

Labor Market Analysis for Program Modification: 0958.00/Water and Wastewater Technology (Water and Wastewater Technology Program) (Water Utility Management AS)

Orange County Center of Excellence, October 2023



Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met <input type="checkbox"/>	Endorsed: Some LMI Criteria Met <input checked="" type="checkbox"/>	Not LMI Endorsed <input type="checkbox"/>
Program LMI Endorsement Criteria			
	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Supply Gap:	<p><i>Comments:</i> There is projected to be 221 annual job openings throughout Los Angeles and Orange counties for <i>water and wastewater treatment plant and system operators</i>, which is slightly less than the 256 awards conferred by educational institutions. However, the oversupply is within the COE's margin (25% over or under the number of annual job openings) to be considered "supply met" rather than a "supply gap".</p>		
	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Living Wage: (Entry-Level, 25 th)	<p><i>Comments:</i> Entry-level hourly wages for water and wastewater treatment plant and system operators are \$27.35, which is above the OC living wage of \$20.63.</p>		
	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Education:	<p><i>Comments:</i> The typical entry-level education for <i>water and wastewater treatment plant and system operators</i> is a high school diploma or equivalent. However, more than one-third of workers in the field have completed some college or an associate degree as their highest level of education.</p>		
Emerging Occupation(s)			
	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
	<i>Comments:</i> N/A		

The Orange County Center of Excellence for Labor Market Research (OC COE) prepared this report to determine whether there is a supply gap in the Los Angeles/Orange County regional labor market related to one middle-skill occupation:

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

In addition to the analysis of this occupation, the OC COE has conducted extensive research on the water/wastewater industry, including a statewide analysis of eight mission-critical occupations which are essential to water and wastewater operations. *California Workforce Needs in the Water/Wastewater Industry* also includes results from a statewide survey of water/wastewater employers, demographic data, and findings and recommendations for the water/wastewater industry to close workforce and equity gaps.¹

¹ <https://coecc.net/california/2023/03/california-workforce-needs-in-the-water-wastewater-industry/>

Based on the available data, there does not appear to be a supply gap for *water and wastewater treatment plant and system operators*. However, the oversupply is within the COE's margin (25% over or under the number of annual job openings) to be considered "supply met" rather than a "supply gap". Typical entry-level hourly wages are above the living wage and typical education requirements for this occupation aligns with a community college education. **Therefore, due to some of the regional labor market criteria being met, the COE endorses this proposed program.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for the occupations included in this report.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25 th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Water and Wastewater Treatment Plant and System Operators (51-8031)	LA: 179 OC: 43	LA: 64 OC: 192	OC: \$27.35	High School Diploma or Equivalent	44%
Total	221	256	N/A	N/A	N/A

Demand:

- The number of jobs related to *water and wastewater treatment plant and system operators* is projected to increase 1% through 2027, equating to 221 annual job openings.
- The hourly entry-level wage for *water and wastewater treatment plant and system operators* is \$27.35 in Orange County, which is above the living wage of \$20.63.
- There were 244 online job postings for *water and wastewater treatment plant and system operators* over the past 12 months. The highest number of postings were for wastewater operators, wastewater treatment operators, water operators, and water technicians.
- The typical entry-level education for *water and wastewater treatment plant and system operators* is a high school diploma or equivalent.
- Approximately 44% of workers in the field have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 256 awards conferred by 3 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- There were no awards conferred by non-community college institutions from 2019 to 2021.
- Orange County community college students that exited water and wastewater technology programs in the 2020-21 academic year had a median annual wage of \$79,056 after exiting the program and 82% attained the regional living wage.
- Throughout Orange County, 78% of water and wastewater technology students that exited their program in 2019-20 reported that they are working in a job closely related to their field of study.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for water and wastewater treatment plant and system operators from 2017 through 2027. Employment for water and wastewater treatment plant and system operators declined 12% from 2019 to 2020 due to the COVID-19 pandemic, which is larger than the 7% decline across all occupations during the same period. However, employment in the occupation began to increase in 2022.

Exhibit 2: Annual Percent Change in Jobs for Water and Wastewater Treatment Plant and System Operators, 2017-2027

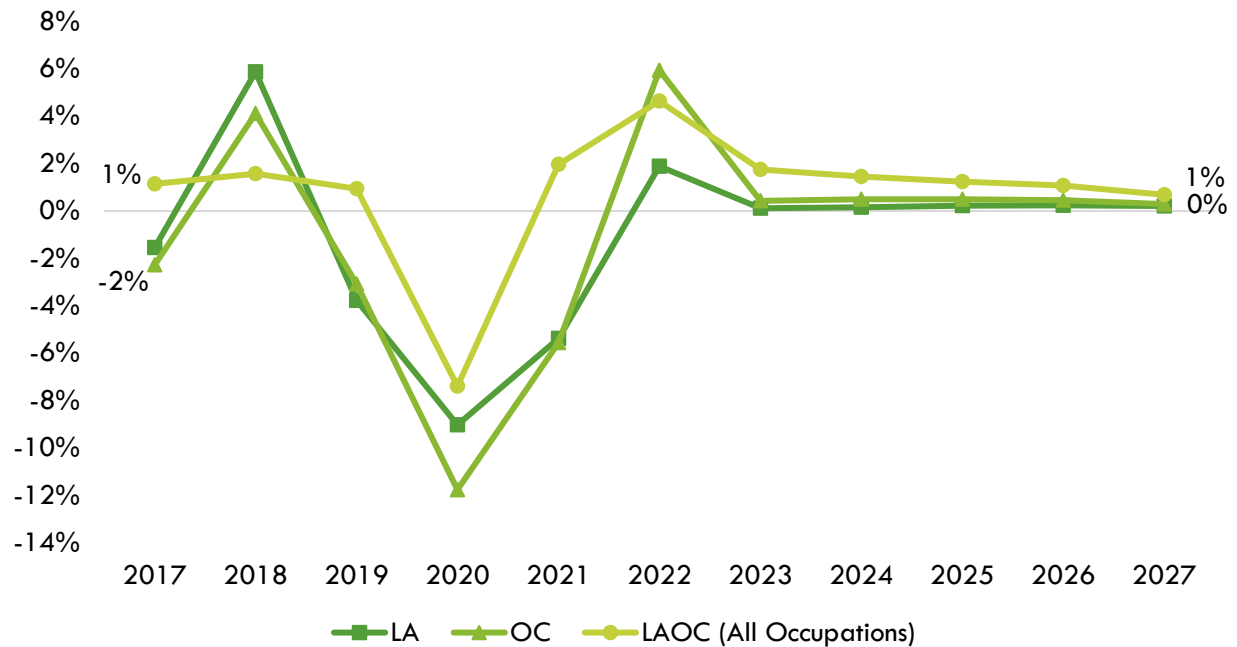


Exhibit 3 shows the five-year occupational demand projections for water and wastewater treatment plant and system operators. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase by 1% through 2027. There is projected to be 221 jobs available annually.

Exhibit 3: Occupational Demand in Los Angeles and Orange Counties²

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	1,799	1,816	17	1%	179
Orange	419	428	9	2%	43
Total	2,218	2,245	26	1%	221

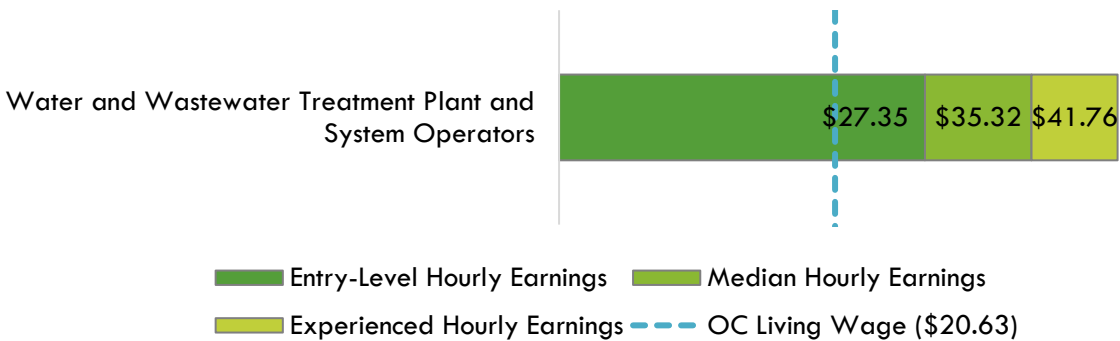
² Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for *water and wastewater treatment plant and system operators* in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region.

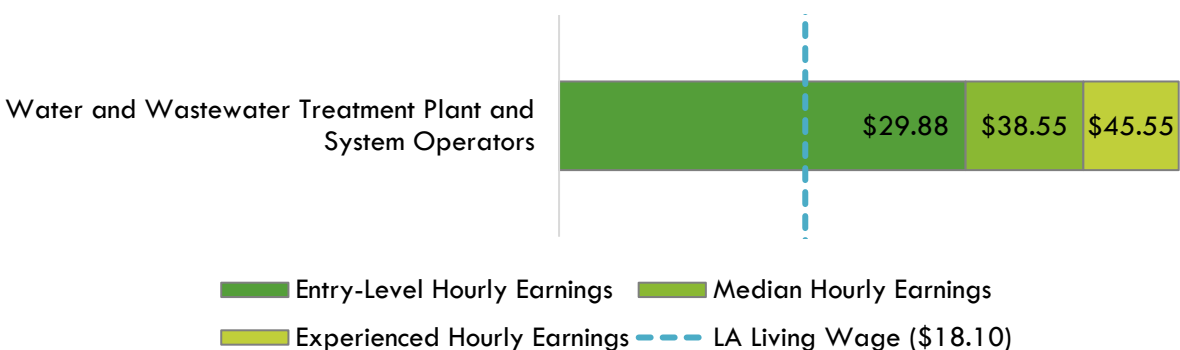
The typical entry-level hourly earnings for *water and wastewater treatment plant and system operators* are \$27.35, which is above the living wage for one adult in Orange County (\$20.63). Orange County's average wage (\$34.93) is below the average statewide wage of \$37.45 for this occupation. Exhibit 4 shows the wage range for *water and wastewater treatment plant and system operators* in Orange County and how it compares to the regional living wage.

Exhibit 4: Wages by Occupation in Orange County



The typical entry-level hourly earnings for *water and wastewater treatment plant and system operators* are \$29.88, which is above the living wage for one adult in Los Angeles County (\$18.10). Los Angeles County's average wage (\$38.09) is also slightly above the average statewide wage of \$37.45 for this occupation. Exhibit 5 shows the wage range for *water and wastewater treatment plant and system operators* in Los Angeles County and how it compares to the regional living wage.

Exhibit 5: Wages by Occupation in Los Angeles County



Job Postings:

Important Online Job Postings Data Note: Online job postings data is sourced from Lightcast, a labor market analytics firm that scrapes, collects, and organizes data from online job boards such as LinkedIn, Indeed, Glassdoor, Monster, GovernmentJobs.com, and thousands more. Lightcast uses natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. However, NLP has limitations that include understanding contextual words of phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors.³ For these reasons, job postings could be assigned to the wrong employer, industry, or occupation within Lightcast's database.

Additionally, there are several limitations when analyzing job postings. A single job posting may not represent a single job opening, as employers may be creating a pool of candidates for future openings or hiring for multiple positions with a single posting. Additionally, not all jobs are posted online, and jobs may be filled through other methods such as internal promotion, word-of-mouth advertising, physical job boards, or a variety of other channels.

There were 244 online job postings related to water and wastewater treatment plant and system operators listed in the past 12 months. Exhibit 6 shows the number of job postings for this occupation.

Exhibit 6: Number of Job Postings by Occupation (n=244)

Occupation	Job Postings	Percentage of Job Postings
Water and Wastewater Treatment Plant and System Operators	244	100%

The top employers in the region for water and wastewater treatment plant and system operators, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=244)

Employer	Job Postings	Percentage of Job Postings
Transdev	20	8%
Golden State Water Company	9	4%
Safety-Kleen	7	3%
American States Water Company	6	2%
Integrated Performance Consultants	6	2%
McCarthy Building Company	6	2%
Cis International Holdings	5	2%
Trojan Battery Company	5	2%
City of Downey	4	2%
City of Torrance	4	2%

The top specialized, soft, and computer skills for water and wastewater treatment plant and system operators listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 8.

³ K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), <https://link.springer.com/book/10.1007/978-81-322-3972-7>.

Exhibit 8: Top Skills by Number of Job Postings (n=244)

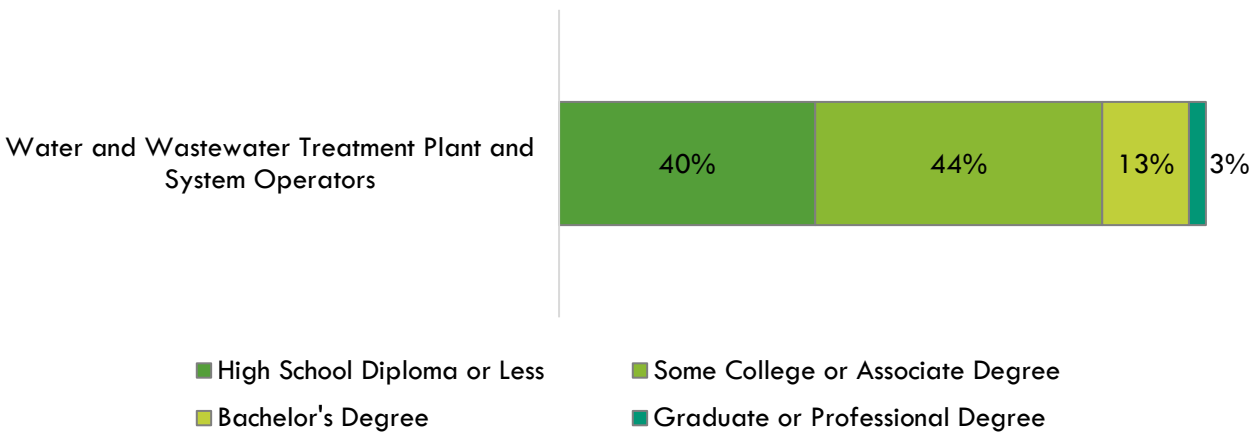
Top Specialized Skills	Top Soft Skills	Top Computer Skills
Wastewater (120)	Operations (134)	Spreadsheets (21)
Sewage Treatments (98)	Communications (91)	Microsoft Excel (18)
Valves (Piping) (84)	Management (50)	Microsoft Office (17)
Water Treatment (74)	Mathematics (50)	Microsoft Outlook (16)
Water Distribution (50)	Troubleshooting (Problem Solving) (47)	Microsoft Word (14)
Housekeeping (41)	Coordinating (38)	Operating Systems (10)
Pump Stations (41)	Good Driving Record (34)	AutoCAD (6)
Water Supply Networks (37)	Customer Service (33)	Gmail (6)
Process Control (34)	Report Writing (32)	Google Drive (6)
Supervisory Control and Data Acquisition (SCADA) (34)	Planning (31)	Operational Data Store (6)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for *water and wastewater treatment plant and system operators*. The national-level educational attainment data indicates 44% of workers in the field have completed some college or associate degree as their highest level of education. Exhibit 9 shows the educational attainment for *water and wastewater treatment plant and system operators*.

Of the 62% of cumulative job postings for *water and wastewater treatment plant and system operators* that listed a minimum education requirement in Los Angeles/Orange County, 95% (143) requested a high school diploma or an associate degree and 5% (7) requested a bachelor's degree.

Exhibit 9: National-level Educational Attainment for Occupations



Educational Supply

Community College Supply:

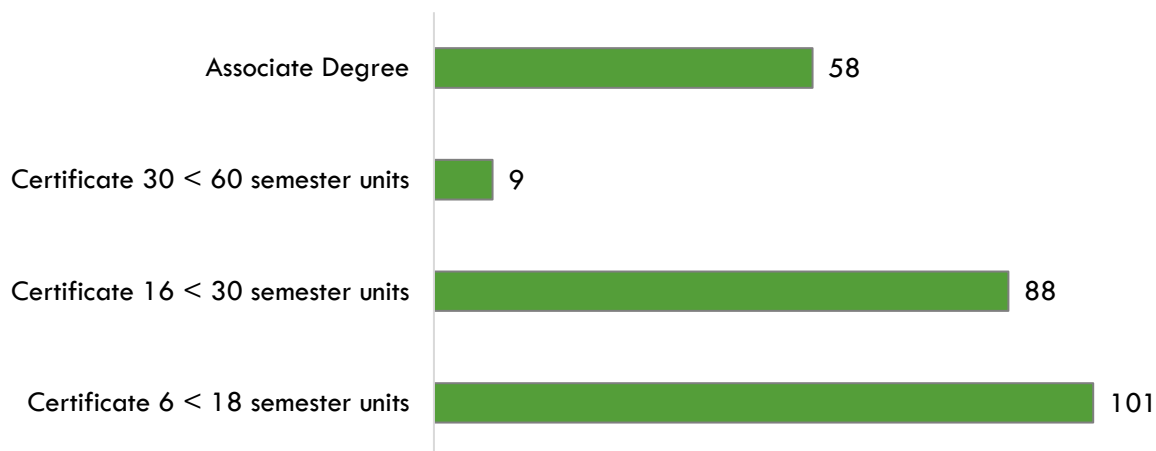
Exhibit 10 shows the three-year average number of awards conferred by community colleges in the related TOP code: Water and Wastewater Technology (0958.00). Three colleges reported completions in the region, including: Santiago Canyon, Citrus and L.A. Trade. Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

Exhibit 10: Regional Community College Awards (Certificates and Degrees), 2019-2022

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
0958.00	Water and Wastewater Technology	Citrus	32	53	37	40
		LA Trade	27	21	23	24
		LA Subtotal	59	74	60	64
		Santiago Canyon	94	369	111	192
		OC Subtotal	94	369	111	192
Supply Total/Average			153	443	171	256

Exhibit 11 shows the annual average community college awards by type from 2019-20 through 2021-22. Of the 256 awards, 39% (101) were for certificates between 6 and less than 18 semester units, 34% (88) were for certificates between 16 and less than 30 semester units, and 23% (58) were for associate degrees.

Exhibit 11: Annual Average Community College Awards by Type, 2019-2022



Community College Student Outcomes:

Exhibit 12 shows the Strong Workforce Program (SWP) metrics for water and wastewater technology programs in Rancho Santiago Community College District (RSCCD), the Orange County Region, and California. Currently, Santiago Canyon College is the only college in Orange County that offers water and wastewater technology programs. Therefore, all metrics for the Orange County region are identical to those for RSCCD.

RSCCD students who exited water and wastewater technology programs in the 2020-21 academic year had considerably higher median annual earnings (\$79,056) compared to all water and wastewater technology students statewide (\$62,010). Additionally, approximately 78% of RSCCD water and wastewater technology students reported working in a job closely related to their field of study, higher than the statewide average (74%). A vast majority (82%) of RSCCD students also attained the living wage.

Exhibit 12: Water and Wastewater Technology (0958.00) Strong Workforce Program Metrics, 2020-21⁴

SWP Metric	RSCCD	OC Region	California
SWP Students	627	Same as RSCCD	2,731
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	26%	Same as RSCCD	30%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	Insufficient Data	Same as RSCCD	41%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	74	Same as RSCCD	268
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	Insufficient Data	Same as RSCCD	38
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	78%	Same as RSCCD	74%
Median Annual Earnings for SWP Exiting Students	\$79,056 (\$38.01)	Same as RSCCD	\$62,010 (\$29.81)
Median Change in Earnings for SWP Exiting Students	27%	Same as RSCCD	24%
SWP Exiting Students Who Attained the Living Wage	82%	Same as RSCCD	79%

⁴ All SWP metrics are for 2020-21 unless otherwise noted.

Non-Community College Supply:

For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for *water and wastewater treatment plant and system operators*. However, there were no awards conferred by other institutions under the related Classification of Instructional Programs (CIP) Code: Water Quality and Wastewater Treatment Management and Recycling Technology/Technician. Between 2020 and 2021, non-community colleges in the region did not confer any awards under this CIP code.

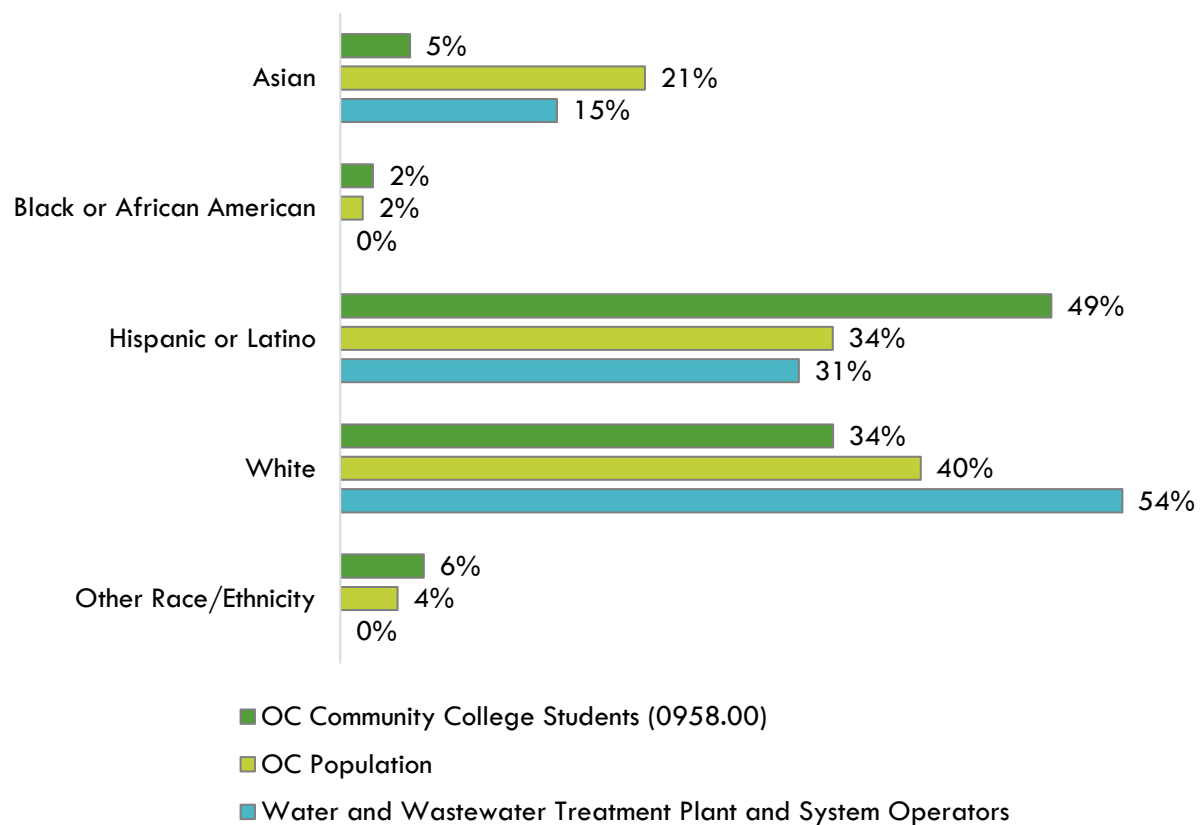
Regional Demographics

This section analyzes demographic data for Orange County community college students enrolled in water and wastewater technology programs compared to the OC population, as well occupational data, for the purpose of identifying potential diversity and equity issues that can be addressed by community college programs.

Ethnicity:

Exhibit 14 shows the ethnicity of Orange County community college students enrolled in water and wastewater technology programs compared to the overall Orange County population, as well as for workers employed as *water and wastewater treatment plant and system operators*. White (54%) workers comprise the largest group of *water and wastewater treatment plant and system operators*, higher than their representation among the population (40%) or water and wastewater technology students (34%). Hispanic or Latino workers are the next largest group of *water and wastewater treatment plant and system operators* at 31%, slightly lower than their representation in the population (34%) but considerably lower than the number of Hispanic or Latino water and wastewater technology students (49%).

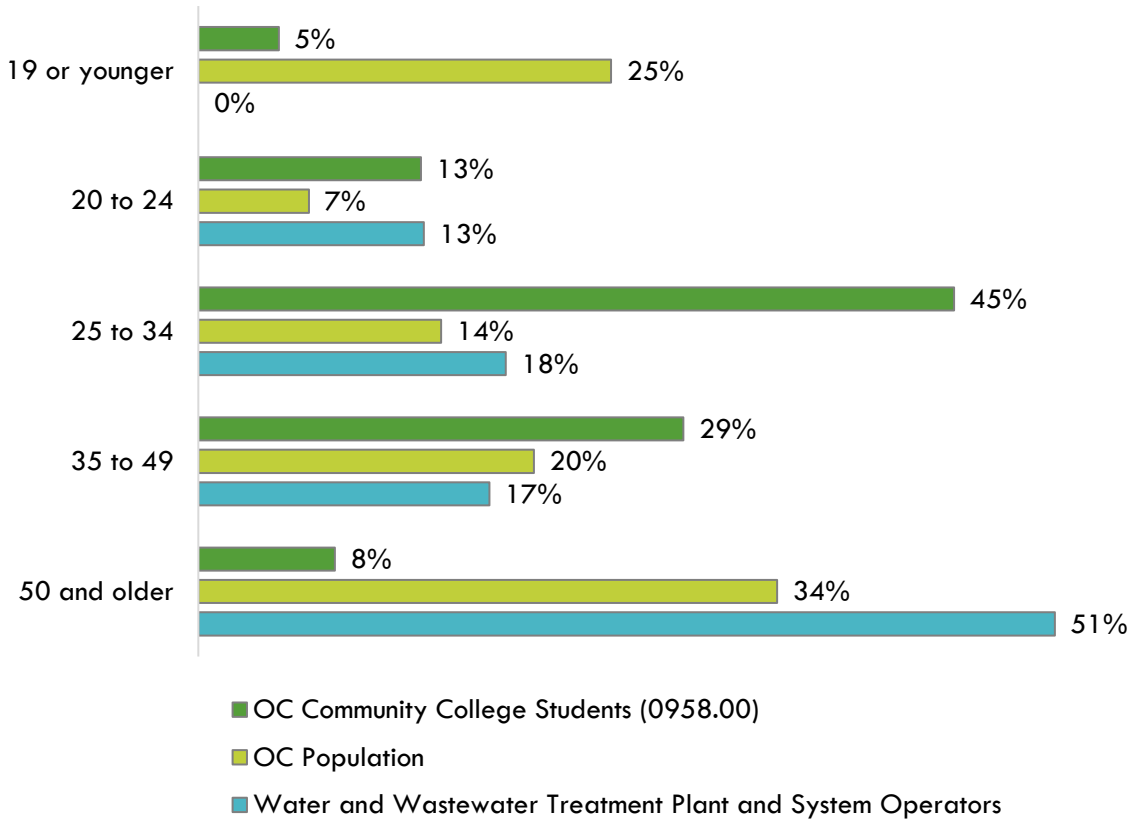
Exhibit 14: Program and County Demographics by Ethnicity



Age:

Exhibit 14 shows the age of Orange County community college students enrolled in water and wastewater technology programs compared to the overall Orange County population, as well as *water and wastewater treatment plant and system operators*. *Water and wastewater treatment plant and system operators* are largely older, with a majority (51%) of workers aged 50 years or older, considerably higher than the population (34%). *Water and wastewater technology students*, however, are largely younger, with nearly two-thirds (63%) of students aged 34 years or younger.

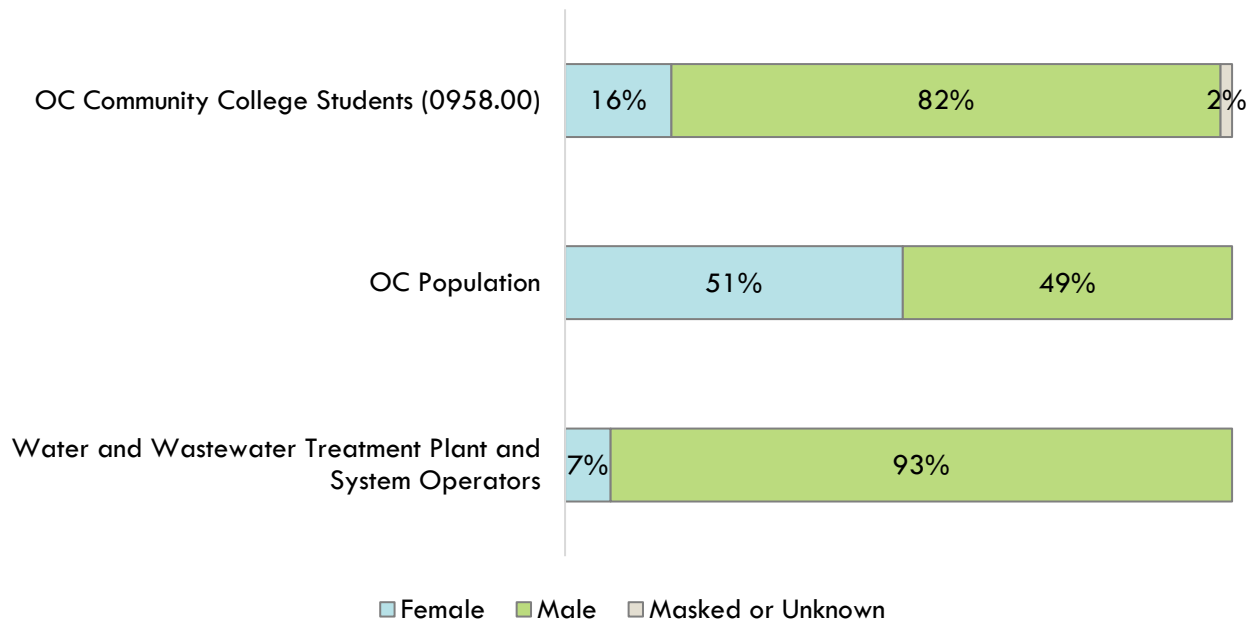
Exhibit 14: Program and County Demographics by Age



Sex:

Exhibit 15 shows the sex of Orange County community college students enrolled in water and wastewater technology programs compared to the overall Orange County population as well as *water and wastewater treatment plant and system operators*. While women and men are almost evenly represented among the population, men comprise almost all *water and wastewater treatment plant and system operators* (93%) and a vast majority of water and wastewater technology students (82%).

Exhibit 15: Program and County Demographics by Sex



Appendix A: Methodology

The OC COE prepared this report by analyzing data from occupations and education programs. Occupational data is derived from Lightcast, a labor market analytics firm that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Program supply data is drawn from two systems: Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP).

Using a TOP-SOC crosswalk, the OC COE identified middle-skill jobs for which programs within these TOP codes train. Middle-skill jobs include:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

The OC COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The COE developed a “supply table” with this information, which is the source of the program supply data for this report. TOP code data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP code data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data), also known as IPEDS. TOP is a system of numerical codes used at the state level to collect and report information on California community college programs and courses throughout the state that have similar outcomes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. Institutions outside of the California Community College system do not use TOP codes in their reporting systems.

Data included in this analysis represent the labor market demand for relevant positions most closely related to the proposed program as expressed by the requesting college in consultation with the OC COE. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study which can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions.

All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; 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 findings; however, neither the Centers of Excellence for Labor Market Research (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.

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	<p>Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/</p>
Living Wage	<p>The living wage is derived from the Insight Center's California Family Needs Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data assesses the cost of housing, food, child care, health care, transportation, and taxes. For more information, see: https://insightccd.org/family-needs-calculator/</p> <p>The living wage for one adult in Orange County is \$20.63 per hour (\$42,910.40 annually). This figure is used by the CCCCCO to calculate the percentage of students that attained the regional living wage.</p>
Typical Education and Training Requirements, and Educational Attainment	<p>The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm</p>
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	<p>The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/</p>
Educational Supply	<p>The CCCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu</p> <p>The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions</p>
Student Metrics and Demographics	<p>LaunchBoard, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://www.calpassplus.org/LaunchBoard/Home.aspx</p>
Population and Occupation Demographics	<p>The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs</p> <p>Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml</p>

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