APPLICATIONS
MANAGEMENT CONSULTING LTD.

Regional Labour Profile
Alberta's Industrial Heartland
Final Report

Alberta
Canada

Alberta's Industrial Heartland
Celebrating 20 Years

Edmonton

CITY OF FORT SASKATCHEWAN

Lamont County

STRATHCONA COUNTY

Sturgeon County

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Executive Summary

Economic and employment growth in Alberta's Industrial Heartland region and the broader Edmonton Metropolitan Region has undergone some significant changes over the past decade, from rapid growth and severe labour shortages through an economic downturn with varying impacts on local and regional employers. These economic changes have resulted in significant shifts in the demand for workers and skill requirements to meet employer needs. These labour market issues are complicated and complimented by the Industrial Heartland region being a part of a larger economic and employment region, that is also diverse and evolving. As a result, it is timely to evaluate the current state of the regional and sub-regional labour market to develop a comprehensive labour market profile.

Based on the employer survey, it is estimated that there are almost 12,000 filled jobs in industries of interest in the Study Area. Nearly half of these jobs are in the chemical manufacturing industry, with other dominant industries including the rail transportation, petroleum and coal product manufacturing, pipeline transportation, and primary metal manufacturing.

The fastest growing occupations in the Study Area include power engineers and power systems operators, civil engineers and supervisors, petroleum, gas and chemical processing and utilities. However, forecast analysis suggests that Study Area employers are unlikely to face significant future hiring challenges for the largest occupation groups.

Notable features of the Study Area workforce include a full-time worker component of more than 80% of operations employment; and a sizeable overtime component representing nearly 1,000 full-time workers annually. Further, the results of a Study Area employer survey found that wages across the top occupations in the region were generally significantly higher in the Study Area relative to both the Edmonton CMA and the province as a whole.

The table below displays the top occupations in the Study Area in terms of operations employment, the number of filled jobs in the Study Area, the proportion of these jobs relative to the Edmonton CMA, the number of new jobs expected over the 2018 to 2023 forecast period, the average annual growth rate of each occupation over the forecast period, and the total worker shortage expected to be face over the forecast period by Edmonton CMA employers.

Top Study Area Operations Occupations, Current and Outlook to 2023

NOC Code	Occupation Title		# of jobs	% of jobs in Edm CMA	New jobs (2018-23)	Avg Annual Growth Rate	Total Gap
7311	Construction millwrights and industrial mechanics		1,193	41%	145	1.0%	6
9232	Petroleum, gas and chemical process operators	* Δ	1,179	74%	84	1.0%	1
9241	Power engineers and power systems operators	* Δ	775	41%	135	1.4%	5
7361	Railway and yard locomotive engineers		763	408%	5	0.5%	0
7362	Railway conductors and brakemen/women		630	186%	8	0.5%	0
2132	Mechanical engineers	* Δ	481	21%	142	1.2%	10
2131	Civil engineers		401	13%	220	1.4%	22
2145	Petroleum engineers		329	37%	50	1.1%	3
731	Managers in transportation		308	28%	48	0.9%	4
911	Manufacturing managers		237	10%	94	0.8%	0
9212	Supervisors, petroleum, gas and chemical processing and utilities		212	22%	65	1.3%	0
2243	Industrial instrument technicians and mechanics	*	204	23%	49	1.1%	1
1523	Production logistics co-ordinators		194	38%	26	1.0%	1
2275	Railway traffic controllers and marine traffic regulators		194	161%	4	0.6%	0
2134	Chemical engineers		189	21%	52	1.1%	3
1525	Dispatchers		179	12%	83	1.1%	5
9619	Other labourers in processing, manufacturing and utilities		178	21%	40	0.9%	1
7314	Railway carmen/women		178	152%	4	0.6%	0
7531	Railway yard and track maintenance workers		145	68%	11	1.0%	0
2112	Chemists		142	23%	30	0.9%	2
921	Supervisors, processing and manufacturing occupations		95	7%	89	1.2%	1
213	Engineering managers		54	4%	46	1.4%	9
211	Computer and information systems managers		41	6%	80	1.1%	4

* denotes occupations that employers reported actively recruiting for in the survey.

Δ denotes occupations that employers reported high voluntary turnover in the survey.

The key findings derived from the results of the Study Area employer survey are presented below.

Public Transit

- Future service directly from the various communities to the Industrial Heartland could provide employees with additional transportation options. This service could work with the Fort Saskatchewan transit or directly serve adjacent communities. Such a service would both provide a decent alternative to driving as well as potentially reduce the cost to users and reduce volume on the road network. The Fort Saskatchewan Transportation Master Plan (2018) identifies possible service to the Industrial areas and states that it would need further study.

Workforce Needs and Shortages

- Profiles could be developed to promote in-demand occupations to prospective students and jobseekers.
- Industry-specific career fairs could focus on in-demand occupations. Include speakers from in-demand occupations and post-secondary institutions.

Recruitment

- Having an online presence is key to successful hiring.
- Networking is important for finding workers.
- Greater utilization of other recruitment methods by employers could attract more qualified applicants.
- A showcase of regional examples of employer success utilizing creative recruitment methods could assist other/future employers.
- Hiring contractors and increasing the workload for current workers can help address temporary labour shortages.
- Responding to hiring difficulties by adopting new staffing solutions can alleviate labour shortages in the long-term.
- Employers can create a long term recruitment plan to develop candidates in anticipation of workforce shortages.
- Employers can utilize workplace resources to develop candidates in anticipation of workforce shortages. In cases where apprentices are suitable candidates, the Apprenticeship Job Creation Tax Credit can support the hiring and training of new workers. For highly skilled occupations, utilizing the Canada-Alberta Job Grant can support training requirements. For lower skilled occupations, utilizing the Workplace Training Program and Workplace Essential Skills Training Program could be an effective way of finding new candidates.
- Promotional materials could be created to demonstrate how short the commute time is from urban areas in the Edmonton Metropolitan region to the major employment sites in the Study Area.

Retention

- An increased focus on effective retention strategies by employers can reduce voluntary turnover and its associated costs.
- Employers could encourage their mature workers reaching retirement age to remain in the workforce longer by offering them incentives such as part time hours, casual employment and flexible work measures.

- Employers can create an organizational succession plan to develop candidates in anticipation of future workforce retirements.
- Offering competitive financial compensation is key to retention.
- Providing a positive work environment is also important for keeping workers.
- Greater use of other retention methods by employers could retain more qualified applicants.
- Workers in the Study Area could be surveyed to gain insight as to what recruitment methods would be most attractive to them.
- A showcase of regional examples of employer success utilizing creative compensation methods could be helpful to other/future employers.

Technological Change

- Promotion of employers implementing or adopting technological changes and encouraging networking between regional stakeholders could help the Study Area remain competitive in global markets.
- It could be helpful to support employers in finding the skilled workforce necessary to implement or adopt technological change. Utilization of workplace resources is useful when employers need to access new workers or train existing workers.
- Connecting workers that have been affected by employment contractions due to technological change with other employers in the region could alleviate both shortages and worker's time spent jobless.
- Supporting employers implementing or adopting technological change to provide skill upgrading to new and existing workers could boost competitiveness. In cases where skill upgrading is needed, the Canada-Alberta Job Grant can support the technical and specialized training of workers to meet the new requirements.
- Raising employer awareness of opportunities to upskill workers towards new technology where possible could boost productivity.

Diversity Recruitment

- Increasing recruitment efforts with underrepresented and underemployed groups could allow for greater success reaching these under-utilized labour pools.
- Building connections between employers and post-secondary institutions to attract underrepresented and underemployed groups into relevant education and training programs could benefit both employers and workers.
- Building connections among regional stakeholders (i.e. employers, post-secondary institutions and training providers) and organizations that serve underrepresented and underemployed groups could benefit both employers and workers.
- A showcase of regional examples of employer success employing underrepresented and underemployed groups could improve diversity recruitment.
- Celebrating regional employers with a diverse workforce could encourage further diversification. Encourage through a "Nominate an Employer/Employee" program or award.

Workplace Resources

- A showcase of regional examples of employer success accessing workplace resources could lead to greater utilization of such resources across other/future employers.

- Raising awareness among regional employers about how specific workplace resources can be utilized effectively could assist in addressing employment challenges.
- Developing short information materials to distribute to employers on how specific workplace resources apply to and are of benefit to their organizations could increase awareness.
- Informing employers of workplace resources to help them hire workers and provide them with subsidized on the job training could boost competitiveness.

Education / Skill Development

- Helping to connect regional educators, training providers and employers to discuss in-demand occupations and labour market issues could lead to greater awareness among new and potential workers.
- Industry specific networking sessions to connect regional educators, training providers and employers could improve labour market efficiency.
- Building connections among regional stakeholders and organizations that serve underrepresented and underemployed jobseekers in the region could lead to better labour market representation among such groups.

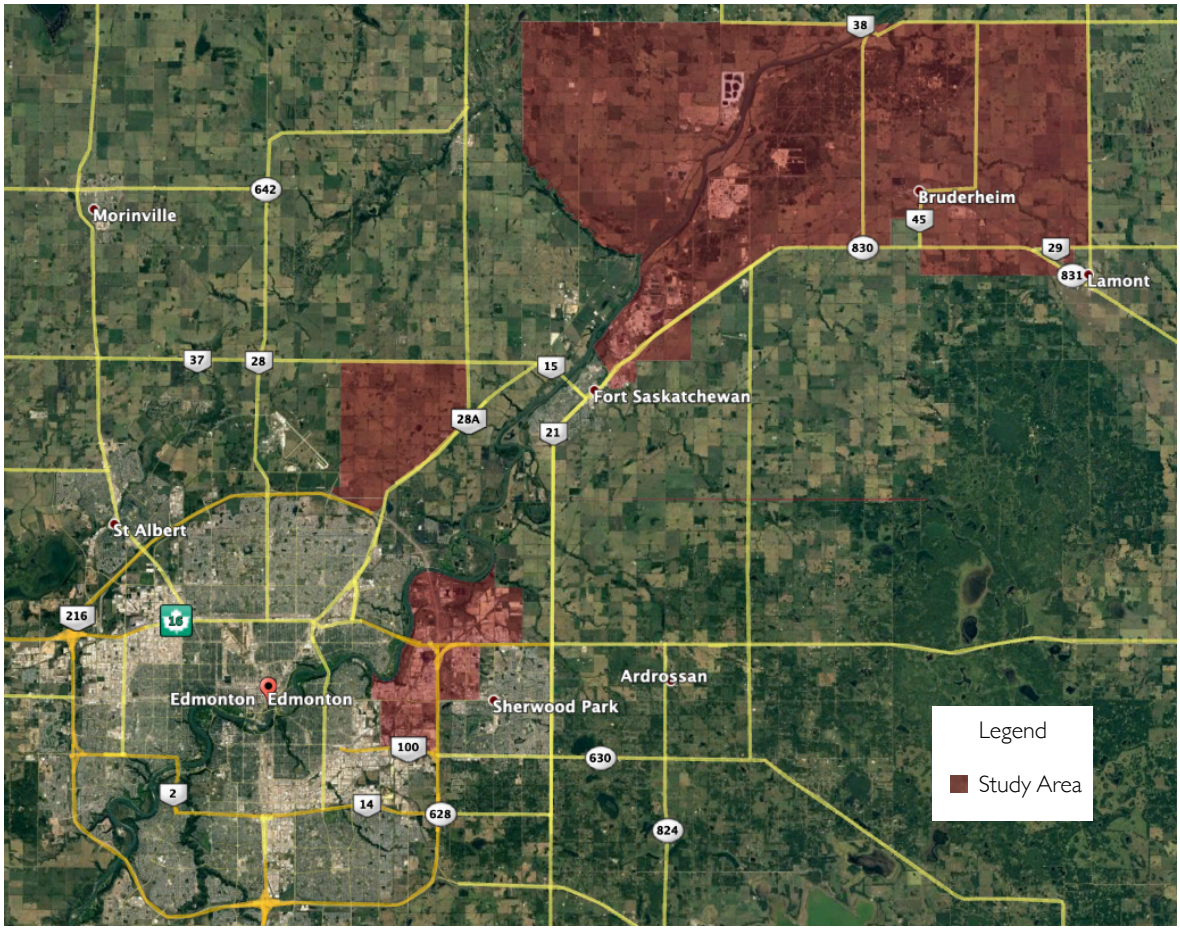
Purpose of the Study

Economic and employment growth in Alberta's Industrial Heartland region and the broader Edmonton Metropolitan Region has undergone some significant changes over the past decade, from rapid growth and severe labour shortages through an economic downturn with varying impacts on local and regional employers. These economic changes have resulted in significant shifts in the demand for workers and skill requirements to meet employer needs. These labour market issues are complicated and complimented by the Industrial Heartland region being a part of a larger economic and employment region, that is also diverse and evolving. As a result, it is timely to evaluate the current state of the regional and sub-regional labour market to develop a comprehensive labour market profile.

Alberta's Industrial Heartland region is a world class location for chemical, petrochemical, oil and gas investment and is also Canada's largest hydrocarbon processing region. It is currently home to over 40 major companies, producing fuels, fertilizers, power, and petrochemicals to provincial and global consumers.

For this project, Alberta's Industrial Heartland Association and its municipal partners (City of Edmonton, City of Fort Saskatchewan, Lamont County, Strathcona County, and Sturgeon County) have teamed up with the Ministry of Labour to undertake the Regional Labour Profile study. This project will result in the development of a comprehensive labour profile for the Industrial Heartland region.

Study Area Map



Employment Profile

This section of the report presents a comprehensive Employment Profile for major employers in the Study Area. The data provided here is from the employer survey and scaled to be representative of the total employment in the region. A forecast of employment was developed using Application Management Consulting Ltd.'s Labour Market Demand and Supply Model.

Current Employment

Employment information about the Study Area has been developed from the employer survey. For more details regarding the employer survey results, see Appendix A.

The results presented here represent scaled survey results, thus reflecting an estimate of the total employment in the Industrial Heartland region, Strathcona Industrial Area and Region, henceforth referred to as the "Study Area" in this report. For details on survey scaling methodology, see Appendix B.

Jobs By Industry

Based on the employer survey, it is estimated that there are almost 12,000 filled jobs in industries of interest in the Study Area.

Of the total filled jobs, nearly half (48.7%) are in the Chemical manufacturing industry. Another one-fifth (20.7%) are in the Rail transportation industry. This is followed by 12.2% in Petroleum and coal product manufacturing, 9.3% in Pipeline transportation, and 5.3% in Primary metal manufacturing.

Other industries comprising the total include Utilities (1.9%), Plastics and rubber products manufacturing (1.1%), Warehouse and storage (0.4%), Truck transportation (0.3%) and Non-metallic mineral product manufacturing (0.1%).

Jobs By Industry (3 Digit NAICS)[1]

Industry (NAICS)	# of jobs	% of jobs
325 Chemical manufacturing	5,822	48.7%
482 Rail transportation	2,478	20.7%
324 Petroleum and coal product manufacturing	1,465	12.2%
486 Pipeline transportation	1,112	9.3%
331 Primary metal manufacturing	634	5.3%
221 Utilities	232	1.9%
326 Plastics and rubber products manufacturing	129	1.1%
493 Warehousing and storage	52	0.4%
484 Truck transportation	30	0.3%
327 Non-metallic mineral product manufacturing	8	0.1%
Total	11,962	100%
Note: Data is based on scaled survey results. Some job totals are rounded.		

Jobs By Occupation

Based on the employer survey, the top 20 occupations according to the number of filled jobs are presented on the following page. These occupations have also been ranked according to the number of jobs located in the Study Area in 2019.

Occupations with more than 1,000 jobs include Construction millwrights and industrial mechanics and Petroleum, gas and chemical process operators.

Rail-related occupations also comprise a significant number of jobs in the Study Area - with rail transportation being key to market access and employer success. In some cases, the number of jobs in rail-related occupations in the Study Area outnumber those reported for the entire Edmonton CMA.

Some of the main occupations included in the "other" category include facility operation and maintenance managers, steamfitters, pipe fitters and sprinkler system installers, and contractors and supervisors, installers, repairers and servicers. For a complete list of jobs by occupation, see Appendix C.

[1] North America Industrial Classification System (NAICS) is a standardized way of classifying employment establishments for the purpose of collecting, analyzing, and publishing statistical data related to the economy and labour force http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=1181553

Top 20 Jobs by Occupation (4 Digit NOC)[2]

NOC Code	Occupation Title	# of jobs	% of jobs
7311	Construction millwrights and industrial mechanics	1,193	10.0%
9232	Petroleum, gas and chemical process operators	1,179	9.9%
9241	Power engineers and power systems operators	775	6.5%
7361	Railway and yard locomotive engineers	763	6.4%
7362	Railway conductors and brakemen/women	630	5.3%
2132	Mechanical engineers	481	4.0%
2131	Civil engineers	401	3.4%
2145	Petroleum engineers	329	2.8%
731	Managers in transportation	308	2.6%
911	Manufacturing managers	237	2.0%
9212	Supervisors, petroleum, gas and chemical processing and utilities	212	1.8%
2243	Industrial instrument technicians and mechanics	204	1.7%
1523	Production logistics co-ordinators	194	1.6%
2275	Railway traffic controllers and marine traffic regulators	194	1.6%
2134	Chemical engineers	189	1.6%
1525	Dispatchers	179	1.5%
9619	Other labourers in processing, manufacturing and utilities	178	1.5%
7314	Railway carmen/women	178	1.5%
7531	Railway yard and track maintenance workers	145	1.2%
2112	Chemists	142	1.2%
	Other occupations	3,851	32.2%
Total		11,962	100%

Note: Data is based on scaled survey results. Some job totals are rounded.

[2] National Occupation Classification (NOC) is a standardized system for classifying jobs for the purpose of collecting, analyzing, and publishing statistical data related to the economy and labour force. http://noc.esdc.gc.ca/English/NOC/Welcome.aspx?ver=16

Turnaround Employment / Scheduling

Employment and scheduling information about Study Area turnarounds is from the employer survey. Results were not scaled to be representative of the entire Study Area workforce, as when turnarounds are scheduled (and their resulting employment demand impacts) is at the discretion of each employer.

Turnaround Jobs By Type

The survey captured turnaround employment information from about half (53%) of the employers surveyed.[3] Some employers reported that their turnarounds do not occur on a set schedule, suggesting a segment of turnaround employment demand in the region is unplanned and variable in nature. In addition to employers who participated in the survey, there are other employers in the Study Area whose turnaround employment information is not captured.[4] It is expected that the demand for turnaround workers is more acute at certain times than what is shown in the chart below. The demand for turnaround workers is therefore greater than what is represented in the survey results and other employers may increase demand for turnaround workers at peak times.

Employers reported the frequency and Quarter/Year for each of their scheduled turnarounds. Over a five year period from the time of survey, employers anticipate a total of 100 turnaround events, including:

- Seventy (70) Type 1 turnaround events,
- Twenty-three (23) Type 2 turnaround events, and
- Seven (7) Type 3 turnaround events.[5]

There are numerous quarters where multiple employers have scheduled turnarounds at the same time, requiring a total sum of 500 workers or more. Quarter 2 of each year is a particularly high demand time for workers for scheduled turnarounds in the Study Area. This is true even without the employers not captured by the survey.

The Type 2 turnaround event occurring annually in Quarter 1 is undertaken by one employer and requires an estimated 2,500 turnaround workers. If other employers schedule their turnaround during this time period, there is a higher likelihood temporary worker shortages would occur.

Some examples of the turnaround schedules employers reported are below:

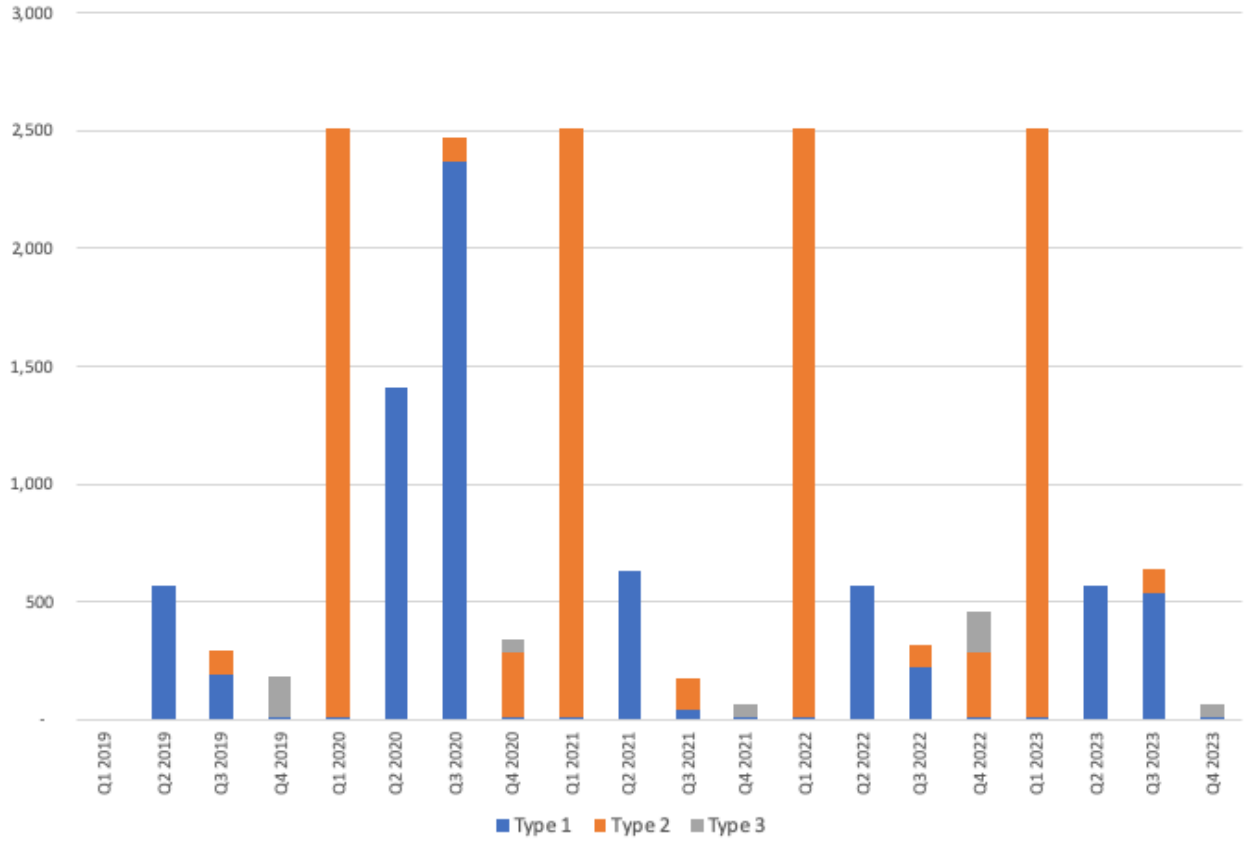
- "The target is every 8 years for Hydrocarbons [Type 3], every 2 years for Polyethylene [Type 1], and every 3 years for Power Generation [Type 2]." - Manufacturing employer
- "[Type 3] every 5 years, [Type 2] every 4 years, [Type 1] every 3 years. There is a full plant outage every 10 years, with the next planned for 2028." - Mining, quarrying, and oil and gas extraction employer
- "We have turnarounds annually - often in the spring and fall [Type 1 and Type 2]." - Mining, quarrying, and oil and gas extraction employer

[3] Eight employers surveyed reported they do not have scheduled turnarounds.

[4] Turnaround employment was not scaled because it is difficult to project the experience of some Study Area employers to others, because they all have unique processes - scaling in this case would likely be too speculative.

[5] Turnaround types are not defined by employers in a standard way. Generally, for the purposes of the survey results, Type 1 is occurring most frequently and Type 3 least frequently.

Next Turnaround Jobs By Type



The top turnaround occupations reported by employers in the survey are listed on the following page.

Top 10 Next Turnaround Occupations[6]

NOC Code	Occupation Title	# of turnaround workers	% of turnaround workers
7311	Construction millwrights and industrial mechanics	2,072	30.9%
7271	Carpenters	779	11.6%
7252	Steamfitters, pipefitters and sprinkler system installers	768	11.5%
7234	Boilermakers	685	10.2%
7611	Construction trades helpers and labourers	655	9.8%
7205	Contractors and supervisors, other construction trades, installers, repairers and servicers	450	6.7%
7242	Industrial electricians	324	4.8%
7237	Welders and related machine operators	304	4.5%
2243	Industrial instrument technicians and mechanics	250	3.7%
7293	Insulators	195	2.9%
	Other occupations	215	3.2%
Total		6,697	100%
Note: 15 employers provided a response for this question.			

Key Findings

The results of the Study Area employer survey suggest the following key findings

- Coordinating turnaround schedules amongst regional employers may help to alleviate short term workforce shortages.

Future Employment

The table below provides a summary of the growth forecasts for the largest occupation groups in the Study Area. Based on these forecasts, the average growth rate for occupations varies from 0.5% per year to 1.4% per year. It is expected that for the majority of these occupations most of this growth will occur within the Study Area.

[6] Includes only the next Quarter/Year turnaround occupations for each Type 1, Type 2, and Type 3 turnaround.

The fastest growing occupations include:

- Power engineers and power systems operators,
- Civil engineers, and
- Supervisors, petroleum, gas and chemical processing and utilities.

Employers in the Study Area are unlikely to face significant hiring challenges for the largest occupation groups. Rail related jobs in the Study Area are typically greater in number relative to the Edmonton CMA, and as such any projected shortages in these occupation groups are likely to be faced entirely by Study Area employers.[7]

Despite the differences across occupations in terms of expected future job growth, the top 20 list of occupations in Study Area operations employment is unlikely to change in ranking.

The forecast includes consideration of future employment related to the planned Canada Kuwait Petrochemical Corporation's Sturgeon Petrochemical Rail Yard Project; and Alberta Midland Railway Terminal Ltd.'s Lamont Railcar Storage Project.

[7] Census metropolitan area (CMA) is formed by one or more adjacent municipalities centred on a population centre (known as the core), with a total population of at least 100,000 of which 50,000 or more must live in the core. https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/geo009-eng.cfm

Future Employment Top 20 Occupations

NOC Code	Occupation Title	# of Study Area jobs	Edm CMA jobs (2018)	Edm CMA jobs (2023 Forecast)	New jobs (2018-23)	Avg Annual Growth Rate
7311	Construction millwrights and industrial mechanics	1,193	2,931	3,077	145	1.0%
9232	Petroleum, gas and chemical process operators	1,179	1,592	1,676	84	1.0%
9241	Power engineers and power systems operators	775	1,895	2,030	135	1.4%
7361	Railway and yard locomotive engineers	763	187	191	5	0.5%
7362	Railway conductors and brakemen/women	630	339	347	8	0.5%
2132	Mechanical engineers	481	2,280	2,423	142	1.2%
2131	Civil engineers	401	3,071	3,291	220	1.4%
2145	Petroleum engineers	329	891	941	50	1.1%
731	Managers in transportation	308	1,081	1,129	48	0.9%
911	Manufacturing managers	237	2,397	2,491	94	0.8%
9212	Supervisors, petroleum, gas and chemical processing and utilities	212	944	1,009	65	1.3%
2243	Industrial instrument technicians and mechanics	204	904	954	49	1.1%
1523	Production logistics co-ordinators	194	506	533	26	1.0%
2275	Railway traffic controllers and marine traffic regulators	194	120	124	4	0.6%
2134	Chemical engineers	189	920	972	52	1.1%
1525	Dispatchers	179	1,434	1,517	83	1.1%
9619	Other labourers in processing, manufacturing and utilities	178	867	907	40	0.9%
7314	Railway carmen/women	178	117	121	4	0.6%
7531	Railway yard and track maintenance workers	145	212	223	11	1.0%
2112	Chemists	142	619	649	30	0.9%

Note: Data is based on scaled survey results and employment forecast. Some job totals are rounded.

Employment Breakdown

Based on the employer survey, it is estimated that there are almost 10,000 Full time workers in industries of interest in the Study Area, representing 83.4% of operations employment.

There are another 1,800 Contract workers, representing 15.5% of operations employment. This is followed by Seasonal and Part time workers, with about 60 workers each (0.5%). Casual employment is a very marginal component of operations employment, representing 0.1% of the workers.

Full Time / Part Time / Contractor / Seasonal / Casual

Worker Category	# of operations workers	% of operations workers
Full time	9,973	83.4%
Part time	60	0.5%
Contract	1,855	15.5%
Seasonal	62	0.5%
Casual	11	0.1%
Total	**11,961**	**100%**

Note: Data is based on scaled survey results. Some job totals are rounded.

Overtime Hours

According to the employers who participated in the survey, the average percentage of operations workforce hours that are overtime is 8.6%. This is roughly equivalent to over 1,000 person years of employment in the Study Area.

The share of operations workforce hours that are overtime was highest for Manufacturing employers at 9.1%, followed by Mining, quarrying, and oil and gas extraction employers at 9.0% and Transportation and warehousing employers at 6.3%.

Proportion of Operation Work Overtime

Industry (NAICS)	Average % of operations workforce hours that are overtime
Manufacturing (31-33)	9.1%
Mining, quarrying, and oil and gas extraction (21)	9.0%
Transportation and warehousing (48-49)	6.3%
Total	**8.6%**
Note: 26 employers provided a response for this question.	

Wage / Salary

The table on the following page displays the top 20 occupations used in operations employment in the Study Area, the average hourly wages for both starting/entry level and higher end positions in each occupation as reported by the employer survey, and the average hourly wages as reported by the 2017 Alberta Wage and Salary Survey.

Of the occupations for which wages were reported in the employer survey, the majority (7 of 11) in the starting/entry level category were higher than those reported by the 2017 Alberta Wage and Salary Survey for both the Edmonton CMA and province as a whole. The average reported across the higher end of the wage scale for each occupation were also typically higher in the employer survey (10 of 11) relative to the Wage and Salary Survey. In most cases, the average hourly wages reported in the employer survey were significantly greater than those reported for the Edmonton CMA, with 6 of the 11 occupations reporting an average wage more than 40% greater than the CMA.

There are, however, some limitations to the wage-related survey data presented in the table above. The survey data represents a relatively small sample of employers, with fewer than ten employers providing wage responses for most occupations. As well, the survey data is entirely self-reported by employers, meaning that there could be some degree of ambiguity regarding the specific wages offered for each occupation; and potentially some ambiguity in the NOC code categorization of occupations. While the survey responses provide valuable insight into the wages offered by employers in the Study Area, they are not necessarily perfectly comparable to those average wages reported for the Edmonton CMA and province.

Selected Average Starting and Upper End Hourly Wages (2017)[8]

NOC Code	Occupation Title	Starting/Entry Average			Upper End Average		
		Survey	Edm CMA	AB	Survey	Edm CMA	AB
7311	Construction millwrights and industrial mechanics	$42.28	$31.17	$34.69	$59.63	$40.85	$44.42
9232	Petroleum, gas and chemical process operators	$37.19	-	$46.80	$58.96	-	$55.75
9241	Power engineers and power systems operators	$39.72	$30.80	$33.64	$58.05	$40.62	$46.50
7361	Railway and yard locomotive engineers	-	-	-	-	-	-
7362	Railway conductors and brakemen/women	-	-	-	-	-	-
2132	Mechanical engineers	$39.38	$38.45	$41.14	$81.73	$58.38	$63.54
2131	Civil engineers	-	$35.53	$36.96	-	$60.43	$64.08
2145	Petroleum engineers	$33.30	-	$48.51	$77.10	-	$96.18
731	Managers in transportation	$50.48	$36.79	$35.90	$76.92	$52.55	$50.93
911	Manufacturing managers	$48.08	$41.34	$38.79	$76.92	$59.19	$53.28
9212	Supervisors, petroleum, gas and chemical processing and utilities	$40.16	$45.30	$45.45	$73.92	$51.95	$53.69
2243	Industrial instrument technicians and mechanics	$40.13	$31.94	$32.49	$58.23	$45.71	$46.18
1523	Production logistics co-ordinators	-	$24.61	$27.80	-	$38.87	$41.99
2275	Railway traffic controllers and marine traffic regulators	-	-	-	-	-	-
2134	Chemical engineers	-	-	$39.24	-	-	$65.94
1525	Dispatchers	-	$25.54	$25.85	-	$33.95	$33.67
9619	Other labourers in processing, manufacturing and utilities	$28.67	$16.82	$17.40	$45.44	$28.69	$26.53
7314	Railway carmen/women	-	-	-	-	-	-
7531	Railway yard and track maintenance workers	$33.65	-	$16.01	$50.48	-	$37.87
2112	Chemists	-	$32.34	$31.92	-	$48.24	$47.85

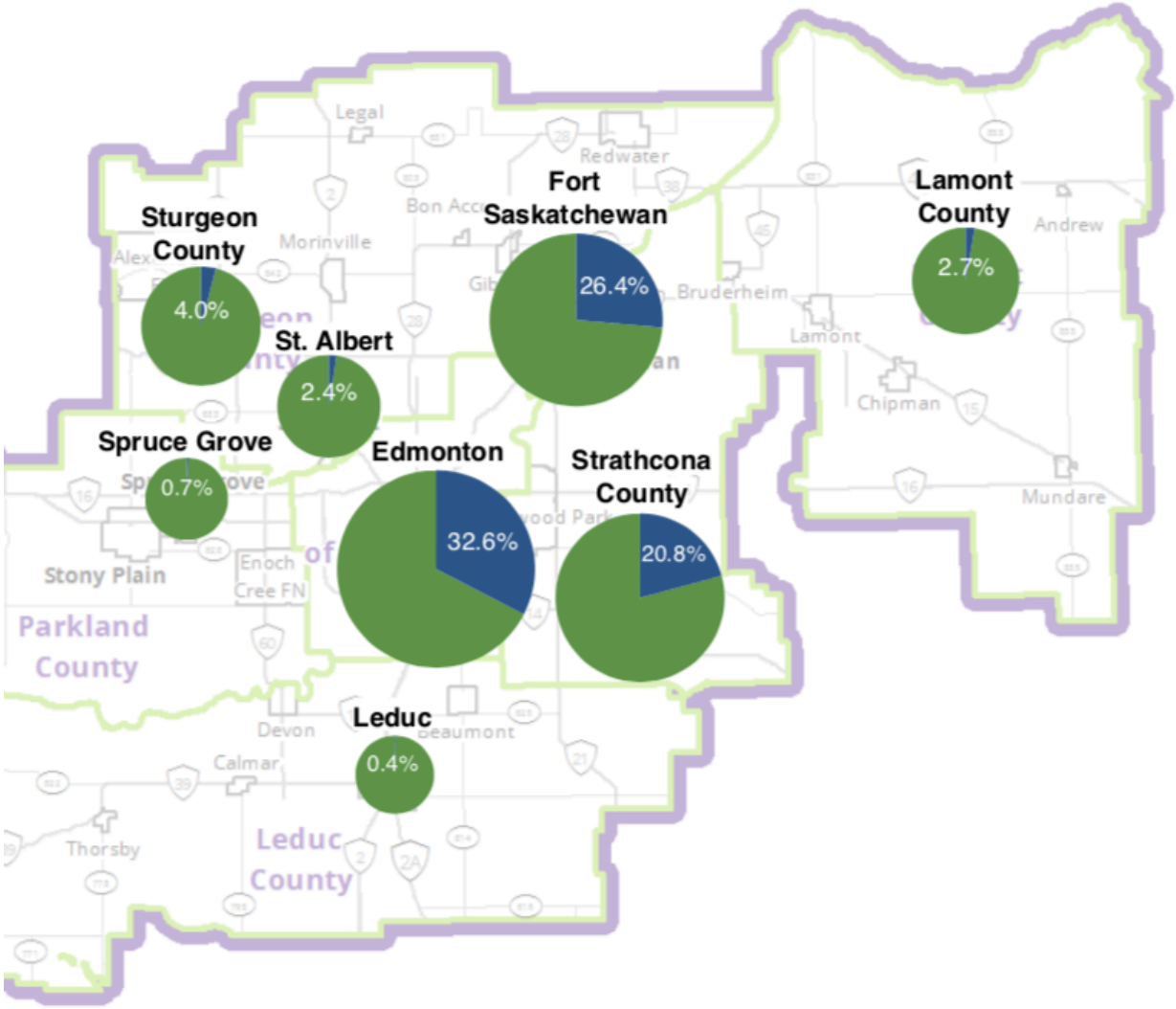
[8] Data was not available/reported for all occupations.

TRANSPORTATION[9]

The Study Area survey respondents indicated where their workforce lived within the Edmonton Region. Approximately 86.4% of the operations workforce lives in one of the five member municipalities of the Alberta's Industrial Heartland Association.

The highest number of workers live in the City of Edmonton, with 2,087 (32.6%). This was followed by 1,687 (26.3%) in the City of Fort Saskatchewan, 1,335 (20.8%) in Strathcona County, 254 (4.0%) in Sturgeon County and 172 (2.7%) in Lamont County.

Where Operations Workers Live



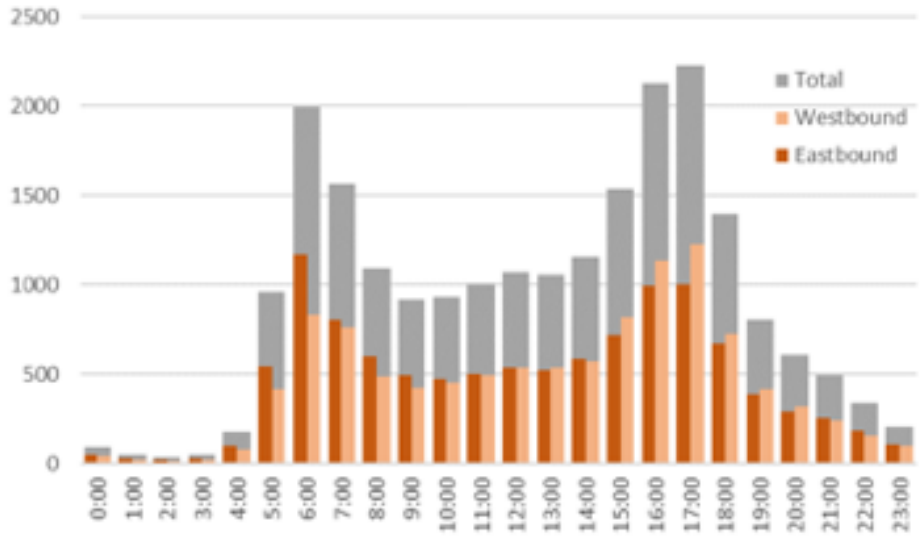
EDMONTON AREA COMMUTING PATTERNS

Commuting patterns were analyzed using data from the 2016 Canadian Census. From the data, the average commute time in and around Edmonton is 25.9 minutes. For motor vehicle commutes, the average time is 24.2 minutes with commutes by bus at 41.3 minutes.

[9] Transportation section completed by WATT Consulting Group.

Traffic volume data from Alberta Transportation was analyzed to identify peak hour patterns in around the Industrial Heartland. An automatic traffic counter located on Highway 15 west of the North Saskatchewan River was used to identify traffic patterns over a 24-hour period. The directional and total volumes for a typical weekday for 2018 are provided below.

Highway 15 Traffic Volumes



Vehicle Commuting

Assessment based on average weekday commute time from each zone to the southwest corner of the Industrial Heartland (on Highway 15). This point is after the junction of Highway 15 and Highway 21 and accounts to both as an available route. Google maps data on typical commute times was used as the primary source of travel time data. Data was collected for a typical weekday (Tuesday, Wednesday, or Thursday) with an arrival time at the boundary of the Industrial Heartland at 7:00am and at Strathmoor Industrial at 7:30am.

Industrial Heartland

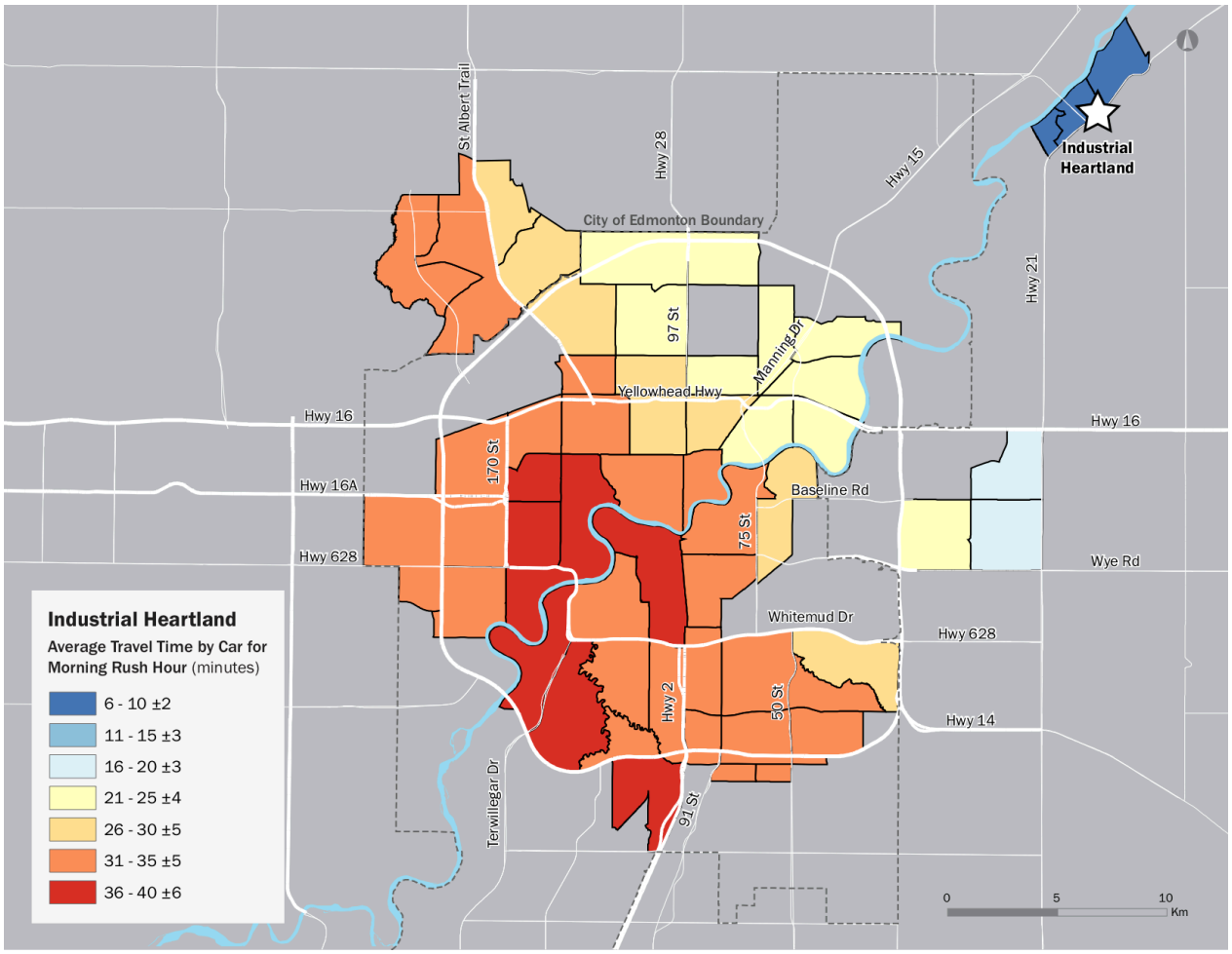
The size of the Industrial Heartland results in a range of travel times based on the location of the final destination. These times could vary between roughly 5 to 25 minutes. Sites on the northwest side of the North Saskatchewan River are in the range of 10-15 additional minutes, but may also modify the route drivers would take to them.

A summary of the approximate range of travel times from various municipalities or areas of Edmonton are provided in the table on the following page. A figure showing a more detailed breakdown for Edmonton and the adjacent municipalities is provided in the map.

AM Peak Hour Commute Times to Industrial Heartland

Municipality	Commute Time to Boundary	Commute Time to Site
Edmonton NE	15-30 minutes	30-45 minutes
Edmonton Central	25-45 minutes	40-60 minutes
Edmonton SE	25-40 minutes	40-55 minutes
Edmonton W/SW	25-45 minutes	40-60 minutes
Fort Saskatchewan	5-10 minutes	15-30 minutes
Sherwood Park	15-25 minutes	30-40 minutes
St. Albert	20-40 minutes	35-55 minutes
Spruce Grove/Stony Plain	40-60 minutes	55-75 minutes
Leduc	40-60 minutes	55-75 minutes
Ardrossan	15-25 minutes	30-40 minutes

Average Commute Time by Neighbourhood to Industrial Heartland Boundary



Apart from employees living in Fort Saskatchewan, the lower bound of the travel time is above the average commute time based on the 2016 Census. Given the location of the Industrial Heartland within the region, this is expected. The northeast of Edmonton offers a large amount of population with a reasonable travel time. The road network in and around Edmonton, primarily Anthony Henday Drive, results in only slight travel time increases in southwest portions of Edmonton.

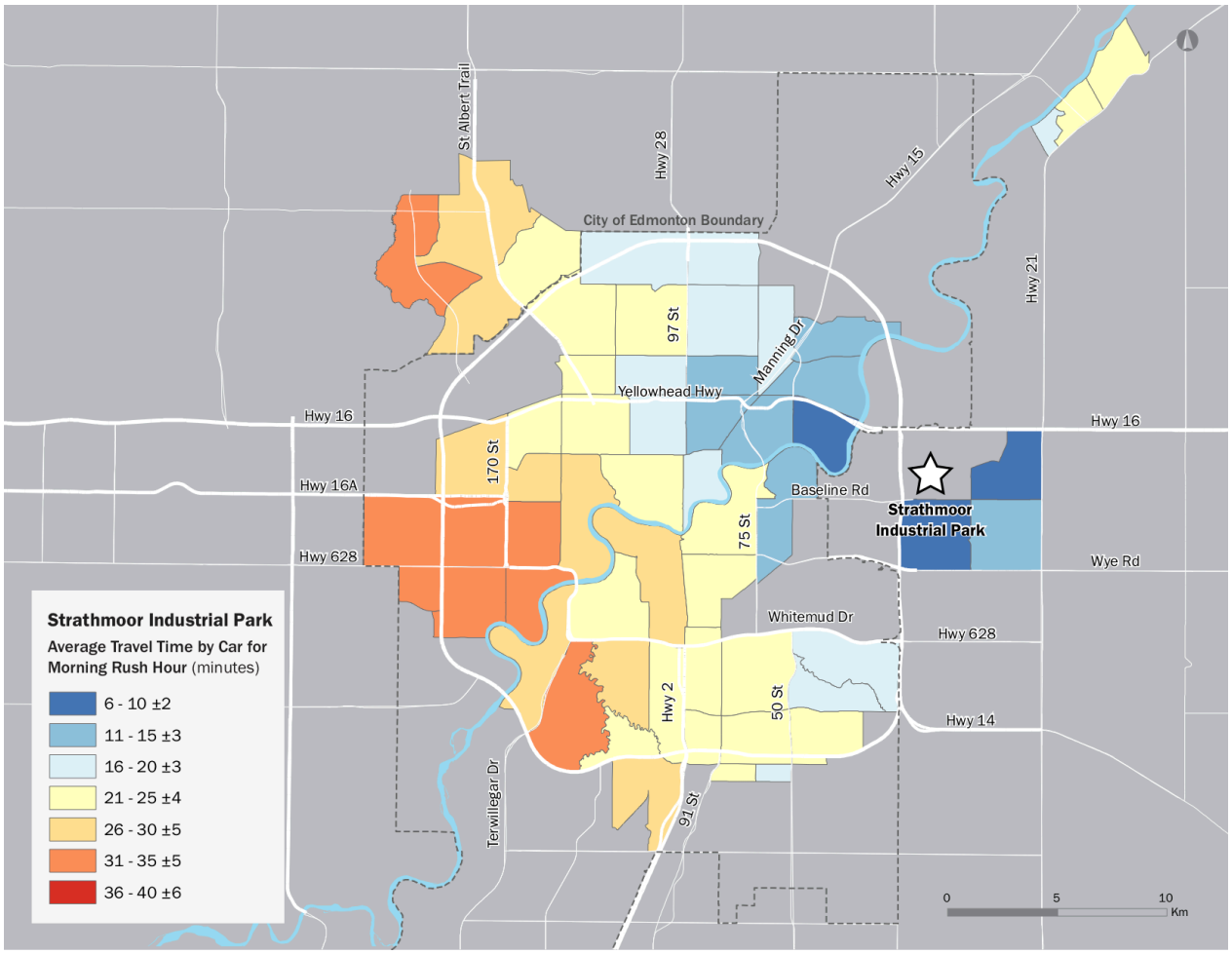
Strathmoor Industrial Park

Strathmoor Industrial, in Strathcona County, is located on the boundary of the City of Edmonton and therefore is closer to more of the population in the region. A summary of the approximate range of travel times from various municipalities or areas of Edmonton are provided below. A map showing a more detailed breakdown for Edmonton and the adjacent municipalities is provided on the following page.

AM Peak Hour Commute Times to Strathmoor Industrial

Municipality	Commute Time to Site
Edmonton NE	5-20 minutes
Edmonton Central	15-35 minutes
Edmonton SE	15-30 minutes
Edmonton W/SW	20-40 minutes
Fort Saskatchewan	15-30 minutes
Sherwood Park	5-15 minutes
St. Albert	20-40 minutes
Spruce Grove/Stony Plain	30-55 minutes
Leduc	25-45 minutes
Ardrossan	10-20 minutes

Average Commute Time by Neighbourhood to Strathmoor Industrial Park



The travel time to Strathmoor industrial from Edmonton and the adjacent municipalities is in line with the average commute time. The travel times tend to increase the further to the west the employee lives with only slight improvements to the travel time due to Yellowhead Highway and Whitemud Drive. With the shorter travel times, the relative increase to the trip is more significant when compared to the Industrial Heartland.

Public Transit

County Transit provides transit service to the Strathmoor Industrial Park. This transit service would be accessible to residents within Sherwood Park, Edmonton, St. Albert, Spruce Grove, and Fort Saskatchewan. Strathcona County provides transit service to downtown Edmonton and this would serve as a transfer point for potential riders. Based on the existing schedules, a summary of the timing for residents of each community to travel to the Strathmoor Industrial Park is provide in Table 3 assuming the earliest departure of the day.

Public Transit Travel Time and Earliest Arrival

	Earliest Departure	Earliest Arrival	Travel Time	Transfers	Transit Providers
Sherwood Park	Varies	7:00	~30 mins	1	1
Edmonton Downtown	6:15	7:00	45 mins	1	1
St. Albert*	6:00	7:30	1.5 hours	2	2
Spruce Grove	6:00	7:30	1.5 hours	2	2
Fort Saskatchewan*	6:00	7:30	1.5 hours	3	3

*- Does not include any local transit service to connect to initial commuter bus.

Employees using transit from Sherwood Park and areas of Edmonton could reach the Strathmoor Industrial Park with a bus ride at or below the average within the Edmonton region. Transit riders from St Albert, Spruce Grove, and Fort Saskatchewan would require a trip twice the average and be required to use at least 2 different transit services. The time and cost of these trips would make transit a much less desirable choice.

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- Future service directly from the various communities to the Industrial Heartland could provide employees with additional transportation options. This service could work with the Fort Saskatchewan transit or directly serve adjacent communities. Such a service would both provide a decent alternative to driving as well as potentially reduce the cost to users and reduce volume on the road network. The Fort Saskatchewan Transportation Master Plan (2018) identifies possible service to the Industrial areas and states that it would need further study.

Workforce Issues and Key Findings

This section of the report includes key findings related to identified workforce issues in the Study Area.

The data provided on workforce issues is from the employer survey, as well as a forecast of employment was developed using Application Management Consulting Ltd.'s Labour Market Demand and Supply Model Other sources of information are indicated in footnotes where applicable.

Key findings have been noted in relation to the workforce issues that emerged during the employer survey and analysis process. Key findings are presented as general suggestions for use by regional stakeholders to establish a path towards addressing labour market needs in the region. They are not to be considered comprehensive of all solutions or representative of all stakeholders.

Workforce Needs and Shortages

Seven occupations were identified by employers as being especially difficult to fill. Of these occupations, two are among the largest occupation groups employed in the Study Area:

- Petroleum, gas and chemical process operators (NOC 9232) and
- Power systems and power station operators (NOC 9241).

Workforce Needs and Shortages By Occupation

NOC Code	Occupation Title		# jobs in Study Area	% of Edm CMA	# jobs in Edm CMA	Shortage (Gap) in Edm CMA		
						Skill Gap	Match Gap	Total Gap
9232	Petroleum, gas and chemical process operators	* Δ	1,179	74.0%	1,592	1	1	2
9241	Power systems and power station operators	* Δ	775	41.0%	1,895	5	5	10
2132	Mechanical engineers	* Δ	481	21.0%	2,280	20	10	30
2243	Industrial instrument technicians and mechanics	*	204	23.0%	904	2	1	4
921	Supervisors, processing occupations		95	5.0%	2,101	24	13	37
213	Computer and information systems managers		54	4.0%	1,443	17	9	26
211	Engineering managers		41	6.0%	658	8	4	12

Note: Data is based on scaled survey results and employment forecast. Some job totals are rounded.

* denotes occupations that employers reported actively recruiting for in the survey.

Δ denotes occupations that employers reported high voluntary turnover in the survey.

Four of the especially difficult to fill occupations are also occupations identified by employers as being among those that are currently actively being recruited. Three of these occupations have among the highest voluntary turnover of all the occupations reported in the Study Area. Given the importance of these occupations groups to employers in the region and the combination of issues (ie. Difficulty to fill, actively recruiting and among the highest voluntary turnover), these occupations are considered to be those that are in most critical need.

In addition, study area employers employ a significant proportion of the total Edmonton region employment for four of the most 'difficult to fill positions'. This creates additional importance for the

employers in the Study Area to ensure that there is a sufficient supply of qualified workers to fill positions due to both growth and turnover.

All positions employed in the Study Area were analyzed to determine the existence and magnitude of employment gaps. These gaps are defined as follows:

- Skill gap: The portion of the recruitment gap that is related to a lack of sufficiently skilled workers available in the local labour force. Workers possessing the skills necessary for required positions are already engaged in employment, or have exited the labour force
- Match gap: The portion of the recruitment gap that is related to inefficiencies in matching between employers and potential employees. The local pool of available workers is estimated to be sufficient in size and skill level to fill these positions, but the jobs remain unfilled due to a failure to match in one or more criteria (the worker finds the offered wage rate unattractive, believes they are overqualified for the job, etc.).

Based on the analysis of both demand and supply of industry and occupations for the Edmonton CMA, the both the Skill Gap and Match Gap for all occupations of interest is low. This suggests that generally the supply for workers in these occupations will keep pace with the expected growth in demand. However, given the importance of these occupations to employers in the Study Area, it will be important to actively promote the growth in the available supply of these occupations.

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- Profiles could be developed to promote in-demand occupations to prospective students and jobseekers.
- Industry-specific career fairs could focus on in-demand occupations. Include speakers from in-demand occupations and post-secondary institutions.

Recruitment

Recruitment refers to the overall process an employer undertakes to attract and select qualified workers for jobs at the company. This includes letting people know the organization is hiring, reviewing resumes to shortlist applicants, contacting and interviewing prospective candidates, making an employment offer to the best fit, and onboarding the new hire.

Recruitment strategies

Employers surveyed reported their most successful recruitment strategy was Career and classified websites (37%), followed by Company website/internal postings (27%). The Career and classified website most reported by employers was Indeed. In total, nearly two-thirds of employers reported online resources were the most successful recruitment strategy. As one Manufacturing employer said, "I just post on Indeed and I get hundreds of resumes."

Word of mouth/employee referrals (27%) was the second most successful recruitment strategy according to the employers surveyed.

Employers in the Study Area rely heavily on a select few recruitment strategies. The only other strategies that employers reported as most successful in the survey were Job fairs and Walk-ins/ unsolicited resumes (3% each). As a Manufacturing employer commented, "With the downturn, we have a lot of applications coming in to us."

Establishing a relationship with post-secondary institutions can be an effective way to source qualified candidates, particularly for specific trades occupations that require technical skills and certifications. For example, some employers in the survey commented that they are recruiting at the University of Alberta and NAIT.

Social media is an increasingly popular recruitment tool for employers to utilize to reach a broader pool of candidates at low cost to the organization. For example, some employers in the survey commented that they are recruiting using Twitter and LinkedIn.

Other common recruitment methods could include:

- Networking at industry conferences,
- Employment agencies and headhunters,
- Employee referral programs,
- Industry, business and professional association postings,
- Rehiring former workers, and
- National and international recruiting.[10]

Past and Future Recruiting Difficulties

About one-fifth (17%) of employers surveyed said their organization has had difficulty recruiting qualified workers in the last 12 months.

Those employers reported various responses to hiring difficulty, including:

- Increased recruiting efforts,
- Partnered with educational institutions,
- Hired contingent workers such as contractors,
- Hired staffing agency, and
- Increased workload for current workers.

According to a 2018 survey of over 1,200 small and medium- sized businesses in Canada, strategies used to address recruiting difficulties included:

- Hire less qualified workers (43%),
- Recruit younger workers (40%),
- Change compensation (35%),
- Recruit retired workers (33%),
- Invest in organizational image (23%),
- Use employment agencies (22%), and
- Recruit new immigrants (18%).[11]

Some employers in the survey anticipate recruitment to become more difficult going forward. Almost one-quarter (23%) said their organization will face more difficulty in the next 12 months and 19% said their organization will face more difficulty farther into the future.

Employers expecting more difficulty cited the following as some of their reasons:

[10] Government of Alberta HR Series for Employers, *Recruiting Staff*, 2015.

[11] Business Development Bank of Canada (BDC), *Labour Shortage: Here to Stay*, September 2018.

- Competition with new regional petrochemical expansion projects for skilled workers,
- Competition with other major industry sectors,
- Drop in enrolment in certain trades programs, and
- The economy is picking up again.

Location in the Study Area affects the ability of some employers to recruit. Overall, 17% of employers surveyed reported their location in the region affects their ability to recruit. Generally employers felt that closer proximity to the City of Edmonton and other urban centres was more attractive to applicants, due to commute times.

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- Having an online presence is key to successful hiring.
- Networking is important for finding workers.
- Greater utilization of other recruitment methods by employers could attract more qualified applicants.
- A showcase of regional examples of employer success utilizing creative recruitment methods could assist other/future employers.
- Hiring contractors and increasing the workload for current workers can help address temporary labour shortages.
- Responding to hiring difficulties by adopting new staffing solutions can alleviate labour shortages in the long-term.
- Employers can create a long term recruitment plan to develop candidates in anticipation of workforce shortages.
- Employers can utilize workplace resources to develop candidates in anticipation of workforce shortages. In cases where apprentices are suitable candidates, the Apprenticeship Job Creation Tax Credit can support the hiring and training of new workers. For highly skilled occupations, utilizing the Canada-Alberta Job Grant can support training requirements. For lower skilled occupations, utilizing the Workplace Training Program and Workplace Essential Skills Training Program could be an effective way of finding new candidates.
- Promotional materials could be created to demonstrate how short the commute time is from urban areas in the Edmonton Metropolitan region to the major employment sites in the Study Area.

Retention

Retention refers to the efforts an employer makes to support current workers to remain employed with the company. Retention is aimed at enhancing job satisfaction and addressing the various needs or wants workers have, in order to reduce the substantial costs involved in hiring and training new staff to replace someone who leaves the organization.

Voluntary Turnover

Voluntary turnover refers to workers who left the organization, not including those who left as a result of retirement, maternity/paternity leave, disability, layoff or termination.

The overall Study Area region turnover rate reported by employers in the survey was 2.0%. The results by industry are as follows:

- Transportation and warehousing employers reported the highest voluntary turnover rate at 4.6%,
- Mining, quarrying, and oil and gas extraction employers reported a rate of 2.4%, and
- Manufacturing employers reported a rate of 0.8%.

As one Transportation and warehousing employer commented, workers "left for other opportunities in the Heartland."

Worker replacement is very expensive for an organization. A 2017 study estimated the average cost of processing an employee turnover in Alberta at $22,600 and among large organizations in Western Canada at $29,220.[12] A 2015 Government of Alberta report estimated the cost of replacing an employee at as much as 70 to 200 percent of the employee's salary, meaning that replacing an employee who was making $50,000 could cost anywhere from $35,000 to $100,000.[13] Costs of worker replacement includes:

- Leaving employee costs (cost of administrative functions related to job separation and exit interviewing),
- Loss of productivity (cost of other employee's salary for covering the work of vacant position),
- Hiring costs (cost of job advertisements and hiring manager's salary for time spent resume screening, reference checking and interviewing),
- Orientation and training costs (orientation/training manager's salary and new hire's salary while training), and
- Days of productivity (time required for new hire to reach full productivity).

Retirements

Employers surveyed reported that they expect to lose approximately 12.1% of their operations workforce to retirement over the next 5 years. According to the Federal Census 2016, the share of the population in the labour force in the Edmonton CMA that is ages 60-64 is 7.9%.

Succession Plans

Succession planning involves ensuring ongoing knowledge transfer within an organization. This is important to help organizations prepare for when long-time, senior and skilled employees retire, so the employer does not lose that knowledge within the company. It is important to identify and develop lower and mid-level workers to take the place of those leaving the organization, in order to ensure that the company retains the expertise needed to operate. Succession planning builds a solid foundation for promoting, expanding or reorganizing a workforce, and is especially relevant for Study Area employers with complex operation, turnaround and construction workforce needs. As a Manufacturing employer commented, "we are hiring now as training takes about a year to become qualified."

One-fifth (20%) of employers surveyed said that their organization has not developed a succession plan to address anticipated retirements.

[12] Torch, *Western Canada HR Trends Report, Spring 2017*

[13] Government of Alberta HR Series for Employers, *Recruiting Staff*, 2015.

Retention Strategies

Employers surveyed reported their most successful worker retention strategy over the last 12 months was Competitive salary (53%). Another 3% reported Cash bonuses was the most successful. In total, 56% of employers reported financial compensation was the most successful retention strategy.

Positive work environment (23%) was the second most successful retention strategy according to the employers surveyed.

A small number of employers in the Study Area also reported other recruitment strategies were the most successful, including Excellent management/supervision (7%), Learning/growth opportunities (7%), and Work/life balance (3%).

Non-monetary compensation as a retention tool is especially important for employers who have difficulty competing with the wages and salaries other organizations are paying in the Study Area.

Other retention methods could include:

- Interesting/challenging work.
- Flexible work measures,
- Perks,
- Reward and recognition programs and
- Diversity and inclusion strategies.

Perks should meet the needs or preferences of existing workers in the organization, as well as the types of workers the organization would like to attract. Examples of perks are transportation programs, subsidized transit passes, referral bonuses, performance-based awards or certificates, milestone gifts, free food and beverages, corporate discount programs, social events, professional association memberships, and conference attendance.[14]

With respect to flexible work measures, according to LinkedIn's 2019 Global Talent Trends study, "if you aren't offering flexibility, you're missing out on a diverse range of candidates."[15]

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- An increased focus on effective retention strategies by employers can reduce voluntary turnover and its associated costs.
- Employers could encourage their mature workers reaching retirement age to remain in the workforce longer by offering them incentives such as part time hours, casual employment and flexible work measures.
- Employers can create an organizational succession plan to develop candidates in anticipation of future workforce retirements.
- Offering competitive financial compensation is key to retention.
- Providing a positive work environment is also important for keeping workers.
- Greater use of other retention methods by employers could retain more qualified applicants.

[14] Government of Alberta HR Series for Employers, *Retaining Your Staff*, 2015.

[15] LinkedIn Talent Solutions, *2019 Global Talent Trends*,

- Workers in the Study Area could be surveyed to gain insight as to what recruitment methods would be most attractive to them.
- A showcase of regional examples of employer success utilizing creative compensation methods could be helpful to other/future employers.

Technological Change

Technological change in the context of the survey included any technological change that affects the operations workforce by increasing or decreasing the number of workers, changing the nature of the work so as to require skill upgrading, or changing the nature of the work so as to completely change the job description.

Implementing or Adopting Technological Change

Overall, 30% of employers surveyed reported their company is planning on implementing or adopting a technological change in the next 2 years that will affect their operations workforce in the Study Area. Another 27% of employers were unsure.

Many of the employers surveyed engaged in complex processes that require significant time and capital investment to make technological changes. Therefore, it is significant that nearly one-third of employers surveyed are implementing or adopting a technological change in the next 2 years.

It is important to note that implementing or adopting technological change has the potential to generate environmental benefits as well. Typically, the newest forms of production-related technology are also the cleanest in terms of environmental impact.

Operations Workforce Employment Changes

More employers surveyed reported technological changes will increase their workforce, rather than decrease employment.

Ten percent of employers said their operations workforce will increase, by approximately 71 workers due to technological change. Examples of technological changes requiring workforce increases included:

- Adoption of new railway processes, and
- Implementation of new product grade standards.

Only 3% said that their operations workforce will decrease, by an unspecified number of workers. Almost one-quarter (23%) of employers were unsure.

Based on public discourse regarding technological change in the workplace, it is assumed that there will be significant net job losses as new technology is implemented or adopted. The Canadian Chamber of Commerce has estimated that between 390,000 and 1.7 million people could see their jobs eliminated, and between 6.6 million and 11.4 million people could see their jobs transformed in the next 10 to 20 years.[16]

However, this may not necessarily the case in the Study Area, particularly given the technical work employers are undertaking and with the highly specialized operations workforce they require. The employers surveyed reported the overall anticipated net change in employment as a result of technological changes in the next two years to be positive.

[16] The Canadian Chamber of Commerce, *Skills for an Automated Future*, March 2018.

Operations Skill Upgrading

According to the employers surveyed, advances in technology are more likely to result in evolving workplace skill demands and requirements than in employment changes. Twenty-three percent of employers said their organization is planning on implementing or adopting technology that will change the nature of work so as to require skill upgrading for approximately 74 workers. One-third (33%) of employers were unsure.

The trend towards skill upgrading in response to technological changes matches findings of popular cited studies. It has been estimated that due to technological change over the coming decades, around 2 percent to 9 percent of occupations are likely to become entirely automated and about 35 percent to 60 percent of occupations are projected to be transformed in some way.[17]

The higher likelihood that skill upgrading will be required suggests that employers in the Study Area are currently planning on implementing or adopting more incremental technological changes, rather than more fundamental ones.

Examples from employers surveyed who are implementing or adopting technological changes requiring skill upgrading included:

- Minor operations changes,
- Greater use of distributed control system (DCS) to computerize processes,
- Automation of some existing manual processes, and
- Use of cloud based data management and document control.

Operations Job Description Changes

No employers reported their organization is planning on implementing or adopting technological changes in the next two years that will change the nature of work so as to completely change the job description. Thirty percent of employers were unsure.

This could be related to the type of operations workers that are employed in the Study Area. For example, a tradesperson completely changing their job description would have to undertake a significant time commitment to pursue a different trade or transition into a lower skilled position. Neither of these options may be desirable to the employer or worker.

However, there may be opportunities for workers to completely change their job description following implementation or adoption of a technological change if their occupation is more adaptable.

In addition, the types of skills required in the workforce are also shifting to some degree and do not necessitate a complete change in job descriptions. A 2016 report postulated that the top ten skills considered important in 2020 will be:

- Complex problem solving,
- Critical thinking,
- Creativity,
- People management;
- Coordinating with others,

[17] Employment and Social Development Canada (ESDC),; Organisation for Economic Co-operation and Development (OECD); C.D. Howe Institute, *Future Shock? The Impact of Automation on Canada's Labour Market*, Mar 2017; RBC, *Humans Wanted, How Canadian youth can thrive in the age of disruption*, March 2018; and McKinsey *Global Institute, Jobs Lost, Jobs Gained: Workforce Transitions in a time of Automation*, December 2017.

- Emotional intelligence,
- Judgement and decision making,
- Service orientation (actively looking for ways to help others),
- Negotiation, and
- Cognitive flexibility.[18]

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- Promotion of employers implementing or adopting technological changes and encouraging networking between regional stakeholders could help the Study Area remain competitive in global markets.
- It could be helpful to support employers in finding the skilled workforce necessary to implement or adopt technological change. Utilization of workplace resources is useful when employers need to access new workers or train existing workers.
- Connecting workers that have been affected by employment contractions due to technological change with other employers in the region could alleviate both shortages and worker's time spent jobless.
- Supporting employers implementing or adopting technological change to provide skill upgrading to new and existing workers could boost competitiveness. In cases where skill upgrading is needed, the Canada-Alberta Job Grant can support the technical and specialized training of workers to meet the new requirements.
- Raising employer awareness of opportunities to upskill workers towards new technology where possible could boost productivity.

Diversity Recruitment

Diversity recruitment in the context of the survey included organizational plans, formal or informal, to recruit workers from underrepresented groups, including Indigenous Peoples, Mature workers (ages 55+), New immigrants, Persons with disabilities, Women, Youth (ages 15-24), and Other groups.

Underrepresented and Underemployed Workforce Groups

The employers surveyed reported the following proportion of their operations workforce falls into the following underrepresented and underemployed groups:

- Aboriginal Identity: First Nations workers comprised 2.7% of the operations workforce and Métis workers comprised 0.6%. No employers reported employing Inuit workers. Overall, Indigenous Peoples comprised 3.3% of the operations workforce.
- Mature: Mature workers age 55-64 comprised 20.8% of the operations workforce. Seniors ages 65 and over comprised 0.8%.
- New Immigrants: New immigrants who immigrated to Canada in the last five years comprised 4.5% of the operations workforce.
- Women: Women comprised 22.4% of the operations workforce.
- Youth: Young adults ages 15-24 comprised 7.9% of the operations workforce.

[18] World Economic Forum, *The Future of Jobs, Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*, January 2016.

An evaluation of the underrepresented and underemployed segments of the labour force reveals there is higher unemployment rates for certain groups. The following unemployment rates are based on Federal Census 2016 data, unless otherwise noted:

- Aboriginal Identity: Indigenous Peoples living off-reserve have significantly higher rates of unemployment than the general labour force. The unemployment rate is 15.0% for Indigenous Peoples ages 15-64 in the Study Area, nearly double the overall regional unemployment rate of 8.5%.
- Mature: The unemployment rate is 5.0% for Mature workers ages 55-64 in the Study Area, lower than the overall regional unemployment rate of 8.5%. Mature workers are an age cohort of interest because they often bring valuable experience and expertise to the workforce.
- New Immigrants: The unemployment rate for immigrants landed in Canada 5 years or less was significantly higher than the average for the general workforce. New immigrants ages 15 years and over had an unemployment rate of 10.2%, compared to an unemployment rate of 5.5% for individuals born in Canada.[19]
- Persons With Disabilities: Persons with disabilities have significantly higher rates of unemployment. The unemployment rate for persons with disabilities ages 25-64 in Alberta is 10.2% in 2017, compared to 6.3% for persons without disabilities.[20]
- Women: The unemployment rate for women ages 15-64 in the Study Area is 7.4%, compared to 10.8% for men and 8.5% overall. While women in the Study Area municipalities have a lower unemployment rate overall, they are underrepresented in the workforce in traditionally male-dominated trades and industry occupations.
- Youth: Young adults ages 15-24 in the Study Area also have higher unemployment rates than the average for the region, 9.8% compared to 8.5% overall.

These underemployed groups are potential labour pools for employers to access and consider, in the context of the skills required for their available positions. However, individuals in these groups may need education and training to effectively engage in the Study Area employment.

Individuals in these groups may require additional supports to help enable their workforce entry and success in the Study Area. For example, Women Building Futures (WBF) is an organization that helps prepare women for economically prosperous careers in industries where women have historically been underrepresented. Their programs aim to increase participation of Indigenous women and all women in the workforce through assessment, training, job placement, and job retention support. WBF works with employers to meet the workforce needs of industry by recruiting the right people and providing them with the right training.

Diversity Recruitment Plans

Underrepresented and underemployed groups provide an under-utilized labour pool for employers to access. Recruiting people already living within or in close proximity to the Study Area may be easier for employers than finding workers willing to relocate. While labour mobility provides employers with a larger pool of qualified candidates, hiring from a more local workforce with the necessary skills can be more cost effective.

Half (50%) of the employers surveyed had plans to recruit workers from at least one of the identified groups, while 27% has no diversity recruitment plans and another 23% are not hiring in the next 12 months.

[19] Statistics Canada, Table 14-10-0087-01.

[20] Statistics Canada, Canadian Survey on Disability 2017, Table 13-10-0377-01.

Forty-three percent of employers have plans to recruit Women,37% have plans to recruit Indigenous Peoples, 33% have plans to recruit Youth, and 20% each have plans to recruit Mature workers, New immigrants, and Persons with disabilities. Other groups employers identified recruiting included Veterans and Visible minorities.

The Summer Temporary Employment Program can support the employment of Youth. This is an opportunity for employers to receive a wage subsidy. In addition, employers can employ a youth worker temporarily to see if they are the right fit for a permanent position following completion of their post-secondary education.

Employers surveyed reported that diversity recruitment has tangible benefits in the Study Area.

Diversity has been correlated with organizational success. According to a 2018 study of over 1,000 companies across 12 countries, there is a clear link between diversity and financial performance. Specifically, companies in the top quartile for gender diversity on executive teams were 21% more likely to experience above average profitability than companies in the fourth quartile and companies in the top quartile for ethnic and cultural diversity were 33% more likely to experience above average profitability than companies in the fourth quartile.[21]

A 2018 global survey of 9,000 talent leaders and hiring managers across 35 countries revealed that companies that focus on diversity improve culture (78%), improve company performance (62%), and better represent customers (49%).[22]

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- Increasing recruitment efforts with underrepresented and underemployed groups could allow for greater success reaching these under-utilized labour pools.
- Building connections between employers and post-secondary institutions to attract underrepresented and underemployed groups into relevant education and training programs could benefit both employers and workers.
- Building connections among regional stakeholders (i.e. employers, post-secondary institutions and training providers) and organizations that serve underrepresented and underemployed groups could benefit both employers and workers.
- A showcase of regional examples of employer success employing underrepresented and underemployed groups could improve diversity recruitment.
- Celebrating regional employers with a diverse workforce could encourage further diversification. Encourage through a "Nominate an Employer/Employee" program or award.

Workplace Resources

Workplace resources in the context of the survey included the following programs:

- Apprenticeship Job Creation Tax Credit: A non-refundable tax credit equal to 10% of the eligible salaries and wages payable to eligible apprentices in respect of employment after May 1, 2006. The maximum credit an employer can claim is $2,000 per year for each eligible apprentice. A business that hires an eligible apprentice qualifies to claim the credit. Any unused credit may be carried back 3 years and carried forward 20 years.

[21] McKinsey & Company, *Delivering Through Diversity*, January 2018.

[22] LinkedIn Talent Solutions, *2018 Global Talent Trends*, 2018..

- Canada-Alberta Job Grant: The employer applies on behalf of their employees for eligible training costs. Employers decide who gets training and what type of training may be needed for their employees.
- Summer Temporary Employment Program: The program provides funding to eligible Alberta employers to hire high school or post-secondary students into summer jobs from May to August.
- Workplace Essential Skills Training Program: Supports people in the workplace to learn new skills and adapt to workplace change. Workplace essential skills include reading text, use of documents, writing, working with numbers, oral communication, thinking skills, working with others, computer use and continuous learning. Government funding contributions are used to support direct training (e.g. assessment, instructor fees, training materials, equipment rental, tutors, etc.), and project management/coordinator costs.
- Workplace Training Program: The program provides individual-focused on the job training or paid work experience to enable individuals to find and maintain employment. The employer is reimbursed to a maximum contribution amount.

Applying For Workplace Resources

Workplace resources are government funding programs that employers and their workers can access. Over one-quarter (27%) of employers surveyed said their organization has applied for or has plans to apply for workplace resources.

Uptake on some workplace resources is higher than for others.

- Seventeen percent of employers identified applying for or having plans to apply for the Canada-Alberta Job Grant,
- Seven percent for the Apprenticeship Job Creation Tax Credit,
- Three percent for the Summer Temporary Employment Program,
- Three percent for the Workplace Essential Skills Training Program, and
- No employers reported accessing the Workplace Training Program.

Half (50%) of the employers surveyed said their organization has never applied for and does not have any plans to apply for any workplace resources. Another 23% were unsure.

The reasons employers reported in the survey for not applying for workplace resources included:

- Don't think we qualify for them,
- Administrative burden,
- Don't know enough about them,
- Don't have the budget to apply/too costly,
- Don't require them/unnecessary, and
- Never heard of them.

This demonstrates that employer awareness and uptake for workplace resources could be improved in the Study Area.

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- A showcase of regional examples of employer success accessing workplace resources could lead to greater utilization of such resources across other/future employers.
- Raising awareness among regional employers about how specific workplace resources can be utilized effectively could assist in addressing employment challenges.
- Developing short information materials to distribute to employers on how specific workplace resources apply to and are of benefit to their organizations could increase awareness.
- Informing employers of workplace resources to help them hire workers and provide them with subsidized on the job training could boost competitiveness.

Education / Skill Development

Based on the largest employed occupation groups in the study area, 10 top occupations have been reviewed for their education and skill requirements and the availability of education and training programs in the Edmonton Metropolitan Region.

These occupations include:

- Construction millwrights and industrial mechanics (NOC 7311),
- Petroleum, gas and chemical process operators (NOC 9232),
- Power engineers and power systems operators (NOC 9241),
- Railway and yard locomotive engineers (NOC 7361),
- Railway conductors and brakemen/women (NOC 7362),
- Mechanical engineers (NOC 2132),
- Civil engineers (NOC 2131),
- Petroleum engineers (NOC 2145),
- Managers in transportation (NOC 0731), and
- Manufacturing managers (NOC 0911).

Of these occupations, 7 require a post-secondary certificate or degree. All have available programs in the Edmonton Metropolitan Region, many at multiple institutions. Three top occupations do not require a post-secondary certificate or degree.

The detailed results by occupation are provided in Appendix D.

Key Findings

The results of the Study Area employer survey suggest the following key findings:

- Helping to connect regional educators, training providers and employers to discuss in-demand occupations and labour market issues could lead to greater awareness among new and potential workers.
- Industry specific networking sessions to connect regional educators, training providers and employers could improve labour market efficiency.
- Building connections among regional stakeholders and organizations that serve underrepresented and underemployed jobseekers in the region could lead to better labour market representation among such groups.

Appendix A: Employer Survey Results

Applications Management Consulting Ltd. conducted an employer survey on behalf of Alberta's Industrial Heartland Association, the City of Edmonton, the City of Fort Saskatchewan, Lamont County, Strathcona County, Sturgeon County, and the Ministry of Labour. This survey gathered relevant, timely, and accurate labour market information from various organizations in the study area regarding their employment practices.

In this survey, employers were initially asked general information about their organization's activities in the Study Area. To qualify employers to participate in the survey, employers were asked to confirm the industry, municipalities and locations their organization belonged to within the Study Area. Employers were asked about their operations, including their total number of operations workers, operations workforce profile by various demographic categories, top operations occupations and their wage rates, operations overtime hours, and anticipated retirements. Employers were asked about their turnarounds, including their turnaround schedules, turnaround workers, and top turnaround occupations. Employers were asked about their future plans, including their expansion schedule, future construction and operations workforce requirements, and top future occupations. Employers were asked for details about their vacant positions, recruitment strategies, voluntary turnover, retirements, and retention strategies, as well their utilization of workplace resources, implementation technological change, and diversity recruitment plans.

This section provides an overview of selected findings from the survey of employers in the Study Area. The results presented below include all the survey respondents and have not been scaled to reflect the total for all employers in the study area.

Survey Methodology

The survey was designed to provide a more in depth picture of the major employers and their workforce in the Study Area. The Steering Committee worked collaboratively with Applications Management Consulting Ltd. to develop, review and refine the survey questionnaire to ensure the questions aligned with the overall project purpose and collected information related to limitations in the availability of regional data and information.

Employers were selected to participate in the survey in consultation with the Steering Committee. Consideration was given to the location and industry of the employers, to ensure relevant organizations in the Study Area were contacted. This contact list was comprised of various contact lists obtained from the Steering Committee.

The employer survey was conducted in February to May of 2019 to collect information from major employers in the Study Area. All employers were contacted by a combination of telephone and email to solicit their participation. Some employers chose to complete the survey by telephone, with other employers opting to complete the survey electronically.

Survey Scaling

Employer survey data was scaled to match the total regional industry data by strata. For example, if 3 surveys were completed in a strata and 6 firms are known to be in the strata, the scaling factor is 2 (6/3=2). Some adjustments were made to the scaling factors. For example, in some instances surveys were not completed by major employers, in which case some of the data was constructed from publicly available information.

All survey data reported reflects scaled totals that are intended to be representative of the total number of employers at the time of the survey.

Survey Response Rate

When contacting employers in the Study Area, surveyors found that for the most part respondents were interested in participating. Overall, the response rate for completed surveys was 79%. Of the 38 organizations formally contacted by Applications Management Consulting Ltd., 30 respondents completed the survey.

Limitations of the Survey

When reviewing the survey results, there are some limitations that should be considered. The survey represents the views of employers in the Study Area. No attempt was made to contact workers and as a result their perspectives are not captured by the survey. The survey results are based on a selected sample of major employers in key industry groups, therefore the results do not reflect all employers or all industries in the Study Area.

Profile of Survey Respondents

During the employer survey process, a total of 30 employers completed the survey, representing 60 locations throughout the Study Area.

Employers By Industry

More employer surveys were completed in the Manufacturing industry than any other, with 15 (50%) of the 30 total surveys. The Manufacturing industry in Study Area includes Chemical manufacturing (325), Petroleum and coal products manufacturing (324), Primary metal manufacturing (331), Plastics and rubber products manufacturing (326), and Non-metallic mineral product manufacturing (327).

Mining, quarrying, and oil and gas extraction made up 10 (33.3%) of the survey responses, followed by Transportation and warehousing at 5 (16.7%).

What industry best describes your organization?

Industry (NAICS)	# of employers	% of employers	# of workers	% of workers
Manufacturing (31-33)	15	50.0%	5,982	58.7%
Mining, quarrying, and oil and gas extraction (21)	10	33.3%	1,978	19.4%
Transportation and warehousing (48-49)	5	16.7%	2,228	21.9%
Total	30	100%	10,188	100%
Note: 30 employers provided a response for this question.				

Employers By Municipality

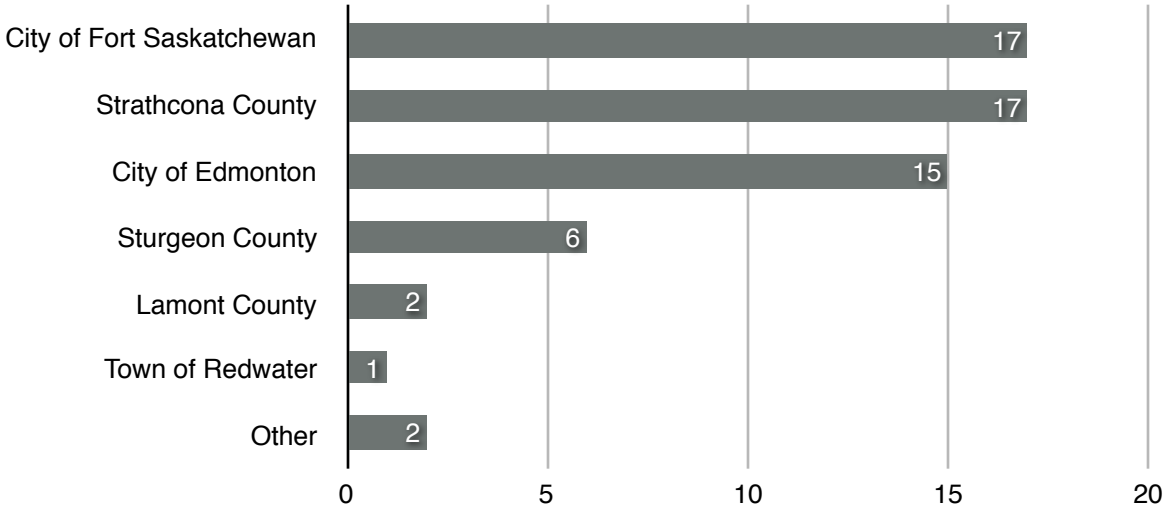
The 30 employers who completed the survey answered for 60 locations within the Study Area.

The City of Fort Saskatchewan and Strathcona County were the most represented by municipality, with 17 (28%) locations each.

This is followed by the City of Edmonton at 15 (25%), Sturgeon County at 6 (10%), Lamont County at 2 (3%), and Town of Redwater at 1 (2%).

The Other category represents 2 (3%) locations and refers to pipelines within in the Study Area that could not be assigned to one municipality because they cross various municipal boundaries.

How many locations does your organization have in the Study Area? (Check all that apply)



Note: 30 employers provided a response for this question.

Operations

Employers were asked various questions about their operations workforce. Operations refers to the work activities required for the day-to-day operation and maintenance of an industrial facility. This includes various types of workers, including but not limited to engineers, technologists, tradespeople, plant operations and maintenance workers, as well as management, business and administration staff.

Operations Workforce By Worker Category

The 30 employers surveyed employ a total of approximately 10,188 operations workers in the Study Area.[23]

Of this total, 8,374 (82.2%) are Full time workers and 1,688 (16.6%) are Contract workers.

The remainder of the operations workforce includes 79 (0.8%) Part time workers, 42 (0.4%) Seasonal workers, and 5 (0.05%) Casual workers.

[23] Operations workforce does not include those workers involved in turnaround maintenance or new construction projects.

How many operations workers are currently employed?

Worker Category	# of operations workers	% of operations workers
Full time	8,374	82.2%
Part time	79	0.8%
Contract	1,688	16.6%
Seasonal	42	0.4%
Casual	5	0.0%
Total	10,188	100%
Note: 30 employers provided a response for this question.		

Selected comments about operations workers from employers are below:

- "The site occupation descriptions are subdivided by occupation and all personnel work under the Operations department of the company." - Mining, quarrying, and oil and gas extraction employer
- "Our operations workforce includes unionized and salaried staff." - Manufacturing employer

Top Operations Occupations

Employers were asked in what occupations they currently employ the most workers. Occupations with 100 or more workers are shown below.

According to the employers who participated in the survey, the top three operations occupations in the Study Area are Construction millwrights and industrial mechanics (NOC 7311), Petroleum, gas and chemical process operators (NOC 9232), and Power systems and power station operators (NOC 9241).[24]

[24] Two employers did not specify which occupations they currently employ the most workers.

In what occupations do you currently employ the most workers?

NOC Code	Occupation Title	# of operations workers
7311	Construction millwrights and industrial mechanics	1,161
9232	Petroleum, gas and chemical process operators	1,151
9241	Power systems and power station operators	776
7361	Railway and yard locomotive engineers	760
2132	Mechanical engineers	461
2131	Civil engineers	355
2145	Petroleum engineers	300
9212	Supervisors, petroleum, gas and chemical processing and utilities	179
1523	Production clerks	173
2243	Industrial instrument technicians and mechanics	173

Note: 28 employers provided a response for this question.

Operations Workforce By Community

Twenty-two employers provided information about where their operations workers live., representing an estimated total of 6,410 workers.

Approximately 86.4% of the operations workforce lives in one of the five member municipalities of the Alberta's Industrial Heartland Association.

The highest number of workers live in the City of Edmonton, with 2,087 (32.6%). This was followed by 1,687 (26.3%) in the City of Fort Saskatchewan, 1,335 (20.8%) in Strathcona County, 254 (4.0%) in Sturgeon County and 172 (2.7%) in Lamont County.

What proportion of your operations workers live in the following communities?

Worker Category	# of operations workers	% of operations workers
City of Edmonton	2,087	32.6%
City of Fort Saskatchewan	1,687	26.3%
Strathcona County	1,335	20.8%
Others in the Edmonton Region	638	10.0%
Sturgeon County	254	4.0%
Lamont County	172	2.7%
City of St. Albert	151	2.4%
City of Spruce Grove	45	0.7%
City of Leduc	27	0.4%
Others Outside the Edmonton Region	14	0.2%
Total	6,410	100%

Note: 22 employers provided a response for this question.

Operations Workforce By Age Category

Twenty-seven employers provided information about the ages of their operations workers, representing an estimated total of 7,182 workers.

Approximately 3,183 (44.3%) are ages 25-44 years old and 1,928 (26.8%) are ages 45-54 years old.

Of mature workers ages 55 and over, 1,442 (20.1%) are ages 55-64 and just 59 (0.6%) are over 65 years old.

Only 570 (7.9%) are youth ages 15-24 years old.

What proportion of your operations workforce falls into the following age categories?

Worker Category	# of operations workers	% of operations workers
15-24 years	570	7.9%
25-44 years	3,183	44.3%
45-54 years	1,928	26.8%
55-64 years	1,442	20.1%
65+ years	59	0.8%
Total	**7,182**	**100%**
Note: 27 employers provided a response for this question.		

Operations Workforce By Gender Category

Twenty-seven employers provided information about the gender of their operations workers, representing an estimated total of 6,870 workers.

Approximately 5,334 (77.6%) operations workers are Male and 1,536 (22.4%) are Female.

What proportion of your operations workforce falls into the following gender categories?

Worker Category	# of operations workers	% of operations workers
Male	5,334	77.6%
Female	1,536	22.4%
Other	0	0.0%
Total	**6,870**	**100%**
Note: 27 employers provided a response for this question.		

Operations Workforce By Immigration Category

Twenty employers provided information about their operations workers who immigrated to Canada within the last five years, representing an estimated total of 4,425 workers.

Approximately 200 (4.5%) operations workers Immigrated to Canada in the last five years.

What proportion of your operations workforce falls into the following immigration categories?

Worker Category	# of operations workers	% of operations workers
Immigrated to Canada in the last five years	200	4.5%
Did not immigrate to Canada in the last five years	4,225	95.5%
Total	4,425	100%
Note: 20 employers provided a response for this question.		

Operations Workforce By Indigenous Category

Nineteen employers provided information about their operations workers who are Indigenous, representing an estimated total of 3,732 workers.

Approximately 105 (2.7%) operations workers are First Nations, 22 (0.6%) are Métis, and none are Inuit.

Indigenous workers make up 3.3% of the operations workforce.

What proportion of your operations workforce falls into the following First Nations/Métis/Inuit categories?

Worker Category	# of operations workers	% of operations workers
First Nations	105	2.7%
Métis	22	0.6%
Inuit	0	0.0%
Non-Indigenous identity	3,732	96.7%
Total	3,859	100%
Note: 19 employers provided a response for this question.		

Operations Overtime

Employers were asked if their operations overtime hours changed over the last 12 months, by how much, and what occupations experienced the most change in overtime hours.

Operations Overtime Hours

Twenty-six employers provided information about the percentage of their operations workforce hours that are overtime.[25]

According to the employers who participated in the survey, the average percentage of operations workforce hours that are overtime is 8.6%.

The share of operations workforce hours that are overtime was highest for Manufacturing employers at 9.1%, followed by Mining, quarrying, and oil and gas extraction employers at 9.0% and Transportation and warehousing employers at 6.3%.

What percentage of your operations workforce hours are overtime?

Industry (NAICS)	Average % of operations workforce hours that are overtime
Manufacturing (31-33)	9.1%
Mining, quarrying, and oil and gas extraction (21)	9.0%
Transportation and warehousing (48-49)	6.3%
Total	**8.6%**
Note: 26 employers provided a response for this question.	

Selected comments about operations overtime from employers are below:

- "Only 50% of our workforce is overtime eligible." - Manufacturing employer
- "Depending on the month, 6-9% of our operations hours are overtime" - Manufacturing employer

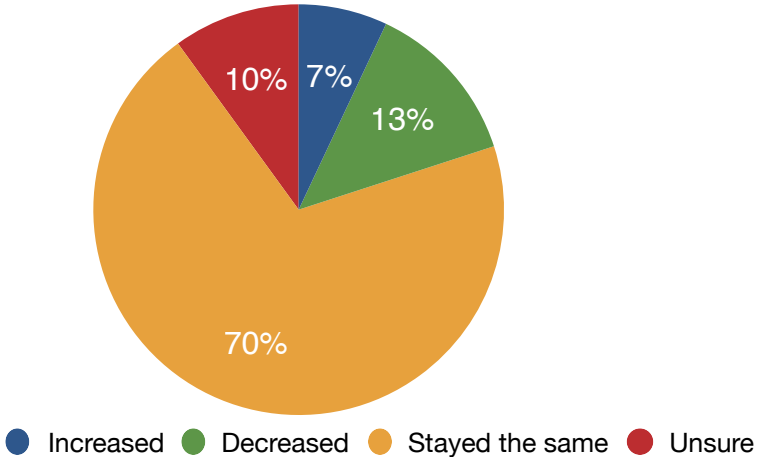
Operations Overtime Hours Changes

Two employers (7%) said their operations overtime hours Increased and 4 employers (13%) said their overtime hours Decreased.

Twenty-one employers (70%) reported that the share of overtime hours for their operations workforce Stayed the same over the last 12 months and 3 (10%) were Unsure.

[25] Operations workforce does not include those workers involved in turnaround maintenance or new construction projects.

Has the share of overtime hours for your operations workforce increased, decreased or stayed the same over the last 12 months?



Note: 30 employers provided a response for this question.

Operations Overtime Occupations Affected

Two employers (7%) said their operations overtime hours Increased:

- Manufacturing employer reported an overtime hour increase of 5% for Supervisors, Petroleum, Gas and Chemical Processing and Utilities (NOC 9212) and Other Labourers in Processing, Manufacturing and Utilities (NOC 9619); and
- Manufacturing employer reported an overtime hour increase of 2% for Chemical Plant Machine Operators (NOC 9421).

Four employers (13%) said their overtime hours Decreased:

- Manufacturing employer reported an overtime hour decrease of 35% for Chemical Plant Machine Operators (NOC 9421);
- Mining, quarrying, and oil and gas employer reported an overtime hour decrease of 4% for Machine Operators, Mineral and Metal Processing (NOC 9411);
- Mining, quarrying, and oil and gas employer reported an overtime hour decrease of 16% for Power Systems and Power Station Operators (NOC 9241) and Chemical Technologists and Technicians (NOC 2211); and
- Manufacturing employer reported an overtime hour decrease of 3% for Power Systems and Power Station Operators (NOC 9241).

Turnaround

Employers were asked various questions about their turnaround. Turnaround is a scheduled event in which an entire process unit of an industrial facility is taken off-stream for an extended period for revamp or renewal.[26]

[26] Turnaround does not include day-to-day maintenance activities or unscheduled maintenance events.

Turnaround Schedule

Employers were asked for the frequency and next scheduled event for their Type 1, 2 and 3 turnarounds.

Of the 26 employers who answered the question, 18 (69%) reported one or more scheduled turnaround. Eight (31%) reported no scheduled turnarounds.

Of the 31 scheduled turnarounds reported in the survey, 13 (42%) are occurring at a frequency of once per year or more.[27]

What is your Type 1, Type 2 and Type 3 turnaround schedule?

Frequency	# of turnarounds
Every 14-20 Weeks	1
Every 6 Months	3
Every Year	9
Every 2 Years	2
Every 3 Years	7
Every 4 Years	4
Every 4.5 Years	1
Every 5 Years	2
Every 8 Years	1
Every 10 Years	1
None Scheduled	8
Total	39
Note: 26 employers provided a response for this question.	

Selected comments about turnaround schedules are below:

- "One department is currently in biannual shut down and the other department will be in the fall." - Manufacturing employer
- "The target is every 8 years for Hydrocarbons, every 2 years for Polyethylene, and every 3 years for Power Generation." - Manufacturing employer
- "Our turnaround schedule is very low. The turnaround schedule for these plants is every 3 years if everything is on target. There will be a minor plant turnaround for our main customer, which means we sometimes take offline for 2 days but it is unplanned." - Manufacturing employer

[27] Eight employers reported more than one scheduled turnaround.

- "Type 1 schedule semi-annual. Type 2 schedule is a function of the [nearby site] turnaround scheduling frequency." - Manufacturing employer
- "[One area of plant] every 5 years, [one area plant] every 4 years, [one area of plant] every 3 years. There is a full plant outage every 10 years, with the next planned for 2028." - Mining, quarrying, and oil and gas extraction employer
- "We have turnarounds annually - often in the spring and fall." - Mining, quarrying, and oil and gas extraction employer
- "Every 3 years for each single fractionation train, with one per year." - Mining, quarrying, and oil and gas extraction employer

Selected comments from employers without turnaround schedules are below:

- "Not applicable because we do not schedule a typical turnaround." - Transportation and warehousing employer
- "Not applicable as we have a small operation and thus have ongoing small maintenance turnarounds during the year rather than a full turnaround." - Mining, quarrying, and oil and gas extraction employer
- "We don't have any turnarounds." - Transportation and warehousing employer
- "No turnaround as this site is not currently operational." - Manufacturing employer
- "Turnarounds are not conducted, only tank inspections and cleanings at our Edmonton facility." - Mining, quarrying, and oil and gas extraction employer

Turnaround Workforce By Industry

Employers with scheduled turnarounds were asked for the number of turnaround workers expected for their Type 1, 2 and 3 turnarounds.[28]

Sixteen employers reported the turnaround workforce required to complete 25 scheduled turnarounds. An estimated 7,376 workers are expected.[29]

Of this total, 6,811 workers (92.3%) will be required by Manufacturing employers and 565 workers (7.7%) will be required by Mining, quarrying, and oil and gas extraction employers. No Transportation and warehousing employers reported any scheduled turnarounds..

[28] Turnaround workforce does not include those workers involved in current operations activities or new construction projects.

[29] Two employers did not report the expected number of workers required to complete 6 scheduled turnarounds.

How many turnaround workers are expected for each Type?

Industry (NAICS)	# of turnarounds	# of turnaround workers	% of turnaround workers
Manufacturing (31-33)	18	6,811	92.3%
Mining, quarrying, and oil and gas extraction (21)	7	565	7.7%
Transportation and warehousing (48-49)	0	0	0.0%
Total	25	7,376	100%
Note: 16 employers provided a response for this question.			

Selected comments about turnaround workers from employers are below:

- "A lot of these workers are from our other sites whether in Canada or the U.S. They come up and help us in [Industrial Heartland region]. We can add an additional at least 30 on each site. Unfortunately these turnarounds are occurring at the same time for both sites. This means there is a lack of human resources for our company during this period." - Manufacturing employer
- "It really varies from turnaround to turnaround what our workforce requirements will be." - Mining, quarrying, and oil and gas extraction employer
- "We use our existing maintenance and operations staff for the most part." - Manufacturing employer
- "It ranges from 500 - 2500 in terms of workforce size, depending on which turnaround we are completing." - Manufacturing employer

Top Turnaround Occupations

Employers with scheduled turnarounds were asked in what occupations they expect to employ the most workers to complete their scheduled turnarounds. Occupations with 100 or more expected turnaround workers are shown below.

According to the employers who participated in the survey, the top three turnaround occupations in the Study Area are Construction millwrights and industrial mechanics (NOC 7311), Carpenters (NOC 7271) and Steamfitters, pipefitters and sprinkler system installers (7252).[30]

[30] Three employers did not specify which occupations they expect to employ the most workers to complete 7 scheduled turnarounds.

What occupations do you expect to employ the most workers to complete Type 1, Type 2 and Type 3 Turnaround?

NOC Code	Occupation Title	# of turnaround workers
7311	Construction millwrights and industrial mechanics	2,072
7271	Carpenters	779
7252	Steamfitters, pipefitters and sprinkler system installers	768
7234	Boilermakers	685
7611	Construction trades helpers and labourers	655
7205	Contractors and supervisors, other construction trades, installers, repairers and servicers	450
7242	Industrial electricians	324
7237	Welders and related machine operators	304
2243	Industrial instrument technicians and mechanics	250
7293	Insulators	195

Note: 15 employers provided a response for this question.

Selected comments about turnaround occupations from employers are below:

- "There are also other specialized roles that we will also utilize internally and externally." - Manufacturing employer
- "All full time staff are in employment for the turnarounds. In addition, 10 contract workers vary depending on required work scopes." - Mining, quarrying, and oil and gas extraction employer

Expansion

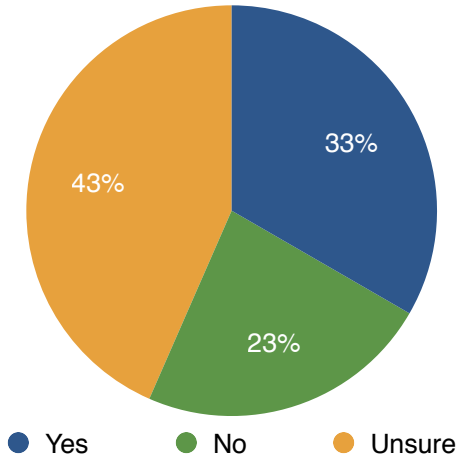
Employers were asked if they are currently completing or planning an expansion of their operations. Expansion refers to a new industrial project proposed or under construction.

Expansion of Operations

Ten employers (33%) said their organization is completing or planning an expansion of their operations.

Thirteen employers (43%) reported that their organization is not currently completing or planning an expansion of operations, while 7 (23%) were unsure.

Are you currently completing or planning an expansion of your operations?



Note: 30 employers provided a response for this question.

Selected comments about expansions from employers are below:

- "There will be increased rail storage by Q3 2019." - Transportation and warehousing employer
- "We are building a new complex in Heartland. Target achievement in 2021.." - Transportation and warehousing employer
- "Small expansions starting in Q4 2019." - Manufacturing employer

Expansion Timeline

Of the 10 employers currently completing or planning an expansion of their operations, 4 each will be expanding in 2019 and 2020. One employer each will be expanding in 2021 and 2022.

When are you planning an expansion of your operations?

Timeline	# of employers expanding	% of employers expanding
2019	4	40.0%
2020	4	40.0%
2021	1	10.0%
2022	1	10.0%
Total	10	100%

Note: 10 employers provided a response for this question.

Expansion Workforce By Industry

An estimated total of 2,878 workers will be added as a result of expansions occurring in the Study Area between 2019 and 2022.[31]

Four Manufacturing employers reported their workforce will be expanding by approximately 2,500 workers.

Five Mining, quarrying, and oil and gas extraction employers reported their workforce will be expanding by approximately 378 workers.

One employer in Transportation and warehousing was unable to provide the number of workers expected to be required to complete the expansion project.

How many workers are expected to be required to complete this expansion project?

Industry (NAICS)	# of employers expanding	% of employers expanding	# of expansion workers	% of expansion workers
Manufacturing (31-33)	4	40.0%	2,500	86.9%
Mining, quarrying, and oil and gas extraction (21)	5	50.0%	378	13.1%
Transportation and warehousing (48-49)	1	10.0%	0	0.0%
Total	**10**	**100%**	**2,878**	**100%**
Note: 10 employers provided a response for this question.				

Expansion Workforce By Worker Category

Nine employers reported the expansion workforce required was expected to be an estimated 2,878 workers.[32]

Of this total, 2,500 (82.2%) will be Construction workers and 378 (13.1%) will be Operations workers.

[31] Expansion workforce does not include those workers involved in current operations activities or turnaround maintenance.

[32] One employer did not specify how many workers will be required to complete their expansion project.

How many will be project construction workers? What will the operations employment impacts be?

Worker Category	# of expansion workers	% of expansion workers
Construction	2,500	86.9%
Operations	378	13.1%
Total	2,878	100%
Note: 9 employers provided a response for this question.		

Top Expansion Occupations

Employers were asked in what occupations they expect to employ the most construction and operations workers in to complete their expansion project. Occupations with 20 or more expected workers are shown below.

According to the employers who participated in the survey, the top three expansion occupations in theStudy Area are Construction trades helpers and labourers (NOC 7611), Steamfitters, pipefitters and sprinkler system installers (NOC 7252) and Power systems and power station operators (9241).[33]

[33] Two employers did not specify which occupations they expect to employ the most workers to complete their expansion project.

In what occupations do you expect to employ the most workers (construction and operations) to complete this project?

NOC Code	Occupation Title	# of expansion workers
7611	Construction trades helpers and labourers	170
7252	Steamfitters, pipefitters and sprinkler system installers	70
9241	Power systems and power station operators	50
7237	Welders and related machine operators	40
7271	Carpenters	30
2141	Industrial and manufacturing engineers	25
2243	Industrial instrument technicians and mechanics	25
7293	Insulators	20
7301	Contractors and supervisors, mechanic trades	20
7521	Heavy equipment operators	20
9232	Petroleum, gas and chemical process operators	20

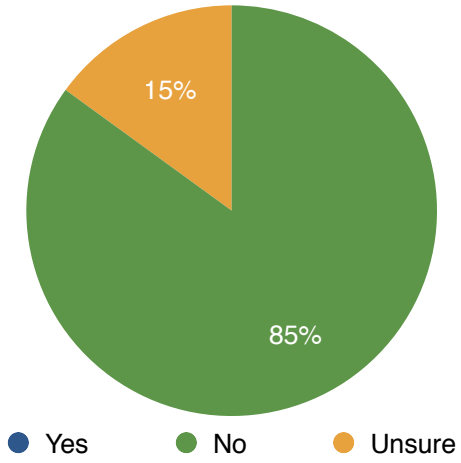
Note: 7 employers provided a response for this question.

Downsize

Only employers who are not planning an expansion were asked if they are planning on downsizing their operations or changing the scope of their operations in the foreseeable future.

None of the employers reported that their organization is planning on downsizing. Three employers (15%) were Unsure.

Are you planning on downsizing your operations or changing the scope of your operations in the foreseeable future?



Note: 20 employers provided a response for this question.

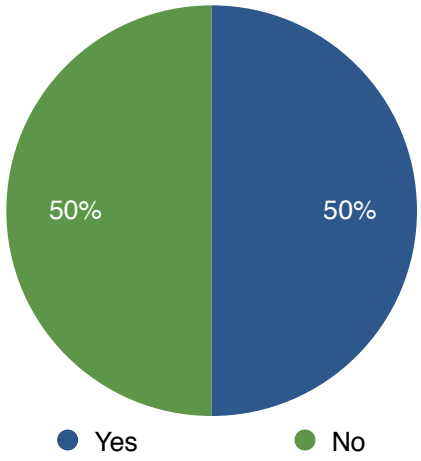
Selected comments about downsizes from employers are below:

- "We are pretty unique because we've been in operation for 60 years and we only have the one facility here." - Manufacturing employer
- "A downsize was done in December 2018." - Manufacturing employer

Vacant Positions

Fifteen (50%) of the employers reported that their organization currently has vacant positions they are actively recruiting for, while 15 (50%) said their organization does not have vacant positions they are actively recruiting for.

Do you currently have vacant positions you are actively recruiting for?



Note: 30 employers provided a response for this question.

Selected comments about vacant positions from employers are below:

- "We are pretty consistently recruiting for Operators [NOC 9411]. We always have a posting on our website." - Manufacturing employer
- "In 2019 we have 120 vacant positions company wide. Six are in the Heartland region." - Manufacturing employer

Vacancy Rate

The 30 employers surveyed had a total of approximately 217 vacant positions they were actively recruiting for in the Study Area at the time of their survey. The overall vacancy rate was 2.1%.

Transportation and warehousing employers reported the highest vacancy rate at 6.3%, representing a total of 150 vacant positions. This was followed by Mining, quarrying, and oil and gas extraction with a vacancy rate of 1.3% and Manufacturing with a vacancy rate of 0.7%.[34]

[34] Vacancy rate is the number of vacant positions divided by all positions (vacant and occupied).

How many total vacant positions are you actively recruiting for?

Industry (NAICS)	# of vacant positions	Total Workers	Vacancy Rate
Transportation and warehousing (48-49)	150	2,228	6.3%
Mining, quarrying, and oil and gas extraction (21)	27	1,978	1.3%
Manufacturing (31-33)	40	5,982	0.7%
Total	**217**	**10,188**	**2.1%**
Note: 30 employers provided a response for this question.			

Vacant Positions By Occupation

Employers were asked what occupations they are actively recruiting for. Occupations with 4 or more vacant positions are shown below.

According to the employers who participated in the survey, the top three vacant positions in the Study Area are Railway and yard locomotive engineers (NOC 7361), Mechanical engineers (NOC 2132) and Civil engineers (NOC 2131).[35]

What occupations are you actively recruiting for?

NOC Code	Occupation Title	# of vacant positions
7361	Railway and yard locomotive engineers	65
2132	Mechanical engineers	37
2131	Civil engineers	31
1523	Production clerks	13
912	Utilities managers	11
9232	Petroleum, gas and chemical process operators	11
9241	Power systems and power station operators	9
2145	Petroleum engineers	5
7622	Railway and motor transport labourers	5
2243	Industrial instrument technicians and mechanics	4
Note: 15 employers provided a response for this question.		

[35] One employer did not specify which occupations for 5 tradesperson positions.

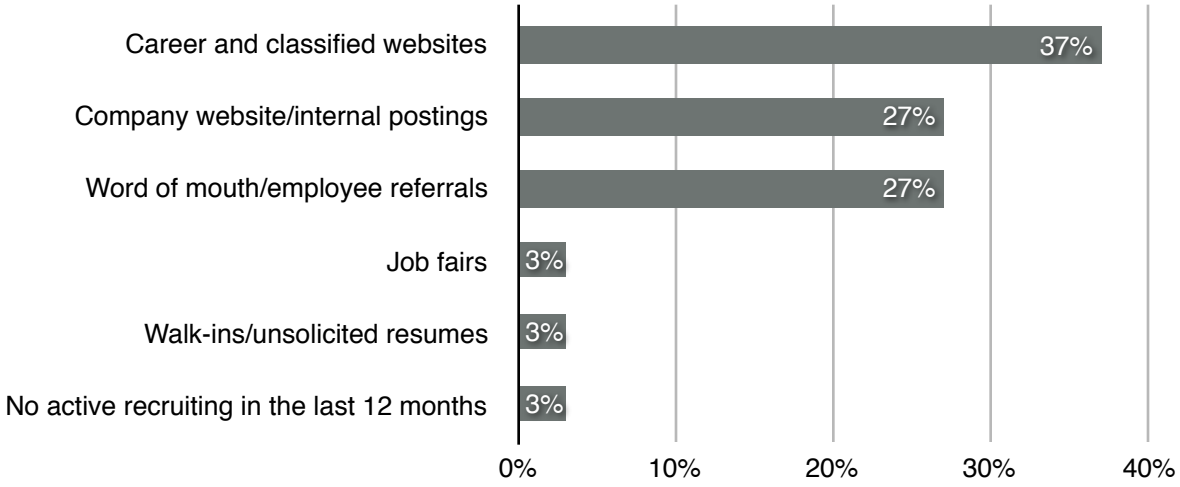
Recruitment Strategies

The most successful recruitment strategy to find applicants over the last 12 months was Career and classified websites (37%). Of those 12 employers who said Career and classified websites, 11 specified that Indeed was the most successful.

Another 27% of employers reported Company website/internal postings was the most successful recruitment strategy. In total, 64% of employers reported online resources were the most successful.

Word of mouth/employee referrals (27%) was the second most successful recruitment strategy. This was followed by Job fairs (3%), and Walk-ins/unsolicited resumes (3%). One employer (3%) reported the organization had no active recruiting in the last 12 months.

What has been your most successful recruitment strategy to find applicants over the last 12 months? (One answer only)



Note: 30 employers provided a response for this question.

Selected comments from employers about recruitment strategies over the last 12 months are below:

- "I just filled the available positions we had. I was surprised how many people were on the market this time around. I just post on Indeed and I get hundreds of resumes." - Manufacturing employer
- "In addition to word of mouth/employee referral, we also use career and classified websites and local papers." - Transportation and warehousing employer
- "We also recruit using our company website and at the U of A." - Manufacturing employer
- "We also brought in an HR temp because it's a constant process." - Manufacturing employer
- "We also company website/internal postings and employment agencies." - Manufacturing employer
- "We also use LinkedIn." - Mining, quarrying, and oil and gas extraction employer
- "We use company website, employee referrals, Twitter/LinkedIn, NAIT postings, and a headhunter." - Manufacturing employer

Past Recruiting Difficulties

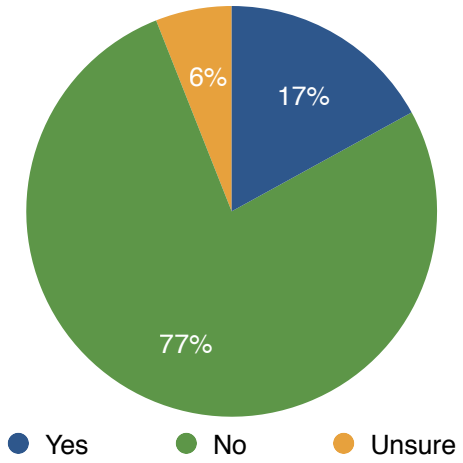
Employers were asked questions about their past recruiting difficulties.

Past Recruiting Difficulties In the Last 12 Months

Twenty-three employers (77%) reported that their organization has not had difficulty recruiting qualified workers in the last 12 months and 2 employers (7%) were unsure.

Only 5 employers (17%) said their organization has had difficulty recruiting qualified workers in the last 12 months.

Have you had difficulty recruiting qualified workers in the last 12 months



Note: 30 employers provided a response for this question.

Selected comments from employers with past recruiting difficulties in the last 12 months are below:

- "We have been able to recruit qualified workers but the quantity for selection has decreased." - Mining, quarrying, and oil and gas extraction employer
- "We have difficulty with technical positions, such as experienced engineers [NOC 211]." - Transportation and warehousing employer

Selected comments from employers without past recruiting difficulties in the last 12 months are below:

- "With the downturn, we have a lot of applications coming in to us." - Manufacturing employer
- "We recently posted an Operator role [NOC 9243] in February 2019 and had 300 applicants." - Mining, quarrying, and oil and gas extraction employer

Difficult to Fill Positions By Occupation

The 5 employers who reported difficulty recruiting qualified workers in the last 12 months were asked which occupations have been most difficult to fill.

The complete list of most difficult to fill positions reported by employers who participated in the survey is below.

Which occupations have been most difficult to fill?

NOC Code	Occupation Title	# of employers who reported
211	Engineering managers	1
213	Computer and information systems managers	1
921	Supervisors, processing occupations	1
2132	Mechanical engineers	1
2243	Industrial instrument technicians and mechanics	1
9232	Petroleum, gas and chemical process operators	1
9241	Power systems and power station operators	1

Note: 5 employers provided a response for this question.

Responses to Recruiting Difficulties

The 5 employers who reported difficulty recruiting qualified workers in the last 12 months were asked how they have or will respond to the difficulty.

Employers have responded to the difficulty finding qualified employees in a variety of ways. Increased recruiting efforts and Partnered with educational institutions were the top ways.

How have or will you respond to the difficulty recruiting qualified workers? (Check all that apply.)

Response to hiring difficulties	# of employers who reported
Increased recruiting efforts	3
Partnered with educational institutions	2
Hired contingent workers, such as contractors	1
Hired staffing agency	1
Increased workload for current workers	1
Nothing	1

Note: 5 employers provided a response for this question.

Future Recruiting Difficulties

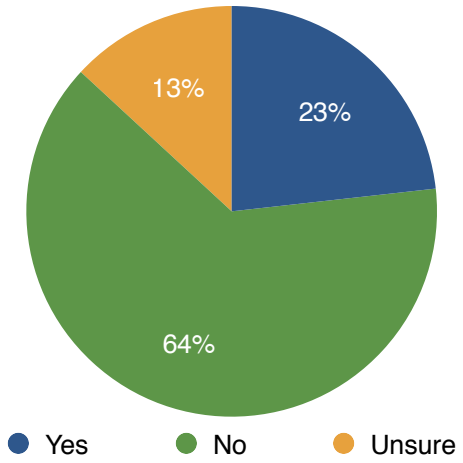
Employers were asked questions about their future recruiting difficulties.

Future Recruiting Difficulties In the Next 12 Months

Nineteen employers (63%) reported they do not expect recruiting qualified workers to be more difficult for their organization in the next 12 months and 4 employers (13%) were unsure.

Only 7 employers (23%) said their organization will face more difficulty recruiting qualified workers in the next 12 months.

Do you expect recruiting qualified workers to be more difficult in the next 12 months?



Note: 30 employers provided a response for this question.

Selected comments from employers expecting more recruiting difficulties in the next 12 months are below:

- "New projects in the area requiring staff." - Mining, quarrying, and oil and gas extraction employer
- "We need to replace a millwright [NOC 7311]." - Mining, quarrying, and oil and gas extraction employer
- "The large petrochemical projects are hiring so there is less skilled workforce available. It is difficult to compete with them as a small company." - Mining, quarrying, and oil and gas extraction employer
- "Market seems to be getting tighter as good and qualified workers are taken for roles. We feel like there were a lot of people who left Alberta. NAIT and SAIT are also reporting drops in the Power Engineering & Instrument Technology Programs." - Manufacturing employer
- "We have seen an increase in overqualified workers which I foresee going back to their trade or role when the economy picks up." - Mining, quarrying, and oil and gas extraction employer
- "[Three major expansion projects] have been approved in the area." - Mining, quarrying, and oil and gas extraction employer

Selected comments from employers not expecting more recruiting difficulties in the next 12 months are below:

- "Lots of unemployed people from the industrial sector are available." - Manufacturing employer

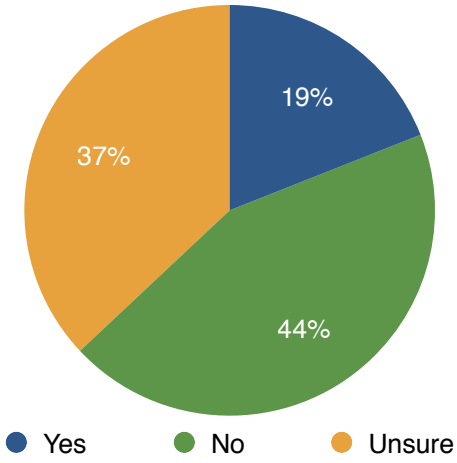
- "I recently posted for an Instrumentation Technician [NOC 2243] on Indeed and received 168 resumes just from that. We used to struggle to find people in Alberta, but now we are finding so many." - Manufacturing employer
- "Recruiting in the Heartland Region has always been challenging." - Transportation and warehousing employer
- "No need to recruit in the next year." - Manufacturing
- "With the downturn in the Oil and Gas markets the labour market and unemployment rates are pretty high. We receive a high volume of qualified applicants to our postings." - Manufacturing employer
- "We seem to have a steady stream of applicants."" - Mining, quarrying, and oil and gas extraction employer
- "The response to job postings for most positions has been high." - Mining, quarrying, and oil and gas extraction employer
- "We haven't had any issues recruiting in the last couple years so no reason to expect any issues in upcoming years." - Mining, quarrying, and oil and gas extraction employer

Future Recruiting Difficulties Farther Into the Future

Twelve employers (44%) reported they do not expect recruiting qualified workers to be more difficult for their organization farther into the future and 10 employers (37%) were unsure.

Only 5 employers (19%) said their organization will face more difficulty recruiting qualified workers farther into the future.

Do you expect recruiting qualified workers to be more difficult farther into the future (say 1-2 years from now)?



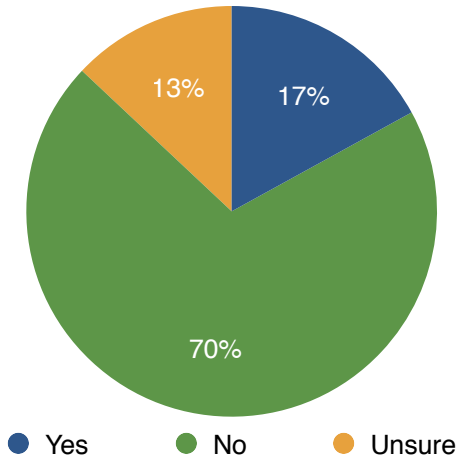
Note: 27 employers provided a response for this question.

Recruiting Difficulties Due to Location

Twenty-one employers (70%) reported that their organization's locations in the Industrial Heartland region do not affect their ability to successfully recruit qualified workers and 4 employers (13%) were unsure.

Only 5 employers (17%) said it does affect their organization's ability to successfully recruit.

Do your locations in Alberta's Industrial Heartland region affect your ability to successfully recruit qualified workers?



Note: 30 employers provided a response for this question.

Selected comments from employers who said their locations in the Industrial Heartland region affect their ability to recruit are below:

- "Sometimes we have difficulty with [our plant]. I think people's preference would be more to work in Sherwood Park if they have the option. However, there are so many people available we can find the workers we need. Sherwood Park is much more attractive than [our plant], due to the proximity to the City of Edmonton." - Manufacturing employer
- "Yes because we are competing with oil and gas companies for qualified candidates." - Manufacturing employer
- "The Oil companies close to our plant usually if in high demand scoop up some of our qualified Process Operators." - Manufacturing employer
- "It's a requirement to stay competitive to offer further perks to recruit from Edmonton due to the commute." - Mining, quarrying, and oil and gas extraction employer

Selected comments from employers who said their locations in the Industrial Heartland region do not affect their ability to recruit are below:

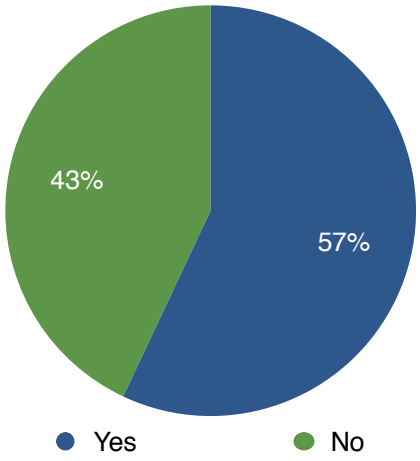
- "Good place to be close to Edmonton and large population." - Manufacturing employer
- "The location can be a job incentive for the industry." - Mining, quarrying, and oil and gas extraction employer
- "We feel our location in the Industrial Heartland is very attractive to applicants." - Manufacturing employer
- "Generally there is a good pool of skilled workers available in Edmonton area or available to relocate from Calgary." - Manufacturing employer
- "People want to work in Edmonton." - Mining, quarrying, and oil and gas extraction employer
- "We have had great success in our Edmonton and area recruitment and our recruitment metrics definitely showcase that.." - Mining, quarrying, and oil and gas extraction employer

- "We are within close proximity to Edmonton." - Mining, quarrying, and oil and gas extraction employer

Voluntary Turnover

Seventeen (57%) of the employers reported that workers left their organization in the last 12 months as a result of voluntary turnover, while 14 (43%) said no workers left their organization in the last 12 months as a result of voluntary turnover.[36]

Have any workers left your organization in the last 12 months as a result of voluntary turnover?



Note: 30 employers provided a response for this question.

Selected comment from employers about voluntary turnover are below:

- "They left for other opportunities in the Heartland." - Transportation and warehousing employer
- "One process engineer [NOC 2141] in a senior role left in October for a better opportunity." - Manufacturing employer
- "Not a lot of people have left. It would be positions within the union." - Manufacturing employer

Voluntary Turnover Rate

The 30 employers surveyed had a total of approximately 201 workers leave their organizations in the Study Area in the last 12 months as a result of voluntary turnover. The overall voluntary turnover rate was 2.0%.

Transportation and warehousing employers reported the highest vacancy rate at 4.6%, representing a total of 103 voluntary turnover positions. This was followed by Mining, quarrying, and oil and gas extraction with a vacancy rate of 2.4% and Manufacturing with a vacancy rate of 0.8%.[37]

[36] Voluntary turnover does not include workers who left the organization as a result of retirement, maternity/paternity leave, disability, layoff or termination.

[37] Voluntary turnover rate is the number of voluntary turnover positions divided by the number of total workers.

How many workers have left your organization as a result of voluntary turnover in the last 12 months?

Industry (NAICS)	# of voluntary turnover positions	Total Workers	Voluntary Turnover Rate
Transportation and warehousing (48-49)	103	2,228	4.6%
Mining, quarrying, and oil and gas extraction (21)	48	1,978	2.4%
Manufacturing (31-33)	50	5,982	0.8%
Total	**201**	**10,188**	**2.0%**
Note: 30 employers provided a response for this question.			

Voluntary Turnover Positions By Occupation

Employers were asked which occupations experienced the most voluntary turnover Occupations with 2 or more voluntary turnover positions are shown below.

According to the employers who participated in the survey, the top three voluntary turnover positions in the Study Area are Railway and yard locomotive engineers (NOC 7361), Petroleum, gas and chemical process operators (NOC 9232) and Civil engineers (NOC 2131).[38]

[38] Five employers did not specify which occupations for 53 voluntary turnover positions.

Which occupations experienced the most voluntary turnover?

NOC Code	Occupation Title	# of voluntary turnover positions
7361	Railway and yard locomotive engineers	64
9232	Petroleum, gas and chemical process operators	19
2131	Civil engineers	12
1523	Production clerks	10
9619	Other labourers in processing, manufacturing and utilities	10
2132	Mechanical engineers	9
9241	Power systems and power station operators	9
7511	Transport truck drivers	3
213	Computer and information systems managers	2
1221	Administrative officers	2
7311	Construction millwrights and industrial mechanics	2

Note: 14 employers provided a response for this question.

Retirements

Twenty-seven employers provided information about their operations workforce they expect to lose to retirement in the next five years, representing an estimated total of 8,773 workers.

Approximately 1,061 (12.1%) operations workers are anticipated to retire in the next five years.

What proportion of your operations workforce are you expecting to lose to retirement in the next five years?

Worker Category	# of operations workers	% of operations workers
Anticipated retirements	1,061	12.1%
Remaining operations workforce	7,712	87.9%
Total	8,773	100%

Note: 27 employers provided a response for this question.

Selected comment from employers about retirements are below:

- "I may have only 2 people retiring." - Manufacturing employer
- "Our workforce has been aging for awhile but we have quite a good balance going on. The largest number of retirements would be within the union." - Manufacturing employer
- "There will be none in the next five years." - Manufacturing employer

Retirement Positions By Occupation

Employers were asked which occupations are most likely to be affected by retirements Occupations reported 2 or more times are shown below.

According to the employers who participated in the survey, the top two retirement positions in the Study Area are Petroleum, gas and chemical process operators (NOC 9232) and Power systems and power station operators (NOC 9241).[39]

Which occupations are most likely to be most affected by retirements?

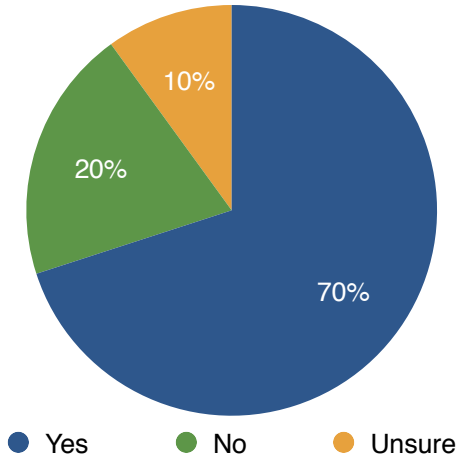
NOC Code	Occupation Title	# of employers who reported
9232	Petroleum, gas and chemical process operators	10
9241	Power systems and power station operators	4
16	Senior managers - goods production, utilities, transportation and construction	2
811	Primary production managers	2
911	Manufacturing managers	2
1241	Secretaries	2
2132	Mechanical engineers	2
2243	Industrial instrument technicians and mechanics	2
7311	Construction millwrights and industrial mechanics	2
9212	Supervisors, petroleum, gas and chemical processing and utilities	2
9421	Chemical plant machine operators	2
Note: 24 employers provided a response for this question.		

[39] Two employers did not specify which occupations are most likely to be most affected by retirements. and one employer is not anticipating any retirements.

Succession Plans

Twenty-one employers (70%) reported that their organization has developed a succession plan to address the anticipated retirements, while 6 (20%) said their organization had not. Three employers (10%) were unsure.

Has your organization developed a succession plan to address the anticipated retirements?



Note: 30 employers provided a response for this question.

Selected comment from employers with succession plans are below:

- "We are hiring now as training takes about a year to become qualified." - Manufacturing employer
- "We have a succession plan because we don't want retirement to impact our workforce. We aim for a seamless process." - Manufacturing employer
- "If anything, we'd prefer more would retire." - Mining, quarrying, and oil and gas extraction employer

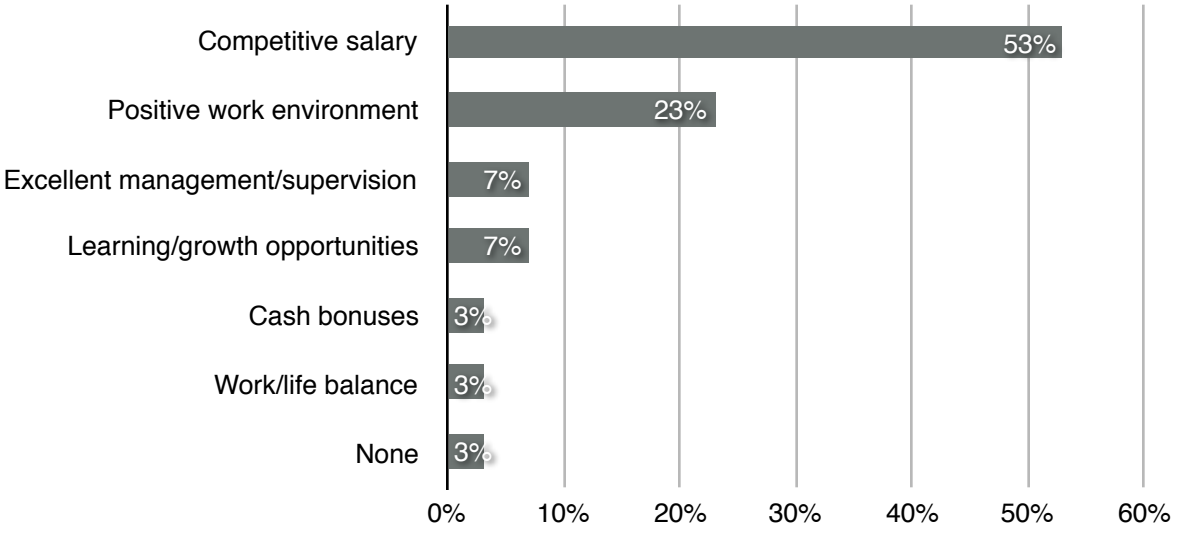
Retention Strategies

The most successful worker retention strategy over the last 12 months was Competitive salary (53%).

Another 3% of employers reported Cash bonuses was the most successful retention strategy. In total, 56% of employers reported financial compensation was the most successful.

Positive work environment (23%) was the second most successful retention strategy. This was followed by Excellent management/supervision (7%), Learning/growth opportunities (7%), and Work/life balance (3%). One employer (3%) reported the organization has no specific strategy because there is no problem with retention.

What has been your most successful worker retention strategy over the last 12 months? (One answer only)



Note: 30 employers provided a response for this question.

Selected comment from employers about worker retention strategies are below:

- "We didn't put any new strategies in place in the last 12 months. We focus on offering fair pay. We try to match what we think the market is paying. We also work to ensure our benefits stay competitive." - Manufacturing employer
- "We also have flexible work measures, cash bonuses, and work/life balance." - Manufacturing employer
- "Honestly it's not really a concern of ours. We have a good workforce and they like to work here. There is not a specific strategy because we don't need to address it." - Manufacturing employer
- "We also offer interesting/challenging work and learning/growth opportunities." - Mining, quarrying, and oil and gas extraction employer
- "The most successful are our salaries and our retirement plans." - Manufacturing employer

Workplace Resources

Employers were asked about their involvement with various workplace resources. Workplace resources are government funding programs that employers and their workers can access.

Applying For Workplace Resources

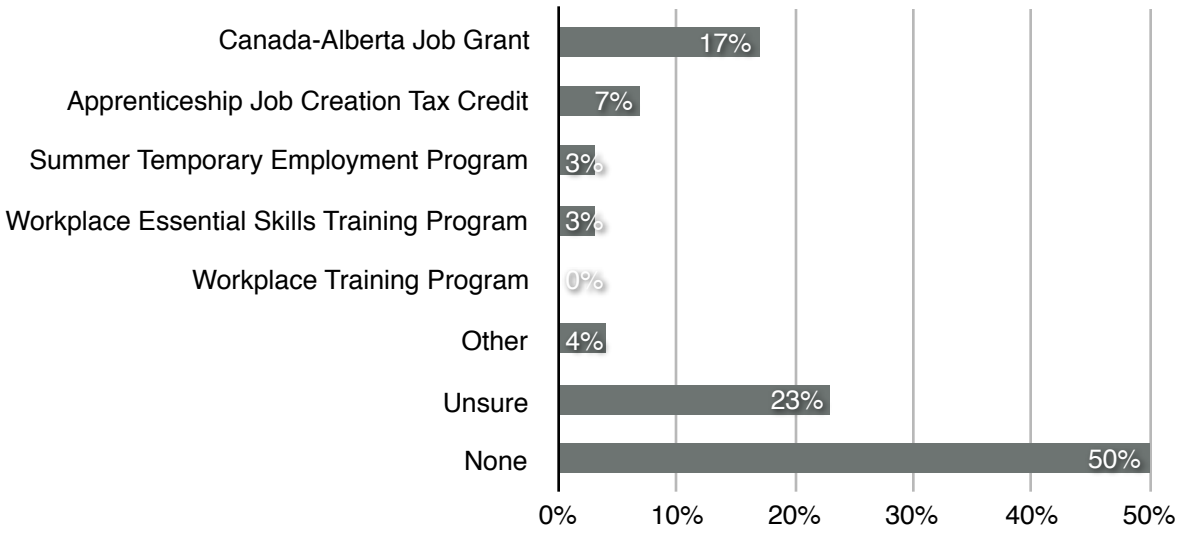
Eight employers (27%) reported their organization has applied for or has plans to apply for workplace resources.

Fifteen employers (50%) have never applied for and do not have any plans to apply for any workplace resources. Seven employers (23%) were unsure.

Five employers (17%) identified applying for or having plans to apply for the Canada-Alberta Job Grant, 2 (7%) identified Apprenticeship Job Creation Tax Credit, and 1 (3%) each identified the Summer Temporary Employment Program and Workplace Essential Skills Training Program. No employers reported accessing the Workplace Training Program.

One employer (4%) identified an Other workplace resource, which is Veterans Programs.

Has your company ever applied for or does your company have plans to apply for any of the following workplace resources? (Check all that apply)



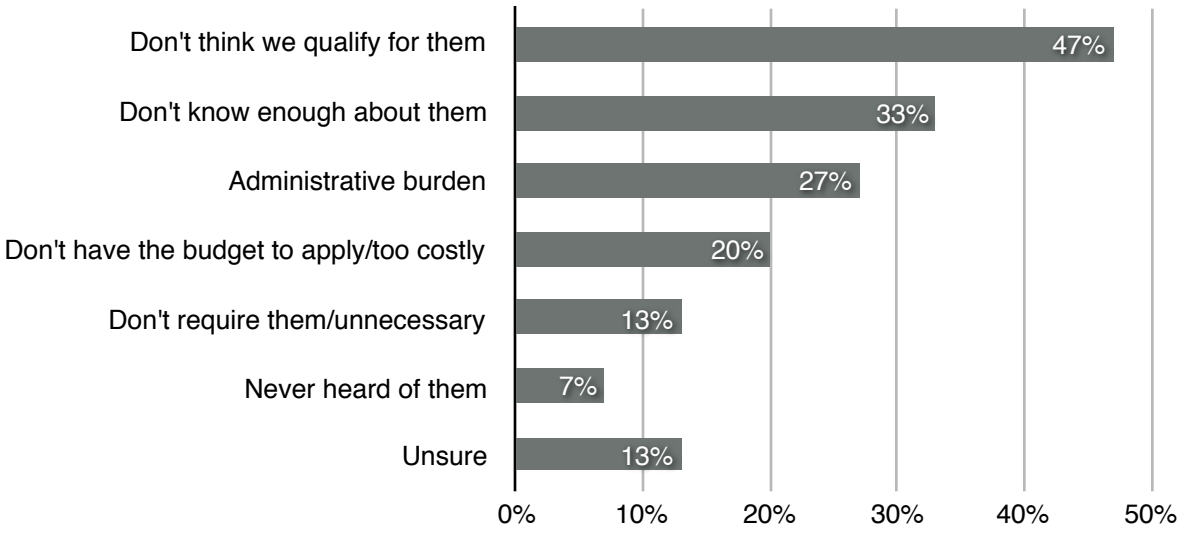
Note: 30 employers provided a response for this question.

Reasons For Not Applying For Workplace Resources

The 15 employers who reported they have never applied for and do not have plans to apply for any workplace resources were asked to provide reasons.

Of those 15 employers, 7 (47%) said they Don't think we qualify for them. Five (33%) said workplaces resources are an Administrative burden and 4 (27%) said they Don't know enough about them. Three (27%) said they Don't have the budget to apply/too costly and 2 (20%) said they Don't require them/unnecessary. One employer (7%) said they Never heard of them. Two (13%) were unsure what the reason their organization's reason was.

What are the reasons your company has never applied for or does not have plans to apply for any workplace resources?(Check all that apply)



Note: 15 employers provided a response for this question.

Technological Change

Employers were asked about their plans to implement or adopt any technological changes in the next two years that will affect their operations workforce.[40]

In order to be included in the survey, the technological change must affect the operations workforce in one or more of the following ways:

- Increase or decrease the number of workers
- Change the nature of work so as to require skill upgrading
- Change the nature of work so as to completely change the job description

Implementing or Adopting Technological Change

Nine employers (30%) reported their organization is planning on implementing or adopting technological changes in the next two years that will affect their operations workforce in the Study Area, while 13 (43%) reported their organization is not. Eight employers (27%) were unsure.

In addition, two employers indicated that their organization is planning on implementing or adopting technological changes in the next two years that will affect their operations workforce outside of the Study Area. Comments from those employers are below:

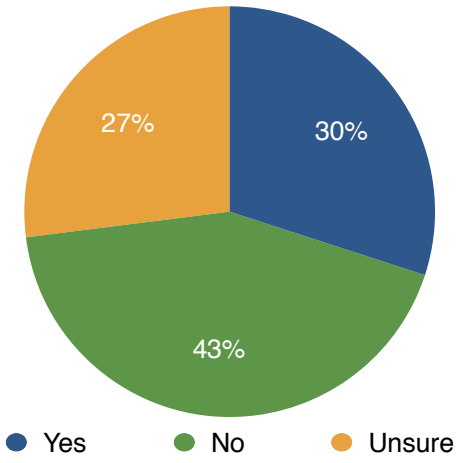
- "We are going through some technological changes for July 1. I don't think they're going to affect the workforce in that region though. We are changing our in house system for employees. This is what they use to access their own information and what management uses day to day to track their

[40] Operations workforce does not include those workers involved in turnaround maintenance or new construction projects.

people. In HR & Payroll we are leaving the SAP and moving to a Word based system. This will be an easier, more modern tool for them." - Manufacturing employer

- "There will be a New Control Center set up in Hardisty." - Mining, quarrying, and oil and gas extraction employer

Is your company planning on implementing or adopting any technological changes in the next two years that will affect your operations workforce?



Note: 30 employers provided a response for this question.

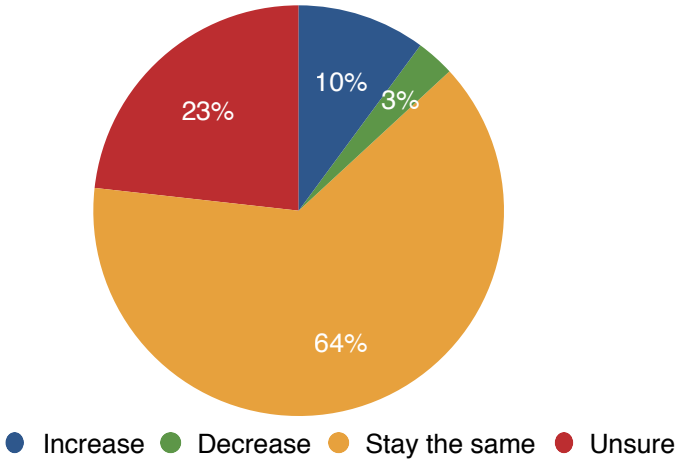
Operations Workforce Employment Changes

Three employers (10%) reported their organization is planning on implementing or adopting technological changes in the next two years that will Increase their operations workforce.

Only 1 employer (3%) reported their organization is planning on implementing or adopting technological changes in the next two years that will Decrease their operations workforce.

Nineteen (63%) said their operations workforce will Stay the same with respect to the impacts of technological change and 7 (23%) were Unsure.

Do you anticipate the implementation or adoption of any technological changes to increase or decrease your operations workforce?



Note: 30 employers provided a response for this question.

Operations Workforce Employment Changes By Occupation

The 4 employers who reported an operations workforce employment change were asked to describe the technological change, the occupations that will experience a change, and how many workers will be affected.

Three employers (10%) said their operations workforce will Increase by approximately 71 workers due to technological change:

- Transportation and warehousing employer reported a new railway will require an increase of 40 Chemical Plant Machine Operators (NOC 9421) and 30 Railway Yard Workers (NOC 7531);
- Manufacturing employer reported a new sub process will result in a new product grade that will require an increase of 1 Chemical technologists and technicians (NOC 2211) worker; and
- Manufacturing employer did not provide details about the operations workforce increase.

One employer (3%) said their operations workforce will Decrease due to technological change:

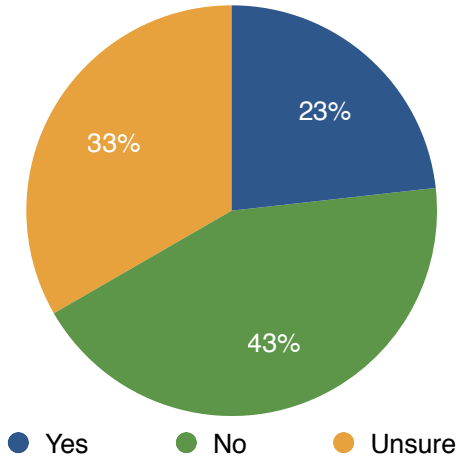
- Manufacturing employer did not provide details about the operations workforce decrease, beyond commenting "Ideally, technology will enable us to reduce the cost burden associated with staffing."

Operations Skill Upgrading

Seven employers (23%) reported their organization is planning on implementing or adopting technological changes in the next two years that will change the nature of work so as to require skill upgrading.

Thirteen (43%) reported their organization is not planning on implementing or adopting technological changes in the next two years that will change the nature of work so as to require skill upgrading. Ten employers (33%) were unsure.

Do you anticipate the implementation or adoption of any technological changes to change the nature of work so as to require skill upgrading?



Note: 30 employers provided a response for this question.

Selected comments from employers about skill upgrading changes are below:

- "The use of a new cloud based data management and document control technology will require all site staff to use and access electronic tools such as electronic log book, online drawings, etc." - Manufacturing employer
- "They will have to learn how to use the new supply chain technology but this will happen very quickly and training is all done in house." - Mining, quarrying, and oil and gas extraction employer

Operations Skill Upgrading By Occupation

The 7 employers who reported an operations skill upgrading change were asked to describe the technological change, the occupations that will have to upgrade their skills, and how many workers will be affected.

According to the employers who participated in the survey, a total of 74 workers will have to upgrade their skills to successfully implement or adopt technological changes.[41]

The complete list of occupations that will have to upgrade their skills is shown below. According to the employers who participated in the survey, the top three occupations requiring skills upgrading as a result of technological change are Petroleum, gas and chemical process operators (NOC 9232), Industrial instrument technicians and mechanics (NOC 2243), and Power systems and power station operators (NOC 9241).

[41] One employer did not specify which occupations will have to upgrade their skills or how many workers will be affected.

Please describe the technological changes, the occupations that will have to upgrade their skills, and how many workers will be affected.

NOC Code	Occupation Title	# of workers requiring skill upgrading
9232	Petroleum, gas and chemical process operators	26
2243	Industrial instrument technicians and mechanics	25
9241	Power systems and power station operators	16
9243	Water and waste plant operators	12
2211	Chemical technologists and technicians	6
1241	Secretaries	3
7242	Industrial electricians	3
2132	Mechanical engineers	1
7252	Steamfitters, pipefitters and sprinkler system installers	1
9212	Supervisors, petroleum, gas and chemical processing and utilities	1
9461	Process control and machine operators, food and beverage processing	1

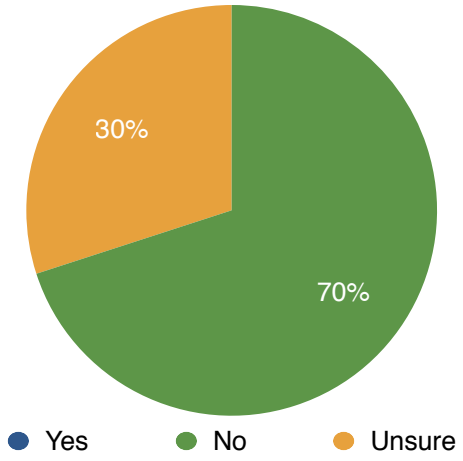
Note: 6 employers provided a response for this question.

Operations Job Description Changes

Twenty-one employers (70%) reported their organization is not planning on implementing or adopting technological changes in the next two years that will change the nature of work so as to completely change the job description. Nine employers (30%) were Unsure.

No employers reported their organization is planning on implementing or adopting technological changes in the next two years that will change the nature of work so as to completely change the job description.

Do you anticipate the implementation or adoption of any technological changes to change the nature of work so as to completely change the job description?



Note: 30 employers provided a response for this question.

Selected comments from employers about job description changes are below:

- Manufacturing employer said No because "Technology deployment, in most cases, will either make existing work more efficient or reduce headcount. Technological changes have to result in either cost savings (usually through reduced employee cost - whether efficiency or replacement) or reduced HSSE expose (and ideally both)."
- Mining, quarrying, and oil and gas extraction employer said Unsure because "Job descriptions are under review to reconfirm accountabilities and some roles have taken on new accountabilities."

Diversity Recruitment

Employers were asked about their organization's diversity recruitment.

Diversity Recruitment Plans

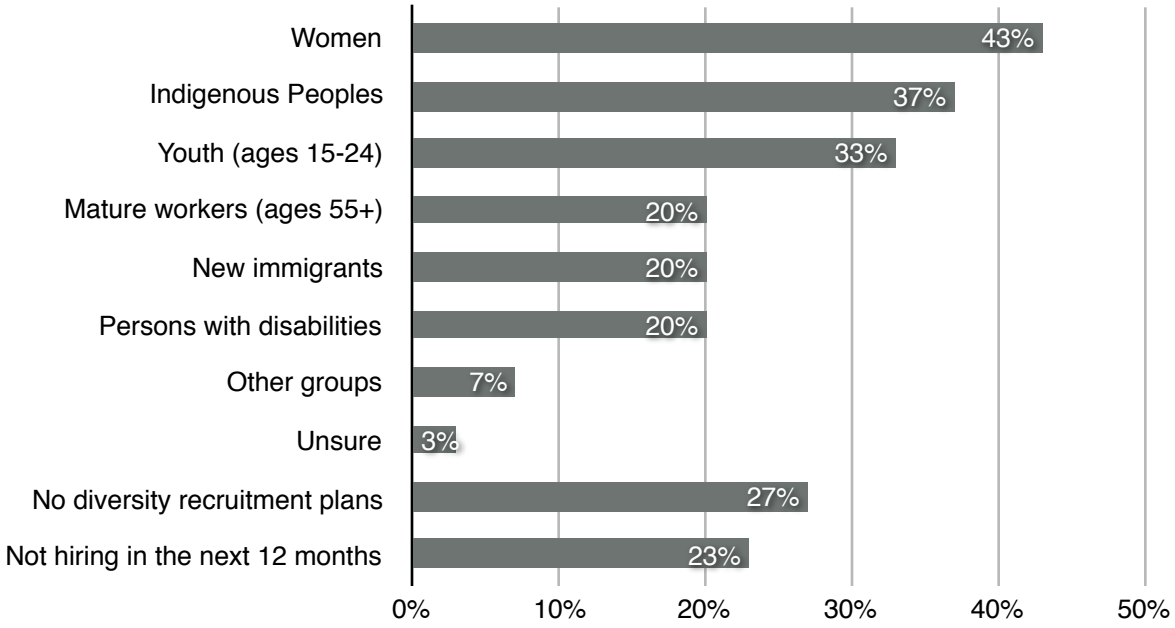
Fifteen employers (50%) reported plans to recruit workers from at least one of the identified groups.

Seven employers (23%) said their organization is Not hiring in the next 12 months. Eight employers (27%) said they have No diversity recruitment plans and 1 (3%) was Unsure. The employer who was unsure said "A Diversity and Inclusion Committee is being established which will impact recruitment efforts."

Thirteen (43%) of the employers identified their organization has plans to recruit Women. This was followed by 11 employers (37%) with plans to recruit Indigenous Peoples, 10 (33%) with plans to recruit Youth, and 6 (20%) each who have plans to recruit Mature workers. New immigrants, and Persons with disabilities.

Two employers (7%) identified Other groups. One employer mentioned Veterans and another mentioned Visible minorities.

Does your organization have plans (formal or informal) to recruit workers from the following groups in the next 12 months? (Check all that apply)



Note: 30 employers provided a response for this question.

Diversity Recruitment Benefits

Employers who have formal or informal plans to recruit workers from diversity groups were asked to provide one important example of how employing someone from these groups has provided a tangible benefit to their organization.

Selected comments are below:

- "We recruit youth through our co-op programs. Otherwise, we are an equal opportunity employer but we don't take any additional measures to recruit from those groups." - Manufacturing employer
- "Recruiting students and Engineers In Training (EITs) increases awareness and safety on the job. Employees are in constant training mode and the complacency decreases." - Manufacturing employer
- "It brings diverse ideas to the organization." - Manufacturing employer
- "The two groups we have worked hard to recruit for are women in the trades, and hiring indigenous contractors. This is because there are benefits to hiring them." - Manufacturing employer
- "Youth bring an innovative mindset and a higher technological capacity which bleeds over to all ages." - Mining, quarrying, and oil and gas extraction employer
- "Diversity in terms of different ways of thinking and diversity in terms of breaking down stigmas has been very important.." - Manufacturing employer

- "We recruit youth, mature workers, persons with disabilities, women, Indigenous Peoples, and new immigrants. Their past work experience and working knowledge has brought in new perspective." - Mining, quarrying, and oil and gas extraction employer
- "We improve our reputation in the local community and on campus with recruitment of students, females and Indigenous Peoples. This increases diversity in the workplace." - Manufacturing employer

Appendix B: Employment Forecast

This section provides an overview of the methodology for the forecast of employment that was developed using Application Management Consulting Ltd.'s Labour Market Demand and Supply Model.

Labour Market Demand and Supply Model

The model consists of an Occupational Demand module, an Occupational Supply module (which consists of a Population Forecast and Labour Supply module) and a Job Matching module. As in most occupational forecasting estimations, the model focuses on exploring the functioning and dynamics of labour markets under various economic scenarios.

Employers estimate the number of workers required for each occupation by considering the structure, cost, and productivity of their workforce, as well as current and anticipated levels of production. This decision-making process on the part of the employer is defined as "occupational demand for labour". In the model, occupational demand includes the number of workers currently employed, as well as any additional vacancies that are created as a result of industry growth and attrition.

The number of individuals employed or actively seeking employment is the "occupational supply of labour". Occupational supply is determined by the size and growth rate of the population, the share of the population willing to participate in the labour force, and the skills and training of these workforce participants. Other socio-economic factors that shape the supply of labour include the age distribution of the population; the retirement, migration and education choices of the labour force; and the prevailing economic climate.

Occupational forecasting has become a key instrument in predicting labour market imbalances. At the base of this model is the Manpower Requirements Approach (MRA), which first gained widespread recognition in the 1960s when employed by the Organisation for Economic Co-operation and Development (OECD) for educational planning purposes. This approach requires the estimation of two typically independently forecasted components: occupational demand and occupational supply. The occupational demand and supply forecasts are compared and if supply does not match demand, labour market imbalances are forecasted. These types of models rely on a number of economic assumptions, among them the premise that different occupations are non-substitutable. The supply of workers associated with one occupation has no immediate effect on the supply in another occupation, even if the occupations require similar sets of skills. Hence, the elasticity of substitution is assumed to be zero.

In reality, workers from different occupations may be fully or partially substitutable, provided that they possess sufficiently similar skill sets. Hence, the elasticity of substitution for occupations could vary between zero and one depending on the similarity of skill requirements. Taking a more realistic approach to analyze the functioning of a labour market, the model aims to consider inter-occupational mobility by developing a job matching mechanism, which carefully considers the factors that influence worker and employer decisions.

The job matching module employed in the model is broadly based on the "search and matching theory" influenced by the Nobel Prize winning work of Peter Diamond, Dale Mortensen and Christopher Pissarides. These researchers analyzed markets with search frictions and have been credited with the development of modern search and matching theory of unemployment.

In the model, a job seeker searches for suitable employment considering factors important to the individual such as job suitability, remuneration, the relative tightness of the labour market, as well as the manner of job separation from previous employment (seeking a higher wage/benefits, layoff, fired, etc.).

Simultaneously, an employer searches through potential candidates possessing certain attributes and compares them across a variety of criteria that reflect the skills required for the vacancy. Employers may also consider the relative tightness of the labour market and factors such as the fit of the candidate to the work environment and the manner of the candidate's separation from prior employment. Hence, the job matching mechanism can be broadly described as a comparison of the attractiveness of the job opportunity (from the point of view of the job seeker) and the attractiveness of the worker (from the point of view of the employer) with consideration given to general labour market conditions.

"At each stage of the process a job seeker is paired with a position. The job seeker decides whether to apply for the position on the basis of its attractiveness. The employer then decides whether to call the applicant to interview on the basis of the application (his attractiveness). A job matching occurs after the interview only by mutual consent. These final decisions are based on both the attractiveness and character of the prospective partners. At equilibrium each individual uses a strategy appropriate to their type."[42]

Model Description

The model is comprised of three major modules. These include an estimation of labour demand, an estimation of labour supply (as related to population forecasts), and a job matching module that determines the suitability of matching across occupations.

Occupational Demand Module:

2016 Base Labour Demand (by NOC & NAICS): Base (2016) labour demand is estimated according to 4-digit National Occupational Classification (NOC) codes and 3-digit North American Industry Classification System (NAICS) codes. The model assumes that the labour market in the base year is in equilibrium. That is, the model does not estimate any labour demand shortages that may exist or have accumulated in the year(s) prior to the base.

Industry-Specific Output Growth Forecasts & Macroeconomic Reference Scenario: Additional labour demand resulting from expansionary economic activity is estimated according to exogenous provincial and industry-specific growth forecasts, as well as productivity considerations and the structure of each industry's labour force in the base year. This base set of industry and provincial growth forecasts is the "Macroeconomic Reference Scenario". Scenario- and occupation-specific rates of labour productivity growth are also applied.

Inter-Industry Trade Flows: Trade flows are incorporated into the model based on industry purchasing trends, using inter- and intra-provincial input-output tables drawn from Statistics Canada's System of National Accounts. These tables are used to determine the industry-specific economic impacts resulting from higher (or lower) than anticipated growth in any industry, or from higher (or lower) than anticipated growth in any other province.

Replacement Demand due to Attrition: Along with expansionary labour demand generated according to industry- and province-specific growth forecasts, annual replacement demand is estimated according to attrition. The types of attrition considered in the model include retirement, mortality, emigration, and other voluntary and involuntary job separations. Reasons for job separation

[42] David M. Ramsey and Stephen Kinsella, *A Labour Market Model With Multiple Criteria,* February 19, 2009.

considered in the model include career advancement, pay/benefits, layoffs, firings, and a general "other" category.

Projected Labour Demand: Total labour demand in each period is estimated by taking demand in the prior period, adding expansionary and replacement labour demand, and subtracting any layoffs induced by forecasted output contractions.

Total Job Vacancies: The sum of expansionary and replacement labour demand growth in each period, adjusted according to structural and productivity considerations, provides the net number of employment vacancies according to 4-digit NOC and 3-digit NAICS. These annual net vacancy estimates form the basis of forecasted labour demand to which labour supply is compared and assigned.

Labour Supply and Population Components:

The Population and Employment Projection Model uses an employment based methodology to project population. The model is driven by employment growth in key driver industries. In addition, commercial and non-commercial employment that is generated as a result of population growth is incorporated in the model.

Population projections are based on the net migration of workers and additional family members into the region required to meet the expected employment growth. The model also incorporates the aging of the permanent population, based on the Standard Component Method, which projects the individual components of the population rather than the population as a whole. By incorporating the Standard Component Method into the model, an estimate of age and gender can be provided for each forecast year, which are internally consistent with the total population and employment projections. Using employment to drive the net-migration component model helps to ensure the forecast is using consistent assumptions about provincial and economic growth.

2016 Base and Forecasted Population by Sub-Groups: Historical, base and forecasted population is estimated according to dimensions including geography, age, and gender.

2016 Base Labour Force: The model assumes that base (2016) labour supply in each province is comprised of the employed (base labour demand by 4-digit NOC and 3-digit NAICS) along with the existing pool of unemployed.

Migration-Based Labour Force Growth: Through the forecast period, the supply of labour is impacted by economic scenario-specific rates of international and inter-provincial migration, along with the participation rates and occupational skills/education traits assigned to these sub-populations. A population-forecasting module is applied to estimate the impact of scenario-specific changes in demographics on the labour force.

"Natural" Labour Force Growth (School Leavers & New Entrants): Similar to the above, the population-forecasting module is applied to estimate the demographic and associated labour force impact of new graduates and re-entrants into the pool of available job candidates.

Distribution of Skill/Education Profiles to the Existing Labour Force: Worker-specific skills and educational attainment are assigned to members of the labour force based on the "Essential Skills Profiles" developed by Employment and Social Development Canada. As the model applies equilibrium conditions in the base year, workers are assumed to be perfectly matched with their respective occupations and are assigned skill profiles accordingly. In cases where the most recent occupation of a worker is generally unknown (i.e. the existing pool of unemployed, new migrants, etc.), data is drawn from a variety of studies and sources to estimate the most likely skill and educational traits possessed.

Distribution of Skill/Education Profiles to New Entrants: Skill and educational traits are assigned to school leavers based on program enrolment rates in accordance with the Classification for Instructional Programs (CIP) system. Education traits are applied based on the major field of study as well as the level of education (less than high school, secondary, college, university, post-secondary aggregation). NOC-specific traits are applied for post-secondary enrolment in the case of trades occupations.

Total Unattached Workers in the Labour Force: The pool of unattached workers in each period is comprised of the unemployed, new international and interprovincial migrants, school leavers, and any worker estimated to have separated from their prior employment through the year.

Job Matching Module:

The purpose of this module is to address the concept of multi-occupational mobility in a realistic labour market setting. In some cases, occupational matching is a relatively straightforward exercise. Consider the example of recent graduates from a dental school, where realistic occupational mobility is generally limited to one specific occupation (NOC 3113 - Dentists). In this example, labour market imbalances may be forecasted based on a comparison of the projected number of additional dentists needed and the net projected number of dentists graduating or arriving in the province. Alternatively, consider the example of recent graduates from a business school, for whom there is no single (4-digit NOC) occupation that the supply of graduates would reasonably be expected to uniformly enter. There may be a multitude of employment options available to this sub-population, depending on forecasted economic conditions. The job matching module assigns a set of mobility probabilities for each origin occupation in accordance with worker type and overall forecasted economic conditions.

Occupational mobility is driven by the number of net vacancies (by 4-digit NOC and 3-digit NAICS) estimated in the labour demand component along with the pool of unattached workers for whom specific occupational skill profiles have been assigned in the labour supply and population components. The matching module estimates the suitability of a job candidate across all positions in the 4-digit NOC system.

The job candidate who has separated from prior employment seeks a position based on a number of criteria including skill type and level, educational attainment as well as the manner of their job separation (e.g. voluntary separation, firing, layoff, etc.) - a factor that influences the worker's wage expectations. In a similar fashion, employers seek to fill vacancies by selecting the most suitable candidate. Employers assess a candidate's skills and educational compatibility with the vacancy, as well as the applicant's reason for prior job separation.

Forecasted Aggregate Unemployment Rate: The overall state of the economy is also a consideration when employers and job seekers interact. A worker is deemed suitable to fill a vacant position if a certain threshold of job matching is achieved in the model. This threshold varies according to projected economic conditions, with tighter labour market conditions generally allowing workers a greater degree of choice in occupation and a reduced inclination to accept low-skill or low-wage employment, and vice versa. The tightness of the labour market is primarily reflected by the unemployment rate.

To allow for a greater degree of realism in labour market interactions, employers rank candidates based on the nature of their separation from prior employment. For example, if two candidates possess identical skill and education attributes but differing manners of job separation – the first was fired and the second left to pursue career advancement – the model assumes that the employer prefers to hire the latter candidate due to the stigma typically attached to fired workers. Similar is the logic applied to new entrants to the labour market applying for vacancies. Although new entrants may possess the required skills and education to fill a vacancy, an employer typically prefers to hire an

identical candidate with strong motivation (i.e. separated from previous job to pursue career advancement) or prior work experience. Provided that an employer's top-choice candidates are insufficient to fill all vacancies, employers continue to hire workers until the vacancies are filled or the supply of suitable candidates is depleted.

Workers form wage expectations for prospective occupations based on the wage they received in a previous occupation, the manner of their job separation and the relative tightness of the labour market (as indicated by the unemployment rate).

The matching mechanism uses Human Resources and Skills Development Canada (HRSDC) Essential Skills Profiles to gauge the suitability of cross-occupational mobility, which are available at the 4-digit NOC level.

"Essential Skills are not the technical skills required by particular occupations but rather the skills applied in all occupations. For example, writing skills are required in a broad range of occupations. The complexity and frequency of writing varies, of course. Some workers fill out simple forms every day, while others write daily or monthly reports. Essential Skills enable people to do their work. For example, repair persons may have to read and understand written work orders before they can do the repairs."[43]

According to HRSDC, there are nine primary, essential skills which vary in usage and complexity depending on the occupation. In addition, each occupation is assigned most important essential skills (MIES) and a corresponding minimum and maximum required education level ranging from "no formal education or training" to "post graduate or professional degree".

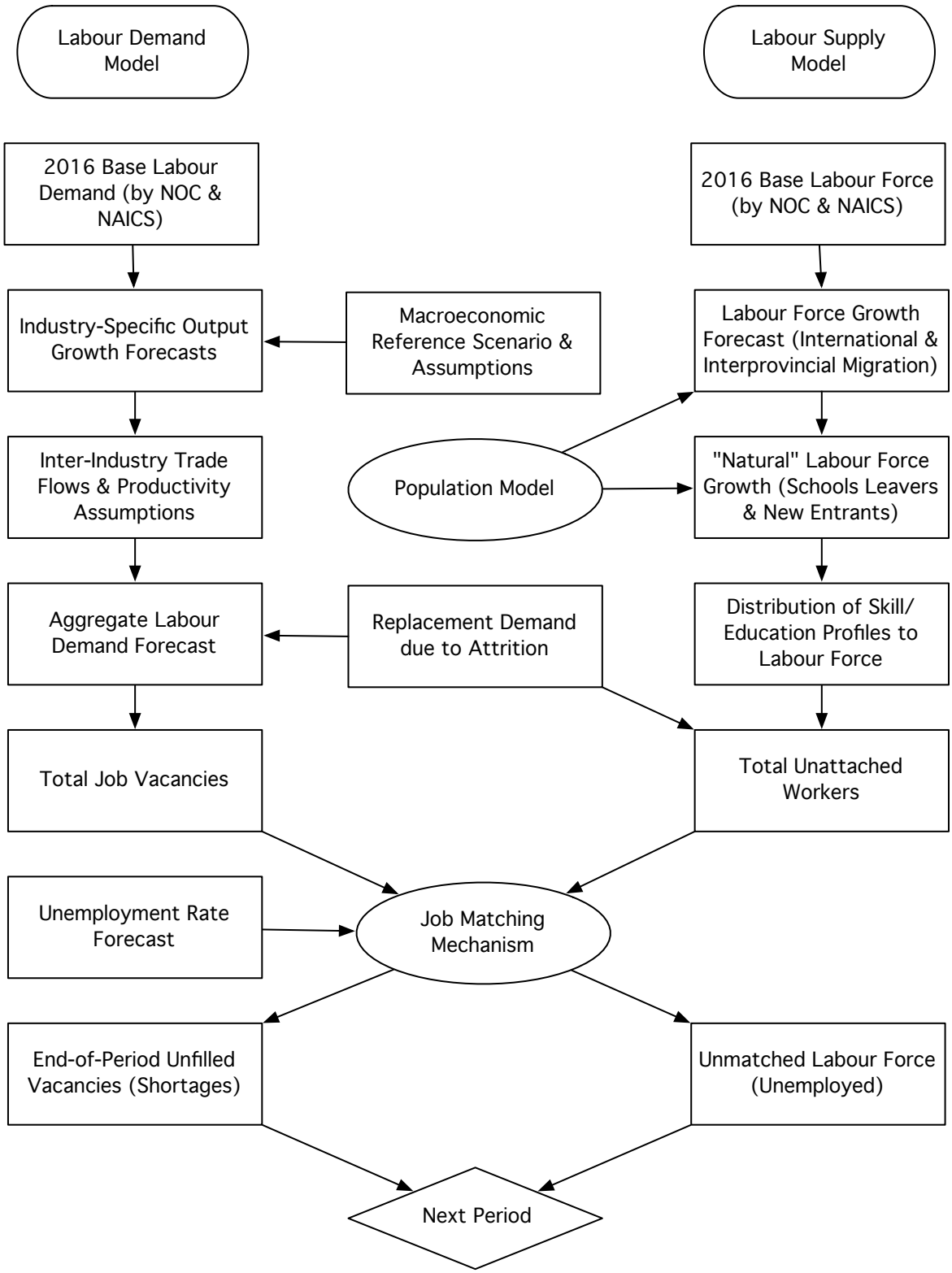
HRSDC Essential Skills:

Reading Text, Document Use, Writing, Numeracy, Oral Communication, Thinking Skills, Problem Solving, Decision Making, Critical Thinking, Job Task Planning and Organizing, Significant Use of Memory, Finding Information, Working with Others, Computer Use, and Continuous Learning.

End-of-Period Unfilled Positions (Shortages) & Type of Shortage: At the end of each period of the forecast, the magnitude and type of any estimated labour shortage is assessed. The first type of labour shortage is induced by skill limitations in the supply of labour. In this case, employers were unable to fill all vacancies due to a lack of suitably skilled workers in the available supply of labour. The second type of labour shortage is induced by a lack of matching efficiency in the labour market. In this case, the existing pool of unattached labour was sufficient in size and ability to fill all vacancies, but matching did not occur. Potential causes of this type of shortage may include an insufficiently high wage as to attract the worker, or the worker not perfectly realizing their candidacy for the position. Labour shortages carry over to the next period of the forecast, at which time employers again attempt to fill their vacancies.

Unmatched Labour Force (Unemployed) & Traits of the Unemployed: By analyzing the outputs of the matching mechanism at the end of each period, a detailed understanding of the types of workers in excess supply, along with the skill characteristics of those more likely to remain unemployed can be examined. These are the members of the labour force who were not successfully matched with a job vacancy, and they remain in the pool of unemployed until the next period, adjusting their employment expectations accordingly.

[43] Employment and Social Development Canada, Readers' Guide to Essential Skills Profiles, November 2007, http:// www.esdc.gc.ca/eng/jobs/les/profiles/readersguide.shtml


Labour Demand Model
Labour Supply Model
2016 Base Labour Demand (by NOC & NAICS)
2016 Base Labour Force (by NOC & NAICS)
Industry-Specific Output Growth Forecasts
Macroeconomic Reference Scenario & Assumptions
Labour Force Growth Forecast (International & Interprovincial Migration)
Inter-Industry Trade Flows & Productivity Assumptions
Population Model
"Natural" Labour Force Growth (Schools Leavers & New Entrants)
Aggregate Labour Demand Forecast
Replacement Demand due to Attrition
Distribution of Skill/ Education Profiles to Labour Force
Total Job Vacancies
Total Unattached Workers
Unemployment Rate Forecast
Job Matching Mechanism
End-of-Period Unfilled Vacancies (Shortages)
Unmatched Labour Force (Unemployed)
Next Period

Appendix C: Scaled Study Area Jobs By Occupation

Scaled Study Area Jobs by Occupation (4 Digit NOC)

NOC Code	Occupation Title	# of jobs
7311	Construction millwrights and industrial mechanics	1,193
9232	Petroleum, gas and chemical process operators	1,179
9241	Power engineers and power systems operators	775
7361	Railway and yard locomotive engineers	763
7362	Railway conductors and brakemen/women	630
2132	Mechanical engineers	481
2131	Civil engineers	401
2145	Petroleum engineers	329
731	Managers in transportation	308
911	Manufacturing managers	237
9212	Supervisors, petroleum, gas and chemical processing and utilities	212
2243	Industrial instrument technicians and mechanics	204
1523	Production logistics co-ordinators	194
2275	Railway traffic controllers and marine traffic regulators	194
2134	Chemical engineers	189
1525	Dispatchers	179
9619	Other labourers in processing, manufacturing and utilities	178
7314	Railway carmen/women	178
7531	Railway yard and track maintenance workers	145
2112	Chemists	142
714	Facility operation and maintenance managers	133
7252	Steamfitters, pipefitters and sprinkler system installers	133

NOC Code	Occupation Title	# of jobs
7205	Contractors and supervisors, other construction trades, installers, repairers and servicers	131
2211	Chemical technologists and technicians	126
7242	Industrial electricians	123
7511	Transport truck drivers	123
1411	General office support workers	110
7237	Welders and related machine operators	108
7452	Material handlers	106
2171	Information systems analysts and consultants	103
6221	Technical sales specialists - wholesale trade	98
112	Human resources managers	95
143	Financial, insurance and related administrative support workers	91
1221	Administrative officers	91
1111	Financial auditors and accountants	88
2263	Inspectors in public and environmental health and occupational health and safety	80
7622	Railway and motor transport labourers	78
9421	Chemical plant machine operators	77
1225	Purchasing agents and officers	77
7302	Contractors and supervisors, heavy equipment operator crews	73
7304	Supervisors, railway transport operations	73
2148	Other professional engineers, n.e.c.	71
1521	Shippers and receivers	60
7312	Heavy-duty equipment mechanics	57
1241	Administrative assistants	55
213	Computer and information systems managers	54

NOC Code	Occupation Title	# of jobs
601	Corporate sales managers	51
1431	Accounting and related clerks	46
9231	Central control and process operators, mineral and metal processing	46
9243	Water and waste treatment plant operators	45
2133	Electrical and electronics engineers	44
2232	Mechanical engineering technologists and technicians	44
9613	Labourers in chemical products processing and utilities	42
211	Engineering managers	41
4161	Natural and applied science policy researchers, consultants and program officers	38
9611	9611 Labourers in mineral and metal processing	37
16	Senior managers - construction, transportation, production and utilities	35
2282	User support technicians	35
114	Other administrative services managers	35
2111	Physicists and astronomers	35
7301	Contractors and supervisors, mechanic trades	35
7241	Electricians (except industrial and power system)	35
6421	Retail salespersons	34
1121	Human resources professionals	32
912	Utilities managers	31
2281	Computer network technicians	31
7371	Crane operators	30
2233	Industrial engineering and manufacturing technologists and technicians	30
7236	Ironworkers	28
9211	Supervisors, mineral and metal processing	27

NOC Code	Occupation Title	# of jobs
6552	Other customer and information services representatives	27
2241	Electrical and electronics engineering technologists and technicians	26
811	Managers in natural resources production and fishing	26
7442	Waterworks and gas maintenance workers	26
1526	Transportation route and crew schedulers	24
621	Retail and wholesale trade managers	23
1432	Payroll clerks	22
9416	Metalworking and forging machine operators	21
1122	Professional occupations in business management consulting	21
9536	Industrial painters, coaters and metal finishing process operators	20
9415	Inspectors and testers, mineral and metal processing	19
9412	Foundry workers	19
1422	Data entry clerks	18
2231	Civil engineering technologists and technicians	16
2212	Geological and mineral technologists and technicians	16
1452	Correspondence, publication and regulatory clerks	15
7521	Heavy equipment operators (except crane)	14
2261	Non-destructive testers and inspection technicians	14
1215	Supervisors, supply chain, tracking and scheduling co-ordination occupations	13
2142	Metallurgical and materials engineers	11
7201	Contractors and supervisors, machining, metal forming, shaping and erecting trades and related occupations	11
7235	Structural metal and platework fabricators and fitters	11
7243	Power system electricians	10

NOC Code	Occupation Title	# of jobs
9422	Plastics processing machine operators	9
7202	Contractors and supervisors, electrical trades and telecommunications occupations	9
9411	Machine operators, mineral and metal processing	9
7234	Boilermakers	8
7244	Electrical power line and cable workers	7
9537	Other products assemblers, finishers and inspectors	6
1454	Survey interviewers and statistical clerks	6
9535	Plastic products assemblers, finishers and inspectors	5
9615	Labourers in rubber and plastic products manufacturing	5
9423	Rubber processing machine operators and related workers	4
9214	Supervisors, plastic and rubber products manufacturing	4
7253	Gas fitters	4
6411	Sales and account representatives - wholesale trade (non-technical)	3
1414	Receptionists	3
1123	Professional occupations in advertising, marketing and public relations	2
7441	Residential and commercial installers and servicers	2
2264	Construction inspectors	2
7514	Delivery and courier service drivers	2
7611	Construction trades helpers and labourers	2
2253	Drafting technologists and technicians	2
6733	Janitors, caretakers and building superintendents	2
111	Financial managers	2
6622	Store shelf stockers, clerks and order fillers	2
7445	Other repairers and servicers	2

NOC Code	Occupation Title	# of jobs
1524	Purchasing and inventory control workers	2
1522	Storekeepers and partspersons	1
2147	Computer engineers (except software engineers and designers)	1
7612	Other trades helpers and labourers	1
7292	Glaziers	1
711	Construction managers	1
1222	Executive assistants	1
4021	College and other vocational instructors	1
113	Purchasing managers	1
6731	Light duty cleaners	1
1112	Financial and investment analysts	1
1314	Assessors, valuators and appraisers	1
7522	Public works maintenance equipment operators and related workers	1
7321	Automotive service technicians, truck and bus mechanics and mechanical repairers	1
124	Advertising, marketing and public relations managers	1
1213	Supervisors, library, correspondence and related information workers	1
4164	Social policy researchers, consultants and program officers	1
7333	Electrical mechanics	1
7231	Machinists and machining and tooling inspectors	1
9533	Other wood products assemblers and inspectors	1
7305	Supervisors, motor transport and other ground transit operators	1
125	Other business services managers	1
1223	Human resources and recruitment officers	1

NOC Code	Occupation Title	# of jobs
5121	Authors and writers	1

Note: Data is based on scaled survey results. Some job totals are rounded.

Appendix D: Jobs By Education Resources

Education Requirements of Top 10 Occupations

NOC Code	Occupation Title	# of jobs	Description	Required Skills	Requires Post-Secondary Certificate /Degree	Schools
7311	Construction millwrights and industrial mechanics	1,193	Construction millwrights and industrial mechanics install, maintain, troubleshoot, overhaul and repair stationary industrial machinery and mechanical equipment.	Possess a mechanical aptitude, enjoy working with machinery and possess strong trouble shooting skills; follow procedures closely when adjusting machinery or installing new equipment; have good eye-hand coordination, strength and agility; be able to work well both independently and as part of a team; have strong communication skills. Completion of Grade 10 or equivalent (including English 10, Mathematics 10, Science 10) is the minimum education requirement; however, completion of secondary school is preferred. Other beneficial qualifications include: completion of a three- to four-year apprenticeship program (or a combination of more than three years work experience in the trade and some college or industry courses) for certification by the Industry Training Authority.	Yes	1. NAIT

NOC Code	Occupation Title	# of jobs	Description	Required Skills	Requires Post-Secondary Certificate /Degree	Schools
9232	Petroleum, gas and chemical process operators	1,179	Petroleum, gas and chemical process operators monitor and operate petroleum, petrochemical and chemical plants and monitor, adjust and maintain processing units and equipment in these plants.	Should be comfortable working with computers; ave an interest in working with complex machines and systems, be mechanically inclined and have good problem-solving skills; pay attention to safety and have the ability to approach tasks with precision; have mathematical abilities, be decisive and be able to communicate effectively with others; be comfortable working in all types of weather conditions and in remote areas for long periods of time. Completion of secondary school is generally required, although some employers do hire people without high school diplomas if they have appropriate college-level training or experience.	No	N/A

NOC Code	Occupation Title	# of jobs	Description	Required Skills	Requires Post-Secondary Certificate /Degree	Schools
9241	Power engineers and power systems operators	775	Power engineers operate and maintain reactors, turbines, boilers, generators, stationary engines and auxiliary equipment to generate electrical power and to provide heat, light, refrigeration and other utility services for commercial, industrial and institutional buildings and other work sites.	General learning ability; numerical ability; methodical; manual dexterity; verbal and written comprehension; directive. Completion of secondary school is usually required. Power engineers require a college training program in stationary or power engineering and several years of work experience in the field. Power engineers require a provincial power engineering or stationary engineering certificate according to class. Power systems operators require completion of a three- to five-year power system operator apprenticeship program or over three years of work experience in the trade and some college or industry courses in electrical and electronic technology.	Yes	1. NAIT

NOC Code	Occupation Title	# of jobs	Description	Required Skills	Requires Post-Secondary Certificate /Degree	Schools
7361	Railway and yard locomotive engineers	763	Railway locomotive engineers operate railway locomotives to transport passengers and freight. Yard locomotive engineers operate locomotives within yards of railway, industrial or other establishments.	Manual dexterity; detail-oriented; spatial perception; object-oriented. Completion of secondary school is usually required. Experience as a conductor is required for railway locomotive engineers and may be required for yard locomotive engineers. Experience as a railway yard worker may be required for yard locomotive engineers.	No	N/A
7362	Railway conductors and brakemen/ women	630	Railway conductors coordinate and supervise the activities of passenger and freight train crew members. Brakemen/ women check train brakes and other systems and equipment prior to train run and help railway conductors with activities en route.	Manual dexterity; detail-oriented; verbal and written comprehension; spatial perception; object-oriented; social. Completion of secondary school is usually required. Experience as a brakeman/woman is required for conductors. Experience as a railway worker is usually required for brakemen/ women.	No	N/A

NOC Code	Occupation Title	# of jobs	Description	Required Skills	Requires Post-Secondary Certificate /Degree	Schools
2132	Mechanical engineers	481	Mechanical engineers research, design, and evaluate machines, devices, equipment, systems, and processes, an d plan and oversee their development, installation, operation and maintenance.	Ability to do math and think in abstract terms; ability to see objects in 3 dimensions when looking at drawings in two dimensions; a practical approach to tasks; comfort with mechanical things; an interest in technical processes; persistence and determination; strong speaking and writing skills; good people skills; the ability to work as part of a team; a commitment to ethics and professionalism. The minimum education requirement for mechanical engineers is a bachelor's degree in mechanical engineering.	Yes	1. U of A
2131	Civil engineers	401	Civil engineers plan, design, and supervise the construction, maintenance, and decommissio ning of a wide variety of public and private structures and facilities.	Speaking, listening, and writing skills; ability to analyze data, review calculations, and prepare cost estimates; ability to see objects in 3 dimensions from drawings; ability to think logically and solve problems; capacity for details. The basic educational requirement for working as a civil engineer is a 4-year bachelor's degree in civil engineering.	Yes	1. NAIT 2. U of A

NOC Code	Occupation Title	# of jobs	Description	Required Skills	Requires Post-Secondary Certificate /Degree	Schools
2145	Petroleum engineers	329	Petroleum engineers are involved in the exploration and development of oil and gas. They apply the principles of geology, physics, chemistry and engineering sciences to the recovery of petroleum and natural gas from conventional reservoirs and oil sands.	An aptitude for mathematics and science (especially chemistry and physics); ability to think logically and solve problems; good communication skills including written and oral presentation skills; ability to work independently or with a team of scientists; high energy levels to deal with their demanding workloads and changing priorities. The minimum education requirement for petroleum engineers is a bachelor's degree in petroleum engineering or a related discipline (for example, a degree in mechanical engineering with a minor in petroleum engineering). After graduation, petroleum engineers must be prepared to continue their education on an ongoing basis to keep up with new developments.	Yes	1. U of A

NOC Code	Occupation Title	# of jobs	Description	Required Skills	Requires Post-Secondary Certificate /Degree	Schools
731	Managers in transportation	308	Plan, organize and direct the operations of the transportation and movement of goods, under the direction of a general manager or other senior manager.	Innovative; directive; social; verbal and written comprehension. A bachelor's degree in business administration or engineering is usually required. Certification as an operator of a particular mode of transportation, such as commercial pilot, vessel master or truck driver, is usually required.	Yes	1. NAIT 2. U of A 3. MacEwan 4. King's 5. NorQuest 6. Concordia
911	Manufacturing managers	237	Manufacturing managers direct and co-ordinate the operation of manufacturing, service delivery and production departments in industrial, commercial and government organizations.	Good oral and written communication skills; good analytical skills; ability to motivate, lead and manage employees; commitment to customer satisfaction. There is no standard educational requirement to become a manufacturing manager but a related degree or post-secondary diploma in business or engineering is recommended. Employers in particular industries may require specialized courses or related experience.	Yes	1. U of A 2. MacEwan 3. King 4. NorQuest 5. Concordia

Note: Data is based on scaled survey results. Some job totals are rounded.