



GREATER PHOENIX CHAMBER
FOUNDATION

**Workforce Analysis
Construction
Summer 2023**



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This report is one industry of a larger analysis covering five target industries: construction, cybersecurity/IT, financial services, healthcare, and manufacturing.



Introduction

The Greater Phoenix region is a leader in the development of the state's economy and has become a notable leader across the nation as a whole. The state has become a destination for not only new residents, but for new businesses as well. Workforce quality, availability, and cost effectiveness are keys to maintaining this momentum.

Rounds Consulting Group ("RCG") partnered with the Greater Phoenix Chamber Foundation ("Foundation") to perform a workforce summary of key target industries including a "high-level" review of supply and demand opportunities and constraints. The analysis examined multiple data points from various sources in order to determine if the supply of labor in the target sectors is expected to meet the demand. The five target industries include: Manufacturing, Construction, Healthcare, Financial Services, and Cybersecurity/IT.

Analysis Methodology

Within the analysis, employment projections from the Arizona Office of Economic Opportunity ("OEO") were used to determine the number of jobs that are expected to be demanded by either industry sub-sector or occupation within the given industries over the next 10 years. Information was then collected related to the educational requirements needed for entry into each occupation or industry sub-sector.

The information was analyzed and displays the total number of jobs that will be demanded by industry sub-sector or occupation at each educational attainment level (i.e., requiring a high school diploma, associate's degree, bachelor's degree, etc.). The statistics were then compared to degrees awarded, graduation rates, post-secondary education outcomes, and retention rates, among other data, from the Arizona Department of Education ("ADE") and the Arizona Board of Regents ("ABOR").

These figures were combined with projected population inflow data to determine the overall workforce supply that is expected in Arizona over the next 10 years. The information is presented from top to bottom. In other words, the broader industry data is presented first followed by more detailed occupational data and detailed information about degrees awarded.

The gap between supply and demand that was identified provides an insight into the strengths and weaknesses in the state's workforce and education pipeline. This information can also serve as a high-level guide in forming public policy recommendations and decisions.

Research Limitations

This research analysis is subject to certain limitations arising from the limited availability of data and the classification of the available data. These limitations should be taken into consideration when interpreting and generalizing the findings of this high-level analysis.

First, the entire scope of degrees awarded by all of the state's universities and colleges is limited and can vary among the institutions and regions. Variations in data collection methods, reporting, and disclosure policies may contribute to gaps or discrepancies in the information obtained. Furthermore, predicting the industry that specific graduates will enter upon earning their degree is a challenging task due to the dynamic nature of the job market and evolving industry trends. Factors such as individual preferences, market demands, technological advancements, and economic conditions greatly influence the career choices made by graduates, making it difficult to make precise projections. Consequently, the research outcomes may not represent the entire landscape of degrees or the industries in which graduates will enter; therefore, caution should be used when interpreting the information related to university and college degrees.

Introduction

Secondly, there are two standard classification systems of the available data regarding employment counts, occupations, wages, and projections utilized by both the federal and local governments: the North American Industry Classification System (“NAICS”) and the Standard Occupational Classification (“SOC”).

NAICS and SOC are distinct classification systems designed to categorize different aspects of employment data. NAICS primarily focus on classifying establishments and industries based on the primary activity of a business – while SOC classifies occupations based on job duties, skills, and qualifications across various industries. The differences in the classification framework and criteria make it difficult to cross-reference and reconcile the data between the two systems.

Furthermore, the NAICS and SOC systems have different hierarchical structures. The NAICS system organizes industries into hierarchical levels based on broad economic sectors, industries, and sub-industries. While the SOC system classifies occupations into hierarchical levels based on broad occupations and detailed occupations within the broader group.

Utilizing NAICS data provides insights into industry trends or sector-specific research. However, caution should be used when analyzing the industry’s workforce as several varying occupations can be employed at establishments that are classified under similar industries. SOC data should be used when analyzing occupations with similar skills, job duties, and education. However, the workers in the occupational groups can be employed in various industries.

While cross-referencing NAICS data with SOC data presents its challenges due to the differing classification systems, both are valuable resources and analyzed in this report. Further NAICS and SOC definitions and information regarding the classifications are summarized in the following table.

Due to the research limitations, it is essential to interpret and utilize the findings of this research with caution. The intent of this disclosure is to ensure transparency and promote a responsible understanding of the scope and implications of the research conducted for this assignment. It is recommended that further research by industries employing more extensive data collection methods should be considered to enhance the validity and reliability of the findings.

For any inquiries or clarifications regarding this disclosure statement or the research conducted, please feel free to contact RCG or the Foundation.

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Introduction

Table 1: NAICS and SOC Definitions and Classifications

North American Industry Classification System - NAICS

NAICS employment and payroll data is based on survey information collected from establishments (i.e., employers). The establishments are grouped into industries according to similarity in the processes used to produce goods or services.

For example, a semiconductor manufacturing company would be classified under the broader manufacturing industry (i.e., NAICS 31-33) and the semiconductor and related device manufacturing sub-industry (i.e., NAICS 33-4413).

Although the sub-industry is comprised of establishments primarily engaged in similar activity, the employment and payroll data include occupations of all types such as management professionals, accountants, human resource managers, engineers, production workers, janitorial staff, etc.

Standard Occupational Classification - SOC

The SOC system classifies occupations based on their job duties, skills, and qualifications. It encompasses a wide range of occupations across various industries and sectors. Each broad occupational group is further broken down into detailed occupations, representing specific job titles and roles.

Examples of detailed occupations within the broad occupational “nurse” group include registered nurses, nurse anesthetists, nurse midwives, nurse practitioners, etc. Nurses, however, can be employed across different industries such as the ambulatory healthcare services industry, hospital industry, nursing and residential care industry, and the social assistance industry.

The SOC system is widely used for various purposes, including labor market analysis, workforce policy development, and research on occupational trends. The data is compiled through collaboration with government agencies, subject matter experts, employers, and labor market analysts as well as various surveys.

Source: U.S. Census Bureau; U.S. Bureau of Labor Statistics

The Construction Industry

The construction industry has been an essential contributor to the state's economy over the past years. Construction opportunities continue to increase as more out-of-state developers realize the value of building in the growing Arizona market and take advantage of the opportunity that the state offers in its location, competitiveness, housing needs, and pro-business conditions.

The growing population and the increase in businesses, particularly manufacturing and professional business services companies, moving to Arizona has produced a steady demand for new construction projects throughout the state.

The state's construction workforce supply is struggling to keep up with current demand. The increase in construction due to the robust migration of residents and businesses to the state has caused a shortage of workers, delaying construction projects.

The lack of workforce supply in the construction industry must be addressed to meet the current and future demands of the state. Addressing the current labor shortage is critical to addressing current housing shortages and preventing further declines in housing affordability.

“We have repeat clients calling us to start projects and we ask the timeline they have set for construction. If it doesn't fit within our manpower availability, we are declining or discussing the possibility of delaying the project by a few months to ensure we are able to complete the project successfully.”

- Grenee Martacho, CEO of Concord General Contracting

Employment in Construction

According to the Arizona Office of Economic Opportunity (“OEO”), the construction industry (as defined under NAICS 23-00¹) employed 6.3% of the total statewide workforce in 2022 (see Figure 1). This is compared to the national construction industry which represents 5.0% of the overall national workforce as of 2022, according to the United States Bureau of Labor Statistics (“BLS”).

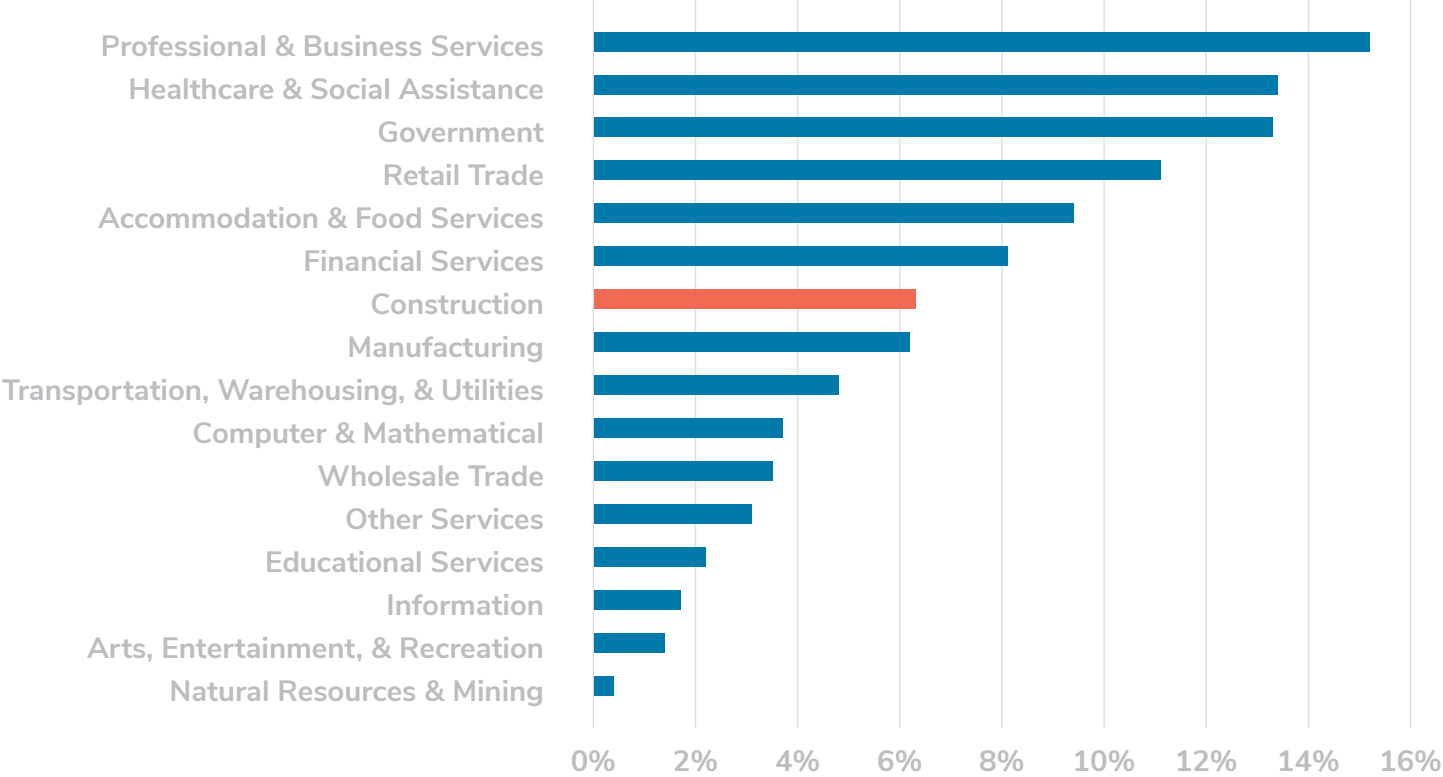
The construction industry has a profound impact on Arizona's economy. As of 2022, the construction industry made up 5.2% of the state's GDP, (\$23.6 billion according to Federal Economic Data) as displayed in Figure 2, and employed 193,500 individuals in Arizona, according to the OEO. The industry employed over 14,200 more employees in 2022 than it did in 2021, representing a 7.9% increase.

The industry in Arizona has had an average growth rate of 5.3% per year over the past decade, as displayed in Figure 3. This can be compared to the nationwide construction industry which has grown by an average rate of 3.0% per year.

1. The North American Industry Classification System, or NAICS, employment and payroll data is based on survey information collected from establishments (i.e., employers). The establishments are grouped into industries according to similarity in the processes used to produce goods or services. NAICS 23-00 is comprised of establishments that primarily engage in the construction of buildings and engineering projects (e.g., highways, utilities, etc.)

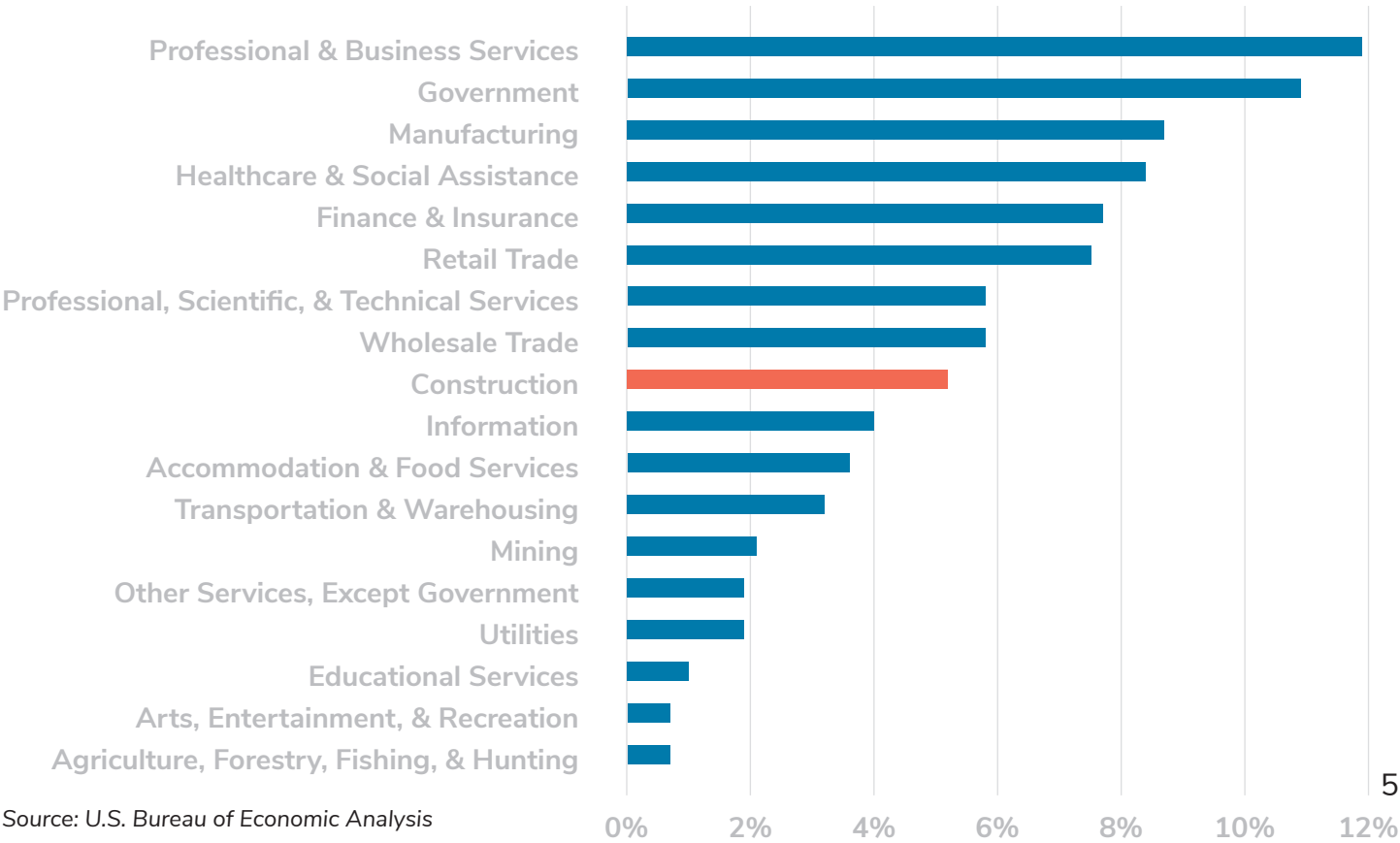
The Construction Industry

Figure 1: Share of Total Employment in Arizona by Industry in 2022



Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

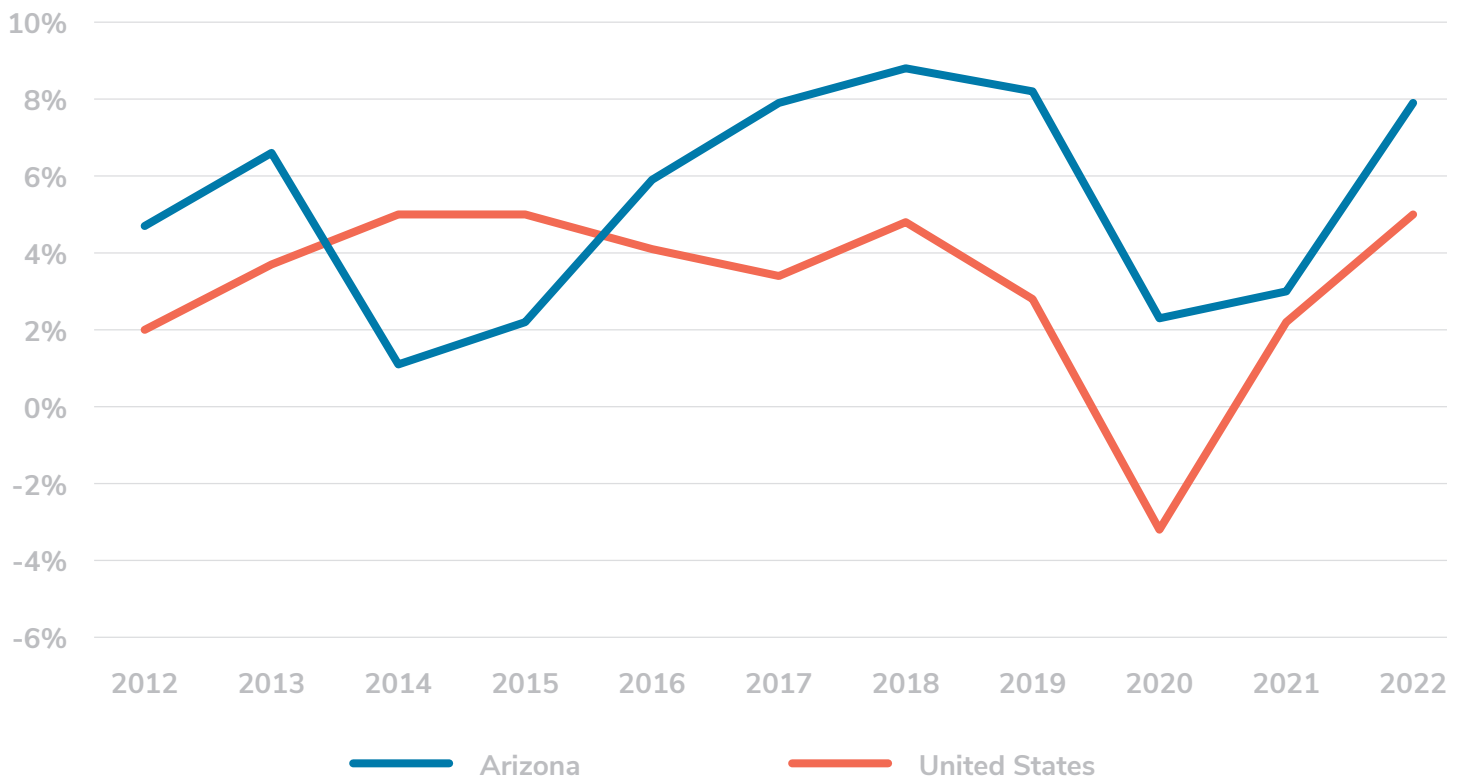
Figure 2: Share of Arizona's GDP by Industry in 2022



Source: U.S. Bureau of Economic Analysis

The Construction Industry

Figure 3: Annual Construction Industry Employment Change in Arizona and the U.S.



Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

Construction Employment by Broad Occupational Group

Figure 4 presents a “bubble chart” that provides perspective of the size of the occupational groups, their respective wages, and the growth opportunities of the broad occupational groups with job duties, skills, and/or education related to the construction industry, as defined by the SOC system in the Greater Phoenix area.

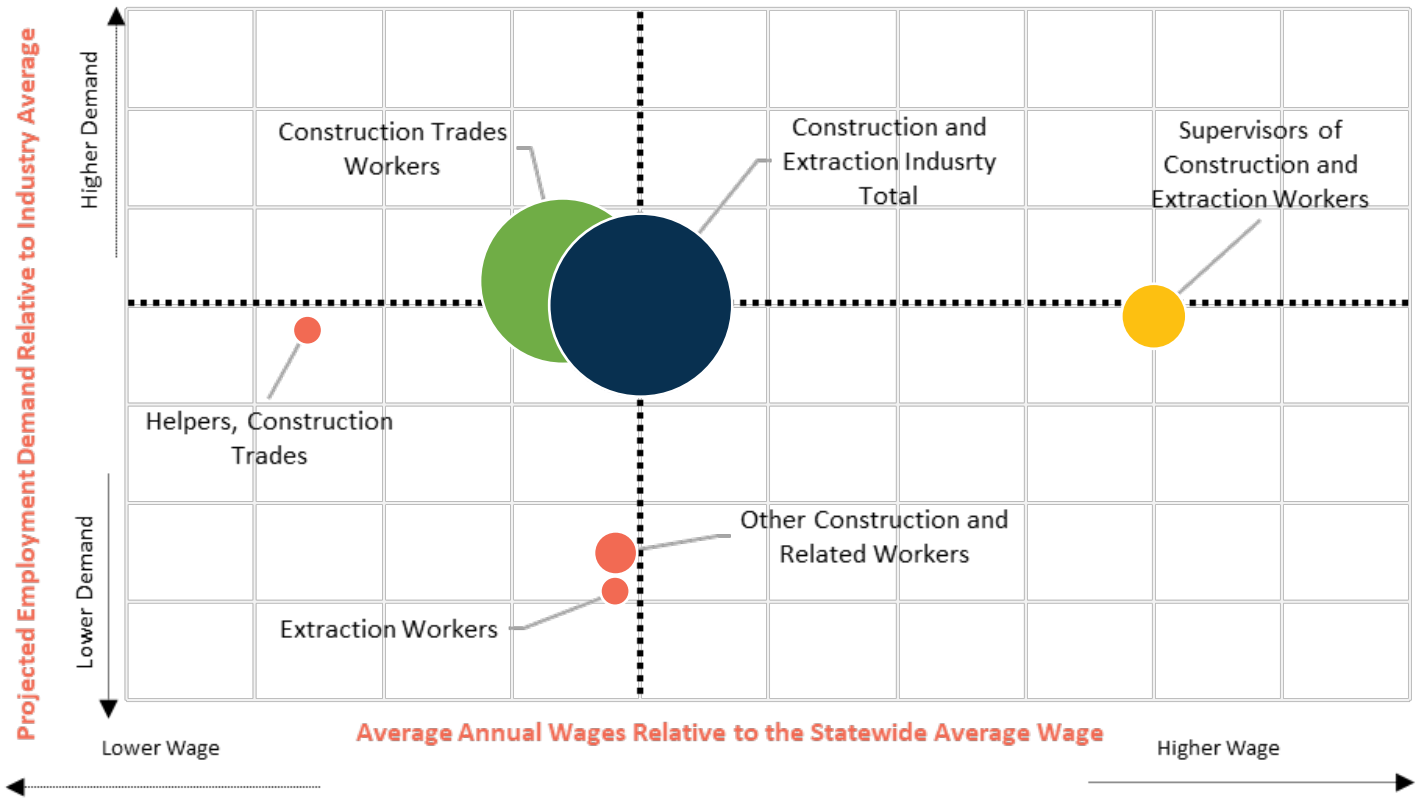
The broad occupational groups in Figure 4 are “mapped” based on the job being high-wage or low-wage and illustrate the future demand levels of the job. The economic region would benefit by focusing on employment categories that are higher in wages and have an expected high-demand going forward.

The occupations above the dashed horizontal line will have a demand that exceeds the industry’s average. The occupations below the dashed horizontal line will have a lower forecasted demand – meaning that those occupations will likely see the lowest employment growth relative to the industry average.

The size of the bubbles represents the employment base for the broad occupational group as of 2021. For example, the employment base for extraction workers is smaller than the employment base for supervisors of construction and extraction workers as of 2021. To provide perspective on the size of the construction industry relative to the occupational groups, the dark blue bubble represents the construction industry as a whole.

The Construction Industry

Figure 4: Construction Employment Demand and Wage levels by Broad Occupational Groups



Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity



The Construction Industry

Occupations in Construction with a High-demand

In order to identify specific areas of the construction industry that will best support the state's economic growth, occupational data with high-demand must be considered. Table 2 displays different occupations that are employed within the construction industry including their employment growth rates, mean wage earnings, and the educational attainment levels required for entry for each occupation.

Recently, with the influx of population and business expansions, the construction industry has reported a worker shortage. The more efficient, innovative, and productive the construction industry is within the state, the greater the economic prosperity will be, and the high cost of construction can be managed.

The BLS estimated that the mean wage in the construction industry was \$52,472 in 2022. Elevator and escalator installers and repairers earned the highest mean wage at \$80,114 as of 2022. The lowest mean wage was earned by fence erectors at \$41,482 in 2022. Overall, the construction industry's mean wage (\$52,472) was lower than the statewide mean wage (at \$58,620) as of 2022.

The solar photovoltaic installers occupation is expected to have the largest employment growth within the industry (a growth rate of 78.2%) over the next decade. The expected total average employment growth rate within the state's construction industry (of 19.7%) is estimated to exceed the statewide average growth rate of 17.2%.



The Construction Industry

Table 2: High-Wage and High Projected Growth Occupations in the Construction Industry			
Occupation Title	10-Year Employment Growth Rate	Mean Wage	Educational Attainment Needed for Entry
Solar Photovoltaic Installers	78.2%	\$55,099	High school diploma or equivalent
Tile and Stone Setters	30.9%	\$46,017	No formal educational credential
Floor Layers, Except Carpet, Wood, and Hard Tiles	26.4%	\$50,477	No formal educational credential
Glaziers	25.6%	\$53,207	High school diploma or equivalent
Electricians	25.4%	\$51,431	High school diploma or equivalent
Plasters and Stucco Masons	24.5%	\$57,612	No formal educational credential
Fence Erectors	23.2%	\$41,482	No formal educational credential
Elevator and Escalator Installers and Repairers	22.8%	\$80,114	High school diploma or equivalent
Drywall and Ceiling Tile Installers	22.6%	\$54,091	No formal educational credential
Structural Iron and Steel Workers	22.5%	\$46,831	High school diploma or equivalent
Construction Laborers	22.3%	\$48,669	No formal educational credential
Insulation Workers, Floors, Ceiling, and Wall	22.2%	\$48,508	No formal educational credential
Roofers	22.1%	\$53,601	No formal educational credential
First-line Supervisors of Construction Trades and Extraction Workers	19.4%	\$73,722	High school diploma or equivalent
Boilermakers	9.5%	\$67,530	High school diploma or equivalent
Construction and Building Inspectors	4.2%	\$64,682	High school diploma or equivalent
Construction Industry Total	19.7%	\$52,472	-
Statewide Total Employment	17.2%	\$58,620	-

Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

The solar photovoltaic installers occupation is expected to have the largest employment growth within the industry (a growth rate of 78.2%) over the next decade.

The Construction Industry

Figure 5 provides a representation of each occupation previously mentioned and the projected demand it has relative to the industry average including measurements for mean wages and a scale to measure the current size of the workforce.

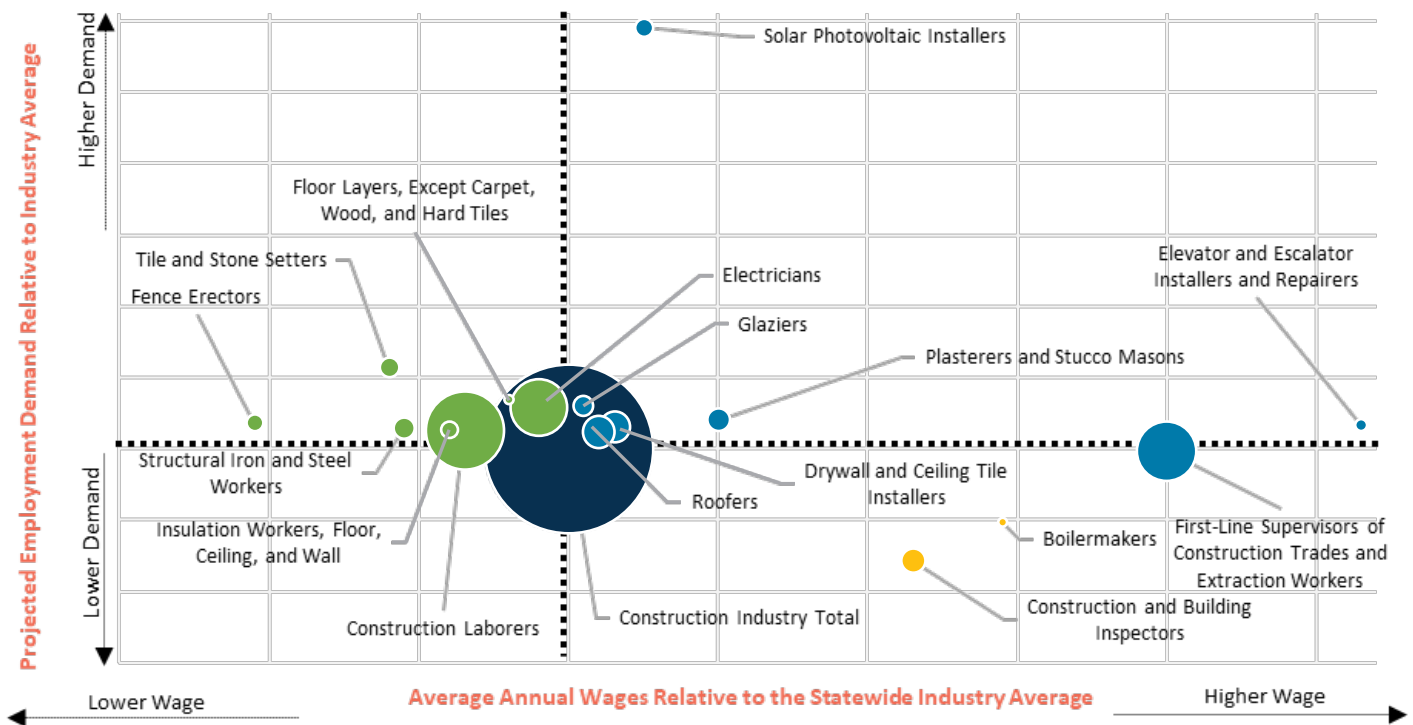
The industries that lie in the area above the dashed horizontal line represent the occupations that are expected to grow at a rate faster than the statewide industry average over the next decade (see Figure 5). The occupations that are expected to grow at a slower rate than the statewide industry average will lie below the horizontal line. For example, tile and stone setters are expected to grow at a faster rate than construction and building inspectors over the next ten years.

Additionally, the occupations with a higher mean wage in 2021 compared to the statewide mean wage will lie to the right of the vertical line. The occupations to the left will represent those that had a wage that was lower than the statewide average.

The size of each circle displays a visual of the current base of employment, or current supply of workers, within the occupation as of 2021 according to the OEO's 2021-2031 occupation projections. Construction laborers, electricians, and first-line supervisors of construction and extraction workers employed the greatest number of individuals out of the given occupations.

Figure 5 displays a high-level view of the expected occupational needs within Arizona's construction industry over the next ten-year period. The occupations in the top-right quadrant are the occupations in the industry with the greatest demand and highest wages in comparison to statewide averages.

Figure 5: Construction Employment Demand and Wage Level by Occupation in Arizona



Source: Arizona Office of Economic Opportunity

The Construction Industry

Highlighting Educational Programs in the Construction Industry

Arizona has an extensive supply of students at the state’s universities, community colleges, and trade schools. These schools offer a wide variety of programs offering different degrees and certifications within the construction industry. The following highlights select programs offered at the state’s universities, colleges, or trade schools.

- **Maricopa Community Colleges** offer associate degrees and certifications in the field of construction trades. The Associate in Applied Science (“AAS”) degrees allow students to specialize in air conditioning/refrigeration/facilities, construction management, construction technology, and carpentry. The wide array of supplemental certificates includes certificates in building inspection, electrical construction trades, and construction management.

Community College	Construction Trades.	
	Cert.	Degrees
Level of Attainment		
Mesa Community College	19	27
Phoenix College	-	-
Rio Salado Community College	77	-
Estrella Mountain Community College	-	-
Paradise Valley Community College	-	-
Glendale Community College	-	-
Chandler-Gilbert Community College	2	2
Scottsdale Community College	-	-
South Mountain Community College	-	-
GateWay Community College	7	7
Total – Maricopa County	105	36

Source: National Center for Education Statistics – Integrated Postsecondary Education Data System

- **Arizona State University’s Del E. Webb School of Construction** offers undergraduate and graduate degree programs in construction engineering and construction management and technology. The school offers a bachelor’s of science (“BS”) in engineering and master’s of science (“MS”) in construction engineering with the option of an accelerated program allowing students to complete both degrees in 5 years. The school also offers a BS and MS in construction management with the options to pursue the master’s degree online or through an accelerated 4+1 program.

The Construction Industry

- University of Arizona's College of Engineering** (emphasis on civil & architectural engineering & mechanics) offers a BS in civil engineering with an emphasis on construction engineering management and a certificate in construction engineering management. Additionally, the college offers an MS in civil engineering and engineering mechanics and Ph.D. in civil engineering and engineering mechanics through which students can declare a focus area of construction engineering management if desired.

Table 4 8 Sample of Degrees Awarded by Classification of Instructional Program (CIP) and Major – 2021-2022

CIP or Major Related to the Construction Industry	ASU	NAU	UA	Total
Classification of Instructional Program				
Bachelor's Degree in Engineering (All Fields)	1,699	241	511	2,451
Bachelor's Degree in Engineering and Engineering Related Technologies and Technicians	178	-	19	197
Bachelor's Degree in Architecture and Related Services	299	-	139	438
Master's Degree in Engineering (All Fields)	777	21	205	1,003
Master's Degree in Architecture and Related Services	155	-	-	155
Specific Majors				
Bachelor's of Science Degree in Construction Management	-	67	-	67
Bachelor's of Science Degree in Electrical & Computer Engineering	345	-	101	446
Bachelor's of Science Degree in Engineering	388	-	-	388
Master's of Science Degree in Electrical & Computer Engineering	99	-	96	195
Bachelor's of Science Degree in Mechanical Engineering	276	72	-	348
Bachelor's of Science Degree in Management	252	114	180	546
Master's of Science Degree in Computer Science	355	150	-	505
Master's of Science Degree in Electrical & Computer Engineering	99	-	96	195

Source: Arizona Board of Regents.

Note: Information on degrees awarded for every major was not available.

The Construction Industry

Key Findings

Workforce shortages in the construction industry must be addressed in order for Arizona to maintain its economic growth trend. The occupational groups with the highest expected demand include construction trades workers and supervisors of construction and extraction workers.

These two occupational groups offer some of the higher wages in the construction industry. Occupational groups that have a lower projected demand relative to the industry as a whole include extraction workers, construction trades helpers, and other construction and related workers.

In general, the state's effort in attracting new businesses and residents has led to a high-demand for positions within the construction industry. The demand for construction occupations will continue to grow as more companies and individuals locate to Arizona.

Solar photovoltaic installers, tile and stone setters, floor layers, glaziers, and electricians are expected to have a high-demand relative to the overall construction industry over the next ten years. Construction and building inspectors, boilermakers, and first-line supervisors of construction and extraction workers are expected to have a lower demand relative to the overall construction industry average over the same period.

Solar photovoltaic installers, tile and stone setters, floor layers, glaziers, and electricians are expected to have a high-demand relative to the overall construction industry over the next ten years.



The Construction Industry

To meet the expected demand of the construction industry in Arizona, it is important that efforts are made to develop and attract construction laborers. Over the next 10 years, the state will demand approximately 36,900 construction jobs – while the universities and colleges will produce 4,800 construction workers. This means there will be a shortage of about 32,067 construction workers by the 10th year.

However, these estimates do not include the trade school workers or workers that enter the construction industry with just a high school degree. Therefore, the future shortage is likely about half of the 32,100.

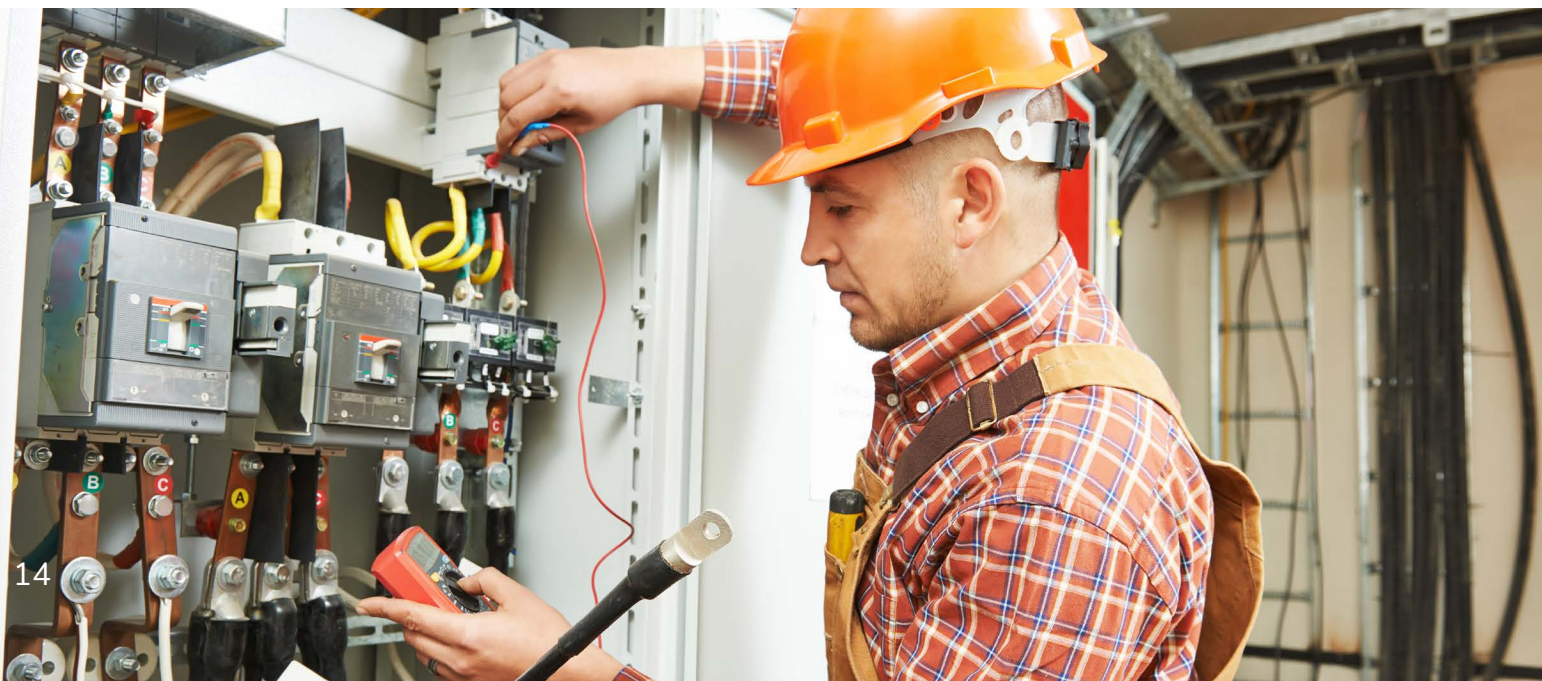
Table 5 9: Future Supply and Demand in the Construction Services Industry

	No. of Jobs
10-Year Projected Demand in Construction Workers	36,900
10-Year Projected New Supply of Construction Workers	4,800
Surplus/(Shortage)	(32,100)

Notes: Estimates for the 10-year projected demand in construction workers is based on OEO’s estimated job growth for the construction industry as a whole. Estimates for the 10-year projected new supply of construction workers is based on the expected number of graduates in the identified majors related to construction as well as the awarded certifications. Since it is difficult to predict the exact industry that graduates will enter upon earning their degree or certification due to the dynamic nature of the job market, evolving industry trends, individual preferences, and market demands, the calculations assume a 25% graduate retention rate for the identified engineering majors, but assume a 95% graduate retention rate for the construction certificate and bachelor’s/associate’s degree earners of the state’s universities and the Maricopa County Community Colleges.

Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity; Arizona Board of Regents; National Center for Education Statistics – Integrated Postsecondary Education Data System.

Note: These calculations were conducted to provide context on the state’s potential future workforce gap and talent pipeline within the state in the construction industry; however, the estimates are based on a limited availability of data and highly assumption based. These limitations should be taken into consideration when interpreting and generalizing the findings of this high-level analysis.



The Construction Industry

Recent Construction Conditions and Expansions/Relocations

The COVID-19 pandemic exacerbated numerous issues in the construction industry's supply chain with labor constraints, rising costs, and time delays. The industry continues to be affected by these issues in 2023. The pandemic dramatically decreased the number of workers available and depleted the workforce.

The mean wage per construction worker increased in an attempt to regain the pre-pandemic level of workers and there continues to be large shortages of construction materials which in turn has caused the price of construction to dramatically increase.

The current rate of economic growth will depend on the construction industry's ability to adapt and fill in the worker shortages. There are numerous construction projects completed every year in Arizona, from construction of residential homes, small businesses, corporations, and manufacturing plants, along with roadway construction projects, and more. The following is a list to highlight large construction projects that have been underway in recent years.

- South Central Light Rail Valley Metro is a 5.5-mile light rail extension that is estimated to cost \$1.4 billion and began in 2020. The project is expanding the light rail from Downtown Phoenix to Baseline Road. Kiewit Corporation is serving as the construction manager at risk. The extension is expected to be completed in 2024.
- Valleywise Health Roosevelt Campus Hospital & Site Development began construction on the hospital portion of the development project in February of 2020. The plans are for a 673,000 -square-foot project with 233 private patient rooms, a floor dedicated to the Arizona Burn Center, two radiology areas, ten operating rooms, two catheterization labs, and a rooftop helipad.

The site development will include relocations of underground utilities, underground corridors, tunnels, utilities, etc. and construction of a Central Utility Plant. Kitchell is the general contractor of the project and is anticipating the project to be completed in October 2023.

- Central Station in Downtown Phoenix, a dynamic one-million-square-foot mixed-use development, began construction in the end of April 2022. The Central Station will be adjacent to Arizona State University's Downtown Phoenix Campus and the Civic Space Park. The space will accommodate 70,000 square feet of flexible office space and 30,000 square feet of retail space that will be focusing on food-oriented concepts.
- I-17 Improvement Project, this project will improve a 23-mile section of the interstate in both directions between Anthem Way and Sunset Point. Construction on the interstate began in 2022 and is expected to be completed by 2025. The work being done includes widening 15 miles of roadway, constructing eight miles of flex lanes, replacing two bridges, and widening 10 bridges.

Conclusions

This report is one in a series of reports highlighting workforce supply and demand in five target high-wage, high-demand industries. The full series of reports can be accessed at www.phoenixchamberfoundation.com/wfseries.

Efforts by the state, local governments, and economic development organizations in strengthening Arizona's base sector industries and attracting new businesses to the region has created a high-demand for employment in the five target industries outlined in this series. However, based on the current talent pipeline and projections, significant workforce shortages are expected in four of the five target industries if the state does not focus efforts on educating and training individuals.

- The manufacturing industry will suffer from a labor shortage of an estimated 10,200 employees over the next 10 years. On a broad basis, the occupational groups with a high projected demand include the food processing workers, woodworkers, engineers, and operations specialties managers groups.
- Over the next 10 years, the state will demand approximately 36,900 construction jobs. The occupational groups with the highest expected demand include construction trades workers and supervisors of construction and extraction workers.
- The healthcare industry overall will experience a labor shortage of approximately 76,000 over the next decade. The occupations with the highest demand include nurse practitioners, occupational therapist assistants, physician assistants, physical therapist assistants, and home health and personal care aides, among others.
- The financial services industry will be short approximately 5,200 workers over the next 10 years. The occupations including financial examiners, credit counselors, personal financial advisors, and loan officers are expected to have a high-demand relative to the entire financial services industry.
- Over the next decade, the cybersecurity/IT services industry will experience a relatively minor shortage of 700 workers. The occupational groups with higher projected demand compared to the industry as a whole include information securities analysts, computer and information research scientists, web developers, computer systems analysts, web and digital interface designers, and software quality assurance analysts and testers.

Prioritizing education and technical training programs to meet the future demand for workers in the identified fields is critical in continuing Arizona's growth momentum and securing the state's long-term economic sustainability.

Table 5 22: Future Supply and Demand in the Five Target Industries

Industry	Surplus/(Shortage)
Manufacturing Workers	(10,200)
Construction Workers	(32,100)
Healthcare Workers	(76,000)
Financial Services Workers	(5,200)
Cybersecurity/IT Services Workers	(700)

Notes: Estimates for the 10-year projected demand for workers is based on OEO's estimated job growth by industry. Estimates for the 10-year projected new supply of workers is based on the expected number of graduates and certification awarded in the identified majors related to each industry.

Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity; Arizona Board of Regents; National Center for Education Statistics – Integrated Postsecondary Education Data System.



GREATER PHOENIX CHAMBER
FOUNDATION

In consultation with:
Rounds Consulting Group, Inc.



Jim Rounds

President and CEO
Rounds Consulting Group, Inc.
602.739.0844
www.roundsconsulting.com

Jennifer Mellor

Chief Innovation Officer
Greater Phoenix Chamber Foundation
jmellor@phoenixchamber.com



2575 E. Camelback Rd., Ste. 410, Phoenix, AZ 85016
P: 602.495.2195
foundation@phoenixchamber.com
phoenixchamberfoundation.com