Labor Gap Study for Workforce Development

Requested by
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List of Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
AB	Assembly bill
ACS	American Community Survey
ADOT	Arizona DOT
AGC	Associated General Contractors of America
BLS	Bureau of Labor Statistics
BOLI	Bureau of Labor and Industries
BTS	Bureau of Transportation Statistics
CalHR	California Department of Human Resources
Caltrans	California Department of Transportation
CDOT	Colorado Department of Transportation
CES	Current Employment Statistics program
CIP	Classification of Instructional Programs
CPS	Current Population Survey
CSV	comma-separated value
CWI	Center for Workforce Initiatives
DDOT	District (of Columbia) Department of Transportation
DEI	diversity, equity and inclusion
DOT	department of transportation
EDD	Employment Development Department
EEO	equal employment opportunity
EMSI	Economic Modeling Specialists International
FHWA	Federal Highway Administration
GDOT	Georgia Department of Transportation
HCCTP	Highway Construction Careers Training Program
HCWP	Highway Construction Workforce Pilot
INDOT	Indiana Department of Transportation
J2J	Job-to-Job Flows
JOLTS	Job Openings and Labor Turnover Survey
LAUS	Local Area Unemployment Statistics
LED	Local Employment Dynamics
LEHD	Longitudinal Employer-Household Dynamic
LMID	Labor Market Information Division
LODES	LEHD Origin-Destination Employment Statistics
LWDA	Local Workforce Development Areas
MnDOT	Minnesota Department of Transportation

NAICS	North American Industry Classification System
NCS	National Compensation Survey
NJDOT	New Jersey Department of Transportation
NMDOT	New Mexico Department of Transportation
ODT	Ohio Department of Transportation
OEWS	Occupational Employment and Wage Statistics
OJT	on-the-job training
OMB	Office of Management and Budget
OSW	offshore wind (activity)
QCEW	Quarterly Census of Employment and Wages
QWI	Quarterly Workforce Indicators
RPU	Regional Planning Unit
SCDOT	South Carolina Department of Transportation
SIC	Standard Industrial Classification (system)
SIPP	Survey of Income and Program Participation
SOC	Standard Occupational Classification
SS	supportive services
SWA	State Workforce Agency
SWM	strategic workforce management
SWOT	strengths, weaknesses, opportunities, and threats (analysis)
TET	transportation economic trends
TxDOT	Texas Department of Transportation
UCFE	unemployment compensation for federal employees
UI	unemployment insurance
WIOA	Workforce Innovation and Opportunity Act

Executive Summary

Background

With the need for a skilled and diverse workforce to support ongoing capital and maintenance projects, California Department of Transportation (Caltrans) created its On-the-Job Training Supportive Services (OJT/SS) Program to equip underrepresented groups for opportunities in construction trades. For the OJT/SS Program to plan effectively and deliver its benefits to the intended participants, including women, minorities and disadvantaged individuals, information on labor markets and potential employment outcomes for participants is required. Currently a research gap exists within the highway construction industry regarding labor needs and opportunities for underrepresented groups.

Specifically, Caltrans requires a labor gap study for workforce development that distinguishes workforce shortages in the transportation construction industry from shortages in related industries or in the general workforce. This study would:

- Identify areas where there are the most significant gaps.
- Ascertain the work types that should receive the greatest investment.
- Determine workforce development strategies most likely to maximize outcomes.
- Consider regional shortages in clusters of industries.
- Predict gaps in certain industries.
- Consider local and regional needs.

In support of a future labor gap analysis conducted by Caltrans, CTC & Associates gathered relevant information and sources through three methods:

- Literature search of domestic research and resources addressing transportation construction labor statistics, trends and strategies on a national, regional, state and local level.
- Collation of data sources and data search tools that provide access to pertinent labor and economic data, allowing for analysis and comparison of geographic regions, industries, demographic groupings and other economic variables related to workforce supply and demand.
- Survey of state departments of transportation (DOTs) requesting information on experience with the study of transportation construction labor gaps addressing underrepresented groups.

Summary of Findings

Related Research and Resources

A literature search of publicly available domestic research and related resources identified publications that are organized in the following categories:

- National resources.
- State and district research and practices.
- Municipal research and practices.
- Industry resources.

Table 1 in Appendix B, which begins on page 50, summarizes these publications, providing the publication or resource title, the year of publication where given, category and a brief description of the resource. More information about each resource can be found in the **Detailed Findings** section of this report.

Workforce Analyses

Publications describing efforts by states and municipalities to address current and future workforce needs include a 2010 case study of workforce planning in North Carolina municipal governments, which presented a step-by-step methodology for conducting a workforce analysis. Similar efforts by Indiana DOT include a 2020 assessment of the workforce and occupations in the transportation construction industry in the state, and research in progress that is conducting a training gap analysis.

Some studies addressed general labor needs in the transportation or construction industry, such as the 2024 Workforce Survey Analysis produced by the Associated General Contractors of America (AGC), while others focused on underrepresented populations to gather insights and identify strategies for attracting more candidates and workers from specific groups to increase employee diversity. Two examples of this approach are New Jersey DOT's (NJDOT's) March 2017 study and the District of Columbia's labor market analysis that identified women, minorities and disadvantaged individuals as target populations. Still other studies, such as Oregon's October 2024 assessment, evaluated recruitment initiatives already implemented by measuring their attraction of demographic groups.

Workforce Strategies and Initiatives

Included in the literature are state and municipality practices for initiating or supporting an OJT program, and recruiting within local populations for transportation construction projects. Recruitment of the local population may be a contract requirement for construction projects, as seen in the 2023 San Francisco Local Hiring Policy for Construction Annual Report and Seattle's 2024 Priority Hire Annual Report. Other agencies have built their own online tools for job seekers and employers, looking for ways to facilitate communication, training and networking in the labor market. Wisconsin's graphic mapping tool on the WisConomy site is an example. This tool allows job seekers and companies to search for hot spots across the state.

Data Sources

A search of publicly accessible databases and search tools identified relevant data sources for a labor gap analysis. These are organized in the following categories:

- Federal government:
    - Job Classification Systems and Crosswalks.
    - U.S. Bureau of Labor Statistics (BLS).
    - U.S. Census Bureau.
    - U.S. Department of Labor.
    - U.S. Department of Transportation.
    - U.S. Equal Employment Opportunity Commission.
- National transportation associations and organizations.
- State of California:
    - Employment Development Department.
    - California Open Data Portal.
    - California Department of Human Resources.

Table 2 in Appendix B, which begins on page 54, summarizes these resources, providing the title, the year of publication where given, category and a brief description of the resource. More information about each resource can be found in the **Detailed Findings** section of this report.

Survey of Practice

An online survey distributed to state DOT members of the American Association of State Highway and Transportation Officials (AASHTO) Committee on Civil Rights received eight responses:

- Arizona DOT (ADOT).
- District (of Columbia) DOT (DDOT).
- Georgia DOT (GDOT).
- Minnesota DOT (MnDOT).
- NJDOT.
- New Mexico DOT (NMDOT).
- Ohio DOT (ODOT).
- South Carolina DOT (SCDOT).

Survey questions are provided in Appendix A. Survey results are summarized below.

None of the responding agencies has completed a labor gap analysis within the last five years that examined the labor needs and opportunities for underrepresented groups within the highway construction sector. Of these respondents:

- Three agencies — ADOT, NMDOT and SCDOT — have no plans for or interest in conducting such an analysis.
- Five agencies — DDOT, GDOT, MnDOT, NJDOT and ODOT — are interested in conducting such an analysis.
    - *DDOT's* interest in a labor gap analysis is to understand the mitigating issues with more recent data. The agency last updated this information before the COVID-19 pandemic.
    - *GDOT* is interested in preparing a labor gap analysis to ensure that its project workforce reflects the communities where the projects are occurring. The agency would also like to begin in 2025, but needs "the team and experience" to conduct the analysis.
    - *MnDOT* would be interested in conducting an analysis to learn more about the data and potentially apply it to the agency's SS/OJT program offerings. The agency requires funding and vendors before conducting the analysis.
    - *NJDOT* would like to prepare a labor gap analysis to assess the difference between the current skills and the required skills of its external construction contractor workforce and to identify areas where OJT programs could bridge that gap. The agency would need a consultant to assist with the analysis and recommendations. Also, a study of the effectiveness of its OJT program is needed before the analysis, which could start in 2025.
    - *ODOT* would also use a labor gap analysis to target its OJT program and workforce development activities. The agency currently lacks the funding for this analysis.

Gaps in Findings

While the survey conducted for this project gathered little information from other state DOTs about the development of labor gap analyses, examples of workforce studies conducted by state DOTs and municipal agencies identified through a literature search can provide methodological examples to inform a future Caltrans labor gap analysis.

Although a number of state DOTs have conducted analyses of the labor and occupations in within their own agencies, this investigation identified less focus on positions hired by transportation construction contractors.

Despite the significant data resources available through the federal BLS and California's expansive Employment Development Department, the crossover between the Transportation and Construction classifications may complicate data analysis. Employment in Transportation: Transportation Economic Concepts provides some clarification of the overlap between the two sectors, as it seeks to distinguish transportation jobs within transportation and transportation-related jobs in other sectors.

Next Steps

Moving forward, Caltrans could consider:

- Reviewing in detail the survey conducted by the AGC, which provided job-specific data that may help to clarify construction occupations for the Caltrans labor gap analysis.
- Engaging with the respondents from ADOT, NMDOT and SCDOT to learn why these agencies have no plans for or interest in completing a labor gap study.
- Exploring use of the LED Extraction Tool to access the local market data that connects households with companies in the LEHD Data Infrastructure. This may allow Caltrans to narrow its labor analysis to relevant construction companies and help to distinguish transportation construction from other types.
- Reviewing published workforce analyses to gather lessons learned about data mining using the tools offered by the BLS and other databases described in the resources cited in this Preliminary Investigation.
- Examining in detail the datasets made available through the various data sources identified in this Preliminary Investigation, including the BLS, U.S. Census Bureau and California Open Data Portal, to assess their relevance for Caltrans' planned labor gap analysis.

Detailed Findings

Background

The transportation infrastructure and construction industry in California plays an important role in the state's economic development, driving the need for a skilled and diverse workforce to support various capital and maintenance projects. However, the industry has historically underrepresented certain groups, including women, minorities and disadvantaged individuals. To address this disparity, the California Department of Transportation (Caltrans) established its On-the-Job Training Supportive Services (OJT/SS) Program, which provides these underrepresented groups with the necessary skills to thrive in construction trades. This initiative is intended not only to enhance employability for these individuals but also to foster a more inclusive and representative workforce in the highway construction sector.

Despite the potential benefits of the OJT program, its success relies on the ability to accurately assess labor market demands and employment outcomes for program participants. Currently, there is a significant gap in research focused on the specific labor needs and opportunities for underrepresented groups within the highway construction industry. Without this essential data, it is challenging to best use the OJT program to effectively address workforce disparities and meet the industry's evolving demands. A targeted labor market analysis is needed to inform the program's planning and implementation, ensuring that it contributes meaningfully to workforce development and advances social equity within California's highway construction industry.

Critical to a future labor gap study for workforce development is the collection and analysis of data that distinguishes between general workforce shortages and sector-specific gaps in the transportation industry (such as laborers, skilled journey workers and tradespeople, and supervisory/project management). Using such data, Caltrans' future labor gap analysis is expected to:

- Identify areas where there are the most significant gaps.
- Ascertain the work types that should receive the greatest investment.
- Determine workforce development strategies most likely to maximize outcomes.
- Consider regional shortages in clusters of industries.
- Predict gaps in certain industries.
- Consider local and regional needs.

This investigation sought essential information that can inform the future development of a labor gap analysis from three sources, including a wide-ranging literature search with two focus areas:

- *Labor gap analyses and related practices*. Resources from national transportation organizations were supplemented by published and in-progress research conducted on behalf of federal agencies and state departments of transportation (DOTs). The literature search also sought resources to inform Caltrans' development of a construction industry survey to gather feedback on supply (labor availability) and demand (labor needs).

- *Relevant data sources*. To address the need for data to conduct a labor gap analysis specific to California and its transportation-related construction trades, investigators identified federal, state, regional and local agencies that collect, analyze and report information on industry-specific employment statistics, demographic information and economic trends.

The third source of information for this Preliminary Investigation was an online survey sent to state DOT members of the American Association of State Highway and Transportation Officials (AASHTO) Committee on Civil Rights, which received responses from eight state transportation agencies:

- Arizona DOT (ADOT).
- District (of Columbia) DOT (DDOT).
- Georgia DOT (GDOT).
- Minnesota DOT (MnDOT).
- New Jersey DOT (NJDOT).
- New Mexico DOT (NMDOT).
- Ohio DOT (ODOT).
- South Carolina DOT (SCDOT)

Survey questions are provided in Appendix A. Survey results are summarized on page INSERT of this report.

Related Research and Resources

A literature search of publicly available domestic research and related resources identified a sampling of publications that are organized in the following categories:

- National resources.
- State and district research and practices.
- Municipal research and practices.
- Industry resources.

NOTE: Table 1 in Appendix B, which begins on page 50 of this report, summarizes the publications cited below, providing the publication or resource title, the year of publication, a category, and a brief description of the resource.

National Resources

EDC-7, Strategic Workforce Development, Every Day Counts, Center for Accelerating Innovation, Federal Highway Administration, February 10, 2025.
https://www.fhwa.dot.gov/innovation/everydaycounts/edc_7/strategic_workforce_development.cfm
From the website:

> FHWA [Federal Highway Administration] partnered with the American Association of State Highway and Transportation Officials, AGC [Associated General Contractors of America], the American Road & Transportation Builders Association, and the U.S. Department of Labor's Employment and Training Administration to bring together various parties interested in workforce development in the highway construction field. One result of this partnership is a highway construction workforce development playbook called "Identify, Train, Place."

The Every Day Counts website offers examples of state DOTs partnering with workforce development boards, community colleges, nonprofits and contractors to address the need for construction workers. Below are selected program examples:

- ConnectU2Jobs in Texas prepares and trains justice-involved young adults for careers in highway construction.
- AGC of Arizona offers a 10-week OJT through its Industry Readiness Program.

- Idaho established a Heavy Equipment Operator Training program through its Highway Construction Workforce Partnership.

NCHRP Synthesis 618: Advancing Gender Equity in the DOT Workforce, Stephanie Ivey, Susan Gallagher, Anthony Dontoh, Sarah Hashemikamangar, Dustie Flowers, Kassandra Arellano, Prashant Jha, Logan Sirbaugh and Jaila Kimbro, 2024.
https://nap.nationalacademies.org/catalog/27646/advancing-gender-equity-in-the-dot-workforce
From the summary:

> The objective of this synthesis project is to document current state DOT practices related to advancing gender equity in the workforce, as well as the data collection and assessment practices currently utilized by state DOTs to evaluate impacts.

The study's literature review offers strategies for recruitment, retention and advancement to address barriers to women's full participation in the workforce, but the study indicates a lack of evidence measuring the impact of specific practices on gender equity outcomes. Similarly, the authors note, "There is a lack of readily attainable and detailed data on the current gender composition of the workforce at state DOTs."

Case studies of state transportation agencies in Alaska, Minnesota, Tennessee, Texas, Vermont and Washington highlight "the importance of data collection and analysis to inform the design of interventions." Below are selected highlights from the case studies:

- Tennessee DOT recently developed a robust data management and analysis tool to view trends and create strategies for attracting, retaining and advancing underrepresented populations. The tool includes metrics for assessing gender equity and is intended to help the agency lower employee turnover.
- Texas DOT (TxDOT) and Vermont Agency of Transportation also analyze the data for underrepresented groups, comparing it to census data for the state's population.
- Washington State DOT uses an Enterprise system for employee data tracking. This data populates publicly available dashboards on the Washington State Office of Financial Management's website.

Investing in America: Best Practices to Expand Access to Jobs and Economic Opportunity Through Transportation Infrastructure Investments, U.S. Department of Transportation, February 2024.
https://www.transportation.gov/sites/dot.gov/files/2024-02/Best%20Practices%20to%20Expand%20Accessto%20Jobs%20and%20Economic%20Opportunity-v2%20.pdf
From page 1 of the report:

> This report includes detailed recommendations on how state and local transportation agencies can expand access to jobs and opportunity for several underrepresented groups including women, young people, justice involved and people of color. This report also explains how DOT has been successful in getting more transportation agencies to include workforce plans for their projects and to make use of tools such as local and economic hiring preferences.

Municipalities have sought to address the needs of economically disadvantaged local communities by incorporating local hiring guidelines and policies in their workforce agreements. Due to the demographic diversity of these disadvantaged areas, these statistics are captured in the analysis.

The report includes demographic information for the construction industry workforce, with data sources, including the publication cited in *Related Resource* below.

Related Resource:

> **The Construction Industry: Characteristics of the Employed, 2003-2020**, Claire McAnaw Gallagher, U.S. Bureau of Labor Statistics, April 2022.
> https://www.bls.gov/spotlight/2022/the-construction-industry-labor-force-2003-to-2020/home.htm
> Data presented are from the Current Population Survey (CPS), a monthly nationwide sample survey of approximately 60,000 households administered by the U.S. Bureau of Labor Statistics. Selected data:
>
> - In 2020, women accounted for 1.2 million, or about one in 10, of those employed in construction.
> - Although Hispanic workers were strongly represented in the industry across all positions (30% in 2020), they had the lowest representation (9.9%) in management, business and financial operations of the four demographic groups studied.

NCHRP Research Report 1008: Attracting, Retaining and Developing the 2030 Transportation Workforce; Design, Construction and Maintenance, Candace Blair Cronin, Allison Alexander, Grace Arnold, Juan Carlos Batarse, Kelly Dray, Sasha Iliev, Jessica Jenkins, Erik Smallwood, Rachel Smart, Jake Streng, Mara Campbell, Susan Gallagher, Tyler Reeb, Tom O'Brien and Glenn McRae, 2022.
https://nap.nationalacademies.org/catalog/26768/attracting-retaining-and-developing-the-2030-transportation-workforce-design-construction-and-maintenance
From the foreword:

> The [g]uide provides a roadmap and decision tree to help agencies analyze their unique workforce needs and navigate the practical strategies within the [g]uide. Together, these resources will be of immediate interest to state departments of transportation (DOTs) seeking easily implementable strategies and tools to develop and sustain a high-quality, stable and skilled workforce in transportation system design, construction and maintenance.

Phase 1 analysis of current and anticipated trends focused on priority jobs with the following steps:

- Literature review.
- Interviews and focus groups to identify workforce challenges.
- Survey of state DOTs to determine priority jobs as well as current and future needs.
- Labor market analysis for priority jobs.

Phase 2 development of best practices and tools included identifying future industry scenarios, developing strategies to address the scenarios and creating an implementation guide for DOTs. Recommendations that address how to attract, retain and develop the needed workforce are listed on slide 21 of the Briefing to Overview Project Findings presentation. A closer look at these strategies follows.

Additional resource links for *NCHRP Research Report 1008*:

> Executive Summary
> Technical Memorandum
> Final Report (Background Documentation)
> PowerPoint Presentation

Leading Practices in Strategic Workforce Management by Transportation Agencies, NCHRP Project 20-68, Scan 19-02, U.S. Domestic Scan Program, National Cooperative Highway Research Program, June 2021.
https://domesticscan.org/download/7263/?tmstv=1725892983
From the introduction:

> The purpose of this scan was to examine innovative SWM [strategic workforce management] practices state DOTs are implementing, particularly those activities that can quickly be adopted and implemented to recruit, develop and retain the workforce they need today and for the future.

Below are highlights of project findings:

- Twelve states provided information on programs and activities for scan participants to review: Alaska, Arkansas, California, Colorado, Georgia, Maryland, Minnesota, Missouri, Pennsylvania, Texas, Vermont and Virginia. Three private sector companies also participated.
- Five states were found to follow a clearly defined strategic workforce management plan: Alaska, California, Georgia, Maryland and Texas. The following states employed elements of a workforce management plan: Arkansas, Colorado and Minnesota.
- Two states, Pennsylvania and Vermont, developed recruitment videos targeting recent high school and college graduates to educate them on the range of careers available in transportation agencies. Both agencies seek to attract more diverse employee populations.
    - Video: This is PennDOT.
    - Video: VTrans Intern Maintenance Worker Program.
- Both Texas and Georgia have legislative mandates to develop workforce plans as part of their strategic planning. TxDOT uses a summer internship program to cultivate qualified employees.
- Key workforce plan elements are reviewed on page 63 of the PDF.
- Overall findings and conclusions are outlined on pages 64-65 of the PDF.

Identify, Train, Place: A Playbook to Build Tomorrow's Highway Construction Workforce, Federal Highway Administration, February 2021.
https://www.fhwa.dot.gov/innovativeprograms/centers/workforce_dev/hcwp/pdfs/hcwp_playbook.pdf
The Highway Construction Workforce Pilot (HCWP), sponsored by multiple national agencies and industry partners, was designed to create partnerships for identifying, training and placing individuals in highway construction jobs to address pressing demands for more resources.

The takeaway lessons, or plays, from the 12 pilot locations are presented in the report:

- Include the highway construction industry as a foundational participant due to their knowledge of the skills and number of workers needed for projects.
- Involve multiple agencies and community organizations to increase the resources and perspectives that will support the success of participants.
- Assess the industry training needs before developing training programs and start with fundamentals.
- Communicate the opportunities in the industry, using multiple channels and partners.
- Provide support services for applicants in the process so they do not fall through the cracks.
- Community colleges are well suited to address local workforce development needs.

Eighty percent of those surveyed indicated they have difficulty filling jobs in occupations that are

essential to highway construction, including heavy equipment operators, cement masons and iron workers.

State and District Research and Practices

Multiple States

A Framework to Promote Diversity and Inclusion in Workforce Development in the Southeast States, Mehir Mohebbi, Virginia Sisiopiku, Dimitra Michalaka and Kweka Brown, Southeastern Transportation Research, Innovation, Development and Education Center, February 2023.
https://stride.ce.ufl.edu/wp-content/uploads/sites/153/2023/03/STRIDE-Project-E5-FINAL-.pdf
From the introduction:

> The project identifies existing gaps, predicts future needs and captures the role transportation agencies, research centers, [d]epartments of [t]ransportation (DOTs) and professional organizations can play to recruit, train and maintain a diverse and inclusive workforce.

Table 1, which appears on page 11 of this publication (see Figure 1), presents the percentages of women and minorities in the transportation workforce based on mode and occupation, using U.S. Bureau of Labor Statistics data from the *Labor Force Statistics from Current Population Survey* and *Occupational Outlook Handbook*.

Occupation	Total Jobs	Projected Growth 2016-2026 ** (%)	Women * (%)	Black or African American * (%)	Hispanic or Latino * (%)
Civil Engineers	461,000	11	14.4	6.4	10.7
Construction and Building Inspectors	89,000	10	10.2	9.8	11.2
Construction Managers	1,081,000	11	7.4	4.9	12.4
Computer Systems Analysts	554,000	9	38.9	9.7	7.2
Electrical and Electronics Engineers	284,000	7	12.3	3.5	9.0
Engineering Managers	129,000	6	8.7	8.3	6.2
Engineering Technicians	375,000	...	20.0	8.9	10.3
Information Security Analysts	105,000	28	20.2	15.6	4.6

* U.S. Bureau of Labor Statistics. *Labor Force Statistics from Current Population Survey.* January 18, 2019.
** U.S. Bureau of Labor Statistics. *Occupational Outlook Handbook 2018*. April 12, 2019.

Figure 1. Representation of Women and Minorities in Transportation Workforce Based on Mode and Occupation
(*Source*: *A Framework to Promote Diversity and Inclusion in Workforce Development in the Southeast States*.)

The report's conclusion noted that it is important to recognize that the type of service (transit versus nontransit) and geographic location (urban versus rural) "critically impact an agency's ability to attract and retain diverse groups of individuals to their workforce." Among the tips the authors offer to help fill the existing gaps regarding diversity and inclusion in the workforce:

- Invest in promotion and retention for underserved groups (such as caregivers, minorities, older employees, etc.) by providing nonmonetary benefits and incentives (such as parental leave, leadership training and flexible work schedules).
- Prioritize investments in areas that are the least diverse (such as senior-level jobs).

California

AB 525 Workforce Development Readiness Plan, California State Lands Commission, June 2023.
https://slcprdwordpressstorage.blob.core.windows.net/wordpressdata/2023/07/AB525-Workforce-Readiness-Plan_acc.pdf
From the executive summary:

> The purpose of this Assembly Bill (AB) 525 Workforce Development Readiness Plan is to provide recommendations for workforce development efforts ahead of the necessary seaport investments and activities identified in the AB 525 Port Readiness Plan.
>
> The workforce development readiness plan was developed considering the workforce required in California to deliver 25 [gigawatts] of offshore wind power generation capacity by year 2045. This assessment includes the potential direct workforce required for the delivery of offshore wind projects, the workforce required for related port infrastructure upgrades as outlined in the AB 525 Port Readiness Plan, and the workforce requirement related to transmission network upgrades.
>
> The workforce development assessment consists of three discrete pieces: (1) a needs assessment that analyzed the scale, timing and necessary skills of the required workforce; (2) an assessment of the currently available workforce and training infrastructure in California to support the growth of the offshore wind industry; and (3) a gap and opportunity analysis between the needs and availability assessments.

The authors describe efforts to identify:

- Workforce demand for key occupations.
- Workforce opportunities and required qualifications.
- Workforce supply assessment.
- Workforce regions:
    - Regional labor market overview.
    - Demographic and socioeconomic profile.
    - Occupational supply analysis.

See page 60 of the report, page 71 of the PDF, for a description of the regional gap analysis conducted for this effort:

> A gap analysis for the workforce was conducted for both port upgrades and for OSW [offshore wind] activity within each region. A Red-Amber-Green analysis was used to highlight the workforce demand and projected workforce gap for the top in-demand jobs. Priority levels were categorized based on total demand for jobs (i.e., the absolute number of workers required for each occupation in each region), occupation-specific considerations regarding training and upskilling, the projected workforce gap in 2030 for port upgrades and in 2040 for OSW activity.

The Economic Impact of Construction in the United States and California, Ken Simonson, Associated General Contractors of America, September 2022.
https://www.agc.org/sites/default/files/Files/Construction%20Data/CA.pdf
From the publication:

> Construction Employment (Seasonally Adjusted):
>
> - Construction (residential + nonresidential) employed 7.7 million workers in August 2022, an increase of 311,000 (4.2%) from August 2021, and an increase of 1.1% from February 2020, the peak pre-pandemic month.

- Construction employment in California in August 2022 totaled 918,700, an increase of 40,600 (4.6%) from August 2021, and an increase of 8,500 (0.9%) from February 2020.
- Contractors are having trouble filling positions, impeding the industry's recovery. In the August 2022 AGC Autodesk Workforce Survey, 93% of firms in the U.S. and 85% in California had unfilled hourly craft positions.

Future of Work in California, A New Social Compact for Work and Workers, Future of Work Commission, State of California, 2021.
https://www.labor.ca.gov/wp-content/uploads/sites/338/2021/02/ca-future-of-work-report.pdf
In addition to outlining the charter and goals for the Future of Work Commission, this report provides statistics on labor, wages and demographic data across the state of California:

- Percentage of population groups making less than $15/hour in the state (page 19 of the PDF).
- Percentage of workers that are union members in the state (page 25 of the PDF).
- Percentage of low-wage workers in eight of the state's largest metropolitan areas (page 27 of the PDF).
- Housing costs and wages over time in the state (page 28 of the PDF).
- High housing cost burden for renters by region (page 29 of the PDF).

Colorado

Community Job Readiness and Workforce Needs Assessment, Colorado Department of Transportation, August 2016.
Provided to Caltrans separately.
From the introduction and purpose:

> In order to define an appropriate local hire goal for Central 70 and to identify programming resources, CDOT [Colorado DOT] released a request for proposals to complete a Community Job Readiness and Workforce Needs Assessment.
>
> ….
>
> **Goal and Program Recommendations**
>
> - Provide estimated workforce hours to be fulfilled by local residents within targeted neighborhoods. Recommended goal is included in report.
> - Prepare initial recommendations on programming and resources to support contractors in meeting and exceeding set goals; CWI [Center for Workforce Initiatives] analyzed original data sources, local organization capacity and national best practices in local hiring to identify implementation recommendations included in Section 4 of this report.

Components and outcomes of the assessment work plan included:

- Community baseline data.
- Community assessment of career interests, training needs and resource gaps.
- Employer assessment of position opportunities.
- Existing training resources.
- Identification of gaps in current available training and proposed training or resource activities to bridge anticipated skills gaps.

District of Columbia

Labor Market Awareness, Department of Employment Services, District of Columbia, undated.
https://does.dc.gov/page/labor-statistics
This dynamic dashboard of information for the District of Columbia regarding employment and wages, labor force, economic indicators and population includes links to monthly and quarterly reports, data search tools and other employment publications focused on the metropolitan area.

Related Resource:

> **2024 Top 50 High Demand Occupations Requiring Less Than a Highschool Diploma**, Department of Employment Services, District of Columbia, 2024.
> https://does.dc.gov/sites/default/files/dc/sites/does/page_content/attachments/2024%20Top%2050%20High%20Demand%20Occupations%20Requiring%20Less%20Than%20A%20Highschool%20Diploma.pdf
> A one-page document lists the top 50 jobs, including their two-year and 10-year projected job growth, annual median wages, education requirements and on-the-job training. "Construction Laborers" is on the list, showing short-term negative job growth, but longer-term positive growth.

District of Columbia Labor Market Analysis, Department of Employment Services, District of Columbia, undated.
https://does.dc.gov/sites/default/files/dc/sites/does/page_content/attachments/BW%20Research%20-%20Labor%20Market%20Analysis%20-%20DOES%20Report%20Final.pdf
As an example of a labor market analysis, the research includes detailed employment profiles of 88 occupations built with data from the district's Department of Employment Services and the Bureau of Labor Statistics, along with:

- A survey of 1,377 local employers in 2013.
- Interviews with company executives in 2014.
- A resume panel study conducted in 2014 that addresses perceptions of women and applicants from special populations, such as the formerly incarcerated, long-term unemployed, the homeless and people with disabilities.

The study's employment profile template includes information about education requirements or certifications, skill development, work activities and employers' difficulty finding applicants.

D.C. Labor Market Indicators: January 2015 - November 2024, Unique Morris-Hughes, Victor Robertson and Rebati Mendali, Department of Employment Services, District of Columbia, November 2024.
https://does.dc.gov/sites/default/files/dc/sites/does/page_content/attachments/DC%20Labor%20Market%20Indicators_November_2024.pdf
An overview of labor statistics comparing data from the District of Columbia with national data includes breakdowns by city wards. The study also lists the top five industries with the highest employment increases in the 10-year period. Included are graphs of the top five job postings and top five job postings that require less than a bachelor's degree for the month of November 2024, both lists indicating annual median wages for each position.

Idaho

2019 Skills Gap Survey, Idaho Transportation Department, undated.
Provided to Caltrans separately.
On behalf of the Idaho Transportation Department, the Idaho Department of Labor designed a 27-question survey to assess skill gaps within Idaho's construction industry for the calendar year. The information would be used to develop training programs. Questions pertain to:

- Ease of hiring.
- Applicants' skill levels.
- Training expectations for applicants.
- Skill needs by position.
- Anticipated hires by geographical region.

Illinois

HCCTP: Build Your Story Here, Office of Business and Workforce Diversity, Illinois Department of Transportation, 2023.
https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/about-idot/employment/specialized-training/HCCTP%20Map%20Flyer%2005.16.24.pdf
From the document: In collaboration with the Federal Highway Administration, the Illinois Department of Transportation initiated a Highway Construction Careers Training Program [HCCTP] in late 2009, in an effort to increase access to highway construction jobs for minorities, women and disadvantaged individuals. The HCCTP emphasizes lifelong learning and provides opportunities for further education and assistance to improve employability in Illinois' highway construction industry. The program is implemented through ten community colleges throughout the state. [Includes a map and list of the community colleges.]

Indiana

Research in Progress: SPR-4806: INDOT Training Gap Analysis, Developing a Training Program for INDOT Workforce Development (New, Front-Line and Supervisors) and Smart Tool for Effective Planning for Workforce, Indiana Department of Transportation, start date: October 2023; expected completion date: October 2025.
Project description at https://trid.trb.org/View/2270067
From the project description: The public transportation agencies in the Department of Transportation (DOT) face significant challenges in retaining the workforce that threaten the sustainability of their operations. Indiana Department of Transportation (INDOT) needs a systematic and thorough assessment of current workforce development needs by conducting a gap analysis, prioritizing workforce development needs, and proposing [two] or [three] executive courses targeting the gaps. This study will allow for developing a strategic plan for the next five years.

An Assessment of the Workforce and Occupations in the Highway, Street and Bridge Construction Industries in Indiana, Indraneel Kumar, Lionel Beaulieu, Annie Cruz-Porter, Chun Song, Benjamin St. Germain and Andrey Zhalnin, Indiana Department of Transportation, July 2020.
https://rosap.ntl.bts.gov/view/dot/55680
From the abstract:

> This project explores workforce and occupations within the highway, street and bridge construction industries (NAICS 237310) in Indiana. There are five specific deliverable[s] comprised of three data reports, one policy document and a website. The first data report includes an assessment of the

workforce based on the eight-part framework, which are industry, occupations, job postings, hard-to-fill jobs, Classification of Instructional Programs (CIP), GAP Analysis, compatibility and automation. The report defines a cluster followed by a detailed analysis of the occupations, skills, job postings, etc., in the NAICS 237310 industry in Indiana. The report makes use of specialized labor market databases, such as the Economic Modeling Specialists International (EMSI), CHMURA JobsEQ, etc. The analysis is based only on the jobs covered under the unemployment insurance or the Quarterly Census of Employment and Wages (QCEW) data. The second data report analyzes jobs to jobs flows to and from the construction industry in Indiana, with a particular emphasis on the Great Recession, by utilizing the Bureau of Labor Statistics (BLS) data. The third data report looks into the equal employment opportunity or Section 1391 and 1392 data for Indiana and analyzes specific characteristics of that data.

Recommendations generated from the data analysis:

- Invest in annual maintenance of the interactive website with occupation data and staffing patterns for every district. A one-size approach will not work for all districts.
- Invest in a workforce development pilot in one district, include key stakeholders, and pursue more robust evaluation since existing data is not sufficient for gender and diversity equity goals.
- Implement a career pathway for construction sector, including training.
- Encourage regional approaches within agency districts tailored to unique development needs.
- Develop a support services network to help retain a newly trained workforce.
- Coordinate outreach to minorities, women, people with disabilities and veterans.

New Jersey

Increasing Representation of Minorities, Females and Underrepresented Individuals in Journey Level Jobs on Highway Construction Projects, Janice R. Daniel, Hindy Schachter and David Washington, New Jersey Department of Transportation and Federal Highway Administration, March 2017.
https://www.nj.gov/transportation/business/research/reports/FHWA-NJ-2017-004.pdf
From the recommendations:

> The overall objective of this research was to develop a framework for use by New Jersey Department of Transportation to establish a viable On-the-Job Training/Support Services (OJT/SS) pre-apprenticeship training program aimed at moving women, minorities and other underutilized groups into journey-level positions in highway construction skilled crafts. The literature review, survey of neighboring states, national survey and the review of union apprenticeship programs all indicate similar key elements needed for a successful pre-apprenticeship program.

Below are two of the many recommendations, which begin on page 38 of the report, page 45 of the PDF:

- The literature strongly suggests that successful programs grow out of political and administrative decisions.
- The most important decisions state DOTs make in developing OJT/SS programs involve finding the right partners.

North Carolina

"Preparing for Tomorrow: A Case Study of Workforce Planning in North Carolina Municipal Governments," Willow S. Jacobson, *Public Personnel Management*, Vol. 39, No. 4, Winter 2010. https://cplg.sog.unc.edu/wp-content/uploads/sites/16800/2019/03/Preparing-for-Tomorrow.pdf
Though dated, this journal article provides a useful outline of the questions, tasks and data needed to conduct a labor gap analysis.

Review organizational objectives. Begin with the strategic objectives for the program or activity the gap analysis is intended to inform.

Analyze present and future workforce needs to identify gaps or surpluses. The goal is to gain a strong understanding of the composition and characteristics of the current workforce, evaluating current conditions and identifying areas that may require additional planning to address future needs. The three steps in this analysis:

1. Analyze the current workforce profile. Data collected may include:
    - Demographics (gender, race, ethnicity).
    - Age distribution of current workforce.
    - Skills and competencies of current workforce.
    - Average years of service of current workforce.
    - Time to fill vacant positions.
    - Turnover rates.
    - Labor market skill availability.
2. Analyze the future workforce profile.
    - New skills needed.
    - Number of employees needed to meet future service needs.
    - Impact of new technologies.
    - Identify critical positions.
    - External workforce trends (skill availability).
    - Impacts of legislative changes, social and economic trends.
    - Competition for future skills.
3. Determine gaps and surpluses. Information gathered in the preceding two steps "provide the data necessary to analyze resulting gaps and surpluses." In addition to the workforce gap analysis itself, planning and analysis activities may include:
    - Retirement projections.
    - Competitiveness of compensation strategies.
    - Short-term staffing needs (one year or less).
    - Long-term staffing needs (more than one year).
    - Recruiting plans.
    - Identification of high-potential employees.
    - Identification of critical hiring areas.
    - Identification of key positions within the agency.
    - Succession plans.
    - Training plans.

Oregon

Evaluation of the Highway Construction Workforce Development Program, Lindsey Wilkinson and Maura Kelly, Oregon Department of Transportation and Oregon Bureau of Labor and Industries, October 2024.
https://www.oregon.gov/boli/apprenticeship/Documents/2024+Evaluation+of+the+Highway+Construction+Workforce+Development+Program.pdf
Selected findings from the executive summary:

- The Oregon highway construction workforce continues to become more diverse, with increased integration of women and people of color in apprenticeships.
- The Highway Construction Workforce Development Program improves completion rates for apprentices in eligible trades who receive services. Among apprentices in the 2016-2017 cohorts, on average, those receiving services were 10% more likely to complete their apprenticeship than those who did not receive services. This percentage varies across race/ethnicity and gender.
- The findings presented here demonstrate the effectiveness of the program's supportive services. Among all apprentices in the 2016-2017 cohorts, those receiving child care; "ready items" (work clothes, tools and protective equipment); nonfinancial assistance; and hardship funds were more likely to complete rather than cancel relative to those not receiving services.
- The findings also demonstrate that the likelihood of completion increased when apprentices received both financial and nonfinancial services, indicating the effectiveness of the coordinated services approach.
- Pre-apprenticeship programs have contributed to diversifying the construction workforce, in particular by increasing numbers of women.
- Women, Native men and Black men apprentices are less likely than white men to complete their apprenticeship in six years, but progress continues to be made in increasing the completion rates of women and people of color.

2022 Needs Assessment of Oregon's Highway Trades Apprenticeship, Maura Kelly and Molly Benitez, Oregon Department of Transportation and Oregon Bureau of Labor and Industries, November 2022.
https://www.oregon.gov/odot/Business/OCR/SiteAssets/Pages/Workforce-Development/Needs_Assessment_November_22_FINAL.pdf
From the executive summary: This research was conducted for [t]he Oregon Department of Transportation (ODOT) and Oregon Bureau of Labor and Industries (BOLI) to assess the current needs of the construction industry in order to support ongoing work to increase the recruitment and retention of a diverse highway construction workforce ….
….

Across the board, all contractor and labor partner interviewees agreed that within the short term (next five years), many more workers would be needed. Estimates for the additional workers needed range from 5% to 10%, 25% to 30%, and as high as 50%. … When asked what type of workforce would be needed, top responses were women, workers of color, journey workers and workers willing to travel. Other workforce needs included project engineers, project managers and superintendents.

Wisconsin

WisConomy, State of Wisconsin Department of Workforce Development, undated.
https://www.jobcenterofwisconsin.com/wisconomy/
Links for employers and job seekers are available alongside data search links and dashboards providing labor force and economic data. Users can conduct keyword searches to generate map graphics by clicking on *Job Seekers* > *Search for Jobs*. Examples of possible outputs are provided in Figure 2 and Figure 3.

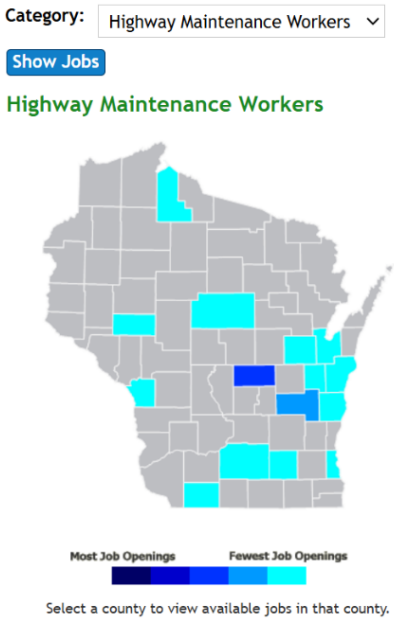


Figure 2. Interactive Map Showing Job Openings for Highway Maintenance Workers in Wisconsin

(*Source*: State of Wisconsin Department of Workforce Development.)

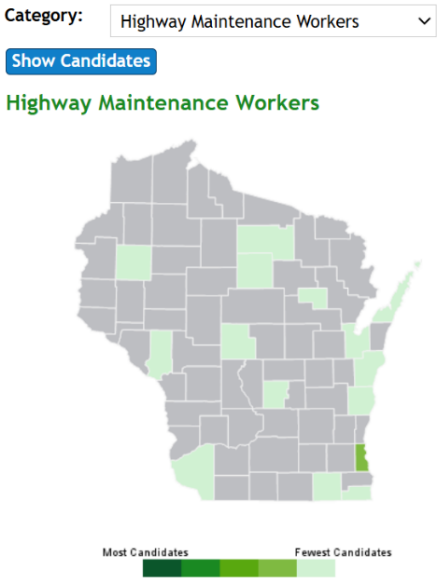


Figure 3. Interactive Map Showing Volume of Candidates for Highway Maintenance Workers in Wisconsin

(*Source*: State of Wisconsin Department of Workforce Development.)

WisDOT Workforce Development and Readiness Project, Romila Singh, Xiao Qin, Mark Gottlieb and Nadya Fouad, Wisconsin Department of Transportation, January 2022.
https://rosap.ntl.bts.gov/view/dot/67677/dot_67677_DS1.pdf
To understand the nature of personnel gaps at the Division of Transportation System Development and provide recommendations to address some of the gaps, these analysis steps were taken:

- SWOT [strengths, weaknesses, opportunities, and threats] analysis.
- Attrition analysis over time.
- Areas of failed recruitments.
- Assessments of mission-critical activities performed in various regions and bureaus.
- Current needs met by full-time employees versus consultants across regions and bureaus.
- Analysis of benchmarking data obtained through interviews with peer DOTs.

From the analysis, three primary recommendations were proposed:

1. Annual/biennial workforce planning coordinated with strategic planning across multiple levels.
2. Succession planning and knowledge management programs aligned with the strategic planning.

3. Retention practices: core competency training, communities of practice and career development.

Municipal Research and Practices

San Francisco, California

The San Francisco Local Hiring Policy for Construction Annual Report, San Francisco Office of Economic and Workforce Development, 2023.
https://www.sf.gov/sites/default/files/2023-03/2023%20Local%20Hiring%20Policy%20Annual%20Report.pdf
The report describes the use of the Local Hiring Policy for Construction on projects managed by the city and county of San Francisco for the calendar year 2022. Although initially implemented to increase local participation specifically on infrastructure projects, the policy was expanded to include all construction on city-owned land. To meet the hiring demands of the construction industry, training is provided through the CityBuild Academy to residents in a 12-week session held at the City College of San Francisco, which provides them a nationally recognized certification offered through North America's Building Trades Unions.

Included is data for workers in San Francisco and surrounding counties by demographic information, trade and project. For example, page 6 of the PDF provides data for demographic groups, indicating hours worked and the number of workers in each geographical area (see Figure 4).

Demographic Category	San Francisco		Non-SF Bay Area		Other CA		Out of State	
	Work Hours	Worker Count	Work Hours	Worker Count	Work Hours	Worker Count	Work Hours	Worker Count
AFRICAN AMERICAN	181,703	238	50,524	154	20,982	49	572	3
ASIAN/PACIFIC ISLANDER	84,951	203	56,229	222	7,498	45	94	1
CAUCASIAN	171,617	285	364,356	1236	284,008	735	30,197	65
HISPANIC	569,071	834	791,850	3218	323,862	1438	26,791	31
NATIVE AMERICAN/ALASKAN	1,200	5	3,177	24	11,908	12	0	0
NOT SPECIFIED	322,901	568	405,667	1480	187,627	709	17,384	48
OTHER/TWO OR MORE	27,038	62	27,903	169	12,331	62	1,827	3
FEMALE	4.2%	118	1.9%	118	2.3%	41	4.2%	4

Figure 4. Work Hours and Worker Count Across Demographics

(*Source*: *The San Francisco Local Hiring Policy for Construction Annual Report*.)

Seattle, Washington

2024 Priority Hire Annual Report, Seattle Finance and Administrative Services, June 2025.
https://www.seattle.gov/documents/departments/fas/purchasingandcontracting/labor/priority%20hire%20annual%20report/2024%20priority%20hire%20annual%20report.pdf
From the overview:

> Priority Hire ensures residents receive a fair share of wealth-generating construction jobs and increases economic equity in our region.
>
> Construction workers living in economically distressed communities have earned $120 million dollars in wages. Most of these workers are BIPOC [Black, Indigenous and People of Color], women and apprentices. We estimate this is double than they would have earned without Priority Hire.

Priority Hire ensures money stays local and helps stop displacement of communities. In 2024 alone, Priority Hire workers earned $16 million in wages, plus benefits.

The report includes a comparison of hours worked by different groups before Priority Hire was initiated and hours worked by these same groups in 2024 (see Figure 5).

How does Priority Hire affect workers by race/ethnicity?

Race/Ethnicity	Share of Hours Before Priority Hire[1]	2024 Priority Hire Projects (872,931 hours)	2024 Workers (4,455 workers)
African American/Black	4%	7%	6%
Asian	3%	3%	3%
Latinx	16%	23%	18%
Native American	3%	2%	1%
Other	N/A	5%	4%
White	75%	49%	50%
Not Specified	N/A	10%	19%
All BIPOC[2]	**25%**	**40%**	**32%**

[1]Share of hours before Priority Hire is based on hours from a sample of projects from 2009-2013. There is no prior data for Other or Not Specified.
[2]BIPOC exclude White and Not Specified.
Source: City of Seattle, 2025. Data includes public works and public-private partnership projects. Percentages are based on share of hours or share of workforce and may not add to 100% due to rounding.

Figure 5. Impacts of Priority Hire on Hours Worked

(*Source*: *2024 Priority Hire Annual Report*.)

Industry Resources

2024 Workforce Survey Analysis: Summary, Associated General Contractors of America, undated. https://www.agc.org/sites/default/files/Files/Communications/2024_Workforce_Survey_Analysis.pdf
From the summary: The Associated General Contractors of America and Arcoro conduct an annual survey of construction firms to measure the state of the industry's labor market. This survey, the 2024 Workforce Shortage Survey, is designed to measure the severity of construction workforce shortages and the impacts those shortages have on construction firms and projects. It is also designed to measure what construction firms are doing in response to those shortages to cope and help bring more people into the industry.

What this year's survey makes clear is that our nation's failure to invest in construction workforce education and training programs is having a real, measurable impact on the country's ability to build infrastructure and other construction projects. These impacts include higher costs, longer construction schedules and a significant number of delayed and/or canceled projects.

Overwhelming shares of contractors are both seeking more workers and having difficulty filling those openings. Ninety-four percent of respondents report having openings for craft workers and 85[%]have openings for salaried workers. Ninety-four percent of firms with craft worker openings report those positions are hard to fill; similarly, 92[%] of firms with openings for salaried workers report they are hard to find.

One reason it is so difficult for firms to find people is because federal officials have failed to properly invest in construction workforce training and education. A recent report that the association released in partnership with the Progressive Policy Institute found that federal officials invest four times as much each year encouraging students to earn four-year degrees as they do supporting workforce development programs for fields like construction.

Related Resource:

> **2024 Construction Outlook: National Survey Results**, Associated General Contractors of America, undated.
> https://www.agc.org/sites/default/files/users/user21902/2024_Outlook_National_FINAL.pdf
> This publication provides the data from 1,293 responses to the annual survey described in the publication cited above.

A Construction Market in Transition: The 2024 Construction Hiring and Business Outlook, Associated General Contractors of America and Sage, undated.
https://www.agc.org/sites/default/files/users/user21902/2024%20Construction%20Hiring%20and%20Business%20Outlook%20Report_V2.pdf
From the summary: The outlook for the construction market in 2024 is decidedly mixed as contractors predict transitions in demand for projects, the challenges they will face and the types of technology they will embrace. Amid these changes, however, contractors are still struggling to cope with significant labor shortages, the impacts of higher interest rates and costs and a supply chain that, while better, is still far from normal.

Demand for different types of projects is changing. Respondents to this year's Outlook survey are less confident about growth prospects for many market segments than they were a year ago. They are most optimistic about a range of public-sector market segments, including water and sewer projects, transportation, federal and bridge and highway work. Conversely, they predict private sector demand will be less robust for segments like manufacturing and multifamily residential and will decline for lodging, retail and private office construction.

Contractors have also tempered last year's high expectations for new federal investments in infrastructure and other construction projects. Nowhere did contractors' expectations for growth in a market segment drop more between last year and this year than in the highway and street and other transportation construction segments. A relatively few firms report having picked up work because of new federal investments in 2023. A growing number of firms likely have found that the federal review process and complex new Buy America rules associated with these projects are limiting the benefits of the federal funds.

The 2024 Construction Hiring and Business Outlook, Associated General Contractors of America, January 2024.
https://www.agc.org/news/2024/01/04/2024-construction-hiring-and-business-outlook
This web page offers links to a range of resources associated with construction contractors' perspectives on hiring and business. *From the web page*:

> Construction contractors have a decidedly mixed outlook for 2024 as firms predict transitions in demand for projects, the types of challenges they will face and the technologies, including artificial intelligence, they will embrace[,] according to survey results the Associated General Contractors of America and Sage released today. Amid these changes, contractors are struggling to cope with significant labor shortages, the impacts of higher interest rates and input costs, and a supply chain that, while better, is still far from normal, according to *A Construction Market in Transition: The 2024 Construction Hiring and Business Outlook.*
>
> "2024 offers a mixed bag for construction contractors: [O]n one hand, demand for many types of projects should continue to expand and firms will continue to invest in the tools they need to be more efficient," said Stephen E. Sandherr, the association's chief executive officer. "Meanwhile,

they face significant challenges when it comes to finding workers, coping with rising costs and weathering the impacts of higher interest rates."

Diversity, Equity and Inclusion Initiatives in the Construction Trades, Cihan Bilginsoy, David Bullock, Amy Tracy Wells and Roland Zullo, North America's Building Trades Unions, March 2022. https://nabtu.org/wp-content/uploads/2023/01/ICERES-Study-22Diversity-Equity-and-Inclusion-Initiatives-in-the-Construction-Trades22.pdf
This report addresses union and nonunion diversity, equity and inclusion (DEI) practices separately due to the differing structures of employment in both environments:

- Many union programs to improve diversity in the trades include substantial partnerships with community organization, industry leaders and government agencies. Support for pre-apprenticeship participants, including transportation, mentoring and clothing vouchers, can increase completion rates.
- Nonunion DEI programs are nearly always top-down directives from the chief executive. They are generally less developed when it comes to retention and promotion, focusing instead on recruitment and hiring of diverse candidates.
- Apprenticeships are the third topic addressed, representing an important access point for people joining the industry. Programs sponsored jointly by unions and contractors register "far more" female, Black, Hispanic and "other race" workers than nonjoint programs. More than half of apprentices leave their respective training programs before completion. Data suggests that Hispanic apprentices are disproportionately enrolled in programs for lower-paying trades.

Data Sources

A search of publicly accessible databases and search tools identified relevant data sources for a labor gap analysis. These are organized in the following categories:

- Federal government:
    - Job Classification Systems and Crosswalks.
    - U.S. Bureau of Labor Statistics.
    - U.S. Census Bureau.
    - U.S. Department of Labor.
    - U.S. Department of Transportation.
    - U.S. Equal Employment Opportunity Commission.
- National transportation associations and organizations.
- State of California:
    - Employment Development Department.
    - California Open Data Portal.
    - California Department of Human Resources.

NOTE: Table 2 in Appendix B, which begins on page 54 of this report, summarizes the publications cited below, providing the publication or resource title, the year of publication, a category, and a brief description of the resource.

Federal Government

Job Classification Systems and Crosswalks

Among the citations below are publications that describe the evolution of job classification systems. Governmental agencies and researchers use job classifications to track and report data on thousands of jobs across the country in multiple industries, and these classifications have changed over time with the evolution of work and measurement methodologies. For some multiyear analyses, it may be necessary to compare jobs across different classification lists. References to crosswalk resources are provided.

North American Industry Classification System, U.S. Census Bureau, August 2025.
https://www.census.gov/naics/
From the introduction to NAICS: The North American Industry Classification System (NAICS) is the standard used by [f]ederal statistical agencies in classifying business establishments for the purpose of collecting, analyzing and publishing statistical data related to the U.S. business economy. NAICS was developed under the auspices of the Office of Management and Budget (OMB), and adopted in 1997 to replace the Standard Industrial Classification (SIC) system.

Standard Occupational Classification System, U.S. Bureau of Labor Statistics, undated.
https://www.bls.gov/soc/
From the description: The 2018 Standard Occupational Classification (SOC) system is a federal statistical standard used by federal agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. All workers are classified into one of 867 detailed occupations according to their occupational definition. To facilitate classification, detailed occupations are combined to form 459 broad occupations, 98 minor groups and 23 major groups. Detailed occupations in the SOC with similar job duties, and in some cases skills, education and/or training, are grouped together.

The O*NET-SOC Taxonomy, O*NET Resource Center, August 2025.
https://www.onetcenter.org/taxonomy.html
From the description:

> The 2019 version of the O*NET-SOC taxonomy is updated to align with the 2018 Standard Occupational Classification (SOC) system. The revised taxonomy includes 1,016 occupational titles, of which 923 represent O*NET data-level occupations. In total, the taxonomy currently encompasses more than 55,000 jobs.

Since the initial O*NET database release in 1998, the taxonomy underwent four updates before transitioning to 2018 SOC, establishing O*NET-SOC 2019.

Employment Projections: Classifications and Crosswalks, U.S. Bureau of Labor Statistics, August 2025.
https://www.bls.gov/emp/documentation/crosswalks.htm
This website describes the classification systems used to produce employment projections and offers links to crosswalks between different classification structures, including:

- 2022 NAICS.
- 2018 SOC system/O*NET-SOC.
- American Community Survey (ACS), conducted by the U.S. Census Bureau.
- CPS, conducted monthly by the U.S. Census Bureau.
- Occupational Employment and Wage Statistics, which uses the 2018 SOC system.

Industry and Occupation Code Lists and Crosswalks, U.S. Census Bureau, May 2025.
https://www.census.gov/topics/employment/industry-occupation/guidance/code-lists.html
This website addresses the same need to bridge datasets as is covered by the previous citation due to the evolution of occupation classification systems. The 2022 Census Industry Code Lists are derived from the 2022 NAICS.

U.S. Bureau of Labor Statistics

Industries at a Glance: Construction: NAICS 23, U.S. Bureau of Labor Statistics, August 2025.
https://www.bls.gov/iag/tgs/iag23.htm
From the website:

> The [C]onstruction sector comprises establishments primarily engaged in the construction of buildings or engineering projects (e.g., highways and utility systems). Establishments primarily engaged in the preparation of sites for new construction and establishments primarily engaged in subdividing land for sale as building sites also are included in this sector.

The [C]onstruction sector includes these subsectors:

- Construction of Buildings: NAICS 236.
- Heavy and Civil Engineering Construction: NAICS 237 and its industry groups:
  - Utility System Construction: NAICS 2371.
  - Land Subdivision: NAICS 2372.
  - Highway, Street and Bridge Construction: NAICS 2373.
  - Other Heavy and Civil Engineering Construction: NAICS 2379.
- Specialty Trade Contractors: NAICS 238.

Industries at a Glance: Transportation and Warehousing: NAICS 48-49, U.S. Bureau of Labor Statistics, August 2025.
https://www.bls.gov/iag/tgs/iag48-49.htm
From the website: The Transportation and Warehousing sector includes industries providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation. Establishments in these industries use transportation equipment or transportation-related facilities as a productive asset. The type of equipment depends on the mode of transportation. The modes of transportation are air, rail, water, road and pipeline.

Measuring Productivity Growth in Construction, Leo Sveikauskas, Samuel Rowe, James Mildenberger, Jennifer Price and Arthur Young, *Monthly Labor Review*, January 2018.
https://www.bls.gov/opub/mlr/2018/article/measuring-productivity-growth-in-construction.htm
The study differentiates productivity growth in four industries within the construction sector to better demonstrate how they perform individually rather than as a group. Only one of the four industries — highways, roads and bridges — does not show positive growth, according to the analysis. This contradicts previous studies, which generalize that growth within total construction has been negative or zero. One aspect of the analysis is a separation of the industries using the NAICS, which denotes highway, street and bridge construction as NAICS 237310.

Current Employment Statistics – CES (National), U.S. Bureau of Labor Statistics, undated.
https://www.bls.gov/CES/

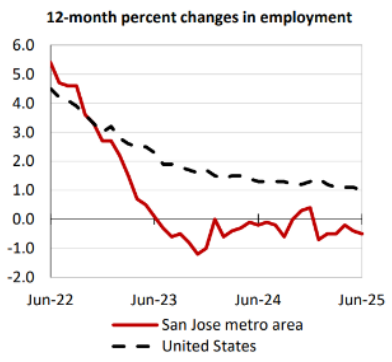
Current Employment Statistics – CES (State and Metro Area Employment, Hours and Earnings), U.S. Bureau of Labor Statistics, undated.
https://www.bls.gov/sae/
From the website:

> The Current Employment Statistics (CES) program produces detailed industry estimates of employment, hours and earnings of workers on nonfarm payrolls. CES State and Metro Area produces data for all 50 [s]tates, the District of Columbia, Puerto Rico, the Virgin Islands, and about 430 metropolitan areas and divisions. CES National Estimates produces estimates for the nation. Each month, CES surveys approximately 121,000 businesses and government agencies, representing 631,000 individual worksites.

State of California Data
The Western Information Office of the BLS produces a statewide California profile that includes California Economy at a Glance, which offers six months of data for the various employment sectors tracked, links to generate content specific to 25 areas across California, and the latest labor and economic news releases.

The BLS Western Information Office also produces economic summaries for eight metropolitan areas: Fresno, Los Angeles, Riverside, Sacramento, San Diego, San Francisco, San Jose and Santa Rosa. These reports include unemployment rates, average weekly wages, employment by sector and cost of living information. Figure 6 is taken from the San Jose Area Economic Summary.

Employment on nonfarm payrolls and employment by major industry sector, over-the-year changes



San Jose metro area employment (number in thousands)	Jun. 2025	Change from Jun. 2024 to Jun. 2025	
		Number	Percent
Total nonfarm	1,149.6	-5.5	-0.5
Mining and logging	0.2	0.0	0.0
Construction	54.0	0.4	0.7
Manufacturing	122.5	-3.9	-3.1
Trade, transportation, and utilities	116.2	-0.4	-0.3
Information	92.8	-0.9	-1.0
Financial activities	35.1	-1.3	-3.6
Professional and business services	279.6	-6.4	-2.2
Education and health services	214.6	6.6	3.2
Leisure and hospitality	102.7	-2.4	-2.3
Other services	28.2	0.6	2.2
Government	103.7	2.2	2.2

Source: U.S. BLS, Current Employment Statistics.

Figure 6. San Jose Metro Employment by Industry
(*Source*: *San Jose Area Economic Summary*.)

Labor Force Statistics from the Current Population Survey, U.S. Bureau of Labor Statistics, undated.
https://www.bls.gov/cps/
From the website:

> The Current Population Survey (CPS) provides a wealth of information on the nation's labor force, including data on the employed, unemployed and those not in the labor force. Key CPS measures are the unemployment rate, labor force participation rate and employment-population ratio.

A sampling of other available data:

- Technical documentation web page includes descriptions of the methodology, survey questionnaire and other relevant research considerations.
- Data retrieval tools allow users to access statistics, periodical reports and research papers that are searchable by subject.
- Databases, Tables and Calculators by Subject. Links are provided to datasets and calculators:
    - Employment, Hours and Earnings – National.
    - Employment, Hours and Earnings – State and Metro Area.
    - Job Openings and Labor Turnover Survey (JOLTS).
    - Local Area Unemployment Statistics (LAUS).
    - Occupational Projections Data.
    - National Employment Matrix by Occupation.
    - National Employment Matrix by Industry.

Related Resources:

Household Data Series from the Monthly A Tables. Sixteen data tables provide employment status information by sex, age, race, educational attainment, veteran status and disability status.

Employment in Transportation: Employment in Transportation Related Occupations by Industry, 2024 Year-in-Review. This report provides employment data for occupations within the transportation industry and transportation-related occupations in nontransportation industries, as defined by the SOC system.

Labor Force Characteristics by Race and Ethnicity, 2023. Topics addressed in this report include composition of the labor force, employment rates by race, educational attainment, occupation percentages and earnings.

Persons With a Disability: Labor Force Characteristics, 2024. This report offers employment statistics for people with disabilities, including age, race, educational attainment, percentage of self-employment and percentage of unemployment.

Geographic Profile of Employment and Unemployment, 2024. Employment data is presented in 26 tables by geographical region, state, demographic categories and other employment factors.

Industry Productivity Viewer. This tool presents industry-specific data on multiple productivity measures in graph or table formats. As an example, Figure 7 illustrates the type of dynamic chart that can be created for heavy and civil engineering construction using the website tool. This chart represents the employment rate in thousands and the change in employment rate as a percentage, with 2017 as the baseline (2017=100).

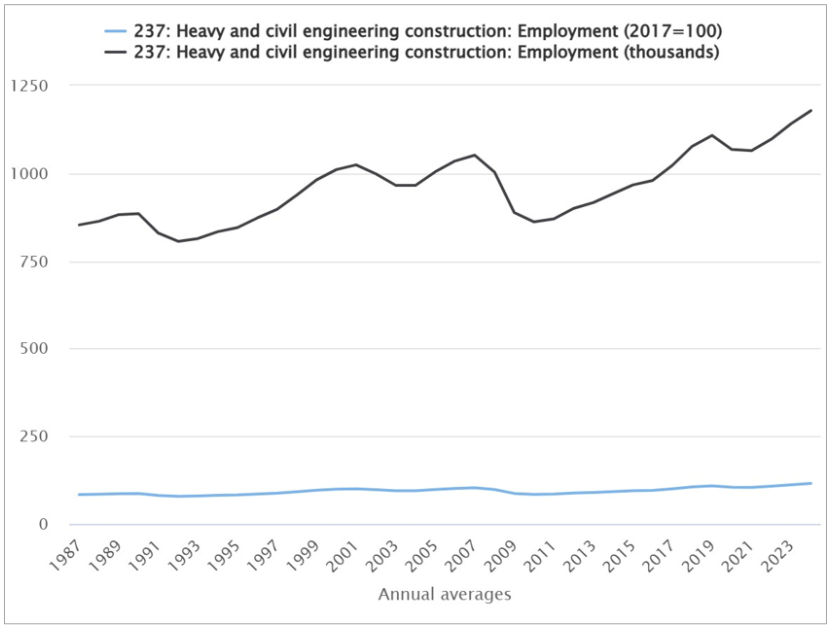


Figure 7. Sample Chart Generated by the Industry Productivity Viewer

(*Source*: U.S. Bureau of Labor Statistics.)

Monthly Labor Review. Research articles addressing current employment and economy-related topics are released on this page. The archive is searchable by topic, author, date and department.

Women in the Labor Force, 2023: Women and Workplace Flexibilities. The report includes longitudinal data tracking men's and women's labor force participation by age from 1948 to 2023. Other topics are telework rates, part-time work percentages and reasons for part-time work. Figure 8 shows the percentage of men and women working in different occupations, including the telework rates.

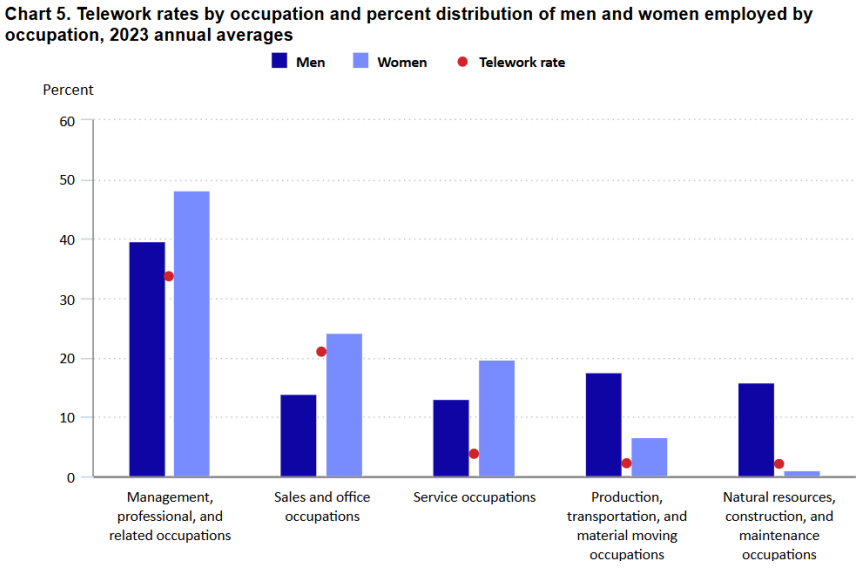


Figure 8. Telework Rates by Occupation (2023 Annual Averages)

(*Source*: U.S. Bureau of Labor Statistics.)

Occupational Outlook Handbook, Construction Laborers and Helpers, U.S. Bureau of Labor Statistics, August 2025.
https://www.bls.gov/ooh/construction-and-extraction/construction-laborers-and-helpers.htm#tab-1
The website provides job descriptions, pay ranges, 10-year job outlook and qualification pathways for construction laborers and helpers. Similar handbooks are available for all occupations in the SOC system through the A-Z Index or the website's search window.

Occupational Employment and Wage Statistics, U.S. Bureau of Labor Statistics, April 2025.
https://www.bls.gov/oes/oes_emp.htm
From the website:

> The Occupational Employment and Wage Statistics (OEWS) program produces employment and wage estimates for approximately 830 occupations based on a survey of business establishments (employers). The OEWS survey covers wage and salary workers in nonfarm establishments and does not include the self-employed, owners and partners in unincorporated firms, household workers, or unpaid family workers.
>
> OEWS data [is] published annually with a May reference date. The OEWS data available from BLS include cross-industry occupational employment and wage estimates for the nation; states, the District of Columbia and territories; approximately 530 metropolitan statistical areas (MSAs) and nonmetropolitan areas; national industry-specific estimates at the NAICS sector, 3-digit, most 4-digit, and selected 5- and 6-digit industry levels; and national estimates by ownership across all industries and for schools and hospitals.

An OEWS Profile also indicates which industries and states have the highest employment for specific occupations. Figure 9 is an example of a map that can be generated by the OEWS Data Retrieval Tool by querying occupations in the Construction and Extraction category.

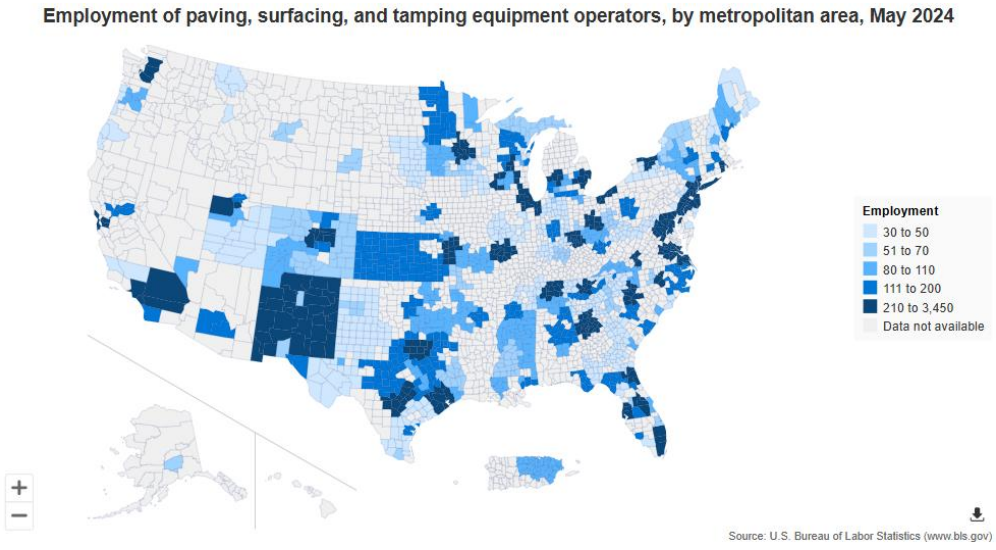


Figure 9. Sample Map Generated by the OEWS Data Retrieval Tool
(*Source*: U.S. Bureau of Labor Statistics.)

U.S. Census Bureau

Profile: California, U.S. Census Bureau, undated.
https://data.census.gov/profile/California?g=040XX00US06
Data categories include additional subtopics:

- Business and Economy.
- Education.
- Employment.
- Families and Living Arrangements.
- Health.
- Housing.
- Income and Poverty.
- Populations and People.
- Race and Ethnicity.

Labor Force Statistics, U.S. Census Bureau, June 2025.
https://www.census.gov/topics/employment/labor-force.html
From the website: The Census Bureau's labor force statistics provide information about employment status, employment dynamics and work experience (usual hours worked and the number of weeks worked in the last year).

Guidance for Labor Force Statistics Data Users. This guide offers information on the different sources used to develop unemployment (labor force) estimates:

- CPS.
- ACS.
- Local Area Unemployment Statistics (LAUS) Program.
- CES program.
- Survey of Income and Program Participation (SIPP).
- Unemployment Insurance (UI) Administrative Records.

Industry and Occupation Data Tools, U.S. Census Bureau, November 2021.
https://www.census.gov/topics/employment/industry-occupation/data/tools.html
From the website: Interactive applications, created by the Census Bureau, to help you find, customize and even visualize, statistics and information from multiple censuses, surveys and programs.

LED Extraction Tool, U.S. Census Bureau, undated.
https://ledextract.ces.census.gov/
The LED Extraction Tool enables streamlined access to the raw public-use data produced through the Local Employment Dynamics (LED) Partnership. This easy-to-use tool provides comma-separated value (CSV) files for the exact variables and characteristics requested by users. The LED Extraction Tool offers access to the Quarterly Workforce Indicators (QWI), Job-to-Job Flows (J2J), and LEHD [Longitudinal Employer-Household Dynamic] Origin-Destination Employment Statistics (LODES) data products. Related resources:

- LED Extraction Tool one-page overview.
- LEHD Data Infrastructure links employer and household data, creating a longitudinal archive for analysis of the interactions between workers and companies.

Quarterly Workforce Indicators (QWI) Explorer, U.S. Census Bureau, undated.
https://qwiexplorer.ces.census.gov/
QWIs are generated by the U.S. Census Bureau to measure employment and earnings at the local level (such as the county and metropolitan area). They offer data on job creation, job loss, employee turnover, hires and separations. They can be analyzed for demographic information and by company.

Figure 10 is a sample graph resulting from a query of all female hires in San Mateo County by construction firms, with the colored bars representing different age ranges.

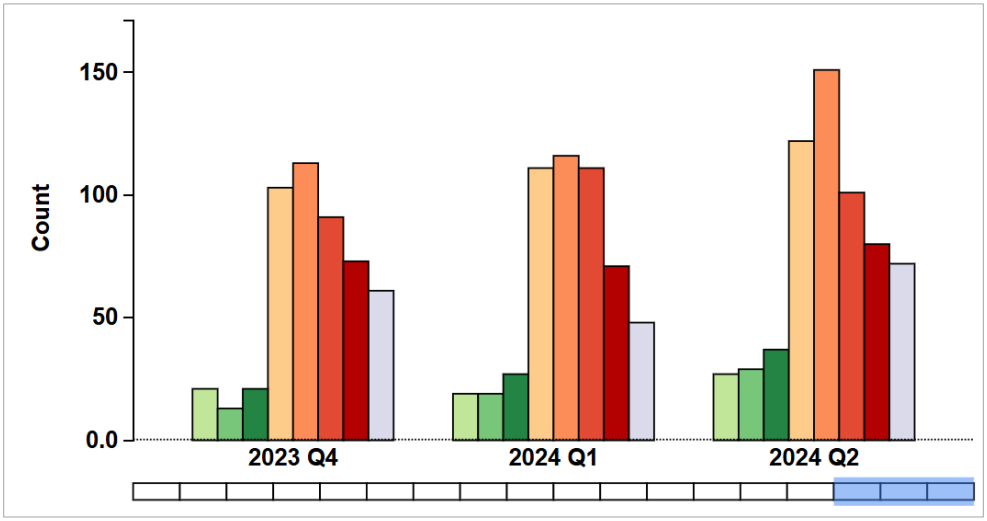


Figure 10. Sample Graph Generated by QWI Explorer
(*Source*: U.S. Census Bureau.)

U.S. Department of Labor

Data and Statistics, Office of Apprenticeship, U.S. Department of Labor, undated.
https://www.apprenticeship.gov/data-and-statistics
From the website: Office of Apprenticeship prioritizes the growth and expansion of [r]egistered [a]pprenticeships across industry sectors and all populations as a continuing goal of the National Apprenticeship System. Stakeholders should utilize existing data to better inform utilization analysis and targeted outreach to support apprentice participation goals. Browse through our visual dashboards to learn more about the apprenticeship system.

Related Resource:

- Apprentices by State Dashboard. Provides graphics of key statistics on apprentices, searchable by year, state, demographic information, industry, occupation and other variables (see Figure 11).

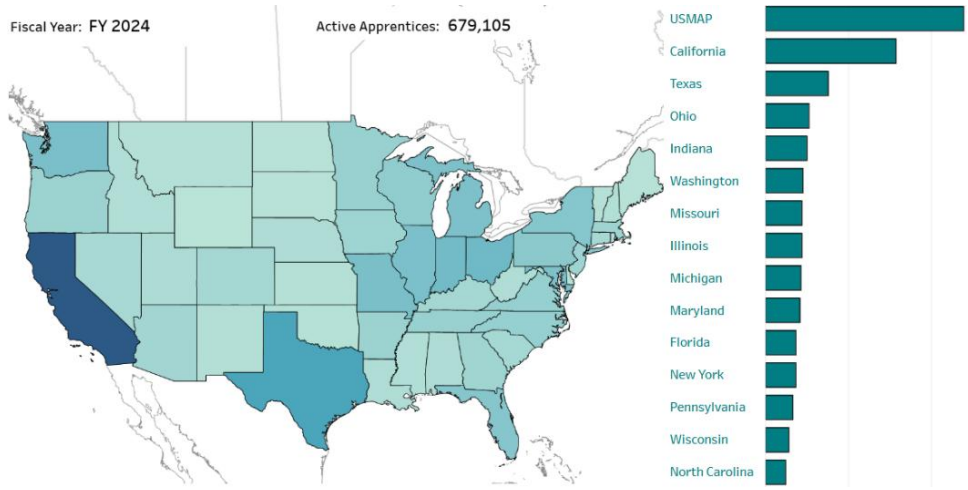


Figure 11. Sample Graphic Available from the Apprentices by State Dashboard

(*Source*: U.S. Department of Labor.)

The multiple criteria allow for tracking year-over-year comparison of specific groups. Figure 12 presents 10 years of statistics for Hispanic or Latina female apprentices in California.

Apprentice Growth by Fiscal Year

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Apprentice Count	1,276	1,797	1,945	2,101	2,345	2,560	2,889	3,490	4,071	4,399	4,397
Year over Year		▲40.83%	▲8.24%	▲8.02%	▲11.61%	▲9.17%	▲12.85%	▲20.80%	▲16.65%	▲8.06%	▼-0.05%
Growth from 2015		▲40.83%	▲52.43%	▲64.66%	▲83.78%	▲100.63%	▲126.41%	▲173.51%	▲219.04%	▲244.75%	▲244.59%

Figure 12. Apprentice Growth by Fiscal Year (California Hispanic or Latina Females)

(*Source*: U.S. Department of Labor.)

U.S. Department of Transportation

Transportation Economic Trends, Bureau of Transportation Statistics, U.S. Department of Transportation, undated.
https://data.bts.gov/stories/s/28tb-cpjy
From the website:

> *Transportation Economic Trends (TET)*, developed by the Bureau of Transportation Statistics (BTS), highlights transportation's role in the economy and explores changes (trends) over time through a series of interactive charts. TET also explains related concepts and data sources for a general audience.

The site includes links to content associated with transportation employment:

Employment in Transportation

- Monthly Employment Statistics:
  - Unemployment in Transportation.
  - Employment in Transportation: Total, by Mode and Women.
- Annual Employment Statistics:
  - Employment in Transportation and Related Industries.

    - Employment in Transportation Related Occupations and Selected Characteristics.
    - Employment in Transportation Related Occupations by Industry.
- Concepts.

Related Resources:

Transportation Economic Trends (TET) Data, Bureau of Transportation Statistics, U.S. Department of Transportation, last updated September 2, 2025.
https://data.bts.gov/Research-and-Statistics/Transportation-Economic-Trends-TET-data/tcq5-4pgu/about_data
This site offers access to the data used in connection with the TET website. Interactive visualizations are available at https://data.transportation.gov/stories/s/28tb-cpjy.

Employment in Transportation: Transportation Economic Concepts, *Transportation Economic Trends,* Bureau of Transportation Statistics, U.S. Department of Transportation, undated.
https://data.bts.gov/stories/s/Transportation-Economic-Concepts-Transportation-Em/rpax-fyz5#what-are-transportation-and-related-industries
This web page clarifies the distinction between employment in transportation and related industries versus employment in transportation occupations. It includes a list of occupations in the following categories:

- Transportation and warehousing.
- Transportation-related manufacturing.
- Other transportation-related industries (including highway, street and bridge construction).
- Vehicle operators, pipeline operators and primary support occupations.
- Secondary support service occupations.
- Transportation equipment manufacturing and maintenance occupations.
- Transportation infrastructure construction and maintenance occupations.
- Other occupations.

U.S. Equal Employment Opportunity Commission

EEO-4 (State and Local Government Information Report) Statistics, U.S. Equal Employment Opportunity Commission, undated.
https://www.eeoc.gov/data/eeo-4-state-and-local-government-information-report-statistics
From the introductory note:

> The State and Local Government Information Report (EEO-4), also referred to as the EEO-4 Report, is a mandatory biennial data collection that requires all state and local governments with 100 or more employees to submit workforce demographic data including data by race/ethnicity, sex, job category and salary band.

EEOC Explore (see Figure 13), an interactive data query and mapping tool available on this website, is described as a "user-friendly tool [that] enables stakeholders to explore privacy-protected data and compare trends across a number of categories (including location, sex, race and ethnicity, job type, employee type and industry sector) without the need for computer programming or statistical analysis experience." An **EEOC Explore User Guide** provides step-by-step instructions for using the interactive functions of the website to retrieve data with the map graphics. It also provides guidance for downloading the source data from the website.

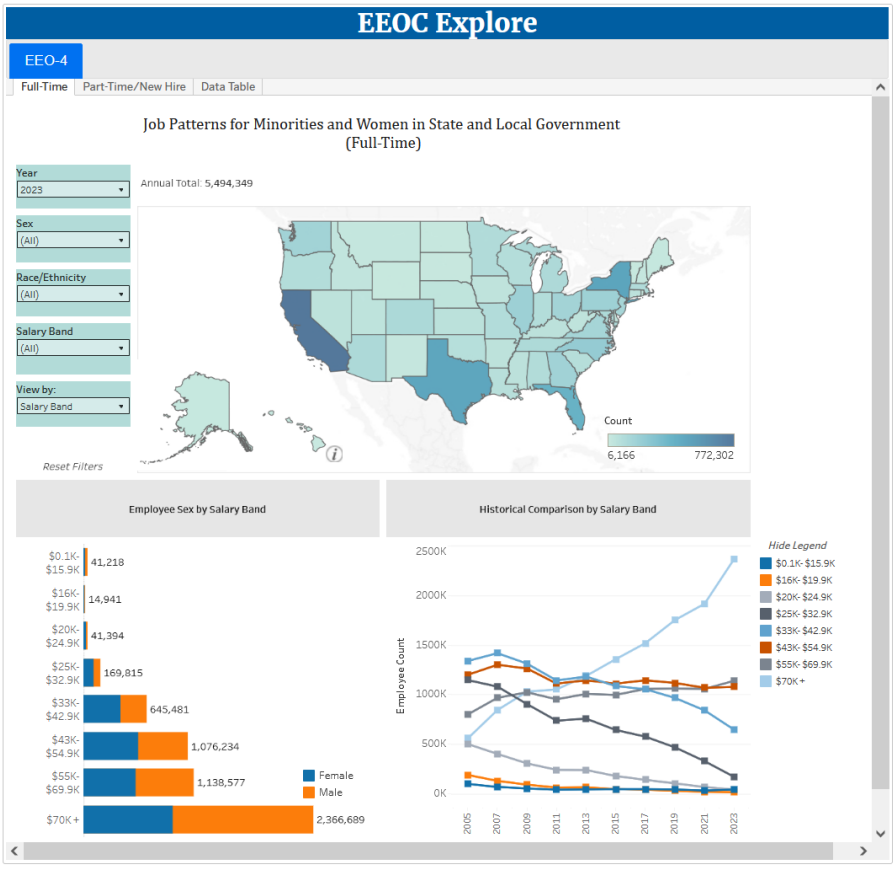


Figure 13. Screenshot of the EEOC Explore Data Tool Used to Track Employment Trends

(*Source*: U.S. Equal Employment Opportunity Commission.)

National Transportation Associations and Organizations

2024 Workforce Survey Results, Associated General Contractors of America, undated.
https://www.agc.org/sites/default/files/users/user21902/2024_Workforce_Survey_National_FINALIZED.pdf
The data from 1,496 total responses address labor topics, including number of open craft or salaried positions, difficulty in filling open positions, recruitment strategies added in the past 12 months, changes made to training and pay, and anticipated changes to headcount in the next 12 months.

Related Resource:

2024 Workforce Survey Results: California Results, Associated General Contractors of America, undated.
https://www.agc.org/sites/default/files/users/user21902/2024_Workforce_Survey__California_FINALIZED.pdf
Data from 53 total responses report the following, among other results:

- 99% of respondents have difficulty filling hourly craft positions, with 92% for salaried positions.
- The most difficult salaried and hourly craft positions to fill are reported.
- The most common reasons for difficult in filling positions are a lack of skills or certification and failure to show up or stay.

- Employers have increasingly turned to career-building programs, online strategies and unions in the past 12 months to acquire workers.
- They have also increased or initiated spending on training and development.

2023 Annual AASHTO State DOT HR Metrics Report, American Association of State Highway and Transportation Officials, October 2024.
Provided to Caltrans separately.
This annual report presents employment data from member states that responded to the request. Categories include:

- General metrics: position counts, average age of new hires and current employees, average length of service, turnover rates, types of turnover and retirement eligibility/projections.
- Telework data: percentage of full-time telework, part-time telework and out-of-state.
- Diversity data: gender, race, ethnicity, veteran status, disability status for the entire agency and broken down by equal employment opportunity (EEO) position categories.

2023 AASHTO Salary Survey, American Association of State Highway and Transportation Officials, September 2024.
Provided to Caltrans separately.
This report provides job classifications and salary data on positions currently used by the transportation industry, intended for the use of human resources professionals to analyze job classifications, write job descriptions and develop pay structures for DOTs.

Eighty-nine job titles are divided into five job categories:

- Administrative.
- Engineering.
- General.
- Maintenance.
- Other.

2022 Annual AASHTO State DOT HR Metrics Report, American Association of State Highway and Transportation Officials, March 2024.
Provided to Caltrans separately.
This annual report presents employment data from member states that responded to the request.

State of California

Employment Development Department

The resources below provide labor market information made available through the Employment Development Department (EDD). Additional resources in the form of datasets supported by EDD are cited under **California Open Data Portal**, beginning on page 39.

Labor Market Information
https://labormarketinfo.edd.ca.gov/?PAGEID=94
From the website:

> The Labor Market Information Division (LMID) is the prime source of high quality and timely workforce and labor market information for the State of California. Our mission is to help our

customers and stakeholders with informed decision making by providing accurate labor market data and information. We collect, analyze and publish statistical data and reports on California's labor force, industries, occupations, employment projections, wages and other important labor market and economic data.

Labor market information available through EDD:

Employment Projections estimate the changes in industry and occupational employment over time resulting from industry growth, technological change and other factors. California produces 10-year projections of employment annually for the state and local areas.

Labor Market Information by California Geographic Areas provides labor market data, industry studies and other economic reports for California and substate areas. This website contains the most frequently accessed California labor market data and information by geographic areas.

Local Workforce Development Areas (LWDA) in California. LWDA administrators administer Workforce Innovation and Opportunity Act (WIOA) services. Each month EDD releases revised and preliminary, not seasonally adjusted civilian labor force, and unemployment rates for LWDA local areas. Estimates of employment by industry are not available.

Interactive Map and Data Tools. This page features interactive California labor force and unemployment maps, dynamic charts and data tables. These interactive tools and associated data are updated monthly. The site's interactive map displays nonseasonally adjusted California labor force and unemployment data for all 58 counties and 21 major cities ranked by population size. Maps and associated data are updated monthly.

California Open Data Portal

The datasets below are available through the California Open Data Portal. Sponsored by the Government Operations Agency, the portal is described as a "statewide open data portal created to improve collaboration, expand transparency and lead to innovation and increased effectiveness." As the website notes, "While several state agencies host their own open data portals, data.ca.gov was designed specifically to host open data from more than one agency. GovOps is in the process of linking each of the existing state portals, so that all of the state's open datasets can be searched from https://data.ca.gov."

Current Employment Statistics (CES)
https://data.ca.gov/dataset/current-employment-statistics-ces-2
From the website: The Current Employment Statistics (CES) program is a [f]ederal-[s]tate cooperative effort in which monthly surveys are conducted to provide estimates of employment, hours and earnings based on payroll records of business establishments. The CES survey is based on approximately 119,000 businesses and government agencies representing approximately 629,000 individual worksites throughout the United States.

CES data reflect the number of nonfarm, payroll jobs. It includes the total number of persons on establishment payrolls, employed full- or part-time, who received pay (whether they worked or not) for any part of the pay period that includes the 12th day of the month. Temporary and intermittent employees are included, as are any employees who are on paid sick leave or on paid holiday.

Local Area Unemployment Statistics (LAUS)
https://data.ca.gov/dataset/local-area-unemployment-statistics-laus
From the website: The Local Area Unemployment Statistics (LAUS) program is a [f]ederal-[s]tate cooperative effort in which monthly estimates of total employment and unemployment are prepared for approximately 7,600 areas, including counties, cities and metropolitan statistical areas. These estimates are key indicators of local economic conditions.
….

Estimates for counties are produced through a building-block approach known as the "Handbook method." This procedure also uses data from several sources, including the CPS, the CES program, state UI systems, and the [U.S.] Census Bureau's American Community Survey (ACS), to create estimates that are adjusted to the statewide measures of employment and unemployment. Estimates for cities are prepared using disaggregation techniques based on inputs from the ACS, annual population estimates and current UI data.

Occupational Employment and Wage Statistics (OEWS)
https://data.ca.gov/dataset/oews
The OEWS survey calculates employment and wage estimates by occupation, industry and geographic area. The survey is a federal-state cooperative program between the BLS and SWAs in all 50 states, District of Columbia, Puerto Rico, Guam and the Virgin Islands. The BLS provides the procedures and technical support, draws the sample and produces the survey materials while SWAs collect the data.

Quarterly Census of Employment and Wages (QCEW)
https://data.ca.gov/dataset/quarterly-census-of-employment-and-wages
From the website: The Quarterly Census of Employment and Wages (QCEW) [p]rogram is a [f]ederal-[s]tate cooperative program between the U.S. Department of Labor's Bureau of Labor Statistics (BLS) and the California EDD's Labor Market Information Division (LMID). The QCEW program produces a comprehensive tabulation of employment and wage information for workers covered by California [u]nemployment [i]nsurance (UI) laws and [f]ederal workers covered by the [u]nemployment [c]ompensation for [f]ederal [e]mployees (UCFE) program.

The QCEW program serves as a near census of monthly employment and quarterly wage information by [six]-digit industry codes from the North American Industry Classification System (NAICS) at the national, state and county levels.

Civilian Unemployment Rate for US and California
https://data.ca.gov/dataset/civilian-unemployment-rate-for-us-and-california
From the website: This dataset contains unemployment rates for the U.S. (1948 – [p]resent) and California (1976 – [p]resent). The unemployment rate represents the number of unemployed as a percentage of the labor force. Labor force data is restricted to people 16 years of age and older, who currently reside in [one] of the 50 states or the District of Columbia, who do not reside in institutions (e.g., penal and mental facilities, homes for the aged), and who are not on active duty in the [a]rmed [f]orces. This rate is also defined as the U-3 measure of labor underutilization.

Unemployment Rate by Age Groups
https://data.ca.gov/dataset/unemployment-rate-by-age-groups
From the website: This dataset contains nonseasonally adjusted California [u]nemployment [r]ate by age groups, from the Current Population Survey (CPS). The age group ranges are as follows: 16-19; 20-24; 25-34; 35-44; 45-54; 55-64; 65+. This data is based on a 12-month moving average.

Labor Force Participation Rate by Age Groups
https://data.ca.gov/dataset/labor-force-participation-rate-by-age-group
From the website: This dataset contains nonseasonally adjusted California [l]abor [f]orce [p]articipation by age groups, from the Current Population Survey (CPS). The age group ranges are as follows: 16-19; 20-24; 25-34; 35-44; 45-54; 55-64; 65+. This data is based on a 12-month moving average.

Labor Force Participation Rate: US and California
https://data.ca.gov/dataset/labor-force-participation-rate-us-and-california
From the website: The labor force participation rate is the percentage of the population that is either employed or unemployed (that is, either working or actively seeking work). People with jobs are employed. People who are jobless, looking for a job and available for work are unemployed. The labor force is made up of the employed and the unemployed. People who are neither employed nor unemployed are not in the labor force.

Long-Term Industry Employment Projections
https://data.ca.gov/dataset/long-term-industry-employment-projections
From the website: Long-term [i]ndustry [p]rojections for a 10-year time horizon are produced for the [s]tate and its labor market regions to provide individuals and organizations with an insight into future industry trends to make informed decisions on individual career and organizational program development. Long-term projections are revised every year. Data is not available for geographies below the labor market regions. Detail may not add to summary lines due to suppression of confidential data.
Long-Term Industry Occupational Employment Projections
https://data.ca.gov/dataset/long-term-occupational-employment-projections
From the website: Long-term [o]ccupational [p]rojections for a 10-year time horizon are provided for the [s]tate and its labor market regions to provide individuals and organizations with an occupational outlook to make informed decisions on individual career and organizational program development. Long-term projections are revised annually. Data is not available for geographies below the labor market regions. Detail may not add to summary lines due to suppression of data because of confidentiality and/or quality.

Regional Planning Unit Overviews
https://data.ca.gov/dataset/regional-planning-unit-overviews
From the website: The purpose of these reports is to provide employment data at a regional level. Regional Planning Units (RPUs) respect the existing administrative boundaries of counties and Local Workforce Development boards while providing a foundation upon which to facilitate regional planning under the requirements of the Workforce Innovation and Opportunity Act (WIOA).

California Department of Human Resources

2023 Total Compensation Report, California Department of Human Resources, 2025.
https://www.calhr.ca.gov/about-calhr/divisions-programs/financial-management-division/compensation-surveys/2023-total-compensation-report-f/
From the website: … CalHR [California Department of Human Resources] turned to the U.S. Department of Labor's Bureau of Labor Statistics (Bureau), which produces two of the nation's most comprehensive wage and benefit surveys: the Occupational Employment and Wage Statistics (OEWS) survey and the National Compensation Survey (NCS).

By using the Bureau's benchmark data and established methodology for calculating employee costs, the state is able to compare its compensation practices with other employer groups in California, and provide valuable insight to current and prospective employees, policymakers and the public.

2022 Women's Earnings Report, California Department of Human Resources, 2025.
https://www.calhr.ca.gov/about-calhr/divisions-programs/equity-accessibility-management-services/workforce-analysis-census-employees/2022-womens-earnings-report/
In the report, CalHR explored the impact that two occupation classifications have on the broader gender pay gap: information technology, and peace officer and firefighter. The report concludes that, over the past 10 years, the gender pay gap has narrowed for California civil service employees, but has leveled out at approximately 14% over the last few years. Also, the gender pay gap is normalizing back to pre-pandemic levels with some volatility year to year, and the state's civil service requirements, salary structures and bargaining unit composition are more equitable.

Departmental Demographic Reports, California Department of Human Resources, 2025.
https://www.calhr.ca.gov/departmental-demographic-reports/
Reports may be accessed by selecting a department from a drop-down menu.

Statewide Reports, California Department of Human Resources, 2025.
https://www.calhr.ca.gov/about-calhr/divisions-programs/equity-accessibility-management-services/statewide-reports/
Biannual reports capture the race/ethnicity, gender, disability and veteran status by occupational group and classification for all state employees. Links are organized chronologically.

Workforce Development Division, California Department of Human Resources, 2025.
https://www.calhr.ca.gov/about-calhr/divisions-programs/workforce-development-division/
From the website: [The Workforce Development Division is responsible] for the statewide learning and development, workforce planning, succession management, organizational development and non-traditional apprenticeship programs to support state departments in their goals to attract, retain and develop a well-qualified and diverse workforce that meets their current and future mission-critical business needs.

Survey of Practice

An online survey sought information about the recent experiences of state transportation agencies that conducted a labor gap analysis to examine the labor needs and opportunities for underrepresented groups within the highway construction sector. Members of the AASHTO Committee on Civil Rights received the survey.

Representatives from eight transportation agencies responded to the survey:

- ADOT.
- DDOT.
- GDOT.
- MnDOT.
- NJDOT.
- NMDOT.
- ODOT.
- SCDOT.

Survey questions are provided in Appendix A. Survey results are summarized below.

None of these agencies has completed a labor gap analysis within the last five years that examined the

labor needs and opportunities for underrepresented groups within the highway construction sector. Of these respondents:

- Three agencies — ADOT, NMDOT and SCDOT — have no plans for or interest in conducting such an analysis.
- Five agencies — DDOT, GDOT, MnDOT, NJDOT and ODOT — are interested in conducting such an analysis.
    - *DDOT's* interest in preparing a labor gap analysis is to understand the mitigating issues with more recent data. (The agency last updated this information before the COVID-19 pandemic.)
    - *GDOT* is interested in preparing a labor gap analysis to ensure that its project workforce reflects the communities where the projects are occurring. The agency would also like to begin work on this effort in 2025, but would need "the team and experience" to conduct the analysis.
    - *MnDOT* would be interested in conducting an analysis to learn more about the data and potentially apply it to the agency's SS/OJT program offerings. The agency requires funding and vendors before conducting the analysis.
    - *NJDOT* would like to prepare a labor gap analysis to assess the difference between the skills currently held by its external construction contractor workforce and the required skills to identify areas where OJT programs could bridge the gap and ensure a competent workforce for construction contractors. The agency requires the use of a consultant to assist in performing the analysis, delivering the results and making recommendations. Before the agency can conduct this analysis, which could potentially start in 2025, it would need to begin a study on the implementation and effectiveness of its OJT program.
    - *ODOT* would also use the results of a labor gap analysis to provide targeted support within its OJT program and in workforce development activities. The agency has no current plans to conduct this analysis due to a lack of funding.

Contacts

CTC engaged with the individuals below to gather information for this investigation.

Arizona

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Appendix A: Survey Questions

The online survey represented below was distributed via email to members of the American Association of State Highway and Transportation Officials Committee on Civil Rights.

Caltrans Survey on Labor Gap Analyses to Inform Workforce Development Practices
The California Department of Transportation (Caltrans) is preparing to conduct a labor gap analysis to inform future planning and implementation efforts for the agency's On-the-Job Training (OJT) program and other workforce development activities. The OJT program is designed to equip underrepresented groups, including women, minorities and disadvantaged individuals, with the necessary skills to thrive in construction trades and foster a more inclusive and representative workforce in the highway construction sector.

With the survey below, Caltrans is seeking information from other state transportation agencies with experience or interest in conducting similar labor gap analyses that contribute to workforce development and advance social equity. We estimate the survey will take approximately 30 minutes to complete. We would appreciate receiving your responses by **January 3, 2025**.

The final report for this project, which will include a summary of the responses received from all survey participants, will be available on the Caltrans website.

If you have questions about completing the survey, please contact Carol Rolland at carol.rolland@ctcandassociates.com. If you have questions about Caltrans' interest in this issue, please contact Tori Kanzler at tori.kanzler@dot.ca.gov.

Thanks very much for your participation.

(Required) Please provide your contact information.

Name:
Agency:
Title/Division:
Email Address:
Phone Number:

(Required) Has your agency completed a labor gap analysis within the last five years that examined the labor needs and opportunities for underrepresented groups within the highway construction sector?

- Yes (Skipped the respondent to **General Information**, **Preparing the Analysis**, **Assessing the Analysis** and **Wrap-Up**.)
- No, but we have interest in conducting such an analysis. (Skipped the respondent to **Interest in Preparing a Labor Gap Analysis** and **Wrap-Up**.)
- No, and we have no plans for or interest in conducting such an analysis. (Skipped the respondent to **Wrap-Up**.)

General Information

1. When did your agency conduct its most recent labor gap analysis?

2. Does your agency plan to update this analysis?
    - No
    - Yes (Please describe your agency's plans for update.)
3. Please provide links to any documentation associated with the labor gap analysis. Send any files not available online to carol.rolland@ctcandassociates.com.

Preparing the Analysis

1. What tools and services did your agency use to conduct the analysis? Please select all that apply.
    - Data analytics tools
    - External consulting services
    - Internal workforce data analysis
    - Labor market surveys
    - Workforce forecasting models
    - Other (Please describe.)
2. Please describe the data sources your agency used to prepare the labor gap analysis. You'll have the opportunity to describe up to four data sources in four categories:
    - Federal
    - State
    - Local and regional
    - Other

Federal Data Sources

Data Source 1
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 2
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 3
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 4
Data provider:
Data type:
How data was used:
URL for data source:

State Data Sources

Data Source 1
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 2
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 3
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 4
Data provider:
Data type:
How data was used:
URL for data source:

Local and Regional Data Sources

Data Source 1
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 2
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 3
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 4
Data provider:
Data type:
How data was used:
URL for data source:

Other Data Sources

Data Source 1
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 2
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 3
Data provider:
Data type:
How data was used:
URL for data source:

Data Source 4
Data provider:
Data type:
How data was used:
URL for data source:

3. Please indicate the participants and partners involved in preparing the labor gap analysis. Select all that apply.
    - Academic partners
    - Community organizations
    - Construction industry
    - Consultant
    - Federal agencies
    - In-house staff
    - Labor unions
    - Local, regional or other state agencies
    - Other (Please describe.)
4. If your agency collaborated with construction industry representatives, please respond to the questions below:
    - 4A. Which construction industry group(s) were involved in the collaboration?
    - 4B. Please briefly describe the engagement process.
5. What benefits resulted from your agency's collaborative approach to the labor gap analysis?

Assessing the Analysis

1. Did your agency encounter challenges when conducting its labor gap analysis?
    - No
    - Yes (Please describe these challenges and how your agency addressed or mitigated them.)
2. In its analysis, did your agency consider challenges such as rapid technological changes, automation or labor market fluctuations to forecast or anticipate future labor gaps?
    - No
    - Yes (Please describe these challenges and how your agency addressed or mitigated them.)
3. What metrics did your agency use to measure success in workforce development efforts that promoted social equity? Select all that apply.
    - Job placement rates for underrepresented groups
    - Retention rates
    - Wage growth
    - Other (Please briefly describe.)
4. Please describe the strategies your agency used to advance social equity in the workforce.
5. Please describe how the labor gap analysis addressed systemic barriers that women, minorities and disadvantaged groups face when entering the workforce.
6. Did the analysis offer insight into the effectiveness of existing policies and programs that have aimed to diversify the workforce?
    - No
    - Yes (Please describe these insights.)
7. Please provide one or more examples of how labor gap analysis findings have been, or are expected to be, applied in your agency's workforce development program.
8. What lessons learned or best practices can you offer to other agencies preparing to conduct a labor gap analysis, particularly one focused on underrepresented groups?

    Lesson Learned or Best Practice 1:
    Lesson Learned or Best Practice 2:
    Lesson Learned or Best Practice 3:

Interest in Preparing a Labor Gap Analysis

1. Please briefly describe your agency's interest in preparing a labor gap analysis.
2. What is needed for your agency to conduct the analysis?
3. When do you anticipate beginning work on the analysis?

Wrap-Up

Please use this space to provide any comments or additional information about your previous responses.

Appendix B: Related Research, Resources and Data Sources

Table 1. Related Research and Resources

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
EDC-7, Strategic Workforce Development (2025)	National	FHWA partnered with AASHTO, AGC, the American Road and Transportation Builders Association, and the U.S. Department of Labor's Employment and Training Administration to bring together various parties interested in workforce development in the highway construction field.
NCHRP Synthesis 618: Advancing Gender Equity in the DOT Workforce (2024)	National	This synthesis project documented current state DOT practices related to advancing gender equity in the workforce and assessed practices currently used by state DOTs to evaluate impacts. The study included six state case studies.
Investing in America: Best Practices to Expand Access to Jobs and Economic Opportunity Through Transportation Infrastructure Investments (2024)	National	This report includes recommendations on how state and local transportation agencies can expand access to jobs and opportunity for several underrepresented groups, including women, young people, justice involved and people of color.
The Construction Industry: Characteristics of the Employed, 2003-2020 (2022)	National	Data from the CPS, a monthly nationwide sample survey of approximately 60,000 households administered by the U.S. Bureau of Labor Statistics, include statistics on women and Hispanic workers.
NCHRP Research Report 1008: Attracting, Retaining and Developing the 2030 Transportation Workforce; Design, Construction and Maintenance (2022)	National	This guide helps agencies analyze their unique workforce needs and navigate practical strategies. The resources are intended for state DOTs seeking easily implementable strategies and tools to develop and sustain a high-quality, stable and skilled workforce in transportation system design, construction and maintenance.
Leading Practices in Strategic Workforce Management by Transportation Agencies (2021)	National	This domestic scan examined innovative strategic workforce management practices that state DOTs are implementing, particularly those activities that can quickly be adopted and implemented to recruit, develop and retain the workforce they need today and for the future. Twelve states provided input.
Identify, Train, Place: A Playbook to Build Tomorrow's Highway Construction Workforce (2021)	National	The HCWP was designed to create partnerships for identifying, training and placing individuals in highway construction jobs to address pressing demands for more resources. The report presented 12 pilot locations and includes lessons learned.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
A Framework to Promote Diversity and Inclusion in Workforce Development in the Southeast States (2023)	Multiple States	This project identified existing gaps; predicted future needs; and captured the role transportation agencies, research centers, DOTs and professional organizations can play to recruit, train and maintain a diverse and inclusive workforce.
AB 525 Workforce Development Readiness Plan (2023)	California	This workforce development readiness plan has a workforce development assessment that included a needs assessment that analyzed the scale, timing and necessary skills of the required workforce; an assessment of the currently available workforce and training infrastructure in California to support the growth of the offshore wind industry; and a gap and opportunity analysis of the needs and availability assessments.
The Economic Impact of Construction in the United States and California (2022)	California	This publication provides data on the economic impact of construction, construction spending, seasonally adjusted construction employment and construction pay, offering both a U.S. and California perspective.
Future of Work in California, A New Social Compact for Work and Workers (2021)	California	In addition to outlining the charter and goals for the Future of Work Commission, this report provides statistics on labor, wages and demographic data across the state.
Community Job Readiness and Workforce Needs Assessment (2016)	Colorado	To define an appropriate local hire goal for Central 70 and to identify programming resources, CDOT completed an assessment work plan that included community baseline data; community assessment of career interests, training needs and resource gaps; employer assessment of position opportunities; and existing training resources.
Labor Market Awareness (undated)	District of Columbia	This website offers a dynamic dashboard of information for the District of Columbia regarding employment and wages, labor force, economic indicators and population, Links to monthly and quarterly reports, data search tools and other employment publications focused on the metropolitan area.
2024 Top 50 High Demand Occupations Requiring Less Than a Highschool Diploma (2024)	District of Columbia	This one-page document lists the top 50 jobs, including their two-year and 10-year projected job growth, annual median wages, education requirements and OJT. “Construction Laborers” is on the list, showing short-term negative job growth but longer-term positive growth.
District of Columbia Labor Market Analysis (undated)	District of Columbia	As an example of a labor market analysis, this research includes detailed employment profiles of 88 occupations built with data from the district’s Department of Employment Services and the Bureau of Labor Statistics.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
D.C. Labor Market Indicators: January 2015 - November 2024 (2024)	District of Columbia	An overview of labor statistics comparing District of Columbia data with national data includes breakdowns by city wards. The study also lists the top five industries with the highest employment increases in the 10-year period.
2019 Skills Gap Survey (undated)	Idaho	Idaho Department of Labor designed a 27-question survey to assess the skills gaps within Idaho's construction industry for the calendar year. The information was intended to inform the development of training programs.
HCCTP: Build Your Story Here (2023)	Illinois	In collaboration with FHWA, Illinois DOT initiated its HCCTP in late 2009 to increase access to highway construction jobs for minorities, women and disadvantaged individuals. The program is implemented in 10 of the state's community colleges.
Research in Progress: SPR-4806: INDOT Training Gap Analysis, Developing a Training Program for INDOT Workforce Development (New, Front-Line and Supervisors) and Smart Tool for Effective Planning for Workforce (expected completion date: October 2025)	Indiana	Indiana DOT is seeking a systematic and thorough assessment of current workforce development needs by conducting a gap analysis, prioritizing workforce development needs and proposing two to three executive courses targeting the gaps.
An Assessment of the Workforce and Occupations in the Highway, Street and Bridge Construction Industries in Indiana (2020)	Indiana	This project explored workforce and occupations within the highway, street and bridge construction industries in Indiana. Five deliverables include three data reports, one policy document and a website.
Increasing Representation of Minorities, Females and Underrepresented Individuals in Journey Level Jobs on Highway Construction Projects (2017)	New Jersey	Among the recommendations identified by researchers: • The literature strongly suggests that successful OJT programs grow out of political and administrative decisions. • The most important decisions state DOTs make in developing OJT programs involve finding the right partners.
Preparing for Tomorrow: A Case Study of Workforce Planning in North Carolina Municipal Governments (2010)	North Carolina	Though dated, this publication provides a useful outline of the questions, tasks and data needed to conduct a labor gap analysis.
Evaluation of the Highway Construction Workforce Development Program (2024)	Oregon	This publication assesses the effectiveness of strategies for increasing workforce diversity. An example is improved completion rates for apprenticeships due to the availability of support services.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
2022 Needs Assessment of Oregon's Highway Trades Apprenticeship (2022)	Oregon	This research was conducted for Oregon DOT and Oregon Bureau of Labor and Industries to assess the current needs of the construction industry and support ongoing work to increase the recruitment and retention of a diverse highway construction workforce.
WisConomy (undated)	Wisconsin	This state website offers links for employers and job seekers and dashboards providing labor force and economic data.
WisDOT Workforce Development and Readiness Project (2022)	Wisconsin	A workforce and benchmarking analysis was undertaken to better understand the nature of personnel gaps within the Division of Transportation System Development and provide recommendations to address some of the gaps.
The San Francisco Local Hiring Policy for Construction Annual Report (2023)	San Francisco, California	The report describes the use of the Local Hiring Policy for Construction on projects managed by the city and county of San Francisco for the calendar year 2022.
2024 Priority Hire Annual Report (2025)	Seattle, Washington	Priority Hire ensures residents receive a fair share of wealth-generating construction jobs and increases economic equity in the region.
2024 Workforce Survey Analysis: Summary (undated)	Industry	The 2024 Workforce Shortage Survey from the AGC and Arcoro measures the severity of construction workforce shortages and the impact of shortages on construction firms and projects.
2024 Construction Outlook: National Survey Results (undated)	Industry	This publication provides the data from 1,293 responses to the annual survey described in the publication cited above.
A Construction Market in Transition: The 2024 Construction Hiring and Business Outlook (undated)	Industry	In this assessment, despite the challenges with technology, hiring and costs, survey respondents are most optimistic about a range of public-sector market segments, including transportation, bridge and highway work.
The 2024 Construction Hiring and Business Outlook (2024)	Industry	This web page offers links to a range of resources associated with construction contractors' perspectives on hiring and business. Significant challenges include finding workers, coping with rising costs and weathering higher interest rates.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
Diversity, Equity and Inclusion Initiatives in the Construction Trades (2022)	Industry	The report addresses union and nonunion diversity, equity and inclusion practices, describing existing efforts to improve diversity in the trades, with an emphasis on effective strategies and partnerships.

Table 2. Data Sources

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
North American Industry Classification System (2025)	Job Classification Systems and Crosswalks	The NAICS is the standard used by federal statistical agencies in classifying business establishments to collect, analyze and publish statistical data related to the U.S. business economy.
Standard Occupational Classification System (undated)	Job Classification Systems and Crosswalks	The 2018 SOC system is a federal statistical standard used by federal agencies to classify workers into occupational categories. All workers are classified into one of 867 detailed occupations according to their occupational definition.
The O*NET-SOC Taxonomy (2025)	Job Classification Systems and Crosswalks	The 2019 version of the O*NET-SOC taxonomy is updated to align with the 2018 SOC system. The revised taxonomy includes 1,016 occupational titles, of which 923 represent O*NET data-level occupations. The taxonomy currently encompasses more than 55,000 jobs.
Employment Projections: Classifications and Crosswalks (2025)	Job Classification Systems and Crosswalks	This website describes the classification systems used to produce employment projections and offers links to crosswalks between different classification structures, including NAICS, O*NET-SOC, ACS and CPS.
Industry and Occupation Code Lists and Crosswalks (2025)	Job Classification Systems and Crosswalks	This website addresses the same need to bridge datasets as is covered by the previous citation due to the evolution of occupation classification systems. The 2022 Census Industry Code Lists are derived from the 2022 NAICS.
Industries at a Glance: Construction: NAICS 23 (2025)	Bureau of Labor Statistics	The Construction sector comprises establishments primarily engaged in the construction of buildings or engineering projects (e.g., highways and utility systems).

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
Industries at a Glance: Transportation and Warehousing: NAICS 48-49 (2025)	Bureau of Labor Statistics	The Transportation and Warehousing sector includes industries providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation.
Measuring Productivity Growth in Construction (2018)	Bureau of Labor Statistics	Researchers differentiated productivity growth in four industries within the construction sector to better demonstrate how they perform individually rather than as a group. Only one of the four industries — highways, roads and bridges — does not show positive growth, according to the analysis.
Current Employment Statistics – CES (National) Current Employment Statistics – CES (State and Metro Area Employment, Hours and Earnings) (undated)	Bureau of Labor Statistics	The CES program produces detailed industry estimates of employment, hours and earnings of workers on nonfarm payrolls. CES State and Metro Area produces data for all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands and about 430 metropolitan areas.
Labor Force Statistics from the Current Population Survey (undated)	Bureau of Labor Statistics	The CPS provides a wealth of information on the nation's labor force, including data on the employed, unemployed and those not in the labor force. Key CPS measures are the unemployment rate, labor force participation rate and employment-population ratio.
Household Data Series from the Monthly A Tables (undated)	Bureau of Labor Statistics	Sixteen data tables provide employment status information by sex, age, race, educational attainment, veteran and disability status.
Employment in Transportation: Employment in Transportation Related Occupations by Industry, 2024 Year-in-Review (undated)	Bureau of Labor Statistics	This report provides employment data for occupations within the transportation industry and transportation-related occupations in nontransportation industries, as defined by the SOC system.
Labor Force Characteristics by Race and Ethnicity, 2023	Bureau of Labor Statistics	Topics addressed in this report include composition of the labor force, employment rates by race, educational attainment, occupation percentages and earnings.
Persons With a Disability: Labor Force Characteristics, 2024	Bureau of Labor Statistics	This report offers employment statistics for people with disabilities, including age, race, educational attainment, percentage of self-employment and percentage of unemployment.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
Geographic Profile of Employment and Unemployment, 2024	Bureau of Labor Statistics	Employment data is presented in 26 tables by geographical region, state, demographic categories and other employment factors.
Industry Productivity Viewer	Bureau of Labor Statistics	This tool presents industry-specific data on multiple productivity measures in graph or table formats.
Monthly Labor Review	Bureau of Labor Statistics	Research articles addressing current employment and economy-related topics are released on this page. The archive is searchable by topic, author, date and department.
Women in the Labor Force, 2023: Women and Workplace Flexibilities (2025)	Bureau of Labor Statistics	The report includes longitudinal data tracking men's and women's labor force participation by age from 1948 to 2023. Other topics are telework rates, part-time work percentages and reasons for part-time work.
Occupational Outlook Handbook, Construction Laborers and Helpers (2025)	Bureau of Labor Statistics	This website provides job descriptions, pay ranges, 10-year job outlook and qualification pathways for construction laborers and helpers. Similar handbooks are available for all occupations in the SOC system through the A-Z Index or the website's search functionality.
Occupational Employment and Wage Statistics (2025)	Bureau of Labor Statistics	This program produces employment and wage estimates for approximately 830 occupations based on a survey of business establishments (employers).
Profile: California (undated)	Census Bureau	Data categories include population, income and poverty, education, employment, housing, health, business and economy, families and living arrangements,; and race and ethnicity.
Labor Force Statistics (2025)	Census Bureau	The Census Bureau's labor force statistics provide information about employment status, employment dynamics and work experience.
Industry and Occupation Data Tools (2021)	Census Bureau	These interactive applications created by the Census Bureau help users find, customize and visualize statistics and information from multiple censuses, surveys and programs.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
LED Extraction Tool (undated)	Census Bureau	The LED Extraction Tool enables streamlined access to the raw public-use data produced through the LED Partnership. This easy-to-use tool provides CSV files for the exact variables and characteristics requested by users.
Quarterly Workforce Indicators (QWI) Explorer (undated)	Census Bureau	Accessed via the LED Extraction Tool, QWIs are generated by the Census Bureau to measure employment and earnings at the local level (such as the county and metropolitan area).
Data and Statistics (undated)	Department of Labor	This website recommends that stakeholders use targeted outreach to support apprentice participation goals and offers visual dashboards to learn more about the apprenticeship system.
Transportation Economic Trends (undated)	Department of Transportation	This economic data developed by the Bureau of Transportation Statistics highlights transportation's role in the economy and explores changes over time through a series of interactive charts.
Transportation Economic Trends (TET) Data (2025)	Department of Transportation	This website provides access to the data used in the interactive version of TET.
Employment in Transportation: Transportation Economic Concepts (undated)	Department of Transportation	This site clarifies the distinction between employment in transportation and related industries versus employment in transportation occupations. It includes a list of occupations in categories that relate to transportation.
EEO-4 (State and Local Government Information Report) Statistics (undated)	Equal Employment Opportunity Commission	The State and Local Government Information Report (EEO-4), also referred to as the EEO-4 Report, is a mandatory biennial data collection that requires all state and local governments with 100 or more employees to submit workforce demographic data, including race/ethnicity, sex, job category and salary band.
2024 Workforce Survey Results (undated)	National Associations and Organizations	Data from 1,496 total responses address labor topics, including number of open craft or salaried positions, difficulty in filling open positions, recruitment strategies added in the past 12 months, changes made to training and pay, and anticipated changes to headcount in the next 12 months.
2024 Workforce Survey Results: California Results (undated)	National Associations and Organizations	This survey offers data from 53 total responses that reported difficulty filling hourly craft positions and salaried positions. Employers have increasingly turned to career-building programs and online strategies to acquire workers.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
2023 Annual AASHTO State DOT HR Metrics Report (2024)	National Associations and Organizations	This annual report presents employment data from member states that responded to the request. Metrics include position counts, age of new hires, turnover rates, telework data and diversity data.
2023 AASHTO Salary Survey (2024)	National Associations and Organizations	This report provides job classifications and salary data on positions currently used by the transportation industry and intended for the use of human resources professionals to analyze job classifications, write job descriptions and develop pay structures for DOTs.
2022 Annual AASHTO State DOT HR Metrics Report (2024)	National Associations and Organizations	This annual report presents employment data from member states that responded to the request. Metrics include position counts, age of new hires, turnover rates, telework data and diversity data.
Labor Market Information	California Employment Development Department	LMID collects, analyzes and publishes statistical data and reports on California's labor force, industries, occupations, employment projections, wages and other important labor market and economic data.
Employment Projections	California Employment Development Department	Employment Projections estimate the changes in industry and occupational employment over time resulting from industry growth, technological change and other factors. California produces 10-year projections of employment annually for the state and local areas.
Labor Market Information by California Geographic Areas	California Employment Development Department	Labor market data, industry studies and other economic reports for California and substate areas are provided.
Local Workforce Development Areas (LWDAs) in California	California Employment Development Department	These areas administer the WIOA services. Each month, the EDD releases revised and preliminary (not seasonally adjusted) civilian labor force and unemployment rates for LWDA local areas.
Interactive Map and Data Tools	California Employment Development Department	The site's interactive map displays nonseasonally adjusted California labor force and unemployment data for all 58 counties and 21 major cities ranked by population size. Maps and associated data are updated monthly.
Current Employment Statistics (CES)	California Open Data Portal	CES is a federal-state cooperative effort in which monthly surveys are conducted to provide estimates of employment, hours and earnings based on payroll records of business establishments.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
Local Area Unemployment Statistics (LAUS)	California Open Data Portal	LAUS is a federal-state cooperative effort in which monthly estimates of total employment and unemployment are prepared for approximately 7,600 areas, including counties, cities and metropolitan statistical areas. These estimates are key indicators of local economic conditions.
Occupational Employment and Wage Statistics (OEWS)	California Open Data Portal	The OEWS survey calculates employment and wage estimates by occupation, industry and geographic area. The survey is a federal-state cooperative program between the BLS and SWAs in all 50 states, District of Columbia, Puerto Rico, Guam and the Virgin Islands. The BLS provides the procedures and technical support, draws the sample and produces the survey materials while SWAs collect the data.
Quarterly Census of Employment and Wages (QCEW)	California Open Data Portal	The QCEW program serves as a near census of monthly employment and quarterly wage information by six-digit industry codes from the NAICS at the national, state and county levels.
Civilian Unemployment Rate for US and California	California Open Data Portal	This dataset contains unemployment rates for the U.S. (1948 to present) and California (1976 to present). The unemployment rate represents the number of unemployed as a percentage of the labor force.
Unemployment Rate by Age Groups	California Open Data Portal	This dataset contains nonseasonally adjusted California unemployment rate by age groups collected by the CPS. This data is based on a 12-month moving average.
Labor Force Participation Rate by Age Groups	California Open Data Portal	This dataset contains nonseasonally adjusted California labor force participation by age groups collected by the CPS. This data is based on a 12-month moving average.
Labor Force Participation Rate: US and California	California Open Data Portal	The labor force participation rate is the percentage of the population that is either employed or unemployed (that is, either working or actively seeking work).
Long-Term Industry Employment Projections	California Open Data Portal	Long-term industry projections for a 10-year time horizon are produced for the state and its labor market regions to provide individuals and organizations with an insight into future industry trends to make informed decisions on individual career and organizational program development.

Publication or Resource (Year)	Category	Excerpt from Abstract or Description of Resource
Long-Term Industry Occupational Employment Projections	California Open Data Portal	Long-term occupational projections for a 10-year time horizon are provided for the state and its labor market regions. They are revised annually. Data is not available for geographies below the labor market regions.
Regional Planning Unit Overviews	California Open Data Portal	The purpose of these reports is to provide employment data at a regional level. RPUs respect the existing administrative boundaries of counties and Local Workforce Development boards while providing a foundation upon which to facilitate regional planning under the requirements of the WIOA.
2023 Total Compensation Report (2025)	California Department of Human Resources	By using benchmark data and established methodology for calculating employee costs, the state is able to compare its compensation practices with other employer groups in California and provide valuable insight to current and prospective employees, policymakers and the public.
2022 Women's Earnings Report (2025)	California Department of Human Resources	This report explored the impact that two occupation classifications have on the broader gender pay gap: information technology, and peace officer and firefighter. The report concludes that the gender pay gap has narrowed for California civil service employees, but has leveled out at approximately 14%.
Departmental Demographic Reports (2025)	California Department of Human Resources	Reports may be accessed by selecting a department from a drop-down menu.
Statewide Reports (2025)	California Department of Human Resources	These biannual reports capture race/ethnicity, gender, disability and veteran status by occupational group and classification for all state employees. Links are organized chronologically.
Workforce Development Division (2025)	California Department of Human Resources	This division is responsible for the statewide learning and development, workforce planning, succession management, organizational development and nontraditional apprenticeship programs that support state departments.