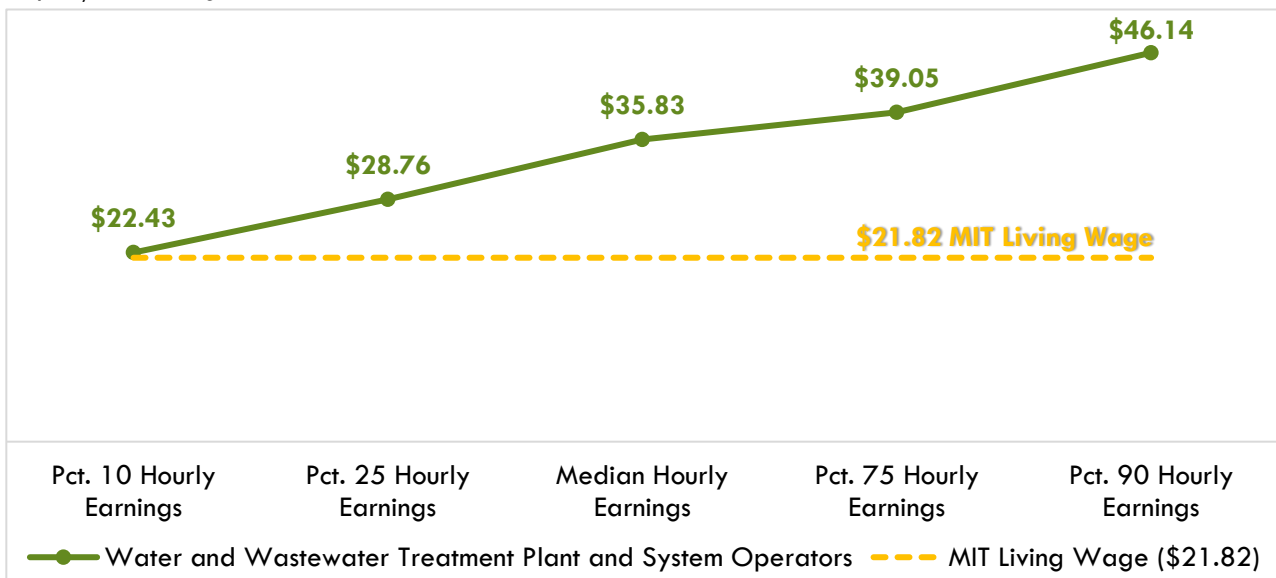
Source: Lightcast 2023.1

Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide a living wage. The MIT living wage calculator estimates that an individual must earn \$21.82 per hour or \$45,386 annually to be self-sufficient in California (Glasmeier, 2023).

Exhibit 3 displays the hourly earnings for water and wastewater treatment plant and system operators. The 10th percentile hourly earnings for water and wastewater treatment plant and system operators are above the living wage standard, indicating that at least 90% of workers earn a living wage.

Exhibit 3. Hourly earnings by percentile for water and wastewater treatment plant and system operators, Inland Empire/Desert Region, 2021

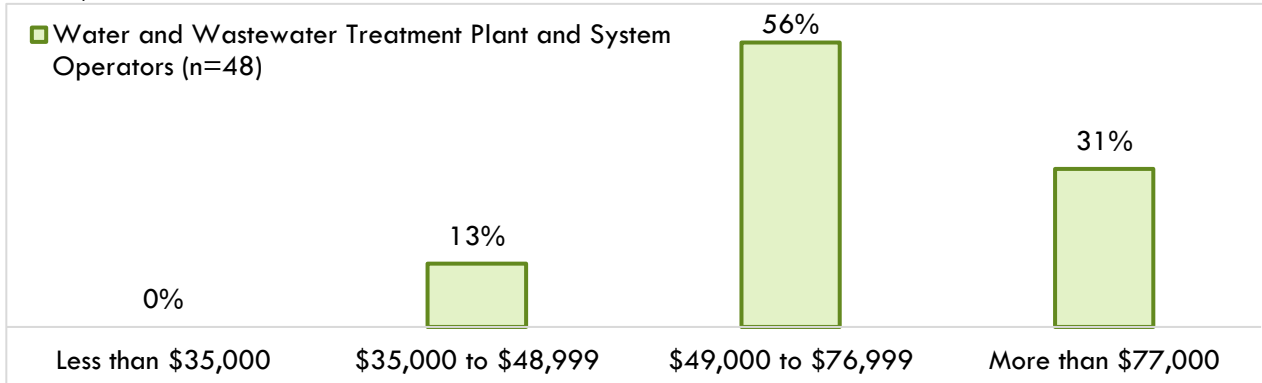


Source: Lightcast 2023.1

Advertised Salary from Online Job Ads

Exhibit 4 displays the regional online advertised salaries for water and wastewater treatment plant and system operators over the last 12 months. Online job ad salary information reveals that employers are willing to pay water and wastewater treatment plant and system operators an annual salary of \$69,368 or \$33.35 per hour, above the region's \$21.82 hourly living wage standard. Consider the salary information with caution since only 53% (48 of 90) of online job ads for this occupation provided salary information.

Exhibit 4. Online advertised salaries for water and wastewater treatment plant and system operators, Inland Empire/Desert Region, May 2022 through April 2023



Source: Lightcast 2023.1

Job Titles, Employers, Skills, Education, and Work Experience

Exhibit 5 displays the job titles most frequently used in job ads for water and wastewater treatment plant and system operators over the last 12 months. Displaying advertised job titles may provide insight into the types of positions sought by employers posting job ads. The most frequently requested job title in the region was water treatment operator.

Exhibit 5. Job titles most frequently used in water and wastewater treatment plant and system operators job ads, Inland Empire/Desert Region, May 2022 through April 2023

Job Titles	Unique Job Ads
Water Treatment Operators	19
Wastewater Operators	15
Water Distribution Operators	10
Water and Wastewater Treatment Plant Operators	13
Water Operators	8
Water Systems Operators	5
All other job titles	19
Total	90

Source: Lightcast 2023.1

Exhibit 6 displays the employers that posted the most job ads for water and wastewater treatment plant and system operators over the last 12 months. Showing employer names provides insight into where students may find employment after completing a program. Veolia North America, a wastewater management company contracted with local governments such as Rialto and Palm Springs, posted the most job ads for water and wastewater treatment plant and system operators in the region.

Exhibit 6. Employers posting the most job ads for water and wastewater treatment plant and system operators, Inland Empire/Desert Region, May 2022 through April 2023

Top Employer	Unique Job Ads
Veolia North America	26
Liberty Utilities	9
City of Corona	6
City of Riverside	4
Eastern Municipal Water District	3
Inland Empire Utilities Agency	3
San Bernardino County's Special Districts Department's Water and Sanitation Division	3
<i>All other employers</i>	36
Total	90

Source: Lightcast 2023.1

Exhibit 7 lists a sample of specialized and employability skills employers seek when seeking workers to fill water and wastewater treatment plant and system operator positions. Specialized skills are occupation-specific skills that employers request for industry or job competency. Common skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job ads may be utilized to guide curriculum development.

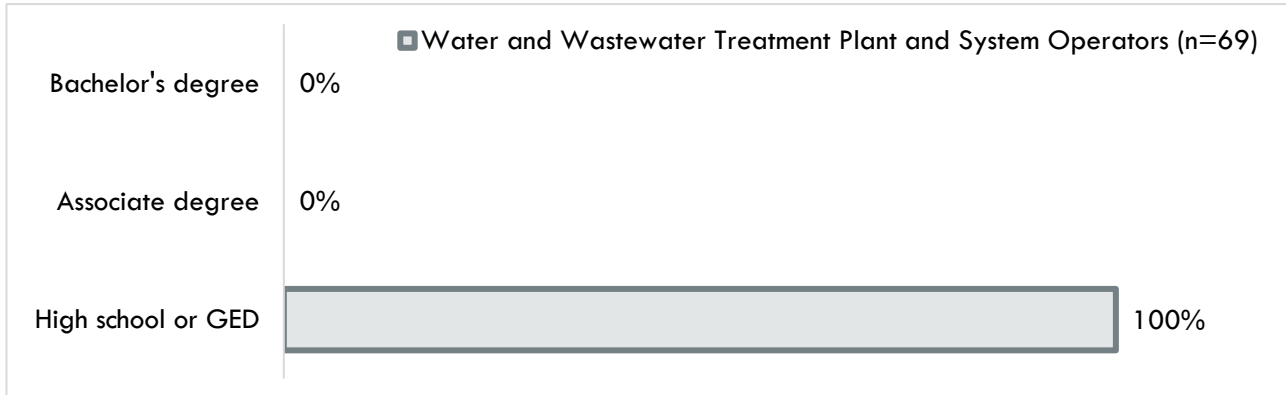
Exhibit 7. Sample of in-demand skills from employer job ads, Inland Empire/Desert Region, May 2022 through April 2023

Specialized skills (n=90)	Common skills
<ul style="list-style-type: none"> Laboratory Testing Sewage Treatment Water Distribution Disinfecting Preventative Maintenance Supervisory Control and Data Acquisition (SCADA) Process Control 	<ul style="list-style-type: none"> Operations Troubleshooting (Problem-Solving) Communication Skills Arithmetic Management Teamwork Record Keeping

Source: Lightcast 2023.1

Exhibit 8 displays the minimum advertised education requirements for water and wastewater treatment plant and system operators. According to the Bureau of Labor Statistics, 44% of incumbent workers in this field hold a community college-level of educational attainment; "some college, no degree," and an "associate degree." All employers listing a minimum education level requested a candidate with a high school diploma or equivalent. Educational and experience requirements are highly correlated with the California State Water Resources Control Board certifications sought by employers.

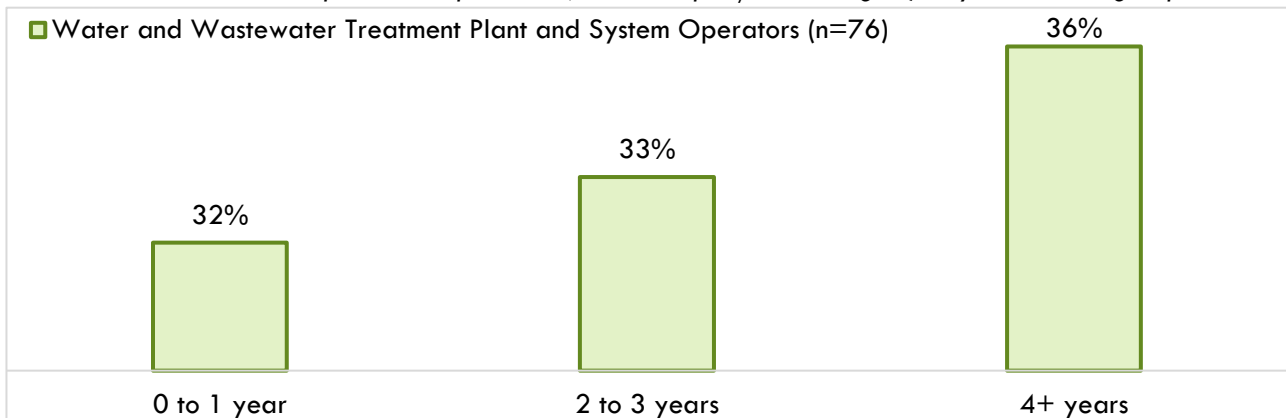
Exhibit 8. Minimum advertised education requirements, Inland Empire/Desert Region, May 2022 through April 2023



Source: Lightcast 2023.1

Exhibit 9 displays the work experience typically required from employer job ads for water and wastewater treatment plant and system operators. While the majority of employers (68%) sought candidates with more than one year of previous work experience, nearly a third of employers sought candidates with zero to one year of previous work experience.

Exhibit 9. Real-time work experience requirements, Inland Empire/Desert Region, May 2022 through April 2023



Source: Lightcast 2023.1

Certifications

Exhibit 10 displays the most frequently requested certifications by employers in job ads. Most employer job ads (96%) sought candidates with a certification from California State Water Resources Control Board. There are five levels of certification – all of which require an examination. To become eligible for each examination after the first level, applicants must complete specialized training and/or obtain additional experience. Each of the certifications can be obtained with a high school diploma and qualifying work experience ranging from one to ten years. The Operator Grade 1 certification was the most frequently sought certification by employers posting job ads. Employers frequently included multiple certification options in job ads. For example, employers may post for a wastewater operator with an Operator I/II/III certification. For

more information regarding certification requirements, visit the California State Water Resources Control Board website.

Exhibit 10: Certifications most frequently required by employers, Inland Empire/Desert Region, May 2022 through April 2023

Certification	Jobs Ads
Water Treatment Operator Certification (Grades I-V)	86
Water Treatment Operator Certification Grade I	81
Water Treatment Operator Certification Grade II	38
Water Treatment Operator Certification Grade III	42
Water Treatment Operator Certification Grade IV	13
Water Treatment Operator Certification Grade V	9

Source: Lightcast 2023.1

Student Completions and Programs Outcomes

Exhibit 11 displays student completions for water and wastewater technology programs (TOP 0958.00) over the last three academic years (2019-22). Over the last three academic years, regional community colleges have issued 62 awards annually in water and wastewater technology programs. Program completion and student outcome methodologies are found in the appendix.

Exhibit 11. Annual average community college awards for water and wastewater technology programs, Inland Empire/Desert Region, Academic Years 2019-2022

TOP 0958.00 – Water and Wastewater Technology (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Mt. San Jacinto (Water Technology)				37
Associate Degree	15	12	26	18
Certificate 16 < 30-semester units	20	20	17	19
San Bernardino Valley (Water Supply Technology, Water Technology)				25
Associate Degree	7	14	23	15
Certificate 16 < 30-semester units	10	12	10	11
Total	52	58	76	62

Source: MIS Data Mart, COCI

California program outcome data may provide useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 12.

Exhibit 12. 0958.00 – Water and wastewater technology strong workforce program outcomes, Inland Empire/Desert Region, Academic Year 2019-2020 (Unless Noted)

Strong Workforce Program Metrics: 0958.00 – Water and Wastewater Technology	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2020-21)	453	2,731
Completed 9+ career education units in one year (2020-21)	28%	30%
Students who attained a noncredit workforce milestone in a year (2020-21)	39%	41%
Students who earned a degree, certificate, or attained apprenticeship (2020-21)	38	268
Transferred to a four-year institution (transfers)	-	38
Job closely related to the field of study (2018-19)	67%	75%
Median annual earnings (all exiters)	\$49,832	\$55,718
Median change in earnings (all exiters)	21%	22%
Attained a living wage (completers and skills-builders)	79%	75%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Other postsecondary institutions may utilize water quality and wastewater treatment management and recycling technology/technician CIP code (15.0506) for their water and wastewater programs. However, no other regional postsecondary education institution issued awards using this program code over the last three academic years. The following is the program description for water quality and wastewater treatment management and recycling technology/technician CIP programs.

A program that prepares individuals to apply basic engineering principles and technical skills in support of engineers and other professionals engaged in developing and using water storage, waterpower, and wastewater treatment systems. Includes instruction in water storage, power and/or treatment systems and equipment; testing and inspection procedures; system maintenance procedures; and report preparation (IPEDS, 2023).

Summary of Findings

The knowledge, skills, and abilities trained by water and wastewater technology programs (TOP 0958.00) programs prepare students for employment as water and wastewater treatment plant and system operators. Water and wastewater treatment plant and system operators are projected to have 150 annual job openings and increase employment by 6% over the next five years in the Inland Empire/Desert Region. The 90th percentile hourly earnings for water and wastewater treatment plant and system operators are above the living wage standard, indicating that at least 90% of these workers earn a living wage.



Over the last three academic years, regional community colleges have issued 62 awards annually in water and wastewater technology programs. Over the last three academic years, no other regional postsecondary education institution issued awards using the water quality and wastewater treatment management and recycling technology/technician program code.

The Centers of Excellence recommends expanding water and wastewater technology programs to meet the demand for workers in the region. Colleges considering this program should partner with applicable employers to document their demand for water and wastewater treatment plant and system operators and the skills and certifications needed for students to obtain employment shortly after exiting the program.

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Appendix: Methodology

Exhibit 11 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2019 and 2022 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variations that might be present in a single year.

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from California's Employment Development Department's Unemployment Insurance database records. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2023a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2023a).

Job ad data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job ads often do not reveal employers' hiring intentions; it is unknown if employers plan to hire one or multiple workers from a single online job ad or collect resumes for future hiring needs. A closed job ad may not be the result of a hired worker.

Table 1. 2021 to 2026 job growth, wages, entry-level education, training, and work experience required for water and wastewater treatment plant and system operators in the Inland Empire/Desert Region (Riverside and San Bernardino Counties combined)

Occupation (SOC)	2021 Jobs	5-Year Change	5-Year % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10 th to 90 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Water and Wastewater Treatment Plant and System Operators (51-8031)	1,343	79	6%	150	\$22.43 to \$46.14	\$35.83	\$71,100	High school diploma or equivalent & More than 12 months	None

Source: Lightcast 2023.1