

Labor Market Analysis for Program Review:
 0953.20/Civil Drafting (*Engineering Civil Drafting and Design AS Degree and Certificate*)
 Orange County Center of Excellence, June 2024



Program reviews are conducted by individual colleges to periodically review curriculum of their existing programs, and in the case of career technical education programs, ensure continued alignment with regional labor market needs. Because a program review evaluates an existing program, rather than establishing a new program, additional supply will not be added; therefore, the endorsement criteria included in this report is determined slightly differently than it is for a new program that requires regional recommendation.

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met <input checked="" type="checkbox"/>	Endorsed: Some LMI Criteria Met <input type="checkbox"/>	Not LMI Endorsed <input type="checkbox"/>
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Program LMI Endorsement Criteria

	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Supply Gap:	<i>Comments:</i> There are projected to be 447 middle-skill annual job openings throughout Los Angeles and Orange counties for <i>architectural and civil drafters</i> , which is less than the 539 awards conferred by educational institutions . However, these educational programs also prepare students for 16 other related occupations, which account for 7,069 additional annual job openings . Because these programs train for a variety of occupations with high demand, there is an undersupply of labor for architectural and civil drafter.	
Living Wage: (Entry-Level, 25 th)	<i>Comments:</i> Entry-level hourly wages for architectural and civil drafters are \$25.78, which is significantly above the OC living wage of \$20.63.	
Education:	<i>Comments:</i> The typical entry-level education for <i>architectural and civil drafters</i> is an associate degree and 53% workers in the field have completed some college or an associate degree as their highest level of education.	

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:

- *Architectural and Civil Drafters (17-3011)*

Based on the available data, there appears to be a supply gap for *architectural and civil drafters*. Though the number of awards for this occupation exceeds demand, supply is overstated because the related educational programs train for an additional 16 occupations. When considering the high demand for these occupations, there is an undersupply of labor for *architectural and civil drafters*. In addition, typical

education requirements for this occupation aligns with a community college education and typical entry-level wages are significantly above the living wage. **Therefore, due to all 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
Architectural and Civil Drafters (17-3011)	LA: 267	LA: 373	OC: \$25.78	Associate degree	53%
	OC: 180	OC: 167			
Total	447	539	N/A	N/A	N/A

Demand:

- The number of jobs related to *architectural and civil drafters* is projected to increase 2% through 2027, equating to 447 annual job openings.
- Hourly entry-level wages for *architectural and civil drafters* are \$25.78 in Orange County, which is significantly above the living wage of \$20.63.
- There were 1,030 online job postings for *architectural and civil drafters* over the past 12 months. The highest number of postings were for architectural designers, civil design engineers, and civil designers.
- The typical entry-level education for *architectural and civil drafters* is an associate degree.
- Approximately 53% 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 539 awards conferred by 20 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- Non-community college institutions did not confer any awards from 2019 to 2021.
- There is only one community colleges in Orange County that offers a civil drafting program. Due to a low number of students in these courses, student outcomes data is unavailable for the Orange County region.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for *architectural and civil drafters* from 2017 through 2027. Though employment declined 7% across all occupations in Los Angeles and Orange counties in 2020 due to the COVID-19 pandemic, employment for *architectural and civil drafters* remained flat during the same period. However, employment for this occupation drastically fluctuated in the following two years as employment rose in 2021 and fell significantly in 2022.

In the years preceding the pandemic, employment for *architectural and civil drafters* declined at varying degrees. However, employment for this occupation is projected to increase in Orange County, similarly to all occupations across Los Angeles and Orange counties, through 2027.

Exhibit 2: Annual Percent Change in Jobs for Architectural and Civil Drafters, 2017-2027

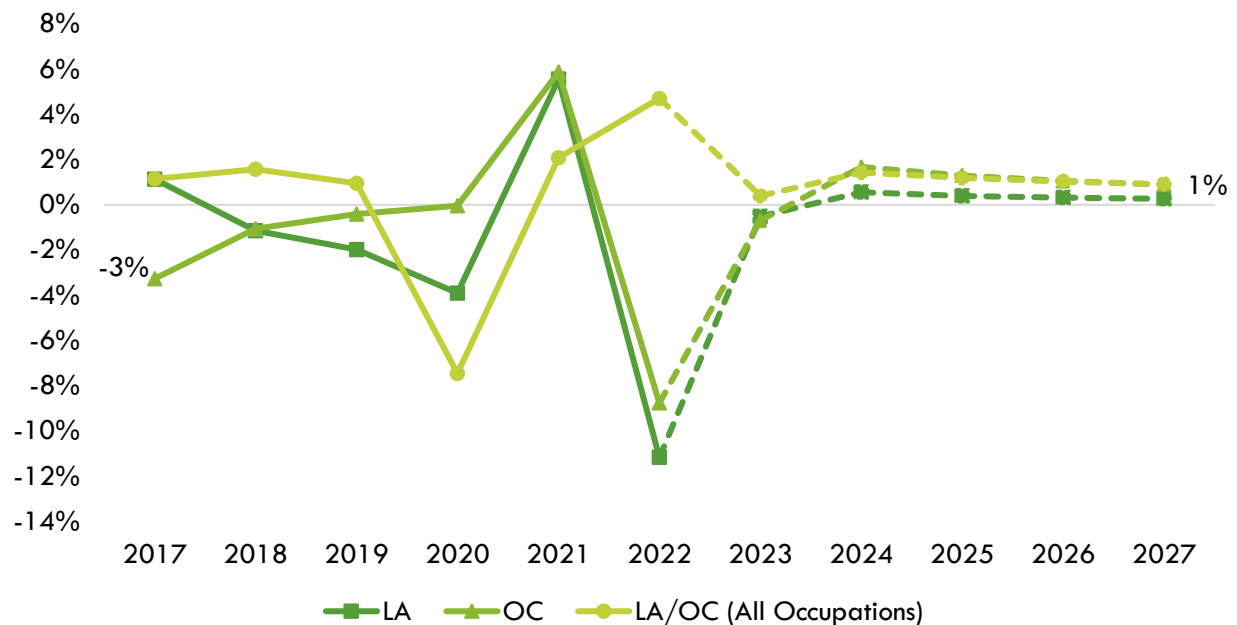


Exhibit 3 shows the five-year occupational demand projections for *architectural and civil drafters*. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase by 2% through 2027. There is projected to be 447 jobs available annually.

Exhibit 3: Occupational Demand in Los Angeles and Orange Counties¹

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	2,786	2,815	28	1%	267
Orange	1,740	1,815	74	4%	180
Total	4,527	4,629	103	2%	447

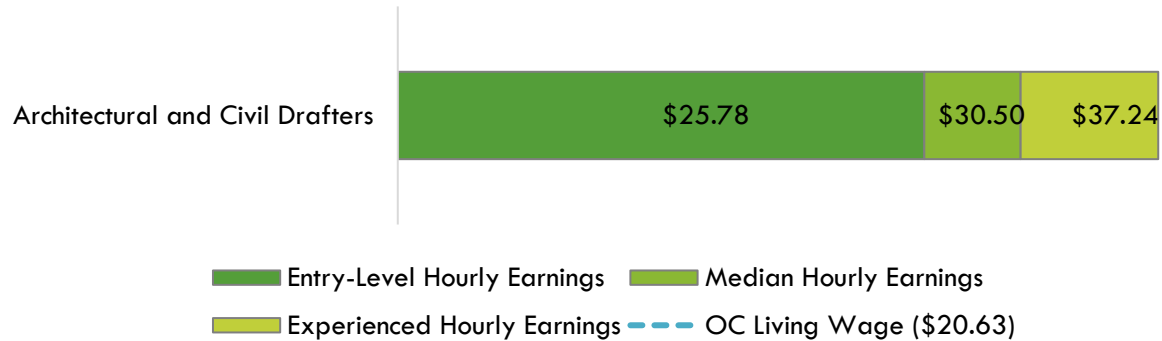
¹ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Wages:

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

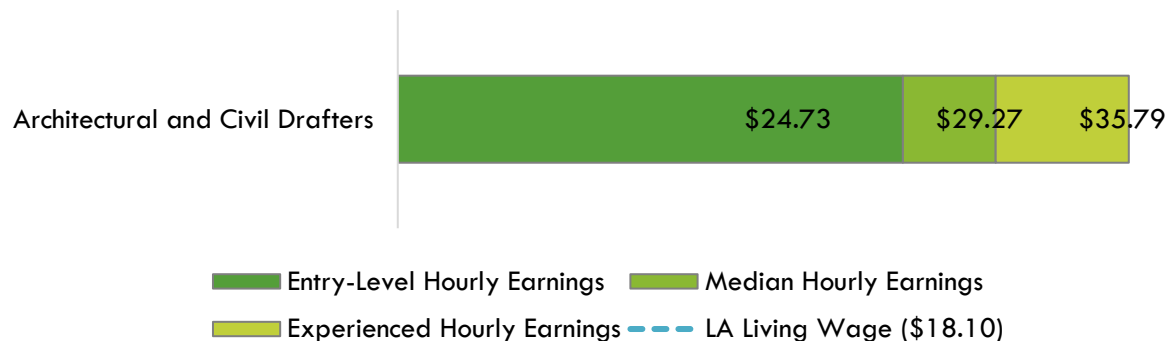
The typical entry-level hourly wage for *architectural and civil drafters* is \$25.78, which is significantly above the living wage for one adult (\$20.63 in Orange County). Orange County's average wage of \$32.39 is slightly higher relative to the average statewide wage of \$32.22 for this occupation. Exhibit 4 shows the wage range for *architectural and civil drafters* 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 wage for *architectural and civil drafters* is \$24.73, which is significantly above the living wage for one adult (\$18.10 in Los Angeles County). Los Angeles County's average wage of \$31.15 is below the average statewide wage of \$32.22 for this occupation. Exhibit 5 shows the wage range for *architectural and civil drafters* 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.² 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 1,030 online job postings related to architectural and civil drafters listed in the past 12 months, as shown in Exhibit 6.

Exhibit 6: Number of Job Postings by Occupation (n=1,030)

Occupation	Job Postings	Percentage of Job Postings
Architectural and Civil Drafters	1,030	100%
Total Postings	1,030	100%

The top employers in the region, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=1,030)

Employer	Job Postings	Percentage of Job Postings
Actalent	76	7%
GPAC	49	5%
AECOM	22	2%
Stantec	21	2%
HNTB	17	2%
Tait & Associates	15	1%
Ware Malcomb	15	1%
Burns & McDonnell	11	1%
Roberts	11	1%
Lpa	10	1%

² K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), <https://link.springer.com/book/10.1007/978-81-322-3972-7>.

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 8.

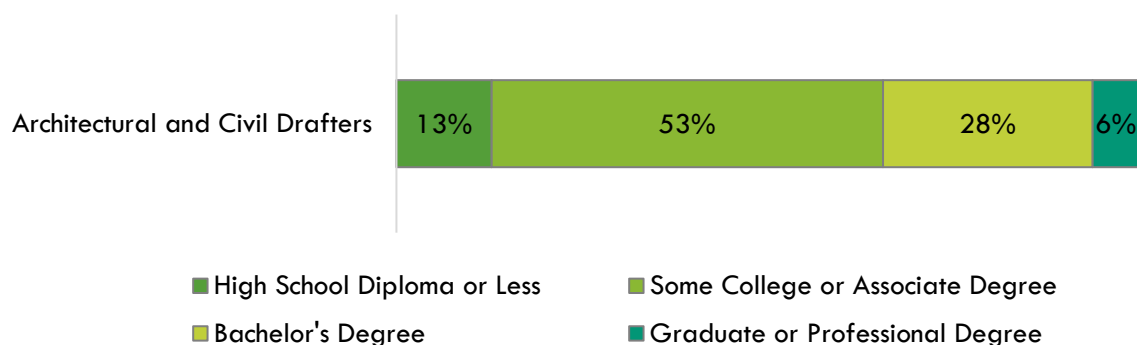
Exhibit 8: Top Skills by Number of Job Postings (n=1,030)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
AutoCAD (514)	Communication (352)	AutoCAD (514)
Autodesk Revit (439)	Coordinating (250)	Autodesk Revit (439)
Project Management (336)	Research (198)	AutoCAD Civil 3D (237)
Computer-Aided Design (259)	Detail Oriented (190)	SketchUp (3D Modeling Software) (223)
Construction (248)	Planning (182)	Adobe Photoshop (149)
AutoCAD Civil 3D (237)	Management (150)	Microsoft Office (142)
SketchUp (3D Modeling Software) (222)	Microsoft Office (142)	Rhinoceros 3D (124)
Civil Engineering (205)	Presentations (142)	MicroStation (CAD Design Software) (97)
Architectural Drawing (178)	Problem Solving (141)	Adobe Illustrator (91)
Grading (Landscape) (178)	Writing (123)	Adobe InDesign (86)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists an associate degree as the typical entry-level education for *architectural and civil drafters*. In addition, the national-level educational attainment data indicates 53% of workers in the field have completed some college or an associate degree as their highest level of education. Exhibit 9 shows the educational attainment for *architectural and civil drafters*.

Exhibit 9: National-level Educational Attainment for Occupations



Of the 63% of the cumulative job postings for *architectural and civil drafters* that listed a minimum education requirement in Los Angeles/Orange County, 76% (497) requested a bachelor's degree and 22% (143) requested a high school diploma or an associate degree.

Educational Supply

Community College Supply:

Exhibit 10 shows the three-year average number of awards conferred by community colleges in the related TOP codes:

- Architecture and Architectural Technology (0201.00)
- Drafting Technology (0953.00)
- Architectural Drafting (0953.10)
- Civil Drafting (0953.20)
- Manufacturing and Industrial Technology (0956.00)

The colleges with the most completions in the region are Mt. San Antonio, Orange Coast, and Cerritos. 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

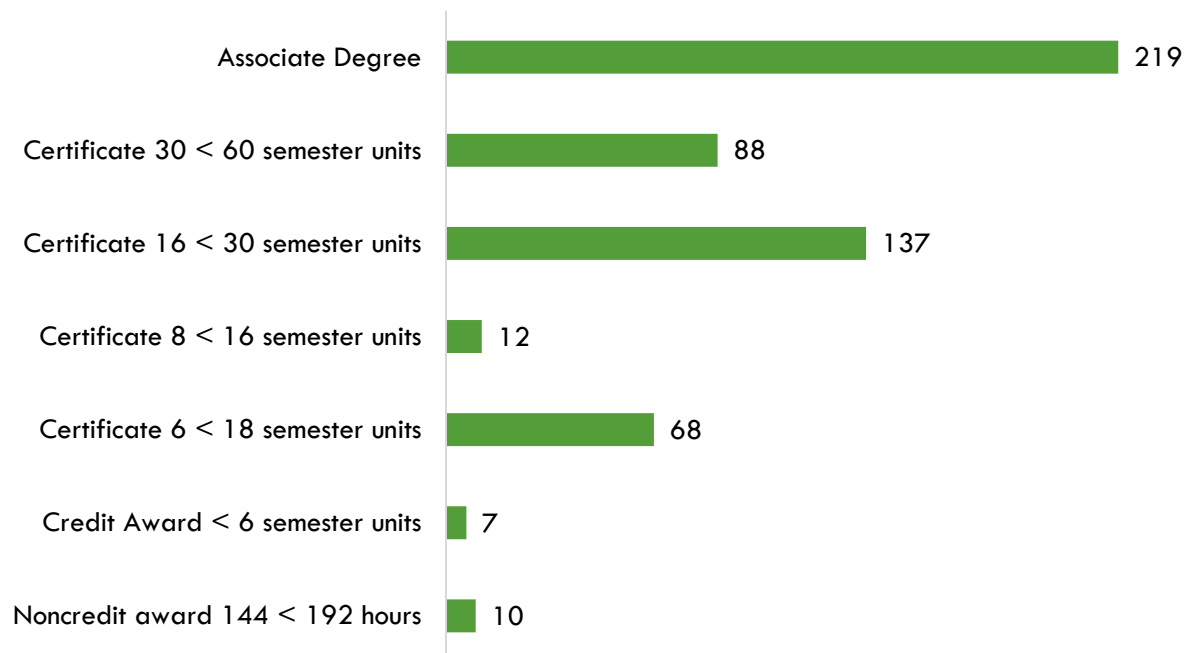
TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average	
0201.00	Architecture and Architectural Technology	Cerritos	44	28	15	29	
		Citrus	6	6	7	6	
		East LA	25	16	23	21	
		El Camino	21	5	15	14	
		Glendale	6	3	17	9	
		LA Harbor	4	4	13	7	
		LA Pierce	4	16	11	10	
		LA Trade	8	7	13	9	
		LA Valley	3	4	3	3	
		Long Beach	13	11	9	11	
		Mt San Antonio	51	61	95	69	
		Pasadena	18	12	12	14	
		Rio Hondo	3	3	8	5	
		LA Subtotal		206	176	241	208
		Fullerton	12	4	0	5	
		Orange Coast	59	38	75	57	
		Saddleback	8	3	4	5	
		OC Subtotal		79	45	79	68
Supply Subtotal/Average			285	221	320	275	
0953.00	Drafting Technology	Cerritos	14	9	40	21	
		Citrus	15	12	15	14	
		East LA	7	20	12	13	
		El Camino	9	7	10	9	

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		LA Pierce	2	8	1	4
		LA Valley	3	0	0	1
		Long Beach	1	0	0	0
		Mt San Antonio	23	32	24	26
		Pasadena	6	6	8	7
		Rio Hondo	13	8	15	12
		LA Subtotal	93	102	125	107
		Fullerton	4	10	5	6
		Golden West	9	4	3	5
		Irvine	10	6	7	8
		Saddleback	2	1	1	1
		Santa Ana	27	30	16	24
		OC Subtotal	52	51	32	45
		Supply Subtotal/Average			145	153
0953.10	Architectural Drafting	Citrus	2	1	2	2
		Long Beach	9	5	3	6
		Rio Hondo	9	6	39	18
		LA Subtotal	20	12	44	25
		Fullerton	1	1	8	3
		Santa Ana	1	2	0	1
		OC Subtotal	2	3	8	4
Supply Subtotal/Average			22	15	52	30
0953.20	Civil Drafting	Rio Hondo	3	3	4	3
		LA Subtotal	3	3	4	3
		Irvine	3	1	3	2
		Santa Ana	0	0	3	1
		OC Subtotal	3	1	6	3
Supply Subtotal/Average			6	4	10	7
0956.00	Manufacturing and Industrial Technology	Cerritos	0	1	1	1
		El Camino	0	0	4	1
		Glendale	2	0	1	1
		LA Trade	9	9	15	11
		LA Valley	9	7	0	5
		Mt San Antonio	14	4	13	10
		LA Subtotal	34	21	34	30
		Fullerton	38	20	18	25
		Irvine	0	4	2	2

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Saddleback	7	4	8	6
		Santa Ana	3	2	4	3
		Santiago Canyon	10	12	7	10
		OC Subtotal	58	42	39	46
		Supply Subtotal/Average	92	63	73	76
		Supply Total/Average	550	456	612	539

Exhibit 11 shows the annual average community college awards by type from 2019-20 to 2021-22. The plurality of the awards are for associate degrees, followed by certificates between 16 and less than 30 semester units and certificates between 30 and less than 60 semester units.

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 civil drafting programs in Rancho Santiago Community College District (RSCCD), the Orange County Region, and California. According to Chancellor's Office Curriculum Inventory (COCI) data, there are two active civil drafting programs in Orange County, both of which are hosted at RSCCD. However, there are no active civil drafting courses offered by community colleges in Orange County. Therefore, outcomes data is unavailable at the district and county levels.

Exhibit 12: Civil Drafting (0953.20) Strong Workforce Program Metrics, 2020-21³

SWP Metric	RSCCD	OC Region	California
SWP Students	N/A	N/A	120
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	N/A	N/A	41%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	N/A	Insufficient Data
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	N/A	N/A	Insufficient Data
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	N/A	N/A	11
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	N/A	N/A	100%
Median Annual Earnings for SWP Exiting Students	N/A	N/A	\$66,968 (\$32.20)
Median Change in Earnings for SWP Exiting Students	N/A	N/A	13%
SWP Exiting Students Who Attained the Living Wage	N/A	N/A	83%

Non-Community College Supply:

To comprehensively analyze the regional supply, it is crucial to include data from other institutions offering architectural and civil drafting training programs. Exhibit 13 displays the annual and two-year average awards granted by these institutions under the related Classification of Instructional Programs (CIP) Code: Drafting and Design Technology/Technician, General (15.1301).

No awards were conferred under the following related CIP Codes:

- Architectural Technology/Technician (4.0901)
- Architectural Engineering Technologies/Technicians (15.0101)
- CAD/CADD Drafting and/or Design Technology/Technician (15.1302)
- Architectural Drafting and Architectural CAD/CADD (15.1303)
- Civil Drafting and Civil Engineering CAD/CADD (15.1304)
- 3-D Modeling and Design Technology/Technician (15.1307)

The available data covers 2019 to 2021. During this period, non-community college institutions did not confer awards in related programs.

³ All SWP metrics are for 2020-21 unless otherwise noted.

Exhibit 13: Regional Non-Community College Awards, 2019-2021

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
15.1303	Drafting and Design Technology / Technician, General	Woodbury University	0	0	0
Supply Total/Average			0	0	0

Regional Demographics

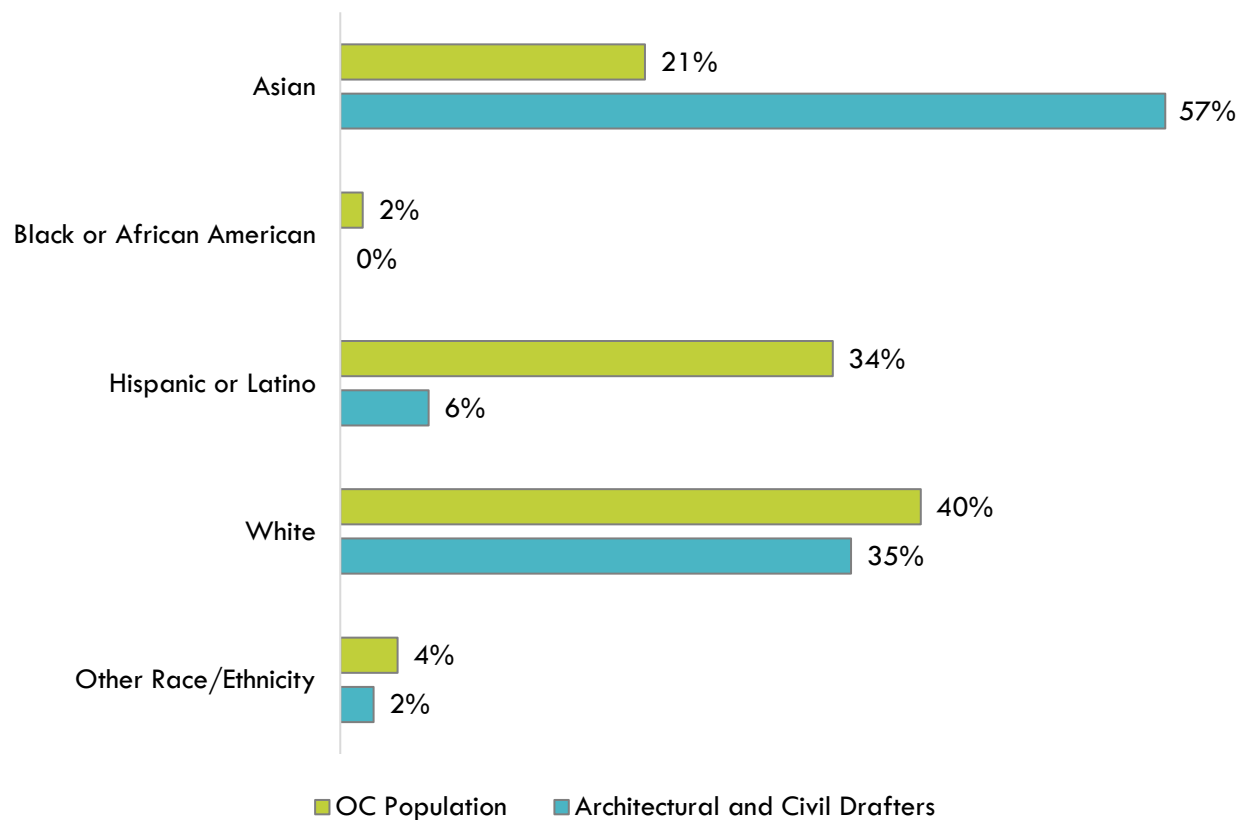
This section examines demographic data for the OC population compared to occupational data to identify potential diversity and equity issues. As noted in the student outcomes section, there are currently no civil drafting courses offered by Orange County community colleges. Therefore, demographic data for OC community college civil drafting students is not available.

Ethnicity:

Exhibit 14 compares individual's ethnicities in the overall Orange County population relative to occupation-specific data for *architectural and civil drafters*.

The majority of workers (57%) in the field are Asian, which is significantly greater than the Asian share of the county population (21%). In addition, while the representation of white individuals is slightly higher between the population (40%) and workers in the field (35%), the share of Hispanic or Latino workers (6%) is four-times less than the Hispanic or Latino share of the county population (34%).

Exhibit 14: Program and County Demographics by Ethnicity

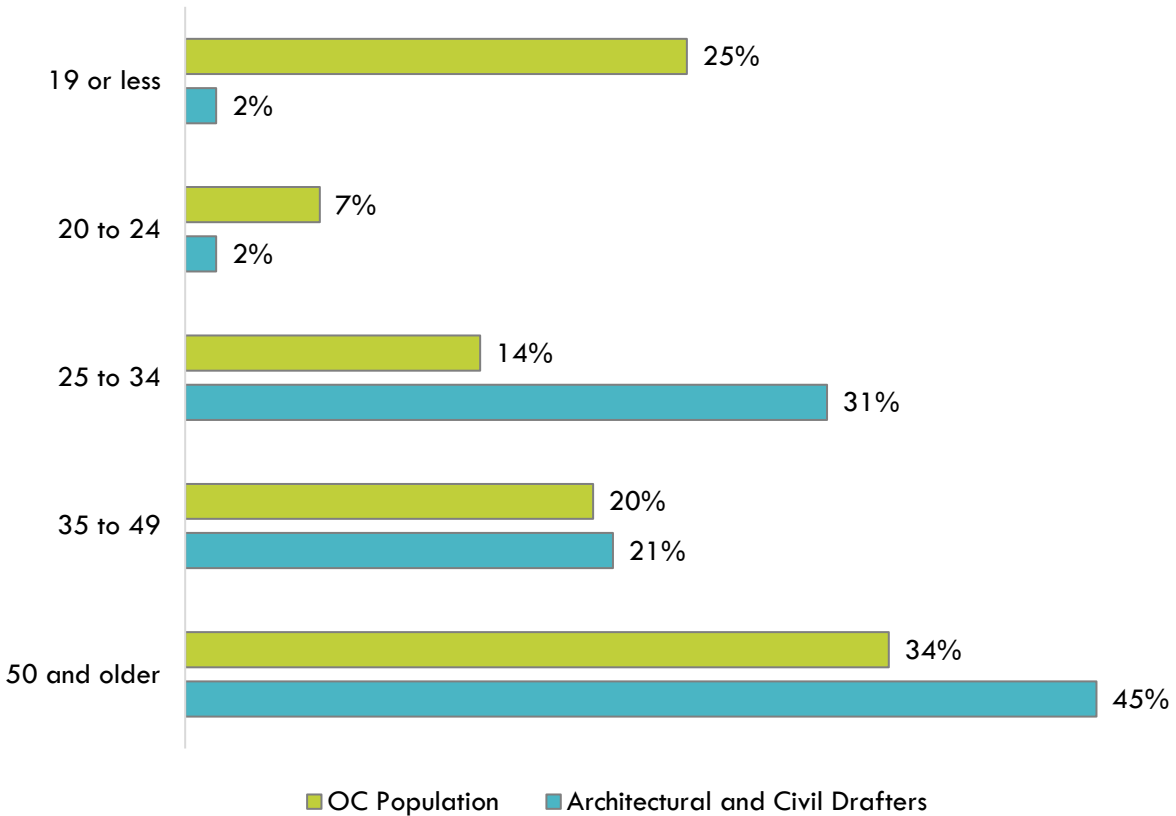


Age:

Exhibit 15 compares individual's ethnicities in the overall Orange County population relative to occupation-specific data for *architectural and civil drafters*.

Individuals 50 and older account for the plurality of workers (45%) in the field and of the county population. However, the second largest group of workers are 25 to 34 yet comprise only 14% of the population. Furthermore, despite accounting for 32% of the population, persons 24 and younger account for only 4% of workers in the field.

Exhibit 15: Program and County Demographics by Age

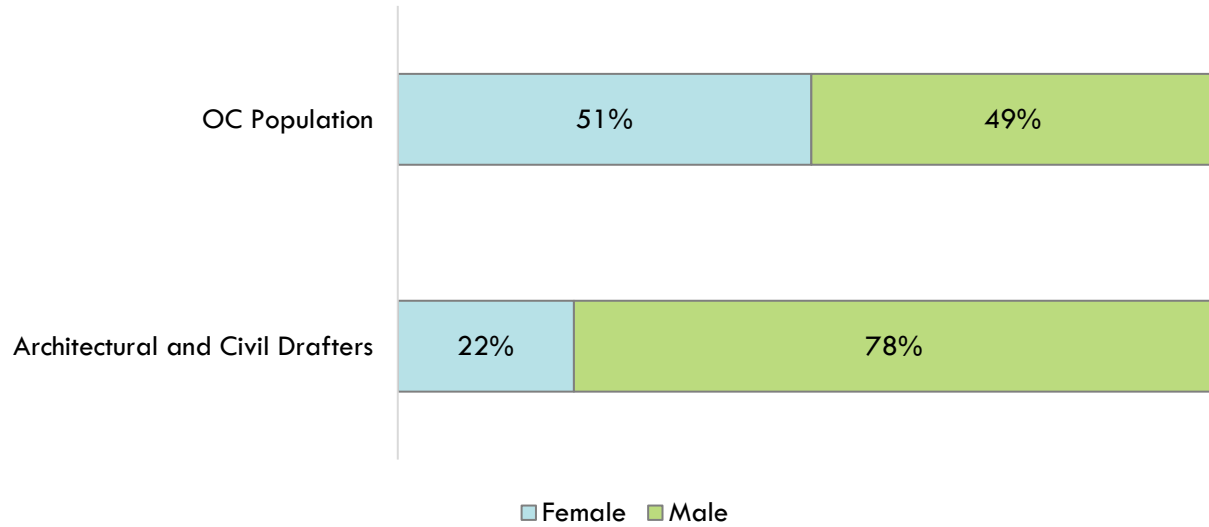


Sex:

Exhibit 16 compares individual's ethnicities in the overall Orange County population relative to occupation-specific data for *architectural and civil drafters*.

Though the population is split nearly evenly between women and men, only 22% of workers in the field are women.

Exhibit 16: 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>

Data Type	Source
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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