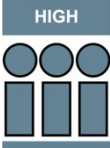


Water and Wastewater Technology Occupations

Labor Market Analysis: San Diego County

August 2026

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED LEVEL(S) OF EDUCATION
 Proceed with Caution	 	 	☐ Doctorate Degree ☐ Master's Degree ☐ Bachelor's Degree ☒ Associate degree ☐ Some College or Certificate ☒ HS Diploma or Equivalent ☐ Less Than a HS Diploma ☐ Apprenticeship
SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS	
 	HIGH 	HIGH 	

The San Diego & Imperial Center of Excellence (COE) developed this brief to assist the region's community colleges with strategic planning and program development. *Water and Wastewater Technology Occupations* include "Environmental Engineering Technologists and Technicians," "Environmental Science and Protection Technicians, Including Health," "Industrial Machinery Mechanics," "Pump Operators, Except Wellhead Pumpers," and "Water and Wastewater Treatment Plant and System Operators." According to available data, *Water and Wastewater Technology Occupations* in San Diego County have a labor market demand of 468 annual job openings (while average demand for a single occupation in San Diego County is 289 annual job openings), and nine institutions supply 173 awards for these occupations. This brief recommends proceeding with caution when developing a new program and supports a program modification because 1) there is a supply gap; 2) a high number of annual job openings exist for these occupations. However, entry-level wages are below the living wage and typical education ranges from high school to an associate degree for these occupations.

Introduction

This report provides labor market information in San Diego County for the following occupational codes in the Standard Occupational Classification (SOC) system:¹

- **Water and Wastewater Treatment Plant and System Operators** (SOC 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.
- **Environmental Engineering Technologists and Technicians** (SOC 17-3025): Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientists.
- **Environmental Science and Protection Technicians, Including Health** (SOC 19-4042): Perform laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health, under the direction of an environmental scientist, engineer, or other specialist. May collect samples of gases, soil, water, and other materials for testing.
- **Industrial Machinery Mechanics** (SOC 49-9041): Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.
- **Pump Operators, Except Wellhead Pumpers** (SOC 53-7072): Tend, control, or operate power-driven, stationary, or portable pumps and manifold systems to transfer gases, oil, other liquids, slurries, or powdered materials to and from various vessels and processes.

For the purpose of this report, these occupations are referred to as *Water and Wastewater Technology Occupations*.

¹ The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for collecting, calculating, and disseminating data. [bls.gov/soc](https://www.bls.gov/soc)

Projected Occupational Demand

Between 2025 and 2030, businesses in San Diego County will need to hire **468** employees annually to fill new jobs and backfill positions made vacant through turnover and retirement (Exhibit 1). Industrial Machinery Mechanics account for the largest share of demand, with **238** annual openings. Overall employment is projected to increase by **193** jobs, or **four percent**, during the five-year period.

Exhibit 1: Number of Jobs for Water and Wastewater Technology Occupations (2025-2030)²

Occupational Title	2025 Jobs	2030 Jobs	2025-2030 Net Jobs Change	2025-2030 % Jobs Change	Annual Job Openings (Demand)
Industrial Machinery Mechanics	2,447	2,613	166	7%	238
Water and Wastewater Treatment Plant and System Operators	949	978	29	3%	93
Environmental Science and Protection Technicians, Including Health	601	596	-4	-1%	80
Environmental Engineering Technologists and Technicians	363	363	0	0%	30
Pump Operators, Except Wellhead Pumpers	229	232	3	1%	27
Total	4,589	4,782	193	4%	468

Earnings

According to traditional labor market information (LMI), entry-level hourly earnings for *Water and Wastewater Technology Occupations* range from **\$19.54 to \$33.59** (Exhibit 2).³

Exhibit 2: Hourly Earnings for Water and Wastewater Technology Occupations in San Diego County⁴

Occupational Title	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Water and Wastewater Treatment Plant and System Operators	\$33.59	\$38.25	\$49.41
Industrial Machinery Mechanics	\$27.52	\$32.31	\$39.23
Environmental Engineering Technologists and Technicians	\$22.78	\$27.87	\$29.68
Environmental Science and Protection Technicians, Including Health	\$20.73	\$27.93	\$38.21
Pump Operators, Except Wellhead Pumpers	\$19.54	\$25.86	\$30.87

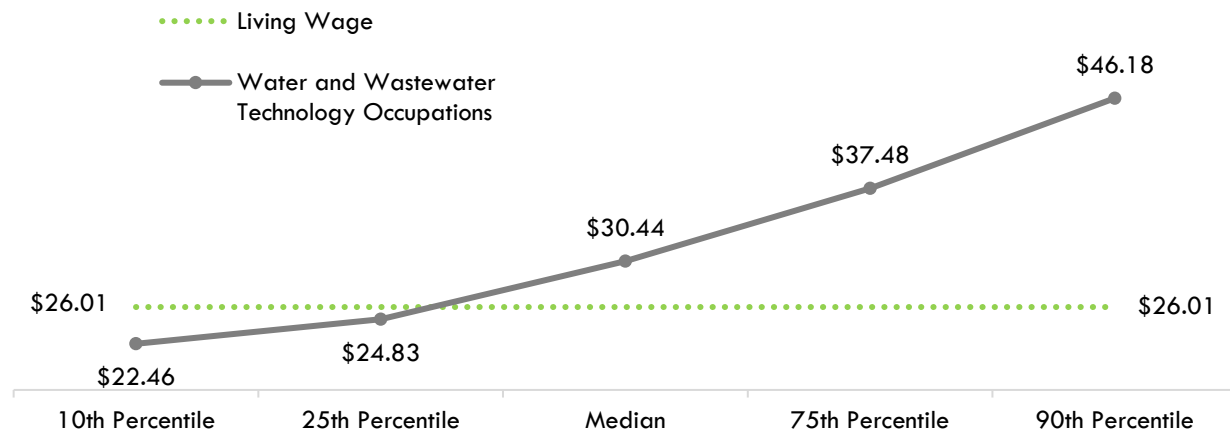
² Lightcast Q3 2026; QCEW, Non-QCEW, Self-Employed.

³ Traditional LMI is generally historical data captured by the U.S. Bureau of Labor Statistics or the California Employment Development Department. It may not reflect recent technological, economic, or legislative changes.

⁴ Lightcast Q3 2026; QCEW, Non-QCEW, Self-Employed.

On average, entry-level hourly earnings for employed *Water and Wastewater Technology Occupations* are \$24.83—or approximately \$51,649 annually. This is below the living wage of \$26.01 per hour for a single adult in San Diego County (Exhibit 3).⁵⁶

Exhibit 3: Average Hourly Earnings for Water and Wastewater Technology Occupations in San Diego County⁷⁸



In online job postings, employers also advertised between \$19 to \$21 per hour between January 1, 2023 and December 31, 2025 for *Water and Wastewater Technology Occupations* in San Diego County (Exhibit 4). This suggests that employer-advertised wages in online job postings were below the entry-level wages reported in traditional labor market information and increased over the period analyzed.⁹

⁵ Annualized salaries assume a full-time position with 2,080 work hours. Multiplying the hourly wage by 2,080 yields the annual salary.

⁶ Center for Women's Welfare, University of Washington. The Self-Sufficiency Standard for California 2024.

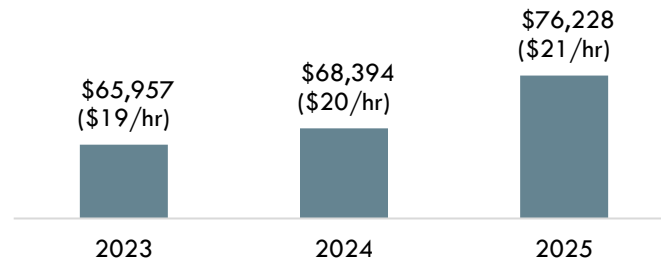
selfsufficiencystandard.org/california

⁷ The 10th and 25th percentiles may be considered entry-level wages; the 75th and 90th percentiles may be considered experienced wages.

⁸ Lightcast Q3 2026; QCEW, Non-QCEW, Self-Employed.

⁹ Lightcast Q3 2026; Job Posting Analytics, January 2023 through December 2025.

**Exhibit 4: Entry-Level Advertised Salaries in Online Job Postings for
Water and Wastewater Technology Occupations in San Diego County (2023-2025)**



Expected Level of Education

According to traditional LMI reported to the California Employment Development Department and U.S. Bureau of Labor Statistics, *Water and Wastewater Technology Occupations* typically require either a [high school diploma or equivalent](#) or an [associate degree](#) for entry-level employment (Exhibit 5).¹⁰

Exhibit 5: National Educational Attainment for *Water and Wastewater Technology Occupations*¹¹

Occupational Title	Typical Entry-Level Education
Environmental Engineering Technologists and Technicians	Associate degree
Environmental Science and Protection Technicians, Including Health	Associate degree
Industrial Machinery Mechanics	High school diploma or equivalent
Pump Operators, Except Wellhead Pumpers	High school diploma or equivalent
Water and Wastewater Treatment Plant and System Operators	High school diploma or equivalent

Similarly, a [high school diploma or GED](#) was the most requested listed educational requirement in online job postings for *Water and Wastewater Technology Occupations* in San Diego County between January 1, 2023 and December 31, 2025. Employers also requested the certifications shown in Exhibit 6, including CDL Class C licenses, wastewater operator certifications, and security clearances.¹²

¹⁰ Lightcast Q3 2026; QCEW, Non-QCEW, Self-Employed.

¹¹ Lightcast Q3 2026; QCEW, Non-QCEW, Self-Employed.

¹² Lightcast Q3 2026; Job Posting Analytics, January 2023 through December 2025.

**Exhibit 6: Top Certifications for Water and Wastewater Technology Occupations
in San Diego County in Online Job Postings (2023-2025)¹³**

- | | |
|---|--------------------------------------|
| 1. CDL Class C License | 5. First Aid Certification |
| 2. Wastewater Operator Certification | 6. CDL Class A License |
| 3. Security Clearance | 7. CDL Class B License |
| 4. Cardiopulmonary Resuscitation (CPR)
Certification | 8. Commercial Driver's License (CDL) |

Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes. There are [nine](#) TOP codes and [12](#) CIP codes related to *Water and Wastewater Technology Occupations* (Exhibit 7).

Exhibit 7: Related TOP and CIP Codes for Water and Wastewater Technology Occupations¹⁴

TOP or CIP Code	TOP or CIP Program Title
TOP 0958.00	Water and Wastewater Technology
TOP 0303.00	Environmental Technology
TOP 1920.00	Ocean Technology
TOP 0301.00	Environmental Science
TOP 0302.00	Environmental Studies
TOP 0934.20	Industrial Electronics
TOP 0935.00	Electro-Mechanical Technology
TOP 0943.00	Instrumentation Technology
TOP 0945.00	Industrial Systems Technology and Maintenance
CIP 15.0506	Water Quality and Wastewater Treatment Management and Recycling Technology/Technician
CIP 15.0507	Environmental Engineering Technology/Environmental Technology
CIP 15.0508	Hazardous Materials Management and Waste Technology/Technician
CIP 41.9999	Science Technologies/Technicians, Other
CIP 03.0104	Environmental Science
CIP 30.4401	Geography and Environmental Studies

¹³ Lightcast Q3 2026; Job Posting Analytics, January 2023 through December 2025.

¹⁴ This brief uses a conservative estimate of program supply based on the nine TOP and 12 CIP codes listed in Exhibit 7.

TOP or CIP Code	TOP or CIP Program Title
CIP 15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician
CIP 15.0499	Electromechanical Technologies/Technicians, Other
CIP 15.0612	Industrial Technology/Technician
CIP 47.0105	Industrial Electronics Technology/Technician
CIP 47.0303	Industrial Mechanics and Maintenance Technology/Technician

According to TOP data, six community colleges supply the region with awards for these occupations: Cuyamaca College, MiraCosta College, Palomar College, San Diego City College, San Diego Mesa College, and Southwestern College. According to CIP data, three non-community colleges supply the region with awards: Point Loma Nazarene University, San Diego State University, and the University of San Diego. Combined, the nine institutions confer an average of 173 awards annually (Exhibit 8). Displayed subgroup totals may differ by one due to rounding.

**Exhibit 8: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions
(Program Year 2021-22 Through Program Year 2024-25 Average)**

TOP or CIP Code	TOP or CIP Program Title	3-Yr Annual Average CC Awards (PY22-23 to PY24-25)	Other Institutions 3-Yr Average Awards (PY21-22 to PY23-24)	Total Average Supply (PY21-22 to PY24-25)
0958.00	Water and Wastewater Technology	52	0	52
	Cuyamaca	15	0	
	• Associate degree	6	0	
	• Certificate 30 < 60 units	9	0	
	• Certificate 16 < 30 units	1	0	
	Palomar	37	0	
	• Associate degree	15	0	
	• Certificate 30 < 60 units	16	0	
	• Certificate 16 < 30 units	6	0	

TOP or CIP Code	TOP or CIP Program Title	3-Yr Annual Average CC Awards (PY22-23 to PY24-25)	Other Institutions 3-Yr Average Awards (PY21-22 to PY23-24)	Total Average Supply (PY21-22 to PY24-25)
0303.00	Environmental Technology	23	0	23
	Cuyamaca	18	0	
	• Associate degree	12	0	
	• Certificate 30 < 60 units	4	0	
	• Certificate 16 < 30 units	2	0	
	San Diego City	1	0	
	• Associate degree	0	0	
	• Certificate 16 < 30 units	1	0	
	Southwestern	3	0	
	• Certificate 16 < 30 units	1	0	
	• Certificate 6 < 18 units	3	0	
0302.00	Environmental Studies	17	0	17
	MiraCosta	3	0	
	• Certificate 30 < 60 units	3	0	
	Palomar	6	0	
	• Certificate 16 < 30 units	6	0	
	San Diego City	3	0	
	• Associate degree	3	0	
	San Diego Mesa	6	0	
	• Associate degree	6	0	
03.0104	Environmental Science	0	80	80
	Point Loma Nazarene University	0	4	
	• Bachelor's degree	0	4	
	San Diego State University	0	36	
	• Bachelor's degree	0	36	
	University of San Diego	0	40	
	• Bachelor's degree	0	40	
			Total	173

Demand vs. Supply

Comparing labor demand with labor supply suggests that there is a **supply gap** for these occupations in San Diego County, with **468** annual openings and **173** average annual awards—a gap of **295** workers. Comparatively, there are **5,267** annual openings in California and **3,013** annual awards, suggesting a statewide supply gap of **2,254** workers (Exhibit 9).^{15,16}

Exhibit 9: Labor Demand (Annual Openings) Compared with Labor Supply (Average Annual Awards)

	Demand (Annual Openings)	Supply (Average Annual Awards)	Supply Gap or Oversupply
San Diego	468	173	295
California	5,267	3,013	2,254

Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed.

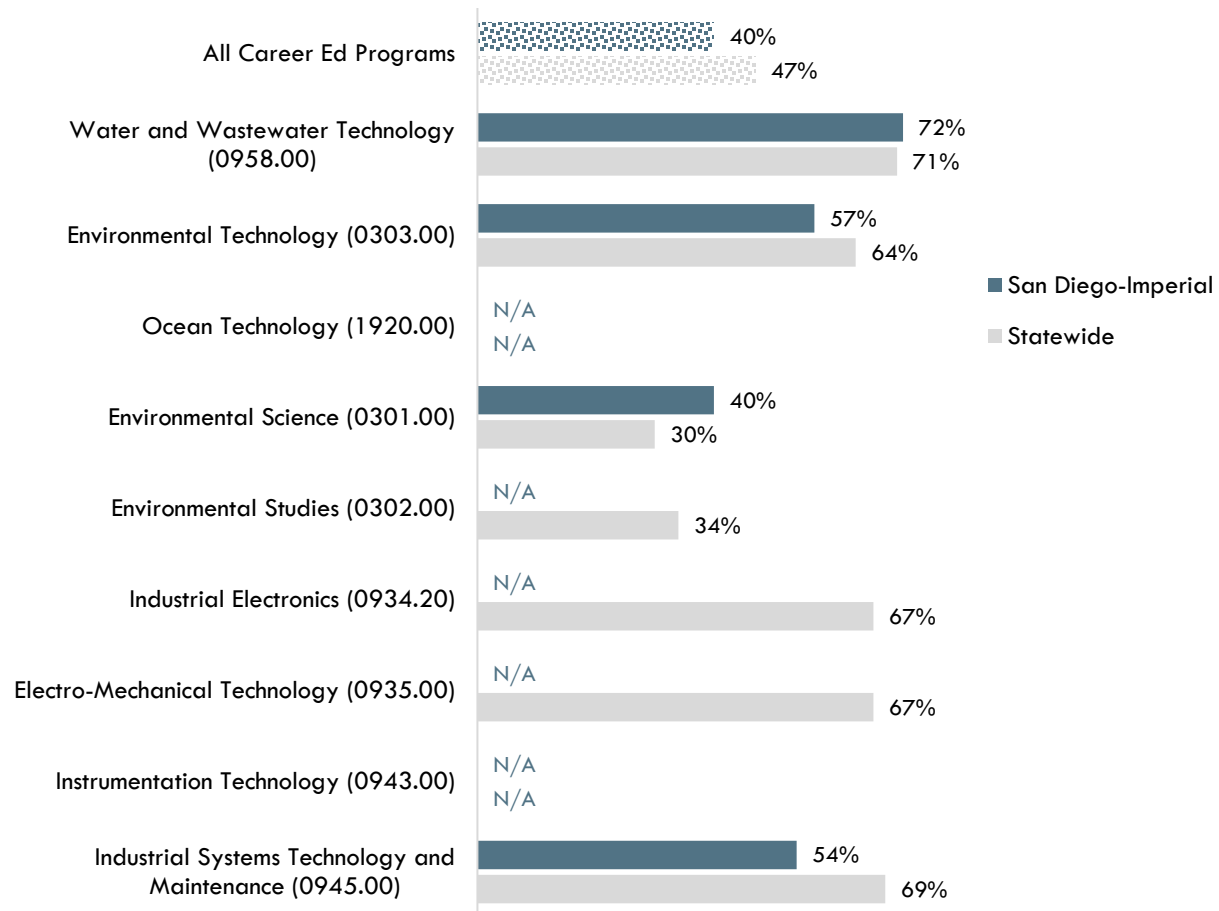
¹⁵ San Diego County and California demand data are from Lightcast Q3 2026 projections for 2025–2030. Community college award data are from the California Community Colleges Chancellor's Office MIS Data Mart; other postsecondary award data are from the Integrated Postsecondary Education Data System.

¹⁶ California Community Colleges Centers of Excellence. Supply and Demand Tables. coeccc.net/our-resources

Student Outcomes and Regional Comparisons

According to the California Community Colleges DataVista, available San Diego-Imperial outcomes show that 40% to 72% of students earned a living wage after completing a related program, compared with 30% to 71% statewide. The comparable rates for all Career Education programs were 40% in the region and 47% statewide (Exhibit 10).¹⁷

Exhibit 10: Percentage of Students Who Earned a Living Wage by Program, PY2023-24¹⁸



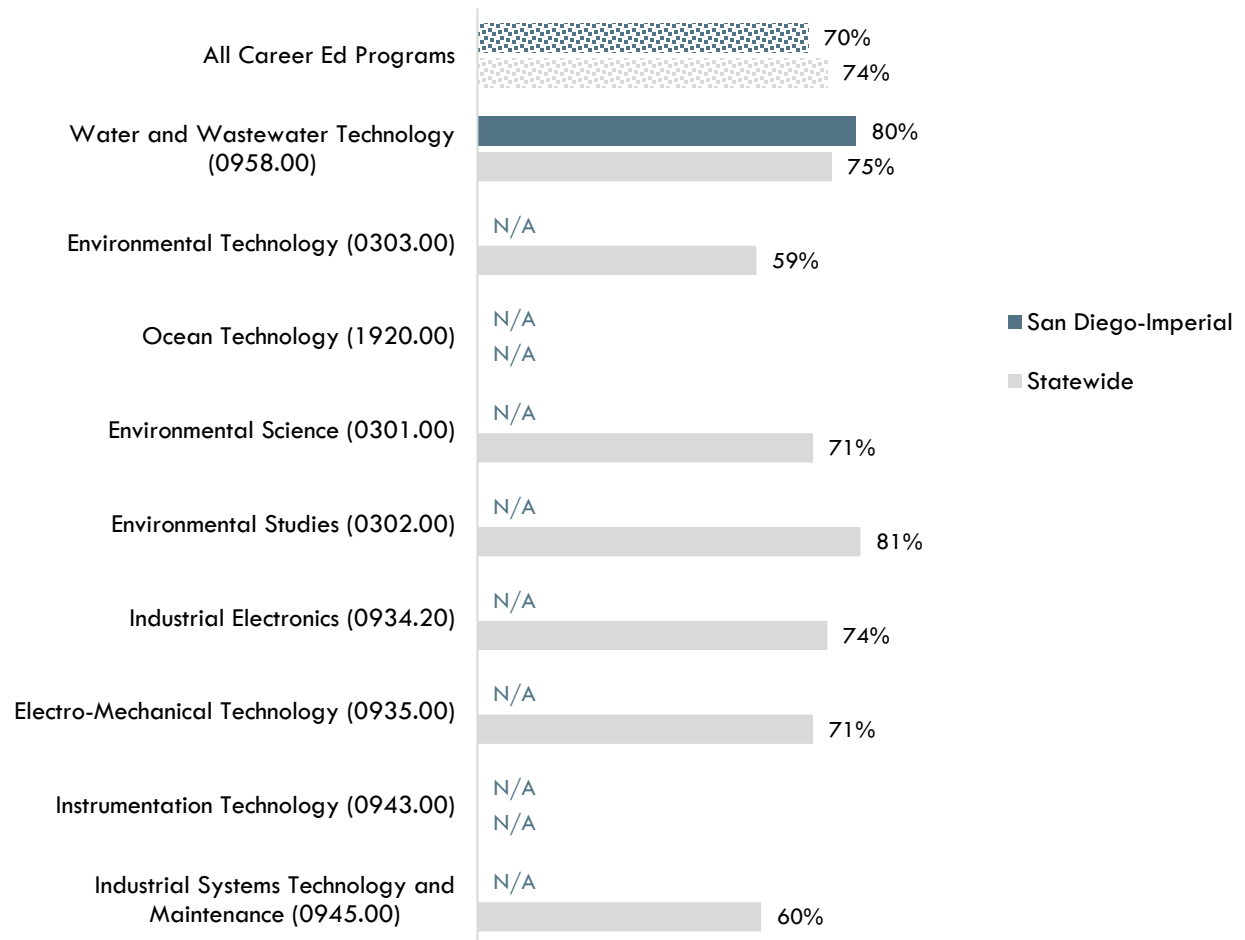
"N/A" indicates insufficient data.

¹⁷ California Community Colleges DataVista. <https://datavista.cccco.edu/>

¹⁸ Most recent year with available data is Program Year 2023–24. The measure reports the percentage of completers and skills builders who exited and attained a living wage.

According to DataVista, 80% of students who completed Water and Wastewater Technology in the San Diego-Imperial region reported a job closely related to their field of study, compared with 75% statewide. The comparable rates for all Career Education programs were 70% in the region and 74% statewide (Exhibit 11).¹⁹

**Exhibit 11: Percentage of Students in a Job Closely Related to Field of Study
by Program, PY2022–23²⁰**



"N/A" indicates insufficient data.

¹⁹ California Community Colleges DataVista. <https://datavista.cccco.edu/>

²⁰ Most recent year with available data is Program Year 2022–23. The measure reports the percentage of CTE Outcomes Survey respondents employed in the same or a similar field as their program of study.

Employers

Between January 1, 2023 and December 31, 2025, the top employers in San Diego County for *Water and Wastewater Technology Occupations* included [City Of San Diego](#), [Hilton](#), [Transdev](#), [General Atomics](#), and [City Of Escondido](#), based on online job postings (Exhibit 12).

Exhibit 12: Top Employers for *Water and Wastewater Technology Occupations* in San Diego County²¹

Top Employers	
• City Of San Diego • Hilton • Transdev • General Atomics • City Of Escondido	• Hollandia Dairy • CalPortland • City Of Oceanside • Veolia • Jacobs Solutions

Skills

Exhibit 13 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2023 and December 31, 2025.

Exhibit 13: Top Skills for *Water and Wastewater Technology Occupations* in San Diego County²²

Specialized Skills	Soft Skills	Software Skills
• Wastewater • Valves • Sewage Treatments • Machinery • Power Tool Operation • Wastewater Treatment Plant • Hand Tools • Water Treatment • Lifting Ability • Biology • Preventive Maintenance	• Operations • Communication • Troubleshooting • Management • English Language • Problem Solving • Customer Service	• N/A

²¹ Lightcast Q3 2026; Job Posting Analytics, January 2023 through December 2025.

²² Lightcast Q3 2026; Job Posting Analytics, January 2023 through December 2025. Skills must populate in at least 10% of job postings to be listed.

Prepared by:

Tina Ngo Bartel, Executive Director (tngobartel@miracosta.edu)

John Edwards, Research Analyst (jedwards@miracosta.edu)



SAN DIEGO & IMPERIAL
CENTER OF EXCELLENCE

Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the California Community Colleges Centers of Excellence (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.