

**Labor Market Analysis for:**  
**0958.00 Water and Wastewater Technology**  
**Inland Empire/Desert Center of Excellence, May 2024**  
 Prepared by: Chris Cruzcosa, ccruzcosa@iegocollaborative.org



## Summary

|                                |                          |   |                          |
|--------------------------------|--------------------------|---|--------------------------|
| <b>Program LMI Endorsement</b> | All LMI Criteria Met     | <b>Some LMI Criteria Met<br/>(Proceed with Caution)</b> | LMI Criteria NOT Met     |
|                                | <input type="checkbox"/> | <input checked="" type="checkbox"/>                     | <input type="checkbox"/> |

| Program LMI Endorsement Criteria |  |   |
|----------------------------------|--|---|
| <b>Supply Gap</b>                | <b>Yes</b> <input checked="" type="checkbox"/>   | <b>No</b> <input type="checkbox"/>            |
|                                  | <i>Comments:</i> There is <i>projected</i> to be <b>469 annual job openings</b> throughout the Inland Empire/Desert region, which is more than the <b>59 annual average awards conferred by educational institutions over the last 3 years</b> . Supply data includes both community college awards (59) and non-community college awards (0). |   |
| <b>Living Wage</b>               | <b>Yes</b> <input checked="" type="checkbox"/>   | <b>No</b> <input type="checkbox"/>            |
|                                  | <i>Comments:</i> <b>All (100%) of annual job openings</b> for these five occupations <b>have entry-level hourly wages above the IE/D living wage of 13.74.</b> <sup>1</sup>  |   |
| <b>Education</b>                 | <b>Yes</b> <input type="checkbox"/>  | <b>No</b> <input checked="" type="checkbox"/> |
|                                  | <i>Comments:</i> <b>Most job postings for target occupations require a bachelor's degree (70%).</b> See exhibits 8 and 9 for more details.   |   |

The Inland Empire/ Desert (IE/D) Center of Excellence for Labor Market Research (IE/D COE) reviewed the following occupations to prepare this report:

- Middle-Skill (typically require training/education above a HS diploma but less than a bachelor's degree)
  - Environmental Engineering Technologists and Technicians (17-3025)
  - Water and Wastewater Treatment Plant and System Operators (51-8031)
- Above Middle-Skill (typically require a bachelor's degree)
  - Natural Sciences Managers (11-9121)
  - Civil Engineers (17-2051)
  - Hydrologists (19-2043)

## Summary of findings

### Demand

- The number of jobs related to the listed occupations are projected to increase 9% through 2027, with 469 annual job openings (new and replacement jobs).
- Hourly entry-level wages for all occupations are above living wage at the 25<sup>th</sup> percentile hourly wage ranging from \$27.14 to \$53.77 in IE/D.
- There were 976 online job postings from 348 employers over the past 12-months with the highest postings for civil engineers and water and wastewater treatment plant and system operators.
- Most job postings for target occupations require a bachelor's degree (70%), followed by a high school degree or equivalent (25%) and associate degree (4%).

### Supply

- On average, there were 59 annual awards conferred by educational institutions over the last 3 years in related fields: 59 from community colleges and 0 from other institutions (e.g., 4-year universities, private schools).
- IE/D community college students that exited these programs in the 2021-22 academic year earned a median annual wage of \$55,180 (\$26.53 per hour).
- 75% of students that exited their program in 2021-22 reported that they are working in a job closely related to their field of study.
- Community college programs play an important role diversifying the talent pipeline in these occupations. Most IE/D professionals in wastewater technology occupations are White (46%), "mid-career" age category (45%), and male (85%). Most community college students in related programs are Hispanic/Latino (55%), "early career" or "mid-career" age categories (70%), and male (82%)..

<sup>1</sup> While the [UW self-sufficiency standard](#) is currently used by the CO and other COEs, the self-sufficiency standard was last updated by UW in 2021, does not account for significant increases in the cost of living in the Inland Empire the last three years, and is below the State of California minimum wage of \$16.00. For these reasons, the COE will provide an alternative living wage calculation from MIT in the analysis below as an additional reference point. MIT estimates, the living wage for an adult with no kids living in 2024 is \$26.30 in Riverside County and \$25.17 in San Bernadino County.

## Introduction

California Community College Water and Wastewater Technology (TOP 0958.00) programs prepare students for employment using the principles, technical skills and equipment used to process, purify, store and distribute potable water, and dispose of wastewater. Design, construction, operation, and maintenance of equipment for water or wastewater treatment systems (Taxonomy of Programs, 2023). The knowledge, skills, and abilities trained by Water and Wastewater Technology programs lead to employment in occupations related to wastewater technology.

## Job Demand

In 2022, there were 5,041 jobs in occupations related to wastewater technology in the IE/D region. Regional employment for this occupation group is projected to increase by 9% through 2027 with 469 job openings projected annually. Exhibit 1 displays the job count, five-year projected job growth, and job openings in the region.

**Exhibit 1. Five-year projections for occupations related to wastewater technology, IE/D Region, 2022-2027**

| Occupation  | SOC     | 2022 Jobs    | 2027 Jobs    | 2022 - 2027 % Change | 5-Yr Openings (New + Replacement Jobs) | Annual Openings (New + Replacement Jobs) |
|---|---------|--------------|--------------|----------------------|--|--|
| Civil Engineers   | 17-2051 | 3,134        | 3,472        | 11%                  | 1289                                   | 258                                      |
| Water and Wastewater Treatment Plant and System Operators | 51-8031 | 1,446        | 1,581        | 9%                   | 836                                    | 167                                      |
| Natural Sciences Managers                                 | 11-9121 | 250          | 275          | 10%                  | 114                                    | 23                                       |
| Environmental Engineering Technologists and Technicians   | 17-3025 | 109          | 119          | 9%                   | 60                                     | 12                                       |
| Hydrologists  | 19-2043 | 102          | 109          | 7%                   | 47                                     | 9  |
| <b>Total</b>  |         | <b>5,041</b> | <b>5,556</b> | <b>9%</b>            | <b>2347</b>                            | <b>469</b>                               |

SOURCE: LIGHTCAST 2024.1

## Job Postings

The following analysis for occupations related to wastewater technology using online job posting data.

**Important note:** The data produced in this section were generated by leveraging online job posting data sourced from Lightcast, which is the labor market analytics software tool COEs use to produce these briefs. The job posting data is collected from scraping online job boards such as LinkedIn, Indeed, Glassdoor and many others. The process Lightcast uses to assemble this data does have some limitations due to methods that recruitment professionals sometimes use (e.g., posting one job to fill multiple positions). For example, the number of jobs posted is not necessarily the same as the number of job vacancies.<sup>2</sup> While not perfect, Lightcast leverages machine learning and other AI technologies to enrich, deduplicate and aggregate this information to make it a meaningful dataset.

Exhibit 2 displays the number of job ads posted for occupations related to wastewater technology over the last 12 months and the median posting duration. Over the previous 12 months, there were 976 unique job postings for occupations related to wastewater technology in the region from 348 employers.

<sup>2</sup> "Job Posting Analytics (JPA) Methodology." Lightcast Knowledge Base, <https://kb.lightcast.io/en/articles/6957446-job-posting-analytics-jpa-methodology>

**Exhibit 2. Job ads and posting duration, IE/D Region, May 2023 – April 2024**

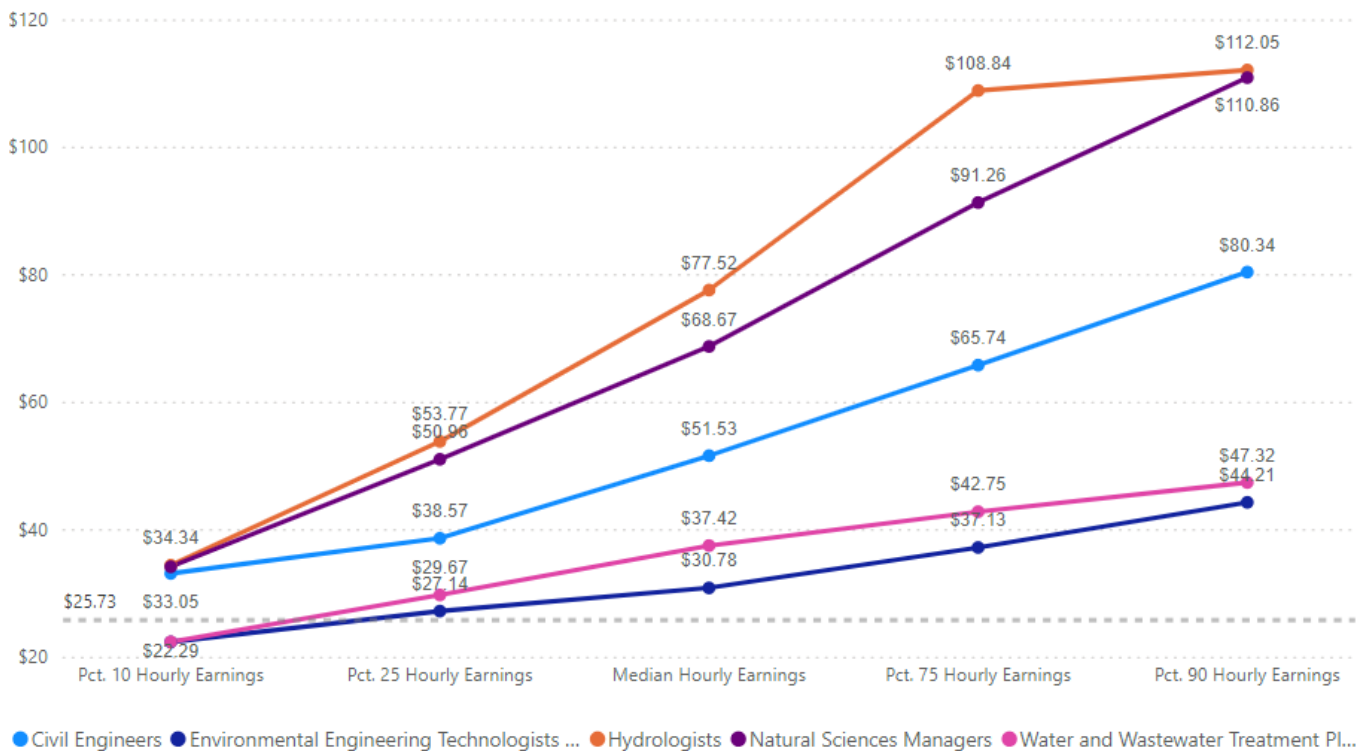
| Job Title   | Job Ads    | Median Posting Duration |
|---|------------|-------------------------|
| Civil Engineers   | 596        | 27 days                 |
| Environmental Engineering Technologists and Technicians   | 22         | 33 days                 |
| Hydrologists  | 6          | 6 days                  |
| Natural Sciences Managers                                 | 175        | 30 days                 |
| Water and Wastewater Treatment Plant and System Operators | 177        | 31 days                 |
| <b>Total</b>  | <b>976</b> |                         |

SOURCE: LIGHTCAST 2024.1

## Earnings

Exhibit 3 displays the hourly earnings for occupations related to wastewater technology and includes comparison of hourly earnings as compared to the MIT IE/D living wage of \$25.73.<sup>3</sup>

**Exhibit 3. Hourly earnings by percentile for occupations related to wastewater technology, IE/D Region, 2022**



SOURCE: LIGHTCAST 2024.1

All entry-level earnings (that is, the earnings of the lowest paid 25% of employees in the IE/D) were above the UW Self-Sufficiency Standard for the IE/D<sup>4</sup>. All of the occupations we also above the MIT living wage for an adult with no children (\$25.73).

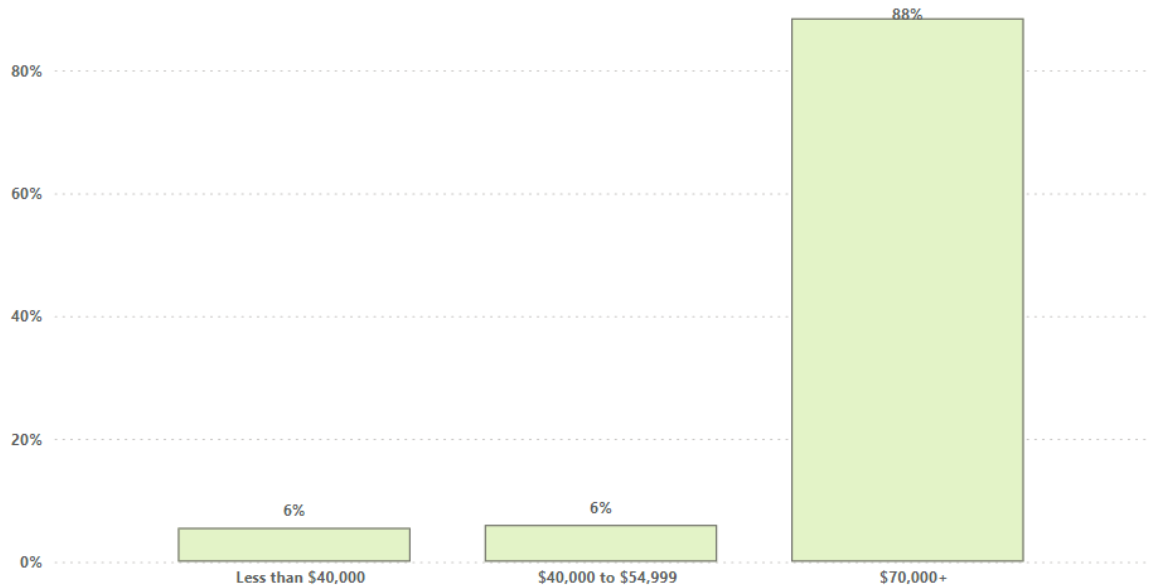
<sup>3</sup> While the [UW self-sufficiency standard](#) is currently used by the CO and other COEs, the self-sufficiency standard was last updated by UW in 2021, does not account for significant increases in the cost of living in the Inland Empire the last three years, and is below the State of California minimum wage of \$16.00. While the COE uses this standard for the LMI Wage criteria, For these reasons, the provides an alternative living wage calculation from MIT in the analysis as an additional reference point. MIT estimates, the living wage for an adult with no kids living in 2024 is \$26.30 in Riverside County and \$25.17 in San Bernadino County.

<sup>4</sup> *ibid*

## Advertised Salary from Online Job Ads

Exhibit 4 displays the regional online advertised salaries for the occupations related to wastewater technology over the last 12 months. Online job ad salary information data suggests most employers (88%) advertise an annual salary greater than \$70,000.

*Exhibit 4. Online advertised salaries occupations related to wastewater technology, IE/D Region, May '23 to April '24*



SOURCE: LIGHTCAST 2024.1

## Online Job Advertisements: top job titles, skills, education & work experience.

Exhibit 5 displays the job titles most frequently used in job postings for the occupations related to wastewater technology over the last 12 months. Assessing the top advertised job titles may provide insight into the types of positions sought by employers.

*Exhibit 5. Job titles most frequently used in job ads, IE/D May '23 to April '24*

| Job Title                      | Unique Postings |
|--------------------------------|-----------------|
| Civil Engineers                | 51              |
| Water Distribution Operators   | 29              |
| Building Engineers             | 25              |
| Project Engineers              | 23              |
| Clinical Research Coordinators | 22              |
| Site Civil Engineers           | 17              |
| Structural Engineers           | 17              |
| Transportation Engineers       | 16              |
| Plan Check Engineers           | 15              |
| Roadway Engineers              | 15              |
| Lead Civil Engineers           | 14              |

SOURCE: LIGHTCAST 2024.1

Exhibit 6 displays the employers posting the most job ads for this occupational group during the last 12 months. Showing employer names can provide insight into where students may find employment after completing a program and may inform job development and other employer engagement targets for faculty and staff involved in related programs. The County of Riverside and State of California had the highest unique job posts for this occupational group in the last 12 months. Posting intensity is the ratio of total job posts to unique job posts which are deduplicated. A higher posting intensity can represent the level of effort and activity the organization is putting into hiring for that position. The following report comes directly from Lightcast’s Job Posting Analytics dashboard.

**Exhibit 6. Employers posting the most job ads, IE/D May '23 to April '24**

| Company                      | Total/Unique (May 2023 - Apr 2024) | Posting Intensity | Median Posting Duration |
|------------------------------|------------------------------------|-------------------|-------------------------|
| County Of Riverside          | 34 / 21                            | 2 : 1             | 17 days                 |
| State of California          | 43 / 21                            | 2 : 1             | 19 days                 |
| Michael Baker International  | 232 / 20                           | 12 : 1            | 23 days                 |
| Transdev                     | 41 / 19                            | 2 : 1             | 28 days                 |
| Loma Linda University Health | 86 / 17                            | 5 : 1             | 22 days                 |
| CDM Smith                    | 79 / 17                            | 5 : 1             | 40 days                 |
| City Of Riverside Ca         | 44 / 15                            | 3 : 1             | 27 days                 |
| HNTB                         | 36 / 14                            | 3 : 1             | 28 days                 |
| Marriott International       | 43 / 13                            | 3 : 1             | 29 days                 |
| Supernal                     | 24 / 13                            | 2 : 1             | 5 days                  |

SOURCE: LIGHTCAST 2024.1

Exhibit 7 displays the top common, specialized and computer skills that were included in the job postings over the last 12 months. Today’s demand is an important indicator of which skills employers are looking for in the current market. Analyzing skills from a historical perspective as well as projecting the future needs of employers may provide insight into how the job posting skills demand compares to the market as a whole. Rapidly growing skills are those that are increasing in demand at a faster rate than the market as a whole.<sup>5</sup>

<sup>5</sup> “What are Lightcast Skill Projects”, Lightcast Knowledge base, <https://kb.lightcast.io/en/articles/8496296-what-are-lightcast-skill-projections>

**Exhibit 7. Top 10 in-demand skills from employer job ads, IE/D May '23 to April '24**

| Common skills    | Total Postings | Skill Growth Relative to Market |
|------------------|----------------|---------------------------------|
| Communication    | 373            | Lagging                         |
| Operations       | 318            | Stable                          |
| Management       | 306            | Stable                          |
| Planning         | 252            | Growing                         |
| Writing          | 212            | Growing                         |
| Research         | 180            | Growing                         |
| Coordinating     | 172            | Growing                         |
| Leadership       | 171            | Stable                          |
| Customer Service | 154            | Stable                          |
| Problem Solving  | 125            | Growing                         |

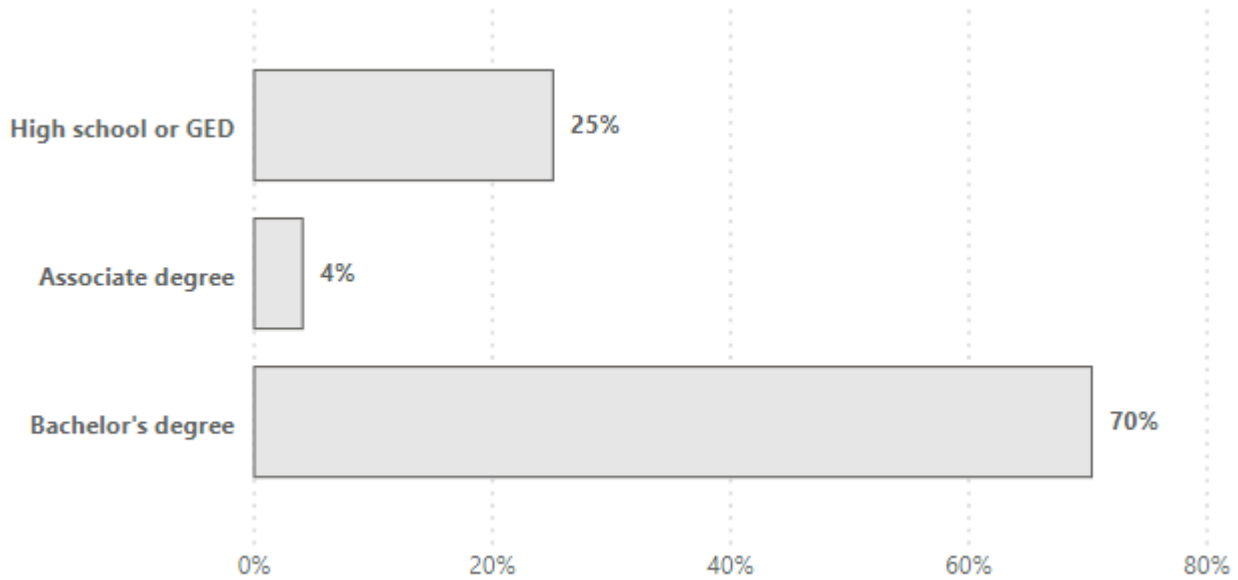
| Specialized skills                 | Total Postings | Skill Growth Relative to Market |
|------------------------------------|----------------|---------------------------------|
| Civil Engineering                  | 262            | Rapidly Growing                 |
| Project Management                 | 256            | Rapidly Growing                 |
| Construction                       | 213            | Growing                         |
| Wastewater                         | 139            | Growing                         |
| AutoCAD                            | 127            | Growing                         |
| Public Works                       | 115            | Stable                          |
| Construction Management            | 86             | Growing                         |
| AutoCAD Civil 3D                   | 80             | Stable                          |
| Valves (Piping)                    | 80             | Stable                          |
| MicroStation (CAD Design Software) | 78             | Lagging                         |

| Computer Skills                    | Total Postings | Skill Growth Relative to Market |
|------------------------------------|----------------|---------------------------------|
| AutoCAD                            | 128            | Growing                         |
| Microsoft Office                   | 105            | Growing                         |
| Microsoft Excel                    | 104            | Growing                         |
| MicroStation (CAD Design Software) | 91             | Lagging                         |
| AutoCAD Civil 3D                   | 80             | Stable                          |
| Microsoft PowerPoint               | 57             | Rapidly Growing                 |
| OpenRoads (Civil Design Software)  | 50             | Growing                         |
| Microsoft Outlook                  | 48             | Rapidly Growing                 |
| Geographic Information Systems     | 38             | Growing                         |
| Spreadsheets                       | 34             | Rapidly Growing                 |

SOURCE: LIGHTCAST 2024.1

Exhibit 8 includes the minimum educational requirements from job postings for this occupational group with bachelor's degree (70%) significantly greater than associate degree (4%) or high school diploma or equivalent (25%).

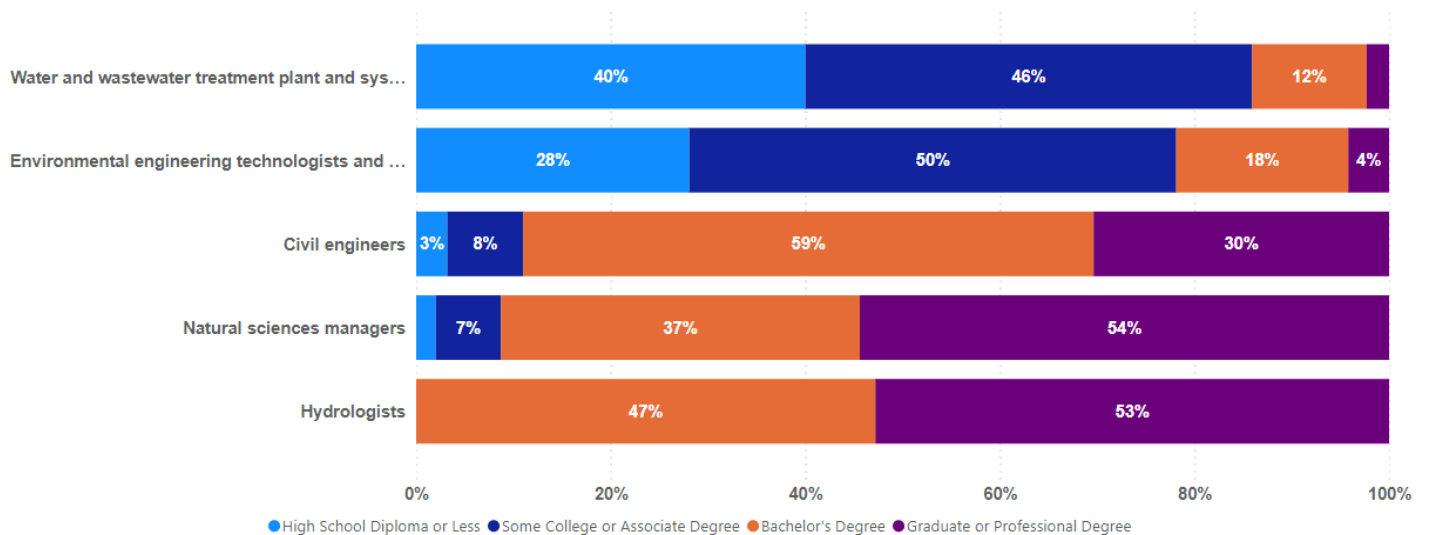
**Exhibit 8 Minimum educational requirements in job postings for this occupational group, 2023**



SOURCE: LIGHTCAST 2024.1

For the middle-skill occupations, the Bureau of Labor Statistics (BLS) education attainment data in Exhibit 9 for current professionals in the occupations of interest indicates that between 46% and 50% of workers have completed some college or an associate degree as their highest level of education. For the above middle-skill occupations, between 37% and 59% have completed a bachelor's degree.

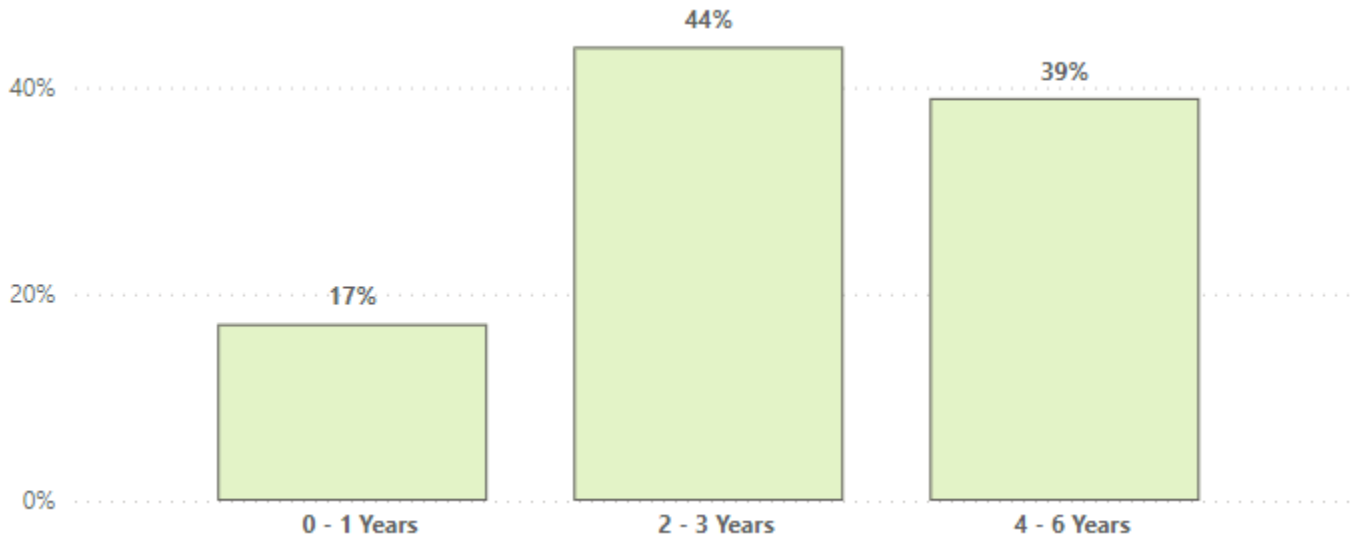
**Exhibit 9 National-level Education Attainment for Occupations**



SOURCE: BLS 2021

Exhibit 10 displays the work experience typically required from employer job ads for this occupational group. The plurality (44%) of employers listing minimum experience requirements sought candidates with 2 – 3 years of previous work experience.

**Exhibit 10 Work experience requirements, IE/D May '23 to April '24**



SOURCE: LIGHTCAST 2024.1

## Student Completions and Program Outcomes

Exhibit 11 displays student completions for the Water and Wastewater Technology (TOP 0958.00) programs over the last three academic years (2020-2023). In the previous three academic years, two regional community colleges issued an average of 59 awards in relevant programs.

**Exhibit 11 Annual average community college awards for Water and Wastewater Technology (TOP 0958.00)**

| Top Code     | Program                         | College         | 2020-2021 Awards | 2021-2022 Awards | 2022-2023 Awards | 3-Year Award Average |
|--------------|---------------------------------|-----------------|------------------|------------------|------------------|----------------------|
| 0958.00      | Water and Wastewater Technology | Mt. San Jacinto | 32               | 43               | 22               | 32                   |
| 0958.00      | Water and Wastewater Technology | San Bernardino  | 26               | 33               | 22               | 27                   |
| <b>Total</b> |                                 |                 | <b>58</b>        | <b>76</b>        | <b>44</b>        | <b>59</b>            |

SOURCE: MIS DATA MART

### Non-Community College Supply

In the previous three academic years, no regional non-community colleges institutions appear to have issued any awards in relevant programs, related by associated CIP code, using IPEDS data.

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 Water and Wastewater Technology strong workforce program outcomes, IE/D, most recent academic year**

| Program metric title  | Inland Empire/Desert | Statewide |
|---|----------------------|-----------|
| Attained a living wage (completers and skills-builders)               | 84%                  | 79%       |
| Completed 9+ career education units in one year                       | 20%                  | 27%       |
| Job closely related to the field of study                             | 75%                  | 74%       |
| Median annual earnings (all exiters)                                  | \$55,180             | \$62,010  |
| Students who attained a noncredit workforce milestone in a year       |                      |           |
| Students who earned a degree, certificate, or attained apprenticeship | 62                   | 270       |
| Unduplicated count of enrolled students                               | 534                  | 2,621     |

SOURCE: LAUNCHBOARD

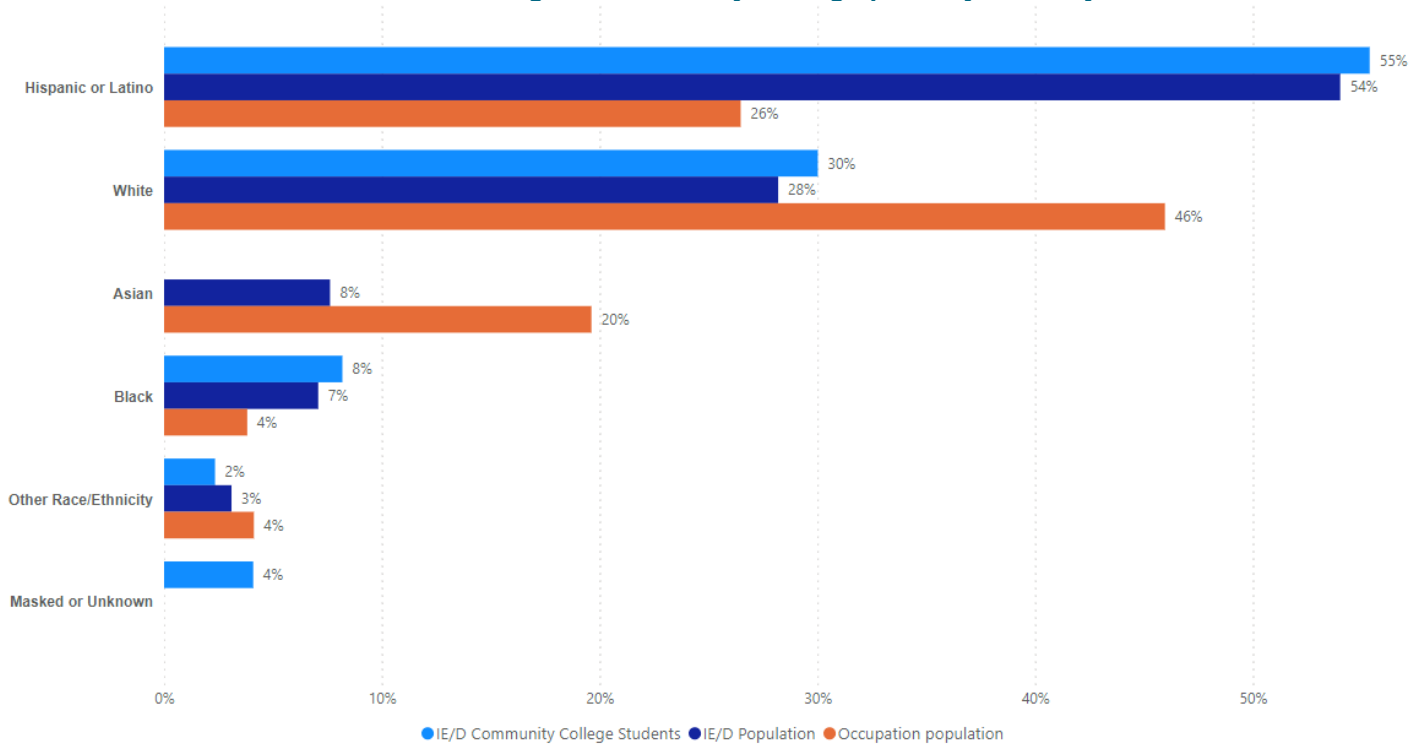
# Building an Inclusive Economy

This section examines demographic data for IE/D community college students in Water and Wastewater Technology programs compared to the IE/D population. We also include demographics for related occupation data for the five occupations related to wastewater technology. This analysis can be used to:

- Understand the community college system’s current or potential role supporting a diverse talent pipeline into the occupations of interest.
- Inform students (and the faculty and staff working with them) the extent to which individuals from similar demographic groups are over or underrepresented in the professions related to their field of study.
- Inform employers of the diverse talent pipeline coming from the community college system for the occupations analyzed.

Notably, 55% of students enrolled in Water and Wastewater Technology programs are Hispanic/Latino, which is significantly higher than 26% workers in occupations related to wastewater technology in the IE/D region (26%). Additionally, 20% of the IE/D population that are employed in occupations related to wastewater technology are Asian, which is significantly higher than both IE/D community college students (<1%) and IE/D population (8%). Though 46% of the workers employed in occupations related to wastewater technology are White, only 30% of students in Water and Wastewater Technology programs and 28% of the IE/D population are White.

**Exhibit 13 Program and County Demographics by Ethnicity**



SOURCE: LIGHTCAST 2024.1 AND LAUNCHBOARD

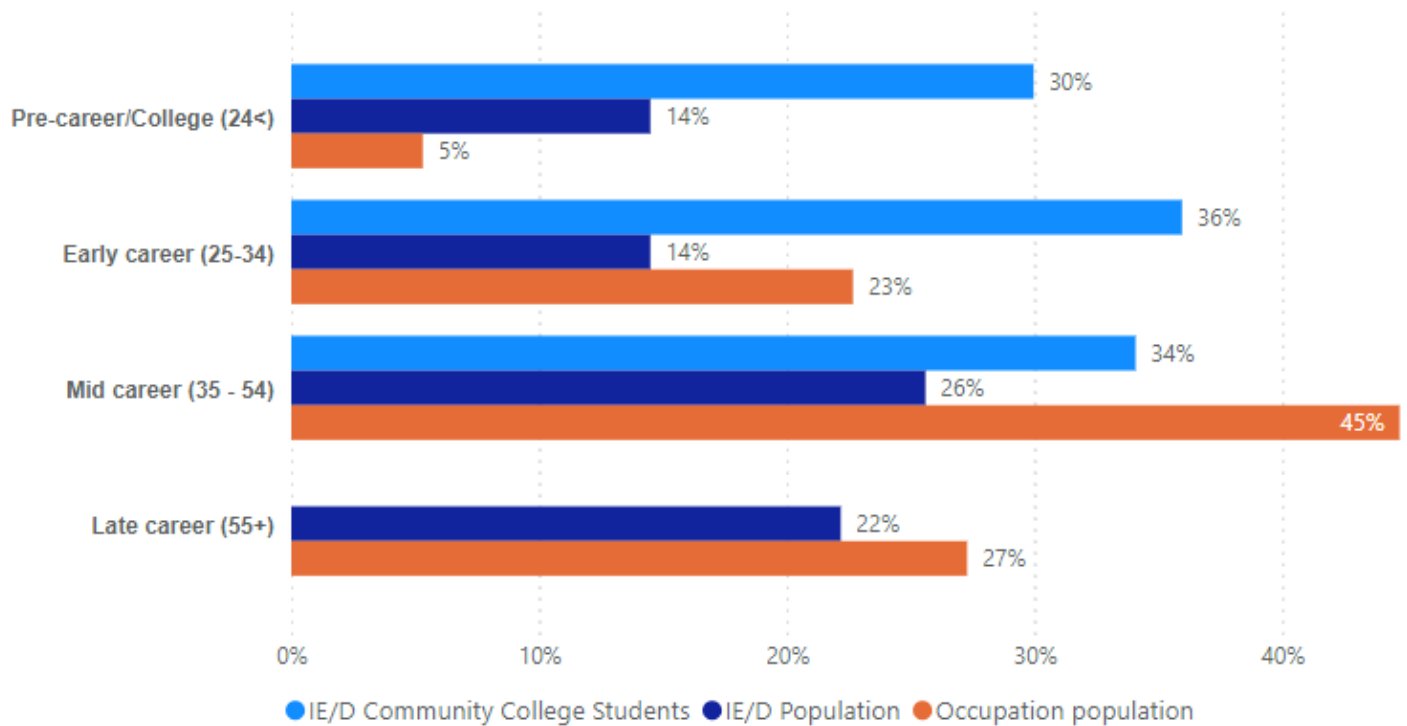
Most IE/D professionals in wastewater technology occupations are White (46%), “mid-career” age category (45%), and male (85%). Most community college students in related programs are Hispanic/Latino (55%), “early career” or “mid-career” age categories (70%), and male (82%). Major takeaways:

- Community colleges are an important talent source for employers committed to greater racial/ethnic diversity, especially Hispanic/Latino professionals.
- College programs may want to consider strategies to engage more women into these programs.

Exhibit 14 compares the age of IE/D community college students enrolled in Water and Wastewater Technology programs compared to the IE/D population.

The majority of students enrolled in Water and Wastewater Technology programs are either in the “early career” category (36%) or “mid-career” category (34%) as compared to IE/D population (14%; 26%) and workforce (23%; 45%) in these five occupations related to wastewater technology. These programs are an important entry point for young wastewater technology professionals.

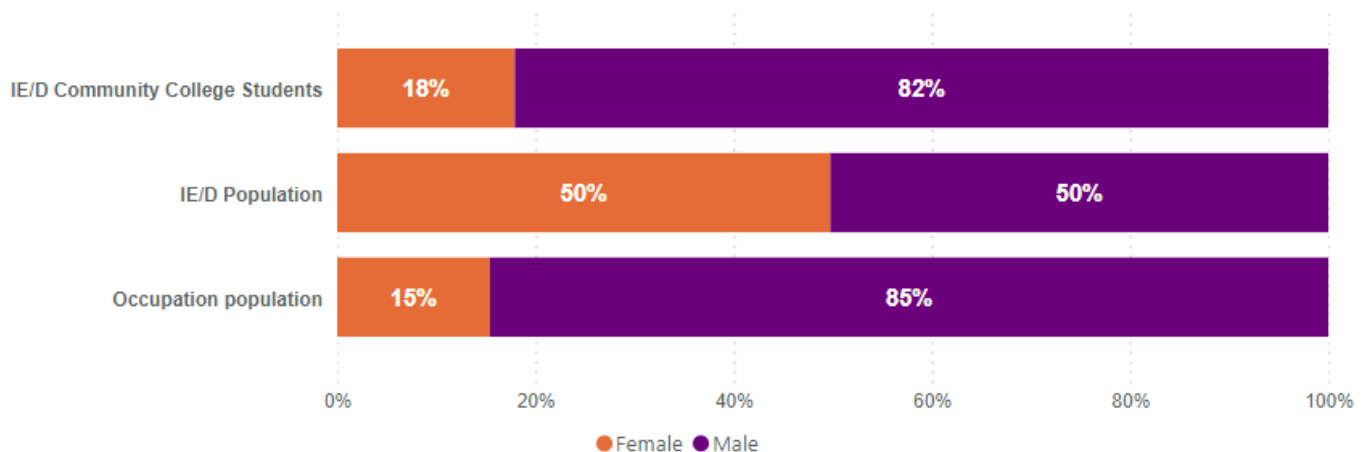
**Exhibit 14 Program and County Demographics by Age**



SOURCE: LIGHTCAST 2024.1

Exhibit 15 compares the gender of IE/D County community college students enrolled in Water and Wastewater Technology programs compared to the IE/D population. We also include demographics for related occupation data for the five occupations related to wastewater technology to identify potential diversity and equity issues addressable by community college programs.

**Exhibit 15 Program and County Demographics by Gender**



SOURCE: LIGHTCAST 2024.1

## Appendix: Methodology

Exhibit 11 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2020 and 2023 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total 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. 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).

## Appendix: References

| Type of Data  | Source  |
|---|---|
| Occupational Projections, Wages, and Job Postings                       | 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. <a href="https://lightcast.io/">https://lightcast.io/</a>   |
| Living Wage   | The living wage is derived from MITs Living Wage Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data assesses the cost of housing, food, childcare, health care, transportation, and taxes. For more information, see: <a href="https://livingwage.mit.edu/pages/methodology">https://livingwage.mit.edu/pages/methodology</a><br>The living wage for one adult in San Bernardino County is \$25.17 per hour (\$52,353.60 annually). The living wage for one adult in Riverside County is \$26.30 per hour (\$54,704 annually). The average living wage to represent Inland Empire/Desert is \$25.74 per hour (53,539.20 annually) |
| Typical Education and Training Requirements, and Educational Attainment | 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 <a href="https://www.bls.gov/emp/documentation/education/tech.htm">https://www.bls.gov/emp/documentation/education/tech.htm</a>  |
| Educational Supply  | The CCCC Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: <a href="https://datamart.cccco.edu">https://datamart.cccco.edu</a><br>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 <a href="https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions">https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions</a>  |
| Student Metrics and Demographics  | 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: <a href="https://www.calpassplus.org/LaunchBoard/Home.aspx">https://www.calpassplus.org/LaunchBoard/Home.aspx</a>  |